

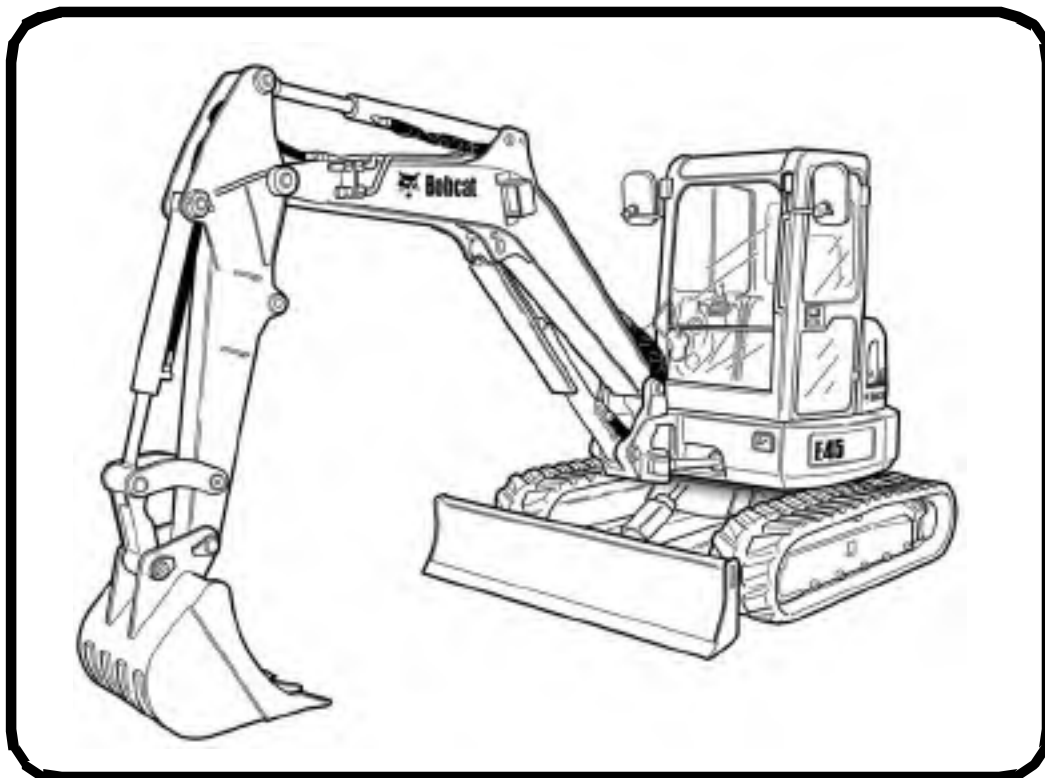


Bobcat®

EN

Operation & Maintenance Manual E45 Compact Excavator

S/N AHHC11001 & Above



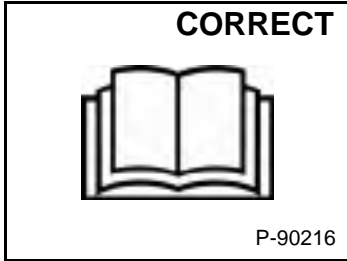
OPERATOR SAFETY WARNING

WARNING


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

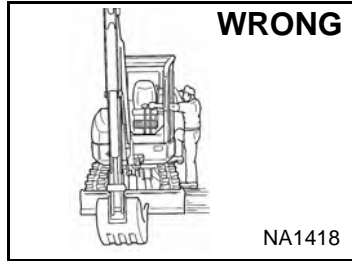
W-2001-0502


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





 Never operate without instructions.

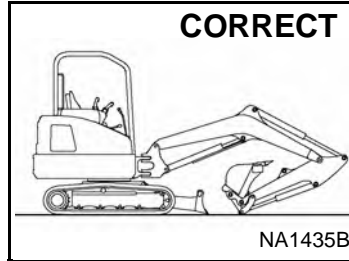
 Read machine signs, and Operation & Maintenance Manual, and Operator's Handbook.



 Do not grasp control handles when entering cab / canopy.


 Be sure controls are in neutral before starting.

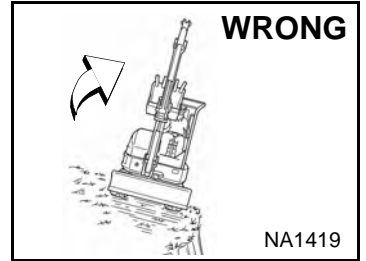
 Sound horn and check behind machine before starting.




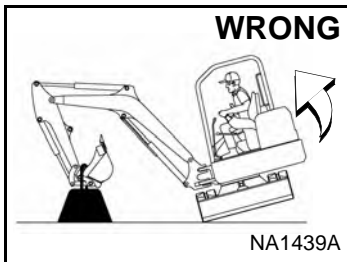
 Never operate without approved cab / canopy.


 Never modify equipment.


 Never use attachments not approved by Bobcat Company.

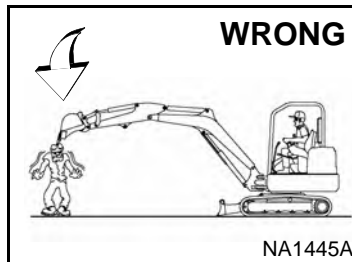


 Avoid steep areas or banks that could break away.



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

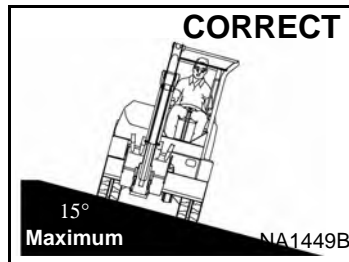
 Operate on flat, level ground.




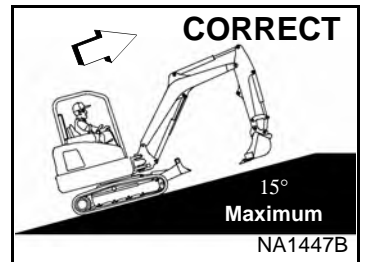
 Keep bystanders out of maximum reach area.

 Do not travel or turn with bucket extended.

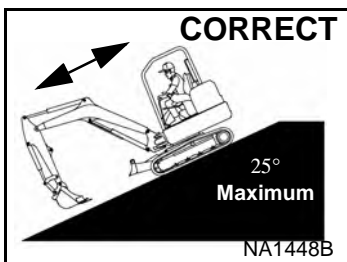
 Never carry riders.




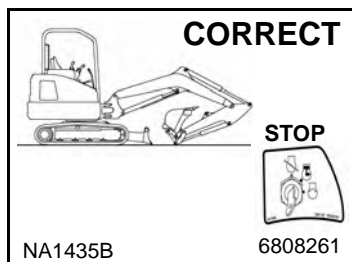
 Never exceed a 15° slope to the side.




 Never travel up a slope that exceeds 15°.

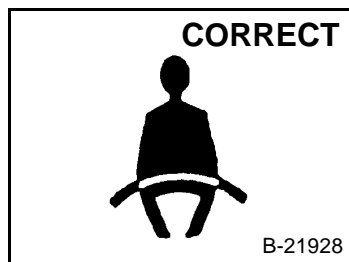


 Never exceed 25° when going down or backing up a slope.



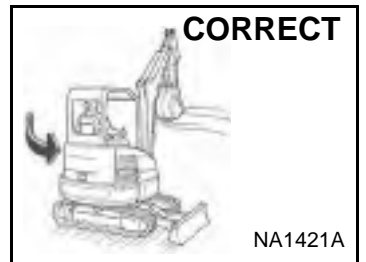
 To leave excavator, lower the work equipment and the blade to the ground.


 Stop the engine.



 Fasten seat belt securely.

 Operate controls only from operator's seat.



 Look in the direction of rotation and make sure no bystanders are in the work area.

SAFETY EQUIPMENT

The excavator must be equipped with safety items necessary for each job. Ask your dealer about attachments and accessories.

1. **SEAT BELT:** Check belt fasteners and check for damaged webbing or buckle.
2. **OPERATOR CAB / CANOPY (ROPS and TOPS):** Check condition and mounting hardware.
3. **OPERATOR'S HANDBOOK:** Must be in the cab / canopy.
4. **LEFT HAND CONSOLE:** When raised must deactivate the travel and hydraulic functions.
5. **SAFETY SIGNS (DECALS):** Replace if damaged.
6. **GRAB HANDLES:** Replace if damaged.
7. **INTEGRATED SLEW LOCK BRAKE.**
8. **SAFETY TREAD.:** Replace if damaged.

OSW66-0409



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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
P.O. Box 128
Gwinner, ND 58040-0128
UNITED STATES OF AMERICA

Doosan Benelux SA
Drève Richelle 167
B-1410 Waterloo
BELGIUM



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.

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DECLARATION OF CONFORMITY

For Model E45

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.

<p>Manufacturer</p>  <p>Bobcat Company World Headquarters 250 East Beaton Drive West Fargo, ND 58078-6000 UNITED STATES OF AMERICA</p>	<p>Directive 2000/14/EC: Noise Emission in the Environment by Equipment For Use Outdoors</p> <p>Notified Body Technical and Test Institute for Construction Prague Czech Republic Notified Body Number: 1020</p> <p>EC Certificate No. 1020-090-022395</p>
<p>Technical Documentation Doosan Benelux SA Drève Richelle 167 B-1410 Waterloo BELGIUM</p>	<p>Conformity Assessment Procedure(s) 2000/14/EC, Annex VIII, Full Quality Assurance</p> <p>Sound Power Levels [Lw(A)] Measured Sound Power 94dBA Guaranteed Sound Power 95dBA</p>
<p>Description of Equipment Type of Equipment: Excavator Model Name: E45***EM Model Code: AHHC</p> <p>Engine Manufacturer: Kubota Engine Model: V2403-M-DI-EU37 Engine Power: 30.7 kW @ 2200 RPM</p>	<p>Equipment conforms to CE Directive(s) Listed Below 2006/42/EC: Machinery Directive 2004/108/EC: Electromagnetic Compatibility Directive</p>
<p>Declaration of Conformance This equipment conforms to the requirements specified in all the EC Directives listed in this declaration.</p>	
<p>Effective From: 18 March 2010</p>	



BOBCAT COMPANY IS ISO 9001 CERTIFIED












ISO 9001 is an international standard that specifies requirements for a quality management system 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 at Bobcat’s manufacturing facilities in Gwinner and Bismarck, North Dakota (U.S.A.), Pontchateau (France), Dobris (Czech Republic) and the Bobcat corporate offices (Gwinner, Bismarck & West Fargo) in North Dakota. Only certified assessors, like BSI, can grant registrations.

ISO 9001 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

 <p>ENGINE OIL FILTER (6 Pack) 6675517</p>	 <p>BATTERY 6670251</p>
 <p>FUEL FILTER 6667352</p>	 <p>HYDRAULIC FILL / BREATHER CAP 6692836</p>
 <p>AIR FILTER, Outer 6666375</p>  <p>AIR FILTER, Inner 6666376</p>	 <p>RADIATOR CAP 6646678</p>
 <p>PRIMARY HYDRAULIC FILTER 6668819</p>  <p>CASE DRAIN HYDRAULIC FILTER 6516722</p>	

NOTE: Always verify Part Numbers with your Bobcat dealer.

LUBRICANTS AND FLUIDS

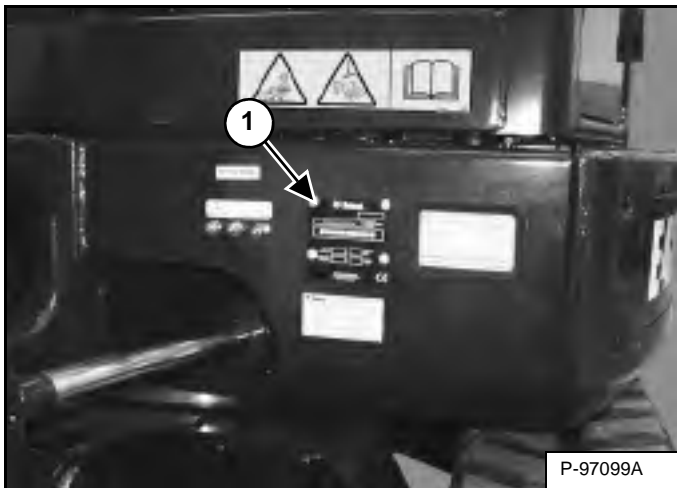
		All Bobcat Equipment				Only for TL-S, Wheeled EXC and AL							
Packaging	Lineart	ENGINE / LOADER TRANSMISSION		HYDRAULIC/ HYDROSTATIC		ANTIFREEZE COOLANT		AXLE / TRANSMISSION		BRAKE FLUID			
		Bobcat Engine Power SAE 0W/30	Bobcat Engine Power SAE 10W/30	Bobcat Engine Power SAE 15W/40	Bobcat Engine 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 Brake Fluid LHM	Bobcat Brake Fluid (Roto TLS only)
5 L Can		6987500A	6904840A	6904841A	6987501A	6904842A	6904843A	6987646A	6904844A	6987596A	6987597A	6904846A	6987667A
25 L Container		6987500B	6904840B	6904841B	6987501B	6904842B	6904843B	6987646B	6904844B	6987596B	6987597B		6987667B
209 L Drum		6987500C	6904840C	6904841C	6987501C	6904842C	6904843C	6987646C	6904844C	6987596C	6987597C		6987667C
1000 L Tank		6987500D	6904840D	6904841D	6987501D	6904842D	6904843D	6987646D	6904844D	6987596D	6987597D		6987667D
			6903122										
400 gr Grease		Bobcat Supreme HD Grease	6687884										
		Bobcat Extreme HP Grease	6687885										
4700300-EN (01-10)													

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.

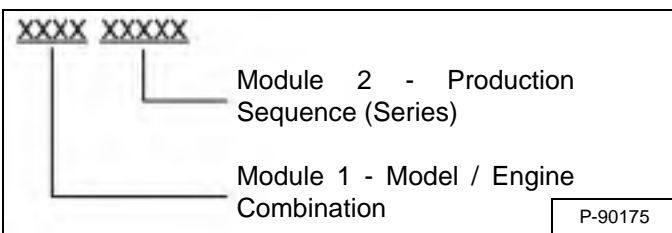
Excavator Serial Number

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

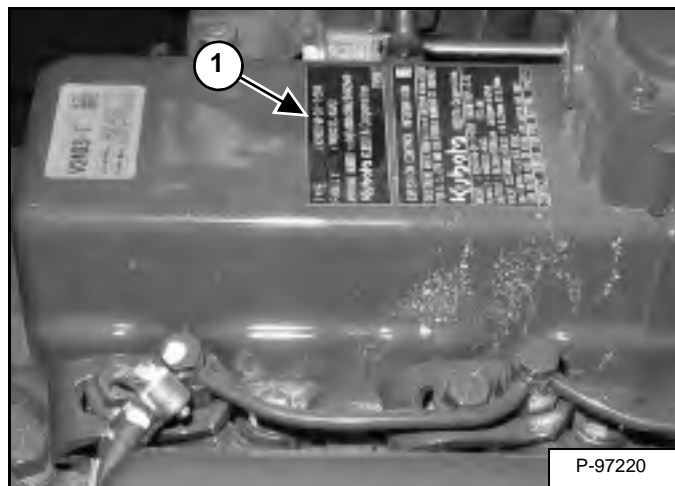


Explanation of excavator Serial Number [Figure 2]:

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



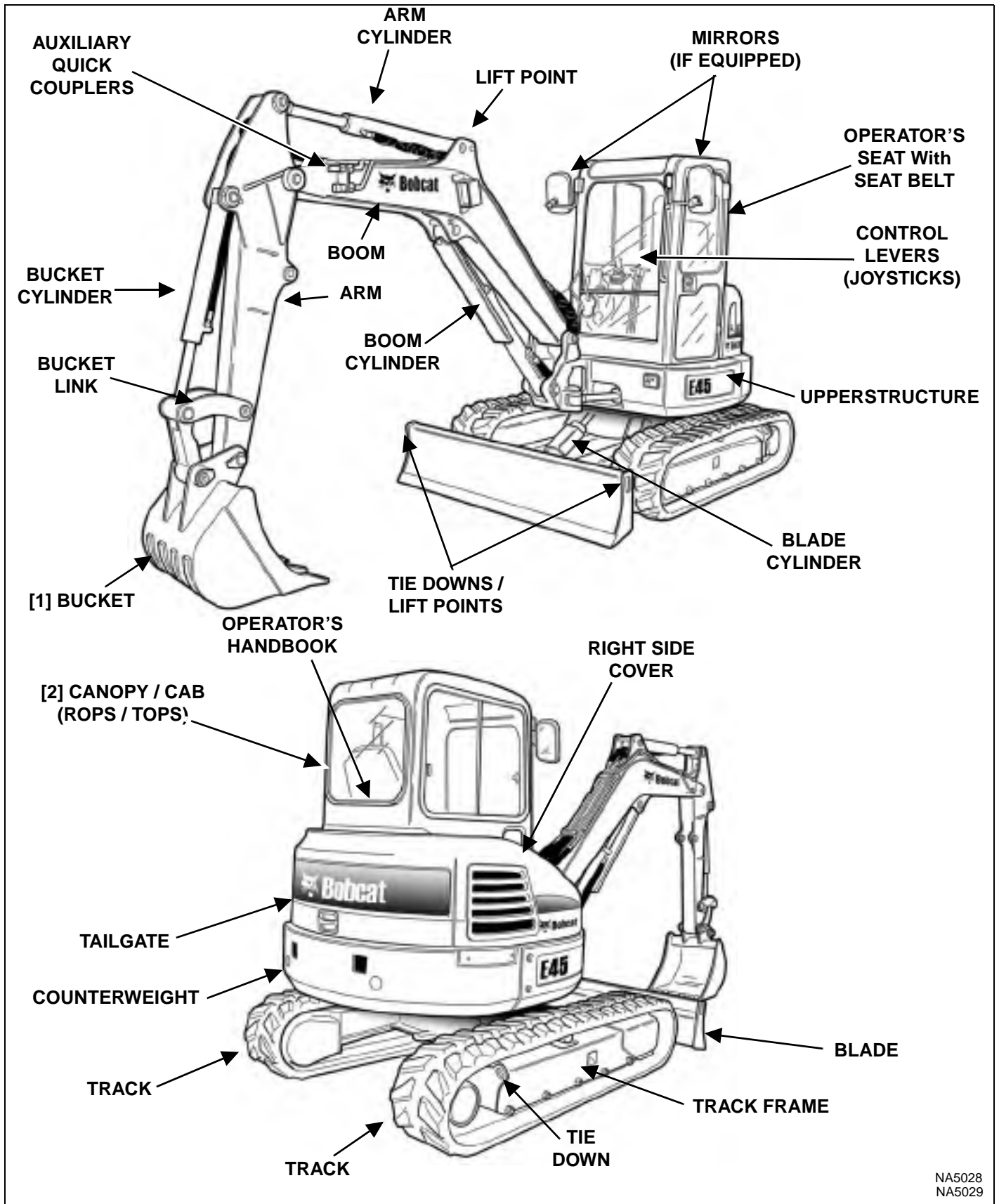
The engine serial number (Item 1) [Figure 3] is located on the top cover.

DELIVERY REPORT

Figure 4

The delivery report [Figure 4] must be completed 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.

EXCAVATOR IDENTIFICATION



NA5028
NA5029

- [1] BUCKET - Several different buckets and other attachments are available for 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 E45 Bobcat excavators are equipped with the following standard items:

- 1960 mm (77.2 in) Dozer Blade
- Enclosed Cab With Heater
- Cab Mounted Lights
- 400 mm (15.7 in) Rubber Tracks
- Two-Speed Travel
- Auto-Shift Drive System
- Auxiliary Hydraulics (With Selectable Auxiliary Hydraulic Flow)
- Hydraulic and Travel Control Lockouts
- Engine Speed Control Dial With Auto Idle Feature
- Blade Float
- Work Lights - Boom and Frame Mounted
- Engine and Hydraulic system Monitor with Shut Down
- Horn
- Hydraulic Joystick Controls
- Suspension Seat
- Retractable Seat Belt
- Spark Arrester Muffler
- Advanced Diagnostics
- Counterweight

Options And Accessories

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

- Enclosed Cab With Heater and A.C.
- Travel Motion Alarm
- Keyless Start
- Cab Mounted Lights
- Catalytic Exhaust Purifier
- Top Guard Kit (FOGS)
- Special Application Kit
- Steel Tracks - 400 mm (15.7 in)
- Long Arm
- Load Holding Valve - Arm
- Load Holding Valve - Boom
- Direct to Tank Auxiliary Hydraulics
- Mirror Kit (Left / Right)
- Second Auxiliary Hydraulics
- Counterweight (Additional)
- X-Change™
- Hydraulic X-Change
- Arm Mounted Auxiliary Hydraulic Couplers
- RFID Kit (Security Key Start System)

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
- Breaker
- Hydraulic Clamp
- 3-Tined Grapple
- Compactor
- Grading Blade
- Power Tilt
- Ripper
- Rotary Grinder
- Hydro tilt
- Packer wheel
- Trencher
- Lazer Receiver

Buckets Available

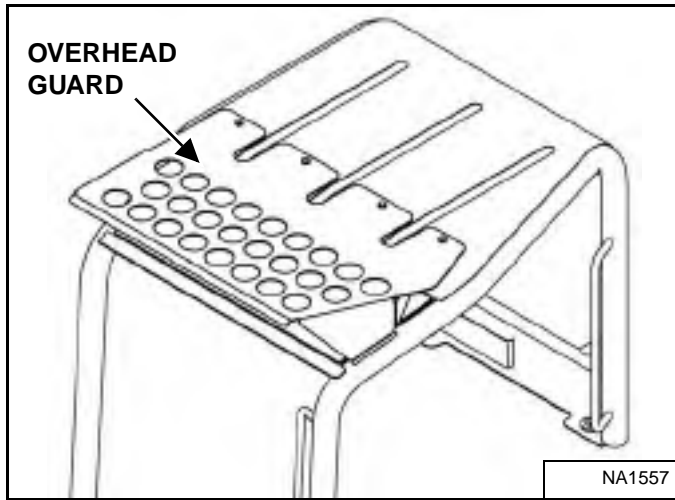
Increase the versatility of your Bobcat excavator with a variety of bucket sizes.

Many bucket styles, widths and different capacities are available for a variety of different applications. They include Trenching, Digging, Grading, Tilt, to name a few. See your Bobcat dealer for the correct bucket for your Bobcat excavator and application.

FEATURES, ACCESSORIES AND ATTACHMENTS (CONT'D)

Falling Object Guards (FOGS)

Figure 5



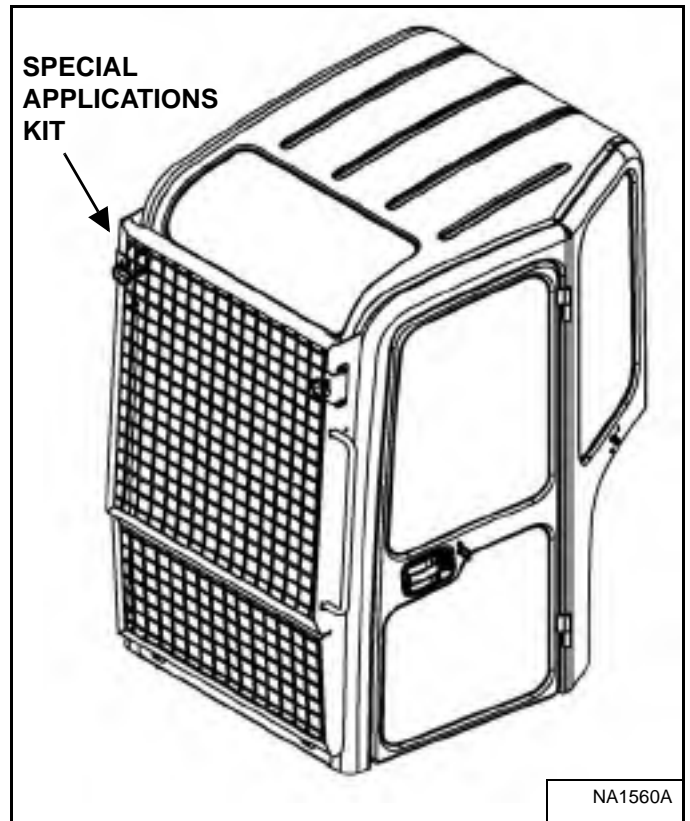
Available for special applications that require protection from smaller objects that can fall on the canopy / cab or restrict material from entering canopy / cab openings [Figure 5] and [Figure 6].

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 an upper and lower 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

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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.

SAFETY INSTRUCTIONS (CONT'D)

Safe Operation Is The Operator's Responsibility



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

W-2001-0502



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



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 coordination while working. An operator who is taking prescription drugs must get medical advice to determine if he or she can safely operate a machine.

A Qualified Operator Must Do The Following:

Understand the Written Instructions, Rules and Regulations

- The written instructions from Bobcat Company include the Delivery Report, Operation & Maintenance Manual, Operator's Handbook 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 DSN EMEA-1009

SAFETY INSTRUCTIONS (CONT'D)

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.

FIRE PREVENTION (CONT'D)

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 or air intake heater. 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.

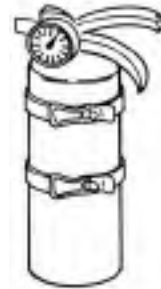
Welding And Grinding

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

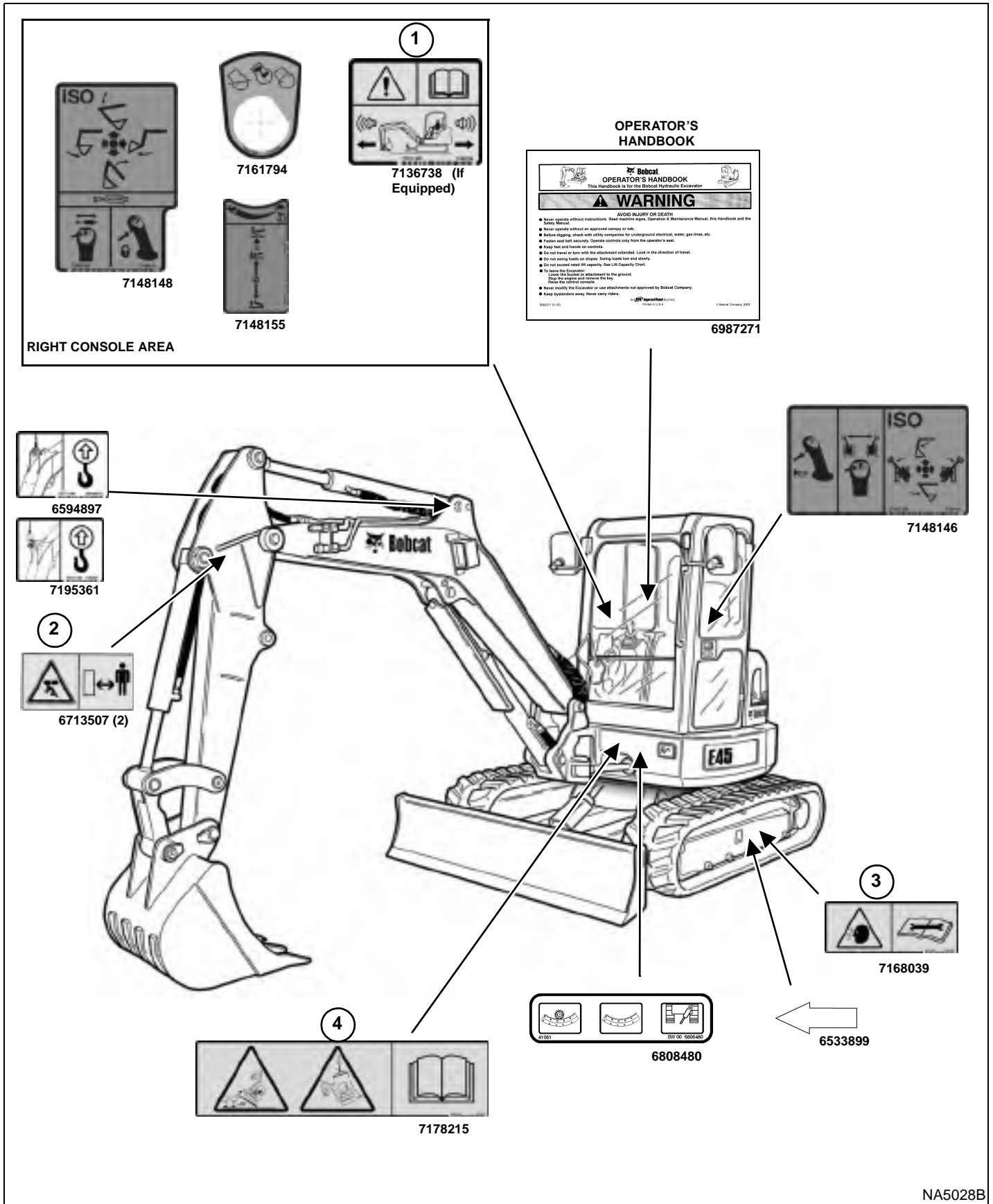


Know where fire extinguishers and first aid kits are located and how to use them. Inspect the fire extinguisher and service the fire extinguisher regularly. Obey the recommendations on the instructions plate.



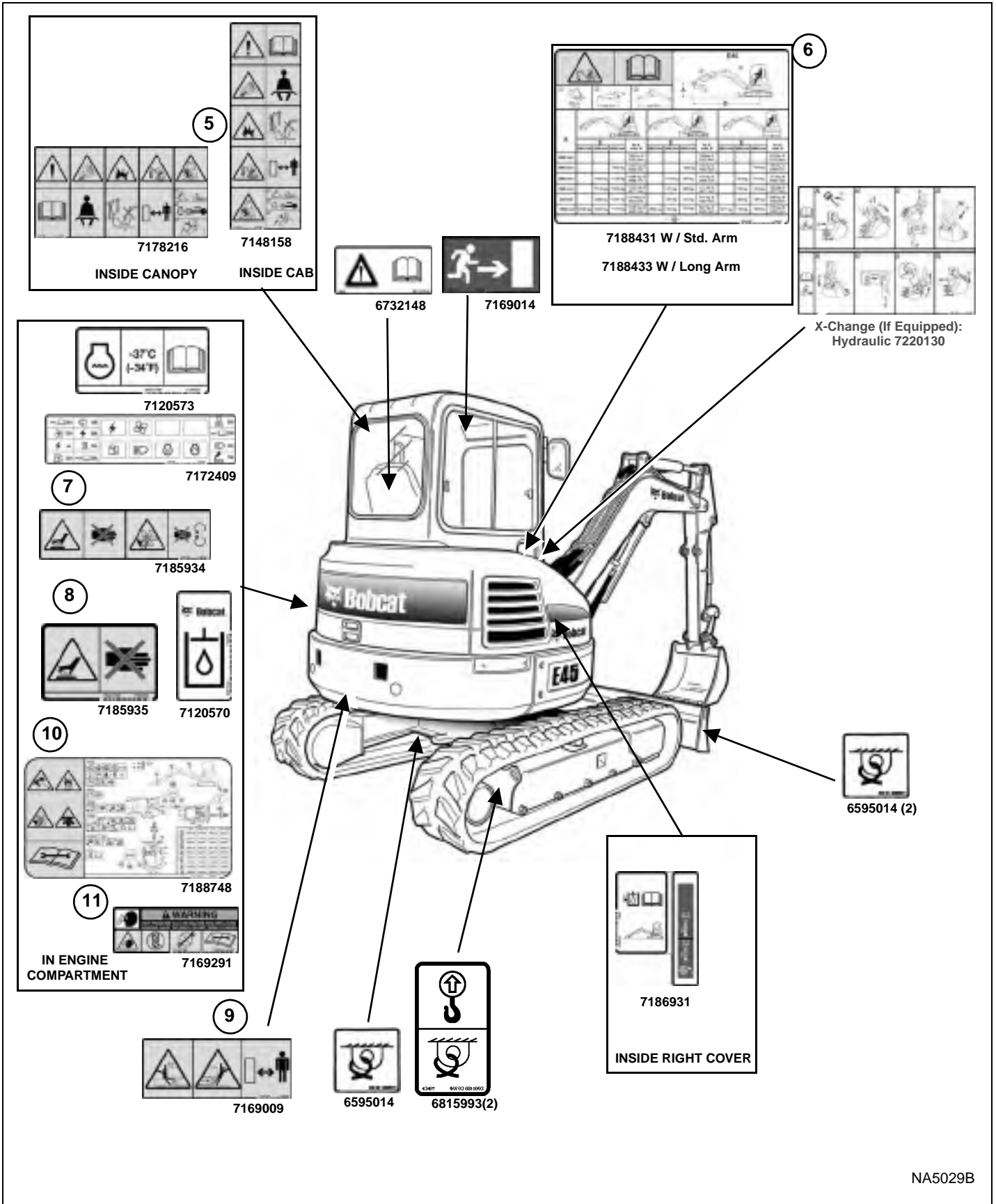
MACHINE SIGNS (DECALS)

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.

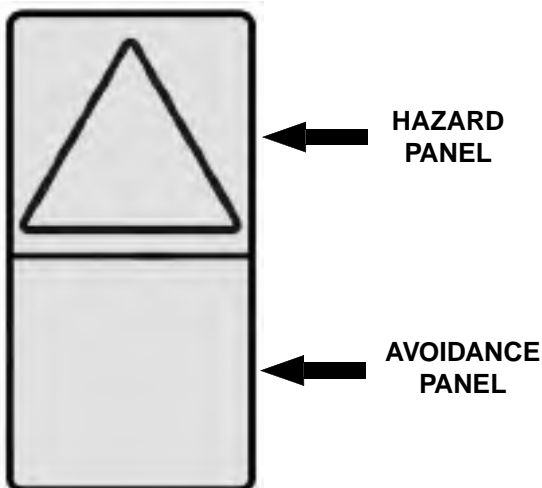


MACHINE SIGNS (DECALS) (CONT'D)

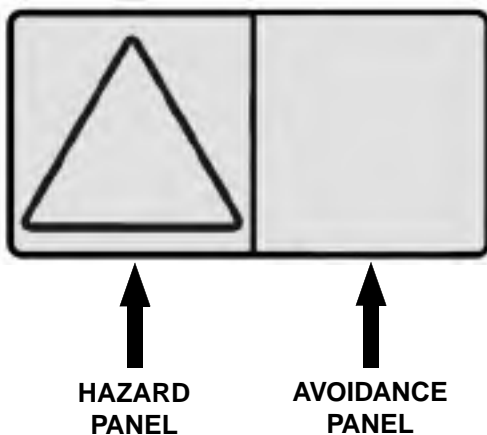
No-Text Safety Signs

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.

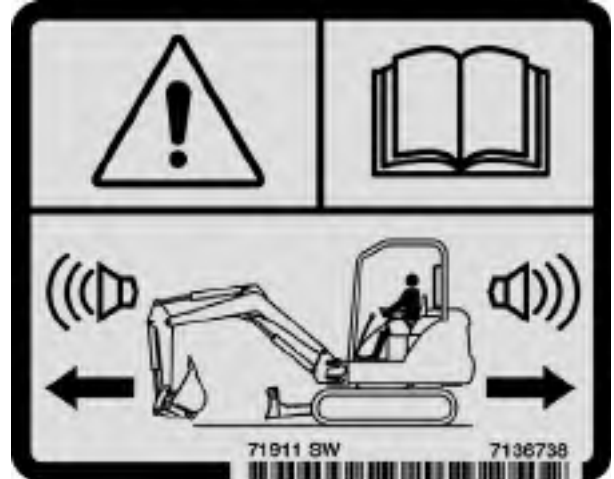
Avoidance panels depict actions required to avoid the hazards.

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. Motion Alarm (7136738)

This safety sign is located on the right rear console.



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.

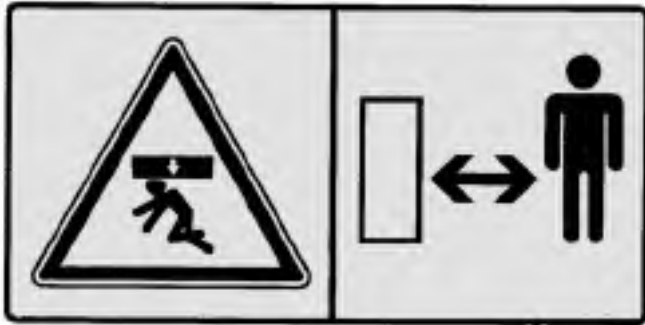
The operator is responsible for the safe operation of this machine.

W-2786-0309

MACHINE SIGNS (DECALS) (CONT'D)

2. Crush Hazard (6713507)

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



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

W-2520-0106

3. Thrown Or Flying Objects (7168039)

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



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

4. Transporting And Lifting (7178215)

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



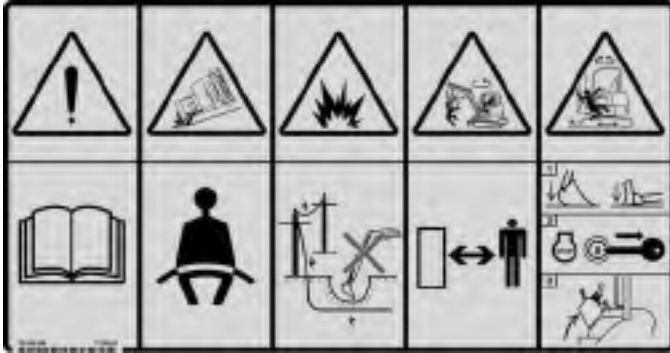
Improper loading, transporting and lifting procedures can cause serious injury or death. Read and understand the Operation & Maintenance Manual prior to transporting or lifting the machine.

W-2517-0110

MACHINE SIGNS (DECALS) (CONT'D)

5. General Hazard (7148158, 7178216)

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



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.

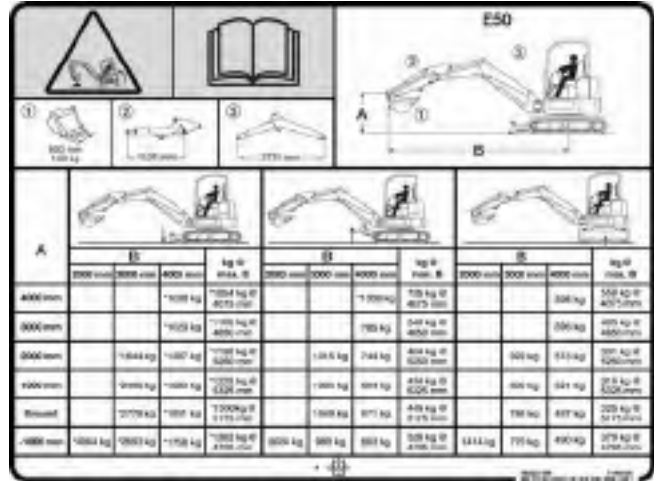
To Leave Excavator:

1. Lower attachment and blade to ground.
2. Stop engine and remove the key (if equipped).
3. Raise control console.

W-2518-0110

6. Lift Capacity (7188431, 7188433)

This safety sign is located on the right side cover.



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

7. Hot Surfaces and Rotating Fan (7185934)

This safety sign is located inside the engine compartment.



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

MACHINE SIGNS (DECALS) (CONT'D)

8. Hot Surfaces (7185935)

This safety sign is located in the engine compartment.



AVOID BURNS

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

W-2070-1203

9. Stay Away (7169009)

This safety sign is located on both upper rear corners of the upperstructure.



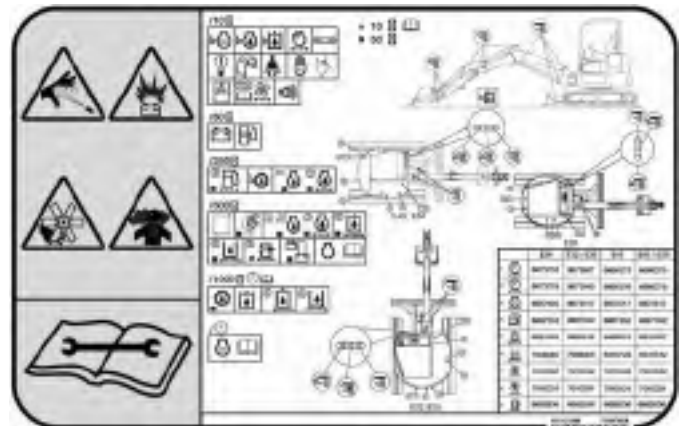
AVOID INJURY OR DEATH

- Keep out of swing area or travel path.
- Always look in the direction of travel.
- Make sure swing area is clear of bystanders and objects.

W-NEW-1108

10. High Pressure, Battery, Rotating Fan, Exhaust Gases and Service Schedule (7188748)

This safety sign is located in the engine compartment. For Service Schedule Information, (See SERVICE SCHEDULE on Page 109.)



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

11. Thrown or Flying Objects (7169291)

This safety sign is located on the gas spring in the engine compartment.



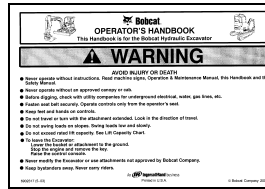
High pressure gas can cause serious injury or death. Do not open. Opening cylinder can release rod.

W-2523-0106

PUBLICATIONS AND TRAINING RESOURCES

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

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



OPERATOR'S HANDBOOK

6987271

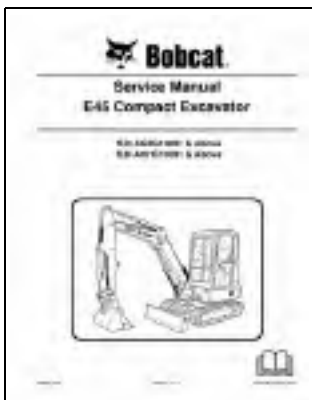
Gives basic operation instructions and safety warnings.



OPERATION & MAINTENANCE MANUAL

6989436

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



SERVICE MANUAL

6989437

- Complete maintenance instructions for your BOBCAT excavator.

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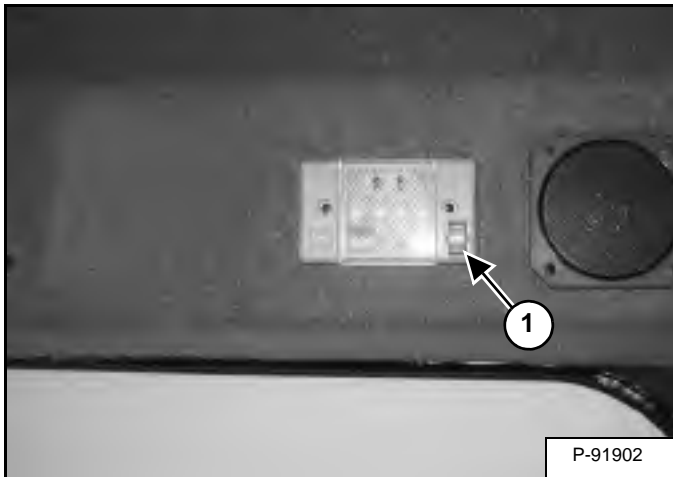
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INSTRUMENTS AND CONSOLES

Cab Interior Light (If Equipped)

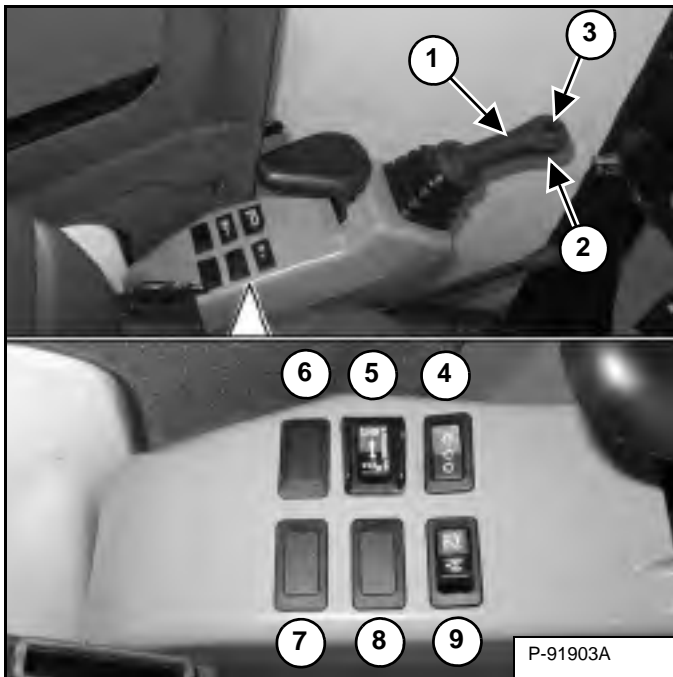
Figure 7



Press the top of the switch (Item 1) [Figure 7] to turn the light ON. Press the bottom of the switch to turn OFF

Left Console

Figure 8



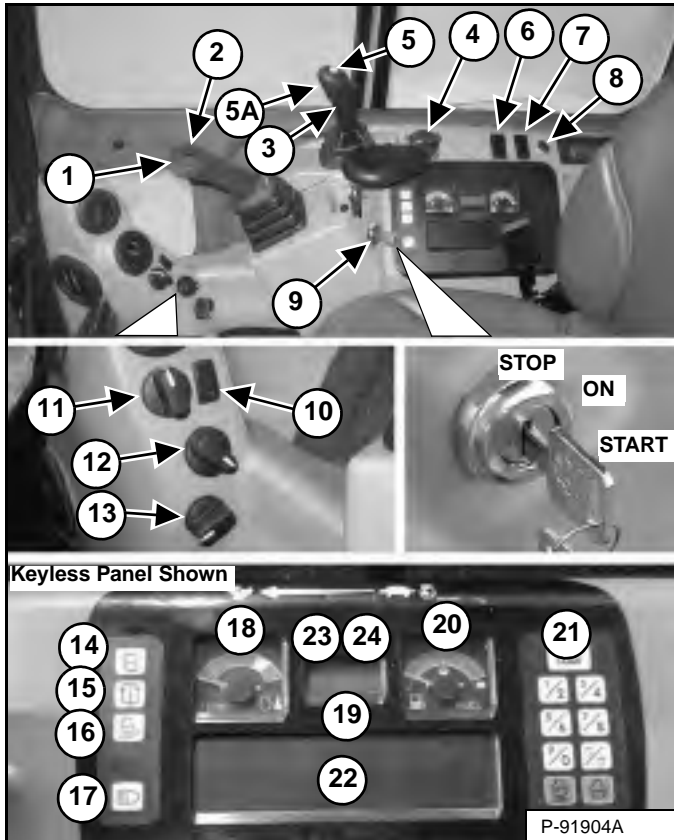
Left Console [Figure 8]

REF. NO	DESCRIPTION	FUNCTION / OPERATION
1	Left Joystick	(See HYDRAULIC CONTROLS on Page 48.)
2	Horn	Press the switch on the bottom of the left joystick to sound horn.
3	Boom Swing Switch / Secondary Auxiliary Hydraulic (If Equipped)	Move the switch to the left to swing the boom to the left. Move the switch to the right to swing the boom to the right. (See Secondary Auxiliary Hydraulics and Boom Swing in this manual.)
4	Wiper / Washer Switch (If Equipped)	Press the switch to the left to turn wiper ON. Press and hold switch to the left to activate window washer. Press the switch to the right to turn wiper OFF.
5	Hydraulic X-Change Switch (If Equipped)	Press and hold the switch to the right to fully retract hydraulic pins. Press and hold the switch to the left to fully extend hydraulic pins.
6	Beacon / Strobe Light (If Equipped)	Press switch to the left to turn ON the beacon / Strobe light. Press the switch to the right to turn OFF.
7	Not Used	---
8	Not Used	---
9	Boom Swing Switch / Secondary Auxiliary Hydraulic	Move the switch to the right to activate the secondary auxiliary hydraulics. Move the switch to the left for boom swing function. (See Secondary Auxiliary Hydraulics and Boom Swing in this manual.)

INSTRUMENTS AND CONSOLES (CONT'D)

Right Console

Figure 9



Right Console [Figure 9]

REF.	DESCRIPTION	FUNCTION / OPERATION
1	Right Joystick	(See HYDRAULIC CONTROLS in this manual.)
2	Auxiliary Hydraulic Switch	Controls the fluid flow to the auxiliary quick couplers (attachment). (See Auxiliary Hydraulics in this manual.)
3	Blade Control Lever	Controls raising and lowering the blade. Pushed all the way forward puts blade in float position. (See BLADE LEVER CONTROL in this manual.)
4	Engine Speed Control Dial	Controls rpm of the engine. (See ENGINE SPEED CONTROL DIAL in this manual.)
5	Two Speed Button	Engages and disengages High Range Travel Speed. (See Two-Speed Travel in this manual.)
6	Motion Alarm Cancel Switch	This switch temporarily disables the motion alarm. (See MOTION ALARM SYSTEM (IF EQUIPPED) on Page 45.)
7	Not Used	---
8	Auxiliary Power Outlet	12 volt receptacle for accessories.
9	Key Switch (STANDARD Panel Only)	Always perform the <i>PRE-STARTING PROCEDURE</i> . (See <i>PRE-STARTING PROCEDURE</i> in this manual), before starting the engine. (See <i>STARTING THE ENGINE</i> in this manual).

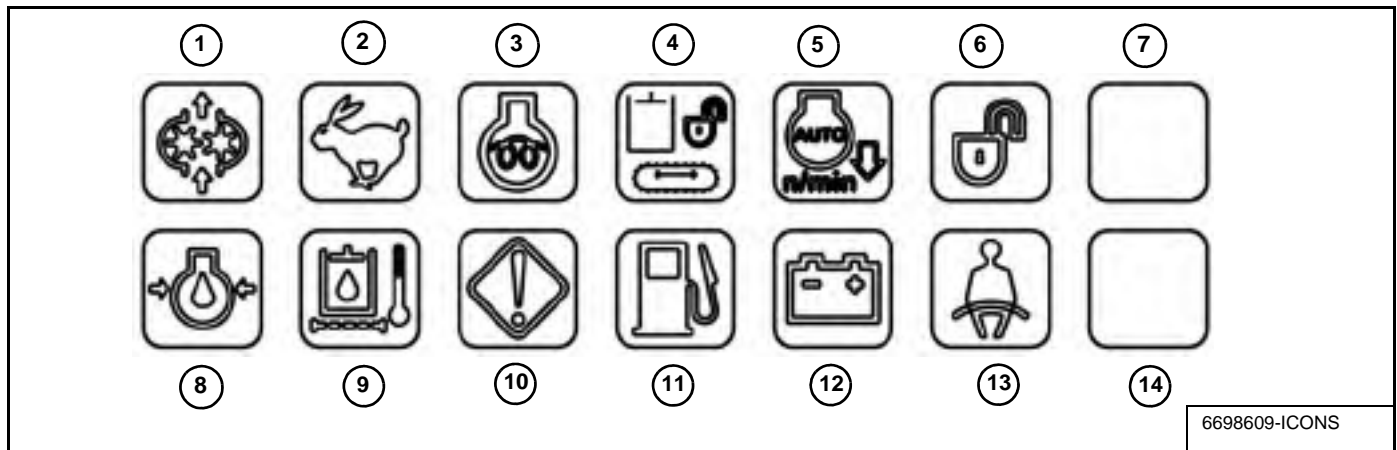
REF.	DESCRIPTION	FUNCTION / OPERATION
10	Air Conditioning Switch (If Equipped)	Press top of switch to turn air conditioner ON (light in switch will be ON), Press bottom of switch to turn OFF.
11	Fan Motor Switch (If Equipped)	Turn clockwise to increase fan speed; anticlockwise to decrease.
12	Temperature Control (If Equipped)	Turn clockwise to increase temperature; anticlockwise to decrease.
13	Recirculation / Fresh Air Control	Turn clockwise for fresh air; anticlockwise for recirculation. (Use recirculation mode for increased heating and cooling efficiency.)
14	Auxiliary Hydraulic Button	Activates and deactivates auxiliary hydraulic function (Selectable Auxiliary Hydraulic Flow) (Audible beep sounds each time the button is pressed.) (See Auxiliary Hydraulics in this manual).
15	Information	Cycles through (after each button press): Hours, Job Clock, Engine rpm, Selectable Auxiliary Hydraulic Flow (when activated); in the data Display, Item 19.)
16	Auto Idle Feature	Press once to turn Auto Idle Feature ON, press a second time to turn OFF. (See Auto Idle Feature in this manual).
17	Lights	Press once to turn lights ON; press again to turn lights OFF.
18	Temperature	Shows the engine coolant temperature.
19	Data Display Screen	The data display screen shows the Hourmeter during normal operation of the excavator. When preheat is activated, the display screen will show the remaining preheat time. Can also be used to display Job Clock, Engine rpm, and Selectable Auxiliary Hydraulic Flow. (See Job Clock in this manual).
20	Fuel Gauge	Shows the amount of fuel in the tank.
21	Keyless (OPTIONAL)	(Always perform the <i>PRE-STARTING PROCEDURE</i> , (See <i>PRE-STARTING PROCEDURE</i> in this manual), before starting the engine. (See <i>STARTING THE ENGINE</i> in this manual).
22	Indicator Icons	(See Indicator Icons in this manual).
23	Job	On when Job Clock is activated.
24	RPM	On when Engine rpm is activated.
25	Selectable Auxiliary Hydraulic Flow	On for two seconds when Auxiliary Hydraulics are activated, indicates flow selected: Aux3-Aux2-Aux1. (See Auxiliary Hydraulics in this manual).

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.

INSTRUMENTS AND CONSOLES (CONT'D)

Indicator Icons

Figure 10



The right console contains the instrument panel with Indicator Icons [Figure 10].

NOTE: If a Warning Icon (Icons 8, 9, 10 and 12) is illuminated or flashes, appropriate action is needed to avoid potential machine damage. Service the machine as soon as possible when conditions are present.

REF. NO.	INDICATOR ICONS		
	<i>When Indicator Icon Is Illuminated</i>	<i>When Indicator Icon Is OFF</i>	<i>When Indicator Icon Is Flashing</i>
1	Auxiliary Hydraulics Engaged	Auxiliary Hydraulics Disengaged	See Error Codes in SA section
2	High Range Engaged	Low Range Engaged	See Error Codes in SA section
3	Glow Plugs Energized	Glow Plugs OFF	See Error Codes in SA section
4	Hydraulic Traction Drive Activated	Hydraulic Traction Drive Deactivated	See Error Codes in SA section
5	Auto Idle System Activated	Auto Idle System Deactivated	See Error Codes in SA section
6	Keypad Unlocked	Keypad Locked	-----
7	Future Use		
8	Low Engine Oil Pressure	Engine Oil Pressure in operating range	Extremely Low Engine Oil Pressure, Engine will shut down in 10 seconds, See Error Codes in SA section
9	Plugged Hydraulic Filter or High Hydraulic Oil Temperature	Hydraulic Filter and Oil in operating range.	Extremely High Hydraulic Oil Temperature, Engine will shut down in 10 seconds, See Error Codes in SA section
10	General Warning	All system in operating range	Extremely High Coolant Temperature or Extremely High Engine RPM, Engine will shut down in 10 seconds, See Error Codes in SA section
11	Low Fuel Level	Fuel level in operating range	----
12	Extremely Low Battery Voltage, Engine will shut down in 10 seconds, See Error Codes in SA section	Battery Voltage in operating range	High or Low Battery Voltage
13	Fasten Seat Belt Reminder - Light stays on for 45 seconds to remind operator to fasten seat belt.	----	----
14	Future Use		

INSTRUMENTS AND CONSOLES (CONT'D)

Raising And Lowering The Console

Raise the console before exiting the cab.

Figure 11



Pull up on the release handle [Figure 11]. The lift spring will assist in raising the console.

Lower the console before operating the excavator.

Push down on the console [Figure 11] until the latch is engaged.

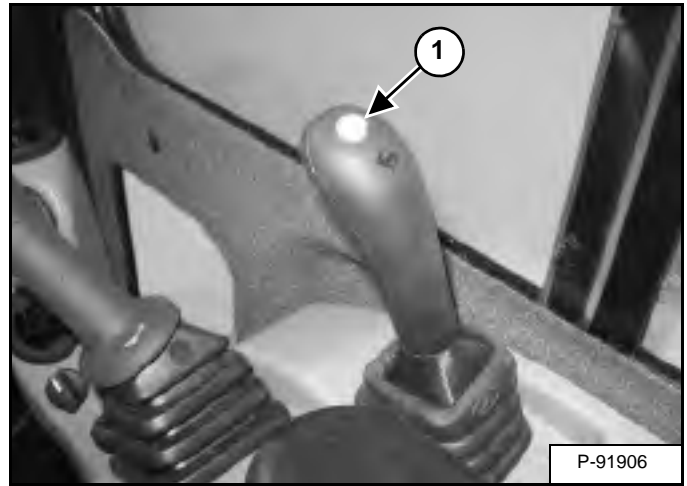
NOTE: When the console is raised, the hydraulic and traction system functions are locked and will not operate.

If the engine stops, the boom / bucket (attachments) 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.

Two-Speed Travel

Figure 12



Press the button (Item 1) [Figure 12] to engage the High Range. Press a second time to disengage.

Figure 13



When High Range is engaged, the two speed travel icon (Item 1) [Figure 13] will illuminate.

Press the button (Item 1) [Figure 12] again to disengage.

Auto-Shift Drive System (If Equipped)

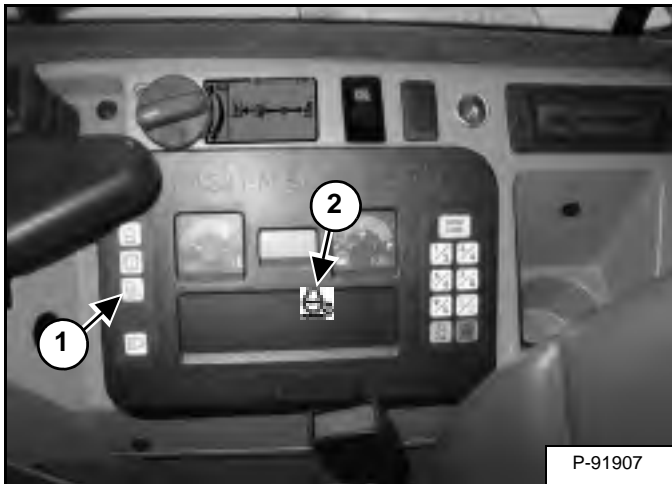
When in high range, the travel motors will automatically shift to low range when more torque is required and return to high range when hydraulic pressure decreases.

NOTE: Always set the travel speed to low range when loading or unloading the excavator onto a transport vehicle.

INSTRUMENTS AND CONSOLES (CONT'D)

Auto Idle Feature

Figure 14



The auto idle feature (when engaged) will reduce the engine speed to low idle when the control levers (joystick, blade, travel, etc.) are in neutral and not used for approximately four seconds. The engine rpm will return to the set position as soon as any control lever is activated.

The automatic idle switch (Item 1) [Figure 14] is used to engage or disengage the automatic idle feature.

Press the switch (Item 1) once to engage automatic idle and the icon (Item 2) will illuminate. Press the switch (Item 1) a second time to disengage automatic idle, the icon (Item 2) [Figure 14] will be OFF.

NOTE: Always disengage the auto idle feature when loading or unloading the excavator onto a transport vehicle.

OPERATOR CANOPY (ROPS / TOPS) (IF EQUIPPED)

Description

The Bobcat excavator has available 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 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

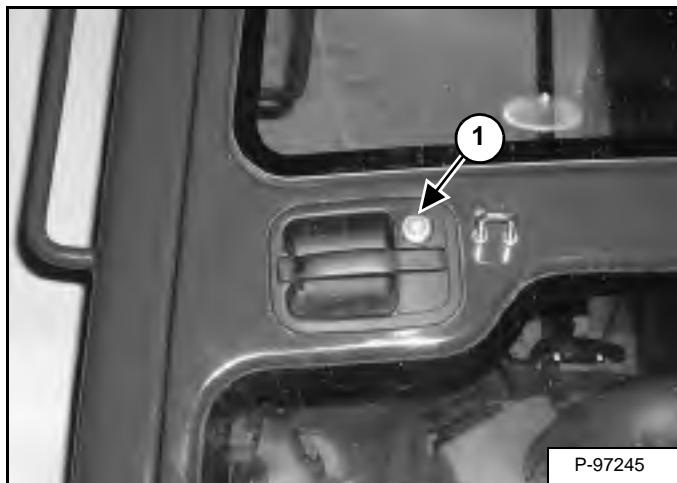
Never modify operator cab by welding, grinding, drilling holes or adding attachments unless instructed to do so by Bobcat Company. Changes to the cab can cause loss of operator protection from rollover and falling objects, and result in injury or death.

W-2069-0200

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

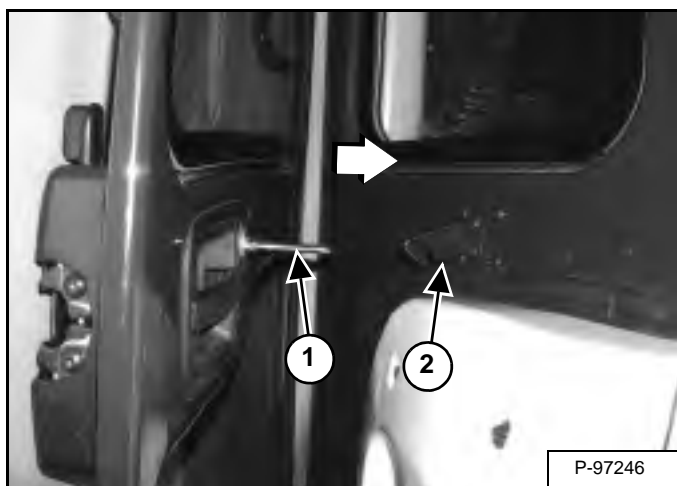
Cab Door

Figure 15



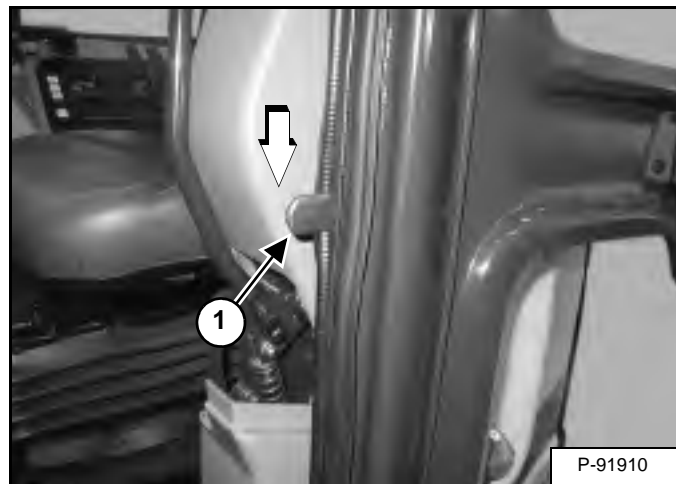
The cab door can be locked (Item 1) [Figure 15] with the same key as the starter switch.

Figure 16



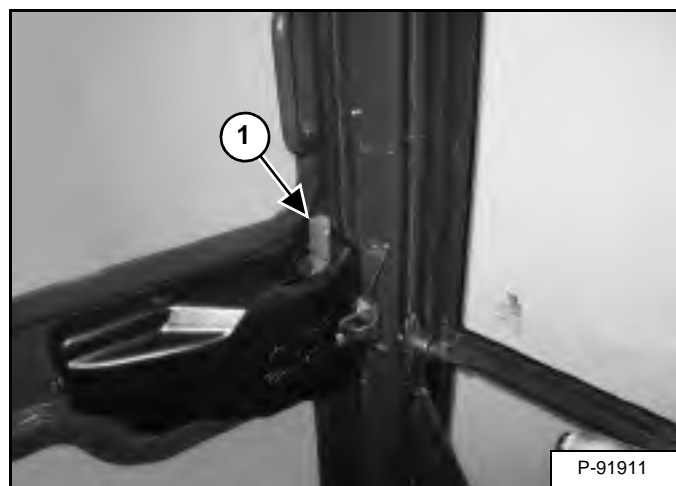
Push the door all the way open until the latch post (Item 1) engages in the latch (Item 2) [Figure 16] to hold the door in the open position.

Figure 17



When the door is in the open position, push down on the latch (Item 1) [Figure 17] and close the door.

Figure 18



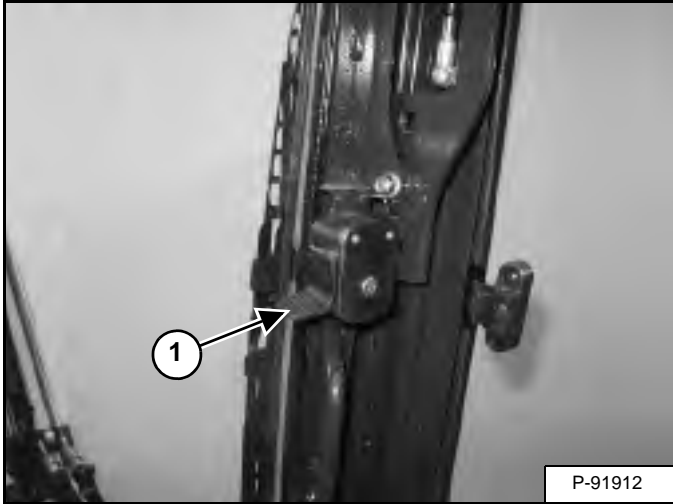
From inside the cab, open the door using handle (Item 1) [Figure 18].

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

Front Window

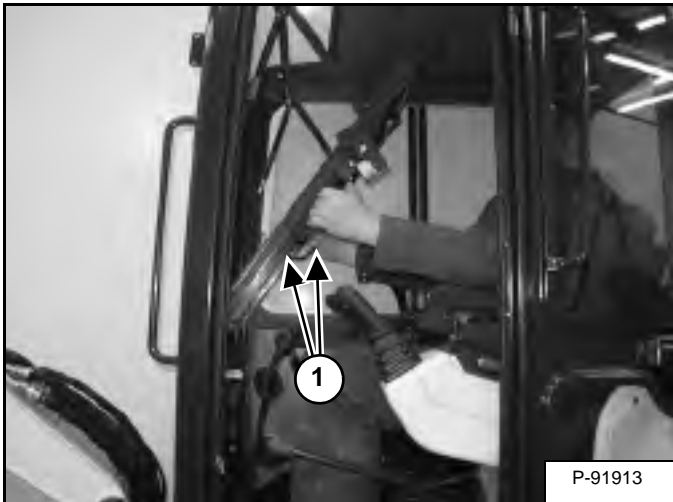
Opening The Front Window

Figure 19



Press the top window latch (Item 1) **[Figure 19]** (both sides).

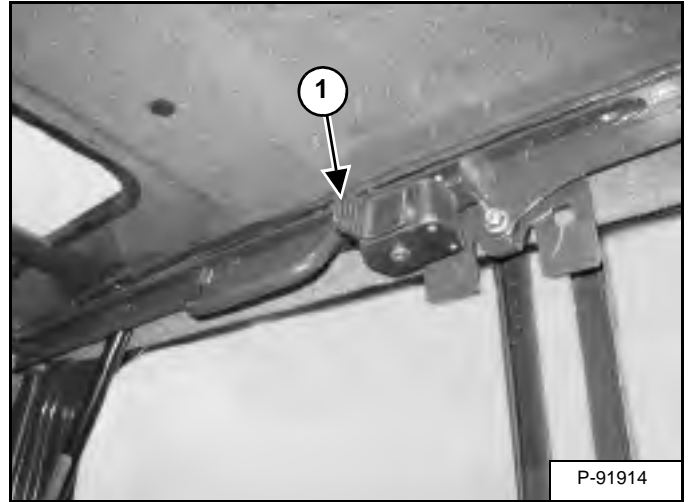
Figure 20



Use both window grab handles (Item 1) **[Figure 20]** to pull the top of the window in.

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

Figure 21



When the window is fully raised, the latch (Item 1) **[Figure 21]** (both sides) will close on the bracket in the latched position.

Pull down slightly on the window to make sure it is fully latched.

Closing The Front Window

Support the window while releasing the window latch (Item 1) **[Figure 21]** (both sides).

Use both window grab handles (Item 1) **[Figure 20]** to pull the window down fully.

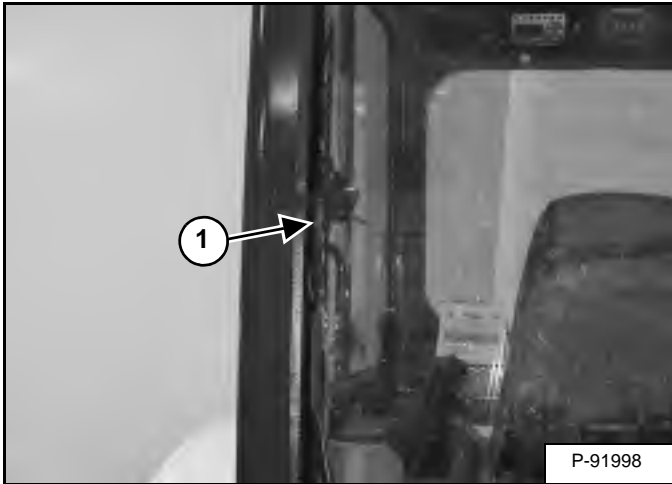
Press the top of the window in until the latch (Item 1) **[Figure 19]** locks into the latched position (both sides).

Pull inward slightly on the window to make sure it is fully latched in the closed position.

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

Front Wiper

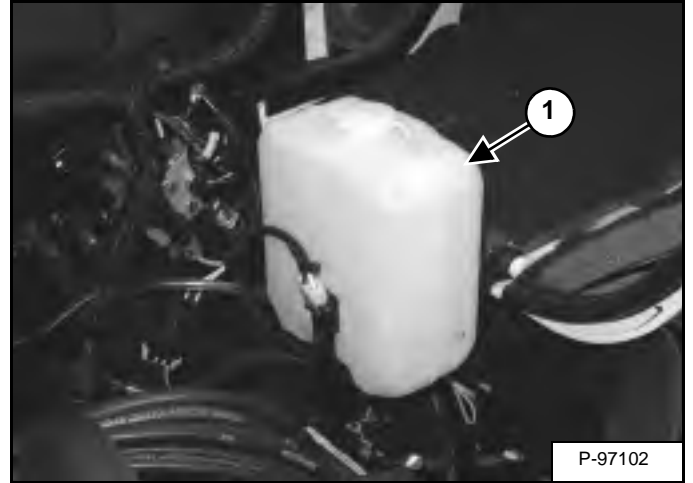
Figure 22



The front window is equipped with a wiper (Item 1) [Figure 22] and washer.

Window Washer Reservoir

Figure 23



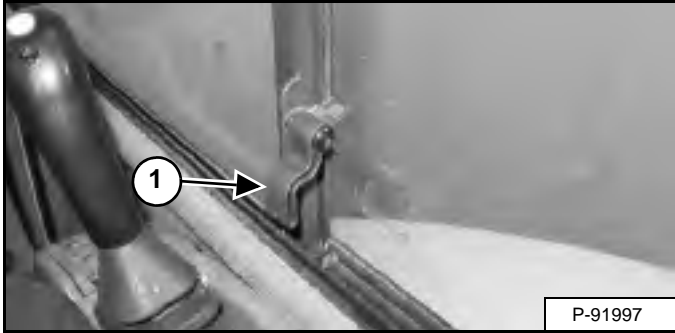
The window washer reservoir (Item 1) [Figure 23] is located under the right side cover.

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

Right Side Windows

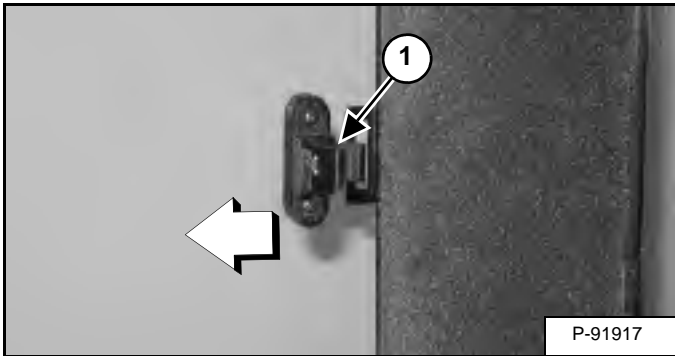
Opening The Right Rear Window

Figure 24



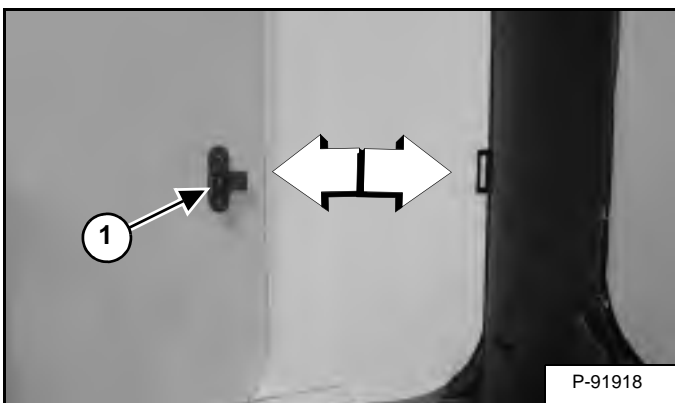
Raise the latch (Item 1) [Figure 24] located at the rear of the front window.

Figure 25



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

Figure 26



Pull the latch (Item 1) [Figure 26] forward to open the window. When the window is in the open position, push down on the latch (Item 1) [Figure 24].

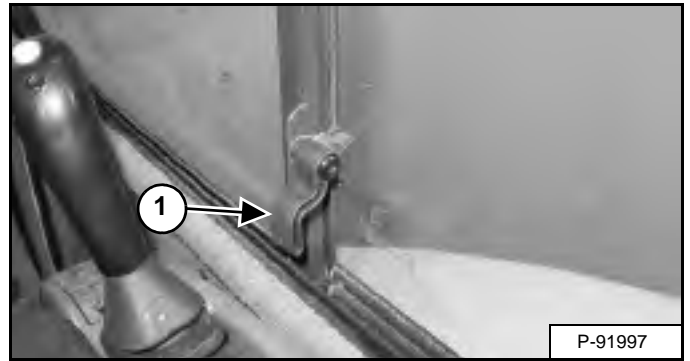
Closing The Right Rear Window

Raise the latch (Item 1) [Figure 24].

Push the latch (Item 1) [Figure 26] back to close the window. Rotate the latch (Item 1) [Figure 24] down.

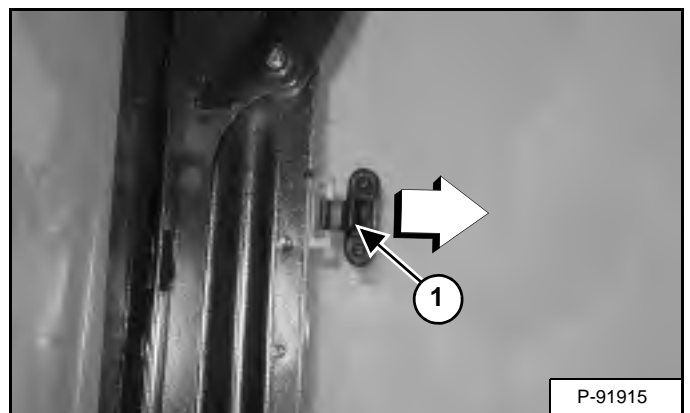
Opening The Right Front Window

Figure 27



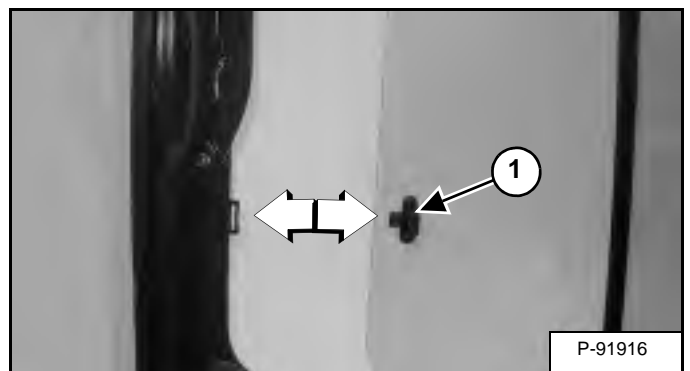
Raise the latch (Item 1) [Figure 27] located at the rear of the front window.

Figure 28



Pull back on the latch (Item 1) [Figure 28].

Figure 29



Pull the latch (Item 1) [Figure 29] back to open the window.

When the window is in the open position, push down on the latch (Item 1) [Figure 27].

Closing The Right Front Window

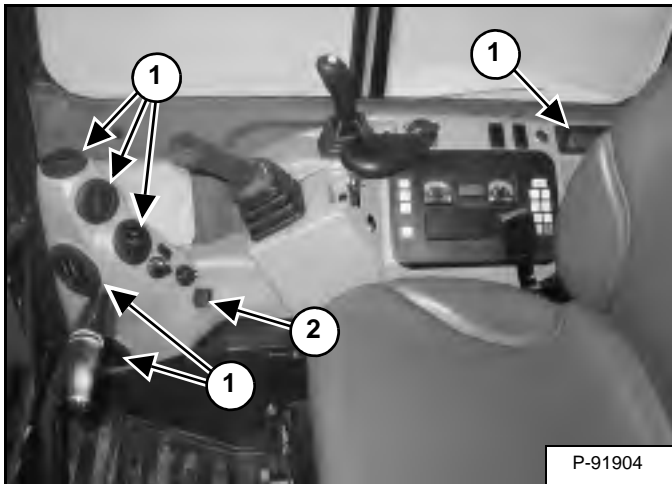
Raise the latch (Item 1) [Figure 27].

Push the handle (Item 1) [Figure 29] forward to close the window. Rotate the latch (Item 1) [Figure 27] down.

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

Heating, Ventilation, And Air Conditioning Ducting

Figure 30



The HVAC louvers (Item 1) **[Figure 30]** can be positioned as needed to direct the air flow to various areas in the cab.

*Operating Tip: To increase heating or cooling efficiency, move the Recirculation / Fresh Air Control knob (Item 2) **[Figure 30]** to the recirculation position. This will allow the air to recirculate through the HVAC system and improve temperature control. If left in the fresh air position, the HVAC system will also need to heat or cool the ambient air that is drawn in from the outside, slowing and / or reducing the temperature change inside the cab.*

EMERGENCY EXIT

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

Right Side Rear Window

Figure 31



Exit through the window [Figure 31].

Front Window

Figure 32



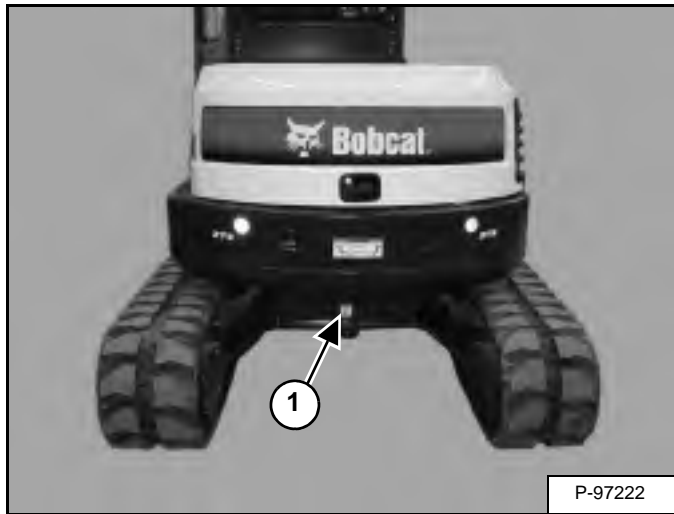
Open the front window and exit [Figure 32].

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 33



This excavator may be equipped with a motion alarm system. The motion alarm (Item 1) [Figure 33] is located inside the rear of the excavator.

Figure 34



The motion alarm can be temporarily disabled by pressing the motion alarm switch (Item 1) [Figure 34] while the machine is moving. As soon as the travel levers are returned to the neutral position, the motion alarm will be enabled.

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 35] in either the forward or reverse direction.

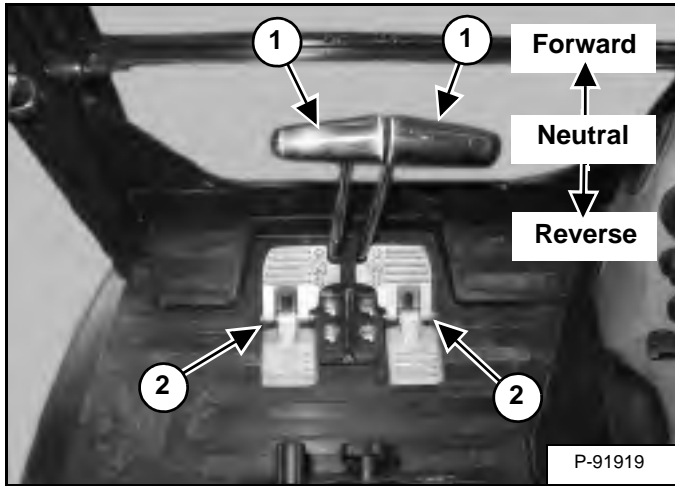
If alarm does not sound or for adjustment instructions, see inspection and maintenance instructions for the motion alarm system in the preventive maintenance section of this manual. (See MOTION ALARM SYSTEM (IF EQUIPPED) on Page 112.)

TRAVEL CONTROLS

Forward And Reverse Travel

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

Figure 35



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 35] forward for forward travel; backward for reverse travel.

* Travel can also be controlled with foot pedals (Item 2) [Figure 35]. Pivot the heel of the pedals forward for additional space on the floor.

WARNING

AVOID INJURY OR DEATH

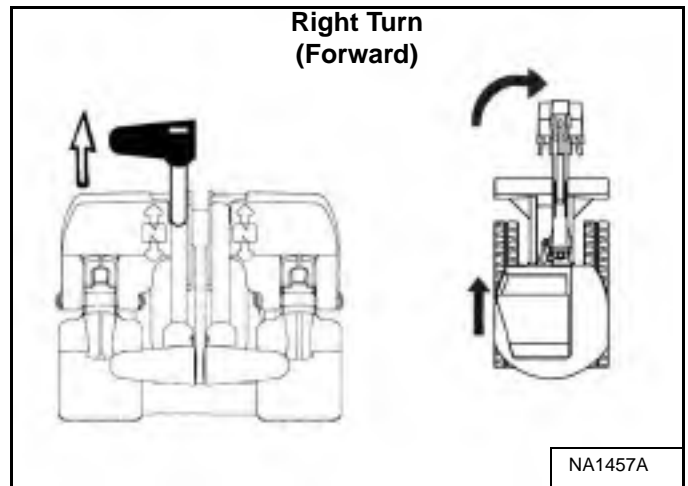
- Check the blade location before travelling. When the blade is to the rear, operate the steering levers/foot pedals in the opposite direction to when the blade is in the front.
- Move the steering levers/foot pedals slowly. Abrupt lever motion will cause the machine to jerk.

W-2235-EN-1009

Turning

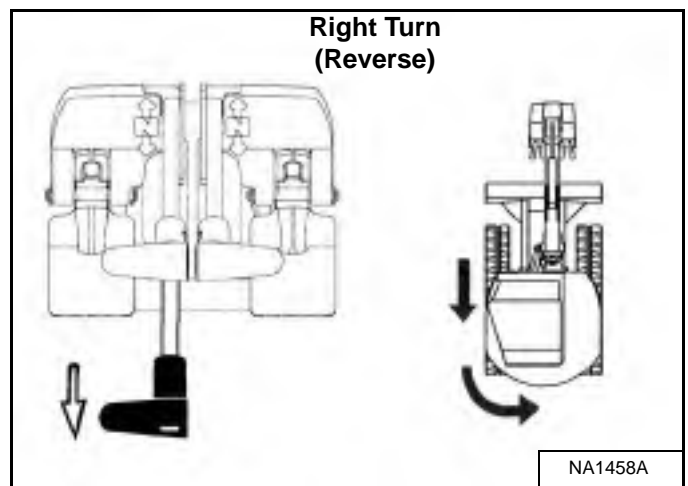
Right Turn

Figure 36



Push the left steering lever forward to turn right [Figure 36] while travelling forward.

Figure 37



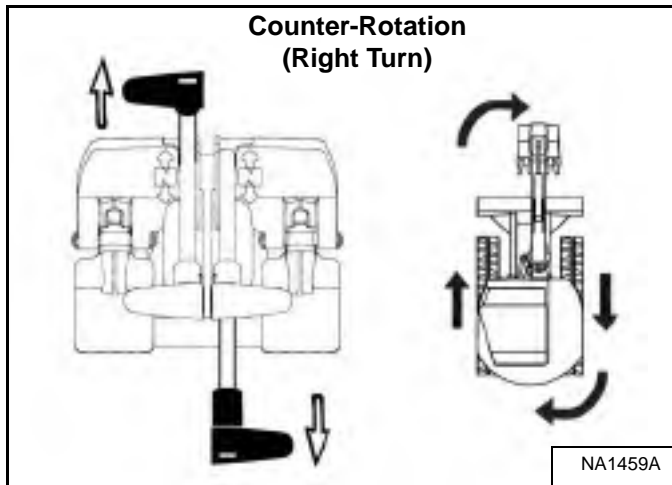
Pull the left steering lever backward to turn right while travelling backward [Figure 37]

TRAVEL CONTROLS (CONT'D)

Turning (Cont'd)

Counter-Rotation Right Turn

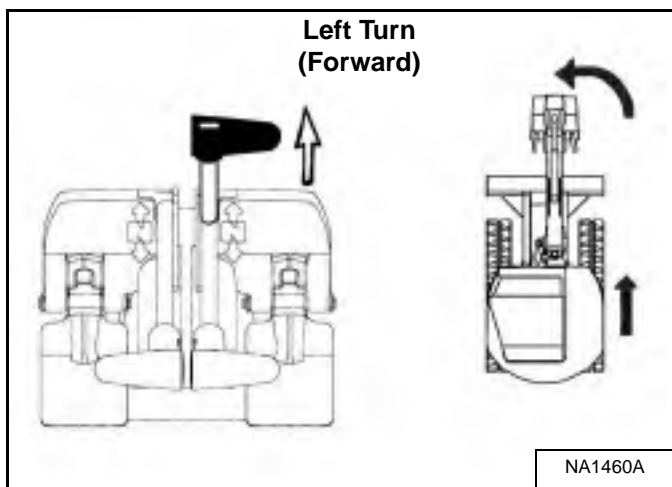
Figure 38



Push the left steering lever forward and pull the right steering lever backward [Figure 38].

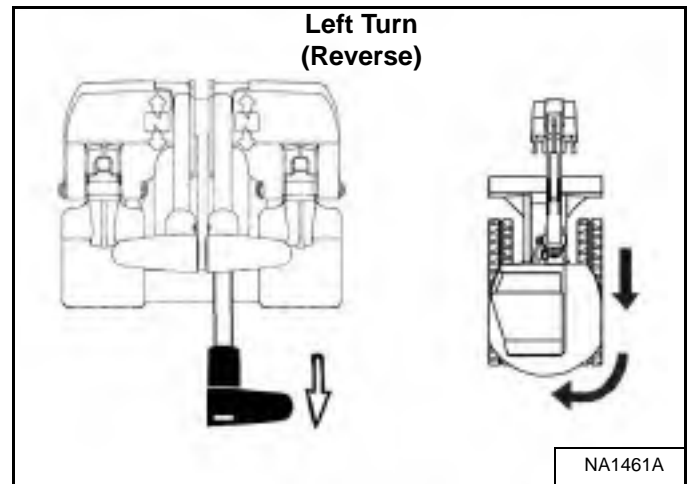
Left Turn

Figure 39



Push the right steering lever forward to turn left while travelling forward [Figure 39].

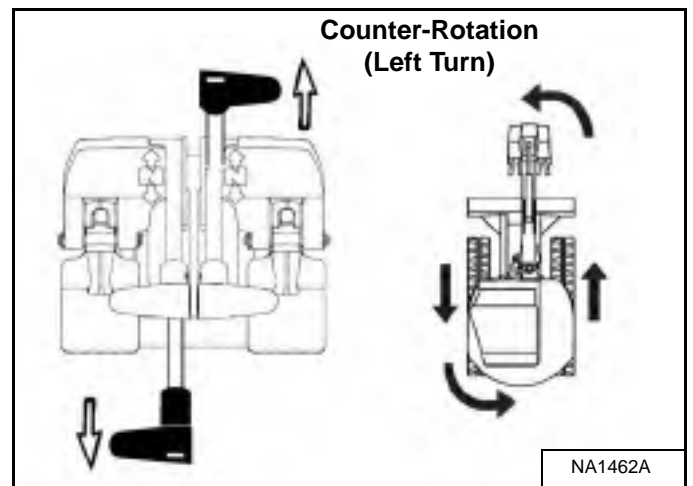
Figure 40



Pull the right steering lever backward to turn left while travelling backward [Figure 40].

Counter-Rotation Left Turn

Figure 41



Push the right steering lever forward and pull the left steering lever backward [Figure 41].

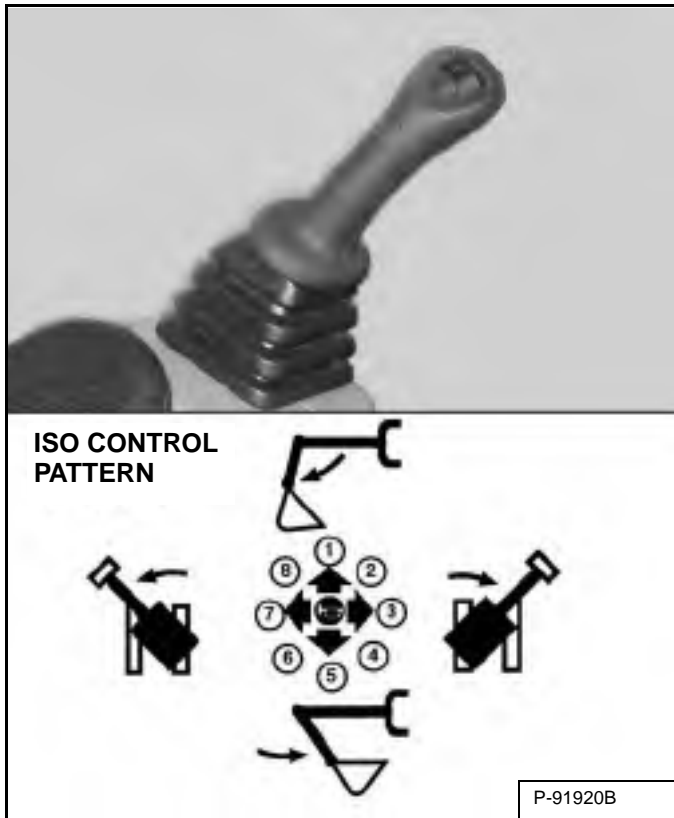
HYDRAULIC CONTROLS

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 42

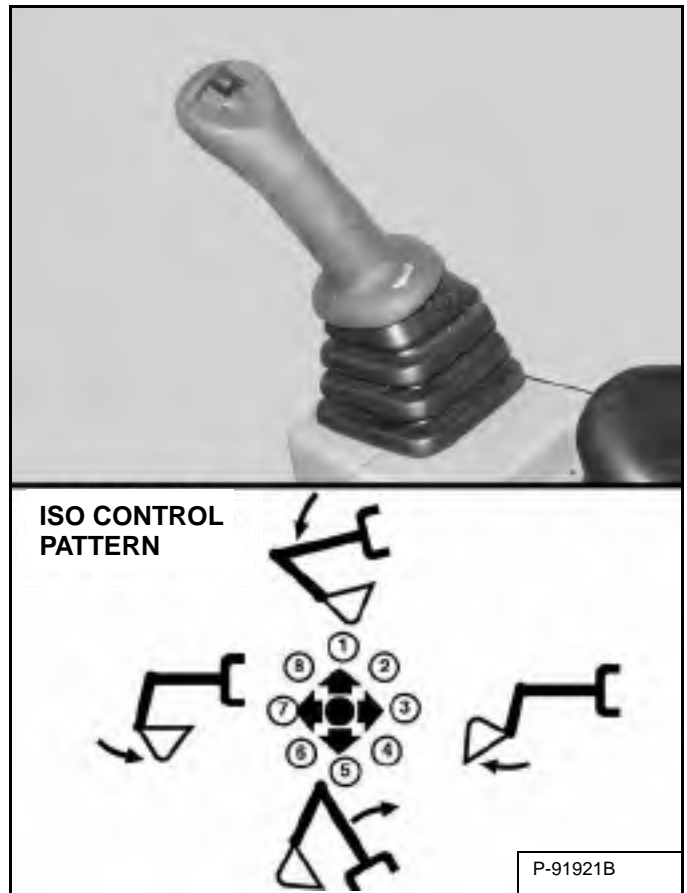


The left lever (joystick) is used to operate the arm and slew the upperstructure [Figure 42].

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

Right Control Lever (Joystick)

Figure 43



The right lever (joystick) is used to operate the boom and bucket [Figure 43].

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

HYDRAULIC CONTROLS (CONT'D)

Quick Couplers

WARNING

AVOID BURNS

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

W-2220-0396

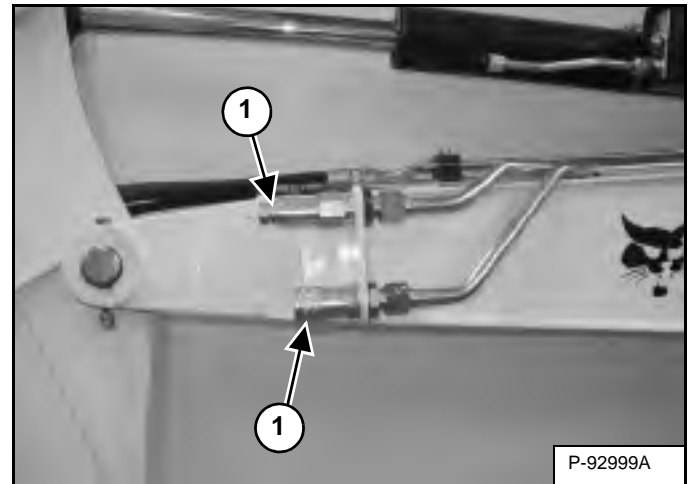
WARNING

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 doctor familiar with this injury.

W-2072-EN-0909

Figure 44



Excavators and attachments are supplied with flush faced couplers (Item 1) [Figure 44].

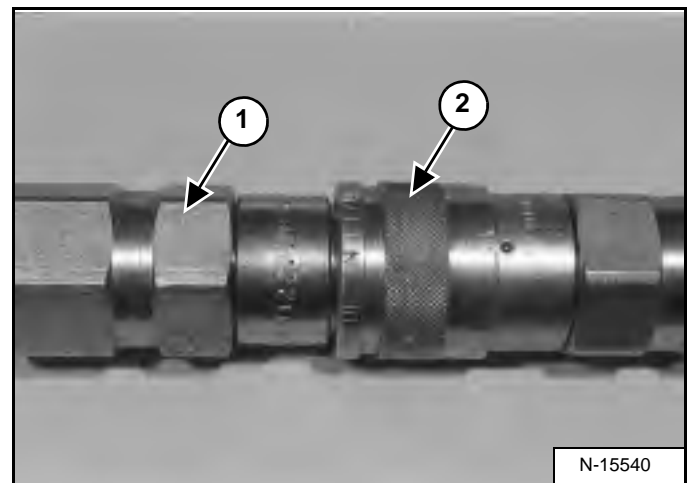
To Connect:

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 44] 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 45



Hold the male coupler (Item 1). Retract the sleeve (Item 2) [Figure 45] on the female coupler until the couplers disconnect.

HYDRAULIC CONTROLS (CONT'D)

Auxiliary Hydraulics

The primary auxiliary hydraulics has Selectable Auxiliary Hydraulic Flow. This allows the operator to select a hydraulic flow that matches the attachment hydraulic requirements. The auxiliary hydraulics can be set to Aux3, Aux2, Aux1 or off. Aux3 allows maximum hydraulic flow, Aux2 allows medium hydraulic flow and Aux1 allows low hydraulic flow.

Figure 46



Press the Auxiliary Hydraulics button on the right console (Item 1) [Figure 46] (an audible beep will sound each time the auxiliary button is pressed).

The first time the Auxiliary Hydraulics button is pressed, the last selected auxiliary hydraulic flow (Aux3, Aux2 or Aux1) will appear in the data display (Item 2) [Figure 46] for approximately two seconds and then the data screen will revert back to the previous information on the data display.

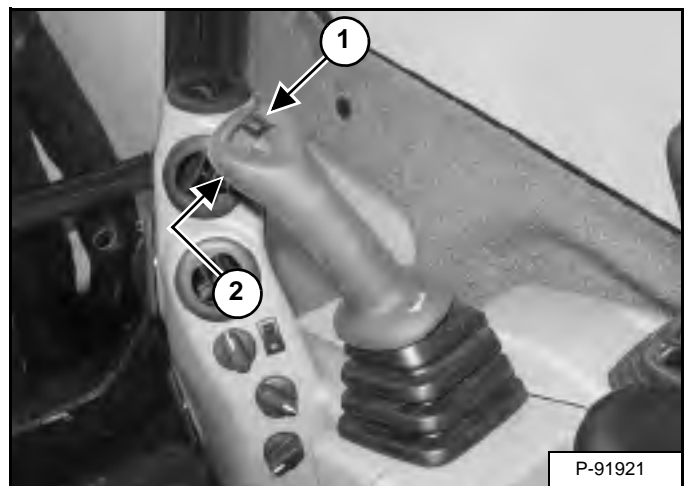
To change the auxiliary flow, press the Auxiliary Hydraulics button (Item 1) to toggle through the settings, each time the button is pressed, the next setting will appear in the data display (Item 2) [Figure 46]. Once the desired setting is selected, it will stay at that setting until a different auxiliary flow is selected by the operator. (Example: If Aux2 has been selected, after key OFF and engine restart, the Aux2 setting will still be the active hydraulic flow when auxiliary hydraulics are activated.)

Examples for setting Selectable Auxiliary Hydraulic Flow and the attachment used:

AUX FLOW SETTING	FLOW	ATTACHMENTS
Aux3	Maximum	Breaker, Vibratory Plate Compactor, Auger
Aux2	Medium	Clamp, Grapple
Aux1	Low	Power Tilt, Hydra Tilt

NOTE: Use only approved attachments for your model excavator. Attachments are approved for each model of excavator based on various factors. Using unapproved attachments could cause damage to the attachment or to the excavator.

Figure 47



Move the switch (Item 1) [Figure 47] on the right control lever to the right to supply hydraulic flow to the female coupler. Move the switch to the left to supply hydraulic flow to the male coupler. If you move the switch halfway, the auxiliary functions move at approximately one-half speed.

Press the switch (Item 2) [Figure 47] on the front of the handle to provide constant flow to the female coupler.

NOTE: Pressing the switch (Item 1) to the left while pressing the switch (Item 2) [Figure 47] on the front of the handle will provide constant flow to the male coupler.

Press the switch (Item 2) [Figure 47] a second time to stop auxiliary flow to the quick couplers.

NOTE: Reverse flow can cause damage to some attachments. Use reverse flow with your attachment only if approved. See your attachment Operation & Maintenance Manual for detailed information.

HYDRAULIC CONTROLS (CONT'D)

Relieve Hydraulic Pressure (Excavator And Attachment)

Excavator:

Put the attachment flat on the ground.

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

NOTE: The left console must be fully lowered for relieving hydraulic pressure.

Press AUX HYD Button (Item 1) **[Figure 46]** and then move the switch (Item 1) **[Figure 47]** to the right and left 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.

HYDRAULIC CONTROLS (CONT'D)

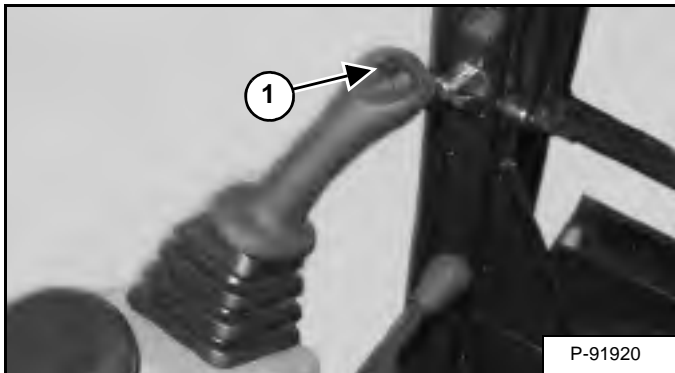
Secondary Auxiliary Hydraulics (If Equipped)

When equipped with secondary auxiliary hydraulics, the second set of hydraulic couplers will be mounted on the right side of the arm.

Figure 48



Figure 49



Move the switch (Item 1) [Figure 49] on the left control lever to the right to supply hydraulic flow to the female coupler. Move the switch to the left to supply hydraulic flow to the male coupler. If you move the switch halfway, the auxiliary functions move at approximately one-half speed.

Relieve Hydraulic Pressure (Excavator And Attachment)

Excavator:

Put the attachment flat on the ground.

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

NOTE: The left console must be fully lowered for relieving hydraulic pressure.

Move the boom swing / secondary auxiliary hydraulic switch (Item 1) [Figure 48] to the right, secondary auxiliary hydraulic position.

Move the switch (Item 1) [Figure 49] to the right and left 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.

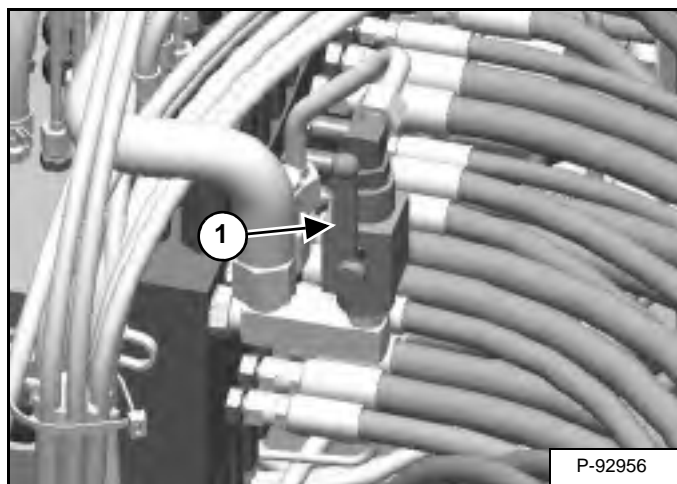
Hydraulic pressure in the auxiliary hydraulic system can make it difficult to engage quick couplers to an attachment.

HYDRAULIC CONTROLS (CONT'D)

Return To Tank Valve (If Equipped)

The optional return to tank valve is located under the right side cover at the front of the control valve.

Figure 50



Rotate the lever (Item 1) **[Figure 50]** clockwise to direct auxiliary return hydraulic fluid to the reservoir.

Rotate the lever (Item 1) **[Figure 50]** anticlockwise for two way hydraulic auxiliary flow operation.

BLADE CONTROL LEVER

Raising And Lowering Blade

Figure 51



Pull the lever backward to raise the blade (Item 1) [Figure 51].

Push the lever forward to lower the blade (Item 2) [Figure 51].

Push the lever forward until the lever is in the locked position (Item 3) [Figure 51] to put the blade in the *float* position.

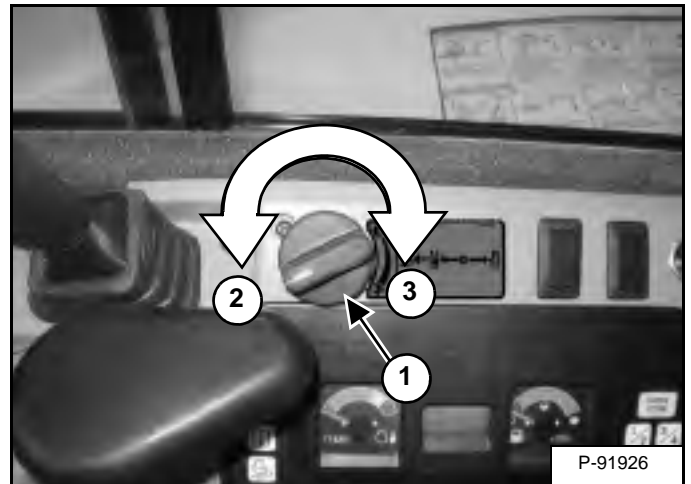
Pull the lever backward to unlock from the *float* position.

NOTE: Keep blade lowered for increased digging performance.

ENGINE SPEED CONTROL DIAL

Setting Engine Speed (RPM)

Figure 52



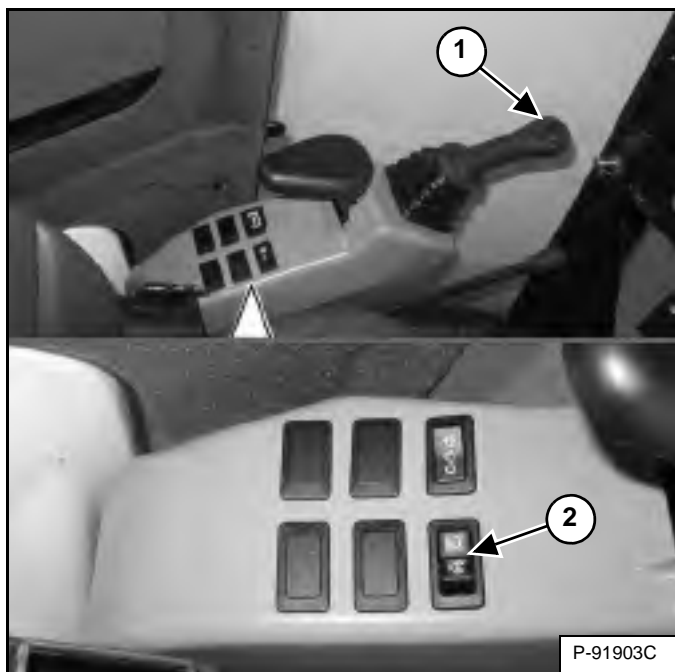
The engine speed control dial (Item 1) [Figure 52] controls engine rpm.

Rotate the engine speed control dial anticlockwise (Item 2) to reduce engine rpm. Rotate the engine speed control dial clockwise (Item 3) [Figure 52] to increase engine rpm.

BOOM SWING

Operation

Figure 53



The switch (Item 1) [Figure 53] on the left control lever (joystick) controls boom swing. Move the switch to the left to swing the boom to the left. Move the switch to the right to swing the boom to the right.

If Equipped With Secondary Auxiliary Hydraulics:

If the machine is equipped with secondary auxiliary hydraulic couplers, the switch (Item 2) [Figure 53] is used to select either the boom swing function or the secondary auxiliary hydraulic function.

Move the switch (Item 2) [Figure 53] to the left to select boom swing function, move the switch to the right to select secondary auxiliary hydraulic function.

Figure 54



NOTE: The purpose of the boom swing is to offset the boom with respect to the upperstructure for digging close to a structure [Figure 54].

BOOM LOAD HOLDING VALVE (IF EQUIPPED)

Description

The boom load holding valve (if equipped) will hold the boom in its current position in the event of hydraulic pressure loss.

NOTE: Load Holding Valves may be required for lifting objects. Check the regulation in your area. See your Bobcat dealer for load holding valves for your model excavator.

! WARNING

AVOID INJURY OR DEATH

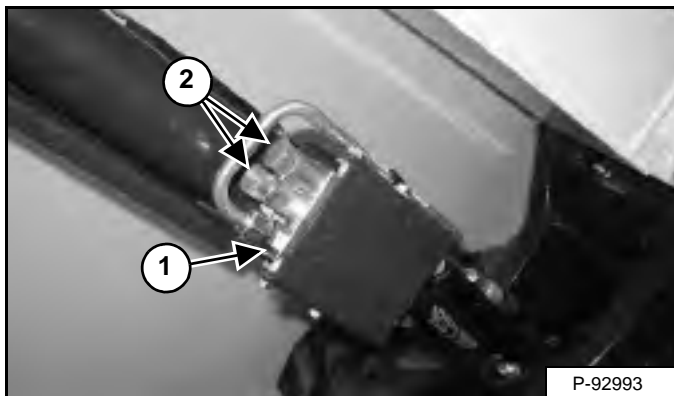
Do Not work or stand under raised work equipment or attachment.

W-2793-0409

Lowering Boom With Load Holding Valve

NOTE: The boom load holding valve is required for object handling applications.

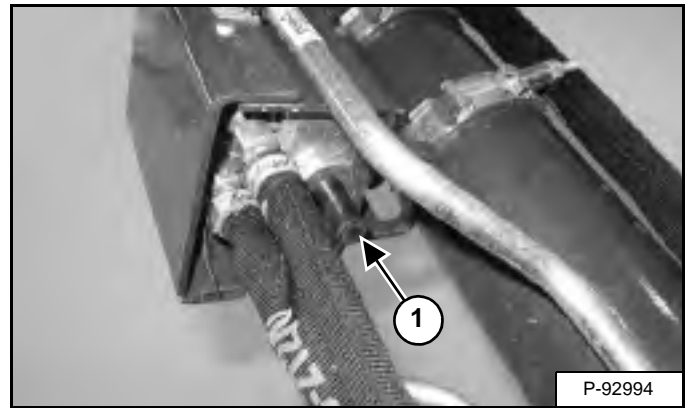
Figure 55



If the excavator is equipped with a boom load holding valve (Item 1) [Figure 55], it will be attached to the boom cylinder at the base end.

NOTE: DO NOT remove or adjust the two port relief valves (Item 2) [Figure 55]. If the port relief valves have been tampered with, see your Bobcat dealer for service.

Figure 56



Remove the plastic protective cap (Item 1) [Figure 56] from the valve.

! WARNING

AVOID BURNS

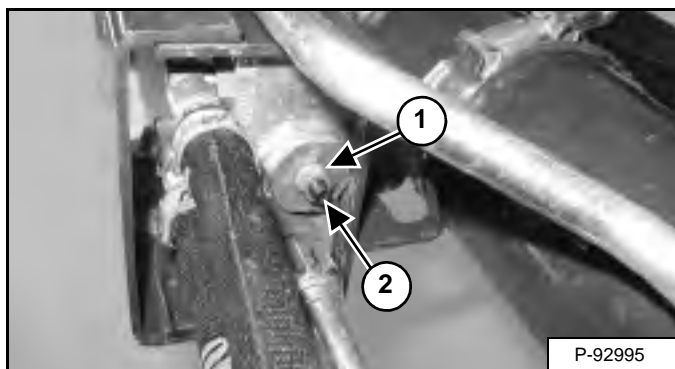
Hydraulic fluid, tubes, fittings and quick couplers can get hot when running machine and attachments. Be careful when connecting and disconnecting quick couplers.

W-2220-0396

BOOM LOAD HOLDING VALVE (IF EQUIPPED) (CONT'D)

Lowering Boom With Load Holding Valve (Cont'd)

Figure 57



Lowering procedures:

With base end hose failure:

Loosen the jam nut (Item 1). Install a hex wrench into the valve screw (Item 2) **[Figure 57]** and slowly rotate the screw clockwise 1/8 to 1/4 turn and allow the boom to lower to the ground.

After the boom is fully lowered, rotate the screw anticlockwise (Item 2) 1/8 to 1/4 turn and tighten the lock nut (Item 1) **[Figure 57]**.

With rod end hose failure - with accumulator pressure:

Place a container under the valve and hose end to contain hydraulic fluid. Enter the excavator and turn the key to the ON position but do not start the engine. Slowly move the joystick boom lower function and allow the boom to lower to the ground.

With rod end hose failure and NO accumulator pressure:

Remove the boom base end hose from the boom load holding valve. Place a container under the valve and base end hose to contain hydraulic fluid.

Loosen the jam nut (Item 1). Install a hex wrench into the valve screw (Item 2) **[Figure 57]** and slowly rotate the screw clockwise 1/8 to 1/4 turn and allow the boom to lower to the ground.

After the boom is fully lowered, rotate the screw (Item 2) anticlockwise 1/8 to 1/4 turn and tighten the lock nut (Item 1) **[Figure 57]**. Reinstall the base end hose.

Loss of hydraulic pressure:

Use the same procedure as: **With rod end hose failure and NO accumulator pressure.**

ARM LOAD HOLDING VALVE (IF EQUIPPED)

Description

The arm load holding valve (if equipped) will hold the arm in its current position in the event of hydraulic pressure loss.

NOTE: Load Holding Valves may be required for lifting objects. Check the regulation in your area. See your Bobcat dealer for load holding valves for your model excavator.

WARNING

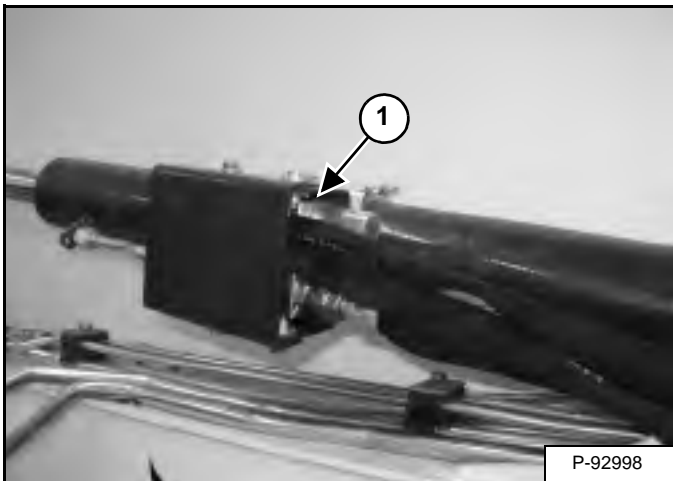
AVOID INJURY OR DEATH

Do Not work or stand under raised work equipment or attachment.

W-2793-0409

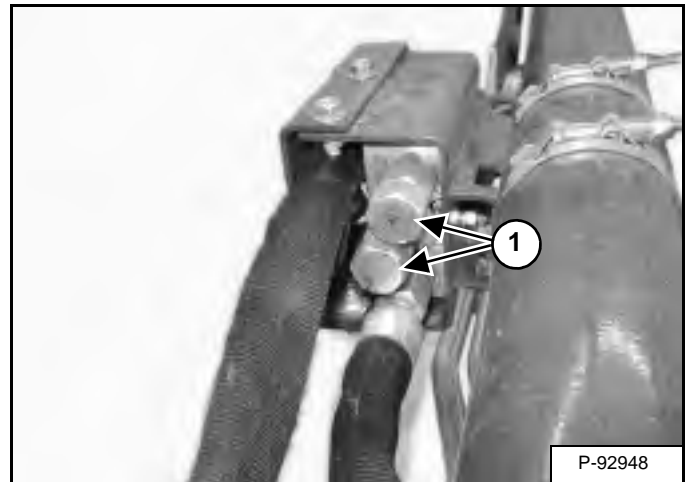
Lowering Arm With Load Holding Valve

Figure 58



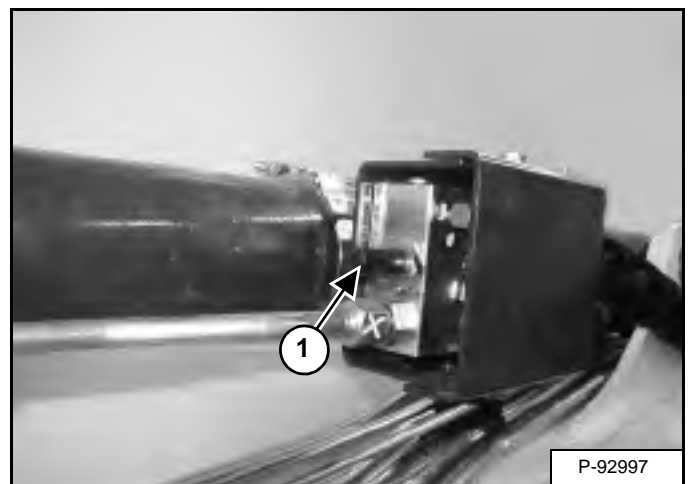
If the excavator is equipped with arm load holding valve (Item 1) [Figure 58], it will be attached to the arm cylinder base end as shown.

Figure 59



NOTE: DO NOT remove or adjust the two port relief valves (Item 1) [Figure 59]. If the port relief valves have been tampered with, see your Bobcat dealer for service.

Figure 60



Remove the plastic protective cap (Item 1) [Figure 60] from the valve.

WARNING

AVOID BURNS

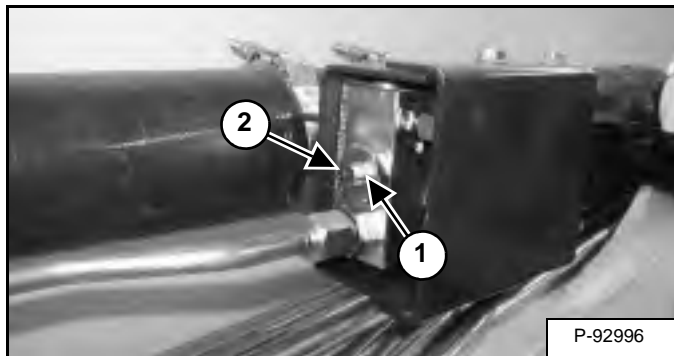
Hydraulic fluid, tubes, fittings and quick couplers can get hot when running machine and attachments. Be careful when connecting and disconnecting quick couplers.

W-2220-0396

ARM LOAD HOLDING VALVE (IF EQUIPPED) (CONT'D)

Lowering Arm With Load Holding Valve (Cont'd)

Figure 61



Lowering procedures:

With base end hose failure:

Loosen the jam nut (Item 1). Install a hex wrench into the valve screw (Item 2) [Figure 61] and slowly rotate the screw clockwise 1/8 to 1/4 turn and allow the arm to lower.

After the arm is lowered, rotate the screw anticlockwise (Item 2) the same 1/8 to 1/4 turn and tighten the lock nut (Item 1) [Figure 61].

With rod end hose failure - with accumulator pressure:

Place a container under the valve and hose end to contain hydraulic fluid. Enter the excavator and turn the key to the ON position but do not start the engine. Move the joystick arm retract function to slowly lower the arm.

With rod end hose failure and NO accumulator pressure:

Remove the arm base end hose from the arm load holding valve. Place a container under the valve and base end hose to contain hydraulic fluid.

Loosen the jam nut (Item 1). Install a hex wrench into the valve screw (Item 2) [Figure 61] and slowly rotate the screw clockwise 1/8 to 1/4 turn and allow the arm to lower.

After the arm is lowered, rotate the screw (Item 2) anticlockwise 1/8 to 1/4 turn and tighten the lock nut (Item 1) [Figure 61]. Reinstall the base end hose.

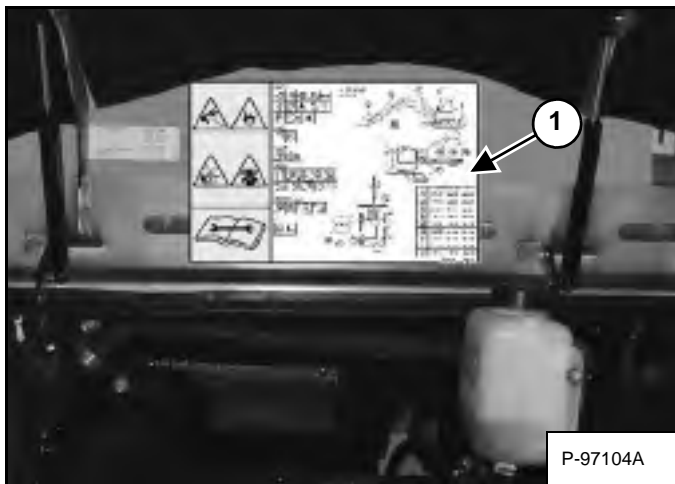
Loss of hydraulic pressure:

Use the same procedure as: **With rod end hose failure - with NO accumulator pressure** above.

DAILY INSPECTION

Daily Inspection And Maintenance

Figure 62



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 62] is located inside the rear door. (See SERVICE SCHEDULE on Page 109.)

Check the following items before each day of operation:

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

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 bylaws 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 centre of the decal toward the edges.

I-2226-EN-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

PRE-STARTING PROCEDURE

Operation & Maintenance Manual And Operator's Handbook Locations

Figure 63

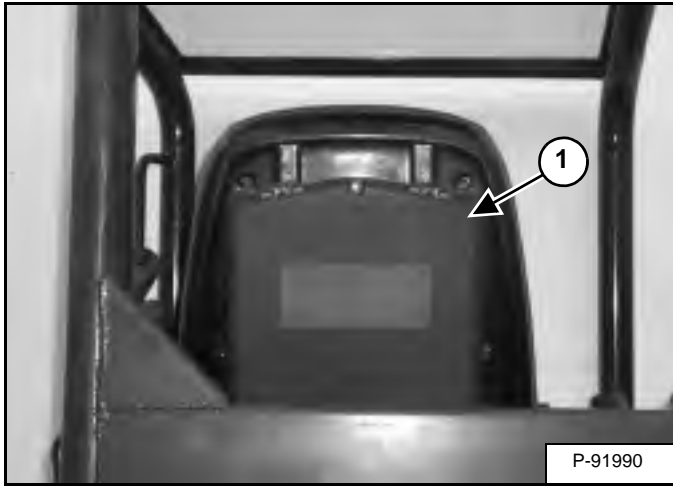
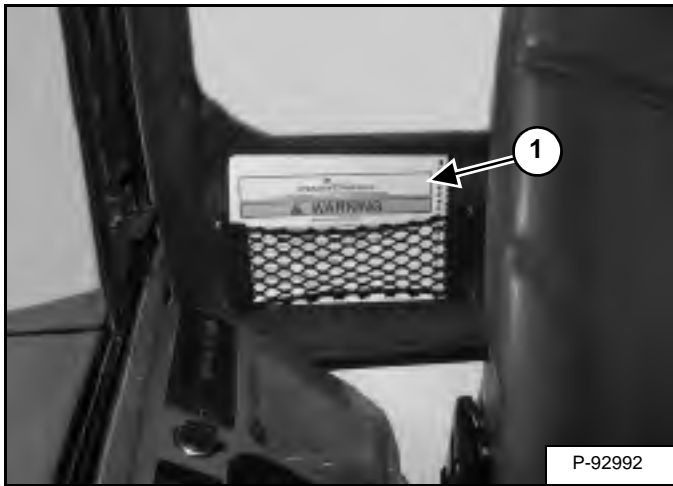


Figure 64



Read and understand the Operation & Maintenance Manual (Item 1) [Figure 63] (located inside the storage box on the back of the operator's seat) and the Operator's Handbook (Item 1) [Figure 64] before operating.

Entering The Excavator

Figure 65



Use the grab handles and tracks to enter the canopy / cab [Figure 65].

WARNING

AVOID INJURY OR DEATH

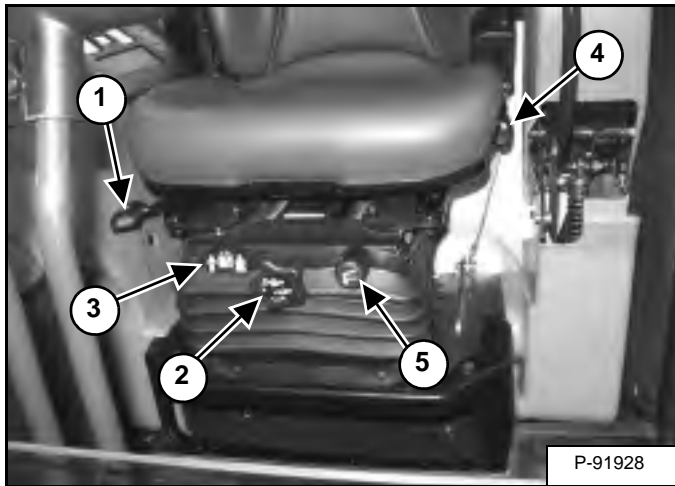
Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, Operator's Handbook and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after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

W-2003-0807

PRE-STARTING PROCEDURE (CONT'D)

Seat Adjustment

Figure 66



Release the seat lever (Item 1) [Figure 66] to adjust the seat forward or back.

Turn the handle (Item 2) to change the adjustment for operator weight. Turn the handle until the operator's weight is shown in the window (Item 3) [Figure 66].

Release the lever (Item 4) [Figure 66] to change the incline of the seat back.

Sit in the seat and turn the knob (Item 5) [Figure 66] to adjust the height of the seat.

Seat Belt

Figure 67



Fasten the seat belt [Figure 67].

PRE-STARTING PROCEDURE (CONT'D)

Control Console

Figure 68



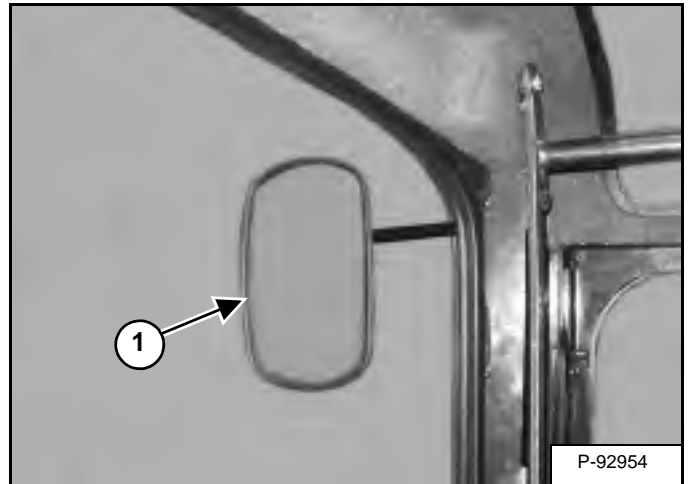
Lower the control console [Figure 68].

NOTE: There is a control lock sensor in the left console which deactivates the hydraulic control levers (joysticks) and the traction drive system when the control console is raised. The console must be in the locked down position for the hydraulic control levers (joysticks) and traction system to operate.

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

Mirror Adjustment (If Equipped)

Figure 69



Adjust mirrors (Item 1) [Figure 69] (if equipped).

STARTING THE ENGINE

Key Switch

! WARNING

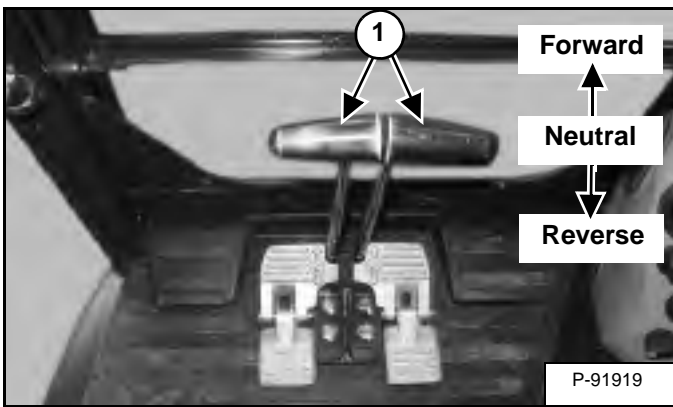
AVOID INJURY OR DEATH

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

W-2135-1108

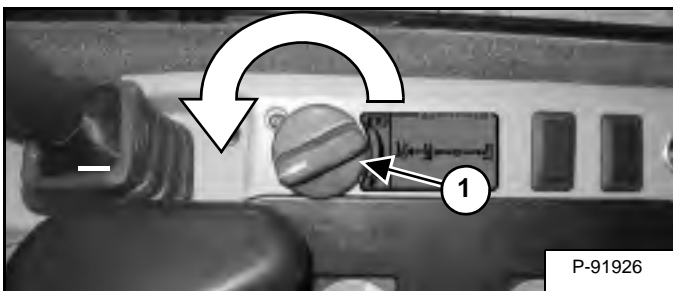
Perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page 61.)

Figure 70



Put control levers (Item 1) [Figure 70] in the neutral position.

Figure 71



Turn the engine speed control dial (Item 1) [Figure 71] anticlockwise to low idle.

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



Turn the key (Item 1) [Figure 72] to the ON position. If preheating is required, the glow plugs will automatically cycle and the remaining preheat time (in seconds) will show in the data display screen. (Preheat icon will be ON).

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

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

STARTING THE ENGINE (CONT'D)

Keyless

! WARNING

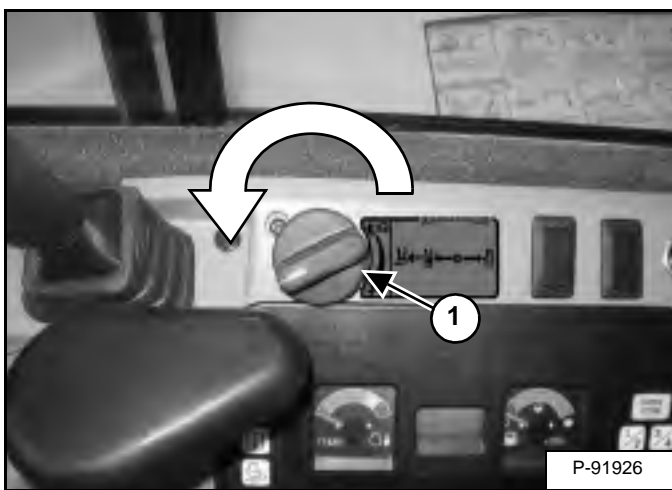
AVOID INJURY OR DEATH

- 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 61.)

Figure 73



Rotate the engine speed control dial (Item 1) [Figure 73] to low idle.

Figure 74



Press ENTER CODE Button (Item 1) [Figure 74]. The display will become lighted and there will be two short beeps, Code will appear on the data display screen.

Use the keypad (Item 2) [Figure 74] to enter the password. For each digit that you enter, a dash will appear on the data display screen. (You have 40 seconds to enter the password or the process will abort and you will need to start over.) If the password was entered correctly, there will be one long beep.

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

Press the START Button (Item 3) [Figure 74] and hold it until the engine starts.

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 4) [Figure 74] to stop the engine.

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

Check for the cause before starting the engine again.

Password Lockout Feature

See Password Lockout Feature. (See Password Lockout Feature on Page 156.)

STARTING THE ENGINE (CONT'D)

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.

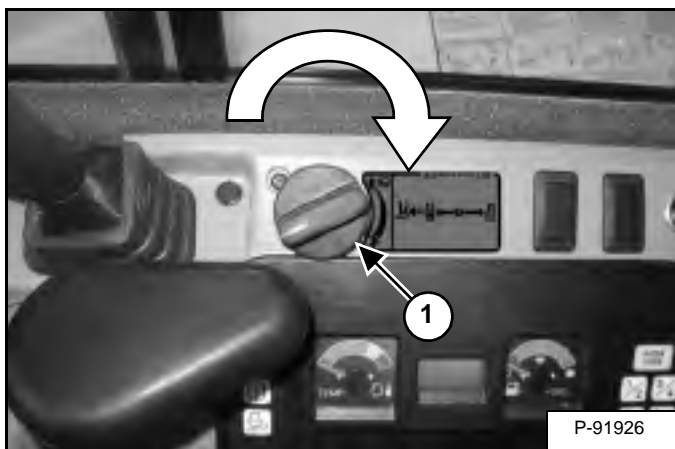
W-2071-0907

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 Oil Chart on Page 123.)
- 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 131.).

Figure 75



Rotate the engine speed control dial (Item 1) [Figure 75] clockwise to high idle.

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

Key Switch

Figure 76



Turn the key to the ON position [Figure 76].

Figure 77



The preheat icon (Item 1) [Figure 77] will illuminate. The glow plugs will automatically cycle. When the icon goes off, turn the key to START.

Release the key when the engine starts, it will return to the ON position.

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

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

STARTING THE ENGINE (CONT'D)

Cold Temperature Starting (Cont'd)

Keyless

Follow STARTING PROCEDURE. (See Keyless on Page 65.)

If the preheat icon comes ON, wait for it to go off before pressing the START Button [Figure 77 on Page 66].

The remaining preheat time (in seconds) will count down in the data display screen.

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

IMPORTANT

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

I-2015-0284

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

Warming The Hydraulic System

IMPORTANT

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

I-2007-0910

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

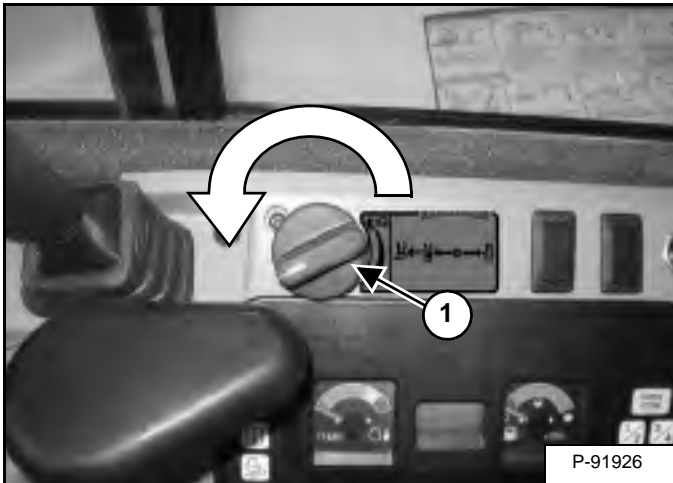
Procedure

Figure 78



Stop the machine on level ground. Lower the work equipment and the blade to the ground [Figure 78].

Figure 79



Rotate the engine speed control dial (Item 1) [Figure 79] anticlockwise to low idle.

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

Figure 80

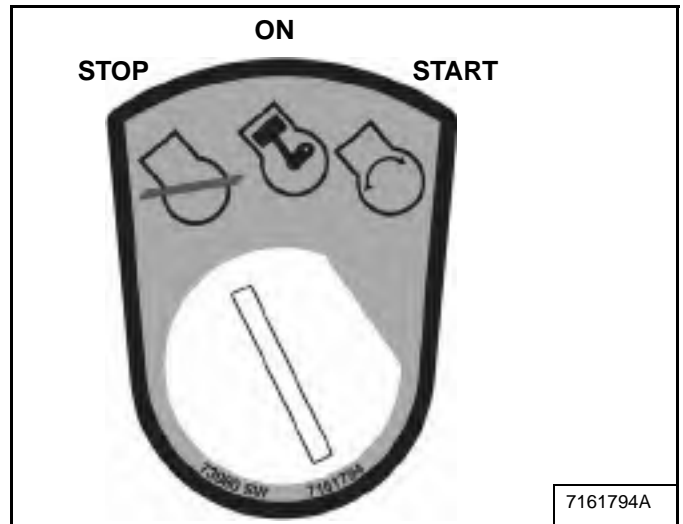


Figure 81



Turn the key switch to STOP [Figure 80] or press the STOP Button (Keyless Panel) (Item 1) [Figure 81].

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.

ATTACHMENTS

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

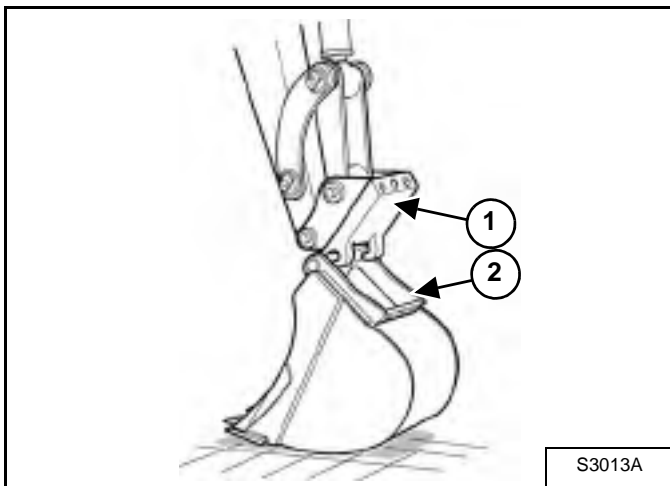
Never use attachments or buckets which are not approved by Bobcat Company. Buckets and attachments for safe loads of specified densities are approved for each model. Unapproved attachments can cause injury or death.

W-2052-0907

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

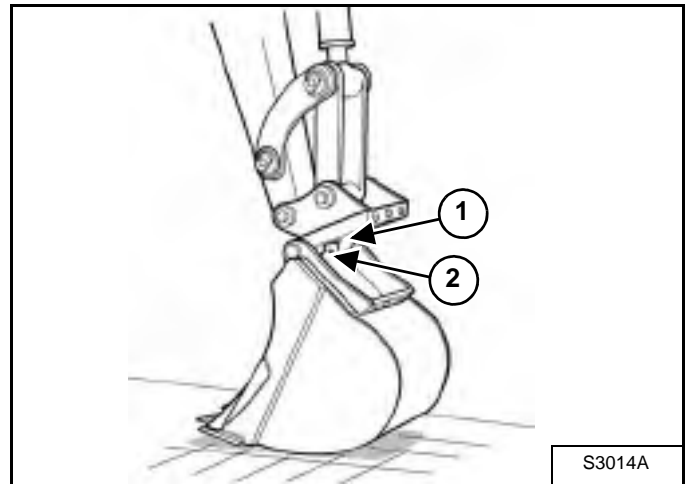
Fully retract the bucket cylinder.

Figure 82



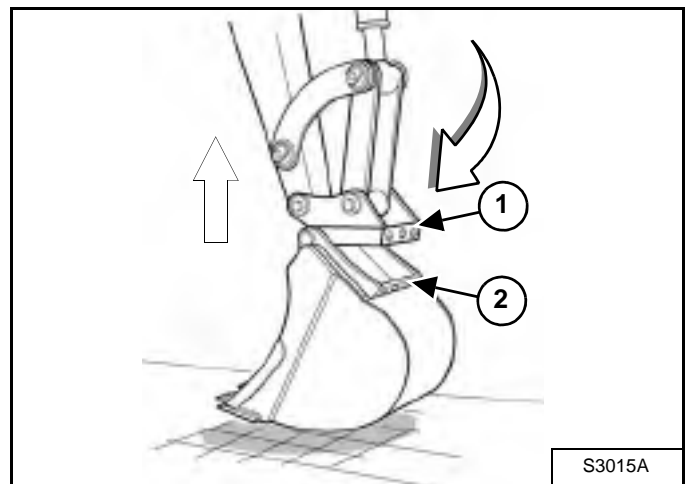
Lower the coupler (Item 1) onto the attachment (Item 2) [Figure 82].

Figure 83



Engage the coupler hooks (Item 1) onto the attachment shaft (Item 2) [Figure 83].

Figure 84



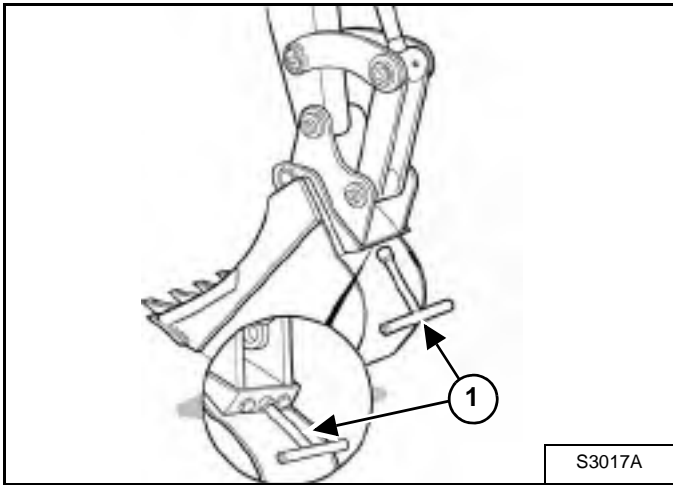
Extend (curl in) the bucket cylinder and slightly raise the boom until the coupler (Item 1) contacts the back of the attachment mount (Item 2) [Figure 84].

ATTACHMENTS (CONT'D)

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

Installation (Cont'd)

Figure 85



Engage the parking brake.

Stop the engine and exit the excavator.

Use the supplied wrench (Item 1) **[Figure 85]** and turn the locking pins clockwise until they are fully engaged.

Removal

Park the excavator on a level surface.

Figure 86

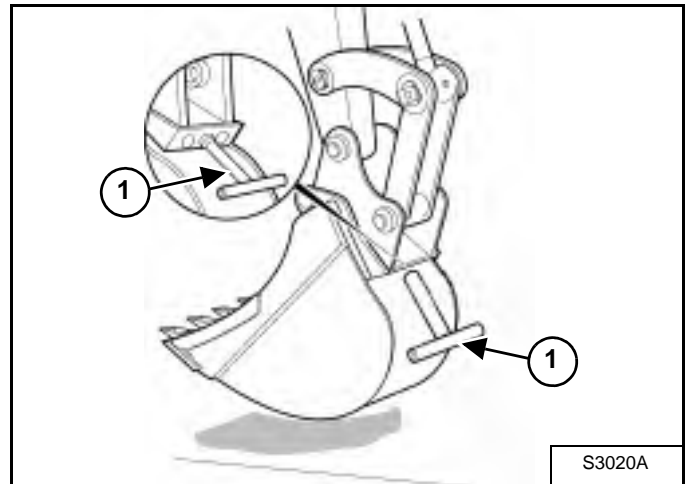


Raise the boom and extend the bucket cylinder until the attachment it is slightly off the ground **[Figure 86]**.

Engage the parking brake.

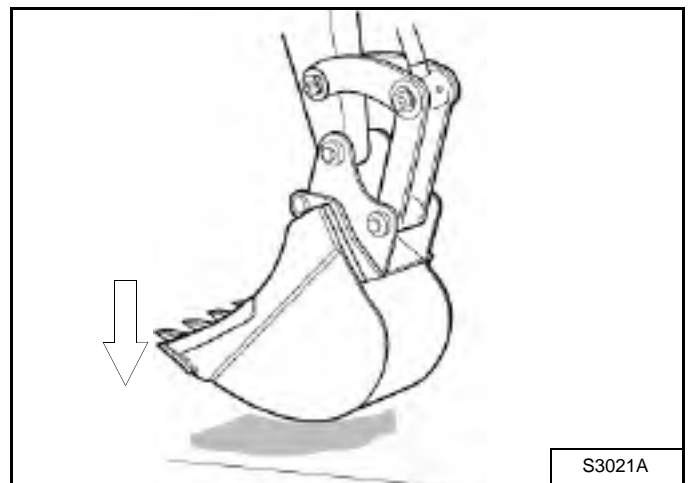
Stop the engine and exit the excavator.

Figure 87



Install the wrench (Item 1) **[Figure 87]** on the locking pins and turn anticlockwise until the locking pins are disengaged.

Figure 88



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

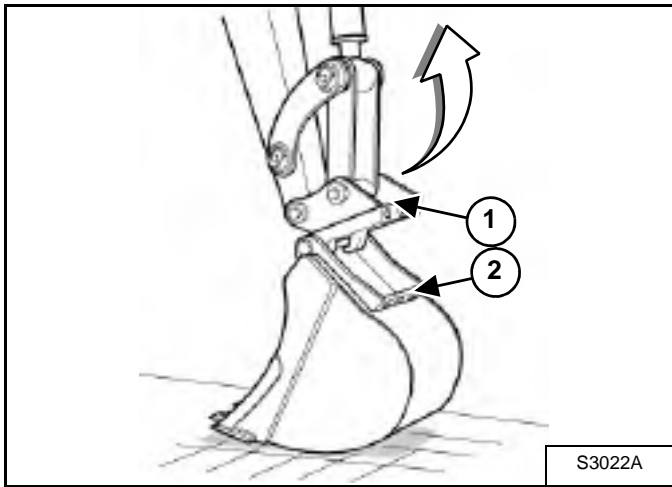
Lower the attachment until it is on the ground **[Figure 88]**.

ATTACHMENTS (CONT'D)

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

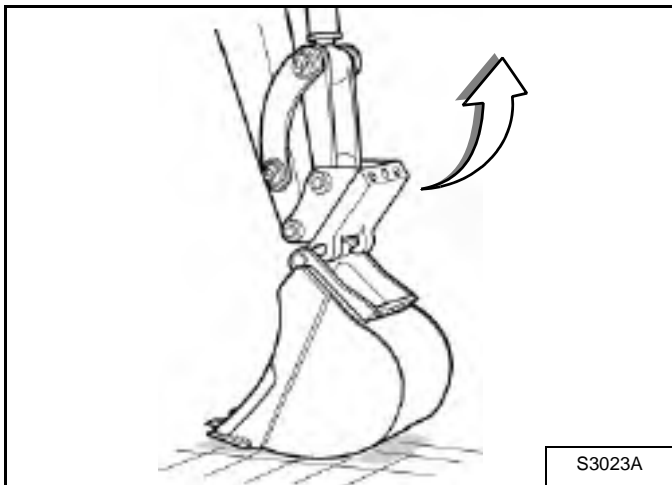
Removal (Cont'd)

Figure 89



Retract the bucket cylinder to rotate the coupler (Item 1) out of the attachment mount (Item 2) **[Figure 89]**.

Figure 90



Move the arm out and raise the boom until the quick coupler is clear of the attachment **[Figure 90]**.

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.

ATTACHMENTS (CONT'D)

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.).

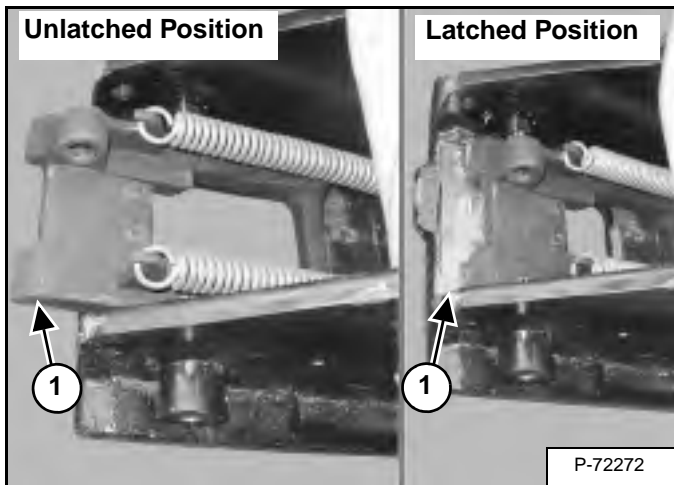
! WARNING

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 91



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 91].

If in the latched position, see [Figure 92] for additional information.

If the latch is in the unlatched position, proceed to [Figure 93].

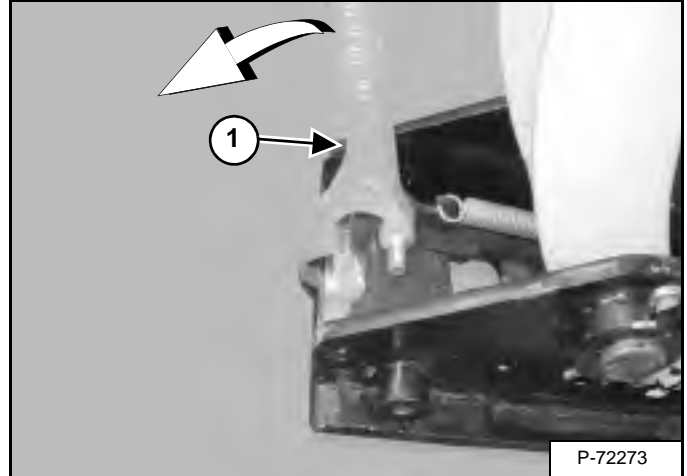
! WARNING

AVOID INJURY

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

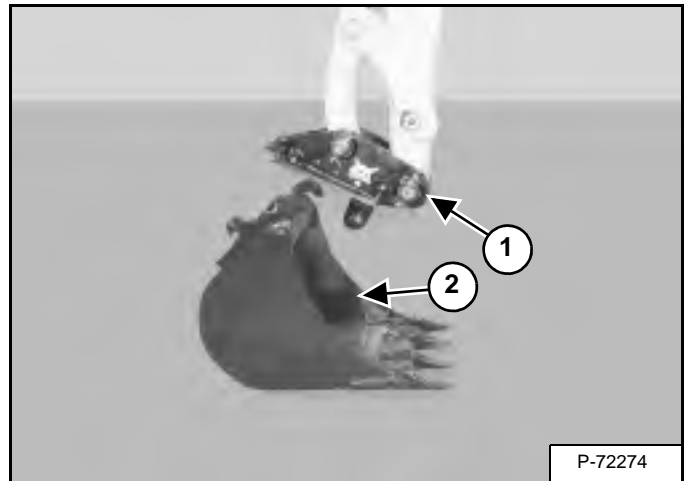
W-2541-1106

Figure 92



To unlatch the quick coupler, install the tool (Item 1) [Figure 92] and pull the handle. The latch will move completely forward. The latch will lock in the unlatched position.

Figure 93



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

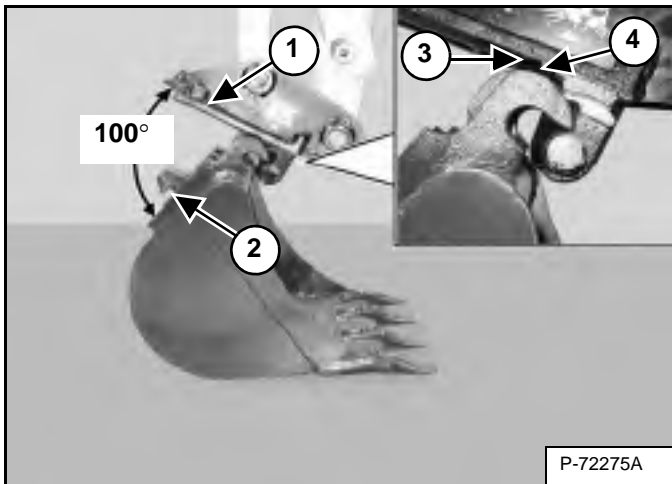
Position the quick coupler (Item 1) to the attachment (Item 2) [Figure 93].

ATTACHMENTS (CONT'D)

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

Installation (Cont'd)

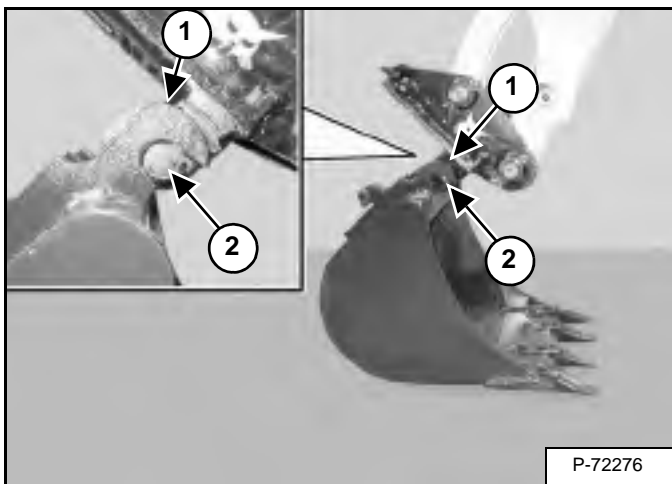
Figure 94



There must be at least 100° between the quick coupler surface (Item 1) and the attachment mounting surface (Item 2) [Figure 94]. Extend the arm out to get the required angle for proper installation.

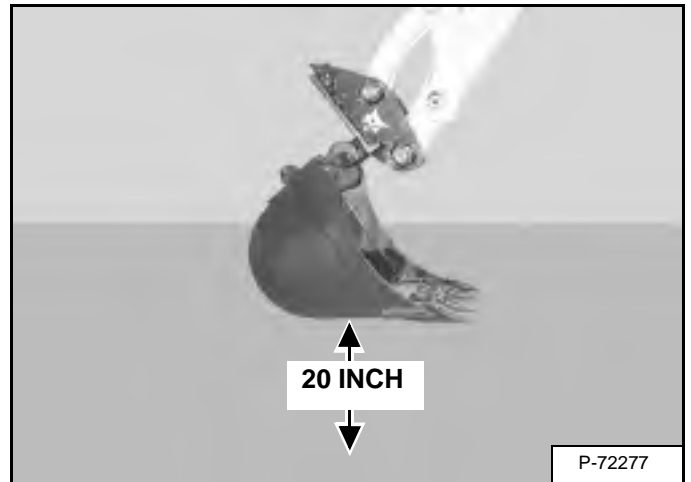
NOTE: There must be proper clearance (100° minimum) between the hook (Item 3) and the quick coupler (Item 4) [Figure 94]. Possible damage to the attachment hooks or the quick coupler could occur without proper clearance.

Figure 95



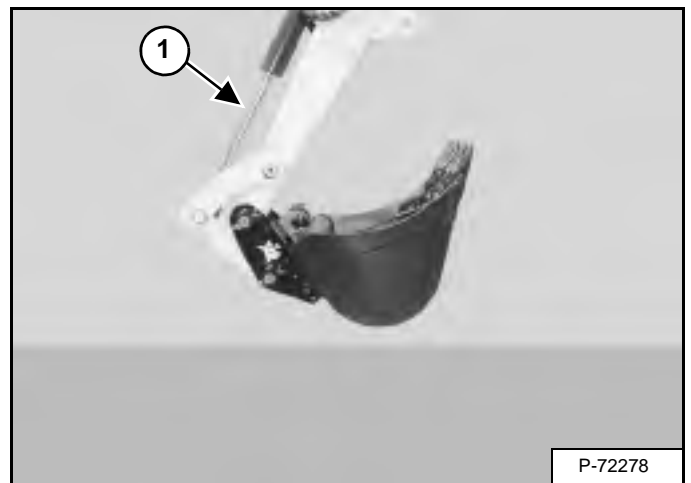
Raise the boom and extend the arm until the hooks of the attachment (Item 1) engage the pins (Item 2) of the quick coupler [Figure 95].

Figure 96



Raise the boom until there is approximately 500 mm (20.0 in) of clearance between the bottom of the attachment and the ground [Figure 96].

Figure 97



Extend the bucket cylinder (Item 1) [Figure 97] fully.

Lower the attachment until it is flat on the ground.

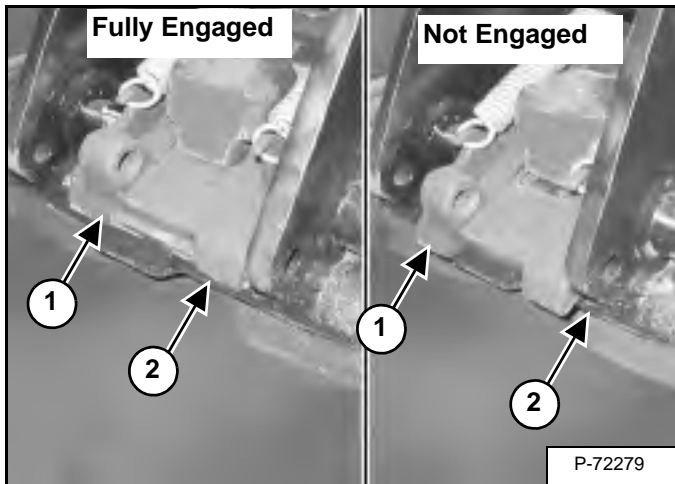
Stop the engine and exit the excavator.

ATTACHMENTS (CONT'D)

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

Installation (Cont'd)

Figure 98



Visually inspect the quick coupler latch (Item 1) to the bucket mount (Item 2) [Figure 98]. The latch must be fully engaged.

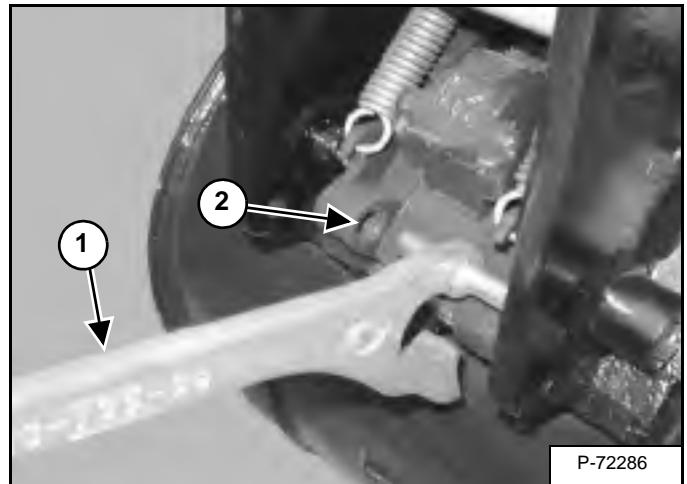
! WARNING

AVOID INJURY

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

W-2541-1106

Figure 99



If the latch is not engaged, install the tool (Item 1) in the hole (Item 2) [Figure 99] 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 98] 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 114] for *Quick Coupler And Attachment Inspection* information.)

ATTACHMENTS (CONT'D)

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

Removal

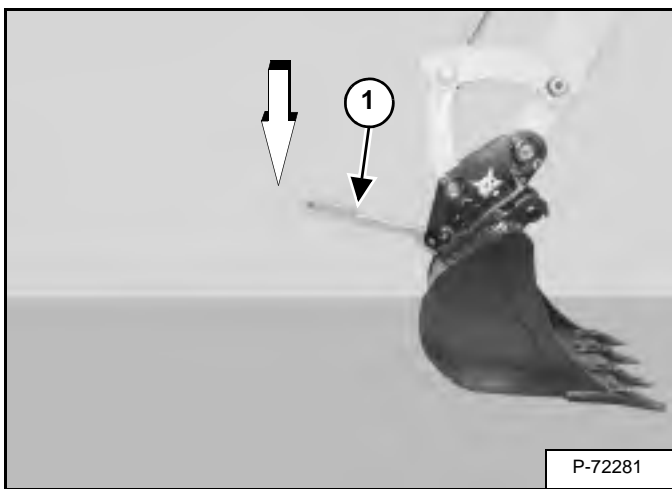
⚠ WARNING

AVOID INJURY

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

W-2541-1106

Figure 100



Position the attachment flat on the ground.

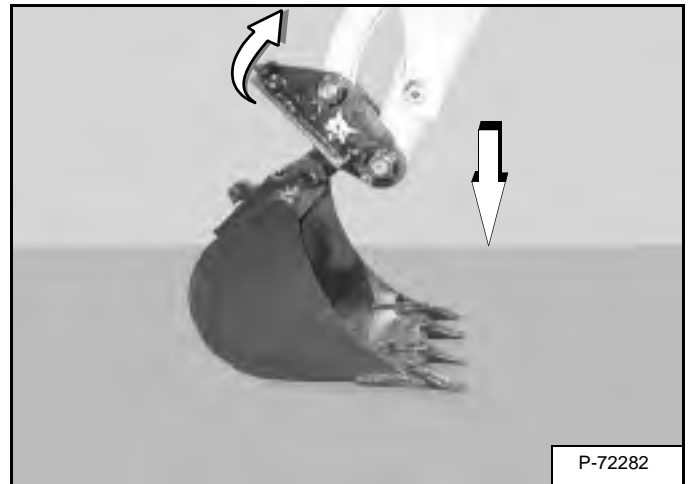
Install the quick coupler tool (Item 1) into the hole (Item 2) [Figure 99] in the quick coupler.

Push down on the tool (Item 1) [Figure 100] to unlock the latch.

Remove the tool.

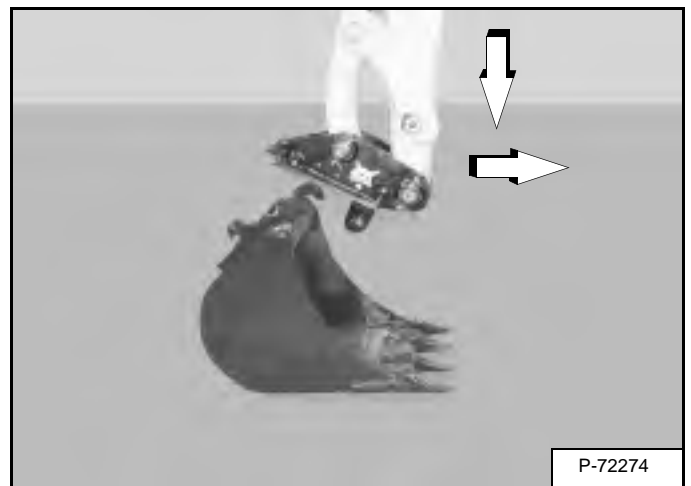
Enter the excavator, fasten the seat belt and start the engine.

Figure 101



Retract the bucket cylinder fully and lower the boom [Figure 101] until the attachment is on the ground.

Figure 102



Continue to lower the boom and move the arm towards the excavator until the quick coupler is clear of the attachment [Figure 102].

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Hydraulic X-Change)

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

WARNING

AVOID INJURY OR DEATH

Both hydraulic pins must be fully extended through the attachment mounting holes. Failure to fully engage the hydraulic pins can allow attachment to come off.

W-2935-0512

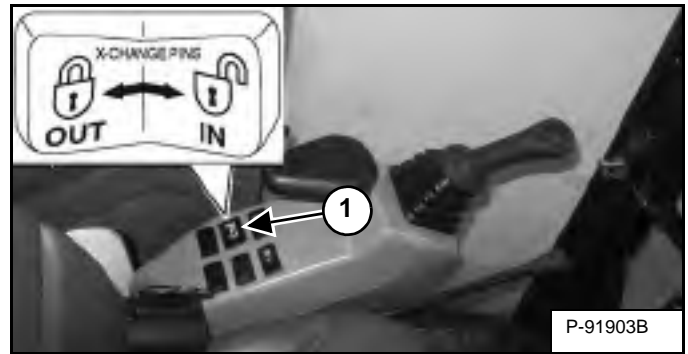
Figure 103



Start the engine.

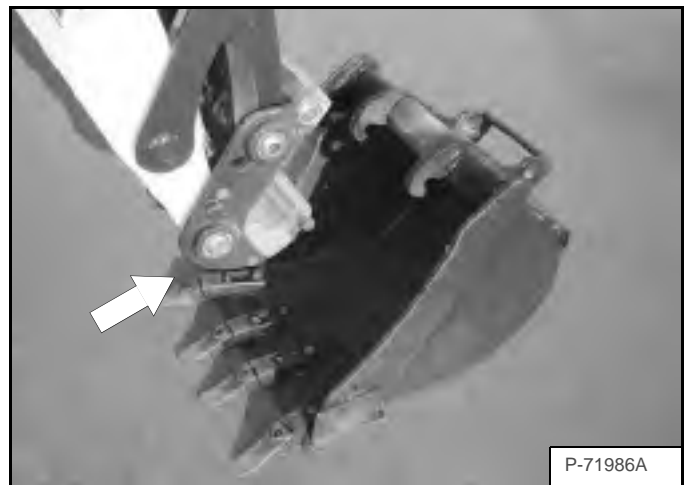
Swing the excavator arm fully to the left [Figure 103] (for better operator visibility when connecting attachments).

Figure 104



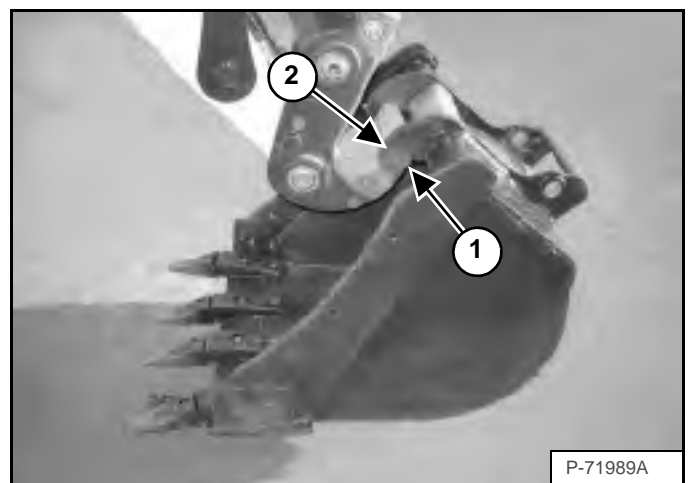
Press and hold the X-Change switch (Item 1) [Figure 104] to the right (IN) to fully retract the hydraulic pins.

Figure 105



Move the arm toward the attachment [Figure 105].

Figure 106



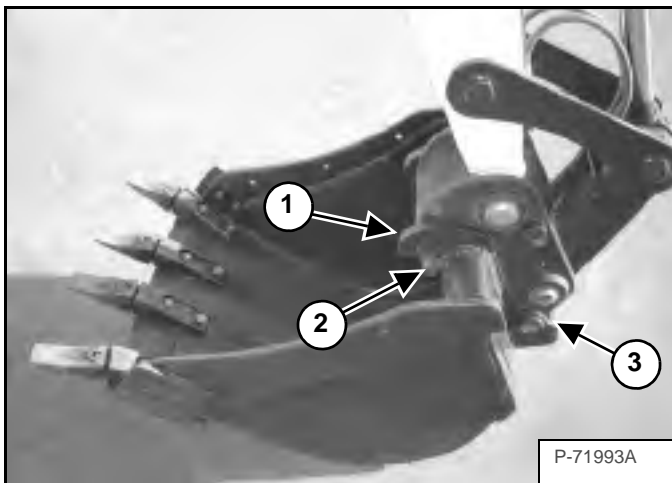
Raise the boom until the X-Change pins (Item 1) engage the attachment hooks (Item 2) [Figure 106] on the bucket.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Hydraulic X-Change) (Cont'd)

Installation (Cont'd)

Figure 107



Raise the boom and extend (curl in) the bucket cylinder until the X-Change contacts the back of the attachment [Figure 107].

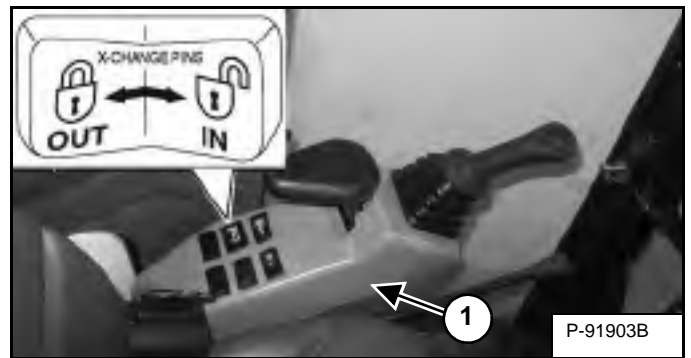
With the arm vertical, lower the boom until the hooks (Item 1) of the bucket disengage the X-Change pins (Item 2) and the plate (Item 3) [Figure 107] fully engages into the bucket crossmember.

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.

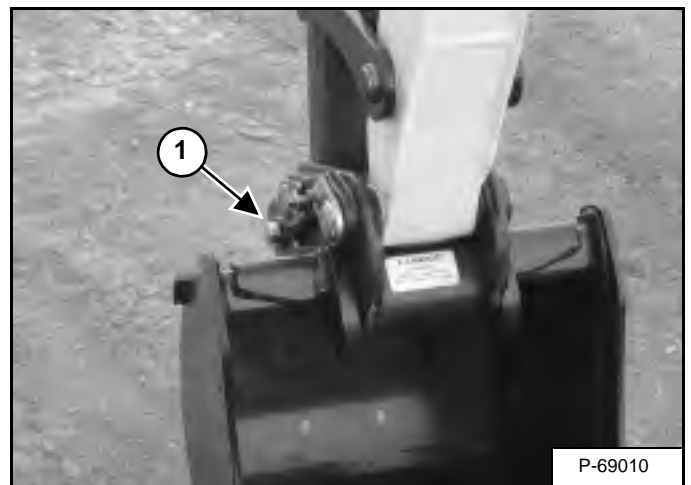
W-2119-0910

Figure 108



Press and hold the X-Change switch (Item 1) [Figure 108] to the left (OUT) and **FULLY EXTEND** the hydraulic pins.

Figure 109



Check that both hydraulic pins (Item 1) [Figure 109] are fully engaged to secure the attachment.

WARNING

AVOID INJURY OR DEATH

Both hydraulic pins must be fully extended through the attachment mounting holes. Failure to fully engage the hydraulic pins can allow attachment to come off.

W-2935-0512

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Hydraulic X-Change) (Cont'd)

Removal

NOTE: Removal and installation 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

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.

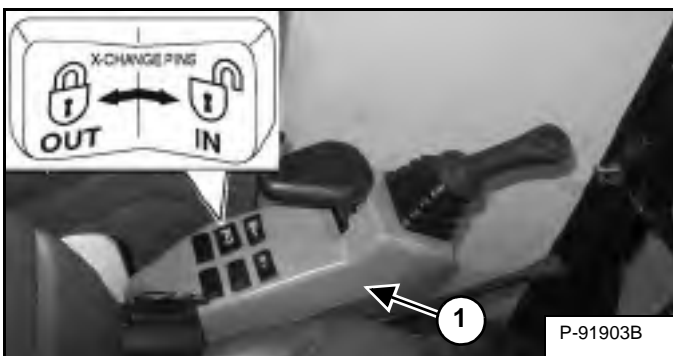
W-2119-0910

Figure 110



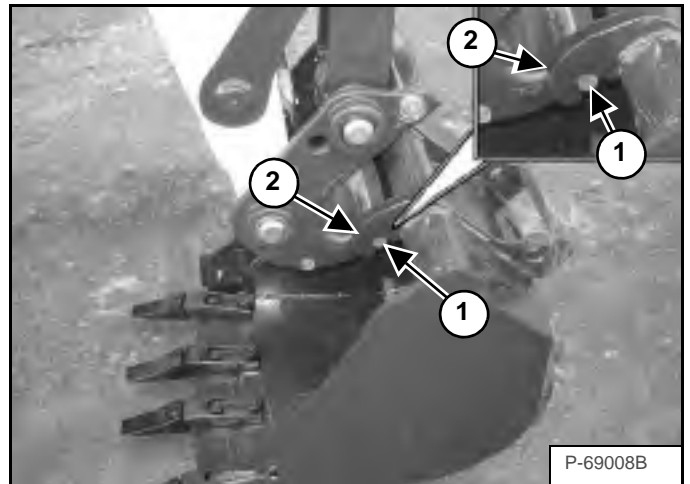
Park the excavator on a flat level surface. Put the attachment on the ground [Figure 110].

Figure 111



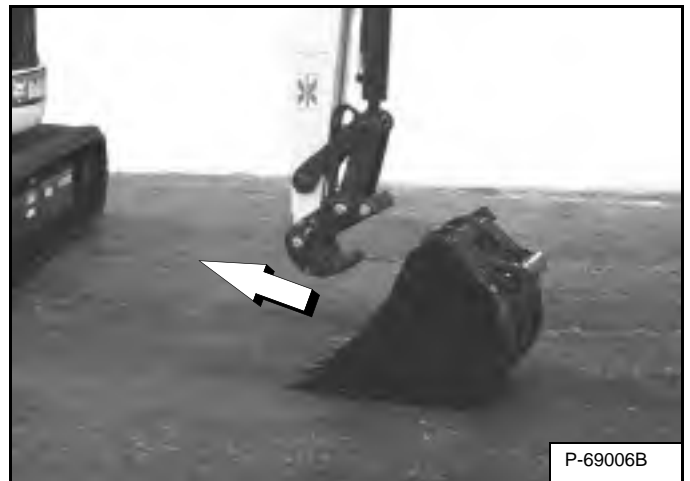
Press and hold the X-Change switch (Item 1) [Figure 111] on the left console to the right (IN) to **FULLY RETRACT** the hydraulic pins.

Figure 112



Raise the boom and retract the bucket cylinder until the X-Change pins (Item 1) engage the attachment hooks (Item 2) [Figure 112] on the bucket.

Figure 113



Fully retract the bucket cylinder (bucket dump).

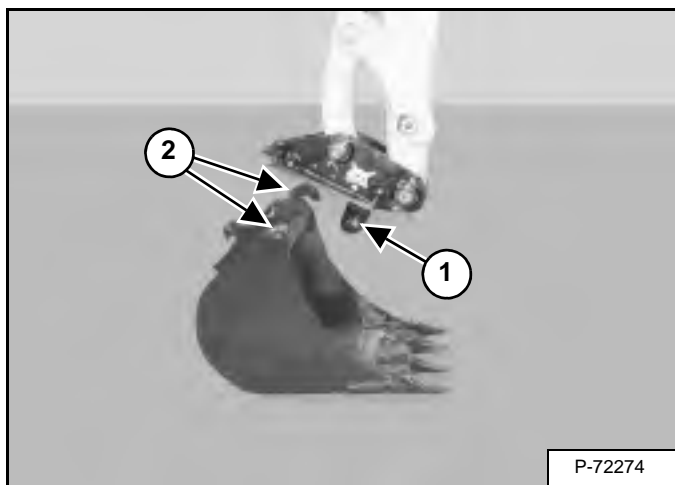
Lower the boom and arm until the attachment is on the ground and the X-Change pins are disengaged from the attachment hooks.

Move the arm toward the excavator until the X-Change pins are clear of the attachment [Figure 113].

ATTACHMENTS (CONT'D)

Quick Coupler And Attachment Inspection

Figure 114



Inspect the quick coupler for wear or damage. Inspect the quick coupler pins (Item 1) and the hooks (Item 2) [Figure 114] (on the attachment) for wear or damage.

Repair or replace damaged parts.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Pin-On X-Change)

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.).

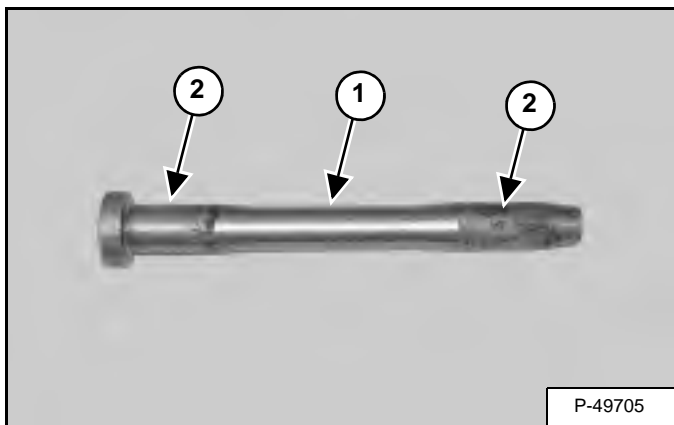
WARNING

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 115



Inspect the pin (Item 1) [Figure 115] for wear or damage. Replace the pin as needed.

Apply a light coat of grease to the ends of the pin (Item 2) [Figure 115].

Figure 116



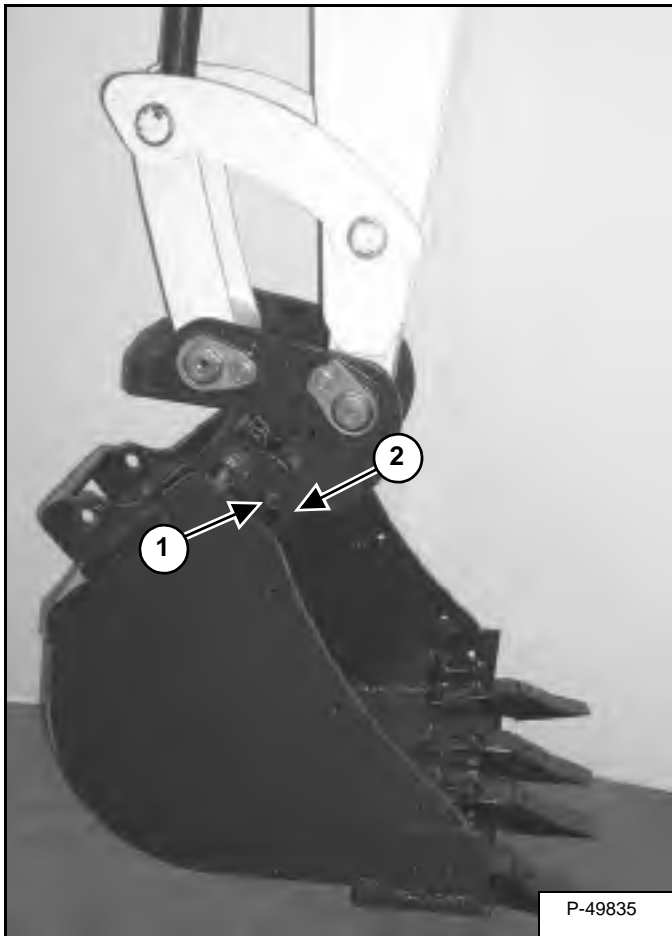
Start the engine and move the arm toward the bucket [Figure 116].

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Pin-On X-Change) (Cont'd)

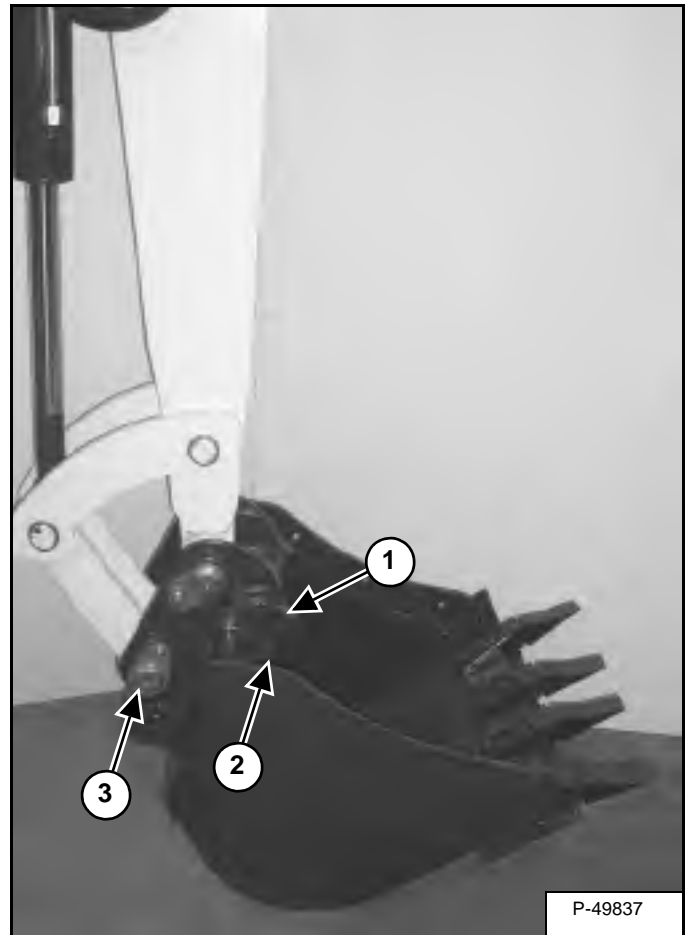
Installation (Cont'd)

Figure 117



Raise the boom until the pins (Item 1) engage the hooks (Item 2) **[Figure 117]** on the bucket.

Figure 118



Raise the boom and extend the bucket cylinder until the X-Change contacts the attachment back **[Figure 118]**.

With the arm vertical, lower the boom until the hooks (Item 1) of the bucket disengage the pins (Item 2) of the X-Change and the plate (Item 3) **[Figure 118]** fully engages in the bucket crossmember.

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.

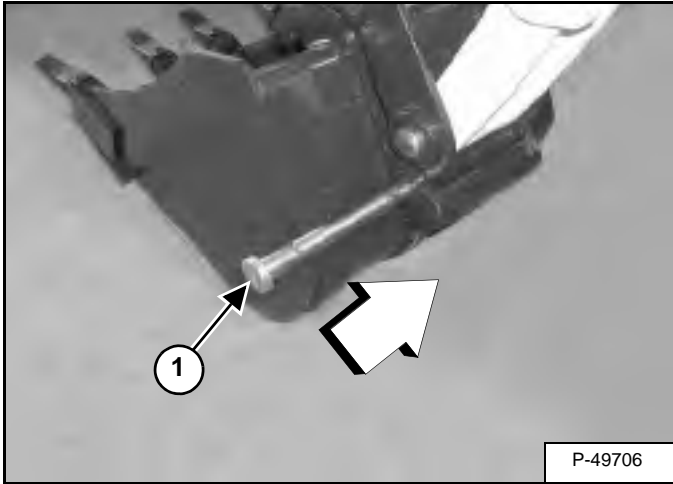
W-2119-0910

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Pin-On X-Change) (Cont'd)

Installation (Cont'd)

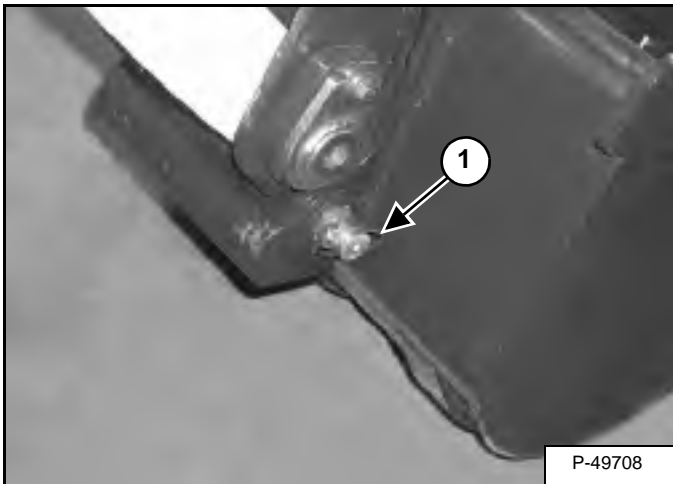
Figure 119



Stop the engine. Turn the start key to the ON position and move both hydraulic control levers to relieve hydraulic pressure.

Drive the pin (Item 1) [Figure 119] through the bucket mount and X-Change.

Figure 120



Install the retainer pin (Item 1) [Figure 120].

Check for proper installation.

Lift the attachment and fully extend and retract the bucket cylinder.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Pin-On X-Change) (Cont'd)

Removal

NOTE: Removal and installation 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 121



Park the excavator on a flat level surface. Put the bucket on the ground [Figure 121].

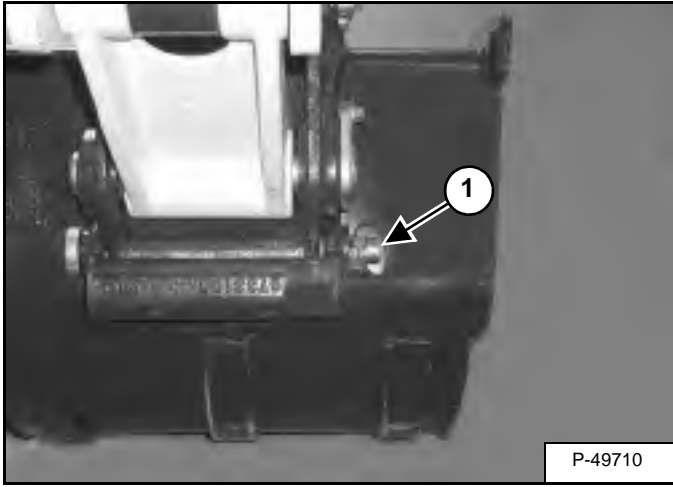
With the engine off, turn the start key to the ON position and move both hydraulic control levers to relieve hydraulic pressure.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Pin-On X-Change) (Cont'd)

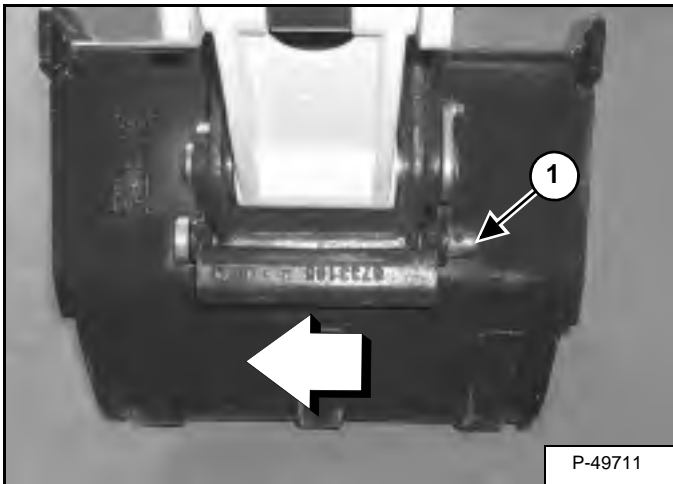
Removal (Cont'd)

Figure 122



Remove the retainer pin (Item 1) [Figure 122].

Figure 123



Drive the pin (Item 1) [Figure 123] out of the bucket and X-Change mount.

WARNING

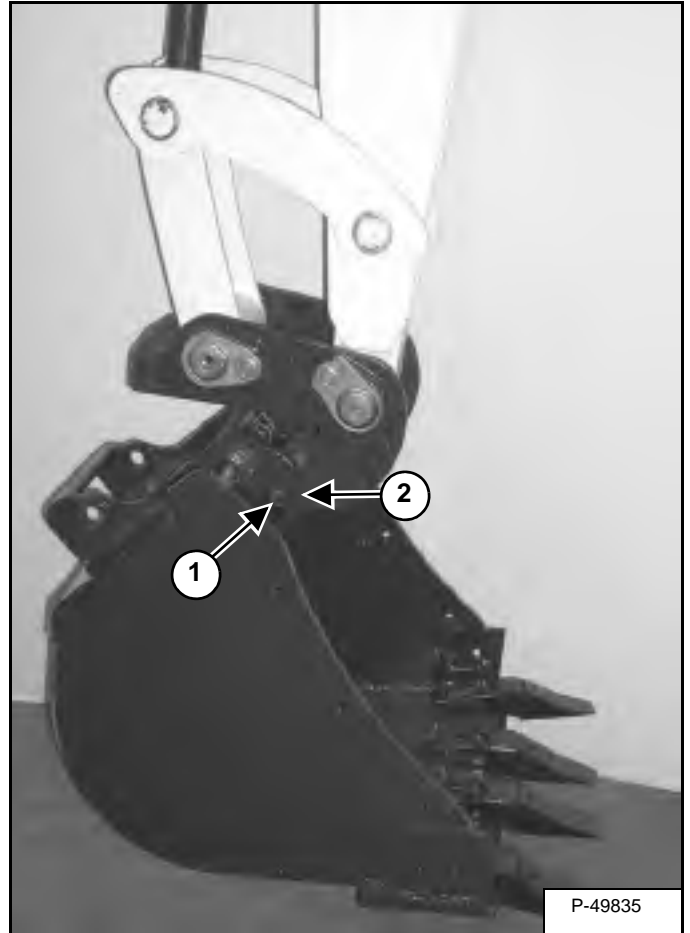
AVOID INJURY OR DEATH

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

Figure 124



Start the engine, raise the boom approximately one foot and retract the bucket cylinder until the X-Change pins (Item 1) engage the hooks (Item 2) [Figure 124] on the bucket.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Pin-On X-Change) (Cont'd)

Removal (Cont'd)

Figure 125



Fully retract the bucket cylinder and lower the boom and arm until the bucket is on the ground, and the X-Change pins (Item 1) are disengaged from the hooks (Item 2) **[Figure 125]**.

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

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Pin-On Attachment)

Installation

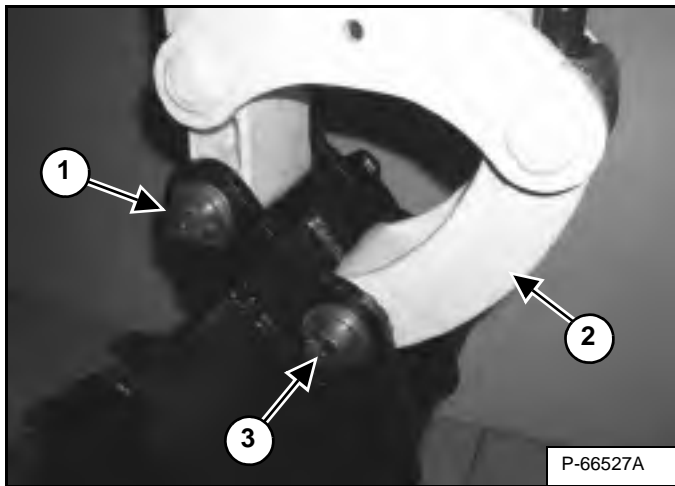
! WARNING

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 126

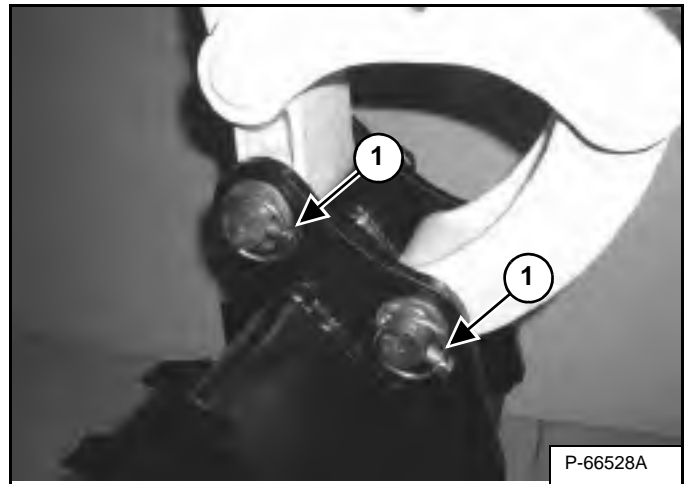


Install the arm into the bucket and align the mounting hole.

Install the pin (Item 1) [Figure 126] and washers.

Install the link (Item 2) in the bucket and align the mounting hole. Install the pin (Item 3) [Figure 126] and washers

Figure 127



Install the two retainer pins (Item 1) [Figure 127]. 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 127].

Remove the washers and pins (Items 1 and 3) [Figure 126].

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, electrical, water, sewer, irrigation, etc.) located and marked. Work slowly in areas of underground utilities.

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 part of 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 128



The joystick lock switch disengages the hydraulic control functions from the joysticks when the console is raised [Figure 128].

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 128].

OPERATING PROCEDURE (CONT'D)

Lifting A Load

Do not exceed the Rated Lift Capacity.



AVOID INJURY OR DEATH

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

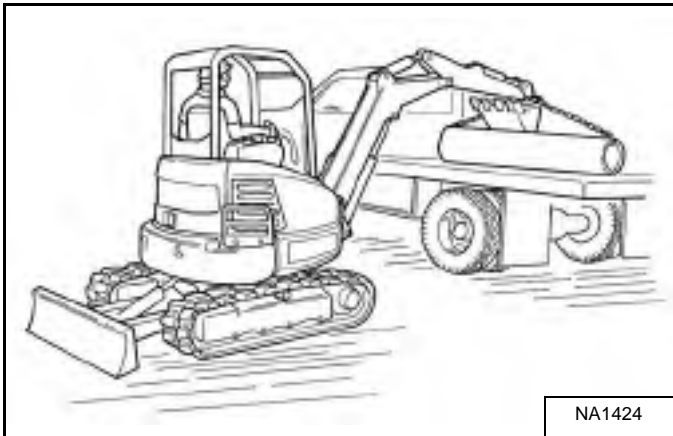
W-2374-0500

NOTE: Load Holding Valves may be required for lifting objects. Check the regulation in your area. See your Bobcat dealer for load holding valves for your model excavator.

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 129



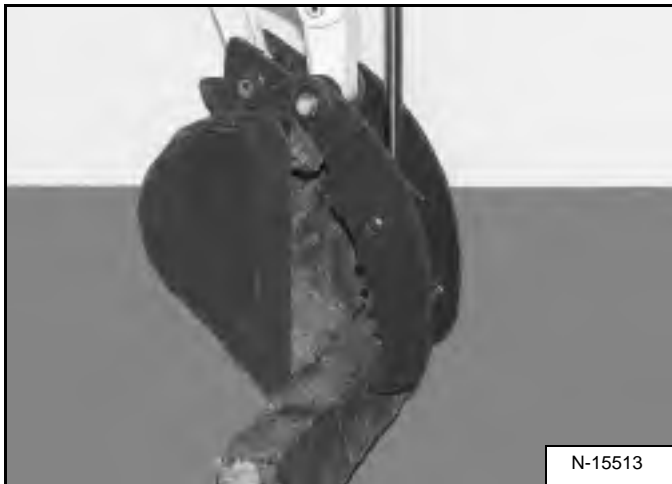
Make sure the load is evenly weighted and centred on the lifting chain, and is secured to prevent the load from shifting [**Figure 129**].

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.

OPERATING PROCEDURE (CONT'D)

Using The Clamp (If Equipped)

Figure 130



The optional lifting clamp attachment gives the excavator a wider range of use and mobility for debris removal [Figure 130].

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

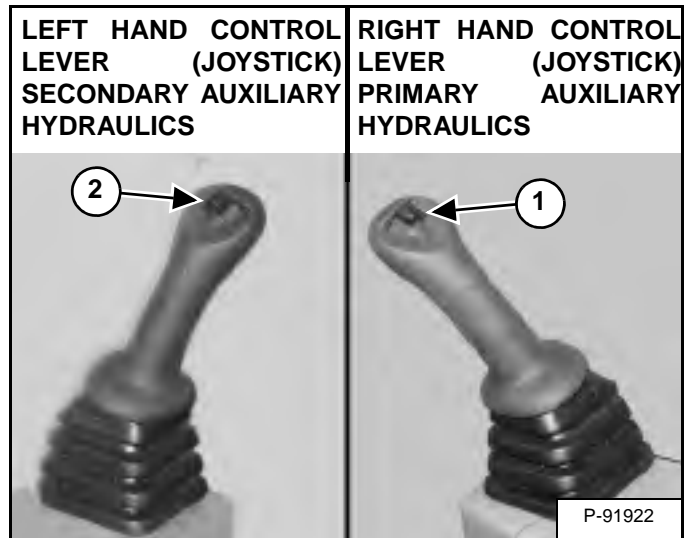
The lift capacities are reduced by 122 Kg (270 lb) if the excavator is equipped with the optional lifting clamp.

NOTE: Use care when operating the bucket and clamp functions on machines equipped with an X-Change and without a bucket or attachment installed. Cylinder damage can occur due to contact between the X-Change and the clamp when both cylinders are fully extended.

When Using Primary Auxiliary Hydraulics To Activate Clamp

Engage the auxiliary hydraulics and toggle to the Aux2 setting. (See Auxiliary Hydraulics on Page 50.)

Figure 131



Move the switch (Item 1) [Figure 131] on the right control lever to the right to open the clamp. Move the switch to the left to close the clamp.

When Using Secondary Auxiliary Hydraulics To Activate Clamp

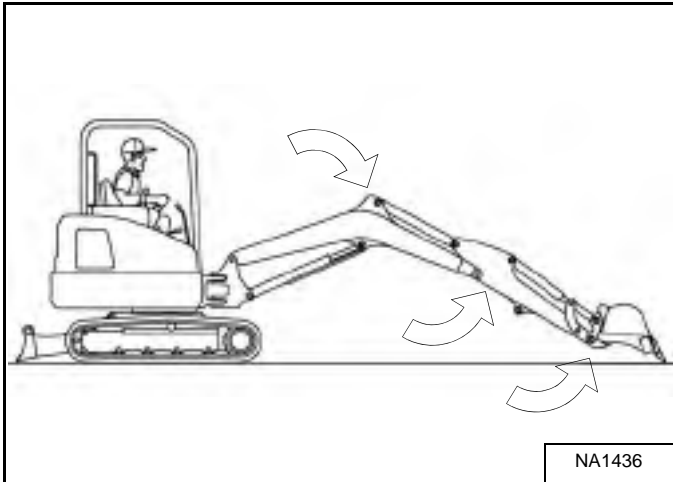
Move the switch (Item 2) [Figure 131] on the left control lever to the left open the clamp. Move the switch to the right to close the clamp.

OPERATING PROCEDURE (CONT'D)

Excavating

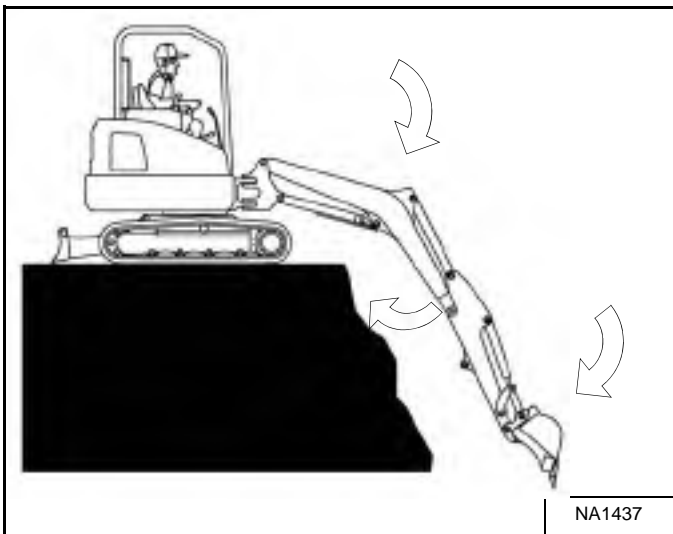
Lower the blade to increase digging performance.

Figure 132



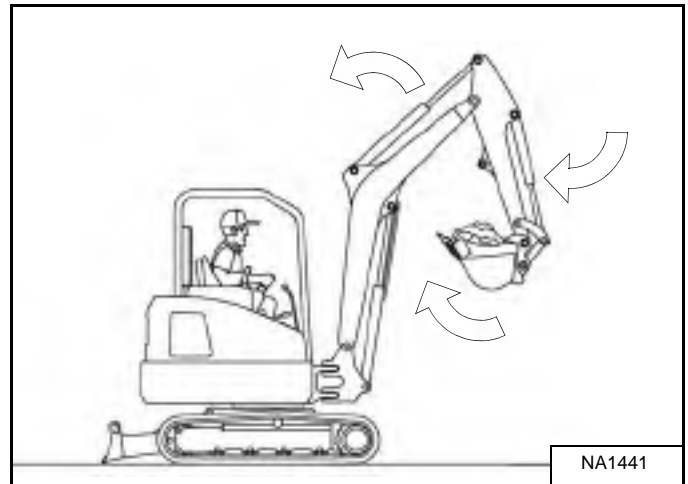
Extend the arm, lower the boom, and open the bucket [Figure 132].

Figure 133



Retract the arm, while lowering boom and curling the bucket [Figure 133].

Figure 134



Raise the boom, retract the arm and curl the bucket [Figure 134].

Rotate the upperstructure.

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.

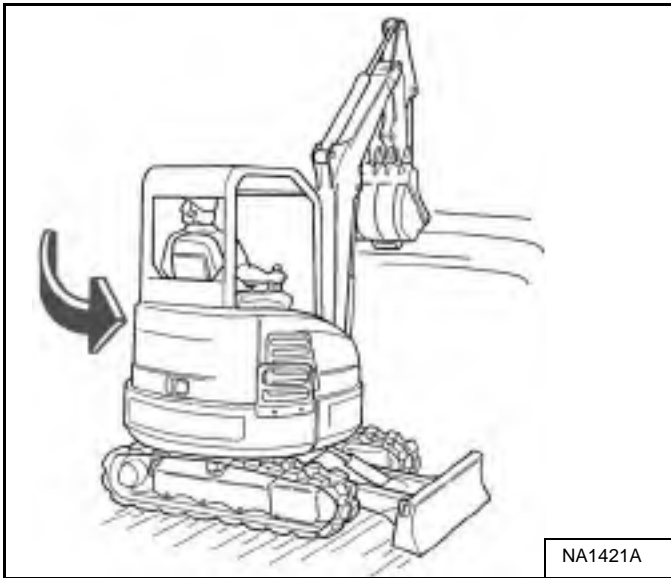
VOLTAGE	MINIMUM DISTANCE
up to 50 kV	3 m
beyond 50 kV	5 m

W-2757-EN-1009

OPERATING PROCEDURE (CONT'D)

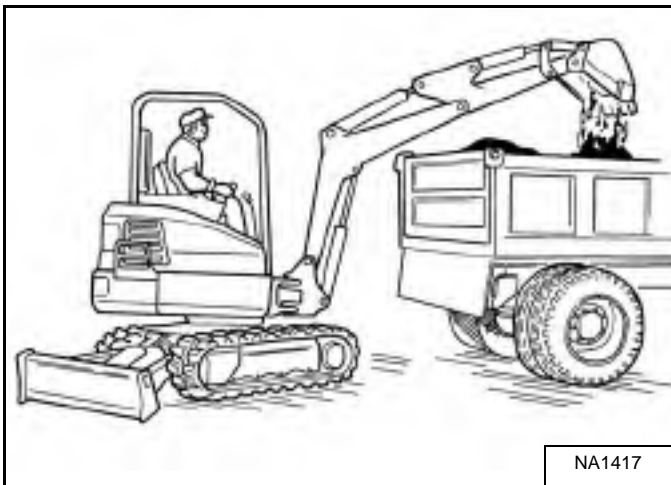
Excavating (Cont'd)

Figure 135



Look in the direction of rotation and make sure there are no bystanders in the work area before rotating the upperstructure [Figure 135].

Figure 136



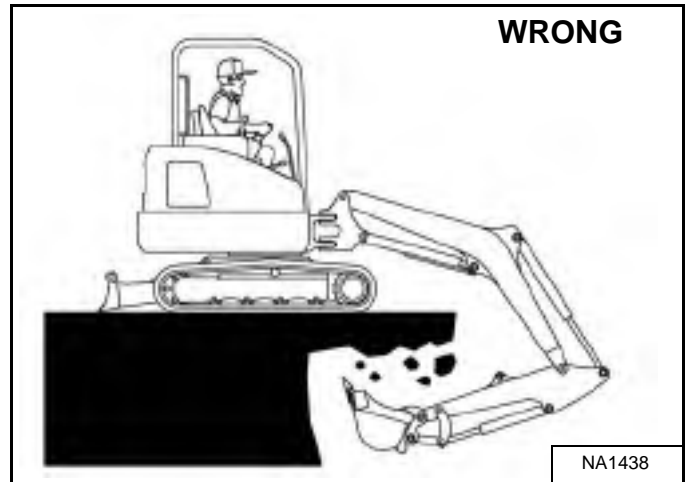
Extend the arm and uncurl the bucket to dump the material into a pile or truck [Figure 136].

IMPORTANT

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

I-2220-0503

Figure 137



Do not dig under the excavator [Figure 137].

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.

OPERATING PROCEDURE (CONT'D)

Boom Swing

Figure 138

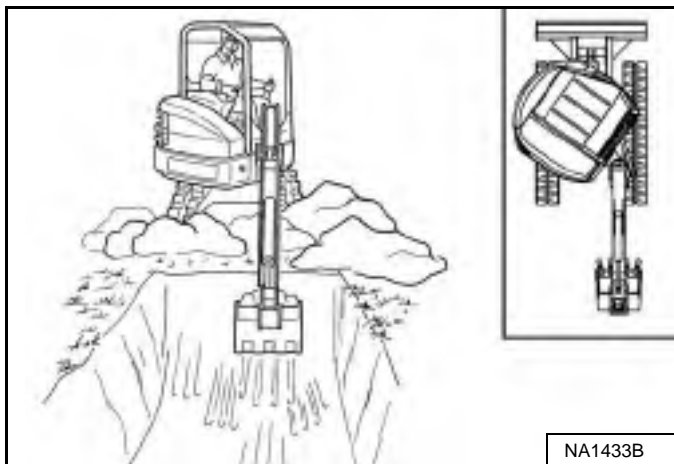


Figure 139

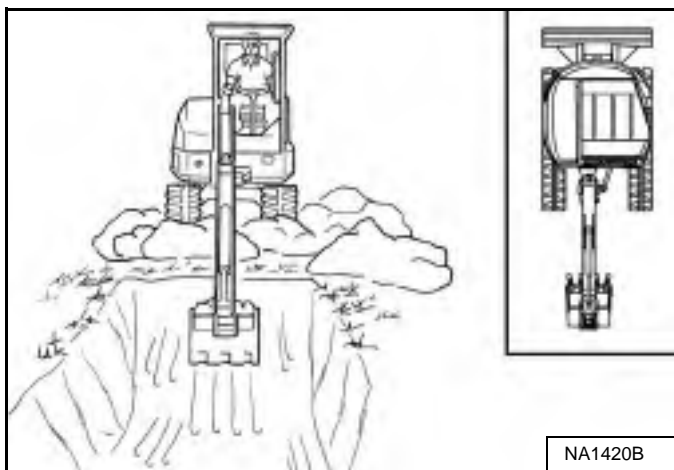
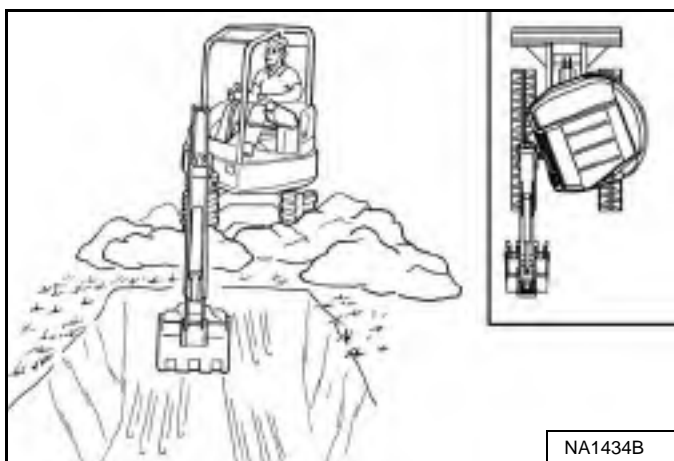


Figure 140



Slew the upperstructure, swing the boom to the right [Figure 138], centre [Figure 139] and left [Figure 140] to dig a square hole the width of the machine without repositioning the excavator.

Figure 141



The boom swing allows the operator to offset the boom and dig close to buildings and other structures [Figure 141].

OPERATING PROCEDURE (CONT'D)

Backfilling

IMPORTANT

Avoid impacting objects with the blade. Damage to blade and undercarriage components may occur.

I-2256-0507

Figure 142



Use the blade to backfill the trench or hole after excavating [Figure 142].

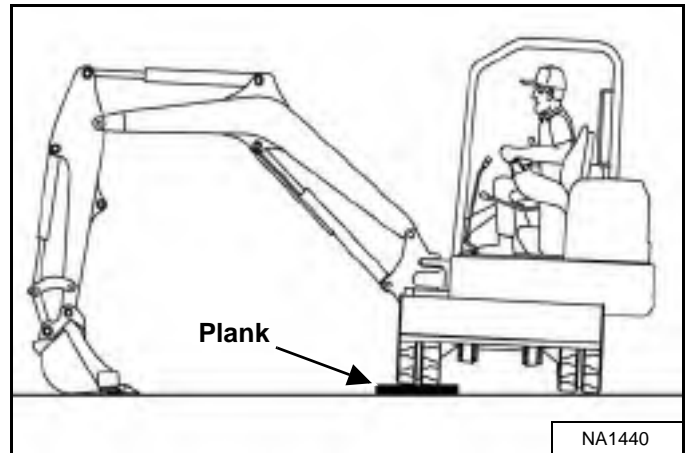
Driving The Excavator

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.

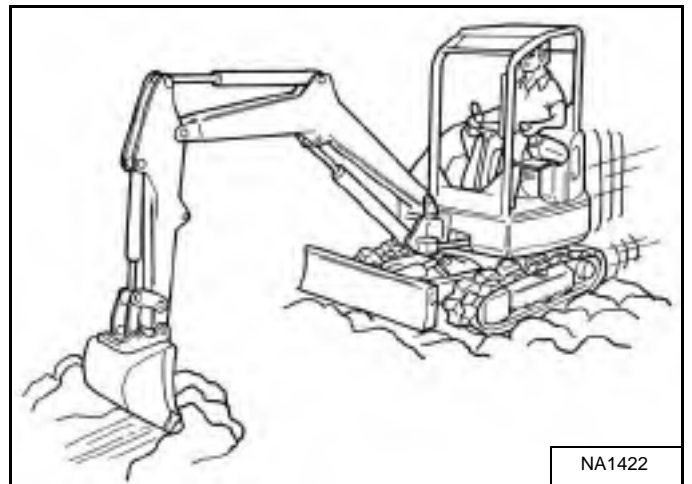
Figure 143



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 143].

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

Figure 144



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 144].

OPERATING PROCEDURE (CONT'D)

Operating On Slopes

! WARNING

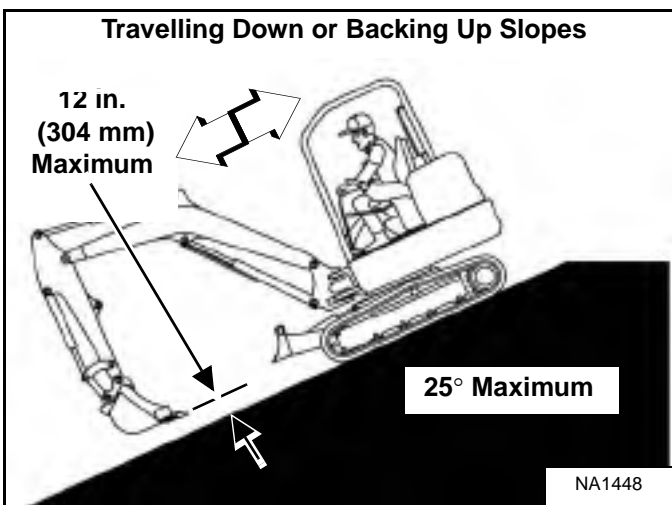
AVOID INJURY OR DEATH

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

W-2497-0304

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

Figure 145



When going down grades that exceed 15 degrees, put the machine in the position shown, and run the engine slowly [Figure 145].

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

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

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

! WARNING

AVOID INJURY OR DEATH

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

W-2498-EN-1009

Figure 146

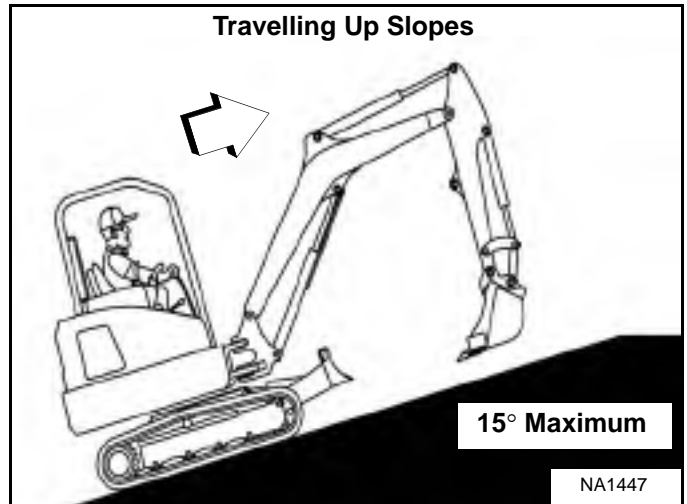
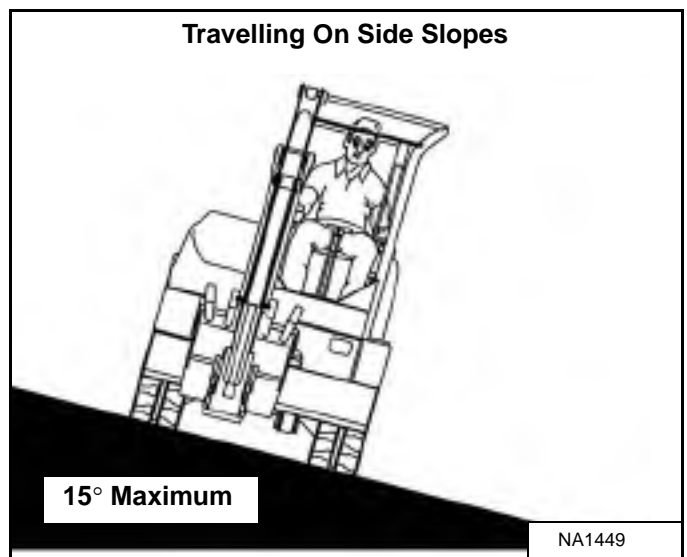


Figure 147

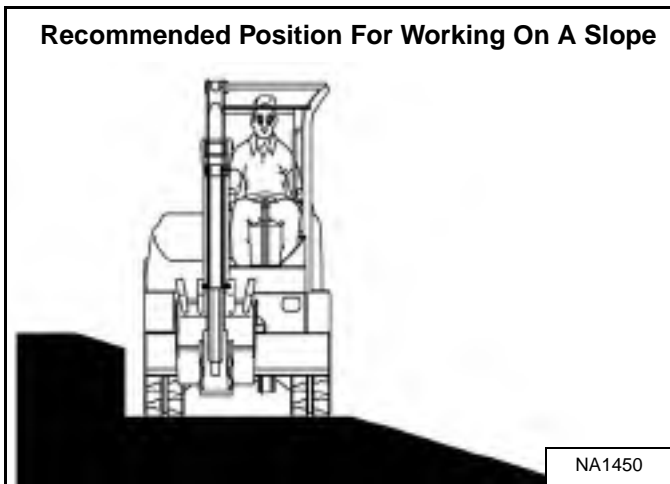


When travelling up slopes or on side slopes that are 15 degrees or less, position the machine as shown and run the engine slow [Figure 146] and [Figure 147].

OPERATING PROCEDURE (CONT'D)

Operating On Slopes (Cont'd)

Figure 148



When operating on a slope, level the work area before beginning [Figure 148].

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

Do not work on slopes which are over 15 degrees.

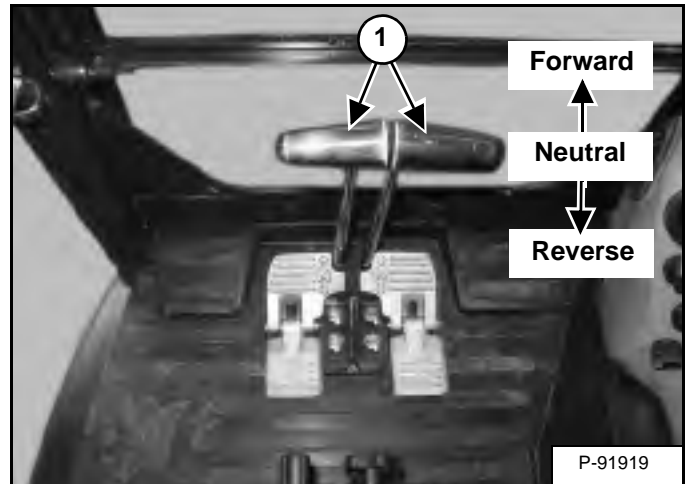
Use a slow work cycle.

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 149



To brake the machine when going down a slope, move the steering levers (Item 1) [Figure 149] 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.

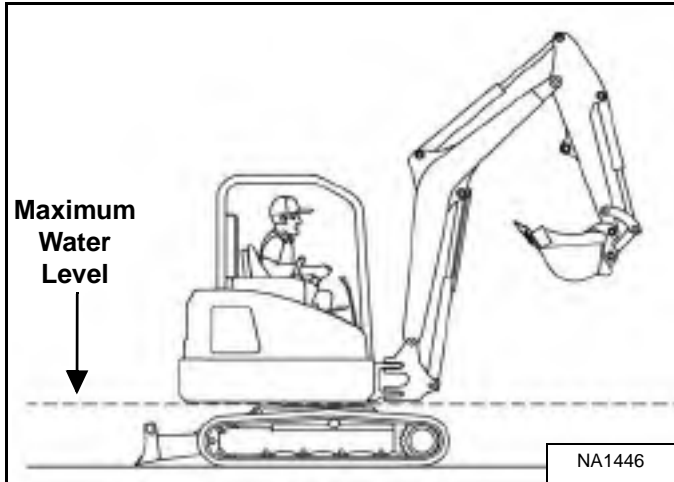
Start the engine and resume operation.

OPERATING PROCEDURE (CONT'D)

Operating In Water

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

Figure 150



Do not operate or immerse the excavator in water higher than the bottom of the swing bearing **[Figure 150]**.

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.

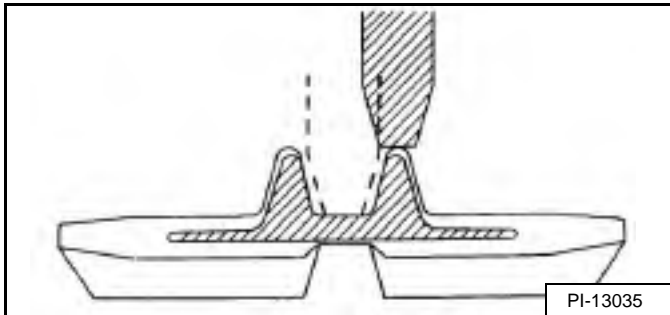
OPERATING PROCEDURE (CONT'D)

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.

Some Cause Of Track Damage:

Figure 151

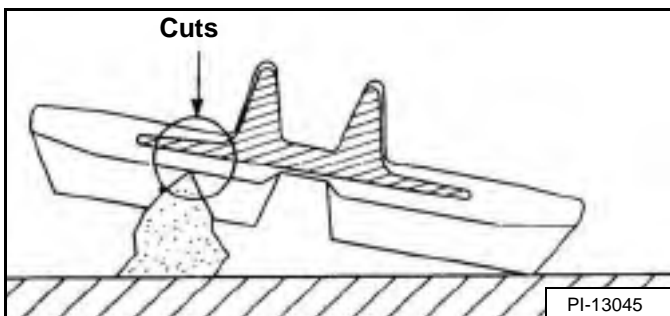


Incorrect track tension: When the rubber track is detracting, the idler or sprocket rides on the projections of the embedded metal **[Figure 151]** causing the embedded metal to be exposed to corrosion. (See TRACK TENSION on Page 138.)

If rubber track is clogged with stones or foreign objects, these can get wedged between the sprocket / rollers and cause detracting and track stress.

When moisture invades through cuts on the track, the embedded steel cords will corrode. The deterioration of the design strength may lead to the breaking of the steel cords.

Figure 152

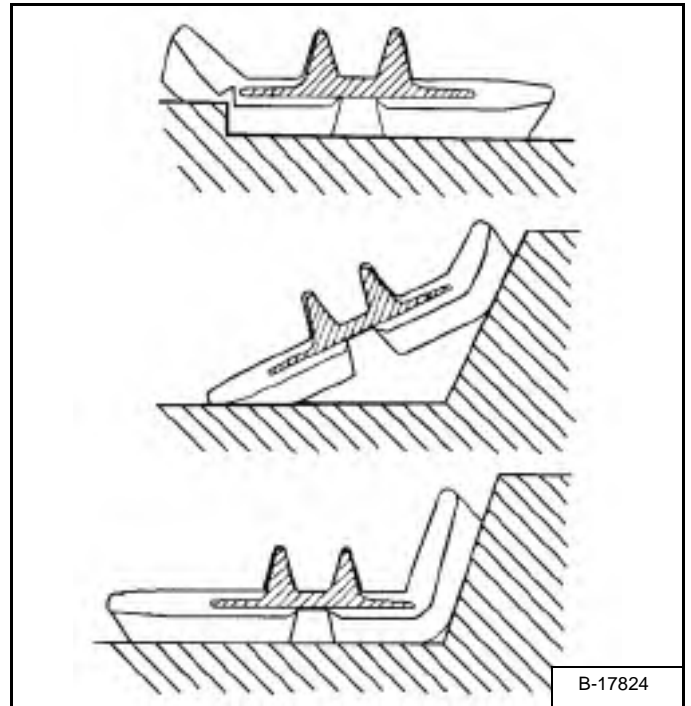


When rubber tracks drive over projections or sharp objects in the field, the concentrated forces applied cause cuts on the lug side rubber surface **[Figure 152]**. In case of making turns on projections, the lug side rubber surface will have an even higher chance to be cut. If the cuts run through the embedded steel cords, it might result in the steel cords' breakage due to their corrosion.

Avoid quick turns on bumpy and rocky fields.

Driving over sharp objects should be avoided. If this is impossible, do not make turns while driving over sharp objects.

Figure 153



When rubber tracks drive over sharp projections, intensive stress is applied to the lug side rubber surface, especially at the edges of embedded metals, causing cracks and cuts in the area around the embedded metals **[Figure 153]**.

Avoid extensive stress applied to the lug root where metals are embedded. Operators should try to avoid driving over stumps and ridges.

TOWING THE EXCAVATOR

Procedure

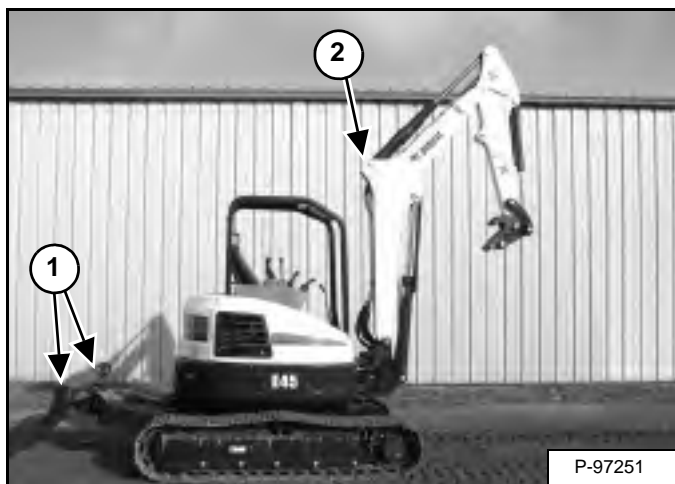
There is not a recommended towing procedure for the excavators.

- 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 164.)

LIFTING THE EXCAVATOR

Procedure

Figure 154



Fully extend the cylinders of the bucket, arm, and boom so that the excavator is in the position as shown [Figure 154].

Raise the blade all the way.

Put all the control levers in neutral.



AVOID INJURY OR DEATH

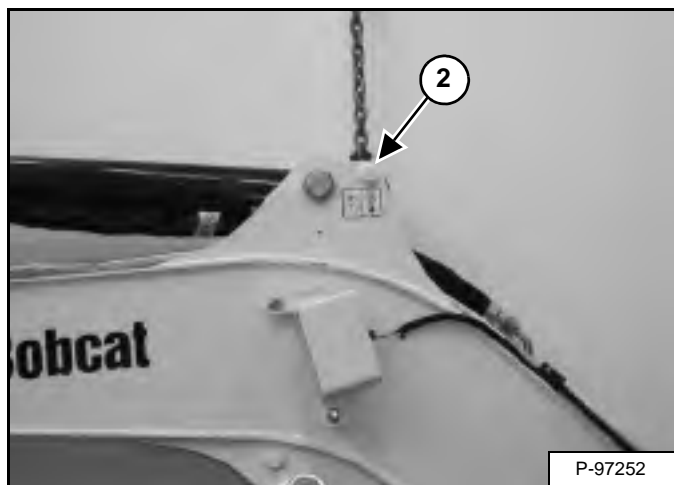
- Use chains and lifting equipment with sufficient capacity for the weight of the excavator plus any added attachments.
- Maintain centre of gravity and balance when lifting.
- Do not swing boom or upperstructure. Engage the upperstructure slew lock.
- Never lift with operator on machine.
- Never lift with the blade angled (if equipped).

W-2580-EN-0210

Figure 155



Figure 156



Fasten chains to the ends of the blade (Item 1) [Figure 154] and [Figure 155] 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 2) [Figure 154] and [Figure 156] 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.

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.

Determine the direction of the track movement before moving the machine (blade forward).

Disengage the auto idle feature and move the two speed travel to the low range position.

Figure 157



Move the machine forward onto the transport vehicle **[Figure 157]**.

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

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

Stop the engine and remove the key (if equipped).

Put blocks at the front and rear of the tracks.

TRANSPORTING THE EXCAVATOR ON A TRAILER (CONT'D)

Fastening

Figure 158

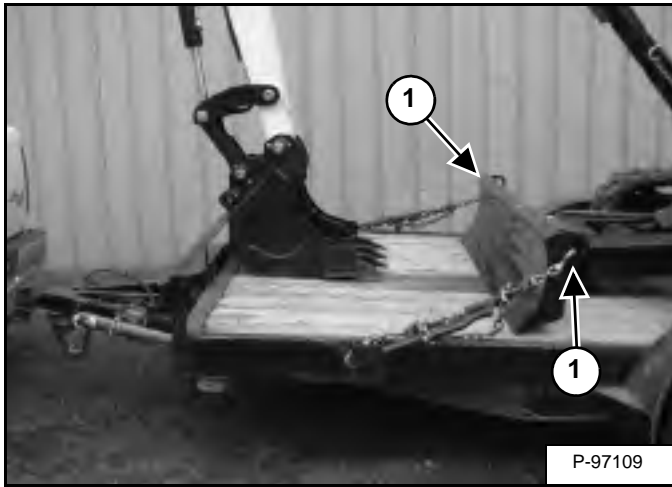
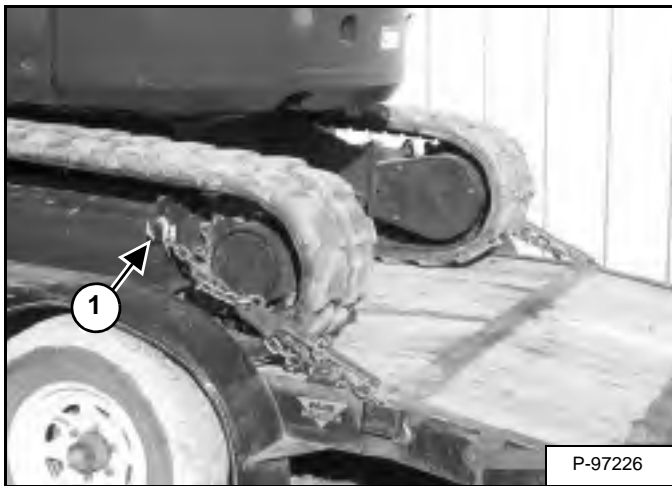


Figure 159



Fasten chains to the front corners of the blade (Item 1) [Figure 158] and to the tie down loop at both sides of the track frame (Item 1) [Figure 159] to prevent it from moving when going up or down slopes or during sudden stops.

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

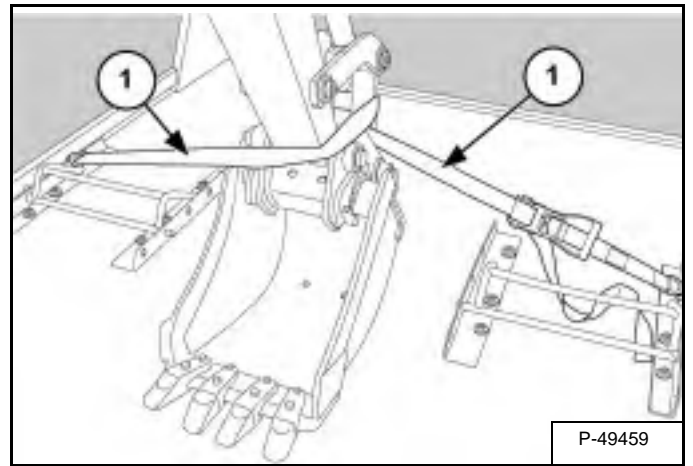
WARNING

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

Figure 160



When on the transport vehicle, loop the chains through the holes in the mounting frame.

Loop the chain (Item 1) [Figure 160] round the bucket link.



PREVENTIVE MAINTENANCE

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MAINTENANCE SAFETY



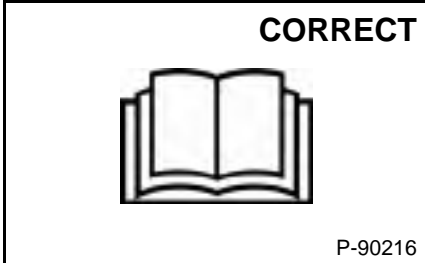
WARNING

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

W-2003-0807

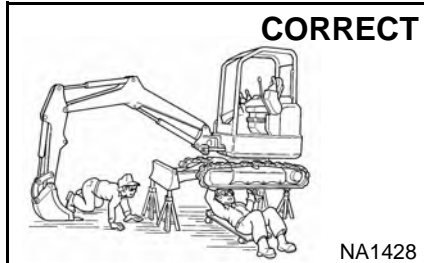


Safety Alert Symbol: This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.



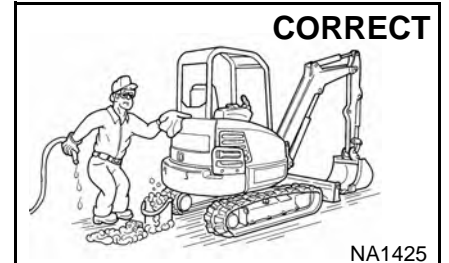
P-90216

- ⚠ Never service the Bobcat Compact Excavator without instructions.



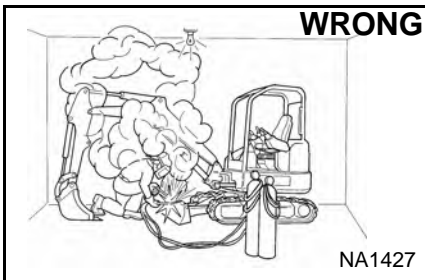
NA1428

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



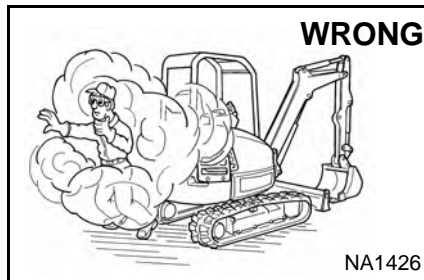
NA1425

- ⚠ Cleaning and maintenance are required daily.



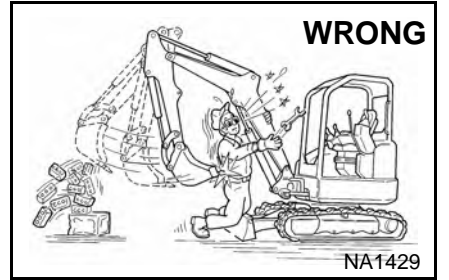
NA1427

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



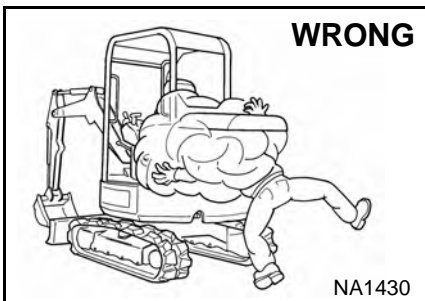
NA1426

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



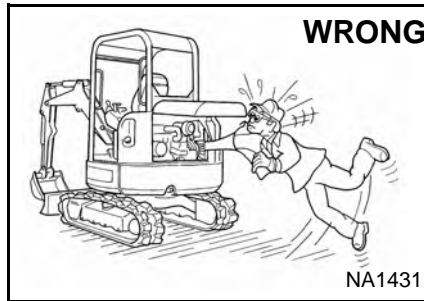
NA1429

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



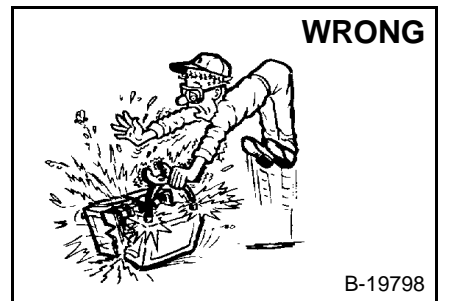
NA1430

- ⚠ 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.



NA1431

- ⚠ 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.



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.


MSW38-0409



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.

 <b style="font-size: 24pt; margin-left: 10px;">WARNING	<p>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.</p> <p style="text-align: right; font-size: 10pt;">W-2003-0807</p>
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SERVICE SCHEDULE		HOURS					
ITEM	SERVICE REQUIRED	8-10	50	100	250	500	[4] 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 and Motion Alarm [1]	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.						
X-Change [1]	Lubricate and inspect for damage or loose parts.	[1]					
Swing Circle and Pinion	Grease two fittings		[2]				
Fuel Tank and Filter	Drain water and sediment from fuel tank and fuel filter.						
Battery	Check battery, cables, connections and electrolyte level. Add distilled water as needed.						
Spark Arrester Muffler	Clean the spark chamber.						
Fuel Filter	Replace fuel filter.		[3]				
Travel Motor	Check oil level in both motors.						
Engine Oil and Filter	Replace oil and filter.		[3]				
Radiator, Oil Cooler, A/C Condenser [1]	Clean debris from the radiator fins.						
Hydraulic Filter, Case Drain Filter and Reservoir Breather	Replace the hydraulic filter, case drain filter and reservoir breather.		[3]				
Alternator and Starter	Check the alternator and starter connections.		[3]				
Belt(s)	Check condition of belt and replace as needed.		[3]				
Engine Valves	Check and adjust the engine valve clearance.						
Hydraulic System	Replace the hydraulic fluid and filters. Clean the reservoir.						
Travel Motor	Replace the lubricant in both travel motors.		[3]				
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] Or every 12 months.

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

SERVICE SCHEDULE (CONT'D)

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:

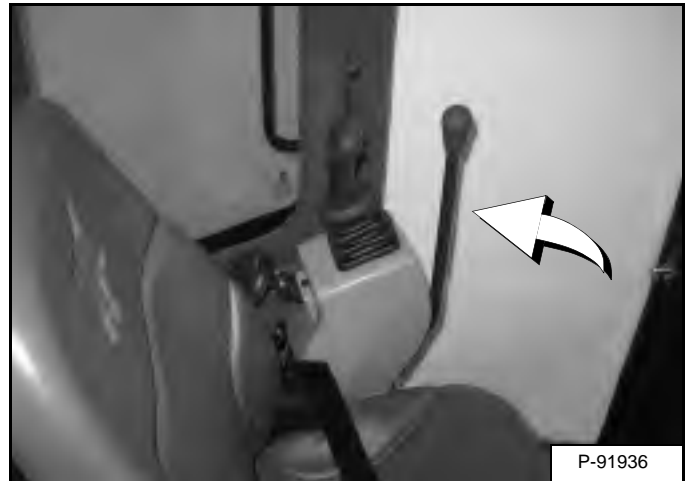
- Doosan Benelux S.A. Warranty Conditions
- Protection Plus Extended Warranty Conditions
- General Parts Policy
- General Information
- First Inspection
- Scheduled Services
- Identification
- Authorised Identification
- Lubricants and Fluids Table
- Service Parts Chart

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

CONTROL CONSOLE LOCKOUTS

Inspection And Maintenance

Figure 161



When the left console is raised **[Figure 161]**, 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 161]**.

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.

Service the system if these controls do not deactivate when the left 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.

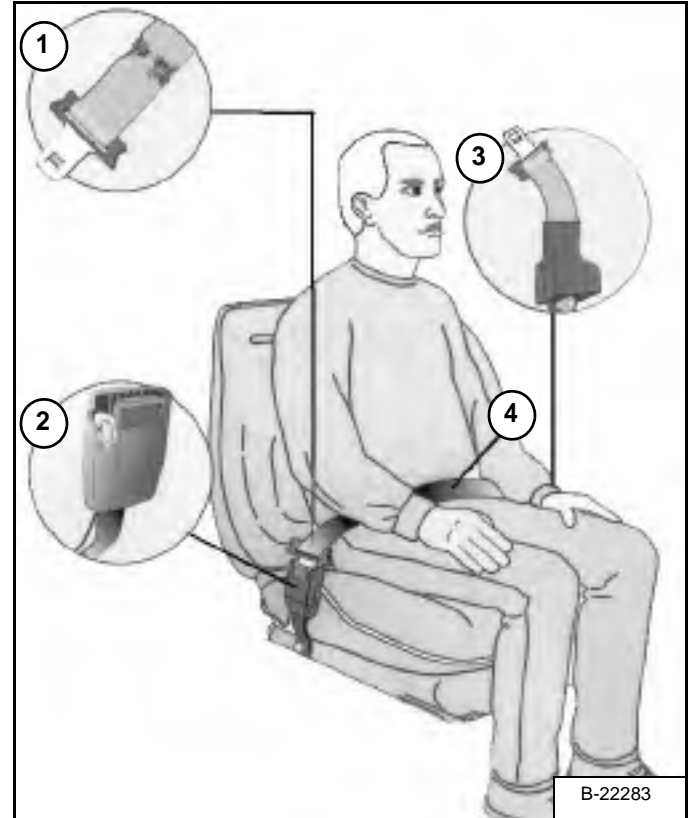
W-2466-0703

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 162



The items below are referenced in **[Figure 162]**.

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 163



Figure 164



Inspect for damaged or missing motion alarm decal (Item 1) [Figure 163] (cab machine) or (Item 1) [Figure 164] (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 61.)

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.

Figure 165



Slightly move both travel control levers in the forward direction (until the machine is slowly moving forward) and then press the motion alarm cancel switch (Item 1) [Figure 165]. The motion alarm will shut off. With the machine still moving forward, move one of the levers to the neutral position, the motion alarm must sound.

Slightly move both travel control levers in the reverse direction (until the machine is slowly moving backward) and then press the motion alarm cancel switch (Item 1) [Figure 165] (the switch icon will be illuminated when the motion alarm is deactivated). The motion alarm will shut off. With the machine still moving backward, move one of the levers to the neutral position, the motion alarm must sound.

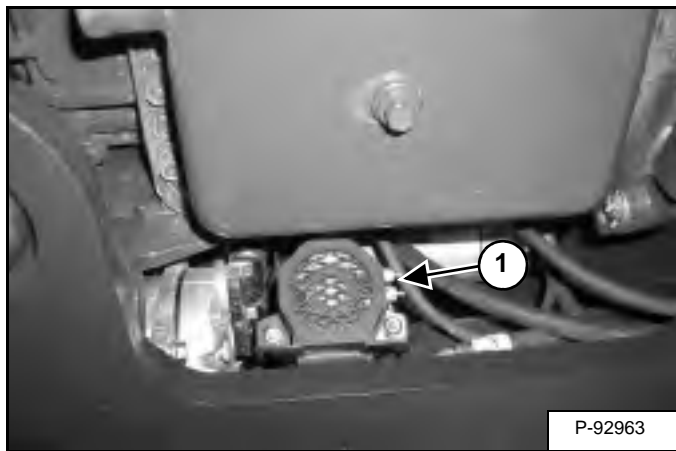
Return both levers to neutral and turn excavator key to OFF position. Exit the excavator. (See STOPPING THE ENGINE AND LEAVING THE EXCAVATOR on Page 68.)

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

Inspecting (Cont'd)

The motion alarm is mounted to the bottom rear of the excavator. (To the front of the engine oil pan.)

Figure 166

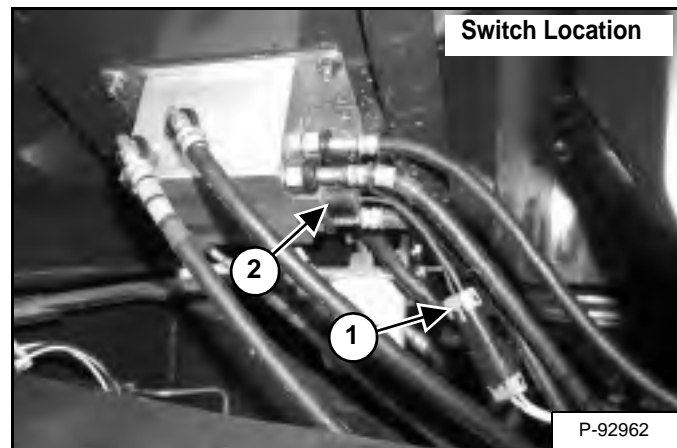


Inspect the motion alarm electrical connections and wire harness (Item 1) [Figure 166], wire harness (Item 1) [Figure 167] and motion alarm switch (Item 2) [Figure 167] for tightness and damage. Repair or replace any damaged components.

If the motion alarm switch requires a service, see the following information.

Adjusting Switch Position

Figure 167



The motion alarm switch (Item 2) [Figure 167] 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 167] is non-adjustable. It must be fully installed into the travel control valve housing and tightened. Tighten the switch to 18 - 20 N•m (13 - 15 ft-lb).

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 168



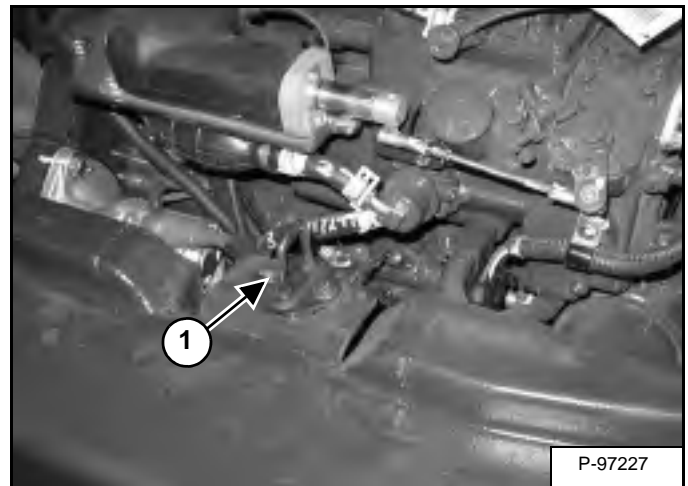
Pull the latch (Item 1) [Figure 168] and open the tailgate.

Push firmly to close the tailgate.

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

Adjusting The Latch

Figure 169



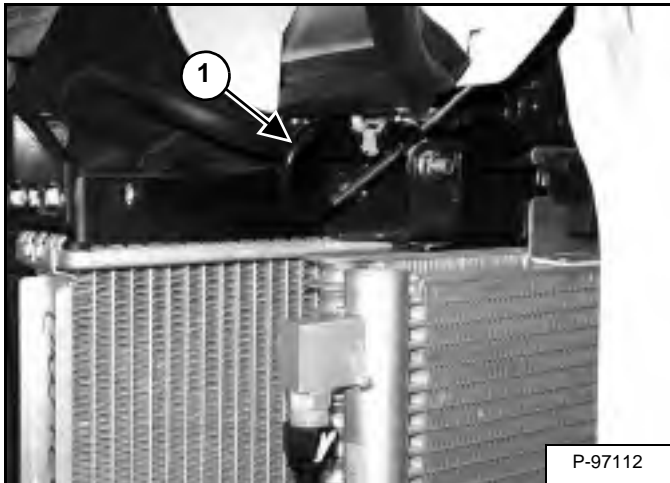
The tailgate latch (Item 1) [Figure 169] can be adjusted by loosening the two bolts, moving the latch, and tightening the two bolts.

Close the tailgate before operating the excavator.

RIGHT SIDE COVER

Opening And Closing

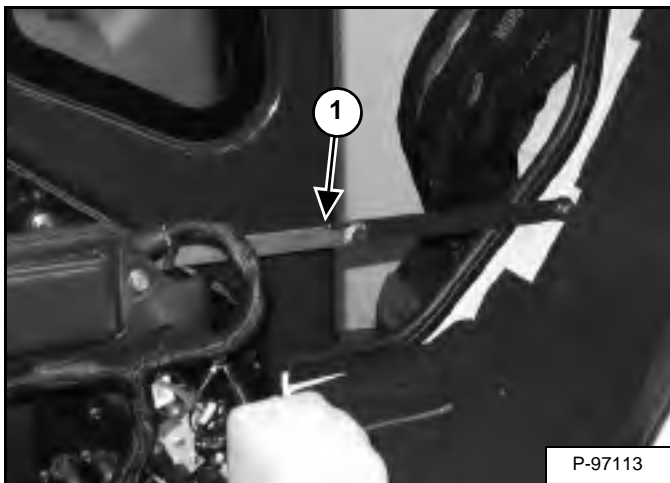
Figure 170



Open the tailgate to access the right side cover latch (Item 1) [Figure 170].

Pull the latch handle (Item 1) [Figure 170] out until the right side cover is unlatched.

Figure 171



Raise the right side cover and rotate forward until it is held open by the retainer (Item 1) [Figure 171].

To close the right side cover, lift up on the retainer (Item 1) [Figure 171] while raising the right side cover. Rotate the cover back until it is in the fully closed position. Secure the right side cover with the latch (Item 1) [Figure 170].

CAB FILTERS

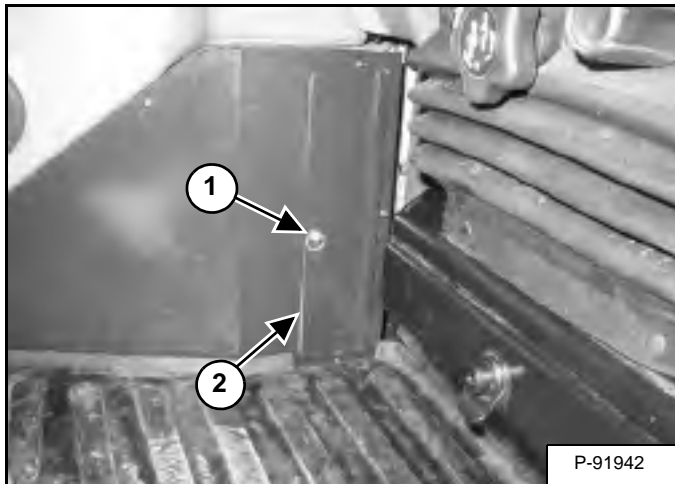
Cleaning And Maintenance

The recirculation filter and the fresh air filter must be cleaned regularly. (See SERVICE SCHEDULE on Page 109.)

The recirculation filter is located to the right of the operator seat and the fresh air filter is located under the right side cover.

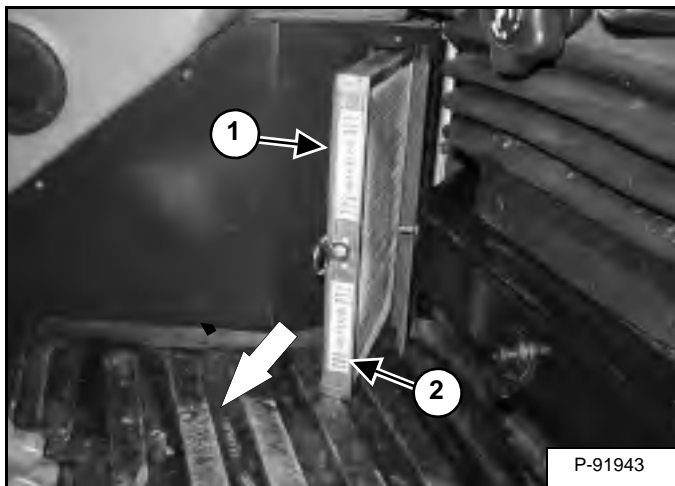
Recirculation Filter

Figure 172



Turn the fastener (Item 1) 1/4 turn and open the cover (Item 2) [Figure 172].

Figure 173



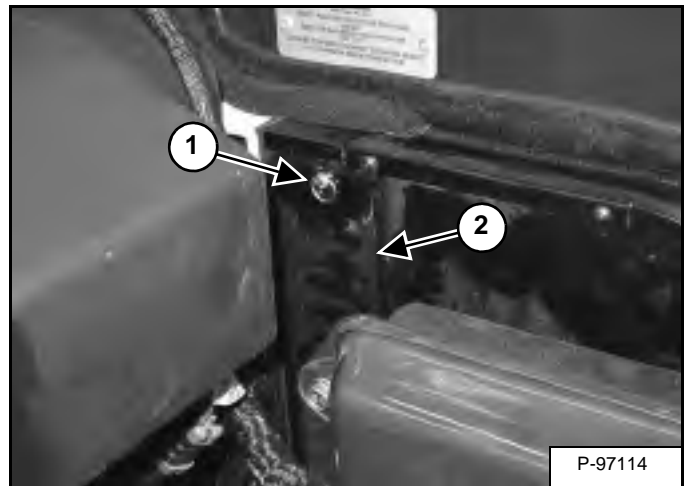
Pull the filter (Item 1) [Figure 173] out of the heater housing.

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

Installation: Install the filter with the arrows that indicate air flow direction (Item 2) [Figure 173] pointing toward the heater housing.

Fresh Air Filter

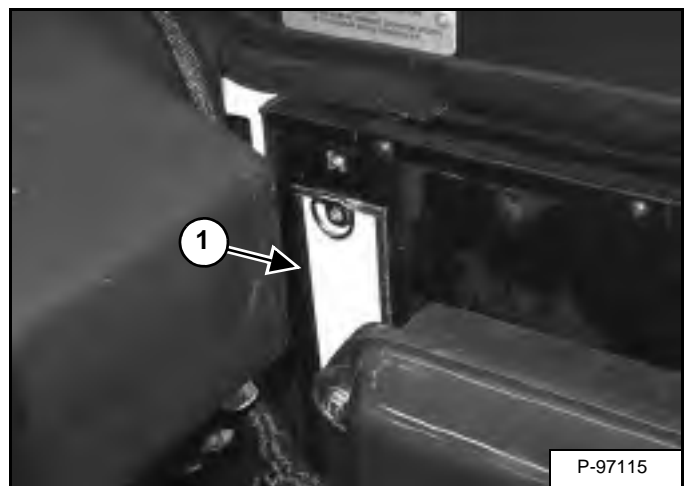
Figure 174



Open the right side cover. (See RIGHT SIDE COVER on Page 115.)

Turn the fastener (Item 1) 1/4 turn and remove the cover (Item 2) [Figure 174].

Figure 175



Pull the filter (Item 1) [Figure 175] out of the housing.

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

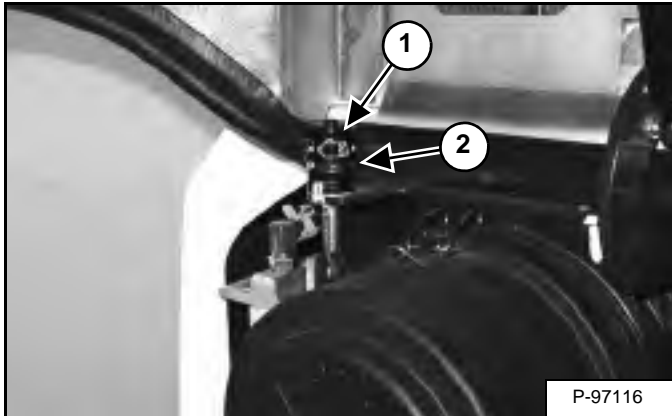
AIR CLEANER SERVICE

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 109.)

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 114.)

Figure 176



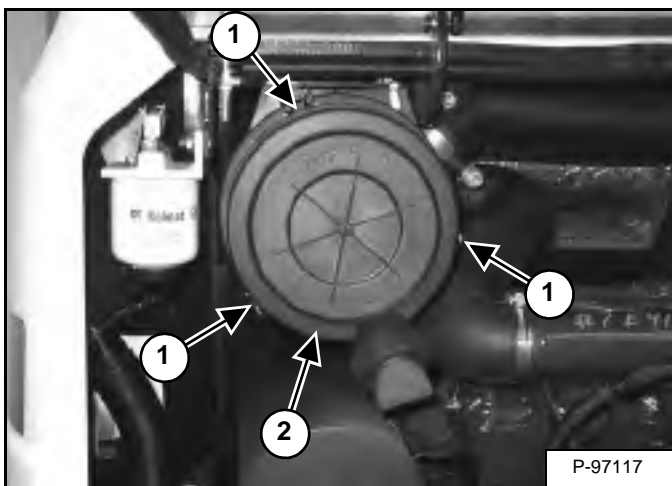
Check the condition indicator (Item 1) [Figure 176]. If the red ring shows in the condition indicator, the filter needs to be replaced.

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

Replacing Filter Elements

Outer Filter

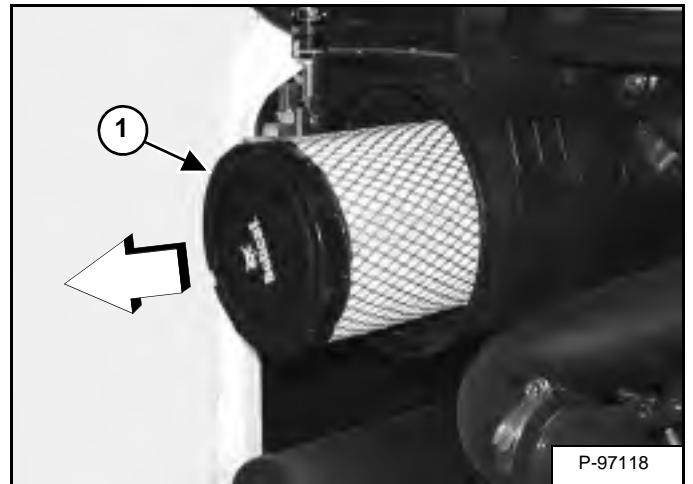
Figure 177



Release the three fasteners (Item 1) [Figure 177].

Remove and clean the dust cup (Item 2) [Figure 177].

Figure 178



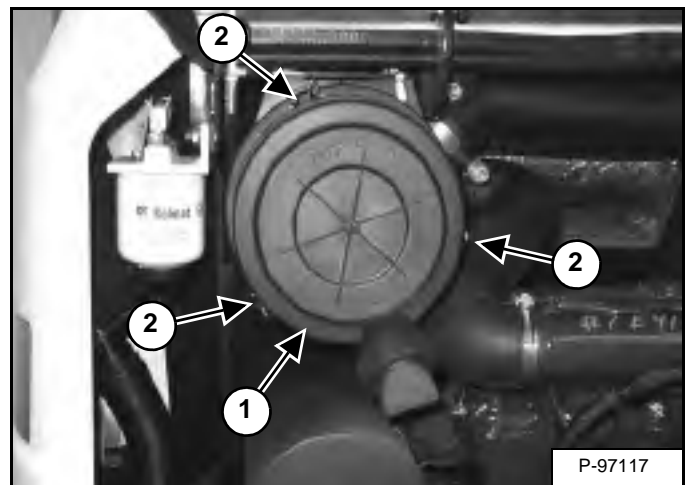
Pull the outer filter (Item 1) [Figure 178] from the air cleaner housing.

Check the housing for damage.

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

Install a new filter.

Figure 179



Install the dust cup (Item 1) and engage the three fasteners (Item 2) [Figure 179].

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

After the outer filter has been replaced, press the button (Item 1) [Figure 176] on the end of the condition indicator and start the engine. Run at full rpm, then reduce engine speed and stop the engine. If the red ring (Item 2) [Figure 176] shows in the condition indicator, replace the inner filter.

AIR CLEANER SERVICE (CONT'D)

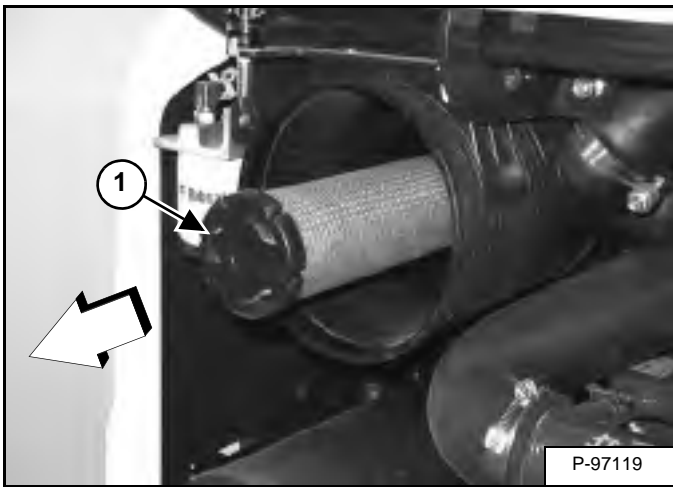
Replacing Filter Elements (Cont'd)

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 176]** on the end 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.

Figure 180



Remove the dust cup, outer filter and inner filter (Item 1) **[Figure 180]**.

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

Install the new inner filter.

Install the outer filter and the dust cup.

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

Close the tailgate.

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.



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



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 stabiliser 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.

FUEL SYSTEM (CONT'D)

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 181



The fuel cap uses the start key to unlock the fuel cap.

Remove the fuel fill cap (Item 1) [Figure 181].

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 109.)

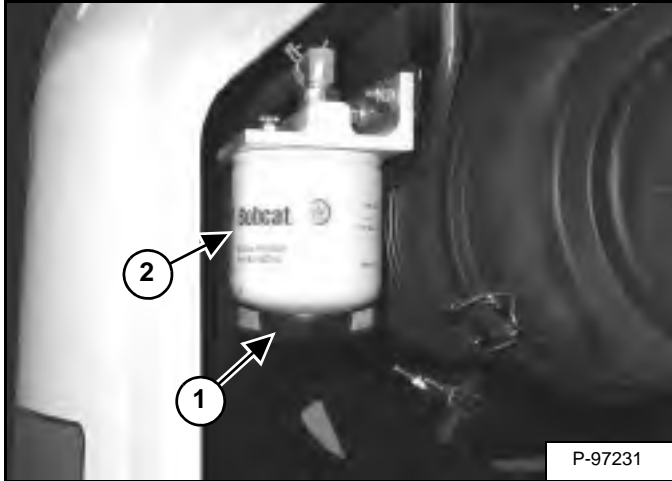
FUEL SYSTEM (CONT'D)

Fuel Filter

Removing Water

Open the tailgate. (See TAILGATE on Page 114.)

Figure 182



Loosen the drain (Item 1) [Figure 182] at the bottom of the filter to drain water from the filter into a container.

Clean up any spilled fuel.

Replacing Element

Remove the filter (Item 2) [Figure 182].

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 122.)

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 doctor familiar with this injury.

W-2072-EN-0909

Draining The Fuel Tank

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 109.)

Figure 183

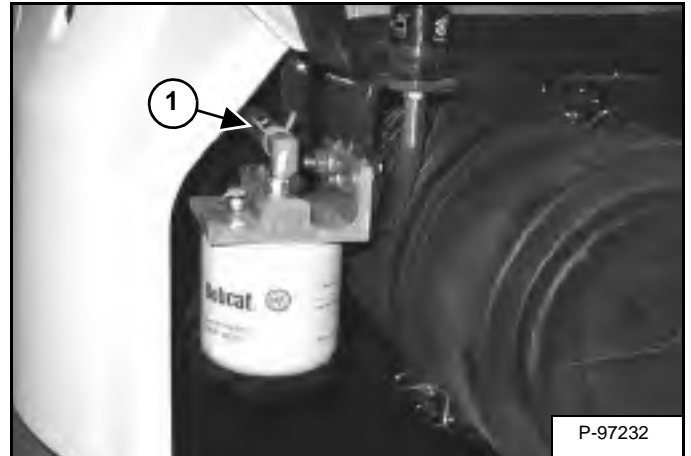
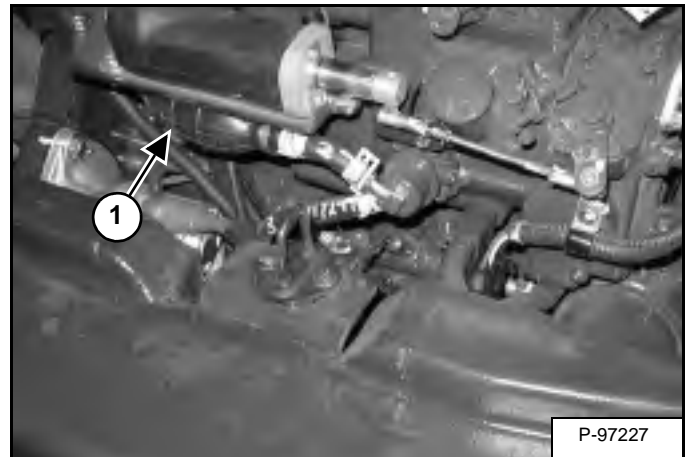


Figure 184



Remove the hose (Item 1) [Figure 183] from the fuel filter. Route the hose to a container.

Squeeze the hand pump (priming bulb) (Item 1) [Figure 184] 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 183] after the fuel is removed from fuel tank.

FUEL SYSTEM (CONT'D)

Removing Air From The Fuel System

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

Figure 185

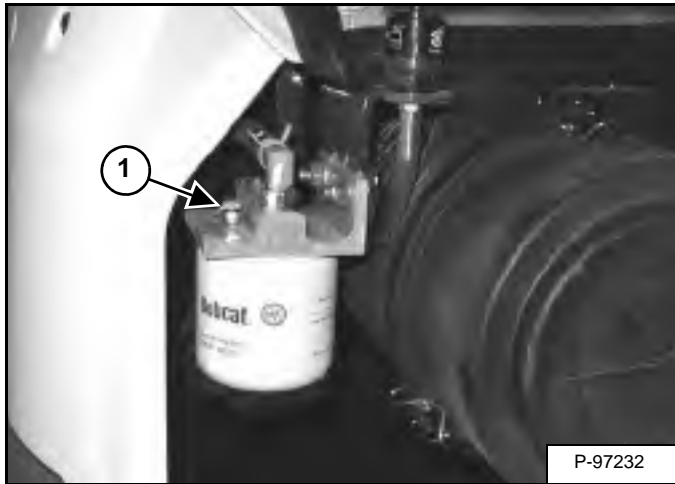
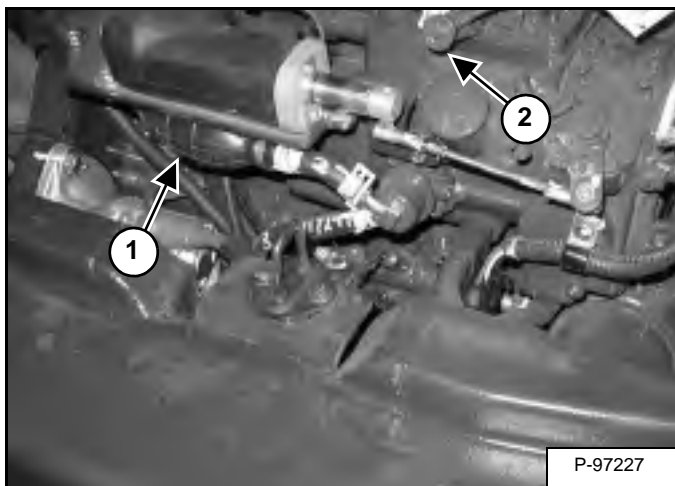


Figure 186



Open the tailgate. (See TAILGATE on Page 114.)

Open the fuel filter vent (Item 1) **[Figure 185]** and operate the hand pump (priming bulb) (Item 1) **[Figure 186]** until the fuel flows from the vent with no air bubbles.

Close the vent (Item 1) **[Figure 185]**.

Clean up any spilled fuel.

Start the engine. It may be necessary to open the vent (Item 2) **[Figure 186]** (at the fuel injection pump) briefly until the engine runs smoothly.

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 doctor familiar with this injury.

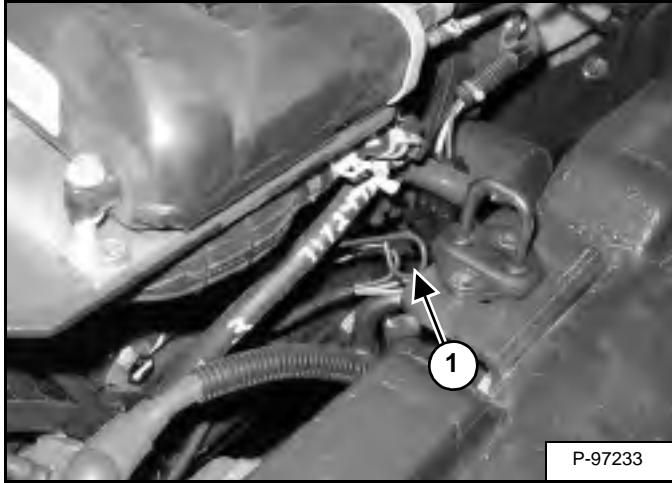
W-2072-EN-0909

ENGINE LUBRICATION SYSTEM

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 109.)

Figure 187



Open the tailgate and remove the dipstick (Item 1) [Figure 187].

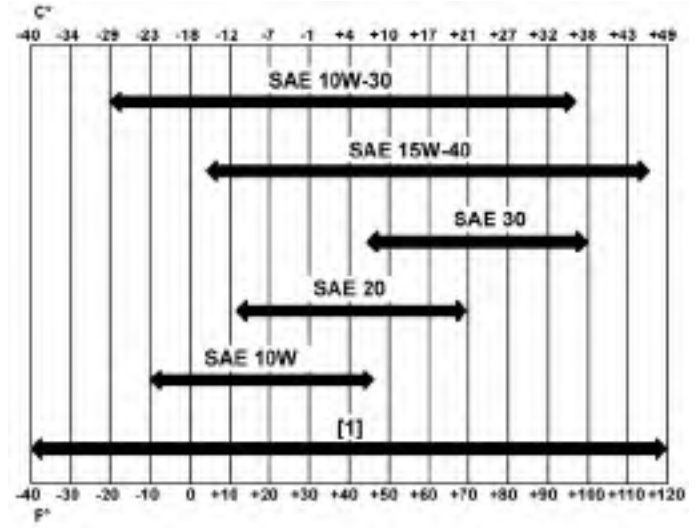
Keep the oil level between the marks on the dipstick.

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

Engine Oil Chart

Figure 188

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 188].

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

ENGINE LUBRICATION SYSTEM (CONT'D)

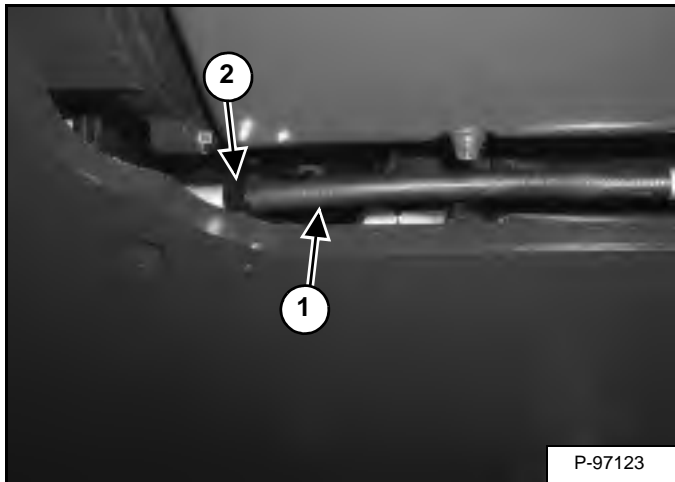
Removing And Replacing Oil And Filter

See the SERVICE SCHEDULE for the service interval for replacing the engine oil and filter. (See SERVICE SCHEDULE on Page 109.)

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

Open the tailgate. (See TAILGATE on Page 114.)

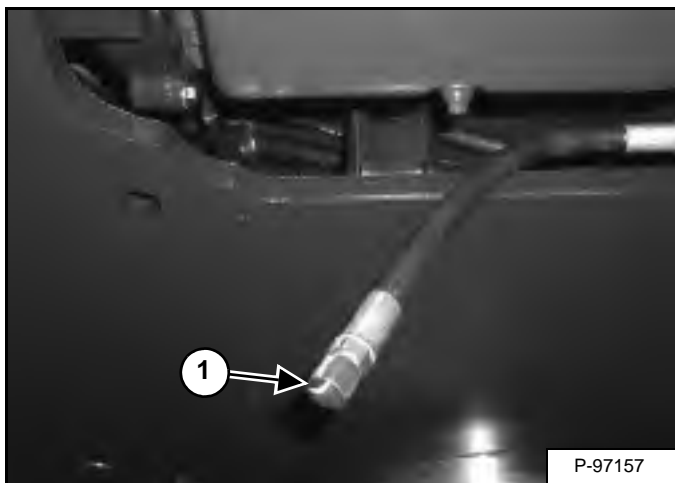
Figure 189



If equipped with the optional air deflector, remove the four bolts and the air deflector to access the drain hose (Item 1) [Figure 189].

Remove the drain hose (Item 1) from the storage clamp (Item 2) [Figure 189].

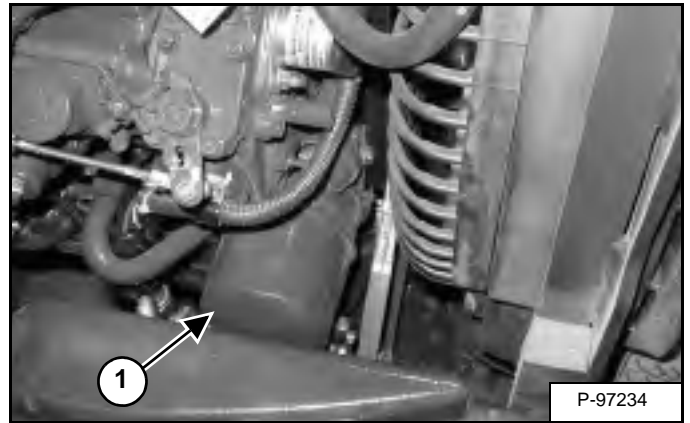
Figure 190



Place a container under the excavator. Remove the drain plug (Item 1) [Figure 190] from the drain hose.

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

Figure 191



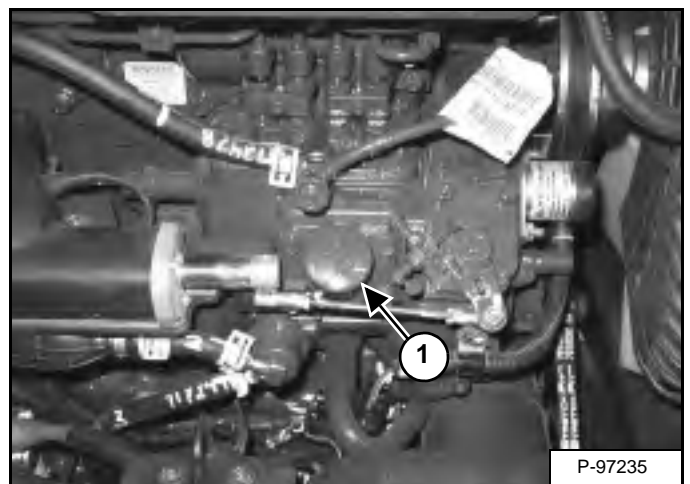
Remove the oil filter (Item 1) [Figure 191] and clean the filter housing surface.

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

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

Put the drain hose (Item 1) back into the storage clamp (Item 2) [Figure 189].

Figure 192



Remove the fill cap (Item 1) [Figure 192].

Put oil in the engine. (See ENGINE LUBRICATION SYSTEM on Page 123.) and (See Capacities on Page 167.)

Install the fill cap (Item 1) [Figure 192].

Start the engine and let it run for several minutes.

Stop the engine. Check for leaks at the oil drain plug and the oil filter. Check the oil level.

Add oil as needed if it is not at the top mark on the dipstick.

ENGINE COOLING SYSTEM

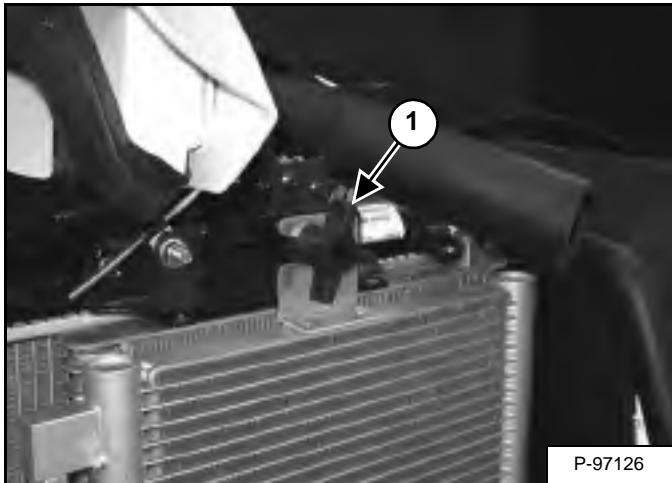
Check the cooling system every day to prevent overheating, loss of performance or engine damage. (See SERVICE SCHEDULE on Page 109.)

Cleaning

Open the right side cover. (See RIGHT SIDE COVER on Page 115.)

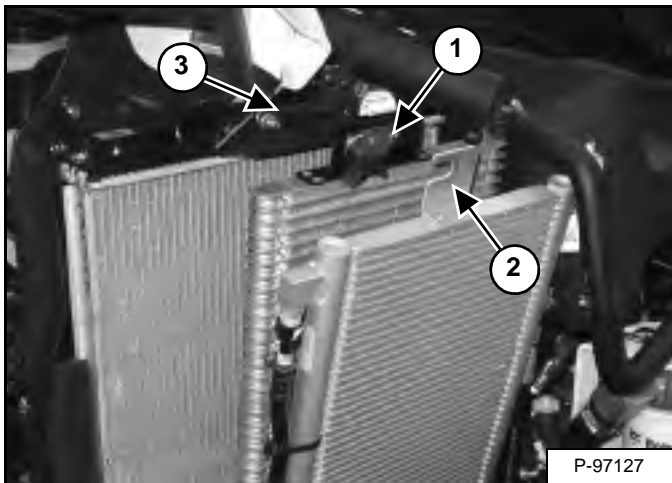
NOTE: Allow the cooling system and engine to cool before servicing or cleaning the cooling system.

Figure 193



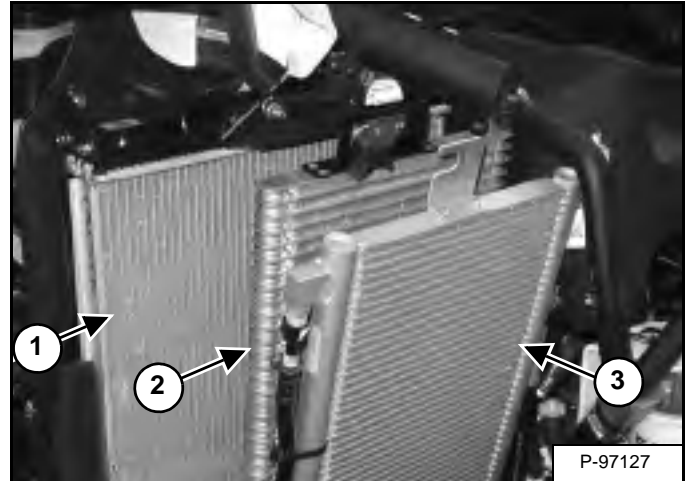
Loosen the knob (Item 1) [Figure 193]. Slide the knob towards the rear of the machine.

Figure 194



Slide the knob (Item 1) out of the condenser mount (Item 2) (if equipped) and the radiator mounting bracket (Item 3) [Figure 194]. Be careful not to damage fins.

Figure 195



Use air pressure or water pressure to clean the radiator (Item 1), oil cooler (Item 2) and condenser (Item 3) [Figure 195] (if equipped). Be careful not to damage fins when cleaning.

Position the knob (Item 1) so it fits into the radiator mount (Item 3) and the condenser mount (Item 2) [Figure 194] (if equipped).

Slide the knob (Item 1) toward the front of the machine until it is fully seated in the slots of the mounting brackets. Tighten the knob (Item 1) [Figure 193]. Be careful not to damage fins.

ENGINE COOLING SYSTEM (CONT'D)

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

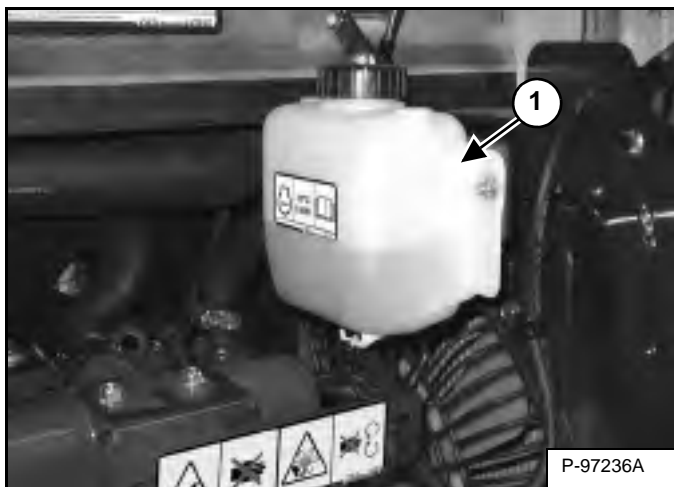
Wear safety glasses to prevent eye injury when any of the following conditions exist:

- 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 114.)

Figure 196



Check the coolant level in the coolant recovery tank (Item 1) [Figure 196].

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

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

IMPORTANT

AVOID ENGINE DAMAGE

Always use the correct ratio of water to antifreeze.

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

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

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

I-2124-0497

ENGINE COOLING SYSTEM (CONT'D)

Removing And Replacing Coolant

See the SERVICE SCHEDULE for correct service intervals. (See SERVICE SCHEDULE on Page 109.)

Stop the engine. Open the tailgate. (See TAILGATE on Page 114.)

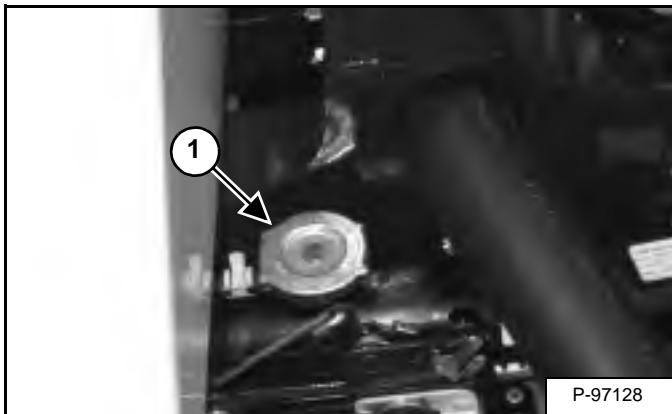
WARNING

AVOID BURNS

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

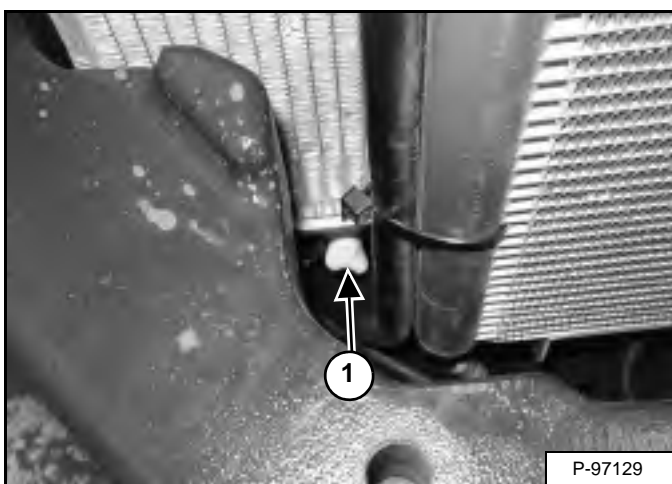
W-2070-1203

Figure 197



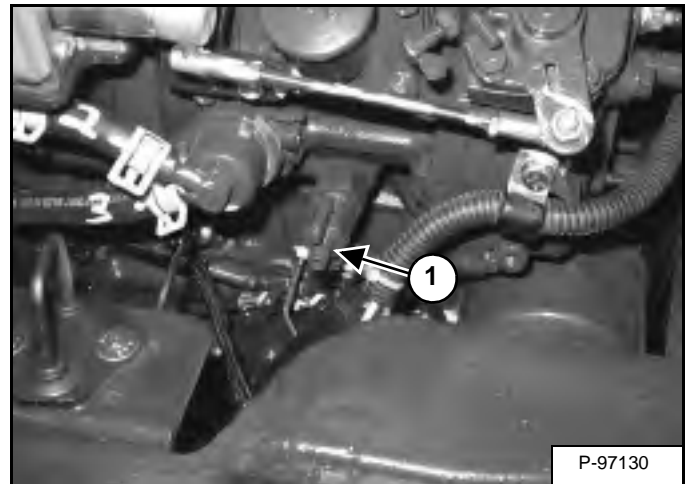
When the engine is cool, loosen and remove the radiator cap (Item 1) [Figure 197].

Figure 198



Put a hose on the drain valve at the bottom of the radiator. Open the drain valve (Item 1) [Figure 198] and drain the coolant into a container.

Figure 199



Put a hose on the drain valve on the engine block. Open the drain valve (Item 1) [Figure 199] 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 125.) and (See Capacities on Page 167.)

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

The correct mixture of coolant to provide a -37°C (-34°F) freeze protection is 5 L propylene glycol mixed with 4,4 L of water **OR** 1 U.S. gal propylene glycol mixed with 3.5 qt of water.

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

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.

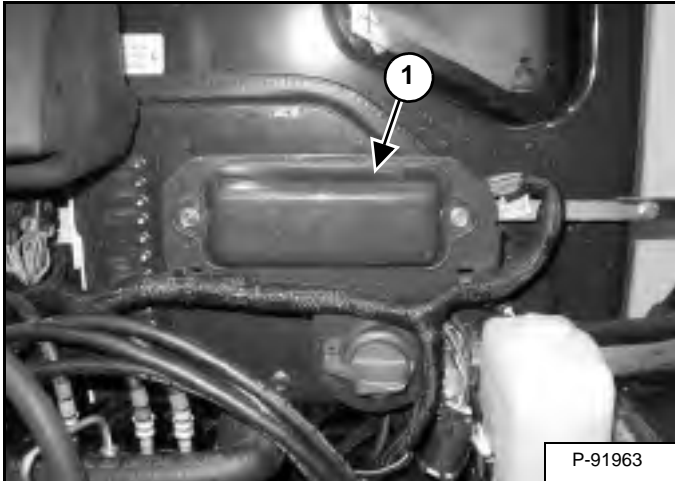
Add coolant to the recovery tank as needed.

Close the tailgate.

ELECTRICAL SYSTEM

Description

Figure 200



The excavator has a 12 volt, negative earth electrical system. The electrical system is protected by fuses located under the right side cover of the excavator (Item 1) [Figure 200]. 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

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

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

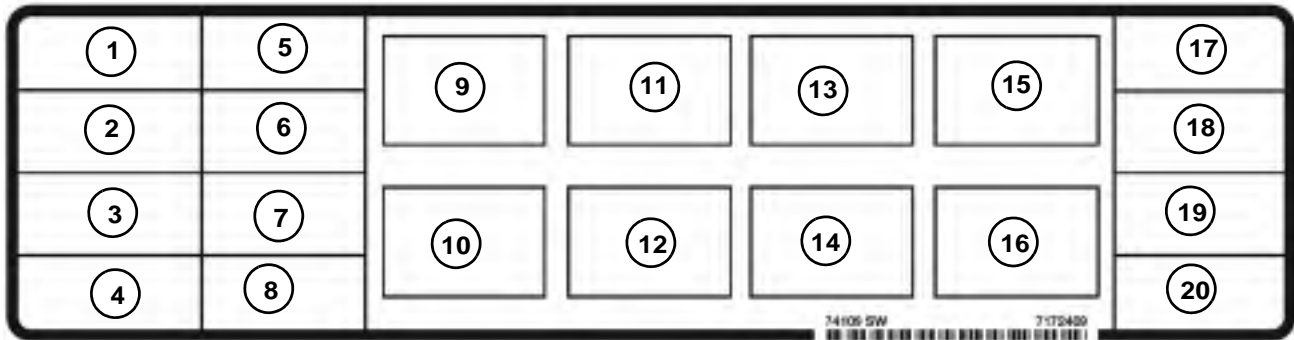
The location and sizes are shown in [Figure 201].

Always replace fuses using the same type and capacity.

ELECTRICAL SYSTEM (CONT'D)

Fuse And Relay Location / Identification (Cont'd)

Figure 201



The location and sizes are shown in the table below and on the decal [Figure 201]. Relays are identified by the letter “R” in the AMP column.

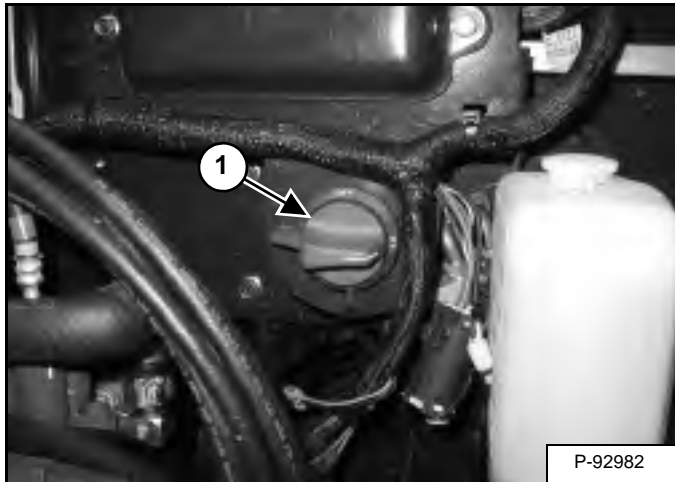
REF	ICON	DESCRIPTION	AMP	REF	ICON	DESCRIPTION	AMP	REF	ICON	DESCRIPTION	AMP
1		CONTROLLER	20	9		Switched Power	R	17		Controller	25
2		HVAC	25	10		Fuel Shutoff	R	18		ACD	25
3		Start Key	5	11		HVAC	R	19		LIGHTS	20
4		Fuel Shutoff	25	12		Lights	R	20		Power Port	15
5		Wiper / Washer	10	13		NOT USED	R				
6		Switched Power	20	14		Glow Plugs	R				
7		Alternator Excite / Heater	25	15		NOT USED	R				
8		ACD	25	16		Starter	R				

ELECTRICAL SYSTEM (CONT'D)

Shut-Off Switch

Open the right side cover. (See RIGHT SIDE COVER on Page 115.)

Figure 202



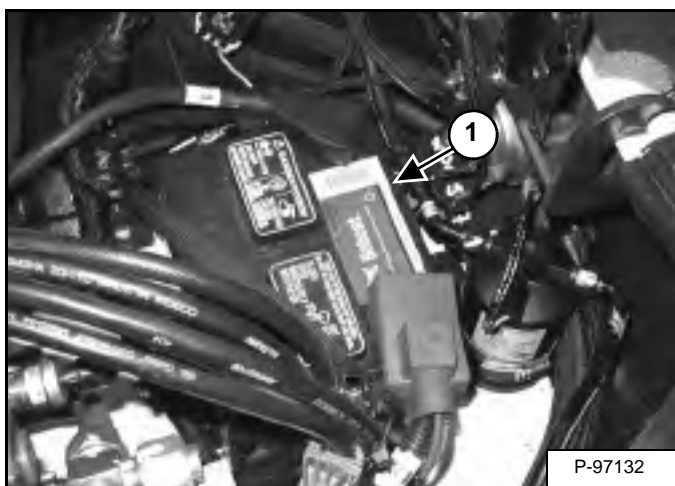
The shut-off switch (Item 1) [Figure 202] is located under the right side cover below the fuse panel.

Rotate the switch (Item 1) [Figure 202] anticlockwise to turn the switch to the OFF position, clockwise to turn to the ON position.

Battery Maintenance

Open the right side cover. (See RIGHT SIDE COVER on Page 115.)

Figure 203



The battery (Item 1) [Figure 203] is located in the front of the right side upperstructure.

Figure 204



The battery cables must be clean and tight [Figure 204]. 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 (0.50 in) 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

ELECTRICAL SYSTEM (CONT'D)

Using A Booster Battery (Jump Starting)

IMPORTANT

If jump starting the excavator from a second machine:

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

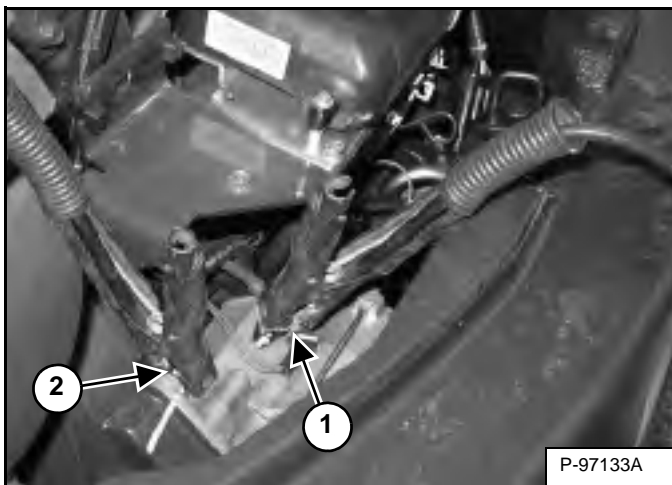
I-2060-0906

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.

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

Open the tailgate. (See TAILGATE on Page 114.)

Figure 205



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 205] 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 2) [Figure 205].

Start the engine. After the engine has started, remove the earth (-) cable first (Item 2) [Figure 205].

Disconnect the cable from the excavator starter (Item 1) [Figure 205].

NOTE: (See Cold Temperature Starting on Page 66.)

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.

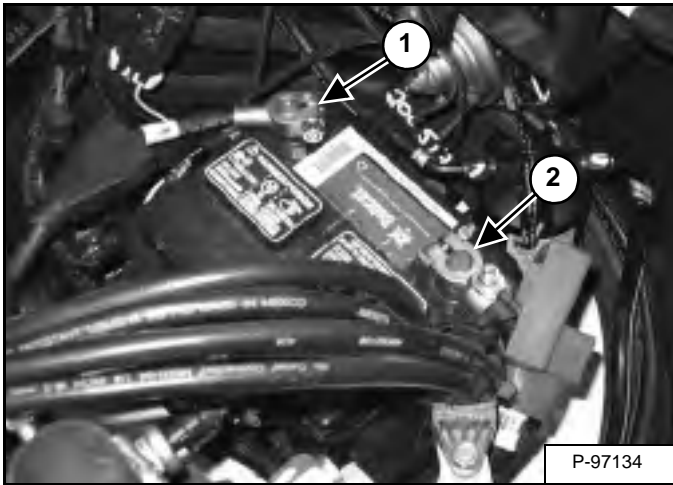
W-2065-0807

ELECTRICAL SYSTEM (CONT'D)

Removing And Installing The Battery

Open the right side cover. (See RIGHT SIDE COVER on Page 115.)

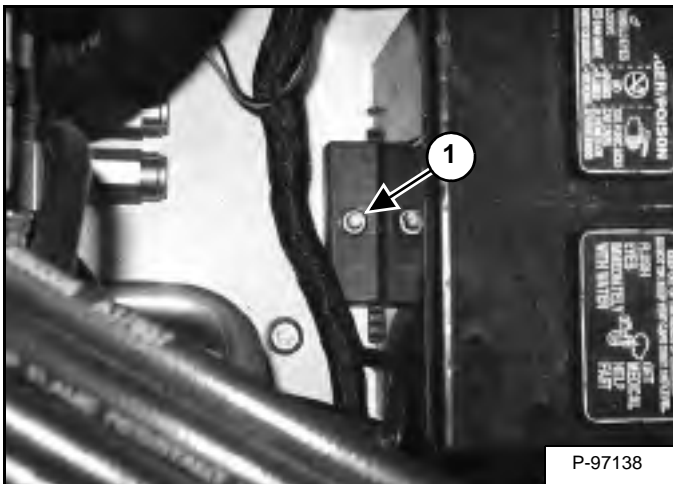
Figure 206



Disconnect the negative (-) cable (Item 1) [Figure 206] first.

Disconnect the positive (+) cable (Item 2) [Figure 206].

Figure 207



Remove the bolt (Item 1) [Figure 207] and remove the hold down clamp.

Remove the battery.

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

Connect the negative (-) cable last to prevent sparks.

Connect and tighten the battery cables.

Install and tighten the battery hold down.

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

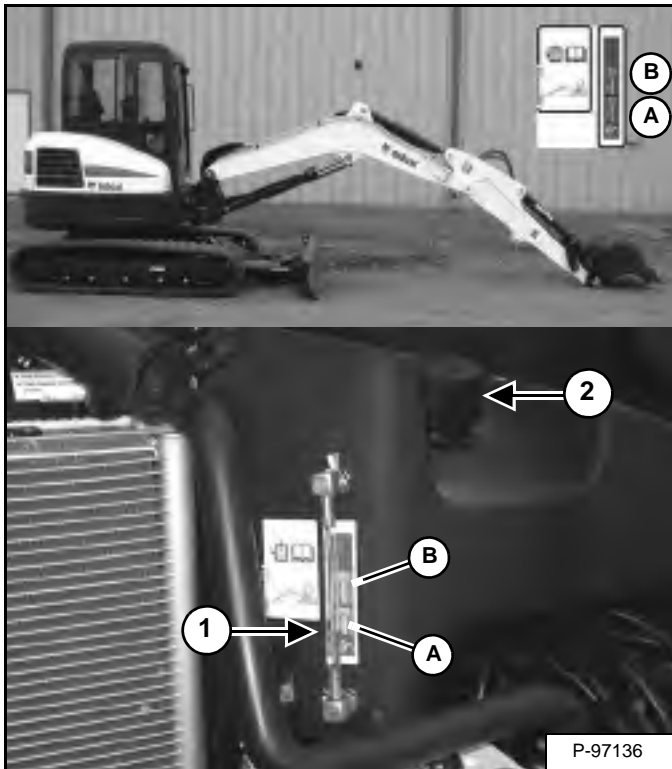
Checking And Adding Hydraulic Oil

Put the machine on a flat level surface.

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

Open the right side cover. (See RIGHT SIDE COVER on Page 115.)

Figure 208



Park the machine in the position shown [Figure 208]. (The preferred method is to check the hydraulic oil when it is cold.)

Check the hydraulic oil level, it must be visible in the sight gauge (Item 1) [Figure 208]. The decal on the hydraulic tank shows the correct fill level.

A - Correct Oil Level COLD (Preferred)

B - Correct Oil Level HOT (Optional)

Clean the surface around the reservoir cap and remove the cap from the reservoir (Item 2) [Figure 208].

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 209



Check the condition of the fill strainer screen (Item 1) [Figure 209]. Clean or replace as necessary.

Be sure the screen is installed before adding fluid.

Add the correct fluid to the reservoir until it is visible in the sight gauge. (See HYDRAULIC SYSTEM on Page 133.)

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

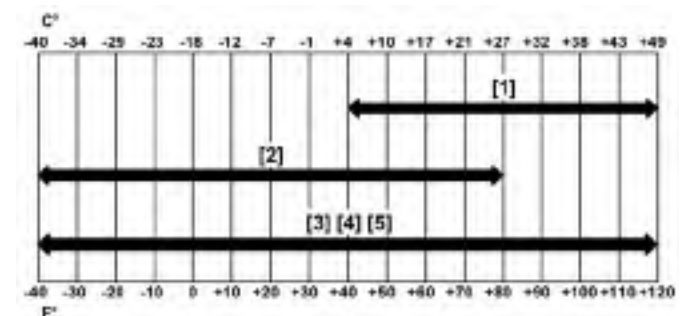
Install the cap.

Close the right side cover and tailgate.

Hydraulic / Hydrostatic Fluid Chart

Figure 210

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



TEMPERATURE RANGE ANTICIPATED DURING MACHINE USE

[1] VG 100; Minimum VI 130

[2] VG 46; Minimum VI 150

[3] BOBCAT All-Season Fluid

[4] BOBCAT Synthetic Fluid

[5] BOBCAT Biodegradable Hydraulic / Hydrostatic Fluid (Unlike biodegradable fluids that are vegetable based, Bobcat biodegradable fluid is formulated to prevent oxidation and thermal breakdown at operating temperatures.)

Install the oil fill cap.

HYDRAULIC SYSTEM (CONT'D)

Removing And Replacing Hydraulic Filters

WARNING

AVOID INJURY OR DEATH

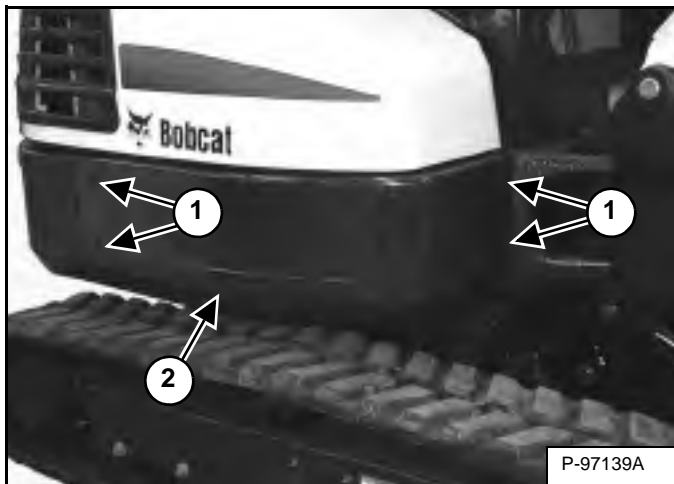
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire.

W-2103-0508

Hydraulic Filter

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 109.)

Figure 211

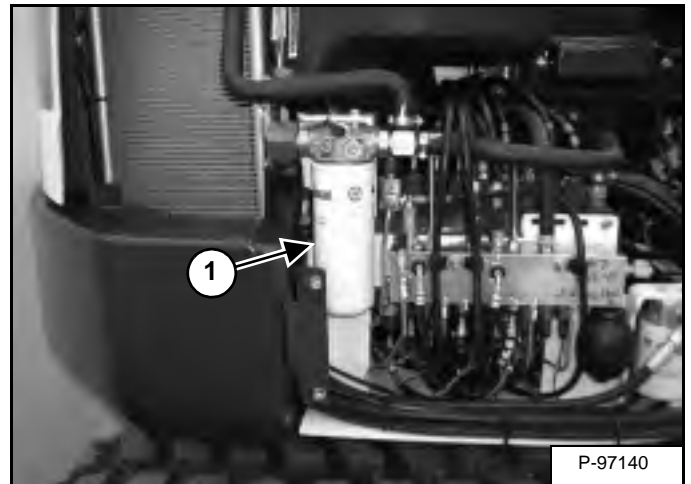


Open the right side cover. (See RIGHT SIDE COVER on Page 115.)

For easier access to change the hydraulic filter, remove the lower right side panel.

Remove the four bolts (Item 1) from the side panel (Item 2) [Figure 211]. Remove the side panel.

Figure 212



Remove the hydraulic filter (Item 1) [Figure 212].

Clean the housing where the filter gasket makes contact.

Put clean hydraulic fluid on the gasket. Install the new filter and hand tighten only. Use a genuine Bobcat replacement filter.

HYDRAULIC SYSTEM (CONT'D)

Removing And Replacing Hydraulic Filters (Cont'd)

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

Case Drain Filter

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 109.)

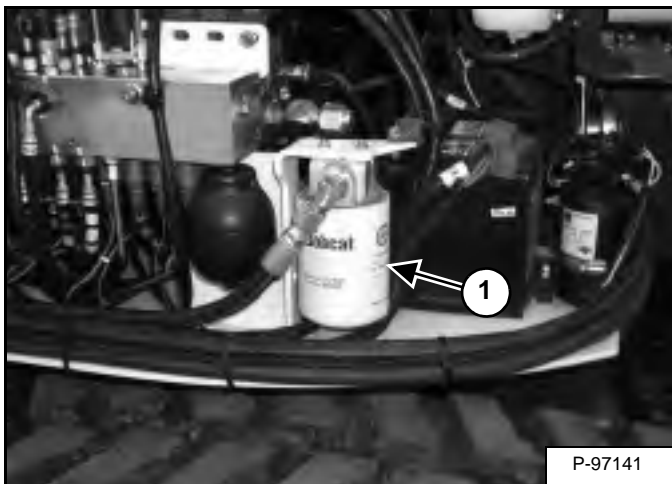
The case drain filter is located in the right front corner of the excavator.

Open the right side cover. (See RIGHT SIDE COVER on Page 115.)

For easier access to change the case drain filter, remove the lower right side panel.

Remove the four bolts (Item 1) from the side panel (Item 2) [Figure 211]. Remove the side panel.

Figure 213



Remove the case drain filter (Item 1) [Figure 213].

Clean the housing where the filter gasket makes contact.

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

HYDRAULIC SYSTEM (CONT'D)

Removing And Replacing Hydraulic Fluid

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 109.)

⚠ WARNING

AVOID INJURY OR DEATH

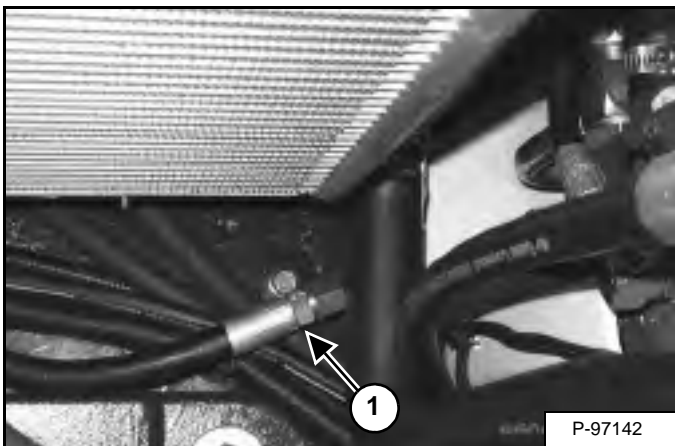
Diesel fuel or hydraulic fluid under pressure can penetrate skin or eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. Do not use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical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

W-2072-EN-0909

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

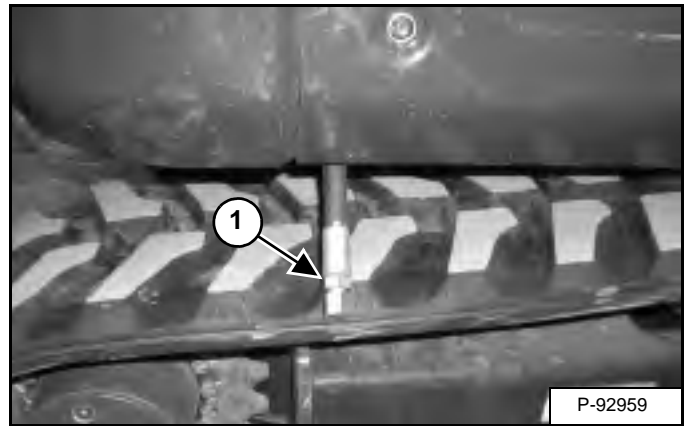
Open the tailgate. (See TAILGATE on Page 114.)

Figure 214



The hydraulic oil drain hose (Item 1) [Figure 214] is located below the oil cooler in the right rear corner of the upperstructure.

Figure 215



Reposition the drain hose out the bottom of the upperstructure and remove the cap (Item 1) [Figure 215].

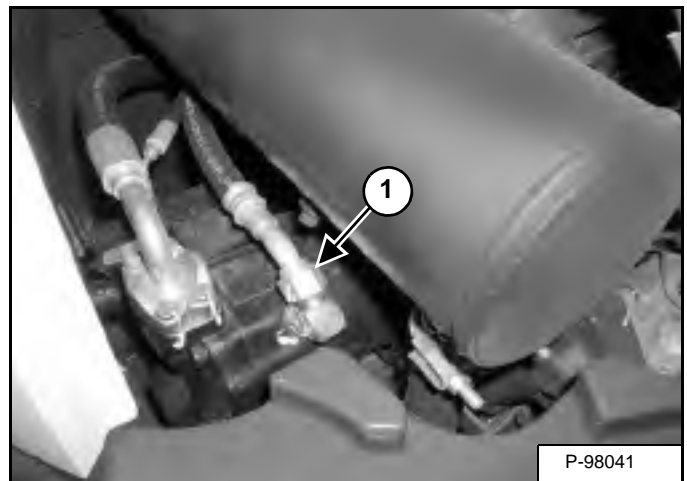
Drain the fluid into a container.

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

Install the cap (Item 1) [Figure 215] and position the drain hose back to the storage position (Item 1) [Figure 214].

Add fluid to the reservoir. (See HYDRAULIC SYSTEM on Page 133.)

Figure 216



With the engine OFF, loosen the hose (Item 1) [Figure 216] on the hydraulic pump until all air is purge from the system. Tighten the hose after a steady stream of hydraulic fluid, free of any air bubbles, drains from the hose. **DO NOT RUN THE MACHINE WITH THE HOSE LOOSE.**

Start the engine and operate the machine 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 109.)

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

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

W-2011-1285

WARNING

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

W-2068-1285

WARNING

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

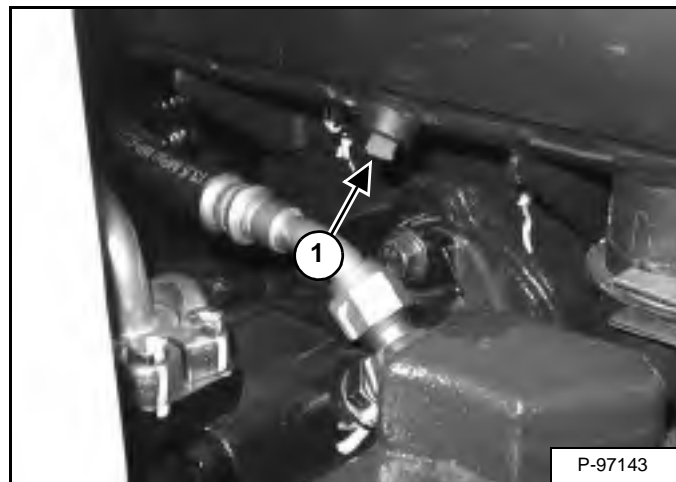
Failure to do so can cause injury or death.

W-2203-0595

Do not operate the excavator with a defective exhaust system.

Stop the engine. Open the tailgate. (See TAILGATE on Page 114.)

Figure 217



Remove the plug (Item 1) [Figure 217] from the bottom of the muffler.

Start the engine and run for about 10 seconds while a second person, wearing safety glasses, holds a piece of wood over the outlet of the muffler. The carbon deposits will be forced out of the muffler plug hole (Item 1) [Figure 217].

Stop the engine. Install and tighten the plug.

Close the tailgate.

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.

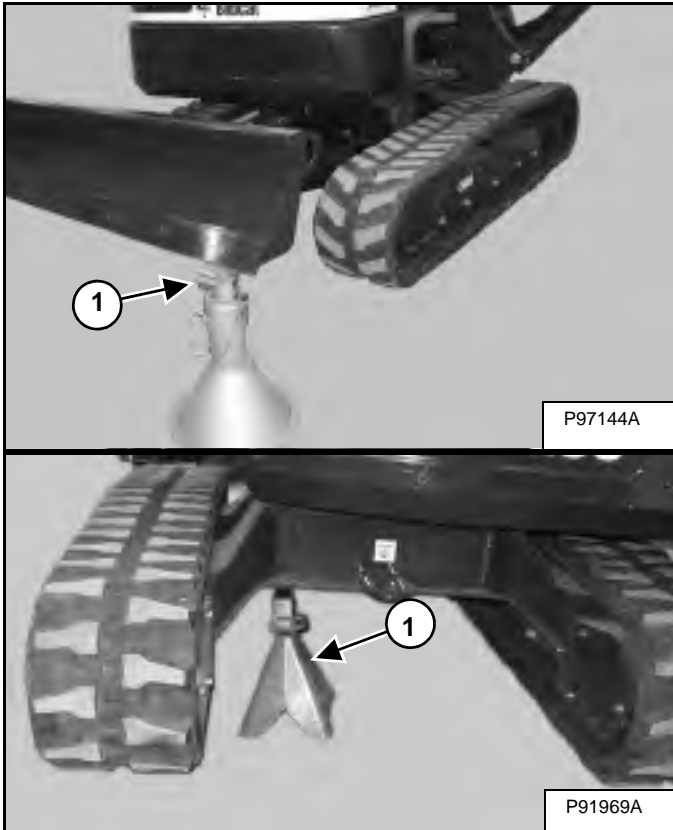
I-2284-EN-0909

TRACK TENSION

NOTE: The wear of the pins and bushings on the undercarriage vary with the working conditions and the different types of soil conditions. It is necessary to inspect track tension and maintain the correct tension. See **SERVICE SCHEDULE** for the correct service interval. (See **SERVICE SCHEDULE** on Page 109.)

Adjusting

Figure 218



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

Raise the blade fully and install jackstands under the blade and track frame (Item 1) [Figure 218]. Lower the machine until all machine weight is on the jackstands.

Stop the engine.

Rubber Track Clearance

Figure 219

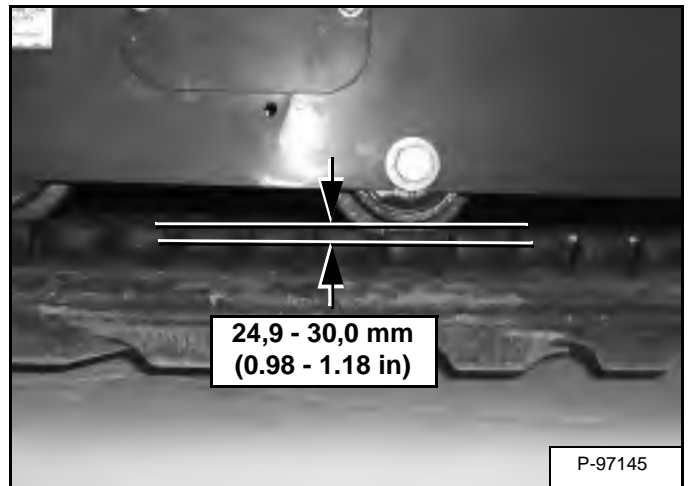
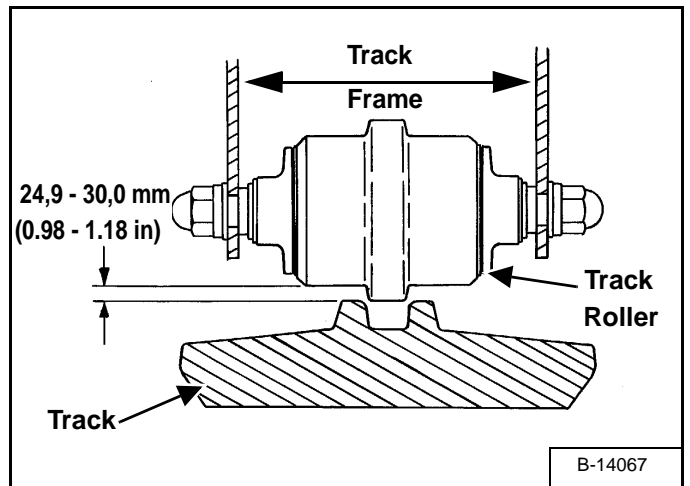


Figure 220



Measure the clearance at the middle track roller. Do not get fingers into pinch points between the track and the track roller. Use a bolt or a dowel of the appropriate size to check the gap between the contact edge of the roller and the top edge of the track guide [Figure 219] and [Figure 220].

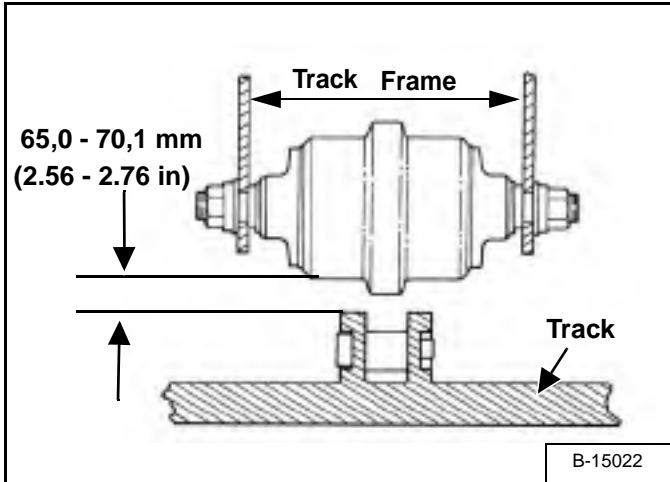
Rubber Track Clearance - 24,9 - 30,0 mm (0.98 - 1.18 in).

TRACK TENSION (CONT'D)

Adjusting (Cont'd)

Steel Track Clearance

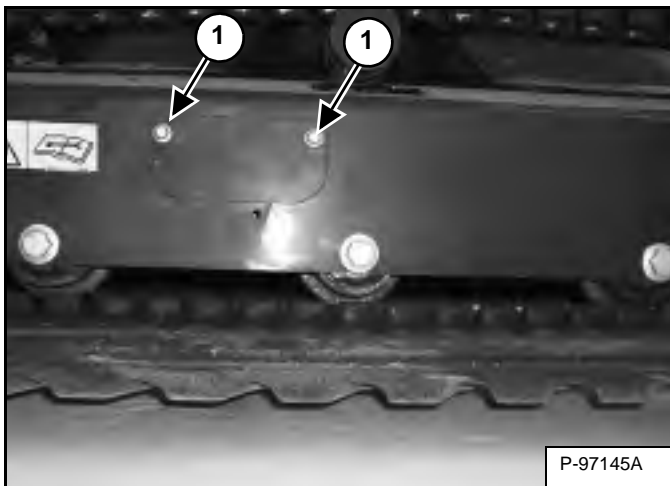
Figure 221



Measure the track clearance at the middle track roller. Do not get fingers into pinch points between the track and the track roller. Use a bolt or dowel of the appropriate size to check the gap between the contact edge of the roller and the top edge of the track guide [Figure 221].

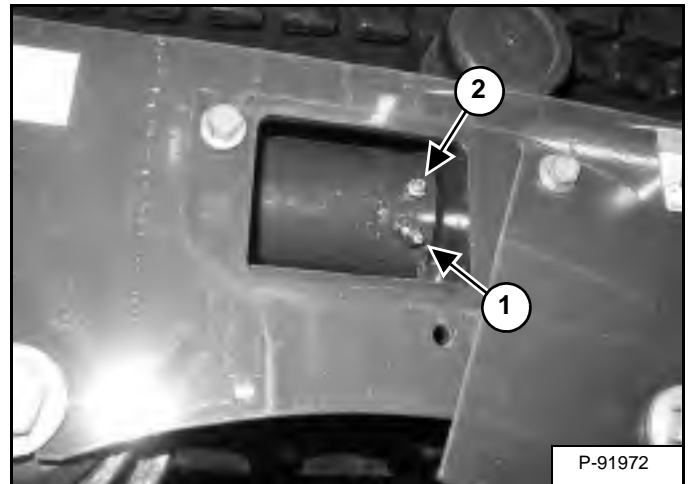
Steel Track Clearance - 65,0 - 70,1 mm (2.56 - 2.76 in).

Figure 222



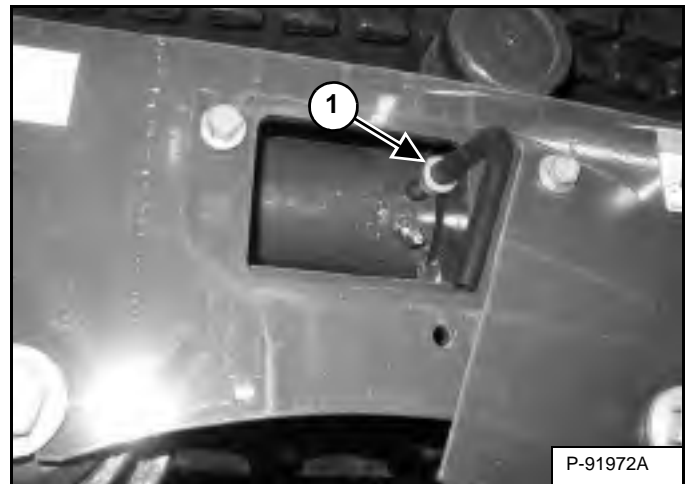
Loosen the two bolts from the cover (Item 1) [Figure 222]. Pivot the cover downward.

Figure 223



Add grease to the fitting (Item 1) [Figure 223] until the track tension is correct.

Figure 224



Use tool MEL1560 (Item 1) [Figure 224] to loosen the bleed fitting (Item 2) [Figure 223] to release tension from the track.

NOTE: Do not loosen the grease fitting (Item 1) [Figure 223].

Repeat the procedure for the other side.

WARNING

HIGH PRESSURE GREASE CAN CAUSE SERIOUS INJURY

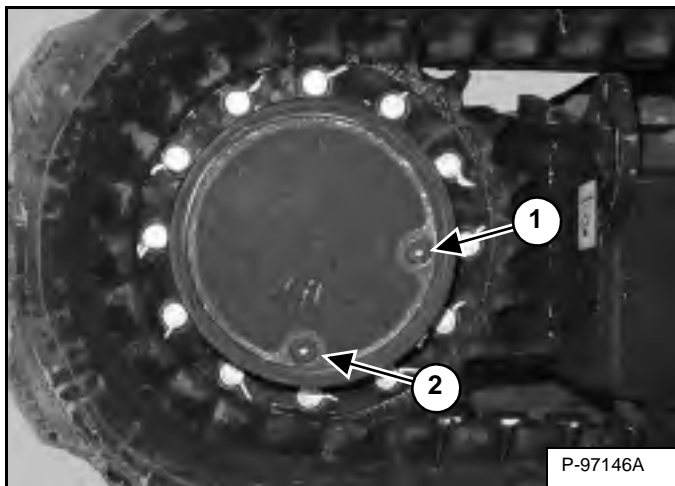
- Do not loosen grease fitting.
- Do not loosen bleed fitting more than 1 - 1/2 turns.

W-2781-0109

TRAVEL MOTOR

Checking And Adding Oil

Figure 225



Park the excavator on a level surface with the plugs (Items 1 and 2) [Figure 225] positioned as shown.

Remove the plug (Item 1) [Figure 225]. The lube level must be at the bottom edge of the hole.

Add lubricant (SAE 90W) through the hole (Item 1) [Figure 225] if the lube level is low.

Repeat the procedure for the opposite travel motor.

Removing And Replacing Oil

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 109.)

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

Park the excavator on a level surface with plugs (Items 1 and 2) [Figure 225] positioned as shown. Remove both plugs and drain the lubricant into a container.

Install the bottom plug (Item 2). Add lubricant (SAE 90W) through the plug hole (Item 1) [Figure 225] until the lube level is at the bottom edge of the hole. (See Capacities on Page 167.)

Install the plug (Item 1) [Figure 225].

Repeat the procedure for the opposite travel motor.

ALTERNATOR BELT

Belt Adjustment

The alternator belt is a special maintenance free type that is pretensioned over the pulleys. This belt eliminates the need for a tensioning device and does not require periodic adjustment. Contact your Bobcat dealer for replacement parts.

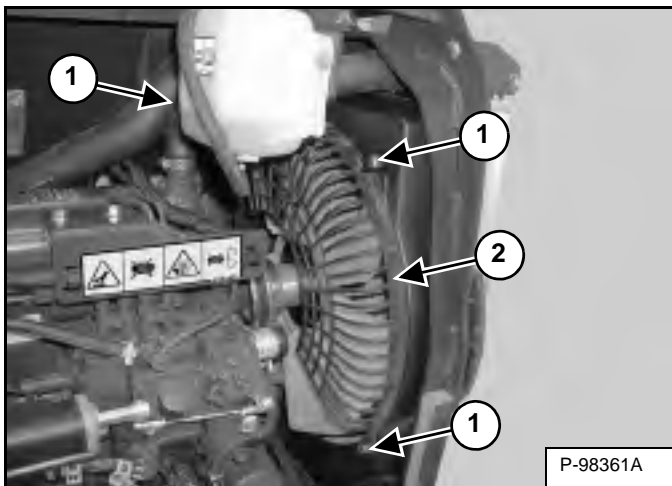
Belt Replacement

Stop the engine and open the tailgate. (See TAILGATE on Page 114.)

NOTE: If the machine is equipped with air conditioning, the compressor belt will need to be removed before the alternator belt can be removed.

Removal

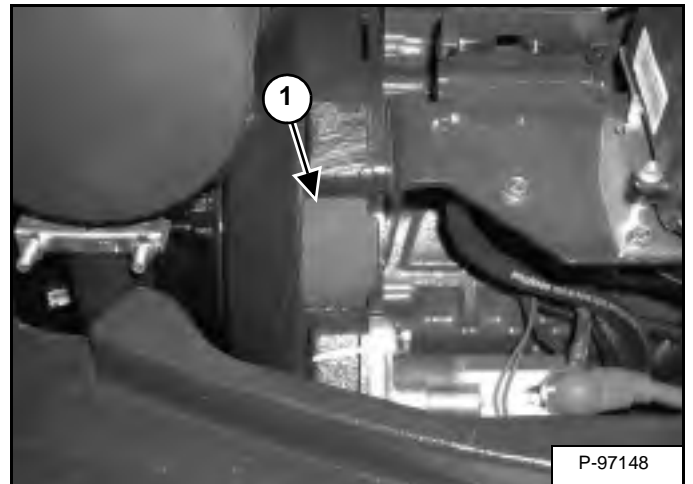
Figure 226



Remove the air conditioning compressor belt (if equipped). (See AIR CONDITIONING COMPRESSOR BELT on Page 143.)

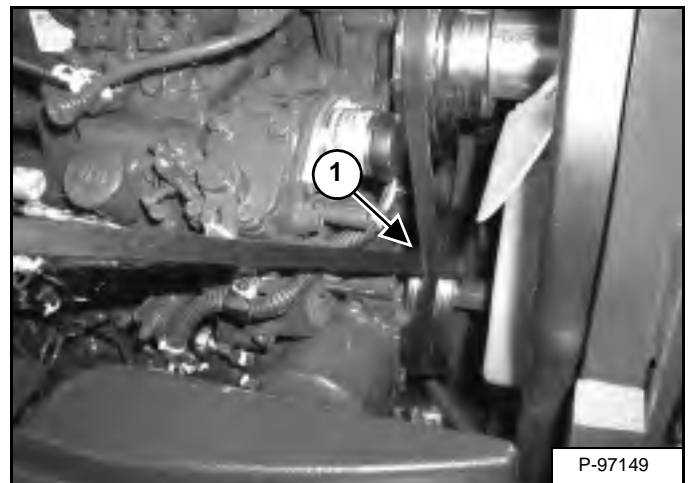
Remove the three bolts (Item 1) and remove the fan guard (Item 2) [Figure 226].

Figure 227



The engine will need to be rotated by hand to remove the belt. To access the flywheel, remove the plug (Item 1) [Figure 227] from the flywheel housing. (A pry bar will be needed to rotate the flywheel to assist in belt removal and installation.)

Figure 228



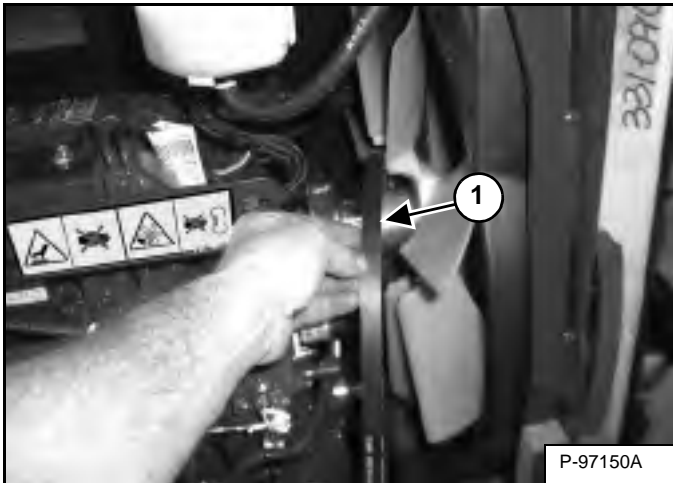
Use a pry bar between the belt and the crankshaft pulley (Item 1) [Figure 228].

Using a pry bar on the flywheel, rotate the engine by hand to push the belt off the crankshaft pulley. Continue to rotate the flywheel until the belt is loose.

ALTERNATOR BELT (CONT'D)

Belt Replacement (Cont'd)

Figure 229

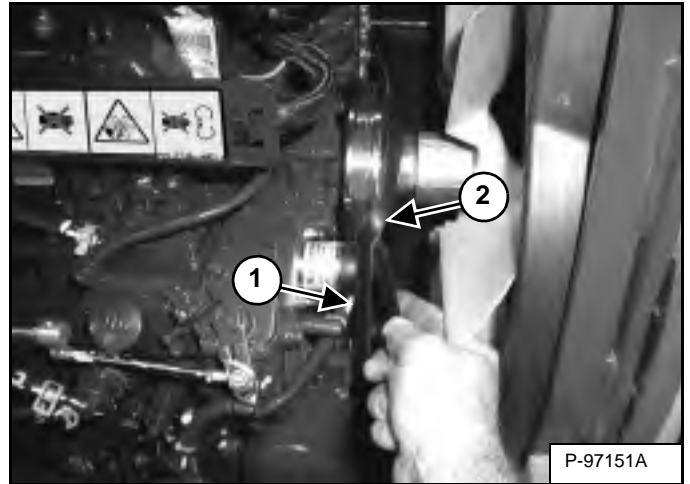


Remove the belt (Item 1) [Figure 229] by sliding it over the fan blades.

Installation

Position the belt (Item 1) [Figure 229] over the fan blades.

Figure 230



Install the belt (Item 1) [Figure 230] over the alternator pulley, the crankshaft pulley and over the fan spacer.

Use a pry bar (Item 2) [Figure 230] to position the belt onto the fan pulley.

Using a pry bar, rotate the flywheel by hand while using the second pry bar (Item 2) [Figure 230] to install the belt over the fan pulley.

Continue to rotate the engine by hand until the belt is fully on the pulleys.

Reinstall the rubber plug (Item 1) [Figure 227].

Install the fan guard (Item 2) with the three bolts (Item 1) [Figure 226].

Close the tailgate.

AIR CONDITIONING COMPRESSOR BELT

Belt Adjustment

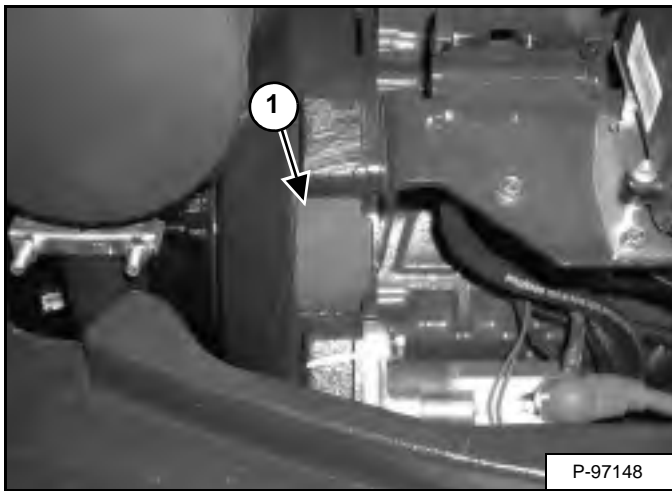
The compressor belt is a special maintenance free type that is pretensioned over the pulleys. This belt eliminates the need for a tensioning device and does not require periodic adjustment. Contact your Bobcat dealer for replacement parts.

Belt Replacement

Stop the engine and open the tailgate. (See TAILGATE on Page 114.)

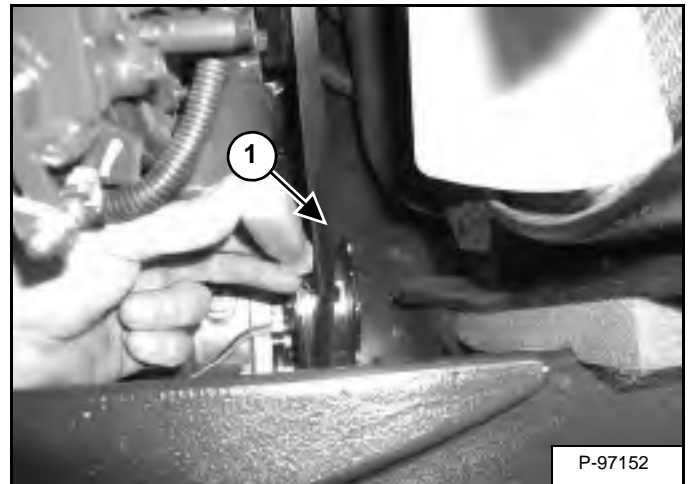
Removal

Figure 231



The engine will need to be rotated by hand to remove the belt. To access the flywheel, remove the plug (Item 1) [Figure 231] from the flywheel housing.

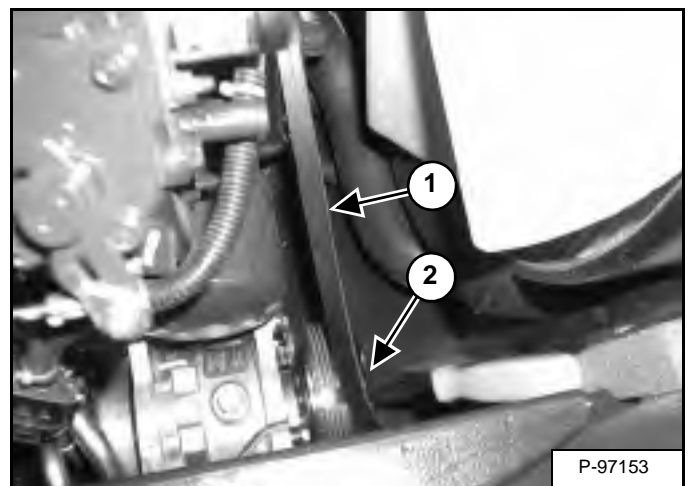
Figure 232



Use a pry bar (Item 1) [Figure 232] to push the belt off of the pulley. Using a pry bar on the flywheel, rotate the engine by hand to push the belt off the compressor pulley. Continue to rotate the flywheel until the belt is loose. Remove the belt.

Installation

Figure 233



Position the belt (Item 1) [Figure 233] over the crankshaft pulley and to the compressor pulley.

Use a pry bar (Item 2) [Figure 233] to position the belt on the pulley while using the second pry bar at the flywheel to rotate the engine by hand.

Continue to rotate the engine by hand until the belt is fully on the pulleys.

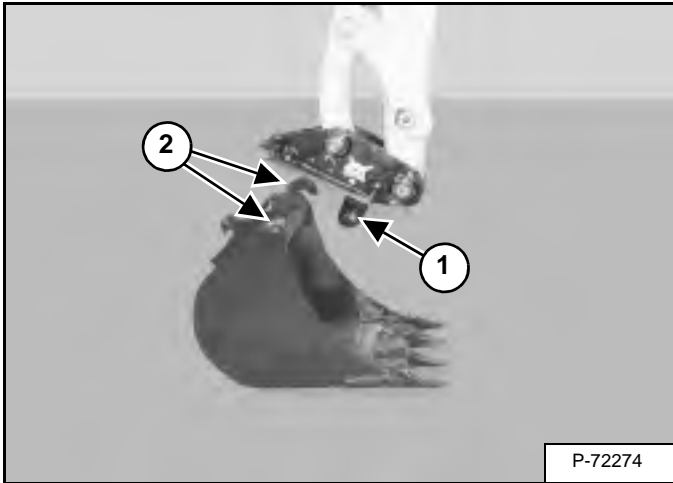
Reinstall the rubber plug (Item 1) [Figure 231].

Close the tailgate.

QUICK COUPLER

Quick Coupler And Attachment Inspection And Maintenance

Figure 234



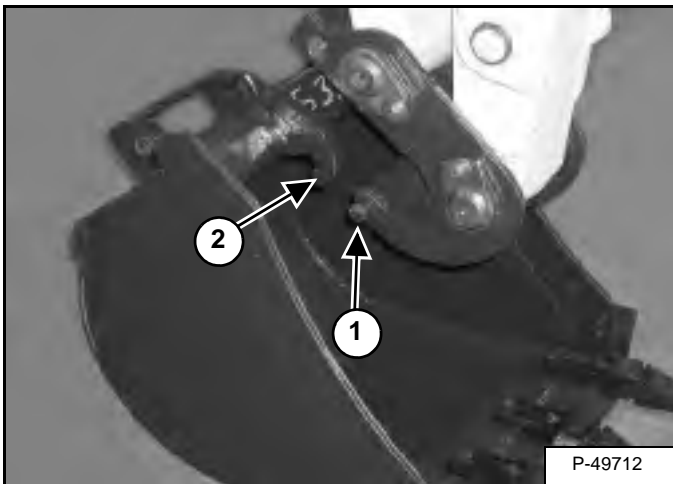
Inspect the quick coupler for wear or damage. Inspect the quick coupler pins (Item 1) and the hooks (Item 2) [Figure 234] (on the attachment) for wear or damage

Repair or replace damaged parts.

X-CHANGE

Inspection And Maintenance

Figure 235



Inspect the X-Change for wear or damage. Inspect the X-Change pins (Item 1) and hooks (Item 2) [Figure 235] (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.

BUCKET

Bucket Teeth Removal And Installation

WARNING

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

- Pressurised fluids and springs or other stored energy components.
- Flying debris or loose material is present.
- Engine is running.
- Tools are being used.

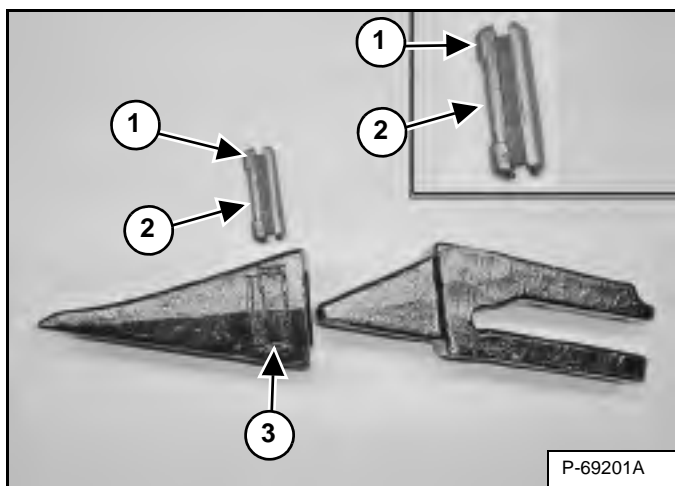
W-2505-EN-1009

Position the bucket so the bucket teeth are at a 30° angle up from the ground for accessibility to the teeth.

Lower the boom until the bucket is fully on the ground.

Stop the engine and exit the excavator.

Figure 236



The retaining pin (Item 1) must be installed as shown [notch (Item 2) to the front] for proper fit and tooth retention. The side of the tooth point (Item 3) [Figure 236] also shows the correct orientation of the retaining pin.

Installation: Position the new tooth point on the shank and install a new retaining pin. Install the retaining pin until it is flush with the top of the point.

LUBRICATION OF THE HYDRAULIC EXCAVATOR

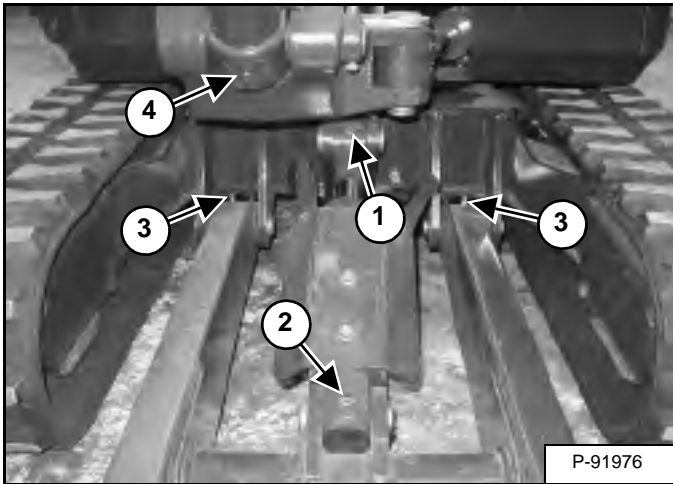
Lubrication Locations

Lubricate the excavator as specified in the SERVICE SCHEDULE for the best performance of the machine. (See SERVICE SCHEDULE on Page 109.)

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

Lubricate the following locations on the excavator EVERY 8 - 10 HOURS:

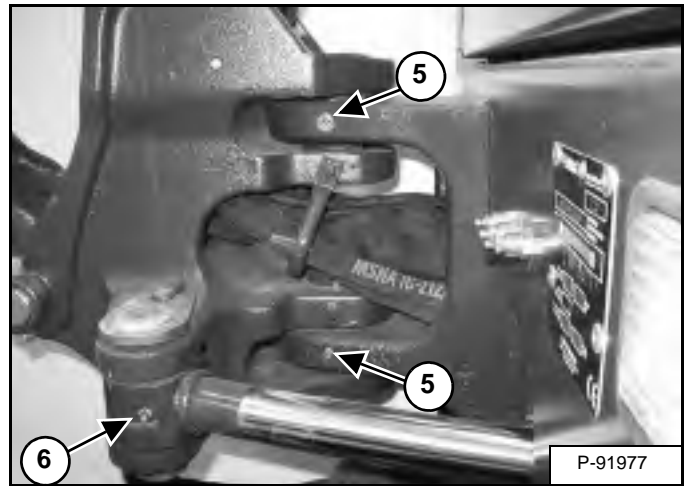
Figure 237



Ref Description (# of Fittings)

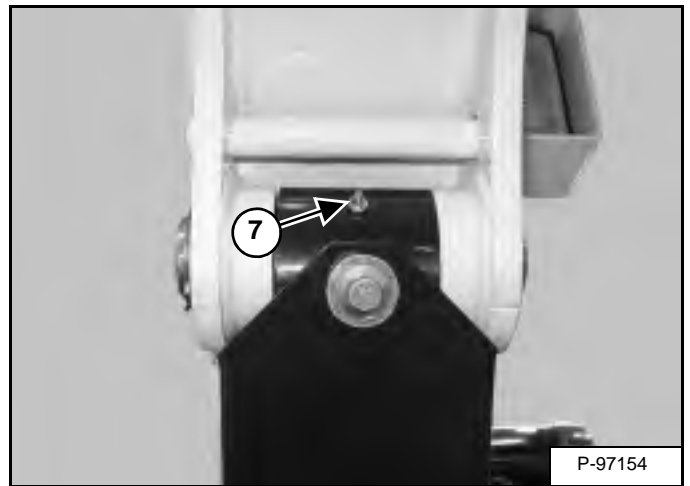
1. Blade Cylinder Rod End (1) [Figure 237].
2. Blade Cylinder Base End (1) [Figure 237].
3. Blade Pivots (2) [Figure 237].
4. Boom Cylinder Base End (1) [Figure 237].

Figure 238



5. Boom Swing Pivot (2) [Figure 238].
6. Boom Swing Cylinder Rod End (1) [Figure 238].

Figure 239

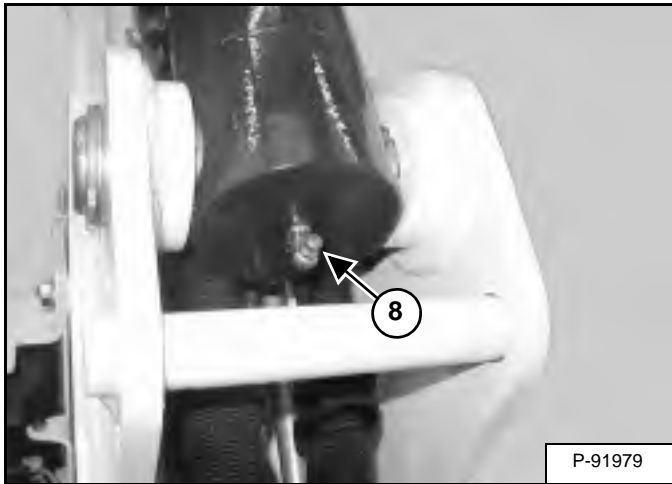


7. Boom Cylinder Rod End (1) [Figure 239].

LUBRICATION OF THE HYDRAULIC EXCAVATOR (CONT'D)

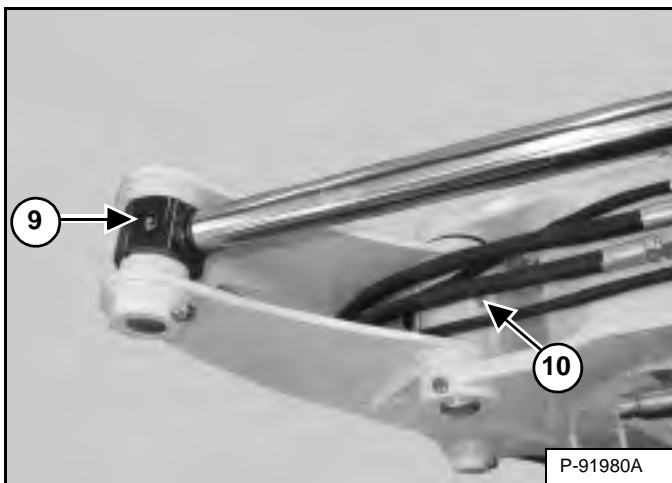
Lubrication Locations (Cont'd)

Figure 240



8. Arm Cylinder Base End (1) [Figure 240].

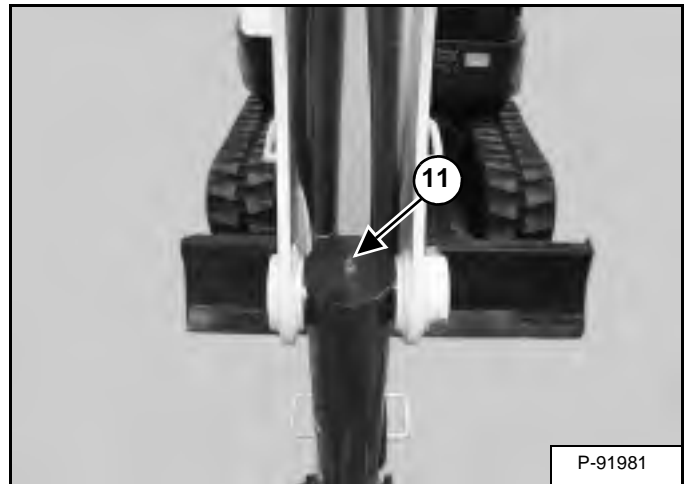
Figure 241



9. Arm Cylinder Rod End (1) [Figure 241].

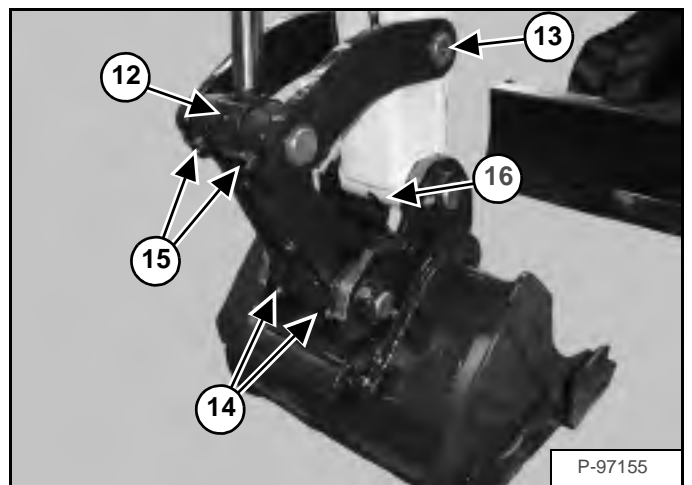
10. Arm Pivot (1) [Figure 241].

Figure 242



11. Bucket Cylinder Base End (1) [Figure 242].

Figure 243



12. Bucket Cylinder Rod End (1) [Figure 243].

13. Bucket Link Pin (1) [Figure 243].

14. Bucket Pivot (3) [Figure 243].

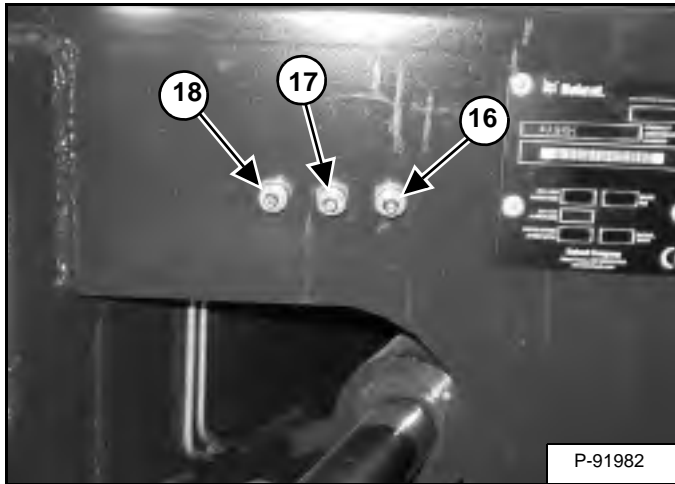
15. Bucket Link (2) [Figure 243].

16. Arm (1) [Figure 243].

LUBRICATION OF THE HYDRAULIC EXCAVATOR (CONT'D)

Lubrication Locations (Cont'd)

Figure 244



17. Boom Swing Cylinder Base end (1) [Figure 244].

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

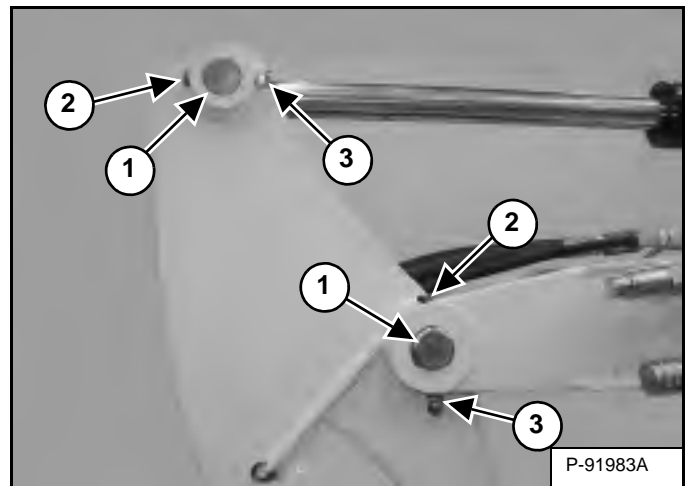
18. Swing Circle (1) [Figure 244].

19. Swing Pinion (1) [Figure 244]. (Install 3 to 4 pumps of grease then rotate the upperstructure 90°. Install 3 to 4 pumps of grease and again rotate the upperstructure 90°. Repeat this until the slew pinion has been greased at four positions.)

PIVOT PINS

Inspection And Maintenance

Figure 245



The pivots and cylinders (Item 1) have a large pin held in position with a bolt (Item 2) and double nuts (Item 3) [Figure 245] 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) 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 stabiliser in the fuel tank and run the engine a few minutes to circulate the stabiliser 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.



SYSTEM SETUP & ANALYSIS

DIAGNOSTIC SERVICE CODES	153
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Password Entry (For Starting And Operating The Machine)	155
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Job Clock	156
RPM	156



DIAGNOSTIC SERVICE CODES

Number Codes List

CODE		CODE	
C0216	Hydraulic charge filter not connected	C2005	Two speed solenoid error ON
C0217	Hydraulic charge filter plugged	C2006	Two speed solenoid error OFF
C0309	Battery voltage low	C2102	Glow plugs error ON
C0310	Battery voltage high	C2103	Glow plugs error OFF
C0311	Battery voltage extremely high		
C0314	Battery voltage extremely low	C2202	Starter error ON
C0315	Battery voltage shutdown level	C2203	Starter error OFF
C0322	Battery voltage out of range low		
		C2305	Offset base solenoid short to battery
C0414	Oil pressure extremely low	C2306	Offset base solenoid short to ground
C0415	Oil pressure shutdown level	C2307	Offset base solenoid open circuit
C0610	Engine speed high	C2405	Offset rod solenoid short to battery
C0611	Engine speed extremely high	C2406	Offset rod solenoid short to ground
C0613	Engine speed no signal	C2407	Offset rod solenoid open circuit
C0615	Engine speed shutdown level		
C0618	Engine speed out of range high	C2505	Offset return short to battery
		C2506	Offset return short to ground
C0710	Hydraulic oil temperature high	C2507	Offset return open circuit
C0711	Hydraulic oil temperature extremely high		
C0715	Hydraulic oil temperature shutdown level	C2605	Auxiliary base solenoid short to battery
C0721	Hydraulic oil temperature out of range high	C2606	Auxiliary base solenoid short to ground
C0722	Hydraulic oil temperature out of range low	C2607	Auxiliary base solenoid open circuit
C0810	Engine coolant temperature high	C2705	Auxiliary rod solenoid short to battery
C0811	Engine coolant temperature extremely high	C2706	Auxiliary rod solenoid short to ground
C0815	Engine coolant temperature shutdown level	C2707	Auxiliary rod solenoid open circuit
C0821	Engine coolant temperature out of range high		
C0822	Engine coolant temperature out of range low	C2805	Hydraulic exchange error ON
		C2806	Hydraulic exchange error OFF
C0921	Fuel level out of range high		
C0922	Fuel level out of range low	C3028	Controller memory failure (Log only)
C1221	Front auxiliary control out of range high	C3128	Interrupted power failure (Log only)
C1222	Front auxiliary control out of range low		
C1223	Front auxiliary control not in neutral	C3323	Main controller not programmed
C1305	Fuel shut-off hold solenoid short to battery	C3397	Main controller programmed (Log only)
C1306	Fuel shut-off hold solenoid short to earth		
C1307	Fuel shut-off hold solenoid open circuit		
C1402	Fuel shut-off hold solenoid short error on		
C1403	Fuel shut-off hold solenoid short error off		

DIAGNOSTICS SERVICE CODE (CONT'D)

Number Codes List (Cont'd)

CODE		CODE	
C4021	Angle blade control out of range high	E0105	Throttle actuator short to battery
C4022	Angle blade control out of range low	E0106	Throttle actuator short to earth
C4023	Angle blade control not in neutral	E0107	Throttle actuator open circuit
C4105	Angle blade base solenoid short to battery	E01233	Throttle actuator not calibrated
C4106	Angle blade base solenoid short to earth		
C4107	Angle blade base solenoid open circuit	E0321	5 volt supply out of range high
		E0322	5 volt supply out of range low
C4205	Angle blade rod solenoid short to battery		
C4206	Angle blade rod solenoid short to earth	E0421	Throttle sensor out of range high
C4207	Angle blade rod solenoid open circuit	E0422	Throttle sensor out of range low
C4321	Load sense pressure out of range high	E0521	Throttle actuator feedback out of range high
C4322	Load sense pressure out of range low	E0522	Throttle actuator feedback out of range low
C4416	Auxiliary controller not connected (Tilt rotator option only)	E3128	Interrupted power failure log only
		E3297	Controller programmed log only
C4516	Throttle controller not connected		
C6021	Offset controller out of range high		
C6022	Offset controller out of range low		
C6023	Offset controller not in neutral		
C6204	Load moment in error		
C6305	Console sensor short to battery		
C6306	Console sensor short to earth		
C6405	Switched power relay short to battery		
C6406	Switched power relay short to earth		
C6407	Switched power relay open circuit		
C6505	Work group lockout short to battery		
C6506	Work group lockout short to earth		
C6507	Work group lockout open circuit		

DISPLAY CONTROLLER PANEL SETUP

Passwords

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

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

Master Password:

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

Owner Password:

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

Operator Password:

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

Password Entry (For Starting And Operating The Machine)

Press ENTER CODE button (Item 1). The panel will become lighted and there will be two short beeps. **Code** will appear on the data display screen (Item 2) [Figure 246].

NOTE: After you press ENTER CODE you have 40 seconds to use the keypad (Item 3) [Figure 246] to enter the password. (If more than 40 seconds is used, the process will abort and you will need to start over.

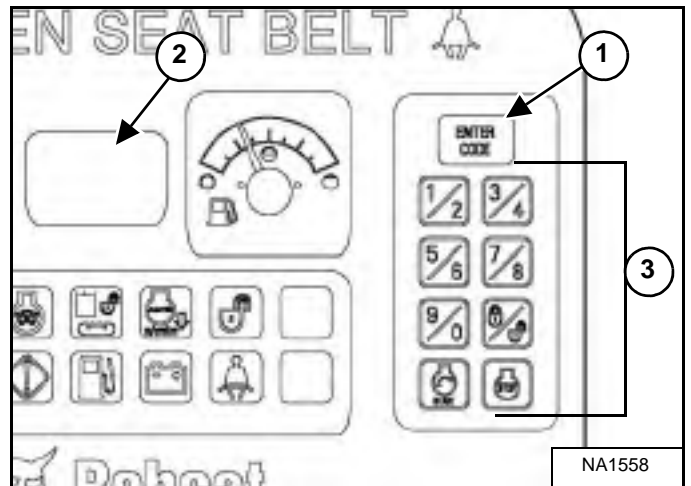
Enter the password. For each digit that you enter, a dash will appear on the data display screen. If the password was entered correctly, there will be one long beep.

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

You are now ready to start and operate the machine.

If you will be changing the operator password, do not start the engine. (See Changing The Operator Password on Page 155.)

Figure 246



Changing The Operator Password

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

Press and hold the ENTER CODE button (Item 1) for three seconds. Code 1 will appear on the data display screen (Item 2) [Figure 246].

Press the ENTER CODE button until the desired Code (**Code 0, Code 1, Code 2, Code 3**) appears. Code 0 is Owner Password, the other codes are Operator passwords. You now have 40 seconds to use the keypad (Item 3) [Figure 246] to enter each digit of a new four digit password.

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

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

NOTE: If the new passwords do not match, there will be one long beep and **Error will appear for 1 second and then the data display screen will return to HOURMETER function.**

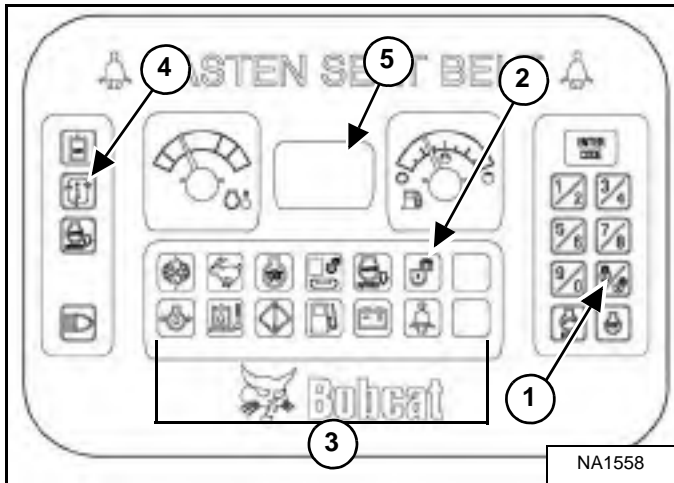
DISPLAY CONTROLLER PANEL SETUP (CONT'D)

Password Lockout Feature

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

Perform Password Entry ((See Password Entry (For Starting And Operating The Machine) on Page 155.)) (the engine can be started or stopped.) The password entry can be performed with the engine off or with the engine running.

Figure 247



Press the Lock / Unlock button (Item 1). The data display screen (Item 5) [Figure 247] will continuously alternate from **UnLoc** to **CodE** for 1 second periods.

Perform Password Entry again.

UnLoc will appear in the data display screen (Item 5), the Unlocked Icon (Item 2) will appear in the Icon Display Area (Item 3) [Figure 247] and there will be two short beeps.

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

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

To lock the system again, press the Lock / Unlock button (Item 1) [Figure 247] and enter the password during the 15 second period.

Job Clock

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

Press and release the information button (Item 4) until JOB light is ON at the top, centre of the data display screen (Item 5) [Figure 247].

While the JOB light is ON, press and hold the information button (Item 4) [Figure 247] until the data display screen returns to zero.

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

Pressing the information button (Item 4) [Figure 247] again or pressing the START button will return the data display screen to HOURMETER function.

RPM

The data display screen (Item 5) [Figure 247] can be set to display engine rpm.

With the engine running, press and release the information button (Item 4) until RPM light is ON at the top, centre of the data display screen (Item 5) [Figure 247].

Engine RPM is now displayed in the data display screen.

Press the information button (Item 4) [Figure 247] again the return to HOURMETER function.

SPECIFICATIONS

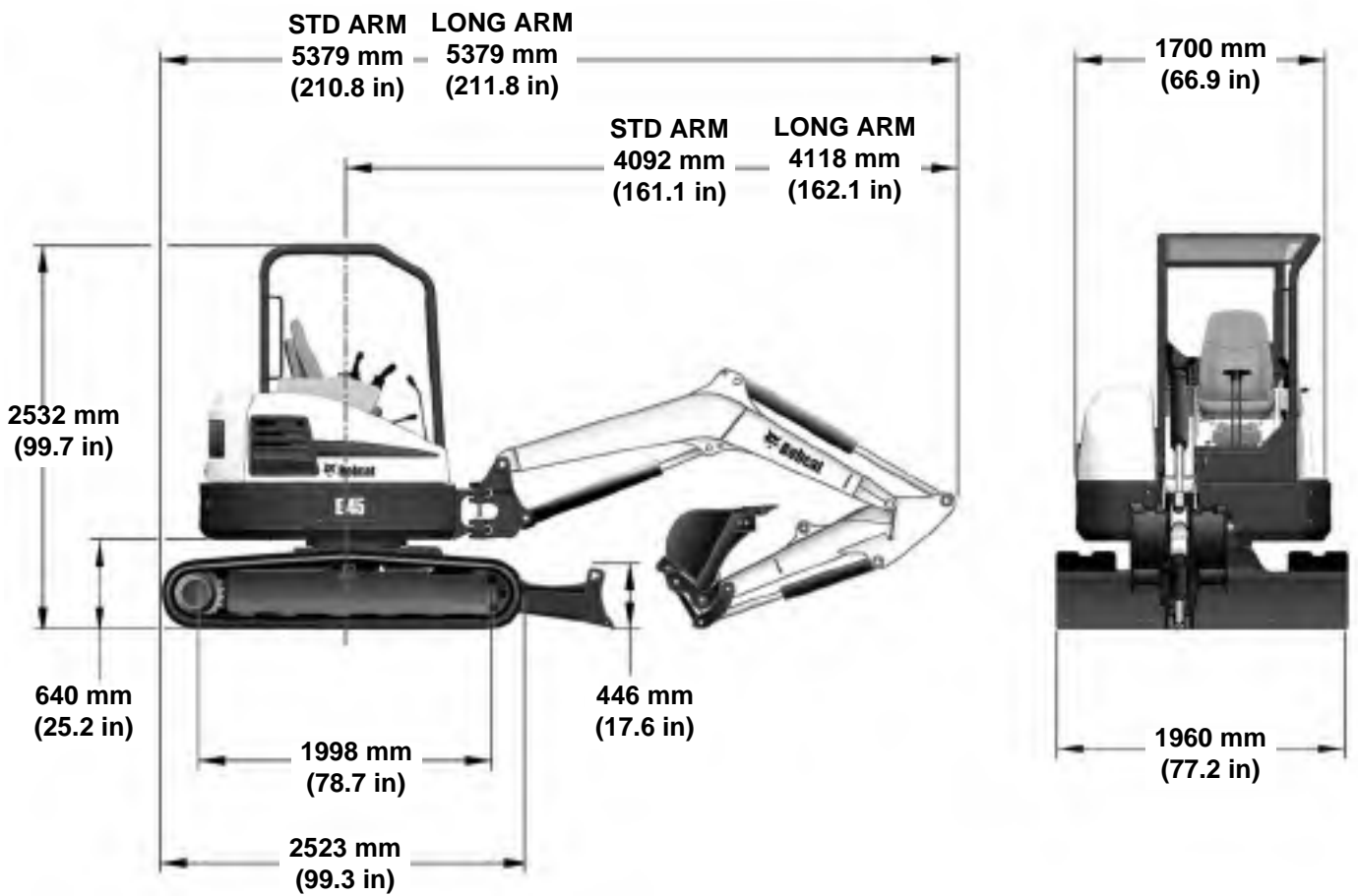
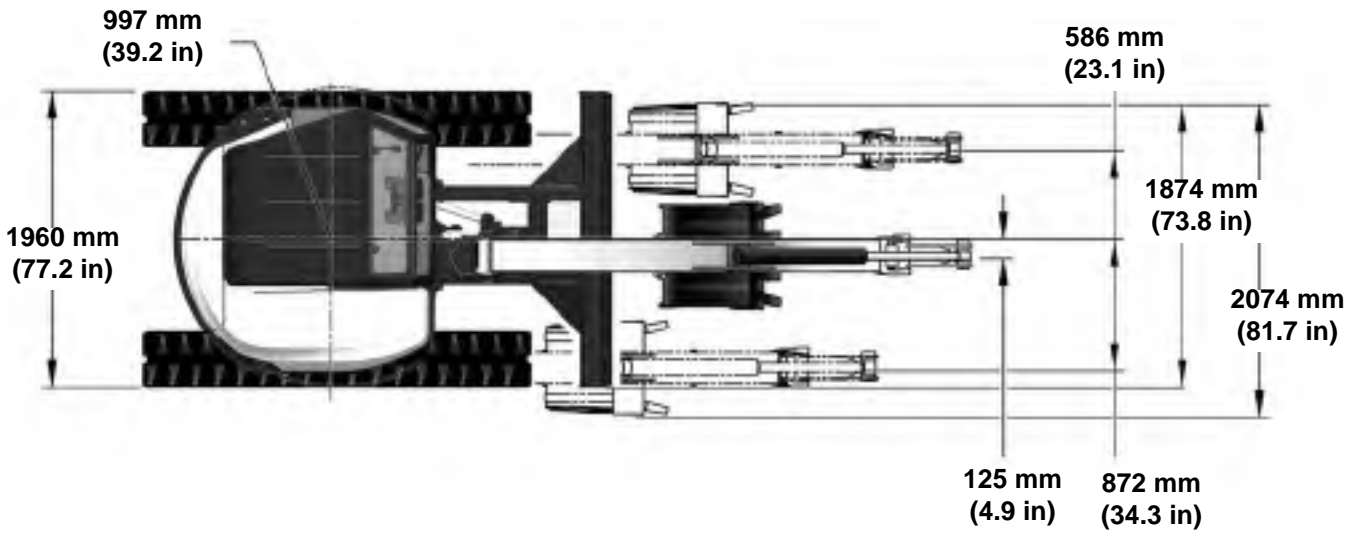
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E45 EXCAVATOR SPECIFICATIONS

Machine Dimensions

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

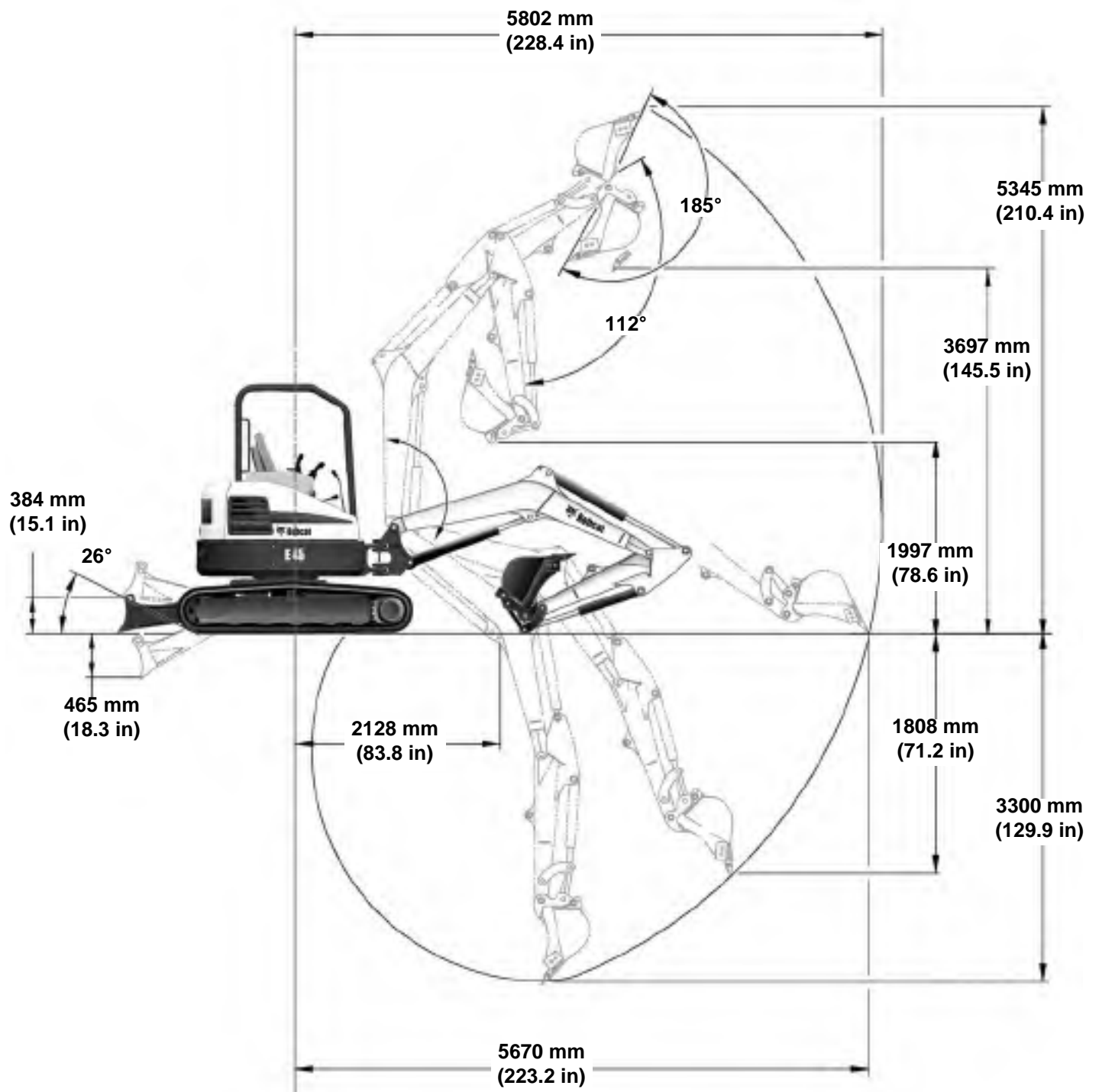


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E45 EXCAVATOR SPECIFICATIONS (CONT'D)

Machine Dimensions (Standard Arm)

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

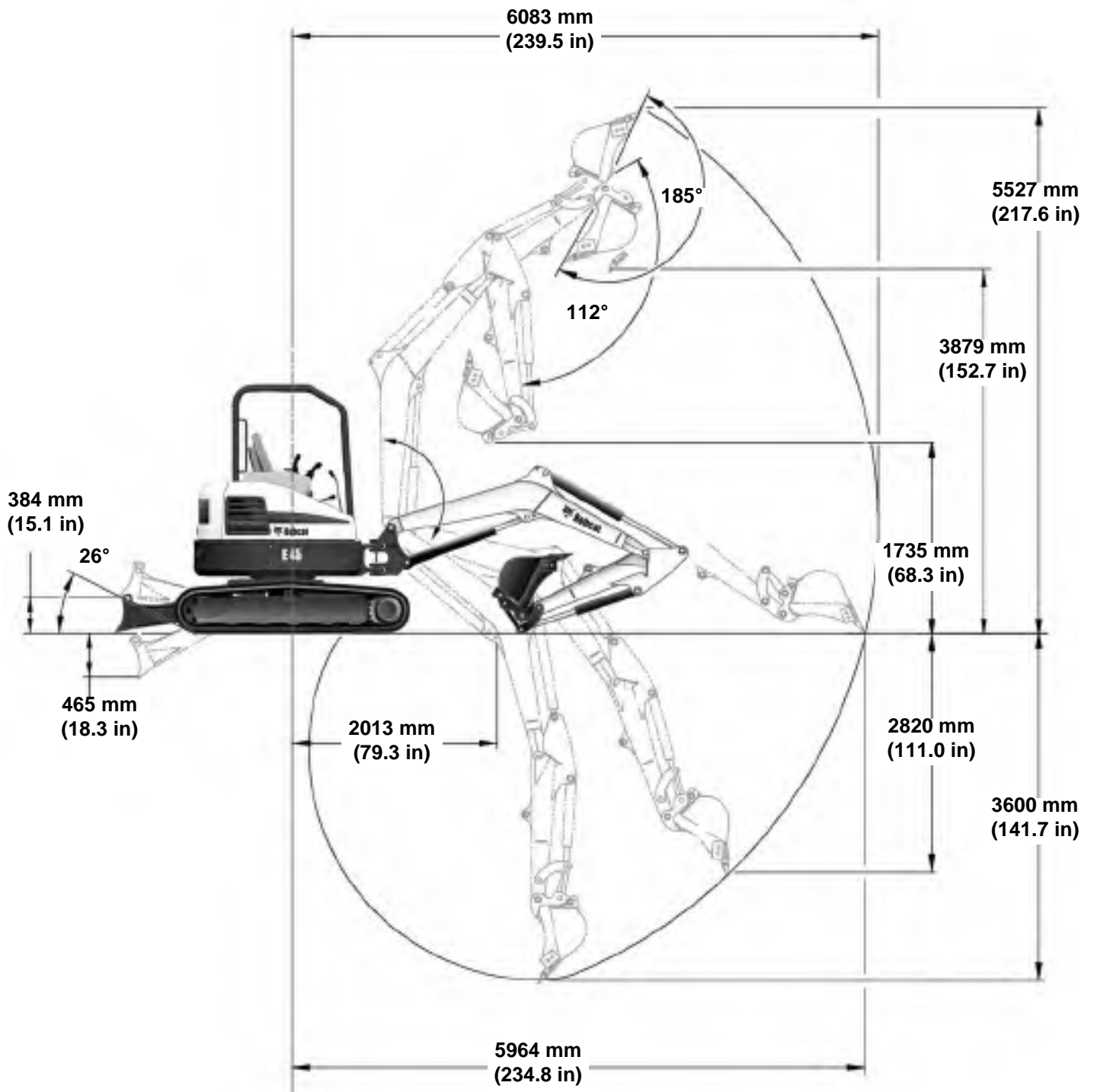


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E45 EXCAVATOR SPECIFICATIONS (CONT'D)

Machine Dimensions (Long Arm)

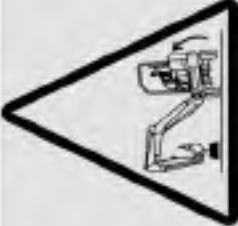


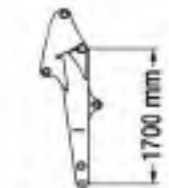
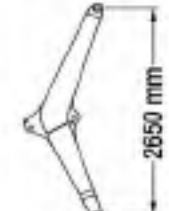
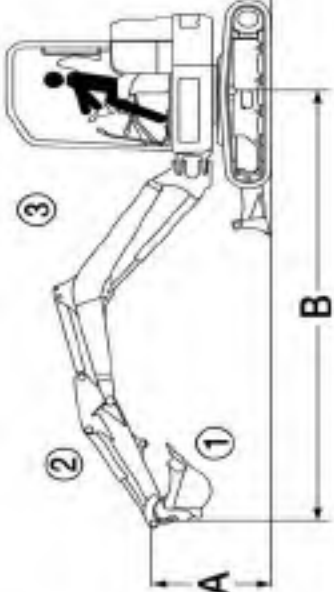




- Where applicable, specification conform to SAE or ISO standards and are subject to change without notice.



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E45 EXCAVATOR SPECIFICATIONS (CONT'D)

Rated Lift Capacity (Long Arm)

																			
																		A	
4000 mm	2000 mm	3000 mm	4000 mm	5000 mm	*808 kg @ 4134 mm	*808 kg @ 4134 mm			2000 mm	3000 mm	4000 mm	5000 mm	kg @ max. B	561 kg @ 4134 mm					
3000 mm			*760 kg	*752 kg	*893 kg @ 4836 mm	*893 kg @ 4836 mm								393 kg @ 4836 mm					
2000 mm	*1179 kg	*1000 kg	*942 kg	*942 kg	*953 kg @ 5170 mm	*953 kg @ 5170 mm				*1179 kg	*1000 kg	*942 kg		334 kg @ 5170 mm					
1000 mm	*1975 kg	*1290 kg	*1058 kg	*1058 kg	*1026 kg @ 5237 mm	*1026 kg @ 5237 mm				*1975 kg	*1290 kg	*1058 kg		306 kg @ 5237 mm					
Ground	*2346 kg	*1495 kg	*1117 kg	*1117 kg	*1117 kg @ 5102 mm	*1117 kg @ 5102 mm				*2346 kg	*1495 kg	*1117 kg		314 kg @ 5102 mm					
-1000 mm	*3757 kg	*2348 kg	*1511 kg		*1253 kg @ 4682 mm	*1253 kg @ 4682 mm				*3757 kg	*2348 kg	*1511 kg		377 kg @ 4682 mm					

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E45 EXCAVATOR SPECIFICATIONS (CONT'D)

Engine

Make / Model	Kubota V2403-M-DI-E3B-BC-5
Fuel / Cooling	Diesel / Liquid
Horsepower (SAE Net) @ 2200 RPM	30,2 Kw (40.5 hp)
Torque @ 1200 RPM (SAE Net)	152,7 N•m (112.7 ft-lb)
Number Of Cylinders	4
Displacement	2,433 L (148.5 ci)
Bore / Stroke	87,1 x 102,4 mm (3.43 x 4.03 in)
Lubrication	Pressure System with Filter
Crankcase Ventilation	Closed Breathing
Air Cleaner	Dry replaceable paper dual cartridge
Ignition	Diesel-Compression
Low Idle Speed	1200 rpm +/- 75 rpm
High Idle Speed	2450 rpm
Engine Coolant	Propylene Glycol / water mixture (53% PG / 47% water)

Hydraulic System

Pump Type	Engine driven, single outlet, variable displacement, load sensing, torque limited, piston pump
Pump Capacity Piston Pump	99,1 L/min (26.2 U.S. gpm)
Auxiliary Flow (Aux3)	75,7 L/min (20.0 U.S. gpm)
Auxiliary Flow - 2nd Aux (Female coupler) (Male Coupler)	26,4 L/min (7.0 U.S. gpm) 21,0 L/min (5.5 U.S. gpm)
Hydraulic Filter	Full flow replaceable, 3 micron synthetic media element
Control Valve	9 spool closed centre individually compensated
System Relief Pressure Slew Circuit Boom, Blade, Arm, Bucket, Boom Swing, Auxiliary Joystick Control Pressure	24097 kPa (241 bar) (3495 psi) 25580 kPa (256 bar) (3710 psi) 2999 kPa (30 bar) (435 psi)
Auxiliary Port Relief, Male And Female Couplers	20995 kPa (210 bar) (3045 psi)
Arm Port Relief, Base End And Rod End	28999 kPa (290 bar) (4206 psi)
Boom Port Relief, Base End And Rod End	28999 kPa (290 bar) (4206 psi)
Bucket Port Relief Base End And Rod End	28999 kPa (290 bar) (4206 psi)
Blade Port Relief Base End And Rod End	26000 kPa (260 bar) (3771 psi)
Main Hydraulic Filter Bypass	27000 kPa (270 bar) (3916 psi)
Case Drain	345 kPa (3,5 bar) (50 psi)

E45 EXCAVATOR SPECIFICATIONS (CONT'D)

Hydraulic Cylinders

Cylinder	Bore	Rod	Stroke
Boom (cushion up)	95,2 mm (3.75 in)	50,8 mm (2.00 in)	697 mm (27.45 in)
Arm (cushion retract / extend)	82,6 mm (3.25 in)	50,8 mm (2.00 in)	644 mm (25.35 in)
Bucket	76,2 mm (3.00 in)	44,5 mm (1.75 in)	524 mm (20.63 in)
Boom Swing	88,9 mm (3.50 in)	44,5 mm (1.75 in)	491 mm (19.32 in)
Blade	95,2 mm (3.75 in)	50,8 mm (2.00 in)	195 mm (7.68 in)

Hydraulic Cycle Times

Bucket Curl	2.3 Seconds
Bucket Dump	2.1 Seconds
Arm Retract	2.7 Seconds
Arm Extend	2.7 Seconds
Boom Raise	4.1 Seconds
Boom Lower	4.5 Seconds
Boom Swing Left	7.7 Seconds
Boom Swing Right	7.4 Seconds
Blade Raise	3.1 Seconds
Blade Lower	2.8 Seconds

Electrical

Starting Aid	Glow Plugs
Alternator	12 volt, 90 Amp open frame w/ internal regulator
Battery	12 volt - 530 CCA @ -18°C (0°F)
Starter	12 volt; gear reduction 2.0 kw (2.7 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	56.4:1 two stage planetary

Slew System

Slew Motor	Axial piston connected to a planetary drive
Slew Circle	Single row shear type ball bearing with internal gear
Slew Speed	9.0 rpm

E45 EXCAVATOR SPECIFICATIONS (CONT'D)

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	1960 mm (77.2 in)

Tracks

Type	Rubber	Steel
Width	400 mm (15.7 in)	400 mm (15.7 in)
Number Of Shoes	Single Assembly	39
Number of Track Rollers (per side)	5	5

Ground Pressure

Rubber Tracks - Standard Arm	25,4 kPa (0,254 bar) (3.68 psi)
Long Arm	26,5 kPa (0,266 bar) (3.85 psi)
Steel Tracks - Standard Arm	26,1 kPa (0,261 bar) (3.79 psi)
Long Arm	27,3 kPa (0,273 bar) (3.96 psi)

Capacities

Fuel Tank	79,9 L (21.1 U.S. gal)
Hydraulic Reservoir Only (Centre of Sight Glass)	Tank Cap. 15,1 L (4.0 U.S. gal)
Hydraulic System (with Reservoir)	54,9 L (14.5 U.S. gal)
Cooling System	8,3 L (2.2 U.S. gal)
Engine Oil and Filter	7,1 L (7.5 qt)
Final Drive (each)	1,1 L (1.2 qt)

Fuel Consumption

Fuel Consumption	6,3 Lph (1.66 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)	95 dB(A)	-----
Operator position noise level (Cab) (ISO 6396)	79 dB(A)	+2,5 / -0 dB(A)
Whole body vibration (ISO 2631-1) (limit 0,5 m/s ²)	0,115 m/s ²	-----
Hand-arm vibration (ISO 5349-1) (limit 2,5 m/s ²)	0,304 m/s ²	-----

Temperature Range

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

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WARRANTY

BOBCAT EXCAVATORS

DOOSAN BENELUX S.A. 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 BENELUX S.A.'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 BENELUX S.A. 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.

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