

EN



Bobcat®

Operation & Maintenance Manual



B34

Compact Excavator

S/N B3Y311001 & Above



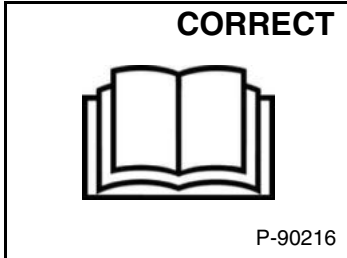
OPERATOR SAFETY WARNING

! WARNING

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

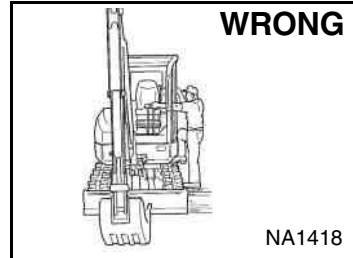
W-2001-0502

! 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.

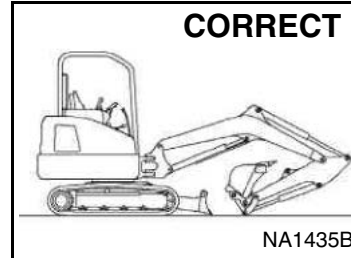
! Read machine signs, and Operation & Maintenance Manual, and Operator's Handbook.



! Do not grasp control handles when entering cab / canopy.

! Be sure controls are in neutral before starting.

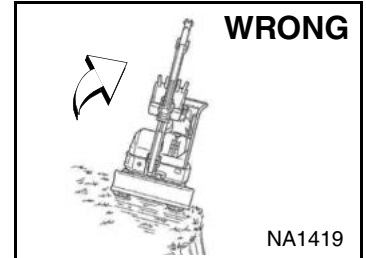
! Sound horn and check behind machine before starting.



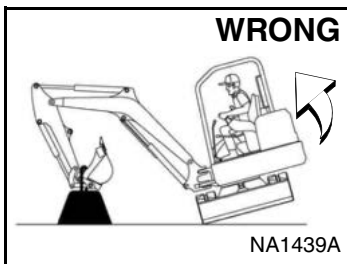
! Never operate without approved cab / canopy.

! Never modify equipment.

! Never use attachments not approved by Bobcat Company.

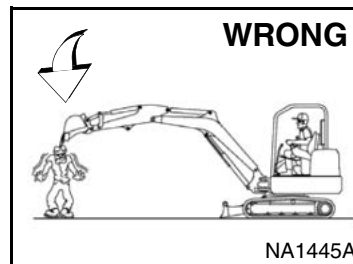


! Avoid steep areas or banks that could break away.



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

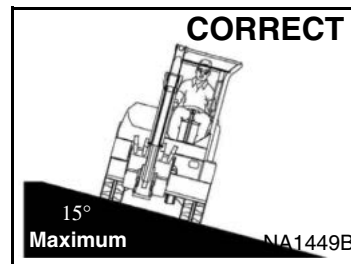
! Operate on flat, level ground.



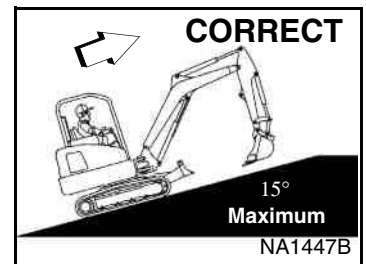
! Keep bystanders out of maximum reach area.

! Do not travel or turn with bucket extended.

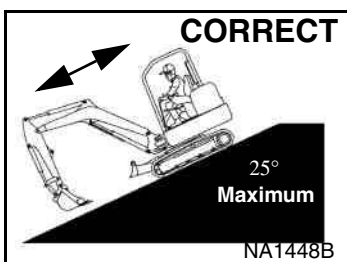
! Never carry riders.



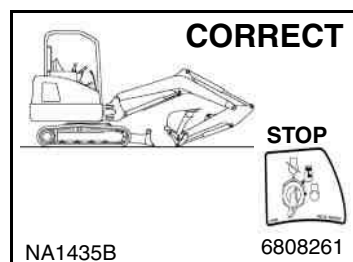
! Never exceed a 15° slope to the side.



! Never travel up a slope that exceeds 15°.

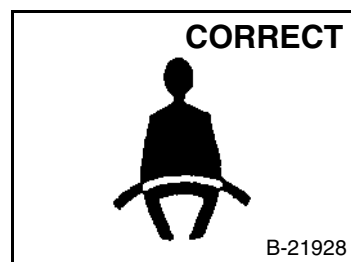


! Never exceed 25° when going down or backing up a slope.



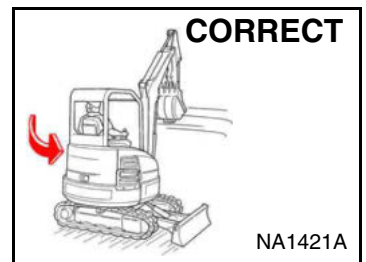
! To leave excavator, lower the work equipment and the blade to the ground.

! 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 Bobcat® excavator must be equipped with safety items necessary for each job. Ask your Bobcat dealer for information on the availability and safe use of 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-EN-0117

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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 Bobcat EMEA s.r.o.
U Kodetky 1810
263 12 Dobris
CZECH REPUBLIC

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 E34

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 Homologation Manager Doosan Bobcat EMEA s.r.o. U Kodetky 1810 263 12 Dobříš CZECH REPUBLIC</p>	<p>Conformity Assessment Procedure(s) 2000/14/EC, Annex VIII, Full Quality Assurance</p> <p>Sound Power Levels [Lw(A)]</p> <table><tr><td>Measured Sound Power</td><td>92 dB(A)</td></tr><tr><td>Guaranteed Sound Power</td><td>94 dB(A)</td></tr></table>	Measured Sound Power	92 dB(A)	Guaranteed Sound Power	94 dB(A)
Measured Sound Power	92 dB(A)				
Guaranteed Sound Power	94 dB(A)				
<p>Description of Equipment Type of Equipment: Excavator Model Name: E34 Model Code: B3Y3</p> <p>Engine Manufacturer: Kubota Engine Model: D1703-M-DI-EF03 Engine Power: 18,2 kW @ 2200 RPM</p>	<p>Equipment conforms to CE Directive(s) Listed Below 2006/42/EC: Machinery Directive 2014/30/EU: 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:</p> <p>16 October 2018</p>					

DECLARATION OF CONFORMITY (CONT'D)



DOOSAN BOBCAT EMEA

U Kodetky 1810,

Dobris, 263 12

Czech Republic

T: +420 318 532 444

www.doosanbobcat.com

Declaration of conformity with Article 14 of Regulation (EU) No 517/2014 of the European Parliament and of the Council

We Doosan Bobcat EMEA s.r.o. with VAT number CZ26489201, acting in its capacity as EU only representative for the import of goods from CLARK EQUIPMENT COMPANY doing business as BOBCAT COMPANY, a corporation organized under the law of the state of Delaware, USA with its registered address located at 250 East Beaton Drive, West Fargo, North Dakota, USA, declare under our sole responsibility that when placing on the market pre-charged equipment, which we import to or manufacture in the Union, the hydrofluorocarbons contained in that equipment are accounted for within the quota system referred to in Chapter IV of Regulation (EU) No 517/2014 as:

A. we hold authorisation(s) issued in accordance with Article 18(2) of Regulation (EU) No 517/2014 and registered in the registry referred to in Article 17 of that Regulation, at the time of release for free circulation to use the quota of a producer or importer of hydrofluorocarbons subject to Article 15 of Regulation (EU) No 517/2014 that cover(s) the quantity of hydrofluorocarbons contained in the equipment.

B. *[for importers of equipment only]* the hydrofluorocarbons contained in the equipment have been placed on the market in the Union, subsequently exported and charged into the equipment outside the Union, and the undertaking that placed the hydrofluorocarbons on the market made a declaration stating that the quantity of hydrofluorocarbons has been or will be reported as placed on the market in the Union and that it has not been and will not be reported as direct supply for export in the meaning of Article 15(2)(c) of Regulation (EU) No 517/2014 pursuant to Article 19 of Regulation (EU) No 517/2014 and Section 5C of the Annex to Commission Implementing Regulation (EU) No 1191/2014 (a).

C. *[for equipment manufactured in the Union only]* the hydrofluorocarbons charged into the equipment were placed on the market by a producer or importer of hydrofluorocarbons subject to Article 15 of Regulation (EU) No 517/2014.

Miguel Mallo Marcos

27th March, 2019

Doosan Bobcat EMEA s.r.o. | Identification No. 264 89 201 | Prague Commercial Register Section C, Entry 85459



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, North Dakota (U.S.A.), Pontchâteau (France), and the Bobcat corporate offices (Gwinner, Bismarck, and West Fargo) in North Dakota. TÜV Rheinland is the Certified Registrar Bobcat Company chose to assess the company’s compliance with the ISO 9001 at Bobcat’s manufacturing facility in Dobris (Czech Republic). Only certified assessors, like BSI and TÜV Rheinland, 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 7269858</p>
 <p>FUEL FILTER 6667352</p>	 <p>HYDRAULIC FILL / BREATHER CAP 6692836</p>
 <p>FUEL PRE-FILTER 7247169</p>	 <p>RADIATOR CAP 6673313</p>
 <p>AIR FILTER, Outer 6672467</p>  <p>AIR FILTER, Inner 6672468</p>	 <p>PRIMARY HYDRAULIC FILTER 6668819</p> <p>CASE DRAIN HYDRAULIC FILTER 7009365</p>
 <p>HVAC AIR FILTER (IF EQUIPPED) Fresh Air 7176099 Recirculation 7222791</p>	

NOTE: Always verify Part Numbers with your Bobcat dealer.

REGULAR MAINTENANCE ITEMS (CONT'D)

Fluids, Lubricants, And Fuel

The fluids, lubricants and fuel described below are those used in the factory and apply to operating conditions in European temperate climate areas. Please see your Bobcat dealer for requirements in other climate areas.

Read and understand the preventive maintenance required before adding or replacing any fluids or lubricants.

ENGINE SYSTEMS				
Machine Components	Fluids And Lubricants	T° Range	Packaging**	Part Number
Engine	- Bobcat Engine Power SAE 10W30 CJ4 / ACEA E9	-25°C – +30°C	A, B, C, D	6987818*
	- Bobcat Engine Power SAE 15W40 CJ4 / ACEA E9	-20°C – +40°C	A, B, C, D	6987819
Cooling Circuit	- Bobcat PG Coolant Concentrated	-36°C	B, C, D	6987803*
	- Bobcat PG Coolant 4 Seasons	-36°C	A, B, C, D	6987793
Fuel Tank	- High-quality diesel fuel that meets EN590	-	-	*

HYDRAULIC / HYDROSTATIC SYSTEMS				
Machine Components	Fluids And Lubricants	T° Range	Packaging**	Part Number
Hydraulic Oil Tank	- Bobcat Superior SH Hydraulic / Hydrostatic	-35°C – +50°C	A, B, C, D	6987791*
	- Bobcat Biodegradable Hydraulic / Hydrostatic	-35°C – +50°C	A, B, C, D	6987792

MECHANICAL SYSTEMS				
Machine Components	Fluids And Lubricants	Drop Point	Packaging**	Part Number
All Mechanical Systems	- Bobcat Multipurpose Grease	From 260°C	E	6987888*
	- Bobcat Supreme HD Grease	From 280°C	E	6987889
	- Bobcat Extreme HP Grease	From 260°C	E	6987890

(*) Factory Filled Fluids And Lubricants

(**) Packaging Available:

A = 5 L Can

B = 25 L Container

C = 209 L Drum

D = 1000 L Tank

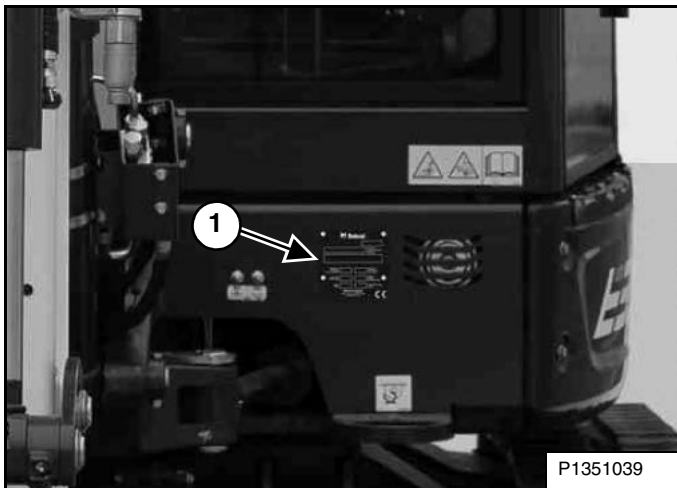
E = 400 g Tube

SERIAL NUMBER LOCATIONS

Always use the serial number of the excavator when requesting service information or when ordering parts. Earlier 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

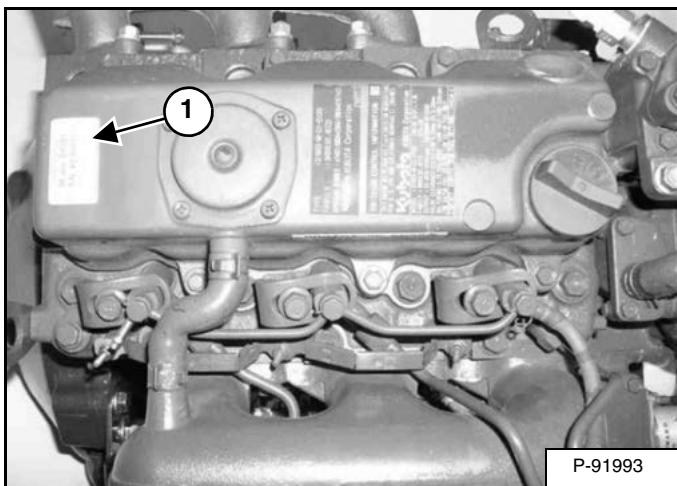
Excavator Serial Number

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



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

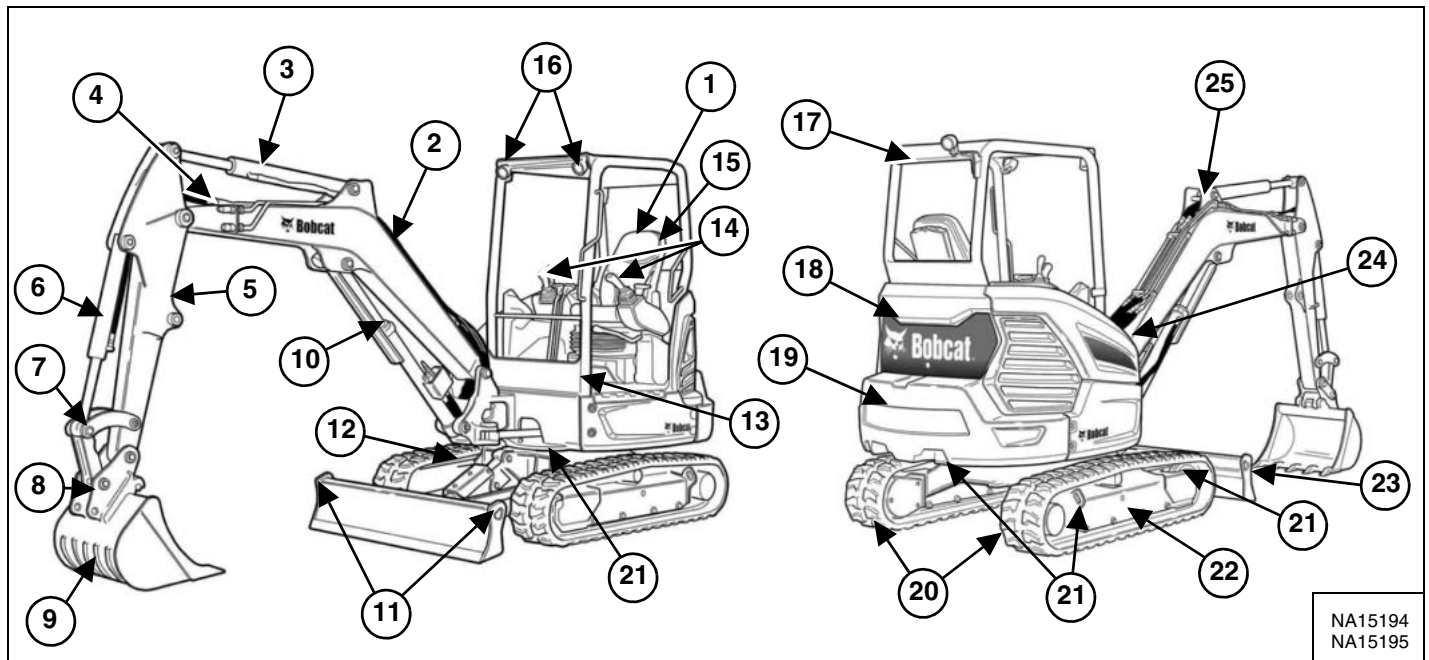
DELIVERY REPORT

Figure 3

The delivery report [Figure 3] contains a list of items that must be explained or shown to the owner or operator by the dealer when the Bobcat excavator is delivered.

The delivery report must be reviewed and signed by the owner or operator and the dealer.

EXCAVATOR IDENTIFICATION



ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Operation & Maintenance Manual and Operator's Handbook	17	Canopy / Cab (ROPS / TOPS / FOPS) [3]
2	Boom	18	Rear Cover
3	Arm Cylinder	19	Counterweight
4	Auxiliary Quick Couplers	20	Tracks [4]
5	Arm	21	Tie Downs (Both Sides)
6	Bucket Cylinder	22	Track Frames
7	Bucket Link	23	Blade
8	Attachment Quick Coupler (if equipped) [1]	24	Right Side Cover
9	Bucket [2]	25	Lift Point
10	Boom Cylinder		
11	Tie Downs / Lift Points		
12	Blade Cylinder		
13	Upperstructure		
14	Joysticks		
15	Operator's Seat with Seat Belt		
16	Mirrors (If Equipped)		

[1] Attachment Coupler - Optional attachment couplers are available.

[2] Bucket - Several different buckets and other attachments are available from the Bobcat Excavator.

[3] ROPS, TOPS - (Roll-Over Protective Structure / Tip-Over Protective Structure) per ISO 12117-2 and ISO 12117. FOPS (Falling Object Protective Structure) per ISO 10262 - Level 1.

[4] Tracks - Optional tracks are available.

FEATURES, ACCESSORIES, AND ATTACHMENTS

Standard Items

Model E34 Bobcat excavators are equipped with the following standard items:

- 1550 mm (61.0 in) Dozer Blade
- Canopy with ROPS / TOPS / FOPS Approval
- 300 mm (11.8 in) Rubber Tracks
- Standard Instrument Panel
- Two-Speed Travel
- Auto Shift Drive Motors
- Auxiliary Hydraulics (With Selectable Auxiliary Hydraulic Flow)
- Hydraulic and Travel Control Lockouts
- Engine Speed Control Lever
- Blade Float
- Standard Arm
- Boom and Frame Mounted Work Lights
- Engine And Hydraulic System Monitor With Shut Down
- Horn
- Hydraulic Joystick Controls
- Basic Seat
- Retractable Seat Belt
- 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 (ROPS / TOPS / FOPS)
- Enclosed Cab With Heater and A/C (ROPS / TOPS / FOPS)
- Cloth / Vinyl Suspension Seat
- Deluxe Instrument Panel
- Primary, Secondary, Third, and Fourth Auxiliary Hydraulics
- Radio
- Depth Check
- Travel Motion Alarm
- Keyless Start
- Canopy / Cab Mounted Lights
- Engine Speed Control Dial With Auto Idle Feature
- Spark Arrester Muffler
- Attachment Quick Coupler, Klac™ System
- Attachment Quick Coupler, German Style Quick Coupler
- Attachment Quick Coupler, Bobcat Hydraulic Quick Coupler
- Bobcat Hydraulic Pin Grabber Coupler
- Pin-On X-Change™
- Front Guard Kit
- Steel Tracks
- Long Arm

- Load Hold - Boom / Arm
- Hydraulic Track Tension
- Lifting Device
- Direct to Tank Auxiliary Hydraulics
- Counterweight (Additional)
- Suspension Seat
- Coupler Block Kit
- Case Drain
- Arm Mounted Auxiliary Hydraulic Couplers
- HEPA HVAC Fresh Air Filter
- Fire Extinguisher
- Beacon
- Strobe Light
- Shoe Pad Kit
- Sediment Bowl Kit
- Engine Block Heater Kit
- Antenna And Speakers Kit
- Muffler Purifier Kit

Attachments

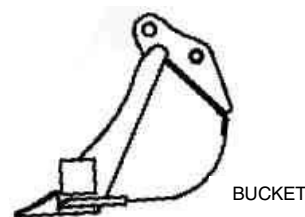
These and other attachments are approved for use on this model Bobcat excavator. Do not use unapproved attachments. Attachments not manufactured by Bobcat may not be approved.

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
- Flail Mower
- Hydraulic Clamp
- Pro Clamp™ System
- Rotary Grinder

Buckets Available



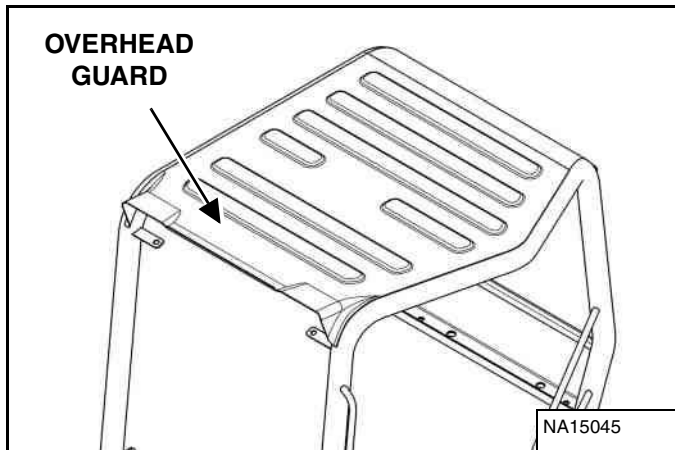
Many bucket styles, widths and different capacities are available for a variety of different applications. They include Trenching, Digging, Grading, and Tilt, to name a few. See your Bobcat dealer for the correct bucket for your Bobcat excavator and application.

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

FEATURES, ACCESSORIES AND ATTACHMENTS (CONT'D)

Falling-Object Protective Structure (FOPS) (Canopy Model)

Figure 4



The excavator canopy is qualified as a Falling Object Protective Structure (FOPS) that meets the top guard requirements in ISO 10262 - Level 1 [Figure 4].

Falling-Object Protective Structure (FOPS) (Cab Model)

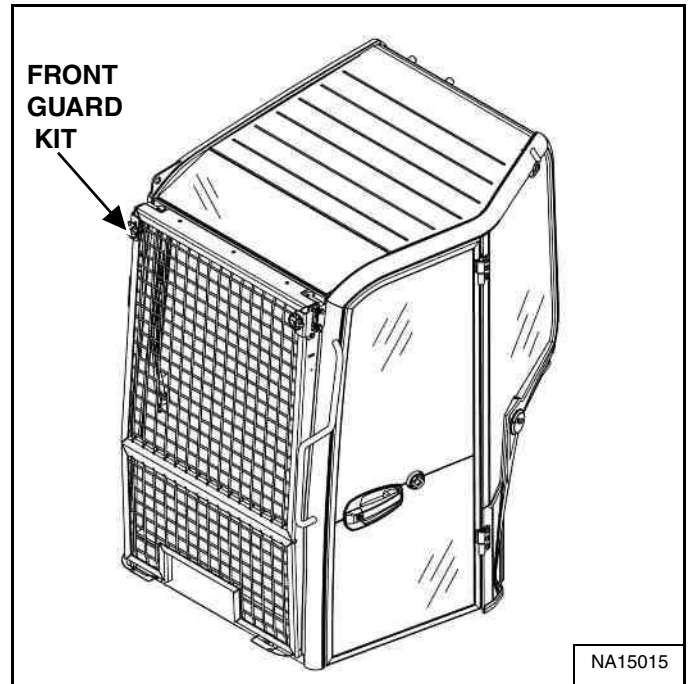
Figure 5



The excavator cab top window is qualified as a Falling-Object Protective Structure (FOPS) that meets the top guard requirements in ISO 10262 - Level 1 (Item 1) [Figure 5].

Front Guard Kit

Figure 6



Available for applications that require protection from objects entering the front of the excavator.

The excavator must have the Front Guard Kit 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.

Front Guard Kit Inspection And Maintenance

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

SAFETY AND 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 EMEA-0913

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.

SI EXC EMEA-0913

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.

Ultra Low Sulfur Diesel (ULSD) poses a greater static ignition hazard than earlier diesel formulations with higher Sulfur content. Avoid death or serious injury from fire or explosion. Consult with your fuel or fuel system supplier to ensure the delivery system is in compliance with fueling standards for proper grounding and bonding practices.

Starting

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

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

Spark Arrester Exhaust System

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

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

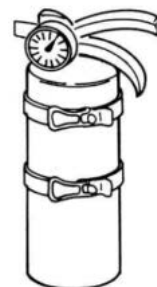
Welding And Grinding

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

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

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

Fire Extinguishers



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

PUBLICATIONS AND TRAINING RESOURCES

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

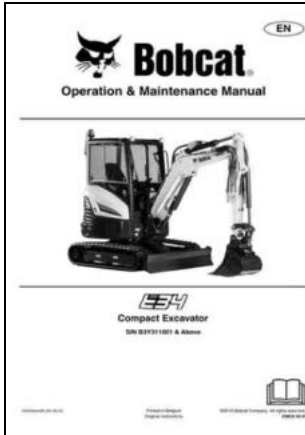
For the latest information on Bobcat products and the Bobcat Company, visit our Website at **Bobcat.com/training** or **Bobcat.com**.



OPERATOR'S HANDBOOK

7350243enGB

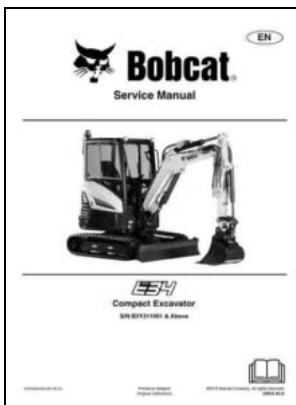
Gives basic operation instructions and safety warnings.



OPERATION & MAINTENANCE MANUAL

7323254enGB

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



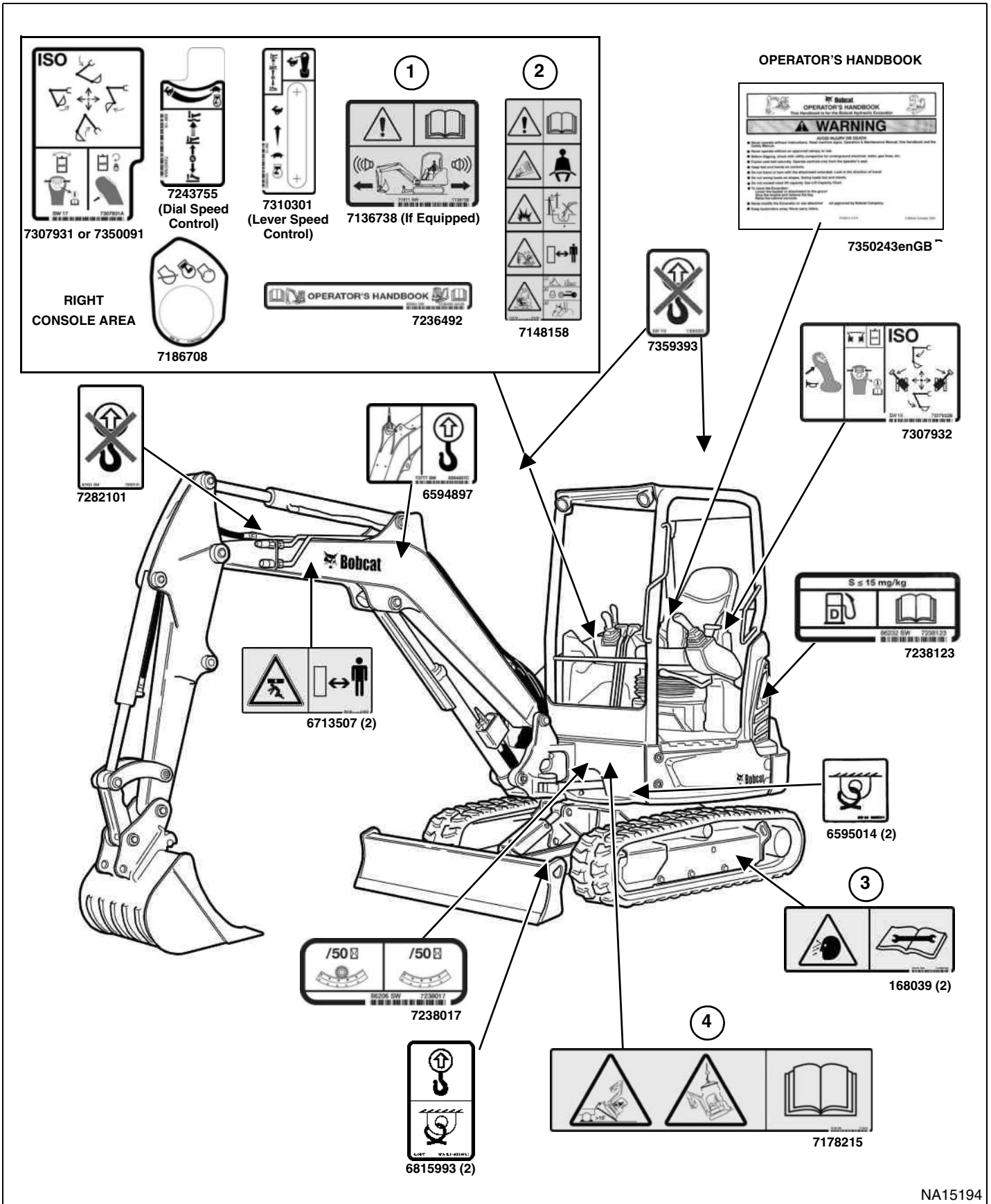
SERVICE MANUAL

7362447enUS

Complete maintenance instructions for the Bobcat excavator.

MACHINE SIGNS (DECALS)

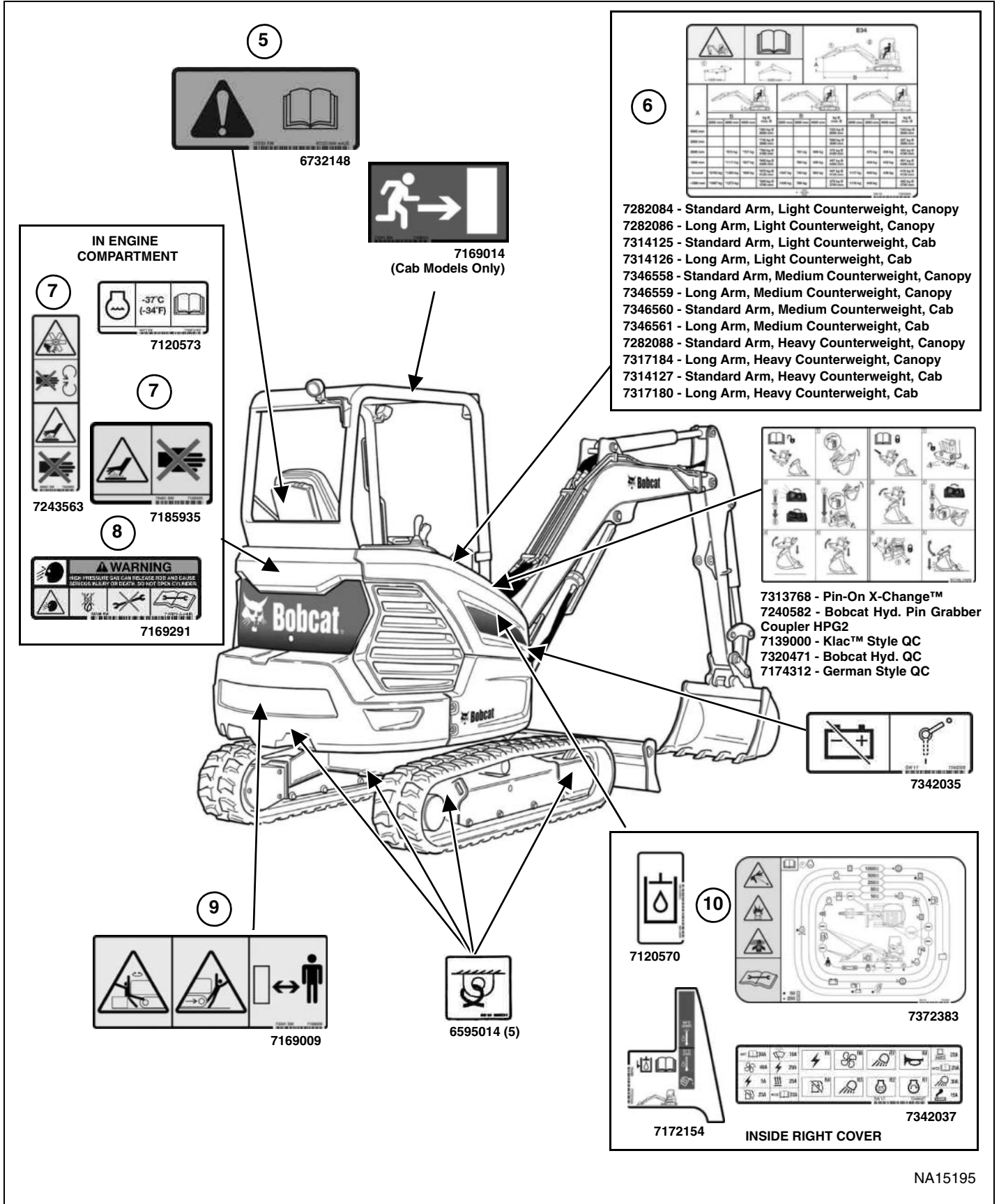
Follow the instructions on all the Machine Signs (Decals) that are on the excavator. Replace any damaged machine signs and be sure they are in the correct locations. Machine signs are available from your Bobcat excavator dealer.



NA15194

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.

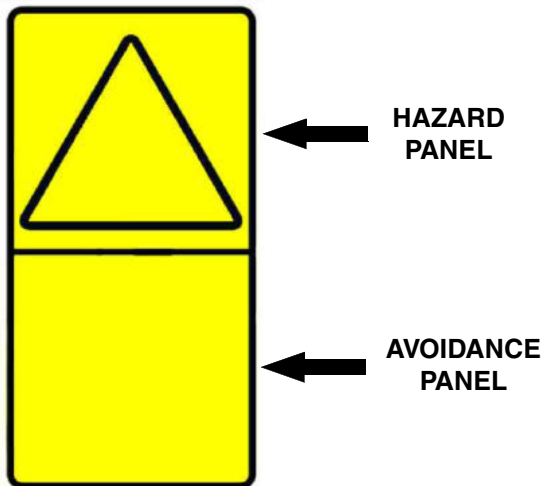


MACHINE SIGNS (DECALS) (CONT'D)

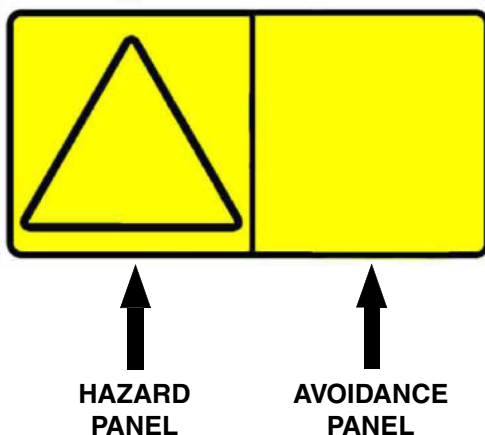
Pictorial Only Safety Signs

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 familiarised 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 17 and MACHINE SIGNS (DECALS) (Cont'd) on Page 18 for the machine location of each corresponding numbered pictorial only decals as shown below.

1. Motion Alarm (7136738) (If Equipped)

This safety sign is on the ceiling of canopy models and on the right window of cab models.



**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)

Pictorial Only Safety Signs (Cont'd)

2. General Hazard (7148158)

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



Failure to obey warning signs and instructions can cause serious injury or death. Never use excavator without instructions. Read and understand the Operation & Maintenance Manual and Handbook.

Keep away from dropoffs, steep areas or banks that could break away.

Explosion or electrocution can occur if machine contacts utility lines or pipes. Check for overhead or underground lines before operating.

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

Failure to operate machine from the operator's position can cause serious injury or death.

To Leave Excavator:

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

W-2518-0110

3. 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 the track tension fitting more than 1 - 1/2 turns.

W-2994-0515

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)

Pictorial Only Safety Signs (Cont'd)

5. Operation & Maintenance Manual (6732148)

This safety sign is located on the back of the operator's seat.



AVOID INJURY OR DEATH

Read and understand the Operation & Maintenance Manual before operating the machine.

W-3021-0217

6. Lift Capacity (7282084, 7282086, 7282088, 7314125, 7314126, 7314127, 7317184, 7317180, 7346558, 7346559, 7346560, 7346561)

This safety sign is located on the ceiling of canopy models and on the right window of cab models.

A	B		kg lb	kg lb	kg lb	kg lb	kg lb	kg lb	kg lb	kg lb	kg lb	kg lb	kg lb	
	2000 mm	3000 mm												4000 mm
4000 mm			1985 kg lb	4368 lb	2000 kg lb	4409 lb	2020 kg lb	4450 lb	2040 kg lb	4491 lb	2060 kg lb	4532 lb	2080 kg lb	4573 lb
3000 mm			1710 kg lb	3769 lb	1680 kg lb	3698 lb	1650 kg lb	3627 lb	1620 kg lb	3556 lb	1590 kg lb	3485 lb	1560 kg lb	3414 lb
2000 mm	1019 kg	2237 kg	1000 kg lb	2205 lb	980 kg lb	2170 lb	960 kg lb	2135 lb	940 kg lb	2100 lb	920 kg lb	2065 lb	900 kg lb	2030 lb
1000 mm	1111 kg	2437 kg	1000 kg lb	2205 lb	980 kg lb	2170 lb	960 kg lb	2135 lb	940 kg lb	2100 lb	920 kg lb	2065 lb	900 kg lb	2030 lb
Ground	12100 kg	26630 kg	10000 kg	22045 kg	9047 kg	20000 kg	7450 kg	16500 kg	3630 kg	8000 kg	1770 kg	3900 kg	860 kg	1890 kg
10000 mm	11987 kg	26370 kg	10000 kg	22045 kg	9047 kg	20000 kg	7450 kg	16500 kg	3630 kg	8000 kg	1770 kg	3900 kg	860 kg	1890 kg



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 (7185935, 7243563)

These safety signs are 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)

Pictorial Only Safety Signs (Cont'd)

8. Thrown or Flying Objects (7169291)

This safety sign is located on the gas springs under the rear cover and inside the right cover.



9. Stay Away (7169009)

This safety sign is located on the rear of the upperstructure below the tailgate.



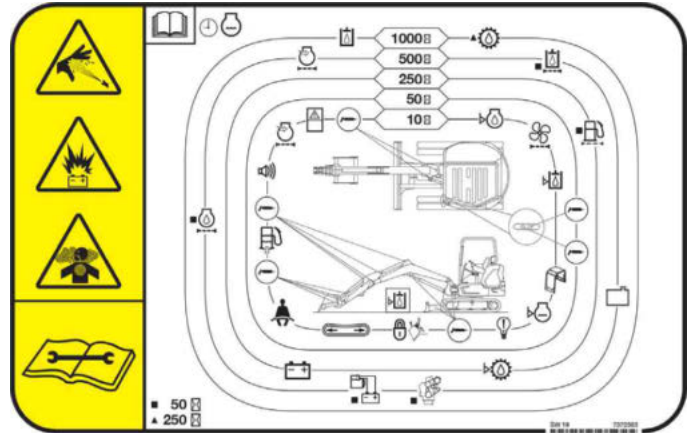
AVOID INJURY OR DEATH

- 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-2775-1208

10. High Pressure, Battery, Rotating Fan, Exhaust Gases and Service Schedule (7372383)

This safety sign is located inside the right cover. (See SERVICE SCHEDULE on Page 146.)



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

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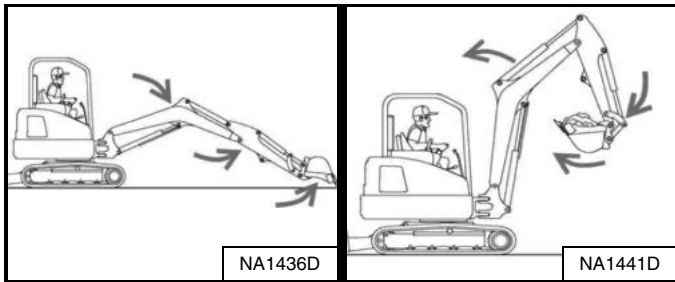
INTENDED USE

This machine is classified as a Compact Excavator as defined in ISO 6165. This machine has wheels or tracks and commonly a mounted bucket for the principle intended functions of excavating, loading and backfilling loose materials such as earth, gravel, or crushed rock.

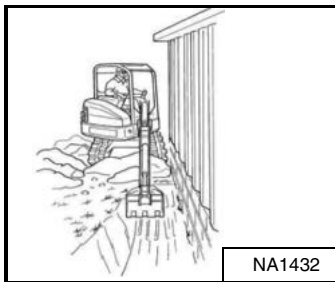
Additional Bobcat approved attachments allow this machine to perform other tasks described in the attachment Operation & Maintenance Manuals.

Examples of intended use include:

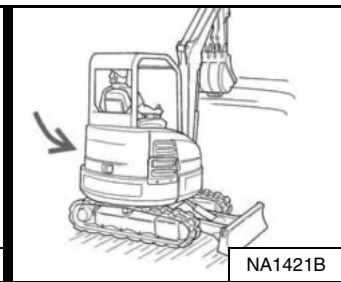
Excavating



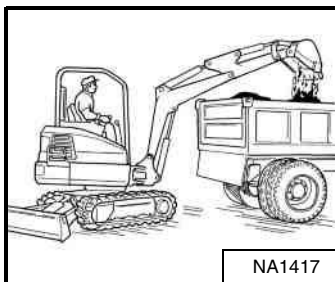
Boom Swing



Rotating the Upperstructure



Loading Material



Backfilling



! 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 (10 ft)
beyond 50 kV	5 m (17 ft)

W-2757-EN-0513

! 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

IMPORTANT

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

I-2256-0507

! WARNING

AVOID INJURY OR DEATH

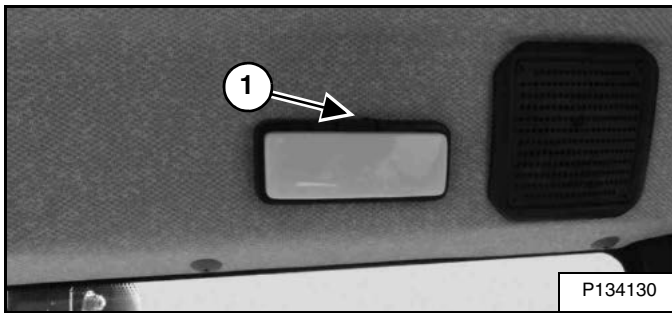
Do not exceed rated lift capacity. Excessive load can cause tipping or loss of control.

W-2374-0500

INSTRUMENTS AND CONSOLES

Cab Interior Light (If Equipped)

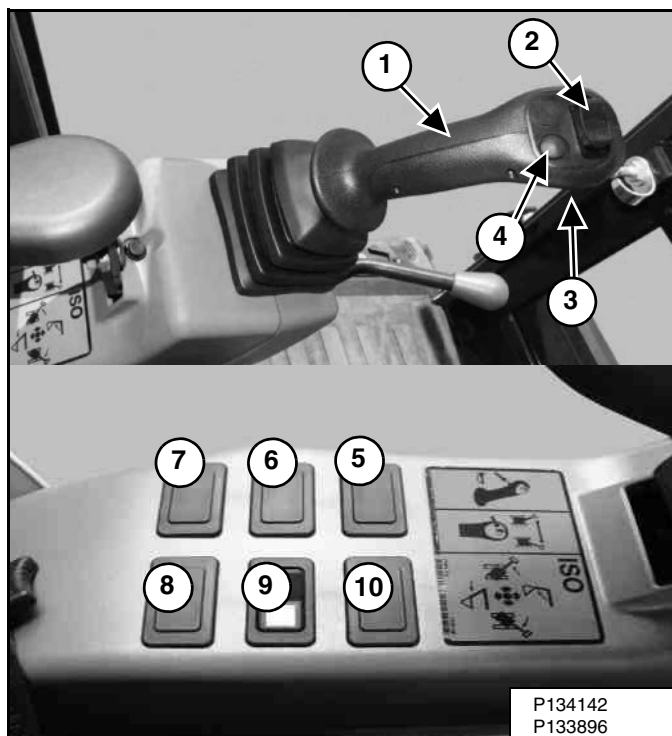
Figure 7



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

Left Console

Figure 8



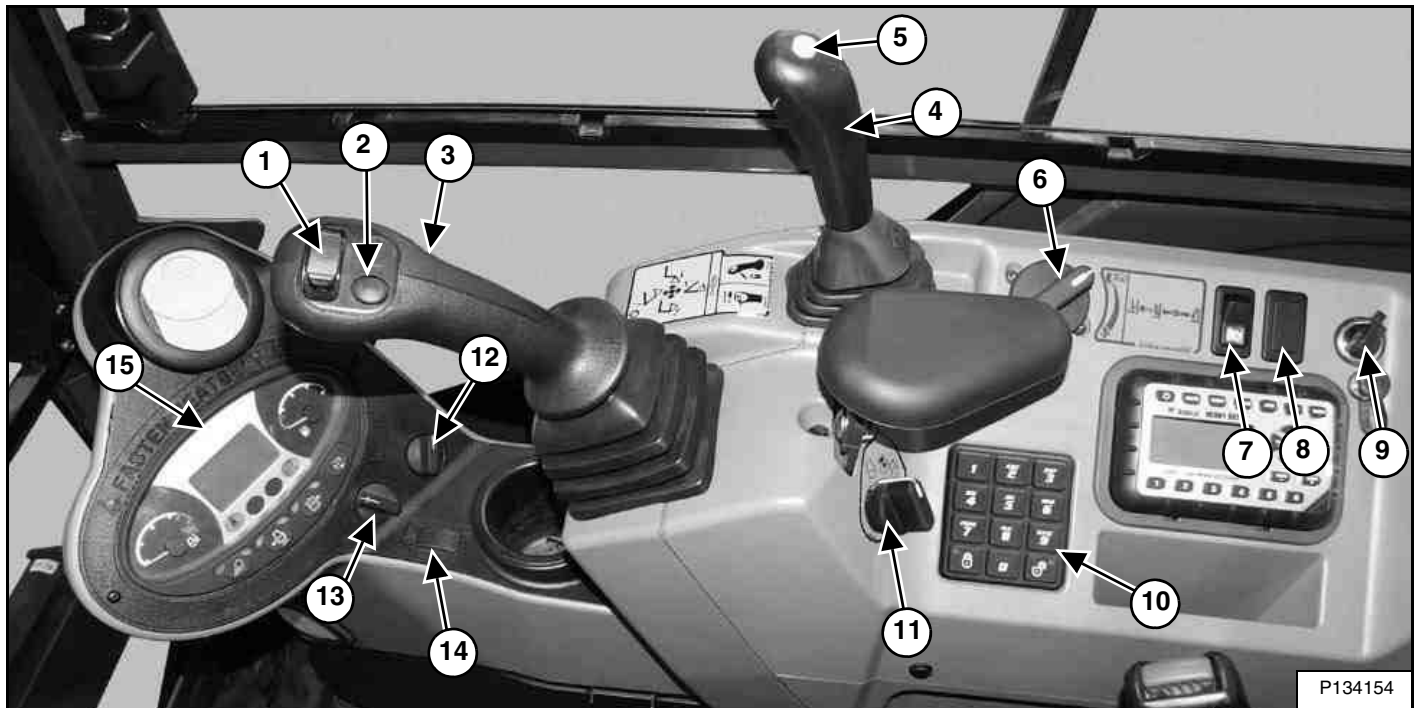
Left Console [Figure 8]

REF. NO	DESCRIPTION	FUNCTION / OPERATION
1	Left Joystick	(See HYDRAULIC CONTROLS on Page 46.)
2	Boom Swing / Secondary Auxiliary Hydraulic Switch	(See BOOM SWING on Page 61.) (See HYDRAULIC CONTROLS on Page 46.)
3	Horn	Press the switch on the bottom of the left joystick to sound the horn.
4	Left Joystick Button	Push the button to toggle between boom swing and optional auxiliary hydraulics (if equipped).
5	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.
6	Hydraulic Quick Coupler ON / OFF Switch (if equipped)	Press switch to the left to turn the quick coupler ON. Press the switch to the right to turn OFF. (See Installing And Removing The Attachment (Bobcat Hydraulic Quick Coupler) on Page 85.)
7	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.
8	Hydraulic Quick Coupler INTENT Switch (if equipped)	Press switch to the left to initiate the quick coupler install or remove mode. (See Installing And Removing The Attachment (Bobcat Hydraulic Quick Coupler) on Page 85.)
9	Overload Warning Device Switch (if equipped)	Press the switch to the left to activate the Overload Warning Device. Press the switch to the right to deactivate the system. (See OVERLOAD WARNING DEVICE on Page 59.)
10	Boom Swing Switch (if equipped)	Push to select boom swing offset for either the left or right joystick. (See Operating Attachments With Primary, Secondary, Or Fourth Auxiliary Hydraulics (Software Version 88.03 Or Above) on Page 55.)

INSTRUMENTS AND CONSOLES (CONT'D)

Right Console

Figure 9



REF	DESCRIPTION	FUNCTION / OPERATION
1	Auxiliary Hydraulic Switch (if equipped)	(See HYDRAULIC CONTROLS on Page 46.)
2	Right Joystick Button	Push the button to toggle between auxiliary hydraulics (if equipped).
3	Right Joystick	(See HYDRAULIC CONTROLS on Page 46.)
4	Blade Control Lever	Controls raising and lowering the blade. Push all the way forward to put blade in float position. (See BLADE CONTROL LEVER on Page 60.)
5	Two-Speed Button	Engages and disengages High Range Travel Speed. (See Two-Speed Travel on Page 35.)
6	Engine Speed Control Lever or Engine Speed Control Dial	Controls rpm of the engine. (See ENGINE SPEED CONTROL on Page 60.)
7	Motion Alarm Cancel Switch	Temporarily disables the motion alarm. (See MOTION ALARM SYSTEM on Page 43.)
8	Direct to Tank Switch (if equipped)	Press switch to direct auxiliary return flow to the hydraulic oil reservoir. (See Direct To Tank Switch on Page 59.)
9	Auxiliary Power Outlet	12 volt receptacle for accessories.
10	Keypad (if equipped)	Enter the password to start the engine (See Standard Instrument Panel - Keyless Start on Page 71.) (See Deluxe Instrument Panel - Keyless Start on Page 72.)
11	Key Switch or Keyless Start Switch	Always perform the PRE-STARTING PROCEDURE (See PRE-STARTING PROCEDURE on Page 68.) before starting the engine. (See STARTING THE ENGINE on Page 70.)
12	Temperature Control (if equipped)	Turn clockwise to increase temperature; anticlockwise to decrease.
13	Fan Motor Switch (if equipped)	Turn clockwise to increase fan speed; anticlockwise to decrease.
14	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.
15	Instrument Panel	(See Instrument Panel - Standard on Page 29.) (See Instrument Panel - Deluxe on Page 32.)

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.

INSTRUMENTS AND CONSOLES (CONT'D)

Instrument Panel - Standard

Figure 10



P-97989

REF. NO.	DESCRIPTION	FUNCTION / OPERATION
1	Lights	Press once for work lights. (Left green LED illuminates.) Press again to turn all lights off. (Left green LED off.)
		Press and hold 5 seconds to display software version in display screen.
2	Auto Idle Feature	Press once to turn Auto Idle Feature ON. (Left green LED illuminates.) Press a second time to turn OFF. (Left and right green LEDs off.) (See Auto Idle Feature on Page 36.)
3	Auxiliary Hydraulic Button	Press once to enable auxiliary hydraulic function. (Left green LED illuminates.) Continue to press and release to scroll through the selectable auxiliary hydraulic setting (3-2-1-OFF). Press and hold (minimum of one second) to enable the continuous flow auxiliary hydraulic feature. (Right green LED illuminates.) Continue to press and release to scroll through the continuous flow selectable auxiliary hydraulic settings (3-2-1-OFF). (See Activating Primary Auxiliary Hydraulics With Standard Instrument Panel on Page 48.)
4	Information	Cycles through (after each button press) (The following information is displayed in the Data Display Screen, Item 6): <ul style="list-style-type: none"> • Hourmeter (On startup) • Job Clock (1 and 2) (Press and hold 7 seconds when displayed to reset the job clock.) • Engine rpm • Battery voltage • Maintenance clock (Press and hold 7 seconds when displayed to reset the maintenance clock.) • Service codes*
5	Engine Temperature Gauge	Shows the engine coolant temperature.

INSTRUMENTS AND CONSOLES (CONT'D)

Instrument Panel - Standard (Cont'd)

REF. NO.	DESCRIPTION	FUNCTION / OPERATION
6	Data Display Screen	The data display screen shows the Hourmeter at start up and then changes to engine rpm 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, Boom Offset / Second Auxiliary and Selectable Auxiliary Hydraulic Flow.
7	Fuel Gauge	Shows the amount of fuel in the tank.
8	Seat Belt	Fasten Seat Belt Reminder - Light stays on for 45 seconds to remind operator to fasten seat belt.
9		Not used for this model.
10		Not used for this model.
11	Left Console Lockout	Icon ON when left console is raised. Icon OFF when left console is lowered.
12	General Warning **	Malfunction with one or more machine functions. (See Service Codes in this manual.)
13	High Range Engaged ***	Icon is illuminated when two-speed travel is enabled.
14	Engine Coolant Temperature **	Engine coolant temperature high or sensor error.
15	Engine Malfunction **	Engine malfunction or failure.
16	Hydraulic System Malfunction **	Hydraulic system malfunction or failure.
17	Fuel	Fuel level low or sensor error. (Icon is ON when fuel level is low, Icon flashes when fuel sensor fault is activated.)
18		Not used for this model.
19		Not used for this model.
20		Not used for this model.
21		Not used for this model.

* See SYSTEM SETUP AND ANALYSIS for Service Code Description. (See DIAGNOSTIC SERVICE CODES on Page 193.)

** Icons will be ON or flashing when diagnostic system indicates a problem. (See DIAGNOSTIC SERVICE CODES on Page 193.)

*** Icons will be flashing when diagnostic system indicates a problem. (See DIAGNOSTIC SERVICE CODES on Page 193.)

INSTRUMENTS AND CONSOLES (CONT'D)

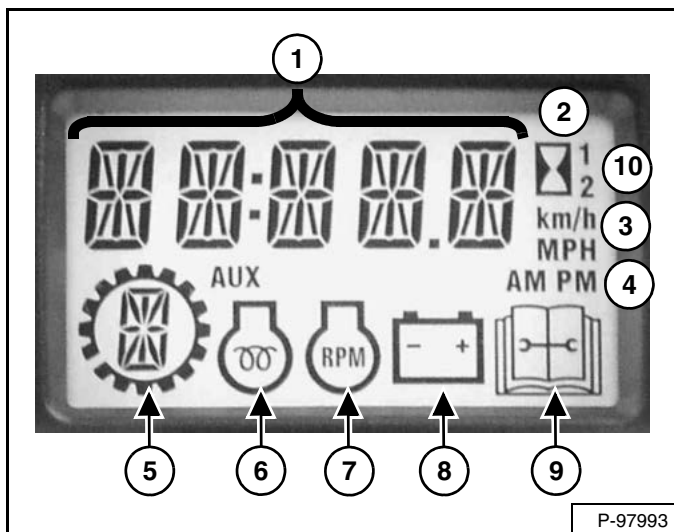
Instrument Panel - Standard (Cont'd)

Indicator Icons

The display screen can display the following information:

- Operating hours
- Job Clock (1 and 2)
- Engine rpm
- Battery voltage
- Maintenance clock countdown
- Second Auxiliaries
- Service codes

Figure 11



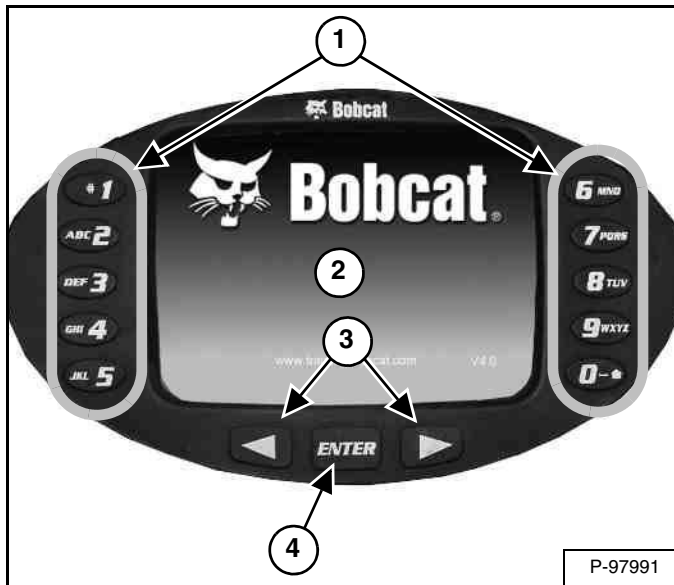
The display screen is shown in [Figure 11]. The data display will show operating hours upon startup.

1. **Data Display**
2. **Hourmeter**
3. **Metric / English (Not Used For This Model)**
4. **Clock (Not Used For This Model)**
5. **Selectable Auxiliary Flow (3 - 2 - 1)**
6. **Engine Preheat**
7. **Engine RPM**
8. **Battery / Charging Voltage**
9. **Service**
10. **Job Clock (1 and 2)**

INSTRUMENTS AND CONSOLES (CONT'D)

Instrument Panel - Deluxe

Figure 12



This machine may be equipped with a Deluxe Instrument Panel [Figure 12].

- Keypad (1 through 0):** The keypad has two functions:
 - To enter a number code (password) to allow starting the engine.
 - To enter a number as directed for further use of the display screen.
- Display Screen:** The display screen is where all system setup, monitoring, and error conditions are displayed.
- Scroll Buttons:** Used to scroll through display screen choices.
- ENTER Button:** Used to make selections on the display screen.

Figure 13



Turn the start key to the ON position.

When this screen is on the display you can enter the password and start the engine [Figure 13].

NOTE: Your excavator (with Deluxe Instrument Panel) will have an Owner Password. Your dealer will provide you with this password. Change the password to one that you will easily remember to prevent unauthorised use of your excavator. (See Changing The Owner Password on Page 205.) Keep your password in a safe location for future needs.

Enter The Password:

Use the numbers on the keypad to enter the password, then press the [ENTER] button. A symbol will appear on the display screen for each number entered. The left scroll button can be used to backspace if an incorrect number is entered.

If the correct password is not entered, [INVALID PASSWORD] will appear on the display screen and the password will have to be reentered.

See CONTROL PANEL SETUP for further description of screens to set up the system for your use. (See CONTROL PANEL SETUP on Page 197.)

Lights

Press keypad [1] [Figure 13] once for FRONT work lights. Press a second time to turn all lights off.

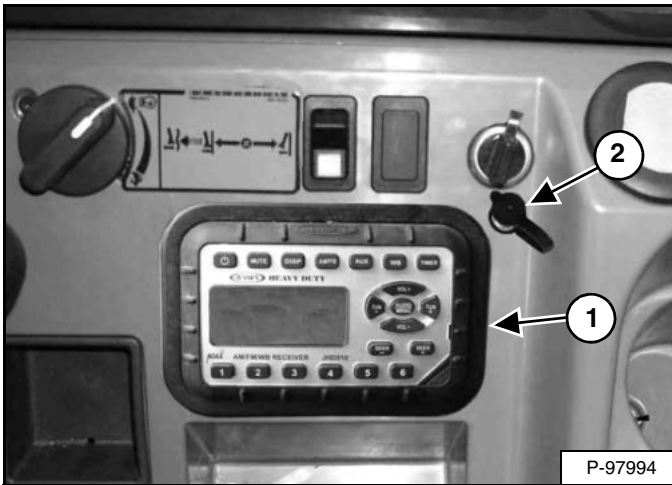
Change Language:

The language can be changed at any time. (See CONTROL PANEL SETUP on Page 197.)

INSTRUMENTS AND CONSOLES (CONT'D)

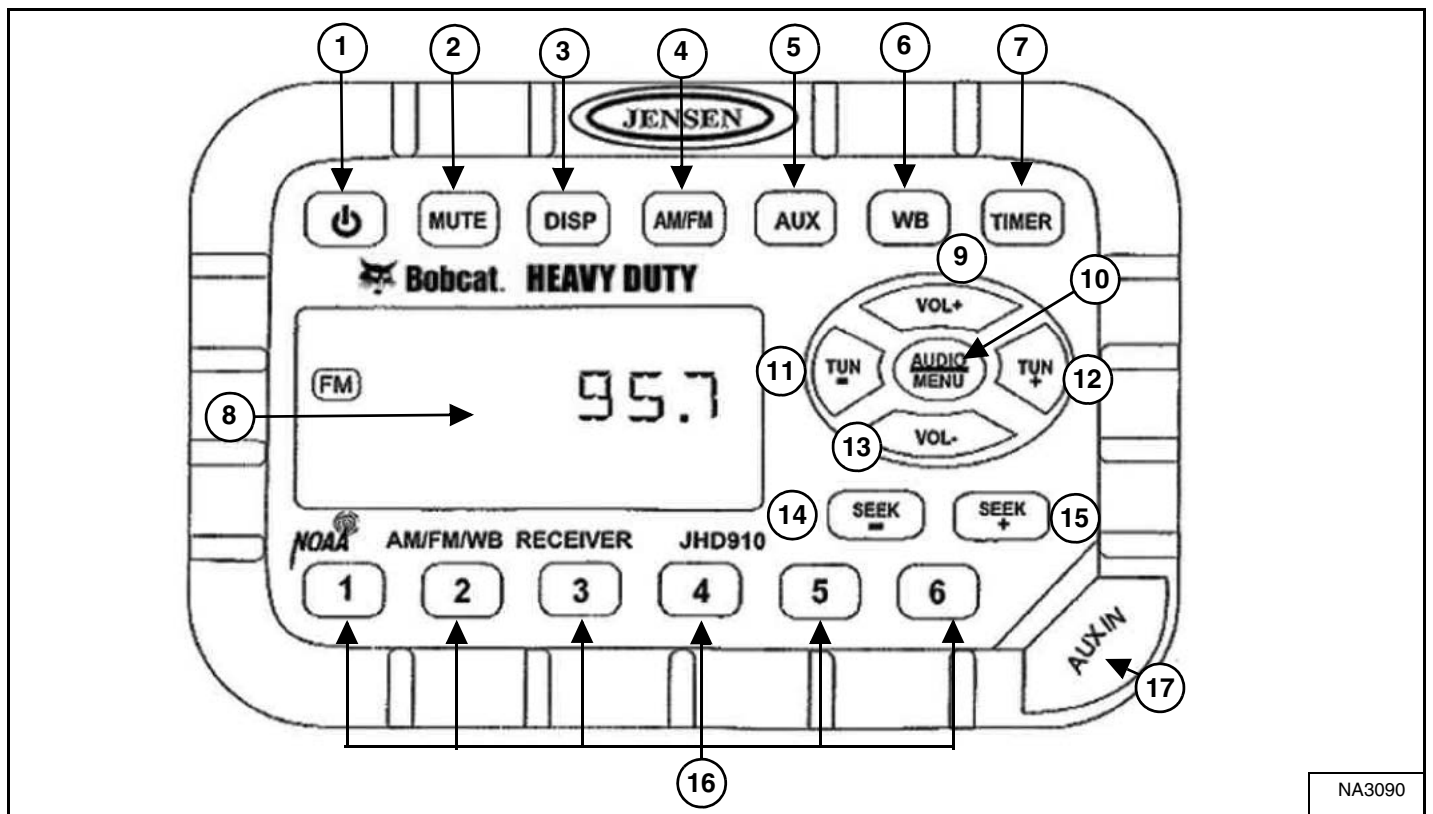
Radio Option

Figure 14



This excavator may be equipped with a radio (Item 1) and the headphone jack (Item 2) [Figure 14].

Figure 15



NOTE: See DISPLAY (Item 3) in the following table for clock setting instructions.

INSTRUMENT AND CONSOLES (CONT'D)

Radio (Cont'd)

REF. NO.	DESCRIPTION	FUNCTION / OPERATION
1	POWER	Press to turn ON; press again to turn OFF.
2	MUTE	Press to mute audio output; [MUTE] will appear in display screen; press again to turn OFF.
3	DISPLAY	Press to toggle between function mode (showing tuner frequency, auxiliary input, weather band information, or timer) and clock mode. Press and hold to enter clock setting mode; use FREQUENCY DOWN (TUN -) button to adjust hours and FREQUENCY UP (TUN +) button to adjust minutes; normal operation will resume automatically.
4	BAND	Press to select tuner mode. Press to cycle through 2 AM (MW) bands and 3 FM bands.
5	AUXILIARY	Press to select Auxiliary Input mode. Portable audio device (MP3 player) must be attached to auxiliary input jack.
6	WEATHER BAND	Press to select weather band; use FREQUENCY UP (TUN +) and FREQUENCY DOWN (TUN -) buttons to adjust to the clearest station. The weather alert feature, if activated, will automatically switch from the current function to the weather band if a weather warning is received. See AUDIO / MENU ADJUSTMENT in this table.
7	TIMER	Press to access timer mode. Press to start the timer function; press again to stop timer; press again to resume timer or press and hold to reset timer and exit from timer mode.
8	DISPLAY SCREEN	Displays the time, frequency, and activated functions.
9	VOLUME UP	Adjusts volume up; current volume (0 - 40) will appear briefly in display screen.
10	AUDIO / MENU ADJUSTMENT	AUDIO ADJUSTMENT: Press to cycle through bass, treble, and balance settings; use VOLUME UP (VOL +) and VOLUME DOWN (VOL -) buttons to adjust when desired option is displayed; normal operation will resume automatically. MENU ADJUSTMENT: Press and hold for 3 seconds to enter menu adjustment settings; press to cycle through the following settings; use VOLUME UP (VOL +) and VOLUME DOWN (VOL -) buttons to adjust when desired option is displayed; normal operation will resume automatically. <ul style="list-style-type: none"> • Beep Confirm (On or Off) - Determines if beep will sound with each button press. • Operation Region (USA or Europe) - Selects the appropriate region. • Clock Display (12 or 24) - Selects a 12-hour or 24-hour clock display. • Display Brightness (Low, Medium, or High) - Determines brightness level of display screen. • Backlight Colour (Amber or Green) - Determines backlight colour of display screen. • Power On Volume (0 - 40) - Selects default volume setting when radio is turned on. • WB Alert (On or Off) - Determines if weather band alert feature is activated.
11	FREQUENCY DOWN	Press to manually tune the radio frequency down.
12	FREQUENCY UP	Press to manually tune the radio frequency up.
13	VOLUME DOWN	Adjusts volume down; current volume (0 - 40) will appear briefly in display screen.
14	SEEK FREQUENCY DOWN	Press to automatically tune frequency down to next strong station.
15	SEEK FREQUENCY UP	Press to automatically tune frequency up to next strong station.
16	PRESET STATIONS	Used to store and recall stations for each AM and FM band. Press and hold to store current station; press button to recall station.
17	AUXILIARY INPUT JACK	Connect line output of portable audio device (MP3 player) to 3,5 mm (1/8 in) jack and press AUXILIARY button.

INSTRUMENTS AND CONSOLES (CONT'D)

Raising And Lowering The Console

Raise the console before exiting the cab.

Figure 16



Pull up on the release handle [Figure 16]. The lift spring will assist in raising the console.

Lower the console before operating the excavator.

Push down on the lever [Figure 16] until the latch is engaged.

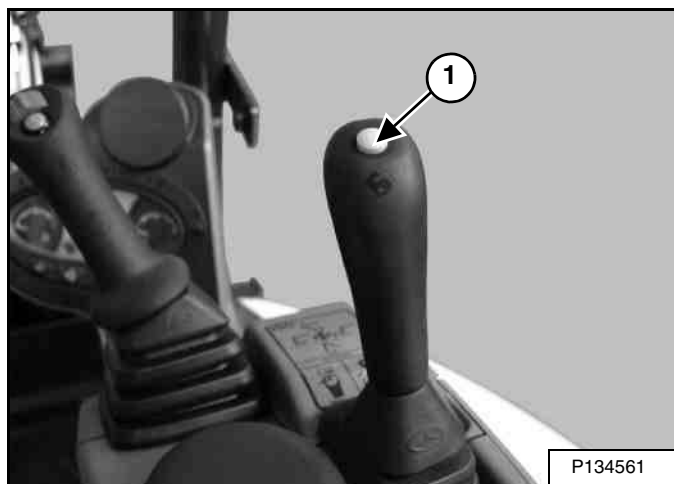
NOTE: When the console is raised, the hydraulic and traction system functions are locked and will not operate.

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

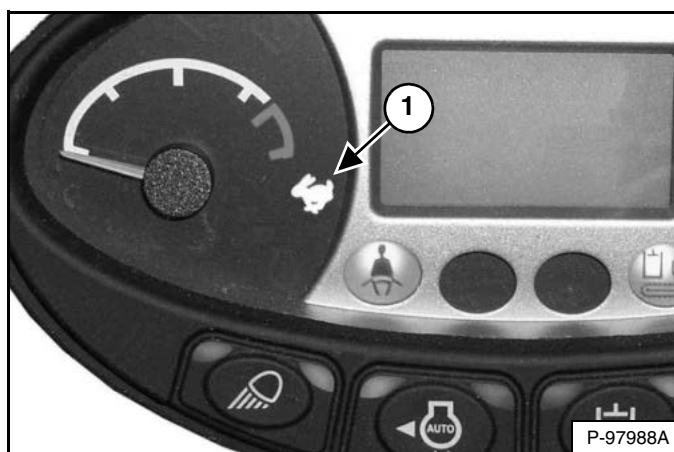
Figure 17



Press the button (Item 1) [Figure 17] to engage the high range. Press a second time to disengage.

NOTE: When engaging high range, two audible beeps will be heard. When engaging low range, one audible beep will be heard.

Figure 18



When high range is engaged, the two-speed travel icon (Item 1) [Figure 18] will illuminate.

Press the button (Item 1) [Figure 17] again to disengage.

Auto Shift Drive Motors

The travel motors are equipped with an auto shift feature that senses hydraulic pressure. 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

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.

NOTE: Auto idle is only available on machines equipped with a dial throttle.

Standard Panel

Figure 19



The automatic idle switch (Item 1) [Figure 19] is used to engage or disengage the automatic idle feature.

Press the switch (Item 1) once to engage automatic idle and the LED (Item 2) will illuminate. Press the switch (Item 1) a second time to disengage automatic idle, the LED (Item 2) [Figure 19] will be OFF.

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

Deluxe Panel

Figure 20



Press ENTER (Item 1) once to engage automatic idle. Press ENTER (Item 1) [Figure 20] again and auto idle will be OFF.

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

NOTE: When equipped with the Deluxe Instrument Panel, the time delay for auto idle to activate can be adjusted. (See Auto Idle Time Delay on Page 199.)

OPERATOR CANOPY (ROPS / TOPS / FOPS)

Description

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

Check the ROPS / TOPS / FOPS canopy, mounting, and hardware for damage. Never modify the ROPS / TOPS / FOPS 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.

FOPS - Falling Objects Protective structure, Top Guard per ISO 10262 - Level 1.

OPERATOR CAB (ROPS / TOPS / FOPS)

Description

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

Check the ROPS / TOPS / FOPS cab, mounting, and hardware for damage. Never modify the ROPS / TOPS / FOPS 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.

FOPS - Falling Objects Protective structure, Top Guard per ISO 10262 - Level 1.



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



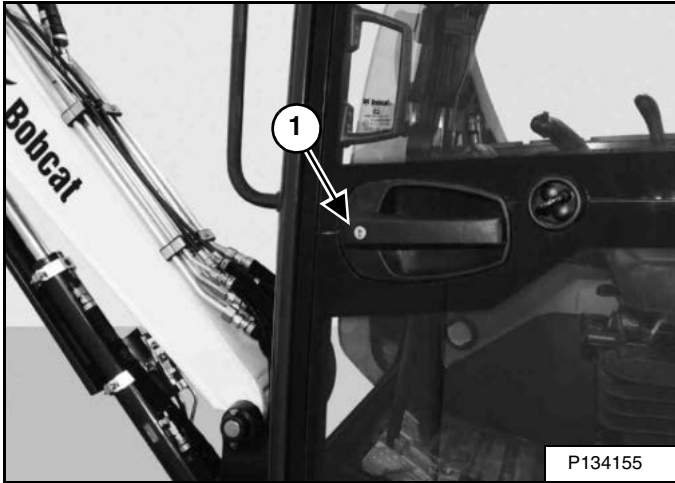
Never modify operator cab by welding, grinding, drilling holes or adding attachments unless instructed to do so by Bobcat Company. Changes to the cab can cause loss of operator protection from rollover and falling objects, and result in injury or death.

W-2069-0200

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

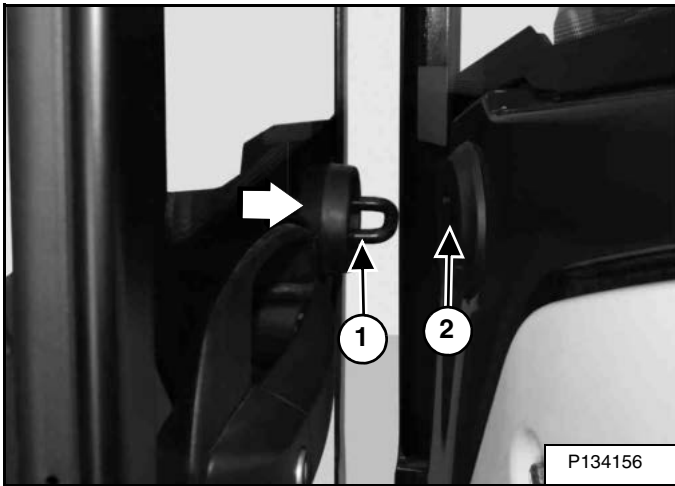
Cab Door

Figure 21



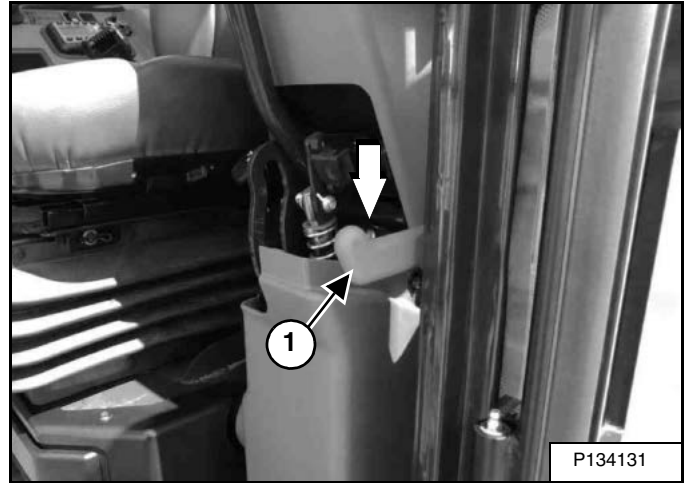
The cab door can be locked (Item 1) [Figure 21] with the same key as the starter switch.

Figure 22



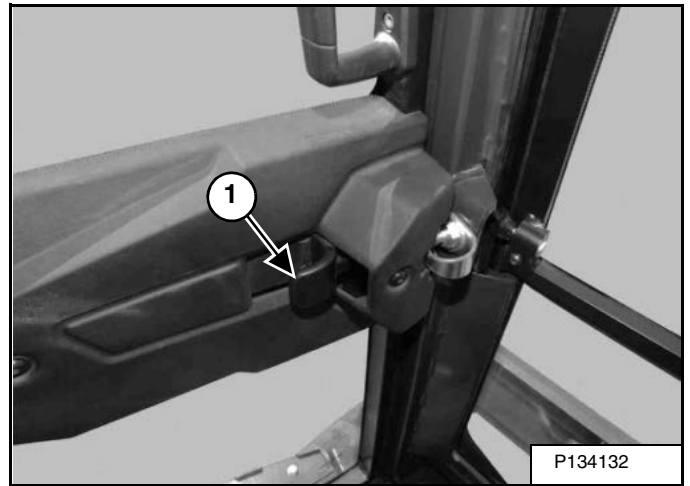
Push the door all the way open until the latch post (Item 1) engages in the latch (Item 2) [Figure 22] to hold the door in the open position.

Figure 23



When the door is in the open position, push down on the latch (Item 1) [Figure 23] to close the door.

Figure 24



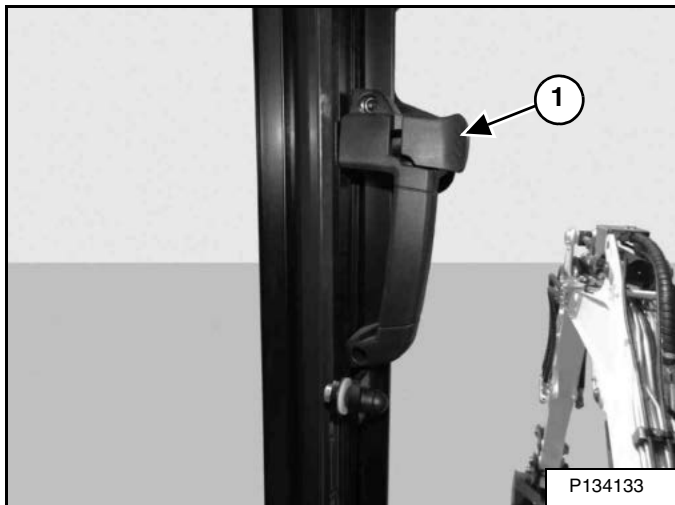
From inside the cab, open the door using the handle (Item 1) [Figure 24].

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

Front Window

Opening The Front Window

Figure 25



Push the window latch buttons (Item 1) [Figure 25] on both sides.

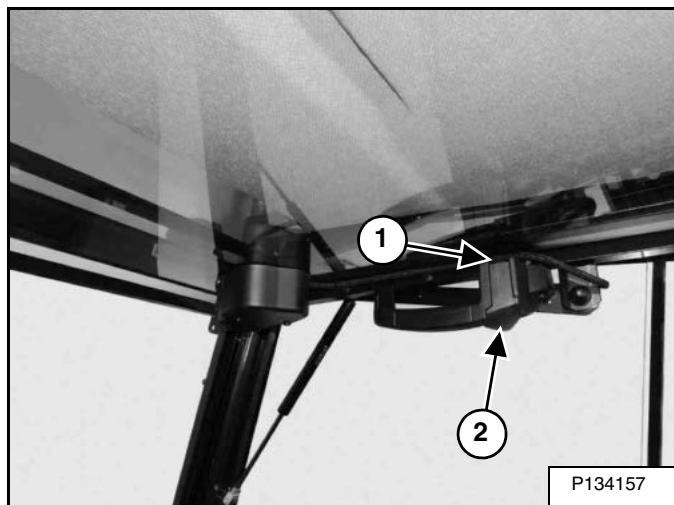
Figure 26



Use both window grab handles (Item 1) [Figure 26] 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 27



When the window is fully raised, the latch (Item 1) [Figure 27] (both sides) will close on the bracket in the latched position.

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

Closing The Front Window

Use both window grab handles to support the window while pressing the window latch button (Item 2) [Figure 27] (both sides).

Use both window grab handles (Item 1) [Figure 26] to pull the window down fully.

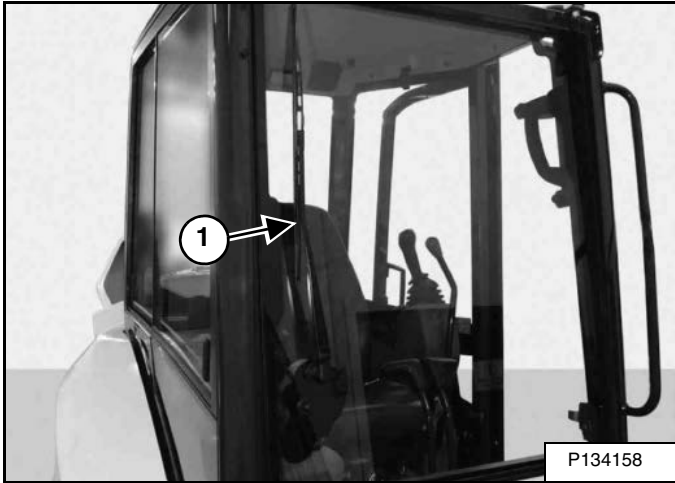
Press the top of the window in until the latch locks into the latched position (both sides) [Figure 25].

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

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

Front Wiper

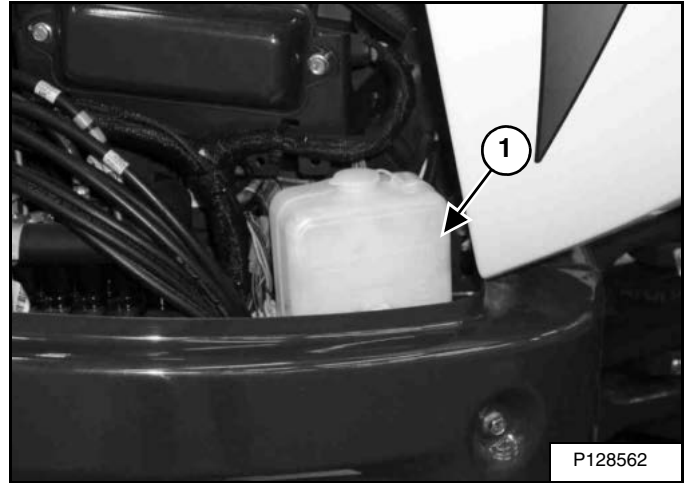
Figure 28



The front window is equipped with a wiper (Item 1) [Figure 28] and washer.

Window Washer Reservoir

Figure 29



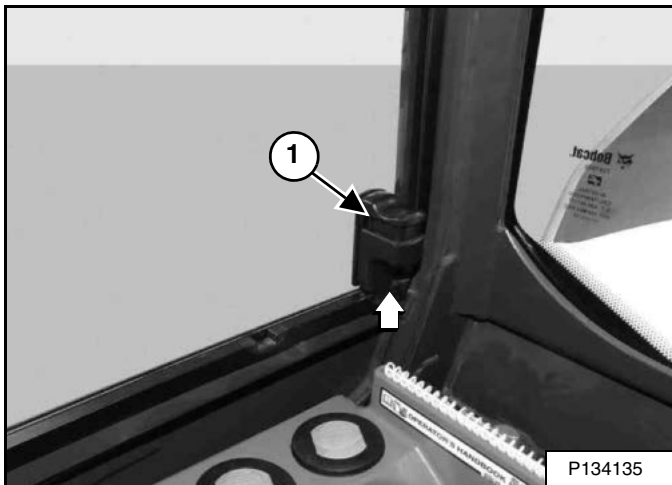
The window washer reservoir (Item 1) [Figure 29] is located under the right side cover.

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

Right Side Windows

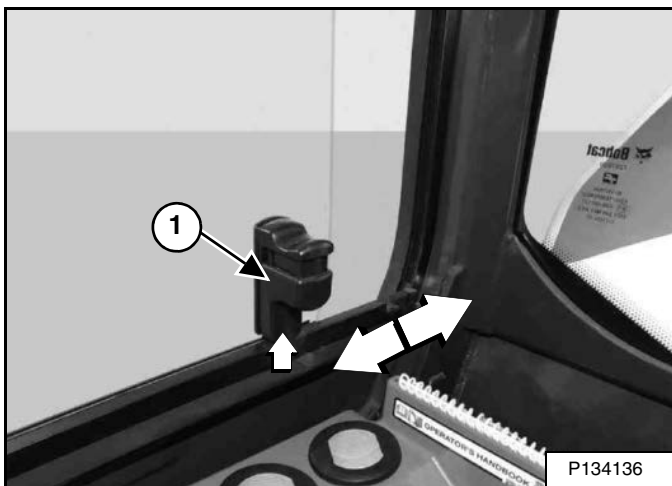
Opening The Right Rear Window

Figure 30



Pull up on the bottom latch (Item 1) [Figure 30].

Figure 31



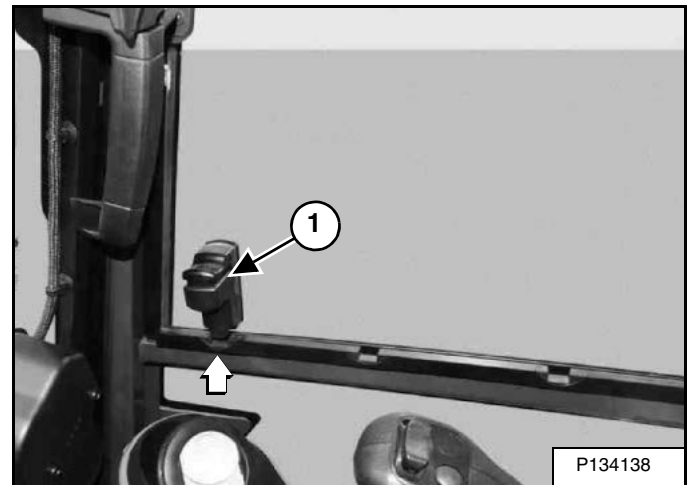
Pull the latch (Item 1) [Figure 31] forward to open the window until the desired stop. Release the bottom latch and snap the lock in place.

Closing The Right Rear Window

Pull up on the bottom latch (Item 1) [Figure 30] and push the latch back to close the window.

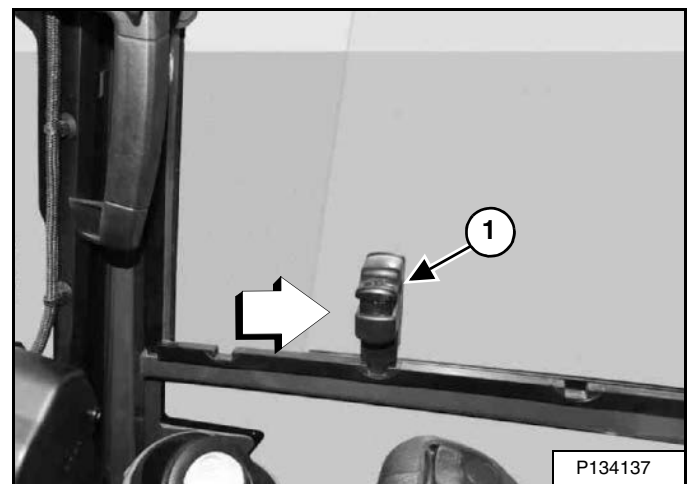
Opening The Right Front Window

Figure 32



Pull up on the bottom latch (Item 1) [Figure 32] located at the front of the front window.

Figure 33



Pull the latch (Item 1) [Figure 33] backward to open the window until the desired stop. Release the bottom latch and snap the lock in place.

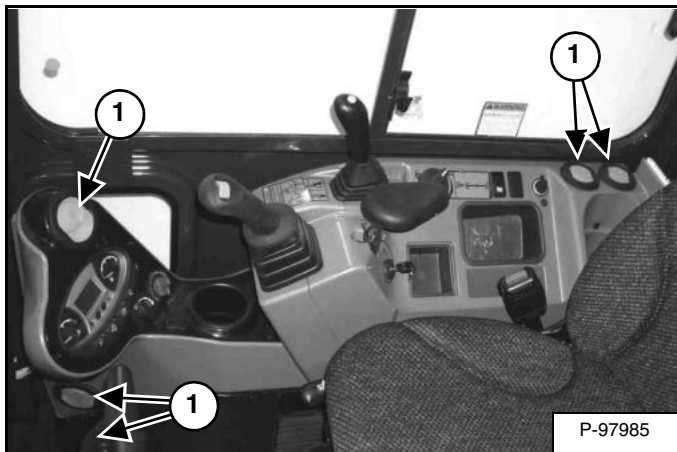
Closing The Right Front Window

Pull up on the bottom latch (Item 1) [Figure 32] and push the latch forward to close the window.

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

Heating And Ventilation Ducting

Figure 34



The louvres (Item 1) [Figure 34] can be positioned as needed to direct the air flow to various areas in the cab.

EMERGENCY EXIT

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

Right Side Rear Window

Figure 35



Exit through the window [Figure 35].

Front Window

Figure 36



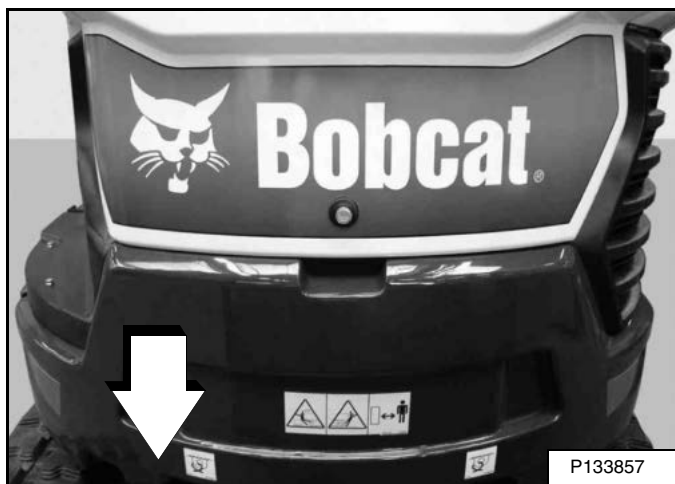
Open the front window and exit [Figure 36].

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

MOTION ALARM SYSTEM

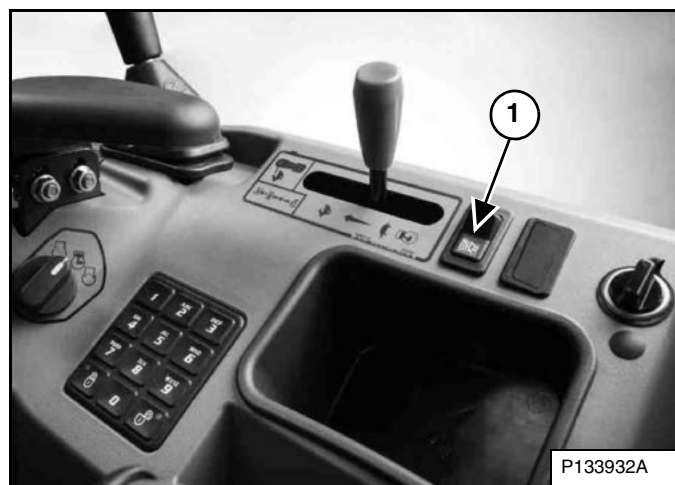
Operation

Figure 37



This excavator can be equipped with a motion alarm system. The motion alarm is located underneath the rear of the excavator.

Figure 38



The motion alarm can be temporarily disabled by pressing the Motion Alarm switch (Item 1) [Figure 38] 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 39] in either the forward or reverse direction.

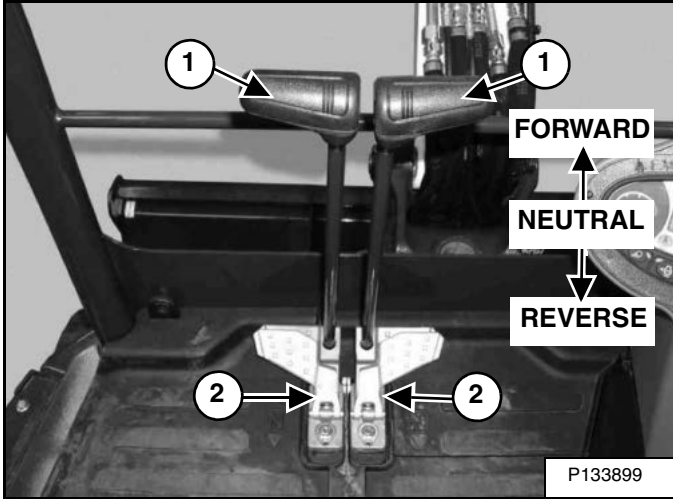
If alarm does not sound or for adjustment instructions, see inspection and maintenance instructions for the motion alarm system in the preventive maintenance section of this manual. (See MOTION ALARM SYSTEM on Page 150.)

TRAVEL CONTROLS

Forward And Reverse Travel

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

Figure 39



Position the blade so it is at the front of the machine (as you sit in the operator's seat). Slowly move both steering levers* (Item 1) [Figure 39] forward for forward travel; backward for reverse travel.

* Travel can also be controlled with foot pedals (Item 2) [Figure 39]. Pivot the heel of the pedals forward for additional space on the floor.

WARNING

AVOID INJURY OR DEATH

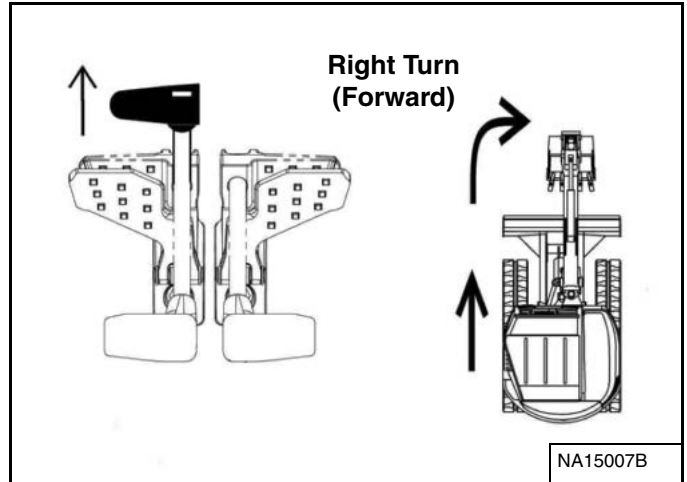
- Check the blade location before travelling. When the blade is to the rear, operate the steering levers / foot pedals in the opposite direction to when the blade is in the front.
- Move the steering levers / foot pedals slowly. Abrupt lever motion will cause the machine to jerk.

W-2235-EN-1009

Turning

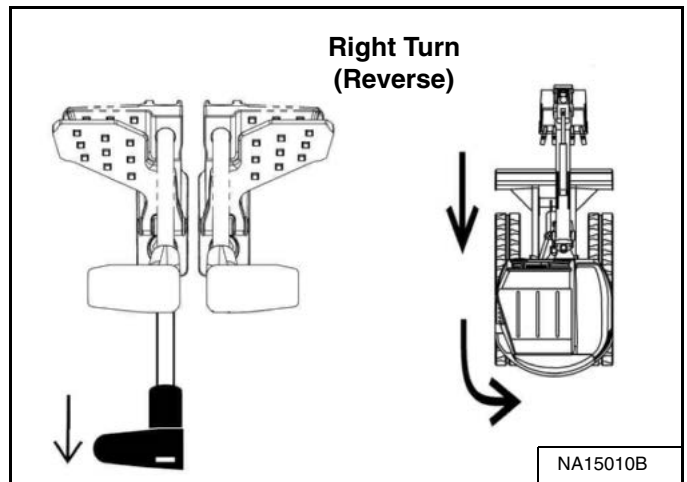
Right Turn

Figure 40



Push the left steering lever forward to turn right [Figure 40] while travelling forward.

Figure 41



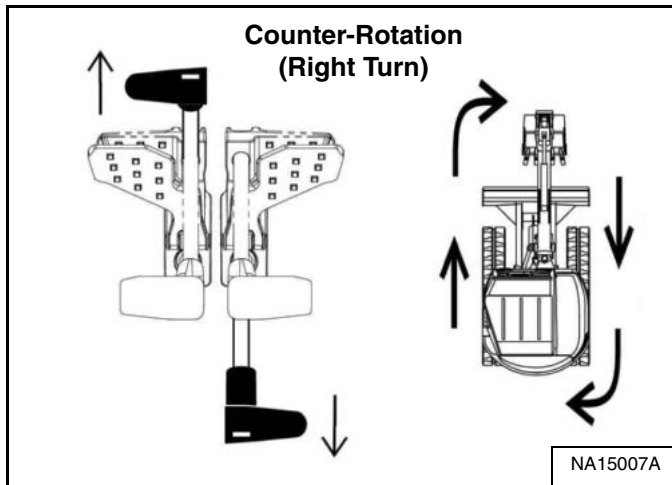
Pull the left steering lever backward to turn right while travelling backward [Figure 41]

TRAVEL CONTROLS (CONT'D)

Turning (Cont'd)

Counter-Rotation Right Turn

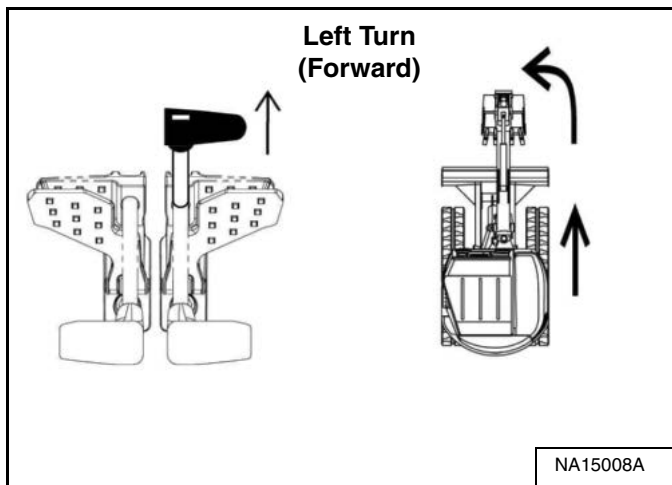
Figure 42



Push the left steering lever forward and pull the right steering lever backward [Figure 42].

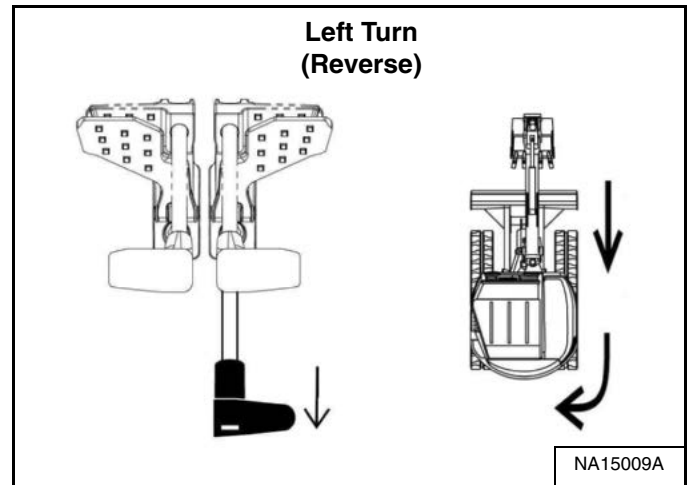
Left Turn

Figure 43



Push the right steering lever forward to turn left while travelling forward [Figure 43].

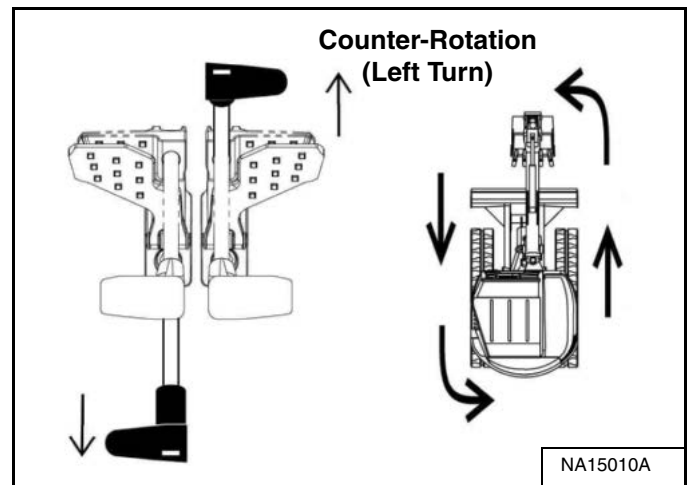
Figure 44



Pull the right steering lever backward to turn left while travelling backward [Figure 44].

Counter-Rotation Left Turn

Figure 45



Push the right steering lever forward and pull the left steering lever backward [Figure 45].

HYDRAULIC CONTROLS

Description

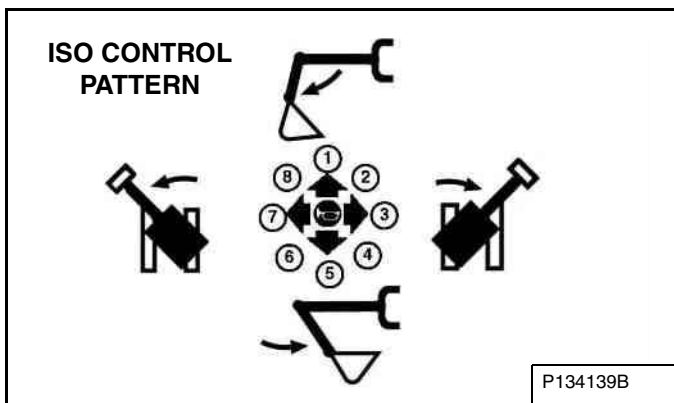
Operate the work equipment (boom, arm, bucket, and upperstructure slew) with the left and right joysticks.

Left Joystick

Figure 46



Figure 47



The left lever (joystick) is used to operate the arm and slew the upperstructure [Figure 46].

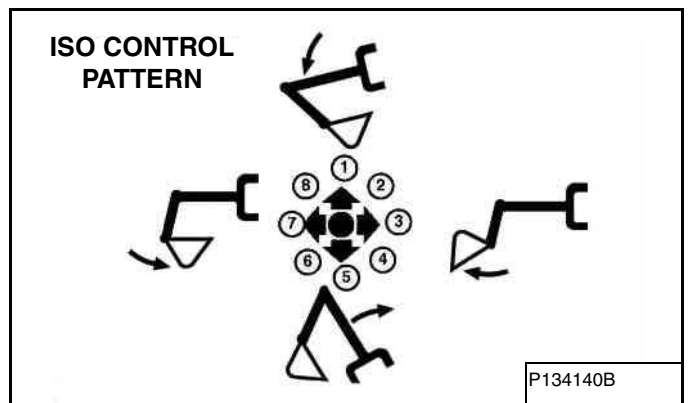
1. Arm out.
2. Arm out and slew right.
3. Slew right.
4. Arm in and slew right.
5. Arm in.
6. Arm in and slew left.
7. Slew left.
8. Arm out and slew left.

Right Joystick

Figure 48



Figure 49



The right lever (joystick) is used to operate the boom and bucket [Figure 48].

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

WARNING

AVOID INJURY OR DEATH

Before leaving the machine:

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

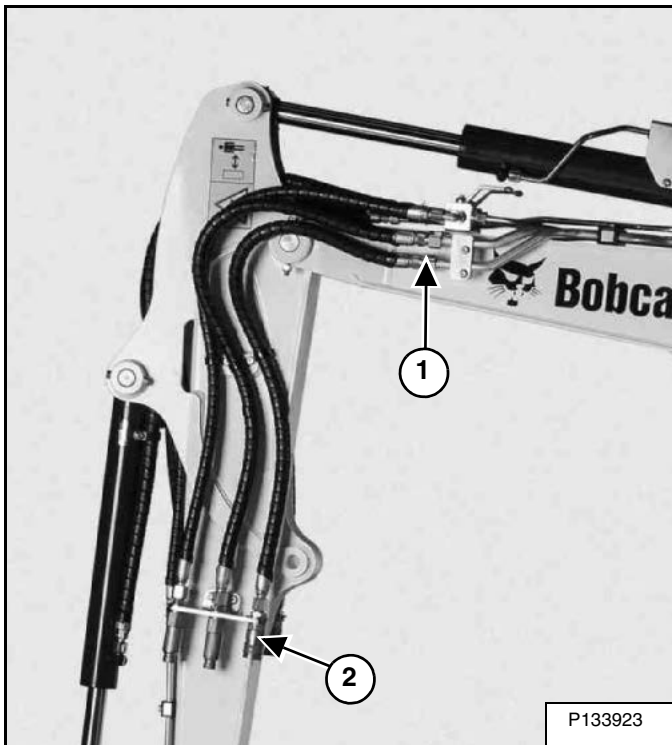
! WARNING

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 physician familiar with this injury.

W-2072-0807

Figure 50



If equipped with auxiliary hydraulics, the excavator and attachments are supplied with flush faced couplers. The couplers can be mounted on the boom (Item 1) or on the arm (Item 2) [Figure 50].

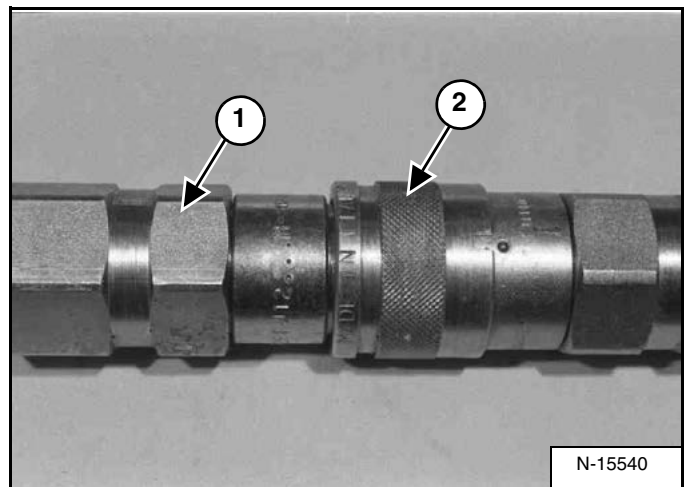
To Connect:

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 50] 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 51



Hold the male coupler (Item 1). Retract the sleeve (Item 2) [Figure 51] on the female coupler until the couplers disconnect.

HYDRAULIC CONTROLS (CONT'D)

Selectable And Continuous Auxiliary Hydraulic Flow Description

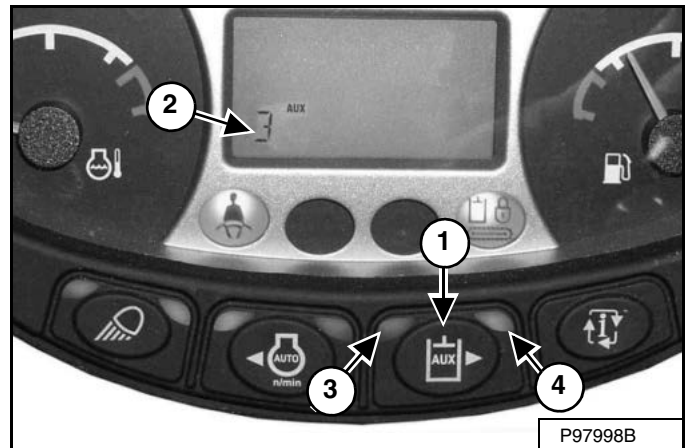
The primary auxiliary hydraulics have Selectable Auxiliary Hydraulic Flow or Continuous Auxiliary Hydraulic Flow. This allows the operator to select a hydraulic flow that matches the attachment's hydraulic requirements.

If the auxiliary hydraulics are enabled when the engine is turned OFF, they will stay enabled when the engine is restarted. If Continuous flow was enabled at engine OFF, it will reset to Selectable flow.

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.

Activating Primary Auxiliary Hydraulics With Standard Instrument Panel

Figure 52



Selectable Flow Auxiliary Hydraulics - Press the AUX Hydraulics button (Item 1) [Figure 52]. A beep will sound each time the auxiliary button is pressed. The last selected auxiliary hydraulic flow (Mode 3, Mode 2, or Mode 1) will appear in the data display (Item 2) [Figure 52]. The left LED (Item 3) [Figure 52] will illuminate.

Press the AUX Hydraulics button (Item 1) [Figure 52] to scroll through the flow settings (3, 2, 1). The setting will appear in the data display (Item 2) [Figure 52]. Once the setting is selected, it will stay at that setting until a different auxiliary flow is selected by the operator, even after engine restart.

Continuous Flow Auxiliary Hydraulics - Press and hold the AUX Hydraulics button (Item 1) [Figure 52] for more than one second. The right LED (Item 4) [Figure 52] will illuminate. Press the AUX Hydraulics button (Item 1) [Figure 52] again to scroll through the flow settings (3, 2, 1).

Selectable Auxiliary Hydraulic Flow Settings For Selected Attachments

The auxiliary hydraulics can be set to Mode 3 (shown on display as 3^{AUX}), Mode 2 (2^{AUX}), Mode 1 (1^{AUX}), or OFF. Mode 3 allows maximum hydraulic flow, Mode 2 allows medium hydraulic flow, and Mode 1 allows low hydraulic flow.

AUX FLOW SETTING	FLOW	ATTACHMENTS
Mode 3 (3 ^{AUX})	Maximum	Breaker, Vibratory Plate Compactor, Auger
Mode 2 (2 ^{AUX})	Medium	Clamp, Grapple
Mode 1 (1 ^{AUX})	Low	Power Tilt, Hydra Tilt

HYDRAULIC CONTROLS (CONT'D)

Activating Primary Auxiliary Hydraulics With Deluxe Instrument Panel (Software Version 88.02 Or Below)

Figure 53



Selectable Flow Auxiliary Hydraulics - Press key 6 (Item 1) [Figure 53] to activate auxiliary hydraulics. Press key 6 (Item 1) [Figure 53] again to scroll through the flow settings (see table below).

Continuous Flow Auxiliary Hydraulics - Press and hold key 6 (Item 1) [Figure 53] for more than one second. The continuous flow icons below will illuminate. Press key 6 (Item 1) [Figure 53] to scroll through the flow settings (see table below).

ICON	DESCRIPTION
	Engine OFF - Auxiliary Hydraulics Pressure Release
	Engine Running - Auxiliary Hydraulics OFF
	Auxiliary Hydraulics - Maximum Flow - Continuous Flow Disabled
	Auxiliary Hydraulics - Medium Flow - Continuous Flow Disabled
	Auxiliary Hydraulics - Low Flow - Continuous Flow Disabled
	Auxiliary Hydraulics - Maximum Flow - Continuous Flow Enabled
	Auxiliary Hydraulics - Medium Flow - Continuous Flow Enabled
	Auxiliary Hydraulics - Low Flow - Continuous Flow Enabled

Activating Primary Auxiliary Hydraulics With Deluxe Instrument Panel (Software Version 88.03 Or Above)

Figure 54



NOTE: Updated deluxe panels have the Aux icon (Item 3) [Figure 54] on the Gauges screen.

Selectable Flow Auxiliary Hydraulics - Press key 6 (Item 1) [Figure 54] to activate auxiliary hydraulics.

Continuous Flow Auxiliary Hydraulics - Press and hold key 6 (Item 1) [Figure 54] for more than one second. The continuous flow icon will illuminate.

Setting Auxiliary Hydraulic Flow Rate

Figure 55



Press key 7 (Item 2) [Figure 54] to open the AUXILIARY SETTINGS screen and set auxiliary flow rate.

On the AUXILIARY SETTINGS screen, press keys 1 or 6 to scroll through the settings [Figure 55]. See the table below for an explanation of the icons. Select the icon that corresponds to your attachment or select one of the Custom settings to save your own flow rates.













HYDRAULIC CONTROLS (CONT'D)

Activating Primary Auxiliary Hydraulics With Deluxe Instrument Panel (Software Version 88.03 Or Above) (Cont'd)

Adjust the flow rate percentages with keys 2 – 4 and 7 – 9. After changing a flow rate, press the save icon to save the setting.

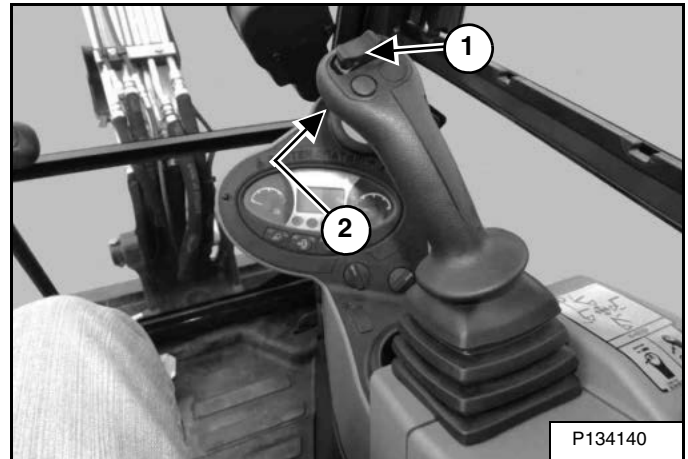
Press key 0 to return to the Gauge screen.

Press key 5 to return settings to the default setting.

ICON	DESCRIPTION
	Selectable Flow
	Continuous Flow
	Secondary Auxiliary
	Auger
	Cutter / Crusher
	Breaker
	Rotating Grapple
	Flail Mower
	Tilt Coupler
	Custom Setting 1
	Custom Setting 2
	Custom Setting 3

Operating Attachments With Primary Auxiliary Hydraulics

Figure 56



After activating auxiliary hydraulics and selecting Selectable or Continuous flow (See Activating Primary Auxiliary Hydraulics With Standard Instrument Panel on Page 48.), (See Activating Primary Auxiliary Hydraulics With Deluxe Instrument Panel (Software Version 88.02 Or Below) on Page 49.), or (See Activating Primary Auxiliary Hydraulics With Deluxe Instrument Panel (Software Version 88.03 Or Above) on Page 49.), operate the attachment as follows:

- Move the switch (Item 1) [Figure 56] on the right joystick to the right to supply hydraulic flow to the female coupler.
- Move the switch (Item 1) [Figure 56] to the left to supply hydraulic flow to the male coupler.
- Move the switch (Item 1) [Figure 56] halfway and the auxiliary functions will move at approximately one-half speed.
- Press the button (Item 2) [Figure 56] on the front of the handle to provide continuous flow to the female coupler.
- Press the switch (Item 1) to the left while pressing the button (Item 2) [Figure 56] on the front of the handle to provide continuous flow to the male coupler.
- Press the button (Item 2) [Figure 56] 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)

Releasing Hydraulic Pressure In Excavator With Standard Instrument Panel

NOTE: Excavator engine must have recently been started to release hydraulic pressure.

Put the attachment flat on the ground.

Stop the engine and turn the key switch to ON.

NOTE: The left console must be fully lowered to release hydraulic pressure.

Figure 57



If the auxiliary hydraulics are disabled, press AUX Hydraulics button (Item 1) [Figure 57] and then move the switch (Item 1) [Figure 56] to the right and left several times.

If the auxiliary hydraulics are enabled, then move the switch (Item 1) [Figure 56] to the right and left several times.

Releasing Hydraulic Pressure In Excavator With Deluxe Instrument Panel

NOTE: Excavator engine must have recently been started to release hydraulic pressure.

Put the attachment flat on the ground.

Stop the engine and turn the start switch to ON.

NOTE: The left console must be fully lowered to release hydraulic pressure.

Figure 58



Press either Scroll button (Item 1) [Figure 58] until the above screen is visible.

Press key 6 [Figure 58] and the AUX PRESSURE RELEASE screen [Figure 59] will appear.

Figure 59



Press the ENTER button (Item 1) [Figure 59] to release auxiliary pressure in the excavator. An hour glass symbol will appear and when pressure is released, the screen will show *Auxiliary Hydraulic Pressure Release*.

HYDRAULIC CONTROLS (CONT'D)

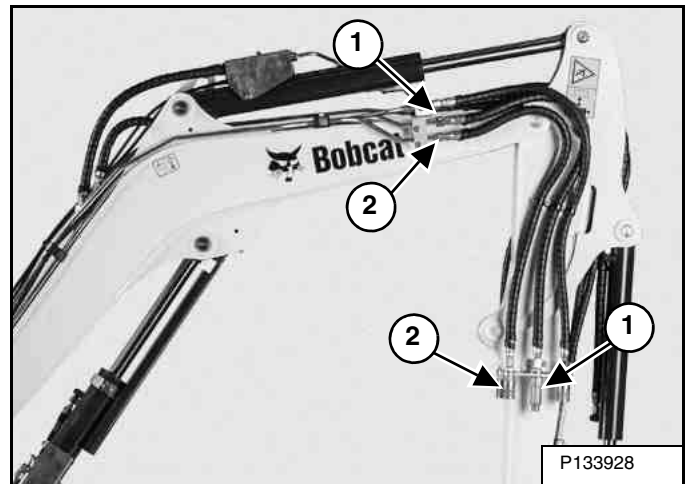
Releasing Hydraulic Pressure In Attachments

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

- Follow procedure to release hydraulic 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.

Secondary Auxiliary Hydraulics Location

Figure 60



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

HYDRAULIC CONTROLS (CONT'D)

Operating Attachments With Secondary Auxiliary Hydraulics (Software Version 88.02 Or Below)

If your machine's software has been updated, (See Operating Attachments With Primary, Secondary, Or Fourth Auxiliary Hydraulics (Software Version 88.03 Or Above) on Page 55.)

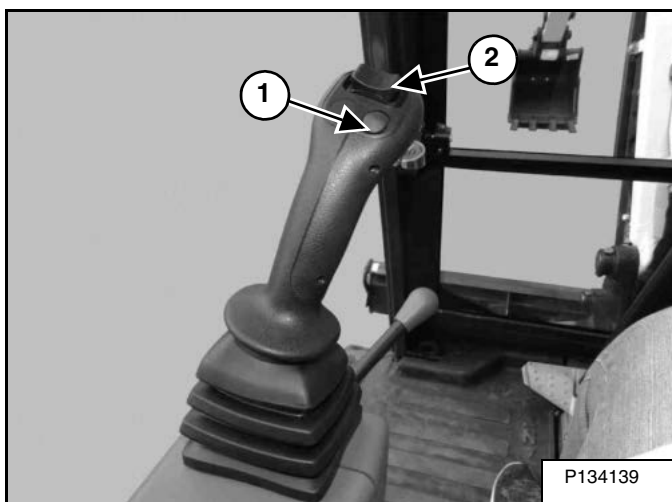
Figure 61



1. Activate auxiliary hydraulics.

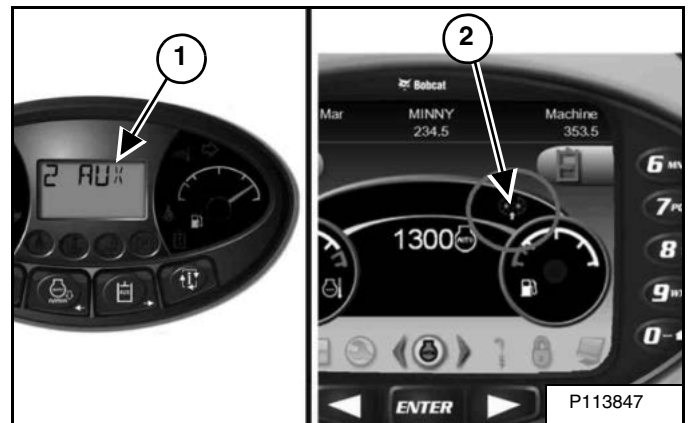
- *Standard Instrument Panel:* Press the AUX Hydraulics button (Item 1) [Figure 66].
- *Deluxe Instrument Panel:* Press key 6 (Item 2) [Figure 66].

Figure 62



2. Press and hold the button (Item 1) [Figure 62] on the left joystick until a beep is heard to switch between the boom swing function and the secondary auxiliary hydraulics.

Figure 63



- *Standard Instrument Panel:* The display (Item 1) [Figure 63] will show 2 AUX when in the second auxiliary mode.
 - *Deluxe Instrument Panel:* The icon (Item 2) [Figure 63] will be illuminated when in the second auxiliary mode.
3. Operate the attachment as follows:
- Move the switch (Item 2) [Figure 62] on the left control lever to the left to supply hydraulic flow to the female coupler.
 - Move the switch (Item 2) [Figure 62] to the right to supply hydraulic flow to the male coupler.
 - Move the switch (Item 2) [Figure 62] halfway and the auxiliary functions will move at approximately one-half speed.

HYDRAULIC CONTROLS (CONT'D)

Releasing Secondary Auxiliary Hydraulic Pressure In Excavator

NOTE: Excavator engine must have recently been started to release hydraulic pressure.

1. Put the attachment flat on the ground.
2. Stop the engine and turn the key to ON.
3. Make sure left console is fully lowered.
4. Activate auxiliary hydraulics. (See Operating Attachments With Secondary Auxiliary Hydraulics (Software Version 88.02 Or Below) on Page 53.) (See Operating Attachments With Primary, Secondary, Or Fourth Auxiliary Hydraulics (Software Version 88.03 Or Above) on Page 55.)
5. Activate secondary auxiliary hydraulics. (See Operating Attachments With Secondary Auxiliary Hydraulics (Software Version 88.02 Or Below) on Page 53.) (See Operating Attachments With Primary, Secondary, Or Fourth Auxiliary Hydraulics (Software Version 88.03 Or Above) on Page 55.)
6. Move the left joystick switch (Item 2) **[Figure 62]** to the right and left several times to release pressure.

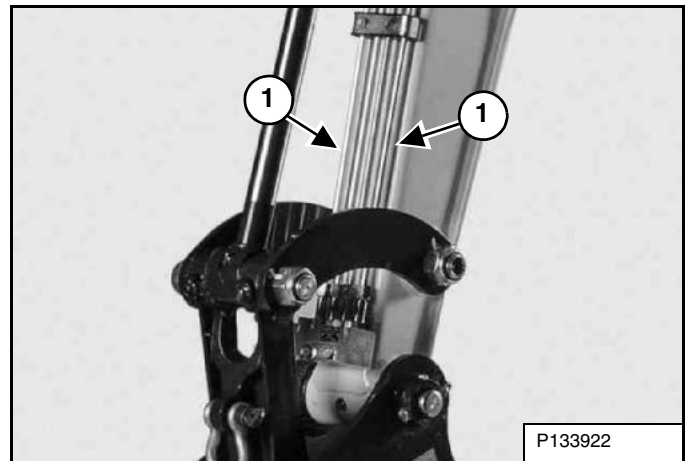
Releasing Secondary Auxiliary Hydraulic Pressure In Attachment

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

- 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.

Fourth Auxiliary Hydraulics Location

Figure 64



When the excavator is equipped with fourth auxiliary hydraulics, the fourth auxiliary hydraulic tube lines will be mounted on top the arm in the outside position (Item 1) **[Figure 64]** and connect to the port block on the arm.

HYDRAULIC CONTROLS (CONT'D)

Operating Attachments With Primary, Secondary, Or Fourth Auxiliary Hydraulics (Software Version 88.03 Or Above)

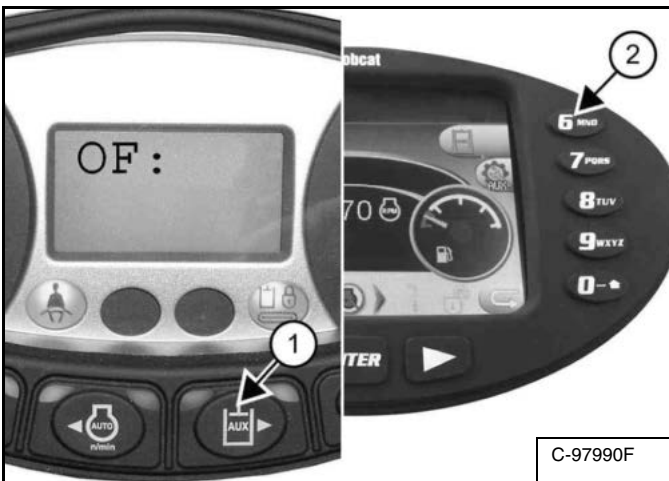
In machines equipped with primary, secondary, and fourth auxiliary hydraulics, you can toggle between OF (boom offset), Aux1, Aux2, and Aux4 to select the control configuration that best suits the attachment and operation.

Figure 65



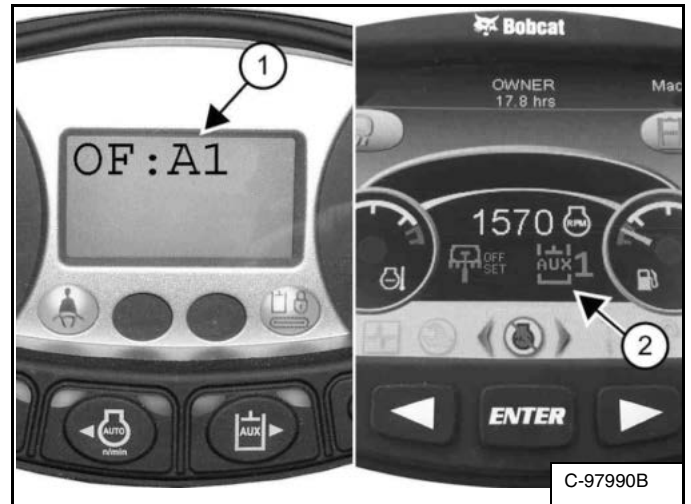
1. Push the Boom Swing switch (Item 1) [Figure 65] on the left console to the left to operate boom swing offset with the left joystick switch. This switch can later be pushed to the right to transfer boom swing control to the right joystick.
- *Standard Instrument Panel:* The display will show [OF] on the left side, indicating this joystick controls boom swing offset.
 - *Deluxe Instrument Panel:* The Offset icon will illuminate on the left side of the display, indicating this joystick controls boom swing offset.

Figure 66



2. Activate auxiliary hydraulics.
- *Standard Instrument Panel:* Press the AUX Hydraulics button (Item 1) [Figure 66].
 - *Deluxe Instrument Panel:* Press key 6 (Item 2) [Figure 66].

Figure 67

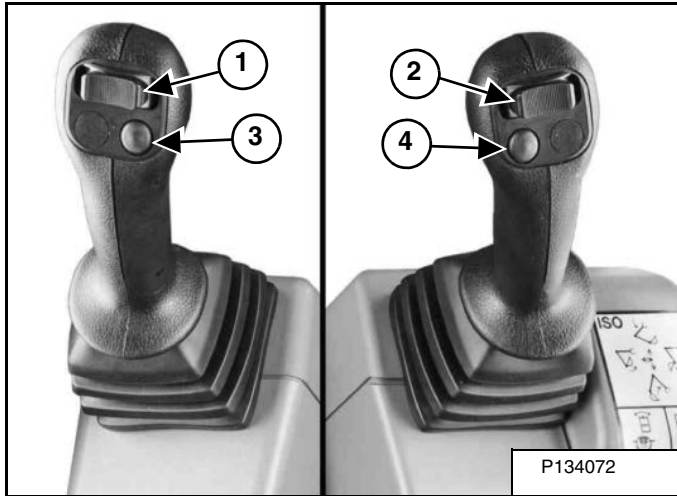


3. The display will indicate the left joystick controls boom swing offset and the right joystick controls auxiliary hydraulics.
- *Standard Instrument Panel:* The display will show [OF:A1] (Item 1) [Figure 67].
 - *Deluxe Instrument Panel:* The display will show Offset and Aux1 icons (Item 2) [Figure 67].

HYDRAULIC CONTROLS (CONT'D)

Operating Attachments With Primary, Secondary, Or Fourth Auxiliary Hydraulics (Software Version 88.03 Or Above) (Cont'd)

Figure 68



NOTE: After you push the Boom Swing switch (Item 1) [Figure 65], the auxiliary hydraulics will automatically deactivate. Press the AUX Hydraulics button (Item 1) [Figure 66] or key 6 (Item 2) [Figure 66] to reactivate auxiliary hydraulics.

To set auxiliary hydraulics flow rate, (See Setting Auxiliary Hydraulic Flow Rate on Page 49.).

See the following table for more information on switching between auxiliary hydraulic combinations.

4. Press the joystick buttons to toggle to the desired hydraulic setting.
 - Press the left joystick button (Item 3) [Figure 68] until two beeps are heard to select OF, Aux2, or Aux4.
 - Press the right joystick button (Item 4) [Figure 68] until two beeps are heard to select OF, Aux1, or Aux4.

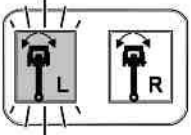









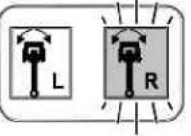







NOTE: Boom swing offset (OF) will only be available for the joystick that is set with the Boom Swing switch (Item 1) [Figure 65]. Aux4 will be available only for the other joystick.

NOTE: The joystick switches must be in the neutral position before you press a joystick button to change to a different auxiliary.

5. Operate the attachment as follows:
 - Use the left joystick switch (Item 1) [Figure 68] to control the hydraulics indicated on the left side of the display panel (OF, Aux2, or Aux4).
 - Use the right joystick switch (Item 2) [Figure 68] to control the hydraulics indicated on the right side of the display panel (OF, Aux1, or Aux4).

HYDRAULIC CONTROLS (CONT'D)

Operating Attachments With Primary, Secondary, Or Fourth Auxiliary Hydraulics (Software Version 88.03 Or Above) (Cont'd)

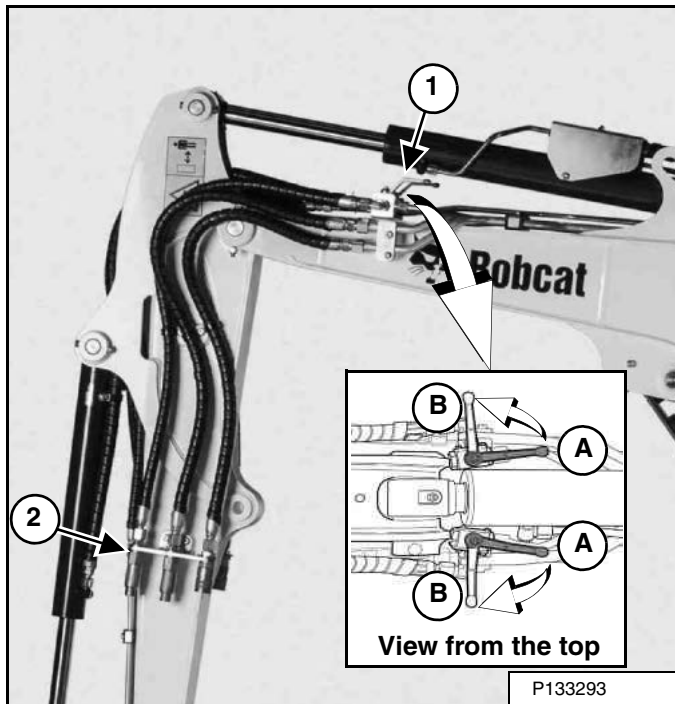
AUXILIARY HYDRAULICS SETTINGS SEQUENCE			
BOOM SWING SWITCH	ACTION	STANDARD DISPLAY	DELUXE DISPLAY
	1. Initial setting (Boom Swing switch set to left joystick).	OF:_	
	2. Activate auxiliary hydraulics.	OF:A1	 
	3. Press right joystick button.	OF:A4	 
	4. Press left joystick button.	A2:A4	 
	5. Press right joystick button.	A2:A1	 
	6. Press Boom Swing switch to right.	_:OF	
	7. Activate auxiliary hydraulics.	A4:OF	 
	8. Press right joystick button.	A4:A1	 
	9. Press left joystick button.	A2:A1	 

NOTE: The combination A2:OF is not a possible setting.

HYDRAULIC CONTROLS (CONT'D)

Third Auxiliary Hydraulics (A3)

Figure 69



When the excavator is equipped with third auxiliary hydraulics (A3), two manually operated diverter valves (Item 1) [Figure 69] will be installed into the bucket hydraulic circuit.

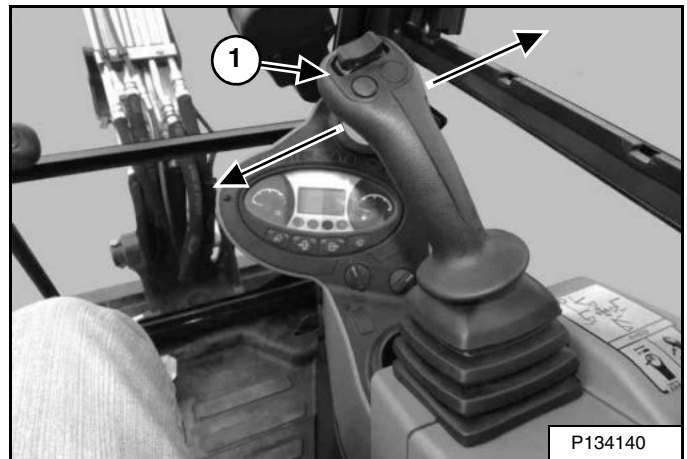
NOTE: Both levers (Item 1) must be fully rotated in either the bucket position (Item A) or the third auxiliary position (Item B) [Figure 69] for correct operation.

IMPORTANT

Attachments must be disconnected from the auxiliary hydraulic diverter valve quick couplers when the levers are in the A position. If left connected, hydraulic system pressure can cause unexpected attachment movement.

I-2389-0518

Figure 70



1. Release hydraulic pressure in the excavator. (See Releasing Hydraulic Pressure In Excavator With Standard Instrument Panel on Page 51.) (See Releasing Hydraulic Pressure In Excavator With Deluxe Instrument Panel on Page 51.)
2. Move both levers to the (B) position (Item 1) [Figure 69] to select third auxiliary hydraulics.
3. Connect the attachment to the third auxiliary quick couplers (Item 2) [Figure 69].
4. Move the right joystick (Item 1) [Figure 70] right and left to supply hydraulic flow to the third auxiliary ports (Item 2) [Figure 69].

HYDRAULIC CONTROLS (CONT'D)

Direct To Tank Switch

The direct to tank switch (if equipped) is located on the right console.

Figure 71



Push the top of the switch (Item 1) [Figure 71] to direct auxiliary return flow to the hydraulic oil reservoir. The button will illuminate.

Push the bottom of the switch (Item 1) [Figure 71] to select two-way hydraulic auxiliary flow operation.

OVERLOAD WARNING DEVICE

Description

NOTE: The excavator must be equipped with the optional boom load holding valve to install the overload warning device.

The overload warning device (if equipped), senses hydraulic pressure in the boom lift circuit. When the hydraulic pressure in the boom lift circuit reaches a predetermined pressure setting, a buzzer will sound that indicates an overload condition.

If the buzzer sounds, immediately move the arm closer to the excavator and lower the boom. Reduce the size of the load before attempting to re-lift the load.

Operation

Figure 72

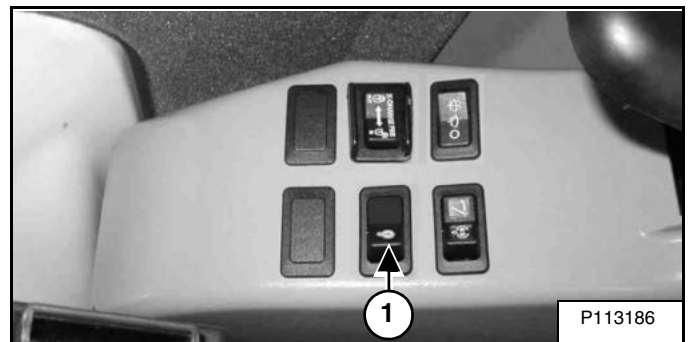
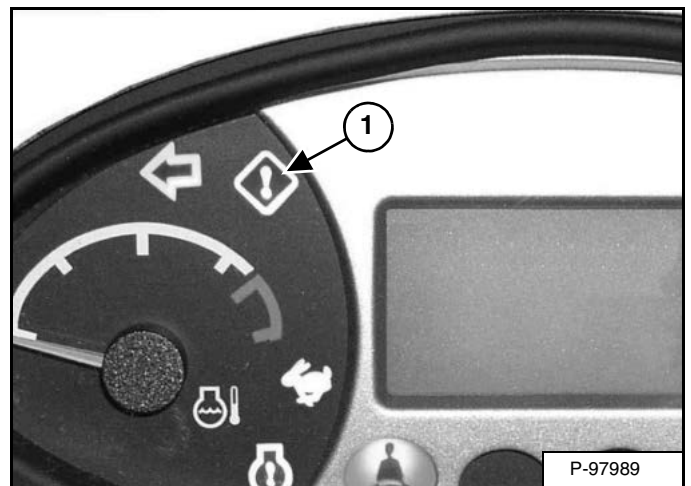


Figure 73



Press the switch (Item 1) [Figure 72] to the right to enable the Overload Warning Feature.

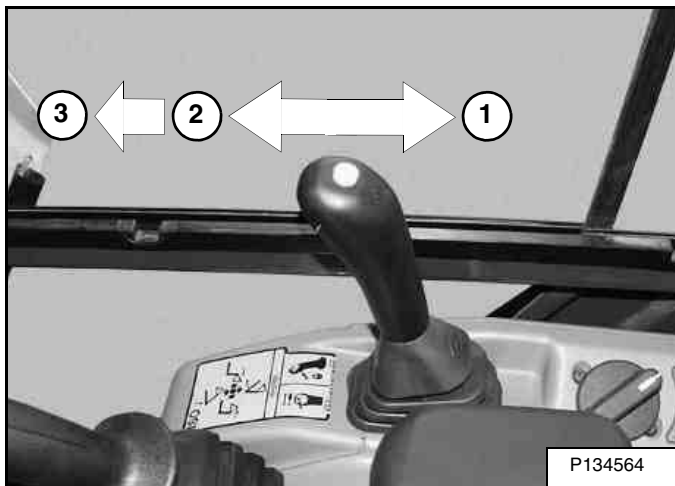
A buzzer will sound and the general warning icon (Item 1) [Figure 73] will illuminate when the boom is overloaded.

To disengage the overload warning feature, press the switch (Item 1) [Figure 72] to the left. The icon (Item 1) [Figure 73] will turn off when the overload warning feature is disabled.

BLADE CONTROL LEVER

Raising And Lowering Blade

Figure 74



Pull the lever backward to raise the blade (Item 1) [Figure 74].

Push the lever forward to lower the blade (Item 2) [Figure 74].

Push the lever (Item 3) [Figure 74] forward until the lever is in the locked position to put the blade in the *float* position.

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

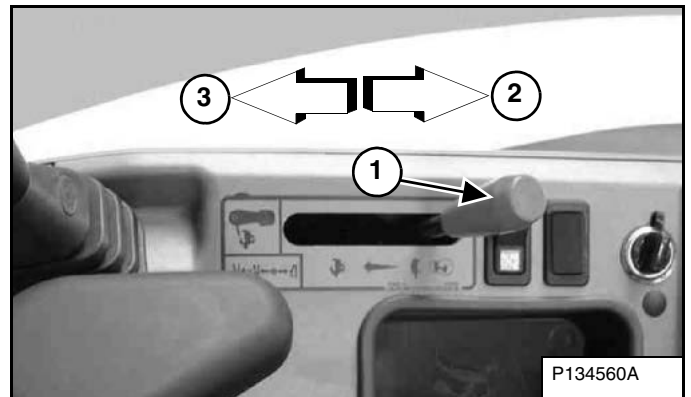
NOTE: Keep blade lowered for increased digging performance.

ENGINE SPEED CONTROL

Setting Engine Speed (RPM)

Engine Speed Control Lever (If Equipped)

Figure 75

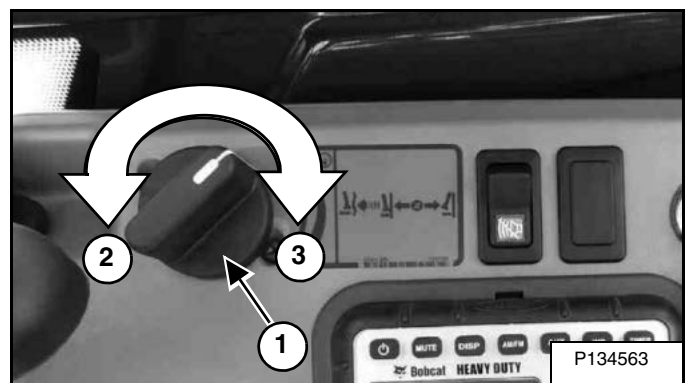


The engine speed control lever (Item 1) [Figure 75] controls engine rpm.

Pull the engine speed control lever back (Item 2) to reduce engine rpm. Push the engine speed control lever forward (Item 3) [Figure 75] to increase engine rpm.

Engine Speed Control Dial (If Equipped)

Figure 76



The engine speed control dial (Item 1) [Figure 76] 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 76] to increase engine rpm.

NOTE: Auto idle feature is only available with the engine speed control dial (Item 1) [Figure 76]. (See Auto Idle Feature on Page 36.)

ECO Mode (With Deluxe Instrument Panel Only)

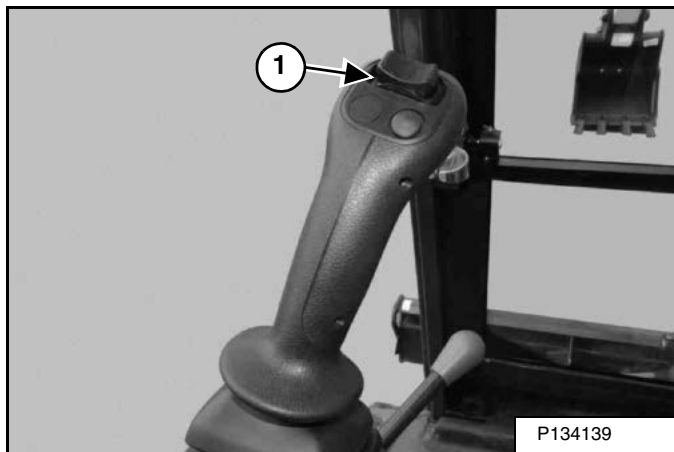
If the machine is equipped with the Deluxe Instrument Panel, ECO mode is available.

To enable ECO mode, (See ECO MODE on Page 200.)

BOOM SWING

Operation

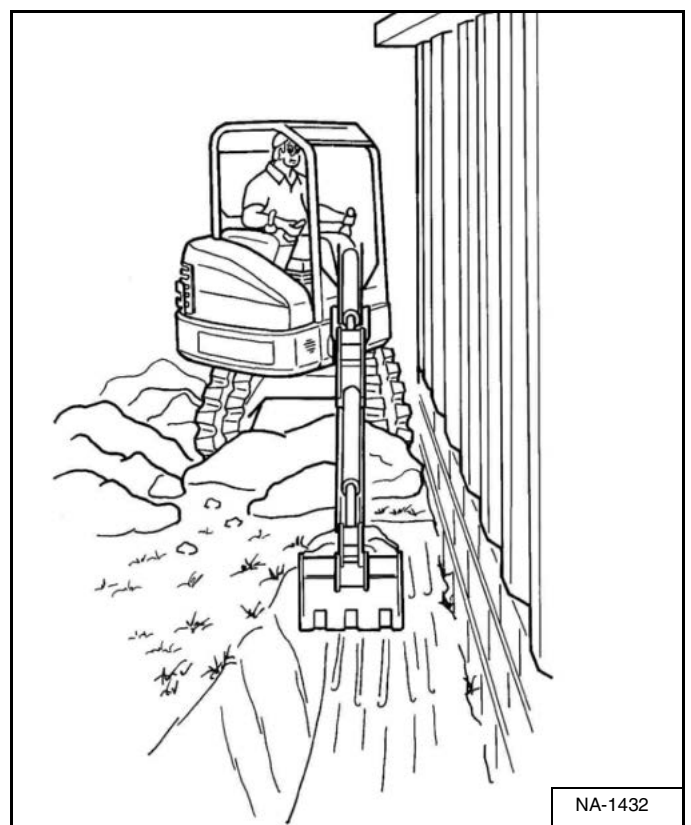
Figure 77



When no auxiliary hydraulics are enabled, control the boom swing with the left joystick switch (Item 1) [Figure 77]. 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.

For instructions on operating the boom swing / auxiliary hydraulics (See Operating Attachments With Secondary Auxiliary Hydraulics (Software Version 88.02 Or Below) on Page 53.) (See Operating Attachments With Primary, Secondary, Or Fourth Auxiliary Hydraulics (Software Version 88.03 Or Above) on Page 55.)

Figure 78



NOTE: The purpose of the boom swing is to offset the boom with respect to the upperstructure for digging close to a structure [Figure 78].

BOOM LOAD HOLDING VALVE

Description

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

! WARNING

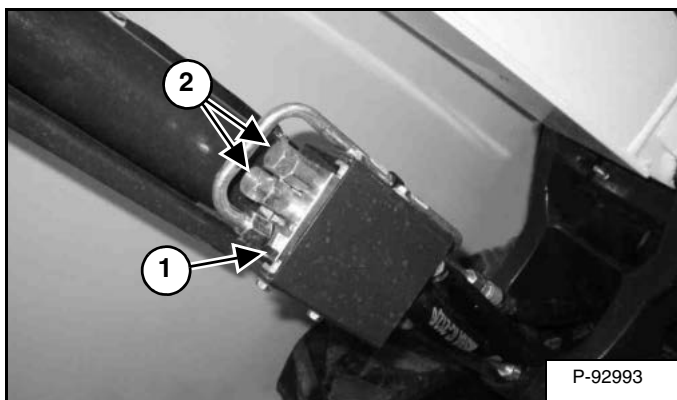
AVOID INJURY OR DEATH

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

W-2793-0409

Lowering Boom With Load Holding Valve

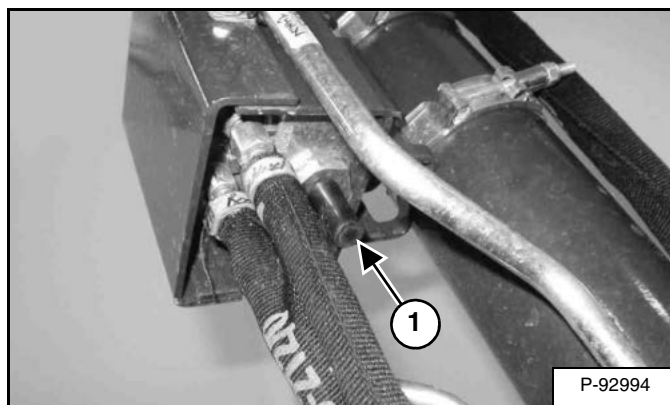
Figure 79



If the excavator is equipped with a boom load holding valve (Item 1) [Figure 79], 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 79]. If the port relief valves have been tampered with, see your Bobcat dealer for service.

Figure 80



Remove the plastic protective cap (Item 1) [Figure 80] from the valve.

! WARNING

AVOID BURNS

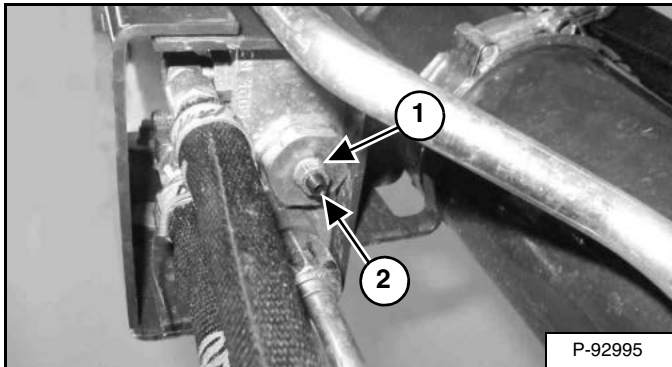
Hydraulic fluid, tubes, fittings and quick couplers can get hot when running machine and attachments. Be careful when connecting and disconnecting quick couplers.

W-2220-0396

BOOM LOAD HOLDING VALVE (CONT'D)

Lowering Boom With Load Holding Valve (Cont'd)

Figure 81



Lowering procedures:

With base end hose failure:

Loosen the locknut (Item 1). Install a hex wrench into the valve screw (Item 2) [Figure 81] 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 locknut (Item 1) [Figure 81].

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 or press the ENTER CODE Button (Keyless Panel), 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 locknut (Item 1). Install a hex wrench into the valve screw (Item 2) [Figure 81] 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 locknut (Item 1) [Figure 81]. 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

Description

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

! WARNING

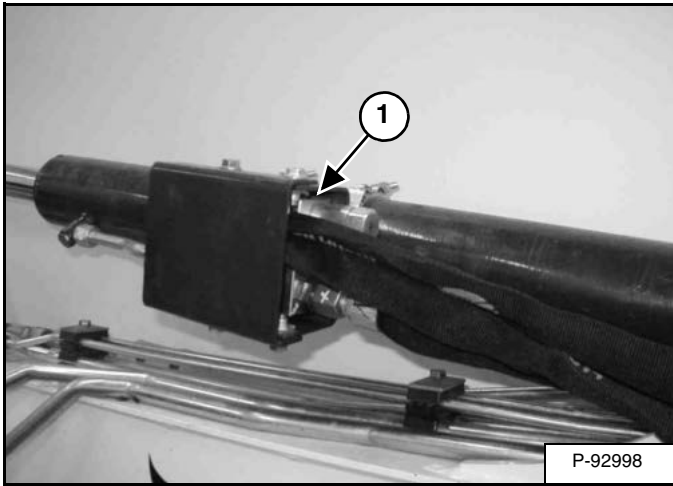
AVOID INJURY OR DEATH

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

W-2793-0409

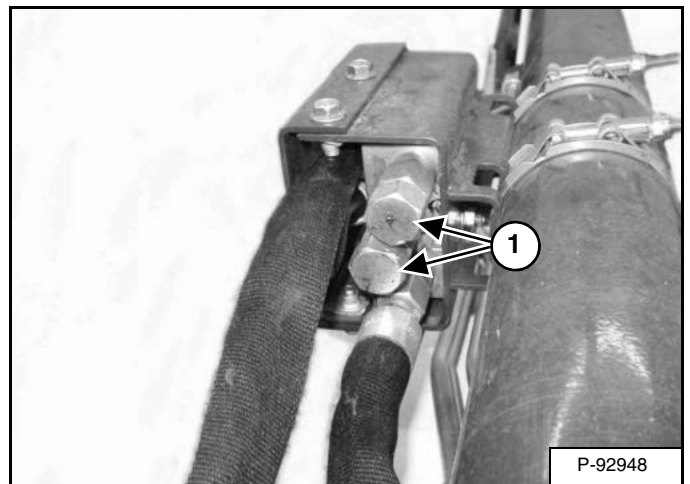
Lowering Arm With Load Holding Valve

Figure 82



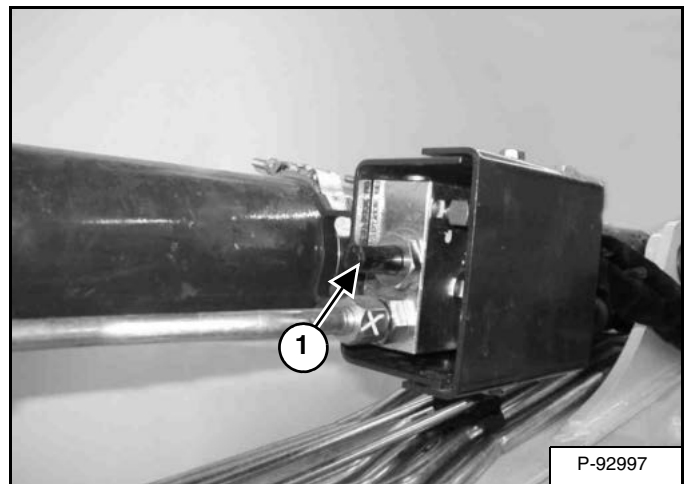
If the excavator is equipped with arm load holding valve (Item 1) [Figure 82], it will be attached to the arm cylinder base end as shown.

Figure 83



NOTE: DO NOT remove or adjust the two port relief valves (Item 1) [Figure 83]. If the port relief valves have been tampered with, see your Bobcat dealer for service.

Figure 84



Remove the plastic protective cap (Item 1) [Figure 84] from the valve.

! WARNING

AVOID BURNS

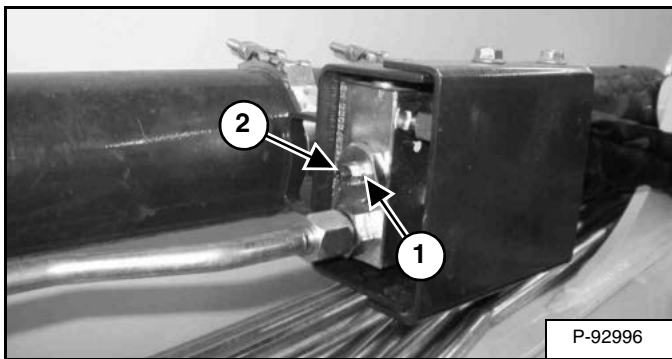
Hydraulic fluid, tubes, fittings and quick couplers can get hot when running machine and attachments. Be careful when connecting and disconnecting quick couplers.

W-2220-0396

ARM LOAD HOLDING VALVE (CONT'D)

Lowering Arm With Load Holding Valve (Cont'd)

Figure 85



Lowering procedures:

With base end hose failure:

Loosen the locknut (Item 1). Install a hex wrench into the valve screw (Item 2) [Figure 85] 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 locknut (Item 1) [Figure 85].

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 or press the ENTER CODE Button (Keyless Panel), 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 locknut (Item 1). Install a hex wrench into the valve screw (Item 2) [Figure 85] 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 locknut (Item 1) [Figure 85]. Reinstall the base end hose.

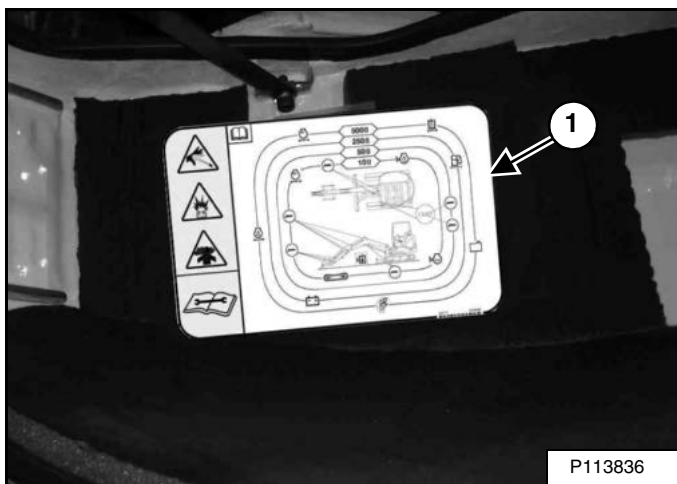
Loss of hydraulic pressure:

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

DAILY INSPECTION

Daily Inspection And Maintenance

Figure 86



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 86] is located inside the right side cover. (See SERVICE SCHEDULE on Page 146.)

WARNING

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

W-2001-0502

NOTE: Fluids such as engine oil, hydraulic fluid, coolant, 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 regulations for correct disposal.

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

Check the following items before each day of operation:

- Operator Canopy or Cab (ROPS / TOPS / FOPS) and mounting hardware.
- Check seat belt and mounting hardware. Replace seat belt if damaged.
- Check for damaged decals, replace as needed.
- Check control console lockout.
- Check Attachment Mounting System (if equipped) for damaged or loose parts.
- Check air cleaner and intake hoses / clamps.
- Check engine oil level and engine for leaks.
- Drain water from fuel filter.
- Check engine coolant level in coolant recovery tank and in radiator and check system 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

AVOID INJURY OR DEATH

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

W-2782-0409

IMPORTANT

PRESSURE WASHING DECALS

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

I-2226-0910

PRE-STARTING PROCEDURE

Operation & Maintenance Manual And Operator's Handbook Locations

Figure 87

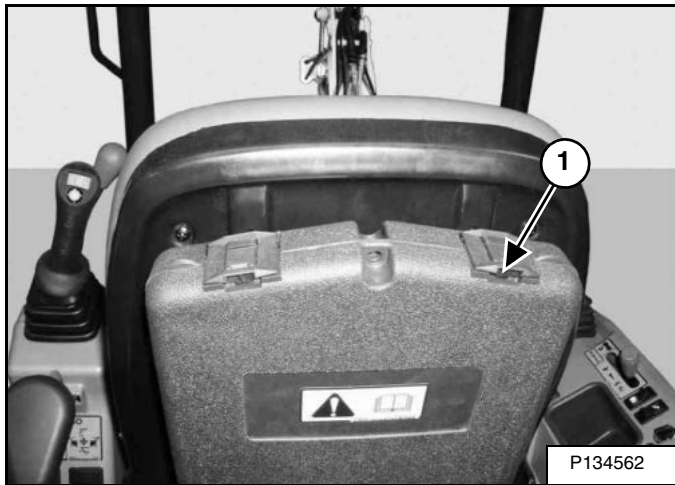
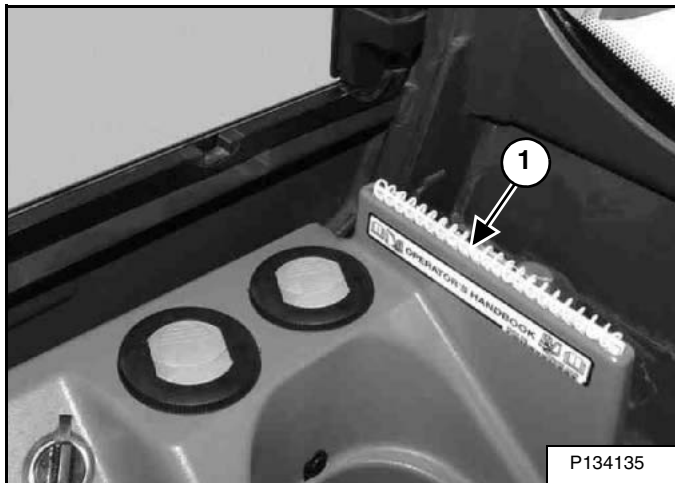


Figure 88



Read and understand the Operation & Maintenance Manual (Item 1) [Figure 87] (located inside the storage box on the back of the operator's seat) and the Operator's Handbook (Item 1) [Figure 88] before operating.

Entering The Excavator

Figure 89



Use the grab handles and tracks to enter the canopy / cab [Figure 89].

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.

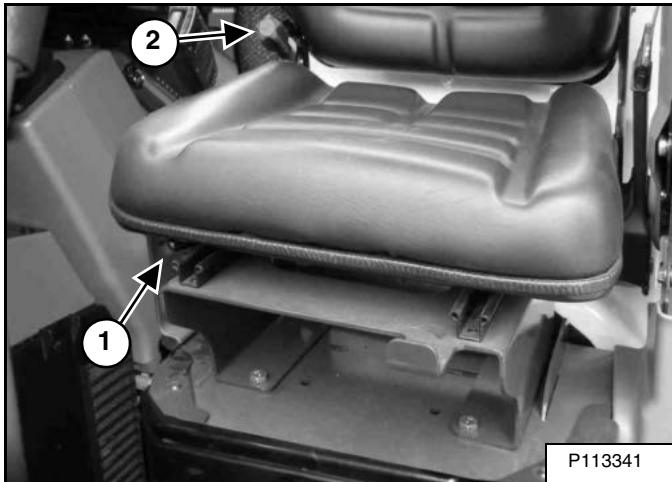
W-2003-0807

PRE-STARTING PROCEDURE (CONT'D)

Seat Adjustment

Standard Seat

Figure 90

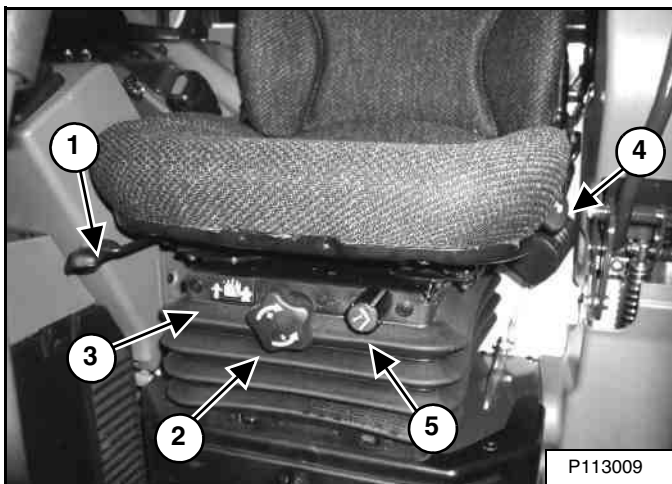


Release the seat lever (Item 1) [Figure 90] to adjust the seat forward or back.

Sit in the seat and turn the knob (Item 2) [Figure 90] to adjust the position of the back cushion.

Suspension Seat (If Equipped)

Figure 91



Release the seat lever (Item 1) [Figure 91] 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 91].

Release the lever (Item 4) [Figure 91] to change the incline of the seat back.

Sit in the seat and turn the knob (Item 5) [Figure 91] to adjust the height of the seat.

Seat Belt

Figure 92



Fasten the seat belt [Figure 92].

STARTING THE ENGINE

Standard Instrument Panel - Key Start

! WARNING

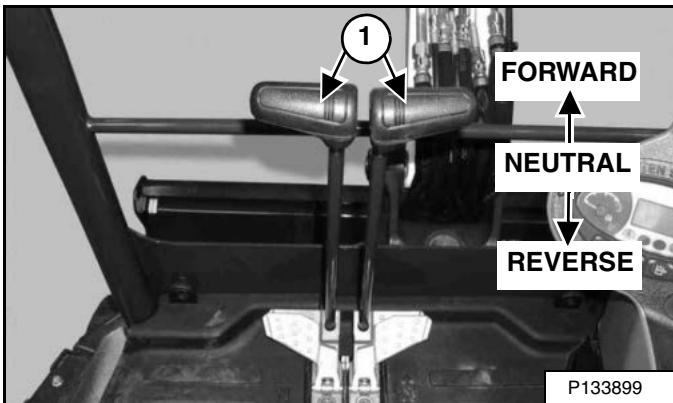
AVOID INJURY OR DEATH

- 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 68.)

Figure 93



Put control levers (Item 1) [Figure 93] in the NEUTRAL position.

Figure 94

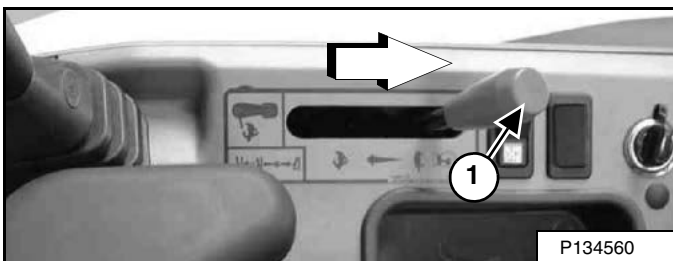
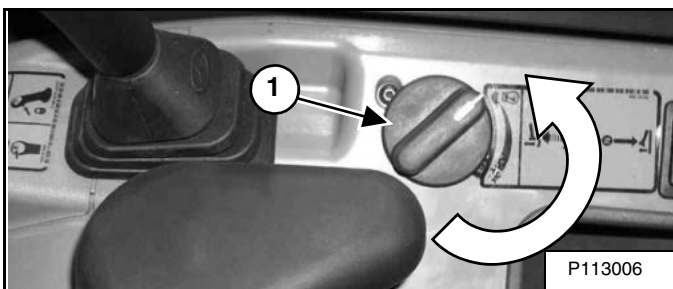


Figure 95



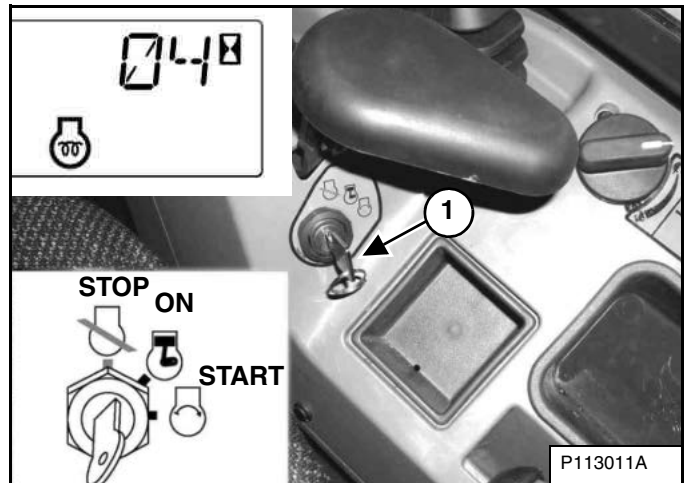
Move the engine speed control lever (Item 1) [Figure 94] back or turn the engine speed control dial (Item 1) [Figure 95] anticlockwise to low idle.

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 96



With the left console raised, turn the key (Item 1) [Figure 96] 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 (see inset). (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 96].

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

STARTING THE ENGINE (CONT'D)

Standard Instrument Panel - Keyless Start

! 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 68.)

Figure 97

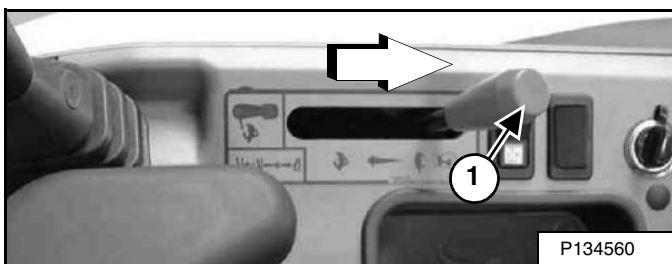
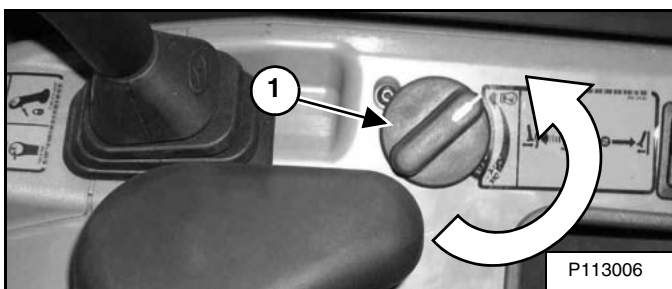
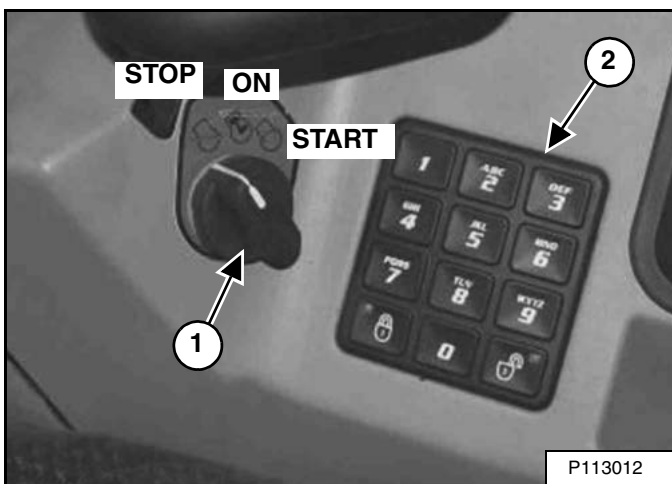


Figure 98



Move the engine speed control lever (Item 1) [Figure 94] back or turn the engine speed control dial (Item 1) [Figure 95] anticlockwise to low idle.

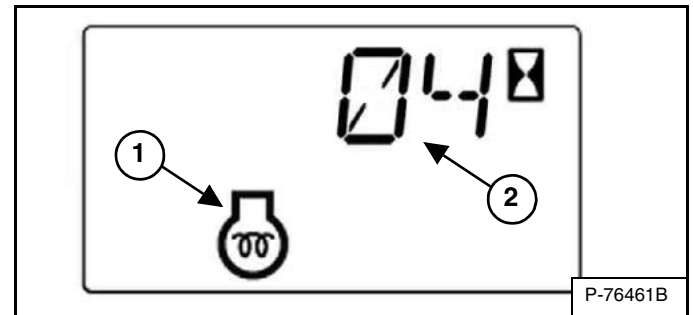
Figure 99



With the left console raised, turn the start switch (Item 1) [Figure 99] to ON. The indicator lights on the instrument panel will come ON briefly and the Instrument Panel / monitoring system will do a self test.

Use the keypad (Item 2) [Figure 99] to enter the password.

Figure 100



If preheating is required, the glow plugs will automatically cycle based on temperature. The engine preheat icon (Item 1) will be ON and the cycle time remaining (Item 2) [Figure 100] will be shown on the data display.

When the engine preheat icon goes OFF, turn the start switch (Item 1) [Figure 99] to START position and hold it until the engine starts. Release the switch and it will return to the ON position.

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

Turn the start switch (Item 1) [Figure 99] to the STOP position 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 204.)

STARTING THE ENGINE (CONT'D)

Deluxe Instrument Panel - Keyless Start



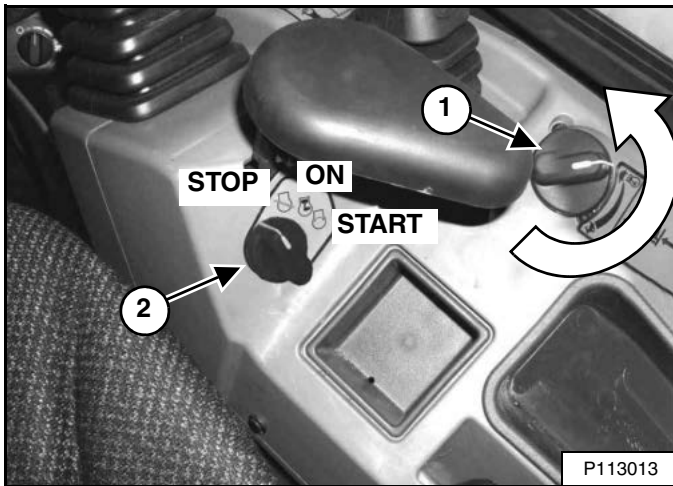
AVOID SERIOUS INJURY OR DEATH

- 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

Perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page 68.)

Figure 101



Set the engine speed control (Item 1) [Figure 101] to the low idle position.

NOTE: Excavators with a Deluxe Instrument Panel have a permanent, randomly generated Master Password set at the factory. Your excavator will also be assigned an Owner Password. Your dealer will provide you with this password. Change the owner password to one that you will easily remember to prevent unauthorised use of your excavator. (See Changing The Owner Password on Page 205.) Keep your password in a safe location for future needs.

NOTE: The Password Lockout feature can be used to allow starting of the excavator without a password. If unlocked, the start switch will start the machine without using a password. (See Password Lockout Feature on Page 204.)

Figure 102



With the left console raised, turn the start switch (Item 2) [Figure 101] to ON. The message [ENTER PASSWORD] will appear on the display screen if the Deluxe Instrument Panel is locked. (If not locked, use the start switch without a password to start the engine.)

Use the numeric keypad (Item 1) [Figure 102] to enter the password.

Figure 103



If preheating is required, the glow plugs will automatically cycle and the engine preheat icon (Item 1) [Figure 103] and will be shown in the data display.

When the engine preheat icon goes OFF, turn the key switch to START (Item 2). Release the switch when the engine starts and allow it to return to the ON position (Item 2) [Figure 102].

Turn the start switch (Item 2) [Figure 101] to the STOP position 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.

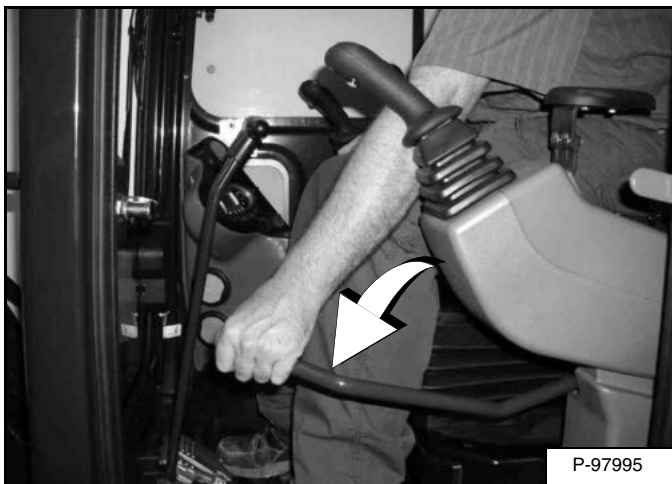
Password Lockout Feature

See Password Lockout Feature. (See Password Lockout Feature on Page 204.)

STARTING THE ENGINE (CONT'D)

Lowering The Control Console

Figure 104



Lower the control console [Figure 104].

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.

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.

Cold Temperature Starting

! WARNING

EXPLOSION CAN CAUSE SERIOUS INJURY, DEATH OR SEVERE ENGINE DAMAGE
DO NOT use ether or starting fluid with glow plug or air intake heater systems.

W-2071-0415

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 162.)
- Make sure the battery is fully charged.
- Install an engine heater.

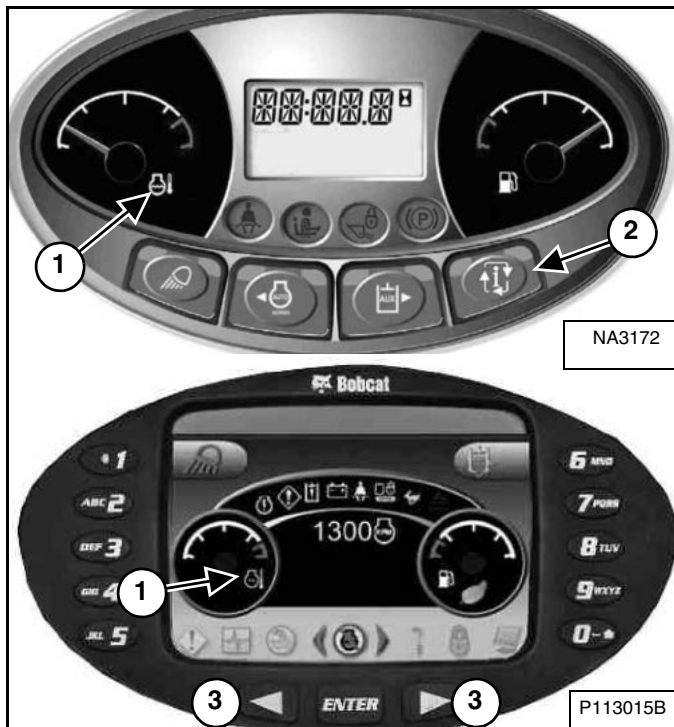
NOTE: If the battery is discharged (but not frozen) a booster battery can be used to jump start the excavator. (See Using A Booster Battery (Jump Starting) on Page 172.)

NOTE: The display screen on the instrument panel may not be at full intensity when the temperature is below -26°C (-15°F). The display screen may take 30 seconds to several minutes to warm up. All systems remain monitored even when the display screen is off.

MONITORING THE DISPLAY PANELS

Instrument Panel

Figure 105



Frequently monitor the temperature and fuel gauges [Figure 105].

After the engine is running, frequently monitor the instrument panel [Figure 105] for machine condition.

The associated icon is displayed if there is an error condition.

EXAMPLE: Engine Coolant Temperature is High.

The Engine Coolant Temperature icon (Item 1) [Figure 105] is ON.

Press the Information button (Item 2) (Standard Panel) or press a scroll button (Item 3) [Figure 105] (Deluxe Panel) repeatedly to cycle the data display until the service code screen is displayed. One of the following SERVICE CODES is displayed.

- [M0810] Engine Coolant Temperature Too High
- [M0811] Engine Coolant Temperature Extremely High

Find the cause of the service code and correct before operating the excavator again. (See DIAGNOSTIC SERVICE CODES on Page 193.)

NOTE: The optional Deluxe Instrumentation Panel offers an additional view of service codes that includes a brief description. (See DIAGNOSTIC SERVICE CODES on Page 193.)

Warning And Shutdown

When a WARNING condition exists; the associated icon light is ON and the alarm sounds 3 beeps. If this condition is allowed to continue, there may be damage to the engine or hydraulic systems.

When a SHUTDOWN condition exists; the associated icon light is ON and the alarm sounds continuously. The monitoring system will automatically stop the engine in 15 seconds. The engine can be restarted to move or relocate the excavator.

The SHUTDOWN feature is associated with the following icons:

- General Warning
- Engine Malfunction
- Engine Coolant Temperature
- Hydraulic Fluid Temperature

STOPPING THE ENGINE AND LEAVING THE EXCAVATOR

Procedure

Figure 106



Stop the machine on level ground. Lower the work equipment and the blade to the ground [Figure 106].

Figure 107

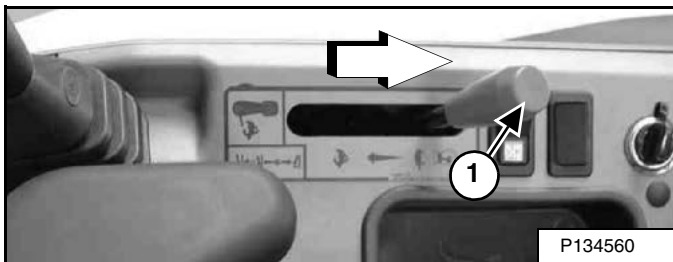
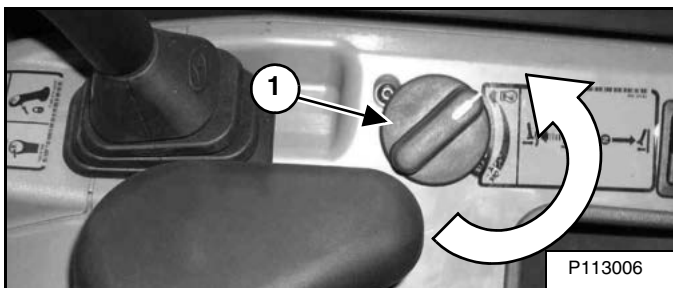


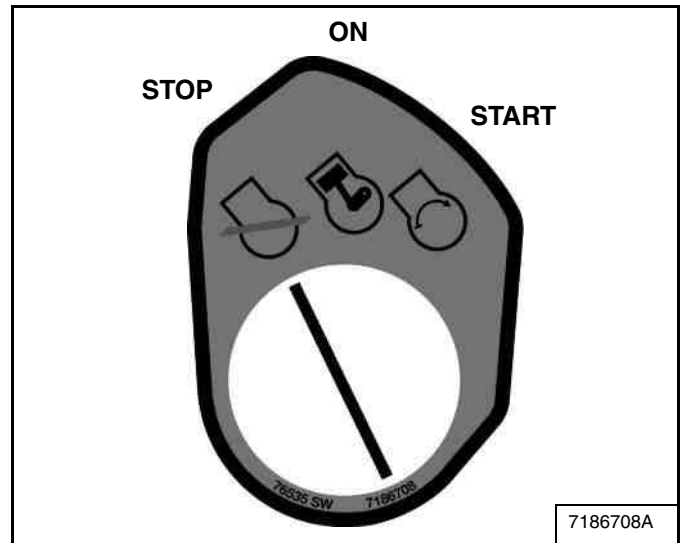
Figure 108



Move the engine speed control lever (Item 1) [Figure 94] back or turn the engine speed control dial (Item 1) [Figure 95] anticlockwise to low idle.

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

Figure 109



Turn the start switch or key to STOP (Item 1) [Figure 109].

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 (Pin-On Attachment)

Installation

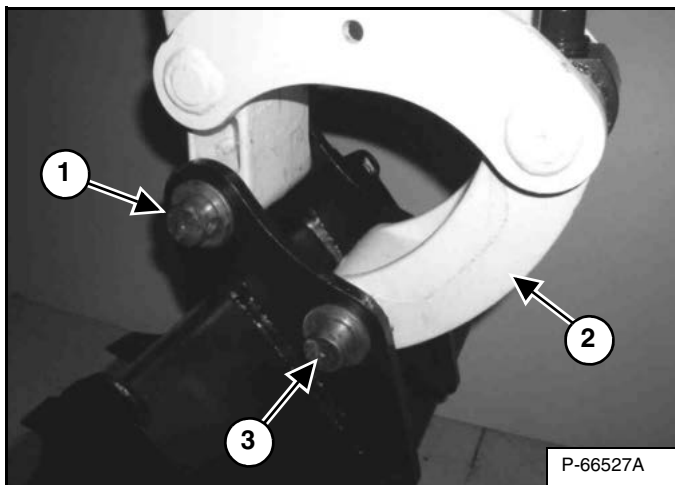
! WARNING

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 110

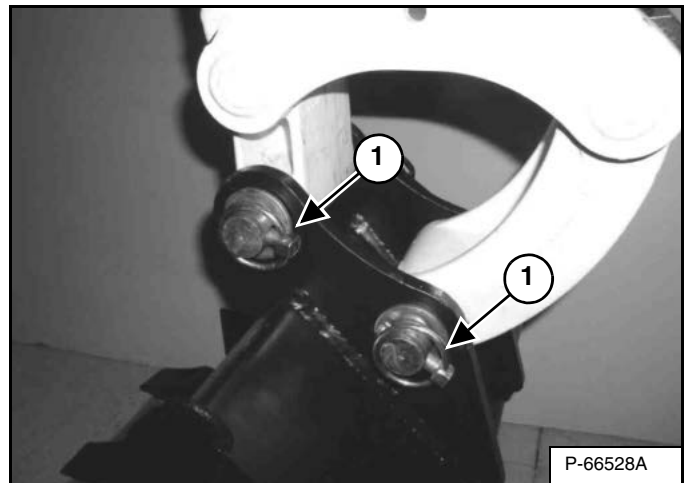


Install the arm into the bucket and align the mounting hole.

Install the pin (Item 1) [Figure 110] and washers.

Install the link (Item 2) in the bucket and align the mounting hole. Install the pin (Item 3) [Figure 110] and washers.

Figure 111



Install the two retainer pins (Item 1) [Figure 111]. 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 111].

Remove the washers and pins (Items 1 and 3) [Figure 110].

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

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

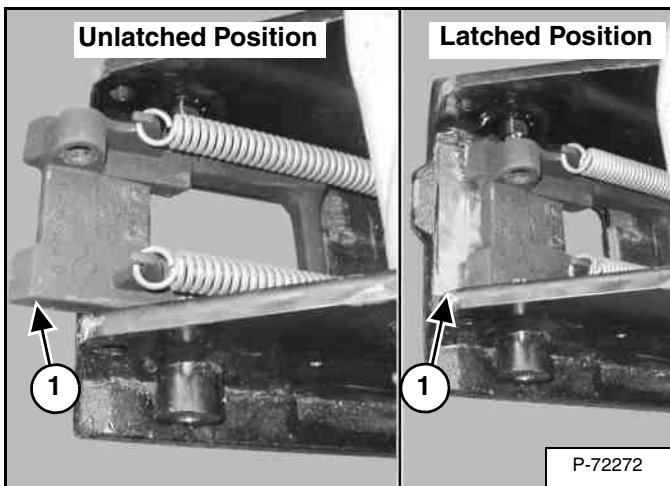
AVOID INJURY OR DEATH

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

NOTE: Coupler equipped with the lifting device can only be used on machines where the overload warning device and the boom and arm load holding valves are installed. See your Bobcat dealer for available kits.

Figure 112



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 112].

If the latch is in the latched position, see [Figure 113] for additional information.

If the latch is in the unlatched position, proceed to [Figure 114].

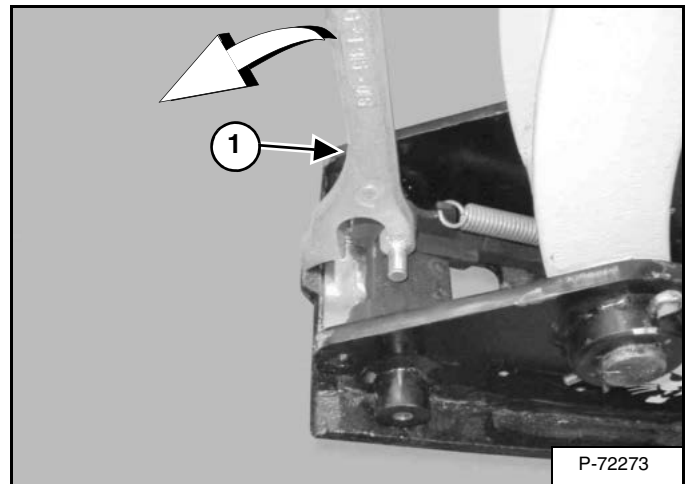
! WARNING

AVOID INJURY

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

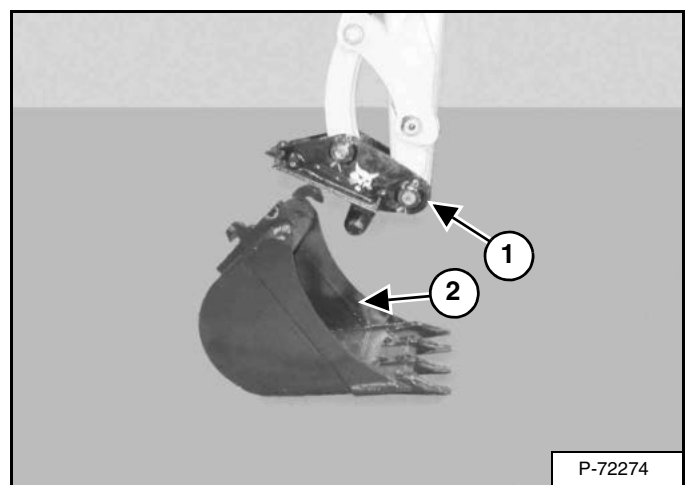
W-2541-1106

Figure 113



To unlatch the quick coupler, install the tool (Item 1) [Figure 113] and pull the handle. The latch will move completely forward. The latch will lock in the unlatched position.

Figure 114



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

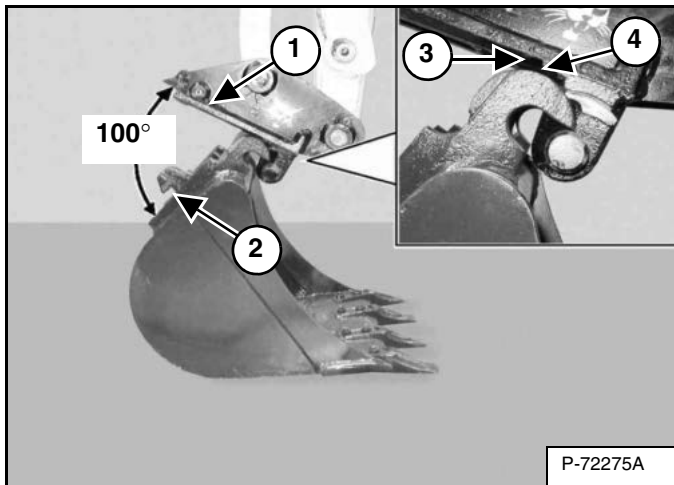
Position the quick coupler (Item 1) near the attachment (Item 2) as shown [Figure 114].

ATTACHMENTS (CONT'D)

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

Installation (Cont'd)

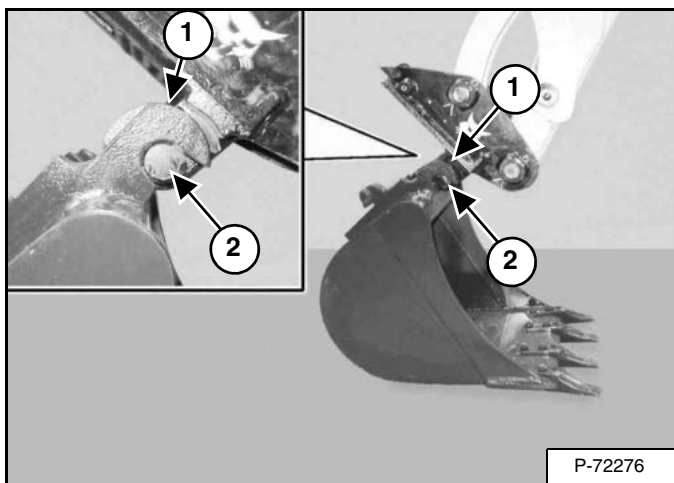
Figure 115



There must be at least 100° between the quick coupler surface (Item 1) and the attachment mounting surface (Item 2) [Figure 115]. Extend the arm out to get the required angle for proper installation.

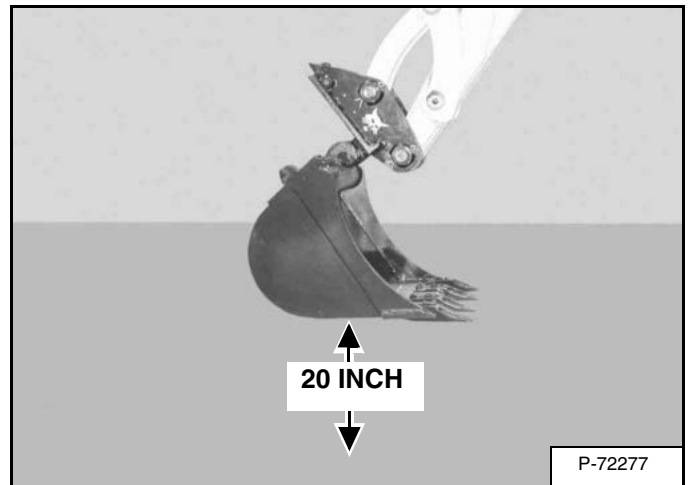
NOTE: There must be proper clearance (100° minimum) between the hook (Item 3) and the quick coupler (Item 4) [Figure 115]. Possible damage to the attachment hooks or the quick coupler could occur without proper clearance.

Figure 116



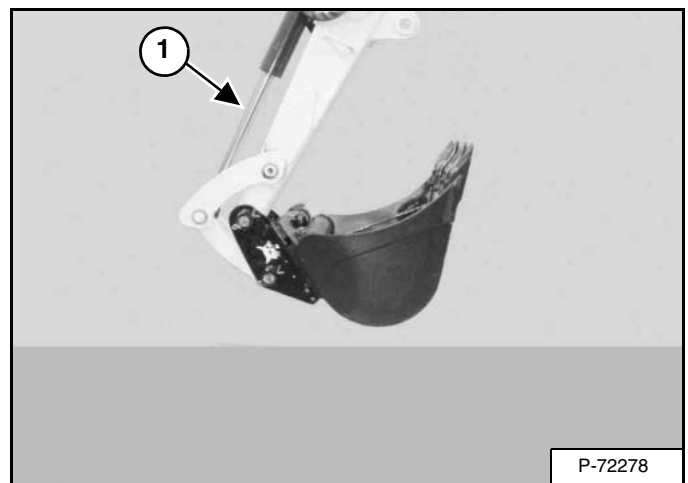
Raise the boom and extend the arm until the hooks of the attachment (Item 1) engage the pins (Item 2) of the quick coupler [Figure 116].

Figure 117



Raise the boom until there is approximately 500 mm (20.0 in) of clearance between the bottom of the attachment and the ground [Figure 117].

Figure 118



Extend the bucket cylinder (Item 1) [Figure 118] fully.

Lower the attachment until it is flat on the ground.

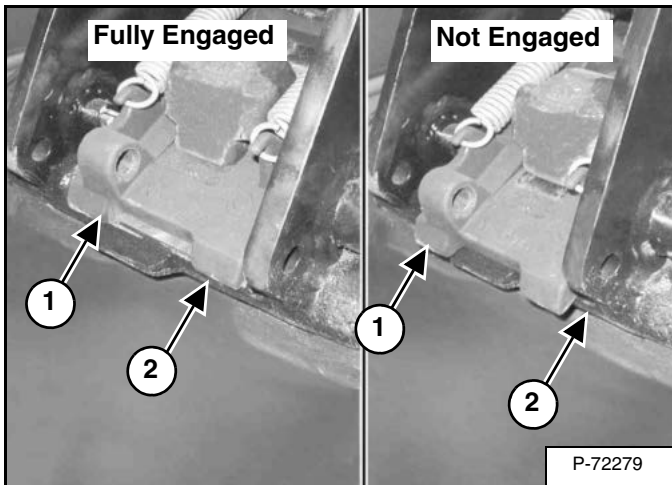
Stop the engine and exit the excavator.

ATTACHMENTS (CONT'D)

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

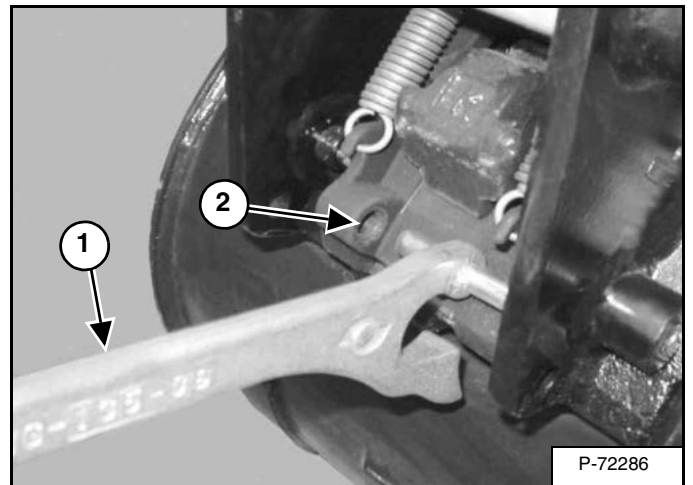
Installation (Cont'd)

Figure 119



Visually inspect the quick coupler latch (Item 1) to the bucket mount (Item 2) [Figure 119]. The latch must be fully engaged.

Figure 120



If the latch is not engaged, install the tool (Item 1) in the hole (Item 2) [Figure 120] 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 119] 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 Quick Coupler And Attachment Inspection And Maintenance on Page 186.)

! WARNING

AVOID INJURY

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

W-2541-1106

ATTACHMENTS (CONT'D)

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

Removal

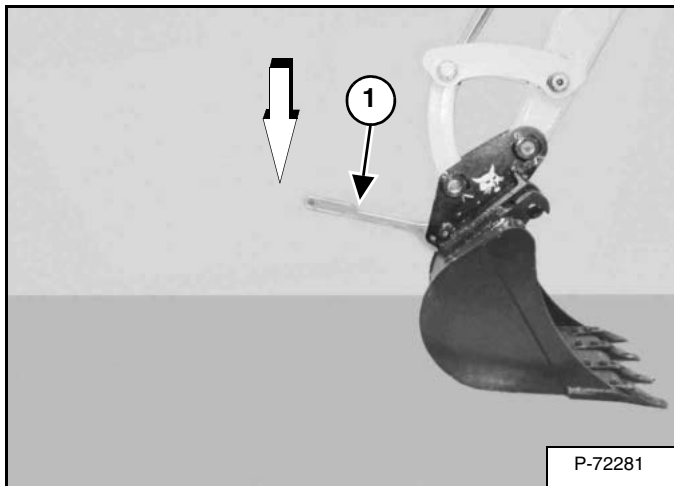
! WARNING

AVOID INJURY

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

W-2541-1106

Figure 121



Position the attachment flat on the ground.

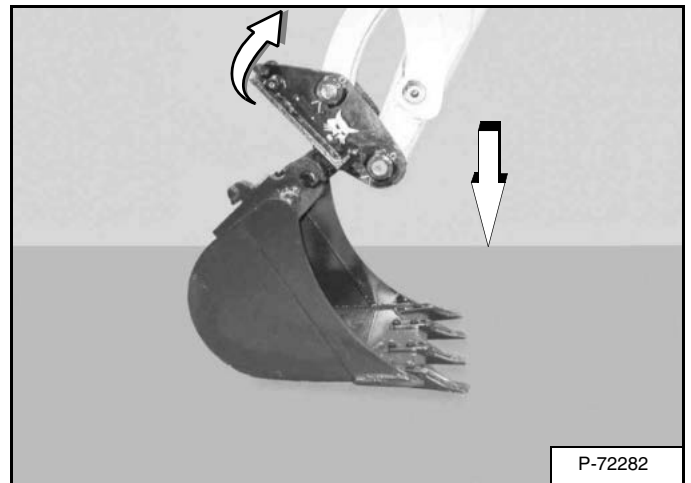
Install the quick coupler tool (Item 1) into the hole (Item 2) [Figure 120] in the quick coupler.

Push down on the tool (Item 1) [Figure 121] to unlock the latch.

Remove the tool.

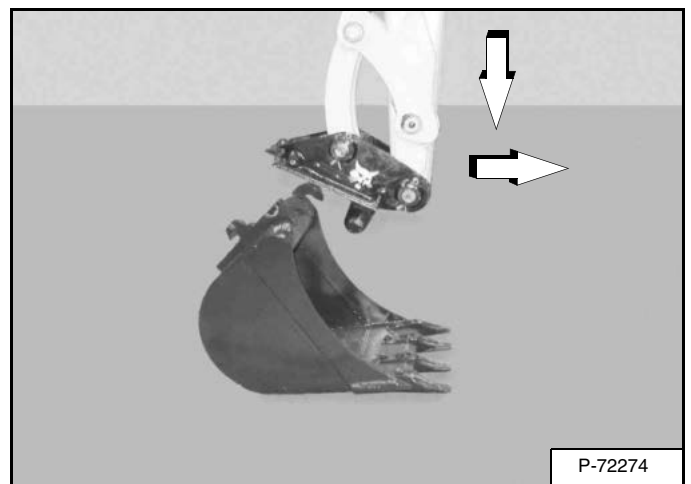
Enter the excavator, fasten the seat belt, and start the engine.

Figure 122



Retract the bucket cylinder fully and lower the boom [Figure 122] until the attachment is on the ground.

Figure 123



Continue to lower the boom and move the arm towards the excavator until the quick coupler is clear of the attachment [Figure 123].

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (German Style Coupler)

The type of quick coupler installed on the excavator may influence the excavator's rated lift capacity and the availability of attachments.

To determine the lift capacity changes, see the applicable lift capacity chart:

(See Rated Lift Capacity For Standard Arm, Light Counterweight, And Canopy on Page 212.), (See Rated Lift Capacity For Long Arm, Light Counterweight, And Canopy on Page 213.), (See Rated Lift Capacity For Standard Arm, Light Counterweight, And Cab on Page 214.), (See Rated Lift Capacity For Long Arm, Light Counterweight, And Cab on Page 215.), (See Rated Lift Capacity For Standard Arm, Medium Counterweight, And Canopy on Page 216.), (See Rated Lift Capacity For Long Arm, Medium Counterweight, And Canopy on Page 217.), (See Rated Lift Capacity For Standard Arm, Medium Counterweight, And Cab on Page 218.), (See Rated Lift Capacity For Long Arm, Medium Counterweight, And Cab on Page 219.), (See Rated Lift Capacity For Standard Arm, Heavy Counterweight, And Canopy on Page 220.), (See Rated Lift Capacity For Long Arm, Heavy Counterweight, And Canopy on Page 221.), (See Rated Lift Capacity For Standard Arm, Heavy Counterweight, And Cab on Page 222.) or (See Rated Lift Capacity For Long Arm, Heavy Counterweight, And Cab on Page 223.).

See your Bobcat dealer for a list of approved attachments for the type of quick coupler installed on the machine.

NOTE: Coupler equipped with the lifting device can only be used on machines where the overload warning device and the boom and arm load holding valves are installed. See your Bobcat dealer for available kits.

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.).



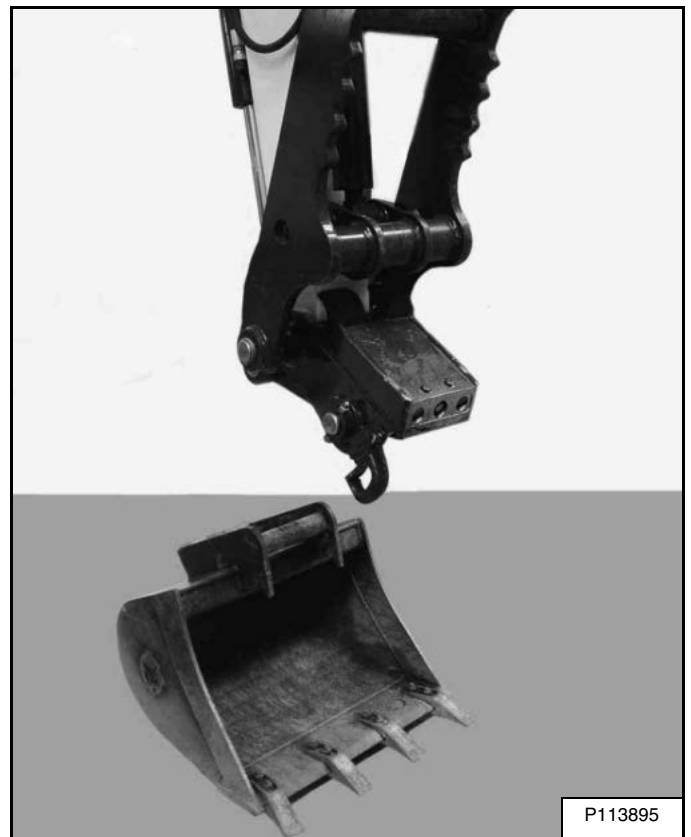
WARNING

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 124



Position the arm and quick coupler to the attachment [Figure 124].

NOTE: If equipped with a hydraulic clamp, fully retract the hydraulic clamp cylinder so the clamp is out of the way for installing the attachment.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (German Style Coupler) (Cont'd)

Installation (Cont'd)

Figure 125

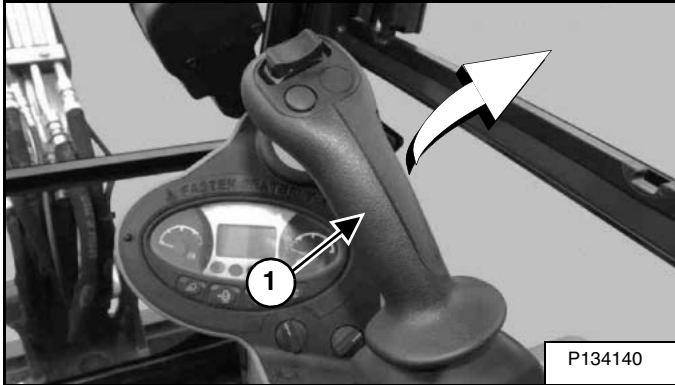
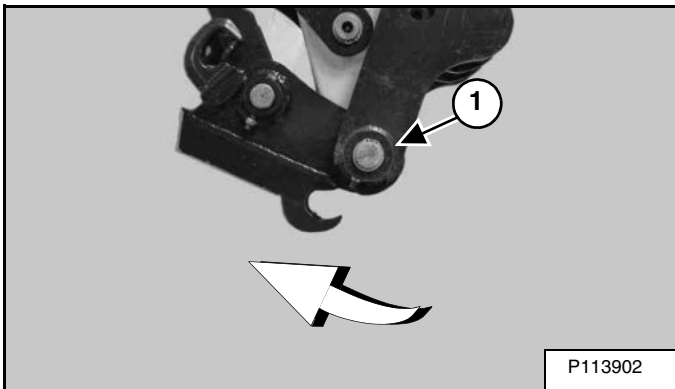


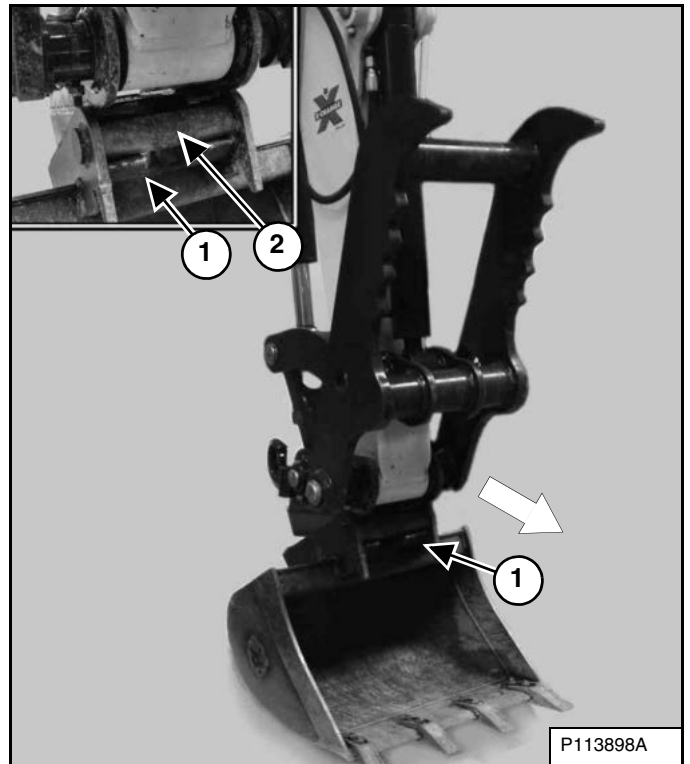
Figure 126



Move the right joystick (Item 1) [Figure 125] to the right (OUT) to curl the coupler (Item 1) [Figure 126] back, fully away from the cab.

Lower the coupler onto the attachment.

Figure 127



Engage the coupler hooks (Item 1) onto the attachment shaft (Item 2) [Figure 127].

Figure 128



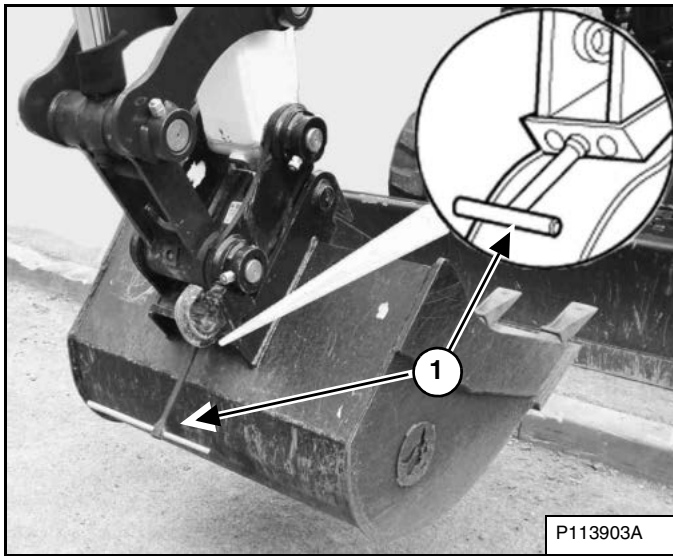
Move the right joystick (Item 1) [Figure 125] to the left (IN) and curl the coupler (Item 1) [Figure 128] towards the cab fully.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (German Style Coupler) (Cont'd)

Installation (Cont'd)

Figure 129



Stop the engine and leave the machine. (See STOPPING THE ENGINE AND LEAVING THE EXCAVATOR on Page 75.)

Use the supplied wrench (Item 1) [Figure 129] and turn the wrench clockwise until the locking pins fully engaged.

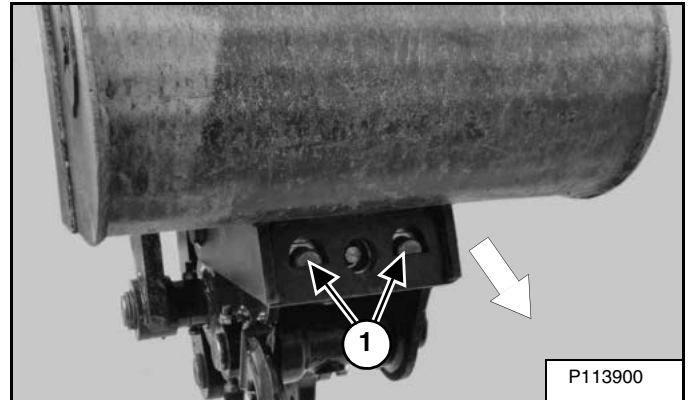
WARNING

AVOID INJURY OR DEATH

The quick coupler locking pins must be fully engaged and locked to the attachment pins. Failure to fully engage the locking pins can allow attachment to come off.

W-3023-0417

Figure 130



Visually check that the locking pins (Item 1) [Figure 130] are extended through the holes in the attachment mounting frame, securely fastening the attachment to the coupler.

If both locking pins do not engage in the locked position, see your Bobcat dealer for service.

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

Enter the excavator, fasten the seat belt and start the engine. (See PRE-STARTING PROCEDURE on Page 68.)

With the attachment as low to the ground as possible, curl the attachment out and in several times to ensure the attachment is secured to the coupler.

Lower the attachment flat to the ground.

Park the excavator on a level surface.

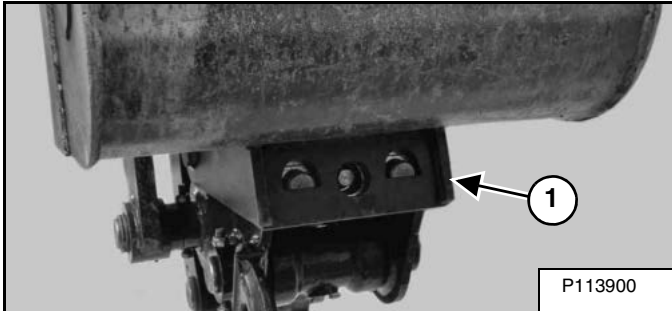
ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (German Style Coupler) (Cont'd)

Removal

Enter the excavator, fasten the seat belt, and start the engine. (See PRE-STARTING PROCEDURE on Page 68.)

Figure 131

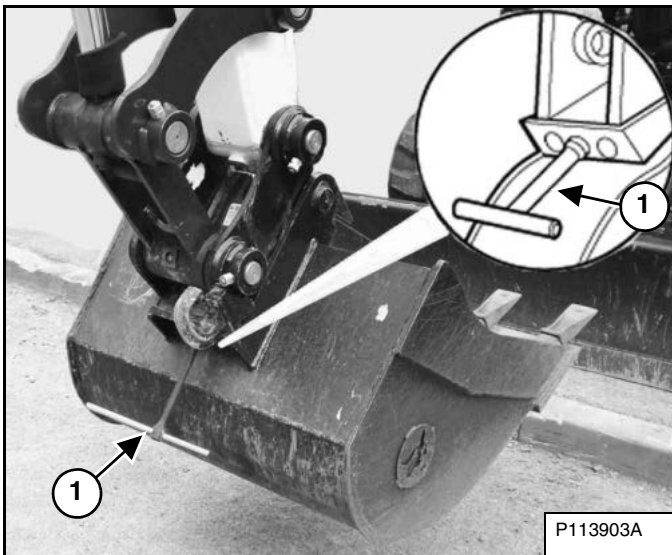


Raise the boom.

Move the right joystick (Item 1) [Figure 125] to the left (IN) and curl the coupler (Item 1) [Figure 131] towards the cab fully.

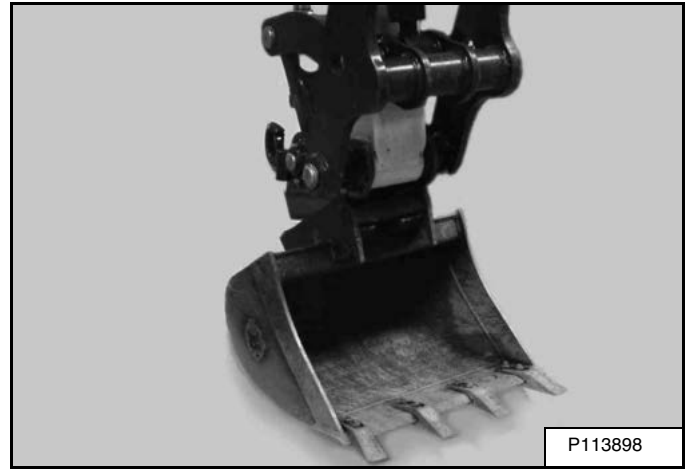
Stop the engine and exit the excavator. (See STOPPING THE ENGINE AND LEAVING THE EXCAVATOR on Page 75.)

Figure 132



Use the supplied wrench (Item 1) [Figure 132] and turn the wrench anticlockwise until the locking pins are fully disengaged.

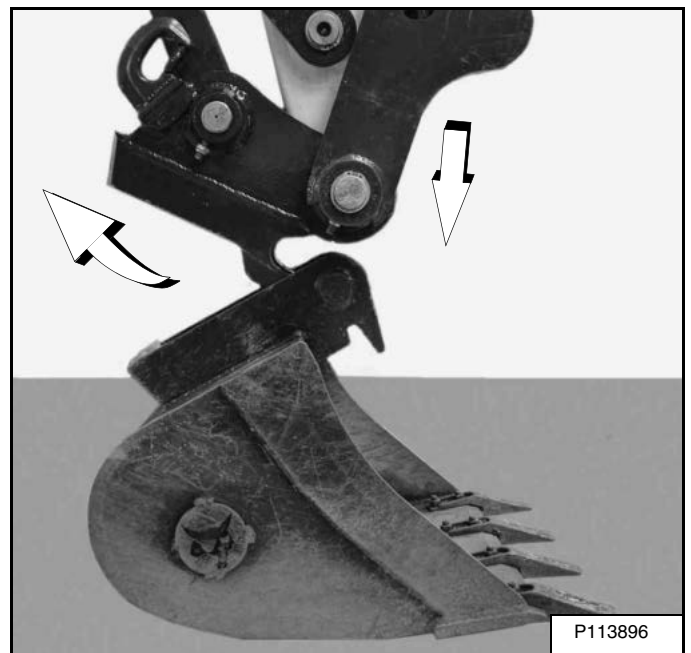
Figure 133



Enter the excavator, fasten the seat belt, and start the engine. (See PRE-STARTING PROCEDURE on Page 68.)

With the attachment slightly off of the ground, roll the quick coupler back until the coupler starts to disengage from the attachment [Figure 133].

Figure 134



Roll the quick coupler back fully and lower the boom and arm until the attachment is on the ground and the quick coupler is disengaged from the attachment pins [Figure 134].

Move the arm away from the attachment.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Bobcat Hydraulic Quick Coupler)

The type of quick coupler installed on the excavator may influence the excavator's rated lift capacity and the availability of attachments.

To determine the lift capacity changes, see the applicable lift capacity chart:

(See Rated Lift Capacity For Standard Arm, Light Counterweight, And Canopy on Page 212.), (See Rated Lift Capacity For Long Arm, Light Counterweight, And Canopy on Page 213.), (See Rated Lift Capacity For Standard Arm, Light Counterweight, And Cab on Page 214.), (See Rated Lift Capacity For Long Arm, Light Counterweight, And Cab on Page 215.), (See Rated Lift Capacity For Standard Arm, Medium Counterweight, And Canopy on Page 216.), (See Rated Lift Capacity For Long Arm, Medium Counterweight, And Canopy on Page 217.), (See Rated Lift Capacity For Standard Arm, Medium Counterweight, And Cab on Page 218.), (See Rated Lift Capacity For Long Arm, Medium Counterweight, And Cab on Page 219.), (See Rated Lift Capacity For Standard Arm, Heavy Counterweight, And Canopy on Page 220.), (See Rated Lift Capacity For Long Arm, Heavy Counterweight, And Canopy on Page 221.), (See Rated Lift Capacity For Standard Arm, Heavy Counterweight, And Cab on Page 222.) or (See Rated Lift Capacity For Long Arm, Heavy Counterweight, And Cab on Page 223.).

See your Bobcat dealer for a list of approved attachments for the type of quick coupler installed on the machine.

NOTE: Coupler equipped with the lifting device can only be used on machines where the overload warning device and the boom and arm load holding valves are installed. See your Bobcat dealer for available kits.

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.).



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

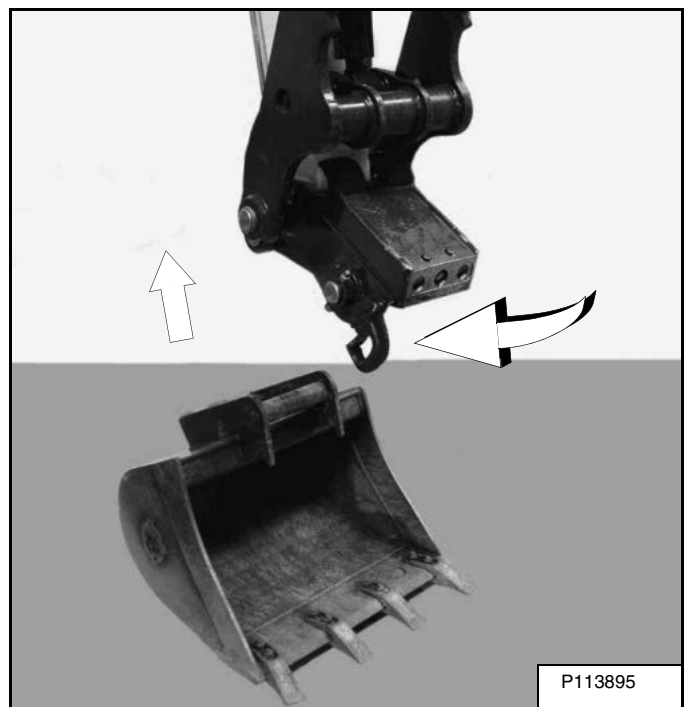


Keep all bystanders 6 m (20 ft) away from equipment when operating. Contact with moving parts, a trench cave-in or flying objects can cause injury or death.

W-2119-0910

Start the engine. (See PRE-STARTING PROCEDURE on Page 68.)

Figure 135



Position the arm and quick coupler to the attachment [Figure 135].

NOTE: If equipped with a hydraulic clamp, fully retract the hydraulic clamp cylinder so the clamp is out of the way for installing the attachment.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Bobcat Hydraulic Quick Coupler) (Cont'd)

Installation (Cont'd)



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 136

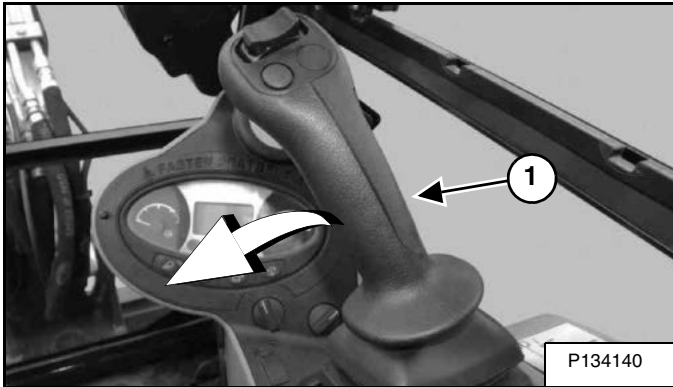
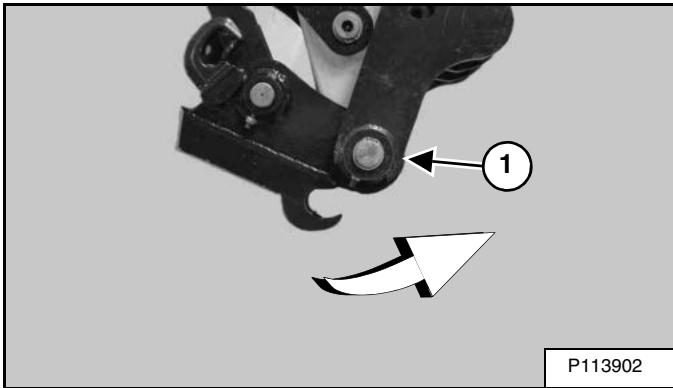
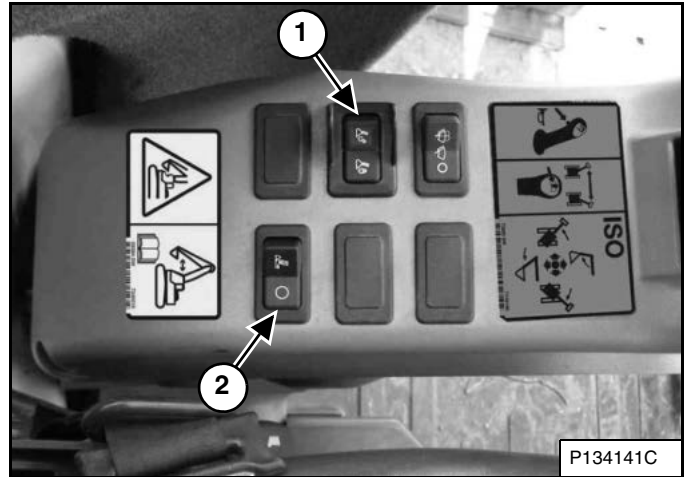


Figure 137



Move the right joystick (Item 1) [Figure 136] to the left (IN) to curl the coupler (Item 1) [Figure 137] fully in towards the cab.

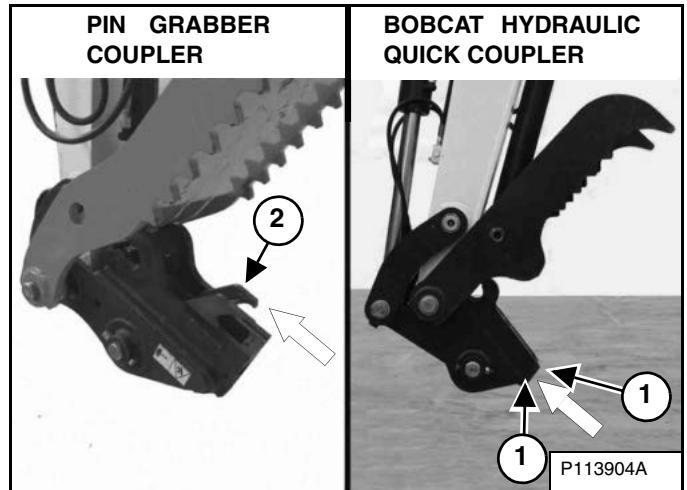
Figure 138



Press the coupler ON / OFF switch (Item 1) [Figure 138] to the left (ON) position to enable the quick coupler feature. The switch will illuminate when in the ON position and a buzzer will sound.

While holding the right joystick (Item 1) [Figure 136] to the left (IN), press and release the INTENT switch (Item 2) [Figure 138] within five seconds after pressing the ON / OFF switch (Item 1) [Figure 138]. (The buzzer will continue to sound and the light (Item 1) [Figure 138] will stay ON.)

Figure 139



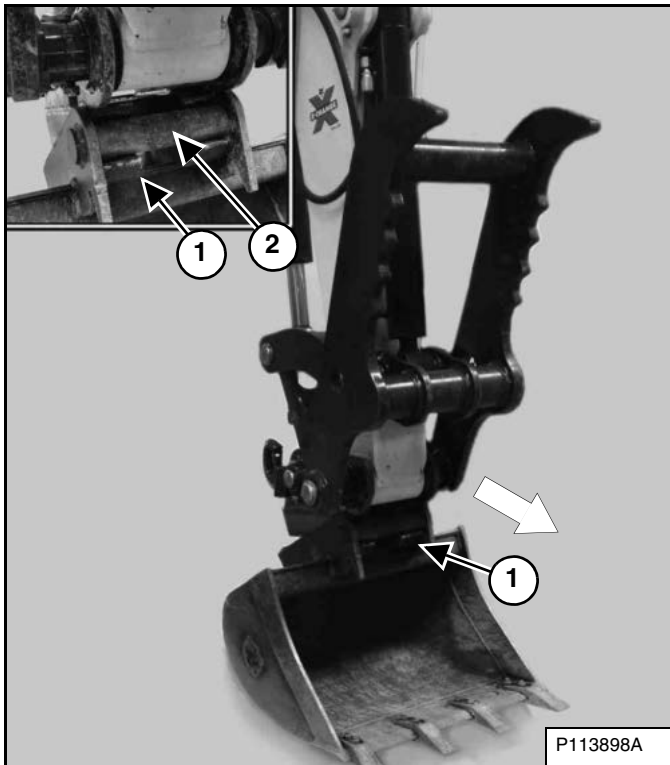
Continue holding the right joystick (Item 1) [Figure 136] to the left (IN) until the pins (Item 1) [Figure 139] are fully retracted or the locking clasp (Item 2) [Figure 139] is fully retracted.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Bobcat Hydraulic Quick Coupler) (Cont'd)

Installation (Cont'd)

Figure 140



Roll the coupler out. Move the arm towards the attachment. Reposition the boom, arm, and coupler until the coupler (Item 1) is positioned over the attachment pin (Item 2) [Figure 140]. Raise the attachment up slightly.

Figure 141



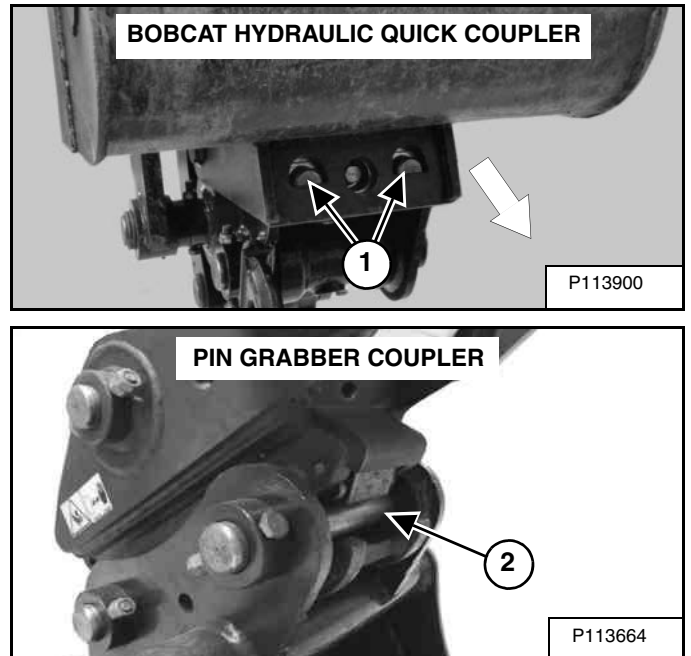
Curl the quick coupler in fully [Figure 141].

Press the coupler ON / OFF switch (Item 1) [Figure 138] to the right, (OFF) position. The switch light and buzzer will turn OFF.

For the Hydraulic German Style Coupler: The locking pins will extend and engage the attachment mount locking the attachment to the coupler.

For the Pin Grabber Coupler, Continue to curl the bucket in for an additional ten seconds to allow the locking clasp to move and lock to the bucket pins.

Figure 142



For the Hydraulic German Style Coupler: Visually check that the locking pins (Item 1) [Figure 142] are extended through the holes in the attachment mounting frame, securely fastening the attachment to the coupler.

If both locking pins do not engage in the locked position, see your Bobcat dealer for service.

For the Pin Grabber Quick Coupler, Visually check that the green locking clasp (Item 2) [Figure 142] is FULLY ENGAGED AND LOCKED, securely fastening the attachment to the coupler.

With the attachment as low to the ground as possible, curl the attachment out and in several times to ensure the attachment is secured to the coupler.

If the locking clasps do not engage in the locked position, see your Bobcat dealer for service.

Lower the attachment flat to the ground.

! WARNING

AVOID INJURY OR DEATH

The quick coupler locking clasps / pins must be fully engaged and locked to the attachment pins. Failure to fully engage the locking clasps / pins can allow attachment to come off.

W-3024-0417

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Bobcat Hydraulic Quick Coupler) (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

Enter the excavator and start the engine. (See PRE-STARTING PROCEDURE on Page 68.)

Figure 143

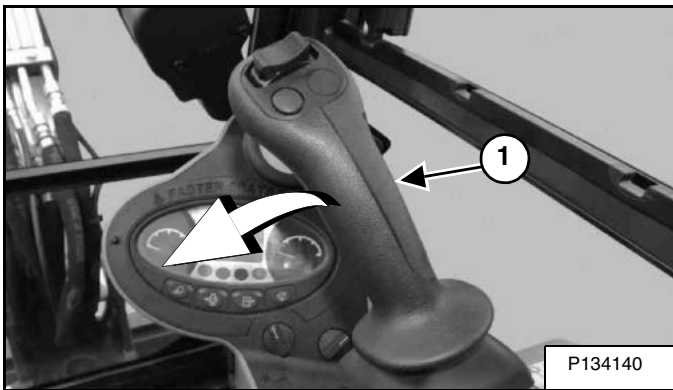


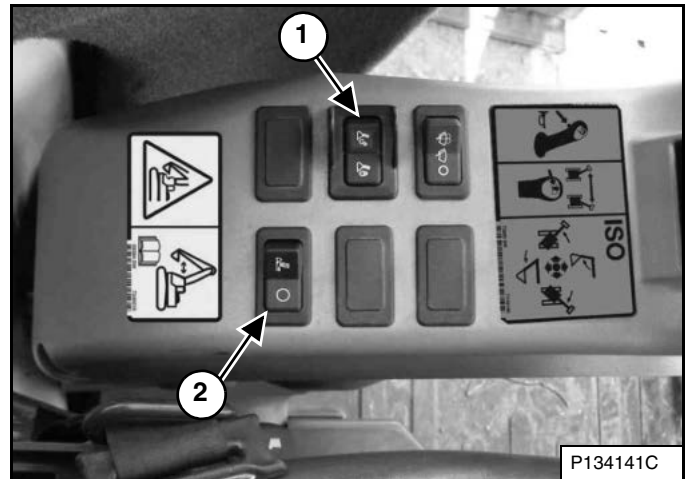
Figure 144



Raise the attachment slightly off of the ground.

Move the right joystick (Item 1) [Figure 143] to the left (IN) to curl the coupler (Item 1) [Figure 144] fully in towards the cab.

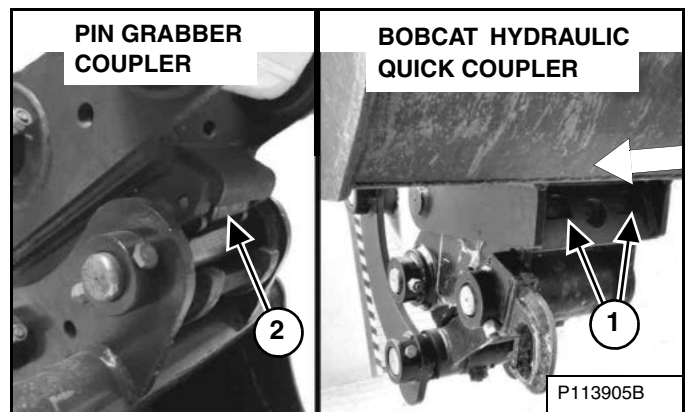
Figure 145



Press the coupler ON / OFF switch (Item 1) [Figure 145] to the left (ON) position to enable the quick coupler feature. The switch will illuminate when in the ON position and a buzzer will sound.

While holding the right joystick (Item 1) [Figure 143] to the left (IN), press and release the INTENT switch (Item 2) [Figure 145] within five seconds after pressing the ON / OFF switch (Item 1) [Figure 145]. (The buzzer will continue to sound and the light (Item 1) [Figure 145] will stay ON.)

Figure 146



For the Hydraulic German Style Coupler: Continue holding the right joystick (Item 1) [Figure 143] to the left (IN) until the pins (Item 1) [Figure 146] are fully retracted to unlock the attachment from the quick coupler.

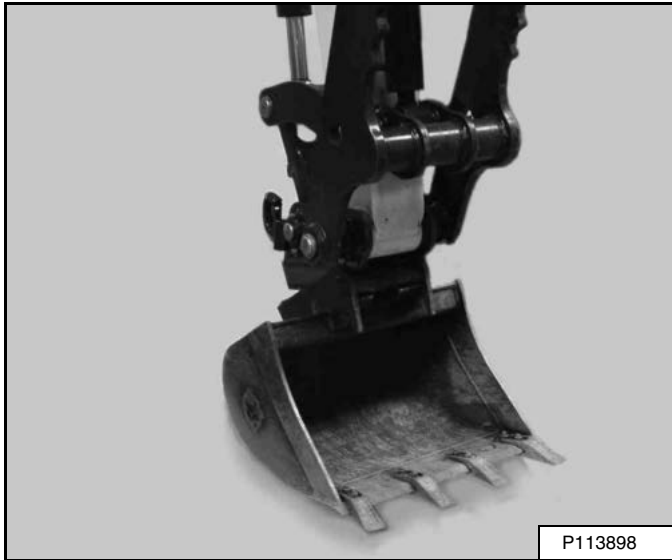
For the Pin Grabber Quick Coupler: Continue holding the right joystick (Item 1) [Figure 143] to the left (IN) until the green locking clasp (Item 2) [Figure 143] retracts and will unlock the attachment from the quick coupler.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Bobcat Hydraulic Quick Coupler) (Cont'd)

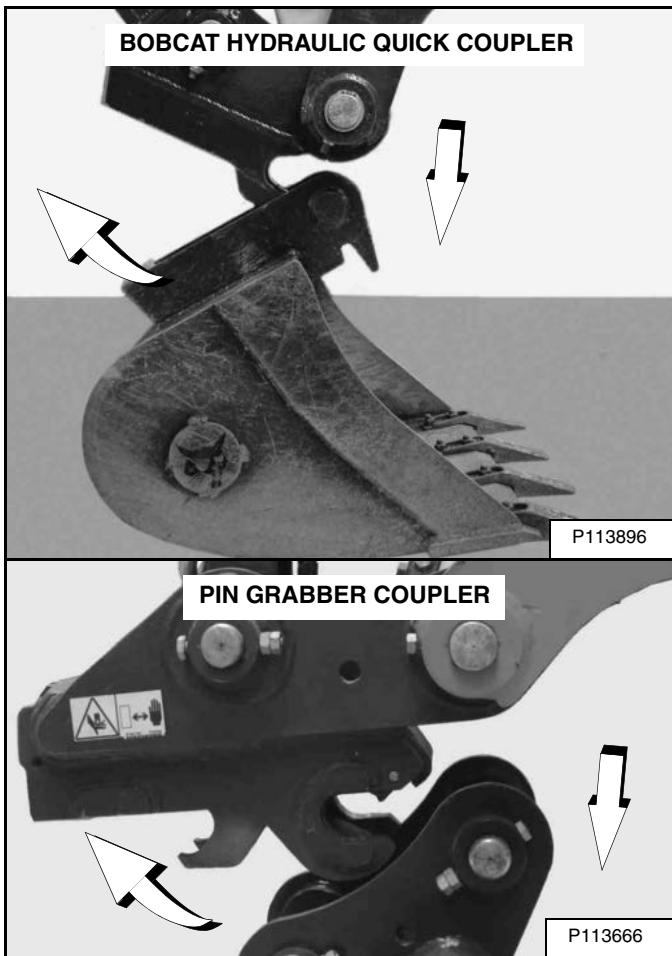
Removal (Cont'd)

Figure 147



With the attachment slightly off the ground, roll the quick coupler back until the coupler starts to disengage from the attachment [Figure 147].

Figure 148

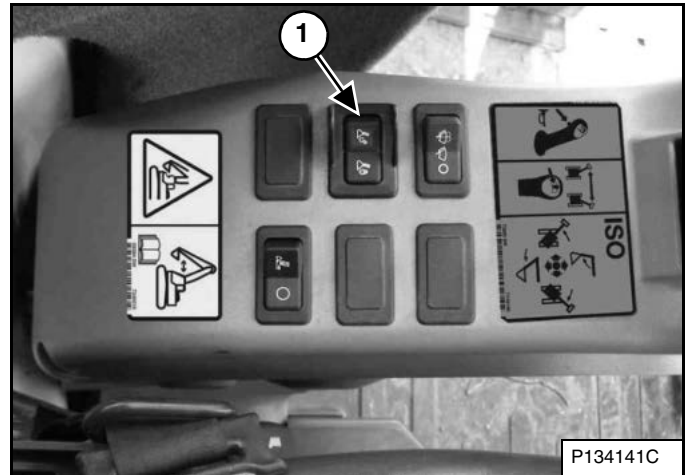


Roll the quick coupler back fully.

Lower the boom and arm until the attachment is on the ground and the quick coupler is disengaged from the attachment pins.

Move the arm away from the excavator until the quick coupler is clear of the attachment [Figure 148].

Figure 149



Press the coupler ON / OFF switch (Item 1) [Figure 149] to the right, (OFF) position. The switch light and buzzer will turn OFF.

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

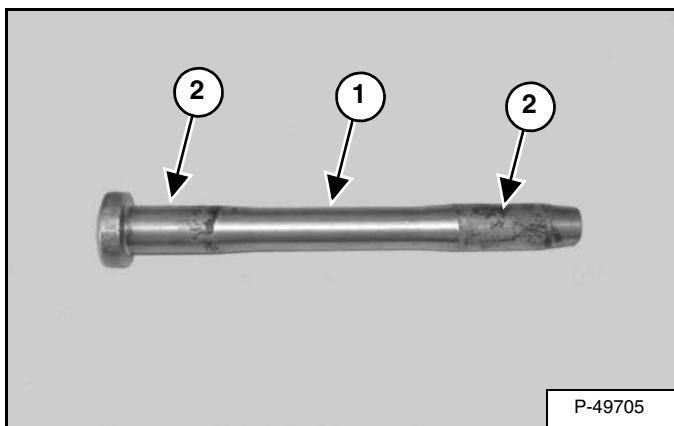
! WARNING

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

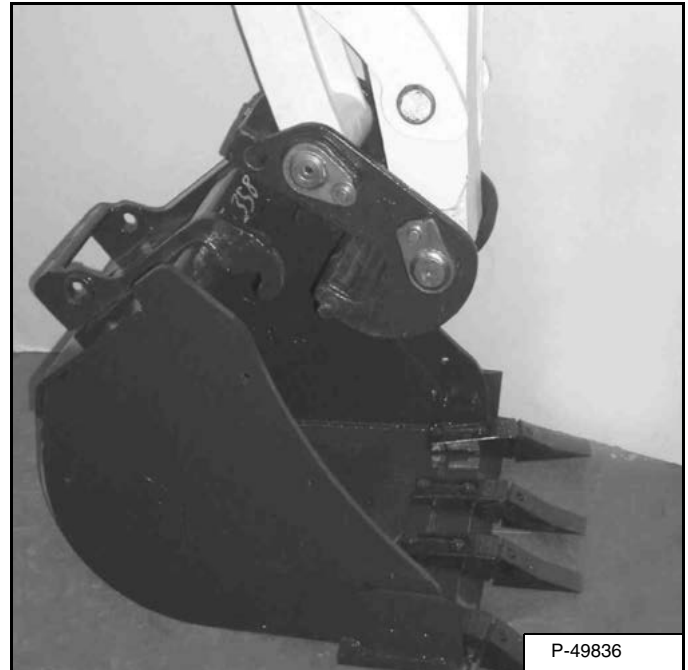
Figure 150



Inspect the pin (Item 1) [Figure 150] for wear or damage. Replace the pin as needed.

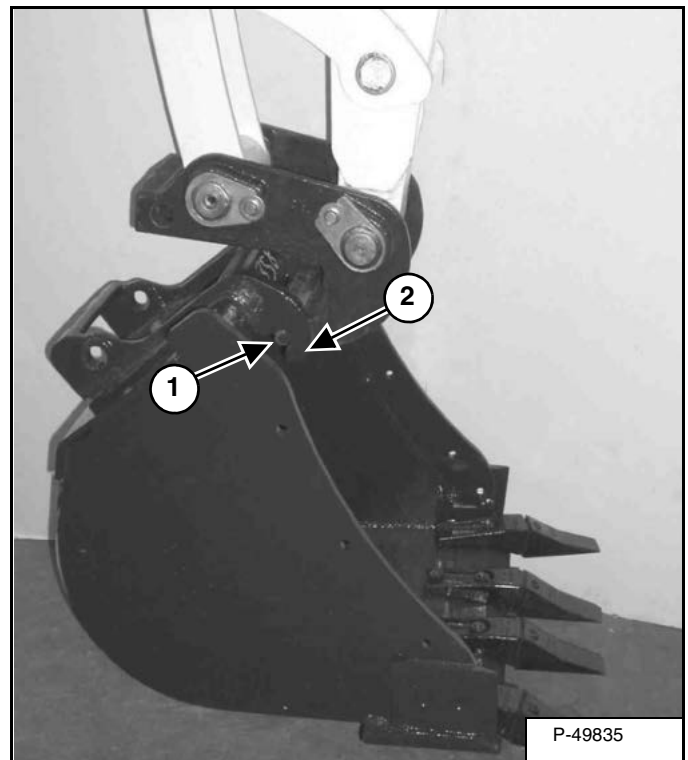
Apply a light coat of grease to the ends of the pin (Item 2) [Figure 150].

Figure 151



Start the engine and move the arm towards the bucket [Figure 151].

Figure 152



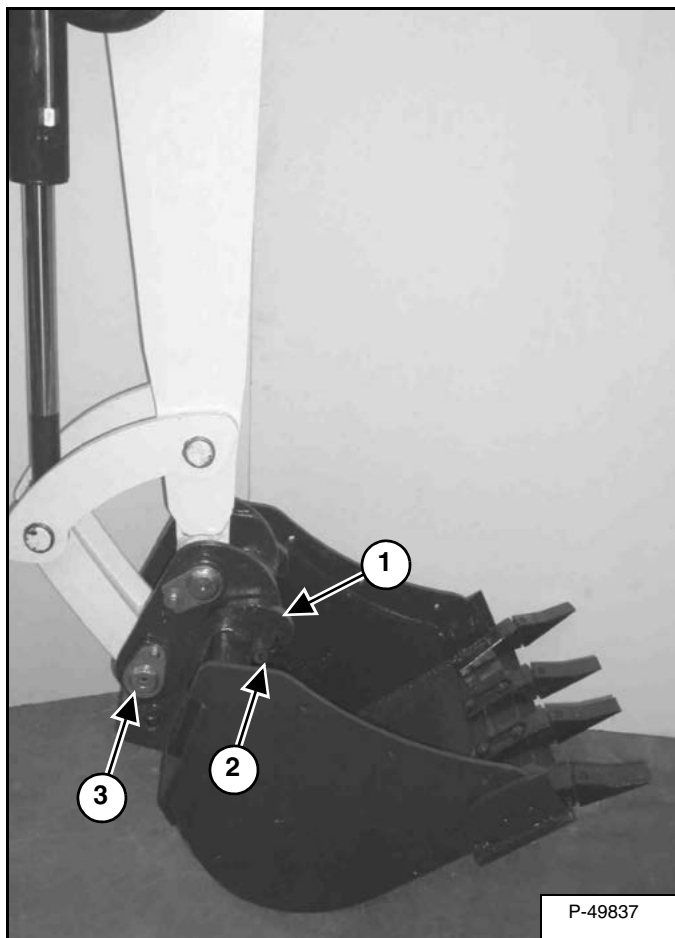
Raise the boom until the pins (Item 1) engage the hooks (Item 2) [Figure 152] on the bucket.

ATTACHMENTS (CONT'D)

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

Installation (Cont'd)

Figure 153



Raise the boom and extend the bucket cylinder until the X-Change contacts the attachment back [Figure 153].

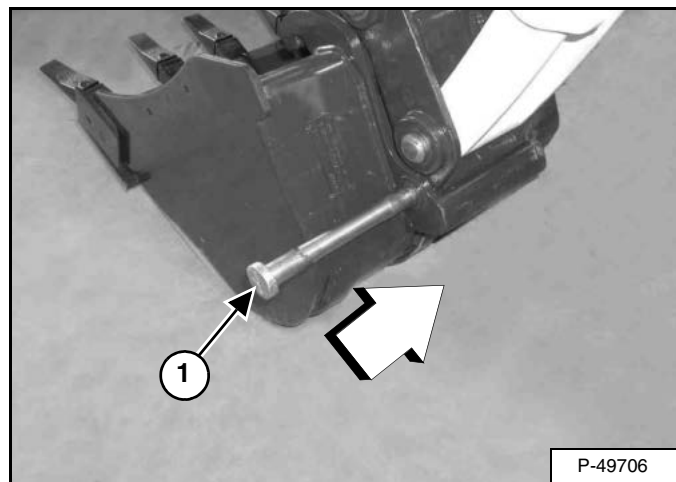
With the arm vertical, lower the boom until the hooks (Item 1) of the bucket disengage the pins (Item 2) of the X-Change and the plate (Item 3) [Figure 153] fully engages in the bucket crossmember.

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

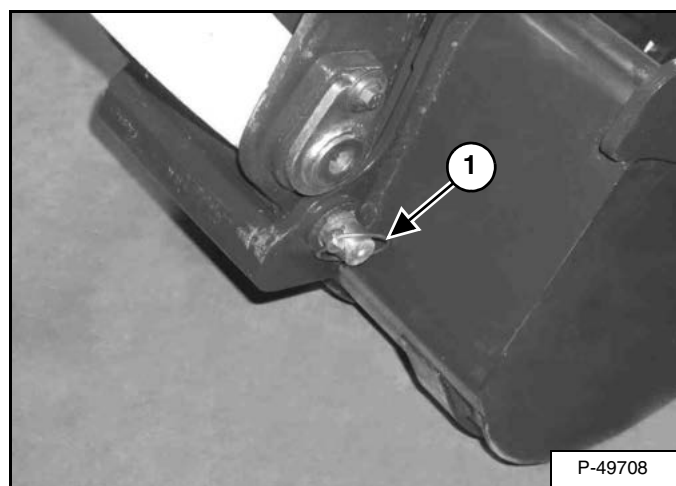
Figure 154



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 154] through the bucket mount and X-Change.

Figure 155



Install the retainer pin (Item 1) [Figure 155].

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

Use the Pin-On X-Change when installing new attachments that are equipped with the Pin-On X-Change bracket.

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

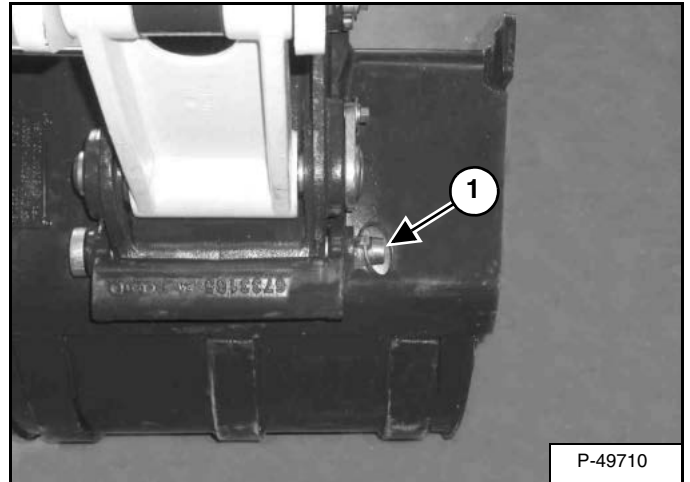
Figure 156



Park the excavator on a flat level surface. Put the bucket on the ground [Figure 156].

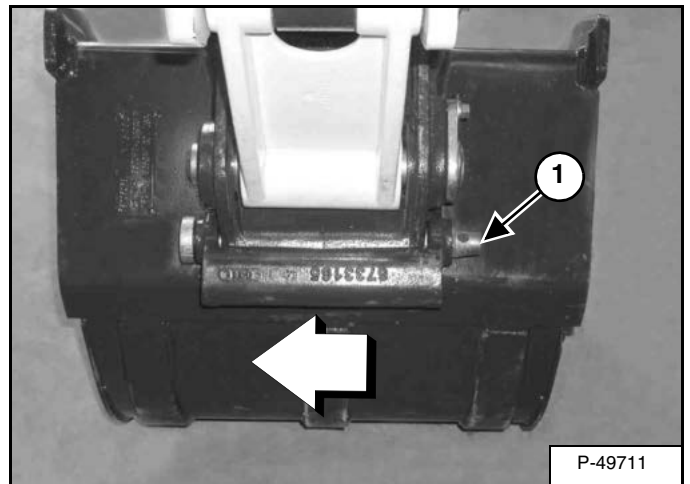
With the engine off, turn the start key to the ON position and move both hydraulic control levers to relieve hydraulic pressure.

Figure 157



Remove the retainer pin (Item 1) [Figure 157].

Figure 158



Drive the pin (Item 1) [Figure 158] 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.

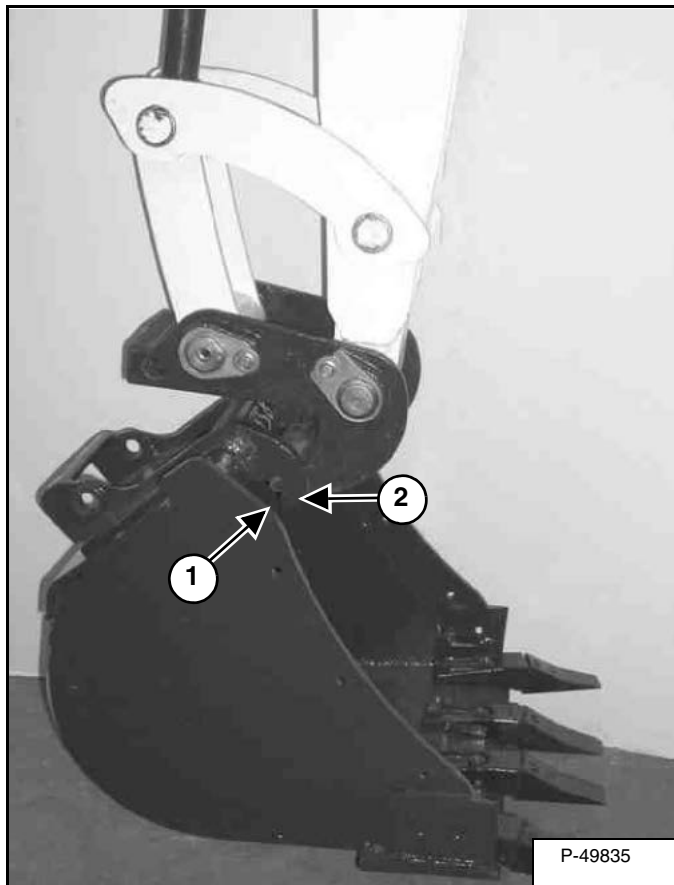
W-2019-0907

ATTACHMENTS (CONT'D)

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

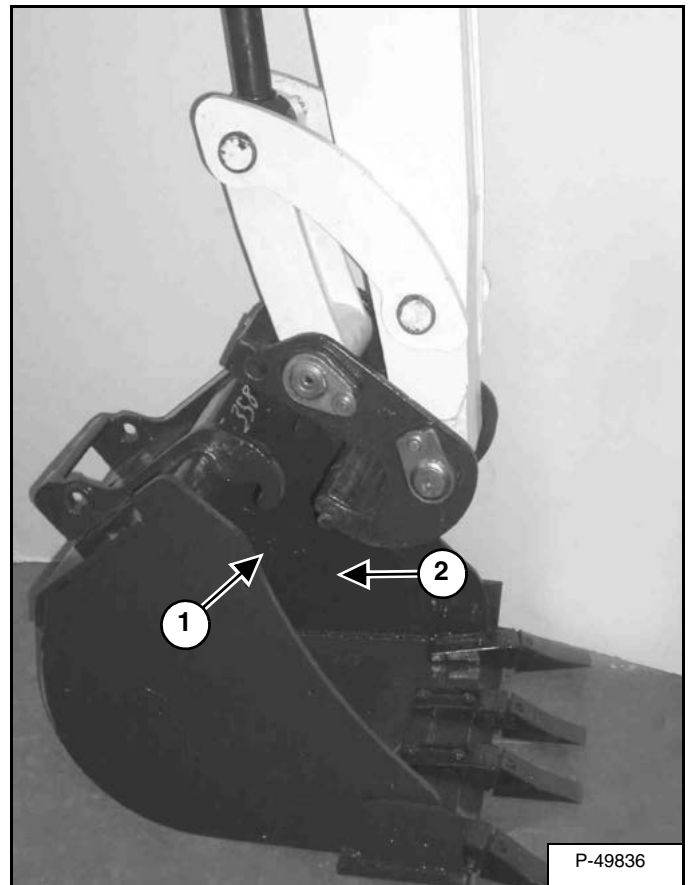
Removal (Cont'd)

Figure 159



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 159]** on the bucket.

Figure 160



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 160]**.

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

ATTACHMENTS (CONT'D)

Installing And Removing The Pro Clamp System Tool

Installation

! WARNING

AVOID INJURY OR DEATH

Keep fingers and hands out of pinch points when installing and removing implement or attachment.

W-2571-1212

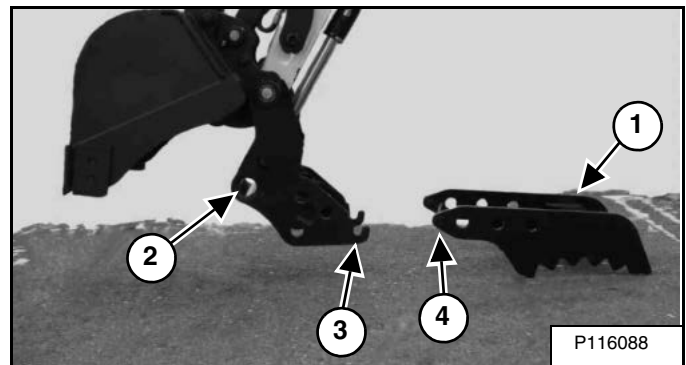
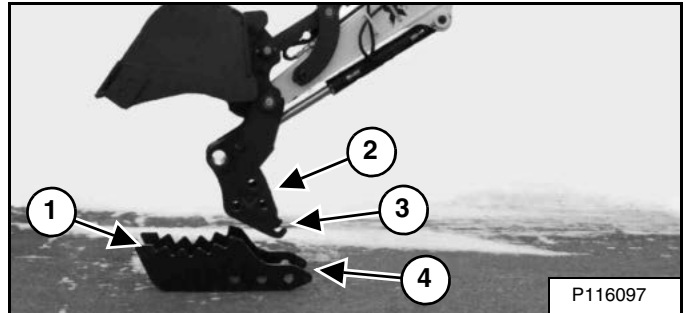
! WARNING

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

Enter the excavator and start the engine. (See PRE-STARTING PROCEDURE on Page 68.)

Figure 161

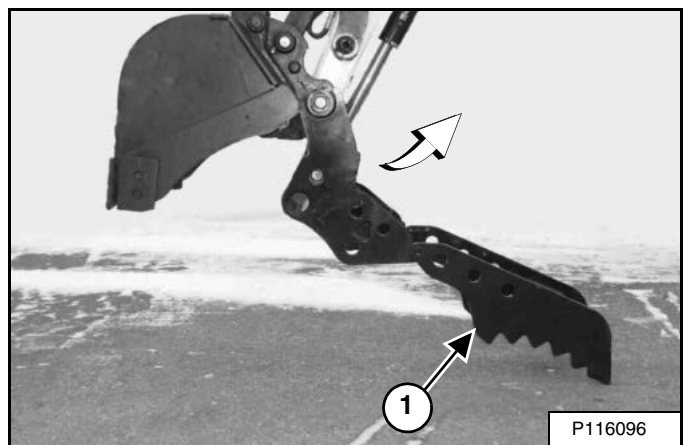


NOTE: To install the clamp tool (Item 1) onto the clamp base (Item 2), the clamp tool (Item 1) can be positioned in either configuration as shown in [Figure 161].

Move the arm towards the clamp tool.

Engage the clamp base hooks (Item 3) onto the clamp anchors (Item 4) [Figure 161].

Figure 162



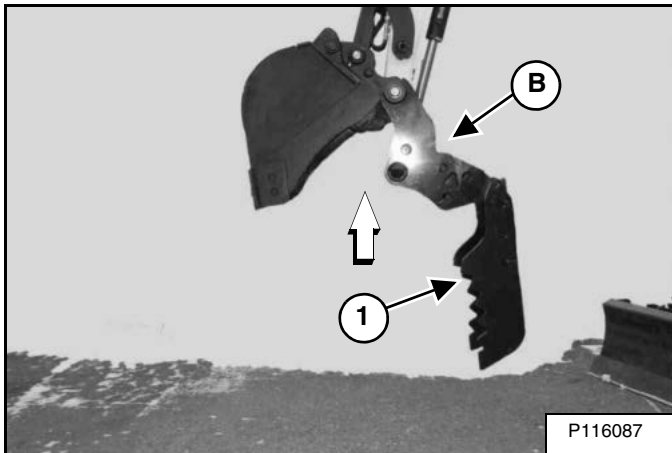
Retract the bucket cylinder (Item 1) [Figure 162] until the clamp tool is supported by the clamp hooks and the tool anchors.

ATTACHMENTS (CONT'D)

Installing And Removing The Pro Clamp System Tool (Cont'd)

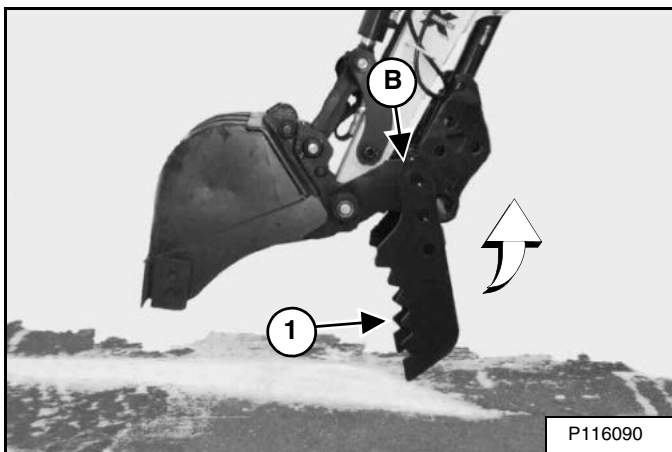
Installation (Cont'd)

Figure 163



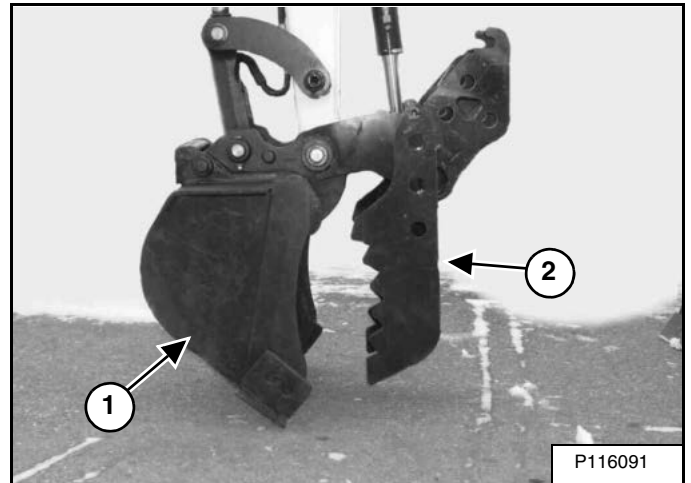
Raise the boom until the clamp tool (Item 1) [Figure 163] is slightly off the ground.

Figure 164



Continue to retract the bucket cylinder until the clamp tool (Item 1) [Figure 164] slides into the (index point B) [Figure 163] and [Figure 164].

Figure 165



Rotate the bucket (Item 1) [Figure 165] down until it is in the position shown. Lower the boom until the bucket is fully on the ground.

The bottom of the clamp tool (Item 2) [Figure 165] must be slightly off the ground when the bucket is resting on the ground in order to rotate the tool to install the pins.

NOTE: The clamp tool can become unstable and fall off the clamp mount if the clamp tool (Item 2) [Figure 165] is allowed to contact the ground.

NOTE: The clamp tool (Item 2) can be positioned in multiple arrangements depending on which mounting holes are used. See [Figure 166] and [Figure 167] for the approved positions for the clamp tool.

Stop the engine and exit the excavator. (See STOPPING THE ENGINE AND LEAVING THE EXCAVATOR on Page 75.)

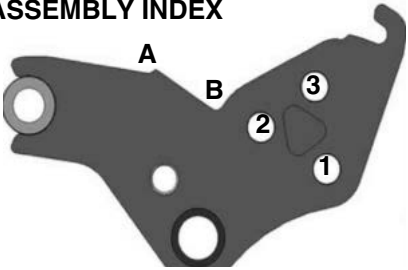
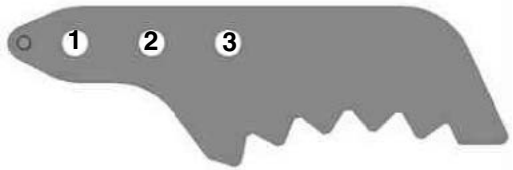



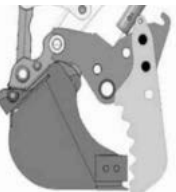

ATTACHMENTS (CONT'D)

Installing And Removing The Pro Clamp System Tool (Cont'd)

Installation (Cont'd)

Material Tool Arrangements

Figure 166

PRO CLAMP 3 APPROVED TOOL ARRANGEMENTS								
USE CHECKED INDEX POINT WHEN INSTALLING TOOL. INSTALL MOUNTING PINS IN CHECKED MOUNTING HOLES.	BASE ASSEMBLY INDEX					MATERIAL TOOL INDEX*		
								
APPROVED TOOL POSITIONS	INDEX	POINT	MOUNTING HOLE			MOUNTING HOLE		
	A	B	1	2	3	1	2	3
TOOTHED DIRT BUCKET 	X		X	X			X	X
TOOTHED DIRT BUCKET 		X	X		X	X		
TOOTHLESS DIRT BUCKET 	X		X	X			X	X
TOOTHLESS DIRT BUCKET 		X	X		X	X	X	
GRADING BUCKET 	X		X		X		X	X

* Material Tool Weight: 27 kg (60 lb)

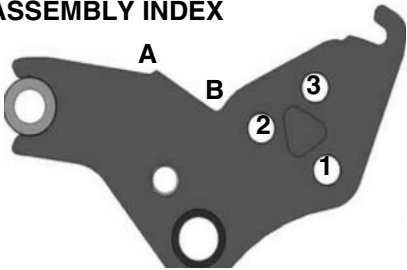
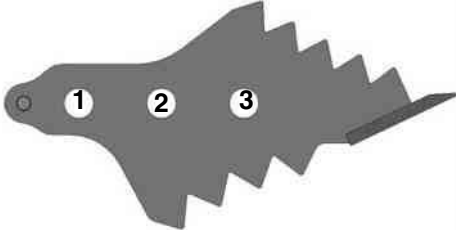
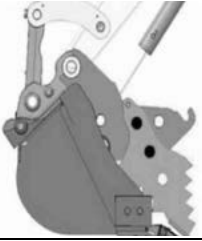

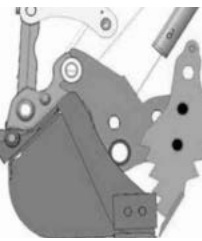
ATTACHMENTS (CONT'D)

Installing And Removing The Pro Clamp System Tool (Cont'd)

Installation (Cont'd)

Grading And Clamp Tool Arrangements

Figure 167

PRO CLAMP 3 APPROVED TOOL ARRANGEMENTS								
USE CHECKED INDEX POINT WHEN INSTALLING TOOL. INSTALL MOUNTING PINS IN CHECKED MOUNTING HOLES.	BASE ASSEMBLY INDEX					GRADING & CLAMP TOOL INDEX*		
								
APPROVED TOOL POSITIONS	INDEX	POINT	MOUNTING HOLE			MOUNTING HOLE		
	A	B	1	2	3	1	2	3
TOOTHED DIRT BUCKET ** 		X	X	X		X	X	
TOOTHLESS DIRT BUCKET 		X	X		X	X	X	
GRADING BUCKET 	X		X		X		X	X

* Grading And Clamp Tool Weight: 30 kg (65 lb)

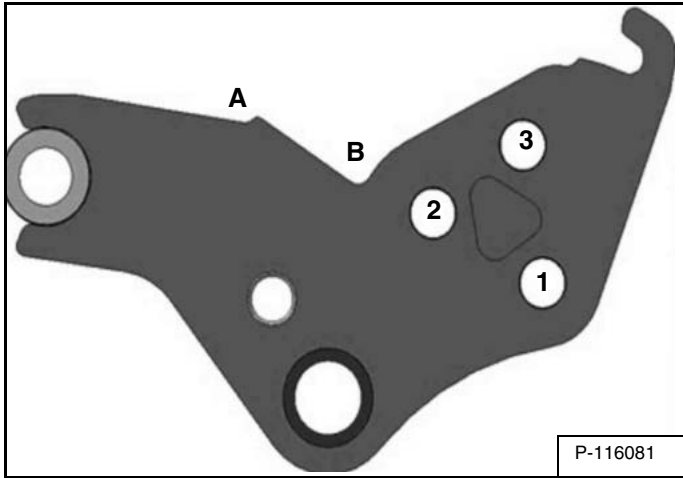
** Note: See OPERATING PROCEDURE - Operating In The Grading Arrangement for correct procedures.

ATTACHMENTS (CONT'D)

Installing And Removing The Pro Clamp System Tool (Cont'd)

Installation (Cont'd)

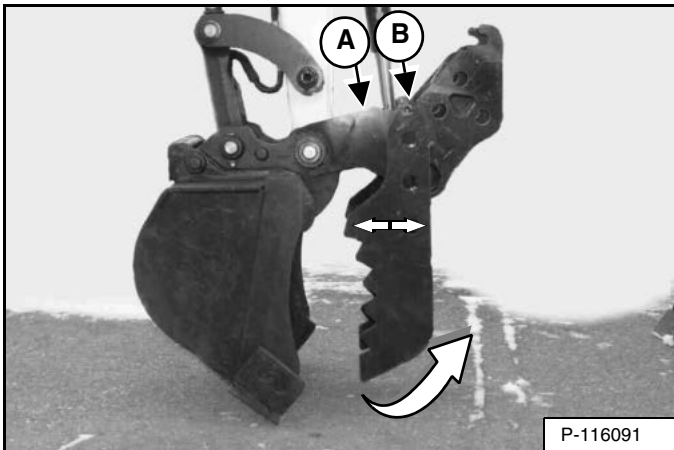
Figure 168



For aligning the clamp tool and base assembly, there are three mounting holes (Items 1, 2, and 3). For indexing the clamp tool, there are two indexing points on the base assembly (Items A and B) [Figure 168].

Use [Figure 166] and [Figure 167] to determine which index point is used for the desired tool position.

Figure 169



Move the clamp tool along the base assembly to the desired indexing point (A or B) [Figure 169].

NOTE: The clamp tool anchors must be located in one of the indexing points on the base assembly for the mounting holes to align. The base assembly hooks are for lifting the clamp tool only. The hooks cannot be used as an indexing point for mounting hole alignment.

Lifting the bottom of the clamp tool, use the anchors and indexing point as a hinge to align the mounting holes (Item 1) [Figure 169].

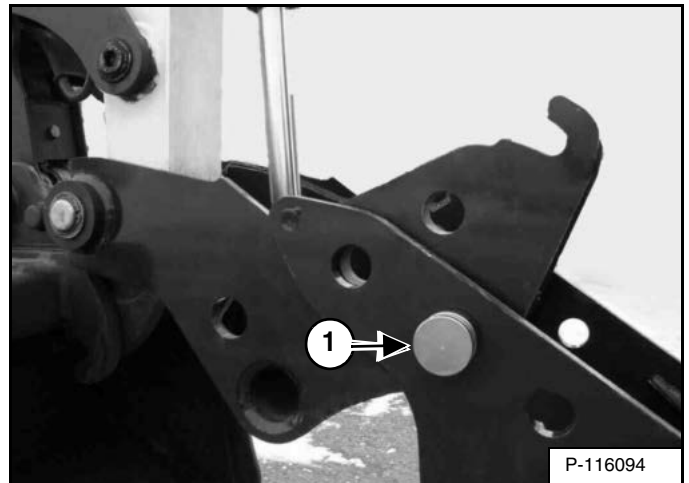
! WARNING

AVOID INJURY OR DEATH

Keep fingers and hands out of pinch points when installing and removing implement or attachment.

W-2571-1212

Figure 170



Install a pin (Item 1) [Figure 170] in the mounting hole on each side. Install the lock pins (Item 1) [Figure 173].

NOTE: When installing the clamp tool, always install the pins in the hole 1 [Figure 168] first. Hole 1 [Figure 168] will always be used for mounting the tools.

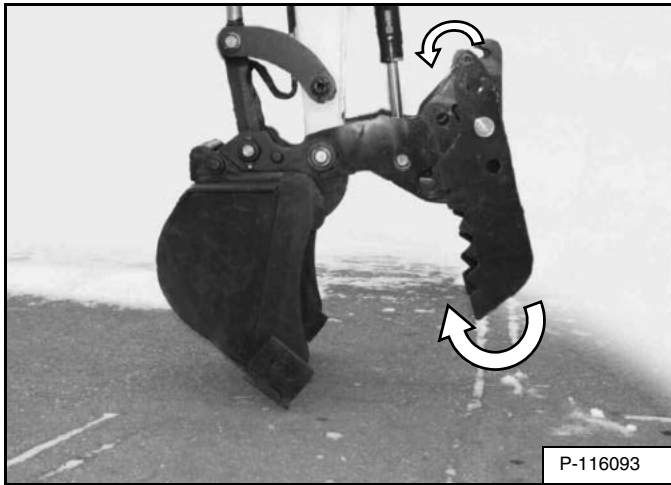
NOTE: When repositioning or removing the pro clamp tool, remove the pins from positions 2 or 3 first. The pin in location 1 should always be the last pin removed or the first pin installed [Figure 168].

ATTACHMENTS (CONT'D)

Installing And Removing The Pro Clamp System Tool (Cont'd)

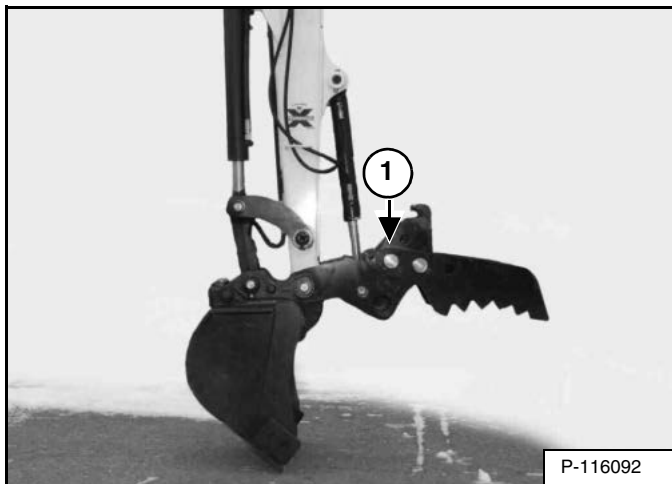
Installation (Cont'd)

Figure 171



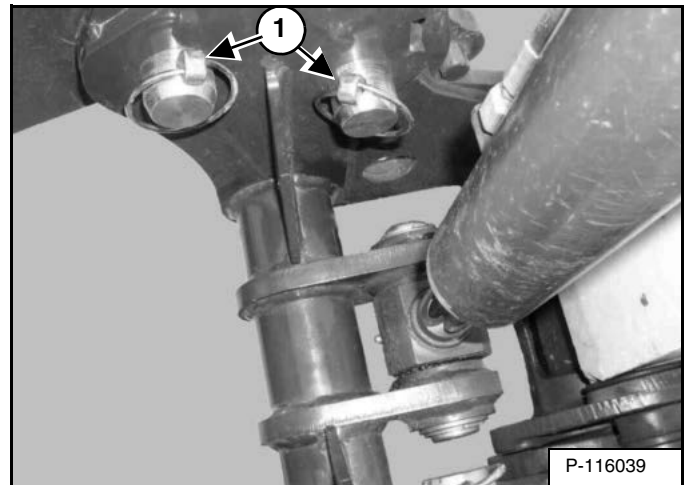
Rotate the clamp tool to the desired angle, aligning the other mounting holes [Figure 171].

Figure 172



Install the pins (Item 1) [Figure 172].

Figure 173



Install the retaining pins (Item 1) [Figure 173].

NOTE: Always install ALL of the mounting pins and the retaining pins.

IMPORTANT

Always install all of the mounting pins and retainer pins. Failure to do so will cause structural damage.

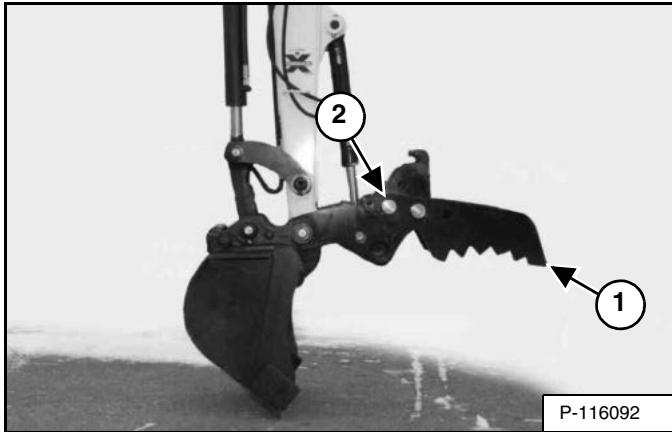
I-2380-0314

ATTACHMENTS (CONT'D)

Installing And Removing The Pro Clamp System Tool (Cont'd)

Removal

Figure 174



Park the excavator on a flat and level surface. Position the bucket as shown in [Figure 174] and lower the boom until the bucket is fully on the ground.

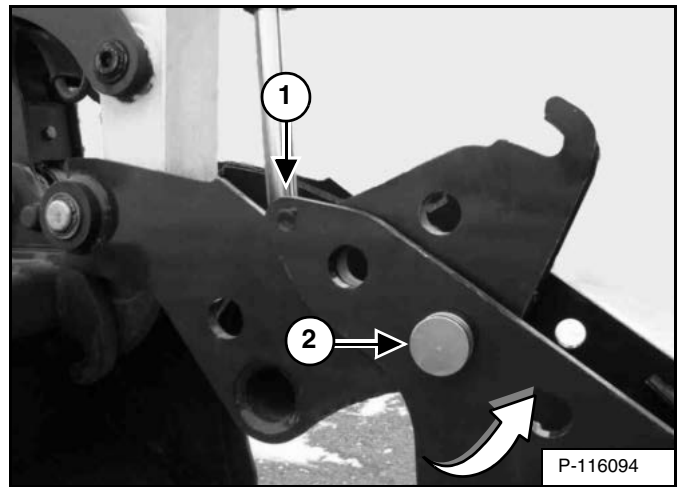
Stop the engine and exit the excavator.

Remove the retainer pins (Item 1) [Figure 173].

NOTE: When repositioning or removing the pro clamp tool, remove the pins from positions 2 or 3 first. The pin in location 1 should always be the last pin removed or the first pin installed [Figure 168].

Hold the bottom of the clamp tool (Item 1) and remove the pin (Item 2) [Figure 174] from each side.

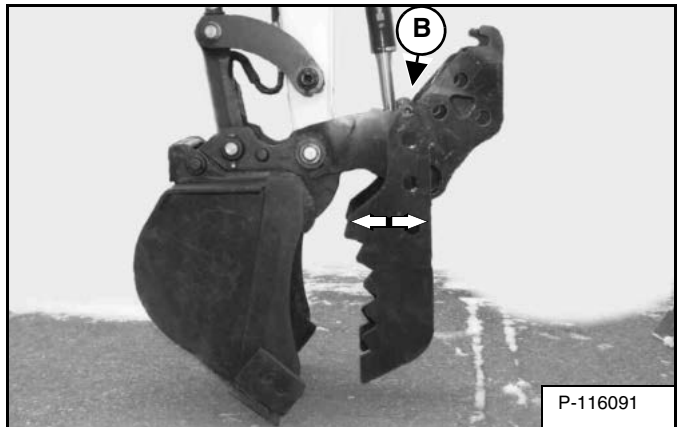
Figure 175



Rotate the clamp tool until the anchors (Item 1) [Figure 175] are contacting the indexing point.

Lift on the bottom of the clamp tool using the anchors as a fulcrum to take pressure off of the pins (Item 2) and remove pins (Item 2) [Figure 175] (both sides). Rotate the tool down until it hangs freely straight down.

Figure 176



Slide the clamp tool along the base assembly until the anchors on the clamp tool are positioned in index point B [Figure 176] on the base assembly.

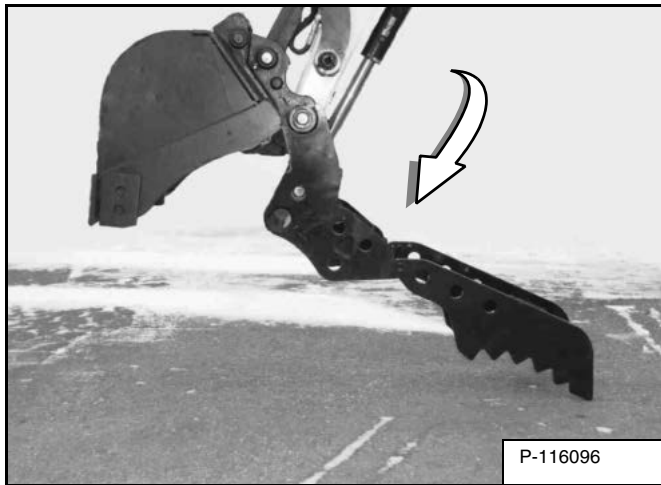
Enter the excavator and fasten the seat belt.

ATTACHMENTS (CONT'D)

Installing And Removing The Pro Clamp System Tool (Cont'd)

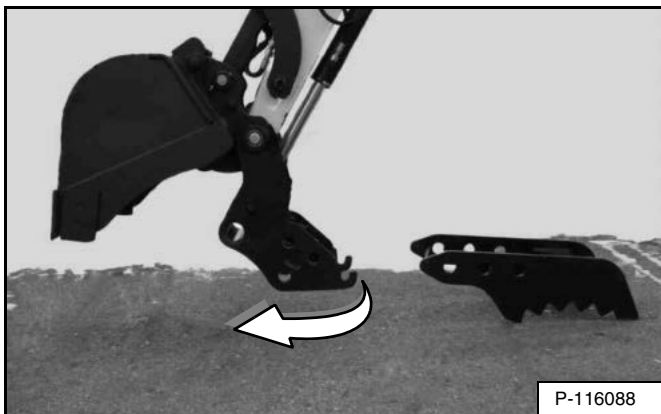
Removal (Cont'd)

Figure 177



Slightly raise the boom and retract the bucket cylinder fully. Lower the boom until the tip of the clamp tool is touching the ground. Extend the clamp cylinder and slightly lower the boom and rotate the clamp tool forward until the clamp tool is fully on the ground **[Figure 177]**.

Figure 178



Lower the boom and move the arm forward until the hooks of the clamp mount (Item 1) are disengaged from the clamp tool anchors (Item 2) **[Figure 178]**.

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 179



The joystick lock switch disengages the hydraulic control functions from the joysticks when the console are raised [Figure 179].

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 179].

OPERATING PROCEDURE (CONT'D)

Object Handling With The Lifting Device

The excavator must be equipped with the optional lift eye (Item 1) [Figure 180], the boom and arm load hold valves and the overload warning device option. See your Bobcat dealer for available kits.

WARNING

AVOID INJURY OR DEATH

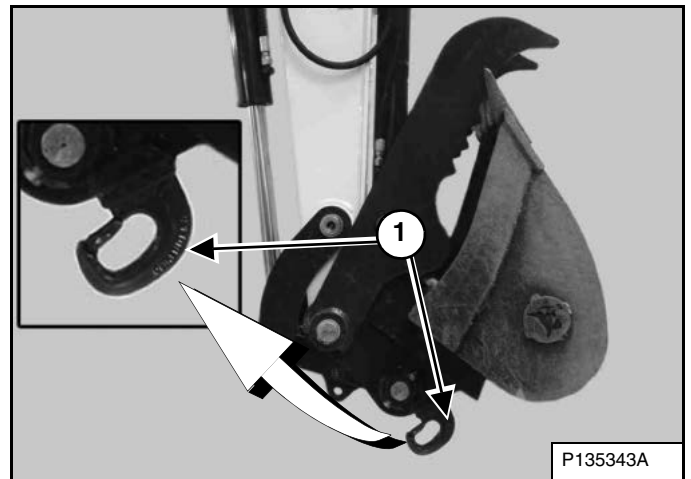
- Do not exceed rated lift capacity.
- Excessive load can cause tipping or loss of control.
- Excessive load can cause failure of the lift eye and cause the load to drop.

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Do not exceed the machine's Rated Lift Capacity or the Rated Lift Load (RLL) of the lifting device (lift eye). (See Rated Lift Capacity For Standard Arm, Light Counterweight, And Canopy on Page 212.), (See Rated Lift Capacity For Long Arm, Light Counterweight, And Canopy on Page 213.), (See Rated Lift Capacity For Standard Arm, Light Counterweight, And Cab on Page 214.), (See Rated Lift Capacity For Long Arm, Light Counterweight, And Cab on Page 215.), (See Rated Lift Capacity For Standard Arm, Medium Counterweight, And Canopy on Page 216.), (See Rated Lift Capacity For Long Arm, Medium Counterweight, And Canopy on Page 217.), (See Rated Lift Capacity For Standard Arm, Medium Counterweight, And Cab on Page 218.), (See Rated Lift Capacity For Long Arm, Medium Counterweight, And Cab on Page 219.), (See Rated Lift Capacity For Standard Arm, Heavy Counterweight, And Canopy on Page 220.), (See Rated Lift Capacity For Long Arm, Heavy Counterweight, And Canopy on Page 221.), (See Rated Lift Capacity For Standard Arm, Heavy Counterweight, And Cab on Page 222.) or (See Rated Lift Capacity For Long Arm, Heavy Counterweight, And Cab on Page 223.)

Make sure the secondary lifting system (chain) is of sufficient strength to lift the object.

Figure 180

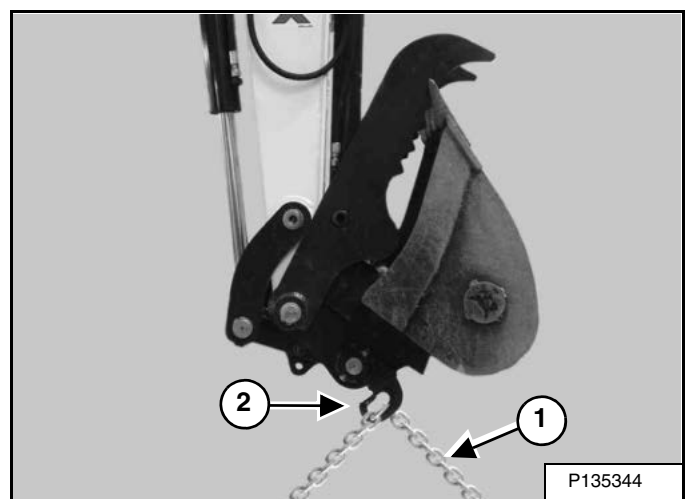


The maximum RLL is shown on the side of the lift eye (Item 1) [Figure 180].

Extend the bucket cylinder completely and lower the boom to the ground. Stop the engine. Exit the excavator. (See STOPPING THE ENGINE AND LEAVING THE EXCAVATOR on Page 75.)

NOTE: Visually check the lift eye and the secondary lifting system (chain) for any damage. Replace any damaged components before lifting. See your Bobcat dealer for replacement parts.

Figure 181



Install a lift chain (Item 1) (or other type of lifting device) through the lift eye (Item 2) [Figure 181] and connect to the object to be lifted.

NOTE: Always use chains or other types of lifting devices that are intended for this type of use and that are of adequate strength for the object being lifted.

OPERATING PROCEDURE (CONT'D)

Object Handling With The Lifting Device (Cont'd)

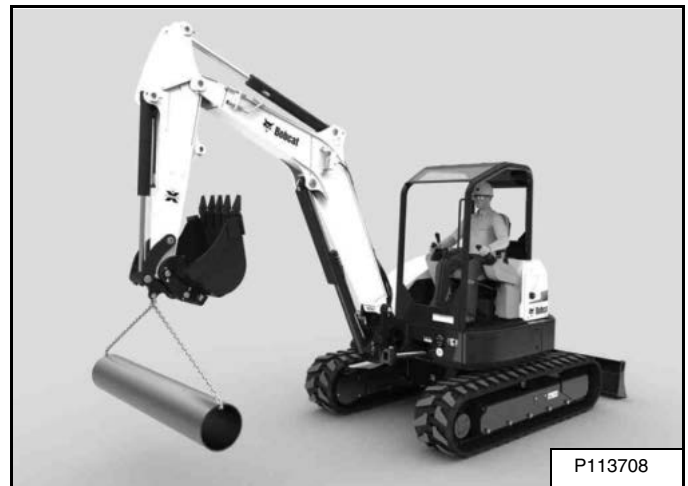
Enter the excavator, fasten the seat belt, and start the engine. (See PRE-STARTING PROCEDURE on Page 68.)

Figure 182



Press the switch (Item 1) **[Figure 182]** to the left to activate the overload warning device.

Figure 183



Make sure the load is evenly weighted and centred on the lifting chain (or other type of lifting device), and is secured to prevent the load from shifting **[Figure 183]**.

Operate the controls slowly and smoothly to avoid suddenly swinging the lifted load.

Lift and position the load. When the load is placed in a secured position and tension is removed from the lift chain, remove the chain from the load and from the lift eye.

OPERATING PROCEDURE (CONT'D)

Lift Capacity

The lifting capacities were calculated with a standard configuration machine equipped with a Pin-On X-Change and no attachment. The weight of the attachment, the hydraulic clamp (if equipped), and a different interface (if equipped) must be subtracted from the lift capacity to obtain the actual lift capacity.



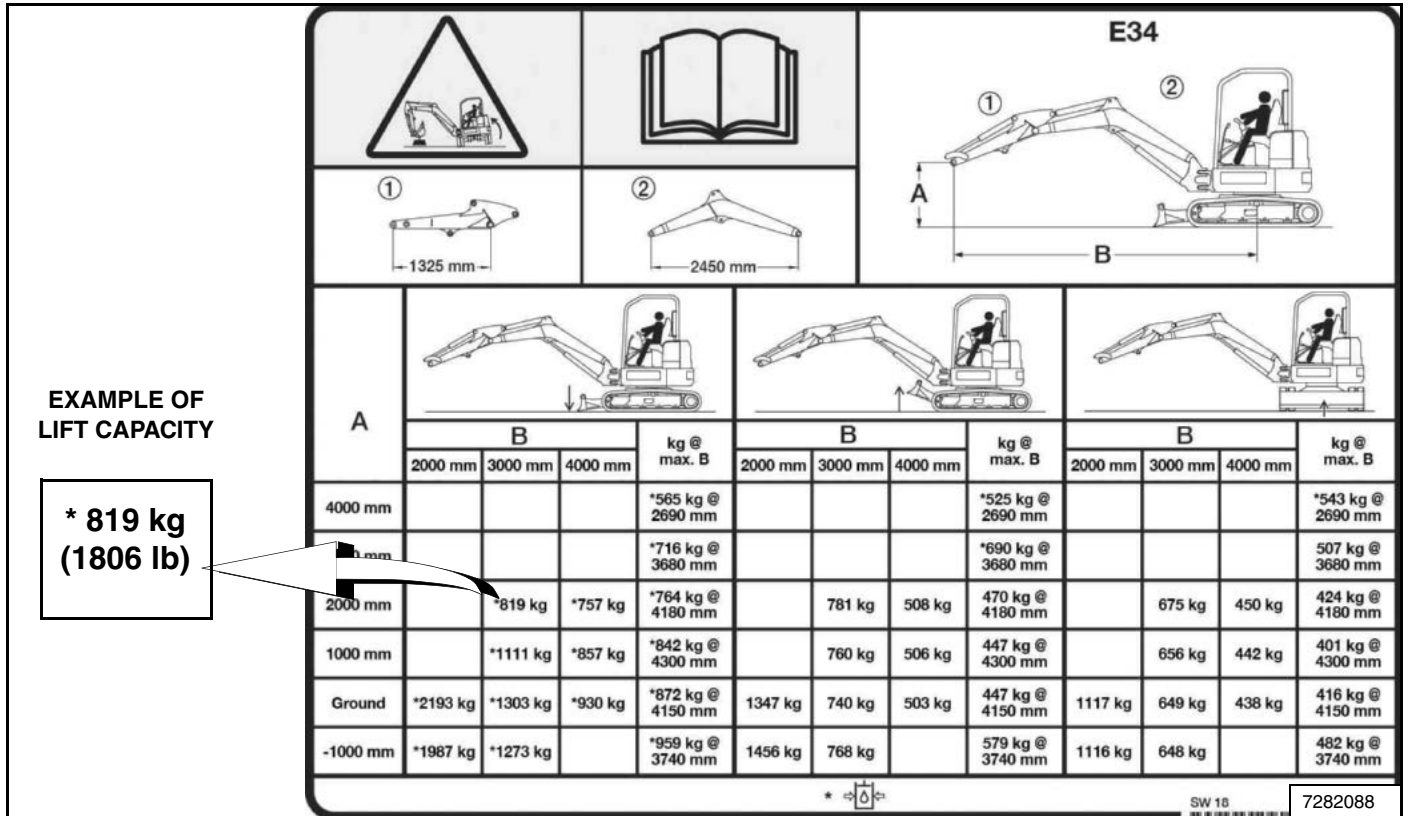
WARNING

AVOID INJURY OR DEATH

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

W-2374-0500

Figure 184



Detailed information about quick coupler and hydraulic clamp weights can be found in documentation including the serial number plate. The following lists examples of the optional quick coupler and hydraulic clamp weights:

- Pin-On X-Change = 27 kg (60 lb)
- Klac™ Quick Coupler = 24 kg (53 lb)
- German Style Coupler = 35 kg (77 lb)
- Bobcat Hydraulic Coupler HPG2 = 35 kg (77 lb)
- Tilt Coupler (mechanical) = 83 kg (183 lb)
- Tilt Coupler (hydraulic) = 87 kg (192 lb)
- Hydraulic Clamp And Cylinder = 65 kg (143 lb)
- Hydraulic Pro-Clamp, Clamp Tool And Cylinder = 77 kg (170 lb)
- Optional Buckets and Attachments (See **NOTE** below)

NOTE: For bucket weights, see your Bobcat dealer. For attachment weights, see the attachment Operation & Maintenance Manual.

The following example will show how to calculate the lift capacity differences between the lift capacity charts with standard equipment and when using optional equipment.

OPERATING PROCEDURE (CONT'D)

Lift Capacity (Cont'd)

The following is an example for determining the lift capacity using the sample chart shown above **[Figure 184]**.

- Machine Position: Over Blade, Blade Down
- Lift Radius: 3000 mm (118 in)
- Lift Point Height: 2000 mm (78 in)
- Hydraulic Clamp and Cylinder
- Standard Bucket

1. Obtain Lift Capacity from Chart: 819 kg (1806 lb)

2. Obtain the weights of any optional equipment that reduces the lift capacity of the machine (coupling interface, hydraulic clamp, attachment)

Optional Equipment Weights: Hydraulic Clamp and Cylinder (65 kg (143 lb)) and Standard Bucket (42 kg (92 lb)).

3. Calculate the actual lift capacity by subtracting the weight of any optional equipment from the lift capacity of the standard configuration:

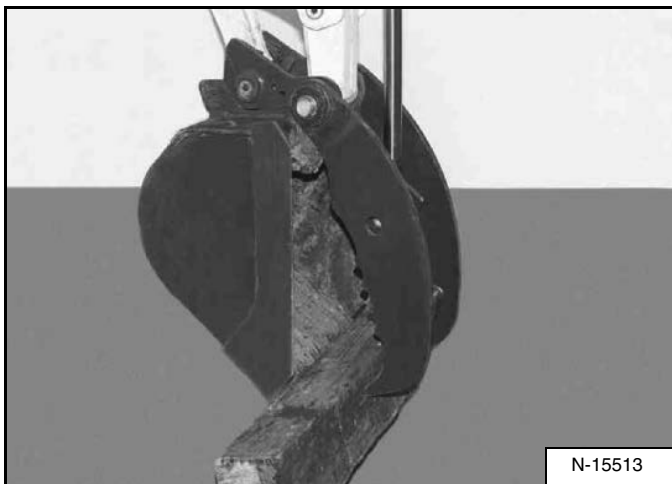
819 kg (1806 lb) (capacity of standard configuration) - 65 kg (143 lb) (hydraulic clamp and cylinder) - 42 kg (92 lb) (standard bucket) = 712 kg (1571 lb) (actual lift capacity)

** The lift capacity charts (decals) are based off ISO 10567: 2007. The lift capacities are defined as the lower value of 75% of the tipping load or 87% of the hydraulic lift capacity.*

OPERATING PROCEDURE (CONT'D)

Using The Clamp

Figure 185



The optional lifting clamp attachment (if equipped) gives the excavator a wider range of use and mobility for debris removal [Figure 185].

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

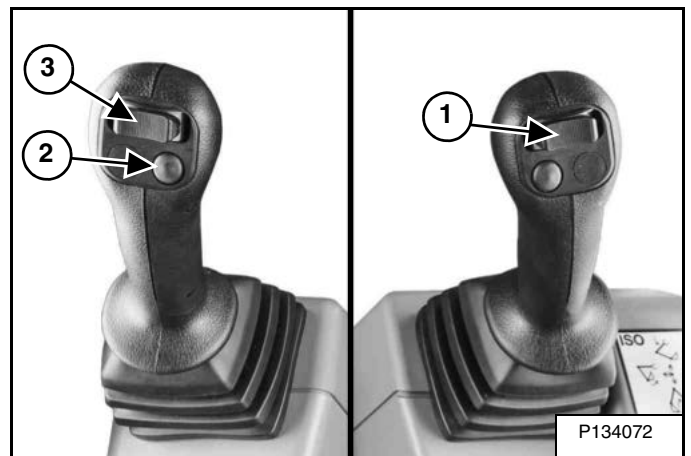
The lift capacities are reduced by 45 kg (99 lb) if the excavator is equipped with the optional lifting clamp.

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.

Using Primary Auxiliary Hydraulics To Activate Clamp

1. Engage the auxiliary hydraulics. (See Activating Primary Auxiliary Hydraulics With Standard Instrument Panel on Page 48.) (See Activating Primary Auxiliary Hydraulics With Deluxe Instrument Panel (Software Version 88.02 Or Below) on Page 49.) (See Activating Primary Auxiliary Hydraulics With Deluxe Instrument Panel (Software Version 88.03 Or Above) on Page 49.)
2. Set auxiliary flow rate to Mode 2 (standard instrument panel) or Medium Flow (deluxe instrument panel with old software) or 65 – 75% (deluxe instrument panel with new software).

Figure 186



3. Move the switch (Item 1) [Figure 186] on the right control lever to the right to open the clamp. Move the switch to the left to close the clamp.

Using Secondary Auxiliary Hydraulics To Activate Clamp

1. Engage the auxiliary hydraulics. (See Operating Attachments With Secondary Auxiliary Hydraulics (Software Version 88.02 Or Below) on Page 53.) (See Operating Attachments With Primary, Secondary, Or Fourth Auxiliary Hydraulics (Software Version 88.03 Or Above) on Page 55.)
2. Press the button on the left joystick (Item 2) [Figure 186] to toggle to the secondary auxiliary hydraulics.
3. Move the switch (Item 3) [Figure 186] on the left joystick to the left open the clamp. Move the switch to the right to close the clamp.

OPERATING PROCEDURE (CONT'D)

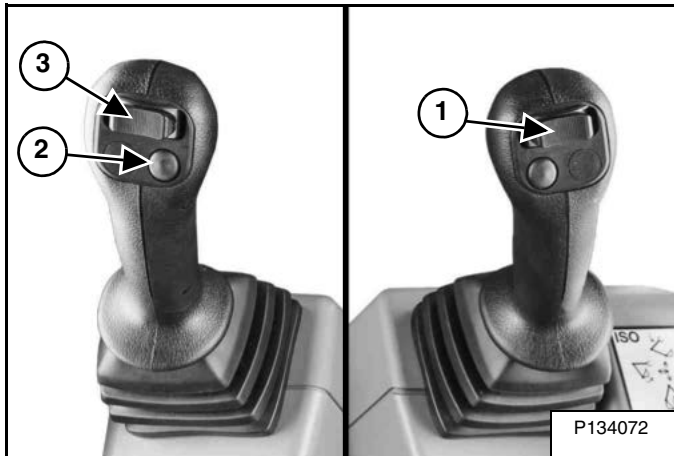
Using The Pro Clamp System

The lift capacities of the excavator will be reduced by 77 kg (170 lb) with the Pro Clamp installed (if equipped). (See Lift Capacity on Page 105.)

Using Primary Auxiliary Hydraulics To Activate Clamp

1. Engage the auxiliary hydraulics. (See Activating Primary Auxiliary Hydraulics With Standard Instrument Panel on Page 48.) (See Activating Primary Auxiliary Hydraulics With Deluxe Instrument Panel (Software Version 88.02 Or Below) on Page 49.) (See Activating Primary Auxiliary Hydraulics With Deluxe Instrument Panel (Software Version 88.03 Or Above) on Page 49.)
2. Set auxiliary flow rate to Mode 2 (standard instrument panel) or Medium Flow (deluxe instrument panel with old software) or 65 – 75% (deluxe instrument panel with new software).

Figure 187



3. Move the switch (Item 1) [Figure 186] on the right control lever to the right to open the clamp. Move the switch to the left to close the clamp.

Using Secondary Auxiliary Hydraulics To Activate Clamp

1. Engage the secondary auxiliary hydraulics. (See Operating Attachments With Secondary Auxiliary Hydraulics (Software Version 88.02 Or Below) on Page 53.) (See Operating Attachments With Primary, Secondary, Or Fourth Auxiliary Hydraulics (Software Version 88.03 Or Above) on Page 55.)
2. Press the button on the left joystick (Item 2) [Figure 186] to toggle to the secondary auxiliary hydraulics.
3. Move the switch (Item 3) [Figure 186] on the left joystick to the left open the clamp. Move the switch to the right to close the clamp.

For installing and removing the pro clamp tools, (See Installing And Removing The Pro Clamp System Tool on Page 94.)

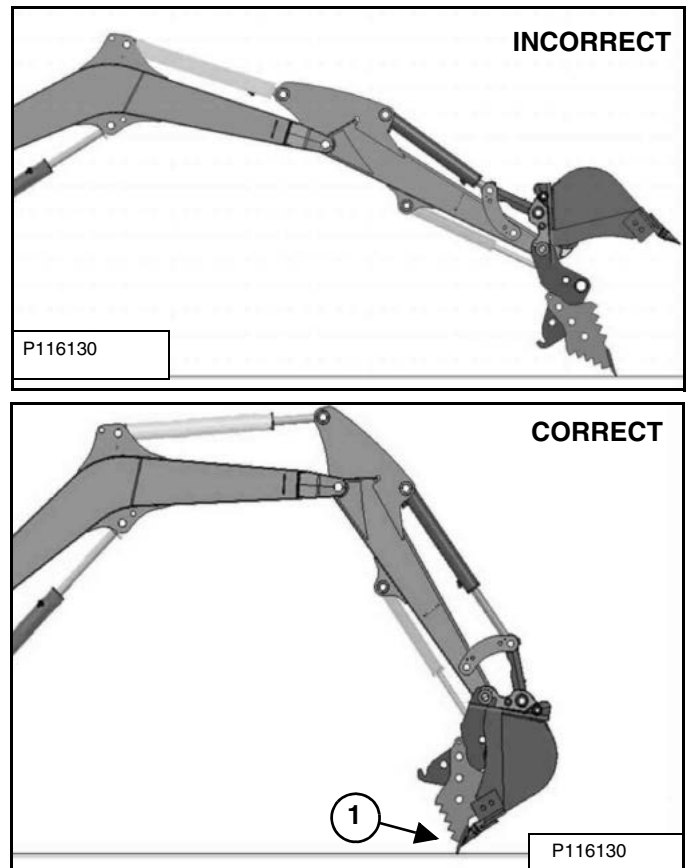
Operating With The Grading Tool

IMPORTANT

When using the Pro Clamp System with the Grading Tool, the Grading Tool must not be used with the cylinder fully extended and unsupported. It is necessary to support the Grading Tool with the bucket to avoid damaging the clamp cylinder.

I-2381-1015

Figure 188



When using the Pro Clamp with the Grading Tool, the Grading Tool must not be used with the cylinder fully extended and unsupported. It is necessary to support the Grading Tool with the bucket to avoid damaging the clamp cylinder. Position the bucket to the clamp grading tool as shown [Figure 188].

NOTE: The clamp grading tool plate (Item 1) [Figure 188] must be in contact with the bucket or bucket teeth when using the tool for grading.

OPERATING PROCEDURE (CONT'D)

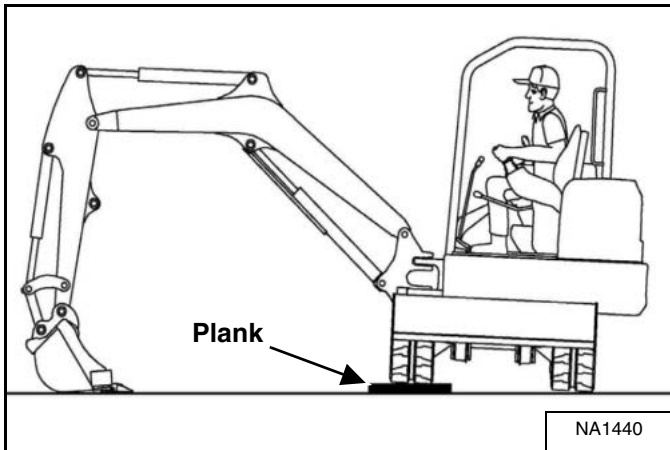
Driving The Excavator

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.

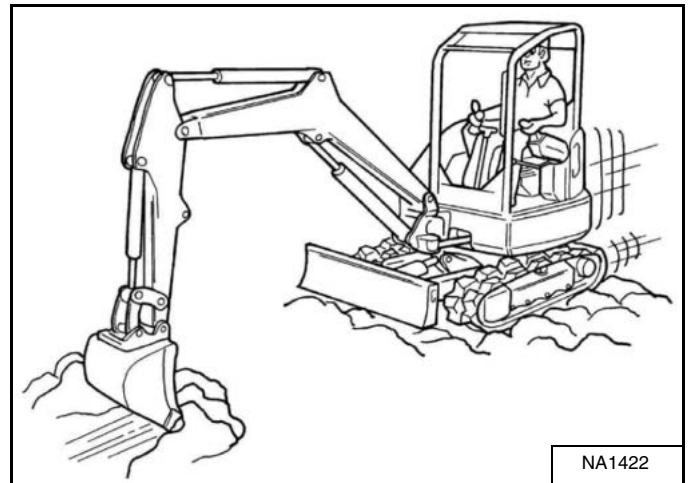
Figure 189



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 189]**.

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

Figure 190



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 190]**.

OPERATING PROCEDURE (CONT'D)

Operating On Slopes

! WARNING

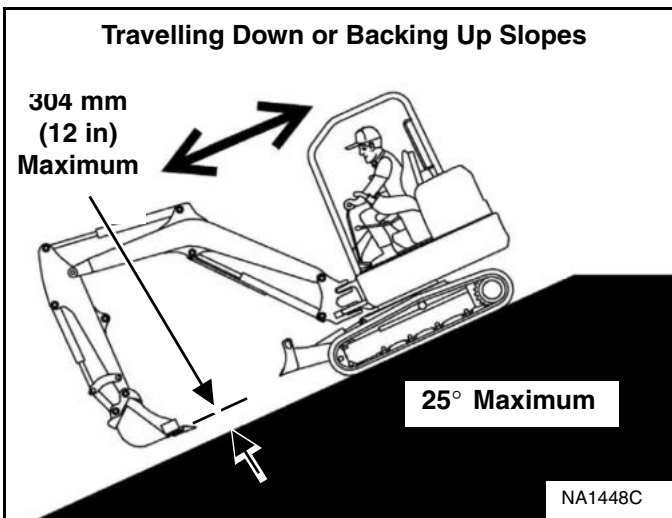
AVOID INJURY OR DEATH

- 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.

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

Figure 191



When going down grades that exceed 15 degrees, put the machine in the position shown, and run the engine slowly [Figure 191].

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

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

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

! WARNING

AVOID INJURY OR DEATH

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

W-2498-0304

Figure 192

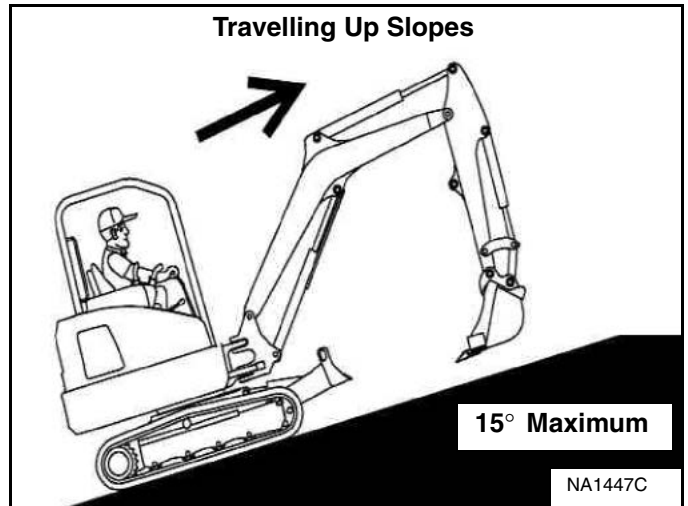
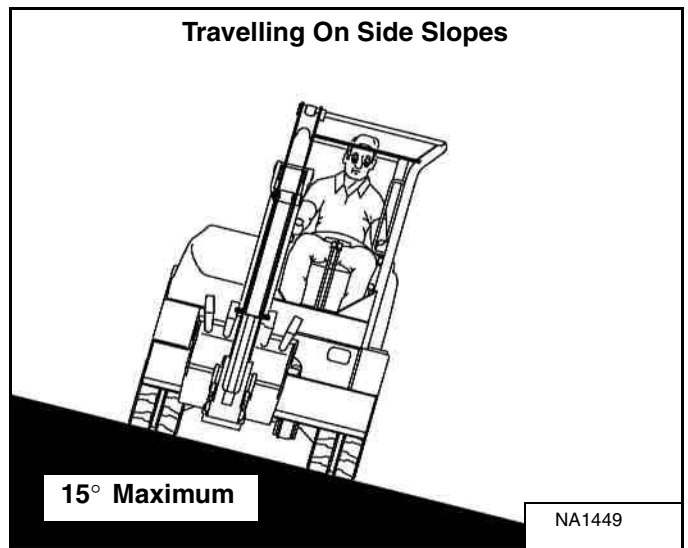


Figure 193

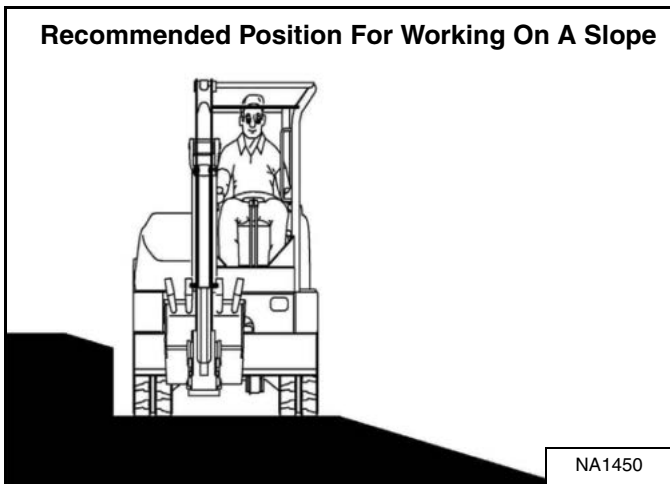


When travelling up slopes or on side slopes that are 15 degrees or less, position the machine as shown and run the engine slow [Figure 192] and [Figure 193].

OPERATING PROCEDURE (CONT'D)

Operating On Slopes (Cont'd)

Figure 194



When operating on a slope, level the work area before beginning [Figure 194].

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

Do not work on slopes which are over 15 degrees.

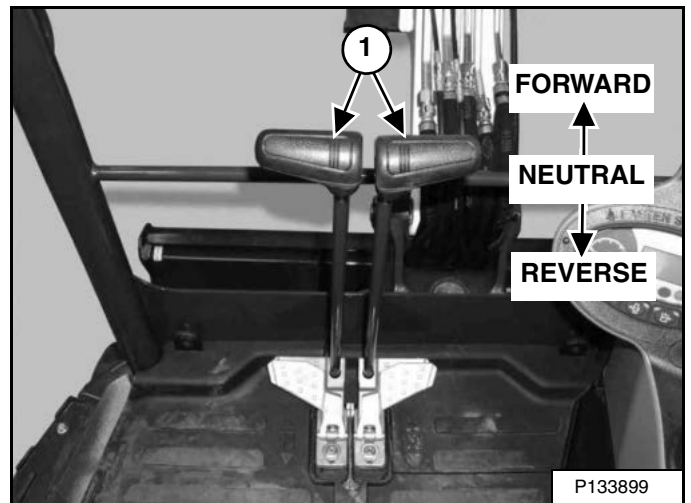
Use a slow work cycle.

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 195



To brake the machine when going down a slope, move the steering levers (Item 1) [Figure 195] 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.

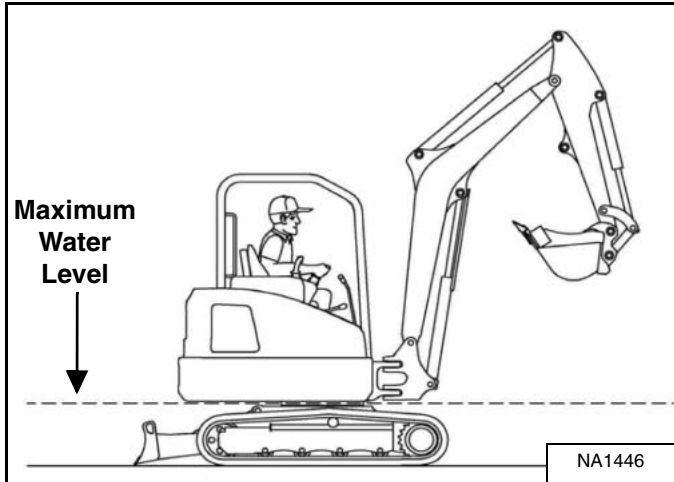
Start the engine and resume operation.

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 196



Do not operate or immerse the excavator in water higher than the bottom of the swing bearing **[Figure 196]**.

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.

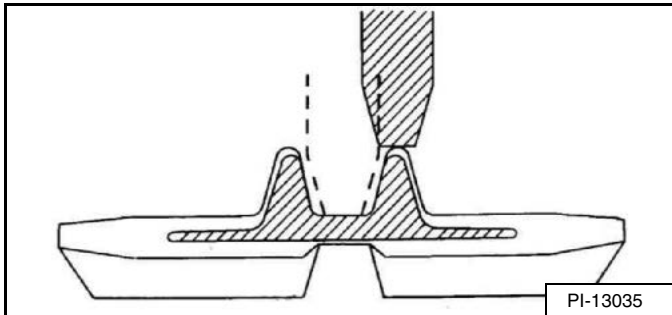
OPERATING PROCEDURE (CONT'D)

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 197

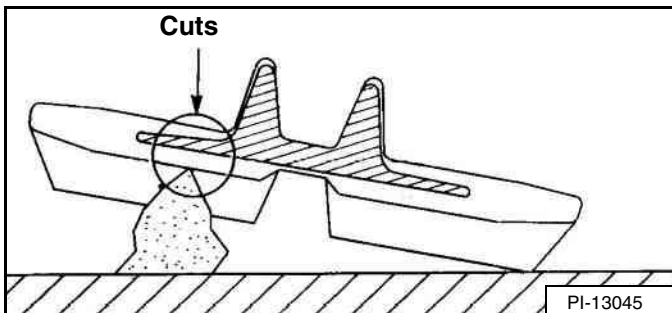


Incorrect track tension: When the rubber track is detracting, the idler or sprocket rides on the projections of the embedded metal [Figure 197] causing the embedded metal to be exposed to corrosion. (See TRACK TENSION on Page 180.)

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 198

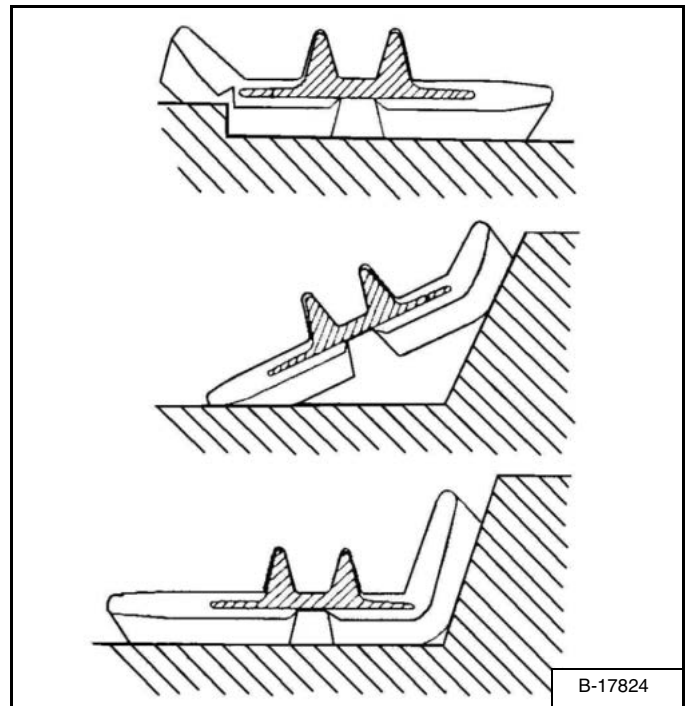


When rubber tracks drive over projections or sharp objects in the field, the concentrated forces applied cause cuts on the lug side rubber surface [Figure 198]. In case of making turns on projections, the lug side rubber surface will have an even higher chance to be cut. If the cuts run through the embedded 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 199



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 199].

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

DEPTH CHECK

Setup / Calibration

NOTE: The machine shown in the photos may be different than your machine and this manual but the procedure is the same for all models.

! 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

NOTE: When the Depth Check kit was initially installed, the machine should have had the setup / calibration procedure performed. But with usage of any attachment, components and the cutting surfaces wear. The accuracy of the Depth Check system is affected by the wear of these components. If loss of accuracy is noticed, re-calibrate the attachment to reset the dimensions needed for the Depth Check system to operate correctly.

Move the machine to an open area where the boom and arm can be repositioned and there is fresh air as the engine will need to be operating during this procedure.

Park the machine on a flat level surface.

The calibration procedure is a two person operation. One person must remain in the cab to enter data into the deluxe display panel while a second person takes measurements from outside the machine. Make sure the second person is away from the machine when moving any of the work group components (boom, arm, bucket, etc.).

! WARNING

Keep all bystanders 6 m (20 ft) away from equipment when operating.

W-2268-0910

Figure 200

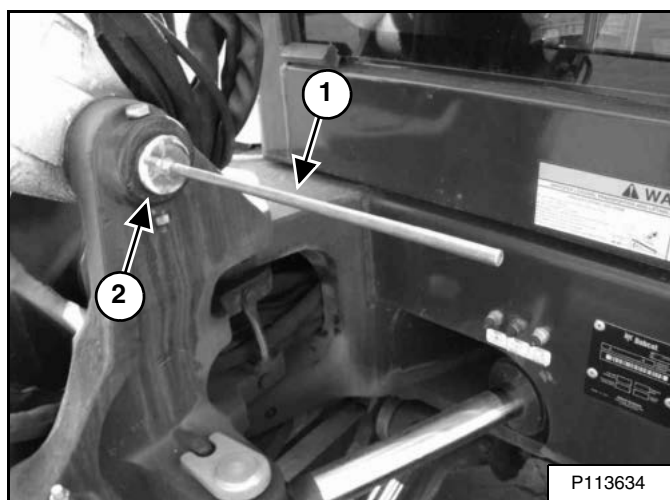


Position the excavator [Figure 200] as shown so the second person can install the magnetic tools, the plumb bob and do measurements for calibrating the system.

Two magnetic mounted tools are included with the kit for positioning the boom, arm and bucket for calibration. These magnetic tools need to be kept with the machine as the Depth Check system should be re-calibrated on a yearly bases or sooner if slight changes in accuracy are noticed.

The Depth Check system sensors are designed for high angle stability and temperature ranges. However, with the use of any mechanical components (boom, arm, bucket, etc.), there is wear on the components with normal usage and this will affect the accuracy of the Depth Check system over time. Also, if any structural changes are made, components replaced or a new attachment is installed on the excavator, will require the setup / calibration procedure to be performed.

Figure 201

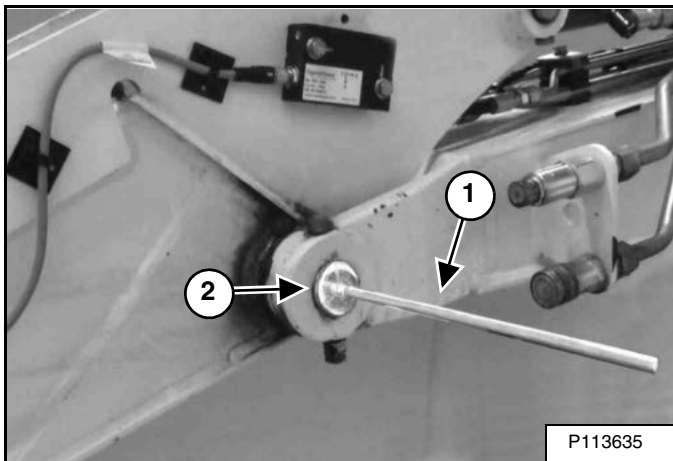


Install one of the magnetic tools (Item 1) on the boom pivot pin (Item 2) [Figure 201]. centre the magnetic tool as close as possible to the centre of the boom pin.

DEPTH CHECK (CONT'D)

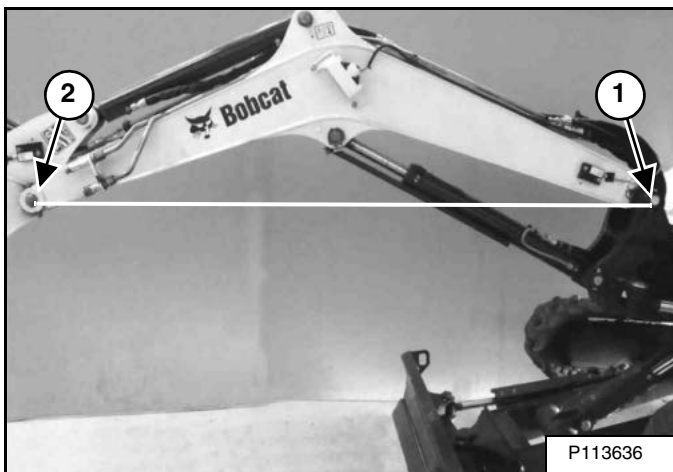
Setup / Calibration (Cont'd)

Figure 202



Install the second magnetic tool (Item 1) on the arm pivot pin (Item 2) [Figure 202]. Centre the magnetic tool as close as possible to the centre of the arm pin.

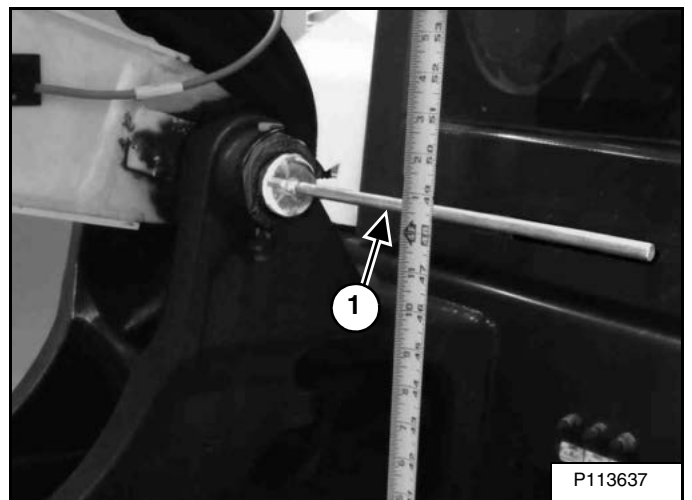
Figure 203



Position the excavator with the bucket fully rolled out and the arm fully extended. Position the work group so the distance from the ground to the two magnetic sensors (Item 1 and 2) [Figure 203] is identical.

NOTE: It may be necessary on some machines to lower the blade to raise the front of the excavator up slightly to position the boom pivot pin so that the boom and arm pivot points will be parallel to the ground when calibrating.

Figure 204

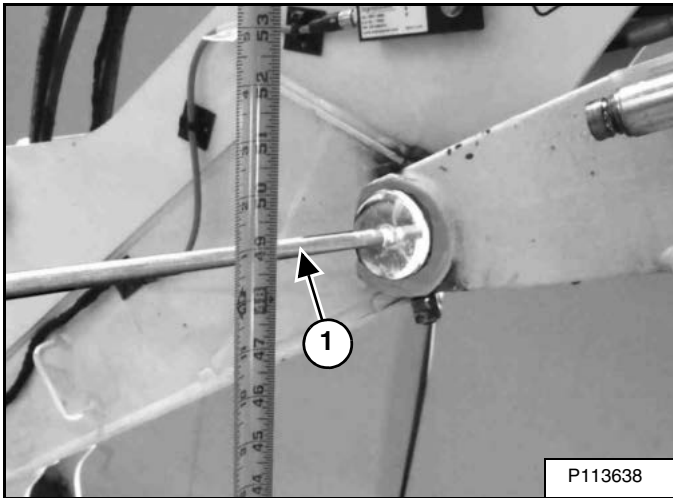


Measure the distance from the centre of the boom magnetic tool (Item 1) [Figure 204] to the ground. Measure as close to the boom as possible without interference from components between the boom and the ground. The closer to the boom the measurement is taken, the more accurate the measurement should be. (A laser level can also be used for locating the centerlines of the magnetic tools as this will eliminate an possible variation in the measurements to the ground.)

DEPTH CHECK (CONT'D)

Setup / Calibration (Cont'd)

Figure 205

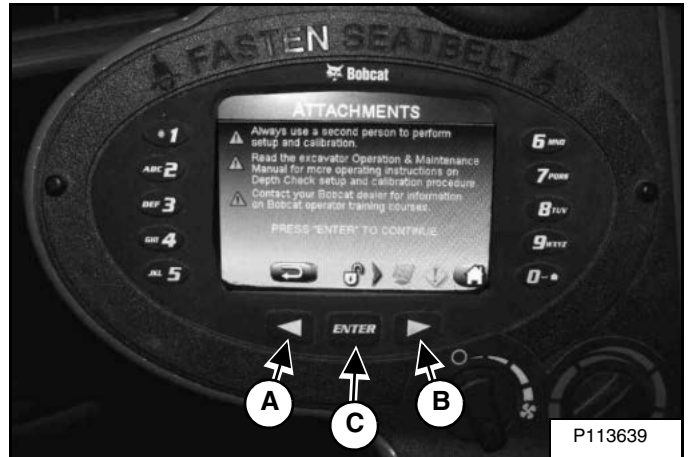


Measure the distance from the centre of the arm magnetic tool (Item 1) [Figure 205] to the ground and make sure both measurements are the same. Adjust the boom up or down as needed and remeasure until both dimensions are the same between [Figure 204] and [Figure 205].

Once the dimensions are identical, the second person in the cab will need to enter the setup / calibration information into the dash panel. *(The accuracy of these dimensions affect the accuracy of the Depth Check.)*

NOTE: Make sure there is no cylinder drift that could affect the calibration accuracy. The second person needs to enter the information into the display panel in a timely manner.

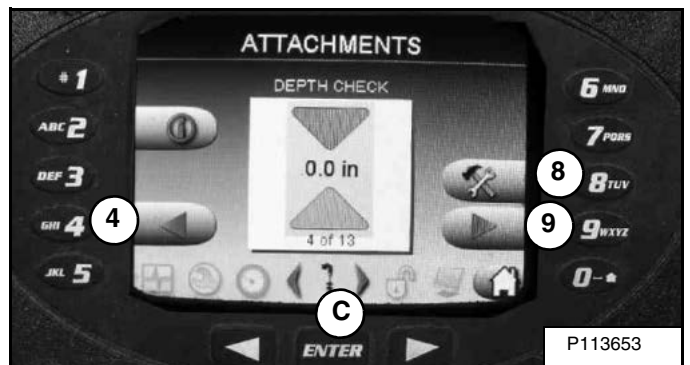
Figure 206



Scroll through the dash panel by pressing the left arrow (Item A) or the right arrow (Item B) until the ATTACHMENTS screen is displayed. Press the ENTER button (Item C) [Figure 206]

NOTE: If the Depth Check settings have been locked, enter the owner password to access the setup / calibration procedure.

Figure 207



On the ATTACHMENTS screen, use the left arrow button (Item 4) or the right arrow button (Item 9) and scroll to the Attachment Depth Check screen shown here. Press the ENTER button (Item C) or button (Item 8) [Figure 207] to access the Depth Check SETUP screen.

DEPTH CHECK (CONT'D)

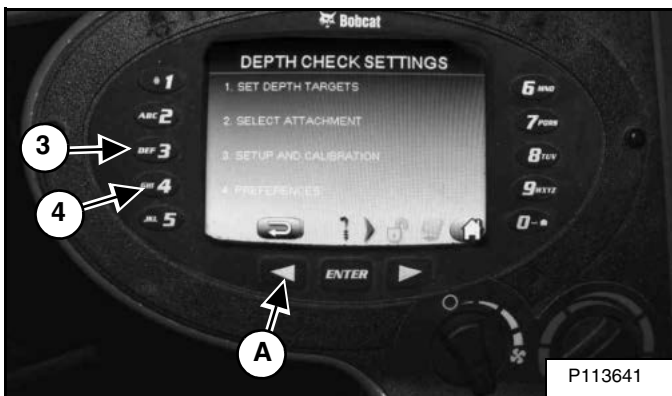
Setup / Calibration (Cont'd)

Figure 208



One of three different screens can appear. Which ever screen appears, press button (Item 2) [Figure 208] to access the Depth Check SETUP screen.

Figure 209



NOTE: The units of measure can be set in either millimeters or inches. Press button (Item 4) to enter the Preferences screen and select meters, millimeters, feet or inches, then press the arrow button (Item A) [Figure 209] to go back to the above screen.

NOTE: If the Depth Check settings have been locked, enter the owner password to access the setup / calibration procedure.

Press the button (Item 3) [Figure 209] for setup / calibration mode.

Figure 210



Read the message on the screen and press the ENTER button (Item C) [Figure 210] to continue.

Figure 211

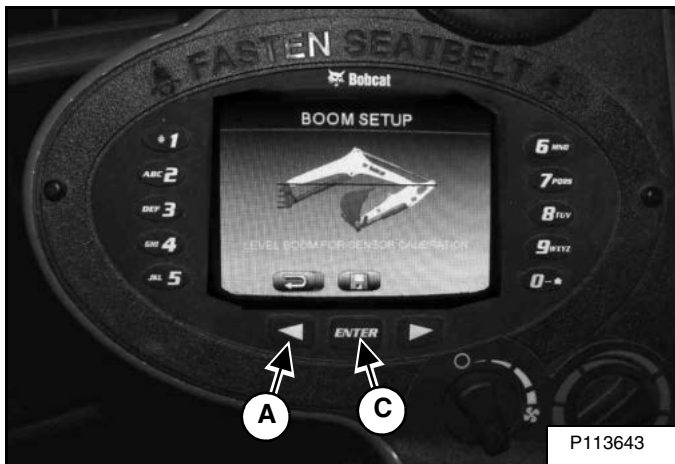


Press Boom Setup (Item 1) [Figure 211].

DEPTH CHECK (CONT'D)

Setup / Calibration (Cont'd)

Figure 212



With the boom leveled [Figure 204] and [Figure 205], press the ENTER button (Item C) [Figure 212] to store this information into the setup / calibration settings.

The next setup / calibration step will be for Arm Setup. This will require a plumb bob to make sure the arm is in the correct vertical position.

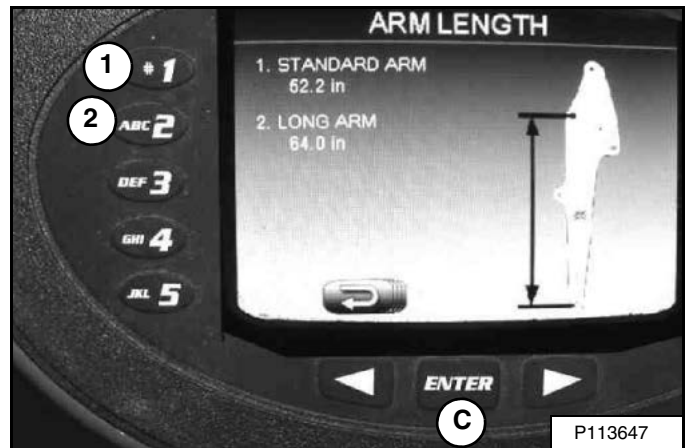
NOTE: If a plumb bob is not available, fishing line or a string with a heavy nut or two tied on one end of the string can be used in place of a plumb bob.

Figure 213



Have the second person in the cab and press the Arm Setup (Item 2) [Figure 213].

Figure 214

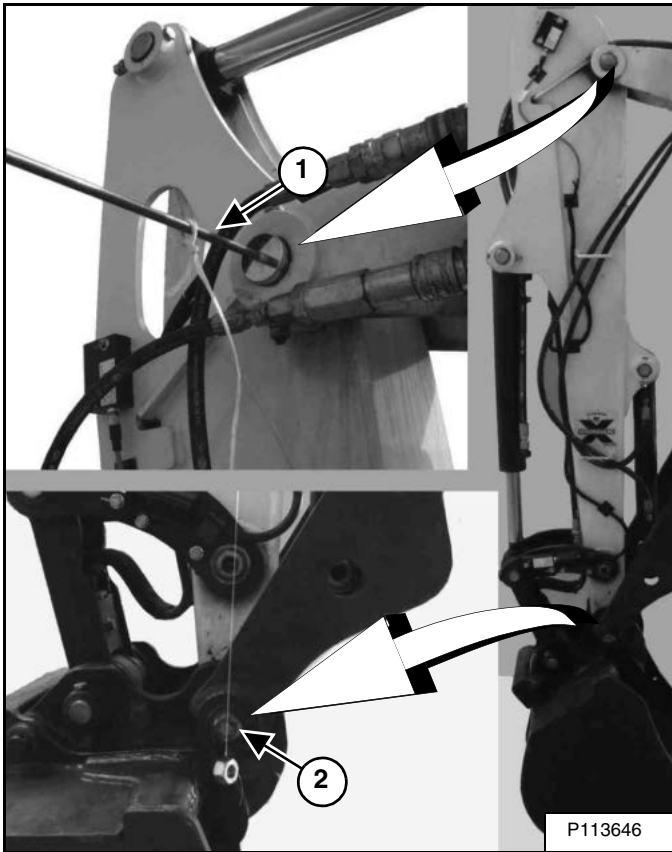


The system needs to know if the machine is equipped with a standard arm or the long arm option. The excavator ECU knows the machine model so the dimensions for the two arms is shown on the screen. For the Standard Arm, press (Item 1), for Long Arm, press (Item 2). Press the ENTER button (Item C) [Figure 214] to store this information into the setup / calibration settings.

DEPTH CHECK (CONT'D)

Setup / Calibration (Cont'd)

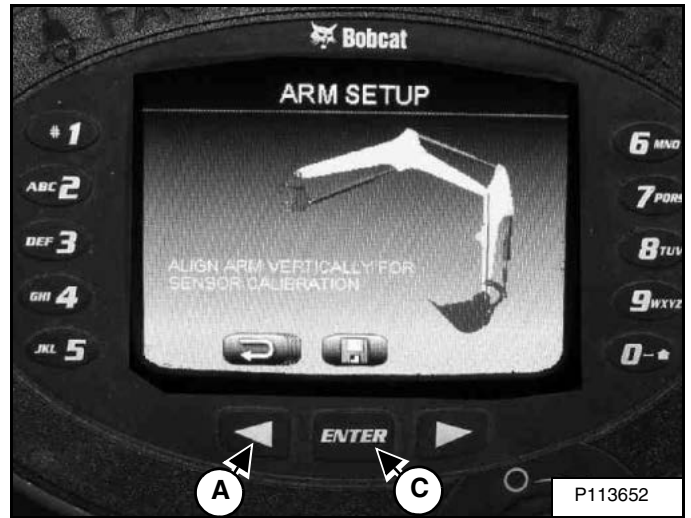
Figure 215



Place the plumb bob (Item 1) [Figure 215] on the magnetic tool that is installed on the arm pin. Raise the boom and move the arm until the arm is vertical.

Move the arm until the plumb bob line is centred on the bucket pin (Item 2) [Figure 215]. *(The accuracy of the arm being vertical affects the accuracy of the Depth Check.)*

Figure 216



With the arm vertical [Figure 215], press the ENTER button (Item C) [Figure 216] to store this information into the setup / calibration settings.

Figure 217



Press the Attachment Setup button (Item 3) [Figure 217].

DEPTH CHECK (CONT'D)

Setup / Calibration (Cont'd)

Figure 218



Select one of the attachments (Items 1 - 5) [Figure 218] from the list.

NOTE: Up to five different attachments can be named, setup / calibrated and stored or removed to make room for a new attachment. When switching between attachments, just select the desired attachment and as long as it was correctly setup, the Depth Check system will have the information needed for that attachment.

Figure 219



On the ATTACHMENT SETUP screen, you can select Change Name (Item 1), Setup And Calibration (Item 2), or Remove (Item 3) [Figure 219] the attachment from the saved list.

Select Change Name (Item 1) [Figure 219] to open the attachment name screen.

Name Examples: 24" bucket, 30" bucket, Auger, etc.

Figure 220



Use the keypads (Items 1 through 0) and enter a name or number for the attachment being setup. Press the ENTER button (Item C) [Figure 220] to save the name. (To add the name, press the keypad multiple times until the correct letter or number appears on the screen for the attachment name.)

If setting up additional attachments, select (Items 2 through Item 5) [Figure 218] and add the additional attachment names.

If setting up and calibrating multiple attachments at the same time, add all the attachment names into the system before doing the measurements. It will be more convenient when it comes time to add the dimensions.

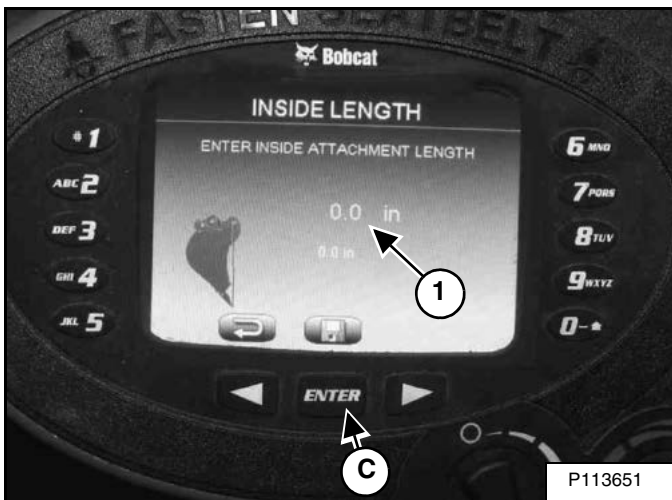
Press the arrow button (Item A) [Figure 219] and go back to the Attachment Setup screen.

Press the Setup And Calibration button (Item 2) [Figure 219].

DEPTH CHECK (CONT'D)

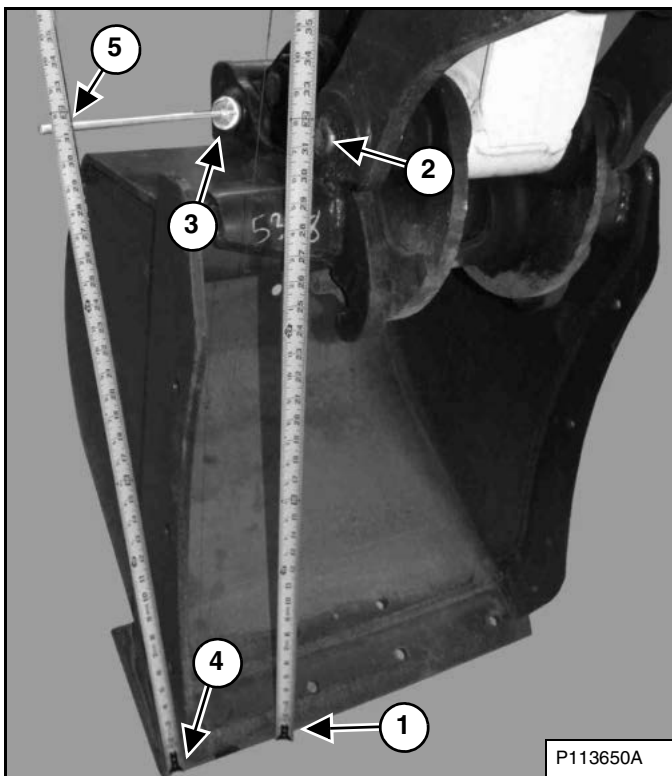
Setup / Calibration (Cont'd)

Figure 221



The INSIDE LENGTH screen (Item 1) [Figure 221] is where the first attachment dimensions will be added from the information determined in step [Figure 222].

Figure 222



This two-part step will measure the distance between the bucket pin (Item 2) [Figure 222] or the furthest point away from the bucket pin on any attachment used with the Depth Check system. We will be using a bucket as an example, but all attachments will be similar for this setup. *(The accuracy of these dimensions affect the accuracy of the Depth Check.)*

Position the bucket vertical. Use the plumb bob to locate the furthest vertical cutting point (Item 1) from the centre of the bucket pin (Item 2) [Figure 222].

Set the tip of the bucket (Item 1) on the ground ensuring that everything is still vertical. Using a tape measure, measure the distance between the cutting edge (Item 4) and the centre of the bucket pin (Item 3) [Figure 222].

NOTE: With usage of any attachment, the cutting surfaces wear. Example: The cutting edge (Item 1) [Figure 222] wears with the use of the bucket. The accuracy of the Depth Check system is affected by the wear of these components. If loss of accuracy is noticed, recalibrate the attachment to reset the dimensions needed for the Depth Check system to operate correctly.

The INSIDE LENGTH screen (Item 1) [Figure 221] is where the attachment dimensions will be added from the information determined in step [Figure 222].

Using the keypad (Item 1 through 0) [Figure 221], enter this dimension. After the measurement is entered and verified, press the ENTER button (Item C) [Figure 221]. As soon as the ENTER button is pressed, the OUTSIDE LENGTH [Figure 223] screen will be activated.

DEPTH CHECK (CONT'D)

Setup / Calibration (Cont'd)

Figure 223

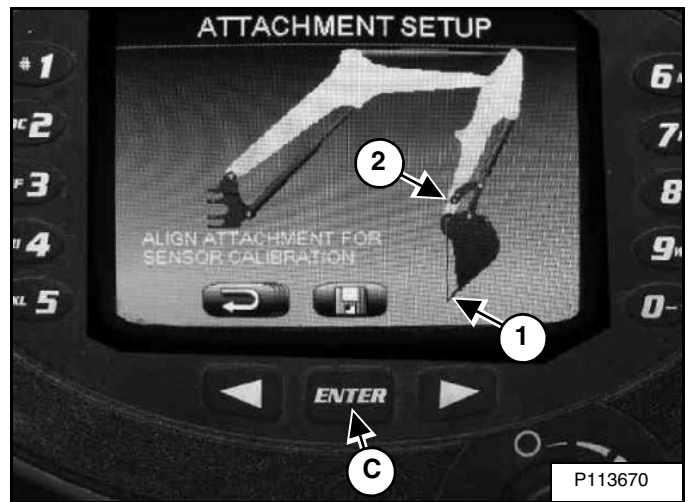


Install a magnetic pin on the second bucket pin (Item 3) [Figure 222].

The next measurement is from the cutting edge (Item 4) to the centre of the magnetic pin (Item 5) [Figure 222] for the outside length dimension.

Using the keypad (Item 1 through 0) [Figure 223] enter this dimension. After the measurement is entered and verified, press the ENTER button (Item C) [Figure 223]. As soon as the ENTER button is pressed, the screen will change to the ATTACHMENT SETUP screen [Figure 224].

Figure 224



Make sure the bucket is still vertical to the bucket pin (Item 2) and the cutting edge (or bucket teeth) (Item 1) and press the ENTER button (Item C) [Figure 224] to store the calibration information.

NOTE: If more than one attachment is being setup, the attachments can be changed on the arm and the additional attachment dimensions can also be entered. Always measure to the cutting / work tip on the attachment when measuring the dimensions to add to the inside and outside length screens for each new attachment. The Depth Check system uses these dimension along with the other setup points to calculate the tip position for Depth Check.

NOTE: When using an auger, it will not be as accurate as solid mounted attachments because all components are not rigidly mounted (auger bit has extra movement and rotation where the system is designed for fixed positions). When using the auger with the Depth Check system, enter zero for both attachment dimensions. When using the auger, try to keep the X-Change horizontal to the ground during the dig cycle and monitor the screen depth. Using this setup should give fairly accurate Depth Check information for auger applications.

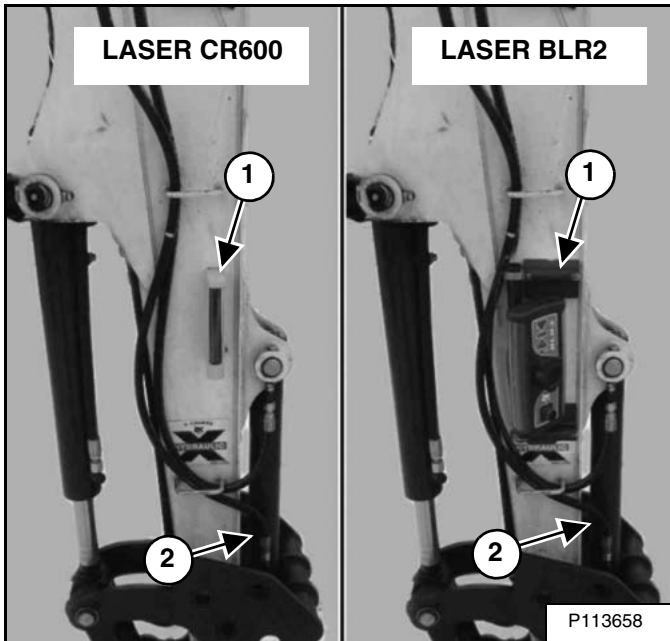
This finishes the SETUP / CALIBRATION procedure except if also installing a laser. (See If Using A Laser With Depth Check on Page 123.)

DEPTH CHECK (CONT'D)

Setup / Calibration (Cont'd)

If Using A Laser With Depth Check

Figure 225



FOR model E32 with the standard arm ONLY; If using either of the laser receivers (Item 1) on machines that have the standard arm and a hydraulic clamp installed, you will need to check the length of the hydraulic clamp rod end hose (Item 2) [Figure 225] to make sure the existing hose does not interfere with the laser.

Measure the length of the hose (Item 2) [Figure 225].

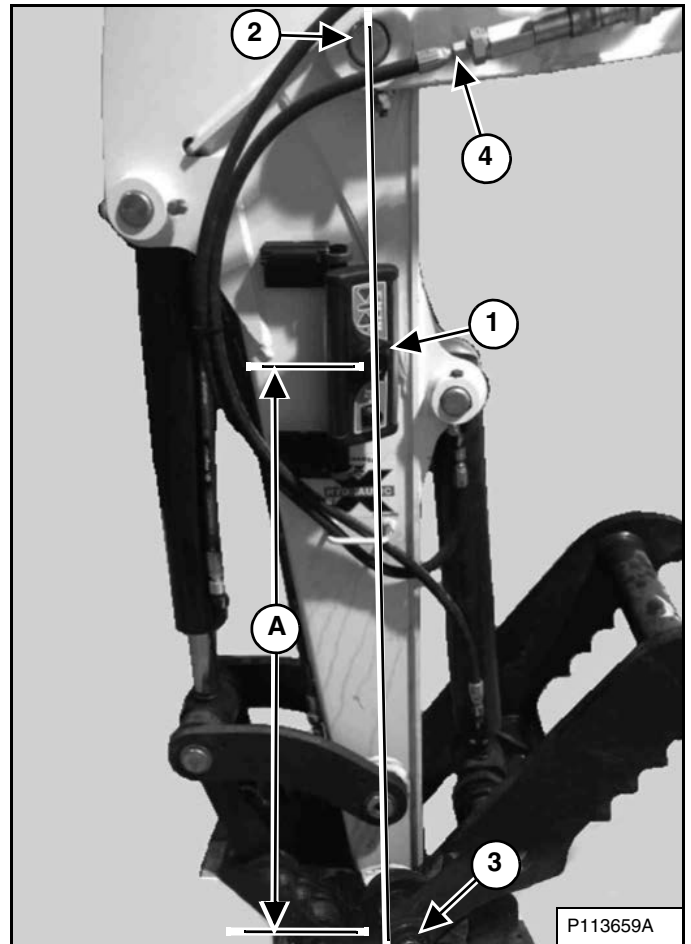
Measure the hose from the rod end of the clamp cylinder (Item 2) [Figure 225] to the end of the hose at the coupler (Item 4) [Figure 226].

The hose length must be 1245 mm (49.0 in) or a new hose (P/N 7250478) must be ordered and installed.

If the hose is incorrect, it may interfere with the laser when the hydraulic clamp is operated and possibly knock the laser receiver off of the arm. OR, the laser can be mounted on the opposite side of the arm, then the hose will not interfere with the laser.

NOTE: For excavator equipped with a clamp, (or other options or configurations added to the arm that may interfere with the laser), make sure there is no hose to laser interference. Fully curl the arm and bucket and make sure the hoses do not interfere with the laser receiver during any arm and bucket movement. Adjust the position of the laser receiver if necessary to avoid any contact with the hoses.

Figure 226



For both standard and long arm models; When installing the laser receiver (Item 1), it should be installed as close as possible in line with the arm pin (Item 2) and the bucket pivot pin (Item 3) [Figure 226].

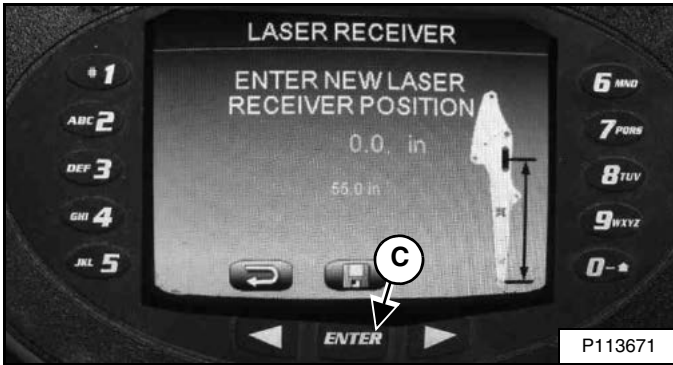
Position the laser (Item 1) approximately as shown. The dimension (Item A) will need to be added to the display screen. Measure from the centre of the bucket pin (Item 3) up to the centre of the laser receiver (Item 1) [Figure 226].

DEPTH CHECK (CONT'D)

Setup / Calibration (Cont'd)

If Using A Laser With Depth Check (Cont'd)

Figure 227



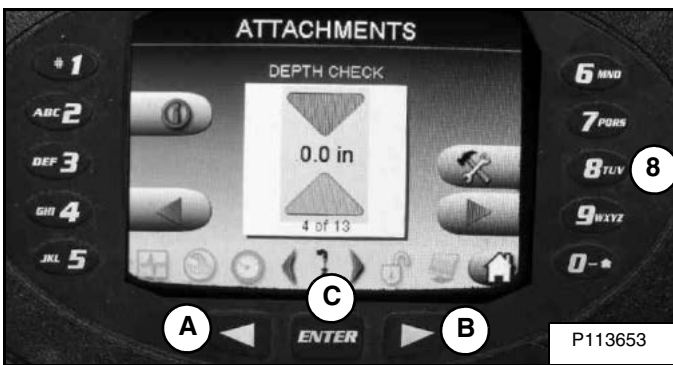
Add the dimension (Item A) [Figure 226] to the LASER RECEIVER screen, press the ENTER button (Item C) [Figure 227] to store the information. See [Figure 243] through [Figure 245] for additional information for setting the laser receiver dimensions.

Initial Setup

The initial setup will describe adding and changing the Depth Check target settings, grade zone setting, warning zone setting, laser receiver, preferences (changing unit of measurement settings), and describe how the Depth Check system functions.

Depth Check Settings

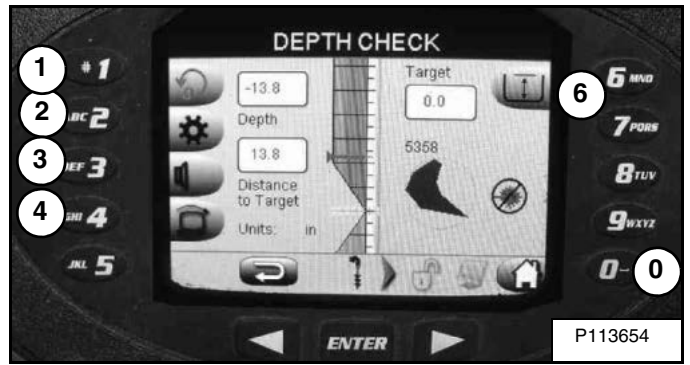
Figure 228



Using the left / right arrow buttons (Item A and B), toggle to the Attachment Depth Check screen [Figure 228].

Press the tool button (Item 8) or the ENTER button (Item C) [Figure 228] to go to the DEPTH CHECK screen [Figure 229] and [Figure 230].

Figure 229



The DEPTH CHECK screen [Figure 229] shows the following information. Press the numbered keypad to access each screen for setting the system:

(1) Re-bench: Used for setting the attachment start point to zero. (Example: Use surveyors elevation pin for the known depth to set zero.)

(2) Setup: Opens screen for selecting the following screens; Set Target Depth, Select Attachment, Setup and Calibration, and Preferences.

(3) Alarm: Sets the depth alarm to ON or OFF.

(4) Change Screens: Toggles through various depth screens; Depth Check, distance to target or grade check.

(6) Target Depth: Shows the depths for up to five preset depth settings.

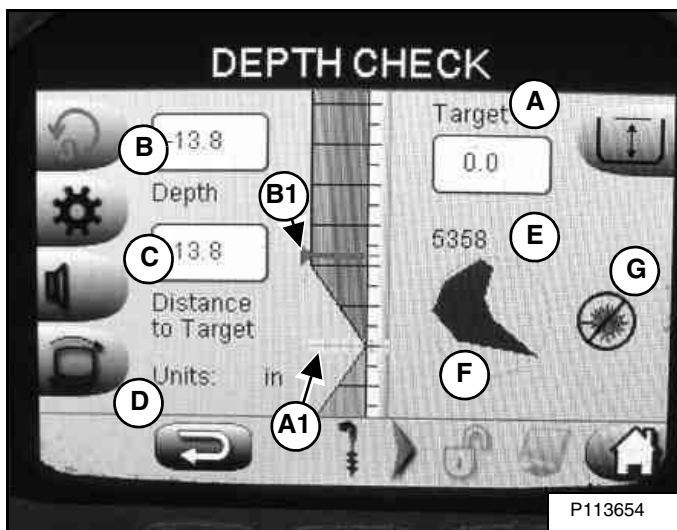
(0) Home Screen: Press 0 to go back to the home screen on the display panel.

DEPTH CHECK (CONT'D)

Initial Setup (Cont'd)

Depth Check Settings (Cont'd)

Figure 230



The DEPTH CHECK screen [Figure 230] shows the following information:

(A) Target (Dimension): The target is the depth to dig from an established starting point set by the operator. (Example: Desired dig depth from a surveyors elevation pin.)

(A1) Target (Bar Graph): The bar graph line shows where the target is at in relationship to the attachment position (Item B1).

(B) Depth (Dimension): This is the current depth of the attachment cutting edge.

(B1) Depth (Bar Graph): The bar graph line moves up and down and shows the position of attachment to the target (Item A1). (When the attachment gets close to the selected target depth, an audible alarm will start beeping. The closer the attachment gets to the target, the faster the beeps. When the alarm is continuous, you have reach the target depth. The alarm can be set ON or OFF by pressing the keypad number 3 [Figure 229]).

(C) Distance To Target (Dimension): The distance the attachment needs to travel to reach the selected target depth.

(D) Units: Shows the current selected unit of measure. (The units of measure can be set to meters, millimeters, feet or inches.)

(E) Name of attachment selected: Shows the name or the number of the selected attachment. (The attachment must be selected so that the Depth Check system knows what attachment is currently used for proper depth calculations.)

(F) Attachment: The screen uses a bucket to represent the attachment. The bucket will rotate to represent the position of the bucket (attachment) as the attachment is curled out or curled in. When the attachment is calibrated, it sets the position of bucket icon (F).

(G) Laser: The laser icon (Item G) will show if the laser is set to ON or OFF. (The laser as shown in [Figure 230] with the circle with the line through it represents the OFF position.)

DEPTH CHECK (CONT'D)

Initial Setup (Cont'd)

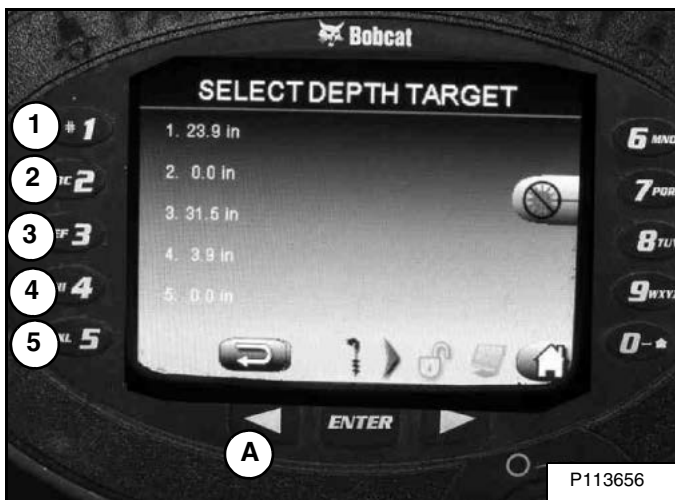
Depth Check Settings (Cont'd)

Figure 231



Press button (Item 6) [Figure 231] to go to the SELECT DEPTH TARGET screen [Figure 232].

Figure 232



Five different depths can be preset and stored in the system.

Select (Item 1 through Item 5) [Figure 232] to select one of the existing depths.

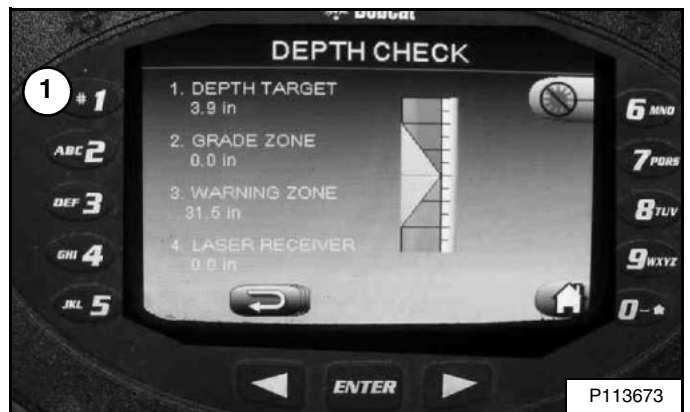
Or, if a different depth is needed, press the return button (Item A) [Figure 232] to go back one screen, then press button (Item 2) [Figure 231] to go to the DEPTH CHECK SETTINGS screen [Figure 233].

Figure 233



Press (Item 1) [Figure 233] to Set Depth Targets.

Figure 234



Press (Item 1) [Figure 234] to select Depth Target.

Figure 235



Select (Items 1 through 5) [Figure 235] to select one of the five possible stored depth settings.

DEPTH CHECK (CONT'D)

Initial Setup (Cont'd)

Depth Check Settings (Cont'd)

Figure 236



Use the keypads (Items 1 through 0) and enter the new target dimension. If the dimension entered is incorrect, press the arrow button (Item A) [Figure 236] to backspace the dimension.

Press the ENTER button (Item C) [Figure 236] to save the depth dimension. (Dimensions shown in inches but can be set to feet, meters, or millimeters. See [Figure 248].)

Grade Zone

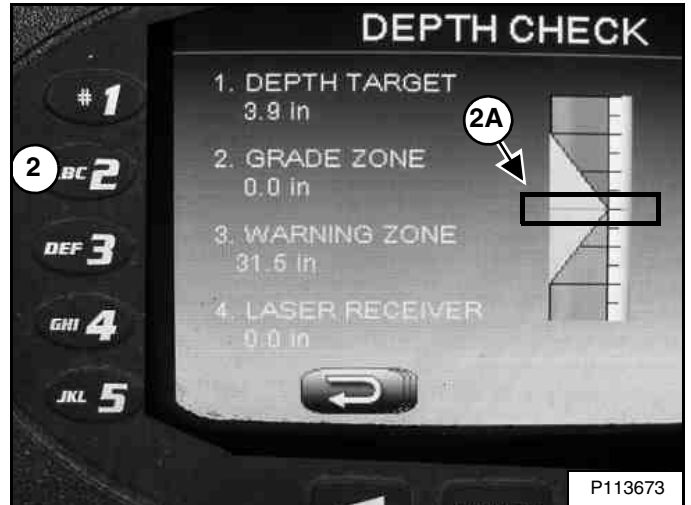
The Grade Zone sets the distance up or down from the target depth for when the warning alarm will start to be a continuous alarm. This will also increase the YELLOW highlighted area on the screen where the target zone is shown.

Figure 237



Press Set Depth Targets (Item 1) [Figure 237] to change to the next screen [Figure 238].

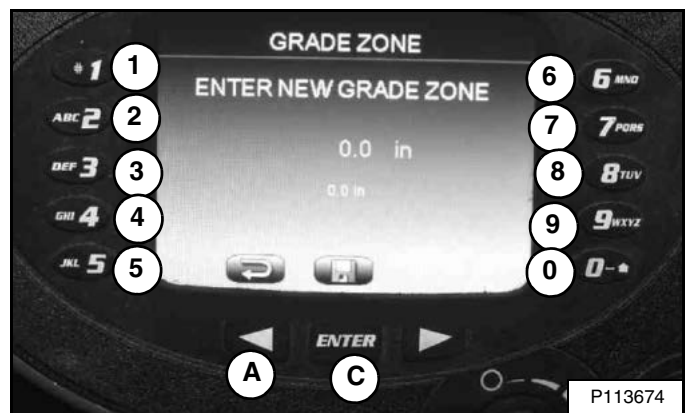
Figure 238



Press Grade Zone (Item 2) [Figure 238].

Grade zone area (Item 2A) [Figure 238] (in yellow on the display screen) is the area that will change with the dimensions as set in [Figure 239].

Figure 239



Use the keypads (Items 1 through 0) and enter the new grade zone dimension. If the dimension entered is incorrect, press the arrow button (Item A) [Figure 239] to backspace the dimension.

Press the ENTER button (Item C) [Figure 239] to save the grade zone dimension. (Dimensions shown in inches but can be set to feet, meters, or millimeters. See [Figure 248].)

DEPTH CHECK (CONT'D)

Initial Setup (Cont'd)

Warning Zone

The Warning Zone sets the upper distance from the target depth when the warning alarm will start to beep. (The alarm will start beeping when getting close to the selected target depth. The closer to the target, the faster beeps until you reach the target depth, then it will be a continuous sound. If the bucket goes below the selected target depth, the beeps will be very fast until the bucket is raised above the target depth.)

Figure 240



Press Set Depth Targets (Item 1) [Figure 240] to change to the next screen [Figure 241].

Figure 241



Press Warning Zone (Item 3) [Figure 241].

Press (Item 6) [Figure 241] to turn the laser ON or OFF.

Figure 242



Use the keypads (Items 1 through 0) and enter the new warning zone dimension. If the dimension entered is incorrect, press the arrow button (Item A) [Figure 242] to backspace the dimension.

Press the ENTER button (Item C) [Figure 242] to save the warning zone dimension. (Dimensions shown in inches but can be set to feet, meters, or millimeters. See [Figure 248].)

DEPTH CHECK (CONT'D)

Initial Setup (Cont'd)

Laser Receiver Position On Arm

The Depth Check system needs to know the location of laser receiver mounted on the arm. This dimension is used along with the target depth to set the Depth Check position.

Activate the laser on the dash panel by pressing button (Item 6) [Figure 244]. Press once, laser ON. Press a second time, laser OFF.

Figure 243



Press Set Depth Targets (Item 1) [Figure 243] to change to the next screen [Figure 244].

Figure 244



Press Laser Receiver (Item 4) [Figure 244].

Figure 245

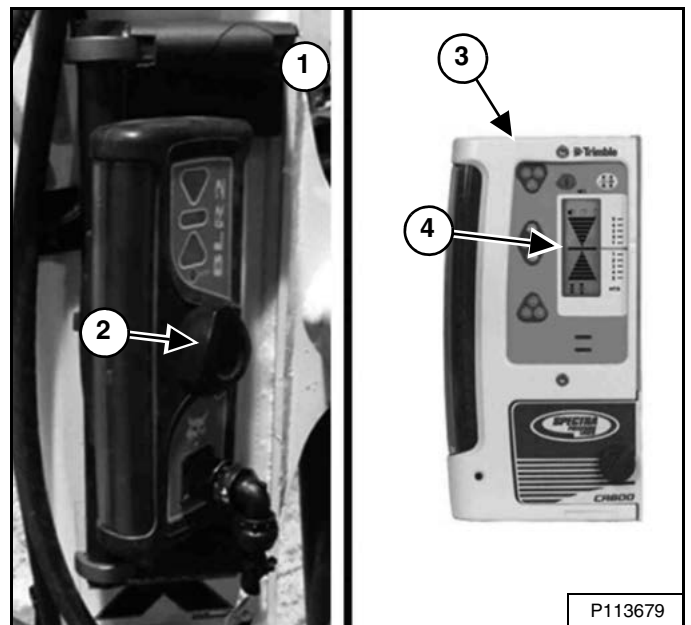


Use the keypads (Items 1 through 0) and enter the new laser receive position on the arm dimension. If the dimension entered is incorrect, press the arrow button (Item A) [Figure 245] to backspace the dimension. See [Figure 227] for additional information of the laser receiver.

Press the ENTER button (Item C) [Figure 245] to save the warning zone dimension. (Dimensions shown in inches but can be set to feet, meters, or millimeters. See [Figure 248].)

Measuring The Laser Location

Figure 246



For the model BLR2 (Item 1), measure to the centre of the knob (Item 2) [Figure 246].

For the model CR600 (Item 3), measure to the centre of the red line (Item 4) [Figure 246].

DEPTH CHECK (CONT'D)

Initial Setup (Cont'd)

Preferences

The Preferences screen is used to set two features;

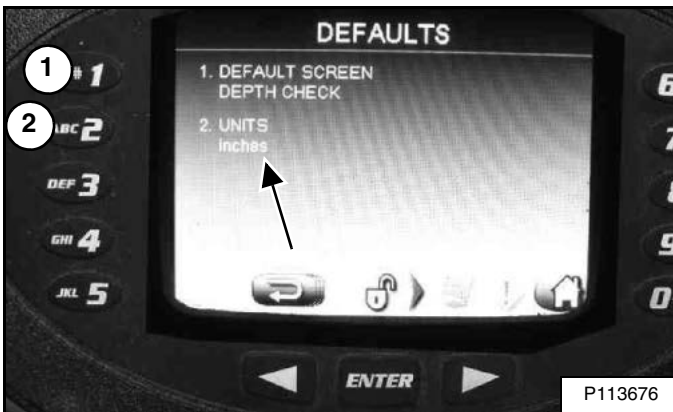
1. To set the screen preference for; Distance to Target, Depth Check or Grade Check.
2. To set units of measure (screen can be set to display; millimeters, meters, feet, or inches).

Figure 247



Press Preferences (Item 4) [Figure 247] to change to the DEFAULTS screen [Figure 248].

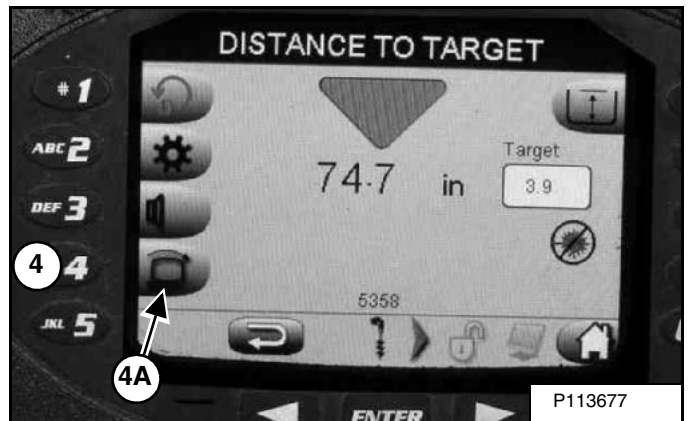
Figure 248



Press Default Screen button (Item 1) [Figure 248] to toggle the Preference screen between the following screens; Distance to Target [Figure 249], Depth Check [Figure 250], or Grade Check [Figure 251].

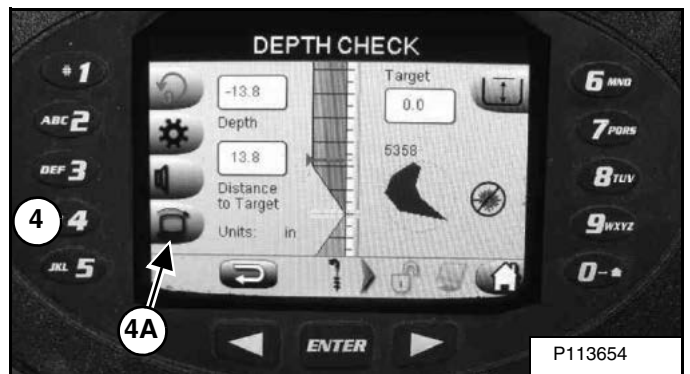
Press the UNITS button (Item 2) to toggle between meters, millimeters, feet, or inches. This sets how you will record and enter ALL dimensions into the Depth Check system. The selected units will be displayed under the word UNITS (Item 3) [Figure 248] and will be visible on all Depth Check screens that show dimensions.

Figure 249



Distance to Target [Figure 249] screen.

Figure 250



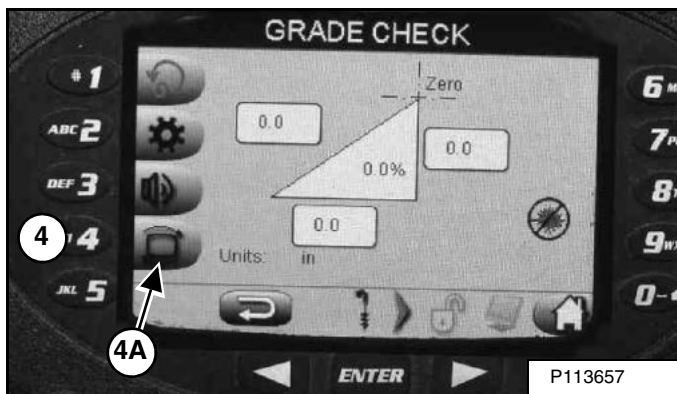
Depth Check [Figure 250] screen.

DEPTH CHECK (CONT'D)

Initial Setup (Cont'd)

Preferences (Cont'd)

Figure 251



Grade Check [Figure 251] screen.

NOTE: You can also press button (Item 4) [Figure 249], [Figure 250] or [Figure 251] to toggle between these three screens any time that the icon (Item 4A) is visible on any Depth Check screen.

Operation

The following will give some basic operation information for:

! WARNING

AVOID INJURY OR DEATH

Check area to be excavated for overhead or underground lines such as electrical, gas, oil, water, etc. Consult local utilities before digging. Extreme caution must be used in areas where utility lines are present.

W-2774-1208

IMPORTANT

When digging in an area with underground utilities, do not depend on the Depth Check system for digging close to known utilities. The Depth Check system accuracy is dependent on the accuracy of the calibration, slope of the ground and other unknown variables. The current depth of utility lines varies and may not be to the same depth as when the utility was buried due to soil erosion, grading and many other factors. Some laws require non-mechanical (hand) digging in the area of marked underground utilities. Make sure you follow all local rules and regulations regarding digging in the area of underground utilities.

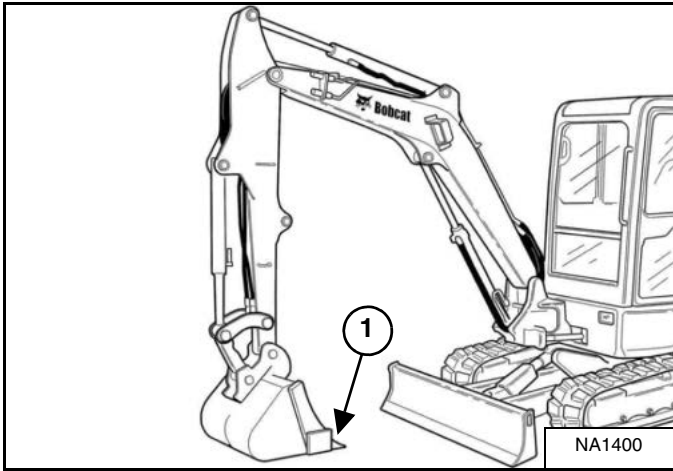
I-2383-1214

DEPTH CHECK (CONT'D)

Operation (Cont'd)

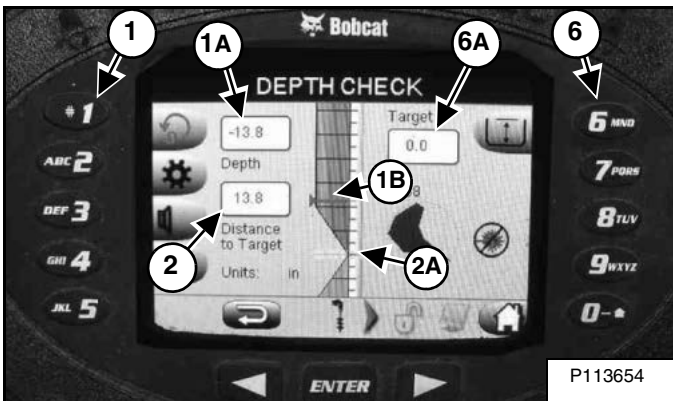
Digging A Hole To A Predetermined Depth

Figure 252



The first step is to set the position the bucket (Item 1) [Figure 252] at the ground surface you are going to start the dig or on the surveyor mark to establish the starting ground position. Lower the bucket until it is on the ground or on the surveyor mark. This is called re-benching.

Figure 253



To set the cutting edge position (re-benching) to zero, access the Depth Check screen, and press the re-benching button (Item 1). After the button is pressed, the dimensions on the screen for depth (Item 1A) will be set to 0.0. (As the bucket is raised or lowered, the screen at (Item 1A) [Figure 253] will show the bucket position dimension moving.)

Press button (Item 6) [Figure 253] to change to the SELECT TARGET DEPTH screen [Figure 254].

Figure 254



Select the target depth by pressing button (Item 1 through Item 5) [Figure 254] for selecting an existing depth. (To add a new target depth or to change an existing target depth, see information shown with steps [Figure 231] through [Figure 236].)

The selected target depth will now appear on the screen at (Item 6A) [Figure 253].

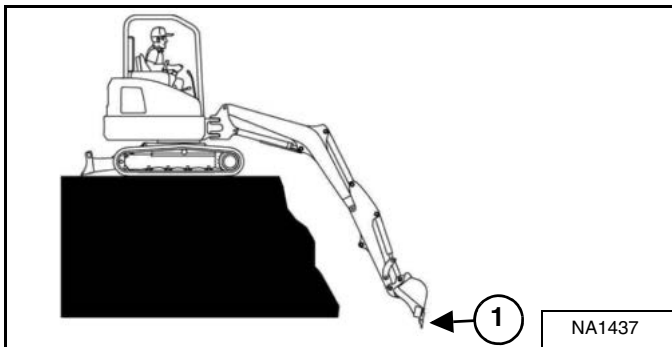
NOTE: If the excavator is at an angle (side slope) when re-benching, the system will only be accurate on the same plane (location) that it was re-benched at.

DEPTH CHECK (CONT'D)

Operation (Cont'd)

Digging A Hole To A Predetermined Depth (Cont'd)

Figure 255



As the hole is being dug, the position of the bucket (Item 1) [Figure 255] is dimensionally shown (Item 1A) [Figure 253] and shown on the bar graph at (Item 1B) [Figure 253]. The distance to target depth is dimensionally shown in (Item 2) [Figure 253] and shown on the bar graph (Item 2A) [Figure 253].

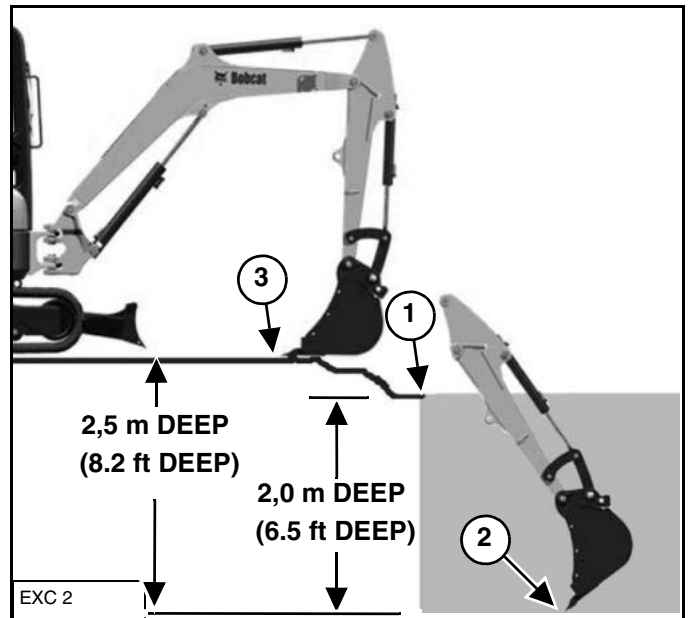
When the bucket is getting close to the target depth, a warning buzzer (if activated) will start to slowly beep. The beeps will increase in frequency the closer the bucket gets to the target depth. When the target depth is reached, the buzzer will sound continuously.

EXAMPLE: The target depth is 2 meters (6.5 ft) (Item 6A) and the position of the bucket (Item 1A) is at 1.5 meter (4.9 ft), the distance to target (Item 2) [Figure 253] will be 0.5 m (1.6 ft). [2 m - 1.5 m = 0.5 m (6.5 ft - 4.9 ft = 1.6 ft).]

NOTE: The distance from the target depth to when the when the alarm starts to beep can be set using the *Warning Zone* information. (See *Warning Zone* on Page 128.)

To reposition the excavator to continue digging the hole at the original depth:

Figure 256



If possible, reposition the excavator so the bucket can be re-benched off of the original starting point (Item 1) [Figure 256].

Or, If that is not possible, position the excavator so the bucket will reach to the bottom of the hole (Item 2) [Figure 256] at an area that is know to be the correct depth. (When re-benched at the bottom of the trench, set the target depth to zero to continue digging at the original depth.)

Or, With the bucket on the ground next to the excavator (Item 3) [Figure 256], re-bench the bucket to zero. Now reach into the existing hole until the bucket is touching the bottom of the hole (Item 2) [Figure 256] in an area you know is the correct depth. Example: The dimension shown in (Item 1A) [Figure 253] is now 2.5 m (8.2 ft). You now need to reset the target depth to 2.5 m (8.2 ft) to continue digging the hole at the original target depth.

Or, If you want to just continue digging with the hole parallel to the ground, no re-benching is necessary but the hole will not be horizontal, it will be at the same plane as the ground surface the machine is on.

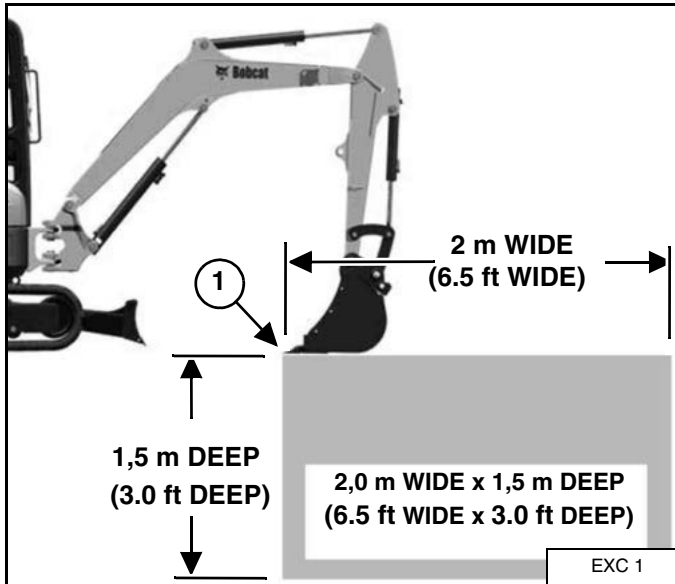
DEPTH CHECK (CONT'D)

Operation (Cont'd)

Digging A Hole To A Predetermined Width And Depth

EXAMPLE: Digging a 2.0 meter wide x 1.5 meter deep (6.5 ft wide x 3 ft deep) hole.

Figure 257

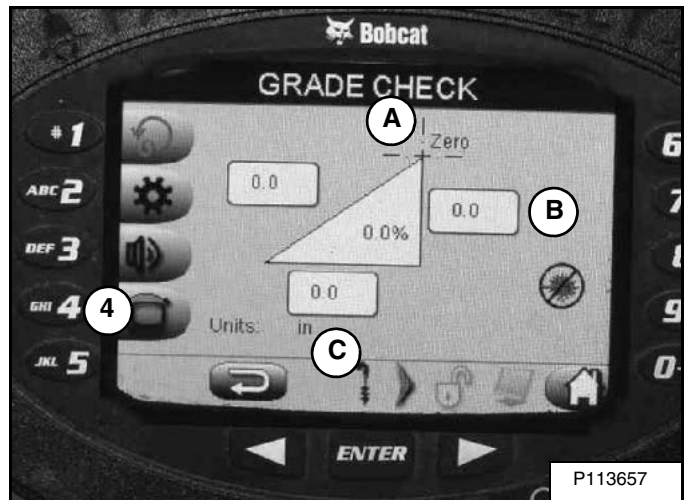


Follow the same procedure as for digging a hole except as follows. (See Digging A Hole To A Predetermined Depth on Page 132.)

When re-benching the bucket for setting to 0.0, position the bucket (Item 1) [Figure 257] at the starting point of the side of the hole that the excavator is positioned on.

This will allow the Depth Check to know the starting position of the hole for the depth and width of the hole.

Figure 258



Press (Item 4) [Figure 258] to scroll to the GRADE CHECK screen on the display panel. For additional information. (See Preferences on Page 130.)

The ZERO (Item A) is the re-benching starting point. (Item B) shows the target depth. (Item C) [Figure 258] shows the reach (distance away from the zero mark starting point (Item 1) [Figure 257]).

NOTE: The warning buzzer (if activated) will start to beep when getting close to the target depth and progressively beeps faster until the target depth is reach and then the buzzer will sound continuously. The buzzer only activates on the depth, not for the reach (width of hole). That will need to be monitored visually using (Item C) [Figure 258].

WARNING

AVOID INJURY OR DEATH

Check area to be excavated for overhead or underground lines such as electrical, gas, oil, water, etc. Consult local utilities before digging. Extreme caution must be used in areas where utility lines are present.

W-2774-1208

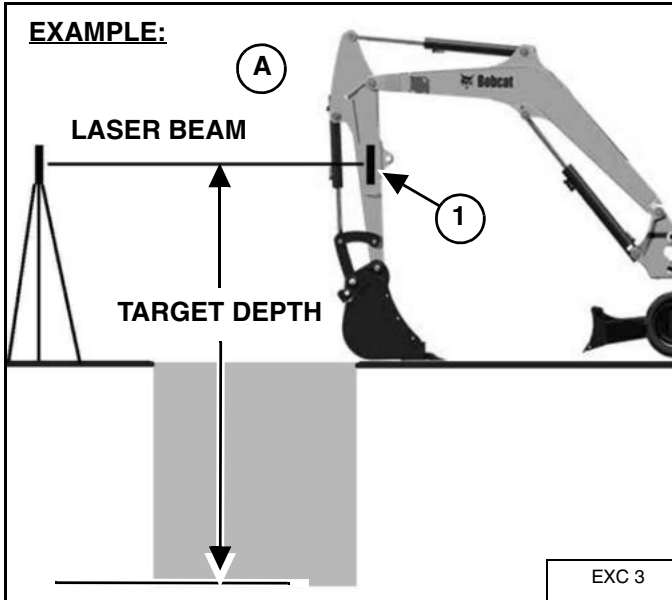
DEPTH CHECK (CONT'D)

Operation (Cont'd)

Digging A Hole Using A Laser

Read and understand the information supplied with the laser for correctly setting up the laser system.

Figure 259

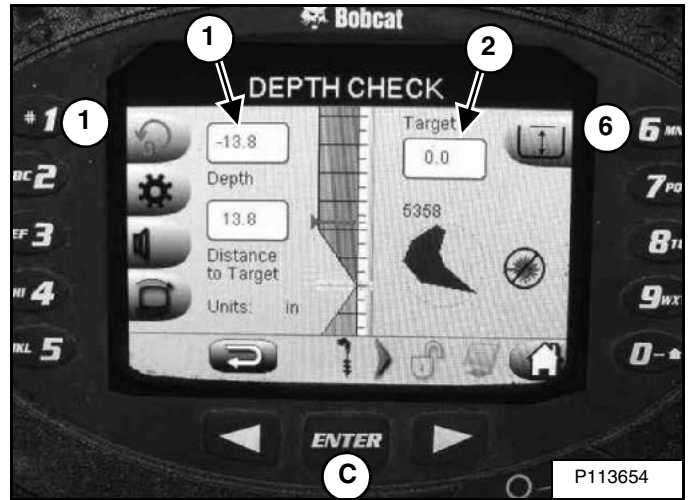


NOTE: Make sure the laser receiver dimensional location on the arm has been added into the Depth Check. For additional information. (See Laser Receiver Position On Arm on Page 129.)

With the arm vertical, raise or lower the boom and arm as needed until the laser (Item 1) strikes the receiver (Item 2) [Figure 259]. (If needed, curl the bucket fully for increased bucket ground clearance or a hole may need to be dug so that the bucket can be lowered to allow the laser to strike the receiver with the arm vertical.)

NOTE: If the arm is not vertical and you try to re-bench, a screen will tell you to make the arm vertical before it will allow the re-bench.

Figure 260



With the laser striking the receiver, press (Item 1) [Figure 260] to set the laser position.

Press (Item 6) to access the Preset Target Depth screen or go to figure [Figure 232] to add or change the target depth. When the correct target depth is entered, press the ENTER button (Item C) [Figure 260] to save the setting.

With the Depth Check system set-up, the excavator can now be repositioned and the dig depth will stay consistent to the set target depth.

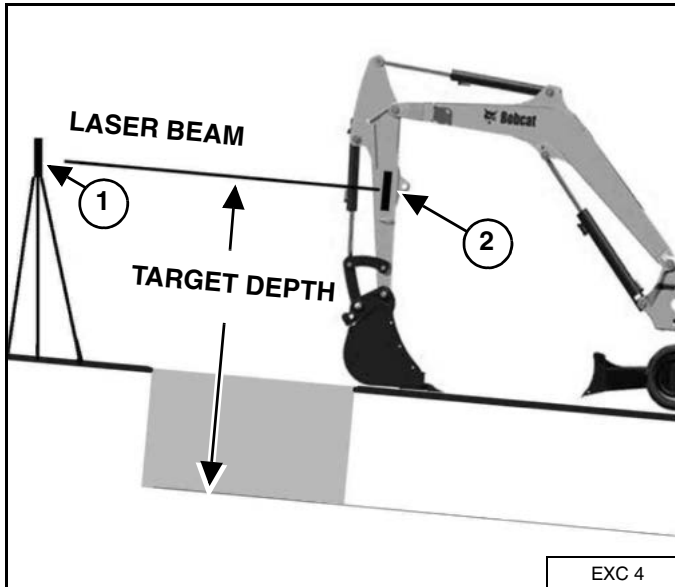
DEPTH CHECK (CONT'D)

Operation (Cont'd)

Digging A Trench With Slope Using A Laser

Read and understand the information supplied with the laser for correctly setting up the laser system.

Figure 261

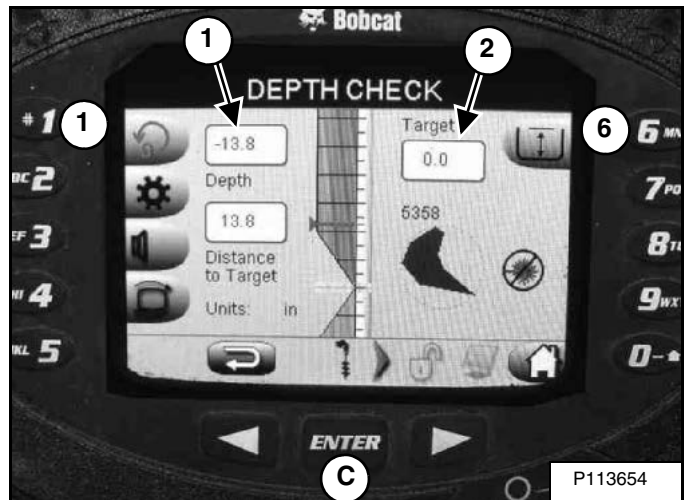


NOTE: Make sure the laser receiver dimensional location on the arm has been added into the Depth Check. For additional information. (See Laser Receiver Position On Arm on Page 129.)

With the arm vertical, raise or lower the boom and arm as needed until the laser (Item 1) strikes the receiver (Item 2) [Figure 261]. (If needed, curl the bucket fully for increased bucket ground clearance or a hole may need to be dug so that the bucket can be lowered to allow the laser to strike the receiver with the arm vertical.)

NOTE: If the arm is not vertical and you try to re-bench, a screen will tell you to make the arm vertical before it will allow the re-bench.

Figure 262



With the laser striking the receiver, press (Item 1) [Figure 262] to set the laser position.

Press (Item 6) to access the Preset Target Depth screen or go to figure [Figure 232] to add or change the target depth. When the correct target depth is entered, press the ENTER button (Item C) [Figure 262] to save the setting.

With the Depth Check system set-up, the excavator can now be repositioned and the dig depth will stay consistent to the set target depth and to the slope set with the laser.

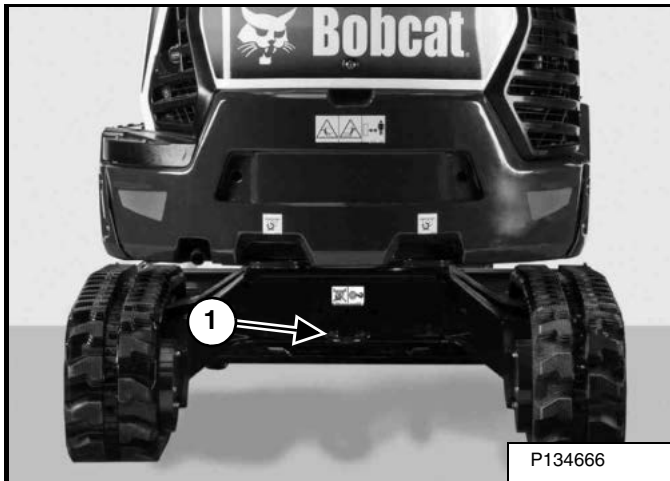
TOWING THE EXCAVATOR

Procedure

There is not a recommended towing procedure for the excavators.

The excavator can be lifted onto the transport vehicle (See LIFTING THE EXCAVATOR on Page 138.).

Figure 263



The excavator can be skidded a short distance for service (for example, moving it onto a transport vehicle) without damaging the hydraulic system. (The tracks will not turn.) There might be slight wear to the tracks when the excavator is skidded.

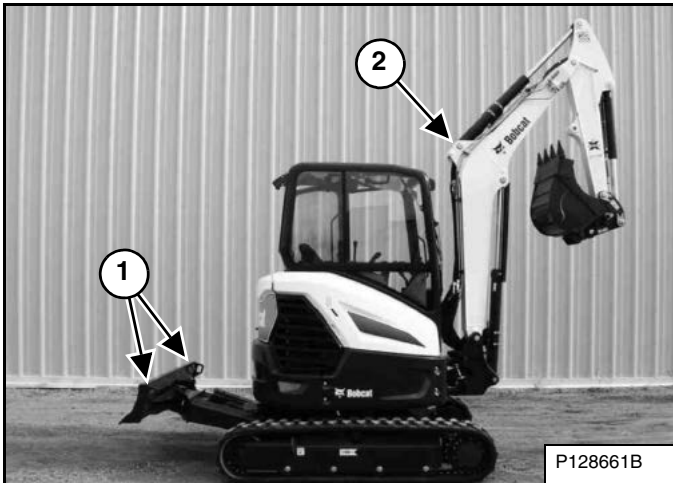
Secure the towing chain to the loop located at the rear of the excavator (Item 1) [**Figure 263**].

The towing chain (or cable) must be rated at 1.5 times the weight of the excavator. (See Performance on Page 224.)

LIFTING THE EXCAVATOR

Procedure

Figure 264



Before lifting, fully extend the cylinders of the bucket, arm, and boom. Raise the blade fully. Turn the upperstructure so the boom and blade are at opposite ends of the excavator as shown [Figure 264].

Put all the control levers in NEUTRAL and stop the machine.

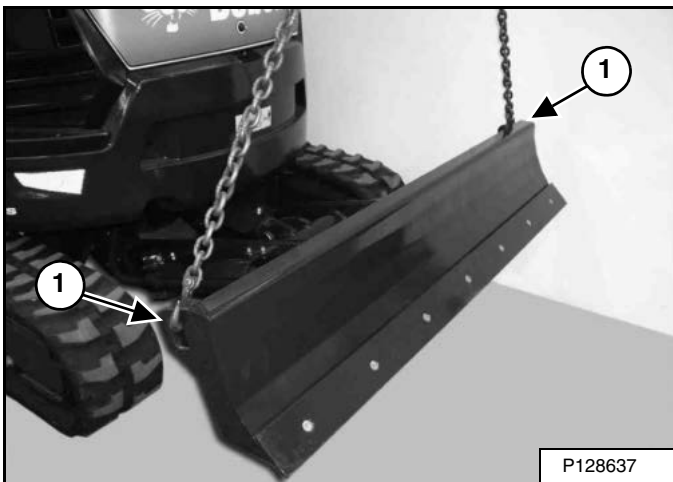
WARNING

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.
- Never lift with operator on machine.
- Never lift with the blade angled (if equipped).

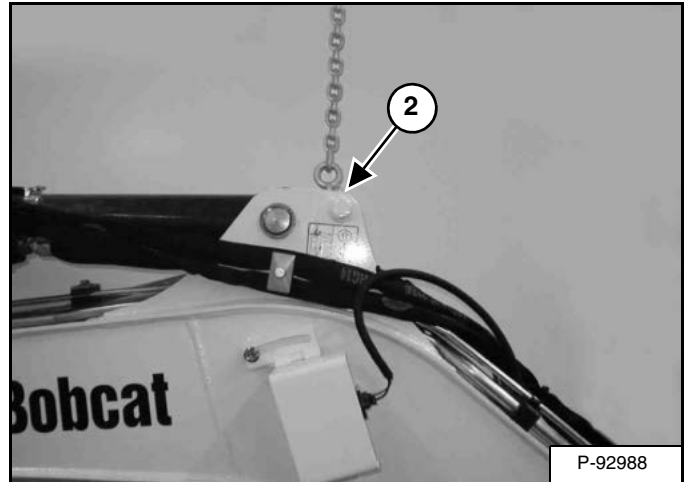
W-2800-EN-0210

Figure 265



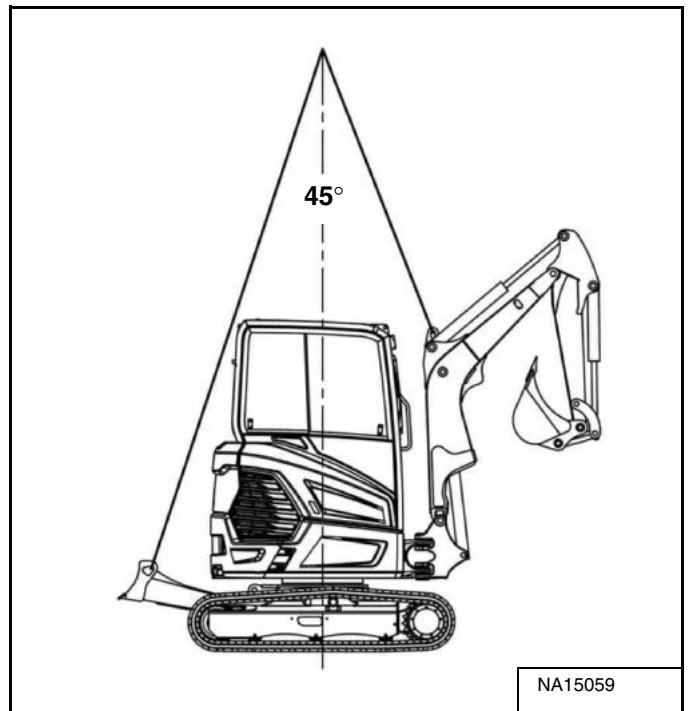
Fasten chains to the ends of the blade (Item 1) [Figure 264] and [Figure 265] and up to a lifting fixture above the canopy / cab. The lifting fixture must extend over the sides of the canopy / cab to prevent the chains from hitting the ROPS / TOPS.

Figure 266



Fasten a chain (Item 2) [Figure 264] and [Figure 266] from the rod to the lift fixture.

Figure 267



The excavator should remain as close to horizontal as possible while it is lifted. To prevent damage, the chains should not contact any part of the operator canopy / cab. The chains should be at an angle of 45 degrees [Figure 267].

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.

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.

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 268



Move the machine forward onto the transport vehicle [Figure 268].

TRANSPORTING THE EXCAVATOR ON A TRAILER (CONT'D)

Fastening

Tie down the excavator to prevent it from moving when going up or down slopes or during sudden stops.

Front Tie-Down Locations

Figure 269

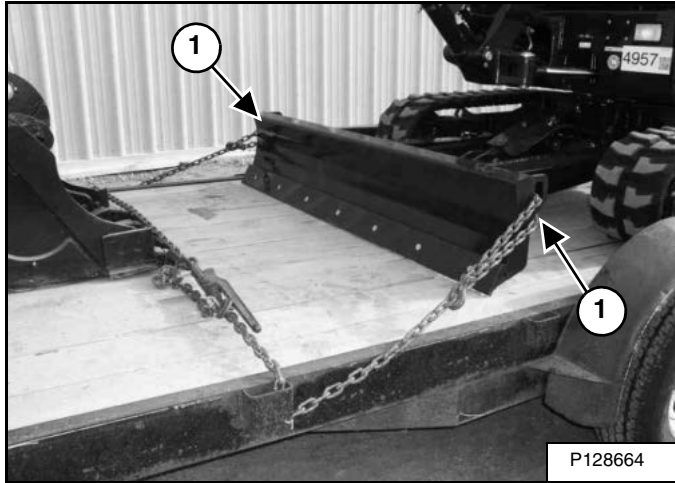
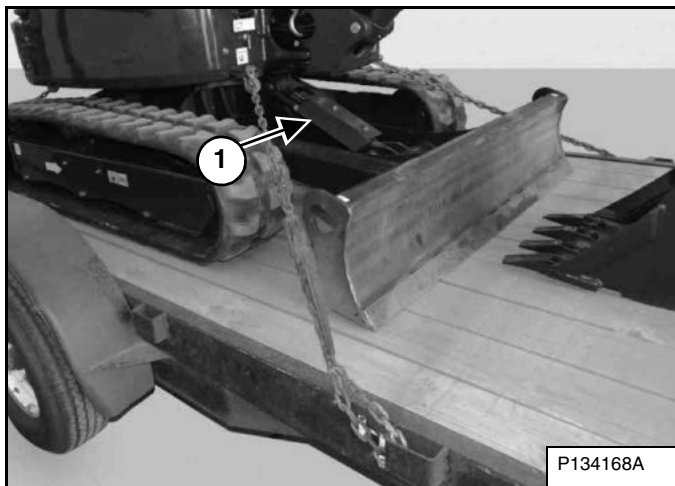


Figure 270



Fasten chains to the front corners of the blade (Item 1) [Figure 269] or to the tie-down loops at the front of the upperstructure (Item 1) [Figure 271].

Rear Tie-Down Locations

Figure 271

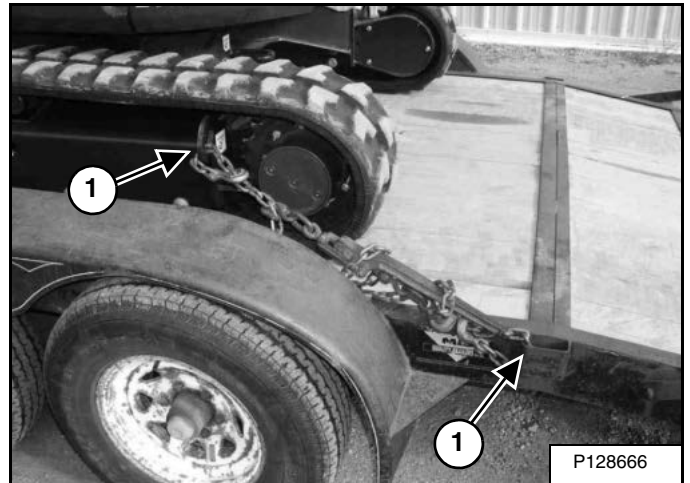
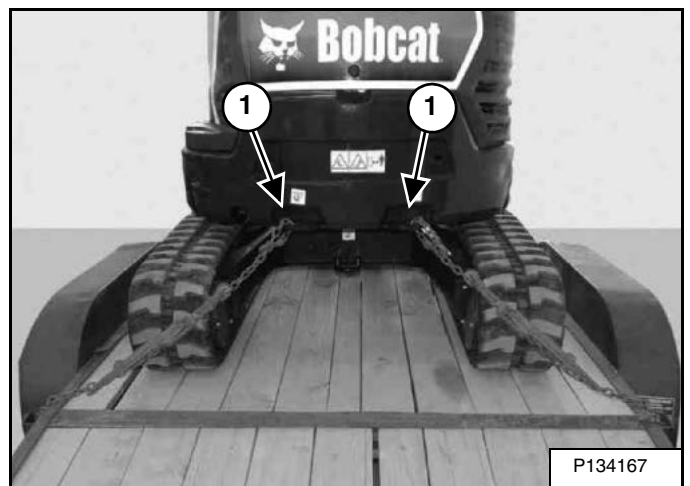


Figure 272



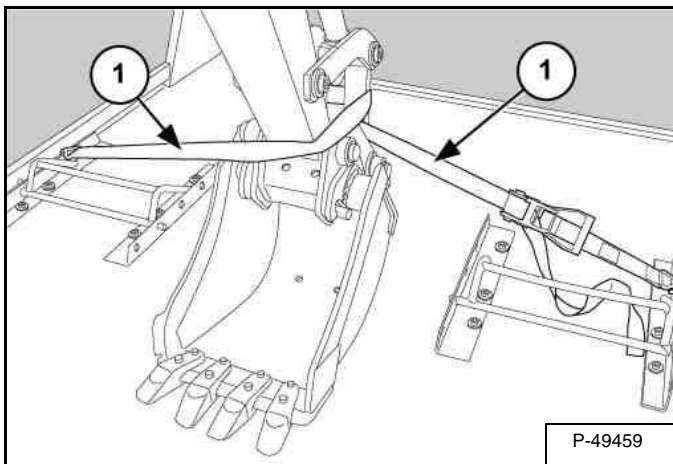
Fasten chains to the tie-down loops at the rear corners of the track frame (Item 1) [Figure 271] or to the tie-down loops at the rear of the upperstructure (Item 1) [Figure 272].

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

TRANSPORTING THE EXCAVATOR ON A TRAILER (CONT'D)

Fastening (Cont'd)

Figure 273



Loop a chain (Item 1) [Figure 273] around the bucket link and to the trailer.

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

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MAINTENANCE SAFETY



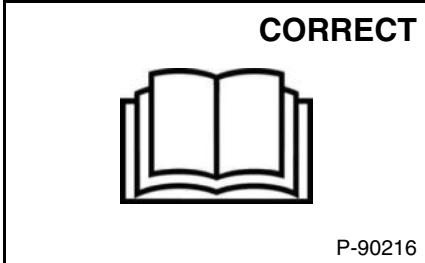
WARNING

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

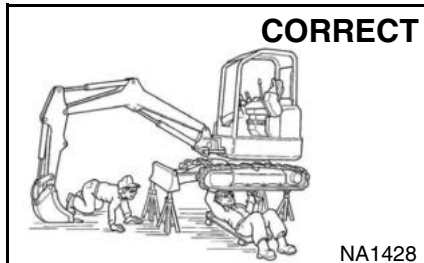


Safety Alert Symbol: This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.



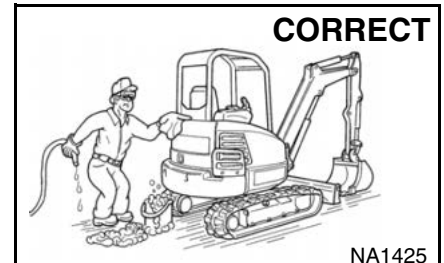
P-90216

- ⚠ Never service the Bobcat Compact Excavator without instructions.



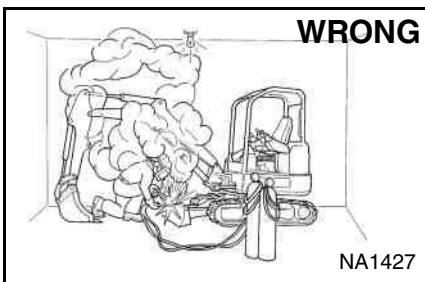
NA1428

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



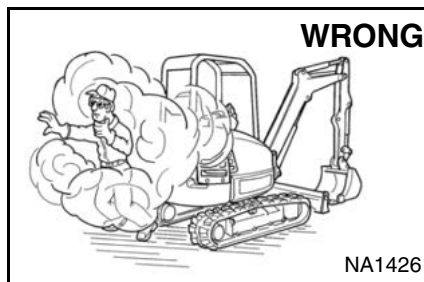
NA1425

- ⚠ Cleaning and maintenance are required daily.



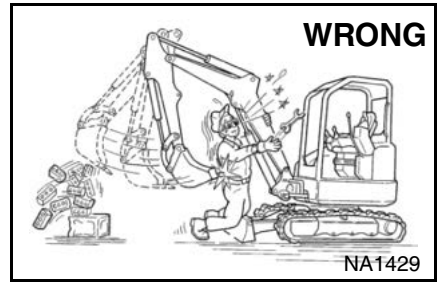
NA1427

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



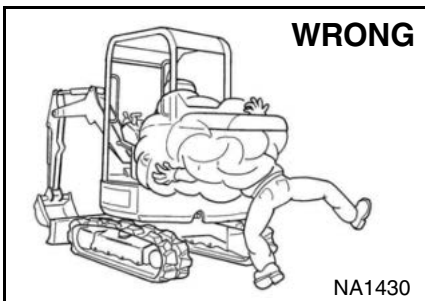
NA1426

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



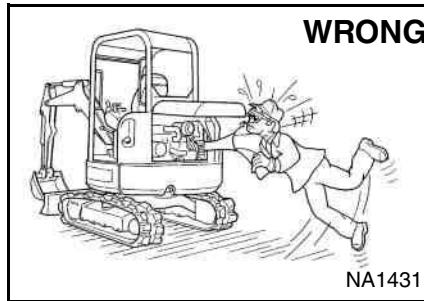
NA1429

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



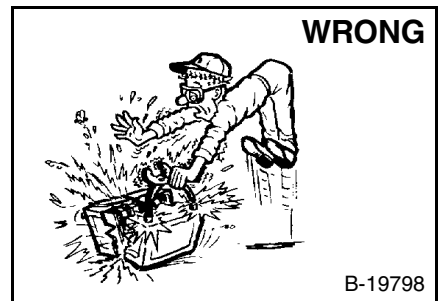
NA1430

- ⚠ 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.

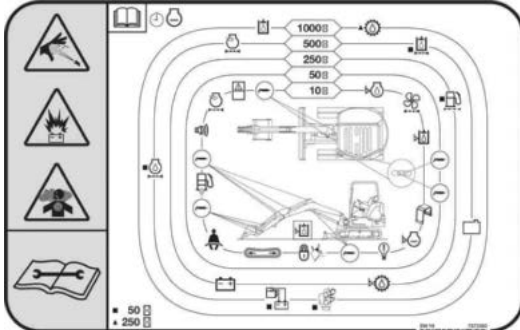
MSW38-0409

SERVICE SCHEDULE

Maintenance Intervals

Maintenance work must be done at regular intervals. Failure to do so will result in excessive wear and early failures.

The service schedule is a guide for correct maintenance of the Bobcat excavator.



See inside page of the back cover for symbols and identification.

Every 10 Hours (Before Starting The Excavator)

- **Engine Oil** - Check level and add as needed. (See Page 162.)
- **Engine Air Filters and Air System** - Check the condition indicator. Service only when required. Check for leaks and damaged components. (See Page 155.)
- **Engine Cooling System** - Check coolant level COLD and add premixed coolant as needed. (See Page 164.) and (See Page 166.)
- **Seat Belt, Seat Belt Retractors, Seat Belt Mounting hardware** - Check the condition of seat belt and mounting hardware. Clean or replace seat belt retractors as needed. Clean dirt and debris from moving parts. (See Page 149.)
- **Control Console Lockout** - Check the control console lockout lever for proper operation. (See Page 148.)
- **Motion Alarm and Horn** - Check for proper function. (See Page 150.)
- **Operator Canopy / Cab** - Check the canopy / cab condition and mounting hardware. (See Page 37.)
- **Operator Cab and HVAC Filters** - Clean filters. (See Page 155.)
- **Indicators and Lights** - Check for correct operation of all indicators and lights. (See Page 27.)
- **Safety Signs** - Check for damaged signs (decals). Replace any signs that are damaged. (See Page 17.)
- **Hydraulic Fluid** - Check fluid level and add as needed. (See Page 174.)
- **Fuel Filter** - Drain water and sediment from filter. (See Page 160.)
- **Track Tension** - Check tension and adjust as needed. (See Page 180.)
- **Pivot Points** - Grease all machinery pivot points. Grease clamp (if equipped). (See Page 188.)
- **Attachment Coupler** - Check for damage or loose parts (if equipped). (See Page 186.)

First 50 Hours

- **Fuel Filter** - Replace filter. (See Page 160.)
- **Engine Oil and Filter** - Replace oil and filter. (See Page 163.)
- **Drive Belts (Alternator)** - Check condition. Replace as needed. (See Page 183.)
- **Hydraulic Filter and Case Drain Filter** - Replace hydraulic filter and case drain filter. (See Page 175.)
- **Alternator and Starter** - Check connections.

Every 50 Hours

- **Swing Bearing** - Grease swing bearing and swing pinion. Service every 10 hours when operating in water. (See Page 188.)



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

SERVICE SCHEDULE (CONT'D)

Maintenance Intervals (Cont'd)

Every 100 Hours

- **Spark Arrestor Muffler (If Equipped)** - Clean spark chamber. (See Page 178.)

First 250 Hours

- **Travel Motors (Final Drive)** - Replace fluid. (See Page 182.)

Every 250 Hours Or Every 12 Months

- **Battery** - Check cables, connections, and electrolyte level. (See Page 167.)
- **Fuel Filter** - Replace filter. (See Page 160.)
- **Travel Motors (Final Drive)** - Check fluid level and add as needed. (See Page 182.)

Every 500 Hours Or Every 12 Months

- **Engine Oil and Filter** - Replace oil and filter. (See Page 163.)
- **Engine Air Filters and Air System** - Check the condition indicator. Service only when required. Check for leaks and damaged components. (See Page 156.)
- **Engine Cooling System** - Clean debris from radiator, fuel cooler, hydraulic fluid cooler, air conditioning condenser (if equipped). (See Page 165.)
- **Drive Belts (Alternator) (Air Conditioning - If Equipped)** - Check condition. Replace as needed. (See Page 183.)
- **Hydraulic Filter, Case Drain Filter, and Hydraulic Reservoir Breather Cap** - Replace the hydraulic filter, case drain filter, and reservoir breather cap. (See Page 175.)
- **Alternator and Starter** - Check connections.
- **HVAC** - Check housing and coils.

Every 1000 Hours Or Every 12 Months

- **Engine Valves** - Adjust the engine valve clearance.
- **Travel Motors (Final Drive)** - Replace fluid. (See Page 182.)
- **Hydraulic Fluid and Filters** - Replace hydraulic fluid and filters. (See Page 175.)

Every 24 Months

- **Coolant** - Replace the coolant. (See Page 166.)

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Inspection Checkbook

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 the correct maintenance of the Bobcat excavator.

The Inspection Checkbook contains the following information:

- Doosan Bobcat EMEA s.r.o. Warranty Policy
- Doosan Bobcat EMEA s.r.o. Extended Warranty Policy

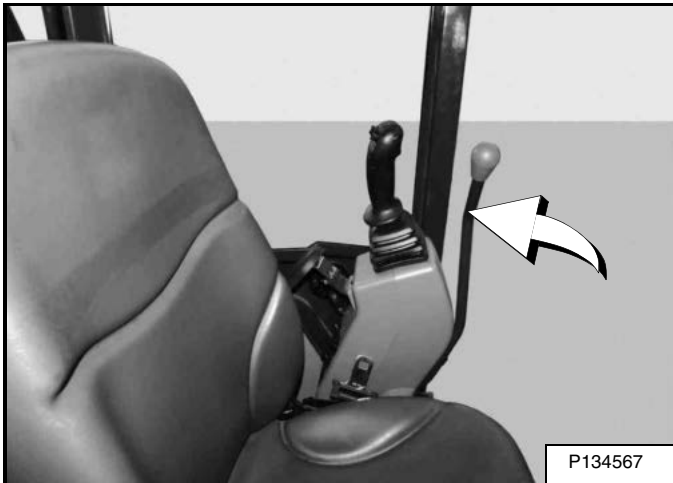
The inspection checkbook has to be filled in by the Dealer for any maintenance and service work of your Bobcat machine. This book may be required anytime by an authorised dealer or by Bobcat Europe, should be a breakdown occur on the Bobcat equipment.

Your dealer can order the Inspection Checkbook.
Part Number: 7296478.

CONTROL CONSOLE LOCKOUTS

Inspection And Maintenance

Figure 274



When the left console is raised **[Figure 274]**, 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.

Keep the left console raised **[Figure 274]**.

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.

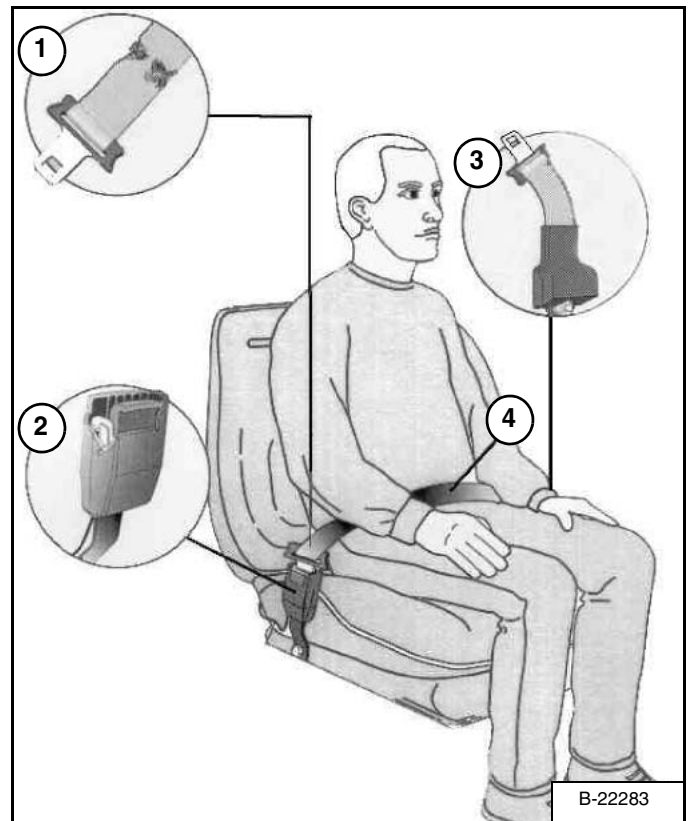
Any seat belt system that shows cuts, fraying, extreme or unusual wear, significant discolourations due to ultraviolet UV exposure, dusty / dirty conditions, abrasion to the seat belt webbing, or damage to the buckle, latch plate, retractor (if equipped), hardware or any other obvious problem should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

The items below are referenced in **[Figure 275]**.

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.

Figure 275



MOTION ALARM SYSTEM

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 276



Figure 277



Inspect for damaged or missing motion alarm decal (Item 1) [Figure 276] (cab machine) or (Item 1) [Figure 277] (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 68.)

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 278



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 278]. The motion alarm will shut off. With the machine still moving forward, move both 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 278] (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.

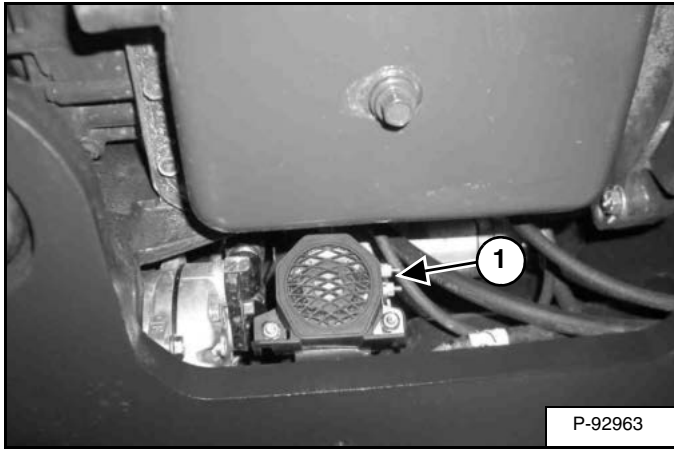
Return both levers to NEUTRAL and turn excavator key to OFF position. Exit the excavator. (See STOPPING THE ENGINE AND LEAVING THE EXCAVATOR on Page 75.)

MOTION ALARM SYSTEM (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 279

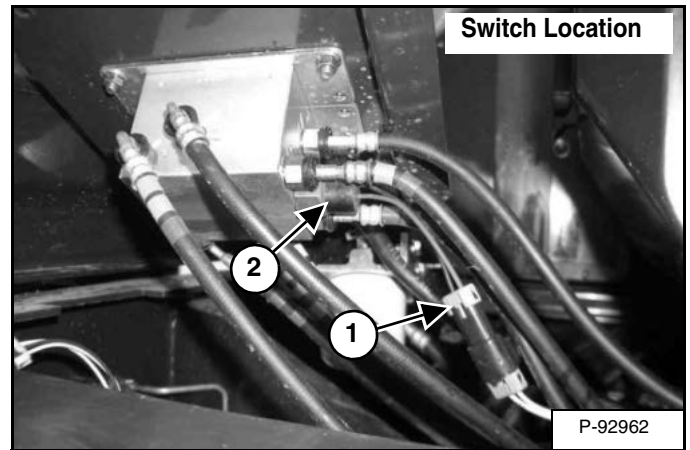


Inspect the motion alarm electrical connections and wire harness (Item 1) [Figure 279], wire harness (Item 1) [Figure 280] and motion alarm switch (Item 2) [Figure 280] for tightness and damage. Repair or replace any damaged components.

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

Adjusting Switch Position

Figure 280



The motion alarm switch (Item 2) [Figure 280] is located in the travel control valve located under the floorplate. Remove the floor mat and the floorplate to access the switch.

The switch (Item 2) [Figure 280] is non-adjustable. It must be fully installed into the travel control valve housings 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.

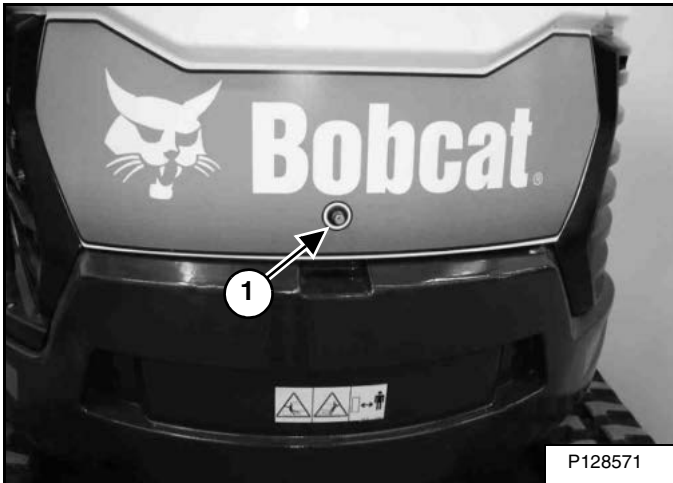
W-2012-0497

! WARNING

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

W-2020-1285

Figure 281



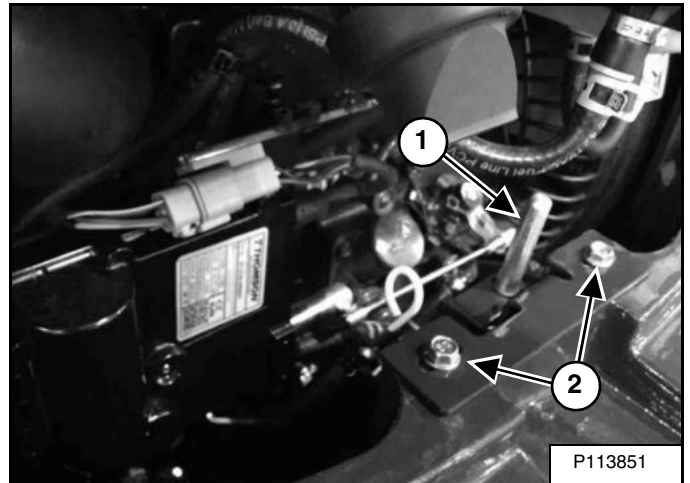
Push the button (Item 1) [Figure 281] to open the tailgate.

Push firmly to close the tailgate.

NOTE: The tailgate (Item 1) [Figure 281] can be locked using the start key.

Adjusting The Latch

Figure 282



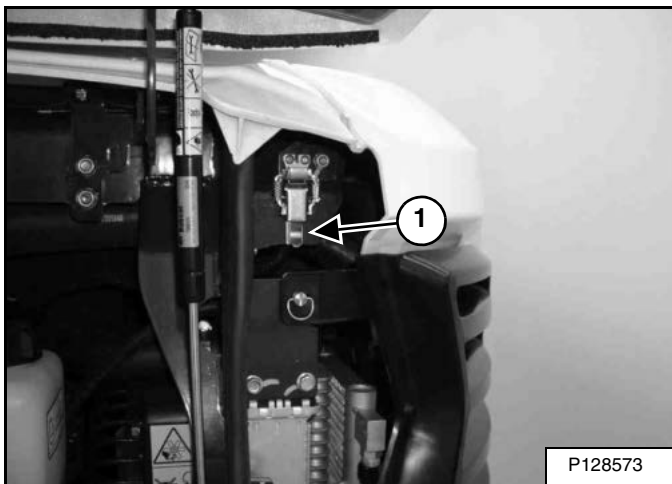
The tailgate latch (Item 1) can be adjusted by loosening the two bolts (Item 2) [Figure 282], moving the latch, and tightening the two bolts.

Close the tailgate before operating the excavator.

RIGHT SIDE COVER

Opening And Closing

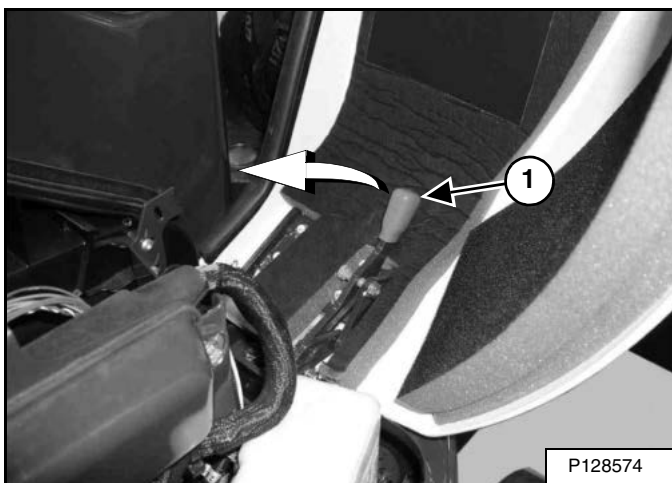
Figure 283



Open the tailgate to access the right side cover latch (Item 1) [Figure 283].

Pull up on the latch (Item 1) [Figure 283] to release cover.

Figure 284



Raise the right side cover and rotate forward until it is held fully open.

To close the right side cover, pull back on the lever (Item 1) [Figure 284] while raising the right side cover. Rotate the cover back until it is in the fully closed position.

Close the cover fully and secure by lowering the latch (Item 1) [Figure 283] to lock the cover in the closed position.

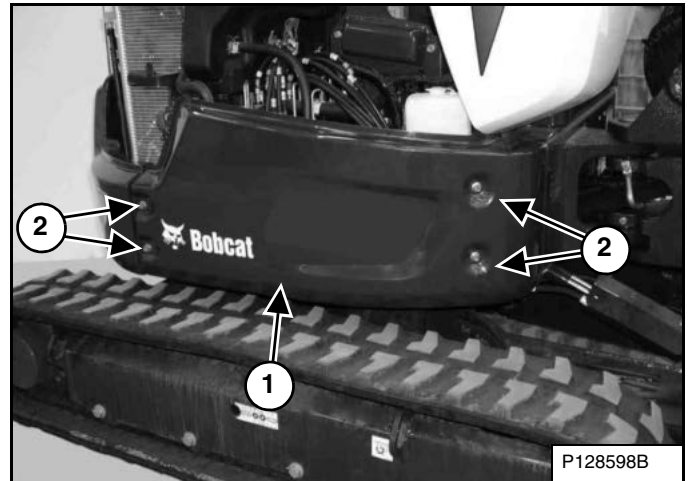
RIGHT SIDE PANEL

Removal And Installation

Open the right side cover. (See RIGHT SIDE COVER on Page 153.)

Removal

Figure 285



To remove the right side upperstructure cover (Item 1), remove the four bolts (Item 2) [Figure 285].

Remove the cover (Item 1) [Figure 285].

Installation

Position the cover (Item 1) [Figure 285] to the upperstructure.

Install the four bolts (Item 2) [Figure 285] and tighten.

CAB FILTERS

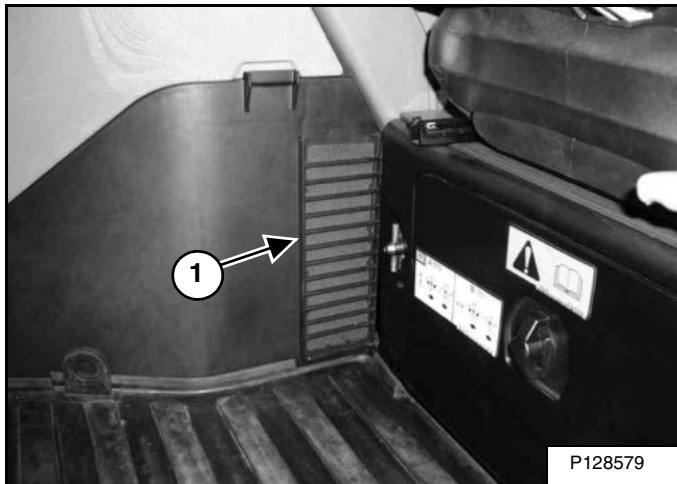
Cleaning And Maintenance

The recirculation filter and the fresh air filter must be cleaned regularly. (See SERVICE SCHEDULE on Page 146.)

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

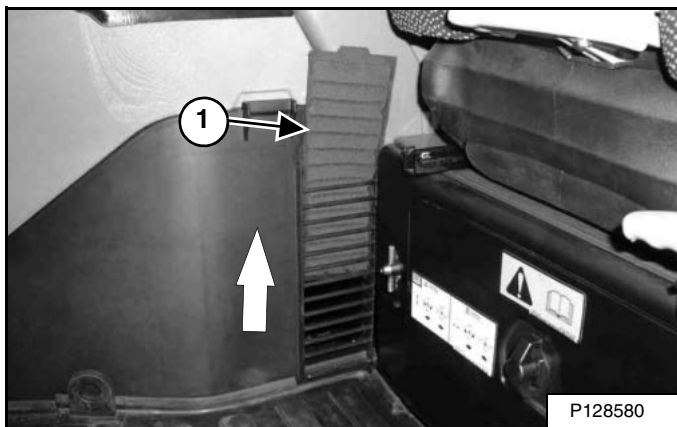
Recirculation Filter

Figure 286



The recirculation filter (Item 1) [Figure 286] is located to the right of the operator's seat.

Figure 287



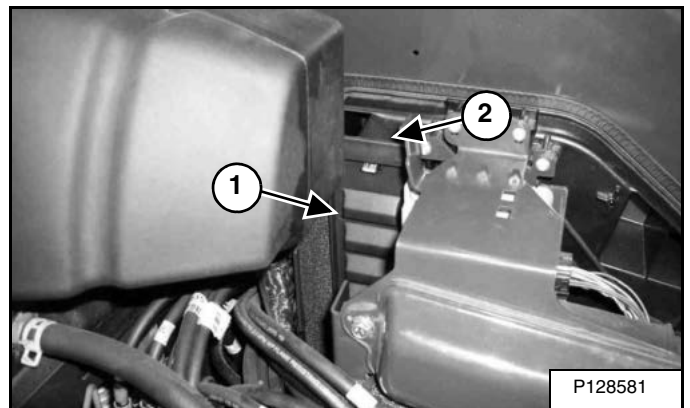
Pull up on the filter (Item 1) [Figure 287] until removed from the housing.

Shake the filter or use low pressure air to clean the filter. Replace the filter when very dirty or if damaged.

Installation: Position the bottom of the filter (Item 1) [Figure 287] into the housing and slowly push the filter down fully.

Fresh Air Filter

Figure 288

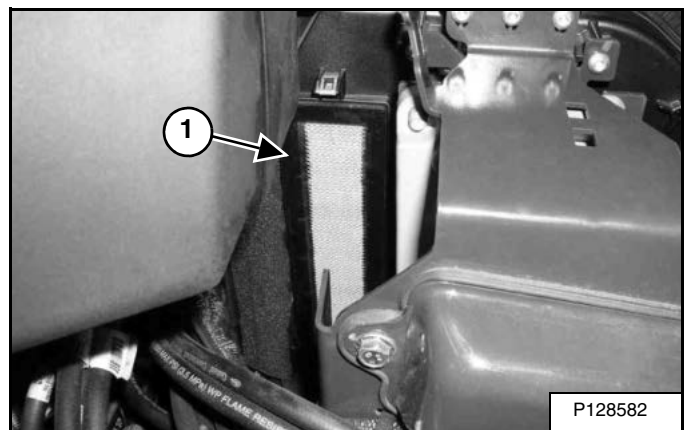


The fresh air filter is located under the right side cover.

Open the right side cover. (See RIGHT SIDE COVER on Page 153.)

Pull out on the tab (Item 1) and remove the cover (Item 2) [Figure 288].

Figure 289



Pull the filter (Item 1) [Figure 289] out of the housing.

Shake the filter or use low pressure air to clean the filter. Do not use solvents. Replace the filter when very dirty or damaged.

Installation: Position the filter (Item 1) [Figure 287] into the housing and slowly push the filter in fully.

Place the bottom tabs of the filter cover (Item 2) into the frame and push the top in until the tab (Item 1) [Figure 288] locks to the frame.

NOTE: Do not use a brush on the filter as it can push debris into the filter. Gently tap the sides of the filter and / or use low pressure compressed air from the back side of the filter to remove debris. If the filter is damaged, replace the filter.

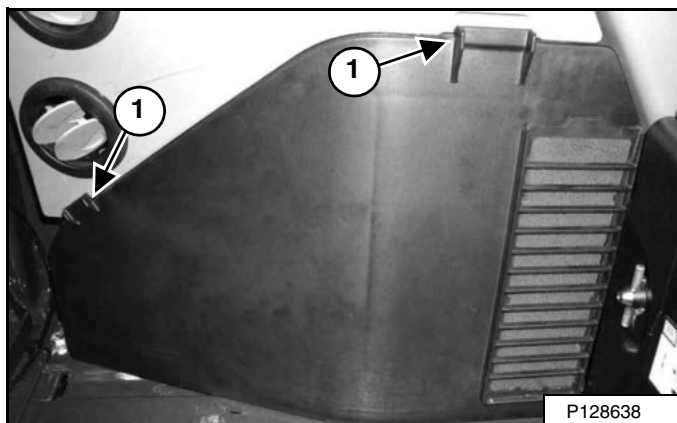
HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

Cleaning And Maintenance

The inside of the HVAC housing needs to be cleaned regularly. Dust will accumulate over time inside the housing. A dusty heater and evaporator coil will reduce heating and cooling efficiency. (See SERVICE SCHEDULE on Page 146.)

The HVAC housing is located to the right of the operator seat.

Figure 290

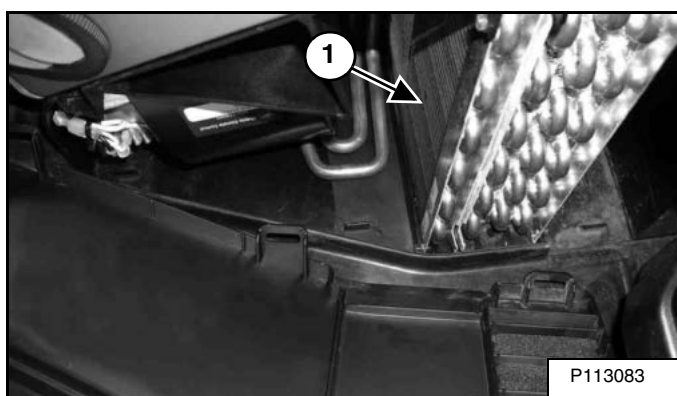


Remove the floor mat.

Pull back on the two latches (Item 1) [Figure 290] and remove the HVAC side cover.

To allow water to drain from the HVAC housing during the cleaning process, it is recommended to rotate the upperstructure 90° to the right. Then using the blade, raise the front of the excavator to allow water to run out of the housing. Use jackstands to support the front of the undercarriage.

Figure 291



Use a lower pressure air or a low pressure water stream to remove debris and to clean the coils (Item 1) [Figure 291].

After the housing has been cleaned and flushed, remove the jackstands and raise the blade so the front of the excavator is flat on the ground. Stop the engine.

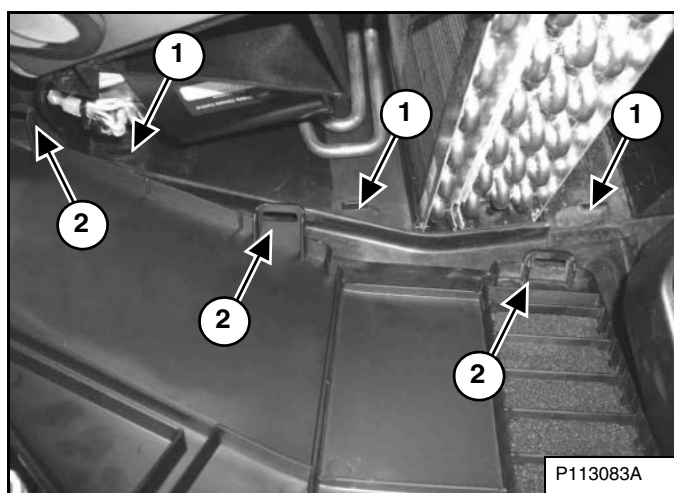
There are three rubber drain valves that allow condensation to drain from the housing during normal air conditioning usage. These drain valve can get clogged with dirt and should be cleaned at the same time the housing is cleaned.

Two of the drain valve can be accessed from the right side cover (the drain valves are located below the HVAC housing on the right side) and one of the valves is located below the left rear corner of the HVAC housing and will be accessed by removing the centre floorplate.

Pinch the three rubber drain valves on the flat sides to open the valves and allow dirt and moisture to exit from the end of the valves.

Reinstall the centre floorplate and close the right side cover.

Figure 292



NOTE: The floor mat needs to be removed to allow easier access for installing the HVAC side cover.

Three tabs (Item 1) are on the bottom of the HVAC housing that the side cover retainers (Item 2) [Figure 292] fit into.

Position the side cover on the tabs and starting with the front edge of the side cover, position it into the front of the HVAC housing. Press on the front of the cover to secure the front latch (Item 1) [Figure 290]. Then press in on the top edge of the side cover and work back to the rear of the cover and secure the rear latch.

Reinstall the floor mat.

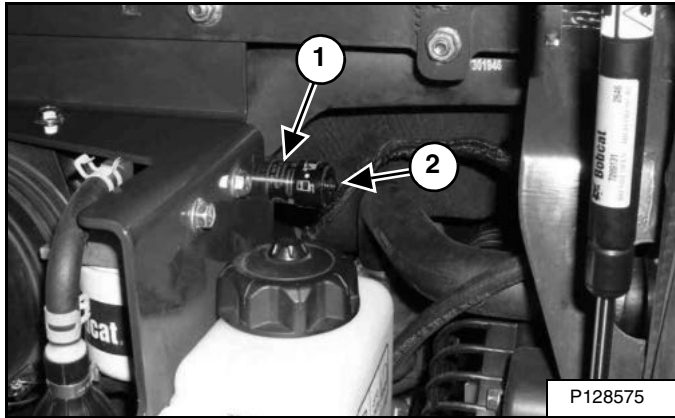
AIR CLEANER SERVICE

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 146.)

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 152.)

Figure 293



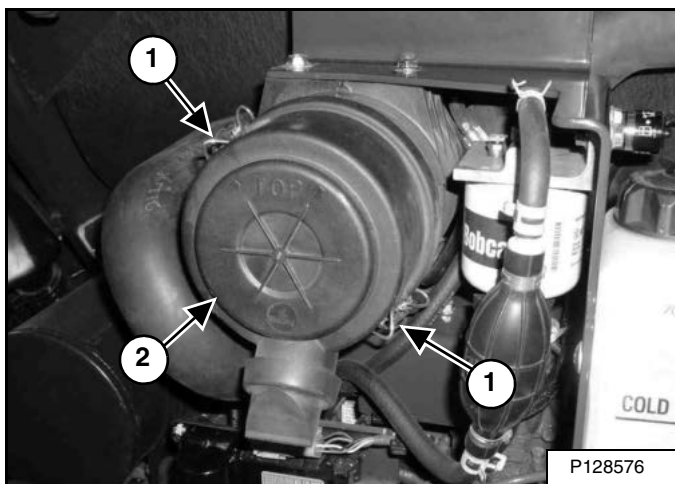
Check the condition indicator (Item 1) [Figure 293]. If the red ring shows in the condition indicator, the filter needs to be replaced.

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

Replacing The Filter Elements

Outer Filter

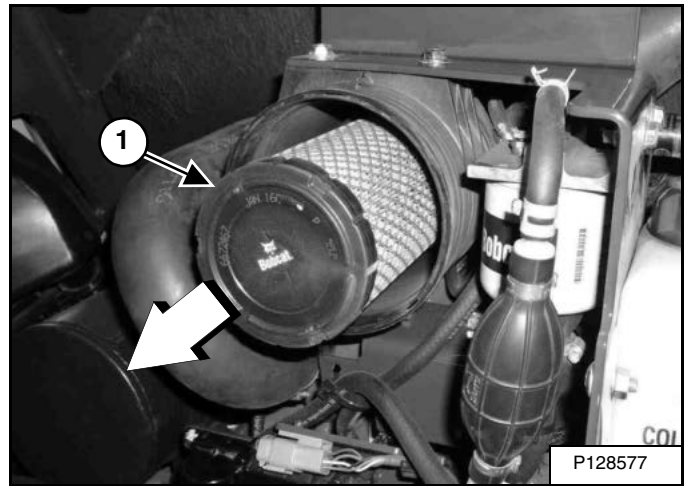
Figure 294



Release the two fasteners (Item 1) [Figure 294].

Remove and clean the dust cup (Item 2) [Figure 294].

Figure 295



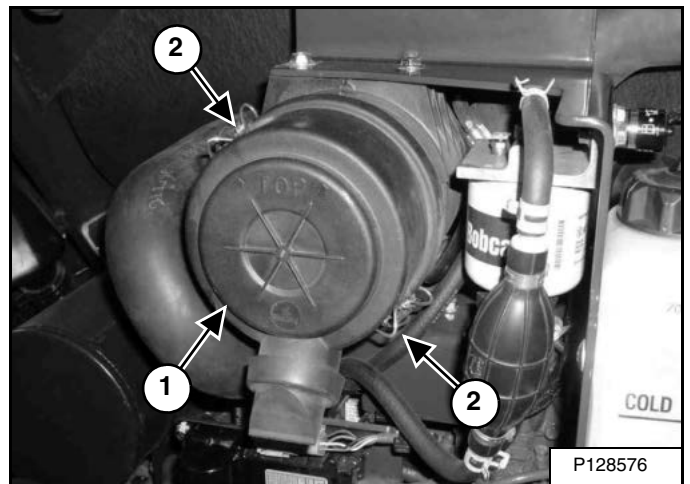
Pull the outer filter (Item 1) [Figure 295] from the air cleaner housing.

Check the housing for damage.

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

Install a new filter.

Figure 296



Install the dust cup (Item 1) and engage the fasteners (Item 2) [Figure 296].

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 2) [Figure 293] 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 1) [Figure 293] shows in the condition indicator, replace the inner filter.

AIR CLEANER SERVICE (CONT'D)

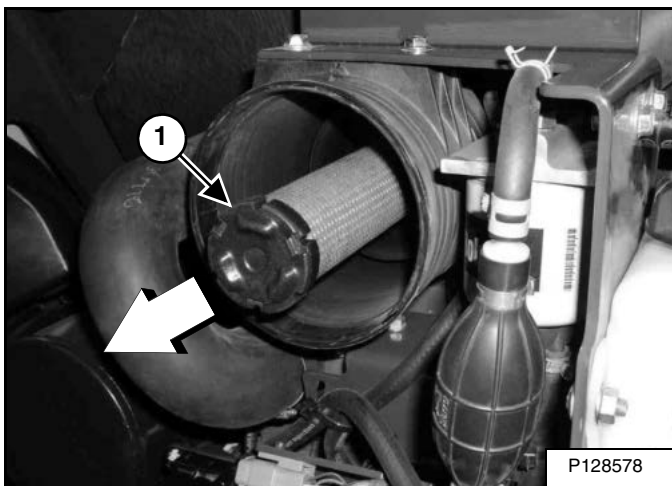
Replacing The Filter Elements (Cont'd)

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 293]** 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 297



Remove the dust cup, outer filter and inner filter (Item 1) **[Figure 297]**.

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.

FUEL SYSTEM

Fuel Specifications

NOTE: Contact your local fuel supplier to receive recommendations for your region.

U.S. Standard (ASTM D975)

Use only clean, high quality diesel fuel, Grade Number 2-D or Grade Number 1-D.

Ultra low sulfur diesel fuel must be used in this machine. Ultra low sulfur is defined as 15 mg/kg (15 ppm) sulfur maximum.

The following is one suggested blending guideline that should prevent fuel gelling during cold temperatures:

TEMPERATURE	GRADE 2-D	GRADE 1-D
Above -9°C (+15°F)	100%	0%
Down to -21°C (-5°F)	50%	50%
Below -21°C (-5°F)	0%	100%

NOTE: Biodiesel blend fuel may also be used in this machine. Biodiesel blend fuel must contain no more than five percent biodiesel mixed with ultra low sulfur petroleum based diesel. This biodiesel blend fuel is commonly marketed as B5 blended diesel fuel. B5 blended diesel fuel must meet ASTM specifications.

E.U. Standard (EN590)

Use only clean, high quality diesel fuel that meets the EN590 specifications listed below:

- Ultra low sulfur diesel fuel defined as 10 mg/kg (10 ppm) sulfur maximum
- Diesel fuel with cetane number of 51.0 and above.

NOTE: Biodiesel blend fuel may also be used in this machine. Biodiesel blend fuel must contain no more than seven percent biodiesel mixed with ultra low sulfur petroleum based diesel. This biodiesel blend fuel is commonly marketed as B7 blended diesel fuel. B7 blended diesel fuel must meet EN590 specifications.

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

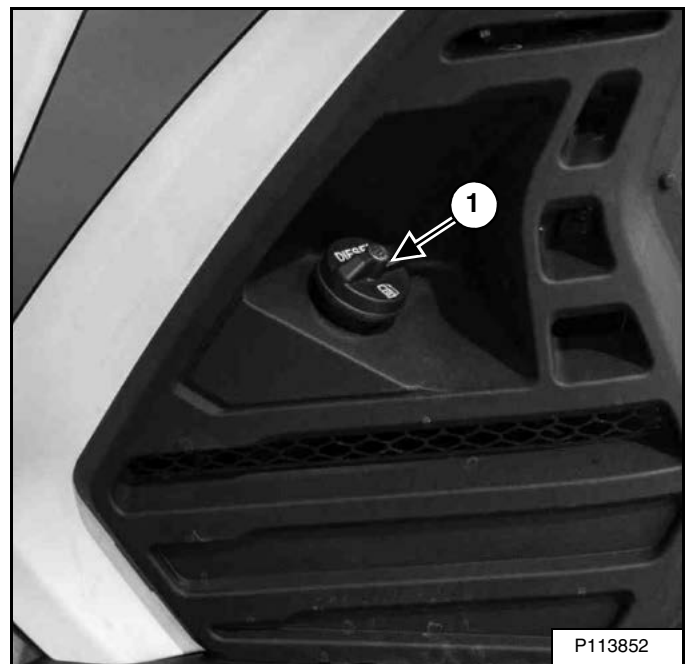
WARNING

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 298



Use the start key to unlock the fuel cap.

Remove the fuel fill cap (Item 1) [Figure 298].

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 146.)

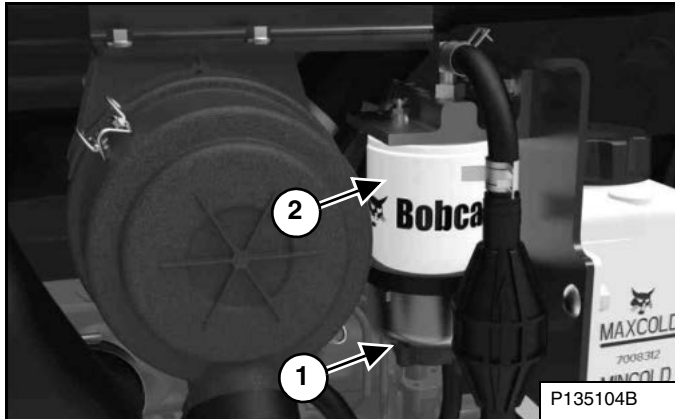
FUEL SYSTEM (CONT'D)

Fuel Filters

Removing Water

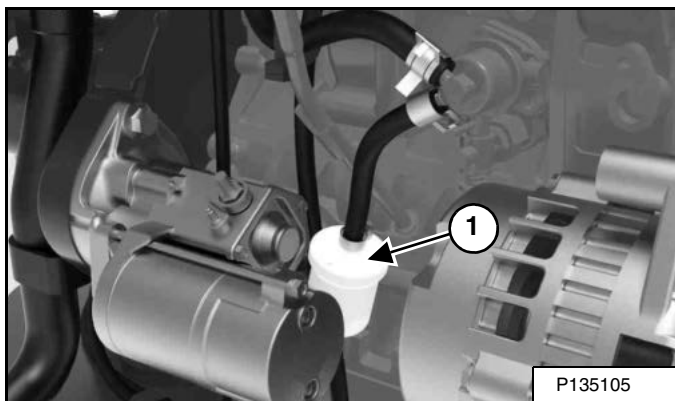
Open the tailgate. (See TAILGATE on Page 152.)

Figure 299



Loosen the drain (Item 1) [Figure 299] at the bottom of the fuel filter (Item 2) [Figure 299] to drain water from the filter into a container.

Figure 300



Inspect the fuel pre-filter (Item 1) [Figure 300] daily for moisture and contamination. Replace as necessary.

Clean up any spilled fuel.

Replacing Elements

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 146.)

Remove and replace the fuel pre-filter (Item 3) [Figure 300].

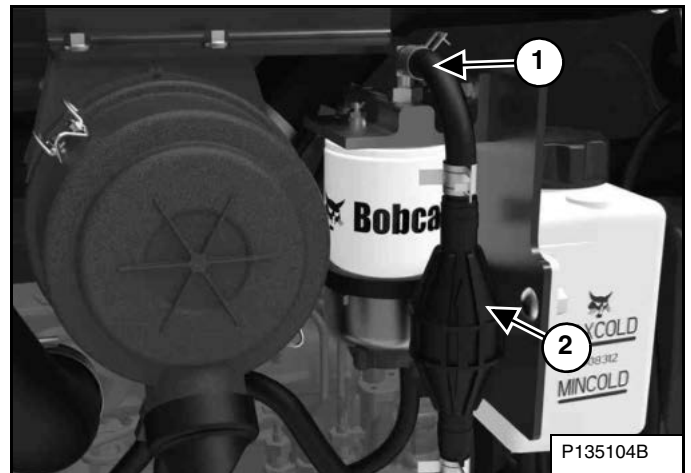
Remove the fuel filter (Item 2) [Figure 299]. Clean the area around the filter housing. Put clean oil on the seal of the new filter. Install the fuel filter and hand tighten.

Remove the air from the fuel system. (See Removing Air From The Fuel System on Page 161.)

Draining The Fuel Tank

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 146.)

Figure 301



Remove the hose (Item 1) [Figure 301] from the fuel filter. Route the hose to a container.

Squeeze the hand pump (priming bulb) (Item 2) [Figure 301] 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 301] after the fuel is removed from fuel tank.

WARNING

AVOID INJURY OR DEATH

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

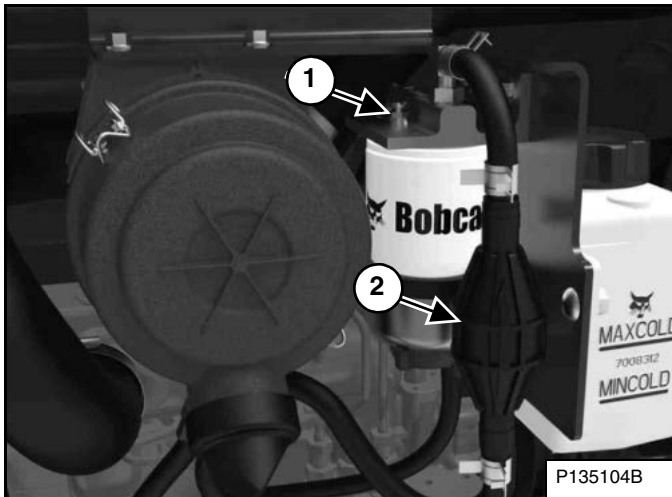
W-2072-0807

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 302

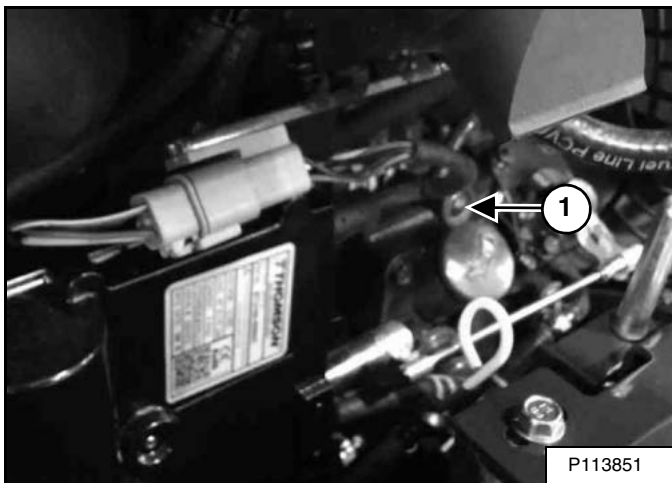


Open the tailgate. (See TAILGATE on Page 152.)

Open the fuel filter vent (Item 1) and operate the hand pump (priming bulb) (Item 2) [Figure 302] until the fuel flows from the vent with no air bubbles.

Close the vent (Item 1) [Figure 302].

Figure 303



Start the engine. It may be necessary to open the vent (Item 1) [Figure 303] 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.

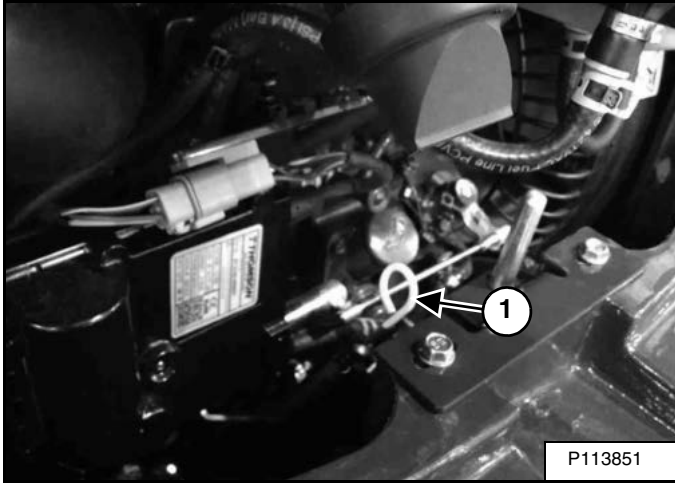
W-2072-EN-0909

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 146.)

Figure 304



Open the tailgate. (See TAILGATE on Page 152.)

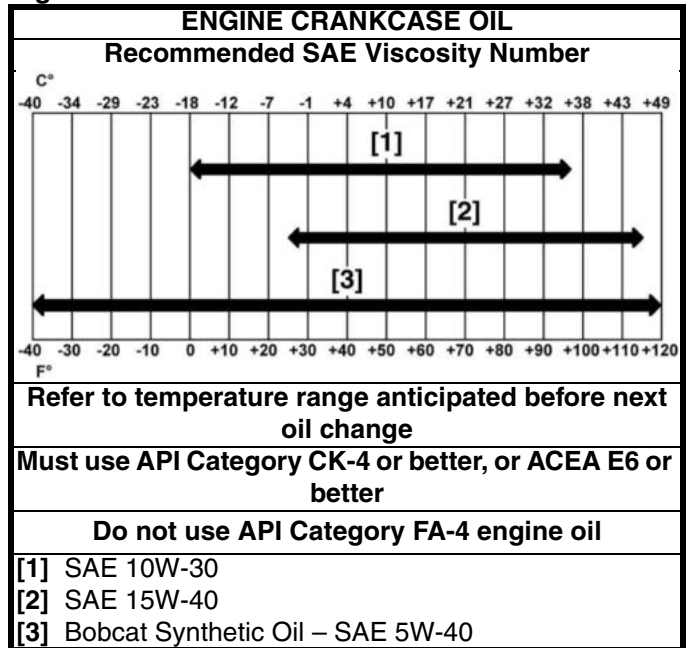
Remove the dipstick (Item 1) [Figure 304].

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 305



Bobcat engine oils are recommended for use in this machine. If Bobcat engine oil is not available, use a good quality engine oil that meets API Service Category of CK-4 or better, or ACEA E6 or better [Figure 305].

 **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)

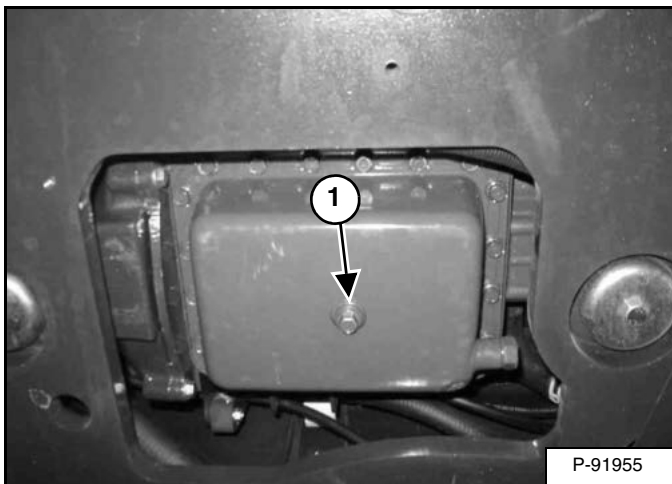
Removing And Replacing Oil And Filter

See the SERVICE SCHEDULE for the service interval for replacing the engine oil and filter. (See SERVICE SCHEDULE on Page 146.)

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

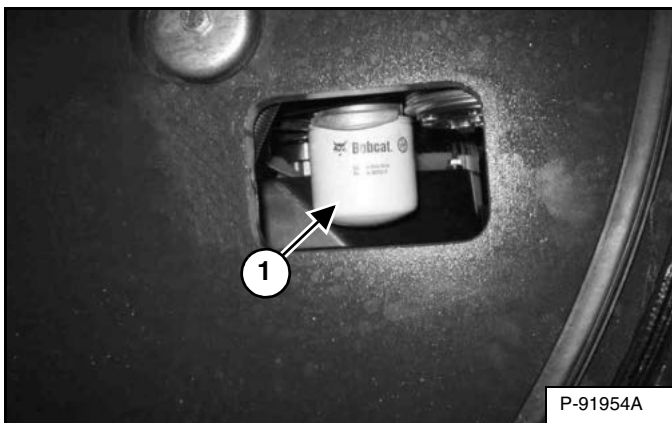
Open the tailgate. (See TAILGATE on Page 152.)

Figure 306



Place a container under the oil pan. Remove the drain plug (Item 1) [Figure 306] from the bottom of the engine oil pan.

Figure 307



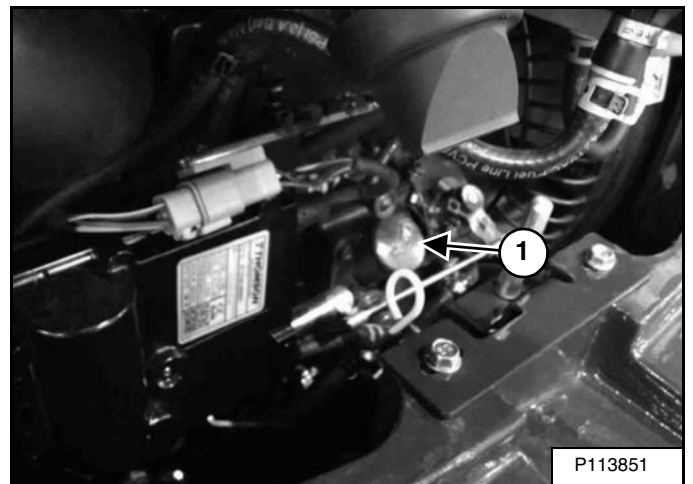
Remove the oil filter (Item 1) [Figure 307] and clean the filter housing surface.

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 306].

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

Figure 308



Remove the fill cap (Item 1) [Figure 308].

Put oil in the engine. (See Engine Oil Chart on Page 162.)

Install the fill cap (Item 1) [Figure 308].

Start the engine and let it run for several minutes.

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

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

ENGINE COOLING SYSTEM

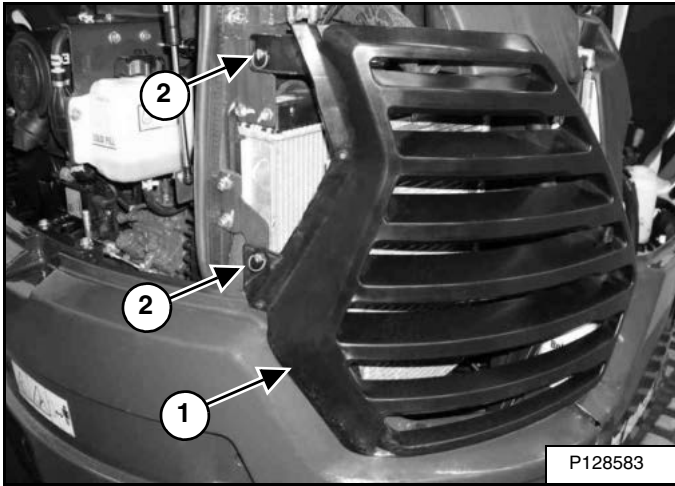
Check the cooling system every day to prevent overheating, loss of performance or engine damage. (See SERVICE SCHEDULE on Page 146.)

Cleaning

Open the right side cover. (See RIGHT SIDE COVER on Page 153.)

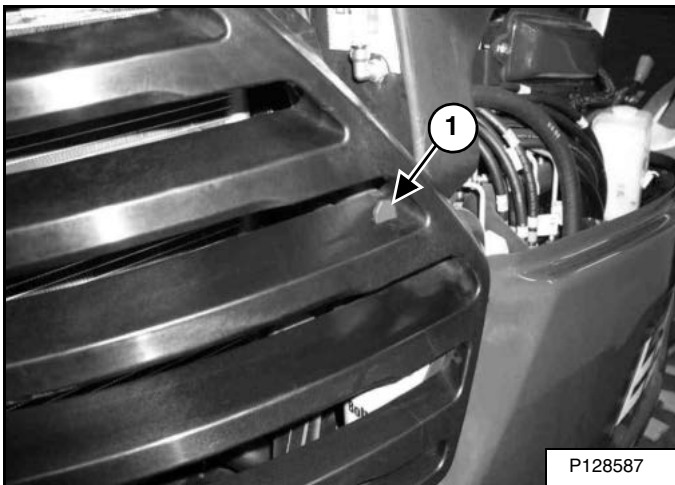
NOTE: Allow the cooling system and engine to cool before servicing or cleaning the cooling system.

Figure 309



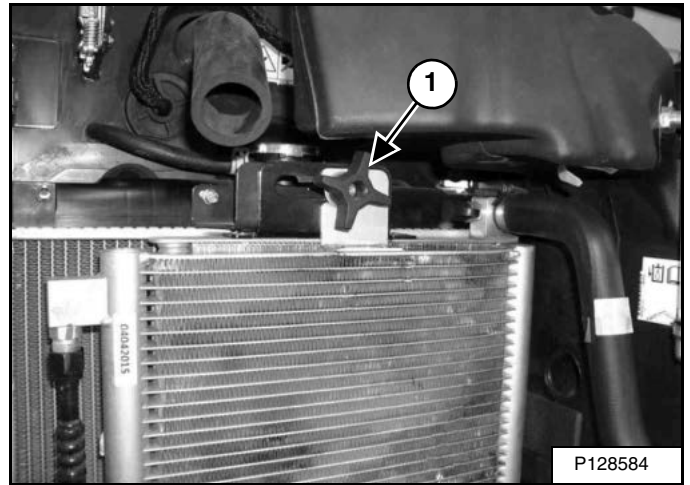
To remove the side grille (Item 1), turn the two fasteners (Item 2) [Figure 311] a quarter turn.

Figure 310



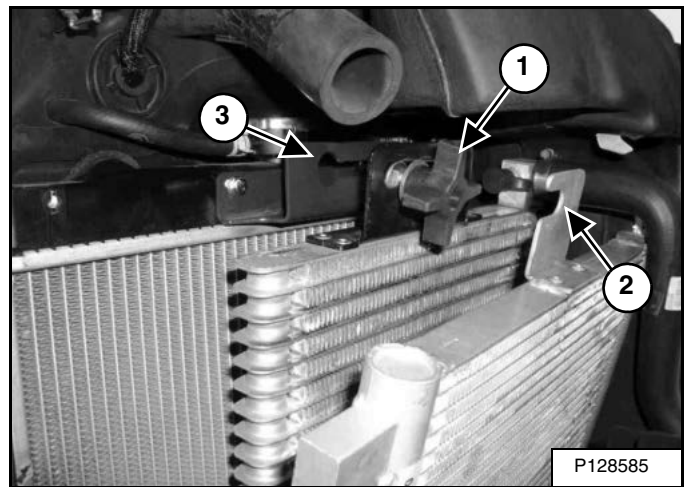
Pull out slightly on the rear of the grill and then lift up on the grille to remove from the post (Item 1) [Figure 311]. Remove the grille.

Figure 311



Loosen the knob (Item 1) [Figure 311]. Slide the knob towards the rear of the machine.

Figure 312

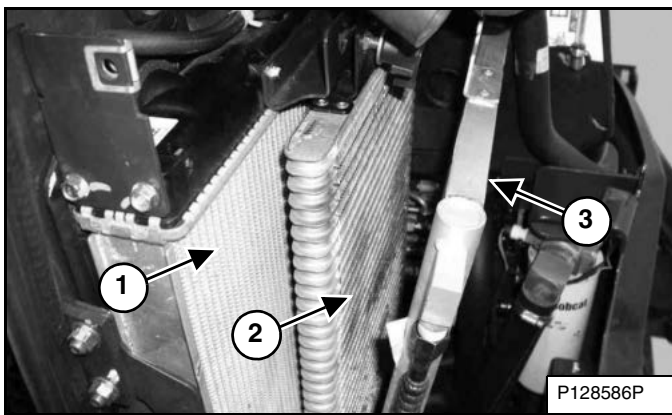


Slide the knob (Item 1) out of the condenser mount (Item 2) (if equipped) and the radiator mounting bracket (Item 3) [Figure 312]. Be careful not to damage fins.

ENGINE COOLING SYSTEM (CONT'D)

Cleaning (Cont'd)

Figure 313



Use low air pressure or low water pressure to clean the radiator (Item 1), oil cooler (Item 2) and condenser (Item 3) [Figure 313] (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 312] (if equipped).

Slide the knob (Item 1) towards the front of the machine until it is fully seated in the slots of the mounting brackets. Tighten the knob (Item 1) [Figure 311]. Be careful not to damage fins.

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

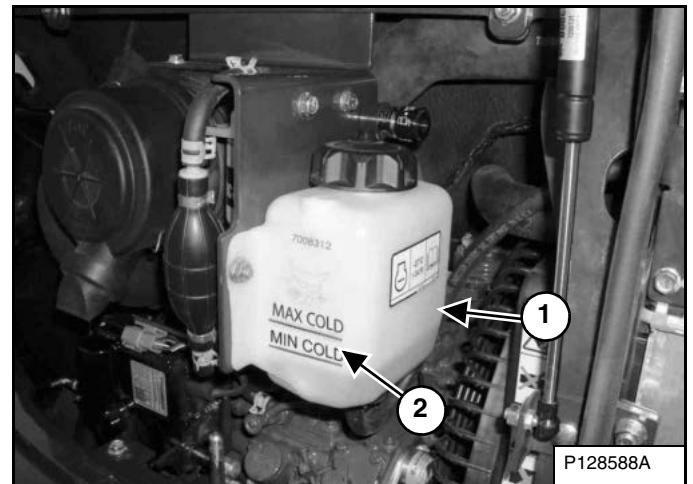
Wear safety glasses to prevent eye injury when any of the following conditions exist:

- 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 152.)

Figure 314



Check the coolant level when the coolant is cold. Check the coolant level in the coolant recovery tank (Item 1). It must be between the "MAX COLD" and the "MIN COLD" level marks (Item 2) [Figure 314]. Add fluid as needed.

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 146.)

Stop the engine. Open the tailgate. (See TAILGATE on Page 152.)

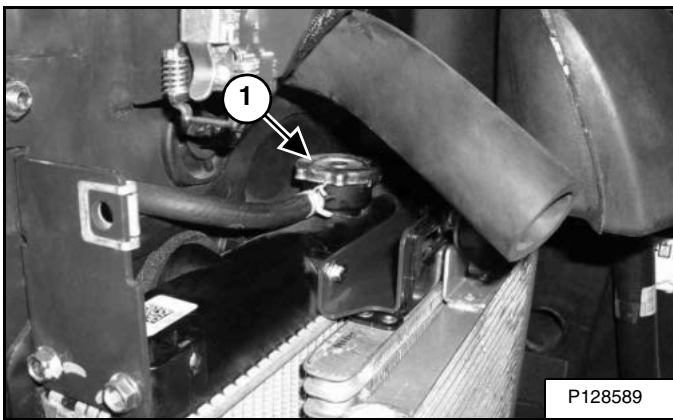
WARNING

AVOID BURNS

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

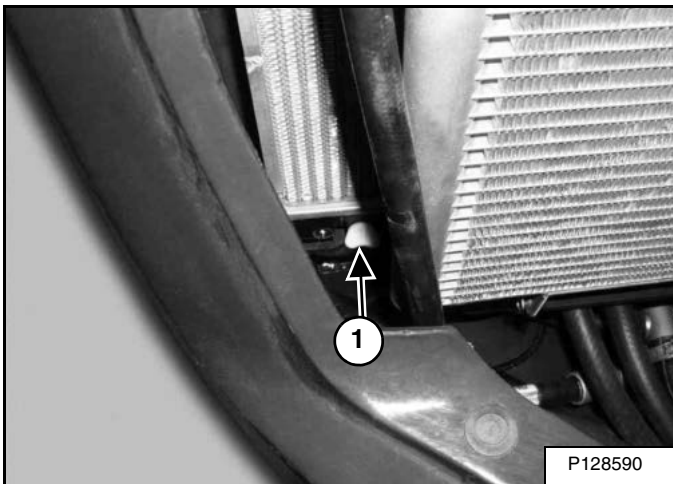
W-2070-1203

Figure 315



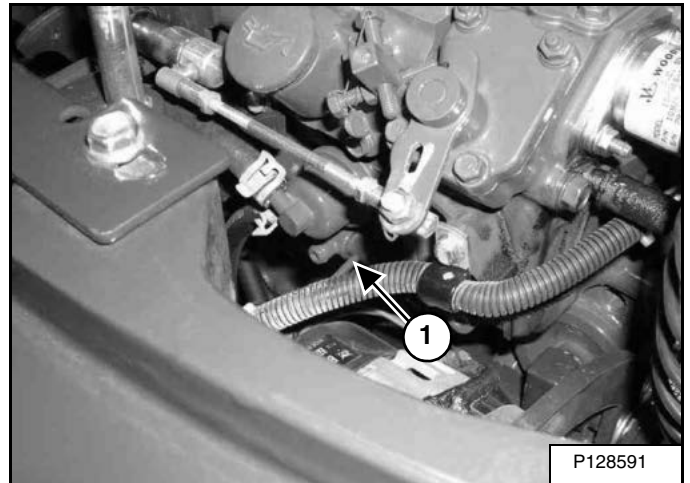
When the engine is cool, loosen and remove the radiator cap (Item 1) [Figure 315].

Figure 316



Put a hose on the drain valve at the bottom of the radiator. Open the drain valve (Item 1) [Figure 316] and drain the coolant into a container.

Figure 317



Put a hose on the drain valve on the engine block. Open the drain valve (Item 1) [Figure 317] 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 Capacities on Page 227.)

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 -34°F (-37°C) 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.

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

Add premixed coolant until the level is correct.

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

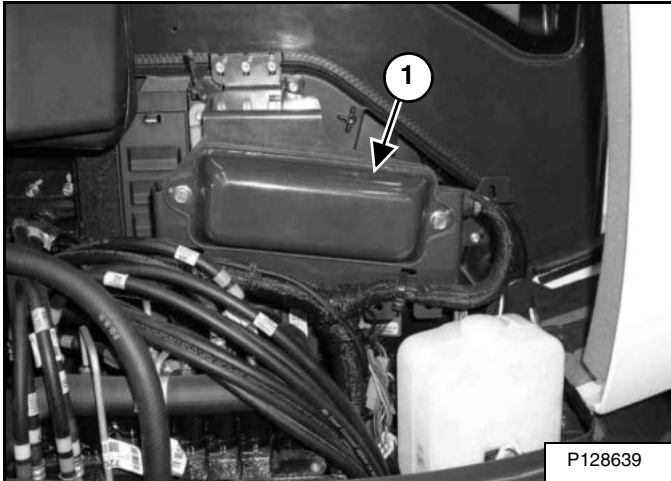
Add coolant to the recovery tank as needed.

Close the tailgate.

ELECTRICAL SYSTEM

Description

Figure 318



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 318]. 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.

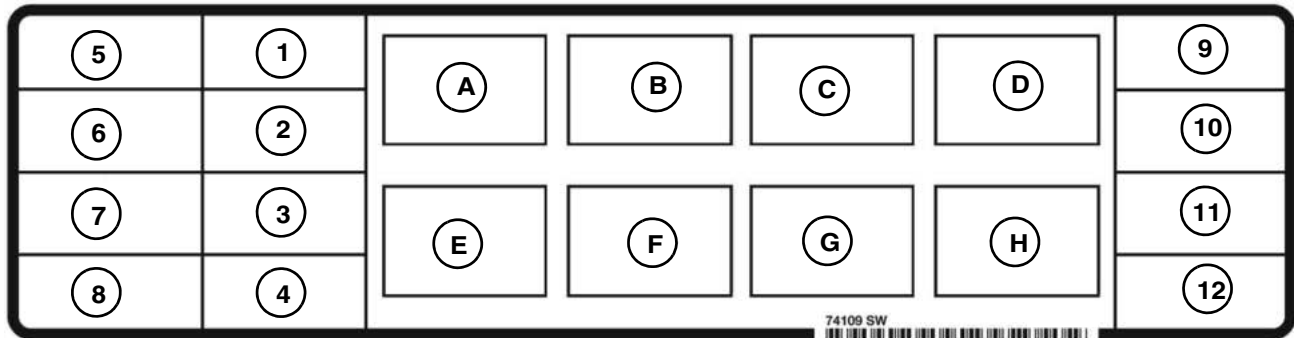
The location and sizes are shown in [Figure 319].

Always replace fuses using the same type and capacity.

ELECTRICAL SYSTEM (CONT'D)

Fuse And Relay Location / Identification (Cont'd)

Figure 319



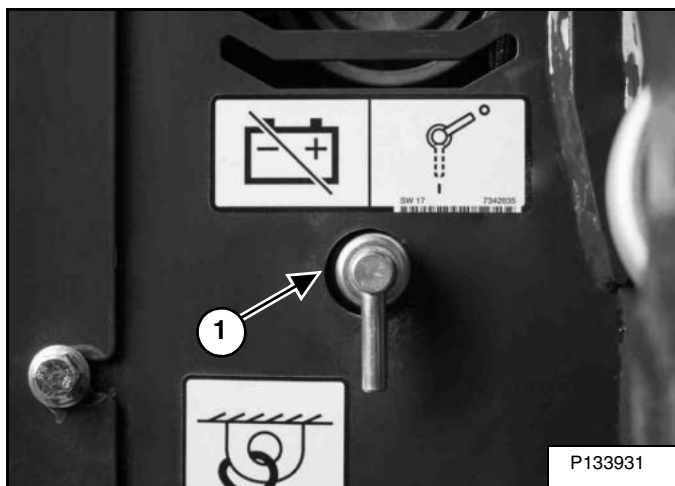
The location and sizes are shown in the table below and on the decal [Figure 319]. Relays are identified by the letter “R” in the AMP column.

REF	ICON	DESCRIPTION	AMP	REF	ICON	DESCRIPTION	AMP	REF	ICON	DESCRIPTION	AMP
1		Wiper / Washer	10	9		Panel / Display Controller	25	E		Fuel Shutoff	R
2		Switched Power	20	10		ACD Unswitched Power	25	F		Lights	R
3		Alternator Excite / Heater	25	11		Lights	30	G		Glow Plug	R
4		ACD Switched Power	25	12		Power Port	15	H		Starter	R
5		Auto Idle Controller (AIC) (if equipped)	20	A		Switched Power	R				
6		HVAC / Heater	40	B		Heater / HVAC	R				
7		Ignition	5	C		Lights	R				
8		Fuel Shutoff	25	D		Horn	R				

ELECTRICAL SYSTEM (CONT'D)

Shut-Off Switch

Figure 320



The shut-off switch (Item 1) [Figure 320] is located on the right front of the excavator.

Rotate the switch (Item 1) anticlockwise to turn the switch to the OFF position, clockwise to turn to the ON position (shown here in the ON position) [Figure 320].

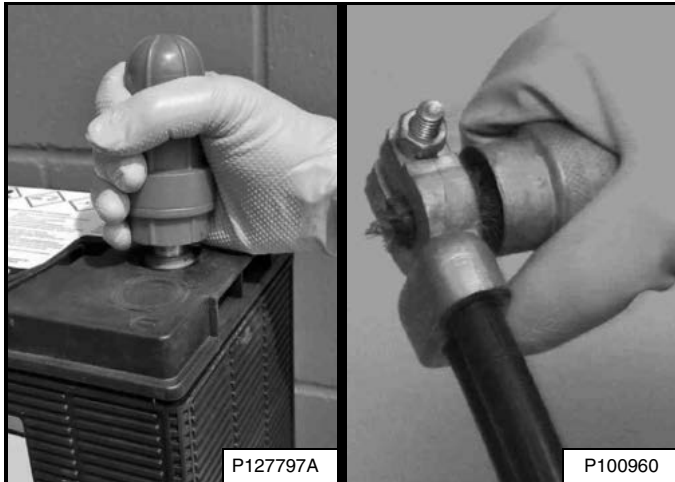
ELECTRICAL SYSTEM (CONT'D)

Battery Maintenance

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 146.)

The Bobcat brand battery supplied with your machine is sealed and does not require watering. Proper charging and storage are important to maximize the life of all batteries.

Figure 321



Simple steps for reliability and long battery life:

- Keep battery posts and terminals clean [Figure 321].
- Keep terminals tight.
- Remove corrosion from battery and terminals with sodium bicarbonate (baking soda) and water solution.
- Put Bobcat Battery Saver or grease on the battery terminals and cable ends to prevent corrosion.
- Operate the machine for at least 15 minutes to recover from the battery drain caused by engine start up whenever practical.
- Maintain the battery charge level. This is a key factor for long battery life.
- Charge a severely discharged battery with a battery charger instead of relying on the machine charging system. (See Battery Charging on Page 171.)
- Check the battery state of charge every 30 days on machines that are not frequently used. (See Battery Testing on Page 171.)

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

Maintaining Battery Charge Level

All batteries will self-discharge over time. This machine has features that require battery power even when the machine is not being used. Use of a quality battery maintainer is highly recommended to ensure that your machine is ready to start when you need it and avoid costly battery replacement.

Battery Maintainers

Use a good quality battery maintainer to keep the battery above 12.4 volts for machines that are not frequently used. Batteries below 12.4 volts must first be charged using a battery charger. Solar maintainers should have a minimum capacity of 10 watts to be effective.

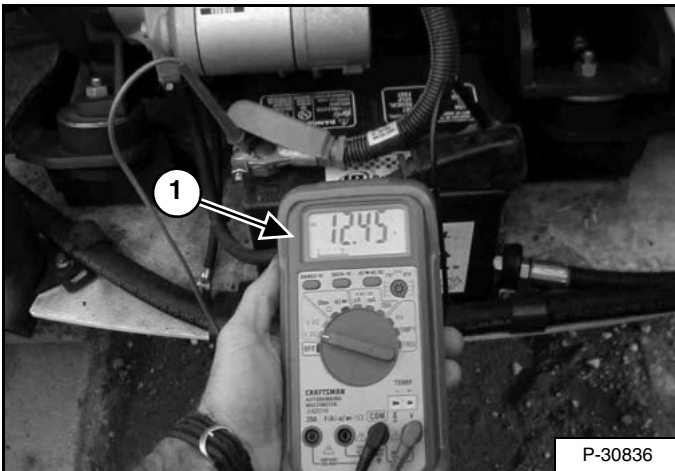
Battery Service During Machine Storage

Remove the battery if storing the machine for an extended period of time. Fully charge the battery. Store the battery in a cool dry place above freezing and boost charge periodically. If battery removal is not desired, a good quality battery maintainer must be used to compensate for battery self-discharge and parasitic loads from machine controllers, accessories, and features such as connected machine intelligence.

ELECTRICAL SYSTEM (CONT'D)

Battery Testing

Figure 322



The simplest and most common check to determine battery state of charge is to use a digital multimeter or voltmeter (Item 1) [Figure 322].

A battery found below 12.4 volts must be charged to 100% charge per the battery charger's recommendation. **Allow at least 60 minutes after operating the machine or charging the battery to get an accurate reading.**

If the reading is less than 12.4 volts after the battery has been charged for several hours, see your Bobcat dealer to have a more thorough battery test performed.

The freezing point of battery electrolyte is dependent on the battery state of charge. Keeping the battery voltage above 12.4 volts will help prevent batteries from freezing, even at extremely low temperatures.

If the battery freezes, the internal grid may be damaged and the case will be distorted or cracked. If this happens, dispose of the battery according to local regulations.

Battery Charging

A battery charger designed for 12 volt charging systems is recommended. Follow the battery charger manufacturer's instructions to charge the battery to 12.6 volts (100% charge). Batteries should be charged at room temperature to avoid an undercharge or overcharge condition. Never attempt to charge a frozen battery.

The following table can be used to identify the approximate amount of time required to charge a discharged battery. Allow at least 60 minutes after operating the machine or charging the battery to get an accurate reading.

BATTERY VOLTAGE	STATE OF CHARGE	CHARGER MAXIMUM RATE		
		30 Amps	20 Amps	10 Amps
12.6 V	100%	READY TO USE		
12.4 V	75%	0.9 hr.	1.3 hr.	2.5 hr.
12.2 V	50%	1.9 hr.	2.7 hr.	5.1 hr.
12.0 V	25%	2.9 hr.	4.3 hr.	7.8 hr.
11.8 V	0%	4.0 hr.	5.7 hr.	10.7 hr.

NOTE: Use a good quality automatic charger to avoid battery damage from overcharging.



BATTERY GAS CAN EXPLODE AND CAUSE SERIOUS INJURY OR DEATH

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

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

W-2066-0910

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.

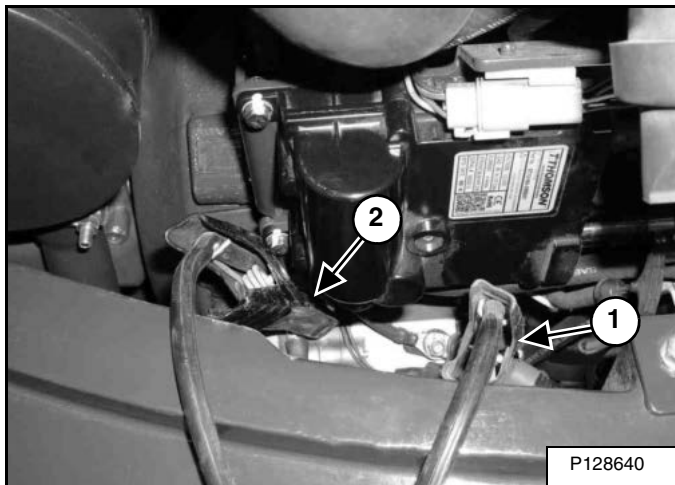
I-2060-0906

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 152.)

Figure 323



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 323] 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 323].

Start the engine. After the engine has started, remove the earth (-) cable first (Item 2) [Figure 323].

Disconnect the cable from the excavator starter (Item 1) [Figure 323].

NOTE: (See Cold Temperature Starting on Page 73.)

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

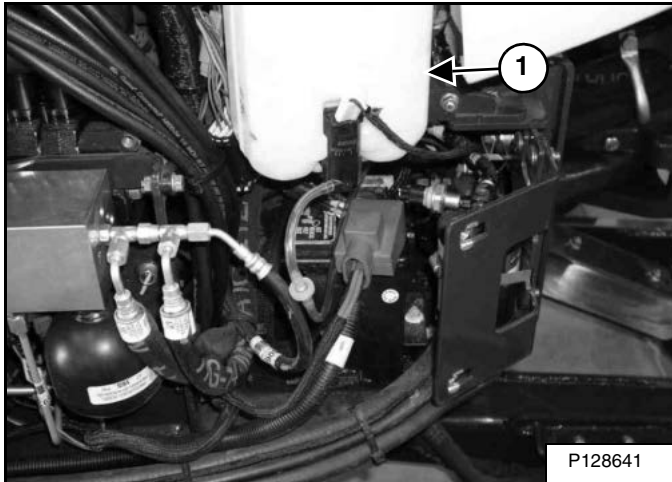
ELECTRICAL SYSTEM (CONT'D)

Removing And Installing The Battery

Open the right side cover. (See RIGHT SIDE COVER on Page 153.)

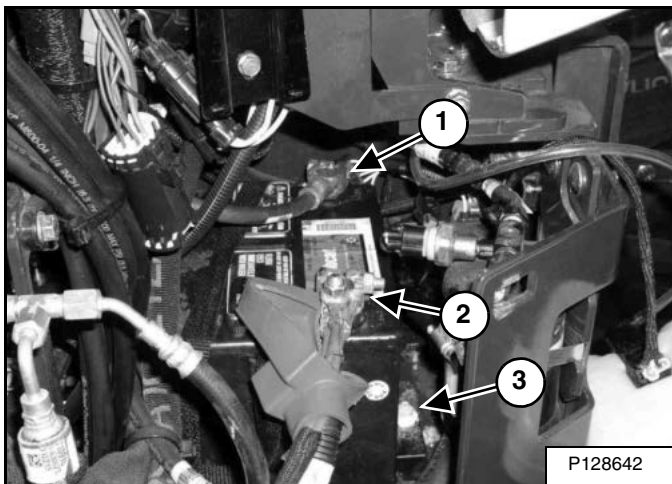
Remove the right side upperstructure cover. (See RIGHT SIDE PANEL on Page 153.)

Figure 324



Remove the washer bottle (item 1) [Figure 324] (if equipped) by lifting up on the bottle to remove from the retainer bracket. Set the bottle aside.

Figure 325



Disconnect the negative (-) cable (Item 1) [Figure 325] first.

Disconnect the positive (+) cable (Item 2) [Figure 325].

Remove the bolt (Item 3) [Figure 325] and remove the hold-down clamp.

Remove the battery.

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

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

Connect the battery cables. Connect the negative (-) cable (Item 1) [Figure 325] last to prevent sparks.

WARNING

AVOID INJURY OR DEATH

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

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

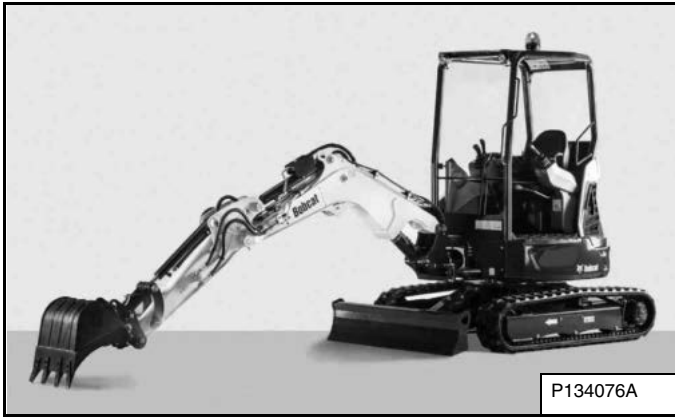
If electrolyte is taken internally drink large quantities of water or milk! DO NOT induce vomiting. Get prompt medical attention.

W-2065-0807

HYDRAULIC SYSTEM

Checking And Adding Hydraulic Oil

Figure 326

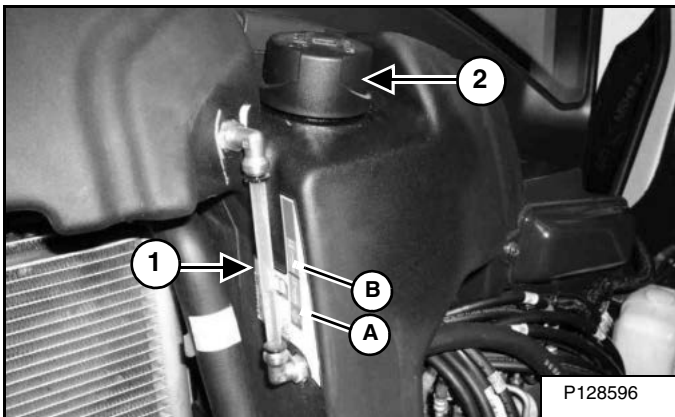


Park the machine on a flat level surface in the position shown [Figure 326]. (The preferred method is to check the hydraulic oil when it is cold.)

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 153.)

Figure 327



Check the hydraulic oil level, it must be visible in the sight gauge (Item 1) [Figure 327]. 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 327].

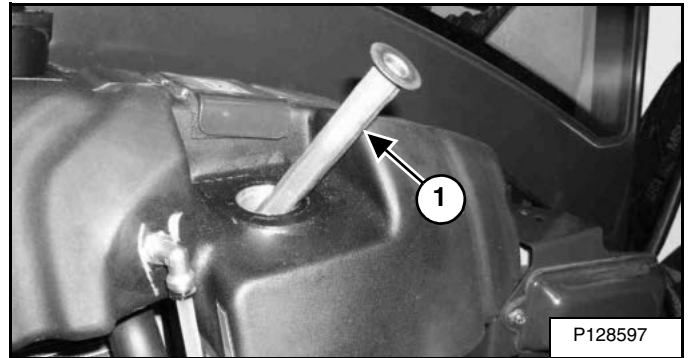
WARNING

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 328



Check the condition of the fill strainer screen (Item 1) [Figure 328]. 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 / Hydrostatic Fluid Chart on Page 176.)

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

Install the cap.

Close the right side cover and tailgate.

HYDRAULIC SYSTEM (CONT'D)

Removing And Replacing The 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

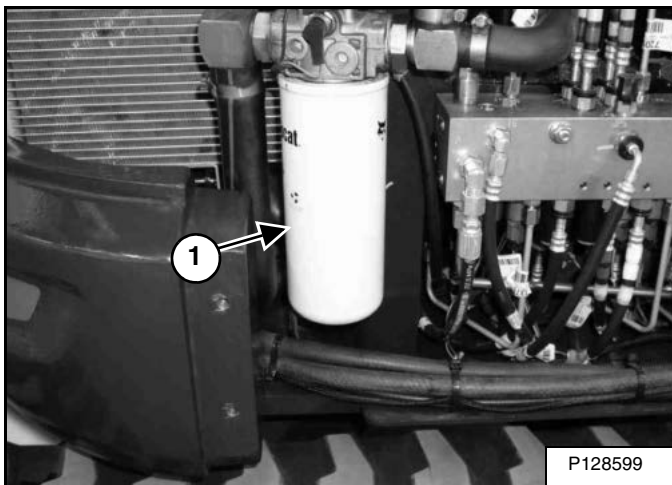
Hydraulic Filter

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 146.)

Remove the right side cover. (See RIGHT SIDE COVER on Page 153.)

For easier access to change the hydraulic filter, remove the lower right side panel. (See RIGHT SIDE PANEL on Page 153.)

Figure 329



Remove the hydraulic filter (Item 1) **[Figure 329]**.

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.

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

Case Drain Filter

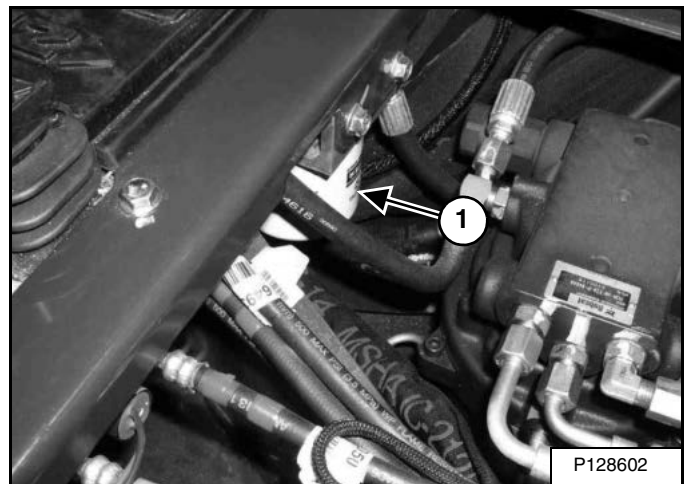
See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 146.)

The case drain filter is located below the floorplate.

Remove the floor mat.

Remove the floorplate.

Figure 330



Remove the case drain filter (Item 1) **[Figure 330]**.

Clean the housing where the filter gasket makes contact.

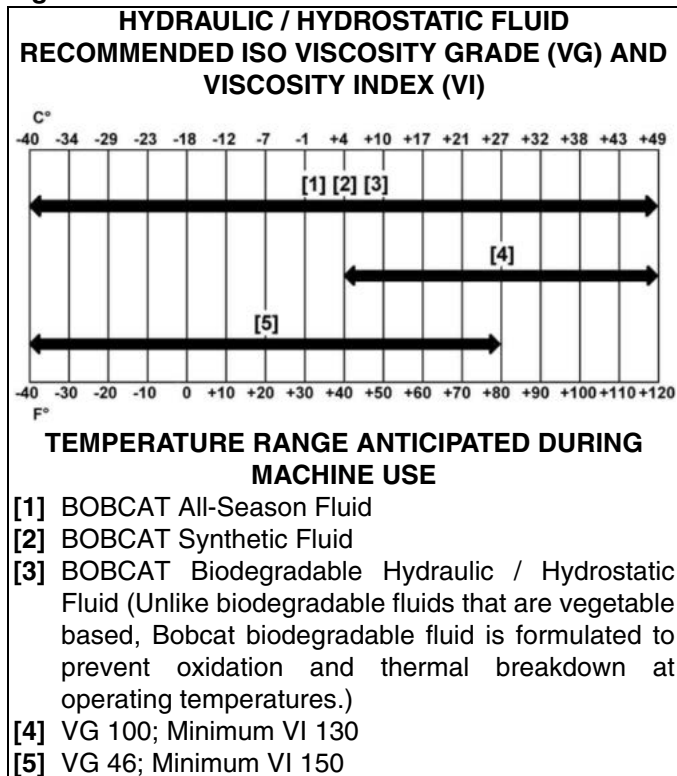
Put clean hydraulic fluid on the gasket. Install the new filter and hand tighten only.

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

HYDRAULIC SYSTEM (CONT'D)

Hydraulic / Hydrostatic Fluid Chart

Figure 331



Bobcat hydraulic fluids are recommended for use in this machine. If Bobcat hydraulic fluid is not available, use a good quality hydraulic fluid meeting the viscosity grade and viscosity index shown in the chart [Figure 331].

Removing And Replacing The Hydraulic Fluid

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 146.)

WARNING

AVOID INJURY OR DEATH

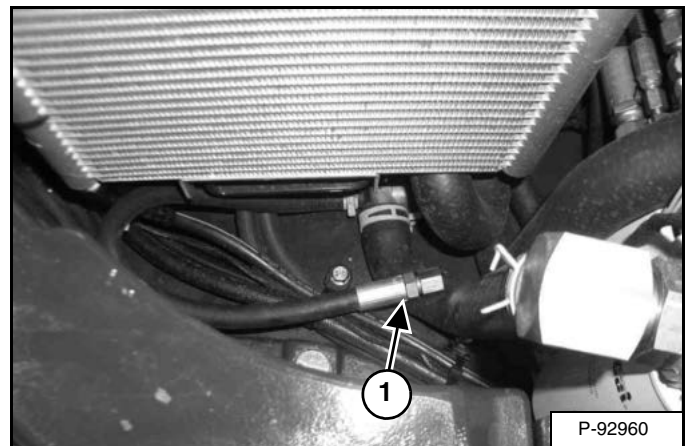
Diesel fuel or hydraulic fluid under pressure can penetrate skin or eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. Do not use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical 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 152.)

Figure 332

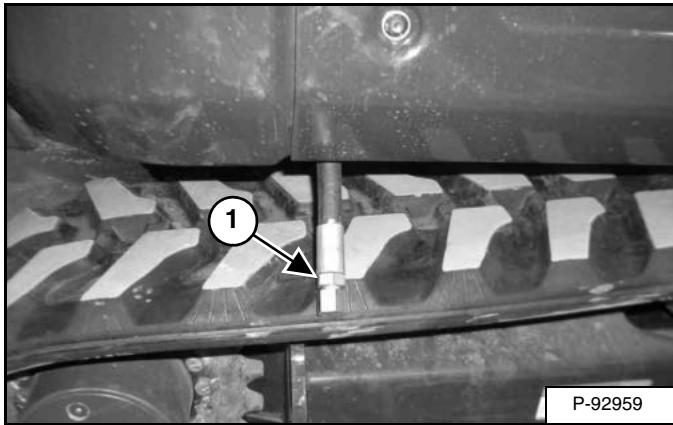


The hydraulic oil drain hose (Item 1) [Figure 332] is located below the oil cooler in the right rear corner of the upperstructure.

HYDRAULIC SYSTEM (CONT'D)

Removing And Replacing The Hydraulic Fluid (Cont'd)

Figure 333



Reposition the drain hose out the bottom of the upperstructure and remove the cap (Item 1) [Figure 333].

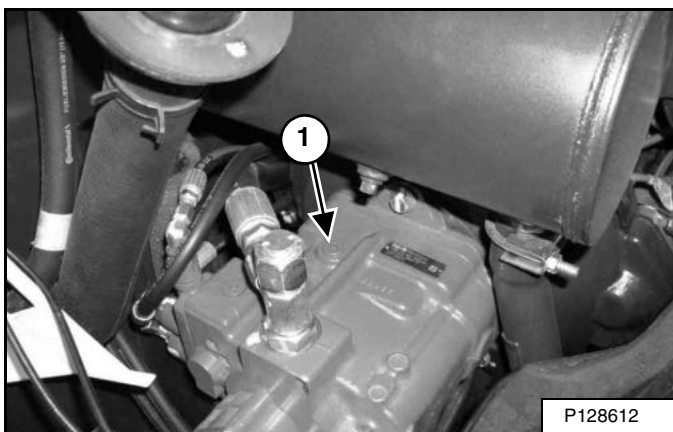
Drain the fluid into a container.

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

Install the cap (Item 1) [Figure 333] and position the drain hose back to the storage position (Item 1) [Figure 332].

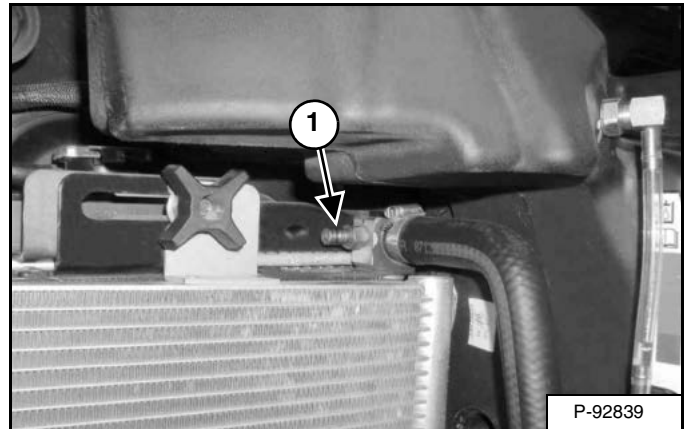
Add fluid to the reservoir. (See Hydraulic / Hydrostatic Fluid Chart on Page 176.)

Figure 334



With the engine OFF, loosen the plug (Item 1) [Figure 334] on the hydraulic pump. Tighten the plug after a steady stream of hydraulic fluid, free of any air bubbles, drains from the plug. **DO NOT RUN THE MACHINE WITH THE PLUG OPEN.**

Figure 335



There is also a port (Item 1) [Figure 335] on the hydraulic cooler for bleeding air. Install a diagnostic coupler and hose on this fitting and to allow air to be bled from the hydraulic system after the hydraulic fluid has been replaced.

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 146.)

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

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

WARNING

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

W-2068-1285

WARNING

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

W-2011-1285

WARNING

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

Failure to do so can cause injury or death.

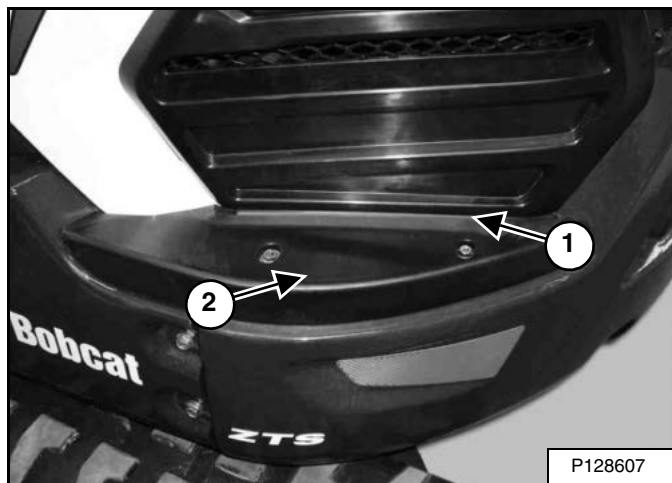
W-2203-0595

Do not operate the excavator with a defective exhaust system.

Stop the engine.

Remove the fuel cap.

Figure 336



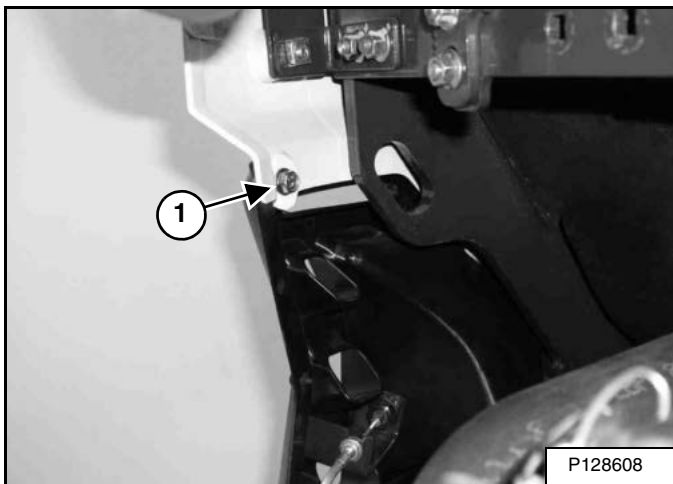
Remove the two bolts (Item 1) and remove the cover (Item 2) [Figure 336].

Open the tailgate. (See TAILGATE on Page 152.)

SPARK ARRESTER MUFFLER (CONT'D)

Cleaning Procedure (Cont'd)

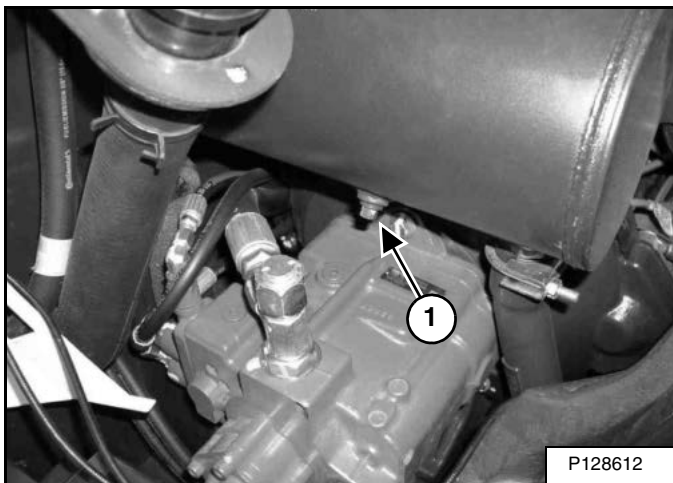
Figure 337



Remove the bolt (Item 1) [Figure 337] and position the left hand screen out of the way.

Reinstall the fuel cap to keep debris from entering the fuel tank.

Figure 338



Remove the plug (Item 1) [Figure 338] 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 338].

Stop the engine. Install and tighten the plug (Item 1) [Figure 338].

Remove the fuel cap.

Reposition the left hand screen and reinstall the bolt (Item 1) [Figure 337].

Reinstall the fuel cap.

Reinstall the cover (Item 2) and install the two bolts (Item 1) [Figure 336].

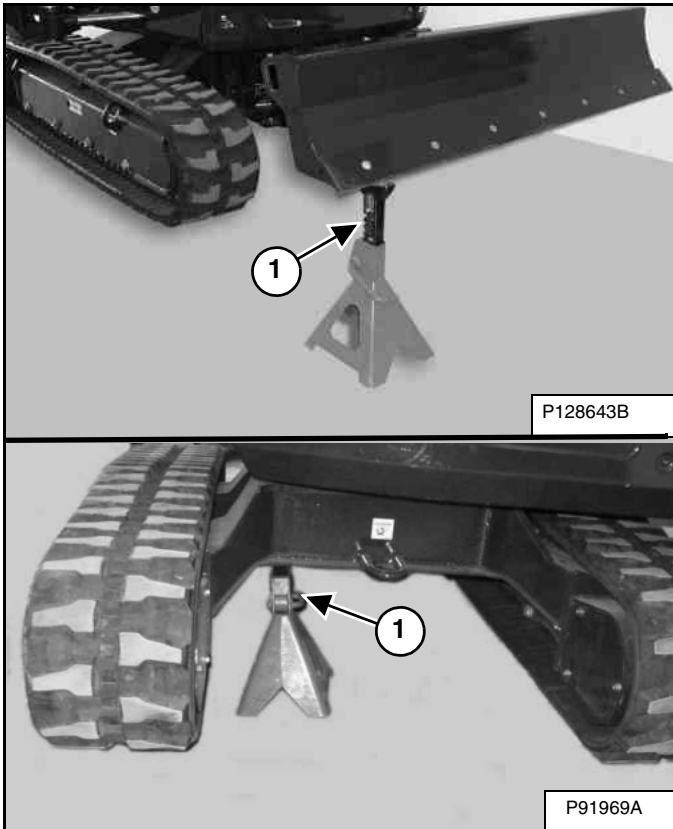
Close the tailgate.

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 146.)

Adjusting

Figure 339



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 339]. Lower the boom until all machine weight is on the jackstands.

Stop the engine.

! WARNING

AVOID INJURY

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

W-2142-0903

Rubber Track Clearance

Figure 340

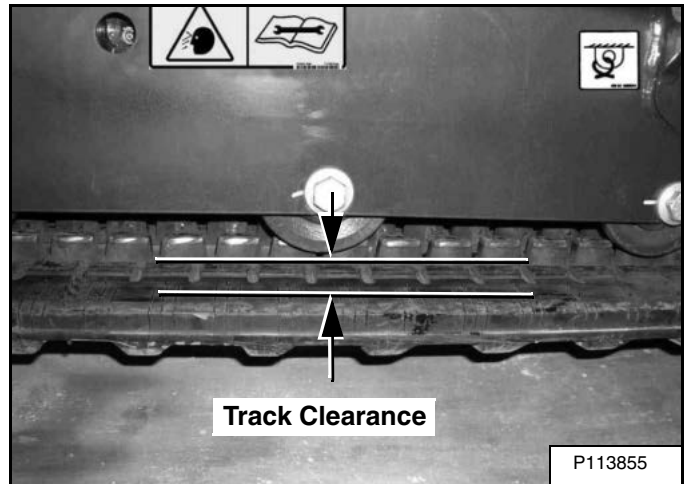
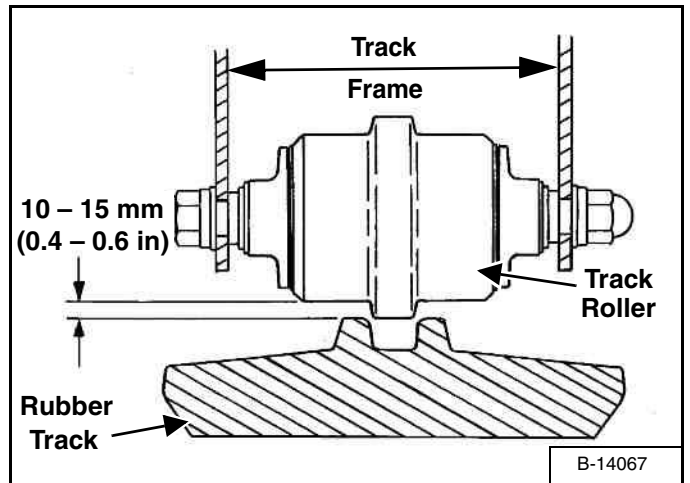


Figure 341



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 340] and [Figure 341].

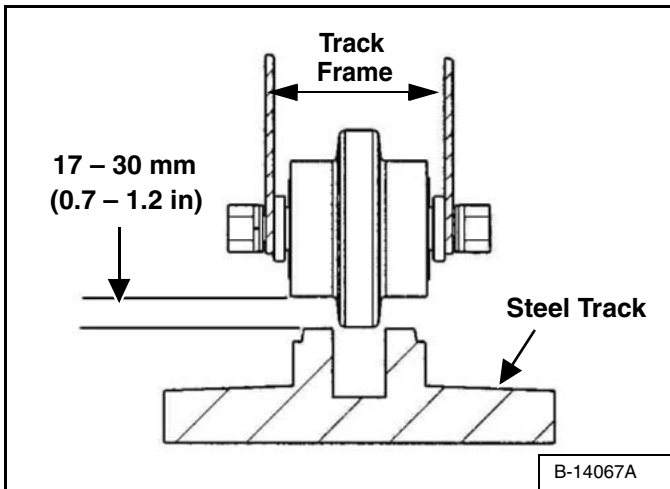
Rubber Track Clearance	10 – 15 mm (0.4 – 0.6 in)
------------------------	------------------------------

TRACK TENSION (CONT'D)

Adjusting (Cont'd)

Steel Track Clearance

Figure 342



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 342].

Steel Track Clearance	17 – 30 mm (0.7 – 1.2 in)
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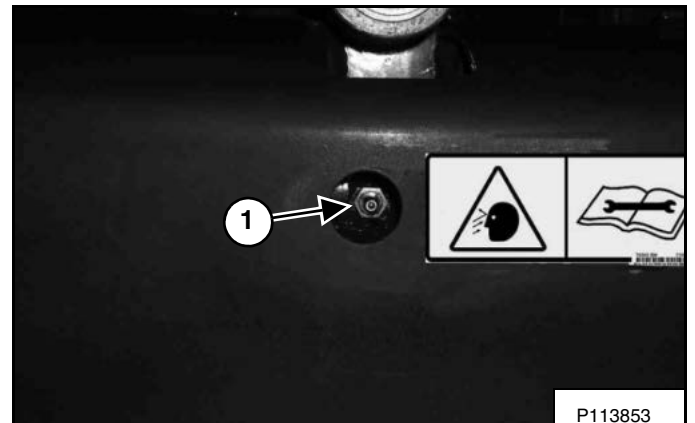
WARNING

HIGH PRESSURE GREASE CAN CAUSE SERIOUS INJURY

- Do not loosen the track tension fitting more than 1 - 1/2 turns.

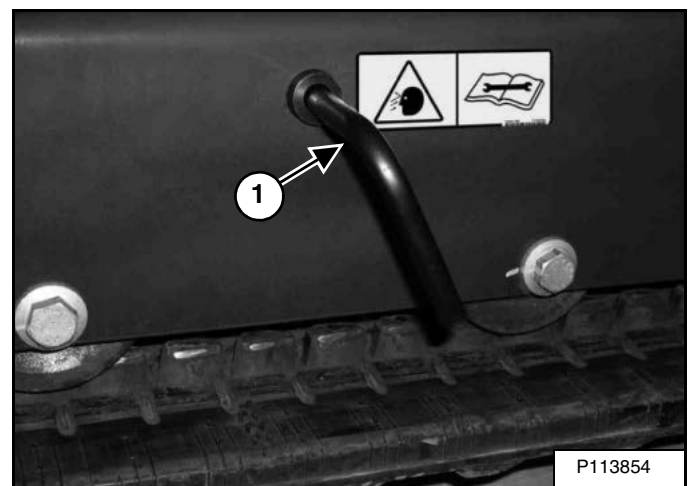
W-2994-0515

Figure 343



Add grease to the fitting (Item 1) [Figure 343] until the track tension is correct.

Figure 344



The tension removal tool (P/N 7277225) is available and recommended to direct the flow of grease to aid in cleanup. Always dispose of the grease in an environmentally friendly manner.

The tool is sized to fit the one piece track tension fitting (Item 1) [Figure 343].

Use tool (P/N 7277225) (Item 1) [Figure 344] to loosen the tension fitting (Item 2) [Figure 343] to release tension from the track.

NOTE: Do not loosen the track tension fitting (Item 1) [Figure 343] more than 1-1/2 turns.

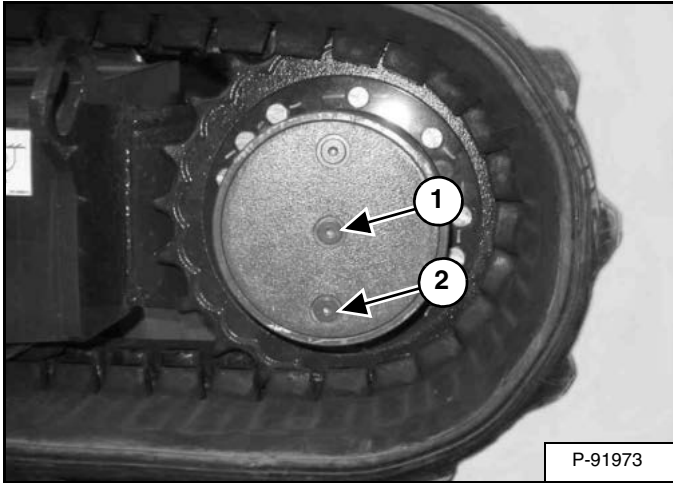
Installation: Tighten the track tension fitting to 23 N•m (17 ft-lb) torque.

Repeat the procedure for the other side.

TRAVEL MOTOR

Checking And Adding Oil

Figure 345



Park the excavator on a level surface with the plugs (Items 1 and 2) [Figure 345] in the vertical position as shown.

Remove the plug (Item 1) [Figure 345]. The lube level must be at the bottom edge of the hole.

Add lubricant (SAE 80W-90 API GL-5) through the hole if the lube level is low.

Removing And Replacing Oil

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 146.)

Park the excavator on a level surface with plugs (Items 1 and 2) [Figure 345] in the vertical position shown. Remove both plugs and drain the lubricant into a container.

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

Install the bottom plug (Item 2) [Figure 345]. Add lubricant through the centre plug hole until the lube level is at the bottom edge of the hole.

Add lubricant (SAE 80W-90 API GL-5) through the hole if the lube level is low.

Install the plug (Item 1) [Figure 345].

ALTERNATOR BELT

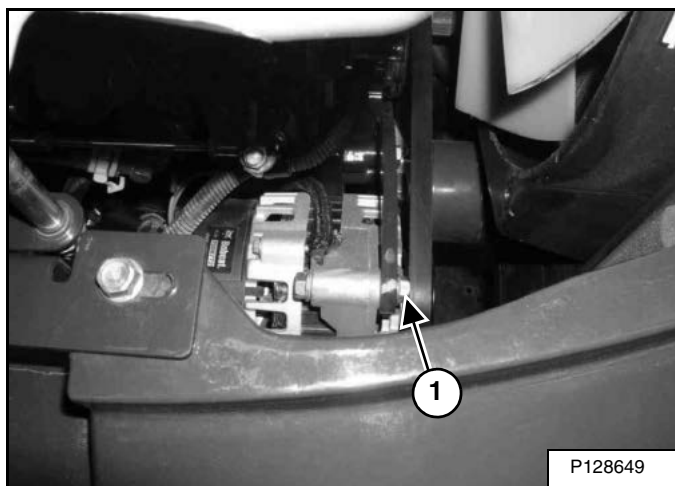
Belt Adjustment

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 152.)

Figure 346



Loosen the bolt (Item 1) [Figure 346] and the lower alternator mounting bolt and nut (not shown).

Use a pry bar to take the pressure off of the bolt (Item 1) [Figure 346] and remove the top bolt.

Remove and replace the alternator belt.

Use the pry bar to position the alternator and install the bolt (Item 1) [Figure 346].

Tighten the top and bottom alternator mounting bolts.

Close the tailgate.

FAN BELT

Belt Adjustment

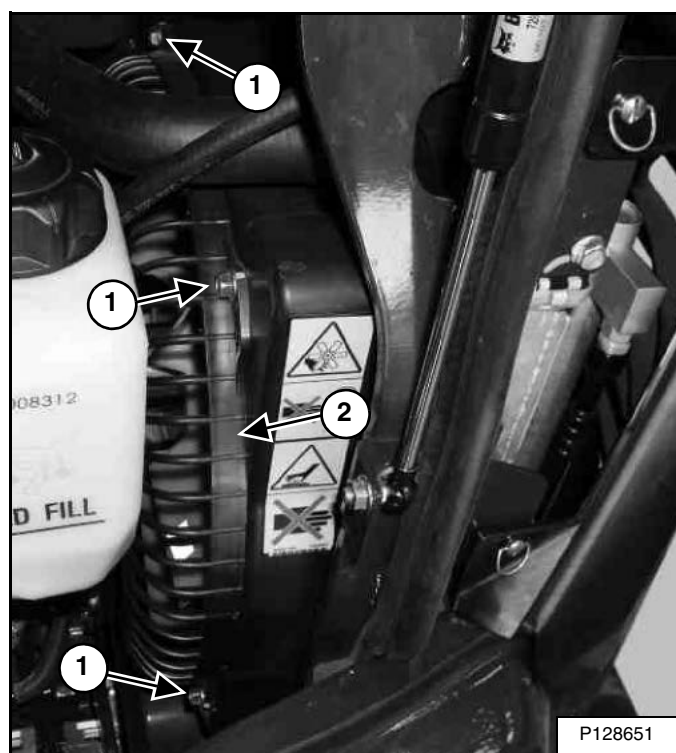
The fan belt is a special maintenance free type that is pretensioned over the pulleys. This belt eliminates the need for a tensioning device and does not require periodic adjustment. Contact your Bobcat dealer for replacement parts.

Belt Replacement

Stop the engine and open the tailgate. (See TAILGATE on Page 152.)

Remove the alternator belt. (See ALTERNATOR BELT on Page 183.)

Figure 347

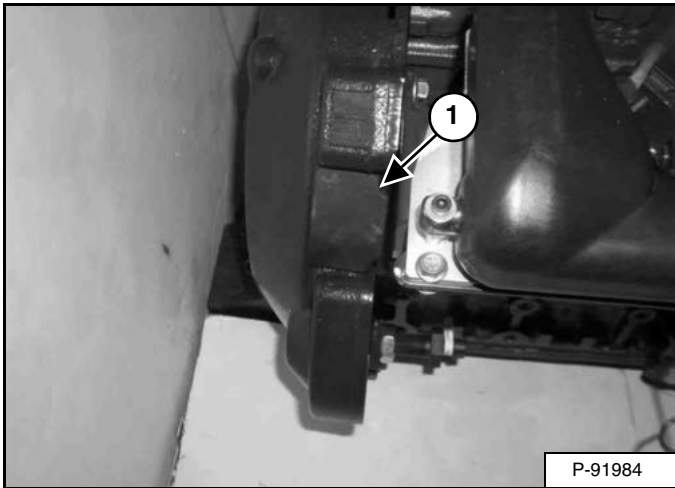


Remove the three bolts (Item 1) and the fan guard (Item 2) [Figure 347] for clearance for belt removal.

FAN BELT (CONT'D)

Belt Replacement (Cont'd)

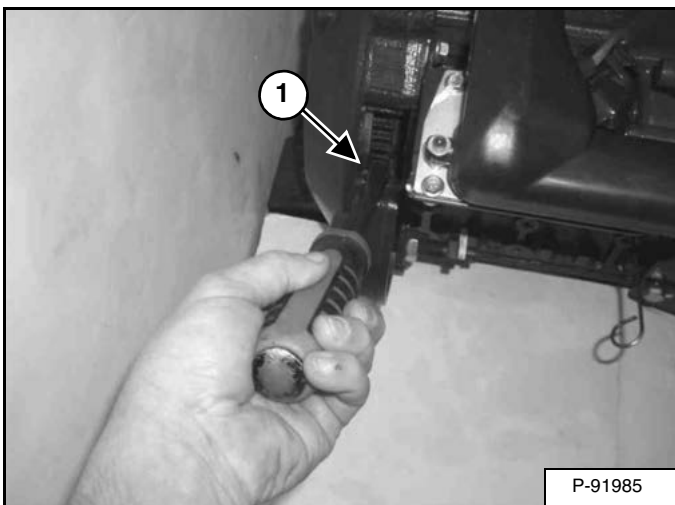
Figure 348



NOTE: The engine is removed from the machine for photo clarity only. This procedure can be performed with engine installed in machine.

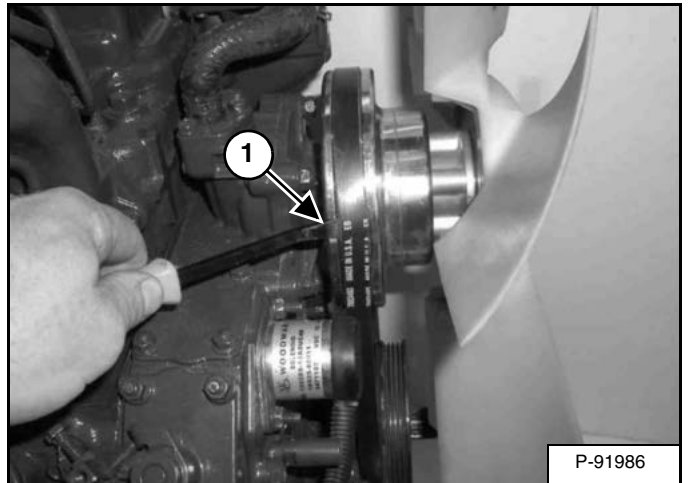
The engine will need to be rotated by hand to remove the fan belt. To access the flywheel, remove the plug (Item 1) [Figure 348] from the flywheel housing.

Figure 349



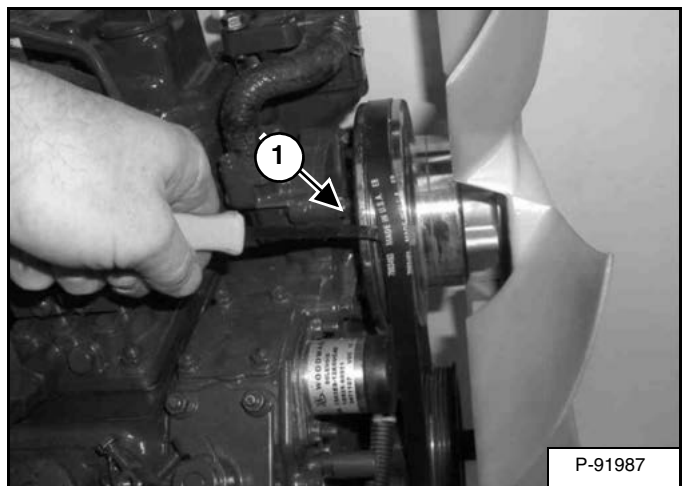
Install a pry bar (Item 1) [Figure 349] to the flywheel teeth.

Figure 350



Install a second pry bar (Item 1) [Figure 350] or flat blade screw driver between the belt and the water pump pulley.

Figure 351



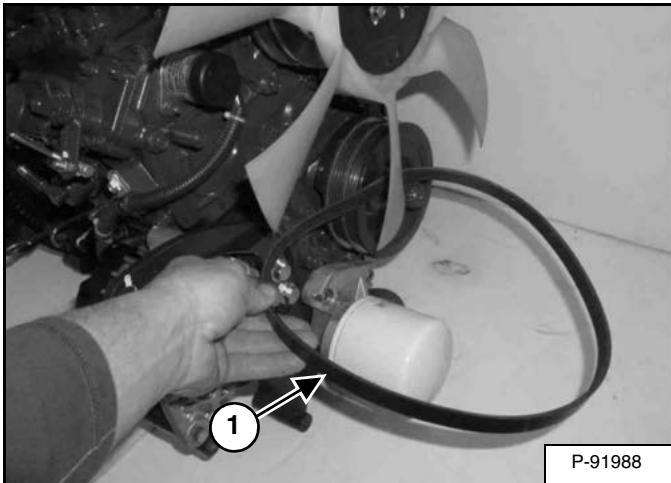
Using the pry bar (Item 1) [Figure 349] to rotate the engine, start to push the belt off of the pulley using the second pry bar (Item 1) [Figure 351].

Continue to manually rotate the engine until the belt is off the pulley.

FAN BELT (CONT'D)

Belt Replacement (Cont'd)

Figure 352

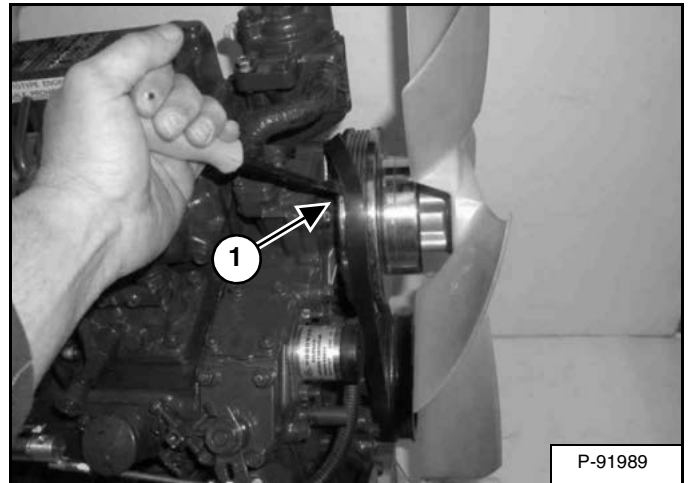


NOTE: Fan blades may be sharp, use care when removing the belt over the fan blades.

The belt (Item 1) [Figure 352] will need to be worked over the fan blades until it can be removed.

Install the new fan belt.

Figure 353



Position the belt over the water pump pulley and next to the engine block and align the lower part of the belt to the crankshaft pulley.

Using the pry bar (Item 1) [Figure 349] to rotate the engine and push the belt on the pulley using the second pry bar (Item 1) [Figure 353].

Continue rotating the engine until the belt is fully installed.

Install the flywheel plug (Item 1) [Figure 348].

Install the alternator belt. (See ALTERNATOR BELT on Page 183.)

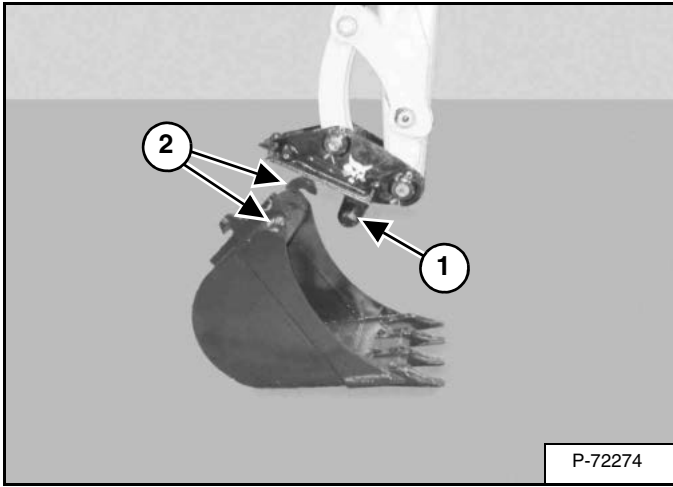
Install the fan guard (Item 1) [Figure 347].

Close the tailgate.

QUICK COUPLER

Quick Coupler And Attachment Inspection And Maintenance

Figure 354



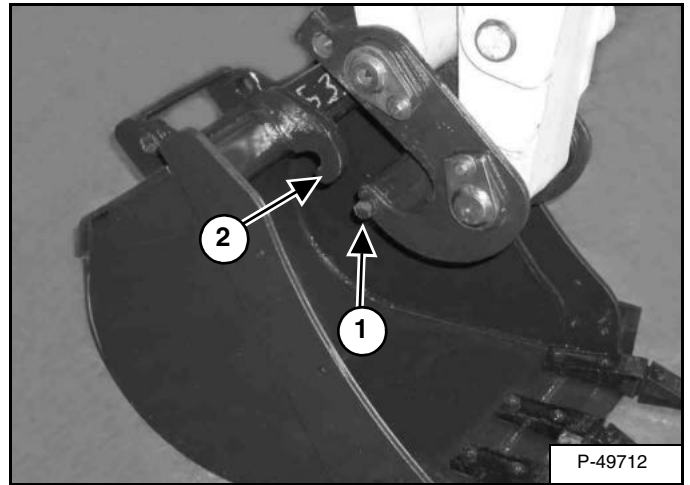
Inspect the quick coupler for wear or damage. Inspect the quick coupler pins (Item 1) and the hooks (Item 2) [Figure 354] (on the attachment) for wear or damage.

Repair or replace damaged parts.

X-CHANGE

Inspection And Maintenance

Figure 355



Inspect the X-Change for wear or damage. Inspect the X-Change pins (Item 1) and hooks (Item 2) [Figure 355] (on the attachment) for wear or damage.

Repair or replace damaged parts.

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

BUCKET

Bucket Teeth Removal And Installation

! WARNING

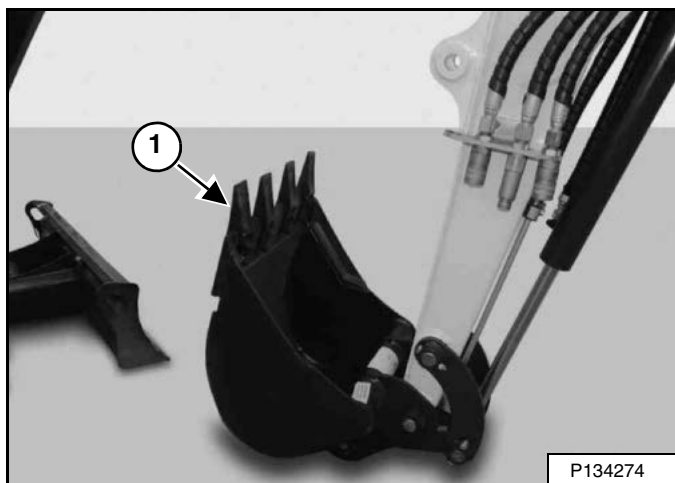
Wear safety glasses to prevent eye injury when any of the following conditions exist:

- 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

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

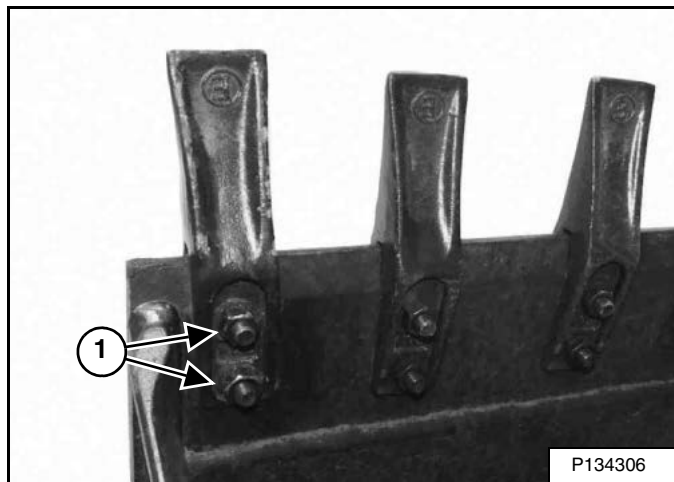
Figure 356



Position the bucket so the bucket teeth are pointed upwards at an angle convenient for accessing the teeth (Item 1) [Figure 356].

Stop the engine and exit the excavator.

Figure 357



Removal: Remove a tooth point by removing the two bolts and nuts (Item 1) [Figure 357].

Installation: Position the new tooth point on the bucket. Secure it with two bolts and nuts and tighten to 75 – 85 N•m (55 – 60 ft-lb).

TRACK ROLLER AND IDLER LUBRICATION

Procedure

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

LUBRICATION OF THE HYDRAULIC EXCAVATOR

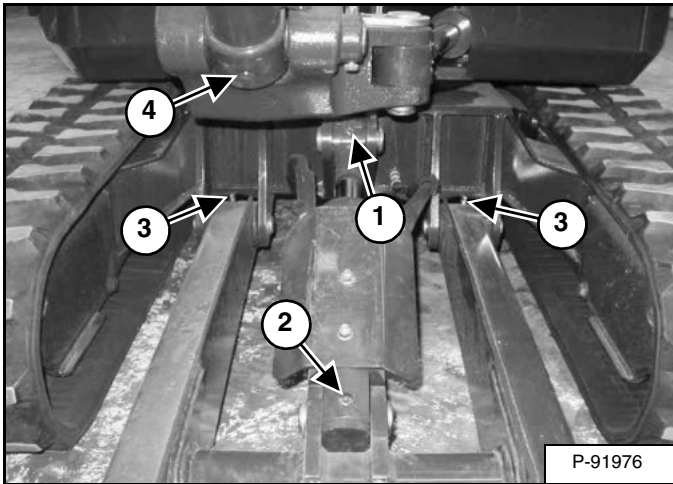
Lubrication Locations

Lubricate the excavator as specified in the SERVICE SCHEDULE for the best performance of the machine. (See SERVICE SCHEDULE on Page 146.)

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:

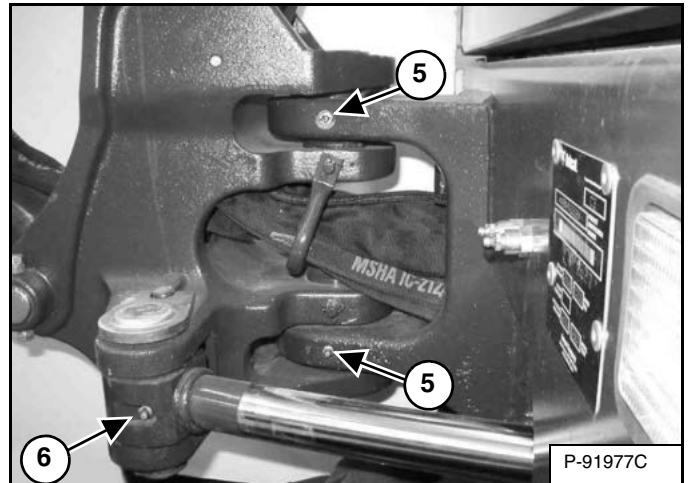
Figure 358



Ref Description (# of Fittings)

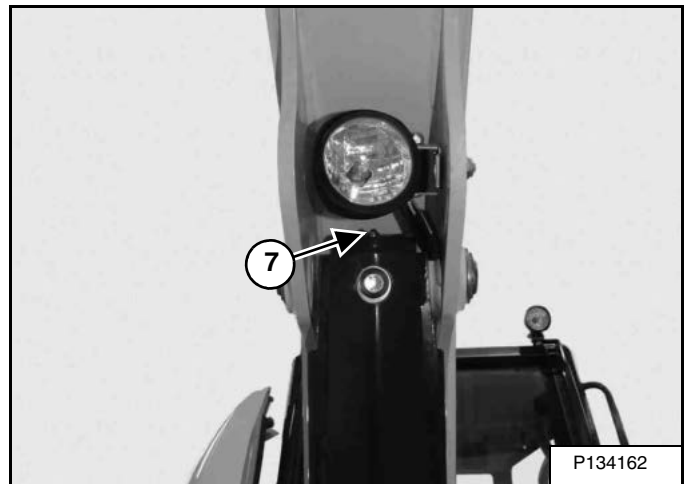
1. Blade Cylinder Rod End (1) [Figure 358]
2. Blade Cylinder Base End (1) [Figure 358]
3. Blade Pivots (2) [Figure 358]
4. Boom Cylinder Base End (1) [Figure 358]

Figure 359



5. Boom Swing Pivot (3) [Figure 359]
6. Boom Swing Cylinder Rod End (1) [Figure 359]

Figure 360

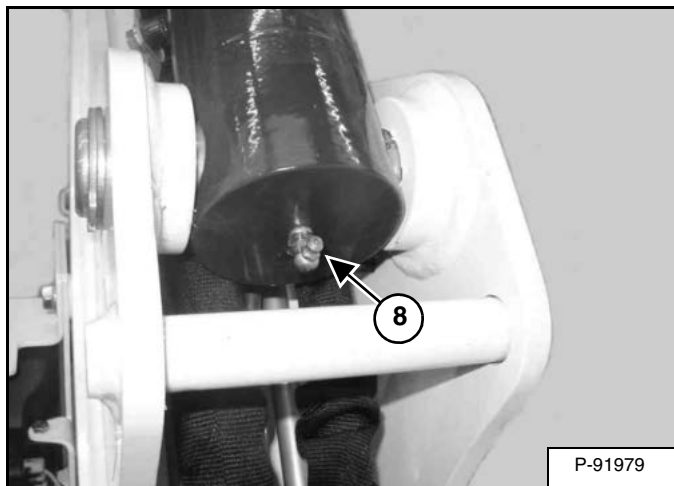


7. Boom Cylinder Rod End (1) [Figure 360]

LUBRICATION OF THE HYDRAULIC EXCAVATOR (CONT'D)

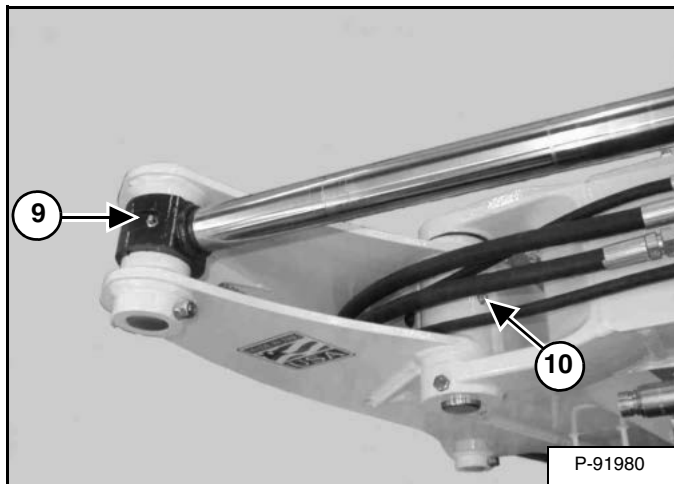
Lubrication Locations (Cont'd)

Figure 361



8. Arm Cylinder Base End (1) [Figure 361]

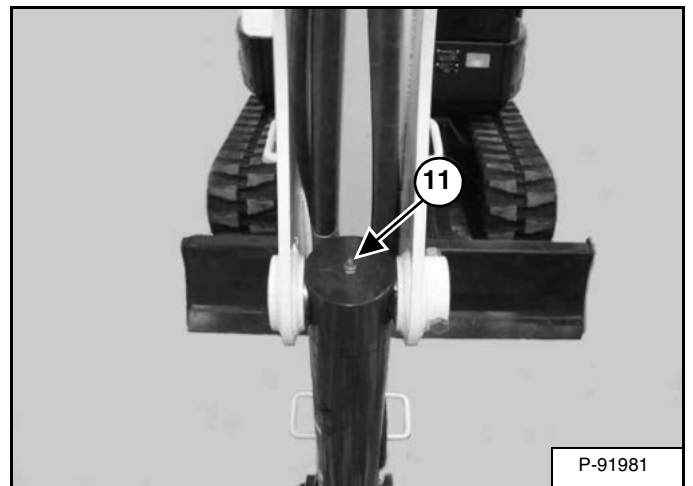
Figure 362



9. Arm Cylinder Rod End (1) [Figure 362]

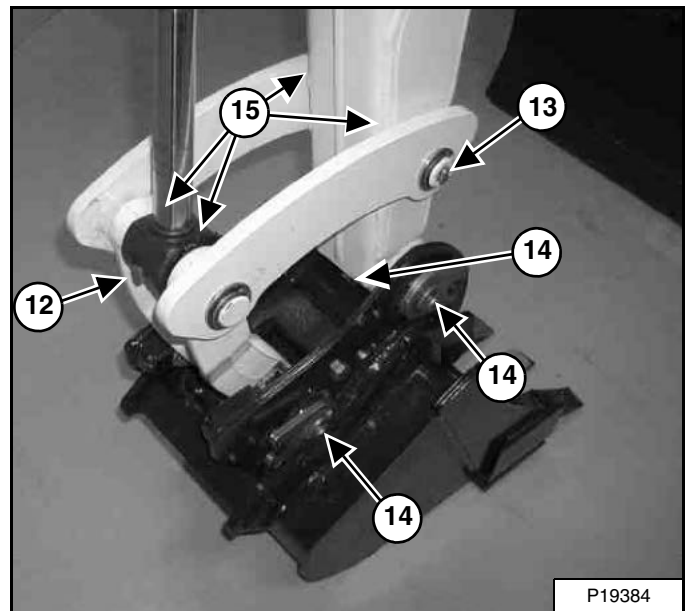
10. Arm Pivot (1) [Figure 362]

Figure 363



11. Bucket Cylinder Base End (1) [Figure 363]

Figure 364



12. Bucket Cylinder Rod End (1) [Figure 364]

13. Bucket Link Pin (1) [Figure 364]

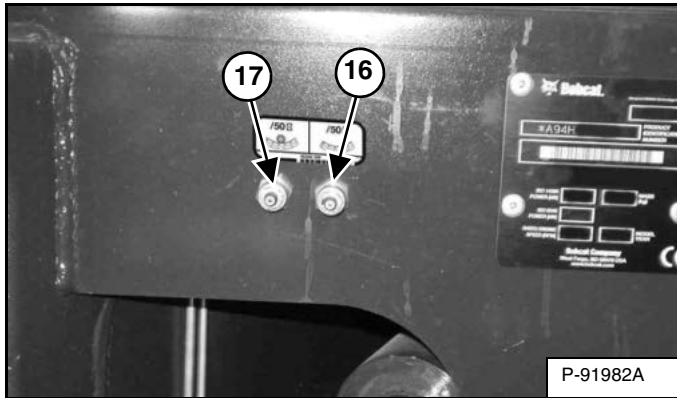
14. Bucket Pivot (3) [Figure 364]

15. Bucket Link - without extendable arm (2), with extendable arm (4) [Figure 364]

LUBRICATION OF THE HYDRAULIC EXCAVATOR (CONT'D)

Lubrication Locations (Cont'd)

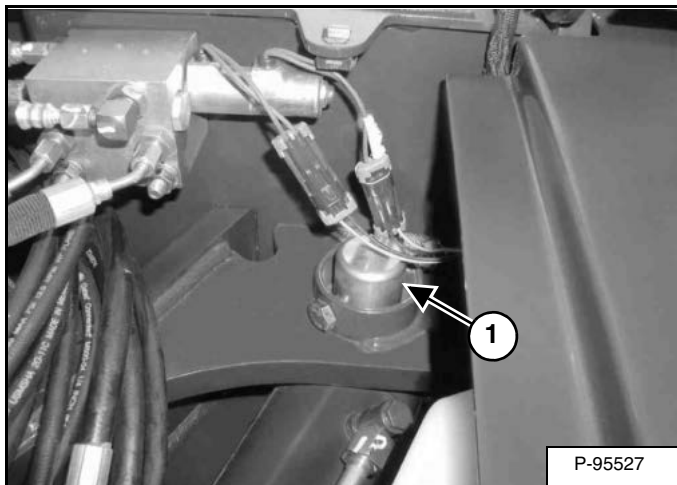
Figure 365



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

16. Swing Circle (1) [Figure 365]
17. Swing Pinion (1) [Figure 365]. (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.)

Figure 366



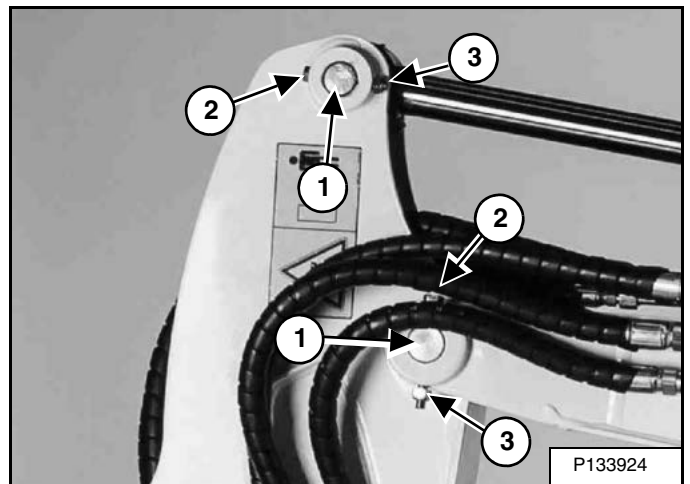
18. Boom Swing Cylinder Base End Pin (Item 1) [Figure 366]

NOTE: The boom swing cylinder base end does not have a grease fitting and uses a maintenance free bushing. No lubrication is required.

PIVOT PINS

Inspection And Maintenance

Figure 367



The pivots and cylinders (Item 1) have a large pin held in position with a bolt (Item 2) and a nut (Item 3) [Figure 367] securing the pin.

Installation: After the nut (Item 3) and bolt (Item 2) [Figure 367] are tightened together, the bolt should be free to spin.

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 AND ANALYSIS

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DIAGNOSTIC SERVICE CODES

Viewing Service Codes

The Service Codes will aid your dealer in diagnosing conditions that can damage your machine.

Standard Instrument Panel

Figure 368



Press the Information button (Item 2) to cycle the data display (Item 1) [Figure 368] until the service code screen is displayed. If more than one service code is present, the codes will scroll on the data display.

When no service code is present, [NONE] is displayed [Figure 368].

NOTE: Corroded or loose earths can cause multiple service codes and / or abnormal symptoms. All instrument panel lights flashing, alarm sounding, headlights and taillights flashing, can indicate a bad earth. The same symptoms can apply if the voltage is low, such as loose or corroded battery cables. If you observe these symptoms, check earths and positive leads first.

Deluxe Instrument Panel

The last 40 codes stored in history can also be viewed using the Deluxe Instrument Panel.

	<p>Press a scroll button (Item 1) repeatedly until the Active Warnings screen icon (Inset) is highlighted.</p>
	<p>The ACTIVE WARNINGS screen displays active service codes. Press [9] to view the next service code if more than one is present. Press [4] to display a history of service codes.</p>
	<p>The WARNINGS HISTORY screen will list the Service Code Number (CODE), Hourmeter reading when the error occurred (HOURL), and the User (USER) who was logged in to operate the machine when the error occurred.</p>
<p>Press [9] to view the next eight service codes.</p>	
<p>A total of 40 codes can be stored. When more than 40 codes occur, the oldest code will disappear and the newest code will be in the number 1 position.</p>	
	<p>Press the list number next to the service code for more detail.</p> <p>Press the left scroll button to back up one screen.</p>

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List

CODE	DESCRIPTION
H0104	Boom Angle Sensor No Communication
H0204	Arm Angle Sensor No Communication
H0304	Bucket Angle Sensor No Communication
H0405	Angle Sensor Supply Short To Battery
H0406	Angle Sensor Supply Short To Ground
H0407	Angle Sensor Supply Open Circuit
H0705	Aux 4 Base Short to Battery
H0706	Aux 4 Base Short to Ground
H0707	Aux 4 Base Open Circuit
H0732	Aux 4 Base Overcurrent
H0805	Aux 4 Rod Short to Battery
H0806	Aux 4 Rod Short to Ground
H0807	Aux 4 Rod Open Circuit
H0832	Aux 4 Rod Overcurrent
H2521	Angle Blade Control Switch Out Of Range High
H2522	Angle Blade Control Switch Out Of Range Low
H2524	Angle Blade Control Switch Out Of Neutral
H2605	Angle Blade Base Solenoid Short To Battery
H2606	Angle Blade Base Solenoid Short To Ground
H2607	Angle Blade Base Solenoid Open Circuit
H2632	Angle Blade Base Solenoid Overcurrent
H2705	Angle Blade Rod Solenoid Short To Battery
H2706	Angle Blade Rod Solenoid Short To Ground
H2707	Angle Blade Rod Solenoid Open Circuit
H2732	Angle Blade Rod Solenoid Overcurrent
H2805	Diverter Output Short To Battery
H2806	Diverter Output Short To Ground
H2807	Diverter Output Open Circuit
H2832	Diverter Output Overcurrent
H2848	Diverter Multiple Input
H3128	Interrupted Power Failure
H3904	Left Joystick In Error
H3912	Left Joystick Thumb Switch Not In Neutral
H3913	Left Joystick Grip No Communication
H3916	Left Joystick No Communication
H3928	Left Joystick Internal Failure
H3948	Left Joystick Multiple
H4423	Secondary Not Programmed
H4497	Secondary Controller Programmed
H4621	5 Volt Sensor Supply Out Of Range High
H4622	5 Volt Sensor Supply Out Of Range Low
H4721	8 Volt Sensor Supply Out Of Range High

CODE	DESCRIPTION
H4722	8 Volt Sensor Supply Out Of Range Low
H5705	Angle Blade Aux 4 Base Short to Battery
H5706	Angle Blade Aux 4 Base Short to Ground
H5707	Angle Blade Aux 4 Base Open Circuit
H5732	Angle Blade Aux 4 Base Overcurrent
H5805	Angle Blade Aux 4 Rod Short to Battery
H5806	Angle Blade Aux 4 Rod Short to Ground
H5807	Angle Blade Aux 4 Rod Open Circuit
H5832	Angle Blade Aux 4 Rod Overcurrent
H7404	Main Controller No Communication
H7604	Display No Communication
H7902	Door Unlock Error On
H7903	Door Unlock Error Off
H8002	Door Lock Error On
H8003	Door Lock Error Off
L0102	Lights Button Error On
L0202	High Flow Enable Button Error On
L0302	Auxiliary Enable Button Error On
L0402	Information Button Error On
L7404	Information Button Error On
L7672	Information Button Error On
LOWVLT G	Machine IQ Device Low Voltage
M0116	Air Filter Not Connected
M0117	Air Filter Plugged
M0144	Air Filter Derate Level 1
M0145	Air Filter Derate Level 2
M0216	Hydraulic/hydrostatic Filter Not Connected
M0217	Hydraulic/hydrostatic Filter Plugged
M0309	System Voltage Too Low
M0310	System Voltage Too High
M0311	System Voltage Extremely High
M0314	System Voltage Extremely Low
M0322	System Voltage Out Of Range Low
M0414	Engine Oil Pressure Extremely Low
M0415	Engine Oil Pressure In Shutdown
M0610	Engine Speed Too High
M0611	Engine Speed Extremely High
M0613	Engine Speed No Signal
M0615	Engine Speed In Shutdown
M0618	Engine Speed Out Of Range
M0710	Hydraulic Oil Temp Too High
M0711	Hydraulic Oil Temp Extremely High
M0715	Hydraulic Oil Temp In Shutdown

CODE	DESCRIPTION
M0721	Hydraulic Oil Temp Out Of Range High
M0722	Hydraulic Oil Temp Out Of Range Low
M0810	Engine Coolant Temp Too High
M0811	Engine Coolant Temp Extremely High
M0815	Engine Coolant Temp In Shutdown
M0821	Engine Coolant Temp Out Of Range High
M0822	Engine Coolant Temp Out Of Range Low
M0826	Engine Coolant Temp Out Of Range Low
M0909	Fuel Level Too Low
M0921	Fuel Level Out Of Range High
M0922	Fuel Level Out Of Range Low
M1121	Console Sensor Out Of Range High
M1122	Console Sensor Out Of Range Low
M1128	Console Sensor Failure
M1305	Fuel Hold Solenoid Short To Battery
M1306	Fuel Hold Solenoid Short To Ground
M1307	Fuel Hold Solenoid Open Circuit
M1402	Fuel Pull Solenoid Error On
M1403	Fuel Pull Solenoid Error Off
M1407	Fuel Pull Solenoid Open Circuit
M1428	Fuel Pull Solenoid Failure
M1605	Hydraulic Bypass Short to Battery
M1606	Hydraulic Bypass Short to Ground
M1607	Hydraulic Bypass Open Circuit
M1632	Hydraulic Bypass Overcurrent
M1705	Hydraulic Lock Valve Short To Battery
M1706	Hydraulic Lock Valve Short To Ground
M1707	Hydraulic Lock Valve Open Circuit
M1732	Hydraulic Lock Valve Overcurrent
M1802	Power Beyond Valve Output Error On
M1803	Power Beyond Valve Output Error Off
M1902	Power Beyond Valve Relay Error On
M1903	Power Beyond Valve Relay Error Off
M2005	Two Speed Primary Solenoid Short To Battery
M2006	Two Speed Primary Solenoid Short To Ground
M2007	Two Speed Primary Solenoid Open Circuit
M2102	Glow Plug Output Error On
M2103	Glow Plug Output Error Off
M2107	Glow Plug Output Open Circuit
M2128	Glow Plug Output Failure
M2202	Starter Output Error On
M2203	Starter Output Error Off
M2207	Starter Output Open Circuit
M2228	Starter Output Failure
M2302	Starter Relay Error On

CODE	DESCRIPTION
M2303	Starter Relay Error Off
M2402	Fuel Pull Relay Error On
M2403	Fuel Pull Relay Error Off
M2521	Load Sense Sensor Out Of Range High
M2522	Load Sense Sensor Out Of Range Low
M2602	Glow Plug Relay Error On
M2603	Glow Plug Relay Error Off
M2721	Throttle Primary Sensor Out Of Range High
M2722	Throttle Primary Sensor Out Of Range Low
M2805	Diverter Output Short To Battery
M2806	Diverter Output Short To Ground
M2807	Diverter Output Open Circuit
M3128	Interrupted Power Failure
M3204	Throttle Controller No Communication To Bobcat Controller
M3223	Throttle Controller Not Calibrated
M3228	Throttle Controller Failure
M3299	Throttle Controller Calibration In Process
M3304	Deluxe Panel No Communication
M3372	Display Software Incompatible
M3373	Display Software Outdated
M3702	HYD Exchange Output Error On
M3703	HYD Exchange Output Error Off
M3904	Jog Shuttle No Communication
M4028	Wrong ECU Detected
M4109	Alternator Voltage Too Low
M4110	Alternator Voltage High
M4204	Keyless Entry No Communication
M4304	Keyless Start Panel No Communication
M4404	Secondary No Communication
M4472	Secondary Controller Software Incompatible
M4473	Secondary Controller Software Outdated
M4621	5 Volt Sensor Supply Out Of Range High
M4622	5 Volt Sensor Supply Out Of Range Low
M4721	8 Volt Sensor Supply Out Of Range High
M4722	8 Volt Sensor Supply Out Of Range Low
M4802	Front Light Relay Error On
M4803	Front Light Relay Error Off
M5002	Front Light Output Error On
M5003	Front Light Output Error Off
M5205	Offset Base Solenoid Short To Battery
M5206	Offset Base Solenoid Short To Ground
M5207	Offset Base Solenoid Open Circuit
M5232	Offset Base Solenoid Overcurrent
M5305	Offset Rod Solenoid Error On

CODE	DESCRIPTION
M5306	Offset Rod Solenoid Short To Ground
M5307	Offset Rod Solenoid Open Circuit
M5332	Offset Rod Solenoid Overcurrent
M5421	Offset Control Switch Out Of Range High
M5422	Offset Control Switch Out Of Range Low
M5424	Offset Control Switch Out Of Neutral
M5505	Auxiliary Base Solenoid Short To Battery
M5506	Auxiliary Base Solenoid Short To Ground
M5507	Auxiliary Base Solenoid Open Circuit
M5532	Auxiliary Base Solenoid Overcurrent
M5605	Auxiliary Rod Solenoid Short To Battery
M5606	Auxiliary Rod Solenoid Short To Ground
M5607	Auxiliary Rod Solenoid Open Circuit
M5632	Auxiliary Rod Solenoid Overcurrent
M5721	Auxiliary Control Switch Out Of Range High
M5722	Auxiliary Control Switch Out Of Range Low
M5724	Auxiliary Control Switch Out Of Neutral
M5810	Fuel Temperature High
M5811	Fuel Temperature Extremely High
M5815	Fuel Temperature In Shutdown
M5826	Fuel Temperature In Shutdown
M6021	Left Control Switch Out of Range High
M6022	Left Control Switch Out of Range Low
M6024	Left Control Switch Out of Neutral
M6121	Right Control Switch Out of Range High
M6122	Right Control Switch Out of Range Low
M6124	Right Control Switch Out of Neutral
M6204	Load Moment Sensor In Error
M6221	Overload Warning Sensor Out of Range High
M6222	Overload Warning Sensor Out of Range Low
M6402	Switched Power Relay Error On
M6403	Switched Power Relay Error Off
M6505	ECU Power Short To Battery
M6506	ECU Power Short To Ground
M6507	ECU Power Open Circuit
M6604	ECU No Communication
M6702	HVAC Output Error On
M6703	HVAC Output Error Off
M6905	Dump Valve Short to Battery
M6906	Dump Valve Short to Ground
M6907	Dump Valve Open Circuit
M6932	Dump Valve Overcurrent
M7002	Switched Power Output Error On
M7003	Switched Power Output Error Off
M7007	Switched Power Output Open Circuit

CODE	DESCRIPTION
M7028	Switched Power Output Failure
M7423	Main Controller Not Programmed
M7472	Main Controller Software Incompatible
M7473	Main Controller Software Outdated
M7497	Main Controller Programmed
M7604	Standard Display Panel No Communication
M7748	Key Switch Multiple
M7839	Hourmeter Changed
M8004	Cooling Fan Controller No Communication
M8005	Cooling Fan Short To Battery
M8006	Cooling Fan Short To Ground
M8021	Cooling Fan Out Of Range High
M8022	Cooling Fan Out Of Range Low
M8025	Cooling Fan Unresponsive
M8027	Cooling Fan CAN Error
M8028	Cooling Fan Failure
M8029	Cooling Fan Wiring Fault
M8030	Cooling Fan Controller Fault
M8302	Wait to Start Lamp Error On
M8303	Wait to Start Lamp Error Off
M8615	Engine Speed Derate In Shutdown
M8625	Engine Speed Derate Unresponsive
M9111	Fuel Filter Extremely Plugged
M9117	Fuel Filter Plugged
M9144	Fuel Filter Derate Level 1
M9145	Fuel Filter Derate Level 2
M9202	Fuel Lift Pump Error On
M9203	Fuel Lift Pump Error Off
M9287	Fuel Pump Failure Time Exceeded
M9309	Fuel Pressure Low
M9314	Fuel Pressure Extremely Low
M9321	Fuel Pressure Out Of Range High
M9322	Fuel Pressure Out Of Range Low
M9344	Fuel Pressure Derate Level 1
M9701	Turbo Prime Sequence Active
R3327	Display CAN Error
R3334	Display CAN Error
R3335	Display CAN Error
R3904	Jog Shuttle No Communication
R7404	Main Controller No Communication
R7492	Main Controller Authentication Failed
R9604	Radio No Communication
VRLOW VLTG	Machine IQ Device Very Low Voltage

CONTROL PANEL SETUP

Deluxe Instrument Panel

Icon Identification

Figure 369



ICON	DESCRIPTION
	DATE / TIME
	USER / USER HOURS
	MACHINE HOURS (HOURMETER)
	ACTIVE WARNINGS screen icon
	VITALS screen icon
	SERVICE screen icon
	AUTO IDLE Status icon
	ATTACHMENTS screen icon
	MACHINE SETTINGS screen icon
	DISPLAY screen icon
	HOME icon (Return to MAIN screen)
	LEFT SCROLL button
	RIGHT SCROLL button
	ENTER button

Vitals







	Press a scroll button (Item 1) repeatedly until the Vitals screen icon (Inset) is highlighted.
	Displays select system operating levels.
<p>You can monitor real-time displays of:</p> <ul style="list-style-type: none"> Engine Speed (RPM) Engine Coolant Temperature System Voltage Hydraulic Fluid Temperature 	

The Deluxe Instrument Panel is easy to use. Continue to set your own preferences for operating / monitoring your Bobcat excavator.




CONTROL PANEL SETUP (CONT'D)

Deluxe Instrument Panel (Cont'd)



Date And Time

	<p>Press a scroll button (Item 1) repeatedly until the Display screen icon (Inset) is highlighted.</p>
	<p>Select [1. CLOCKS].</p>
	<p>Select [1. TIME].</p>
	<p>Use the keypad to enter time. Select AM / PM / 24hr. Press [ENTER] to continue.</p>
	<p>Select [2. DATE].</p>
	<p>Use the keypad to enter date. Press [ENTER] to continue.</p>

Languages

	<p>Press a scroll button (Item 1) repeatedly until the Display screen icon (Inset) is highlighted.</p>
	<p>Select [2. LANGUAGES].</p>
	<p>Select the desired language.</p>





English / Metric Display

	<p>Press a scroll button (Item 1) repeatedly until the Display screen icon (Inset) is highlighted.</p>
	<p>Select [4. DISPLAY SETTINGS]. Press [1] to cycle between ENGLISH and METRIC.</p>







CONTROL PANEL SETUP (CONT'D)

Deluxe Instrument Panel (Cont'd)

Auto Idle Time Delay

	<p>Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.</p>
	<p>Select [3. MACHINE PERFORMANCE].</p>
	<p>Select [1. AUTO IDLE DELAY TIME].</p>
	<p>Use the keypad to enter the desired delay time between 4 and 250 seconds.</p> <p>Press [ENTER] to save and continue. Press left scroll button to exit without saving.</p>

Job Clock Reset

	<p>Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.</p>
	<p>Select [1. PASSWORDS / LOCKOUTS].</p>
	<p>Enter owner password and press [ENTER].</p>
	<p>Select [1. USER SETTINGS].</p>
	<p>Select user.</p>
	<p>Press [9] to reset job statistics.</p> <p>Press left scroll button or [0] to exit without saving.</p>

CONTROL PANEL SETUP (CONT'D)

Deluxe Instrument Panel (Cont'd)

Alarm Clock Reset

	<p>Press a scroll button (Item 1) repeatedly until the Display screen icon (Inset) is highlighted.</p>
	<p>Select [3. ALARM CLOCK].</p>
	<p>Select [1. OFF ONCE], Select [2. ON Daily] or Select [3. ON WEEKLY].</p>
	<p>Select [1. OFF / ON], Select [2. TIME] or Select [3. DAILY].</p>
	<p>Use keypad numbers to set time. Select [7. AM], Select [8. PM] or Select [9. 24 hr clock].</p> <p>Select [ENTER] to save. Press left scroll to back space numbers.</p>
	<p>Press [4] to set alarm to sleep. (When pressed, display will return to main screen.)</p> <p>Press [9] to shut off alarm. Alarm will still be active for the next day alarm setting. (When pressed, display will return to main screen.)</p>





ECO MODE

	<p>Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.</p>
	<p>Select [3. MACHINE PERFORMANCE].</p>
	<p>Select [2. ECO MODE].</p> <p>ECO Mode will set the maximum engine rpm to be at 85% of the high idle setting.</p> <p>Example: If the machine maximum engine speed is 2450 rpm, when ECO Mode is enabled, the maximum engine speed will be approximately 2080 rpm.</p>





CONTROL PANEL SETUP (CONT'D)

Deluxe Instrument Panel (Cont'd)

Machine History - Log In Information

	<p>Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.</p>
	<p>MACHINE SETTINGS is visible on screen.</p> <p>Select [2. MACHINE HISTORY].</p>
	<p>Select [1. LOG-IN INFORMATION].</p>
	<p>View User Log hours and last time / dated used.</p> <p>Individual information can be viewed and reset back to zero.</p> <p>Select user [KEYPAD 1 - 9] to access individual user.</p>




Machine History - User Job Statistics

	<p>Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.</p>
	<p>MACHINE SETTINGS is visible on screen.</p> <p>Select [2. MACHINE HISTORY].</p>
	<p>Select [2. USER JOB STATISTICS].</p>
	<p>View Job Statistics (Job Hours / Idle Time.</p> <p>Information can be viewed and reset back to zero.</p>





CONTROL PANEL SETUP (CONT'D)

Deluxe Instrument Panel (Cont'd)

Machine History - Overall Job Statistics

	<p>Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.</p>
	<p>MACHINE SETTINGS is visible on screen.</p> <p>Select [2. MACHINE HISTORY].</p>
	<p>Select [3. OVERALL JOB STATISTICS].</p>

Attachments

	<p>Press a scroll button (Item 1) repeatedly until the Attachment screen icon (Inset) is highlighted.</p>
	<p>ATTACHMENTS is visible on screen.</p> <p>Press [ENTER].</p>
	<p>Press [4] or [9] repeatedly until the desired Attachment is visible in the display screen.</p>
	<p>Information about the attachment, recommended auxiliary hydraulic flow and tips about attachment operation will be displayed.</p>

PASSWORD SETUP (KEYPAD PANEL)

Password Description

Master Password:

A permanent, randomly selected password set at the factory that 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:

Allows for full use of the excavator. Must be used to change the owner password, or User 1 / User 2 password.

NOTE: By default, the owner password is the last five digits of the machine's serial number.

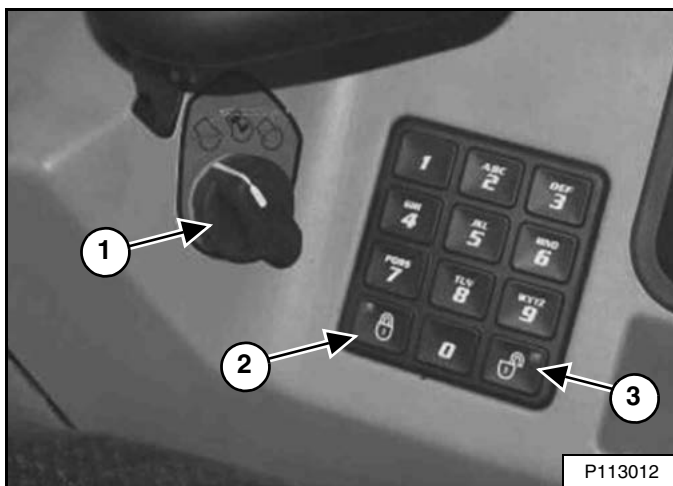
User 1 And User 2 Passwords:

By default, User 1 and User 2 passwords are not set.

NOTE: The User 1 and User 2 Password cannot be used to change a password or to switch between the Locked / UnLocked modes.

Changing The Owner, User 1, And User 2 Passwords

Figure 370



Turn the start switch (Item 1) [Figure 370] to the ON position to turn on the excavator's electrical system.

Enter the five-digit owner password on the keypad if locked.

Press and hold the lock (Item 2) and unlock (Item 3) [Figure 370] keys for three seconds.

The display screen will show [CODE].

The display screen will show [OWNER] for two seconds. Press the unlock key (Item 3) [Figure 370] to navigate between [OWNER], [USER 1], and [USER 2].

After two seconds, the display screen will show [ENTER].

NOTE: The lock key's (Item 2) red LED and the unlock key's (Item 3) [Figure 370] green LED will flash during the procedure.

Enter a new five-digit owner, User 1, or User 2 password using the keypad. An asterisk will show in the display screen for each key pressed.

The display screen will show [AGAIN].

Enter the new five-digit password again.

The display screen will show [STORE] if the password has been changed.

The display screen will show [ERROR] if:

- The second five-digit password is different from the first one.
- OR
- No number key was pressed for more than 20 seconds.
- OR
- "00000" was entered as the password.

NOTE: "00000" is not an acceptable owner, User 1, or User 2 password.

The system returns to its previous state. Either the lock key's (Item 2) red LED or the unlock key's (Item 2) [Figure 370] green LED will become solid.

PASSWORD SETUP (KEYPAD PANEL) (CONT'D)

Password Lockout Feature

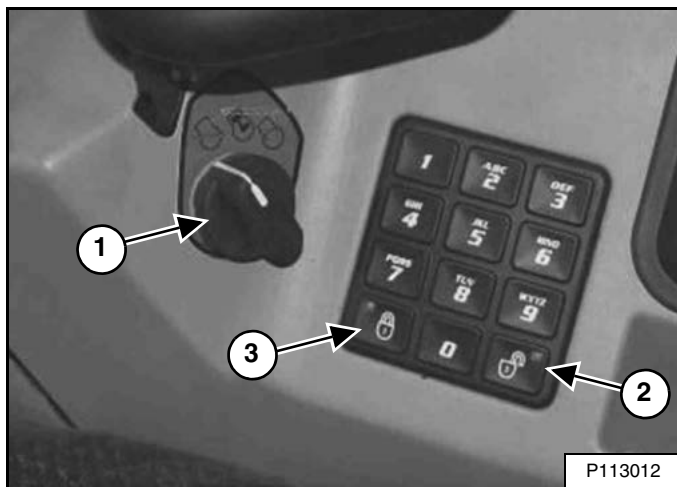
This feature allows the owner to unlock the password feature so that a password does not need to be used every time the engine is started.

NOTE: The password lockout feature does not function with the User 1 or User 2 passwords.

Turn the start switch (Item 1) **[Figure 371]** to the ON position to turn on the excavator's electrical system.

Enter the five-digit owner password using the keypad.

Figure 371



Press the unlock key (Item 2) **[Figure 371]**.

The left panel display screen will show **[CODE]**.

Enter the five-digit owner password using the keypad. The unlock key's green light will flash, then become solid.

The excavator can now be started without using a password.

NOTE: Use the following procedure to reset the machine lock so that the excavator requires a password to start the engine.

Turn the start switch to the ON position to turn on the excavator's electrical system.

Press the lock key (Item 3) **[Figure 371]**.

The lock key's red light will flash and the left panel display screen will show **[CODE]**.

Enter the five-digit owner password using the keypad. The unlock key's green light will flash, then the lock key's red light will become solid.

You must now enter the password every time to start the excavator.

PASSWORD SETUP (DELUXE INSTRUMENT PANEL)

Password Setup is available on machines with a Deluxe Instrument Panel.

Password Description

All new machines with a Deluxe Instrument Panel arrive at Bobcat dealerships with the keypad in locked mode. Locked mode means that a password must be used to start the engine.

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

Master Password:

A permanent, randomly selected password set at the factory that 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:

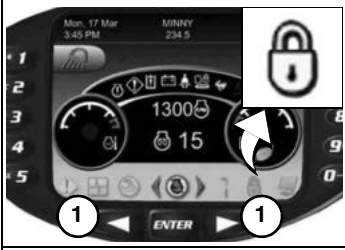






Allows for full use of the excavator and to set up the Deluxe Instrument Panel. There is only one owner password. The owner password must be used to change the owner or user passwords. The owner should change the password as soon as possible for the security of the excavator.

User Password:

Allows starting and operating the excavator; cannot be used to change a password or any of the other setup features.

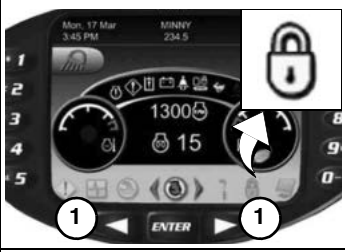






For the procedures to change passwords: (See Changing The Owner Password on Page 205.) and (See Changing The User Passwords on Page 206.)

Changing The Owner Password

	<p>Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.</p>
	<p>Select [1. PASSWORDS / LOCKOUTS].</p>
	<p>Enter owner password and press [ENTER].</p>
	<p>Select [1. USER SETTINGS].</p>
	<p>Select [1. OWNER].</p>
	<p>Select [2. CHANGE PASSWORD].</p>
	<p>Enter new owner password and press [ENTER].</p> <p>You will be prompted to reenter the new owner password.</p>

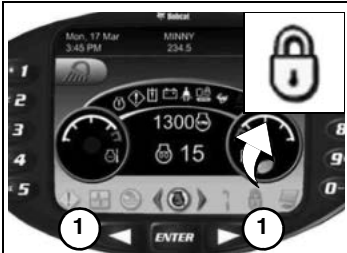



PASSWORD SETUP (DELUXE INSTRUMENT PANEL) (CONT'D)

Changing The User Passwords

	<p>Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.</p>
	<p>Select [1. PASSWORDS / LOCKOUTS].</p>
	<p>Enter owner password and press [ENTER].</p>
	<p>Select [1. USER SETTINGS].</p>
	<p>Select user.</p>
	<p>Select [2. CHANGE PASSWORD].</p>
	<p>Enter new user password and press [ENTER].</p>

Password Lockout Feature

This feature allows the owner to unlock the password feature so that a password does not need to be used every time the engine is started.

	<p>Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.</p>
	<p>Select [1. PASSWORDS / LOCKOUTS].</p>
	<p>Enter owner password and press [ENTER].</p>
	<p>Select [2. MACHINE LOCK].</p>

NOTE: The procedure above can be followed to reset the machine lock so that the machine requires a password to start the engine.

NOTE: When the password is in UNLOCKED, no password is needed. The start switch is used to start the machine.

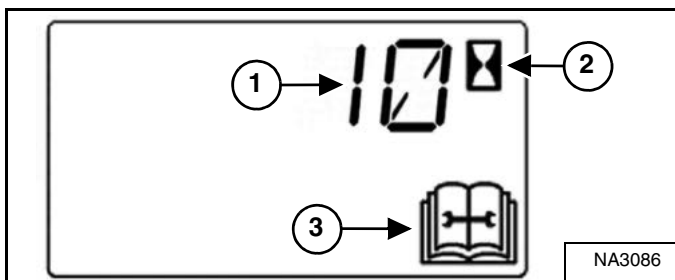
MAINTENANCE CLOCK

Description

The Maintenance Clock alerts the operator when the next service interval is due. *EXAMPLE:* The maintenance clock can be set to a 500 hour interval as a reminder for the next 500 hour planned maintenance.

Standard Instrument Panel

Figure 372



During machine operation, a 2 beep alarm will sound when there are less than 10 hours until the next planned maintenance.

The remaining hours before maintenance is required (Item 1) will appear in the data display for 5 seconds while the service icon (Item 3) and the hourmeter icon (Item 2) [Figure 372] flash.

NOTE: The display will show negative numbers after counting down to zero.

The display will revert to the previous display and will appear for 5 seconds every time the machine is started until the maintenance clock is reset.

Setup

See your Bobcat dealer about installation of this feature.

Reset

Figure 373

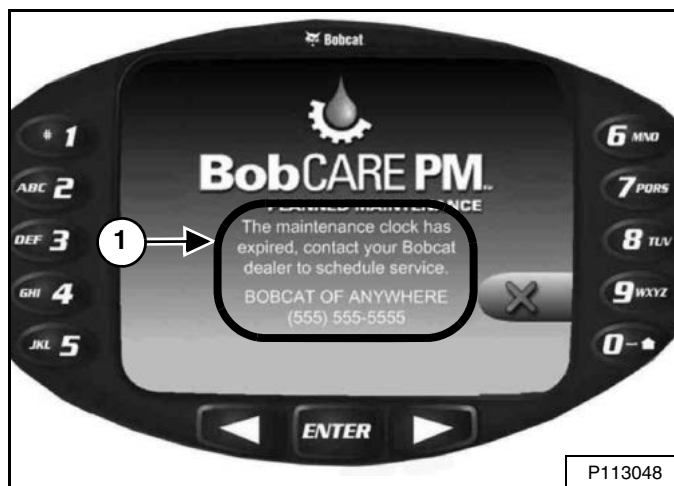


Press the Information button (Item 2) [Figure 373] until the display screen shows the maintenance clock.

Press and hold the Information button (Item 2) for 7 seconds until [RESET] (Item 1) [Figure 373] appears in the display screen.

Deluxe Instrument Panel

Figure 374



The Deluxe Instrument Panel (if equipped) will display a message (Item 1) [Figure 374] alerting the operator to service the machine.

This message will remain for 10 seconds and will appear for 10 seconds every time the machine is started until the maintenance clock is reset.

Figure 375



The Deluxe Instrument Panel (if equipped) will display a bar (Item 1) [Figure 375] showing the time remaining until next service. This bar will turn red when service is past due. NEXT MAINTENANCE DUE will change to MAINTENANCE PAST DUE and display the number of hours past due.

Keys [4] and [9] can be used to adjust the service interval when the owner is logged in [Figure 375].

To reset the service clock after servicing the machine, press and hold key [1] [Figure 375] (when the owner is logged in) until the bar graph resets to 0 [Figure 374].

SPECIFICATIONS

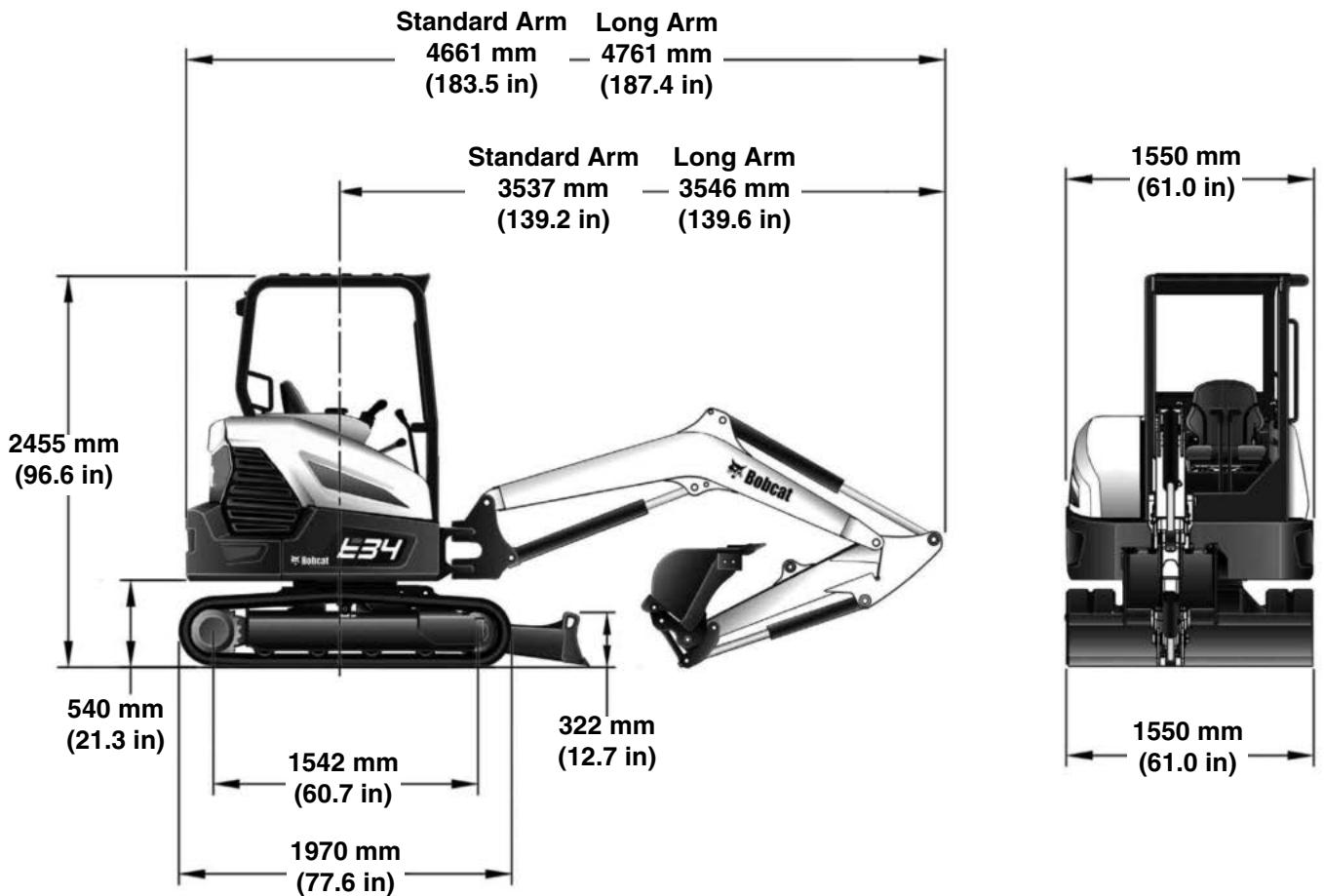
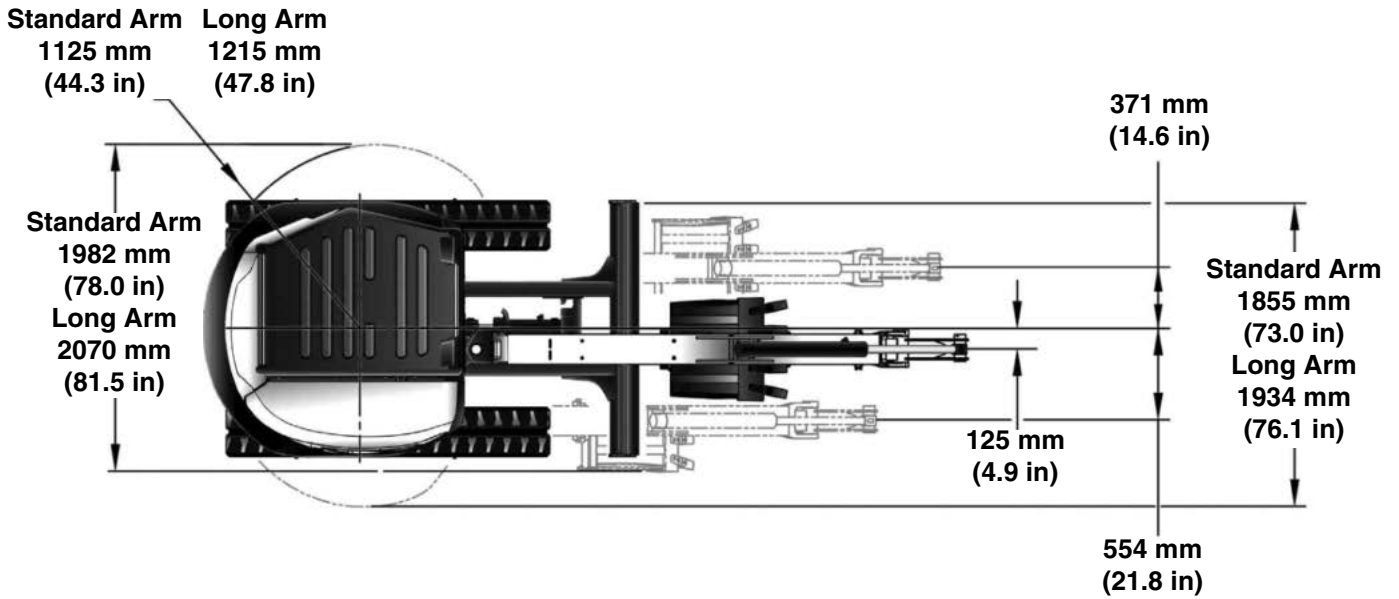
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Certain specification(s) are based on engineering calculations and are not actual measurements. Specification(s) are provided for comparison purposes only and are subject to change without notice. Specification(s) for your individual Bobcat equipment will vary based on normal variations in design, manufacturing, operating conditions, and other factors.

EXCAVATOR SPECIFICATIONS

Excavator Machine Dimensions

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

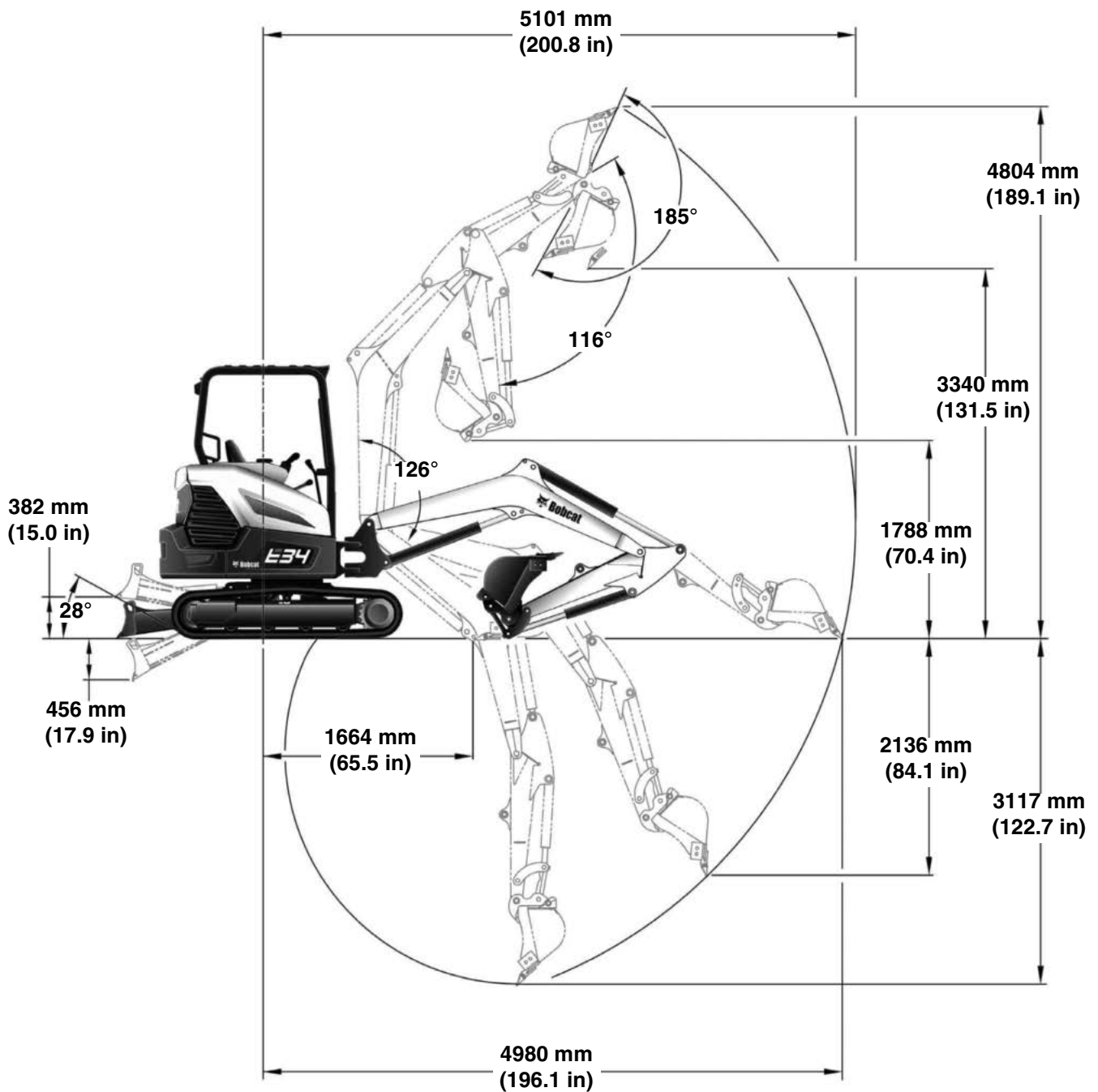


NA15187

EXCAVATOR SPECIFICATIONS (CONT'D)

Excavator Machine Dimensions - Standard Arm

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

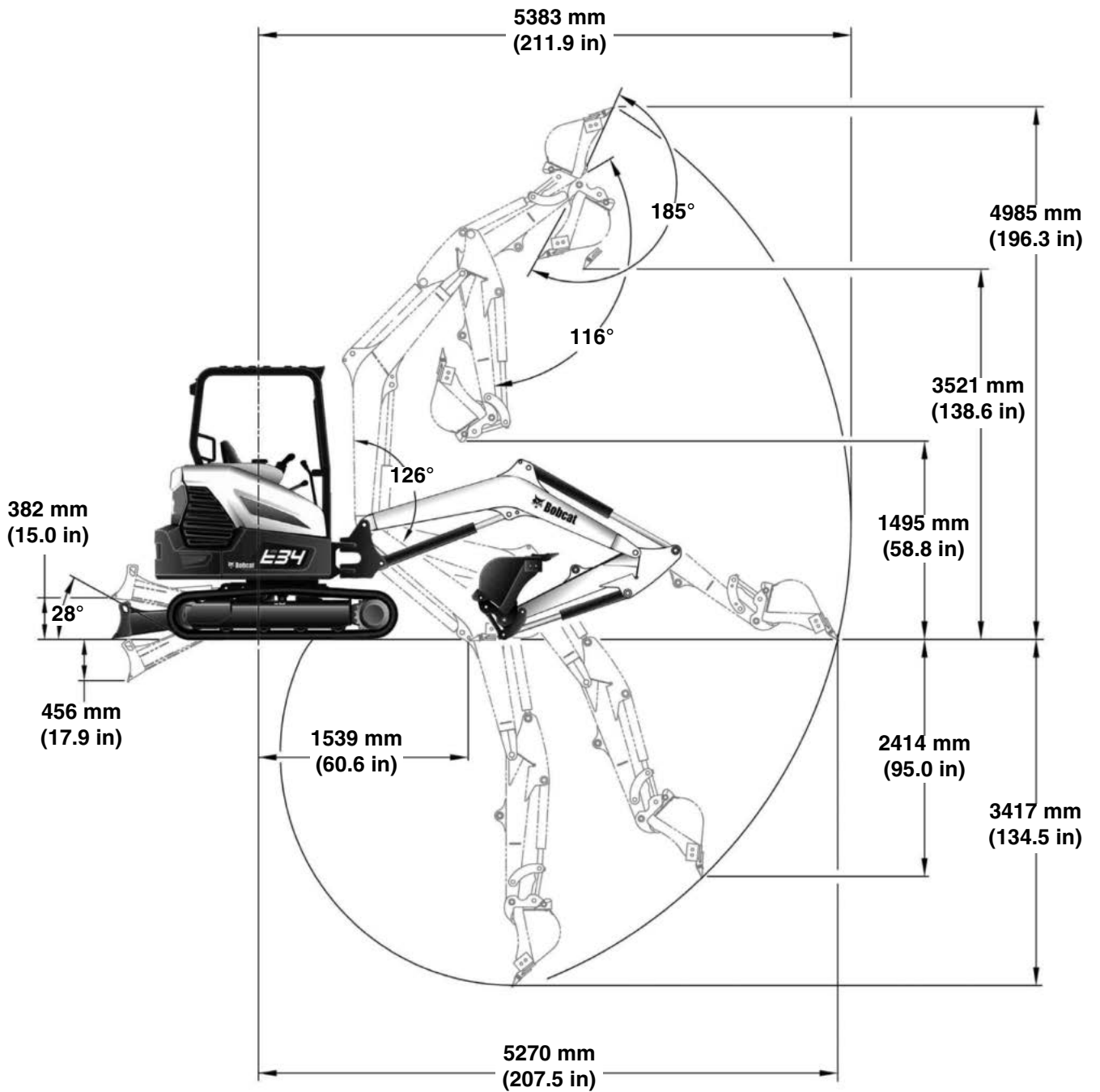


NA15190

EXCAVATOR SPECIFICATIONS (CONT'D)

Excavator Machine Dimensions - Long Arm


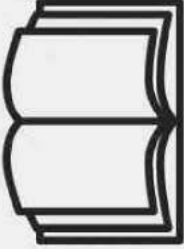
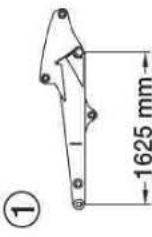

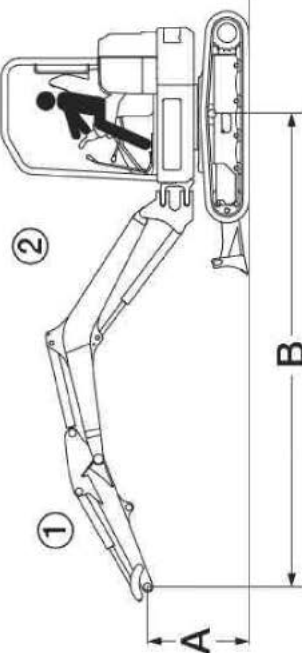
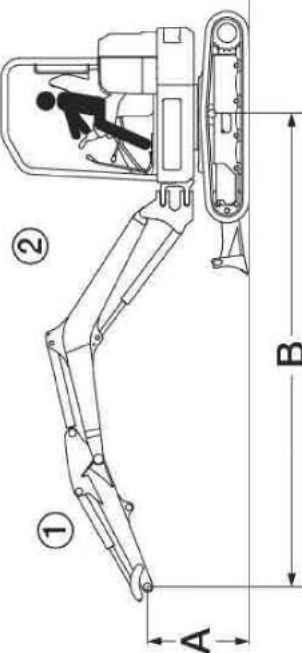
- Where applicable, specification conform to SAE or ISO standards and are subject to change without notice.



NA15190

EXCAVATOR SPECIFICATIONS (CONT'D)

Rated Lift Capacity For Long Arm, Light Counterweight, And Canopy

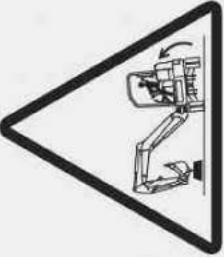
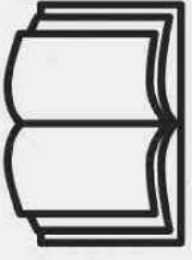

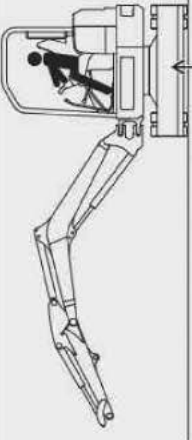
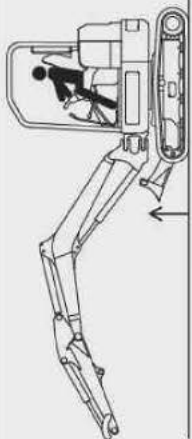
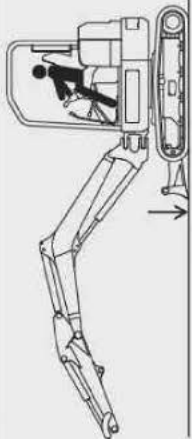

E34														kg @ max. B	
														2000 mm	3000 mm
4000 mm														602 kg @ 3210 mm	
3000 mm														425 kg @ 4050 mm	
2000 mm														352 kg @ 4490 mm	
1000 mm														327 kg @ 4620 mm	
Ground														335 kg @ 4440 mm	
-1000 mm														392 kg @ 4050 mm	

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EXCAVATOR SPECIFICATIONS (CONT'D)

Rated Lift Capacity For Standard Arm, Light Counterweight, And Cab

														kg @ max. B	
														2000 mm	3000 mm
A	4000 mm														*274 kg @ 2690 mm
	3000 mm														351 kg @ 3680 mm
	2000 mm														289 kg @ 4180 mm
	1000 mm														271 kg @ 4300 mm
	Ground	*2193 kg	*1303 kg	*930 kg											280 kg @ 4150 mm
	-1000 mm	*1987 kg	*1273 kg												329 kg @ 3740 mm


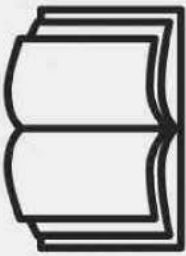
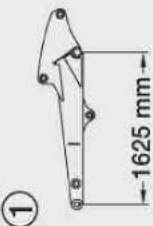

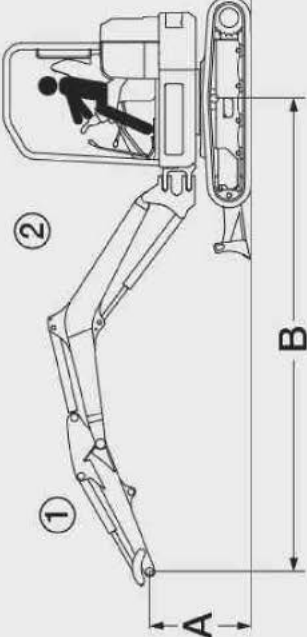
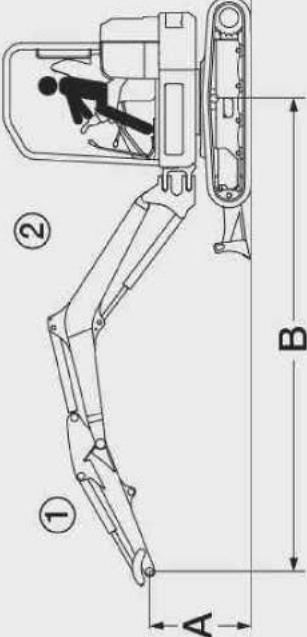
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EXCAVATOR SPECIFICATIONS (CONT'D)


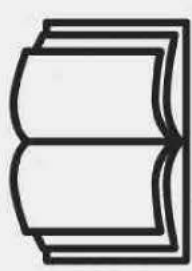
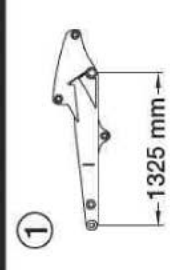
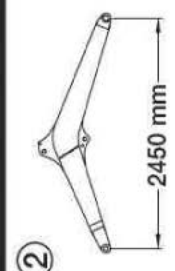
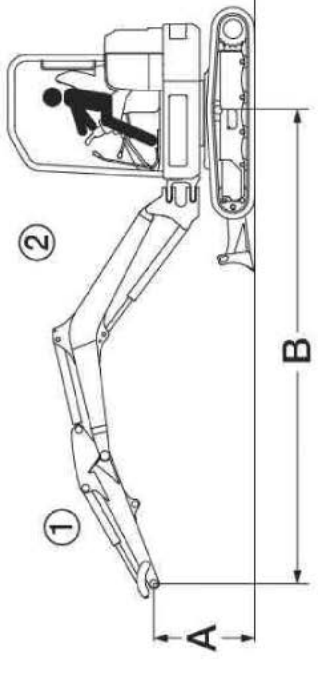
Rated Lift Capacity For Long Arm, Light Counterweight, And Cab

												B		kg @ max. B
												2000 mm	3000 mm	4000 mm
4000 mm													602 kg @ 3210 mm	
3000 mm			*662 kg										425 kg @ 4050 mm	
2000 mm		*746 kg	*699 kg									644 kg	352 kg @ 4490 mm	
1000 mm		*1057 kg	*941 kg									608 kg	327 kg @ 4620 mm	
Ground		*1288 kg	*915 kg									1005 kg	335 kg @ 4440 mm	
-1000 mm		*2193 kg	*891 kg									1034 kg	392 kg @ 4050 mm	

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EXCAVATOR SPECIFICATIONS (CONT'D)

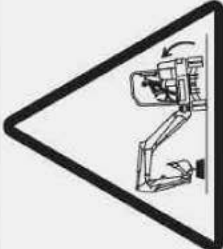

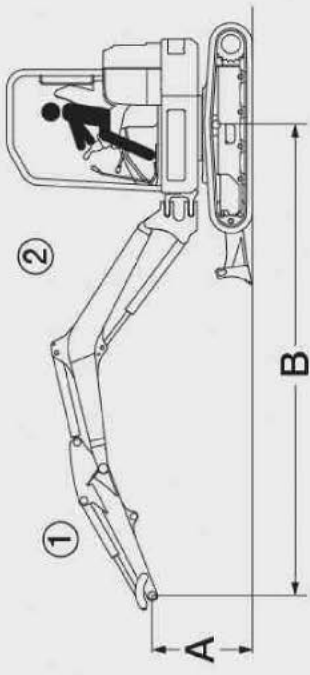

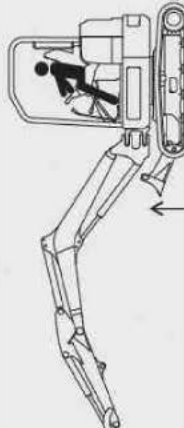
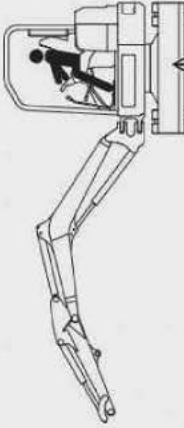
Rated Lift Capacity For Standard Arm, Heavy Counterweight, And Canopy

										E34	
										A	
A	2000 mm	B		kg @ max. B	kg @ max. B	B		kg @ max. B	B		
		3000 mm	4000 mm			2000 mm	3000 mm		4000 mm	2000 mm	3000 mm
4000 mm				*565 kg @ 2690 mm	*525 kg @ 2690 mm						
3000 mm				*716 kg @ 3680 mm	*690 kg @ 3680 mm						
2000 mm			*819 kg	*764 kg @ 4180 mm	470 kg @ 4180 mm				675 kg	450 kg	
1000 mm			*1111 kg	*842 kg @ 4300 mm	447 kg @ 4300 mm				656 kg	442 kg	
Ground	*2193 kg	*1303 kg	*930 kg	*872 kg @ 4150 mm	447 kg @ 4150 mm				1117 kg	649 kg	438 kg
-1000 mm	*1987 kg	*1273 kg		*959 kg @ 3740 mm	579 kg @ 3740 mm				1116 kg	648 kg	

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EXCAVATOR SPECIFICATIONS (CONT'D)

Rated Lift Capacity For Standard Arm, Heavy Counterweight, And Cab

				 <p>E34</p>																
						A			B			B			B					
4000 mm	3000 mm	2000 mm	1000 mm	Ground	-1000 mm	2000 mm	3000 mm	4000 mm	kg @ max. B	2000 mm	3000 mm	4000 mm	kg @ max. B	2000 mm	3000 mm	4000 mm	kg @ max. B	2000 mm	3000 mm	4000 mm
									*565 kg @ 2690 mm				*525 kg @ 2690 mm				*543 kg @ 2690 mm			
									*716 kg @ 3680 mm				*690 kg @ 3680 mm				507 kg @ 3680 mm			
									*764 kg @ 4180 mm				470 kg @ 4180 mm				424 kg @ 4180 mm			
									*842 kg @ 4300 mm				447 kg @ 4300 mm				401 kg @ 4300 mm			
									*872 kg @ 4150 mm				447 kg @ 4150 mm				416 kg @ 4150 mm			
									*959 kg @ 3740 mm				579 kg @ 3740 mm				482 kg @ 3740 mm			
									*1273 kg				1456 kg				1116 kg			
									*1987 kg				1347 kg				1117 kg			
									*2193 kg				760 kg				656 kg			
									*1111 kg				781 kg				675 kg			
									*819 kg				740 kg				649 kg			
									*757 kg				503 kg				450 kg			
									*857 kg				506 kg				442 kg			
									*930 kg				508 kg				450 kg			

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EXCAVATOR SPECIFICATIONS (CONT'D)

Performance

E34	
Operating weight (cab with HVAC, standard arm, rubber tracks, medium counterweight, standard bucket and 75 kg operator)	3476 kg (7663 lb)
If equipped with the following:	Cab w/Heater, subtract 19 kg (42 lb); Canopy, subtract 137 kg (302 lb); Steel Tracks, add 93 kg (205 lb); Long Arm (with additional counterweight), add 303 kg (668 lb); Additional Counterweight, add 291 kg (642 lb)
Travel Speed (Low / High)	2,6 km/h / 4,7 km/h (1.6 mph / 2.9 mph)
Digging Force (per ISO 6015)	
With Standard Arm	Arm - 20790 N (4674 lbf) Bucket - 33430 N (7515 lbf)
With Long Arm	Arm - 18010 N (4049 lbf) Bucket - 33430 N (7515 lbf)

Controls

Steering	Two hand levers (optional foot pedals)
Hydraulics	Two hand operated levers (joysticks) control boom, bucket, arm and upperstructure slew
Blade	Hand lever
Two-Speed	Switch on blade lever
Boom Switch	Electric switch in left joystick
Auxiliary Hydraulics	Electric switch in right joystick
Auxiliary Pressure Release	Electric switch in right joystick
Engine	Engine speed control dial with auto idle feature, key type start switch
Starting Aid	Glow Plugs - activated by key switch
Brakes Travel Service & Parking Swing Service Holding	Hydraulic lock in motor circuit Hydraulic lock on motor Spring applied - hydraulic release

EXCAVATOR SPECIFICATIONS (CONT'D)

Engine

Make / Model	Kubota D1703-M-D1-E4B-BC-2 Stage 5
Fuel / Cooling	Diesel / Liquid
Horsepower: – Gross power (ISO 14396) – Gross power (SAE J1995) – Net power (SAE J1349)	18,2 kW (24.4 hp) @ 2200 rpm 18,5 kW (24.8 hp) @ 2200 rpm 17,9 kW (24.1 hp) @ 2200 rpm
Torque: – Gross torque (SAE J1995) – Net torque (SAE J1349)	97,4 N•m (71.8 lb-ft) @ 1500 rpm 94,6 N•m (69.7 lb-ft) @ 1600 rpm
Number Of Cylinders	3
Displacement	1,642 L (100.2 in ³)
Bore / Stroke	87,0 x 92,4 mm (3.43 x 3.64 in)
Lubrication	Pressure System with Filter
Crankcase Ventilation	Closed Breathing
Air Cleaner	Dry replaceable paper dual cartridge
Ignition	Diesel-Compression
Low Idle Speed	1200 – 1350 rpm
High Idle Speed	2350 – 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 Gear Pump - Pilot	92,4 L/min (24.4 U.S. gpm) 8,8 L/min (2.3 U.S. gpm)
Auxiliary Flow (Aux3)	63,9 L/min (16.9 U.S. gpm)
Auxiliary Flow - 2nd Aux (Female coupler) (Male Coupler)	20,3 L/min (5.4 U.S. gpm) 15,0 L/min (4.0 U.S. gpm)
Hydraulic Filter	Full flow replaceable, 3 micron synthetic media element
Control Valve	9 spool closed centre individually compensated
Fluid Type	Bobcat Fluid, Hydraulic / Hydrostatic 6903117 - (2.5 U.S. gal) 6903118 - (5 U.S. gal) 6903119 - (55 U.S. gal)
System Relief Pressure Slew Circuit Boom, Boom Swing Bucket, Arm, Auxiliary Blade Joystick Control Pressure	21600 kPa (216 bar) (3132 psi) 24500 kPa (245 bar) (3550 psi) 24500 kPa (245 bar) (3550 psi) 24500 kPa (245 bar) (3550 psi) 3000 kPa (30 bar) (428 psi)
Auxiliary Relief	20600 kPa (206 bar) (2987 psi)
Arm Port Relief, Base End And Rod End	27000 kPa (270 bar) (3916 psi)
Boom Port Relief, Base End	29000 kPa (290 bar) (4206 psi)
Boom Port Relief, Rod End	27000 kPa (270 bar) (3916 psi)
Bucket Port Relief Base End And Rod End	27000 kPa (270 bar) (3916 psi)
Blade Port Relief Base End	27000 kPa (270 bar) (3916 psi)
Main Hydraulic Filter Bypass	340 kPa (3,4 bar) (50 psi)
Case Drain Filter Bypass	120 – 160 kPa (1,2 – 1,6 bar) (18 – 23 psi)

EXCAVATOR SPECIFICATIONS (CONT'D)

Hydraulic Cycle Times

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

Hydraulic Cylinders

Cylinder	Bore	Rod	Stroke
Boom (cushion up)	76,2 mm (3.00 in)	44,5 mm (1.75 in)	670,1 mm (26.38 in)
Arm (cushion retract / extend)	76,2 mm (3.00 in)	44,5 mm (1.75 in)	607,1 mm (23.90 in)
Bucket	69,9 mm (2.75 in)	44,5 mm (1.75 in)	466,3 mm (18.36 in)
Boom Swing	82,6 mm (3.25 in)	44,5 mm (1.75 in)	459,9 mm (18.11 in)
Blade	88,9 mm (3.50 in)	44,5 mm (1.75 in)	184,0 mm (7.25 in)

Drive System

Final Drive	Each track is driven by hydrostatic axial piston motor
Type of Reduction	48.6:1 two stage planetary

Slew System

Slew Motor	Axle piston connected to a planetary drive
Slew Circle	Single row shear type ball bearing with internal gear
Slew Speed	8.6 rpm

Undercarriage

Crawler Track Design	Sealed track rollers with boxed section track roller frame, grease type track adjuster with shock absorbing recoil spring
Width of crawler	1550 mm (61.0 in)

EXCAVATOR SPECIFICATIONS (CONT'D)

Electrical

Starting Aid	Glow Plugs
Alternator	12 volt, 90 Amp open frame w / internal regulator
Battery	12 volt - 500 CCA @ -18° C (0° F)
Starter	2.0 kW (12 volt; gear reduction 2.7 hp)
Lights	37.5 watt (2)
Instrumentation	<p>Gauges: Engine Coolant Temperature, Fuel Level.</p> <p>Warning lights: Fuel Level, Seat Belt, Engine Coolant Temperature, Engine Malfunction, Hydraulic System Malfunction, General Warning.</p> <p>Indicators: Two-Speed, Engine Preheat.</p> <p>Data Display: Operating Hours, Engine rpm, Maintenance Clock Countdown, Battery Voltage, Service Codes, Engine Preheat.</p> <p>Other: Audible Alarm, Lights.</p> <p>Optional Deluxe Instrumentation Panel: *Additional displays for: Engine rpm, Coolant Temperature and Oil Pressure; System Voltage and Hydraulic Oil Temperature. *Additional Features Included: Keyless Start, Digital Clock, Job Clock, Password Lockout, Multi-language Display, Help Screens, Diagnostic Capability and Engine / Hydraulic Systems Shutdown Function.</p>

Capacities

Fuel Tank	52,0 L (13.7 U.S. gal)
Hydraulic Reservoir Only (Centre of Sight Glass)	Tank Cap. 8,3 L (2.2 U.S. gal)
Hydraulic System (with Reservoir)	39,7 L (10.5 U.S. gal)
Cooling System	8,0 L (2.1 U.S. gal)
Engine Oil and Filter	5,2 L (5.5 qt)
Final Drive (each)	0,5 L (0.55 qt)

EXCAVATOR SPECIFICATIONS (CONT'D)

Tracks

Type	Rubber	Steel
Width	300 mm (11.8 in)	300 mm (11.8 in)
Number Of Shoes	Single Assembly	41
Number of Track Rollers (per side)	4	4

Ground Pressure

Rubber Tracks - Standard Arm	33,6 kPa (0,336 bar) (4.87 psi)
Long Arm	33,7 kPa (0,337 bar) (4.89 psi)
Steel Tracks - Standard Arm	34,5 kPa (0,345 bar) (5.01 psi)
Long Arm	34,7 kPa (0,346 bar) (5.02 psi)

Environmental

DECLARED SINGLE-NUMBER NOISE EMISSION VALUES In accordance with ISO 4871	
Noise level per Directive 2000/14/EC - L _{WA}	94 dB(A)
Operator noise level per Directive 2006/42/EC - L _{pA} (Cab)	77 dB(A)
Operator noise level per Directive 2006/42/EC - L _{pA} (Canopy)	81 dB(A)

DECLARED VIBRATION EMISSION VALUES In accordance with EN 12096		
		Uncertainty
Whole-body vibration per ISO 2631-1	1,20 m/s ² (3.94 ft/s ²)	0,48 m/s ² (1.57 ft/s ²)
Hand-arm vibration per ISO 5349-1	0,85 m/s ² (2.79 ft/s ²)	--

Machines equipped with optional HVAC (air conditioning) contain fluorinated greenhouse gas (F-gas)	
F-gas type	HFC-134a
F-gas mass (kg)	0,77
CO ₂ equivalent (t)	1,10
GWP	1430

ENGINE CO ₂ EMISSION VALUES	
CO ₂ emission	938,3 g/kWh
This CO ₂ measurement results from testing over a fixed test cycle under laboratory conditions a(n) (parent) engine representative of the engine type (engine family) and shall not imply or express any guarantee of the performance of a particular engine.	

Temperature Range

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

WARRANTY 230

WARRANTY

BOBCAT EXCAVATORS

Doosan Bobcat EMEA s.r.o. ("Doosan") warrants to its authorized dealers who in turn warrants to the customer that each new Bobcat Excavator will be free from defects in material and workmanship for twelve (12) months from the date of delivery to the customer or 2000 hours of machine usage, whichever occurs first. During the warranty period, the authorized Doosan dealer shall repair or replace, at Doosan's option, without charge for parts, labour and travel of technicians, any part of the Doosan product which fails because of defects in material or workmanship. The customer shall provide the authorized Doosan dealer with prompt written notice of the defect and allow reasonable time for replacement or repair. Doosan may, at its option, request failed parts to be returned to the factory or to any other designated location. Transportation of the Doosan product to the authorized Doosan dealer for warranty work is not the responsibility of Doosan. Service schedules must adhere to prescribed intervals and Bobcat genuine parts/lubricants must be used. The warranty does not apply to tyres, tracks or other accessories not manufactured by Doosan. For coverage on engines, consult with your Bobcat Dealer. For these non-covered items, the customer shall refer solely to the warranty, if any, of the respective manufacturers thereof, in accordance with the respective manufacturers warranty statement. Some Doosan parts are covered pro-rata depending on the expected life-time of the part. Coverage for batteries, air-conditioning refill, couplers and ignition system parts (glow plugs, fuel injection pumps, injectors) is reduced as failures generally originate from factors not under Doosan's control such as, but not limited to, prolonged storage, abuse or fuel quality. Reduced coverage is, depending on the component, limited from 50 to 500 operating hours. The warranty does not cover: (i) Oils and lubricants, coolant fluids, filter elements, brake linings, tune-up parts, bulbs, fuses, alternator fan belts, drive belts, pins, bushings and other high-wear items. (ii) Damages resulting from abuse, accidents, alterations, use of the product with any bucket or attachment not approved by Doosan, air flow obstructions, or failure to maintain or use the Doosan product according to the instructions applicable to it. (iii) Ground engaging parts such as bucket teeth and cutting edges. (iv) Fuel or hydraulic system cleaning, engine tune-up, brake inspection or adjustment. (v) Adjustments or slight defects which generally do not affect the stability or reliability of the machine.

DOOSAN EXCLUDES OTHER CONDITIONS, WARRANTIES OR REPRESENTATIONS OF ALL KINDS, EXPRESSED OR IMPLIED, STATUTORY OR OTHERWISE (EXCEPT THAT OF TITLE) INCLUDING ALL IMPLIED WARRANTIES AND CONDITIONS RELATING TO MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. CORRECTIONS BY DOOSAN OF NONCONFORMITIES WHETHER PATENT OR LATENT, IN THE MANNER AND FOR THE TIME PERIOD PROVIDED ABOVE, SHALL CONSTITUTE FULFILLMENT OF ALL LIABILITIES OF DOOSAN FOR SUCH NONCONFORMITIES, WHETHER BASED ON CONTRACT, WARRANTY, TORT, NEGLIGENCE, INDEMNITY, STRICT LIABILITY OR OTHERWISE WITH RESPECT TO OR ARISING OUT OF SUCH PRODUCT. THE REMEDIES OF THE END-USER/OWNER SET FORTH UNDER THE PROVISIONS OF THE WARRANTY OUTLINED ABOVE ARE EXCLUSIVE AND THE TOTAL LIABILITY OF DOOSAN INCLUDING ANY HOLDING, SUBSIDIARY, ASSOCIATED OR AFFILIATED COMPANY OR DISTRIBUTOR WITH RESPECT TO THIS SALE OR THE PRODUCT AND SERVICE FURNISHED HEREUNDER IN CONNECTION WITH THE PERFORMANCE OR BREACH THEREOF, OR FROM DELIVERY, INSTALLATION, REPAIR OR TECHNICAL DIRECTION COVERED BY OR FURNISHED UNDER THIS SALE, WHETHER BASED ON CONTRACT, WARRANTY, TORT, NEGLIGENCE, INDEMNITY, STRICT LIABILITY OR OTHERWISE SHALL NOT EXCEED THE PURCHASE PRICE OF THE PRODUCT UPON WHICH SUCH LIABILITY IS BASED. DOOSAN INCLUDING ANY HOLDING, SUBSIDIARY, ASSOCIATED OR AFFILIATED COMPANY AND DISTRIBUTOR SHALL IN NO EVENT BE LIABLE TO THE END-USER/OWNER, ANY SUCCESSORS IN INTEREST OR ANY BENEFICIARY OR ASSIGNEE RELATING TO THIS SALE FOR ANY CONSEQUENTIAL, INCIDENTAL, INDIRECT, SPECIAL OR PUNITIVE DAMAGES ARISING OUT OF THIS SALE OR BY ANY BREACH THEREOF, OR ANY DEFECT IN, OR FAILURE OF, OR MALFUNCTION OF THE PRODUCT UNDER THIS SALE, WHETHER BASED UPON LOSS OF USE, LOST PROFITS OR REVENUE, INTEREST, LOST GOODWILL, WORK STOPPAGE, IMPAIRMENT OF OTHER GOODS, LOSS BY REASON OF SHUTDOWN OR NON-OPERATION, INCREASED EXPENSES OF OPERATION OR CLAIMS OF USER OR CUSTOMERS OF THE USER FOR SERVICE INTERRUPTION WHETHER OR NOT SUCH LOSS OR DAMAGE IS BASED ON CONTRACT, WARRANTY, TORT, NEGLIGENCE, INDEMNITY, STRICT LIABILITY OR OTHERWISE.



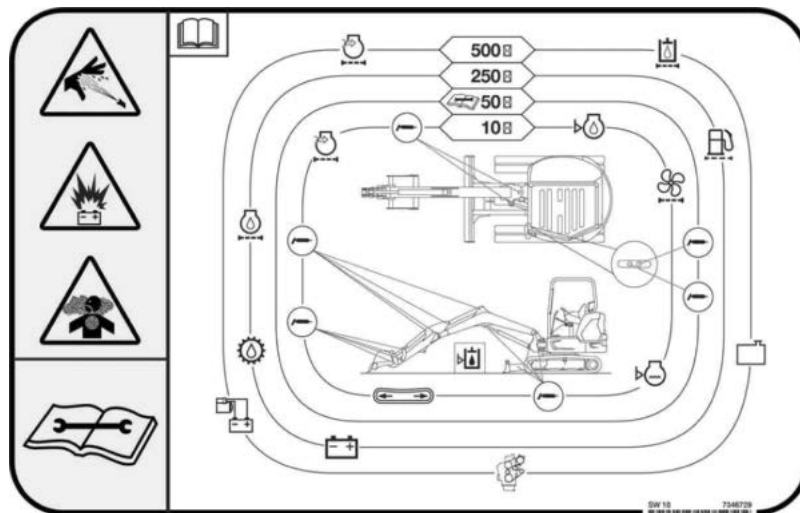
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









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SERVICE SCHEDULE SYMBOLS



 Check Engine Oil	 Check Gear Box and / or Travel Motor Fluid
 Change Engine Oil and Filter	 Change Gear Box and / or Travel Motor Fluid
 Check Engine Coolant	 Check Track Tension, Adjust As Needed
 Change Engine Coolant	 Check Belt Tension, Adjust Or Replace As Needed
 Check Engine Air Filter, Change As Necessary	 Lubricate Grease Fittings
 Drain Contaminants From Fuel Filter	 Check Seat Belt
 Drain Contaminants From Fuel Tank	 Check Cab / Canopy
 Change Fuel Filter	 Empty Spark Arrestor Muffler
 Check Hydraulic Fluid	 Check Motion Alarm
 Change Hydraulic Fluid and Filter(s)	 Check Cab and Heater Filters
 Check Battery Cables and Connections	 Check Indicators and Lights

