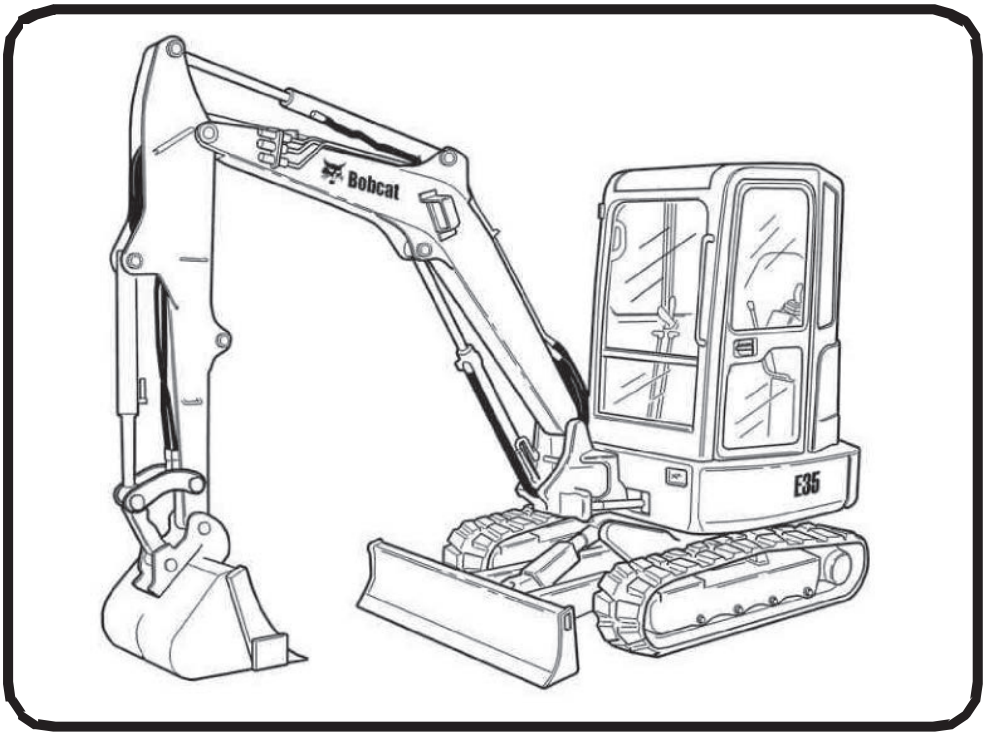
EN

Bobcat®

Operation & Maintenance Manual
E35 Compact Excavator

S/N AC2P15000 & Above
S/N B3GR11001 & Above



6990442enGB (01-18) (D)

Printed in Belgium
Original Instructions

OPERATOR SAFETY WARNING

⚠ WARNING

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

W-2001-0502

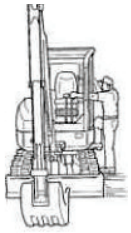
⚠ **Safety Alert Symbol:** **This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.**

CORRECT

P-90216

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

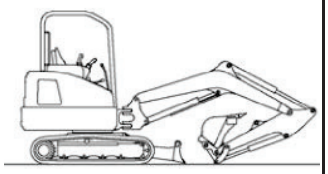
WRONG



NA1418

- ⚠ **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.**

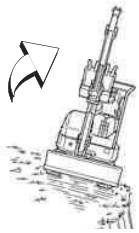
CORRECT



NA1435B

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

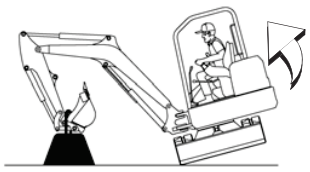
WRONG



NA1419

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

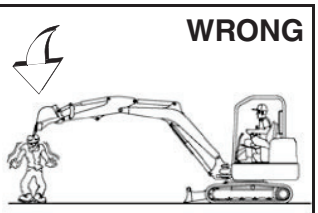
WRONG



NA1439A

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

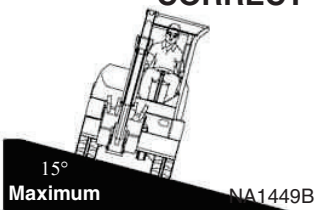
WRONG



NA1445A

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

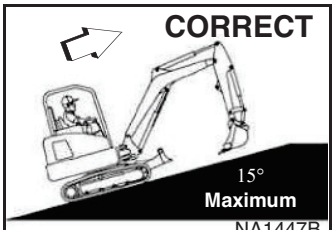
CORRECT



NA1449B

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

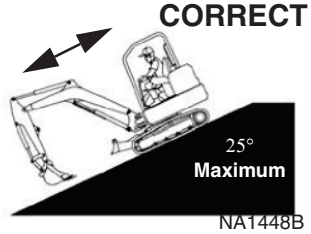
CORRECT



NA1447B

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

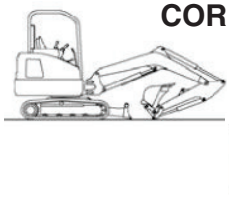
CORRECT



NA1448B

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

CORRECT



NA1435B 6808261

- ⚠ **To leave excavator, lower the work equipment and the blade to the ground.**
- ⚠ **Stop the engine.**

CORRECT

B-21928

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

CORRECT

NA1421A

- ⚠ **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


Bobcat®

CONTENTS

REFERENCE INFORMATION

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

Excavator Serial Number _____

Engine Serial Number _____

NOTES:

_____

_____

_____

_____

YOUR BOBCAT DEALER:

_____

ADDRESS:

_____

PHONE:

_____

Bobcat Company
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


Bobcat®

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.


Bobcat®

Contents of EC Declaration of Conformity

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

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

Manufacturer

Bobcat

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

Technical Documentation
Homologation Manager
Doosan Bobcat Engineering s.r.o.
U Kodetky 1978
263 12 Dobris
CZECH REPUBLIC

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

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

EC Certificate No.
1020-090-022395

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

Sound Power Levels [Lw(A)]

Measured Sound Power	**92dBA**
Guaranteed Sound Power	**93dBA**

Description of Equipment
Type of Equipment: Excavator
Model Name: E35***EM
Model Code: AC2P

Engine Manufacturer: Kubota
Engine Model: D1803-M-DI-EU35
Engine Power: 24,4 kW @ 2400 RPM

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

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

Effective From:

29 December 2009

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.

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2000/14/EC, Annex VIII, Full Quality Assurance

Sound Power Levels [Lw(A)]

Measured Sound Power	**92dBA**
Guaranteed Sound Power	**93dBA**

Description of Equipment
Type of Equipment: Excavator
Model Name: E35
Model Code: B3GR

Engine Manufacturer: Kubota
Engine Model: D1803-M-DI-EU35
Engine Power: 24,4 kW @ 2400 RPM

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

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

Effective From:

22 May 2015

Homologation Manager
Doosan Bobcat Engineering s.r.o.
U Kodetky 1978
26312 Dobris
Czech Republic

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 Doosan Infracore Co,. Ltd with its address at Doosan Tower, 275, Jangchungdan-ro, Jung-gu, Seoul, 100-730, Korea, 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 (2).

■ 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.

Dobroslav Rak

30th January, 2017


Bobcat®

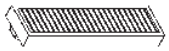
BOBCAT COMPANY IS IS0 9001 CERTIFIED

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

 ENGINE OIL FILTER (6 Pack) 6675517	 HVAC AIR FILTER (IF EQUIPPED) Fresh Air 7176099 Recirculation 7222791
 FUEL FILTER 6667352	 BATTERY 6669600
 AIR FILTER, Outer 6672467  AIR FILTER, Inner 6672468	 HYDRAULIC FILL / BREATHER CAP 6692836
 PRIMARY HYDRAULIC FILTER 6668819 CASE DRAIN HYDRAULIC FILTER 7009365	 RADIATOR CAP 6673313

NOTE: Always verify Part Numbers with your Bobcat dealer.

Packaging		Bobcat Equipment												Only for Wheeled EXC and AL	
		ENGINE / LOADER TRANSMISSION					HYDRAULIC/ HYDROSTATIC		ANTIFREEZE COOLANT			AXLE / TRANSMISSION		BRAKE FLUID
		Bobcat Engine Power SAE 0W30	Bobcat Engine Power SAE 10W30	Bobcat Engine Power SAE 15W40 CJ4	Bobcat Engine Power SAE 10W30 CJ4	Bobcat Engine Power SAE 15W40	Bobcat Engine Power SAE 20W50	Bobcat Superior SH Hydraulic/Hydrostatic	Bobcat Bio Hydraulic Hydraulic/Hydrostatic	Bobcat PG Coolant Concentrated	Bobcat PG Coolant 4 Seasons	Bobcat EG Coolant Concentrated	Bobcat EG Coolant Premixed	Bobcat Axle / Transmission oil SAE 85W90 LS	Bobcat Axle / Transmission Oil ISO 100	Bobcat Brake Fluid LHM
		-35°C/+30°C	-25°C/+30°C	-20°C/+40°C			-15°C/+50°C	-35°C/+50°C		Protection -36°C				-12°C/+50°C	-20°C/+40°C	
5 L Can	Lineart	6987796A	6987789A	6987819A	6987818A	6987790A	6987797A	6987791A	6987792A		6987793A	6987803A	6987804A	6987805A	6987794A	6987795A
25 L Container		6987796B	6987789B	6987819B	6987818B	6987790B	6987797B	6987791B	6987792B	6987813B	6987793B	6987803B	6987804B	6987805B	6987794B	
209 L Drum		6987796C	6987789C	6987819C	6987818C	6987790C	6987797C	6987791C	6987792C	6987813C	6987793C	6987803C	6987804C	6987805C	6987794C	
1000 L Tank		6987796D	6987789D	6987819D	6987818D	6987790D	6987797D	6987791D	6987792D	6987813D	6987793D	6987803D	6987804D	6987805D		
400 gr Grease		Bobcat Multi-Purpose Grease												6987888		
		Bobcat Supreme HD Grease												6987889		
		Bobcat Extreme HP Grease												6987890		

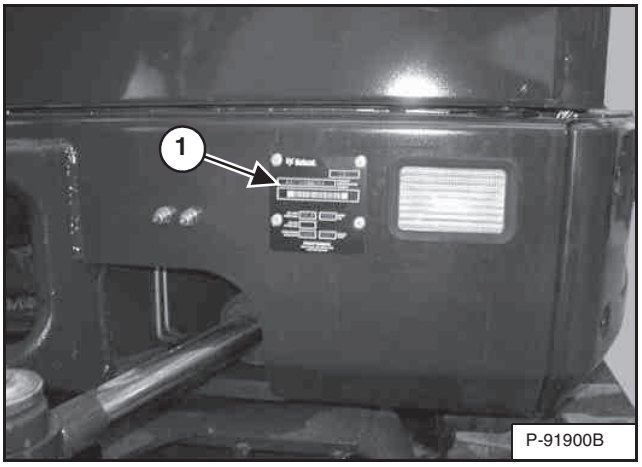
4700300-EN (06-13)

SERIAL NUMBER LOCATIONS

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

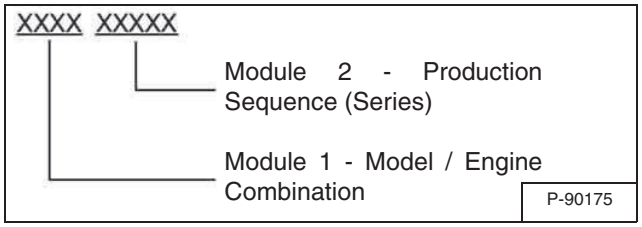
Excavator Serial Number

Figure 1



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

Figure 2



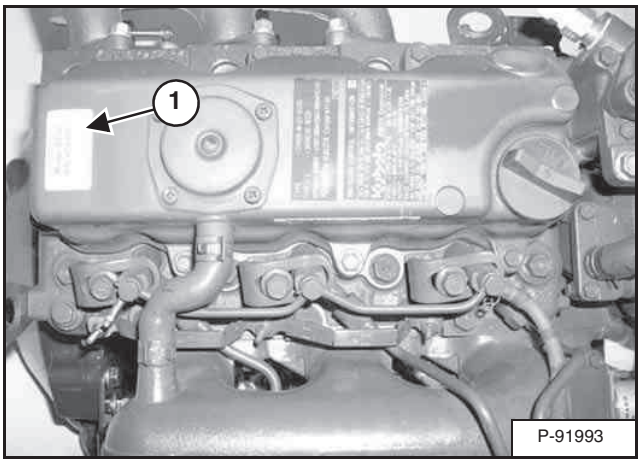
Explanation of excavator Serial Number **[Figure 2]**:

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

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

Engine Serial Number

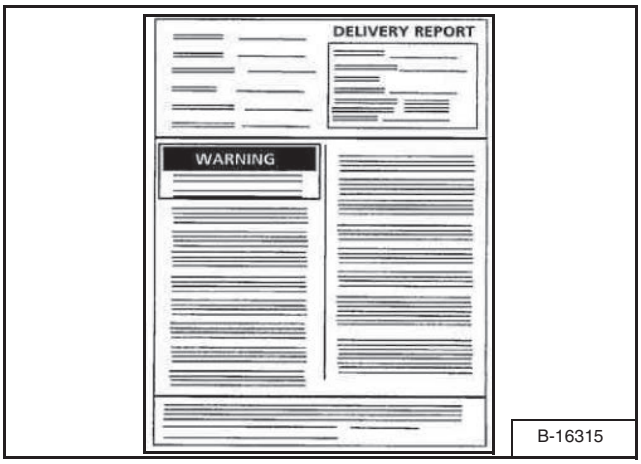
Figure 3



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

DELIVERY REPORT

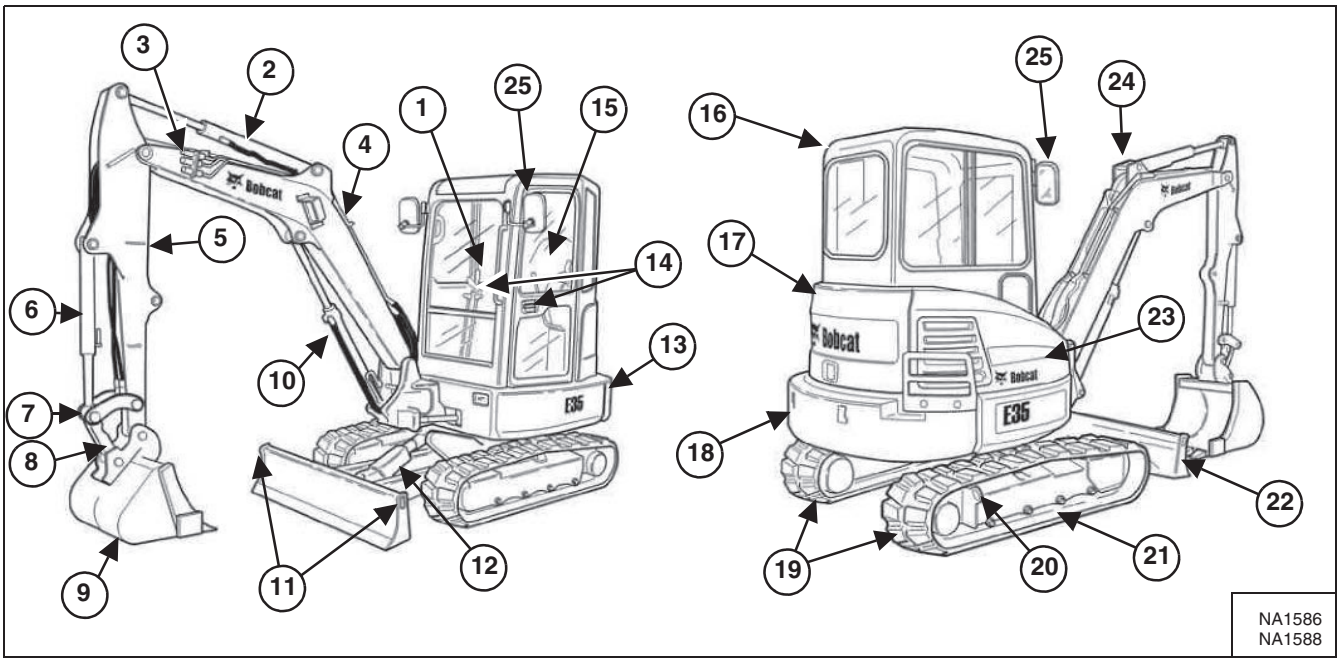
Figure 4



The delivery report **[Figure 4]** 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	Operator's Handbook	16	Cab (ROPS / TOPS) **[2]**
2	Arm Cylinder	17	Tailgate
3	Auxiliary Quick Couplers (If Equipped)	18	Counterweight
4	Boom	19	Tracks **[3]**
5	Arm	20	Tie Downs (Both Sides)
6	Bucket Cylinder	21	Track Frames
7	Bucket Link	22	Blade
8	Attachment Quick Coupler (If Equipped) **[4]**	23	Right Side Cover
9	Bucket **[1]**	24	Lift Point
10	Boom Cylinder	25	Mirrors (If Equipped)
11	Tie Downs / Lift Points		
12	Blade Cylinder		
13	Upperstructure		
14	Control Levers (Joysticks)		
15	Operator's Seat with Seat Belt		

[1] BUCKET - Several different buckets and other attachments are available for the Bobcat excavator.
[2] ROPS / TOPS - (Roll-Over Protective Structure / Tip-Over Protective Structure) as standard equipment. The ROPS / TOPS meets ISO 12117-2:2008, ISO 12117: 2000 and EN13531:2001.
[3] TRACKS - Optional tracks are available.
[4] ATTACMENT COUPLERS - Optional attachment couplers are available.

FEATURES, ACCESSORIES AND ATTACHMENTS

Standard Items

Model E35 Bobcat excavators are equipped with the following standard items:

- 1750 mm (68.9 in) Dozer Blade
- Canopy with ROPS / TOPS Approval
- 320 mm (12.6 in) Rubber Tracks
- Two-Speed Travel
- Auto Shift Drive Motors
- Hydraulic and Travel Control Lockouts
- Engine Speed Control Dial With Auto Idle Feature
- Blade Float
- Work Lights - Boom and Frame Mounted
- Engine and Hydraulic system Monitor with Shut Down
- Horn
- Hydraulic Joystick Controls
- Suspension Seat
- Retractable Seat Belt
- Advanced Diagnostics
- Counterweight

Options And Accessories

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

- Enclosed Cab With Heater and A/C
- Enclosed Cab With Heater
- Deluxe Instrument Panel
- Depth Check
- Auxiliary Hydraulics (With Selectable Auxiliary Hydraulic Flow)
- Auxiliary Hydraulic Lines and Hydraulic Quick Couplers Mounted On Boom
- ISO / STD Control Pattern Selection Feature
- Travel Motion Alarm
- Keyless Start
- Canopy / Cab Mounted Lights
- Catalytic Exhaust Purifier
- Top Guard Kit (FOGS)
- Special Application Kit
- Fire Extinguisher Kit
- Steel Tracks
- Long Arm
- Counterweight (Additional)
- Direct to Tank Auxiliary Hydraulics
- Attachment Quick Coupler, Klac™ System
- Attachment Quick Coupler, German Style Quick Coupler
- Attachment Quick Coupler, Bobcat Hydraulic Quick Coupler
- Bobcat Hydraulic Pin Grabber Coupler HPG2
- Second Auxiliary Hydraulics
- Arm Mounted Auxiliary Hydraulic Couplers
- Radio
- Operator Seat (cloth or vinyl)
- HEPA HVAC Fresh Air Filter
- Spark Arrester Muffler

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

Attachments

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

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

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

- Auger
- Breaker
- Hydraulic Clamp
- Tilt Coupler
- Laser Receiver
- Flail Mower
- Rotary Grinder

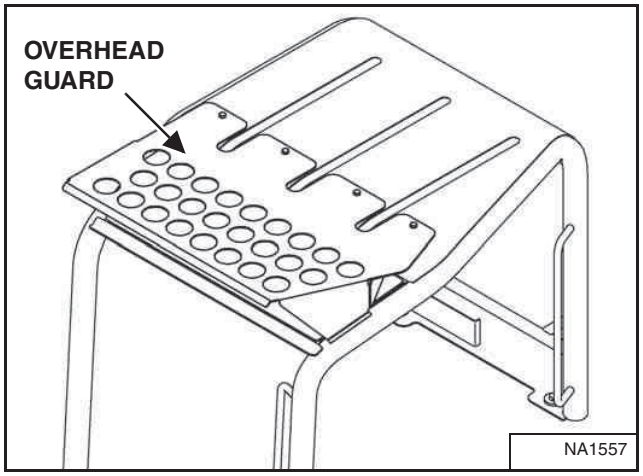
Buckets Available

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

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

Falling-Object Guards (FOGS)

Figure 5



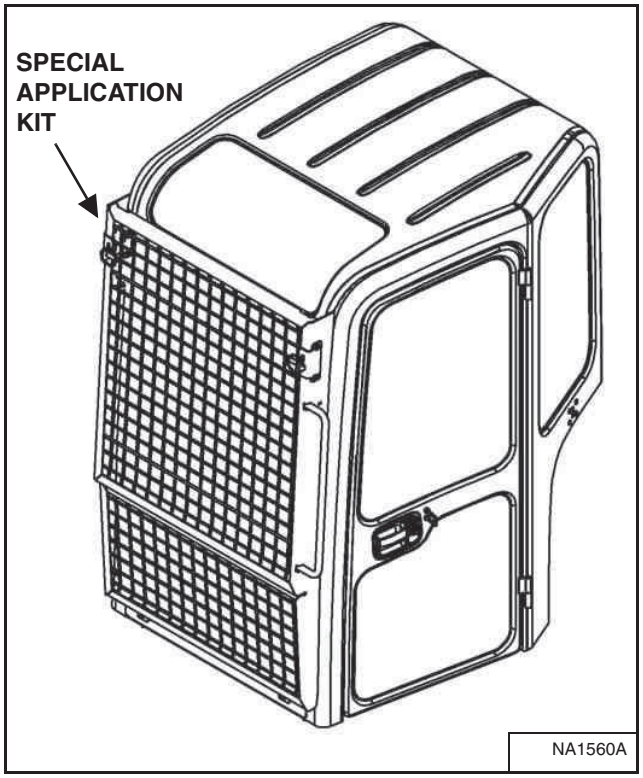
Available for special applications that require protection from smaller objects that can fall on the canopy / cab or restrict material from entering canopy / cab openings **[Figure 5]** and **[Figure 6]**.

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

See your Bobcat Dealer for more information.

Special Applications Kit

Figure 6



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

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

Kit includes an upper and lower screen guard.

See your Bobcat Dealer for more information.

Special Applications Kit Inspection And Maintenance

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

SAFETY AND TRAINING RESOURCES


Bobcat®

SAFETY INSTRUCTIONS

Before Operation

Carefully follow the operating and maintenance instructions in this manual.

The Bobcat excavator is highly maneuverable and compact. It is rugged and useful under a wide variety of conditions. This presents an operator with hazards associated with off motorway, rough terrain applications, common with Bobcat excavator usage.

The Bobcat excavator has an internal combustion engine with resultant heat and exhaust. All exhaust gases can kill or cause illness so use the excavator with adequate ventilation.

The dealer explains the capabilities and restrictions of the Bobcat excavator and attachment for each application. The dealer demonstrates the safe operation according to Bobcat instructional materials, which are also available to operators. The dealer can also identify unsafe modifications or use of unapproved attachments. The attachments and buckets are designed for a Rated Lift Capacity. They are designed for secure fastening to the Bobcat excavator. The user must check with the dealer, or Bobcat literature, to determine safe loads of materials of specified densities for the machine - attachment combination.

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

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

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

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

- An Operator's Handbook is fastened to the operator cab of the excavator. Its brief instructions are convenient to the operator. See your Bobcat dealer for more information on translated versions.

The dealer and owner / operator review the recommended uses of the product when delivered. If the owner / operator will be using the machine for a different application(s) he or she must ask the dealer for recommendations on the new use.

SI EXC EMEA-0913

Safe Operation Is The Operator's Responsibility

Safety Alert Symbol

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

WARNING

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

W-2001-0502

IMPORTANT

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

I-2019-0284

DANGER

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

D-1002-1107

WARNING

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

W-2044-1107

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

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

Safe Operation Needs A Qualified Operator

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

A Qualified Operator Must Do The Following:

Understand the Written Instructions, Rules and Regulations

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

Have Training with Actual Operation

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

Know the Work Conditions

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

SI EXC EMEA-0913

Avoid Silica Dust

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

FIRE PREVENTION

Maintenance

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

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

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

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

Operation

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

Electrical

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

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

FIRE PREVENTION (CONT'D)

Hydraulic System

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

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

Fueling

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

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).

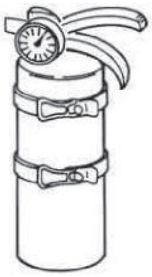
Welding And Grinding

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.

SI EXC EMEA-0913

PUBLICATIONS AND TRAINING RESOURCES

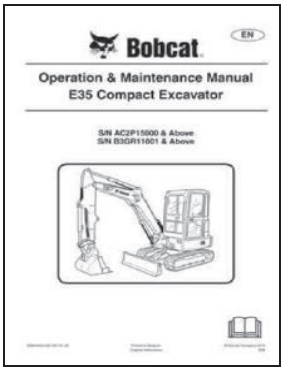
The following publications are also available for your Bobcat excavator. You can order them from your Bobcat dealer.

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

OPERATOR'S HANDBOOK

6990434enGB

Gives basic operation instructions and safety warnings



OPERATION & MAINTENANCE MANUAL

6990442enGB

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

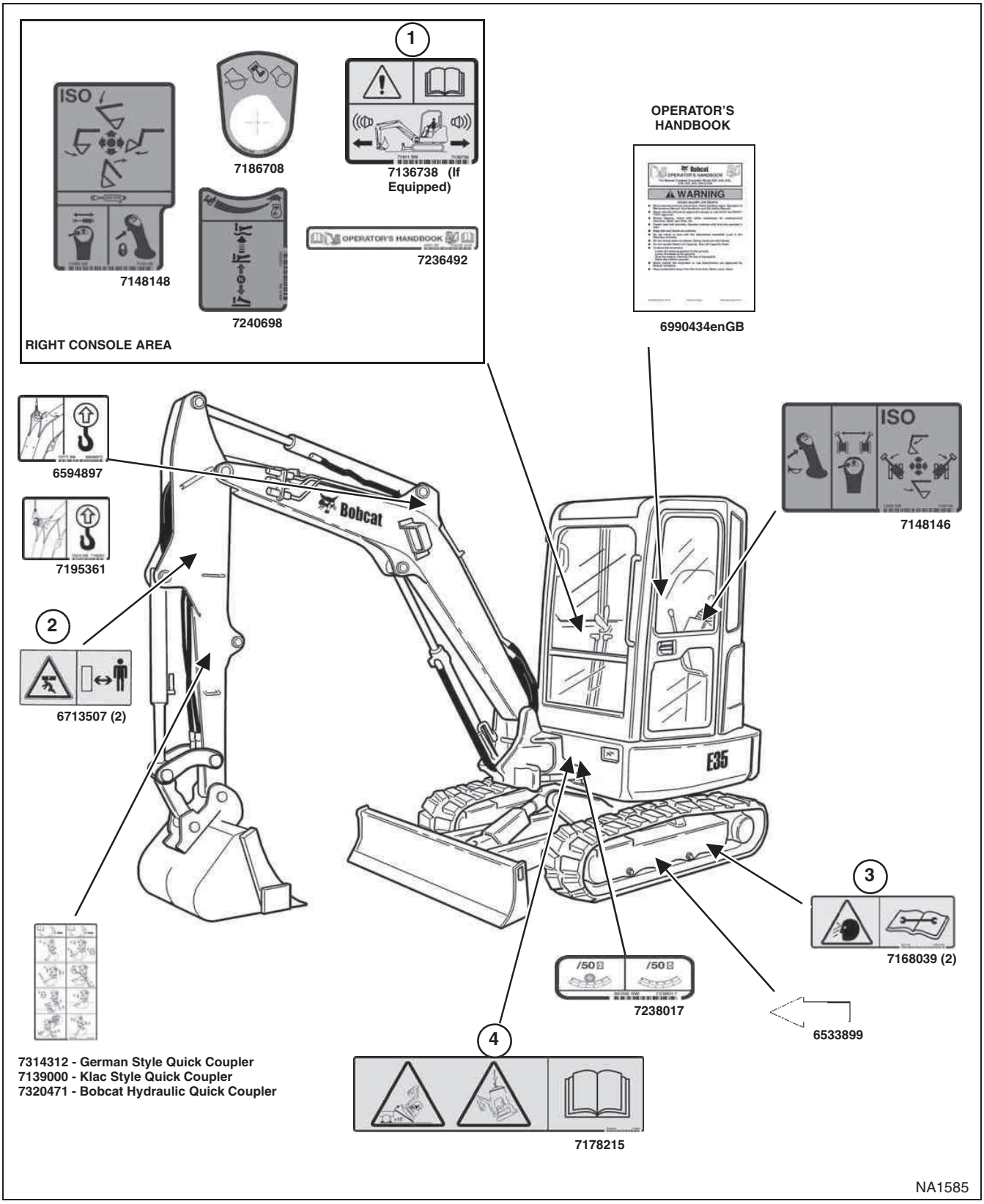
SERVICE MANUAL

6987276enUS

- Complete maintenance instructions for your BOBCAT excavator.

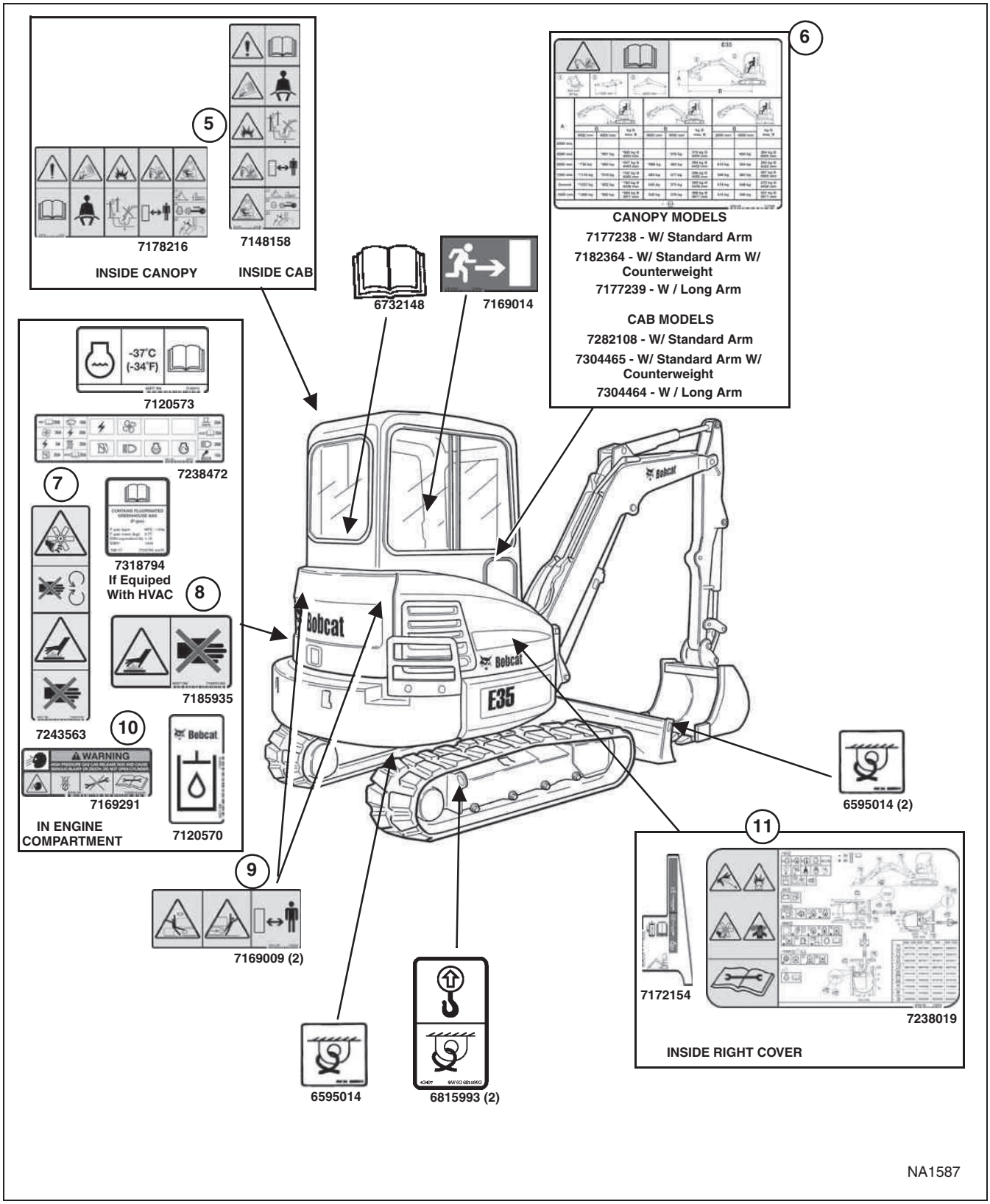
MACHINE SIGNS (DECALS)

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.



MACHINE SIGNS (DECALS) (CONT'D)

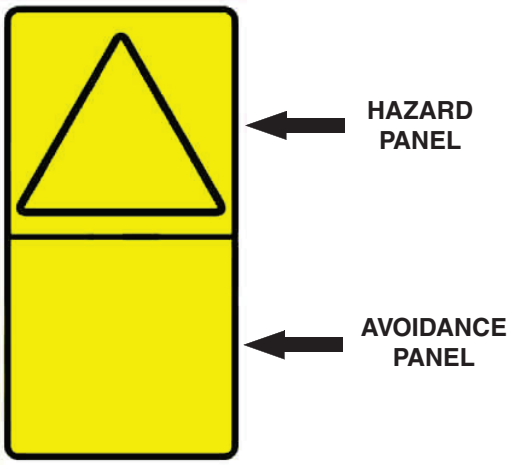
Follow the instructions on all the Machine Signs (Decals) that are on the excavator. Replace any damaged machine signs and be sure they are in the correct locations. Machine signs are available from your Bobcat excavator dealer.



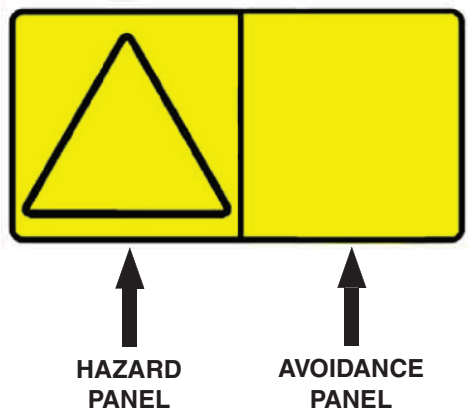
Pictorial Only Safety Signs

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.

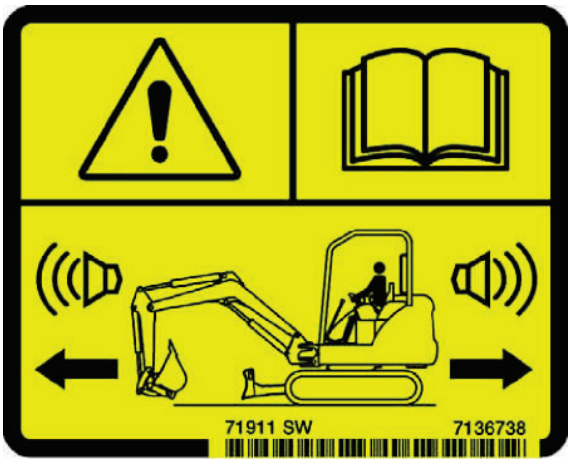
Avoidance panels depict actions required to avoid the hazards.

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 24 and Machine Signs (Decals) (Cont'd) on Page 25 for the machine location of each corresponding numbered pictorial only decals as shown below.

1. Motion Alarm (7136738)

This safety sign is located on the right rear console.



⚠ 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

2. Crush Hazard (6713507)

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

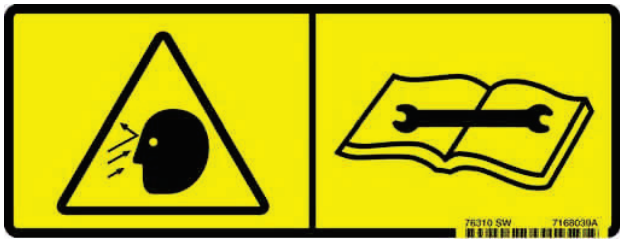
⚠ WARNING

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

W-2520-0106

3. Thrown Or Flying Objects (7168039)

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



⚠ WARNING

High pressure grease can cause serious injury. Do not loosen grease fitting. Do not loosen bleed fitting more than 1 - 1/2 turns.

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

W-2516-0110

4. Transporting And Lifting (7178215)

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

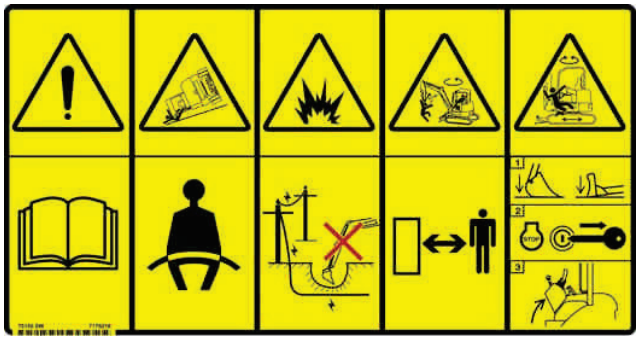
⚠ WARNING

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

W-2517-0110

5. General Hazard (7148158, 7178216)

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



WARNING

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

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

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

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

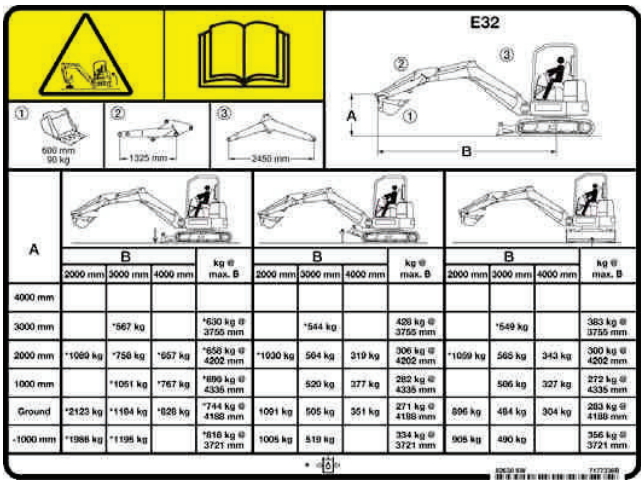
Failure to operate machine from the operator's position can cause serious injury or death.

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

W-2518-0110

6. Lift Capacity (7177238, 7177239, 7182364, 7282108, 7304464, 7304465)

This safety sign is located on the right side cover.



A	B				B				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	kg @ max. B
4000 mm												
3000 mm		*567 kg		*630 kg @ 3755 mm		*544 kg		426 kg @ 3755 mm		*549 kg		383 kg @ 3755 mm
2000 mm	*1069 kg	*758 kg	*657 kg	*658 kg @ 4202 mm	*1030 kg	564 kg	319 kg	306 kg @ 4202 mm	*1099 kg	565 kg	343 kg	300 kg @ 4202 mm
1000 mm		*1051 kg	*767 kg	*699 kg @ 4335 mm		520 kg	377 kg	282 kg @ 4335 mm		506 kg	327 kg	272 kg @ 4335 mm
Ground	*2123 kg	*1184 kg	*826 kg	*744 kg @ 4188 mm	1091 kg	505 kg	351 kg	271 kg @ 4188 mm	896 kg	484 kg	304 kg	263 kg @ 4188 mm
-1000 mm	*1988 kg	*1195 kg		*616 kg @ 3721 mm	1005 kg	519 kg		334 kg @ 3721 mm	905 kg	490 kg		356 kg @ 3721 mm

WARNING

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

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

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

W-2519-0110

7. Hot Surfaces and Rotating Fan (7243563)

This safety sign is located inside the engine compartment.

⚠ WARNING

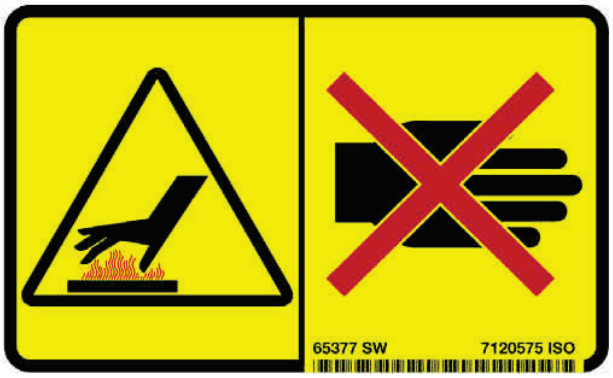
Rotating fan blade can cause serious injury or death. Keep away from fan and moving parts. Do not operate with guard removed.

Hot surfaces can cause injury. Do not touch. Allow to cool before servicing.

W-2521-0106

8. Hot Surfaces (7185935)

This safety sign is located in the engine compartment.



⚠ WARNING

AVOID BURNS

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

W-2070-1203

9. Stay Away (7169009)

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

⚠ WARNING

AVOID INJURY OR DEATH

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

W-NEW-1108

10. Thrown or Flying Objects (7169291)

This safety sign is located on the gas spring under the rear cover.

7169291

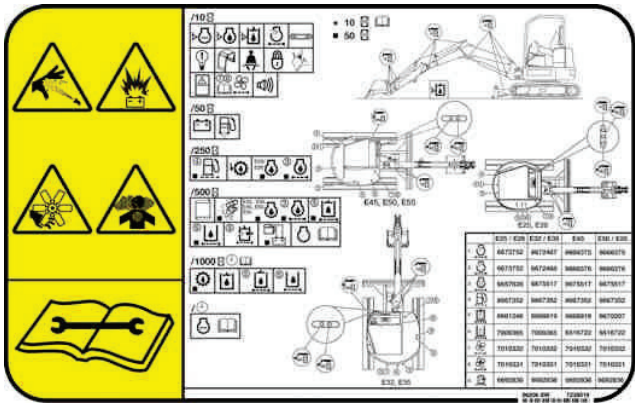
⚠ WARNING

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

W-2523-0106

11. High Pressure, Battery, Rotating Fan, Exhaust Gases and Service Schedule (7238019)

This safety sign is located on the right front corner of the upperstructure. For Service Schedule Information, (See SERVICE SCHEDULE on Page 139.)



⚠ WARNING

Leaking fluids under pressure can enter the skin and cause serious injury or death. Immediate medical attention is required. Wear goggles. Use cardboard to check for leaks.

Battery makes flammable and explosive gas. Keep arcs, sparks, flames and lighted tobacco away. Keep away from electrical contacts

Rotating fan can cause serious injury. Keep away from fan and moving parts. Do not operate with guard removed.

All exhaust gases can kill. Always ventilate.

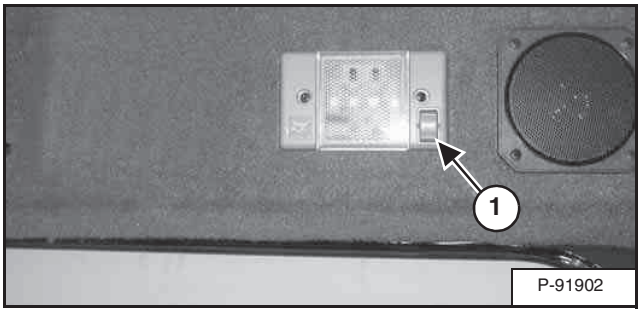
Read and understand the Operation & Maintenance Manual for more information.

W-2522-0110


Bobcat®

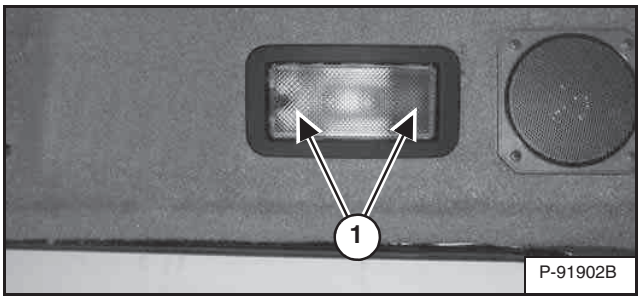
Cab Interior Light (If Equipped)

Figure 7



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

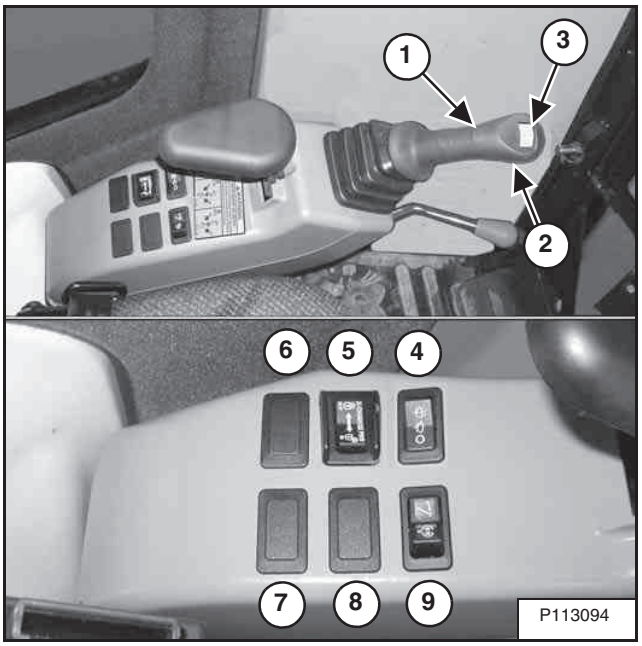
Figure 8



Later Models: Press either side of the lens (Item 1) **[Figure 8]** to turn the light ON. Return the LENS to the centre position to turn OFF.

Left Console

Figure 9

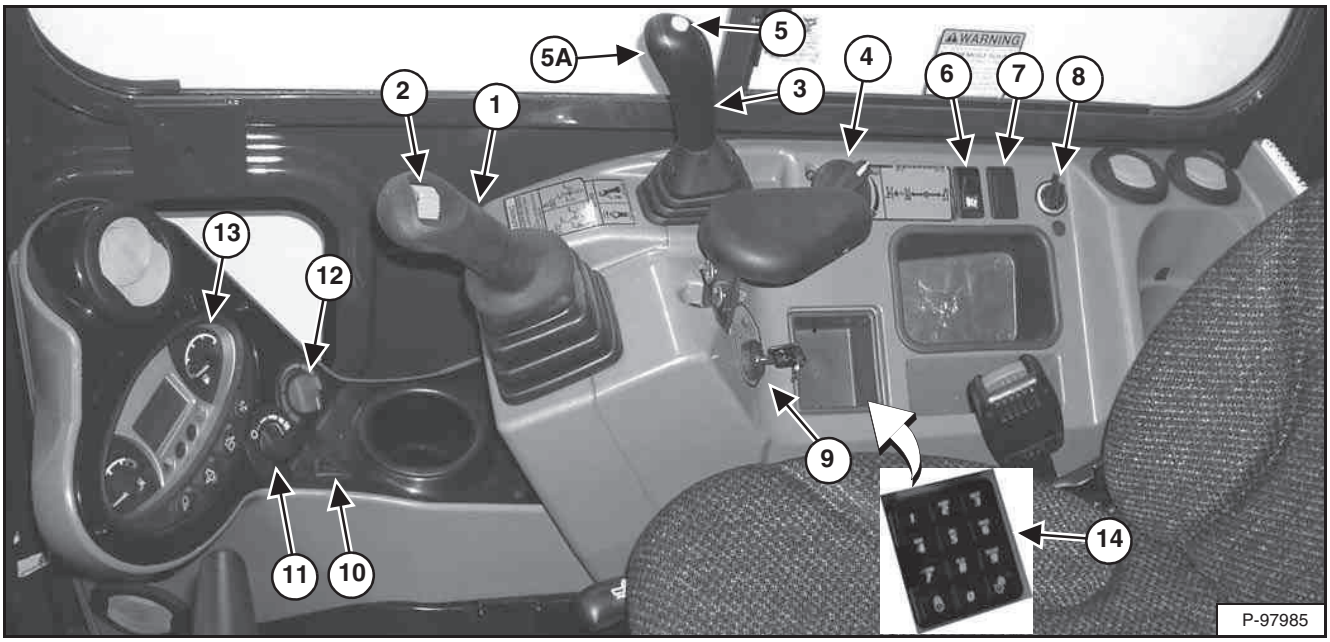


Left Console **[Figure 9]**

REF. NO.	DESCRIPTION	FUNCTION / OPERATION
1	Left Joystick	(See HYDRAULIC CONTROLS on Page 54.)
2	Horn	Press the switch on the bottom of the left joystick to sound horn.
3	Boom Swing Switch / Secondary Auxiliary Hydraulic (If Equipped)	Move the switch to the left to swing the boom to the left. Move the switch to the right to swing the boom to the right. (See Secondary Auxiliary Hydraulics and Boom Swing in this manual.)
4	Wiper / Washer Switch (If Equipped)	Press the switch to the left to turn wiper ON. Press and hold switch to the left to activate window washer. Press the switch to the right to turn wiper OFF.
5	Pin Grabber Quick Coupler ON / OFF Switch (If Equipped)	Press switch to the left to turn the pin grabber quick coupler ON. Press the switch to the right to turn OFF.
6	Beacon / Strobe Light (If Equipped)	Press switch to the left to turn ON the beacon / Strobe light. Press the switch to the right to turn OFF.
7	Pin Grabber 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 (Pin Grabber Quick Coupler) in this manual.)
8	Not Used	- - -
9	Boom Swing Switch / Secondary Auxiliary Hydraulic (If Equipped)	Move the switch to the right to activate the secondary auxiliary hydraulics. Move the switch to the left for boom swing function. (See Secondary Auxiliary Hydraulics and Boom Swing in this manual.)

Right Console

Figure 10



REF	DESCRIPTION	FUNCTION / OPERATION
1	Right Joystick	(See HYDRAULIC CONTROLS in this manual.)
2	Auxiliary Hydraulic Switch (If Equipped)	Controls the fluid flow to the auxiliary quick couplers (attachment). (See Auxiliary Hydraulics in this manual.)
3	Blade Control Lever	Controls raising and lowering the blade. Pushed all the way forward puts blade in float position. (See BLADE LEVER CONTROL in this manual).
4	Engine Speed Control Dial	Controls rpm of the engine. (See ENGINE SPEED CONTROL DIAL in this manual).
5	Two-Speed Button (Without Angle Blade Option)	Engages and disengages High Range Travel Speed. (See Two-Speed Travel in this manual).
5A	Two-Speed Button (With Angle Blade Option)	Engages and disengages High Range Travel Speed. (See Two-Speed Travel in this manual). (Also see Angle Blade in this manual.)
6	Motion Alarm Cancel Switch	This switch temporarily disables the motion alarm. (See MOTION ALARM SYSTEM on Page 51.)
7	Not Used	---
8	Auxiliary Power Outlet	12 volt receptacle for accessories.
9	Key Switch	Always perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE in this manual), before starting the engine. (See STARTING THE ENGINE in this manual).
10	Air Conditioning Switch (If Equipped)	Press top of switch to turn air conditioner ON (light in switch will be ON), Press bottom of switch to turn OFF.
11	Fan Motor Switch (If Equipped)	Turn clockwise to increase fan speed; anticlockwise to decrease.
12	Temperature Control (If Equipped)	Turn clockwise to increase temperature; anticlockwise to decrease.
13	Instrument Panel	See Standard or Deluxe Instrument Panel
14	Keyless (If Equipped)	(Always perform the PRE-STARTING PROCEDURE, (See PRE-STARTING PROCEDURE in this manual), before starting the engine. (See STARTING THE ENGINE in this manual).

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

INSTRUMENTS AND CONSOLES (CONT'D)

Instrument Panel - Standard

Figure 11

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 in this manual).
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 Auxiliary Hydraulics in this manual).
4	Information	Cycles through (after each button press) (The following information is displayed in the Data Display Screen, Item 6): • Hourmeter (On startup) • Job Clock (1 and 2) • 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.

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, and Selectable Auxiliary Hydraulic Flow. (See Job Clock in this manual).
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 187.)

** Icons will be ON or flashing when diagnostic system indicates a problem. (See DIAGNOSTIC SERVICE CODES on Page 187.)

*** Icons will be flashing when diagnostic system indicates a problem. (See DIAGNOSTIC SERVICE CODES on Page 187.)

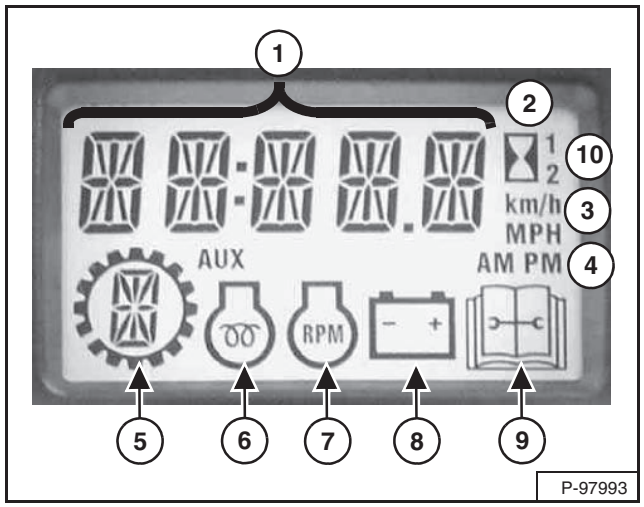
Instrument Panel - Standard (Cont'd)

Indicator Icons

The display screen can display the following information:

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

Figure 12

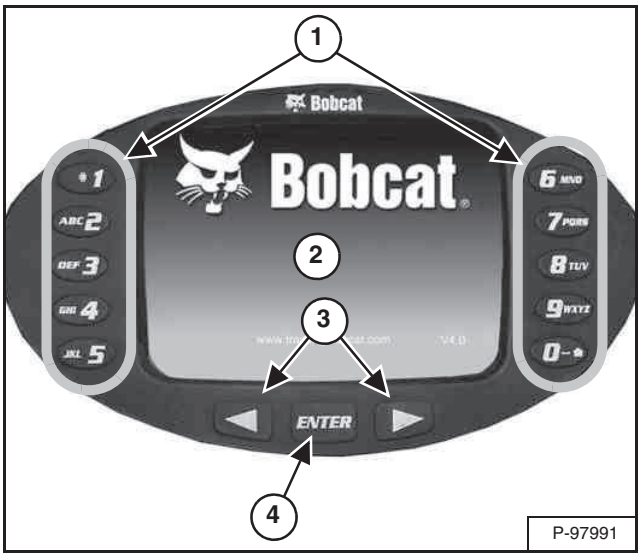


The display screen is shown in **[Figure 12]**. The data display will show operating hours upon startup.

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)**

Instrument Panel - Deluxe

Figure 13



This machine may be equipped with a Deluxe Instrument Panel **[Figure 13]**.

1. **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.

2. **Display Screen:** The display screen is where all system setup, monitoring, and error conditions are displayed.

3. **Scroll Buttons:** Used to scroll through display screen choices.

4. **ENTER Button:** Used to make selections on the display screen.

Figure 14

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 14]**.

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, User 1 and User 2 Password on Page 197.) 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 191.)

Lights

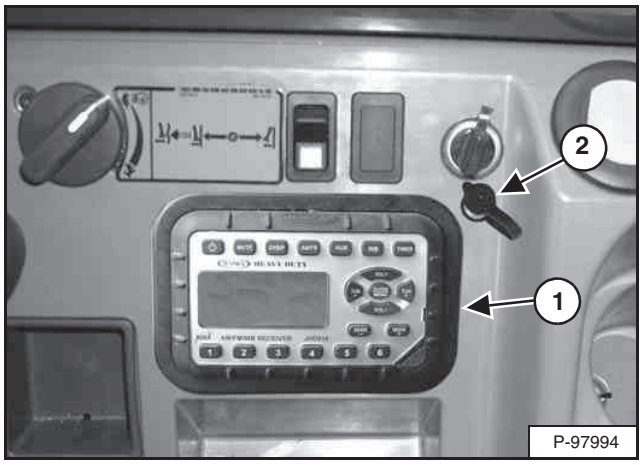
Press key pad [1] **[Figure 14]** once for FRONT work lights. Press a second time to turn all lights off.

Change Language:

The language can be changed at any time. (See CONTROL PANEL SETUP on Page 191.)

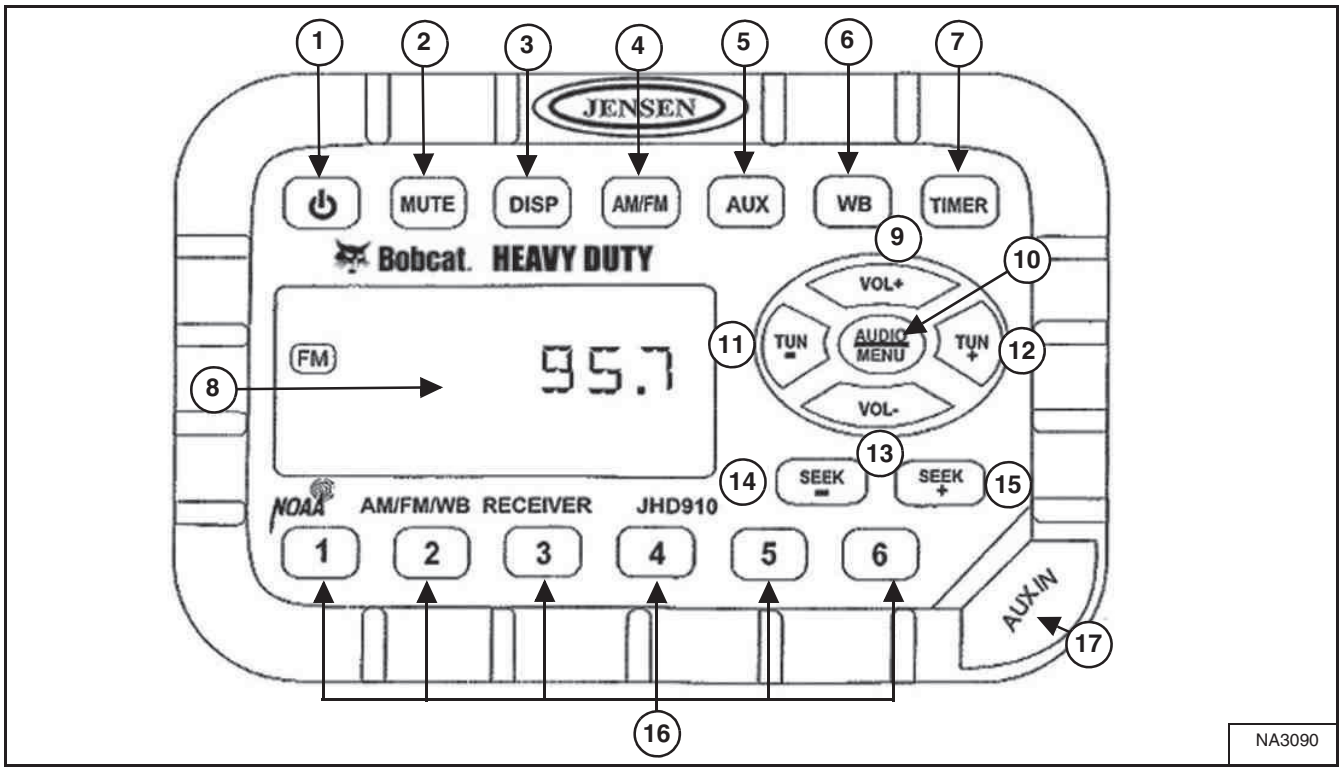
Radio Option

Figure 15



This excavator may be equipped with a radio (Item 1) and the headphone jack (Item 2) **[Figure 15]**.

Figure 16



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

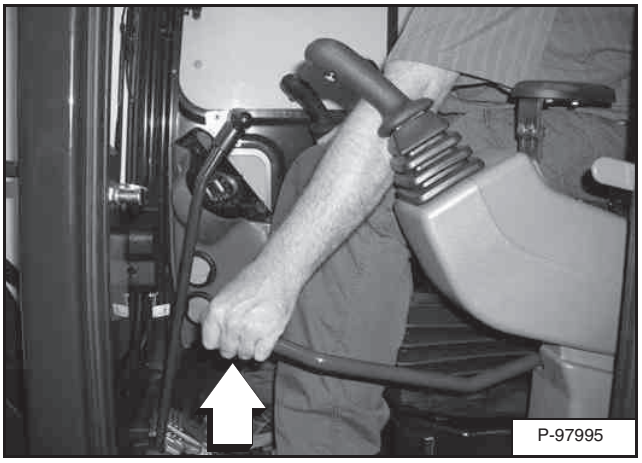
Radio (Cont'd)

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. • 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.

Raising And Lowering The Console

Raise the console before exiting the cab.

Figure 17



Pull up on the release handle **[Figure 17]**. The lift spring will assist in raising the console.

Lower the console before operating the excavator.

Push down on the lever **[Figure 17]** until the latch is engaged.

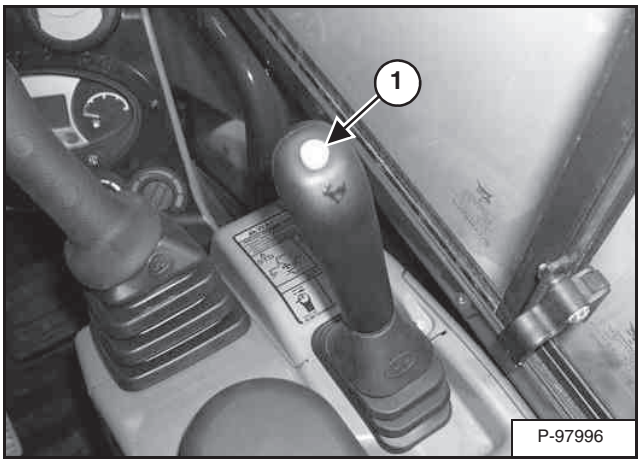
NOTE: When the console is raised, the hydraulic and traction system functions are locked and will not operate.

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.

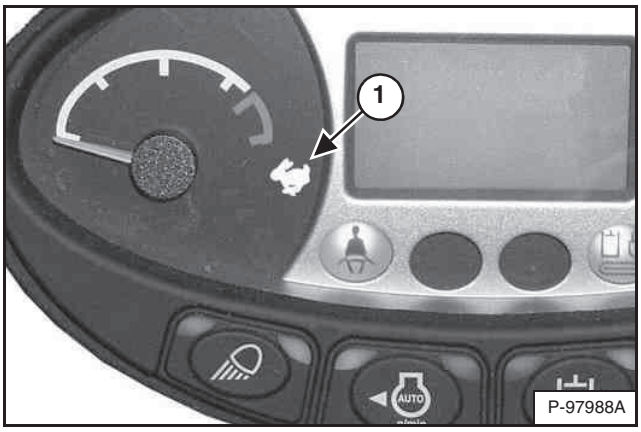
Two-Speed Travel

Figure 18



Press the button (Item 1) **[Figure 18]** to engage the High Range. Press a second time to disengage.

Figure 19



When High Range is engaged, the two-speed travel icon (Item 1) **[Figure 19]** will illuminate.

Press the button (Item 1) **[Figure 18]** again to disengage.

Auto Shift Drive Motors

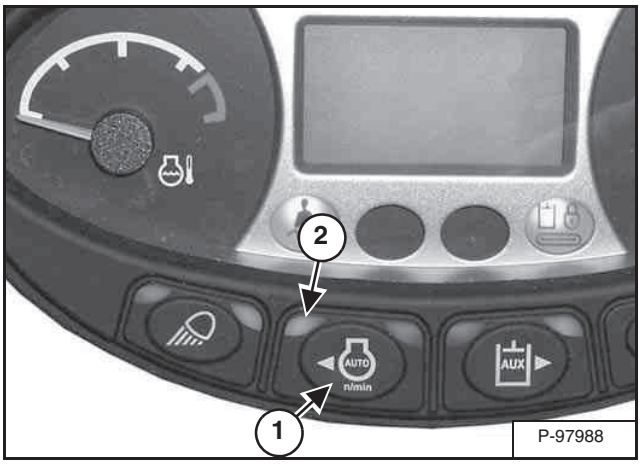
The travel motors are equipped with an auto shift feature that senses hydraulic pressure. When in high range, the travel motors will automatically shift to low range when more torque is required and return to high range when hydraulic pressure decreases.

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

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.

Figure 20



Standard Panel

The automatic idle switch (Item 1) **[Figure 20]** 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 20]** will be OFF.

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

Figure 21

Deluxe Panel

Press ENTER (Item 1) once to engage automatic idle. Press ENTER (Item 1) **[Figure 21]** 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 193.)

OPERATOR CANOPY (ROPS / TOPS)

Description

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

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

ROPS / TOPS - Roll-Over Protective Structure per ISO 12117-2:2008, and Tip-Over Protective Structure per ISO 12117:2000, EN13531:2001.

⚠ WARNING

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

W-2069-0200

OPERATOR CAB (ROPS / TOPS)

Description

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

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

ROPS / TOPS - Roll-Over Protective Structure per ISO 12117-2:2008, and Tip-Over Protective Structure per ISO 12117:2000, EN13531:2001.

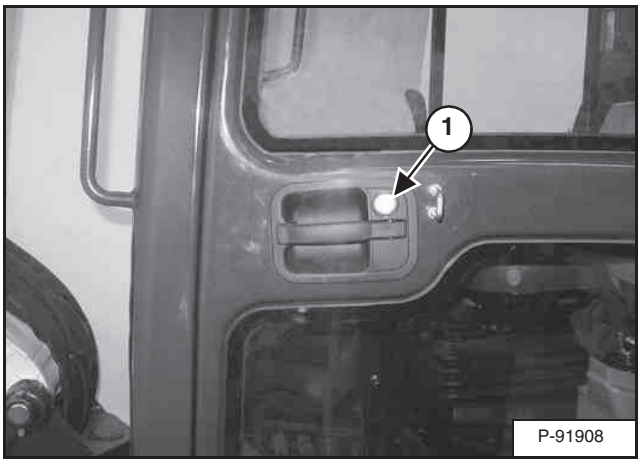
⚠ WARNING

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

W-2069-0200

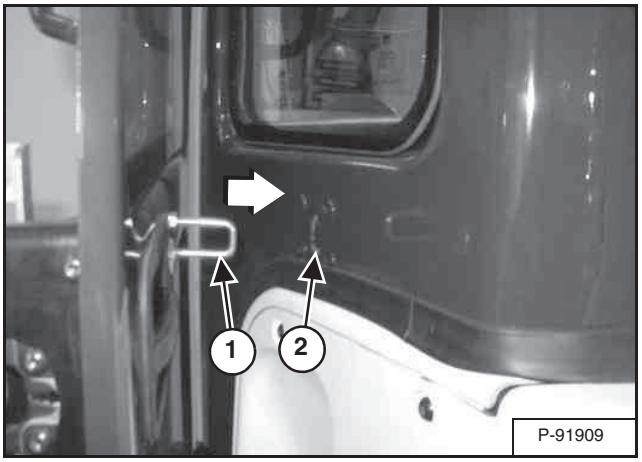
Cab Door

Figure 22



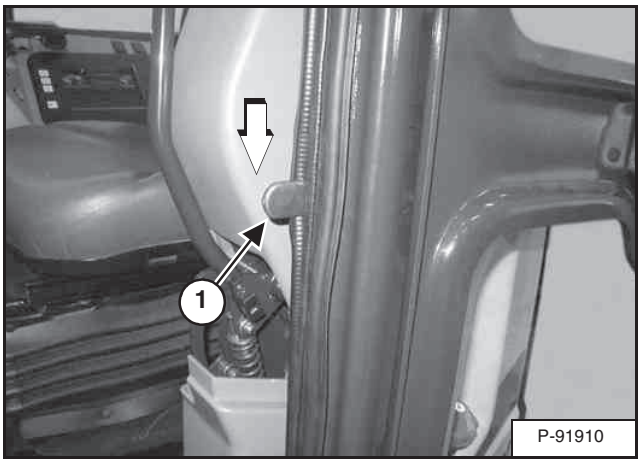
The cab door can be locked (Item 1) **[Figure 22]** with the same key as the starter switch.

Figure 23



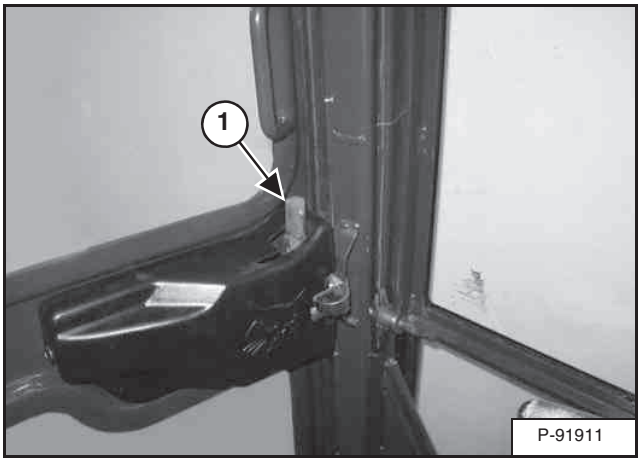
Push the door all the way open until the latch post (Item 1) engages in the latch (Item 2) **[Figure 23]** to hold the door in the open position.

Figure 24



When the door is in the open position, push down on the latch (Item 1) **[Figure 24]** and close the door.

Figure 25

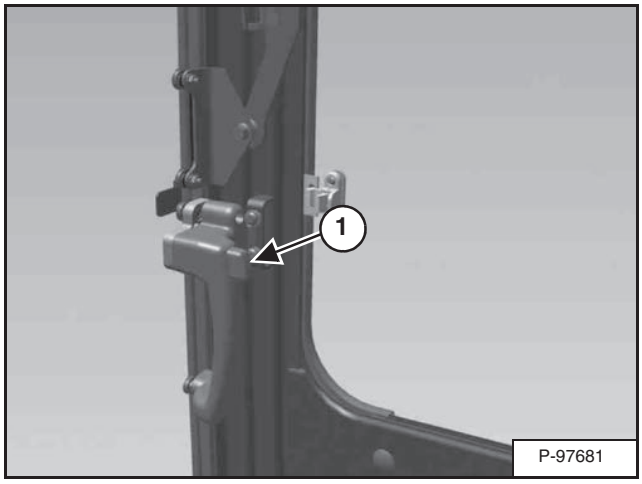


From inside the cab, open the door using handle (Item 1) **[Figure 25]**.

Front Window

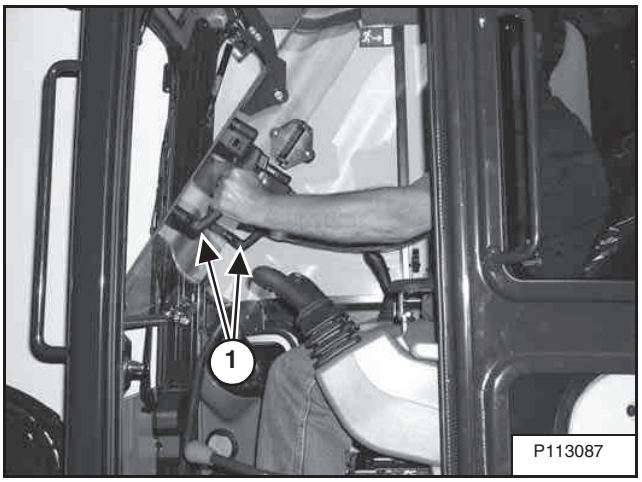
Opening The Front Window

Figure 26



Press the window latch button (Item 1) **[Figure 26]** (both sides).

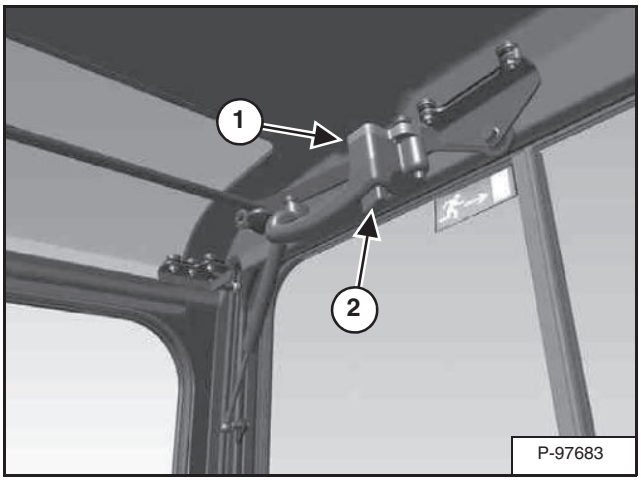
Figure 27



Use both window grab handles (Item 1) **[Figure 27]** 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 28



When the window is fully raised, the latch (Item 1) **[Figure 28]** (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 28]** (both sides).

Use both window grab handles (Item 1) **[Figure 27]** to pull the window down fully.

Press the top of the window in until the latch locks into the latched position (both sides) **[Figure 26]**.

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

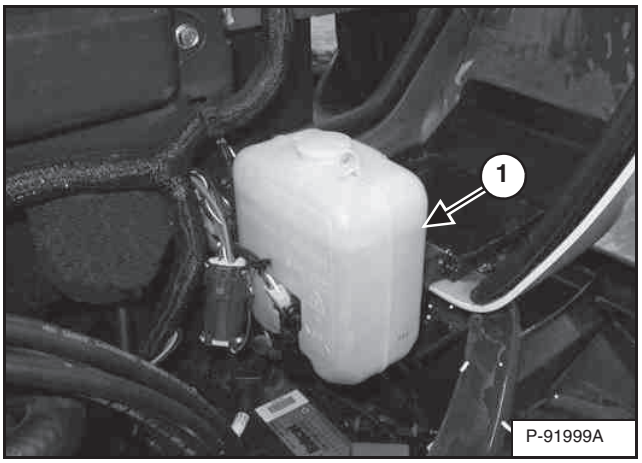
Front Wiper

Figure 29

The front window is equipped with a wiper (Item 1) **[Figure 29]** and washer.

Window Washer Reservoir

Figure 30

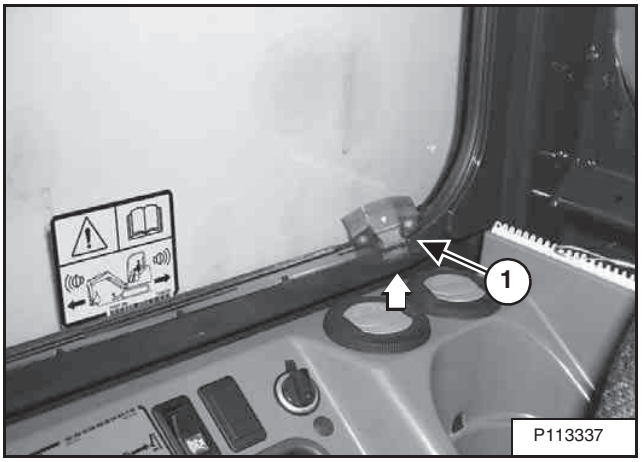


The window washer reservoir (Item 1) **[Figure 30]** is located under the right side cover.

Right Side Window

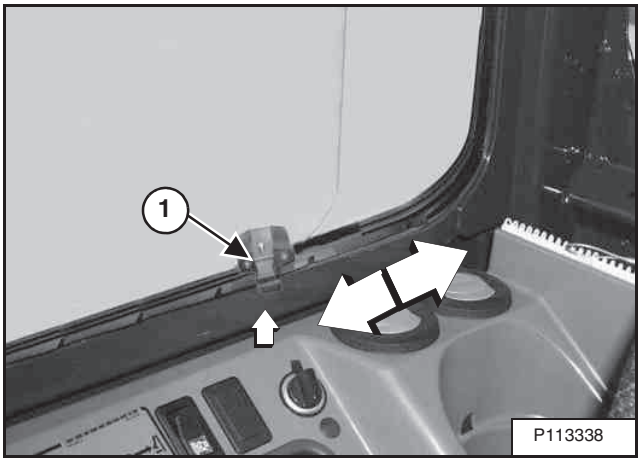
Opening The Right Rear Window

Figure 31



Pull up on the bottom latch (Item 1) **[Figure 31]**.

Figure 32



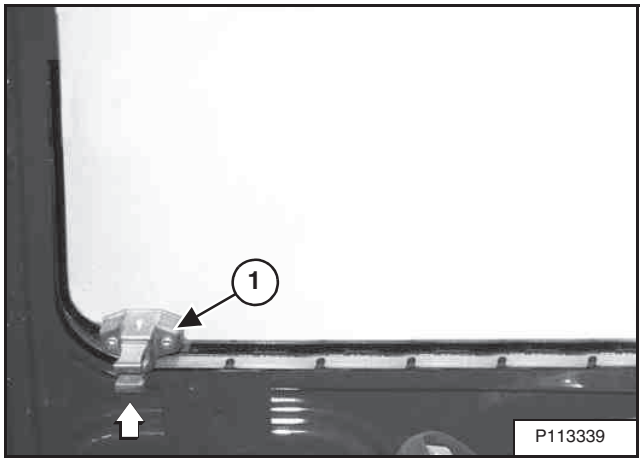
Pull the latch (Item 1) **[Figure 32]** forward to open the window until the desired stop. Release the bottom latch and snap the lock in place.

Closing The Right Rear Window

Pull up on the bottom latch (Item 1) **[Figure 31]** and push the latch back to close the window.

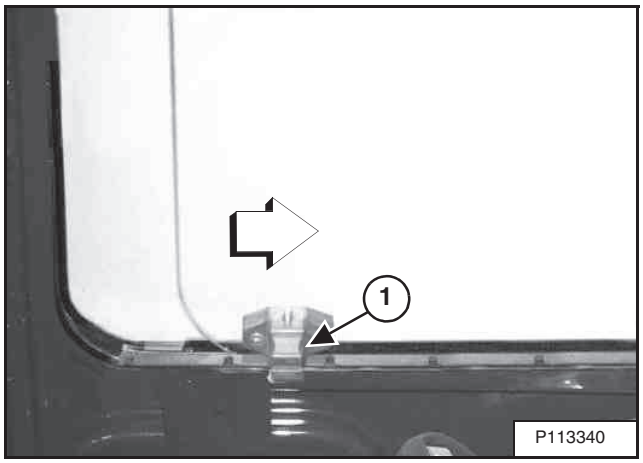
Opening The Right Front Window

Figure 33



Pull up on the bottom latch (Item 1) **[Figure 33]** located at the front of the front window.

Figure 34



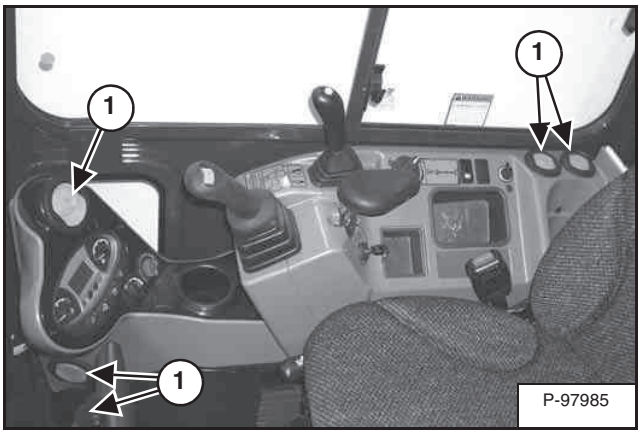
Pull the latch (Item 1) **[Figure 34]** backward to open the window until the desired stop. Release the bottom latch and snap the lock in place.

Closing The Right Front Window

Pull up on the bottom latch (Item 1) **[Figure 33]** and push the latch forward to close the window.

Heating, Ventilation, And Air Conditioning Ducting

Figure 35



The HVAC louvres (Item 1) **[Figure 35]** 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 36

Exit through the window **[Figure 36]**.

Front Window

Figure 37

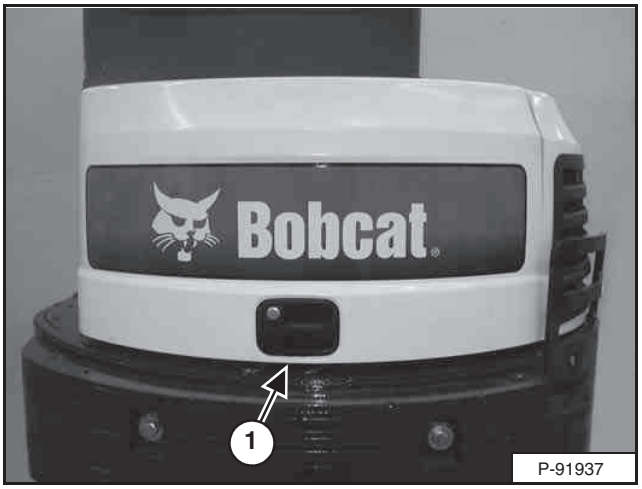
Open the front window and exit **[Figure 37]**.

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

MOTION ALARM SYSTEM

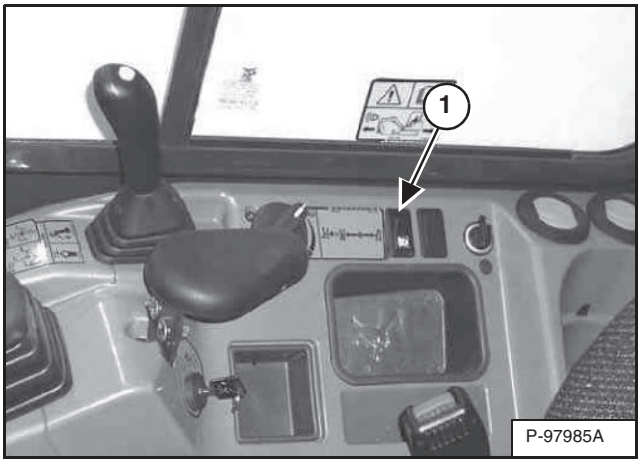
Operation

Figure 38



This excavator may be equipped with a motion alarm system. The motion alarm (Item 1) **[Figure 38]** is located inside the rear of the excavator.

Figure 39



The motion alarm can be temporarily disabled by pressing the motion alarm switch (Item 1) **[Figure 39]** 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 40]** in either the forward or reverse direction.

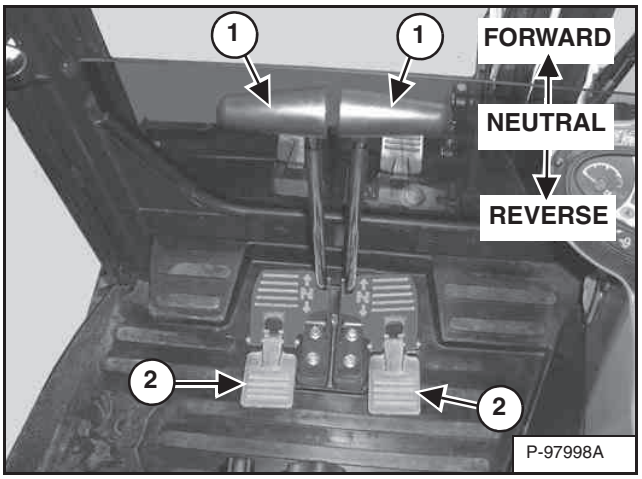
If alarm does not sound or for adjustment instructions, see inspection and maintenance instructions for the motion alarm system in the preventive maintenance section of this manual. (See MOTION ALARM SYSTEM on Page 143.)

TRAVEL CONTROLS

Forward And Reverse Travel

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

Figure 40



Put the blade so that it is at the front of the machine (as you sit in the operator's seat). Slowly move both steering levers* (Item 1) **[Figure 40]** forward for forward travel; backward for reverse travel.

* Travel can also be controlled with foot pedals (Item 2) **[Figure 40]**. Pivot the heel of the pedals forward for additional space on the floor.

⚠ WARNING

AVOID INJURY OR DEATH

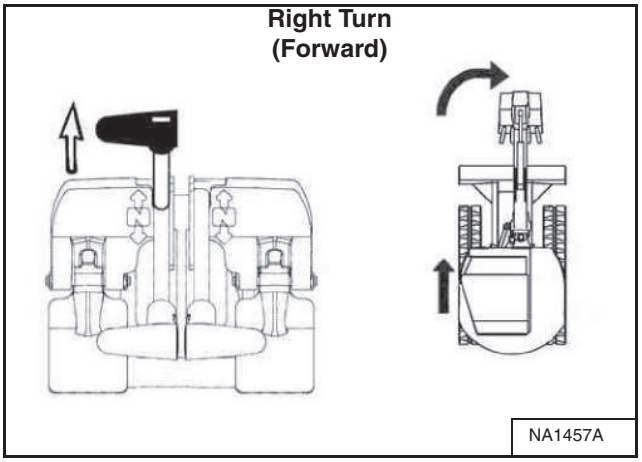
- **Check the blade location before travelling. When the blade is to the rear, operate the steering levers / foot pedals in the opposite direction to when the blade is in the front.**
- **Move the steering levers / foot pedals slowly. Abrupt lever motion will cause the machine to jerk.**

W-2235-EN-1009

Turning

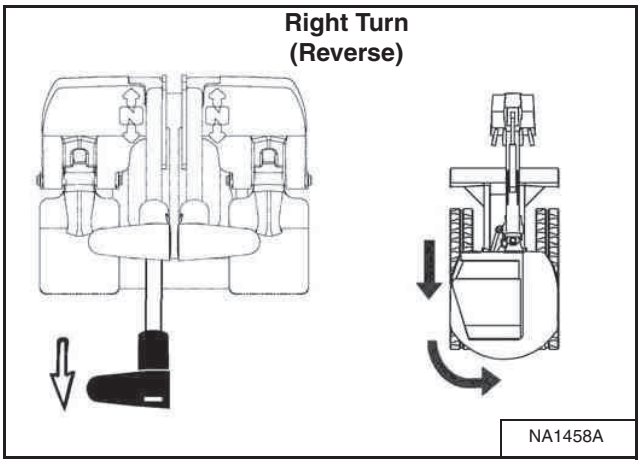
Right Turn

Figure 41



Push the left steering lever forward to turn right **[Figure 41]** while travelling forward.

Figure 42

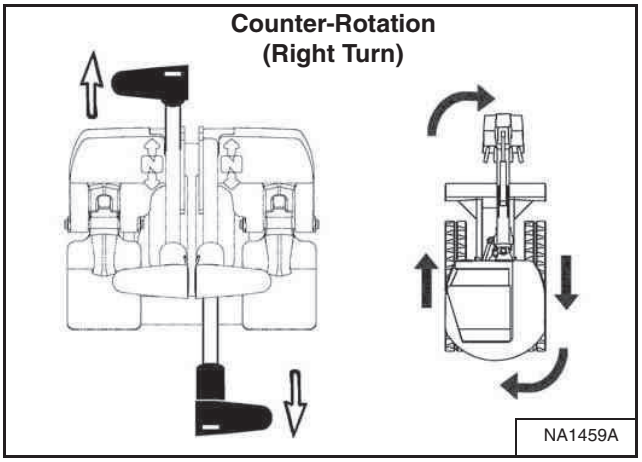


Pull the left steering lever backward to turn right while travelling backward **[Figure 42]**.

Turning (Cont'd)

Counter-Rotation Right Turn

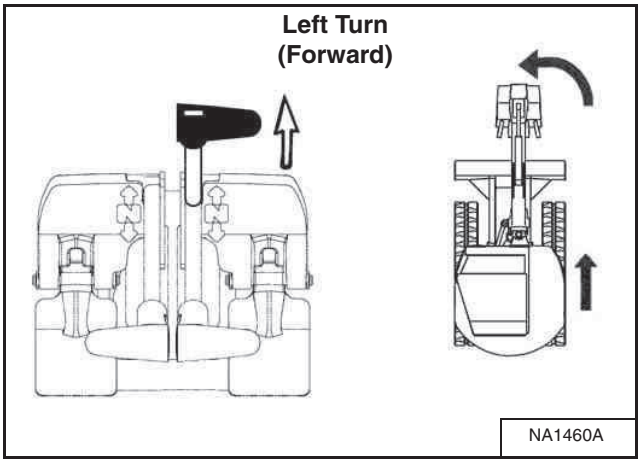
Figure 43



Push the left steering lever forward and pull the right steering lever backward **[Figure 43]**.

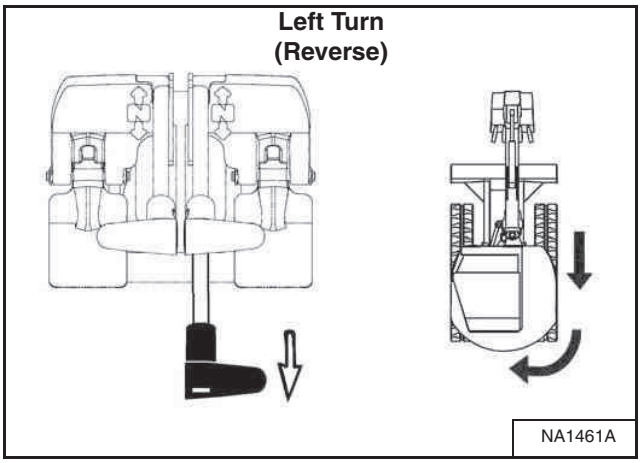
Left Turn

Figure 44



Push the right steering lever forward to turn left while travelling forward **[Figure 44]**.

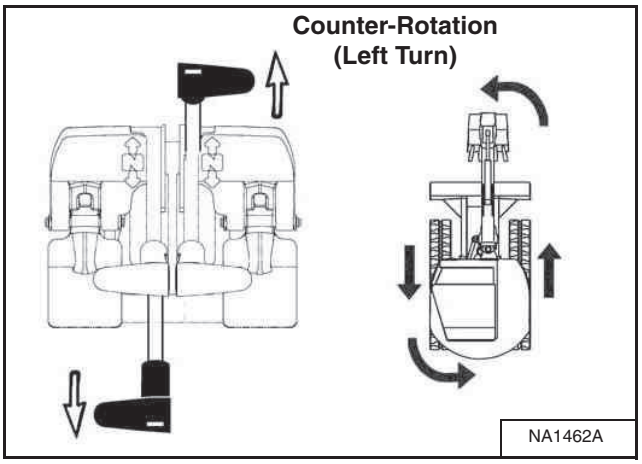
Figure 45



Pull the right steering lever backward to turn left while travelling backward **[Figure 45]**.

Counter-Rotation Left Turn

Figure 46



Push the right steering lever forward and pull the left steering lever backward **[Figure 46]**.

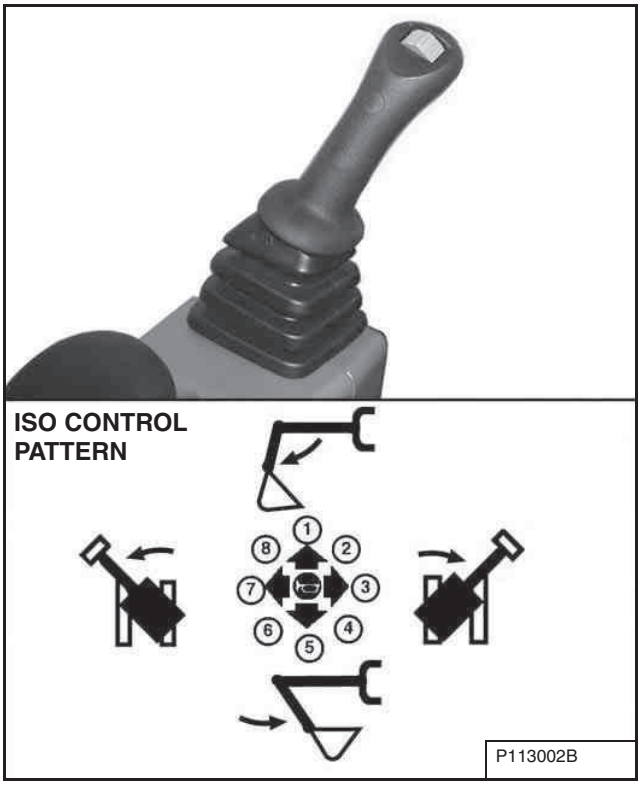
HYDRAULIC CONTROLS

Description

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

Left Control Lever (Joystick)

Figure 47

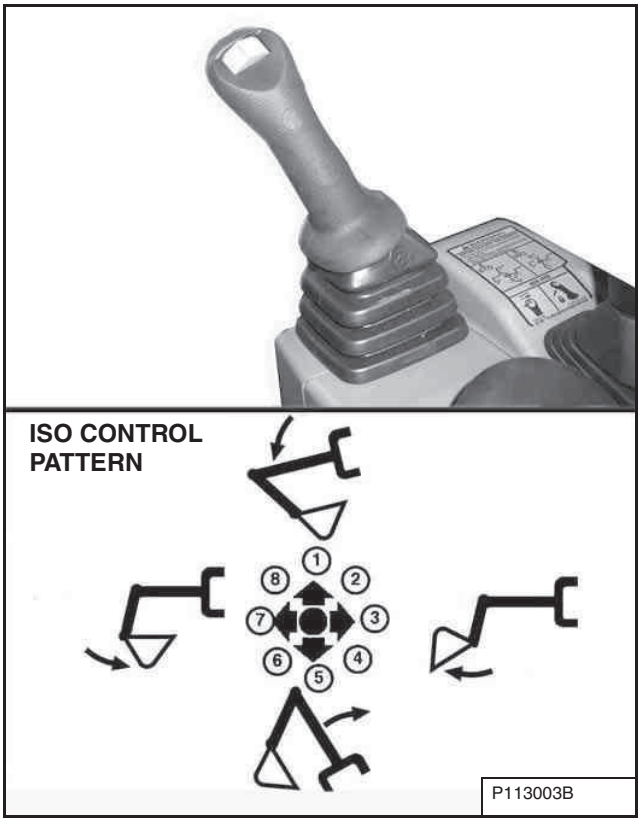


The left lever (joystick) is used to operate the arm and slew the upperstructure **[Figure 47]**.

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

Right Control Lever (Joystick)

Figure 48



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.**

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Quick Couplers

⚠ WARNING

AVOID BURNS

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

W-2220-0396

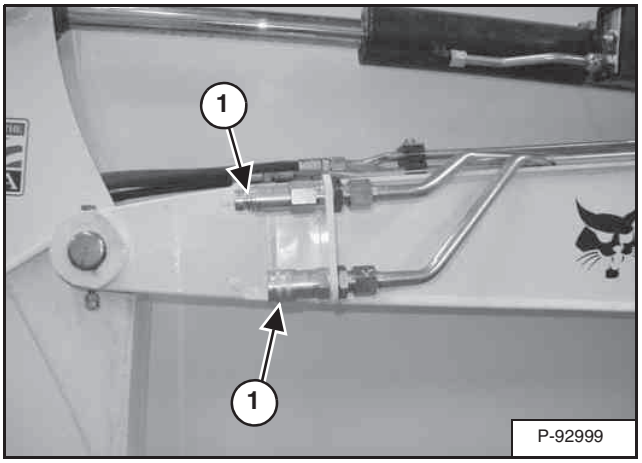
⚠ WARNING

AVOID INJURY OR DEATH

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

W-2072-EN-0909

Figure 49



If equipped with the auxiliary hydraulics, the Excavator and attachments are supplied with flush faced couplers (Item 1) **[Figure 49]**.

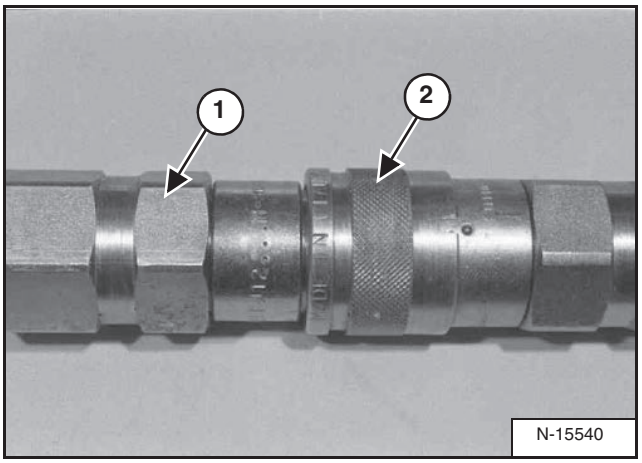
To Connect:

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 49]** 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 50

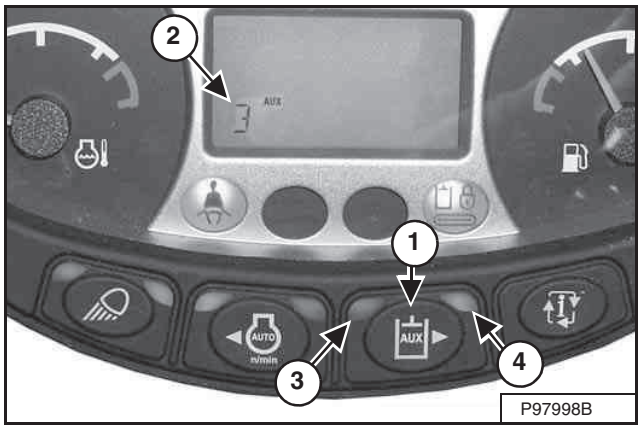


Hold the male coupler (Item 1). Retract the sleeve (Item 2) **[Figure 50]** on the female coupler until the couplers disconnect.

Auxiliary Hydraulics - Standard Instrument Panel

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

Figure 51



NOTE: 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 mode.

Selectable Auxiliary Hydraulics Flow - Press the Auxiliary Hydraulics button (Item 1) (an audible beep will sound each time the auxiliary button is pressed). The last selected auxiliary hydraulic flow (Aux3, Aux2 or Aux1) will appear in the data display (Item 2). The LED (Item 3) **[Figure 51]** will be illuminated.

To change the auxiliary flow, press the Auxiliary Hydraulics button (Item 1) to toggle through the settings, each time the button is pressed, the next setting will appear in the data display (Item 2) **[Figure 51]**. Once the desired setting is selected, it will stay at that setting until a different auxiliary flow is selected by the operator. (Example: Even if the engine was STOPPED, if Aux2 has been selected, after key OFF and engine restart, the Aux2 setting will still be the active hydraulic flow when the machine is started.)

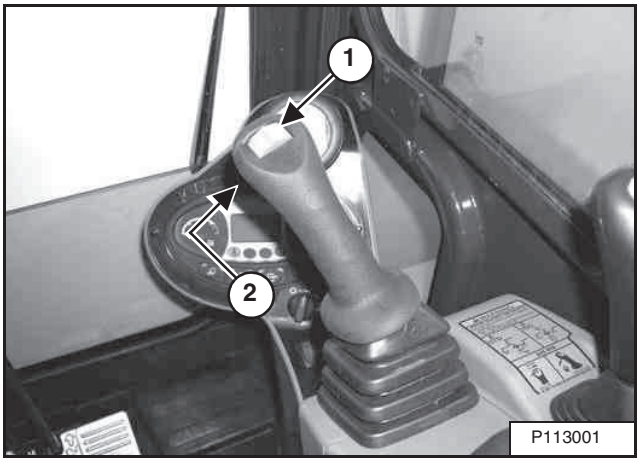
Continuous Flow Auxiliary Hydraulics - Press and hold the Auxiliary Hydraulics button (Item 1) for more than one second. The LED (Item 4) will illuminate. Press the Auxiliary Hydraulics button (Item 1) **[Figure 51]** again to scroll through the various continuous flow auxiliary hydraulic settings (3, 2, 1).

Examples For Setting Selectable Auxiliary Hydraulic Flow And The Attachment Used:

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

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

Figure 52



Move the switch (Item 1) **[Figure 52]** on the right control lever to the right to supply hydraulic flow to the female coupler. Move the switch to the left to supply hydraulic flow to the male coupler. If you move the switch halfway, the auxiliary functions move at approximately one-half speed.

Press the button (Item 2) **[Figure 52]** on the front of the handle to provide continuous flow to the female coupler.

NOTE: Pressing the switch (Item 1) to the left <u>while</u> pressing the button (Item 2) [Figure 52] on the front of the handle will provide continuous flow to the male coupler.

Press the button (Item 2) **[Figure 52]** 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.

Auxiliary Hydraulics - Deluxe Instrument Panel

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

Figure 53

NOTE: 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 mode.

Selectable Flow Auxiliary Hydraulics - Press key pad **[6] [Figure 53]** to scroll through the various front auxiliary hydraulic settings (3, 2, 1).

Continuous Flow Auxiliary Hydraulics - Press and hold the key pad **[6] [Figure 53]** for more than one second. The continuous flow icons below will illuminate. Press the key pad **[6]** to scroll through the various continuous flow auxiliary hydraulic settings (3, 2, 1).

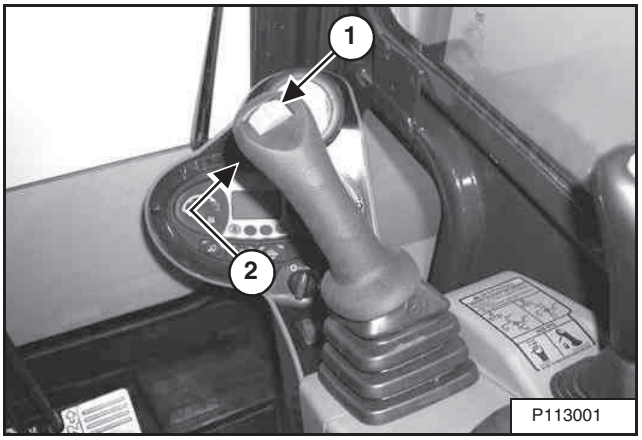
ICON	DESCRIPTION
	Engine OFF - Auxiliary Hydraulics Pressure Relieve
	Engine Running - Auxiliary Hydraulics OFF
	Auxiliary Hydraulics - Maximum Flow - Continuous Flow Disabled
	Auxiliary Hydraulics - Medium Flow - Continuous Flow Disabled
	Auxiliary Hydraulics - Low Flow - Continuous Flow Disabled
	Auxiliary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

Examples For Setting Selectable Auxiliary Hydraulic Flow And The Attachment Used:

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

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

Figure 54



Move the switch (Item 1) **[Figure 54]** on the right control lever to the right to supply hydraulic flow to the female coupler. Move the switch to the left to supply hydraulic flow to the male coupler. If you move the switch halfway, the auxiliary functions move at approximately one-half speed.

Press the button (Item 2) **[Figure 54]** on the front of the handle to provide continuous flow to the female coupler.

NOTE: Pressing the switch (Item 1) to the left <u>while</u> pressing the button (Item 2) [Figure 54] on the front of the handle will provide continuous flow to the male coupler.

Press the button (Item 2) **[Figure 54]** 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.

Relieve Hydraulic Pressure With Standard Instrument Panel (Excavator And Attachment)

Excavator:

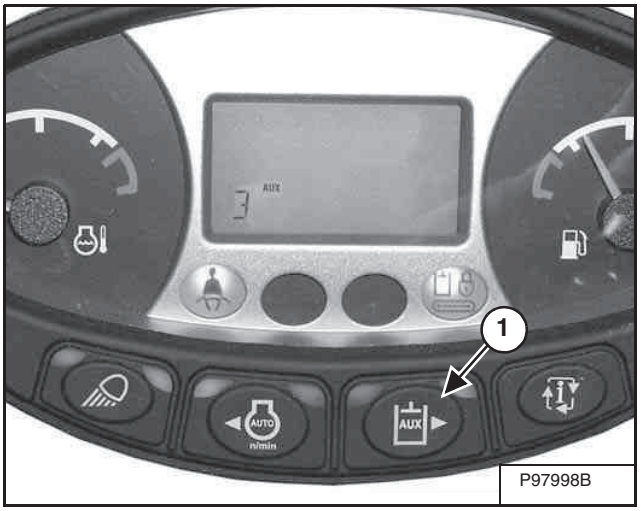
Put the attachment flat on the ground.

Stop the engine and turn the key switch to ON.

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

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

Figure 55



If the auxiliary hydraulics are disabled, press AUX HYD button (Item 1) **[Figure 55]** and then move the switch (Item 1) **[Figure 54]** to the right and left several times.

If the auxiliary hydraulics are enabled, then move the switch (Item 1) **[Figure 54]** to the right and left several times.

Attachments:

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

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

Relieve Hydraulic Pressure With Deluxe Instrument Panel (Excavator And Attachment)

Excavator:

Put the attachment flat on the ground.

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

Figure 56

Stop the engine and turn the start switch to ON. Press either scroll button (Item 1) **[Figure 56]** (Deluxe Panel) until the above screen is visible.

Press button **[6] [Figure 56]** and the AUX PRESSURE RELEASE screen **[Figure 57]** will be visible.

Figure 57

Press the ENTER button (Item 1) **[Figure 57]** to relieve auxiliary pressure in the excavator. An hour glass symbol will appear and when pressure is relieve, the screen will show *Auxiliary Hydraulic Pressure Release*.

Attachments:

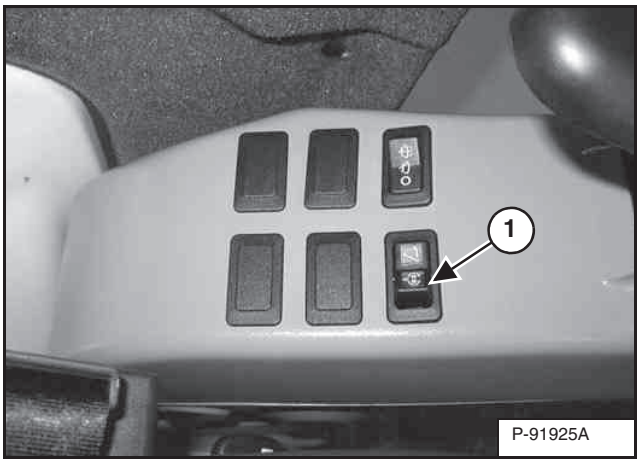
- Follow procedure above to relieve hydraulic pressure in excavator.
- Connect male coupler from attachment to female coupler of excavator then repeat procedure above. This will relieve pressure in the attachment.
- Connect the female coupler from the attachment.

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

Secondary Auxiliary Hydraulics

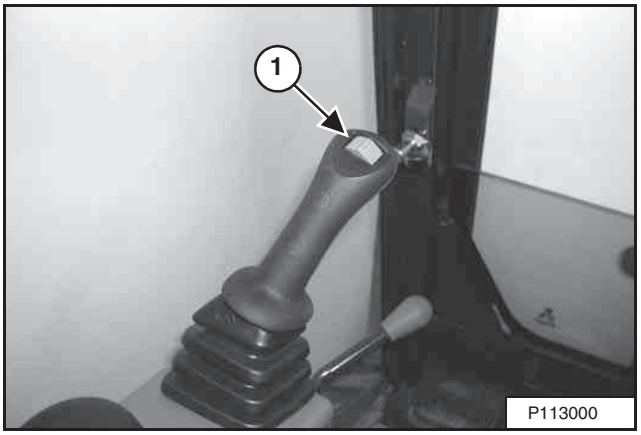
When equipped with secondary auxiliary hydraulics, the second set of hydraulic couplers will be mounted on the right side of the arm.

Figure 58



Press AUX HYD button (Item 1) **[Figure 58]** (if equipped) to the right, secondary auxiliary hydraulic position.

Figure 59



Move the switch (Item 1) **[Figure 59]** on the left control lever to the left to supply hydraulic flow to the female coupler. Move the switch to the right to supply hydraulic flow to the male coupler. If you move the switch halfway, the auxiliary functions move at approximately one-half speed.

Relieve Secondary Auxiliary Hydraulic Pressure (Excavator And Attachment)

Excavator:

Put the attachment flat on the ground.

Stop the engine and turn the key to ON.

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

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

Press AUX HYD button (Item 1) **[Figure 58]** and then move the switch (Item 1) **[Figure 59]** to the right and left several times.

Attachments:

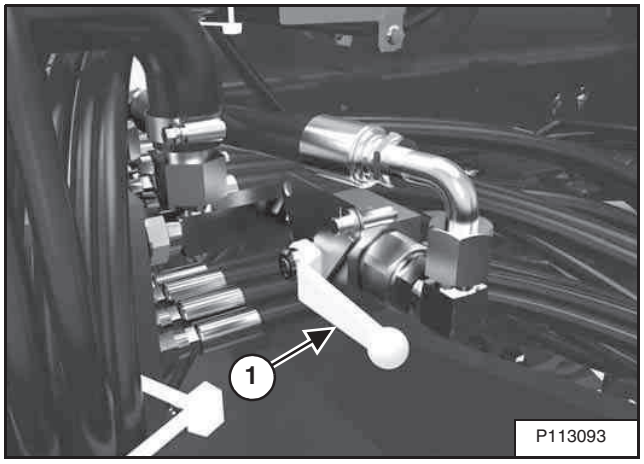
- Follow procedure above to relieve pressure in excavator.
- Connect male coupler from attachment to female coupler of excavator then repeat procedure above. This will relieve pressure in the attachment.
- Connect the female coupler from the attachment.

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

Return To Tank Valve

The return to tank valve is located under the right side cover at the front of the control valve (if equipped).

Figure 60



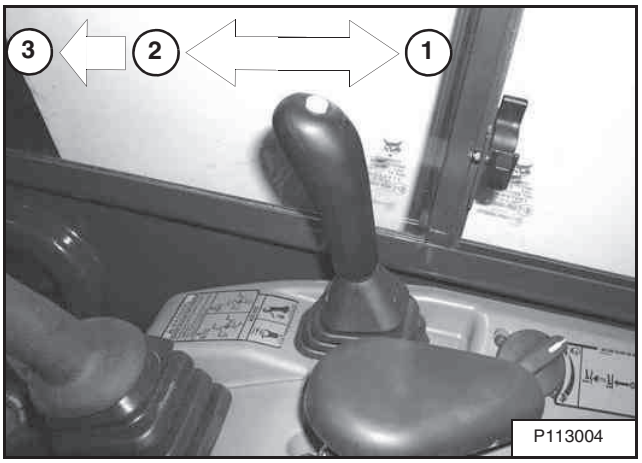
Rotate the lever (Item 1) **[Figure 60]** clockwise to direct auxiliary return hydraulic fluid to the reservoir.

Rotate the lever (Item 1) **[Figure 60]** anticlockwise for two way hydraulic auxiliary flow operation.

BLADE CONTROL LEVER

Raising And Lowering Blade

Figure 61



Pull the lever backward to raise the blade (Item 1) **[Figure 61]**.

Push the lever forward to lower the blade (Item 2) **[Figure 61]**.

Push the lever (Item 3) **[Figure 61]** forward until the lever is in the locked position to put the blade in the *float* position.

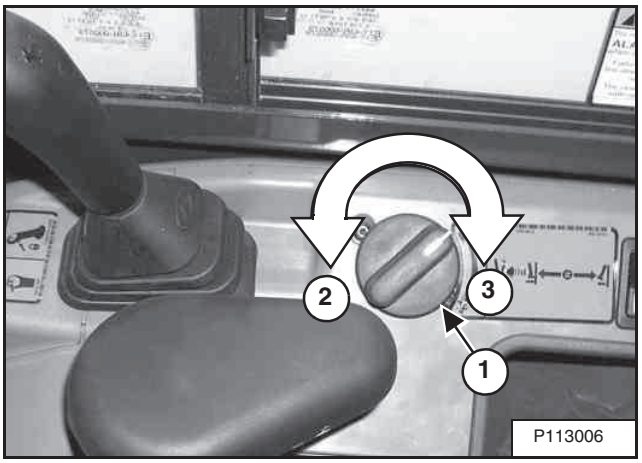
Pull the lever backward to unlock from the *float* position.

NOTE: Keep blade lowered for increased digging performance.

ENGINE SPEED CONTROL DIAL

Setting Engine Speed (RPM)

Figure 62



The engine speed control dial (Item 1) **[Figure 62]** 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 62]** to increase engine rpm.

ECO Mode (With Deluxe Instrument Panel Only)

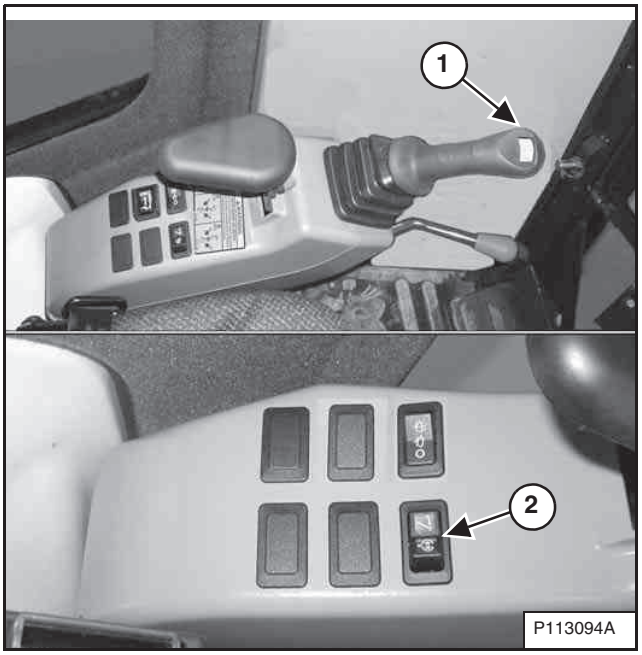
If equipped with the Deluxe Instrument Panel, ECO mode is available.

To enable ECO mode: (See ECO MODE on Page 194.)

BOOM SWING

Operation

Figure 63



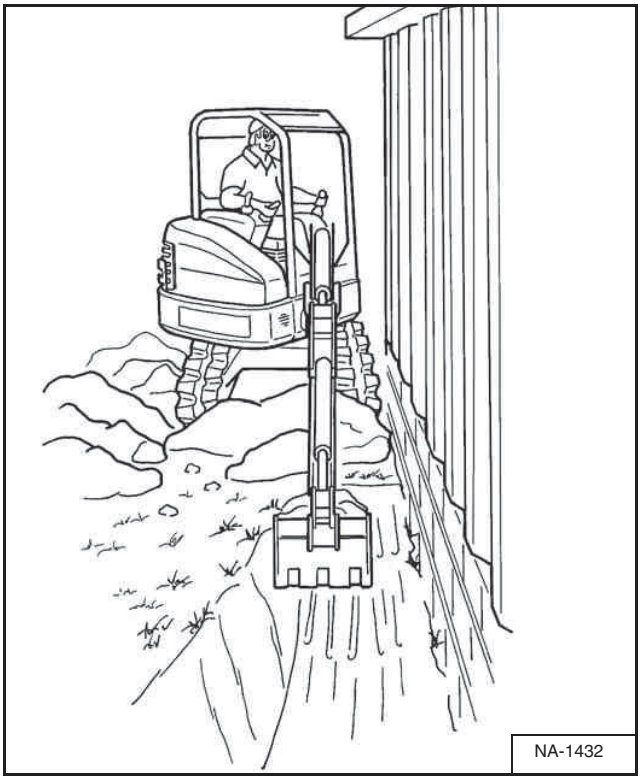
The switch (Item 1) **[Figure 63]** on the left control lever (joystick) controls boom swing. Move the switch to the left to swing the boom to the left. Move the switch to the right to swing the boom to the right.

If Equipped With Secondary Auxiliary Hydraulics:

If the machine is equipped with secondary auxiliary hydraulic couplers, the switch (Item 2) **[Figure 63]** is used to select either the boom swing function or the secondary auxiliary hydraulic function.

Move the switch (Item 2) **[Figure 63]** to the left to select boom swing function, move the switch to the right to select secondary auxiliary hydraulic function.

Figure 64



NOTE: The purpose of the boom swing is to offset the boom with respect to the upperstructure for digging close to a structure [Figure 64].

BOOM LOAD HOLDING VALVE

Description

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

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

WARNING

AVOID INJURY OR DEATH

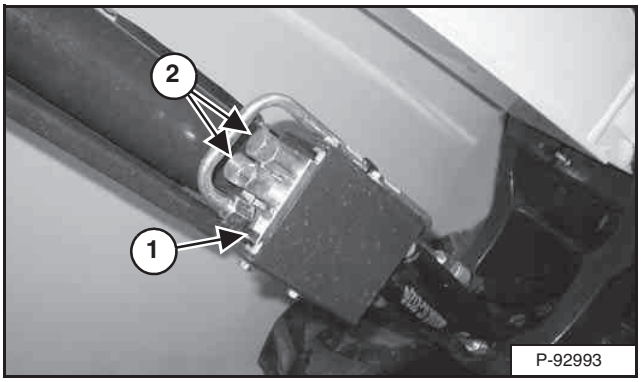
Do Not work or stand under raised work equipment or attachment.

W-2793-0409

Lowering Boom With Load Holding Valve

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

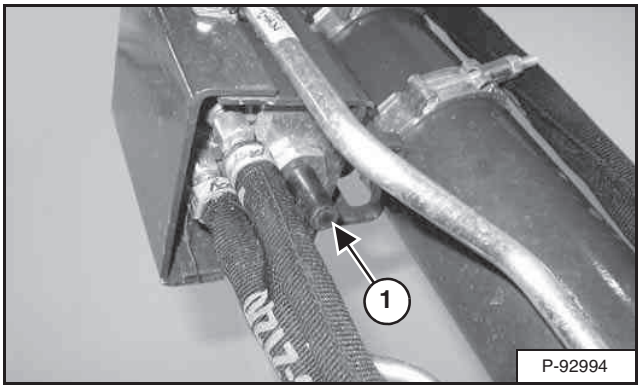
Figure 65



If the excavator is equipped with a boom load holding valve (Item 1) **[Figure 65]**, 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 65]. If the port relief valves have been tampered with, see your Bobcat dealer for service.

Figure 66



Remove the plastic protective cap (Item 1) **[Figure 66]** from the valve.

WARNING

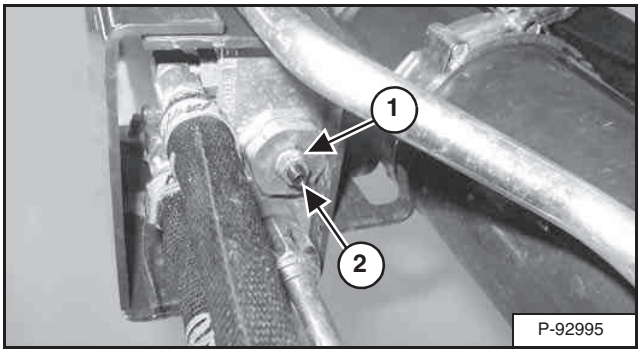
AVOID BURNS

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

Lowering Boom With Load Holding Valve (Cont'd)

Figure 67



Lowering procedures:

With base end hose failure:

Loosen the jam nut (Item 1). Install a hex wrench into the valve screw (Item 2) **[Figure 67]** and slowly rotate the screw clockwise 1/8 to 1/4 turn and allow the boom to lower to the ground.

After the boom is fully lowered, rotate the screw anticlockwise (Item 2) 1/8 to 1/4 turn and tighten the lock nut (Item 1) **[Figure 67]**.

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 jam nut (Item 1). Install a hex wrench into the valve screw (Item 2) **[Figure 67]** and slowly rotate the screw clockwise 1/8 to 1/4 turn and allow the boom to lower to the ground.

After the boom is fully lowered, rotate the screw (Item 2) anticlockwise 1/8 to 1/4 turn and tighten the lock nut (Item 1) **[Figure 67]**. 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 it's current position in the event of hydraulic pressure loss.

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

⚠ WARNING

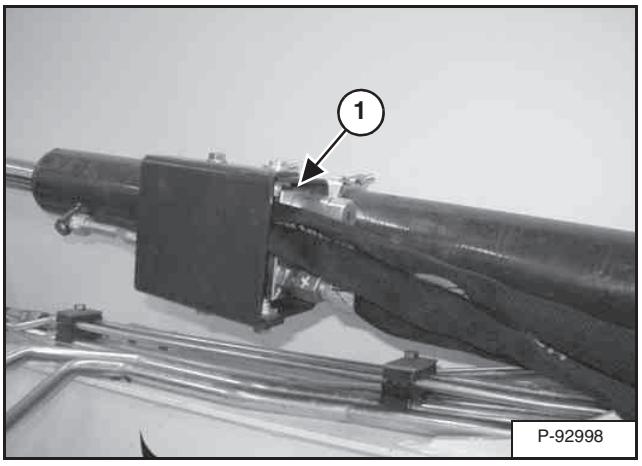
AVOID INJURY OR DEATH

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

W-2793-0409

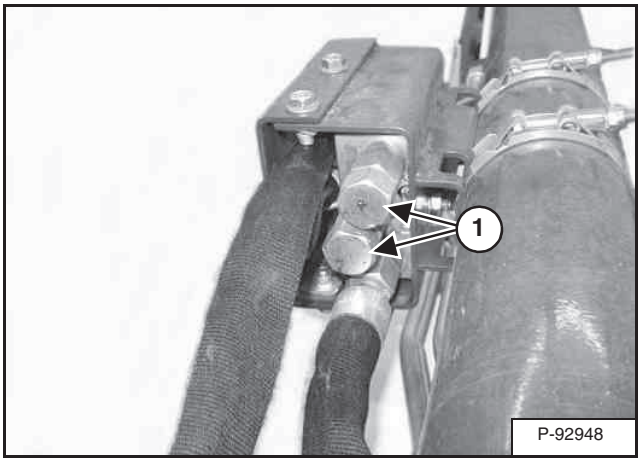
Lowering Arm With Load Holding Valve

Figure 68



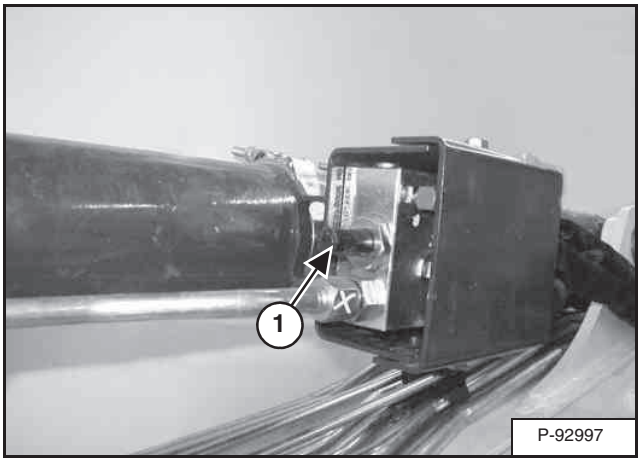
If the excavator is equipped with arm load holding valve (Item 1) **[Figure 68]**, it will be attached to the arm cylinder base end as shown.

Figure 69



NOTE: DO NOT remove or adjust the two port relief valves (Item 1) [Figure 69]. If the port relief valves have been tampered with, see your Bobcat dealer for service.

Figure 70



Remove the plastic protective cap (Item 1) **[Figure 70]** from the valve.

⚠ WARNING

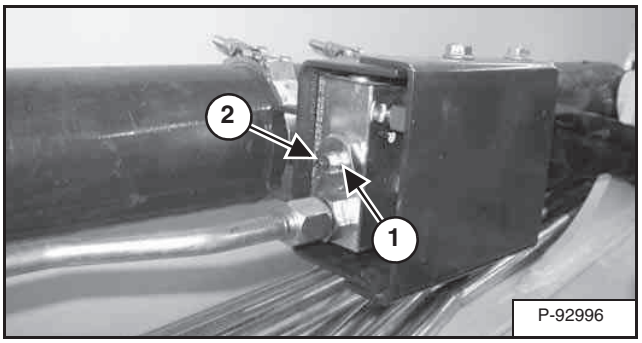
AVOID BURNS

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

Lowering Arm With Load Holding Valve (Cont'd)

Figure 71



Lowering procedures:

With base end hose failure:

Loosen the jam nut (Item 1). Install a hex wrench into the valve screw (Item 2) **[Figure 71]** and slowly rotate the screw clockwise 1/8 to 1/4 turn and allow the arm to lower.

After the arm is lowered, rotate the screw anticlockwise (Item 2) the same 1/8 to 1/4 turn and tighten the lock nut (Item 1) **[Figure 71]**.

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 jam nut (Item 1). Install a hex wrench into the valve screw (Item 2) **[Figure 71]** and slowly rotate the screw clockwise 1/8 to 1/4 turn and allow the arm to lower.

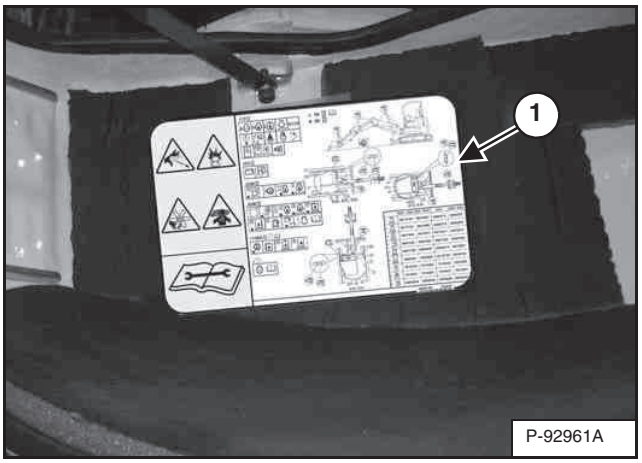
After the arm is lowered, rotate the screw (Item 2) anticlockwise 1/8 to 1/4 turn and tighten the lock nut (Item 1) **[Figure 71]**. Reinstall the base end hose.

Loss of hydraulic pressure:

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

Daily Inspection And Maintenance

Figure 72



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 72]** is located on the rear door top of the right side cover. (See SERVICE SCHEDULE on Page 139.)

Check the following items before each day of operation:

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

⚠ WARNING

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

W-2001-0502

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

IMPORTANT

PRESSURE WASHING DECALS

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

I-2226-EN-0910

IMPORTANT

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

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

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

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

I-2284-EN-0909

Operation & Maintenance Manual And Operator's Handbook Locations

Figure 73

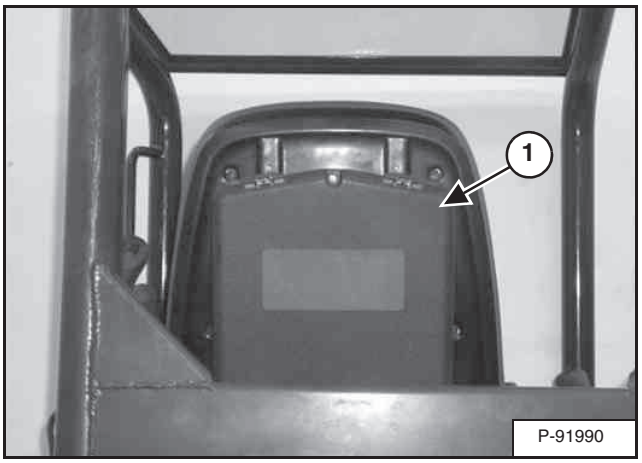
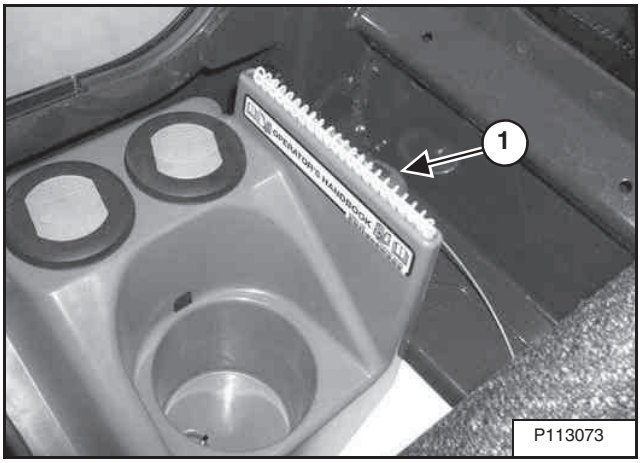


Figure 74



Read and understand the Operation & Maintenance Manual (Item 1) **[Figure 73]** (located inside the storage box on the back of the operator's seat) and the Operator's Handbook (Item 1) **[Figure 74]** before operating.

Entering The Excavator

Figure 75

Use the grab handles and tracks to enter the canopy / cab **[Figure 75]**.

⚠ WARNING

AVOID INJURY OR DEATH

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

W-2003-0807

Seat Adjustment

Standard Seat

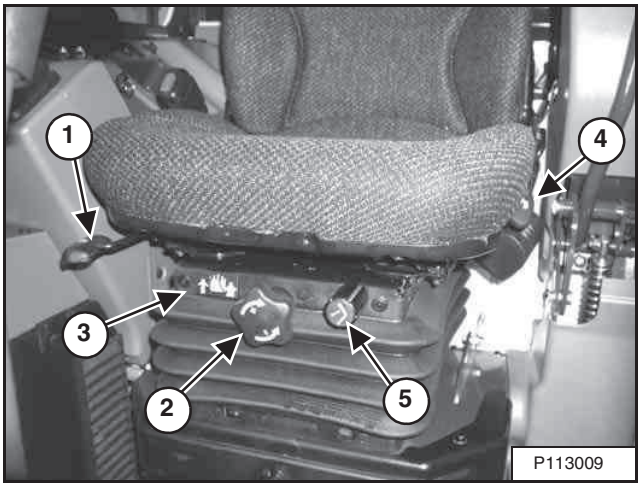
Figure 76

Release the seat lever (Item 1) **[Figure 77]** to adjust the seat forward or back.

Release the seat lever (Item 2) **[Figure 77]** to tilt the seat forward.

Suspension Seat (Option)

Figure 77



Release the seat lever (Item 1) **[Figure 77]** 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 77]**.

Release the lever (Item 4) **[Figure 77]** to change the incline of the seat back.

Sit in the seat and turn the knob (Item 5) **[Figure 77]** to adjust the height of the seat.

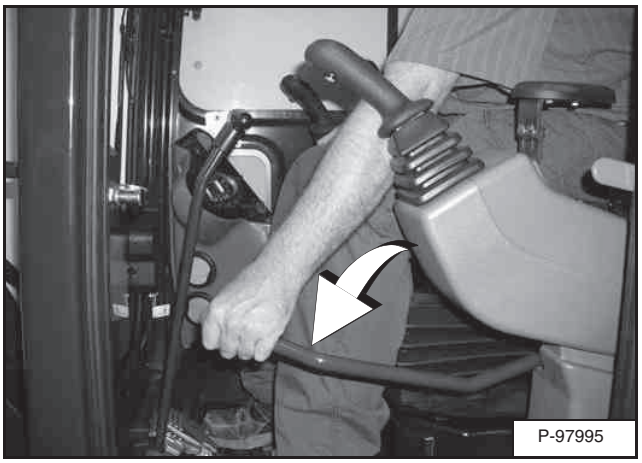
Seat Belt

Figure 78

Fasten the seat belt **[Figure 78]**.

Control Console

Figure 79



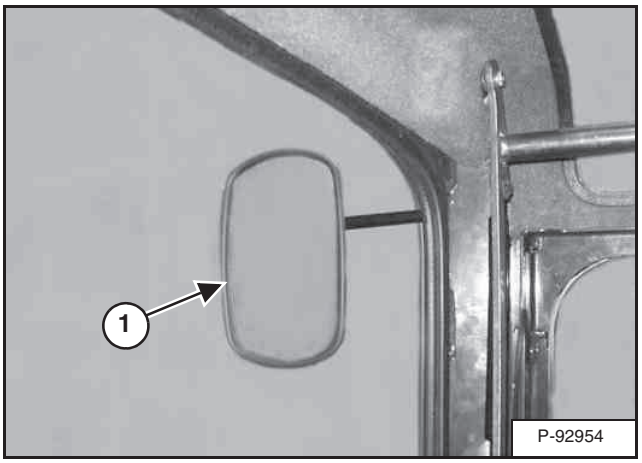
Lower the control console **[Figure 79]**.

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

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

Mirror Adjustment

Figure 80



Adjust mirrors (Item 1) **[Figure 80]** (if equipped).

STARTING THE ENGINE

Key Switch

WARNING

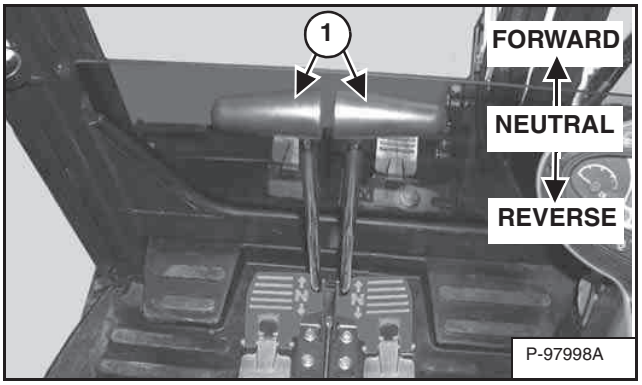
AVOID INJURY OR DEATH

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

W-2135-1108

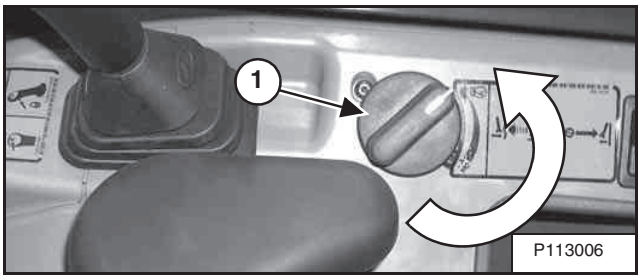
Perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page 68.)

Figure 81



Put control levers (Item 1) **[Figure 81]** in the NEUTRAL position.

Figure 82



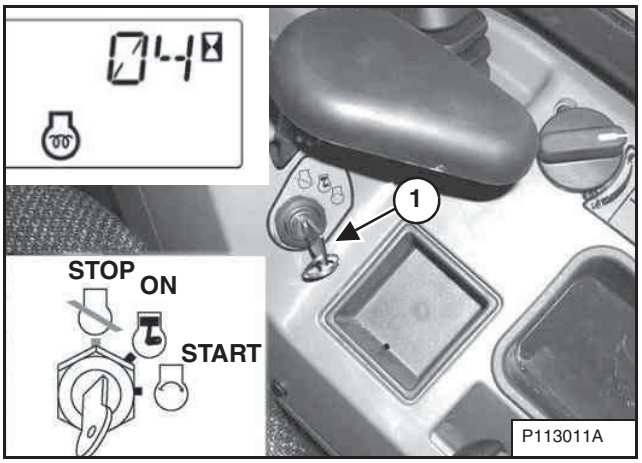
Turn the engine speed control dial (Item 1) **[Figure 82]** anticlockwise to low idle.

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 83



Turn the key (Item 1) **[Figure 83]** 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 83]**.

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

Turn the key switch OFF to stop the engine.

WARNING

AVOID INJURY OR DEATH

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

W-2050-0807

WARNING

AVOID SERIOUS INJURY OR DEATH

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

W-2051-0212

Keyless

⚠ WARNING

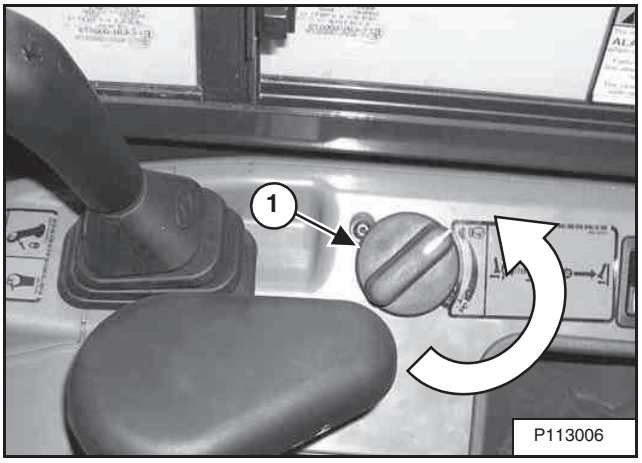
AVOID INJURY OR DEATH

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

W-2135-1108

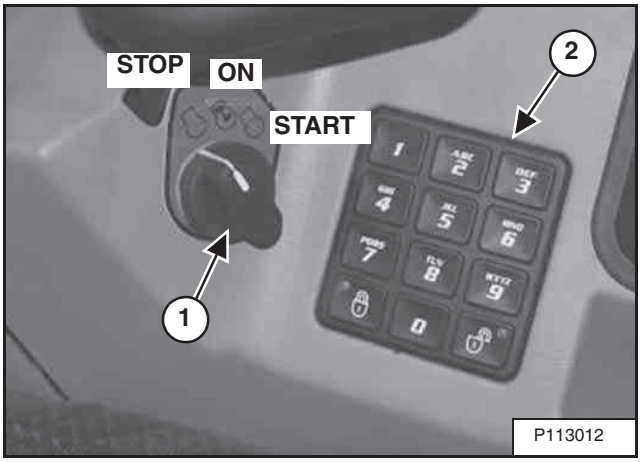
Perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page 68.)

Figure 84



Rotate the engine speed control dial (Item 1) **[Figure 84]** to low idle.

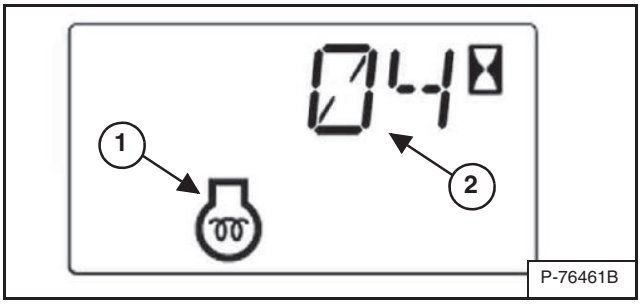
Figure 85



Turn the start switch (Item 1) **[Figure 85]** 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 85]** to enter the password.

Figure 86



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 86]** will be shown on the data display.

When the engine preheat icon goes OFF, turn the start switch (Item 1) **[Figure 85]** 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 85]** 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 198.)

Deluxe Instrument Panel

WARNING

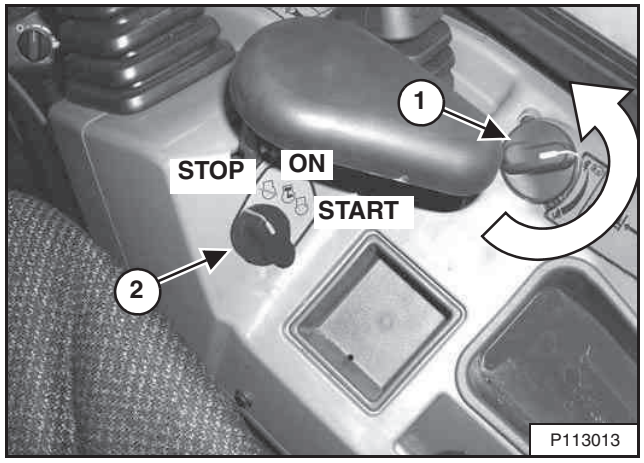
AVOID SERIOUS INJURY OR DEATH

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

W-2051-0212

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

Figure 87

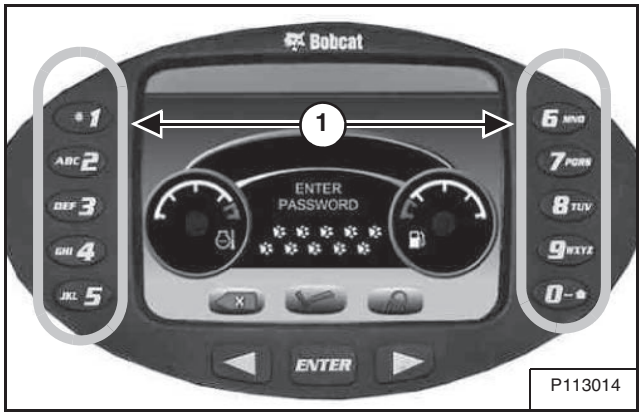


Set the engine speed control (Item 1) **[Figure 87]** to the low idle position.

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, User 1 and User 2 Password on Page 197.) 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 198.)

Figure 88



Turn the start switch (Item 2) **[Figure 87]** 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 88]** to enter the password.

Figure 89

If preheating is required, the glow plugs will automatically cycle and the engine preheat icon (Item 1) **[Figure 89]** 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 87]**.

Turn the start switch (Item 2) **[Figure 87]** 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 198.)

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 155.)
- Make sure the battery is fully charged.
- Install an engine heater.

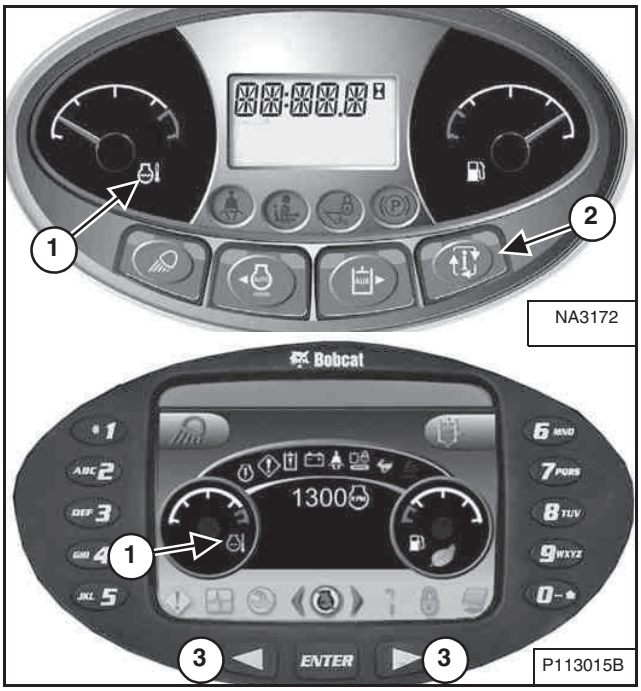
NOTE: If the battery is discharged (but not frozen) a booster battery can be used to jump start the excavator. (See Using A Booster Battery (Jump Starting) on Page 163.)

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 90



Frequently monitor the temperature and fuel gauges **[Figure 90]**.

After the engine is running, frequently monitor the instrument panel **[Figure 90]** 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 90]** is ON.

Press the Information button (Item 2) (Standard Panel) or press a scroll button (Item 3) **[Figure 90]** (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 187.)

NOTE: The optional Deluxe Instrumentation Panel offers an additional view of service codes that includes a brief description. (See DIAGNOSTIC SERVICE CODES on Page 187.)

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

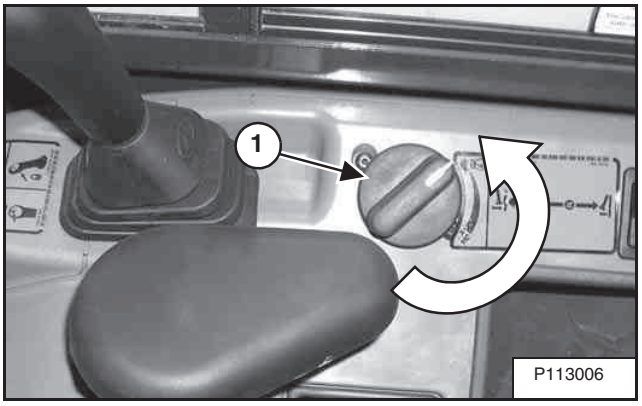
STOPPING THE ENGINE AND LEAVING THE EXCAVATOR

Procedure

Figure 91

Stop the machine on level ground. Lower the work equipment and the blade to the ground **[Figure 91]**.

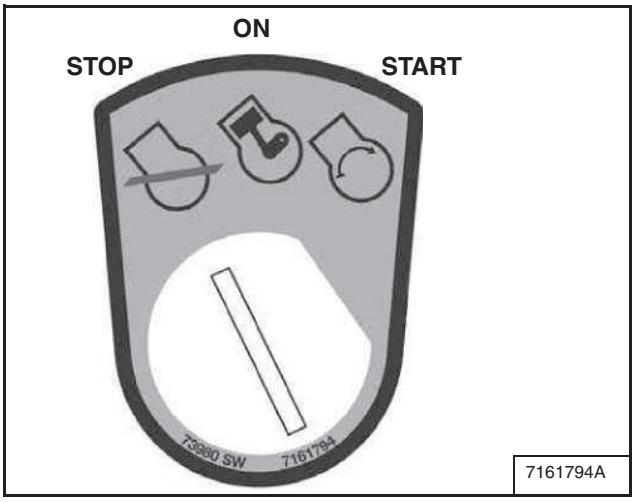
Figure 92



Rotate the engine speed control dial (Item 1) **[Figure 92]** anticlockwise to low idle.

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

Figure 93



Turn the switch to STOP **[Figure 93]**.

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

Installing And Removing The Attachment (Pin-On Attachment)

Installation

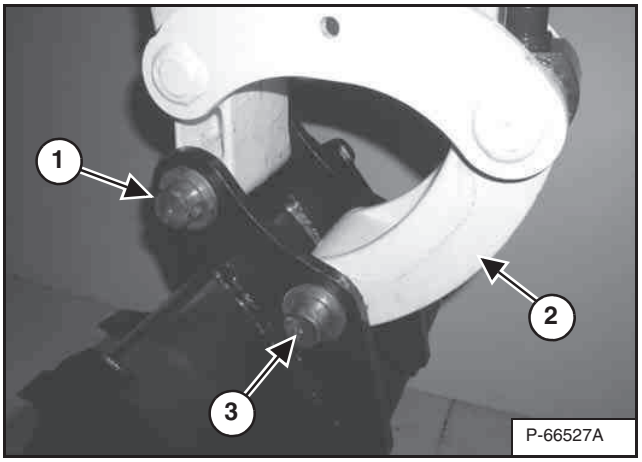
WARNING

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 94

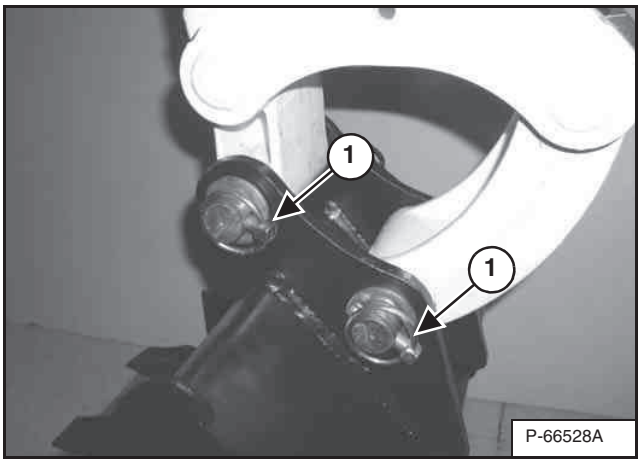


Install the arm into the bucket and align the mounting hole.

Install the pin (Item 1) **[Figure 94]** and washers.

Install the link (Item 2) in the bucket and align the mounting hole. Install the pin (Item 3) **[Figure 94]** and washers.

Figure 95



Install the two retainer pins (Item 1) **[Figure 95]**. 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 95]**.

Remove the washers and pins (Items 1 and 3) **[Figure 95]**.

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

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

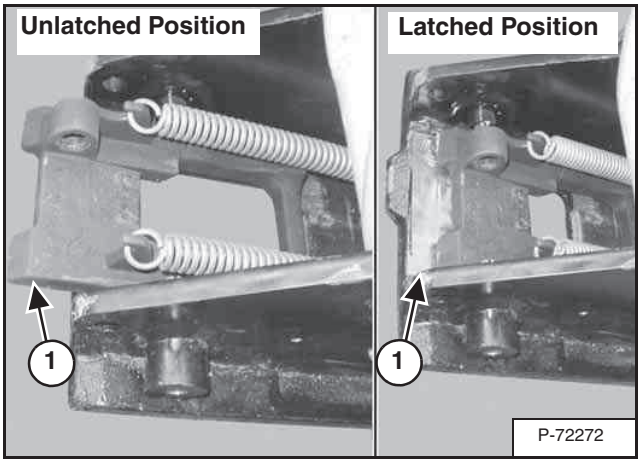
AVOID INJURY OR DEATH

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 96



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 96]**.

If in the latched position, see **[Figure 97]** for additional information.

If the latch is in the unlatched position, proceed to **[Figure 98]**.

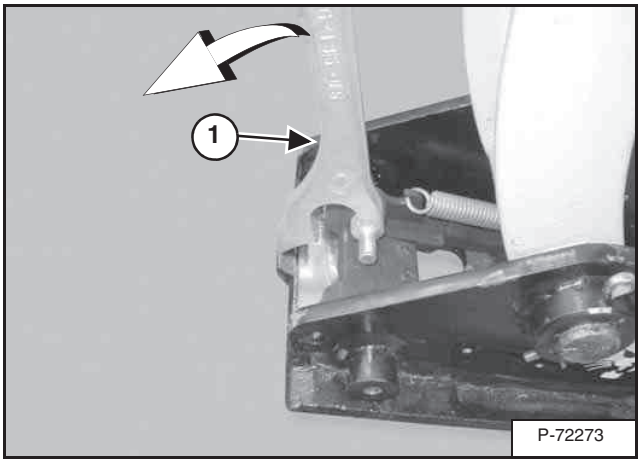
⚠ WARNING

AVOID INJURY

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

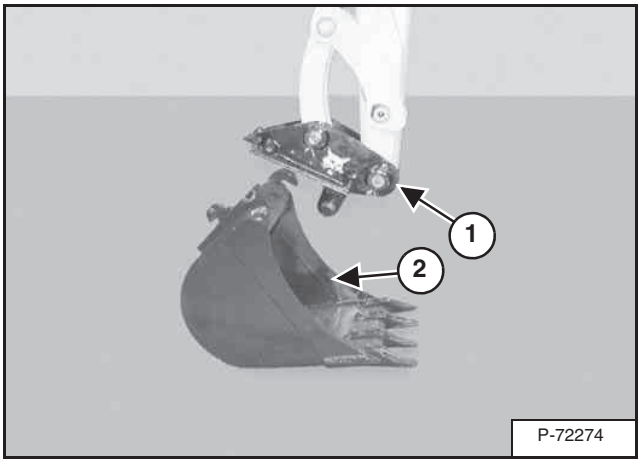
W-2541-1106

Figure 97



To unlatch the quick coupler, install the tool (Item 1) **[Figure 97]** and pull the handle. The latch will move completely forward. The latch will lock in the unlatched position.

Figure 98



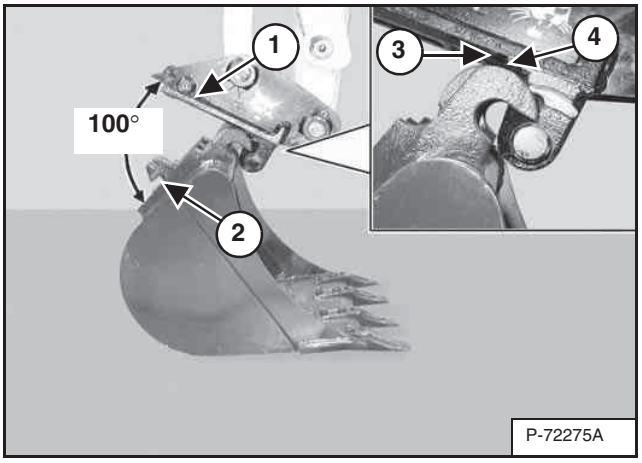
Enter the excavator, fasten the seat belt and start the engine.

Position the quick coupler (Item 1) to the attachment (Item 2) **[Figure 98]**.

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

Installation (Cont'd)

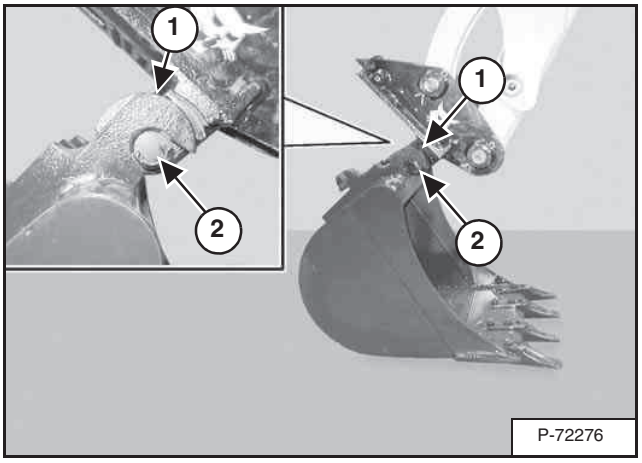
Figure 99



There must be at least 100° between the quick coupler surface (Item 1) and the attachment mounting surface (Item 2) **[Figure 99]**. Extend the arm out to get the required angle for proper installation.

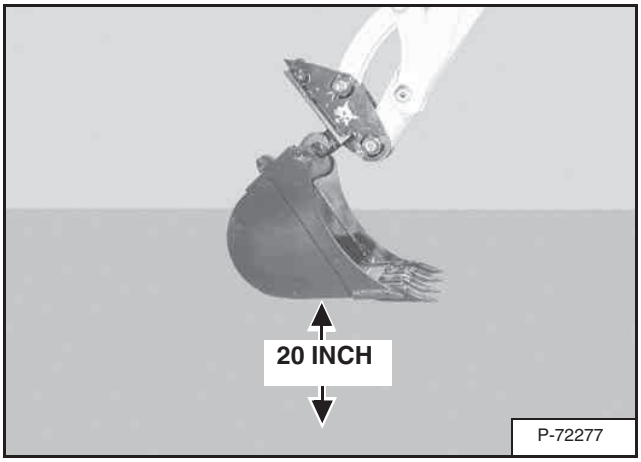
NOTE: There must be proper clearance (100° minimum) between the hook (Item 3) and the quick coupler (Item 4) [Figure 99]. Possible damage to the attachment hooks or the quick coupler could occur without proper clearance.

Figure 100



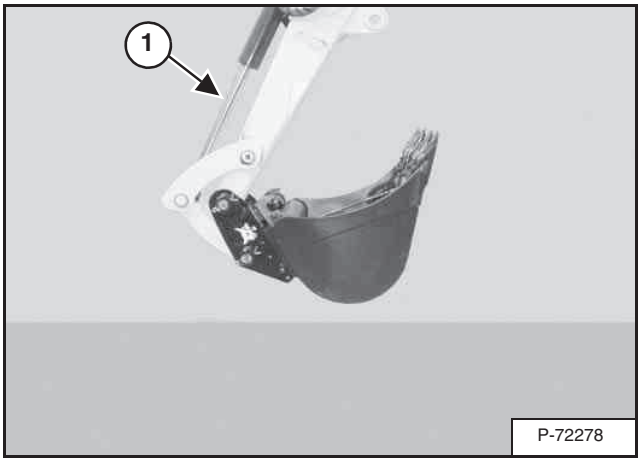
Raise the boom and extend the arm until the hooks of the attachment (Item 1) engage the pins (Item 2) of the quick coupler **[Figure 100]**.

Figure 101



Raise the boom until there is approximately 500 mm (20.0 in) of clearance between the bottom of the attachment and the ground **[Figure 101]**.

Figure 102



Extend the bucket cylinder (Item 1) **[Figure 102]** fully.

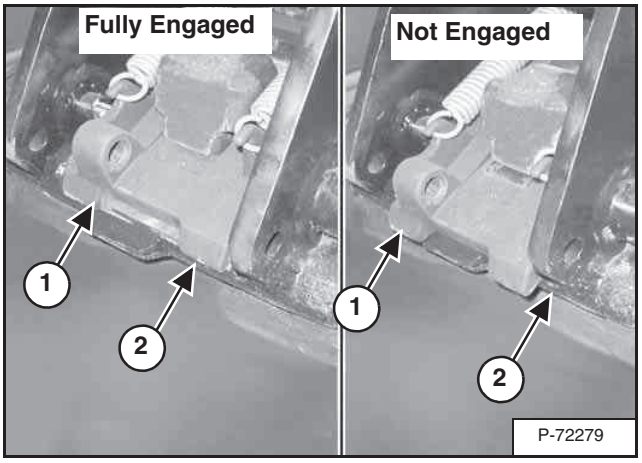
Lower the attachment until it is flat on the ground.

Stop the engine and exit the excavator.

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

Installation (Cont'd)

Figure 103



Visually inspect the quick coupler latch (Item 1) to the bucket mount (Item 2) **[Figure 103]**. The latch must be fully engaged.

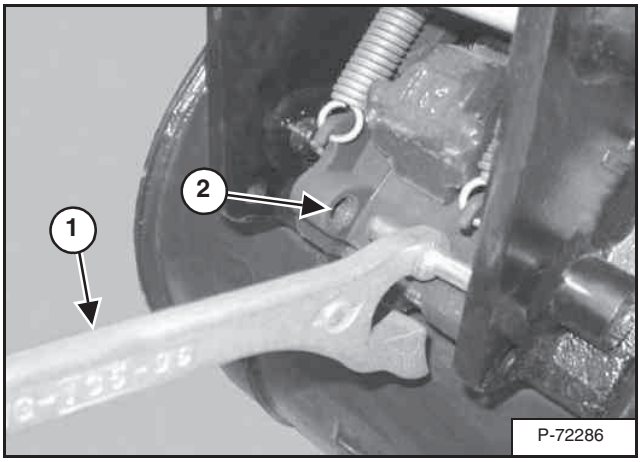
⚠ WARNING

AVOID INJURY

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

W-2541-1106

Figure 104



If the latch is not engaged, install the tool (Item 1) in the hole (Item 2) **[Figure 104]** 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 103]** 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 Inspection And Maintenance on Page 177.)

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

Removal

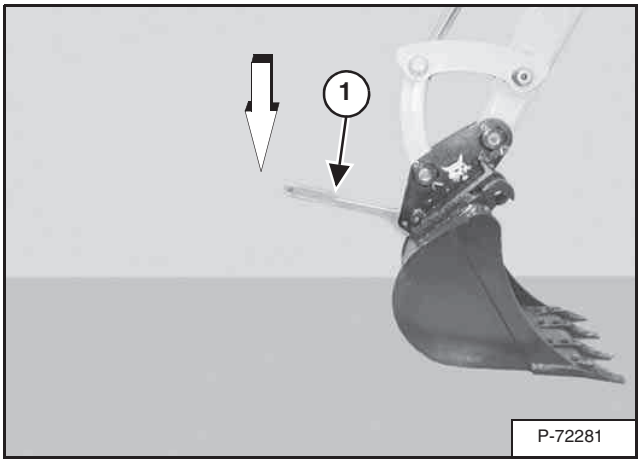
⚠ WARNING

AVOID INJURY

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

W-2541-1106

Figure 105



Position the attachment flat on the ground.

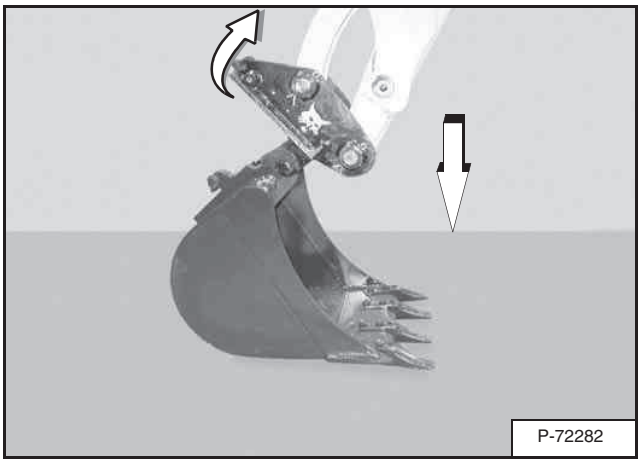
Install the quick coupler tool (Item 1) into the hole (Item 2) **[Figure 104]** in the quick coupler.

Push down on the tool (Item 1) **[Figure 105]** to unlock the latch.

Remove the tool.

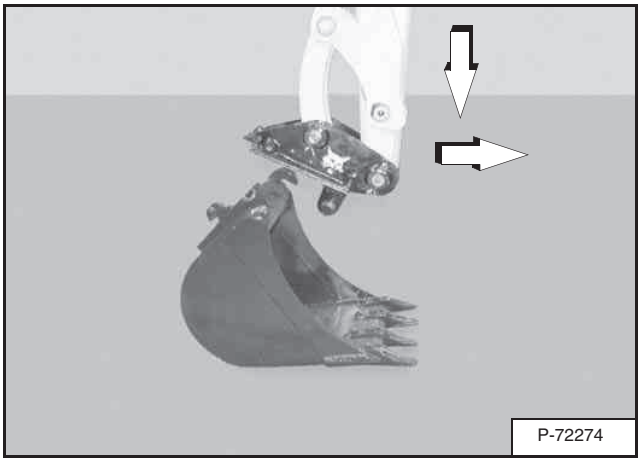
Enter the excavator, fasten the seat belt and start the engine.

Figure 106



Retract the bucket cylinder fully and lower the boom **[Figure 106]** until the attachment is on the ground.

Figure 107



Continue to lower the boom and move the arm towards the excavator until the quick coupler is clear of the attachment **[Figure 107]**.

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 Lift Capacity on Page 94.).

For the rated lift capacity charts, (See Rated Lift Capacity - Canopy Model With Standard Arm on Page 208.), (See Rated Lift Capacity - Cab Model With Standard Arm on Page 211.) (See Rated Lift Capacity - Canopy Model With Standard Arm W/Counterweight on Page 209.), (See Rated Lift Capacity - Cab Model With Standard Arm W/Counterweight on Page 212.), (See Rated Lift Capacity - Canopy Model With Long Arm on Page 210.), or (See Rated Lift Capacity - Cab Model With Long Arm on Page 213.)

See you 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.).

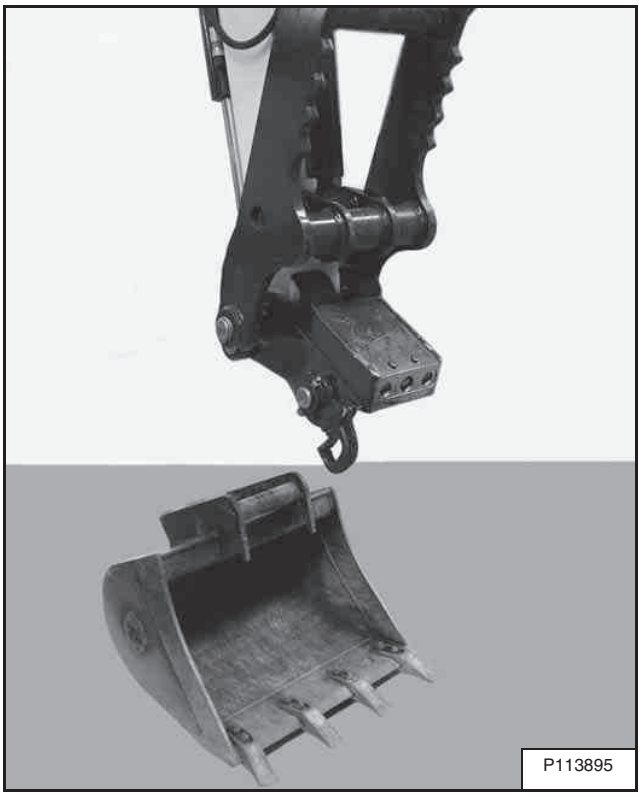
⚠ WARNING

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 108



Position the arm and quick coupler to the attachment **[Figure 108]**.

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.

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

Installation (Cont'd)

Figure 109

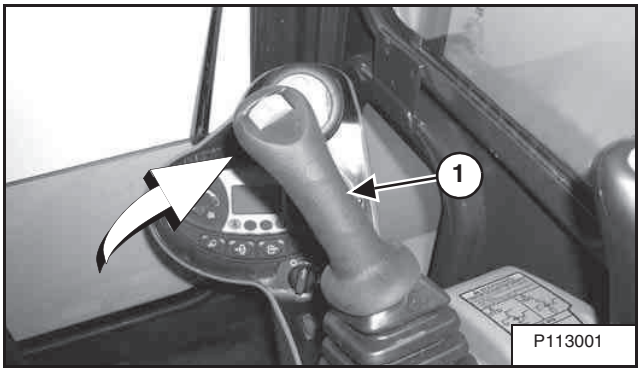
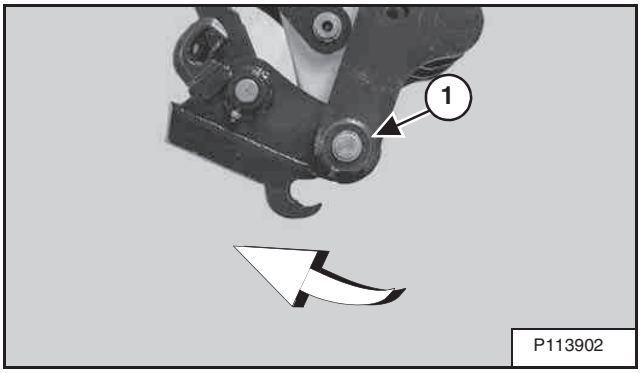


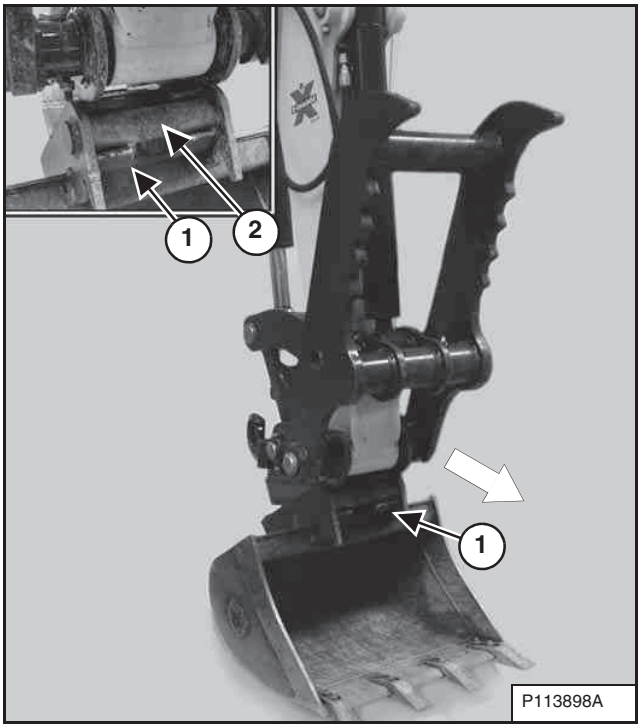
Figure 110



Move the right joystick (Item 1) **[Figure 109]** to the right (IN) and curl the coupler (Item 1) **[Figure 110]** back away from the cab fully.

Lower the coupler onto the attachment.

Figure 111



Engage the coupler hooks (Item 1) onto the attachment shaft (Item 2) **[Figure 111]**.

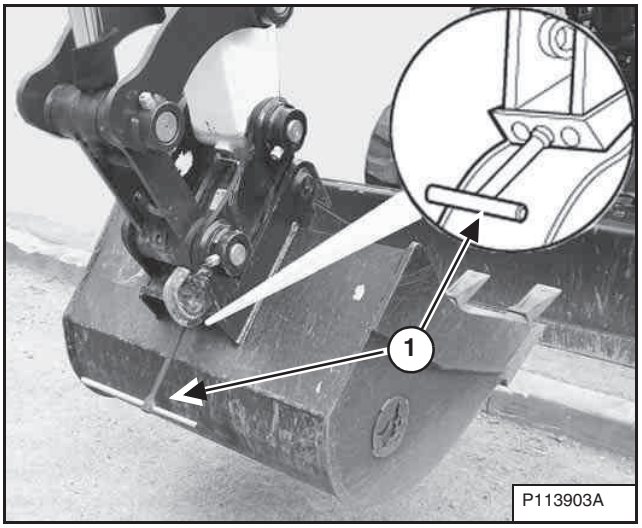
Figure 112

Move the right joystick (Item 1) **[Figure 109]** to the left (OUT) and curl the coupler (Item 1) **[Figure 112]** toward the cab fully.

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

Installation (Cont'd)

Figure 113



Stop the engine and leave the machine. (See STOPPING THE ENGINE AND LEAVING THE EXCAVATOR on Page 76.)

Use the supplied wrench (Item 1) **[Figure 113]** and turn the wrench clockwise until the locking pins fully engaged.

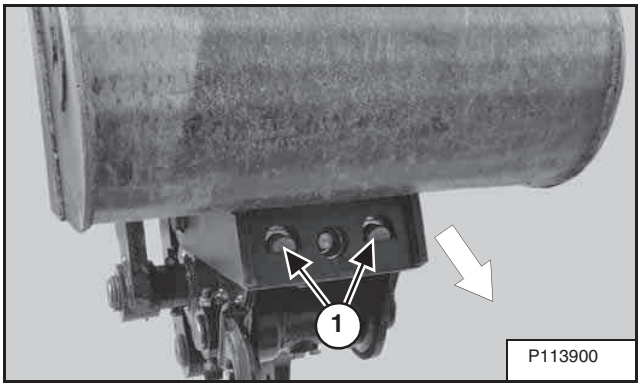
⚠ WARNING

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 114



Visually check that the locking pins (Item 1) **[Figure 114]** 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.

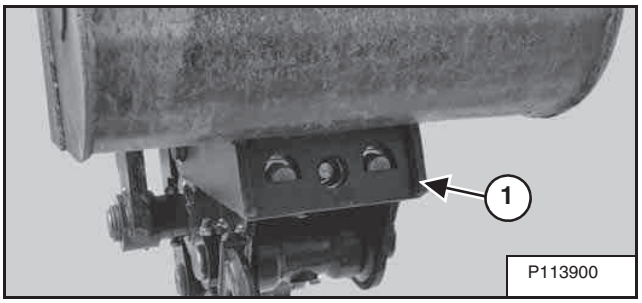
Park the excavator on a level surface.

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 115

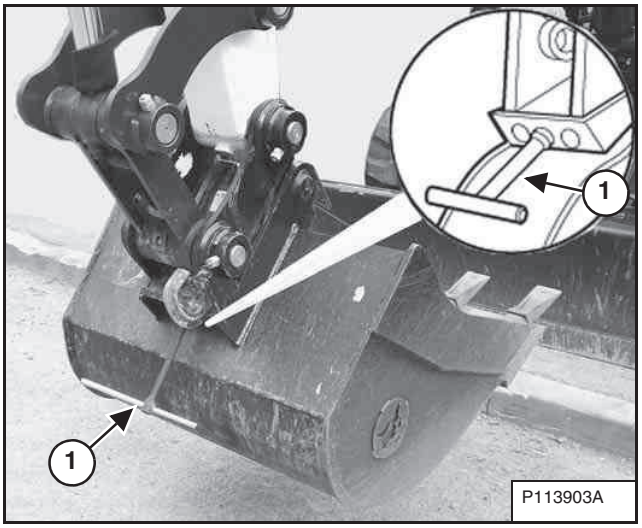


Raise the boom.

Move the right joystick (Item 1) **[Figure 109]** to the left (IN) and curl the coupler (Item 1) **[Figure 115]** toward the cab fully.

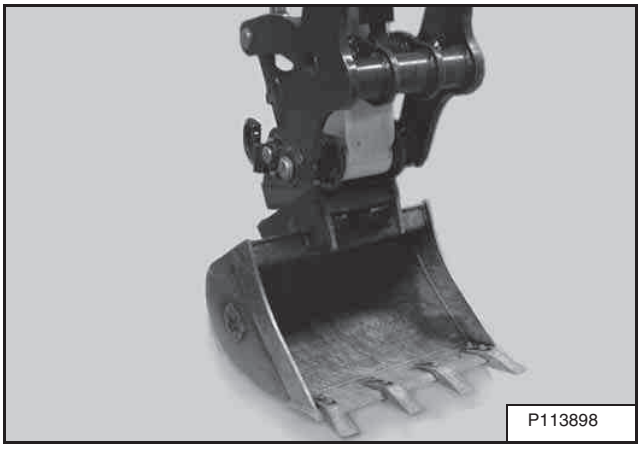
Stop the engine and exit the excavator. (See STOPPING THE ENGINE AND LEAVING THE EXCAVATOR on Page 76.)

Figure 116



Use the supplied wrench (Item 1) **[Figure 116]** and turn the wrench anticlockwise until the locking pins are fully disengaged.

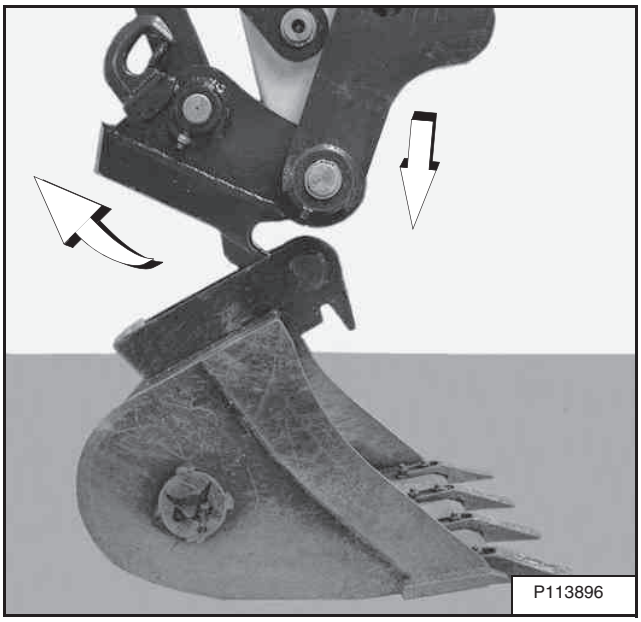
Figure 117



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 117]**.

Figure 118



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 118]**.

Move the arm away from the attachment.

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 Lift Capacity on Page 94.).

For the rated lift capacity charts, (See Rated Lift Capacity - Canopy Model With Standard Arm on Page 208.), (See Rated Lift Capacity - Cab Model With Standard Arm on Page 211.) (See Rated Lift Capacity - Canopy Model With Standard Arm W/Counterweight on Page 209.), (See Rated Lift Capacity - Cab Model With Standard Arm W/Counterweight on Page 212.), (See Rated Lift Capacity - Canopy Model With Long Arm on Page 210.), or (See Rated Lift Capacity - Cab Model With Long Arm on Page 213.).

See you 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

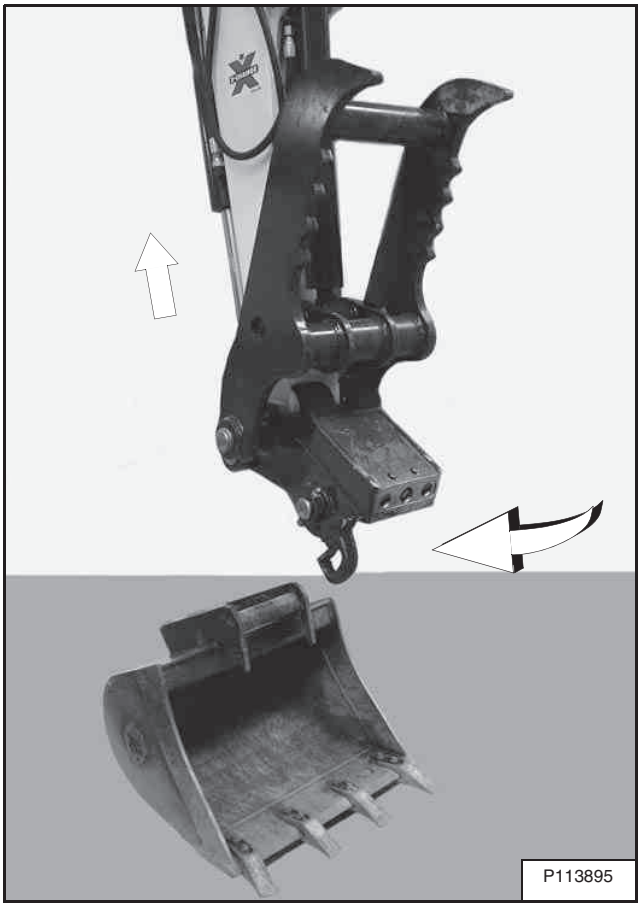
⚠ WARNING

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

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

Figure 119



Position the arm and quick coupler to the attachment **[Figure 119]**.

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.

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

Installation (Cont'd)

⚠ 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

Figure 120

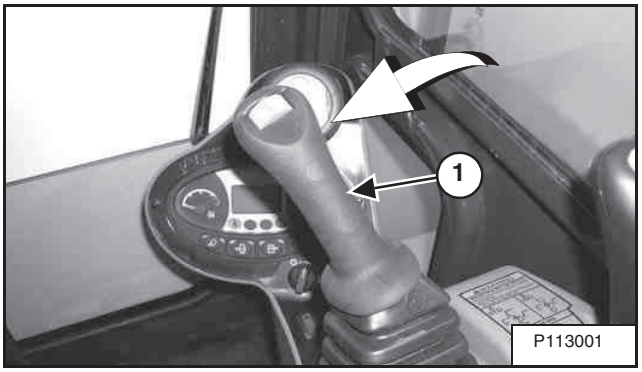
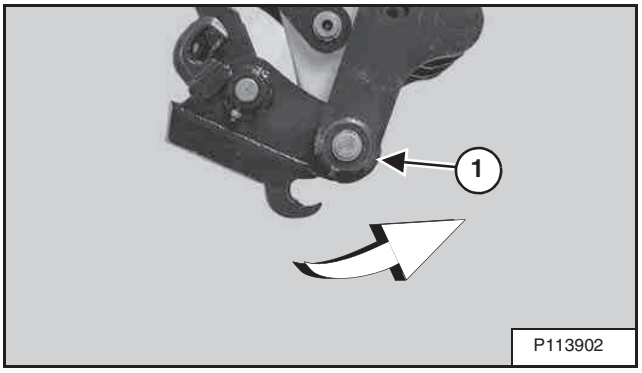
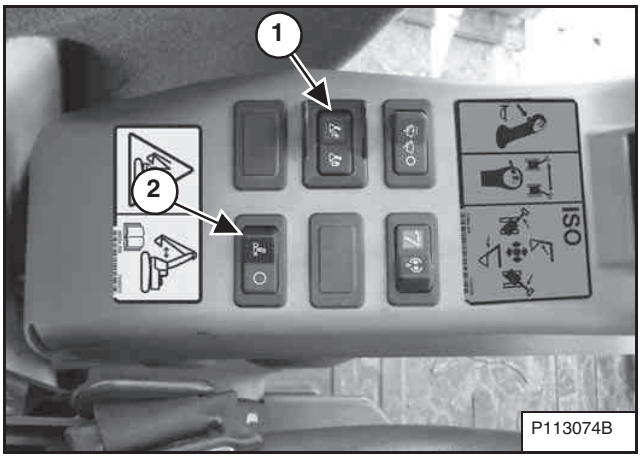


Figure 121



Move the right joystick (Item 1) **[Figure 120]** to the left (IN) and curl the coupler (Item 1) **[Figure 121]** toward the cab fully.

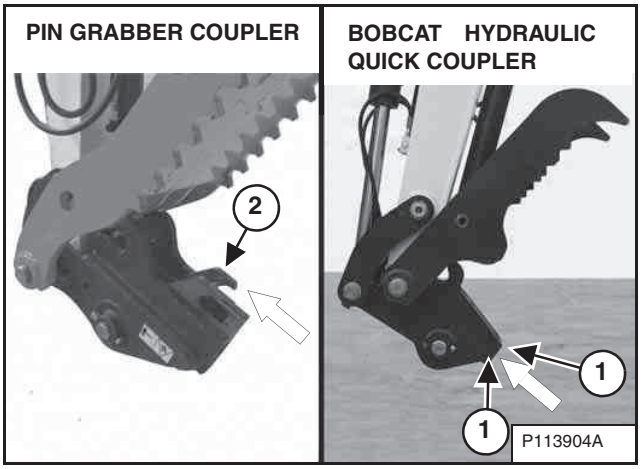
Figure 122



Press the coupler ON / OFF switch (Item 1) **[Figure 122]** 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 120]** to the left (IN), press and release the INTENT switch (Item 2) within five seconds after pressing the ON / OFF switch (Item 1). (The buzzer will continue to sound and the light (Item 1) **[Figure 122]** will stay ON.)

Figure 123

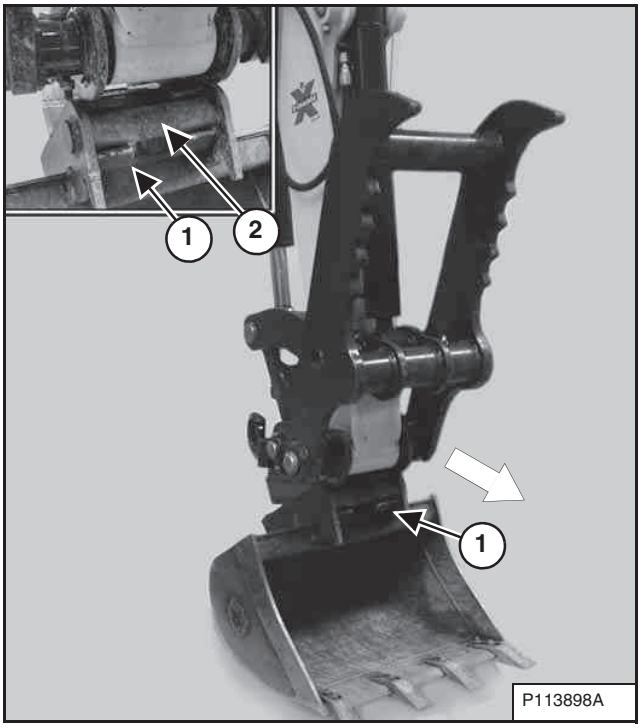


Continue holding the right joystick (Item 1) **[Figure 120]** to the left (IN) until the pins (Item 1) **[Figure 123]** are fully retracted or the locking clasp (Item 2) **[Figure 123]** is fully retracted.

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

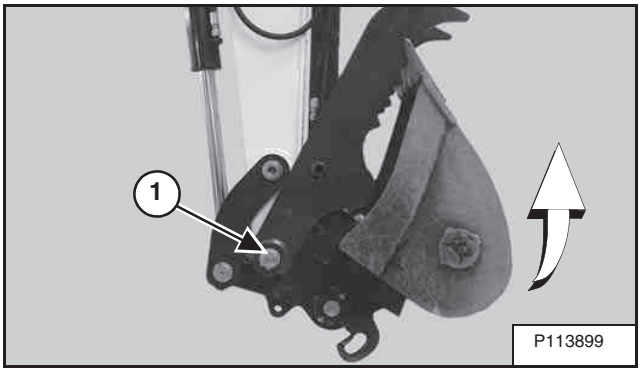
Installation (Cont'd)

Figure 124



Roll the coupler out. Move the arm toward the attachment. Reposition the boom, arm and coupler until the coupler (Item 1) is position over the attachment pin (Item 2) **[Figure 124]**. Raise the attachment up slightly.

Figure 125



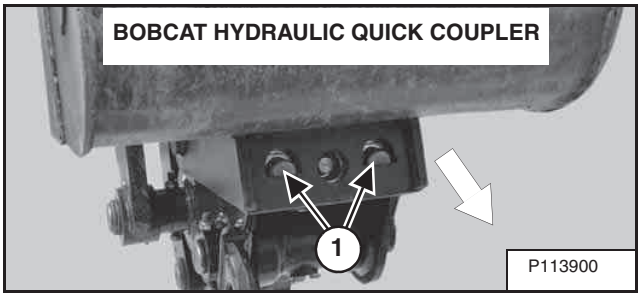
Curl the quick coupler in fully **[Figure 125]**.

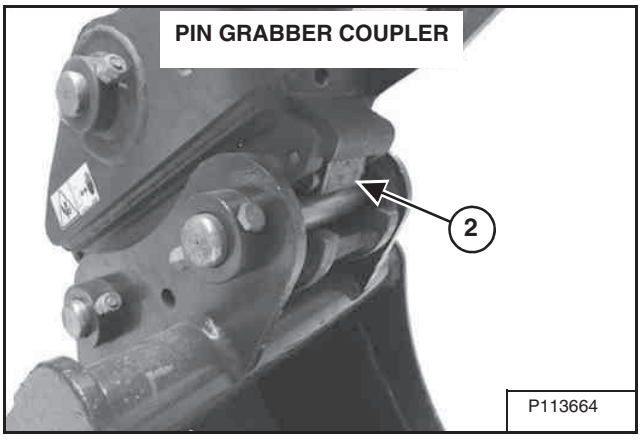
Press the coupler ON / OFF switch (Item 1) **[Figure 122]** to the right, (OFF) position. The switch light and buzzer will turn OFF.

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 126





For the Hydraulic German Style Coupler; Visually check that the locking pins (Item 1) **[Figure 126]** 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 126]** 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

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 127

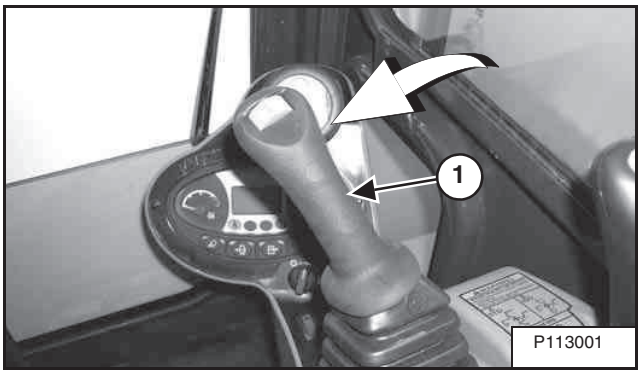
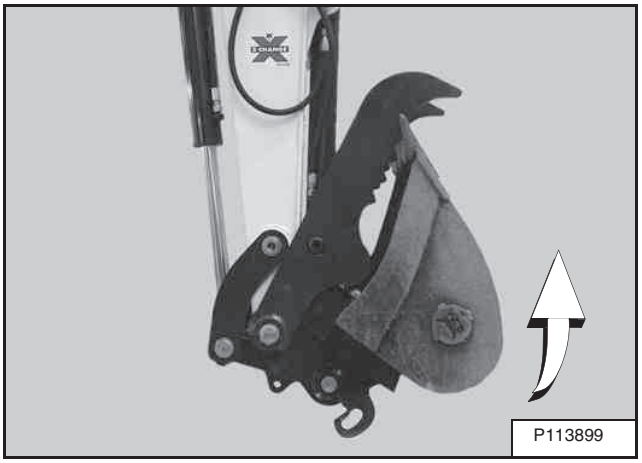


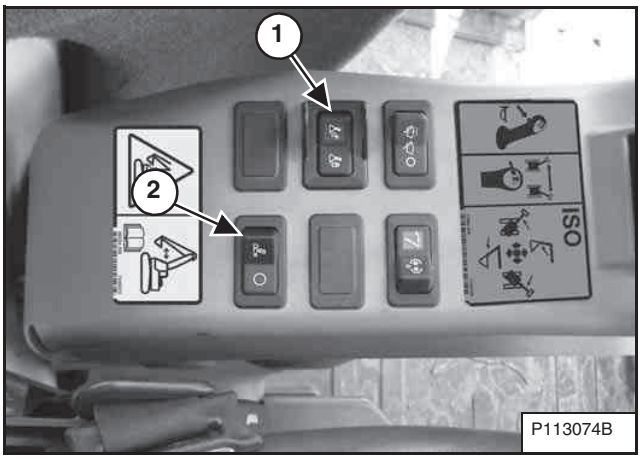
Figure 128



Raise the attachment slightly off of the ground.

Move the right joystick (Item 1) **[Figure 127]** to the left (IN) and curl the quick coupler (Item 1) **[Figure 128]** fully.

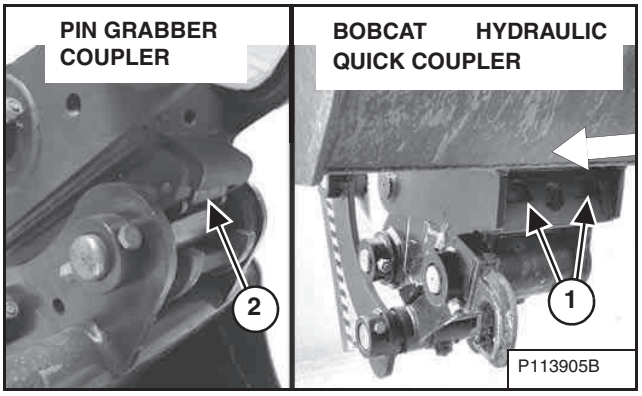
Figure 129



Press the coupler ON / OFF switch (Item 1) **[Figure 129]** 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 127]** to the left (IN), press and release the INTENT switch (Item 2) within five seconds after pressing the ON/OFF switch (Item 1). (The buzzer will continue to sound and the light (Item 1) **[Figure 129]** will stay ON.)

Figure 130



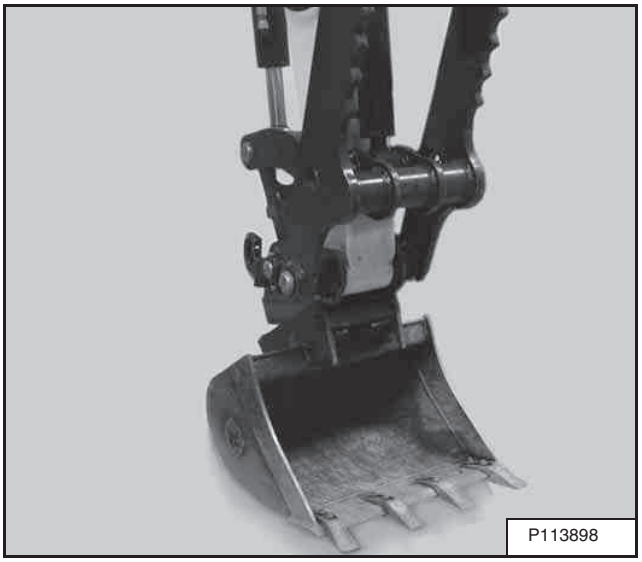
For the Hydraulic German Style Coupler; Continue holding the right joystick (Item 1) **[Figure 127]** to the left (IN) until the pins (Item 1) **[Figure 130]** are fully retracted to unlock the attachment from the quick coupler.

For the Pin Grabber Quick Coupler; Continue holding the right joystick (Item 1) **[Figure 127]** to the left (IN) until the green locking clasp (Item 2) **[Figure 127]** retracts and will unlock the attachment from the quick coupler.

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

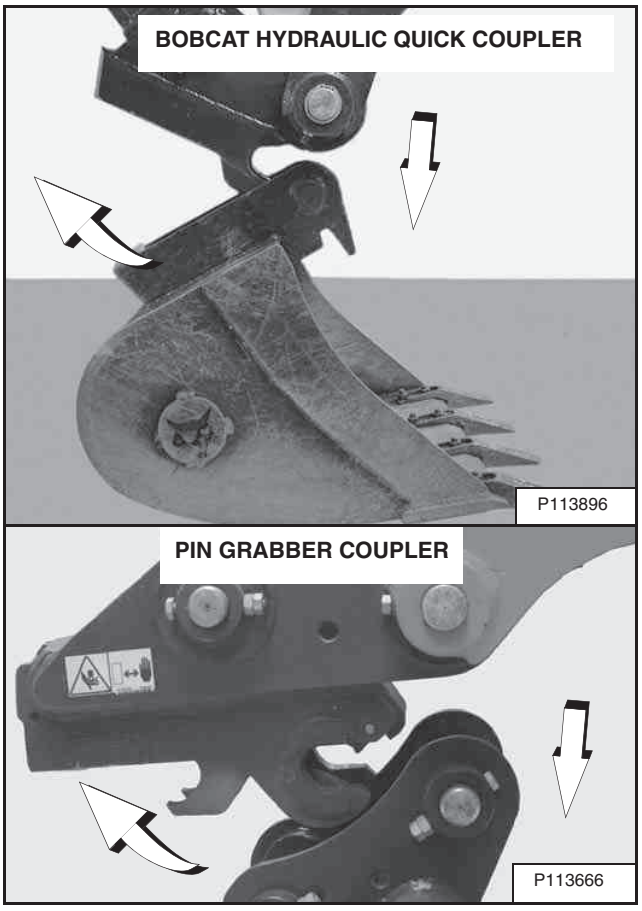
Removal (Cont'd)

Figure 131



With the attachment slightly off of the ground, roll the quick coupler back until the coupler starts to disengage from the attachment **[Figure 131]**.

Figure 132

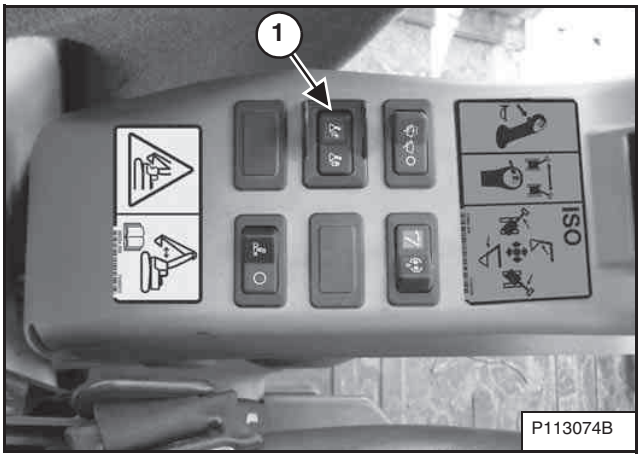


Roll the quick coupler back fully.

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 the excavator until the quick coupler is clear of the attachment **[Figure 132]**.

Figure 133



Press the coupler ON / OFF switch (Item 1) **[Figure 133]** to the right, (OFF) position. The switch light and buzzer will turn OFF.

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.

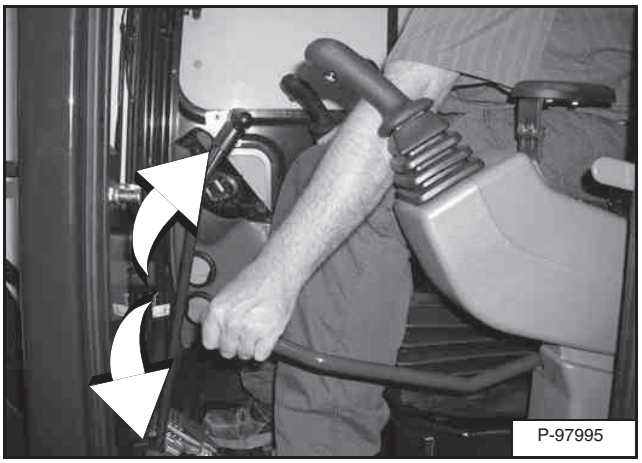
Lowering The Work Equipment (Engine STOPPED)

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 134



The joystick lock switch disengages the hydraulic control functions from the joysticks when the console are raised **[Figure 134]**.

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 134]**.

Object Handling With The Lifting Device

The excavator must be equipped with the optional lift eye link (Item 1) **[Figure 136]**, 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.**

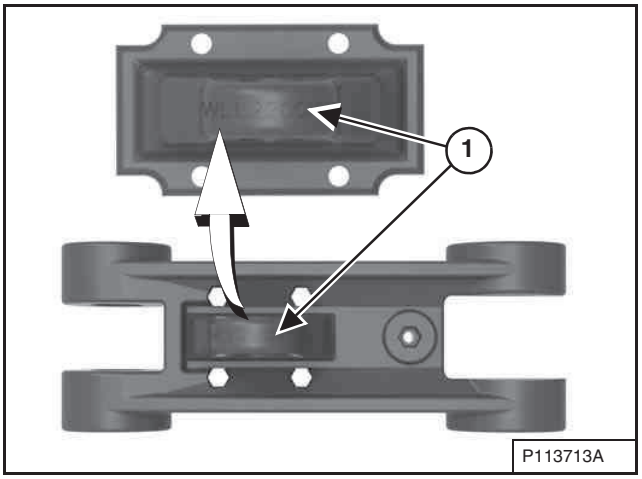
W-2991-0714

NOTE: The lifting device maybe present on the attachment quick coupler. Always use for object handling, only couplers with the lifting device of sufficient capacity (Rated Lift Load).

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 - Canopy Model With Standard Arm on Page 208.), (See Rated Lift Capacity - Canopy Model With Standard Arm W/Counterweight on Page 209.), (See Rated Lift Capacity - Canopy Model With Long Arm on Page 210.), (See Rated Lift Capacity - Cab Model With Standard Arm on Page 211.), (See Rated Lift Capacity - Cab Model With Standard Arm W/Counterweight on Page 212.) or (See Rated Lift Capacity - Cab Model With Long Arm on Page 213.).

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

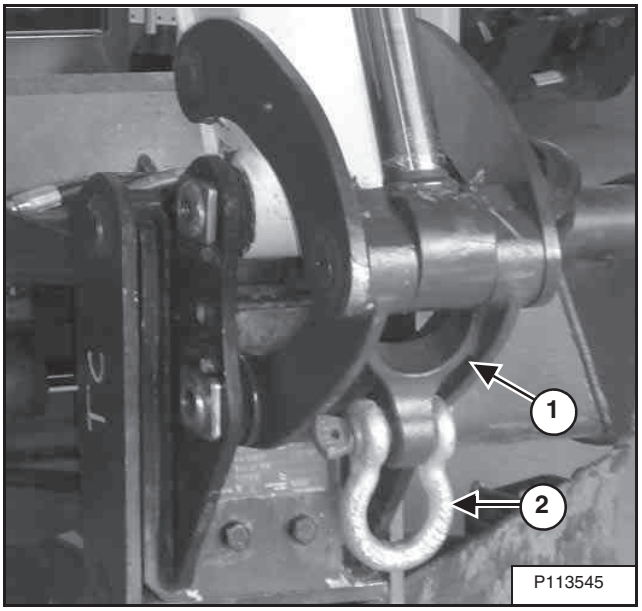
Figure 135



The maximum RLL (Item 1) **[Figure 135]** is shown on the lifting device.

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 76.)

Figure 136

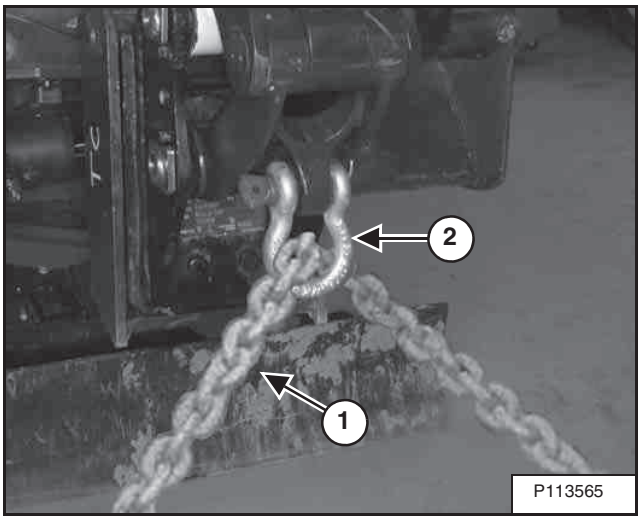


Install the clevis (Item 2) through the lift eye (Item 1) **[Figure 136]**.

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

Object Handling With The Lifting Device

Figure 137



Install a lift chain (Item 1) (or other type of lifting device) through the clevis (Item 2) **[Figure 137]** and connect to the object to be lifted.

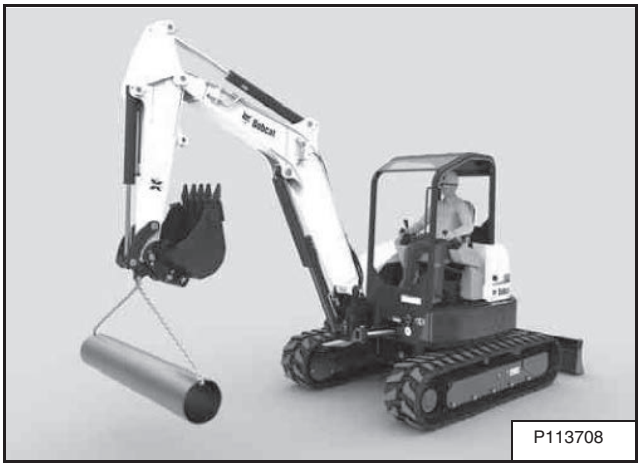
NOTE: Always use chains or other types of lifting devices that are intended for this type of use and that are of adequate strength for the object being lifted.

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

Figure 138

Press the switch (Item 1) **[Figure 138]** to the left to activate the overload warning device.

Figure 139



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 139]**.

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.

Lift Capacity

The lifting capacities were calculated with a machine that was equipped with a standard bucket. The difference between the weight of the attachment and the standard bucket, the quick coupler (if equipped), and the hydraulic clamp (if equipped) must be subtracted.

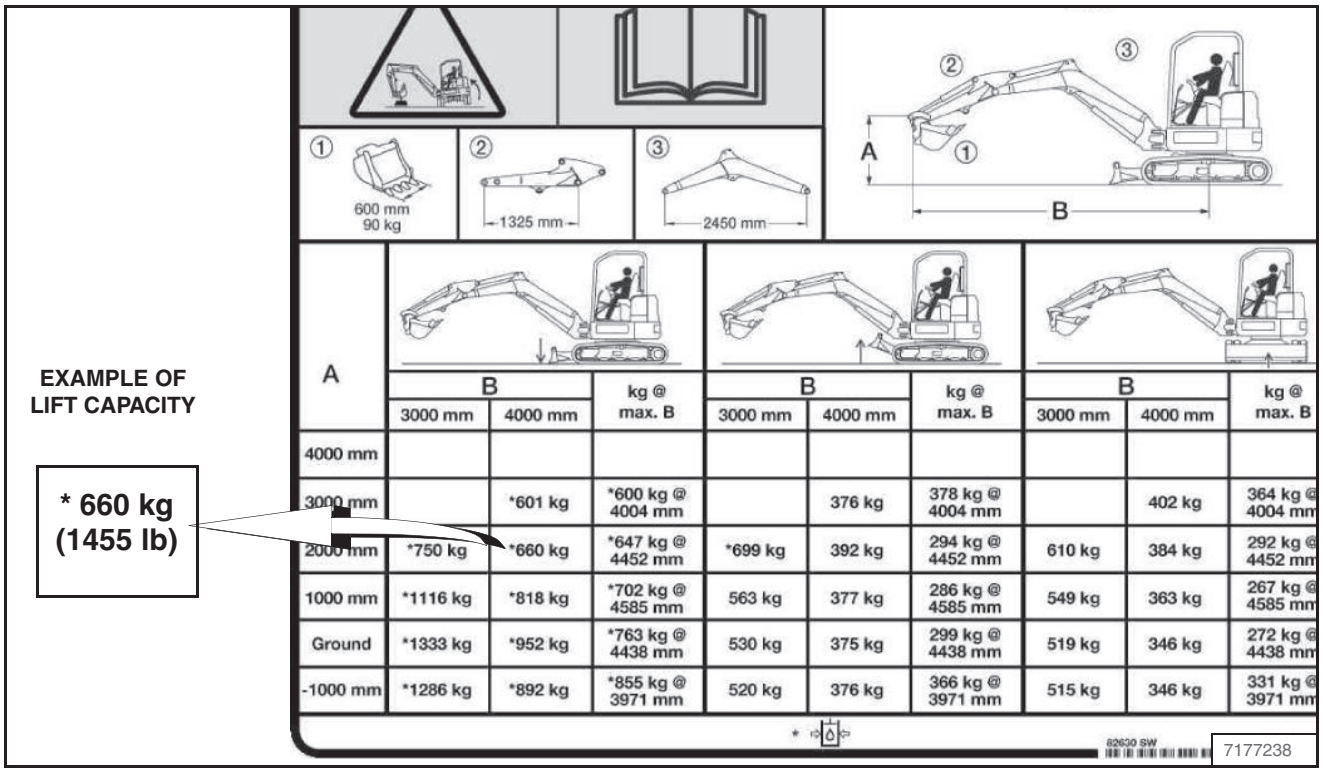
⚠ WARNING

AVOID INJURY OR DEATH

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

W-2374-0500

Figure 140



A	B		kg @ max. B	B		kg @ max. B	B		kg @ max. B
	3000 mm	4000 mm		3000 mm	4000 mm		3000 mm	4000 mm	
4000 mm									
3000 mm		*601 kg	*600 kg @ 4004 mm		376 kg	378 kg @ 4004 mm		402 kg	364 kg @ 4004 mm
2000 mm	*750 kg	*660 kg	*647 kg @ 4452 mm	*699 kg	392 kg	294 kg @ 4452 mm	610 kg	384 kg	292 kg @ 4452 mm
1000 mm	*1116 kg	*818 kg	*702 kg @ 4585 mm	563 kg	377 kg	286 kg @ 4585 mm	549 kg	363 kg	267 kg @ 4585 mm
Ground	*1333 kg	*952 kg	*763 kg @ 4438 mm	530 kg	375 kg	299 kg @ 4438 mm	519 kg	346 kg	272 kg @ 4438 mm
-1000 mm	*1286 kg	*892 kg	*855 kg @ 3971 mm	520 kg	376 kg	366 kg @ 3971 mm	515 kg	346 kg	331 kg @ 3971 mm

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.

The standard equipment weights used when determining lift capacity are as follows:
Standard Bucket = 90 kg (198 lb)

The following lists the weight of the optional quick couplers and hydraulic clamp:

- Klac™ Quick Coupler = 24 kg (53 lb)
- German Style Coupler = 35 kg (77 lb)
- Hydraulic Pin Grabber Coupler HPG2 = 35 kg (77 lb)
- Hydraulic Clamp And Cylinder = 65 kg (143 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.

Lift Capacity (Cont'd)

The following is an example for determining the lift capacity using the sample chart shown above **[Figure 140]**.

- Machine Position: Over Blade, Blade Down
- Lift Radius: 4000 mm (125.5 in)
- Lift Point Height: 2000 mm (78.7 in)

- Hydraulic Clamp and Cylinder (Long and Standard)
- Standard Bucket

1. Obtain Lift Capacity from Chart: 581 kg (1281 lb)

2. Subtract the difference between the weight of the standard configuration (with Standard Bucket) and optional equipment which in this case is the Hydraulic Clamp.

Hydraulic Clamp and Cylinder: 65 kg (143 lb)

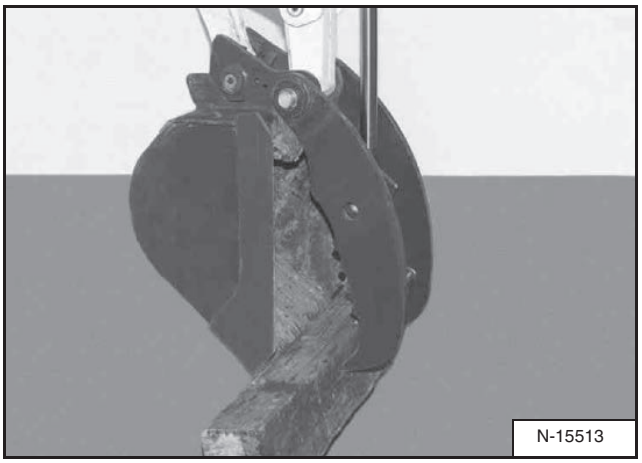
3. Calculate actual Lift Capacity for machine as configured:

660 kg (1455 lb) (lift capacity) - 65 kg (143 lb) (hydraulic clamp and cylinder) = 595 kg (1312 lb)

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

Using The Clamp

Figure 141



The optional lifting clamp attachment gives the excavator a wider range of use and mobility for debris removal **[Figure 141]**.

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

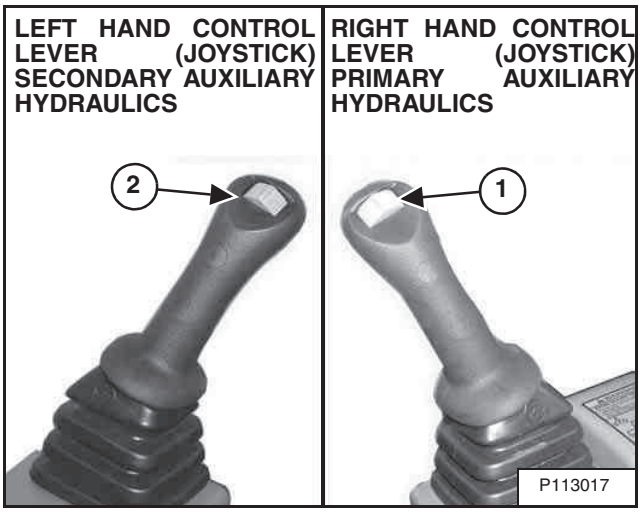
The lift capacities are reduced by 122 kg (270 lb) if the excavator is equipped with the optional lifting clamp.

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

When Using Primary Auxiliary Hydraulics To Activate Clamp

Engage the auxiliary hydraulics and toggle to the Aux2 setting. (See Auxiliary Hydraulics - Standard Instrument Panel on Page 56.) or (See Auxiliary Hydraulics - Deluxe Instrument Panel on Page 57.)

Figure 142



Move the switch (Item 1) **[Figure 142]** on the right control lever to the right to open the clamp. Move the switch to the left to close the clamp.

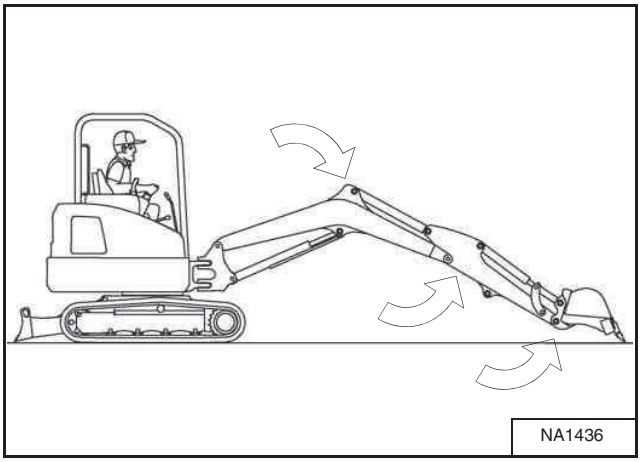
When Using Secondary Auxiliary Hydraulics To Activate Clamp

Move the switch (Item 2) **[Figure 142]** on the left control lever to the left open the clamp. Move the switch to the right to close the clamp.

Excavating

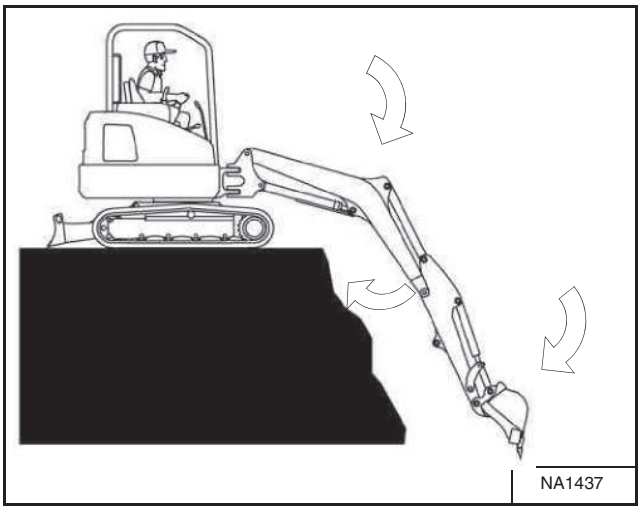
Lower the blade to increase digging performance.

Figure 143



Extend the arm, lower the boom, and open the bucket **[Figure 143]**.

Figure 144



Retract the arm, while lowering boom and curling the bucket **[Figure 144]**.

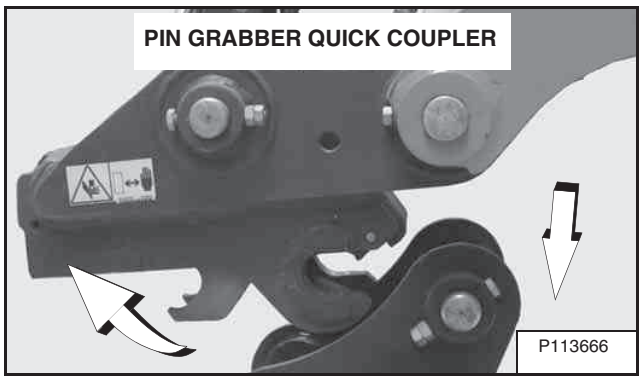
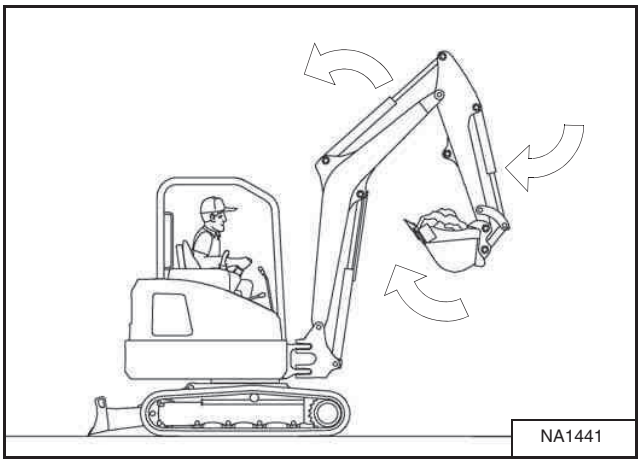


Figure 145



Raise the boom, retract the arm and curl the bucket **[Figure 145]**.

Rotate the upperstructure.

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

⚠ WARNING

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

W-2119-0910

⚠ WARNING

AVOID INJURY OR DEATH

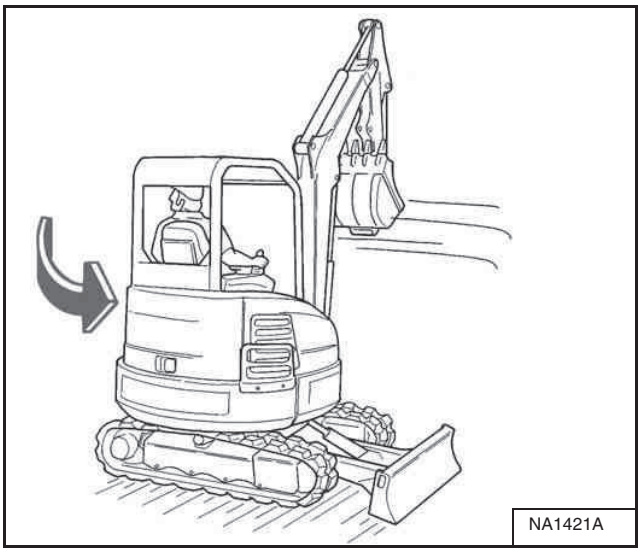
Check area to be excavated for overhead or underground electrical power lines. Keep a safe distance from electrical power lines.

VOLTAGE	MINIMUM DISTANCE
up to 50 kV	3 m (10 ft)
beyond 50 kV	5 m (17 ft)

W-2757-EN-0513

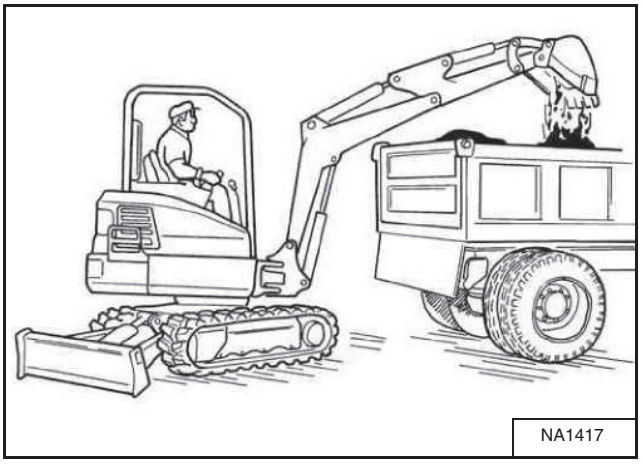
Excavating (Cont'd)

Figure 146



Look in the direction of rotation and make sure there are no bystanders in the work area before rotating the upperstructure **[Figure 146]**.

Figure 147



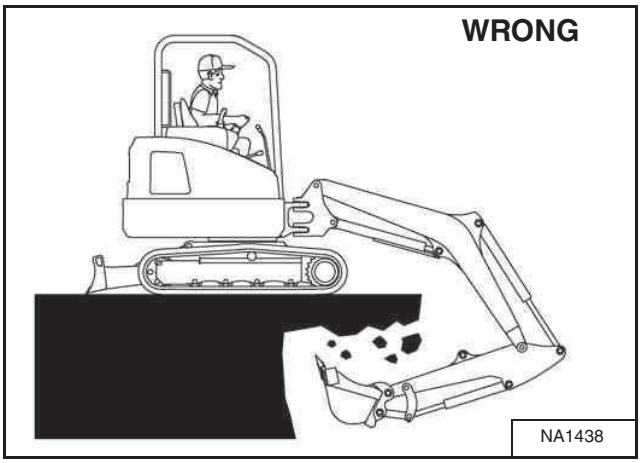
Extend the arm and uncurl the bucket to dump the material into a pile or truck **[Figure 147]**.

IMPORTANT

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

I-2220-0503

Figure 148



Do not dig under the excavator **[Figure 148]**.

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

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

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

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

Boom Swing

Figure 149

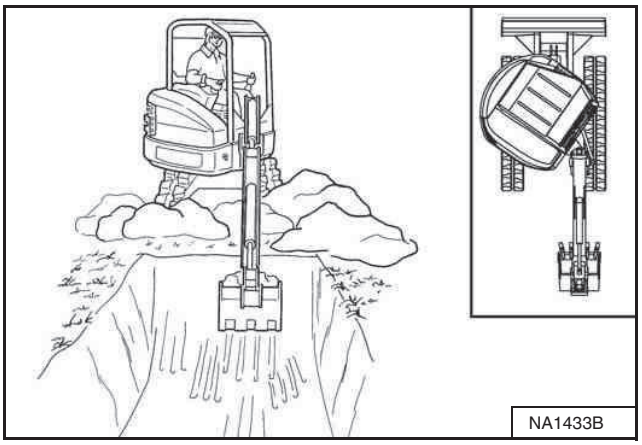


Figure 150

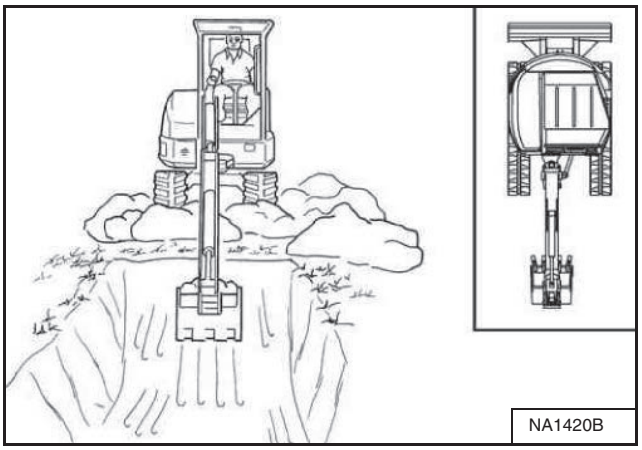
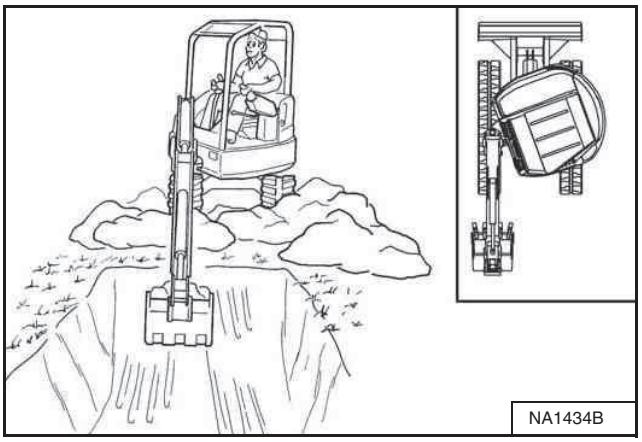


Figure 151



Slew the upperstructure, swing the boom to the right **[Figure 149]**, centre **[Figure 150]** and left **[Figure 151]** to dig a square hole the width of the machine without repositioning the excavator.

Figure 152

The boom swing allows the operator to offset the boom and dig close to buildings and other structures **[Figure 152]**.

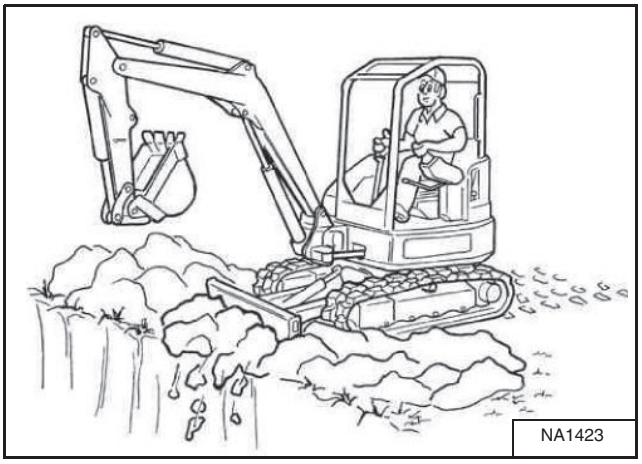
Backfilling

IMPORTANT

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

I-2256-0507

Figure 153



Use the blade to backfill the trench or hole after excavating **[Figure 153]**.

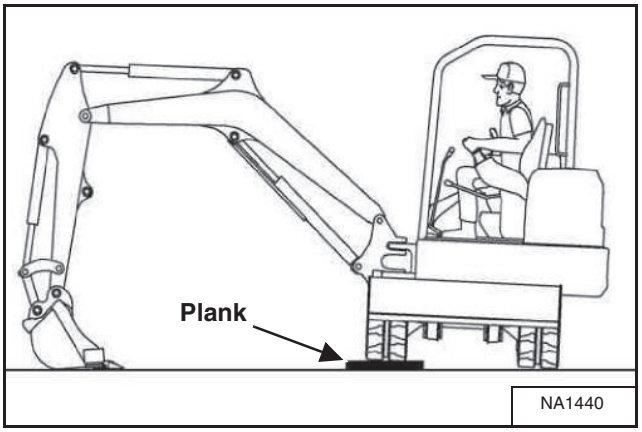
Driving The Excavator

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.

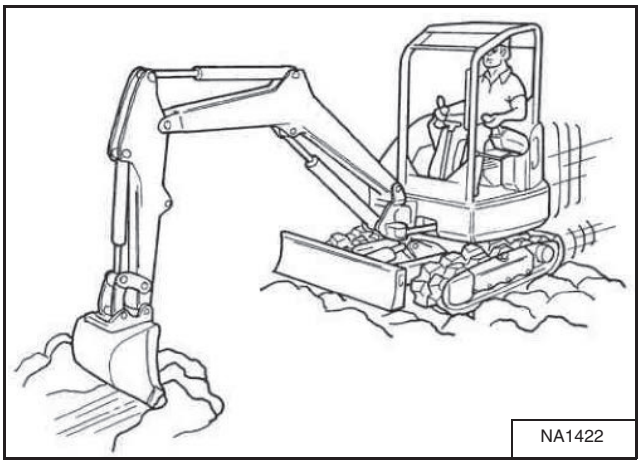
Figure 154



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 154]**.

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

Figure 155



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 155]**.

Operating On Slopes

⚠ WARNING

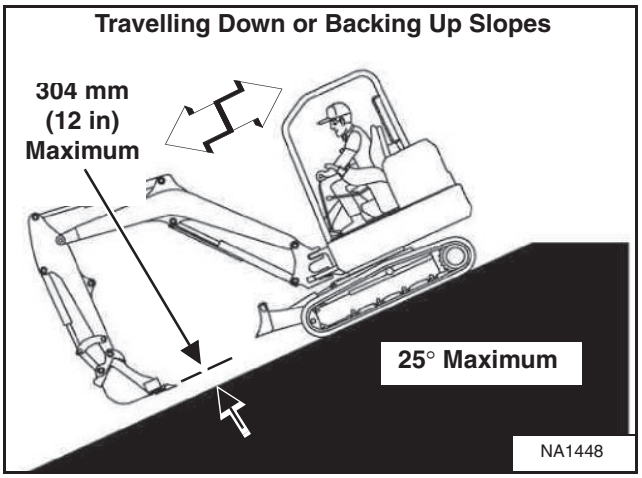
AVOID INJURY OR DEATH

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

W-2497-0304

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

Figure 156



When going down grades that exceed 15 degrees, put the machine in the position shown, and run the engine slowly **[Figure 156]**.

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

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

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

⚠ WARNING

AVOID INJURY OR DEATH

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

W-2498-EN-1009

Figure 157

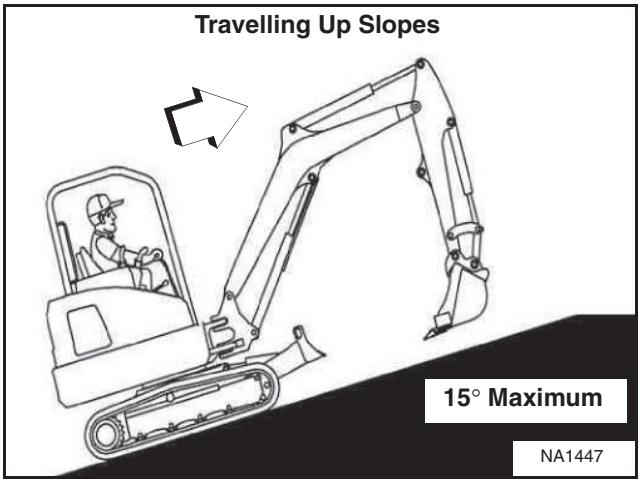
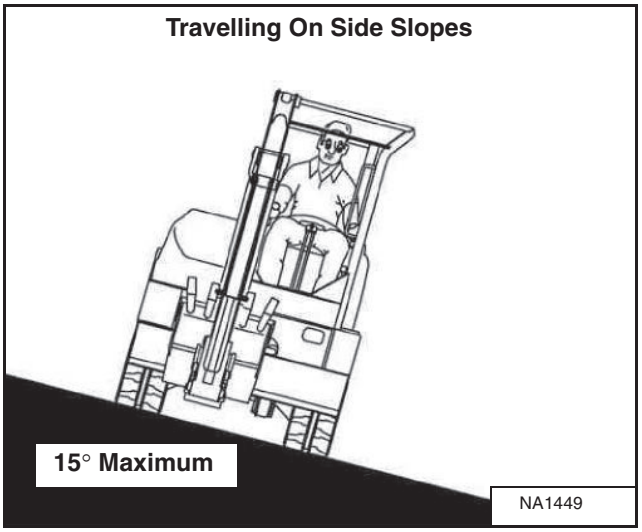


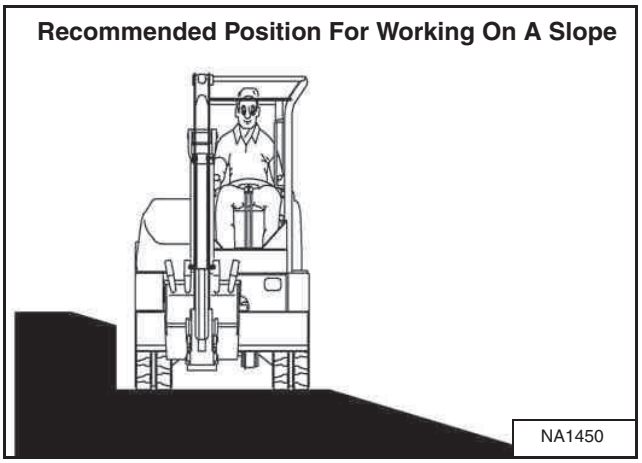
Figure 158



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 157]** and **[Figure 158]**.

Operating On Slopes (Cont'd)

Figure 159



When operating on a slope, level the work area before beginning **[Figure 159]**.

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

Do not work on slopes which are over 15 degrees.

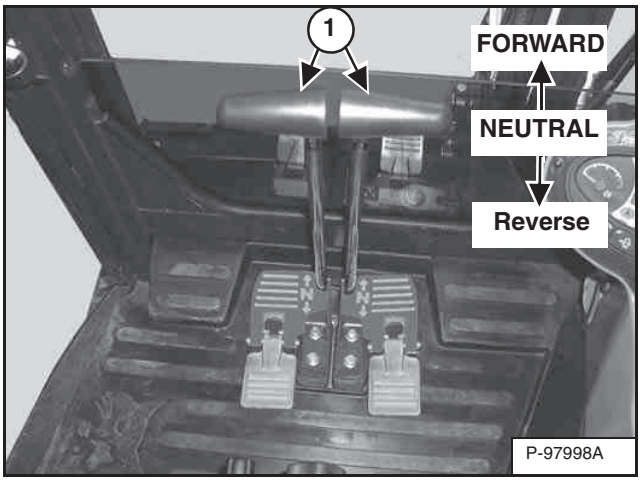
Use a slow work cycle.

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 160



To brake the machine when going down a slope, move the steering levers (Item 1) **[Figure 160]** to the NEUTRAL position. This will engage the hydrostatic braking.

When the engine stops on a slope, move the steering levers to the NEUTRAL position. Lower the boom / bucket to the ground.

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

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

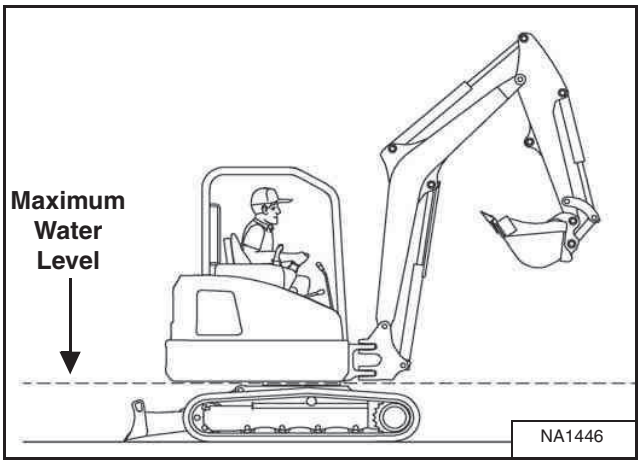
Use the control lever to lower the boom.

Start the engine and resume operation.

Operating In Water

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

Figure 161



Do not operate or immerse the excavator in water higher than the bottom of the swing bearing **[Figure 161]**.

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

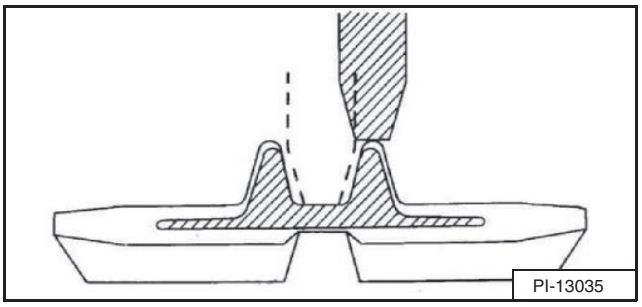
Water must be removed from the cylinder rods. If water freezes to the cylinder rod, the cylinder seals can be damaged when the rod is retracted.

Avoiding Track Damage

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

Some Cause Of Track Damage:

Figure 162

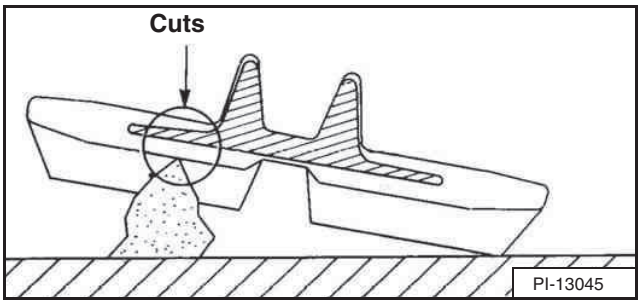


Incorrect track tension: When the rubber track is detracting, the idler or sprocket rides on the projections of the embedded metal **[Figure 162]** causing the embedded metal to be exposed to corrosion. (See TRACK TENSION on Page 170.)

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 163

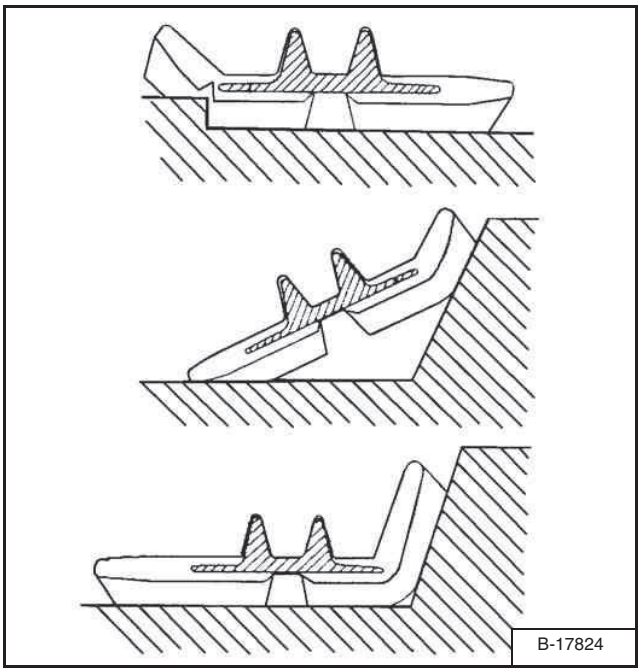


When rubber tracks drive over projections or sharp objects in the field, the concentrated forces applied cause cuts on the lug side rubber surface **[Figure 163]**. In case of making turns on projections, the lug side rubber surface will have an even higher chance to be cut. If the cuts run through the 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 164



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 164]**.

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.

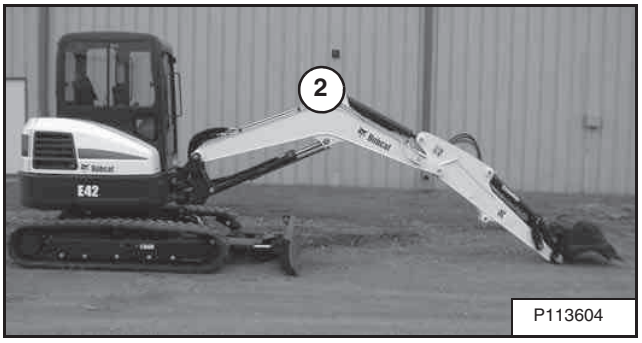
The calibration procedure is a two person operation. One person must remain in the cab to enter data into the deluxe display panel while a second person takes measurements from outside the machine. Make sure the second person is away from the machine when moving any of the work group components (boom,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

⚠ WARNING

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

W-2268-0910

Figure 165

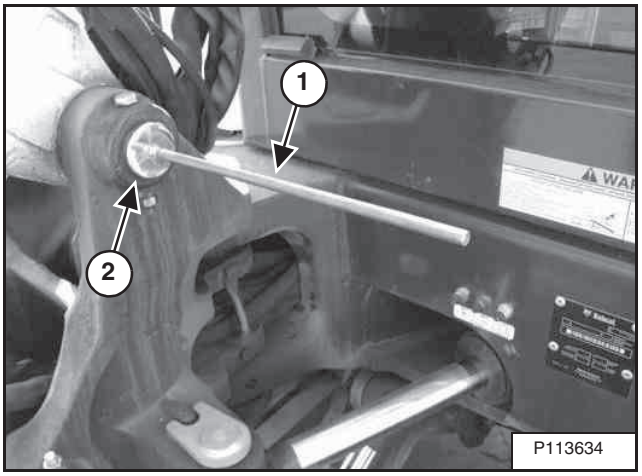


Position the excavator **[Figure 165]** as shown so the second person can install the magnetic tools, the plumb bob and do measurements for calibrating the system.

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.

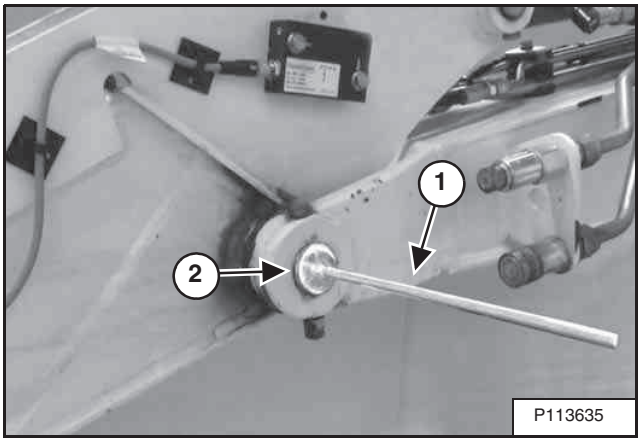
Figure 166



Install one of the magnetic tools (Item 1) on the boom pivot pin (Item 2) **[Figure 166]**. Centre the magnetic tool as close as possible to the centre of the boom pin.

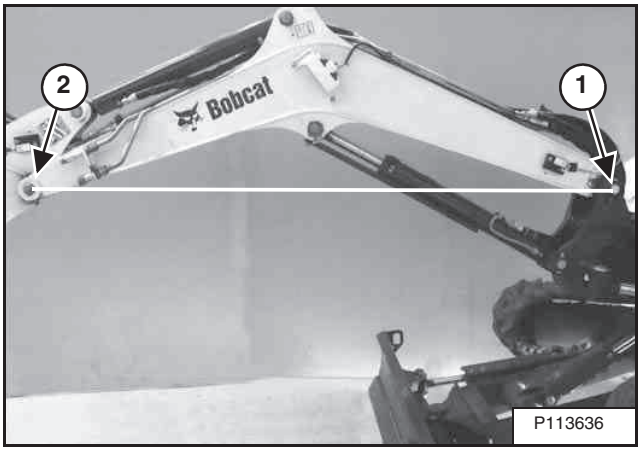
Setup / Calibration (Cont'd)

Figure 167



Install the second magnetic tool (Item 1) on the arm pivot pin (Item 2) **[Figure 167]**. Centre the magnetic tool as close as possible to the centre of the arm pin.

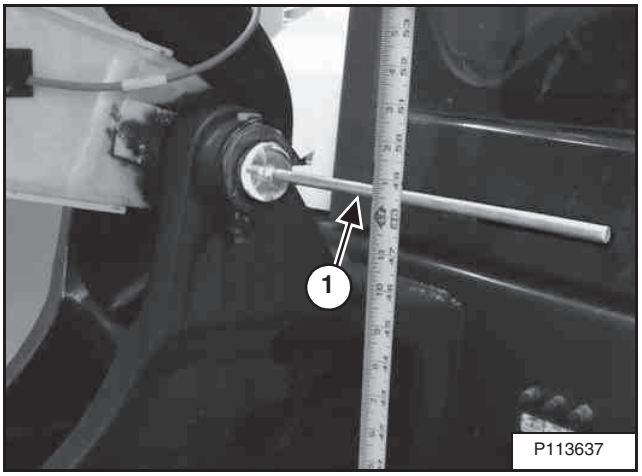
Figure 168



Position the excavator with the bucket fully rolled out and the arm fully extended. Position the workgroup so the distance from the ground to the two magnetic sensors (Item 1 and 2) **[Figure 168]** 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.

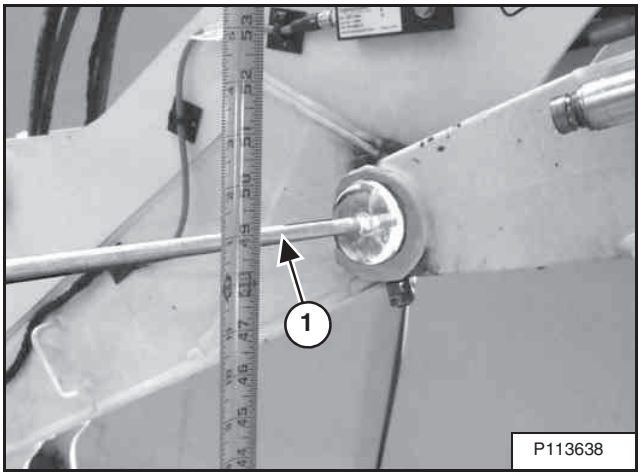
Figure 169



Measure the distance from the centre of the boom magnetic tool (Item 1) **[Figure 169]** 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 centrelines of the magnetic tools as this will eliminate an possible variation in the measurements to the ground.)

Setup / Calibration (Cont'd)

Figure 170

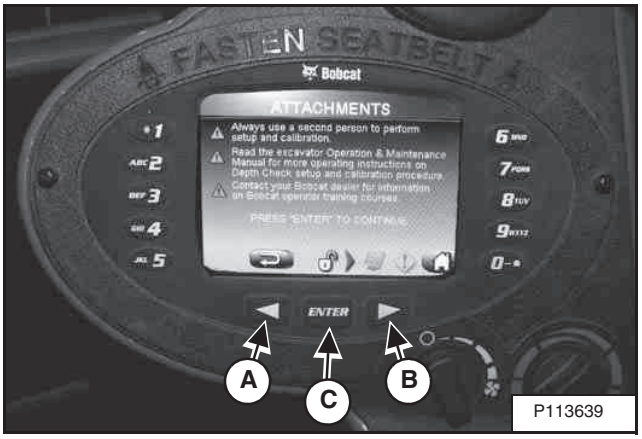


Measure the distance from the centre of the arm magnetic tool (Item 1) **[Figure 170]** to the ground and make sure both measurements are the same. Adjust the boom up or down as needed and remeasure until both dimensions are the same between **[Figure 169]** and **[Figure 170]**.

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 manor.

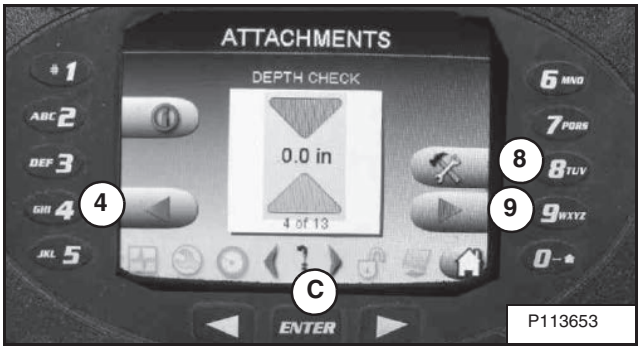
Figure 171



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 171]**

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

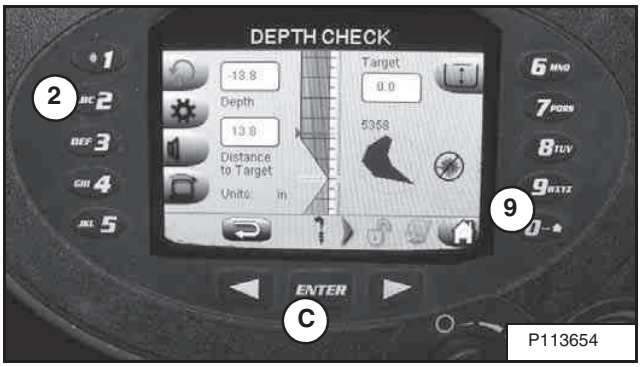
Figure 172



On the [ATTACHMENTS] screen, use the left arrow button (Item 4) or the right arrow button (Item 9) and scroll to the [ATTACHMENTS] [DEPTH CHECK] screen shown here. Press the [ENTER] button (Item C) or button (Item 8) **[Figure 172]** to access the Depth Check setup screen.

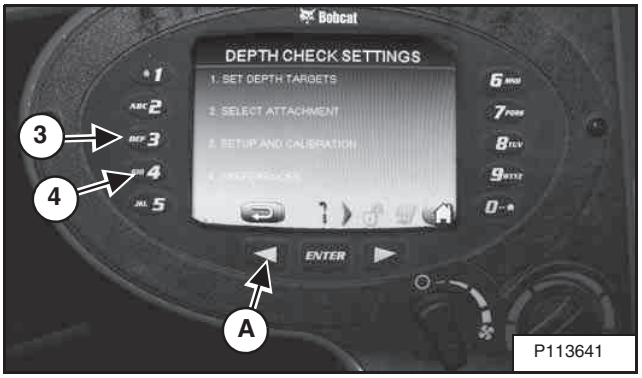
Setup / Calibration (Cont'd)

Figure 173



One of three different screens can appear. Which ever screen appears, press button (Item 2) **[Figure 173]** to access the [DEPTH CHECK] setup screen.

Figure 174

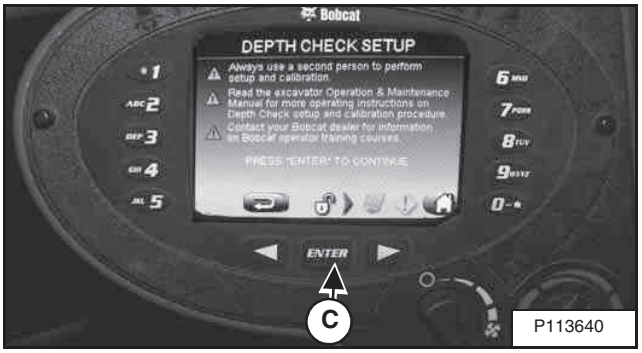


NOTE: The units of measure can be set in either millimeters or inches. Press button (Item 4) to enter the Preferences screen and select meters, millimeters, feet or inches, then press the arrow button (Item A) [Figure 174] to go back to the above screen.

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

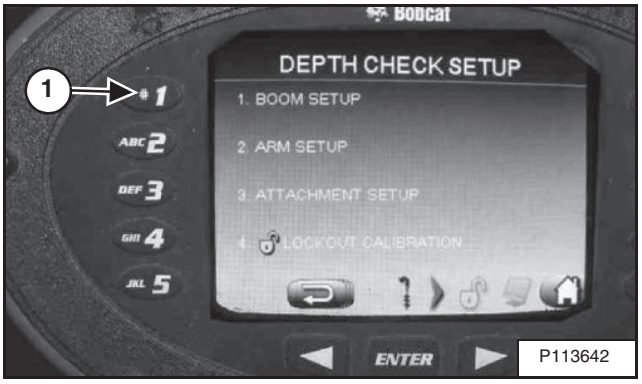
Press the button (Item 3) **[Figure 174]** for [SETUP AND CALIBRATION] mode.

Figure 175



Read the message on the screen and press the [ENTER] button (Item C) **[Figure 175]** to continue.

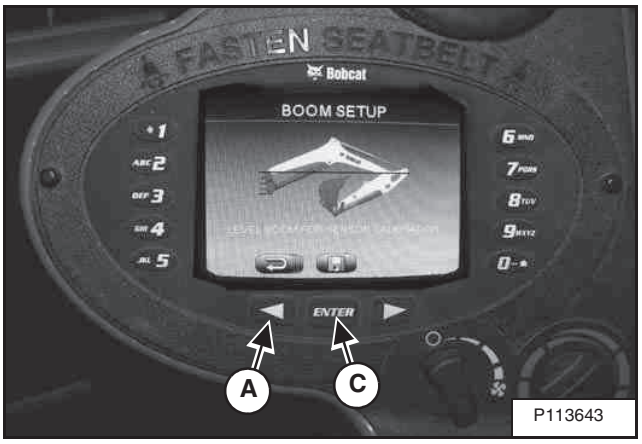
Figure 176



Press [BOOM SETUP] (Item 1) **[Figure 176]**.

Setup / Calibration (Cont'd)

Figure 177

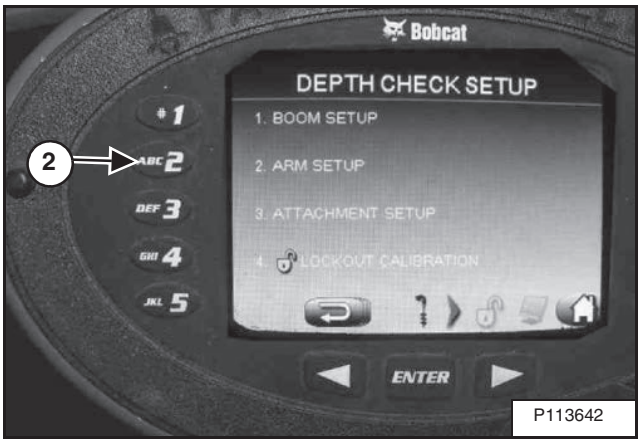


With the boom leveled **[Figure 169]** and **[Figure 170]**, press the [ENTER] button (Item C) **[Figure 177]** to store this information into the setup / calibration settings.

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.

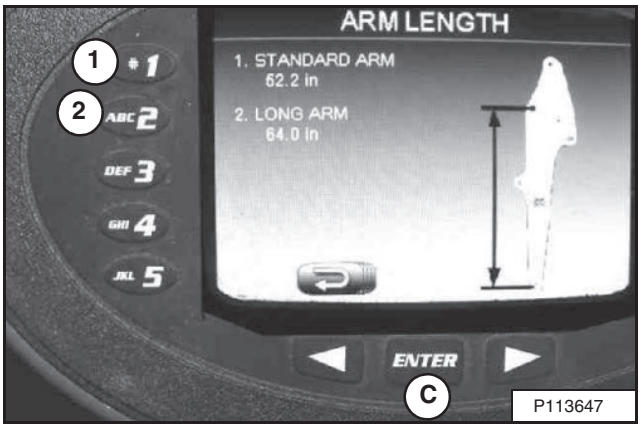
NOTE: If a plumb bob is not available, fishing line or a string with a heavy nut or two tied on one end of the string can be used in place of a plumb bob.

Figure 178



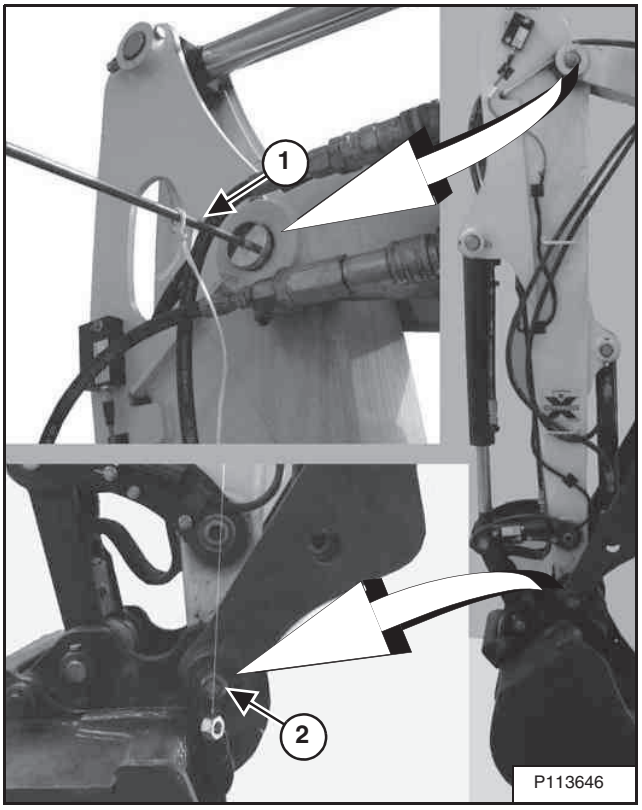
Have the second person in the cab and press the [ARM SETUP] (Item 2) **[Figure 178]**.

Figure 179



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 179]** to store this information into the setup / calibration settings.

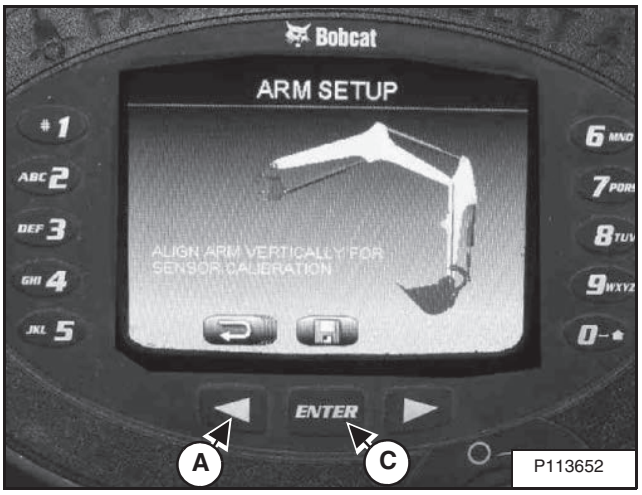
Figure 180



Place the plumb bob (Item 1) **[Figure 180]** on the magnetic tool that is installed on the arm pin. Raise the boom and move the arm until the arm is vertical.

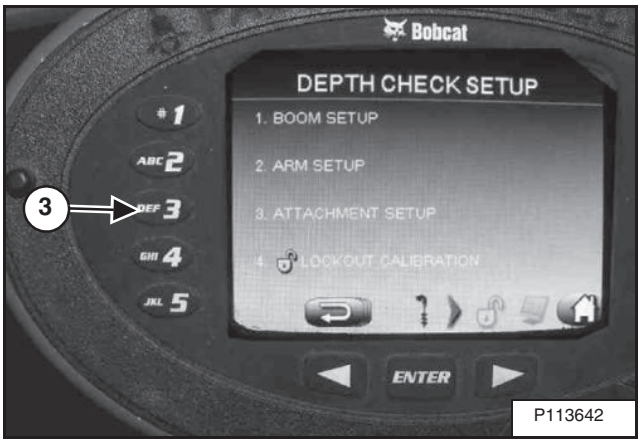
Move the arm until the plumb bob line is centred on the bucket pin (Item 2) **[Figure 180]**. *(The accuracy of the arm being vertical affects the accuracy of the Depth Check.)*

Figure 181



With the arm vertical **[Figure 180]**, press the [ENTER] button (Item C) **[Figure 181]** to store this information into the setup / calibration settings.

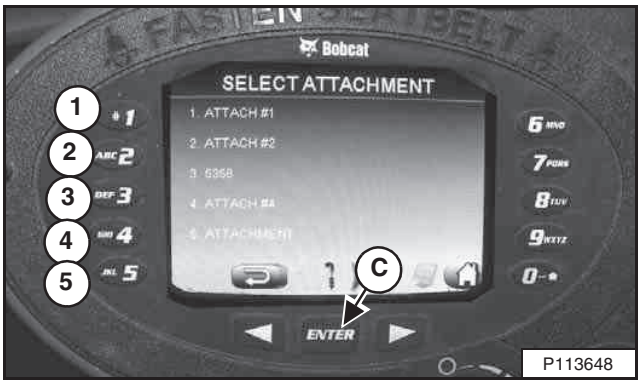
Figure 182



Press the [ATTACHMENT SETUP] button (Item 3) **[Figure 182]**.

Setup / Calibration (Cont'd)

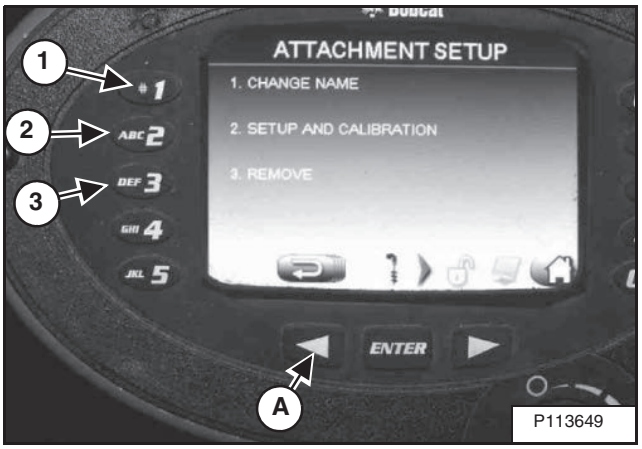
Figure 183



Select one of the attachments (Item 1 - 5) **[Figure 183]** 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 184

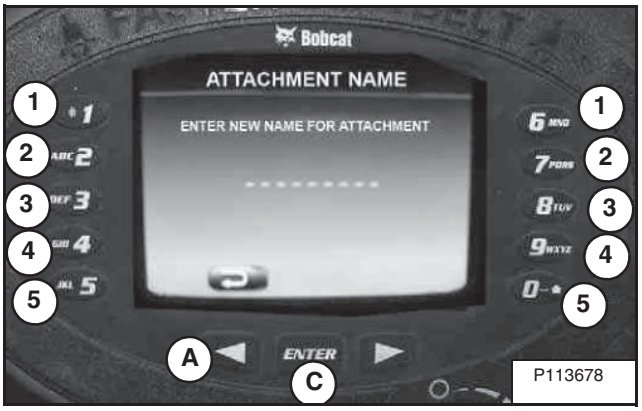


On the [ATTACHMENT SETUP] screen, you can select [CHANGE NAME] (Item 1), [SETUP AND CALIBRATION] (Item 2) or [REMOVE] (Item 3) **[Figure 184]** the attachment from the saved list.

Select [CHANGE NAME] (Item 1) **[Figure 184]** to open the attachment name screen.

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

Figure 185



Use the key pads (Item 1 through 0) and enter a name or number for the attachment being setup. Press the [ENTER] button (Item C) **[Figure 185]** to save the name. (To add the name, press the key pad multiple times until the correct letter or number appears on the screen for the attachment name.)

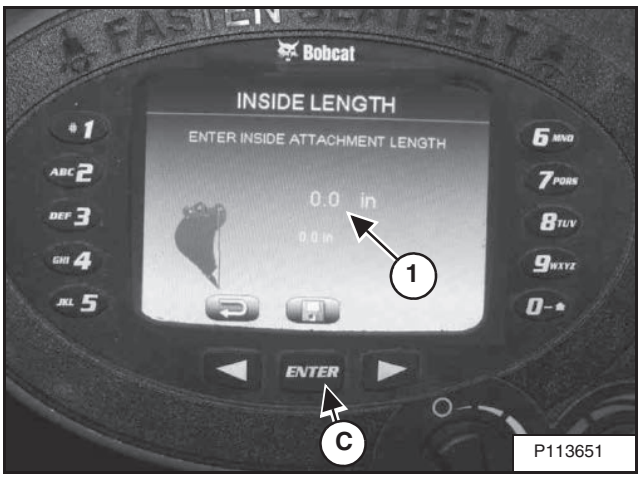
If setting up additional attachments, select (Items 2 through Item 5) **[Figure 183]** and add the additional attachment names.

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 184]** and go back to the [ATTACHMENT SETUP] screen.

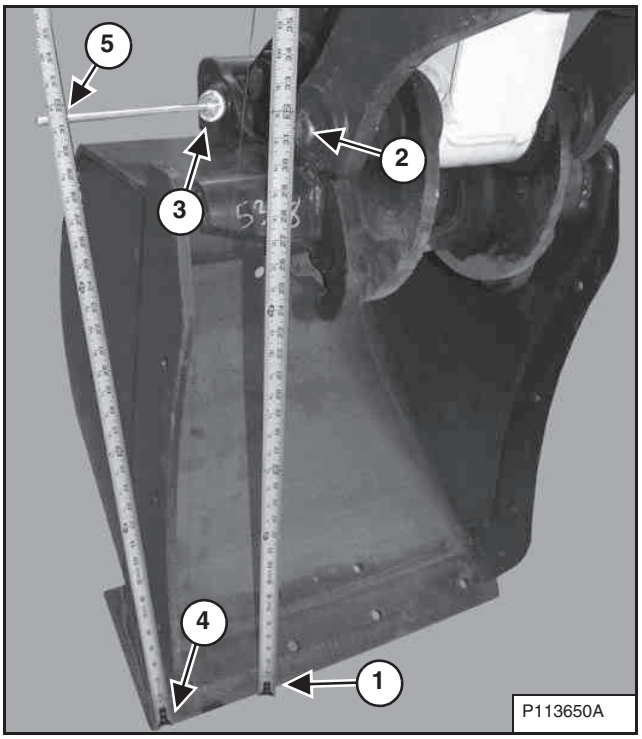
Press the [SETUP AND CALIBRATION] button (Item 2) **[Figure 184]**.

Figure 186



The [INSIDE LENGTH] screen **[Figure 186]** is where the first attachment dimensions will be added from the information determined in step **[Figure 187]**.

Figure 187



This two part step will measure the distance between the bucket pin (Item 2) **[Figure 187]** 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 furtherest vertical cutting point (Item 1) from the centre of the bucket pin (Item 2) **[Figure 187]**.

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 1) and the centre of the bucket pin (Item 2) **[Figure 187]**.

NOTE: With usage of any attachment, the cutting surfaces wear. Example: The cutting edge (Item 1) [Figure 187] 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, re-calibrate the attachment to reset the dimensions needed for the Depth Check system to operate correctly.

The [INSIDE LENGTH] screen **[Figure 186]** is where the attachment dimensions will be added from the information determined in **[Figure 187]**.

Using the key pad (Item 1 through 0) **[Figure 186]**, enter this dimension. After the measurement is entered and verified, press the [ENTER] button (Item C) **[Figure 186]**. As soon as the [ENTER] button is pressed, the [OUTSIDE LENGTH] **[Figure 188]** screen will be activated.

Setup / Calibration (Cont'd)

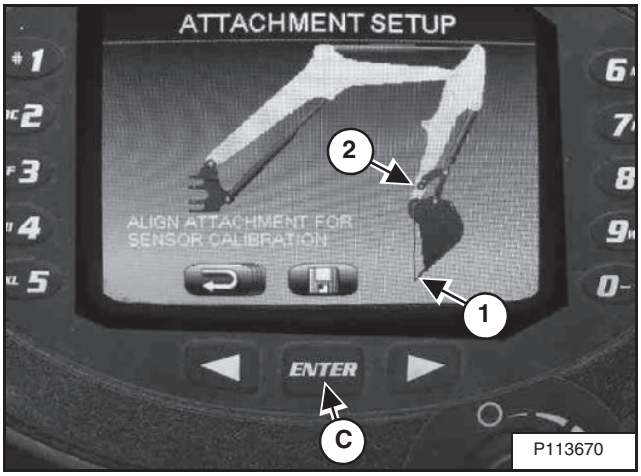
Figure 188

Install a magnetic pin on the second bucket pin (Item 3) **[Figure 187]**.

The next measurement is from the cutting edge (Item 4) to the centre of the magnetic pin (Item 5) **[Figure 187]** for the outside length dimension.

Using the key pad (Item 1 through 0) **[Figure 188]** enter this dimension. After the measurement is entered and verified, press the [ENTER] button (Item C) **[Figure 188]**. As soon as the [ENTER] button is pressed, the screen will change to the [ATTACHMENT SETUP] screen **[Figure 189]**.

Figure 189



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 189]** 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.

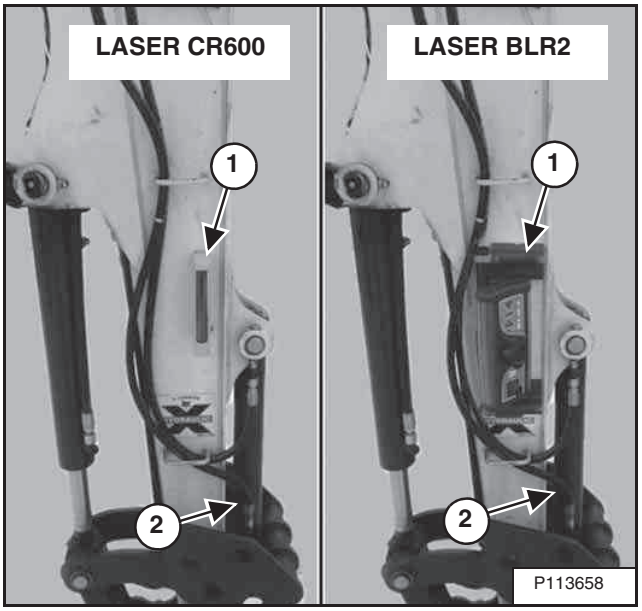
NOTE: When using an auger, it will not be as accurate as solid mounted attachments because all components are not rigidly mounted (auger bit has extra movement and rotation where the system is designed for fixed positions). When using the auger with the Depth Check system, enter zero for both attachment 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 114.)

Setup / Calibration (Cont'd)

If Using A Laser With Depth Check

Figure 190



FOR model E35 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 190]** to make sure the existing hose does not interfere with the laser.

Measure the length of the hose (Item 2) **[Figure 190]**.

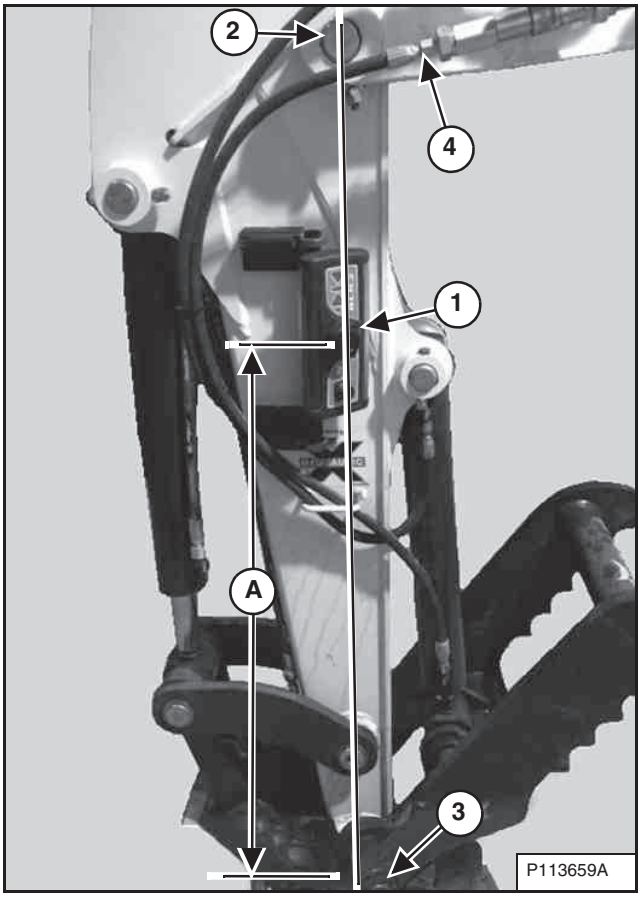
Measure the hose from the rod end of the clamp cylinder (Item 2) **[Figure 190]** to the end of the hose at the coupler (Item 4) **[Figure 191]**.

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 191



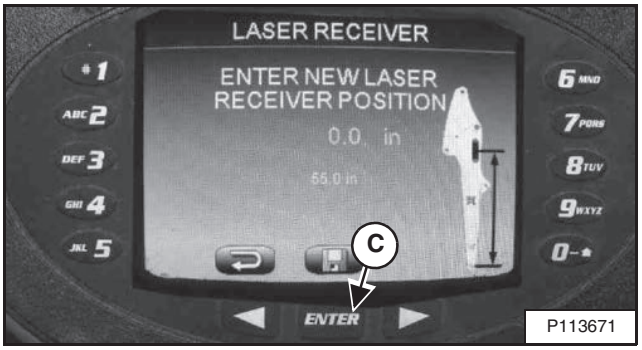
For both standard and long arm models; When installing the laser receiver (Item 1), it should be installed as close as possible in line with the arm pin (Item 2) and the bucket pivot pin (Item 3) **[Figure 191]**.

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 191]**

Setup / Calibration (Cont'd)

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

Figure 192



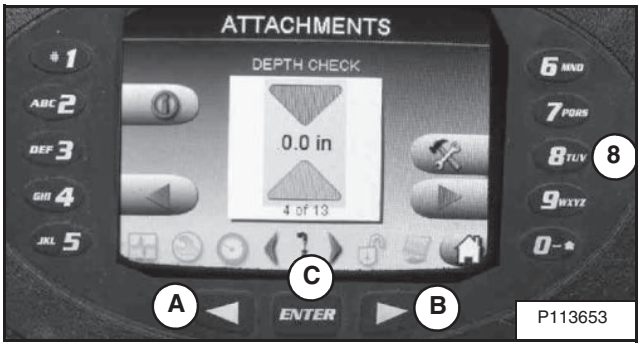
Add the dimension (Item A) **[Figure 191]** to the [LASER RECEIVER] screen, press the ENTER button (Item C) **[Figure 192]** to store the information. See **[Figure 208]** through **[Figure 210]** for additional information for setting the laser receiver dimensions.

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

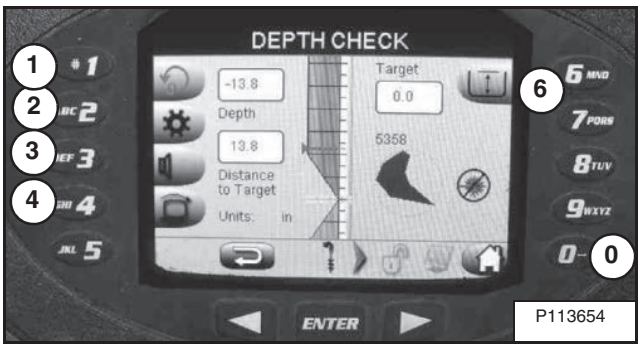
Figure 193



Using the left / right arrow buttons (Item A and B), toggle to the [ATTACHMENTS] [DEPTH CHECK] screen **[Figure 193]**.

Press the tool button (Item 8) or the ENTER button (Item C) **[Figure 193]** to go to the [DEPTH CHECK] screen **[Figure 194]** and **[Figure 195]**.

Figure 194



The **[DEPTH CHECK]** screen **[Figure 194]** shows the following information. Press the numbered key pad 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 pre-set depth settings.

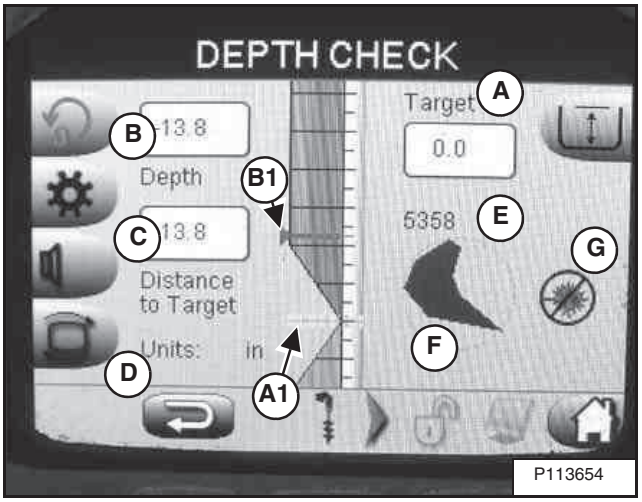
(0) Home Screen: Press 0 to go back to the home screen on the display panel.

DEPTH CHECK (CONT'D)

Initial Setup (Cont'd)

Depth Check Settings (Cont'd)

Figure 195



The [DEPTH CHECK] screen **[Figure 195]** 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 key pad number 3 **[Figure 194]**).

(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.)

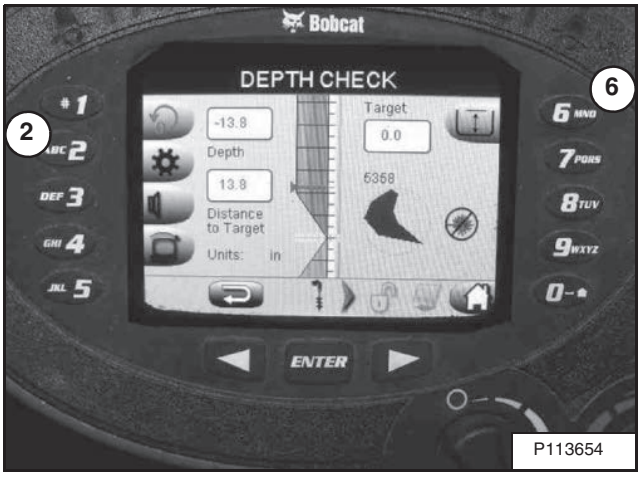
(F) Attachment: The screen uses a bucket to represent the attachment. The bucket will rotate to represent the position of the bucket (attachment) as the attachment is curled out or curled in. When the attachment is calibrated, it sets the position of bucket icon (F).

(G) Laser: The laser icon (Item G) will show if the laser is set to ON or OFF. (The laser as shown in **[Figure 195]** with the circle with the line through it represents the OFF position.)

Initial Setup (Cont'd)

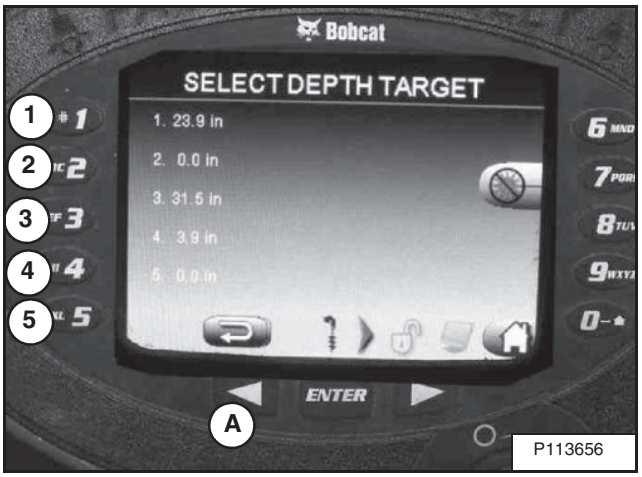
Depth Check Settings (Cont'd)

Figure 196



Press button (Item 6) **[Figure 196]** to go to the [SELECT DEPTH TARGET] screen **[Figure 197]**.

Figure 197

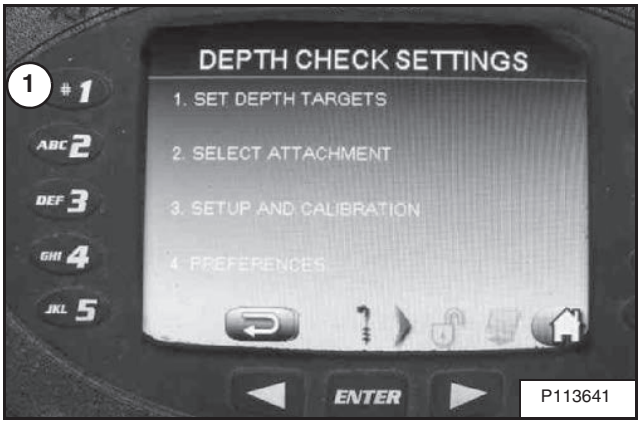


Five different depths can be pre-set and stored in the system.

Select (Item 1 through Item 5) **[Figure 197]** to select one of the existing depths.

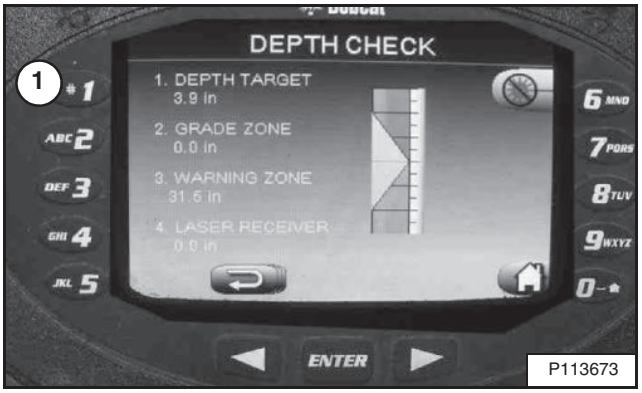
Or, if a different depth is needed, press the return button (Item A) **[Figure 197]** to go back one screen, then press button (Item 2) **[Figure 196]** to go to the [DEPTH CHECK SETTINGS] screen **[Figure 198]**.

Figure 198



Press (Item 1) **[Figure 198]** to [SET DEPTH TARGETS].

Figure 199



Press (Item 1) **[Figure 199]** to select [DEPTH TARGET].

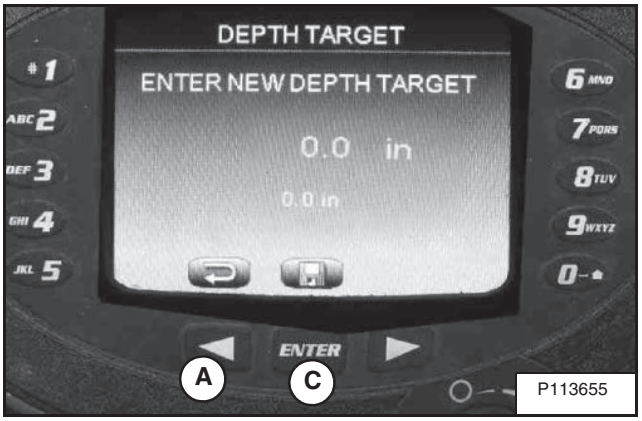
Figure 200

Select (Item 1 through 5) **[Figure 200]** to select one of the five possible stored depth settings.

Initial Setup (Cont'd)

Depth Check Settings (Cont'd)

Figure 201



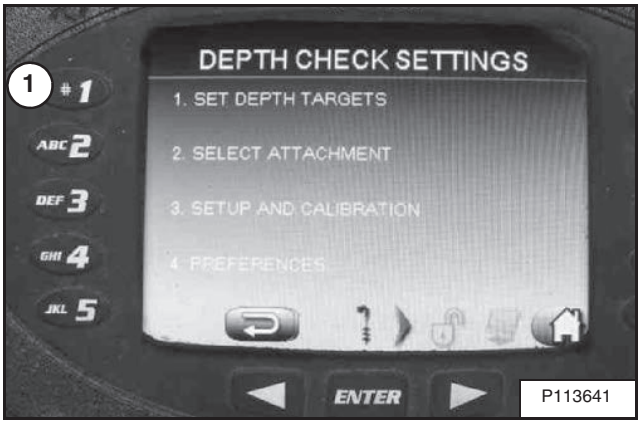
Use the key pads (Item 1 through 0) and enter the new target dimension. If the dimension entered is incorrect, press the arrow button (Item A) **[Figure 201]** to backspace the dimension.

Press the [ENTER] button (Item C) **[Figure 201]** to save the depth dimension. (Dimensions shown in inches but can be set to feet, meters or millimetres. See **[Figure 213]**.)

Grade Zone

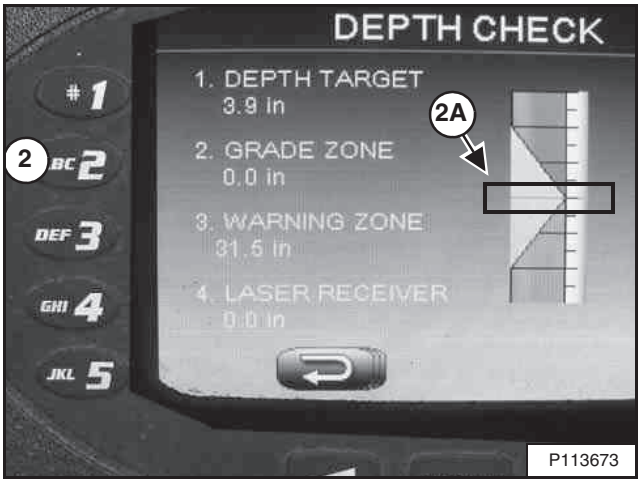
The Grade Zone sets the distance up or down from the target depth for when the warning alarm will start to be a continuous alarm. This will also increase the YELLOW highlighted area on the screen where the target zone is shown.

Figure 202



Press [SET DEPTH TARGETS] (Item 1) **[Figure 202]** to change to the next screen **[Figure 203]**.

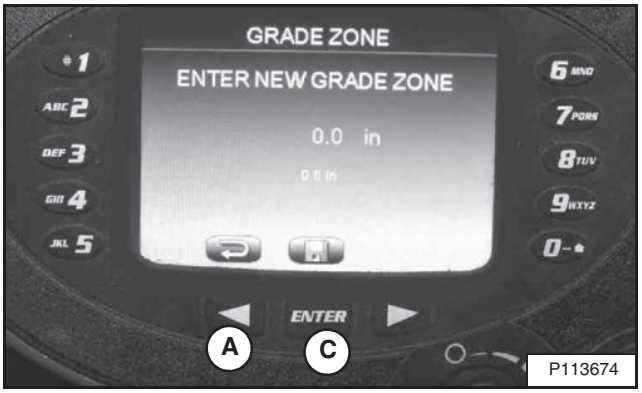
Figure 203



Press [GRADE ZONE] (Item 2) **[Figure 203]**.

Grade zone area (Item 2A) **[Figure 203]** (in yellow on the display screen) is the area that will change with the dimensions as set in **[Figure 204]**.

Figure 204



Use the key pads (Item 1 through 0) and enter the new grade zone dimension. If the dimension entered is incorrect, press the arrow button (Item A) **[Figure 204]** to backspace the dimension.

Press the [ENTER] button (Item C) **[Figure 204]** to save the grade zone dimension. (Dimensions shown in inches but can be set to feet, meters or millimetres. See **[Figure 213]**.)

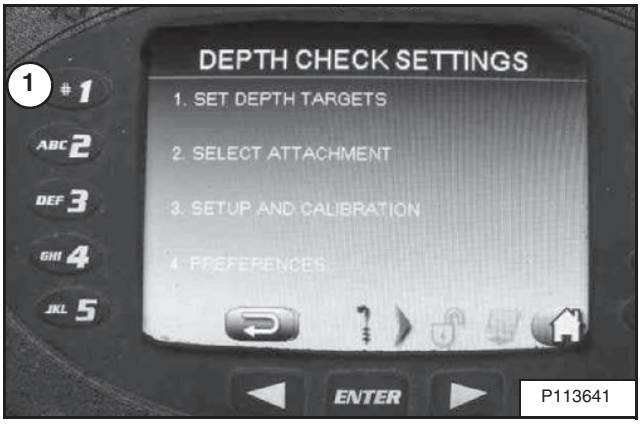
DEPTH CHECK (CONT'D)

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 205



Press [SET DEPTH TARGETS] (Item 1) **[Figure 205]** to change to the next screen **[Figure 206]**.

Figure 206

Press [WARNING ZONE] (Item 3) **[Figure 206]**.

Press (Item 6) **[Figure 206]** to turn the laser ON or OFF.

Figure 207

Use the key pads (Item 1 through 0) and enter the new warning zone dimension. If the dimension entered is incorrect, press the arrow button (Item A) **[Figure 207]** to backspace the dimension.

Press the ENTER button (Item C) **[Figure 207]** to save the warning zone dimension. (Dimensions shown in inches but can be set to feet, meters or millimetres. See **[Figure 213]**.)

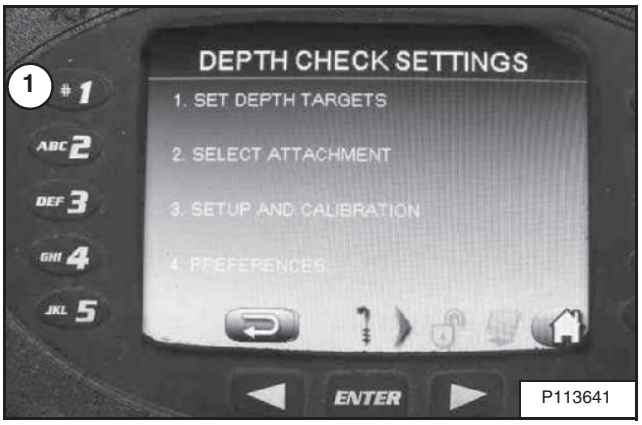
Initial Setup (Cont'd)

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.

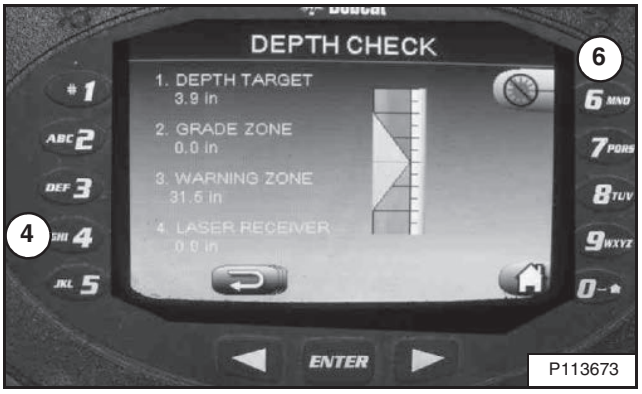
Activate the laser on the dash panel by pressing button (Item 6) **[Figure 209]**. Press once, laser ON. Press a second time, laser OFF.

Figure 208



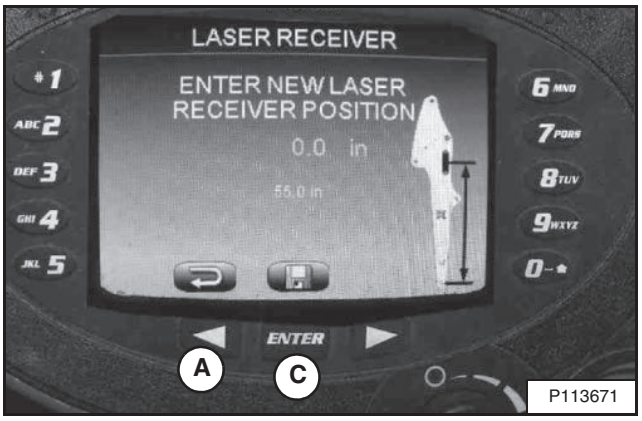
Press [SET DEPTH TARGETS] (Item 1) **[Figure 208]** to change to the next screen **[Figure 209]**.

Figure 209



Press [LASER RECEIVER] (Item 4) **[Figure 209]**.

Figure 210

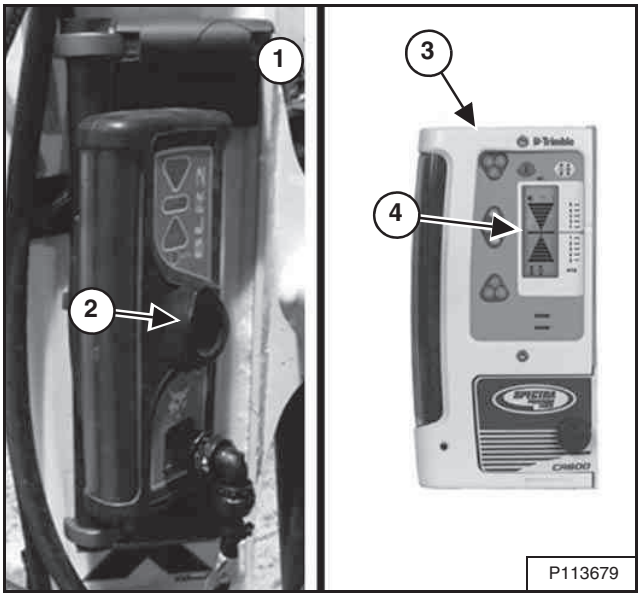


Use the key pads (Item 1 through 0) and enter the new laser receive position on the arm dimension. If the dimension entered is incorrect, press the arrow button (Item A) **[Figure 210]** to backspace the dimension. See **[Figure 192]** for additional information of the laser receiver.

Press the [ENTER] button (Item C) **[Figure 210]** to save the warning zone dimension. (Dimensions shown in inches but can be set to feet, meters or millimetres. See **[Figure 213]**.)

Measuring The Laser Location

Figure 211



For the model BLR2 (Item 1), measure to the centre of the knob (Item 2) **[Figure 211]**.

For the model CR600 (Item 3), measure to the centre of the red line (Item 4) **[Figure 211]**.

DEPTH CHECK (CONT'D)

Initial Setup (Cont'd)

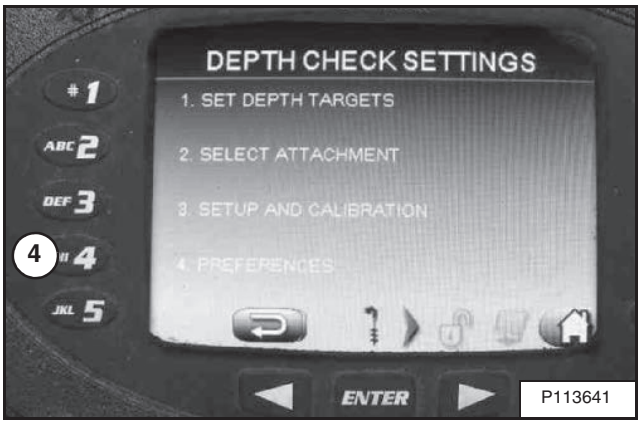
Preferences

The Preferences screen is used to set two features;

1. To set the screen preference for; [DISTANCE TO TARGET], [DEPTH CHECK] or [GRADE CHECK].

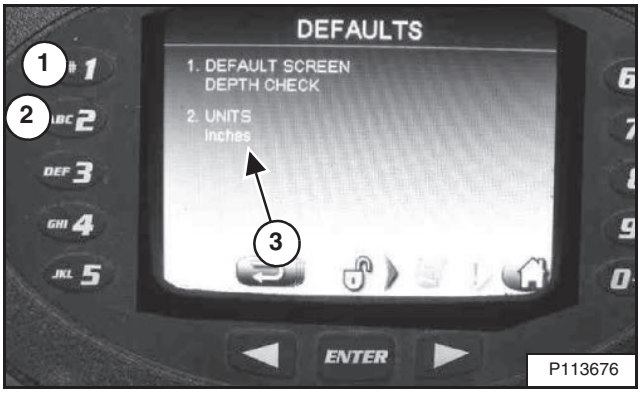
2. To set units of measure (screen can be set to display; millimeters, meters, feet or inches).

Figure 212



Press [PREFERENCES] (Item 4) **[Figure 212]** to change to the [DEFAULTS] screen **[Figure 213]**.

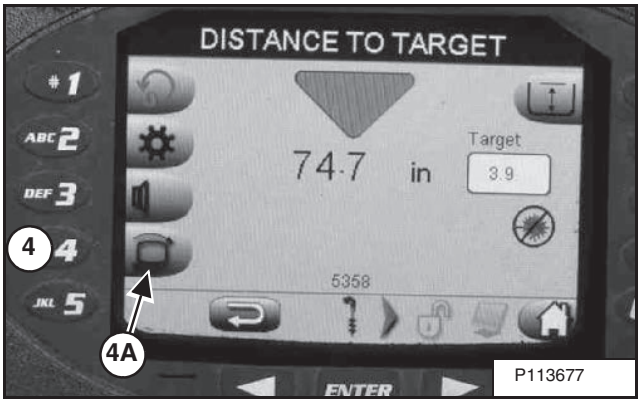
Figure 213



Press [DEFAULT SCREEN DEPTH CHECK] button (Item 1) **[Figure 213]** to toggle the Preference screen between the following screens; [DISTANCE TO TARGET] **[Figure 214]**, [DEPTH CHECK] **[Figure 215]** or [GRADE CHECK] **[Figure 216]**.

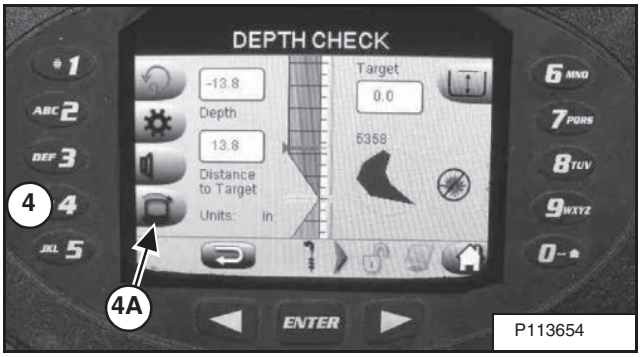
Press the [UNITS] button (Item 2) to toggle between meters, millimetres, feet or inches. This sets how you will record and enter ALL dimensions into the Depth Check system. The selected units will be displayed under the word [UNITS] (Item 3) **[Figure 213]** and will be visible on all Depth Check screens that show dimensions.

Figure 214



[DISTANCE TO TARGET] **[Figure 214]** screen.

Figure 215

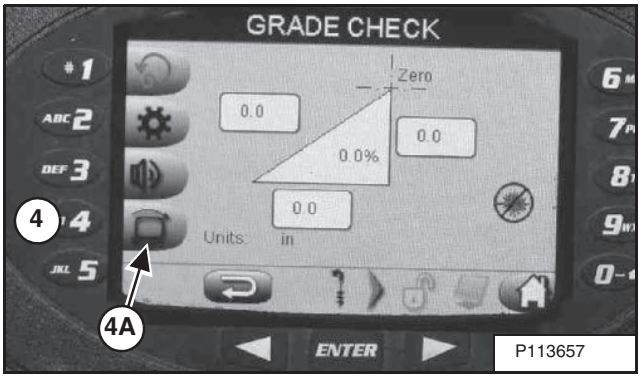


[DEPTH CHECK] **[Figure 215]** screen.

Initial Setup (Cont'd)

Preferences (Cont'd)

Figure 216



[GRADE CHECK] **[Figure 216]** screen.

NOTE: You can also press button (Item 4) [Figure 214], [Figure 215] or [Figure 216] 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

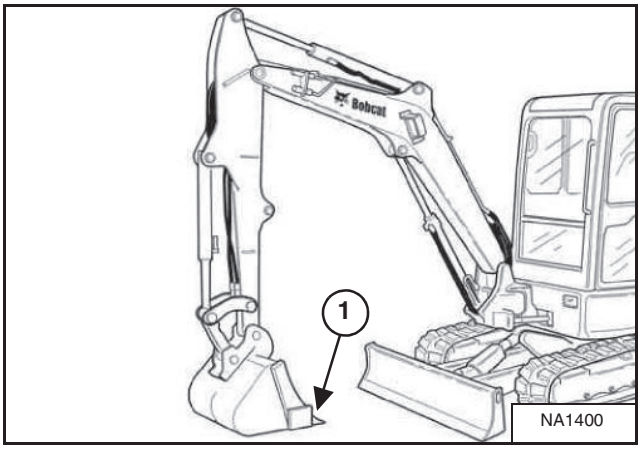
When digging in an area with underground utilities, do not depend on the Depth Check system for digging close to known utilities. The Depth Check system accuracy is dependent on the accuracy of the calibration, slope of the ground and other unknown variables. The current depth of utility lines varies 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

Operation (Cont'd)

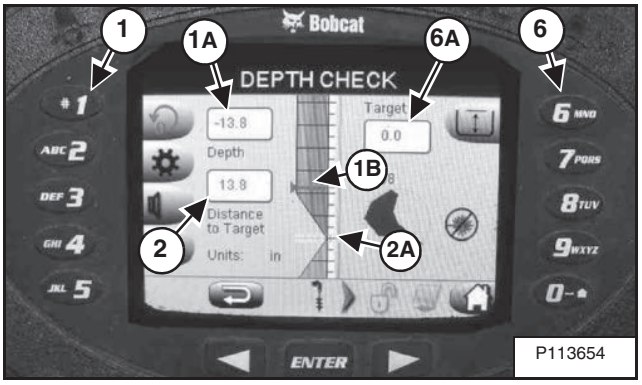
Digging A Hole To A Predetermined Depth

Figure 217



The first step is to set the position of the bucket (Item 1) **[Figure 217]** 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.

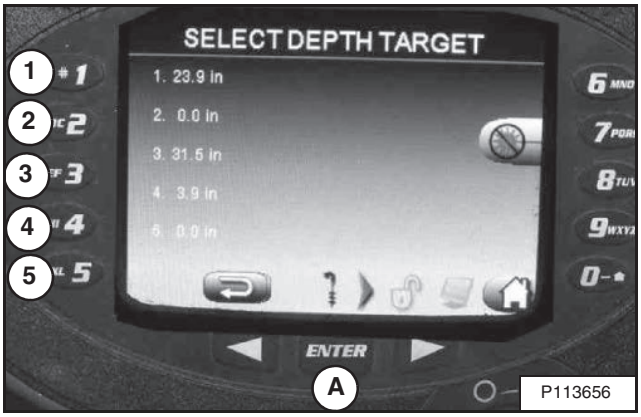
Figure 218



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 218]** will show the bucket position dimension moving.)

Press button (Item 6) **[Figure 218]** to change to the [SELECT DEPTH TARGET] screen **[Figure 219]**.

Figure 219



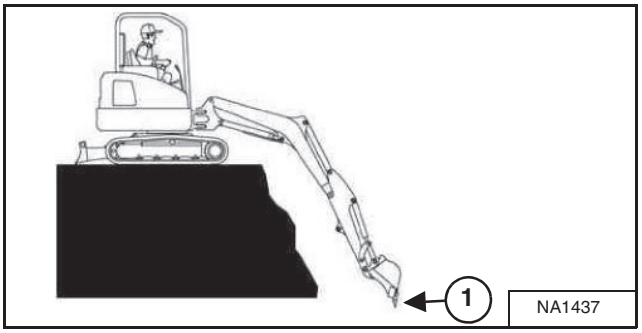
Select the target depth by pressing button (Item 1 through Item 5) **[Figure 219]** for selecting an existing depth. (To add a new target depth or to change an existing target depth, see information shown with steps **[Figure 196]** through **[Figure 201]**.)

The selected target depth will now appear on the screen at (Item 6A) **[Figure 218]**.

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.

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

Figure 220



As the hole is being dug, the position of the bucket (Item 1) **[Figure 220]** is dimensionally shown (Item 1A) **[Figure 218]** and shown on the bar graph at (Item 1B) **[Figure 218]**. The distance to target depth is dimensionally shown in (Item 2) **[Figure 218]** and shown on the bar graph (Item 2A) **[Figure 218]**.

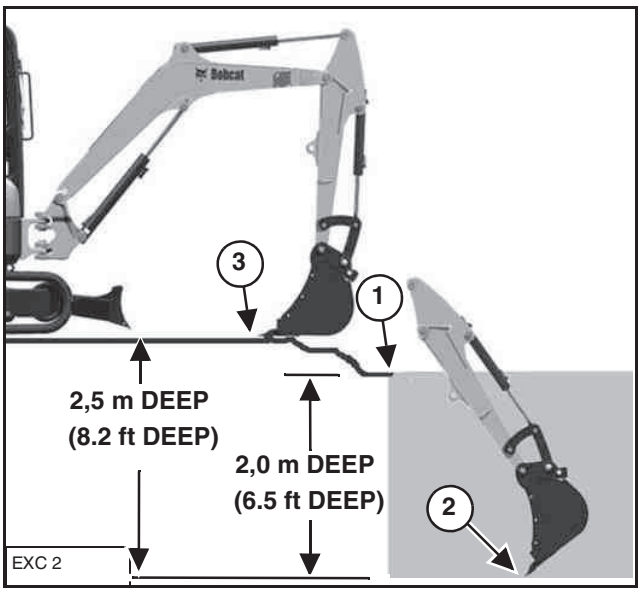
When the bucket is getting close to the target depth, a warning buzzer (if activated) will start to slowly beep. The beeps will increase in frequency the closer the bucket gets to the target depth. When the target depth is reached, the buzzer will sound continuously.

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 218]** 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 119.).

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

Figure 221



If possible, reposition the excavator so the bucket can be re-benched off of the original starting point (Item 1) **[Figure 221]**.

Or, If that is not possible, position the excavator so the bucket will reach to the bottom of the hole (Item 2) **[Figure 221]** 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 221]**, 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 221]** in an area you know is the correct depth. Example: The dimension shown in (Item 1A) **[Figure 218]** 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.

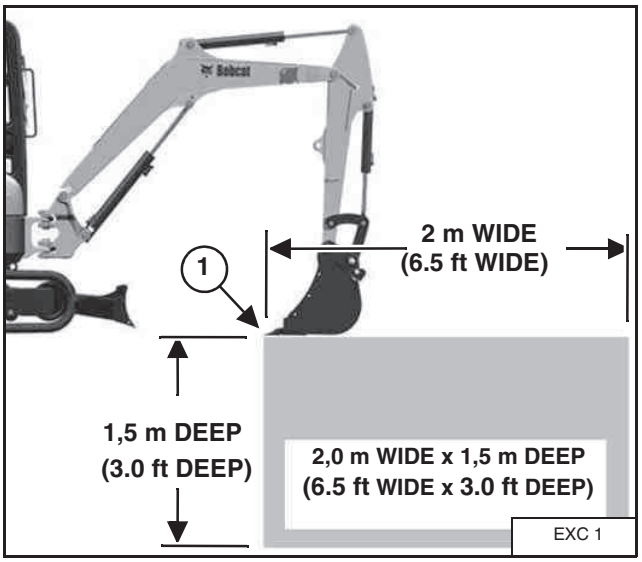
Or, If you want to just continue digging with the hole parallel to the ground, no re-benching is necessary but the hole will not be horizontal, it will be at the same plane as the ground surface the machine is on.

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 222

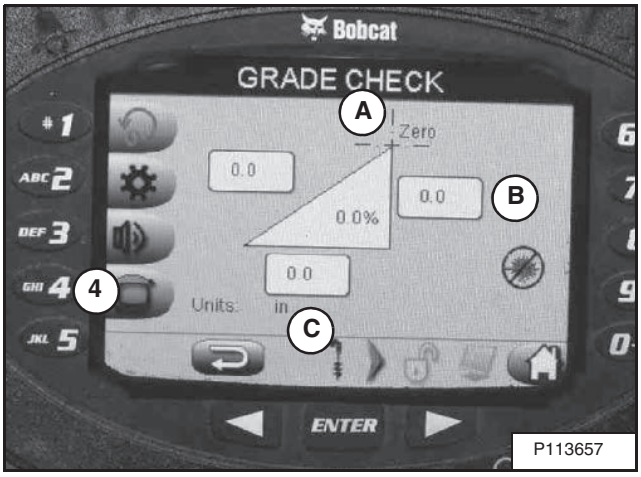


Follow the same procedure as for digging a hole except as follows. (See Digging A Hole To A Predetermined Depth on Page 123.)

When re-benching the bucket for setting to 0.0., position the bucket (Item 1) **[Figure 222]** 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 223



Press (Item 4) **[Figure 223]** to scroll to the [GRADE CHECK] screen on the display panel. For additional information. (See Preferences on Page 121.)

The ZERO (Item A) is the re-benching starting point. (Item B) shows the target depth. (Item C) **[Figure 223]** shows the reach (distance away from the zero mark starting point (Item 1) **[Figure 222]**.

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 223].

⚠ 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.

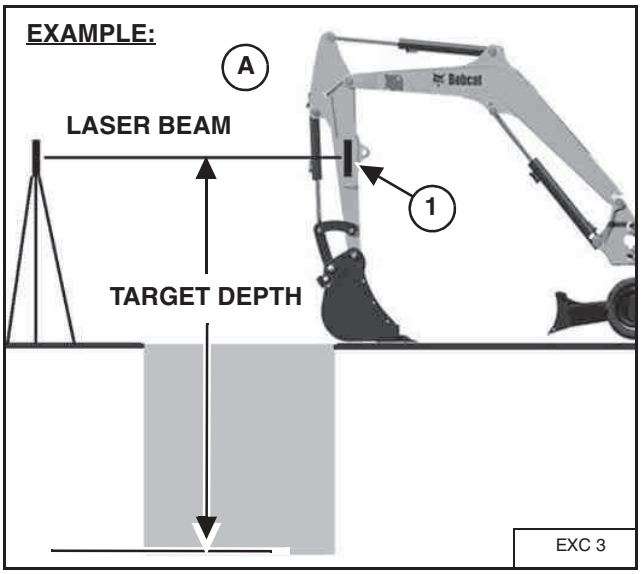
W-2774-1208

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 224

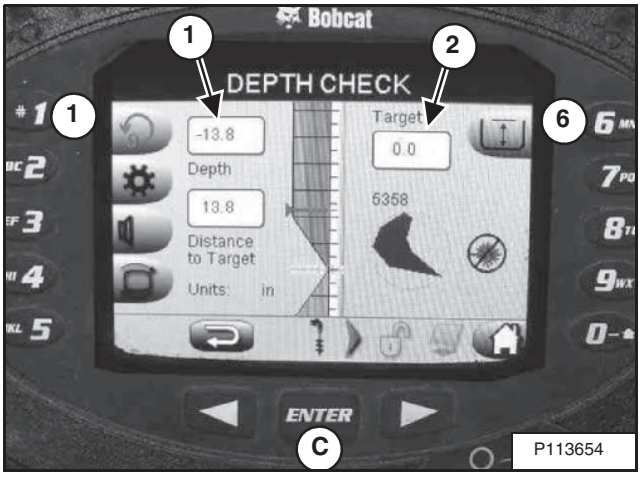


NOTE: Make sure the laser receiver dimensional location on the arm has been added into the Depth Check. For additional information. (See Laser Receiver Position On Arm on Page 120.)

With the arm vertical, raise or lower the boom and arm as needed until the laser (Item 1) strikes the receiver (Item 2) **[Figure 224]**. (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 225



With the laser striking the receiver, press (Item 1) **[Figure 225]** to set the laser position.

Press (Item 6) to access the pre-set [TARGET DEPTH] screen or go to figure **[Figure 197]** to add or change the target depth. When the correct target depth is entered, press the [ENTER] button (Item C) **[Figure 225]** 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.

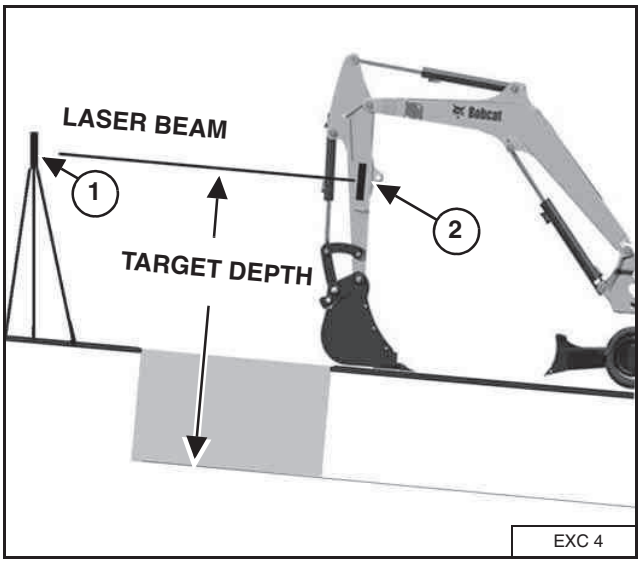
DEPTH CHECK (CONT'D)

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 226

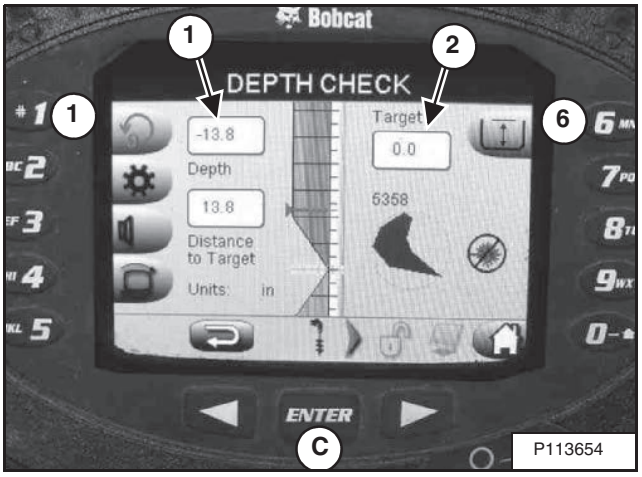


NOTE: Make sure the laser receiver dimensional location on the arm has been added into the Depth Check. For additional information. (See Laser Receiver Position On Arm on Page 120.)

With the arm vertical, raise or lower the boom and arm as needed until the laser (Item 1) strikes the receiver (Item 2) **[Figure 226]**. (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 227



With the laser striking the receiver, press (Item 1) **[Figure 227]** to set the laser position.

Press (Item 6) to access the pre-set [TARGET DEPTH] screen or go to figure **[Figure 197]** to add or change the target depth. When the correct target depth is entered, press the [ENTER] button (Item C) **[Figure 227]** 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

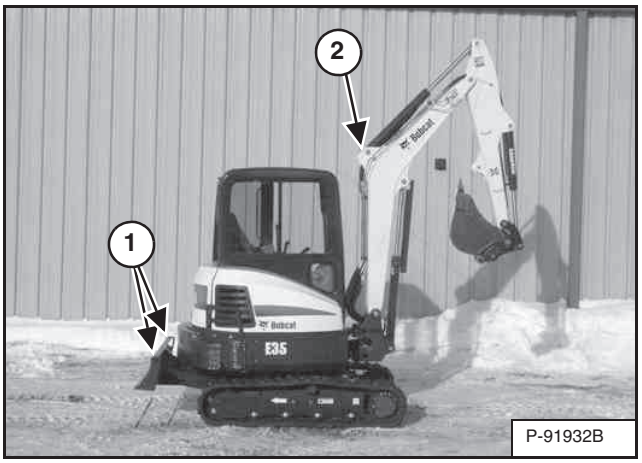
There is not a recommended towing procedure for the excavators.

- The excavator can be lifted onto the transport vehicle.
- The excavator can be skidded a short distance for service (EXAMPLE: Move onto a transport vehicle) without damage to the hydraulic system. (The tracks will not turn.) There might be slight wear to the tracks when the excavator is skidded.
- The towing chain (or cable) must be rated at 1.5 times the weight of the excavator. (See Performance on Page 214.)

LIFTING THE EXCAVATOR

Procedure

Figure 228



Fully extend the cylinders of the bucket, arm, and boom so that the excavator is in the position as shown **[Figure 228]**.

Raise the blade all the way.

Put all the control levers in NEUTRAL.

NOTE: For machines equipped with angle blade feature, make sure the blade is in the straight position prior to lifting.

⚠ 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. Engage the upperstructure slew lock.**
- **Never lift with operator on machine.**
- **Never lift with the blade angled (if equipped).**

W-2580-EN-0210

Figure 229

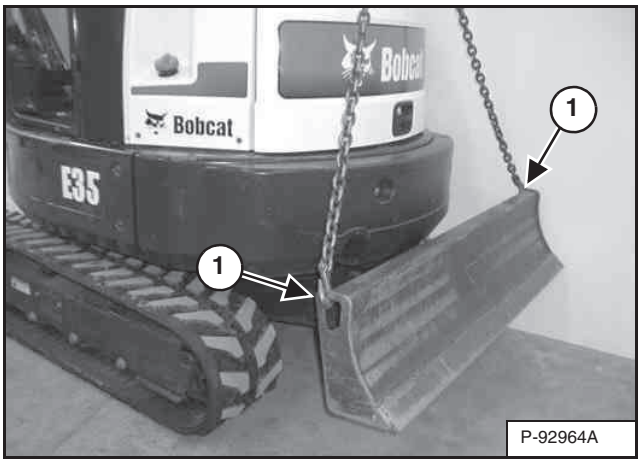
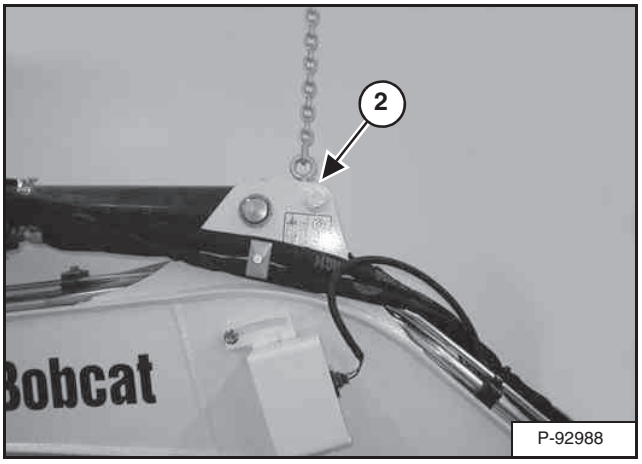


Figure 230



Fasten chains to the ends of the blade (Item 1) **[Figure 228]** and **[Figure 229]** and up to a lifting fixture above the canopy / cab. The lifting fixture must extend over the sides of the canopy / cab to prevent the chains from hitting the ROPS / TOPS.

Fasten a chain (Item 2) **[Figure 230]** from the rod to the lift fixture.

TRANSPORTING THE EXCAVATOR ON A TRAILER

Loading And Unloading

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

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

Align the ramps with the centre of the transport vehicle. Secure the ramps to the truck bed and be sure ramp angle does not exceed 15 degrees.

Use metal loading ramps with a slip resistant surface.

Use ramps that are the correct length and width and can support the weight of the machine.

The rear of the trailer must be blocked or supported when loading or unloading the machine to prevent the front of the transport vehicle from raising.

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

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

Figure 231

Move the machine forward onto the transport vehicle **[Figure 231]**.

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.

Fastening

Figure 232

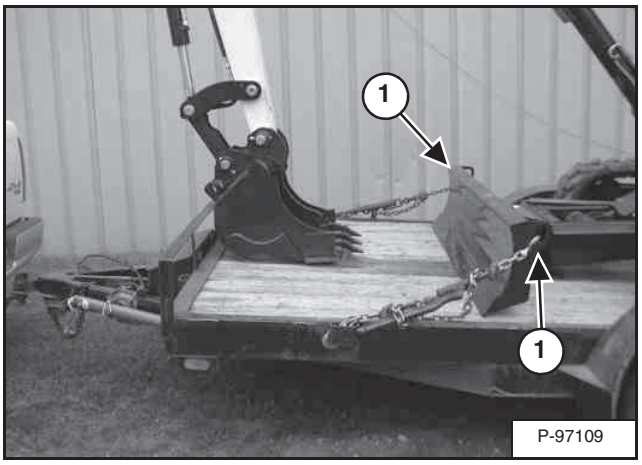
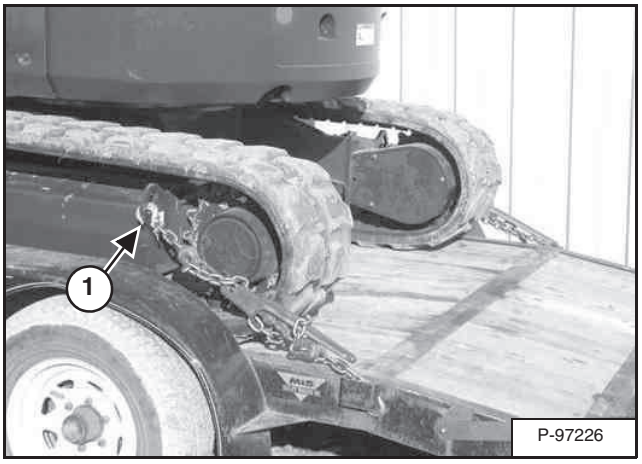


Figure 233



Fasten chains to the front corners of the blade (Item 1) **[Figure 232]** and to the tie down loop at both sides of the track frame (Item 1) **[Figure 233]** to prevent it from moving when going up or down slopes or during sudden stops.

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

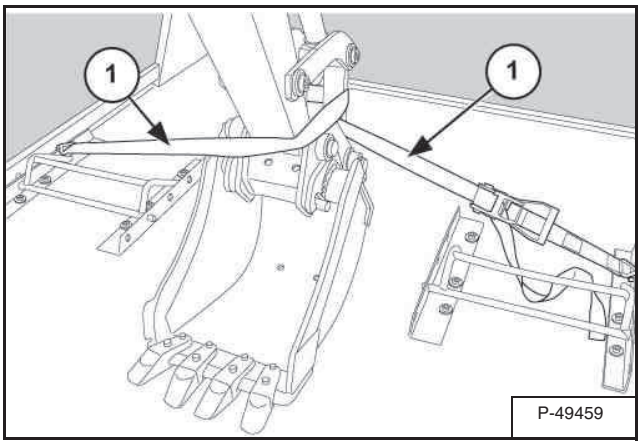
⚠ WARNING

AVOID SERIOUS INJURY OR DEATH

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

W-2058-0807

Figure 234



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

Loop the chain (Item 1) **[Figure 234]** round the bucket link.


Bobcat®

PREVENTIVE MAINTENANCE


Bobcat®

MAINTENANCE SAFETY

WARNING

Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, Operator's Handbook and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments, repairs or service. Untrained operators and failure to follow instructions can cause injury or death. W-2003-0807

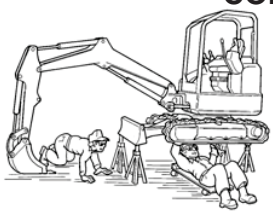
Safety Alert Symbol: This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.

CORRECT

P-90216

Never service the Bobcat Compact Excavator without instructions.

CORRECT



NA1428

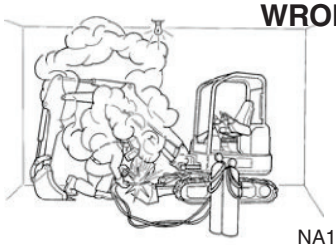
Use the correct procedure to lift and support the excavator.

CORRECT

NA1425

Cleaning and maintenance are required daily.

WRONG



NA1427

Have good ventilation when welding or grinding painted parts.

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

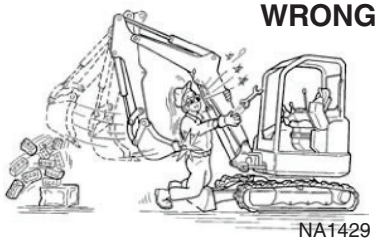
WRONG

NA1426

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

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

WRONG

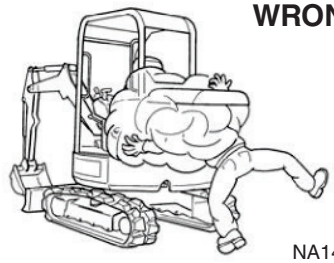


NA1429

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

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

WRONG



NA1430

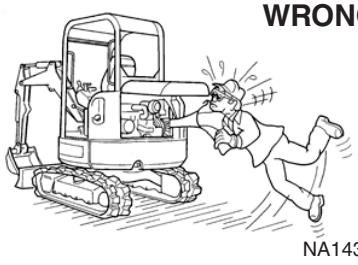
Stop, cool and clean engine of flammable materials before checking fluids.

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.

WRONG



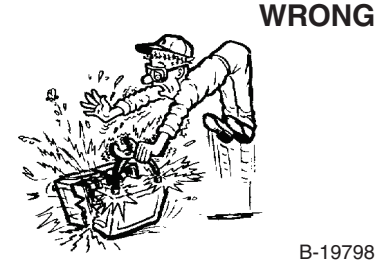
NA1431

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.

WRONG



B-19798

Lead-acid batteries produce flammable and explosive gases.

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

Batteries contain acid which burns eyes or skin on contact.

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

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

MSW38-0409


Bobcat®

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.

⚠ 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

Every 10 Hours (Before Starting The Excavator)

- **Engine Oil** - Check level and add as needed. (See Page 155.)
- **Engine Air Filters and Air System** - Check display panel. Service only when required. Check for leaks and damaged components. (See Page 149.)
- **Engine Cooling System** - Check coolant level COLD and add premixed coolant as needed. (See Page 158.) and (See Page 159.).
- **Seat Belt, Seat Belt Retractors, Seat Belt Mounting hardware, Control Console Lockout** - Check the condition of seat belt and mounting hardware. Clean or replace seat belt retractors as needed. Check the control console lockout lever for proper operation. Clean dirt and debris from moving parts. (See Page 142.)
- **Motion Alarm** - Check for proper function. (See Page 143.)
- **Operator Canopy / Cab** - Check the canopy / cab condition and mounting hardware. (See Page 45.)
- **Operator Cab and HVAC Filters** - Clean filters. (See Page 147.)
- **Indicators and Lights** - Check for correct operation of all indicators and lights. (See Page 35.)
- **Safety Signs** - Check for damaged signs (decals). Replace any signs that are damaged. (See Page 24.)
- **Hydraulic Fluid** - Check fluid level and add as needed. (See Page 165.)
- **Track Tension** - Check tension and adjust as needed. (See Page 170.)
- **Pivot Points** - Grease all machinery pivot points. Grease clamp and angle blade (if equipped). (See Page 179.)
- **Attachment Coupler** - Check for damage or loose parts (if equipped). (See Page 177.)

First 50 Hours

- **Engine Oil and Filter** - Service at first 50 hours, then as scheduled. Replace oil and filter. (See Page 156.)
- **Fuel Filter** - Service at first 50 hours, then as scheduled. Replace filter. (See Page 153.)
- **Alternator and Starter** - Service at first 50 hours, then as scheduled. Check connections.
- **Travel Motors (Final Drive)** - Service at first 50 hours, then as scheduled. Replace fluid. (See Page 173.)

Every 50 Hours

- **Swing Bearing** - Grease swing bearing and swing pinion. Service every 10 hours when operating in water. (See Page 179.)
- **Battery** - Check cables, connections, and electrolyte level; add distilled water as needed. (See Page 160.)
- **Fuel Tank** - Drain water and sediment from fuel tank and fuel filter. (See Page 153.)

Every 100 Hours

- **Spark Arrestor Muffler** - (If Equipped) - Clean spark chamber. (See Page 169.)

Every 250 Hours Or Every 12 Months

- **Fuel Filter** - Replace filter. (See Page 153.)
- **Travel Motors (Final Drive)** - Check fluid level and add as needed. (See Page 173.)

Maintenance Intervals (Cont'd)

Every 500 Hours Or Every 12 Months

- **Engine Oil and Filter** - Replace oil and filter. (See Page 156.)
- **Cooling System** - Clean debris from radiator, fuel cooler, hydraulic fluid cooler, air conditioning condenser (if equipped). (See Page 158.)
- **Hydraulic Filter, Pilot Filter and Hydraulic Reservoir Breather Cap** - Replace the hydraulic filter, pilot filter and the reservoir breather cap. (See Page 166.)
- **Drive Belts (Alternator) (Air Conditioning - If Equipped)** - Check condition. Replace as needed. Service at first 50 hours, then as scheduled. (See Page 174.) and (See Page 174.).
- **Alternator and Starter** - Check connections.
- **Engine Valves** - Adjust the engine valve clearance.
- **HVAC** - Clean housing and coils. (See Page 147.)

Every 1000 Hours Or Every 12 Months

- **Swing Cylinder Base End** - Grease swing cylinder base end grease fitting. (See Page 182.)
- **Hydraulic Fluid and Filters** - Replace hydraulic fluid and filters. (See Page 168.)
- **Travel Motors (Final Drive)** - Replace fluid. (See Page 173.)

Every 24 Months

- **Coolant** - Replace the coolant. (See Page 159.)

NOTE: The Inspection Checkbook can be ordered for you by your local dealer. Part number 7296478.

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:

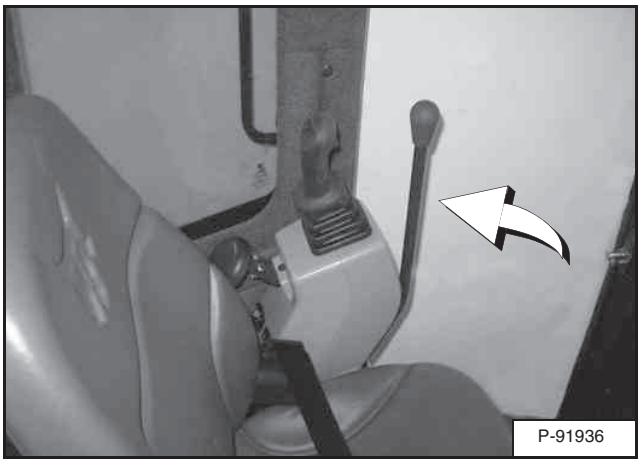
- Doosan Bobcat EMEA s.r.o. Warranty Policy
- Doosan Bobcat EMEA s.r.o. Extended Warranty Policy

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.

Inspection And Maintenance

Figure 235



When the left console is raised **[Figure 235]**, the hydraulic control levers (joysticks) and traction system must not function.

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

Raise the left console **[Figure 235]**.

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

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

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

SEAT BELT

Inspection And Maintenance

WARNING

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

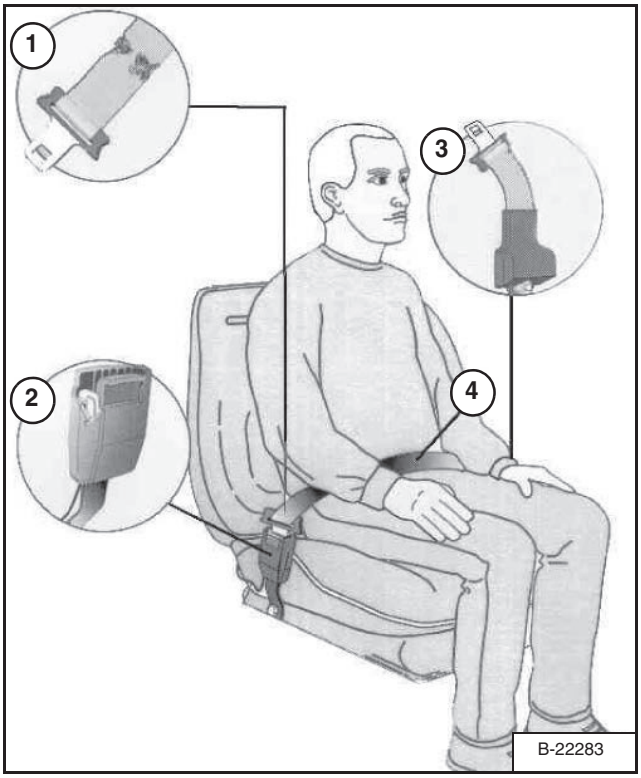
W-2466-0703

Check the seat belt daily for correct function.

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

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

Figure 236



The items below are referenced in **[Figure 236]**.

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

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

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

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

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

MOTION ALARM SYSTEM

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 237

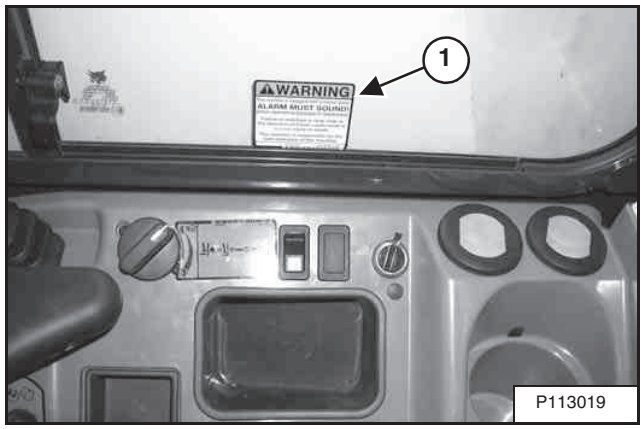
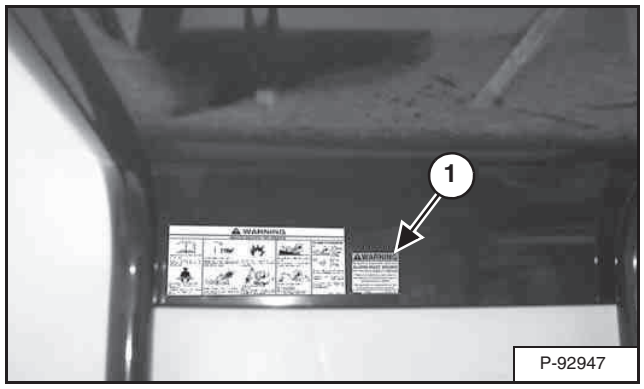


Figure 238



Inspect for damaged or missing motion alarm decal (Item 1) **[Figure 237]** (cab machine) or (Item 1) **[Figure 238]** (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

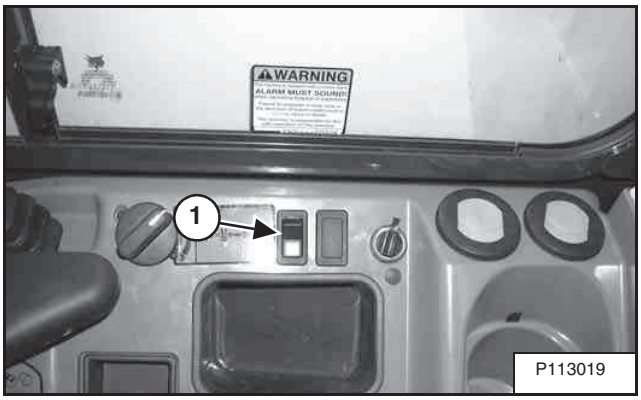
When an engine is running in an enclosed area, fresh air must be added to avoid concentration of exhaust fumes. If the engine is stationary, vent the exhaust outside. Exhaust fumes contain odorless, invisible gases which can kill without warning.

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 239



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 239]**. The motion alarm will shut off. With the machine still moving forward, move one of the levers to the NEUTRAL position, the motion alarm must sound.

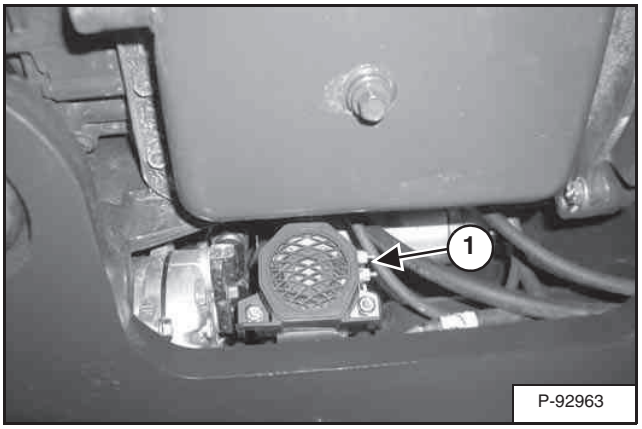
Slightly move both travel control levers in the reverse direction (until the machine is slowly moving backward) and then press the motion alarm cancel switch (Item 1) **[Figure 239]** (the switch icon will be illuminated when the motion alarm is deactivated). The motion alarm will shut off. With the 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 76.)

Inspecting (Cont'd)

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

Figure 240

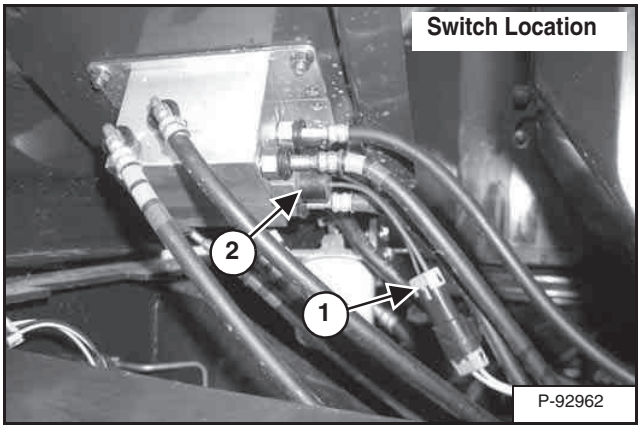


Inspect the motion alarm electrical connections and wire harness (Item 1) **[Figure 240]**, wire harness (Item 1) **[Figure 241]** and motion alarm switch (Item 2) **[Figure 241]** for tightness and damage. Repair or replace any damaged components.

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

Adjusting Switch Position

Figure 241



The motion alarm switch (Item 2) **[Figure 241]** 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 241]** 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.

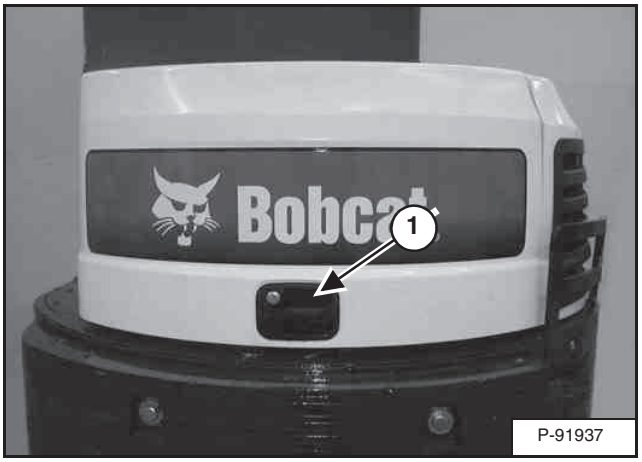
W-2012-0497

WARNING

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

W-2020-1285

Figure 242



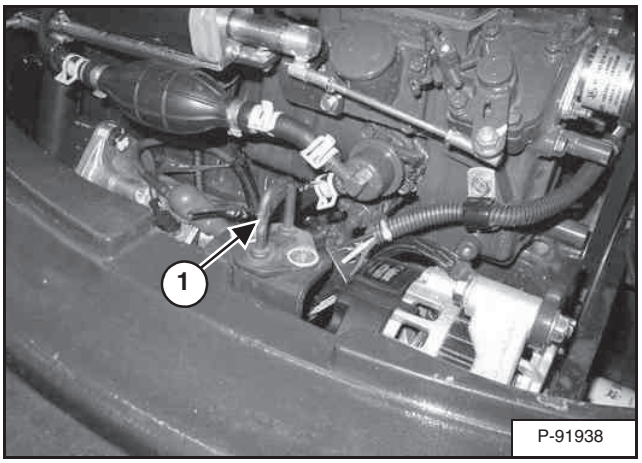
Pull the latch (Item 1) **[Figure 242]** and open the tailgate.

Push firmly to close the tailgate.

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

Adjusting The Latch

Figure 243



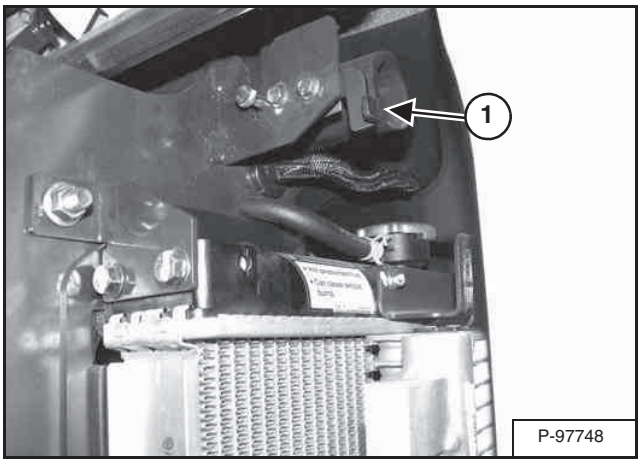
The tailgate latch (Item 1) **[Figure 243]** can be adjusted by loosening the two bolts, moving the latch, and tightening the two bolts.

Close the tailgate before operating the excavator.

RIGHT SIDE COVER

Opening And Closing

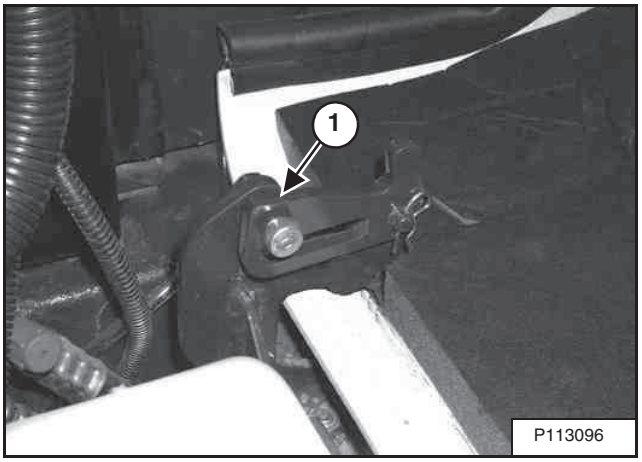
Figure 244



Open the tailgate to access the right side cover latch (Item 1) **[Figure 244]**.

Pull out on the latch (Item 1) **[Figure 244]** to release cover.

Figure 245



Raise the right side cover and rotate forward until it is held open by the retainer (Item 1) **[Figure 245]**.

To close the right side cover, lift up on the retainer (Item 1) **[Figure 245]** while raising the right side cover. Rotate the cover back until it is in the fully closed position.

Close the cover fully until the latch (Item 1) **[Figure 244]** locks the cover in the closed position.

CAB FILTERS

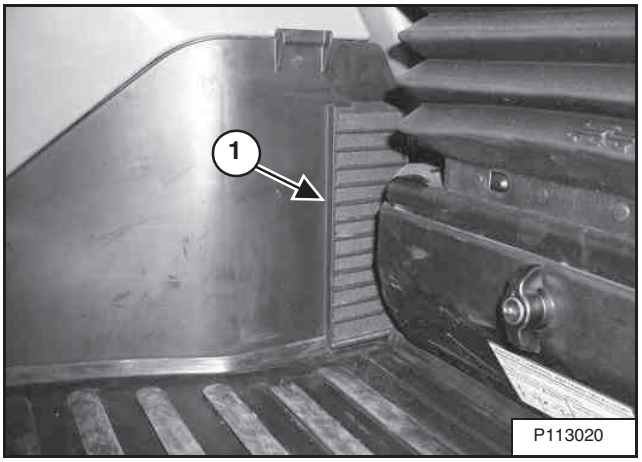
Cleaning And Maintenance

The recirculation filter and the fresh air filter must be cleaned regularly. (See SERVICE SCHEDULE on Page 139.)

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

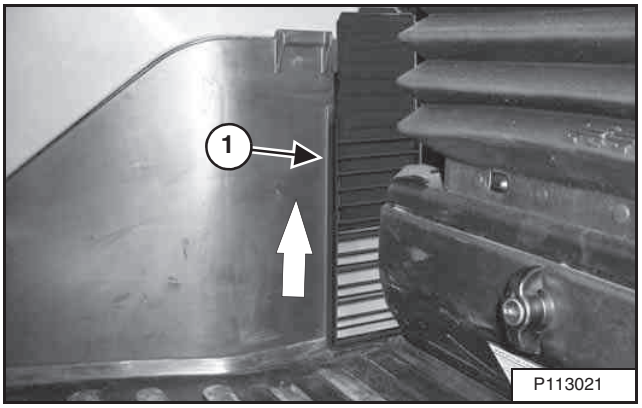
Recirculation Filter

Figure 246



The recirculation filter (Item 1) **[Figure 246]** is located to the right of the operator's seat.

Figure 247



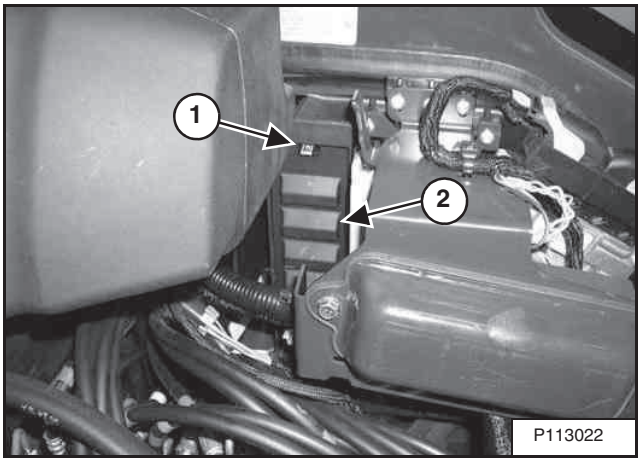
Pull up on the filter (Item 1) **[Figure 247]** until removed from the housing.

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 247]** into the housing and slowly push the filter down fully.

Fresh Air Filter

Figure 248

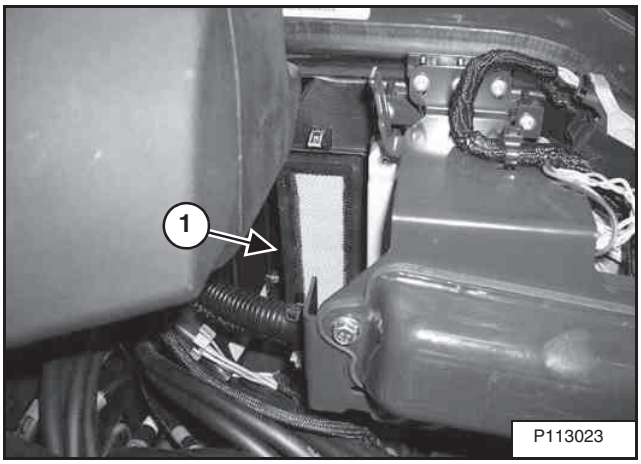


The fresh air filter is located under the right side cover.

Open the right side cover. (See RIGHT SIDE COVER on Page 146.)

Pull out on the tab (Item 1) and remove the cover (Item 2) **[Figure 248]**.

Figure 249



Pull the filter (Item 1) **[Figure 249]** 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 247]** into the housing and slowly push the filter in fully.

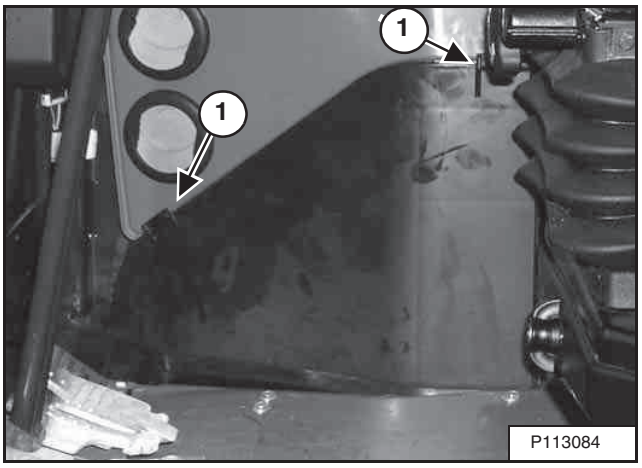
Place the bottom tabs of the filter cover (Item 2) into the frame and push the top in until the tab (Item 1) **[Figure 248]** locks to the frame.

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 139.)

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

Figure 250

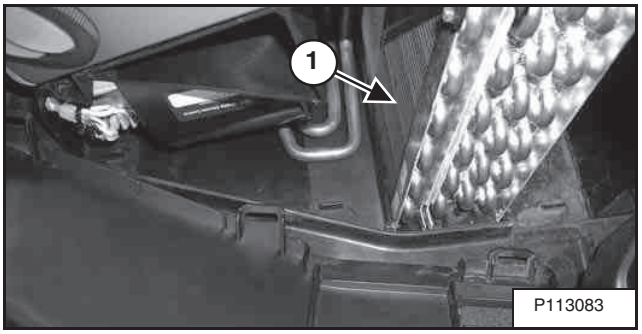


Remove the floor mat.

Pull back on the two latches (Item 1) **[Figure 250]** 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 251



Use a lower pressure air or a low pressure water stream to remove debris and to clean the coils (Item 1) **[Figure 251]**.

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.

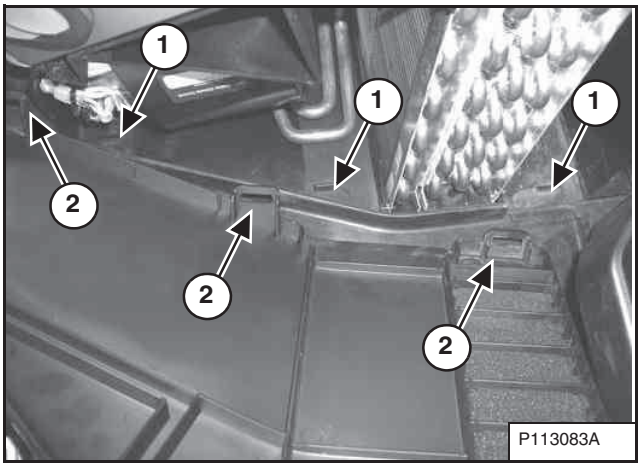
There are three rubber drain valves that allow condensation to drain from the housing during normal air conditioning usage. These drain valve can get clogged with dirt and should be cleaned at the same time the housing is cleaned.

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 252



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 252]** 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 250]**. 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.

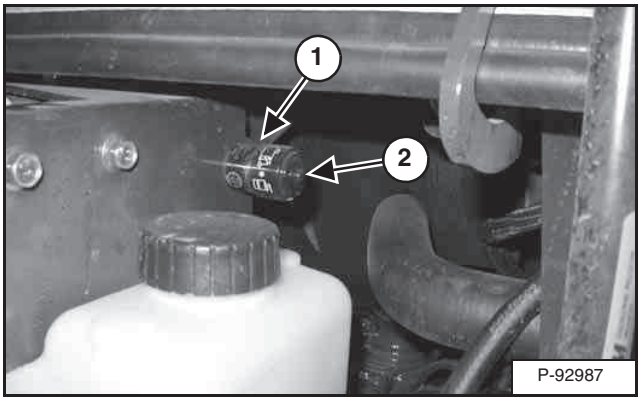
AIR CLEANER SERVICE

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 139.)

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 145.)

Figure 253



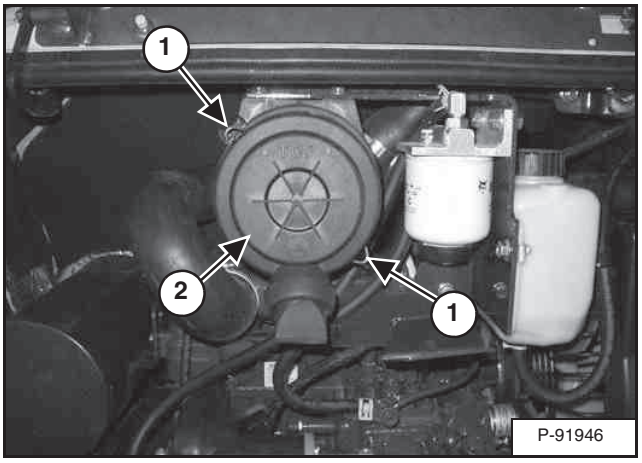
Check the condition indicator (Item 1) **[Figure 253]**. If the red ring shows in the condition indicator, the filter needs to be replaced.

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

Replacing The Filter Elements

Outer Filter

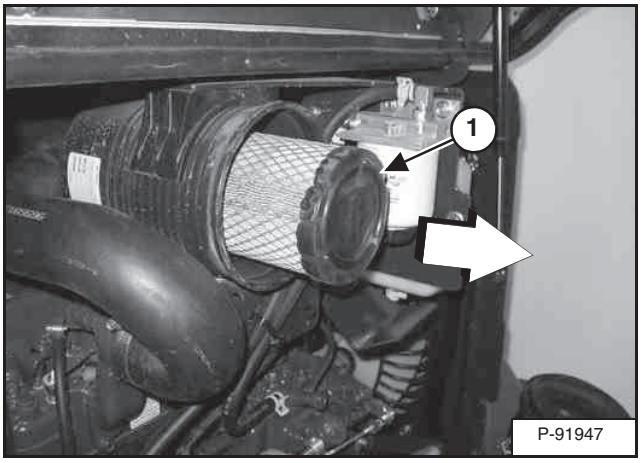
Figure 254



Release the two fasteners (Item 1) **[Figure 254]**.

Remove and clean the dust cup (Item 2) **[Figure 254]**.

Figure 255



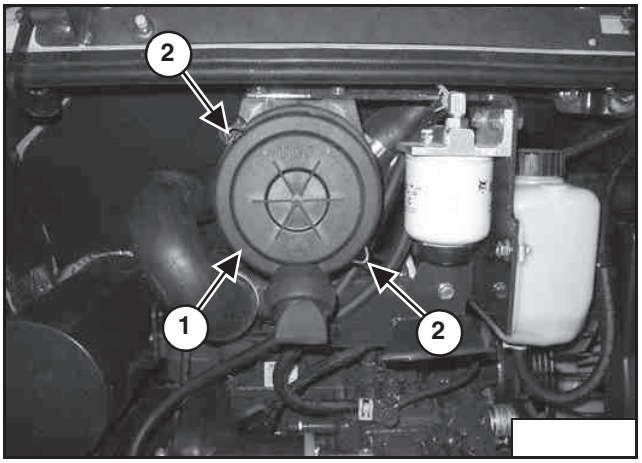
Pull the outer filter (Item 1) **[Figure 255]** from the air cleaner housing.

Check the housing for damage.

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

Install a new filter.

Figure 256



Install the dust cup (Item 1) and engage the fasteners (Item 2) **[Figure 256]**.

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 253]** 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 253]** shows in the condition indicator, replace the inner filter.

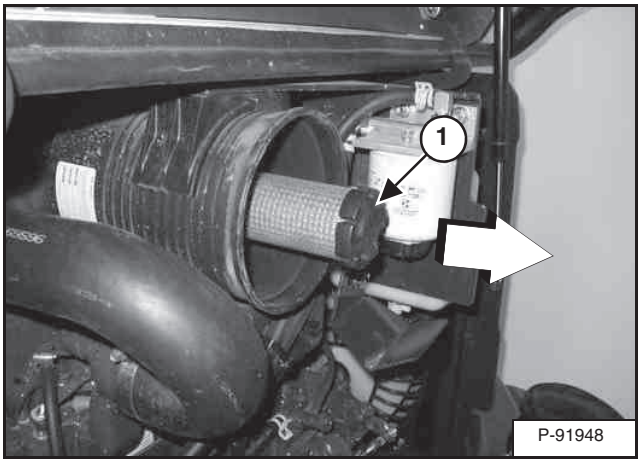
Replacing The Filter Elements (Cont'd)

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 253]** 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 257



Remove the dust cup, outer filter and inner filter (Item 1) **[Figure 257]**.

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.

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

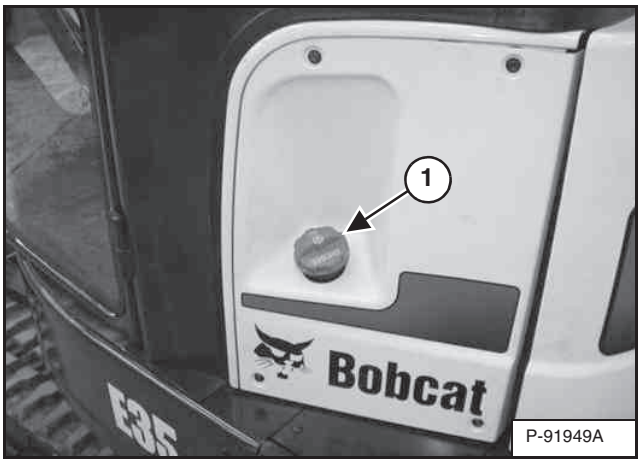
⚠ WARNING

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 258



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

Remove the fuel fill cap (Item 1) **[Figure 258]**.

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.

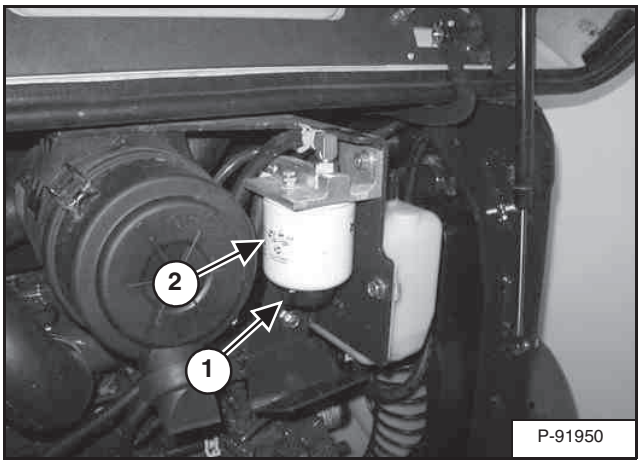
See the SERVICE SCHEDULE for the service interval when to remove water from or replace the fuel filter. (See SERVICE SCHEDULE on Page 139.)

Fuel Filters

Removing Water

Open the tailgate. (See TAILGATE on Page 145.)

Figure 259



Loosen the drain (Item 1) **[Figure 259]** at the bottom of the filter to drain water from the filter into a container.

Clean up any spilled fuel.

Replacing Elements

Remove the filter (Item 2) **[Figure 259]**.

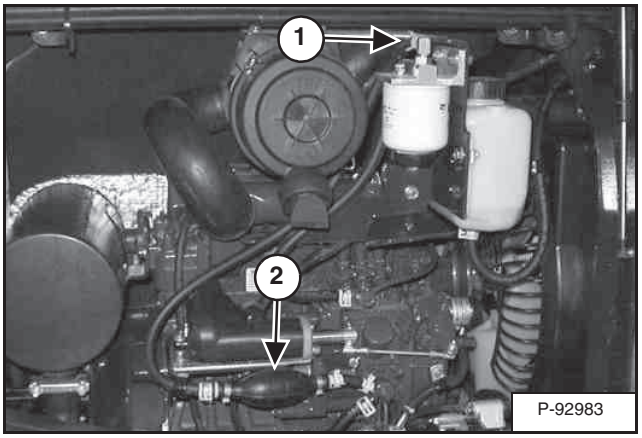
Clean the area around the filter housing. Put clean oil on the seal of the new filter. Install the fuel filter and hand tighten.

Remove the air from the fuel system. (See Removing Air From The Fuel System on Page 154.)

Draining The Fuel Tank

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 139.)

Figure 260



Remove the hose (Item 1) **[Figure 260]** from the fuel filter. Route the hose to a container.

Squeeze the hand pump (priming bulb) (Item 2) **[Figure 260]** 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 260]** 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 doctor familiar with this injury.

W-2072-EN-0909

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 261

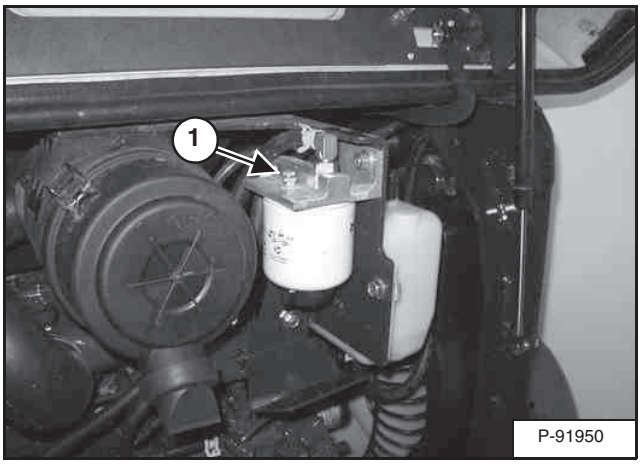
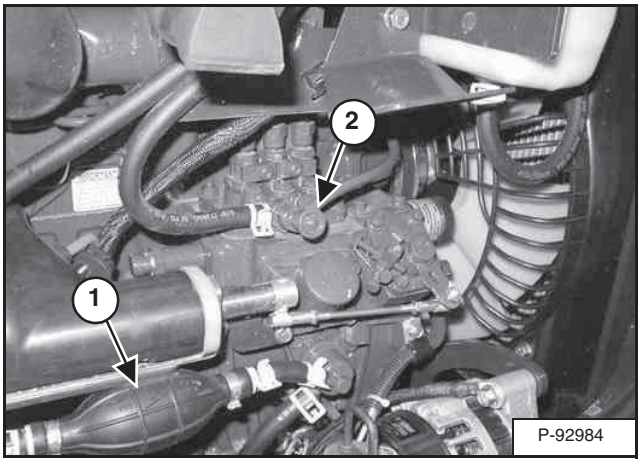


Figure 262



Open the tailgate. (See TAILGATE on Page 145.)

Open the fuel filter vent (Item 1) **[Figure 261]** and operate the hand pump (priming bulb) (Item 1) **[Figure 262]** until the fuel flows from the vent with no air bubbles.

Close the vent (Item 1) **[Figure 261]**.

Start the engine. It may be necessary to open the vent (Item 2) **[Figure 262]** (at the fuel injection pump) briefly until the engine runs smoothly.

⚠ WARNING

AVOID INJURY OR DEATH

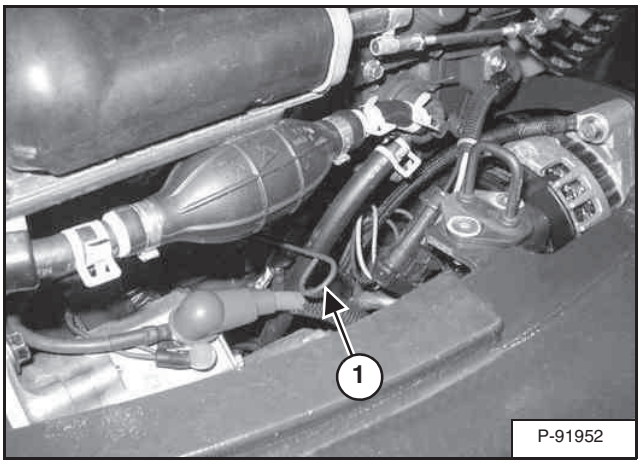
Diesel fuel or hydraulic fluid under pressure can penetrate skin or eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. Do not use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical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

W-2072-EN-0909

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 139.)

Figure 263



Open the tailgate and remove the dipstick (Item 1) **[Figure 263]**.

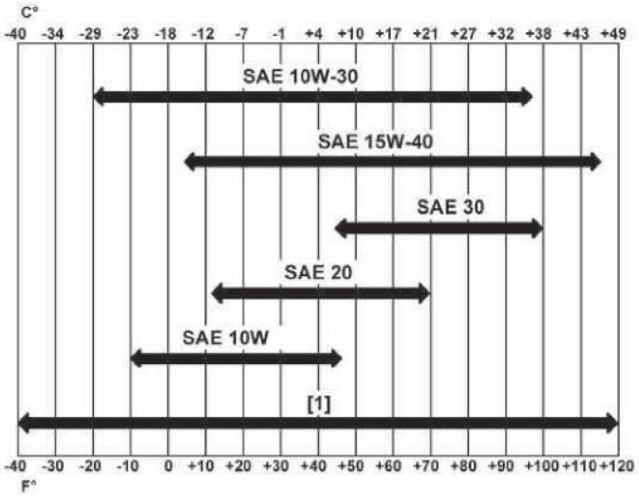
Keep the oil level between the marks on the dipstick.

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

Engine Oil Chart

Figure 264

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



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

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

Use good quality engine oil that meets API Service Classification of CI-4 or better **[Figure 264]**.

⚠ WARNING

AVOID INJURY OR DEATH

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

W-2103-0508

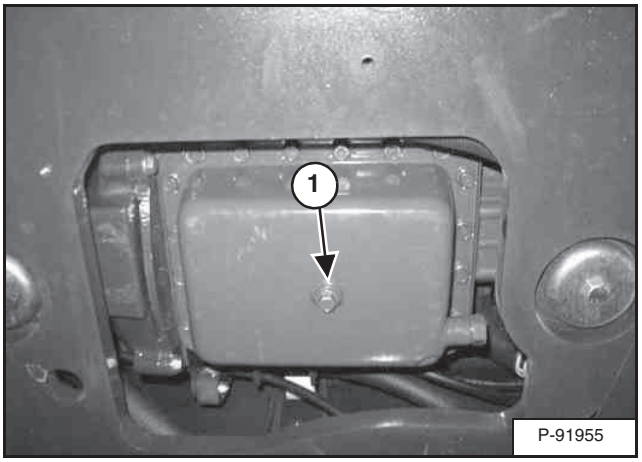
Removing And Replacing Oil And Filter

See the SERVICE SCHEDULE for the service interval for replacing the engine oil and filter. (See SERVICE SCHEDULE on Page 139.)

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

Open the tailgate. (See TAILGATE on Page 145.)

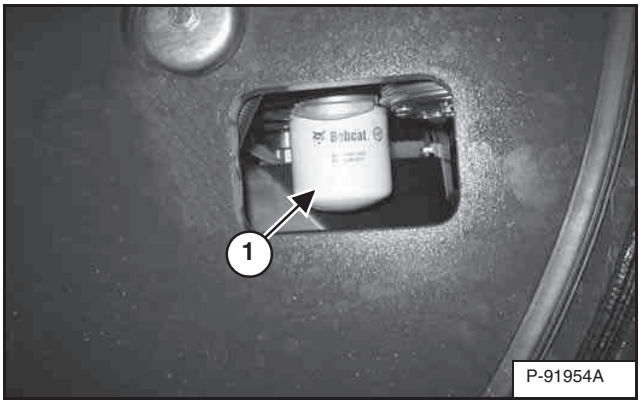
Figure 265



Place a container under the oil pan. Remove the drain plug (Item 1) **[Figure 265]** from the bottom of the engine oil pan.

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

Figure 266

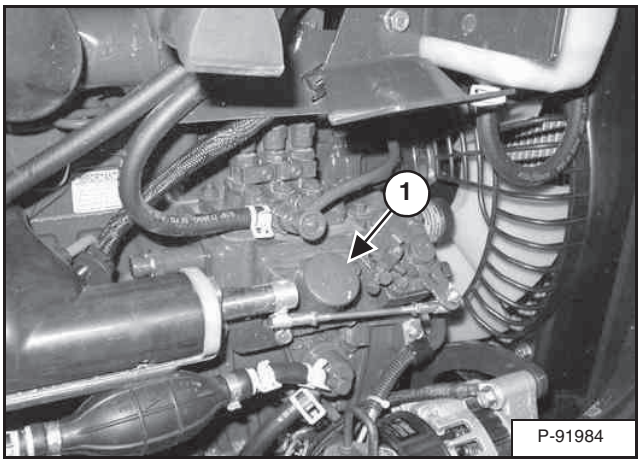


Remove the oil filter (Item 1) **[Figure 266]** and clean the filter housing surface.

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 265]**.

Figure 267



Remove the fill cap (Item 1) **[Figure 267]**.

Put oil in the engine. (See ENGINE LUBRICATION SYSTEM on Page 155.)

Install the fill cap (Item 1) **[Figure 267]**.

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

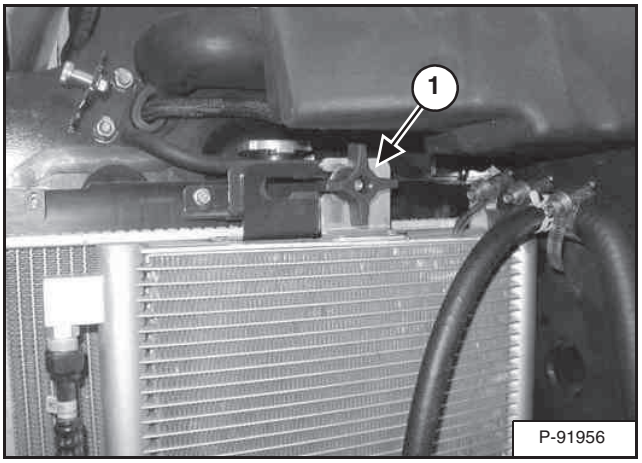
Check the cooling system every day to prevent overheating, loss of performance or engine damage. (See SERVICE SCHEDULE on Page 139.)

Cleaning

Open the right side cover. (See RIGHT SIDE COVER on Page 146.)

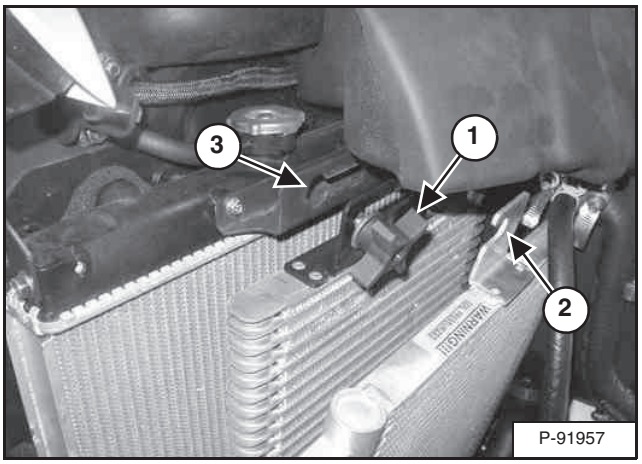
NOTE: Allow the cooling system and engine to cool before servicing or cleaning the cooling system.

Figure 268



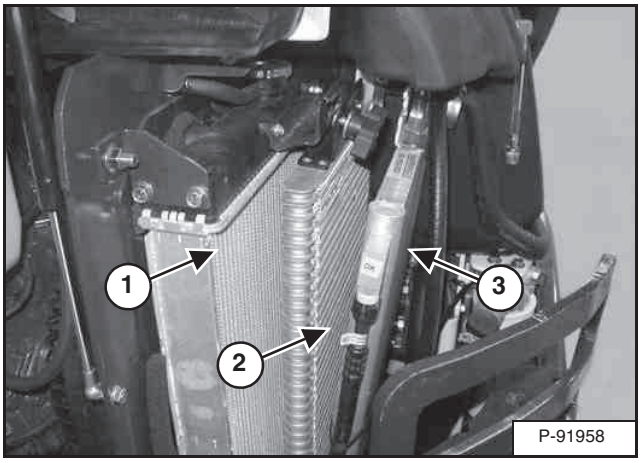
Loosen the knob (Item 1) **[Figure 268]**. Slide the knob toward the rear of the machine.

Figure 269



Slide the knob (Item 1) out of the condenser mount (Item 2) (if equipped) and the radiator mounting bracket (Item 3) **[Figure 269]**. Be careful not to damage fins.

Figure 270



Use air pressure or water pressure to clean the radiator (Item 1), oil cooler (Item 2) and condenser (Item 3) **[Figure 270]** (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 269]** (if equipped).

Slide the knob (Item 1) toward the front of the machine until it is fully seated in the slots of the mounting brackets. Tighten the knob (Item 1) **[Figure 268]**. 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

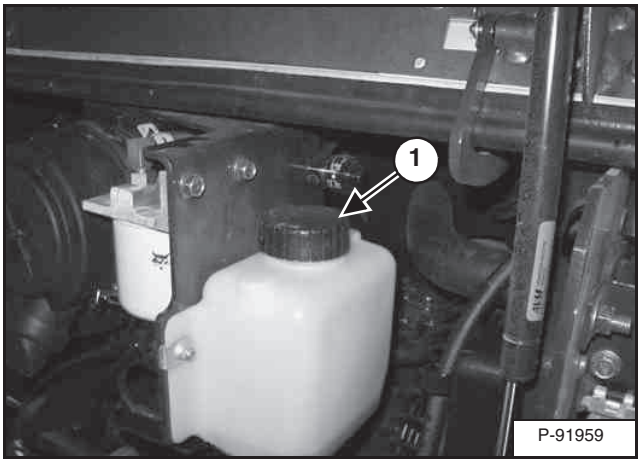
Wear safety glasses to prevent eye injury when any of the following conditions exist:

- **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 145.)

Figure 271



Check the coolant level in the coolant recovery tank (Item 1) **[Figure 271]**.

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

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

IMPORTANT

AVOID ENGINE DAMAGE

Always use the correct ratio of water to antifreeze.

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

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

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

I-2124-0497

Removing And Replacing Coolant

See the SERVICE SCHEDULE for correct service intervals. (See SERVICE SCHEDULE on Page 139.)

Stop the engine. Open the tailgate. (See TAILGATE on Page 145.)

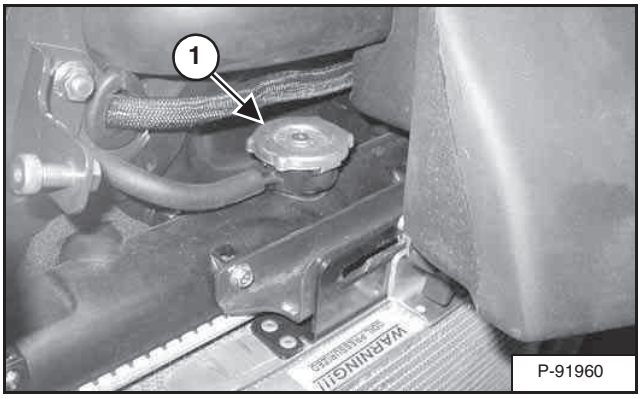
⚠ WARNING

AVOID BURNS

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

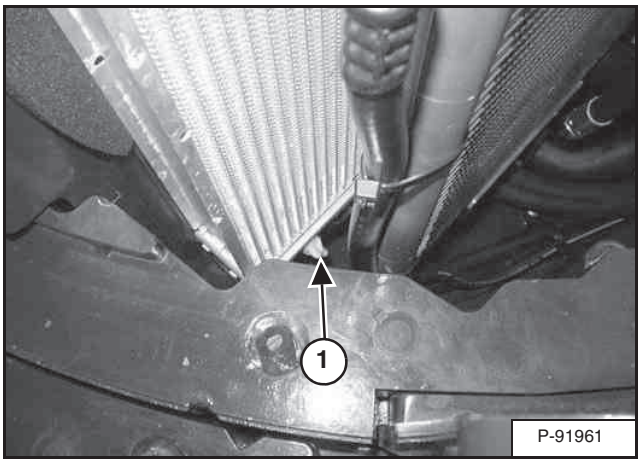
W-2070-1203

Figure 272



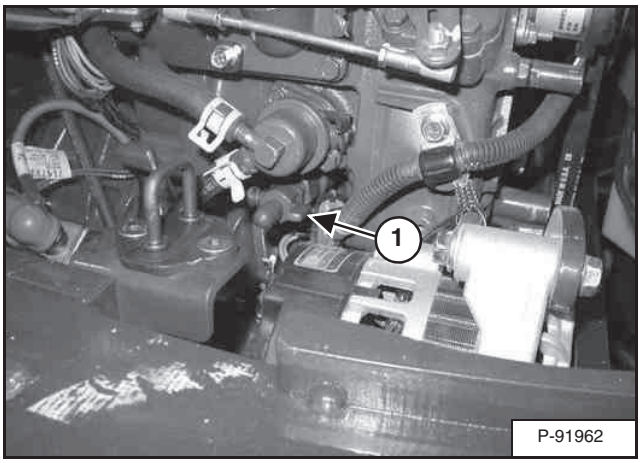
When the engine is cool, loosen and remove the radiator cap (Item 1) **[Figure 272]**.

Figure 273



Put a hose on the drain valve at the bottom of the radiator. Open the drain valve (Item 1) **[Figure 273]** and drain the coolant into a container.

Figure 274



Put a hose on the drain valve on the engine block. Open the drain valve (Item 1) **[Figure 274]** 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 217.)

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.

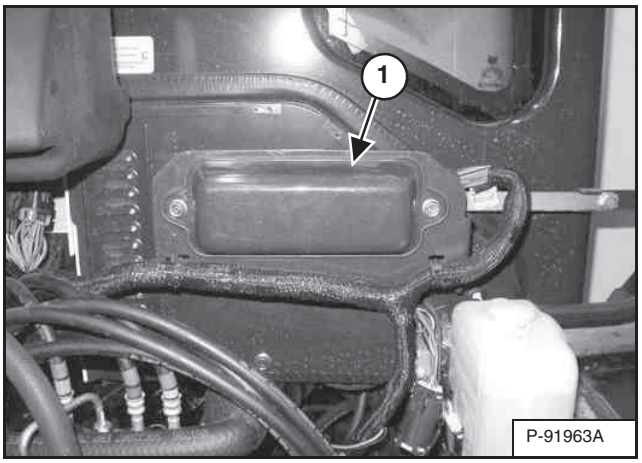
Run the engine until it is at operating temperature. Stop the engine. Check the coolant level and add as needed. Be sure the radiator cap is tight.

Add coolant to the recovery tank as needed.

Close the tailgate.

Description

Figure 275



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 275]**. 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.

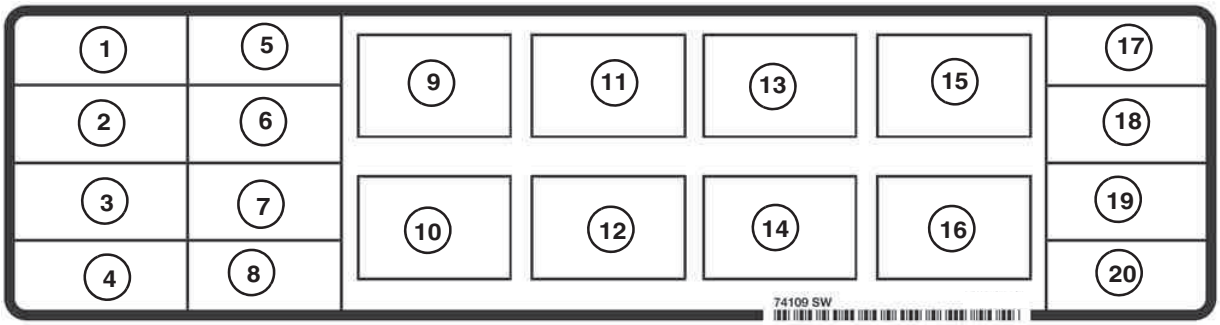
Remove the cover to check or replace the fuses and relays.

The location and sizes are shown in **[Figure 276]**.

Always replace fuses using the same type and capacity.

Fuse And Relay Location / Identification (Cont'd)

Figure 276



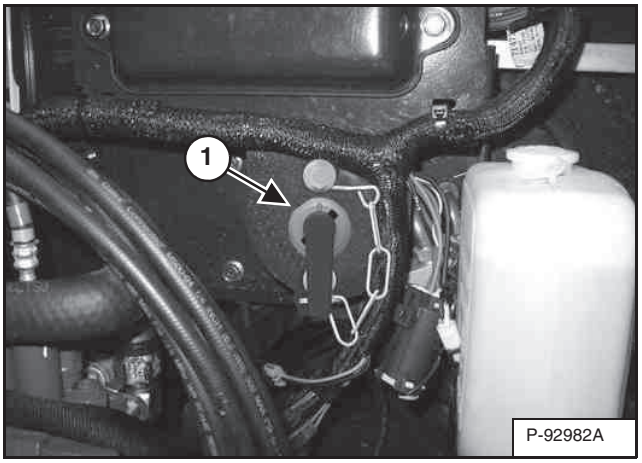
The location and sizes are shown in the table below and on the decal **[Figure 276]**. Relays are identified by the letter "R" in the AMP column.

REF	ICON	DESCRIPTION	AMP	REF	ICON	DESCRIPTION	AMP	REF	ICON	DESCRIPTION	AMP
1		CONTROLLER	20	9		Switched Power	R	17		Controller	25
2		HVAC	35	10		Fuel Shutoff	R	18		ACD	25
3		Start Key	5	11		HVAC	R	19		LIGHTS	20
4		Fuel Pull	25	12		Lights	R	20		Power Port	15
5		Wiper / Washer	10	13		NOT USED	R				
6		Switched Power	20	14		Glow Plugs	R				
7		Alternator Excite / Heater	25	15		NOT USED	R				
8		ACD	25	16		Starter	R				

Shut-Off Switch

Open the right side cover. (See RIGHT SIDE COVER on Page 146.)

Figure 277



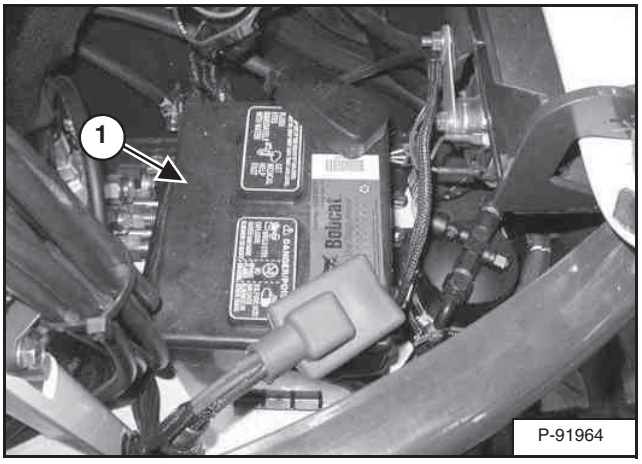
The shut-off switch (Item 1) **[Figure 277]** is located under the right side cover below the fuse panel.

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

Battery Maintenance

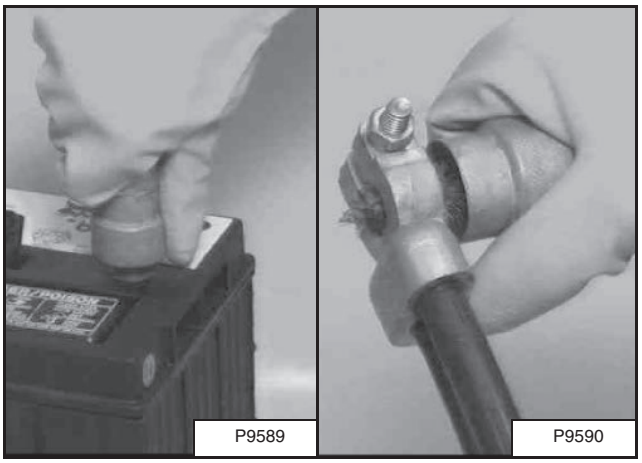
Open the right side cover. (See RIGHT SIDE COVER on Page 146.)

Figure 278



The battery (Item 1) **[Figure 278]** is located in the front of the right side upperstructure.

Figure 279



The battery cables must be clean and tight **[Figure 279]**. Remove acid or corrosion from the battery and cables using a sodium bicarbonate and water solution. Cover the battery terminals and cable ends with battery saver grease to prevent corrosion.

Check for broken or loose connections.

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

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

If the electrolyte level is lower than 13 mm (0.50 in) above the plates, add distilled water only.

⚠ WARNING

AVOID INJURY OR DEATH

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

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

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

W-2065-0807

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.

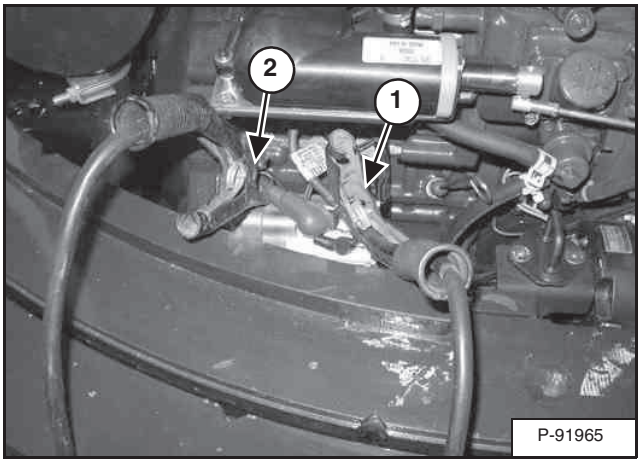
I-2060-0906

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 145.)

Figure 280



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 280]** 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 280]**.

Start the engine. After the engine has started, remove the earth (-) cable first (Item 2) **[Figure 280]**.

Disconnect the cable from the excavator starter (Item 1) **[Figure 280]**.

NOTE: (See Cold Temperature Starting on Page 74.)

IMPORTANT

Damage to the alternator can occur if:

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

I-2223-0903

⚠ WARNING

AVOID INJURY OR DEATH

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

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

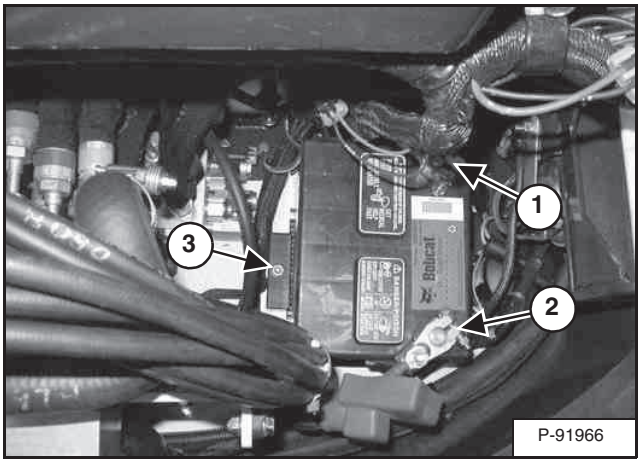
If electrolyte is taken internally drink large quantities of water or milk! DO NOT induce vomiting. Get prompt medical attention.

W-2065-0807

Removing And Installing The Battery

Open the right side cover. (See RIGHT SIDE COVER on Page 146.)

Figure 281



Disconnect the negative (-) cable (Item 1) **[Figure 281]** first.

Disconnect the positive (+) cable (Item 2) **[Figure 281]**.

Remove the bolt (Item 3) **[Figure 281]** 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 281]** 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

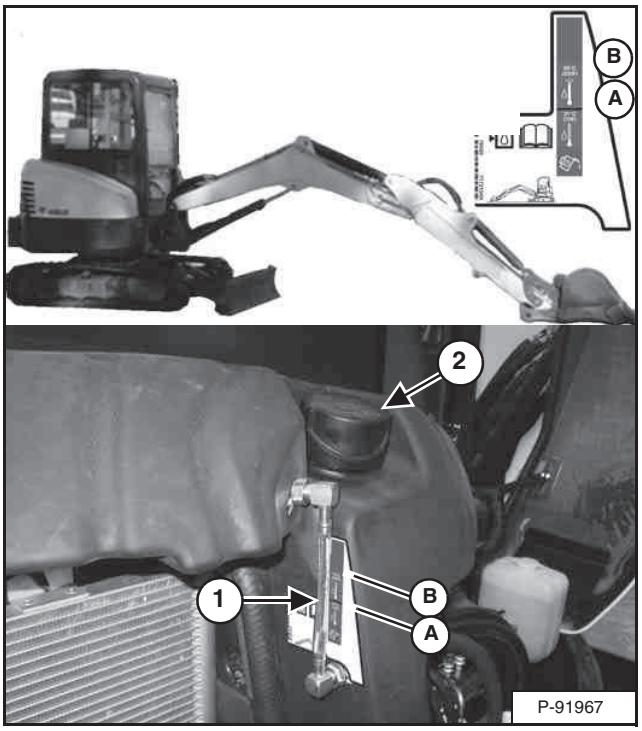
Checking And Adding Hydraulic Oil

Put the machine on a flat level surface.

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

Open the right side cover. (See RIGHT SIDE COVER on Page 146.)

Figure 282



Park the machine in the position shown **[Figure 282]**. (The preferred method is to check the hydraulic oil when it is cold.)

Check the hydraulic oil level, it must be visible in the sight gauge (Item 1) **[Figure 282]**. 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 282]**.

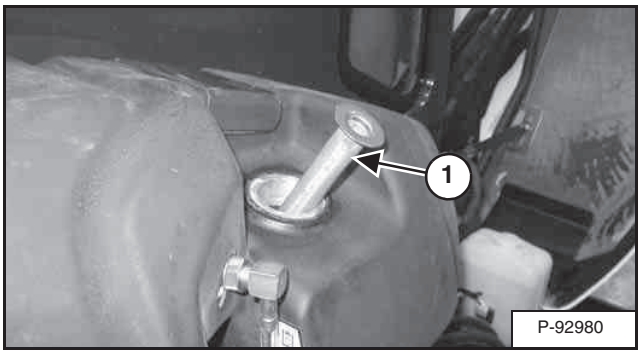
⚠ WARNING

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 283



Check the condition of the fill strainer screen (Item 1) **[Figure 283]**. Clean or replace as necessary.

Be sure the screen is installed before adding fluid.

Add the correct fluid to the reservoir until it is visible in the sight gauge. (See HYDRAULIC SYSTEM on Page 165.)

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

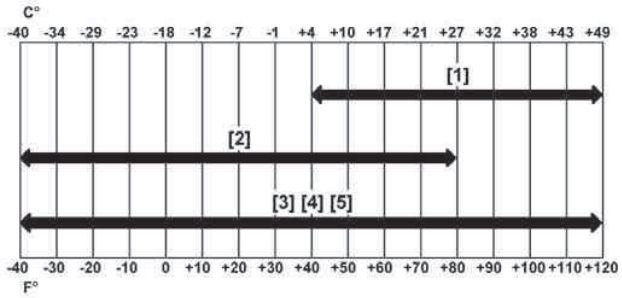
Install the cap.

Close the right side cover and tailgate.

Hydraulic / Hydrostatic Fluid Chart

Figure 284

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



TEMPERATURE RANGE ANTICIPATED DURING MACHINE USE

[1] VG 100; Minimum VI 130
[2] VG 46; Minimum VI 150
[3] BOBCAT All-Season Fluid
[4] BOBCAT Synthetic Fluid
[5] BOBCAT Biodegradable Hydraulic / Hydrostatic Fluid (Unlike biodegradable fluids that are vegetable based, Bobcat biodegradable fluid is formulated to prevent oxidation and thermal breakdown at operating temperatures.)

Install the oil fill cap.

Removing And Replacing The Hydraulic Filters

⚠ WARNING

AVOID INJURY OR DEATH

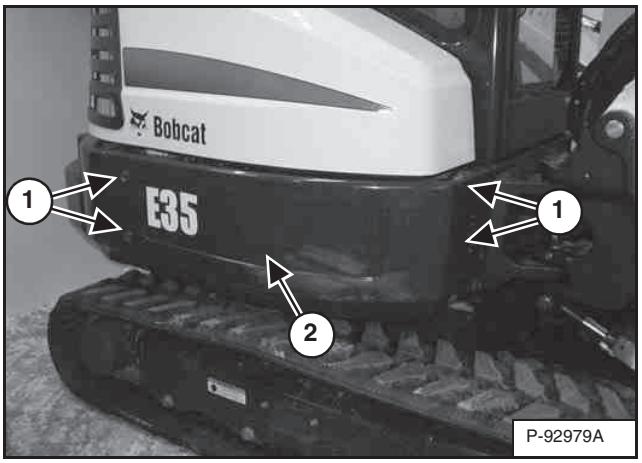
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire.

W-2103-0508

Hydraulic Filter

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 139.)

Figure 285

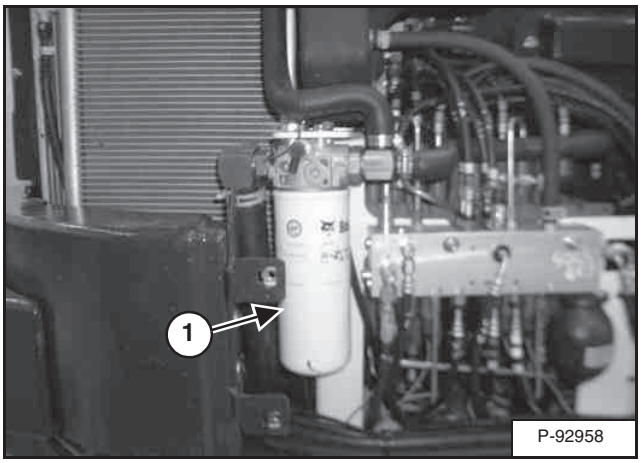


For easier access to change the hydraulic filter, remove the lower right side panel.

Remove the four bolts (Item 1) and the side panel (Item 2) **[Figure 285]**. Remove the side panel.

Open the right side cover. (See RIGHT SIDE COVER on Page 146.)

Figure 286



Remove the hydraulic filter (Item 1) **[Figure 286]**.

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.

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

Case Drain Filter

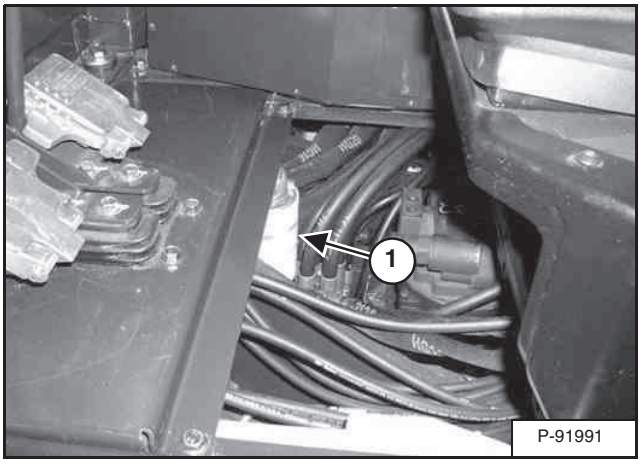
See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 139.)

The case drain filter is located below the floorplate.

Remove the floor mat.

Remove the floorplate.

Figure 287



Remove the case drain filter (Item 1) **[Figure 287]**.

Clean the housing where the filter gasket makes contact.

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

NOTE: When changing the case drain filter, also lubricate the boom swing cylinder base end fitting while the floorplate is removed. (See SERVICE SCHEDULE on Page 139.) and (See LUBRICATION OF THE HYDRAULIC EXCAVATOR on Page 179.).

Removing And Replacing The Hydraulic Fluid

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 139.)

⚠ WARNING

AVOID INJURY OR DEATH

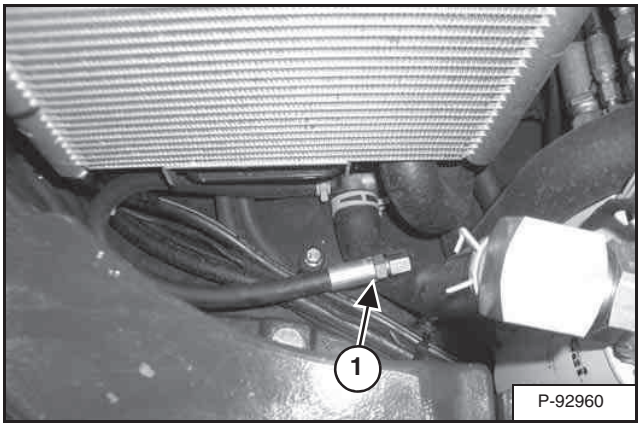
Diesel fuel or hydraulic fluid under pressure can penetrate skin or eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. Do not use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical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

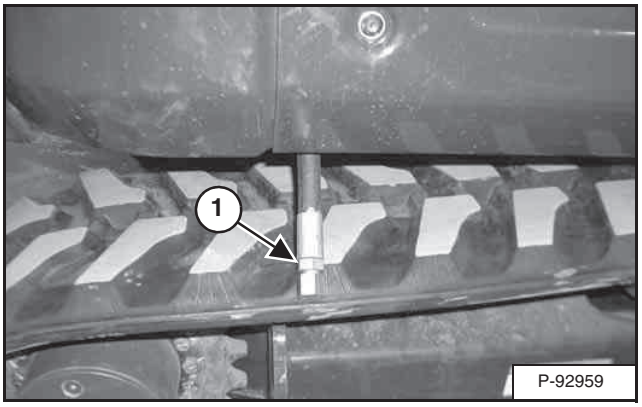
Open the tailgate. (See TAILGATE on Page 145.)

Figure 288



The hydraulic oil drain hose (Item 1) **[Figure 288]** is located below the oil cooler in the right rear corner of the upperstructure.

Figure 289



Reposition the drain hose out the bottom of the upperstructure and remove the cap (Item 1) **[Figure 289]**.

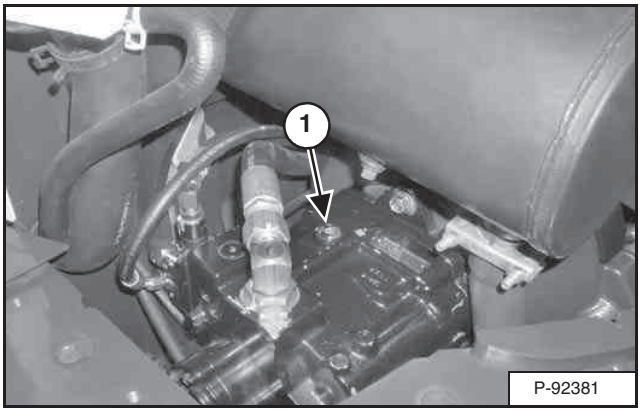
Drain the fluid into a container.

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

Install the cap (Item 1) **[Figure 289]** and position the drain hose back to the storage position (Item 1) **[Figure 288]**.

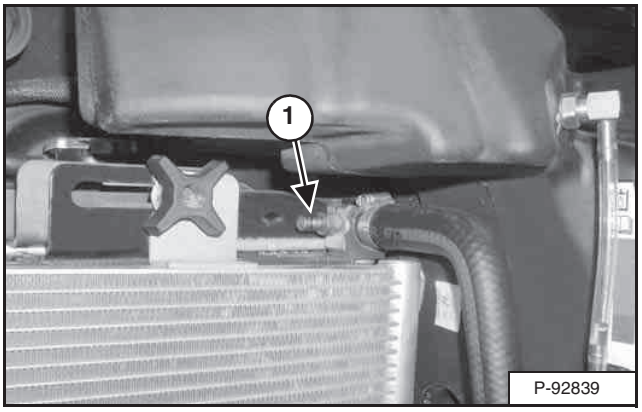
Add fluid to the reservoir. (See HYDRAULIC SYSTEM on Page 165.)

Figure 290



With the engine OFF, loosen the plug (Item 1) **[Figure 290]** 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 291



There is also a port (Item 1) **[Figure 291]** 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

If equipped with the spark arrester muddler, See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 139.)

⚠ WARNING

AVOID INJURY OR DEATH

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

W-2050-0807

⚠ WARNING

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

W-2011-1285

⚠ WARNING

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

W-2068-1285

⚠ WARNING

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

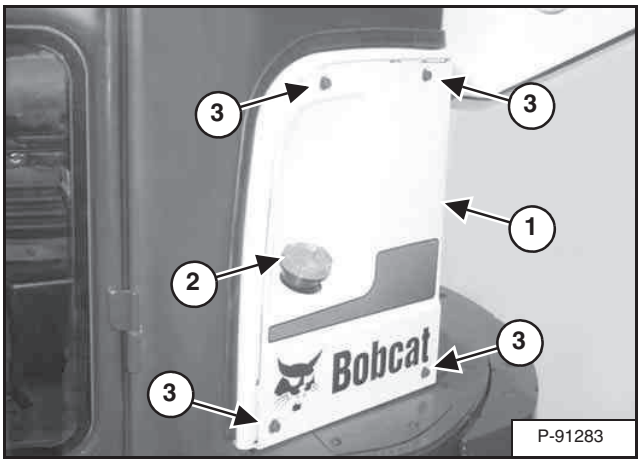
Failure to do so can cause injury or death.

W-2203-0595

Do not operate the excavator with a defective exhaust system.

Stop the engine. Open the tailgate. (See TAILGATE on Page 145.)

Figure 292

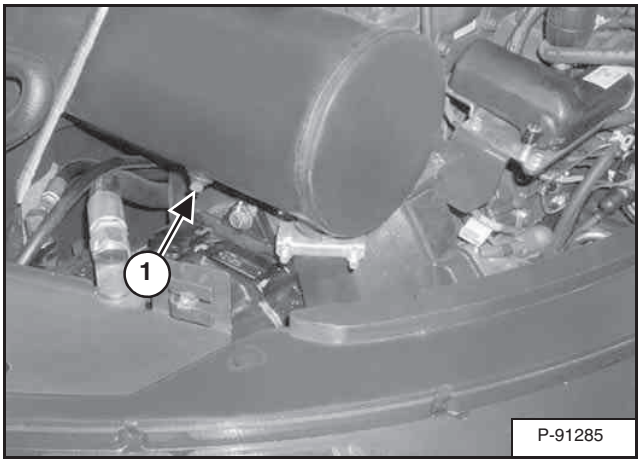


The left panel (Item 1) **[Figure 292]** will need to be removed for access to the spark arrester muffler.

Remove the fuel cap (Item 2) and the four bolts (Item 3) and remove the panel (Item 1) **[Figure 292]**.

Reinstall the fuel cap (Item 2) **[Figure 292]**.

Figure 293



Remove the plug (Item 1) **[Figure 293]** 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 293]**.

Stop the engine. Install and tighten the plug.

Reinstall the panel (Item 1) **[Figure 292]**.

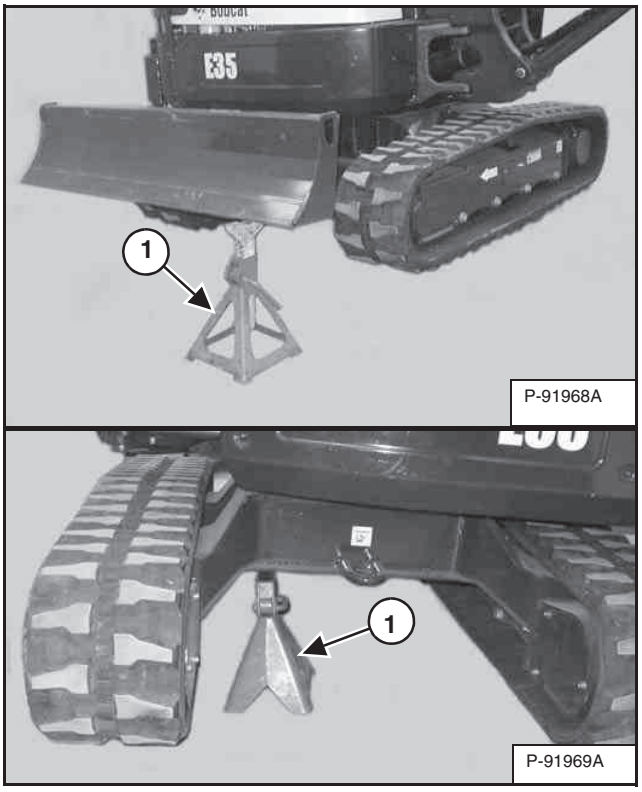
Close the tailgate.

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 139.)

Adjusting

Figure 294



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 294]**. 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

Adjusting (Cont'd)

Rubber Track Clearance

Figure 295

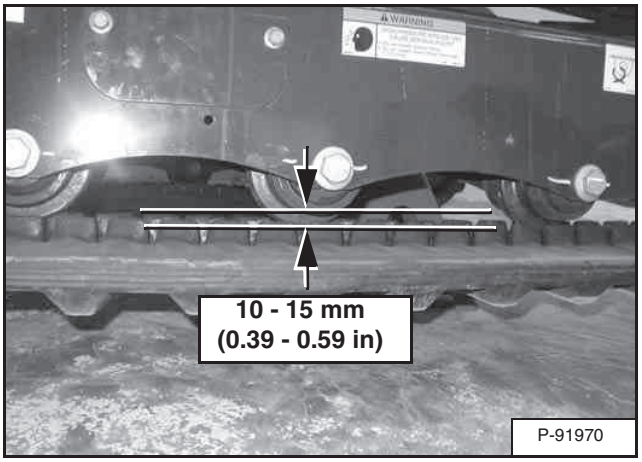
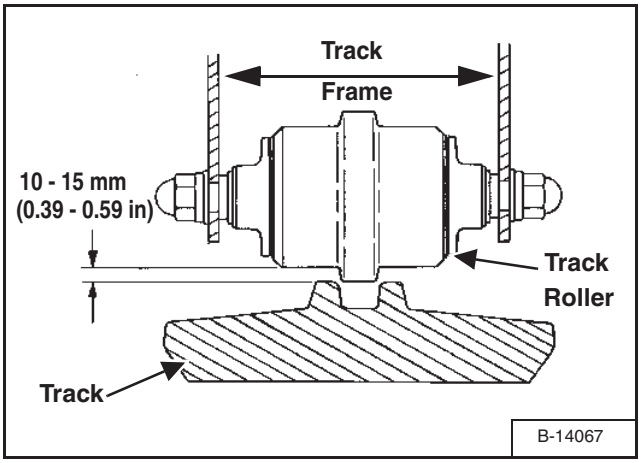


Figure 296

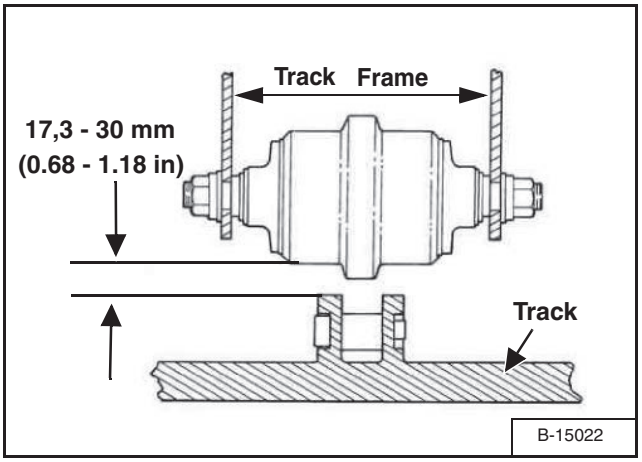


Measure the clearance at the middle track roller. Do not get fingers into pinch points between the track and the track roller. Use a bolt or a dowel of the appropriate size to check the gap between the contact edge of the roller and the top edge of the track guide **[Figure 295]** and **[Figure 296]**.

Rubber Track Clearance - 10 - 15 mm (0.39 - 0.59 in)

Steel Track Clearance

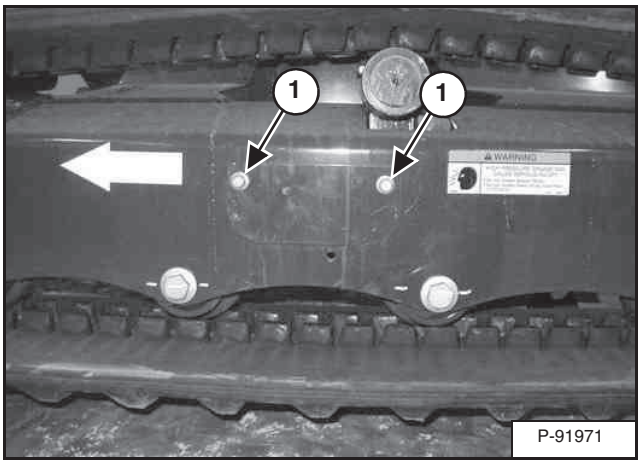
Figure 297



Measure the track clearance at the middle track roller. Do not get fingers into pinch points between the track and the track roller. Us a bolt or dowel of the appropriate size to check the gap between the contact edge of the roller and the top edge of the track guide **[Figure 297]**.

Steel Track Clearance - 17,3 - 30 mm (0.68 - 1.18 in)

Figure 298



Loosen the two bolts from the cover (Item 1) **[Figure 298]**. Pivot the cover downward.

Adjusting (Cont'd)

⚠ WARNING

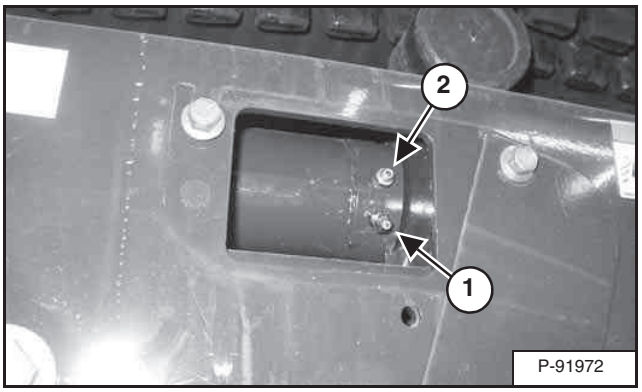
HIGH PRESSURE GREASE CAN CAUSE SERIOUS INJURY

- **Do not loosen the track tension fitting more than 1 - 1/2 turns.**

W-2994-0515

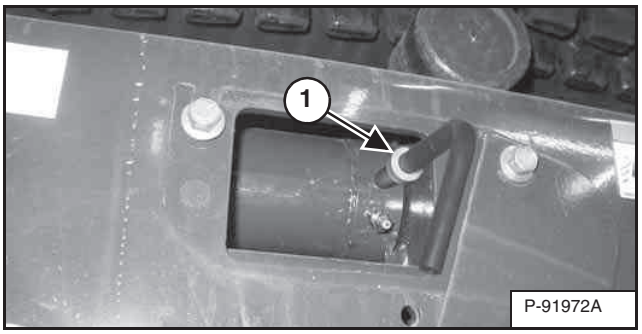
With Bleed Screw and Track Tension Fitting

Figure 299



Add grease to the track tension fitting (Item 1) **[Figure 299]** until the track tension is correct.

Figure 300



The tension removal tool (P/N 6675936) is available and recommended to direct the flow of grease to aid in cleanup. Always dispose of the grease in an environmentally friendly manor.

The tool is sized to fit the bleed fitting (Item 2) **[Figure 299]**.

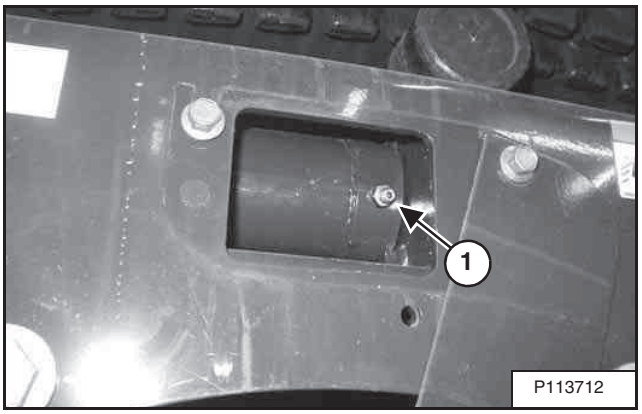
Use tool P/N 6675936 (Item 1) **[Figure 300]** to loosen the bleed fitting (Item 2) **[Figure 299]** to release tension from the track. Do not loosen the bleed fitting more than 1-1/2 turns.

NOTE: Do not loosen the grease fitting (Item 1) [Figure 299].

Repeat the procedure for the other side.

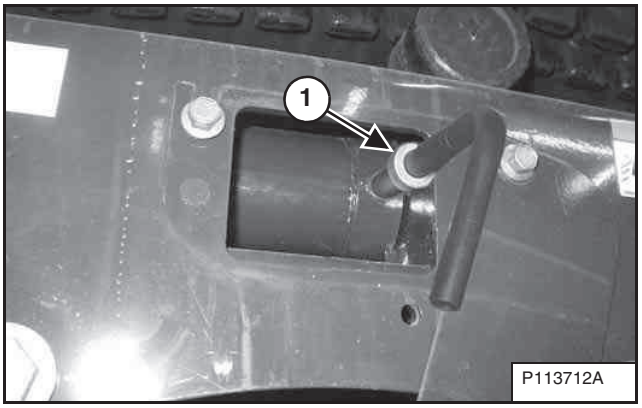
With One Piece - Track Tension Fitting

Figure 301



Add grease to the track tension fitting (Item 1) **[Figure 301]** until the track tension is correct.

Figure 302



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 manor.

The tool is sized to fit the one piece track tension fitting (Item 1) **[Figure 301]**.

Use tool P/N 7277225 (Item 1) **[Figure 302]** to loosen the track tension fitting (Item 1) **[Figure 301]** to release tension from the track.

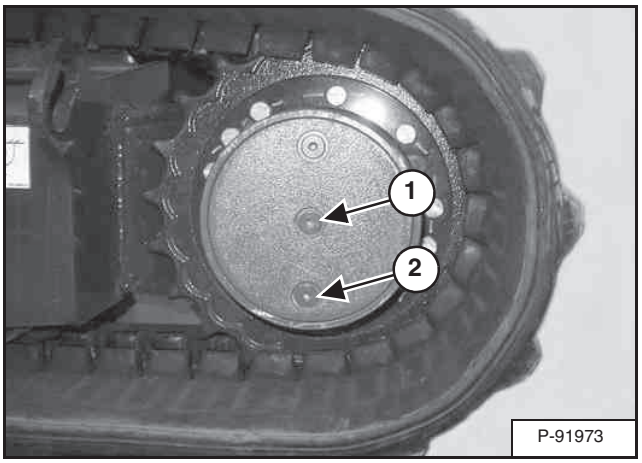
NOTE: Do not loosen the track tension fitting (Item 1) [Figure 301] more than 1-1/2 turns.

Installation: Tighten the track tension fitting to 23 N•m (17 ft-lb) torque.

Repeat the procedure for the other side.

Checking And Adding Oil

Figure 303



Park the excavator on a level surface with the plugs (Items 1 and 2) **[Figure 303]** in the vertical position as shown.

Remove the plug (Item 1) **[Figure 303]**. The lube level must be at the bottom edge of the hole.

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

Removing And Replacing Oil

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 139.)

Park the excavator on a level surface with plugs (Items 1 and 2) **[Figure 303]** 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 303]**. Add lubricant through the centre plug hole until the lube level is at the bottom edge of the hole.

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

Install the plug (Item 1) **[Figure 303]**.

ALTERNATOR BELT

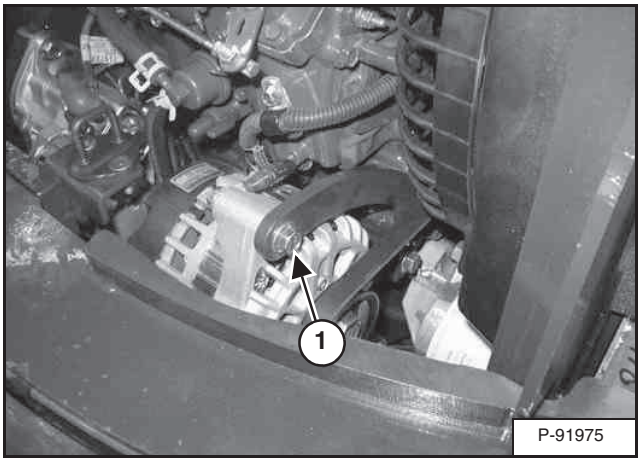
Belt Adjustment

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 145.)

Figure 304



Loosen the bolt (Item 1) **[Figure 304]** 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 304]** 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 304]**.

Tighten the top and bottom alternator mounting bolts.

Close the tailgate.

FAN BELT

Belt Adjustment

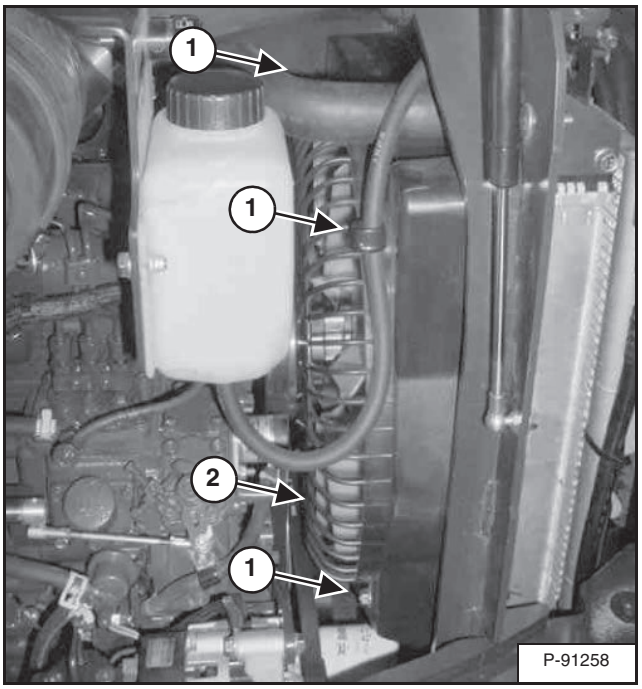
The fan belt is a special maintenance free type that is pretensioned over the pulleys. This belt eliminates the need for a tensioning device and does not require periodic adjustment. Contact your Bobcat dealer for replacement parts.

Belt Replacement

Stop the engine and open the tailgate. (See TAILGATE on Page 145.)

Remove the alternator belt. (See ALTERNATOR BELT on Page 174.)

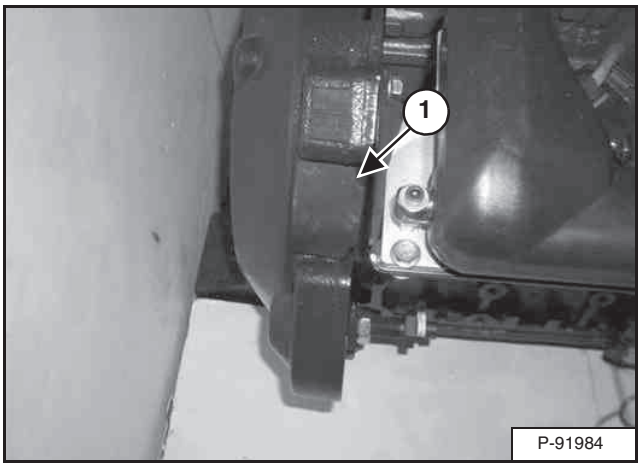
Figure 305



Remove the three bolts (Item 1) and the fan guard (Item 2) **[Figure 305]** for clearance for belt removal.

Belt Replacement (Cont'd)

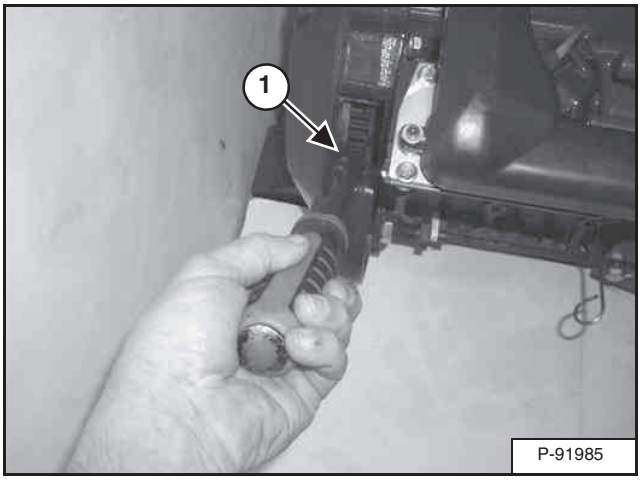
Figure 306



NOTE: The engine is removed from the machine for photo clarity only. This procedure can be performed with engine installed in machine.

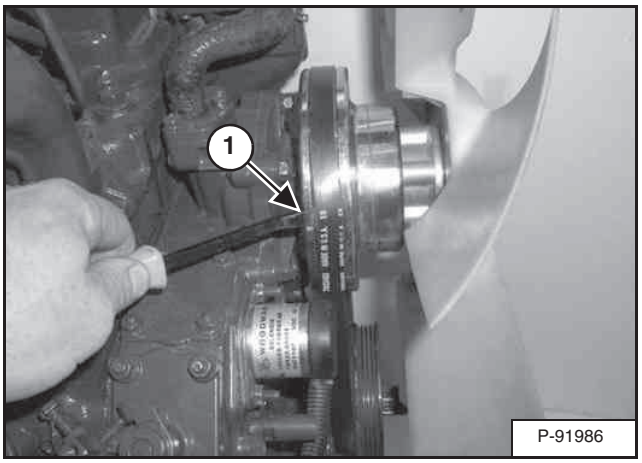
The engine will need to be rotated by hand to remove the belt. To access the flywheel, remove the plug (Item 1) **[Figure 306]** from the flywheel housing.

Figure 307



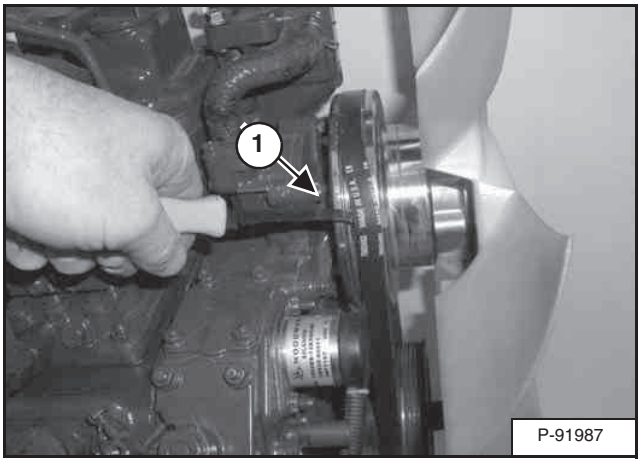
Install a pry bar (Item 1) **[Figure 307]** to the flywheel teeth.

Figure 308



Install a second pry bar (Item 1) **[Figure 308]** or flat blade screw driver between the belt and the water pump pulley.

Figure 309

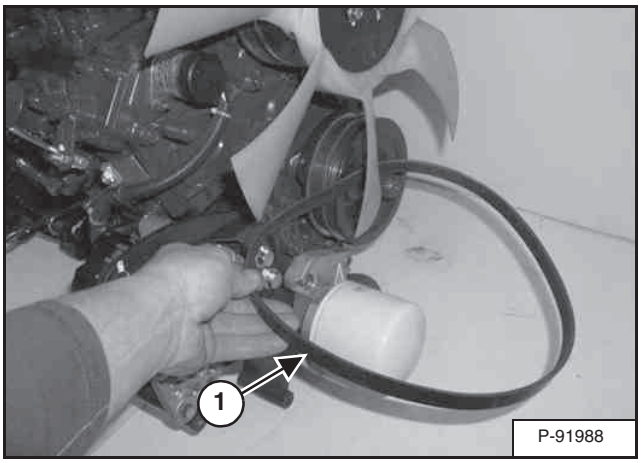


Using the pry bar (Item 1) **[Figure 307]** to rotate the engine, start to push the belt off of the pulley using the second pry bar (Item 1) **[Figure 309]**.

Continue to manually rotate the engine until the belt is off the pulley.

Belt Replacement (Cont'd)

Figure 310

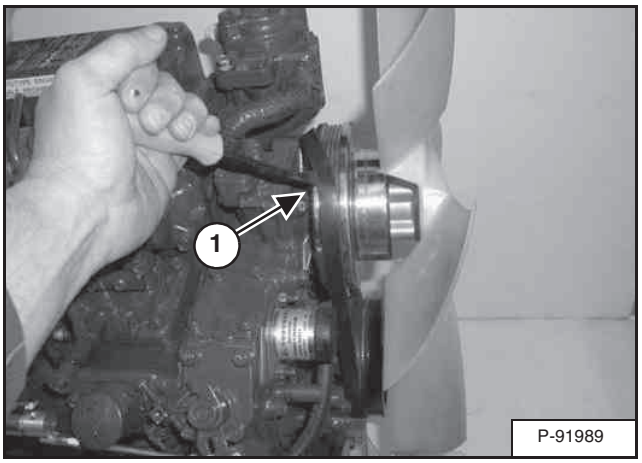


NOTE: Fan blades may be sharp, use care when removing the belt over the fan blades.

The belt (Item 1) **[Figure 310]** will need to be worked over the fan blades until it can be removed.

Install the new fan belt.

Figure 311



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 307]** to rotate the engine and push the belt on the pulley using the second pry bar (Item 1) **[Figure 311]**.

Continue rotating the engine until the belt is fully installed.

Install the flywheel plug (Item 1) **[Figure 306]**.

Install the alternator belt. (See ALTERNATOR BELT on Page 174.)

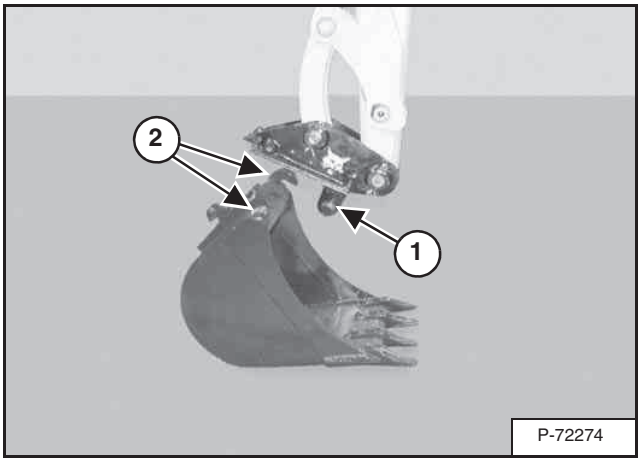
Install the fan guard (Item 1) **[Figure 305]**.

Close the tailgate.

QUICK COUPLER

Quick Coupler And Attachment Inspection And Maintenance

Figure 312



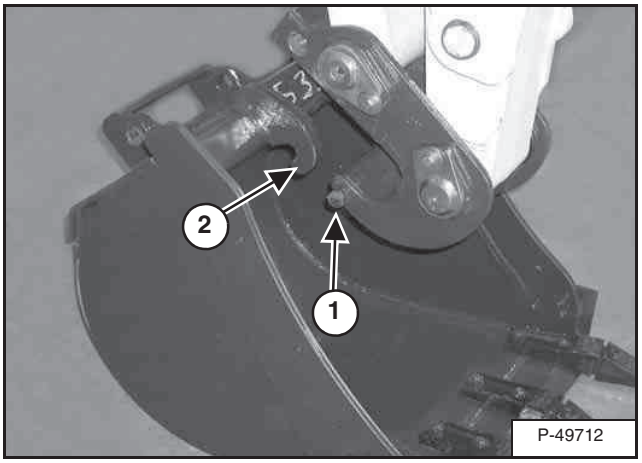
Inspect the quick coupler for wear or damage. Inspect the quick coupler pins (Item 1) and the hooks (Item 2) **[Figure 312]** (on the attachment) for wear or damage

Repair or replace damaged parts.

X-CHANGE

Inspection And Maintenance

Figure 313



Inspect the X-Change for wear or damage. Inspect the X-Change pins (Item 1) and hooks (Item 2) **[Figure 313]** (on the attachment) for wear or damage.

Repair or replace damaged parts.

TRACK ROLLER AND IDLER LUBRICATION

Procedure

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

Bucket Teeth Removal And Installation

⚠ WARNING

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

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

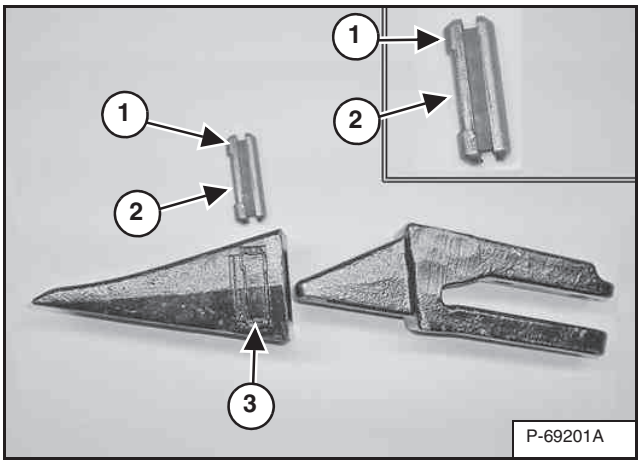
W-2505-EN-1009

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

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

Stop the engine and exit the excavator.

Figure 314



The retaining pin (Item 1) must be installed as shown [notch (Item 2) to the front] for proper fit and tooth retention. The side of the tooth point (Item 3) **[Figure 314]** also shows the correct orientation of the retaining pin.

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

LUBRICATION OF THE HYDRAULIC EXCAVATOR

Lubrication Locations

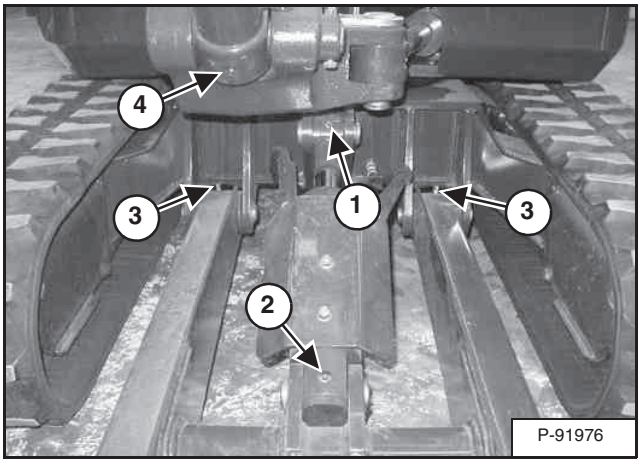
Lubricate the excavator as specified in the SERVICE SCHEDULE for the best performance of the machine. (See SERVICE SCHEDULE on Page 139.)

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

NOTE: Use Extra Heavy Gear Shield grease for grease fittings (Item 19, 20 and 21).

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

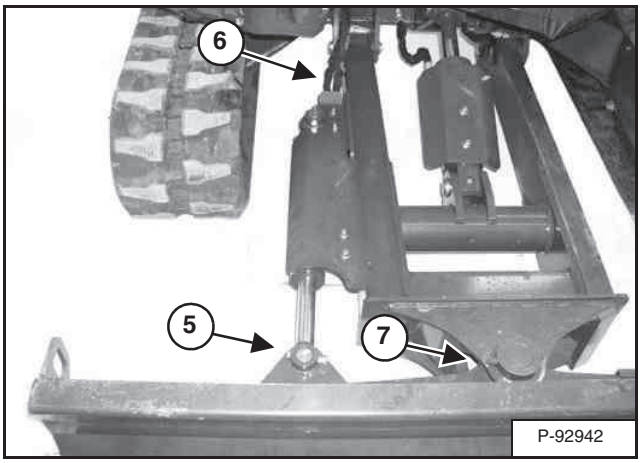
Figure 315



Ref Description (# of Fittings)

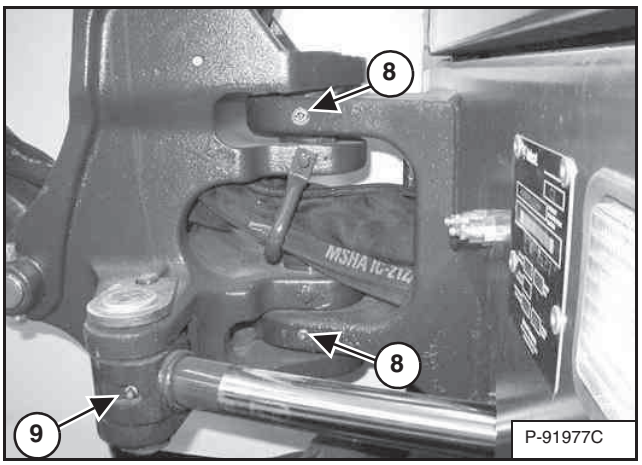
1. Blade Cylinder Rod End (1) **[Figure 315]**
2. Blade Cylinder Base End (1) **[Figure 315]**
3. Blade Pivots (2) **[Figure 315]**
4. Boom Cylinder Base End (1) **[Figure 315]**

Figure 316



5. Angle Blade Cylinder Rod End (1) **[Figure 316]** (If Equipped)
6. Angle Blade Cylinder Base End (1) **[Figure 316]** (If Equipped)
7. Angle Blade Pivot (1) **[Figure 316]** (If Equipped)

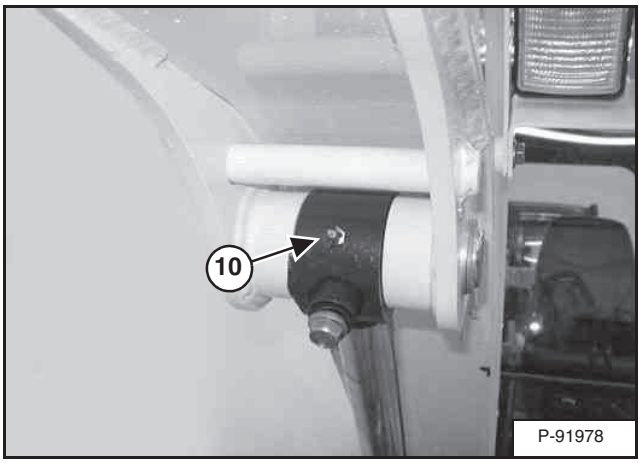
Figure 317



8. Boom Swing Pivot (3) **[Figure 317]**
9. Boom Swing Cylinder Rod End (1) **[Figure 317]**

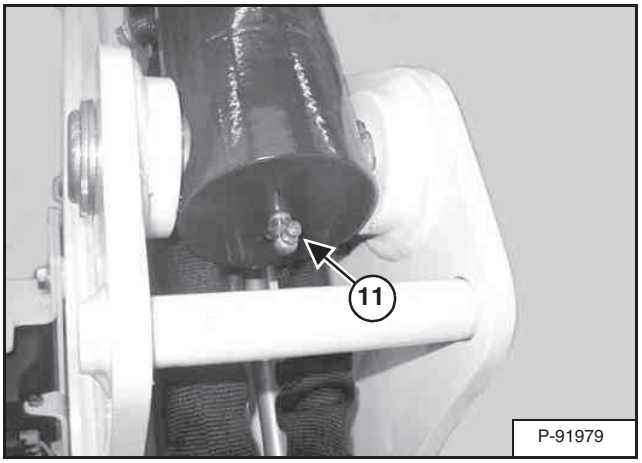
Lubrication Locations (Cont'd)

Figure 318



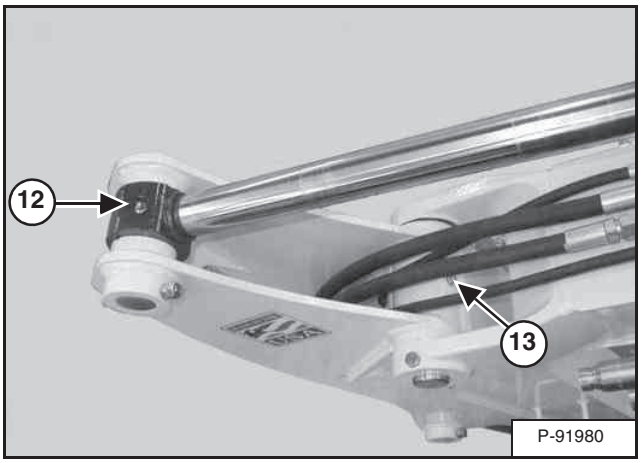
10. Boom Cylinder Rod End (1) **[Figure 318]**

Figure 319



11. Arm Cylinder Base End (1) **[Figure 319]**

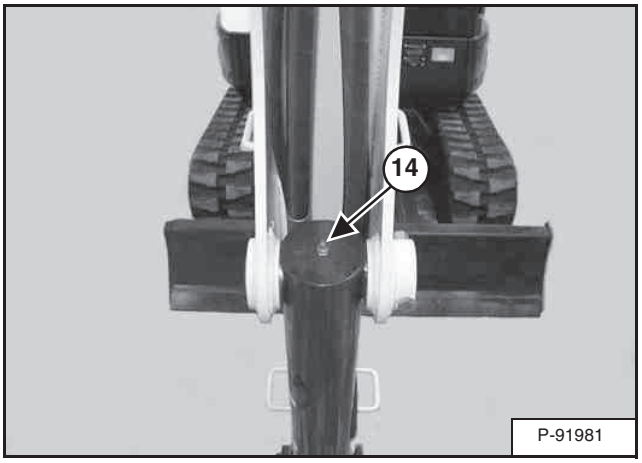
Figure 320



12. Arm Cylinder Rod End (1) **[Figure 320]**

13. Arm Pivot (1) **[Figure 320]**

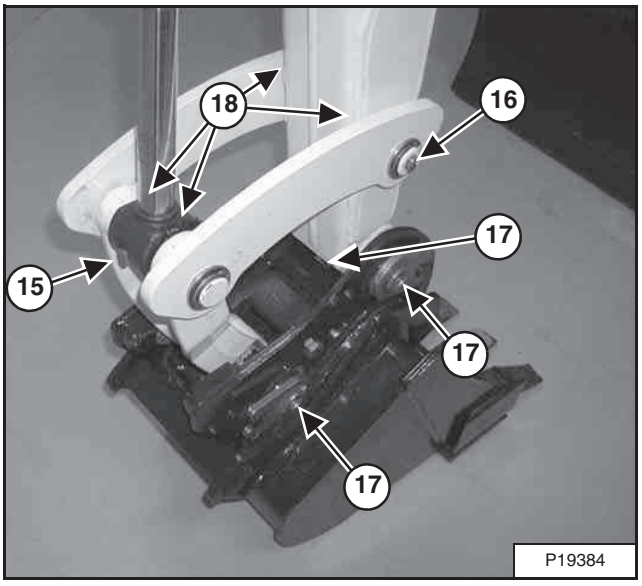
Figure 321



14. Bucket Cylinder Base End (1) **[Figure 321]**

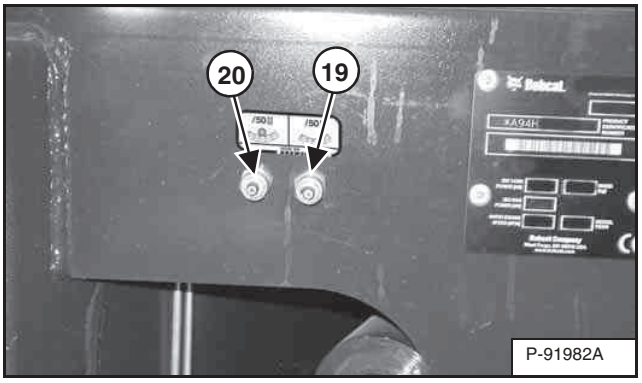
Lubrication Locations (Cont'd)

Figure 322



15. Bucket Cylinder Rod End (1) **[Figure 322]**
16. Bucket Link Pin (1) **[Figure 322]**
17. Bucket Pivot (3) **[Figure 322]**
18. Bucket Link - without extendable arm (2), with extendable arm (4) **[Figure 322]**

Figure 323



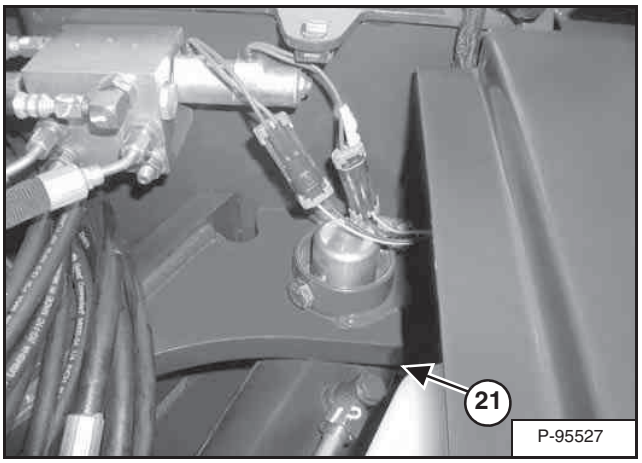
Lubricate the following locations on the hydraulic excavator **EVERY 50 HOURS**:

NOTE: Use Extra Heavy Gear Shield grease for grease fittings (Item 19, 20 and 21).

19. Swing Circle (1) **[Figure 323]**

20. Swing Pinion (1) **[Figure 323]**. (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 324



Lubricate the following location on the hydraulic excavator **EVERY 1000 HOURS**:

NOTE: Use Extra Heavy Gear Shield grease for grease fittings (Item 20, 21 and 22).

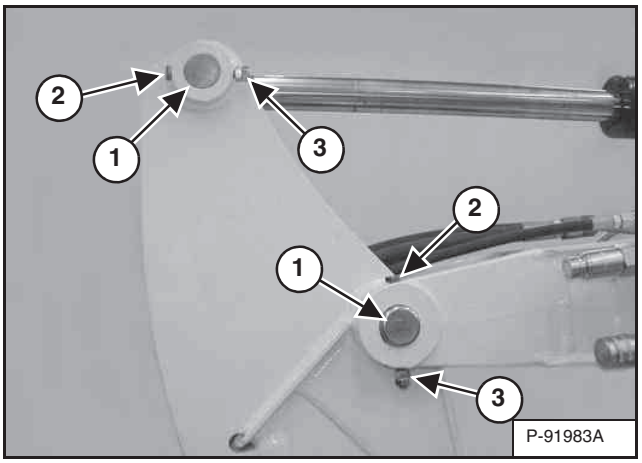
21. Boom Swing Cylinder Base (1) **[Figure 324]**

NOTE: The boom swing grease fitting is located on the side of base end of the cylinder.

PIVOT PINS

Inspection And Maintenance

Figure 325



The pivots and cylinders (Item 1) have a large pin held in position with a bolt (Item 2) and double nuts (Item 3) **[Figure 325]** securing the pin.

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

EXCAVATOR STORAGE AND RETURN TO SERVICE

Storage

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

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

Return To Service

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

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


Bobcat®

SYSTEM SETUP AND ANALYSIS


Bobcat®

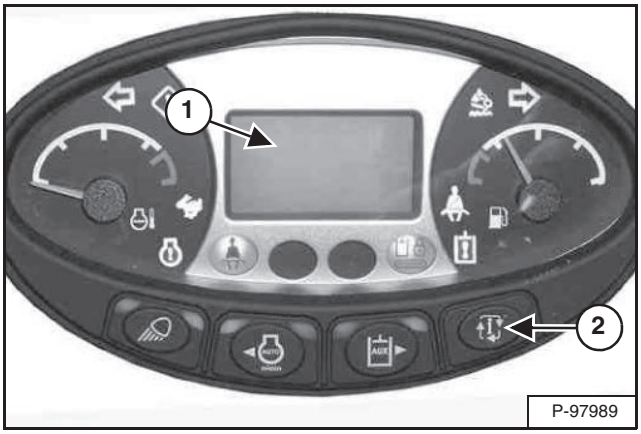
DIAGNOSTIC SERVICE CODES

Viewing Service Codes

The Service Codes will aid your dealer in diagnosing conditions that can damage your machine.

Standard Instrument Panel

Figure 326



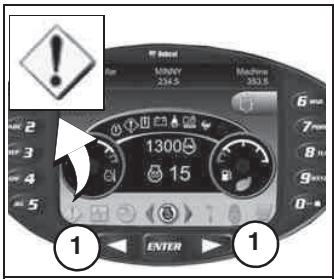
Press the Information button (Item 2) to cycle the data display (Item 1) **[Figure 326]** until the service code screen is displayed. If more than one service code is present, the codes will scroll on the data display.

When no service code is present, **[NONE]** is displayed **[Figure 326]**.

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.

	Press a scroll button (Item 1) repeatedly until the Active Warnings screen icon (Inset) is highlighted.
	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.
	The WARNINGS HISTORY screen will list the Service Code Number **(CODE)**, Hourmeter reading when the error occurred **(HOUR)**, and the User **(USER)** who was logged in to operate the machine when the error occurred.
Press **[9]** to view the next eight service codes. 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.	
	Press the list number next to the service code for more detail. Press the left scroll button to back up one screen.

DIAGNOSTIC SERVICE CODES (CONT'D)

Number Codes List

CODE		CODE	
E0105	Throttle actuator short to battery	L0102	Lights Button Error On
E0106	Throttle actuator short to earth	L0202	High Flow Button Error On
E0107	Throttle actuator open circuit	L0302	Auxiliary Button Error On
		L0402	Information Button Error On
E0123	Throttle actuator not calibrated		
		L7404	Gateway Controller No Communication
E0321	5 volt supply out of range high		
E0322	5 volt supply out of range low	L7672	Left Hand Panel Programming Error
E0421	Throttle sensor out of range high		
E0422	Throttle sensor out of range low	M0216	Hydraulic Filter Not Connected
		M0217	Hydraulic Filter Plugged
E0521	Throttle actuator feedback out of range high		
E0522	Throttle actuator feedback out of range low	M0309	Battery Voltage Low
		M0310	Battery Voltage High
E3128	Interrupted power failure log only	M0311	Battery Voltage Extremely High
		M0314	Battery Voltage Extremely Low
E3297	Controller programmed log only	M0322	Battery Voltage Out of Range Low
		M0414	Engine Oil Pressure Extremely Low
		M0415	Engine Oil Pressure Shutdown
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	M0610	Engine Speed High
		M0611	Engine Speed Extremely High
H2605	Angle Blade Base Solenoid Short to Battery	M0613	Engine Speed No Signal
H2606	Angle Blade base Solenoid Short to Earth	M0615	Engine Speed Shutdown
H2607	Angle Blade Base Solenoid Open Circuit	M0618	Engine Speed Out of Range
H2632	Angle Blade Base Solenoid Overcurrent		
H2705	Angle Blade Rod Solenoid Short to Battery	M0710	Hydraulic Oil Temperature High
H2706	Angle Blade Rod Solenoid Short to Earth	M0711	Hydraulic Oil Temperature Extremely High
H2707	Angle Blade Rod Solenoid Open Circuit	M0715	Hydraulic Oil Temperature Shutdown
H2732	Angle Blade Rod Solenoid Overcurrent	M0721	Hydraulic Oil Temperature Out of Range High
		M0722	Hydraulic Oil Temperature Out of Range Low
H3128	Interrupted Power Failure		
		M0810	Engine Coolant Temperature High
H4423	Secondary Controller Not Programmed	M0811	Engine Coolant Temperature Extremely High
H4497	Secondary Controller Programmed	M0815	Engine Coolant Temperature Shutdown
		M0821	Engine Coolant Temperature Out of Range High
H4621	5V Sensor Supply Out of Range High	M0822	Engine Coolant Temperature Out of Range Low
H4622	5V Sensor Supply Out of Range Low	M0216	Hydraulic Filter Not Connected
H7404	Main Controller No Communication		
H7604	Display No Communication		

Number Codes List (Cont'd)

CODE		CODE	
M0909	Fuel Level Low	M2721	Throttle Sensor Out of Range High
M0921	Fuel Level Out of Range High	M2722	Throttle Sensor Out of Range Low
M0922	Fuel Level Out of Range Low		
		M3128	Interrupted Power Failure
M1121	Console Sensor Out of Range High		
M1122	Console Sensor Out of Range Low	M3204	Throttle Controller No Communication
M1128	Console Sensor Failure		
		M3304	Deluxe Panel No Communication
M1305	Fuel Hold Solenoid Short to Battery		
M1306	Fuel Hold Solenoid Short to Earth	M3404	RFID Key Controller No Communication
M1307	Fuel Hold Solenoid Open Circuit		
		M3702	Hyd Exchange Output Error On
M1402	Fuel Pull Output Error On	M3703	Hyd Exchange Output Error Off
M1403	Fuel Pull Output Error Off		
M1407	Fuel Pull Output Open Circuit		
M1428	Fuel Pull Output Failure		
		M4109	Alternator Low
M1705	Hydraulics Enable Solenoid Short to Battery	M4110	Alternator High
M1706	Hydraulics Enable Solenoid Short to Earth		
M1707	Hydraulics Enable Solenoid Open Circuit	M4304	Keyless Start Panel No Communication
M1732	Hydraulics Enable Solenoid Overcurrent		
		M4404	Secondary Controller No Communication
M2005	Two-Speed Solenoid Short to Battery		
M2006	Two-Speed Solenoid Short to Earth	M4621	5V Sensor Supply Out of Range High
M2007	Two-Speed Solenoid Open Circuit	M4622	5V Sensor Supply Out of Range Low
M2102	Glow Plug Output Error On	M4721	8V Sensor Supply Out of Range High
M2103	Glow Plug Output Error Off	M4722	8V Sensor Supply Out of Range Low
M2107	Glow Plug Output Open Circuit		
M2128	Glow Plug Output Failure	M5002	Light Output Error On
		M5003	Light Output Error Off
M2202	Starter Output Error On		
M2203	Starter Output Error Off	M5205	Offset Base Solenoid Short to Battery
M2207	Starter Output Open Circuit	M5206	Offset Base Solenoid Short to Earth
M2228	Starter Output Failure	M5207	Offset Base Solenoid Open Circuit
		M5232	Offset Base Solenoid Overcurrent
M2302	Starter Relay Error On		
M2303	Starter Relay Error Off	M5305	Offset Rod Solenoid Error On
		M5306	Offset Rod Solenoid Short to Earth
M2402	Fuel Pull Relay Error On	M5307	Offset Rod Solenoid Open Circuit
M2403	Fuel Pull Relay Error Off	M5332	Offset Rod Solenoid Overcurrent
M2521	Load Sense Sensor Out of Range High	M5421	Offset Control Switch Out of Range High
M2522	Load Sense Sensor Out of Range Low	M5422	Offset Control Switch Out of Range Low
		M5424	Offset Control Switch Out of NEUTRAL
M2602	Glow Plug Relay Error On		
M2603	Glow Plug Relay Error Off		

Number Codes List (Cont'd)

CODE		CODE	
M5505	Auxiliary Base Solenoid Short to Battery	M7423	Main Controller Not Programmed
M5506	Auxiliary Base Solenoid Short to Earth	M7497	Main Controller Software Updated
M5507	Auxiliary Base Solenoid Open Circuit		
M5532	Auxiliary Base Solenoid Overcurrent	M7604	Standard Display Panel No Communication
M5605	Auxiliary Rod Solenoid Short to Battery	M7748	Key Switch Multiple
M5606	Auxiliary Rod Solenoid Short to Earth		
M5607	Auxiliary Rod Solenoid Open Circuit	M7839	Hourmeter Changed
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		
M6204	Load Moment Sensor In Error	R7404	No Communication To Main Controller
M6402	Switched Power Relay Error On		
M6403	Switched Power Relay Error Off		
M6702	HVAC Output Error On		
M6703	HVAC Output Error Off		
M6905	Hydraulic Throttle Solenoid Short to Battery		
M6906	Hydraulic Throttle Solenoid Short to Battery		
M6907	Hydraulic Throttle Solenoid Open Circuit		
M6923	Hydraulic Throttle Solenoid Not Calibrated		
M6932	Hydraulic Throttle Solenoid Overcurrent		
M7002	Switched Power Output Error On		
M7003	Switched Power Output Error Off		
M7007	Switched Power Output Open Circuit		
M7028	Switched Power Output Failure		

CONTROL PANEL SETUP

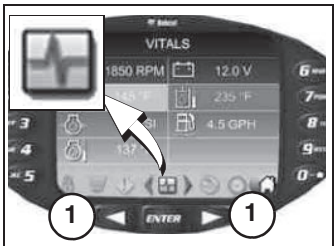
Panel Setup (Deluxe Instrument Panel)

Icon Identification

Figure 327

ICON	DESCRIPTION
Mon, 17 Mar 3:45 PM	DATE / TIME
MINNY 234.5	USER / USER HOURS
Machine 353.5	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	ENTER button

Vitals

	Press a scroll button (Item 1) repeatedly until the Vitals screen icon (Inset) is highlighted.
	Displays select system operating levels.
You can monitor real-time displays of: **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.

Panel Setup (Deluxe Instrument Panel) (Cont'd)

Date And Time

	Press a scroll button (Item 1) repeatedly until the Display screen icon (Inset) is highlighted.
	Select **[1. CLOCKS]**.
	Select **[1. TIME]**.
	Use the keypad to enter time. Select AM / PM / 24hr. Press **[ENTER]** to continue.
	Select **[2. DATE]**.
	Use the keypad to enter date. Press **[ENTER]** to continue.

Languages

	Press a scroll button (Item 1) repeatedly until the Display screen icon (Inset) is highlighted.
	Select **[2. LANGUAGES]**.
	Select the desired language.

English / Metric Display

	Press a scroll button (Item 1) repeatedly until the Display screen icon (Inset) is highlighted.
	Select **[4. DISPLAY SETTINGS]**. Press **[1]** to cycle between ENGLISH and METRIC.

Panel Setup (Deluxe Instrument Panel) (Cont'd)

Auto Idle Time Delay

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	Select **[3. MACHINE PERFORMANCE]**.
	Select **[1. AUTO IDLE DELAY TIME]**.
	Use the keypad to enter the desired delay time between 4 and 250 seconds. Press **[ENTER]** to save and continue. Press left scroll button to exit without saving.

Job Clock Reset

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	Select **[1. PASSWORDS / LOCKOUTS]**.
	Enter owner password and press **[ENTER]**.
	Select **[1. USER SETTINGS]**.
	Select user.
	Press **[9]** to reset job statistics. Press left scroll button or **[0]** to exit without saving.

Panel Setup (Deluxe Instrument Panel) (Cont'd)

Alarm Clock Reset

	Press a scroll button (Item 1) repeatedly until the Display screen icon (Inset) is highlighted.
	Select **[3. ALARM CLOCK]**.
	Select **[1. OFF ONCE]**, Select **[2. ON Daily]** or Select **[3. ON WEEKLY]**.
	Select **[1. OFF / ON]**, Select **[2. TIME]** or Select **[3. DAILY]**.
	Use key pad numbers to set time. Select **[7. AM]**, Select **[8. PM]** or Select **[9. 24 hr clock]**. Select **[ENTER]** to save. Press left scroll to back space numbers.
	Press **[4]** to set alarm to sleep. (When pressed, display will return to main screen.) 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.)

ECO MODE

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	Select **[3. MACHINE PERFORMANCE]**.
	Select **[2. ECO MODE]**. ECO Mode will set the maximum engine rpm to be at 85% of the high idle setting. Example: If the machine maximum engine speed is 2450 rpm, when ECO Mode is enabled, the maximum engine speed will be approximately 2080 rpm.

Panel Setup (Deluxe Instrument Panel) (Cont'd)

Machine History - Log In Information

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	**MACHINE SETTINGS** is visible on screen. Select **[2. MACHINE HISTORY]**.
	Select **[1. LOG-IN INFORMATION]**.
	View User Log hours and last time / dated used. Individual information can be viewed and reset back to zero. Select user **[KEY PAD 1 - 9]** to access individual user.

Machine History - User Job Statistics

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	**MACHINE SETTINGS** is visible on screen. Select **[2. MACHINE HISTORY]**.
	Select **[2. USER JOB STATISTICS]**.
	View Job Statistics (Job Hours / Idle Time Information can be viewed and reset back to zero

PASSWORD SETUP (KEYLESS START PANEL)

Panel Setup (Deluxe Instrument Panel) (Cont'd)

Machine History - Overall Job Statistics

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	**MACHINE SETTINGS** is visible on screen. Select **[2. MACHINE HISTORY]**.
	Select **[3. OVERALL JOB STATISTICS]**.

Attachments

	Press a scroll button (Item 1) repeatedly until the Attachment screen icon (Inset) is highlighted.
	**ATTACHMENTS** is visible on screen. Press **[ENTER]**.
	Press **[4]** or **[9]** repeatedly until the desired Attachment is visible in the display screen.
	Information about the attachment, recommended auxiliary hydraulic flow and Tips about attachment operation will be displayed.

PASSWORD SETUP (KEYLESS START PANEL) (CONT'D)

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.

User 1 and User 2 Passwords:

By default, User 1 and User 2 Passwords are not set.

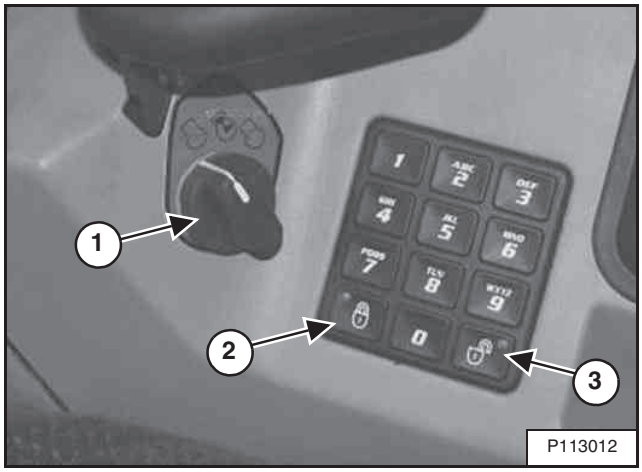
NOTE: The User 1 and User 2 Password cannot be used to change a password or to switch between the Locked / UnLocked modes.

Changing The Owner, User 1 and User 2 Password

Turn the start switch (Item 1) **[Figure 328]** to the ON position to turn on the excavators electrical system.

Enter the five digit owner password using the number keys (1 through 0) if locked.

Figure 328



Press and hold the lock (Item 2) and unlock (Item 3) **[Figure 328]** keys for 2 seconds.

The lock key red light or the unlock key green light will flash and the instrument panel display screen will show **[CODE]**.

Enter the five digit owner or master password using the number keys (1 through 0) if locked.

The display screen will show [OWNER] for two seconds. Press the unlock key (Item 3) **[Figure 328]** to navigate between [OWNER], [USER 1]and [USER 2].

After two seconds, the display screen will show [ENTER].

NOTE: The lock key (Item 2), red light and the unlock key (Item 3) [Figure 328], green light will flash during the procedure.

Enter a new five digit owner, user 1 or user 2 password using the number keys (1 through 0). An asterisk will show in the display screen for each key press.

The display screen will show [AGAIN].

Enter the new five digit owner password again.

The display screen will show [ERROR] if:

- The second five digit owner, user 1 or user 2 password is different from the first one entered.

or

- No number key was pressed for more than 20 seconds.

or

- "00000" was entered as owner, user 1 or user 2 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 (Item 2), red light or the unlock key (Item 3) **[Figure 328]**, green light will become solid.

Password Lockout Feature

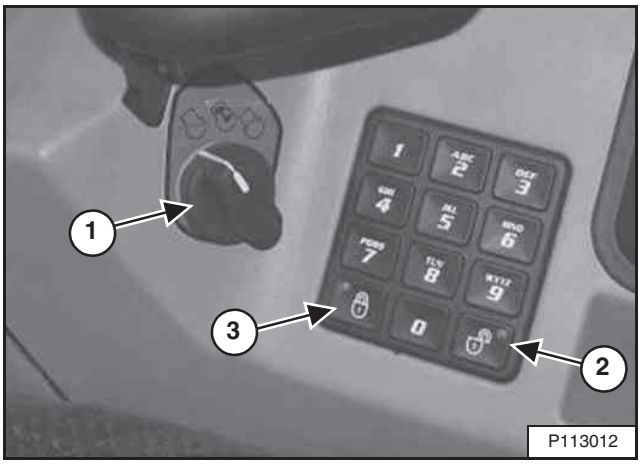
This feature allows the owner to unlock the password feature so that a password does not need to be used every time the engine is started.

NOTE: The password lockout feature does not function with the user 1 or user 2 password.

Turn the start switch (Item 1) **[Figure 329]** to the ON position to turn on the excavators electrical system.

Enter the five digit owner password using the number keys (1 through 0).

Figure 329



Press the unlock key (Item 2) **[Figure 329]**.

The left panel display screen will show **[CODE]**.

Enter the five digit owner password using the number keys (1 through 0). The unlock key 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 key switch to the ON position to turn on the excavators electrical system.

Press the lock key (Item 3) **[Figure 329]**.

The lock key red light will flash and the left panel display screen will show **[CODE]**.

Enter the five digit owner password using the number keys (1 through 0). The unlock key green light will flash, then the lock key 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:

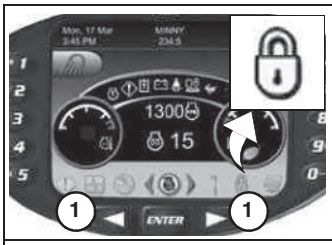
Allows for full use of the excavator and to set up the Deluxe Instrument Panel. There is only one owner password. The owner password must be used to change the owner or user passwords. Owner should change the password as soon as possible for security of the excavator.

User Password:

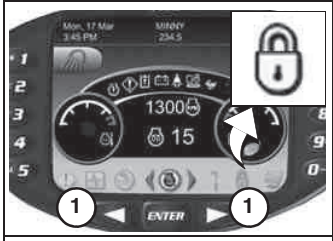
Allows starting and operating the excavator; cannot change password or any of the other setup features.

For the procedures to change passwords: (See Changing The Owner Password on Page 199.) and (See Changing The User Passwords on Page 200.).

Changing The Owner Password

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	Select **[1. PASSWORDS / LOCKOUTS]**.
	Enter owner password and press **[ENTER]**.
	Select **[1. USER SETTINGS]**.
	Select **[1. OWNER]**.
	Select **[2. CHANGE PASSWORD]**.
	Enter new owner password and press **[ENTER]**. You will be prompted to reenter the new owner password.

Changing The User Passwords

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	Select **[1. PASSWORDS / LOCKOUTS]**.
	Enter owner password and press **[ENTER]**.
	Select **[1. USER SETTINGS]**.
	Select user.
	Select **[2. CHANGE PASSWORD]**.
	Enter new user password and press **[ENTER]**.

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.

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	Select **[1. PASSWORDS / LOCKOUTS]**.
	Enter owner password and press **[ENTER]**.
	Select **[2. MACHINE LOCK]**.

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.

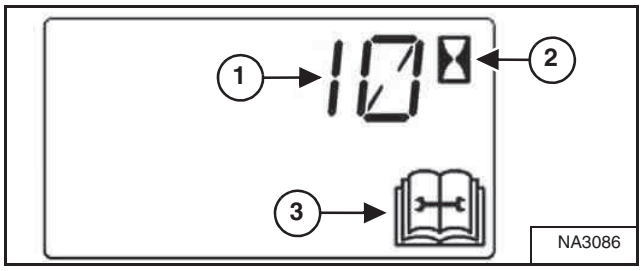
MAINTENANCE CLOCK

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 330



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 330]** flash.

NOTE: The display will show negative numbers after counting down to zero.

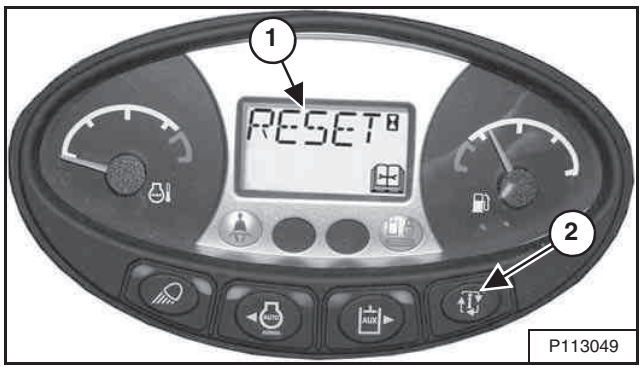
The display will revert to the previous display and will appear for 5 seconds every time the machine is started until the maintenance clock is reset.

Setup

See your Bobcat dealer about installation of this feature.

Reset

Figure 331



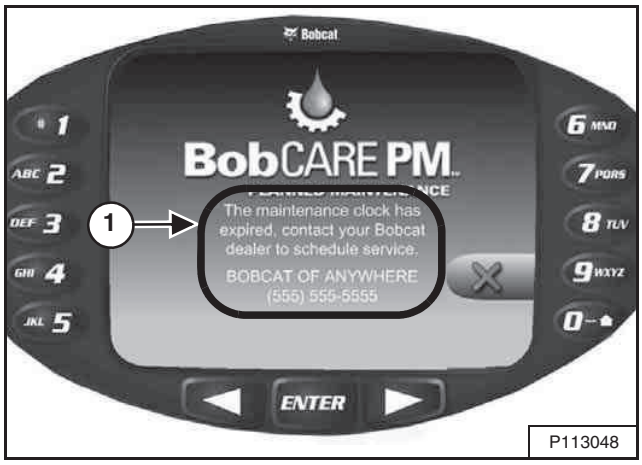
Press the Information button (Item 2) **[Figure 331]** until the display screen shows the maintenance clock.

Press and hold the Information button (Item 2) for 7 seconds until **[RESET]** (Item 1) **[Figure 331]** appears in the display screen.

MAINTENANCE CLOCK (CONT'D)

Deluxe Instrument Panel

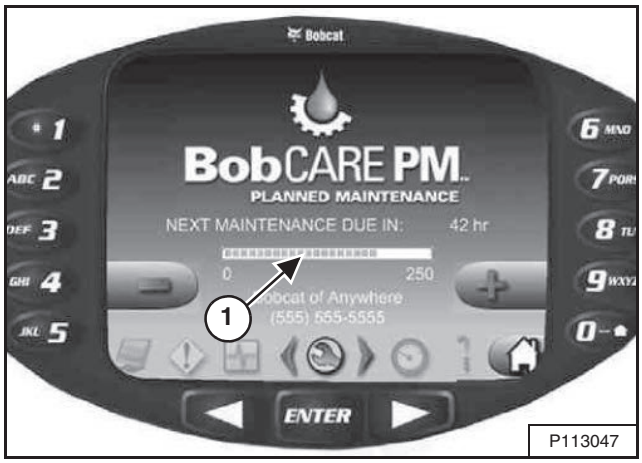
Figure 332



The Deluxe Instrument Panel (if equipped) will display a message (Item 1) **[Figure 332]** 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 333



The Deluxe Instrument Panel (if equipped) will display a bar (Item 1) **[Figure 333]** 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 333]**.

To reset the service clock after servicing the machine, press and hold key **[1] [Figure 333]** (when the owner is logged in) until the bar graph resets to 0.

SPECIFICATIONS

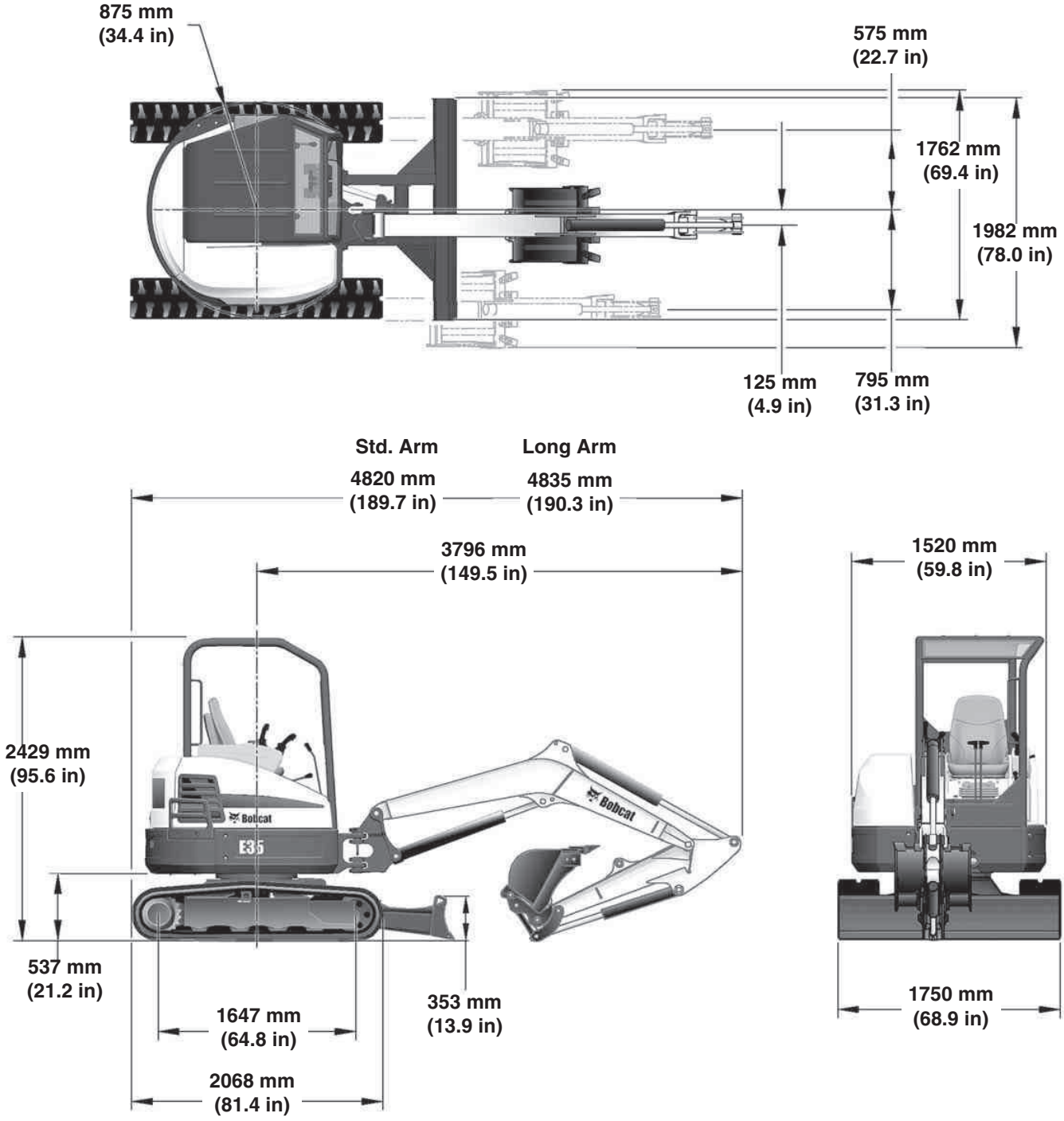
Certain specification(s) are based on engineering calculations and are not actual measurements. Specification(s) are provided for comparison purposes only and are subject to change without notice. Specification(s) for your individual Bobcat equipment will vary based on normal variations in design, manufacturing, operating conditions, and other factors.


Bobcat®

EXCAVATOR SPECIFICATIONS

E35 Excavator Machine Dimensions

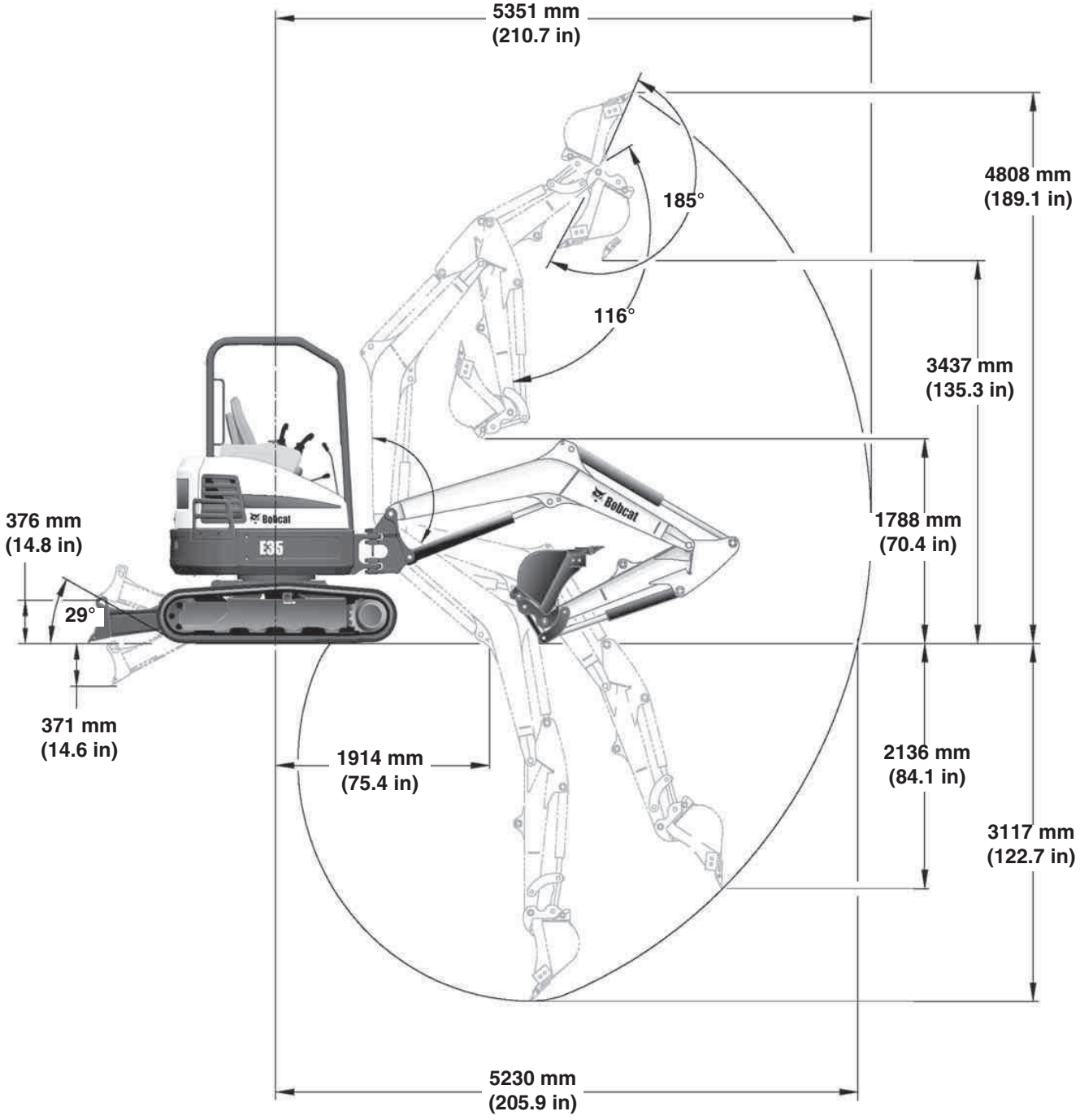
- Where applicable, specification conform to SAE or ISO standards and are subject to change without notice.



NA1483

E35 Excavator Machine Dimensions - Standard Arm

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

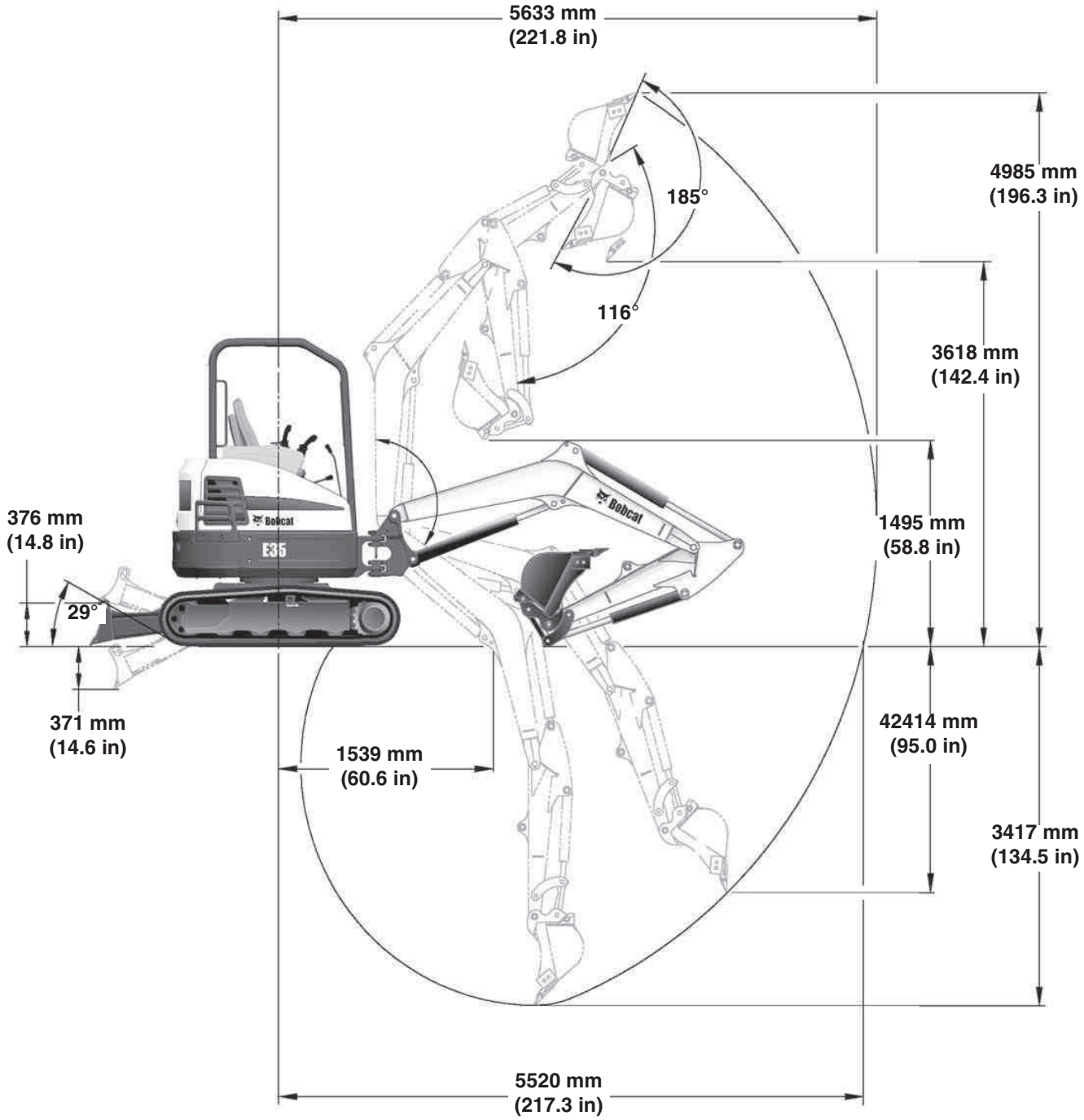


NA1482

EXCAVATOR SPECIFICATIONS (CONT'D)

E35 Excavator Machine Dimensions - Long Arm

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



NA1482

Rated Lift Capacity - Canopy Model With Standard Arm

A	B		kg @ max. B	B		kg @ max. B
	3000 mm	4000 mm		3000 mm	4000 mm	
4000 mm						
3000 mm		*601 kg	*600 kg @ 4004 mm		376 kg	378 kg @ 4004 mm
2000 mm	*750 kg	*660 kg	*647 kg @ 4452 mm	*699 kg	392 kg	294 kg @ 4452 mm
1000 mm	*1116 kg	*818 kg	*702 kg @ 4585 mm	563 kg	377 kg	286 kg @ 4585 mm
Ground	*1333 kg	*952 kg	*763 kg @ 4438 mm	530 kg	375 kg	299 kg @ 4438 mm
-1000 mm	*1286 kg	*892 kg	*855 kg @ 3971 mm	520 kg	376 kg	366 kg @ 3971 mm

B		kg @ max. B
3000 mm	4000 mm	
	402 kg	364 kg @ 4004 mm
610 kg	384 kg	292 kg @ 4452 mm
549 kg	363 kg	267 kg @ 4585 mm
519 kg	346 kg	272 kg @ 4438 mm
515 kg	346 kg	331 kg @ 3971 mm

* ⇨

7177238-V

Rated Lift Capacity - Canopy Model With Standard Arm W/Counterweight

7182364

Rated Lift Capacity - Canopy Model With Long Arm

A	B			B			B		
	3000 mm	4000 mm	kg @ max. B	3000 mm	4000 mm	kg @ max. B	3000 mm	4000 mm	kg @ max. B
4000 mm		*533 kg @ 3504 mm			*519 kg @ 3504 mm			*511 kg @ 3504 mm	
3000 mm		*515 kg	*543 kg @ 4334 mm		*502 kg	420 kg @ 4334 mm		*542 kg	431 kg @ 4334 mm
2000 mm	*630 kg	*600 kg	*583 kg @ 4744 mm	*617 kg	459 kg	338 kg @ 4744 mm	529 kg	460 kg	364 kg @ 4744 mm
1000 mm	*989 kg	*726 kg	*637 kg @ 4867 mm	666 kg	452 kg	308 kg @ 4867 mm	679 kg	422 kg	337 kg @ 4867 mm
Ground	*1269 kg	*878 kg	*714 kg @ 4731 mm	647 kg	461 kg	310 kg @ 4731 mm	624 kg	424 kg	317 kg @ 4731 mm
-1000 mm	*1301 kg	*842 kg	*765 kg @ 4305 mm	586 kg	404 kg	343 kg @ 4305 mm	616 kg	414 kg	357 kg @ 4305 mm

*

7177239-V

Rated Lift Capacity - Cab Model With Standard Arm

A	B			B			B		
	3000 mm	4000 mm	kg @ max. B	3000 mm	4000 mm	kg @ max. B	3000 mm	4000 mm	kg @ max. B
4000 mm									
3000 mm		*601 kg	*600 kg @ 4004 mm		376 kg	378 kg @ 4004 mm		402 kg	364 kg @ 4004 mm
2000 mm	*750 kg	*660 kg	*647 kg @ 4452 mm	*699 kg	392 kg	294 kg @ 4452 mm	610 kg	384 kg	292 kg @ 4452 mm
1000 mm	*1116 kg	*818 kg	*702 kg @ 4585 mm	563 kg	377 kg	286 kg @ 4585 mm	549 kg	363 kg	267 kg @ 4585 mm
Ground	*1333 kg	*952 kg	*763 kg @ 4438 mm	530 kg	375 kg	299 kg @ 4438 mm	519 kg	346 kg	272 kg @ 4438 mm
-1000 mm	*1286 kg	*892 kg	*855 kg @ 3971 mm	520 kg	376 kg	366 kg @ 3971 mm	515 kg	346 kg	331 kg @ 3971 mm

7282108V

Rated Lift Capacity - Cab Model With Standard Arm W/Counterweight

A	B				B				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	kg @ max. B
4000 mm												
3000 mm			*600 kg	*623 kg @ 4004 mm			*590 kg	*597 kg @ 4004 mm			490 kg	460 kg @ 4004 mm
2000 mm		*769 kg	*661 kg	*662 kg @ 4452 mm		*744 kg	501 kg	410 kg @ 4452 mm		*780 kg	487 kg	374 kg @ 4452 mm
1000 mm		*1146 kg	*795 kg	*721 kg @ 4585 mm		743 kg	481 kg	381 kg @ 4585 mm		702 kg	466 kg	347 kg @ 4585 mm
Ground		*1358 kg	*900 kg	*780 kg @ 4438 mm		702 kg	461 kg	396 kg @ 4438 mm		676 kg	453 kg	365 kg @ 4438 mm
-1000 mm		*1341 kg	*851 kg	*856 kg @ 3971 mm		703 kg	456 kg	460 kg @ 3971 mm		657 kg	453 kg	426 kg @ 3971 mm

* ⇨ ⇦

73004465

Rated Lift Capacity - Cab Model With Long Arm

A	B 3000 mm	B 4000 mm	kg @ max. B	B 3000 mm	B 4000 mm	kg @ max. B	B 3000 mm	B 4000 mm	kg @ max. B
4000 mm			*533 kg @ 3504 mm			*519 kg @ 3504 mm			*511 kg @ 3504 mm
3000 mm		*515 kg	*543 kg @ 4334 mm		*502 kg	420 kg @ 4334 mm		*542 kg	431 kg @ 4334 mm
2000 mm	*630 kg	*600 kg	*583 kg @ 4744 mm	*617 kg	459 kg	338 kg @ 4744 mm	529 kg	460 kg	364 kg @ 4744 mm
1000 mm	*989 kg	*726 kg	*637 kg @ 4867 mm	666 kg	452 kg	308 kg @ 4867 mm	679 kg	422 kg	337 kg @ 4867 mm
Ground	*1269 kg	*878 kg	*714 kg @ 4731 mm	647 kg	461 kg	310 kg @ 4731 mm	624 kg	424 kg	317 kg @ 4731 mm
-1000 mm	*1301 kg	*842 kg	*765 kg @ 4305 mm	586 kg	404 kg	343 kg @ 4305 mm	616 kg	414 kg	357 kg @ 4305 mm

7304464-V

EXCAVATOR SPECIFICATIONS (CONT'D)

Performance

E35	
operating weight (canopy w / rubber tracks, and 609 mm (24 in) bucket)	3387 kg (7468 lb)
If equipped with the following, add:	Steel tracks, add 92 kg (212 lb); Cab w/Heater, add 121 kg (267 lb); Cab w/HVAC, add 140 kg (309 lb); Long Arm (with additional counterweight), add 306 kg (675 lb); Additional Counterweight 295 kg (650 lb);
Travel Speed (Low / High)	4.7 km/h / 2.6 km/h (1.6 mph / 2.9 mph)
Drawbar Pull (theoretical at 90% efficiency)	34132 N (7680 lbf)
Digging Force (per ISO 6015)	
With Standard Arm	Arm - 20413 N (4589 lbf) Bucket 30995 N (6968 lbf)
With Long Arm	Arm - 17734 N (3986 lbf) Bucket 30995 N (6968 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
Angle Blade (If Equipped)	Switch on blade 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 D1803-M-DI-E3B-BC-3
Fuel / Cooling	Diesel / Liquid
Horsepower (SAE Net) @ 2400 rpm	23,1 kW (31.0 hp)
Torque @ 1400 rpm (SAE Net)	107,4 N•m (79.3 lb-ft)
Number Of Cylinders	3
Displacement	1,862 L (111.4 ci)
Bore / Stroke	87 x 102,4 mm (3.43 x 4.03 in)
Lubrication	Pressure System with Filter
Crankcase Ventilation	Closed Breathing
Air Cleaner	Dry replaceable paper dual cartridge
Ignition	Diesel-Compression
Low Idle Speed	975 rpm +/- 75 rpm
High Idle Speed	2550 rpm maximum
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	 100,8 L/min (26.6 U.S. gpm) 9,6 L/min (2.5 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
System Relief Pressure Slew Circuit Boom, Boom Swing Bucket, Arm, Auxiliary Blade Joystick Control Pressure	 24100 kPa (241 bar) (3495 psi) 24500 kPa (245 bar) (3550 psi) 24500 kPa (245 bar) (3550 psi) 24500 kPa (245 bar) (3550 psi) 3000 kPa (30 bar) (435 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 And Rod End	29000 kPa (290 bar) (4206 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	350 kPa (3,5 bar) (50 psi)
Case Drain	140 kPa (1,4 bar) (20 psi)

EXCAVATOR SPECIFICATIONS (CONT'D)

Hydraulic Cylinders

Cylinder	Bore	Rod	Stroke
Boom (cushion up)	76,2 mm (3.00 in)	44,5 mm (1.75 in)	670 mm (26.38 in)
Arm (cushion retract / extend)	76,2 mm (3.00 in)	44,5 mm (1.75 in)	607 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)	160 mm (6.30 in)

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	3.1 Seconds
Blade Lower	3.5 Seconds

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	Axial 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	1750 mm (68.9 in)

Electrical

Starting Aid	Glow Plugs
Alternator	12 volt, 90 Amp open frame w / internal regulator
Battery	12 volt - 530 CCA @ -18°C (0°F)
Starter	2.0 kW (12 volt; gear reduction 2.7 hp)
Lights	37.5 watt (2)
Instrumentation	**Gauges:** Engine Coolant Temperature, Fuel Level. **Warning lights:** Fuel Level, Seat Belt, Engine Coolant Temperature, Engine Malfunction, Hydraulic System Malfunction, General Warning. **Indicators:** Two-Speed, Engine Preheat. **Data Display:** Operating Hours, Engine rpm, Maintenance Clock Countdown, Battery Voltage, Service Codes, Engine Preheat. **Other:** Audible Alarm, Lights. **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.

Capacities

Fuel Tank	53,1 L (14 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)
Air Conditioning Refrigerant (R-134a)	0,77 kg (1.7 lb)

Tracks

Type	Rubber	Steel
Width	320 mm (12.6 in)	300 mm (11.8 in)
Number Of Shoes	Single Assembly	43
Number of Track Rollers (per side)	4	4

Ground Pressure

Rubber Tracks - Standard Arm Long Arm	28,6 kPa (0,286 bar) (4.15 psi) 31,2 kPa (0,312 bar) (4.53 psi)
Steel Tracks - Standard Arm Long Arm	31,4 kPa (0,314 bar) (4.55 psi) 34,2 kPa (0,342 bar) (4.96 psi)

Environmental

DECLARED SINGLE-NUMBER NOISE EMISSION VALUES In accordance with ISO 4871	
Noise level per Directive 2000/14/EC - L_{wA}	93 dB
Operator noise level per Directive 2006/42/EC — L_{pA}	78 dB

DECLARED VIBRATION EMISSION VALUES Ina accordance with EN 12096		
	Value	Uncertainty
Whole-body vibration per ISO 2631-1	0,141 m/s^2	0,37 m/s^2
Hand-arm vibration per ISO 5349-1	0,438 m/s^2	---

Machine equipped with optional HVAC (air condition) contains fluorinated greenhouse gas (F-gas)	
F-gas type	HFC-134a
F-gas mass (kg)	0.77
CO2 equivalent (t)	1.10
GWP	1430

Temperature Range

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


Bobcat®

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.

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