Bobcat®

Operation & Maintenance Manual

Dealer Copy -- Not for Resale

E85

Compact Excavator

S/N B48411001 - B48413700

7320317enUS (06-19) (D)

Printed in U.S.A.

OPERATOR SAFETY WARNING

⚠ WARNING

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

W-2001-0502

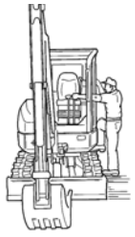
Safety Alert Symbol: **This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.**

CORRECT

P-90216

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

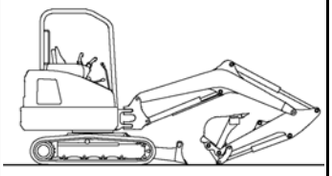
WRONG



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

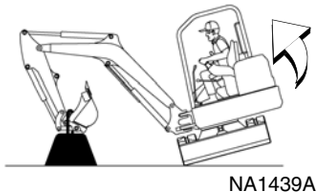
- **Never operate without approved cab / canopy.**
- **Never modify equipment.**
- **Never use attachments not approved by Bobcat Company.**

WRONG

NA1419

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

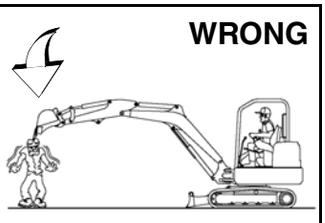
WRONG



NA1439A

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

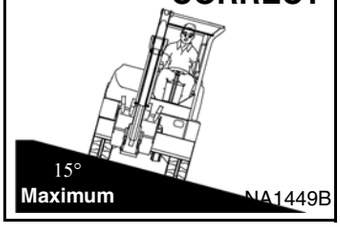
WRONG



NA1445A

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

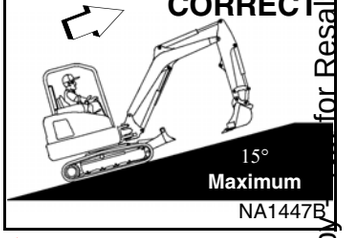
CORRECT



NA1449B

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

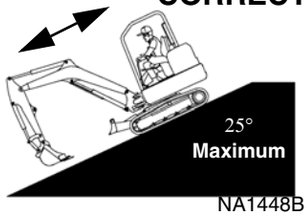
CORRECT



NA1447B

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

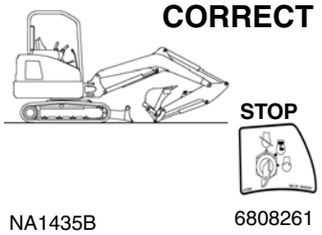
CORRECT



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 and TRAVEL MOTOR BRAKE.**
8. **SAFETY TREAD.: Replace if damaged.**

OSW91-0917

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

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

FOREWORD

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

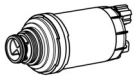
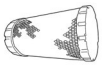
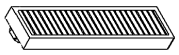
BOBCAT COMPANY IS ISO 9001 CERTIFIED

ISO 9001 is an international standard that specifies requirements for a quality management system that controls the processes and procedures which we use to design, develop, manufacture, and distribute Bobcat products.

British Standards Institute (**BSI**) is the Certified Registrar Bobcat Company chose to assess the company's compliance with the ISO 9001 at Bobcat's manufacturing facilities in Gwinner, North Dakota (U.S.A.), Pontchâteau (France), and the Bobcat corporate offices (Gwinner, Bismarck, and West Fargo) in North Dakota. **TÜV Rheinland** is the Certified Registrar Bobcat Company chose to assess the company's compliance with the ISO 9001 at Bobcat's manufacturing facility in Dobris (Czech Republic). Only certified assessors, like BSI and TÜV Rheinland, can grant registrations.

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

REGULAR MAINTENANCE ITEMS

	ENGINE OIL FILTER 7012303		BATTERY 7269857
	FUEL FILTER 7023589		HYDRAULIC FILL / BREATHER CAP 6692836
 	AIR FILTER, Outer 6690907 AIR FILTER, Inner 7020361		FLUID, Hydraulic / Hydrostatic 6903117 - (2.5 U.S. gal) 6903118 - (5 U.S. gal) 6903119 - (55 U.S. gal)
	PRIMARY HYDRAULIC FILTER 6668819 CASE DRAIN HYDRAULIC FILTER 6516722		ANTI-FREEZE, Propylene Glycol 6983128 - Premixed 6983129 - Concentrate
	HVAC AIR FILTER (IF EQUIPPED) Fresh Air 7176099 Recirculation 7222791		RADIATOR CAP 6646678 OVERFLOW TANK CAP 7218789
	FUEL TANK BREATHER 6692836		
ENGINE OIL 6903105 6903107 6903109 6903113 6903112 6903111	 SAE 15W40 CE/SG (12 qt) SAE 10W30 CE/SG (12 qt) SAE 30W CE/SG (12 qt) SAE 15W40 CE/SG (2.5 U.S. gal) SAE 10W30 CE/SG (2.5 U.S. gal) SAE 30W CE/SG (2.5 U.S. gal)	**GEAR LUBE** **ENGINE OIL** 6903106 6903108 6903110	6903121 - HD 80W-90 (12 qt) SAE 15W40 CE/SG (1 U.S. gal) SAE 10W30 CE/SG (1 U.S. gal) SAE 30W CE/SG (1 U.S. gal)

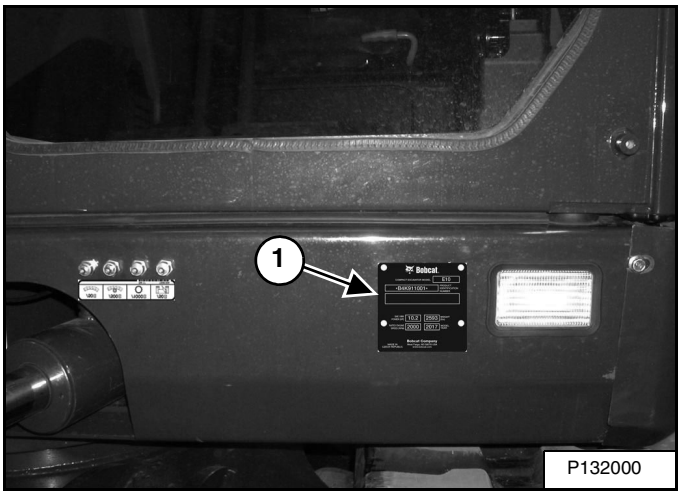
NOTE: Always verify Part Numbers with your Bobcat dealer.

SERIAL NUMBER LOCATIONS

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

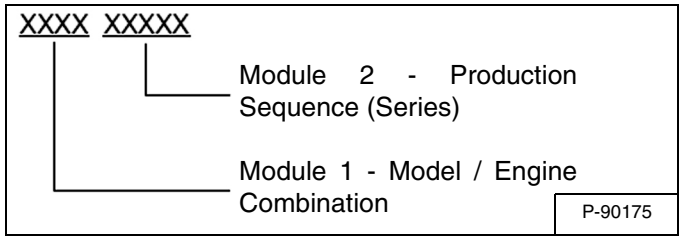
Excavator Serial Number

Figure 1



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

Figure 2



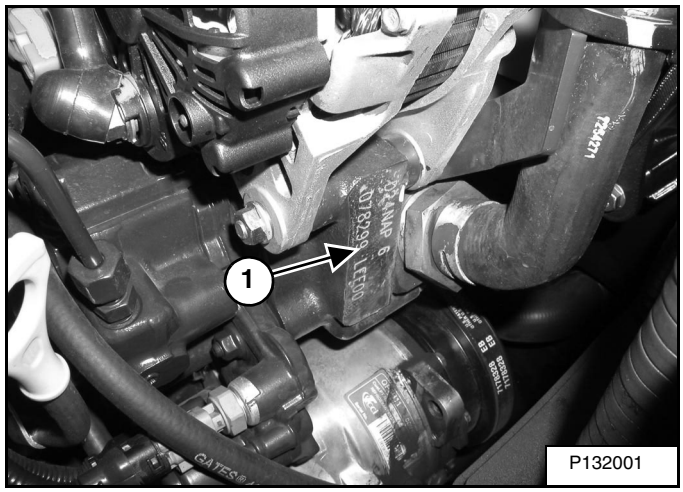
Explanation of excavator Serial Number **[Figure 2]**:

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

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

Engine Serial Number

Figure 3

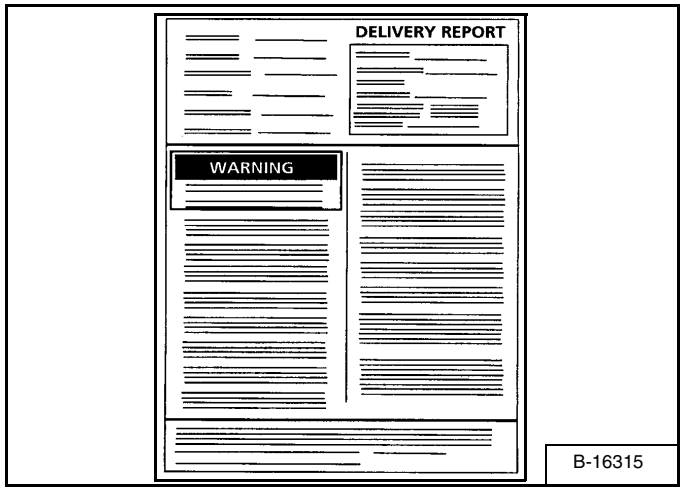


The engine serial number (Item 1) **[Figure 3]** is located on the side of the engine, below the alternator and next to the oil fill tube.

NOTE: The rear counterweight may need to be removed to see the serial number.

DELIVERY REPORT

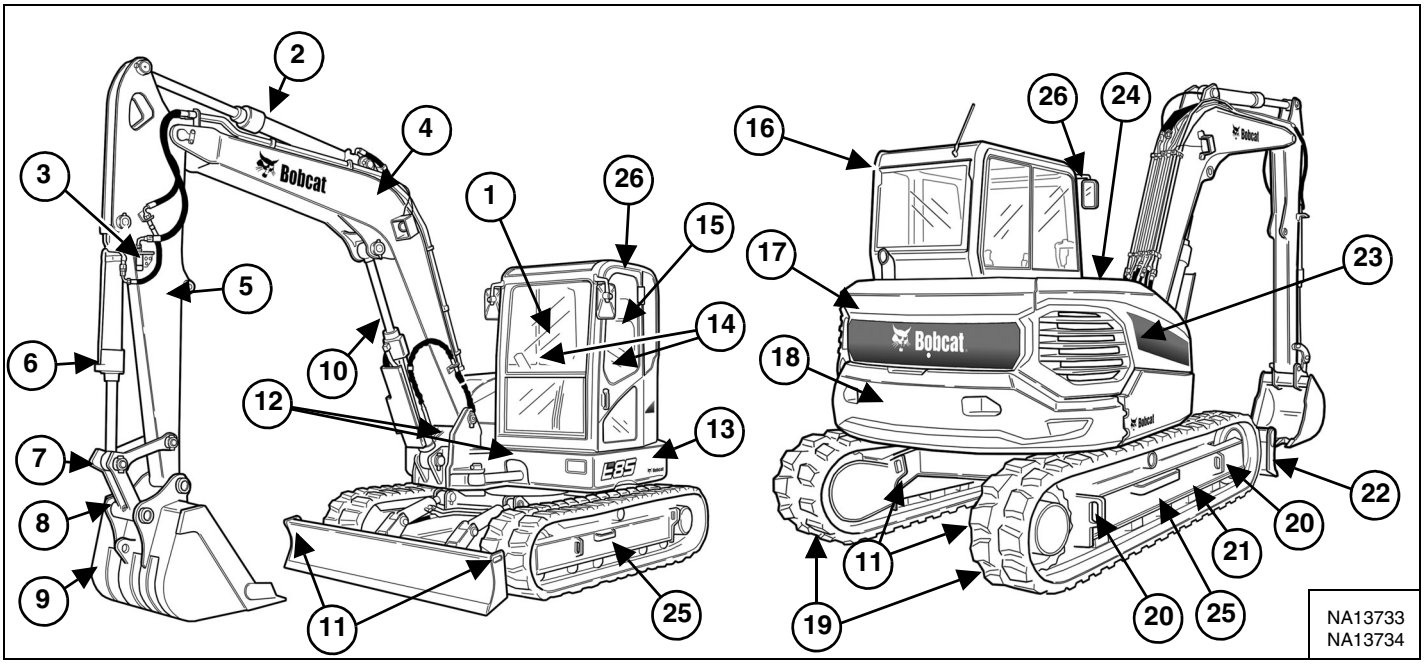
Figure 4



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	Operation & Maintenance Manual and Operator's Handbook	**16**	CAB (ROPS / TOPS AND FOPS) **[2]**
2	Arm Cylinder	**17**	Rear Cover
3	Auxiliary Quick Couplers	**18**	Counterweight
4	Boom	**19**	Tracks
5	Arm	**20**	Tie Downs / Lift Points (Both Sides)
6	Bucket Cylinder	**21**	Track Frame
7	Bucket Link	**22**	Blade
8	Attachment Quick Coupler System (If Equipped)	**23**	Right Side Cover
9	Bucket **[1]**	**24**	Center Cover
10	Boom Cylinder	**25**	Step
11	Tie Downs	**26**	Mirrors
12	Blade Cylinders		
13	Upperstructure		
14	Control Levers (Joysticks)		
15	Operator's Seat with Seat Belt		

[1] BUCKET - Several different buckets and other attachments are available from the Bobcat Excavator.
[2] ROPS, TOPS - (Roll-Over Protective Structure / Tip-Over Protective Structure) per ISO 12117-2 and ISO 12117. FOPS (Fall Object Protective Structure) per ISO 10262 - level 1

FEATURES, ACCESSORIES AND ATTACHMENTS

Standard Items

Model E85 Bobcat excavators are equipped with the following standard items:

- 2205 mm (86.8 in) Dozer Blade
- Enclosed Cab With Heater and A/C and with ROPS / TOPS Approval
- 450 mm (17.7 in) Rubber Tracks
- Two-Speed Travel
- Auto Shift Drive Motors
- Auxiliary Hydraulics (With Selectable Auxiliary Hydraulic Flow)
- Hydraulic and Travel Control Lockouts
- Engine Speed Control Dial With Auto Idle Feature
- Blade Float
- Work Lights - Boom, Cab and Frame Mounted
- Engine and Hydraulic system Monitor with Shut Down
- Horn
- Hydraulic Joystick Controls
- ISO / STD Control Pattern Selection Feature
- Arm Mounted Auxiliary Hydraulic Couplers
- Suspension Seat
- Retractable Seat Belt
- Spark Arrester Muffler
- Advanced Diagnostics
- Counterweight
- Mirrors

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 Auto HVAC
- Deluxe Instrument Panel
- Radio
- Depth Check
- Travel Motion Alarm
- Keyless Start
- Top Guard Kit (FOGS)
- Special Application Kit
- Steel Tracks
- Segmented Tracks
- Load Hold - Boom / Arm
- Load Moment Alarm
- Counterweight (Additional)
- Second Auxiliary Hydraulics
- Coupler Block Kit
- Case Drain
- Battery Disconnect Switch
- HEPA HVAC Fresh Air Filter
- Pin Grabber Coupler Ready Hydraulic Plumbing (intended for use with a Geith® hydraulic pin grabber coupler to fit older Bobcat pin on attachments)

Attachments

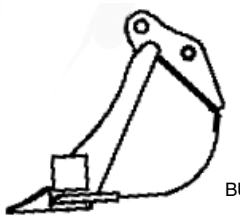
These and other attachments are approved for use on this model Bobcat excavator. Do not use unapproved attachments. Attachments not manufactured by Bobcat may not be approved.

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
- Compactor
- Power Tilt
- Ripper
- Flail Mower
- Laser Receiver

Buckets Available



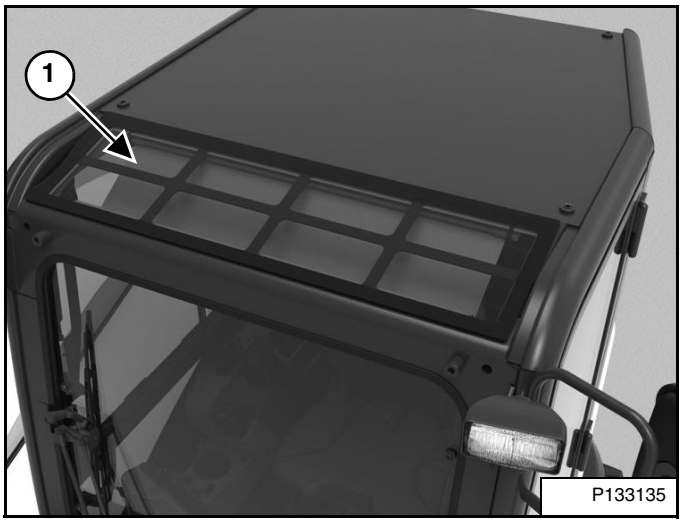
BUCKET

Many bucket styles, widths and different capacities are available for a variety of different applications. See your Bobcat dealer for the correct bucket for your Bobcat excavator and application.

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

Falling-Object Protective Structure (FOPS)

Figure 5



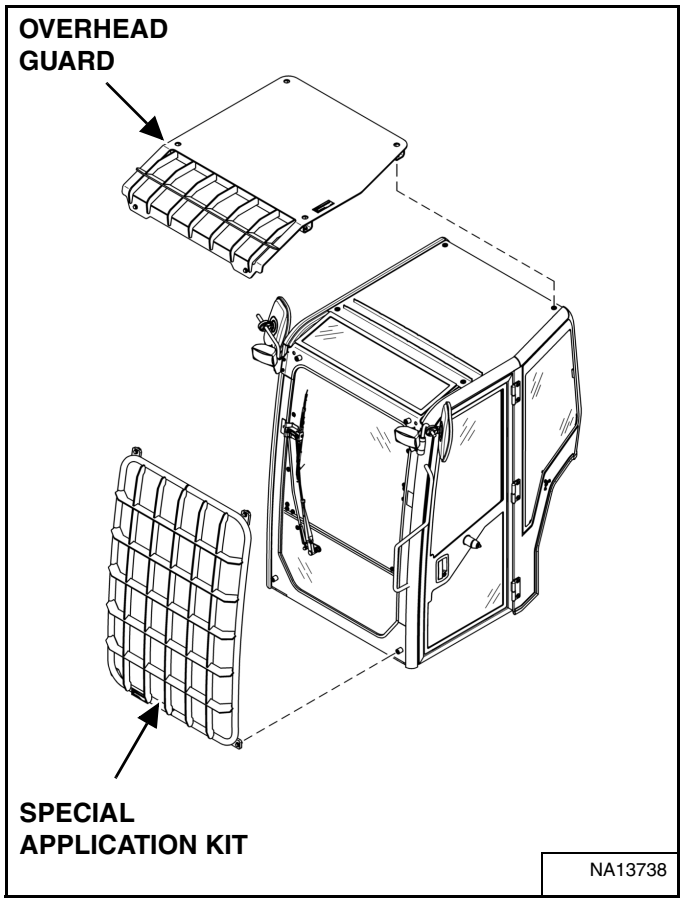
NOTE: The excavator top window is a Falling Object Protective Structure (FOPS) that meets the top guard requirements in ISO 10262 - Level 1.

NOTE: There is a kit available that meets ISO 10262 - Level 2 [Figure 6].

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 ISO 10262 - level 1.

Kit includes a front screen guard.

The excavator must have the overhead guard **[Figure 6]** installed to meet the top guard requirements in ISO 10262 - level 2.

Kit includes an overhead guard.

See your Bobcat Dealer for more information.

Special Applications Kit Inspection And Maintenance

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

SAFETY AND TRAINING RESOURCES

SAFETY INSTRUCTIONS

Before Operation

Carefully follow the operating and maintenance instructions in this manual.

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

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

The 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. It's brief instructions are convenient to the operator. The handbook is available from your dealer in an English edition or one of many other languages. See your Bobcat dealer for more information on translated versions.

- The AEM Safety Manual delivered with the machine gives general safety information.

- The Compact Excavator Operating Training Course is available through your Bobcat dealer. This course is intended to provide rules and practices of correct operation of the Bobcat excavator. The course is available in English and Spanish versions.

- Service Safety Training Courses are available from your Bobcat dealer. They provide information for safe and correct service procedures.

- See the PUBLICATIONS AND TRAINING RESOURCES Page in this manual or your Bobcat dealer for Service and Parts Manuals, printed materials, videos, or training courses available. Also check the Bobcat websites **Bobcat.com/training** or **Bobcat.com**

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.

Call Before You Dig
Dial 811 (USA Only)
1-888-258-0808 (USA & Canada)

When you call, you will be directed to a location in your state / province, or city for information about buried lines (telephone, cable TV, water, sewer, gas, etc.).

SI EXC-1016

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

A Qualified Operator Must Do The Following:

Understand the Written Instructions, Rules and Regulations

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

Have Training with Actual Operation

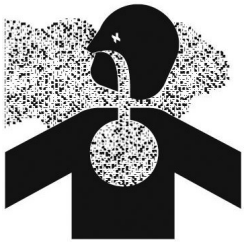
- Operator training must consist of a demonstration and verbal instruction. This training is given by your Bobcat dealer before the product is delivered.
- The new operator must start in an area without bystanders and use all the controls until he or she can operate the machine and attachment safely under all conditions of the work area. Always fasten seat belt before operating.
- Operator Training Courses are available from your Bobcat dealer in English and Spanish. They provide information for safe and efficient equipment operation. Safety videos are also available.
- Service Safety Training Courses are available from your Bobcat dealer. They provide information for safe and correct service procedures.

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. Call local utilities or the TOLL FREE phone number found in the *Before Operation* section of this manual.
- 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-1016

Avoid Silica Dust



Cutting or drilling concrete containing sand or rock containing quartz may result in exposure to silica dust. Do not exceed Permissible Exposure Limits (PEL) to silica dust as determined by OSHA or other job site Rules and Regulations. Use a respirator, water spray or other means to control dust. Silica dust can cause lung disease and is known to the state of California to cause cancer.

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 coolant mixtures are flammable. Flammable fluids that are leaking or spilled onto hot surfaces or onto electrical components can cause a fire.

Operation

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

Electrical

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

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

SI EXC-1016

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 gasoline or diesel fuel for cleaning parts. Use commercial nonflammable 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 or air intake heater. These starting aids can cause explosion and injure you or bystanders.

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

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).

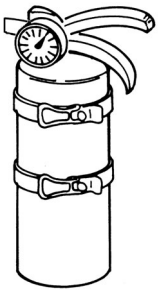
Welding And Grinding

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 nonmetallic 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



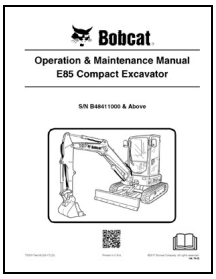
Know where fire extinguishers and first aid kits are located and how to use them. Inspect the fire extinguisher and service the fire extinguisher regularly. Obey the recommendations on the instructions plate.

SI EXC-1016

PUBLICATIONS AND TRAINING RESOURCES

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

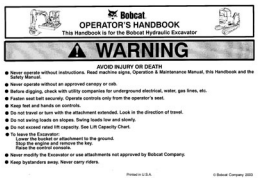
For the latest information on Bobcat products and the Bobcat Company, visit our Web site at **Bobcat.com/training** or **Bobcat.com**



OPERATION & MAINTENANCE MANUAL

7320317enUS

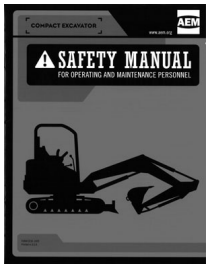
Complete instructions on the correct operation and the routine maintenance of your Bobcat excavator.



OPERATOR'S HANDBOOK

7311306enUS

Gives basic operation instructions and safety warnings.



SAFETY MANUAL

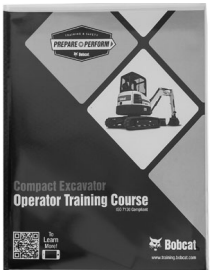
6901951 (English and Spanish)

Gives basic safety procedures and warnings for your Bobcat excavator.

OPERATOR SAFETY DVD

6904762 (English and Spanish)

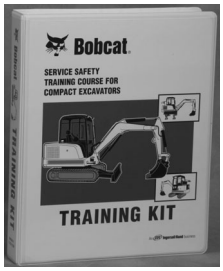
DVD gives basic safety instructions for many Bobcat products including excavator.



COMPACT EXCAVATOR OPERATOR TRAINING COURSE

7249283 (English)
7249286 (Spanish)

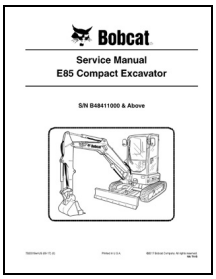
Introduces operator to step-by-step basics of excavator operation.



EXCAVATOR SERVICE SAFETY TRAINING COURSE

6900916

Introduces service technicians to step-by-step basics of proper and safe excavator maintenance and servicing procedures.



SERVICE MANUAL

7320318enUS

Complete maintenance instructions for your Bobcat excavator.

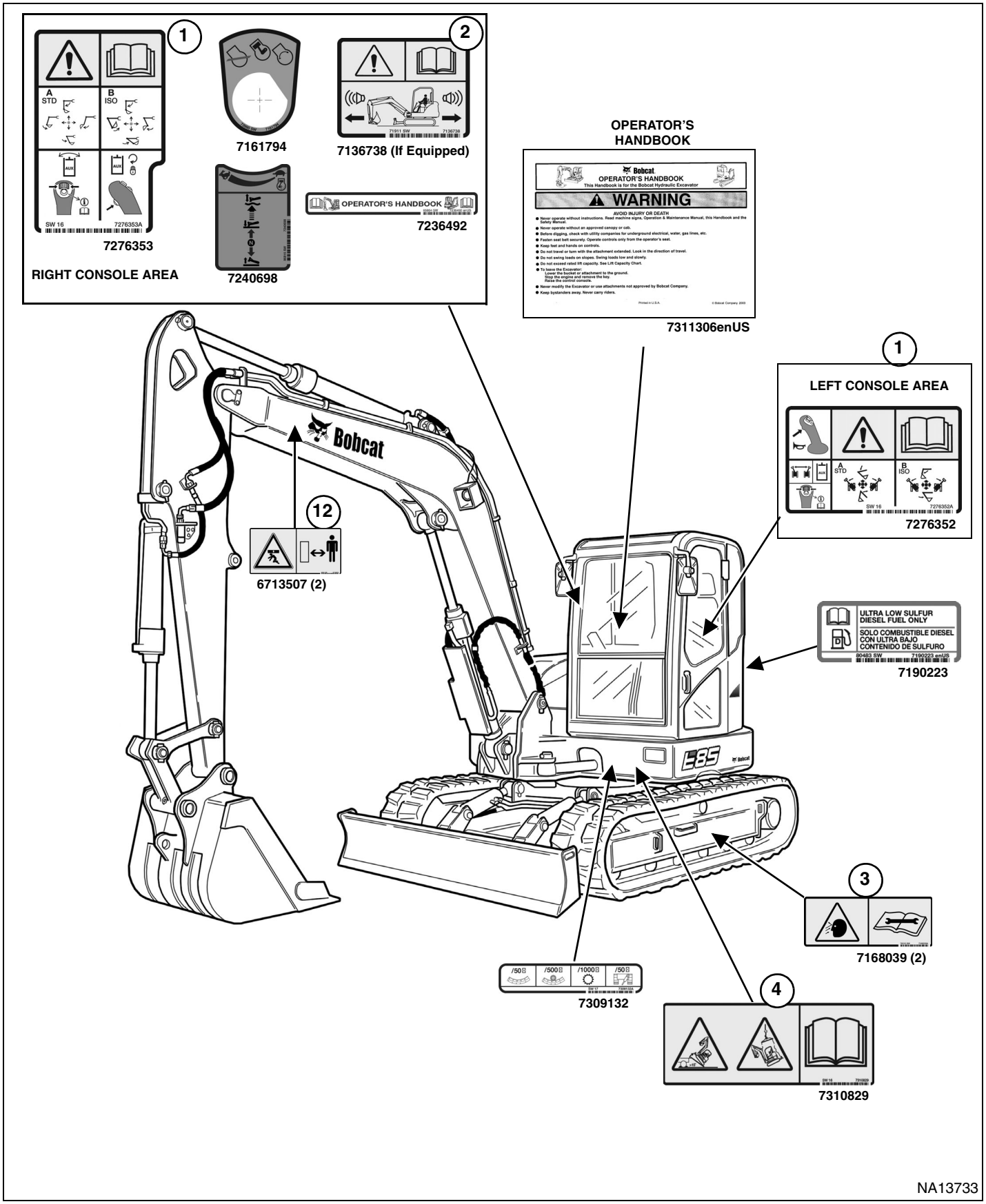
EXCAVATOR SAFETY VIDEO

(Mobile device with quick response code application required)

Scan the code above to watch the excavator safety video or view at **Bobcat.com/training**.

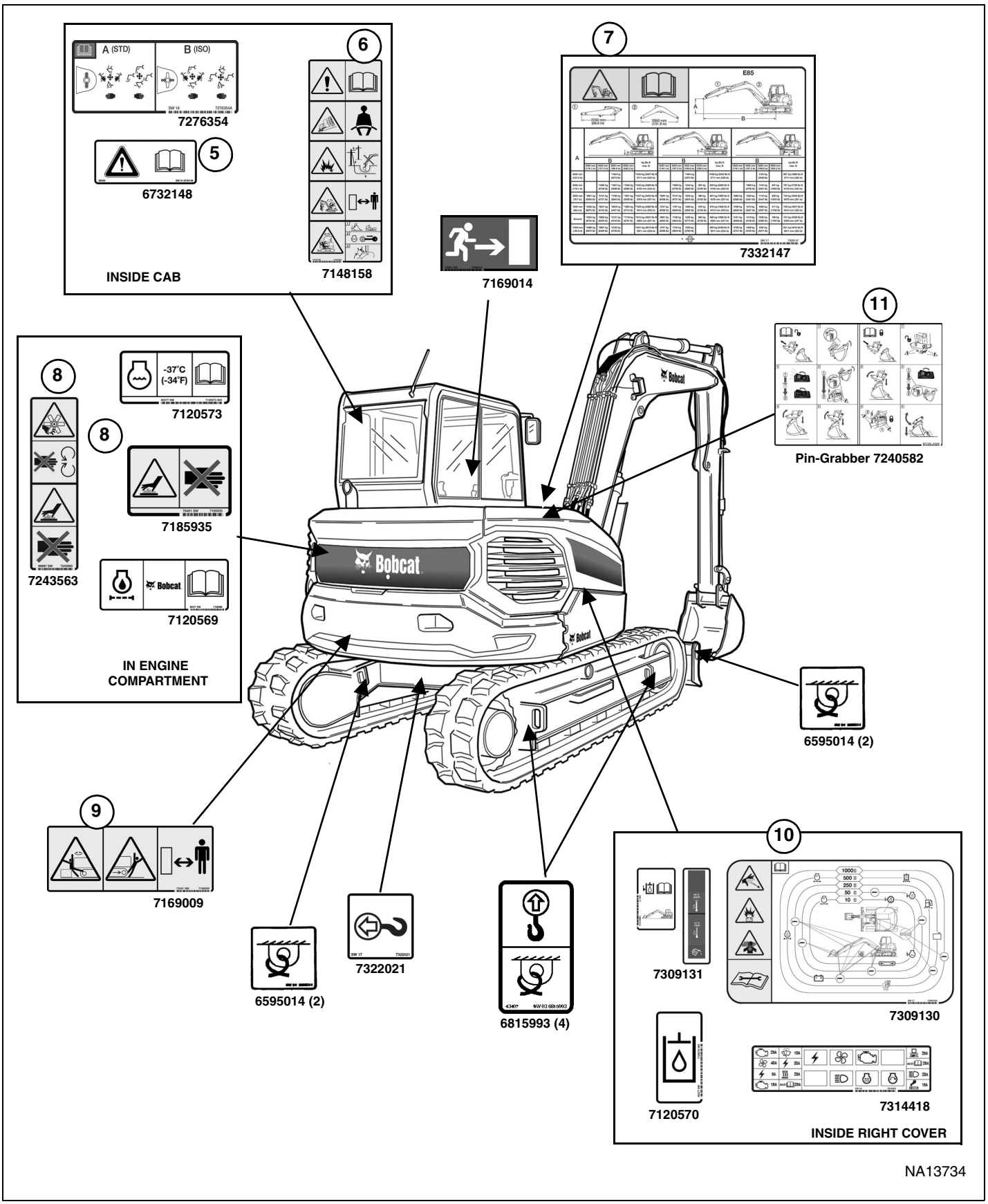
MACHINE SIGNS (DECALS)

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



MACHINE SIGNS (DECALS) (CONT'D)

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

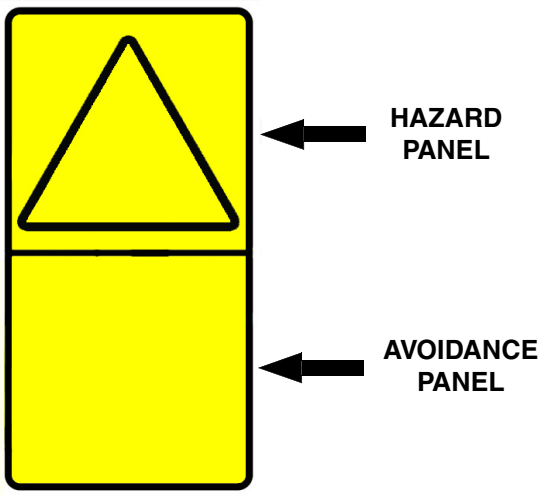


MACHINE SIGNS (DECALS) (CONT'D)

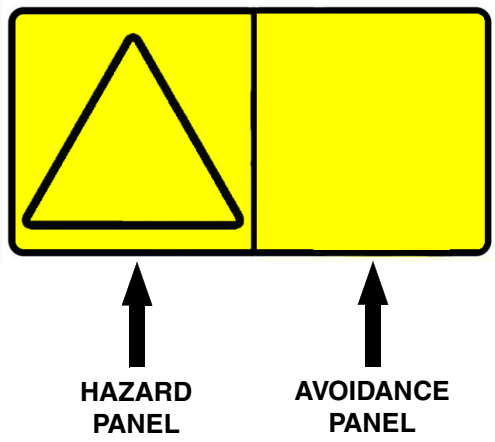
Pictorial Only Safety Signs

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 familiarized with all safety signs installed on the excavator.

Vertical Configuration



Horizontal Configuration



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

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

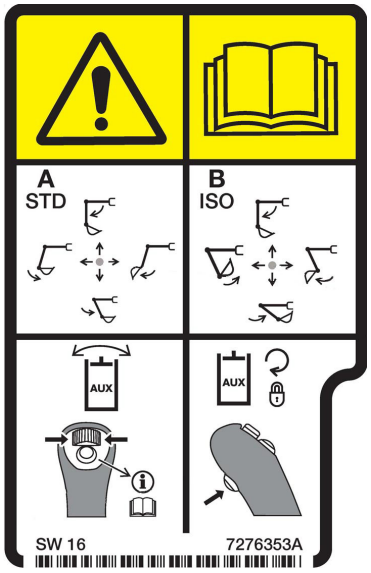
Avoidance panels depict actions required to avoid the hazards.

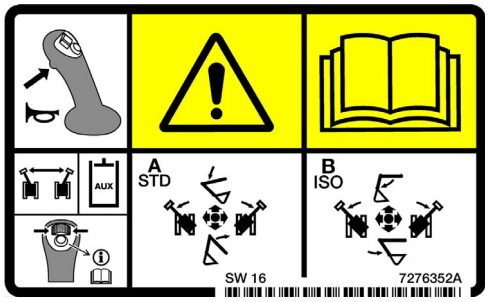
A safety sign may contain more than one hazard panel and more than one avoidance panel.

NOTE: See the numbered MACHINE SIGNS (DECALS) on Page 14 and MACHINE SIGNS (DECALS) (Cont'd) on Page 15 for the machine location of each corresponding numbered pictorial only decals as shown below.

1. Operator Controls (7276352, 7276353)

This safety sign is located on the left or right joystick consoles.





WARNING

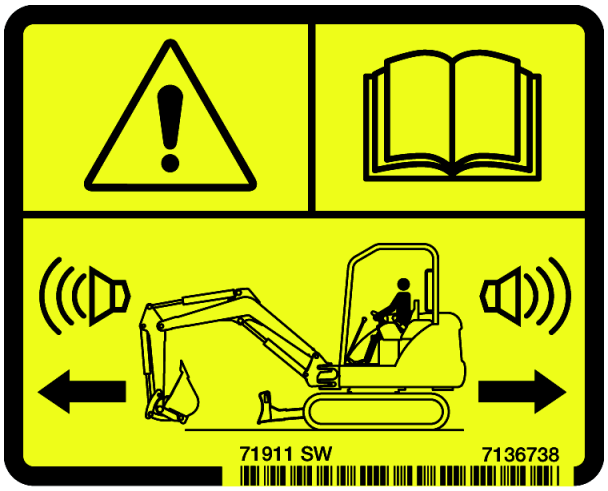
AVOID INJURY OR DEATH
Know the control pattern before operating.
Read and understand the Operation & Maintenance Manual before operating the machine.

W-3022-0217

Pictorial Only Safety Signs (Cont'd)

2. Motion Alarm (7316738) (If Equipped)

This safety sign is located on the right window (cab models), rear crossmember (canopy models).



⚠ WARNING

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

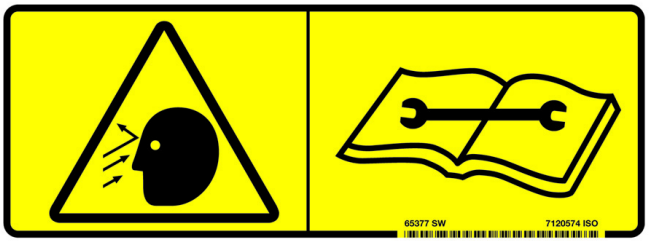
Failure to maintain a clear view in the direction of travel could result in serious injury or death.

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

W-2786-0309

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

W-2994-0515

4. Transporting And Lifting (7178215)

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

⚠ 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

Pictorial Only Safety Signs (Cont'd)

5. Operation & Maintenance Manual (6732148)

This safety sign is located below the operator's seat.

WARNING

AVOID INJURY OR DEATH

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

W-3021-0217

6. General Hazard (7148158)

This safety sign is located inside the operator's area on the left console.

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.

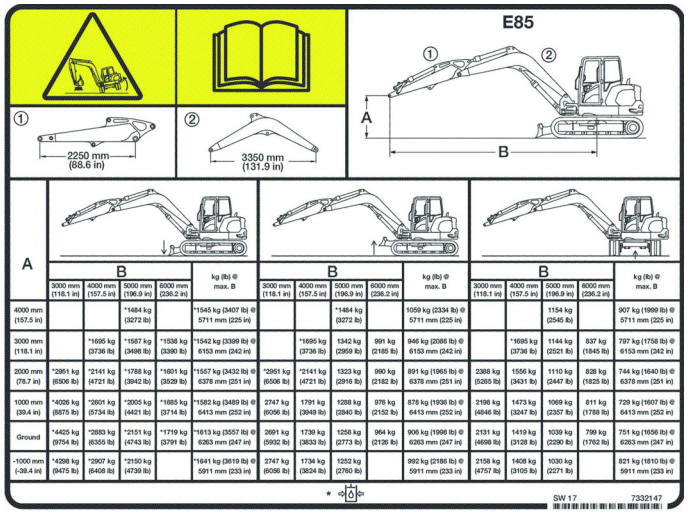
To Leave Excavator:
1. Lower attachment and blade to ground.
2. Stop engine and remove the key (if equipped).
3. Raise control console.

W-2518-0110

Pictorial Only Safety Signs (Cont'd)

7. Lift Capacity (7332147)

This safety sign is located on the right side cover.



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

8. Hot Surfaces and Rotating Fan (7185935, 7243563)

This safety sign is located under the right side cover and 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.

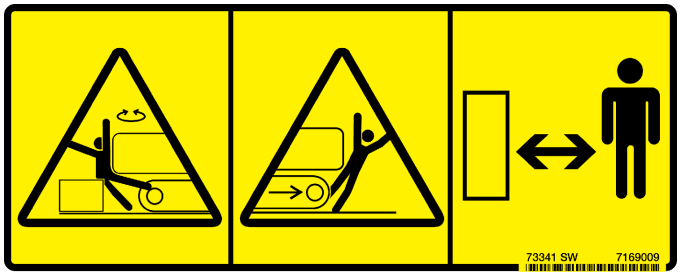
Hot surfaces can cause injury. Do not touch. Allow to cool before servicing.

W-2521-0106

Pictorial Only Safety Signs (Cont'd)

9. Stay Away (7169009)

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



⚠ WARNING

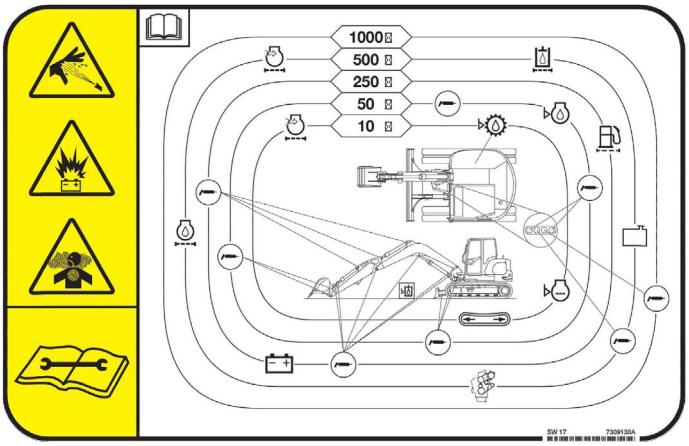
AVOID INJURY OR DEATH

- **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-2775-1208

10. High Pressure, Battery, Exhaust Gases and Service Schedule (7309130)

This safety sign is located inside the tailgate.



⚠ WARNING

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

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

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

All exhaust gases can kill. Always ventilate.

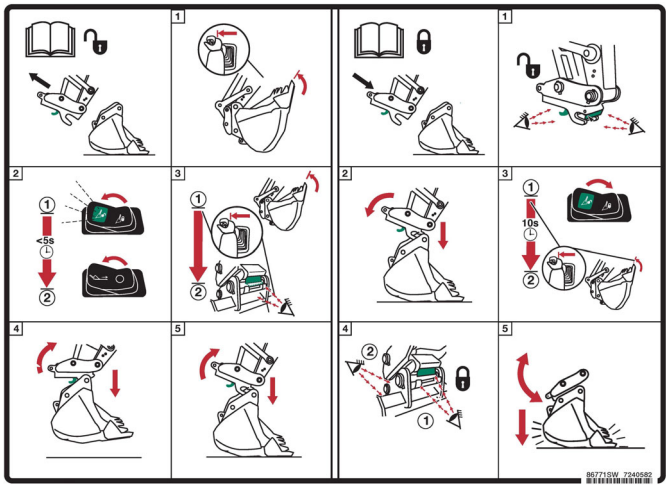
Read and understand the Operation & Maintenance Manual for more information.

W-2522-0110

Pictorial Only Safety Signs (Cont'd)

11. Attachment Mounting And Removal (If Equipped) (7240582)

This safety sign is located on the right side cover.

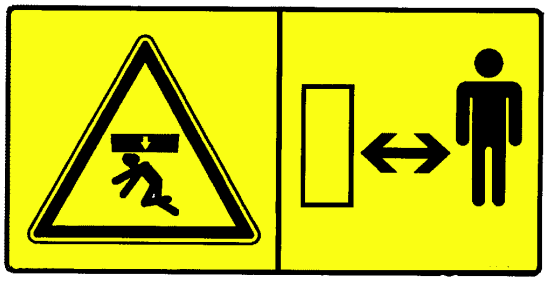


This machine is equipped with an attachment mounting system.

See Installing and Removing the Attachment. (See ATTACHMENTS on Page 71.)

12. 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

OPERATING INSTRUCTIONS

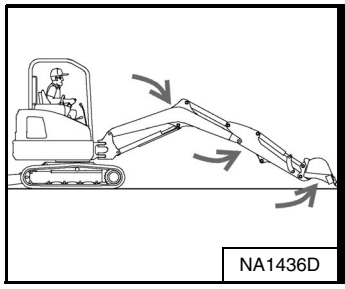
INTENDED USE

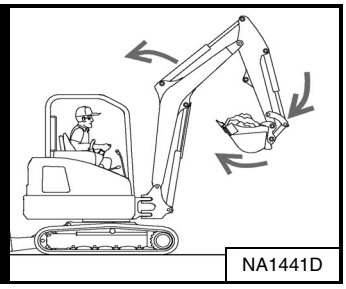
This machine is classified as an Excavator as defined in ISO 6165. This machine has tracks and commonly a mounted bucket for the principle intended functions of excavating, loading and backfilling loose materials such as earth, gravel, or crushed rock.

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

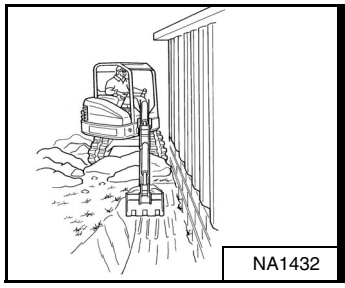
Examples of intended use include:

Excavating

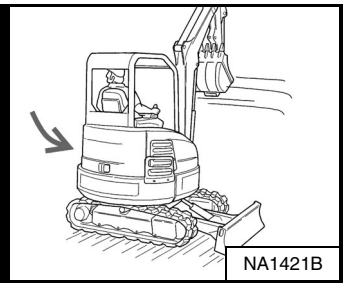




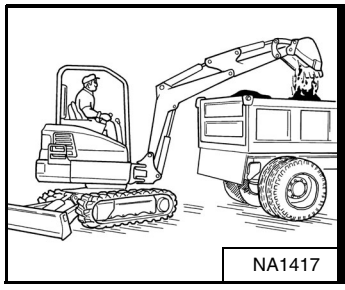
Boom Swing



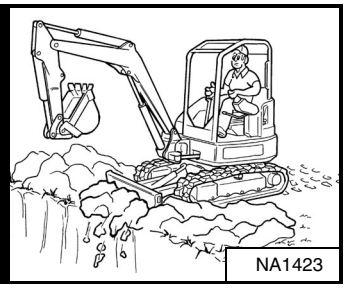
Rotating the Upperstructure



Loading Material



Backfilling



⚠ WARNING

AVOID INJURY OR DEATH

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

W-2374-0500

⚠ WARNING

AVOID INJURY OR DEATH

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

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

W-2757-0910

⚠ WARNING

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

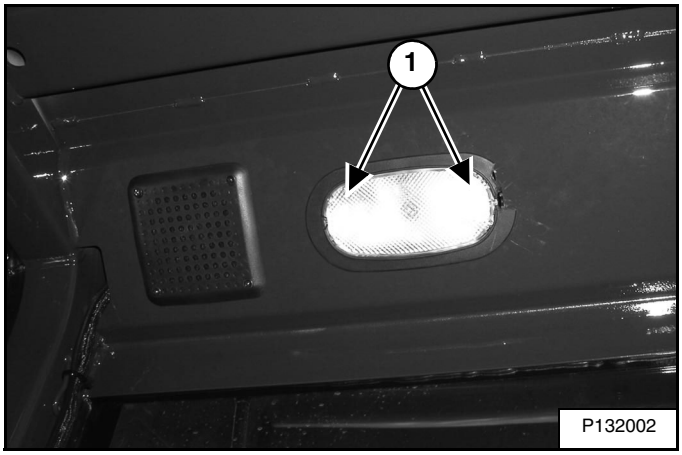
W-2119-0910

IMPORTANT

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

I-2256-0507

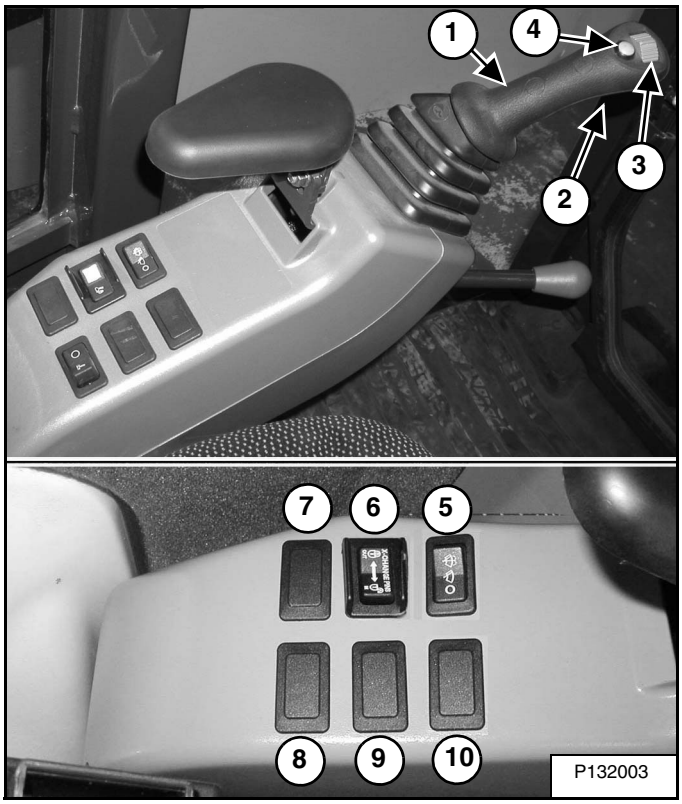
Figure 7



Press either side of the lens (Item 1) **[Figure 7]** to turn the light ON. Return the LENS to the center position to turn OFF.

Left Console

Figure 8

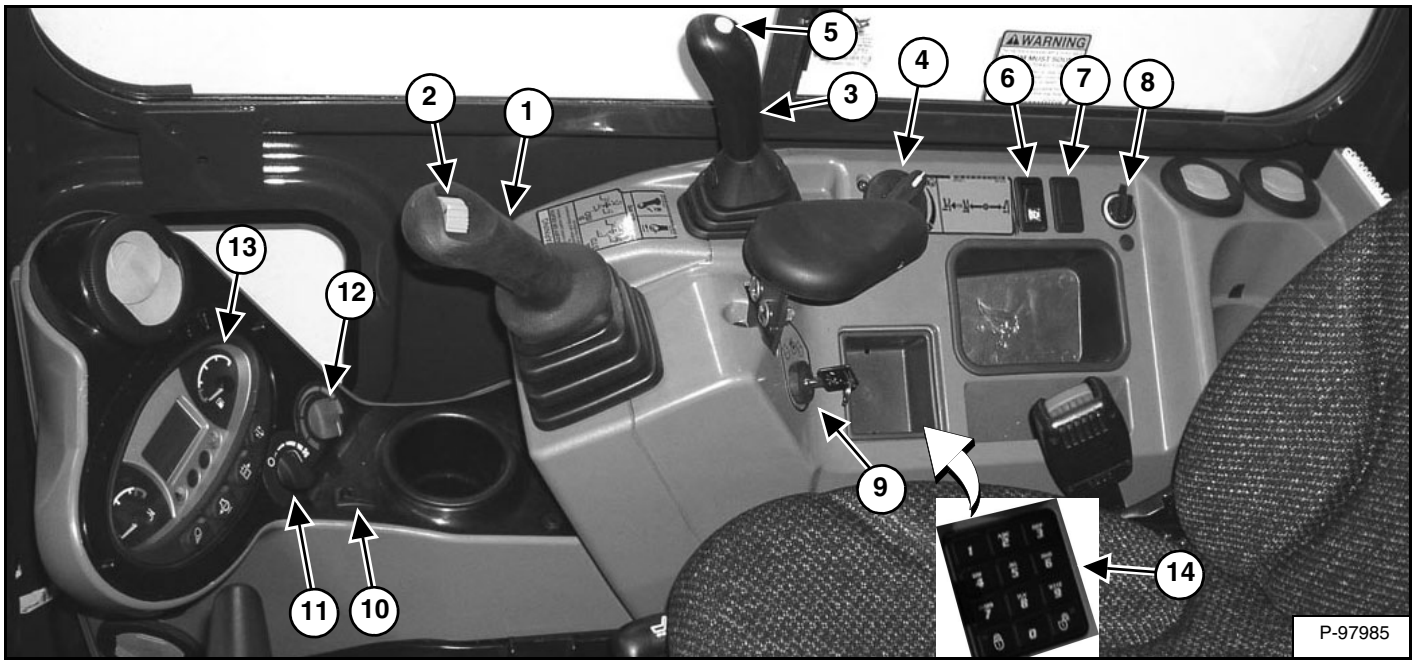


Left Console **[Figure 8]**

REF	DESCRIPTION	FUNCTION / OPERATION
1	Left Joystick	(See HYDRAULIC CONTROLS on Page 47.)
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	Boom Swing Switch / Secondary Auxiliary Hydraulic (If Equipped)	Press and hold button until audible beep to switch function, MODE will be shown on instrument panel. (See Secondary Auxiliary Hydraulics and Boom Swing in this manual.)
5	Wiper / Washer Switch (If Equipped)	Press the switch to the left to turn wiper ON. Press and hold switch to the left to activate window washer. Press switch to the right to turn wiper OFF.
6	Pin Grabber Quick Coupler ON / OFF Switch (If Equipped)	Press the switch to the left to turn the pin grabber coupler ON. Press the switch to the right to turn OFF.
7	Beacon / Strobe Light (If Equipped)	Press switch to the left to turn ON the beacon / Strobe light. Press the switch to the right to turn OFF.
8	Pin Grabber Quick Coupler INTENT Switch (If Equipped)	Press the switch to the left to initiate the quick coupler install or removal mode. (See Installing and Removing the Attachment (Pin Grabber Quick Coupler) in this manual).
9	OVERLOAD WARNING SWITCH (If Equipped)	Press the switch to the right to enable OVERLOAD WARNING feature. Press to the left to disable. (See Overload Warning in this manual).
10	Not Used	---

Right Console

Figure 9



REF	DESCRIPTION	FUNCTION / OPERATION
1	Right Joystick	(See HYDRAULIC CONTROLS in this manual.)
2	Auxiliary Hydraulic Switch	Controls the fluid flow to the auxiliary quick couplers (attachment). (See Auxiliary Hydraulics in this manual.)
3	Blade Control Lever	Controls raising and lowering the blade. Pushed all the way forward puts blade in float position. (See BLADE LEVER CONTROL in this manual).
4	Engine Speed Control Dial	Controls rpm of the engine. (See ENGINE SPEED CONTROL DIAL in this manual).
5	Two-Speed Button	Engages and disengages High Range Travel Speed. (See Two-Speed Travel in this manual).
6	Motion Alarm Cancel Switch	This switch temporarily disables the motion alarm. (See MOTION ALARM SYSTEM on Page 44.)
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	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	The fan switch has multiple positions; Off, Auto (If Equipped), and Low, Medium, High fan speed. (See Auto HVAC Control on Page 42.)
12	Temperature Control	Turn clockwise to increase temperature; counterclockwise 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.

Instrument Panel - Standard

Figure 10

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) (Press and hold 7 seconds when displayed to reset the maintenance clock.) • Engine rpm • Battery voltage • Maintenance clock (Press and hold 7 seconds when displayed to reset the maintenance clock.) • Service codes*
5	Engine Temperature Gauge	Shows the engine coolant temperature.

Instrument Panel - Standard (Cont'd)

REF. NO.	DESCRIPTION	FUNCTION / OPERATION
6	Data Display Screen	The data display screen shows the Hourmeter at start up and then changes to engine rpm during normal operation of the excavator. When preheat is activated, the display screen will show the remaining preheat time. Can also be used to display Job Clock, Engine rpm, Boom Offset / Second Auxiliary and Selectable Auxiliary Hydraulic Flow. (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 164.)

** Icons will be ON or flashing when diagnostic system indicates a problem. (See DIAGNOSTIC SERVICE CODES on Page 164.)

*** Icons will be flashing when diagnostic system indicates a problem. (See DIAGNOSTIC SERVICE CODES on Page 164.)

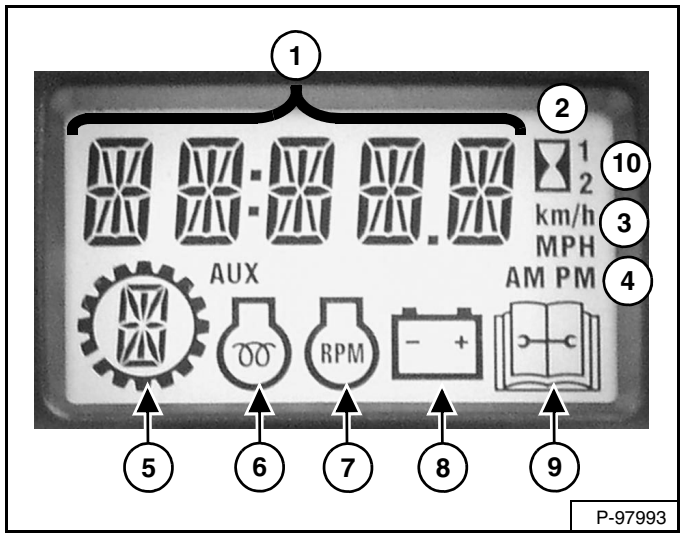
Instrument Panel - Standard (Cont'd)

Indicator Icons

The display screen can display the following information:

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

Figure 11

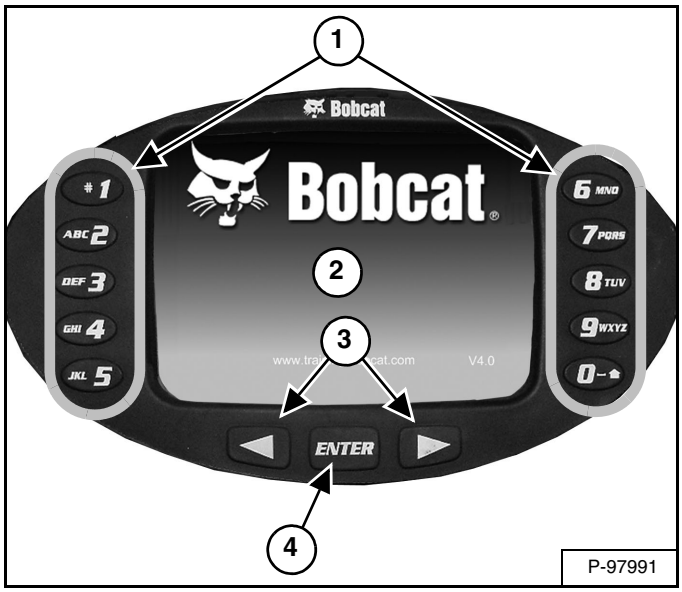


The display screen is shown in **[Figure 11]**. The data display will show operating hours upon startup.

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

Instrument Panel - Deluxe

Figure 12



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

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 13

Turn the start key to the ON position.

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

NOTE: Your excavator (with Deluxe Instrument Panel) will have an Owner Password. Your dealer will provide you with this password. Change the password to one that you will easily remember to prevent unauthorized use of your excavator. (See Changing The Owner Password on Page 178.) 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 171.)

Lights

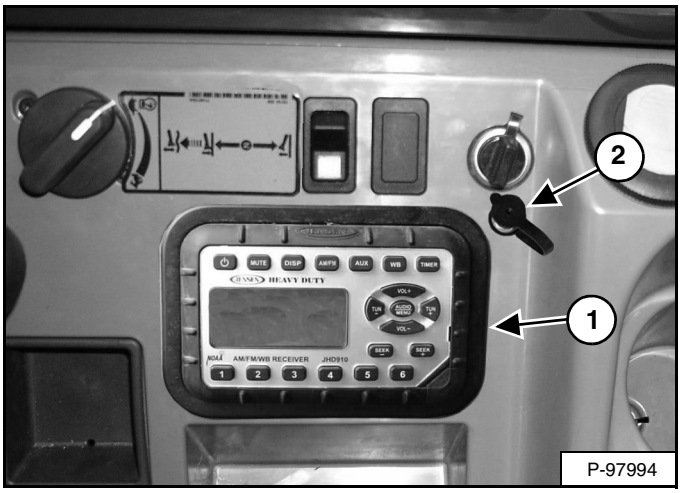
Press key pad [1] **[Figure 13]** once for FRONT work lights. Press a second time to turn all lights off.

Change Language:

The language can be changed at any time. (See CONTROL PANEL SETUP on Page 171.)

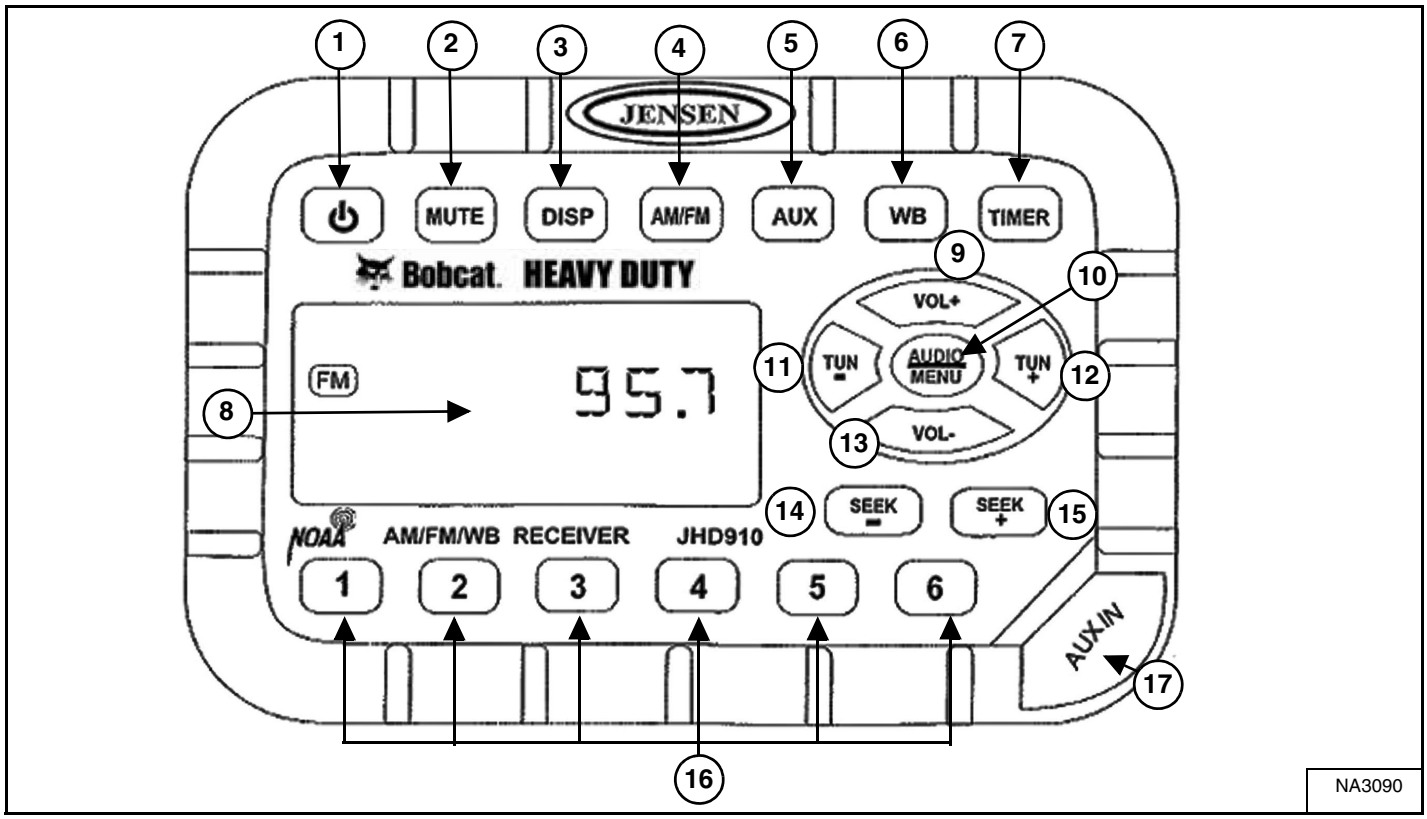
Radio Option

Figure 14



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

Figure 15



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

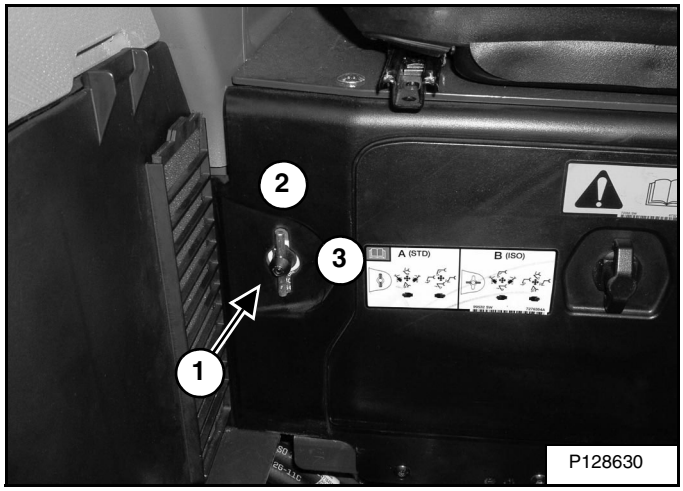
Radio (Cont'd)

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 Color (Amber or Green) - Determines backlight color 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.

STD / ISO Selector Valve

The STD / ISO selector valve is located below the operator's seat.

Figure 16



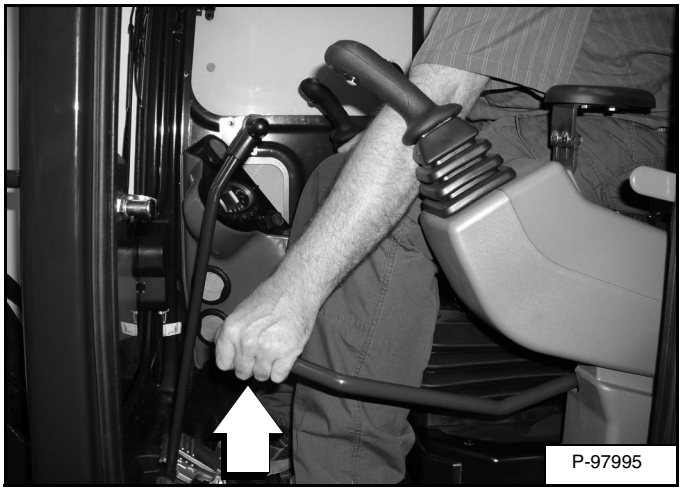
The joystick hydraulic function can be switched from Standard control pattern to ISO control pattern.

Rotate the lever (Item 1) counterclockwise (Item 2) to select STANDARD Control Pattern. Rotate the lever clockwise (Item 3) to select ISO Control Pattern **[Figure 16]**.

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.

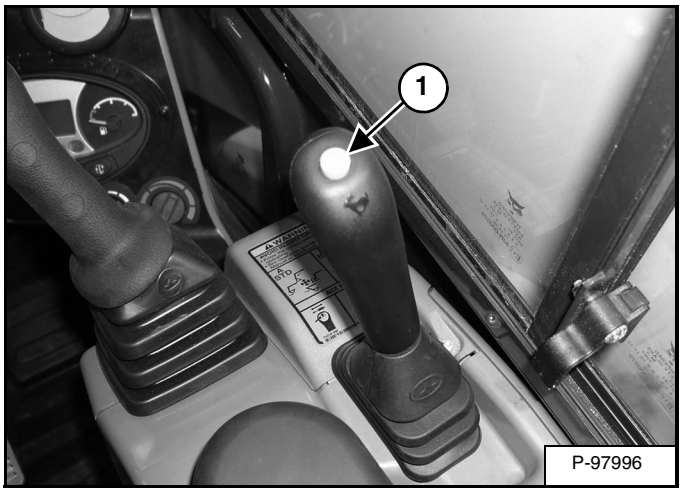
NOTE: When the console is raised, the hydraulic and traction system functions are locked and will not operate.

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

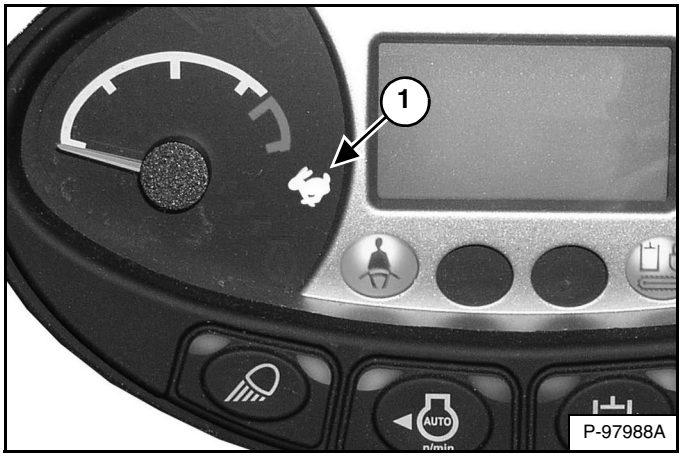
Figure 18



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

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

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.

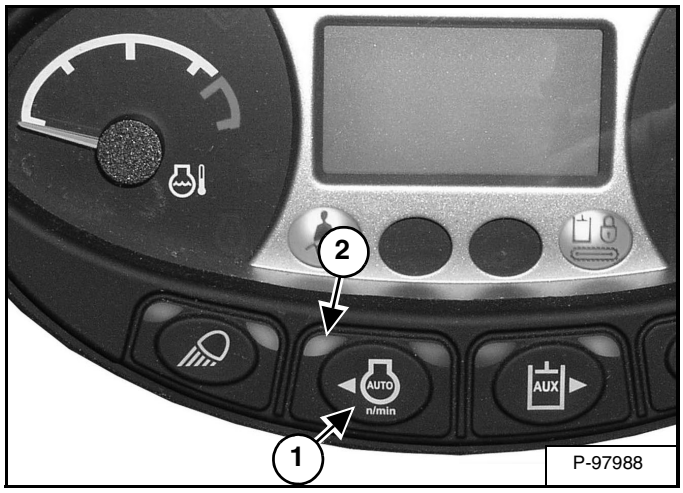
NOTE: Always set the travel speed to low range when loading or unloading the excavator onto a trailer.

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.

Standard Panel

Figure 20



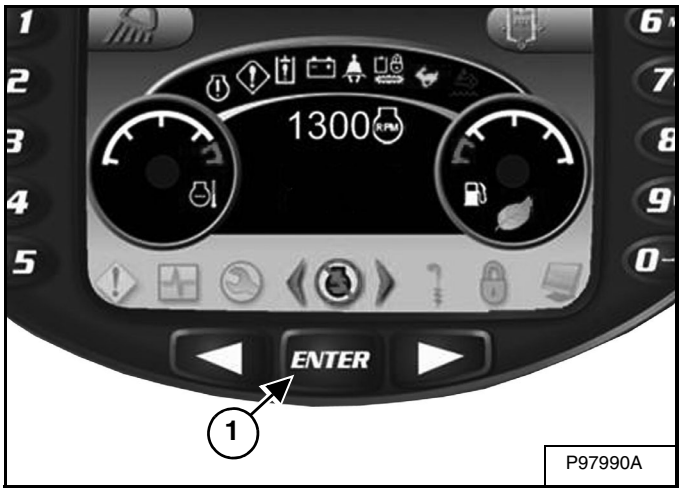
The automatic idle switch (Item 1) **[Figure 20]** is used to engage or disengage the automatic idle feature.

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.

Deluxe Panel

Figure 21



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 173.)

OPERATOR CAB (ROPS / TOPS AND FOPS)

Description

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

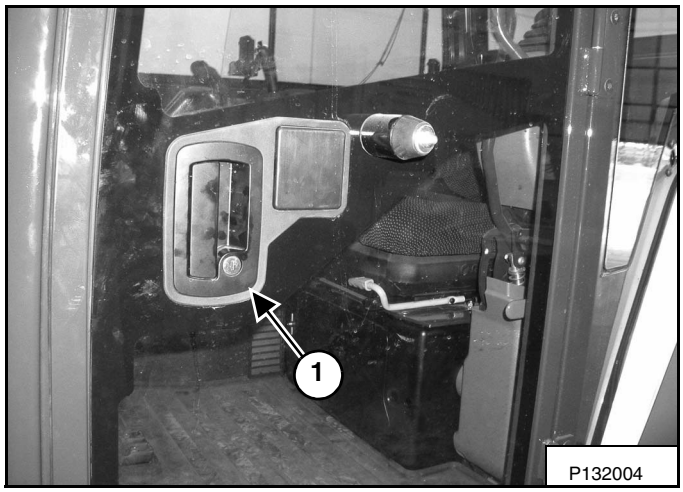
⚠ WARNING

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

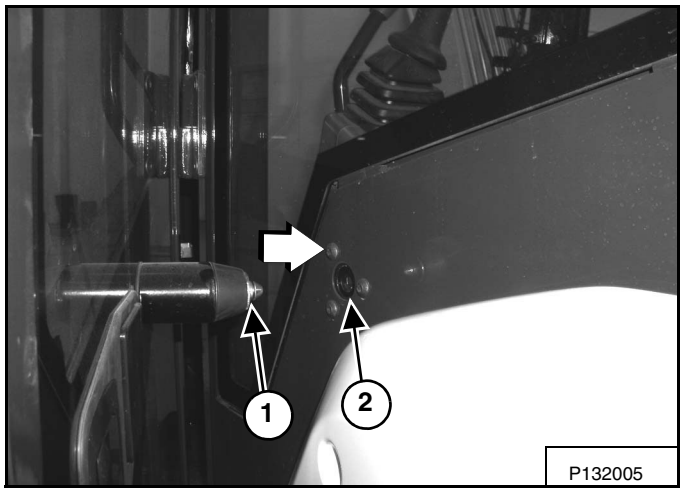
Cab Door

Figure 22



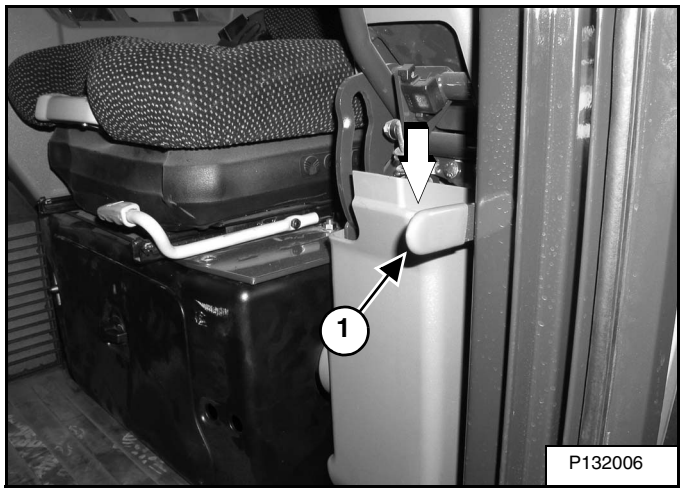
The cab door can be locked (Item 1) **[Figure 22]** with the same key as the starter switch.

Figure 23



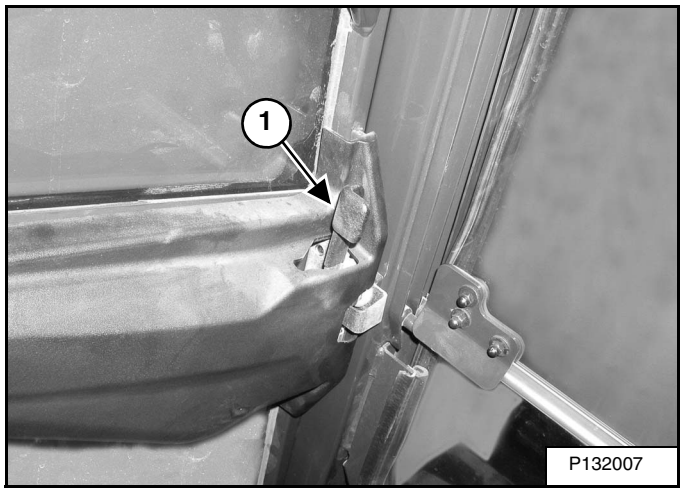
Push the door all the way open until the latch post (Item 1) engages in the latch (Item 2) **[Figure 23]** to hold the door in the open position.

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

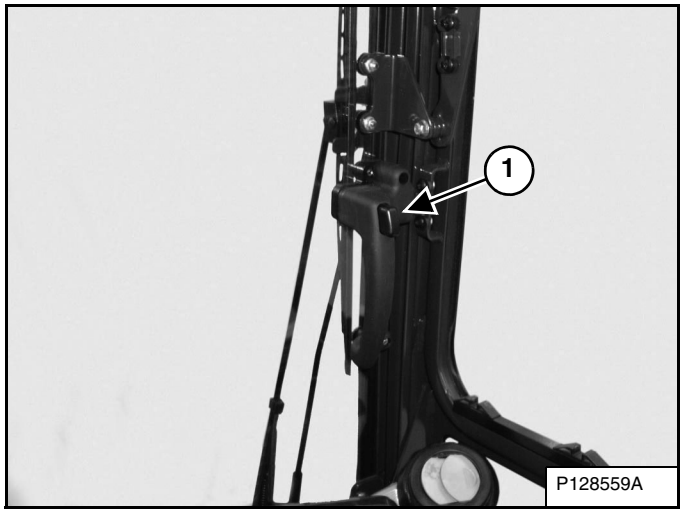


From inside the cab, open the door using handle (Item 1) **[Figure 25]**.

Front Window

Opening The Front Window

Figure 26



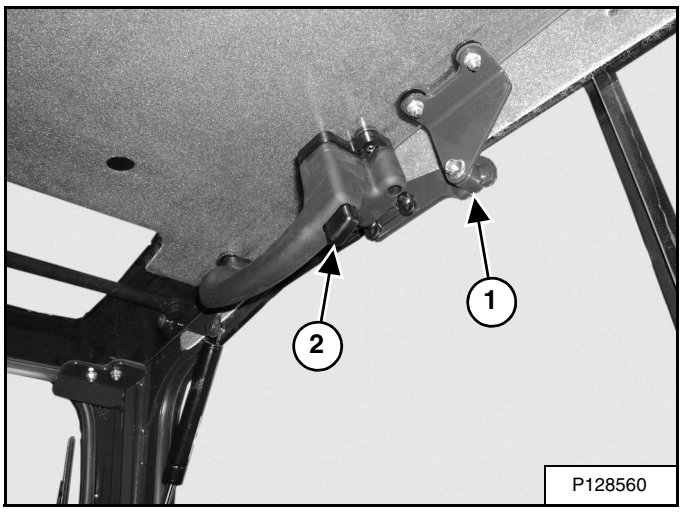
Press the window latch button (Item 1) **[Figure 26]** (both sides).

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).

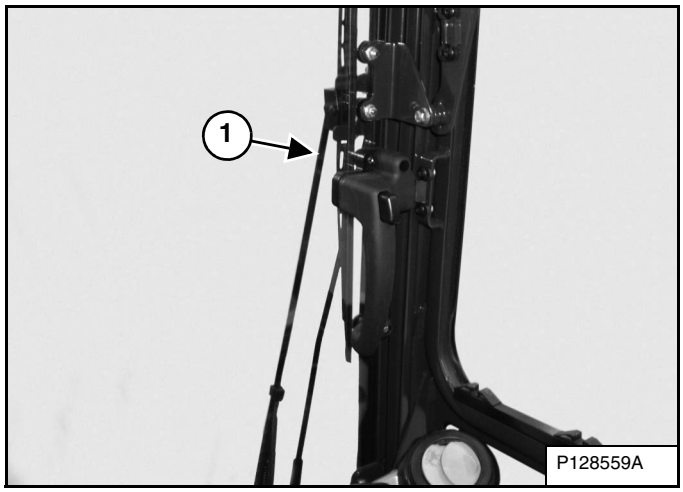
Use both window grab handles (Item 1) **[Figure 27]** to pull the window down fully.

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

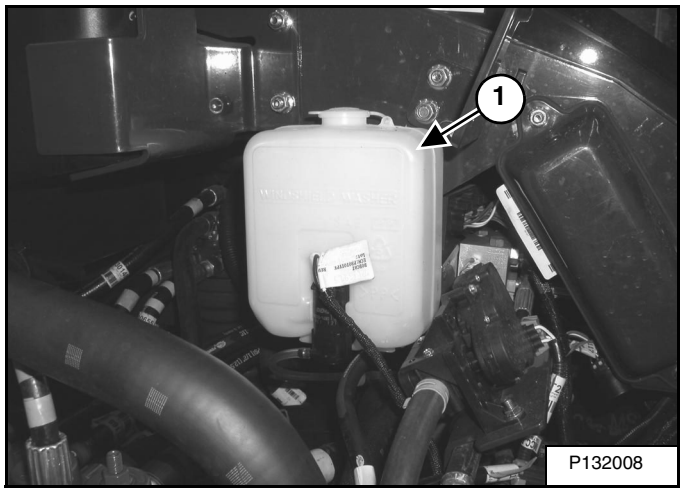
Figure 29



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

Window Washer Reservoir

Figure 30

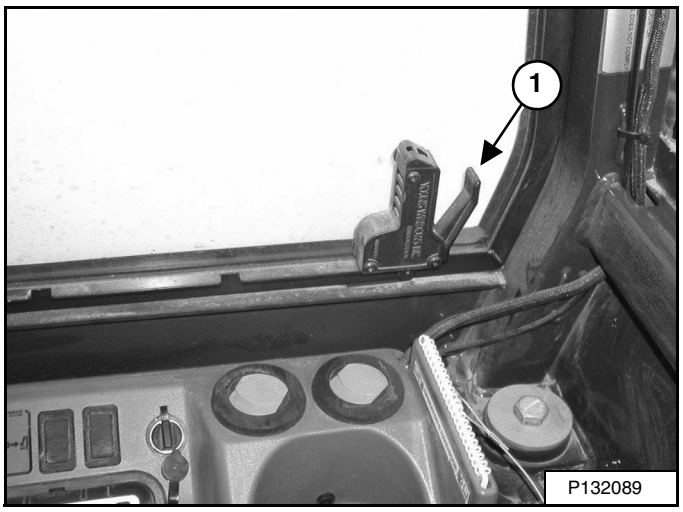


The window washer reservoir (Item 1) **[Figure 30]** is located under the right side cover.

Right Side Windows

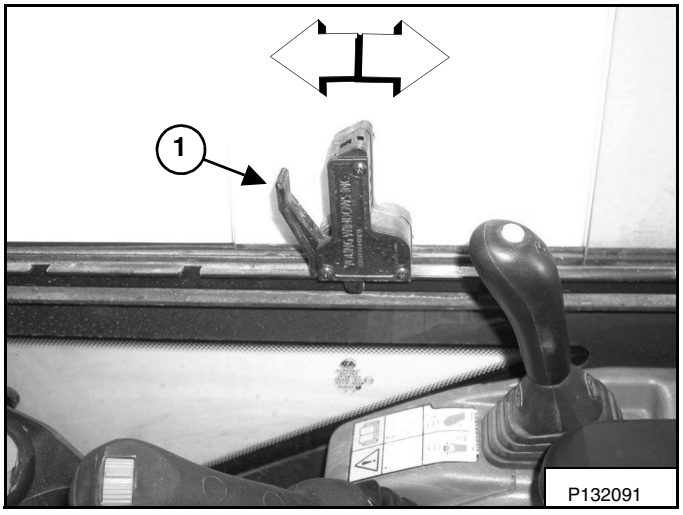
Opening The Right Rear Window

Figure 31



Squeeze the latch (Item 1) **[Figure 31]**.

Figure 32



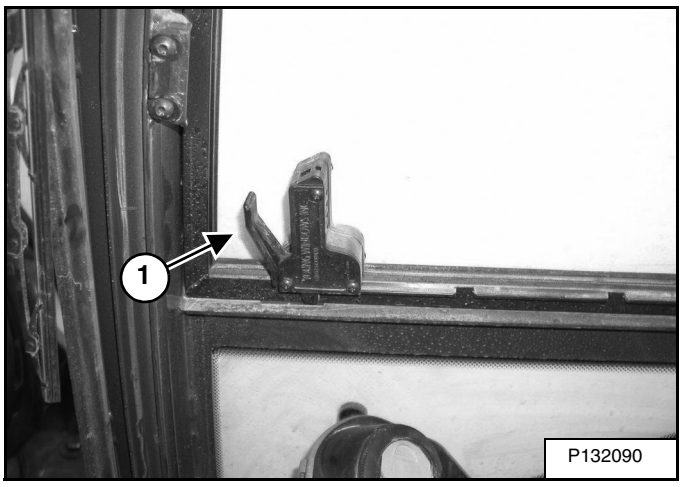
Pull the latch (Item 1) **[Figure 32]** forward to open the window to the desired position. Release the bottom latch and snap the lock back in place.

Closing The Right Rear Window

Squeeze the latch (Item 1) **[Figure 31]** and push the latch back to close the window.

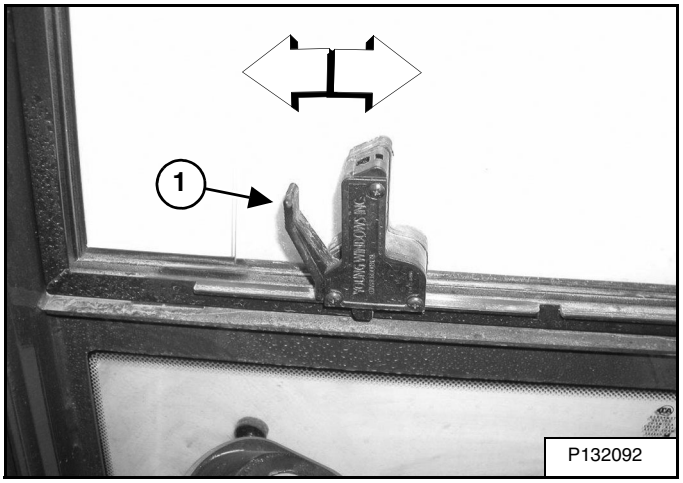
Opening The Right Front Window

Figure 33



Squeeze the latch (Item 1) **[Figure 33]**.

Figure 34



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

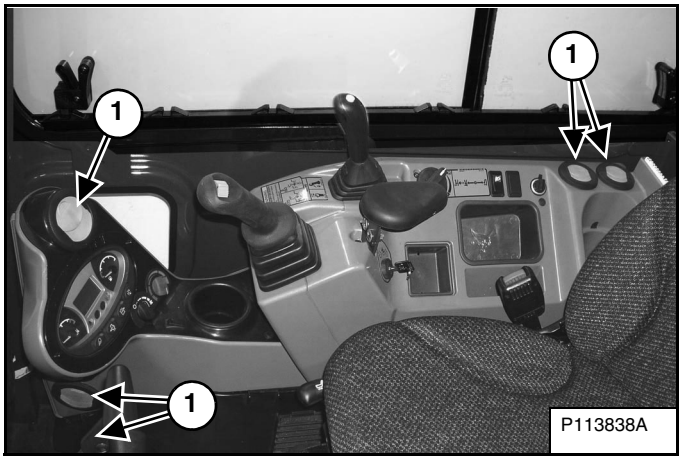
Closing The Right Front Window

Squeeze the latch (Item 1) **[Figure 34]** and push the latch forward to close the window.

Heating, Ventilation, And Air Conditioning (HVAC)

Ducting

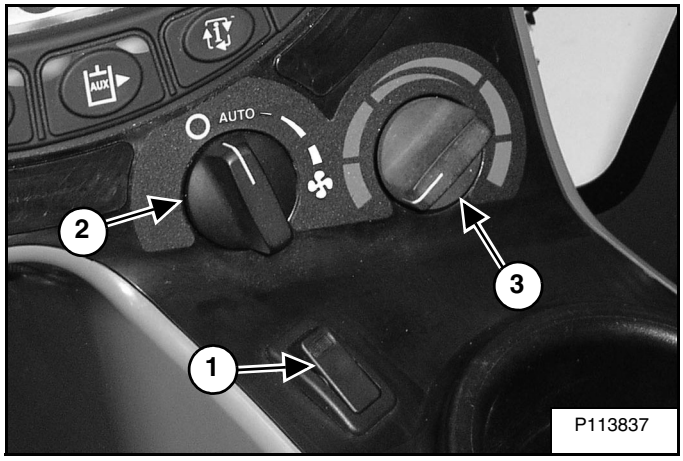
Figure 35



The HVAC louvers (Item 1) **[Figure 35]** can be positioned as needed to direct the air flow to various areas in the cab.

Auto HVAC Control

Figure 36



The HVAC controls are located below the dash panel **[Figure 36]**.

The air conditioning switch (Item 1) **[Figure 36]** is used to turn the air conditioning system On and OFF. Press the top of the switch to turn ON, press bottom to turn OFF. The light in the switch will be illuminated when the switch is in the ON position.

The fan switch (Item 2) **[Figure 36]** has multiple positions; Off, Auto (If Equipped), and Low, Medium and High speed control. Rotate clockwise to increase fan speed, counterclockwise to decrease fan speed.

- Auto (If Equipped): Controls the selected cab temperature by increasing or decreasing the fan speed. When in "AUTO", the fan motor will remain OFF until the engine coolant temperature reaches normal engine operating temperature. The fan will then start and increase or decrease speed to maintain the selected temperature. If the air conditioning switch (Item 1) is in the ON position, the fan will start and run at HIGH until the cab temperature reaches the set position. The fan will increase or decrease speed to maintain temperature.

- Variable Fan Speed: When the fan switch is not in the Auto position (if equipped), the fan switch will control the fan speed from low to high. The fan will maintain at constant speed until the fan switch is rotated clockwise or counterclockwise to increase or decrease fan speed. The fan speed will remain constant regardless of the selected temperature.

The temperature switch (Item 3) controls the desired cab temperature. Rotating the switch counterclockwise decreases temperature, rotating clockwise, increase the temperature. (For air conditioning to be activated, the AC switch (Item 1) **[Figure 36]** must be in the ON position.)

EMERGENCY EXIT

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

Right Side Rear Window

Figure 37

Exit through the window **[Figure 37]**.

Front Window

Figure 38

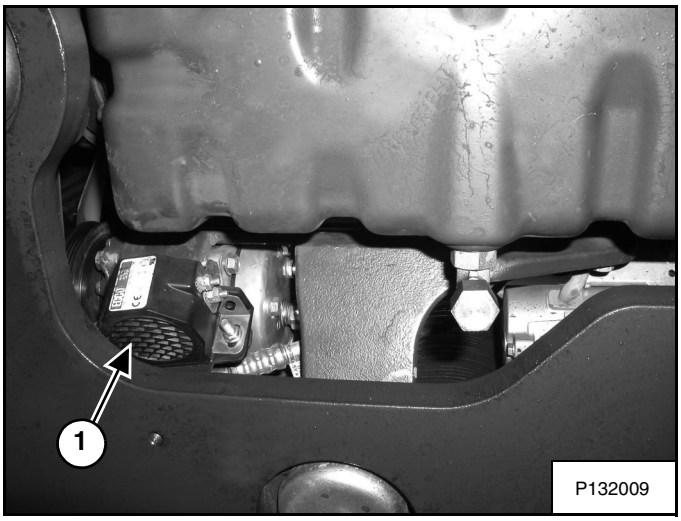
Open the front window and exit **[Figure 38]**.

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

MOTION ALARM SYSTEM

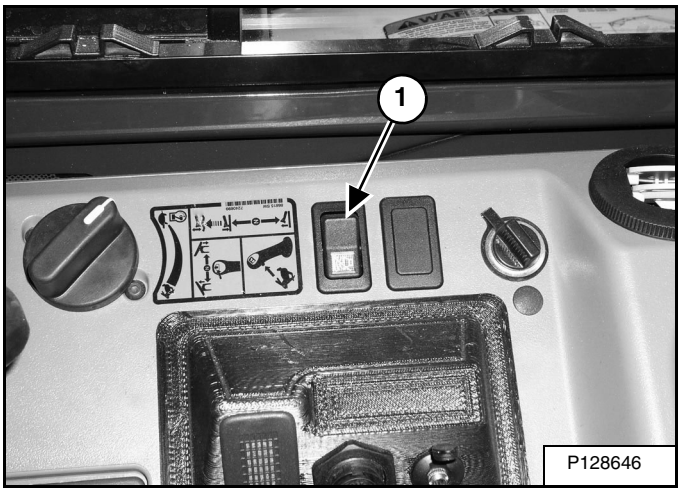
Operation

Figure 39



This excavator may be equipped with a motion alarm system. The motion alarm (Item 1) **[Figure 39]** is located inside the rear of the excavator.

Figure 40



The motion alarm can be temporarily disabled by pressing the motion alarm switch (Item 1) **[Figure 40]** 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 41]** in either the forward or reverse direction.

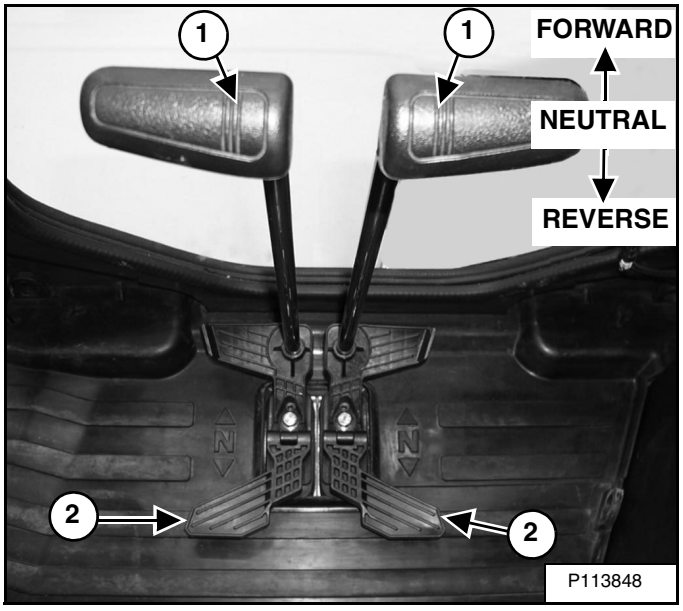
If alarm does not sound or for adjustment instructions, see inspection and maintenance instructions for the motion alarm system in the preventive maintenance section of this manual. (See MOTION ALARM SYSTEM on Page 123.)

TRAVEL CONTROLS

Forward And Reverse Travel

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

Figure 41



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 41]** forward for forward travel; backward for reverse travel.

* Travel can also be controlled with foot pedals (Item 2) **[Figure 41]**. Pivot the heel of the pedals forward for additional space on the floor.

⚠ WARNING

AVOID INJURY OR DEATH

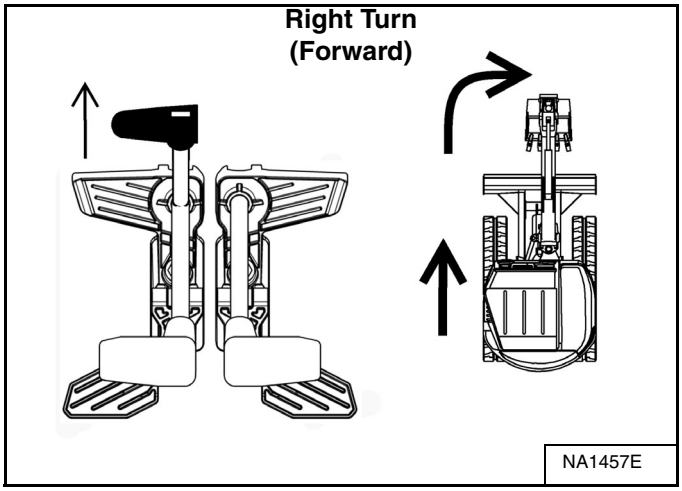
- **Check the blade location before traveling. When the blade is to the rear, operate the steering levers / foot pedals in the opposite direction to when the blade is in the front.**
- **Move the steering levers / foot pedals slowly. Abrupt lever motion will cause the machine to jerk.**

W-2235-0396

Turning

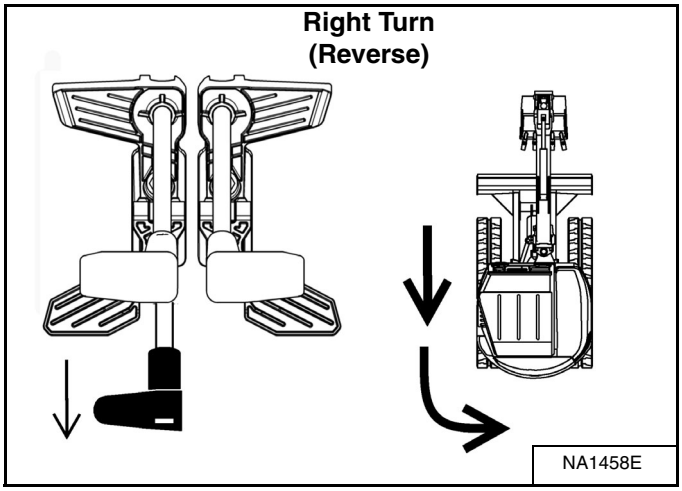
Right Turn

Figure 42



Push the left steering lever forward to turn right **[Figure 42]** while traveling forward.

Figure 43

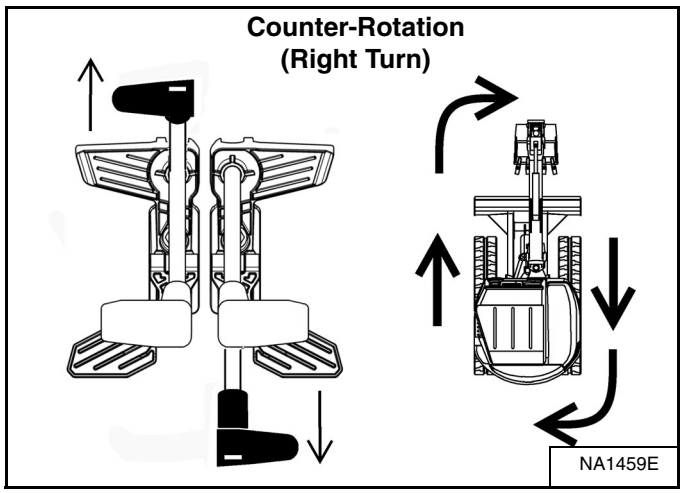


Pull the left steering lever backward to turn right while traveling backward **[Figure 43]**.

Turning (Cont'd)

Counter-Rotation Right Turn

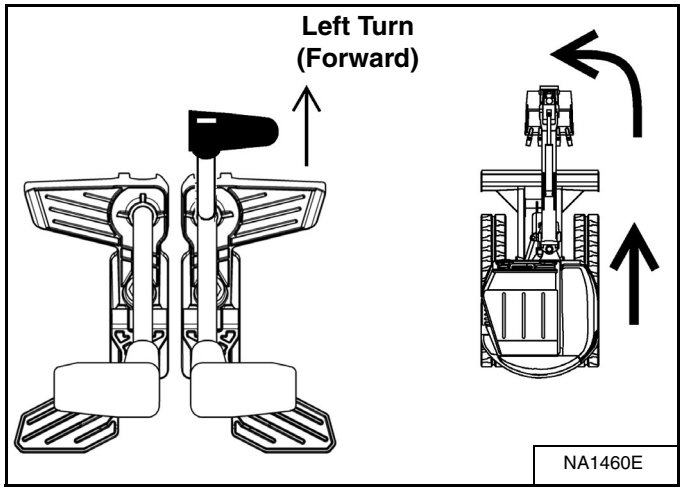
Figure 44



Push the left steering lever forward and pull the right steering lever backward **[Figure 44]**.

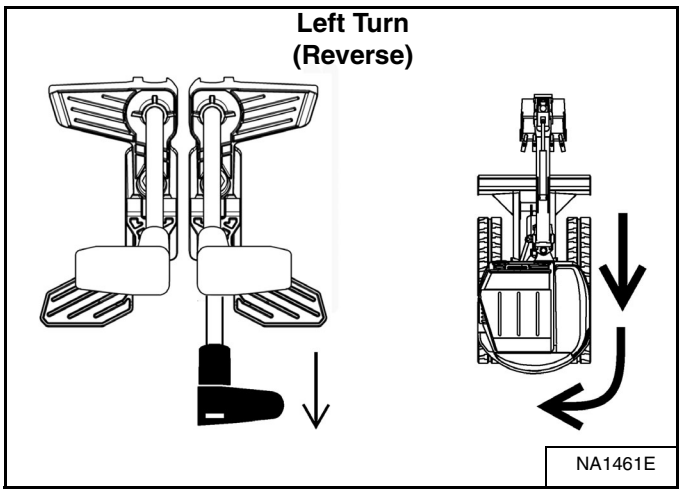
Left Turn

Figure 45



Push the right steering lever forward to turn left while traveling forward **[Figure 45]**.

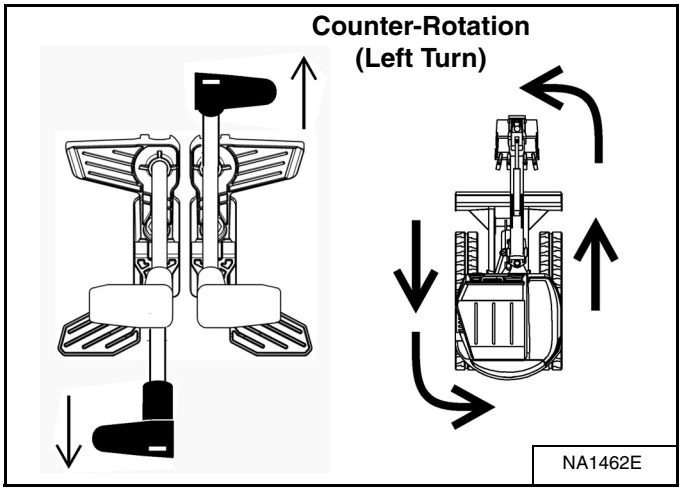
Figure 46



Pull the right steering lever backward to turn left while traveling backward **[Figure 46]**.

Counter-Rotation Left Turn

Figure 47



Push the right steering lever forward and pull the left steering lever backward **[Figure 47]**.

HYDRAULIC CONTROLS

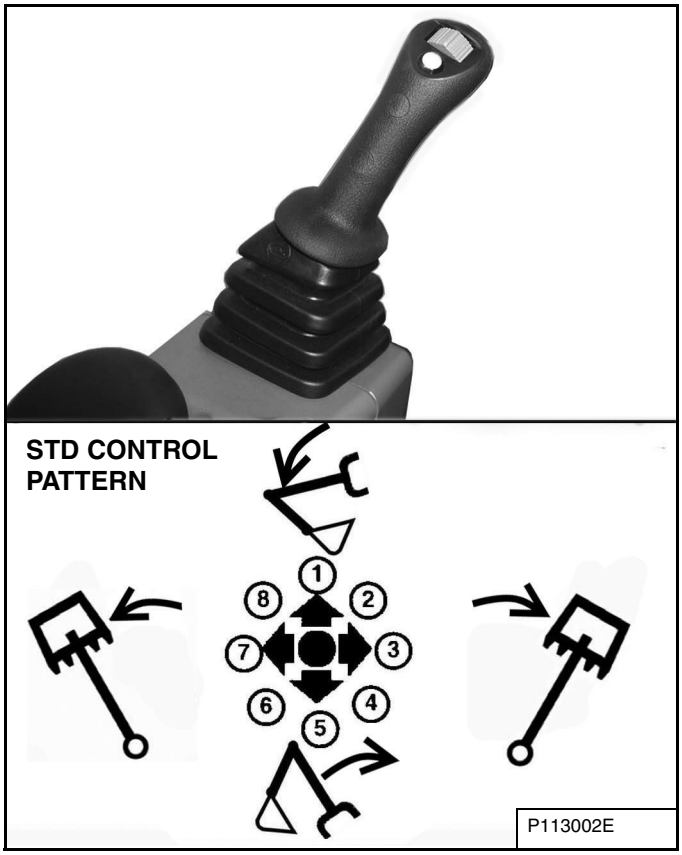
Description

The work equipment (boom, arm, bucket, and upperstructure slew) is operated by using the left and right control levers (joysticks). These joysticks can be used in either a STANDARD Control Pattern **[Figure 48]** and **[Figure 49]** or in the ISO Control Pattern **[Figure 50]** and **[Figure 51]**.

STANDARD Control Pattern

Left Control Lever (Joystick)

Figure 48

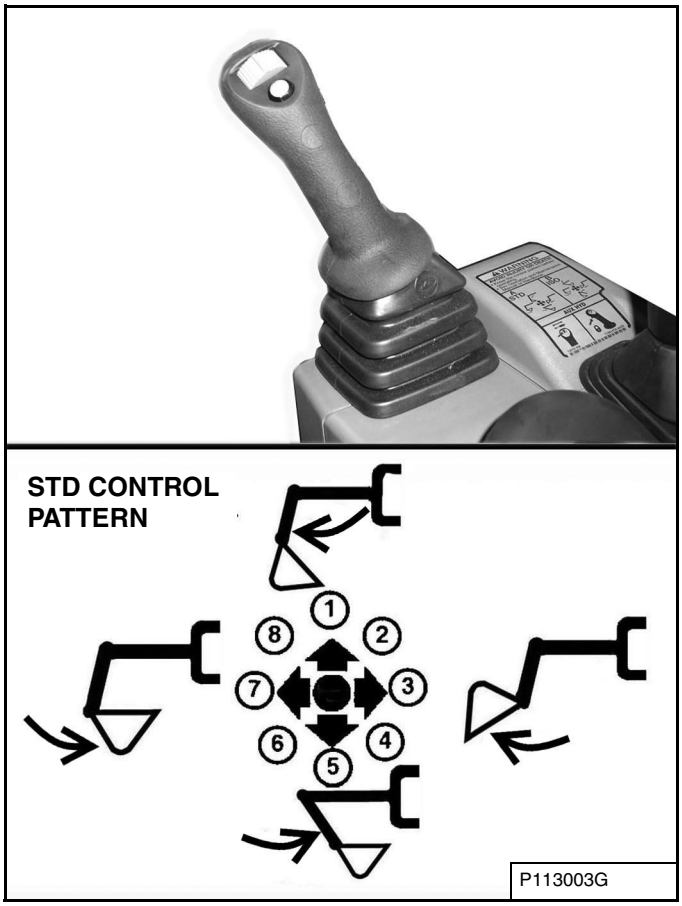


The left lever (joystick) is used to operate the boom and slew the upperstructure **[Figure 48]**.

1. Boom lower.
2. Boom lower and slew right.
3. Slew right.
4. Boom raise and slew right.
5. Boom raise.
6. Boom raise and slew left.
7. Slew left.
8. Boom lower and slew left.

Right Control Lever (Joystick)

Figure 49



The right lever (joystick) is used to operate the arm and bucket **[Figure 49]**.

1. Arm out.
2. Arm out and bucket dump.
3. Bucket dump.
4. Arm in and bucket dump.
5. Arm in.
6. Arm in and bucket curl.
7. Bucket curl.
8. Arm out 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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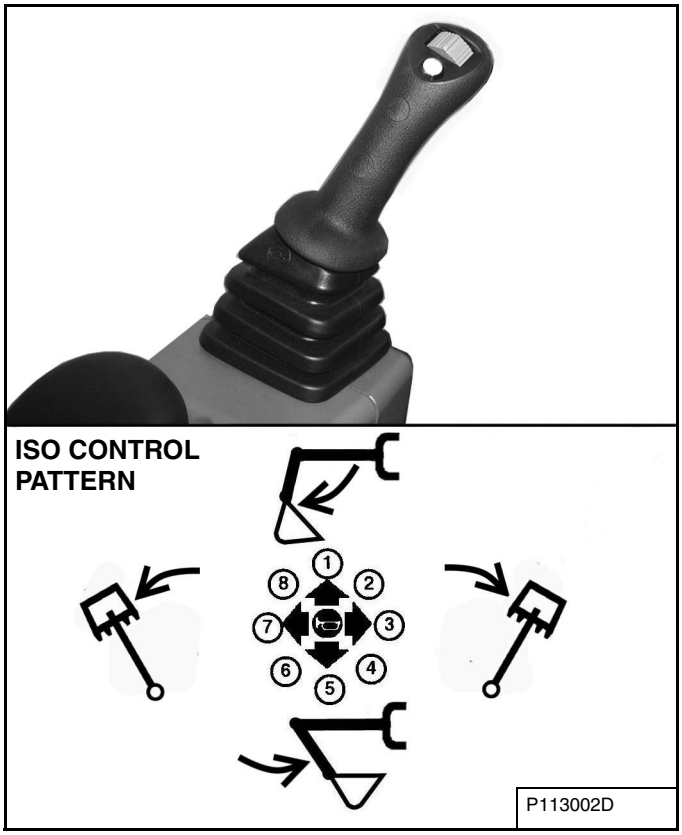
ISO Control Pattern

Left Control Lever (Joystick)

Figure 50

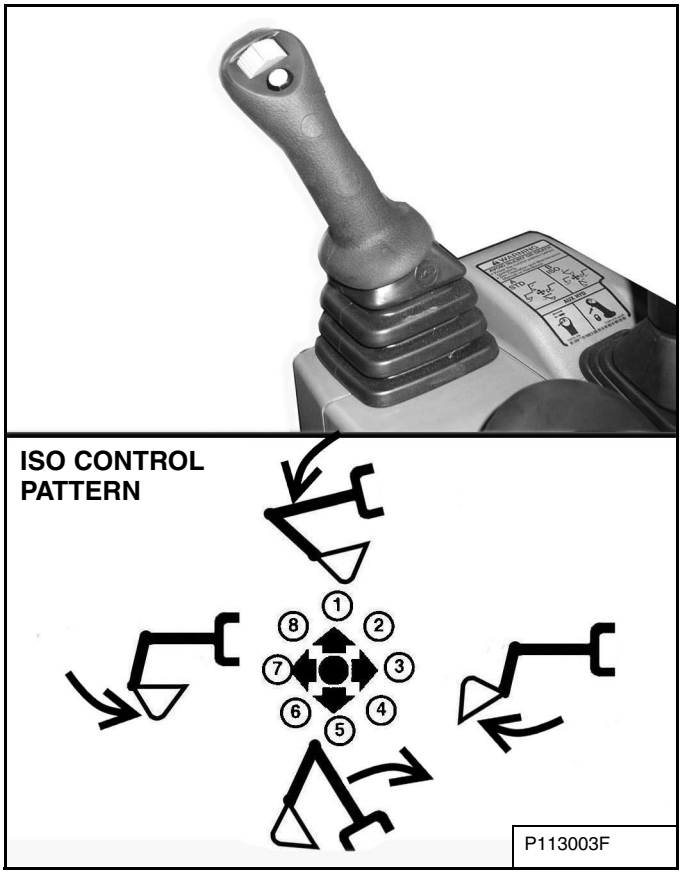


The left lever (joystick) is used to operate the arm and slew the upperstructure **[Figure 50]**.

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 51



The right lever (joystick) is used to operate the boom and bucket **[Figure 51]**.

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

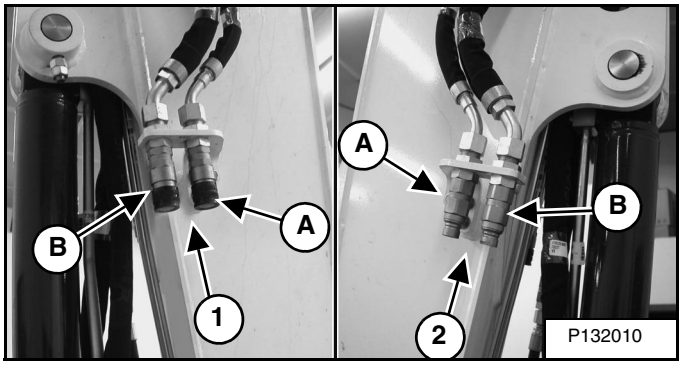
⚠ WARNING

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 physician familiar with this injury.

W-2072-0807

Figure 52



Excavators and attachments are supplied with flush faced couplers **[Figure 52]**.

The female couplers (Item 1) are located on the left side of the arm and the male couplers (Item 2 **[Figure 52]** are located on the right side of the arm.

The secondary (Optional) couplers (Item B) are the forward couplers and the primary couplers (Item A) **[Figure 52]** are to the cab side of the arm.

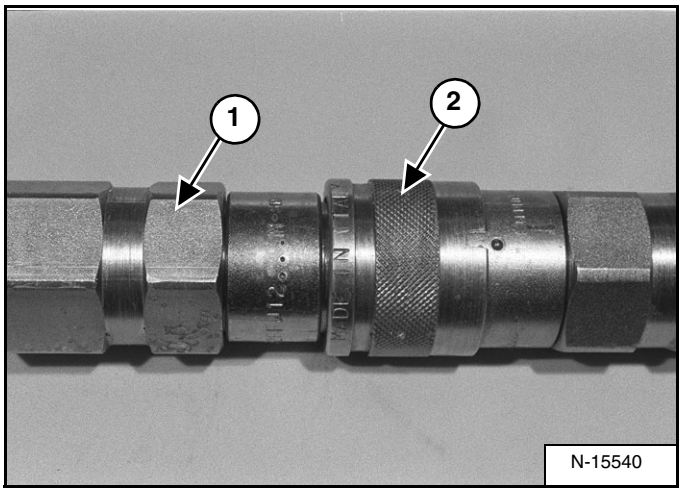
To Connect:

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 and / or Item 2) **[Figure 52]** 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 53

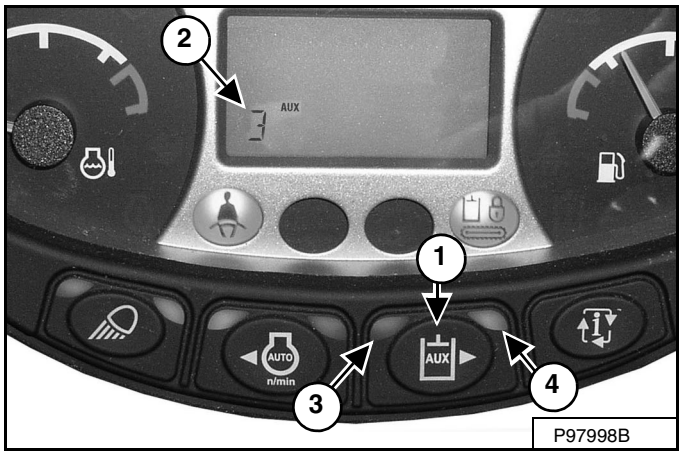


Hold the male coupler (Item 1). Retract the sleeve (Item 2) **[Figure 53]** on the female coupler until the couplers disconnect.

Auxiliary Hydraulics - Standard Instrument Panel

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 54



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 54]** 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 54]**. 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.)

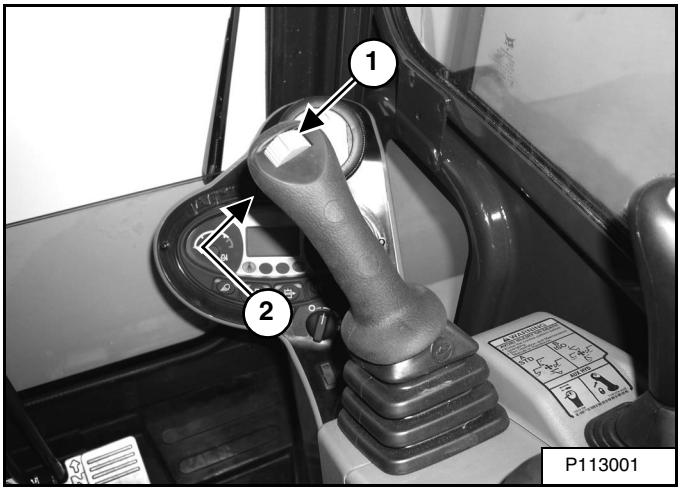
Continuous Flow Auxiliary Hydraulics - Press and hold the Auxiliary Hydraulics button (Item 1) for more than one second. The LED (Item 4) will illuminate. Press the Auxiliary Hydraulics button (Item 1) **[Figure 54]** again to scroll through the various continuous flow auxiliary hydraulic settings (3, 2, 1).

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

AUX FLOW SETTING	FLOW	ATTACHMENTS (IF APPROVED)
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 55



Move the switch (Item 1) **[Figure 55]** 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 55]** 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 55] on the front of the handle will provide continuous flow to the male coupler.

Press the button (Item 2) **[Figure 55]** a second time to stop auxiliary flow to the quick couplers.

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

HYDRAULIC CONTROLS (CONT'D)

Auxiliary Hydraulics - Deluxe Instrument Panel

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 56

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 56]** to scroll through the various front auxiliary hydraulic settings (3, 2, 1).

Continuous Flow Auxiliary Hydraulics - Press and hold the key pad **[6] [Figure 56]** 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).

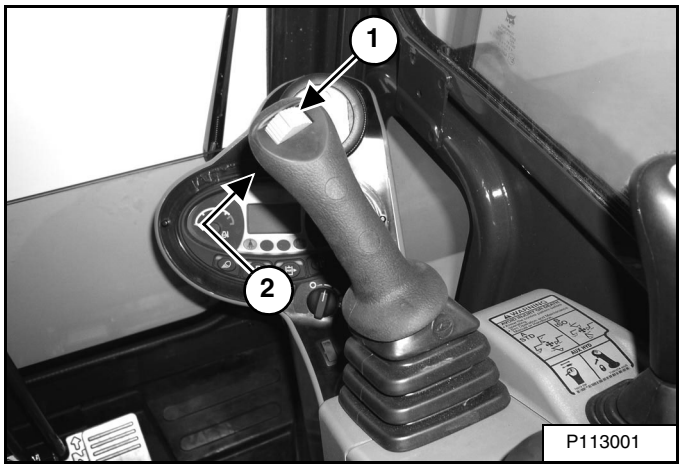
ICON	DESCRIPTION
	Engine OFF - Auxiliary Hydraulics Pressure Relieve
	Engine Running - Auxiliary Hydraulics OFF
	Auxiliary Hydraulics - Maximum Flow - Continuous Flow Disabled
	Auxiliary Hydraulics - Medium Flow - Continuous Flow Disabled
	Auxiliary Hydraulics - Low Flow - Continuous Flow Disabled
	Auxiliary 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 (IF APPROVED)
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 57



Move the switch (Item 1) **[Figure 57]** 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 57]** 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 57] on the front of the handle will provide continuous flow to the male coupler.

Press the button (Item 2) **[Figure 57]** 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:

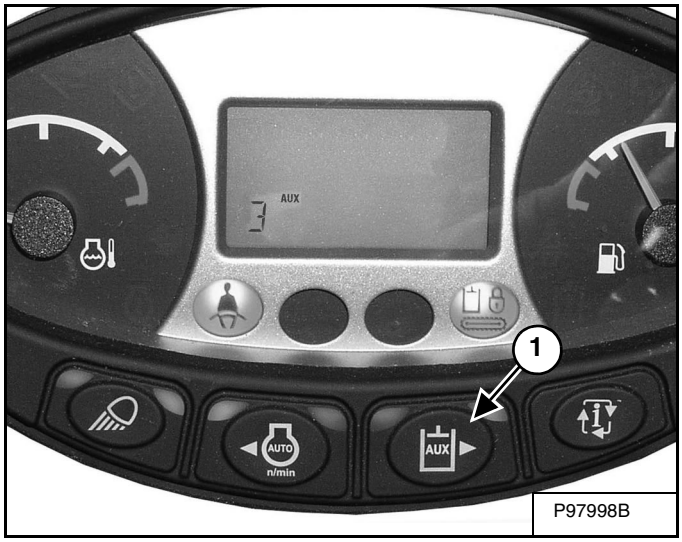
Put the attachment flat on the ground.

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 58



If the auxiliary hydraulics are disabled, press AUX HYD button (Item 1) **[Figure 58]** and then move the switch (Item 1) **[Figure 57]** to the right and left several times.

If the auxiliary hydraulics are enabled, then move the switch (Item 1) **[Figure 57]** 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 59

Stop the engine and turn the start switch to ON. Press either Scroll button (Item 1) **[Figure 59]** (Deluxe Panel) until the above screen is visible.

Press button **[6] [Figure 59]** and the AUX PRESSURE RELEASE screen **[Figure 60]** will be visible.

Figure 60

Press the ENTER button (Item 1) **[Figure 60]** 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

Figure 61

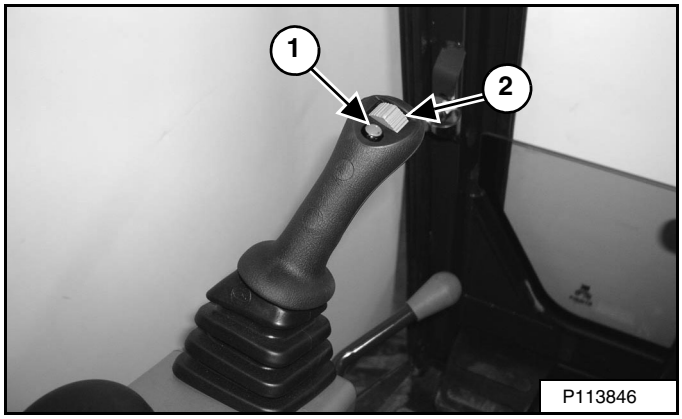
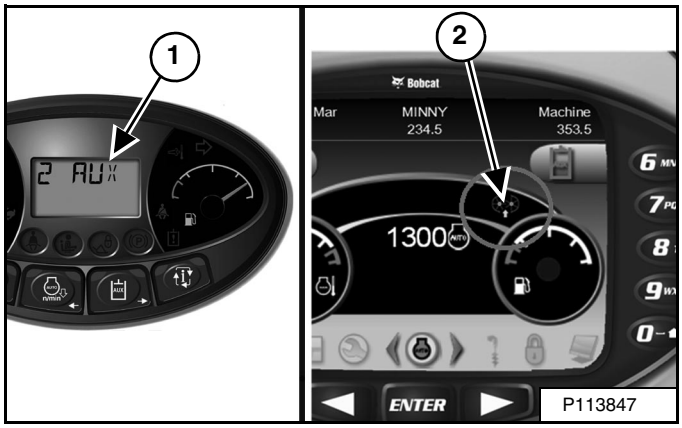


Figure 62



Press and hold the button (Item 1) **[Figure 61]** on the left control lever until an audible beep is heard to switch between the boom swing function and the secondary auxiliary hydraulics.

Standard Dash Panel: The display (Item 1) **[Figure 62]** will show *2 Aux* when in the second auxiliary mode.

Deluxe Dash Panel: The icon (Item 2) **[Figure 62]** will be illuminated when in the second auxiliary mode.

Move the switch (Item 2) **[Figure 61]** 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 and hold the button (Item 1) **[Figure 61]** on the left control lever until an audible beep is heard to switch to the secondary auxiliary hydraulics.

Standard Dash Panel: The display (Item 1) **[Figure 62]** will show *2 Aux* when in the second auxiliary mode.

Deluxe Dash Panel: The icon (Item 2) **[Figure 62]** will be illuminated when in the second auxiliary mode.

Move the switch (Item 2) **[Figure 61]** to the right and left several times.

Attachments:

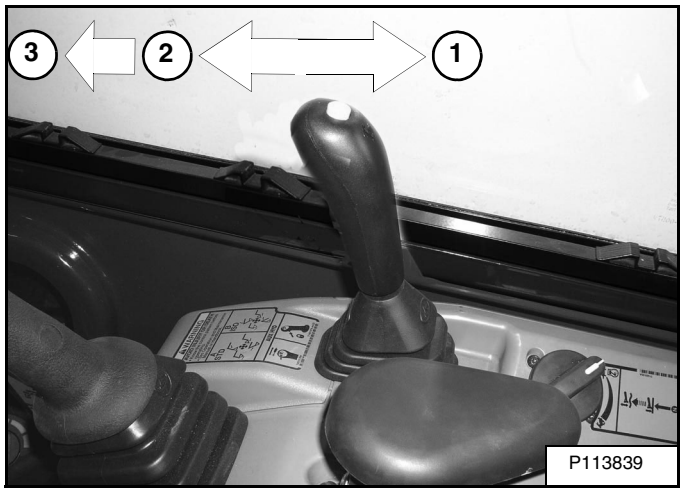
- Follow procedure above to relieve pressure in excavator.
- Connect male coupler from attachment to female coupler of excavator then repeat procedure above. This will relieve pressure in the attachment.
- Connect the female coupler from the attachment.

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

BLADE CONTROL LEVER

Raising And Lowering Blade

Figure 63



Pull the lever backward to raise the blade (Item 1) **[Figure 63]**.

Push the lever forward to lower the blade (Item 2) **[Figure 63]**.

Push the lever (Item 3) **[Figure 63]** forward until the lever is in the locked position to put the blade in the FLOAT position.

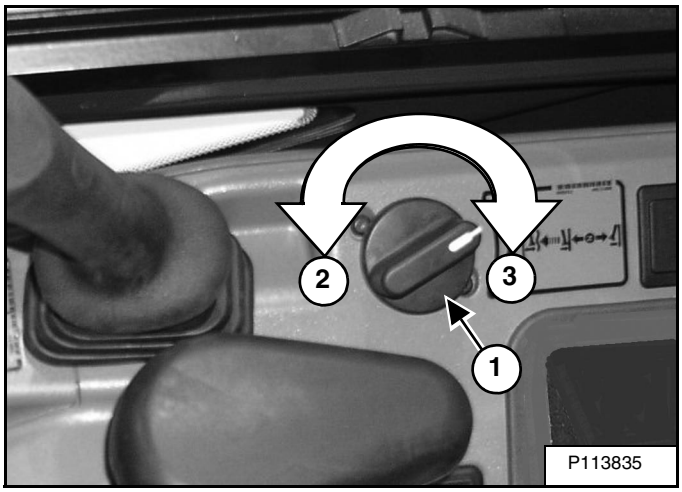
Pull the lever backward to unlock from the *float* position.

NOTE: Keep blade lowered for increased digging performance.

ENGINE SPEED CONTROL DIAL

Setting Engine Speed (RPM)

Figure 64



The engine speed control dial (Item 1) **[Figure 64]** controls engine rpm.

Rotate the engine speed control dial counterclockwise (Item 2) to reduce engine rpm. Rotate the engine speed control dial clockwise (Item 3) **[Figure 64]** to increase engine rpm.

ECO Mode (With Deluxe Instrument Panel Only)

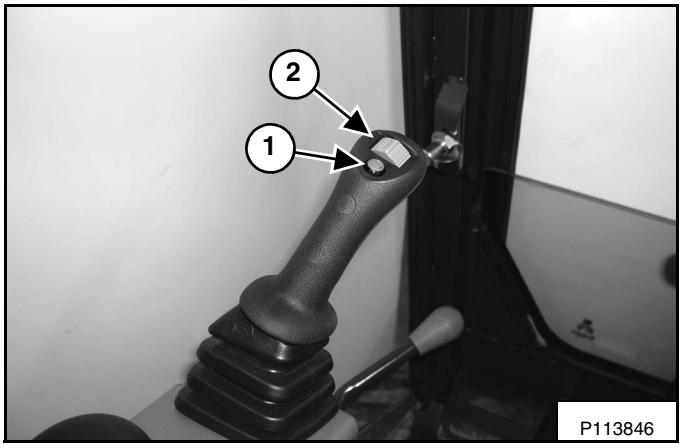
If equipped with the Deluxe Instrument Panel, ECO mode is available.

To enable ECO mode: (See ECO MODE on Page 174.)

BOOM SWING

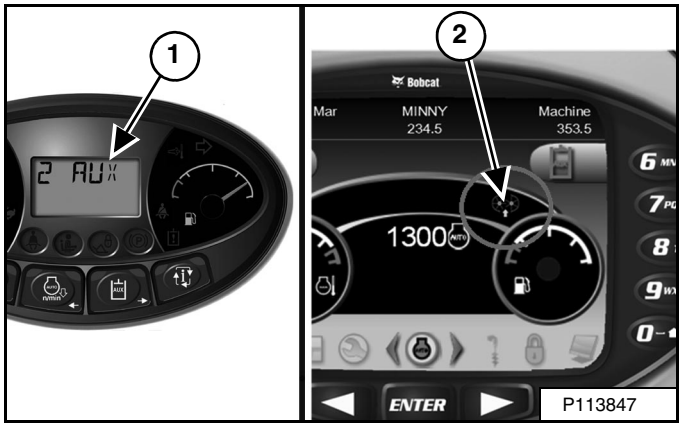
Operation

Figure 65



Make sure your machine is in boom swing, see **[Figure 66]**.

Figure 66



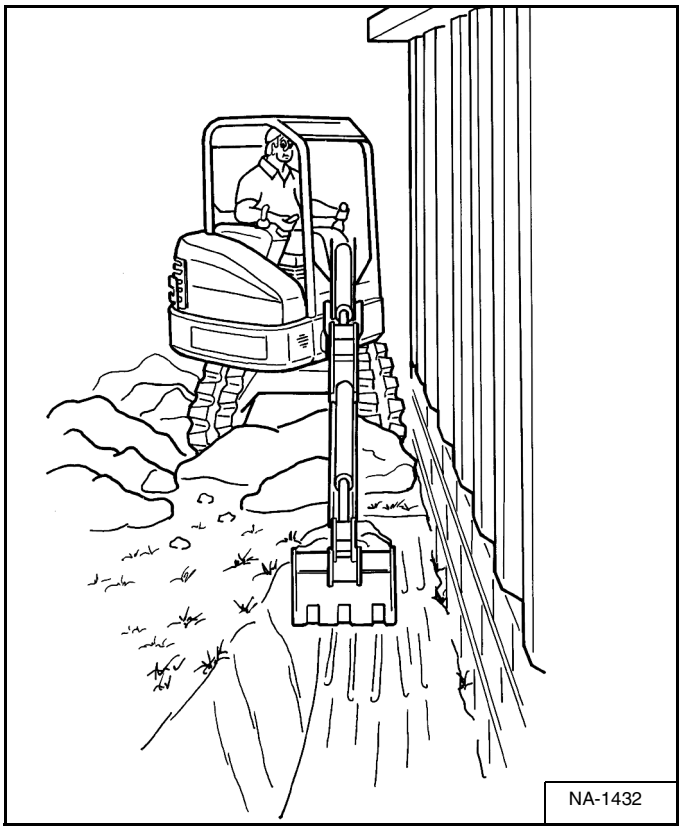
Press and hold the button (Item 1) **[Figure 65]** on the left control lever until an audible beep is heard to switch between the boom swing function and the secondary auxiliary hydraulics.

Standard Dash Panel: The display (Item 1) **[Figure 66]** will switch between *2 Aux and Boom Swing.*

Deluxe Dash Panel: The icon (Item 2) will be illuminated when in the second auxiliary mode, press a second time to switch to boom swing mode, the icon (Item 2) **[Figure 66]** will be OFF.

The switch (Item 2) **[Figure 65]** 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.

Figure 67



NOTE: The purpose of the boom swing is to offset the boom with respect to the upperstructure for digging close to a structure [Figure 67].

NOTE: Adjust the mirrors.

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.

⚠ WARNING

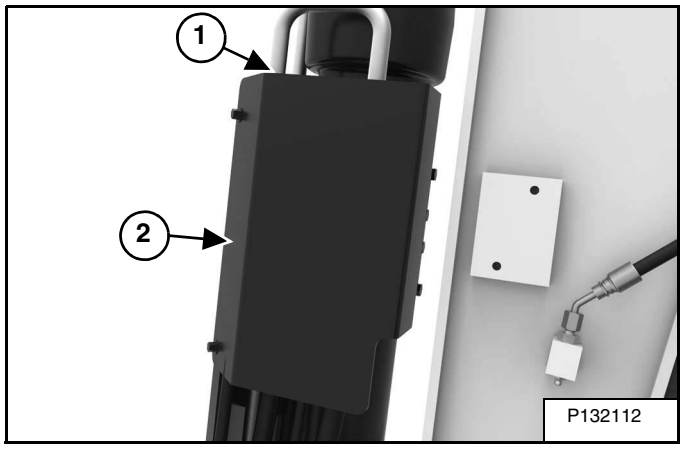
AVOID INJURY OR DEATH

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

W-2793-0409

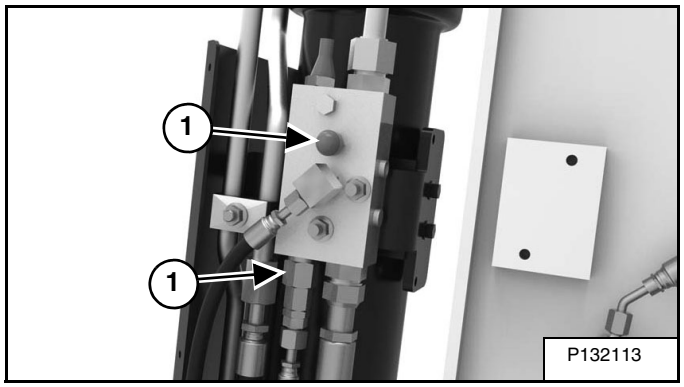
Lowering Boom With Load Holding Valve

Figure 68



If the excavator is equipped with a boom load holding valve (Item 1) located under the cover (Item 2) **[Figure 68]**, it will be attached to the boom cylinder at the base end.

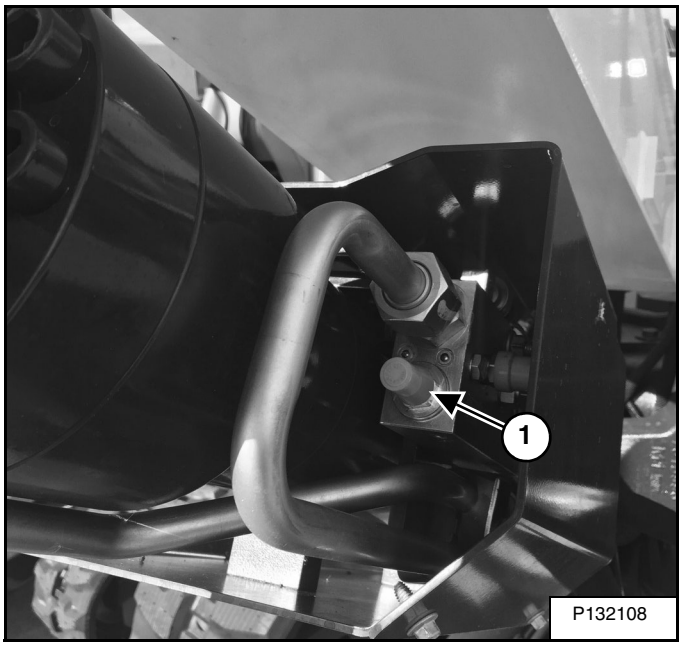
Figure 69



MOTE: The cover (Item 2) [Figure 68] is removed for photo clarity in [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

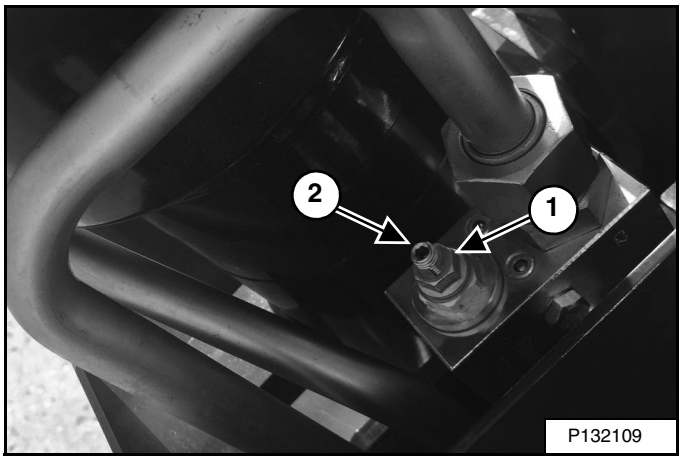
Lowering Boom With Load Holding Valve (Cont'd)

⚠ WARNING

AVOID INJURY OR DEATH
Do Not work or stand under raised work equipment or attachment.

W-2793-0409

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 boom to lower to the ground.

After the boom is fully lowered, rotate the screw counterclockwise (Item 2) 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. 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 71]** 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) counterclockwise 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 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.

⚠ WARNING

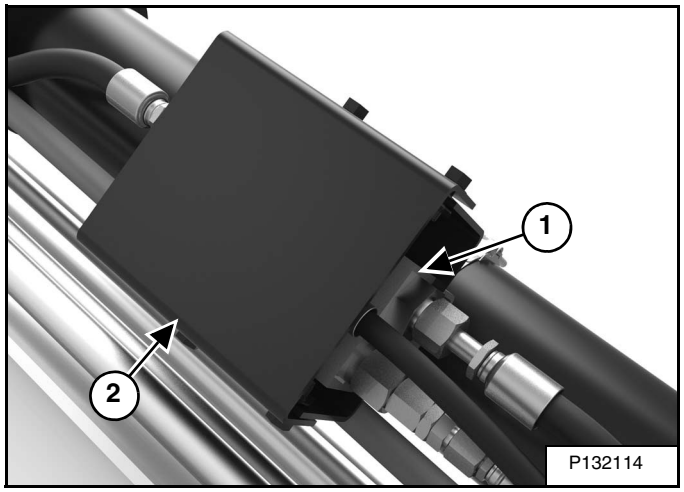
AVOID INJURY OR DEATH

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

W-2793-0409

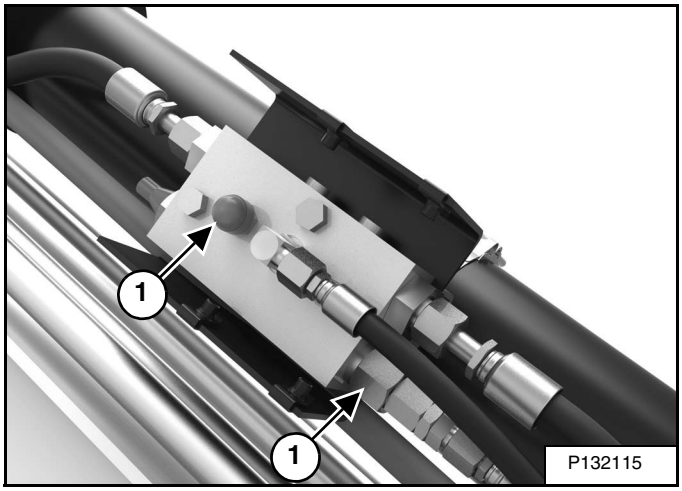
Lowering Arm With Load Holding Valve

Figure 72



If the excavator is equipped with arm load holding valve (Item 1) **[Figure 72]**, it will be attached to the arm cylinder base end as shown.

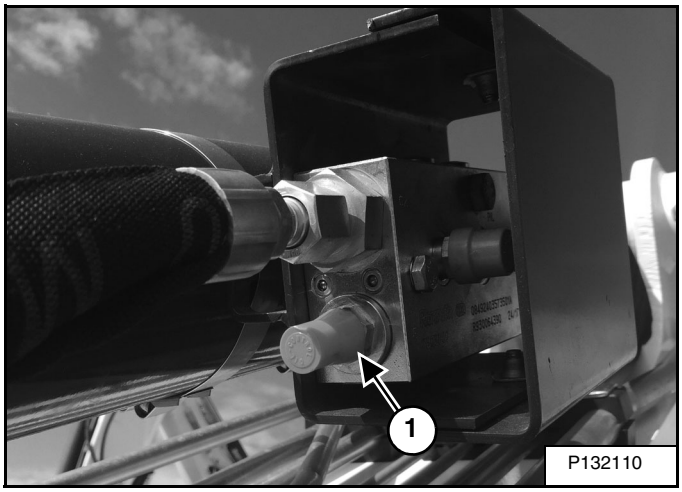
Figure 73



MOTE: The cover (Item 2) [Figure 72] is removed for photo clarity in [Figure 73].

NOTE: DO NOT remove or adjust the two port relief valves (Item 1) [Figure 73]. If the port relief valves have been tampered with, see your Bobcat dealer for service.

Figure 74



Remove the plastic protective cap (Item 1) **[Figure 74]** 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

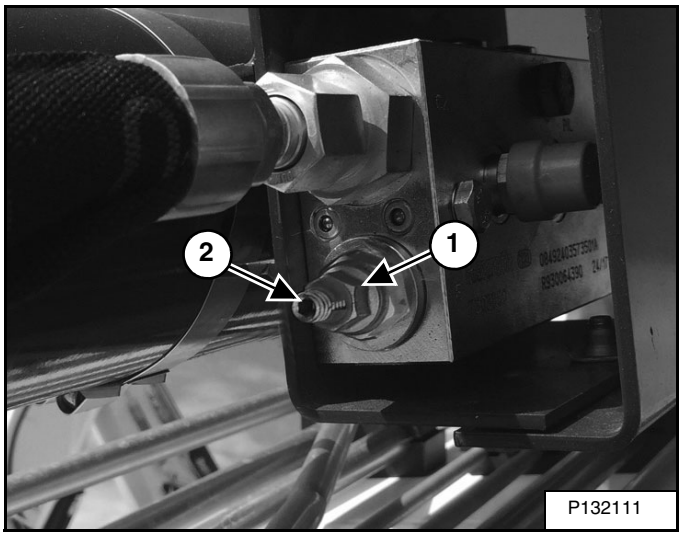
Lowering Arm With Load Holding Valve (Cont'd)

⚠ WARNING

AVOID INJURY OR DEATH
Do Not work or stand under raised work equipment or attachment.

W-2793-0409

Figure 75



Lowering procedures:

With base end hose failure:

Loosen the jam nut (Item 1). Install a hex wrench into the valve screw (Item 2) **[Figure 75]** 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 counterclockwise (Item 2) the same 1/8 to 1/4 turn and tighten the lock nut (Item 1) **[Figure 75]**.

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 75]** 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) counterclockwise 1/8 to 1/4 turn and tighten the lock nut (Item 1) **[Figure 75]**. Reinstall the base end hose.

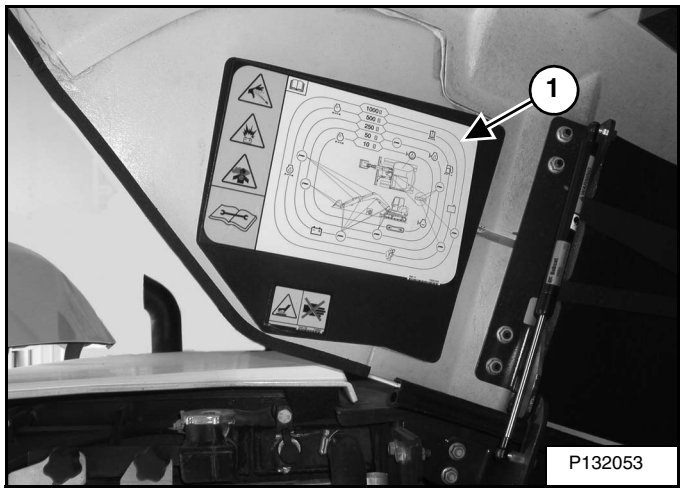
Loss of hydraulic pressure:

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

DAILY INSPECTION

Daily Inspection And Maintenance

Figure 76



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 76]** is located inside the right side cover. (See SERVICE SCHEDULE on Page 119.)

Check the following items before each day of operation:

- Operator 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 the attachment mounting system 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, state, and federal regulations for correct disposal.

IMPORTANT

PRESSURE WASHING DECALS

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

I-2226-0910

IMPORTANT

This machine is factory equipped with a U.S.D.A. Forestry Service approved 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, it must be equipped with a spark arrester attached to the exhaust system and maintained in working order. Failure to do so will be in violation of California State Law, Section 4442. PRC. Refer to local laws and regulations for spark arrester requirements.

I-2284-0111

Operation & Maintenance Manual And Operator's Handbook Locations

⚠ 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

Figure 77

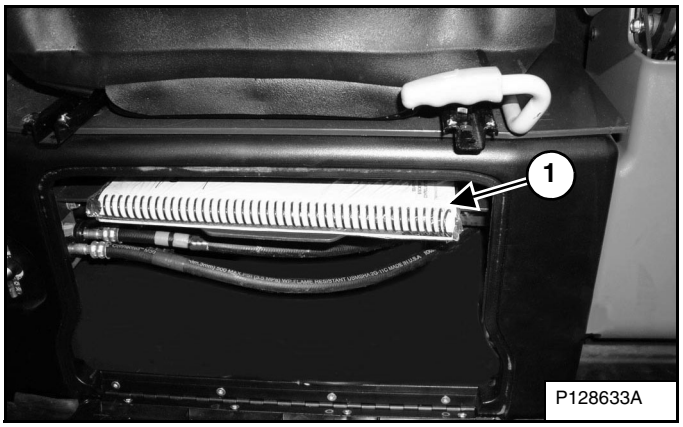
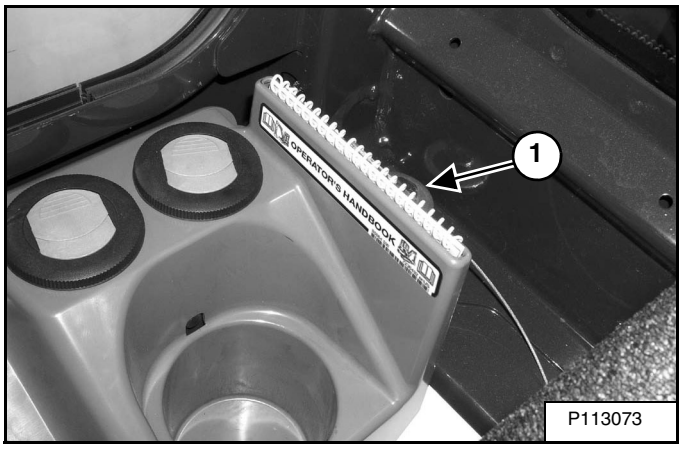


Figure 78



Read and understand the Operation & Maintenance Manual (Item 1) **[Figure 77]** (located inside the storage container below the operator's seat and inside the toolbox) and the Operator's Handbook (Item 1) **[Figure 78]** before operating.

Mirrors

Inspect, clean and adjust mirrors prior to operating machine.

Figure 79

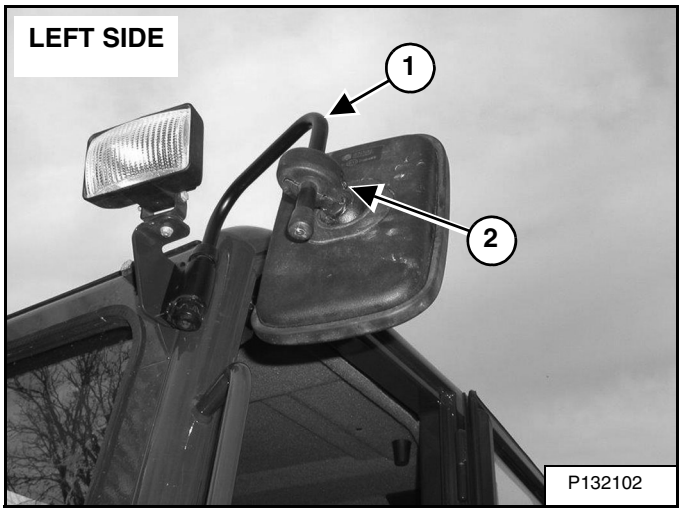
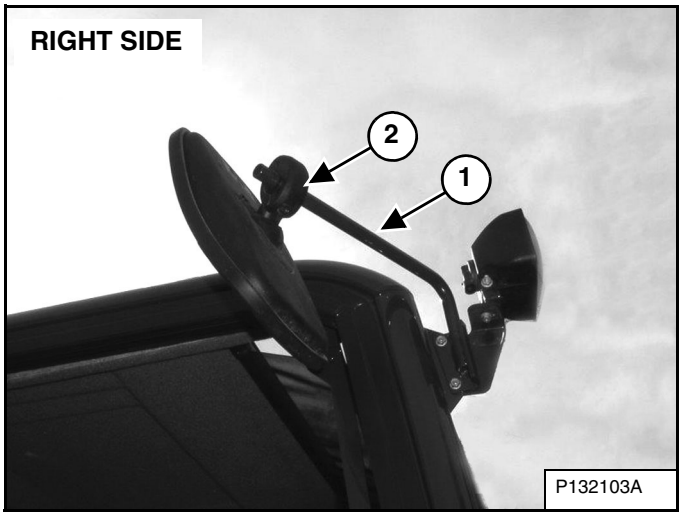


Figure 80



Before entering the cab, position the left and right mirror brackets (Item 1) **[Figure 79]** and (Item 1) **[Figure 80]** as shown.

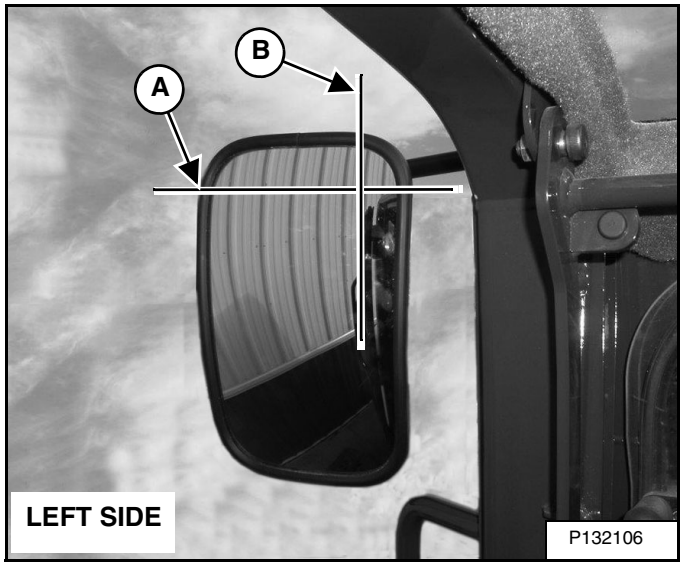
Final mirror adjustment will be made when seated in the cab.

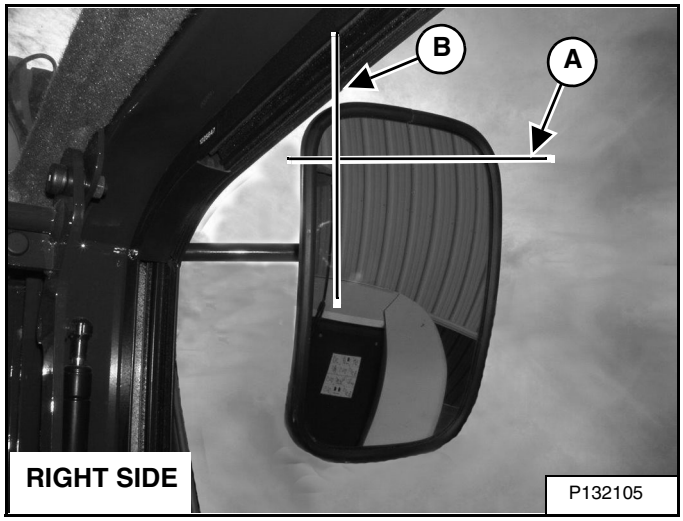
Tighten the mount retention screws (Item 2) **[Figure 79]** and **[Figure 80]** as needed to maintain the mirror mount in position on the bracket

Mirrors (Cont'd)

With the seat adjusted and sitting in the operating position, check the images in both mirrors.

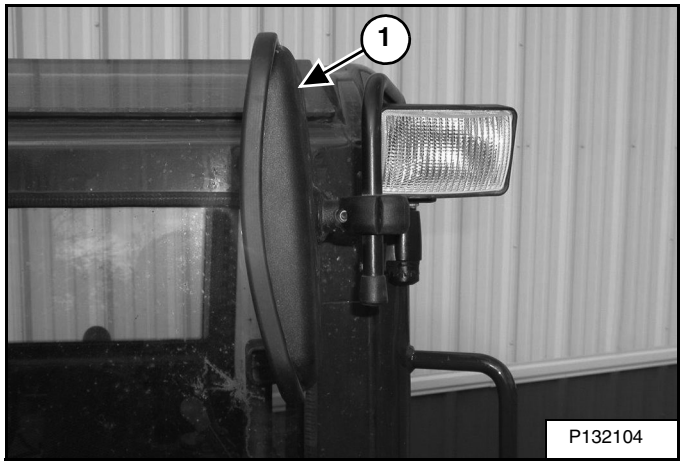
Figure 81





Adjust both mirrors to see the top of the cab (Item A) and the edge of the cab (Item B) **[Figure 81]** approximately as shown in the mirror.

Figure 82



The left mirror (Item 1) **[Figure 82]** can be rotated and put into the transport position when trailering the excavator.

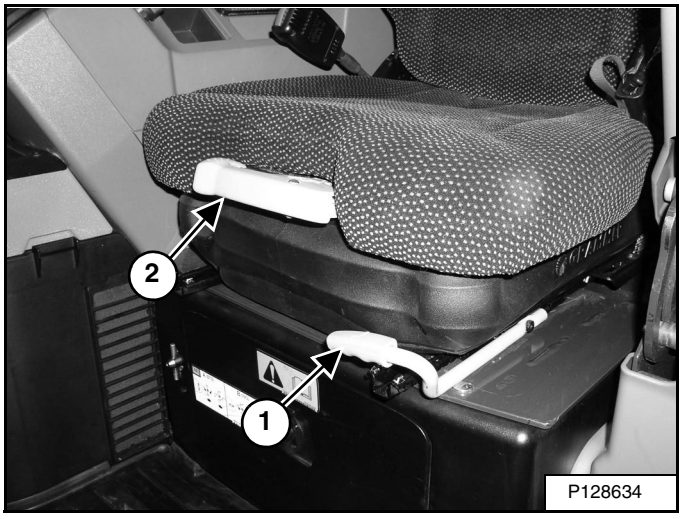
Entering The Excavator

Figure 83

Use the grab handles, steps and tracks to enter the cab **[Figure 83]**.

Seat Adjustment

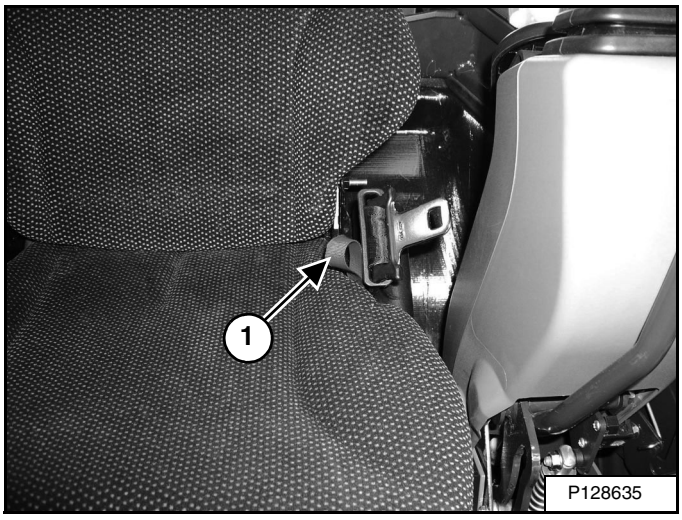
Figure 84



Release the seat lever (Item 1) **[Figure 84]** to adjust the seat forward or back.

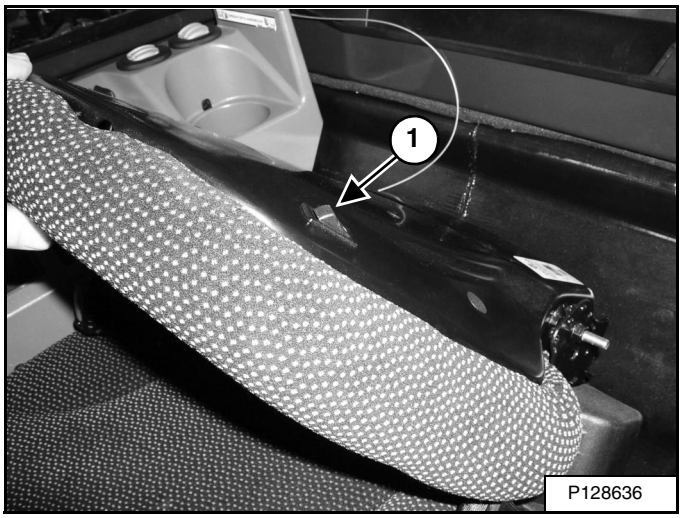
Turn the handle (Item 2) **[Figure 84]** to change the adjustment for operator weight.

Figure 85



Pull the strap (Item 1) **[Figure 85]** to change the incline of the seat back.

Figure 86



Press the top of the switch (Item 4) **[Figure 86]** to turn the heated seat ON (if equipped). Press the bottom of the switch turn OFF.

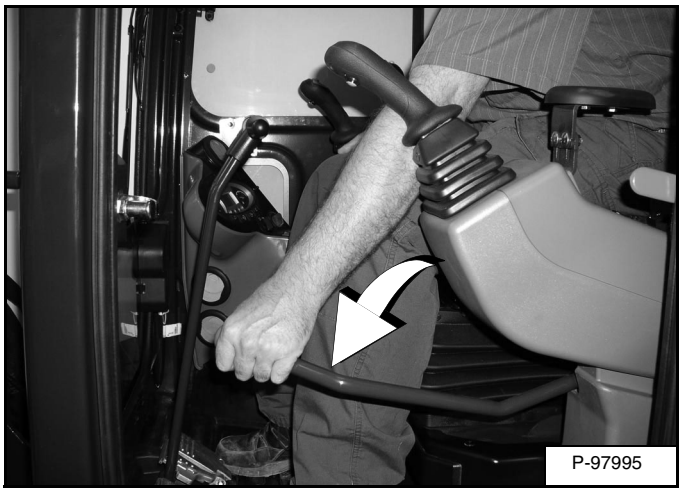
Seat Belt

Figure 87

Fasten the seat belt **[Figure 87]**.

Control Console

Figure 88



Lower the control console **[Figure 88]**.

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.

STARTING THE ENGINE

Key Switch

WARNING

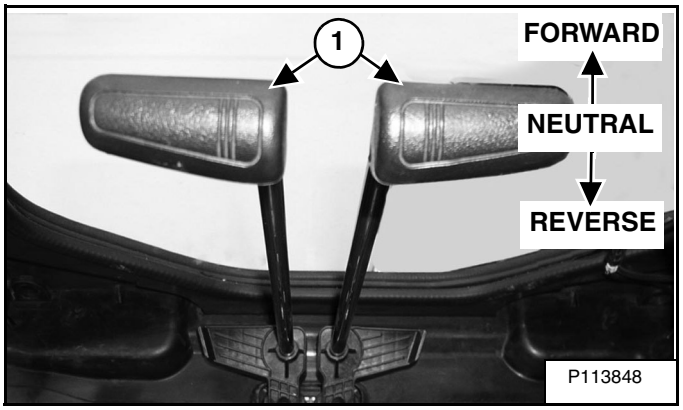
AVOID INJURY OR DEATH

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

W-2135-1108

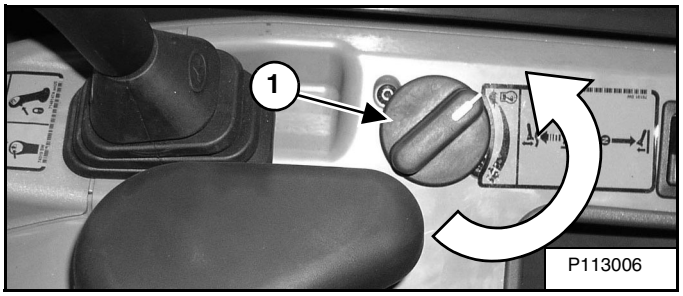
Perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page 61.)

Figure 89



Put all control levers (Item 1) **[Figure 89]** in the NEUTRAL position (steering, joysticks, and blade control levers).

Figure 90



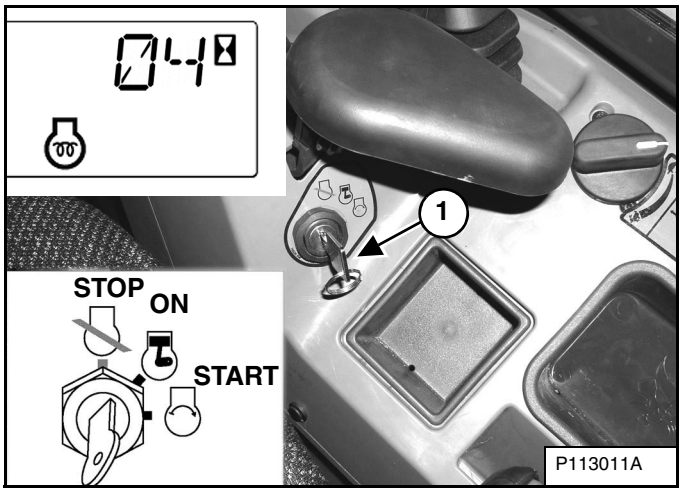
Turn the engine speed control dial (Item 1) **[Figure 90]** counterclockwise to low idle.

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 91



Turn the key (Item 1) **[Figure 91]** 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 91]**.

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

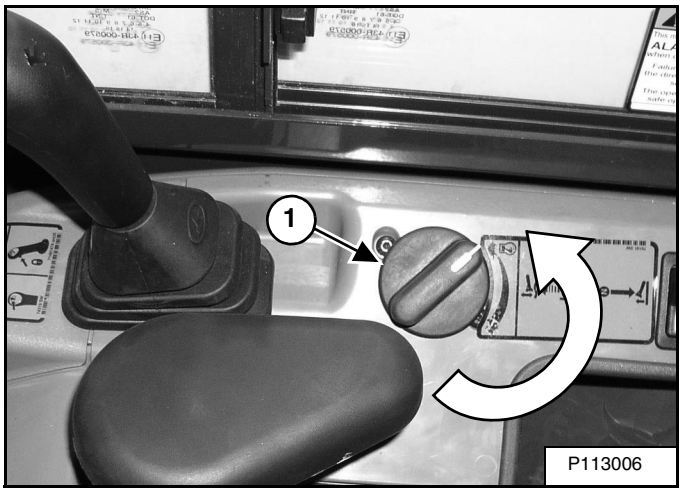
AVOID INJURY OR DEATH

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

W-2135-1108

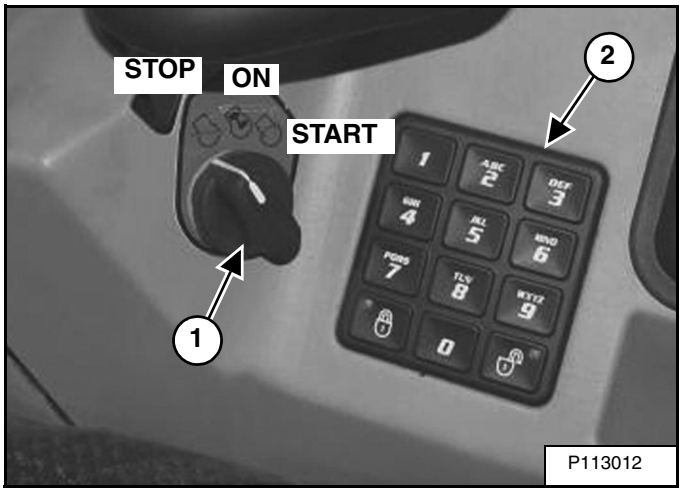
Perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page 61.)

Figure 92



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

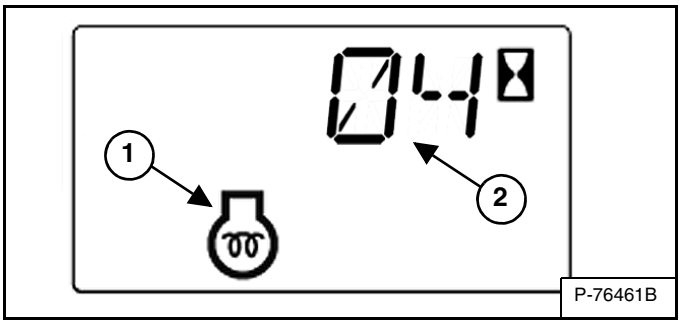
Figure 93



Turn the start switch (Item 1) **[Figure 93]** 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 93]** to enter the password.

Figure 94



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

When the engine preheat icon goes OFF, turn the start switch (Item 1) **[Figure 93]** 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 93]** 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 177.)

Deluxe Instrument Panel

⚠ WARNING

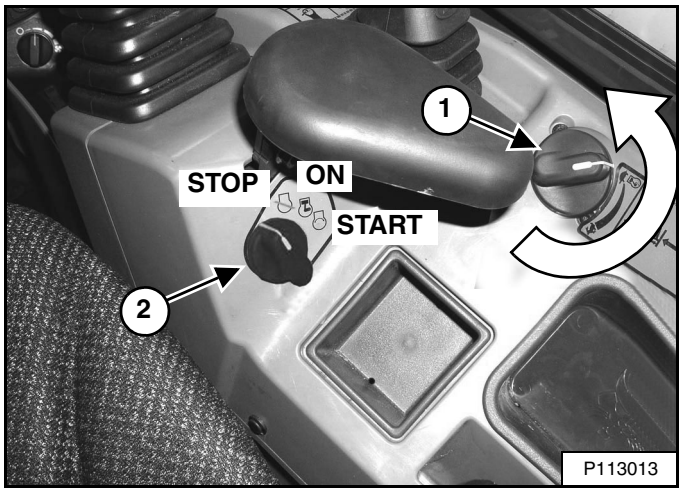
AVOID SERIOUS INJURY OR DEATH

- **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 61.)

Figure 95

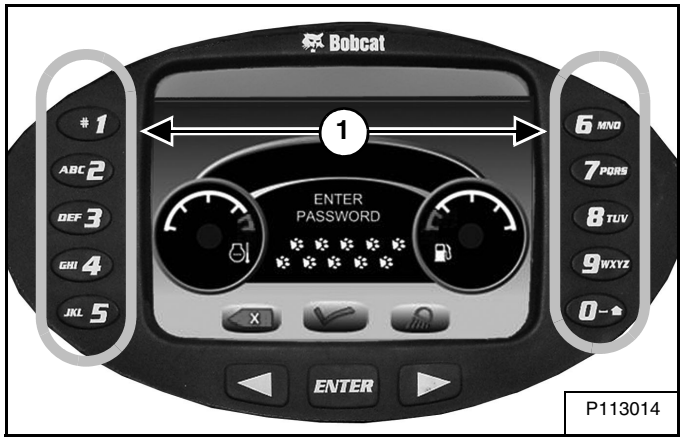


Set the engine speed control (Item 1) **[Figure 95]** to the low idle position.

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 unauthorized use of your excavator. (See Changing The Owner Password on Page 177.) 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 177.)

Figure 96



Turn the start switch (Item 2) **[Figure 95]** 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 96]** to enter the password.

Figure 97

If preheating is required, the glow plugs will automatically cycle and the engine preheat icon (Item 1) **[Figure 97]** 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 96]**.

Turn the start switch (Item 2) **[Figure 95]** 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 177.)

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 137.)
- Make sure the battery is fully charged.
- Install an engine heater.

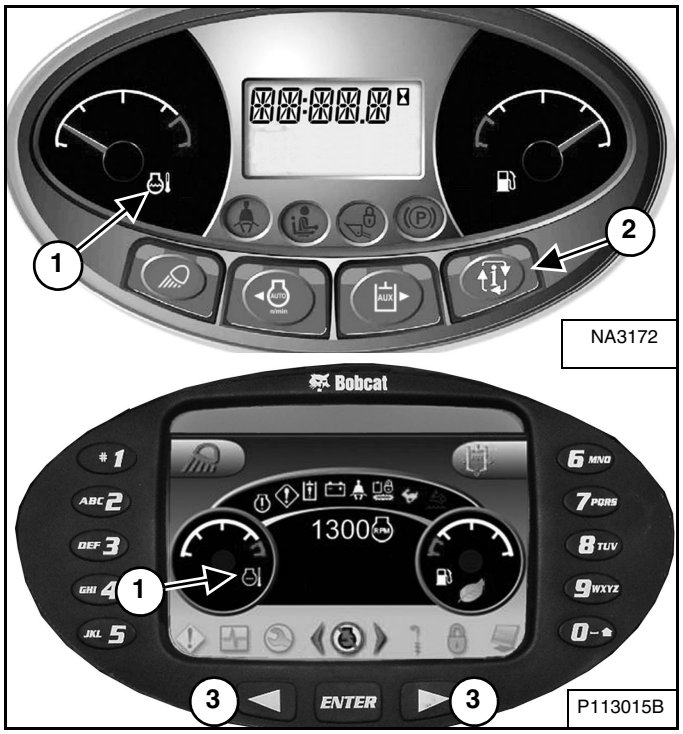
NOTE: If the battery is discharged (but not frozen) a booster battery can be used to jump start the excavator. (See Using A Booster Battery (Jump Starting) on Page 146.)

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 98



Frequently monitor the temperature and fuel gauges **[Figure 98]**.

After the engine is running, frequently monitor the instrument panel **[Figure 98]** 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 98]** is ON.

Press the Information button (Item 2) (Standard Panel) or press a scroll button (Item 3) **[Figure 98]** (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 164.)

NOTE: The optional Deluxe Instrumentation Panel offers an additional view of service codes that includes a brief description. (See DIAGNOSTIC SERVICE CODES on Page 164.)

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

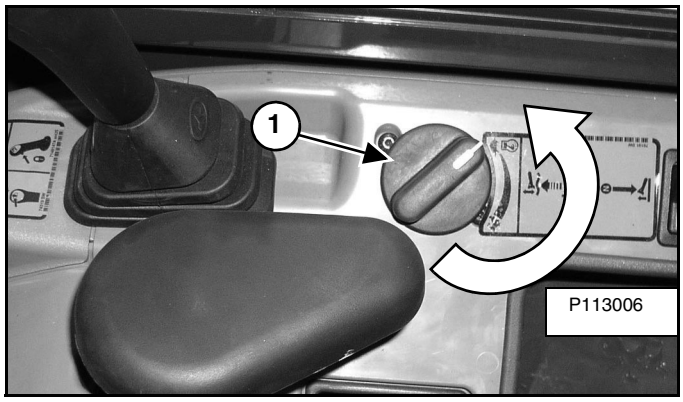
STOPPING THE ENGINE AND LEAVING THE EXCAVATOR

Procedure

Figure 99

Stop the machine on level ground. Lower the work equipment and the blade to the ground **[Figure 99]**.

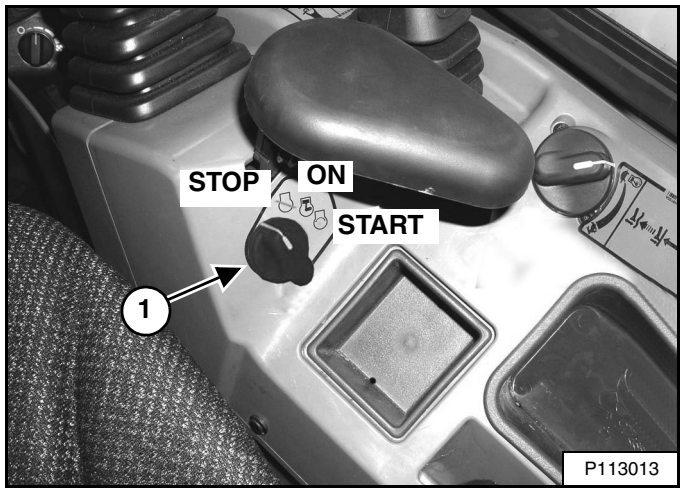
Figure 100



Rotate the engine speed control dial (Item 1) **[Figure 100]** counterclockwise to low idle.

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

Figure 101



Turn the switch (Item 1) **[Figure 101]** to STOP.

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

Installing And Removing The Attachment (Pin-On Attachment)

Installation

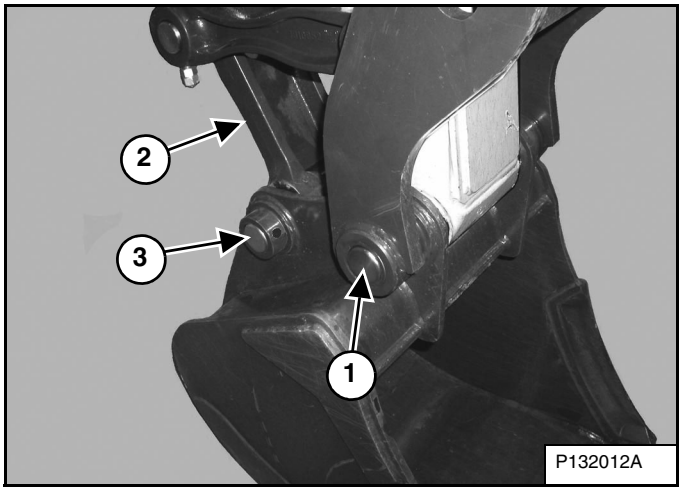
WARNING

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 102



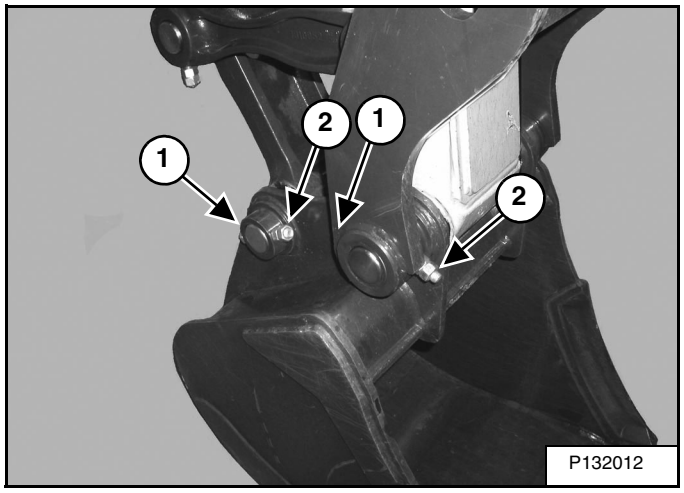
Install the arm into the bucket and align the mounting hole.

Install the pin (Item 1) **[Figure 102]**.

NOTE: The photos of the bucket installation are shown with the optional clamp installed. Align the clamp to the bucket before installing the bucket pin (Item 1) [Figure 102].

Install the link (Item 2) in the bucket and align the mounting hole. Install the pin (Item 3) **[Figure 102]**.

Figure 103



Install the two bolts (Item 1) and the four nuts (Item 2) **[Figure 103]**. (Install the nut onto the bolt but do not tighten securely. The bolt should be free to rotate. Install the second nut and tighten the two nuts to each other so that the bolt is free to rotate after the nuts are tightened.)

Install grease in the grease fittings.

Removal

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

Remove the four nuts (Item 2) and the two bolts (Item 1) **[Figure 103]**.

Remove the pins (Items 1 and Item 3) **[Figure 102]**.

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 (Pin Grabber Quick Coupler)

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

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

Figure 104

Position the arm and coupler to the attachment **[Figure 104]**.

⚠ WARNING

AVOID INJURY OR DEATH

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

W-2978-0317

Figure 105

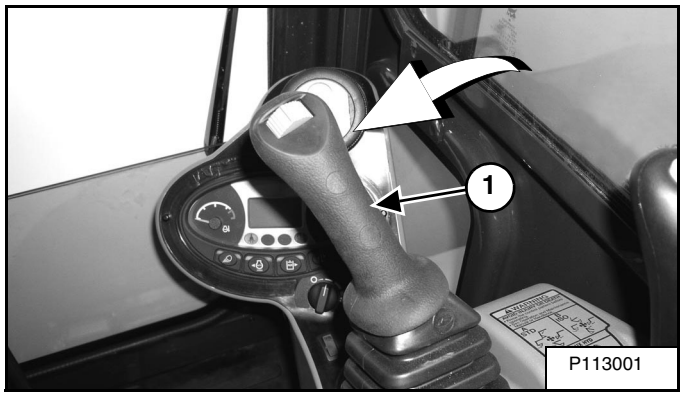
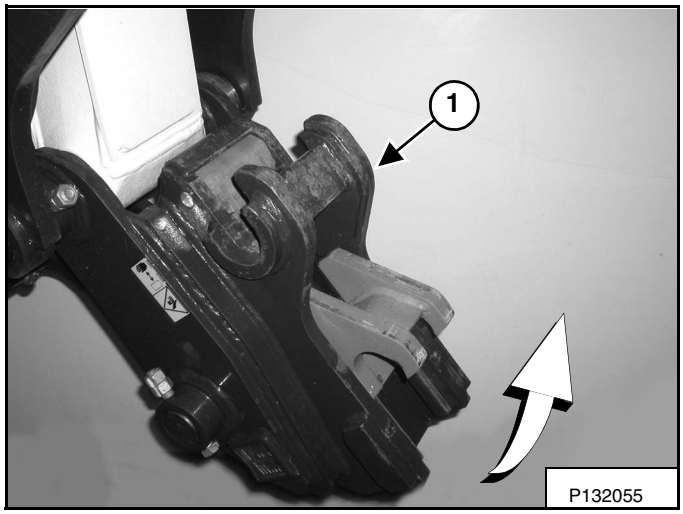


Figure 106

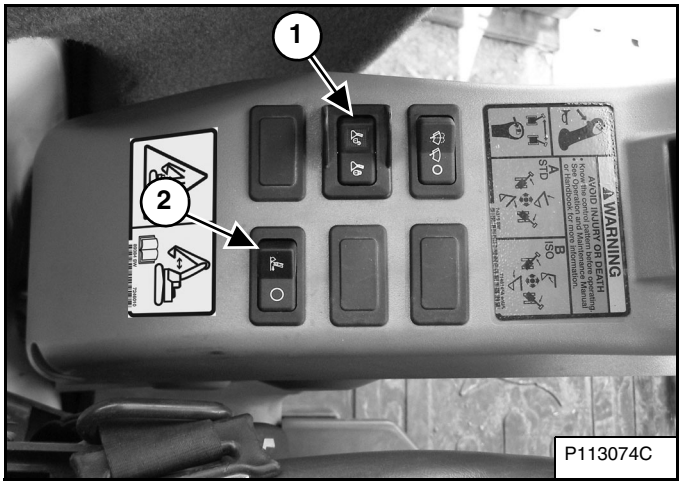


Move the right joystick (Item 1) **[Figure 105]** to the left (IN) and curl the coupler (Item 1) **[Figure 106]** toward the cab fully.

Installing And Removing The Attachment (Pin Grabber Quick Coupler) (Cont'd)

Installation (Cont'd)

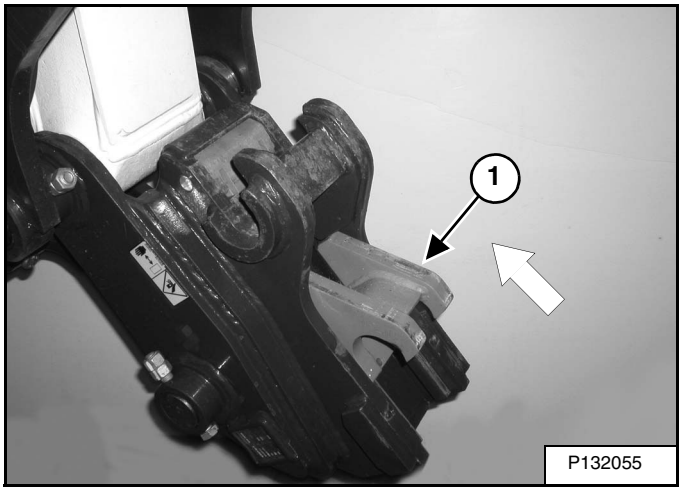
Figure 107



Press the coupler ON / OFF switch (Item 1) **[Figure 107]** to the left (ON) position to enable the pin grabber quick coupler feature. The switch will illuminate when in the ON position and a buzzer will sound.

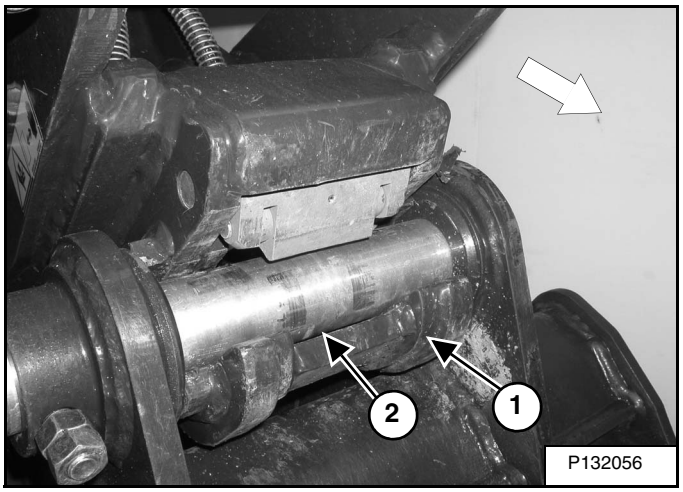
Press and release the INTENT switch (Item 2) within five seconds. (The buzzer will continue to sound and the light (Item 1) **[Figure 107]** will stay ON.)

Figure 108



Continue to curl the quick coupler until the locking clasp (Item 1) **[Figure 108]** moves in fully.

Figure 109



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 109]**. Raise the attachment up slightly.

Figure 110

Curl the quick coupler in fully **[Figure 110]**.

Press the coupler ON / OFF switch (Item 1) **[Figure 107]** to the right, (OFF) position. The switch light and buzzer will turn OFF.

Continue to curl the attachment in for an additional ten seconds to allow the locking clasp to move and lock to the attachment pins.

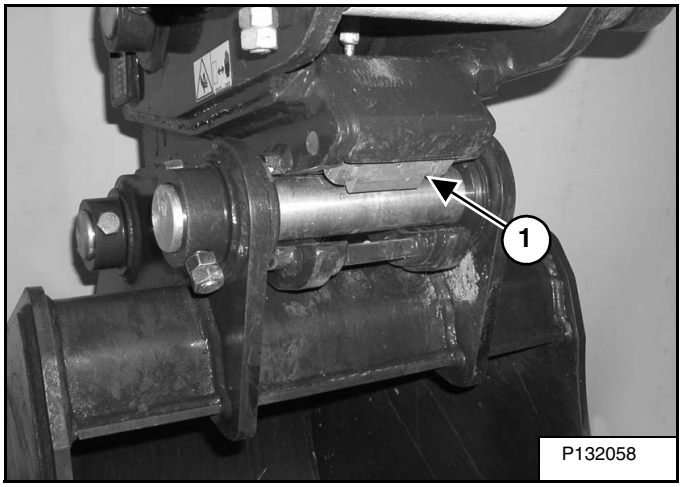
With the attachment as low to the ground as possible, curl the attachment out and in several times to ensure the attachment is secured to the coupler.

Lower the attachment flat to the ground.

Installing And Removing The Attachment (Pin Grabber Quick Coupler) (Cont'd)

Installation (Cont'd)

Figure 111



Visually check that the green locking clasp (Item 1) **[Figure 111]** is FULLY ENGAGED AND LOCKED.

⚠ 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

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

W-2978-0317

Installing And Removing The Attachment (Pin Grabber 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

Figure 112

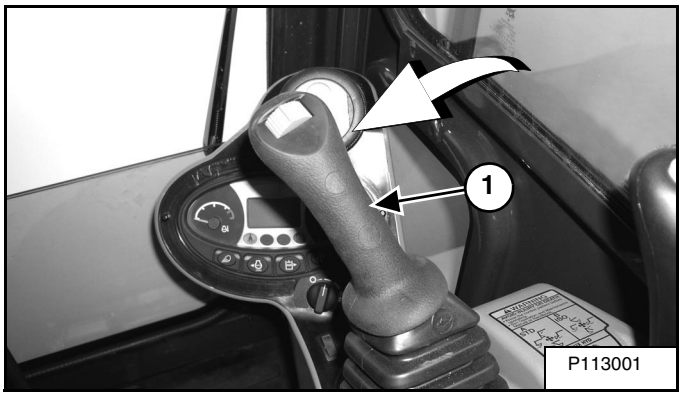
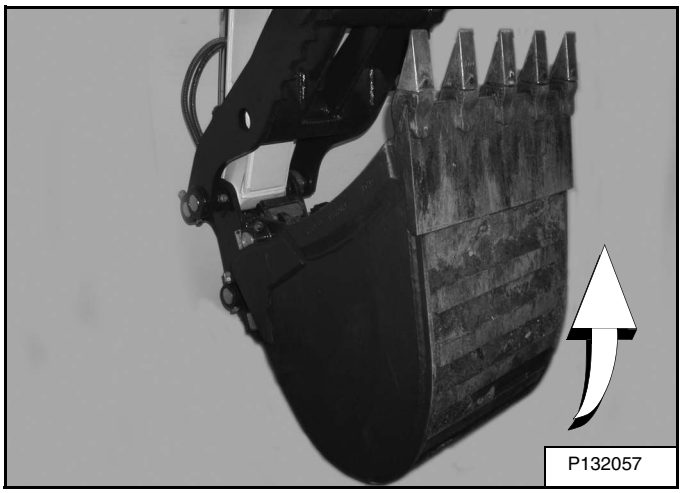
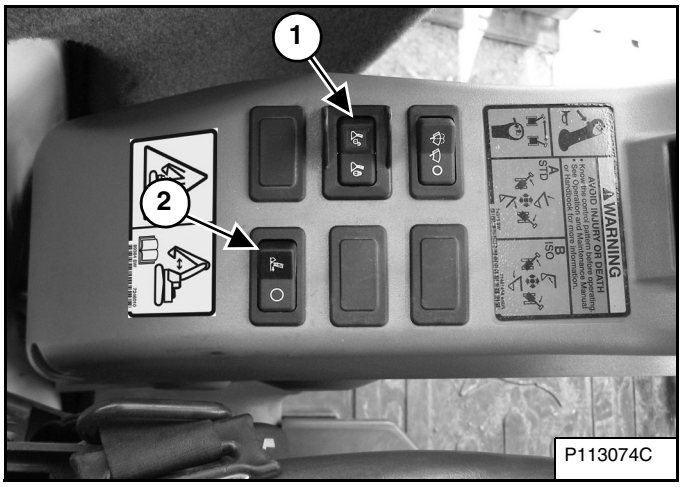


Figure 113



Move the right joystick (Item 1) **[Figure 112]** to the left (IN) and curl the quick coupler (Item 1) **[Figure 113]** fully.

Figure 114

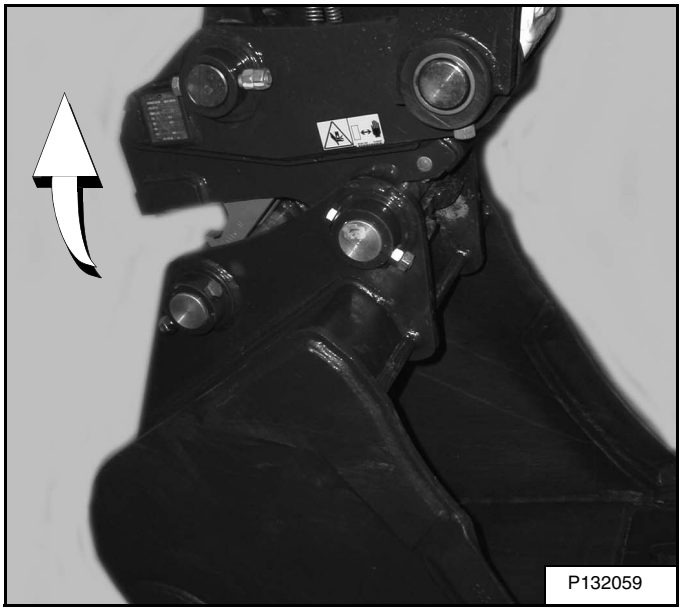


Press the coupler ON / OFF switch (Item 1) **[Figure 114]** to the left (ON) position to enable the pin grabber quick coupler feature. The switch will illuminate when in the ON position and a buzzer will sound.

Press and release the INTENT switch (Item 2) within five seconds. (The buzzer will continue to sound and the light (Item 1) **[Figure 114]** will stay ON.)

Move the right joystick (Item 1) **[Figure 112]** to the left (IN) and continue to curl the quick coupler **[Figure 113]**. The coupler locking clasps will lift fully to unlock the attachment from the quick coupler.

Figure 115

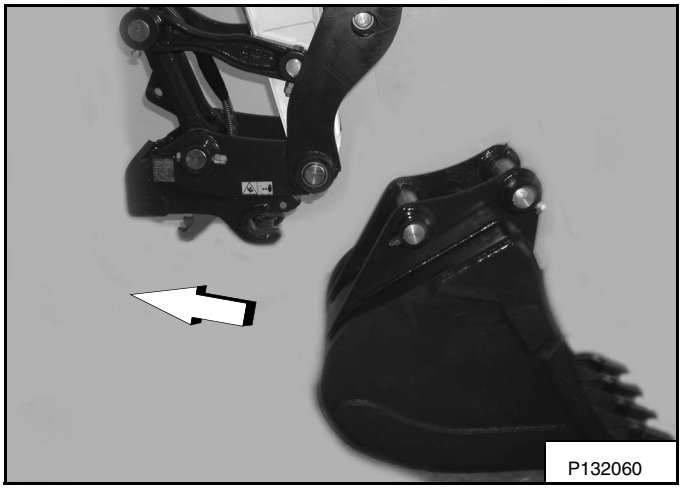


With the attachment slightly off of the ground, roll the quick coupler back until the coupler starts to disengage from the attachment **[Figure 115]**.

Installing And Removing The Attachment (Pin Grabber Quick Coupler) (Cont'd)

Removal (Cont'd)

Figure 116

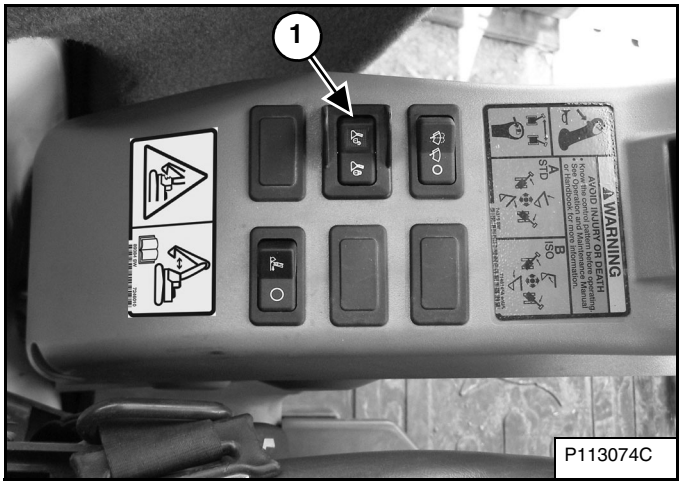


Roll the quick coupler back fully.

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 116]**.

Figure 117



Press the coupler ON / OFF switch (Item 1) **[Figure 117]** 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 highway, 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.

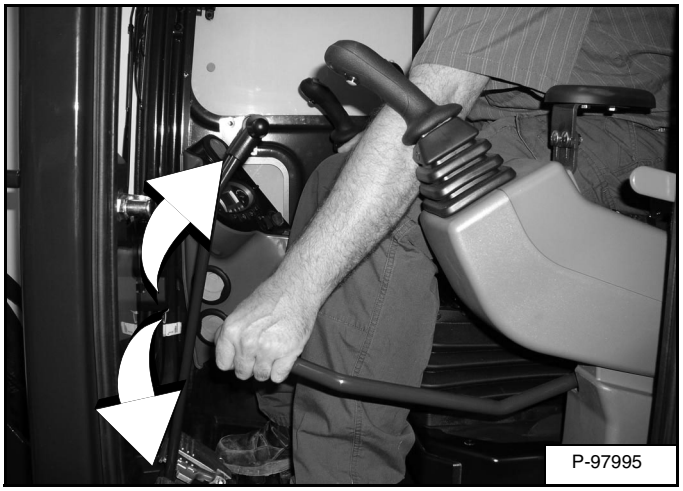
Lowering The Work Equipment (Engine STOPPED)

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 118



The joystick lock switch disengages the hydraulic control functions from the joysticks when the console are raised **[Figure 118]**.

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 118]**.

Object Handling With The Lifting Device

The excavator is equipped with the lift eye (Item 1) **[Figure 120]** as part of the bucket link.

⚠ WARNING

AVOID INJURY OR DEATH

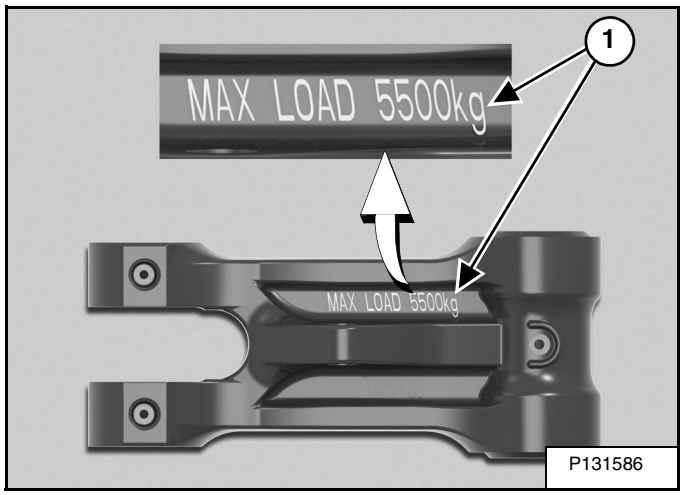
- **Do not exceed rated lift capacity.**
- **Excessive load can cause tipping or loss of control.**
- **Excessive load can cause failure of the lift eye and cause the load to drop.**

W-2991-0714

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 (With Additional Counterweight) on Page 186.)

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

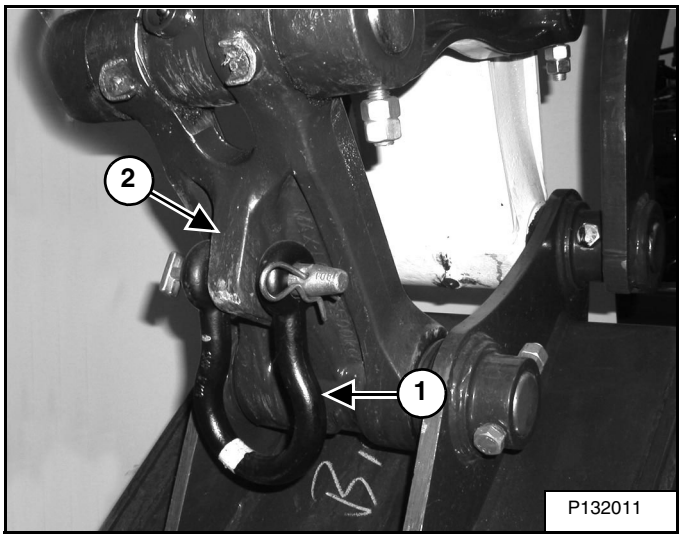
Figure 119



The maximum RLL (Item 1) **[Figure 119]** is shown on the bucket link.

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 70.)

Figure 120

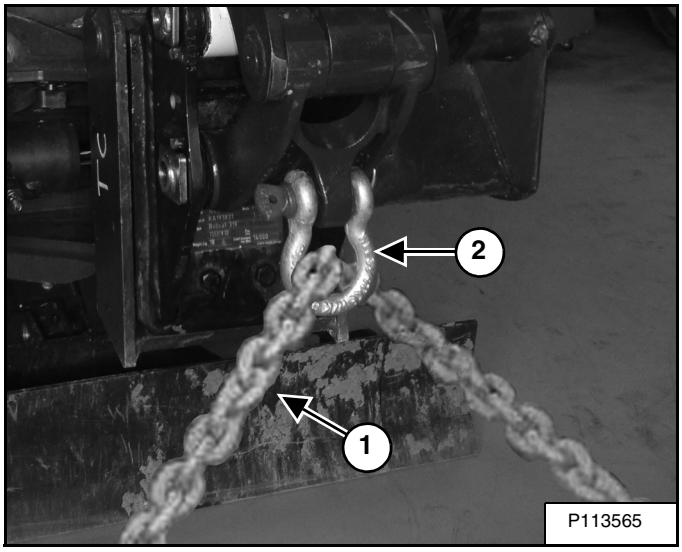


Install the clevis (Item 1) through the lift eye (Item 2) **[Figure 120]**.

NOTE: Visually check the lift 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 (Cont'd)

Figure 121

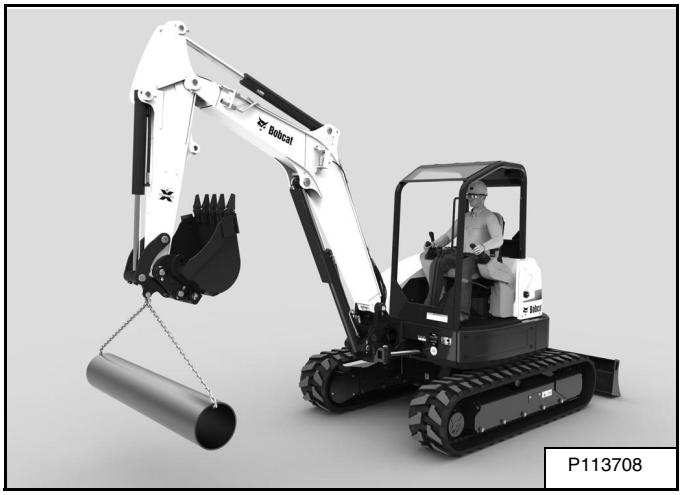


Install a lift chain (Item 1) (or other type of lifting device) through the clevis (Item 2) **[Figure 121]** and connect to the object to be lifted.

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 61.)

Figure 122



Make sure the load is evenly weighted and centered on the lifting chain (or other type of lifting device), and is secured to prevent the load from shifting **[Figure 122]**.

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 no bucket or attachment. The difference between the weight of the attachment, the quick coupler, and the hydraulic clamp (if equipped) must be subtracted.

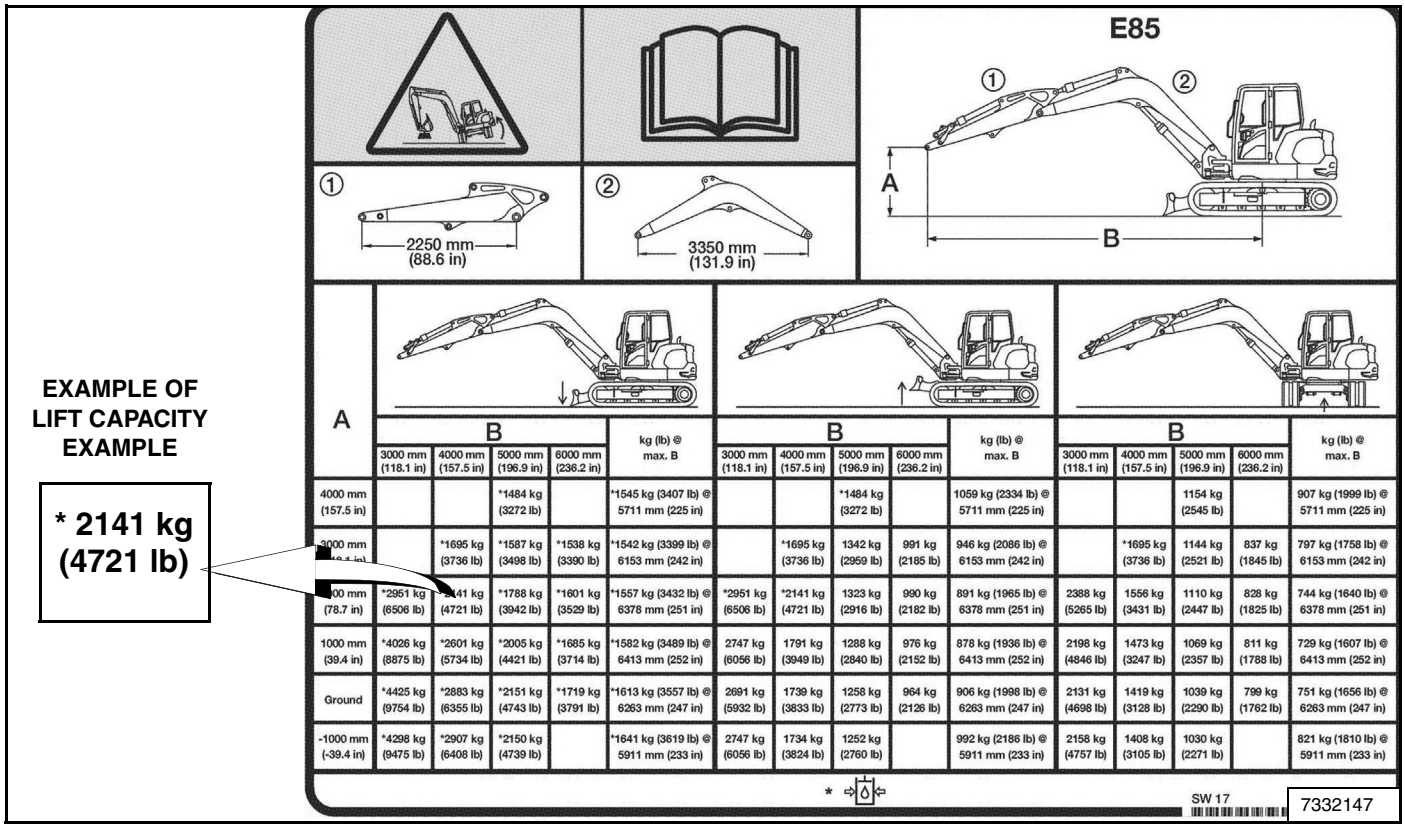
⚠ WARNING

AVOID INJURY OR DEATH

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

W-2374-0500

Figure 123



A	B: 3000 mm (118.1 in)	B: 4000 mm (157.5 in)	B: 5000 mm (196.9 in)	B: 6000 mm (236.2 in)	kg (lb) @ max. B
4000 mm (157.5 in)			*1484 kg (3272 lb)		*1545 kg (3407 lb) @ 5711 mm (225 in)
3000 mm		*1695 kg (3736 lb)	*1587 kg (3498 lb)	*1538 kg (3390 lb)	*1542 kg (3399 lb) @ 6153 mm (242 in)
00 mm (78.7 in)	*2951 kg (6506 lb)	*2141 kg (4721 lb)	*1788 kg (3942 lb)	*1601 kg (3529 lb)	*1557 kg (3432 lb) @ 6378 mm (251 in)
1000 mm (39.4 in)	*4026 kg (8875 lb)	*2601 kg (5734 lb)	*2005 kg (4421 lb)	*1685 kg (3714 lb)	*1582 kg (3489 lb) @ 6413 mm (252 in)
Ground	*4425 kg (9754 lb)	*2883 kg (6355 lb)	*2151 kg (4743 lb)	*1719 kg (3791 lb)	*1613 kg (3557 lb) @ 6263 mm (247 in)
-1000 mm (-39.4 in)	*4298 kg (9475 lb)	*2907 kg (6408 lb)	*2150 kg (4739 lb)		*1641 kg (3619 lb) @ 5911 mm (233 in)

A	B: 3000 mm (118.1 in)	B: 4000 mm (157.5 in)	B: 5000 mm (196.9 in)	B: 6000 mm (236.2 in)	kg (lb) @ max. B
4000 mm (157.5 in)			*1484 kg (3272 lb)		1059 kg (2334 lb) @ 5711 mm (225 in)
3000 mm		*1695 kg (3736 lb)	1342 kg (2959 lb)	991 kg (2185 lb)	946 kg (2086 lb) @ 6153 mm (242 in)
00 mm (78.7 in)	*2951 kg (6506 lb)	*2141 kg (4721 lb)	1323 kg (2916 lb)	990 kg (2182 lb)	891 kg (1965 lb) @ 6378 mm (251 in)
1000 mm (39.4 in)	2747 kg (6056 lb)	1791 kg (3949 lb)	1288 kg (2840 lb)	976 kg (2152 lb)	878 kg (1936 lb) @ 6413 mm (252 in)
Ground	2691 kg (5932 lb)	1739 kg (3833 lb)	1258 kg (2773 lb)	964 kg (2126 lb)	906 kg (1998 lb) @ 6263 mm (247 in)
-1000 mm (-39.4 in)	2747 kg (6056 lb)	1734 kg (3824 lb)	1252 kg (2760 lb)		992 kg (2186 lb) @ 5911 mm (233 in)

A	B: 3000 mm (118.1 in)	B: 4000 mm (157.5 in)	B: 5000 mm (196.9 in)	B: 6000 mm (236.2 in)	kg (lb) @ max. B
4000 mm (157.5 in)			1154 kg (2545 lb)		907 kg (1999 lb) @ 5711 mm (225 in)
3000 mm		*1695 kg (3736 lb)	1144 kg (2521 lb)	837 kg (1845 lb)	797 kg (1758 lb) @ 6153 mm (242 in)
00 mm (78.7 in)	2388 kg (5265 lb)	1556 kg (3431 lb)	1110 kg (2447 lb)	828 kg (1825 lb)	744 kg (1640 lb) @ 6378 mm (251 in)
1000 mm (39.4 in)	2198 kg (4846 lb)	1473 kg (3247 lb)	1069 kg (2357 lb)	811 kg (1788 lb)	729 kg (1607 lb) @ 6413 mm (252 in)
Ground	2131 kg (4698 lb)	1419 kg (3128 lb)	1039 kg (2290 lb)	799 kg (1762 lb)	751 kg (1656 lb) @ 6263 mm (247 in)
-1000 mm (-39.4 in)	2158 kg (4757 lb)	1408 kg (3105 lb)	1030 kg (2271 lb)		821 kg (1810 lb) @ 5911 mm (233 in)

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:
No coupler and No Bucket (Attachment)

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

- Pin Grabber Coupler = 84 kg (185 lb)
- TAG Quick Coupler = 66 kg (146 lb)
- Hydraulic Clamp And Cylinder = 159 kg (350 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 123]**.

- Machine Position: Over Blade, Blade Down
- Lift Radius: 4000 mm (125.5 in)
- Lift Point Height: 2000 mm (78.7 in)
- Pin grabber Quick Coupler
- Hydraulic Clamp and Cylinder
- Standard Bucket

1. Obtain Lift Capacity from Chart: 2141 kg (4721 lb)

2. Calculate actual Lift Capacity for machine as configured:

2141 kg (4731 lb) - 84 kg (185 lb) (pin grabber quick coupler) - 159 kg (350 lb) (hydraulic clamp and cylinder) - 46 kg (100 lb) (36 inch bucket with teeth) = 1852 kg (4096 lb)

** The lift capacity charts (decals) are calculated using 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 124

The optional lifting clamp attachment (if equipped) gives the excavator a wider range of use and mobility for debris removal **[Figure 124]**.

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

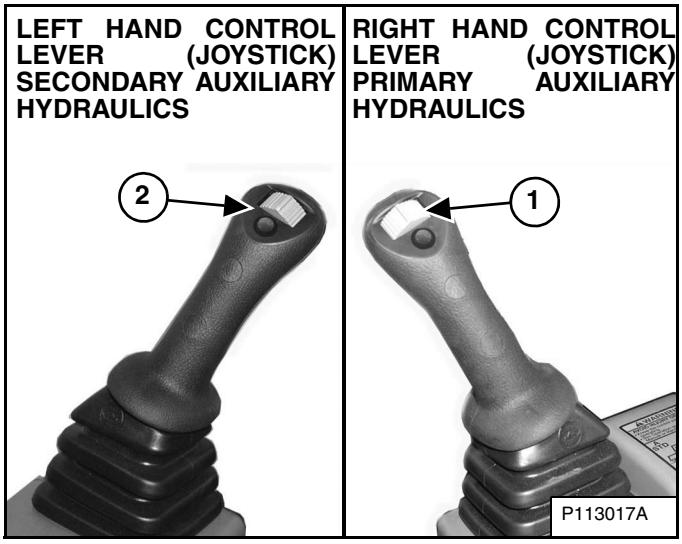
The lift capacities are reduced if equipped with the optional lifting clamp. (See Lift Capacity on Page 80.) and (See Rated Lift Capacity (With Additional Counterweight) on Page 186.)

NOTE: Use care when operating the bucket and clamp functions on machines equipped with a Pin Grabber Quick Coupler and without a bucket or attachment installed. Cylinder damage can occur due to contact between the coupler 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 50.) or (See Auxiliary Hydraulics - Deluxe Instrument Panel on Page 51.)

Figure 125



Move the switch (Item 1) **[Figure 125]** 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 125]** on the left control lever to the left open the clamp. Move the switch to the right to close the clamp.

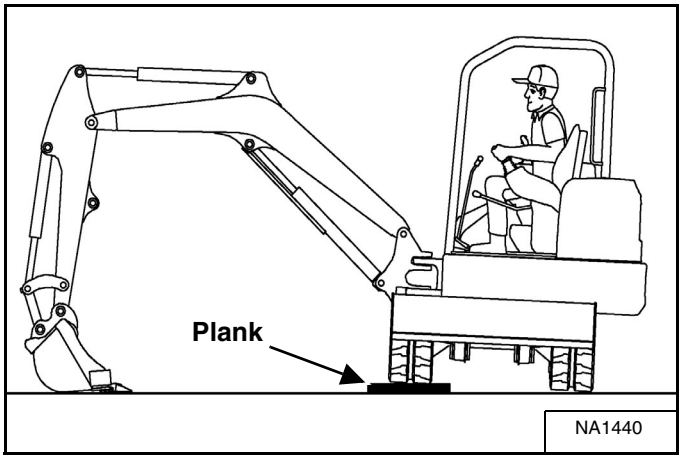
Driving The Excavator

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

Avoid traveling 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.

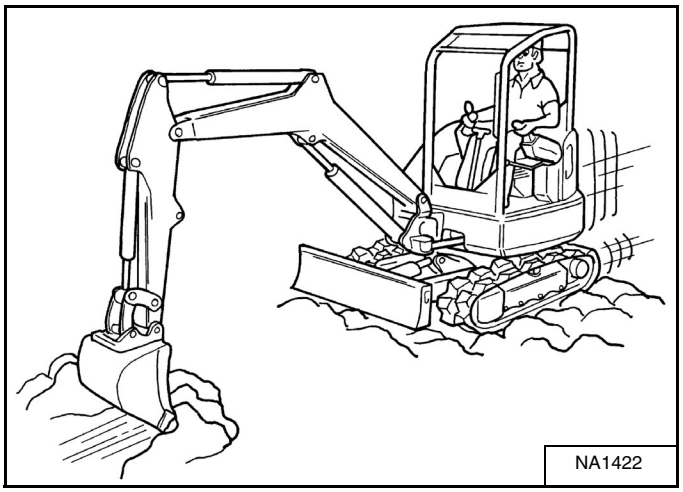
Figure 126



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 126]**.

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

Figure 127



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 127]**.

Operating On Slopes

⚠ WARNING

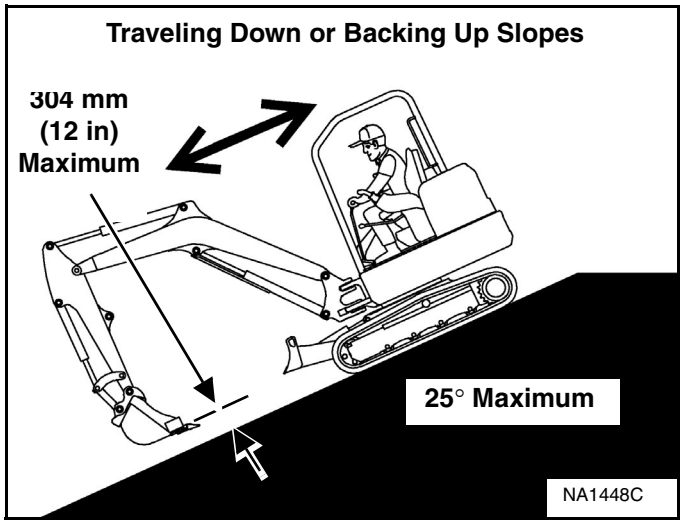
AVOID INJURY OR DEATH

- **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 128



When going down grades that exceed 15 degrees, put the machine in the position shown, and run the engine slowly **[Figure 128]**.

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

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

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

⚠ WARNING

AVOID INJURY OR DEATH

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

W-2498-0304

Figure 129

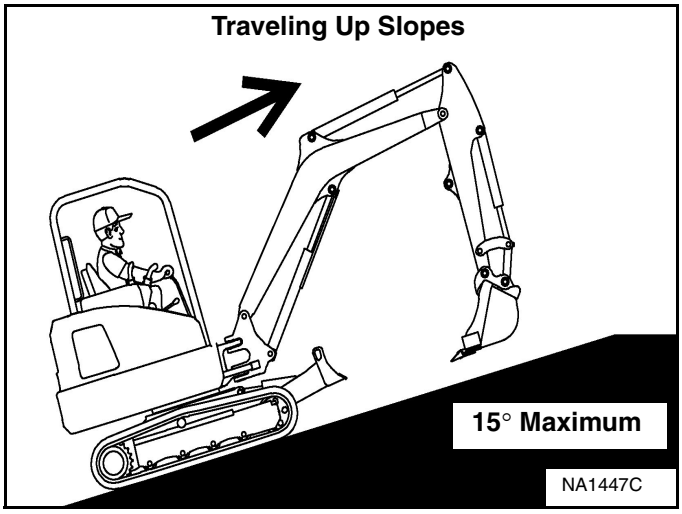
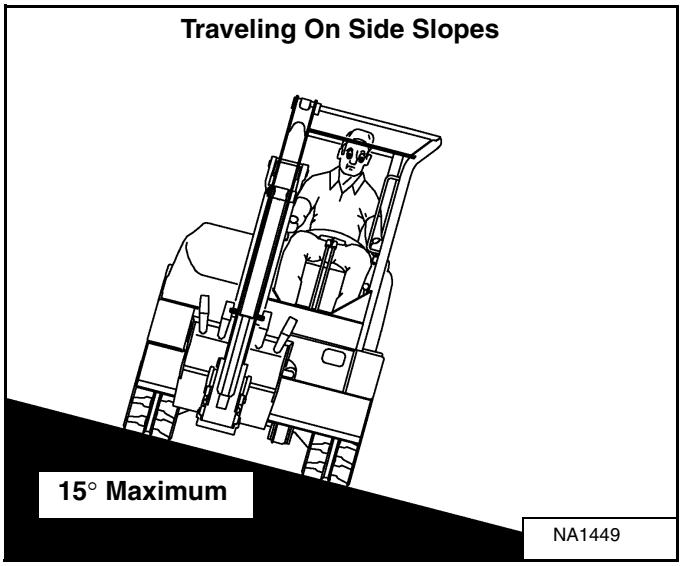


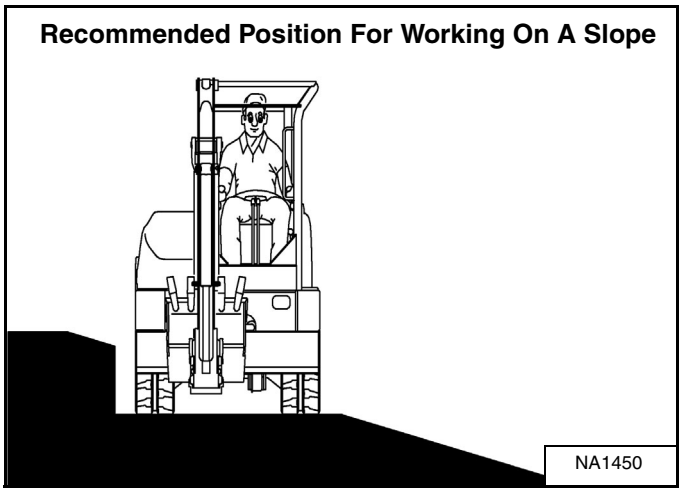
Figure 130



When traveling up slopes or on side slopes that are 15 degrees or less, position the machine as shown and run the engine slow **[Figure 129]** and **[Figure 130]**.

Operating On Slopes (Cont'd)

Figure 131



When operating on a slope, level the work area before beginning **[Figure 131]**.

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

Do not work on slopes which are over 15 degrees.

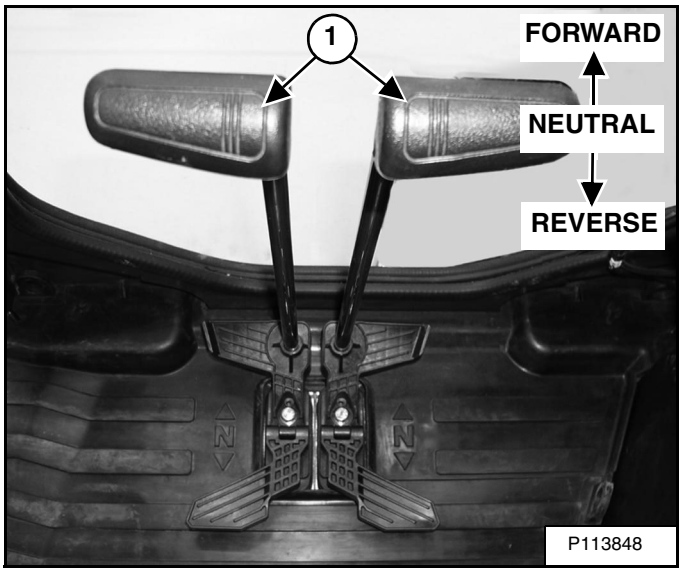
Use a slow work cycle.

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 132



To brake the machine when going down a slope, move the steering levers (Item 1) **[Figure 132]** 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.

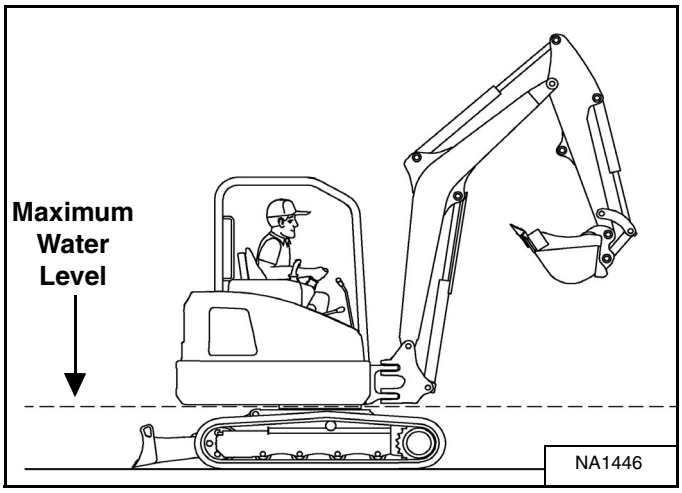
Use the control lever to lower the boom.

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 133



Do not operate or immerse the excavator in water higher than the bottom of the swing bearing **[Figure 133]**.

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.

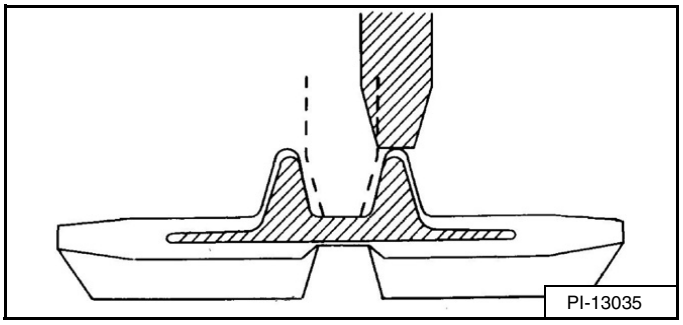
Water must be removed from the cylinder rods. If water freezes to the cylinder rod, the cylinder seals can be damaged when the rod is retracted.

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 134

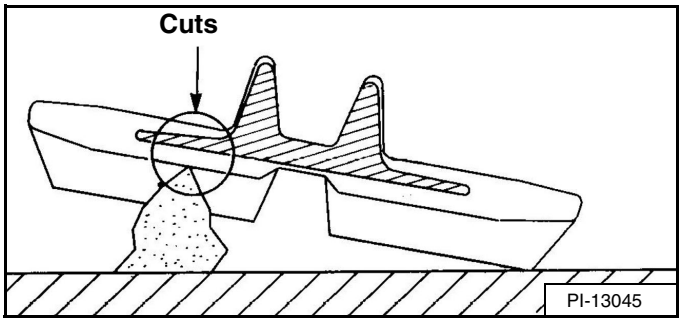


Incorrect track tension: When the rubber track is detracting, the idler or sprocket rides on the projections of the embedded metal **[Figure 134]** causing the embedded metal to be exposed to corrosion. (See TRACK TENSION on Page 152.)

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 135

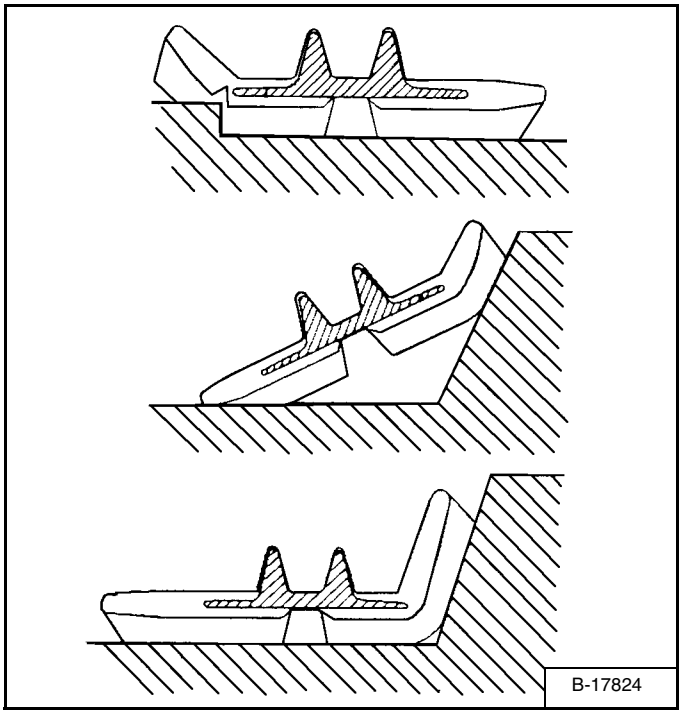


When rubber tracks drive over projections or sharp objects in the field, the concentrated forces applied cause cuts on the lug side rubber surface **[Figure 135]**. In case of making turns on projections, the lug side rubber surface will have an even higher chance to be cut. If the cuts run through the 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 136



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 136]**.

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.

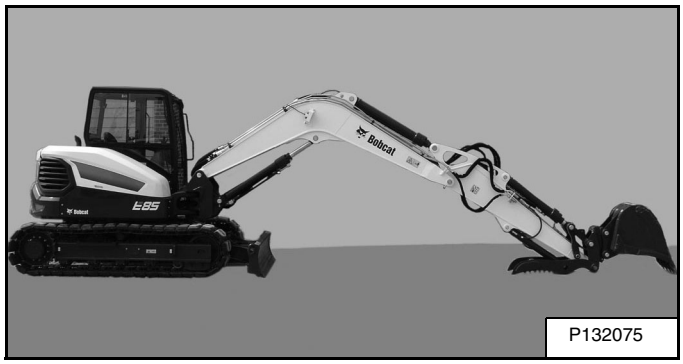
The calibration procedure is a two person operation. One person must remain in the cab to enter data into the deluxe display panel while a second person takes measurements from outside the machine. Make sure the second person is away from the machine when moving any of the work group components (boom,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

⚠ WARNING

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

W-2268-0910

Figure 137

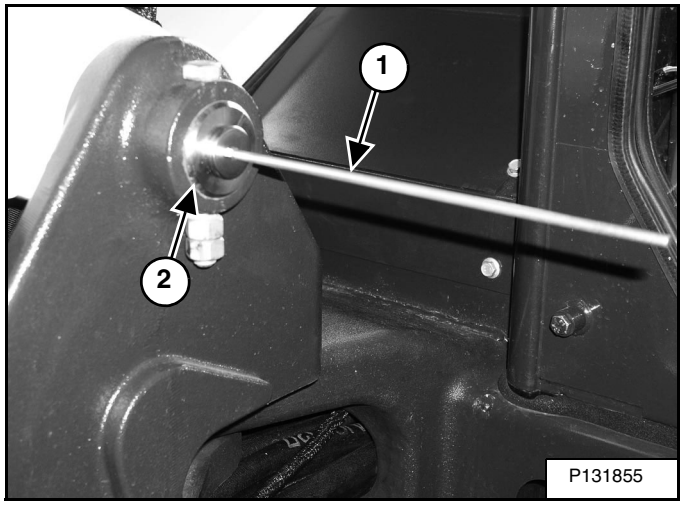


Position the excavator **[Figure 137]** as shown so the second person can install the magnetic tools, the plumb bob and do measurements for calibrating the system.

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.

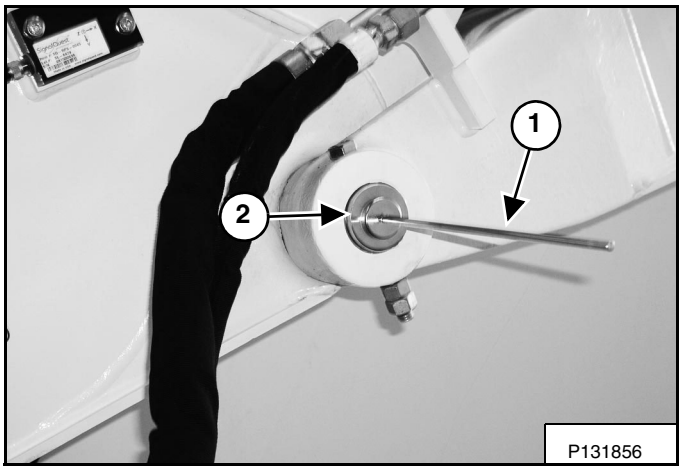
Figure 138



Install one of the magnetic tools (Item 1) on the boom pivot pin (Item 2) **[Figure 138]**. Center the magnetic tool as close as possible to the center of the boom pin.

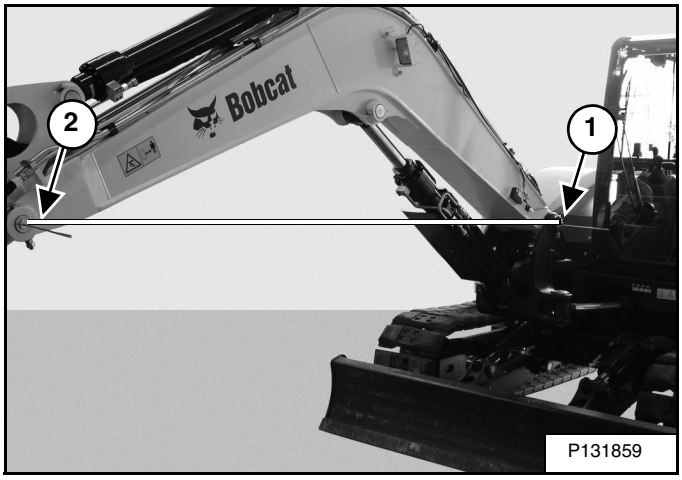
Setup / Calibration (Cont'd)

Figure 139



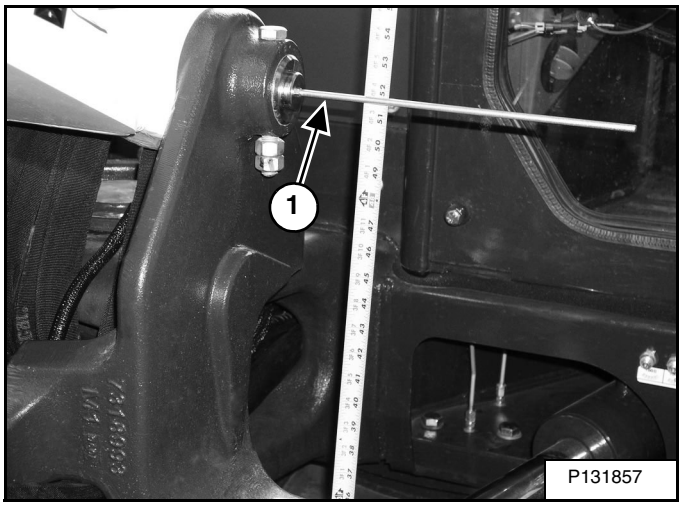
Install the second magnetic tool (Item 1) on the arm pivot pin (Item 2) **[Figure 139]**. Center the magnetic tool as close as possible to the center of the arm pin.

Figure 140



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 140]** is identical.

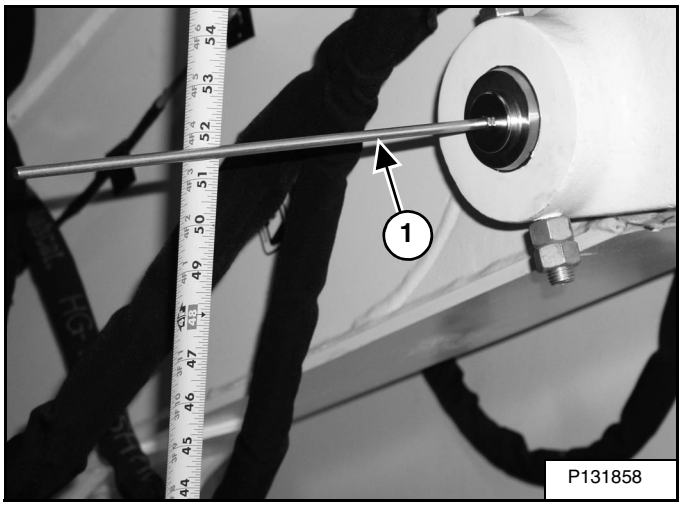
Figure 141



Measure the distance from the center of the boom magnetic tool (Item 1) **[Figure 141]** to the ground. Measure as close to the boom as possible without interference from components between the boom and the ground. The closer to the boom the measurement is taken, the more accurate the measurement should be. (A laser level can also be used for locating the centerlines of the magnetic tools as this will eliminate an possible variation in the measurements to the ground.)

Setup / Calibration (Cont'd)

Figure 142

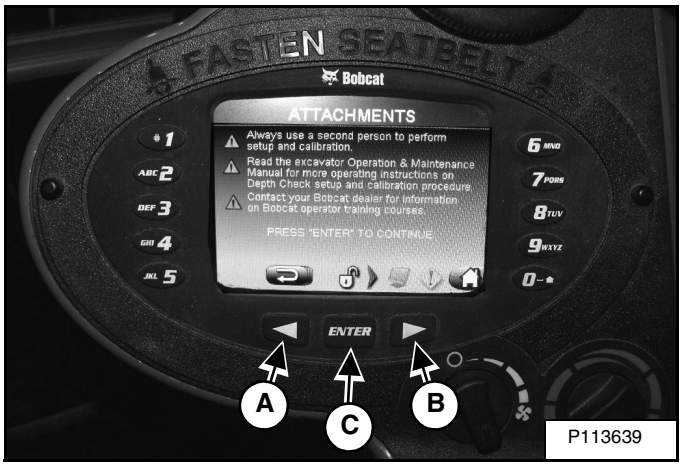


Measure the distance from the center of the arm magnetic tool (Item 1) **[Figure 142]** to the ground and make sure both measurements are the same. Adjust the boom up or down as needed and remeasure until both dimensions are the same between **[Figure 141]** and **[Figure 142]**.

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.

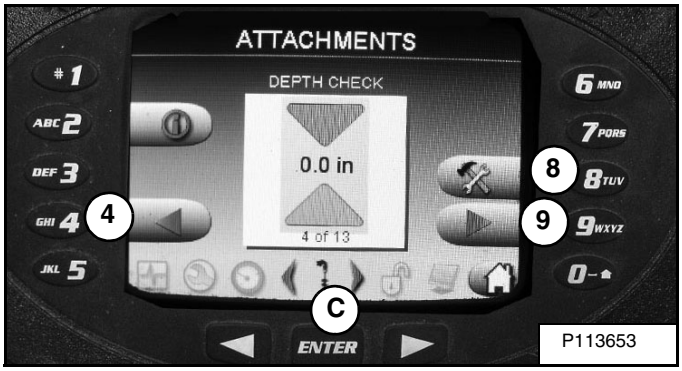
Figure 143



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 143]**

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

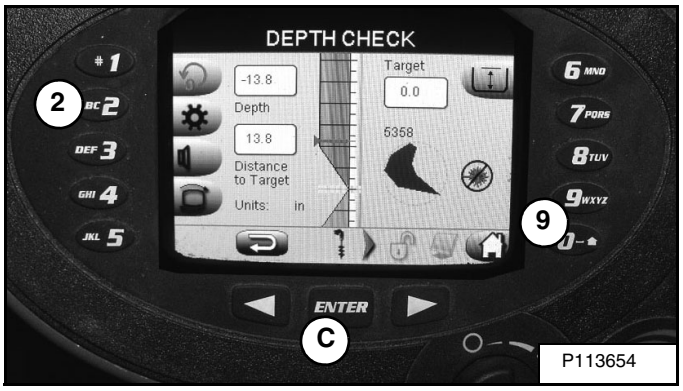
Figure 144



On the **[ATTACHMENTS]** screen, use the left arrow button (Item 4) or the right arrow button (Item 9) and scroll to the Attachment Depth Check screen shown here. Press the ENTER button (Item C) or button (Item 8) **[Figure 144]** to access the Depth Check SETUP screen.

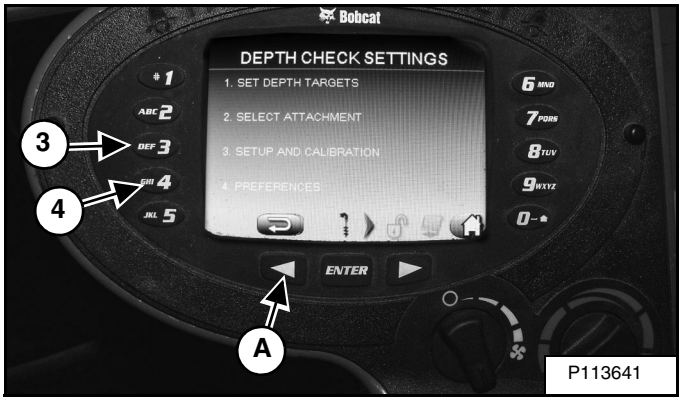
Setup / Calibration (Cont'd)

Figure 145



One of three different screens can appear. Which ever screen appears, press button (Item 2) **[Figure 145]** to access the Depth Check SETUP screen.

Figure 146

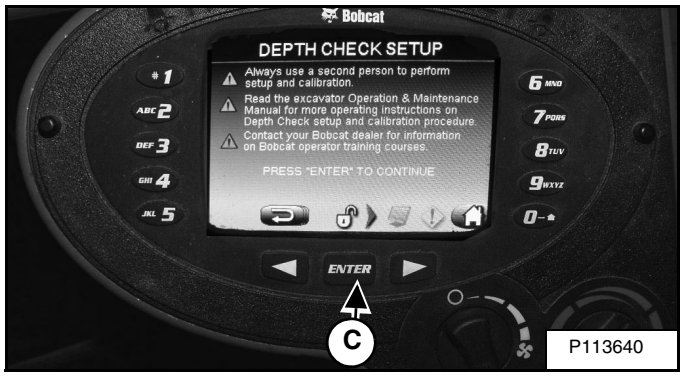


NOTE: The units of measure can be set in either millimeters or inches. Press button (Item 4) to enter the Preferences screen and select meters, millimeters, feet or inches, then press the arrow button (Item A) [Figure 146] to go back to the above screen.

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

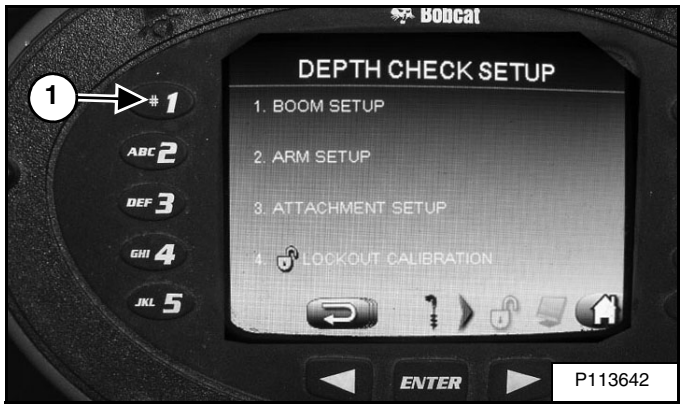
Press the button (Item 3) **[Figure 146]** for setup / calibration mode.

Figure 147



Read the message on the screen and press the ENTER button (Item C) **[Figure 147]** to continue.

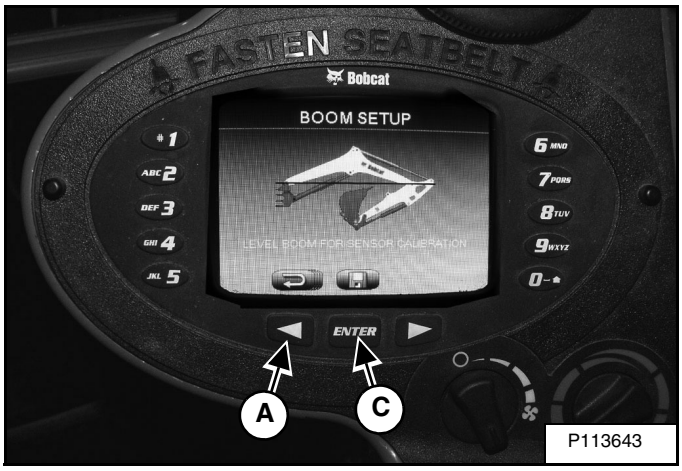
Figure 148



Press Boom Setup (Item 1) **[Figure 148]**.

Setup / Calibration (Cont'd)

Figure 149

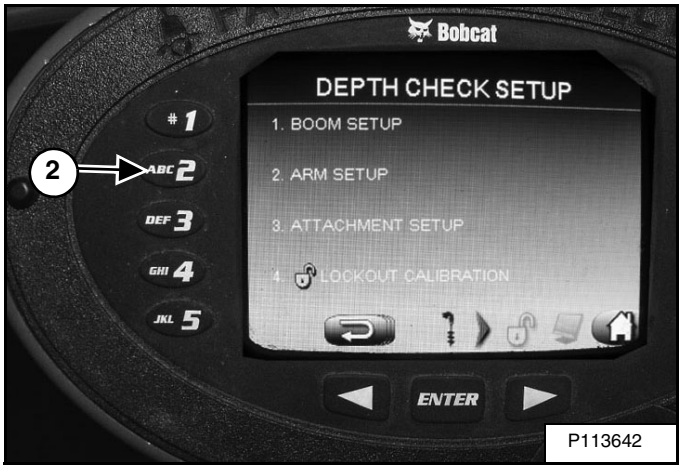


With the boom leveled **[Figure 141]** and **[Figure 142]**, press the ENTER button (Item C) **[Figure 149]** to store this information into the setup / calibration settings.

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.

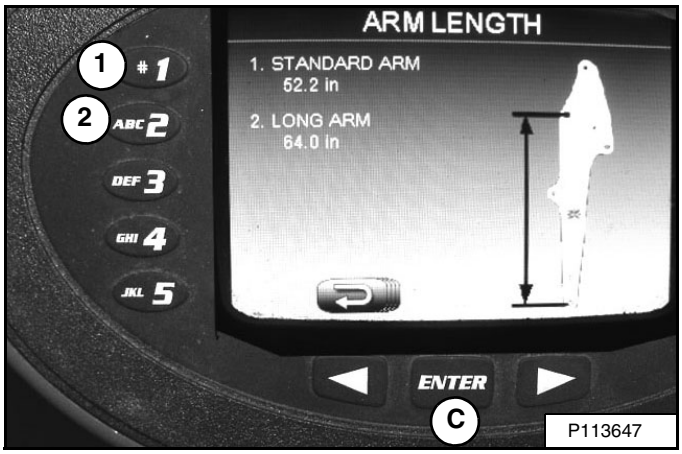
NOTE: If a plumb bob is not available, fishing line or a string with a heavy nut or two tied on one end of the string can be used in place of a plumb bob.

Figure 150



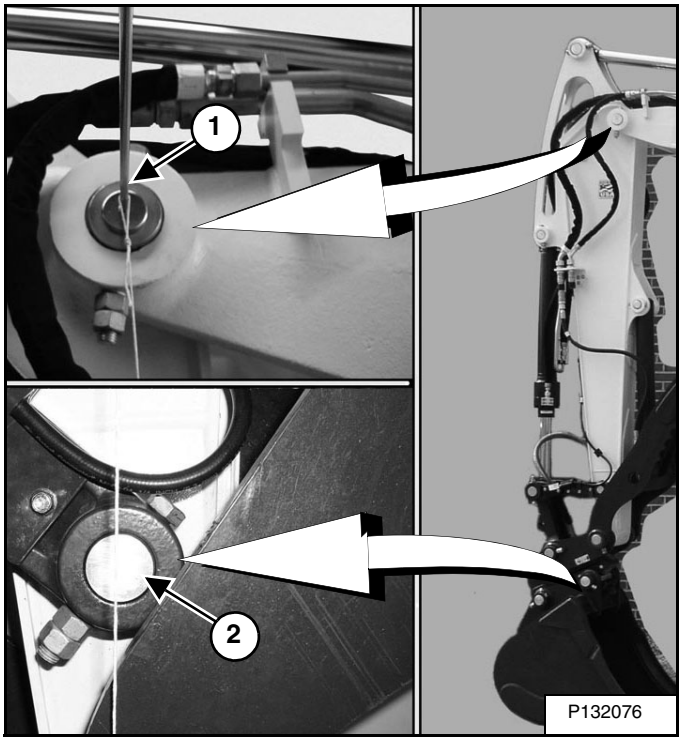
Have the second person in the cab and press the Arm Setup (Item 2) **[Figure 150]**.

Figure 151



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

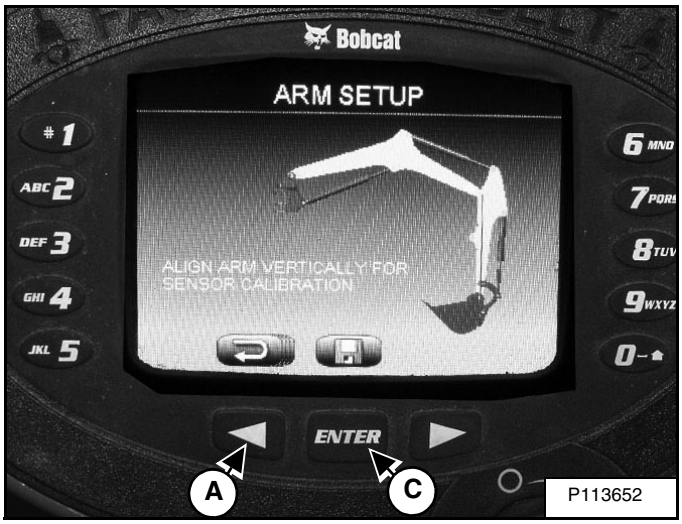
Figure 152



Place the plumb bob (Item 1) **[Figure 152]** on the magnetic tool that is installed on the arm pin. Raise the boom and move the arm until the arm is vertical.

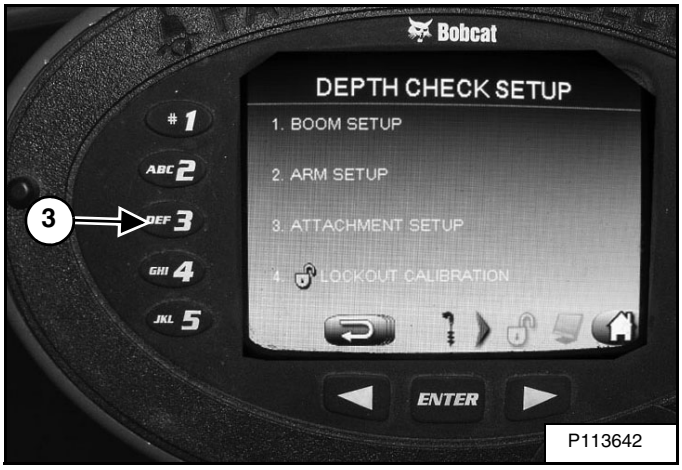
Move the arm until the plumb bob line is centered on the bucket pin (Item 2) **[Figure 152]**. *(The accuracy of the arm being vertical affects the accuracy of the Depth Check.)*

Figure 153



With the arm vertical **[Figure 152]**, press the ENTER button (Item C) **[Figure 153]** to store this information into the setup / calibration settings.

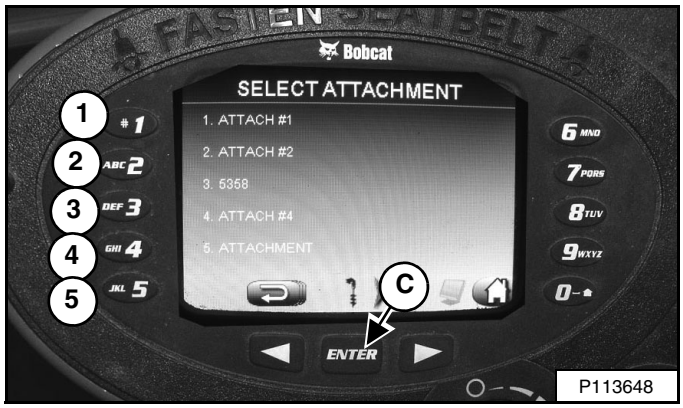
Figure 154



Press the Attachment Setup button (Item 3) **[Figure 154]**.

Setup / Calibration (Cont'd)

Figure 155



Select one of the attachments (Item 1 - 5) **[Figure 155]** 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 156

On the ATTACHMENT SETUP screen, you can select Change Name (Item 1), Setup And Calibration (Item 2) or Remove (Item 3) **[Figure 156]** the attachment from the saved list.

Select Change Name (Item 1) **[Figure 156]** to open the attachment name screen.

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

Figure 157

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 157]** 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 155]** and add the additional attachment names.

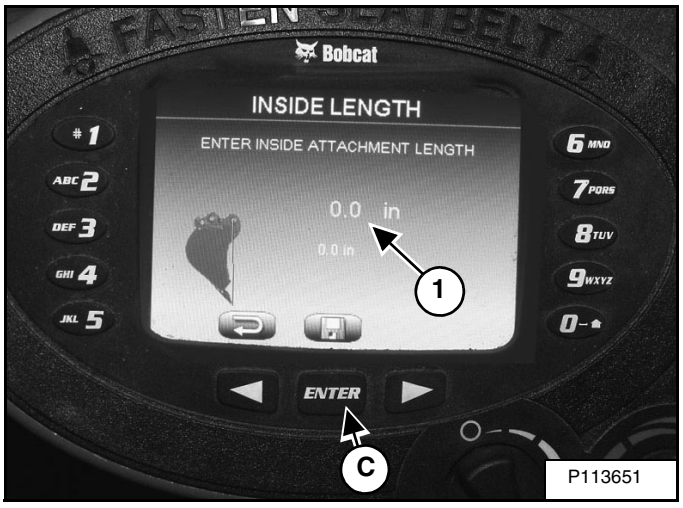
If setting up and calibrating multiple attachments at the same time, add all the attachment names into the system before doing the measurements. It will be more convenient when it comes time to add the dimensions.

Press the arrow button (Item A) **[Figure 156]** and go back to the Attachment Setup screen.

Press the Setup And Calibration button (Item 2) **[Figure 156]**.

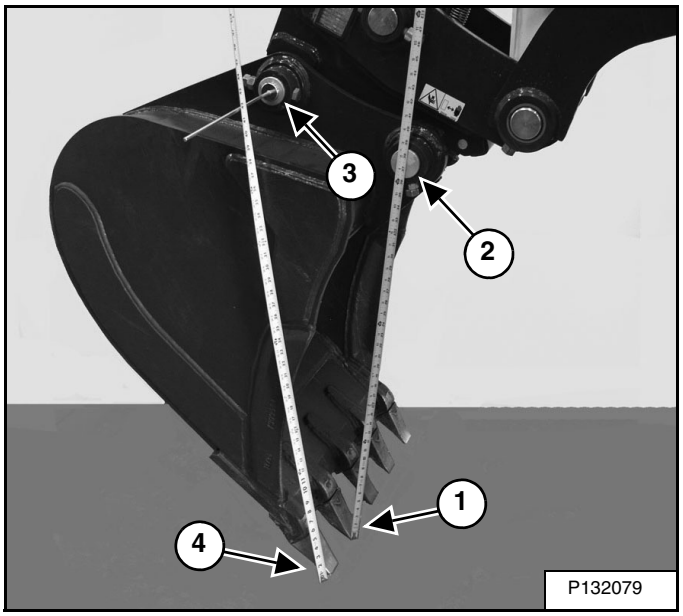
Setup / Calibration (Cont'd)

Figure 158



The INSIDE LENGTH screen **[Figure 158]** is where the first attachment dimensions will be added from the information determined in step **[Figure 159]**.

Figure 159



This two part step will measure the distance between the bucket pin (Item 2) **[Figure 159]** 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 center of the bucket pin (Item 2) **[Figure 159]**.

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 (tooth) (Item 4) and the center of the bucket pin (Item 3) **[Figure 159]**.

NOTE: With usage of any attachment, the cutting surfaces wear. Example: The cutting edge (tooth) (Item 1) [Figure 159] 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 158]** is where the attachment dimensions will be added from the information determined in **[Figure 159]**.

Using the key pad (Item 1 through 0) **[Figure 158]**, enter this dimension. After the measurement is entered and verified, press the ENTER button (Item C) **[Figure 158]**. As soon as the ENTER button is pressed, the OUTSIDE LENGTH **[Figure 160]** screen will be activated.

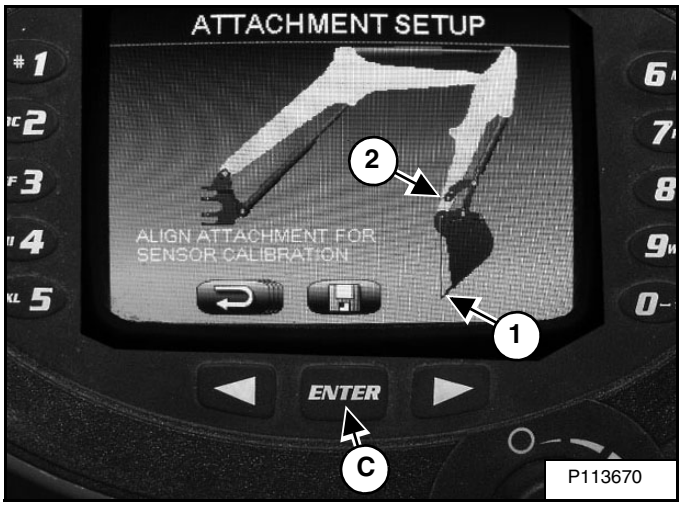
Figure 160

Install a magnetic pin on the second bucket pin (Item 3) **[Figure 159]**.

The next measurement is from the cutting edge (tooth) (Item 4) to the center of the magnetic pin (Item 3) **[Figure 159]** for the outside length dimension.

Using the key pad (Item 1 through 0) **[Figure 160]** enter this dimension. After the measurement is entered and verified, press the ENTER button (Item C) **[Figure 160]**. As soon as the ENTER button is pressed, the screen will change to the ATTACHMENT SETUP screen **[Figure 161]**.

Figure 161



Make sure the bucket is still vertical to the bucket pin (Item 2) **[Figure 159]** and the cutting edge (or bucket teeth) (Item 1) **[Figure 159]**, and press the ENTER button (Item C) **[Figure 161]** 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.

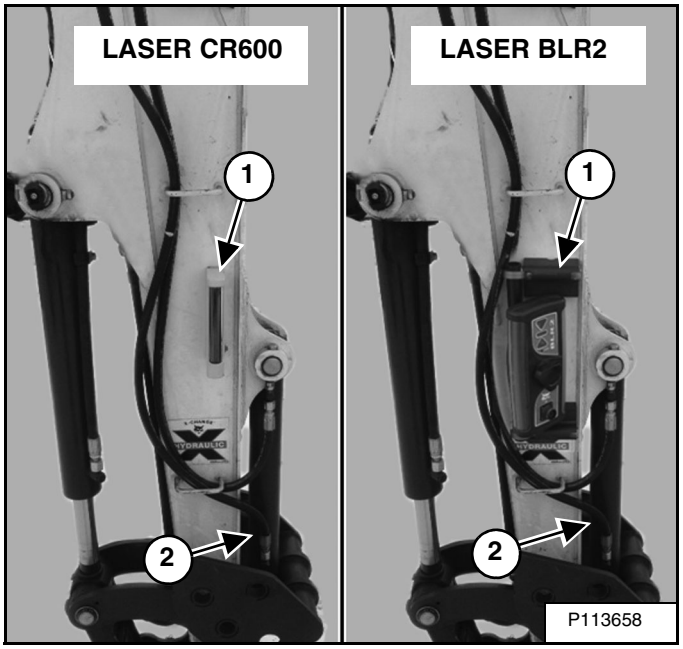
NOTE: When using an auger, it will not be as accurate as solid mounted attachments because all components are not rigidly mounted (auger bit has extra movement and rotation where the system is designed for fixed positions). When using the auger with the Depth Check system, enter zero for both attachment dimensions. When using the auger, try to keep the attachment mounting system 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 97.)

Setup / Calibration (Cont'd)

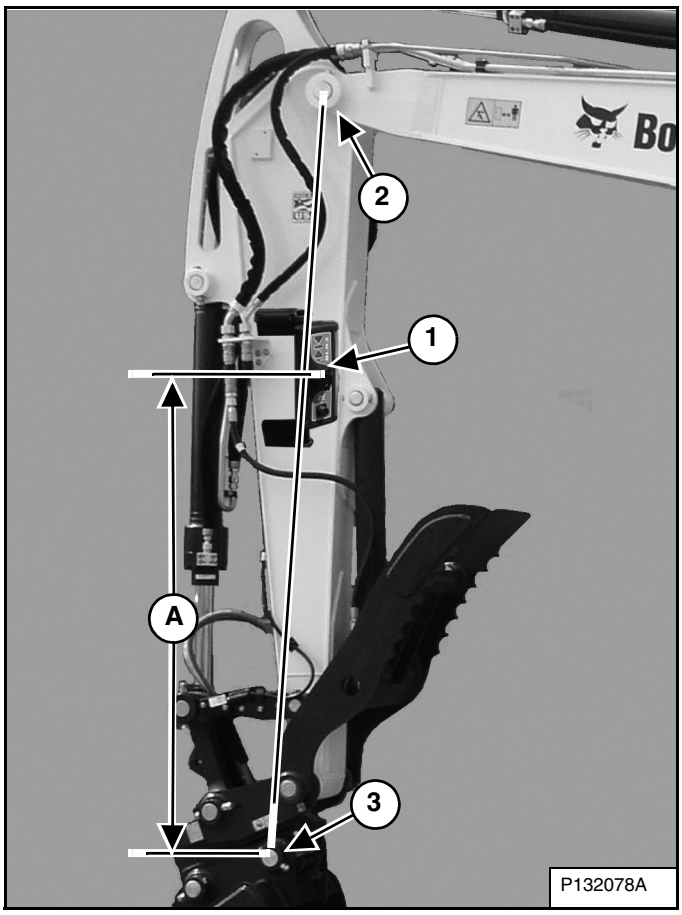
If Using A Laser With Depth Check

Figure 162



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 163



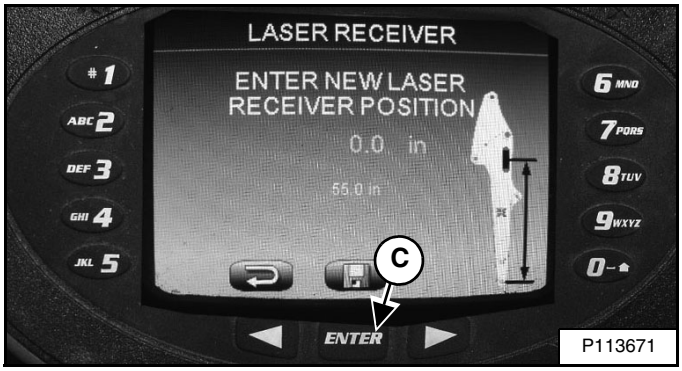
When installing the laser receiver (Item 1), it should be installed as close as possible in line with the arm pin (Item 2) and the bucket pivot pin (Item 3) **[Figure 163]**.

Position the laser (Item 1) approximately as shown. The dimension (Item A) will need to be added to the display screen. Measure from the center of the bucket pin (Item 3) up to the center of the laser receiver (Item 1) **[Figure 163]**.

Setup / Calibration (Cont'd)

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

Figure 164



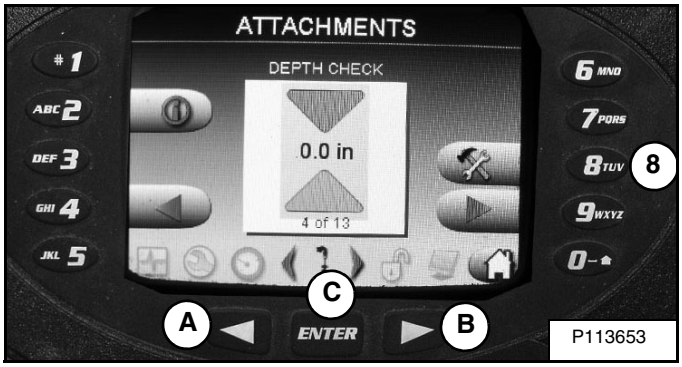
Add the dimension (Item A) **[Figure 163]** to the LASER RECEIVER screen, press the ENTER button (Item C) **[Figure 164]** to store the information. See **[Figure 180]** through **[Figure 182]** for additional information for setting the laser receiver dimensions.

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

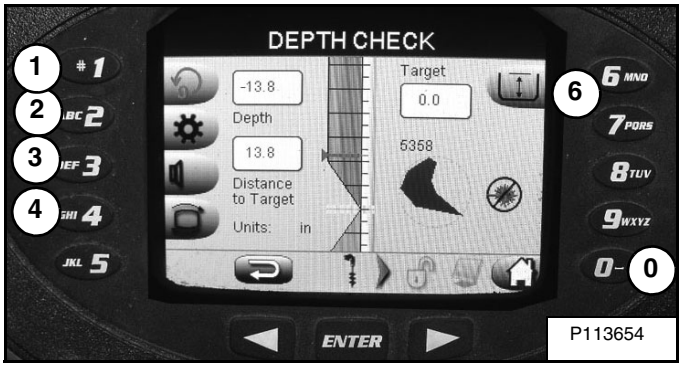
Figure 165



Using the left / right arrow buttons (Item A and B), toggle to the Attachment Depth Check screen **[Figure 165]**.

Press the tool button (Item 8) or the ENTER button (Item C) **[Figure 165]** to go to the DEPTH CHECK screen **[Figure 166]** and **[Figure 167]**.

Figure 166



The DEPTH CHECK screen **[Figure 166]** 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.

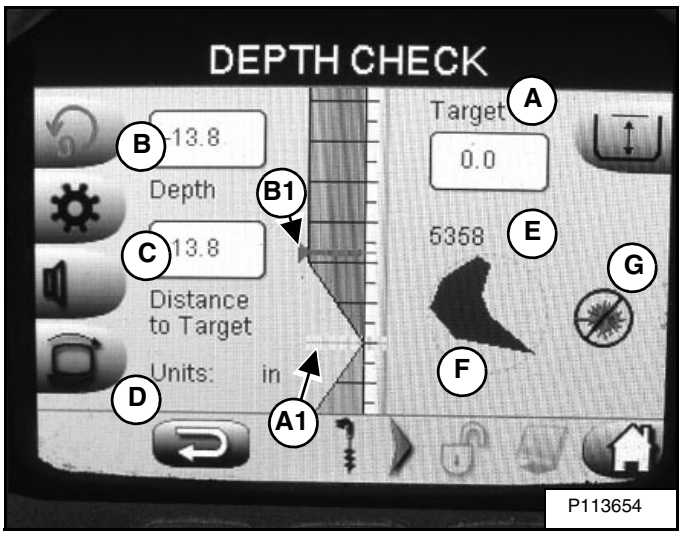
(6) Target Depth: Shows the depths for up to five pre-set depth settings.

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

Initial Setup (Cont'd)

Depth Check Settings (Cont'd)

Figure 167



The DEPTH CHECK screen **[Figure 167]** 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 166]**).

(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).

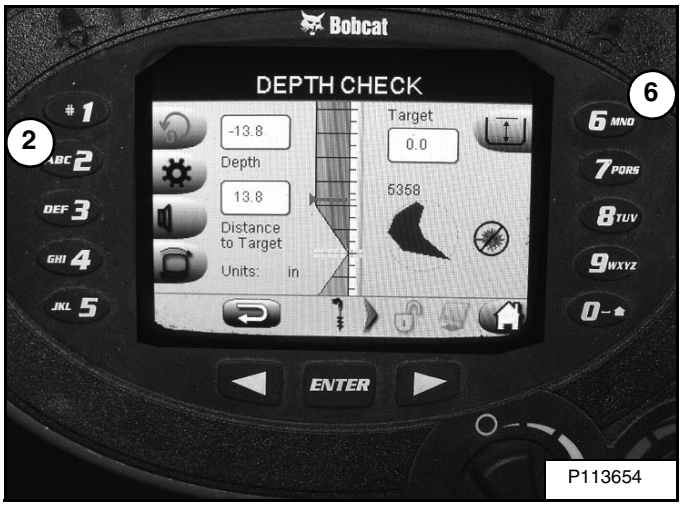
(G) Laser: The laser icon (Item G) will show if the laser is set to ON or OFF. (The laser as shown in **[Figure 167]** with the circle with the line through it represents the OFF position.)

DEPTH CHECK (CONT'D)

Initial Setup (Cont'd)

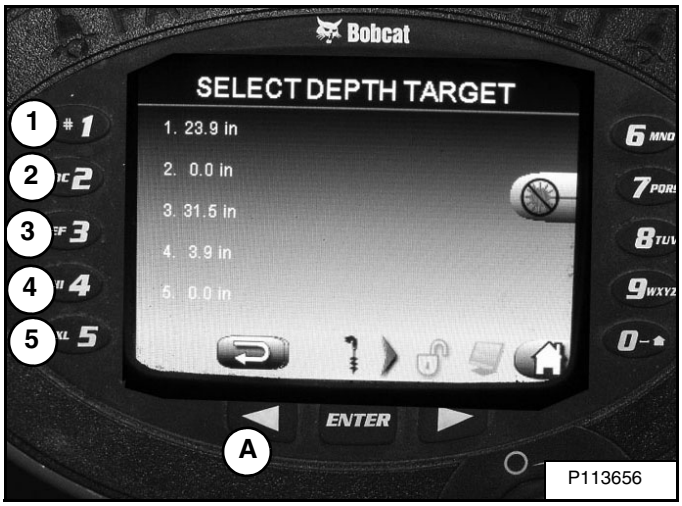
Depth Check Settings (Cont'd)

Figure 168



Press button (Item 6) **[Figure 168]** to go to the SELECT DEPTH TARGET screen **[Figure 169]**.

Figure 169

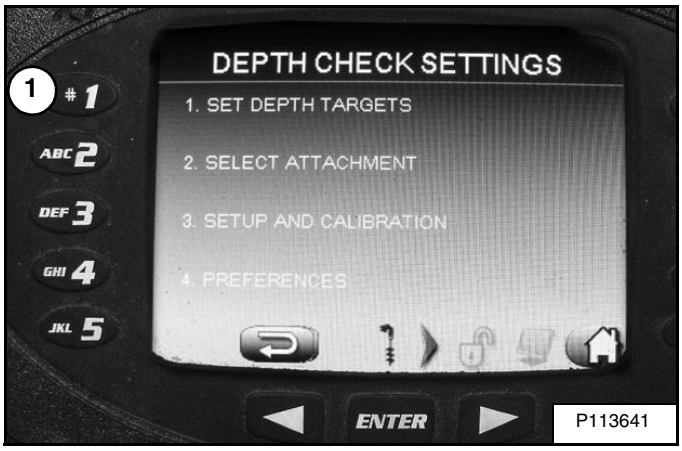


Five different depths can be pre-set and stored in the system.

Select (Item 1 through Item 5) **[Figure 169]** to select one of the existing depths.

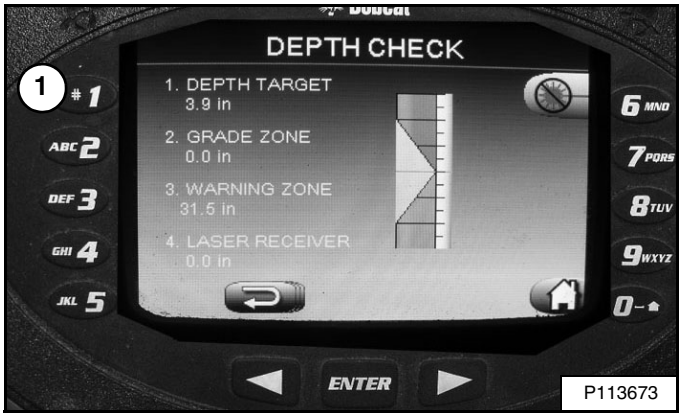
Or, if a different depth is needed, press the return button (Item A) **[Figure 169]** to go back one screen, then press button (Item 2) **[Figure 168]** to go to the DEPTH CHECK SETTINGS screen **[Figure 170]**.

Figure 170



Press (Item 1) **[Figure 170]** to Set Depth Targets.

Figure 171



Press (Item 1) **[Figure 171]** to select Depth Target.

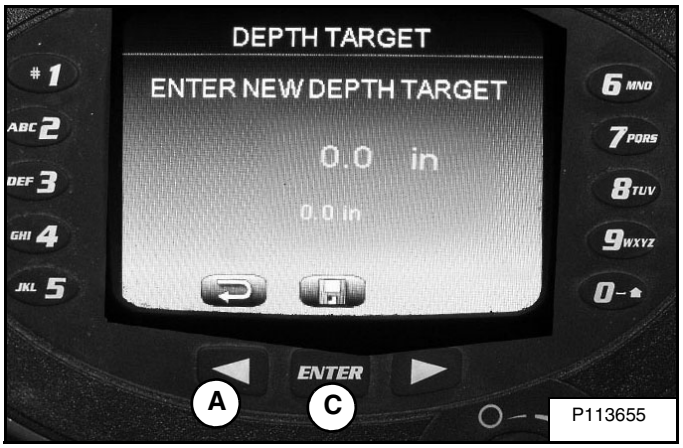
Figure 172

Select (Item 1 through 5) **[Figure 172]** to select one of the five possible stored depth settings.

Initial Setup (Cont'd)

Depth Check Settings (Cont'd)

Figure 173



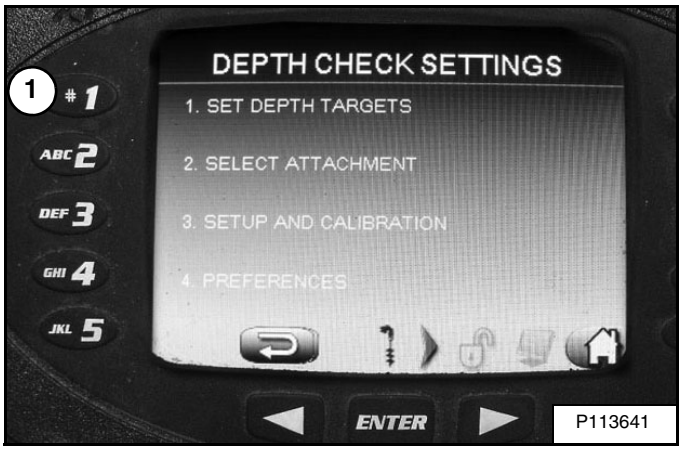
Use the key pads (Item 1 through 0) and enter the new target dimension. If the dimension entered is incorrect, press the arrow button (Item A) **[Figure 173]** to backspace the dimension.

Press the ENTER button (Item C) **[Figure 173]** to save the depth dimension. (Dimensions shown in inches but can be set to feet, meters or millimeters. See **[Figure 185]**.)

Grade Zone

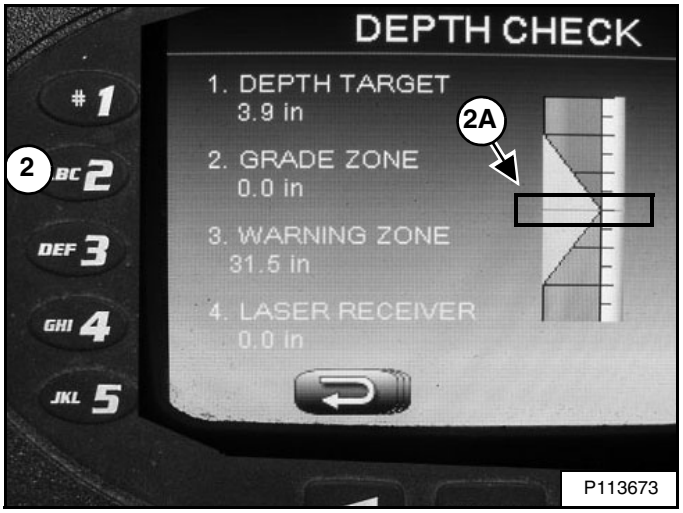
The Grade Zone sets the distance up or down from the target depth for when the warning alarm will start to be a continuous alarm. This will also increase the YELLOW highlighted area on the screen where the target zone is shown.

Figure 174



Press Set Depth Targets (Item 1) **[Figure 174]** to change to the next screen **[Figure 175]**.

Figure 175



Press Grade Zone (Item 2) **[Figure 175]**.

Grade zone area (Item 2A) **[Figure 175]** (in yellow on the display screen) is the area that will change with the dimensions as set in **[Figure 176]**.

Figure 176

Use the key pads (Items 1 through 0) and enter the new grade zone dimension. If the dimension entered is incorrect, press the arrow button (Item A) **[Figure 176]** to backspace the dimension.

Press the ENTER button (Item C) **[Figure 176]** to save the grade zone dimension. (Dimensions shown in inches but can be set to feet, meters or millimeters. See **[Figure 185]**.)

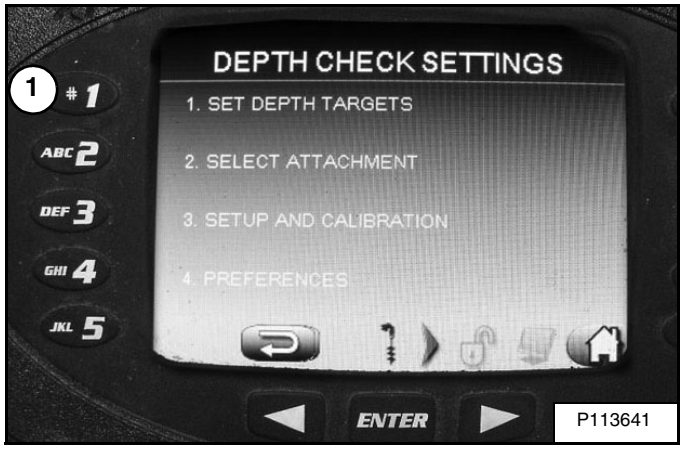
DEPTH CHECK (CONT'D)

Initial Setup (Cont'd)

Warning Zone

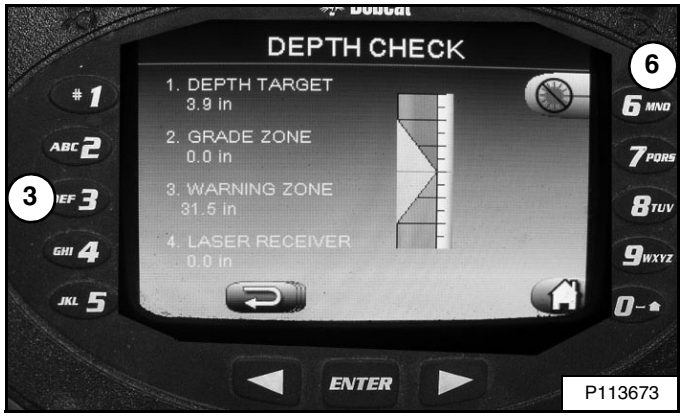
The Warning Zone sets the upper distance from the target depth when the warning alarm will start to beep. (The alarm will start beeping when getting close to the selected target depth. The closer to the target, the faster beeps until you reach the target depth, then it will be a continuous sound. If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

Figure 177



Press Set Depth Targets (Item 1) **[Figure 177]** to change to the next screen **[Figure 178]**.

Figure 178



Press Warning Zone (Item 3) **[Figure 178]**.

Press (Item 6) **[Figure 178]** to turn the laser ON or OFF.

Figure 179

Use the key pads (Items 1 through 0) and enter the new warning zone dimension. If the dimension entered is incorrect, press the arrow button (Item A) **[Figure 179]** to backspace the dimension.

Press the ENTER button (Item C) **[Figure 179]** to save the warning zone dimension. (Dimensions shown in inches but can be set to feet, meters or millimeters. See **[Figure 185]**.)

DEPTH CHECK (CONT'D)

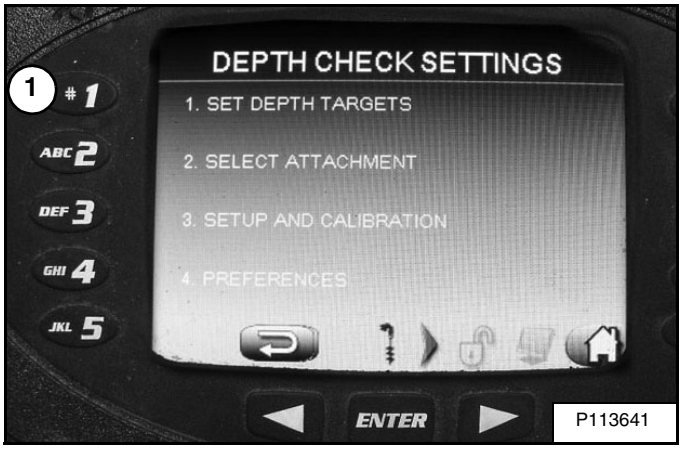
Initial Setup (Cont'd)

Laser Receiver Position On Arm

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

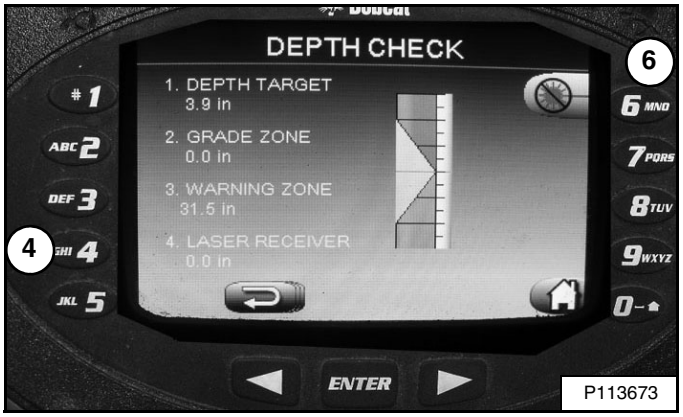
Activate the laser on the dash panel by pressing button (Item 6) **[Figure 181]**. Press once, laser ON. Press a second time, laser OFF.

Figure 180



Press Set Depth Targets (Item 1) **[Figure 180]** to change to the next screen **[Figure 181]**.

Figure 181



Press Laser Receiver (Item 4) **[Figure 181]**.

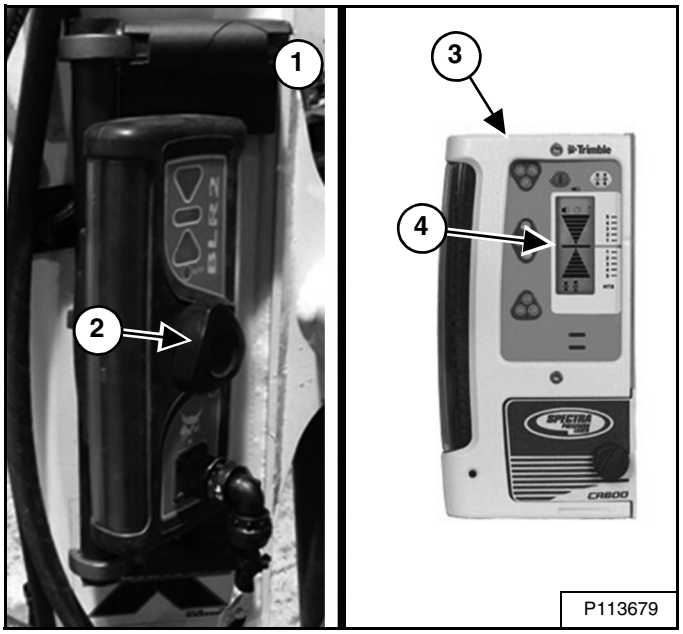
Figure 182

Use the key pads (Items 1 through 0) and enter the new laser receive position on the arm dimension. If the dimension entered is incorrect, press the arrow button (Item A) **[Figure 182]** to backspace the dimension. See **[Figure 164]** for additional information of the laser receiver.

Press the ENTER button (Item C) **[Figure 182]** to save the warning zone dimension. (Dimensions shown in inches but can be set to feet, meters or millimeters. See **[Figure 185]**.)

Measuring The Laser Location

Figure 183



For the model BLR2 (Item 1), measure to the center of the knob (Item 2) **[Figure 183]**.

For the model CR600 (Item 3), measure to the center of the red line (Item 4) **[Figure 183]**.

Initial Setup (Cont'd)

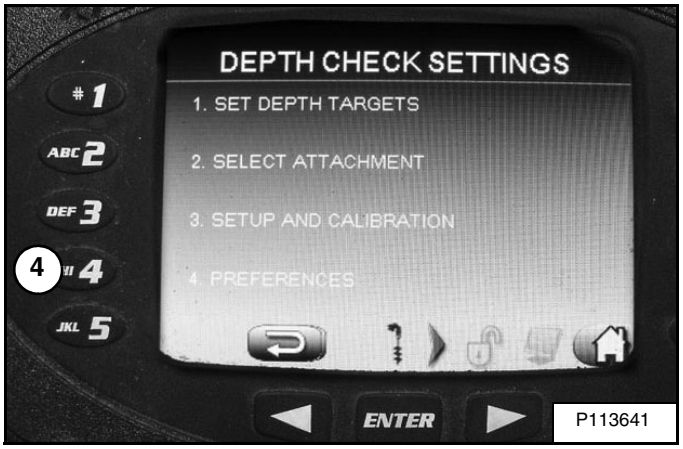
Preferences

The Preferences screen is used to set two features;

1. To set the screen preference for; Distance to Target, Depth Check or Grade Check.

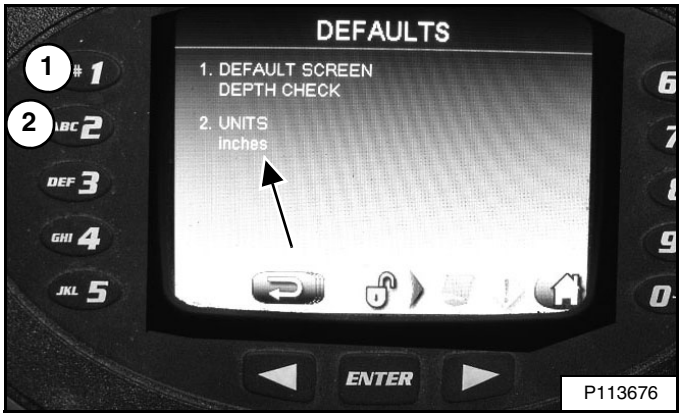
2. To set units of measure (screen can be set to display; millimeters, meters, feet or inches).

Figure 184



Press Preferences (Item 4) **[Figure 184]** to change to the DEFAULTS screen **[Figure 185]**.

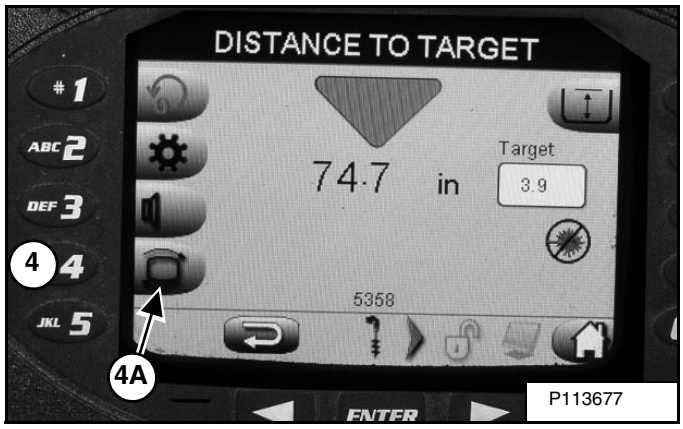
Figure 185



Press Default Screen button (Item 1) **[Figure 185]** to toggle the Preference screen between the following screens; Distance to Target **[Figure 186]**, Depth Check **[Figure 187]** or Grade Check **[Figure 188]**.

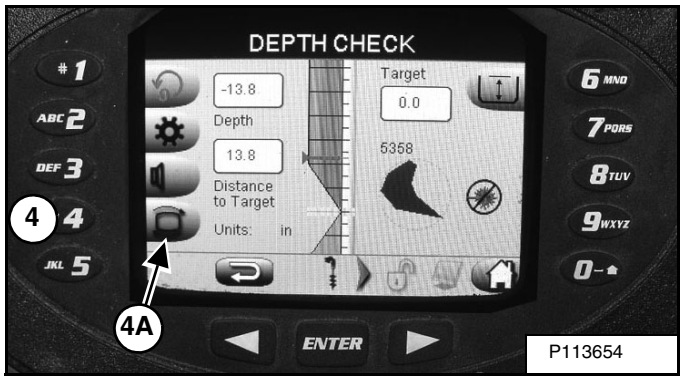
Press the UNITS button (Item 2) to toggle between meters, millimeters, feet or inches. This sets how you will record and enter ALL dimensions into the Depth Check system. The selected units will be displayed under the word UNITS (Item 3) **[Figure 185]** and will be visible on all Depth Check screens that show dimensions.

Figure 186



Distance to Target **[Figure 186]** screen.

Figure 187

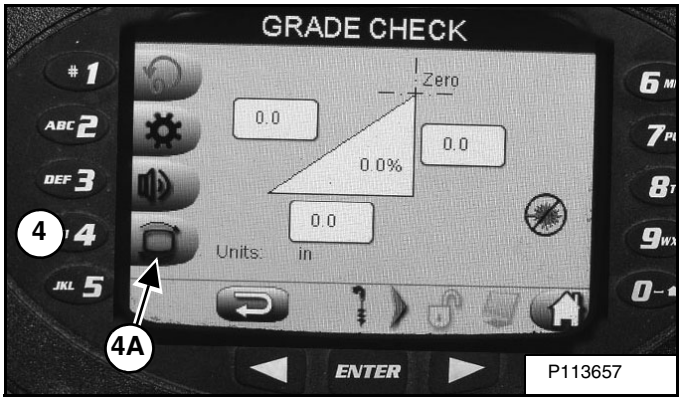


Depth Check **[Figure 187]** screen.

Initial Setup (Cont'd)

Preferences (Cont'd)

Figure 188



Grade Check **[Figure 188]** screen.

NOTE: You can also press button (Item 4) [Figure 186], [Figure 187] or [Figure 188] 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. CALL 1-888-258-0808 and consult local utilities before digging. Extreme caution must be used in areas where utility lines are present.

W-2116-0903

IMPORTANT

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

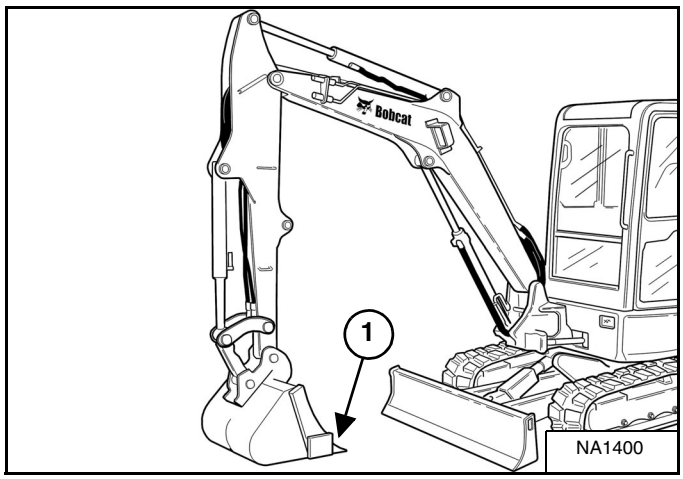
I-2383-1214

DEPTH CHECK (CONT'D)

Operation (Cont'd)

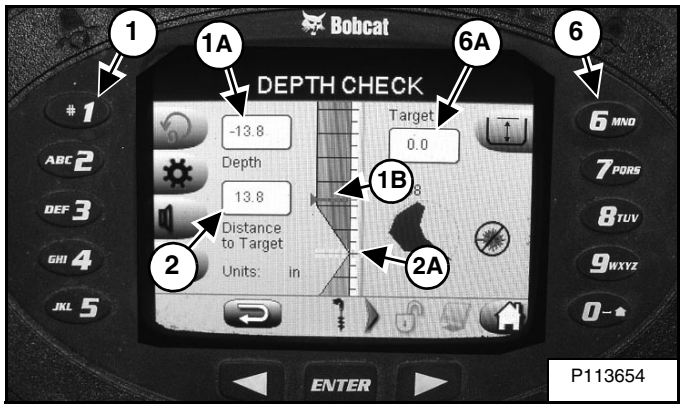
Digging A Hole To A Predetermined Depth

Figure 189



The first step is to set the position the bucket (Item 1) **[Figure 189]** 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 190



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

Press button (Item 6) **[Figure 190]** to change to the SELECT TARGET DEPTH screen **[Figure 191]**.

Figure 191

Select the target depth by pressing button (Item 1 through Item 5) **[Figure 191]** for selecting an existing depth. (To add a new target depth or to change an existing target depth, see information shown with steps **[Figure 168]** through **[Figure 173]**.)

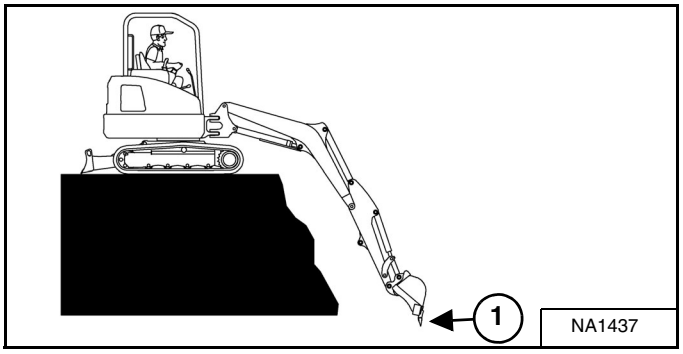
The selected target depth will now appear on the screen at (Item 6A) **[Figure 190]**.

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.

Operation (Cont'd)

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

Figure 192



As the hole is being dug, the position of the bucket (Item 1) **[Figure 192]** is dimensionally shown (Item 1A) **[Figure 190]** and shown on the bar graph at (Item 1B) **[Figure 190]**. The distance to target depth is dimensionally shown in (Item 2) **[Figure 190]** and shown on the bar graph (Item 2A) **[Figure 190]**.

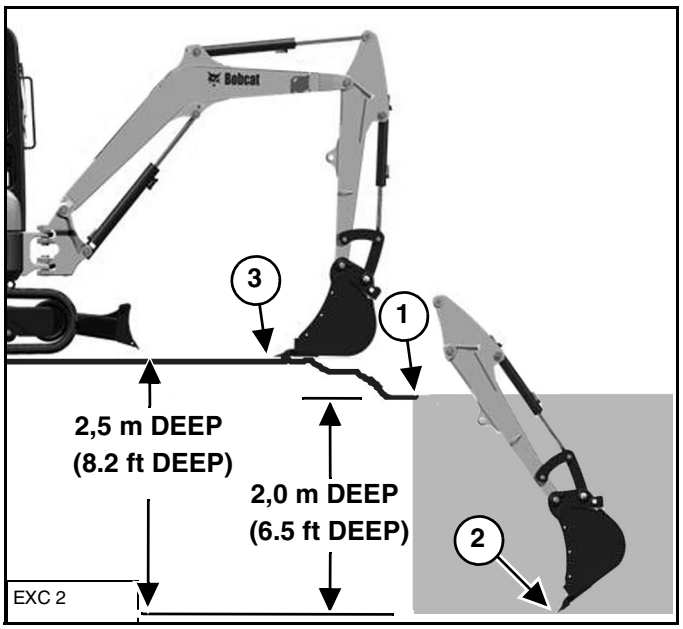
When the bucket is getting close to the target depth, a warning buzzer (if activated) will start to slowly beep. The beeps will increase in frequency the closer the bucket gets to the target depth. When the target depth is reached, the buzzer will sound continuously.

EXAMPLE: The target depth is 2 m (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 190]** 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 102.)

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

Figure 193



If possible, reposition the excavator so the bucket can be re-benched off of the original starting point (Item 1) **[Figure 193]**.

Or, If that is not possible, position the excavator so the bucket will reach to the bottom of the hole (Item 2) **[Figure 193]** 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 193]**, 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 193]** in an area you know is the correct depth. Example: The dimension shown in (Item 1A) **[Figure 190]** is now 2,5 m (8.2 ft). You now need to reset the target depth to 2,5 m (8.2 ft) to continue digging the hole at the original target depth.

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

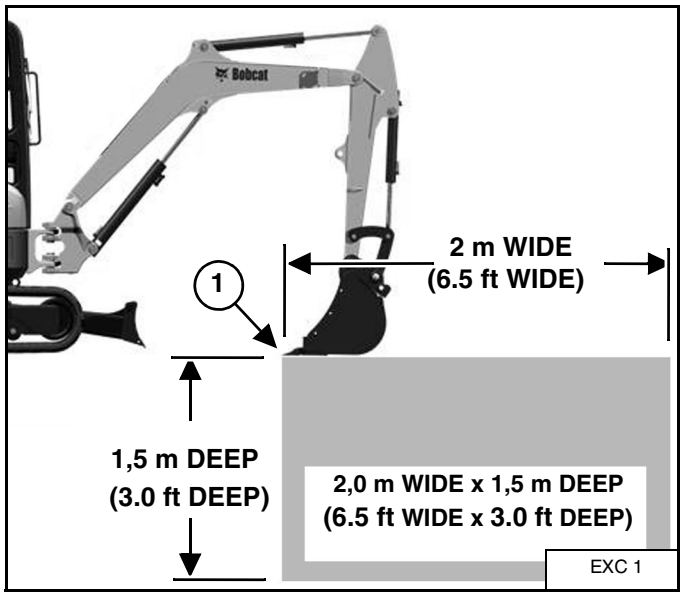
DEPTH CHECK (CONT'D)

Operation (Cont'd)

Digging A Hole To A Predetermined Width And Depth

EXAMPLE: Digging a 2,0 m wide x 1,5 m deep (6.5 ft wide x 3 ft deep) hole.

Figure 194

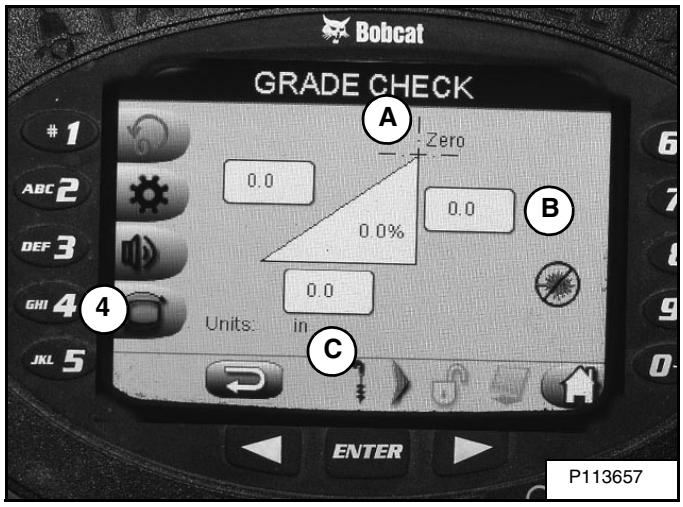


Follow the same procedure as for digging a hole except as follows. (See Digging A Hole To A Predetermined Depth on Page 106.)

When re-benching the bucket for setting to 0.0., position the bucket (Item 1) **[Figure 194]** 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 195



Press (Item 4) **[Figure 195]** to scroll to the GRADE CHECK screen on the display panel. For additional information. (See Preferences on Page 104.)

The ZERO (Item A) is the re-benching starting point. (Item B) shows the target depth. (Item C) **[Figure 195]** shows the reach (distance away from the zero mark starting point (Item 1) **[Figure 194]**.

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 195].

⚠ WARNING

AVOID INJURY OR DEATH

Check area to be excavated for overhead or underground lines such as electrical, gas, oil, water, etc. CALL 1-888-258-0808 and consult local utilities before digging. Extreme caution must be used in areas where utility lines are present.

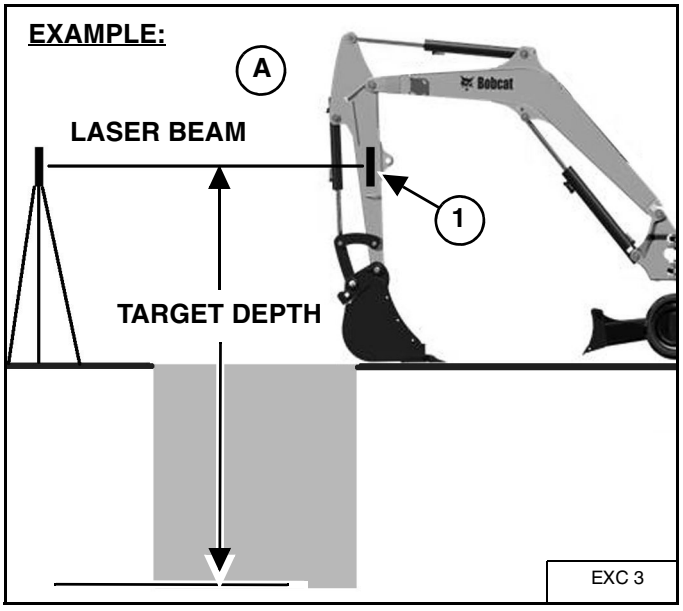
W-2116-0903

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 196

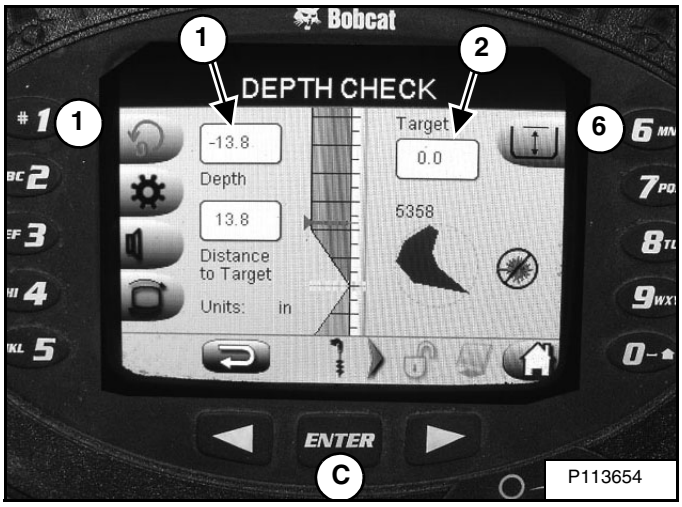


NOTE: Make sure the laser receiver dimensional location on the arm has been added into the Depth Check. For additional information. (See Laser Receiver Position On Arm on Page 103.)

With the arm vertical, raise or lower the boom and arm as needed until the laser (Item 1) strikes the receiver (Item 2) **[Figure 196]**. (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 197



With the laser striking the receiver, press (Item 1) **[Figure 197]** to set the laser position.

Press (Item 6) to access the Pre-set Target Depth screen or go to figure **[Figure 169]** to add or change the target depth. When the correct target depth is entered, press the ENTER button (Item C) **[Figure 197]** to save the setting.

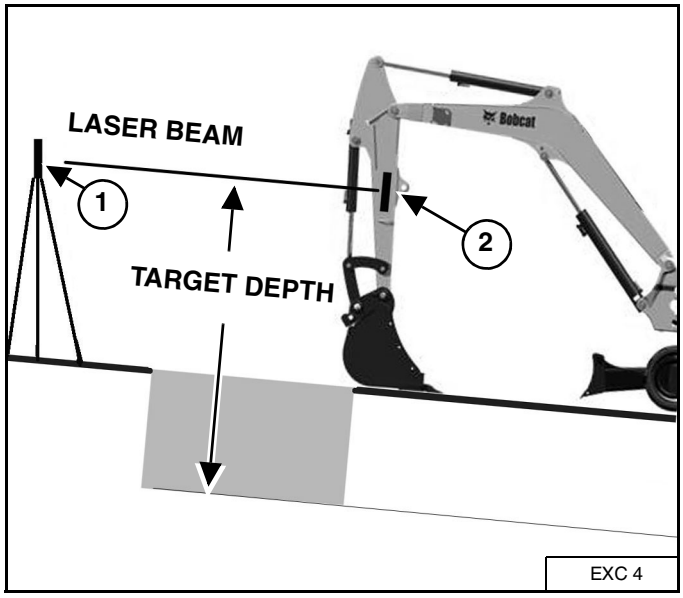
With the Depth Check system set-up, the excavator can now be repositioned and the dig depth will stay consistent to the set target depth.

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 198

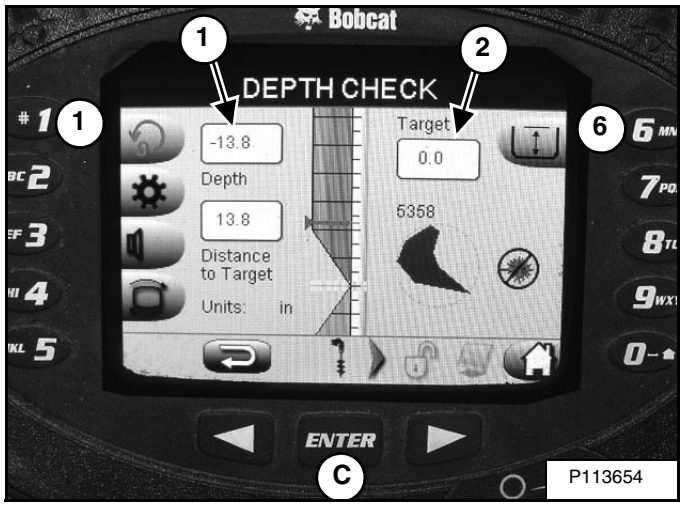


NOTE: Make sure the laser receiver dimensional location on the arm has been added into the Depth Check. For additional information. (See Laser Receiver Position On Arm on Page 103.)

With the arm vertical, raise or lower the boom and arm as needed until the laser (Item 1) strikes the receiver (Item 2) **[Figure 198]**. (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 199



With the laser striking the receiver, press (Item 1) **[Figure 199]** to set the laser position.

Press (Item 6) to access the Pre-set Target Depth screen or go to figure **[Figure 169]** to add or change the target depth. When the correct target depth is entered, press the ENTER button (Item C) **[Figure 199]** 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

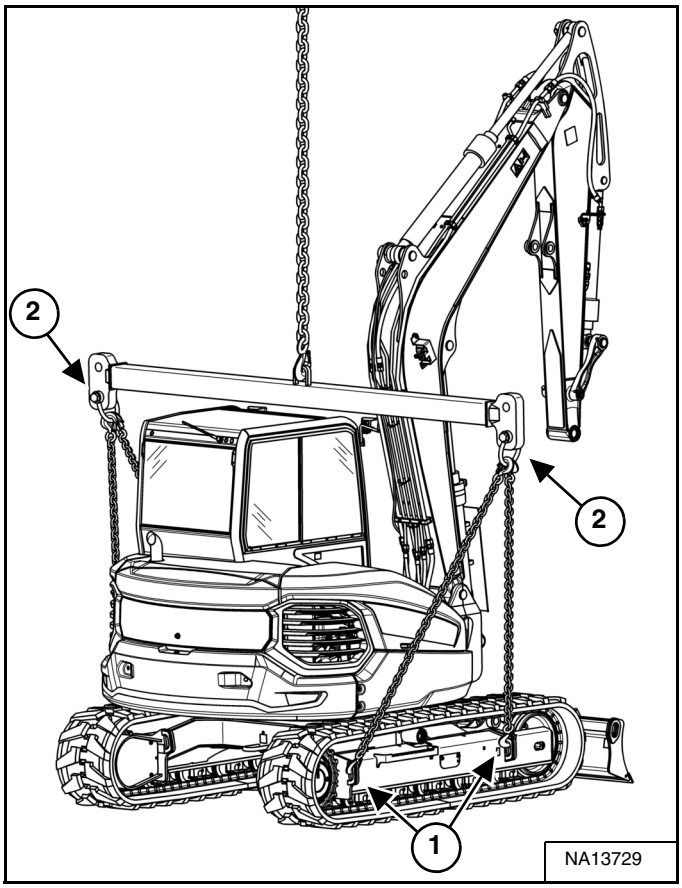
There is not a recommended towing procedure for the excavators.

- 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 187.)

LIFTING THE EXCAVATOR

Procedure

Figure 200



Fully extend the cylinders of the bucket, arm, and boom so that the excavator is in the position as shown **[Figure 200]**.

Raise the blade all the way.

Put all the control levers in NEUTRAL.

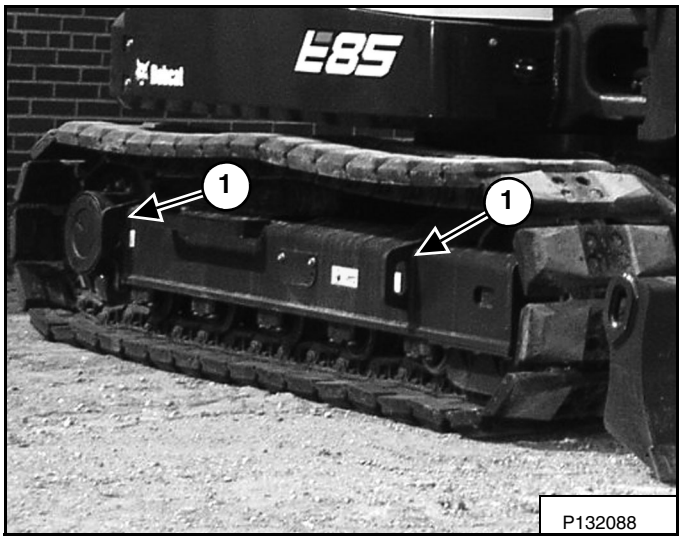
⚠ WARNING

AVOID INJURY OR DEATH

- **Use chains and lifting equipment with sufficient capacity for the weight of the excavator plus any added attachments.**
- **Maintain center 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-2580-0607

Figure 201



Fasten four chains to the outer lift eyes on the track frame (Item 1) **[Figure 200]** and **[Figure 201]** and to the lifting fixture (Item 2) **[Figure 200]**. The lifting fixture must extend over the sides of the cab to prevent the chains from hitting the tracks.

NOTE: The lifting fixture must be at least 3658 mm (12 ft) wide so that the chains to not contact the tracks when lifting.

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 center 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 202

Move the machine forward onto the transport vehicle **[Figure 202]**.

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

NOTE: There are multiple tie down locations on this excavator. The locations are at the blade, at the front track frame, and at the rear track frame (inside of track frame and outside of track frame). Any combination of these tie down locations is acceptable as long as the machine is tied down at a front locations and at the rear location on both sides.

Front Tie Down Locations

Figure 203

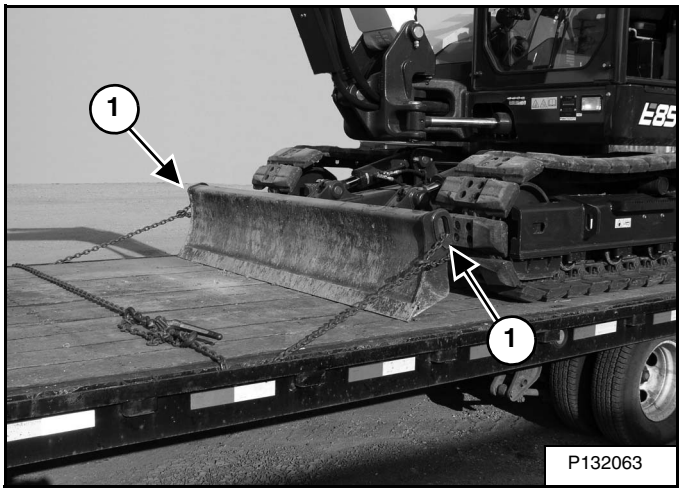
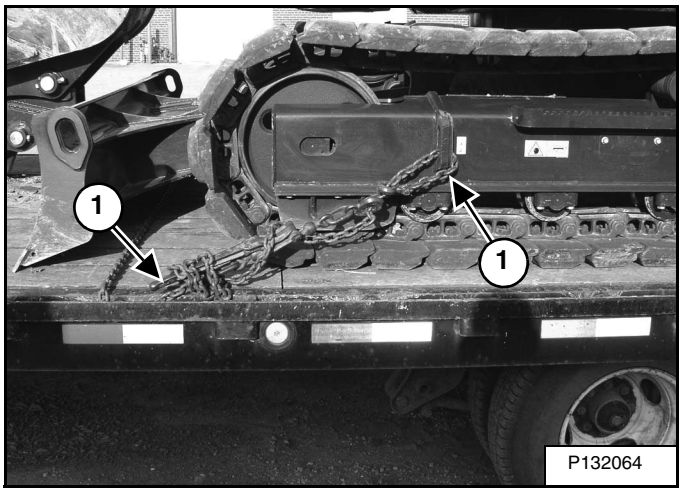
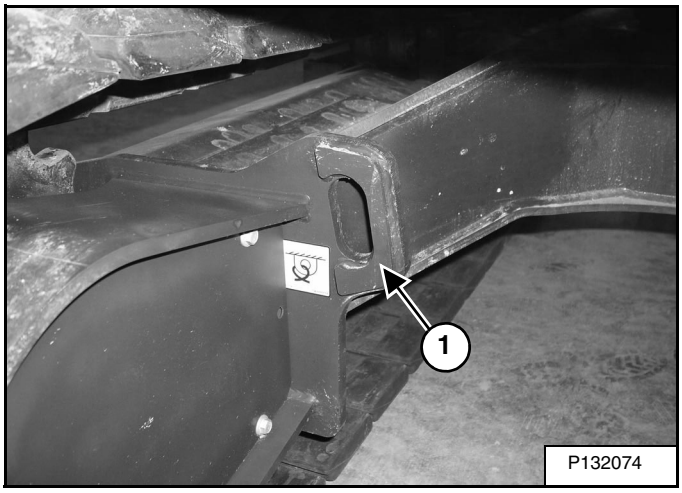


Figure 204



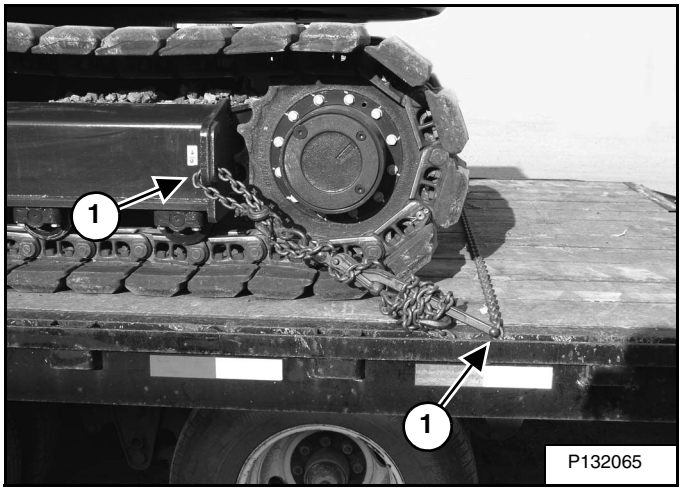
Rear Tie Down Locations

Figure 205



Inside Rear Frame Tie-down Location

Figure 206



Fasten chains to the front corners of the blade (Item 1) **[Figure 203]** or the front sides of the track frame (Item 1) **[Figure 204]**.

Fasten chains to the rear insides of the track frame (Item 1) **[Figure 205]** or the rear outsides of the track frame (Item 1) **[Figure 206]** 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

PREVENTIVE MAINTENANCE

MAINTENANCE SAFETY

WARNING

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

W-2003-0807

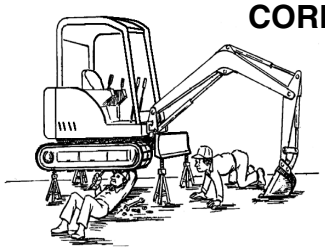
Safety Alert Symbol: This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.

CORRECT

P-90216

Never service the Bobcat Excavator without instructions.

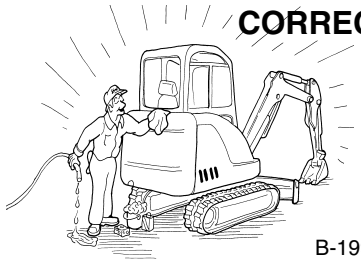
CORRECT



B-19964

Use the correct procedure to lift and support the excavator.

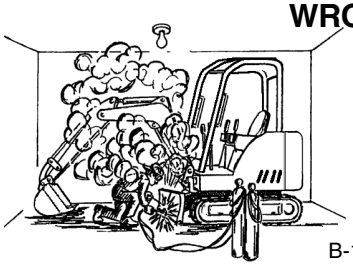
CORRECT



B-19959

Cleaning and maintenance are required daily.

WRONG



B-19965

Have good ventilation when welding or grinding painted parts.

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

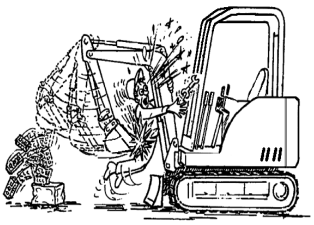
WRONG

B-19960

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

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

WRONG

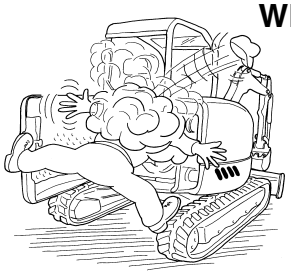


B-19966

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

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

WRONG



B-19962

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

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

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

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

WRONG

B-19958

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

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

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

WRONG

B-19798

Lead-acid batteries produce flammable and explosive gases.

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

Batteries contain acid which burns eyes or skin on contact.

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

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

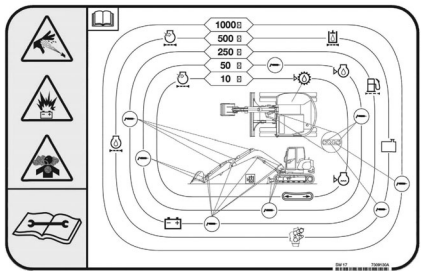
MSW28-0409

SERVICE SCHEDULE

Maintenance Intervals

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

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



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

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 137.)
- **Engine Air Filters and Air System** - Check the condition indicator. Service only when required. Check for leaks and damaged components. (See Page 130.)
- **Engine Cooling System** - Check coolant level COLD and add premixed coolant as needed. (See Page 139.) and (See Page 141.)
- **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 122.)
- **Motion Alarm and Horn** - Check for proper function. (See Page 123.)
- **Operator Cab** - Check the cab condition and mounting hardware. (See Page 37.)
- **Operator Cab and HVAC Filters** - Clean filters. (See Page 128.)
- **Indicators and Lights** - Check for correct operation of all indicators and lights. (See Page 26.)
- **Safety Signs** - Check for damaged signs (decals). Replace any signs that are damaged. (See Page 14.)
- **Hydraulic Fluid** - Check fluid level and add as needed. (See Page 148.)
- **Fuel Filter** - Drain water and sediment from filter. (See Page 134.)
- **Swing Reduction Gear**box - Check fluid level and add as needed. (See Page 158.)
- **Track Tension** - Check tension and adjust as needed. (See Page 152.)
- **Attachment Coupler** - Check for damage or loose parts (if equipped). (See Page 156.)

First 50 Hours

- **Engine Oil and Filter** - Replace oil and filter. (See Page 138.)
- **Alternator and Starter** - Check connections.
- **Fuel Filter** - Replace filter. (See Page 134.)

Every 50 Hours

- **Swing Bearing** - Grease swing bearing. Service every 10 hours when operating in water. (See Page 158.)
- **Blade, Boom Swing, Boom Swing Cylinder and Bucket Pivot Points** - Grease all machinery pivot points. (See Page 158.)

Maintenance Intervals (Cont'd)

Every 250 Hours Or Every 12 Months

- **Battery** - Check cables, connections, and electrolyte level; add distilled water as needed. (See Page 143.)
- **Boom, Boom Cylinder, Arm, Arm Cylinder, Bucket Link, and Bucket Cylinder** - Grease pivot points. Grease clamp (if equipped). (See Page 158.)
- **Travel Motors (Final Drive)** - Check fluid level and add as needed. (See Page 154.)

Every 500 Hours Or Every 12 Months

- **Engine Oil and Filter** - Replace oil and filter. (See Page 138.)
- **Fuel Filter** - Replace filter. (See Page 134.)
- **Cooling System** - Clean debris from radiator, fuel cooler, hydraulic fluid cooler, air conditioning condenser (if equipped). (See Page 140.)
- **Hydraulic Filter, Pilot Filter and Hydraulic Reservoir Breather Cap** - Replace the hydraulic filter, pilot filter and the reservoir breather cap. (See Page 149.)
- **Engine Air Filters and Air System** - Check the display panel for service code. Service only when required. Check for leaks and damaged components. (See Page 130.)
- **Drive Belts - Alternator (Air Conditioning - If Equipped)** - Check condition. Replace as needed. (See Page 155.)
- **Swing Pinion** - Grease swing pinion. (See Page 158.)
- **HVAC** - Clean housing and coils. (If Equipped) (See Page 128.)

Every 1000 Hours Or Every 12 Months

- **Hydraulic Fluid and Filters** - Replace hydraulic fluid and filters. (See Page 150.)
- **Engine Valves** - Adjust the engine valve clearance.
- **Swing Reduction Gear** - Grease swing reduction gear. (See Page 158.)
- **Swing Reduction Gearbox** - Replace fluid. (See Page 158.)
- **Fuel Tank Breather** - Replace breather. (See Page 135.)
- **Travel Motors (Final Drive)** - Replace fluid. (See Page 154.)

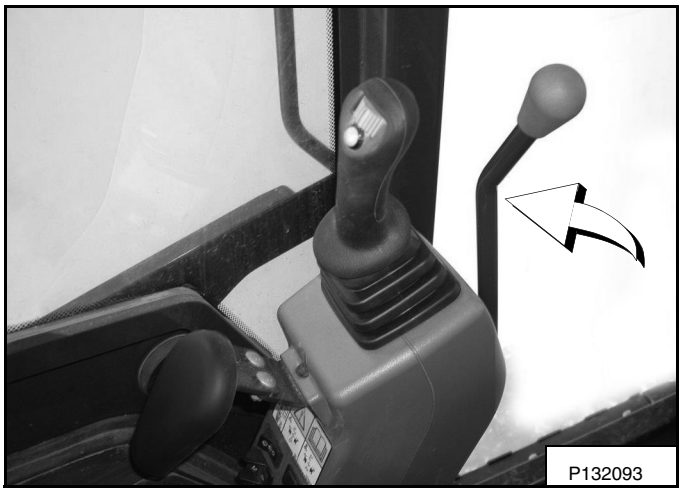
Every 24 Months

- **Coolant** - Replace the coolant. (See Page 141.)

CONTROL CONSOLE LOCKOUTS

Inspection And Maintenance

Figure 207



When the left console is raised **[Figure 207]**, 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 207]**.

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 discolorations due to ultraviolet UV exposure, dusty / dirty conditions, abrasion to the seat belt webbing, or damage to the buckle, latch plate, retractor (if equipped), hardware or any other obvious problem should be replaced immediately.

The items below are referenced in **[Figure 208]**.

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.

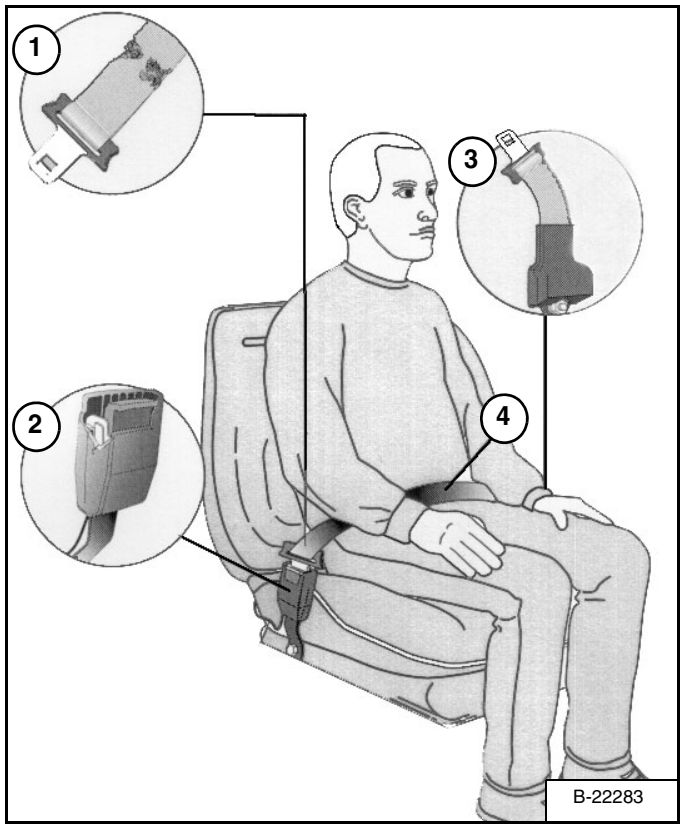
2. Check the buckle and latch for correct operation. Make sure latch plate is not excessively worn, deformed or buckle is not damaged or casing broken.

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 color of the webbing in these areas is extremely faded and / or the webbing is packed with dirt, the webbing strength may have deteriorated.

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

Figure 208



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 209

Inspect for damaged or missing motion alarm decal (Item 1) **[Figure 209]**. Replace if required.

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

⚠ WARNING

AVOID INJURY OR DEATH

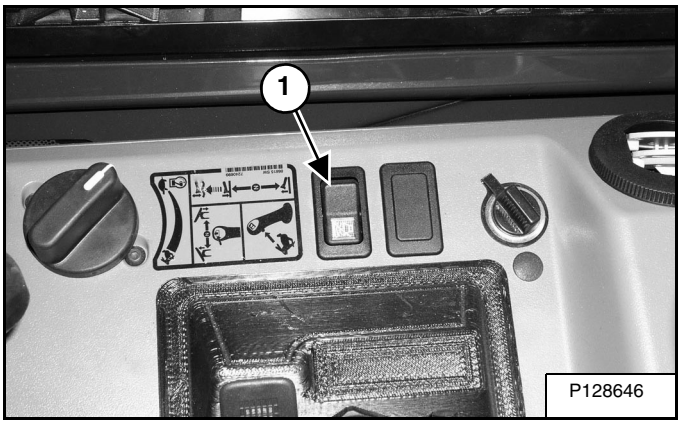
When an engine is running in an enclosed area, fresh air must be added to avoid concentration of exhaust fumes. If the engine is stationary, vent the exhaust outside. Exhaust fumes contain odorless, invisible gases which can kill without warning.

W-2050-0807

Sit in the operator's seat and fasten the seat belt. Start the engine. (See PRE-STARTING PROCEDURE on Page 61.)

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

Figure 210



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 210]**. 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.

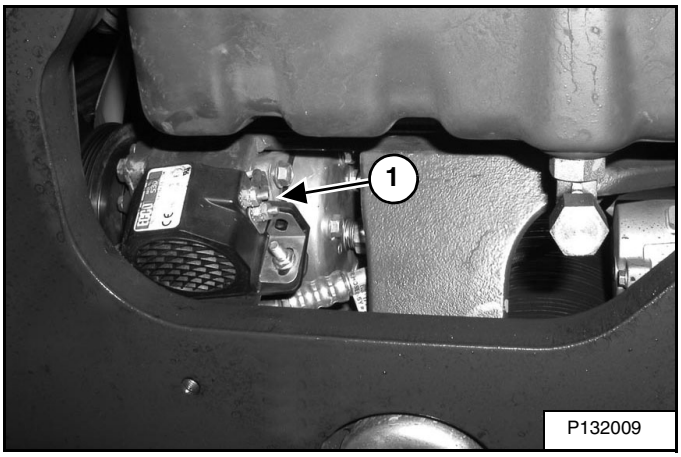
Slightly move both travel control levers in the reverse direction (until the machine is slowly moving backward) and then press the motion alarm cancel switch (Item 1) **[Figure 210]** (the switch icon will be illuminated when the motion alarm is deactivated). The motion alarm will shut off. With the 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 70.)

Inspecting (Cont'd)

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

Figure 211

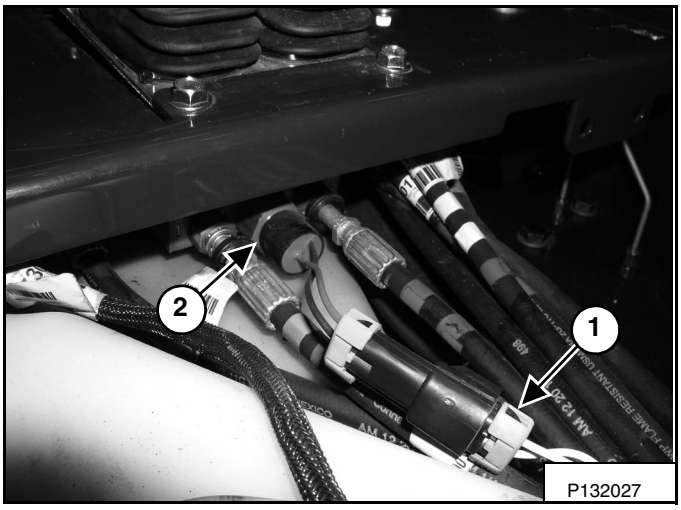


Inspect the motion alarm electrical connections and wire harness (Item 1) **[Figure 211]**, wire harness (Item 1) **[Figure 212]** and motion alarm switch (Item 2) **[Figure 212]** for tightness and damage. Repair or replace any damaged components.

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

Adjusting Switch Position

Figure 212



The motion alarm switch (Item 2) **[Figure 212]** 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 212]** 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.

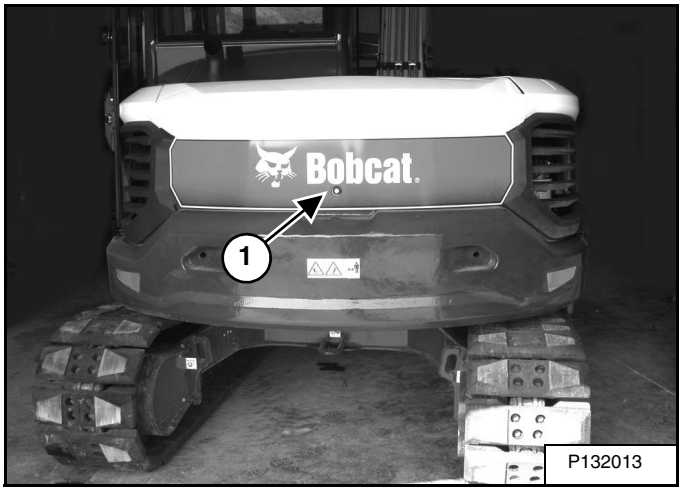
W-2012-0497

WARNING

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

W-2020-1285

Figure 213



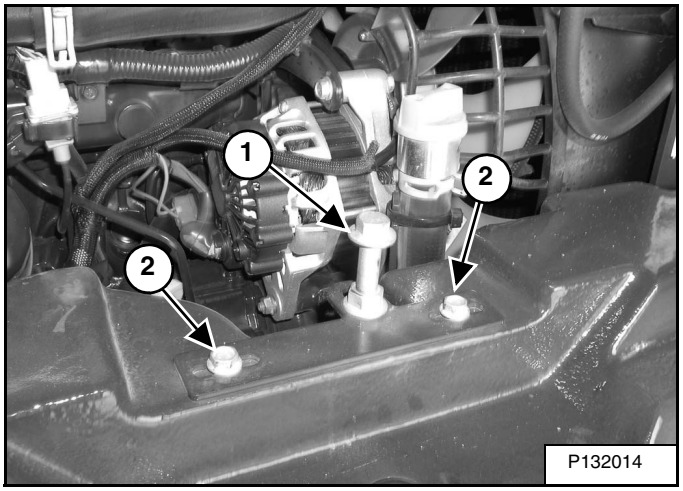
To open the tailgate, press the button (Item 1) **[Figure 213]** and open the tailgate.

Push firmly to close the tailgate.

NOTE: The tailgate (Item 1) [Figure 213] can be locked using the start key.

Adjusting The Latch

Figure 214



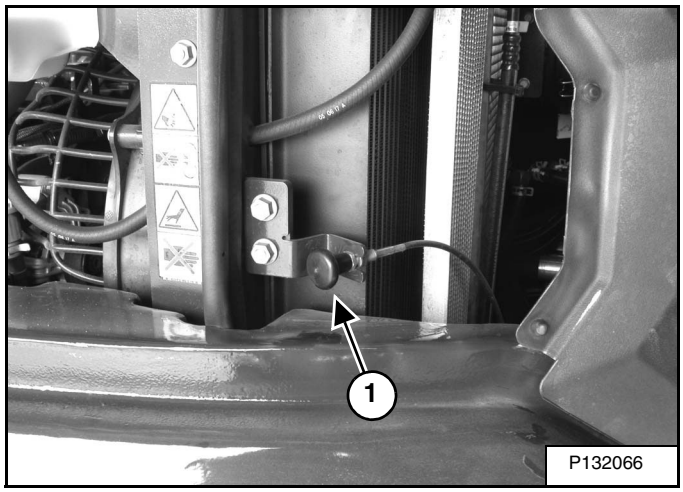
The tailgate latch (Item 1) can be adjusted by loosening the two bolts (Item 2) **[Figure 214]**, moving the latch, and tightening the two bolts.

Close the tailgate before operating the excavator.

RIGHT SIDE COVER

Opening And Closing

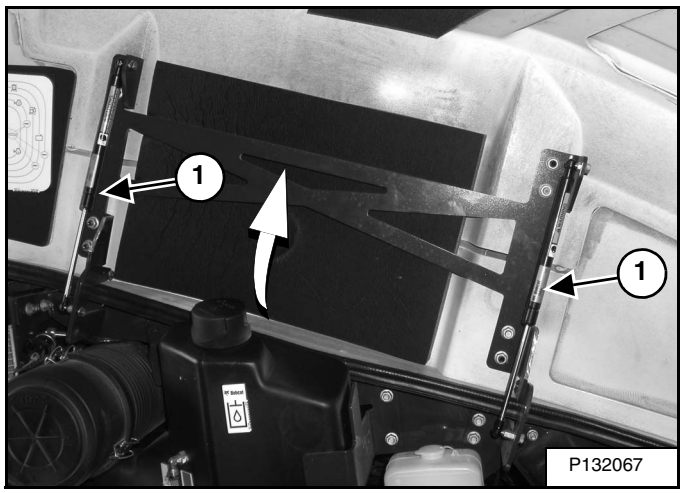
Figure 215



Open the tailgate to access the right side cover latch knob (Item 1) **[Figure 215]**.

Pull the knob (Item 1) **[Figure 215]** to release cover.

Figure 216



Two gas springs (Item 1) **[Figure 216]** will raise the right side cover to the open position.

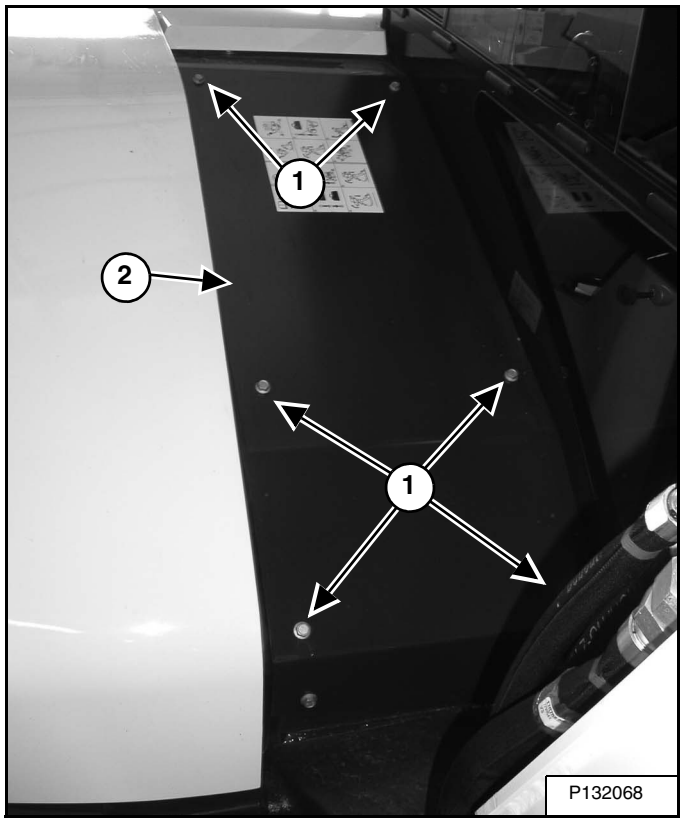
To close the right side cover, rotate the cover down until it is in the fully closed position.

Check that it is securely latched in the closed position.

CENTER COVER

Removal And Installation

Figure 217



Remove the six bolts (Item 1) and remove the center cover (Item 2) **[Figure 215]**.

Installation

Position the cover (Item 2) **[Figure 218]** to the center frame.

Install the six bolts (Item 1) **[Figure 218]** and tighten.

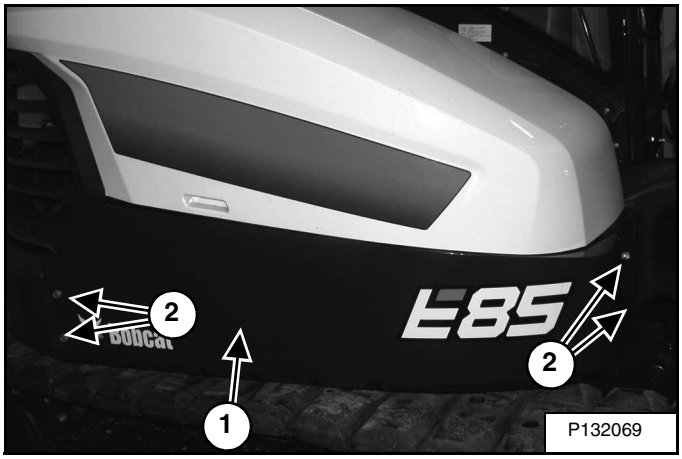
RIGHT SIDE UPPERSTRUCTURE COVER

Removal And Installation

Open the right side cover. (See RIGHT SIDE COVER on Page 126.)

Removal

Figure 218



To remove the right side upperstructure cover (Item 1), remove the four bolts (Item 2) **[Figure 218]**.

Remove the cover (Item 1) **[Figure 218]**.

Installation

Position the cover (Item 1) **[Figure 218]** to the upperstructure.

Install the four bolts (Item 2) **[Figure 218]** and tighten.

CAB FILTERS

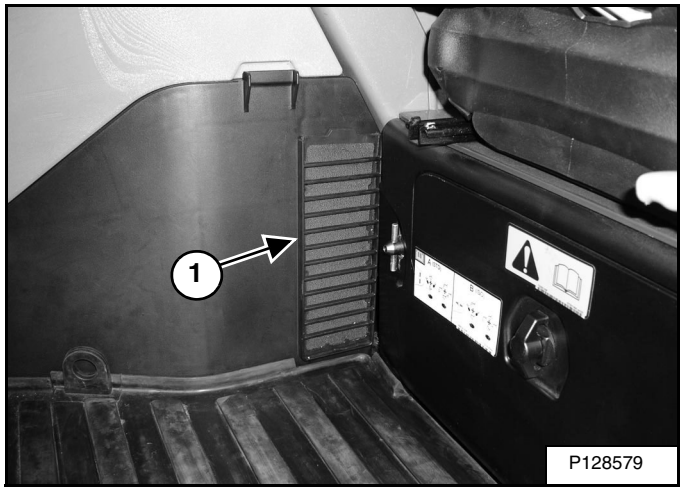
Cleaning And Maintenance

The recirculation filter and the fresh air filter must be cleaned regularly. (See SERVICE SCHEDULE on Page 119.)

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

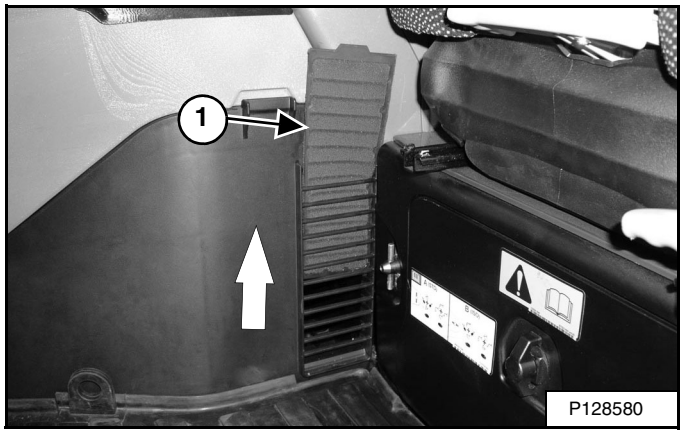
Recirculation Filter

Figure 219



The recirculation filter (Item 1) **[Figure 219]** is located to the right of the operator's seat.

Figure 220



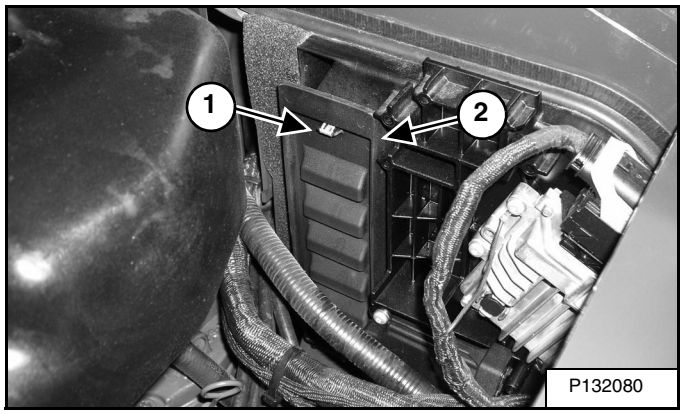
Pull up on the filter (Item 1) **[Figure 220]** until removed from the housing.

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

Fresh Air Filter

Figure 221

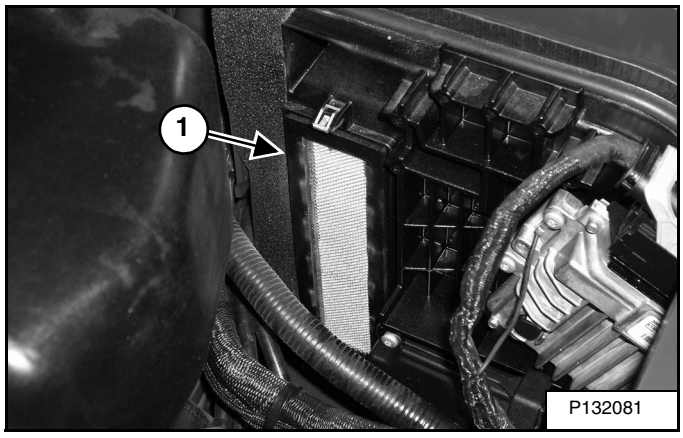


The fresh air filter is located under the center cover.

Remove the center cover. (See CENTER COVER on Page 126.)

Pull out on the tab (Item 1) and remove the cover (Item 2) **[Figure 221]**.

Figure 222



Pull the filter (Item 1) **[Figure 222]** 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 220]** 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 221]** locks to the frame.

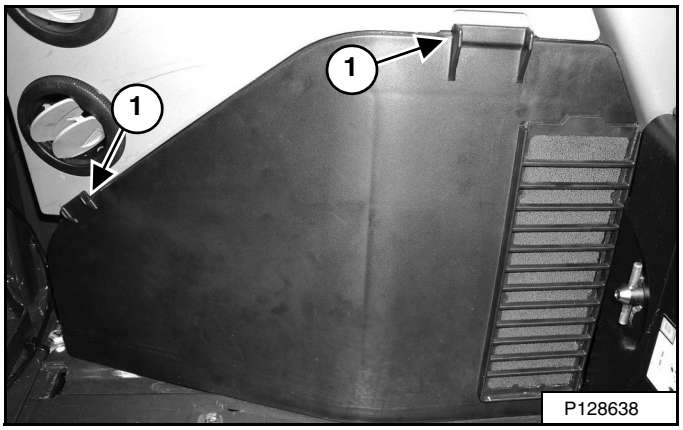
NOTE: Do not use a brush on the filter as it can push debris into the filter. Gently tap the sides of the filter and / or use low pressure compressed air from the back side of the filter to remove debris. If the filter is damaged, replace the filter.

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 119.)

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

Figure 223

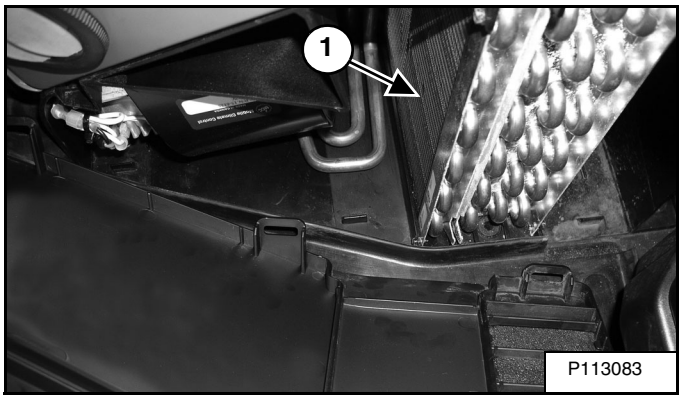


Remove the floor mat.

Pull back on the two latches (Item 1) **[Figure 223]** 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 224



Use a lower pressure air or a low pressure water stream to remove debris and to clean the coils (Item 1) **[Figure 224]**.

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.

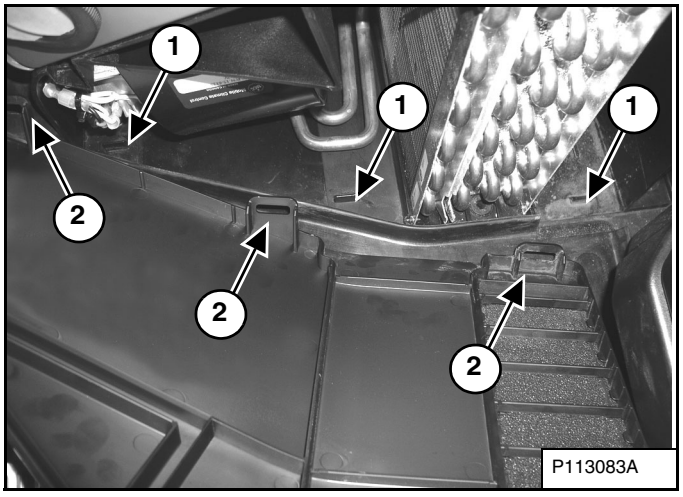
There are three rubber drain valves that allow condensation to drain from the housing during normal air conditioning usage. These drain valve can get clogged with dirt and should be cleaned at the same time the housing is cleaned.

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 center 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 center floorplate and close the right side cover.

Figure 225



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 225]** 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 223]**. 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.

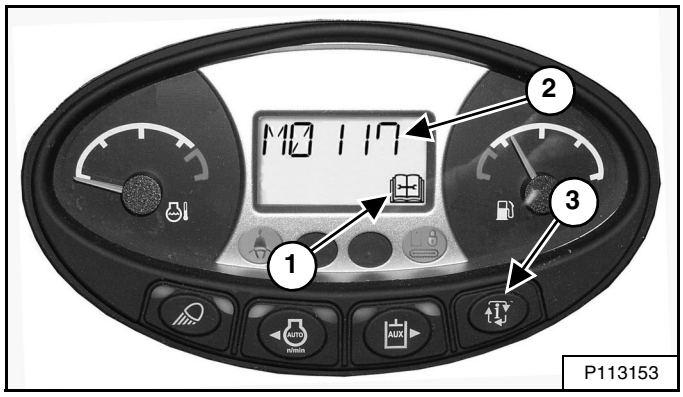
Reinstall the floor mat.

AIR CLEANER SERVICE

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 119.)

Replacing The Filter Elements

Figure 226



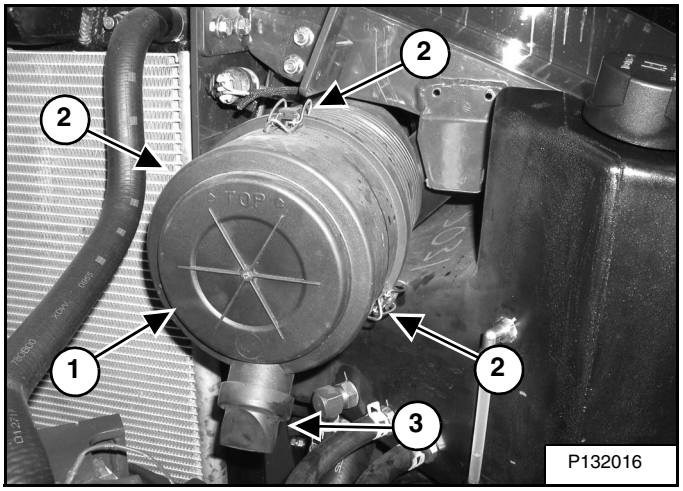
Replace the air filters only when necessary. The service indicator (Item 1) will FLASH. Press the Information button (Item 3) until the display screen shows the service codes. Service code **[M0117]** (Air Filter Plugged) will show in the display screen (Item 2) **[Figure 226]** when air filter replacement is necessary.

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

Outer Filter

The air cleaner is located in the engine compartment. Open the tailgate to access the air cleaner for service. (See TAILGATE on Page 125.)

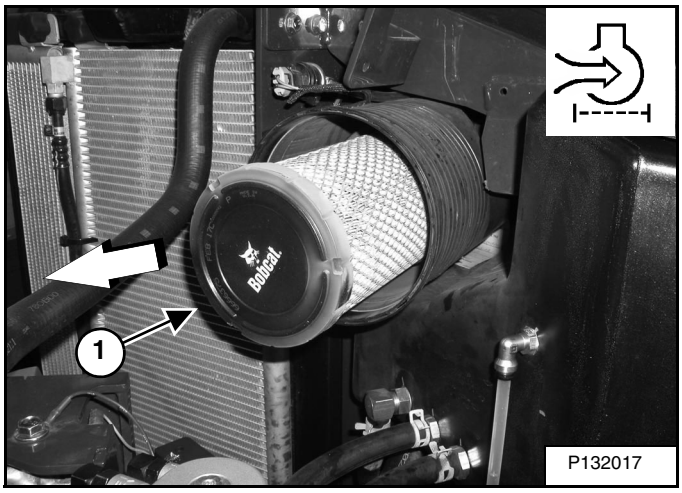
Figure 227



To remove the air cleaner dust cap (Item 1) raise the three latches (Item 2) **[Figure 227]**.

Remove and clean the dust cup (Item 1) **[Figure 227]**.

Figure 228



Pull the outer filter (Item 1) **[Figure 228]** 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 outer filter.

Install the dust cup (Item 1), and position the evacuator (Item 3) **[Figure 227]** so that it is pointing down.

Fasten the three clamps (Item 2) **[Figure 227]** to secure the dust cap.

Close the right side cover and the tailgate.

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

Replacing The Filter Elements (Cont'd)

Inner Filter

Only replace the inner filter under the following conditions:

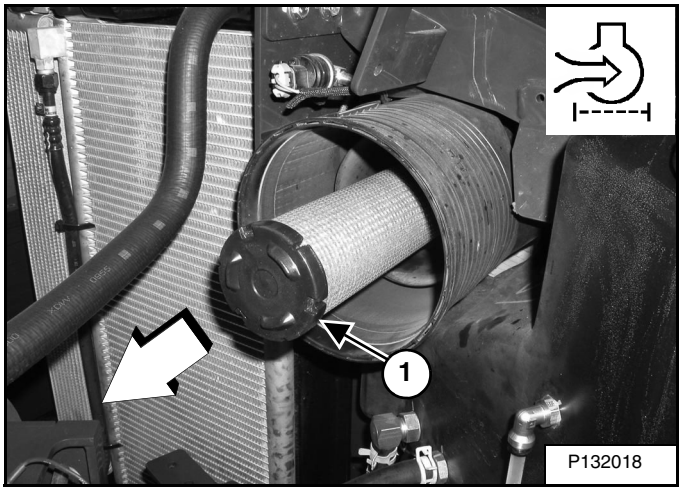
- Replace the inner filter every *second* time the outer filter is replaced.
- After the outer filter has been replaced, start the engine and operate at full rpm. If service code **[M0117]** (Air Filter Plugged) is still displayed in the data display, replace the inner filter.

Open the right side cover to access the air cleaner for service. (See RIGHT SIDE COVER on Page 126.)

To remove the air cleaner dust cap (Item 1) **[Figure 227]**, rotate the dust cap counterclockwise.

Remove the outer filter (Item 1) **[Figure 228]**.

Figure 229



Remove inner filter (Item 1) **[Figure 229]**.

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.

Close the right side cover and the tailgate.

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 that can cause corrosion and plugging of fuel system components.
- Use of biodiesel blend fuel may result in premature failure of fuel system components, such as: plugged fuel filters and deteriorated fuel lines.
- Shorter maintenance intervals may be required, such as: cleaning the fuel system and replacing fuel filters and fuel lines.
- Using biodiesel blended fuels containing more than five percent biodiesel can affect engine life and cause deterioration of hoses, tubelines, injectors, injector pump, and seals.

Apply the following guidelines if biodiesel blend fuel is used:

- Ensure the fuel tank is as full as possible at all times to prevent moisture from collecting in the fuel tank.
- Ensure that the fuel tank cap is securely tightened.
- Biodiesel blend fuel can damage painted surfaces, remove all spilled fuel from painted surfaces immediately.
- Drain all water from the fuel filter daily before operating the machine.
- Do not exceed engine oil change interval. Extended oil change intervals can cause engine damage.
- Before vehicle storage; drain the fuel tank, refill with 100% petroleum diesel fuel, add fuel stabilizer, and operate 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 3 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

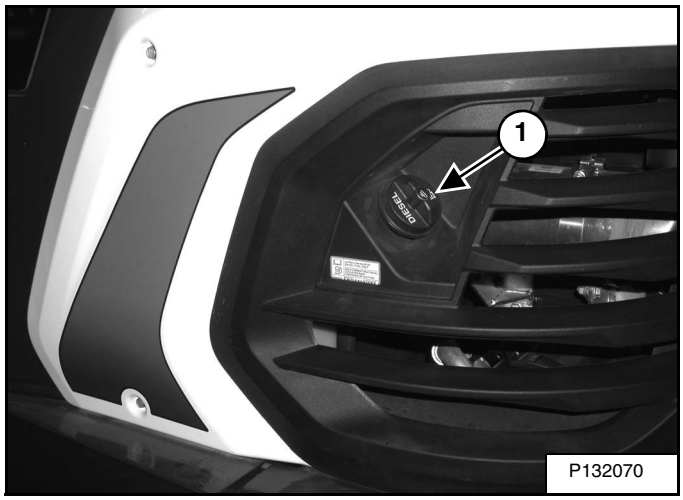
⚠ WARNING

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 230



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

Remove the fuel fill cap (Item 1) **[Figure 230]**.

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 119.)

Fuel Filters

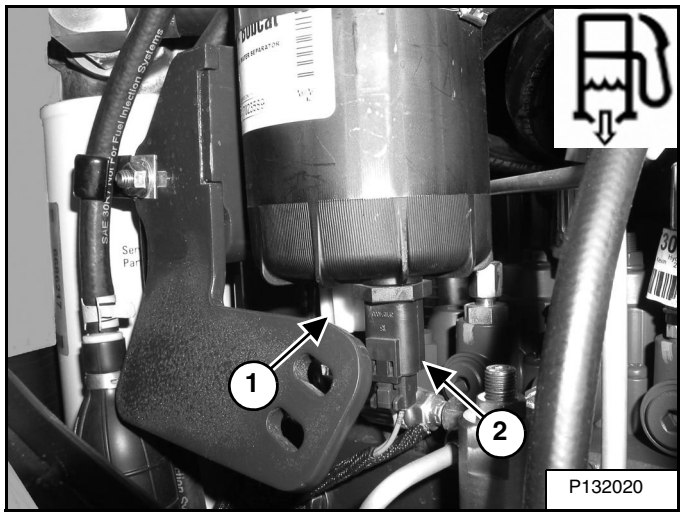
Removing Water

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 119.)

Open the tailgate. (See TAILGATE on Page 125.)

Open the right side cover. (See RIGHT SIDE COVER on Page 126.)

Figure 231



Loosen the drain (Item 1) **[Figure 231]** at the bottom of the filter to remove trapped water from the filter.

Securely tighten the drain.

⚠ WARNING

AVOID INJURY OR DEATH

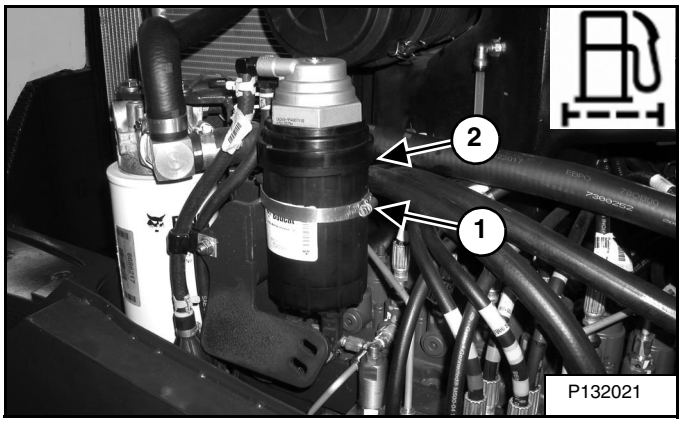
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire.

W-2103-0508

Close the right side cover and the tailgate.

Replacing Elements

Figure 232



Disconnect the electrical connector (Item 1) **[Figure 231]**.

Remove the clamp (Item 1) **[Figure 232]**.

Remove the filter (Item 2) **[Figure 232]**.

NOTE: Do NOT fill the new fuel filter element with fuel at this time.

Put clean oil on the two new fuel filter element O-rings, install the element, and tighten to 13,5 N•m (10 ft-lb) torque.

Reposition the filter assembly (Item 2) and install the clamp (Item 1) **[Figure 232]**.

Connect the electrical connector (Item 1) **[Figure 231]**.

Remove the air from the fuel system. (See Removing Air From The Fuel System on Page 135.)

Start the engine and allow to operate for one minute.

⚠ WARNING

AVOID INJURY OR DEATH

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

W-2072-0807

Stop the engine and check for leaks at the filter.

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.

⚠ WARNING

AVOID INJURY OR DEATH

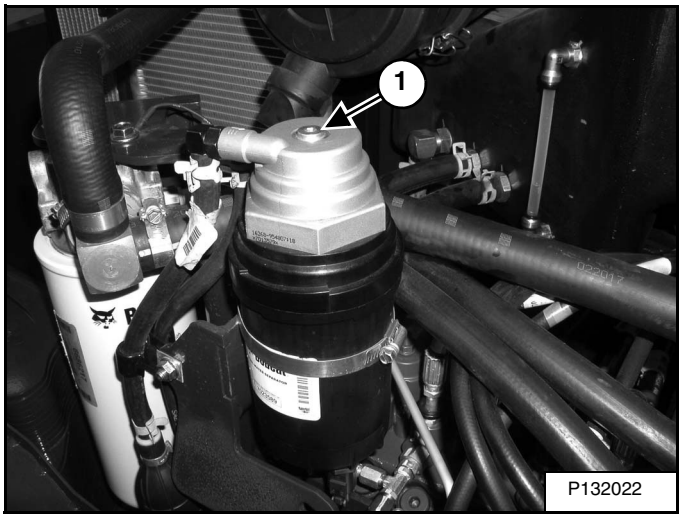
Diesel fuel or hydraulic fluid under pressure can penetrate skin or eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. Do not use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical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

W-2072-0807

Open the tailgate. (See TAILGATE on Page 125.)

Open the right side cover. (See RIGHT SIDE COVER on Page 126.)

Figure 233



Open the air vent plug (Item 1) **[Figure 233]** on the fuel filter assembly three full turns.

Squeeze the hand pump (priming bulb) (Item 1) **[Figure 236]** until fuel flows from the air vent plug with no air bubbles.

Close the air vent plug (Item 1) **[Figure 233]**.

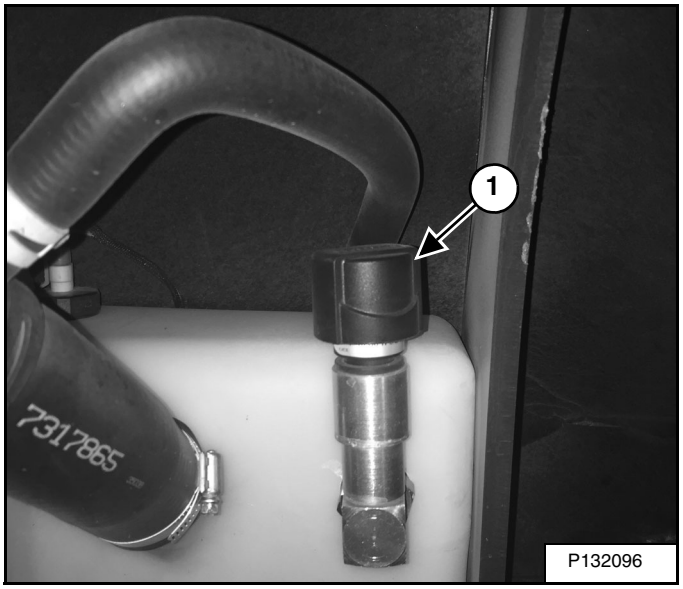
Replacing The Fuel Tank Breather

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 119.)

Open the tailgate. (See TAILGATE on Page 125.)

Open the right side cover. (See RIGHT SIDE COVER on Page 126.)

Figure 234

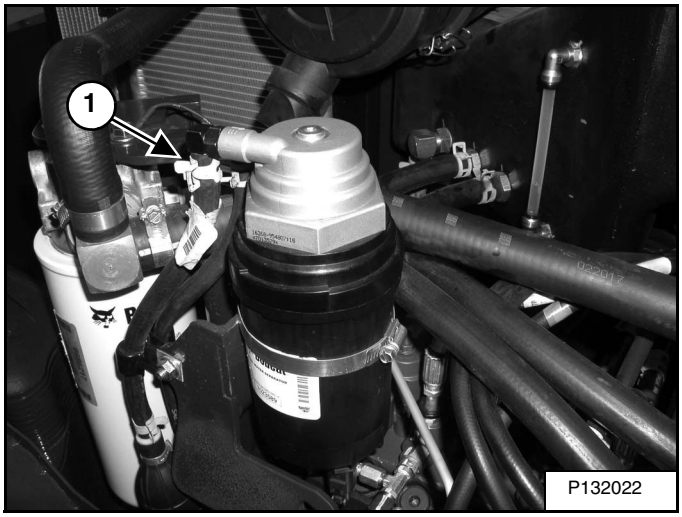


Remove the fuel tank breather (Item 1) **[Figure 234]** and replace.

Draining The Fuel Tank

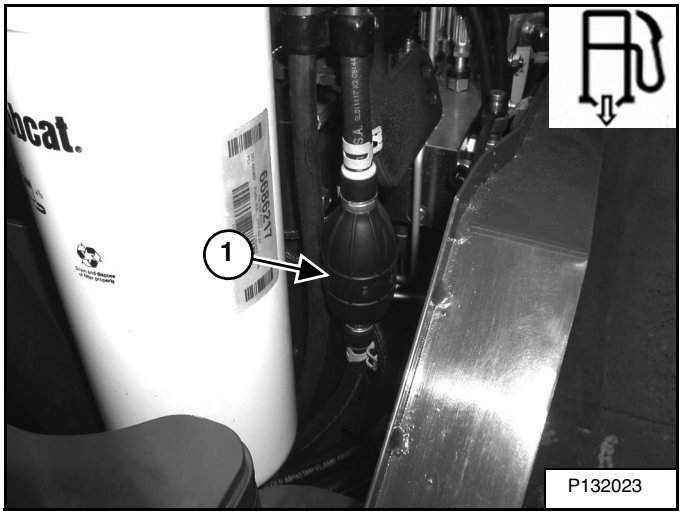
See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 119.)

Figure 235



Remove the hose (Item 1) **[Figure 235]** from the fuel filter. Route the hose to a container.

Figure 236



Squeeze the hand pump (priming bulb) (Item 1) **[Figure 236]** 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 235]** after the fuel is removed from fuel tank.

⚠ WARNING

AVOID INJURY OR DEATH

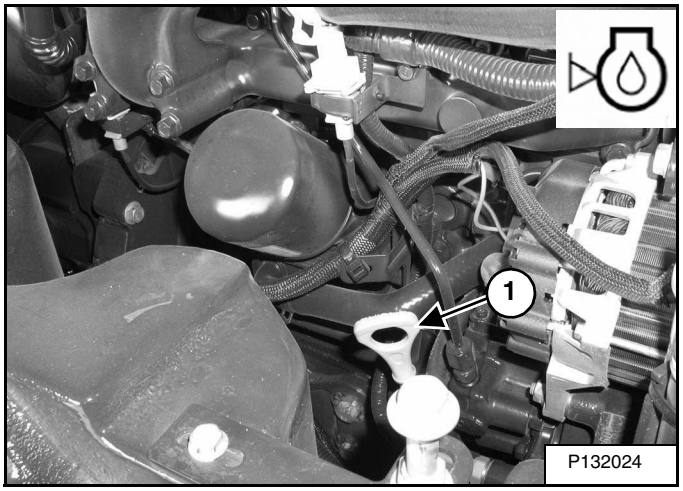
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire.

W-2103-0508

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 119.)

Figure 237



Open the tailgate. (See TAILGATE on Page 125.)

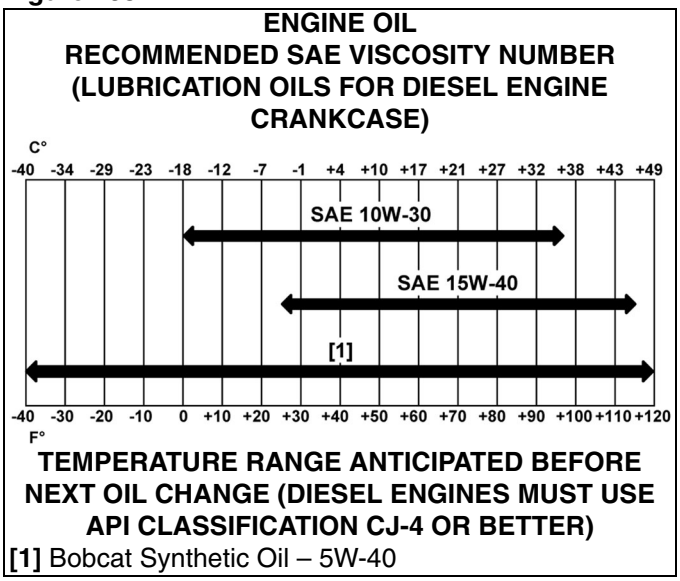
Remove the dipstick (Item 1) **[Figure 237]**.

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 238



Bobcat engine oils are recommended for use in this machine. If Bobcat engine oil is not available, use a good quality engine oil that meets API Service Classification of CJ-4 or better **[Figure 238]**.

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

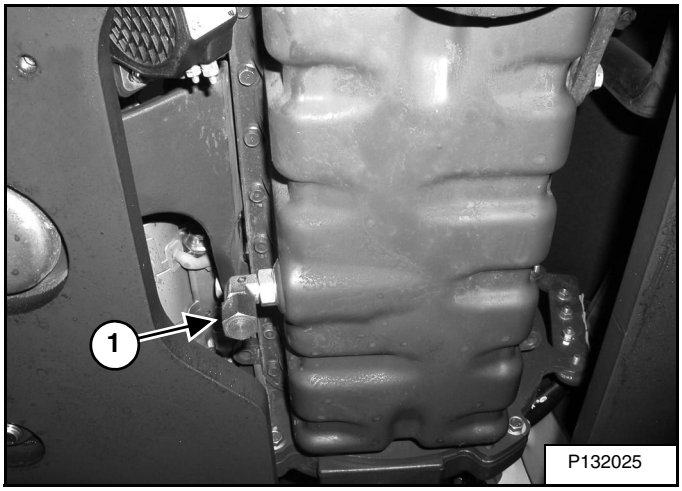
Removing And Replacing Oil And Filter

See the SERVICE SCHEDULE for the service interval for replacing the engine oil and filter. (See SERVICE SCHEDULE on Page 119.)

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

Open the tailgate. (See TAILGATE on Page 125.)

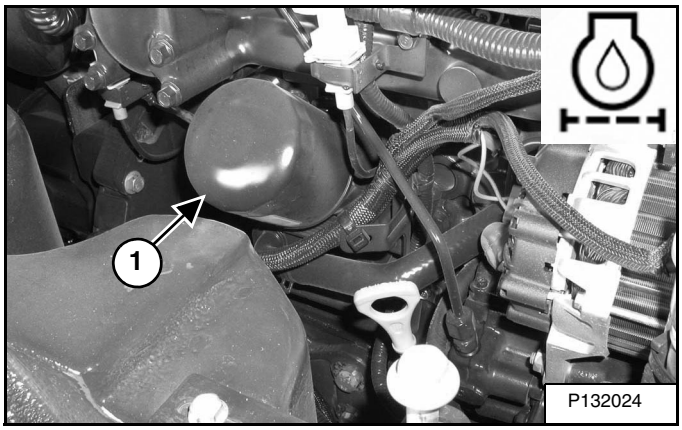
Figure 239



Place a container under the oil pan. Remove the drain cap (Item 1) **[Figure 239]** from the elbow on the bottom of the engine oil pan.

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

Figure 240

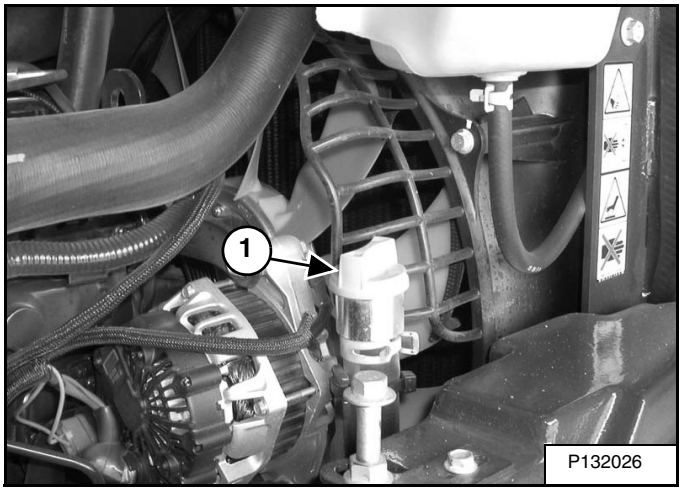


Remove the oil filter (Item 1) **[Figure 240]** and clean the filter housing surface.

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

Install and tighten the drain cap (Item 1) **[Figure 239]**.

Figure 241



Remove the fill cap (Item 1) **[Figure 241]**.

Put oil in the engine. (See ENGINE LUBRICATION SYSTEM on Page 137.)

Install the fill cap (Item 1) **[Figure 241]**.

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

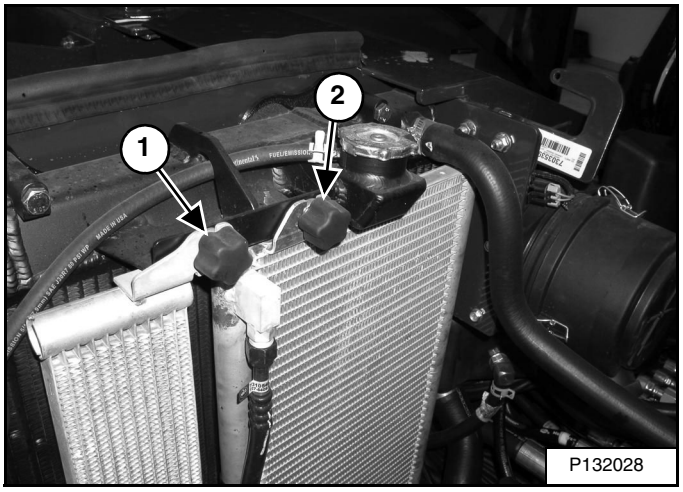
Check the cooling system every day to prevent overheating, loss of performance or engine damage. (See SERVICE SCHEDULE on Page 119.)

Cleaning

Open the tailgate and the right side cover. (See TAILGATE on Page 125.) and (See RIGHT SIDE COVER on Page 126.)

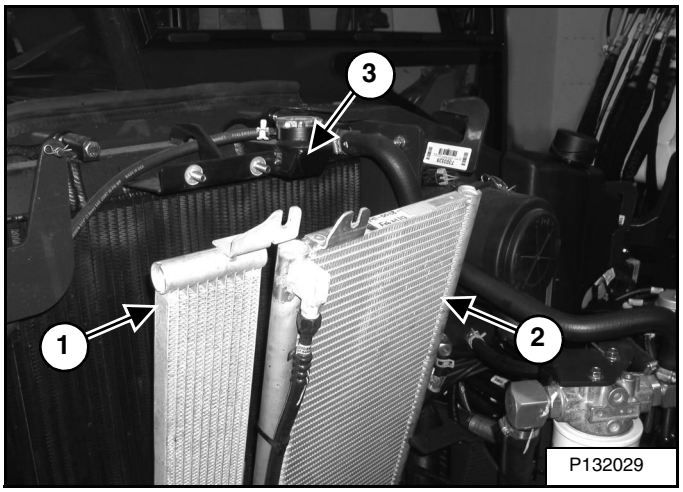
NOTE: Allow the cooling system and engine to cool before servicing or cleaning the cooling system.

Figure 242



Remove the knob (Item 1) from the fuel cooler and from the air condition condenser (Item 2) **[Figure 242]** (if equipped).

Figure 243



Tilt the fuel cooler (Item 1), and / or the condenser (Item 2) (if equipped) from the radiator / charged air / oil cooler (Item 3) **[Figure 243]**. Be careful not to damage fins.

Use low air pressure or low water pressure to clean the fuel cooler (Item 1), the condenser (Item 2) (if equipped), and the radiator / charged air/ oil cooler (Item 3) **[Figure 243]**. Be careful not to damage fins when cleaning.

Reposition the condenser (Item 2) (if equipped) and the fuel cooler (Item 1) **[Figure 243]** to the radiator / oil cooler. Be careful not to damage fins.

Install and tighten the knob (Item 1 and 2) **[Figure 242]**.

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

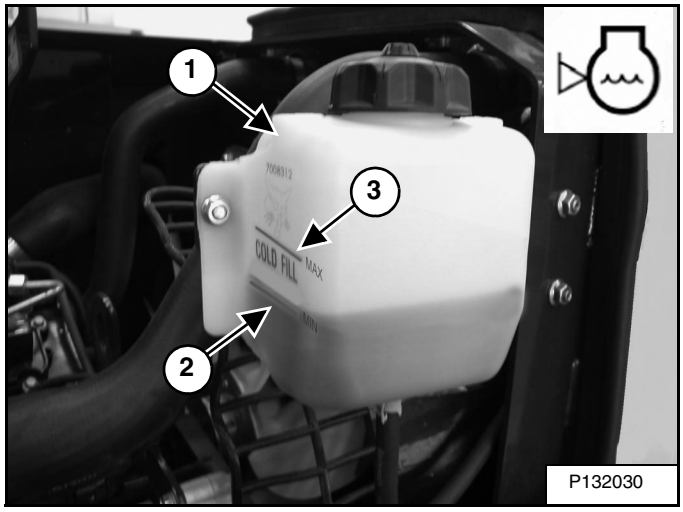
Wear safety glasses to prevent eye injury when any of the following conditions exist:

- **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 125.)

Figure 244



Check the coolant level when the coolant is cold. Check the coolant level in the coolant recovery tank (Item 1). It must between the "MIN" level (Item 2) and the MAX" level (Item 3) **[Figure 244]**. Add fluid as needed.

NOTE: The cooling system is factory filled with propylene glycol (purple color). 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 119.)

Stop the engine. Open the tailgate and the right side cover. (See TAILGATE on Page 125.) and (See RIGHT SIDE COVER on Page 126.)

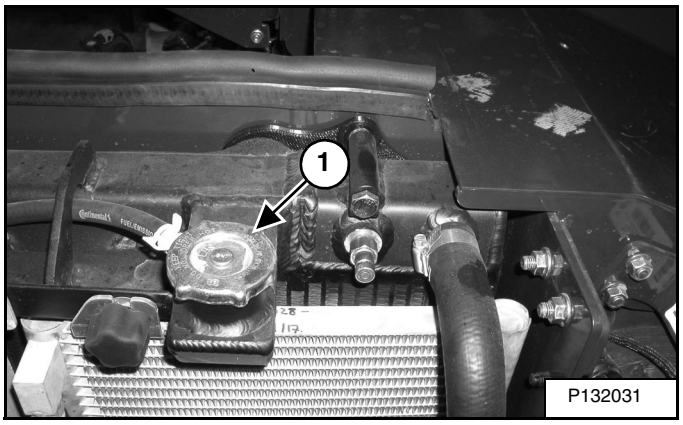
⚠ WARNING

AVOID BURNS

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

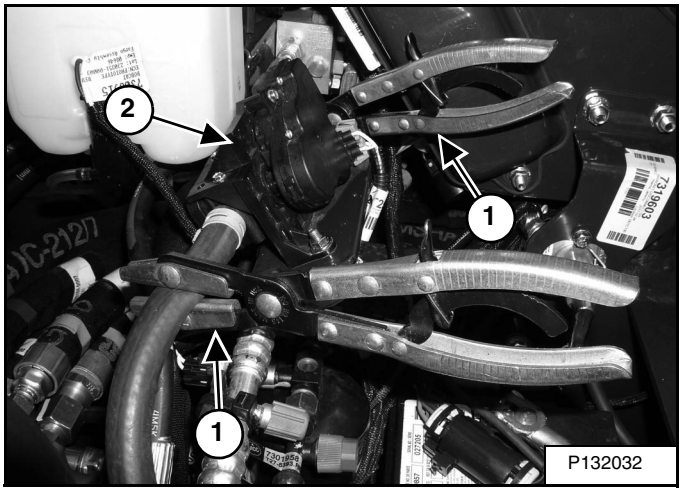
W-2070-1203

Figure 245



When the engine is cool, loosen and remove the radiator cap (Item 1) **[Figure 245]**.

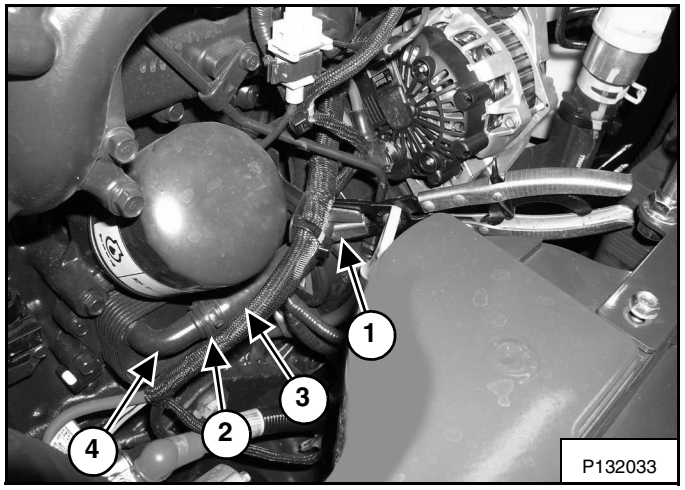
Figure 246



The radiator and the engine block can be drained at the engine oil cooler and at the heater shut-off valve.

Put a locking hose pinching plier (Item 1) on both sides of the heater valve (Item 2) **[Figure 246]** or similar tool. Disconnect the hose clamps from the heater valve. Route the hoses out of the upperstructure, remove the two locking hose pinching pliers and drain the coolant into a container.

Figure 247



Pinch off the coolant hose attached to the engine oil cooler using a locking hose pinching plier (Item 1) **[Figure 247]** or similar tool.

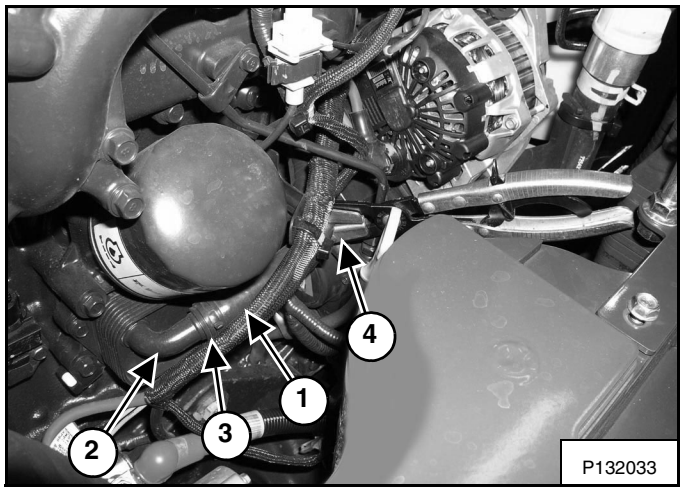
Remove the hose clamp (Item 2) and disconnect the hose (Item 3) from the engine oil cooler fitting (Item 4) **[Figure 247]**.

Quickly install the spare 0.75 in. coolant hose onto the engine oil cooler fitting.

Drain the coolant into a container.

Removing And Replacing Coolant (Cont'd)

Figure 248

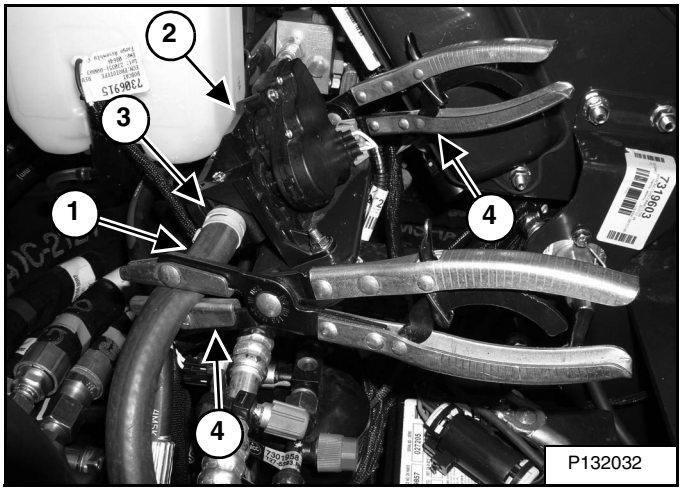


Remove the temporary drain hose from the engine oil cooler fitting when the coolant has drained.

Install the coolant hose (Item 1) onto the engine oil cooler fitting (Item 2) and install the clamp (Item 3) **[Figure 248]**.

Remove the tool used to pinch off the coolant hose (Item 4) **[Figure 248]**.

Figure 249



Install the two heater hoses (Item 1) onto the heater valve (Item 2) with the two hose clamps (Item 3). Remove the two tools used to pinch off the coolant hose (Item 4) **[Figure 249]**.

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

Mix new coolant in a separate container. (See Capacities on Page 190.)

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

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

Add premixed coolant, 47% water and 53% propylene glycol to the radiator until the coolant level reaches the top of the radiator.

Install the radiator cap (Item 1) **[Figure 245]**.

Add premixed coolant; 47% water and 53% propylene glycol to the recovery tank until it is at the cold fill mark **[Figure 244]**.

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

Add coolant to the recovery tank as needed.

Close the right side cover and the tailgate.

Description

Figure 250

The excavator has a 12 volt, negative ground electrical system. The electrical system is protected by fuses located under the right side cover of the excavator (Item 1) **[Figure 250]**. 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.

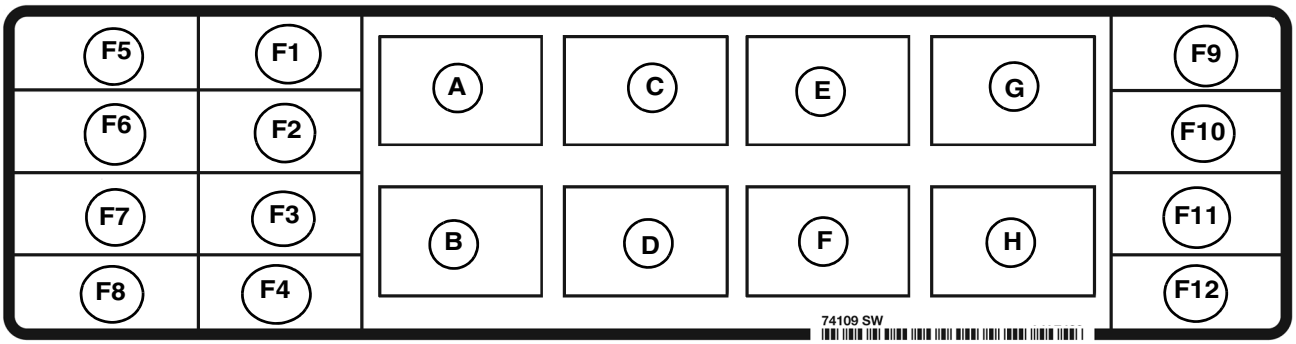
Remove the cover to check or replace the fuses and relays.

The location and sizes are shown in **[Figure 251]**.

Always replace fuses using the same type and capacity.

Fuse And Relay Location / Identification (Cont'd)

Figure 251



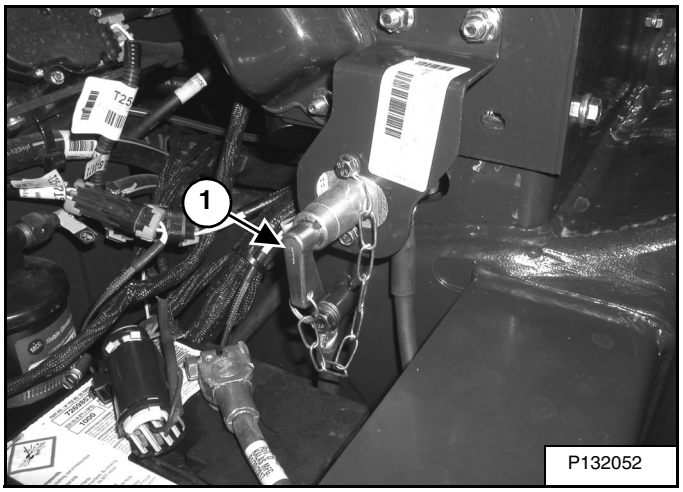
The location and sizes are shown in the table below and on the decal **[Figure 251]**. Relays are identified by the letter "R" in the AMP column.

REF	ICON	DESCRIPTION	AMP	REF	ICON	DESCRIPTION	AMP	REF	ICON	DESCRIPTION	AMP
F1		Wiper / Washer	10	**F9**		Controller	25	**A**		Switched Power	R
F2		Switched Power	20	**F10**		ACD	25	**B**		NOT USED	R
F3		Alternator Excite / Heater	25	**F11**		Lights	20	**C**		HVAC	R
F4		ACD	25	**F12**		Power Port	15	**D**		Lights	R
F5		Controller (ECU)	25					**E**		Fuel Shutoff	R
F6		HVAC	40					**F**		Glow Plugs	R
F7		Start Key	5					**G**		NOT USED	R
F8		Fuel Pull	15					**H**		Starter	R

Shut-Off Switch (If Equipped)

Open the tailgate and the right side cover. (See TAILGATE on Page 125.) and (See RIGHT SIDE COVER on Page 126.)

Figure 252



The shut-off switch (Item 1) **[Figure 252]** (if equipped) is located under the right side cover below the fuse panel.

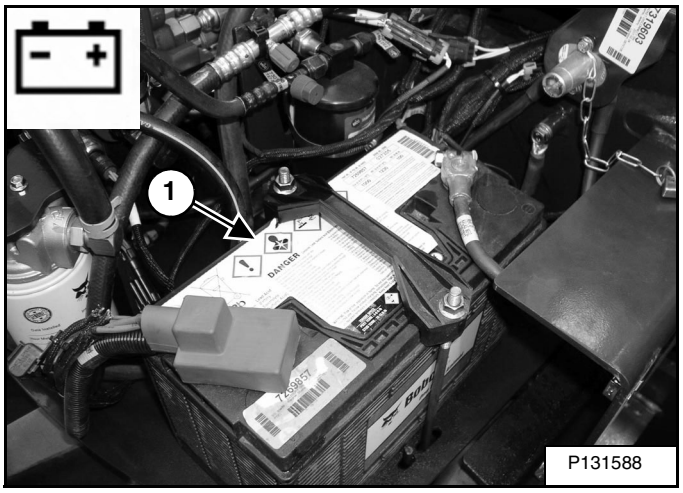
Rotate the switch (Item 1) **[Figure 252]** counterclockwise to turn the switch to the OFF position, clockwise to turn to the ON position.

Battery Maintenance

Open the tailgate and the right side cover. (See TAILGATE on Page 125.) and (See RIGHT SIDE COVER on Page 126.)

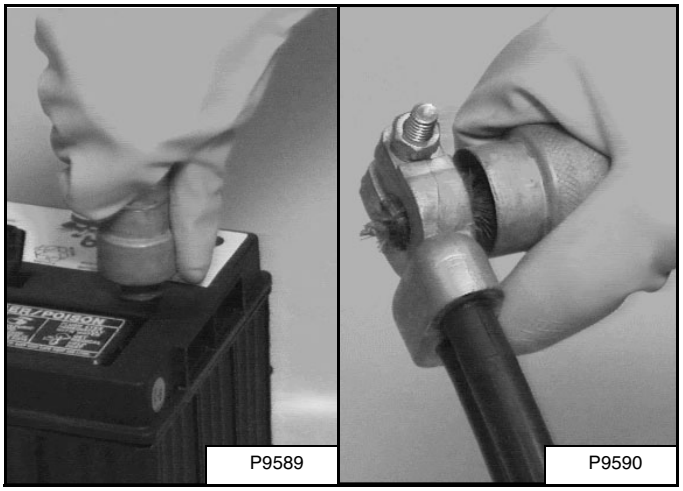
Remove the right side upperstructure cover. (See RIGHT SIDE UPPERSTRUCTURE COVER on Page 127.)

Figure 253



The battery (Item 1) **[Figure 253]** is located in the front of the right side upperstructure.

Figure 254



The battery cables must be clean and tight **[Figure 254]**. 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.

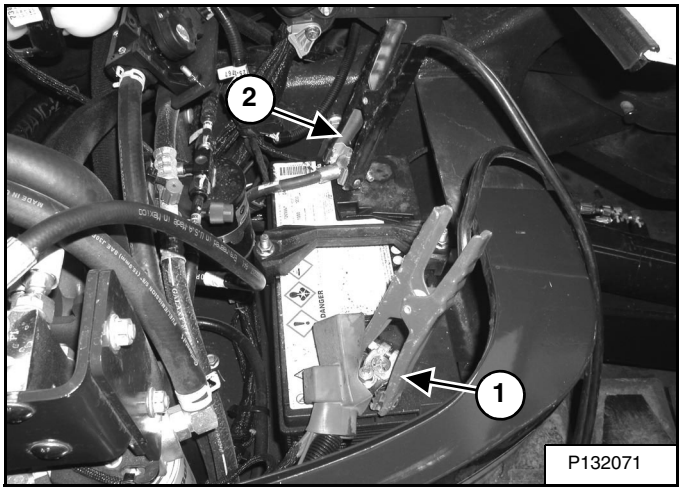
I-2060-0906

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 125.)

Figure 255



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 255]** 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 255]**.

Start the engine. After the engine has started, remove the ground (-) cable first (Item 2) **[Figure 255]**.

Disconnect the cable from the excavator starter (Item 1) **[Figure 255]**.

NOTE: (See Cold Temperature Starting on Page 68.)

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.

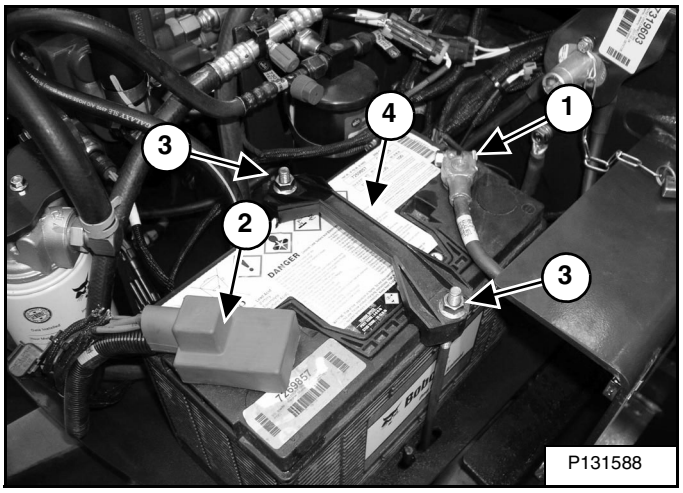
W-2065-0807

Removing And Installing The Battery

Open the right side cover. (See RIGHT SIDE COVER on Page 126.)

Remove the right side upperstructure cover. (See RIGHT SIDE UPPERSTRUCTURE COVER on Page 127.)

Figure 256



Disconnect the negative (-) cable (Item 1) **[Figure 256]** first.

Disconnect the positive (+) cable (Item 2) **[Figure 256]**.

Remove the nuts (Item 3) and remove the hold-down clamp (Item 4) **[Figure 256]**.

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 nuts.

Connect the battery cables. Connect the negative (-) cable (Item 1) **[Figure 256]** 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.

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HYDRAULIC SYSTEM

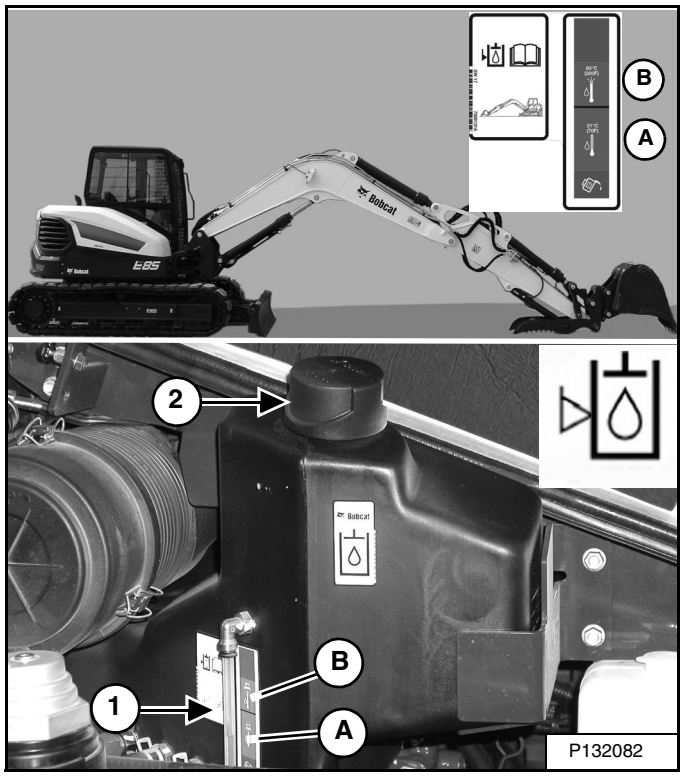
Checking And Adding Hydraulic Oil

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 126.)

Figure 257



Park the machine in the position shown **[Figure 257]**. (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 257]**. 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 257]**.

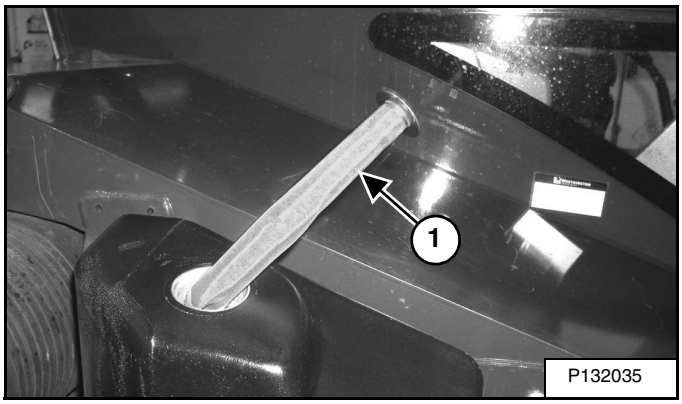
⚠ WARNING

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



Check the condition of the fill strainer screen (Item 1) **[Figure 258]**. 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 148.)

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

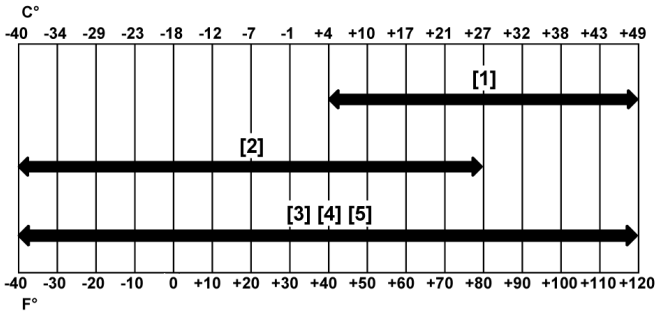
Install the cap.

Close the right side cover and tailgate.

Hydraulic / Hydrostatic Fluid Chart

Figure 259

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.)

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.

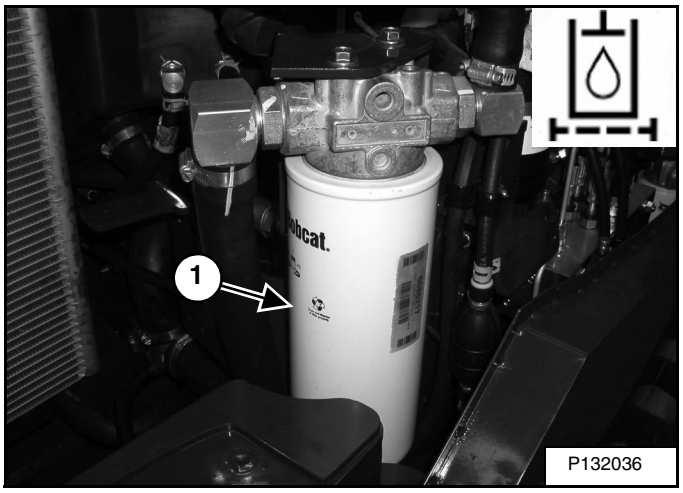
W-2103-0508

Hydraulic Filter

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 119.)

Open the tailgate and the right side cover. (See TAILGATE on Page 125.) and (See RIGHT SIDE COVER on Page 126.)

Figure 260



Remove the hydraulic filter (Item 1) **[Figure 260]**.

Clean the housing where the filter gasket makes contact.

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

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

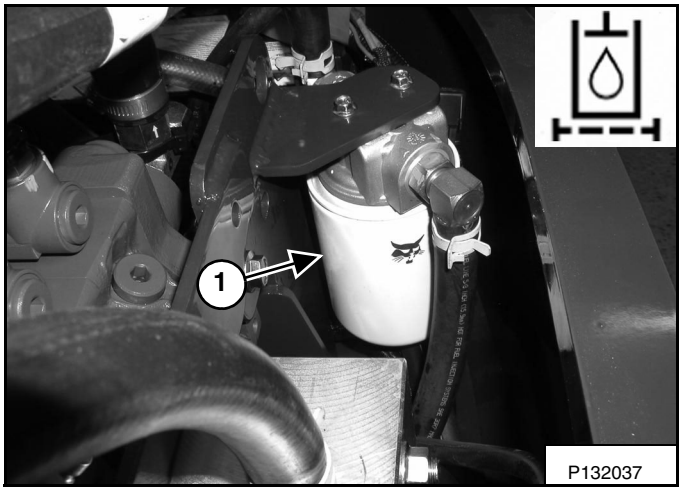
Case Drain Filter

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 119.)

The case drain filter is located in the right front side of the upperstructure.

Open the tailgate and the right side cover. (See TAILGATE on Page 125.) and (See RIGHT SIDE COVER on Page 126.)

Figure 261



Remove the case drain filter (Item 1) **[Figure 261]**.

Clean the housing where the filter gasket makes contact.

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

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

Removing And Replacing The Hydraulic Fluid

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 119.)

⚠ WARNING

AVOID INJURY OR DEATH

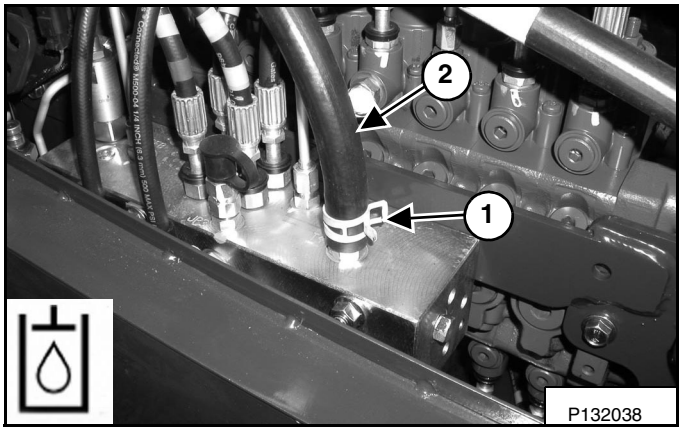
Diesel fuel or hydraulic fluid under pressure can penetrate skin or eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. Do not use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical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

W-2072-0807

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

Open the tailgate and the right side cover. (See TAILGATE on Page 125.) and (See RIGHT SIDE COVER on Page 126.)

Figure 262



Remove the hose clamp (Item 1). Disconnect the hose (Item 2) and reposition the hose out the side of the upperstructure **[Figure 262]**.

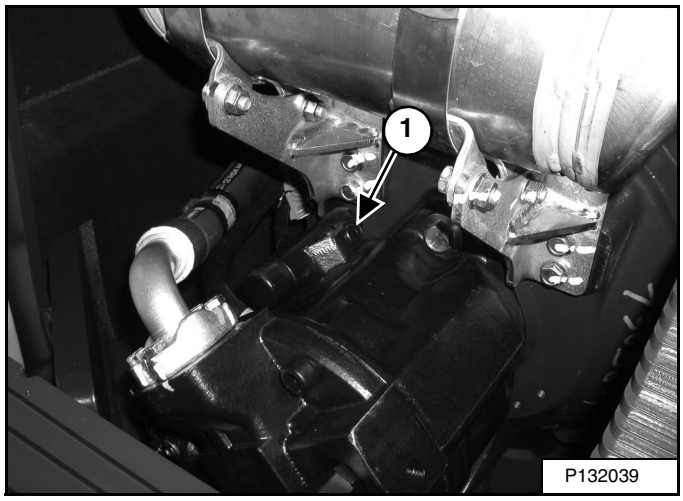
Drain the fluid into a container.

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

Reinstall the hose (Item 2) and the clamp (Item 1) **[Figure 262]**.

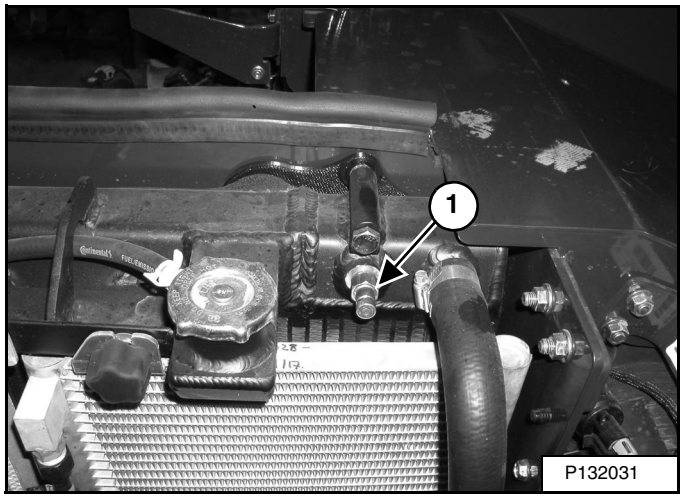
Add fluid to the reservoir. (See HYDRAULIC SYSTEM on Page 148.)

Figure 263



With the engine OFF, loosen the plug (Item 1) **[Figure 263]** 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 264

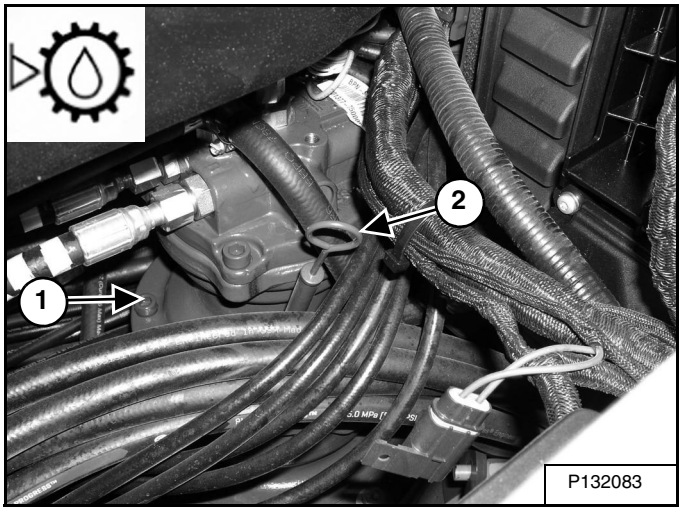


There is also a port (Item 1) **[Figure 264]** on the hydraulic cooler for bleeding air. Install a diagnostic coupler and hose on this fitting and to allow air to be bleed from the hydraulic system after the hydraulic fluid has been replaced. Remove the diagnostic coupler.

Start the engine and operate the machine through the hydraulic functions. Stop the engine. Check the fluid level and add as needed.

Checking Swing Motor Gear Box Fluid Level

Figure 265



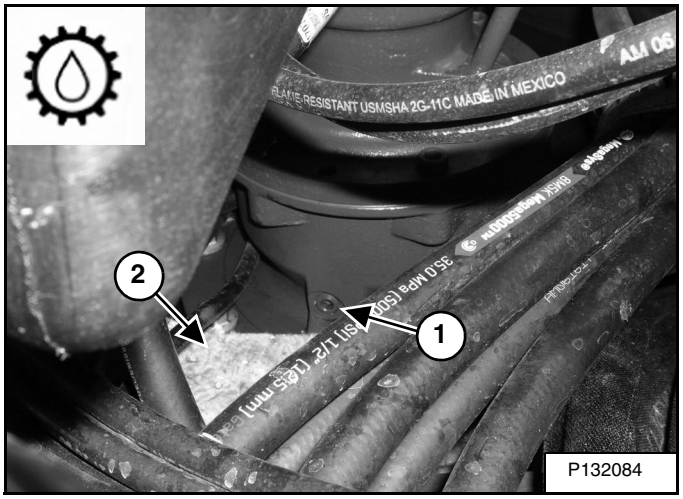
Open the tailgate and the right hand cover to access the swing motor. (See TAILGATE on Page 125.) and (See RIGHT SIDE COVER on Page 126.)

The swing motor gear box (Item 1) has a dipstick (Item 2) **[Figure 265]** for checking the swing motor gear box oil level.

Keep the oil level between the marks on the dipstick.

Removing And Replacing Swing Motor Gear Box Fluid

Figure 266



Open the center cover to access the swing motor. (See CENTER COVER on Page 126.)

The swing motor carrier drain plug (Item 1) **[Figure 266]** is located on the side of the swing motor carrier.

Place a oil containment mat (Item 2) **[Figure 266]** in the upperstructure by the drain plug to collect the used fluid.

Remove the plug (Item 1) **[Figure 266]** and drain the swing motor carrier fluid onto the oil containment mat.

Reinstall the drain plug.

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

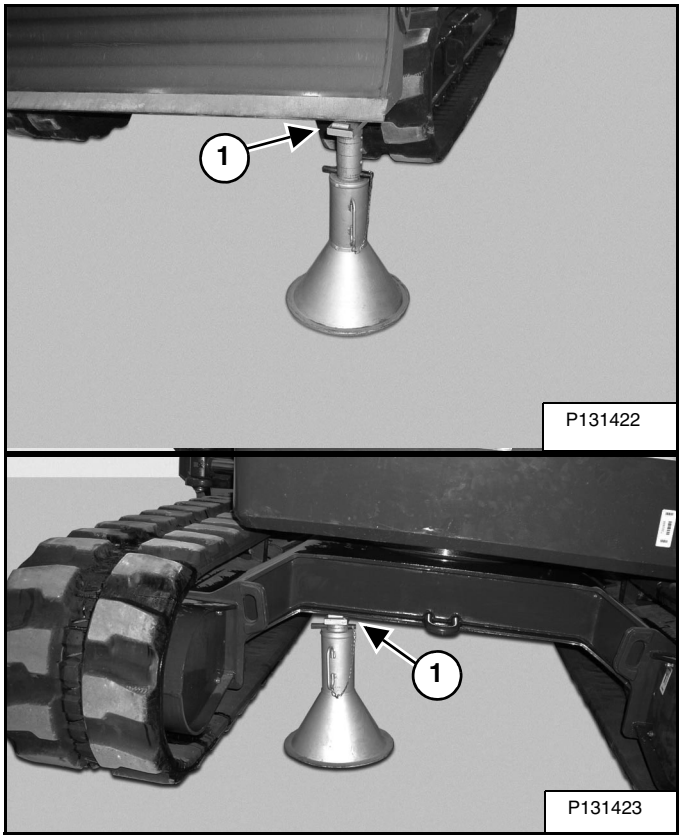
Remove the dipstick (Item 2) **[Figure 265]** and add gear lube (80W-90) until it is at the correct mark on the dipstick. (See REGULAR MAINTENANCE ITEMS on Page 3.) and (See Capacities on Page 190.)

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 119.)

Adjusting

Figure 267



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 267]**. Raise the boom until all machine weight is on the jackstands.

Stop the engine.

⚠ WARNING

AVOID INJURY

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

W-2142-0903

Rubber Track Clearance

Figure 268

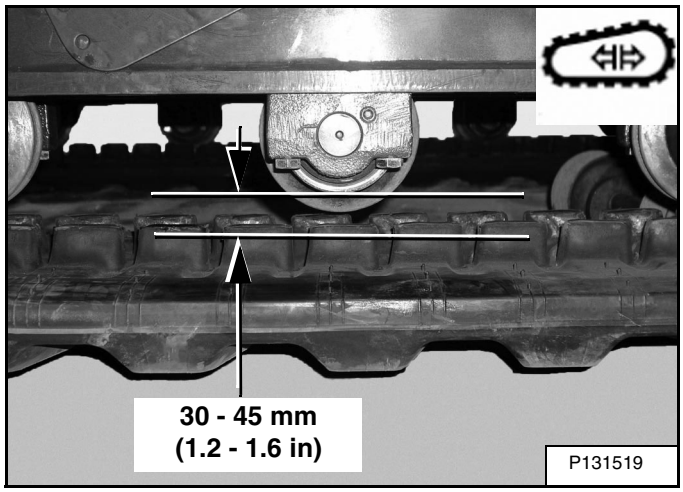
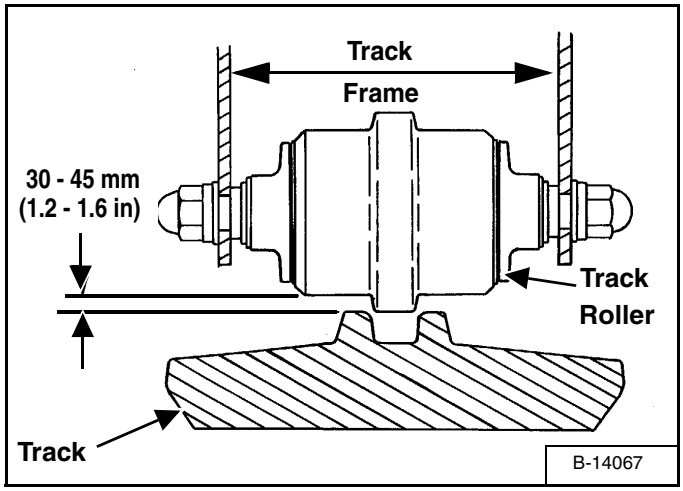


Figure 269



Measure the clearance at either of the two middle track rollers. 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 268]** and **[Figure 269]**.

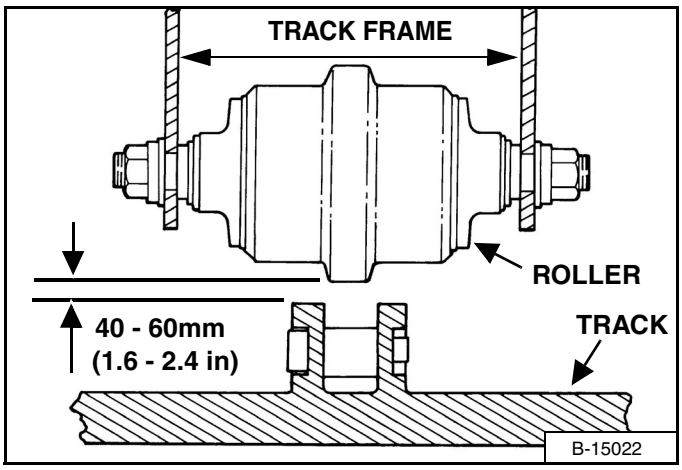
Rubber Track Clearance - 30 - 45 mm (1.2 - 1.6 in).

TRACK TENSION (CONT'D)

Adjusting (Cont'd)

Steel Track And Segmented Track Clearance

Figure 270



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 270]**.

Steel Track and Segmented Track Clearance - 40 - 60 mm (1.6 - 2.4 in).

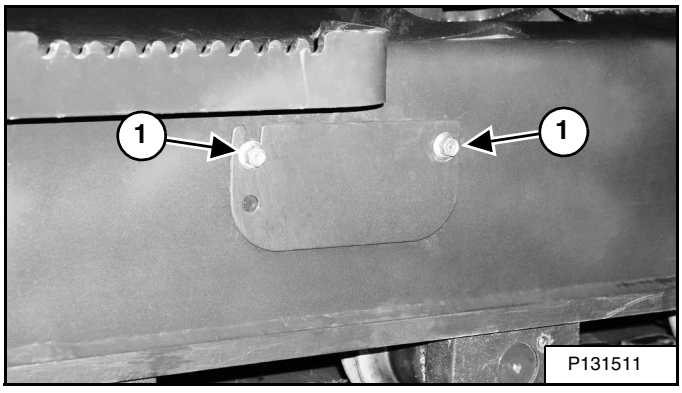
⚠ WARNING

HIGH PRESSURE GREASE CAN CAUSE SERIOUS INJURY

- **Do not loosen the track tension fitting more than 1 - 1/2 turns.**

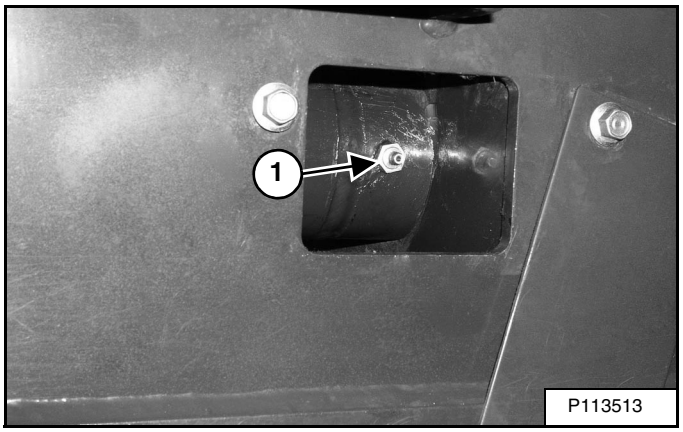
W-2994-0515

Figure 271



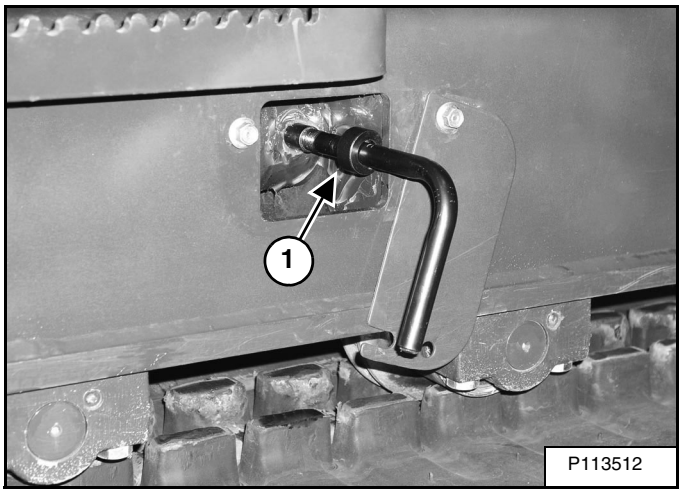
Loosen the two bolts (Item 1) and rotate the cover (Item 2) **[Figure 272]** down to access the bleed screw / grease fitting.

Figure 272



Add grease to the fitting (Item 1) **[Figure 272]** until the track tension is correct.

Figure 273



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 272]**.

Use tool (P/N 7277225) (Item 1) **[Figure 273]** to loosen the tension fitting (Item 2) **[Figure 272]** to release tension from the track.

NOTE: Do not loosen the track tension fitting (Item 1) [Figure 272] more than 1-1/2 turns.

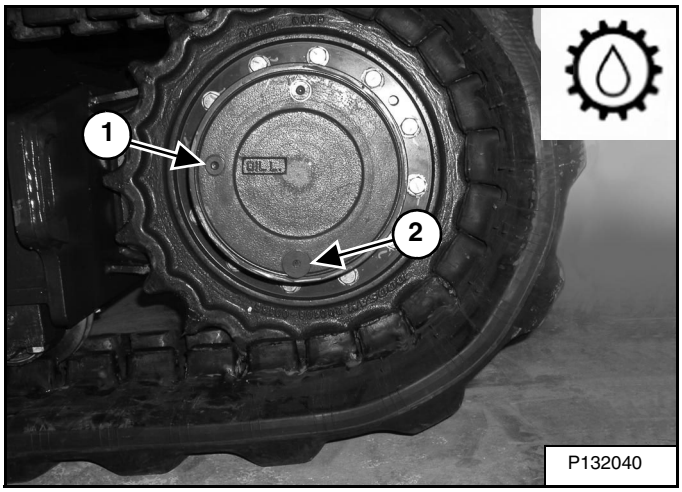
Installation: Tighten the track tension fitting to 23 N•m (17 ft-lb) torque.

Repeat the procedure for the other side.

TRAVEL MOTOR

Checking And Adding Oil

Figure 274



Park the excavator on a level surface with the plugs (Items 1 and 2) **[Figure 274]** positioned as shown.

Remove the plug (Item 1) **[Figure 274]**. 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 119.)

Park the excavator on a level surface with plugs (Items 1 and 2) **[Figure 274]** positioned 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.

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Install the bottom plug (Item 2) **[Figure 274]**. Add lubricant (SAE 90W) through the center plug hole until the lube level is at the bottom edge of the hole.

Install the plug (Item 1) **[Figure 274]**.

ALTERNATOR BELT

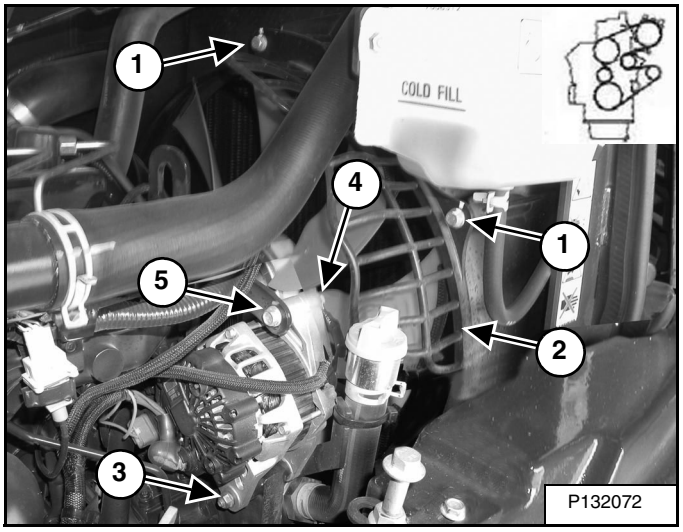
Belt Adjustment

The alternator / 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 125.)

Figure 275



Remove the three bolts (Item 1) securing the fan guard to the radiator shroud and remove the fan guard (Item 2)

Loosen the lower alternator mounting nut (Item 3) **[Figure 275]**.

Remove the nut (Item 4) from the top alternator mounting bolt (Item 5) **[Figure 275]**.

Use a pry bar to take the pressure off of the bolt (Item 5) **[Figure 275]** and remove the top bolt.

Remove and replace the alternator belt.

Use the pry bar to position the alternator and install the bolt (Item 5) **[Figure 275]**.

Install the nut (Item 4) and tighten the top bolt (Item 5) and bottom alternator mounting nut (Item 3) **[Figure 275]**.

Close the tailgate.

AIR CONDITIONING BELT

This machine may be equipped with air conditioning.

Belt Adjustment

The air conditioning 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

The rear counterweight must be removed to service the air conditioning belt. A lifting fixture is needed to remove the counterweight.

See your Bobcat dealer for air conditioning belt replacement.

QUICK COUPLER

Quick Coupler And Attachment Inspection And Maintenance

Figure 276

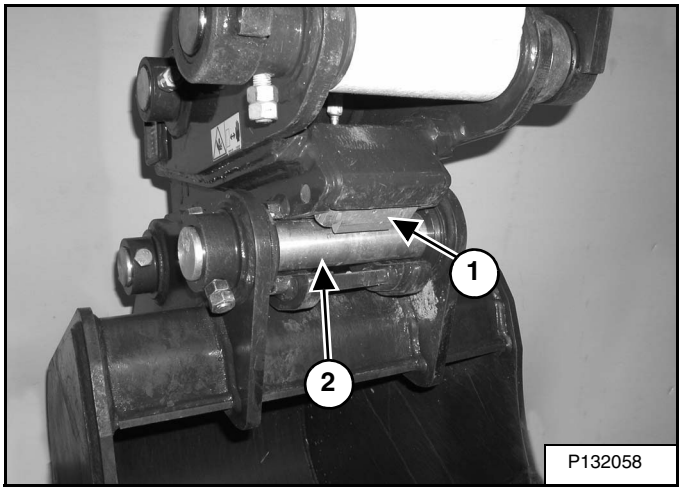
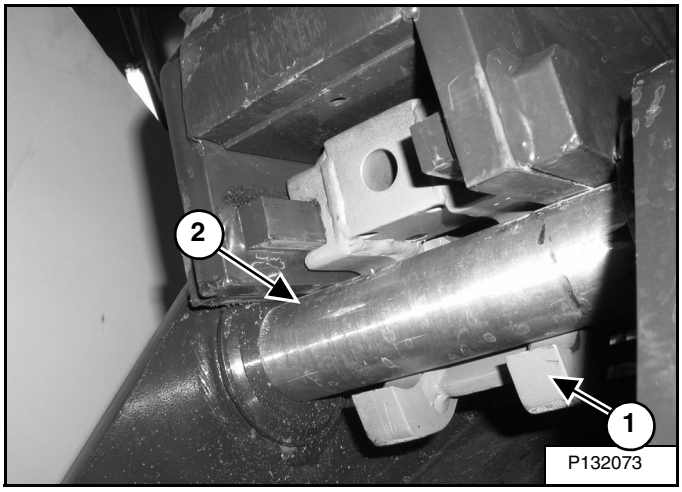


Figure 277



Inspect the quick coupler for wear or damage. Inspect the quick coupler latch (Item 1) **[Figure 276]** and the hooks (Item 2) **[Figure 277]**. Inspect the attachment pins (Item 2) **[Figure 276]** and **[Figure 277]** 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:

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

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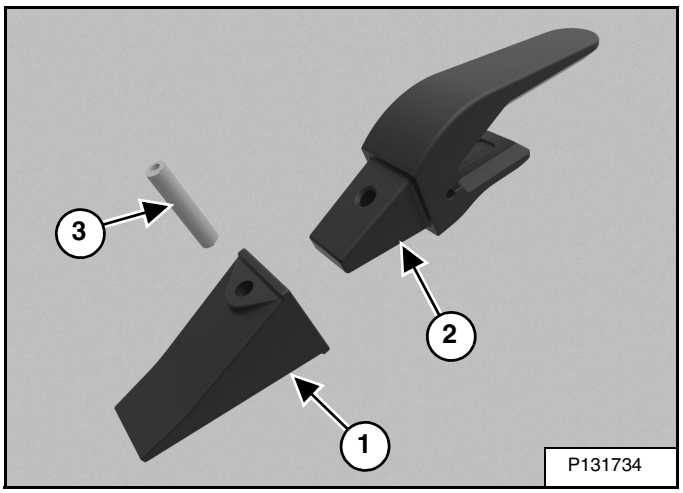
Position the bucket so the bucket teeth are at a 30° angle up from the ground for accessibility to the teeth.

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

Stop the engine and exit the excavator.

Drive the retaining pin (Item 3) out of the tooth and remove the tooth (Item 1) **[Figure 278]**.

Figure 278



Position the tooth point (Item 1) on the shank (Item 1) and install a new retaining pin (Item 3) **[Figure 278]**. Install the retaining pin until it is flush with the top of the point.

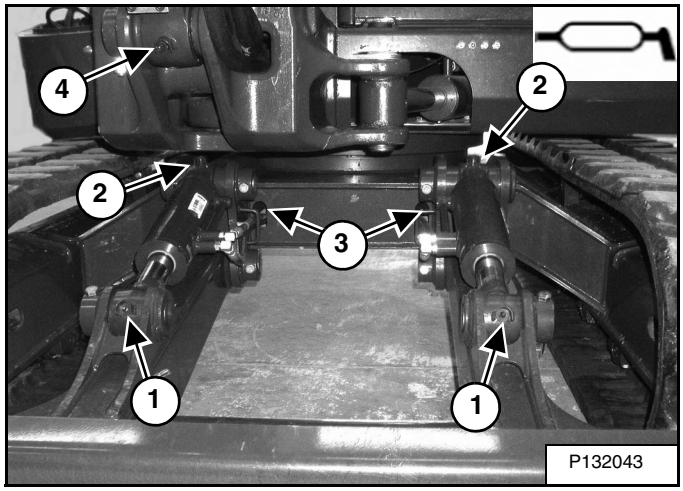
LUBRICATION OF THE HYDRAULIC EXCAVATOR

Lubrication Locations

Lubricate the excavator as specified in the SERVICE SCHEDULE for the best performance of the machine. (See SERVICE SCHEDULE on Page 119.)

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

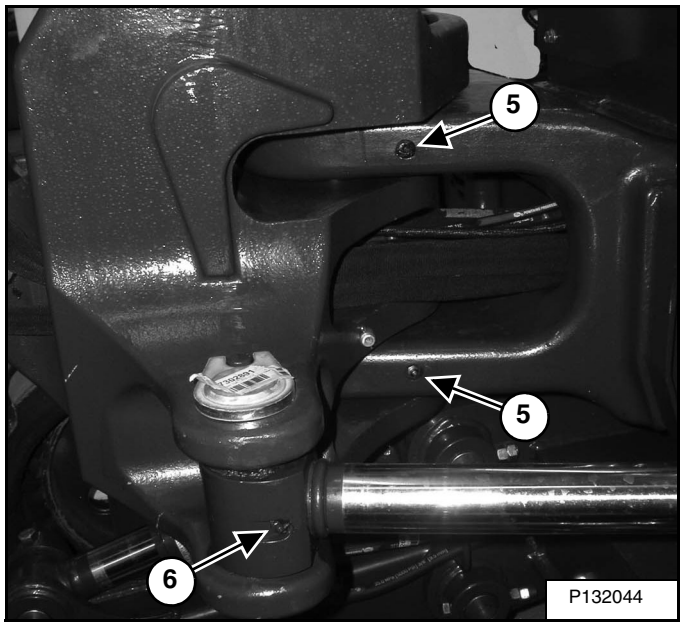
Figure 279



Ref Description (# of Fittings)

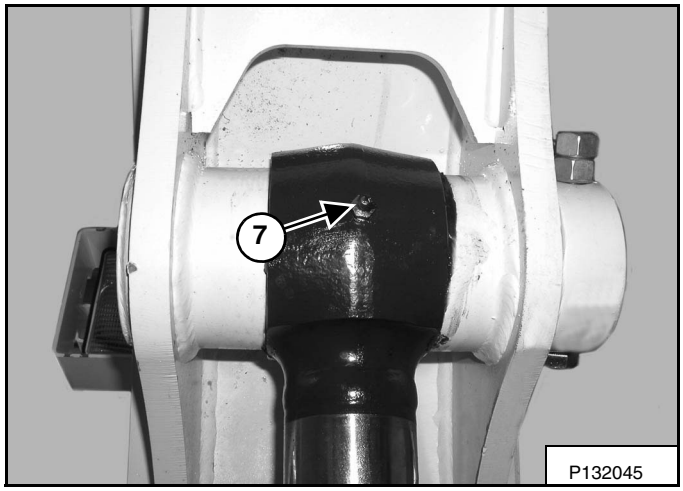
1. Blade Cylinder Rod End (2) **[Figure 279]**
2. Blade Cylinder Base End (2) **[Figure 279]**
3. Blade Pivots (2) **[Figure 279]**
4. Boom Cylinder Base End (1) **[Figure 279]**

Figure 280



5. Boom Swing Pivot (2) **[Figure 280]**
6. Boom Swing Cylinder Rod End (1) **[Figure 280]**

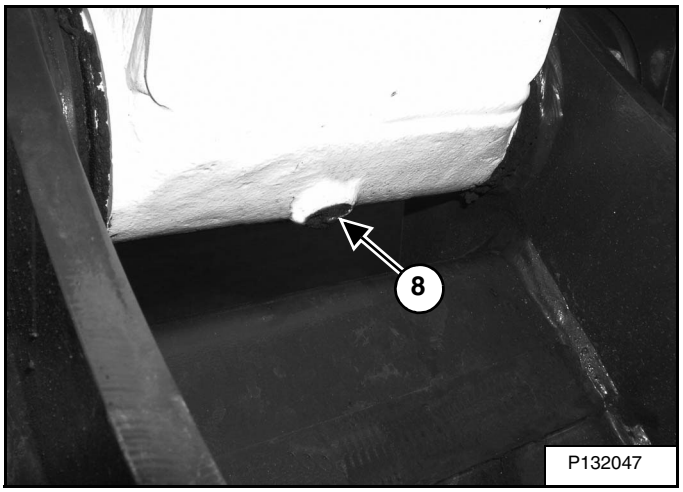
Figure 281



7. Boom Cylinder Rod End (1) **[Figure 281]**

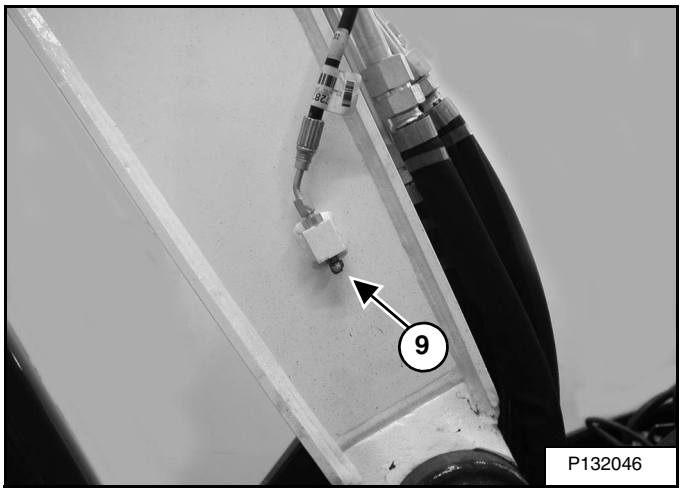
Lubrication Locations (Cont'd)

Figure 282



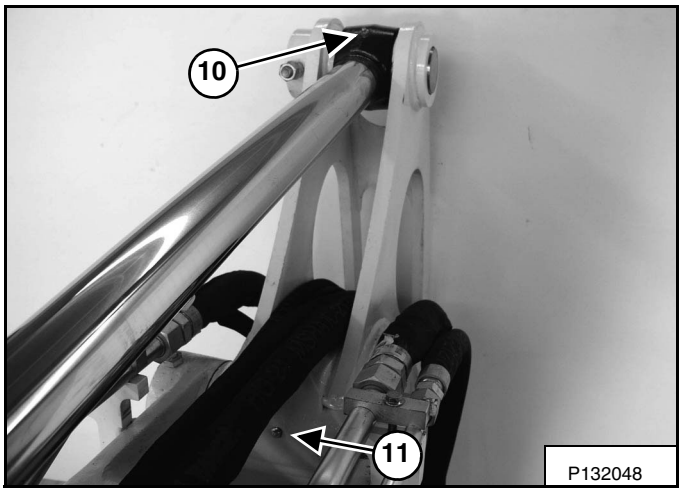
8. Boom Pivot (1) **[Figure 283]**

Figure 283



9. Arm Cylinder Base End (1) **[Figure 283]**

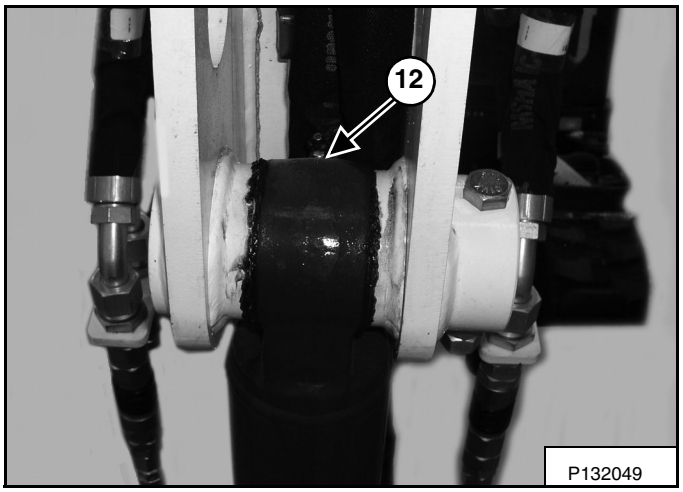
Figure 284



10. Arm Cylinder Rod End (1) **[Figure 284]**

11. Arm Pivot (1) **[Figure 284]**

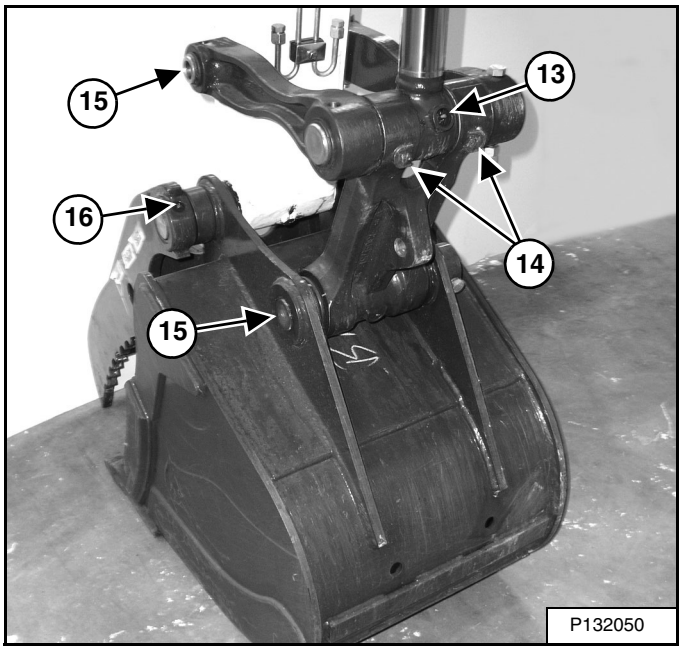
Figure 285



12. Bucket Cylinder Base End (1) **[Figure 285]**

Lubrication Locations (Cont'd)

Figure 286



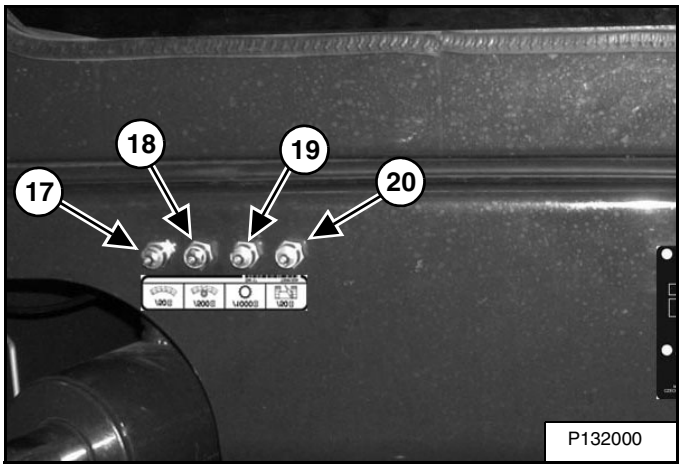
13. Bucket Cylinder Rod End (1) **[Figure 286]**

14. Bucket Link Pin (2) **[Figure 286]**

15. Bucket Pivot (3) **[Figure 286]**

16. Hydraulic Clamp (2) **[Figure 286]** (If Equipped)

Figure 287



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

17. Swing Bearing (1) **[Figure 287]**

18. Swing Pinion (1) **[Figure 287]**. (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.)

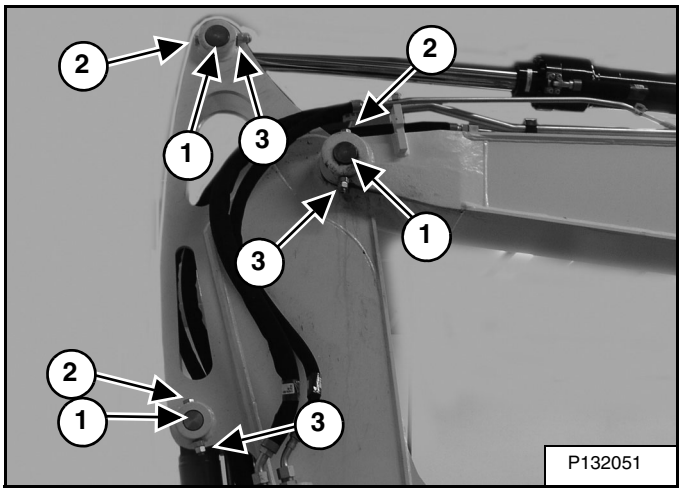
19. Swing Reduction Gear (1) **[Figure 287]**

20. Swing Cylinder (base end) (1) **[Figure 287]**

PIVOT PINS

Inspection And Maintenance

Figure 288



The pivots and cylinders (Item 1) have a large pin held in position with a bolt (Item 2) and double nuts (Item 3) **[Figure 288]** 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 stabilizer in the fuel tank and run the engine a few minutes to circulate the stabilizer to the pump and fuel injectors.

  If biodiesel blend fuel has been used, perform the following:

  Drain the fuel tank, refill with 100% petroleum diesel fuel, add fuel stabilizer, and operate the engine for at least 30 minutes.
- 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. 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.

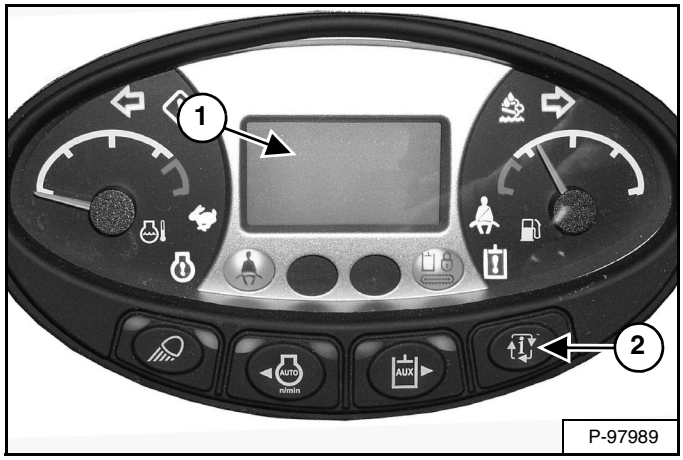
DIAGNOSTIC SERVICE CODES

Viewing Service Codes

The Service Codes will aid your dealer in diagnosing conditions that can damage your machine.

Standard Instrument Panel

Figure 289



Press the Information button (Item 2) to cycle the data display (Item 1) **[Figure 289]** 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 289]**.

NOTE: Corroded or loose grounds can cause multiple service codes and / or abnormal symptoms. All instrument panel lights flashing, alarm sounding, headlights and taillights flashing, can indicate a bad ground. The same symptoms can apply if the voltage is low, such as loose or corroded battery cables. If you observe these symptoms, check grounds 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.

Service Codes List

CODE		CODE	
E00065131	Injector #1 Fault	H0104	Boom Angle Sensor, No Communication
E00065231	Injector #2 Fault	H0204	Arm Angle Sensor, No Communication
E00065331	Injector #3 Fault	H0304	Bucket Angle Sensor, No Communication
E00065431	Injector #4 Fault	H0405	Arm Sensor Supply, Short to Battery
E00122111	ECU Safety Monitoring Fault	H0406	Arm Sensor Supply, Short to Ground
E00122119	ECU Safety Monitoring Fault		
E00122126	ECU Safety Monitoring Fault		
E00122127	ECU Safety Monitoring Fault	M0116	Air Filter Not Connected
E00122128	ECU Safety Monitoring Fault	M0117	Air Filter Not Connected
E00122129	ECU Safety Monitoring Fault		
		M0216	Hydraulic Filter Not Connected
H2521	Angle Blade Control Switch Out of Range High	M0217	Hydraulic Filter Plugged
H2522	Angle Blade Control Switch Out of Range Low		
H2524	Angle Blade Control Switch Out of NEUTRAL	M0309	Battery Voltage Low
		M0310	Battery Voltage High
H2605	Angle Blade Base Solenoid Short to Battery	M0311	Battery Voltage Extremely High
H2606	Angle Blade base Solenoid Short to Ground	M0314	Battery Voltage Extremely Low
H2607	Angle Blade Base Solenoid Open Circuit	M0322	Battery Voltage Out of Range Low
H2632	Angle Blade Base Solenoid Overcurrent		
H2705	Angle Blade Rod Solenoid Short to Battery	M0610	Engine Speed High
H2706	Angle Blade Rod Solenoid Short to Ground	M0611	Engine Speed Extremely High
H2707	Angle Blade Rod Solenoid Open Circuit	M0613	Engine Speed No Signal
H2732	Angle Blade Rod Solenoid Overcurrent	M0615	Engine Speed Shutdown
		M0618	Engine Speed Out of Range
H3128	Interrupted Power Failure	M0634	Engine Speed Invalid Data from ECU
H4423	Secondary Controller Not Programmed		
H4497	Secondary Controller Programmed	M0710	Hydraulic Oil Temperature High
		M0711	Hydraulic Oil Temperature Extremely High
H4621	5V Sensor Supply Out of Range High	M0715	Hydraulic Oil Temperature Shutdown
H4622	5V Sensor Supply Out of Range Low	M0721	Hydraulic Oil Temperature Out of Range High
		M0722	Hydraulic Oil Temperature Out of Range Low
H7404	Main Controller No Communication	M0810	Engine Coolant Temperature High
H7604	Display No Communication	M0811	Engine Coolant Temperature Extremely High
		M0815	Engine Coolant Temperature Shutdown
L0102	Lights Button Error On		
L0202	High Flow Button Error On	M0909	Fuel Level Low
L0302	Auxiliary Button Error On	M0921	Fuel Level Out of Range High
L0402	Information Button Error On	M0922	Fuel Level Out of Range Low
L7404	Gateway Controller No Communication	M1121	Console Sensor Out of Range High
		M1122	Console Sensor Out of Range Low
L7672	Display Panel programming Error	M1128	Console Sensor Failure

Service Codes List (Cont'd)

CODE		CODE	
M1705	Hydraulics Enable Solenoid Short to Battery	M4721	8V Sensor Supply Out of Range High
M1706	Hydraulics Enable Solenoid Short to Ground	M4722	8V Sensor Supply Out of Range Low
M1707	Hydraulics Enable Solenoid Open Circuit		
M1732	Hydraulics Enable Solenoid Overcurrent	M5002	Light Output Error On
		M5003	Light Output Error Off
M2005	Two Speed Solenoid Short to Battery		
M2006	Two Speed Solenoid Short to Ground	M5205	Offset Base Solenoid Short to Battery
M2007	Two Speed Solenoid Open Circuit	M5206	Offset Base Solenoid Short to Ground
		M5207	Offset Base Solenoid Open Circuit
		M5232	Offset Base Solenoid Overcurrent
M2202	Starter Output Error On		
M2203	Starter Output Error Off		
M2207	Starter Output Open Circuit	M5305	Offset Rod Solenoid Error On
M2228	Starter Output Failure	M5306	Offset Rod Solenoid Short to Ground
		M5307	Offset Rod Solenoid Open Circuit
		M5332	Offset Rod Solenoid Overcurrent
M2302	Starter Relay Error On		
M2303	Starter Relay Error Off		
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
M2721	Throttle Sensor Out of Range High		
M2722	Throttle Sensor Out of Range Low	M5505	Auxiliary Base Solenoid Short to Battery
		M5506	Auxiliary Base Solenoid Short to Ground
M3128	Interrupted Power Failure	M5507	Auxiliary Base Solenoid Open Circuit
		M5532	Auxiliary Base Solenoid Overcurrent
M3304	Deluxe Panel No Communication		
		M5605	Auxiliary Rod Solenoid Short to Battery
M3404	RFID Key Controller No Communication	M5606	Auxiliary Rod Solenoid Short to Ground
		M5607	Auxiliary Rod Solenoid Open Circuit
M3702	Hyd Exchange Output Error On	M5632	Auxiliary Rod Solenoid Overcurrent
M3703	Hyd Exchange Output Error Off		
		M5721	Auxiliary Control Switch Out of Range High
M4028	Wrong ECU Detected	M5722	Auxiliary Control Switch Out of Range Low
		M5724	Auxiliary Control Switch Out of NEUTRAL
M4109	Alternator Low		
M4110	Alternator High	M5810	Fuel Temperature High
		M5811	Fuel Temperature Extremely High
M4304	Keyless Start Panel No Communication	M5815	Fuel Temperature Shutdown
M4404	Secondary Controller No Communication	M6204	Load Moment Sensor In Error
M4621	5V Sensor Supply Out of Range High		
M4622	5V Sensor Supply Out of Range Low	M6402	Switched Power Relay Error On
		M6403	Switched Power Relay Error Off

DIAGNOSTICS SERVICE CODE (CONT'D)

Service Codes List (Cont'd)

CODE		CODE	
M6505	ECU Power Short to Battery	P0100	MAF sensor fault
M6506	ECU Power Short to Ground	P0102	MAF sensor fault
M6507	ECU Power Open Circuit	P0103	MAF sensor fault
		P0105	Manifold pressure sensor fault
M6604	ECU No Communication	P0107	Manifold pressure sensor fault
		P0108	Manifold pressure sensor fault
M6702	HVAC Output Error On	P0110	Intake manifold temperature sensor fault
M6703	HVAC Output Error Off	P0111	Intake manifold temperature fault
		P0112	Intake manifold temperature sensor fault
M7002	Switched Power Output Error On	P0113	Intake manifold temperature sensor fault
M7003	Switched Power Output Error Off	P0114	Intake manifold temperature sensor fault
M7007	Switched Power Output Open Circuit	P0116	Engine coolant temperature fault
M7028	Switched Power Output Failure	P0117	Water temperature sensor fault
		P0118	Water temperature sensor fault
M7423	Main Controller Not Programmed		
M7497	Main Controller Software Updated	P0180	Fuel temperature sensor fault
		P0181	Fuel temperature fault
M7748	Key Switch Multiple	P0182	Fuel temperature sensor fault
		P0183	Fuel temperature sensor fault
M7839	Hourmeter Changed		
		P0190	Rail pressure sensor fault
		P0191	Rail pressure fault
M8615	Engine Speed Derate Shutdown	P0192	Rail pressure sensor fault
M8625	Engine Speed Derate Unresponsive	P0193	Rail pressure sensor fault
		P0195	Engine oil temperature sensor fault
		P0196	Engine oil temperature fault
P00BC	Intake air volume fault	P0197	Engine oil temperature sensor fault
P00BD	Intake air volume fault	P0198	Engine oil temperature sensor fault
P0002	Rail pressure control fault	P0200	Injector fault
P0003	Rail pressure control fault	P0201	Injector #1 fault
P0004	Rail pressure control fault	P0202	Injector #2 fault
P0006	Rail pressure control fault	P0203	Injector #3 fault
P0007	Rail pressure control fault	P0204	Injector #4 fault
P0016	Cam or crank sensor fault	P0217	Engine temperature extremely high
		P0219	Engine speed extremely high
P0070	Intake air temperature sensor fault		
P0072	Intake air temperature sensor fault	P0237	Engine oil pressure sensor fault
P0073	Intake air temperature sensor fault	P0238	Engine oil pressure sensor fault
P0074	Intake air temperature sensor fault	P0241	Boost control fault
		P0242	Boost control fault
P0087	Rail pressure fault		
P0088	Rail pressure control fault	P0251	Rail pressure control fault
P0089	Rail pressure control fault	P0252	Rail pressure control fault
P0093	Intake air temperature fault	P0253	Rail pressure control fault

Service Codes List (Cont'd)

CODE		CODE	
P0258	Rail pressure control fault	P0371	Crank position sensor fault
P0259	Rail pressure control fault	P0372	Crank position sensor fault
		P0374	Crank position sensor fault
P025A	Inlet metering valve fault		
P025B	Inlet metering valve fault		
P025C	Inlet metering valve fault	P037E	Glow plug signal fault
P025D	Inlet metering valve fault	P037F	Glow plug signal fault
P0261	Injector #1 fault		
P0262	Injector #1 fault	P0380	Glow plug relay / intake heater fault
P0264	Injector #2 fault	P0383	Glow plug relay fault
P0265	Injector #2 fault	P0384	Glow plug relay fault
P0267	Injector #3 fault		
P0268	Injector #3 fault		
		P0401	EGR control fault
P0270	Injector #4 fault	P0402	EGR control fault
P0271	Injector #4 fault	P0403	EGR actuator fault
		P0404	EGR position fault
		P0405	EGR fault
P029A	Injector #1 fault	P0406	EGR actuator position fault
P029B	Injector #1 fault	P0407	EGR actuator position fault
P029E	Injector #2 fault	P0409	EGR actuator position fault
P029F	Injector #2 fault		
P02A2	Injector #3 fault	P046D	EGR actuator position fault
P02A3	Injector #3 fault		
P02A6	Injector #4 fault	P0524	Engine oil pressure low
P02A7	Injector #4 fault		
		P0543	Exhaust gas temperature sensor fault
P02EE	Injector #1 fault	P0544	Exhaust gas temperature sensor fault
P02EF	Injector #2 fault	P0545	Turbo temperature sensor fault
P02F0	Injector #3 fault	P0546	Turbo temperature sensor fault
P02F1	Injector #4 fault	P0547	Exhaust gas temperature sensor fault
		P0562	System voltage too low
P0325	Knock sensor error	P0563	System voltage too high
P0330	Knock sensor error		
P0335	Crank position sensor fault	P0602	Injector data fault
P0339	Crank position sensor fault	P0603	ECU fault
P0340	Cam signal fault	P0604	ECU fault
P0341	Cam signal fault	P0605	ECU fault
P0342	Cam signal fault	P0606	ECU fault
P0344	Cam signal fault		

Service Codes List (Cont'd)

CODE		CODE	
P060B	ECU fault	P160B	ECU safety monitoring fault
		P160C	ECU safety monitoring fault
P0611	Injector fault		
		P1611	ECU safety monitoring fault
P061B	ECU safety monitoring fault	P1612	ECU safety monitoring fault
P0628	High pressure pump fault		
P0629	High pressure pump fault	P1620	ECU safety monitoring fault
		P1621	ECU safety monitoring fault
		P1622	ECU safety monitoring fault
P062D	Injector #1 and #4 fault	P1623	ECU safety monitoring fault
P062E	Injector #2 and #3 fault	P1624	ECU safety monitoring fault
P062F	ECU fault	P1625	ECU safety monitoring fault
		P1626	ECU safety monitoring fault
		P1627	ECU safety monitoring fault
P0641	Sensor supply voltage fault		
P0651	Sensor supply voltage fault		
P0652	Sensor supply voltage fault	P162B	ECU safety monitoring fault
P0653	Sensor supply voltage fault		
		P1630	ECU safety monitoring fault
P0685	ECU main relay fault	P1631	ECU safety monitoring fault
P0687	ECU main relay fault	P1632	ECU safety monitoring fault
		P1633	ECU safety monitoring fault
P068A	ECU main relay fault	P1634	ECU safety monitoring fault
		P1635	ECU safety monitoring fault
		P1636	ECU safety monitoring fault
P0697	Sensor supply voltage fault	P1637	ECU safety monitoring fault
		P1638	ECU safety monitoring fault
P0C17	EGR position learning fault	P1660	ECU safety monitoring fault
P0C18	EGR position learning fault	P1661	ECU safety monitoring fault
		P1662	ECU safety monitoring fault
		P1663	ECU safety monitoring fault
P1219	ECU safety monitoring fault		
P1228	ECU safety monitoring fault		
		P1690	ECU safety monitoring fault
P1274	Fuel pump fault	P1691	ECU safety monitoring fault
P1275	Fuel pump fault	P1692	ECU safety monitoring fault
P1601	ECU safety monitoring fault	P16D2	ECU safety monitoring fault
P1602	ECU safety monitoring fault	P16D6	ECU safety monitoring fault
P1604	ECU safety monitoring fault	P16D8	ECU safety monitoring fault
P1606	ECU safety monitoring fault		
P1607	ECU safety monitoring fault	P1990	ECU fault

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List (Cont'd)

CODE		CODE	
		P3002	Exhaust temperature extremely high
P2080	Turbo temperature fault	P3003	Exhaust temperature extremely high
P2081	Turbo temperature sensor fault	P3004	Exhaust temperature extremely high
P2108	Intake throttle fault	P3006	Particulate matter warning
		P3007	Particulate matter too high
P2131	Throttle position sensor fault	P3008	Particulate matter extremely high
P2143	EGR motor fault	P3011	Boost pressure fault
P2144	EGR motor fault		
P2145	EGR motor fault	P3018	Exhaust temperature sensor fault
P2146	Injector #1 and #4 fault	P3019	Pump calibration error
P2147	Injector #1 and #4 fault		
P2148	Injector #1 and #4 fault	P3023	Exhaust gas temperature sensor fault
P2149	Injector #2 and #3 fault		
P2150	Injector #2 and #3 fault	P3025	Water temperature sensor fault
P2151	Injector #2 and #3 fault		
		R7404	No Communication To Main Controller
P2226	Barometric pressure fault	U0075	EGR communication error
P2228	Barometric pressure fault	U0076	EGR fault
P2229	Barometric pressure fault		
		U0077	ECU communication fault
P2264	Water in fuel sensor fault	U0081	EGR communication error
P2266	Water in fuel sensor fault	U0082	ECU communication fault
P2267	Water in fuel sensor fault	U0083	ECU communication fault
P2269	Water in fuel detected	U0084	ECU communication fault
		U0085	ECU communication fault
		U0086	ECU communication fault
P2413	EGR actuator fault	U0087	ECU communication fault
P2414	EGR motor fault	U0089	ECU communication fault
P2428	Exhaust over temperature fault		
		U0100	ECU communication error
P242C	EGR temperature sensor fault	U0140	Throttle position sensor fault
P242D	EGR temperature sensor fault		
P2621	Intake throttle lift sensor fault		
P2622	Intake throttle lift sensor fault		
P2BC4	Unknown SCR fault		

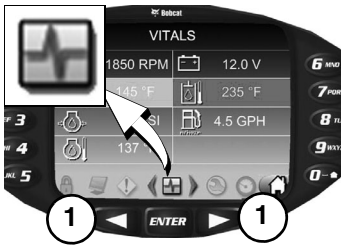
Panel Setup (Deluxe Instrument Panel)

Icon Identification

Figure 290

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

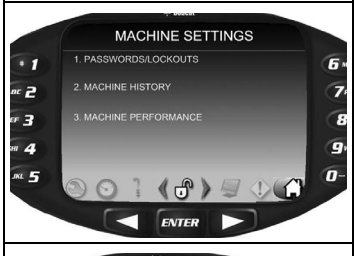
	Press a scroll button (Item 1) repeatedly until the Display screen icon (Inset) is highlighted.
	Select **[4. DISPLAY SETTINGS]**. Press **[1]** to cycle between ENGLISH and METRIC.

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:

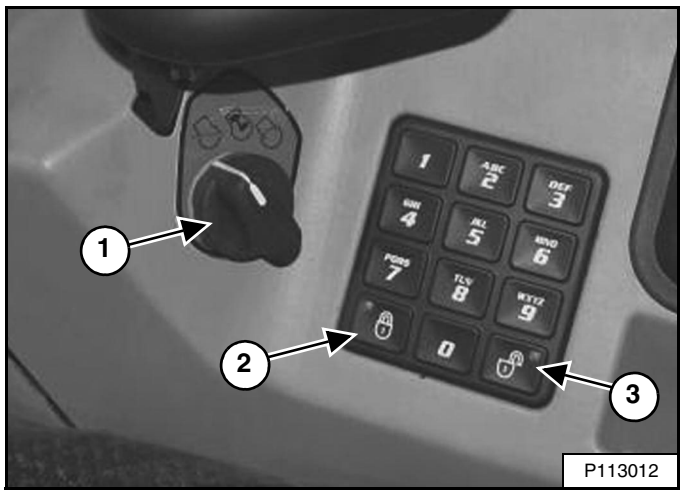
Allows for full use of the excavator. Must be used to change the owner password.

Changing The Owner Password

Turn the start switch (Item 1) **[Figure 291]** 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 291



Press and hold the lock (Item 2) and unlock (Item 3) **[Figure 291]** keys for 2 seconds.

The lock key red light will flash and the instrument panel display screen will show **[ENTER]**.

Enter a new five digit owner password using the number keys (1 through 0). An asterisk will show in the left panel display screen for each key press.

The instrument panel display screen will show **[AGAIN]**.

Enter the new five digit owner password again.

The lock key red light will become solid.

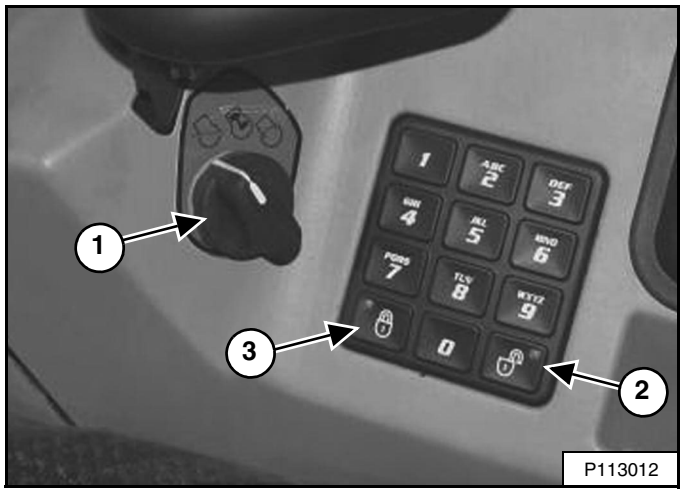
Password Lockout Feature

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.

Turn the start switch (Item 1) **[Figure 292]** 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 292



Press the unlock key (Item 2) **[Figure 292]**.

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 start switch to the ON position to turn on the excavators electrical system.

Press the lock key (Item 3) **[Figure 292]**.

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 178.) and (See Changing The User Passwords on Page 179.)

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.

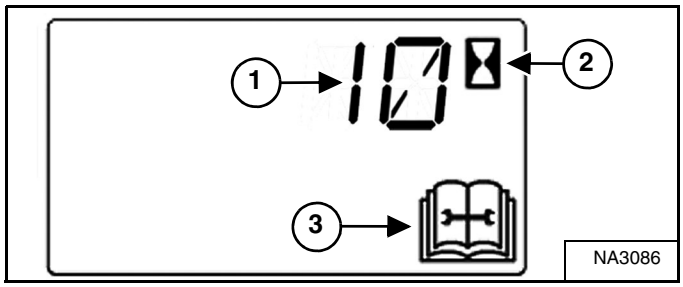
MAINTENANCE CLOCK

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 293



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 293]** flash.

NOTE: The display will show negative numbers after counting down to zero.

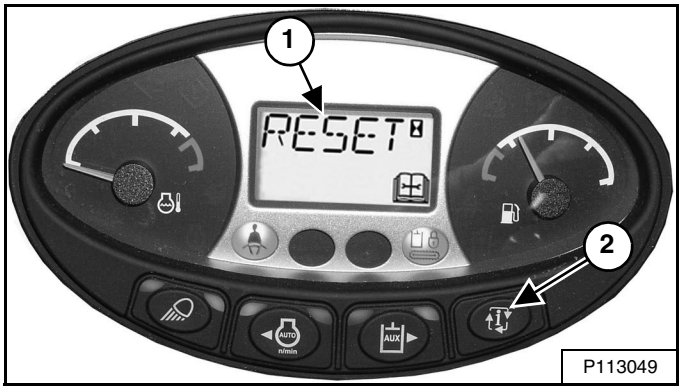
The display will revert to the previous display and will appear for 5 seconds every time the machine is started until the maintenance clock is reset.

Setup

See your Bobcat dealer about installation of this feature.

Reset

Figure 294

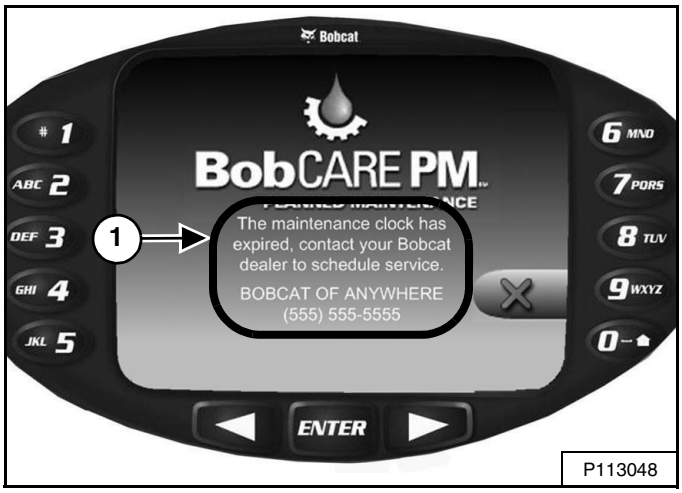


Press the Information button (Item 2) **[Figure 294]** until the display screen shows the maintenance clock.

Press and hold the Information button (Item 2) for 7 seconds until **[RESET]** (Item 1) **[Figure 294]** appears in the display screen.

Deluxe Instrument Panel

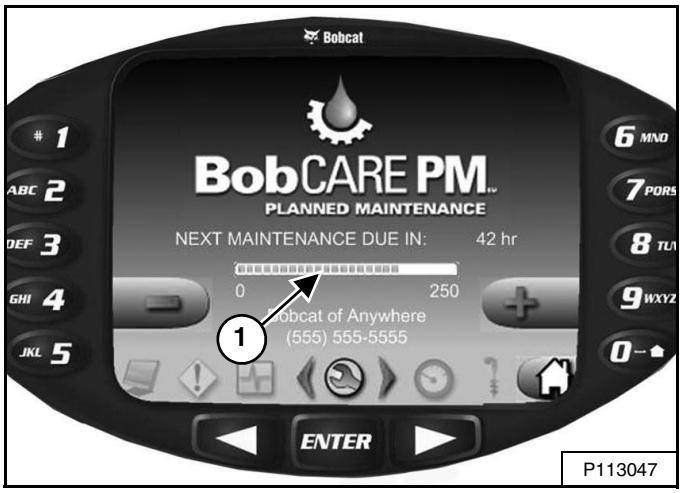
Figure 295



The Deluxe Instrument Panel (if equipped) will display a message (Item 1) **[Figure 295]** 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 296



The Deluxe Instrument Panel (if equipped) will display a bar (Item 1) **[Figure 296]** 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 296]**.

To reset the service clock after servicing the machine, press and hold key **[1] [Figure 296]** (when the owner is logged in) until the bar graph resets to 0.

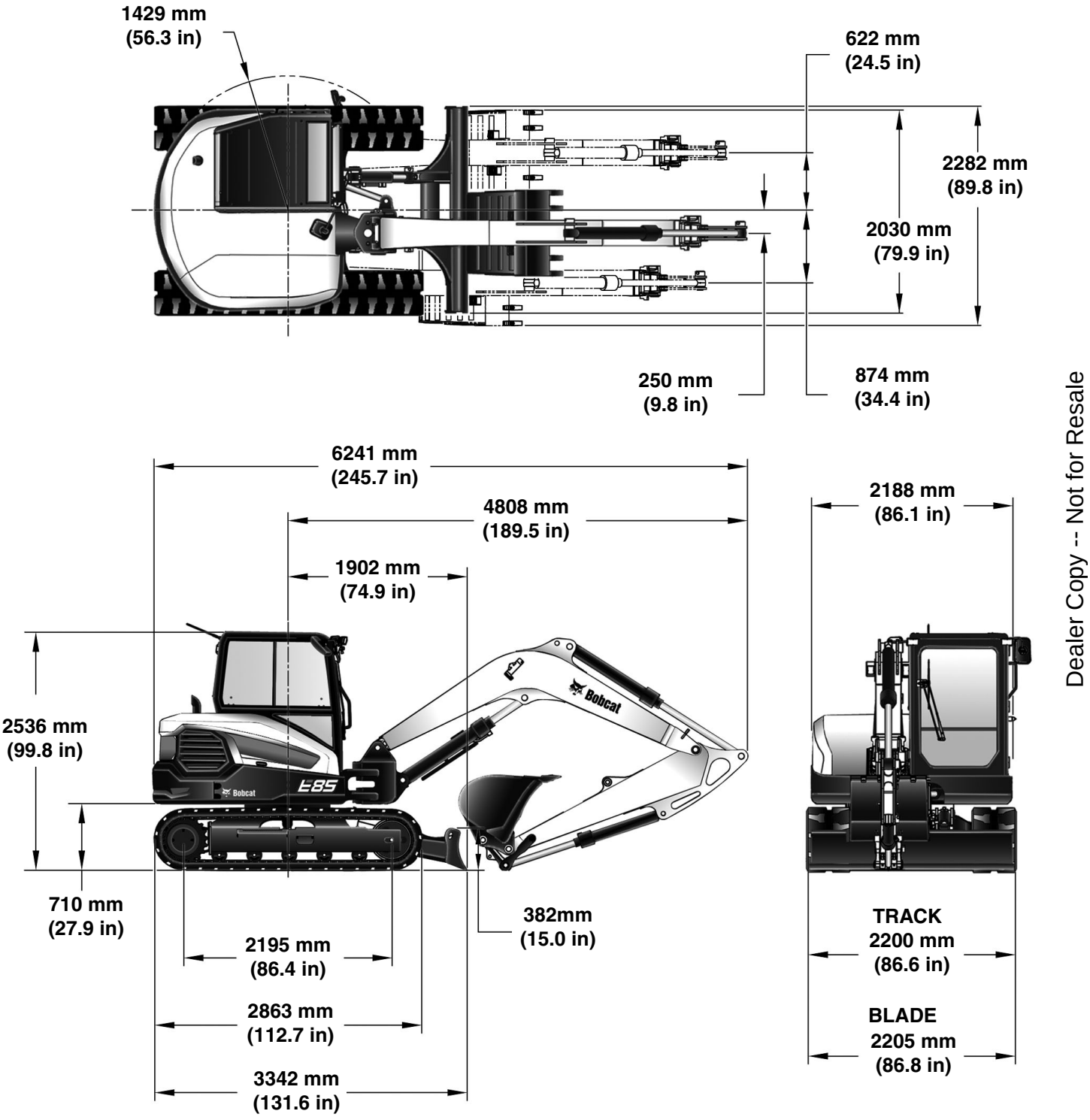
SPECIFICATIONS

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.

E85 EXCAVATOR SPECIFICATIONS

Excavator Machine Dimensions

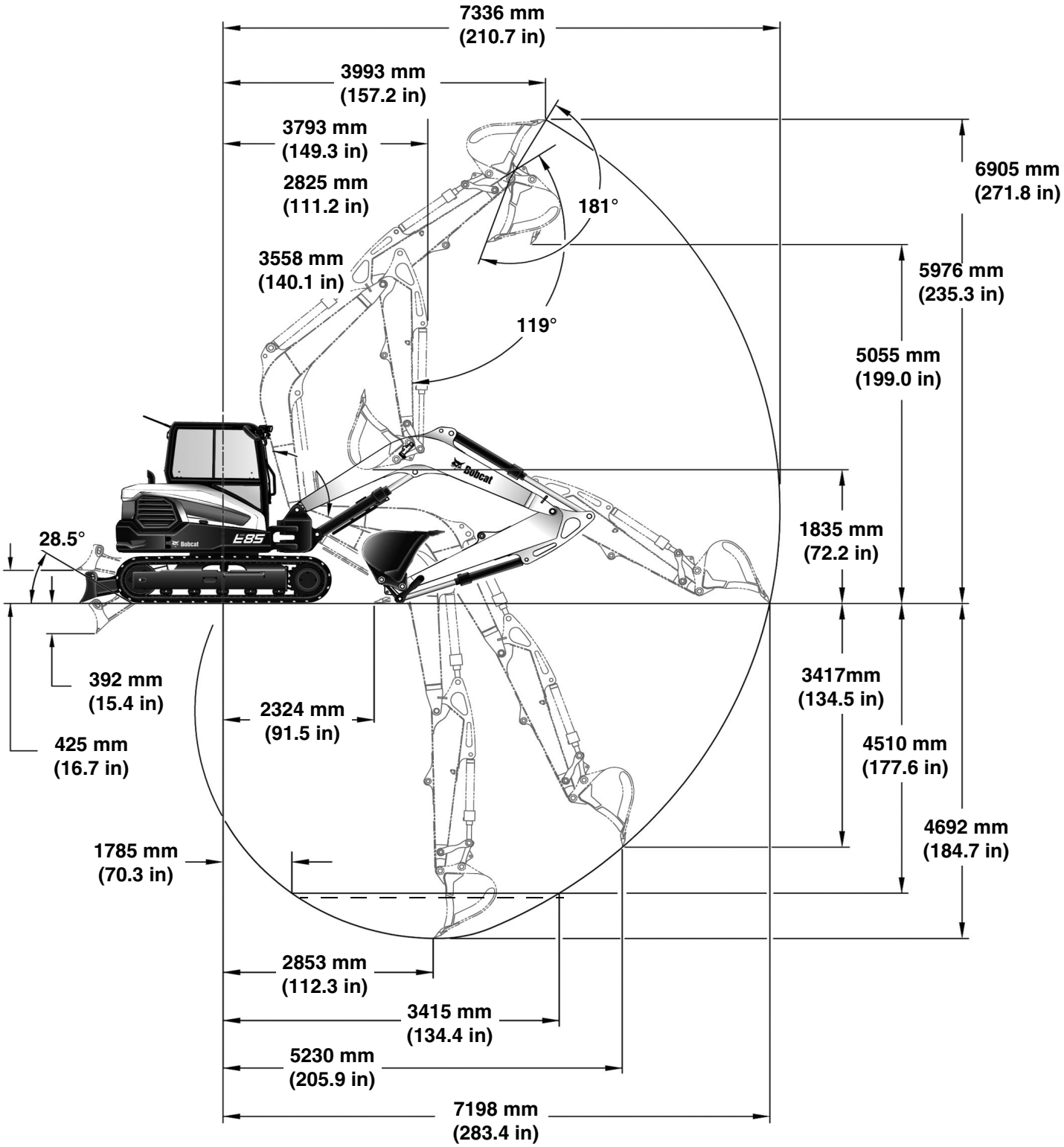
- Where applicable, specification conform to SAE or ISO standards and are subject to change without notice.



NA13735

Excavator Machine Dimensions (Cont'd)

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



NA13736

Rated Lift Capacity (With Standard Counterweight)

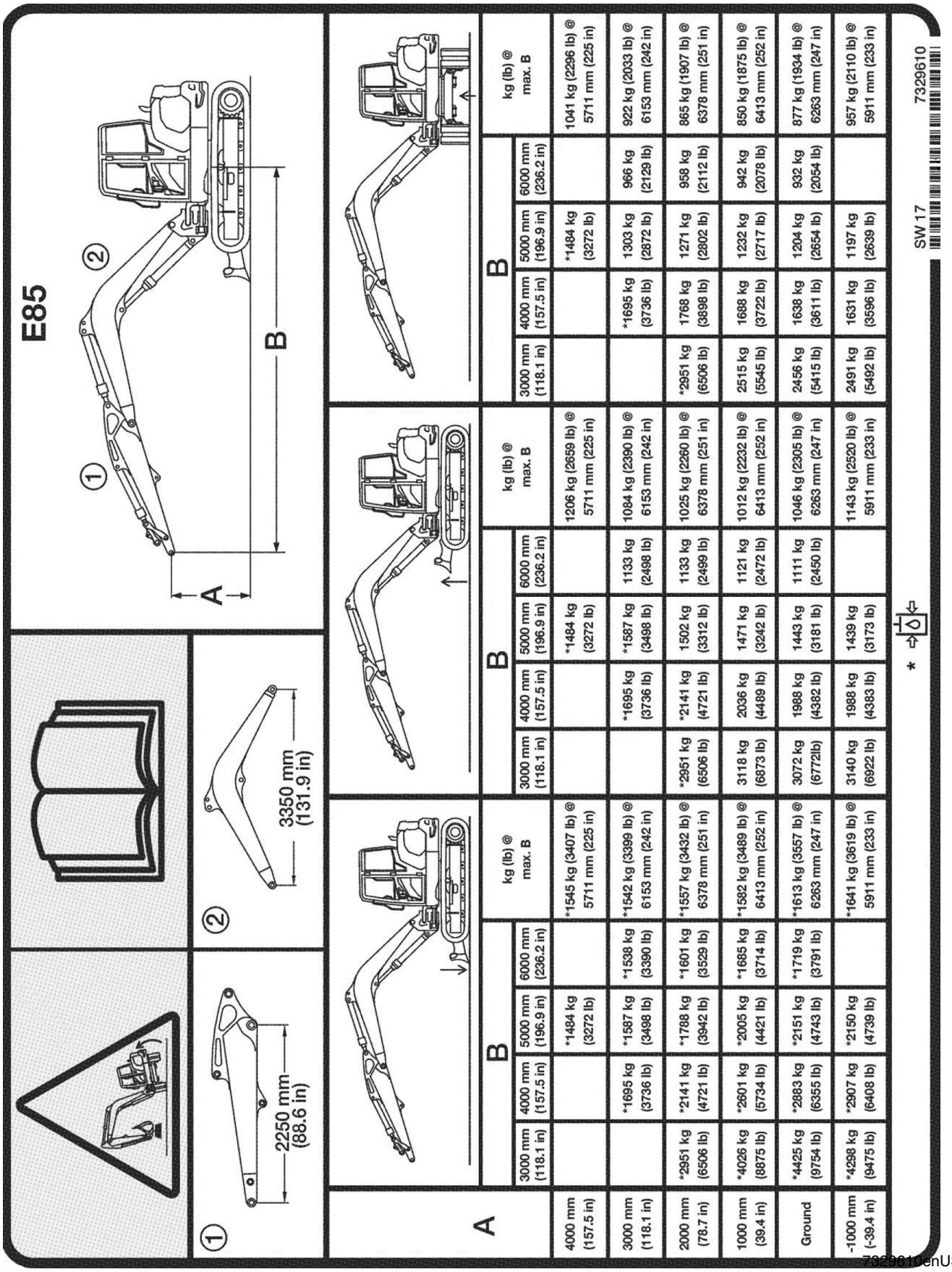
A	B											
	3000 mm (118.1 in)		4000 mm (157.5 in)		5000 mm (196.9 in)		6000 mm (236.2 in)		kg (lb) @ max. B		kg (lb) @ max. B	
4000 mm (157.5 in)					*1484 kg (3272 lb)				*1545 kg (3407 lb) @ 5711 mm (225 in)		1059 kg (2334 lb) @ 5711 mm (225 in)	907 kg (1999 lb) @ 5711 mm (225 in)
3000 mm (118.1 in)			*1695 kg (3736 lb)		*1587 kg (3498 lb)	*1484 kg (3272 lb)	*1538 kg (3390 lb)		*1542 kg (3399 lb) @ 6153 mm (242 in)		946 kg (2086 lb) @ 6153 mm (242 in)	797 kg (1758 lb) @ 6153 mm (242 in)
2000 mm (78.7 in)	*2951 kg (6506 lb)		*2141 kg (4721 lb)		*1788 kg (3942 lb)	*1557 kg (3432 lb) @ 6378 mm (251 in)	*1601 kg (3529 lb)	*1557 kg (3432 lb) @ 6378 mm (251 in)	*2141 kg (4721 lb)	*2951 kg (6506 lb)	891 kg (1965 lb) @ 6378 mm (251 in)	744 kg (1640 lb) @ 6378 mm (251 in)
1000 mm (39.4 in)	*4026 kg (8875 lb)	*2601 kg (5734 lb)	*2005 kg (4421 lb)	*1582 kg (3489 lb) @ 6413 mm (252 in)	*1685 kg (3714 lb)	*1582 kg (3489 lb) @ 6413 mm (252 in)	*1685 kg (3714 lb)	*1582 kg (3489 lb) @ 6413 mm (252 in)	*2005 kg (4421 lb)	*2601 kg (5734 lb)	878 kg (1936 lb) @ 6413 mm (252 in)	729 kg (1607 lb) @ 6413 mm (252 in)
Ground	*4425 kg (9754 lb)	*2883 kg (6355 lb)	*2151 kg (4743 lb)	*1613 kg (3557 lb) @ 6263 mm (247 in)	*1719 kg (3791 lb)	*1613 kg (3557 lb) @ 6263 mm (247 in)	*1719 kg (3791 lb)	*1613 kg (3557 lb) @ 6263 mm (247 in)	*2151 kg (4743 lb)	*2883 kg (6355 lb)	906 kg (1998 lb) @ 6263 mm (247 in)	751 kg (1656 lb) @ 6263 mm (247 in)
-1000 mm (-39.4 in)	*4298 kg (9475 lb)	*2907 kg (6408 lb)	*2150 kg (4739 lb)	*1641 kg (3619 lb) @ 5911 mm (233 in)		*1641 kg (3619 lb) @ 5911 mm (233 in)		*1641 kg (3619 lb) @ 5911 mm (233 in)	*2150 kg (4739 lb)	*2907 kg (6408 lb)	992 kg (2186 lb) @ 5911 mm (233 in)	821 kg (1810 lb) @ 5911 mm (233 in)

B					
3000 mm (118.1 in)	4000 mm (157.5 in)	5000 mm (196.9 in)	6000 mm (236.2 in)	kg (lb) @ max. B	
		1154 kg (2545 lb)		907 kg (1999 lb) @ 5711 mm (225 in)	
	*1695 kg (3736 lb)	1144 kg (2521 lb)	837 kg (1845 lb)	797 kg (1758 lb) @ 6153 mm (242 in)	
2388 kg (5265 lb)	1556 kg (3431 lb)	1110 kg (2447 lb)	828 kg (1825 lb)	744 kg (1640 lb) @ 6378 mm (251 in)	
2198 kg (4846 lb)	1473 kg (3247 lb)	1069 kg (2357 lb)	811 kg (1788 lb)	729 kg (1607 lb) @ 6413 mm (252 in)	
2131 kg (4698 lb)	1419 kg (3128 lb)	1039 kg (2290 lb)	799 kg (1762 lb)	751 kg (1656 lb) @ 6263 mm (247 in)	
2158 kg (4757 lb)	1408 kg (3105 lb)	1030 kg (2271 lb)		821 kg (1810 lb) @ 5911 mm (233 in)	

SW 17 7332147

7332147enUS-v

Rated Lift Capacity (With Additional Counterweight)



A	B											
	3000 mm (118.1 in)	4000 mm (157.5 in)	5000 mm (196.9 in)	6000 mm (236.2 in)	kg (lb) @ max. B	3000 mm (118.1 in)	4000 mm (157.5 in)	5000 mm (196.9 in)	6000 mm (236.2 in)	kg (lb) @ max. B	3000 mm (118.1 in)	4000 mm (157.5 in)	5000 mm (196.9 in)	6000 mm (236.2 in)	kg (lb) @ max. B
4000 mm (157.5 in)			*1484 kg (3272 lb)		*1545 kg (3407 lb) @ 5711 mm (225 in)			*1484 kg (3272 lb)		1206 kg (2659 lb) @ 5711 mm (225 in)			*1484 kg (3272 lb)		1041 kg (2296 lb) @ 5711 mm (225 in)
3000 mm (118.1 in)		*1695 kg (3736 lb)	*1587 kg (3498 lb)	*1538 kg (3390 lb)	*1542 kg (3399 lb) @ 6153 mm (242 in)		*1695 kg (3736 lb)	*1587 kg (3498 lb)	1133 kg (2498 lb)	1084 kg (2390 lb) @ 6153 mm (242 in)		*1695 kg (3736 lb)	1303 kg (2872 lb)	966 kg (2129 lb)	922 kg (2033 lb) @ 6153 mm (242 in)
2000 mm (78.7 in)	*2951 kg (6506 lb)	*2141 kg (4721 lb)	*1788 kg (3942 lb)	*1601 kg (3529 lb)	*1557 kg (3432 lb) @ 6378 mm (251 in)	*2951 kg (6506 lb)	*2141 kg (4721 lb)	1502 kg (3312 lb)	1133 kg (2499 lb)	1025 kg (2260 lb) @ 6378 mm (251 in)	*2951 kg (6506 lb)	1768 kg (3898 lb)	1271 kg (2802 lb)	958 kg (2112 lb)	865 kg (1907 lb) @ 6378 mm (251 in)
1000 mm (39.4 in)	*4026 kg (8875 lb)	*2601 kg (5734 lb)	*2005 kg (4421 lb)	*1685 kg (3714 lb)	*1582 kg (3489 lb) @ 6413 mm (252 in)	3118 kg (6873 lb)	2036 kg (4489 lb)	1471 kg (3242 lb)	1121 kg (2472 lb)	1012 kg (2232 lb) @ 6413 mm (252 in)	2515 kg (5545 lb)	1688 kg (3722 lb)	1232 kg (2717 lb)	942 kg (2078 lb)	850 kg (1875 lb) @ 6413 mm (252 in)
Ground	*4425 kg (9754 lb)	*2883 kg (6355 lb)	*2151 kg (4743 lb)	*1719 kg (3791 lb)	*1613 kg (3557 lb) @ 6263 mm (247 in)	3072 kg (6772lb)	1988 kg (4382 lb)	1443 kg (3181 lb)	1111 kg (2450 lb)	1046 kg (2305 lb) @ 6263 mm (247 in)	2456 kg (5415 lb)	1638 kg (3611 lb)	1204 kg (2654 lb)	932 kg (2054 lb)	877 kg (1934 lb) @ 6263 mm (247 in)
-1000 mm (-39.4 in)	*4298 kg (9475 lb)	*2907 kg (6408 lb)	*2150 kg (4739 lb)		*1641 kg (3619 lb) @ 5911 mm (233 in)	3140 kg (6922 lb)	1988 kg (4383 lb)	1439 kg (3173 lb)		1143 kg (2520 lb) @ 5911 mm (233 in)	2491 kg (5492 lb)	1631 kg (3596 lb)	1197 kg (2639 lb)		957 kg (2110 lb) @ 5911 mm (233 in)

* ⇦◊⇨

E85 EXCAVATOR SPECIFICATIONS (CONT'D)

Performance

E85	
operating weight (Includes cab with HVAC, rubber tracks, 609 mm (24 in) bucket and 75 kg (165 lb) operator)	8683 kg (19142 lb)
If equipped with the following, add:	Steel tracks, add 106 kg (234 lb); Segmented tracks, add 164 kg (362 lb); Additional Counterweight 407 kg (897 lb)
Travel Speed (Low / High)	2.7 km/h / 4.7 km/h (1.7 mph / 2.9 mph)
Digging Force (per ISO 6015)	
With Standard Arm	Arm - 36712 N (8253 lbf) Bucket - 72368 N (16269 lbf)
Drawbar Pull	68564 N (15414 lbf)

Controls

Steering	Two hand levers (with foot pedals)
Hydraulics	Two hand operated levers (joysticks) control boom, bucket, arm and upperstructure slew
Blade	Hand lever
Two-Speed	Switch on blade lever
Boom Offset 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 Hydraulic lock on motor Spring applied - hydraulic release

E85 EXCAVATOR SPECIFICATIONS (CONT'D)

Engine

Make / Model	Bobcat Engine / D24NAP Tier 4
Fuel / Cooling	Diesel / Liquid
Horsepower: – ISO 14396 Gross – SAE J1995 Gross	 48,5 kW (65.1 hp) @ 2100 rpm 49,2 kW (65.9 hp) @ 2100 rpm
Torque: – ISO 14396 Gross – SAE J1995 Gross	 248,0 N•m (183.0 ft-lb) @ 1600 rpm 251,5 N•m (185.5 ft-lb) @ 1600 rpm
Low Idle rpm	1195 – 1245
High Idle rpm	2075 – 2125
Number of Cylinders	4
Displacement	2392 cm^3 (146.0 in^3)
Bore / Stroke	90 mm / 94 mm (3.54 in / 3.70 in)
Lubrication	Gear Pump Pressure System with Filter
Crankcase Ventilation	Closed Breathing
Air Cleaner	Dry replaceable paper cartridge with separate safety element
Ignition	Diesel – Compression
Air Induction	Turbo-Charged and Charged Air Cooled
Engine Coolant	Propylene Glycol / Water Mixture
Starting Aid	Glow plugs automatically activated as needed in RUN position

Hydraulic System

Pump Type	Engine driven, single outlet, variable displacement, pressure compensating, load sensing, torque limiter, piston pump
Pump Capacity Piston Pump	 149,1 L/min (39.4 U.S. gpm)
Auxiliary Flow (Aux3)	95,0 L/min (25.1 U.S. gpm)
Auxiliary Flow - 2nd Aux (Female coupler) (Male coupler)	 62,0 L/min (16.4 U.S. gpm) 41,0 L/min (10.8 U.S. gpm)
Hydraulic Filter	Full flow replaceable, 3 micron synthetic media element
Control Valve	9 spool closed center individually compensated
Fluid Type	Bobcat Fluid, Hydraulic / Hydrostatic 6903117 - (2.5 U.S. gal) 6903118 - (5 U.S. gal) 6903119 - (55 U.S. gal)
System Relief Pressure	29500 kPa (295 bar) (4279 psi)
Slew Circuit	21570 kPa (216 bar) (3129 psi)
Travel Motor	28000 kPa (280 bar) (4061 psi)
Offset Circuit	38000 kPa (380 bar) (5511 psi)
Auxiliary Relief - Main - Second	21000 kPa (210 bar) (3045 psi) 20700 kPa (207 bar) (3002 psi)
Arm Port Relief, Base End And Rod End	34000 kPa (340 bar) (4931 psi)
Boom Port Relief, Base End And Rod End	34000 kPa (340 bar) (4931 psi)
Bucket Port Relief Base End And Rod End	34000 kPa (340 bar) (4931 psi)
Blade Port Relief Base End	38000 kPa (380 bar) (5511 psi)
Main Hydraulic Filter Bypass	340 kPa (3,4 bar) (50 psi)
Case Drain	172 kPa (1,7 bar) (25 psi)

Hydraulic Cylinders

Cylinder	Bore	Rod	Stroke
Boom (cushion up)	115 mm (4.52 in)	75 mm (2.95 in)	775 mm (30.51 in)
Arm	100 mm (3.93 in)	65 mm (1.75 in)	846 mm (33.30 in)
Bucket (cushion retract / extend)	85 mm (3.35 in)	55 mm (2.17 in)	690 mm (27.17 in)
Boom Swing (cushion left / right)	1016 mm (4.00 in)	57,2 mm (2.25 in)	697,2 mm (27.45 in)
Blade	100 mm (3.94 in)	60 mm (2.36 in)	149 mm (5.87 in)

Hydraulic Cycle Times

Bucket Curl	2.8 Seconds
Bucket Dump	1.8 Seconds
Arm Retract	3.0 Seconds
Arm Extend	2.9 Seconds
Boom Raise	4.7 Seconds
Boom Lower	4.6 Seconds
Boom Swing Left	5.6 Seconds
Boom Swing Right	5.3 Seconds
Blade Raise	2.2 Seconds
Blade Lower	2.2 Seconds

Drive System

Final Drive	Each track is driven by hydrostatic axial piston motor
Type of Reduction	50.1:1 two stage planetary

Slew System

Slew Motor	Axel piston connected to a planetary drive
Slew Circle	Single row shear type ball bearing with internal gear
Slew Speed	9.0 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	2200 mm (86.6 in)

Capacities

Fuel Tank	116,0 L (30.6 U.S. gal)
Hydraulic Reservoir Only (Center of Sight Glass)	22,7 L (6.0 U.S. gal)
Hydraulic System (with Reservoir)	83,0 L (22.0 U.S. gal)
Cooling System	10.0 L (2.65 U.S. gal)
Engine Oil and Filter	8,6 L (9.1 qt)
Slew Motor Gear Box	1,5 L (1.6 qt)
Final Drive (each)	1,1 L (1.16 qt)
Air Conditioning Refrigerant (R-134a)	1,36 kg (3.0 lb)

Electrical

Starting Aid	Glow Plugs
Alternator	12 volt, 90 Amp open frame w / internal regulator
Battery	12 volt - 1000 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.

Tracks

Type	Rubber	Steel	Segmented
Width	450 mm (17.7 in)	450 mm (17.7 in)	450 mm (17.7 in)
Number Of Shoes	Single Assembly	39	39
Number of Track Rollers (per side)	5	5	5

Ground Pressure

Rubber Tracks	38,3 kPa (0,383 bar) (5.56 psi)
Steel Tracks	38,8 kPa (0,388 bar) (5.63 psi)
Segmented Tracks	39,1 kPa (0,391 bar) (5.67 psi)

WARRANTY

Bobcat Excavators

Bobcat Company warrants to its authorized dealers and authorized dealers of Bobcat Equipment Ltd., who in turn warrant to the owner, that each new Bobcat excavator with a delivery date on or after January 1, 2019 will be free from proven defects in material and workmanship with respect to (i) all components of the product except as otherwise specified herein for twenty-four (24) months, or a total of 2000 hours of use, whichever occurs first, (ii) tracks for twelve (12) months on a prorated basis based on the remaining depth of the track at the time any defect is discovered, (iii) Bobcat brand batteries, for an initial twelve (12) month warranty period and for an additional twelve (12) months thereafter, Bobcat Company shall reimburse a fixed portion of the cost of replacing the battery as designated by Bobcat in the event of a proven defect and (iv) auxiliary hydraulic quick couplers for six (6) months or 200 hours of use, whichever occurs first. The foregoing time periods shall all commence after delivery by the authorized Bobcat dealer to the original buyer.

During the warranty period, the authorized Bobcat dealer shall repair or replace, at Bobcat Company's option, without charge for parts and labor, any part of the Bobcat product except as otherwise specified herein which fails because of defects in material or workmanship. The owner shall provide the authorized Bobcat dealer with prompt written notice of the defect and allow reasonable time for repair or replacement. Bobcat Company may, at its option, require failed parts to be returned to the factory. Travel time of mechanics and transportation of the Bobcat product to the authorized Bobcat dealer for warranty work are the responsibility of the owner. The remedies provided in this warranty are exclusive.

This warranty does not cover replacement of scheduled service items such as oil, filters, tune-up parts, and other high-wear items. This warranty does not cover damages resulting from abuse, accidents, alterations, use of the Bobcat product with any accessory or attachment not approved by Bobcat Company, air flow obstructions, or failure to maintain or use the Bobcat product according to the instructions applicable to it.

THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES AND CONDITIONS, EXCEPT THE WARRANTY OF TITLE. BOBCAT COMPANY DISCLAIMS ALL OTHER WARRANTIES AND CONDITIONS, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL BOBCAT COMPANY OR THE AUTHORIZED BOBCAT DEALER BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHATSOEVER, INCLUDING, BUT NOT LIMITED TO, LOSS OR INTERRUPTION OF BUSINESS, LOST PROFITS, OR LOSS OF MACHINE USE, WHETHER BASED ON CONTRACT, WARRANTY, TORT, NEGLIGENCE, STRICT LIABILITY, STATUTE OR OTHERWISE, EVEN IF BOBCAT COMPANY OR THE AUTHORIZED BOBCAT DEALER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. THE TOTAL LIABILITY OF BOBCAT COMPANY AND THE AUTHORIZED BOBCAT DEALERS WITH RESPECT TO THE PRODUCT AND SERVICES FURNISHED HEREUNDER SHALL NOT EXCEED THE PURCHASE PRICE OF THE PRODUCT UPON WHICH SUCH LIABILITY IS BASED.

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Bobcat Company

FEDERAL & CALIFORNIA EMISSION CONTROL SYSTEMS LIMITED WARRANTY for NON-ROAD ENGINES (CI)

OWNER'S WARRANTY RIGHTS AND OBLIGATIONS

The U.S. Environmental Protection Agency (EPA), the California Air Resources Board (ARB), and Bobcat Company are pleased to explain the Federal and California Emission Control System Warranty on your 2018MY to 2020MY non-road engine. DOOSAN INFRACORE has designed, built and equipped the engine so as to conform at the time of sale with all applicable regulations of the EPA and of the California ARB. In California, new heavy-duty off-road engines must be designed, built and equipped to meet the State's stringent anti-smog standards.

Bobcat Company must warrant to the initial owner, and each subsequent owner, the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect, improper maintenance or unapproved modifications of your engine. Your emission control system may include those parts listed below:

1. **Fuel Metering System**
   Fuel Supply Pump (HP Pump), Injector, Common Rail, Glow Plug
2. **Air-Induction System**
   Intake Manifold, Turbocharger System
3. **Exhaust Gas Recirculation (EGR) System**
   EGR Valve, EGR Cooler
4. **Catalyst or Thermal Reactor System**
   Diesel Oxidation Catalyst (DOC), Exhaust Manifold
5. **Positive Crankcase Ventilation (PCV) System**
   PCV Valve
6. **Electronic Control System**
   ECU, Cam / Crank Sensor, Coolant Temperature Sensor, MAF Sensor, MAP Sensor (Manifold Pressure Sensor), Inlet Boost Temperature Sensor, Fuel Temperature Sensor, Common Rail Pressure Sensor
7. **Miscellaneous Items Used In Above Systems**
   Temperature and time sensitive valve and switches
   Solenoids and wiring harnesses
   Hoses, clamps, fittings and tubing, sealing gasket
   Emission control information labels

Where a warrantable condition exists, Bobcat Company will repair your heavy-duty off-road engine at no cost to you including diagnosis, parts, and labor.

MANUFACTURER'S WARRANTY COVERAGE

The 2018MY to 2020MY heavy-duty off-road engines are warranted for **five years or 3,000 hours** of operation, whichever occurs first. If any emission-related part on your engine is defective, the part will be repaired or replaced by Bobcat Company.

The warranty period shall begin on the date the machine is delivered to the first retail customer.

OWNER'S WARRANTY RESPONSIBILITIES

As the heavy-duty off-road engine owner, you are responsible for the performance of the **required maintenance listed in the Operation and Maintenance Manual.** Bobcat Company recommends that you retain all receipts covering maintenance on your heavy-duty off-road engine, but Bobcat Company cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

As the heavy-duty off-road engine owner, you should however be aware that Bobcat Company may deny you warranty coverage if your heavy-duty off-road engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

Your engine is designed to operate on **Ultra Low Sulfur Diesel Fuel Only**. Use of any other fuel may result in your engine no longer operating in compliance with the EPA's emissions requirements.

You are responsible for initiating the warranty process. The EPA and California ARB suggest that you present your heavy-duty off-road engine to your Bobcat dealer as soon as a problem exists. The warranty repairs should be completed by the dealer as expeditiously as possible.

If you have any questions regarding your warranty rights and responsibilities, you should contact your nearest authorized Bobcat dealer. To locate a Bobcat dealer, visit www.bobcat.com or call 1-800-743-4340, or contact:

Bobcat Company
250 East Beaton Drive
West Fargo, ND 58078

6990972 (02-18)

Bobcat

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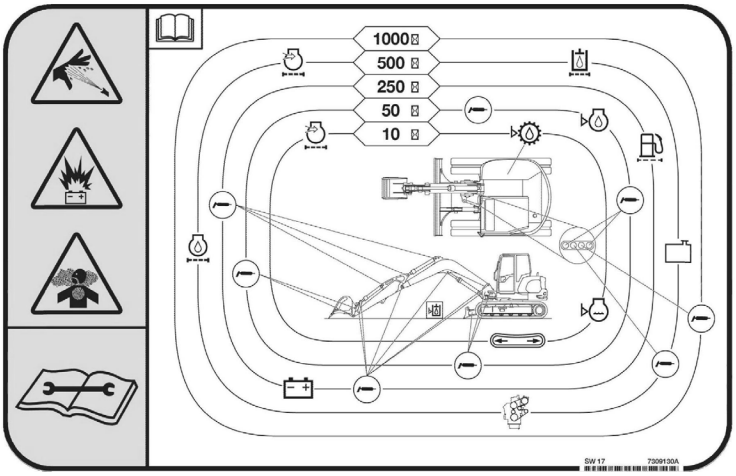
ALPHABETICAL INDEX

SERVICE SCHEDULE SYMBOLS



Check Engine Oil	**Check Gear Box and / or Travel Motor Fluid**
Change Engine Oil and Filter	**Change Gear Box and / or Travel Motor Fluid**
Check Engine Coolant	**Check Track Tension, Adjust As Needed**
Change Engine Coolant	**Check Belt Tension, Adjust Or Replace As Needed**
Check Engine Air Filter, Change As Necessary	**Lubricate Grease Fittings**
Drain Contaminants From Fuel Filter	**Seat Belt**
Drain Contaminants From Fuel Tank	**Cab / Canopy**
Change Fuel Filter	**Spark Arrestor Muffler**
Check Hydraulic Fluid	
Change Hydraulic Fluid and Filter(s)	

WARNING: Cancer and Reproductive Harm.

For more information go to www.P65Warnings.ca.gov.

WARNING: Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to www.P65warnings.ca.gov/diesel.