EN

Operation & Maintenance Manual

Compact Excavator

E50z S/N: B4TC11001 & Above

7417468enGB (0)
March 2021

Printed in Belgium
Original Instructions

iT4-K

OPERATOR SAFETY WARNINGS

• Never operate without instructions. Read machine signs (decals), Operation & Maintenance Manual, and Operator's Handbook.
• Operator must have instructions before operating the machine. Untrained operators can cause injury or death.

SAFETY EQUIPMENT

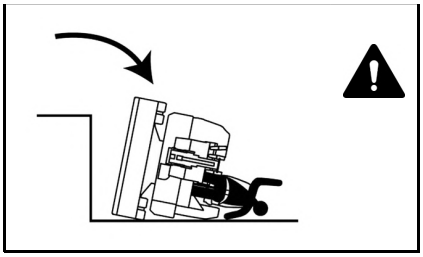
The Bobcat® excavator must be equipped with safety items necessary for each job. Ask your Bobcat dealer for information on the availability and safe use of attachments and accessories.

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

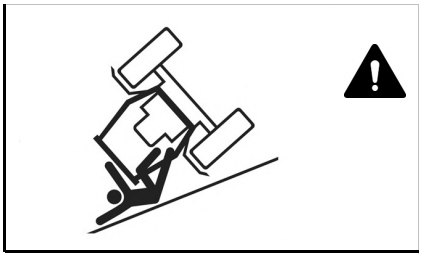
OPERATOR SAFETY WARNINGS

This Safety Alert Symbol means: “Attention! Be Alert! Your Safety is Involved!” Carefully read the message that follows.

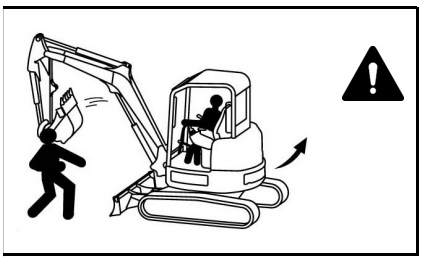
• Do not grasp controls when entering cab / canopy.
• Be sure controls are in neutral before starting.
• Sound horn and check behind machine before starting.



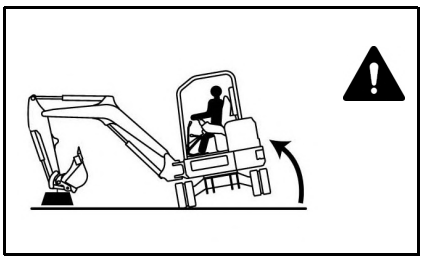
• Never operate without approved cab / canopy.
• Never modify equipment.
• Never use attachments not approved by Bobcat Company.



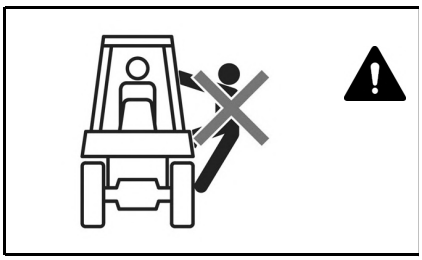
• Never exceed a 15° slope to the side.
• Never travel up a slope that exceeds 15°.
• Never exceed 25° when going down or backing up a slope.



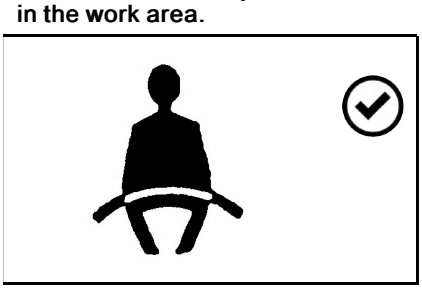
• Keep bystanders out of maximum reach area.
• Do not travel or turn with bucket extended.
• Look in the direction of rotation and make sure no bystanders are in the work area.



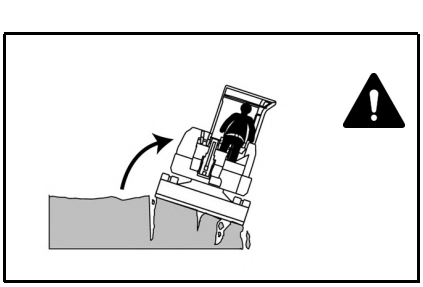
• Use caution to avoid tipping. Do not swing a heavy load over side of track.
• Operate on flat, level ground.



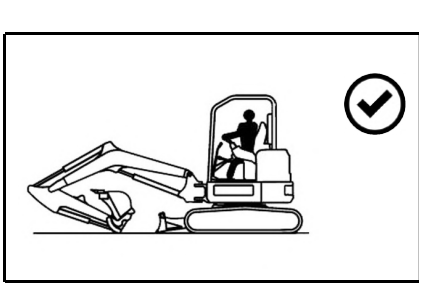
• Never carry riders.



• Fasten seat belt securely.
• Operate controls only from operator’s seat.



• Avoid steep areas or banks that could break away.



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

INTRODUCTION

This Operation & Maintenance Manual was written to give the owner / operator instructions on the safe operation and maintenance of the Bobcat machine. Read and understand this Operation & Maintenance Manual before operating your Bobcat machine. If you have any questions, see your Bobcat dealer. This manual may illustrate options and accessories not installed on your machine.

Bobcat Company Is ISO 9001 Certified

NA3495c

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

British Standards Institute (BSI) is the Certified Registrar that Bobcat Company chose to assess the company's compliance with 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 that Bobcat Company chose to assess the company's compliance with ISO 9001 at Bobcat's manufacturing facility in Dobriš (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.

MANUFACTURING LOCATIONS

North America

Bobcat Company
250 E. Beaton Drive
West Fargo, ND 58078
USA

Czech Republic

Doosan Bobcat EMEA s.r.o.
U Kodetky 1810
263 12 Dobřiš
Czech Republic

SERIAL NUMBER LOCATIONS

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

Machine Serial Number Location

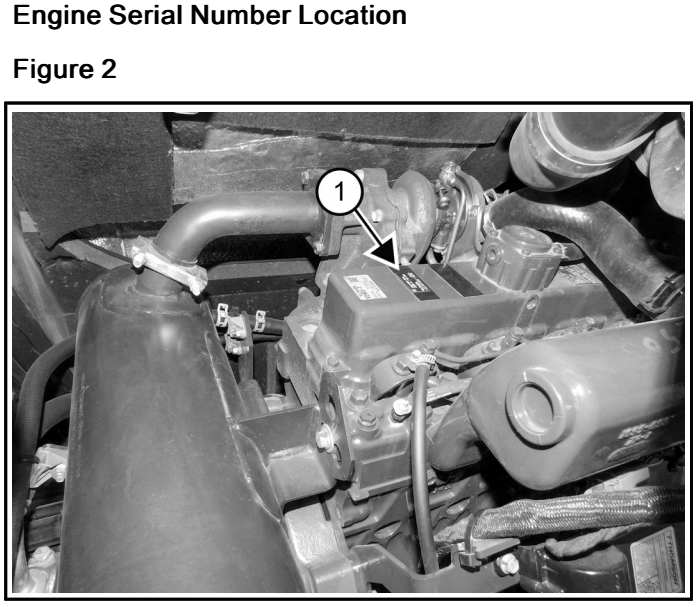
Figure 1

C206254a

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

Engine Serial Number Location

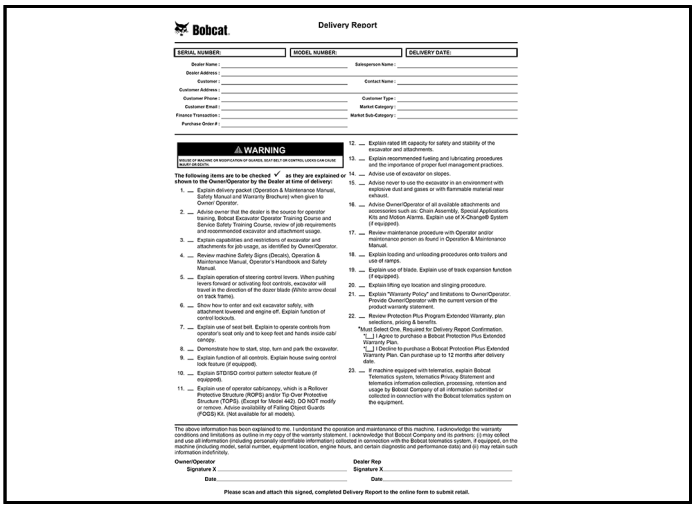
Figure 2



The engine serial number (Item 1) [Figure 2] is located on the engine in the location shown.

DELIVERY REPORT

Figure 3



Bobcat.

Delivery Report

SERIAL NUMBER:	MODEL NUMBER:	DELIVERY DATE:

Dealer Name :
Dealer Address :
Customer :
Customer Address :
Customer Phone :
Customer Email :
Finance Transaction :
Purchase Order # :

Salesperson Name :
Contact Name :
Customer Type :
Market Category :
Market Sub-Category :

⚠ WARNING

FAILURE OF MACHINE OR MODIFICATION OF GUARDS, SEAT BELT OR CONTROL LOCKS CAN CAUSE SERIOUS INJURY OR DEATH.

The following items are to be checked ✓ as they are explained or shown to the Owner/Operator by the Dealer at time of delivery:

1. ___ Explain delivery packet (Operation & Maintenance Manual, Safety Manual and Warranty Brochure) when given to Owner/ Operator.
2. ___ Advise owner that the dealer is the source for operator training. Bobcat Excavator Operator Training Course and Service Safety Training Course, review of job requirements and recommended excavator and attachment usage.
3. ___ Explain capabilities and restrictions of excavator and attachments for job usage, as identified by Owner/Operator.
4. ___ Review machine Safety Signs (Decals), Operation & Maintenance Manual, Operator's Handbook and Safety Manual.
5. ___ Explain operation of steering control levers. When pushing levers forward or activating foot controls, excavator will travel in the direction of the dozer blade (White arrow decal on track frame).
6. ___ Show how to enter and exit excavator safely, with attachment lowered and engine off. Explain function of control lockout.
7. ___ Explain use of seat belt. Explain to operate controls from operator's seat only and to keep feet and hands inside cab/ canopy.
8. ___ Demonstrate how to start, stop, turn and park the excavator.
9. ___ Explain function of all controls. Explain house swing control lock feature (if equipped).
10. ___ Explain STD/ISO control pattern selector feature (if equipped).
11. ___ Explain use of operator cab/canopy, which is a Rollover Protective Structure (ROPS) and/or Top Over Protective Structure (TOPS). (Except for Model 442). DO NOT modify or remove. Advise availability of Falling Object Guards (FOGS) Kit. (Not available for all models).
12. ___ Explain rated lift capacity for safety and stability of the excavator and attachments.
13. ___ Explain recommended fueling and lubricating procedures and the importance of proper fuel management practices.
14. ___ Advise use of excavator on slopes.
15. ___ Advise never to use the excavator in an environment with explosive dust and gases or with flammable material near exhaust.
16. ___ Advise Owner/Operator of all available attachments and accessories such as: Chain Assembly, Special Applications Kits and Motion Alarms. Explain use of X-Change® System (if equipped)
17. ___ Review maintenance procedure with Operator and/or maintenance person as found in Operation & Maintenance Manual.
18. ___ Explain loading and unloading procedures onto trailers and use of ramps.
19. ___ Explain use of blade. Explain use of track expansion function (if equipped).
20. ___ Explain lifting eye location and slinging procedure.
21. ___ Explain "Warranty Policy" and limitations to Owner/Operator. Provide Owner/Operator with the current version of the product warranty statement.
22. ___ Review Protection Plus Program Extended Warranty, plan selections, pricing & benefits.
*Must Select One. Required for Delivery Report Confirmation.
*(__) I Agree to purchase a Bobcat Protection Plus Extended Warranty Plan.
*(__) I Decline to purchase a Bobcat Protection Plus Extended Warranty Plan. Can purchase up to 12 months after delivery date.
23. ___ If machine equipped with telematics, explain Bobcat Telematics system, telematics Privacy Statement and telematics information collection, processing, retention and usage by Bobcat Company of all information submitted or collected in connection with the Bobcat telematics system on the equipment.

The above information has been explained to me. I understand the operation and maintenance of this machine. I acknowledge the warranty conditions and limitations as outline in my copy of the warranty statement. I acknowledge that Bobcat Company and its partners: (i) may collect and use all information (including personally identifiable information) collected in connection with this Bobcat telematics system, if equipped, on the machine (including model, serial number, equipment location, engine hours, and certain diagnostic and performance data) and (ii) may retain such information indefinitely.

Owner/Operator
Signature X
Date

Dealer Rep
Signature X
Date

Please scan and attach this signed, completed Delivery Report to the online form to submit retail.

NA15473

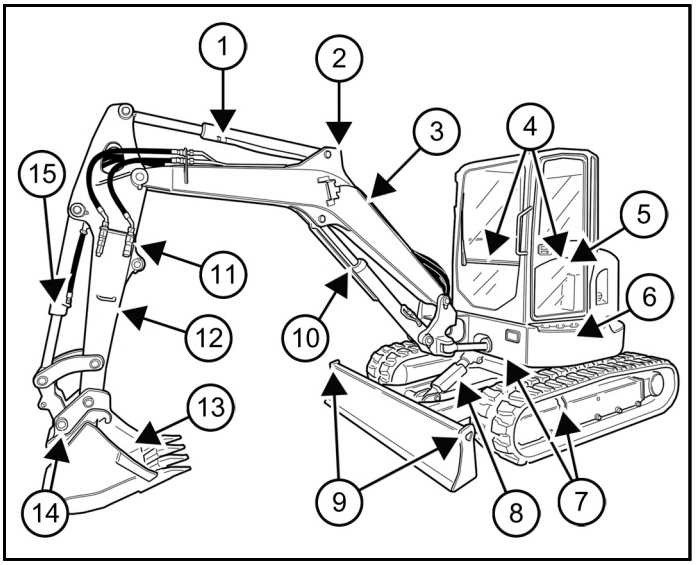
The delivery report contains a list of items that must be explained or shown to the owner or operator by the dealer when the machine is delivered.

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

EXCAVATOR IDENTIFICATION

Front View

Figure 4



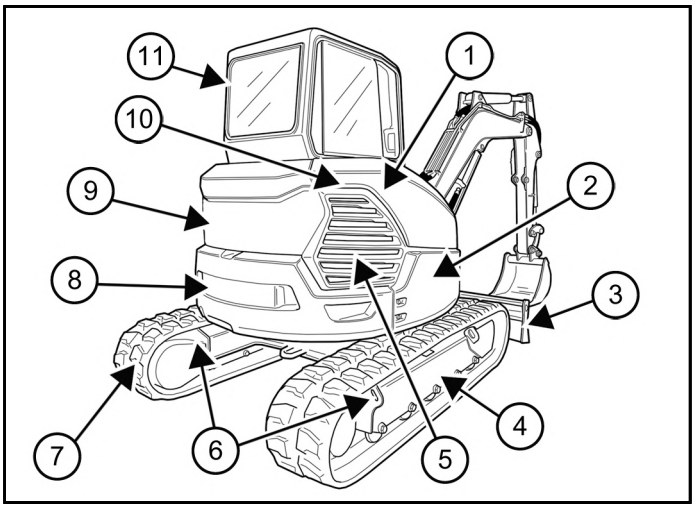
NA18172f

REF	DESCRIPTION
1	Arm Cylinder
2	Lift Point
3	Boom
4	Joysticks
5	Operator's Seat with Seat Belt (location of Operation & Maintenance Manual)
6	Upperstructure
7	Tie-Downs (both sides)
8	Blade Cylinder
9	Tie-Downs / Lift Points
10	Boom Cylinder
11	Auxiliary Hydraulic Couplers
12	Arm
13	Bucket [A]
14	Attachment Mounting System [B] (if equipped)
15	Bucket Cylinder

[A] Several different buckets and other attachments are available.
[B] Optional attachment couplers are available.

Rear View

Figure 5



NA18173b

REF	DESCRIPTION
1	Right Side Cover
2	Right Side Panel
3	Blade
4	Track Frame
5	Right Side Grille
6	Tie-Downs (both sides)
7	Tracks [A] (both sides)
8	Counterweight
9	Tailgate
10	Operator's Handbook (in right console)
11	Canopy [B] / Cab (ROPS / TOPS / FOPS) [C]

[A] Optional tracks are available.
[B] Canopy is not available in all areas. Contact your local Bobcat dealer for more information.
[C] Roll-Over Protective Structure (ROPS) / Tip-Over Protective Structure (TOPS) per ISO 12117–2 and ISO 12117. Falling Object Protective Structure (FOPS) / Top Guard per ISO 10262 (Level 1).

FEATURES, ACCESSORIES, AND ATTACHMENTS

Standard Items

The following items are standard for this model:

- Advanced Diagnostics
- Arm-Mounted Auxiliary Hydraulics and Quick Couplers
- Auto-Shift Drive Motors
- Battery Disconnect Switch
- Canopy with ROPS / TOPS / FOPS Approval
- Counterweight
- Dozer Blade (1960 mm (77.2 in))
- Engine and Hydraulic System Monitor with Shut Down
- Engine Speed Control Dial with Auto Idle Feature
- Fuel Filter with Water Bowl
- Horn
- Hydraulic and Travel Control Lockouts
- Hydraulic Joystick Controls
- Joystick Pattern Selector
- Long Arm
- Pin-On X-Change
- Retractable Seat Belt
- Rubber Tracks
- Standard Panel
- Two-Speed Travel
- Upperstructure Light
- Vinyl Suspension Seat

Options And Accessories

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

- Attachment Quick Coupler – German Style
- Attachment Quick Coupler – Hydraulic Pin Grabber
- Attachment Quick Coupler – Klac™ System
- Beacon Kit
- Block Heater Kit
- Cab With Heater and HVAC
- Cab / Canopy Rear-Mounted Lights
- Cloth Suspension Or Heated Cloth Suspension Seat
- Direct to Tank Kit
- Engine Louver
- Front Guard Kit
- Load Holding Valve - Arm
- Load Holding Valve - Boom
- Overload Warning Device
- Radio
- Rearview Camera
- Secondary Auxiliary Hydraulics
- Side Mirror
- Standard Display
- Steel Tracks
- Travel Motion Alarm

Attachments

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

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

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

- Auger
- Breaker
- Flail Mower
- Grading Blade
- Hydra-Tilt™
- Hydraulic Clamp
- Packer Wheel
- Plate Compactor
- Power Tilt® swing accessory
- Ripper
- Three-Tine Grapple
- Trencher

Buckets Available

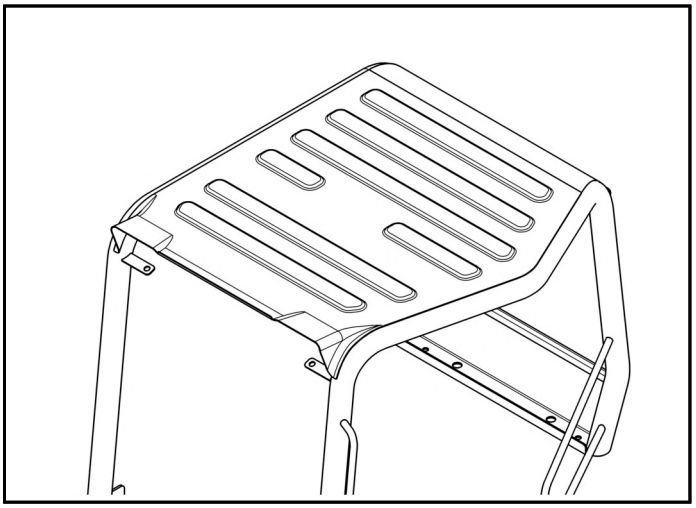
Increase the versatility of your excavator with a variety of bucket sizes.

Many bucket styles, widths, and different capacities are available for a variety of different applications. They include trenching, digging, grading, and tilt, to name a few. See your Bobcat dealer for the correct bucket for your Bobcat excavator and application.

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

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

Figure 6

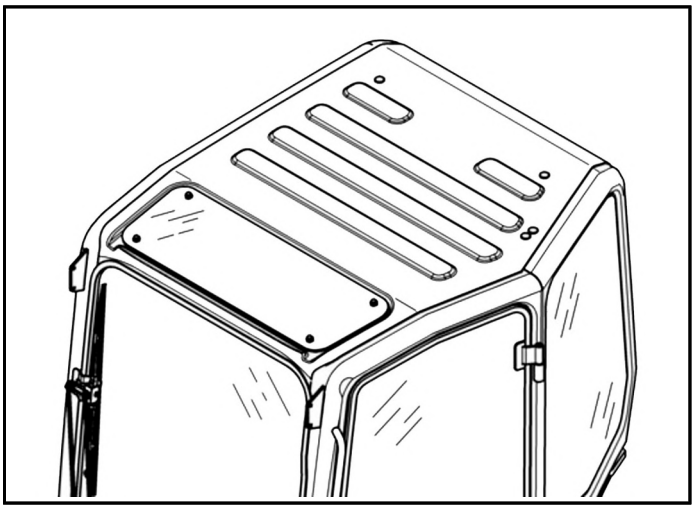


NA15045

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

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

Figure 7

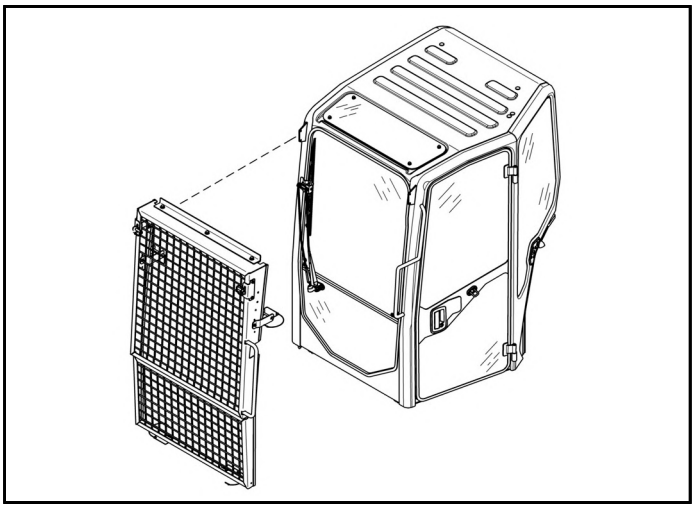


NA13519b

The top window on cab models is a FOPS that meets the top guard requirements in ISO 10262 – Level 1.

Front Guard Kit

Figure 8



NA13519a

The Front Guard Kit is available for applications that require protection from objects entering the front of the excavator.

The excavator must have the front guard installed to meet the front guard requirements in ISO 10262 – Level 1.

The kit includes an upper and lower screen guard. See your Bobcat dealer for more information.

Inspecting And Maintaining The Front Guard Kit

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

SAFETY INSTRUCTIONS

Before Operation

Carefully follow the operating and maintenance instructions in this manual.

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

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

The dealer explains the capabilities and restrictions of the Bobcat machine 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 machine. 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 are 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 machine. Its brief instructions are convenient for the operator. See your Bobcat dealer for more information on translated versions.

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

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

INSUFFICIENT INSTRUCTIONS HAZARD
Untrained operators or failure to follow instructions can cause serious injury or death.
Operators must have adequate training and instruction before operating.◂
W-2001

⚠ IMPORTANT

This notice identifies procedures which must be followed to avoid damage to the machine.◂
I-2019

⚠ 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

⚠ DANGER

The signal word DANGER on machine signs and in the manuals indicates a hazardous situation which, if not avoided, will result in death or serious injury.◂
D-1002

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

Check all of the items on the Service Schedule decal in the Every 10 Hours section or as shown in the Operation & Maintenance Manual.

Safe Operation Needs A Qualified Operator

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

A Qualified Operator Must Do The Following

- Understand the written instructions, rules, and regulations.
  - ▷ The written instructions from Bobcat Company include the Delivery Report, Operation & Maintenance Manual, Operator's Handbook, and machine signs (decals).
  - ▷ Check the rules and regulations at your location. The rules may include an employer's work safety requirements. For driving on public roads, the machine must be equipped as stipulated by the

local regulations authorising operation on public roads in your specific country. Regulations may identify a hazard such as a utility line.

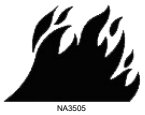
- Have training with actual operation.
  - ▹ Operator training must consist of a demonstration and verbal instruction. This training is given by your Bobcat dealer before the product is delivered.
  - ▹ The new operator must start in an area without bystanders and use all the controls until he or she can operate the machine and attachment safely under all conditions of the work area. Always fasten seat belt before operating.
- Know the work conditions.
  - ▹ Know the weight of the materials being handled. Avoid exceeding the Rated Lift Capacity of the machine. Material that is very dense will be heavier than the same volume of less dense material. Reduce the size of load if handling dense material.
  - ▹ The operator must know any prohibited uses or work areas, for example, he or she needs to know about excessive slopes.
  - ▹ Know the location of any underground lines.
  - ▹ Wear tight fitting clothing. Always wear safety glasses when doing maintenance or service. Safety glasses, respiratory equipment, hearing protection, or Special Applications Kits are required for some work. See your Bobcat dealer about Bobcat safety equipment for your model.

Silica Dust Exposure


NA3504

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

FIRE PREVENTION


NA3505

Maintenance

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

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

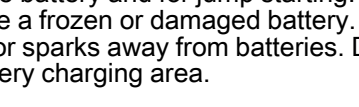
The operator's area, engine compartment, and engine cooling system must be inspected every day and cleaned if necessary to prevent fire hazards and overheating.

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

Operation

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

Electrical


P200082

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.

Hydraulic System

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

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

Fuelling

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 fuelling standards for proper earthing 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 a dust mask when grinding painted parts. Toxic dust or gas can be produced.

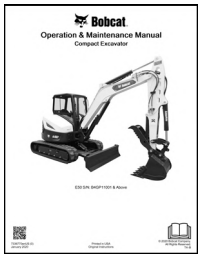
Dust generated from repairing non-metallic parts such as hoods, fenders, or covers can be flammable or explosive. Repair such components in a well ventilated area away from open flames or sparks.

Fire Extinguishers

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

PUBLICATIONS AND TRAINING RESOURCES

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



OPERATION & MAINTENANCE MANUAL

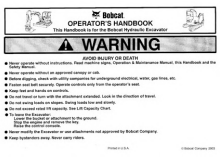
Complete instructions on the correct operation and the routine maintenance of your Bobcat excavator.

7417468enGB

SERVICE MANUAL

Complete maintenance instructions for your Bobcat excavator.

7417469enUS



OPERATOR'S HANDBOOK

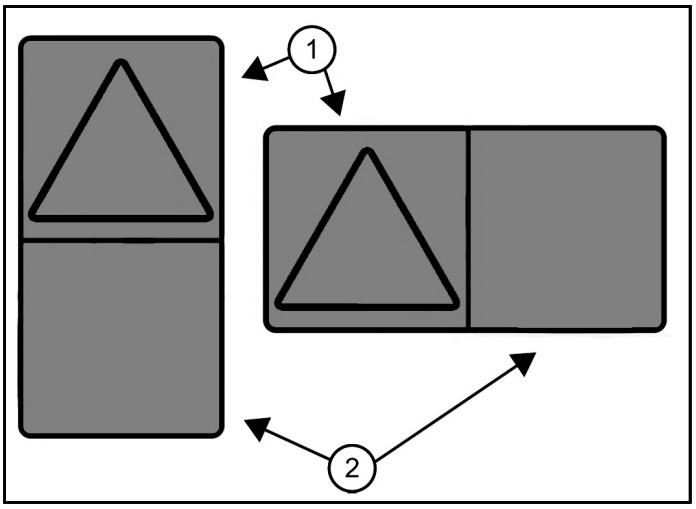
Gives basic operation instructions and safety warnings.

7417470enGB

PICTORIAL ONLY SAFETY SIGNS

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

Figure 9



C200466a

The format consists of the hazard panel(s) (Item 1) [Figure 9] and the avoidance panel(s) (Item 2) [Figure 9].

Hazard Panels: Depict a potential hazard enclosed in a safety alert triangle.

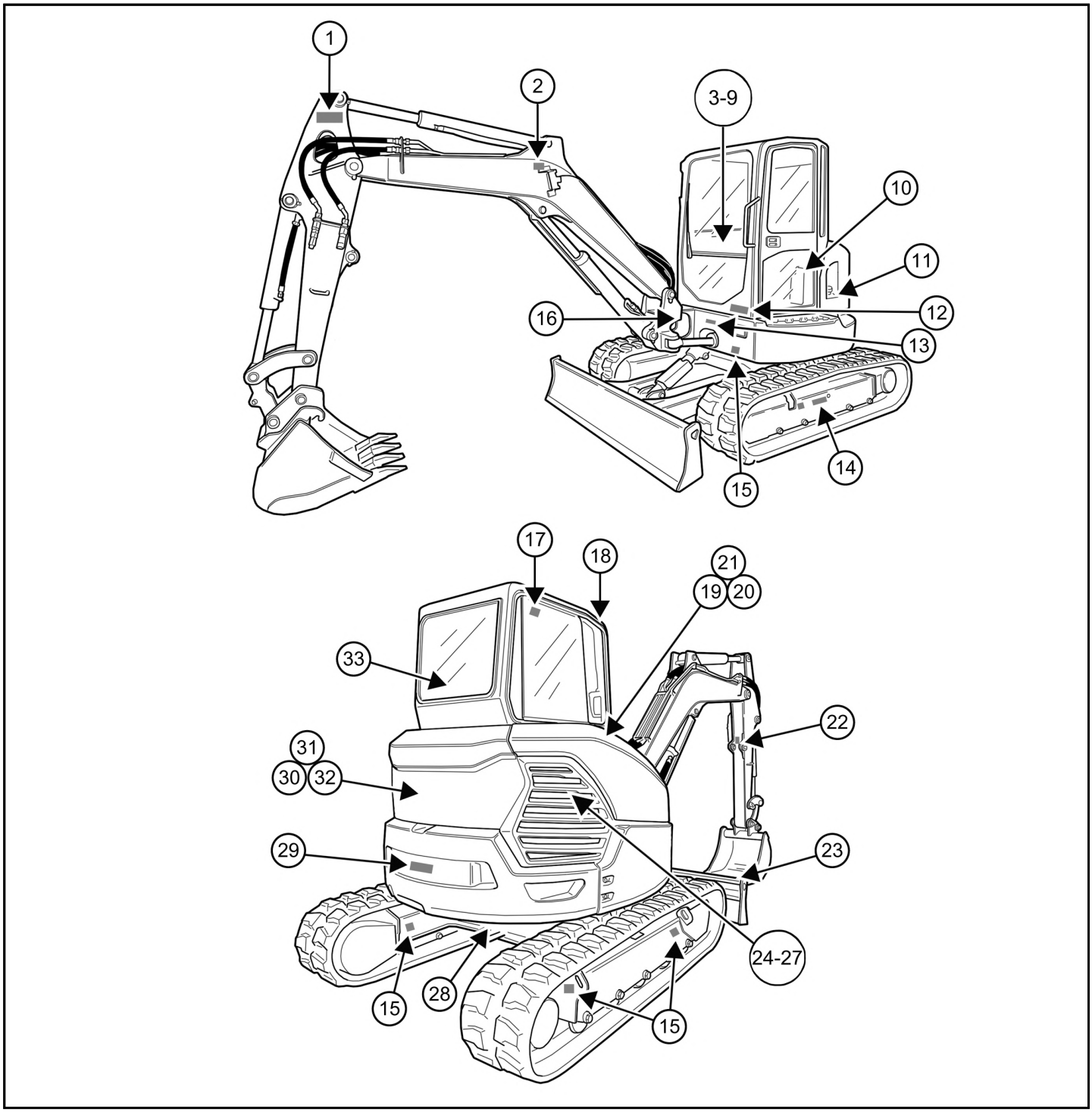
Avoidance Panels: Depict actions required to avoid the hazards.

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

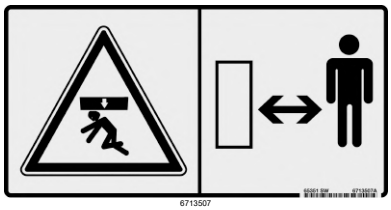
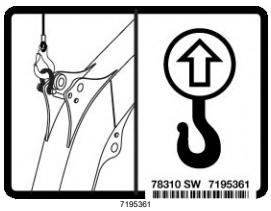
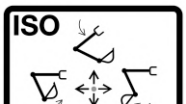
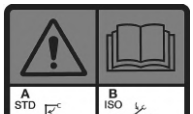
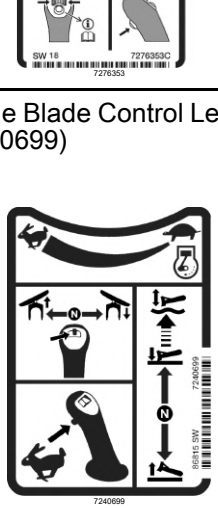
MACHINE SIGNS (DECALS)

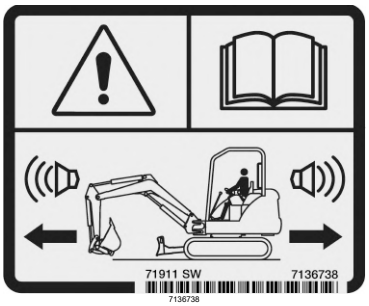
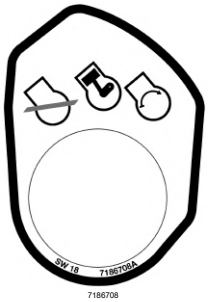
Follow the instructions on all Machine Signs (Decals) that are on the machine. Replace any damaged machine signs and be sure they are in the correct locations. Machine signs are available from your Bobcat dealer.

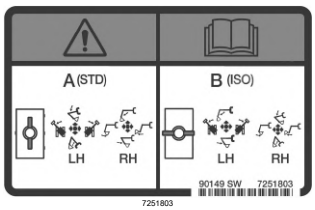
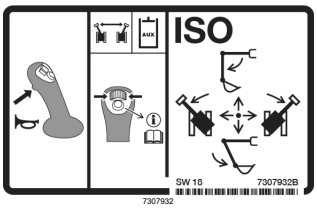
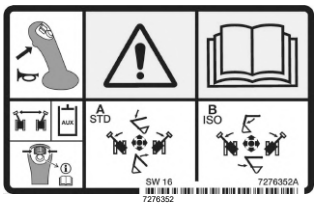
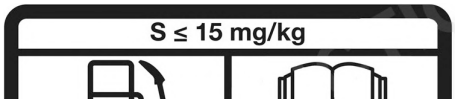
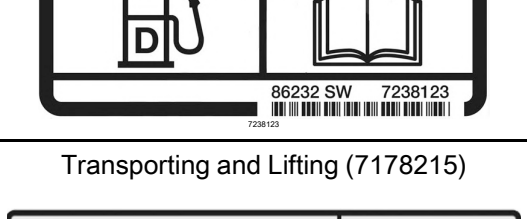
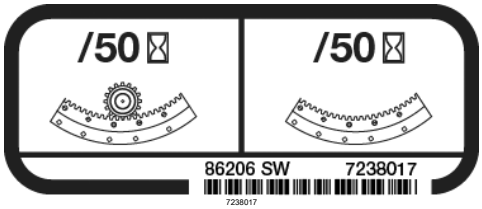
Figure 10

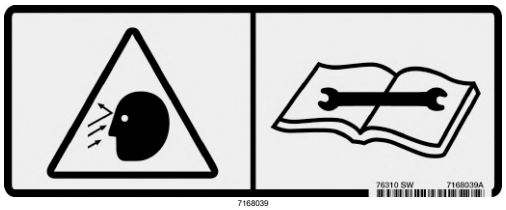
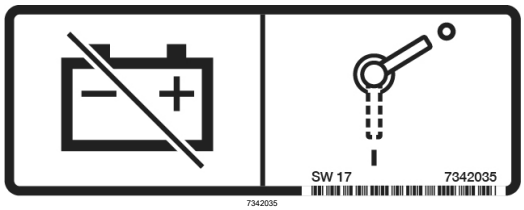
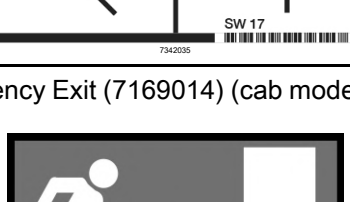


NA18172j

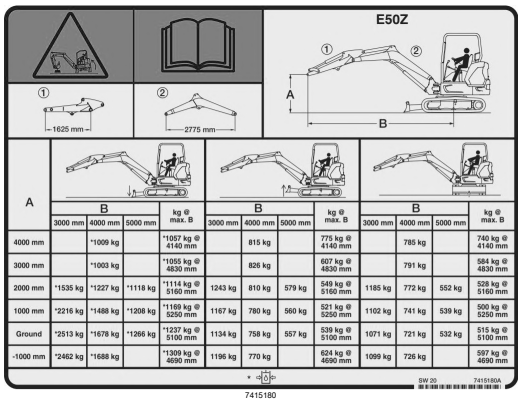
REF	DECAL	WARNING (IF APPLICABLE)
1	Stay Clear (6713507)  	**WARNING** GENERAL HAZARD **Failure to follow instruction can cause serious injury or death.** **Keep away from the operating machine.** W-2520
2	Lift Point (7195361) (2)  	
3	Control Pattern for Right Joystick (7307931 or 7276353)   	**WARNING** UNINTENDED MOVEMENT HAZARD **Failure to follow instructions can cause serious injury or death. Know the control pattern before operating.** **Read and understand the Operation & Maintenance manual before operating the machine.** W-3022
4	Engine Speed Control Dial / Angle Blade Control Lever (7240698 or 7240699)   	

REF	DECAL	WARNING (IF APPLICABLE)
5	Motion Alarm (7136738) (if equipped)  7136738	**⚠ WARNING** **CRUSHING HAZARD** **Failure to maintain a clear view in the direction of travel can cause serious injury or death.** • **This machine is equipped with a motion alarm. ALARM MUST SOUND! when operating forward or backward.** • **The operator is responsible for the safe operation of this machine.** W-2786
6	General Warnings (7148158)  7148158	**⚠ WARNING** **GENERAL HAZARD** **Failure to follow instructions can cause serious injury or death.** **Read and understand the Operation & Maintenance Manual and Handbook before operating excavator.** • **Keep away from drop-offs, 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.** • **Operate machine from operators position only.** **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
7	Operator's Handbook (7236492) 7236492	
8	Start Switch (7186708)  7186708	

REF	DECAL	WARNING (IF APPLICABLE)
9	Joystick Pattern Selector (7251803) 	
10	Control Pattern for Left Joystick (7307932 or 7276352)  	**WARNING** **UNINTENDED MOVEMENT HAZARD** **Failure to follow instructions can cause serious injury or death. Know the control pattern before operating.** **Read and understand the Operation & Maintenance manual before operating the machine.** W-3022
11	Ultra Low Sulfur Diesel Fuel (7238123) 	
12	Transporting and Lifting (7178215) 	**WARNING** GENERAL HAZARD **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
13	Remote grease location (7238017) 	

REF	DECAL	WARNING (IF APPLICABLE)
14	High Pressure Grease (7168039) (2)  	**WARNING** **INJECTION HAZARD** **High pressure grease can penetrate skin and eyes, causing serious injury.** **Do not loosen the track tension fitting more than 1 - 1/2 turns.** W-2994
15	Tie-Down (6595014) (9)  	
16	Battery Shut-Off Switch (7342035)  	
17	Emergency Exit (7169014) (cab models only)  	
18	Not a Lift Point (7359393) (cab models only)  	

REF	DECAL	WARNING (IF APPLICABLE)
19	Lift Capacity (7415180 or 7433706)	

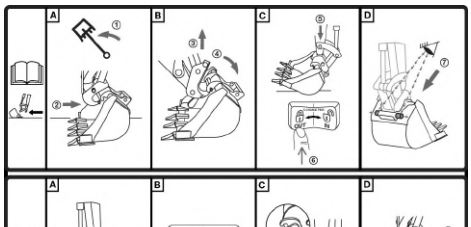


WARNING

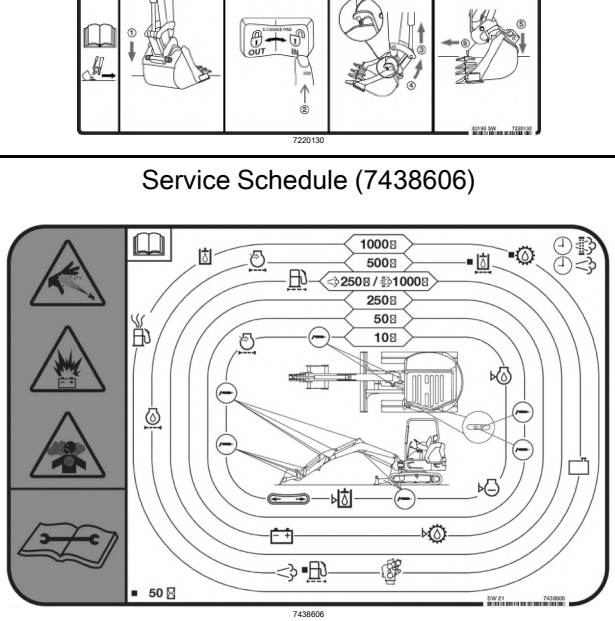
INSTABILITY HAZARD
Overload can cause tipping or rollover leading to serious injury or death.
- **Do not lift or hold any load that exceeds these ratings at their specific load radii and height.**
- **Total rated load is shown. The weight of all lifting devices must be deducted to determine the net load that can be lifted.**
- **Read and understand the Operation & Maintenance Manual for more information.**

W-2519

20	Installing and Removing Attachment (7240582, 7313768, 7174312, 7139000, or 7428649)	



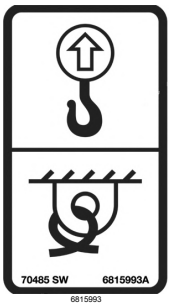
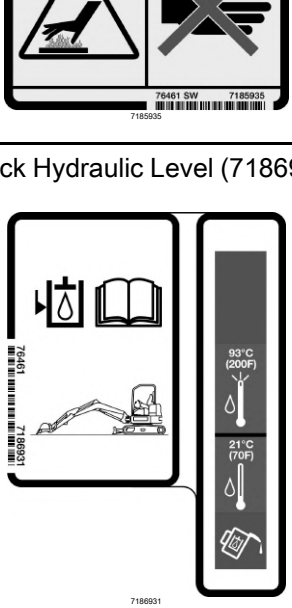
21	Service Schedule (7438606)	

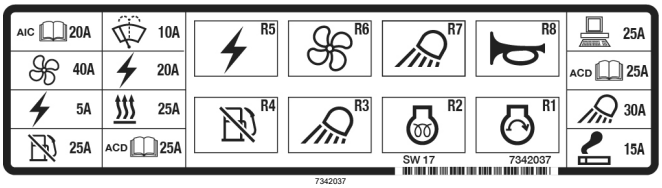
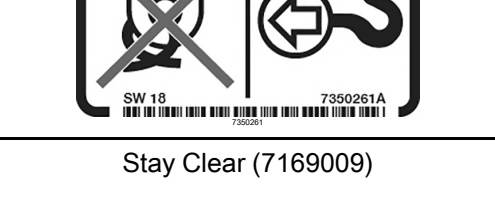


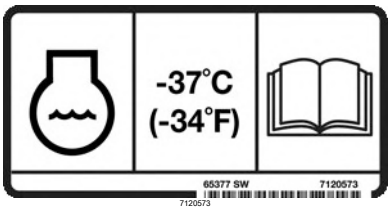
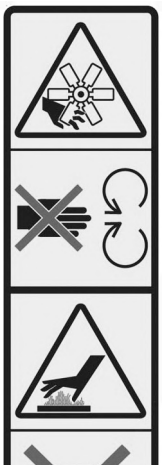
WARNING

GENERAL HAZARD
Failure to follow instructions can cause serious injury or death.
- **Leaking fluids under pressure can enter skin. 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.**
- **Keep away from fan and moving parts. DO NOT operate with guard removed.**
- **All exhaust gases can kill. Always operate machine in a well ventilated area.**
- **Read and understand the Operation & Maintenance Manual for more information.**

W-2522

REF	DECAL	WARNING (IF APPLICABLE)
22	Not a Lift Point (7282101)  7282101	
23	Lift Point / Tie-Down (6815993) (2)  6815993	
24	Hot Surface Warning (7185935)  7185935	**WARNING** **BURN HAZARD** **Failure to follow instructions can cause serious burns.** **Stop the engine and allow it to cool before removing the radiator cap or adding coolant.** W-2070
25	Check Hydraulic Level (7186931)  7186931	

REF	DECAL	WARNING (IF APPLICABLE)
26	Hydraulic Oil (7120570) 	
27	Fuse / Relay (7342037) 	
28	Tow Point Only (7350261) 	
29	Stay Clear (7169009) 	**WARNING** CRUSHING HAZARD Contact with machine can cause property damage, serious 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
30	High Pressure Gas (7169291) (3) 	**WARNING** IMPACT HAZARD Opening cylinder can release rod and cause serious injury or death. • Contents under high pressure. • Do not open. • See Service Manual for additional information. W-2523

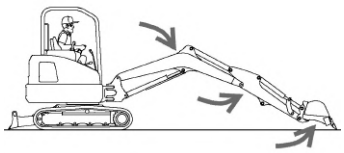
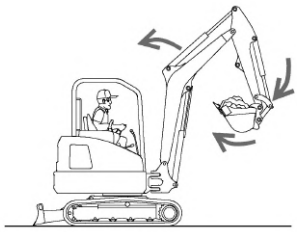
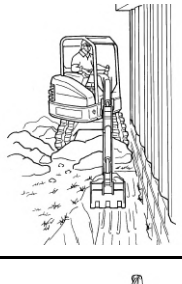
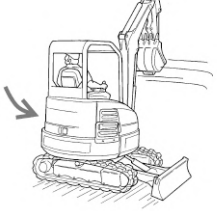
REF	DECAL	WARNING (IF APPLICABLE)
31	Engine Coolant (7120573)  7120573	
32	Rotating Parts and Hot Surfaces (7243563)  7243563	**⚠ WARNING** **CUTTING AND BURN HAZARD** **Keep away from the operating machine.** • **Keep away from fan and moving parts. Do not operate with guard removed.** • **Do not touch hot surfaces. Allow to cool before servicing.** W-2521
33	Operator's Manual Location (6732148) 6732148	**⚠ WARNING** **INSUFFICIENT INSTRUCTIONS HAZARD** **Untrained operators or failure to follow instructions can cause serious injury or death. Read and understand the Operation & Maintenance Manual before operating the machine.** W-3021

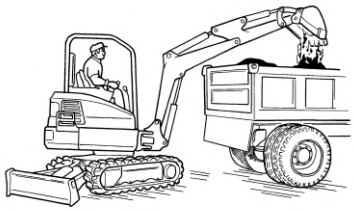
INTENDED USE

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.

Some examples of intended use include:

Excavating	
Excavating	
Boom Swing	
Rotating the Upperstructure	

Loading Material	
Backfilling	

⚠ WARNING

INSTABILITY HAZARD
Excessive load can cause tipping or loss of control leading to serious injury or death.
Do not exceed rated lift capacity.◂
W-2374

⚠ DANGER

EXPLOSION AND ELECTROCUTION HAZARDS
Contact with underground utility lines will cause death, serious injury, or property damage.
- **Check the work area for buried electrical, gas, utility, or other service lines before excavating or operating ground engaging equipment.**
- **Follow all local regarding digging or working in areas around underground utilities. Have all underground utility lines clearly marked before operating.◂**

1221-7BFCF43B

⚠ WARNING

ENTANGLEMENT AND IMPACT HAZARD
Contact with moving parts, a trench cave-in or flying objects can cause serious injury or death.
Keep all bystanders 6 m (20 ft) away from equipment when operating.◂
W-2119

⚠ IMPORTANT

MACHINE DAMAGE HAZARD
Failure to follow instructions could result in damage to the blade and undercarriage components.
Avoid impacting objects with the blade.◂
I-2256

INSTRUMENTS AND CONSOLES

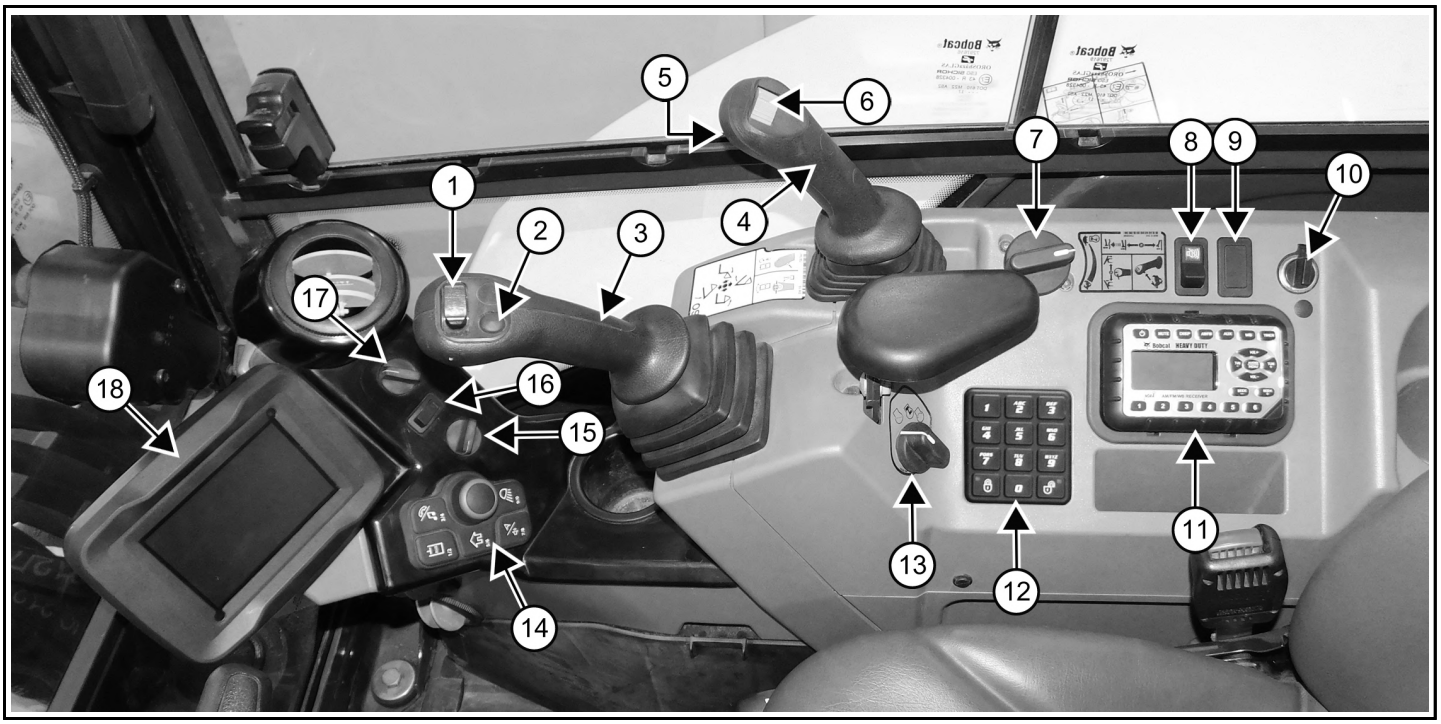
Left Console

Figure 11

REF	DESCRIPTION	FUNCTION
1	Left Joystick	Operates the hydraulic controls. (See Hydraulic Controls on Page 46)
2	Left Joystick Switch	Controls boom swing and auxiliary hydraulics. (See Enabling Boom Swing on Page 60) (See Operating Attachments With Secondary Auxiliary Hydraulics on Page 55)
3	Left Joystick Button	Toggles between boom swing and auxiliary hydraulics (if equipped). (See Enabling Boom Swing on Page 60) (See Operating Attachments With Secondary Auxiliary Hydraulics on Page 55)
4	Horn	Sounds the horn.
5	Wiper / Washer Switch (if equipped)	Operates the windshield wiper and washer. (See Operating Windshield Wiper on Page 42)
6	Hydraulic Quick Coupler On / Off Switch (if equipped)	Retracts and extends hydraulic pins. (See Installing Attachments (Hydraulic Quick Coupler) on Page 89)
7	Beacon / Strobe Light (if equipped)	Turns beacon / strobe light on and off.
8	Hydraulic Quick Coupler Intent Switch (if equipped)	Initiates the quick coupler install or remove mode. (See Installing Attachments (Hydraulic Quick Coupler) on Page 89)
9	Overload Warning Device Switch (if equipped)	Operates the overload warning device. (See Overload Warning Device on Page 57)
10	Boom Swing Switch (if equipped)	Push to select boom swing offset for either the left or right joystick.

Right Console

Figure 12



C206171c

REF	DESCRIPTION	FUNCTION
1	Right Joystick Switch	Controls auxiliary hydraulics. (See Hydraulic Controls on Page 46)
2	Right Joystick Button (if equipped)	Toggles between rear view camera (if equipped) and current screen on the display.
3	Right Joystick	Operates the hydraulic controls. (See Hydraulic Controls on Page 46)
4	Blade Control Lever	Raises and lowers the blade. (See Blade Control Lever on Page 58)
5	Two-Speed Button (With Angle Blade Option)	Engages and disengages High Range Travel Speed. (See Engaging Two-Speed Travel (With Angle Blade Option) on Page 38)
6	Two-Speed Button (Without Angle Blade Option)	Engages and disengages High Range Travel Speed. (See Engaging Two-Speed Travel (Without Angle Blade Option) on Page 37)
7	Engine Speed Control Dial	Controls engine rpm. (See Engine Speed Control on Page 59)
8	Motion Alarm Cancel Switch	Temporarily disables the motion alarm. (See Disabling The Motion Alarm on Page 44)
9	Wait To Start Light (if equipped)	When light turns off, the engine can be started. (See Starting The Engine (Standard Display) on Page 66)
10	Auxiliary Power Outlet	12 volt receptacle for accessories.
11	Radio (if equipped)	(See Radio on Page 35)
12	Keypad (if equipped)	Enter the password on the keypad to start the engine if prompted.
13	Key Switch or Keyless Start Switch	Used to start the engine. (See Starting The Engine (Standard Panel) on Page 63) (See Starting The Engine (Standard Display) on Page 66)

REF	DESCRIPTION	FUNCTION
14	Jog Shuttle (if equipped)	Used to navigate the display. (See Jog Shuttle (Standard Display) on Page 32)
15	Temperature Control Dial (if equipped)	Controls temperature in cab.
16	Air Conditioning Switch (if equipped)	Turns air conditioner ON / OFF.
17	Fan Motor Dial (if equipped)	Controls fan speed.
18	Standard Panel or Standard Display	(See Standard Panel on Page 29) (See Standard Display on Page 31)

Standard Panel

Figure 13

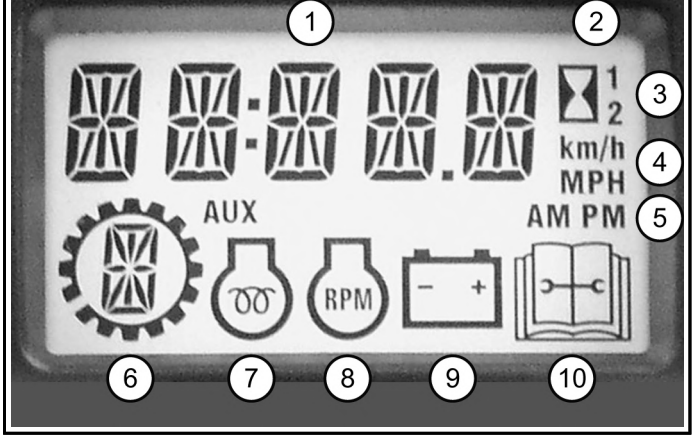
REF	DESCRIPTION	FUNCTION
1	Lights	Controls work lights. The left green LED will illuminate when lights are turned ON. Press and hold 5 seconds to display software version.
2		Not used for this model.
3	Auxiliary Hydraulic Button (Used only with joystick switch–activated Auxiliary Hydraulics)	Turns on auxiliary hydraulics.
4	Information	Cycles through hourmeter, service codes, and auxiliary hydraulics.
5	Engine Temperature Gauge	Shows the engine coolant temperature.

REF	DESCRIPTION	FUNCTION
6	Display Screen	Shows the hourmeter at startup and then changes to engine rpm. When preheat is activated, it shows the remaining preheat time. (See Display Screen Of Standard Panel on Page 30)
7	Fuel Gauge	Show the amount of fuel in the tank.
8	Seat Belt	Light stays on for 45 seconds as a reminder to fasten seat belt.
9		Not used for this model.
10		Not used for this model.
11	Left Console Lockout	Icon is ON when left console is raised. Icon is OFF when left console is lowered. (See Raising And Lowering The Console on Page 37)
12	General Warning	Turns ON or flashes to indicate machine malfunction or failure. (See Diagnostic Service Codes on Page 173)
13	High Range Engaged	Turns ON when two-speed travel is enabled. Light flashes to indicate a problem.(See Two-Speed Travel on Page 37)
14	Engine Coolant Temperature Warning	Turns ON or flashes to indicate engine coolant temperature is high or sensor error.
15	Engine Malfunction	Turns ON or flashes to indicate engine malfunction or failure.
16	Hydraulic System Malfunction	Turns ON or flashes to indicate hydraulic system malfunction or failure.
17	Fuel	Turns ON when fuel level is low, flashes to indicate fuel sensor error.
18		Not used for this model.
19		Not used for this model.
20		Not used for this model.
21		Not used for this model.

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

Display Screen Of Standard Panel

Figure 14

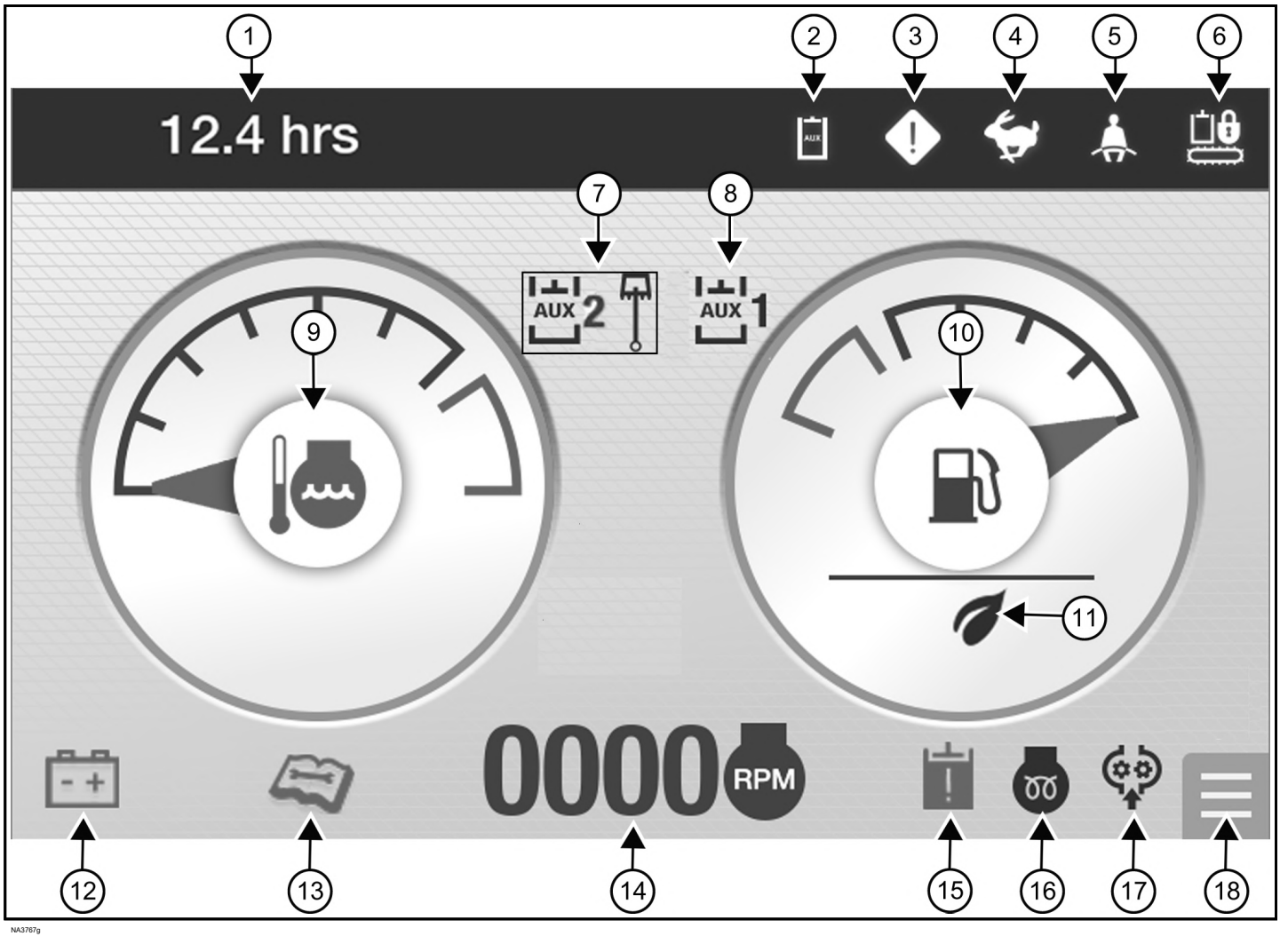


p-97993b

REF	DESCRIPTION
1	Data Display
2	Hourmeter
3	Job Clock (1 and 2)
4	Metric / English (not used for this model)
5	Clock (not used for this model)
6	Auxiliary Flow
7	Engine Preheat
8	Engine RPM
9	Battery / Charging Voltage
10	Service

Standard Display

Figure 15



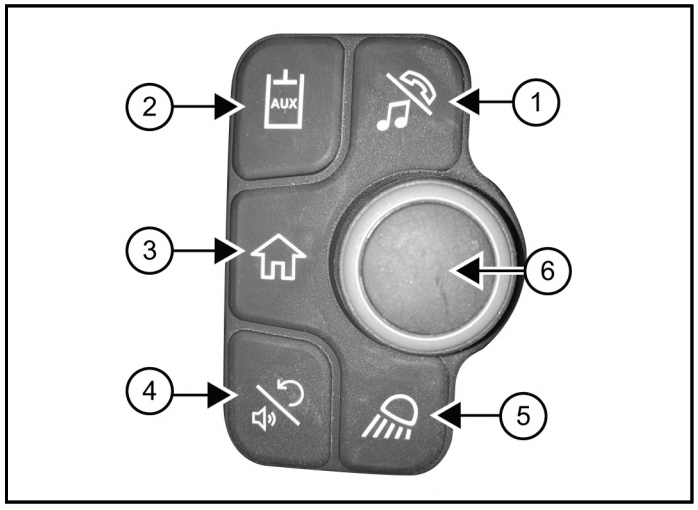
The standard display is a visual interface that provides control of certain machine settings and operating information through the use of a jog shuttle control. The standard display is scratch resistant and weather resistant.

REF	DESCRIPTION	FUNCTION
1	Machine Hours	Shows machine operating hours.
2	Auxiliary Hydraulics	Indicates Auxiliary Hydraulics are activated. The icon changes when detent flow is activated. (See Operating Attachments With Primary Auxiliary Hydraulics on Page 51)
3	General Warning	Indicates a malfunction of one or more machine functions.
4	High Range	Indicates high range is activated. (See Two-Speed Travel on Page 37)
5	Seat Belt Reminder	Illuminates as a reminder to fasten the seat belt.
6	Control Console Raised	Indicates the left console is raised and hydraulic controls are locked out. (See Raising And Lowering The Console on Page 37)
7	Boom Swing or Auxiliary Hydraulics (if equipped)	Icon indicates what the left joystick switch is operating. (See Boom Swing on Page 60) (See Operating Attachments With Secondary Auxiliary Hydraulics on Page 55)

REF	DESCRIPTION	FUNCTION
8	Primary Auxiliary Hydraulics (if equipped)	Icon indicates what the right joystick switch is operating. (See Operating Attachments With Primary Auxiliary Hydraulics on Page 51)
9	Engine Coolant Temperature Gauge	Shows the engine coolant temperature.
10	Fuel Gauge	Shows the amount of fuel in the tank.
11	Eco Mode	Indicates Eco Mode is activated. (See Eco Mode on Page 59)
12	Battery Warning	Indicates battery voltage is low.
13	Service Due	Indicates scheduled maintenance is due.
14	Engine RPM	Shows engine RPM.
15	Hydraulic Warning	Indicates hydraulic fluid temperature is high.
16	Glow Plugs	Indicates glow plugs are active.
17	Secondary Auxiliary Hydraulics	Indicates Secondary Auxiliary Hydraulics are activated. (See Operating Attachments With Secondary Auxiliary Hydraulics on Page 55)
18	Navigation Handle	Brings up the navigation bar. (See Opening Navigation Bar on Page 166) Any active shortcuts will be displayed. (See Active Shortcuts on Page 166)

Jog Shuttle (Standard Display)

Figure 16



C206625a

Navigate the display with the jog shuttle [Figure 16].

See the User Guide included with the machine's literature packet for more information.

REF	DESC.	FUNCTION
1	Not Used	
2	Auxiliary Hydraulics	Activates auxiliary hydraulics. (See Operating Attachments With Primary Auxiliary Hydraulics on Page 51)
3	Gauges	Opens **GAUGES** screen.
4	Back	Returns to previous screen.
5	Lights	Turns front lights ON and OFF.
6	Rotary Knob	Used to navigate between available icons on display. Press knob to select highlighted icon.

Using The Jog Shuttle With Standard Display

- Turn the rotary knob (Item 6) [Figure 16] to move between the icons on the screen.

  Only icons that highlight on the screen can be selected.
- Press the rotary knob (Item 6) [Figure 16] to select a highlighted icon or to turn a feature ON / OFF.
- Press the Back button (Item 4) [Figure 16] to return to the previous screen.
- If a slider is used for changing a setting, highlight the slider and turn the rotary knob to change the slider position.

REAR VIEW CAMERA SYSTEM

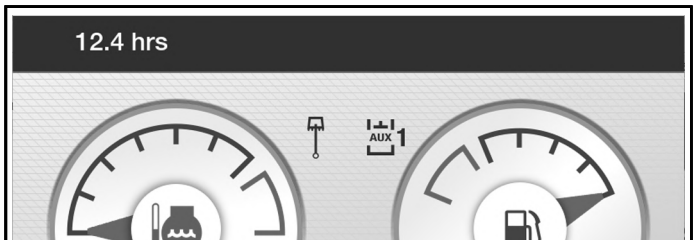
This machine may be equipped with a rear view camera system. The view from the camera is displayed on the display screen.

The rear view camera system is not a substitute for keeping bystanders away from the work area. You must remain fully aware of your surroundings using direct visibility and the rear view camera system. You must service and maintain the camera system to ensure proper function.

NOTE: Objects viewed on the display are closer than they appear.

Operating Rear View Camera

Figure 17



NA3773a

- To navigate to the camera, select **[NAVIGATION HANDLE]→ [CAMERA]** (Item 1) [Figure 17] on the standard display.

Figure 18

C206172a

You can also press the right joystick button (Item 1) [Figure 18] to toggle between the camera and the current screen.

Figure 19

NA3636c

The rotating spinner icon (Item 1) [Figure 19] indicates you are viewing a live broadcast from the camera.

Cleaning And Maintaining Rear View Camera

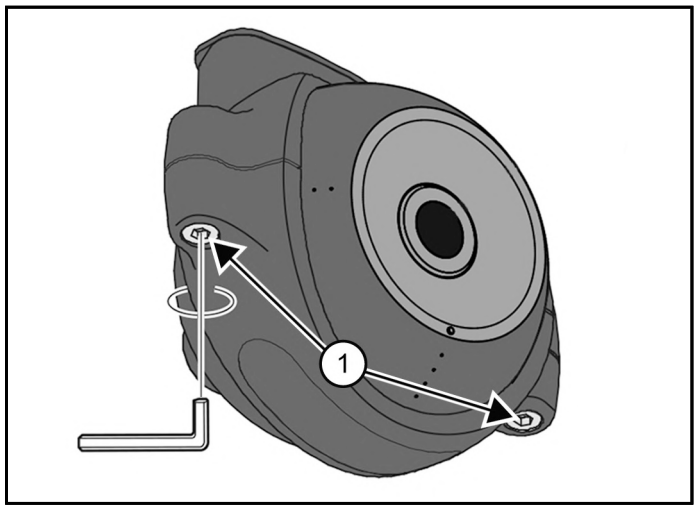
Perform the following daily or as needed:

- Clean the lens of the camera using a soft cloth and clean water.
- Remove mud, snow, ice, or other debris that could affect the clear view provided by the camera system.
- Verify proper camera adjustment. Adjust camera if needed.
  (See Adjusting Rear View Camera Position on Page 34)
- Replace damaged rear view camera system components. See your Bobcat dealer for service and parts.

Adjusting Rear View Camera Position

1. Make a mark on the ground 1,25 m (4 ft) behind the machine.

Figure 20

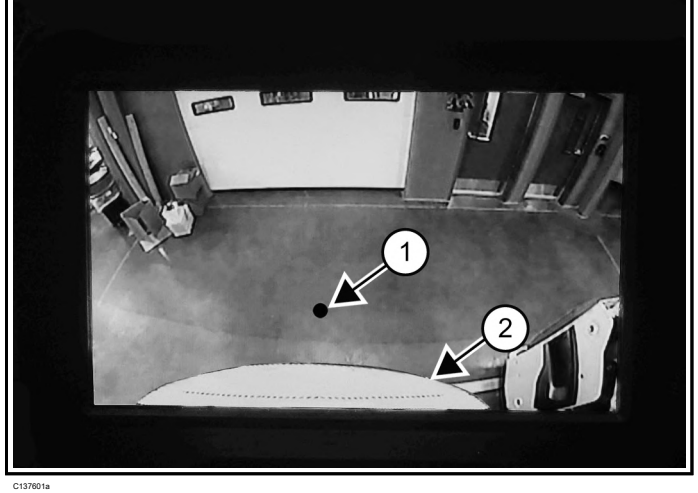


NA3351a

2. Loosen the screws (Item 1) [Figure 20] of the clamp holding the camera.
3. Turn the start switch to ON, but do not start the engine.
4. Turn the camera ON.
5. Compare the camera display with the view through the rear window of the machine. The image should be as a mirror, with an object to the left of the machine appearing on the left of the display.

   See display menu to adjust if needed.

Figure 21



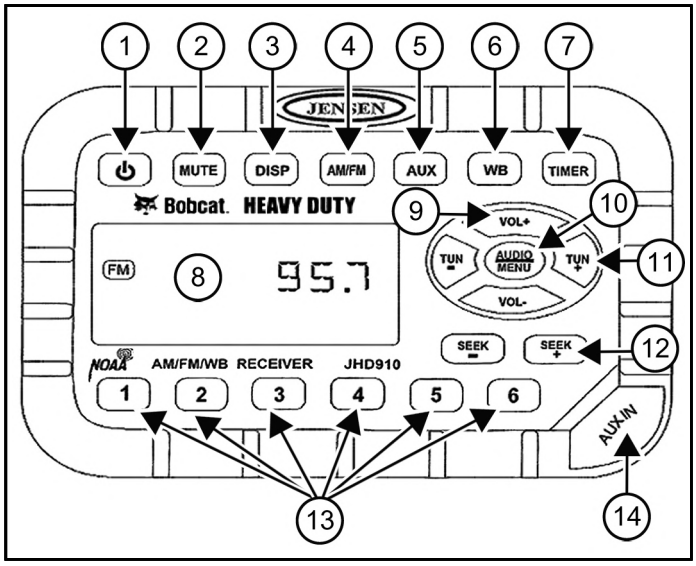
C137601a

6. Adjust the camera as follows.
   a. The mark on the ground (Item 1) [Figure 21] should be visible on the display.
   b. The tailgate (Item 2) [Figure 21] should be just visible on the display.
   c. The camera should be centered left and right.
7. Tighten the screws to 0,8 – 1,0 N•m (7 – 8.8 in-lb) torque.
8. Turn the key switch to OFF.

RADIO

Radio Identification

Figure 22

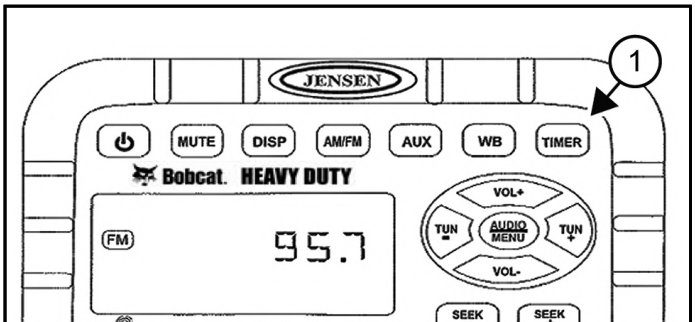


NA3090h

REF	DESC.	FUNCTION
1	POWER	Turns the radio unit ON / OFF.
2	MUTE	Mutes audio output.
3	DISP	Switches between display operation functions of the radio. (See Operating The Radio Clock on Page 36)
4	AM/FM	Switches between AM (MW) bands and three FM bands.
5	AUX	Switches to Auxiliary Input mode. Portable audio device (MP3 player, etc.) must be attached to auxiliary input jack.
6	WB	Selects weather band. The weather alert feature, if activated, will automatically switch from the current function to the weather band if a weather warning is received. (See Adjusting Radio Settings on Page 36)
7	TIMER	Accesses timer mode. (See Operating Radio Timer on Page 35)
8	DISPLAY SCREEN	Displays the time, frequency, and activated functions.
9	VOL+ / VOL-	Adjusts volume up and down. Current volume (0 – 40) will appear briefly in display screen.
10	AUDIO / MENU	Adjusts radio settings. (See Adjusting Radio Settings on Page 36)
11	TUN- / TUN+	Manually tunes the radio frequency up and down.
12	SEEK- / SEEK+	Automatically tunes frequency up or down to next strong station.
13	PRESET STATIONS	Stores and recalls stations for each AM and FM band. Press button and hold to store current station. Press button to recall station.
14	AUX IN	Connect line output of portable audio device (MP3 player, etc.) to 3,5 mm (1/8 in) jack and press AUX button.

Operating Radio Timer

Figure 23

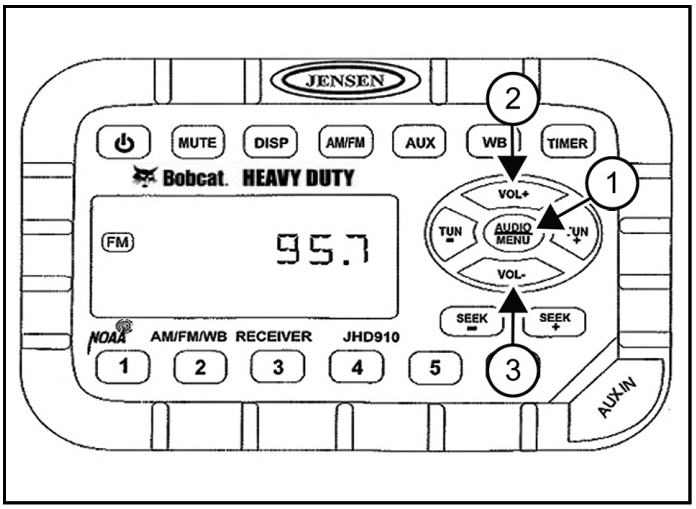


NA3090f

- Press the TIMER (Item 1) [Figure 23] button to start the timer function.
- Press TIMER (Item 1) [Figure 23] again to stop timer.
- Press and hold TIMER (Item 1) [Figure 23] to reset timer and exit from timer mode.

Adjusting Radio Settings

Figure 24



NA3090g

- Press the AUDIO / MENU button (Item 1) [Figure 24] to cycle through bass, treble, and balance settings.
  - ▹ Use the VOL+ (Item 2) and VOL- (Item 3) buttons [Figure 24] to adjust the desired option displayed.

  Normal operation will resume automatically.
- Press and hold the AUDIO / MENU button (Item 1) [Figure 24] for three seconds to enter menu adjustment settings.
  - ▹ Press the AUDIO / MENU button (Item 1) [Figure 24] to cycle through the following settings:

    Beep Confirm: Determines if beep will sound with each button press.

    Operation Region: Selects the appropriate region (USA or Europe).

    Clock Display: Selects a 12 hour or 24 hour clock display.

    Display Brightness: Set display screen brightness level (low, medium, or high).

    Backlight Colour: Set display screen backlight colour (amber or green).

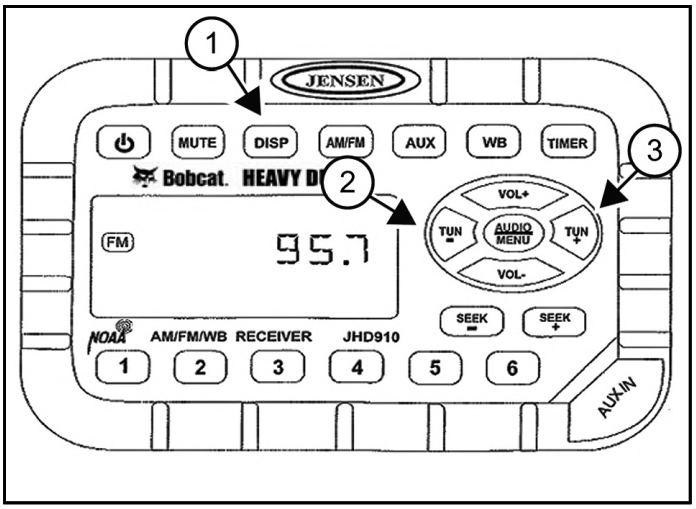
    Power On Volume: Sets default volume setting when radio is turned on.

    WB Alert: Determines if weather band alert features is activated.
  - ▹ Use the VOL+ (Item 2) and VOL- (Item 3) buttons [Figure 24] to adjust the active setting.

  Normal operation will resume automatically.

Operating The Radio Clock

Figure 25



NA3090c

- Press and hold the DISP (Item 1) button [Figure 25] to enter clock setting mode.
- Use TUN – button (Item 2) [Figure 25] to adjust hours.
- Use TUN + button (Item 3) [Figure 25] to adjust minutes.

Normal operation will resume automatically.

RAISING AND LOWERING THE CONSOLE

Figure 26

P134071a

- Before operating the excavator, lower the left console [Figure 26].

  Push down on the handle until the latch is engaged.

- Before exiting the cab, raise the left console by pulling up on the handle.

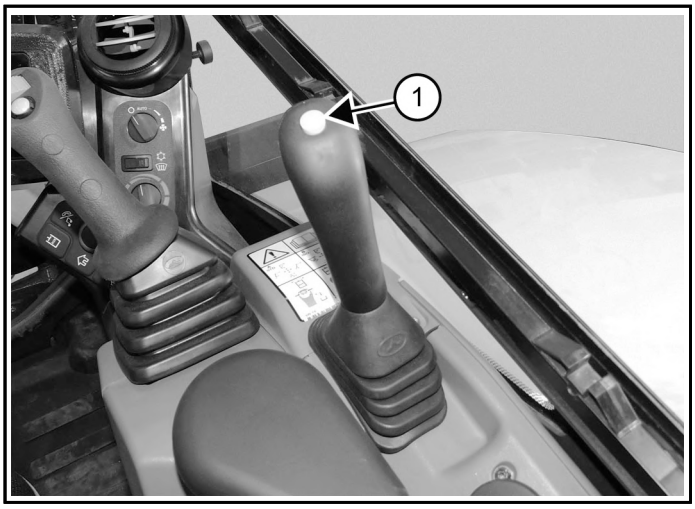
  The lift spring will assist in raising the console.

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

Engaging Two-Speed Travel (Without Angle Blade Option)

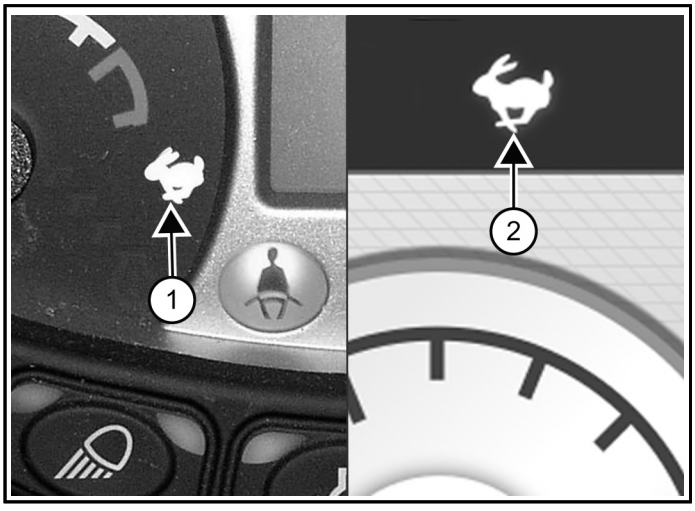
Figure 27



P200092b

1. Press the button (Item 1) [Figure 27] to engage the high range.

Figure 28



NA3774a

   Two beeps will be heard.

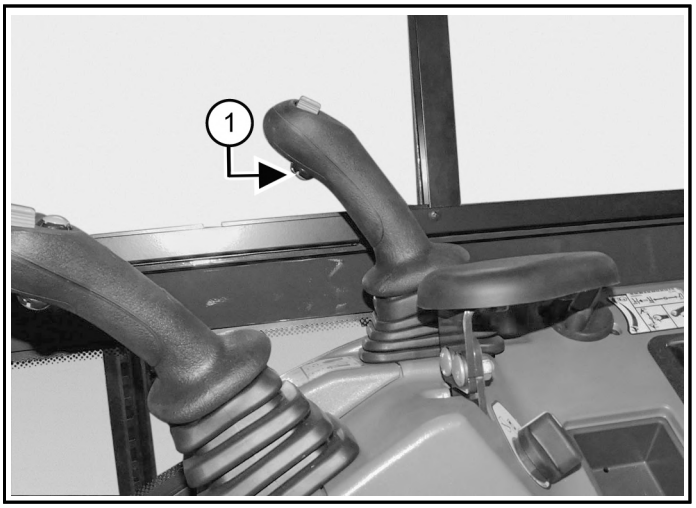
   The high range icon ((Item 1) for the panel or (Item 2) for the display) will illuminate [Figure 28].

2. Press the button (Item 1) [Figure 27] again to disengage.

   One beep will be heard.

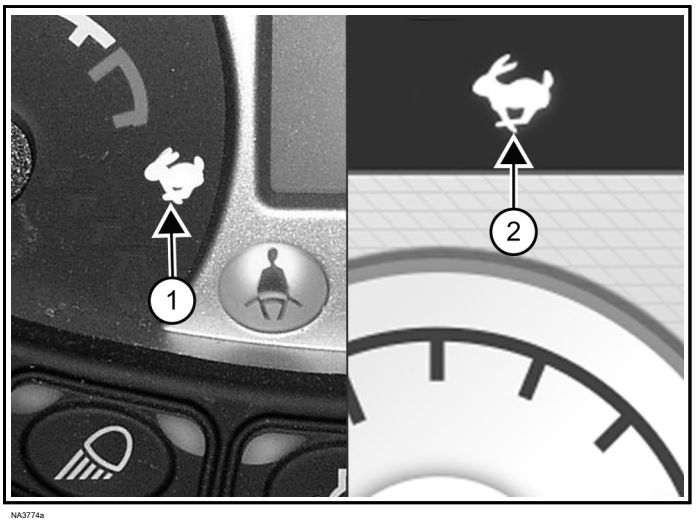
Engaging Two-Speed Travel (With Angle Blade Option)

Figure 29



1. Press the button (Item 1) [Figure 29] to engage the high range.

Figure 30



Two beeps will be heard.

The high range icon ((Item 1) for the panel or (Item 2) for the display) will illuminate [Figure 30].

2. Press the button (Item 1) [Figure 29] again to disengage.

One beep will be heard.

Auto Shift Drive Motors

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

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

AUTO IDLE (STANDARD PANEL)

Auto Idle Description

When auto idle is activated, engine speed will be reduced to low idle when the control levers (joystick, blade, travel, etc.) are in neutral and have not been used for the auto idle delay time. The engine rpm will return to the set position as soon as any control lever is activated.

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

Activating Auto Idle

Figure 31

C-97988d

1. Press the button (Item 1) [Figure 31] once to engage automatic idle.

   The LED (Item 2) [Figure 31] will illuminate.

2. Press the button (Item 1) [Figure 31] a second time to disengage automatic idle.

   The LED (Item 2) [Figure 31] will be OFF.

AUTO IDLE (STANDARD DISPLAY)

Auto Idle Description

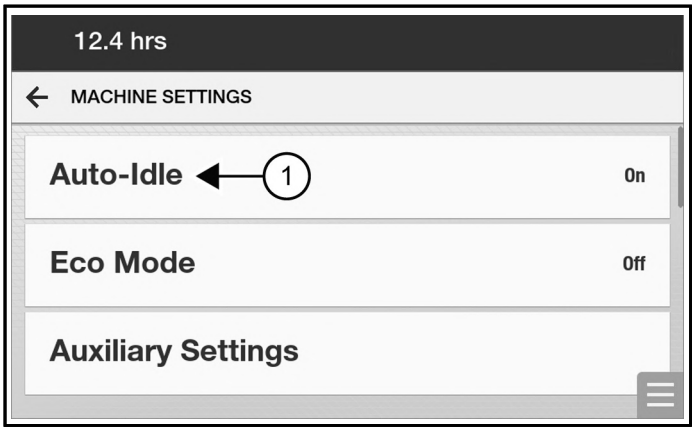
When auto idle is activated, engine speed will be reduced to low idle when the control levers (joystick, blade, travel, etc.) are in neutral and have not been used for the auto idle delay time. The engine rpm will return to the set position as soon as any control lever is activated.

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

Activating Auto Idle

1. Select **[SETTINGS]→ [MACHINE SETTINGS]**.

Figure 32



NA3742d

2. Select **[AUTO-IDLE]** to turn it ON / OFF (Item 1) [Figure 32].

The Auto-Idle Delay Time can be changed on the touch display.

OPERATOR CAB (ROPS / TOPS / FOPS)

The Bobcat excavator may be equipped with an operator cab (Roll-Over Protective Structure (ROPS) / Tip-Over Protective Structure (TOPS) / FOPS) to protect the operator if the excavator is tipped over or from falling objects. The seat belt must be worn for ROPS / TOPS / FOPS protection.

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

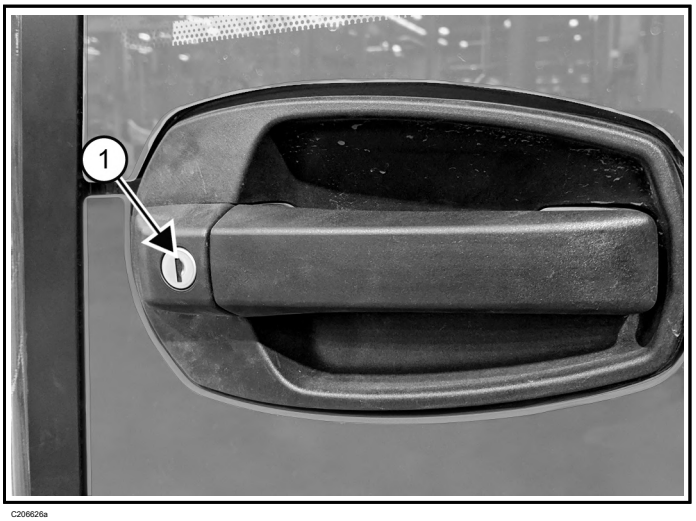
Roll-Over Protective Structure per ISO 12117-2, Tip-Over Protective Structure per ISO 12117, Falling Object Protective Structure (Top Guard) per ISO 10262 - Level 1.

⚠ WARNING

MODIFICATION HAZARD
Cab changes can cause loss of operator protection from rollover and falling objects resulting in serious injury or death.
Never modify operator cab by welding, grinding, drilling holes or adding attachments unless instructed to do so by Bobcat Company.
W-2069

Operating The Cab Door

Figure 33

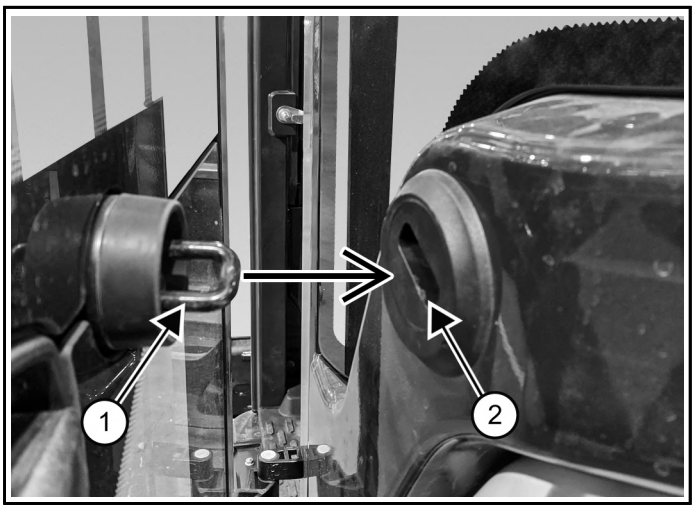


C206626a

- Pull on the latch to open the door.

  The cab door can be locked (Item 1) [Figure 33] with the same key as the starter switch.

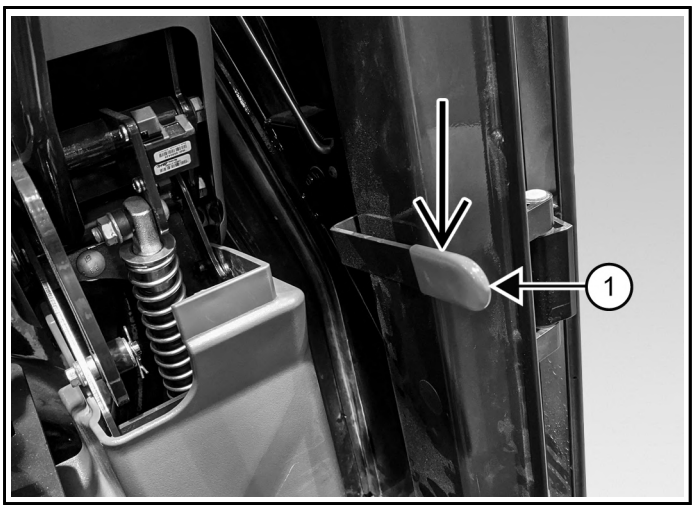
Figure 34



C206627a

- Push the door all the way open until the latch post (Item 1) engages in the latch (Item 2) to hold the door in the open position [Figure 34].

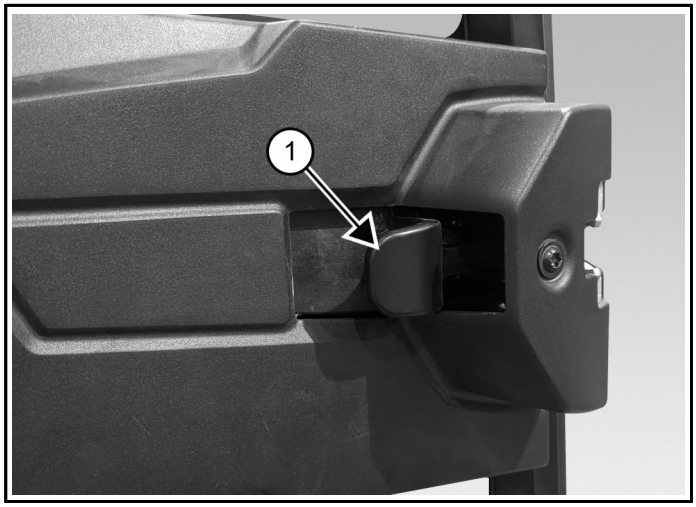
Figure 35



C206628a

- When the door is in the open position, push the latch (Item 1) [Figure 35] to release the door.

Figure 36

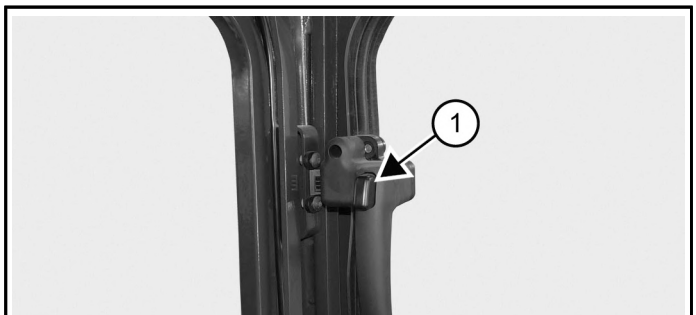


C206629a

- From inside the cab, open the door using the handle (Item 1) [Figure 36].

Operating The Front Window

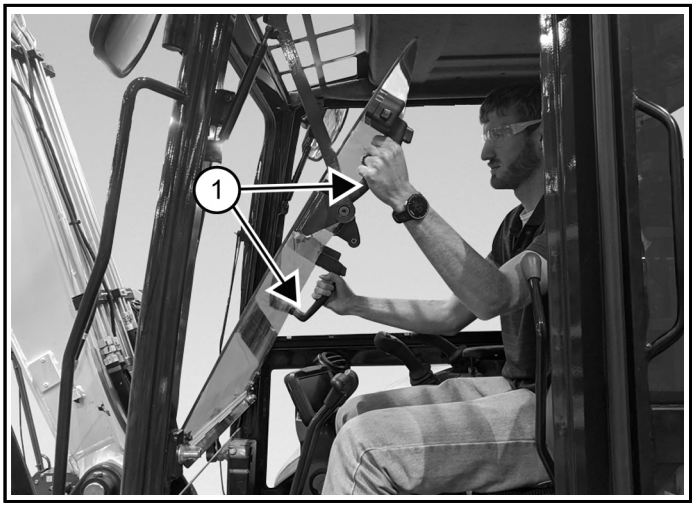
Figure 37



P20095a

1. Push the window latch buttons (Item 1) [Figure 37] on both sides.

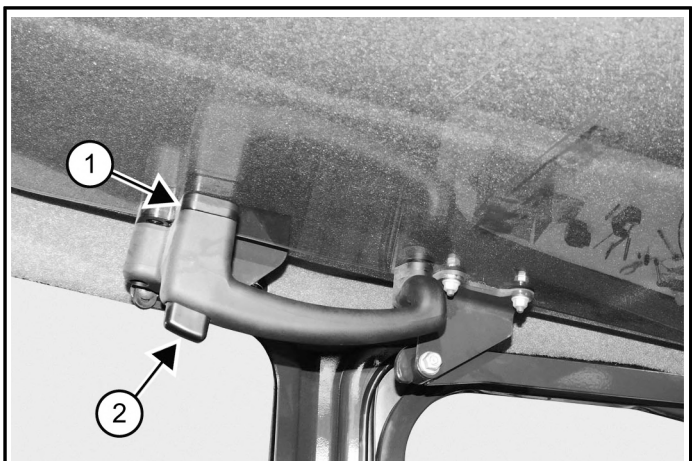
Figure 38



C206630a

2. Use both window grab handles (Item 1) [Figure 38] to pull the top of the window in.

Figure 39



P200096a

3. Continue moving the window in and up over your head until the window is fully raised.

   When the window is fully raised, the latch (Item 1) (both sides) [Figure 39] will close on the bracket in the latched position.

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

5. To close the window, use both window grab handles to support the window while pressing the window latch button (Item 2) [Figure 39] (both sides).

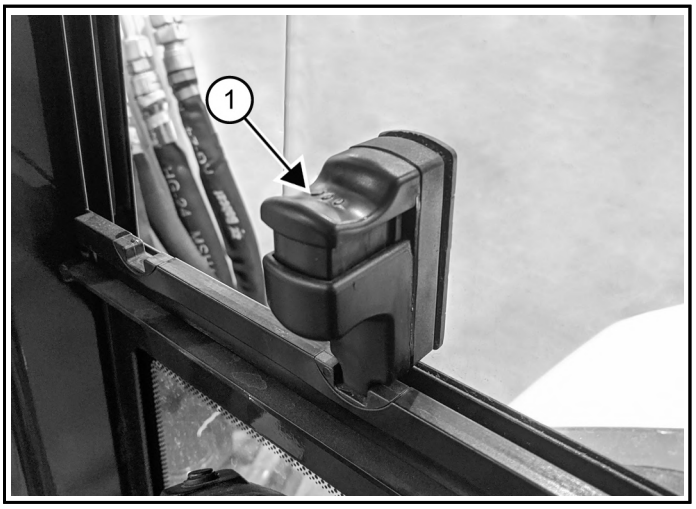
   Use both window grab handles (Item 1) [Figure 38] to pull the window down fully.

6. Press the top of the window in until the latch locks into the latched position (both sides) [Figure 37].

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

Operating The Right Windows

Figure 40

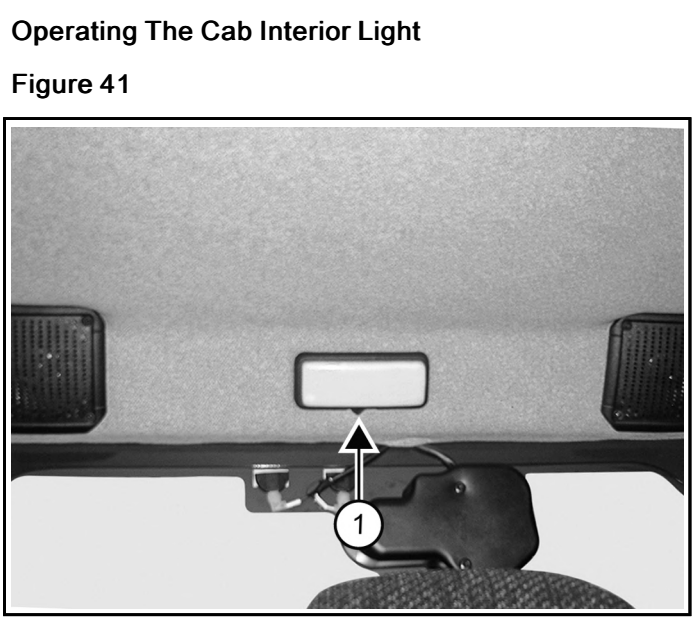


C206631a

1. Pinch the latch together (Item 1) [Figure 40] and pull the window open.
2. Release the lever (Item 1) [Figure 40] into the slot to secure the window open in one of the available positions.
3. To close the window, pinch the latch together and push the window shut. Make sure the lever releases into the slot to secure the window shut.

Operating The Cab Interior Light

Figure 41



C207884a

- Move the switch (Item 1) [Figure 41] to the right and left to the turn the light ON and OFF.

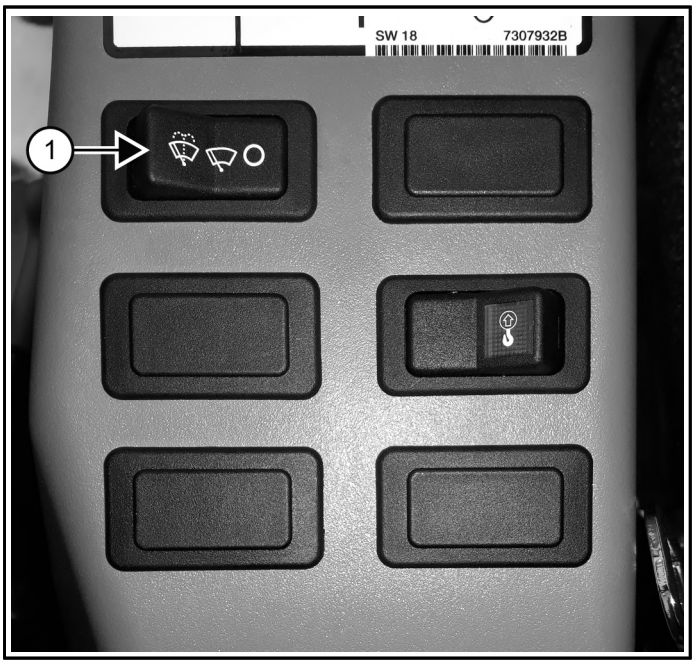
Operating Windshield Wiper

Figure 42

P200099a

The front window is equipped with a windshield wiper (Item 1) [Figure 42] and washer.

Figure 43

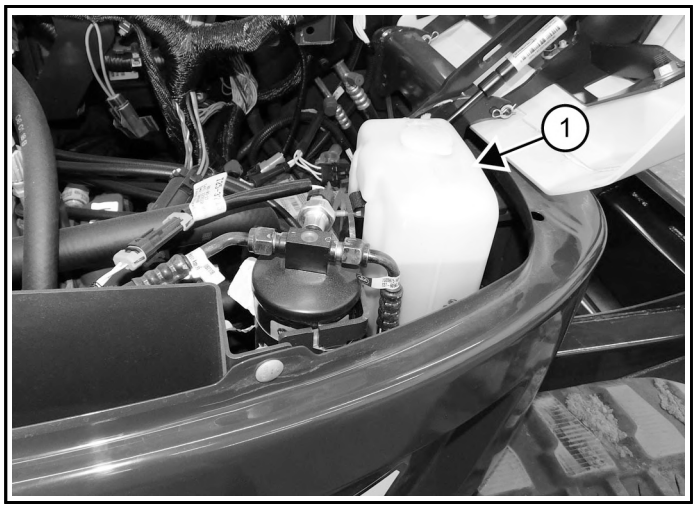


C208529b

1. Press the switch (Item 1) [Figure 43] to the left to turn the windshield wiper ON.
2. Press and hold switch (Item 1) [Figure 43] to the left to activate windshield washer.
3. Press the switch (Item 1) [Figure 43] to the right to turn the windshield wiper OFF.

Window Washer Reservoir

Figure 44

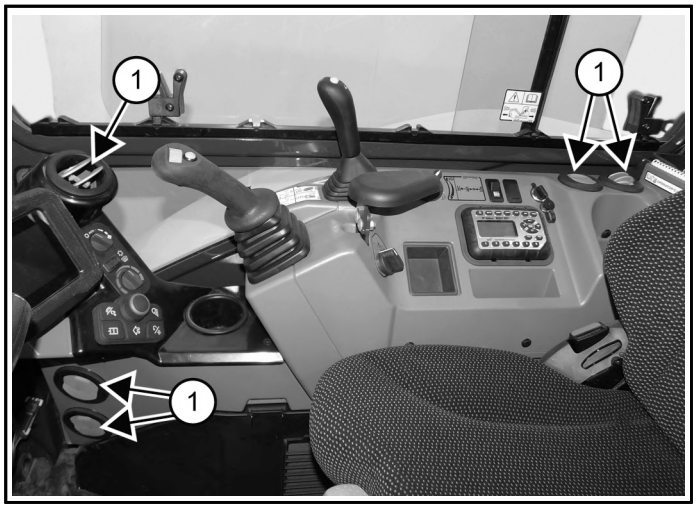


P200100a

The window washer reservoir (Item 1) [Figure 44] is located under the right side cover.

Heating, Ventilation, And Air Conditioning Ducting

Figure 45



P141329a

The HVAC louvers (Item 1) [Figure 45] can be positioned as needed to direct the air flow to various areas in the cab.

EMERGENCY EXITS

Emergency Exit Locations

The door, the right window, and the front window provide exits in case of an emergency.

Making An Emergency Exit Through The Front Window

Figure 46

C206630

You can make an emergency exit through the front window. (See Operating The Front Window on Page 41)

NOTE: If the excavator has a Front Guard Kit installed, the front window can not be used as an emergency exit.

Making An Emergency Exit Through The Right Side Window

Figure 47

P92955

You can make an emergency exit through the right window. (See Operating The Right Windows on Page 42)

MOTION ALARM

Motion Alarm System Description

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

The motion alarm will sound when the operator moves the travel control levers in either the forward or reverse direction.

If the alarm does not sound, see inspection instructions.

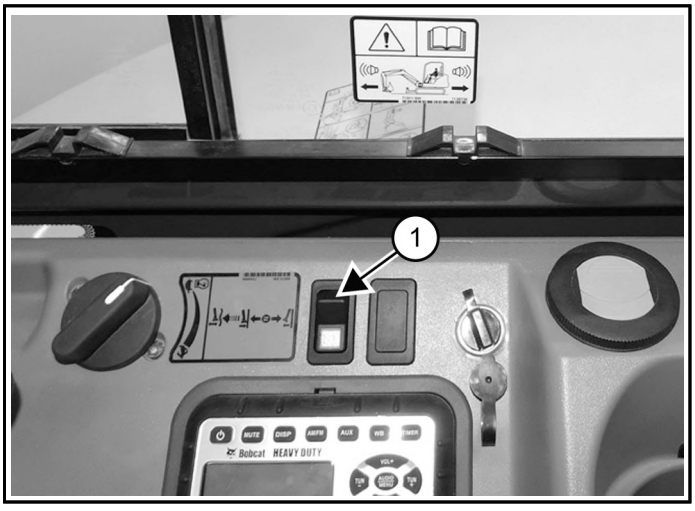
⚠ WARNING

CRUSHING HAZARD
Failure to maintain a clear view in the direction of travel can cause serious injury or death.
- **This machine is equipped with a motion alarm. ALARM MUST SOUND! when operating forward or backward.**
- **The operator is responsible for the safe operation of this machine.◂**

W-2786

Disabling The Motion Alarm

Figure 48



C200665c

- Press the motion alarm switch (Item 1) [Figure 48] on the right console while the machine is moving to temporarily disable the motion alarm.
- Enable the motion alarm by returning the travel levers back to the neutral position.

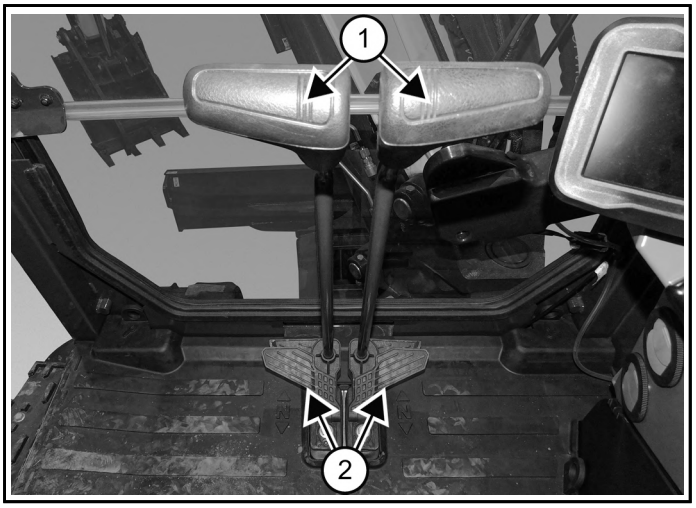
TRAVEL CONTROLS

Forward And Reverse Travel

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

1. Rotate the upperstructure, if necessary, to ensure the blade is at the front of the machine (as you sit in the operator's seat).

Figure 49



C206624b

2. Slowly move both steering levers (Item 1) [Figure 49] forward for forward travel, backward for reverse travel.

   OR

   Control travel with the foot pedals (Item 2) [Figure 49].

   Pivot the heel of the pedals forward for additional space on the floor.

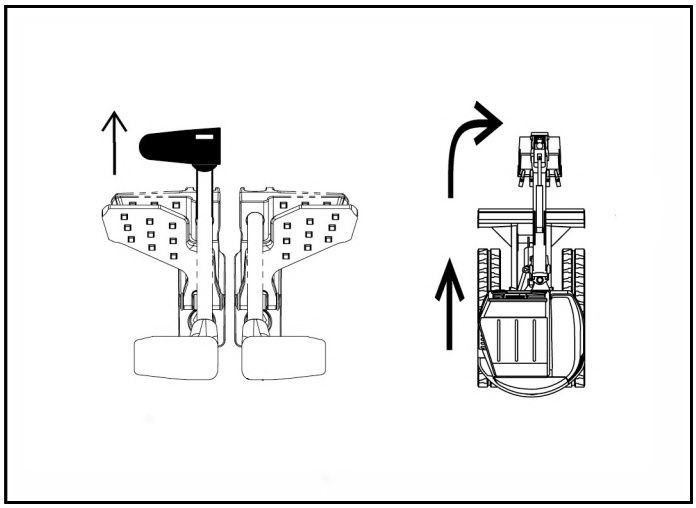
⚠ WARNING

UNINTENDED MOVEMENT HAZARD
Failure to follow instructions can cause serious injury or death.
- **Check the blade location before travelling. When the blade is to the rear, operate the steering levers / foot pedals in the opposite direction to when the blade is in the front.**
- **Move the steering levers / foot pedals slowly. Abrupt lever motion will cause the machine to jerk.◂**

W-2235

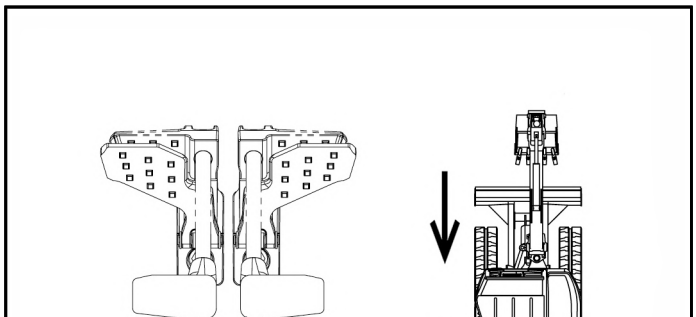
Making A Right Turn

Figure 50



- Push the left steering lever forward to turn right while travelling forward [Figure 50].

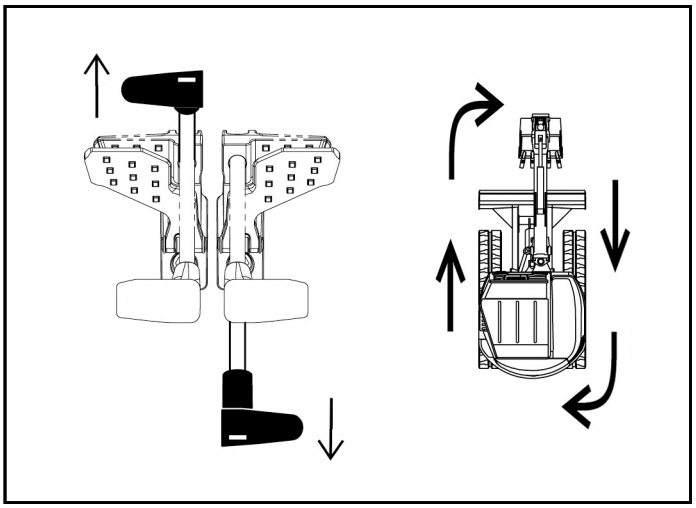
Figure 51



- Pull the left steering lever backward to turn right while travelling backward [Figure 51].

Making A Counter-Rotation Right Turn

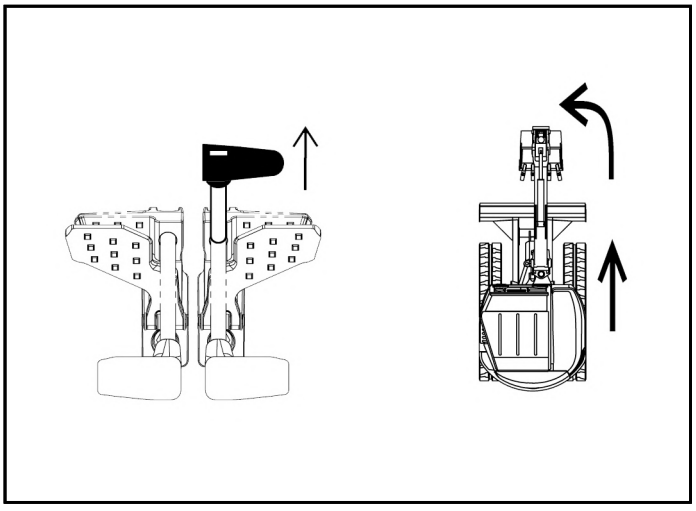
Figure 52



- Push the left steering lever forward and pull the right steering lever backward [Figure 52].

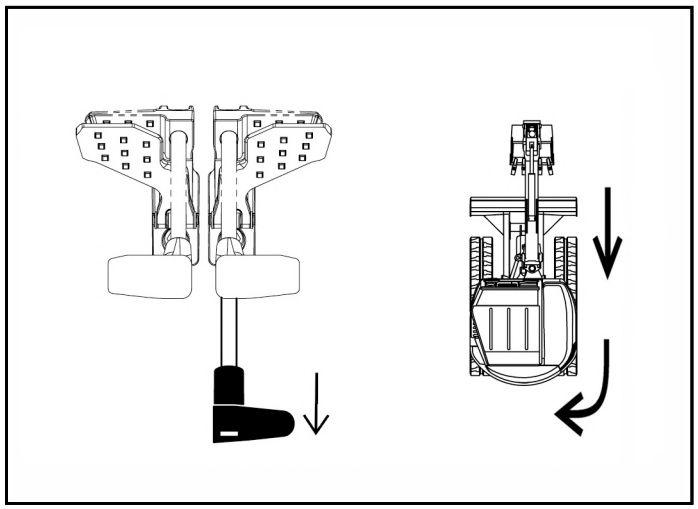
Making A Left Turn

Figure 53



- Push the right steering lever forward to turn left while travelling forward [Figure 53].

Figure 54

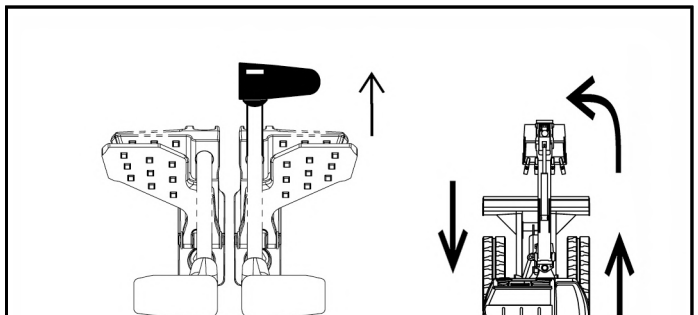


NA15009A

- Pull the right steering lever backward to turn left while travelling backward [Figure 54].

Making A Counter-Rotation Left Turn

Figure 55



NA15010A

- Push the right steering lever forward and pull the left steering lever backward [Figure 55].

HYDRAULIC CONTROLS

Hydraulic Controls Description

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

⚠ WARNING

GENERAL HAZARD
Failure to follow instructions can cause serious injury or death.
Before leaving the machine:
- **Lower the work equipment to the ground.**
- **Lower the blade to the ground.**
- **Stop the engine and remove the key.**
- **Raise the control console.**

W-2780

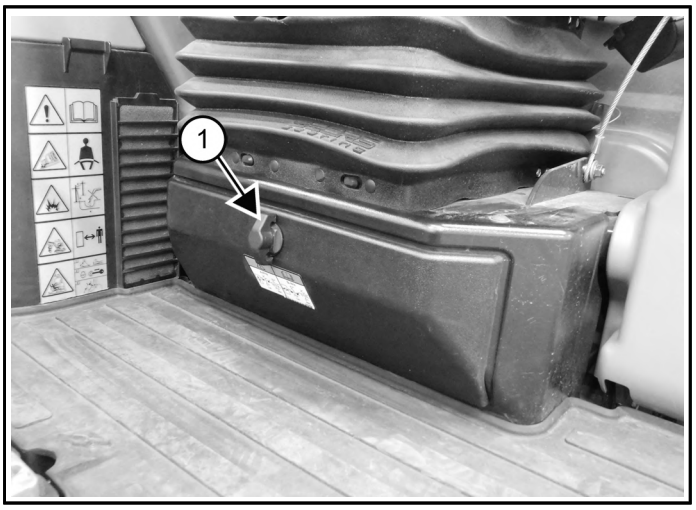
Control Pattern Options

The joysticks can be used in either Standard control pattern or in ISO control pattern.

ISO / STD Selector Valve

The excavator may be equipped with an ISO / STD selector valve located under the operator's seat. Use this valve to switch between ISO control pattern and Standard control pattern.

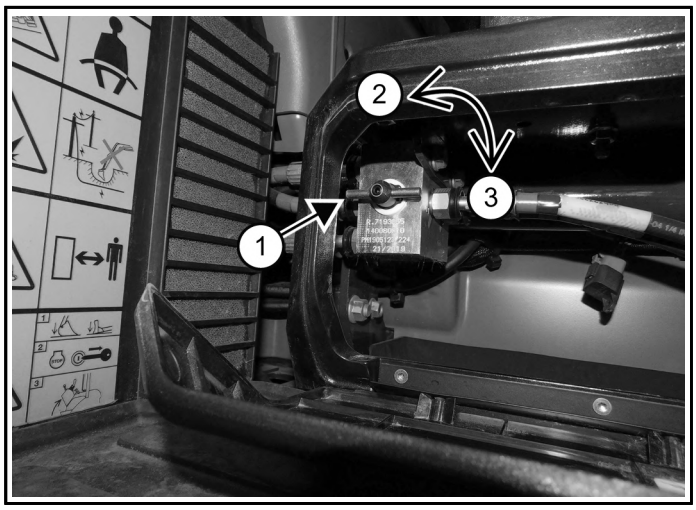
Figure 56



C208244a

1. Open the compartment under the operator's seat (Item 1) [Figure 56].

Figure 57



C208223a

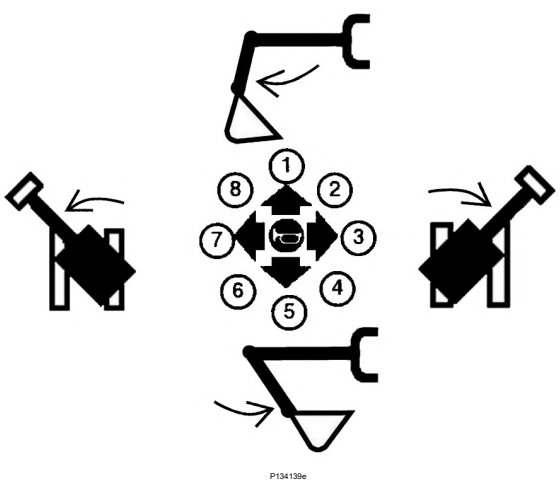
2. Rotate the valve (Item 1) anticlockwise (Item 2) to select Standard control pattern [Figure 57].

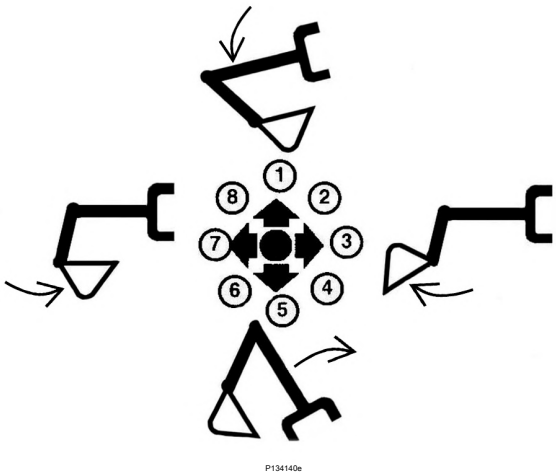
   OR

   Rotate the valve (Item 1) clockwise (Item 3) to select ISO control pattern [Figure 57].

3. Close the compartment (Item 1) [Figure 56].

ISO Control Pattern

Left Joystick	
 P134139e	
Joystick Position	Function
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.

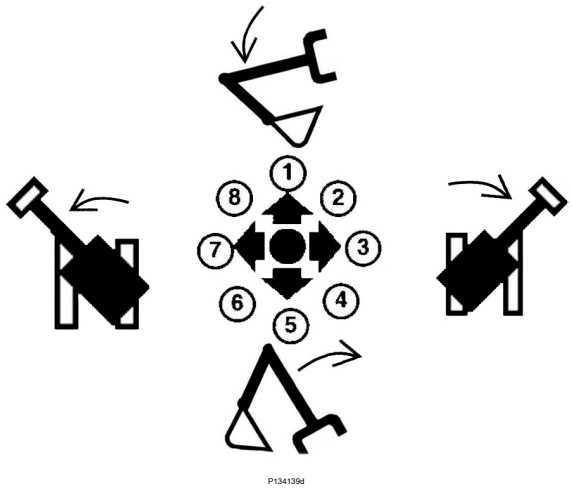
Right Joystick	
 P134140e	
Joystick Position	Function
1	Boom lower.
2	Boom lower and bucket dump.
3	Bucket dump.
4	Boom raise and bucket dump.
5	Boom raise.
6	Boom raise and bucket curl.

Left Joystick	
7	Slew left.
8	Arm out and slew left.

Right Joystick	
7	Bucket curl.
8	Boom lower and bucket curl.

Standard Control Pattern

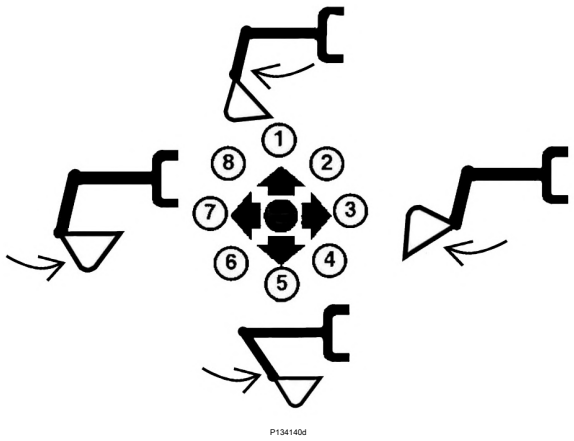
Left Joystick



P134139d

Joystick Position	Function
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 Joystick



P134140d

Joystick Position	Function
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.

QUICK COUPLERS

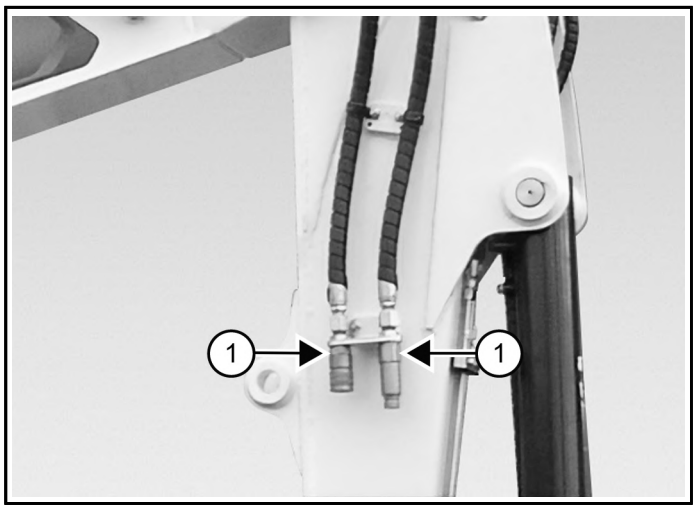
⚠ WARNING

BURN HAZARD
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

⚠ WARNING

INJECTION HAZARD
Pressurised diesel fuel or hydraulic fluid can penetrate skin and eyes, causing serious injury or death.
Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. DO NOT use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical attention from a doctor familiar with this injury.◂
W-2072

Figure 58



C208415a

The excavator and attachments are supplied with flush faced couplers. The couplers are mounted on the arm of the excavator (Item 1) [Figure 58].

Connecting Quick Couplers

1. Remove any dirt or debris from the surface of both the male and female couplers, and from the outside diameter of the male coupler.

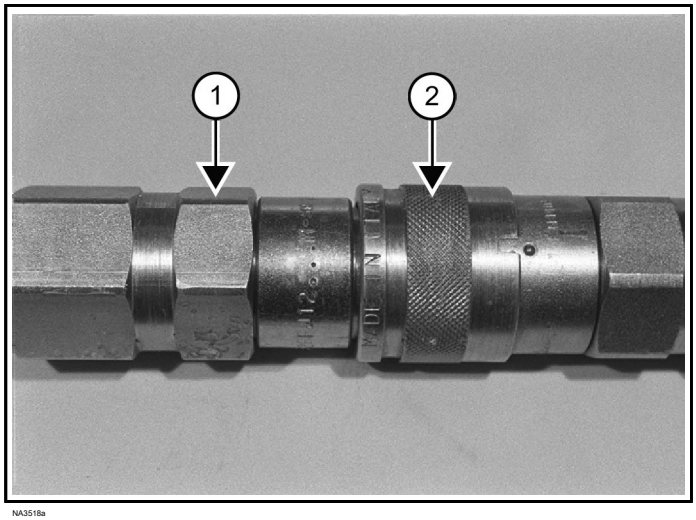
2. Visually check the couplers for corroding, cracking, damage, or excessive wear.

   If any of these conditions exist, the coupler(s) must be replaced.

3. Install the male coupler into the female coupler.

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

Figure 59



NA3518a

4. To disconnect, hold the male coupler (Item 1) and retract the sleeve (Item 2) on the female coupler until the couplers disconnect [Figure 59].

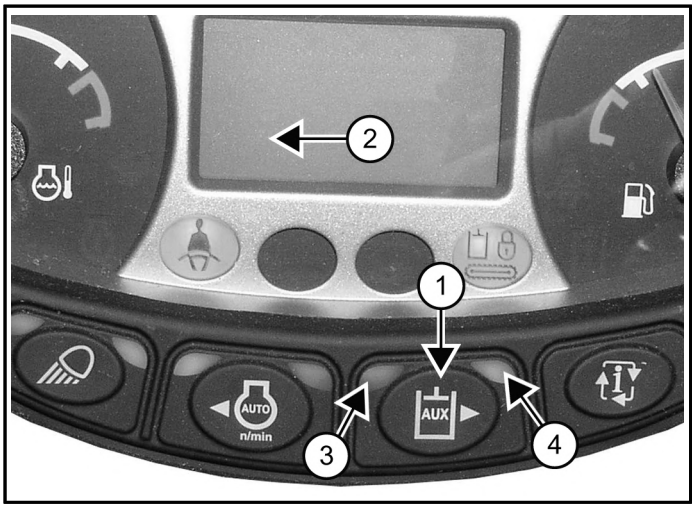
PRIMARY AUXILIARY HYDRAULICS (STANDARD PANEL)

Operating Attachments With Primary Auxiliary Hydraulics

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

Either Selectable Auxiliary Hydraulic Flow or Continuous Auxiliary Hydraulic Flow can be used for primary auxiliary hydraulics. Choose the hydraulic flow that best matches your attachment's hydraulic requirements.

Figure 60



C-97988b

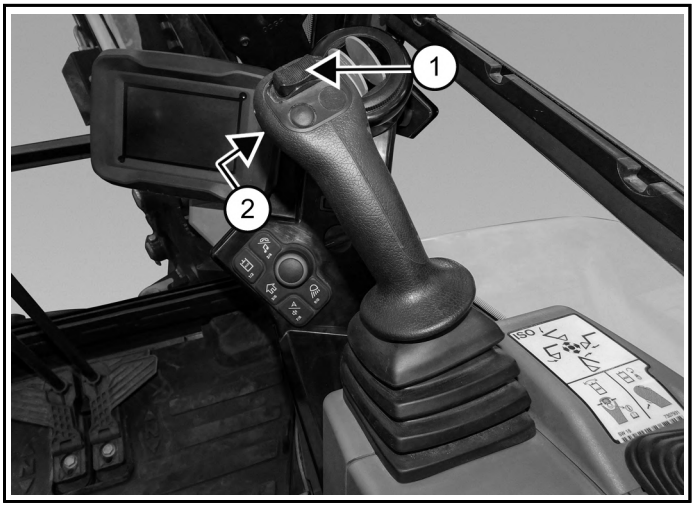
1. Press the AUX button (Item 1) [Figure 60] to enable **Selectable Auxiliary Hydraulics Flow**.

   A beep will sound each time the AUX button is pushed. The last selected flow will appear in the data display (Item 2) [Figure 60]. The left LED (Item 3) [Figure 60] will illuminate.

2. To enable **Continuous Flow Auxiliary Hydraulics**, press and hold the AUX button (Item 1) [Figure 60] for more than one second.

   The right LED (Item 4) [Figure 60] will illuminate.

Figure 61



C206172b

3. To operate the attachment with primary auxiliary hydraulics, see the following table:

Action	Result
Move right joystick switch (Item 1) to the right.	Supply hydraulic flow to female coupler.
Move right joystick switch (Item 1) to the left.	Supply hydraulic flow to male coupler.
Move right joystick switch (Item 1) halfway.	Auxiliary functions move at approximately one-half speed.
Press front joystick button (Item 2).	Supply continuous flow to female coupler.
Move right joystick switch (Item 1) to the left while pressing front joystick button (Item 2).	Supply continuous flow to male coupler.
Press front joystick button (Item 2) a second time.	Stop auxiliary flow to couplers.

4. To turn off auxiliary hydraulics, press the AUX Hydraulics button (Item 1) [Figure 60] and cycle through the settings until it turns off.

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

If the auxiliary hydraulics are enabled when the engine is turned OFF, they will stay enabled when the engine is restarted.

Setting Auxiliary Hydraulics Flow Rate

The auxiliary hydraulics flow rate can be set to 3, 2, or 1. See the table below for recommended flow rates for various attachments.

ATTACHMENTS	RECOMMENDED AUXILIARY FLOW	FLOW RATE
Breaker, Auger	3	Maximum
Clamp	2	Medium
Attachments requiring very low flow for controllability	1	Low

1. Enable auxiliary hydraulics.

Figure 62

p-97988g

2. To change the flow rate, press the AUX button (Item 1) [Figure 62] to toggle through the settings.

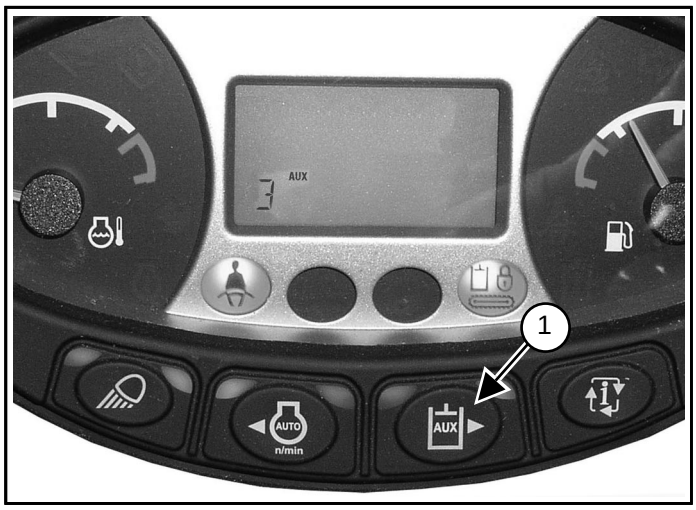
   The flow rate will display in the lower left corner of the display screen (3^{AUX}, 2^{AUX}, or 1^{AUX}) (Item 2) [Figure 62].

Releasing Hydraulic Pressure In Excavator

The engine must have been recently started to release hydraulic pressure.

1. Put the attachment flat on the ground.
2. Stop the engine and then turn the start switch to ON, but do not start the engine.
3. Make sure the left console is fully lowered.

Figure 63



P97988e

4. Press the AUX button (Item 1) [Figure 63] to enable auxiliary hydraulics.

5. Move the right joystick switch (Item 1) [Figure 61] to the right and left several times to release pressure.

Releasing Hydraulic Pressure In Attachments

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

1. Release hydraulic pressure in the excavator.

2. Connect the male coupler from the attachment to the female coupler of the excavator, then repeat the procedure above.

   This will relieve pressure in the attachment.

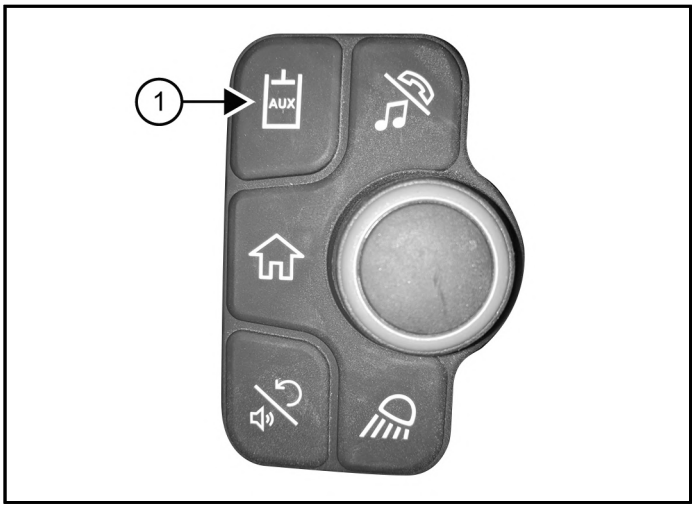
3. Connect the female coupler from the attachment.

PRIMARY AUXILIARY HYDRAULICS (STANDARD DISPLAY)

Operating Attachments With Primary Auxiliary Hydraulics

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

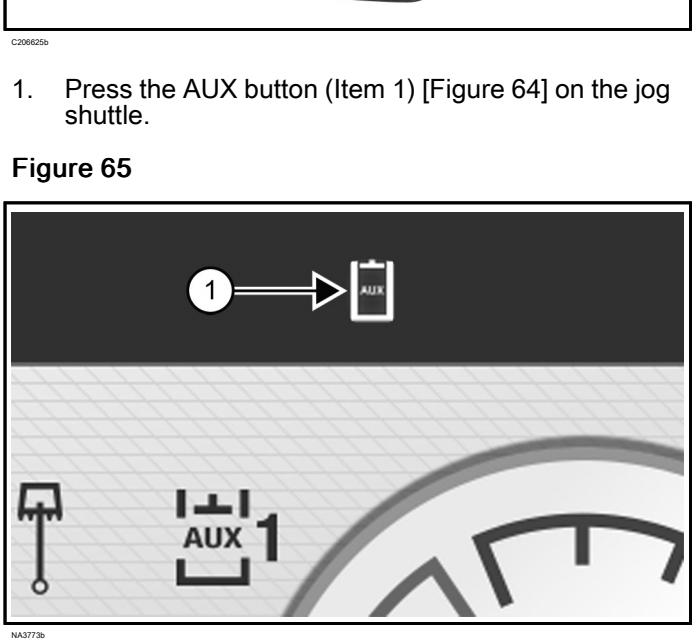
Figure 64



C206625b

1. Press the AUX button (Item 1) [Figure 64] on the jog shuttle.

Figure 65



NA3773b

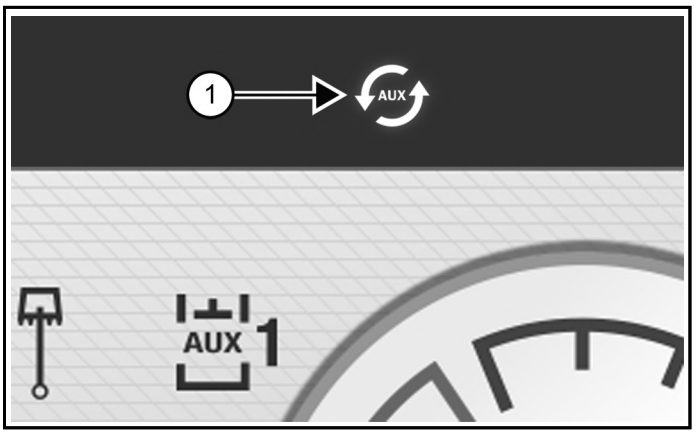
   The auxiliary hydraulics icon (Item 1) [Figure 65] will turn ON.

2. For auxiliary hydraulics, continue to the next step.

   OR

   To activate detent mode, press and hold the AUX button (Item 1) [Figure 64] on the jog shuttle again for at least one second.

Figure 66



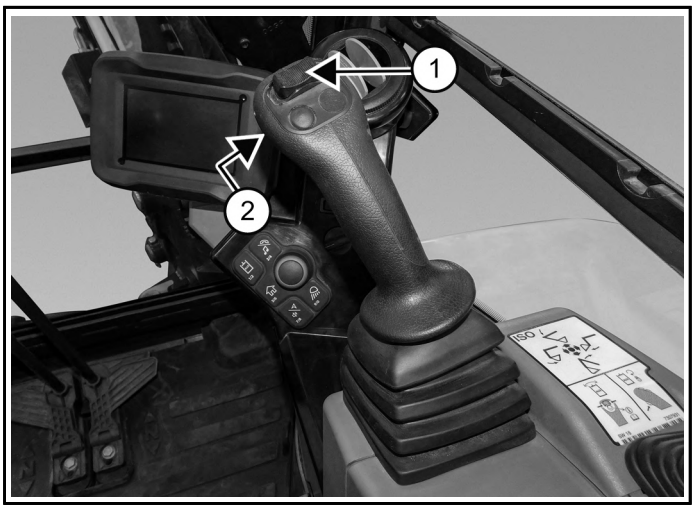
NA3773c

A beep will be heard and the detent icon (Item 1) [Figure 66] will appear. Detent mode will be active.

3. Adjust the hydraulic flow to best meet the needs of the attachment.
(See Setting Auxiliary Hydraulics Flow Rate on Page 52)

4. To operate the attachment with primary auxiliary hydraulics, see the following table:

Figure 67



C206172b

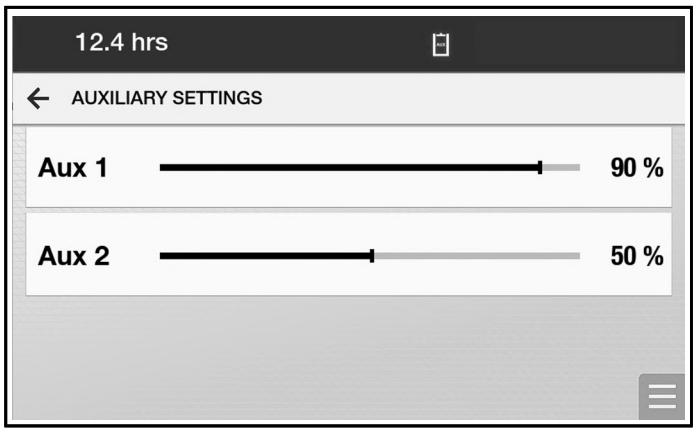
Action	Result
Move right joystick switch (Item 1) to the right.	Supply hydraulic flow to female coupler.
Move right joystick switch (Item 1) to the left.	Supply hydraulic flow to male coupler.
Move right joystick switch (Item 1) halfway.	Auxiliary functions move at approximately one-half speed.
Press front joystick button (Item 2).	Supply continuous flow to female coupler.
Move right joystick switch (Item 1) to the left while pressing front joystick button (Item 2).	Supply continuous flow to male coupler.
Press front joystick button (Item 2) a second time.	Stop auxiliary flow to couplers.

5. To turn off auxiliary hydraulics, press the AUX button (Item 1) [Figure 64] on the jog shuttle.

Setting Auxiliary Hydraulics Flow Rate

1. Select **[SETTINGS]→ [MACHINE SETTINGS]→ [AUXILIARY SETTINGS]**.

Figure 68



NA3766

2. Adjust the flow rate of the auxiliary hydraulics to best match the attachment / operator requirements [Figure 68].

   Below are some suggested flow ranges for common attachments.

FLOW PERCENTAGE	ATTACHMENT
100%	Breaker, Vibratory Plate Compactor, Auger
65 – 75%	Clamp, Grapple
25 – 35%	Tilt Coupler

   The touch display, if equipped, offers additional settings.

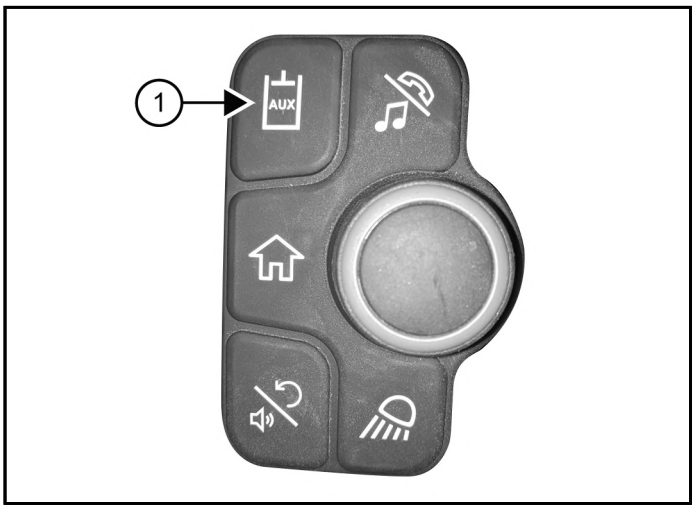
NOTE: If the auxiliary hydraulics are enabled when the engine is turned OFF, they will stay enabled at engine restart. If detent flow was enabled at engine OFF, it will be disabled at engine restart.

Releasing Hydraulic Pressure in Excavator

The engine must have been recently started to release hydraulic pressure.

1. Put the attachment flat on the ground.
2. Stop the engine and then turn the start switch to ON, but do not start the engine.
3. Make sure the left console is fully lowered.

Figure 69



C206625b

4. Press the AUX button (Item 1) [Figure 69] on the jog shuttle to enable auxiliary hydraulics.
5. Move the right joystick switch (Item 1) [Figure 67] to the right and left several times to release pressure.

The touch display, if equipped, offers an additional option for releasing pressure.

Releasing Hydraulic Pressure In Attachments

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

1. Release hydraulic pressure in the excavator.
2. Connect the male coupler from the attachment to the female coupler of the excavator, then repeat the procedure above.

   This will relieve pressure in the attachment.
3. Connect the female coupler from the attachment.

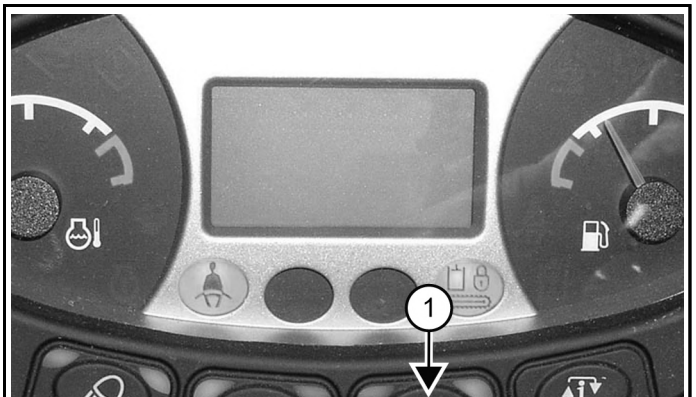
SECONDARY AUXILIARY HYDRAULICS (STANDARD PANEL)

Operating Attachments With Secondary Auxiliary Hydraulics

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

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

Figure 70



C-97988e

1. Press the AUX button (Item 1) [Figure 70] to activate auxiliary hydraulics.

Figure 71

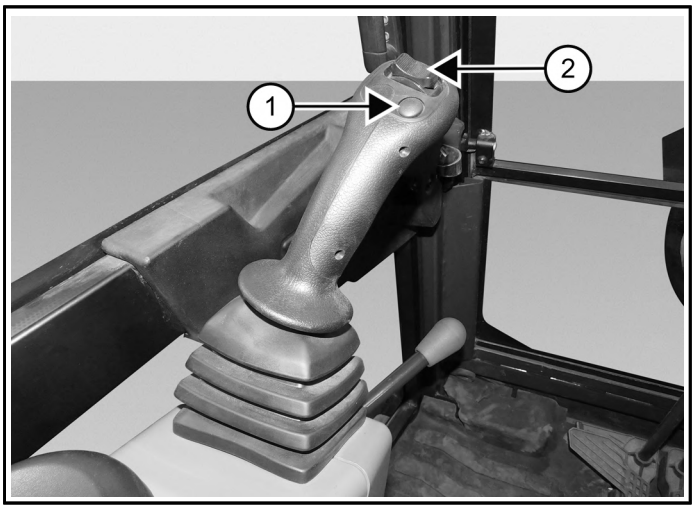
C-97988f

The display will now indicate that the left joystick controls boom swing offset (OF) (Item 1) and the right joystick controls primary auxiliary hydraulics (A1) (Item 2) [Figure 71].

2. Press the left joystick button (Item 1) [Figure 72] until two beeps are heard to switch from boom swing function to secondary auxiliary hydraulics.

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

Figure 72



C206181a

3. Use the left joystick switch (Item 2) [Figure 72] to control the hydraulics indicated on the left side of the display panel (OF or Aux 2).

Releasing Secondary Auxiliary Hydraulic Pressure In Excavator

The engine must have been recently started to release hydraulic pressure.

1. Put the attachment flat on the ground.
2. Stop engine and then turn the start switch to ON, but do not start the engine.
3. Make sure the left console is fully lowered.
4. Activate secondary auxiliary hydraulics. (See Operating Attachments With Secondary Auxiliary Hydraulics on Page 54)
5. Move the left joystick switch (Item 2) [Figure 72] to the right and left several times to release pressure.

Releasing Secondary Auxiliary Hydraulic Pressure In Attachments

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

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

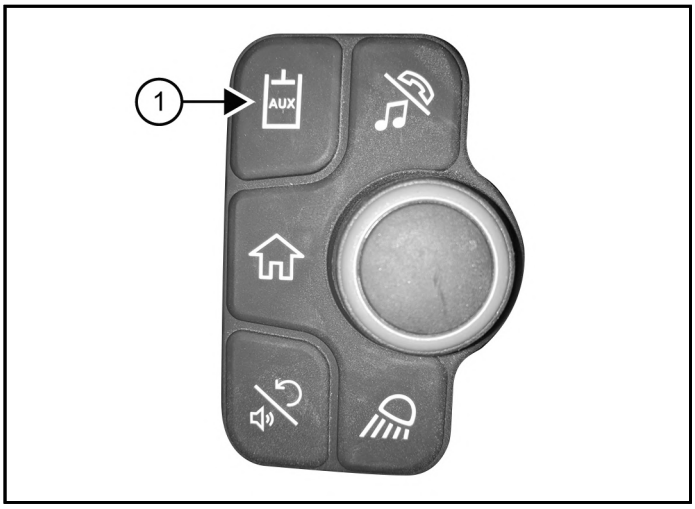
3. Connect the female coupler from the attachment.

SECONDARY AUXILIARY HYDRAULICS (STANDARD DISPLAY)

Operating Attachments With Secondary Auxiliary Hydraulics

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

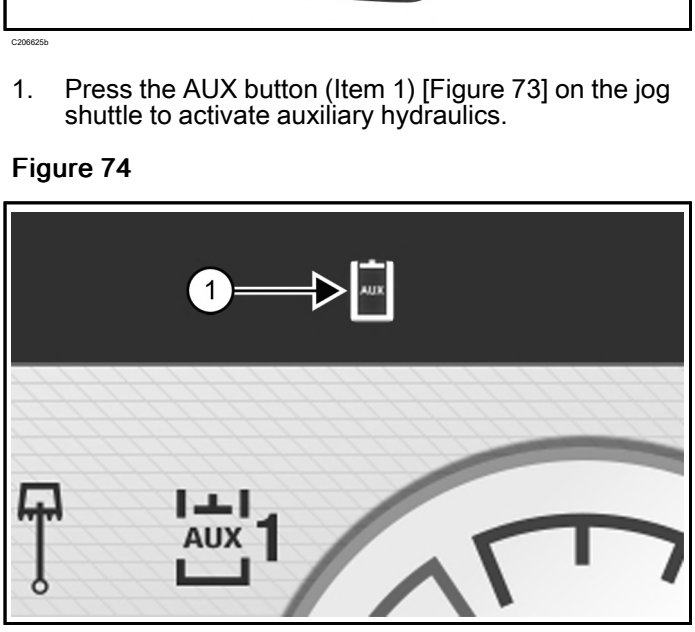
Figure 73



C206625b

1. Press the AUX button (Item 1) [Figure 73] on the jog shuttle to activate auxiliary hydraulics.

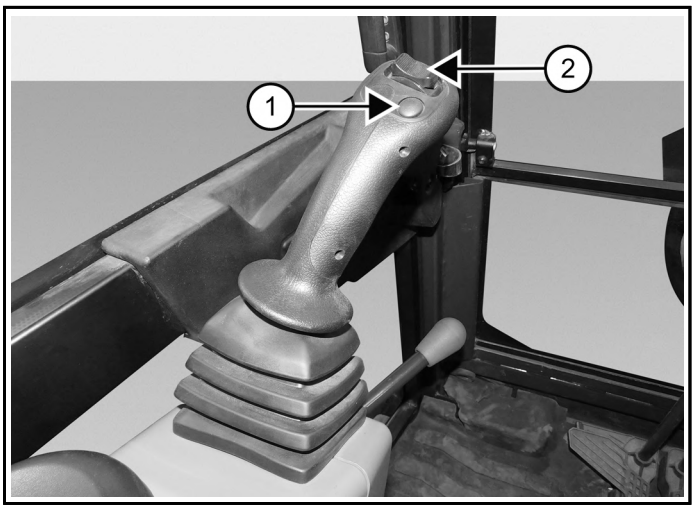
Figure 74



NA3773b

The auxiliary hydraulics icon (Item 1) [Figure 74] will turn ON.

Figure 75



C206181a

2. Press and hold the button (Item 1) [Figure 75] on the left joystick until a beep is heard to switch from boom swing function to secondary auxiliary hydraulics.

Figure 76

C132982b

The second auxiliary hydraulics icon (Item 1) [Figure 76] will appear on the screen.

3. Adjust the secondary hydraulic flow to best meet the needs of the attachment.
(See Setting Auxiliary Hydraulics Flow Rate on Page 52)

4. Use the left joystick switch (Item 2) [Figure 75] to operate the attachment as follows:

   - Move the left joystick switch to the left to supply hydraulic flow to the female coupler.
   - Move the left joystick switch to the right to supply hydraulic flow to the male coupler.
   - Move the switch halfway, and the auxiliary functions will move at approximately one-half speed.

5. To turn off auxiliary hydraulics, press the AUX button (Item 1) [Figure 73] on the jog shuttle.

Releasing Secondary Auxiliary Hydraulic Pressure In Excavator

The engine must have been recently started to release hydraulic pressure.

1. Put the attachment flat on the ground.
2. Stop engine and then turn the start switch to ON, but do not start the engine.
3. Make sure the left console is fully lowered.
4. Press and hold the left joystick button (Item 1) [Figure 75] until a beep is heard to switch to the secondary auxiliary hydraulics.

   The secondary auxiliary hydraulic icon (Item 1) [Figure 76] will be ON when activated.

5. Move the left joystick switch (Item 2) [Figure 75] to the right and left several times to release pressure.

Releasing Secondary Auxiliary Hydraulic Pressure In Attachments

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

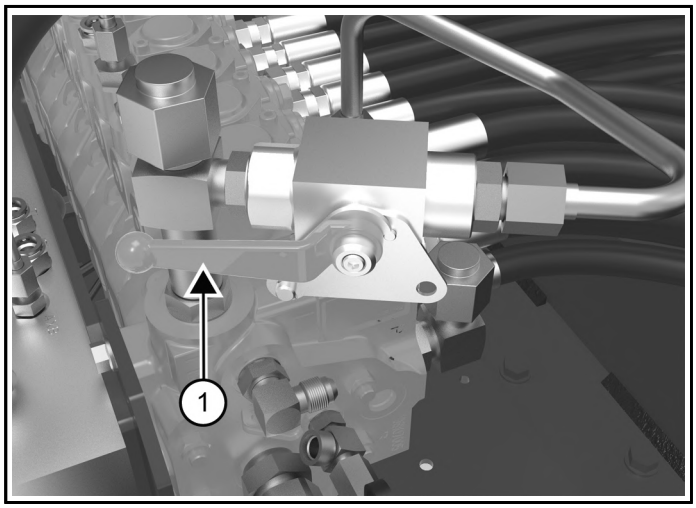
1. Follow the procedure to relieve hydraulic pressure in the excavator.
2. Connect the male coupler from the attachment to the female coupler of the excavator, then repeat the procedure above. This will release pressure in the attachment.
3. Connect the female coupler from the attachment.

DIRECT TO TANK VALVE

Operating The Direct To Tank Valve

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

Figure 77

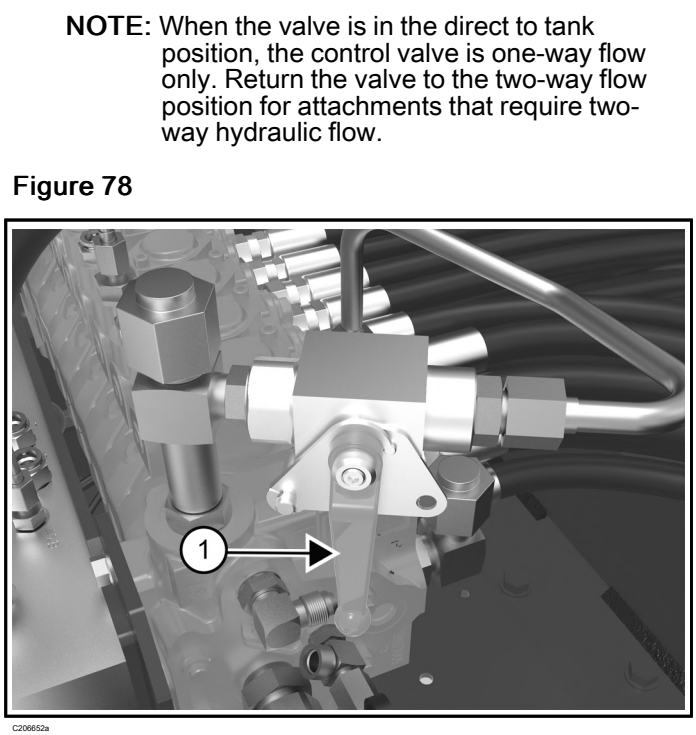


C206651a

- Turn the handle (Item 1) [Figure 77] in line with the valve and the fluid will bypass the hydraulic control valve and return directly to the tank.

  NOTE: When the valve is in the direct to tank position, the control valve is one-way flow only. Return the valve to the two-way flow position for attachments that require two-way hydraulic flow.

Figure 78



C206652a

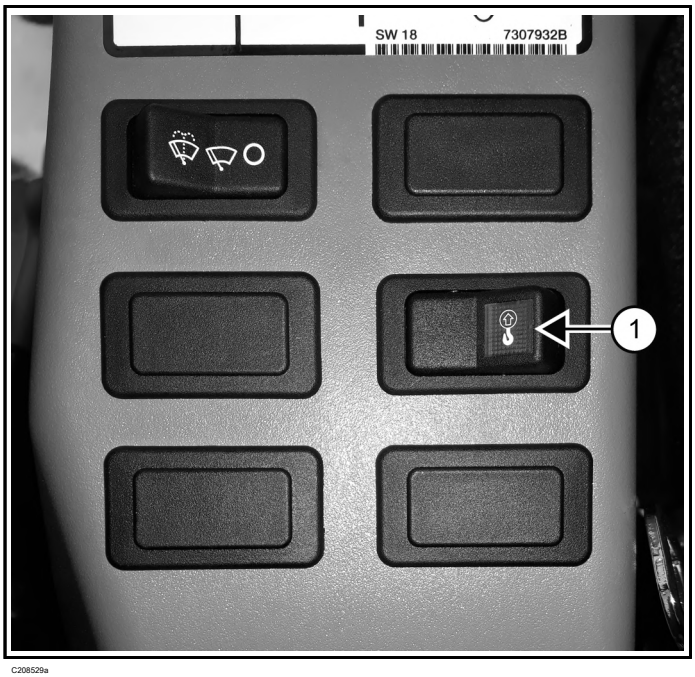
- Turn the handle (Item 1) [Figure 78] perpendicular to the valve and the fluid will return through the hydraulic control valve.

OVERLOAD WARNING DEVICE

Operating The Overload Warning Device

When the overload warning device (if equipped) is engaged, a warning buzzer will sound and the general warning icon will flash on the display if the work group is overloaded.

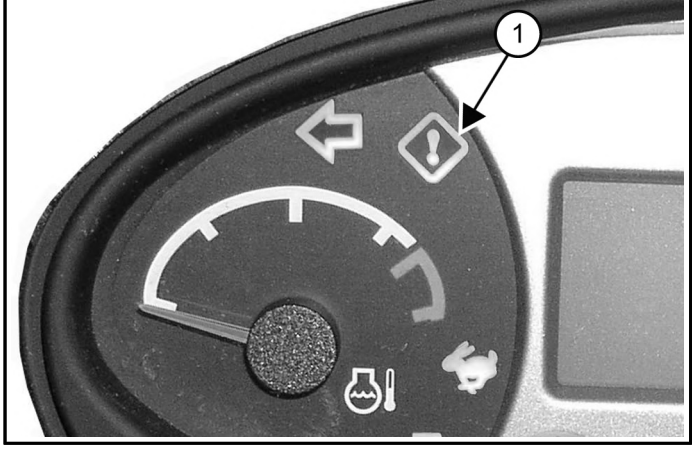
Figure 79



C208529a

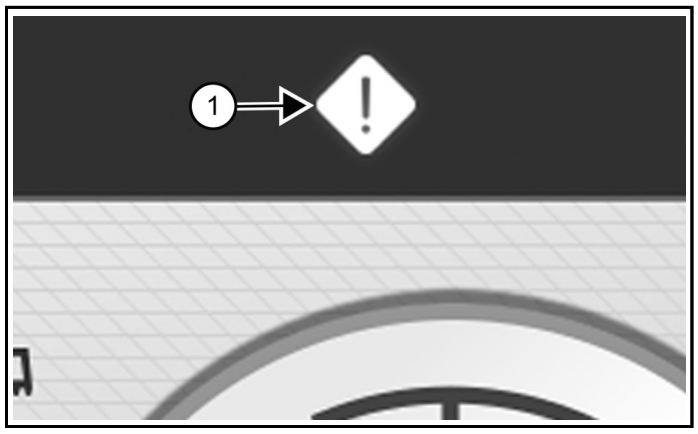
1. Press the overload warning switch [Figure 79] on the left console to enable the overload warning device.

Figure 80



C97989a

Figure 81



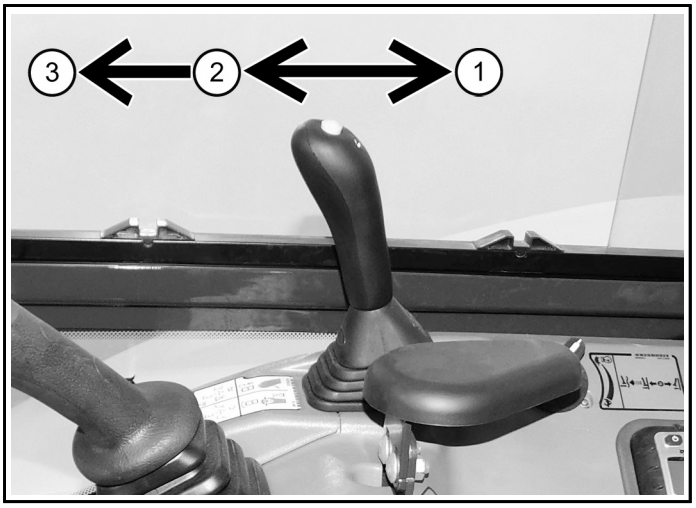
NA3734f

2. If the boom is overloaded, the general warning icon will illuminate (Item 1) [Figure 80] (panel) or (Item 1) [Figure 81] (display). A buzzer will sound.
3. Immediately bring the arm toward the machine, lower the boom, and reduce the load before continuing operation.
4. Disengage the overload warning device by pressing the switch (Item 1) [Figure 79] to the left.

BLADE CONTROL LEVER

Raising And Lowering The Blade

Figure 82



P200125a

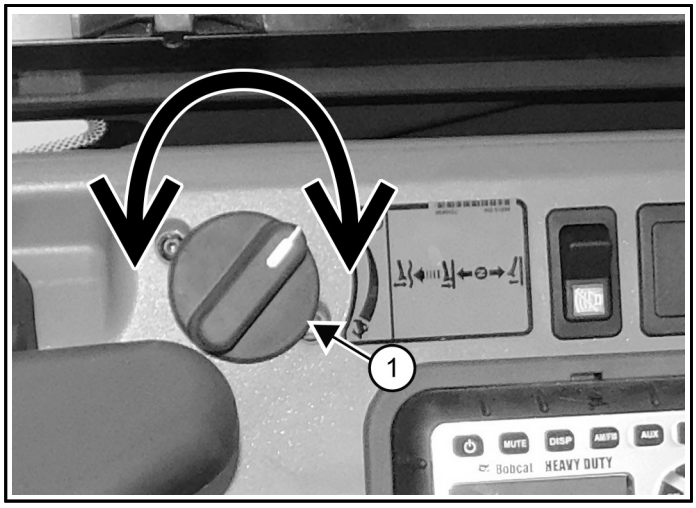
- Pull the lever backward (Item 1) [Figure 82] to raise the blade.
- Push the lever forward (Item 2) [Figure 82] to lower the blade.
- Push the lever forward until the lever is in the locked position (Item 3) [Figure 82] to put the blade in the float position.
    - ▷ Pull the lever backward to unlock from the float position.

Keep blade lowered for increased digging performance.

ENGINE SPEED CONTROL

Setting Engine Speed (RPM)

Figure 83



P200090a

The engine speed control dial (Item 1) [Figure 83] controls engine rpm.

- Rotate the engine speed control dial counterclockwise to reduce engine rpm.
- Rotate the engine speed control dial clockwise to increase engine rpm.

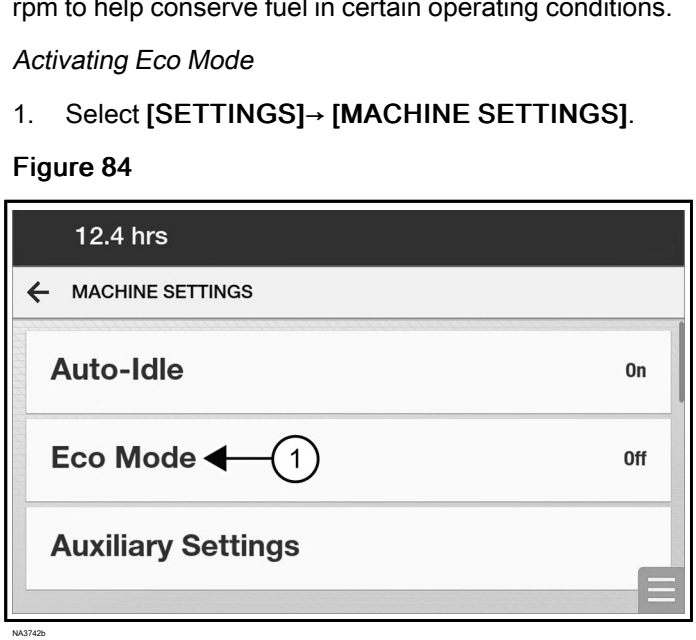
Eco Mode

Eco mode, when enabled, will reduce the high idle engine rpm to help conserve fuel in certain operating conditions.

Activating Eco Mode

1. Select **[SETTINGS]→ [MACHINE SETTINGS]**.

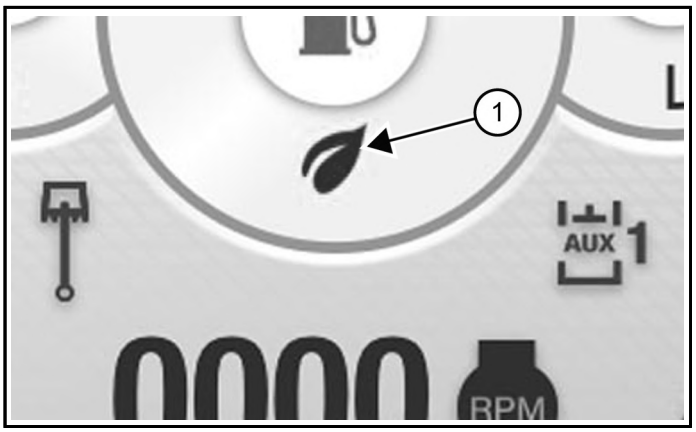
Figure 84



NA3742b

2. Select **[ECO MODE]** (Item 1) [Figure 84] to turn Eco mode ON / OFF.

Figure 85



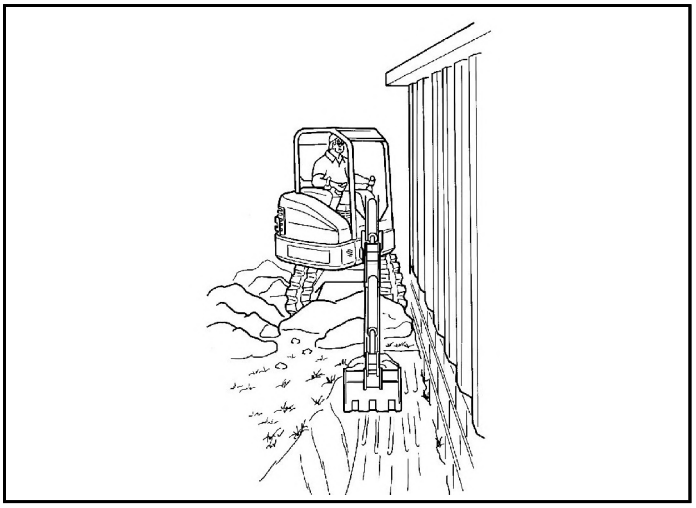
C132900g

The Eco mode icon (Item 1) [Figure 85] will be displayed on the **GAUGES** screen when Eco mode is ON.

BOOM SWING

Enabling Boom Swing

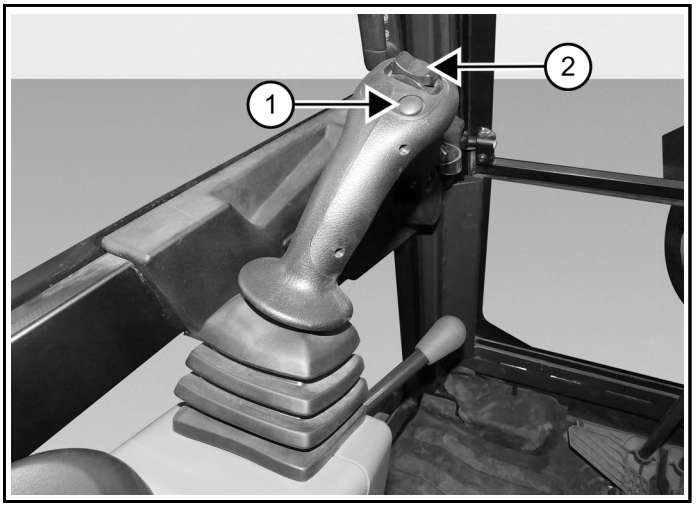
Figure 86



NA1432b

The purpose of the boom swing is to offset the boom with respect to the upperstructure for digging close to a structure [Figure 86]. Adjust the mirrors if necessary before beginning.

Figure 87



C206181a

1. If no auxiliary hydraulics are enabled, control the boom swing with the left joystick switch (Item 2) [Figure 87].

   OR

   If auxiliary hydraulics are enabled, press and hold the button (Item 1) [Figure 87] on the left joystick until a beep is heard to switch between the boom swing function and the secondary auxiliary hydraulics. (See Operating Attachments With Secondary Auxiliary Hydraulics on Page 55)

2. Use the switch (Item 2) [Figure 87] on the left joystick to control boom swing.

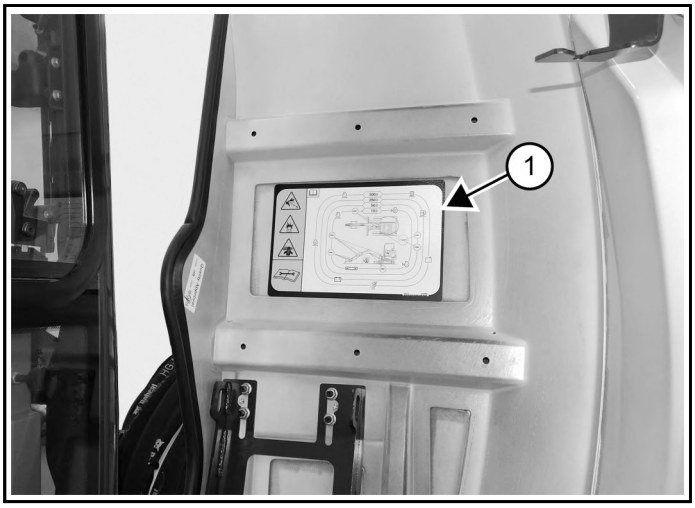
   a. Move the switch to the left to swing the boom to the left.

   b. Move the switch to the right to swing the boom to the right.

DAILY INSPECTION

Daily Inspection And Maintenance List

Figure 88



P200106a

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 88] is located inside the right cover.
(See Service Schedule on Page 121)

Do the following before each day of operation:

- Check operator canopy or cab (ROPS / TOPS / FOPS) and mounting hardware. Lubricate door hinges if necessary.
- Check seat belt and mounting hardware. Replace seat belt if damaged.
- Check for damaged decals, replace as needed.
- Check control console lockout.
- Check attachment mounting system for damage or loose parts.
- Check air cleaner and intake hoses / clamps.
- Check engine oil level and engine for leaks.
- Check engine coolant level in both the coolant recovery tank and radiator and check system for leaks.
- Check engine area for flammable materials.
- Check hydraulic fluid level and system for leaks.
- Check indicator lights for correct operation.
- Grease all pivot points.
- Check cylinder and attachment pivot points.
- Check the track tension.
- Repair broken and loose parts.
- Check or clean cab heater filters (if equipped).
- Check front horn and motion alarm (if equipped) for proper function.

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

⚠ WARNING

INSUFFICIENT INSTRUCTIONS HAZARD
Untrained operators or failure to follow instructions can cause serious injury or death.
Operators must have adequate training and instruction before operating.

W-2001

⚠ IMPORTANT

MACHINE DAMAGE HAZARD
Improper pressure washing may lead to damage of the decal.
- **Direct the stream at a 90 degree angle and at least 300 mm (12 in) from the decal.**
- **Wash from the centre of the decal toward the edges.**

I-2226

⚠ WARNING

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

W-2782

PRE-STARTING PROCEDURE

Entering The Excavator

Figure 89

P132086

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

Operation & Maintenance Manual And Operator's Handbook Locations

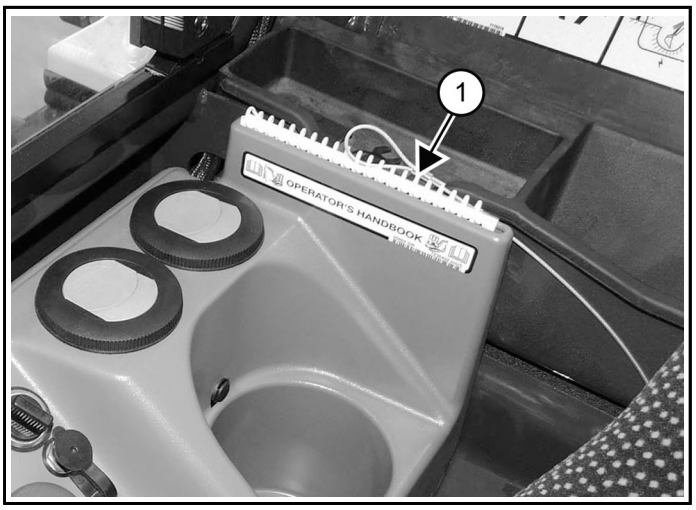
Figure 90

C206182a

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

  The Operation & Maintenance Manual is located inside the storage box on the back of the operator's seat (Item 1) [Figure 90].

Figure 91



P200107a

- Read and understand the Operator's Handbook before operating the machine.

  The Operator's Handbook is located in the back of the right console (Item 1) [Figure 91].

⚠ WARNING

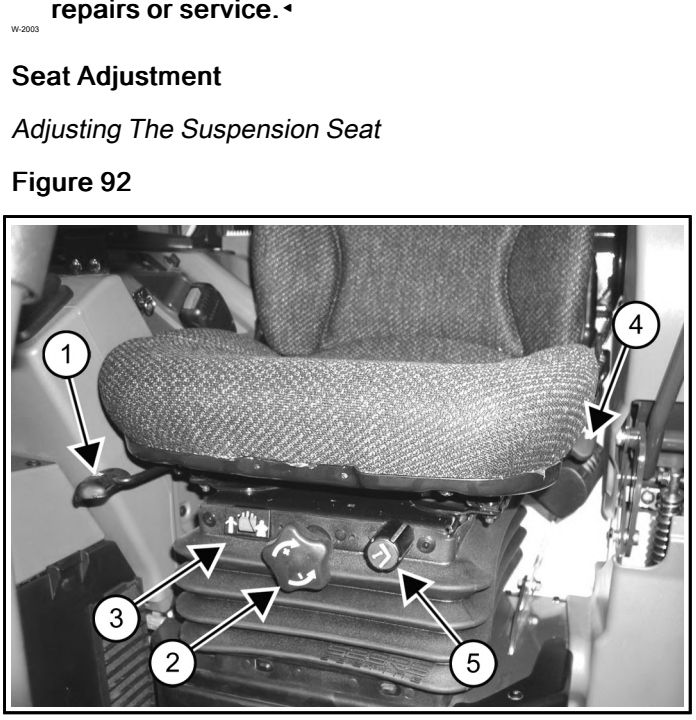
INSUFFICIENT INSTRUCTIONS HAZARD
Untrained operators or failure to follow instructions can cause serious injury or death.
- **Read and understand the Operation & Maintenance Manual, Operator's Handbook and decals on machine.**
- **Follow warnings and instructions in the manuals when making repairs, adjustments or servicing.**
- **Check for correct function after adjustments, repairs or service.**

W-2003

Seat Adjustment

Adjusting The Suspension Seat

Figure 92

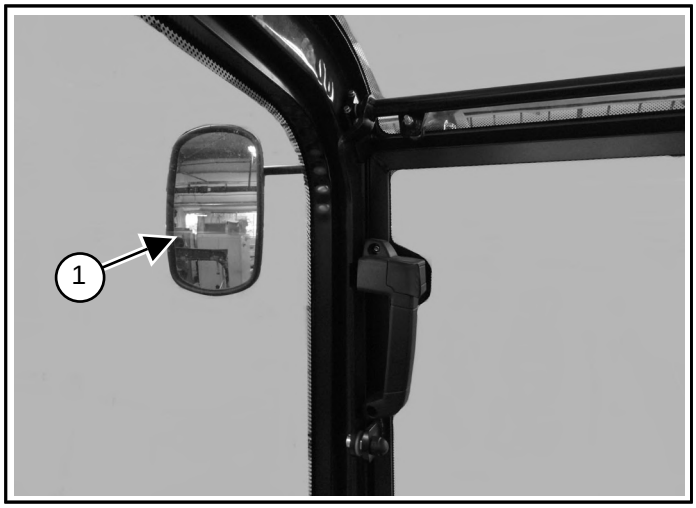


C113009a

1. Release the seat lever (Item 1) [Figure 92] to adjust the seat forward or back.
2. Turn the handle (Item 2) to change the adjustment for operator weight. Turn the handle until your weight is shown in the window (Item 3) [Figure 92].
3. Release the lever (Item 4) [Figure 92] to change the incline of the seat back.
4. Turn the knob (Item 5) [Figure 92] to adjust the height of the seat.

Adjusting Mirrors

Figure 93

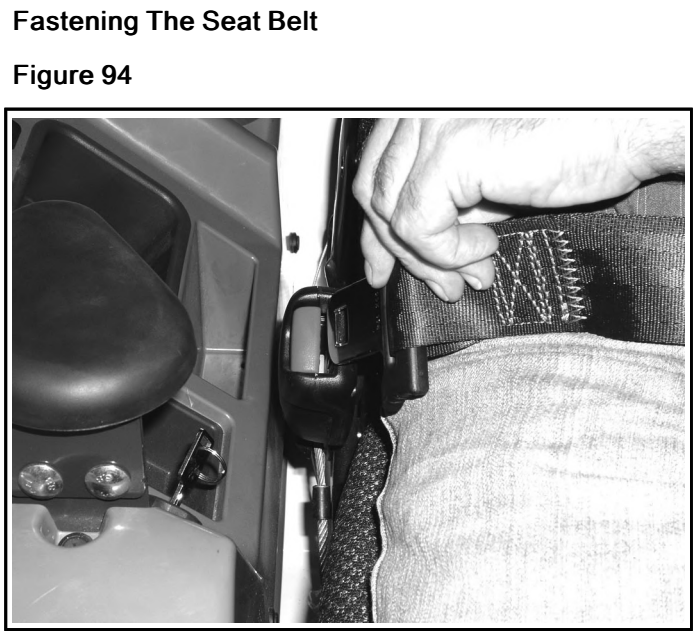


P113541a

Adjust mirrors (Item 1) [Figure 93] (if equipped).

Fastening The Seat Belt

Figure 94



P113010

Fasten the seat belt [Figure 94].

STARTING THE ENGINE (STANDARD PANEL)

Starting Engine With Key Switch

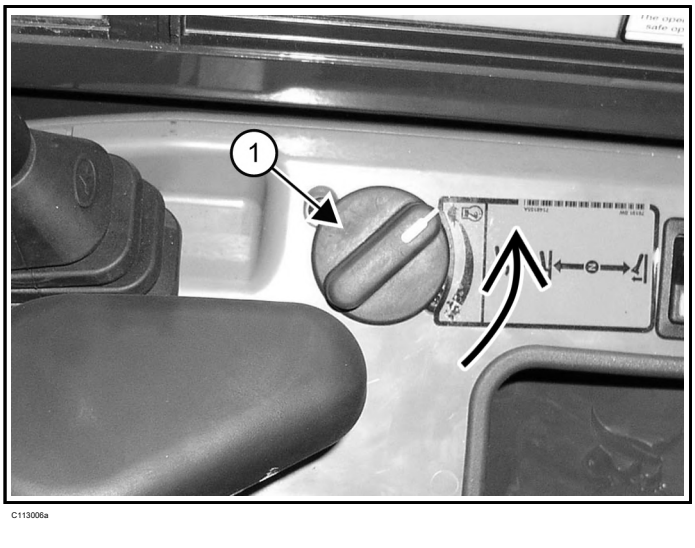
⚠ WARNING

GENERAL HAZARD
Failure to follow instructions can cause serious 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

1. Perform the Pre-Starting Procedure. (See Pre-Starting Procedure on Page 62)
2. Put control levers in the NEUTRAL position.

Figure 95



C113006a

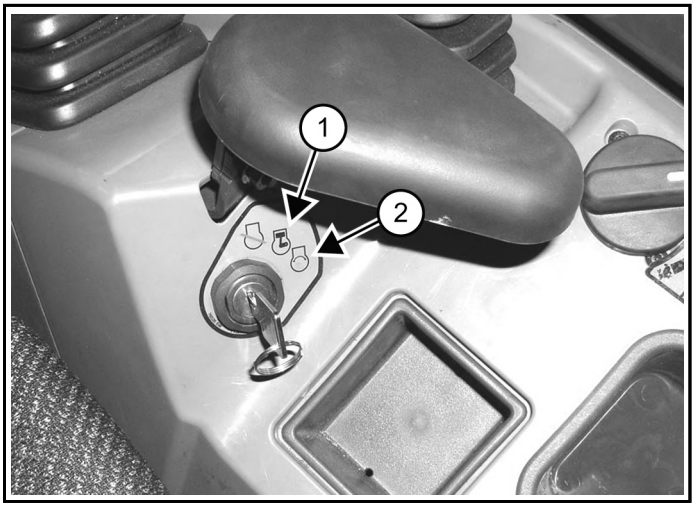
3. Set the engine speed control dial (Item 1) to low idle.

⚠ IMPORTANT

MACHINE DAMAGE HAZARD
Damage to the starter motor can occur with prolonged use.
- **Do not engage the starter for longer than 15 seconds at a time.**
- **Allow the starter motor to cool for 1 minute before using again.**

I-2034

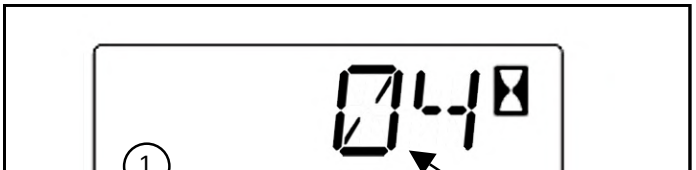
Figure 96



C113011a

4. Turn the key to the ON position (Item 1) [Figure 96].

Figure 97



P-76461aa

If preheating is required, the glow plugs will automatically cycle and the preheat icon will be ON (Item 1) [Figure 97]. The remaining preheat time (in seconds) will show in the data display screen (Item 2) [Figure 97].

NOTE: In cold weather it is recommended to cycle the glow plugs twice before attempting to start the engine. This will allow for additional heating time for cold weather starting.

5. When the engine preheat icon goes OFF, turn the key to START (Item 2) [Figure 96] and release the key when the engine starts.

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

   Check for the cause before starting the engine again.

7. Turn the key switch OFF to stop the engine.

⚠ WARNING

INHALATION HAZARD
Exhaust fumes contain odorless, invisible gases that can kill without warning.
Fresh air must be added to avoid concentration of exhaust fumes when an engine is running in an enclosed area. If the engine is stationary, vent the exhaust outside.◂

W-2050

⚠ WARNING

FIRE AND EXPLOSION HAZARDS
Engines can have hot parts and hot exhaust gas that can cause serious injury or death.
- **Keep flammable material away.**
- **DO NOT use machines in an atmosphere containing explosive dust or gases.◂**

W-2051

Starting Engine With Start Switch

⚠ WARNING

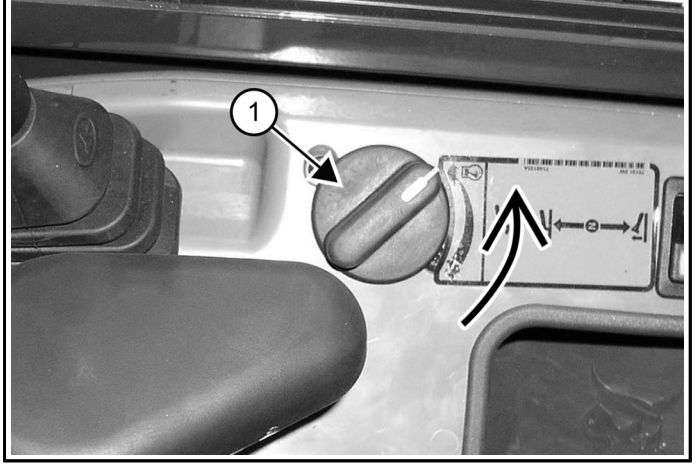
GENERAL HAZARD
Failure to follow instructions can cause serious injury or death.
- **Fasten seat belt, start, and operate only from the operator's seat.**
- **Never wear loose clothing when working near machine.◂**

W-2135

1. Perform the Pre-Starting Procedure.
   (See Pre-Starting Procedure on Page 62)

2. Put control levers in the NEUTRAL position.

Figure 98



C113006a

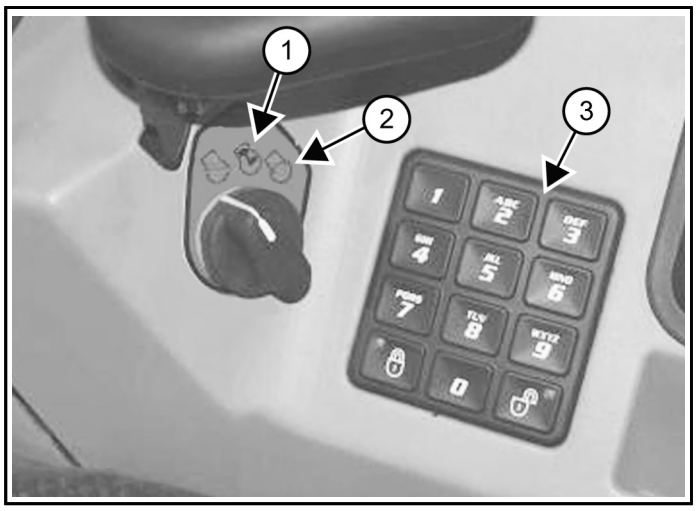
3. Set the engine speed control dial (Item 1) to low idle.

⚠ IMPORTANT

MACHINE DAMAGE HAZARD
Damage to the starter motor can occur with prolonged use.
- **Do not engage the starter for longer than 15 seconds at a time.**
- **Allow the starter motor to cool for 1 minute before using again.** ◂

I-2034

Figure 99



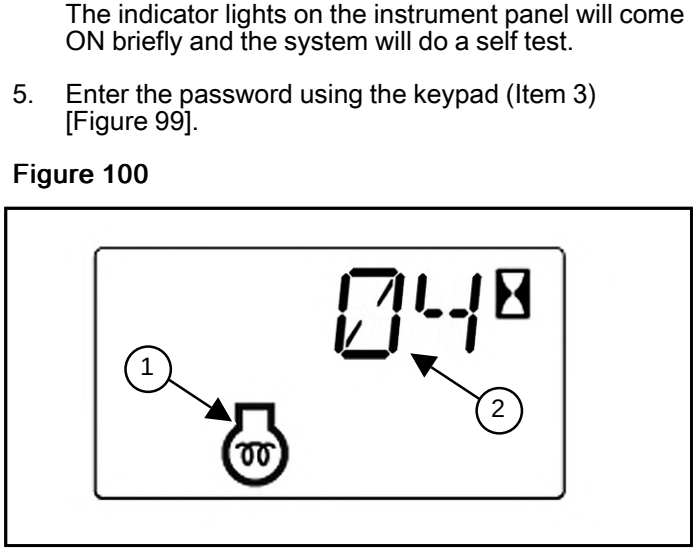
C113012a

4. Turn the start switch to ON (Item 1) [Figure 99].

   The indicator lights on the instrument panel will come ON briefly and the system will do a self test.

5. Enter the password using the keypad (Item 3) [Figure 99].

Figure 100



P-76461aa

If preheating is required, the glow plugs will automatically cycle and the preheat icon will be ON (Item 1) [Figure 100]. The remaining preheat time (in seconds) will show in the data display screen (Item 2) [Figure 100].

NOTE: In cold weather it is recommended to cycle the glow plugs twice before attempting to start the engine. This will allow for additional heating time for cold weather starting.

6. When the engine preheat icon goes OFF, turn the start switch to START (Item 2) [Figure 99] and release the switch when the engine starts.

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

   Check for the cause before starting the engine again.

8. Turn the start switch OFF to stop the engine.

⚠ WARNING

INHALATION HAZARD
Exhaust fumes contain odorless, invisible gases that can kill without warning.
Fresh air must be added to avoid concentration of exhaust fumes when an engine is running in an enclosed area. If the engine is stationary, vent the exhaust outside. ◂

W-2050

⚠ WARNING

FIRE AND EXPLOSION HAZARDS
Engines can have hot parts and hot exhaust gas that can cause serious injury or death.
- **Keep flammable material away.**
- **DO NOT use machines in an atmosphere containing explosive dust or gases.** ◂

W-2051

Lowering The Control Console

Figure 101

P134071a

- Lower the left control console [Figure 101].

The console must be in the locked down position for the hydraulic joysticks and traction system to operate.

The hydraulic joysticks and traction system are deactivated when the control console is raised. If the joysticks and traction system fail to deactivate when the console is raised, see your Bobcat dealer for service.

Warming The Hydraulic System

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

Cold Temperature Starting Tips

⚠ WARNING

EXPLOSION HAZARD
Failure to follow instructions 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

NOTE: The display screen 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.

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.
- Make sure the battery is fully charged.

  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 147)
- Install an engine heater.

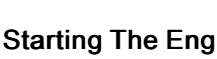
STARTING THE ENGINE (STANDARD DISPLAY)

Quick Start Description

The Sleep Time is the time during which the display is in sleep cycle after the machine is turned off. The Sleep Time is fixed for the standard display.

If your machine is equipped with a touch display, the Sleep Time can be adjusted.

- If you turn the start switch to ON during the sleep cycle, the **GAUGES** or **PASSWORD** screen will be displayed.
- If you turn the start switch to ON after the sleep cycle expires, one set of icons in the following table will be displayed.

Machine Lockout OFF / Quick Start ON  NA3515	• Password is not required. • Engine can be started after glow plugs have cycled and wait to start light is OFF. • Machine functions are active immediately after engine is started.
Machine Lockout ON / Quick Start ON  NA3516	• Password is required. • Engine can be started after glow plugs have cycled and wait to start light is OFF. • Machine functions are disabled until a password is entered. • Machine will shut down if a valid password is not entered within 10 minutes.
Machine Lockout ON / Quick Start OFF  NA3517	• Password is required. • Engine cannot be started until a password is entered.

Starting The Engine

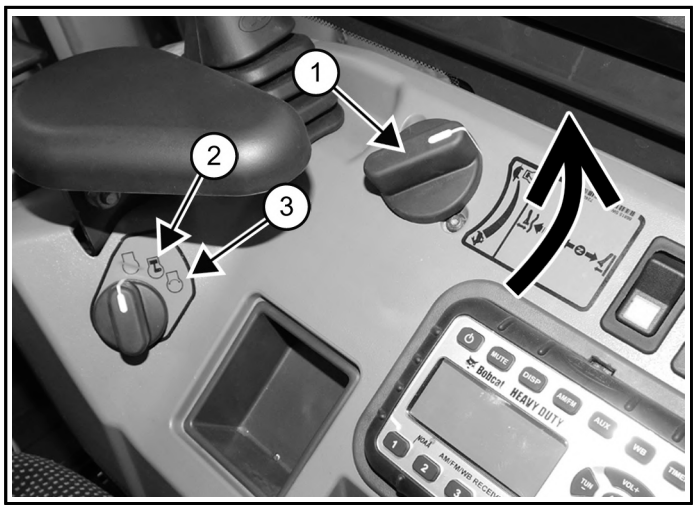
⚠ WARNING

GENERAL HAZARD
Failure to follow instructions can cause serious 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

1. Perform the Pre-Starting Procedure. (See Pre-Starting Procedure on Page 62)

Figure 102



P200582a

2. Set the engine speed control (Item 1) [Figure 102] to low idle.

⚠ IMPORTANT

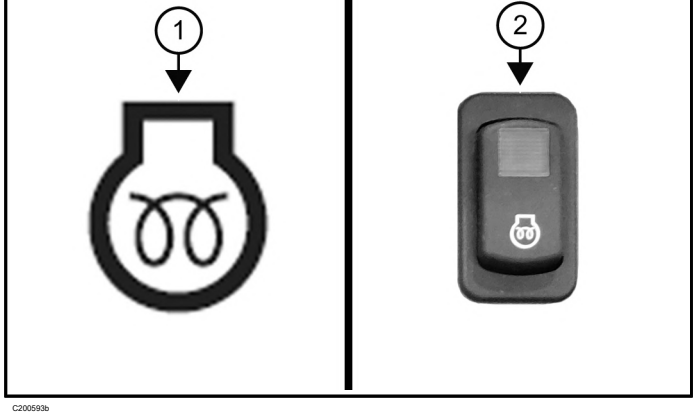
MACHINE DAMAGE HAZARD
Damage to the starter motor can occur with prolonged use.
- **Do not engage the starter for longer than 15 seconds at a time.**
- **Allow the starter motor to cool for 1 minute before using again.** ◂

I-2034

3. Turn the start switch (or key) to ON (Item 2) [Figure 102].

4. Enter the password if prompted.

Figure 103



C200593b

5. Wait while the machine cycles the glow plugs.

   The glow plugs icon (Item 1) will show on the display and the Wait To Start light (Item 2) [Figure 103] on the right console will illuminate while the glow plugs are on.

   NOTE: It is recommended in cold weather to cycle the glow plugs twice before attempting to start the engine. This will allow for additional heating time for cold weather starting.

6. When the Wait To Start light turns OFF, turn the start switch (or key) to the START position (Item 3) [Figure 102].

   Release the start switch (or key) when the engine starts.

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

8. Turn the start switch (or key) to OFF to stop the engine.

⚠ WARNING

INHALATION HAZARD
Exhaust fumes contain odorless, invisible gases that can kill without warning.
Fresh air must be added to avoid concentration of exhaust fumes when an engine is running in an enclosed area. If the engine is stationary, vent the exhaust outside. ◂

W-2050

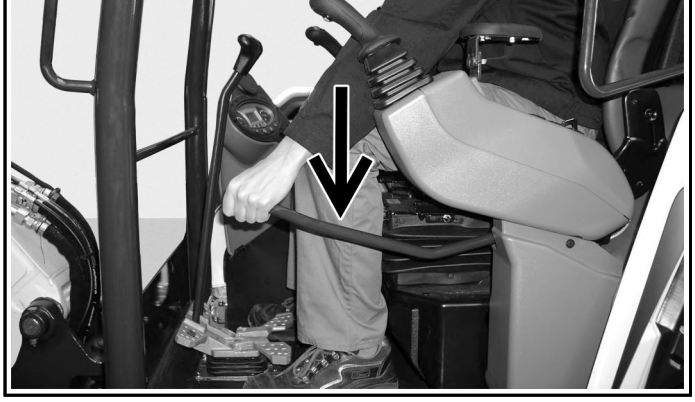
⚠ WARNING

FIRE AND EXPLOSION HAZARDS
Engines can have hot parts and hot exhaust gas that can cause serious injury or death.
- **Keep flammable material away.**
- **DO NOT use machines in an atmosphere containing explosive dust or gases.** ◂

W-2051

Lowering The Control Console

Figure 104



P134071a

- Lower the left control console [Figure 104].

The console must be in the locked down position for the hydraulic joysticks and traction system to operate.

The hydraulic joysticks and traction system are deactivated when the control console is raised. If the joysticks and traction system fail to deactivate when the console is raised, see your Bobcat dealer for service.

Warming The Hydraulic System

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

Cold Temperature Starting Tips

⚠ WARNING

EXPLOSION HAZARD
Failure to follow instructions 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

NOTE: The display screen 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.

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.
- Make sure the battery is fully charged.

  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 147)
- Install an engine heater.

MONITORING THE PANEL

Monitoring The Panel During Operation

Figure 105

NA3267b

- Frequently monitor the temperature and fuel gauges.

  Left Console Lockout light must be OFF to operate machine.
- After the engine is running, frequently monitor the instrument panel [Figure 105] for machine condition.

  The associated icon will be ON if there is an error condition.

  EXAMPLE: Engine Coolant Temperature is High

  - The Engine Over-Temperature icon (Item 1) [Figure 105] is ON.
  - Press the Information button (Item 2) [Figure 105] to cycle the data display until the service code screen is displayed. One of the following Service Codes will be displayed:

    “M0810”:
    Engine Coolant Temp Too High

    “M0811”:
    Engine Coolant Temp Extremely High

  Find the cause of the service code and correct before operating the machine again. (See Diagnostic Service Codes on Page 173)

Warning And Shutdown Conditions

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 machine. The Shutdown feature is associated with the following icons:

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

MONITORING THE DISPLAY

Monitoring The Standard Display During Operation

Figure 106

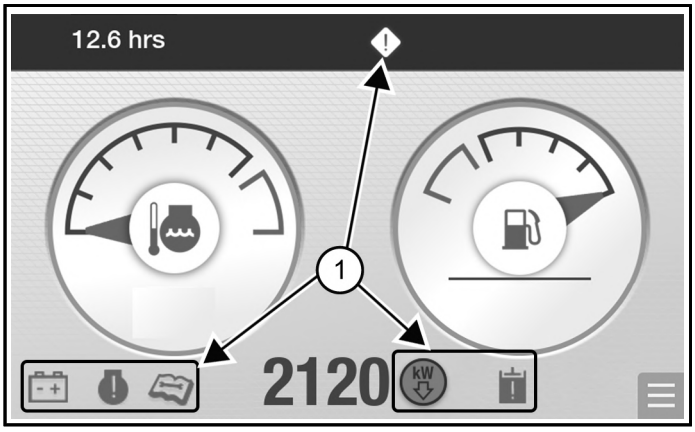
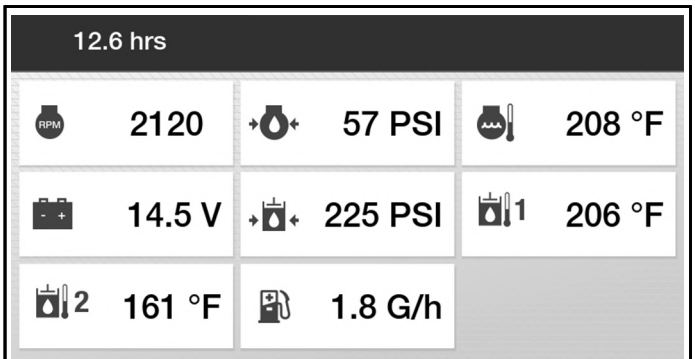


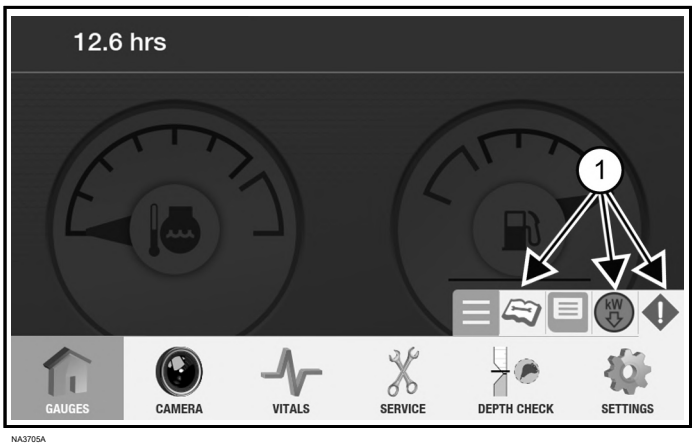
Figure 107



Frequently monitor the **GAUGES** [Figure 106] and **VITAL DETAIL** [Figure 107] screens for machine condition.

These icons (Item 1) [Figure 106] indicate machine conditions that may require service.
(See Standard Display on Page 31)

Figure 108



Active shortcuts (Item 1) [Figure 108] that appear also indicate a need for service.
(See Active Shortcuts on Page 166)

A red dot next to the **[SERVICE]** icon indicates an active service code. (See Viewing Service Codes on Page 168)

The fuel and engine coolant gauges will turn red when there is a problem with these systems.

Derate And Shutdown Conditions

Certain machine conditions can result in a derate condition until the fault is corrected. These derates are designed to protect the machine systems from damage while a fault condition exists.

An engine shutdown can occur during certain system malfunctions. The engine can be restarted to move the machine.

OPERATING PROCEDURE

Inspect The Work Area

Before beginning operation, inspect the work area and check ground conditions 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 machine or cause personal injury.
- Inspect for signs of instability such as cracks or settlement.
- Be aware of weather conditions that can affect ground stability.
- Check for adequate traction if working on a slope.

Basic Operating Instructions

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

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

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

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

Operating Near An Edge Or Water

Keep the machine as far back from the edge as possible and the machine base perpendicular to the edge so that if part of the edge collapses, the machine can be moved back.

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

Lowering The Work Group If The Engine Stops

If the engine stops, you can lower the boom and attachment to the ground using hydraulic pressure in the accumulator.

Figure 109

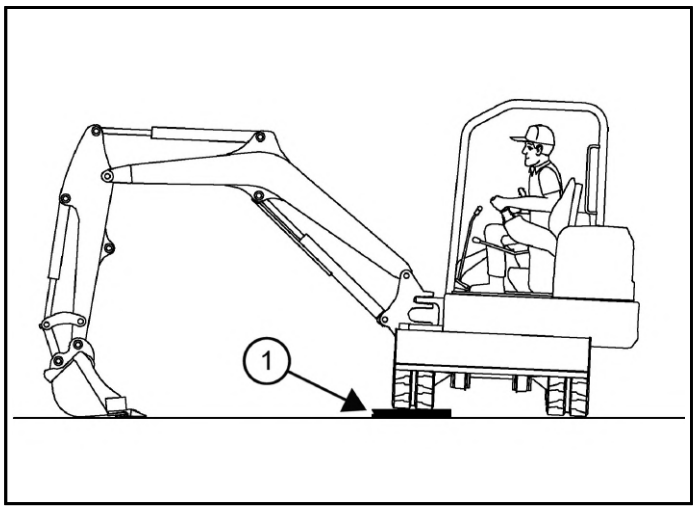
P134071a

1. Ensure the left console is down [Figure 109].
2. Turn the start switch to ON.
3. Use the joystick to lower the boom.

Driving The Excavator

- When operating on uneven ground, operate as slow as possible and avoid sudden changes in direction.
- Avoid travelling over objects such as rocks, trees, stumps, etc.

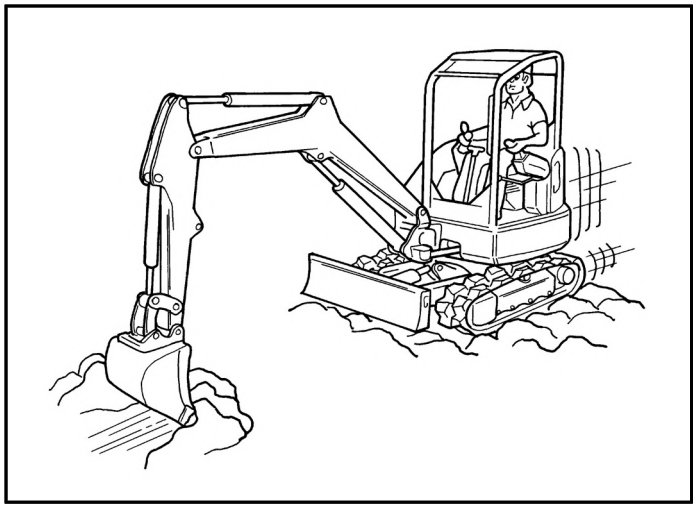
Figure 110



NA1440a

- When working on wet or soft ground, put planks (Item 1) [Figure 110] on the ground to provide a solid base to travel on and prevent the excavator from getting stuck.
- 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.
  - ▹ Put planks under the tracks and drive the excavator to dry ground.

Figure 111



NA1422a

- The bucket may also be used to pull the excavator [Figure 111].
  - ▹ Raise the blade.
  - ▹ Extend the arm and lower the boom.
  - ▹ Operate the boom in a digging manner.

Operating On Slopes

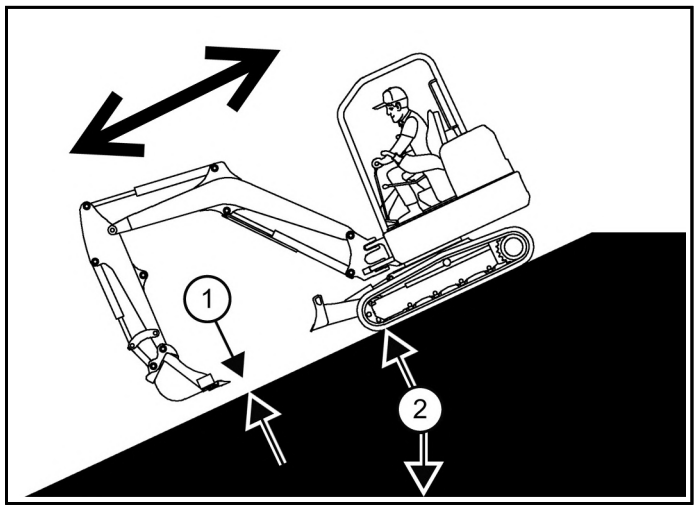
⚠ WARNING

INSTABILITY HAZARD
Machine tipping or rollover can cause serious 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

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

Figure 112



NA1448e

- When going down grades that exceed 15 degrees (Item 2), put the machine in the position shown, with the attachment no higher than 304 mm (12 in) (Item 1) off the ground [Figure 112]. Run the engine slowly.
- Do not travel down or back up slopes that exceed 25 degrees (Item 2) [Figure 112].
- Operate as slow as possible.
- Avoid sudden changes in lever directions.
- Avoid travelling over objects such as rocks, trees, stumps, etc.
- Stop the machine before moving the upper equipment controls.
- Never allow the blade to strike a solid object.

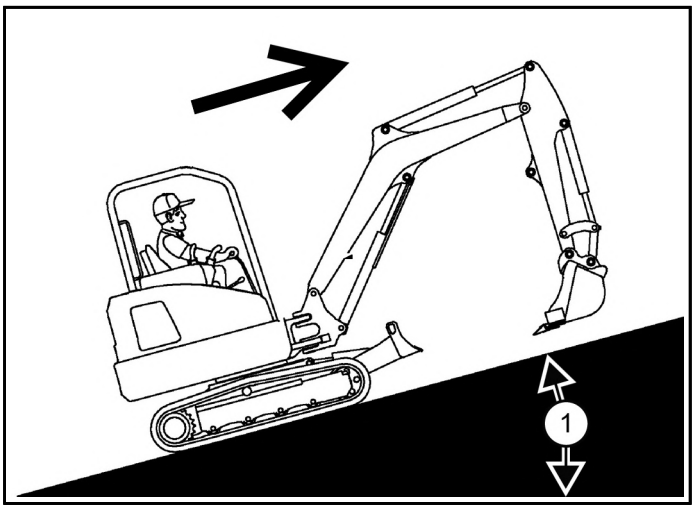
  Damage to the blade or hydraulic cylinder can result.

⚠ WARNING

INSTABILITY HAZARD
Machine tipping or rollover can cause serious injury or death.
- **Always fasten seat belt.**
- **Avoid steep areas or banks that could break away.**
- **Keep boom centred and attachments as low as possible when travelling on slopes or in rough conditions.**
- **Look in the direction of travel.**

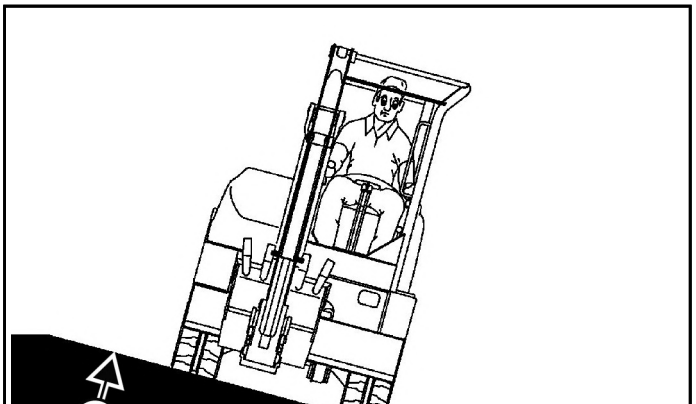
W-2498

Figure 113



NA1447e

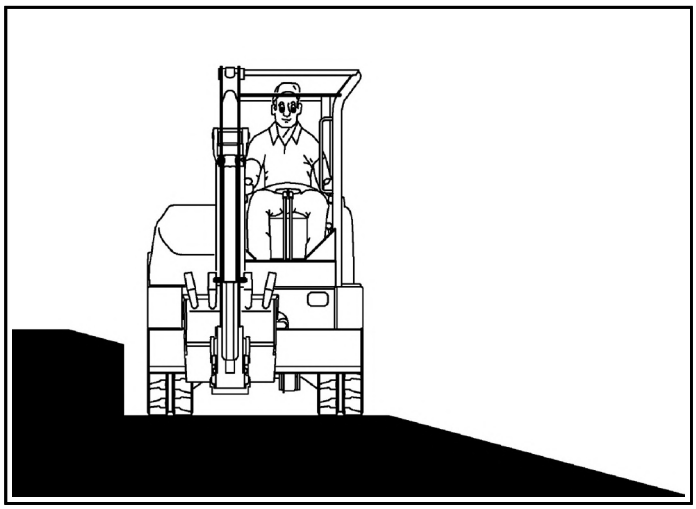
Figure 114



NA1449c

- When travelling up slopes (Item 1) [Figure 113], or on side slopes that are 15 degrees or less (Item 1) [Figure 114], position the machine as shown and run the engine slowly.

Figure 115



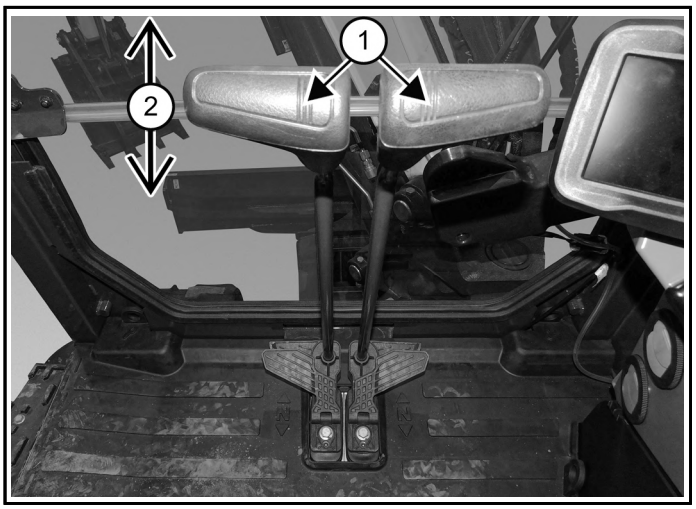
NA1450a

- When operating on a slope, level the work area before beginning [Figure 115].

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

  - Do not work on slopes that are over 15 degrees (Item 1) [Figure 114].
  - 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 blades downhill and lowered.
  - Avoid swinging or extending the bucket more than necessary in a downhill 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 116



P200102a

- To brake the machine when going down a slope, move the steering levers (Item 1) to the NEUTRAL position (Item 2) [Figure 116].

  This will engage the hydrostatic braking.

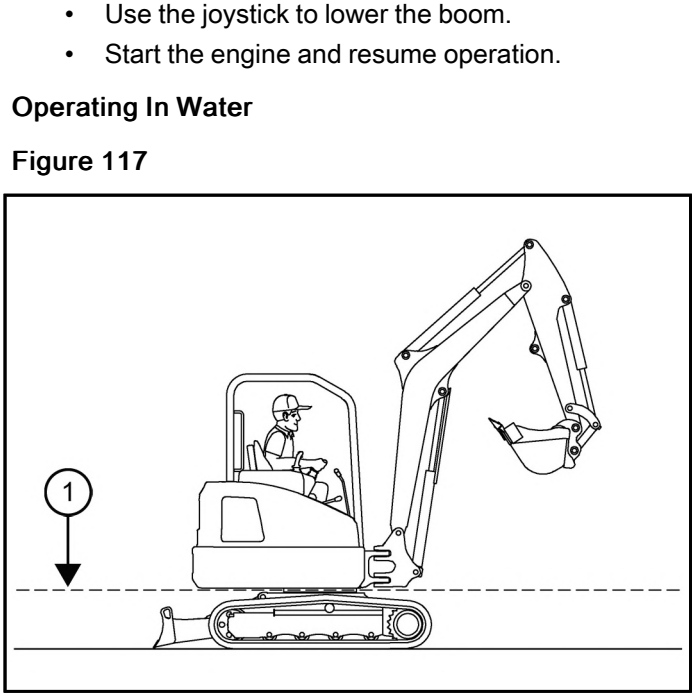
- When the engine stops on a slope, move the steering levers to the NEUTRAL position. Lower the boom / bucket to the ground.

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

  - Ensure the console is in the locked down position, and the key is switched to the ON position.
  - Use the joystick to lower the boom.
  - Start the engine and resume operation.

Operating In Water

Figure 117



NA1446a

- Do not operate or immerse the excavator in water higher than the bottom of the swing bearing (Item 1) [Figure 117].
- Remove mud and water 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.
- 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.
- Remove water from the cylinder rods.

  If water freezes to the cylinder rod, the cylinder seals can be damaged when the rod is retracted.

Protecting The Track From Damage

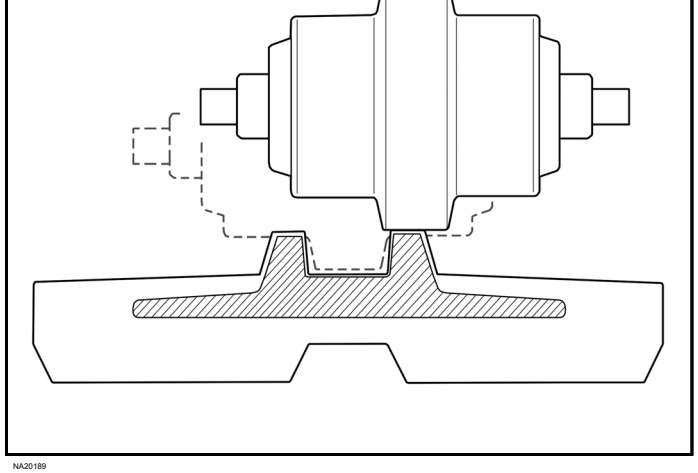
- In freezing temperatures, park the machine on boards or concrete.

  If you park the machine on the ground, the track or undercarriage might freeze to the ground and prevent the machine from moving.
- Remove mud and water from the machine before parking.

  If moisture invades through cuts on the track, the embedded steel cords will corrode. The deterioration of the design strength may cause the steel cords to break.
- Remove any stones or foreign objects that may be clogging the rubber track.

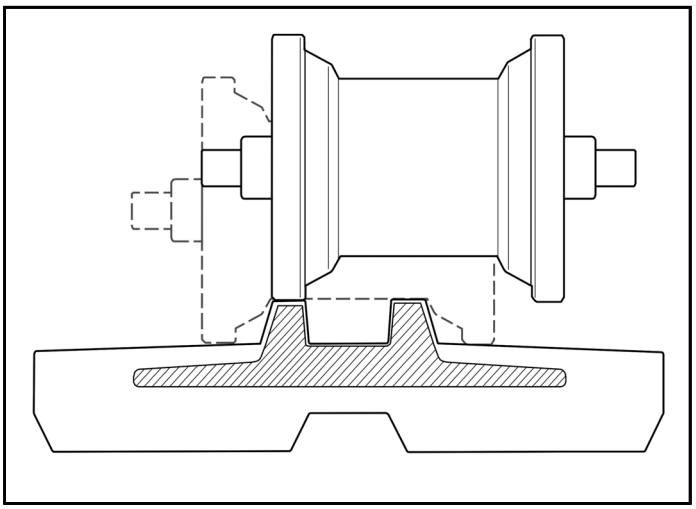
  Stones and foreign objects can become wedged between the sprocket / rollers and cause detracting and track stress.

Figure 118



NA20189

Figure 119

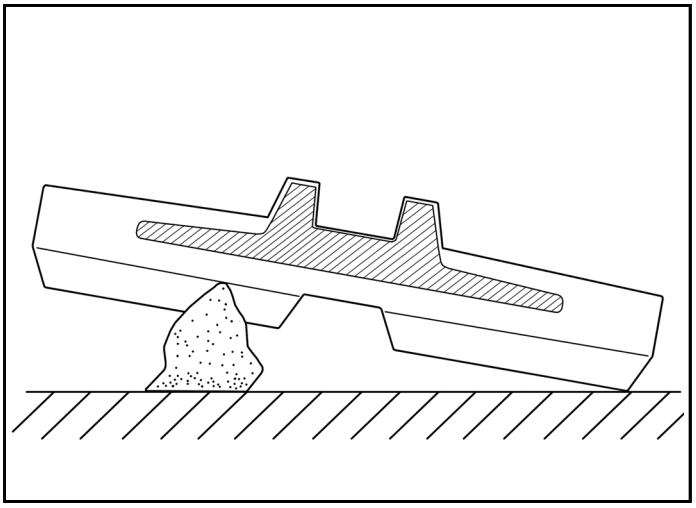


NA20190

- Maintain proper track tension.
  (See Track Tension on Page 154)

  When the rubber track detracts due to improper track tension, the idler or sprocket rides on the projections of the embedded metal causing the embedded metal to be exposed to corrosion ([Figure 118] or [Figure 119]).

Figure 120



NA20246

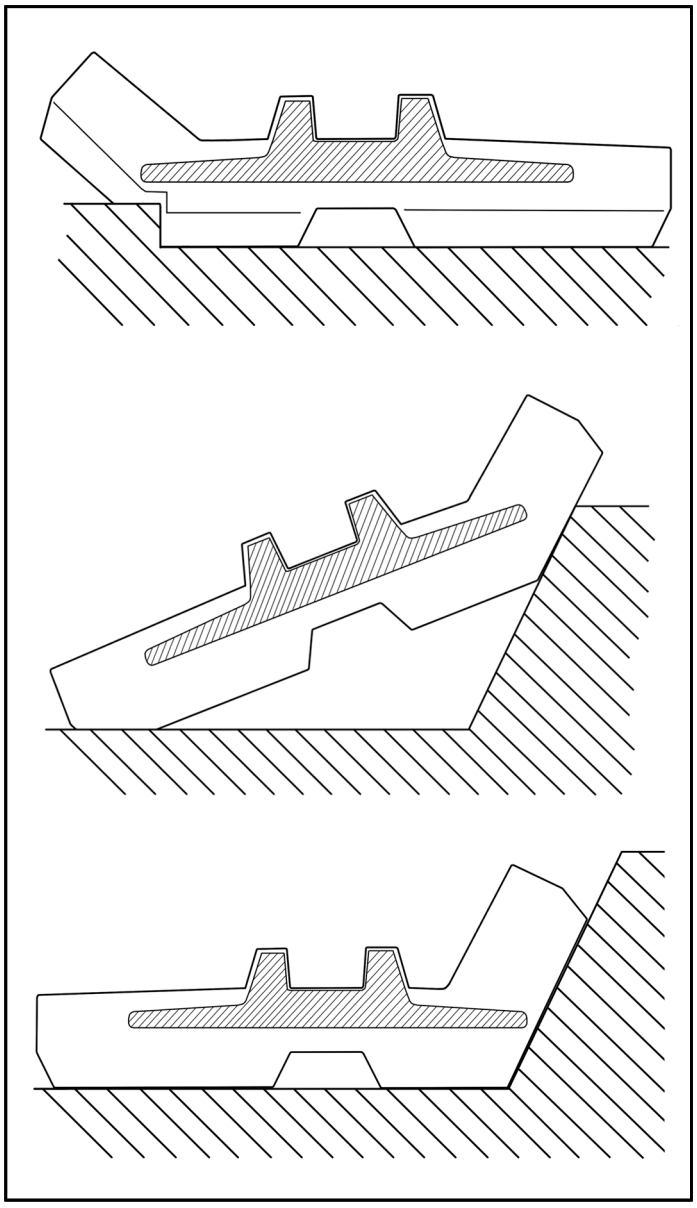
- Avoid driving over sharp objects.

  When rubber tracks drive over sharp projections:

  - Intensive stress is applied to the lug side of the rubber surface, especially at the edges of embedded metals, causing cracks and cuts in the area around the embedded metals.
  - Concentrated forces cause cuts [Figure 120] on the lug side of the rubber surface.
- If avoiding a sharp object is impossible, do not make a turn while driving over a sharp object.

If you make a turn on a projection, the lug side rubber surface will have an even higher chance of being cut. If the cuts run through the embedded steel cords, it might result in the steel cords breaking due to corrosion.

Figure 121



NA20247a

- Avoid driving over stumps and ridges.

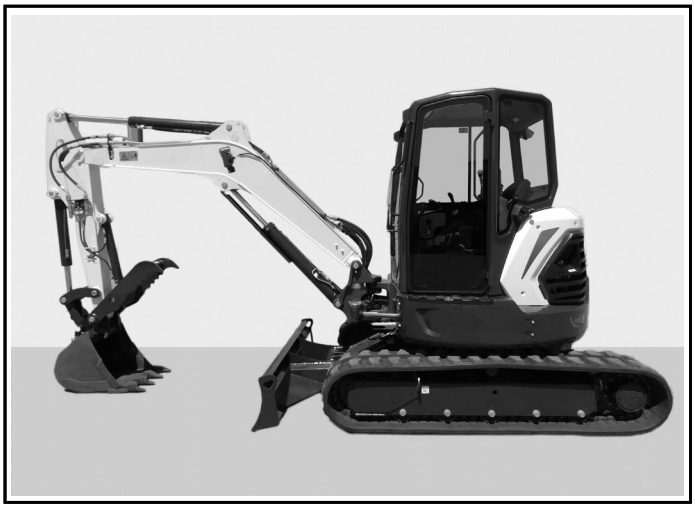
  This may apply extensive stress to the lug root where metals are embedded [Figure 121].

- Avoid making quick turns on bumpy and rocky fields.

STOPPING THE ENGINE AND LEAVING THE MACHINE

Stopping The Engine And Leaving The Machine

Figure 122



C200402a

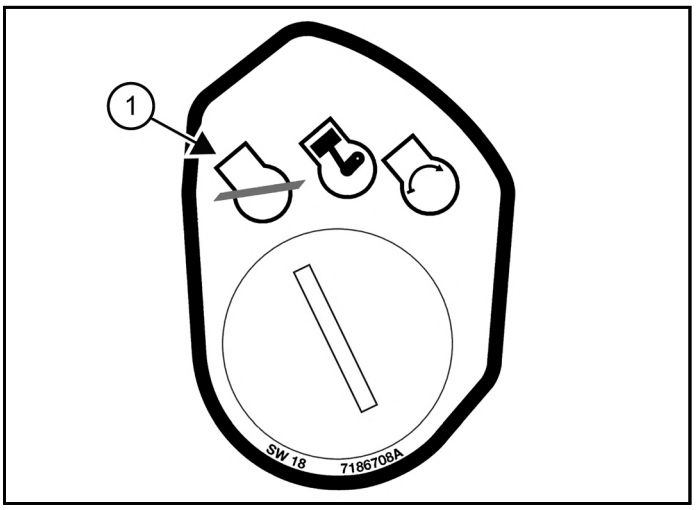
1. Stop the machine on level ground.
2. Lower the work equipment and the blade to the ground [Figure 122].

Figure 123

C208107a

3. Rotate the engine speed control dial counterclockwise to low idle [Figure 123].
4. Run the engine at idle speed for about 5 minutes to allow it to cool.

Figure 124



7186708c

5. Turn the switch to Stop (Item 1) [Figure 124].
6. Disconnect the seat belt.
7. Remove the key from the switch (if equipped) to prevent operation of machine by unauthorised personnel.
8. Raise the control console.
9. Exit the machine.

INSTALLING ATTACHMENTS (PIN-ON ATTACHMENT)

⚠ WARNING

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

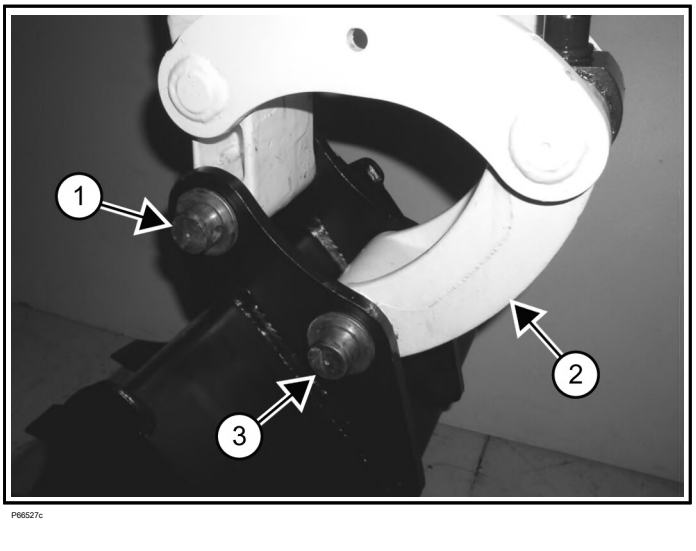
W-2052

⚠ WARNING

GENERAL HAZARD
Failure to follow instructions can cause serious injury or death.
Stop the machine on a firm flat surface. When removing or installing attachments always have a second person in the operator's seat, give clear signals and work carefully.◂

W-2140

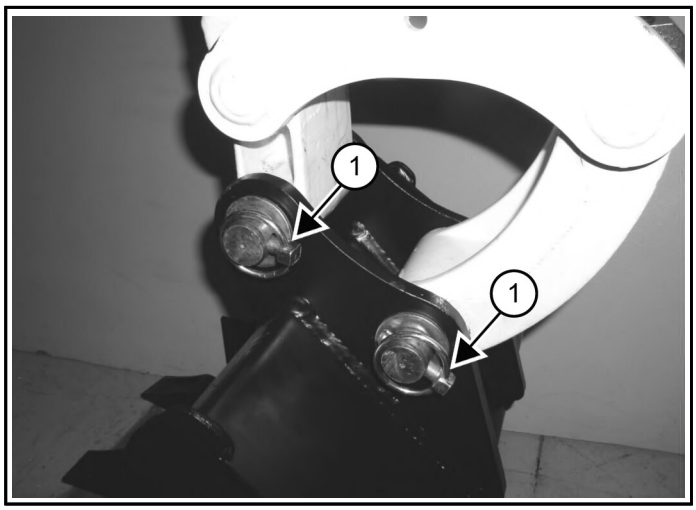
Figure 125



P66527c

1. Install the arm into the bucket and align the mounting hole.
2. Install the pin (Item 1) [Figure 125] and washers.
3. Install the link (Item 2) [Figure 125] in the bucket and align the mounting hole.
4. Install the pin (Item 3) [Figure 125] and washers.

Figure 126



P86528c

5. Install the two retainer pins (Item 1) [Figure 126].
6. Add grease to the grease fittings.

REMOVING ATTACHMENTS (PIN-ON ATTACHMENT)

1. Park the excavator on a flat surface and lower the bucket fully.
2. Remove the two retainer pins (Item 1) [Figure 126].
3. Remove the washers and pins (Items 1 and 3) [Figure 125].
4. Do not damage the dust seals in the arm.

INSTALLING ATTACHMENTS (QUICK COUPLER, KLAC SYSTEM)

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

MODIFICATION HAZARD
Unapproved attachments can cause serious injury or death.
Buckets and attachments for safe loads of specified densities are approved for each model. Never use attachments or buckets that are not approved by Bobcat Company.
W-2052

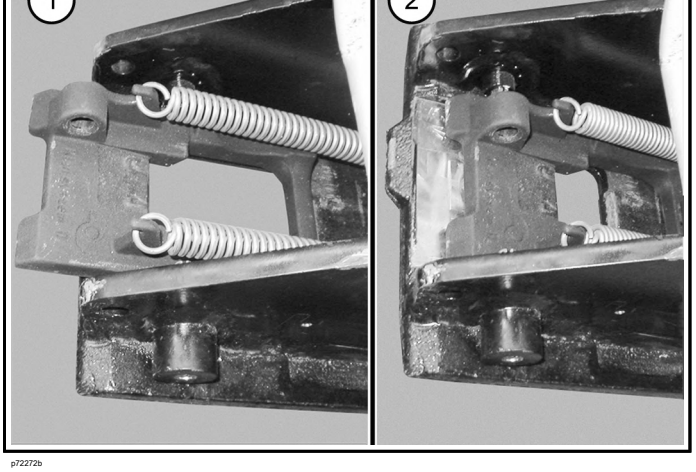
⚠ WARNING

ENTANGLEMENT AND IMPACT HAZARD
Contact with moving parts, a trench cave-in or flying objects can cause serious injury or death.
Keep all bystanders 6 m (20 ft) away from equipment when operating.
W-2119

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

1. Fully retract the bucket cylinder.
2. Stop the engine and exit the excavator.

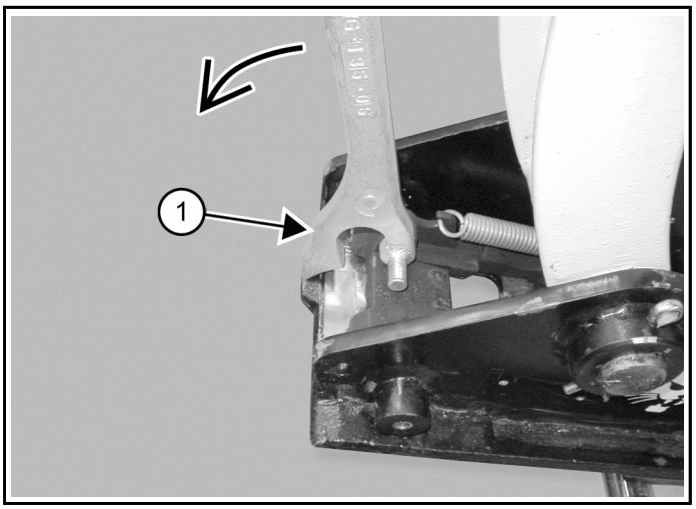
Figure 127



p72272b

3. Inspect the quick coupler [Figure 127].

Figure 128



p72273a

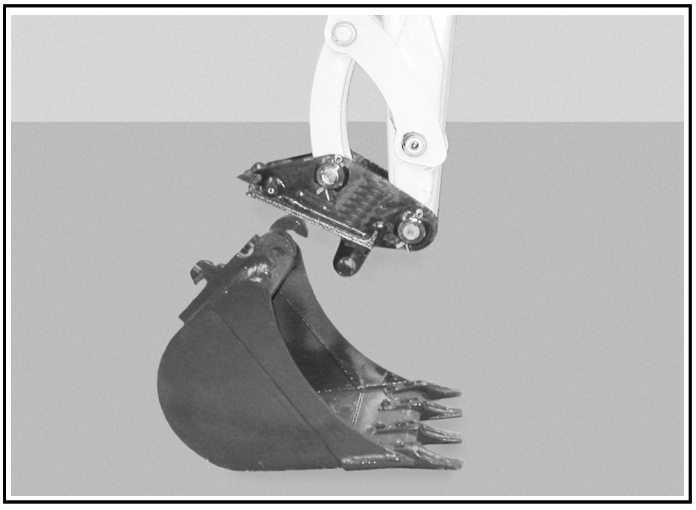
4. If the coupler is in the unlatched position (Item 1) [Figure 127], proceed to Step 5.

   OR

   If the coupler is in the latched position (Item 2) [Figure 127], install the tool (Item 1) [Figure 128] and pull the handle. The latch will move completely forward and lock in the unlatched position.

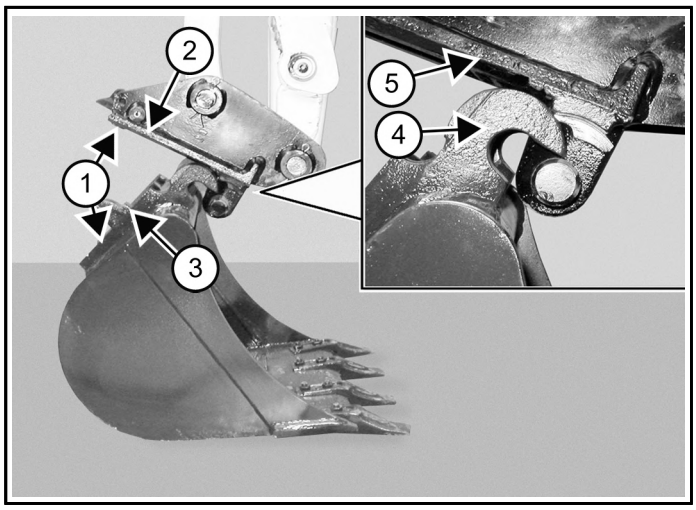
5. Enter the excavator, fasten the seat belt, and start the engine.

Figure 129


p-72274b

6. Position the quick coupler near the attachment [Figure 129].

Figure 130



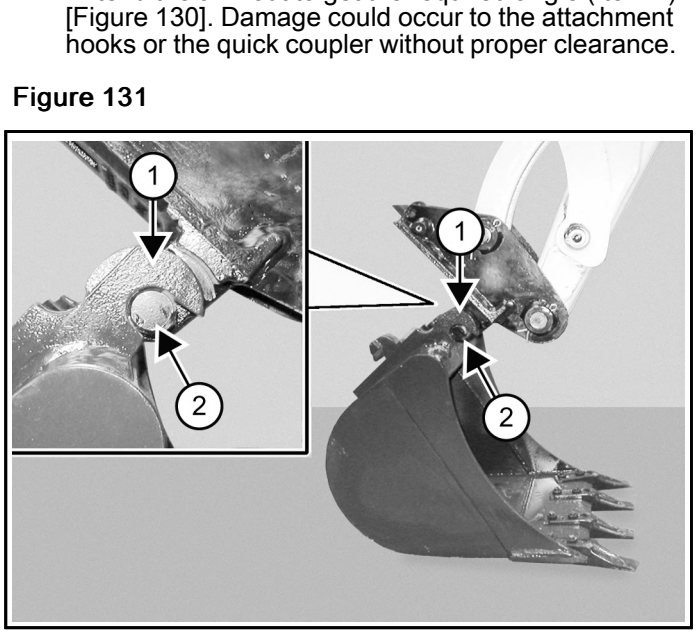
p-72275b

7. Extend the arm out until there is at least 100° (Item 1) between the quick coupler surface (Item 2) and the attachment mounting surface (Item 3) [Figure 130].

   There must be proper clearance (Item 1) between the hook (Item 4) and the quick coupler (Item 5) [Figure 130].

   Extend the arm out to get the required angle (Item 1) [Figure 130]. Damage could occur to the attachment hooks or the quick coupler without proper clearance.

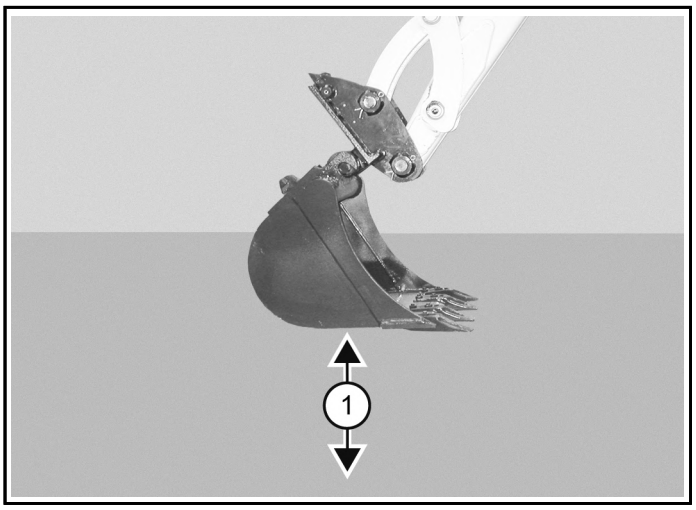
Figure 131



p-72276a

8. Raise the boom and extend the arm until the hooks of the attachment (Item 1) engage the pins (Item 2) of the quick coupler [Figure 131].

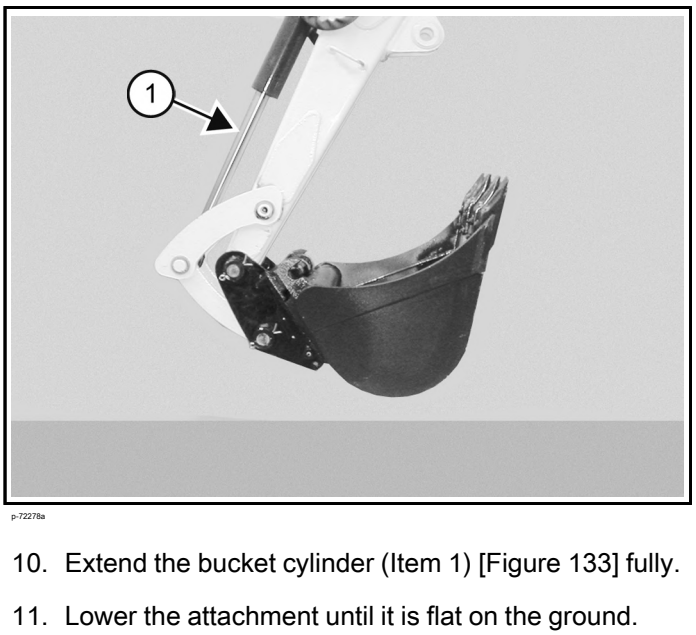
Figure 132



p-72277a

9. Raise the boom until there is approximately 500 mm (20.0 in) (Item 1) [Figure 132] of clearance between the bottom of the attachment and the ground.

Figure 133



p-72278a

10. Extend the bucket cylinder (Item 1) [Figure 133] fully.
11. Lower the attachment until it is flat on the ground.
12. Stop the engine and exit the excavator.

Inspect the quick coupler latch. Check if it has properly locked.
(See Inspecting And Adjusting The Quick Coupler Latch on Page 81)

REMOVING ATTACHMENTS (QUICK COUPLER, KLAC SYSTEM)

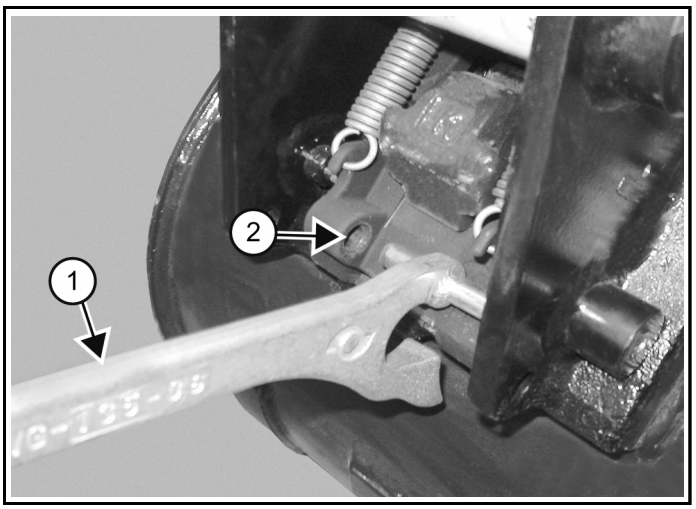
Removal of the bucket is shown. The procedure is the same for other attachments. Disconnect any hydraulic lines that are operated by hydraulic power before removing any attachments (breaker, auger, etc.).

⚠ WARNING

PINCHING HAZARD
Failure to follow instructions can cause serious injury.
Keep fingers and hands out of pinch points when latching and unlatching the attachment quick coupler.
W-2541

1. Position the attachment flat on the ground.

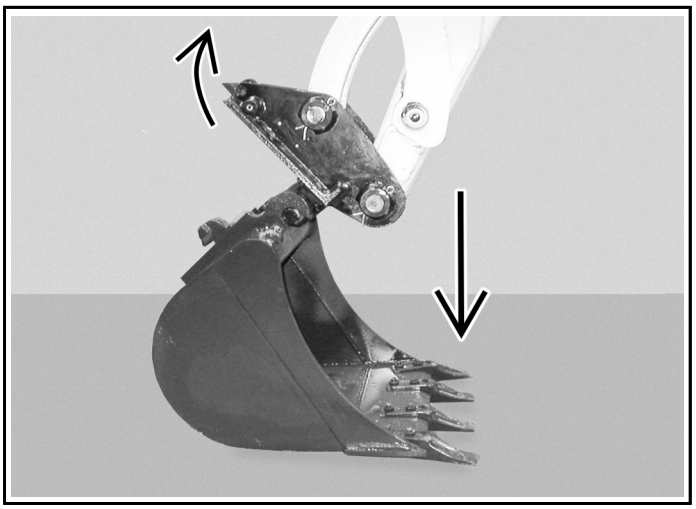
Figure 134



p-72286

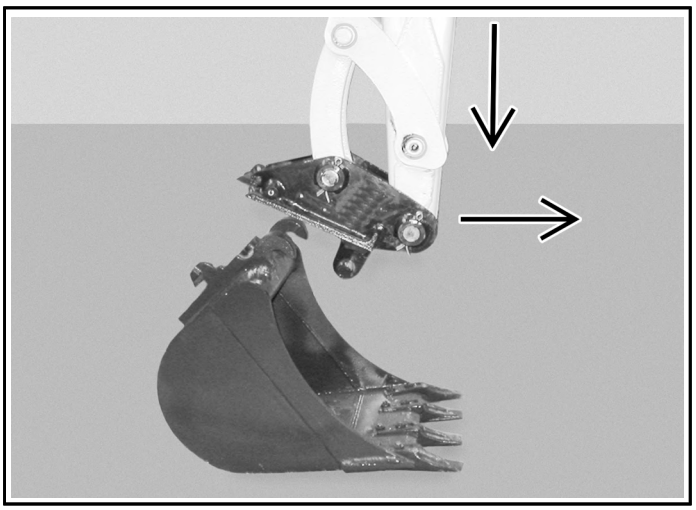
2. Install the quick coupler tool (Item 1) into the hole (Item 2) in the quick coupler [Figure 134].
3. Push down on the tool (Item 1) [Figure 134] to unlock the latch.
4. Remove the tool.
5. Enter the excavator, fasten the seat belt, and start the engine.

Figure 135


p-72282a

6. Retract the bucket cylinder fully and lower the boom until the attachment is on the ground [Figure 135].

Figure 136


p-72274c

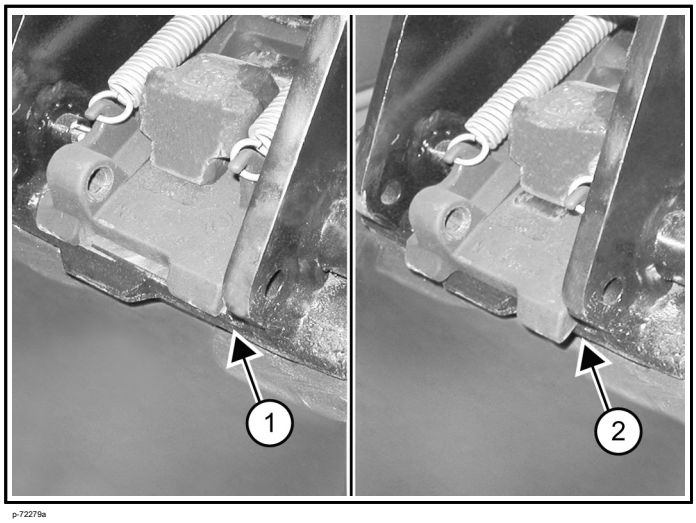
7. Continue to lower the boom and move the arm towards the excavator until the quick coupler is clear of the attachment [Figure 136].

INSPECTING AND ADJUSTING THE QUICK COUPLER LATCH

⚠ WARNING

PINCHING HAZARD
Failure to follow instructions can cause serious injury.
Keep fingers and hands out of pinch points when latching and unlatching the attachment quick coupler.
W-2541

Figure 137

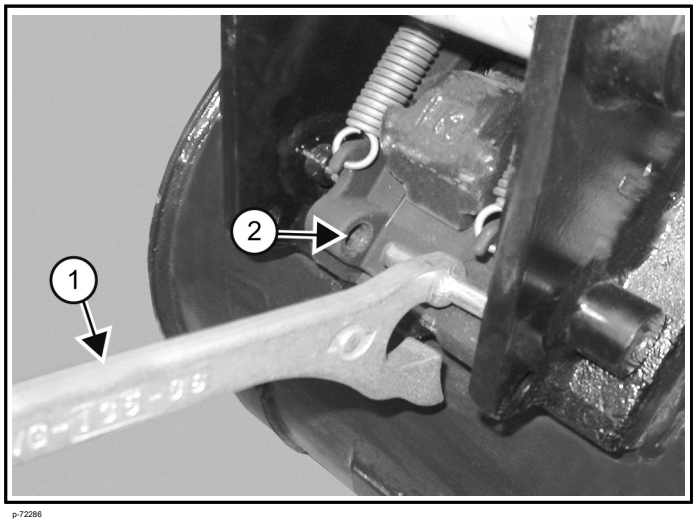


p-72279a

Visually inspect the quick coupler latch to the bucket mount [Figure 137]. The latch must be fully engaged (Item 1) [Figure 137].

If the latch is not fully engaged (Item 2) [Figure 137], proceed with the following instructions:

Figure 138



p-72286

1. Install the tool (Item 1) in the hole (Item 2) of the quick coupler [Figure 138].
2. Push the tool (Item 1) [Figure 138] down to unlatch the quick coupler.
3. Remove the tool (Item 1) [Figure 138].
4. Enter the excavator, fasten the seat belt, and start the engine.
5. Raise the boom 500 mm (20.0 in) off the ground and fully extend the bucket cylinder [Figure 133].
6. Lower the attachment until it is flat on the ground.
7. Stop the engine and exit the excavator.
8. Again, visually inspect the quick coupler to make sure the latch is fully engaged (Item 1) [Figure 137].
9. If it is not fully engaged, remove the attachment and inspect both the quick coupler and the attachment for damage or debris.

INSTALLING ATTACHMENTS (GERMAN STYLE COUPLER)

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

MODIFICATION HAZARD
Unapproved attachments can cause serious injury or death.
Buckets and attachments for safe loads of specified densities are approved for each model. Never use attachments or buckets that are not approved by Bobcat Company.
W-2052

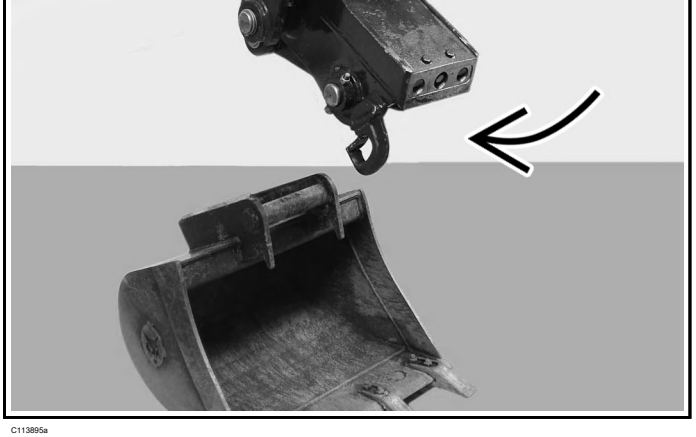
⚠ WARNING

ENTANGLEMENT AND IMPACT HAZARD
Contact with moving parts, a trench cave-in or flying objects can cause serious injury or death.
Keep all bystanders 6 m (20 ft) away from equipment when operating.
W-2119

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

1. Start the engine.
2. If your machine is equipped with a hydraulic clamp, fully retract the hydraulic clamp cylinder so the clamp is out of the way for installing the attachment.

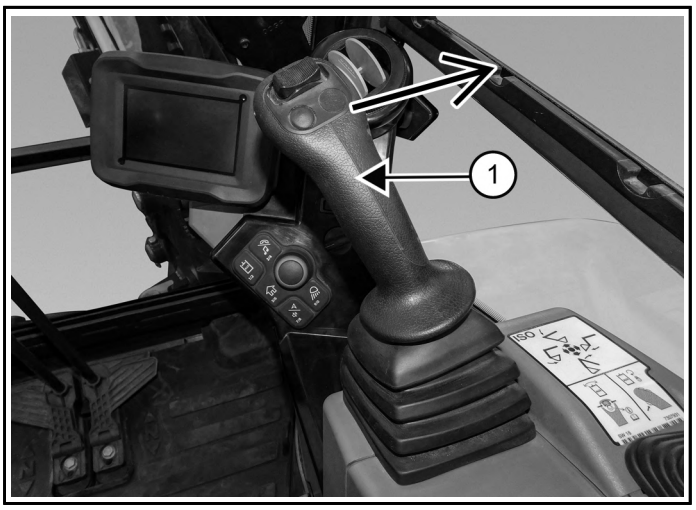
Figure 139



C113895a

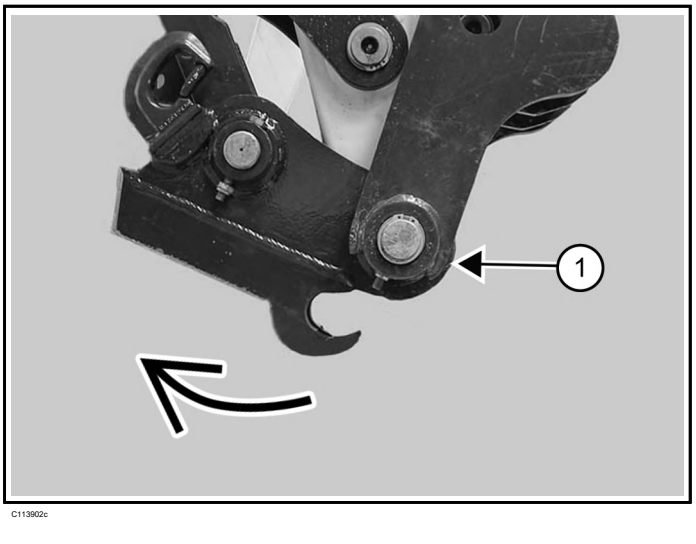
3. Position the arm and quick coupler to the attachment [Figure 139].

Figure 140



C206172c

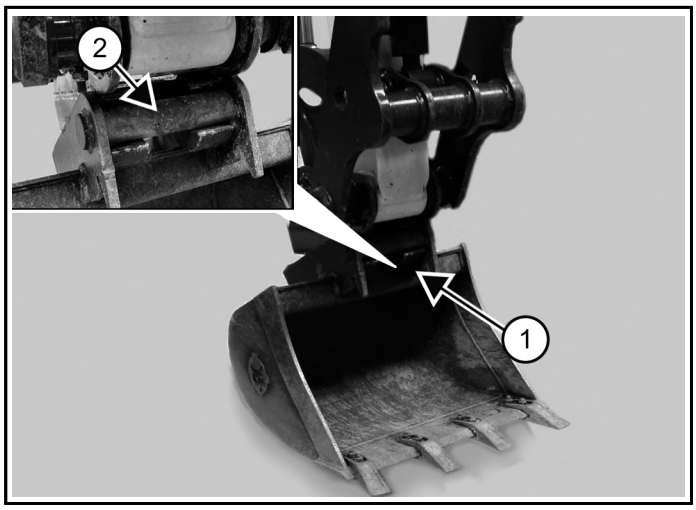
Figure 141



C113902c

4. Move the right joystick (Item 1) [Figure 140] to the right (OUT) to curl the coupler (Item 1) [Figure 141] back, fully away from the cab.
5. Lower the coupler onto the attachment.

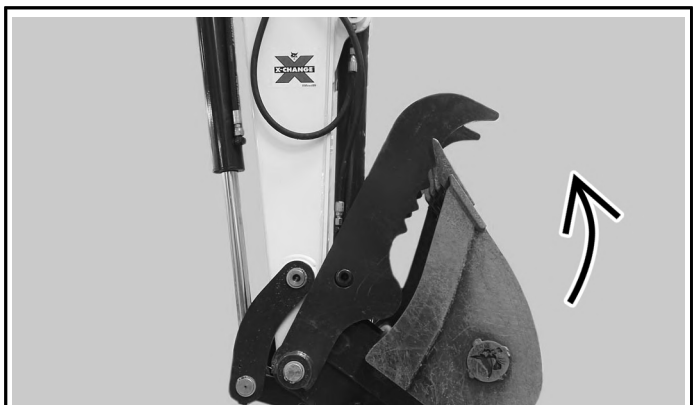
Figure 142



p113898c

6. Engage the coupler hooks (Item 1) onto the attachment shaft (Item 2) [Figure 142].

Figure 143

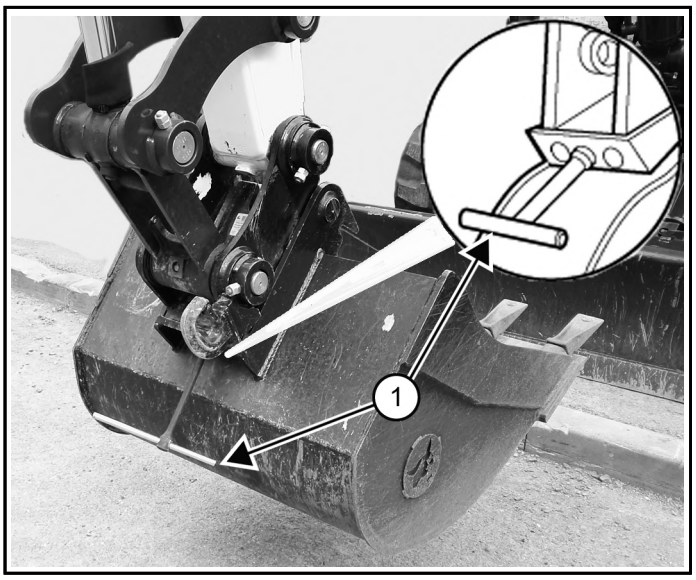


C113899

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

8. Stop the engine and exit the machine.

Figure 144



p113903b

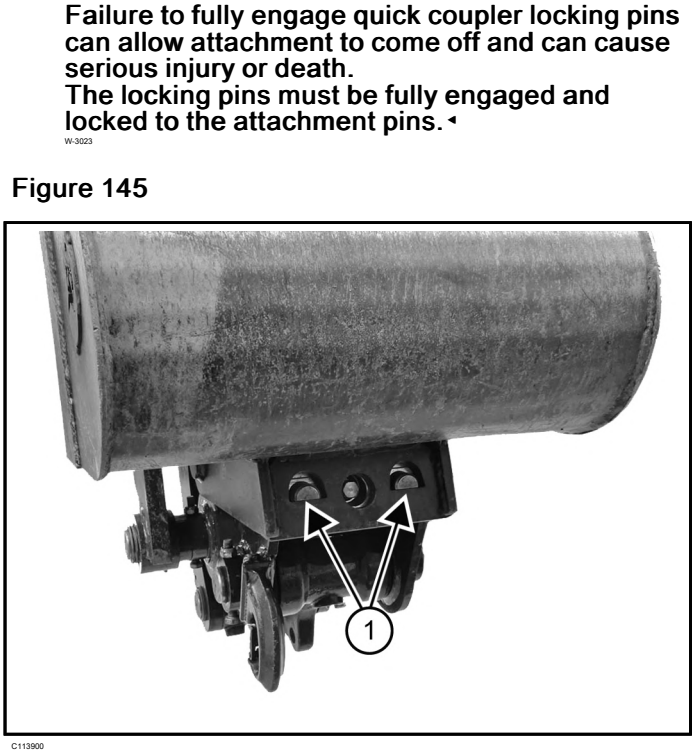
9. Use the supplied wrench (Item 1) [Figure 144] and turn the wrench clockwise until the locking pins fully engage.

⚠ WARNING

CRUSHING HAZARD
Failure to fully engage quick coupler locking pins can allow attachment to come off and can cause serious injury or death.
The locking pins must be fully engaged and locked to the attachment pins.

W-3023

Figure 145



C113900

10. Visually check that the locking pins (Item 1) [Figure 145] are extended through the holes in the attachment mounting frame, securely fastening the attachment to the coupler.

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

11. Enter the excavator, fasten the seat belt, and start the engine.
(See Pre-Starting Procedure on Page 62)

12. 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.

13. Lower the attachment flat to the ground.

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

See the lift capacity decal on your machine for the specific lift capacities of your machine. If this decal is missing or damaged, see your Bobcat dealer.
(See Lift Capacity on Page 97)

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

REMOVING ATTACHMENTS (GERMAN STYLE COUPLER)

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

ENTANGLEMENT AND IMPACT HAZARD
Contact with moving parts, a trench cave-in or flying objects can cause serious injury or death.
Keep all bystanders 6 m (20 ft) away from equipment when operating.
W-2119

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

2. Raise the boom.

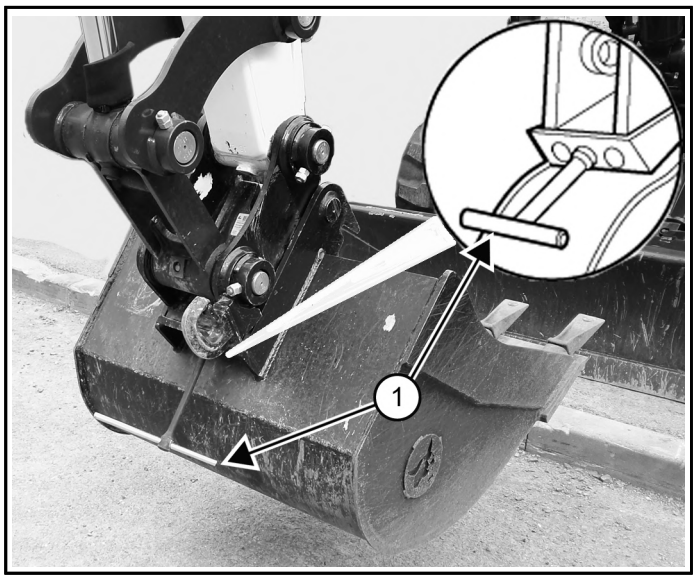
Figure 146

C113899

3. Move the right joystick to the left (IN) and curl the coupler in toward the cab fully [Figure 146].

4. Stop the engine and exit the excavator.

Figure 147



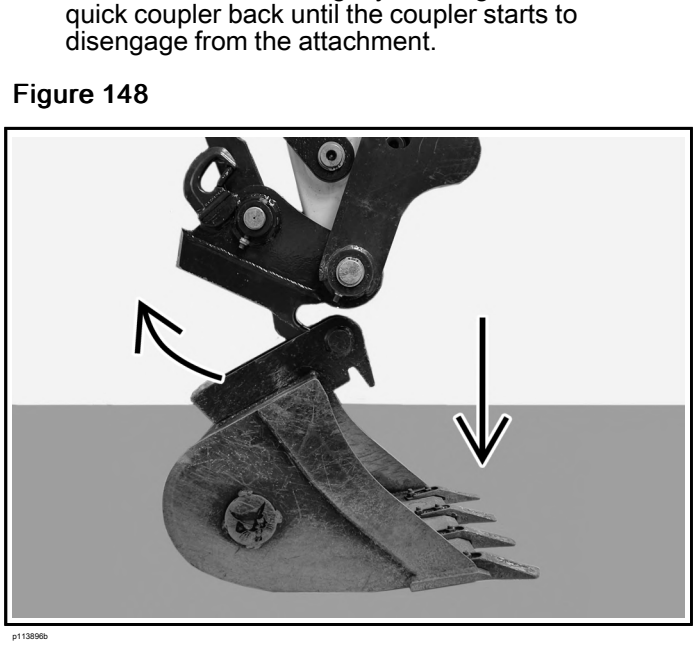
p113903b

5. Use the supplied wrench (Item 1) [Figure 147] and turn the wrench anticlockwise until the locking pins are fully disengaged.

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

7. With the attachment slightly off the ground, roll the quick coupler back until the coupler starts to disengage from the attachment.

Figure 148



p113896b

8. Roll the quick coupler back fully and lower the boom and arm until the attachment is on the ground and the quick coupler is disengaged from the attachment pins [Figure 148].

9. Move the arm away from the attachment.

INSTALLING ATTACHMENTS (MECHANICAL PIN GRABBER COUPLER)

Figure 149

C207444

You have been supplied with the release tool [Figure 149] that is required to disengage and engage the safety lock. Do not use alternative tools, as they may damage the coupler.

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

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

W-2052

⚠ WARNING

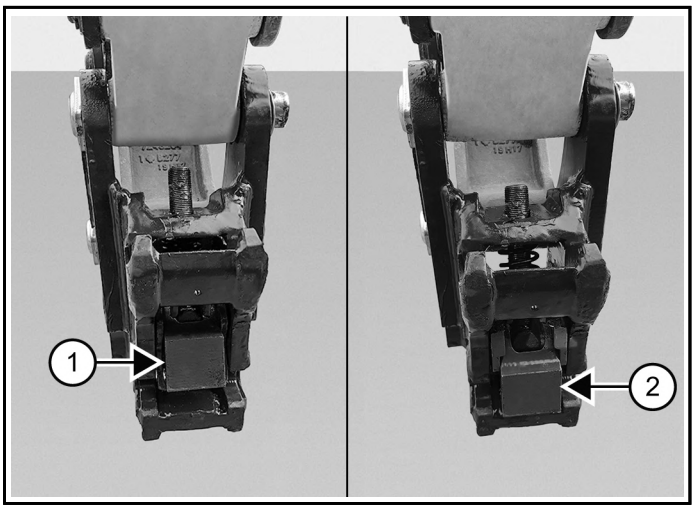
ENTANGLEMENT AND IMPACT HAZARD
Contact with moving parts, a trench cave-in or flying objects can cause serious injury or death.
Keep all bystanders 6 m (20 ft) away from equipment when operating.◂

W-2119

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

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

Figure 150



C207446b

2. Inspect the quick coupler. If the wedge and the trigger are in the primed position (Item 1) [Figure 150], proceed to Step 4.

   OR

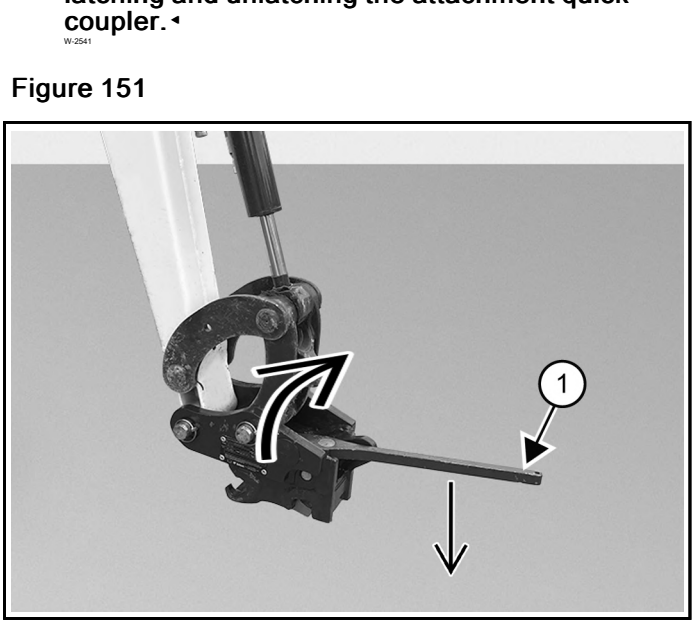
   If the wedge is in the engaged position (Item 2) [Figure 150], see Step 3.

⚠ WARNING

PINCHING HAZARD
Failure to follow instructions can cause serious injury.
Keep fingers and hands out of pinch points when latching and unlatching the attachment quick coupler.

W-2541

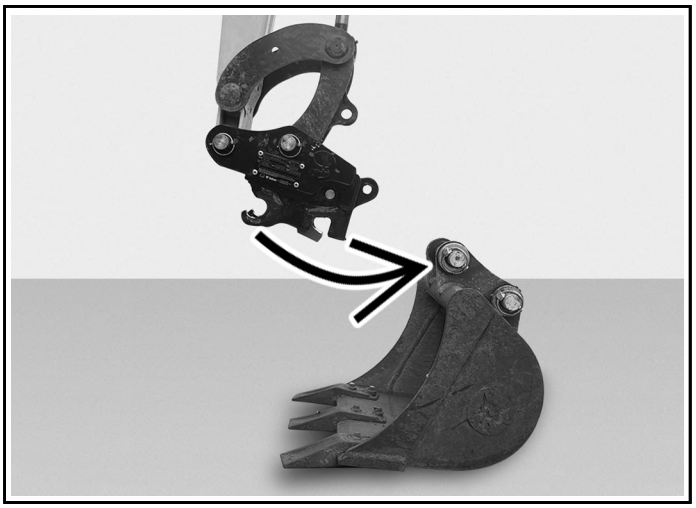
Figure 151



C207448b

3. To prepare the quick coupler, do the following:
   a. Stop the engine and exit the excavator.
   b. Install the release tool (Item 1) [Figure 151].
   c. Rotate the release tool clockwise and hold [Figure 151].
   d. Push the release tool down [Figure 151].
   e. The bottom part of the wedge will withdraw from the rear pin slot and the trigger will drop down.
   f. Remove the release tool and return it to a secure position.
   g. Enter the excavator, fasten the seat belt, and start the engine.

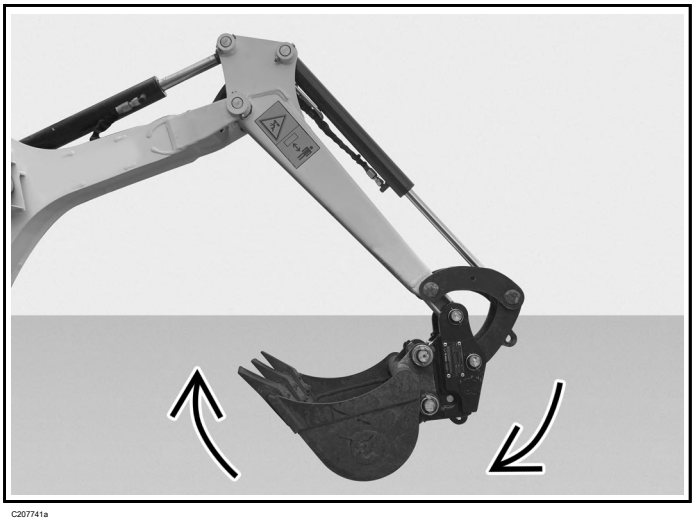
Figure 152



C207447a

4. Guide the coupler front hooks onto the attachment front pin [Figure 152].
5. Raise the boom until there is approximately 500 mm (20 in) of clearance between the bottom of the attachment and the ground.

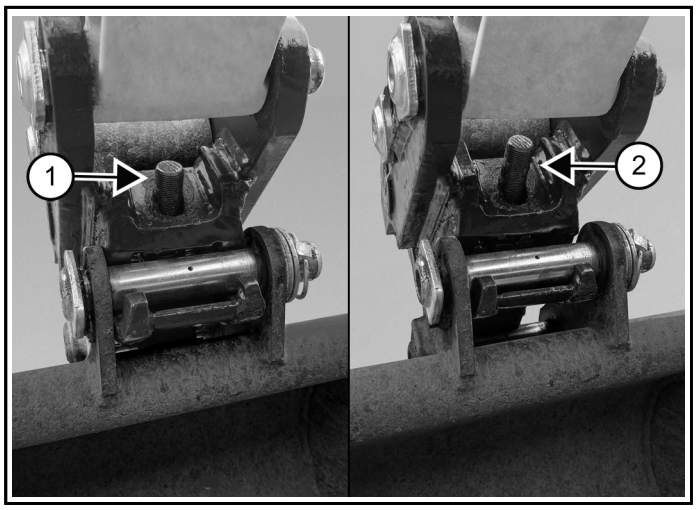
Figure 153



C207741a

6. Extend the bucket cylinder and curl in the bucket [Figure 153] until you hear the wedge engage on the attachment back pin.

Figure 154



C207449b

7. Visually inspect the indication bar to see if the coupler is fully engaged (Item 1) [Figure 154].

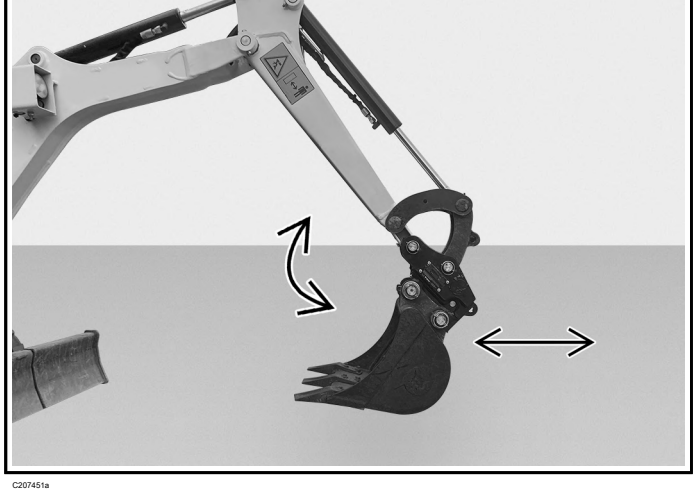
   If the visual indicator bar is not fully engaged (Item 2) [Figure 154], the attachment must not be operated. Turn off the excavator and examine the coupler for dirt build up or damage. Refer to the service manual for further information.

⚠ WARNING

CRUSHING HAZARD
Failure to fully engage quick coupler locking clasps / pins can allow attachment to come off and can cause serious injury or death.
The locking clasps / pins must be fully engaged and locked to the attachment pins.◂

W-3024

Figure 155



C207451a

8. Shake the attachment vigorously and / or carry out a bump test to ensure the attachment is secured to the coupler [Figure 155].

REMOVING ATTACHMENTS (MECHANICAL PIN GRABBER COUPLER)

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

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

W-2052

⚠ WARNING

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

W-2119

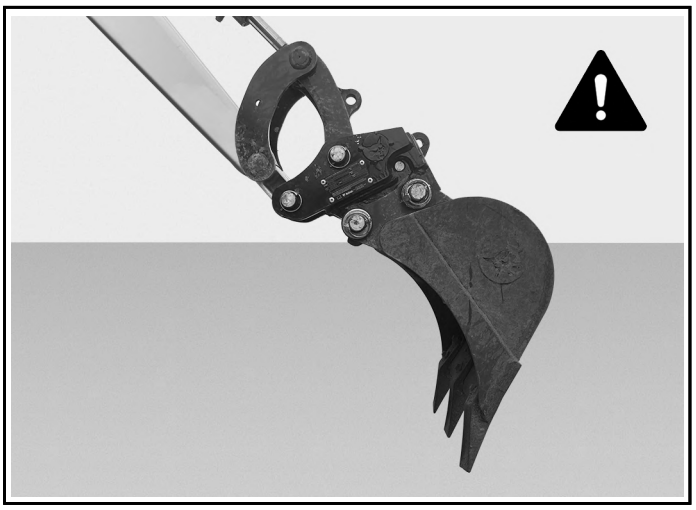
Figure 156

C207452a

1. Position the attachment close to ground level at the angle shown [Figure 156].

   The bucket / attachment pins should be approximately parallel to the ground.

Figure 157



C207453a

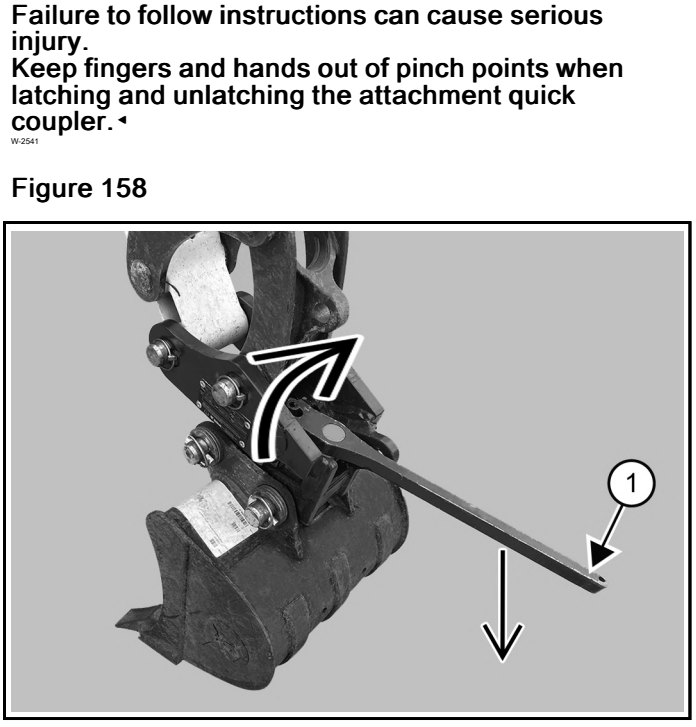
DO NOT RELEASE AN ATTACHMENT WITH THE COUPLER CURLED OPEN. [Figure 157]

2. Stop the engine and exit the excavator.

⚠ WARNING

PINCHING HAZARD
Failure to follow instructions can cause serious injury.
Keep fingers and hands out of pinch points when latching and unlatching the attachment quick coupler.
W-2541

Figure 158



C207454b

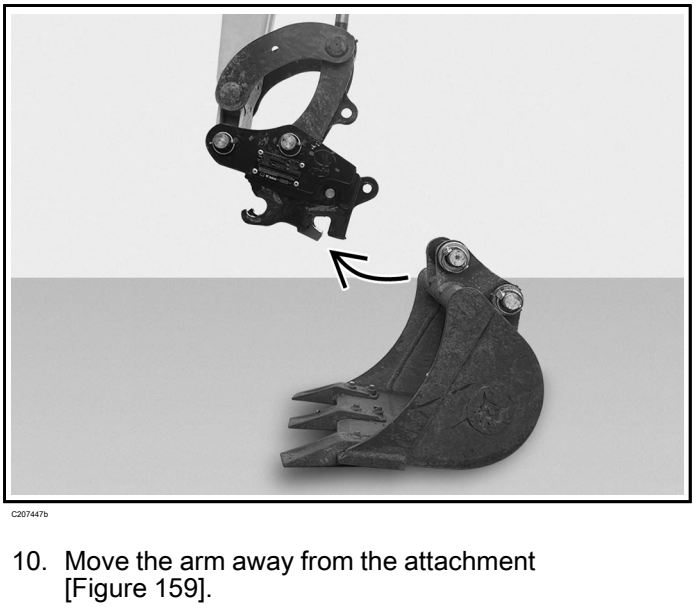
3. Firmly insert the release tool (Item 1) [Figure 158].

⚠ WARNING

PINCHING HAZARD
Failure to follow instructions can cause serious injury.
Keep fingers and hands out of pinch points when latching and unlatching the attachment quick coupler.
W-2541

4. Rotate the release tool clockwise and hold [Figure 158].
5. Press the release tool down against the wedge to disengage the attachment back pin [Figure 158].
6. Remove the release tool and return it to a secure position.
7. Enter the excavator, fasten the seat belt, and start the engine.
8. Lower the attachment to the ground.
9. Roll the coupler back until the coupler disengages from the attachment.

Figure 159



C207447b

10. Move the arm away from the attachment [Figure 159].

INSTALLING ATTACHMENTS (HYDRAULIC QUICK COUPLER)

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

MODIFICATION HAZARD
Unapproved attachments can cause serious injury or death.
Buckets and attachments for safe loads of specified densities are approved for each model. Never use attachments or buckets that are not approved by Bobcat Company.
W-2052

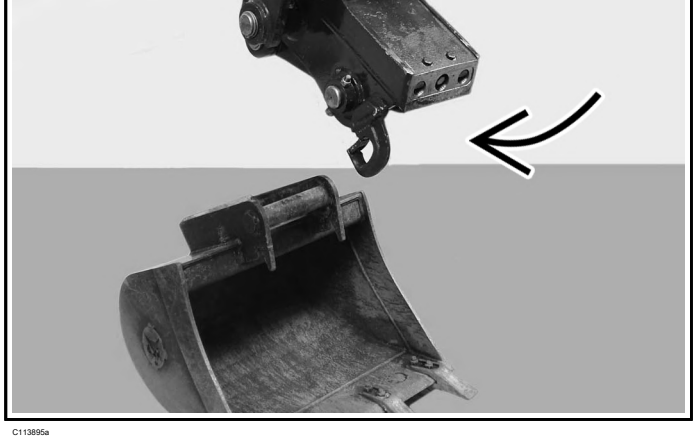
⚠ WARNING

ENTANGLEMENT AND IMPACT HAZARD
Contact with moving parts, a trench cave-in or flying objects can cause serious injury or death.
Keep all bystanders 6 m (20 ft) away from equipment when operating.
W-2119

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

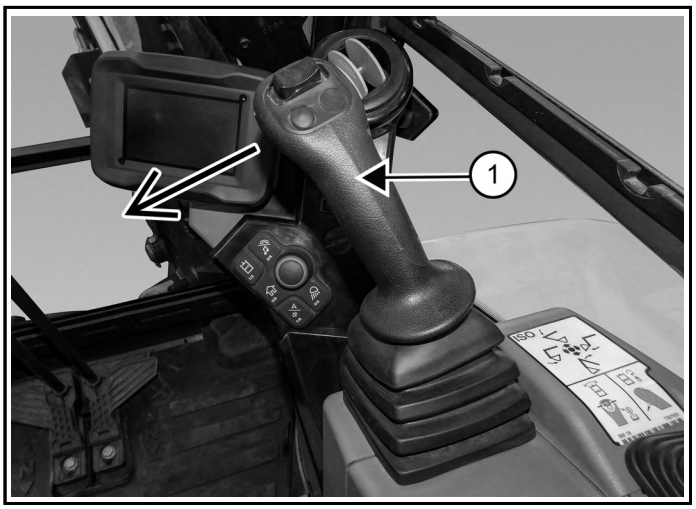
1. Start the engine.
2. If your machine is equipped with a hydraulic clamp, fully retract the hydraulic clamp cylinder so the clamp is out of the way for installing the attachment.

Figure 160


C113895a

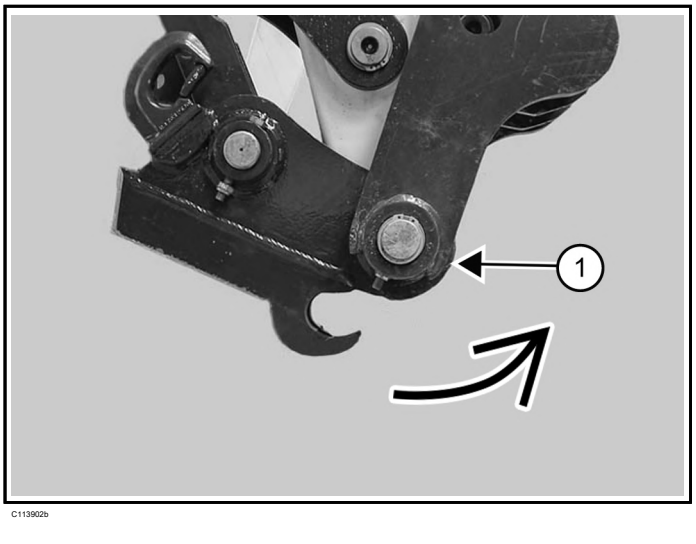
3. Position the arm and quick coupler to the attachment [Figure 160].

Figure 161



C206172e

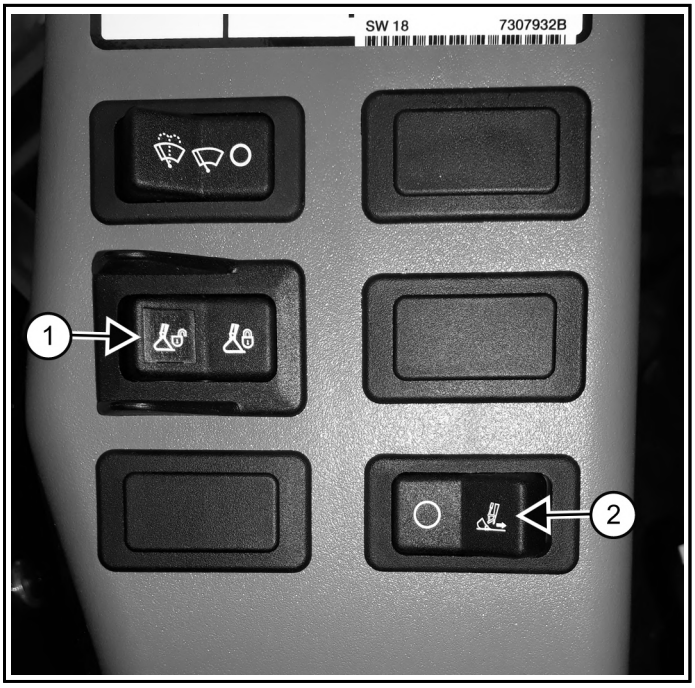
Figure 162



C113902b

4. Move the right joystick (Item 1) [Figure 161] to the left (IN) to curl the coupler (Item 1) [Figure 162] fully in toward the cab.

Figure 163



C208530a

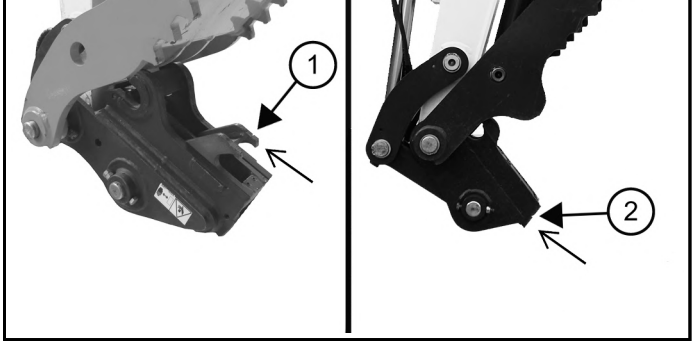
5. Press the coupler ON / OFF switch (Item 1) [Figure 163] to the left (ON) position to enable the quick coupler feature.

   The switch will illuminate in the ON position and a buzzer will sound.

6. Within five seconds after pressing the coupler ON / OFF switch (Item 1), press and release the INTENT switch (Item 2) [Figure 163] while continuing to hold the right joystick to the left (IN).

   The buzzer will continue to sound and the switch will stay ON.

Figure 164



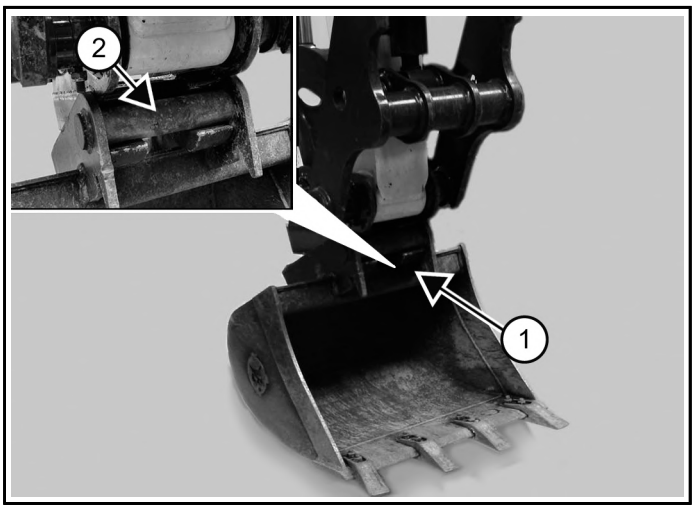
p113904b

7. For the Pin Grabber Coupler – Continue holding the right joystick to the left (IN) until the locking clasp (Item 1) [Figure 164] is fully retracted.

   OR

   For the Hydraulic Quick Coupler – Continue holding the right joystick to the left (IN) until the pins (Item 2) [Figure 164] are fully retracted.

Figure 165



p113898c

8. Roll the coupler out and move the arm toward the attachment. Position the boom, arm, and coupler so the coupler (Item 1) is positioned over the attachment pin (Item 2) [Figure 165].

9. Raise the attachment up slightly.

Figure 166

C113899

10. Curl the quick coupler in fully [Figure 166].

11. Press the coupler ON / OFF switch (Item 1) [Figure 163] to the right, (OFF) position.

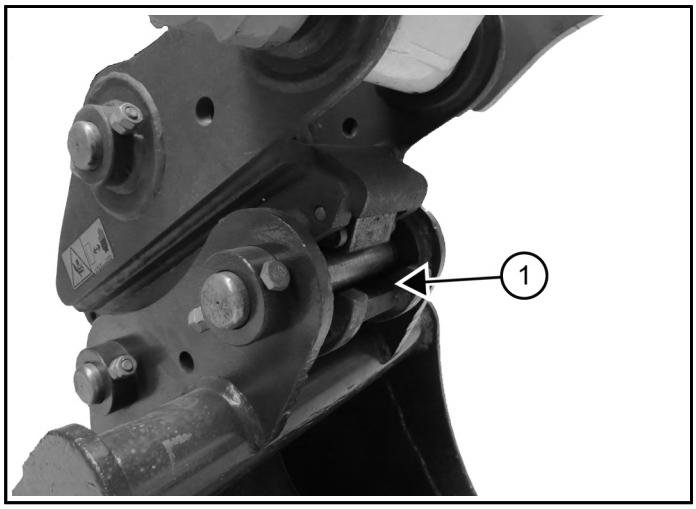
    The switch light and buzzer will turn OFF.

12. For the Pin Grabber Coupler – Continue to curl the bucket in for an additional 10 seconds to allow the locking clasp to move and lock to the bucket pins.

OR

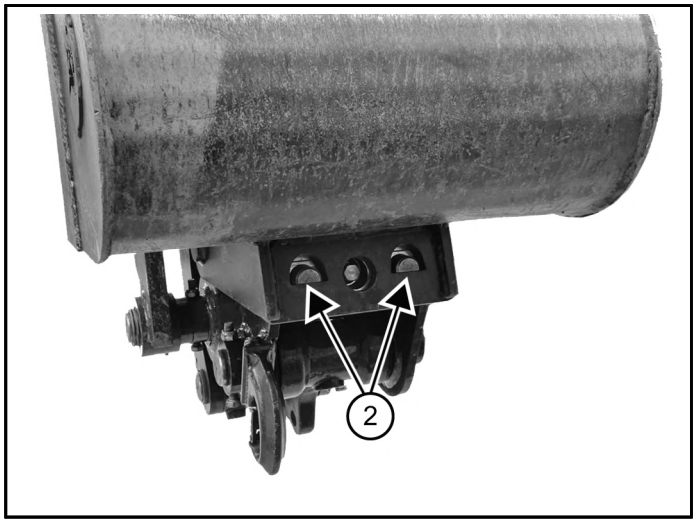
For the Hydraulic Quick Coupler – The locking pins will extend and engage the attachment mount locking the attachment to the coupler.

Figure 167



C113664a

Figure 168



C113900a

13. For the Pin Grabber Coupler – Visually check that the locking clasp (Item 1) [Figure 167] is fully engaged and locked, securely fastening the attachment to the coupler.

    OR

    For the Hydraulic Quick Coupler – Visually check that the locking pins (Item 2) [Figure 168] are extended through the holes in the attachment mounting frame, securely fastening the attachment to the coupler.

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

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

15. Lower the attachment flat to the ground.

⚠ WARNING

CRUSHING HAZARD
Failure to fully engage quick coupler locking clasps / pins can allow attachment to come off and can cause serious injury or death.
The locking clasps / pins must be fully engaged and locked to the attachment pins.

W-3024

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

See the lift capacity decal on your machine for the specific lift capacities of your machine. If this decal is missing or damaged, see your Bobcat dealer.
(See Lift Capacity on Page 97)

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

REMOVING ATTACHMENTS (HYDRAULIC QUICK COUPLER)

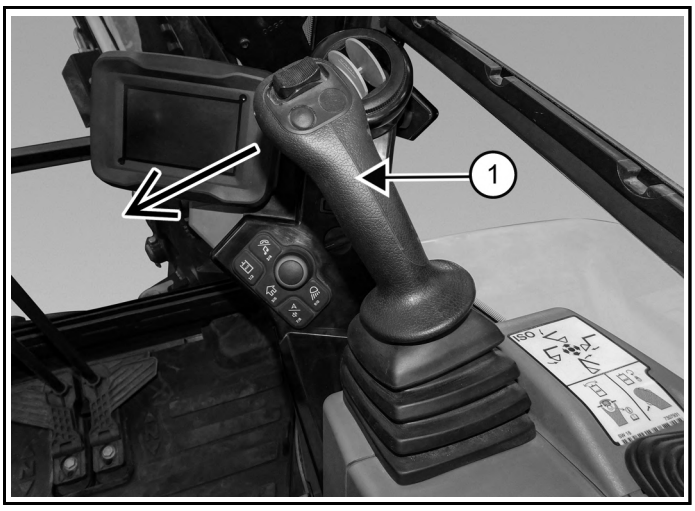
Removal of the bucket is shown. The procedure is the same for other attachments. Disconnect any hydraulic lines that are operated by hydraulic power before removing any attachments (breaker, auger, etc.).

⚠ WARNING

ENTANGLEMENT AND IMPACT HAZARD
Contact with moving parts, a trench cave-in or flying objects can cause serious injury or death.
Keep all bystanders 6 m (20 ft) away from equipment when operating.
W-2119

1. Enter the excavator and start the engine.
2. Raise the attachment slightly off the ground.

Figure 169



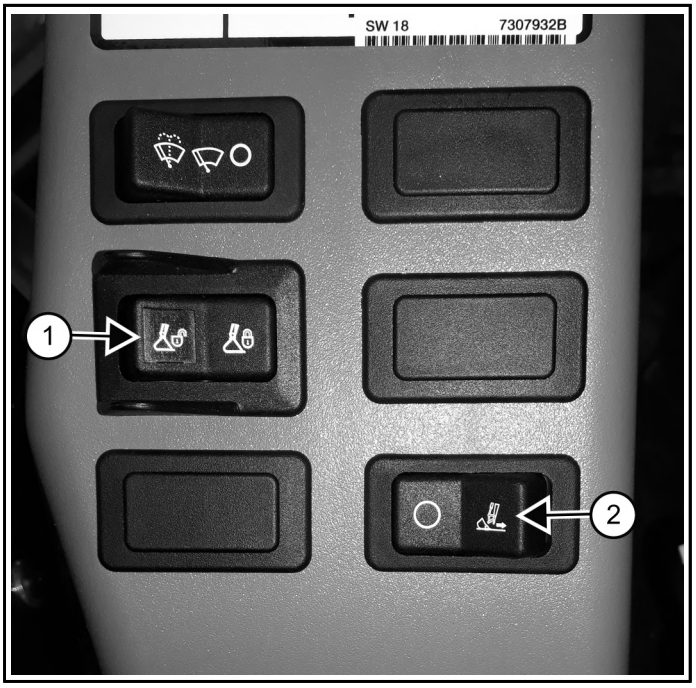
C206172e

Figure 170

C113899

3. Move the right joystick (Item 1) [Figure 169] to the left (IN) to curl the coupler fully in toward the cab [Figure 170].

Figure 171



C208530a

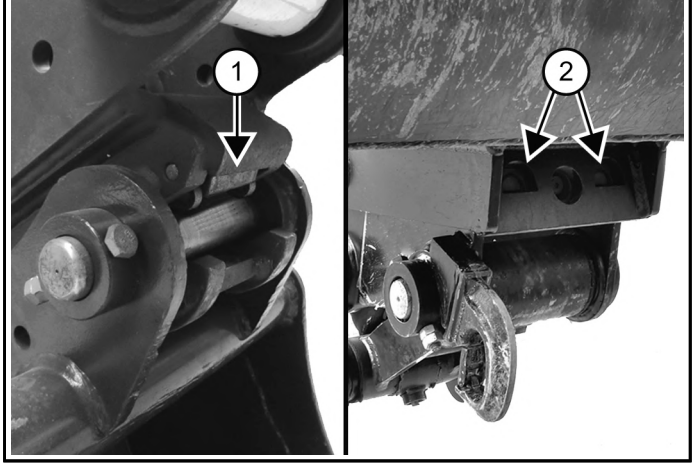
4. Press the coupler ON / OFF switch (Item 1) [Figure 171] to the left (ON) position to enable the quick coupler feature.

   The switch will illuminate when in the ON position and a buzzer will sound.

5. Within five seconds after pressing the coupler ON / OFF switch (Item 1) [Figure 171], press and release the INTENT switch (Item 2) [Figure 171] while continuing to hold the right joystick to the left (IN).

   The buzzer will continue to sound and the light will stay ON.

Figure 172



p113905d

6. For the Pin Grabber Quick Coupler – Continue holding the right joystick to the left (IN) until the locking clasp (Item 1) [Figure 172] retracts and unlocks the attachment from the quick coupler.

   OR

   For the Hydraulic Quick Coupler – Continue holding the right joystick to the left (IN) until the pins (Item 2) [Figure 172] are fully retracted to unlock the attachment from the quick coupler.

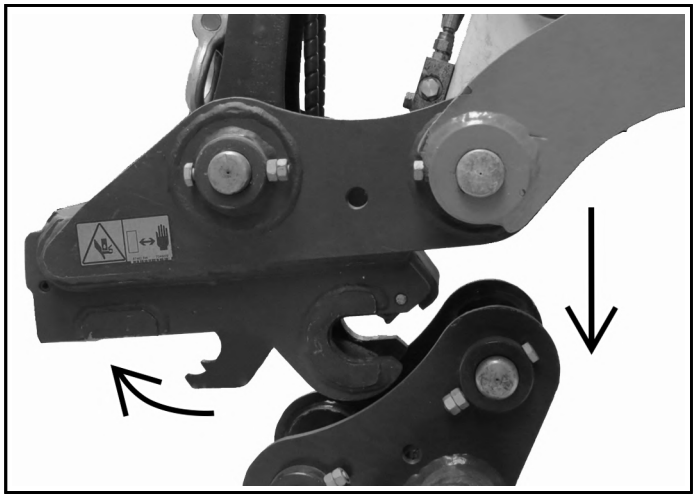
7. With the attachment slightly off the ground, roll the quick coupler back.

   The coupler will start to disengage from the attachment.

8. Roll the quick coupler back fully.

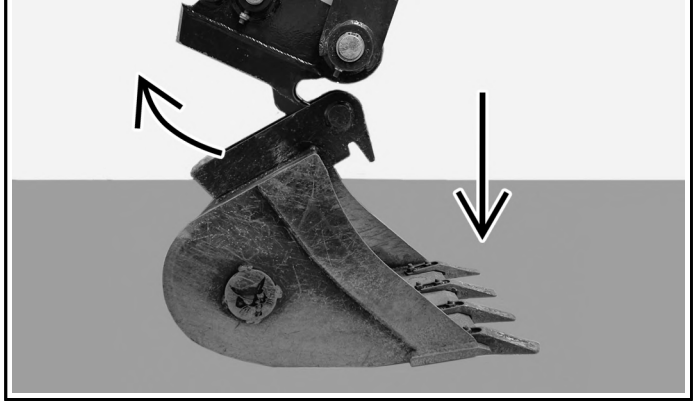
9. Lower the boom and arm until the attachment is on the ground and the quick coupler is disengaged from the attachment pins.

Figure 173



C113666a

Figure 174



p113896b

10. Move the arm away from the excavator until the quick coupler is clear of the attachment [Figure 173] or [Figure 174].

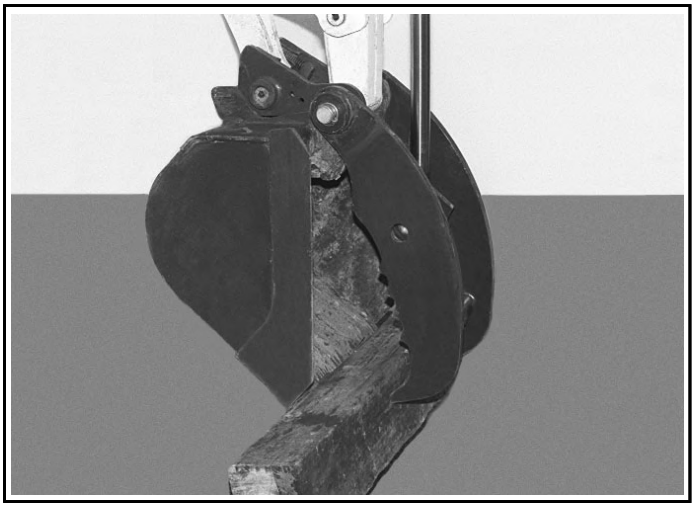
11. Press the coupler ON / OFF switch (Item 1) [Figure 171] to the right, (OFF) position.

    The switch light and buzzer will turn OFF.

HYDRAULIC CLAMP

Hydraulic Clamp Operation

Figure 175



N15513a

The optional lifting clamp attachment (if equipped) gives the excavator a wider range of use and mobility for debris removal [Figure 175].

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

The lift capacities are reduced for machines equipped with the optional lifting clamp.
(See Lift Capacity on Page 97)

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

Using Primary Auxiliary Hydraulics To Activate Clamp

1. Engage the primary auxiliary hydraulics. On the display, push the AUX button on the jog shuttle.
(See Operating Attachments With Primary Auxiliary Hydraulics on Page 51)

   OR

   On the standard panel, press the AUX button.
(See Operating Attachments With Primary Auxiliary Hydraulics on Page 49)

2. On the display, set the hydraulics flow rate to 60 – 70%.
(See Setting Auxiliary Hydraulics Flow Rate on Page 52)

   OR

   On the standard panel, set the hydraulics flow rate to 2.
(See Setting Auxiliary Hydraulics Flow Rate on Page 50)

Figure 176

C206172d

3. Move the switch (Item 1) [Figure 176] on the right joystick to the right and left to open and close the clamp.

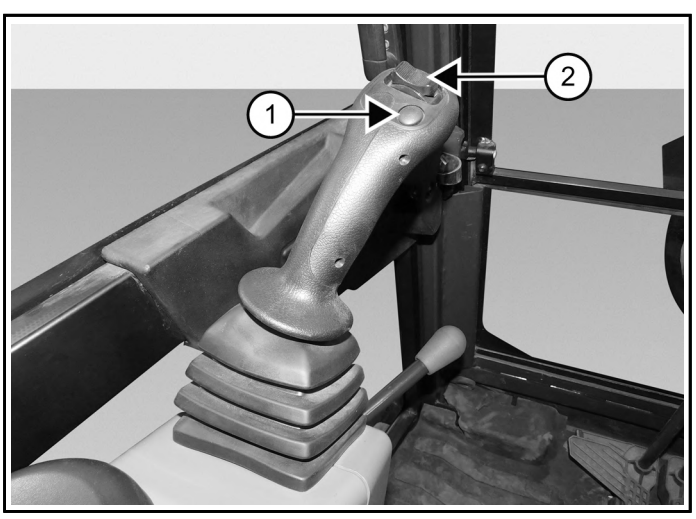
Using Secondary Auxiliary Hydraulics to Activate Clamp

1. On machines equipped with the standard panel, press the AUX button on the panel to engage auxiliary hydraulics.
(See Operating Attachments With Secondary Auxiliary Hydraulics on Page 54)

   OR

   On machines equipped with the display, push the AUX button on the jog shuttle to engage auxiliary hydraulics.
(See Operating Attachments With Secondary Auxiliary Hydraulics on Page 55)

Figure 177



C206181a

2. Press and hold the button (Item 1) [Figure 177] on the left joystick until a beep is heard to switch from boom swing to secondary auxiliary hydraulics.

3. Move the switch (Item 2) [Figure 177] on the left joystick right and left to open and close the clamp.

HANDLING OBJECTS

Do not exceed the Rated Lift Capacity when handling objects.

See the lift capacity decal on your machine for the specific lift capacities of your machine in different configurations. If this decal is missing or damaged, see your Bobcat dealer.
(See Calculating Lift Capacity on Page 97)

⚠ WARNING

INSTABILITY HAZARD
Excessive load can cause tipping or loss of control leading to serious injury or death.
Do not exceed rated lift capacity.
W-2374

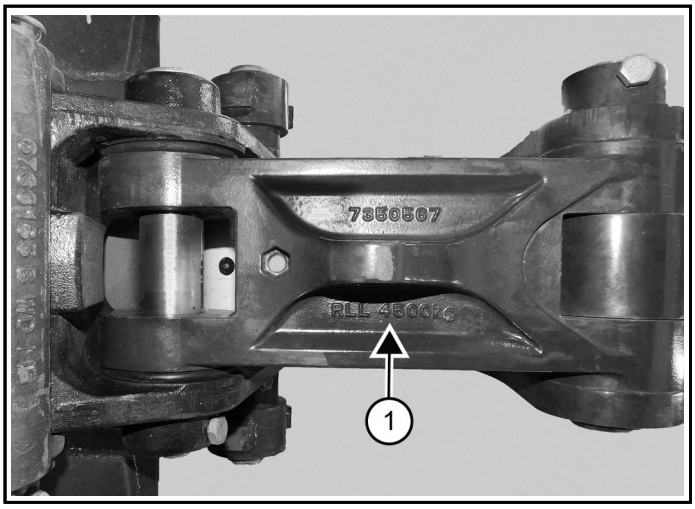
Handling Objects With The Lifting Device

The following items are needed to complete this task:

- Secondary lifting system (chain) of sufficient strength to lift the object
- Clevis

Do not exceed the machine's Rated Lift Capacity or the Rated Lift Load (RLL) of the lifting device (lift eye).

Figure 178



P200410a

The maximum RLL is shown on the lifting device (Item 1) [Figure 178].

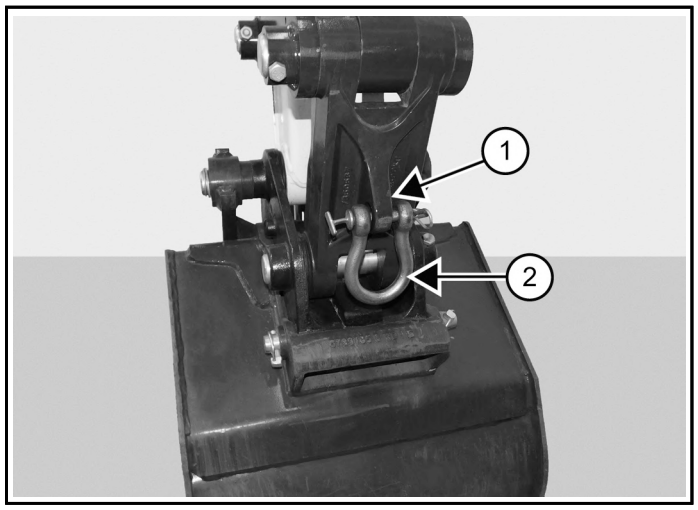
NOTE: The lifting device shown here may look different than the one on your machine but the basic operating procedure is the same.

⚠ WARNING

INSTABILITY AND CRUSHING HAZARD
Excessive load can cause tipping, loss of control or failure of the lift eye resulting in serious injury or death.
Do not exceed rated lift capacity.
W-2991

1. Extend the bucket cylinder completely and lower the boom to the ground.
2. Stop the engine and exit the excavator.

Figure 179

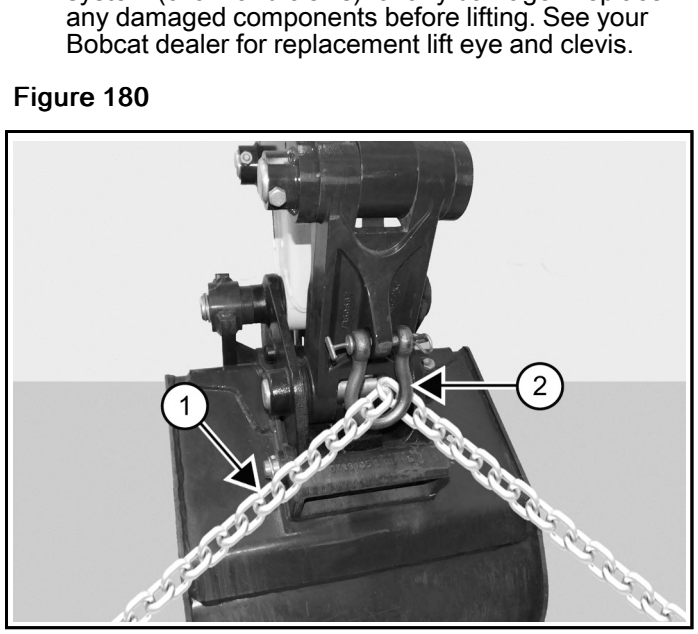


P200408a

3. Install the clevis (Item 2) through the lift eye (Item 1) [Figure 179].

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

Figure 180



P200407a

4. Install a lift chain (Item 1) (or other type of lifting device) through the clevis (Item 2) and connect to the object to be lifted [Figure 180].

   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.

5. Enter the excavator, fasten the seat belt and start the engine. (See Pre-Starting Procedure on Page 62)

Figure 181

P113708

6. Make sure the load is evenly weighted and centred on the lifting chain (or other type of lifting device), and is secured to prevent the load from shifting [Figure 181].
7. Operate the controls slowly and smoothly to avoid suddenly swinging the lifted load.
8. Lift and position the load.
9. 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.
10. Remove the clevis from the lift eye.

LIFT CAPACITY

Lift Capacity Description

⚠ WARNING

INSTABILITY AND CRUSHING HAZARD
Excessive load can cause tipping, loss of control or failure of the lift eye resulting in serious injury or death.
Do not exceed rated lift capacity.
W-2991

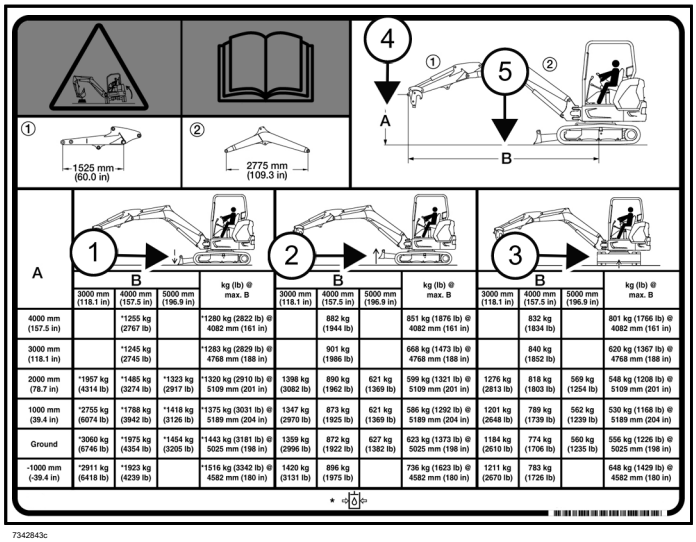
The standard lift capacities listed on the lift capacity decal are calculated for a machine equipped with no attachment mounting system and no attachment.

To obtain the actual lift capacity, subtract the weights of any optional equipment on your machine, such as bucket, coupler, or hydraulic clamp.
(See Calculating Lift Capacity on Page 97)

The weights for attachment mounting systems and hydraulic clamps can be found in documentation, including serial number plates. This manual also contains a detailed list of weights.
(See Attachment Mounting System And Clamp Weights on Page 97)

Calculating Lift Capacity

Figure 182



7342843c

1. Find the standard lift capacity for your working conditions on your machine's lift capacity decal [Figure 182].

   Working conditions include:

   - Blade down (Item 1) [Figure 182]
   - Blade Up (Item 2) [Figure 182]
   - Boom Over Tracks (Item 3) [Figure 182]
   - Lift Point Height (A) (Item 4) [Figure 182]
   - Lift Radius (B) (Item 5) [Figure 182]
   - Tracks Expanded / Retracted (not shown here)

2. Calculate the actual lift capacity for your conditions by subtracting the weights of optional equipment from the standard lift capacity on the decal.

   EXAMPLE: Standard lift capacity on decal (1485 kg (3274 lb)) – Attachment Mounting System (30 kg (66 lb)) – Hydraulic Clamp and Cylinder (86 kg (190 lb)) – Bucket (117 kg (258 lb)) = 1252 kg (2760 lb)

Attachment Mounting System And Clamp Weights

Description	Weight
Common Industry Interface	
DX17z, DX19, E17, E17z, E19, E20, E20z	22 kg (49 lb)
E42, E50, E55, E60	30 kg (66 lb)
German Style Coupler (Lehnhoff SW01)	
DX17z, DX19, E17, E17z, E19, E20, E20z	17 kg (36 lb)
E45, E50, E50z, E55, E55z, E60	29 kg (65 lb)
German Style Coupler (Lehnhoff SW03-5)	
E45, E50, E50z, E55, E55z, E60	36 kg (79 lb)
German Style Coupler (QC 01)	
DX17z, DX19, E17, E17z, E19, E20, E20z	18 kg (40 lb)
German Style Coupler (QC 01 with lift eye)	
DX17z, DX19, E17, E17z, E19, E20, E20z	19 kg (42 lb)
German Style Coupler (QC 03-3)	
E45, E50, E50z, E55, E55z, E60	39 kg (85 lb)
German Style Tilt Coupler	
DX17z, DX19, E17, E17z, E19, E20, E20z	37 kg (82 lb)
Hydraulic Clamp and Cylinder	
DX17z, E17, E17z	39 kg (85 lb)

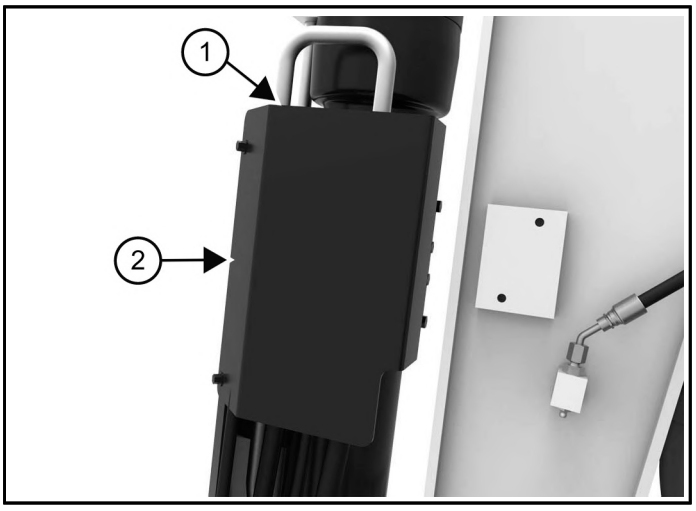
Description	Weight
E19, E20, E20z (Pin-On)	29 kg (64 lb)
E19, E20, E20z (Klac System)	81 kg (179 lb)
E42, E50, E55, E60	97 kg (214 lb)
E50z, E55z, E60 (Europe)	95 kg (210 lb)
E88	166 kg (366 lb)
Hydraulic Pin Grabber	
E42, E50, E60 (North America)	65 kg (143 lb)
E45, E50, E50z, E55, E55z, E60 (Europe and Asia)	62 kg (136 lb)
E88	84 kg (185 lb)
Hydraulic Pro-Clamp, Clamp Tool, and Cylinder	
E42, E50, E55, E60	144 kg (317 lb)
Hydraulic X-Change	
E45, E50, E55, E60	39 kg (87 lb)
Klac System Quick Coupler	
DX17z, DX19, E17, E17z, E19, E20, E20z	15 kg (33 lb)
E45, E50, E50z, E55, E55z, E60	44 kg (97 lb)
Mechanical Pin Grabber Coupler	
E08, E10, E10z, E17, E17z, E19, E20z	18 kg (40 lb)
E26, E27, E27z, E34, E35z, E37	37 kg (82 lb)
E50z, E55z, E60	53 kg (117 lb)
E57w, E62	55 kg (121 lb)
E85	73 kg (160 lb)

BOOM LOAD HOLDING VALVE

Location Of Boom Load Holding Valve

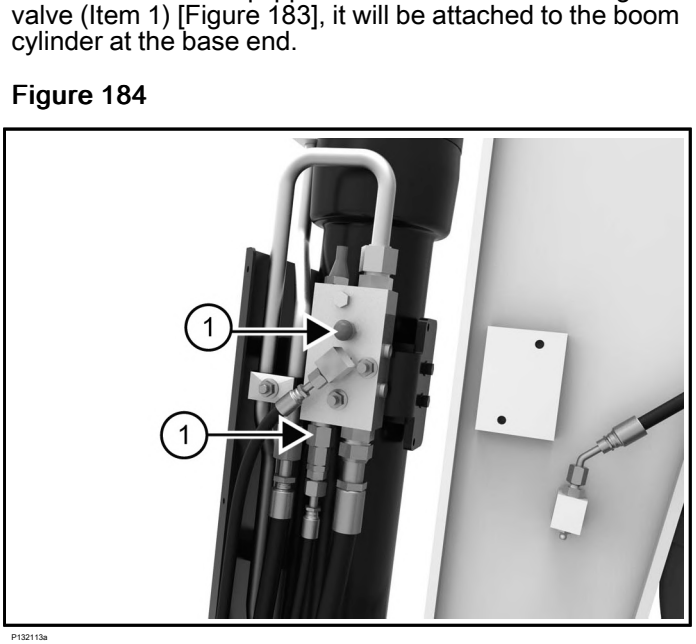
The boom load holding valve (if equipped) will hold the boom in its current position in the event of hydraulic pressure loss.

Figure 183



If the excavator is equipped with a boom load holding valve (Item 1) [Figure 183], it will be attached to the boom cylinder at the base end.

Figure 184



NOTE: The cover (Item 2) [Figure 183] is removed for photo clarity in [Figure 184].

Do not remove or adjust the two valves (Item 1) [Figure 184]. If these valves have been tampered with, see your Bobcat dealer for service.

⚠ WARNING

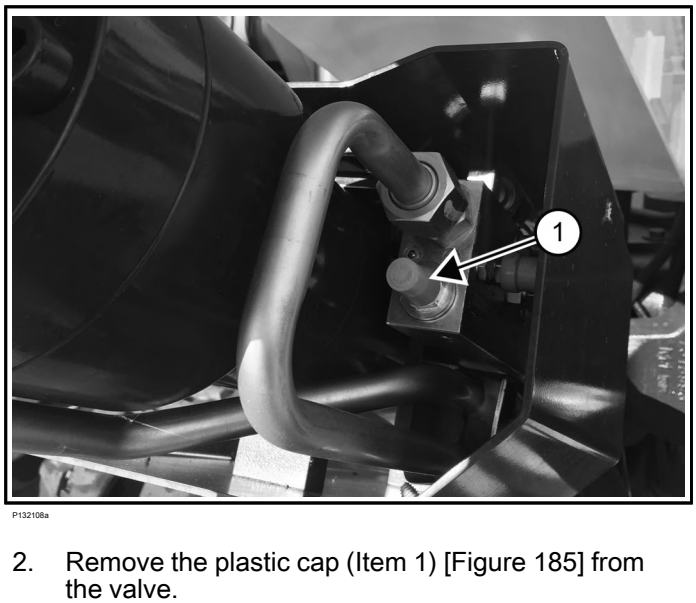
CRUSHING HAZARD
Falling equipment can cause serious injury or death. DO NOT work or stand under raised work equipment or attachment.
W-2793

Lowering Boom With Load Holding Valve With Base End Hose Failure

NOTE: If possible, first remove the load from the work group and support the boom before proceeding.

1. Place a container under the valve and base end hose to catch any hydraulic fluid that is leaking.

Figure 185



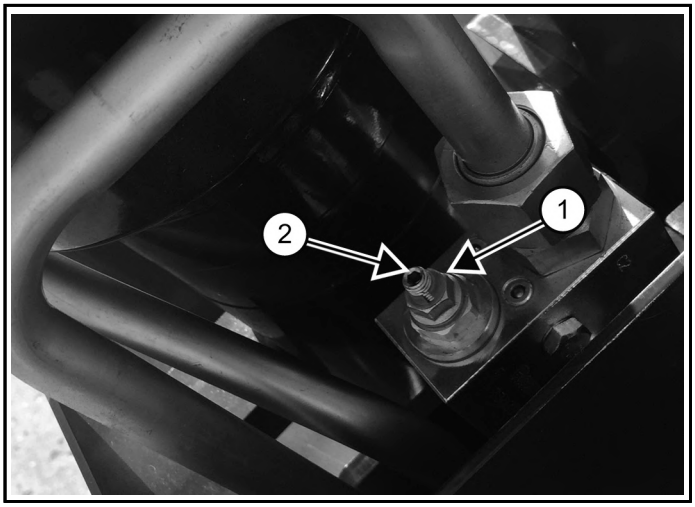
P132108a

2. Remove the plastic cap (Item 1) [Figure 185] from the valve.

⚠ WARNING

BURN HAZARD
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

Figure 186



P132109a

3. Loosen the locknut (Item 1) [Figure 186].

4. Install a hex wrench into the valve screw (Item 2) [Figure 186] and slowly rotate the screw clockwise 1/8 to 1/4 turn and allow the boom to lower to the ground.

5. After the boom is fully lowered, rotate the screw (Item 2) counterclockwise 1/8 to 1/4 turn and tighten the locknut (Item 1) [Figure 186].

Lowering Boom With Load Holding Valve With Rod End Hose Failure – With Accumulator Pressure

NOTE: If possible, first remove the load from the work group and support the boom before proceeding.

1. Place a container under the valve and hose end to catch any hydraulic fluid that is leaking.

2. Enter the excavator and turn the key ON.

   a. Do not start the engine.

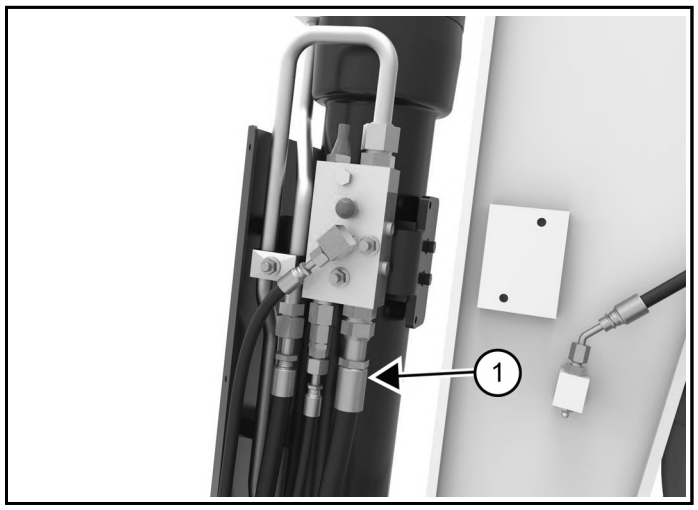
3. Slowly move the joystick boom lower function to lower the boom to the ground.

Lowering Boom With Load Holding Valve With Rod End Hose Failure And No Accumulator Pressure Or Loss Of Hydraulic Pressure

NOTE: If possible, first remove the load from the work group and support the boom before proceeding.

1. Place a container under the valve and rod end hose to catch any hydraulic fluid that is leaking.

Figure 187



C132113b

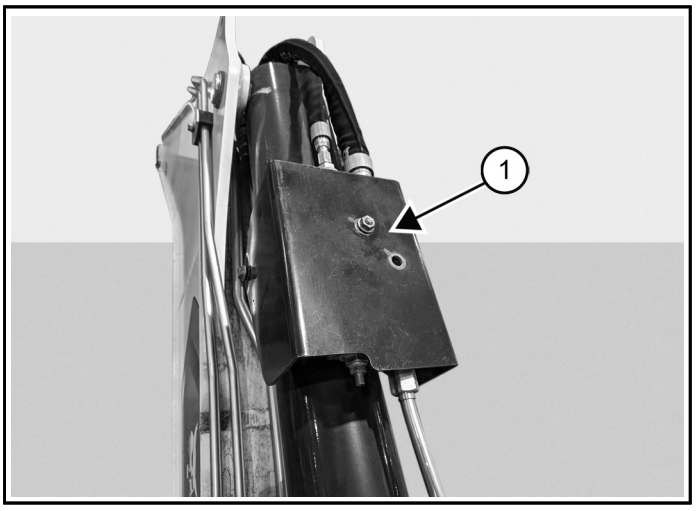
2. Remove the boom base end hose (Item 1) [Figure 187] from the boom load holding valve.
3. Loosen the locknut (Item 1) [Figure 186].
4. Install a hex wrench into the valve screw (Item 2) [Figure 186].
5. Slowly rotate the screw clockwise 1/8 to 1/4 turn and allow the boom to lower to the ground.
6. After the boom is fully lowered, rotate the screw (Item 2) [Figure 186] counterclockwise 1/8 to 1/4 turn and tighten the locknut (Item 1) [Figure 186].
7. Reinstall the base end hose.

ARM LOAD HOLDING VALVE

Location Of Arm Load Holding Valve

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

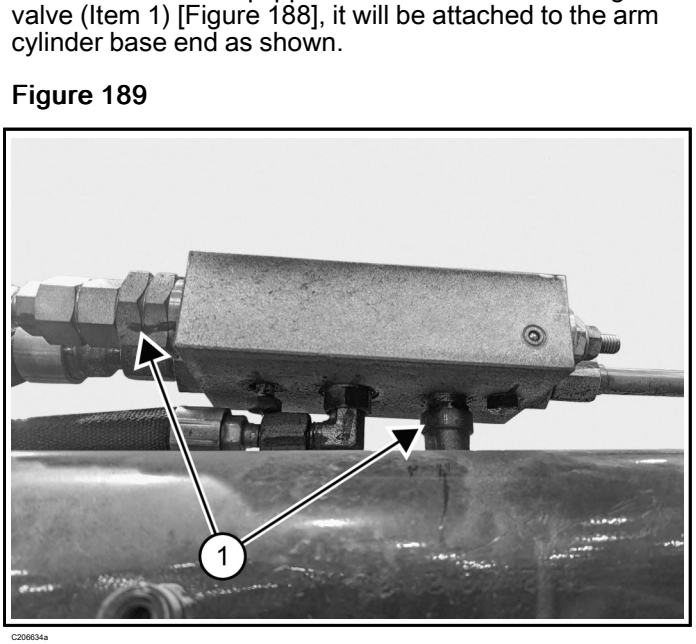
Figure 188



C206633a

If the excavator is equipped with an arm load holding valve (Item 1) [Figure 188], it will be attached to the arm cylinder base end as shown.

Figure 189



C206634a

Do not remove or adjust the two port relief valves (Item 1) [Figure 189]. If the port relief valves have been tampered with, see your Bobcat dealer for service.

⚠ WARNING

CRUSHING HAZARD
Falling equipment can cause serious injury or death. DO NOT work or stand under raised work equipment or attachment.

W-2793

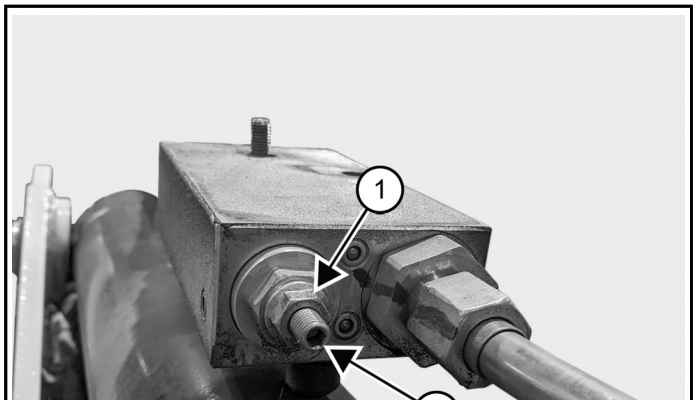
Lowering Arm with Load Holding Valve With Base End Hose Failure

1. Place a container under the valve and hose end to catch any hydraulic fluid that is leaking.

⚠ WARNING

BURN HAZARD
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

Figure 190



C206635a

2. Loosen the locknut (Item 1) [Figure 190].
3. Install a hex wrench into the valve screw (Item 2) [Figure 190].
4. Slowly rotate the screw clockwise 1/8 to 1/4 turn and allow the arm to lower.
5. After the arm is lowered, rotate the screw (Item 2) [Figure 190] counterclockwise the same 1/8 to 1/4 turn.
6. Tighten the locknut (Item 1) [Figure 190].

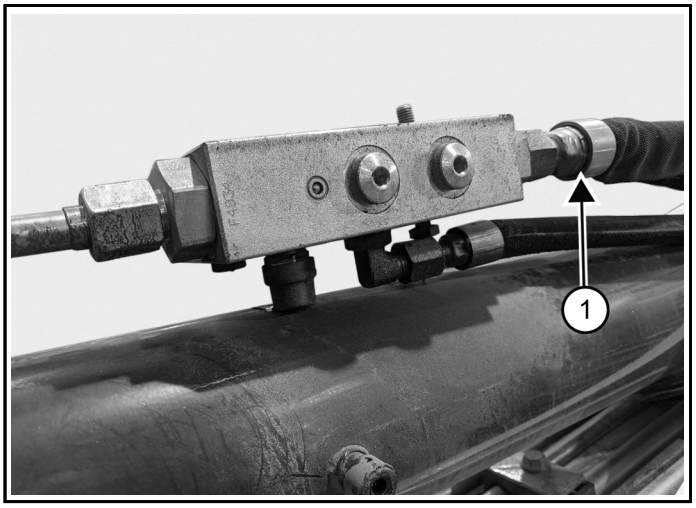
Lowering Arm With Load Holding Valve With Rod End Hose Failure – With Accumulator Pressure

1. Place a container under the valve and hose end to catch any hydraulic fluid that is leaking.
2. Enter the excavator and turn the key ON.

   Do not start the engine.
3. Slowly move the joystick arm retract function to lower the arm.

Lowering Arm With Rod End Hose Failure And No Accumulator Pressure Or Loss Of Hydraulic Pressure

Figure 191



C206636

1. Remove the arm end hose (Item 1) [Figure 191] from the arm load holding valve.
2. Place a container under the valve and base end hose to catch any hydraulic fluid that is leaking.
3. Loosen the locknut (Item 1) [Figure 190].
4. Install a hex wrench into the valve screw (Item 2) [Figure 190].
5. Slowly rotate the screw clockwise 1/8 to 1/4 turn and allow the arm to lower.
6. After the arm is lowered, rotate the screw (Item 2) [Figure 190] counterclockwise 1/8 to 1/4 turn.
7. Tighten the locknut (Item 1) [Figure 190].
8. Reinstall the base end hose.

DEPTH CHECK (STANDARD DISPLAY)

Depth Check Description

⚠ WARNING

INHALATION HAZARD
Exhaust fumes contain odorless, invisible gases that can kill without warning.
Fresh air must be added to avoid concentration of exhaust fumes when an engine is running in an enclosed area. If the engine is stationary, vent the exhaust outside.
W-2050

The Depth Check system provides audible and visual guidance to achieve and / or sustain a user-assigned depth target. Depth Check will display the vertical position of the bucket tip based on your initial starting point or bench point.

When the Depth Check kit was initially installed, the setup / calibration procedure should have been performed. But with usage of any attachment, the 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.

Two magnetic mounted tools are included with the kit for positioning the boom, arm, and bucket for calibration. These magnetic tools must be kept with the machine, as the Depth Check system should be re-calibrated on a yearly basis 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 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, the setup / calibration procedure must be performed again.

The calibration procedure is a two-person task. One person must remain in the cab to enter data into the display 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.).

See the correct section for the type of screen equipped on your machine.
(See Depth Check (Standard Display) on Page 102)

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.

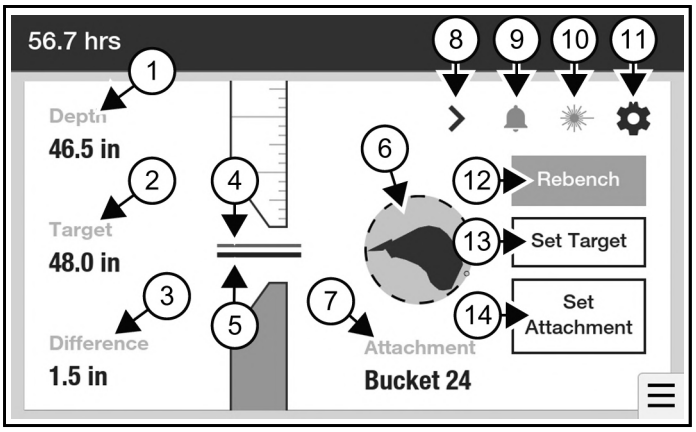
⚠ WARNING

GENERAL HAZARD
Contact with equipment can cause serious injury or death.
Keep all bystanders 6 m (20 ft) away from equipment when operating.
W-2268

Depth Check Screen

Access the **DEPTH CHECK** screen by selecting **[NAVIGATION HANDLE]→ [DEPTH CHECK]**.

Figure 192



NA3915b

REF	DESC.	FUNCTION
1	Depth (Dimension)	The current depth of the attachment cutting edge.
2	Target (Dimension)	Depth to dig from an established starting point set by the operator. (Example: Desired dig depth from a surveyor's elevation pin.)
3	Difference (Dimension)	The difference between the current depth and the target depth.
4	Depth (Bar Graph)	Moves up and down to show the position of the attachment to the target.
5	Target (Bar Graph)	Shows where the target is in relationship to the attachment position.
6	Attachment Rotation	A bucket is used to represent the attachment. The bucket image will rotate to represent the position of the attachment as the attachment is curled out or curled in.
7	Attachment	Displays currently selected attachment.

REF	DESC.	FUNCTION
8	Arrow	Used to move between depth check screens. (See Changing The Depth Check Screen on Page 103)
9	Alarm	Turns target depth alarm ON / OFF. (See Setting The Warning Zone on Page 110)
10	Laser	Accesses **LASER SETUP** screen where you can add the laser position dimension or turn the laser ON / OFF. When laser is ON, the icon is illuminated. (See Setting Up A Laser With Depth Check on Page 112)
11	Depth Check Settings	Accesses **DEPTH CHECK SETTINGS** screen.
12	Rebench	Press to Rebench. (See Digging To A Target Depth on Page 111)
13	Set Target	Accesses **SET TARGET DEPTH** screen. (See Setting Target Depth on Page 109)
14	Set Attachment	Accesses **SET ATTACHMENT** screen.

Changing The Depth Check Screen

There are two **DEPTH CHECK** screens:

- Dig Depth [Figure 193]
- Distance to Target [Figure 194]

Figure 193

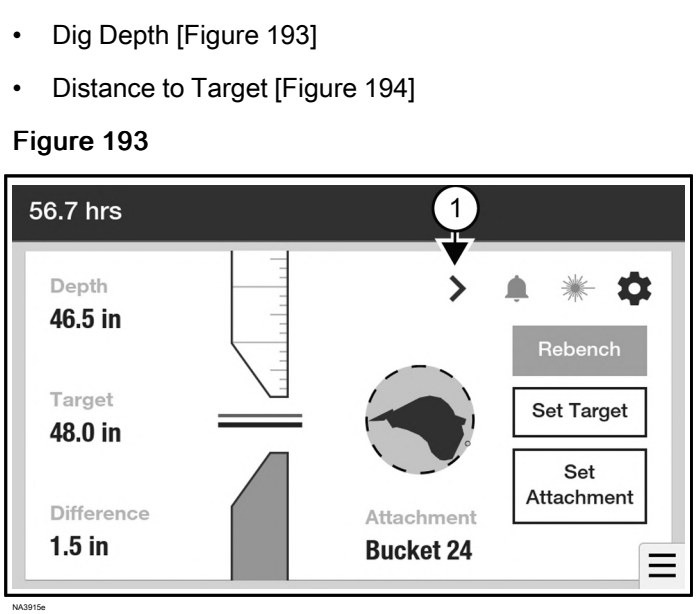
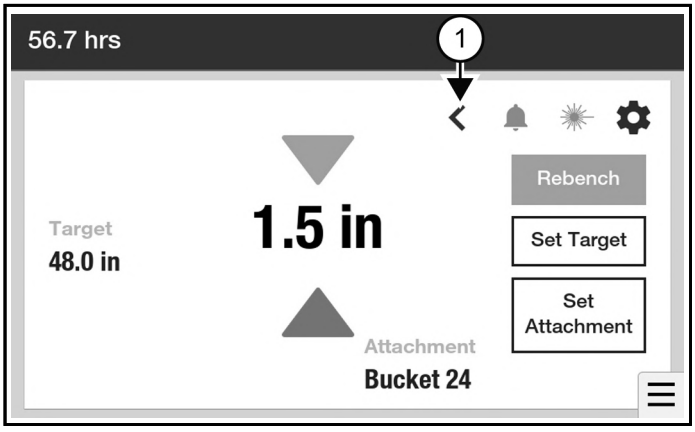


Figure 194



Press the **[ARROW]** icon (Item 1) to toggle between these two screens at any time.

Calibrating The Boom

The following items are needed to complete this task:

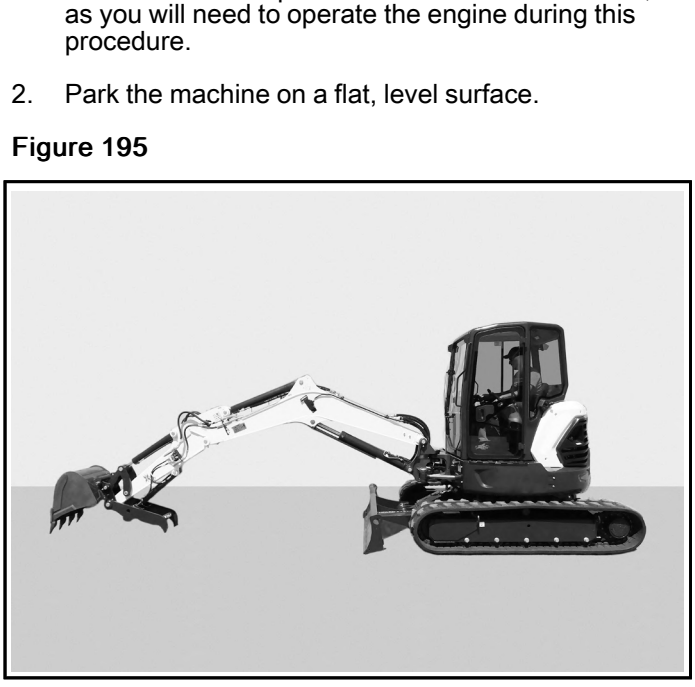
- Tape measure.
- Two magnetic tools that are included with the kit.

The task is a two-person job. One person must remain in the cab to enter data into the display while a second person takes measurements from outside the machine.

NOTE: The owner password is needed to access the Setup and Calibration settings.

1. Move the machine to an open area where the boom and arm can be repositioned and there is fresh air, as you will need to operate the engine during this procedure.
2. Park the machine on a flat, level surface.

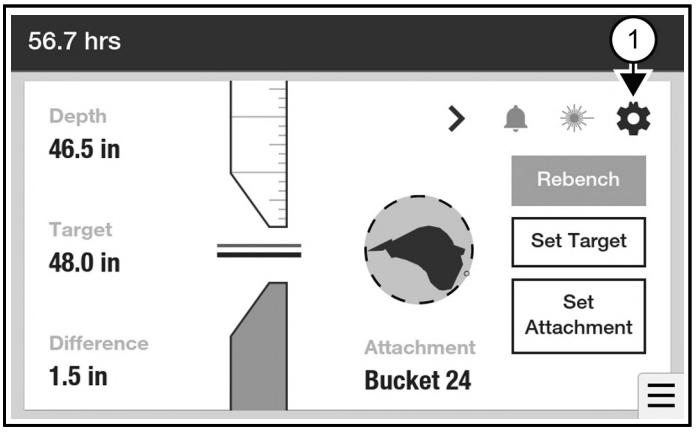
Figure 195



3. Position the excavator with the bucket fully rolled out and the arm fully extended [Figure 195].

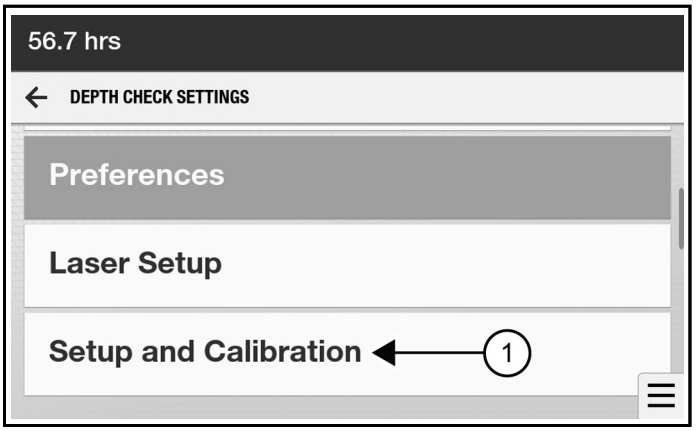
4. On the standard display select **[NAVIGATION HANDLE]→ [DEPTH CHECK]**.

Figure 196



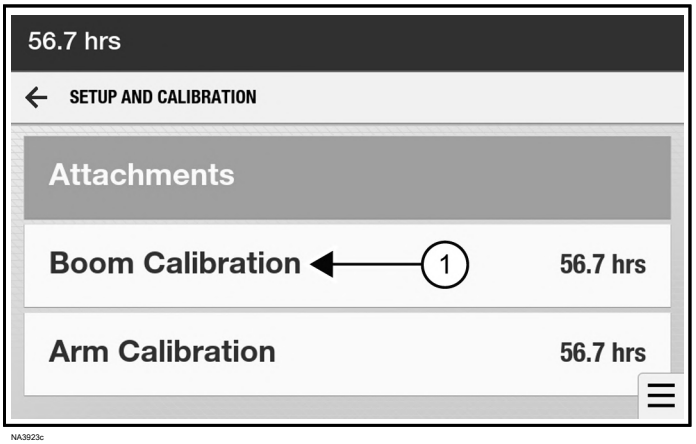
5. Select the **[SETTINGS]** icon (Item 1) [Figure 196].

Figure 197



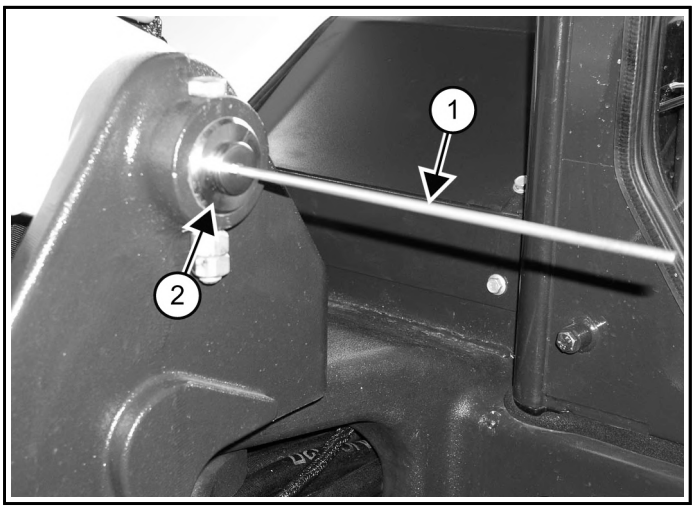
6. Select **[SETUP AND CALIBRATION]** (Item 1) [Figure 197].

Figure 198



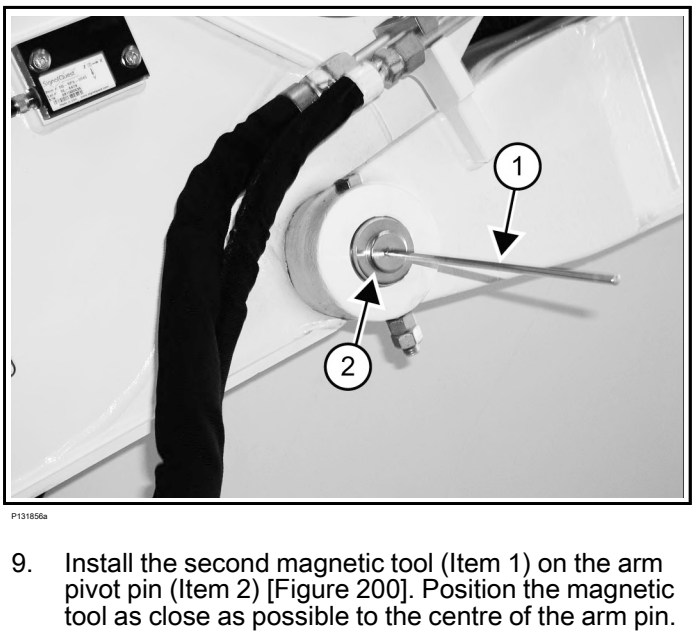
7. Select **[BOOM CALIBRATION]** (Item 1) [Figure 198].

Figure 199



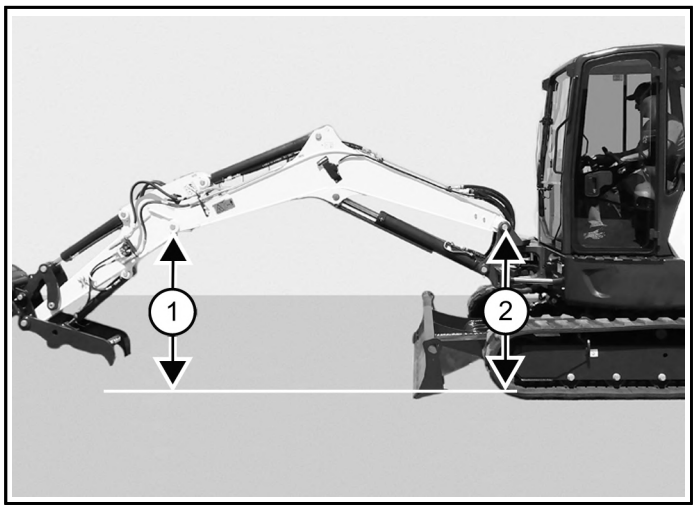
8. Install one of the magnetic tools (Item 1) on the boom pivot pin (Item 2) [Figure 199]. Position the magnetic tool as close as possible to the centre of the boom pivot pin.

Figure 200



9. Install the second magnetic tool (Item 1) on the arm pivot pin (Item 2) [Figure 200]. Position the magnetic tool as close as possible to the centre of the arm pin.

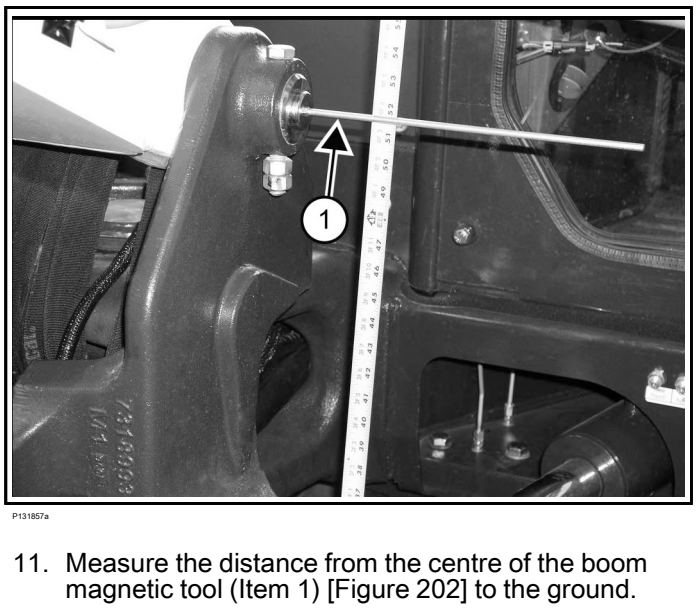
Figure 201



C200403b

10. Position the work group so the distance from the ground to the two magnetic sensors (Items 1 and 2) [Figure 201] is identical.

Figure 202

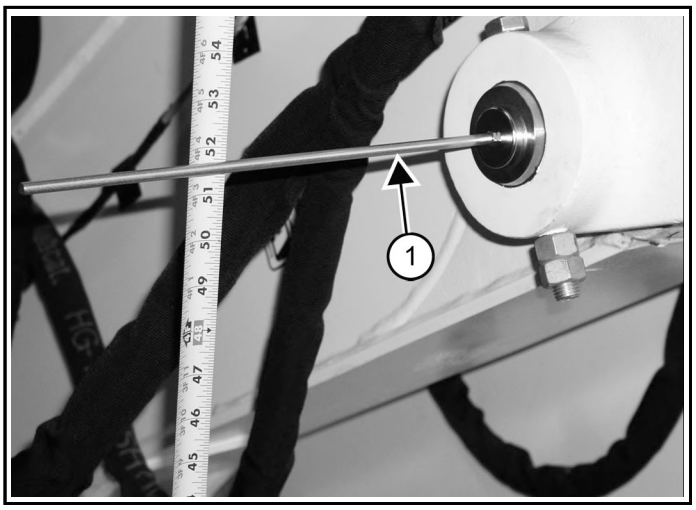


P131857a

11. Measure the distance from the centre of the boom magnetic tool (Item 1) [Figure 202] 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. You can also use a laser level to locate the centerlines of the magnetic tools as this will eliminate any possible variation in the measurements to the ground.

Figure 203



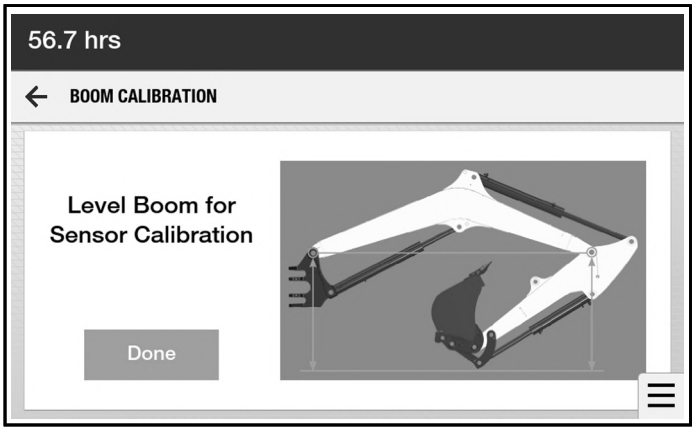
P131858a

12. Measure the distance from the centre of the arm magnetic tool (Item 1) [Figure 203] to the ground.

13. Adjust the boom up or down as needed and remeasure until both distances are the same.

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

Figure 204



NA3910

14. Follow the instructions on the screen and select **[DONE]** [Figure 204].

15. Proceed to calibrating the arm.
    (See Calibrating The Arm on Page 105)

Calibrating The Arm

The following items are needed to complete this task:

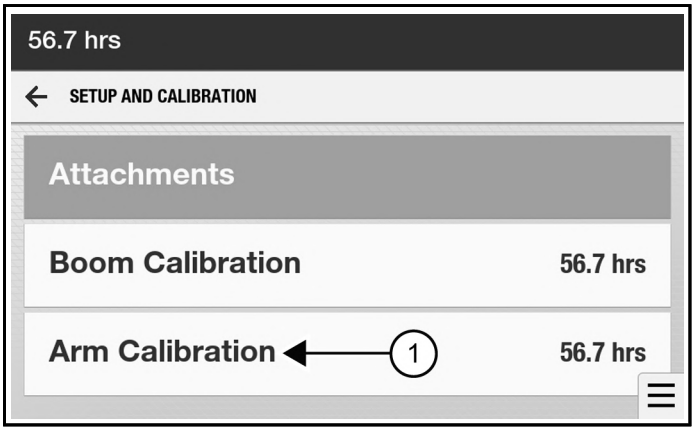
- Plumb bob.
- Magnetic tool that is included with the kit.

The task is a two-person job. One person must remain in the cab to enter data into the display while a second person takes measurements from outside the machine.

NOTE: The owner password is needed to access the Setup and Calibration settings.

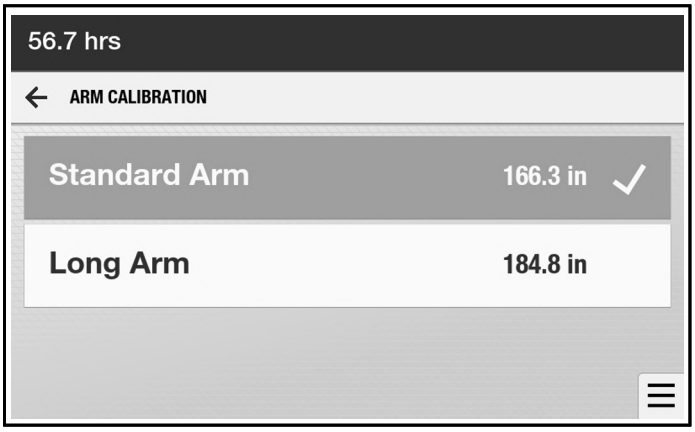
1. Select **[NAVIGATION HANDLE]→ [DEPTH CHECK]→ [SETTINGS]→ [SETUP AND CALIBRATION]**.

Figure 205



2. Select **[ARM CALIBRATION]** (Item 1) [Figure 205].

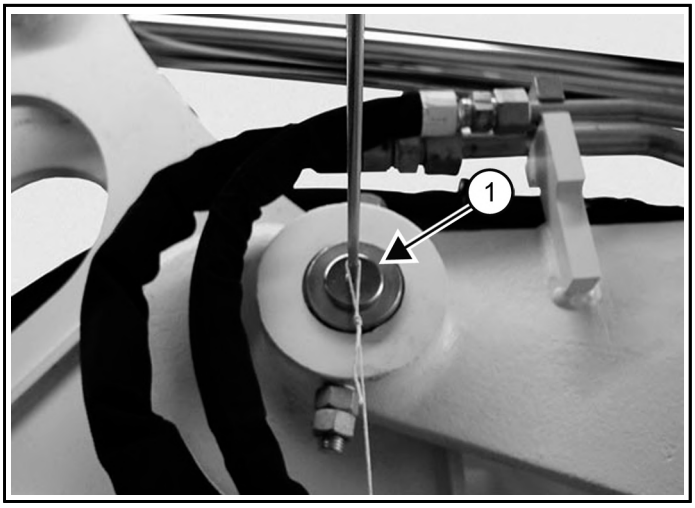
Figure 206



3. Select the arm that your machine is equipped with [Figure 206].

   NOTE: Some models only have one arm option available.

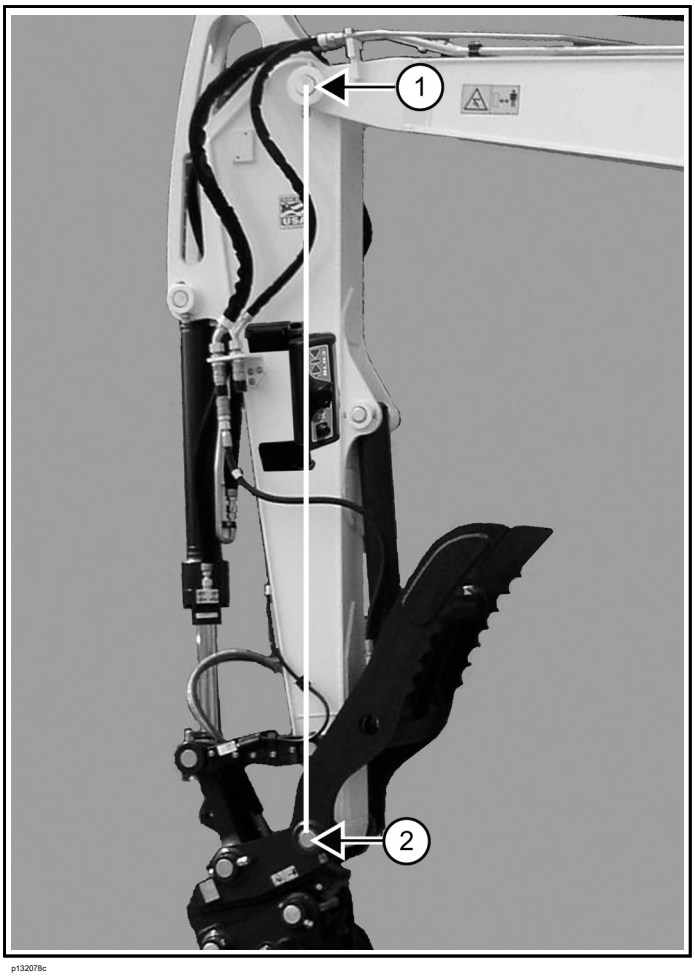
Figure 207



4. Install the magnetic tool on the arm pin (Item 1) [Figure 207].

5. Place the plumb bob on the magnetic tool that is installed on the arm pin (Item 1) [Figure 207].

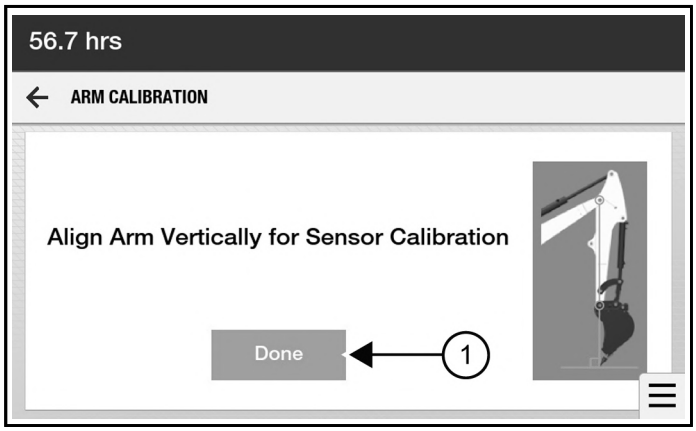
Figure 208



6. Move the arm until the plumb bob line (Item 1) is centred on the pivoting bucket pin (Item 2) [Figure 208].

   The accuracy of the arm being vertical affects the accuracy of the Depth Check system.

Figure 209



7. With the arm vertical, select **[DONE]** (Item 1) [Figure 209] to store this information.

8. Proceed to calibrating the attachment. (See Calibrating The Attachment on Page 107)

Calibrating The Attachment

The following items are needed to complete this task:

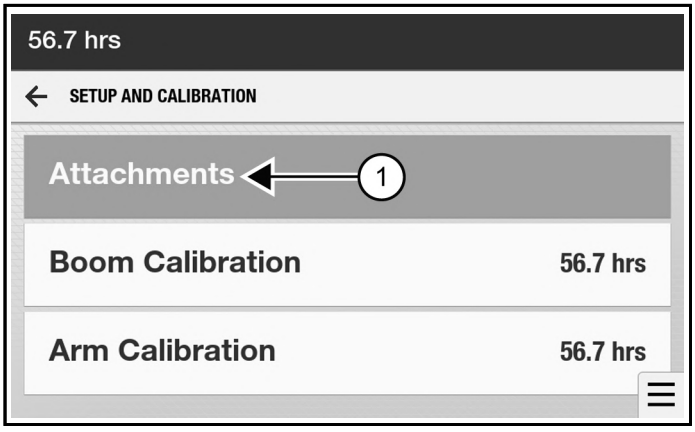
- Tape measure.
- Magnetic tool that is included with the kit.

The task is a two-person job. One person must remain in the cab to enter data into the display while a second person takes measurements from outside the machine.

NOTE: The owner password is needed to access the Setup and Calibration settings.

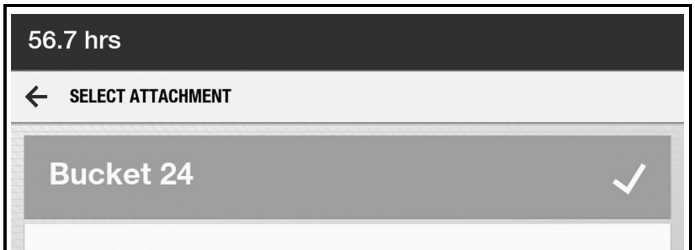
1. Select **[NAVIGATION HANDLE]→ [DEPTH CHECK]→ [SETTINGS]→ [SETUP AND CALIBRATION]**.

Figure 210



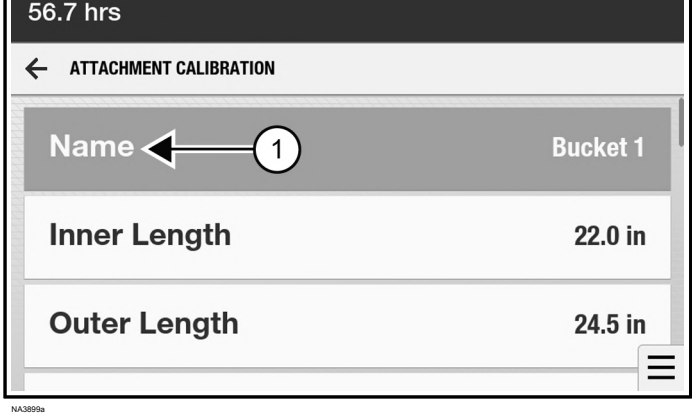
2. Select **[ATTACHMENTS]** (Item 1) [Figure 210].

Figure 211



3. Select one of the attachments [Figure 211].

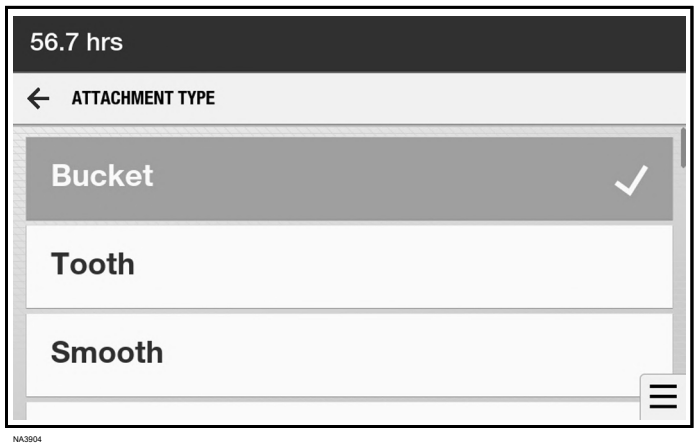
Figure 212



4. On the **ATTACHMENT CALIBRATION** screen, select **[NAME]** (Item 1) [Figure 212].

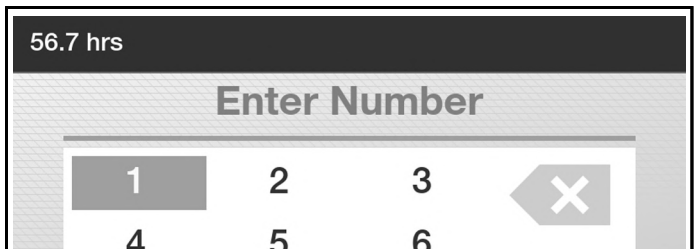
   NOTE: A bucket is used as an example here, but this setup is similar for all attachments. The accuracy of these dimensions affects the accuracy of the Depth Check.

Figure 213



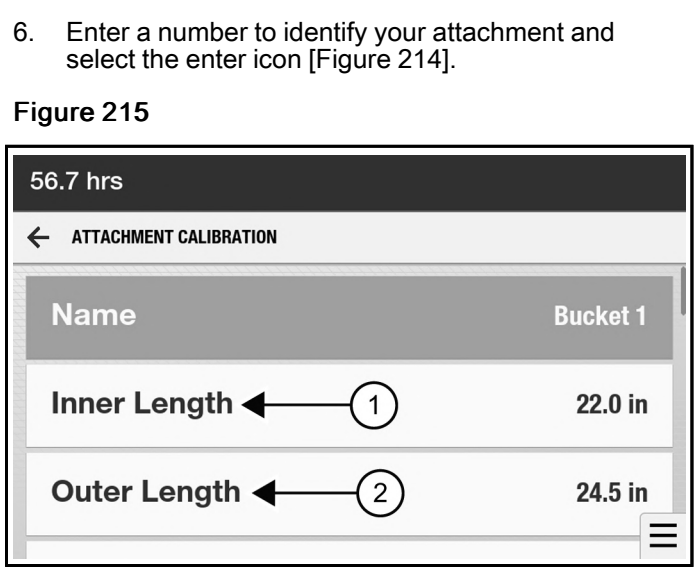
5. Select type of attachment [Figure 213].

Figure 214



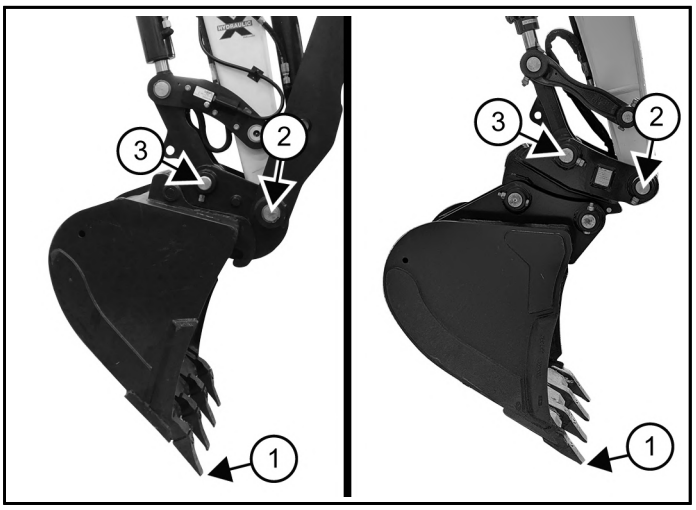
6. Enter a number to identify your attachment and select the enter icon [Figure 214].

Figure 215



7. Select **[INNER LENGTH]** (Item 1) [Figure 215].

Figure 216



8. Measure the distance from the tip of the attachment (Item 1) to the centre of the inner pin (Item 2) [Figure 216] and enter this value.

   Choose the correct pin (Item 2) [Figure 216] based on the type of attachment mounting system on your machine.

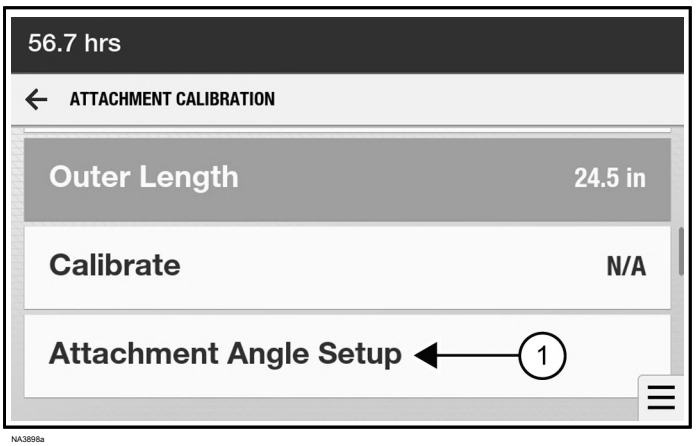
9. Select **[OUTER LENGTH]** (Item 2) [Figure 215].

   NOTE: The cutting surfaces of any attachments will wear over time. For example, the cutting edge (tooth) wears with the use of the bucket. The accuracy of the Depth Check system is affected by the wear of these components. If you notice any loss in accuracy, recalibrate the Depth Check system to reset the attachment dimensions.

10. Measure the distance from the tip of the attachment (Item 1) to the centre of the outer pin (Item 3) [Figure 216] and enter this value.

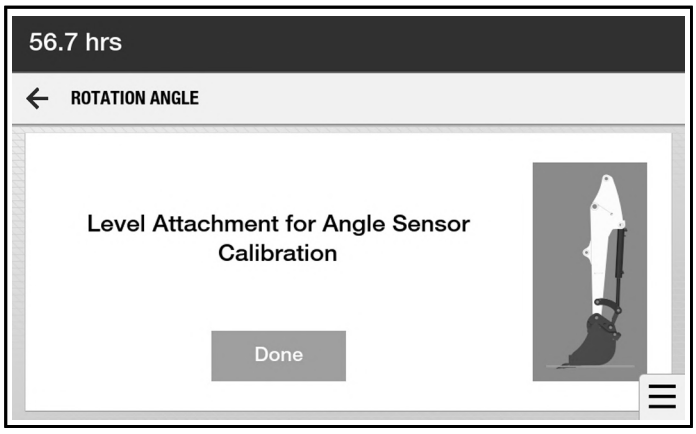
    Choose the correct pin (Item 3) [Figure 216] based on the type of attachment mounting system on your machine.

Figure 217



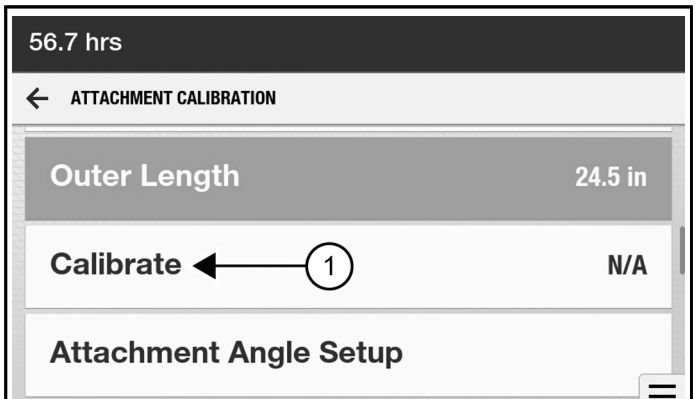
11. If you are using a non-standard bucket or attachment and want the display to more accurately reflect its rotation, select **[ATTACHMENT ANGLE SETUP]** (Item 1) [Figure 217].

Figure 218



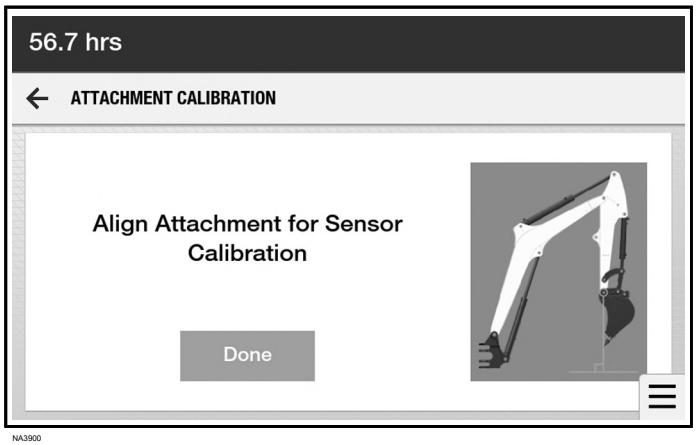
12. Follow the instructions on the screen [Figure 218] and select **[DONE]**.

Figure 219



13. Select **[CALIBRATE]** (Item 1) [Figure 219].

Figure 220



14. Follow the instructions on the screen [Figure 220] and select **[DONE]**.

    Use the plumb bob and pin extender to vertically align the inner pin (Item 2) and the attachment tip (Item 1) [Figure 216].

The Depth Check system will not be as accurate with augers as with solid mounted attachments because all components are not rigidly mounted. The auger bit has extra movement and rotation, but the Depth Check system is designed for fixed positions. Follow these tips:

- Enter zero for both attachment dimensions.
- Try to keep the attachment mounting system horizontal to the ground during the dig cycle and monitor the screen depth.

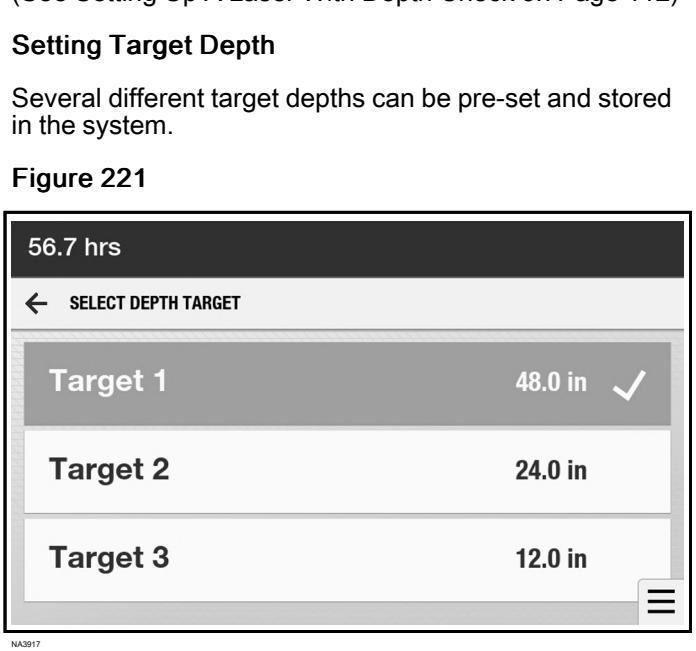
If more than one attachment is being set up, the attachments can be changed on the arm and the additional attachment dimensions can also be entered. Always measure to the cutting / work tip on the attachment when measuring the dimensions to add to the inside and outside length screens for each new attachment.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

This finishes the calibration procedure, except if you are also installing a laser.
(See Setting Up A Laser With Depth Check on Page 112)

Setting Target Depth

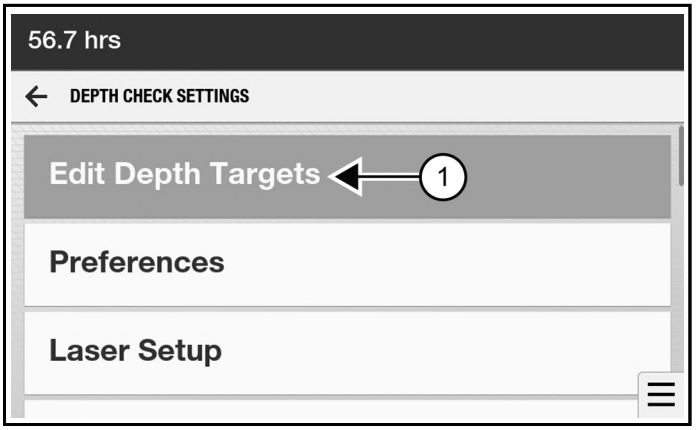
Several different target depths can be pre-set and stored in the system.

Figure 221



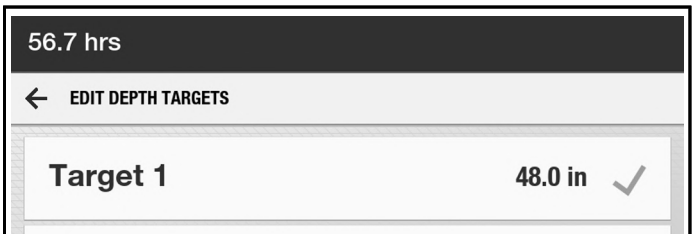
1. To select one of the preset target depths, select **[NAVIGATION HANDLE]→ [DEPTH CHECK]→ [SET TARGET]** and select a Target [Figure 221].
2. To change a preset target depth, select **[NAVIGATION HANDLE]→ [DEPTH CHECK]→ [SETTINGS]**.

Figure 222



3. Select **[EDIT DEPTH TARGETS]** (Item 1) [Figure 222].

Figure 223



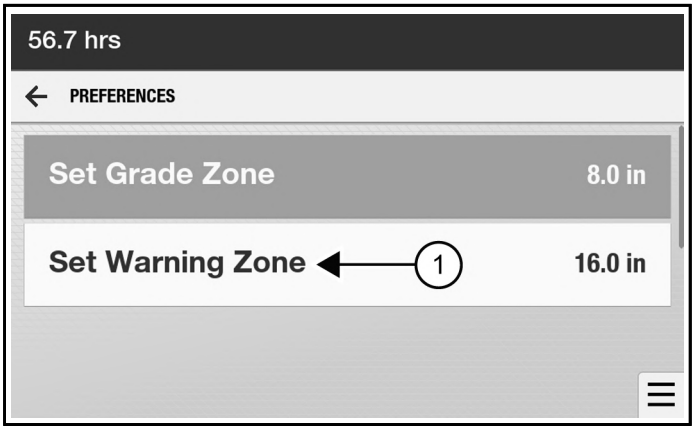
4. Select one of the Targets [Figure 223] and enter the new target depth on the keypad.

Setting The Warning Zone

The Warning Zone is the upper distance from the target depth when the warning alarm will start to beep. The closer the attachment gets to the target, the faster the beeps will be. When the attachment reaches the target depth, the alarm will be a continuous sound. If the attachment goes below the target depth, the beeps will be very fast.

1. Select **[NAVIGATION HANDLE]→ [DEPTH CHECK]→ [SETTINGS]→ [PREFERENCES]**.

Figure 224



2. Select **[SET WARNING ZONE]** (Item 1) [Figure 224] and enter the dimension.

3. Select the **[ENTER]** icon to save your changes.

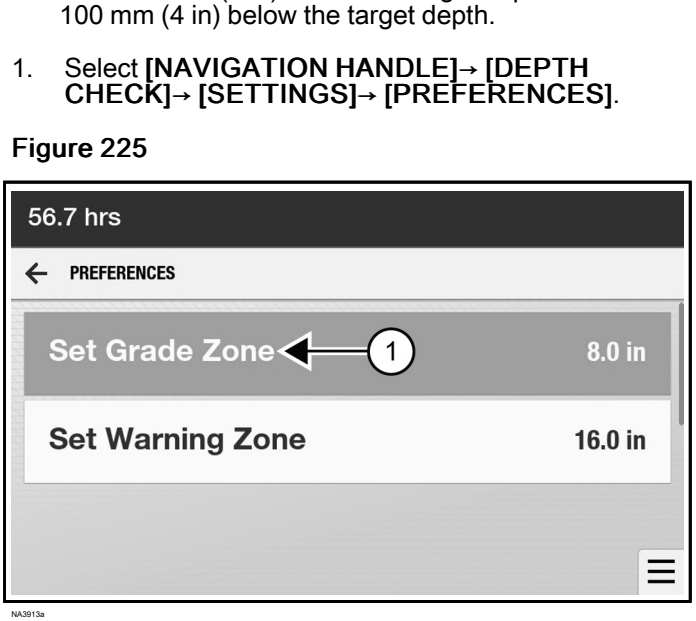
Setting The Grade Zone

The Grade Zone is the distance above and below the target depth at which the alarm will be a continuous beep.

EXAMPLE: If the grade zone is 200 mm (8 in), it will start 100 mm (4 in) above the target depth and end 100 mm (4 in) below the target depth.

1. Select **[NAVIGATION HANDLE]→ [DEPTH CHECK]→ [SETTINGS]→ [PREFERENCES]**.

Figure 225



2. Select **[SET GRADE ZONE]** (Item 1) [Figure 225] and enter the dimension.

3. Select the **[ENTER]** icon to save your changes.

Digging To A Target Depth

⚠ DANGER

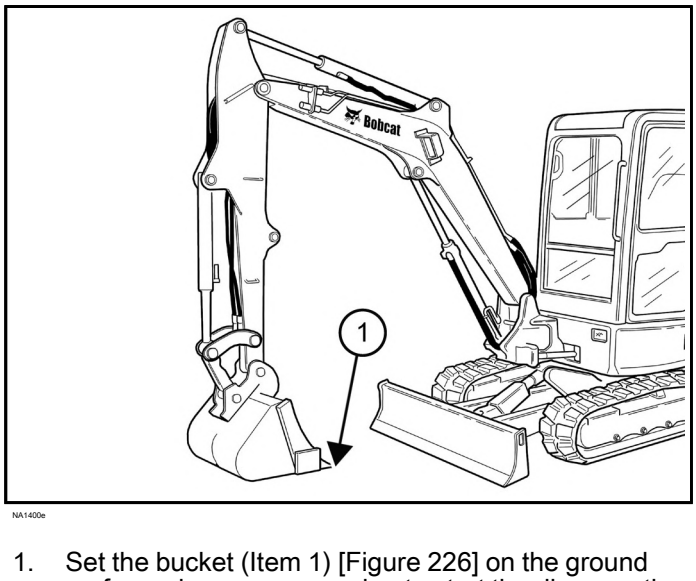
EXPLOSION AND ELECTROCUTION HAZARDS
Contact with underground utility lines will cause death, serious injury, or property damage.

- **Check the work area for buried electrical, gas, utility, or other service lines before excavating or operating ground engaging equipment.**
- **Follow all local regulations regarding digging or working in areas around underground utilities. Have all underground utility lines clearly marked before operating.**
- **DO NOT depend on the Depth Check system for digging close to known utilities. The system accuracy is dependent upon calibration, slope of the ground, and other variables.**
- **Reported utility locations, such as the depth of the line, can also vary due to soil erosion, grading, and other factors.**

1222-7BFD3B03

NOTE: If you are not digging with a laser, make sure the laser icon is not illuminated on the **DEPTH CHECK** screen.

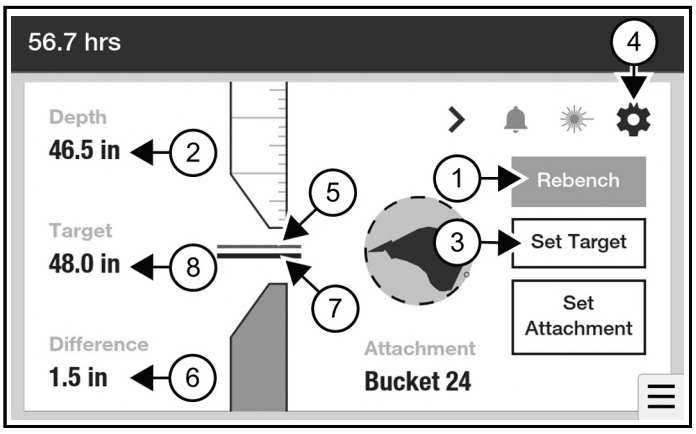
Figure 226



NA1400e

1. Set the bucket (Item 1) [Figure 226] on the ground surface where you are going to start the dig or on the surveyor mark to establish the starting ground position. This is called rebench.
2. Select **[NAVIGATION HANDLE]→ [DEPTH CHECK]**.

Figure 227



NA3915c

3. Select **[REBENCH]** (Item 1) [Figure 227] on the display.

   OR

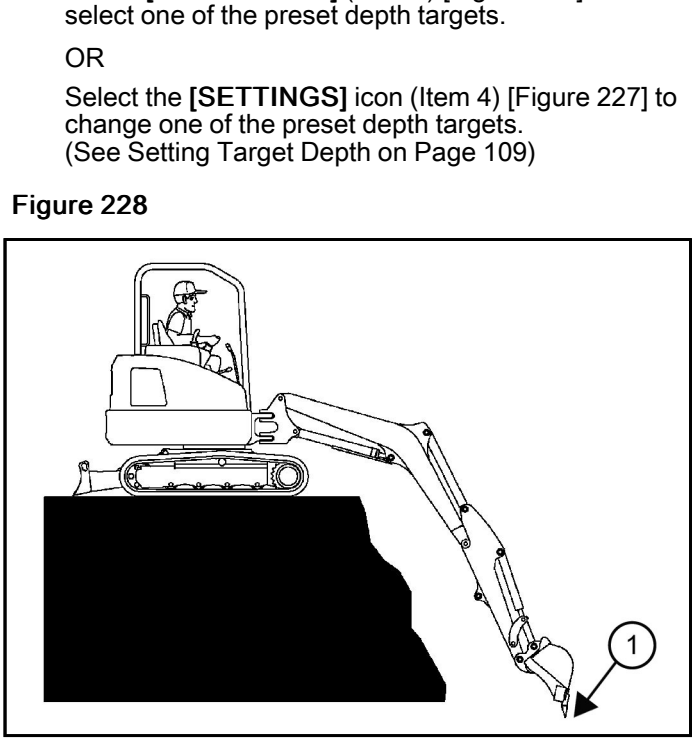
   Press the right joystick button to rebench.

   At rebench, the depth dimension (Item 2) will set to 0.0. As the bucket is raised or lowered, the depth dimension (Item 2) will change [Figure 227].
4. Select **[SET TARGET]** (Item 3) [Figure 227] to select one of the preset depth targets.

   OR

   Select the **[SETTINGS]** icon (Item 4) [Figure 227] to change one of the preset depth targets.
   (See Setting Target Depth on Page 109)

Figure 228



NA1437d

- As the hole is being dug, the position of the bucket (Item 1) [Figure 228] is dimensionally shown (Item 2) [Figure 227] and shown on the bar graph at (Item 5) [Figure 227].
- The distance to target depth is shown dimensionally (Item 6) and on the bar graph (Item 7) [Figure 227].

- When the bucket is getting close to the target depth (Item 8) [Figure 227], a warning alarm (if activated) will start to slowly beep. The beeps will increase in frequency the closer the bucket gets to the target depth or grade zone. When the target depth or grade zone is reached, the alarm will sound continuously. (See Setting The Warning Zone on Page 110)
(See Setting The Grade Zone on Page 110)

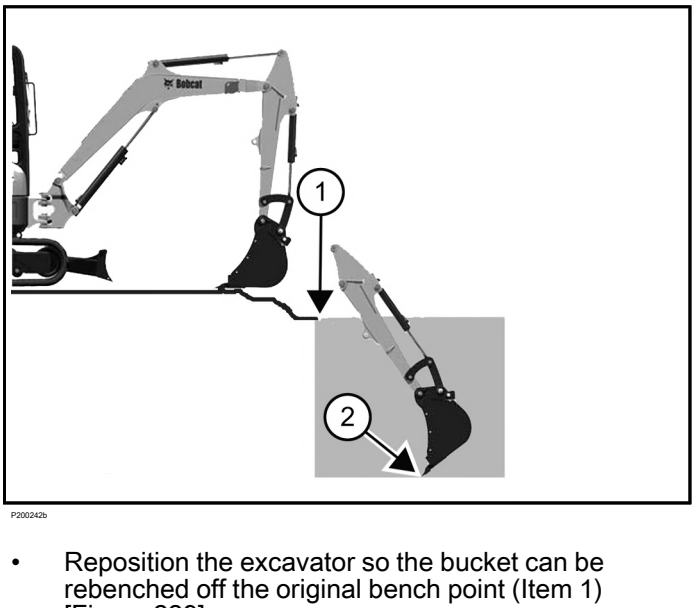
  EXAMPLE: The Target is 2 m (6.5 ft) and the Depth is 1,5 m (4.9 ft), the Difference will be 0,5 m (1.6 ft).

  2 m – 1,5 m = 0,5 m (6.5 ft – 4.9 ft = 1.6 ft).

Repositioning The Excavator And Continuing To Dig To The Original Depth

After repositioning the excavator, choose one of the following options to continue to dig to the original depth.

Figure 229



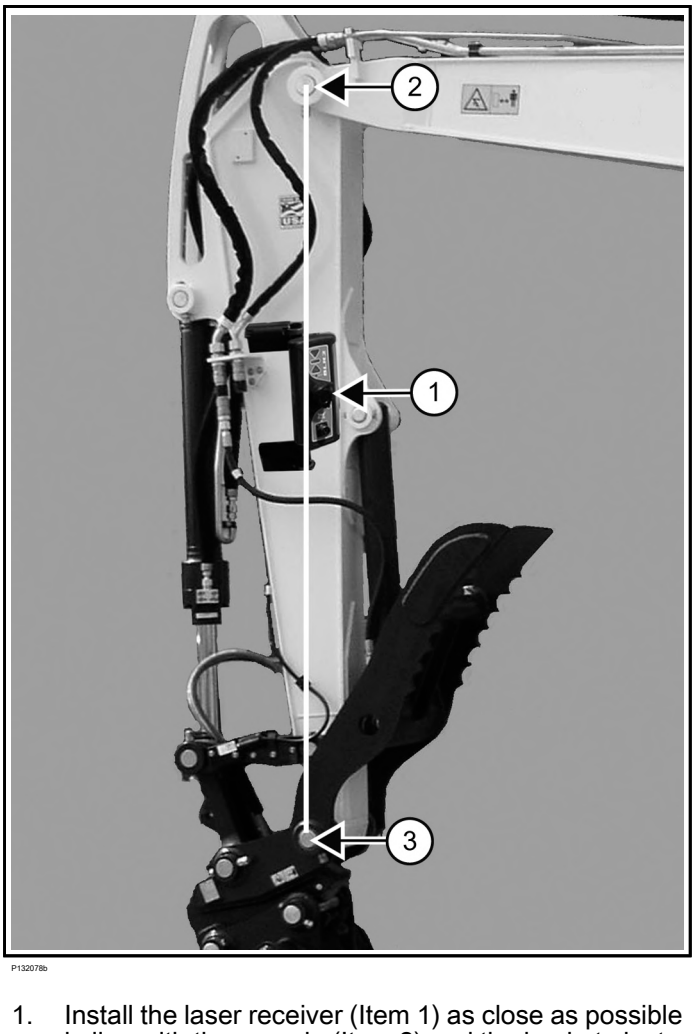
P200242b

- Reposition the excavator so the bucket can be rebenched off the original bench point (Item 1) [Figure 229].
- Position the excavator so the bucket will reach to the bottom of the hole (Item 2) [Figure 229] at an area that is known to be the correct depth. When rebenching at the bottom of the trench, set the target depth to zero to continue digging at the original depth.

NOTE: Set the distance from the target depth to the point at which the alarm starts to beep on the **WARNING ZONE** screen.

Setting Up A Laser With Depth Check

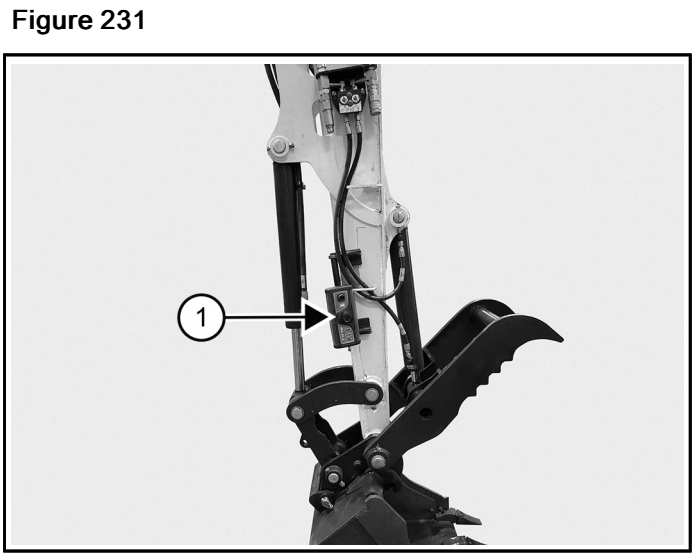
Figure 230



P132078b

1. Install the laser receiver (Item 1) as close as possible in line with the arm pin (Item 2) and the bucket pivot pin (Item 3) [Figure 230].

Figure 231



C204995b

2. If your machine is equipped with options that make it difficult to install the laser receiver in the centre of the arm, install it in an alternative location such as shown here (Item 1) [Figure 231].

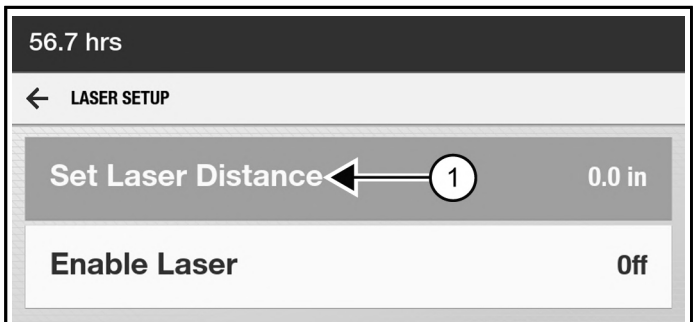
3. If your excavator is equipped with a clamp or arm that may interfere with the laser, make sure there is no hose-to-laser interference.

   a. Fully curl the arm and bucket and make sure the hoses do not interfere with the laser receiver during any arm or bucket movement.

   b. Adjust the position of the laser receiver if necessary to avoid any contact with the hoses.

4. Select **[NAVIGATION HANDLE]→ [DEPTH CHECK]→ [SETTINGS]→ [LASER SETUP]**.

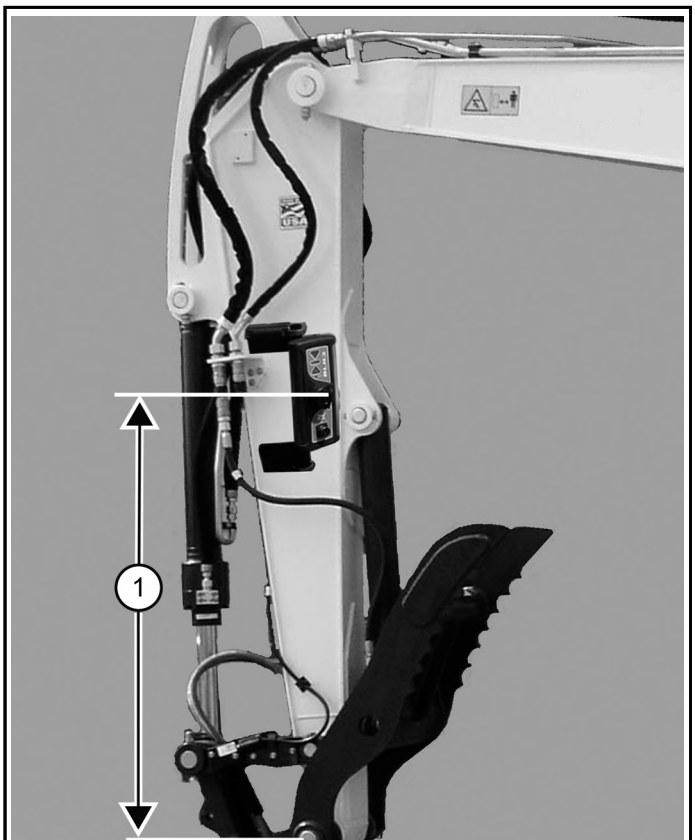
Figure 232



5. Select **[SET LASER DISTANCE]** (Item 1) [Figure 232].

6. Measure from the centre of the laser receiver to the bucket pivot pin (Item 1) [Figure 233]

Figure 233



7. Enter this distance as the Laser Distance.

To dig a hole using the laser, see the following:
(See Benching With A Laser System on Page 113)

Benching With A Laser System

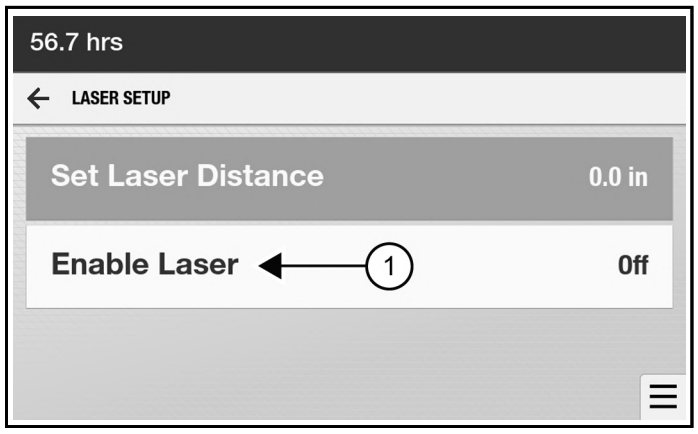
Read and understand the information supplied with the laser receiver for correctly setting up the laser system.

When the laser feature is turned on, measure the target depth off the laser, not the ground. See (Item 3) [Figure 235].

1. Make sure the laser receiver location on the arm has been entered into the Depth Check system.
(See Setting Up A Laser With Depth Check on Page 112)

2. Select **[NAVIGATION HANDLE]→ [DEPTH CHECK]→ [SETTINGS]→ [LASER SETUP]**.

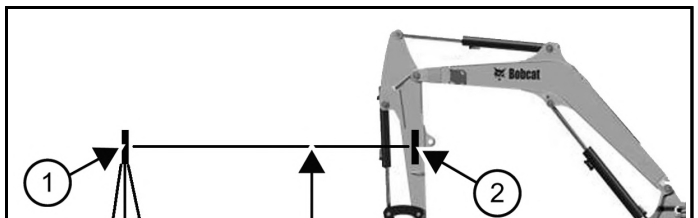
Figure 234



NA3912b

3. Select **[ENABLE LASER]** (Item 1) [Figure 234].

Figure 235



P200243a

4. With the excavator arm vertical, raise or lower the boom and arm as needed until the laser (Item 1) strikes the receiver (Item 2) [Figure 235].

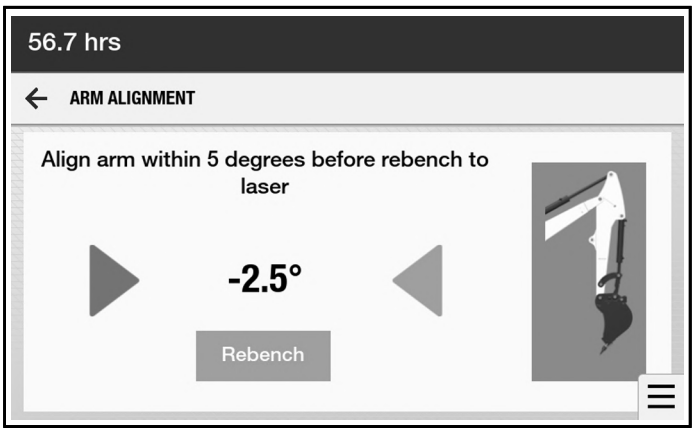
   If necessary, curl the bucket fully for increased bucket ground clearance, or dig a hole so that the bucket can be lowered to allow the laser to strike the receiver with the arm vertical.

5. When the laser strikes the receiver and the receiver light turns green, select **[REBENCH]**.

   OR

   Rebench by pressing the right joystick button.

Figure 236



NA3894

   If the arm is not vertical when you try to rebench, the **ARM ALIGNMENT** screen [Figure 236] will remind you to make the arm vertical before rebenching is possible. Adjust the arm to the vertical position and select **[REBENCH]** [Figure 236].

6. Select **[SET TARGET]**.

7. Enter the distance from the laser to the target depth (Item 3) [Figure 235].

8. Adjust the Warning Zone and Grade Zone as needed. (See Setting The Grade Zone on Page 110) (See Setting The Warning Zone on Page 110)

9. Proceed to dig, referencing the display and listening for audible alerts to maintain the correct depth.

TOWING THE MACHINE

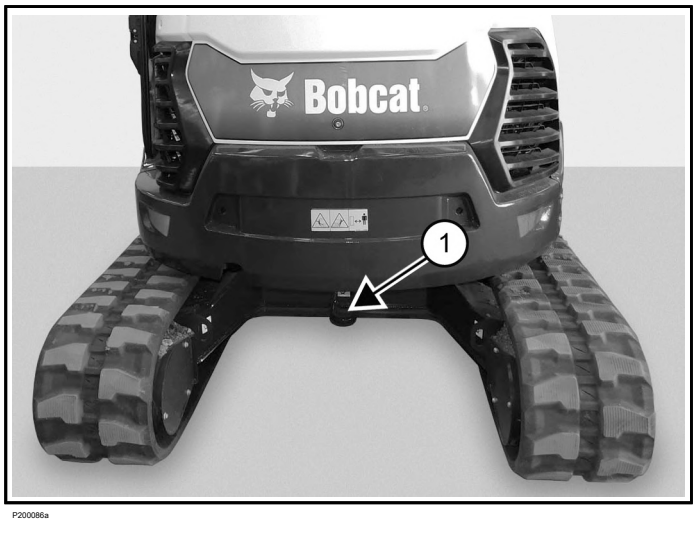
Towing The Machine

There is not a recommended towing procedure for the excavators.

- The excavator can be lifted onto the transport vehicle. (See Lifting The Machine on Page 115)
- The excavator can be skidded a short distance for service (for example, moving it onto a transport vehicle) without damaging the hydraulic system. (The tracks will not turn.)

  There might be slight wear to the tracks when the excavator is skidded.

Figure 237



P200086a

- Secure the towing chain to the loop located at the rear of the excavator (Item 1) [Figure 237].

  The towing chain (or cable) must be rated at 1.5 times the weight of the excavator.

LIFTING THE MACHINE

Lifting The Machine

Figure 238

P200405a

1. Fully extend the cylinders of the bucket, arm, and boom.
2. Raise the blade fully.
3. Turn the upperstructure so the boom and blade are at opposite ends of the excavator as shown in [Figure 238].
4. Put all the control levers in NEUTRAL and stop the machine.

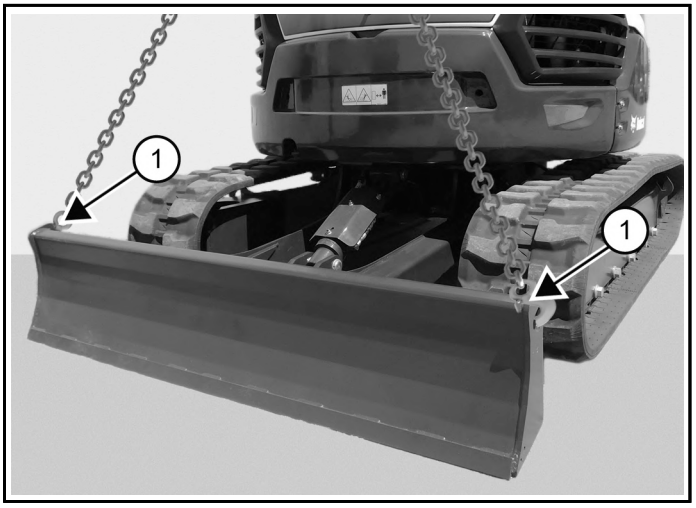
⚠ WARNING

CRUSHING HAZARD
Falling machine can cause serious injury or death.
- **Use chains and lifting equipment with sufficient capacity for the weight of the excavator plus any added attachments.**
- **Keep machine level and balanced when lifting.**
- **Do not swing boom or upperstructure.**
- **Never lift with operator on machine.**
- **Never lift with the blade angled (if equipped).**

◂

W-2800

Figure 239

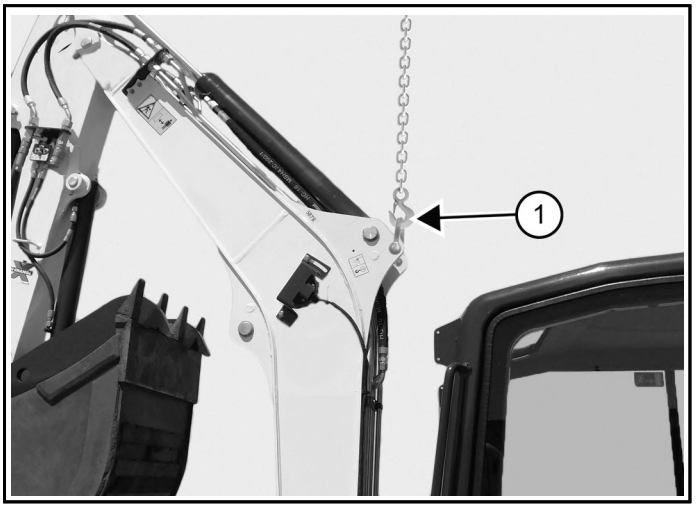


P200406a

5. Fasten chains to the ends of the blade (Item 1) [Figure 239] and up to a lifting fixture above the canopy / cab.

   The lifting fixture must extend over the sides of the canopy / cab to prevent the chains from hitting the canopy / cab.

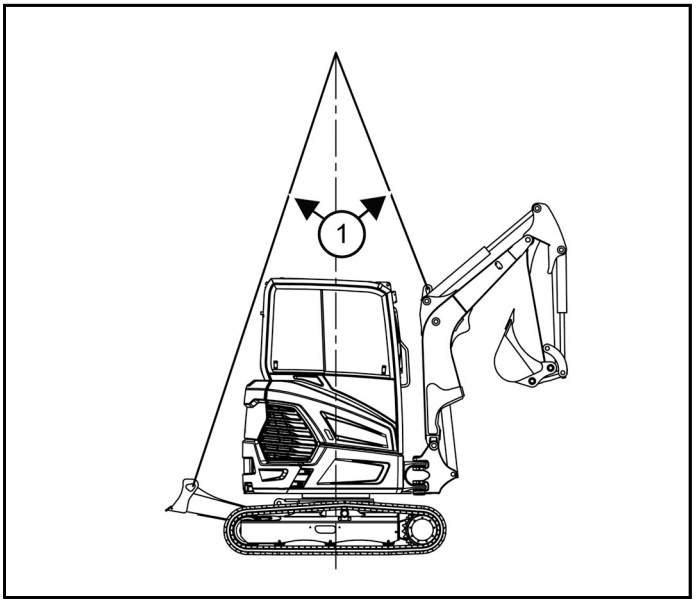
Figure 240



P200404a

6. Fasten a chain from the boom (Item 1) [Figure 240] to the lift fixture.

Figure 241



NA15059a

Keep the following in mind:

- The excavator should remain as close to horizontal as possible.
- To prevent damage, the chains should not contact any part of the canopy / cab.
- The chains should be at an angle of 45° (Item 1) [Figure 241].

TRANSPORTING THE MACHINE

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.

1. Secure the parking brakes and block the wheels of the transport vehicle.
2. Align the ramps with the centre of the transport vehicle.
3. 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 that can support the weight of the machine.
4. Block and support the rear of the trailer during loading and unloading to prevent the front of the transport vehicle from raising.
5. Determine the direction of the track movement before moving the machine (blade forward).
6. Disengage the auto idle feature and move the two-speed travel to the low range position.

⚠ WARNING

INSTABILITY HAZARD
Wood ramps can break and cause personal injury. Use adequately designed ramps of sufficient strength to support the weight of the machine loading onto a transport vehicle.
W-2058

Figure 242

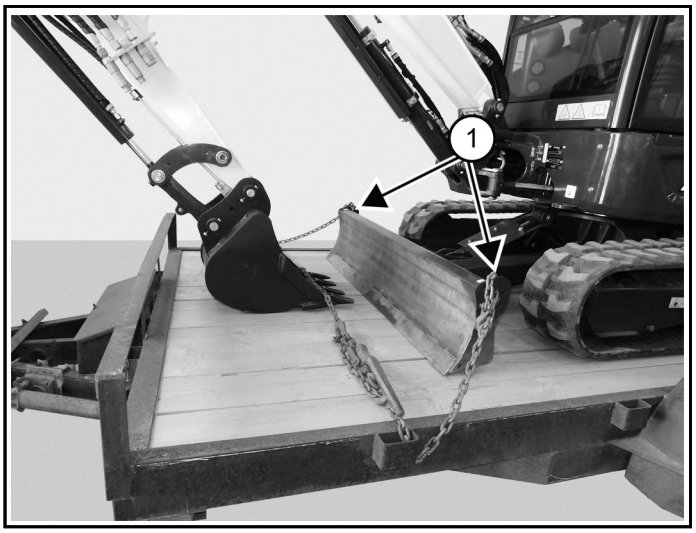

C-97223d

7. Move the machine forward onto the transport vehicle [Figure 242].
8. Do not change the direction of the machine while it is on the ramps.
9. Lower the boom, arm, bucket, and blade to the transport vehicle.
10. Stop the engine and remove the key (if equipped).
11. Put blocks at the front and rear of the tracks.

Fastening The Machine To A Trailer

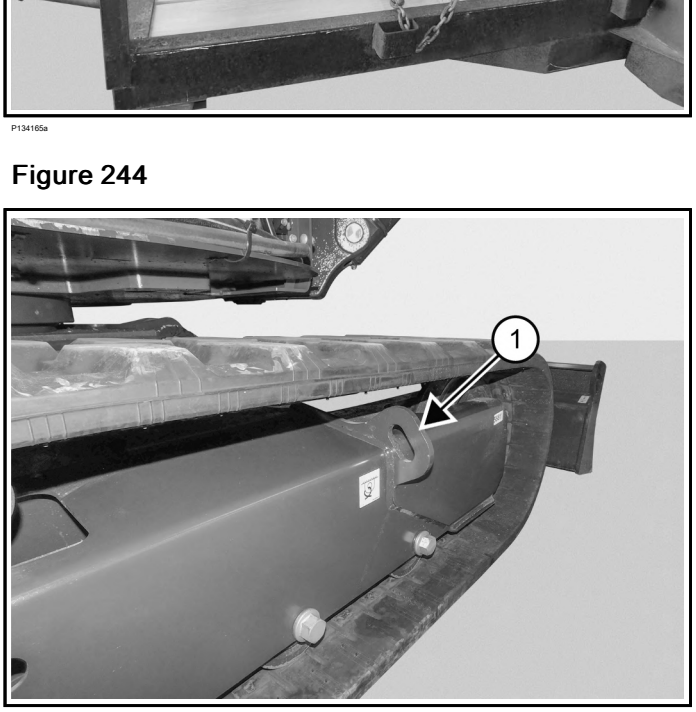
Tie down the excavator to prevent it from moving when going up or down slopes or during sudden stops. Use chain binders to tighten the chains and then safely tie the chain binder levers to prevent loosening.

Figure 243



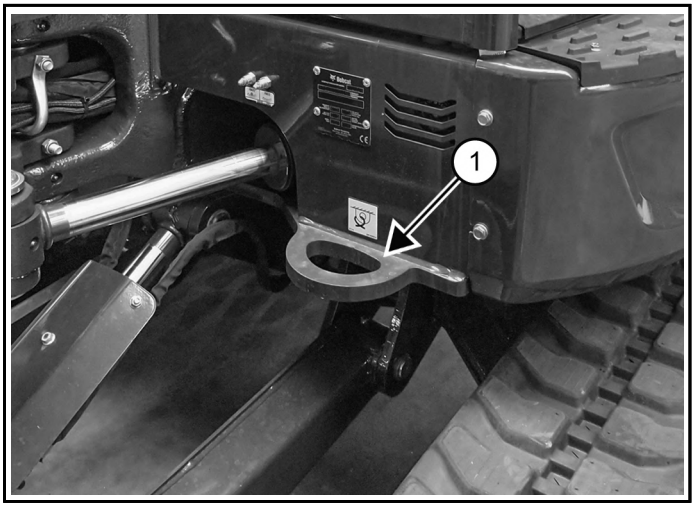
P134165a

Figure 244



C200606a

Figure 245



C206170a

1. At the front of the machine, fasten chains to the corners of the blade (Item 1) [Figure 243].

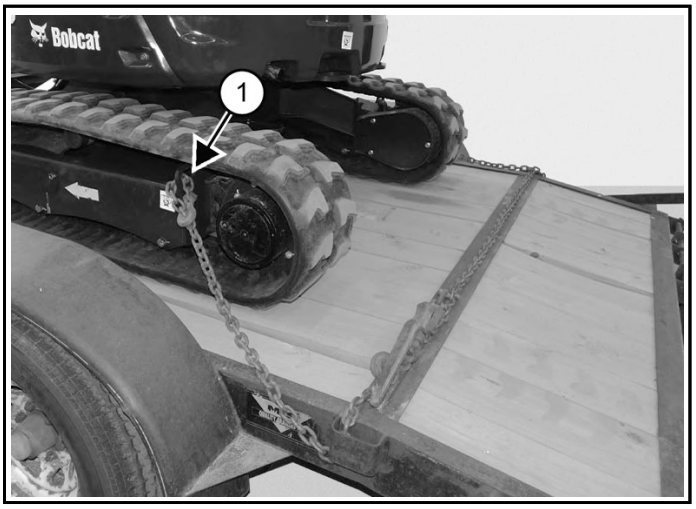
   OR

   Fasten chains to the tie-down loops on the outside of the tracks (Item 1) [Figure 244].

   OR

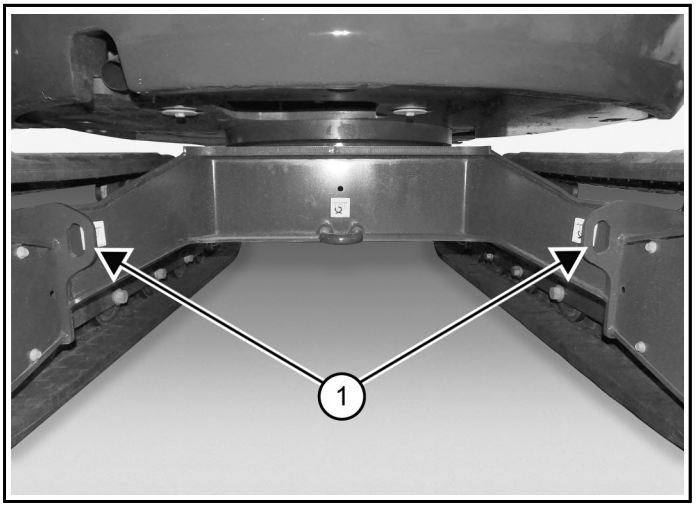
   Fasten chains to the tie-down loops on the front of the upperstructure (Item 1) [Figure 245].

Figure 246



P134166a

Figure 247



C200607a

2. At the rear of the machine, fasten chains to the tie-down loops on the exterior of the track (Item 1) [Figure 246]

   OR

   Fasten chains to the tie-down loops in the interior of the track (Item 1) [Figure 247].

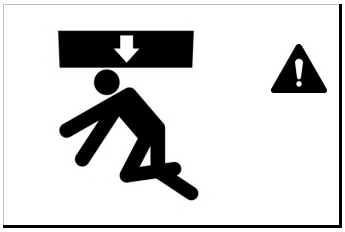
MAINTENANCE SAFETY WARNINGS

- Never service the Bobcat® machine without instructions. Read and understand the Operation & Maintenance Manual, Operator's Handbook, and signs (decals) on machine. Follow warnings and instructions in 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.

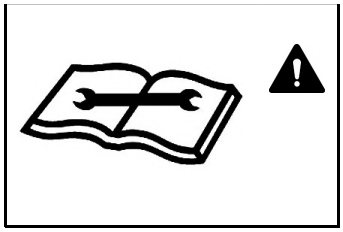
Maintenance procedures that are given in the Operation & Maintenance Manual can be performed by the owner/operator without any specific technical training. Maintenance procedures that are not in the Operation & Maintenance Manual must be performed ONLY BY QUALIFIED BOBCAT SERVICE PERSONNEL. Always use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

MAINTENANCE SAFETY WARNINGS

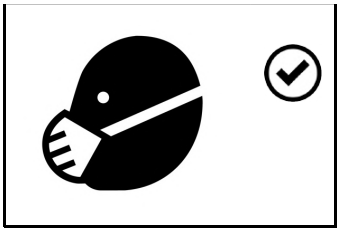
This Safety Alert Symbol means: “Attention! Be Alert! Your Safety is Involved!” Carefully read the message that follows.



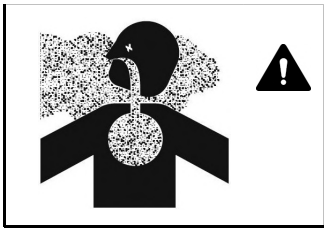
- Use the correct procedure to lift and support the machine.



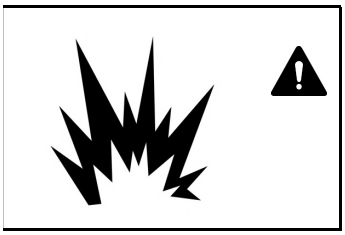
- Cleaning and maintenance are required daily.



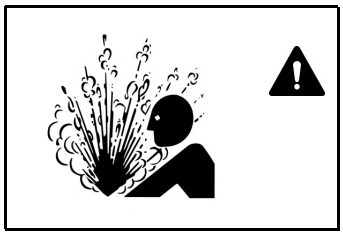
- Have good ventilation when welding or grinding painted parts.
- Wear dust mask when grinding painted parts. Toxic dust and gas can be produced.



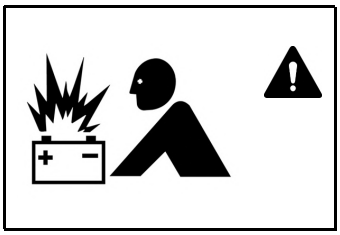
- Vent exhaust to outside when engine must be run for service.
- Exhaust system must be tightly sealed. Exhaust fumes can kill without warning.



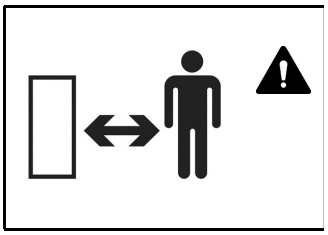
- Stop, cool, and clean engine of flammable materials before checking fluids.
- Never service or adjust machine with the engine running unless instructed to do so in the manual.
- Avoid contact with leaking hydraulic fluid or diesel fuel under pressure. It can penetrate the skin or eyes.
- Never fill fuel tank with engine running, while smoking, or when near open flame.



- 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 machine.



- Lead-acid batteries produce flammable and explosive gases.
- Keep arcs, sparks, flames, and lighted tobacco away from batteries.
- Batteries contain acid that 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.



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

SERVICE SCHEDULE

Maintenance Intervals

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

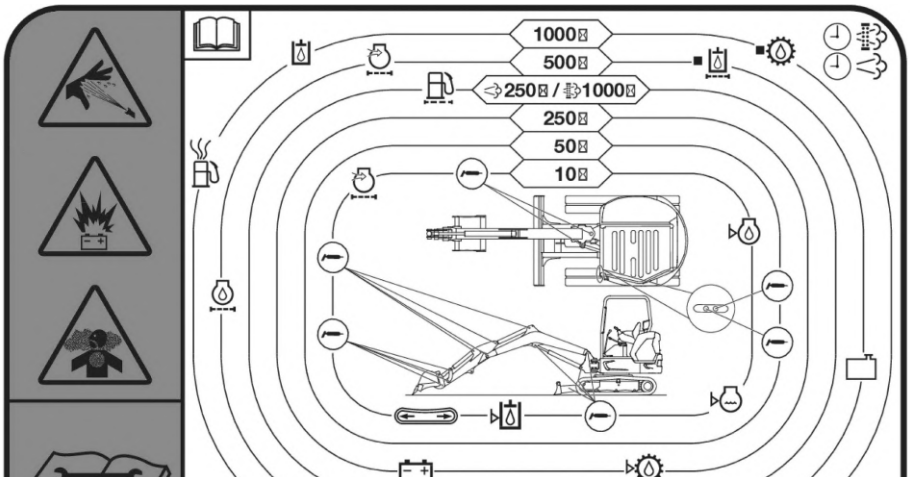
The service schedule decal is a guide for correct maintenance of the Bobcat excavator.

The maintenance items listed under the maintenance intervals on the following pages are the required tasks to be performed. Those items provide additional details and include maintenance that is not shown on the decal.

All maintenance intervals are for machines operating in general environmental conditions. Keep in mind that filter and oil life can be reduced:

- When machines are operating in high dust environments or extreme temperature applications,
- When fuel is taken from uncontrolled storage tanks,
- When other non-standard conditions exist.

For more details, contact your Bobcat dealer.



7438606

⚠ WARNING

INSUFFICIENT INSTRUCTIONS HAZARD
Untrained operators or failure to follow instructions can cause serious injury or death.
- **Read and understand the Operation & Maintenance Manual, Operator's Handbook and 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.**

W-2003

Service Schedule

Explanation of the service intervals:

- **10:** Every 10 hours or daily (before starting the machine).
- **50:** Every 50 hours.
- **250:** Every 250 hours or every 12 months, whichever comes first.
- **500:** Every 500 hours or every 12 months, whichever comes first.
- **1000:** Every 1000 hours or every 12 months, whichever comes first.
- **1500:** Every 1500 hours or every 24 months, whichever comes first.

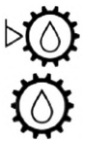
Service Schedule			
O	Check condition / proper operation. Adjust or replace as needed	V	Refill as needed.
D	Check the display. Service only when required.	C	Clean.
W	Service every 10 hours when operating in water.	R	Replace.
F	First time only.	G	Grease.

Item	Service Required	Service Interval (hours)						
		10	50	100	250	500	1000	1500
Engine Air Filters and Air System 	(See Page 133) • Outer Air Filter (6666375) • Inner Air Filter (6666376)	D O				O		
Engine Oil 	(See Page 139) • Engine Oil (Packaging: A = 5 L can, B = 25 L container, C = 209 L drum, D = 1000 L tank): ▷ SAE 15W-40 (-20°C – +40°C) (7395725) ▷ SAE 10W-30 (-25°C – +30°C) (7341377) • Engine Oil Filter (6675517)	V				R		
Hydraulic Fluid	(See Page 149) • Hydraulic Fluid (Packaging: A = 5 L can, B = 20 L container, C = 210 L drum, D = 1000 L tank): ▷ Bobcat Superior SH Hydraulic (-35°C – +50°C) (6987791) ▷ Bobcat Biodegradable Hydraulic (-35°C – +50°C) (6987792)	V					R	
Engine Coolant 	Coolant level (check cold) (See Page 140) • Coolant (Packaging: A = 5 L can, B = 20 L container, C = 210 L drum, D = 1000 L tank): ▷ Bobcat PG Coolant Premix (6987793)	V						R
Tracks 	Tension (See Page 154)	O						
Operator Cab and HVAC	Filters (See Page 132) • HVAC Air Filter (If Equipped): ▷ Fresh Air (7176099) ▷ Recirculation (7222791)	C						

Service Schedule			
O	Check condition / proper operation. Adjust or replace as needed	V	Refill as needed.
D	Check the display. Service only when required.	C	Clean.
W	Service every 10 hours when operating in water.	R	Replace.
F	First time only.	G	Grease.

Item	Service Required	Service Interval (hours)						
		10	50	100	250	500	1000	1500
Safety Signs (decals)		C O						
Seat Belt	Seat belt, mounting hardware, and seat belt retractors (See Page 126)	C O						
Control Console Lockout	(See Page 125)	O						
X-Change / Attachment Coupler	(See Page 160)	O						
Motion Alarm and Horn	(See Page 127)	O						
Operator Canopy / Cab	Canopy / cab, mounting hardware	O						
Indicators and Lights		O						
Pivot Points 	Pivot points, clamp (if equipped) • Grease (Packaging: 400 g tube): ▷ Bobcat Multipurpose Grease (Drop Point from 260°C) (6987888) ▷ Bobcat Supreme HD Grease (Drop Point from 280°C) (6987889) ▷ Bobcat Extreme HP Grease (Drop Point from 260°C) (6987890)	G						
Swing Bearing	Swing bearing, swing pinion • Grease (Packaging: 400 g tube): ▷ Bobcat Multipurpose Grease (Drop Point from 260°C) (6987888) ▷ Bobcat Supreme HD Grease (Drop Point from 280°C) (6987889) ▷ Bobcat Extreme HP Grease (Drop Point from 260°C) (6987890)	W	G					
Fuel Filter and Pre-Filter 	Fuel Filter • Fuel Filter (7359871) Fuel Pre-Filter • Fuel Pre-Filter (7247169)		R		R	R		

Service Schedule			
O	Check condition / proper operation. Adjust or replace as needed	V	Refill as needed.
D	Check the display. Service only when required.	C	Clean.
W	Service every 10 hours when operating in water.	R	Replace.
F	First time only.	G	Grease.

Item	Service Required	Service Interval (hours)						
		10	50	100	250	500	1000	1500
Travel Motors (Final Drive) 	Fluid (See Page 156) • Transmission Fluid (Packaging: A = 5 L, B = 20 L, C = 210 L) ▷ 80W-90 API GL-5 LS (6987805)		F R		V		R	
Hydraulic Filters 	Hydraulic filter and case drain filter (See Page 149) • Primary Hydraulic Filter (6670207) • Case Drain Filter (6516722)		F R			R		
Alternator and Starter	Electrical connections		F O			O		
Exhaust System	Spark arrester (See Page 153)			C				
Battery 	Cables and electrical connections (See Page 146) • Battery (7306047)				O			
Engine Oil Filter	(See Page 139) • Engine Oil (Packaging: A = 5 L can, B = 25 L container, C = 209 L drum, D = 1000 L tank): ▷ SAE 15W-40 (-20°C – +40°C) (7395725) ▷ SAE 10W-30 (-25°C – +30°C) (7341377) • Engine Oil Filter (6675517)					R		
Hydraulic Reservoir 	Breather cap (See Page 149) • Hydraulic Breather Cap (6692836)					R		
Engine Cooling System 	Radiator, fuel cooler, hydraulic fluid cooler, air conditioning condenser (if equipped) (See Page 140) • Radiator Cap (7337382)					C		

Service Schedule			
O	Check condition / proper operation. Adjust or replace as needed	V	Refill as needed.
D	Check the display. Service only when required.	C	Clean.
W	Service every 10 hours when operating in water.	R	Replace.
F	First time only.	G	Grease.

Item	Service Required	Service Interval (hours)						
		10	50	100	250	500	1000	1500
Alternator 	Belt (See Page 157)					O		
Air Conditioning (if equipped)	Belt (See Page 157)					O		
HVAC	Housing and coils (See Page 132)					C		
Fuel Tank Vent 	Filter (See Page 137) • Fuel Tank Vent Filter (7340277)						R	

CONTROL CONSOLE LOCKOUTS

Inspecting And Maintaining The Control Console Lockouts

Figure 248

P200109a

When the left console is raised [Figure 248], the hydraulic joysticks and traction system must not function.

1. Sit in the operator's seat, fasten the seat belt, and start the engine.
2. Raise the left console [Figure 248].
3. Move the joysticks.

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

   There should be no movement of the excavator tracks.

If these controls do not deactivate when the left console is raised, see your Bobcat dealer for service.

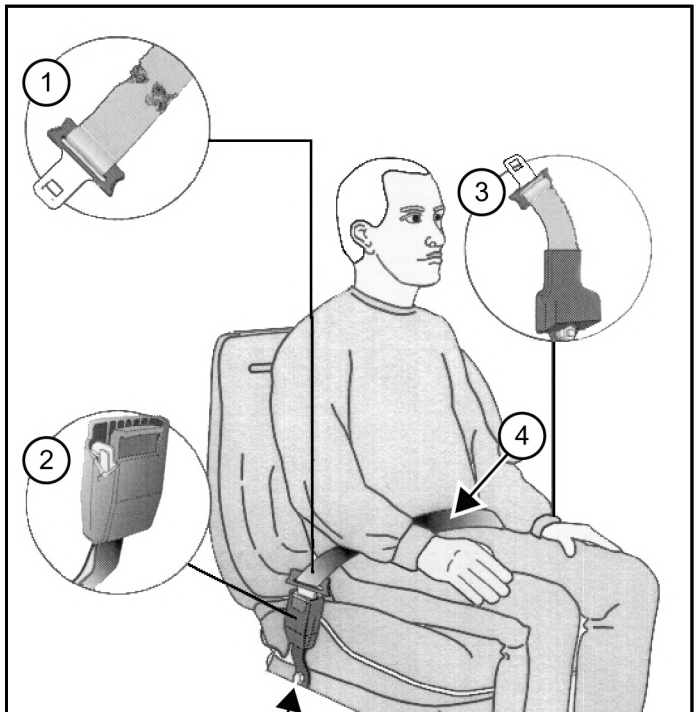
SEAT BELT

Inspecting And Maintaining The Seat Belt

⚠ WARNING

GENERAL HAZARD
Failure to properly inspect and maintain the seat belt can cause lack of operator restraint resulting in serious injury or death.
W-2466

Figure 249



NA3113c

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.

The items below are referenced in [Figure 249].

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 or deformed, buckle is not damaged, and casing is not broken.

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

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

5. Check the hardware on both sides of the seat. Hardware should be tight. Hardware must not be missing, rusted, corroded, or damaged.

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

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

MOTION ALARM SYSTEM

Motion Alarm System Description

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

The motion alarm will sound when the operator moves the travel control levers in either the forward or reverse direction.

If the alarm does not sound, see inspection instructions.

⚠ WARNING

CRUSHING HAZARD
Failure to maintain a clear view in the direction of travel can cause serious injury or death.
- **This machine is equipped with a motion alarm. ALARM MUST SOUND! when operating forward or backward.**
- **The operator is responsible for the safe operation of this machine.◂**

W-2786

Inspecting The Motion Alarm System

You will need to move the machine slightly in the forward and reverse directions to test the motion alarm. Keep all bystanders away from machine during test.

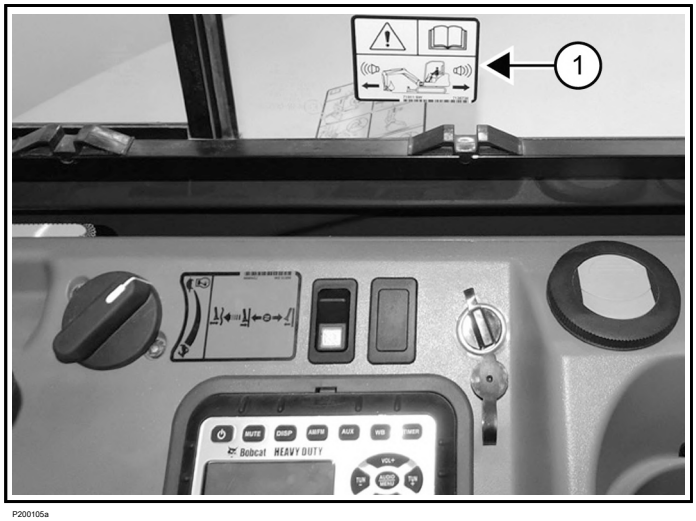
⚠ WARNING

CRUSHING HAZARD
Failure to maintain a clear view in the direction of travel can cause serious injury or death.
- **This machine is equipped with a motion alarm. ALARM MUST SOUND! when operating forward or backward.**
- **The operator is responsible for the safe operation of this machine.◂**

W-2786

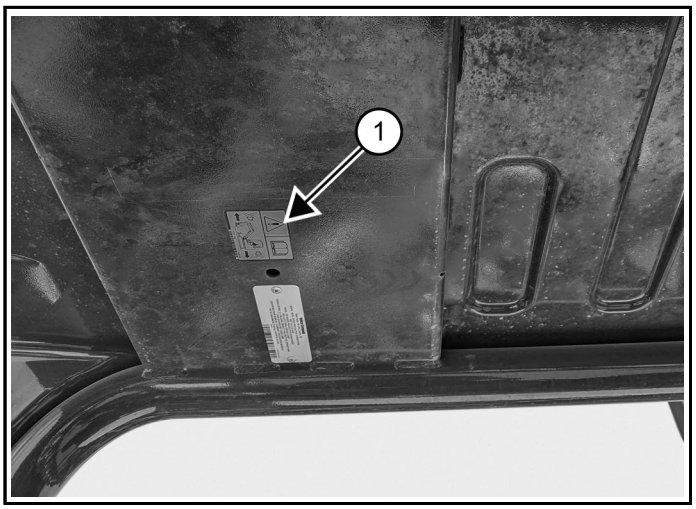
1. Sit in the operator's seat and fasten the seat belt. (See Pre-Starting Procedure on Page 62)

Figure 250



P200105a

Figure 251



C206637a

2. Inspect for damaged or missing motion alarm decal (Item 1) [Figure 250] (cab machine) or [Figure 251] (canopy machine).

   Replace if required.

3. Start the engine.

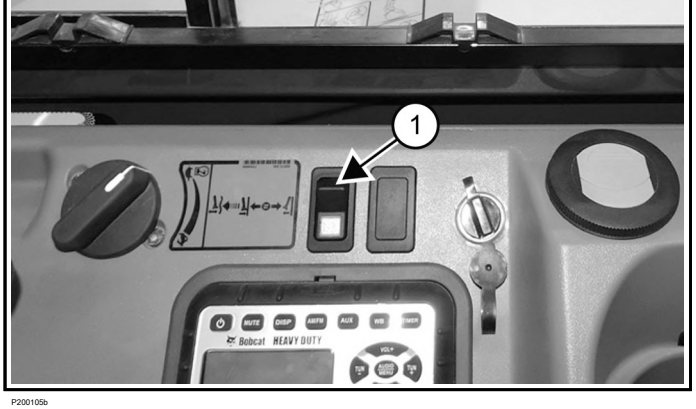
4. Move the travel control levers (one lever at a time) in the forward direction.

   The motion alarm must sound.

5. Move the travel control levers (one lever at a time) in the reverse direction.

   The motion alarm must sound.

Figure 252



P200105b

6. 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 252].

   The motion alarm will shut off.

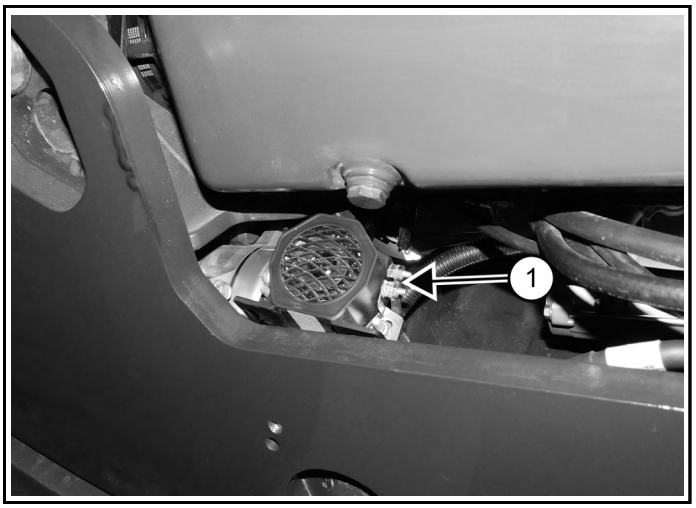
7. Slightly move both travel control levers in the reverse direction (until the machine is slowly moving backward) and then press the motion alarm cancel switch (Item 1) [Figure 252].

   The motion alarm will shut off.

8. Return both levers to NEUTRAL and turn excavator key to OFF position.

9. Exit the excavator.
(See Stopping The Engine And Leaving The Machine on Page 75)

Figure 253



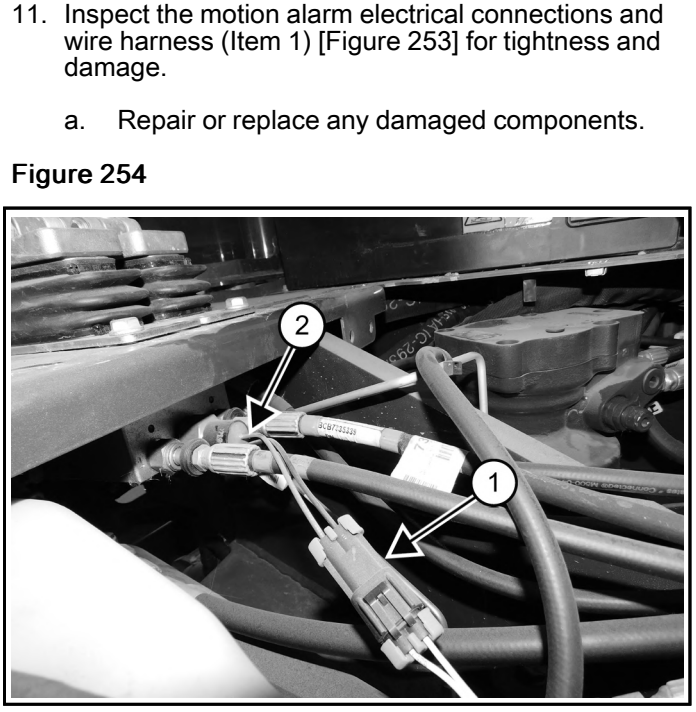
C208670a

10. Locate the motion alarm, which is mounted in the bottom rear of the excavator to the front of the engine oil pan [Figure 253].

11. Inspect the motion alarm electrical connections and wire harness (Item 1) [Figure 253] for tightness and damage.

    a. Repair or replace any damaged components.

Figure 254



C208669b

12. Locate the motion alarm switch, which is in the travel control valve under the floorplate [Figure 254].

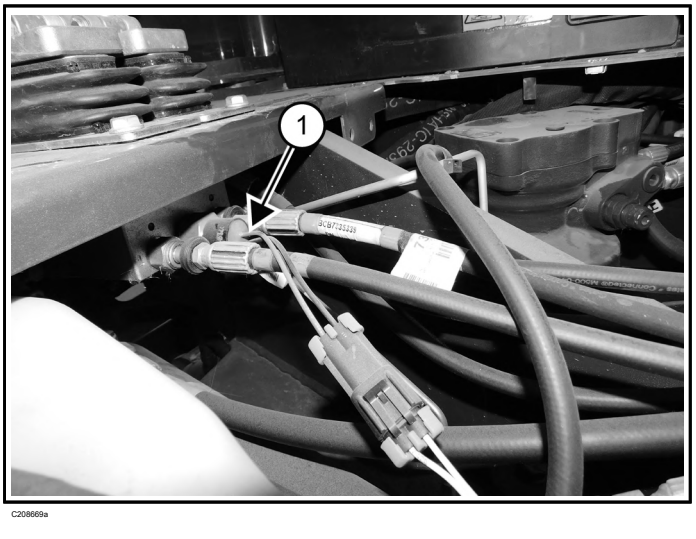
    a. Remove the floor mat and the floorplate to access the switch.

13. Inspect the wire harness (Item 1) and motion alarm switch (Item 2) for tightness and damage [Figure 254].

If the motion alarm switch requires service, see your Bobcat dealer.

Maintaining The Motion Alarm Switch

Figure 255



C208669a

The motion alarm switch (Item 1) [Figure 255] is located in the travel control valve located under the floorplate. In the event the travel alarm is not sounding, inspect the switch.

1. Remove the floor mat and the floorplate to access the switch.

2. Check that the switch (Item 1) [Figure 255] is fully installed into the travel control valve housings and tightened.

   Tighten the switch to 18 – 20 N•m (13 – 15 ft-lb).

3. Recheck the motion alarm.
(See Inspecting The Motion Alarm System on Page 127)

   If the motion alarm still does not sound, replace the switch.

TAILGATE

Opening And Closing The Tailgate

⚠ WARNING

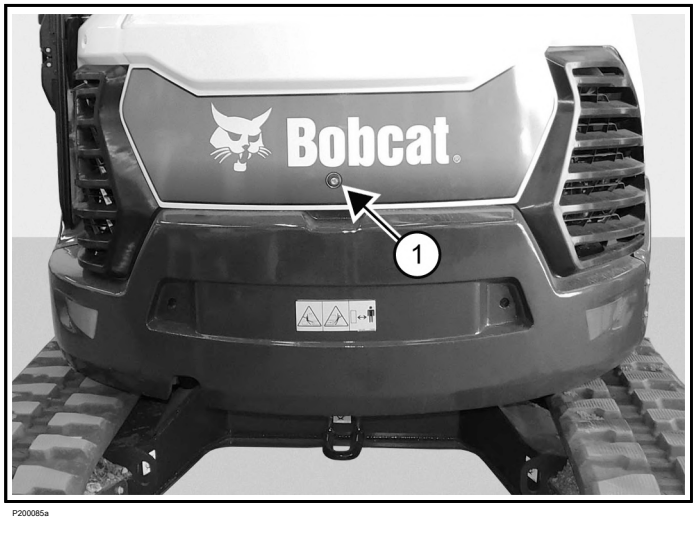
GENERAL HAZARD
Failure to follow instructions can cause serious injury or death.
Never service or adjust the machine when the engine is running unless instructed to do so in the manual.
W-2012

⚠ WARNING

IMPACT HAZARD
Swinging rear door can seriously injure a bystander. Keep the rear door closed when operating the machine.
W-2020

The tailgate can be locked and unlocked using the start key.

Figure 256



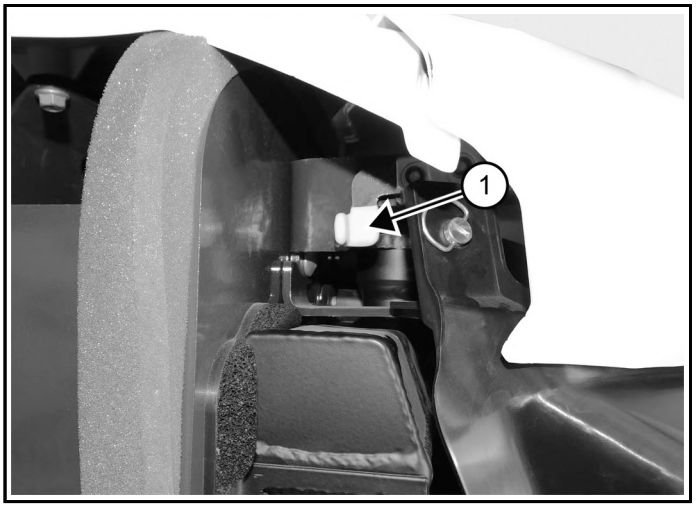
P200085a

- Push the button (Item 1) [Figure 256] and pull the tailgate open.
- Push firmly to close the tailgate.

RIGHT SIDE COVER

Opening And Closing The Right Side Cover

Figure 257



P200111a

1. Open the tailgate to access the right side cover latch (Item 1) [Figure 257].

Figure 258

P141335

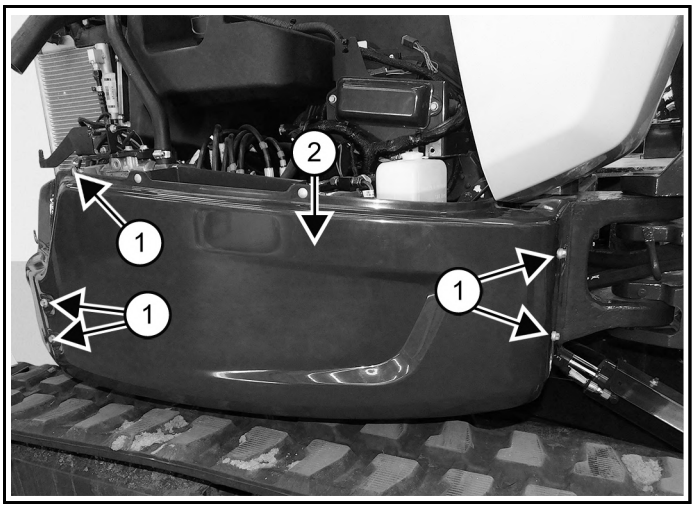
2. Pull the latch (Item 1) [Figure 257] toward the cover and allow the cover to rise slowly [Figure 258].
3. To close the right side cover, rotate the cover back until it is in the fully closed position and you hear the latch snap into place.

RIGHT SIDE PANEL

Removing And Installing The Right Side Panel

1. Open the tailgate. (See Tailgate on Page 129)
2. Open the right side cover.
   (See Right Side Cover on Page 129)

Figure 259



C200143a

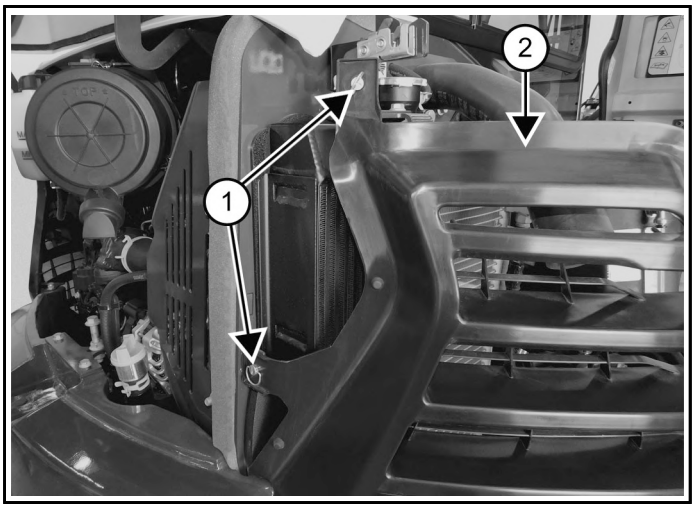
3. Loosen the five bolts (Item 1) on the right side panel (Item 2) and remove the panel [Figure 259].
4. To reinstall the panel, fit the panel back onto the bolts (Item 1) [Figure 259] and tighten the bolts.

RIGHT SIDE GRILLE

Removing And Installing The Right Side Grille

1. Open the tailgate. (See Tailgate on Page 129)
2. Open the right side cover.
   (See Right Side Cover on Page 129)

Figure 260



P200101a

3. Turn the two fasteners (Item 1) [Figure 260] a quarter turn.
4. Remove the right side grille (Item 2) [Figure 260].
5. To install the grille, position it in place and turn the two fasteners (Item 1) [Figure 260] a quarter turn.

CAB FILTERS

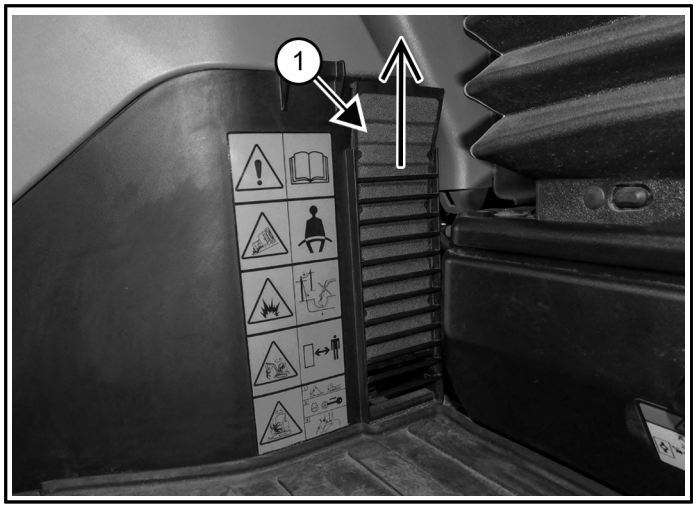
Cleaning And Maintaining The Recirculation Filter

Figure 261

C208224a

The recirculation filter is located to the right of the operator seat (Item 1) [Figure 261]. It must be cleaned regularly.

Figure 262



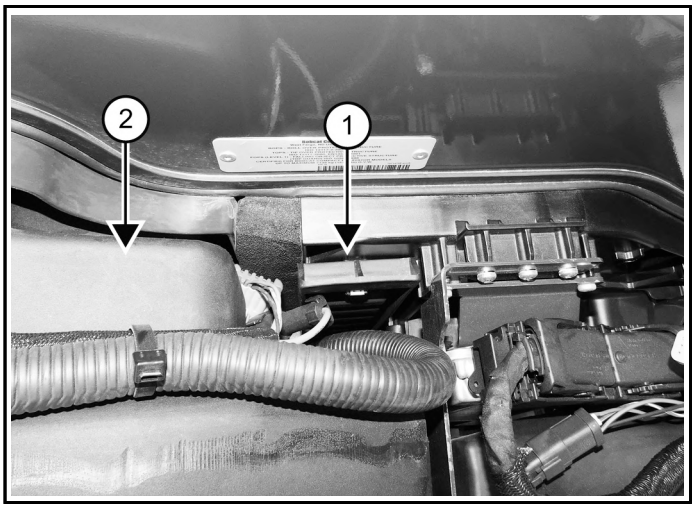
C208225a

1. Pull up on the filter (Item 1) [Figure 262] until it is removed from the housing.
2. Shake the filter or use low pressure air to clean the filter.

   Replace the filter if it is very dirty or damaged.
3. To reinstall the filter, position the bottom of the filter on the housing and slowly push the filter down fully.

Cleaning And Maintaining The Fresh Air Filter

Figure 263



P200114a

The fresh air filter (Item 1) is located behind the hydraulic tank (Item 2) [Figure 263] (view from the top). It must be cleaned regularly.

1. Open the right side cover.
   (See Right Side Cover on Page 129)
2. Pull out on the tab (Item 1) [Figure 263] and remove the cover.
3. Pull the filter out of the housing.
4. Gently tap the sides of the filter and / or use low pressure compressed air from the back side of the filter to remove debris.

   Do not use solvents. Do not use a brush on the filter as it can push debris into the filter.

   Replace the filter if it is very dirty or damaged.
5. To reinstall the filter, position the filter on the housing and slowly push the filter in fully.
6. Place the bottom tabs of the filter cover into the frame and push the top in until the tab locks to the frame.

HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

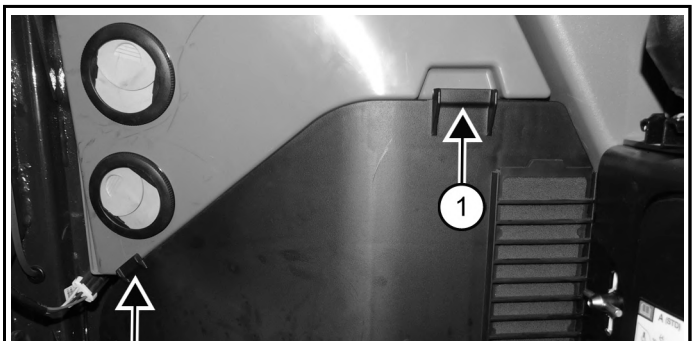
Cleaning HVAC Filters

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 121)

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

1. Rotate the upperstructure 90° to the right to allow water to drain from the housing during the cleaning process.
2. Use the blade to raise the front of the excavator so that water can run out of the housing.
3. Use jackstands to support the front of the undercarriage.
4. Remove the floor mat.

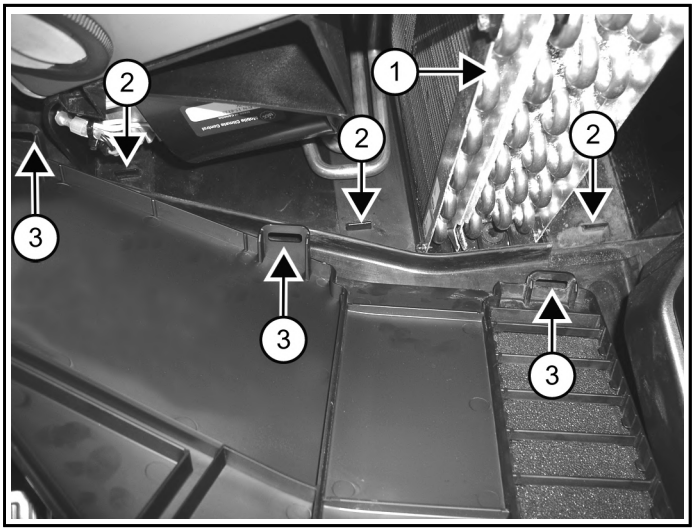
Figure 264



P200301a

5. Pull back on the two latches (Item 1) [Figure 264] and remove the HVAC side cover.

Figure 265



P113083d

6. Use a lower pressure air or low pressure water stream to remove debris and clean the coils (Item 1) [Figure 265].
7. 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.
8. Stop the engine.
9. Access two of the rubber drain valves by opening the right side cover. The drain valves are located below the HVAC housing on the right side.
10. Clean the rubber drain valves by pinching the drain valves on the flat sides to open the valves and allow dirt and moisture to exit from the end of the valves.
11. Remove the centre floorplate to access the third rubber drain valve that is located below the left rear corner of the HVAC housing.
12. Clean the rubber drain valve by pinching the drain valve on the flat side to open the valve and allow dirt and moisture to exit from the end of the valve.

    The rubber drain valves allow condensation to drain from the housing during normal usage. These drain valves can get clogged with dirt and should be cleaned at the same time the housing is cleaned.
13. Reinstall the centre floorplate and close the right cover.
14. Fit the three retainers (Item 1) of the HVAC side cover into the three tabs on the bottom of the HVAC housing (Item 2) [Figure 265].
15. Press on the front of the cover to secure the front latch (Item 1) [Figure 264].
16. Press on the top edge of the side cover and work back to the rear of the cover and secure the rear latch.
17. Reinstall the floor mat.

ENGINE AIR CLEANER

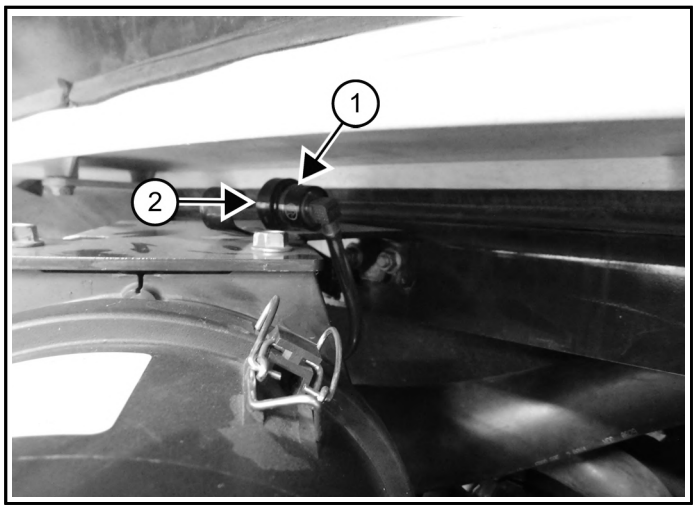
Checking The Condition Indicator Daily

The engine air cleaner is located in the engine compartment.

See the Service Schedule for the correct service interval. (See Service Schedule on Page 121)

1. Open the tailgate. (See Tailgate on Page 129)

Figure 266



2. Check the condition indicator (Item 1) [Figure 266].

   If the red ring shows in the condition indicator, the filter needs to be replaced.

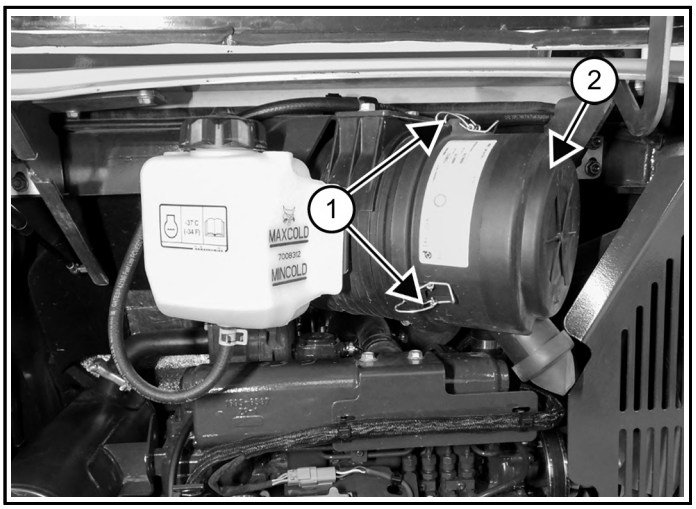
Replace the inner filter every third time the outer filter is replaced or as indicated.

Replacing The Outer Filter Of The Air Cleaner

See the Service Schedule for the correct service interval. (See Service Schedule on Page 121)

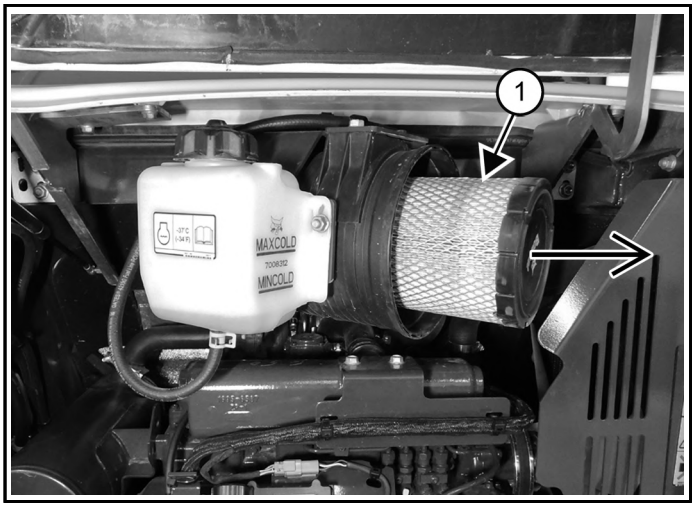
1. Open the tailgate. (See Tailgate on Page 129)

Figure 267



2. Release the fasteners (Item 1) [Figure 267].
3. Remove and clean the dust cover (Item 2) [Figure 267].

Figure 268



4. Pull the outer filter (Item 1) [Figure 268] from the air cleaner housing.
5. Check the housing for damage.
6. Clean the housing and the seal surface. Do not use compressed air.
7. Install a new filter.
8. Position the dust cover (Item 2) [Figure 267] on the housing.
9. Engage the fasteners (Item 1) [Figure 267].
10. Check the air intake hose and the air cleaner housing for damage. Make sure all connections are tight.

11. After the outer filter has been replaced, press the button (Item 2) [Figure 266] on the end of the condition indicator.
12. Start the engine. Run at full rpm, then reduce engine speed and stop the engine.
13. If the red ring still shows in the condition indicator (Item 1) [Figure 266], replace the inner filter. (See Replacing The Inner Filter Of The Air Cleaner on Page 134)
14. Close the tailgate.

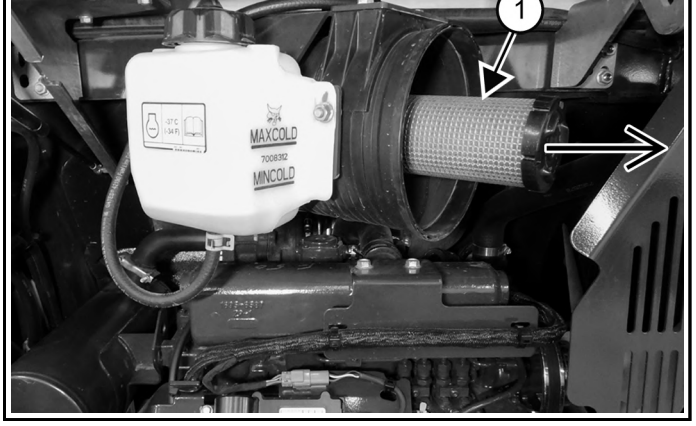
Replacing The Inner Filter Of The Air Cleaner

Only replace the inner filter under the following conditions:

- Replace the inner filter every third time the outer filter is replaced.
- After the outer filter has been replaced, press the button (Item 2) [Figure 266] on the condition indicator and start the engine. Run at full rpm, then reduce engine speed and stop the engine. If the red ring shows in the condition indicator, replace the inner filter.

1. Open the tailgate. (See Tailgate on Page 129)
2. Remove the dust cover and the outer filter. (See Replacing The Outer Filter Of The Air Cleaner on Page 133)

Figure 269



C208215a

3. Remove the inner filter (Item 1) [Figure 269].
4. Check the housing for damage.
5. Clean the housing and the seal surfaces. Do not use compressed air.
6. Install a new inner filter.
7. Install the outer filter and dust cover.
8. Press the button (Item 2) [Figure 266] on the condition indicator to reset the red ring.
9. Close 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 1–D	GRADE 2–D
Above -9°C (+15°F)	0%	100%
Down to -21°C (-5°F)	50%	50%
Below -21°C (-5°F)	100%	0%

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:

- Sulfur-free 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 sulfur-free petroleum based diesel. This biodiesel blend fuel is commonly marketed as B7 blended diesel fuel. B7 blended diesel fuel must meet EN590 specifications.

Biodiesel Blend Fuel

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

- Cold weather conditions can lead to plugged fuel system components and hard starting.
- Biodiesel blend fuel is an excellent medium for microbial growth and contamination, which can cause corrosion and plugging of fuel system components.
- Use of biodiesel blend fuel may result in premature failure of fuel system components, such as plugged fuel filters and deteriorated fuel lines.
- Shorter maintenance intervals may be required, such as cleaning the fuel system and replacing fuel filters and fuel lines.
- Using biodiesel blended fuels containing more than the recommended amount of biodiesel can affect engine life and cause deterioration of hoses, tubelines, injectors, injector pump, and seals. (See Fuel Specifications on Page 135)

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. Extending oil change intervals can cause engine damage.
- Before vehicle storage, drain the fuel tank, refill with 100% petroleum diesel fuel, add fuel stabiliser, and run the engine for at least 30 minutes.

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

Filling The Fuel Tank

⚠ WARNING

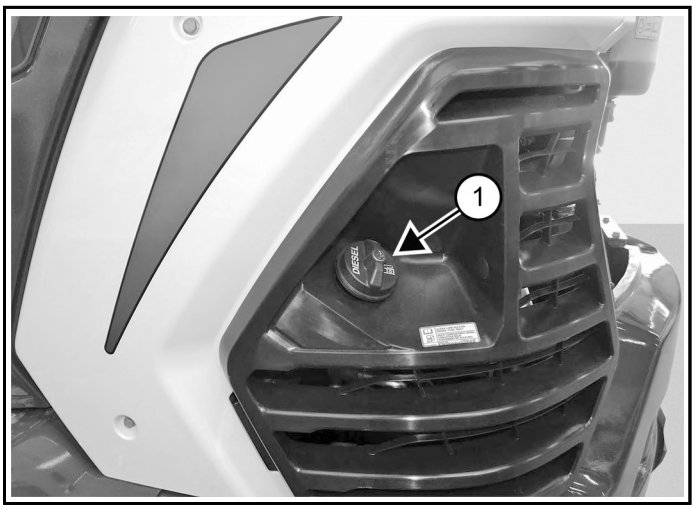
FIRE AND EXPLOSION HAZARDS
Failure to follow instructions can cause serious injury or death.
Stop and cool the engine before adding fuel. NO SMOKING!
W-2063

⚠ WARNING

FIRE AND EXPLOSION HAZARD
Failure to use care around combustibles can cause serious injury or death.
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil.
W-2103

1. Use the start key to unlock the fuel cap.

Figure 270



P200118a

2. Remove the fuel fill cap (Item 1) [Figure 270].
3. Use a clean, approved safety container to add fuel.
4. Add fuel only in an area that has a free movement of air and no flames or sparks. Do not smoke.
5. Install and tighten the fuel fill cap.
6. Clean up any spilled fuel.

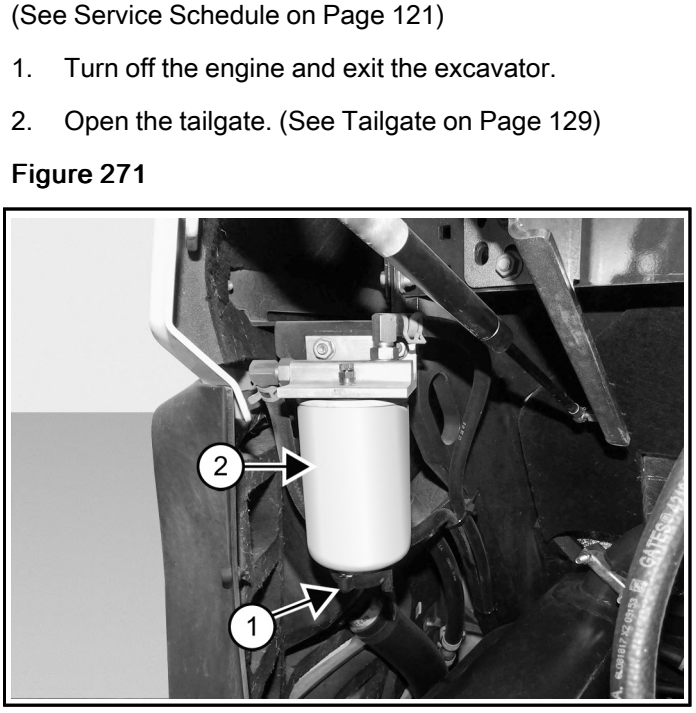
See the Service Schedule for the service interval for removing water from the filter or replacing the filter. (See Service Schedule on Page 121)

Removing Water From The Fuel Filter

See the Service Schedule for the correct service interval. (See Service Schedule on Page 121)

1. Turn off the engine and exit the excavator.
2. Open the tailgate. (See Tailgate on Page 129)

Figure 271



C208217a

3. Loosen the drain (Item 1) at the bottom of the fuel filter (Item 2) to drain water from the filter into a container [Figure 271].
4. Tighten the drain (Item 1) [Figure 271].
5. Clean up any spilled fuel.
6. Close the tailgate.

⚠ WARNING

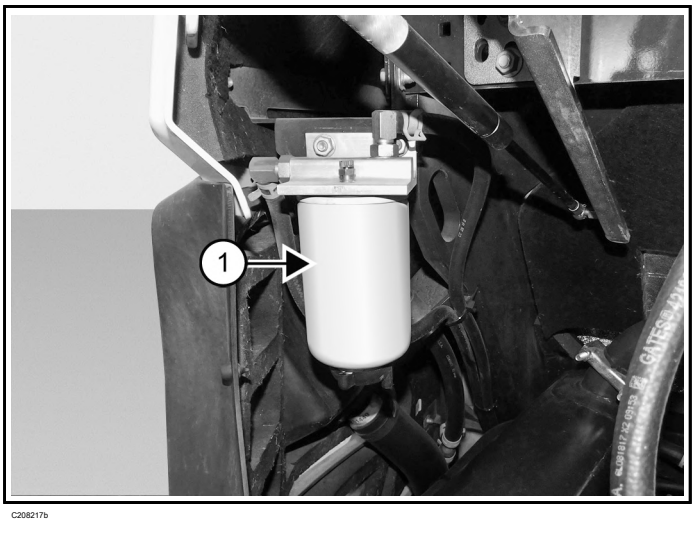
FIRE AND EXPLOSION HAZARD
Failure to use care around combustibles can cause serious injury or death.
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil.
W-2103

Replacing The Fuel Filter

See the Service Schedule for the correct service interval. (See Service Schedule on Page 121)

1. Stop the engine.
2. Open the tailgate. (See Tailgate on Page 129)

Figure 272



C208217b

3. Remove the fuel filter (Item 1) [Figure 272].
4. Clean the area around the filter housing.
5. Put clean oil on the seal of the new filter.
6. Install the fuel filter and hand tighten.
7. Remove the air from the fuel system. (See Removing Air From The Fuel System on Page 138)

⚠ WARNING

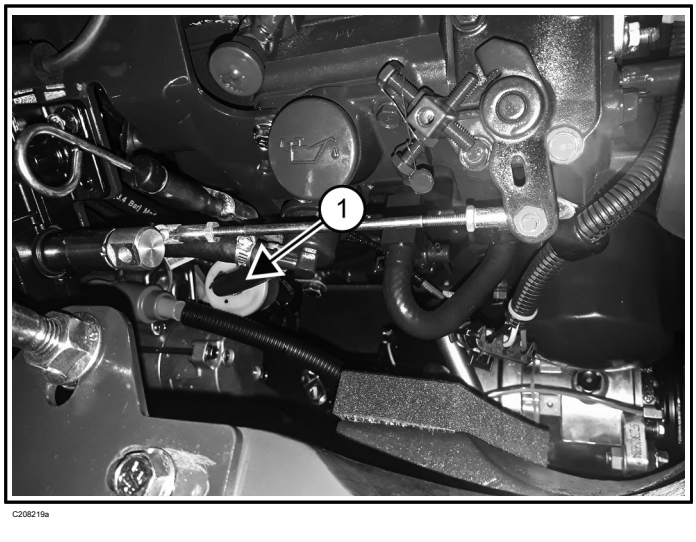
INJECTION HAZARD
Pressurised diesel fuel or hydraulic fluid can penetrate skin and eyes, causing serious injury or death.
Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. DO NOT use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical attention from a doctor familiar with this injury.
W-2072

Replacing The Fuel Pre-Filter

See the Service Schedule for the correct service interval. (See Service Schedule on Page 121)

1. Stop the engine.
2. Open the tailgate. (See Tailgate on Page 129)

Figure 273



C208219a

3. Pinch off the hoses leading to and from the pre-filter (Item 1) [Figure 273] to prevent spilled fuel while the hoses are disconnected.
4. Reposition the upper and lower hose clamps and remove the hoses from the pre-filter.
5. Remove the pre-filter and discard.
6. Install the new pre-filter.
7. Install the upper and lower hoses.
8. Move the hose clamps back into the correct position
9. Remove tools used to pinch off the upper and lower hoses.

⚠ WARNING

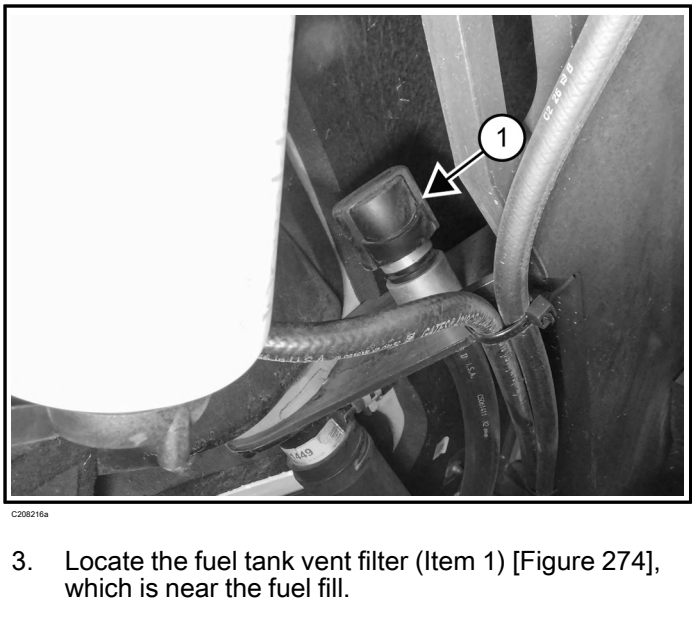
FIRE AND EXPLOSION HAZARD
Failure to use care around combustibles can cause serious injury or death.
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil.
W-2103

Replacing The Fuel Tank Vent Filter

See the Service Schedule for the correct service interval. (See Service Schedule on Page 121)

1. Stop the engine.
2. Open the tailgate. (See Tailgate on Page 129)

Figure 274



C208216a

3. Locate the fuel tank vent filter (Item 1) [Figure 274], which is near the fuel fill.
4. Remove the fuel tank vent filter (Item 1) [Figure 274].
5. Install the new fuel tank vent filter and tighten.
6. Close the tailgate.

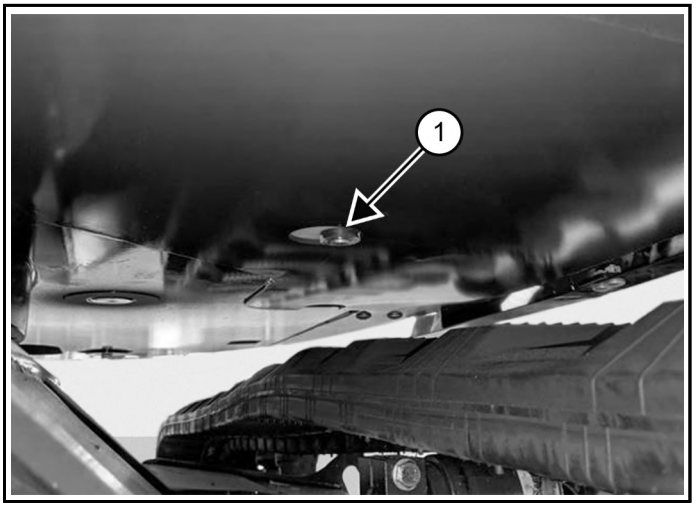
Draining The Fuel Tank

The following item is needed to complete this task:

- Container with a capacity of 72 L (19 US gal)

1. Stop the engine.

Figure 275



C200605a

2. Remove the plug (Item 1) [Figure 275] from the tank and drain the fuel into a container.
3. Replace the plug after fuel has been removed.
4. Reuse, recycle, or dispose of fuel in an environmentally safe manner.

⚠ WARNING

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

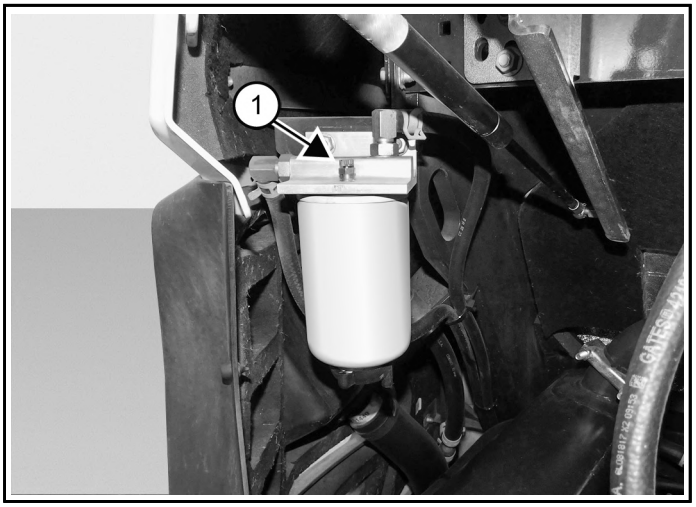
W-2072

Removing Air From The Fuel System

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

1. Open the tailgate. (See Tailgate on Page 129)

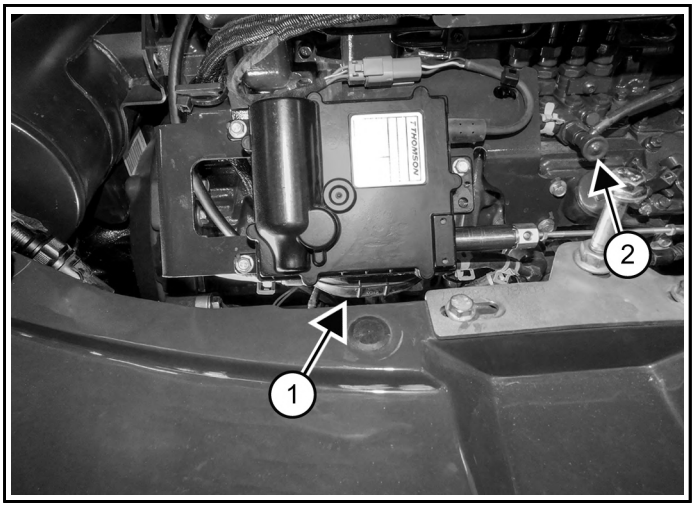
Figure 276



C208217c

2. Open the fuel filter vent (Item 1) [Figure 276].

Figure 277



C208226a

3. Operate the primer bulb (Item 1) [Figure 277] until the fuel flows from the fuel filter vent (Item 1) [Figure 276] with no air bubbles.
4. Close the vent (Item 1) [Figure 276].
5. Start the engine.

It may be necessary to open the vent at the fuel pump (Item 2) [Figure 277] briefly until the engine runs smoothly.

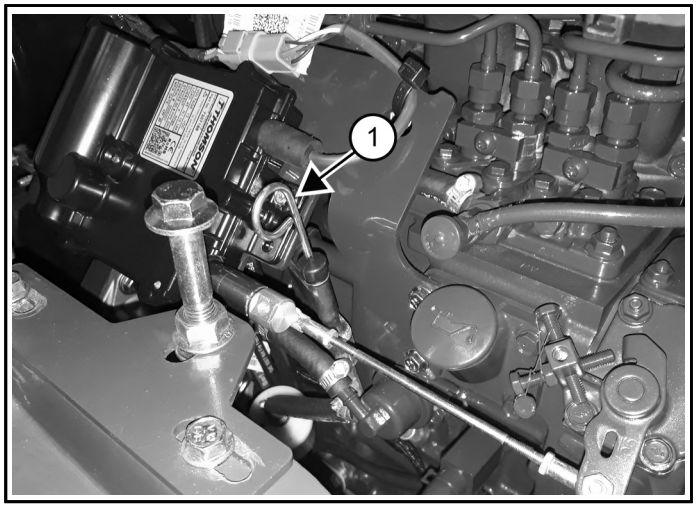
ENGINE LUBRICATION SYSTEM

Checking And Adding Engine Oil

See the Service Schedule for the maintenance interval. (See Service Schedule on Page 121)

1. Stop the engine.
2. Open the tailgate. (See Tailgate on Page 129)

Figure 278

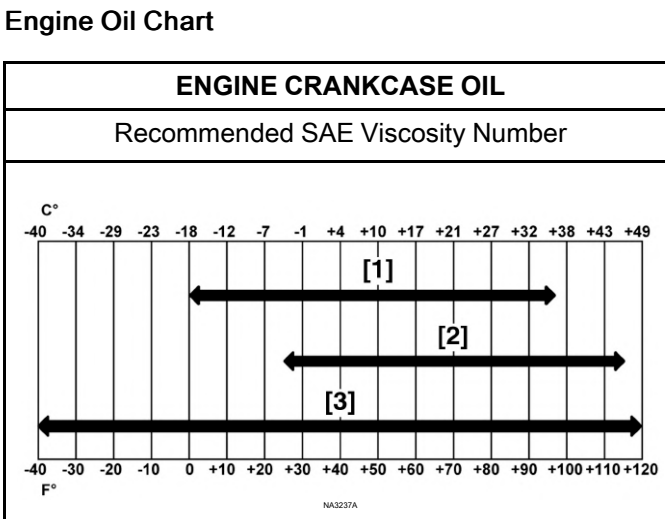


P208218a

3. Remove the dipstick (Item 1) [Figure 278].
4. 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

ENGINE CRANKCASE OIL
Recommended SAE Viscosity Number

Refer to the temperature range anticipated before next oil change.
Must use API Category CJ-4 or better or ACEA E9 or better.
Do not use API category FA-4 engine oil.
[1] SAE 10W-30

NA3237A

ENGINE CRANKCASE OIL
[2] SAE 15W-40
[3] Bobcat Synthetic Oil (SAE 5W-40)

Bobcat engine oils are recommended for use in this machine. If Bobcat engine oil is not available, use a good quality engine oil that meets API Service Category of CJ-4 or better, or ACEA E9 or better.

⚠ IMPORTANT

MACHINE DAMAGE HAZARD
Failure to follow directions may result in severe engine damage.
Use of API Service Category FA-4 engine oil is not approved and may cause irreversible damage to the engine. ◂

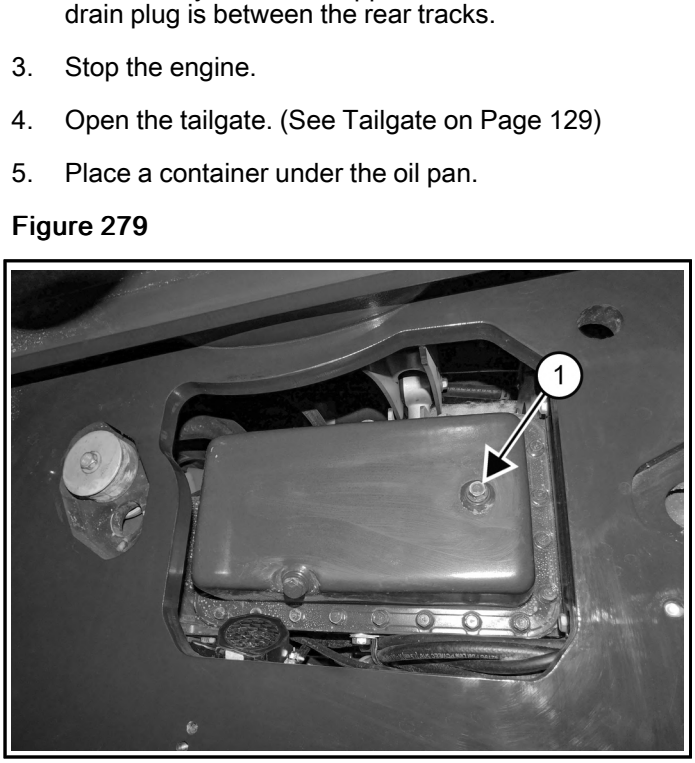
I-2384

Replacing Engine Oil And Filter

See the Service Schedule for the correct service interval. (See Service Schedule on Page 121)

1. Run the engine until coolant is at operating temperature.
2. If necessary, rotate the upperstructure so that the oil drain plug is between the rear tracks.
3. Stop the engine.
4. Open the tailgate. (See Tailgate on Page 129)
5. Place a container under the oil pan.

Figure 279



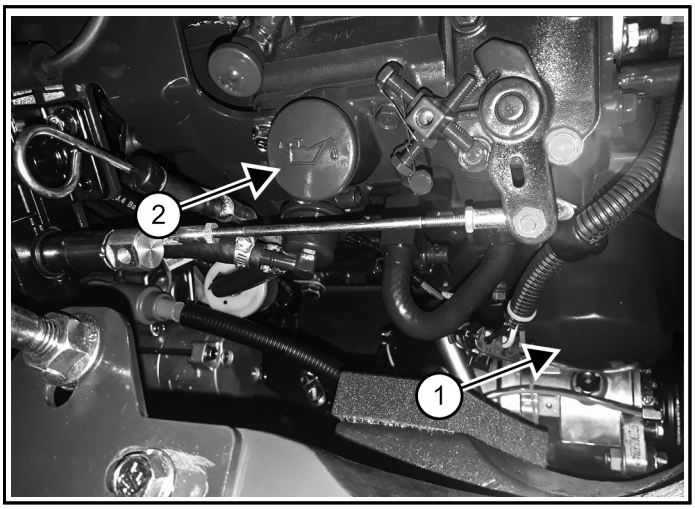
P208220a

6. Remove the drain plug (Item 1) [Figure 279] from the engine oil pan and drain the oil.
7. Recycle or dispose of used oil in an environmentally safe manner.

⚠ WARNING

FIRE AND EXPLOSION HAZARD
Failure to use care around combustibles can cause serious injury or death.
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil.
W-2103

Figure 280



C208219b

8. Remove the oil filter (Item 1) [Figure 280] and clean the filter housing surface.
9. Put clean oil on the replacement filter gasket.

   Use a genuine Bobcat replacement filter.
10. Install the filter and hand tighten.
11. Reinstall the drain plug (Item 1) [Figure 279].
12. Remove the fill cap (Item 2) [Figure 280].
13. Put oil in the engine.
    (See Capacities Specifications on Page 187)

    Do not overfill.
14. Install the fill cap (Item 2) [Figure 280].
15. Start the engine and let it run for several minutes.
16. Stop the engine.
17. Check for leaks at the oil drain plug and the oil filter.
18. Check the oil level.
19. Add oil as needed if it is not at the top mark on the dipstick.

ENGINE COOLING SYSTEM

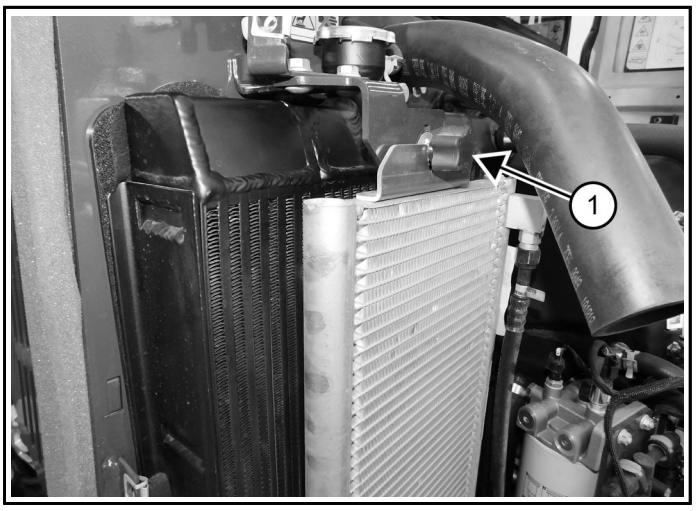
Cleaning The Engine Cooling System

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

Check the cooling system every day to prevent overheating, loss of performance, or engine damage.
(See Service Schedule on Page 121)

1. Stop the engine.
2. Open the right side cover.
   (See Right Side Cover on Page 129)
3. Remove the right side grille.
   (See Right Side Grille on Page 130)

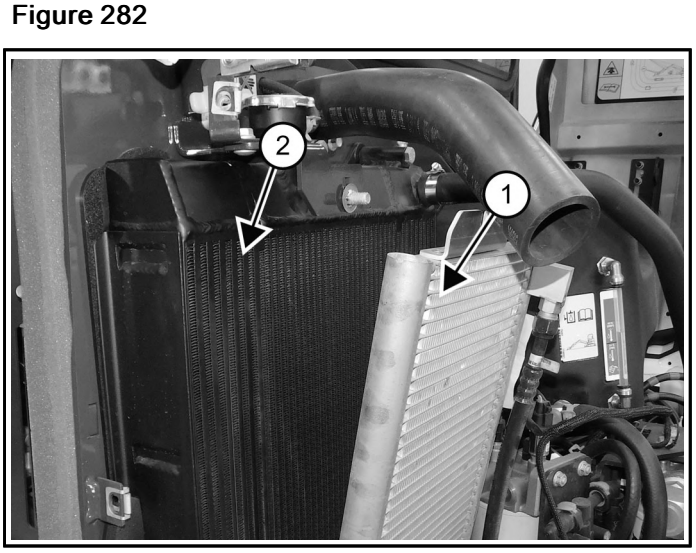
Figure 281



P200134a

4. Remove the knob (Item 1) [Figure 281] on the condenser (if equipped).

Figure 282



P200135a

5. Separate the condenser (Item 1) (if equipped) from the radiator (Item 2) [Figure 282].

Be careful not to damage fins.

6. Use air pressure or water pressure to clean the condenser (Item 1) and the radiator (Item 2) [Figure 282].

   Be careful not to damage fins when cleaning

7. Reposition the condenser (Item 1) [Figure 282] to the radiator.

8. Install and tighten the knob (Item 1) [Figure 281].

Checking Coolant Level

Check the coolant level when the coolant is cold.

⚠ WARNING

BURN HAZARD
Failure to follow instructions can cause serious burns.
Stop the engine and allow it to cool before removing the radiator cap or adding coolant.
W-2070

⚠ WARNING

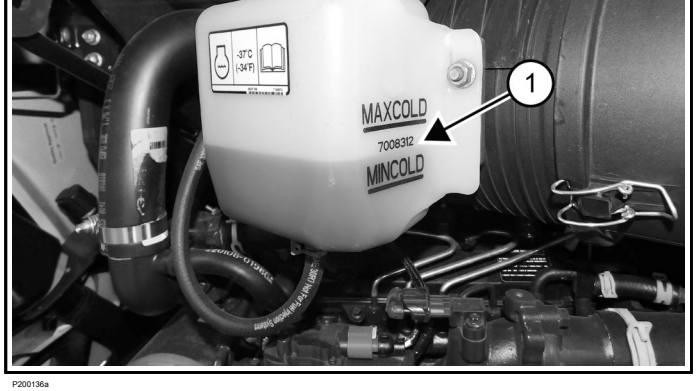
IMPACT AND INJECTION HAZARDS
Flying debris or pressurised fluids can cause serious injury or death.
Wear safety glasses to prevent eye injury when any of the following conditions exist:
- **When fluids are under pressure.**
- **Flying debris or loose material.**
- **Engine is running.**
- **Tools are being used.**

W-2019

1. Stop the engine.

2. Open the tailgate. (See Tailgate on Page 129)

Figure 283



P200136a

3. Check the coolant level in the coolant recovery tank (Item 1) [Figure 283].

   It should be between the MAX and MIN marks.

4. Add fluid as needed.

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

⚠ IMPORTANT

MACHINE DAMAGE HAZARD
The incorrect ratio of water to coolant will reduce cooling system efficiency and may lead to premature engine failure.
- **Always use the correct ratio of water to coolant.**
- **Always add a premixed solution.**

I-2124

Replacing Coolant (Canopy Models)

The following items are needed to complete this task:

- Container to catch the coolant
- Locking hose pinching pliers or a similar tool

These instructions are for canopy models only. For cab models, see the next section.
(See Replacing Coolant (Cab Models) on Page 142)

See the Service Schedule for correct service intervals.
(See Service Schedule on Page 121)

1. Stop the engine.

2. Open the tailgate. (See Tailgate on Page 129)

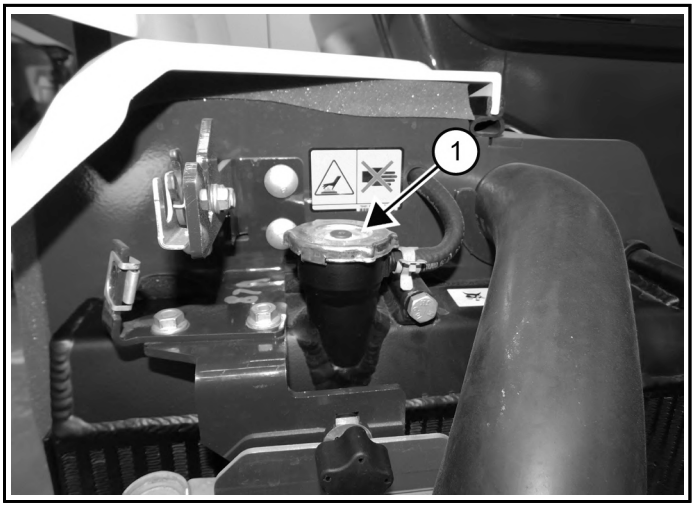
3. Open the right side cover.
   (See Right Side Cover on Page 129)

4. Remove the right side panel.
   (See Right Side Panel on Page 130)

⚠ WARNING

BURN HAZARD
Failure to follow instructions can cause serious burns.
Stop the engine and allow it to cool before removing the radiator cap or adding coolant.
W-2070

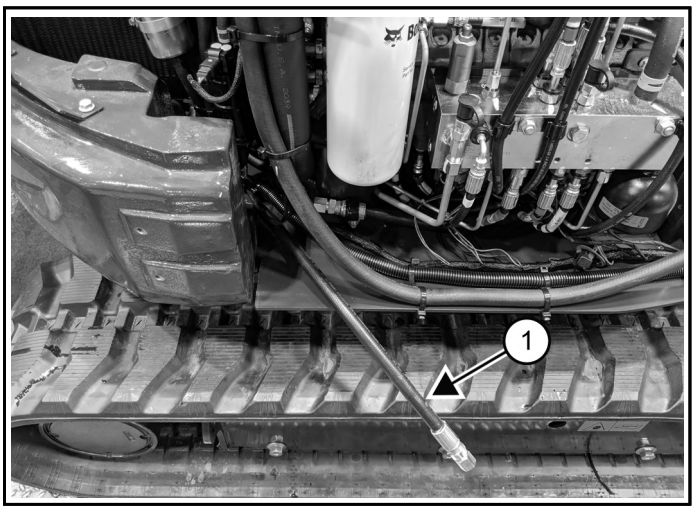
Figure 284



P200137a

5. When the engine is cool, loosen and remove the radiator cap (Item 1) [Figure 284].

Figure 285

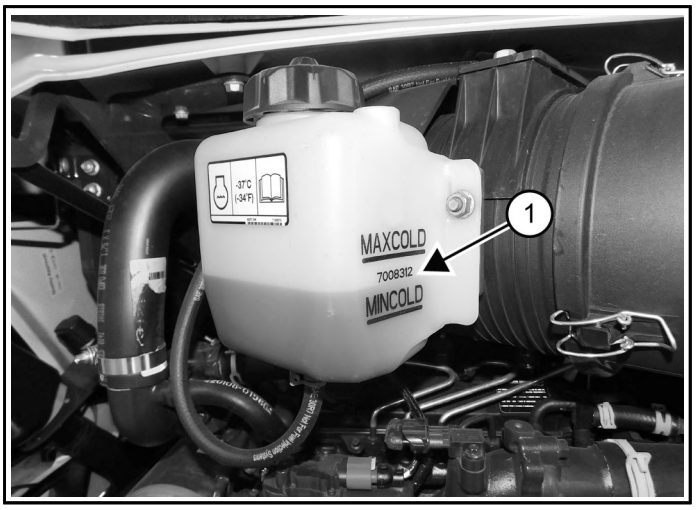


C200724a

6. Locate the drain hose (Item 1) [Figure 285] that extends out from the bottom of the radiator and remove it from its clamp.
7. Unscrew the cap from the drain hose (Item 1) [Figure 285] and drain the coolant into a container.
8. Replace the cap on the drain hose (Item 1) [Figure 285].
9. Recycle or dispose of used coolant in an environmentally safe manner.
10. Mix new coolant in a separate container. (See Capacities Specifications on Page 187)

    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.
11. Add premixed coolant (47% water and 53% propylene glycol) to the radiator (Item 1) [Figure 284] until the coolant level reaches the top of the radiator.
12. Install the radiator cap (Item 1) [Figure 284].

Figure 286



P200136a

13. Add premixed coolant (47% water and 53% propylene glycol) to the recovery tank (Item 1) [Figure 286] until it is between the MAX and MIN marks.

⚠ IMPORTANT

MACHINE DAMAGE HAZARD
The incorrect ratio of water to coolant will reduce cooling system efficiency and may lead to premature engine failure.
- **Always use the correct ratio of water to coolant.**
- **Always add a premixed solution.**

I-2124

14. Run the engine until it is at operating temperature.
15. Stop the engine.
16. Add coolant to the recovery tank as needed.
17. Reinstall the right side panel. Close the right side cover and tailgate.

Replacing Coolant (Cab Models)

The following items are needed to complete this task:
- Container to catch the coolant
- Locking hose pinching pliers or a similar tool

These instructions are for cab models only.

See the Service Schedule for correct service intervals. (See Service Schedule on Page 121)

1. Stop the engine.
2. Open the tailgate. (See Tailgate on Page 129)

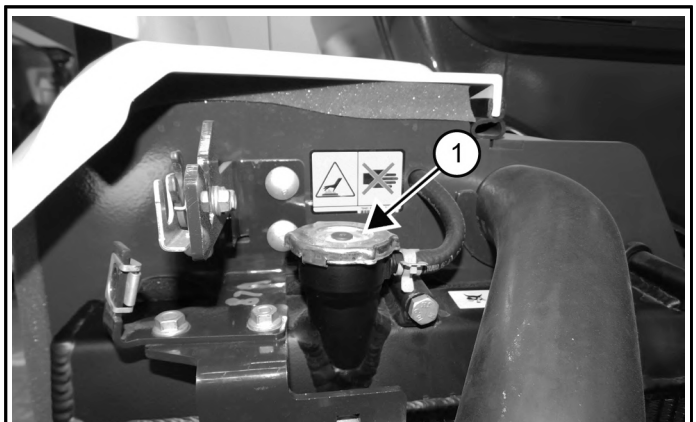
3. Open the right side cover.
(See Right Side Cover on Page 129)

4. Remove the right side panel.
(See Right Side Panel on Page 130)

⚠ WARNING

BURN HAZARD
Failure to follow instructions can cause serious burns.
Stop the engine and allow it to cool before removing the radiator cap or adding coolant.
W-2070

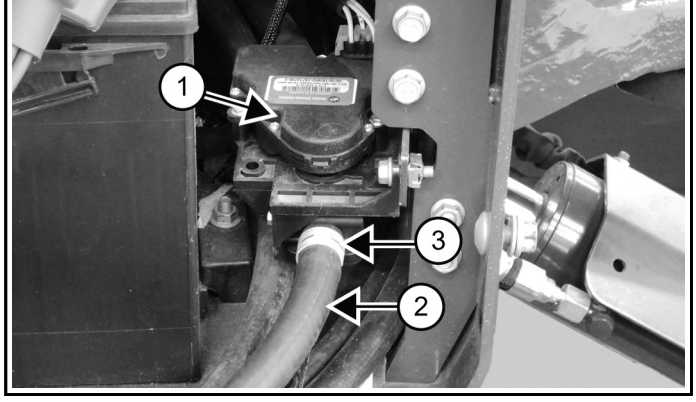
Figure 287



P200137a

5. When the engine is cool, loosen and remove the radiator cap (Item 1) [Figure 287].

Figure 288



P141382a

6. Locate the heater valve (Item 1) [Figure 288], which is directly in front of the battery.

   The coolant is drained at the heater valve.

7. Pinch off the coolant hose (Item 2) [Figure 288] using a locking hose pinching pliers or a similar tool.

8. Reposition the clamp (Item 3) and disconnect the hose (Item 2) from the heater valve (Item 1) [Figure 288].

9. Drain the coolant into a container.

10. Install the coolant hose (Item 2) into the heater valve (Item 1) and install the clamp (Item 3) [Figure 288].

11. Remove the tool used to pinch off the coolant hose.

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

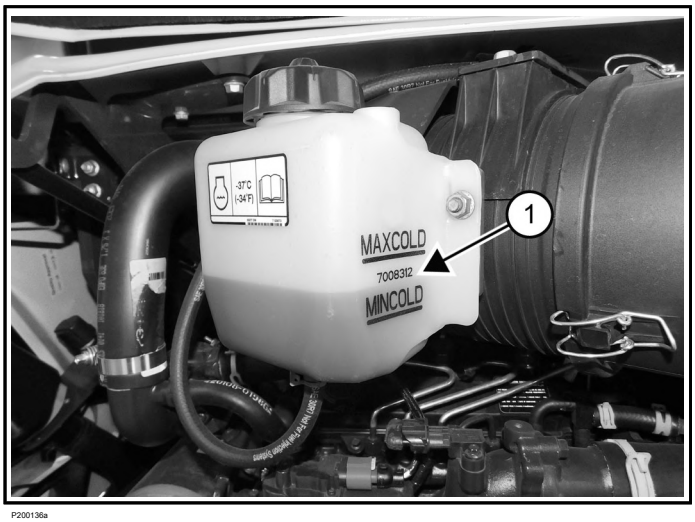
13. Mix new coolant in a separate container.
(See Capacities Specifications on Page 187)

    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.

14. Add premixed coolant (47% water and 53% propylene glycol) to the radiator (Item 1) [Figure 287] until the coolant level reaches the top of the exchanger.

15. Install the radiator cap (Item 1) [Figure 287].

Figure 289



P200136a

16. Add premixed coolant (47% water and 53% propylene glycol) to the recovery tank (Item 1) [Figure 289] until it is between the MAX and MIN marks.

⚠ IMPORTANT

MACHINE DAMAGE HAZARD
The incorrect ratio of water to coolant will reduce cooling system efficiency and may lead to premature engine failure.
- **Always use the correct ratio of water to coolant.**
- **Always add a premixed solution.**

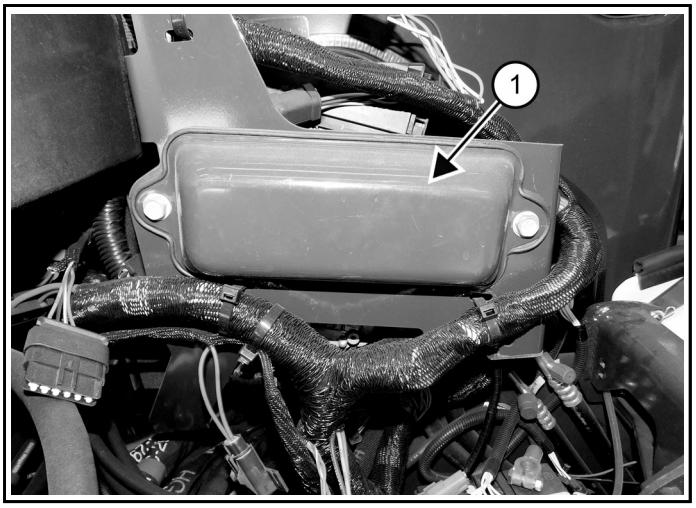
I-2124

17. Run the engine until it is at operating temperature.
18. Stop the engine.
19. Add coolant to the recovery tank as needed.
20. Reinstall the right side panel. Close the right side cover and tailgate.

ELECTRICAL SYSTEM

Electrical System Description

Figure 290



P200138a

The excavator has a 12 volt, negative earth electrical system. The electrical system is protected by fuses (Item 1) [Figure 290] located under the right side cover of the excavator. 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.

⚠ WARNING

CHEMICAL HAZARD
Contact with or ingestion of battery acid can cause serious injury or death.

- **Batteries contain acid that burns eyes and skin on contact. Wear safety 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 5 minutes.**
- **If electrolyte is ingested, drink large quantities of water or milk! DO NOT induce vomiting. Get prompt medical attention.**

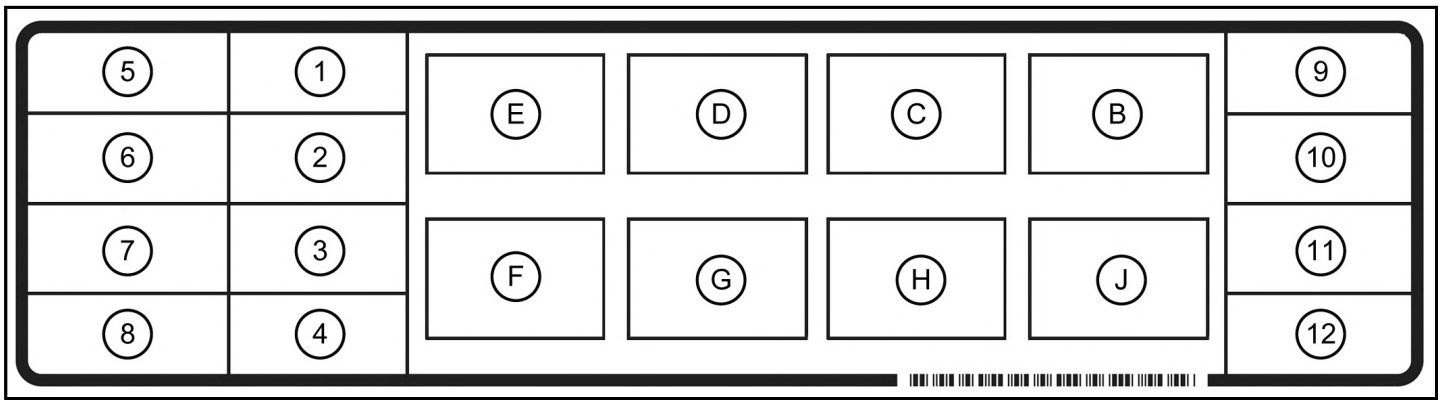
W-2065

Fuse And Relay Identification

The decal inside the fuse cover (Item 1) [Figure 290] shows the location and amp ratings of the fuses.

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

Figure 291

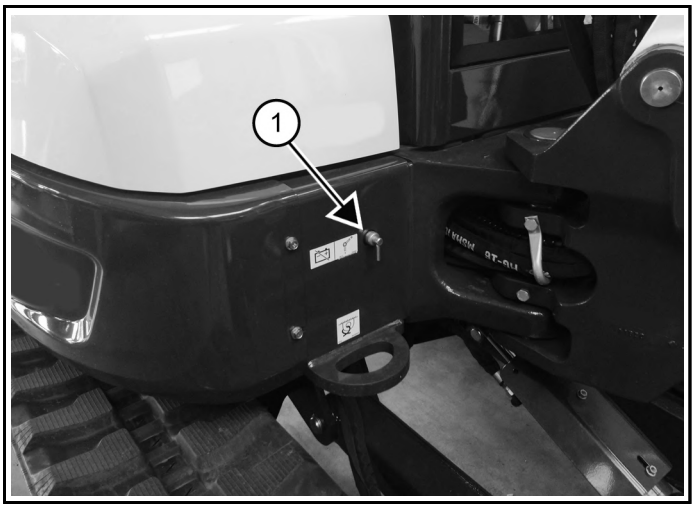


The location and sizes are shown in the table below and on the decal [Figure 291]. Always replace fuses using the same type and capacity. Relays are identified by the letter “R” in the Amp column.

Ref.	Icon	Description	Amp
1		Wiper / Washer	10
2		Switched Power	20
3		Alternator Excite / Heater	25
4	ACD	ACD Switched Power	25
5	AIC	Auto Idle Controller (AIC) (if equipped)	20
6		HVAC / Heater	40
7		Ignition	5
8		Fuel Shutoff	25
9		Panel / Display Controller	25
10	ACD	ACD Unswitched Power	25
11		Lights	30
12		Power Port	15
E		Switched Power	R
D		Heater / HVAC	R
C		Lights	R
B		Horn	R
F		Fuel Shutoff	R
G		Lights	R
H		Glow Plug	R
J		Starter	R

Battery Disconnect Switch

Figure 292



C206169a

Turn the battery disconnect switch to the OFF position before disconnecting or connecting the battery cables.

The battery disconnect switch (Item 1) [Figure 292] (if equipped) is located on the right front of the excavator.

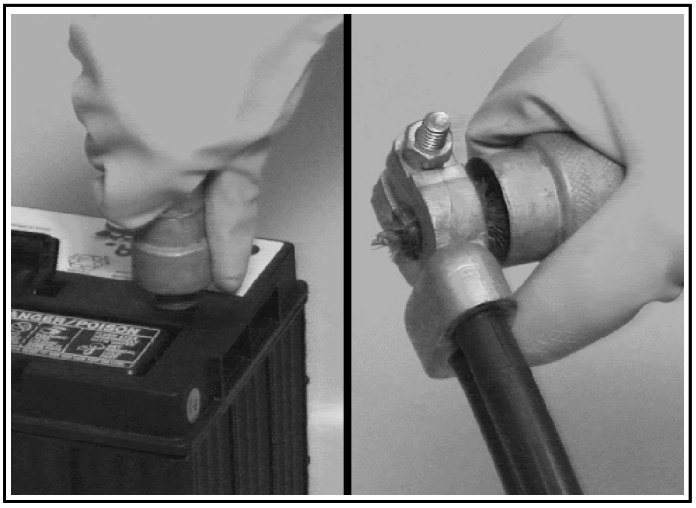
- Rotate the switch (Item 1) [Figure 292] counterclockwise to turn the switch to the OFF position.
- Rotate the switch (Item 1) [Figure 292] clockwise to turn to the ON position (shown here in the ON position).

Battery Maintenance

See the Service Schedule for the correct service interval. (See Service Schedule on Page 121)

The Bobcat brand battery supplied with your machine is sealed and does not require watering. Proper charging and storage are important to maximise the life of all batteries.

Figure 293



P200188

Simple steps for reliability and long battery life:

- Keep battery posts and terminals clean [Figure 293].
- Keep terminals tight.
- Remove corrosion from battery and terminals with sodium bicarbonate (baking soda) and water solution.
- Put Bobcat Battery Saver or grease on the battery terminals and cable ends to prevent corrosion.
- Operate the machine for at least 15 minutes to recover from the battery drain caused by engine start up whenever practical.
- Maintain the battery charge level. This is a key factor for long battery life.
- Charge a severely discharged battery with a battery charger instead of relying on the machine charging system. (See Battery Charging on Page 147)
- Check the battery state of charge every 30 days on machines that are not frequently used. (See Testing The Battery on Page 147)

⚠ WARNING

CHEMICAL HAZARD
Contact with or ingestion of battery acid can cause serious injury or death.
- **Batteries contain acid that burns eyes and skin on contact. Wear safety 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 5 minutes.**
- **If electrolyte is ingested, drink large quantities of water or milk! DO NOT induce vomiting. Get prompt medical attention.◂**

W-2065

Maintaining Battery Charge Level

All batteries will self-discharge over time. This machine has features that require battery power even when the machine is not being used. Use of a quality battery maintainer is highly recommended to ensure that your machine is ready to start when you need it and avoid costly battery replacement.

Battery Maintainers

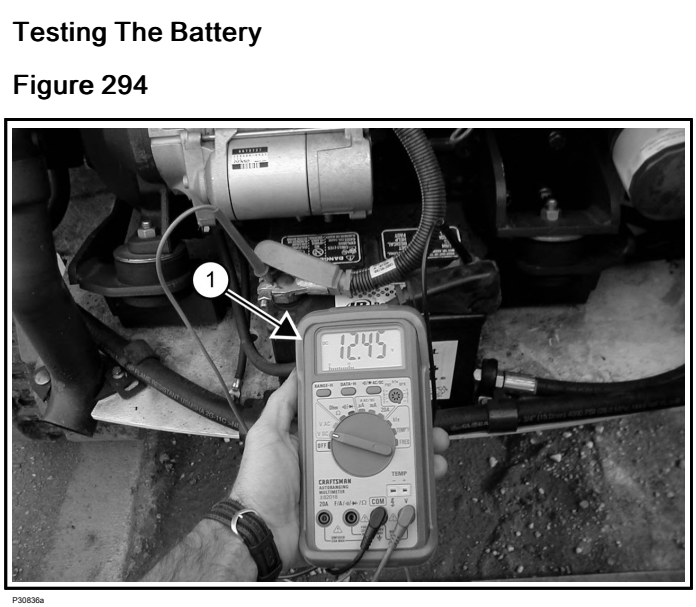
Use a good quality battery maintainer to keep the battery above 12.4 volts for machines that are not frequently used. Batteries below 12.4 volts must first be charged using a battery charger. Solar maintainers should have a minimum capacity of 10 watts to be effective.

Battery Service During Machine Storage

- Remove the battery if storing the machine for an extended period of time.
- Fully charge the battery.
- Store the battery in a cool dry place above freezing and boost charge periodically.
- If battery removal is not desired, a good quality battery maintainer must be used to compensate for battery self-discharge and parasitic loads from machine controllers, accessories, and features such as connected machine intelligence.

Testing The Battery

Figure 294



P30836a

The simplest and most common check to determine battery state of charge is to use a digital multimeter or voltmeter (Item 1) [Figure 294].

A battery found below 12.4 volts must be charged to 100% charge per the battery charger's recommendation. Allow at least 60 minutes after operating the machine or charging the battery to get an accurate reading.

If the reading is less than 12.4 volts after the battery has been charged for several hours, see your Bobcat dealer to have a more thorough battery test performed.

The freezing point of battery electrolyte is dependent on the battery state of charge. Keeping the battery voltage above 12.4 volts will help prevent batteries from freezing, even at extremely low temperatures.

If the battery freezes, the internal grid may be damaged and the case will be distorted or cracked. If this happens, dispose of the battery according to local regulations.

Battery Charging

A battery charger designed for 12 volt charging systems is recommended. Follow the battery charger manufacturer's instructions to charge the battery to 12.6 volts (100% charge). Batteries should be charged at room temperature to avoid an undercharge or overcharge condition. Never attempt to charge a frozen battery.

The following table can be used to identify the approximate amount of time required to charge a discharged battery. Allow at least 60 minutes after operating the machine or charging the battery to get an accurate reading.

Battery Voltage	State of Charge	Charger Maximum Rate		
		30 Amps	20 Amps	10 Amps
12.6 V	100%	Ready to Use		
12.4 V	75%	0.9 hr	1.3 hr	2.5 hr
12.2 V	50%	1.9 hr	2.7 hr	5.1 hr
12.0 V	25%	2.9 hr	4.3 hr	7.8 hr
11.8 V	0%	4.0 hr	5.7 hr	10.7 hr

NOTE: Use a good quality charger to avoid battery damage from overcharging.

⚠ WARNING

EXPLOSION HAZARD

Battery gas can explode and cause serious injury or death.

- **Keep arcs, sparks, flames and lighted tobacco away from batteries. When jumping from booster battery make final connection (negative) at machine frame.**
- **Do not jump start or charge a frozen or damaged battery. Warm battery to 16°C (60°F) before connecting to a charger. Unplug charger before connecting or disconnecting cables to a battery. Never lean over battery while boosting, testing or charging.**

W-2066

Using A Booster Battery (Jump Starting)

The following item is needed to complete this task:

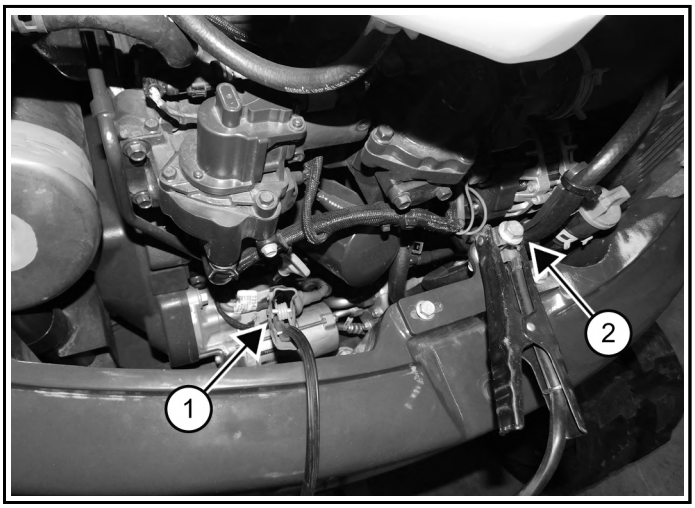
- 12 volt booster battery

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.

1. Be sure the key switch is OFF.
2. Open the tailgate. (See Tailgate on Page 129)

Figure 295



C200723a

3. Connect the cable to the positive (+) terminal (Item 1) [Figure 295] of the excavator starter.
4. Connect the other cable to the tailgate latch bolt (Item 2) [Figure 295].
5. Start the engine.
6. After the engine has started, remove the negative (ground) cable first (Item 2) [Figure 295].
7. Disconnect the cable from the positive terminal (Item 1) [Figure 295].

⚠ IMPORTANT

MACHINE DAMAGE HAZARD
Damage to the alternator can occur
Do not operate machine if:
- **Engine is operated with battery cables disconnected.**
- **Battery cables are connected when using a fast charger or when welding on the machine. Remove both cables from the battery.**
- **Extra battery cables (booster cables) are connected wrong.◂**

I-2023

⚠ WARNING

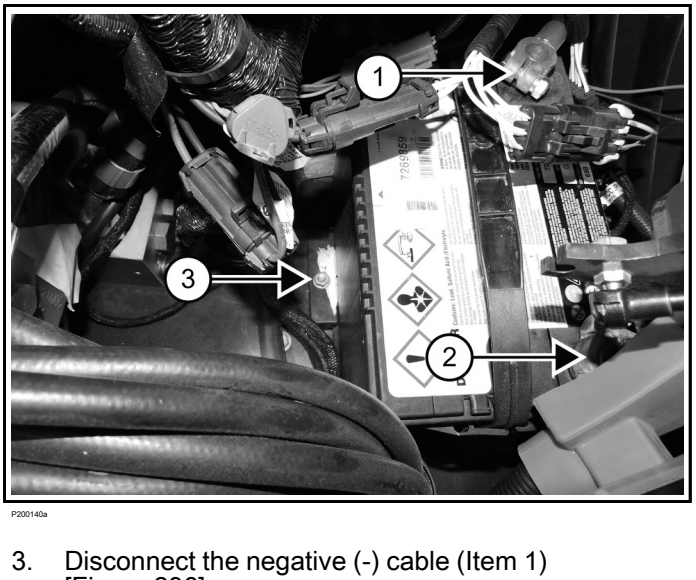
CHEMICAL HAZARD
Contact with or ingestion of battery acid can cause serious injury or death.
- **Batteries contain acid that burns eyes and skin on contact. Wear safety goggles, protective clothing, and rubber gloves to keep acid off body.**
- **In case of acid contact, wash immediately with water. In case of eye contact, get prompt medical attention and wash eye with clean, cool water for at least 5 minutes.**
- **If electrolyte is ingested, drink large quantities of water or milk! DO NOT induce vomiting. Get prompt medical attention.◂**

W-2065

Removing And Installing The Battery

1. Open the right side cover. (See Right Side Cover on Page 129)
2. Remove the right side panel. (See Right Side Panel on Page 130)

Figure 296



P200140a

3. Disconnect the negative (-) cable (Item 1) [Figure 296].
4. Disconnect the positive (+) cable (Item 2) [Figure 296].
5. Remove the bolts (Item 3) [Figure 296] on both sides of the battery and remove the hold-down clamp.
6. Remove the battery.

   Always clean the terminals and the cable ends, even when installing a new battery.
7. Install the battery.
8. Install the hold-down clamp and tighten the bolts.
9. Connect the positive (+) cable (Item 2) [Figure 296].

10. Connect the negative (-) cable (Item 1) [Figure 296] last to prevent sparks.

⚠ WARNING

CHEMICAL HAZARD
Contact with or ingestion of battery acid can cause serious injury or death.
- **Batteries contain acid that burns eyes and skin on contact. Wear safety 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 5 minutes.**
- **If electrolyte is ingested, drink large quantities of water or milk! DO NOT induce vomiting. Get prompt medical attention.**

W-2065

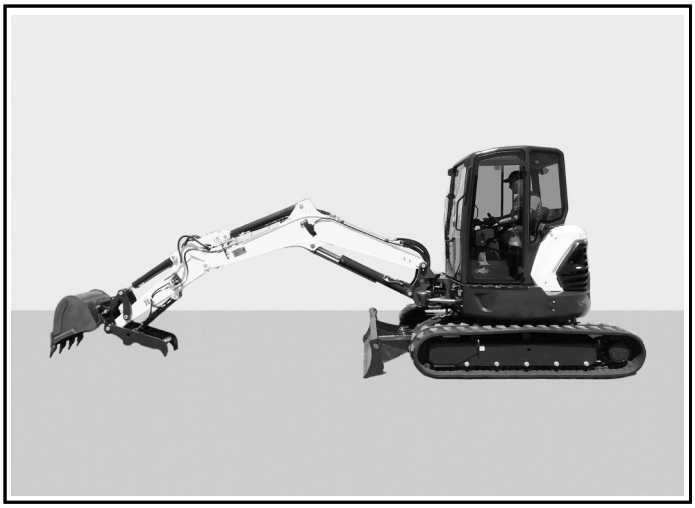
HYDRAULIC SYSTEM

Checking And Adding Hydraulic Fluid

The preferred method is to check the hydraulic fluid when it is cold. See the Service Schedule for the correct service interval. (See Service Schedule on Page 121)

1. Park the machine on a flat surface.

Figure 297



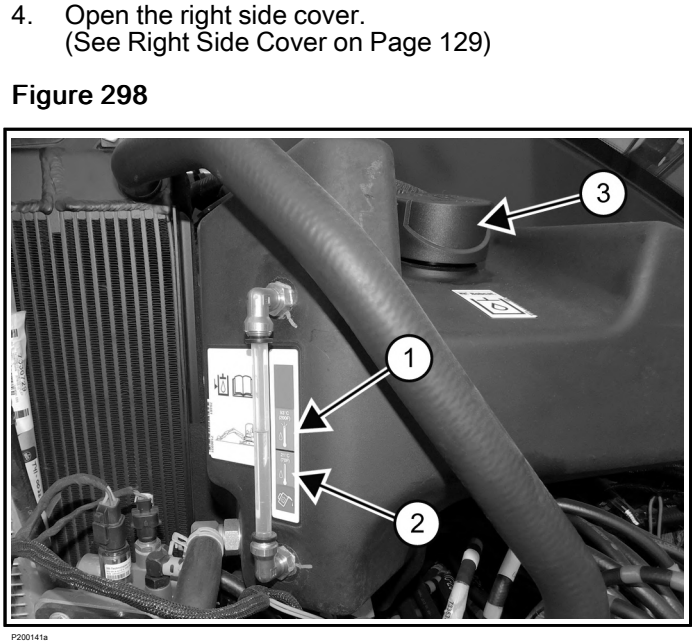
C200403a

2. Extend the boom, arm, and bucket. Lower the bucket to the ground and lower the blade so the machine is in the position shown [Figure 297].

3. Stop the engine.

4. Open the right side cover.
(See Right Side Cover on Page 129)

Figure 298



P200141a

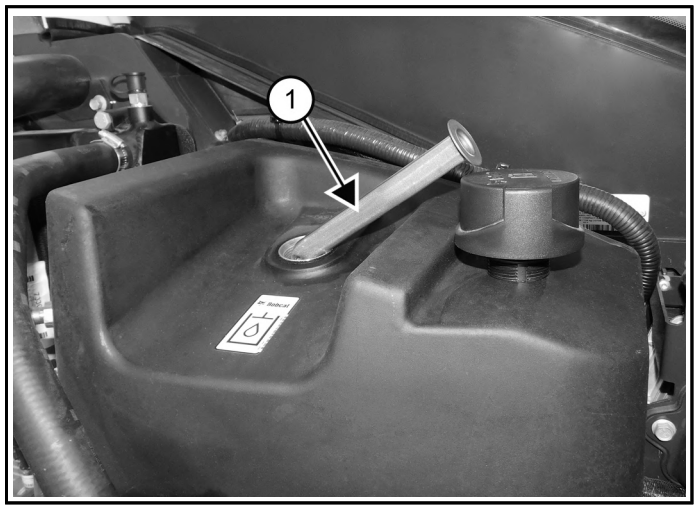
5. Check the hydraulic fluid level. It must be visible in the sight gauge (Item 1) [Figure 298].

The decal on the hydraulic tank shows the correct fill level.

- Item 1 [Figure 298] is the correct fluid level when the machine is HOT (optional).
- Item 2 [Figure 298] is the correct fluid level when the machine is COLD (preferred).

6. Clean the surface around the reservoir cap and remove the cap from the reservoir (Item 3) [Figure 298].

Figure 299



P200142a

7. Check the condition of the fill strainer screen (Item 1) [Figure 299].

⚠ WARNING

FIRE AND EXPLOSION HAZARD
Failure to use care around combustibles can cause serious injury or death.
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil.
W-2103

Clean or replace as necessary.

8. Add the correct fluid to the reservoir until it is visible in the sight gauge [Figure 298].
(See Capacities Specifications on Page 187)

Be sure the screen is installed before adding fluid.

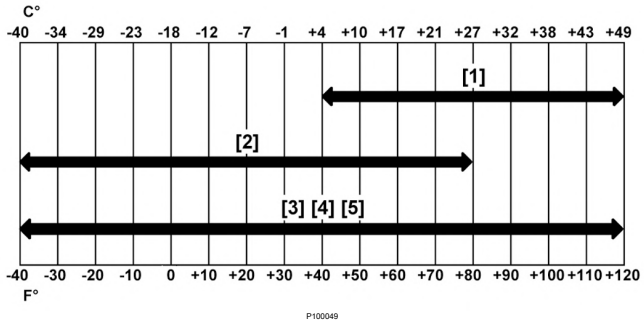
9. Check the cap.

Clean or replace as necessary.

10. Install the cap.

11. Close the right side cover.

Hydraulic Fluid Chart

HYDRAULIC FLUID
Recommended ISO Viscosity Grade (VG) and Viscosity Index (VI)

Refer to the temperature range anticipated before next oil change.
[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.)

P100049

Use only recommended fluid in the hydraulic system.

Replacing The Hydraulic Filter

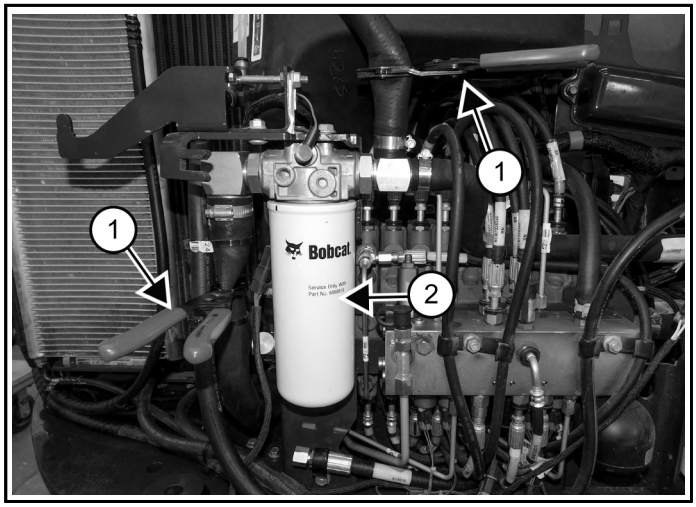
⚠ WARNING

FIRE AND EXPLOSION HAZARD
Failure to use care around combustibles can cause serious injury or death.
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil.
W-2103

See the Service Schedule for the correct service interval.
(See Service Schedule on Page 121)

1. Stop the engine.
2. Open the tailgate. (See Tailgate on Page 129)
3. Open the right side cover.
(See Right Side Cover on Page 129)
4. Remove the right side panel.
(See Right Side Panel on Page 130)
5. Install locking hose pliers (Item 1) [Figure 274] on the hoses running to the filter housing.

Figure 300



C208221a

6. Remove the hydraulic filter (Item 2) [Figure 300].
7. Clean the housing where the filter gasket makes contact.
8. Apply clean hydraulic fluid to the filter gasket.
9. Install the new filter.

   Use a genuine Bobcat replacement filter.

   Tighten until the gasket first makes contact plus 1/2 turn.
10. Remove locking hose pliers (Item 1) [Figure 274].

Replacing The Case Drain Filter

⚠ WARNING

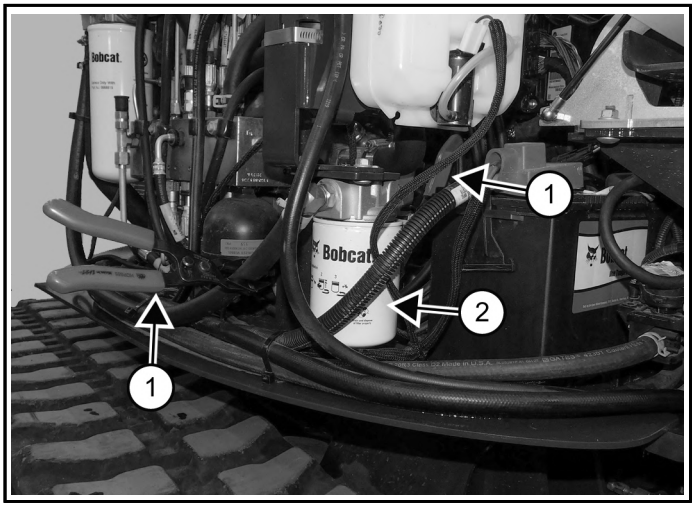
FIRE AND EXPLOSION HAZARD
Failure to use care around combustibles can cause serious injury or death.
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil.◂
W-2103

See the Service Schedule for the correct service interval. (See Service Schedule on Page 121)

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

1. Stop the engine.
2. Open the tailgate. (See Tailgate on Page 129)
3. Open the right side cover. (See Right Side Cover on Page 129)
4. Remove the right side panel. (See Right Side Panel on Page 130)
5. Install locking hose pliers (Item 1) [Figure 301] on the hoses running to the filter housing.

Figure 301



C208222a

6. Remove the case drain filter (Item 2) [Figure 301].
7. Clean the housing where the filter gasket makes contact.
8. Apply clean hydraulic fluid to the filter gasket.
9. Install the new filter.

   Use a genuine Bobcat replacement filter.

   Tighten until the gasket first makes contact plus 3/4 turn.
10. Remove locking hose pliers (Item 1) [Figure 301].

Replacing Hydraulic Fluid

The following items are needed to complete this task:

- Container for the hydraulic fluid
- Hose with female quick coupler on one end

⚠ WARNING

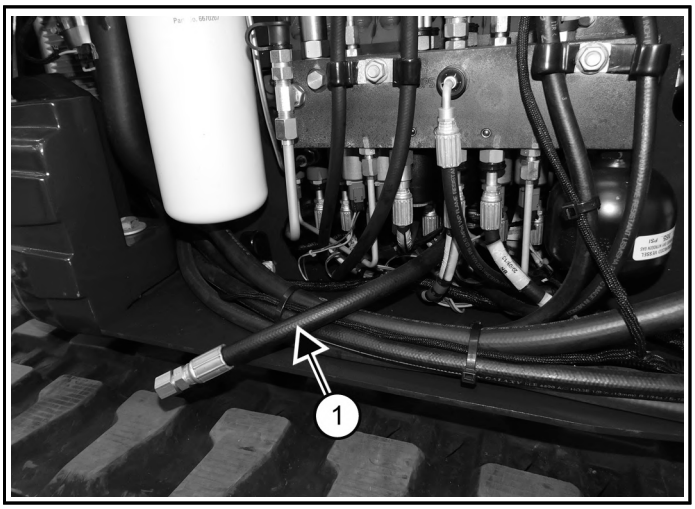
INJECTION HAZARD
Pressurised diesel fuel or hydraulic fluid can penetrate skin and eyes, causing serious injury or death.
Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. DO NOT use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical attention from a doctor familiar with this injury.◂
W-2072

See the Service Schedule for the correct service interval. (See Service Schedule on Page 121)

1. Extend the boom, arm, and bucket. Lower the bucket to the ground and lower the blade so the machine is in the position shown [Figure 297].
2. Stop the engine.

3. Open the tailgate. (See Tailgate on Page 129)
4. Open the right side cover.
(See Right Side Cover on Page 129)
5. Remove the right side panel.
(See Right Side Panel on Page 130)

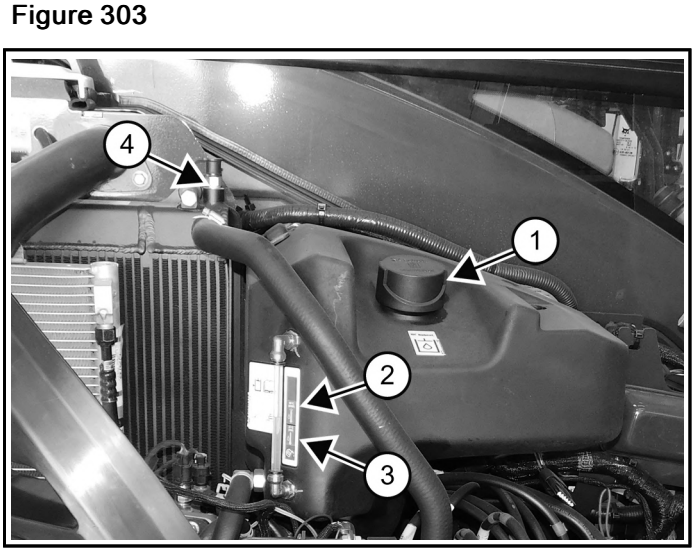
Figure 302



P200583a

6. Locate the drain hose (Item 1) [Figure 302], which is clamped in place under the hydraulic filter.
7. Place a container under the hose.
8. Unscrew the plug at the end of the drain hose and drain the fluid into the container.
9. Recycle or dispose of the fluid in an environmentally safe manner.
10. Put the plug back on the end of the drain hose and install the drain hose back in the storage position.

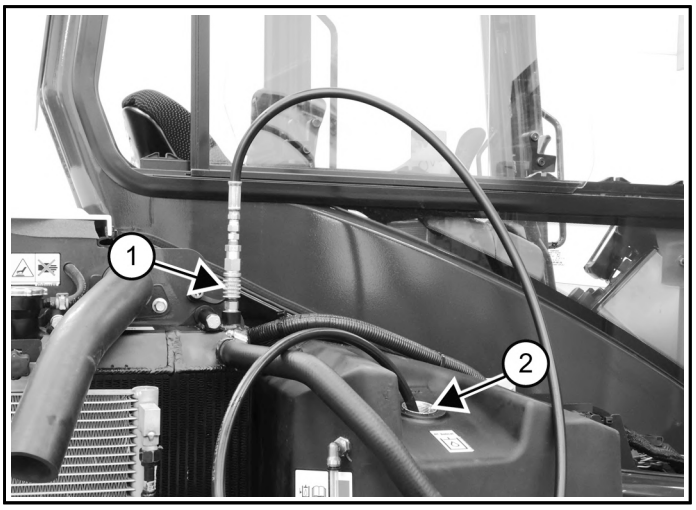
Figure 303



C200664b

11. Add fluid to the hydraulic tank (Item 1) [Figure 303].
(See Capacities Specifications on Page 187)
The level should be between the hot fill (Item 2) and cold fill (Item 3) marks [Figure 303].
12. Locate the male coupler (Item 4) [Figure 303] that is to the left of the hydraulic tank and remove the cap.

Figure 304



P141795b

13. Install a female quick coupler and hose on the male quick coupler (Item 1) [Figure 304].
14. Route the hose (Item 1) from the male quick coupler into the hydraulic tank (Item 2) [Figure 304].
15. Start the machine.
16. Remove the female quick coupler (Item 1) [Figure 304] after a steady stream of hydraulic fluid, free of any air bubbles, drains from the hose.
17. Reinstall the fill cap (Item 1) [Figure 303] on the hydraulic tank.
18. Operate the machine through the hydraulic functions.
19. Stop the engine.
20. Check the hydraulic fluid level and add as needed.
21. Install the right side panel. Close the tailgate and right side cover.

SPARK ARRESTER MUFFLER

Cleaning The Spark Arrester Muffler

The following item is needed to complete this task:

- A piece of wood to hold over the outlet of the spark arrester.

This procedure requires two people.

⚠ WARNING

INHALATION HAZARD
Exhaust fumes contain odorless, invisible gases that can kill without warning.
Fresh air must be added to avoid concentration of exhaust fumes when an engine is running in an enclosed area. If the engine is stationary, vent the exhaust outside.◂
W-2050

⚠ WARNING

BURN AND IMPACT HAZARD
Contact with hot muffler or flying debris can cause serious injury.
- **Stop engine and allow the muffler to cool before cleaning the spark chamber.**
- **Wear safety goggles.◂**

W-2011

⚠ WARNING

FIRE AND EXPLOSION HAZARDS
Engines can have hot parts and hot exhaust gas that can cause serious injury or death.
- **Keep flammable material away.**
- **DO NOT use machines in an atmosphere containing explosive dust or gases.◂**

W-2051

⚠ WARNING

AVOID INJURY OR DEATH
Failure to do so can cause injury or death.
When the engine is running during service, the steering levers must be in neutral.◂
W-2203

⚠ IMPORTANT

ENGINE OR EXHAUST SYSTEM DAMAGE
Failure to maintain the factory equipped spark arrester exhaust system will result in improper function.
- **If equipped, the spark arrester muffler 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.**

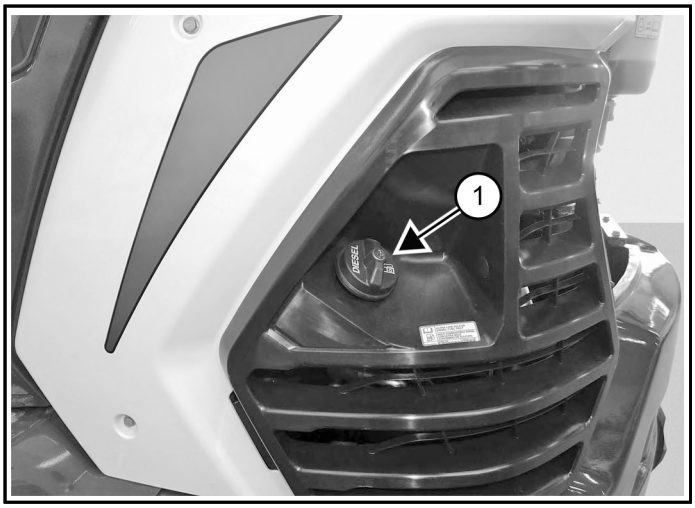
If this machine is operated on flammable forest, brush, or grass covered land, it must be equipped with a spark arrester attached to the exhaust system and maintained in working order. Refer to local laws and regulations for spark arrester requirements.◂
1311-D8CS34DA

See the Service Schedule for the correct service interval. (See Service Schedule on Page 121)

Do not operate the excavator with a defective exhaust system.

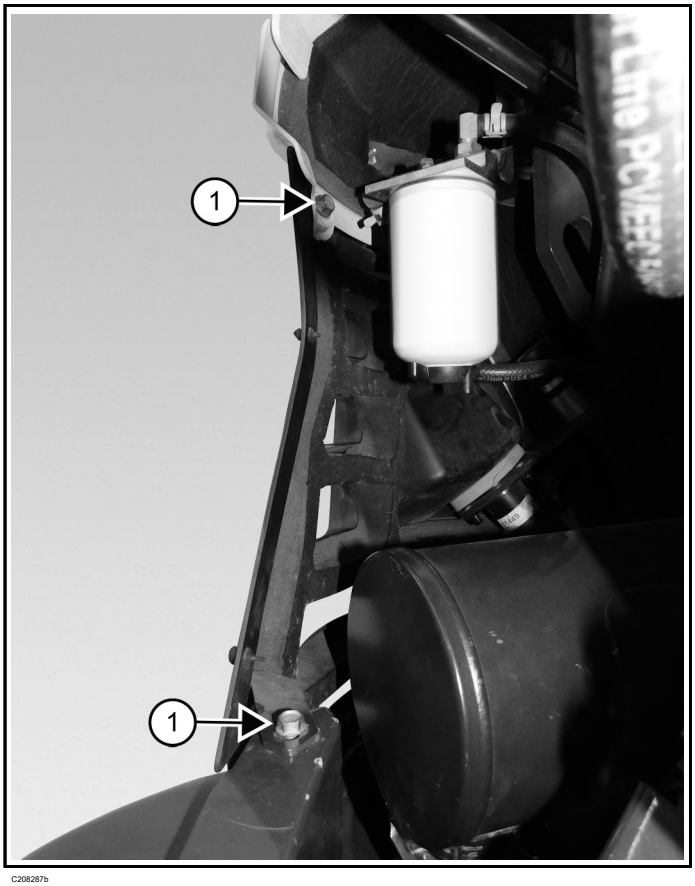
1. Stop the engine.
2. Open the tailgate. (See Tailgate on Page 129)

Figure 305



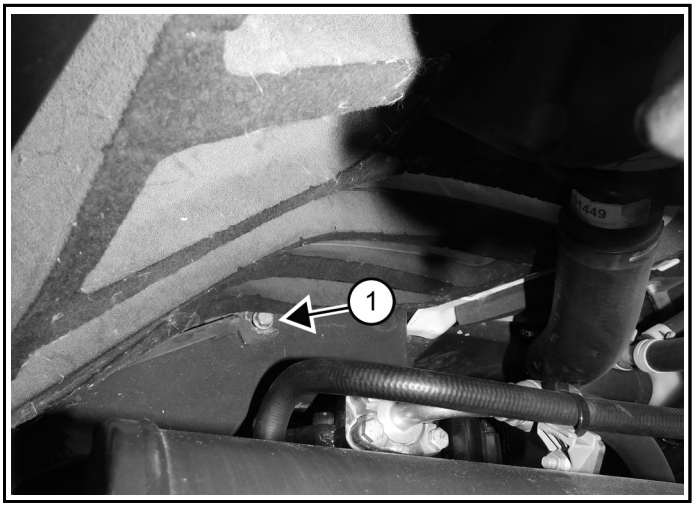
3. Remove the fuel cap (Item 1) [Figure 305].

Figure 306



C208287b

Figure 307

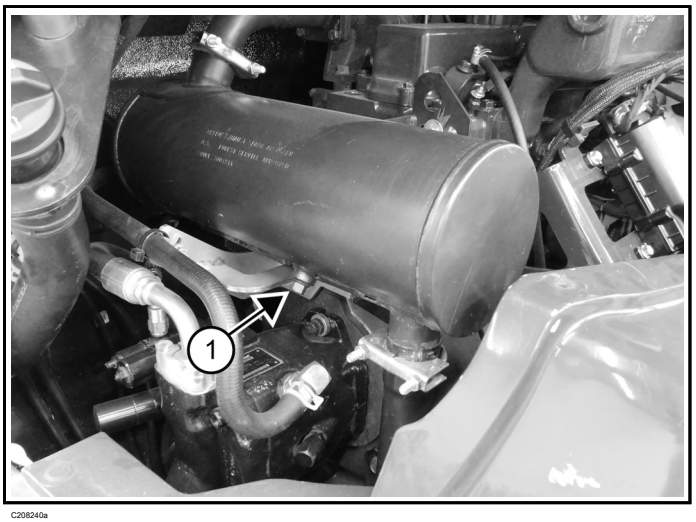


C208288a

4. Remove the left side grille by removing the three interior bolts (Item 1) [Figure 306] [Figure 307].

5. Reinstall the fuel cap (Item 1) [Figure 305] to prevent any contamination from entering the fuel tank.

Figure 308



C208240a

6. Remove the plug (Item 1) [Figure 308] from the bottom of the muffler.

7. Start the engine and run it for about 10 seconds while a second person, wearing safety glasses, holds a piece of wood over the muffler plug hole (Item 1) [Figure 308].

   The carbon deposits will be forced out of the muffler plug hole (Item 1) [Figure 308].

8. Stop the engine.

9. Install and tighten the plug (Item 1) [Figure 308].

10. Reinstall the left side grille.

11. Close the tailgate.

TRACK TENSION

Track Tension Description

The wear of the pins and bushings on the undercarriage vary with working conditions and different types of soil conditions. It is necessary to inspect track tension and maintain the correct tension. See the Service Schedule for the correct service interval.
(See Service Schedule on Page 121)

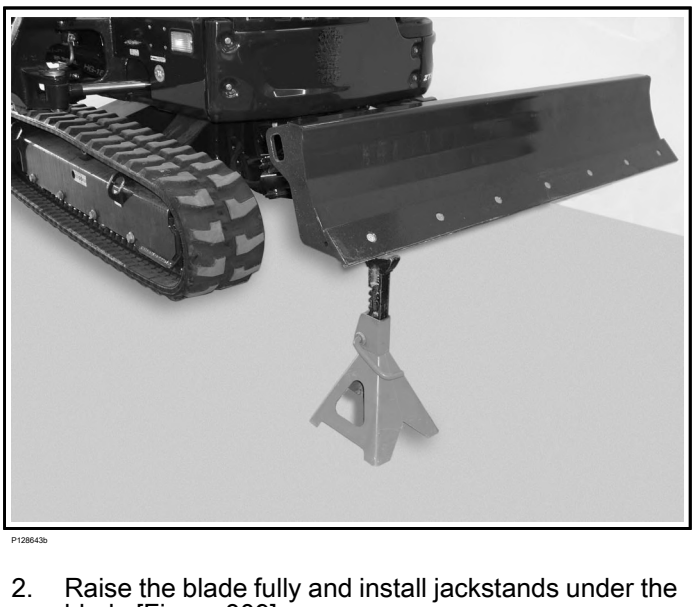
Adjusting Track Tension Manually

The following item is needed to complete this task:

- Bleed tool to decrease track tension. The bleed tool will direct the flow of grease to aid in cleanup. See your Bobcat dealer to order a bleed tool.

1. Raise one side of the machine approximately 100 mm (4 in) using the boom and arm.

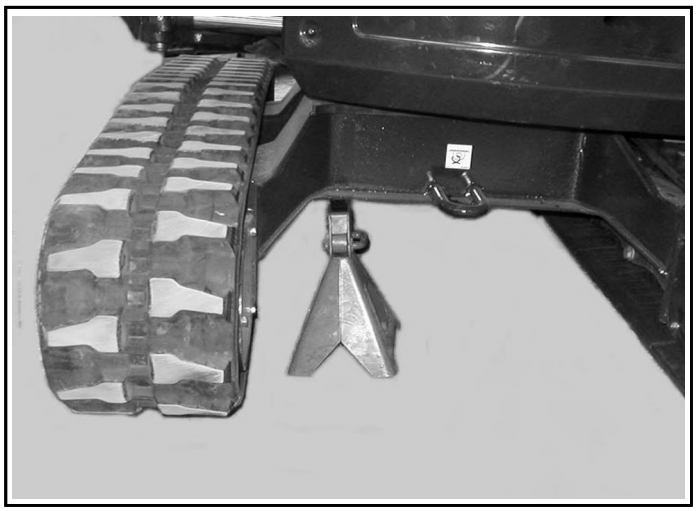
Figure 309



P128643b

2. Raise the blade fully and install jackstands under the blade [Figure 309].

Figure 310



P91969a

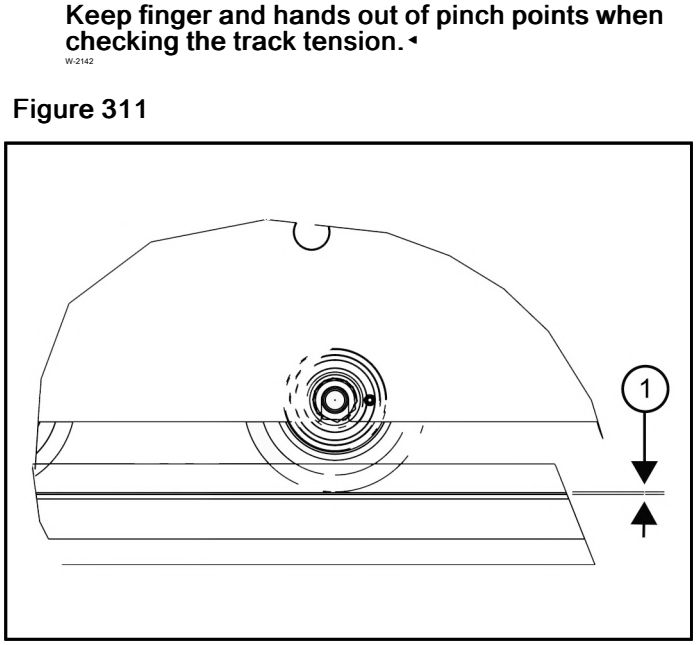
3. Install jackstands under the track frame [Figure 310].
4. Raise the boom until all machine weight is on the jackstands.
5. Stop the engine.

⚠ WARNING

PINCHING HAZARD
Keep finger and hands out of pinch points when checking the track tension.◂

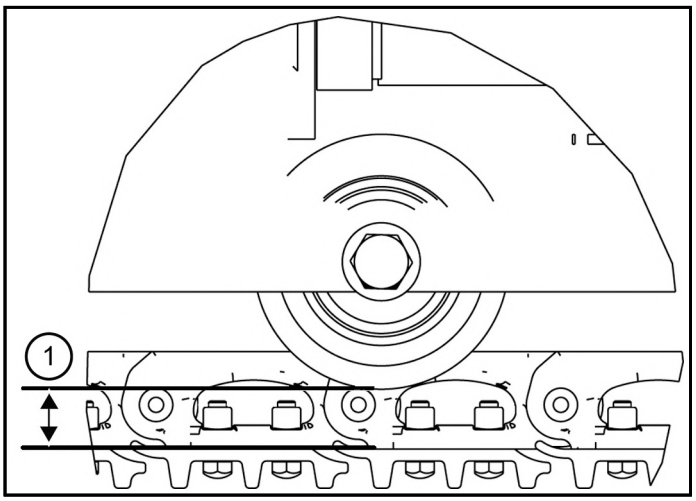
W-2142

Figure 311



NA15893a

Figure 312



NA15892a

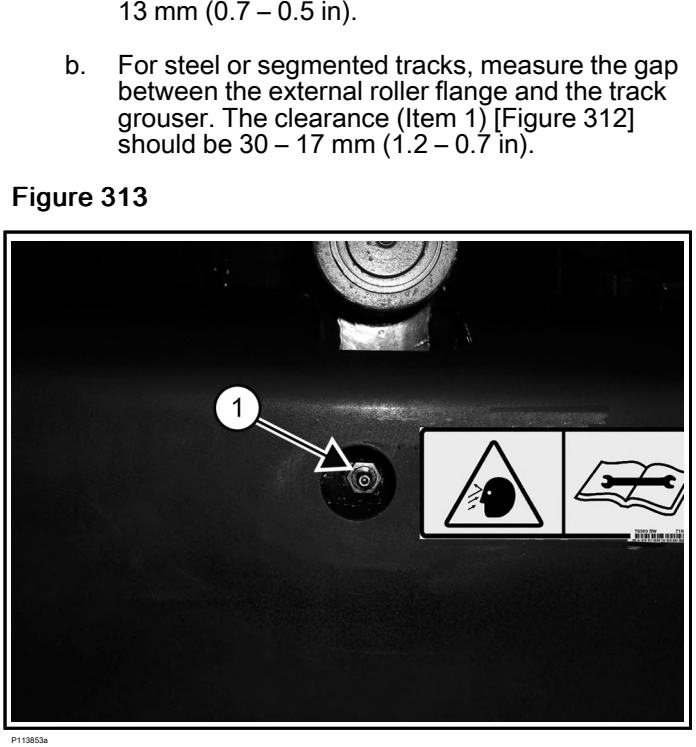
6. Measure the track clearance at the middle track roller.

   Use a bolt or dowel of the appropriate size to check the gap.

   a. For rubber tracks, measure the gap between the contact surface of the roller and the track. The clearance (Item 1) [Figure 311] should be 18 – 13 mm (0.7 – 0.5 in).

   b. For steel or segmented tracks, measure the gap between the external roller flange and the track grouser. The clearance (Item 1) [Figure 312] should be 30 – 17 mm (1.2 – 0.7 in).

Figure 313



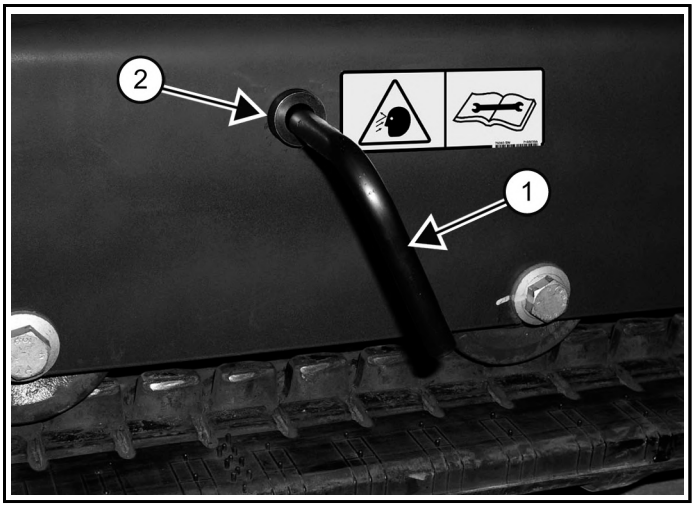
P113853a

7. To **increase track tension**, add grease to the track tension fitting (Item 1) [Figure 313] until the track tension is correct.

⚠ WARNING

INJECTION HAZARD
High pressure grease can penetrate skin and eyes, causing serious injury.
Do not loosen the track tension fitting more than 1 - 1/2 turns.◂
W-2994

Figure 314



P113854a

8. To **decrease track tension**, install the bleed tool (Item 1) on the track tension fitting (Item 2) [Figure 314]. Turn the tool 90° counterclockwise and let the grease flow into a container. Continue to release pressure until the track tension is correct.

   a. Dispose of the grease in an environmentally friendly manner.

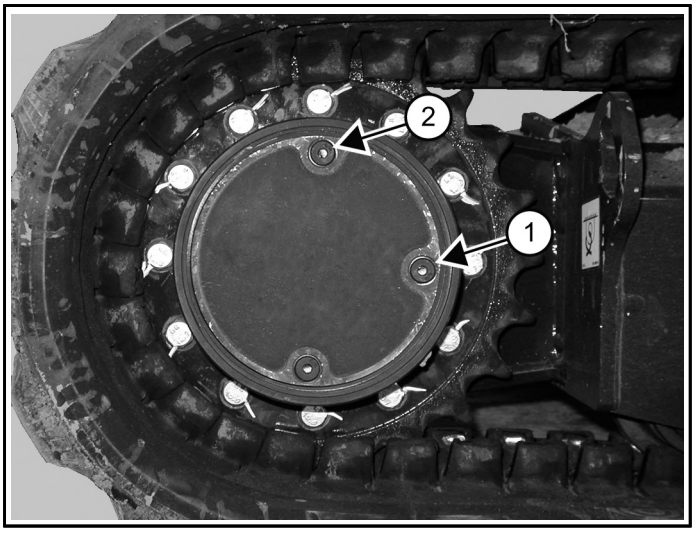
9. Tighten the track tension fitting to 24 – 30 N·m (18 – 22 ft-lb) torque.

10. Repeat the procedure for the opposite side.

TRAVEL MOTOR

Checking And Adding Travel Motor Fluid

Figure 315



P97146d

1. Park the excavator on a level surface with the plugs (Items 1 and 2) [Figure 315] positioned as shown.

2. Remove the plug (Item 1) [Figure 315].

   The fluid level must be at the bottom edge of the hole.

3. Add lubricant through the hole (Item 2) [Figure 315] if the fluid level is low.

   Lubricant should be API GL-4 or 5 containing extreme pressure additive (SAE 80W90).

4. Install the plugs (Items 1 and 2) [Figure 315].

5. Repeat the procedure for the opposite travel motor.

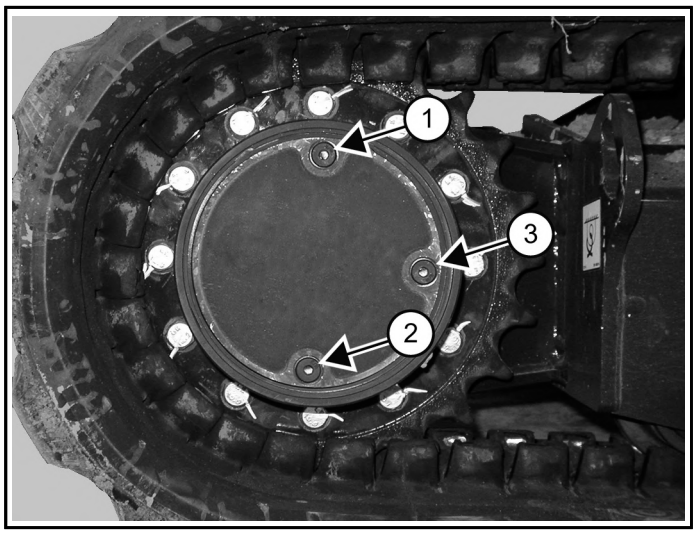
Replacing Travel Motor Fluid

See the Service Schedule for the correct service interval. (See Service Schedule on Page 121)

⚠ WARNING

FIRE AND EXPLOSION HAZARD
Failure to use care around combustibles can cause serious injury or death.
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil.◂
W-2103

Figure 316



P97146f

1. Park the excavator on a level surface with plugs (Items 1, 2, and 3) [Figure 316] positioned as shown.
2. Remove top and bottom plugs (Items 1 and 2) [Figure 316] and drain the lubricant into a container.
3. Install the bottom plug (Item 2) [Figure 316].
4. Remove the side plug (Item 3) [Figure 316].
5. Add lubricant through the top hole (Item 1) until the lube level is at the bottom edge of the check hole (Item 3) [Figure 316].
   (See Capacities Specifications on Page 187)

   Lubricant should be API GL-4 or 5 containing extreme pressure additive (SAE 80W90).
6. Install the plugs (Item 1 and 3) [Figure 316].
7. Repeat the procedure for the opposite travel motor.

BELTS

Adjusting Alternator Belt

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

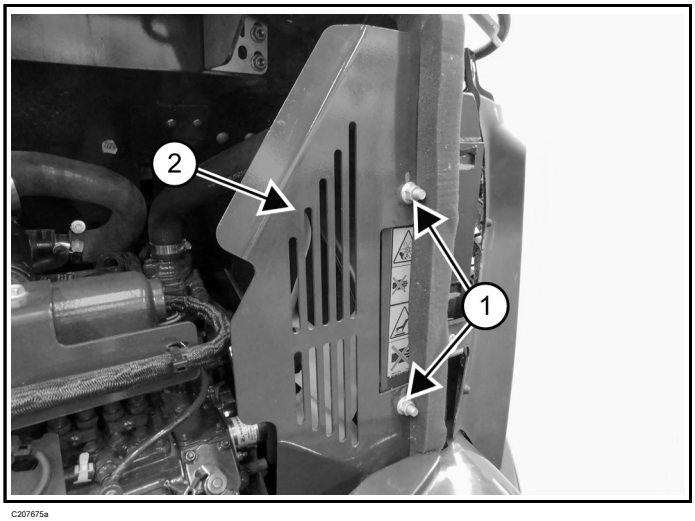
Replacing Alternator Belt

The following items are needed to complete this task:

- Belt tool. See your local Bobcat dealer.
- Pry bar.

1. Stop the engine.
2. Open the tailgate. (See Tailgate on Page 129)
3. If your machine is equipped with air conditioning, remove the compressor belt.
   (See Replacing Air Conditioning Belt on Page 158)

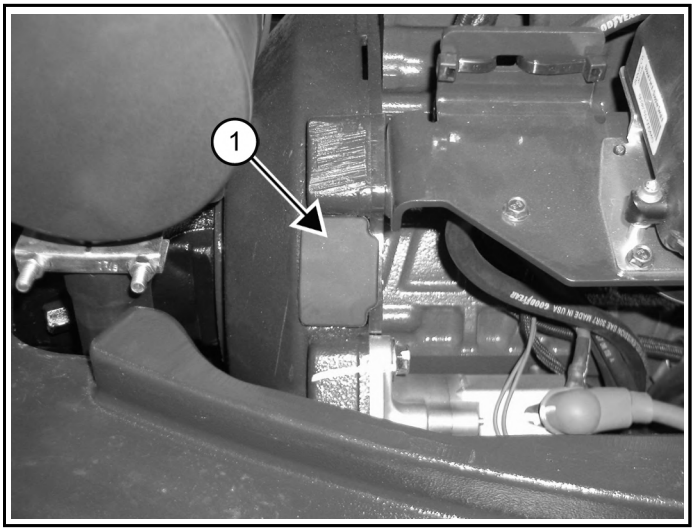
Figure 317



C207675a

4. Loosen the two nuts (Item 1) and remove the fan guard (Item 2) [Figure 317].

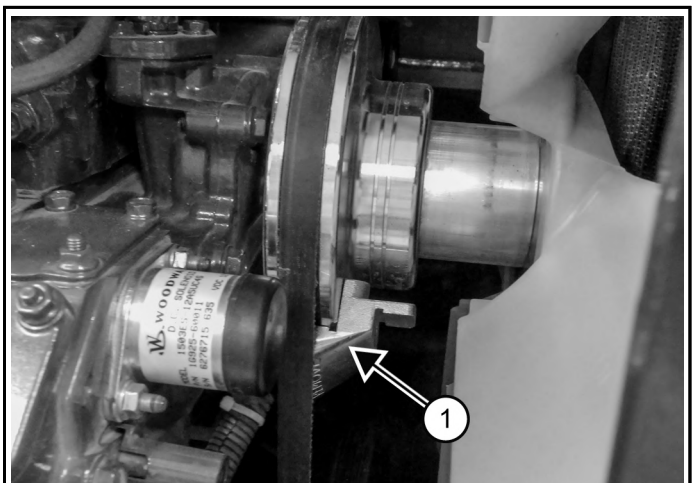
Figure 318



C-97148a

5. Remove the plug (Item 1) [Figure 318] from the flywheel housing to access the flywheel.

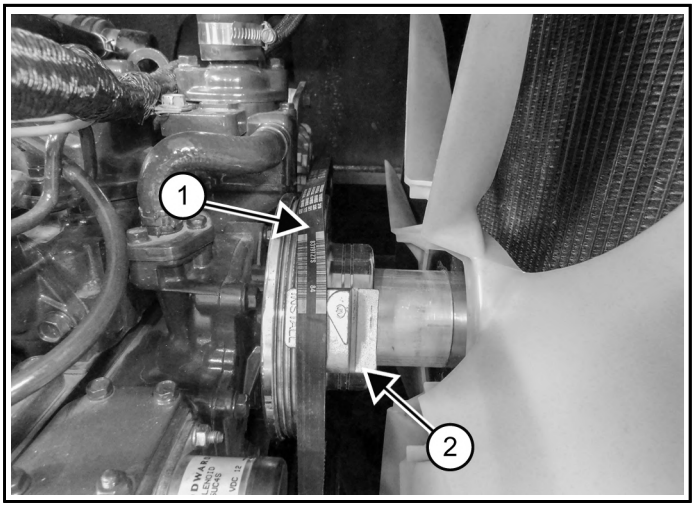
Figure 319



C207676a

6. Use a belt tool (Item 1) [Figure 319] between the belt and the crankshaft pulley.
7. Using a pry bar on the flywheel, rotate the engine by hand to push the belt off the crankshaft pulley. Continue to rotate the flywheel until the belt is loose.
8. Remove the belt.

Figure 320



C207677a

9. Install the belt (Item 1) [Figure 320] over the alternator pulley, the crankshaft pulley, and the fan spacer.
10. Use a belt took (Item 2) [Figure 320] to position the belt onto the fan pulley.
11. Use a pry bar, rotate the flywheel by hand while using the second pry bar to install the belt over the fan pulley.
12. Continue to rotate the engine by hand until the belt is fully on the pulleys.
13. Reinstall the rubber plug (Item 1) [Figure 318].
14. Reinstall the fan guard (Item 2) [Figure 317].
15. Close the tailgate.

Adjusting Air Conditioning Belt

This machine may be equipped with air conditioning.

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.

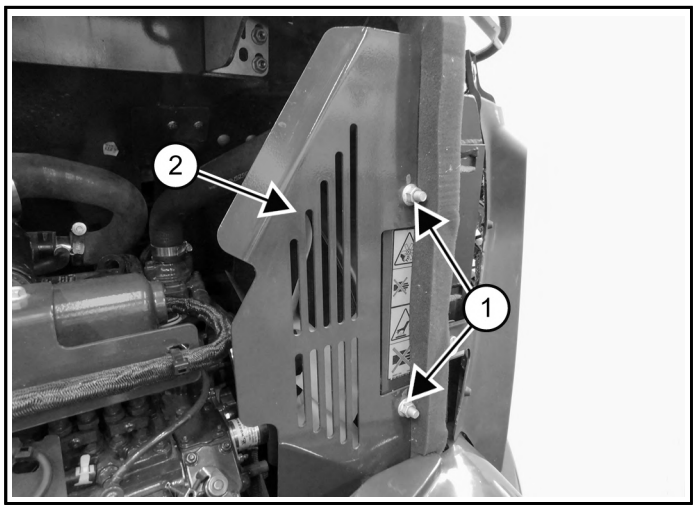
Replacing Air Conditioning Belt

The following items are needed to complete this task:

- Belt tool. See your local Bobcat dealer.
- Pry bar.

1. Stop the engine.
2. Open the tailgate. (See Tailgate on Page 129)

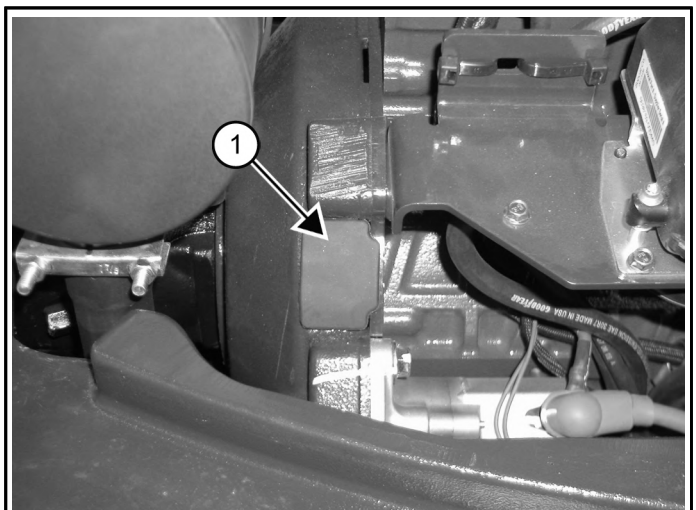
Figure 321



C207675a

3. Loosen the two nuts (Item 1) and remove the fan guard (Item 2) [Figure 321].

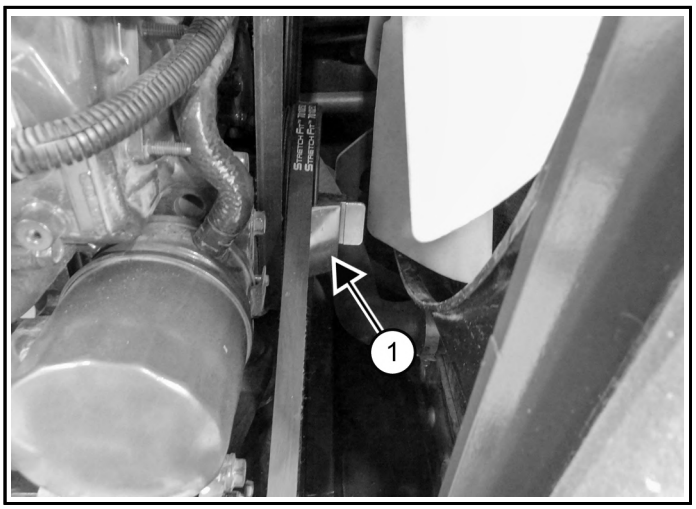
Figure 322



C-97148a

4. Remove the plug (Item 1) [Figure 322] from the flywheel housing to access the flywheel.

Figure 323

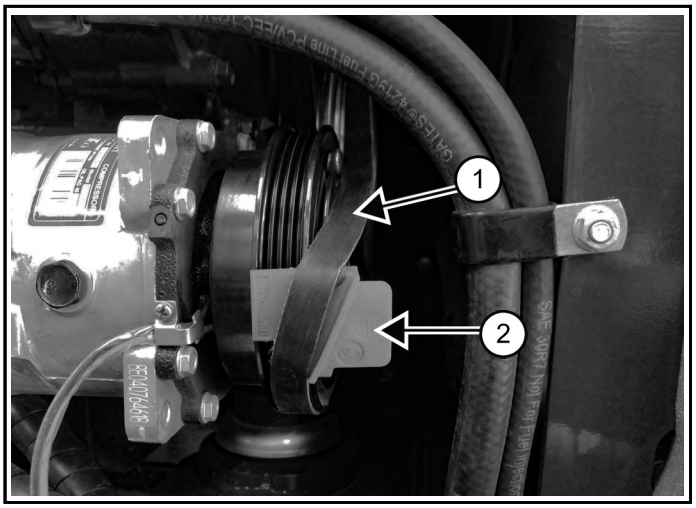


C207735a

5. Use a belt tool (Item 1) [Figure 323] between the belt and the crankshaft pulley.

6. Use a belt tool to position the belt on the pulley while using a pry bar at the flywheel to rotate the engine by hand.

Figure 324



C141388a

7. Position the belt (Item 1) [Figure 324] over the crankshaft pulley and to the compressor pulley.

8. Use a belt tool to position the belt on the pulley while using a pry bar at the flywheel to rotate the engine by hand.

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

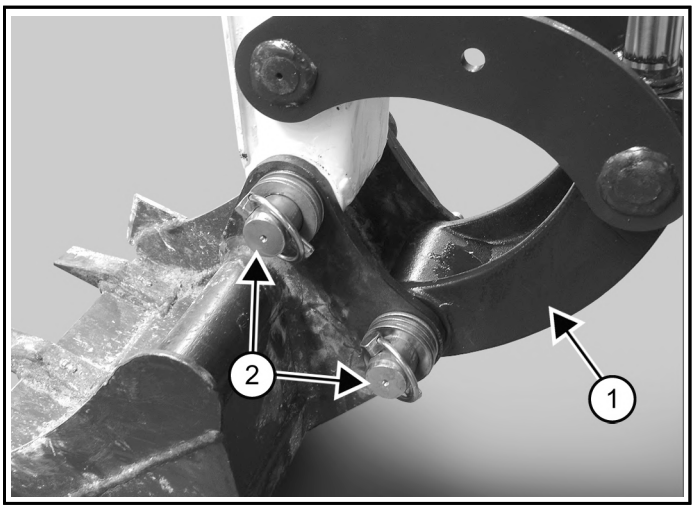
10. Reinstall the rubber plug (Item 1) [Figure 322].

11. Close the tailgate.

QUICK COUPLER

Inspecting And Maintaining The Bucket Link And Coupler

Figure 325

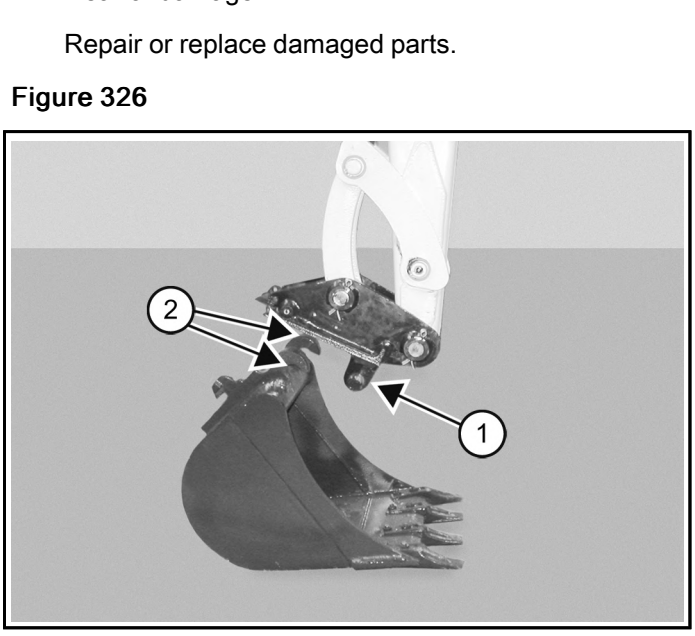


S35382a

- Inspect the bucket link (Item 1) [Figure 325] for wear or damage.
- Inspect the attachment pins (Item 2) [Figure 325] for wear or damage.

  Repair or replace damaged parts.

Figure 326



p-72274d

- Inspect the quick coupler for wear or damage. Inspect the quick coupler pins (Item 1) and the hooks (Item 2) (on the attachment) for wear or damage [Figure 326].

  Repair or replace damaged parts.

BUCKET TEETH

Replacing Bucket Teeth

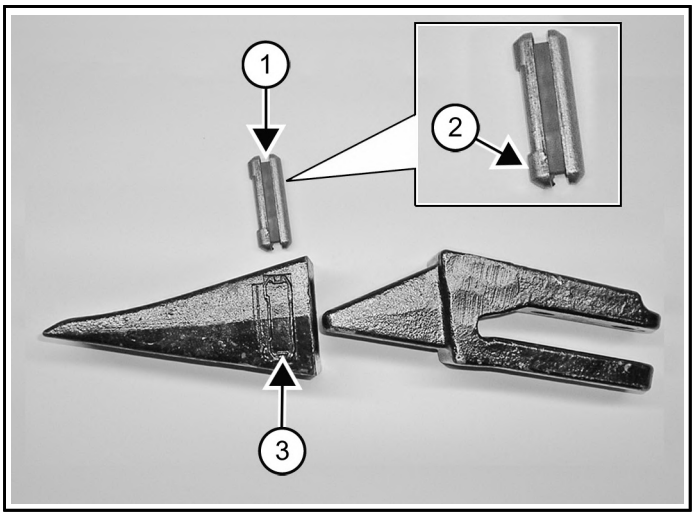
⚠ WARNING

IMPACT AND INJECTION HAZARDS
Flying debris and high pressure fluids can cause serious injury eye injury.
Wear safety glasses to prevent eye injury when any of the following conditions exist:
- **High pressure fluids, springs or other stored energy components.**
- **Flying debris or loose material.**
- **Engine is running.**
- **Tools are being used.**

W-2505

1. Position the bucket so the bucket teeth are at a 30° angle up from the ground to better access the teeth.
2. Lower the boom until the bucket is fully on the ground.
3. Stop the engine and exit the excavator.
4. Inspect the pin, tooth, and fit.

Figure 327



P69201d

5. Position the new tooth point on the shank and install a new retaining pin (Item 1) [Figure 327].

   a. Install the retaining pin (Item 1) as shown, with the notch (Item 2) [Figure 327] to the front, for proper fit and tooth retention.

   The correct orientation of the retaining pin is also shown on the sides of tooth points (Item 3) [Figure 327].

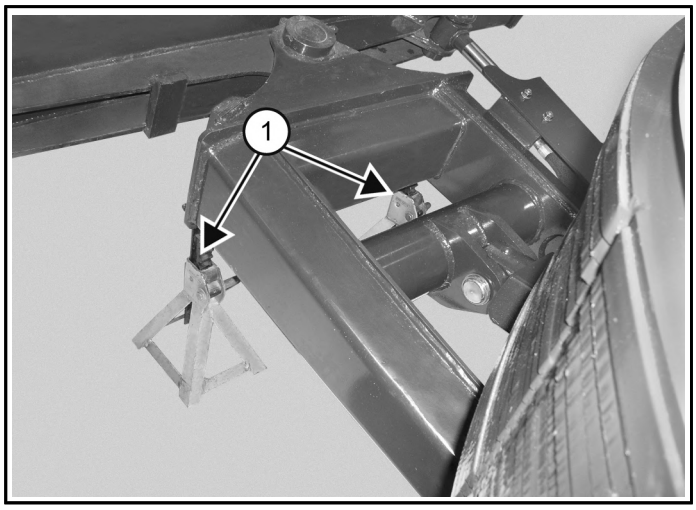
6. Push the retaining pin in until it is flush with the top of the point.

CUTTING EDGE (ANGLE BLADE ONLY)

Reversing Or Replacing The Angle Blade

The cutting edge is reversible and replaceable.

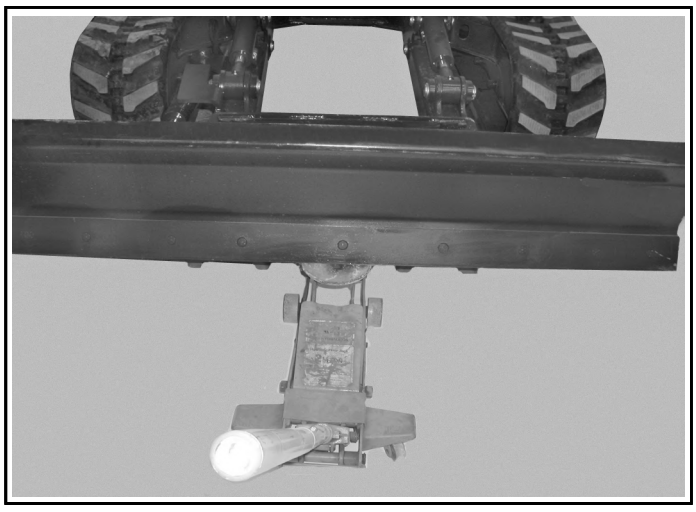
Figure 328



P92276a

1. Raise the blade fully and install jackstands (Item 1) [Figure 328] under the blade arms.

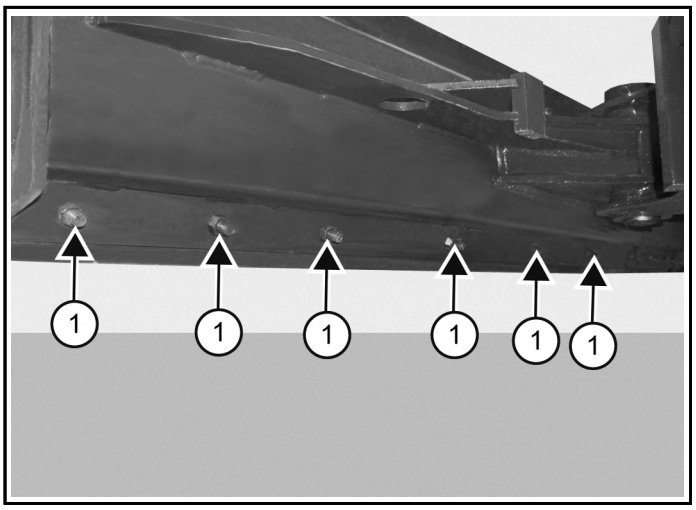
Figure 329



P72782a

2. Place a jack under the cutting edge [Figure 329].

Figure 330



P72780a

3. Remove the nuts and bolts (Item 1) [Figure 330] from the cutting edge.
4. Lower the jack and remove the cutting edge.
5. Reverse the cutting edge or replace it.
6. To install, tighten nuts to 125 N·m (90 ft-lb) torque.

MACHINE LUBRICATION

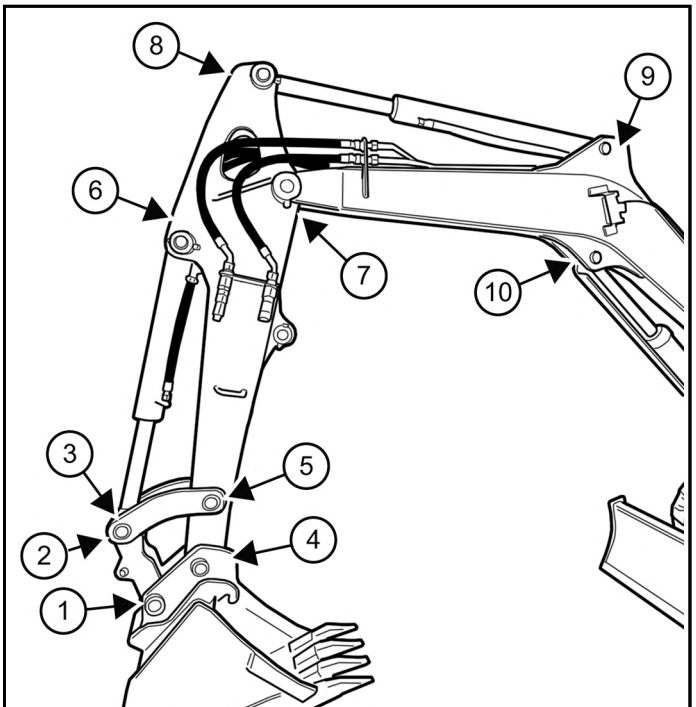
Grease Fitting Locations

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

Lubricate Every 8 – 10 Hours

Bucket, Arm, and Boom

Figure 331

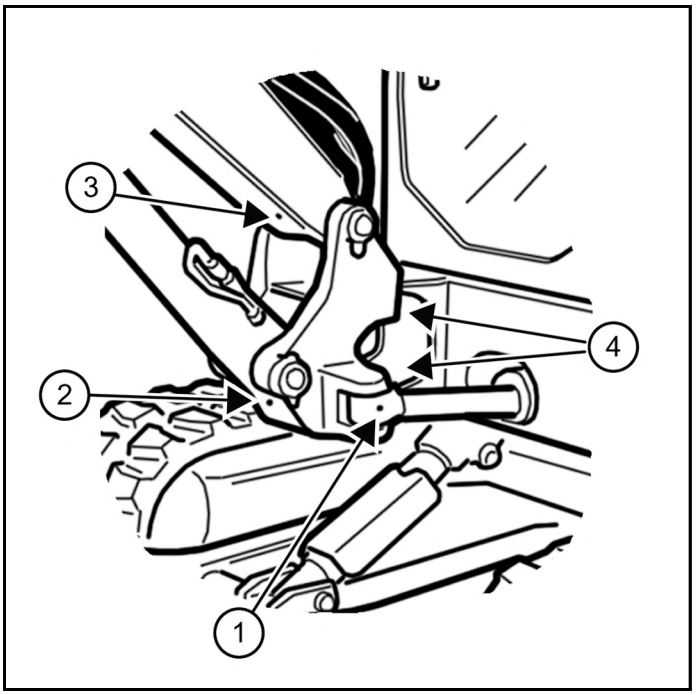


NA18172h

REF	DESCRIPTION	QTY
1	Bucket Pivot	3
2	Bucket Link	2
3	Bucket Cylinder Rod End	1
4	Arm	1
5	Bucket Link Pin	1
6	Bucket Cylinder Base End	1
7	Arm Pivot	1
8	Arm Cylinder Rod End	1
9	Arm Cylinder Base End	1
10	Boom Cylinder Rod End	1

Boom Base

Figure 332

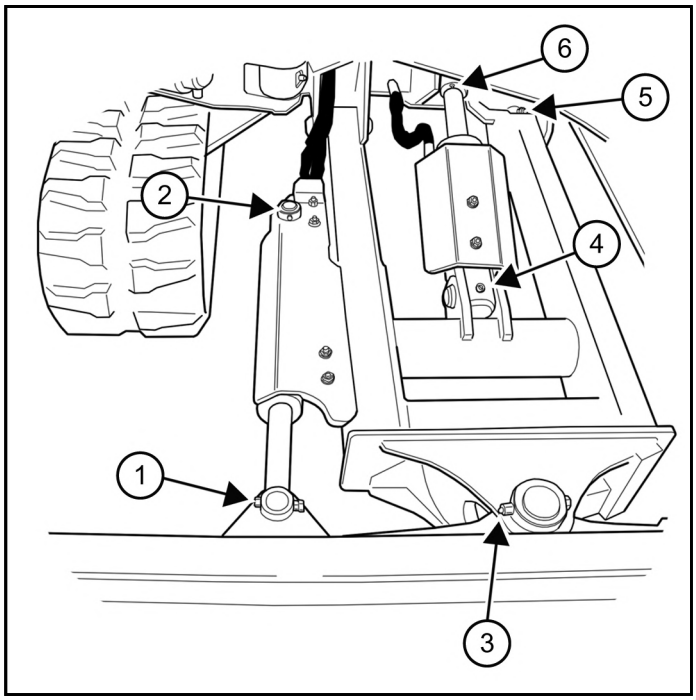


NA18172i

REF	DESCRIPTION	QTY
1	Boom Swing Cylinder Rod End	1
2	Boom Cylinder Base End	1
3	Boom Pivot	1
4	Boom Swing Pivot	2

Blade Cylinder

Figure 333

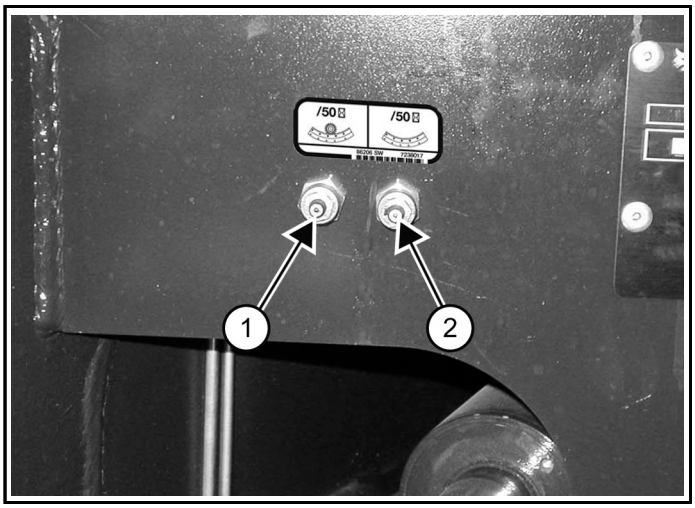


NA20141a

REF	DESCRIPTION	QTY
1	Angle Blade Cylinder Rod End (Angle Blade Only)	1
2	Angle Blade Cylinder Base End (Angle Blade Only)	1
3	Angle Blade Pivot (Angle Blade Only)	1
4	Blade Cylinder Base End	1
5	Blade Pivots	2
6	Blade Cylinder Rod End	1

Lubricate Every 50 Hours

Figure 334



P91982b

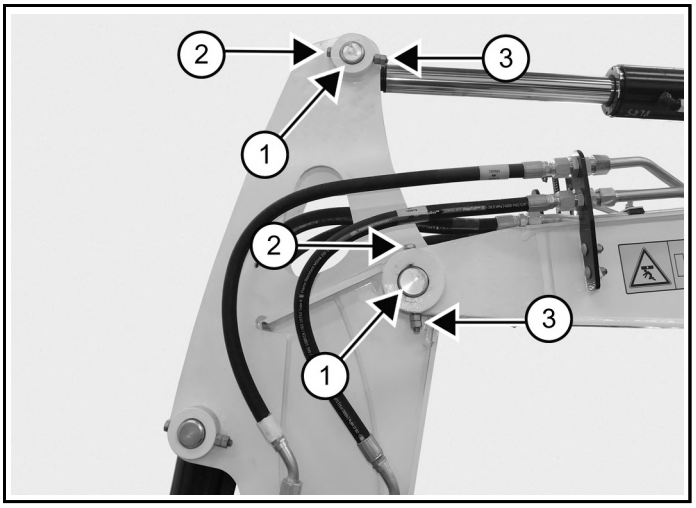
REF	DESCRIPTION	QTY
1	Swing Pinion [A]	1
2	Swing Circle	1

[A] Install three to four pumps of grease then rotate the upperstructure 90°. Install three to four pumps of grease and again rotate the upperstructure 90°. Repeat this until the slew pinion has been greased at four positions.

PIVOT PINS

Pivot Pin Inspection And Maintenance

Figure 335



P200155a

The pivots and cylinders (Item 1) have a large pin held in position with a bolt (Item 2) and a nut (Item 3) [Figure 335] securing the pin.

After the nut (Item 3) and bolt (Item 2) [Figure 335] are installed and nuts are tightened together, the bolt should be free to spin.

See your Bobcat dealer for replacement parts.

STORAGE AND RETURN TO SERVICE

Extended Storage Procedure

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

- Thoroughly clean the machine including the engine compartment.
- Lubricate the machine.
- Replace worn or damaged parts.
- Drive the machine onto planks in a dry protected shelter.
- Lower the boom fully with the bucket flat on the ground.
- Put grease on any exposed cylinder rods.
- Put fuel stabiliser in the fuel tank and run the engine a few minutes to circulate the stabiliser to the pump and fuel injectors.

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

  - Drain the fuel tank, refill with 100% petroleum diesel fuel, add fuel stabiliser and run 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 air cleaner, heater, and air conditioning filters.
- Put all controls in NEUTRAL position.
- Remove the battery. Charge the battery. Store the battery in a cool dry location 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.
- Clean HVAC drain valves (if equipped).

Returning Machine To Service

Follow this list of items to return the machine to service after it has been in extended storage.

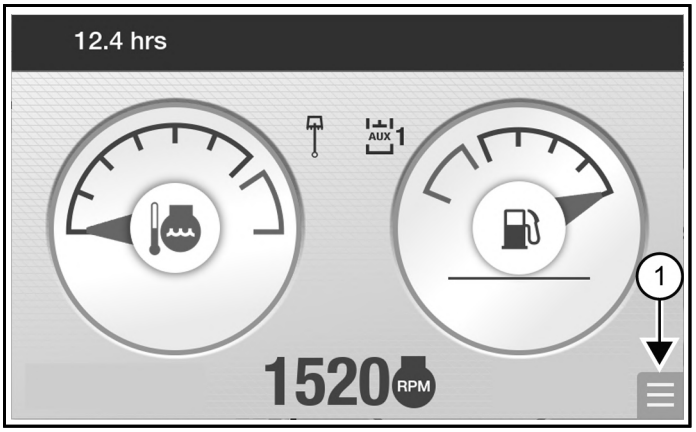
- Check the engine and hydraulic oil levels.
- Check coolant level.
- Install a fully charged battery.
- Remove grease from exposed cylinder rods.

- Check all belt tensions.
- Be sure all shields and guards are in place.
- Lubricate the machine.
- 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 machine off the planks.
- Operate machine, check for correct function.
- Stop the engine and check for leaks. Repair as needed.

NAVIGATION (STANDARD DISPLAY)

Opening Navigation Bar

Figure 336

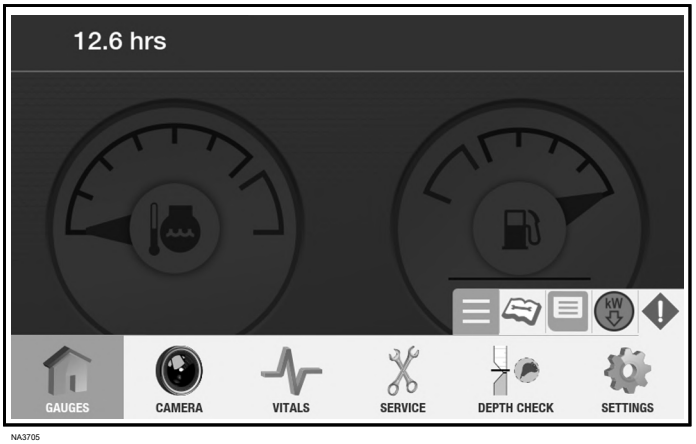


NA3773a

1. Select the navigation handle (Item 1) [Figure 336] to open the navigation bar.
2. Select one of the following screens that appear on the navigation bar:
    1. **GAUGES** screen
    2. **CAMERA** screen
    3. **VITALS** screen
    (See Vitals (Standard Display) on Page 167)
    4. **SERVICE** screen
    (See Service (Standard Display) on Page 168)
    5. **DEPTH CHECK** screen (if equipped)
    (See Depth Check (Standard Display) on Page 102)
    6. **SETTINGS** screen
    (See Settings (Standard Display) on Page 169)

Active Shortcuts

Figure 337



NA3705

The following icons can appear in the navigation handle position [Figure 337]. Selecting an icon will take you directly to the indicated screen.

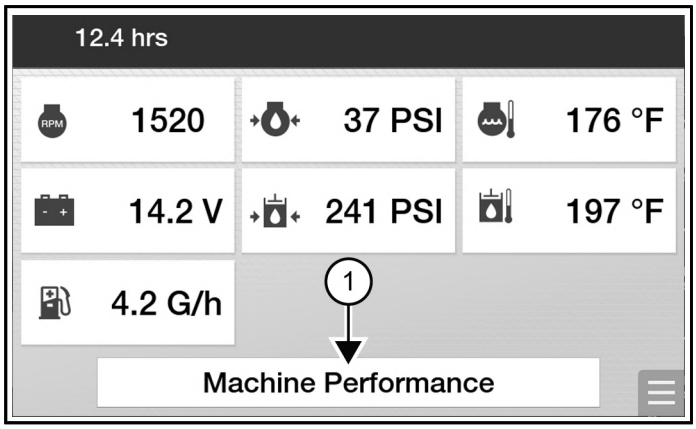
ICON	DESCRIPTION	FUNCTION
	Navigation Handle	Opens and closes the navigation bar.
	Service Due	Opens **SERVICE** screen.
	Software Update	Opens **SOFTWARE** screen.
	Machine Derate	Opens **MACHINE PERFORMANCE** screen.
	Warning	Opens **SERVICE CODES** screen.

VITALS (STANDARD DISPLAY)

Accessing Vital Detail And Machine Performance

1. Select **[NAVIGATION HANDLE]→ [VITALS]**.

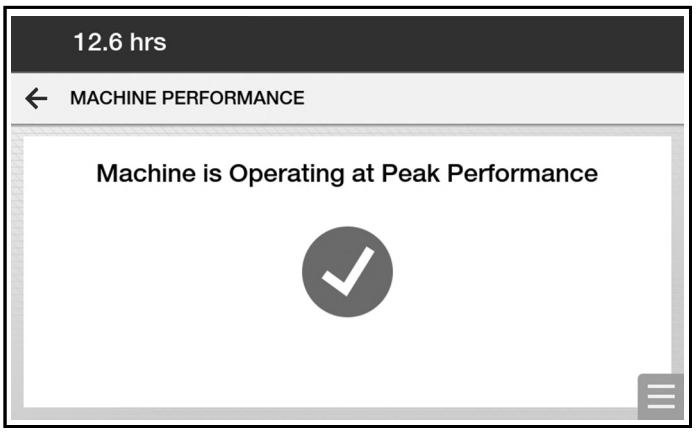
Figure 338



NA3752b

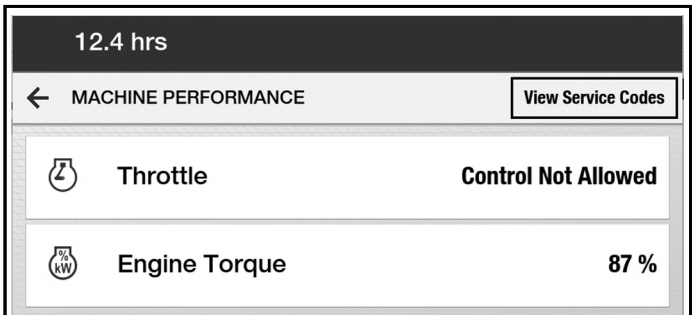
2. On the **VITAL DETAIL** screen [Figure 338], view a digital readout of the gauges. The screen provides real-time monitoring of:
   - Engine Speed (RPM)
   - Engine Oil Pressure
   - Engine Coolant Temperature
   - System Voltage
   - Hydraulic Fluid Pressure
   - Hydraulic Fluid Temperature
   - Fuel Usage (G/h or L/h)
3. Select **[MACHINE PERFORMANCE]** (Item 1) [Figure 338] to view any limitations or restrictions that prevent machine damage.

Figure 339



NA3702

Figure 340



NA3785

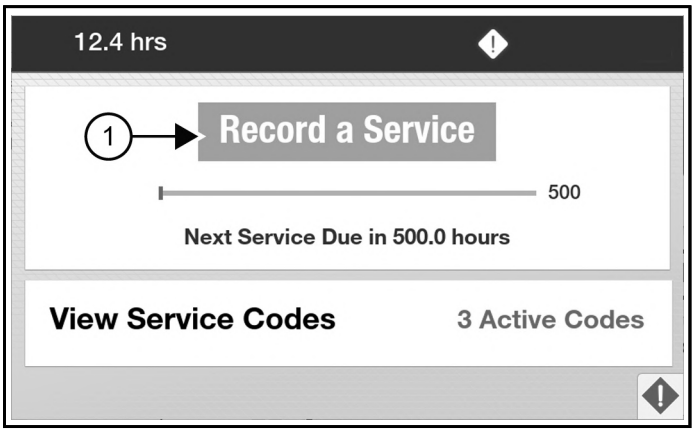
Examples of machine performance screens are shown in [Figure 339] and [Figure 340].

SERVICE (STANDARD DISPLAY)

Recording A Service

1. Select **[NAVIGATION HANDLE]→ [SERVICE]**.

Figure 341

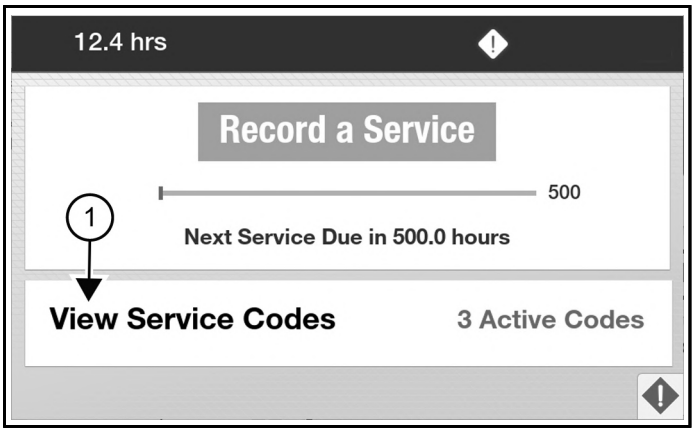


2. Select **[RECORD A SERVICE]** (Item 1) [Figure 341] to record the service as completed.

Viewing Service Codes

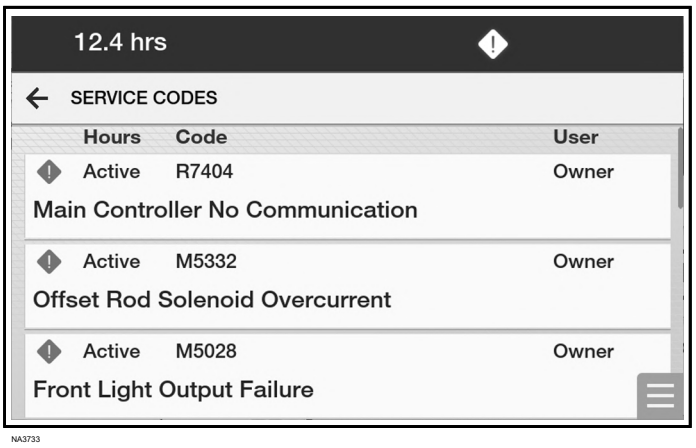
1. Select the **[NAVIGATION HANDLE]→ [SERVICE]**.

Figure 342



2. Select **[VIEW SERVICE CODES]** (Item 1) [Figure 342].

Figure 343



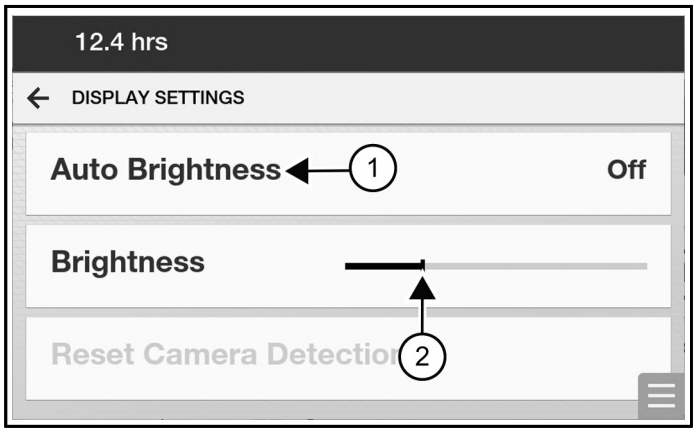
3. Scroll down if necessary to view service codes [Figure 343].

SETTINGS (STANDARD DISPLAY)

Adjusting Display Brightness

1. Select **[NAVIGATION HANDLE]→ [SETTINGS]→ [DISPLAY SETTINGS]**.

Figure 344



2. Select **[AUTO BRIGHTNESS]** (Item 1) [Figure 344] to turn it ON / OFF. When ON, the brightness will automatically adjust according to the ambient light.

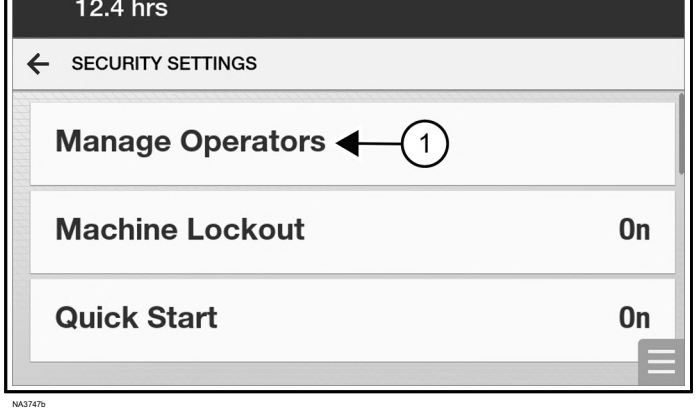
   OR

   To adjust the display brightness, move the slider (Item 2) [Figure 344] to the left to dim, to the right to brighten.

Managing Operators

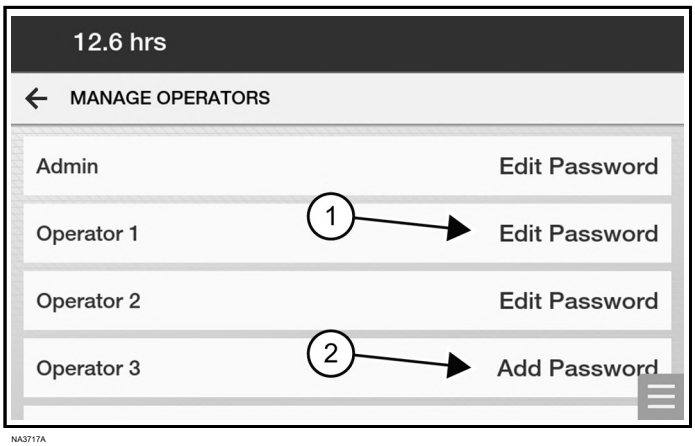
1. Select **[NAVIGATION HANDLE]→ [SETTINGS]→ [SECURITY SETTINGS]**.
2. Enter the password and select the **[ENTER]** icon.

Figure 345



3. Select **[MANAGE OPERATORS]** (Item 1) [Figure 345].

Figure 346



4. Select **[EDIT PASSWORD]** (Item 1) [Figure 346] to change a password or remove an operator.

   OR

   Select **[ADD PASSWORD]** (Item 2) [Figure 346] to enter a password for a new operator.

Machine Lockout And Quick Start

The owner can enable Machine Lockout:

- If Machine Lockout is ON, a password must be entered before the machine can be operated.
- If Machine Lockout is OFF, the machine can be operated without a password.

The owner also has the option to enable Quick Start:

- If Quick Start is ON, the machine can be started before the display is fully booted up.
- If Quick Start is OFF, the machine can't be started until the display is fully booted up.

The machine will not start if engine fuel priming or pre-heat is required. When the Wait to Start light turns OFF, the machine can be started.
(See Quick Start Description on Page 66)

Password Description

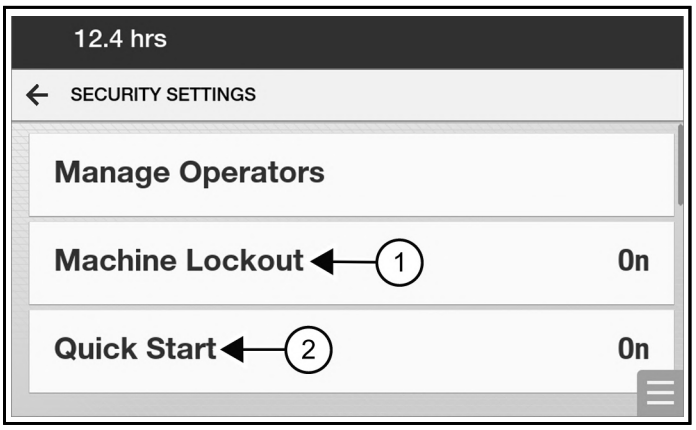
Owner Password: Allows for full use of the machine and to set up the display security settings. There is only one owner password. The owner password must be used to change the owner or operator passwords. If this password is lost, contact your Bobcat dealer to unlock the machine.

Operator Passwords: Allows starting and operating of the machine. The owner password is needed to change an operator password. There can be multiple operator passwords.

Enabling Machine Lockout And Quick Start

1. Select **[NAVIGATION HANDLE]→ [SETTINGS]→ [SECURITY SETTINGS]**.

Figure 347



2. Select **[MACHINE LOCKOUT]** (Item 1) [Figure 347] to turn ON / OFF.
3. Select **[QUICK START]** (Item 2) [Figure 347] to turn ON / OFF.

   Quick Start is always enabled when the Machine Lockout is OFF.

Setting The System Language

1. Select **[NAVIGATION HANDLE]→ [SETTINGS]→ [LANGUAGE SETTINGS]**.

Figure 348

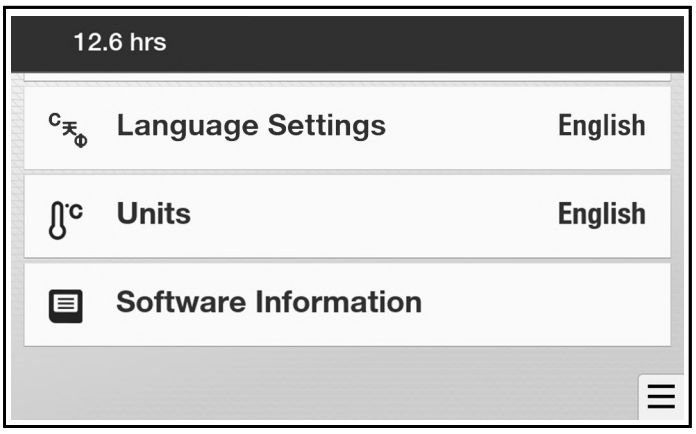
2. On the **SET LANGUAGE** screen, scroll through the languages and select the desired language.

   The selected language will take effect immediately and can be different for each operator.

Switching Between English / Metric Units

1. Select **[NAVIGATION HANDLE]→ [SETTINGS]**.

Figure 349

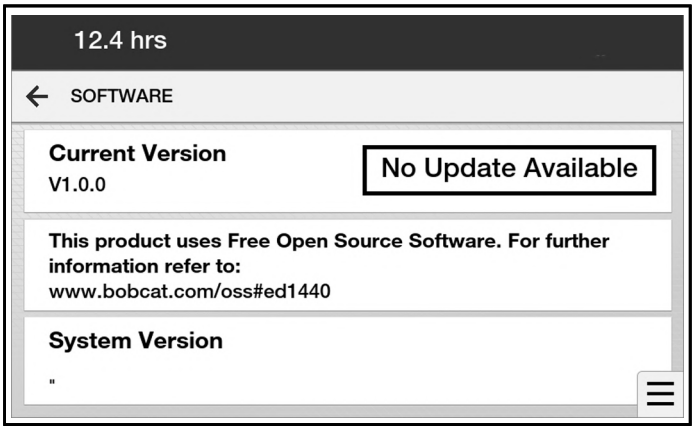


2. Scroll down and select **[UNITS]** (Item 1) [Figure 349] to toggle between English and metric units.

Software Version

1. Select **[NAVIGATION HANDLE]→ [SETTINGS]→ [SOFTWARE INFORMATION]**.

Figure 350



2. Use the **SOFTWARE** screen to find your software version and check for updates.

   To update the software, see your Bobcat dealer.

STANDARD PANEL

Viewing Service Codes

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

Figure 351

NA3272a

Press the information button (Item 2) to cycle the data display (Item 1) [Figure 351] 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.

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

Password Setup (Keyless Start Panel)

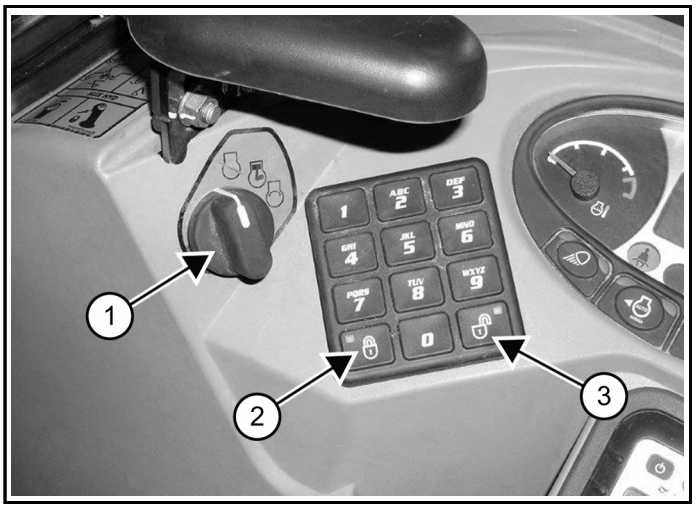
Password Description

Owner Password: Allows for full use of the machine. The owner password must be used to change the owner or user passwords. If this password is lost, contact your Bobcat dealer to unlock the machine.

User 1 and User 2 Passwords: Allows starting and operating of the machine. By default, User 1 and User 2 passwords are not set.

Changing The Owner, User 1, And User 2 Passwords

Figure 352



C113420a

1. Turn the start switch (Item 1) [Figure 352] to ON.
2. Enter the five-digit owner password using the keypad if prompted.
3. Press and hold the lock (Item 2) and unlock (Item 3) [Figure 352] keys for 2 seconds.

   The lock key red light or the unlock key green light will flash and the instrument panel display screen will show “CODE”.
4. Enter a new five-digit password using the keypad.

   The display screen will show “OWNER” for two seconds.
5. Press the unlock key (Item 3) [Figure 352] to navigate between “OWNER”, “USER 1”, and “USER 2”.

   After two seconds, the display screen will show “ENTER”.
6. Enter a new five-digit owner, user 1, or user 2 password using the keypad.
7. Enter the new five-digit password again when prompted.

The system will return to its previous state. Either the lock key (Item 2) red light or the unlock key (Item 3) [Figure 352] green light will become solid.

The display screen will show “ERROR” if:

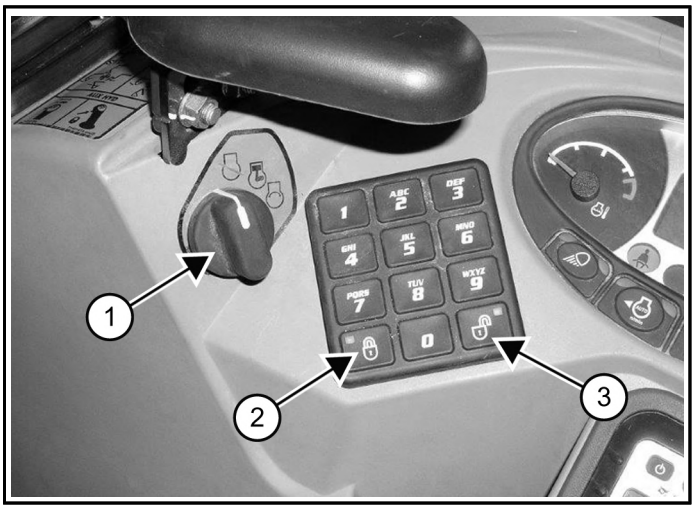
- The second five-digit password is different from the first one entered.
- No number key was pressed for more than 20 seconds.
- The password entered was **[00000]**.

Disabling Password Lockout

The owner can disable the password lockout feature so that a password does not have to be entered every time the engine is started.

1. Turn the start switch (Item 1) [Figure 353] to ON.

Figure 353



C113420a

2. Enter the five-digit owner password using the keypad.
3. Press the unlock key (Item 3) [Figure 353].
4. The left panel display screen will show “CODE”.
5. Enter the five-digit owner password using the keypad.

   The unlock key green light will flash, then become solid.

The excavator can now be started without using a password.

Enabling Password Lockout

The owner can enable the password lockout feature so that operators must enter a password every time the engine is started.

1. Turn the start switch (Item 1) [Figure 353] to ON.
2. Press the lock key (Item 2) [Figure 353].

   The lock key red light will flash, and the left panel display screen will show “CODE”.
3. Enter the five-digit owner password using the keypad.

   The unlock key green light will flash, then the lock key red light will become solid.

Operators must now enter a password every time to start the excavator.

Maintenance Clock

Maintenance Clock Description

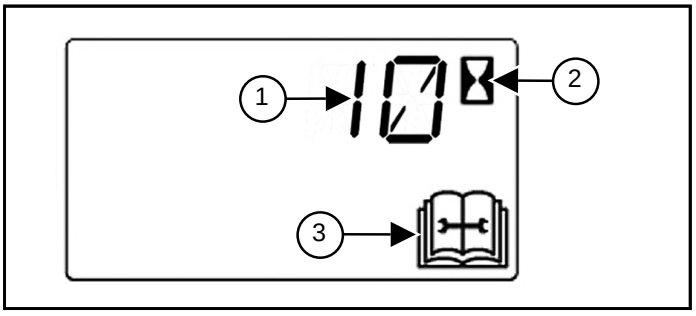
The maintenance clock alerts the operator when the next service interval is due.

The maintenance clock can be set to a 500 hour interval as a reminder for the next 500 hour planned maintenance.

Maintenance Notification On Standard Instrument Panel

During machine operation, a two-beep alarm will sound when there are less than 10 hours until the next planned maintenance.

Figure 354



NA3086a

The remaining hours before maintenance is required (Item 1) will appear in the data display for 5 seconds while the hourmeter icon (Item 2) and service icon (Item 3) [Figure 354] flash.

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

This maintenance notification will appear for five seconds every time the machine is started until the maintenance clock is reset.

Maintenance Clock Setup

See your Bobcat dealer about installation of this feature.

Resetting The Maintenance Clock

Figure 355

NA3273a

1. Press the information button (Item 2) [Figure 355] until the display screen shows the maintenance clock.

2. Press and hold the Information button (Item 2) for seven seconds until “RESET” (Item 1) [Figure 355] appears in the display screen.

   NOTE: The maintenance clock cannot be reset unless the planned maintenance interval is less than 10 hours away or the maintenance is past due.

DIAGNOSTIC SERVICE CODES

Service Codes List

Code	Description
H0104	Boom Angle Sensor No Communication
H0204	Arm Angle Sensor No Communication
H0304	Bucket Angle Sensor No Communication
H0405	Angle Sensor Supply Short To Battery
H0406	Angle Sensor Supply Short To Ground
H0407	Angle Sensor Supply Open Circuit
H0705	Aux 4 Base Short to Battery
H0706	Aux 4 Base Short to Ground
H0707	Aux 4 Base Open Circuit
H0732	Aux 4 Base Overcurrent
H0805	Aux 4 Rod Short to Battery
H0806	Aux 4 Rod Short to Ground
H0807	Aux 4 Rod Open Circuit
H0832	Aux 4 Rod Overcurrent
H0905	Direct To Tank Short to Battery
H0906	Direct to Tank Short to Ground
H0907	Direct to Tank Open Circuit
H0932	Direct to Tank Overcurrent
H2521	Angle Blade Control Switch Out Of Range High
H2522	Angle Blade Control Switch Out Of Range Low
H2524	Angle Blade Control Switch Out Of Neutral
H2605	Angle Blade Base Solenoid Short To Battery
H2606	Angle Blade Base Solenoid Short To Ground
H2607	Angle Blade Base Solenoid Open Circuit
H2632	Angle Blade Base Solenoid Overcurrent
H2705	Angle Blade Rod Solenoid Short To Battery
H2706	Angle Blade Rod Solenoid Short To Ground
H2707	Angle Blade Rod Solenoid Open Circuit
H2732	Angle Blade Rod Solenoid Overcurrent
H2805	Diverter Output Short To Battery
H2806	Diverter Output Short To Ground

Code	Description
H2807	Diverter Output Open Circuit
H2832	Diverter Output Overcurrent
H2848	Diverter Multiple Input
H3128	Interrupted Power Failure
H3904	Left Joystick In Error
H3912	Left Joystick Thumb Switch Not In Neutral
H3913	Left Joystick Grip No Communication
H3916	Left Joystick No Communication
H3928	Left Joystick Internal Failure
H3948	Left Joystick Multiple
H4423	Secondary Not Programmed
H4497	Secondary Controller Programmed
H4621	5 Volt Sensor Supply Out Of Range High
H4622	5 Volt Sensor Supply Out Of Range Low
H4721	8 Volt Sensor Supply Out Of Range High
H4722	8 Volt Sensor Supply Out Of Range Low
H5705	Angle Blade Aux 4 Base Short to Battery
H5706	Angle Blade Aux 4 Base Short to Ground
H5707	Angle Blade Aux 4 Base Open Circuit
H5732	Angle Blade Aux 4 Base Overcurrent
H5805	Angle Blade Aux 4 Rod Short to Battery
H5806	Angle Blade Aux 4 Rod Short to Ground
H5807	Angle Blade Aux 4 Rod Open Circuit
H5832	Angle Blade Aux 4 Rod Overcurrent
H7404	Main Controller No Communication
H7604	Display No Communication
H7902	Door Unlock Error On
H7903	Door Unlock Error Off
H8002	Door Lock Error On
H8003	Door Lock Error Off
L0102	Lights Button Error On
L0202	High Flow Enable Button Error On
L0302	Auxiliary Enable Button Error On
L0402	Information Button Error On
L7404	Information Button Error On

Code	Description
L7672	Information Button Error On
LOWV-LTG	Low Battery Voltage
M0116	Air Filter Not Connected
M0117	Air Filter Plugged
M0144	Air Filter Derate Level 1
M0145	Air Filter Derate Level 2
M0216	Hydraulic/hydrostatic Filter Not Connected
M0217	Hydraulic/hydrostatic Filter Plugged
M0309	System Voltage Too Low
M0310	System Voltage Too High
M0311	System Voltage Extremely High
M0314	System Voltage Extremely Low
M0322	System Voltage Out Of Range Low
M0414	Engine Oil Pressure Extremely Low
M0415	Engine Oil Pressure In Shutdown
M0610	Engine Speed Too High
M0611	Engine Speed Extremely High
M0613	Engine Speed No Signal
M0615	Engine Speed In Shutdown
M0618	Engine Speed Out Of Range
M0710	Hydraulic Oil Temp Too High
M0711	Hydraulic Oil Temp Extremely High
M0715	Hydraulic Oil Temp In Shutdown
M0721	Hydraulic Oil Temp Out Of Range High
M0722	Hydraulic Oil Temp Out Of Range Low
M0810	Engine Coolant Temp Too High
M0811	Engine Coolant Temp Extremely High
M0815	Engine Coolant Temp In Shutdown
M0821	Engine Coolant Temp Out Of Range High
M0822	Engine Coolant Temp Out Of Range Low
M0826	Engine Coolant Temp Out Of Range Low
M0909	Fuel Level Too Low
M0921	Fuel Level Out Of Range High
M0922	Fuel Level Out Of Range Low

Code	Description
M1121	Console Sensor Out Of Range High
M1122	Console Sensor Out Of Range Low
M1128	Console Sensor Failure
M1305	Fuel Hold Solenoid Short To Battery
M1306	Fuel Hold Solenoid Short To Ground
M1307	Fuel Hold Solenoid Open Circuit
M1402	Fuel Pull Solenoid Error On
M1403	Fuel Pull Solenoid Error Off
M1407	Fuel Pull Solenoid Open Circuit
M1428	Fuel Pull Solenoid Failure
M1605	Hydraulic Bypass Short to Battery
M1606	Hydraulic Bypass Short to Ground
M1607	Hydraulic Bypass Open Circuit
M1632	Hydraulic Bypass Overcurrent
M1705	Hydraulic Lock Valve Short To Battery
M1706	Hydraulic Lock Valve Short To Ground
M1707	Hydraulic Lock Valve Open Circuit
M1732	Hydraulic Lock Valve Overcurrent
M1802	Power Beyond Valve Output Error On
M1803	Power Beyond Valve Output Error Off
M1902	Power Beyond Valve Relay Error On
M1903	Power Beyond Valve Relay Error Off
M2005	Two Speed Primary Solenoid Short To Battery
M2006	Two Speed Primary Solenoid Short To Ground
M2007	Two Speed Primary Solenoid Open Circuit
M2102	Glow Plug Output Error On
M2103	Glow Plug Output Error Off
M2107	Glow Plug Output Open Circuit
M2128	Glow Plug Output Failure
M2202	Starter Output Error On
M2203	Starter Output Error Off
M2207	Starter Output Open Circuit
M2228	Starter Output Failure
M2302	Starter Relay Error On

Code	Description
M2303	Starter Relay Error Off
M2402	Fuel Pull Relay Error On
M2403	Fuel Pull Relay Error Off
M2521	Load Sense Sensor Out Of Range High
M2522	Load Sense Sensor Out Of Range Low
M2602	Glow Plug Relay Error On
M2603	Glow Plug Relay Error Off
M2721	Throttle Primary Sensor Out Of Range High
M2722	Throttle Primary Sensor Out Of Range Low
M2805	Diverter Output Short To Battery
M2806	Diverter Output Short To Ground
M2807	Diverter Output Open Circuit
M3128	Interrupted Power Failure
M3204	Throttle Controller No Communication To Bobcat Controller
M3223	Throttle Controller Not Calibrated
M3228	Throttle Controller Failure
M3299	Throttle Controller Calibration In Process
M3304	Deluxe Panel No Communication
M3372	Display Software Incompatible
M3373	Display Software Outdated
M3702	HYD Exchange Output Error On
M3703	HYD Exchange Output Error Off
M3904	Jog Shuttle No Communication
M4028	Wrong ECU Detected
M4109	Alternator Voltage Too Low
M4110	Alternator Voltage High
M4204	Keyless Entry No Communication
M4304	Keyless Start Panel No Communication
M4404	Secondary No Communication
M4472	Secondary Controller Software Incompatible
M4473	Secondary Controller Software Outdated
M4621	5 Volt Sensor Supply Out Of Range High
M4622	5 Volt Sensor Supply Out Of Range Low
M4721	8 Volt Sensor Supply Out Of Range High

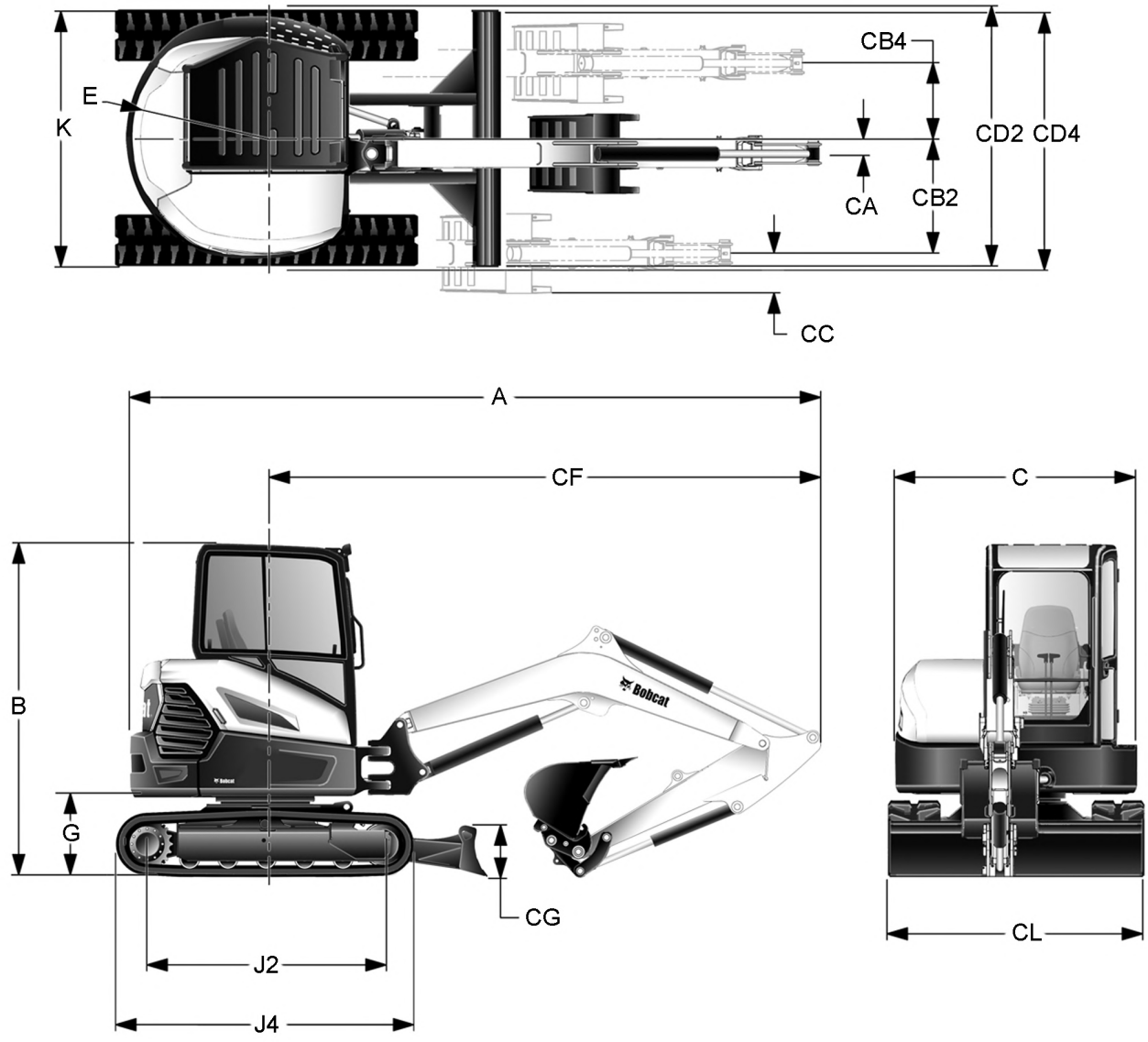
Code	Description
M4722	8 Volt Sensor Supply Out Of Range Low
M4802	Front Light Relay Error On
M4803	Front Light Relay Error Off
M5002	Front Light Output Error On
M5003	Front Light Output Error Off
M5205	Offset Base Solenoid Short To Battery
M5206	Offset Base Solenoid Short To Ground
M5207	Offset Base Solenoid Open Circuit
M5232	Offset Base Solenoid Overcurrent
M5305	Offset Rod Solenoid Error On
M5306	Offset Rod Solenoid Short To Ground
M5307	Offset Rod Solenoid Open Circuit
M5332	Offset Rod Solenoid Overcurrent
M5421	Offset Control Switch Out Of Range High
M5422	Offset Control Switch Out Of Range Low
M5424	Offset Control Switch Out Of Neutral
M5505	Auxiliary Base Solenoid Short To Battery
M5506	Auxiliary Base Solenoid Short To Ground
M5507	Auxiliary Base Solenoid Open Circuit
M5532	Auxiliary Base Solenoid Overcurrent
M5605	Auxiliary Rod Solenoid Short To Battery
M5606	Auxiliary Rod Solenoid Short To Ground
M5607	Auxiliary Rod Solenoid Open Circuit
M5632	Auxiliary Rod Solenoid Overcurrent
M5721	Auxiliary Control Switch Out Of Range High
M5722	Auxiliary Control Switch Out Of Range Low
M5724	Auxiliary Control Switch Out Of Neutral
M5810	Fuel Temperature High
M5811	Fuel Temperature Extremely High
M5815	Fuel Temperature In Shutdown
M5826	Fuel Temperature In Shutdown
M6021	Left Control Switch Out of Range High
M6022	Left Control Switch Out of Range Low
M6024	Left Control Switch Out of Neutral
M6121	Right Control Switch Out of Range High

Code	Description
M6122	Right Control Switch Out of Range Low
M6124	Right Control Switch Out of Neutral
M6204	Load Moment Sensor In Error
M6221	Overload Warning Sensor Out of Range High
M6222	Overload Warning Sensor Out of Range Low
M6402	Switched Power Relay Error On
M6403	Switched Power Relay Error Off
M6505	ECU Power Short To Battery
M6506	ECU Power Short To Ground
M6507	ECU Power Open Circuit
M6604	ECU No Communication
M6702	HVAC Output Error On
M6703	HVAC Output Error Off
M6905	Dump Valve Short to Battery
M6906	Dump Valve Short to Ground
M6907	Dump Valve Open Circuit
M6932	Dump Valve Overcurrent
M7002	Switched Power Output Error On
M7003	Switched Power Output Error Off
M7007	Switched Power Output Open Circuit
M7028	Switched Power Output Failure
M7423	Main Controller Not Programmed
M7472	Main Controller Software Incompatible
M7473	Main Controller Software Outdated
M7497	Main Controller Controller Programmed
M7604	Standard Display Panel No Communication
M7748	Key Switch Multiple
M7839	Hourmeter Changed
M8004	Cooling Fan Controller No Communication
M8005	Cooling Fan Short To Battery
M8006	Cooling Fan Short To Ground
M8021	Cooling Fan Out Of Range High
M8022	Cooling Fan Out Of Range Low
M8025	Cooling Fan Unresponsive

Code	Description
M8027	Cooling Fan CAN Error
M8028	Cooling Fan Failure
M8029	Cooling Fan Wiring Fault
M8030	Cooling Fan Controller Fault
M8302	Wait to Start Lamp Error On
M8303	Wait to Start Lamp Error Off
M8615	Engine Speed Derate In Shutdown
M8625	Engine Speed Derate Unresponsive
M9111	Fuel Filter Extremely Plugged
M9117	Fuel Filter Plugged
M9144	Fuel Filter Derate Level 1
M9145	Fuel Filter Derate Level 2
M9202	Fuel Lift Pump Error On
M9203	Fuel Lift Pump Error Off
M9287	Fuel Pump Failure Time Exceeded
M9309	Fuel Pressure Low
M9314	Fuel Pressure Extremely Low
M9321	Fuel Pressure Out Of Range High
M9322	Fuel Pressure Out Of Range Low
M9344	Fuel Pressure Derate Level 1
M9701	Turbo Prime Sequence Active
R3327	Display CAN Error
R3334	Display CAN Error
R3335	Display CAN Error
R3904	Jog Shuttle No Communication
R7404	Main Controller No Communication
R7423	Display Not Programmed
R7492	Main Controller Authentication Failed
R9604	Radio No Communication
VRLO-WVLTG	Very Low Battery Voltage

MACHINE DIMENSIONS

Figure 356

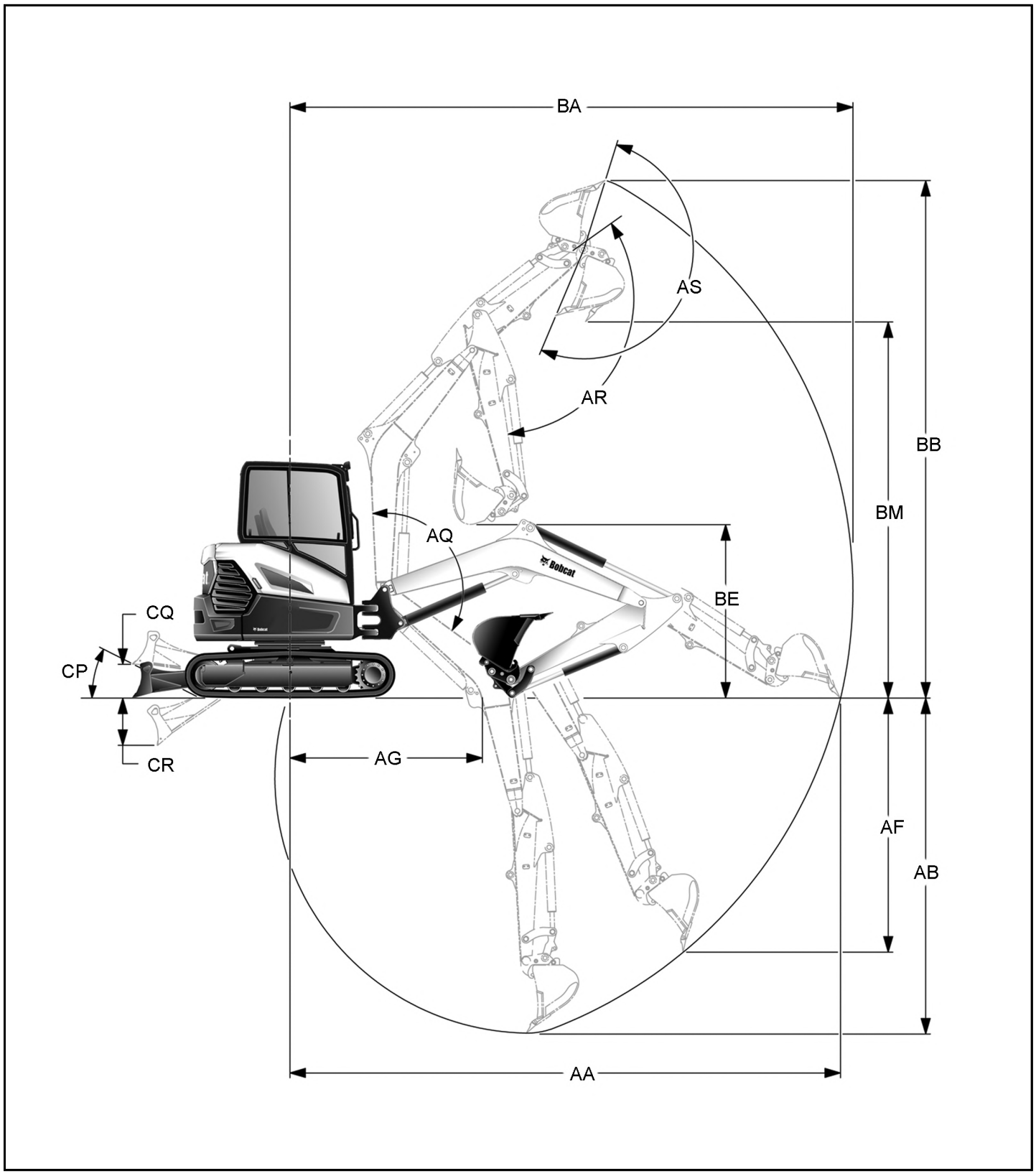


NA20058a

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

REF	DESCRIPTION	VALUE
A	OVERALL LENGTH	5395 mm (212.4 in)
B	OVERALL HEIGHT	2546 mm (100.3 in)
C	WIDTH OF UPPERSTRUCTURE	1852 mm (72.9 in)
E	SLEW CLEARANCE, REAR OF UPPERSTRUCTURE	1035 mm (40.75 in)
G	CLEARANCE, UPPERSTRUCTURE TO GROUNDLINE	608 mm (23.9 in)
J2	NOMINAL DISTANCE BETWEEN CENTERLINES OF DRIVE SPROCKETS AND IDLERS	1803 mm (71.0 in)
J4	NOMINAL OVERALL LENGTH OF TRACK ASSEMBLY	2276 mm (89.6 in)
K	OVERALL WIDTH OF CRAWLER.	1960 mm (77.2 in)
CA	MACHINE CENTERLINE TO WORKING EQUIPMENT CENTERLINE, NORMAL OPERATION	125 mm (4.9 in)
CB2	MACHINE CENTERLINE TO WORKING EQUIPMENT CENTERLINE, WORK WIDTH AT MAX RH ROTATION	872 mm (34.3 in)
CB4	MACHINE CENTERLINE TO WORKING EQUIPMENT CENTERLINE, WORK WIDTH AT MAX LH ROTATION	527 mm (20.7 in)
CC	BUCKET EDGE TO WORKING EQUIPMENT CENTERLINE	306 mm (12.10 in)
CD2	WORKING WIDTH MAX RH ROTATION	2015 mm (79.3 in)
CD4	WORKING WIDTH MAX LH ROTATION	1997 mm (78.6 in)
CF	MIN. RADIUS IN TRAVEL POSITION	4250 mm (167.3 in)
CG	BLADE HEIGHT	373 mm (14.7 in)
CL	BLADE WIDTH	1959 mm (77.1 in)

Figure 357



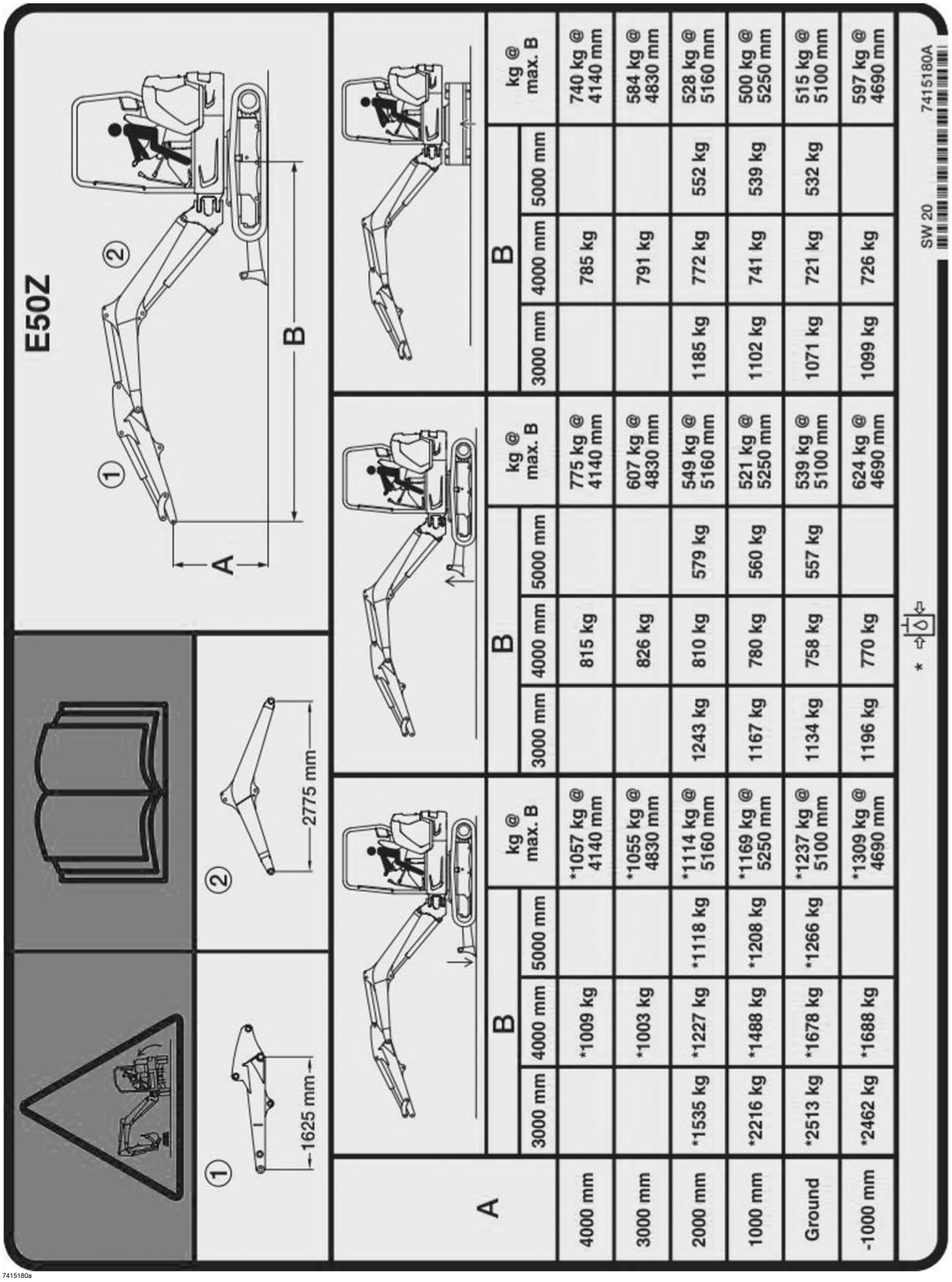
NA20059a

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

REF	DESCRIPTION	VALUE
AA	MAX. RADIUS AT GROUNDLINE	5922 mm (233.2 in)
AB	MAX. DIGGING DEPTH	3553 mm (139.9 in)
AF	MAX. DEPTH OF VERTICAL WALL THAT CAN BE EXCAVATED.	2462 mm (96.9 in)
AG	BUCKET FLAT ON GROUNDLINE	2244 mm (88.3 in)
AQ	BOOM PIVOT ANGLE	126°
AR	ARM PIVOT ANGLE	112°
AS	BUCKET PIVOT ANGLE	186°
BA	MAX. RADIUS OF WORKING EQUIPMENT	6056 mm (238.4 in)
BB	MAX. HEIGHT OF WORKING EQUIPMENT	5499 mm (216.5 in)
BE	MIN. CLEARANCE OF FULLY CURLED BUCKET AT MAX. BOOM HEIGHT	1926 mm (75.8 in)
BM	MIN. CLEARANCE OF FULLY CURLED BUCKET AT MAX. ARM HEIGHT	4015 mm (158.1 in)
CP	MAX. APPROACH ANGLE	26°
CQ	MAX. BLADE HEIGHT	370 mm (14.6 in)
CR	MAX. BLADE DEPTH	502 mm (19.8 in)

RATED LIFT CAPACITY – CAB AND LONG ARM

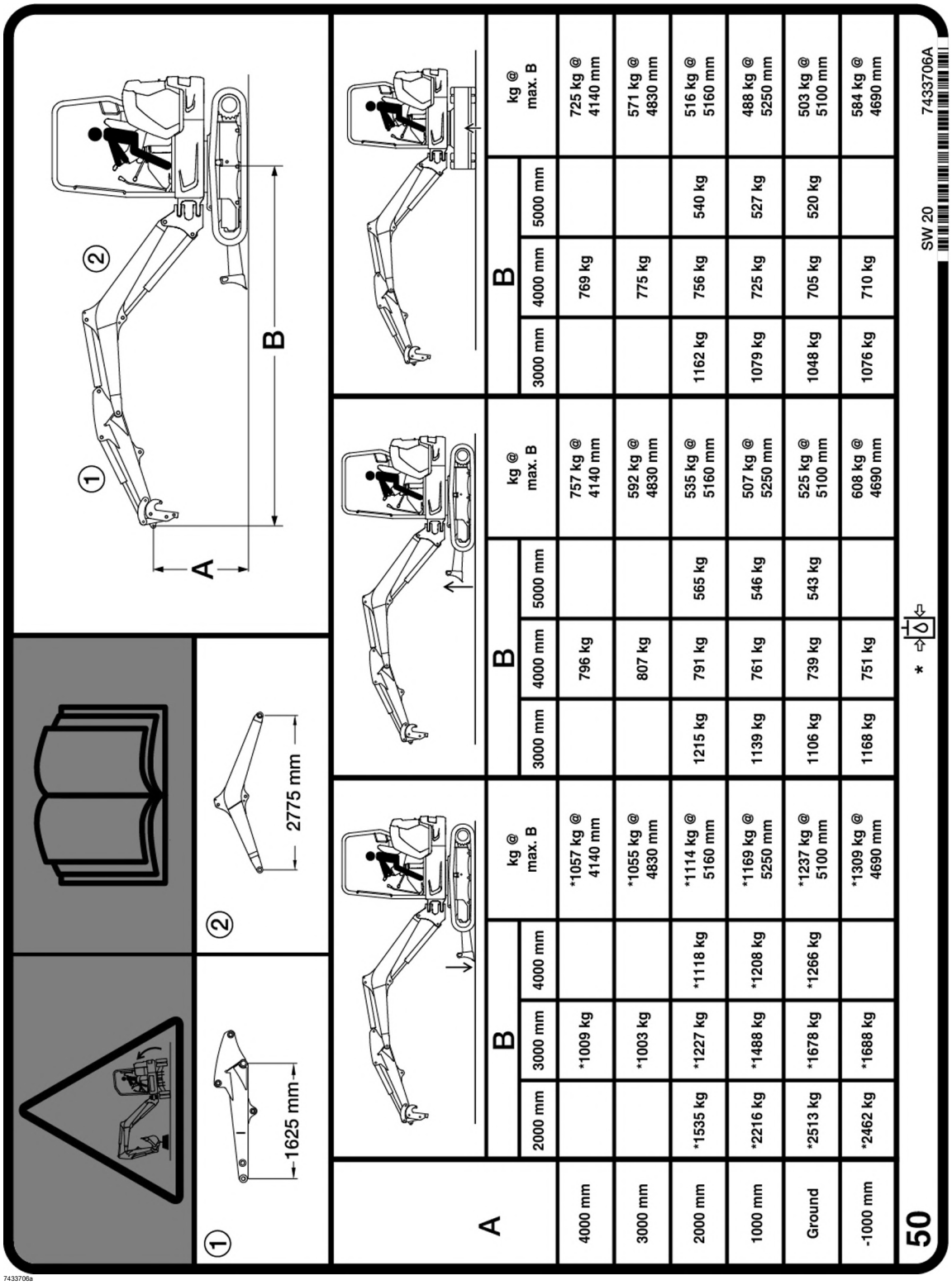
Where applicable, specifications conform to SAE or ISO standards and are subject to change without notice.



A	B			kg @ max. B	B			kg @ max. B	B			kg @ max. B
	3000 mm	4000 mm	5000 mm		3000 mm	4000 mm	5000 mm		3000 mm	4000 mm	5000 mm	
4000 mm		*1009 kg		*1057 kg @ 4140 mm		815 kg		775 kg @ 4140 mm		785 kg		740 kg @ 4140 mm
3000 mm		*1003 kg		*1055 kg @ 4830 mm		826 kg		607 kg @ 4830 mm		791 kg		584 kg @ 4830 mm
2000 mm	*1535 kg	*1227 kg	*1118 kg	*1114 kg @ 5160 mm	1243 kg	810 kg	579 kg	549 kg @ 5160 mm	1185 kg	772 kg	552 kg	528 kg @ 5160 mm
1000 mm	*2216 kg	*1488 kg	*1208 kg	*1169 kg @ 5250 mm	1167 kg	780 kg	560 kg	521 kg @ 5250 mm	1102 kg	741 kg	539 kg	500 kg @ 5250 mm
Ground	*2513 kg	*1678 kg	*1266 kg	*1237 kg @ 5100 mm	1134 kg	758 kg	557 kg	539 kg @ 5100 mm	1071 kg	721 kg	532 kg	515 kg @ 5100 mm
-1000 mm	*2462 kg	*1688 kg		*1309 kg @ 4690 mm	1196 kg	770 kg		624 kg @ 4690 mm	1099 kg	726 kg		597 kg @ 4690 mm

RATED LIFT CAPACITY – CANOPY AND LONG ARM

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



EXCAVATOR 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.

Performance Specifications

Operating weight (for canopy, rubber tracks, counterweight, standard bucket, and no operator)	4819 kg (10624 lb)
If equipped with the following	Cab with Heater, add 112 kg (246 lb) Cab with HVAC, add 131 kg (288 lb) Steel Tracks, add 125 kg (276 lb)
Travel speed (Low / High)	2,8 km/h / 5,5 km/h (1.7 mph / 3.4 mph)
Digging Force (per ISO 6015) (arm)	22171 N (4984 lbf)
Digging Force (per ISO 6015) (bucket)	37744 N (8485 lbf)

Controls Specifications

Steering	Two hand levers (optional foot pedals)
Hydraulics	Two hand-operated joysticks control boom, bucket, arm, and upperstructure slew. Thumb switch controls auxiliary hydraulics and boom swing.
Standard Blade	Hand lever
Angle Blade (if equipped)	Switch on blade lever
Two Speed	Switch on blade lever
Boom Swing	Electric switch on left joystick
Auxiliary Hydraulics	Electric switches on joysticks
Engine	Engine speed control dial with auto idle feature, key or keyless start switch.
Starting Aid	Glow Plugs – activated by start switch
Travel Brakes (Service & Parking)	Hydraulic lock in motor circuit
Swing Brakes (Service)	Hydraulic lock on motor
Swing Brakes (Holding)	Spring applied - hydraulic release

Engine Specifications

Make / Model	V2403-M-DI-TE3B-BC-5 Kubota® Engine
Fuel / Cooling	Diesel / Liquid
Horsepower: – Gross power (SAE J1995)	36,5 kW (48.9 hp)
Torque: – Gross Torque (SAE J1995)	183,0 N•m (135.0 lb-ft)
Number Of Cylinders	4

Displacement	2,434 L (148.5 in³)
Bore / Stroke	87,0 x 102,4 mm (3.43 x 4.031 in)
Lubrication	Forced lubrication / cartridge type
Crankcase Ventilation	Closed breathing
Air Filter	Dual dry replacement paper elements
Ignition	Diesel – Compression
Low Idle Speed	1200 ± 75 rpm
High Idle Speed	2450 max rpm
Engine Coolant	Propylene Glycol / water mixture (53% PG / 47% water)

Hydraulic System Specifications

Pump Type	single outlet variable displacement piston pump with gear pumps
Pump Capacity	99,0 L/min (26.2 U.S. gpm)
Auxiliary Flow	75,7 L/min (20.0 U.S. gpm)
2nd Auxiliary Flow	45,4 L/min (12.0 U.S. gpm)
Control Valves	closed centre individually compensated
System Relief Pressure	250 bar (3625 psi)
Slew Relief Pressure	245 bar (3553 psi)
Joystick Control Pressure	30 bar (435 psi)
Arm Port Relief, Base End And Rod End	290 bar (4206 psi)
Boom Port Relief, Base End And Rod End	290 bar (4206 psi)
Bucket Port Relief Base End And Rod End	290 bar (4206 psi)
Blade Port Relief Based End	260 bar (3771 psi)
Main Hydraulic Filter Bypass	3.4 bar (50 psi)
Case Drain Filter Bypass	1.7 bar (25 psi)
Auxiliary Relief	210 bar (3045 psi)
Automatic Track Tensioning System (if equipped)	
– Rubber Tracks	70 bar (1015 psi)
– Steel Tracks	30 bar (435 psi)

Hydraulic Cylinders

Cylinder	Bore	Rod	Stroke
Boom (cushion up)	95,3 mm (3.75 in)	50,8 mm (2.00 in)	697,2 mm (27.45 in)
Arm (cushion retract / extend)	82,6 mm (3.25 in)	50,8 mm (2.00 in)	643,9 mm (25.35 in)

Cylinder	Bore	Rod	Stroke
Bucket	76,2 mm (3.00 in)	44,5 mm (1.75 in)	524,0 mm (20.63 in)
Boom Swing	88,9 mm (3.50 in)	44,5 mm (1.75 in)	490,7 mm (19.32 in)
Blade	95,3 mm (3.75 in)	50,8 mm (2.00 in)	218,2 mm (8.59 in)

Hydraulic Cycle Times

Bucket Curl	2.6 seconds
Bucket Dump	2.0 seconds
Arm Retract	3.6 seconds
Arm Extend	3.7 seconds
Boom Raise	6.3 seconds
Boom Lower	6.7 seconds
Boom Swing Left	4.4 seconds
Boom Swing Right	4.6 seconds
Blade Raise	3.1 seconds
Blade Lower	2.6 seconds

Electrical System Specifications

Starting Aid	Glow Plugs
Alternator	12 volt, 90 amp open frame with internal regulator
Battery	12 volt negative earth, 700 CCA at -18ºC (0ºF), 110 min reserve capacity at 25 amp
Starter	12 volt, 2.0 kW reduction drive
Lights (2)	37.5 watt (each)

Drive System Specifications

Final Drive	Each track driven by hydraulic axial piston motor
Drive Reduction	45,382:1 two-stage planetary
Gradeability	24°
Travel Brakes	Hydraulic lock on motor

Slew System Specifications

Slew Motor	Axial piston connected to a planetary drive
Slew Circle	Single-row shear-type ball bearings with internal gear
Slew Speed	8,7 rpm

Undercarriage Specifications

Crawler Track Design	Sealed track rollers with box-section track roller frame
Track Adjuster	Grease type track adjusters with shock absorbing recoil springs
Width of Crawler	1960 mm (77.2 in)

Capacities Specifications

Fuel Tank	72,0 L (19.0 U.S. gal)
Hydraulic Reservoir	15,1 L (4.0 U.S. gal)
Hydraulic System Capacity (Centre of Sight Glass)	60,0 L (15.85 U.S. gal)
Cooling System	8,3 L (2.20 U.S. gal)
Engine Oil and Filter	7,1 L (7.50 qt)
Final Drive (each)	1,1 L (1.2 qt)
Air Conditioning Refrigerant (R-134a)	0,77 kg (1.7 lb)

Track Specifications

	Rubber Tracks	Steel Tracks
Width	350 mm (13.8 in)	300 mm (11.8 in)
Number of Shoes	Single Assembly	47
Number of Track Rollers (per side)	5	5

Ground Pressure Specifications

Rubber Tracks	Steel Tracks
34,82 kPa (5.06 psi)	41,67 kPa (6.04 psi)

BOBCAT® EXCAVATORS WARRANTY

Doosan Bobcat EMEA s.r.o. (“Bobcat”) warrants that this Bobcat® Excavator will be free from defects in design, material or workmanship for twenty four (24) months from the retail date to the owner or 2000 hours of machine usage, whichever occurs first. During the warranty period, only official Bobcat dealers (as listed on www.bobcat.com) are entitled to deal with warranty claims and shall repair or replace, at Bobcat’s option, without charge for parts, labour or travel of technicians, any part of the Bobcat® equipment which fails because of defects in design, material or workmanship. The owner shall provide any official Bobcat dealer with prompt written notice of the defect and allow reasonable time for replacement or repair. Bobcat may, at its option, request failed parts to be returned to the factory or to any other designated location. Transportation of the Bobcat® equipment to the official Bobcat dealer for warranty work is not the responsibility of Bobcat. Service schedules must adhere to prescribed intervals and Bobcat® genuine parts/lubricants must be used. The warranty does not apply to tires, tracks or other accessories not manufactured by Bobcat. For warranty coverage on engines, consult with your official Bobcat dealer. For these non-covered items, the owner shall refer solely to the warranty, if any, of the respective manufacturers thereof, in accordance with the respective manufacturers warranty statement. Coverage for air-conditioning refill and couplers is limited as failures generally originate from factors not under Bobcat’s control such as, but not limited to, prolonged storage or abuse. This limited coverage is, depending on the component, 50 to 500 hours of machine usage. The warranty does not cover: (i) Oils and lubricants, coolant fluids, filter elements, brake linings, tune-up parts, bulbs, fuses, alternator fan belts, drive belts, pins, bushings and other high-wear items. (ii) Damages resulting from abuse, misuse, accidents, alterations, use of non-genuine Bobcat parts, use of the product with any bucket or attachment not approved by Bobcat, air flow obstructions, or failure to maintain or use the Bobcat product according to the instructions applicable to it. (iii) Ground engaging parts such as bucket teeth and cutting edges. (iv) Fuel or hydraulic system cleaning, engine tune-up, brake inspection or adjustment. (v) Adjustments or slight defects which generally do not affect the stability or reliability of the machine. (vi) Damage or defect resulting from improper storage, weathering, lack of use, use and operation in a corrosive or chemical environment. (vii) Damage or defect caused by operation of the product under extreme weather or geographical conditions without the written agreement of Bobcat.

BOBCAT EXCLUDES OTHER CONDITIONS, WARRANTIES OR REPRESENTATIONS OF ALL KINDS, EXPRESSED OR IMPLIED, STATUTORY OR OTHERWISE (EXCEPT THAT OF TITLE) INCLUDING ALL IMPLIED WARRANTIES AND CONDITIONS RELATING TO MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. CORRECTIONS BY BOBCAT OF NON-CONFORMITIES WHETHER PATENT OR LATENT, IN THE MANNER AND FOR THE WARRANTY PERIOD PROVIDED ABOVE, SHALL CONSTITUTE FULFILLMENT OF ALL LIABILITIES OF BOBCAT FOR SUCH NON-CONFORMITIES, WHETHER BASED ON CONTRACT, WARRANTY, TORT, NEGLIGENCE, INDEMNITY, STRICT LIABILITY OR OTHERWISE WITH RESPECT TO OR ARISING OUT OF SUCH PRODUCT. THE REMEDIES OF THE END-USER/OWNER SET FORTH UNDER THE PROVISIONS OF THE WARRANTY OUTLINED ABOVE ARE EXCLUSIVE AND THE TOTAL LIABILITY OF BOBCAT INCLUDING ANY HOLDING, SUBSIDIARY, ASSOCIATED OR AFFILIATED COMPANY OR DISTRIBUTOR WITH RESPECT TO THIS SALE OR THE PRODUCT AND SERVICE FURNISHED HEREUNDER IN CONNECTION WITH THE PERFORMANCE OR BREACH THEREOF, OR FROM DELIVERY, INSTALLATION, REPAIR OR TECHNICAL DIRECTION COVERED BY OR FURNISHED UNDER THIS SALE, WHETHER BASED ON CONTRACT, WARRANTY, TORT, NEGLIGENCE, INDEMNITY, STRICT LIABILITY OR OTHERWISE SHALL NOT EXCEED THE PURCHASE PRICE OF THE PRODUCT UPON WHICH SUCH LIABILITY IS BASED. BOBCAT INCLUDING ANY HOLDING, SUBSIDIARY, ASSOCIATED OR AFFILIATED COMPANY AND DISTRIBUTOR SHALL IN NO EVENT BE LIABLE TO THE END-USER/OWNER, ANY SUCCESSORS IN INTEREST OR ANY BENEFICIARY OR ASSIGNEE RELATING TO THIS SALE FOR ANY CONSEQUENTIAL, INCIDENTAL, INDIRECT, SPECIAL OR PUNITIVE DAMAGES ARISING OUT OF THIS SALE OR BY ANY BREACH THEREOF, OR ANY DEFECT IN, OR FAILURE OF, OR MALFUNCTION OF THE PRODUCT UNDER THIS SALE, WHETHER BASED UPON LOSS OF USE, LOST PROFITS OR REVENUE, INTEREST, LOST GOODWILL, WORK STOPPAGE, IMPAIRMENT OF OTHER GOODS, LOSS BY REASON OF SHUTDOWN OR NON-OPERATION, INCREASED EXPENSES OF OPERATION OR CLAIMS OF USER OR CUSTOMERS OF THE USER FOR SERVICE INTERRUPTION WHETHER OR NOT SUCH LOSS OR DAMAGE IS BASED ON CONTRACT, WARRANTY, TORT, NEGLIGENCE, INDEMNITY, STRICT LIABILITY OR OTHERWISE.

4700003enUS (11–20)

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

Q

R

S

T

U

V

W

Reference Information

Compact Excavator Serial Number:

Engine Serial Number:

NOTES:

YOUR BOBCAT DEALER NAME:

Dealer Address:

Affix Business Card Here or enter dealer information

Sales Contact (Name): _____
(Phone): _____
(Email): _____

Rental Contact (Name): _____
(Phone): _____
(Email): _____

Affix Business Card Here or enter dealer information

Service Contact (Name): _____
(Phone): _____
(Email): _____

Parts Contact (Name): _____
(Phone): _____
(Email): _____