



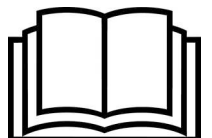
EN

Operation & Maintenance Manual

Compact Excavator



E20z (-C4) S/N: B4YC11001 & Above



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.



This check mark means: "Follow instructions for proper operations." Carefully read the message that follows.



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



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

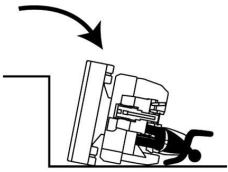
OPERATOR SAFETY WARNINGS



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.



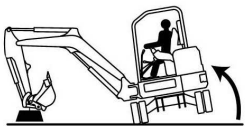
- Never operate without approved cab / canopy.
- Never modify equipment.
- Never use attachments not approved by Doosan Bobcat China Co., Ltd..



- 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.



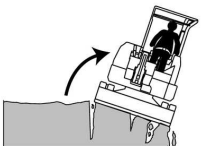
- Keep bystanders out of maximum reach area.
- Do not travel or turn with bucket extended.
- Look in the direction of rotation and make sure no bystanders are in the work area.



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



- Never carry riders.



- Avoid steep areas or banks that could break away.



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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.

Doosan Bobcat China Co., Ltd. Is ISO 9001 Certified



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 Doosan Bobcat products.

SGS is the Certified Registrar that Doosan Bobcat China Co., Ltd. chose to assess the company's compliance with ISO 9001 at Doosan Bobcat's manufacturing facilities in Suzhou, Jiangsu Province, China. Only certified assessors, like SGS, can grant registrations.




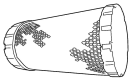





ISO 9001 means that as a company we say what we do and do what we say. In other words, we have established procedures and policies, and we provide evidence that the procedures and policies are followed.

MANUFACTURER

China

Doosan Bobcat China Co., Ltd.
68, Suhong East Road
Suzhou Industrial Park
Jiangsu, 215026
China

REGULAR MAINTENANCE ITEMS

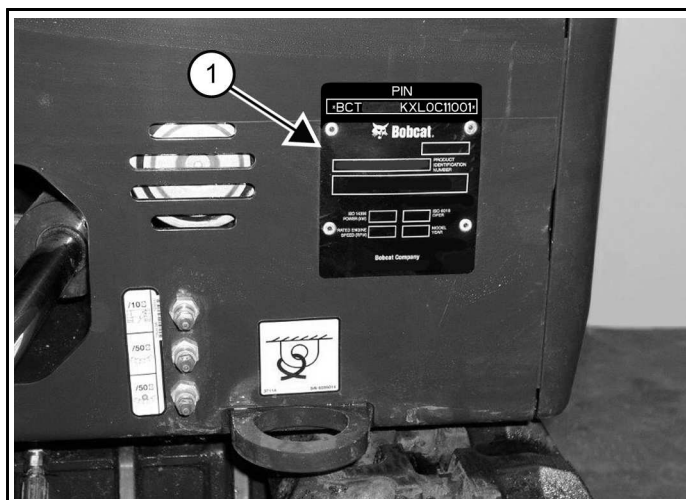
	ENGINE OIL FILTER 6671057
	FUEL FILTER 6667352
	FUEL PRE-FILTER 6683101
	AIR FILTER, OUTER 6673752
	AIR FILTER, INNER 6673753
	PRIMARY HYDRAULIC FILTER 6661248
	BATTERY 7391202
	HYDRAULIC FILL / BREATHER CAP 6692836
	RADIATOR CAP 7257434

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

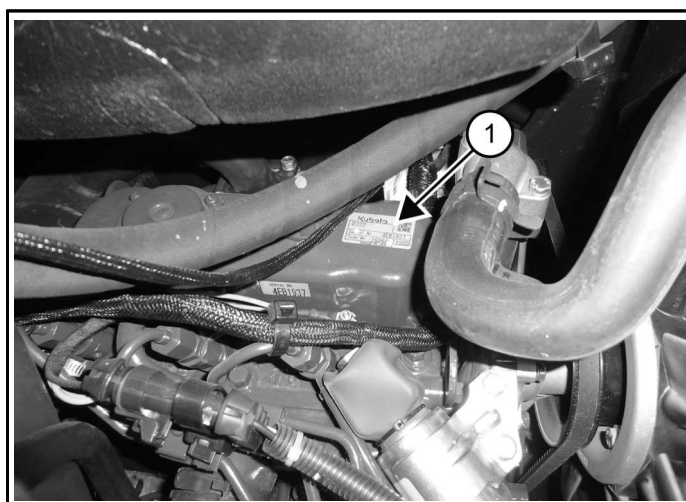


C113376F

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

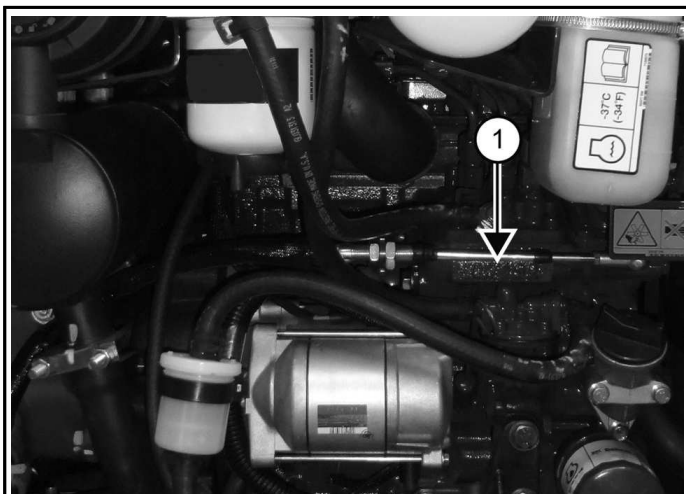
Engine Serial Number Location

Figure 2



C113547a

Figure 3



C112E424

The engine serial number is located on the top cover of the engine (Item 1) [Figure 2] or on the side of the engine block (Item 1) [Figure 3] above the fuel pump.

DELIVERY REPORT

Figure 4

[illegible]

NA15473

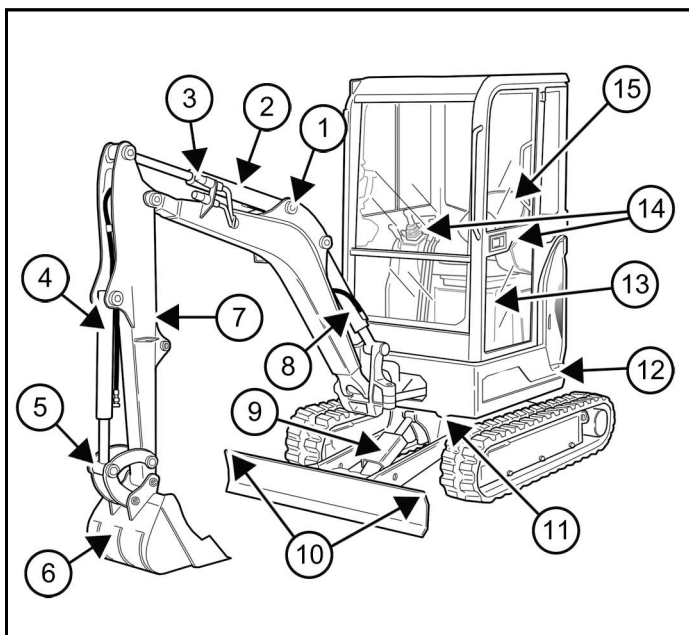
The delivery report contains a list of items that must be explained or shown to the owner or operator by the dealer when the machine is delivered.

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

EXCAVATOR IDENTIFICATION

Front View

Figure 5



NA9348b

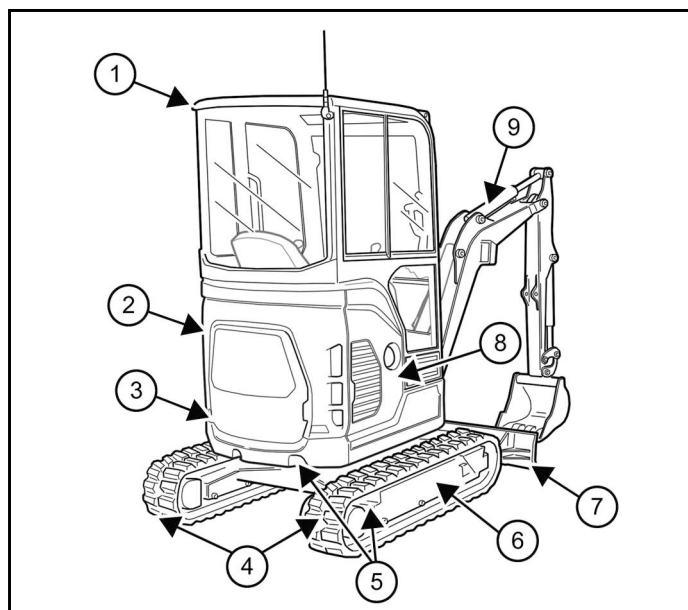
REF	DESCRIPTION
1	Boom
2	Arm Cylinder
3	Auxiliary Quick Couplers
4	Bucket Cylinder
5	Bucket Link / Attachment Coupler (If Equipped) [A]
6	Bucket [B]
7	Arm
8	Boom Cylinder
9	Blade Cylinder
10	Tie-Downs / Lift Points
11	Tie-Downs (Both Sides)
12	Upperstructure
13	Operation & Maintenance Manual
14	Joysticks
15	Operator's Seat with Seat Belt (Operator's Handbook is located behind seat)

[A] Optional attachment couplers are available.

[B] Several different buckets and other attachments are available.

Rear View

Figure 6



NA9347b

REF	DESCRIPTION
1	Cab / Canopy
2	Rear Cover
3	Counterweight
4	Tracks
5	Tie-Downs (both sides)
6	Track Frames
7	Blade
8	Right Side Cover
9	Lift Point

FEATURES, ACCESSORIES, AND ATTACHMENTS

Standard Items

The following items are standard for this model:

- Advanced Diagnostics
- Auxiliary Hydraulics on Boom
- Blade / Track Control Switch
- Boom-Mounted Work Light
- Canopy with ROPS / TOPS / FOPS Approval
- Dozer Blade (980 mm (38.6 in) retracted / 1360 mm (53.5 in) extended)
- Engine Speed Control Lever
- Engine with Shut Down
- Fuel Filter with Sediment Bowl
- Horn
- Hydraulic and Travel Control Lockouts
- Hydraulic Joystick Controls
- Hydraulic Retractable Undercarriage (1360 mm to 980 mm)
- Retractable Seat Belt
- Rubber Tracks (230 mm (9.0 in))
- Spark Arrester Muffler
- Stationary Seat
- Two-Speed Travel
- Upperstructure with Four-Point Tie-Down

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.

- Antenna and Speakers Kit
- Arm-Mounted Auxiliary Hydraulics
- Auto Shift Drive Motors
- Beacon
- Bonnet Reinforcement Kit
- Cab Top Guard Kit (FOGS)
- Cab With Heater
- Canopy / Cab Mounted Lights
- Common Industry Interface Coupler
- Demolition Kit
- Fire Extinguisher
- Front Guard Kit
- German Style Quick Coupler
- Hose Air Bleed Kit
- Joystick Patter Selector
- Keyless Start

- Klac™ System Quick Coupler
- Lift Eye
- Load Holding Valve - Arm
- Load Holding Valve - Boom
- Long Arm
- Long Blade
- Motion Alarm
- Muffler Purifier Kit
- Offset Drain Line Kit
- Overload Warning Device
- Pin-On X-Change™ attachment mounting system
- Radio
- Side Mirror
- Steel Tracks
- Strobe Light
- Suspension Seat

Attachments

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

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

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

- Auger
- Breaker
- Flail Mower
- Hydraulic Clamp

Buckets Available

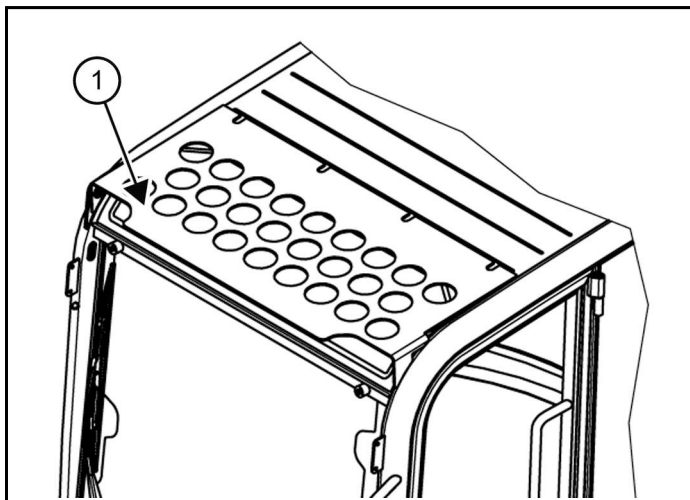
Increase the versatility of your excavator with a variety of bucket sizes.

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 Guard Structure

Figure 7



The Top Guard Kit is available for applications that require protection from smaller objects that can fall on the canopy / cab or restrict material from entering cab openings.

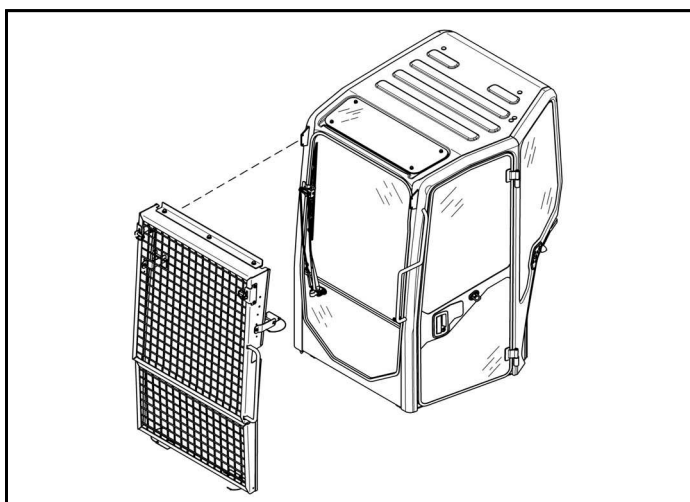
Excavators equipped with a cab must have the top guard (Item 1) [Figure 7] installed to meet the top guard requirements in ISO 10262.

Excavators equipped with a canopy have the top guard installed as standard equipment.

See your Bobcat dealer for more information.

Front Guard Kit

Figure 8



The Front Guard Kit [Figure 8] restricts material from contacting the window.

The excavator must have the front guard kit 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

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

Carefully follow the operating and maintenance instructions in this manual.

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

DANGER

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

D-1002

WARNING

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

W-2044

IMPORTANT

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

I-2019

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

Check all of the items on the Service Schedule decal (if equipped) 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 coordination while working. An operator who is taking prescription drugs must get medical advice to determine if he or she can safely operate a machine.

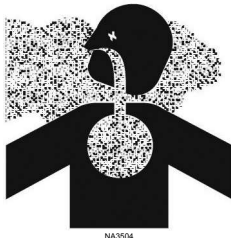
A Qualified Operator Must Do The Following

- Understand the written instructions, rules, and regulations.
 - ▷ The written instructions from Doosan Bobcat China Co., Ltd. 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 authorizing 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



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

FIRE PREVENTION



Maintenance

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

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

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

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

Operation

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

Electrical



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 gasoline or diesel fuel for cleaning parts. Use commercial nonflammable solvents.

Fueling



P200084

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

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

Starting

Do not use ether or starting fluids on any engine that has glow plugs or an 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 nonmetallic parts such as hoods, fenders, or covers can be flammable or explosive. Repair such components in a well-ventilated area away from open flames or sparks.

Fire Extinguishers

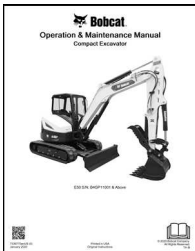


P200083

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

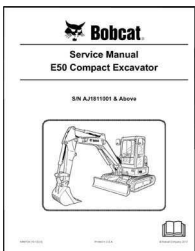
The following publications are also available for your Bobcat excavator. You can order them from your Bobcat dealer.



OPERATION & MAINTENANCE MANUAL

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

7416755



SERVICE MANUAL

Complete maintenance instructions for your Bobcat excavator.

7416756



OPERATOR'S HANDBOOK

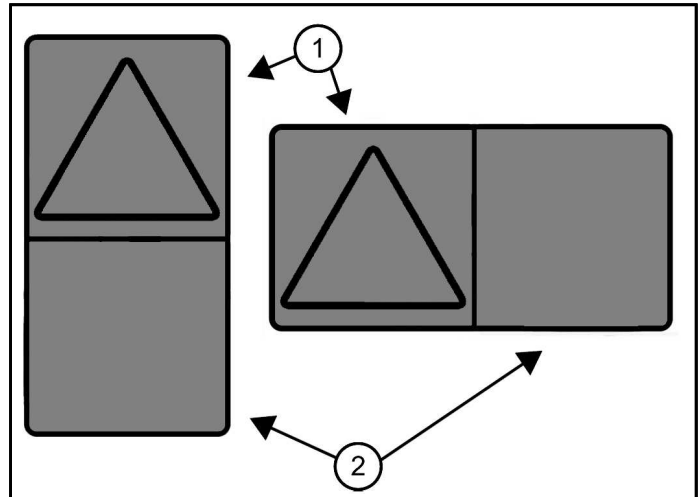
Gives basic operation instructions and safety warnings.

7255006

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 the safety signs section. Please become familiarized 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.

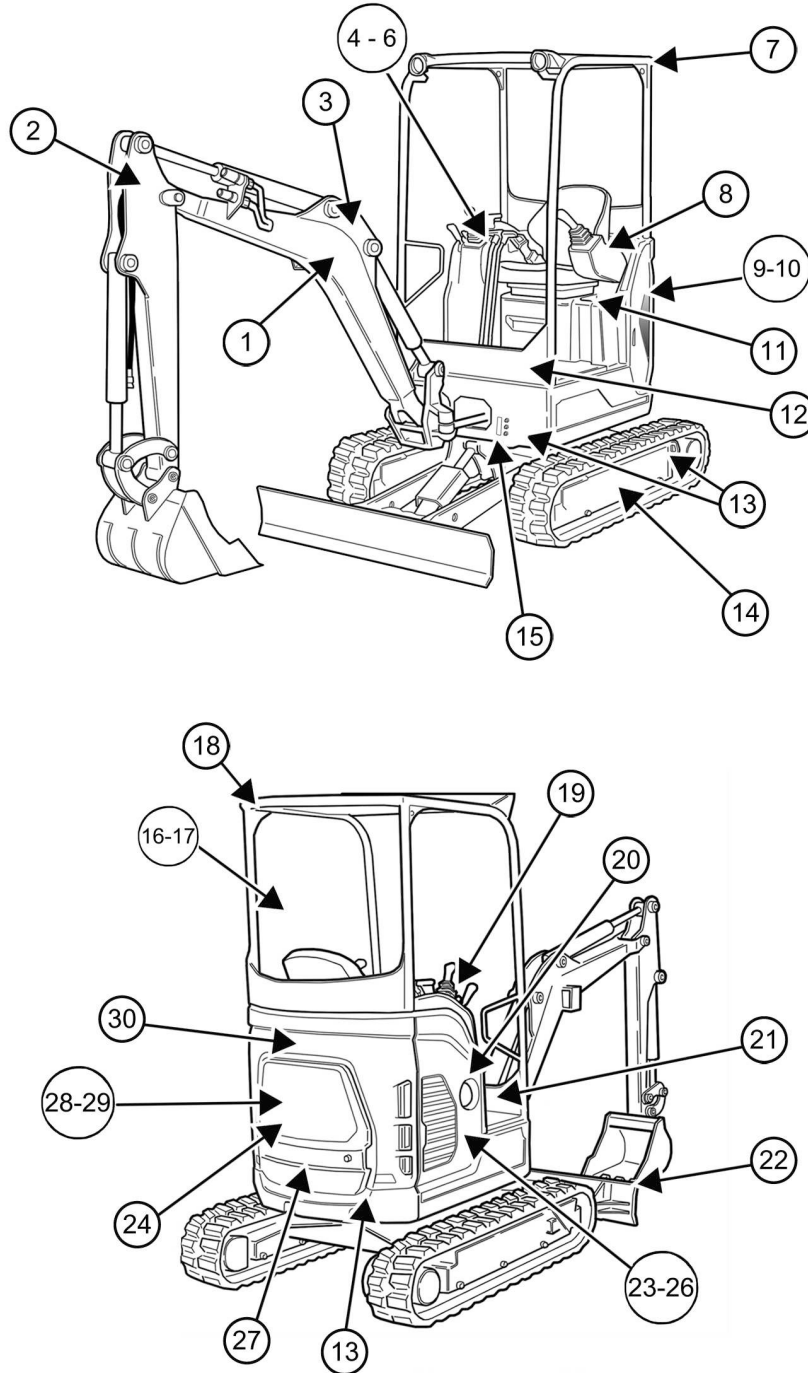
Avoidance Panels: Depict actions required to avoid the hazards.

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

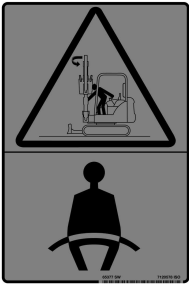

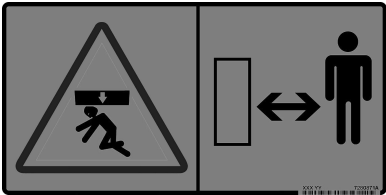

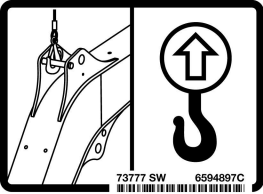
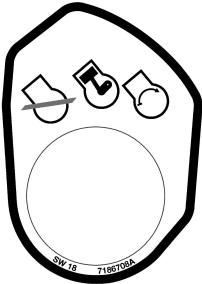
MACHINE SIGNS (DECALS)

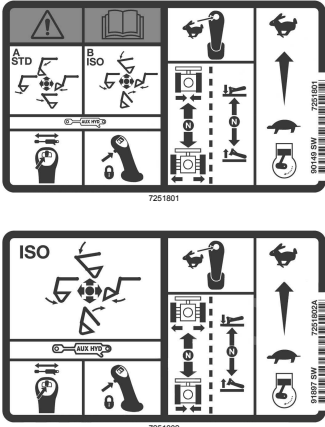

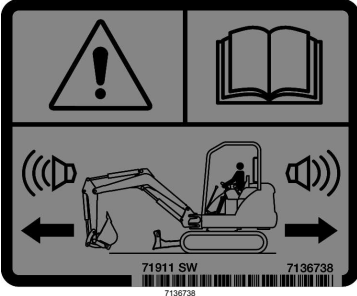


Follow the instructions on all Machine Signs (Decals) that are on the machine. Replace any damaged machine signs and be sure they are in the correct locations. Machine signs are available from your Bobcat dealer.

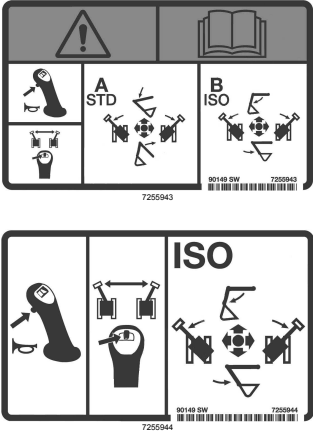

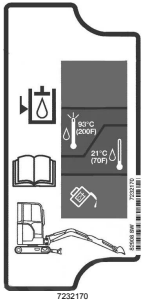

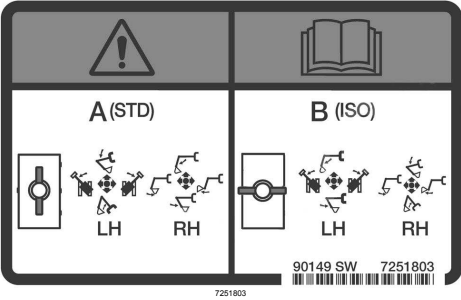

Figure 10


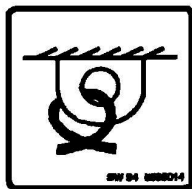
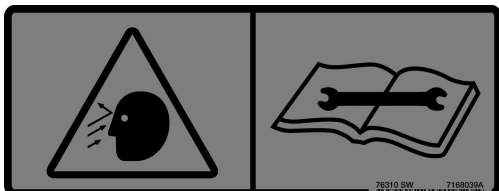




NA13463C

REF	DECAL	WARNING (IF APPLICABLE)
1	Operate from Seat Only (7120578)  7120578	<div> WARNING</div> <p>CRUSHING HAZARD Failure to follow instructions can cause serious injury or death.</p> <ul style="list-style-type: none">• Keep out of swing area.• Keep bystanders away.• Operate the excavator from the operator's position only. ◀ <p>W-2990</p>
2	Stay Clear (7280871)  7280871	<div> WARNING</div> <p>GENERAL HAZARD Failure to follow instruction can cause serious injury or death. Keep away from the operating machine. ◀</p> <p>W-2520</p>
3	Lift Point (6594897)  73777 SW 6594897C 6594897	
4	Start Switch (7186708)  SW-18 7186708A 7186708	

REF	DECAL	WARNING (IF APPLICABLE)
5	<p>RH ISO / STD Joystick Pattern (7251801), RH ISO Joystick Pattern (7251802) or RH ISO Joystick Pattern (7251850, E17 only)</p> 	<div> WARNING</div> <p>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.*</p> <p><small>W-3022</small></p>
6	<p>Motion Alarm (7136738)</p> 	<div> WARNING</div> <p>CRUSHING HAZARD Failure to maintain a clear view in the direction of travel can cause serious injury or death.</p> <ul style="list-style-type: none">• 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.* <p><small>W-2786</small></p>
7	<p>No Lift Point (7359393) (2) (cab models only)</p> 	

REF	DECAL	WARNING (IF APPLICABLE)
8	<div>LH ISO / STD Joystick Pattern (7255943), LH ISO Joystick Pattern (7255944), or LH ISO Joystick Pattern (7251852, E17 only)</div> <div></div>	<div> WARNING</div> <div>UNINTENDED MOVEMENT HAZARD Failure to follow instructions can cause serious injury or death. Know the control pattern before operating. ◀</div> <div><small>W-2989</small></div>
9	<div>Check Hydraulic Level (7232170)</div> <div></div>	
10	<div>Hydraulic Fluid (7120570)</div> <div></div>	
11	<div>STD / ISO Selector Valve (7251803) (if equipped)</div> <div></div>	<div> WARNING</div> <div>UNINTENDED MOVEMENT HAZARD Failure to follow instructions can cause serious injury or death. Know the control pattern before operating. ◀</div> <div><small>W-2989</small></div>

REF	DECAL	WARNING (IF APPLICABLE)
12	Transporting and Lifting (7178215)	<div><div><p>7178215</p></div><div><p>WARNING</p><p>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. ◀</p><p>W-2517</p></div></div>
13	Tie Down (6595014) (6)	<div><div><p>6595014</p></div></div>
14	High Pressure Grease (7168039) (2)	<div><div><p>7168039</p></div><div><p>WARNING</p><p>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. ◀</p><p>W-2994</p></div></div>
15	Remote Grease Location (7255602)	<div><div><p>7255602</p></div></div>
16	Operator's Manual Location (6732148)	<div><div><p>72355 SW 6732148A enUS 6732148</p></div><div><p>WARNING</p><p>INSUFFICIENT INSTRUCTIONS HAZARD Untrained operators or failure to follow instructions and machine signs can cause serious injury or death. Read and understand the Operation & Maintenance Manual before operating the machine. ◀</p><p>W-3021</p></div></div>

REF

DECAL

WARNING
(IF APPLICABLE)

17

General Warnings (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

18

Emergency Exit (7255648) (cab models only)



7255648



19

Lift Capacity (7255477, 7255478, 7255479, 7255480, 7350339, 7350342, 7350345, or 7350348)

E20, E20z, E20z-C4

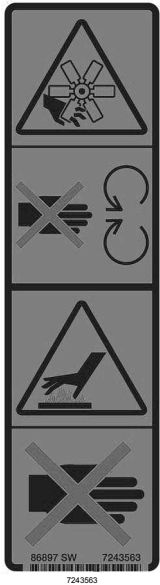
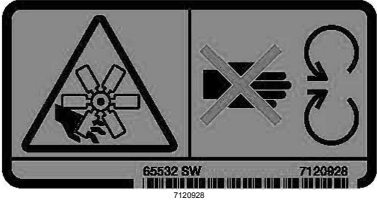
A

B		max. B	
2000 mm (79 in)	3000 mm (118 in)	2000 mm (79 in)	3000 mm (118 in)
1403 kg (3097 lb)	1422 kg (3136 lb)	298 kg (658 lb)	229 kg (505 lb)
1469 kg (3240 lb)	1488 kg (3281 lb)	292 kg (645 lb)	214 kg (472 lb)
1508 kg (3326 lb)	1527 kg (3367 lb)	283 kg (624 lb)	205 kg (452 lb)
1568 kg (3458 lb)	1587 kg (3500 lb)	276 kg (608 lb)	196 kg (432 lb)
1628 kg (3590 lb)	1647 kg (3590 lb)	268 kg (591 lb)	187 kg (412 lb)
1688 kg (3722 lb)	1707 kg (3759 lb)	260 kg (574 lb)	178 kg (392 lb)
1748 kg (3861 lb)	1767 kg (3881 lb)	252 kg (557 lb)	169 kg (372 lb)
1808 kg (3985 lb)	1827 kg (4028 lb)	244 kg (539 lb)	160 kg (352 lb)
1868 kg (4119 lb)	1887 kg (4158 lb)	236 kg (522 lb)	151 kg (332 lb)
1928 kg (4253 lb)	1947 kg (4298 lb)	228 kg (505 lb)	142 kg (312 lb)
1988 kg (4387 lb)	2007 kg (4438 lb)	220 kg (488 lb)	133 kg (292 lb)
2048 kg (4521 lb)	2067 kg (4578 lb)	212 kg (471 lb)	124 kg (272 lb)
2108 kg (4655 lb)	2127 kg (4678 lb)	204 kg (454 lb)	115 kg (252 lb)
2168 kg (4789 lb)	2187 kg (4818 lb)	196 kg (437 lb)	106 kg (232 lb)
2228 kg (4923 lb)	2247 kg (4958 lb)	188 kg (420 lb)	97 kg (212 lb)
2288 kg (5057 lb)	2307 kg (5058 lb)	180 kg (403 lb)	88 kg (192 lb)
2348 kg (5191 lb)	2367 kg (5191 lb)	172 kg (386 lb)	79 kg (172 lb)
2408 kg (5325 lb)	2427 kg (5325 lb)	164 kg (369 lb)	70 kg (152 lb)
2468 kg (5459 lb)	2487 kg (5459 lb)	156 kg (352 lb)	61 kg (132 lb)
2528 kg (5593 lb)	2547 kg (5593 lb)	148 kg (335 lb)	52 kg (112 lb)
2588 kg (5727 lb)	2607 kg (5727 lb)	140 kg (318 lb)	43 kg (92 lb)
2648 kg (5861 lb)	2667 kg (5861 lb)	132 kg (301 lb)	34 kg (72 lb)
2708 kg (5995 lb)	2727 kg (5995 lb)	124 kg (284 lb)	25 kg (52 lb)
2768 kg (6129 lb)	2787 kg (6129 lb)	116 kg (267 lb)	16 kg (32 lb)
2828 kg (6263 lb)	2847 kg (6263 lb)	108 kg (250 lb)	7 kg (12 lb)
2888 kg (6397 lb)	2907 kg (6397 lb)	100 kg (233 lb)	0 kg (0 lb)
2948 kg (6531 lb)	2967 kg (6531 lb)	92 kg (216 lb)	0 kg (0 lb)
3008 kg (6665 lb)	3027 kg (6665 lb)	84 kg (199 lb)	0 kg (0 lb)
3068 kg (6799 lb)	3087 kg (6799 lb)	76 kg (182 lb)	0 kg (0 lb)
3128 kg (6933 lb)	3147 kg (6933 lb)	68 kg (165 lb)	0 kg (0 lb)
3188 kg (7067 lb)	3207 kg (7067 lb)	60 kg (148 lb)	0 kg (0 lb)
3248 kg (7201 lb)	3267 kg (7201 lb)	52 kg (131 lb)	0 kg (0 lb)
3308 kg (7335 lb)	3327 kg (7335 lb)	44 kg (114 lb)	0 kg (0 lb)
3368 kg (7469 lb)	3387 kg (7469 lb)	36 kg (107 lb)	0 kg (0 lb)
3428 kg (7603 lb)	3447 kg (7603 lb)	28 kg (90 lb)	0 kg (0 lb)
3488 kg (7737 lb)	3507 kg (7737 lb)	20 kg (73 lb)	0 kg (0 lb)
3548 kg (7871 lb)	3567 kg (7871 lb)	12 kg (56 lb)	0 kg (0 lb)
3608 kg (8005 lb)	3627 kg (8005 lb)	4 kg (39 lb)	0 kg (0 lb)
3668 kg (8139 lb)	3687 kg (8139 lb)	0 kg (0 lb)	0 kg (0 lb)
3728 kg (8273 lb)	3747 kg (8273 lb)	0 kg (0 lb)	0 kg (0 lb)
3788 kg (8407 lb)	3807 kg (8407 lb)	0 kg (0 lb)	0 kg (0 lb)
3848 kg (8541 lb)	3867 kg (8541 lb)	0 kg (0 lb)	0 kg (0 lb)
3908 kg (8675 lb)	3927 kg (8675 lb)	0 kg (0 lb)	0 kg (0 lb)
3968 kg (8809 lb)	3987 kg (8809 lb)	0 kg (0 lb)	0 kg (0 lb)
4028 kg (8943 lb)	4047 kg (8943 lb)	0 kg (0 lb)	0 kg (0 lb)
4088 kg (9077 lb)	4107 kg (9077 lb)	0 kg (0 lb)	0 kg (0 lb)
4148 kg (9211 lb)	4167 kg (9211 lb)	0 kg (0 lb)	0 kg (0 lb)
4208 kg (9345 lb)	4227 kg (9345 lb)	0 kg (0 lb)	0 kg (0 lb)
4268 kg (9479 lb)	4287 kg (9479 lb)	0 kg (0 lb)	0 kg (0 lb)
4328 kg (9613 lb)	4347 kg (9613 lb)	0 kg (0 lb)	0 kg (0 lb)
4388 kg (9747 lb)	4407 kg (9747 lb)	0 kg (0 lb)	0 kg (0 lb)
4448 kg (9881 lb)	4467 kg (9881 lb)	0 kg (0 lb)	0 kg (0 lb)
4508 kg (10015 lb)	4527 kg (10015 lb)	0 kg (0 lb)	0 kg (0 lb)
4568 kg (10149 lb)	4587 kg (10149 lb)	0 kg (0 lb)	0 kg (0 lb)
4628 kg (10283 lb)	4647 kg (10283 lb)	0 kg (0 lb)	0 kg (0 lb)
4688 kg (10417 lb)	4707 kg (10417 lb)	0 kg (0 lb)	0 kg (0 lb)
4748 kg (10551 lb)	4767 kg (10551 lb)	0 kg (0 lb)	0 kg (0 lb)
4808 kg (10685 lb)	4827 kg (10685 lb)	0 kg (0 lb)	0 kg (0 lb)
4868 kg (10819 lb)	4887 kg (10819 lb)	0 kg (0 lb)	0 kg (0 lb)
4928 kg (10953 lb)	4947 kg (10953 lb)	0 kg (0 lb)	0 kg (0 lb)
4988 kg (11087 lb)	5007 kg (11087 lb)	0 kg (0 lb)	0 kg (0 lb)
5048 kg (11221 lb)	5067 kg (11221 lb)	0 kg (0 lb)	0 kg (0 lb)
5108 kg (11355 lb)	5127 kg (11355 lb)	0 kg (0 lb)	0 kg (0 lb)
5168 kg (11489 lb)	5187 kg (11489 lb)	0 kg (0 lb)	0 kg (0 lb)
5228 kg (11623 lb)	5247 kg (11623 lb)	0 kg (0 lb)	0 kg (0 lb)
5288 kg (11757 lb)	5307 kg (11757 lb)	0 kg (0 lb)	0 kg (0 lb)
5348 kg (11891 lb)	5367 kg (11891 lb)	0 kg (0 lb)	0 kg (0 lb)
5408 kg (12025 lb)	5427 kg (12025 lb)	0 kg (0 lb)	0 kg (0 lb)
5468 kg (12159 lb)	5487 kg (12159 lb)	0 kg (0 lb)	0 kg (0 lb)
5528 kg (12293 lb)	5547 kg (12293 lb)	0 kg (0 lb)	0 kg (0 lb)
5588 kg (12427 lb)	5607 kg (12427 lb)	0 kg (0 lb)	0 kg (0 lb)
5648 kg (12561 lb)	5667 kg (12561 lb)	0 kg (0 lb)	0 kg (0 lb)
5708 kg (12695 lb)	5727 kg (12695 lb)	0 kg (0 lb)	0 kg (0 lb)
5768 kg (12829 lb)	5787 kg (12829 lb)	0 kg (0 lb)	0 kg (0 lb)
5828 kg (12963 lb)	5847 kg (12963 lb)	0 kg (0 lb)	0 kg (0 lb)
5888 kg (13097 lb)	5907 kg (13097 lb)	0 kg (0 lb)	0 kg (0 lb)
5948 kg (13231 lb)	5967 kg (13231 lb)	0 kg (0 lb)	0 kg (0 lb)
6008 kg (13365 lb)	6027 kg (13365 lb)	0 kg (0 lb)	0 kg (0 lb)
6068 kg (13499 lb)	6087 kg (13499 lb)	0 kg (0 lb)	0 kg (0 lb)
6128 kg (13633 lb)	6147 kg (13633 lb)	0 kg (0 lb)	0 kg (0 lb)
6188 kg (13767 lb)	6207 kg (13767 lb)	0 kg (0 lb)	0 kg (0 lb)
6248 kg (13901 lb)	6267 kg (13901 lb)	0 kg (0 lb)	0 kg (0 lb)
6308 kg (14035 lb)	6327 kg (14035 lb)	0 kg (0 lb)	0 kg (0 lb)
6368 kg (14169 lb)	6387 kg (14169 lb)	0 kg (0 lb)	0 kg (0 lb)
6428 kg (14303 lb)	6447 kg (14303 lb)	0 kg (0 lb)	0 kg (0 lb)
6488 kg (14437 lb)	6507 kg (14437 lb)	0 kg (0 lb)	0 kg (0 lb)
6548 kg (14571 lb)	6567 kg (14571 lb)	0 kg (0 lb)	0 kg (0 lb)
6608 kg (14705 lb)	6627 kg (14705 lb)	0 kg (0 lb)	0 kg (0 lb)
6668 kg (14839 lb)	6687 kg (14839 lb)	0 kg (0 lb)	0 kg (0 lb)
6728 kg (14973 lb)	6747 kg (14973 lb)	0 kg (0 lb)	0 kg (0 lb)
6788 kg (15107 lb)	6807 kg (15107 lb)	0 kg (0 lb)	0 kg (0 lb)
6848 kg (15241 lb)	6867 kg (15241 lb)	0 kg (0 lb)	0 kg (0 lb)
6908 kg (15375 lb)	6927 kg (15375 lb)	0 kg (0 lb)	0 kg (0 lb)
6968 kg (15509 lb)	6987 kg (15509 lb)	0 kg (0 lb)	0 kg (0 lb)
7028 kg (15643 lb)	7047 kg (15643 lb)	0 kg (0 lb)	0 kg (0 lb)
7088 kg (15777 lb)	7107 kg (15777 lb)	0 kg (0 lb)	0 kg (0 lb)
7148 kg (15911 lb)	7167 kg (15911 lb)	0 kg (0 lb)	0 kg (0 lb)
7208 kg (16045 lb)	7227 kg (16045 lb)	0 kg (0 lb)	0 kg (0 lb)
7268 kg (16179 lb)	7287 kg (16179 lb)	0 kg (0 lb)	0 kg (0 lb)
7328 kg (16313 lb)	7347 kg (16313 lb)	0 kg (0 lb)	0 kg (0 lb)
7388 kg (16447 lb)	7407 kg (16447 lb)	0 kg (0 lb)	0 kg (0 lb)
7448 kg (16581 lb)	7467 kg (16581 lb)	0 kg (0 lb)	0 kg (0 lb)
7508 kg (16715 lb)	7527 kg (16715 lb)	0 kg (0 lb)	0 kg (0 lb)
7568 kg (16849 lb)	7587 kg (16849 lb)	0 kg (0 lb)	0 kg (0 lb)
7628 kg (16983 lb)	7647 kg (16983 lb)	0 kg (0 lb)	0 kg (0 lb)
7688 kg (17117 lb)	7707 kg (17117 lb)	0 kg (0 lb)	0 kg (0 lb)
7748 kg (17251 lb)	7767 kg (17251 lb)	0 kg (0 lb)	0 kg (0 lb)
7808 kg (17385 lb)	7827 kg (17385 lb)	0 kg (0 lb)	0 kg (0 lb)
7868 kg (17519 lb)	7887 kg (17519 lb)	0 kg (0 lb)	0 kg (0 lb)
7928 kg (17653 lb)	7947 kg (17653 lb)	0 kg (0 lb)	0 kg (0 lb)
7988 kg (17787 lb)	8007 kg (17787 lb)	0 kg (0 lb)	0 kg (0 lb)
8048 kg (17921 lb)	8067 kg (17921 lb)	0 kg (0 lb)	0 kg (0 lb)
8108 kg (18055 lb)	8127 kg (18055 lb)	0 kg (0 lb)	0 kg (0 lb)
8168 kg (18189 lb)	8187 kg (18189 lb)	0 kg (0 lb)	0 kg (0 lb)
8228 kg (18323 lb)	8247 kg (18323 lb)	0 kg (0 lb)	0 kg (0 lb)
8288 kg (18457 lb)	8307 kg (18457 lb)	0 kg (0 lb)	0 kg (0 lb)
8348 kg (18591 lb)	8367 kg (18591 lb)	0 kg (0 lb)	0 kg (0 lb)
8408 kg (18725 lb)	8427 kg (18725 lb)	0 kg (0 lb)	0 kg (0 lb)
8468 kg (18859 lb)	8487 kg (18859 lb)	0 kg (0 lb)	0 kg (0 lb)
8528 kg (18993 lb)	8547 kg (18993 lb)	0 kg (0 lb)	0 kg (0 lb)
8588 kg (19127 lb)	8607 kg (19127 lb)	0 kg (0 lb)	0 kg (0 lb)
8648 kg (19261 lb)	8667 kg (19261 lb)	0 kg (0 lb)	0 kg (0 lb)
8708 kg (19395 lb)	8727 kg (19395 lb)	0 kg (0 lb)	0 kg (0 lb)
8768 kg (19529 lb)	8787 kg (19529 lb)	0 kg (0 lb)	0 kg (0 lb)
8828 kg (19663 lb)	8847 kg (19663 lb)	0 kg (0 lb)	0 kg (0 lb)
8888 kg (19797 lb)	8907 kg (19797 lb)	0 kg (0 lb)	0 kg (0 lb)
8948 kg (19931 lb)	8967 kg (19931 lb)	0 kg (0 lb)	0 kg (0 lb)
9008 kg (20065 lb)	9027 kg (20065 lb)	0 kg (0 lb)	0 kg (0 lb)
9068 kg (20199 lb)	9087 kg (20199 lb)	0 kg (0 lb)	0 kg (0 lb)
9128 kg (20333 lb)	9147 kg (20333 lb)	0 kg (0 lb)	0 kg (0 lb)
9188 kg (20467 lb)	9207 kg (20467 lb)	0 kg (0 lb)	0 kg (0 lb)
9248 kg (20601 lb)	9267 kg (20601 lb)	0 kg (0 lb)	0 kg (0 lb)
9308 kg (20735 lb)	9327 kg (20735 lb)	0 kg (0 lb)	0 kg (0 lb)
9368 kg (20869 lb)	9387 kg (20869 lb)	0 kg (0 lb)	0 kg (0 lb)
9428 kg (21003 lb)	9447 kg (21003 lb)	0 kg (0 lb)	0 kg (0 lb)
9488 kg (21137 lb)	9507 kg (21137 lb)	0 kg (0 lb)	0 kg (0 lb)
9548 kg (21271 lb)	9567 kg (21271 lb)	0 kg (0 lb)	0 kg (0 lb)
9608 kg (21405 lb)	9627 kg (21405 lb)	0 kg (0 lb)	0 kg (0 lb)
9668 kg (21539 lb)	9687 kg (21539 lb)	0 kg (0 lb)	0 kg (0 lb)
9728 kg (21673 lb)	9747 kg (21673 lb)	0 kg (0 lb)	0 kg (0 lb)
9788 kg (21807 lb)	9807 kg (21807 lb)	0 kg (0 lb)	0 kg (0 lb)
9848 kg (21941 lb)	9867 kg (21941 lb)	0 kg (0 lb)	0 kg (0 lb)
9908 kg (22075 lb)	9927 kg (22075 lb)	0 kg (0 lb)	0 kg (0 lb)
9968 kg (22209 lb)	9987 kg (22209 lb)	0 kg (0 lb)	0 kg (0 lb)
10028 kg (22343 lb)	10047 kg (22343 lb)	0 kg (0 lb)	0 kg (0 lb)
10088 kg (22477 lb)	10107 kg (22477 lb)	0 kg (0 lb)	0 kg (0 lb)
10148 kg (22611 lb)	10167 kg (22611 lb)	0 kg (0 lb)	0 kg (0 lb)
10208 kg (22745 lb)	10227 kg (22745 lb)	0 kg (0 lb)	0 kg (0 lb)
10268 kg (22879 lb)	10287 kg (22879 lb)	0 kg (0 lb)	0 kg (0 lb)
10328 kg (23013 lb)	10347 kg (23013 lb)	0 kg (0 lb)	0 kg (0 lb)
10388 kg (23147 lb)	10407 kg (23147 lb)	0 kg (0 lb)	0 kg (0 lb)
10448 kg (23281 lb)	10467 kg (23281 lb)	0 kg (0 lb)	0 kg (0 lb)
10508 kg (23415 lb)	10527 kg (23415 lb)	0 kg (0 lb)	0 kg (0 lb)
10568 kg (23549 lb)	10587 kg (23549 lb)	0 kg (0 lb)	0 kg (0 lb)
10628 kg (23683 lb)	10647 kg (23683 lb)	0 kg (0 lb)	0 kg (0 lb)
10688 kg (23817 lb)	10707 kg (23817 lb)	0 kg (0 lb)	0 kg (0 lb)
10748 kg (23951 lb)	10767 kg (23951 lb)	0 kg (0 lb)	0 kg (0 lb)
10808 kg (24085 lb)	10827 kg (24085 lb)	0 kg (0 lb)	0 kg (0 lb)
10868 kg (24219 lb)	10887 kg (24219 lb)	0 kg (0 lb)	0 kg (0 lb)
10928 kg (24353 lb)	10947 kg (24353 lb)	0 kg (0 lb)	0 kg (0 lb)
10988 kg (24487 lb)	11007 kg (24487 lb)	0 kg (0 lb)	0 kg (0 lb)
11048 kg (24621 lb)	11067 kg (24621 lb)	0 kg (0 lb)	0 kg (0 lb)
11108 kg (24755 lb)	11127 kg (24755 lb)	0 kg (0 lb)	0 kg (0 lb)
11168 kg (24889 lb)	11187 kg (24889 lb)	0 kg (0 lb)	0 kg (0 lb)
11228 kg (25023 lb)	11247 kg (25023 lb)	0 kg (0 lb)	0 kg (0 lb)
11288 kg (25157 lb)	11307 kg (25157 lb)	0 kg (0 lb)	0 kg (0 lb)
11348 kg (25291 lb)	11367 kg (25291 lb)	0 kg (0 lb)	0 kg (0 lb)
11408 kg (25425 lb)	11427 kg (25425 lb)	0 kg (0 lb)	0 kg (0 lb)
11468 kg (25559 lb)	11487 kg (25559 lb)	0 kg (0 lb)	0 kg (0 lb)
11528 kg (25693 lb)	11547 kg (25693 lb)	0 kg (0 lb)	0 kg (0 lb)
11588 kg (25827 lb)	11607 kg (25827 lb)	0 kg (0 lb)	0 kg (0 lb)
11648 kg (25961 lb)	11667 kg (25961 lb)	0 kg (0 lb)	0 kg (0 lb)
11708 kg (26095 lb)	11727 kg (26095 lb)	0 kg (0 lb)	0 kg (0 lb)
11768 kg (26229 lb)	11787 kg (26229 lb)	0 kg (0 lb)	0 kg (0 lb)
11828 kg (26363 lb)	11847 kg (26363 lb)	0 kg (0 lb)	0 kg (0 lb)
11888 kg (26497 lb)	11907 kg (26497 lb)	0 kg (0 lb)	0 kg (0 lb)
11948 kg (26631 lb)	11967 kg (26631 lb)	0 kg (0 lb)	0 kg (0 lb)
12008 kg (26765 lb)	12027 kg (26765 lb)	0 kg (0 lb)	0 kg (0 lb)
12068 kg (26899 lb)	12087 kg (26899 lb)	0 kg (0 lb)	0 kg (0 lb)
12128 kg (27033 lb)	12147 kg (27033 lb)	0 kg (0 lb)	0 kg (0 lb)
12188 kg (27167 lb)	12207 kg (27167 lb)	0 kg (0 lb)	0 kg (0 lb)
12248 kg (27301 lb)	12267 kg (27301 lb)	0 kg (0 lb)	0 kg (0 lb)
12308 kg (27435 lb)	12327 kg (27435 lb)	0 kg (0 lb)	0 kg (0 lb)
12368 kg (27569 lb)	12387 kg (27569 lb)	0 kg (0 lb)	0 kg (0 lb)
12428 kg (27703 lb)	12447 kg (27703 lb)	0 kg (0 lb)	0 kg (0 lb)
12488 kg (27837 lb)	12507 kg (27837 lb)	0 kg (0 lb)	0 kg (0 lb)
12548 kg (27971 lb)	12567 kg (27971 lb)	0 kg (0 lb)	0 kg (0 lb)
12608 kg (28105 lb)	12627 kg (28105 lb)	0 kg (0 lb)	0 kg (0 lb)
12668 kg (28239 lb)	12687 kg (28239 lb)	0 kg (0 lb)	0 kg (0 lb)
12728 kg (28373 lb)	12747 kg (28373 lb)	0 kg (0 lb)	0 kg (0 lb)
12788 kg (28507 lb)	12807 kg (28507 lb)	0 kg (0 lb)	0 kg (0 lb)
12848 kg (28641 lb)	12867 kg (28641 lb)	0 kg (0 lb)	0 kg (0 lb)
12908 kg (28775 lb)	12927 kg (28775 lb)	0 kg (0 lb)	0 kg (0 lb)
12968 kg (28909 lb)	12987 kg (28909 lb)	0 kg (0 lb)	0 kg (0 lb)
13028 kg (29043 lb)	13047 kg (29043 lb)	0 kg (0 lb)	0 kg (0 lb)
13088 kg (29177 lb)	13107 kg (29177 lb)	0 kg (0 lb)	0 kg (0 lb)
13148 kg (29311 lb)	13167 kg (29311 lb)	0 kg (0 lb)	0 kg (0 lb)
13208 kg (29445 lb)	13227 kg (29445 lb)	0 kg (0 lb)	0 kg (0 lb)
13268 kg (29579 lb)	13287 kg (29579 lb)	0 kg (0 lb)	0 kg (0 lb)
13328 kg (29713 lb)	13347 kg (29713 lb)	0 kg (0 lb)	0 kg (0 lb)
13388 kg (29847 lb)	13407 kg (29847 lb)	0 kg (0 lb)	0 kg (0 lb)
13448 kg (29981 lb)	13467 kg (29981 lb)	0 kg (0 lb)	0 kg (0 lb)
13508 kg (30115 lb)	13527 kg (30115 lb)	0 kg (0 lb)	0 kg (0 lb)
13568			

REF	DECAL	WARNING (IF APPLICABLE)
24	Hot Surface Warning (7185935) (2)	<div> WARNING</div> <p>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. ◀</p>
25	Change Filter (7120569)	
26	Battery Shut Off (7315525)	
27	Service Schedule (7252176)	<div> WARNING</div> <p>GENERAL HAZARD Failure to follow instructions can cause serious injury or death.</p> <ul style="list-style-type: none">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. ◀

REF	DECAL	WARNING (IF APPLICABLE)
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28 Rotating Fan and Hot Surfaces (7120928, E17z, E20, E20z, E17z-C4 and E20z-C4) or (7243563, E17 and E19)



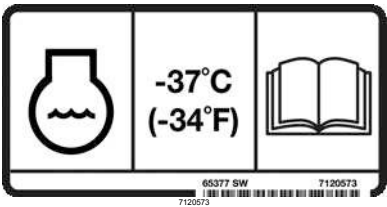
! WARNING

CUTTING AND BURN HAZARD
Keep away from the operating machine.

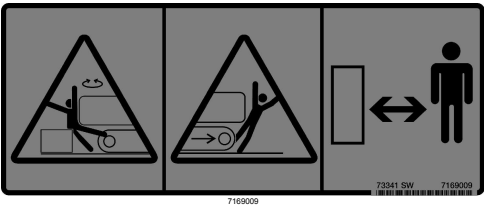
- Keep away from fan and moving parts. Do not operate with guard removed.
- Do not touch hot surfaces. Allow to cool before servicing.*

W-2521

29 Engine Coolant (7120573)



30 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

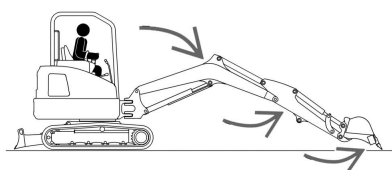
INTENDED USE

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.

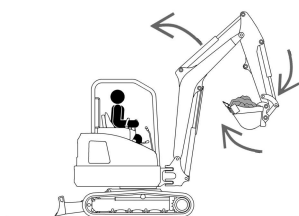
Additional Bobcat approved attachments allow this machine to perform other tasks described in the attachment Operation & Maintenance Manuals.

Some examples of intended use include:

Excavating



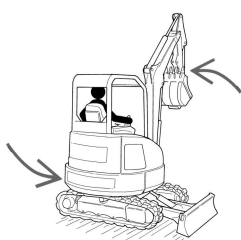
Excavating



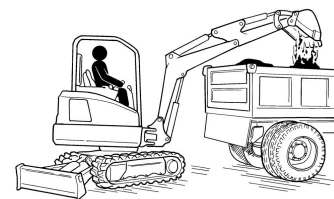
Boom Swing



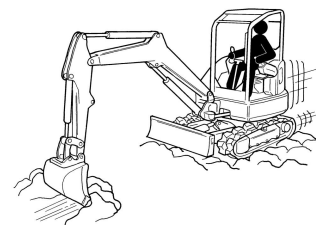
Rotating the Upperstructure



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 rules and regulations regarding digging or working in areas around underground utilities. Have all underground utility lines clearly marked before operating. ◀

D-1052

⚠ 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.

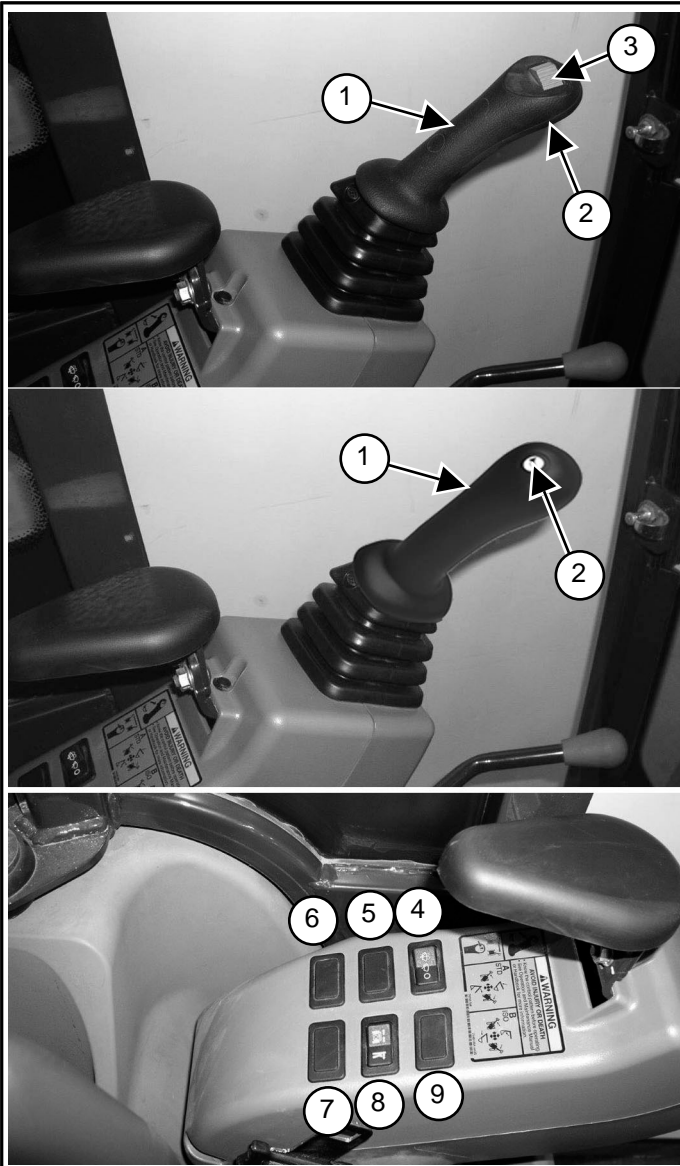
Avoid impacting objects with the blade. ◀

I-2256

INSTRUMENTS AND CONSOLES

Left Console

Figure 11



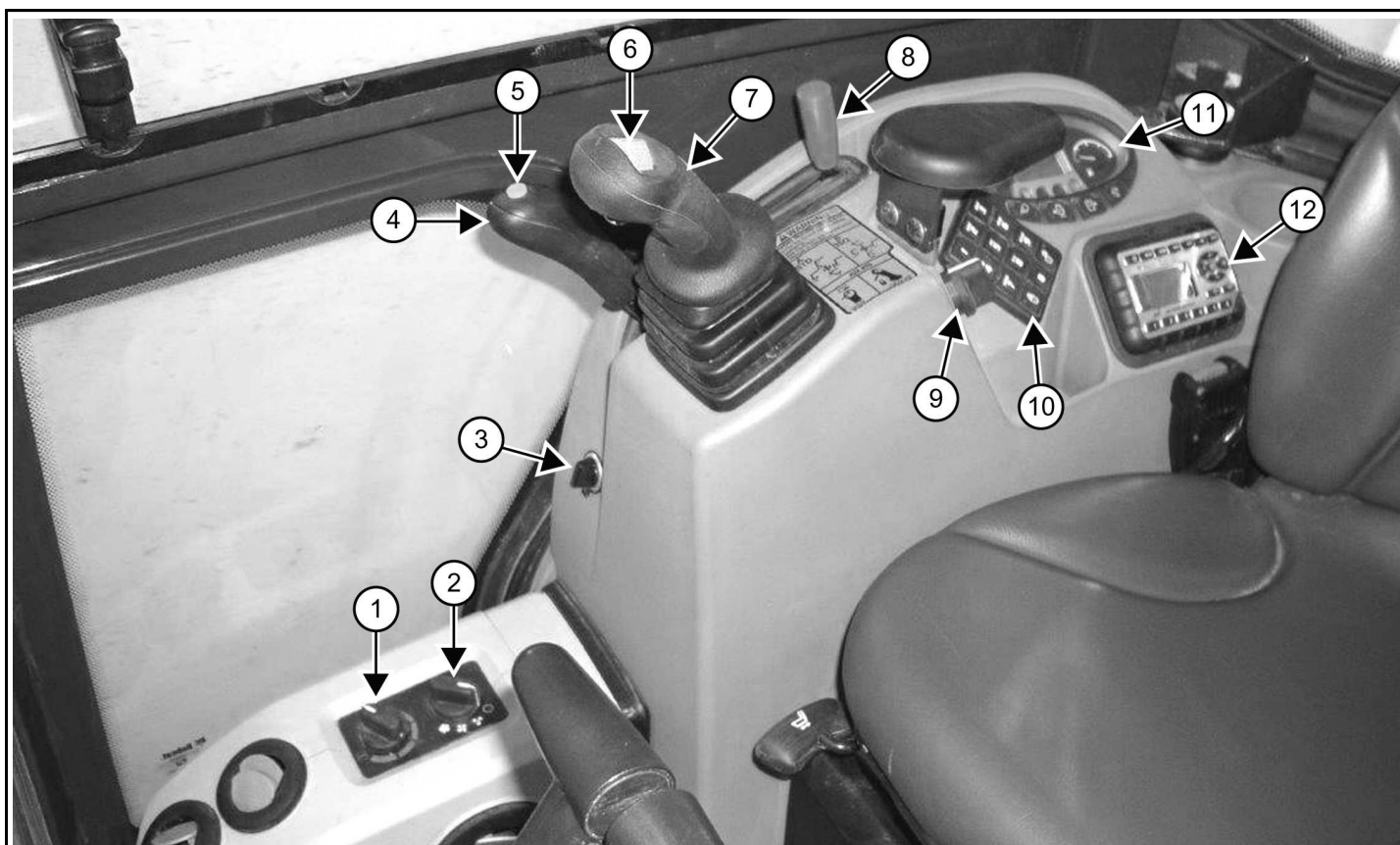
P113380c

REF.	DESCRIPTION	FUNCTION
4	Wiper / Washer Switch (if equipped)	Operates the windshield wiper and washer. (See Operating Windshield Wiper on Page 37)
5	Not Used	
6	Beacon / Strobe Light (if equipped)	Turns beacon / strobe light on / off.
7	Overload Warning Device Switch (if equipped)	Turns the overload warning device on / off. (See Operating The Overload Warning Device on Page 51)
8	Blade / Track Control Switch	Toggles the function of the lever between raising and lowering the blade and extending and retracting the tracks. (See Track Frame Expansion on Page 49)
9	Boom Swing / Secondary Auxiliary Hydraulics Switch (if equipped)	Toggles between boom swing and secondary auxiliary hydraulics. (See Boom Swing on Page 52)

REF.	DESCRIPTION	FUNCTION
1	Left Joystick	Operates the hydraulic controls. (See Hydraulic Controls on Page 42)
2	Horn	Sounds the horn.
3	Left Joystick Switch (if equipped)	Controls boom swing and secondary auxiliary hydraulics. (See Boom Swing on Page 52)

Right Console

Figure 12



C113382b

REF.	DESCRIPTION	FUNCTION
1	Temperature Control Dial (if equipped)	Controls temperature in cab.
2	Fan Motor Dial (if equipped)	Controls fan speed.
3	Auxiliary Power Outlet	12 volt receptacle for accessories.
4	Blade / Track Control Lever	Raises and lowers the blade. (See Blade Control Lever on Page 49) Also retracts and expands the track. (See Track Frame Expansion on Page 49)
5	Two-Speed Button	Engages and disengages High Range Travel Speed. (See Two-Speed Travel on Page 33)
6	Auxiliary Hydraulic Switch (if equipped)	Controls auxiliary hydraulics. (See Operating Attachments With Primary Auxiliary Hydraulics on Page 45)
7	Right Joystick	Operates the hydraulic controls. (See Hydraulic Controls on Page 42)
8	Engine Speed Control Lever	Controls engine rpm. (See Engine Speed Control on Page 48)
9	Key Switch or Keyless Start Switch	Used to start the engine. (See Starting The Engine on Page 57)
10	Keypad (if equipped)	Used to enter data and passwords into the standard panel.
11	Standard Panel	(See Standard Panel on Page 29)
12	Radio (if equipped)	(See Radio on Page 31)

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.

Standard Panel

Figure 13



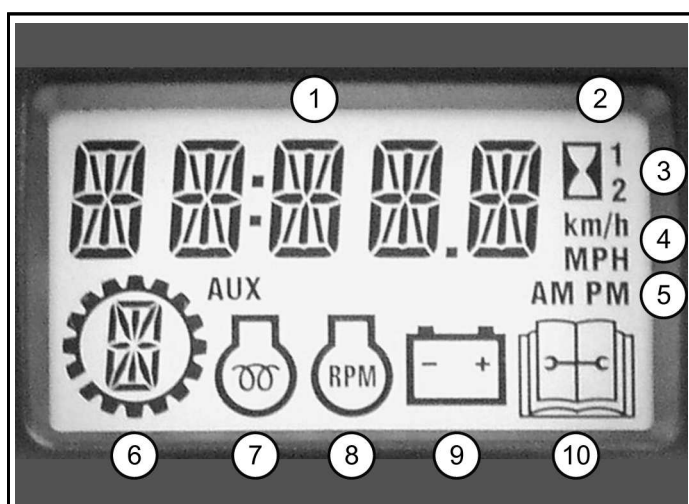
REF.	DESCRIPTION	FUNCTION
1	Engine Temperature Gauge	Shows the engine coolant temperature.
2		Not used for this model.
3	General Warning	Turns on or flashes to indicate machine malfunction or failure. (See Diagnostic Service Codes on Page 128)
4	Display Screen	Shows the hourmeter at startup and then changes to engine rpm. When preheat is activated, it shows the remaining preheat time. (See Display Screen Of Standard Panel on Page 30)
5		Not used for this model.
6		Not used for this model.
7	Fuel Gauge	Shows the amount of fuel in the tank.
8	Engine Coolant Temperature Warning	Turns on or flashes to indicate engine coolant temperature is high or sensor error.
9	Engine Malfunction	Turns on or flashes to indicate engine malfunction or failure.

REF.	DESCRIPTION	FUNCTION
10	High Range Engaged	Turns on when two-speed travel is enabled. Light flashes to indicate a problem. (See Two-Speed Travel on Page 33)
11	Seat Belt	Light stays on for 45 seconds as a reminder to fasten seat belt.
12	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 33)
13	Hydraulic System Malfunction	Turns on or flashes to indicate hydraulic system malfunction or failure.
14	Fuel Level Low	Turns on when fuel level is low, flashes to indicate fuel sensor error.
15		Not used for this model.
16	Lights	Controls work lights. The left green LED will illuminate when lights are turned on. Press and hold five seconds to display software version.
17	Auto Idle (if equipped)	Engages auto idle.
18	Auxiliary Hydraulics (Used only with joystick switch-activated Auxiliary Hydraulics)	Turns on auxiliary hydraulics. (See Operating Attachments With Primary Auxiliary Hydraulics on Page 45)
19	Information	Cycles through hourmeter, service codes, and auxiliary hydraulics.

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



REF.	DESCRIPTION
6	Auxiliary Flow
7	Engine Preheat
8	Engine RPM
9	Battery / Charging Voltage
10	Service

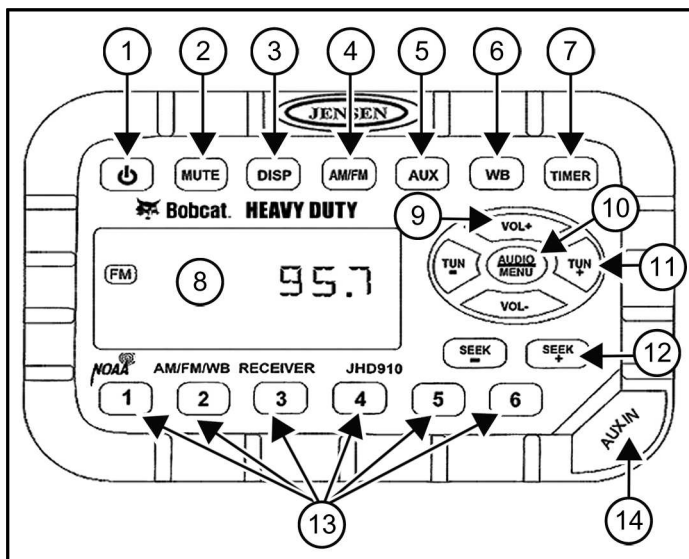
[A] When PRIME is shown in the display, this indicates that the fuel pump is priming the fuel system. Wait to start the machine until this icon is off.

REF.	DESCRIPTION
1	Data Display [A]
2	Hourmeter
3	Job Clock 1 and 2
4	Metric / English (not used for this model)
5	Clock (not used for this model)

RADIO

Radio Identification

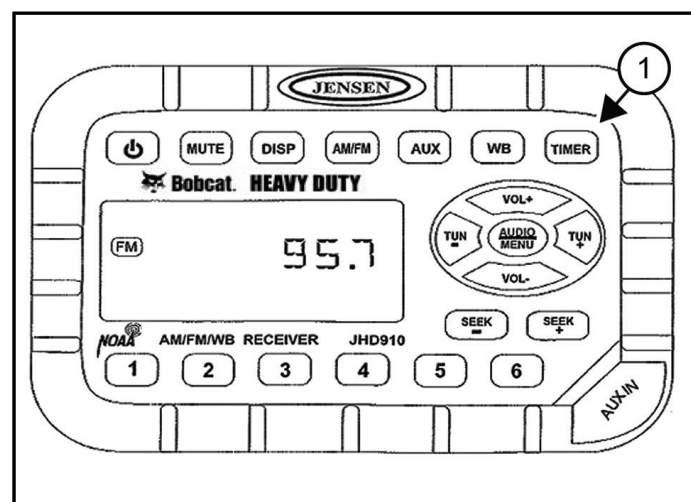
Figure 15



REF	DESC.	FUNCTION
10	AUDIO / MENU	Adjusts radio settings. (See Adjusting Radio Settings on Page 32)
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 16

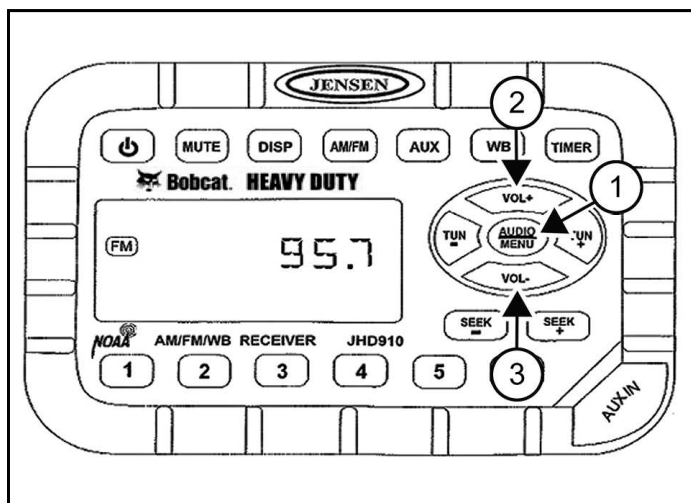


REF	DESC.	FUNCTION
1	POWER	Turns the radio unit ON / OFF.
2	MUTE	Mutes audio output.
3	DISP	Switches between display operation functions of the radio. (See Operating The Radio Clock on Page 32)
4	AM/FM	Switches between AM (MW) bands and three FM bands.
5	AUX	Switches to Auxiliary Input mode. Portable 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 32)
7	TIMER	Accesses timer mode. (See Operating Radio Timer on Page 31)
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.

- Press the TIMER (Item 1) [Figure 16] button to start the timer function.
- Press TIMER (Item 1) [Figure 16] again to stop timer.
- Press and hold TIMER (Item 1) [Figure 16] to reset timer and exit from timer mode.

Adjusting Radio Settings

Figure 17



- Press the AUDIO / MENU button (Item 1) [Figure 17] to cycle through bass, treble, and balance settings.
 - ▷ Use the VOL+ (Item 2) and VOL- (Item 3) buttons [Figure 17] to adjust the desired option displayed.

Normal operation will resume automatically.

- Press and hold the AUDIO / MENU button (Item 1) [Figure 17] for three seconds to enter menu adjustment settings.
 - ▷ Press the AUDIO / MENU button (Item 1) [Figure 17] 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 Color: Set display screen backlight color (amber or green).

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

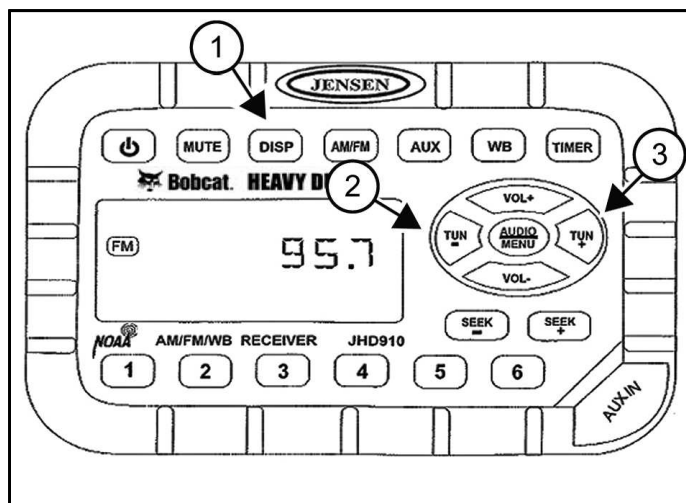
WB Alert: Determines if weather band alert features is activated.

- ▷ Use the VOL+ (Item 2) and VOL- (Item 3) buttons [Figure 17] to adjust the active setting.

Normal operation will resume automatically.

Operating The Radio Clock

Figure 18



- Press and hold the DISP (Item 1) button [Figure 18] to enter clock setting mode.
- Use TUN – button (Item 2) [Figure 18] to adjust hours.
- Use TUN + button (Item 3) [Figure 18] to adjust minutes.

Normal operation will resume automatically.

RAISING AND LOWERING THE CONSOLE

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

Figure 19



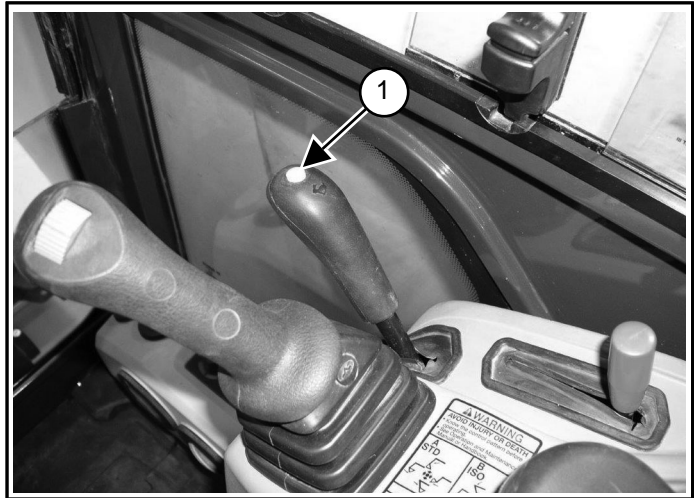
- Before operating the excavator, lower the left console [Figure 19].
Push down on the handle until the latch is engaged.
- Before exiting the cab, raise the left console by pulling up on the handle.
The lift spring will assist in raising the console.

NOTE: 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

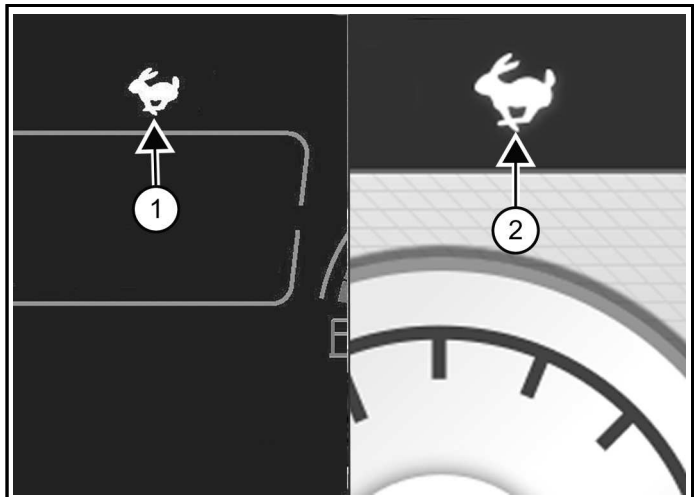
Engaging Two-Speed Travel

Figure 20



- Press the button (Item 1) [Figure 20] to engage the high range.

Figure 21



Two beeps will be heard and the high range icon (Item 1) for the panel or (Item 2) for the display [Figure 21] will illuminate.

- Press the button (Item 1) [Figure 20] again to disengage.

One beep will be heard.

Auto Shift Drive Motors

The travel motors may be 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.

OPERATOR CANOPY (ROPS / TOPS / FOPS)

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

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

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 Doosan Bobcat China Co., Ltd.. ◀

W0095

OPERATOR CAB (ROPS / TOPS)

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

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

Roll-Over Protective Structure per ISO 12117-2, Tip-Over Protective Structure per ISO 12117.

WARNING

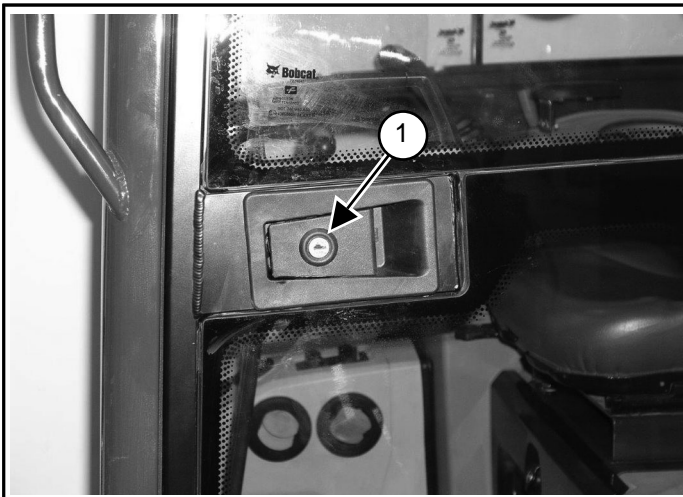
MODIFICATION HAZARD

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 Doosan Bobcat China Co., Ltd..

Operating The Cab Door

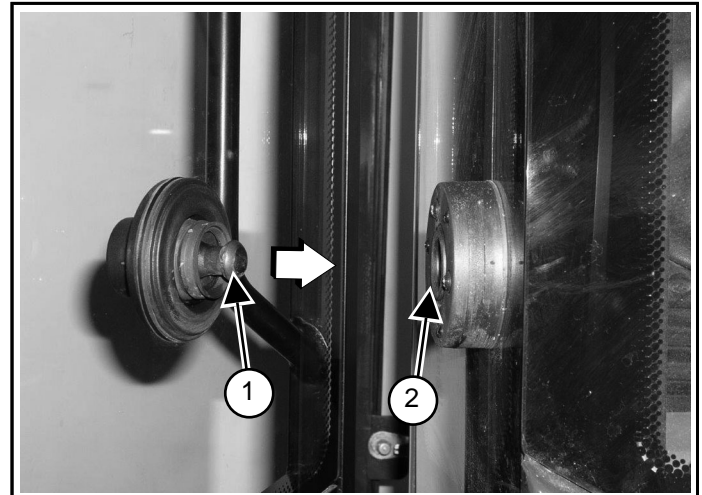
Figure 22



- Pull on the latch to open the door.

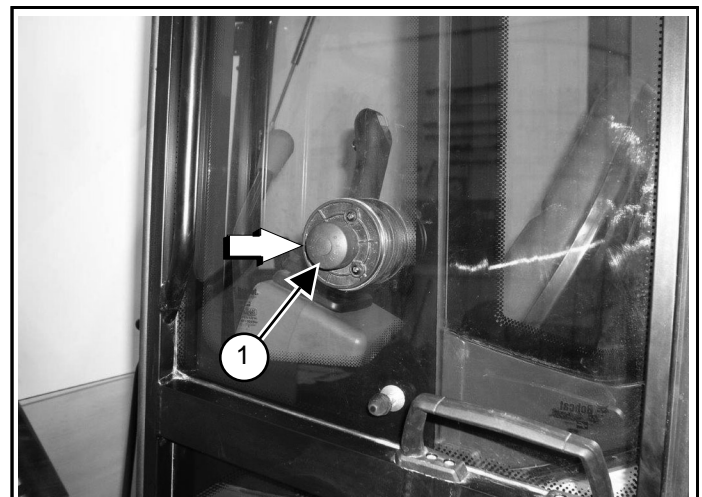
The cab door can be locked (Item 1) [Figure 22] with the same key as the starter switch.

Figure 23



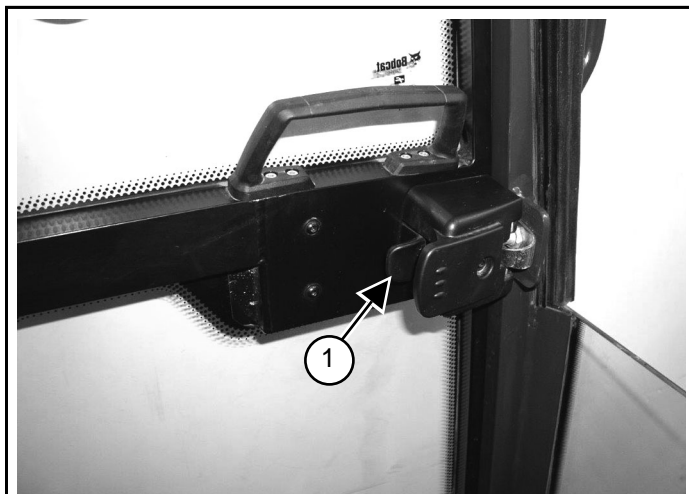
- Push the door all the way open until the latch post (Item 1) engages in the latch (Item 2) to hold the door in the open position [Figure 23].

Figure 24



- When the door is in the open position, push the latch (Item 1) [Figure 24] to release the door.

Figure 25

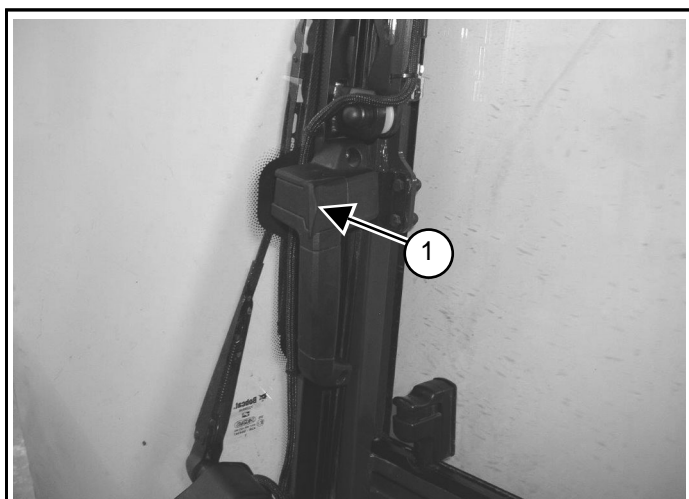


P113391a

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

Operating The Front Window

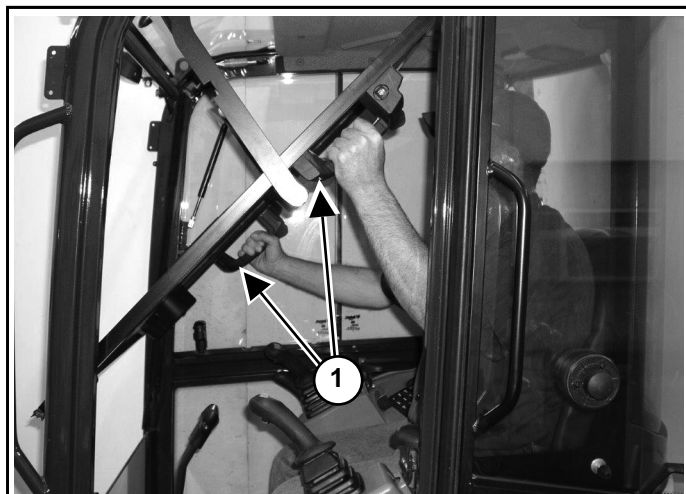
Figure 26



P113392a

1. Push the window latch buttons (Item 1) [Figure 26] on both sides.

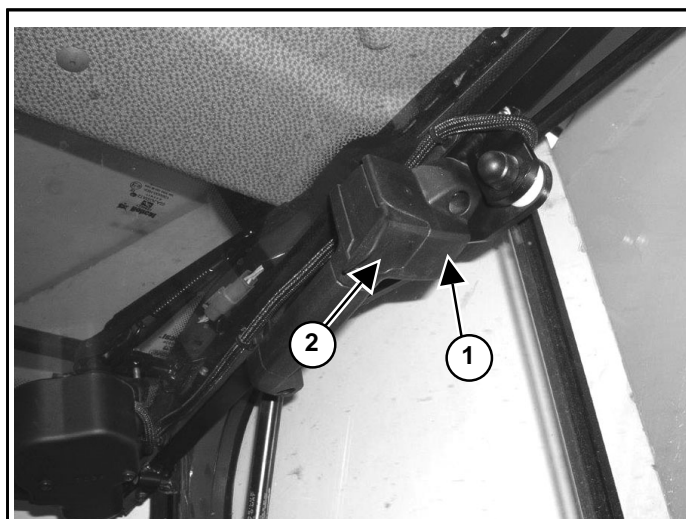
Figure 27



P113393a

2. Use both window grab handles (Item 1) [Figure 27] to pull the top of the window in.

Figure 28



P113392a

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

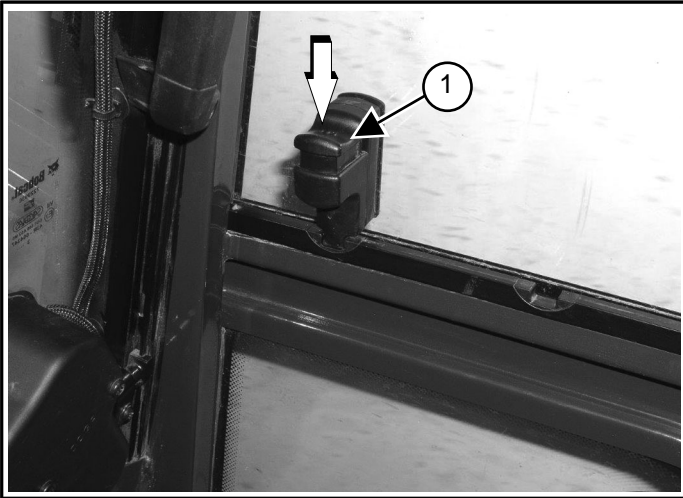
When the window is fully raised, the latch (Item 1) (both sides) [Figure 28] will close on the bracket in the latched position.
4. Pull down and forward slightly on the window to make sure it is fully latched.
5. To close the window, use both window grab handles to support the window while pressing the window latch button (Item 2) [Figure 28] (both sides).

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

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

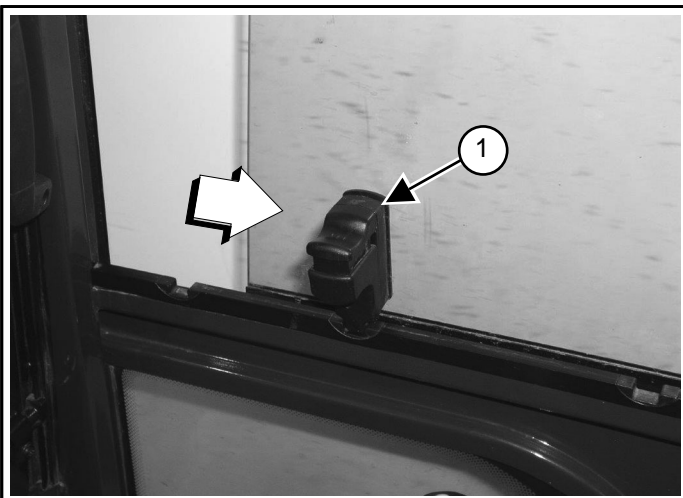
Operating The Right Window

Figure 29



1. Press down on the latch (Item 1) [Figure 29] located at the front of the right window.

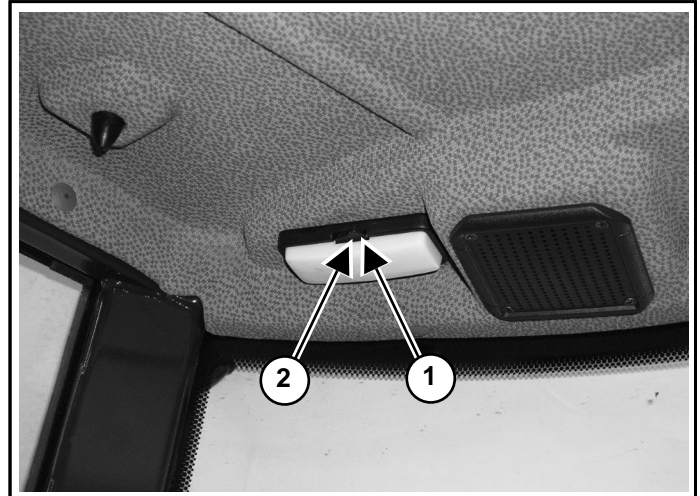
Figure 30



2. Pull the latch (Item 1) [Figure 30] backward to open the window.
3. Release the latch to secure the window in place.
4. To close the window, press down on the latch (Item 1) [Figure 29] and push the latch forward.

Operating The Cab Interior Light

Figure 31



1. Press the switch to the right (Item 1) [Figure 31] to turn the light ON.
2. Press the switch to the left (Item 2) [Figure 31] to turn the light OFF.

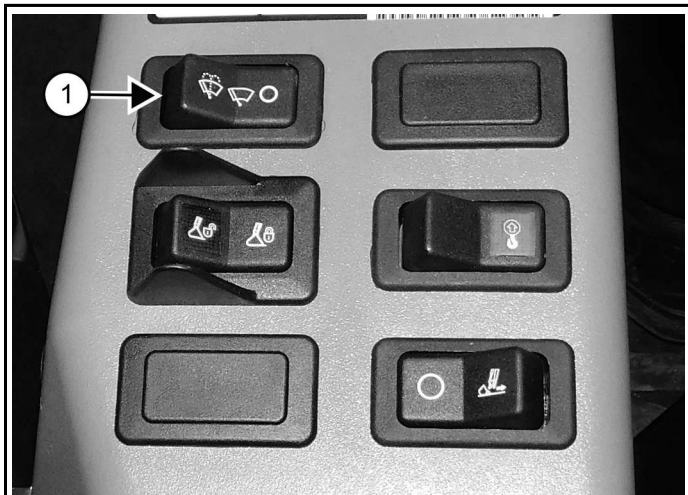
Operating Windshield Wiper

Figure 32



The front window is equipped with a windshield wiper (Item 1) [Figure 32] and washer.

Figure 33

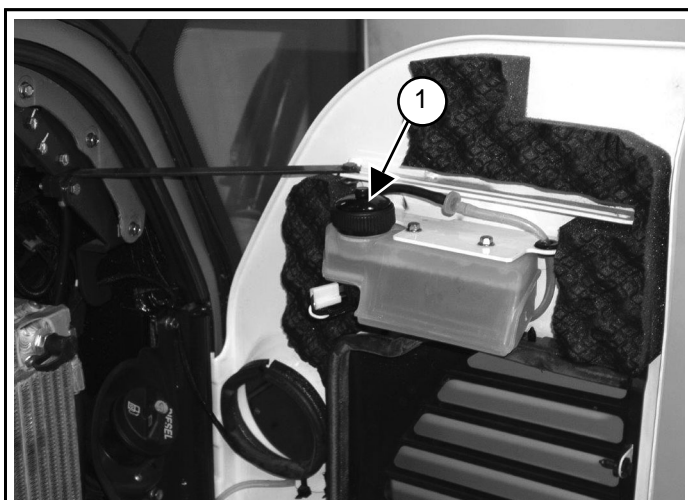


C208594d

1. Press the switch (Item 1) [Figure 33] to the left to turn the windshield wiper on.
2. Press and hold switch (Item 1) [Figure 33] to the left to activate windshield washer.
3. Press the switch (Item 1) [Figure 33] to the right to turn the windshield wiper off.

Window Washer Reservoir

Figure 34



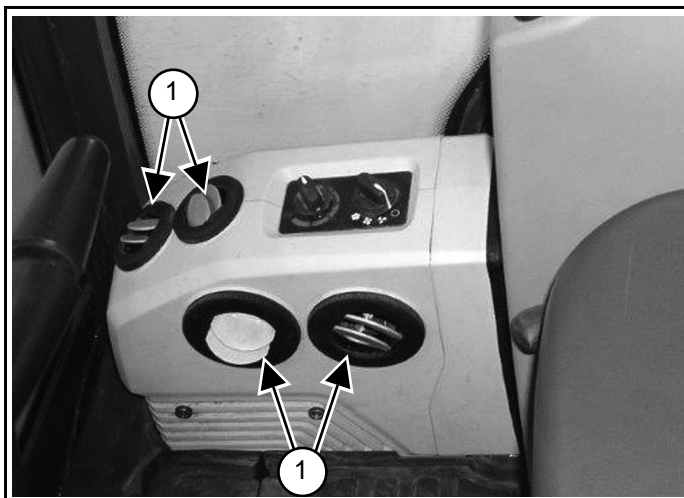
P113396a

The window washer reservoir (Item 1) [Figure 34] is located on the right side cover.

When temperatures are to reach below freezing, use a washer fluid that is recommended for use in cold temperatures to avoid damage to the washer reservoir.

Heating And Ventilation Ducting

Figure 35



P113381c

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

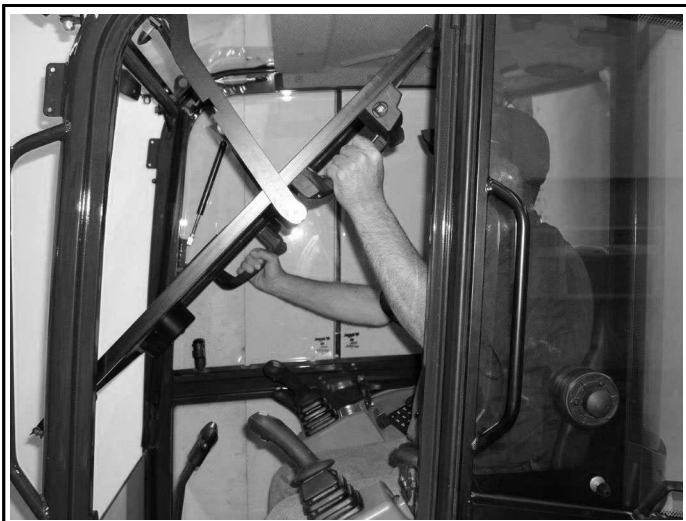
EMERGENCY EXITS

Emergency Exit Locations

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

Making An Emergency Exit Through The Front Window

Figure 36

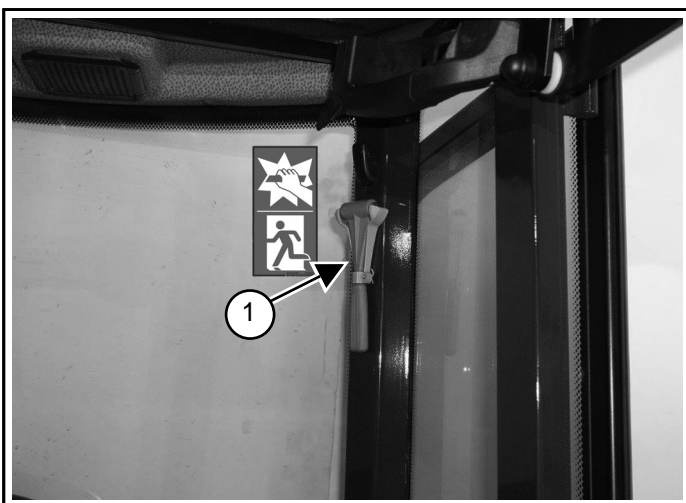


You can make an emergency exit through the front window. (See Operating The Front Window on Page 36)

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

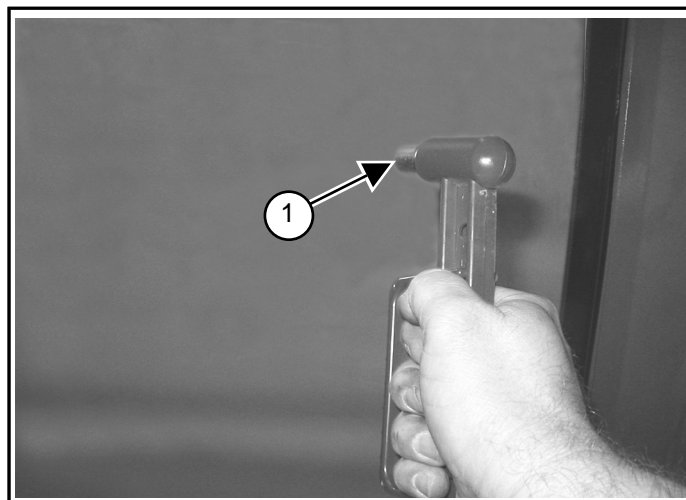
Making An Emergency Exit Through The Rear Window

Figure 37



1. If emergency exit through the rear window is required, use the supplied hammer (Item 1) [Figure 37] located on the left rear side of the cab to break the window.

Figure 38



2. Remove the hammer from the storage position and strike the glass with the pointed end of the hammer (Item 1) [Figure 38].
3. Use the hammer to remove broken glass from the edge of the window before exiting.

TRAVEL MOTION ALARM

Travel Motion Alarm Description

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

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

If the alarm does not sound, see inspection instructions. (See Inspecting The Travel Motion Alarm System on Page 97)

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

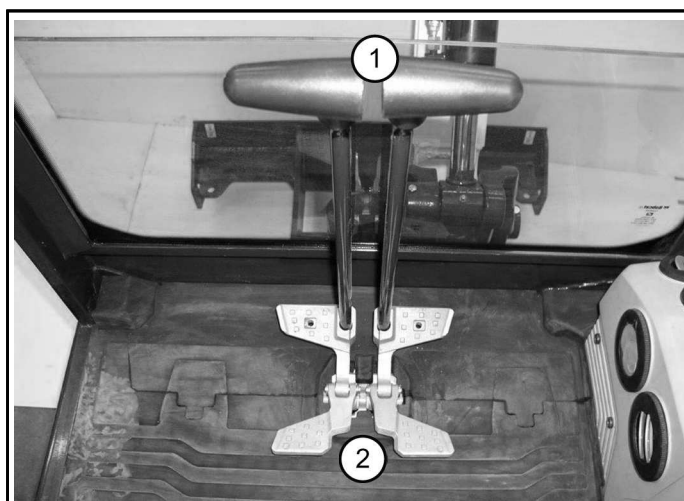
TRAVEL CONTROLS

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 39



2. Slowly move both steering levers (Item 1) [Figure 39] forward for forward travel, backward for reverse travel.

OR

Control travel with the foot pedals (Item 2) [Figure 39].

NOTE: On machines equipped with a two-piece pedal, you can pivot the heel of the pedals forward for additional space on the floor.

WARNING

UNINTENDED MOVEMENT HAZARD

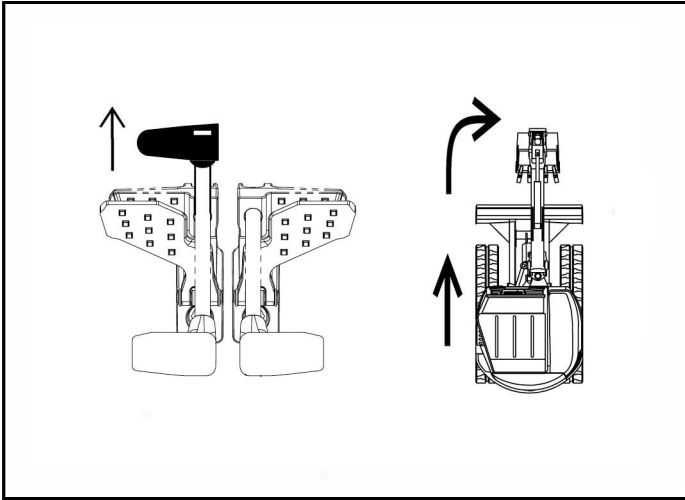
Failure to follow instructions can cause serious injury or death.

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

W-2235

Making A Right Turn

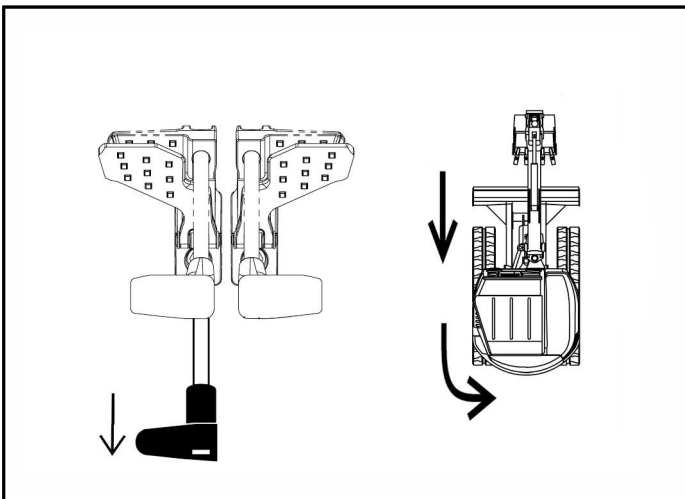
Figure 40



NA15007B

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

Figure 41

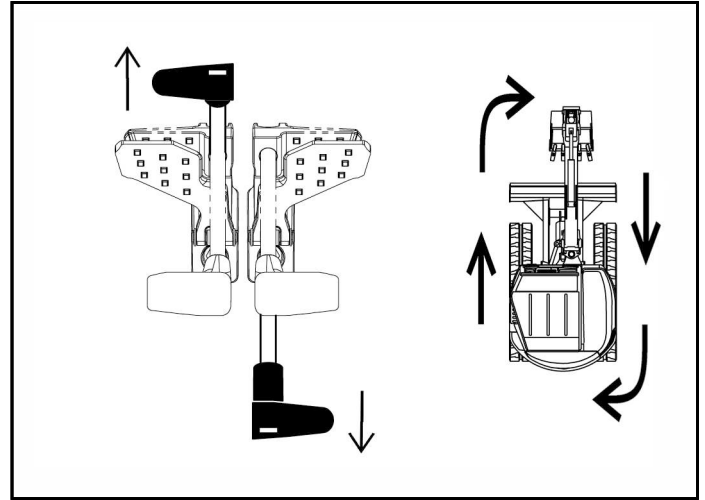


NA15010B

- Pull the left steering lever backward to turn right while traveling backward [Figure 41].

Making A Counter-Rotation Right Turn

Figure 42

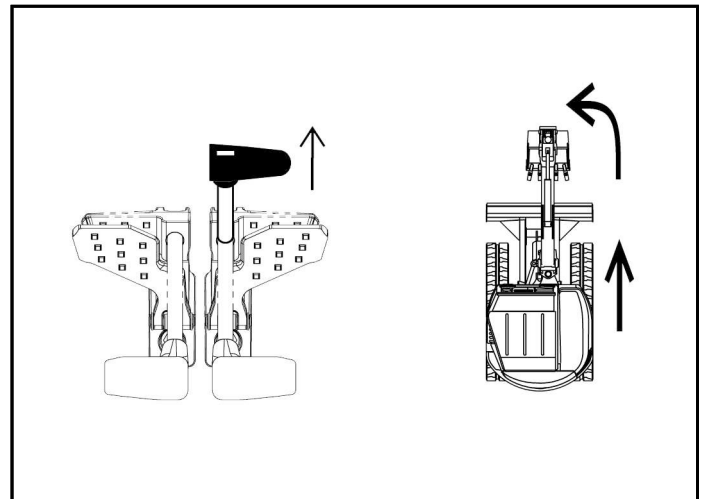


NA15007A

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

Making A Left Turn

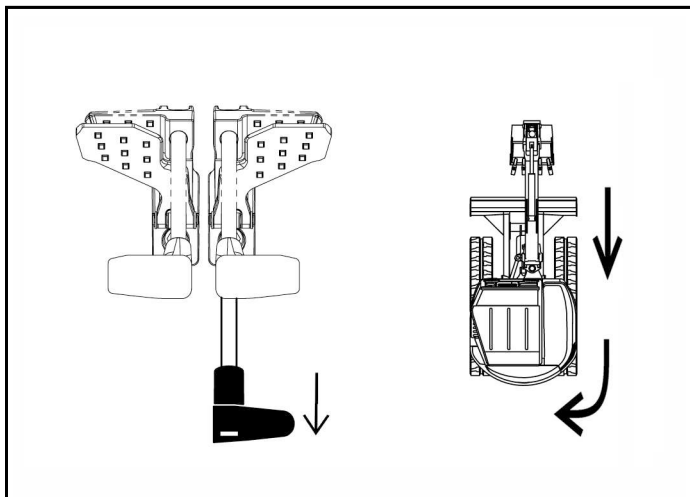
Figure 43



NA15008A

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

Figure 44

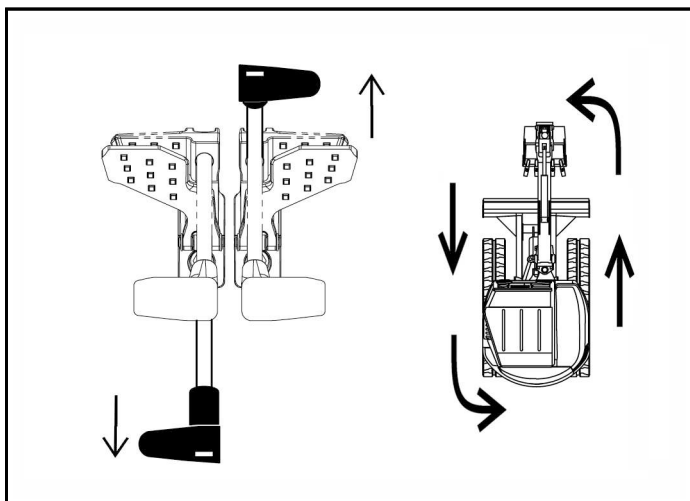


NA15009A

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

Making A Counter-Rotation Left Turn

Figure 45



NA15010A

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

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 Control Pattern

LEFT JOYSTICK	
<p>P134139e</p>	
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
7	Slew left
8	Arm out and slew left

RIGHT JOYSTICK	
<p>P134140e</p>	
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
7	Bucket curl
8	Boom lower and bucket curl

Standard Control Pattern

LEFT JOYSTICK	
<p>P134139d</p>	
JOYSTICK POSITION	FUNCTION

RIGHT JOYSTICK	
<p>P134140d</p>	
JOYSTICK POSITION	FUNCTION

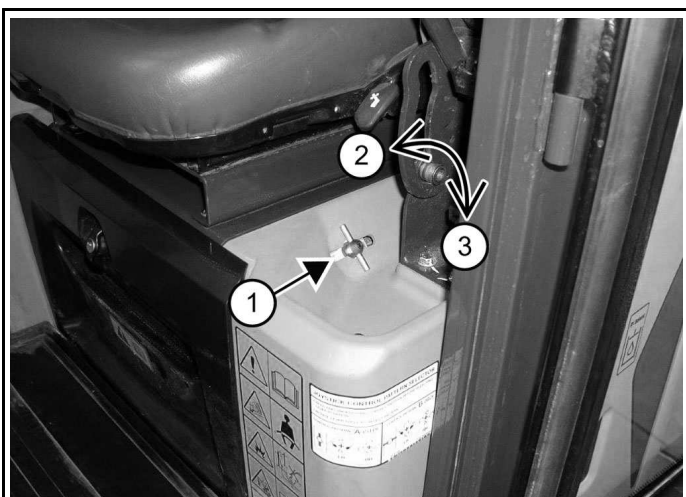
LEFT JOYSTICK	
1	Boom lower
2	Boom lower and slew right
3	Slew right
4	Boom raise and slew right
5	Boom raise
6	Boom raise and slew left
7	Slew left
8	Boom lower and slew left

RIGHT JOYSTICK	
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

Control Pattern Selection Valve

The excavator may be equipped with a control pattern selection valve located to the left of the operator's seat. Use this valve to switch between ISO control pattern and Standard control pattern.

Figure 46



- Rotate the valve (Item 1) counterclockwise (Item 2) to select Standard control pattern [Figure 46].
- Rotate the valve clockwise (Item 3) [Figure 46] to select ISO control pattern.

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

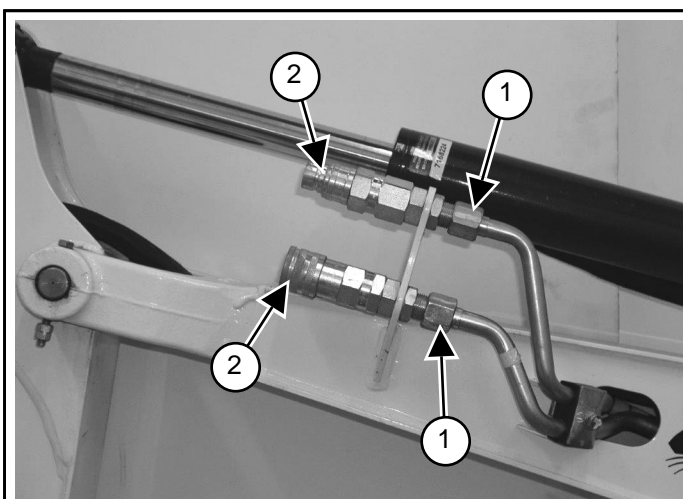
INJECTION HAZARD

Pressurized 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 47



P113402b

The excavator is supplied with hydraulic lines (Item 1) [Figure 47] that supply the hydraulic fluid for attachments.

Optional flush faced couplers (Item 2) [Figure 47] are available. See your Bobcat dealer for flush face couplers.

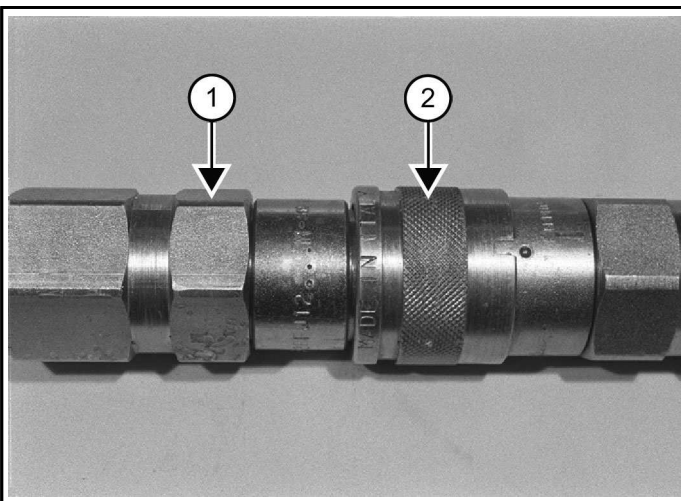
Connecting Quick Couplers

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 48



4. To disconnect, hold the male coupler (Item 1) and retract the sleeve (Item 2) on the female coupler until the couplers disconnect [Figure 48].

Pressure can build up in the auxiliary hydraulic lines, making it difficult to connect or disconnect the auxiliary quick couplers. Release hydraulic pressure in the lines when necessary. (See Releasing Hydraulic Pressure In Excavator With Joystick on Page 47)

PRIMARY AUXILIARY HYDRAULICS

Operating Attachments With Primary Auxiliary Hydraulics

⚠ 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 Doosan Bobcat China Co., Ltd..

W-2052

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 49

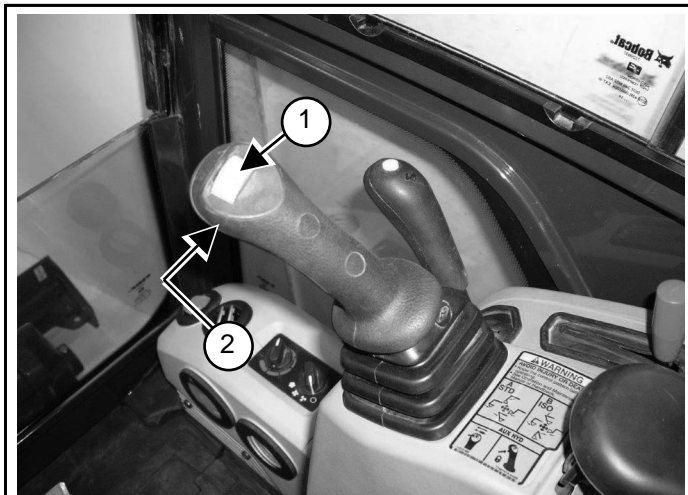


1. Press the AUX button (Item 1) [Figure 49] to enable **Selectable Auxiliary Hydraulics Flow**.

A beep will sound each time the AUX button is pushed. The last selected flow will appear in the data display (Item 2) [Figure 49]. The left LED (Item 3) [Figure 49] will illuminate.
2. To enable **Continuous Flow Auxiliary Hydraulics**, press and hold the AUX button (Item 1) [Figure 49] for more than one second.

The right LED (Item 4) [Figure 49] will illuminate.

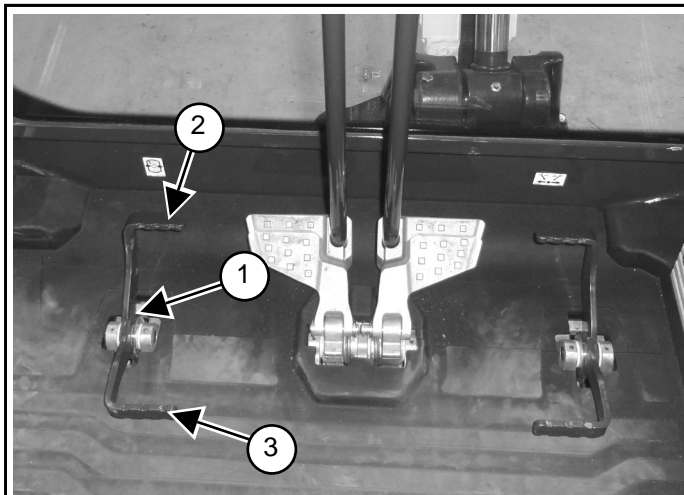
Figure 50



3. If your machine is equipped with the right joystick switch (Item 1) [Figure 50], see the following table to operate attachments:

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.

Figure 51



4. If your machine is equipped with the left pedal (Item 1) [Figure 51], see the following to operate attachments:
- Press the toe of the pedal (Item 2) [Figure 51] to supply hydraulic flow to the female coupler.
 - Press the heel of the pedal (Item 3) [Figure 51] to supply hydraulic flow to the male coupler.
5. To turn off auxiliary hydraulics, press the AUX Hydraulics button (Item 1) [Figure 49] 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.

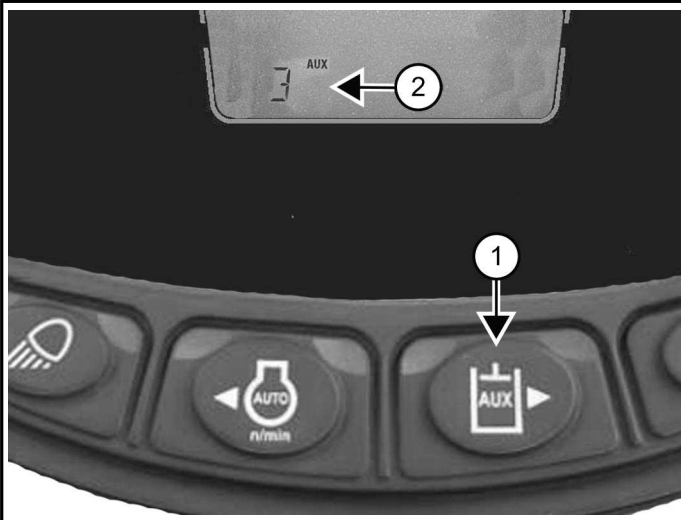
Setting Auxiliary Hydraulics Flow Rate

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 52



2. To change the flow rate, press the AUX button (Item 1) [Figure 52] to toggle through the settings.

The flow rate will display in the lower left corner of the display screen (3AUX, 2AUX, or 1AUX) (Item 2) [Figure 52].

Releasing Hydraulic Pressure In Excavator With Joystick

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

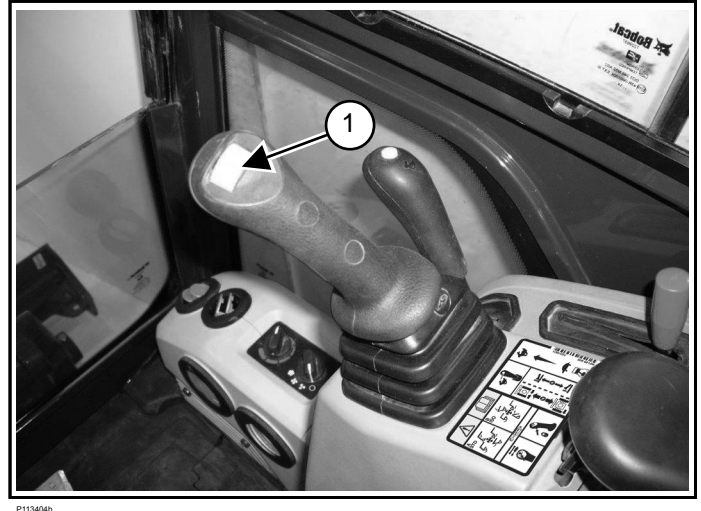
1. Put the attachment flat on the ground.
2. Stop the engine and then turn the start switch to ON, but do not start the engine.
3. Make sure the left console is fully lowered.

Figure 53



4. Press the AUX button (Item 1) [Figure 53] to enable auxiliary hydraulics.

Figure 54



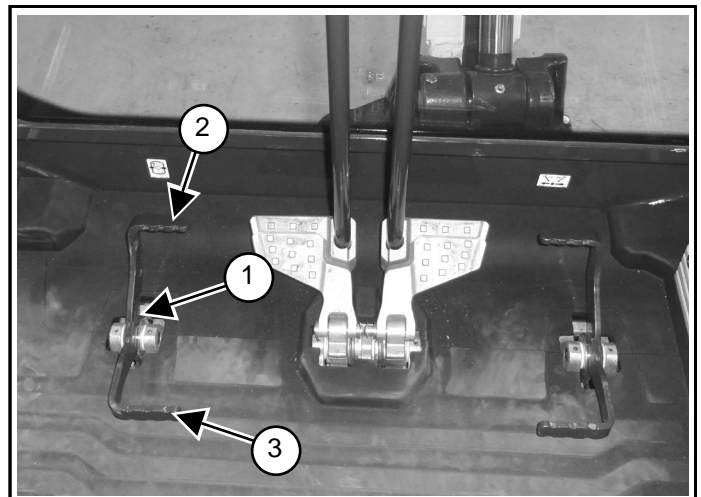
5. Move the right joystick switch (Item 1) [Figure 54] to the right and left several times to release pressure.

Releasing Hydraulic Pressure In Excavator With Pedal

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 55



4. Move the pedal (Item 1) in both directions (Items 2 and 3) several times to release pressure [Figure 55].

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.

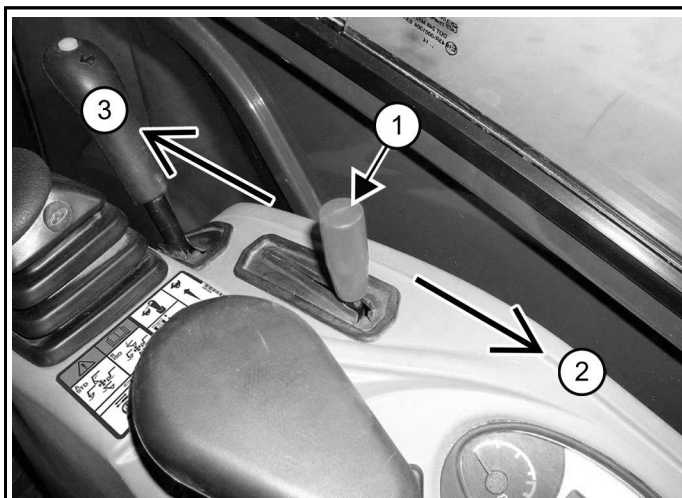
This will relieve pressure in the attachment.

3. Connect the female coupler from the attachment.

ENGINE SPEED CONTROL

Setting Engine Speed (RPM)

Figure 56



C113405a

The engine speed control lever (Item 1) [Figure 56] controls engine rpm.

- Move the engine speed control lever back (Item 2) [Figure 56] to reduce engine rpm.
- Move the engine speed control lever forward (Item 3) [Figure 56] to increase engine rpm.

BLADE CONTROL LEVER

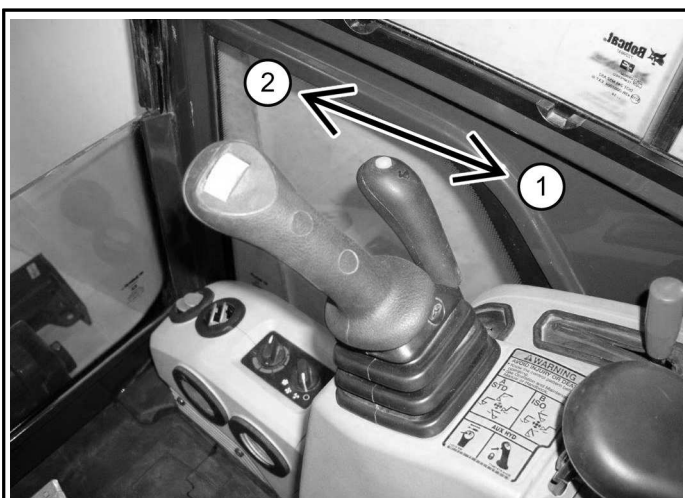
Raising And Lowering The Blade

Figure 57



Push the Blade / Track Control switch (Item 1) [Figure 57] to the right (Blade position).

Figure 58



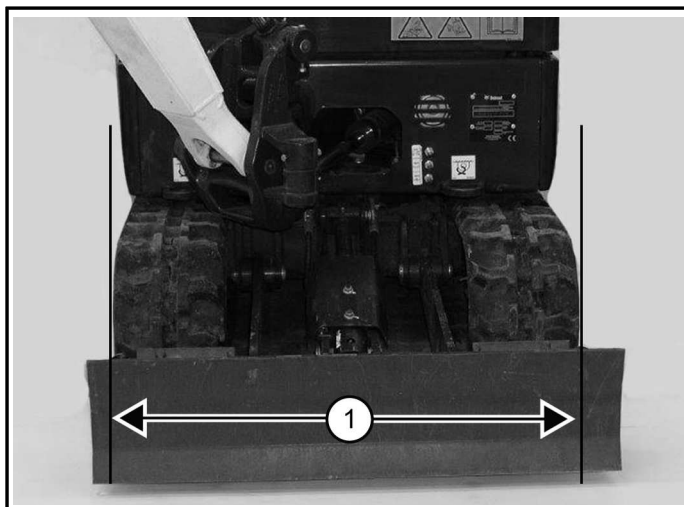
- Pull the lever backward (Item 1) [Figure 58] to raise the blade.
- Push the lever forward (Item 2) [Figure 58] to lower the blade.

Keep blade lowered for increased digging performance.

TRACK FRAME EXPANSION

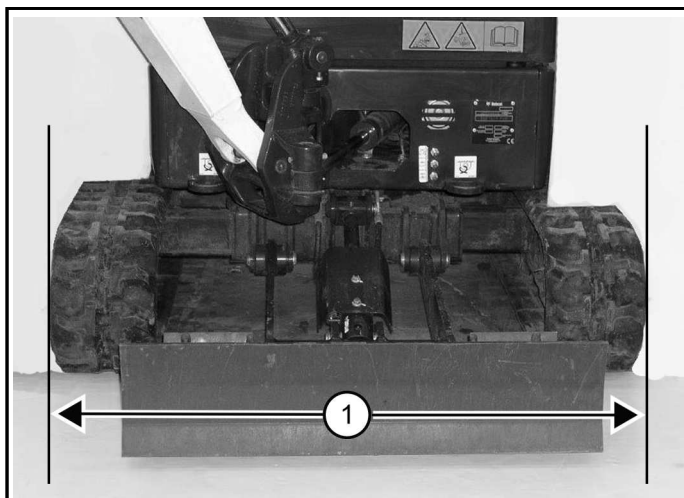
Tips For Expanding And Retracting The Track Frame

Figure 59



Retract the track frame to the position shown (Item 1) [Figure 59] to transport the excavator on a trailer or to access narrow areas.

Figure 60



Expand the track frame to the position shown (Item 1) [Figure 60] for increased digging performance.

Expanding And Retracting The Track Frame

⚠ IMPORTANT

MACHINE DAMAGE HAZARD

Failure to follow instructions could result in damage to the track.

Always lift the excavator before expanding or retracting the track frame. ◀

1/2193

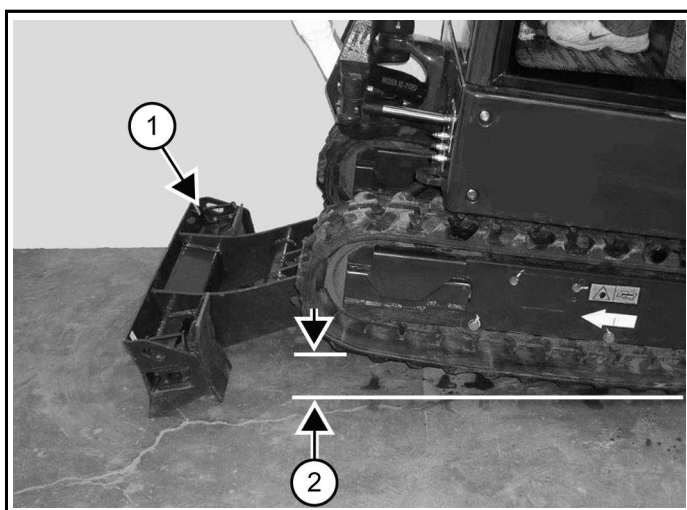
The track frame must be in either the fully expanded or fully retracted position when operating the excavator.

Figure 61



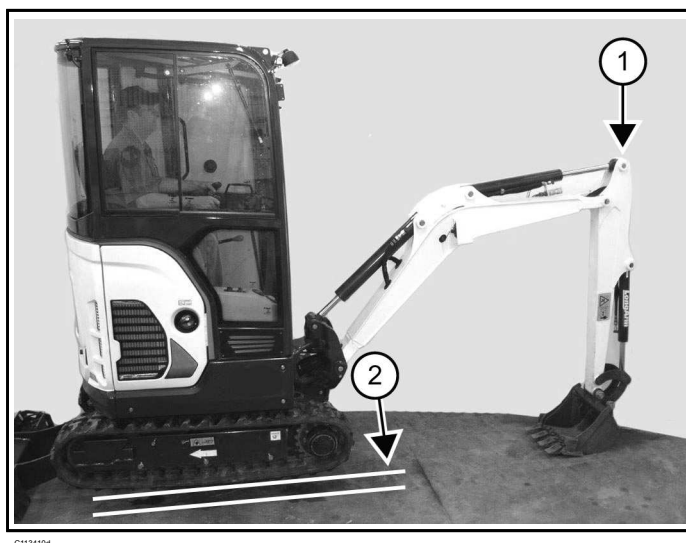
1. Push the Blade / Track Control switch (Item 1) [Figure 61] to the right (Blade position).

Figure 62



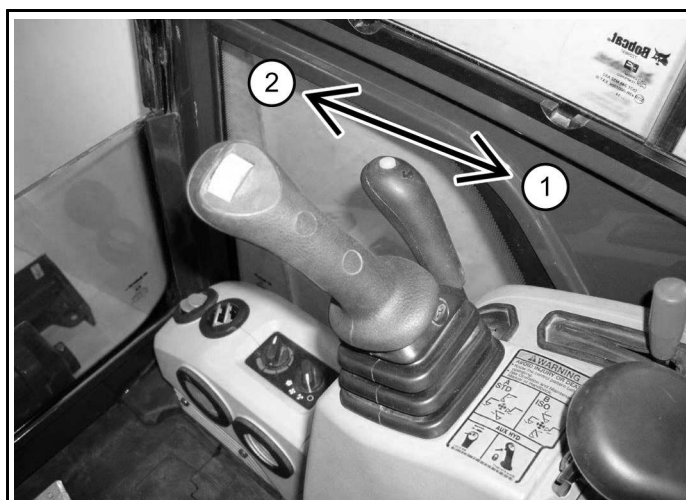
2. With the boom and arm positioned over the blade, lower the blade (Item 1) until the track is raised 100 – 150 mm (4.00 – 6.00 in) (Item 2) off the ground [Figure 62].
3. Rotate the upperstructure 180 degrees.

Figure 63



4. Lower the boom and arm (Item 1) to raise the excavator until the track is 100 – 150 mm (4.00 – 6.00 in) off the ground (Item 2) [Figure 63].
5. Push the Blade / Track Control switch (Item 1) [Figure 61] to the left (Track position).

Figure 64



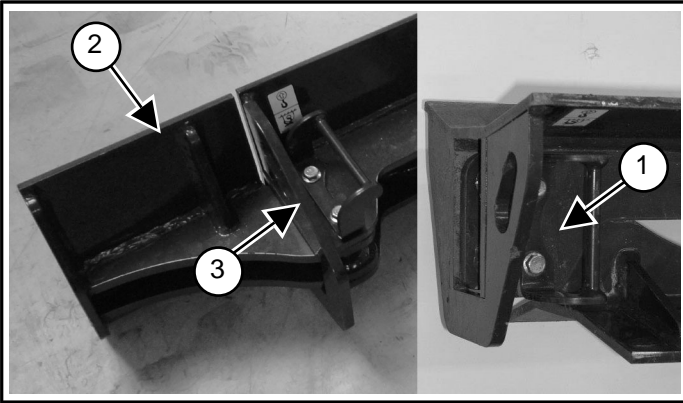
6. Pull the Blade / Track Control lever back (Item 1) [Figure 64] until the track frame is fully retracted.
OR
Push the Blade / Track Control lever forward (Item 2) [Figure 64] until the track frame is fully expanded.
7. Return the Blade / Track Control switch to the Blade position during operation so that the track does not move when using the Blade / Track Control lever.
8. Raise the boom and arm to lower the rear of the excavator to the ground.
9. Rotate the upperstructure 180 degrees.

10. Raise the blade until the tracks are on the ground.

Expanding The Blade

1. Raise the blade slightly and place a block under the blade.
2. Lower the blade fully.

Figure 65



3. Remove the blade retainer pin assembly (Item 1) [Figure 65].
4. Remove and reposition the blade extension (Item 2) [Figure 65] to the outside blade position.
5. Reinstall the blade retainer pin assembly (Item 3) [Figure 65].

OVERLOAD WARNING DEVICE

Operating The Overload Warning Device

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

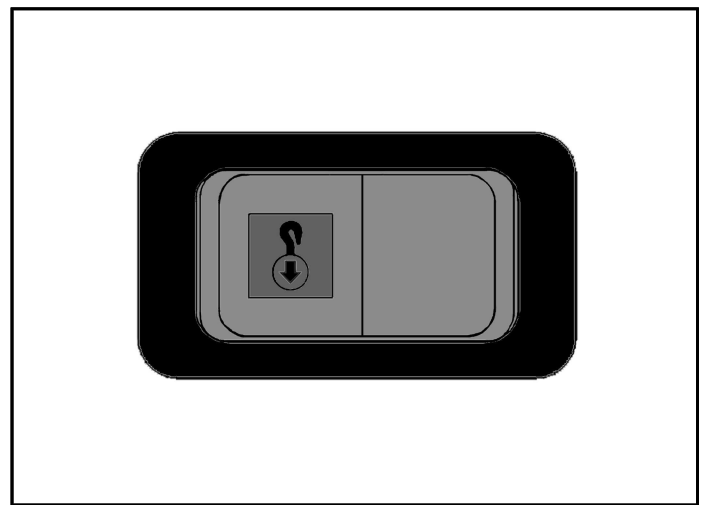
When the overload warning device (if equipped) is engaged, a warning buzzer will sound and the general warning icon will flash on the display if the work group is overloaded.

⚠ WARNING

CRUSHING HAZARD

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

Figure 66



1. Press the overload warning switch [Figure 66] on the left console to enable the overload warning device.

Figure 67

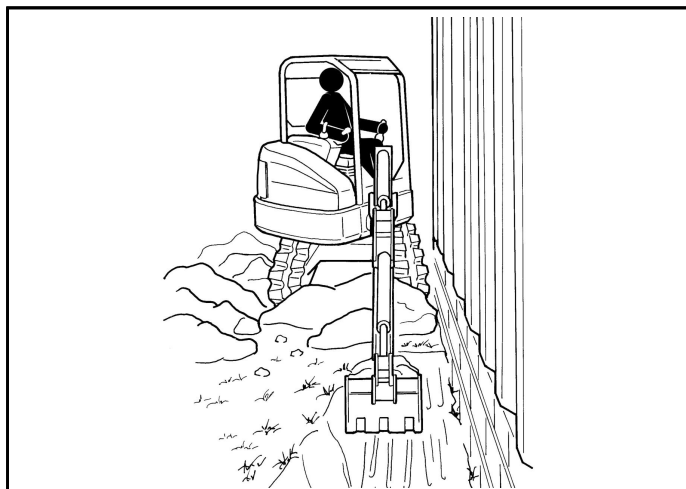


2. If the boom is overloaded, the general warning icon (Item 1) [Figure 67] will illuminate and a buzzer will sound.
3. Immediately bring the arm toward the machine, lower the boom, and reduce the load before continuing operation.
4. Disengage the overload warning device by pressing the switch (Item 1) [Figure 66] to the right.

BOOM SWING

Enabling Boom Swing

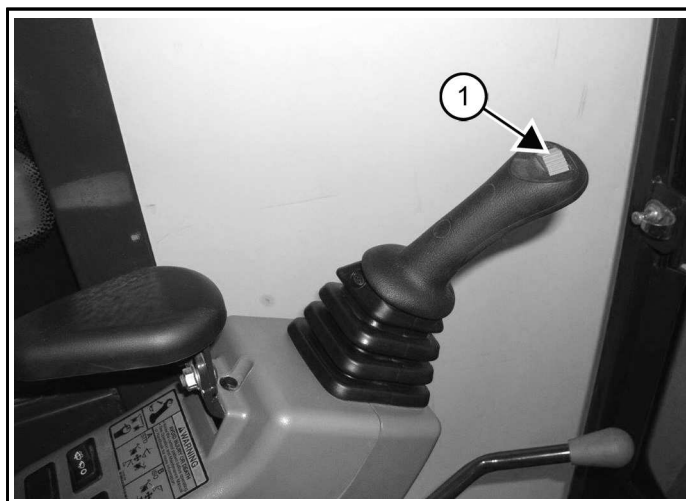
Figure 68



NA20361a

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

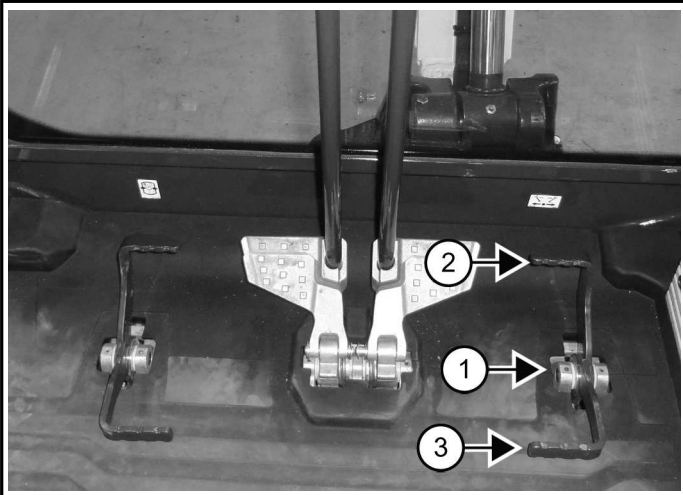
Figure 69



C113379b

1. If your machine is equipped with the left joystick switch:
 - a. Move the switch (Item 1) [Figure 69] to the left to swing the boom to the left.
 - b. Move the switch (Item 1) [Figure 69] to the right to swing the boom to the right.

Figure 70



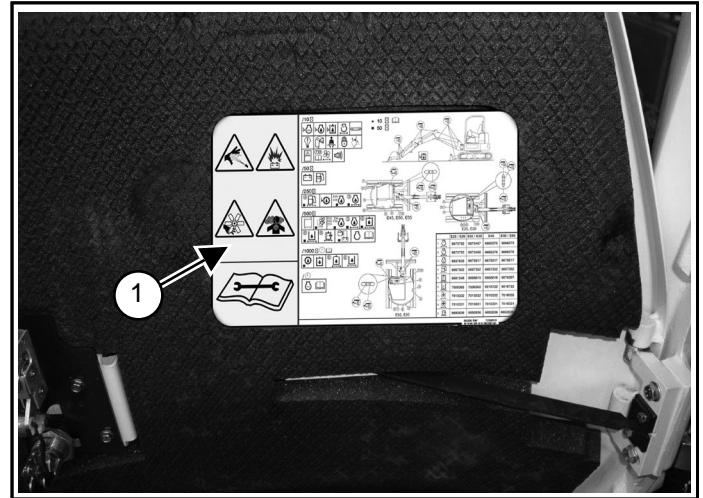
C113530a

2. If your machine is equipped with the right pedal (Item 1) [Figure 70]:
 - a. Press the toe (Item 2) [Figure 70] of the pedal to swing the boom to the right.
 - b. Press the heel (Item 3) [Figure 70] of the pedal to swing the boom to the left.

DAILY INSPECTION

Daily Inspection And Maintenance List

Figure 71



P113412

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 Service Schedule decal (Item 1) [Figure 71] is located on the inside of the tailgate.

A complete list of scheduled maintenance is also located in the Service Schedule.
(See Service Schedule on Page 94)

Do the following before each day of operation:

- Check operator canopy or cab 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 (if equipped) for damage or loose parts.
- Check air cleaner and intake hoses / clamps.
- Check engine oil level and engine for leaks.
- Drain water from fuel filter.
- Check engine coolant level (in both the coolant recovery tank and in the radiator) and 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, state, and federal regulations for correct disposal.

⚠ 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

⚠ 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 center of the decal toward the edges. ◀

I-2228

⚠ 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

PRE-STARTING PROCEDURE

Entering The Excavator

Figure 72



C113415a

NOTE: Tracks must be fully expanded when operators are entering or exiting the excavator.

Use the grab handles and tracks to enter the canopy / cab [Figure 72].

Operation & Maintenance Manual And Operator's Handbook Locations

Figure 73

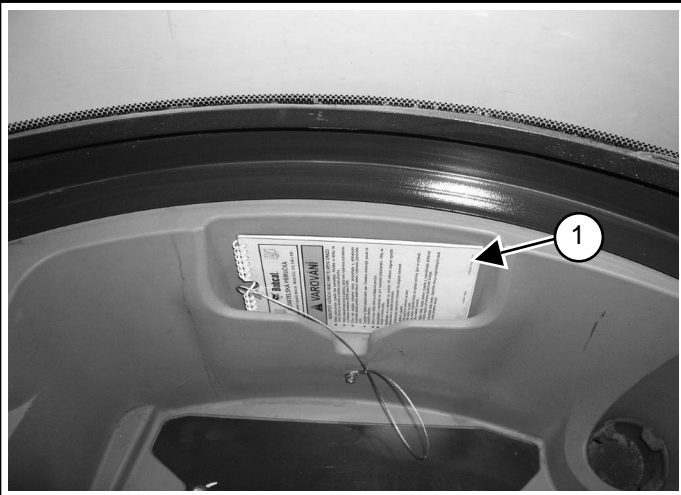


P113413a

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

The Operation & Maintenance Manual is located inside the storage box under the operator's seat (Item 1) [Figure 73].

Figure 74



P113414a

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

The Operator's Handbook is located behind the operator's seat (Item 1) [Figure 74].

WARNING

INSUFFICIENT INSTRUCTIONS HAZARD
Untrained operators or failure to follow instructions can cause serious injury or death.

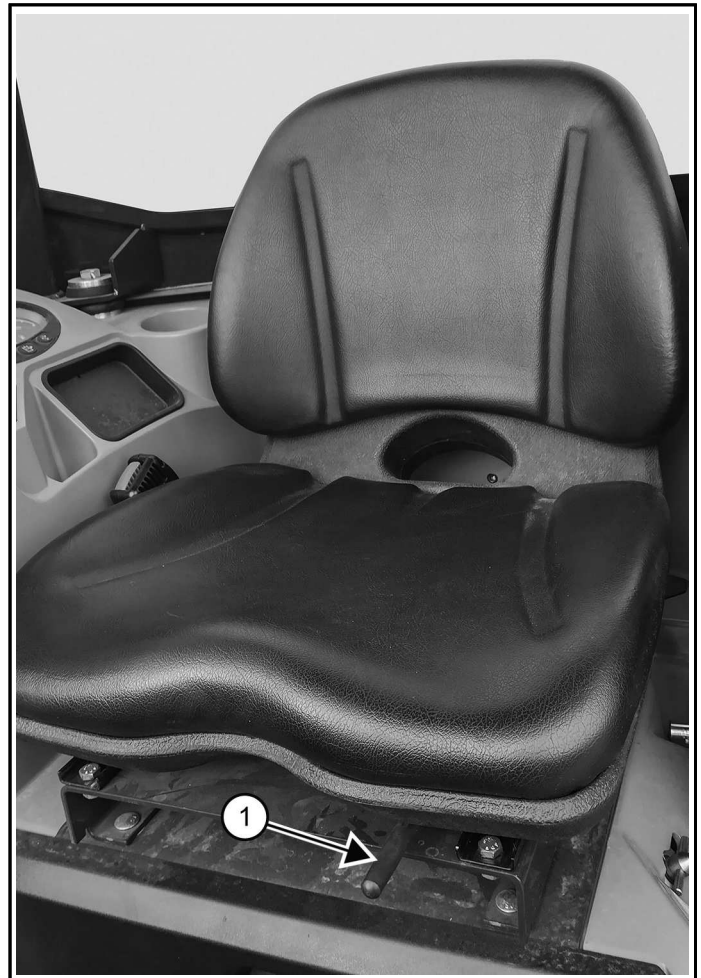
- Read and understand the Operation & Maintenance Manual, Operator's Handbook and decals on machine.
- Follow warnings and instructions in the manuals when making repairs, adjustments or servicing.
- Check for correct function after adjustments, repairs or service. ◀

W-2003

Seat Adjustment

Adjusting The Basic Seat

Figure 75



205272a

- Adjust the seat forward or backward with the adjustment lever (Item 1) [Figure 75].

Adjusting The Standard Seat

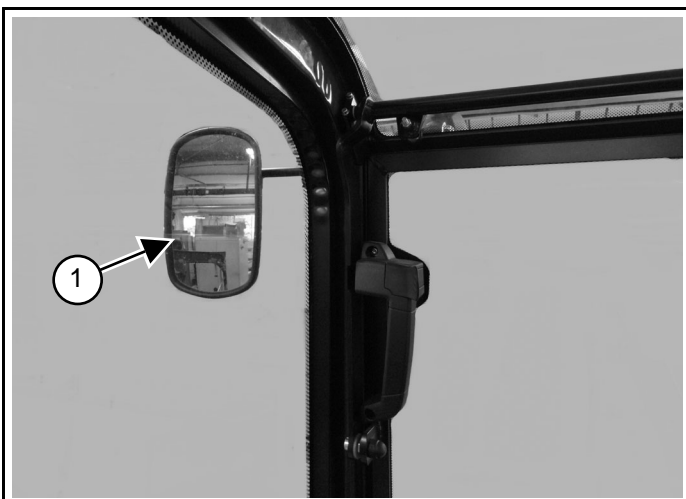
Figure 76



- To adjust the seat forward or backward, release the right seat lever (Item 1) [Figure 76].
- To adjust the position of the back cushion, release the left seat lever (Item 2) [Figure 76].

Adjusting Mirrors

Figure 77



Adjust mirrors (Item 1) [Figure 77] (if equipped).

Fastening The Seat Belt

Figure 78



Fasten the seat belt [Figure 78].

STARTING THE ENGINE

Starting Engine With Key Switch

⚠ WARNING

GENERAL HAZARD

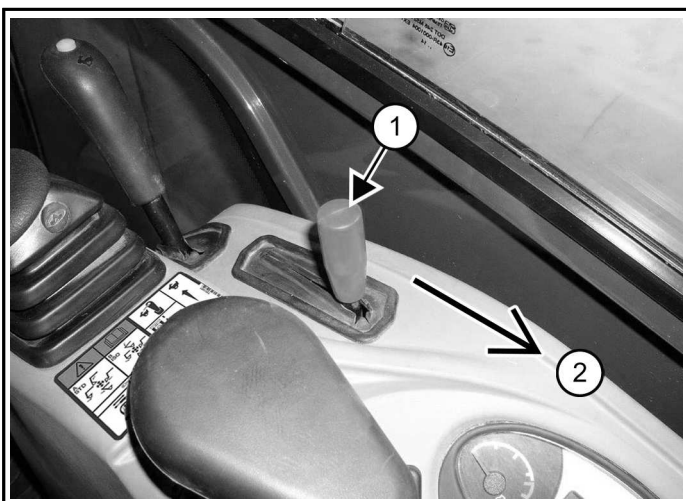
Failure to follow instructions can cause serious injury or death.

- 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 54)
2. Put control levers in the neutral position.

Figure 79



C113409b

3. Move the engine speed control lever (Item 1) back to low idle (Item 2) [Figure 79].

⚠ IMPORTANT

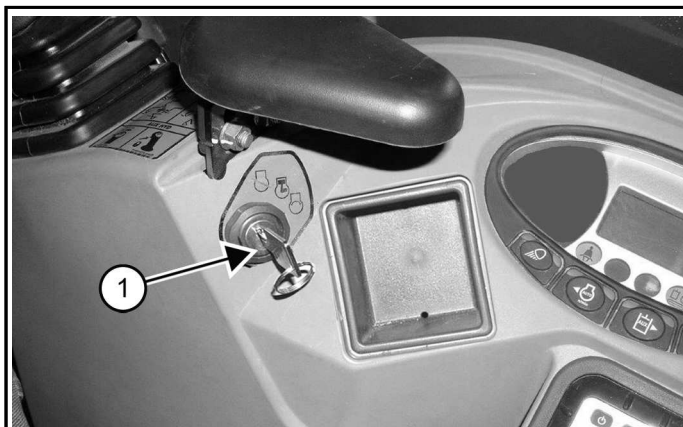
MACHINE DAMAGE HAZARD

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

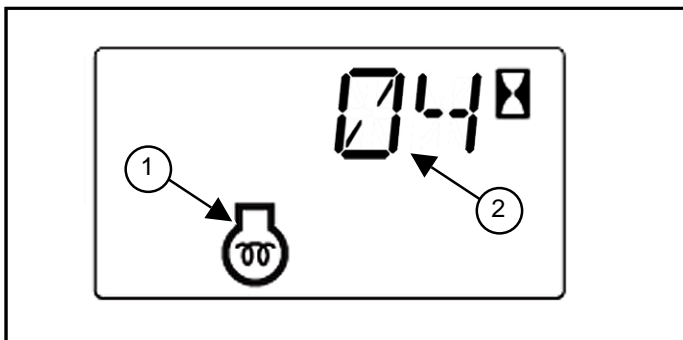
Figure 80



C113421c

4. Turn the key (Item 1) [Figure 80] to the on position.

Figure 81



P-76461aa

If preheating is required, the glow plugs will automatically cycle and the preheat icon will be on (Item 1) [Figure 81]. The remaining preheat time (in seconds) will show in the data display screen (Item 2) [Figure 81].

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 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

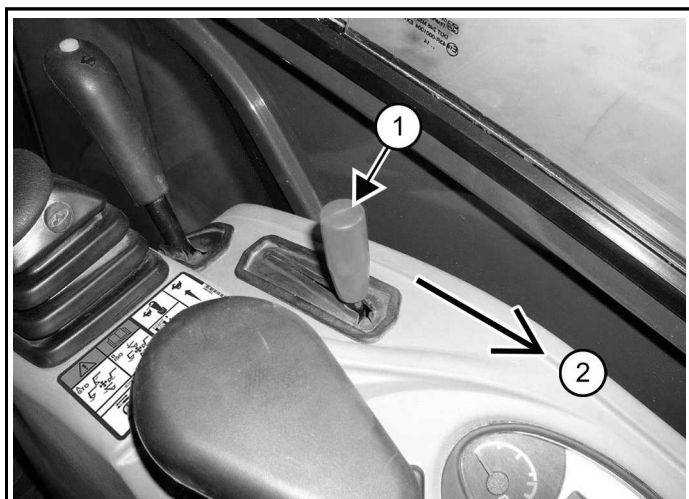
Failure to follow instructions can cause serious injury or death.

- 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 54)
2. Put control levers in the neutral position.

Figure 82



C113405b

3. Move the engine speed control lever (Item 1) back to low idle (Item 2) [Figure 82].

⚠ 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 83



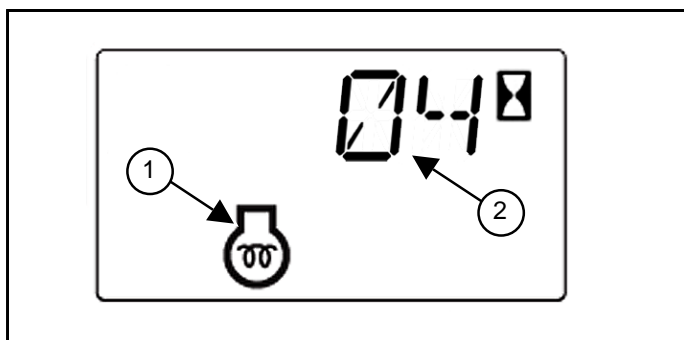
C217584a

4. Turn the start switch (Item 1) [Figure 83] to the on position.

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 2) [Figure 83].

Figure 84



P-76461aa

If preheating is required, the glow plugs will automatically cycle and the preheat icon will be on (Item 1) [Figure 84]. The remaining preheat time (in seconds) will show in the data display screen (Item 2) [Figure 84].

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 (Item 1) [Figure 83] to start 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 85**

P134071a

- Lower the left control console [Figure 85].

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

If the temperature is below freezing, let the engine run for at least 15 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. (See Engine Oil Chart on Page 107)

- 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 114)

- Install an engine heater.

MONITORING THE PANEL

Monitoring The Panel During Operation

Figure 86



- 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 86] 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 86] is on.
- Press the Information button (Item 2) [Figure 86] 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 128)

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

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 highway, 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

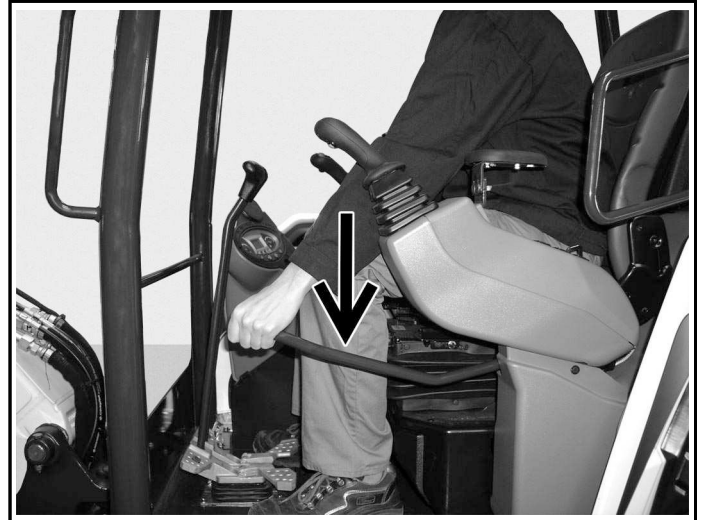
Keep the machine as far back from the edge as possible and the machine base perpendicular to the edge so that if part of the edge collapses, the machine can be moved back.

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 87

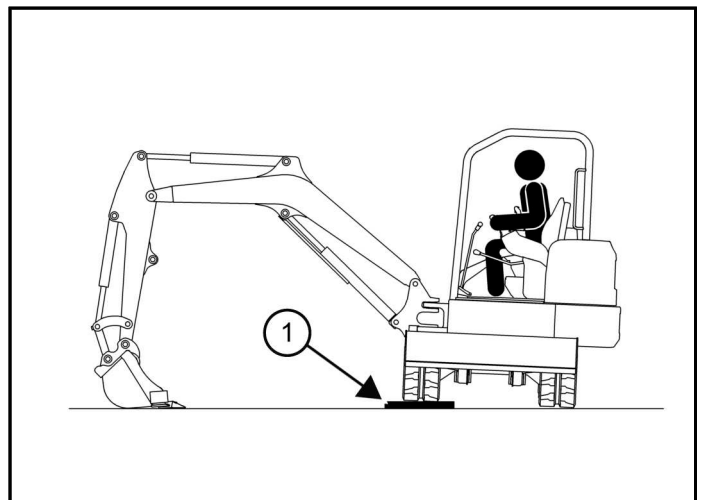


1. Ensure the left console is down [Figure 87].
2. Turn the start switch to ON.
3. Use the joystick to lower the boom.

Driving The Excavator

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

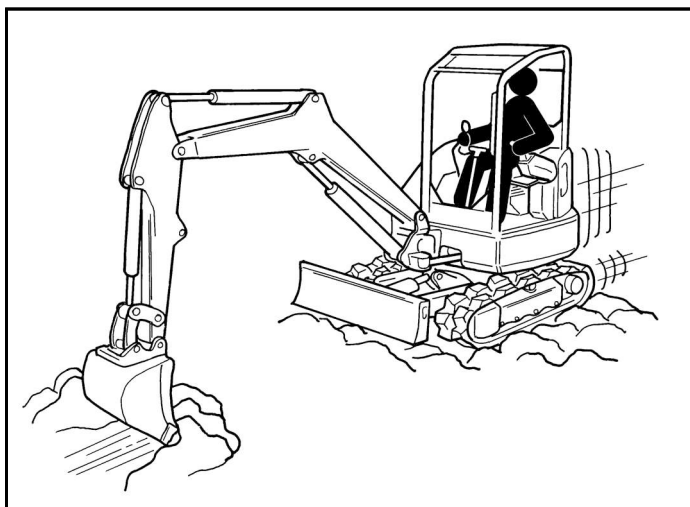
Figure 88



- When working on wet or soft ground, put planks (Item 1) [Figure 88] 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 89



NA20380

- The bucket may also be used to pull the excavator [Figure 89].
 - ▷ Raise the blade.
 - ▷ Extend the arm and lower the boom.
 - ▷ Operate the boom in a digging manner.

Operating On Slopes

⚠ WARNING

INSTABILITY HAZARD

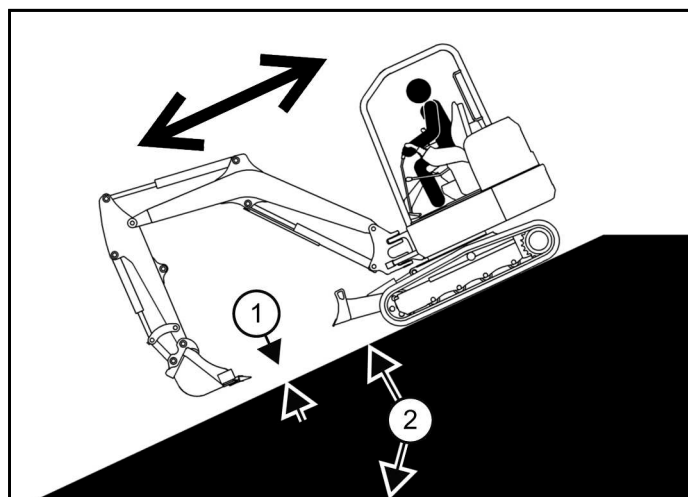
Machine tipping or rollover can cause serious injury or death.

- 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.
- Check for adequate traction.*

W-2497

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

Figure 90



NA20370a

- 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 90]. Run the engine slowly.
- Do not travel down or back up slopes that exceed 25 degrees (Item 2) [Figure 90].
- Operate as slow as possible.
- Avoid sudden changes in lever directions.
- Avoid traveling over objects such as rocks, trees, stumps, etc.
- Stop the machine before moving the upper equipment controls.
- Never allow the blade to strike a solid object.

Damage to the blade or hydraulic cylinder can result.

⚠ WARNING

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 centered and attachments as low as possible when traveling on slopes or in rough conditions.
- Look in the direction of travel.
- Keep feet and hands on controls.*

W-2498

Figure 91

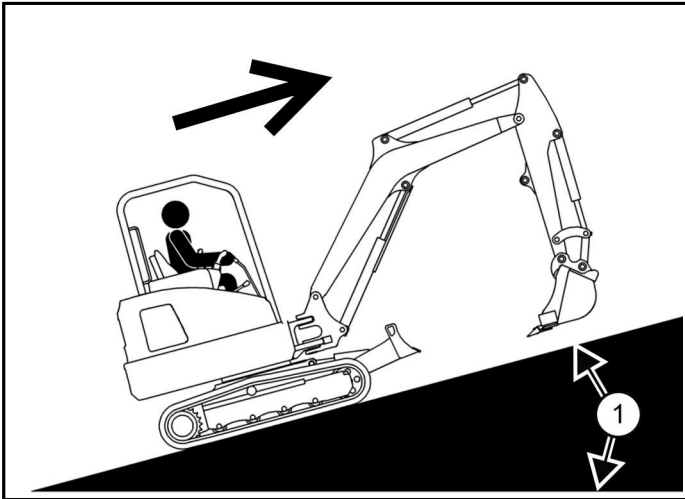
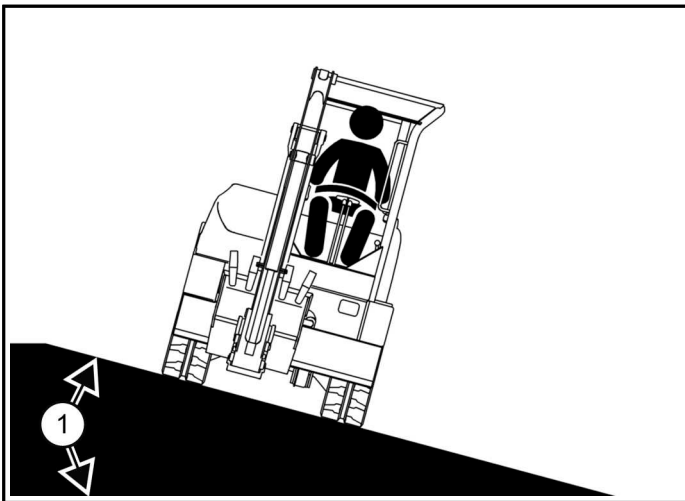
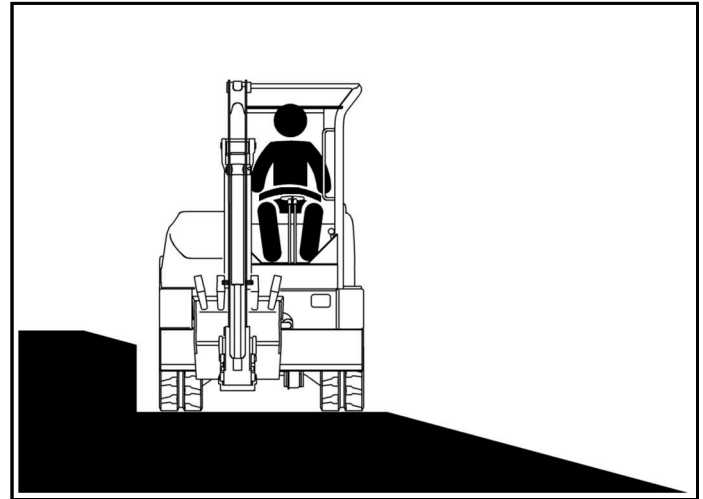


Figure 92



- When traveling up slopes (Item 1) [Figure 91], or on side slopes that are 15 degrees or less (Item 1) [Figure 92], position the machine as shown and run the engine slowly.

Figure 93



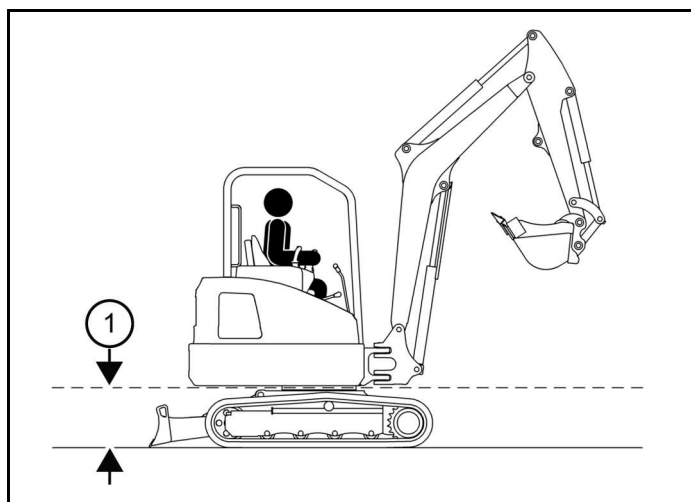
- When operating on a slope, level the work area before beginning [Figure 93].
- If this is not possible, the following procedure should be used:
- Do not work on slopes that are over 15 degrees (Item 1) [Figure 92].
 - Use a slow work cycle.
 - Avoid working with the tracks across the slope. This will 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.
 - To brake the machine when going down a slope, move the travel controls to the neutral position.
- This will engage the hydrostatic braking.
- When the engine stops on a slope, move the steering levers to the neutral position. Lower the boom / bucket to the ground.

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 94



NA20368a

- Do not operate or immerse the excavator in water higher than the bottom of the swing bearing (Item 1) [Figure 94].
- 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.

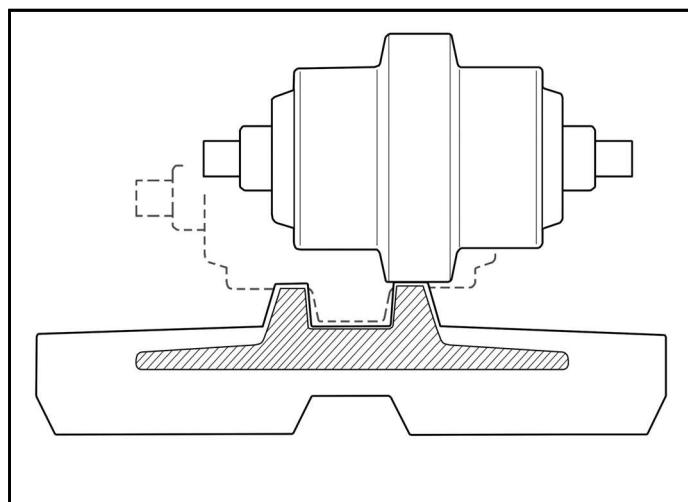
- Remove mud and water from the machine before parking.

If moisture invades through cuts on the rubber 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.

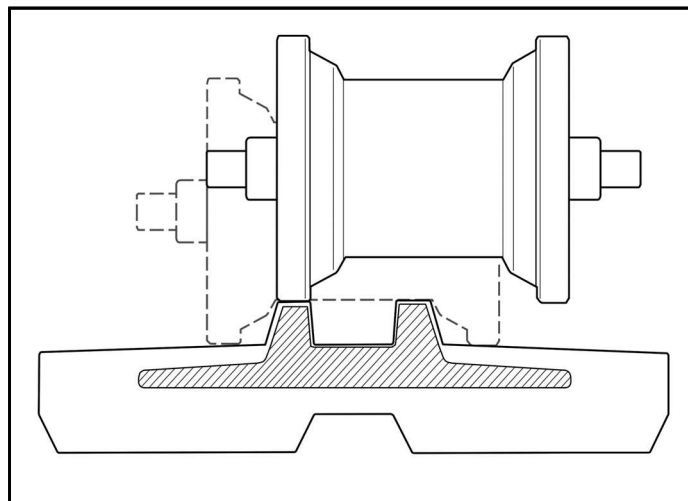
Stones and foreign objects can become wedged between the sprocket / rollers and cause detracting and track stress.

Figure 95



NA20189

Figure 96

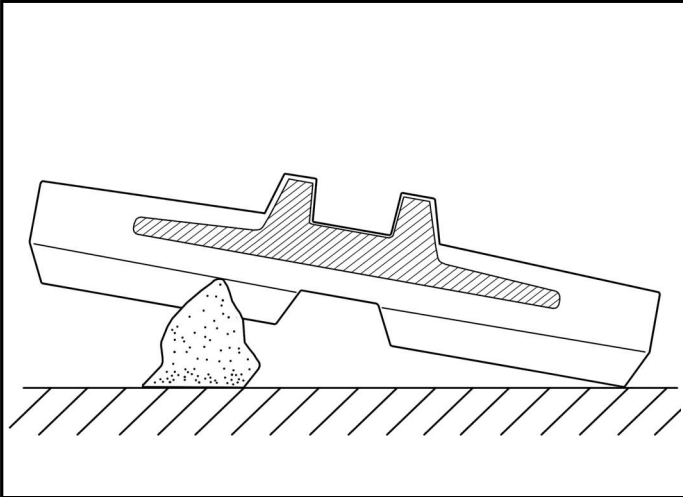


NA20190

- Maintain proper track tension. (See Track Tension on Page 121)

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 95] or [Figure 96]).

Figure 97



NA20246

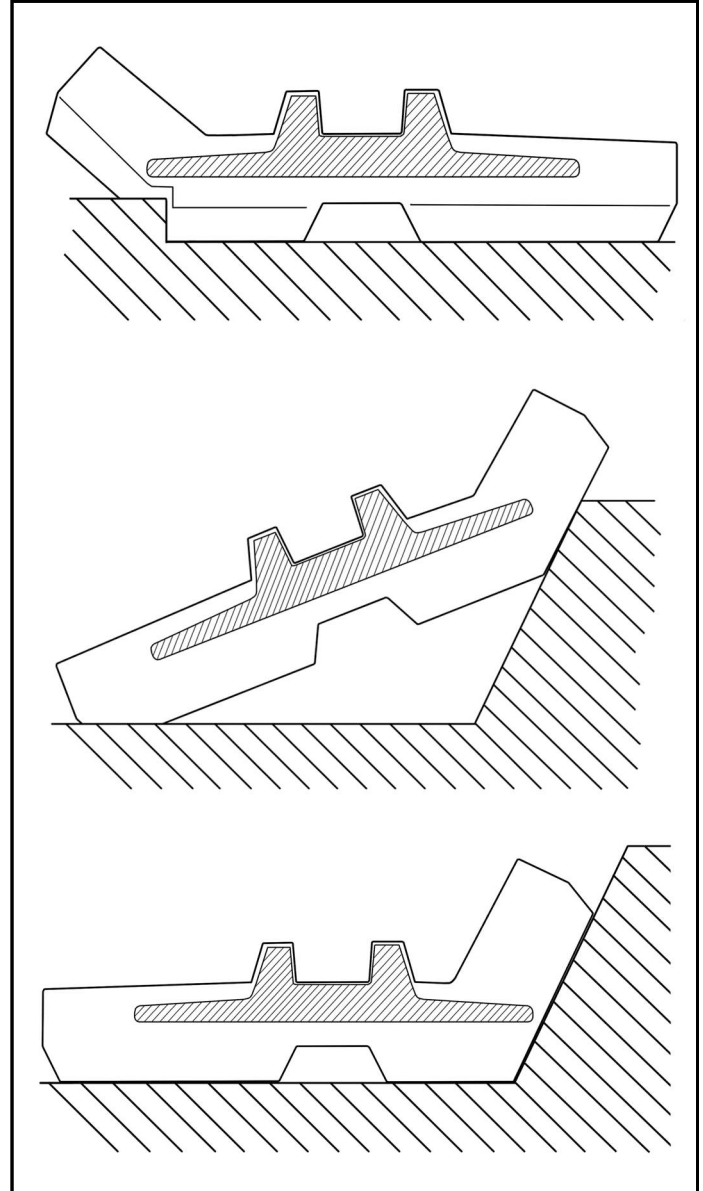
- Avoid driving over sharp objects.

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 97] 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 98



NA20247a

- Avoid driving over stumps and ridges.

This may apply extensive stress to the lug root where metals are embedded [Figure 98].

- Avoid making quick turns on bumpy and rocky fields.

STOPPING THE ENGINE AND LEAVING THE MACHINE

Stopping The Engine And Leaving The Machine

1. Expand the tracks fully.
2. Stop the machine on level ground.

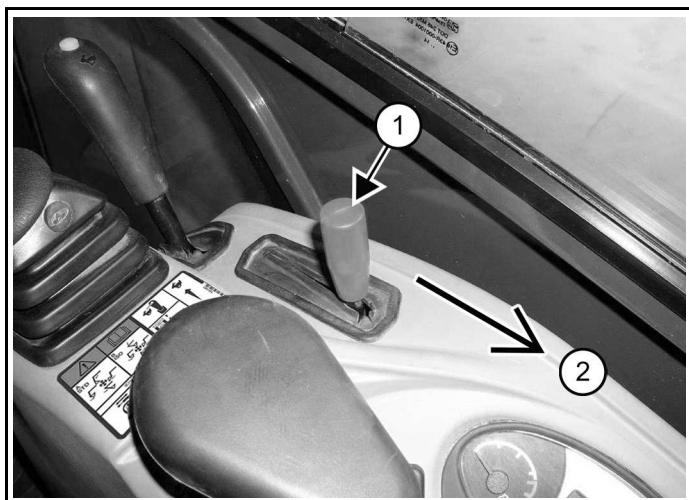
Figure 99



C113422a

3. Lower the work equipment and the blade to the ground [Figure 99].

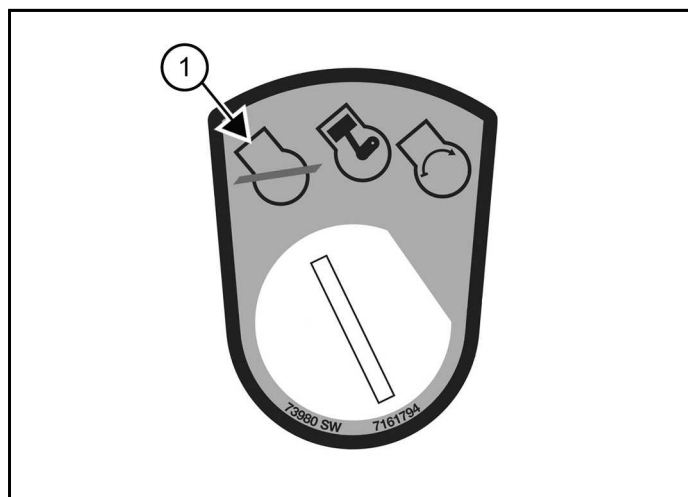
Figure 100



C113405b

4. Move the engine speed control lever (Item 1) backward to low idle (Item 2) [Figure 100].
5. Run the engine at idle speed for about 5 minutes to allow it to cool.

Figure 101



7161794b

6. Turn the switch to Stop (Item 1) [Figure 101].
7. Disconnect the seat belt.
8. Remove the key from the switch (if equipped) to prevent operation of machine by unauthorized personnel.
9. Raise the control console.
10. 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 Doosan Bobcat China Co., Ltd..

W-2142

⚠ WARNING

GENERAL HAZARD

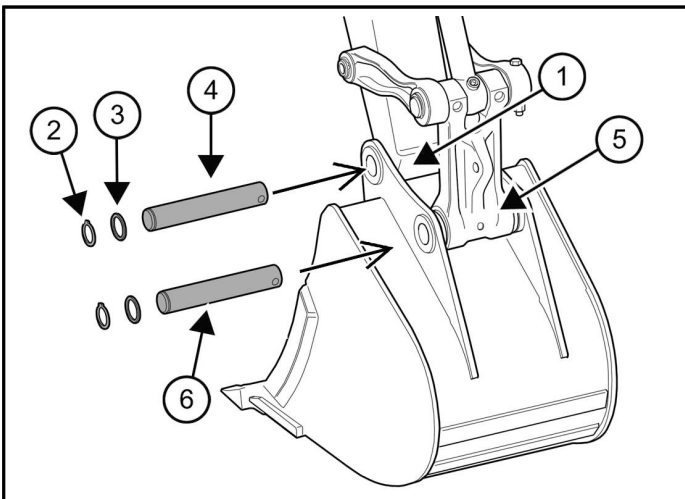
Failure to follow instructions can cause serious injury or death.

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-2142

1. Start the engine.

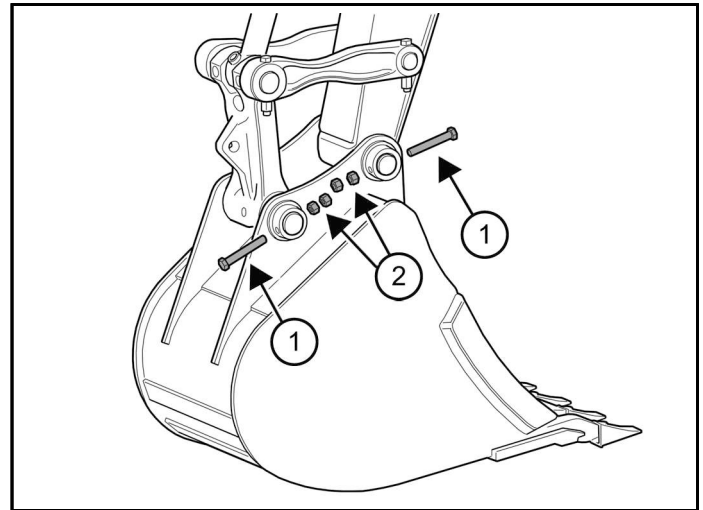
Figure 102



2. Move the arm toward the bucket and align the mounting hole (Item 1) [Figure 102].
3. Stop the engine and exit the excavator.
4. Install the O-rings by rolling them onto the interior bucket bushing groove.
5. Install the snap ring (Item 2) and washer (Item 3) onto the pin (Item 4) [Figure 102].
6. Push the pin (Item 4) through the bucket bushings and pivot [Figure 102].
7. Align link with bucket bushing (Item 5) [Figure 102] and washers.

8. With washer and snap ring installed, push the second pin (Item 6) through bucket bushing and link [Figure 102].

Figure 103

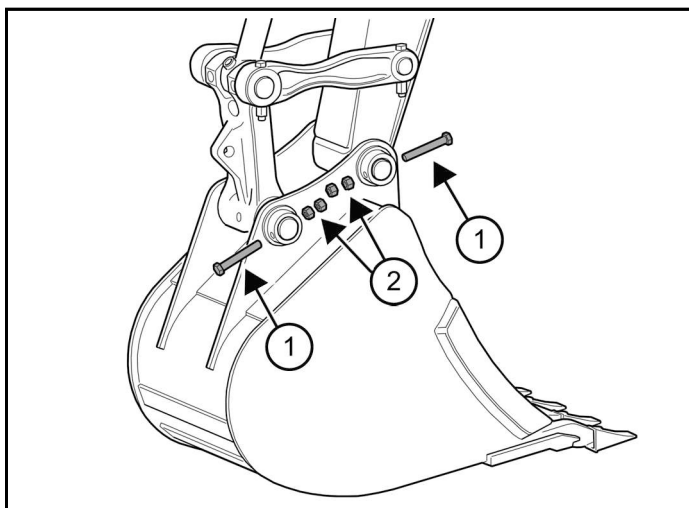


9. Install screws (Item 1) and double nuts (Item 2), ensuring that the screws rotate freely [Figure 103].
10. Add grease to the grease fittings.

REMOVING ATTACHMENTS (PIN-ON ATTACHMENT)

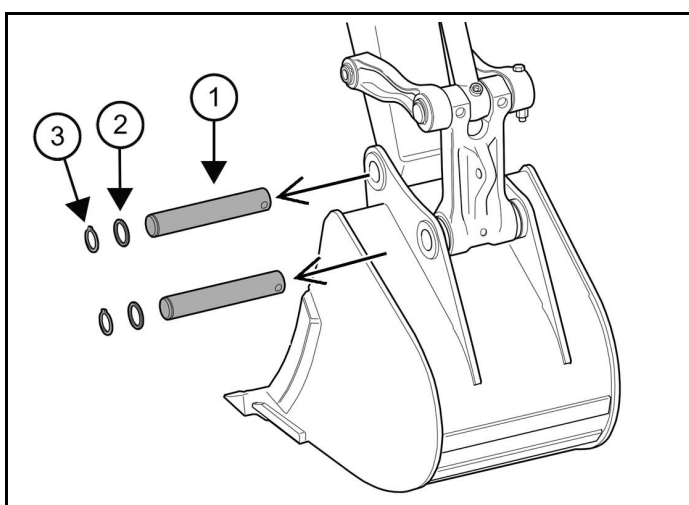
1. Park the excavator on a flat surface and lower the bucket fully.
2. Stop the engine and exit the excavator.

Figure 104



3. Remove the screws (Item 1) and double nuts (Item 2) [Figure 104].

Figure 105



4. Remove the pins, washers, and snap rings (Items 1, 2, and 3) [Figure 105].
5. Do not damage the O-rings in the arm.

INSTALLING ATTACHMENTS (PIN-ON X-CHANGE)

Installation of the bucket is shown. The procedure is the same for other attachments.

⚠ 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 Doosan Bobcat China Co., Ltd..

W-2052

⚠ WARNING

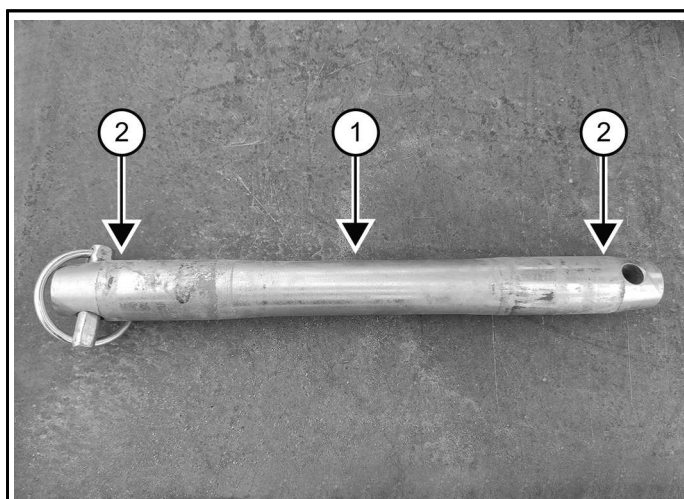
CRUSHING HAZARD

Failure to fully engage and lock both hydraulic pins can allow attachment to come off and cause serious injury or death.

Both hydraulic pins must be fully extended through the attachment mounting holes and locked with both retainer pins and clips.

W-2057

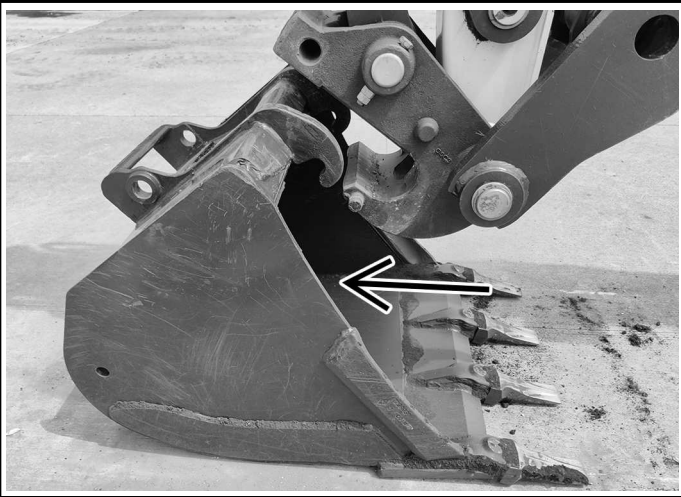
Figure 106



C215296a

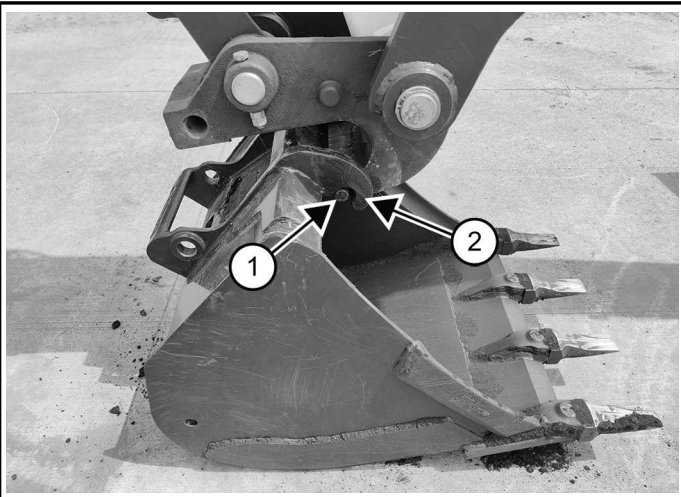
1. Inspect the pin (Item 1) [Figure 106] for wear or damage.
Replace the pin as needed.
2. Apply a light coat of grease to the ends of the pin (Item 2) [Figure 106].

Figure 107



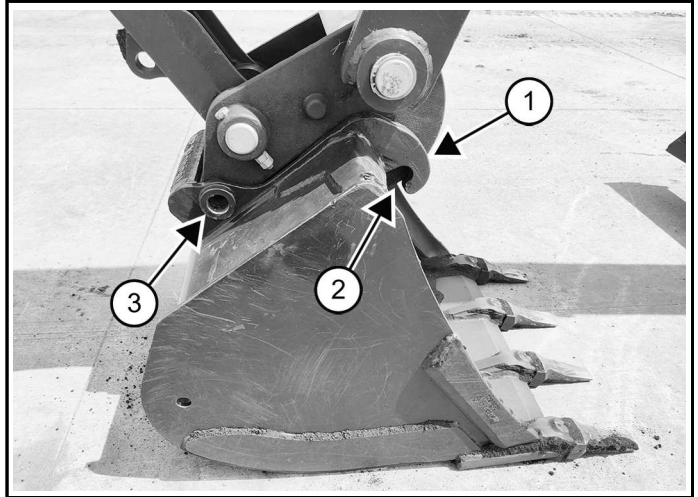
3. Start the engine and move the arm toward the bucket [Figure 107].

Figure 108



4. Raise the boom until the pins (Item 1) engage the hooks (Item 2) [Figure 108] on the bucket.

Figure 109



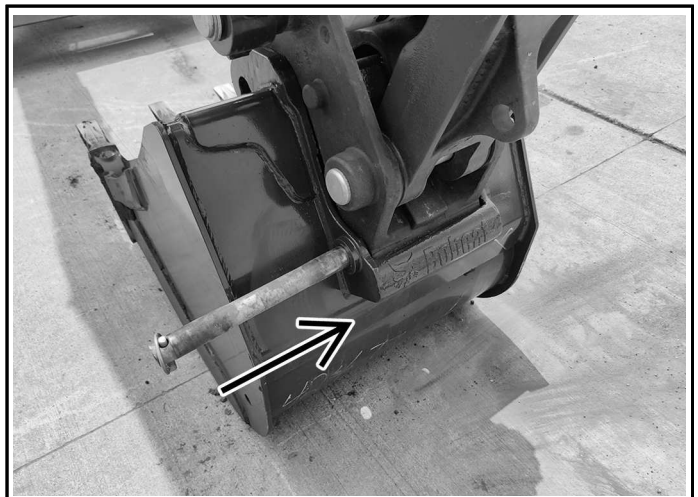
5. Raise the boom and extend the bucket cylinder until the X-Change contacts the attachment back [Figure 109].
6. With the arm vertical, lower the boom until the hooks (Item 1) of the bucket disengage the pins (Item 2) of the X-Change and the plate (Item 3) [Figure 109] fully engages in the bucket crossmember.

⚠ 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.*

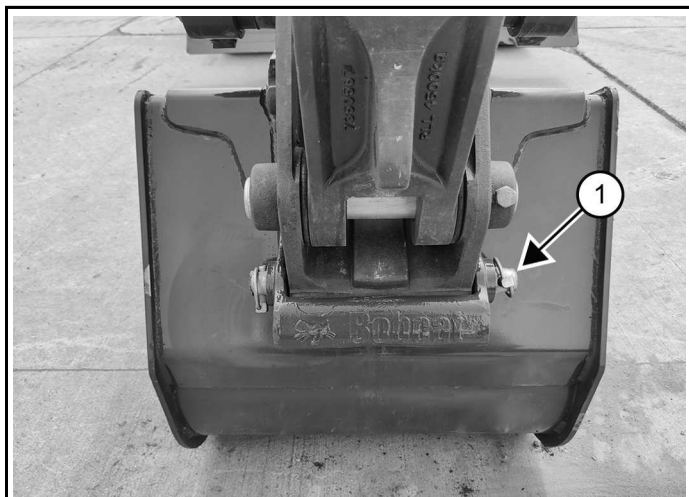
7. Stop the engine.

Figure 110



8. Drive the pin (Item 1) [Figure 110] through the bucket mount and X-Change.

Figure 111



C215301a

9. Install the retainer pin (Item 1) [Figure 111].
10. Check for proper installation.
11. Lift the attachment and fully extend and retract the bucket cylinder.

REMOVING ATTACHMENTS (PIN-ON X-CHANGE)

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

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 Doosan Bobcat China Co., Ltd..

W-2052

1. Park the excavator on a level surface.

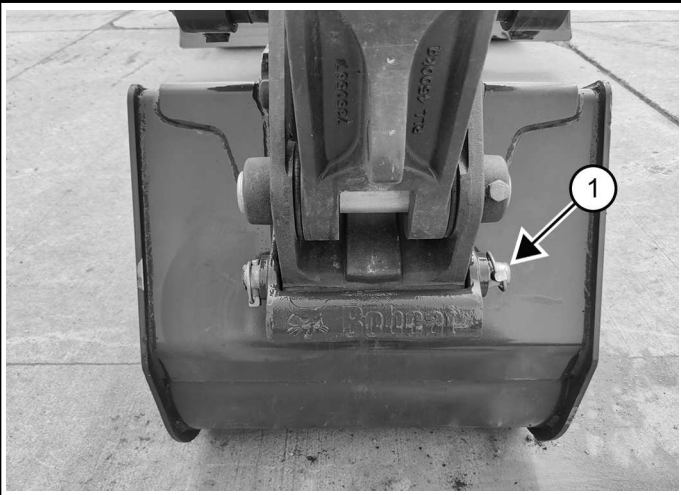
Figure 112



C215302

2. Put the bucket on the ground [Figure 112].
3. Turn the engine off.

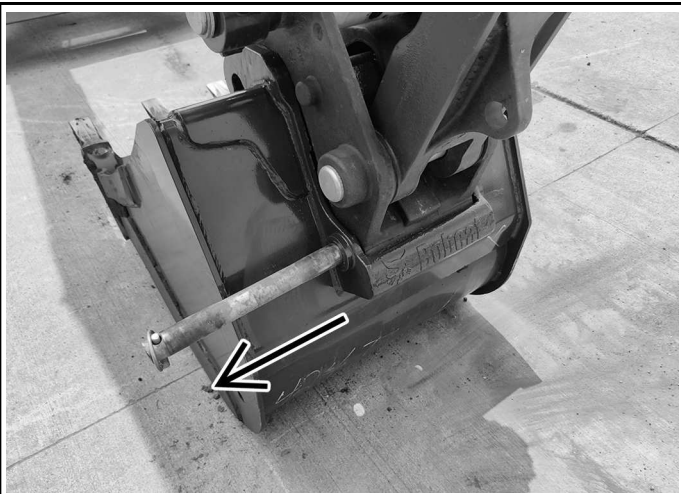
Figure 113



C215301a

4. Remove the retainer pin (Item 1) [Figure 113].

Figure 114



C215300b

5. Drive the pin (Item 1) [Figure 114] out of the bucket and X-Change mount.

⚠ WARNING

IMPACT AND INJECTION HAZARDS

Flying debris or pressurized fluids can cause serious injury or death.

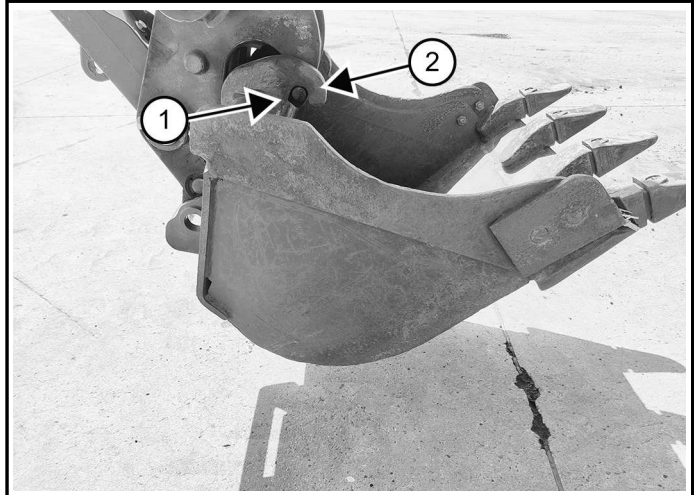
Wear safety glasses to prevent eye injury when any of the following conditions exist:

- When fluids are under pressure.
- Flying debris or loose material.
- Engine is running.
- Tools are being used.

W-2019

6. Start the engine.

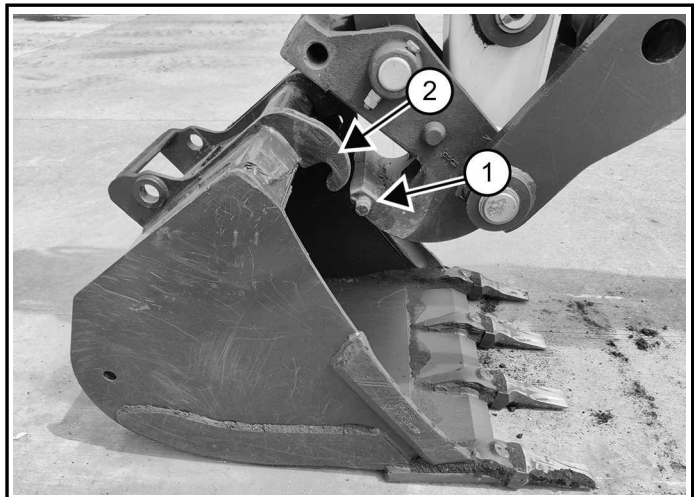
Figure 115



C215341a

7. Raise the boom approximately one foot and retract the bucket cylinder until the X-Change pins (Item 1) engage the hooks (Item 2) [Figure 115] on the bucket.

Figure 116



C215297c

8. Fully retract the bucket cylinder and lower the boom and arm until the bucket is on the ground, and the X-Change pins (Item 1) are disengaged from the hooks (Item 2) [Figure 116].
9. Move the arm toward the excavator until the X-Change pins are clear of the bucket.

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 Doosan Bobcat China Co., Ltd.. *

W-2052

⚠ WARNING

ENTANGLEMENT AND IMPACT HAZARD

Contact with moving parts, a trench cave-in or flying objects can cause serious injury or death.

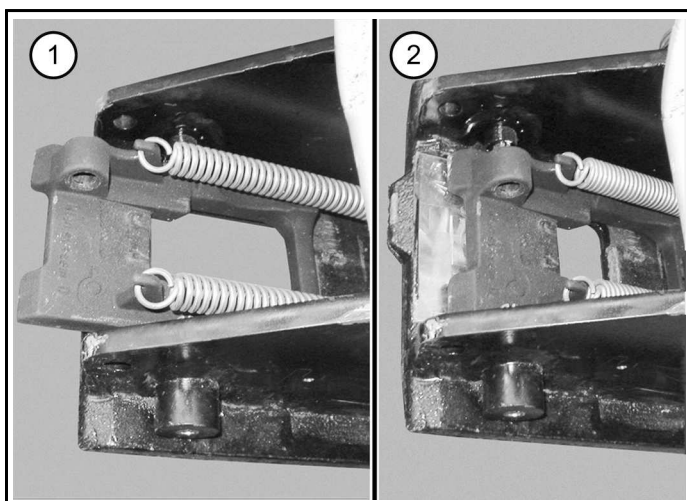
Keep all bystanders 6 m (20 ft) away from equipment when operating. *

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.

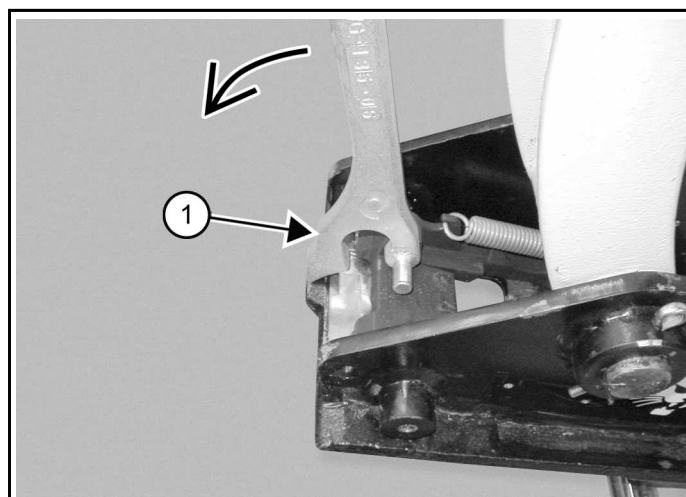
Figure 117



p-72272b

3. Inspect the quick coupler [Figure 117].

Figure 118



p-72273a

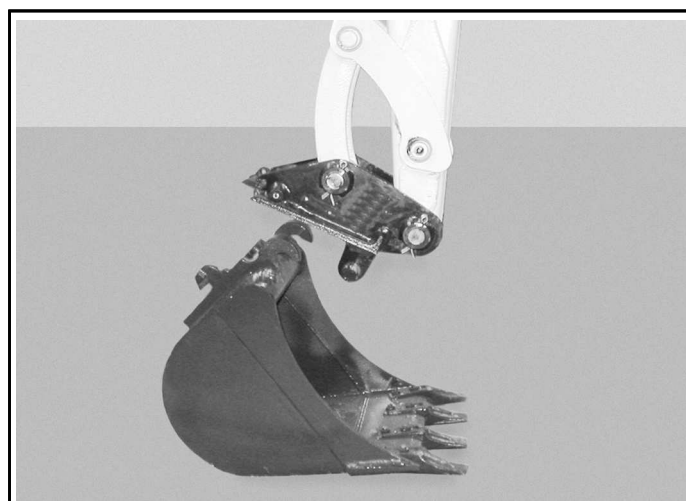
4. If the coupler is in the unlatched position (Item 1) [Figure 117], proceed to Step 5.

OR

If the coupler is in the latched position (Item 2) [Figure 117], install the tool (Item 1) [Figure 118] 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.

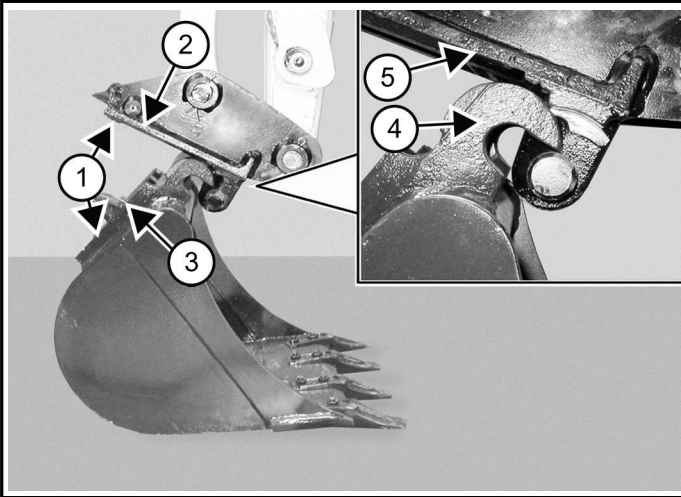
Figure 119



p-72274b

6. Position the quick coupler near the attachment [Figure 119].

Figure 120

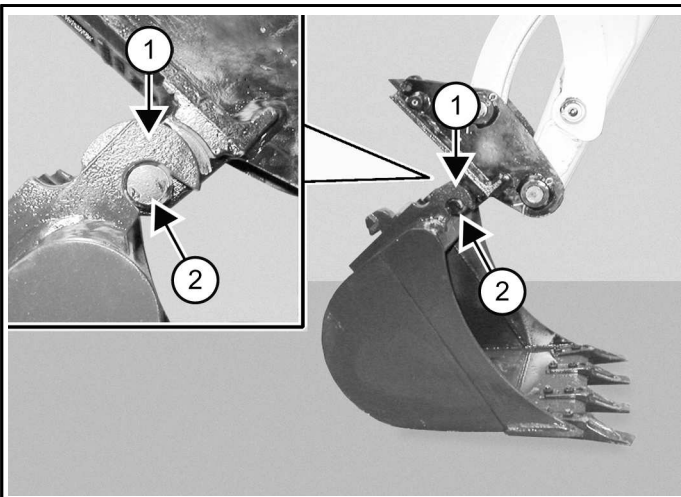


7. Extend the arm out until there is at least 100° (Item 1) between the quick coupler surface (Item 2) and the attachment mounting surface (Item 3) [Figure 120].

There must be proper clearance (Item 1) between the hook (Item 4) and the quick coupler (Item 5) [Figure 120].

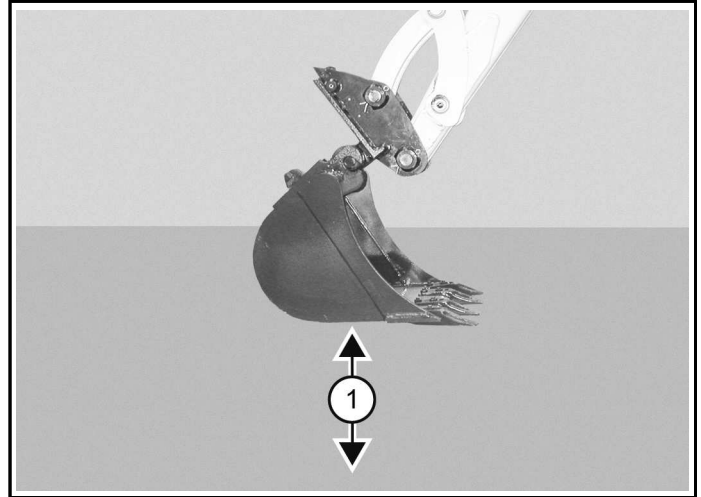
Extend the arm out to get the required angle (Item 1) [Figure 120]. Damage could occur to the attachment hooks or the quick coupler without proper clearance.

Figure 121



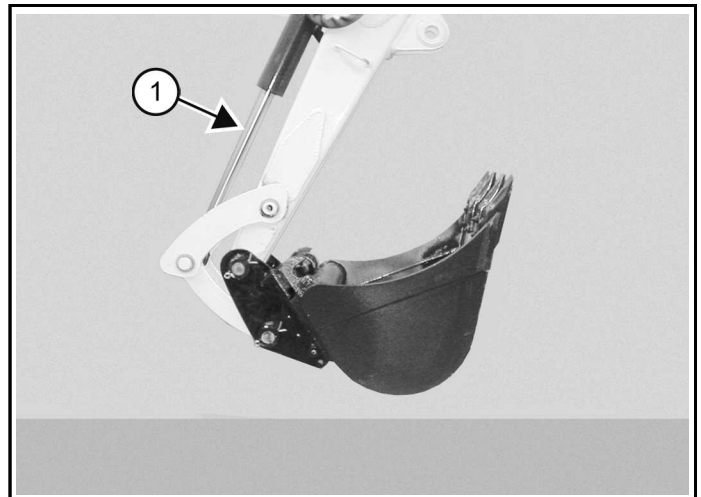
8. Raise the boom and extend the arm until the hooks of the attachment (Item 1) engage the pins (Item 2) of the quick coupler [Figure 121].

Figure 122



9. Raise the boom until there is approximately 500 mm (20.0 in) (Item 1) [Figure 122] of clearance between the bottom of the attachment and the ground.

Figure 123



10. Extend the bucket cylinder (Item 1) [Figure 123] 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 74)

INSPECTING AND ADJUSTING THE QUICK COUPLER LATCH

WARNING

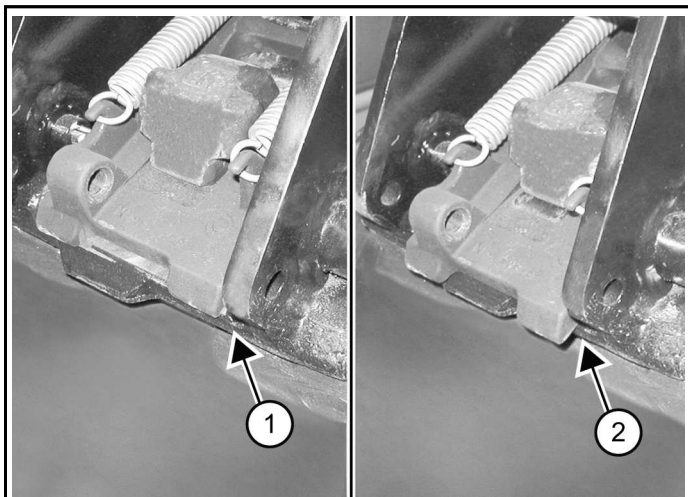
PINCHING HAZARD

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 124

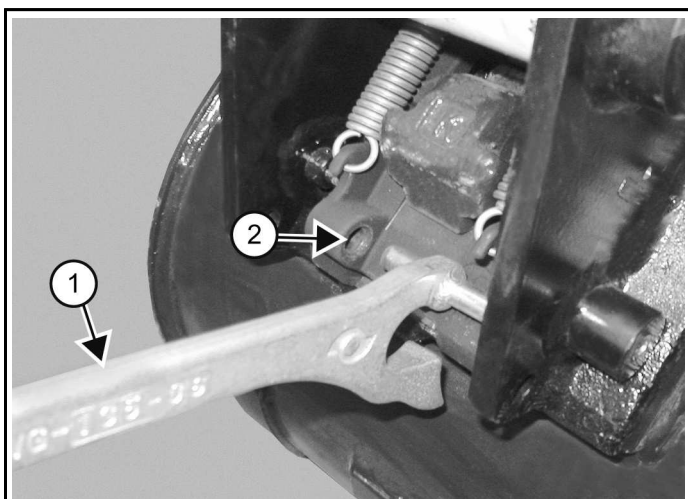


p-72279a

Visually inspect the quick coupler latch to the bucket mount [Figure 124]. The latch must be fully engaged (Item 1) [Figure 124].

If the latch is not fully engaged (Item 2) [Figure 124], proceed with the following instructions:

Figure 125



p-72286

1. Install the tool (Item 1) in the hole (Item 2) of the quick coupler [Figure 125].

2. Push the tool (Item 1) [Figure 125] down to unlatch the quick coupler.
3. Remove the tool (Item 1) [Figure 125].
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 123].
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 124].
9. If it is not fully engaged, remove the attachment and inspect both the quick coupler and the attachment for damage or debris.

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

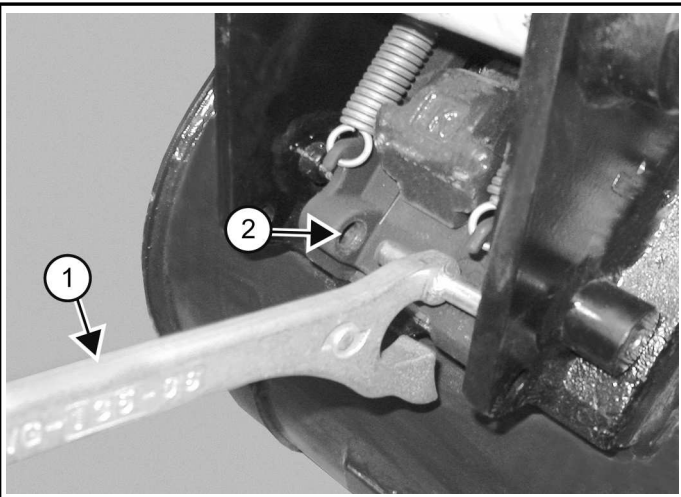
PINCHING HAZARD

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.

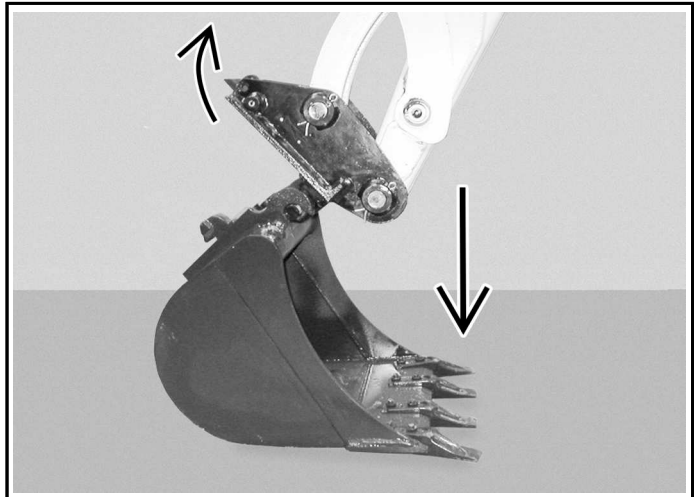
Figure 126



p-72286

2. Install the quick coupler tool (Item 1) into the hole (Item 2) in the quick coupler [Figure 126].
3. Push down on the tool (Item 1) [Figure 126] to unlock the latch.
4. Remove the tool.
5. Enter the excavator, fasten the seat belt, and start the engine.

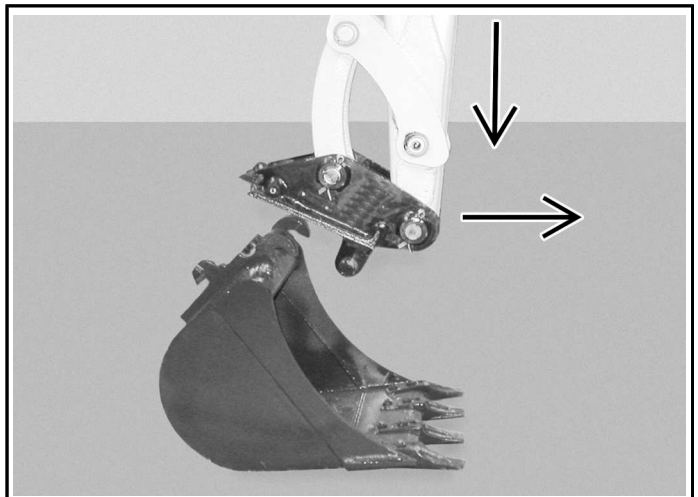
Figure 127



p-72282a

6. Retract the bucket cylinder fully and lower the boom until the attachment is on the ground [Figure 127].

Figure 128



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 128].

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 Doosan Bobcat China Co., Ltd..*

W-2052

⚠ WARNING

ENTANGLEMENT AND IMPACT HAZARD

Contact with moving parts, a trench cave-in or flying objects can cause serious injury or death.

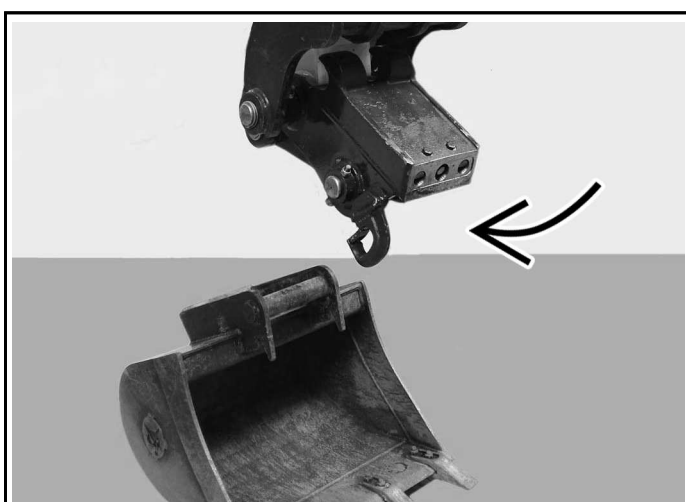
Keep all bystanders 6 m (20 ft) away from equipment when operating.*

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.

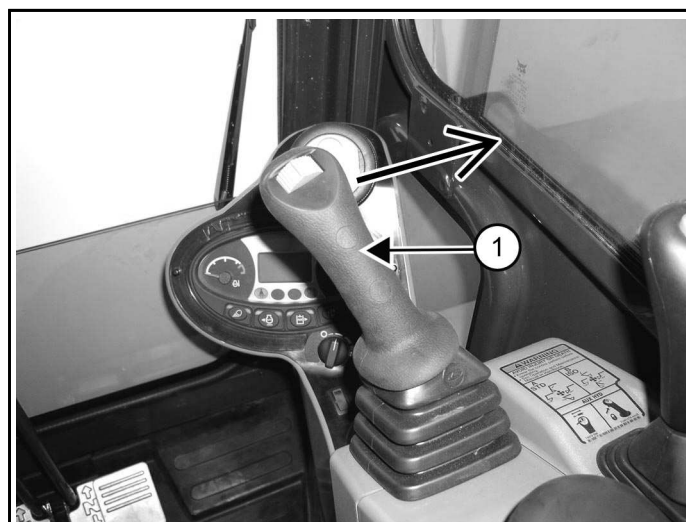
Figure 129



C113895a

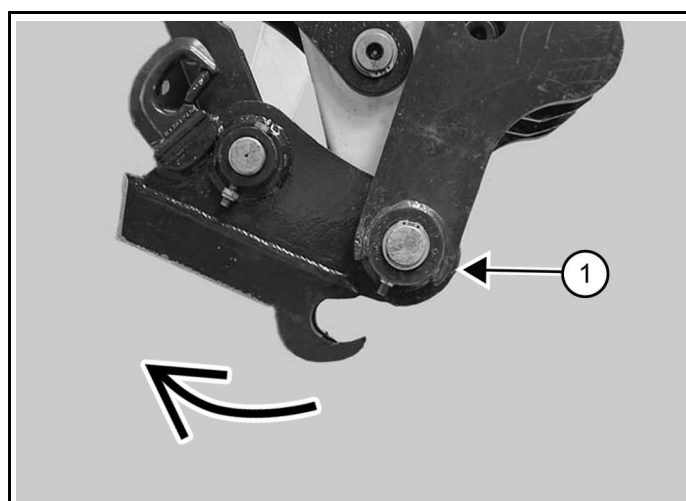
3. Position the arm and quick coupler to the attachment [Figure 129].

Figure 130



C113801a

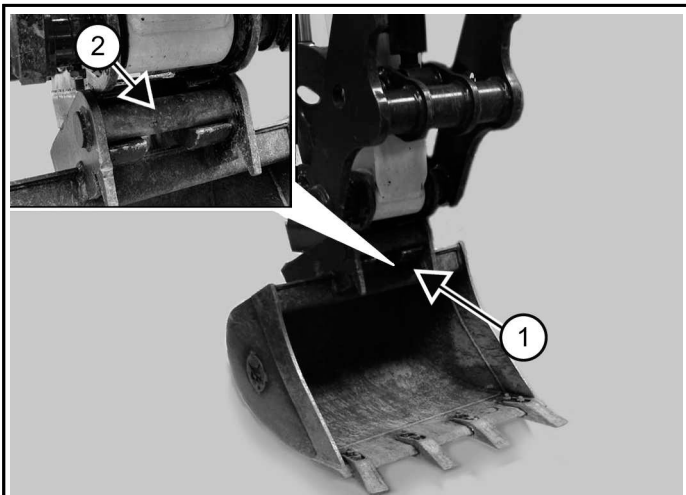
Figure 131



C113802c

4. Move the right joystick (Item 1) [Figure 130] to the right (OUT) to curl the coupler (Item 1) [Figure 131] back, fully away from the cab.
5. Lower the coupler onto the attachment.

Figure 132



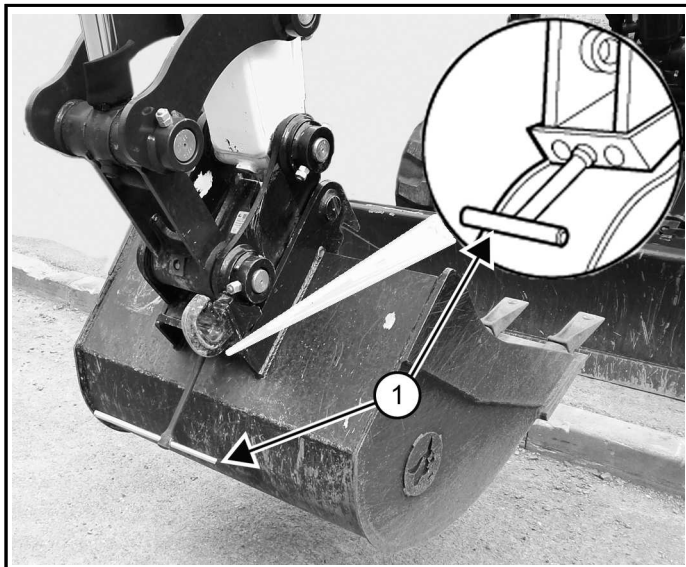
6. Engage the coupler hooks (Item 1) onto the attachment shaft (Item 2) [Figure 132].

Figure 133



7. Move the right joystick to the left (IN) and curl the coupler (Item 1) [Figure 133] in toward the cab fully.
8. Stop the engine and exit the machine.

Figure 134



9. Use the supplied wrench (Item 1) [Figure 134] and turn the wrench clockwise until the locking pins fully engage.

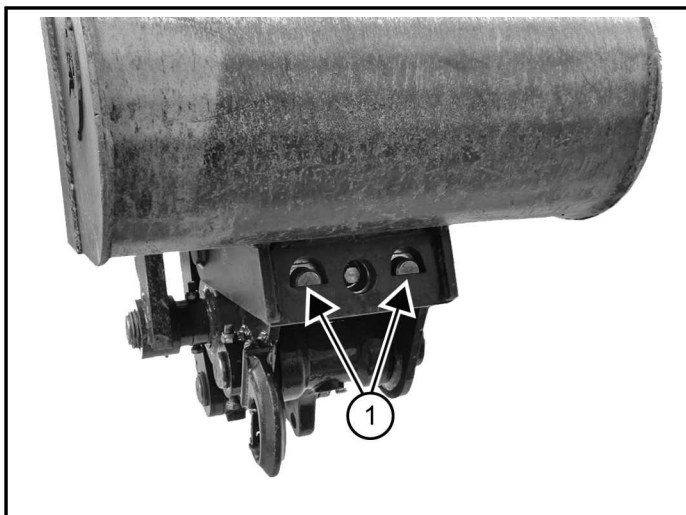
⚠ WARNING

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 135



10. Visually check that the locking pins (Item 1) [Figure 135] 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 54)
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 84)

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.).

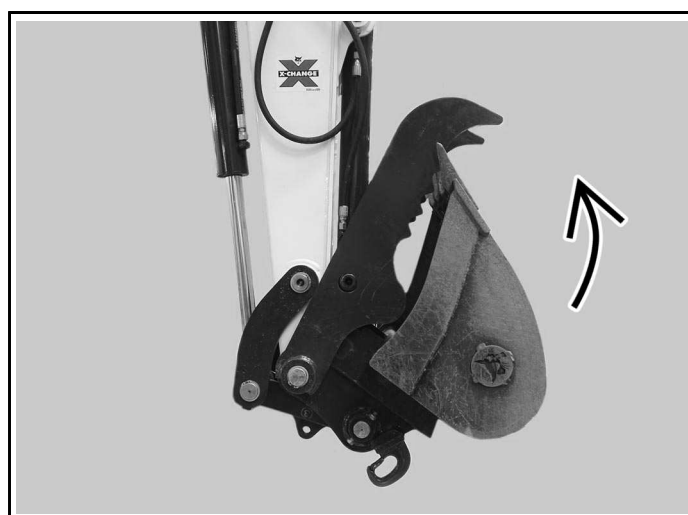
WARNING

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.

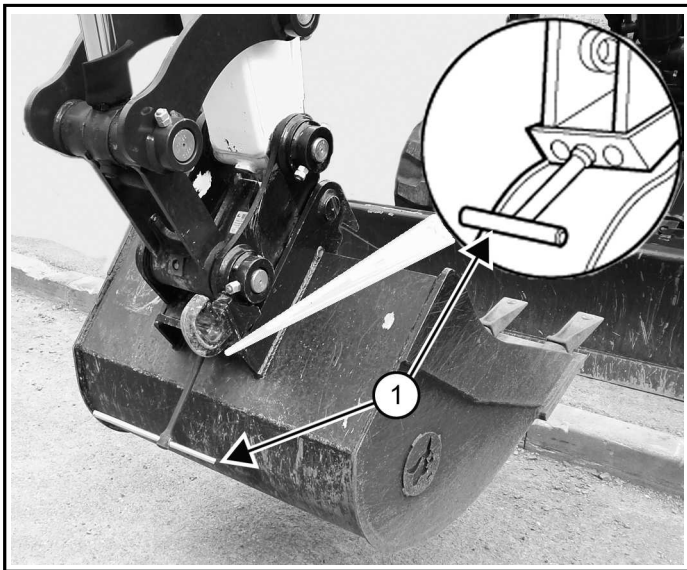
Figure 136



C113899

3. Move the right joystick to the left (IN) and curl the coupler in toward the cab fully [Figure 136].
4. Stop the engine and exit the excavator.

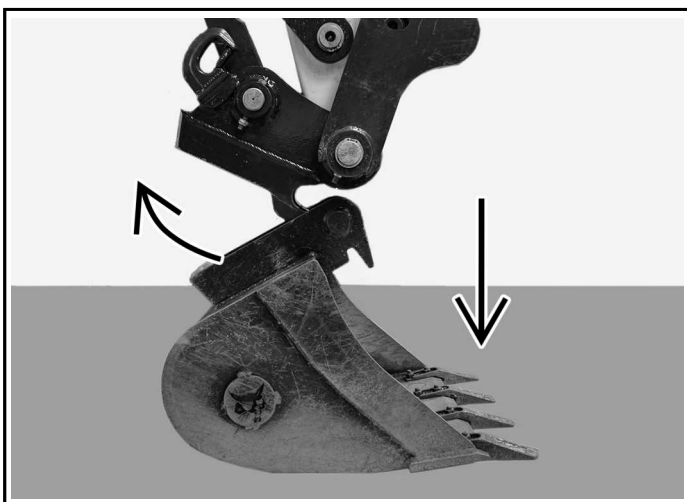
Figure 137



p113803b

5. Use the supplied wrench (Item 1) [Figure 137] 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 138



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 138].
9. Move the arm away from the attachment.

INSTALLING ATTACHMENTS (COMMON INDUSTRY INTERFACE)

Installation of the bucket is shown. The procedure is the same for other attachments.

1. Unlatch the retaining pin and pull out the Common Industry Interface (CII) locking pin.
2. Start the engine.

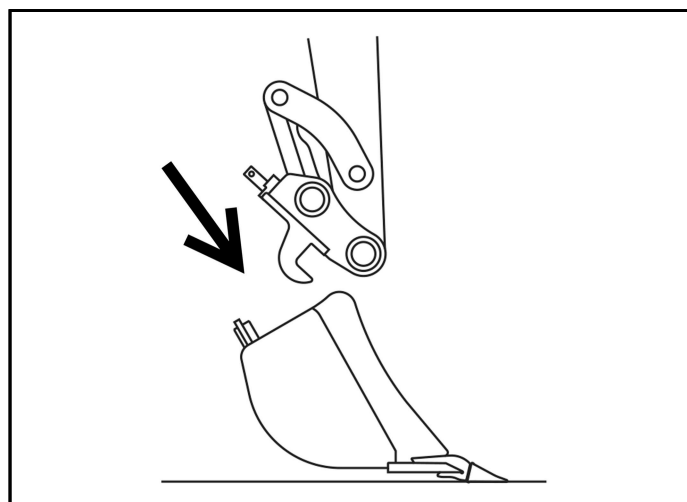
⚠ WARNING

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 Doosan Bobcat China Co., Ltd.. †

W-2052

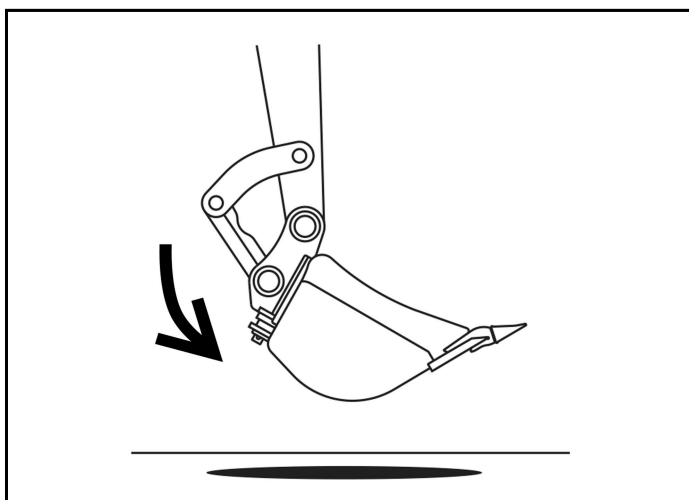
Figure 139



NA15802a

3. Move the arm and coupler toward the attachment [Figure 139].
4. Fully retract the bucket cylinder.
5. Lower the CII onto the attachment.
6. Engage the coupler hooks onto the attachment shaft.

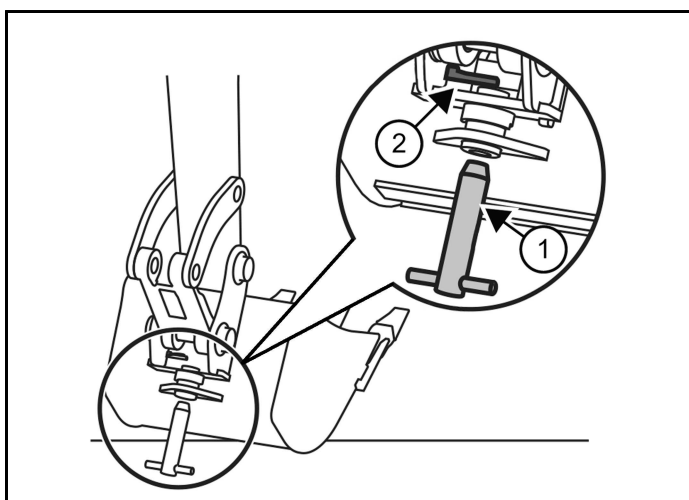
Figure 140



NA15803a

7. Extend (curl in) the bucket cylinder and slightly raise the boom until the coupler contacts the back of the attachment mount [Figure 140].
8. Stop the engine and exit the excavator.

Figure 141



NA15804a

9. Push the locking pin (Item 1) all the way into the coupler and latch with retaining pin (Item 2) [Figure 141].

⚠ WARNING

CRUSHING HAZARD

Failure to secure the locking pin can allow the attachment to come off and cause serious injury or death. The Common Industry Interface locking pin must extend all the way into the coupler and latch with the retaining pin.

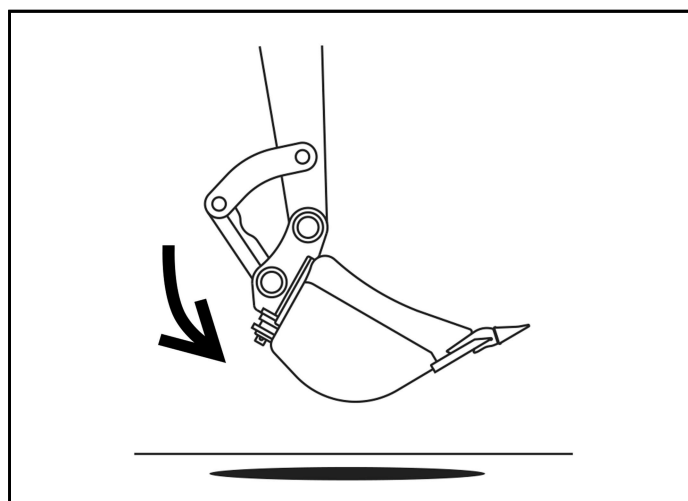
W-3093

REMOVING ATTACHMENTS (COMMON INDUSTRY INTERFACE)

Removal of the bucket is shown. The procedure is the same for other attachments.

1. Park the excavator on a level surface.

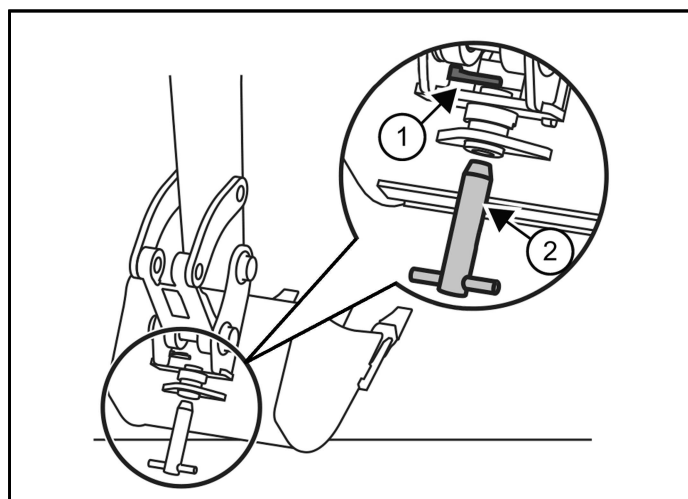
Figure 142



NA15803a

2. Raise the boom and extend the bucket cylinder until the attachment is slightly off the ground [Figure 142].
3. Stop the engine and exit the excavator.

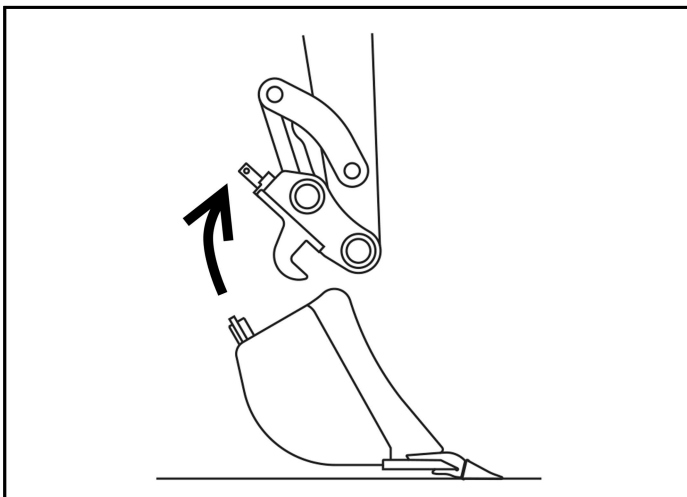
Figure 143



NA15804b

4. Unlatch the retaining pin (Item 1) and remove the locking pin (Item 2) [Figure 143].
5. Enter the excavator, fasten the seat belt, and start the engine.
6. Lower the attachment until it is on the ground.

Figure 144



NA15802b

7. Retract the bucket cylinder to rotate the coupler out of the attachment mount [Figure 144].
8. Move the arm out and raise the boom until the coupler is clear of the attachment.

⚠ WARNING

CRUSHING HAZARD

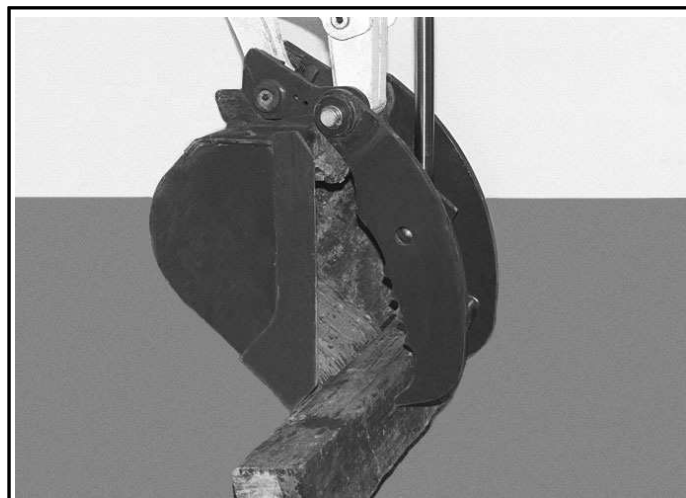
Failure to secure the locking pin can allow the attachment to come off and cause serious injury or death. The Common Industry Interface locking pin must extend all the way into the coupler and latch with the retaining pin. ◀

W-3093

HYDRAULIC CLAMP

Hydraulic Clamp Operation

Figure 145



N15513a

The optional lifting clamp attachment (if equipped) gives the excavator a wider range of use and mobility for debris removal [Figure 145].

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 84)

⚠ IMPORTANT

MACHINE DAMAGE

Improper use of the clamp, such as prying, will result in clamp damage.

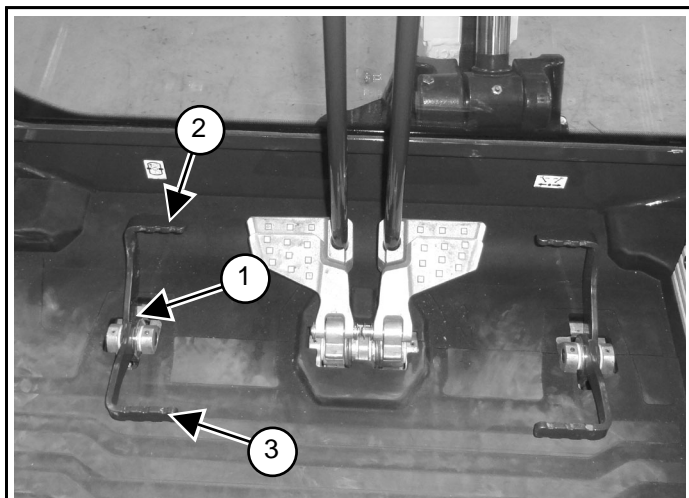
Clamp is for lifting purposes only. ◀

I-2421

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 Left Pedal To Activate Clamp

Figure 146

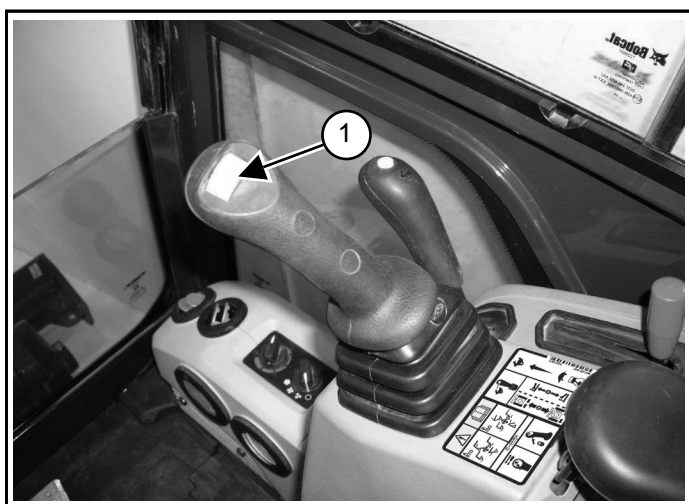


1. Press the toe (Item 2) of the left pedal (Item 1) to open the clamp [Figure 146].
2. Press the heel (Item 3) [Figure 146] of the pedal to close the clamp.

Using Right Joystick To Activate Clamp

1. Engage auxiliary hydraulics.
(See Operating Attachments With Primary Auxiliary Hydraulics on Page 45)

Figure 147



2. Move the right joystick switch (Item 1) [Figure 147] to the right to open the clamp.
3. Move the switch to the left to 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 84)

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

This excavator must be equipped with a lifting device, boom and arm load hold valves, and the overload warning device. See your Bobcat dealer for available kits.

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

WARNING

INSTABILITY AND CRUSHING HAZARD

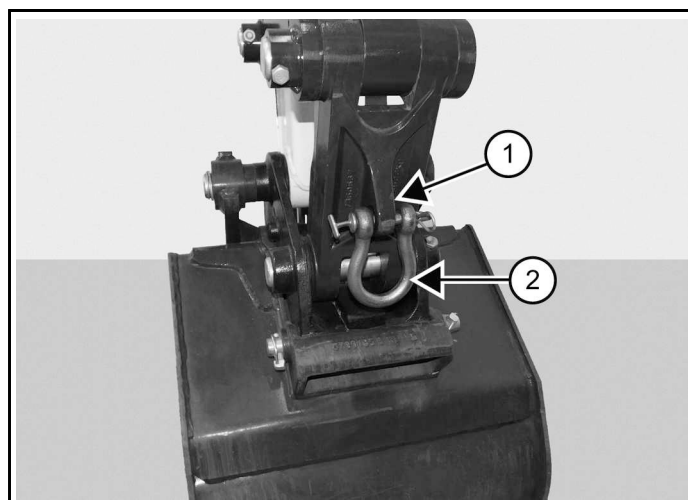
Excessive load can cause tipping, loss of control or failure of the lift eye resulting in serious injury or death.

Do not exceed rated lift capacity.*

W-2391

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

Figure 148



P200408a

3. For clevis lift eyes only, install the clevis (Item 2) through the lift eye (Item 1) [Figure 148].

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 149

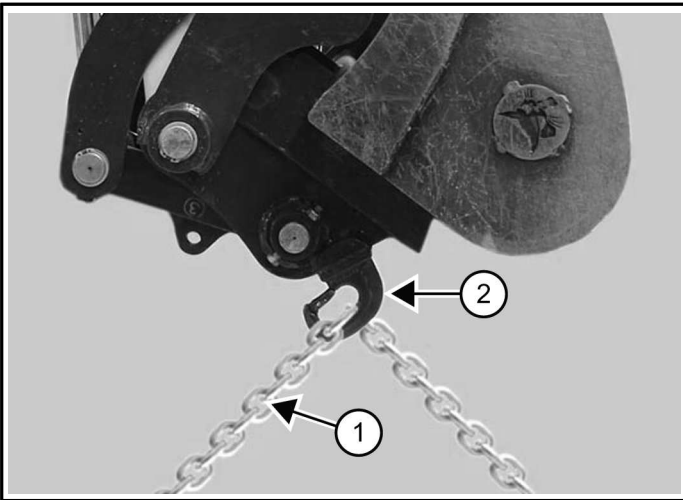
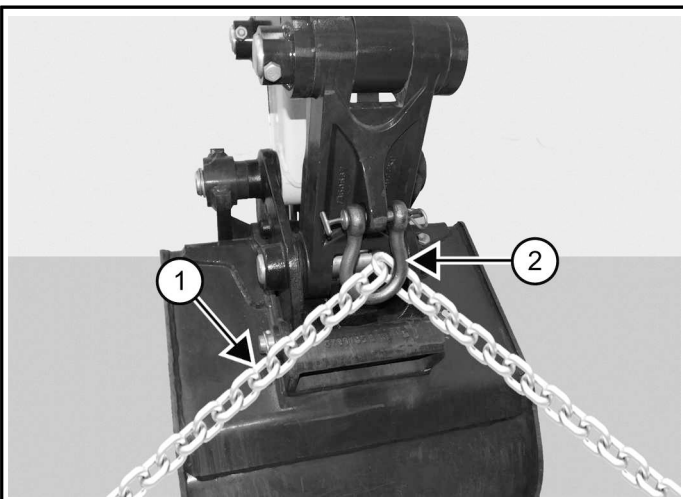


Figure 150

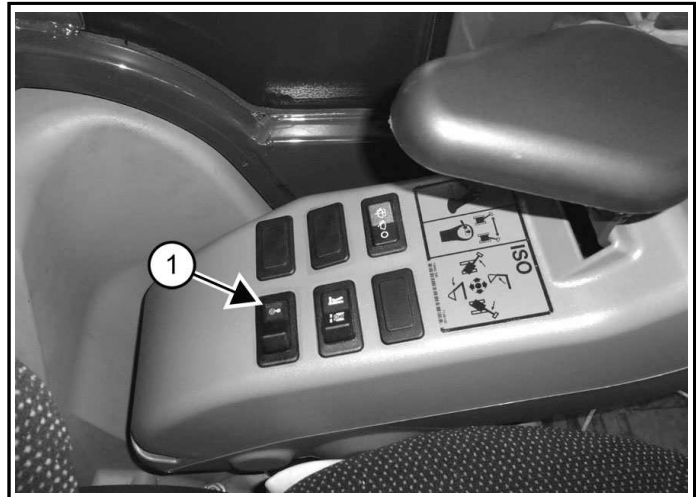


4. Install a lift chain (Item 1) (or other type of lifting device) through the lift eye (Item 2) [Figure 149] or clevis (Item 2) [Figure 150] and connect to the object being lifted.

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 54)

Figure 151



6. Press the switch (Item 1) [Figure 151] to the left to activate the overload warning device.

Figure 152



7. Make sure the load is evenly weighted and centered on the lifting chain (or other type of lifting device), and is secured to prevent the load from shifting [Figure 152].
8. Operate the controls slowly and smoothly to avoid suddenly swinging the lifted load.
9. Lift and position the load.
10. When the load is placed in a secured position and tension is removed from the lift chain, remove the chain from the load and from the lift eye.

LIFT CAPACITY

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.

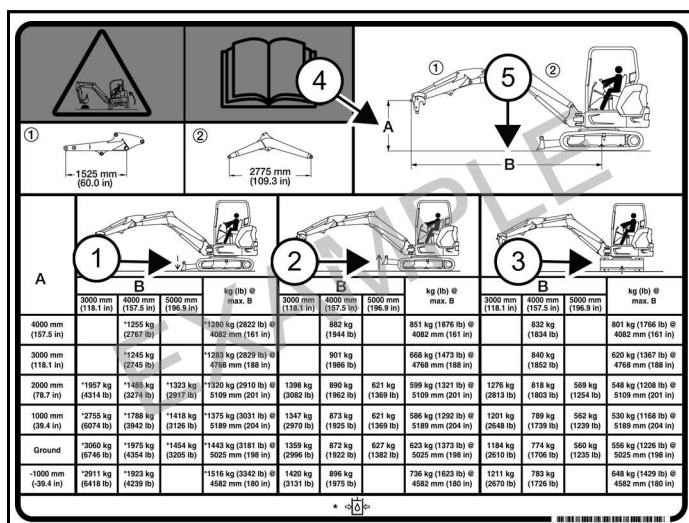
(See Calculating Lift Capacity on Page 84)

The weights for attachment mounting systems and hydraulic clamps can be found in documentation, including serial number plates. This manual also contains a list of weights.

(See Attachment Mounting System And Clamp Weights on Page 84)

Calculating Lift Capacity

Figure 153

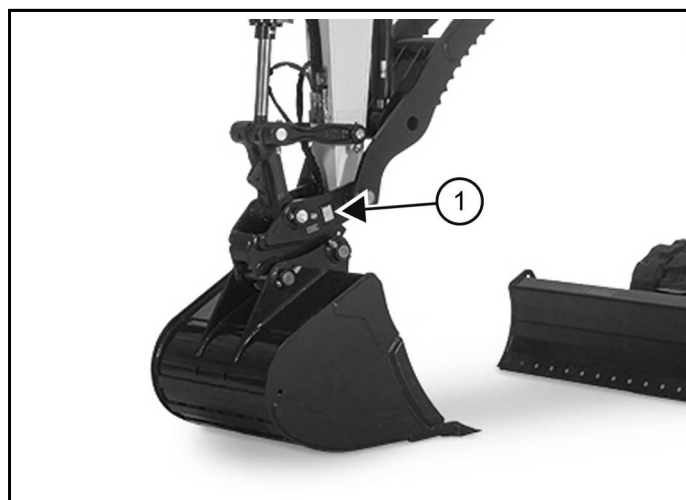


- Find the standard lift capacity for your working conditions on your machine's lift capacity decal [Figure 153].

Working conditions include:

- Blade down (Item 1) [Figure 153]
- Blade Up (Item 2) [Figure 153]
- Boom Over Tracks (Item 3) [Figure 153]
- Lift Point Height (A) (Item 4) [Figure 153]
- Lift Radius (B) (Item 5) [Figure 153]
- Tracks Expanded / Retracted (not shown here)

Figure 154



- Find the weight of your attachment mounting system, which is printed on the plate as shown here (Item 1) [Figure 153].
- Calculate the actual lift capacity for your conditions by subtracting the weights of optional equipment from the standard lift capacity on the decal.

NOTE: For bucket weights, see your Bobcat dealer. For attachment weights, see the attachment Operation & Maintenance Manual. For hydraulic clamp weights, (See Attachment Mounting System And Clamp Weights on Page 84)

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
Hydraulic Clamp and Cylinder	
DX17z, E17, E17z, E17z-C4	39 kg (85 lb)
DX19, E19, E20, E20z, E20z-C4 (Pin-On)	29 kg (64 lb)
E19, E20, E20z, E20z-C4 (Klacc System)	81 kg (179 lb)
E26, E27, E27z	49 kg (98 lb)
E32, E32e, E35, E38, E40	52 kg (114 lb)
E42, E48, E50, E55, E60	97 kg (214 lb)
E50z, E55z, E60 (Europe)	95 kg (210 lb)
E88	166 kg (366 lb)

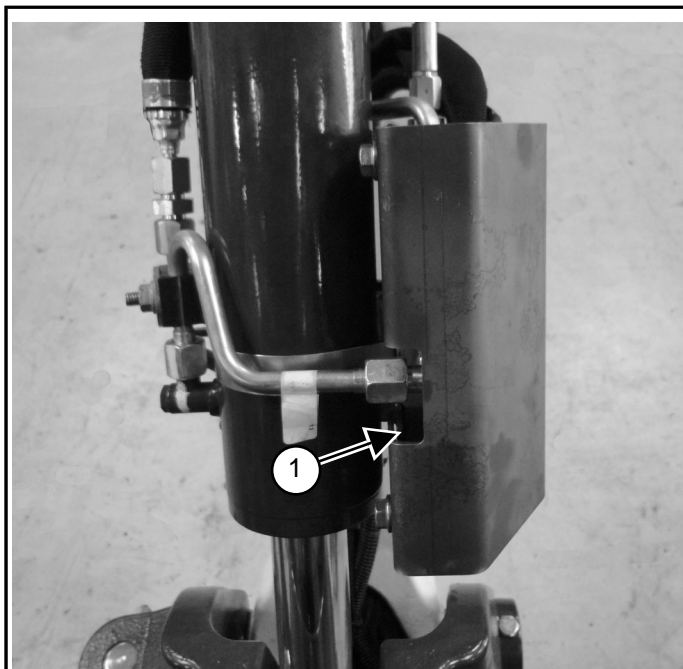
Description	Weight
Pin-On X-Change	
E32, E32e, E35, E38, E40	42 kg (92 lb)
E42, E48, E50, E55, E60	58 kg (128 lb)

BOOM LOAD HOLDING VALVE

Location Of Boom Load Holding Valve

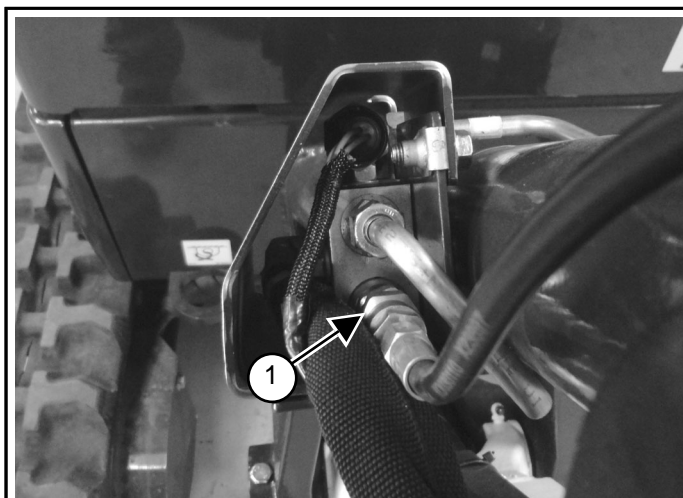
The boom load holding valve (if equipped) will hold the boom in its current position in the event of hydraulic pressure loss.

Figure 155



If the excavator is equipped with a boom load holding valve (Item 1) [Figure 155], it will be attached to the boom cylinder at the base end.

Figure 156



Do not remove or adjust the port relief valve (Item 1) [Figure 156] that the drain hose is connected to. If the port relief valve has 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-2753

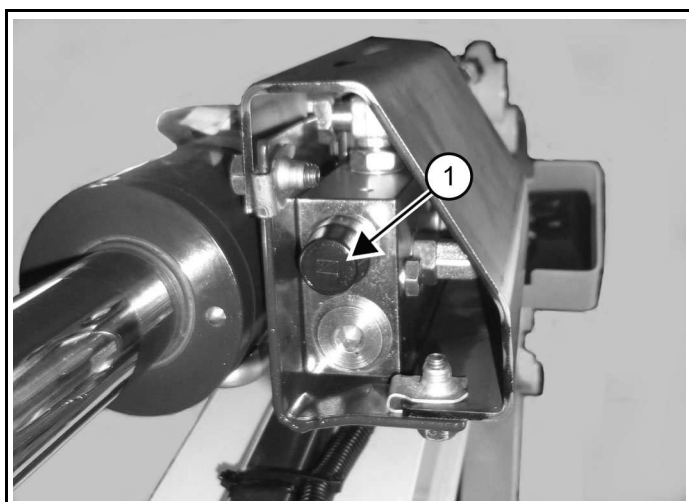
Lowering Boom With Load Holding Valve

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

For Base End Hose Failure, Or For Rod End Hose Failure And No Accumulator Pressure, Or For Loss Of Hydraulic Pressure

If the relief valve must be adjusted to lower the boom, the relief valve must be replaced. It can not be reset back to the factory setting.

Figure 157



C113532a

1. Place a container to catch any hydraulic fluid that is leaking.
2. Remove the plastic protective cap (Item 1) [Figure 157] from the valve.

⚠ WARNING

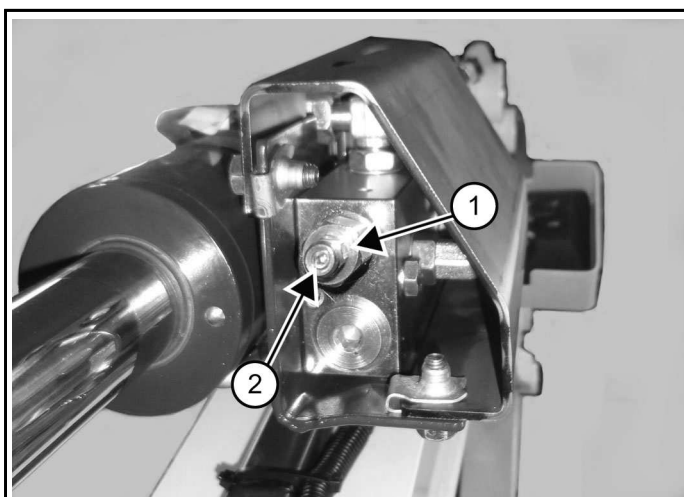
BURN HAZARD

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 158



C113533a

3. Loosen the locknut (Item 1) [Figure 158].
4. Install a hex wrench into the valve screw (Item 2) [Figure 158] and slowly rotate the screw clockwise and allow the boom to lower to the ground.
5. Replace the relief valve. See your Bobcat dealer for service parts.

For Rod End Hose Failure With Accumulator Pressure

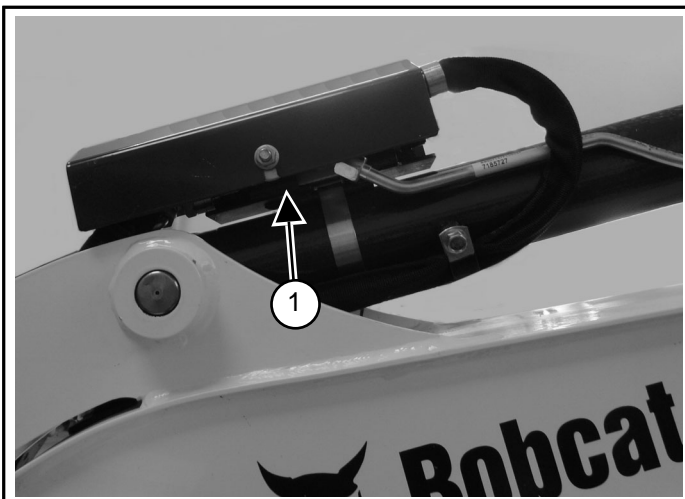
1. Place a container under the valve and hose end to catch any hydraulic fluid that is leaking.
2. Enter the excavator and turn the key switch to the ON position or press the Enter Code button (Keyless Panel), but do not start the engine.
3. Slowly lower the boom to the ground with the joystick.

ARM LOAD HOLDING VALVE

Location Of Arm Load Holding Valve

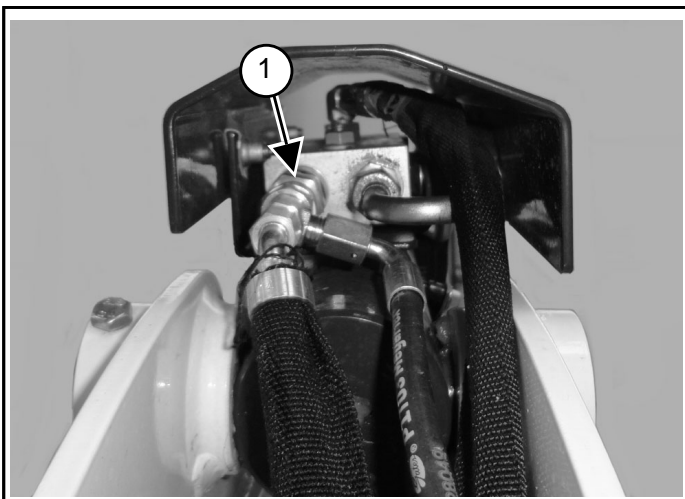
The arm load holding valve (if equipped) will hold the arm in its current position in the event of hydraulic pressure loss.

Figure 159



If the excavator is equipped with an arm load holding valve (Item 1) [Figure 159], it will be attached to the arm cylinder base end as shown.

Figure 160



Do not remove or adjust the port relief valve (Item 1) [Figure 160] (that the drain hose is connected to). If the port relief valve has 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. ◀

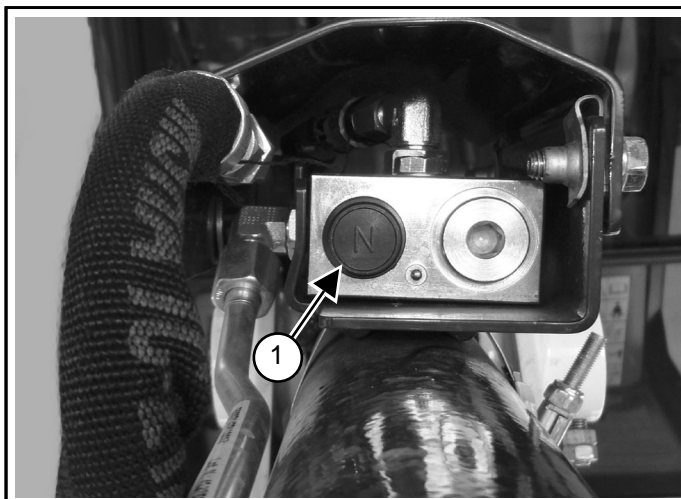
Lowering Arm With Load Holding Valve

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

For Base End Hose Failure, Or For Rod End Hose Failure And No Accumulator Pressure, Or For Loss Of Hydraulic Pressure

If the relief valve must be adjusted to lower the boom, the relief valve must be replaced. It can not be reset back to the factory setting.

Figure 161



1. Place a container to catch any hydraulic fluid that is leaking.
2. Remove the plastic protective cap (Item 1) [Figure 161] from the valve.

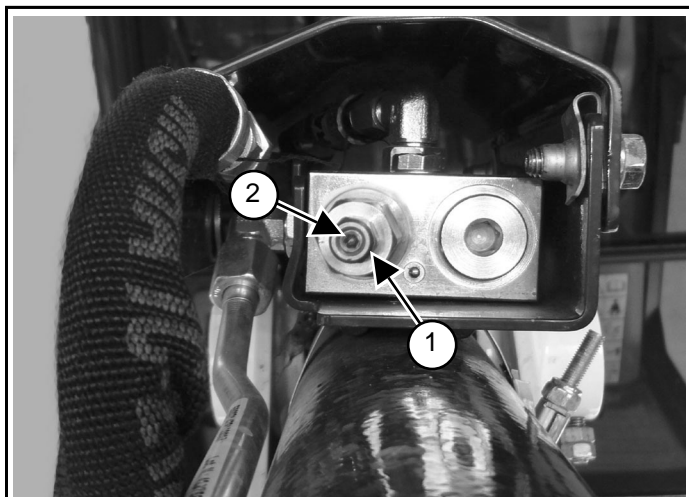
⚠ WARNING

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. ◀

Figure 162



3. Loosen the locknut (Item 1) [Figure 162].
4. Install a hex wrench into the valve screw (Item 2) [Figure 162] and slowly rotate the screw clockwise and allow the arm to lower to the ground.
5. Replace the relief valve. See your Bobcat dealer for service parts.

For 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 switch to the ON position or press the Enter Code button (Keyless Panel), but do not start the engine.
3. Slowly lower the arm to the ground with the joystick.

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.
- 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 when the excavator is skidded and there might be slight wear to the tracks.
- The towing chain (or cable) must be rated at 1.5 times the weight of the excavator.

LIFTING THE MACHINE

Lifting The Machine

Figure 163



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 163].
4. Put all the control levers in neutral and turn the machine off.

WARNING

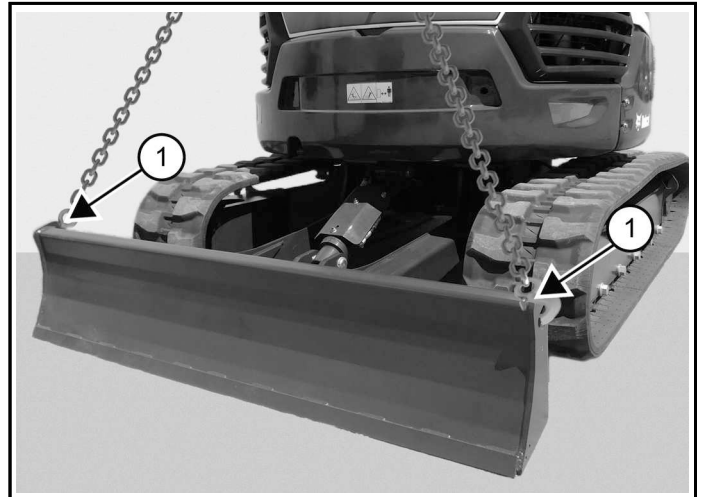
CRUSHING HAZARD

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

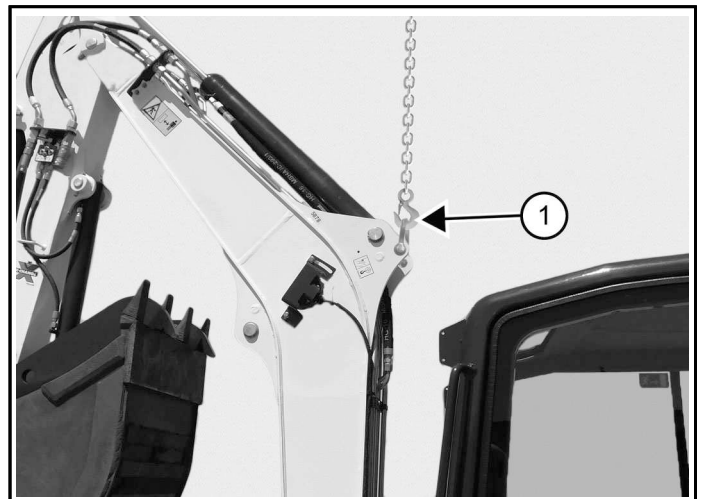
Figure 164



5. Fasten chains to the ends of the blade (Item 1) [Figure 164] 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 165



6. Fasten a chain from the boom (Item 1) [Figure 165] to the lift fixture.

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.
- Depending on the type of chain hooks, it may be necessary to install a clevis at the lift points and then hook to the clevis.

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 center 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 166



CT13426F

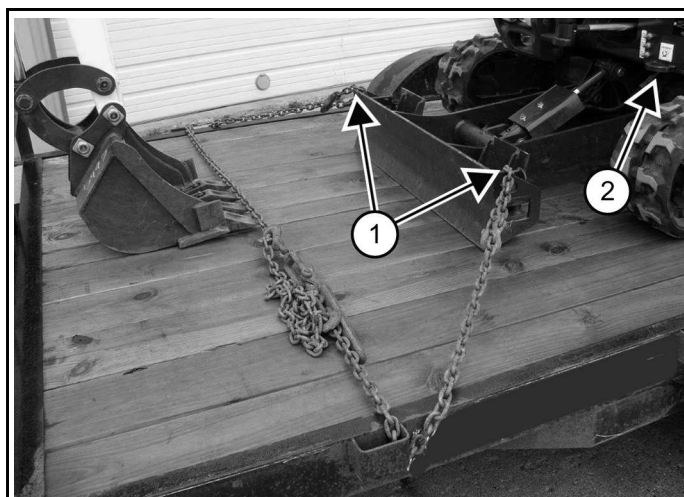
7. Move the machine forward onto the transport vehicle [Figure 166].
8. Do not change the direction of the machine while it is on the ramps.

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.

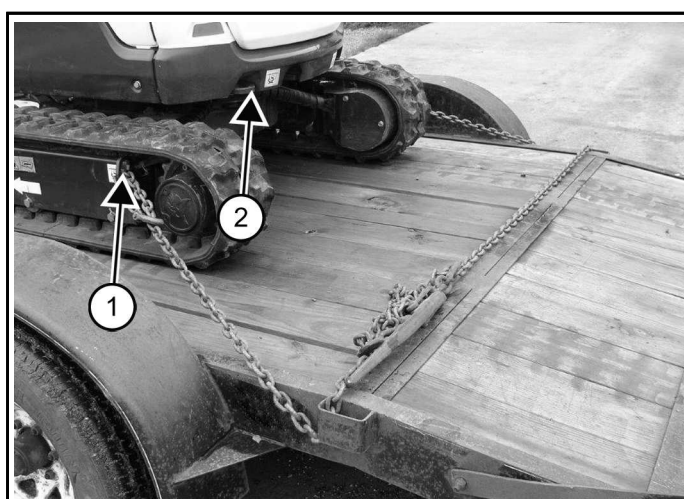
Figure 167



CT13429a

1. At the front of the machine, fasten chains to the corners of the blade (Item 1) [Figure 167].
OR
Fasten chains to the tie down loops on both sides of the front upperstructure (Item 2) [Figure 167].

Figure 168



CT13428a

2. At the rear of the machine, fasten chains to the tie down loops on the exterior of the track (Item 1) [Figure 168].

OR

Fasten chains to the tie down loops at the back of the machine (Item 2) [Figure 168].

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 SERVICE PERSONNEL**. Always use genuine Bobcat replacement parts. The Service Safety Training Course is available from your Bobcat dealer.



This check mark means: "Follow instructions for proper operations." Carefully read the message that follows.



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

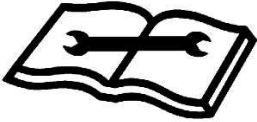
MAINTENANCE SAFETY WARNINGS



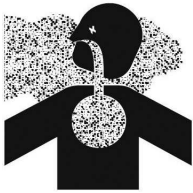
This Safety Alert Symbol means: "Attention! Be Alert! Your Safety is Involved!" Carefully read the message that follows.



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



- Cleaning and maintenance are required daily.



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



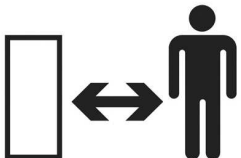
- Stop, cool, and clean engine of flammable materials before checking fluids.
- Never service or adjust machine with the engine running unless instructed to do so in the manual.
- Avoid contact with leaking hydraulic fluid or diesel fuel under pressure. It can penetrate the skin or eyes.
- Never fill 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 Doosan Bobcat China Co., Ltd..

SERVICE SCHEDULE

Maintenance Intervals

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

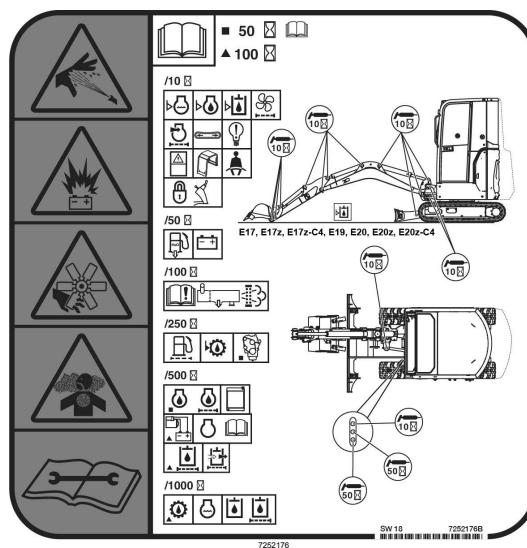
The service schedule decal is a guide for correct maintenance of the Bobcat excavator.

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.



⚠ 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

Every 10 Hours (Before Starting The Machine)

Engine Oil	Check level and add as needed. (See Page 107)
Engine Air Filters and Air System	Check air cleaner condition indicator. Service only when required. Check for leaks and damaged components. (See Page 102)
Fuel Filters	Check filters for moisture or contamination. Drain and replace as needed. (See Page 104)
Engine Cooling System	Check coolant level cold and add premixed coolant as needed. (See Page 109)
Hydraulic Fluid	Check fluid level and add as needed. (See Page 117)
Seat Belt, Seat Belt Retractors, Seat Belt Mounting Hardware, Control Console Lockout	Check the condition of seat belt and mounting hardware. Clean or replace seat belt retractors as needed. Check the control console lockout lever for proper operation. Clean dirt and debris from moving parts. (See Page 96)

Motion Alarm and Horn (if equipped)	Check for proper function. (See Page 97)
Canopy / Cab	Check the canopy / cab condition and mounting hardware. (See Page 34)
Cab Filters	Clean filters (if equipped). (See Page 101)
Indicators and Lights	Check for correct operation of all indicators and lights.
Safety Signs and Safety Tread	Check for damaged signs (decals). Replace any signs that are damaged. (See Page 17)
Track Tension	Check tension and adjust as needed. (See Page 121)
Pivot Points	Grease all machinery pivot points. Grease track expansion. Grease clamp (if equipped). (See Page 125)
Attachment Coupler	Check for damage or loose parts (if equipped).

First 50 Hours

Drive Belts (Alternator)	Check condition. Replace as needed. (See Page 123)
Engine Oil and Filter	Replace oil and filter. (See Page 107)

Every 50 Hours

Swing Bearing	Grease swing bearing and swing pinion. Service every 10 hours when operating in water. (See Page 125)
Battery	Check cables and connections. (See Page 112)
Fuel Tank	Drain water and sediment from fuel tank and fuel filter. (See Page 104)

First 100 Hours

Alternator and Starter	Check connections.
Hydraulic Filter	Replace the hydraulic filter. (See Page 117)

Every 100 Hours

Spark Arrester	Empty spark chamber. (See Page 120)
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Every 250 Hours Or Every 12 Months

Fuel Filter	Replace fuel filter. (See Page 104)
Travel Motors (Final Drive)	Check fluid level. Add as needed. (See Page 122)
Drive Belts (Alternator)	Check condition. Replace as needed. (See Page 117)

Every 500 Hours Or Every 12 Months

Engine Oil and Filter	Replace oil and filter. (See Page 107)
Engine Cooling System	Clean debris from radiator / hydraulic fluid cooler. (See Page 109)
Hydraulic Filter and Hydraulic Reservoir Breather Cap	Replace hydraulic filter and reservoir breather cap. (See Page 117)
Alternator and Starter	Check connections.
Heater	Clean housing and coils (if equipped). (See Page 101)

Every 1000 Hours Or Every 12 Months

Hydraulic Fluid and Filters	Replace hydraulic fluid and filters. (See Page 117)
Engine Valves	Adjust engine valve clearance.
Travel Motors (Final Drive)	Replace fluid. (See Page 122)

Every 24 Months

Engine Cooling System	Replace the coolant. (See Page 109)
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CONTROL CONSOLE LOCKOUTS

Inspecting And Maintaining The Control Console Lockouts

Figure 169



When the left console is raised [Figure 169], 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. Keep the left console raised [Figure 169].
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

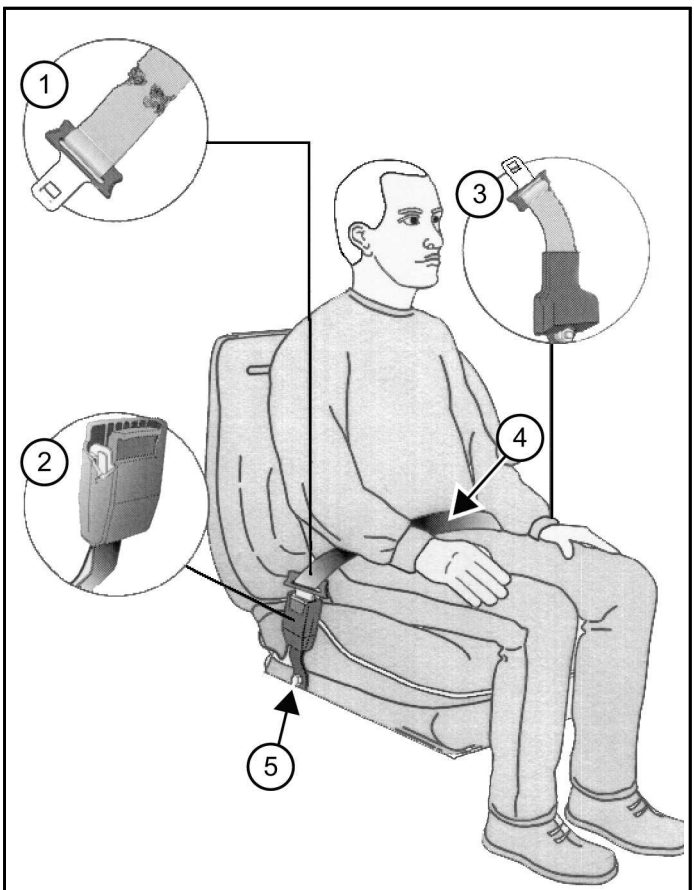
Inspecting And Maintaining The Seat Belt

⚠ WARNING

GENERAL HAZARD

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

Figure 170



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 170].

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

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

TRAVEL MOTION ALARM

Travel Motion Alarm Description

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

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

If the alarm does not sound, see inspection instructions. (See Inspecting The Travel Motion Alarm System on Page 97)

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 Travel Motion Alarm System

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

WARNING

CRUSHING HAZARD

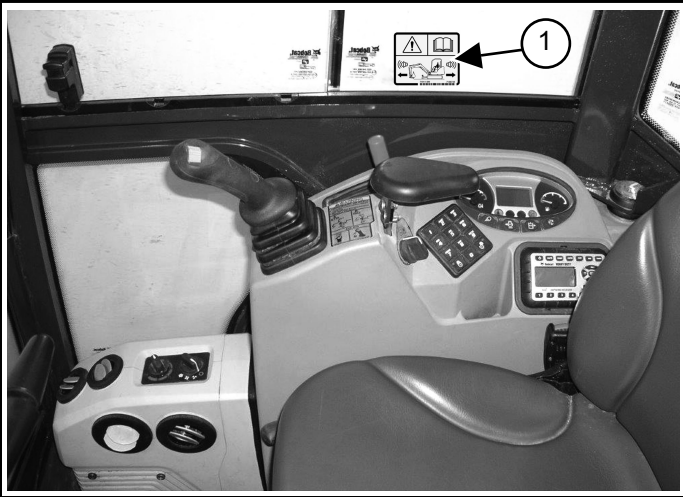
Failure to maintain a clear view in the direction of travel can cause serious injury or death.

- 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

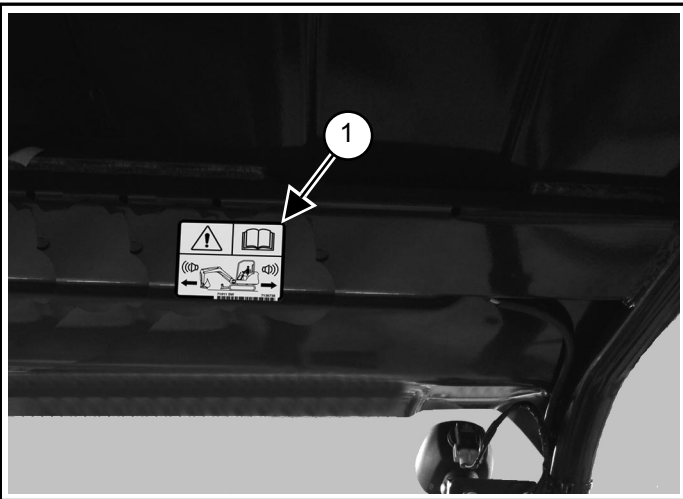
1. Sit in the operator's seat and fasten the seat belt. (See Pre-Starting Procedure on Page 54)

Figure 171



p113361A

Figure 172



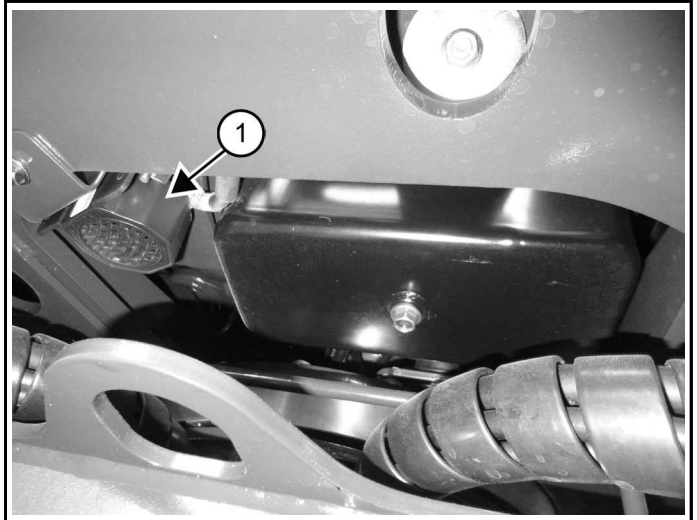
P113566a

2. Inspect for damaged or missing travel motion alarm decal (Item 1) [Figure 171] (cab machine) or (Item 1) [Figure 172] (canopy machine).

Replace if required.

3. Start the engine.
(See Starting The Engine on Page 57)
4. Move the travel control levers (one lever at a time) in the forward direction.
The travel motion alarm must sound.
5. Move the travel control levers (one lever at a time) in the reverse direction.
The travel motion alarm must sound.
6. Return both levers to neutral and turn excavator key to off position.
7. Exit the excavator.

Figure 173



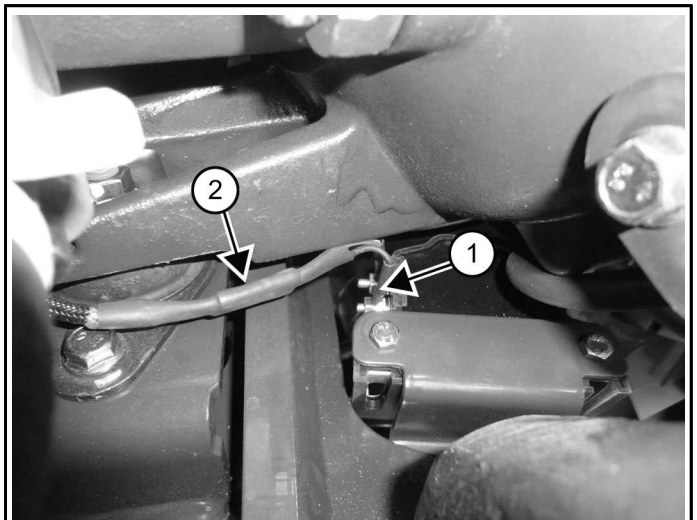
C113529a

8. Inspect the travel motion alarm switch (Item 1) [Figure 173] for tightness and damage.

The travel motion alarm is mounted to the bottom rear of the excavator next to the engine oil pan.

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

Figure 174



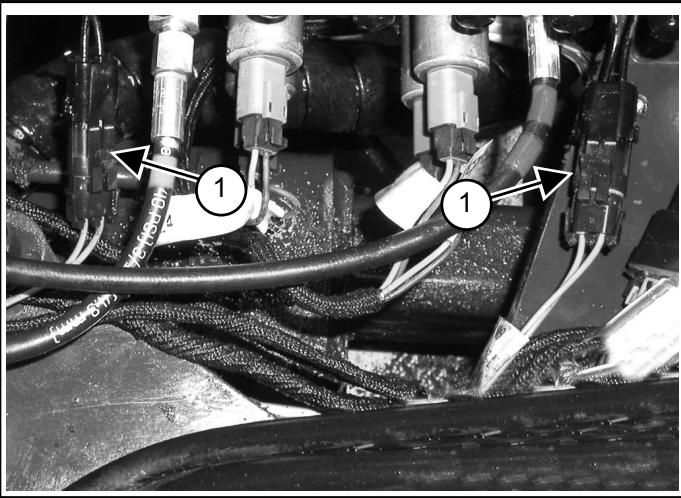
C113542a

9. Inspect the travel motion alarm electrical connections (Item 1) and wire harness (Item 2) for tightness and damage [Figure 174].

- a. Repair or replace any damaged components.

Maintaining The Travel Motion Alarm Switch

Figure 175



The two travel motion alarm switches (Item 1) are located in the two travel control sections of the control valve that is located under the floorplate. In the event the travel motion alarm is not sounding, inspect the electrical connections.

The two switches are non-adjustable.

1. Remove the floor mat and the floorplate.
See the Service Manual for the correct procedure.
2. Inspect the travel motion alarm electrical connections (Item 1) and wire harness for damage.
Repair or replace any damaged components.

Inspect the travel motion alarm system for proper function after switch replacement.

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.

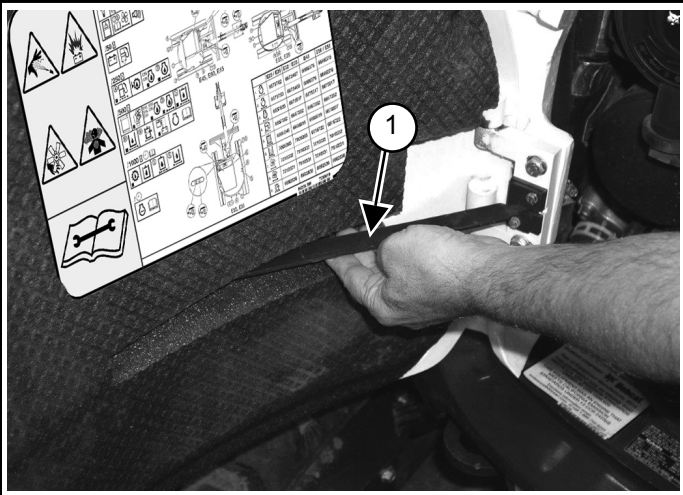
Figure 176



C113400a

1. Push the button (Item 1) [Figure 176] and pull the tailgate open.

Figure 177

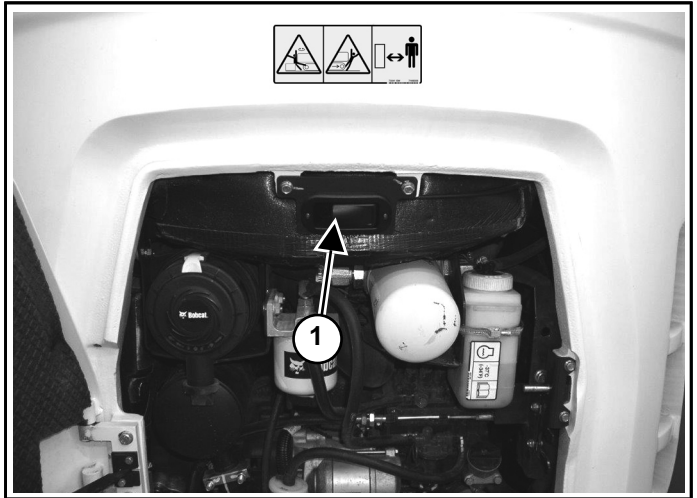


2. Open the tailgate and rotate outward until it is held open by the latch (Item 1) [Figure 177].
3. To close the tailgate, lift up on the latch (Item 1) [Figure 177] and slowly start to close the tailgate.
4. Push firmly to close the tailgate.

RIGHT SIDE COVER

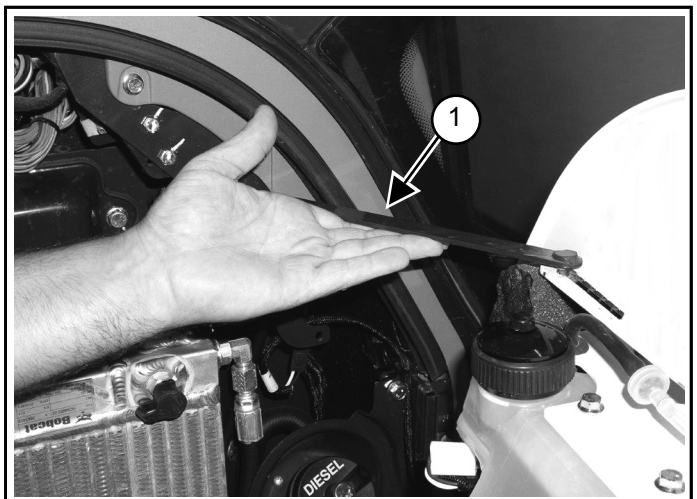
Opening And Closing The Right Side Cover

Figure 178



1. Open the tailgate to access the right side cover latch (Item 1) [Figure 178].
2. Pull out the lever (Item 1) [Figure 178] and open the right side cover.

Figure 179



3. Open the right side cover and rotate forward until it is held open by the latch (Item 1) [Figure 179].
4. To close the tailgate, lift up on the latch (Item 1) [Figure 179] and slowly start to close the tailgate.

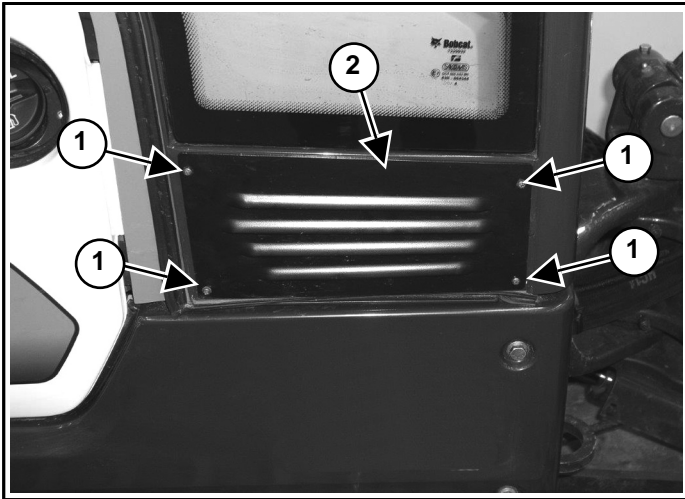
CAB FILTERS

Cleaning And Maintaining The Fresh Air Filter

The fresh air filter is located on the right front corner of the cab.

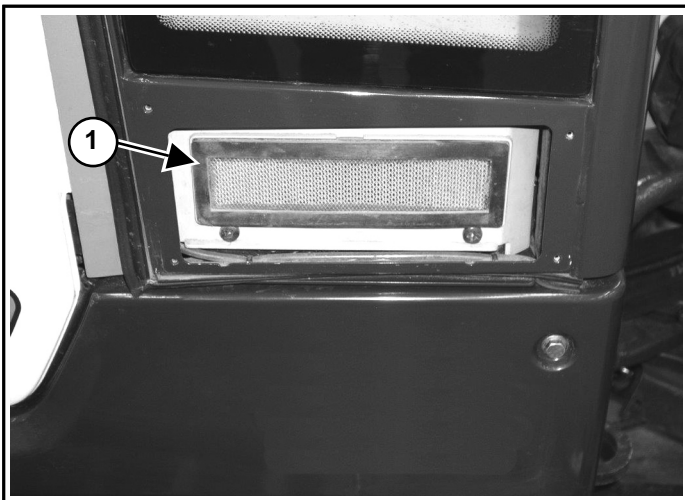
The fresh air filter must be cleaned regularly.
(See Service Schedule on Page 94)

Figure 180



1. Remove the four screws (Item 1) and remove the cover (Item 2) [Figure 180].

Figure 181



2. Pull the filter (Item 1) [Figure 181] out of the housing.
3. 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.

4. Reinstall the filter.
5. Reinstall the cover (Item 2) and the four screws (Item 1) [Figure 180].

ENGINE AIR CLEANER

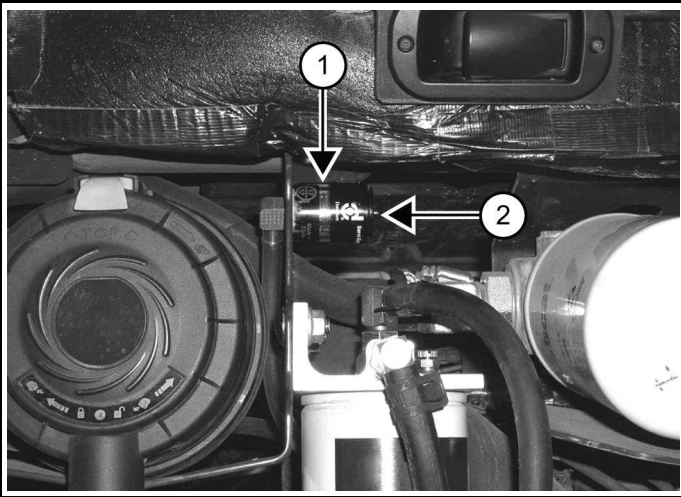
Checking The Condition Indicator Daily

The engine air cleaner is located in the engine compartment.

See the Service Schedule for the correct service interval.
(See Service Schedule on Page 94)

1. Open the tailgate. (See Tailgate on Page 99)

Figure 182



2. Check the condition indicator (Item 1) [Figure 182].

If the red ring shows in the condition indicator, the filter needs to be replaced.

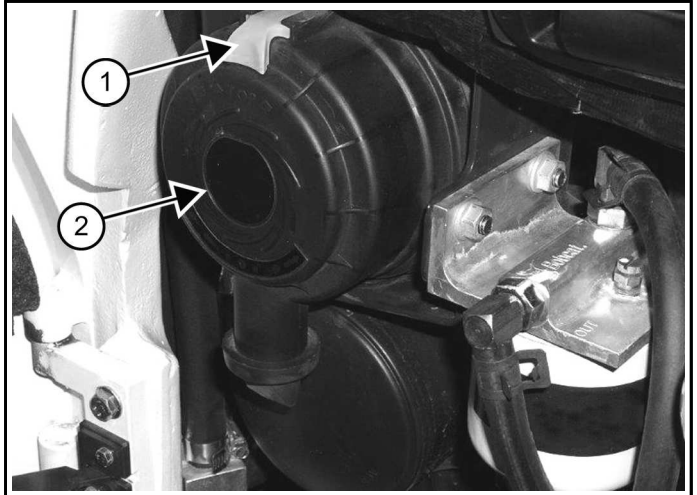
Replace the inner filter every third time the outer filter is replaced or as indicated.

Replacing The Outer Filter Of The Air Cleaner

See the Service Schedule for the correct service interval.
(See Service Schedule on Page 94)

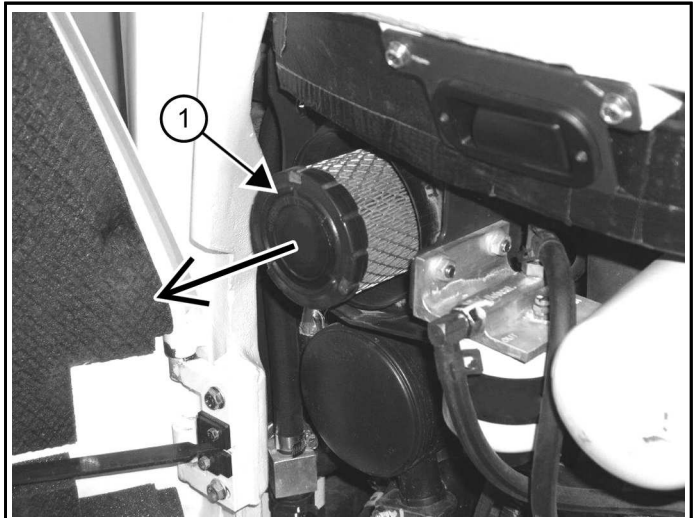
1. Open the tailgate. (See Tailgate on Page 99)

Figure 183



2. Pull out on the latch (Item 1) [Figure 183].
3. Rotate the cover counterclockwise and remove the dust cover (Item 2) [Figure 183].

Figure 184



4. Slightly rotate the filter and pull the outer filter (Item 1) [Figure 184] 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 183] on the housing.
9. Rotate the housing clockwise until the latch is at the top as shown (Item 1) [Figure 183].
10. Secure the dust cover (Item 2) by pushing in the latch (Item 1) [Figure 183].

11. Check the air intake hose and the air cleaner housing for damage. Make sure all connections are tight.
12. After the outer filter has been replaced, press the button (Item 2) [Figure 182] on the end of the condition indicator.
13. Start the engine. Run at full rpm, then reduce engine speed and stop the engine.
14. If the red ring still shows in the condition indicator (Item 1) [Figure 182], replace the inner filter.
(See Replacing The Inner Filter Of The Air Cleaner on Page 103)
15. Close the tailgate.
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 182] on the condition indicator to reset the red ring.
9. Close the tailgate.

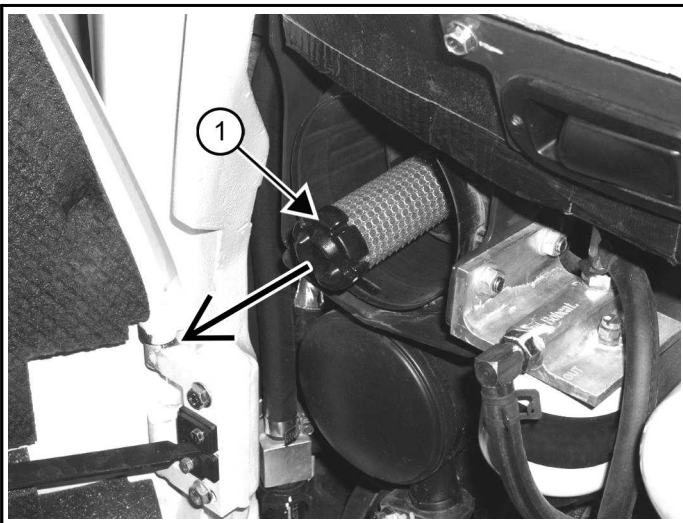
Replacing The Inner Filter Of The Air Cleaner

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 182] 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 99)
2. Remove the dust cover and the outer filter.
(See Replacing The Outer Filter Of The Air Cleaner on Page 102)

Figure 185



3. Remove the inner filter (Item 1) [Figure 185].
4. Check the housing for damage.

FUEL SYSTEM

Fuel Specifications

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

Chinese Standard

Use only clean, high quality diesel fuel that meets the GB19147 and HJ1014 requirement.

Ultra low sulfur diesel fuel must be used in this machine. Ultra low sulfur is defined as 15 mg/kg (15 ppm) sulfur maximum. It is recommended that operators use fuel that meets China Standard GB 252-2015 (sulfur content of 10 mg/kg (10 ppm)).

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

TEMPERATURE	GRADE 2-D	GRADE 1-D
Above -9°C (+15°F)	100%	0%
Down to -21°C (-5°F)	50%	50%
Below -21°C (-5°F)	0%	100%

NOTE: Biodiesel blend fuel may also be used in this machine. Biodiesel blend fuel must contain no more than five percent biodiesel mixed with ultra low sulfur petroleum-based diesel. This biodiesel blend fuel is commonly marketed as B5 blended diesel fuel. B5 blended diesel fuel must meet GB 252-2015 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 104)

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 stabilizer, 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 HAZARD

Failure to follow instructions can cause serious injury or death.

Stop the engine and allow it to cool before adding fuel. NO SMOKING!

W-2063

WARNING

FIRE AND EXPLOSION HAZARD

Failure to use care around combustibles can cause serious injury or death.

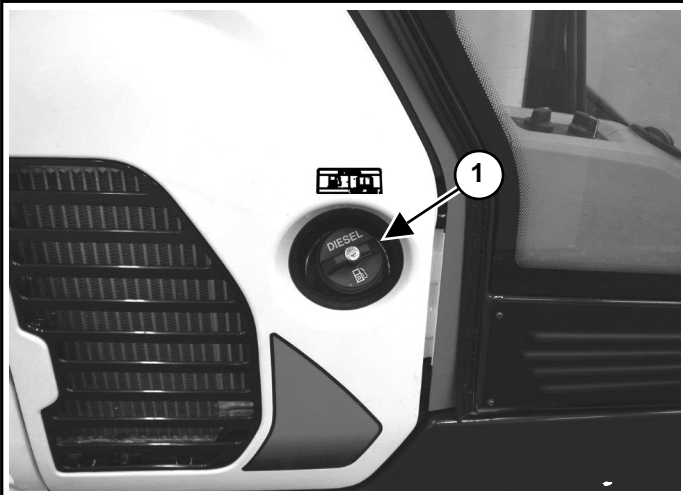
Always clean up spilled flammable fluids or oil. Keep heat, flames, sparks or lighted tobacco away from flammable fluids and oil.

W-2103

NOTE: When filling the fuel tank, with the left console raised, turn the start switch to on but do not start the engine. As fuel is added to the tank, a buzzer will beep, and the closer the tank gets to full, the quicker it will beep. When the tank is full, the buzzer will sound continuously. Stop fueling when buzzer sounds continuously. Turn the start switch off.

1. Use the start key to unlock the fuel cap.

Figure 186



P113441b

2. Remove the fuel fill cap (Item 1) [Figure 186].
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.

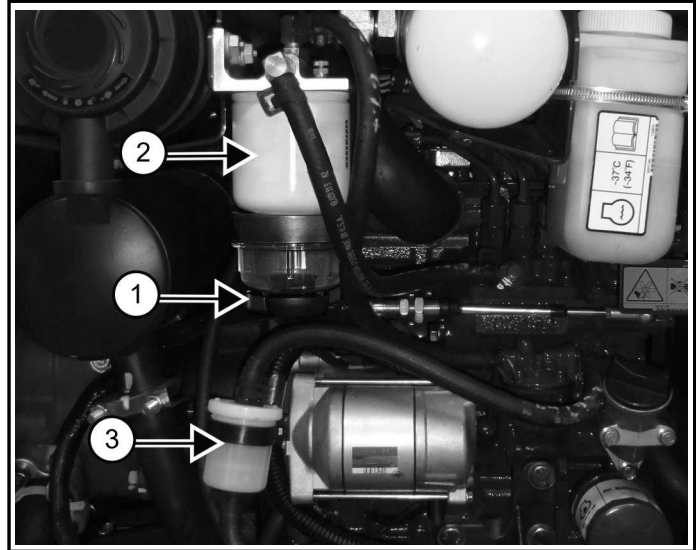
See the Service Schedule for the service interval for removing water from the filter or replacing the filter. (See Service Schedule on Page 94)

Removing Water From The Fuel Filter

See the Service Schedule for the correct service interval. (See Service Schedule on Page 94)

1. Turn off the engine and exit the excavator.
2. Open the tailgate. (See Tailgate on Page 99)

Figure 187



C133877a

3. Loosen the drain (Item 1) at the bottom of the fuel filter (Item 2) [Figure 187] to drain water from the filter into a container.
4. Tighten the drain.
5. Inspect the fuel pre-filter (Item 3) [Figure 187] daily for moisture and contamination. Replace as necessary.
6. Clean up any spilled fuel.
7. Close the tailgate.

⚠ WARNING

FIRE AND EXPLOSION HAZARD

Failure to use care around combustibles can cause serious injury or death. Always clean up spilled flammable fluids or oil. Keep heat, flames, sparks or lighted tobacco away from flammable fluids and oil.

W-2103

Replacing The Fuel Pre-Filter And Filter

See the Service Schedule for the correct service interval. (See Service Schedule on Page 94)

1. Stop the engine.
2. Open the tailgate. (See Tailgate on Page 99)
3. Remove and replace the fuel pre-filter (Item 3) [Figure 187].
4. Remove the fuel filter (Item 2) [Figure 187].
5. Clean the area around the filter housing.
6. Put clean oil on the seal of the new filter.
7. Install the fuel filter and hand tighten.

8. Remove the air from the fuel system.
(See Removing Air From The Fuel System on Page 106)

⚠ WARNING

INJECTION HAZARD

Pressurized 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. *

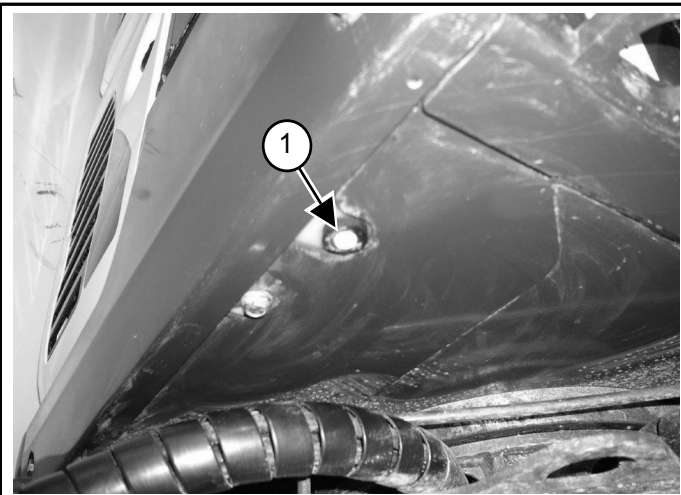
Draining The Fuel Tank

See the Service Schedule for the correct service interval.
(See Service Schedule on Page 94)

The fuel tank can be drained in two ways. See the options below.

First Option For Draining The Fuel Tank

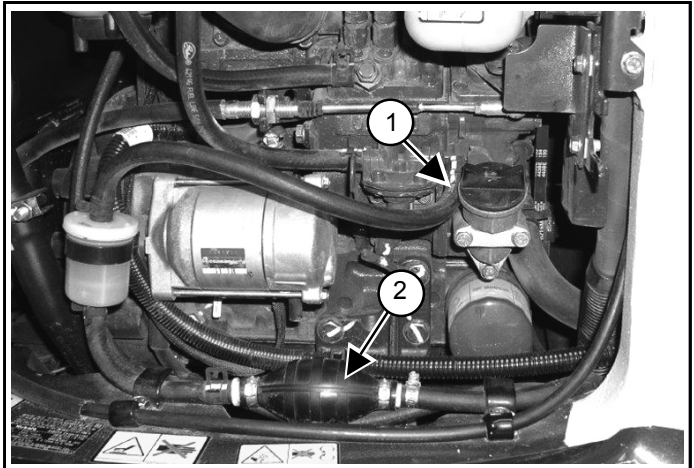
Figure 188



1. Rotate the upperstructure so the fuel tank drain plug (Item 1) [Figure 188] is located between the rear tracks.
2. Remove the drain plug (Item 1) [Figure 188].
3. Drain the fuel into a container.
Reuse, recycle, or dispose of fuel in an environmentally safe manner.
4. Reinstall the drain plug.

Second Option For Draining The Fuel Tank

Figure 189



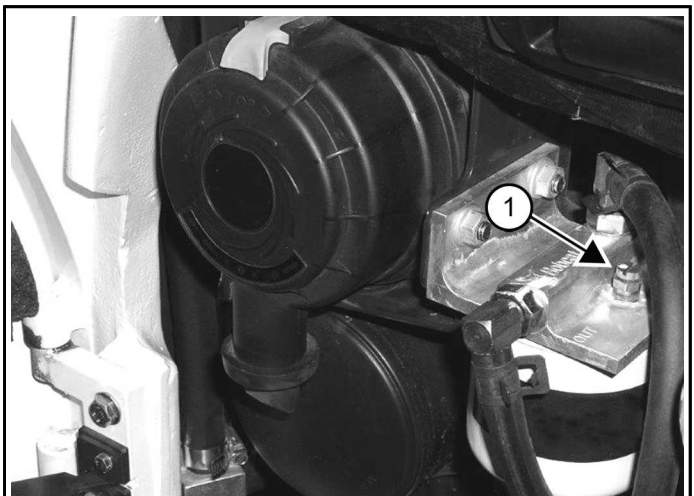
1. Remove the fuel hose (Item 1) [Figure 189] at the fuel pump.
2. Route the hose out of the engine compartment and into a container.
3. Squeeze the primer bulb (Item 2) [Figure 189] to start a siphon and drain the tank.
Reuse, recycle, or dispose of fuel in an environmentally safe manner.
4. Reinstall the fuel hose (Item 1) [Figure 189].

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.

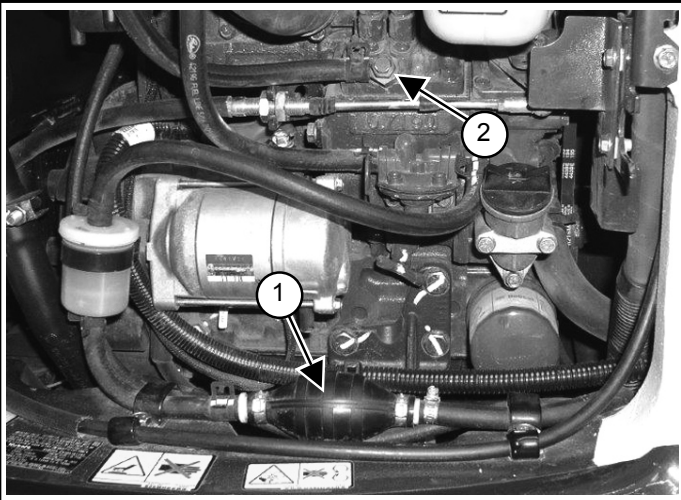
1. Open the tailgate. (See Tailgate on Page 99)

Figure 190



2. Open the fuel filter vent (Item 1) [Figure 190].

Figure 191



P113444c

3. Operate the primer bulb (Item 1) [Figure 191] until the fuel flows from the vent (Item 1) [Figure 190] with no air bubbles.
4. Close the vent (Item 1) [Figure 190].
5. Start the engine.

It may be necessary to open the vent at the fuel pump (Item 2) [Figure 191] briefly until the engine runs smoothly.

⚠ WARNING

INJECTION HAZARD

Pressurized 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

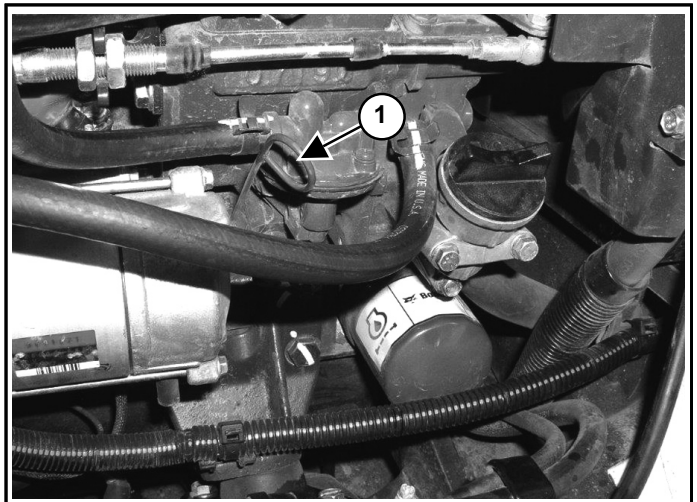
ENGINE LUBRICATION SYSTEM

Checking And Adding Engine Oil

See the Service Schedule for the correct service interval. (See Service Schedule on Page 94)

1. Stop the engine.
2. Open the tailgate. (See Tailgate on Page 99)

Figure 192



P113445b

3. Remove the dipstick (Item 1) [Figure 192].
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	
<div> <div> <div>C°</div> <div>-40 -34 -29 -23 -18 -12 -7 -1 +4 +10 +17 +21 +27 +32 +38 +43 +49</div> </div> <div> <div>[1]</div> <div>[2]</div> <div>[3]</div> </div> <div> <div>-40 -30 -20 -10 0 +10 +20 +30 +40 +50 +60 +70 +80 +90 +100 +110 +120</div> <div>F°</div> </div> </div>	NA3237A
Refer to the temperature range anticipated before next oil change.	
Must use API Category CH-4 or better or ACEA E7 or better.	
Do not use API category FA-4 engine oil.	

ENGINE CRANKCASE OIL

- [1] SAE 10W-30
- [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 CH-4 or better, or ACEA E7 or better.

⚠ IMPORTANT

MACHINE DAMAGE HAZARD

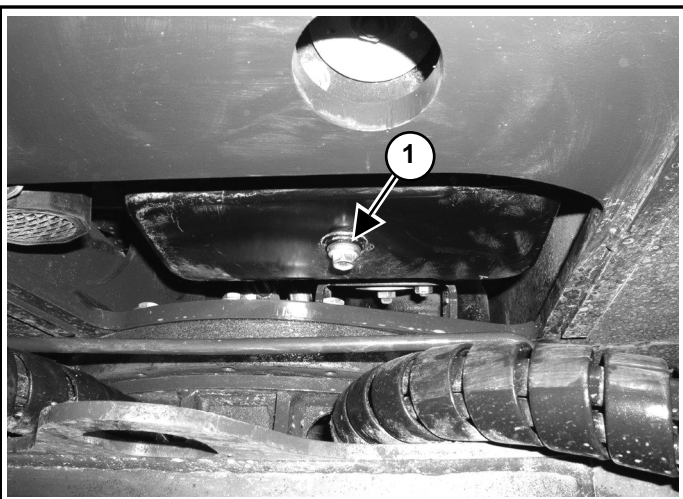
Failure to follow directions may result in severe engine damage. Use of API Service Category FA-4 engine oil is not approved and may cause irreversible damage to the engine. *

Replacing Engine Oil And Filter

See the Service Schedule for the correct service interval. (See Service Schedule on Page 94)

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 99)
5. Place a container under the oil pan.

Figure 193



6. Remove the drain plug (Item 1) [Figure 193] from the engine oil pan and drain the oil.
7. Recycle or dispose of used oil in an environmentally safe manner.

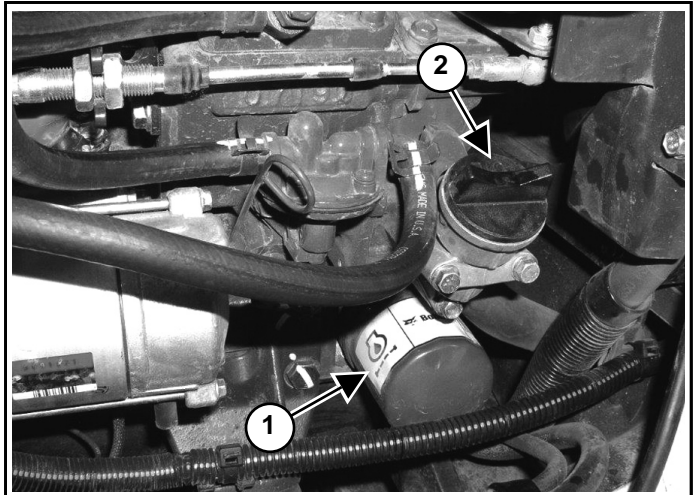
⚠ WARNING

FIRE AND EXPLOSION HAZARD

Failure to use care around combustibles can cause serious injury or death. Always clean up spilled flammable fluids or oil. Keep heat, flames, sparks or lighted tobacco away from flammable fluids and oil. *

W-2103

Figure 194



P113445c

8. Remove the oil filter (Item 1) [Figure 194] 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 193].
12. Remove the fill cap (Item 2) [Figure 194].
13. Put oil in the engine. Do not overfill.
14. Install the fill cap (Item 2) [Figure 194].
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

NOTE: This excavator uses a pusher fan so flow through the radiator / oil cooler will be from inside the engine compartment to outside the right cover. When cleaning the radiator, clean both the inside and outside surfaces of the radiator / oil cooler.

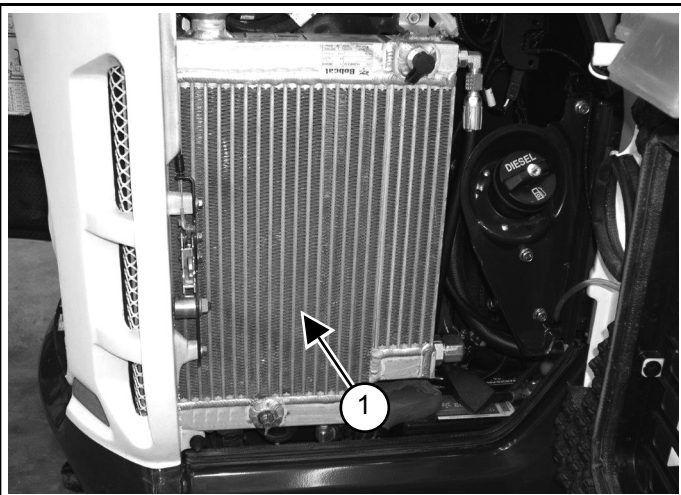
Check the cooling system every day to prevent overheating, loss of performance, or engine damage. (See Service Schedule on Page 94)

1. Stop the engine.

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

2. Open the tailgate. (See Tailgate on Page 99)
3. Open the right side cover. (See Right Side Cover on Page 100)

Figure 195



4. Use air pressure or water pressure to clean both inside and outside surfaces of the radiator / oil cooler (Item 1) [Figure 195].

Be careful not to damage the fins when cleaning.

5. Close the right side cover.
6. Close the tailgate.

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 pressurized fluids can cause serious injury or death.

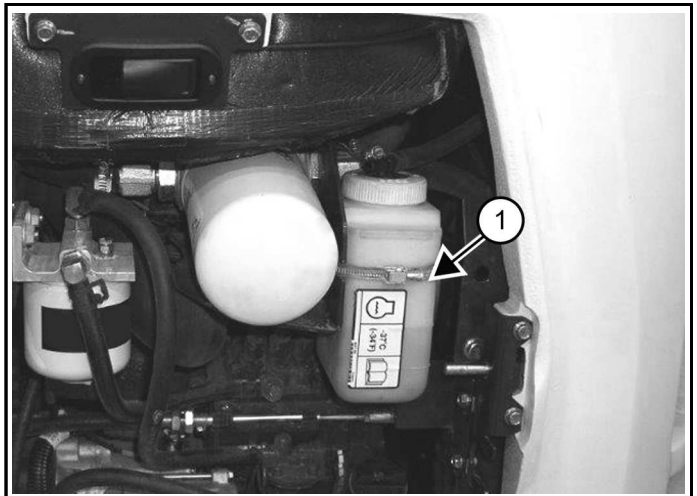
Wear safety glasses to prevent eye injury when any of the following conditions exist:

- 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 99)

Figure 196



C113433a

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

It should be between the MAX and MIN marks.

4. Add fluid as needed. (See Capacities Specifications on Page 150)

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

The following items are needed to complete this task:

- Container to catch the coolant
- Hose.

See the Service Schedule for correct service interval.
(See Service Schedule on Page 94)

1. Stop the engine.
2. Open the right side cover.
(See Right Side Cover on Page 100)

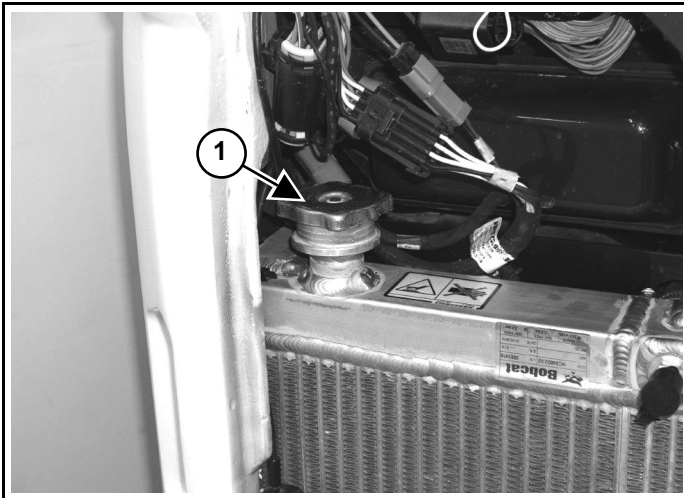
⚠ WARNING

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 197

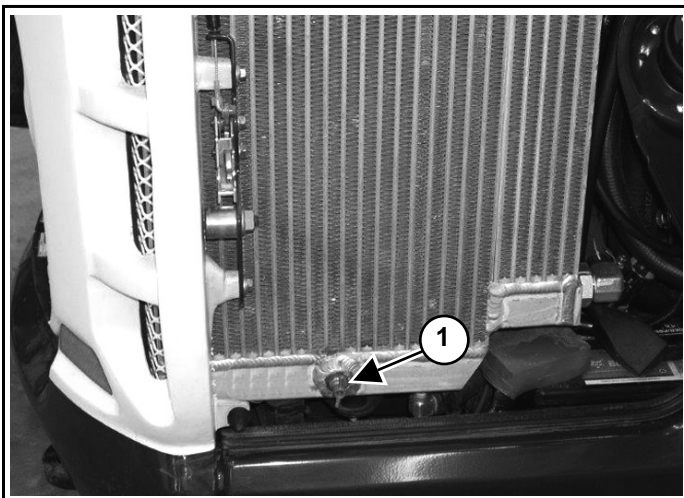


P113447b

3. When the engine is cool, remove the coolant fill cap (Item 1) [Figure 197].

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

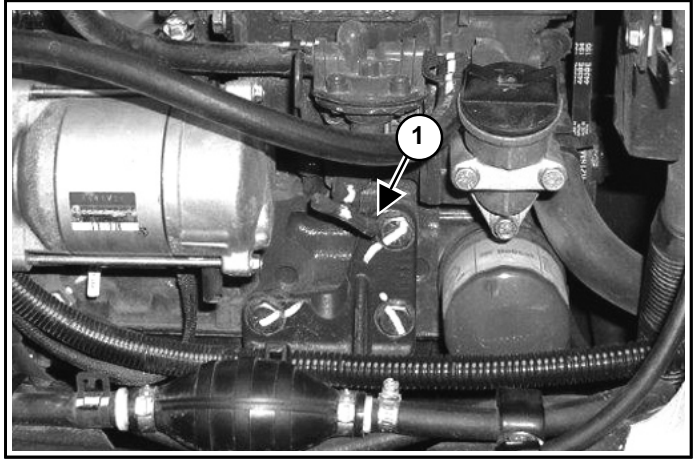
Figure 198



P113448b

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

Figure 199



P113446d

6. Install a hose on the drain valve located at the engine block by the end of the starter (Item 1) [Figure 199].
7. Open the drain valve (Item 1) [Figure 199] and drain the coolant into a container.
8. After all the coolant is removed, close both drain valves.
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 150)

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

11. Add premixed coolant (47% water and 53% propylene glycol) to the coolant tank until the coolant level reaches the lower marker on the tank.
12. Use a refractometer to check the condition of propylene glycol in your cooling system.
13. Add premixed coolant until the level is correct.
14. Install the coolant fill cap.
15. Run the engine until it is at operating temperature.
16. Stop the engine.
17. Check the coolant level when cool.
18. Add coolant to the tank as needed.
19. Install the coolant fill cap.

20. Close the right side cover.

ELECTRICAL SYSTEM

Electrical System Description

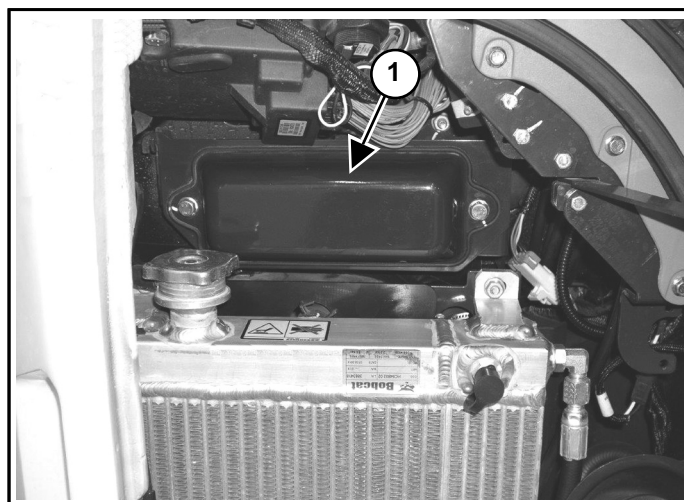
The excavator has a 12 volt, alternator charging system.

The electrical system is protected by fuses located in a master fuse panel, an operator cab fuse panel, and a mainframe fuse panel.

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.

Fuse And Relay Identification

Figure 200




















P113448b

The decal inside the fuse cover (Item 1) [Figure 200] shows the location and amp ratings of the fuses.


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

Figure 201
















F5		F1	10A		R5		R6		R7	PB		F9	25A			
F6		F2	20A								ACD 	F10	25A			
	F7	5A		F3	25A		R4		R3		R2		R1		F11	25A
	F8	25A	ACD 	F4	25A							F12	15A			



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The location and sizes are shown in the table below and on the decal [Figure 201]. Always replace fuses using the same type and capacity. Relays are identified by the letter "R" in the Amp column.

REF.	ICON	DESC.	AMP
F1		Wiper / Washer	10
F2		Switched Power	20
F3		Alternator Excite / Heater	25
F4	ACD 	ACD Switched Power	25
F5	not used		
F6	not used		
F7		Ignition	5
F8		Fuel Shutoff	25
F9		Panel / Display Controller	25
F10	ACD 	ACD Unswitched Power	25
F11		Lights	25
F12		Aux Power	15
R1		Starter	R
R2		Glow Plugs	R
R3		Lights	R
R4		Fuel Shutoff	R
R5		Switched Power	R

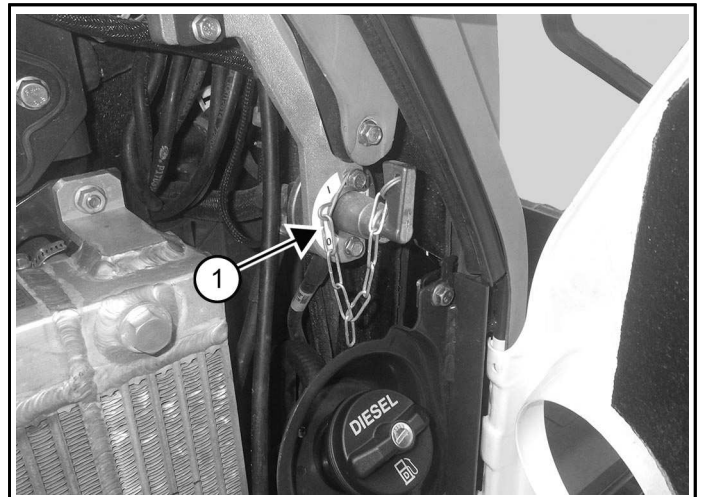
REF.	ICON	DESC.	AMP
R6		Lights	R
R7		Hydraulic Bypass / Power Beyond	R
R8	not used		

Battery Disconnect Switch

Turn the battery disconnect switch to the OFF position before disconnecting or connecting the battery cables.

The battery disconnect switch (Item 1) [Figure 202] is located under the right side cover above the fuel fill cap.

Figure 202



- Rotate the switch (Item 1) [Figure 202] counterclockwise to turn the switch to the OFF position.
- Rotate the switch (Item 1) [Figure 202] clockwise to turn to the ON position (shown here in the ON position).

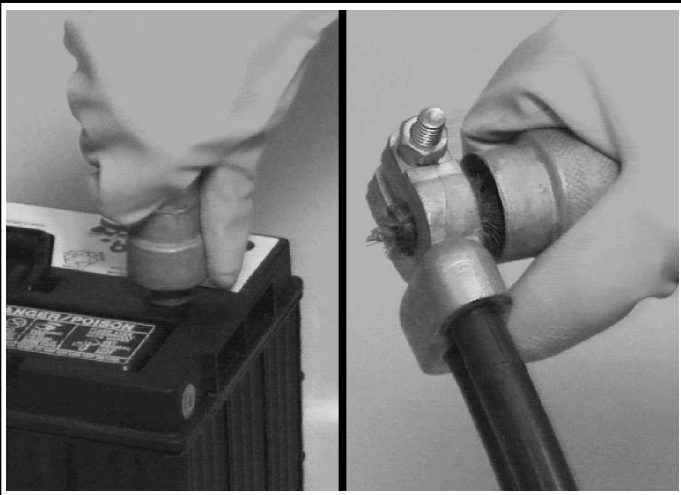
NOTE: When the battery disconnect switch is in the OFF position, the switch key can be removed from the switch. The key is secured to the switch mount with a chain.

Battery Maintenance

See the Service Schedule for the correct service interval. (See Service Schedule on Page 94)

The Bobcat brand battery supplied with your machine is sealed and does not require watering. Proper charging and storage are important to maximize the life of all batteries.

Figure 203



Steps for reliability and long battery life:

- Keep battery posts and terminals clean [Figure 203].
- 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 114)
- Check the battery state of charge every 30 days on machines that are not frequently used. (See Testing The Battery on Page 113)

⚠ 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

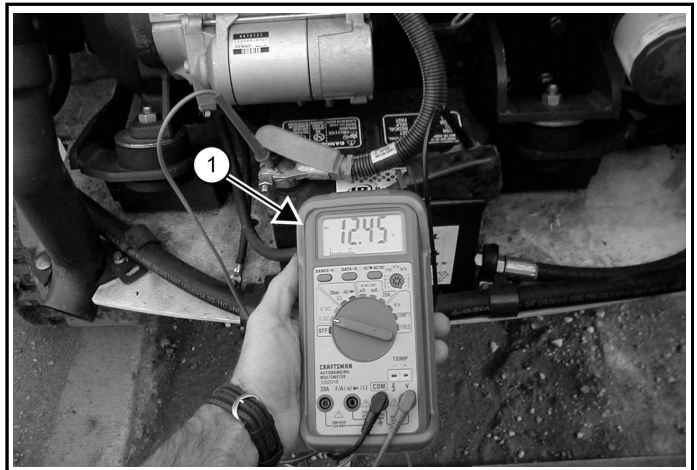
Use a good quality battery maintainer to keep the battery above 12.4 volts for machines that are not frequently used. Batteries below 12.4 volts must first be charged using a battery charger. Solar maintainers should have a minimum capacity of 10 watts to be effective.

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 204



P30836a

The simplest and most common check to determine battery state of charge is to use a digital multimeter or voltmeter (Item 1) [Figure 204].

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

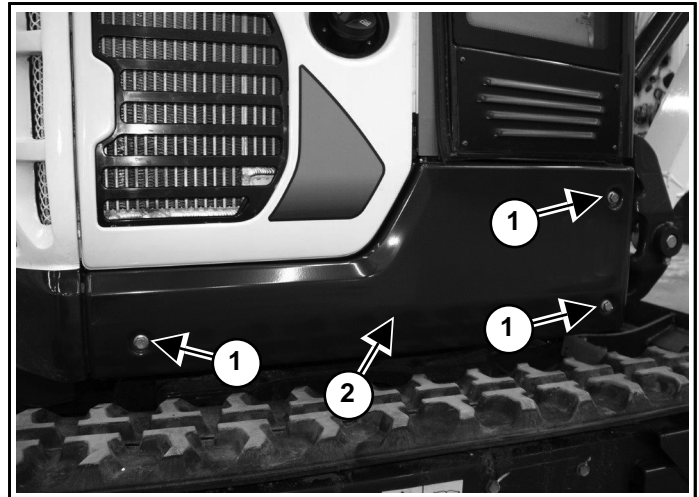
If it is necessary to use a booster battery to start the engine, be careful! There must be one person in the

operator's seat and one person to connect and disconnect the battery cables.

To access the battery for jump starting, you will have to remove the battery hold-down and move the battery outward to access the positive battery post.

1. Be sure the key switch is OFF.
2. Open the tailgate. (See Tailgate on Page 99)

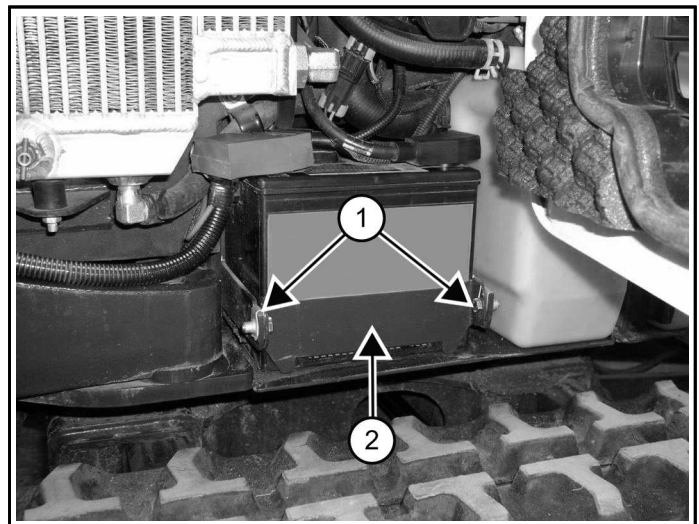
Figure 205



P113450a

3. Remove the three bolts (Item 1) and remove the lower right side cover (Item 2) [Figure 205].
4. Open the right side cover. (See Right Side Cover on Page 100)

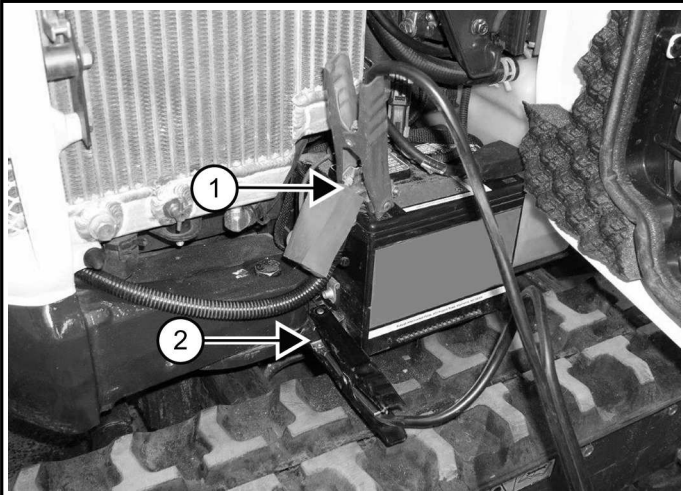
Figure 206



CT13451a

5. Remove the two bolts (Item 1) and remove the battery hold-down plate (Item 2) [Figure 206].
6. Slide the battery out slightly to access the battery posts.

Figure 207



C113452a

7. Connect one end of the first cable to the positive (+) terminal of the booster battery. Connect the other end of the same cable to the positive (+) terminal (Item 1) [Figure 207] of the excavator battery.
8. Connect one end of the second cable to the negative (-) terminal of the booster battery. Connect the other end of the same cable to a frame grounding point (Item 2) [Figure 207].
9. Start the engine.
10. After the engine has started, remove the negative (-) cable first (Item 2) [Figure 207].
11. Disconnect the cable from the positive (+) terminal of the excavator battery (Item 1) [Figure 207].
12. Replace the positive battery cable cover and push the battery in fully.
13. Reinstall the battery hold-down plate (Item 2) and the two bolts (Item 1) [Figure 206].
14. Reinstall the lower right side cover (Item 2) [Figure 205].
15. Close the right side cover.

⚠ 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

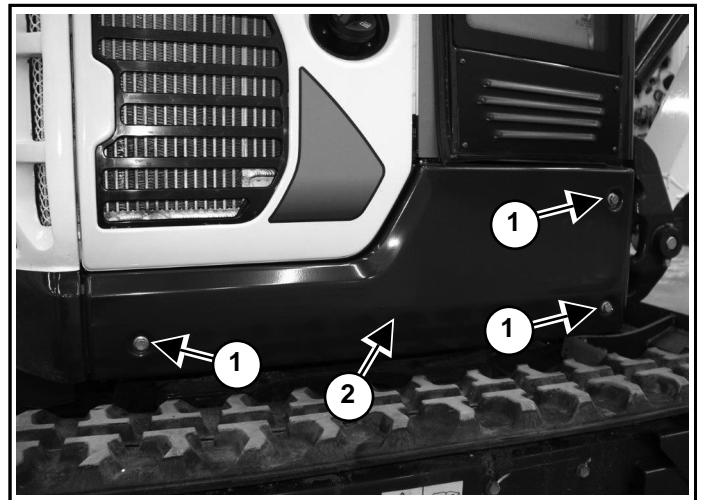
Contact with or ingestion of battery acid can cause serious injury or death.

- 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

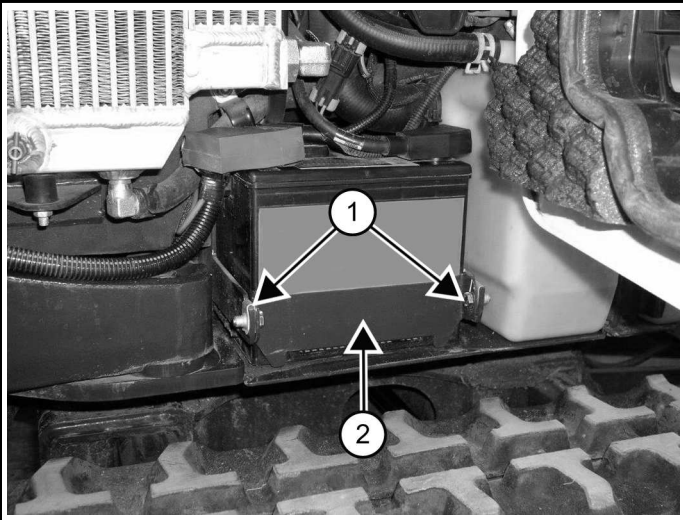
Figure 208



P113450a

1. Remove the three bolts (Item 1) and remove the lower right side cover (Item 2) [Figure 208].
2. Open the right side cover.
(See Right Side Cover on Page 100)
3. Turn the battery disconnect switch to the OFF position (if equipped).
(See Battery Disconnect Switch on Page 112)

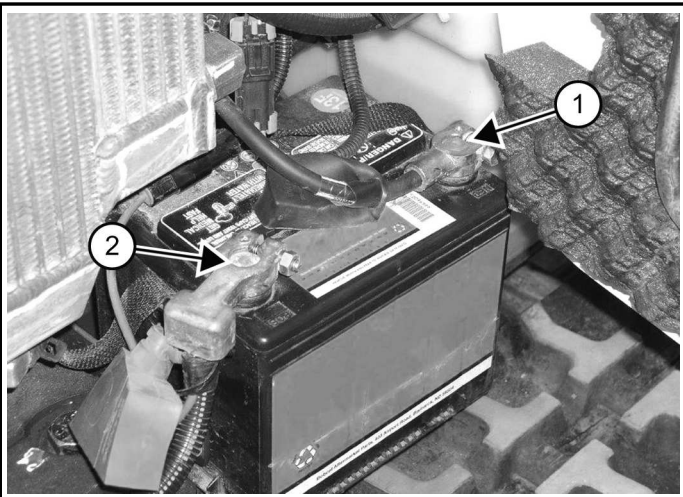
Figure 209



C113451a

4. Remove the two bolts (Item 1) and remove the battery hold-down plate (Item 2) [Figure 209].
5. Slide the battery to the right to access the battery cables.

Figure 210



C113453a

6. Disconnect the negative (-) cable (Item 1) [Figure 210] first.
7. Disconnect the positive (+) cable (Item 2) [Figure 210].
8. Remove the battery.
Always clean the terminals and the cable ends, even when installing a new battery.
9. Position the battery into the battery box.
10. Connect the positive (+) cable (Item 2) [Figure 210].
11. Connect the negative (-) cable (Item 1) [Figure 210] last to prevent sparks.

12. Reinstall the battery post covers and slide the battery in fully.
13. Tighten the terminal clamp nuts to 7 N · m (5 ft-lb) torque.
14. Install the hold-down plate (Item 2) and the two bolts (Item 1) [Figure 209].
15. Reinstall the lower right side cover (Item 2) [Figure 208].
16. Turn the battery disconnect switch to the ON position (if equipped).

⚠ 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-2095

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 94)

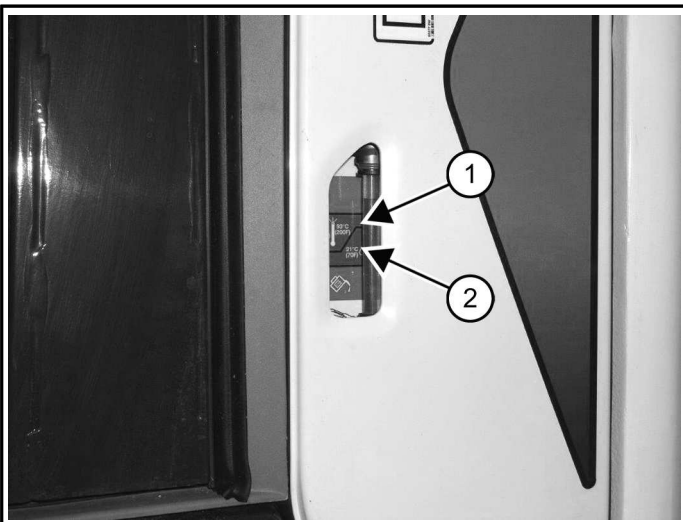
1. Park the machine on a flat surface.

Figure 211



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 211].
3. Stop the engine.

Figure 212

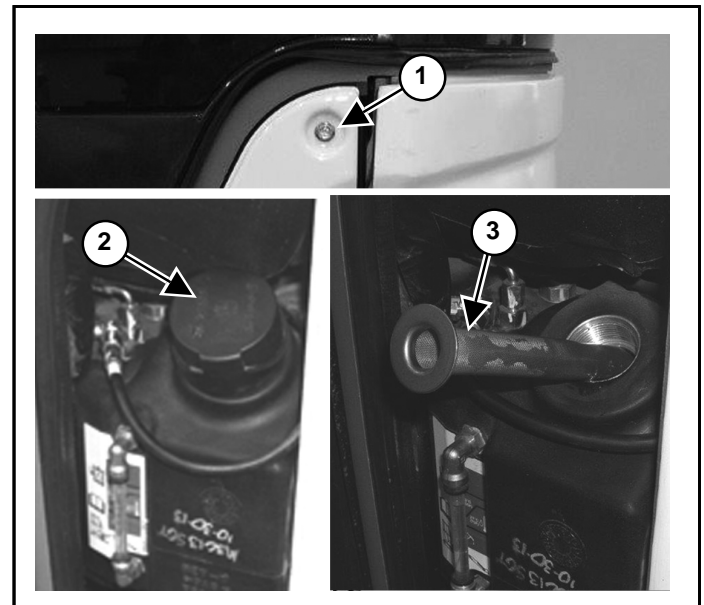


4. Check the hydraulic fluid level. It must be visible in the sight gauge.

The decal on the hydraulic tank shows the correct fill level.

- Item 1 [Figure 212] is the correct fluid level when the machine is HOT (optional).
- Item 2 [Figure 212] is the correct fluid level when the machine is COLD (preferred).

Figure 213



5. Remove the screw (Item 1) [Figure 213] from the top of the left side cover and remove the cover.
6. Clean the surface around the reservoir cap and remove the cap from the reservoir (Item 2) [Figure 213].

⚠ WARNING

FIRE AND EXPLOSION HAZARD

Failure to use care around combustibles can cause serious injury or death. Always clean up spilled flammable fluids or oil. Keep heat, flames, sparks or lighted tobacco away from flammable fluids and oil.*

W2103

7. Check the condition of the fill strainer screen (Item 3) [Figure 213].
Clean or replace as necessary.
8. Add the correct fluid to the reservoir until it is visible in the sight gauge.
(See Capacities Specifications on Page 150)
Be sure the screen is installed before adding fluid.
9. Check the cap.
Clean or replace as necessary.
10. Install the cap.

11. Install the left 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.	
<p>[1] VG 100; Minimum VI 130</p> <p>[2] VG 46; Minimum VI 150</p> <p>[3] Bobcat All-Season Fluid</p> <p>[4] Bobcat Synthetic Fluid</p> <p>[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.)</p>	

Use only recommended fluid in the hydraulic system.

Replacing The Hydraulic Filter

⚠ WARNING

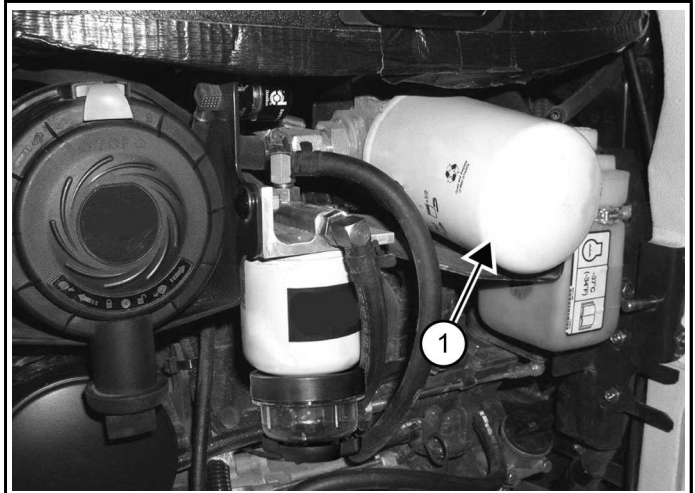
FIRE AND EXPLOSION HAZARD

Failure to use care around combustibles can cause serious injury or death. Always clean up spilled flammable fluids or oil. Keep heat, flames, sparks or lighted tobacco away from flammable fluids and oil.

See the Service Schedule for the correct service interval. (See Service Schedule on Page 94)

1. Stop the engine.
2. Open the tailgate. (See Tailgate on Page 99)

Figure 214



3. Remove the hydraulic filter (Item 1) [Figure 214].
4. Clean the housing where the filter gasket makes contact. Put clean hydraulic fluid on the gasket.
5. Install the new filter and hand tighten only.
Use a genuine Bobcat replacement filter.

Replacing Hydraulic Fluid

The following item is needed to complete this task:

- Container for the hydraulic fluid

⚠ WARNING

INJECTION HAZARD

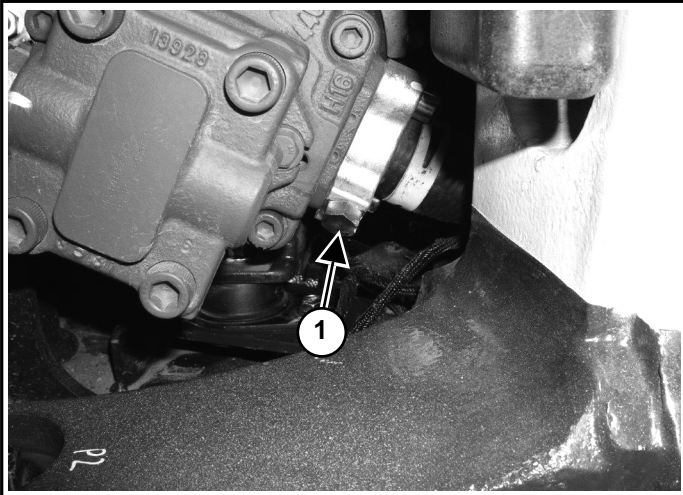
Pressurized diesel fuel or hydraulic fluid can penetrate skin and eyes, causing serious injury or death.

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.

See the Service Schedule for the correct service interval. (See Service Schedule on Page 94)

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 211].
2. Stop the engine.
3. Open the tailgate. (See Tailgate on Page 99)

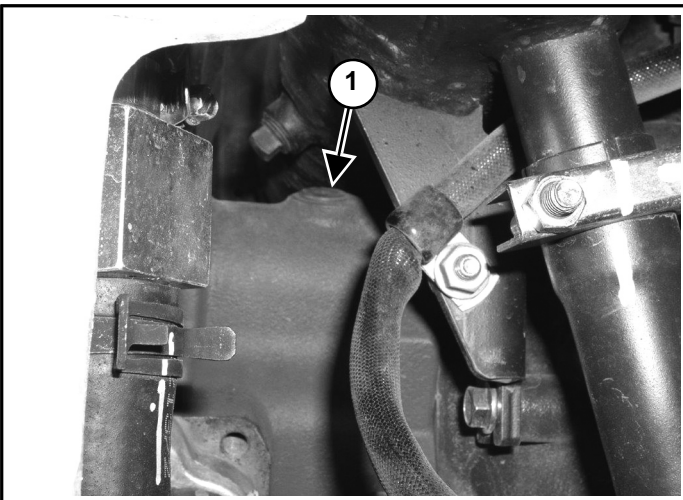
Figure 215



p113457a

4. The hydraulic fluid drain plug (Item 1) [Figure 215] is located on the hydraulic pump inlet fitting.
5. Remove the plug (Item 1) [Figure 215].
6. Drain the fluid into a container.
7. Recycle or dispose of the fluid in an environmentally safe manner.
8. Install the plug (Item 1) [Figure 215].
9. Add fluid to the reservoir.
(See Capacities Specifications on Page 150)

Figure 216



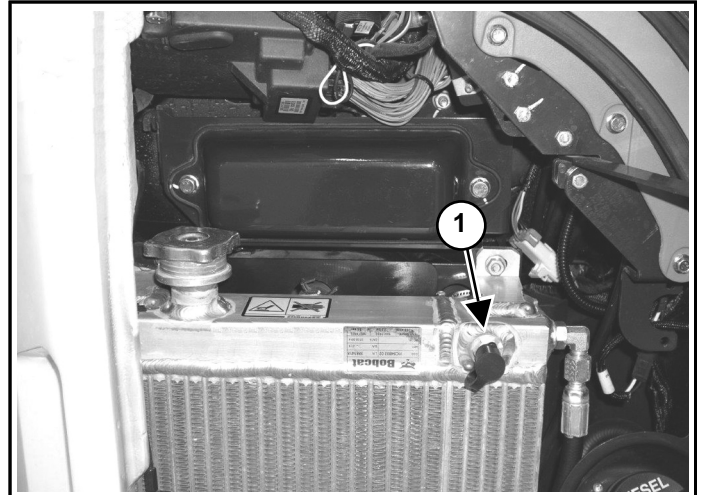
p113458a

10. With the engine OFF, loosen the plug (Item 1) [Figure 216] on the hydraulic pump.
11. Tighten the plug after a steady stream of hydraulic fluid, free of any air bubbles, drains from the plug.

Do not run the machine with the plug open.

12. Tighten the plug to 30 – 34 N·m (22 – 25 ft-lb) torque.

Figure 217



p113448c

13. After the hydraulic fluid has been replaced, locate the port (Item 1) [Figure 217] on the hydraulic cooler.
Install a diagnostic coupler and hose on this fitting to bleed air from the hydraulic system.
14. Remove the hose and coupler before starting the engine.
15. Start the engine and operate the machine through the hydraulic functions.
16. Stop the engine.
17. Check the hydraulic fluid level and add as needed.
18. Close the tailgate.

SPARK ARRESTER MUFFLER

Cleaning The Spark Arrester Muffler

⚠ 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. ◀

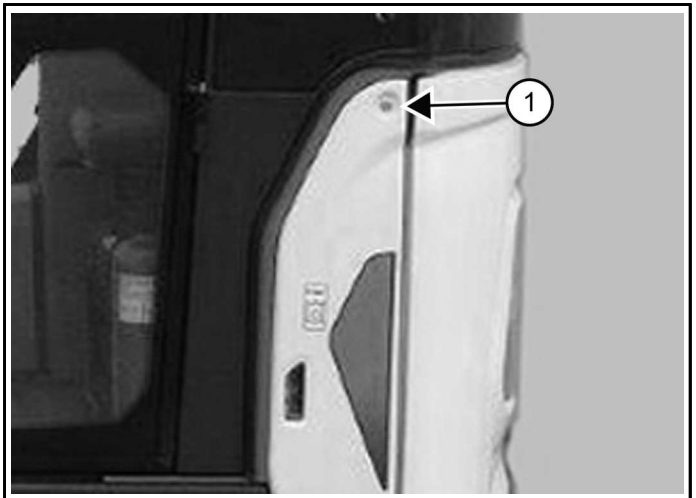
I-2419

See the Service Schedule for the correct service interval. (See Service Schedule on Page 94)

Do not operate the excavator with a defective exhaust system.

1. Stop the engine.
2. Open the tailgate. (See Tailgate on Page 99)

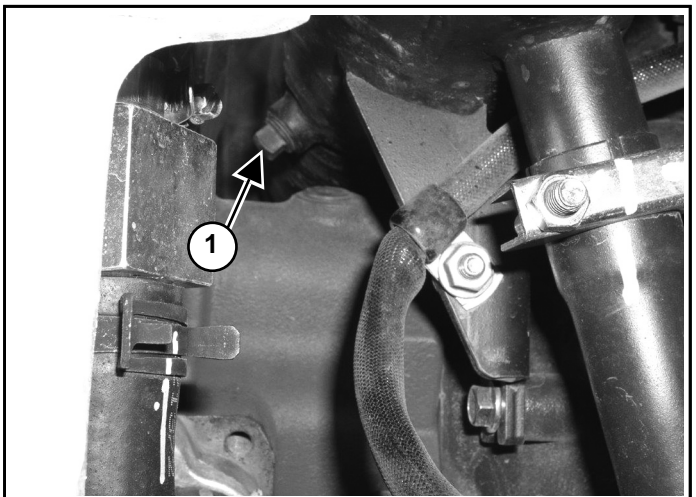
Figure 218



C113422b

3. Remove the left side cover by removing the bolt(s) (Item 1) [Figure 218].

Figure 219



P113452b

4. Remove the plug (Item 1) [Figure 219] from the bottom of the muffler.
5. Start the engine and run for about 10 seconds while a second person, wearing safety glasses, holds a piece of wood over the outlet of the muffler.

The carbon deposits will be forced out of the muffler plug hole (Item 1) [Figure 219].

6. Stop the engine.
7. Install and tighten the plug.
8. Close the tailgate.

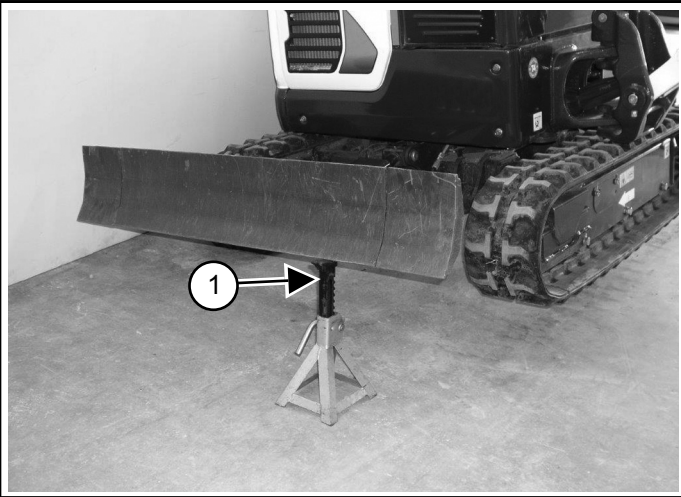
TRACK TENSION

Adjusting Track Tension

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 94)

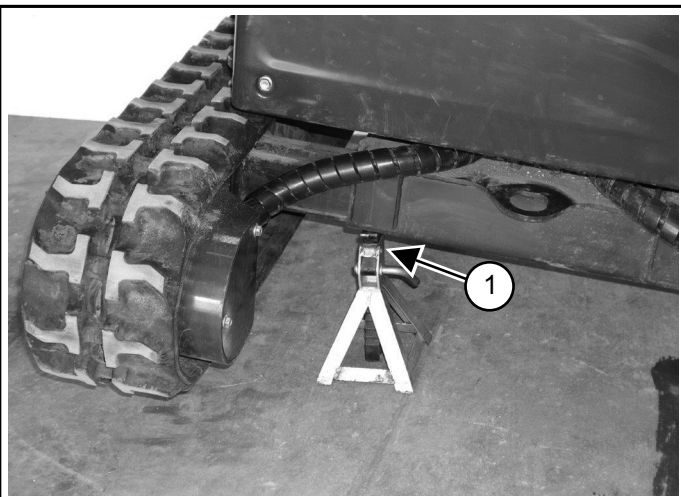
1. Raise one side of the machine approximately 100 mm (4 in) using the boom and arm.

Figure 220



2. Raise the blade fully and install jackstands under the blade (Item 1) [Figure 220].

Figure 221



3. Install jackstands under the track frame (Item 1) [Figure 221].
4. Raise the boom until all machine weight is on the jackstands.
5. Stop the engine.

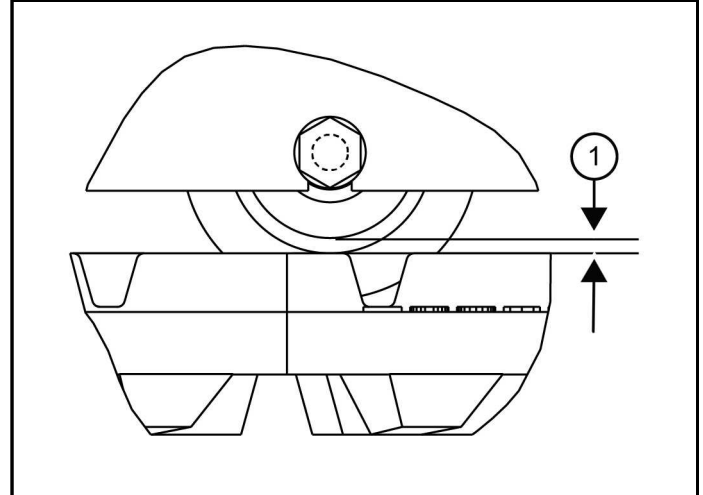
⚠ WARNING

PINCHING HAZARD

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

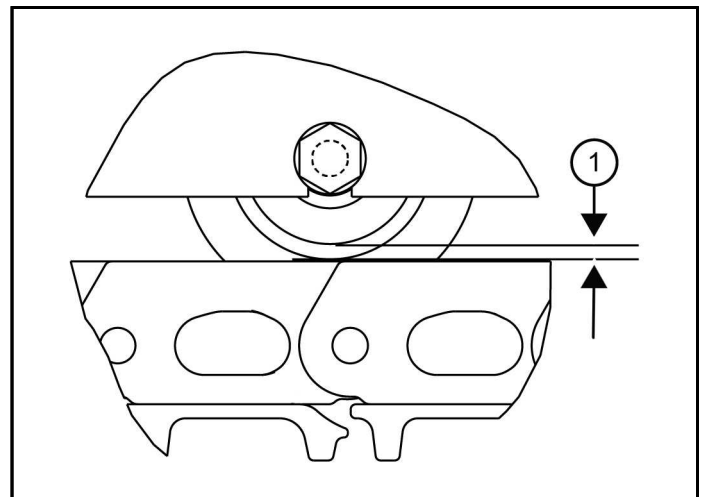
W2142

Figure 222



NA22032a

Figure 223



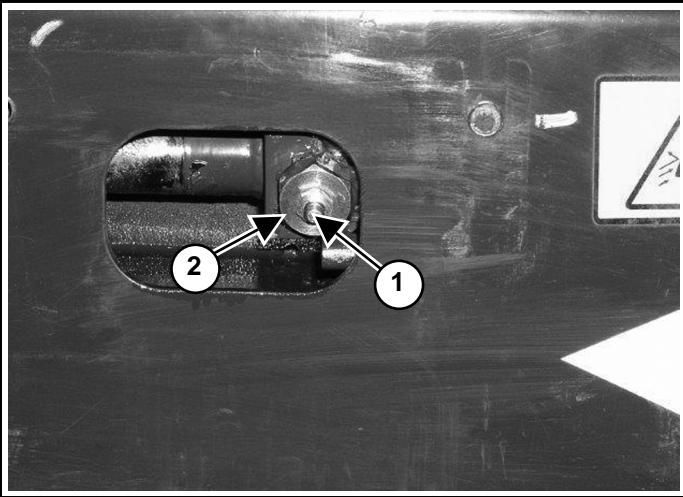
NA22031a

6. Measure the track clearance at the middle track roller.

Use a bolt or dowel of the appropriate size to check the gap between the contact surfaces of the center roller and track.

- a. For rubber tracks, the gap (Item 1) [Figure 222] should be 8 – 13 mm (0.33 – 0.53 in).
- b. For steel tracks, the gap (Item 1) [Figure 223] should be 14 – 26 mm (0.55 – 1.02 in).

Figure 224



7. If it is necessary to adjust track tension, loosen the access cover bolts and pivot the access cover open [Figure 224].
8. To **increase track tension**, add grease to the track tension fitting (Item 1) [Figure 224] until the track tension is correct.
9. To **decrease track tension**, loosen the bleed fitting (Item 2) [Figure 224] (not the grease fitting) and release pressure until the track tension is correct.

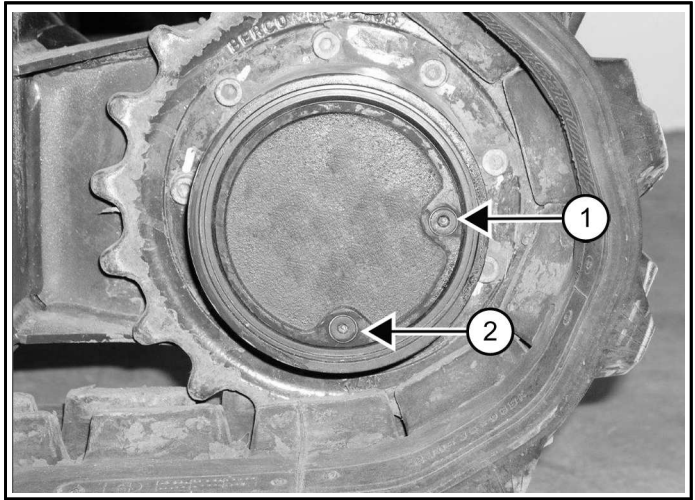
NOTE: Do not loosen the bleed fitting (Item 2) [Figure 224] more than eight turns.

 - a. Tighten the bleed fitting to 80 – 100 N·m (59 – 74 ft-lb) torque.
10. Pivot the access cover closed and tighten the access cover bolts.
11. Repeat the procedure for the opposite side.
12. Dispose of the grease in an environmentally friendly manner.

TRAVEL MOTOR

Checking And Adding Travel Motor Fluid

Figure 225



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

The fluid level must be at the bottom edge of the hole.
3. Add lubricant through the hole (Item 1) [Figure 225] if the fluid level is low.

Lubricant should be API GL-4 or 5 containing extreme pressure additive (SAE 80W90).
4. Install the plug (Item 1) [Figure 225].
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 94)

⚠ WARNING

FIRE AND EXPLOSION HAZARD

Failure to use care around combustibles can cause serious injury or death. Always clean up spilled flammable fluids or oil. Keep heat, flames, sparks or lighted tobacco away from flammable fluids and oil.*

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

4. Add lubricant through the center plug hole (Item 1) [Figure 225] until the lubricant level is at the bottom edge of the hole.
(See Capacities Specifications on Page 150)

Lubricant should be API GL-4 or 5 containing extreme pressure additive (SAE 80W90).

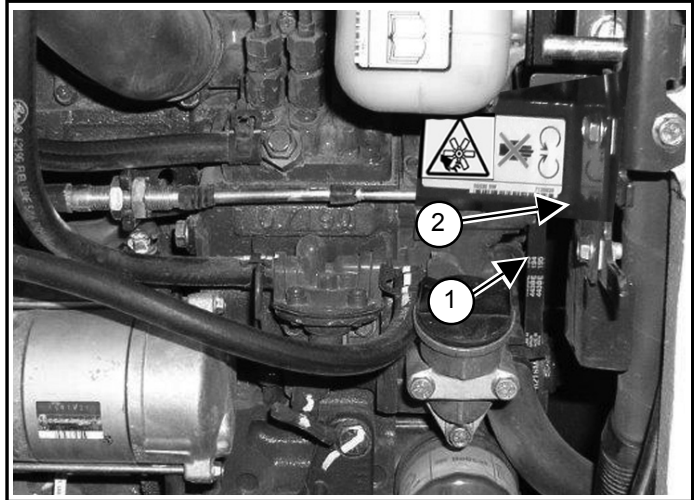
5. Install the plug (Item 1) [Figure 225].
6. Repeat the procedure for the opposite travel motor.

BELTS

Adjusting Alternator And Fan Belt

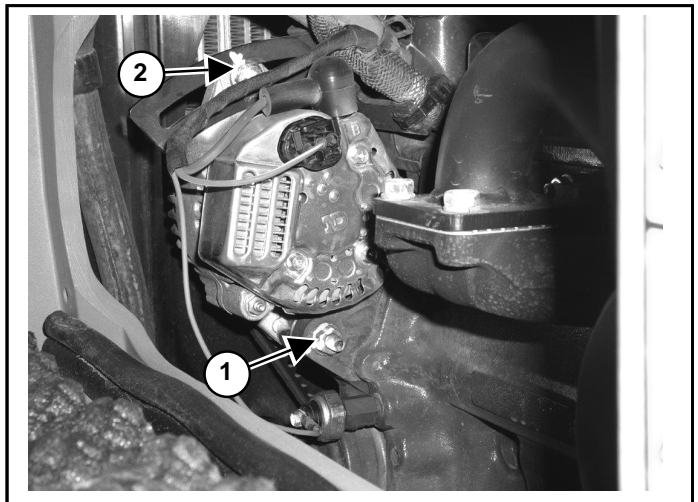
1. Stop the engine.
2. Open the tailgate. (See Tailgate on Page 99)

Figure 226



3. Measure the belt tension at the middle of the belt span (Item 1) [Figure 226].

Figure 227



4. If the belt tension is not correct, loosen the bolt and nut (Item 1) and the bolt (Item 2) until the alternator can be moved toward the engine [Figure 227].

The seat is shown removed for photo clarity. Access the alternator adjusting bolts by removing the belt guard (Item 2) [Figure 226] and reaching around the engine.

5. Adjust belt tension to correct specifications:

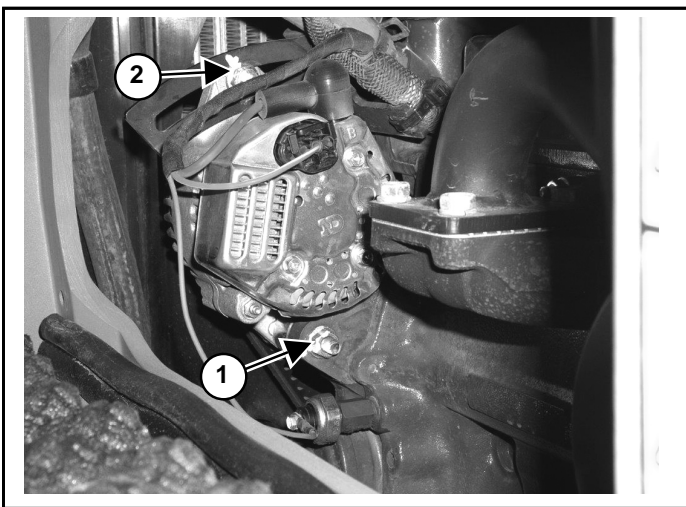
- If a belt tension tool is available, move the alternator until the belt has new belt (272 – 292 N (61 – 65 lbf)) or used belt (233 – 252 N (53 – 57 lbf)) tension.
- If a belt tension tool is not available, move the alternator until the belt has 8,0 mm (5/16 in) movement at the middle of the belt span with 66 N (15 lbf) of force.

6. Tighten the mounting and adjusting bolts.
7. Close the tailgate.

Replacing Alternator And Fan Belt

1. Remove the belt guard (Item 2) [Figure 226].

Figure 228

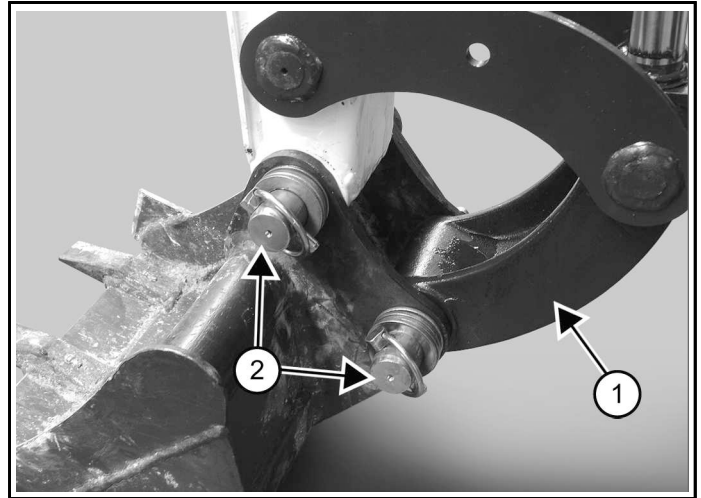


2. Loosen the bolt and nut (Item 1) and the bolt (Item 2) [Figure 228] until the alternator can be moved toward the engine.
3. Remove the old belt and install a new belt.
4. Adjust belt tension to correct specifications.
 - If a belt tension tool is available, move the alternator until the belt has new belt (272 – 292 N (61 – 65 lbf)) or used belt (233 – 252 N (53 – 57 lbf)) tension.
 - If a belt tension tool is not available, move the alternator until the belt has 8,0 mm (5/16 in) movement at the middle of the belt span with 66 N (15 lbf) of force.
5. Tighten the mounting and adjustment bolts.
6. Reinstall the belt guard (Item 2) [Figure 226].
7. Close the tailgate.

QUICK COUPLER

Inspecting And Maintaining The Bucket Link And Coupler

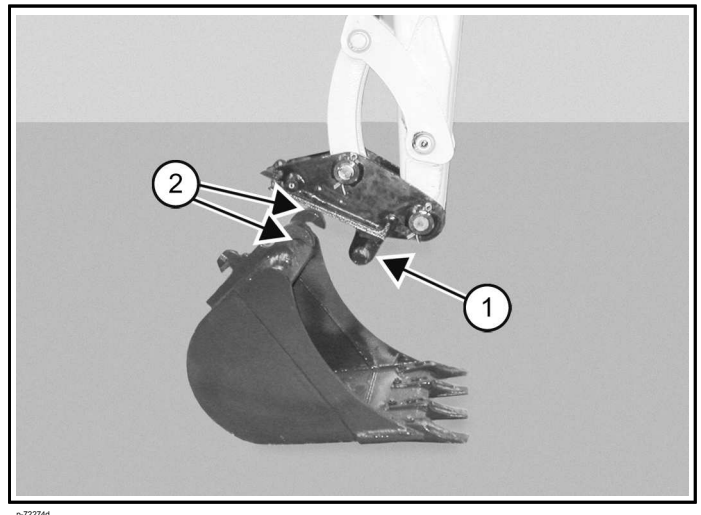
Figure 229



- Inspect the bucket link (Item 1) [Figure 229] for wear or damage.
- Inspect the attachment pins (Item 2) [Figure 229] for wear or damage.

Repair or replace damaged parts.

Figure 230



- 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 230].

Repair or replace damaged parts.

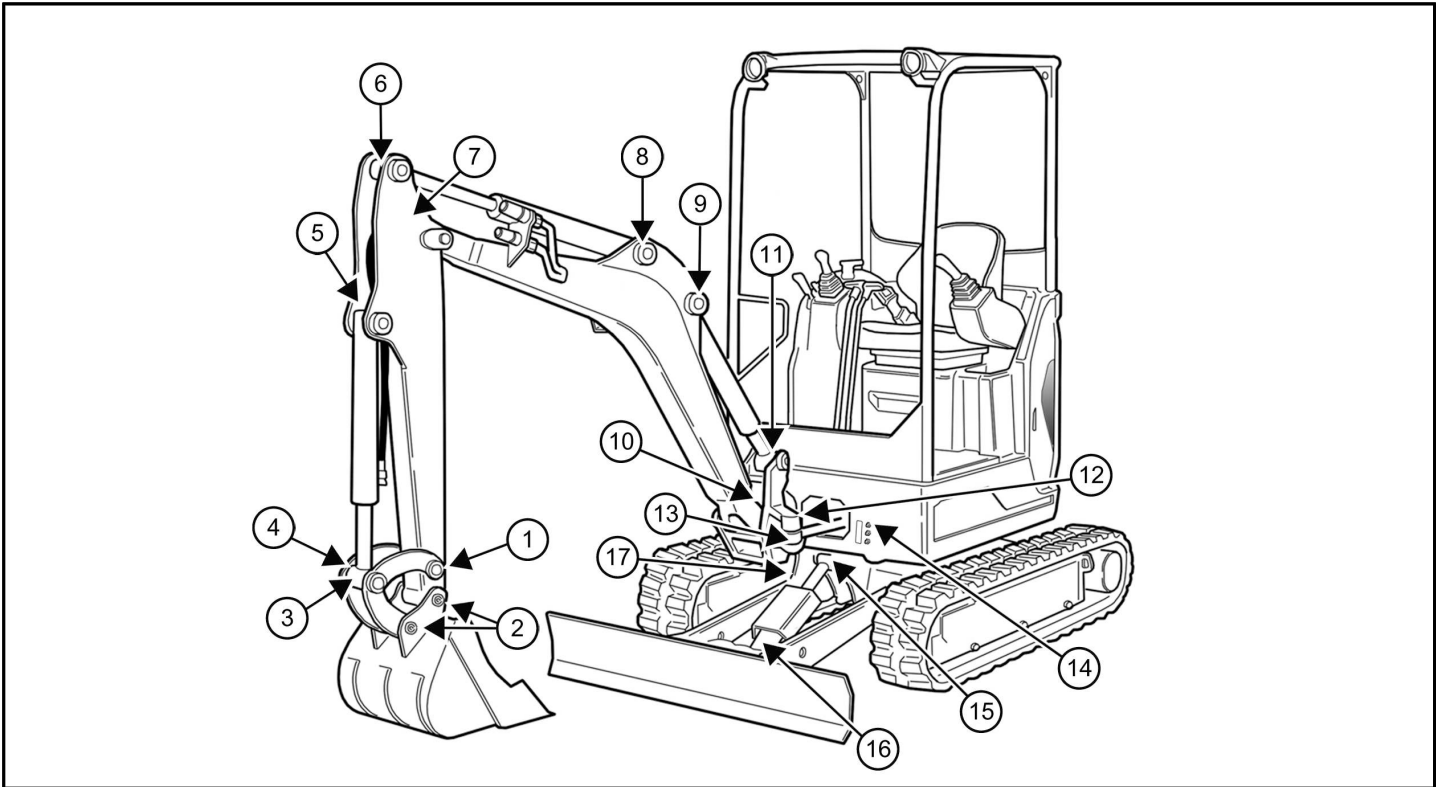
MACHINE LUBRICATION

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 (Boom, Arm, And Bucket)

Figure 231



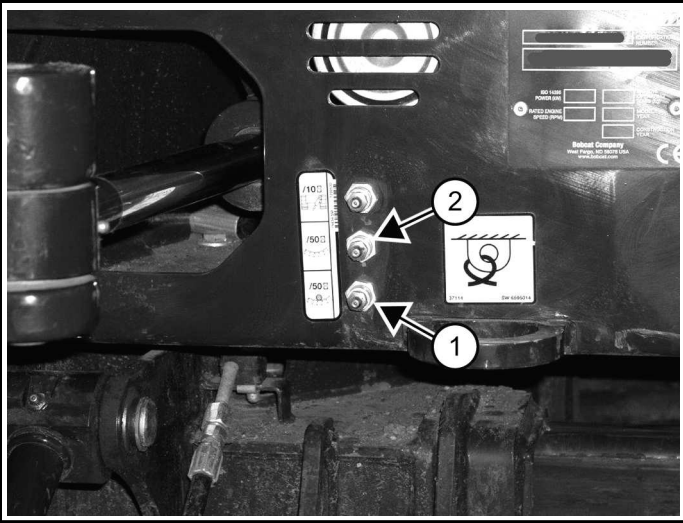
NA13463b

REF.	DESCRIPTION	NO.
1	Bucket Link Pin	1
2	Bucket Pivot	2
3	Bucket Cylinder Rod End	1
4	Bucket Link	2
5	Bucket Cylinder Base End	1
6	Arm Cylinder Rod End	1
7	Arm Pivot	1
8	Arm Cylinder Base End	1
9	Boom Cylinder Base End	1
10	Boom Pivot	2
11	Boom Cylinder Rod End	1
12	Boom Swing Pivot	3

REF.	DESCRIPTION	NO.
13	Boom Swing Cylinder Rod End	1
14	Boom Swing Cylinder Base	1
15	Blade Cylinder Rod End	1
16	Blade Cylinder Base End	1
17	Blade Pivots	2

Lubricate Every 50 Hours

Figure 232



P113473a

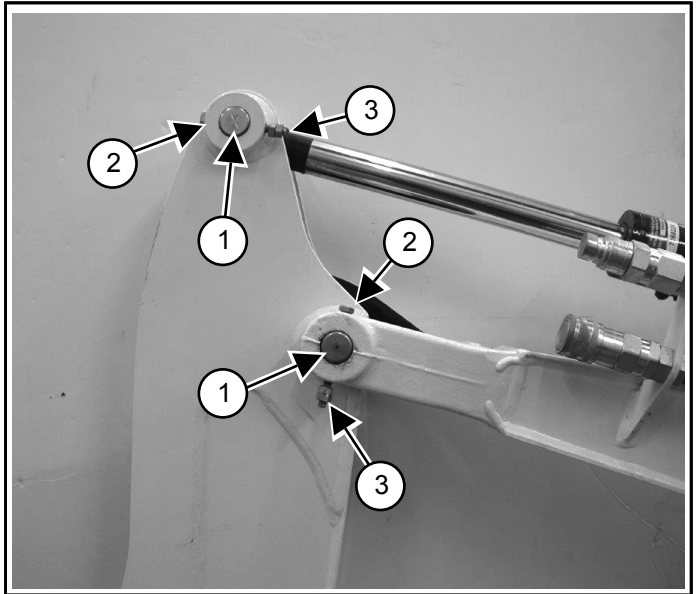
REF.	DESCRIPTION	QTY.
1	Swing Pinion [A]	1
2	Swing Circle	1

- [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 233



P113469b

The pivots and cylinders (Item 1) have a large pin held in position with a bolt (Item 2) and a nut (Item 3) [Figure 233] securing the pin.

After the nut (Item 3) and bolt (Item 2) [Figure 233] 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 stabilizer in the fuel tank and run the engine a few minutes to circulate the stabilizer 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 stabilizer 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.

DIAGNOSTIC SERVICE CODES

Viewing Service Codes

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

Figure 234



C220257a

Press the information button (Item 1) to cycle the data display (Item 2) [Figure 234] until the service code screen is displayed. If more than one service code is present, the codes will scroll on the data display. (See Diagnostic Service Codes on Page 128)

When no service code is present, "NONE" is displayed.

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

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

Code	Description
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
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

Code	Description
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
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

Code	Description
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
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

Code	Description
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
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

Code	Description
M3204	Throttle Controller No Communication To Bobcat Controller
M3223	Throttle Controller Not Calibrated
M3228	Throttle Controller Failure
M3299	Throttle Controller Calibration In Process
M3304	Deluxe Panel No Communication
M3372	Display Software Incompatible
M3373	Display Software Outdated
M3702	HYD Exchange Output Error On
M3703	HYD Exchange Output Error Off
M3904	Jog Shuttle No Communication
M4028	Wrong ECU Detected
M4109	Alternator Voltage Too Low
M4110	Alternator Voltage High
M4204	Keyless Entry No Communication
M4304	Keyless Start Panel No Communication
M4404	Secondary No Communication
M4472	Secondary Controller Software Incompatible
M4473	Secondary Controller Software Outdated
M4621	5 Volt Sensor Supply Out Of Range High
M4622	5 Volt Sensor Supply Out Of Range Low
M4721	8 Volt Sensor Supply Out Of Range High
M4722	8 Volt Sensor Supply Out Of Range Low
M4802	Front Light Relay Error On
M4803	Front Light Relay Error Off
M5002	Front Light Output Error On
M5003	Front Light Output Error Off
M5205	Offset Base Solenoid Short To Battery
M5206	Offset Base Solenoid Short To Ground
M5207	Offset Base Solenoid Open Circuit
M5232	Offset Base Solenoid Overcurrent
M5305	Offset Rod Solenoid Error On
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

Code	Description
M5422	Offset Control Switch Out Of Range Low
M5424	Offset Control Switch Out Of Neutral
M5505	Auxiliary Base Solenoid Short To Battery
M5506	Auxiliary Base Solenoid Short To Ground
M5507	Auxiliary Base Solenoid Open Circuit
M5532	Auxiliary Base Solenoid Overcurrent
M5605	Auxiliary Rod Solenoid Short To Battery
M5606	Auxiliary Rod Solenoid Short To Ground
M5607	Auxiliary Rod Solenoid Open Circuit
M5632	Auxiliary Rod Solenoid Overcurrent
M5721	Auxiliary Control Switch Out Of Range High
M5722	Auxiliary Control Switch Out Of Range Low
M5724	Auxiliary Control Switch Out Of Neutral
M5810	Fuel Temperature High
M5811	Fuel Temperature Extremely High
M5815	Fuel Temperature In Shutdown
M5826	Fuel Temperature In Shutdown
M6021	Left Control Switch Out of Range High
M6022	Left Control Switch Out of Range Low
M6024	Left Control Switch Out of Neutral
M6121	Right Control Switch Out of Range High
M6122	Right Control Switch Out of Range Low
M6124	Right Control Switch Out of Neutral
M6204	Load Moment Sensor In Error
M6221	Overload Warning Sensor Out of Range High
M6222	Overload Warning Sensor Out of Range Low
M6402	Switched Power Relay Error On
M6403	Switched Power Relay Error Off
M6505	ECU Power Short To Battery
M6506	ECU Power Short To Ground
M6507	ECU Power Open Circuit
M6604	ECU No Communication
M6702	HVAC Output Error On
M6703	HVAC Output Error Off

Code	Description
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
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

Code	Description
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

PASSWORD SETUP (KEYLESS START PANEL)

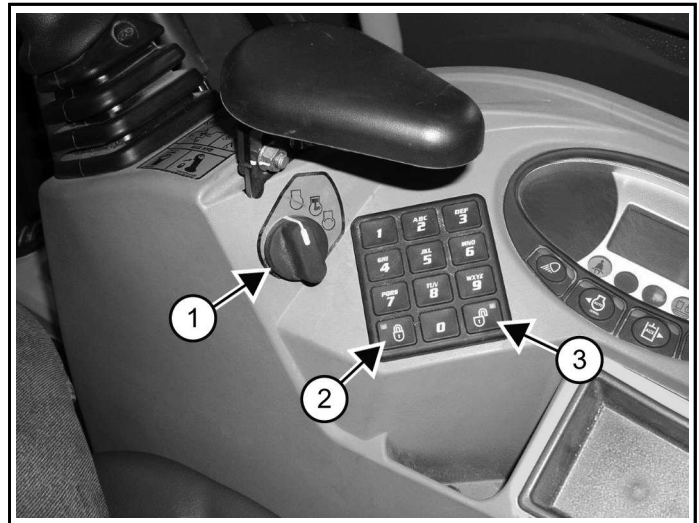
Password Description

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 235



1. Turn the start switch (Item 1) [Figure 235] 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 235] 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 235] 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 235] green light will become solid.

The display screen will show "ERROR" if:

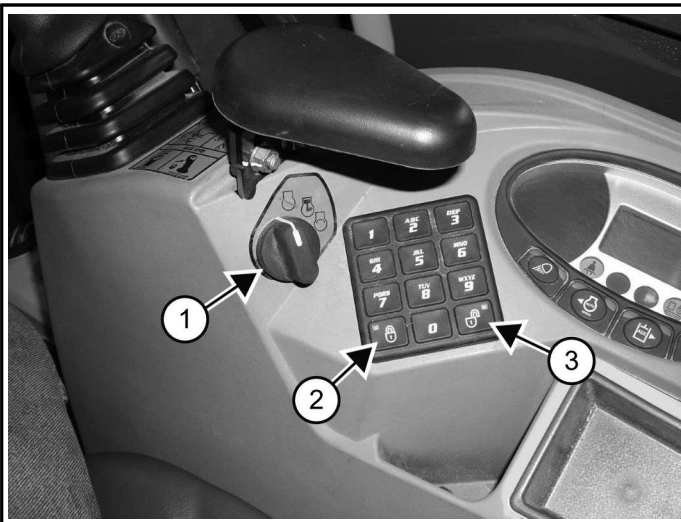
- The second five-digit password is different from the first one entered.
- No number key was pressed for more than 20 seconds.
- The password entered was [00000].

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 236] to ON.

Figure 236



2. Enter the five-digit owner password using the keypad.
3. Press the unlock key (Item 3) [Figure 236].
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) to ON.
2. Press the lock key (Item 2) .

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

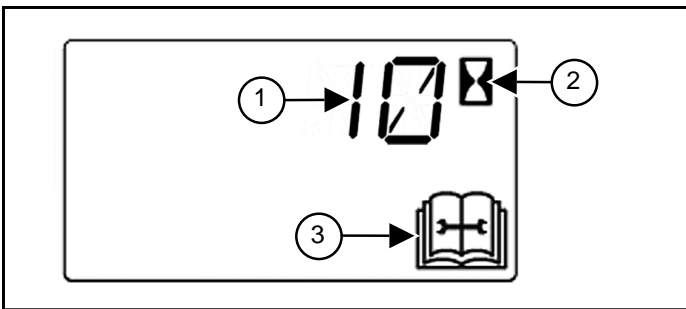
The maintenance clock alerts the operator when the next service interval is due.

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 Panel

During machine operation, a two-beep alarm will sound when there are less than 10 hours until the next planned maintenance.

Figure 237



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 237] 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 238



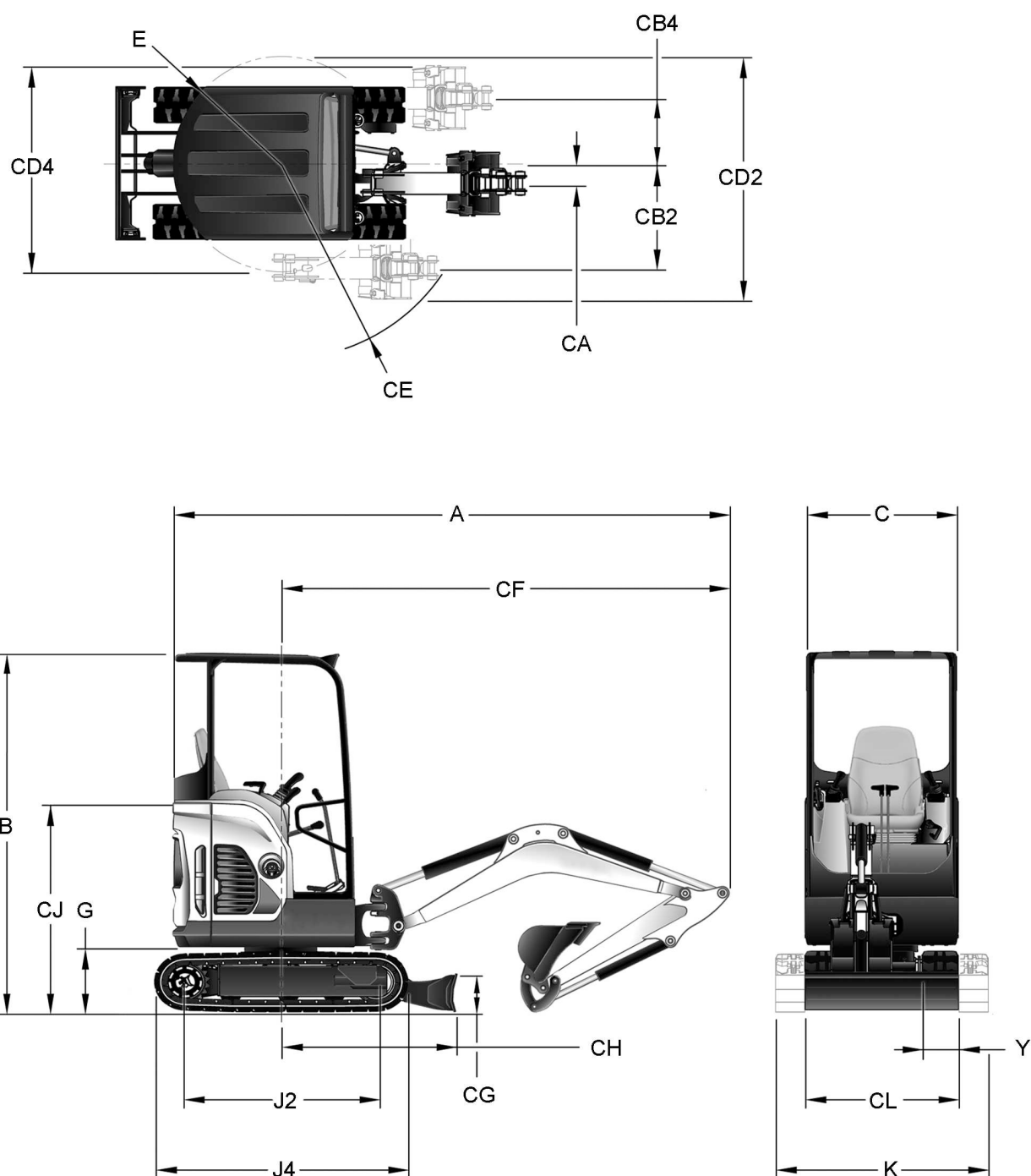
C220256a

1. Press the Information button (Item 1) [Figure 238] until the display screen shows the maintenance clock.
2. Press and hold the Information button (Item 1) for seven seconds until "RESET" (Item 2) [Figure 238] 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.

MACHINE DIMENSIONS

Figure 239

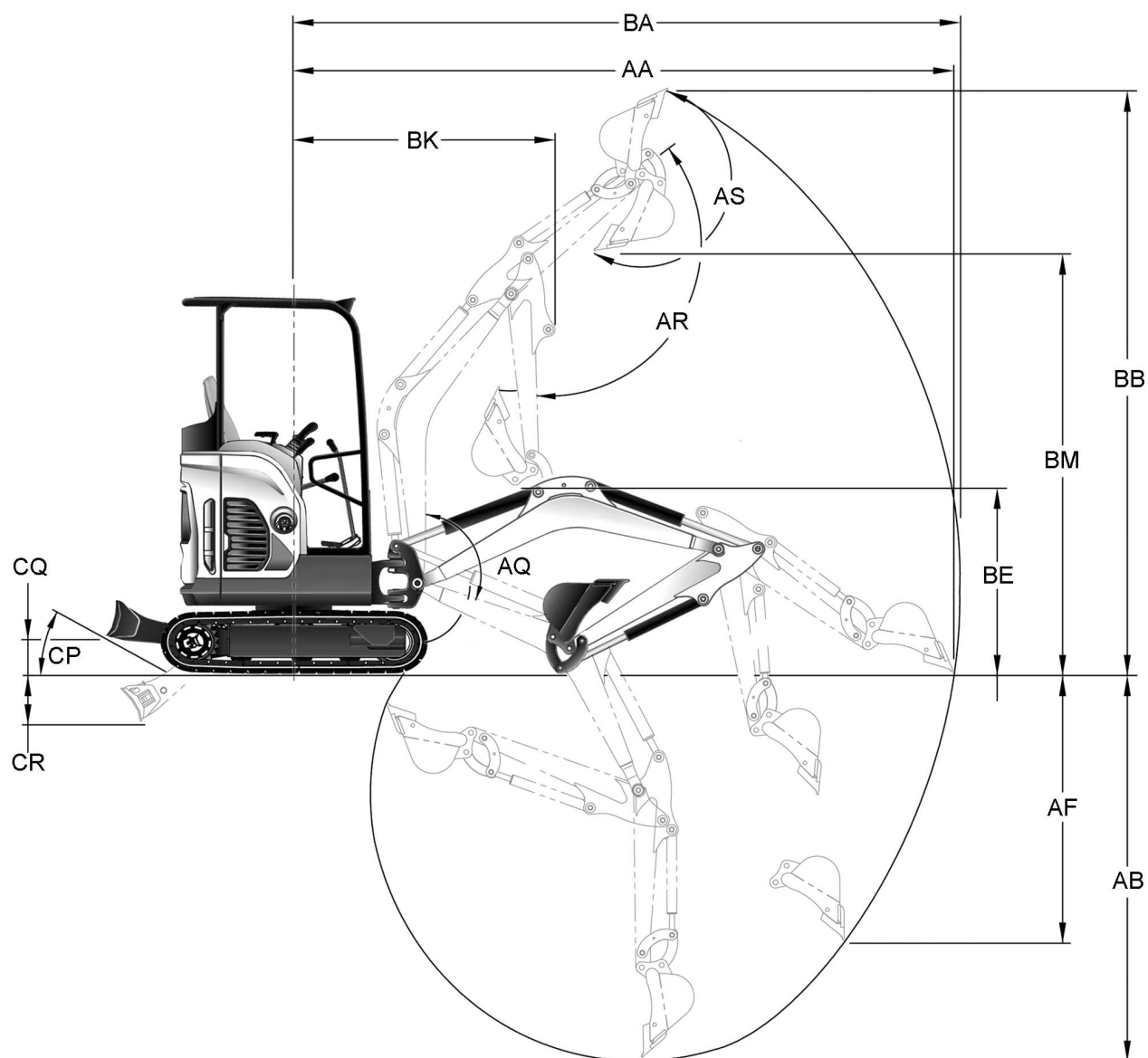


NAB377c

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

REF.	DESCRIPTION	RUBBER TRACKS	STEEL TRACKS
A	OVERALL LENGTH (STANDARD ARM)	3688 mm (145.2 in)	3695 mm (145.5 in)
	OVERALL LENGTH (LONG ARM)	3669 mm (144.4 in)	3676 mm (144.7 in)
B	OVERALL HEIGHT	2297 mm (90.4 in)	2339 mm (92.1 in)
C	WIDTH OF UPPERSTRUCTURE (CANOPY)	980 mm (38.6 in)	980 mm (38.6 in)
	WIDTH OF UPPERSTRUCTURE (CAB)	1024 mm (40.3 in)	1024 mm (40.3 in)
E	SLEW CLEARANCE, REAR OF UPPERSTRUCTURE	690 mm (27.1 in)	690 mm (27.1 in)
G	CLEARANCE, UPPERSTRUCTURE TO GROUNDLINE	419 mm (16.5 in)	461 mm (18.2 in)
J2	NOMINAL DISTANCE BETWEEN CENTERLINES OF DRIVE SPROCKETS AND IDLERS	1258 mm (49.5 in)	1258 mm (49.5 in)
J4	NOMINAL OVERALL LENGTH OF TRACK ASSEMBLY	1620 mm (63.8 in)	1634 mm (64.4 in)
K	OVERALL WIDTH OF CRAWLER.	980 or 1360 mm (38.6 or 53.5 in)	980 or 1360 mm (38.6 or 53.5 in)
Y	WIDTH OF CRAWLER TRACK ASSEMBLY	230 mm (9.1 in)	230 mm (9.1 in)
CA	MACHINE CENTERLINE TO WORKING EQUIPMENT CENTERLINE, NORMAL OPERATION	131 mm (5.1 in)	131 mm (5.1 in)
CB2	MACHINE CENTERLINE TO WORKING EQUIPMENT CENTERLINE, WORK WIDTH AT MAX RH ROTATION	638 mm (25.1 in)	638 mm (25.1 in)
CB4	MACHINE CENTERLINE TO WORKING EQUIPMENT CENTERLINE, WORK WIDTH AT MAX LH ROTATION	476 mm (18.7 in)	476 mm (18.7 in)
CD2	WORKING WIDTH MAX RH ROTATION	1532 mm (60.3 in)	1532 mm (60.3 in)
CD4	WORKING WIDTH MAX LH ROTATION	1370 mm (53.9 in)	1370 mm (53.9 in)
CE	MIN. TURNING RADIUS	1190 mm (46.8 in)	1190 mm (46.8 in)
CF	MIN. RADIUS IN TRAVEL POSITION (STANDARD ARM)	2882 mm (113.5 in)	2882 mm (113.5 in)
	MIN. RADIUS IN TRAVEL POSITION (LONG ARM)	2862 mm (112.7 in)	2862 mm (112.7 in)
CG	BLADE HEIGHT	235 mm (9.3 in)	235 mm (9.3 in)
CH	MACHINE CENTERLINE TO STANDARD BLADE	1045 mm (41.1 in)	1045 mm (41.1 in)
	MACHINE CENTERLINE TO LONG BLADE	1252 mm (49.3 in)	1252 mm (49.3 in)
CJ	GROUNDLINE TO TOP OF ENGINE COVER	1138 mm (44.8 in)	1180 mm (46.5 in)
CL	BLADE WIDTH	980 or 1360 mm (38.6 or 53.5 in)	980 or 1360 mm (38.6 or 53.5 in)

Figure 240



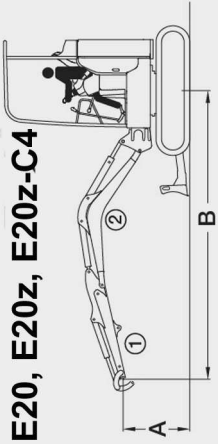

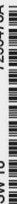
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Where applicable, specifications conform to SAE or ISO standards and are subject to change without notice.

REF.	DESCRIPTION	RUBBER TRACKS	STEEL TRACKS
AA	MAX. RADIUS AT GROUNDLINE	4089 mm (161 in)	4089 mm (161 in)
AB	MAX. DIGGING DEPTH	2385 mm (93.9 in)	2343 mm (92.2 in)
AF	MAX. DEPTH OF VERTICAL WALL THAT CAN BE EXCAVATED	1948 mm (76.7 in)	1906 mm (75.0 in)
AQ	BOOM PIVOT ANGLE	118°	118°
AR	ARM PIVOT ANGLE	129°	129°
AS	BUCKET PIVOT ANGLE	196°	196°
BA	MAX. RADIUS OF WORKING EQUIPMENT	4134 mm (162.8 in)	4134 mm (162.8 in)
BB	MAX. HEIGHT OF WORKING EQUIPMENT	3573 mm (140.7 in)	3615 mm (142.4 in)
BE	MIN. CLEARANCE OF FULLY CURLED BUCKET AT MAX. BOOM HEIGHT	1082 mm (42.6 in)	1124 mm (44.3 in)
BK	MAX. WORKING EQUIPMENT RADIUS WITH BOOM AT MAX. HEIGHT AND WITH ARM FULLY RETRACTED	1592 mm (62.7 in)	1592 mm (62.7 in)
BM	MIN. CLEARANCE OF FULLY CURLED BUCKET AT MAX. ARM HEIGHT	2645 mm (104.1 in)	2687 mm (105.8 in)
CP	MAX. APPROACH ANGLE	29°	30°
CQ	MAX. BLADE HEIGHT (STANDARD BLADE)	220 mm (8.7 in)	227 mm (9.0 in)
	MAX. BLADE HEIGHT (LONG BLADE)	300 mm (11.8 in)	307 mm (12.1 in)
CR	MAX. BLADE DEPTH (STANDARD BLADE)	204 mm (8.0 in)	197 mm (7.8 in)
	MAX. BLADE DEPTH (LONG BLADE)	254 mm (10.0 in)	247 mm (9.7 in)

RATED LIFT CAPACITY – STANDARD ARM AND CAB (NO DEMOLITION KIT)


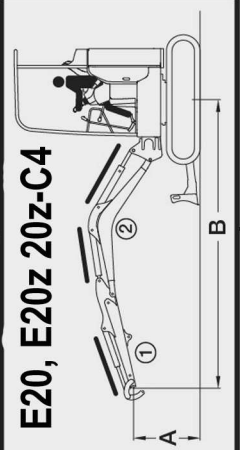

Where applicable, specifications conform to SAE or ISO standards and are subject to change without notice.

A		B		@ max. B		B		@ max. B		B		@ max. B	
		2000 mm (79 in)	3000 mm (118 in)	2000 mm (79 in)	3000 mm (118 in)	2000 mm (79 in)	3000 mm (118 in)	2000 mm (79 in)	3000 mm (118 in)	2000 mm (79 in)	3000 mm (118 in)	2000 mm (79 in)	3000 mm (118 in)
 E20, E20z, E20z-C4	2000 mm (79 in)	*403 kg (887 lb)	*422 kg @ 3225 mm (930 lb @ 127 in)		311 kg (685 lb)		272 kg @ 3225 mm (600 lb @ 127 in)		305 kg (673 lb)		270 kg @ 3225 mm (596 lb @ 127 in)		158 kg @ 3225 mm (348 lb @ 127 in)
	1000 mm (39 in)	*646 kg (1425 lb)	*402 kg @ 3583 mm (886 lb @ 141 in)		*646 kg (1425 lb)		227 kg @ 3583 mm (501 lb @ 141 in)		*646 kg (1425 lb)		223 kg @ 3583 mm (493 lb @ 141 in)		126 kg @ 3583 mm (277 lb @ 141 in)
	Ground	*932 kg (2055 lb)	*508 kg @ 1120 mm (1120 lb)		297 kg (656 lb)		224 kg @ 3583 mm (494 lb @ 140 in)		509 kg (1122 lb)		222 kg @ 3583 mm (489 lb @ 140 in)		124 kg @ 3583 mm (273 lb @ 140 in)
	-1000 mm (-39 in)	*769 kg (1696 lb)	*418 kg @ 921 mm (921 lb)		297 kg (654 lb)		261 kg @ 3162 mm (575 lb @ 125 in)		516 kg (1137 lb)		260 kg @ 3162 mm (572 lb @ 125 in)		145 kg @ 3162 mm (321 lb @ 125 in)
* 													
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RATED LIFT CAPACITY – STANDARD ARM AND CAB (WITH DEMOLITION KIT)

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

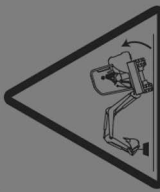
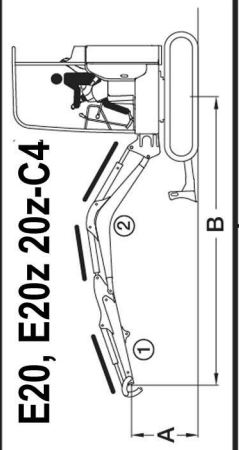
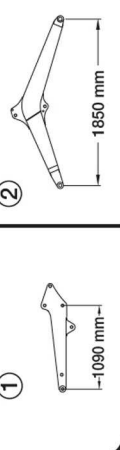
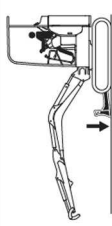
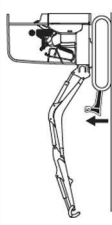
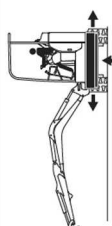
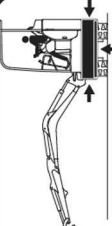
					
E20, E20z 20z-C4					

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

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RATED LIFT CAPACITY – STANDARD ARM AND CANOPY (WITH DEMOLITION KIT)

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

 E20, E20z 20z-C4  									
A	B	@ max.		@ max.		@ max.		@ max.	
		2000 mm (79 in)	3000 mm (118 in)	2000 mm (79 in)	3000 mm (118 in)	2000 mm (79 in)	3000 mm (118 in)	2000 mm (79 in)	3000 mm (118 in)
2000 mm (79 in)		*422 kg (930 lb)	*403 kg (887 lb)	259 kg (572 lb)	299 kg (659 lb)	293 kg (646 lb)	293 kg (646 lb)	178 kg (393 lb)	144 kg (317 lb)
1000 mm (39 in)		*402 kg (886 lb)	*469 kg (1034 lb)	213 kg (470 lb)	292 kg (643 lb)	*646 kg (1425 lb)	286 kg (630 lb)	159 kg (350 lb)	111 kg (244 lb)
Ground		*380 kg (838 lb)	*508 kg (1120 lb)	209 kg (460 lb)	280 kg (618 lb)	483 kg (1065 lb)	272 kg (599 lb)	255 kg (562 lb)	107 kg (236 lb)
-1000 mm (-39 in)		*368 kg (811 lb)	*418 kg (921 lb)	244 kg (537 lb)	279 kg (614 lb)	488 kg (1077 lb)	276 kg (608 lb)	259 kg (571 lb)	127 kg (280 lb)

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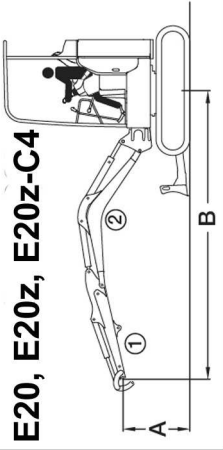
RATED LIFT CAPACITY – LONG ARM AND CAB (NO DEMOLITION KIT)

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

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RATED LIFT CAPACITY – LONG ARM AND CANOPY (NO DEMOLITION KIT)

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

A		B		@ max. B	B		@ max. B	B		@ max. B
		2000 mm (79 in)	3000 mm (118 in)		2000 mm (79 in)	3000 mm (118 in)		2000 mm (79 in)	3000 mm (118 in)	
 E20, E20z, E20z-C4	2000 mm (79 in)	*341 kg (752 lb)	*380 kg @ 3422 mm (838 lb @ 135 in)	262 kg @ 3422 mm (578 lb @ 135 in)		*341 kg (752 lb)	260 kg @ 3422 mm (574 lb @ 135 in)			154 kg @ 3422 mm (340 lb @ 135 in)
	1000 mm (39 in)	*532 kg (1172 lb)	*372 kg @ 3758 mm (821 lb @ 148 in)	222 kg @ 3758 mm (489 lb @ 148 in)	*532 kg (1172 lb)	308 kg (678 lb)	219 kg @ 3758 mm (482 lb @ 148 in)	328 kg (772 lb)	176 kg (388 lb)	125 kg @ 3758 mm (276 lb @ 148 in)
	Ground	*952 kg (2098 lb)	*498 kg (1098 lb)	364 kg @ 3741 mm (801 lb @ 147 in)	528 kg (1165 lb)	300 kg (662 lb)	219 kg @ 3741 mm (482 lb @ 147 in)	283 kg (624 lb)	167 kg (368 lb)	123 kg @ 3741 mm (271 lb @ 147 in)
	-1000 mm (-39 in)	*835 kg (1842 lb)	*453 kg (1000 lb)	*351 kg @ 3365 mm (774 lb @ 133 in)	552 kg (1218 lb)	302 kg (666 lb)	251 kg @ 3365 mm (554 lb @ 133 in)	293 kg (646 lb)	174 kg (383 lb)	143 kg @ 3365 mm (315 lb @ 133 in)

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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 (canopy, standard arm, standard blade, basic seat, standard bucket, and 75 kg operator)	1930 kg (4255 lb)
If equipped with the following:	Cab with Heater, add 81 kg (178 lb) Long Arm, add 6 kg (13 lb) Long Blade, add 9 kg (20 lb) Standard Seat, add 8 (18 lb) Suspension Seat, add 14 kg (30 lb) Steel Track, add 92 kg (203 lb)
Travel Speed (Low / High)	2,1 km/h / 4,2 km/h (1.3 mph / 2.6 mph)
Digging Force (per ISO 6015)	Arm – 10371 N (2331 lb) Bucket – 20835 N (4684 lb)

Controls Specifications

Steering	Two hand-operated joysticks (optional foot pedals)
Hydraulics	Two hand-operated joysticks control boom, bucket, arm, and upperstructure slew
Blade	Hand lever
Two-Speed	Switch on blade lever
Boom Swing	Electric switch in left joystick or right foot pedal
Auxiliary Hydraulics	Electric switch in right joystick or left foot pedal
Auxiliary Pressure Release	Electric switch in right joystick or left foot pedal
Engine	Engine speed control lever, key type start switch
Starting Aid	Glow plugs activated by start switch
Travel Brakes (Service & Parking)	Hydraulic lock in motor circuit
Slew Brakes (Service)	Hydraulic lock on motor
Slew Brakes (Holding)	Spring applied - hydraulic release

Engine Specifications

Make / Model	Kubota D722-E4B-BCZ-7 (China Stage IV)
Fuel	Diesel No. 2-D
Cooling System	Liquid, Forced Circulation
Horsepower:	

– Gross Power (ISO 14396)	10,2 kW (13.7 hp) @ 2500 rpm
– Gross Power (SAE J1995)	10,4 kW (13.9 hp) @ 2500 rpm
– Net Power (SAE J1349)	9,9 kW (13.3 hp) @ 2500 rpm
Torque:	
– Gross Torque (SAE J1995)	43,5 N•m (32.1 lb-ft) @ 2000 rpm
– Net Torque (SAE J1349)	42,3 N•m (31.9 lb-ft) @ 2000 rpm
Number Of Cylinders	3
Displacement	0,719 L (43.9 in ³)
Bore / Stroke	67 x 68 mm (2.64 x 2.68 in)
Lubrication	Forced Lubrication / Cartridge type
Crankcase Ventilation	Closed breathing
Air Filter	Dual dry replacement paper elements
Ignition	Diesel-Compression
Low Idle Speed	1100 – 1250 rpm
High Idle Speed	2570 – 2770 rpm
Engine Coolant	Propylene Glycol / water mixture (53% PG / 47% water)

Hydraulic System Specifications

Pump Type	Engine driven, dual outlet, variable displacement, load sensing, torque limited, piston pump with gear pump
Piston Pump Capacity	2 x 15 L/min (2 x 4.0 U.S. gpm)
Gear Pump Capacity	11,3 L/min (3.0 U.S. gpm)
Auxiliary Flow	30,0 L/min (7.9 U.S. gpm)
Hydraulic Filter	Full flow replaceable, 3 micron synthetic media element
Control Valves	9 spool, parallel series type, open center
Slew Motor	195 cm/rev (11.9 in/rev)
Boom, Arm, Bucket, Travel, and Offset	23100 kPa (231 bar) (3350 psi)
System Relief Pressure (Blade)	20600 kPa (206 bar) (2987 psi)
Slew Relief Pressure	13700 kPa (137 bar) (1987 psi)
Joystick Control Pressure	3100 kPa (31 bar) (450 psi)
Arm Port Relief, Base End And Rod End	25000 kPa (250 bar) (3625 psi)
Boom Port Relief Base End	21000 kPa (210 bar) (3046 psi)
Boom Port Relief Rod End	25000 kPa (250 bar) (3625 psi)
Bucket Port Relief Base End And Rod End	25000 kPa (250 bar) (3625 psi)
Blade Port Relief Base End	29000 kPa (290 bar) (4206 psi)

Main Hydraulic Filter Bypass	340 kPa (3,4 bar) (50 psi)
Auxiliary Relief	18000 kPa (180 bar) (2610 psi)

Hydraulic Cylinders

Cylinder	Bore	Rod	Stroke
Boom (cushion up)	69,9 mm (2.75 in)	41,3 mm (1.63 in)	445,0 mm (17.5 in)
Arm (cushion retract / extend)	60,3 mm (2.38 in)	38,1 mm (1.50 in)	424,9 mm (16.73 in)
Bucket	57,2 mm (2.25 in)	38,1 mm (1.50 in)	385,0 mm (15.16 in)
Boom Swing	60,3 mm (2.38 in)	31,8 mm (1.25 in)	411,2 mm (16.19 in)
Blade	63,5 mm (2.50 in)	34,9 mm (1.38 in)	107,9 mm (4.25 in)
Track Expansion	44,5 mm (1.75 in)	25,4 mm (1.00 in)	385,0 mm (15.16 in)

Hydraulic Cycle Times

Bucket Curl	2,00 seconds
Bucket Dump	1,20 seconds
Arm Retract	2,40 seconds
Arm Extend	2,00 seconds
Boom Raise	4,40 seconds
Boom Lower	3,80 seconds
Boom Swing Left (80°)	2,90 seconds
Boom Swing Right (60°)	3,60 seconds
Blade Raise	2,60 seconds
Blade Lower	2,60 seconds
Track Expand	4,10 seconds
Track Retract	3,50 seconds

Electrical System Specifications

Starting Aid	Glow Plugs
Alternator	12 volt, 40 Amp open frame w/ internal regulator
Battery	12 volt, 500 CCA @ -18°C (0°F)
Starter	12 volt; gear reduction 1,4 kW
Instrumentation	Fuel gauge, audible alarm, visual warning for engine functions and hourmeter
Work Lights	55 watt (each)
Boom Light (if equipped)	55 watt

Drive System Specifications

Final Drive	Each track is driven by hydrostatic axial piston motor
Drive Reduction	31,65:1 two stage planetary
Gradeability	30°
Brakes	Hydraulic lock on motor

Slew System Specifications

Slew Drive	Orbital motor, direct drive
Slew Circle	Single row shear type ball bearings with internal gear
Gear Reduction	21.5:1
Brake	Spring applied, pressure released
Slew Speed	8,4 rpm

Undercarriage Specifications

Crawler Track Design With Expandable Undercarriage	Sealed track rollers with boxed section track roller frame, grease type track adjuster with shock absorbing recoil spring
Width of Crawler (Retracted)	980 mm (38.6 in)
Width of Crawler (Expanded)	1360 mm (53.5 in)

Capacities Specifications

Fuel Tank	19,0 L (5.0 U.S. gal)
Hydraulic Reservoir Only (Center of Sight Glass)	Tank Cap. 14,3 L (3.78 U.S. gal)
Hydraulic System (with Reservoir)	19,0 L (5.0 U.S. gal)
Cooling System	3,3 L (0.87 U.S. gal)
Engine Oil and Filter	3,3 L (3.5 qt)
Final Drive (each)	0,4 L (0.11 U.S. gal)

Track Specifications

Type	Rubber	Steel
Width	230 mm (9.0 in)	230 mm (9.0 in)
Number of Shoes	Single Assembly	38
Number of Track Rollers (per side)	3	3

Ground Pressure Specifications

Rubber Tracks	30,1 kPa (0,301 bar) (4.36 psi)
Steel Tracks	31,4 kPa (0,314 bar) (4.55 psi)

Temperature Range

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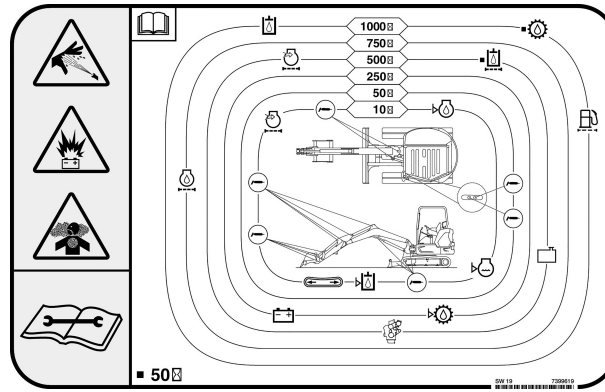
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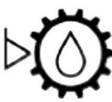







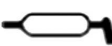









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SERVICE SCHEDULE SYMBOLS



 Check Engine Oil	 Check Engine Air Filter, Change as Necessary
 Replace Engine Oil and Filter	 Check Gear Box and / or Travel Motor Fluid
 Check Engine Coolant	 Replace Gear Box and / or Travel Motor Fluid
 Replace Engine Coolant	 Check Track Tension, Adjust as Needed
 Check Engine Cooling System	 Check Belt Tension, Adjust or Replace as Needed
 Drain Contaminants from Fuel Filter	 Lubricate Grease Fittings
 Drain Contaminants from Fuel Tank	 Check Seat Belt
 Change Fuel Filter	 Check Cab / Canopy
 Check Hydraulic Fluid	 Check Spark Arrester Muffler
 Replace Hydraulic Fluid	 Perform Service First 50 Hours
 Change Hydraulic Filter(s)	

Reference Information

Product Serial Number:

Engine Serial Number:

Dealer Information: