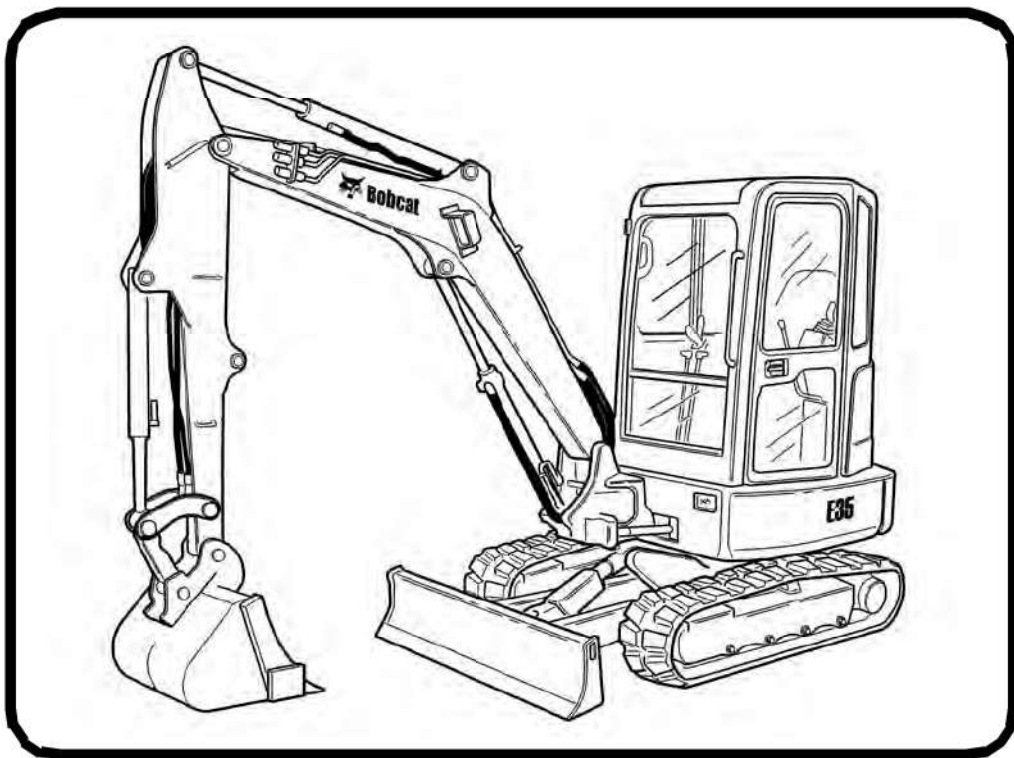




Bobcat®

Operation & Maintenance Manual E35 Compact Excavator

S/N B3K811001 & Above



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OPERATOR SAFETY WARNING



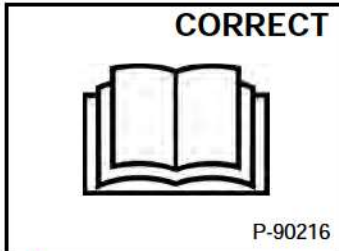
WARNING

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

W-2001-0502

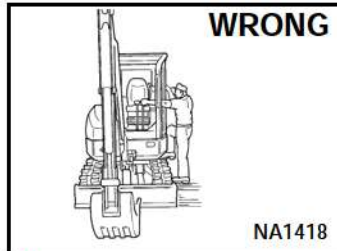


Safety Alert Symbol: This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.



⚠ Never operate without instructions.

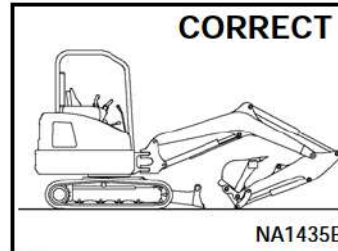
⚠ Read machine signs, and Operation & Maintenance Manual, and Operator's Handbook.



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

⚠ Be sure controls are in neutral before starting.

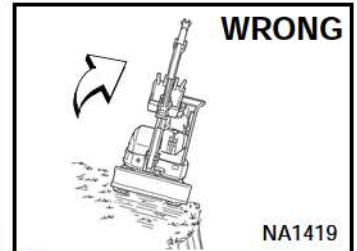
⚠ Sound horn and check behind machine before starting.



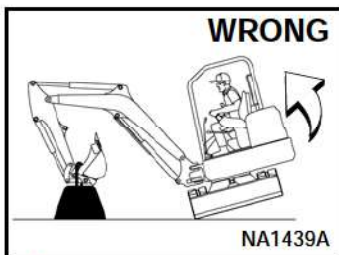
⚠ Never operate without approved cab / canopy.

⚠ Never modify equipment.

⚠ Never use attachments not approved by Bobcat Company.

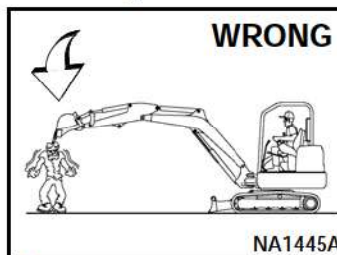


⚠ Avoid steep areas or banks that could break away.



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

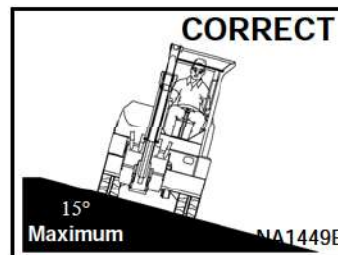
⚠ Operate on flat, level ground.



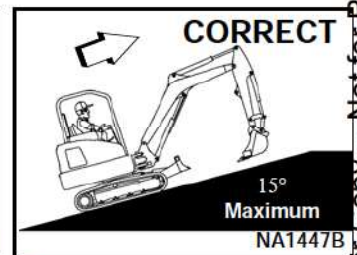
⚠ Keep bystanders out of maximum reach area.

⚠ Do not travel or turn with bucket extended.

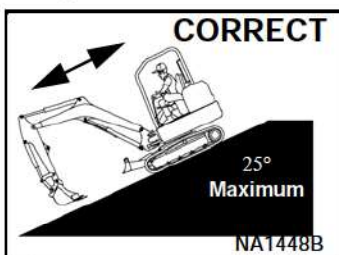
⚠ Never carry riders.



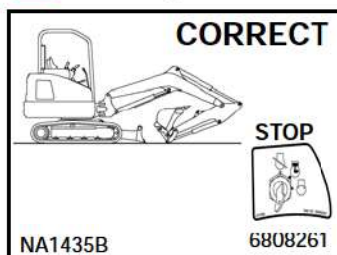
⚠ Never exceed a 15° slope to the side.



⚠ Never travel up a slope that exceeds 15°.

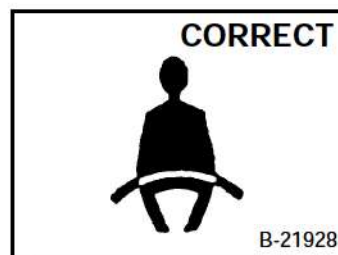


⚠ Never exceed 25° when going down or backing up a slope.



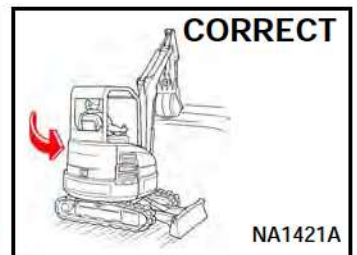
⚠ To leave excavator, lower the work equipment and the blade to the ground.

⚠ Stop the engine.



⚠ Fasten seat belt securely.

⚠ Operate controls only from operator's seat.



⚠ Look in the direction of rotation and make sure no bystanders are in the work area.

SAFETY EQUIPMENT

The excavator must be equipped with safety items necessary for each job. Ask your dealer about attachments and accessories.

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



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REFERENCE INFORMATION

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

Excavator Serial
Number

Engine Serial Number

NOTES:

YOUR BOBCAT DEALER:

ADDRESS:

PHONE:

Bobcat Company
P.O. Box 128
Gwinner, ND 58040-0128

Bobcat Company Europe
Drève Richelle 167
B-1410 WATERLOO
Belgium

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FOREWORD

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

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BOBCAT COMPANY IS ISO 9001 CERTIFIED

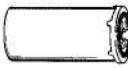


ISO 9001 is an international standard that specifies requirements for a quality management system that controls the processes and procedures which we use to design, develop, manufacture, and distribute Bobcat products.

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

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

REGULAR MAINTENANCE ITEMS

	ENGINE OIL FILTER (6 Pack) 6675517		BATTERY 6670251
	FUEL FILTER 6667352		HYDRAULIC FILL / BREATHER CAP 6692836
	AIR FILTER, Outer 6672467		FLUID, Hydraulic / Hydrostatic 6903117 - (2.5 U.S. gal) 6903118 - (5 U.S. gal) 6903119 - (55 U.S. gal)
	AIR FILTER, Inner 6672468		
	PRIMARY HYDRAULIC FILTER 6668819 CASE DRAIN HYDRAULIC FILTER 7009365		ANTI-FREEZE, Propylene Glycol 6983128 - Premixed 6983129 - Concentrate
	HVAC AIR FILTER (IF EQUIPPED) Fresh Air 7176099 Recirculation 7222791		RADIATOR CAP 6673313
ENGINE OIL 6903105 SAE 15W40 CE/SG (12 qt) 6903107 SAE 10W30 CE/SG (12 qt) 6903109 SAE 30W CE/SG (12 qt) 6903113 SAE 15W40 CE/SG (2.5 U.S. gal) 6903112 SAE 10W30 CE/SG (2.5 U.S. gal) 6903111 SAE 30W CE/SG (2.5 U.S. gal)		ENGINE OIL 6903106 SAE 15W40 CE/SG (1 U.S. gal) 6903108 SAE 10W30 CE/SG (1 U.S. gal) 6903110 SAE 30W CE/SG (1 U.S. gal)	

NOTE: Always verify Part Numbers with your Bobcat dealer.

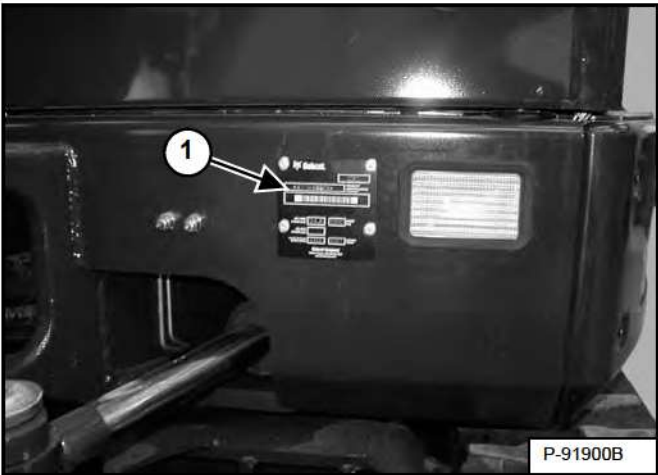
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SERIAL NUMBER LOCATIONS

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

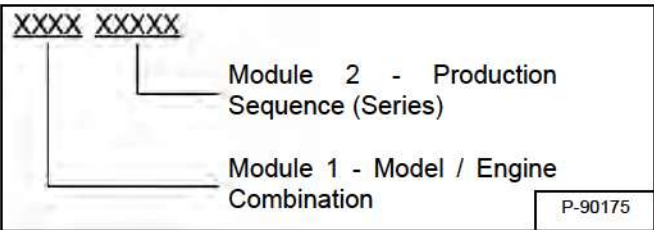
Excavator Serial Number

Figure 1



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

Figure 2

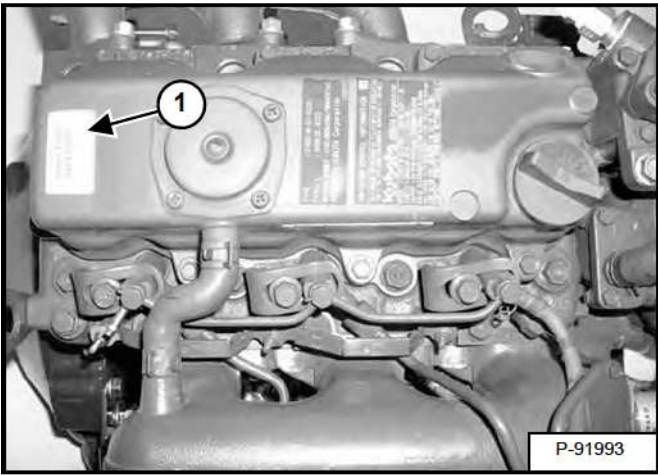


Explanation of excavator Serial Number [Figure 2]:

- 1. The four digit Model / Engine Combination Module number identifies the model number and engine combination.
- 2. The five digit Production Sequence Number identifies the order which the excavator is produced.

Engine Serial Number

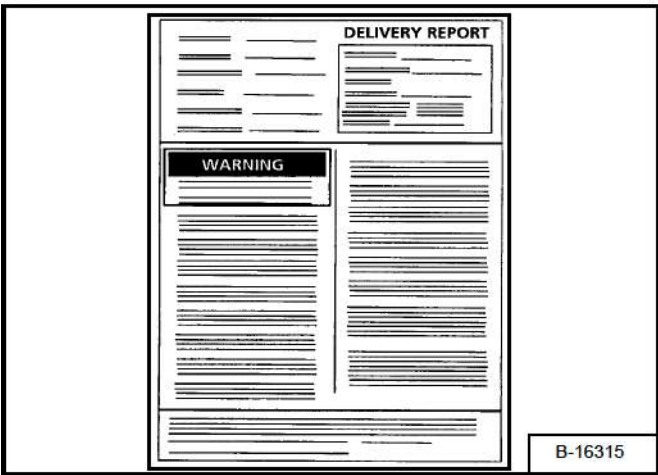
Figure 3



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

DELIVERY REPORT

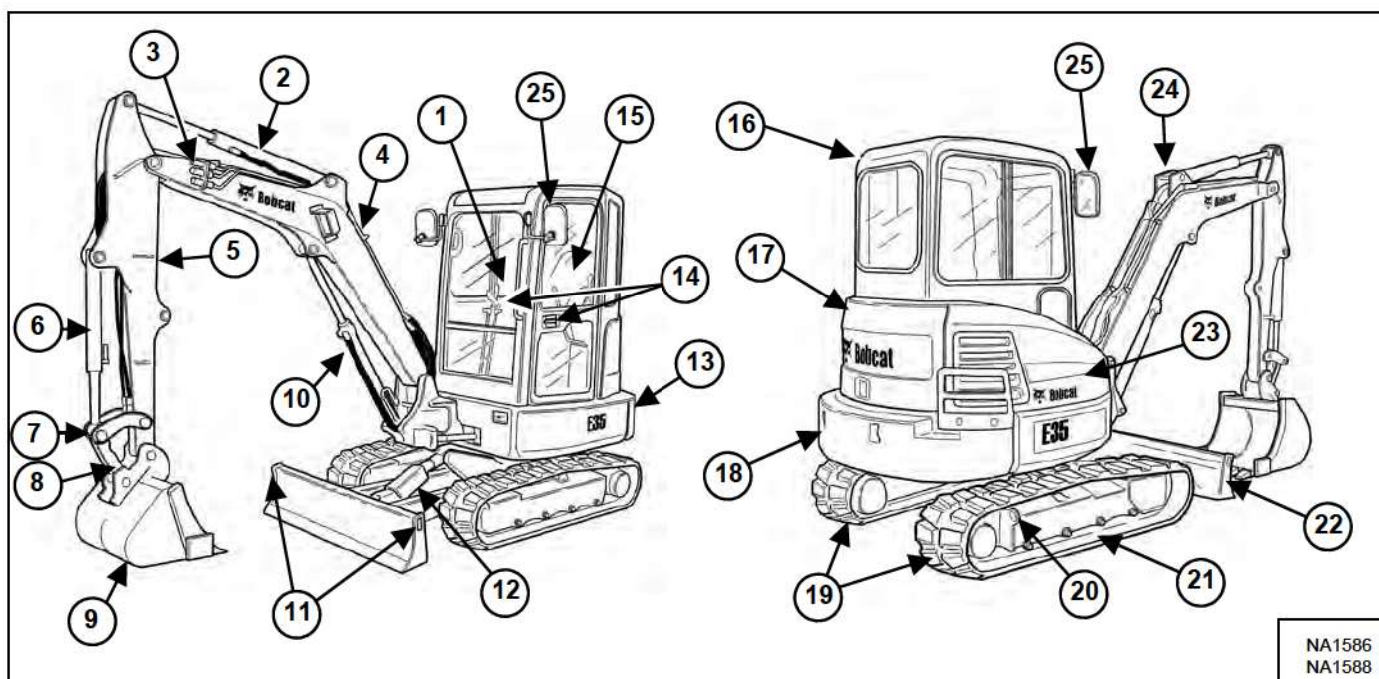
Figure 4



The delivery report [Figure 4] contains a list of items that must be explained or shown to the owner or operator by the dealer when the Bobcat excavator is delivered.

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

EXCAVATOR IDENTIFICATION



NA1586
NA1588

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

[1] BUCKET - Several different buckets and other attachments are available for the Bobcat excavator.

[2] ROPS / TOPS - (Roll-Over Protective Structure / Tip-Over Protective Structure) as standard equipment. The ROPS / TOPS meets ISO 12117-2:2008, ISO 12117: 2000 and EN13531:2001.

[3] TRACKS - Optional tracks are available.

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FEATURES, ACCESSORIES AND ATTACHMENTS

Standard Items

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

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

Options And Accessories

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

- Enclosed Cab With Heater and A/C
- Enclosed Cab With Heater
- Deluxe Instrument Panel
- Depth Check
- ISO / STD Control Pattern Selection Feature
- Travel Motion Alarm
- Keyless Start
- Canopy / Cab Mounted Lights
- Catalytic Exhaust Purifier
- Top Guard Kit (FOGS)
- Special Application Kit
- Fire Extinguisher Kit
- Steel Tracks
- Long Arm
- Counterweight (Additional)
- Direct to Tank Auxiliary Hydraulics
- X-Change
- Second Auxiliary Hydraulics
- Arm Mounted Auxiliary Hydraulic Couplers
- Radio
- Operator Seat (cloth or vinyl)
- HEPA HVAC Fresh Air Filter
- Spark Arrester Muffler

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

Attachments

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

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

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

- Auger
- Breaker
- Hydraulic Clamp
- 3-Tined Grapple
- Power Tilt
- Ripper
- Hydro tilt
- Packer wheel
- Laser Receiver

Buckets Available

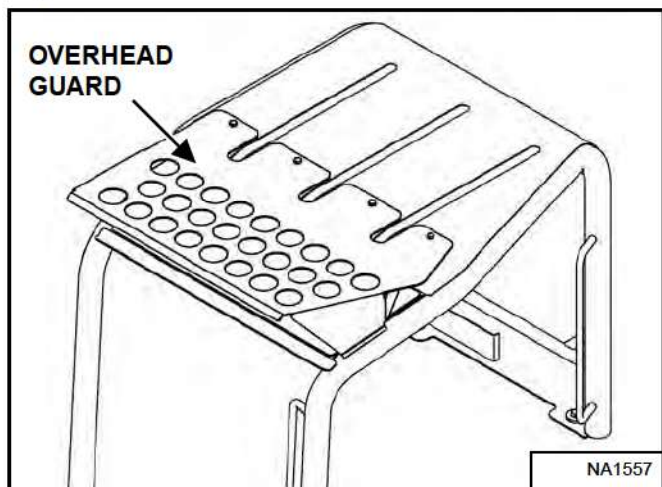
Increase the versatility of your Bobcat excavator with a variety of bucket sizes.

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

FEATURES, ACCESSORIES AND ATTACHMENTS (CONT'D)

Falling-Object Guards (FOGS)

Figure 5



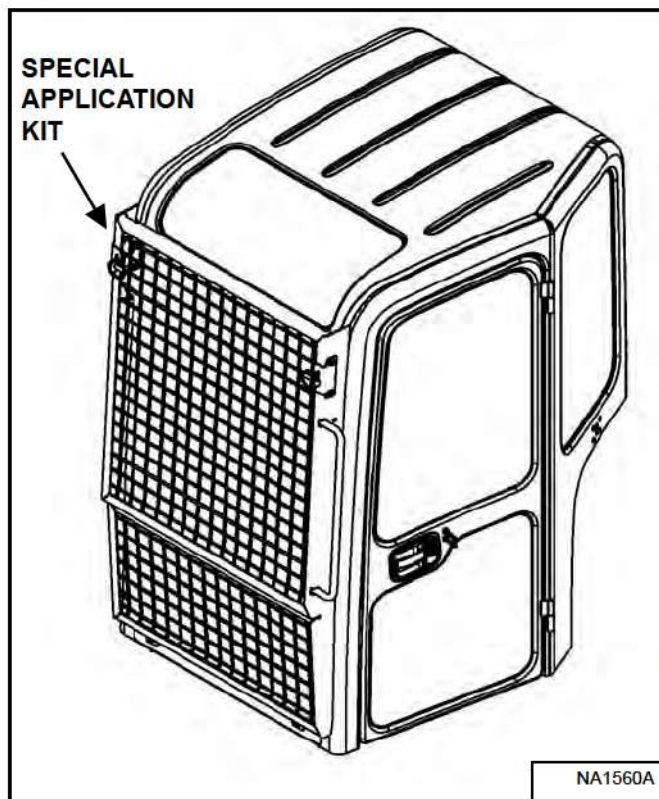
Available for special applications that require protection from smaller objects that can fall on the canopy / cab or restrict material from entering canopy / cab openings [Figure 5] and [Figure 6].

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

See your Bobcat Dealer for more information.

Special Applications Kit

Figure 6



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

Kit includes an upper and lower screen guard.

See your Bobcat Dealer for more information.

Special Applications Kit Inspection And Maintenance

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

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SAFETY AND TRAINING RESOURCES

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SAFETY INSTRUCTIONS

Before Operation

Carefully follow the operating and maintenance instructions in this manual.

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

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

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

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

- The Delivery Report is used to assure that complete instructions have been given to the new owner and that the machine and attachment is in safe operating condition.
- The Operation & Maintenance Manual delivered with the machine or attachment gives operating information as well as routine maintenance and service procedures. It is a part of the machine and can be stored in a container provided on the machine. Replacement Operation & Maintenance Manuals can be ordered from your Bobcat dealer.
- Machine signs (decals) instruct on the safe operation and care of your Bobcat machine or attachment. The signs and their locations are shown in the Operation & Maintenance Manual. Replacement signs are available from your Bobcat dealer.

- An Operator's Handbook is fastened to the operator cab of the excavator. It's brief instructions are convenient to the operator. The handbook is available from your dealer in an English edition or one of many other languages. See your Bobcat dealer for more information on translated versions.
- The AEM Safety Manual delivered with the machine gives general safety information.
- The Compact Excavator Operating Training Course is available through your Bobcat dealer. This course is intended to provide rules and practices of correct operation of the Bobcat excavator. The course is available in English and Spanish versions.
- Service Safety Training Courses are available from your Bobcat dealer. They provide information for safe and correct service procedures.
- See the PUBLICATIONS AND TRAINING RESOURCES Page in this manual or your Bobcat dealer for Service and Parts Manuals, printed materials, videos, or training courses available. Also check the Bobcat web sites www.training.bobcat.com or www.bobcat.com

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



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

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

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SAFETY INSTRUCTIONS (CONT'D)

Safe Operation Is The Operator's Responsibility



Safety Alert Symbol

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



WARNING

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

W-2001-0502

IMPORTANT

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

I-2019-0284



DANGER

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

D-1002-1107



WARNING

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

W-2044-1107

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

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

Safe Operation Needs A Qualified Operator

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

A Qualified Operator Must Do The Following:

Understand the Written Instructions, Rules and Regulations

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

Have Training with Actual Operation

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

Know the Work Conditions

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

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SAFETY INSTRUCTIONS (CONT'D)

Avoid Silica Dust



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

FIRE PREVENTION



Maintenance

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

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

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

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

Operation

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

Electrical



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

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

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FIRE PREVENTION (CONT'D)

Hydraulic System

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

Always clean fluid spills. Do not use gasoline or diesel fuel for cleaning parts. Use commercial nonflammable solvents.

Fueling



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

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

Starting

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

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

Spark Arrester Exhaust System

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

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

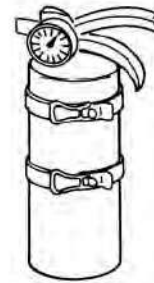
Welding And Grinding

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

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

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

Fire Extinguishers



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

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PUBLICATIONS AND TRAINING RESOURCES

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

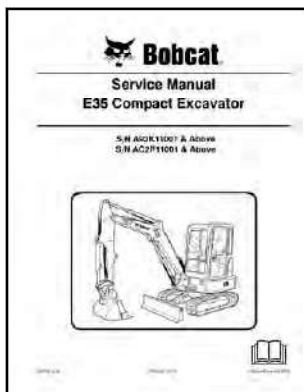
For the latest information on Bobcat products and the Bobcat Company, visit our web site at www.bobcat.com; you can also order Operator and Service Training materials online through www.bobcatstore.com



OPERATION & MAINTENANCE MANUAL

7254733enUS

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



SERVICE MANUAL

6987276enUS

- Complete maintenance instructions for your BOBCAT excavator.



SAFETY MANUAL (English & Spanish)

6901951

- Provide basic safety procedures and warnings for your BOBCAT excavator in both English and Spanish.



OPERATOR'S HANDBOOK

6990434enUS

Gives basic operation instructions and safety warnings.



COMPACT EXCAVATOR OPERATOR TRAINING COURSE

6903186

Introduces operator to step-by-step basics of compact excavator operation. Also available in Spanish P/N 6903228.



EXCAVATOR SERVICE SAFETY COURSE

6900916

Introduces Service Technicians to step-by-step basics of proper and safe excavator maintenance and servicing procedures.



OPERATOR SAFETY DVD

6904762

Provides basic safety instructions contained in all Bobcat Safety Videos in both English and Spanish.



EXCAVATOR SAFETY VIDEO

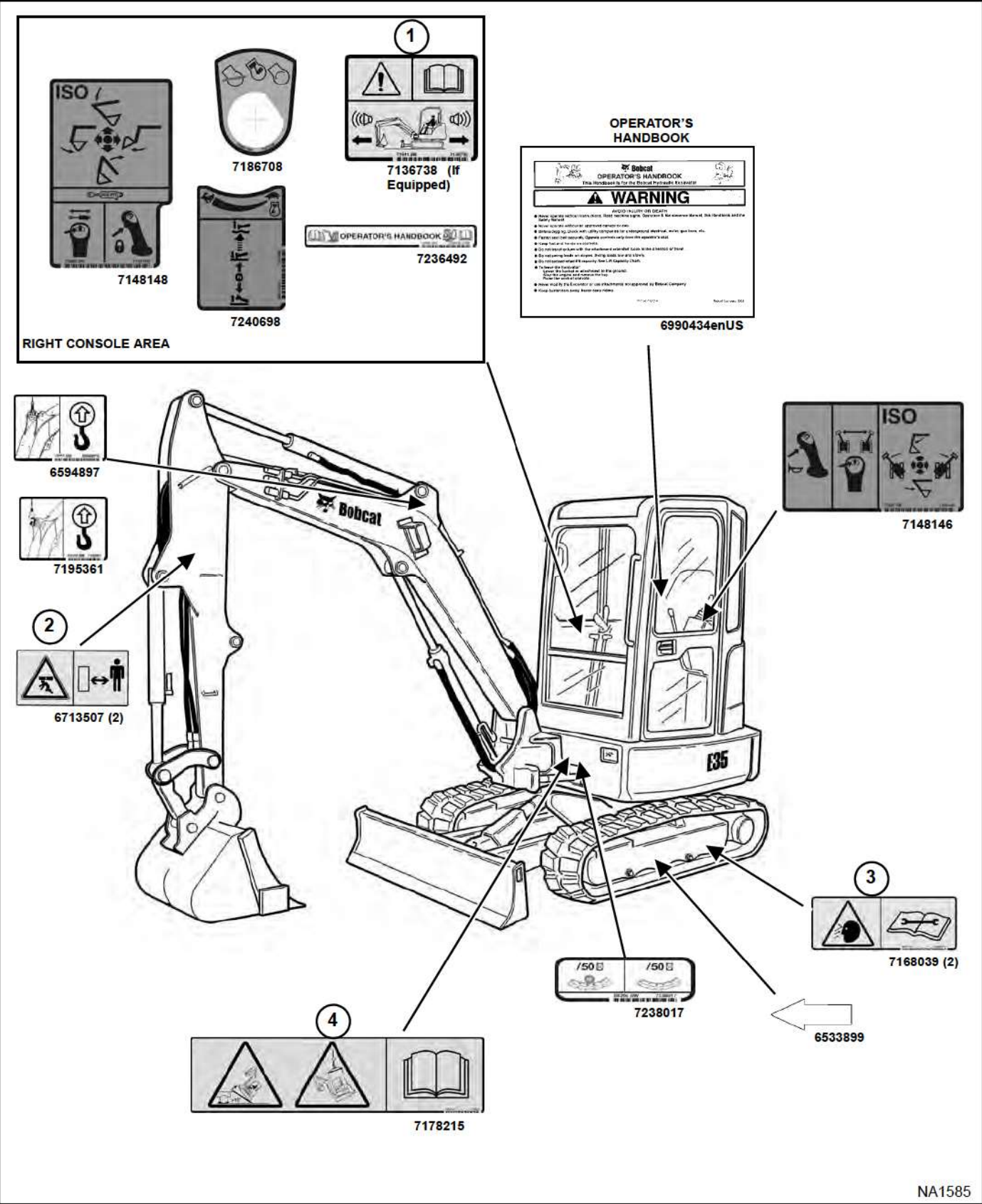
(Mobile device with quick response code application required)

Scan the code above to watch the excavator safety video or view at www.training.bobcat.com.

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MACHINE SIGNS (DECALS)

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

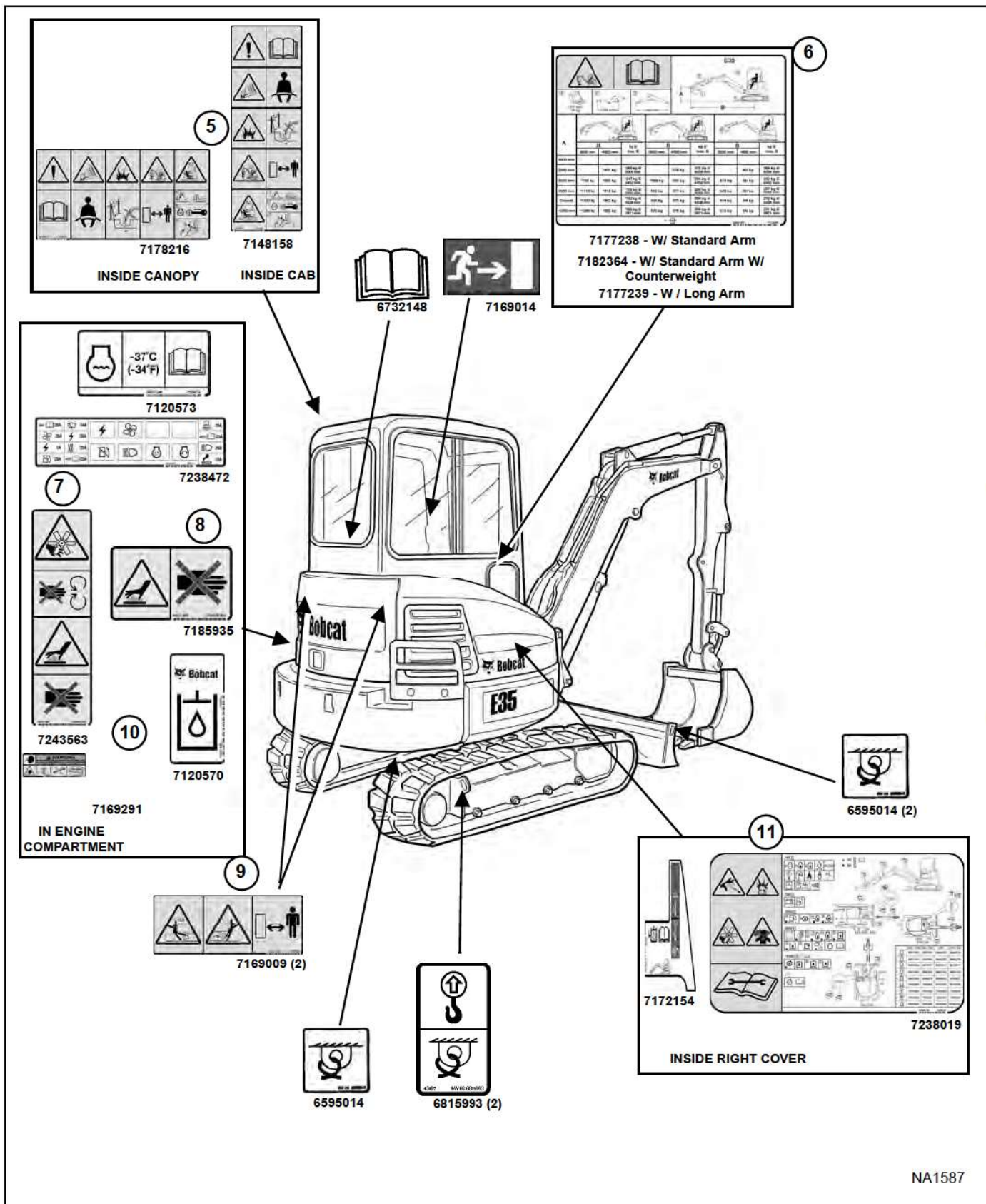


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NA1585

MACHINE SIGNS (DECALS) (CONT'D)

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



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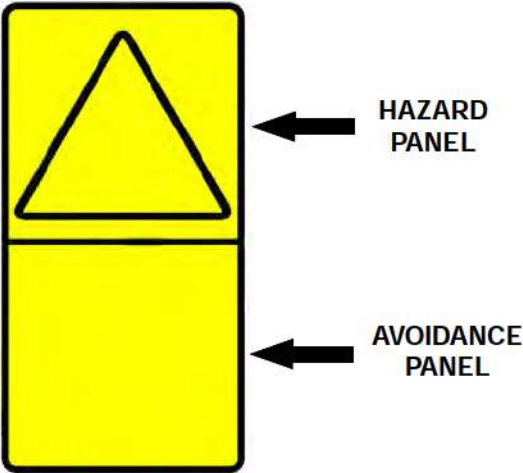
NA1587

MACHINE SIGNS (DECALS) (CONT'D)

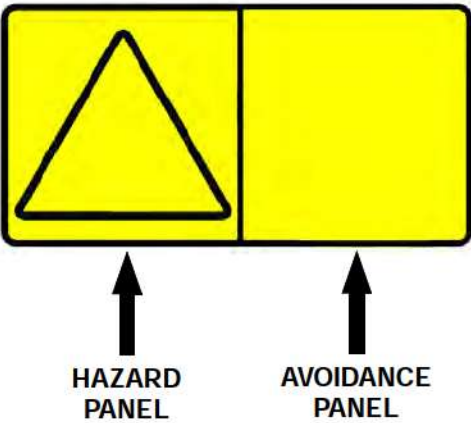
Pictorial Only Safety Signs

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

Vertical Configuration



Horizontal Configuration



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

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

Avoidance panels depict actions required to avoid the hazards.

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

NOTE: See the numbered MACHINE SIGNS (DECALS) on Page 20 and Machine Signs (Decals) (Cont'd) on Page 21 for the machine location of each corresponding numbered no-text decals as shown below.

1. Motion Alarm (7136738)

This safety sign is located on the right rear console.



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

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

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

W-2786-0309

MACHINE SIGNS (DECALS) (CONT'D)

2. Crush Hazard (6713507)

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

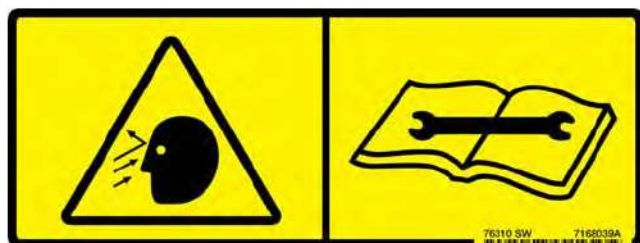


Keep away from the operating machine to avoid serious injury or death.

W-2520-0106

3. Thrown Or Flying Objects (7168039)

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



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

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

W-2516-0110

4. Transporting And Lifting (7178215)

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



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

W-2517-0110

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MACHINE SIGNS (DECALS) (CONT'D)

5. General Hazard (7148158, 7178216)

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



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

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

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

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

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

To Leave Excavator:

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

W-2518-0110

6. Lift Capacity (7177238, 7177239, 7182364)

This safety sign is located on the right side cover.

A	B			kg @ max. B	B			kg @ max. B	B			kg @ max. B
	2000 mm	3000 mm	4000 mm		2000 mm	3000 mm	4000 mm		2000 mm	3000 mm	4000 mm	
4000 mm												
3000 mm		*567 kg		*630 kg @ 3755 mm		*544 kg		420 kg @ 3755 mm		*549 kg		393 kg @ 3755 mm
2000 mm	*1099 kg	*758 kg	*657 kg	*630 kg @ 4302 mm	*1030 kg	564 kg	319 kg	306 kg @ 4302 mm	*1059 kg	565 kg	343 kg	330 kg @ 4302 mm
1000 mm		*1061 kg	*767 kg	*699 kg @ 4335 mm		620 kg	377 kg	292 kg @ 4335 mm		426 kg	377 kg	272 kg @ 4335 mm
Ground	*2123 kg	*1184 kg	*828 kg	*744 kg @ 4188 mm	1091 kg	505 kg	351 kg	271 kg @ 4188 mm	896 kg	484 kg	304 kg	283 kg @ 4188 mm
-1000 mm	*1086 kg	*1195 kg		*818 kg @ 3721 mm	1005 kg	519 kg		334 kg @ 3721 mm	906 kg	490 kg		306 kg @ 3721 mm



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

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

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

W-2519-0110

MACHINE SIGNS (DECALS) (CONT'D)

7. Hot Surfaces and Rotating Fan (7243563)

This safety sign is located inside the engine compartment.



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

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

W-2521-0106

8. Hot Surfaces (7185935)

This safety sign is located in the engine compartment.



AVOID BURNS

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

W-2070-1203

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MACHINE SIGNS (DECALS) (CONT'D)

9. Stay Away (7169009)

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



AVOID INJURY OR DEATH

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

W-NEW-1108

10. Thrown or Flying Objects (7169291)

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

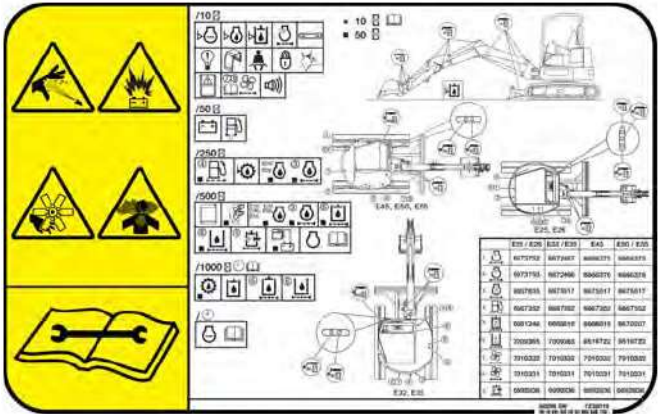


High pressure gas can cause serious injury or death. Do not open. Opening cylinder can release rod.

W-2523-0106

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

This safety sign is located on the right front corner of the upperstructure. For Service Schedule Information, (See SERVICE SCHEDULE on Page 107.)



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

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

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

All exhaust gases can kill. Always ventilate.

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

W-2522-0110

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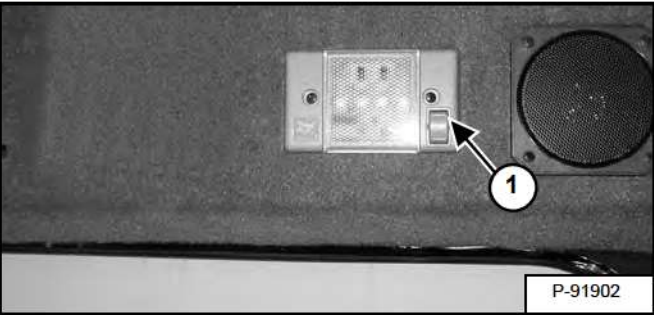
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INSTRUMENTS AND CONSOLES

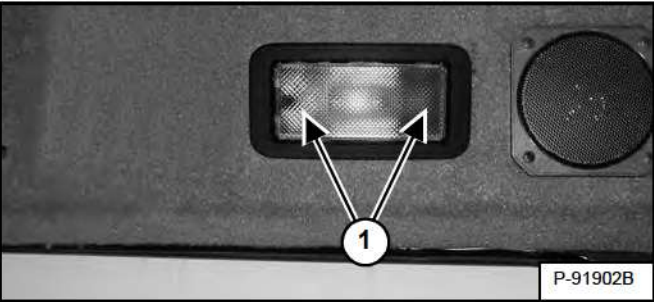
Cab Interior Light

Figure 7



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

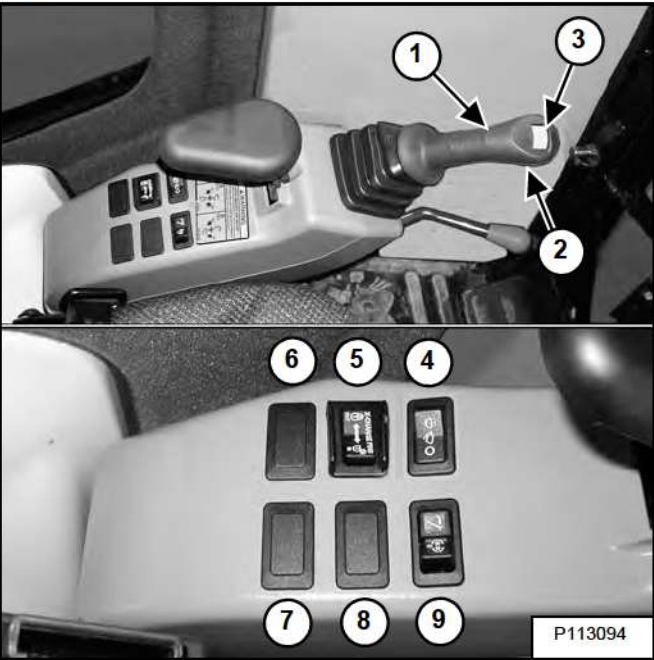
Figure 8



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

Left Console

Figure 9



Left Console [Figure 9]

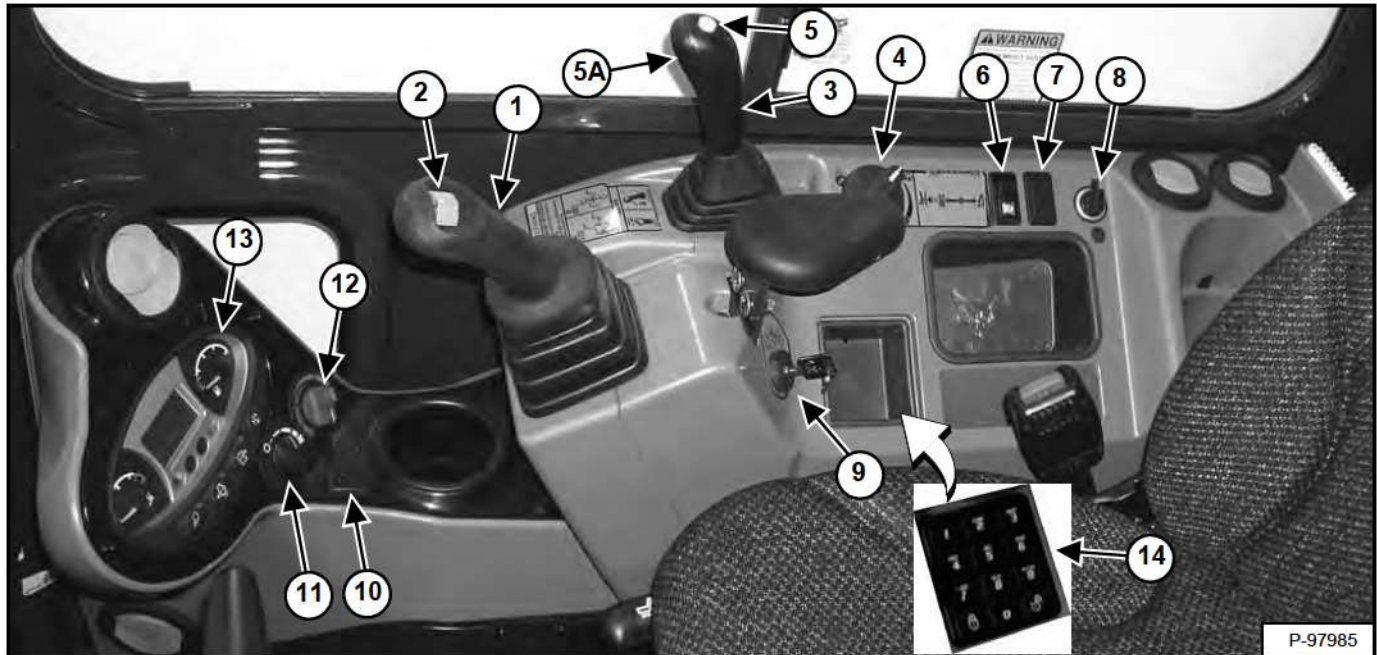
REF. NO	DESCRIPTION	FUNCTION / OPERATION
1	Left Joystick	(See HYDRAULIC CONTROLS on Page 52.)
2	Horn	Press the switch on the bottom of the left joystick to sound horn.
3	Boom Swing Switch / Secondary Auxiliary Hydraulic (If Equipped)	Move the switch to the left to swing the boom to the left. Move the switch to the right to swing the boom to the right. (See Secondary Auxiliary Hydraulics and Boom Swing in this manual.)
4	Wiper / Washer Switch (If Equipped)	Press the switch to the left to turn wiper ON. Press and hold switch to the left to activate window washer. Press the switch to the right to turn wiper OFF.
5	Not Used	---
6	Beacon / Strobe Light (If Equipped)	Press switch to the left to turn ON the beacon / Strobe light. Press the switch to the right to turn OFF.
7	Not Used	---
8	Not Used	---
9	Boom Swing Switch / Secondary Auxiliary Hydraulic (If Equipped)	Move the switch to the right to activate the secondary auxiliary hydraulics. Move the switch to the left for boom swing function. (See Secondary Auxiliary Hydraulics and Boom Swing in this manual.)

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INSTRUMENTS AND CONSOLES (CONT'D)

Right Console

Figure 10



REF	DESCRIPTION	FUNCTION / OPERATION
1	Right Joystick	(See HYDRAULIC CONTROLS in this manual.)
2	Auxiliary Hydraulic Switch	Controls the fluid flow to the auxiliary quick couplers (attachment). (See Auxiliary Hydraulics in this manual.)
3	Blade Control Lever	Controls raising and lowering the blade. Pushed all the way forward puts blade in float position. (See BLADE LEVER CONTROL in this manual.)
4	Engine Speed Control Dial	Controls rpm of the engine. (See ENGINE SPEED CONTROL DIAL in this manual.)
5	Two-Speed Button (Without Angle Blade Option)	Engages and disengages High Range Travel Speed. (See Two-Speed Travel in this manual.)
5A	Two-Speed Button (With Angle Blade Option)	Engages and disengages High Range Travel Speed. (See Two-Speed Travel in this manual.) (Also see Angle Blade in this manual.)
6	Motion Alarm Cancel Switch	This switch temporarily disables the motion alarm. (See MOTION ALARM SYSTEM on Page 49.)
7	Not Used	---
8	Auxiliary Power Outlet	12 volt receptacle for accessories.
9	Key Switch	Always perform the <i>PRE-STARTING PROCEDURE</i> . (See <i>PRE-STARTING PROCEDURE</i> in this manual), before starting the engine. (See <i>STARTING THE ENGINE</i> in this manual).
10	Air Conditioning Switch (If Equipped)	Press top of switch to turn air conditioner ON (light in switch will be ON), Press bottom of switch to turn OFF.
11	Fan Motor Switch (If Equipped)	Turn clockwise to increase fan speed; counterclockwise to decrease.
12	Temperature Control (If Equipped)	Turn clockwise to increase temperature; counterclockwise to decrease.
13	Instrument Panel	See Standard or Deluxe Instrument Panel
14	Keyless (If Equipped)	(Always perform the <i>PRE-STARTING PROCEDURE</i> , (See <i>PRE-STARTING PROCEDURE</i> in this manual), before starting the engine. (See <i>STARTING THE ENGINE</i> in this manual).

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

INSTRUMENTS AND CONSOLES (CONT'D)

Instrument Panel - Standard

Figure 11



P-97989

REF. NO.	DESCRIPTION	FUNCTION / OPERATION
1	LIGHTS	Press once for work lights. (Left green LED illuminates.) Press again to turn all lights OFF. (Left green LED off.) Press and hold 5 seconds to display software version in display screen.
2	Auto Idle Feature	Press once to turn Auto Idle Feature ON. (Left green LED illuminates.) Press a second time to turn OFF. (Left and right green LEDs off.) (See Auto Idle Feature in this manual).
3	Auxiliary Hydraulic Button	Press once to enable auxiliary hydraulic function. (Left green LED illuminates.) Continue to press and release to scroll through the selectable auxiliary hydraulic setting (3-2-1-OFF). Press and hold (minimum of one second) to enable the continuous flow auxiliary hydraulic feature. (Right green LED illuminates.) Continue to press and release to scroll through the continuous flow selectable auxiliary hydraulic settings (3-2-1-OFF). (See Auxiliary Hydraulics in this manual).
4	Information	Cycles through (after each button press) (The following information is displayed in the Data Display Screen, Item 6): • Hourmeter (On startup) • Job Clock (1 and 2) (Press and hold 7 seconds when displayed to reset the job clock.) • Engine rpm • Battery voltage • Maintenance clock (Press and hold 7 seconds when displayed to reset the maintenance clock.) • Service codes*
5	Engine Temperature Gauge	Shows the engine coolant temperature.

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INSTRUMENTS AND CONSOLES (CONT'D)

Instrument Panel - Standard (Cont'd)

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

* See SYSTEM SETUP AND ANALYSIS for Service Code Description. (See DIAGNOSTIC SERVICE CODES on Page 155.)

** Icons will be ON or flashing when diagnostic system indicates a problem. (See DIAGNOSTIC SERVICE CODES on Page 155.)

*** Icons will be flashing when diagnostic system indicates a problem. (See DIAGNOSTIC SERVICE CODES on Page 155.)

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INSTRUMENTS AND CONSOLES (CONT'D)

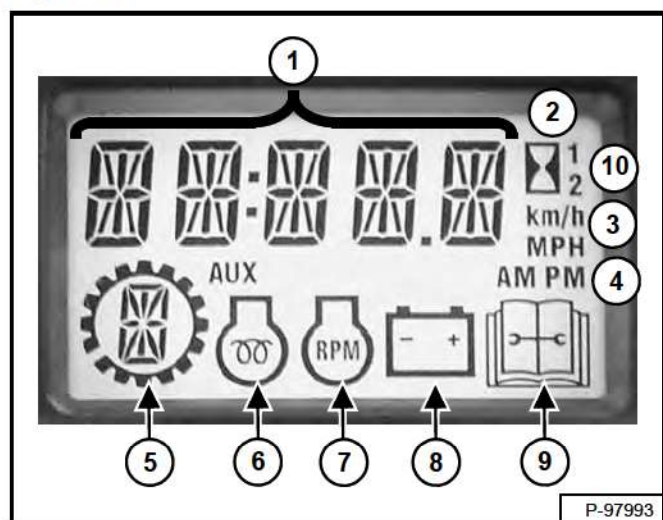
Instrument Panel - Standard (Cont'd)

Indicator Icons

The display screen can display the following information:

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

Figure 12



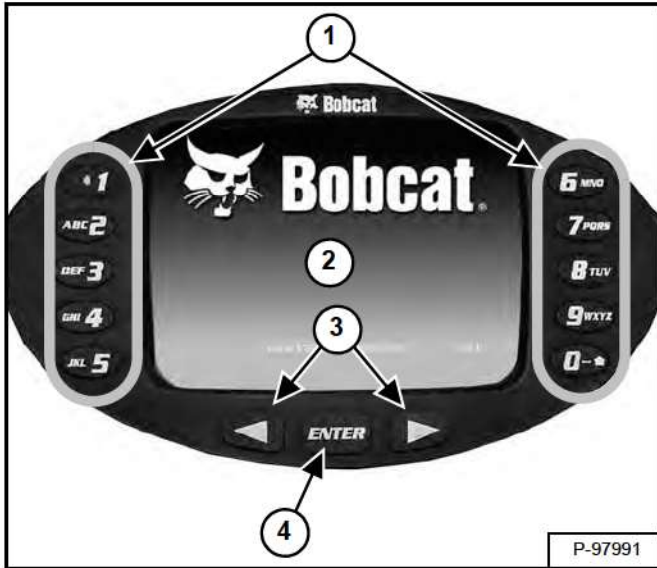
The display screen is shown in [Figure 12]. The data display will show operating hours upon startup.

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

INSTRUMENTS AND CONSOLES (CONT'D)

Instrument Panel - Deluxe

Figure 13



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

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

Figure 14



Turn the start key to the ON position.

When this screen is on the display you can enter the password and start the engine [Figure 14].

NOTE: Your excavator (with Deluxe Instrument Panel) will have an Owner Password. Your dealer will provide you with this password. Change the password to one that you will easily remember to prevent unauthorized use of your excavator. (See Changing The Owner Password on Page 167.) Keep your password in a safe location for future needs.

Enter The Password:

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

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

See CONTROL PANEL SETUP for further description of screens to set up the system for your use. (See CONTROL PANEL SETUP on Page 159.)

Lights

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

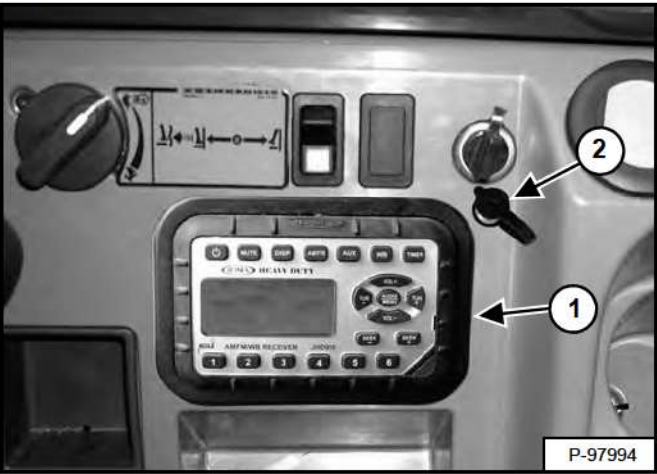
Change Language:

The language can be changed at any time. (See CONTROL PANEL SETUP on Page 159.)

INSTRUMENTS AND CONTROLS (CONT'D)

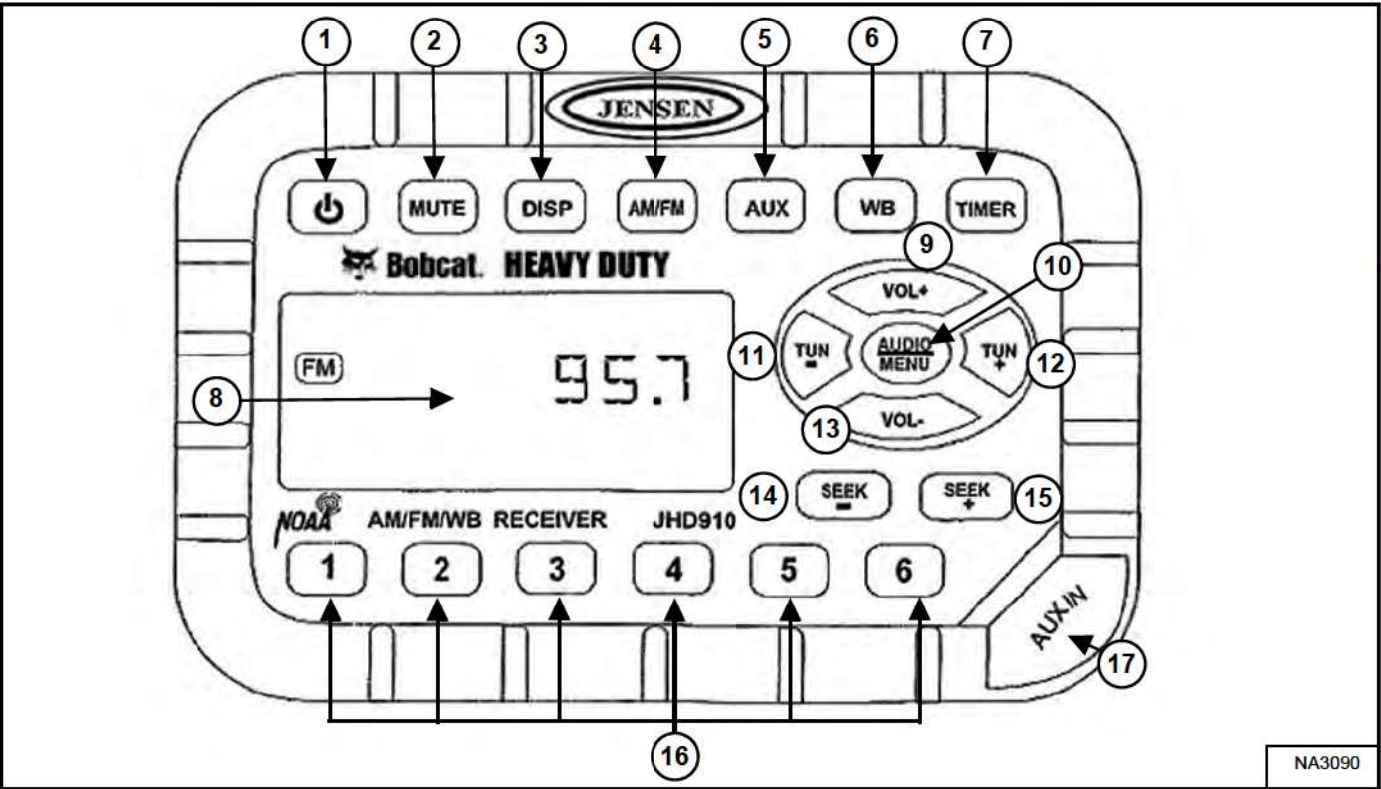
Radio Option

Figure 15



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

Figure 16



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

INSTRUMENT AND CONTROLS (CONT'D)

Radio (Cont'd)

REF. NO.	DESCRIPTION	FUNCTION / OPERATION
1	POWER	Press to turn ON; press again to turn OFF.
2	MUTE	Press to mute audio output; [MUTE] will appear in display screen; press again to turn OFF.
3	DISPLAY	Press to toggle between function mode (showing tuner frequency, auxiliary input, weather band information, or timer) and clock mode. Press and hold to enter clock setting mode; use FREQUENCY DOWN (TUN -) button to adjust hours and FREQUENCY UP (TUN +) button to adjust minutes; normal operation will resume automatically.
4	BAND	Press to select tuner mode. Press to cycle through 2 AM (MW) bands and 3 FM bands.
5	AUXILIARY	Press to select Auxiliary Input mode. Portable audio device (MP3 player) must be attached to auxiliary input jack.
6	WEATHER BAND	Press to select weather band; use FREQUENCY UP (TUN +) and FREQUENCY DOWN (TUN -) buttons to adjust to the clearest station. The weather alert feature, if activated, will automatically switch from the current function to the weather band if a weather warning is received. See AUDIO / MENU ADJUSTMENT in this table.
7	TIMER	Press to access timer mode. Press to start the timer function; press again to stop timer; press again to resume timer or press and hold to reset timer and exit from timer mode.
8	DISPLAY SCREEN	Displays the time, frequency, and activated functions.
9	VOLUME UP	Adjusts volume up; current volume (0 - 40) will appear briefly in display screen.
10	AUDIO / MENU ADJUSTMENT	AUDIO ADJUSTMENT: Press to cycle through bass, treble, and balance settings; use VOLUME UP (VOL +) and VOLUME DOWN (VOL -) buttons to adjust when desired option is displayed; normal operation will resume automatically. MENU ADJUSTMENT: Press and hold for 3 seconds to enter menu adjustment settings; press to cycle through the following settings; use VOLUME UP (VOL +) and VOLUME DOWN (VOL -) buttons to adjust when desired option is displayed; normal operation will resume automatically. • Beep Confirm (On or Off) - Determines if beep will sound with each button press. • Operation Region (USA or Europe) - Selects the appropriate region. • Clock Display (12 or 24) - Selects a 12-hour or 24-hour clock display. • Display Brightness (Low, Medium, or High) - Determines brightness level of display screen. • Backlight Color (Amber or Green) - Determines backlight color of display screen. • Power On Volume (0 - 40) - Selects default volume setting when radio is turned on. • WB Alert (On or Off) - Determines if weather band alert feature is activated.
11	FREQUENCY DOWN	Press to manually tune the radio frequency down.
12	FREQUENCY UP	Press to manually tune the radio frequency up.
13	VOLUME DOWN	Adjusts volume down; current volume (0 - 40) will appear briefly in display screen.
14	SEEK FREQUENCY DOWN	Press to automatically tune frequency down to next strong station.
15	SEEK FREQUENCY UP	Press to automatically tune frequency up to next strong station.
16	PRESET STATIONS	Used to store and recall stations for each AM and FM band. Press and hold to store current station; press button to recall station.
17	AUXILIARY INPUT JACK	Connect line output of portable audio device (MP3 player) to 3,5 mm (1/8 in) jack and press AUXILIARY button.

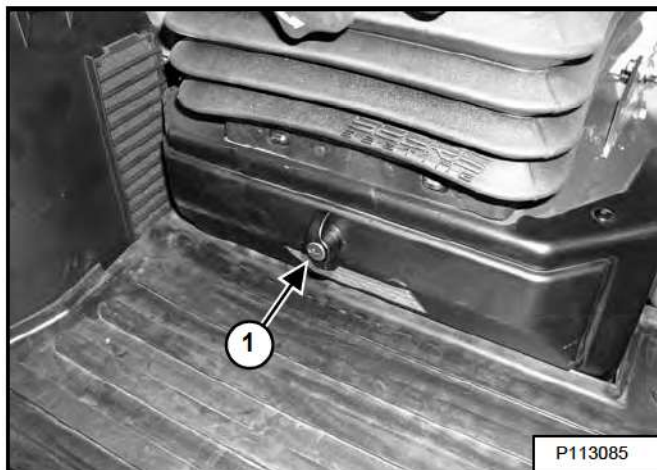
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INSTRUMENTS AND CONTROLS (CONT'D)

STD / ISO Selector Valve

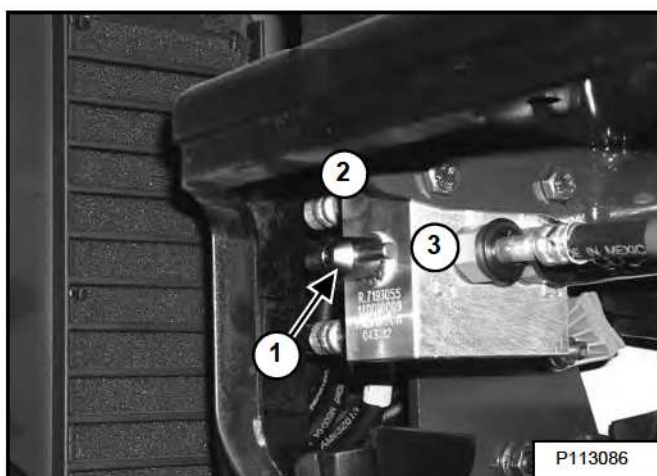
The STD / ISO selector valve is located below the operator's seat, inside the tool box.

Figure 17



From below the operator's seat, open the tool box cover (Item 1) [Figure 17].

Figure 18



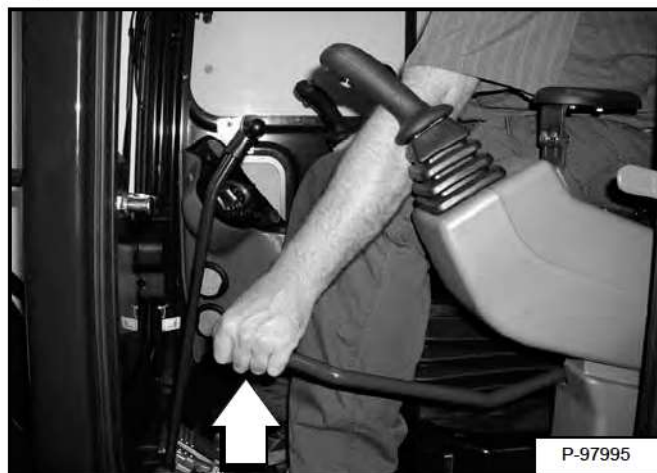
The joystick hydraulic function can be switched from Standard control pattern to ISO control pattern.

Rotate the lever (Item 1) counterclockwise (Item 2) to select STANDARD Control Pattern. Rotate the lever clockwise (Item 3) to select ISO Control Pattern [Figure 18].

Raising And Lowering The Console

Raise the console before exiting the cab.

Figure 19



Pull up on the release handle [Figure 19]. The lift spring will assist in raising the console.

Lower the console before operating the excavator.

Push down on the lever [Figure 19] until the latch is engaged.

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

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

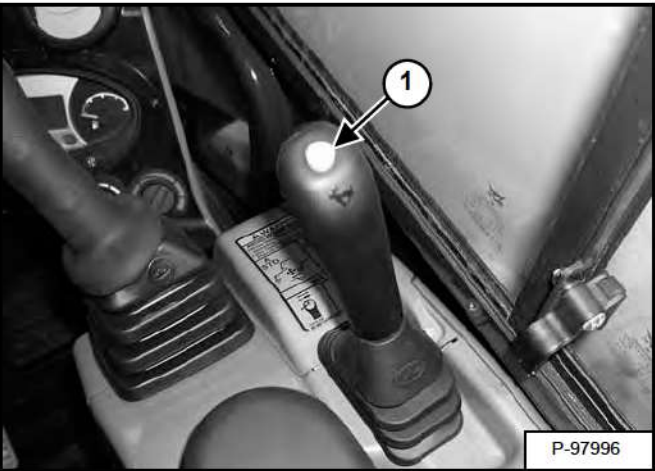
The control console must be in the locked down position, and the key switch in the ON position.

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INSTRUMENTS AND CONTROLS (CONT'D)

Two-Speed Travel (Without Angle Blade Option)

Figure 20



Press the button (Item 1) [Figure 20] to engage the high range. Press a second time to disengage.

Figure 21

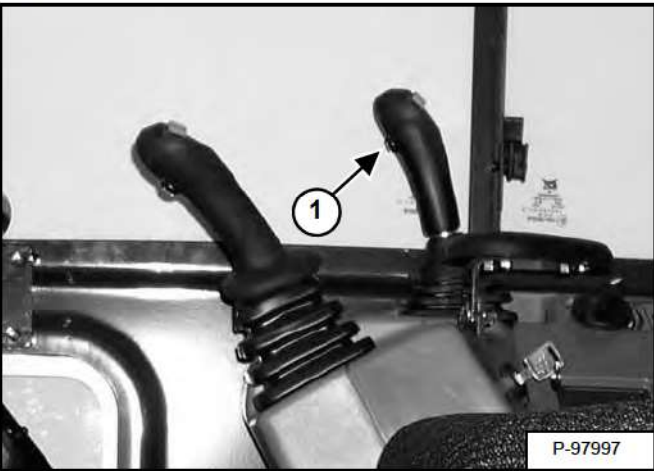


When high range is engaged, the two-speed travel icon (Item 1) [Figure 21] will illuminate.

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

Two-Speed Travel (With Angle Blade Option)

Figure 22



Press the button (Item 1) [Figure 22] to engage the high range. Press a second time to disengage.

Figure 23



When high range is engaged, the two-speed travel icon (Item 1) [Figure 23] will illuminate.

Press the button (Item 1) [Figure 22] again to disengage.

Auto Shift Drive Motors

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

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

INSTRUMENTS AND CONTROLS (CONT'D)

Auto Idle Feature

The auto idle feature (when engaged) will reduce the engine speed to low idle when the control levers (joystick, blade, travel, etc.) are in NEUTRAL and not used for approximately four seconds. The engine rpm will return to the set position as soon as any control lever is activated.

Standard Panel

Figure 24



The automatic idle switch (Item 1) [Figure 24] is used to engage or disengage the automatic idle feature.

Press the switch (Item 1) once to engage automatic idle and the LED (Item 2) will illuminate. Press the switch (Item 1) a second time to disengage automatic idle, the LED (Item 2) [Figure 24] will be OFF.

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

Deluxe Panel

Figure 25



Press [ENTER] (Item 1) once to engage automatic idle. Press [ENTER] (Item 1) [Figure 25] again and auto idle will be OFF.

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

NOTE: When equipped with the deluxe instrument panel, the time delay for auto idle to activate can be adjusted. (See Auto Idle Time Delay on Page 161.)

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OPERATOR CANOPY (ROPS / TOPS)

Description

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

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

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

WARNING

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

W-2069-0200

OPERATOR CAB (ROPS / TOPS)

Description

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

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

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

WARNING

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

W-2069-0200

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

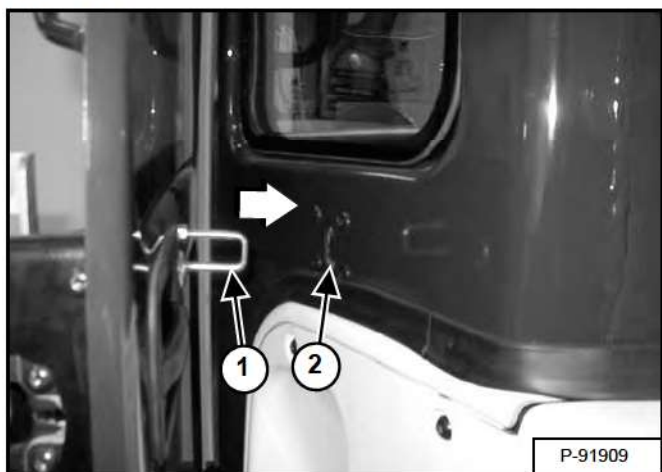
Cab Door

Figure 26



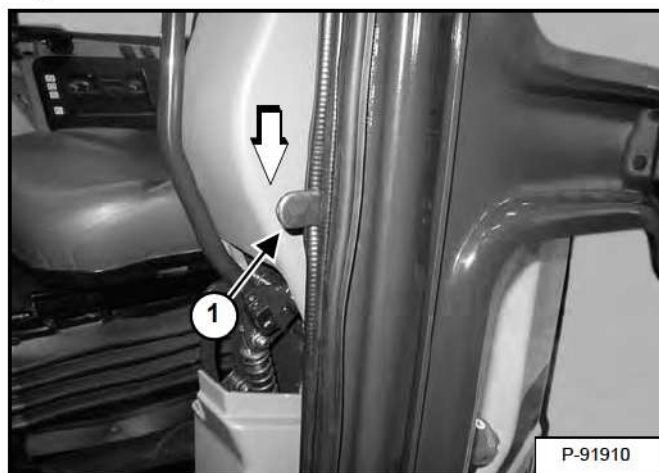
The cab door can be locked (Item 1) [Figure 26] with the same key as the starter switch.

Figure 27



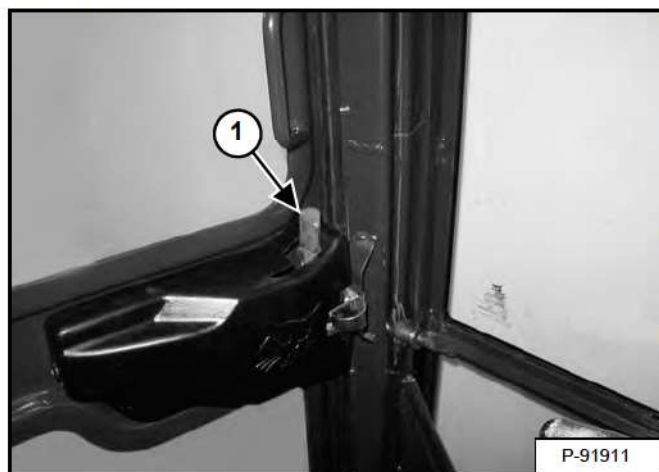
Push the door all the way open until the latch post (Item 1) engages in the latch (Item 2) [Figure 27] to hold the door in the open position.

Figure 28



When the door is in the open position, push down on the latch (Item 1) [Figure 28] and close the door.

Figure 29



From inside the cab, open the door using handle (Item 1) [Figure 29].

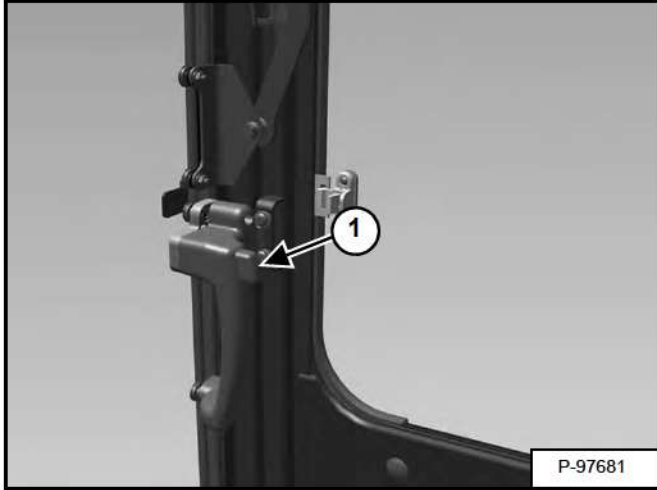
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OPERATOR CAB (ROPS / TOPS) (CONT'D)

Front Window

Opening The Front Window

Figure 30



Press the window latch button (Item 1) **[Figure 30]** (both sides).

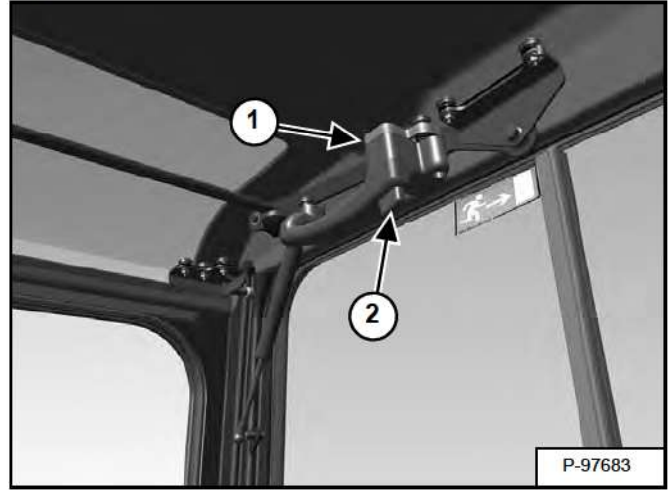
Figure 31



Use both window grab handles (Item 1) **[Figure 31]** to pull the top of the window in.

Continue moving the window in and up over the operator's head until the window is fully raised.

Figure 32



When the window is fully raised, the latch (Item 1) **[Figure 32]** (both sides) will close on the bracket in the latched position.

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

Closing The Front Window

Use both window grab handles to support the window while pressing the window latch button (Item 2) **[Figure 32]** (both sides).

Use both window grab handles (Item 1) **[Figure 31]** to pull the window down fully.

Press the top of the window in until the latch locks into the latched position (both sides) **[Figure 30]**.

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

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

Front Wiper

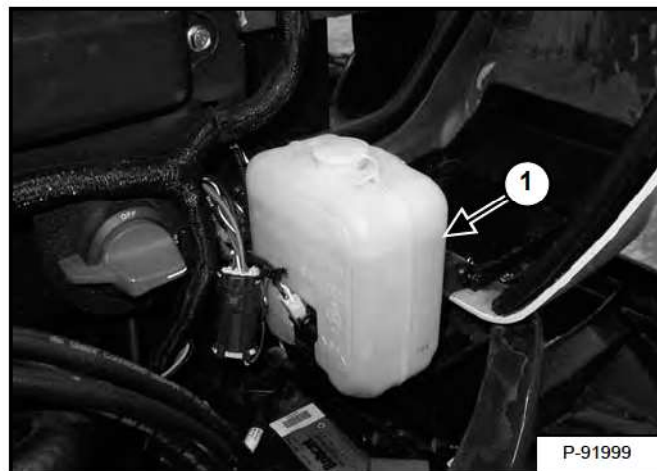
Figure 33



The front window is equipped with a wiper (Item 1) [Figure 33] and washer.

Window Washer Reservoir

Figure 34



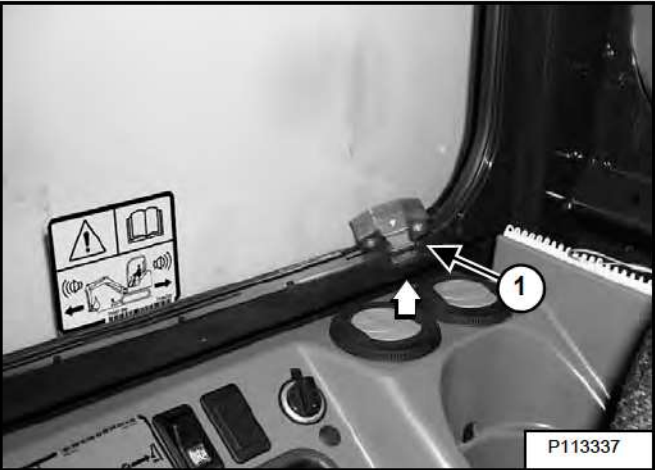
The window washer reservoir (Item 1) [Figure 34] is located under the right side cover.

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OPERATOR CAB (ROPS / TOPS) (CONT'D)
Right Side Window

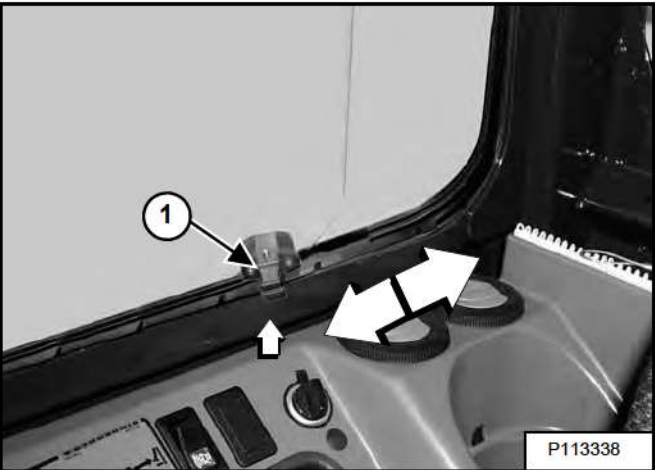
Opening The Right Rear Window

Figure 35



Pull up on the bottom latch (Item 1) **[Figure 35]**.

Figure 36



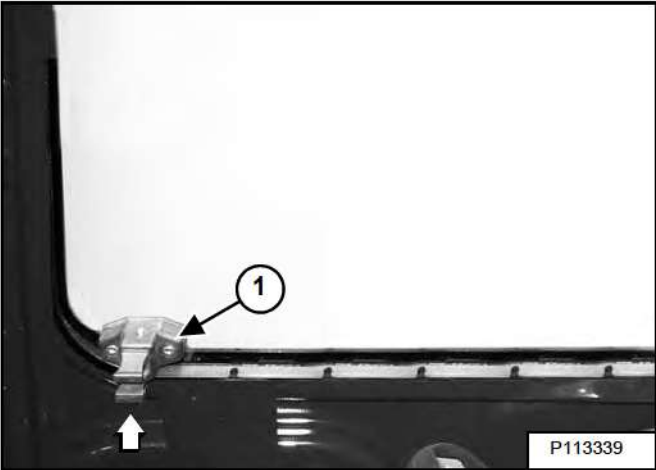
Pull the latch (Item 1) **[Figure 36]** forward to open the window until the desired stop. Release the bottom latch and snap the lock in place.

Closing The Right Rear Window

Pull up on the bottom latch (Item 1) **[Figure 35]** and push the latch back to close the window.

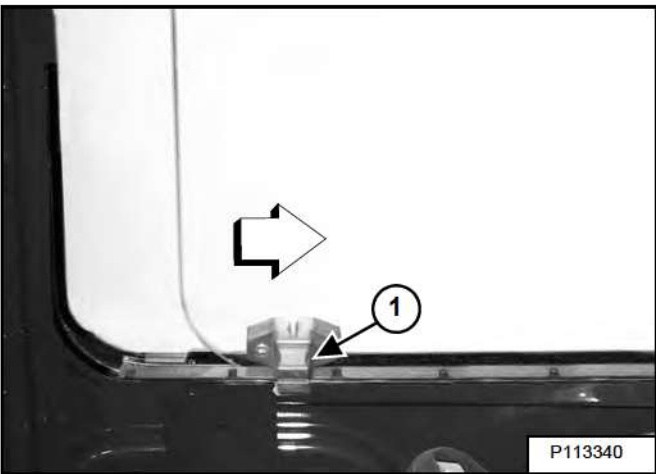
Opening The Right Front Window

Figure 37



Pull up on the bottom latch (Item 1) **[Figure 37]** located at the front of the front window.

Figure 38



Pull the latch (Item 1) **[Figure 38]** backward to open the window until the desired stop. Release the bottom latch and snap the lock in place.

Closing The Right Front Window

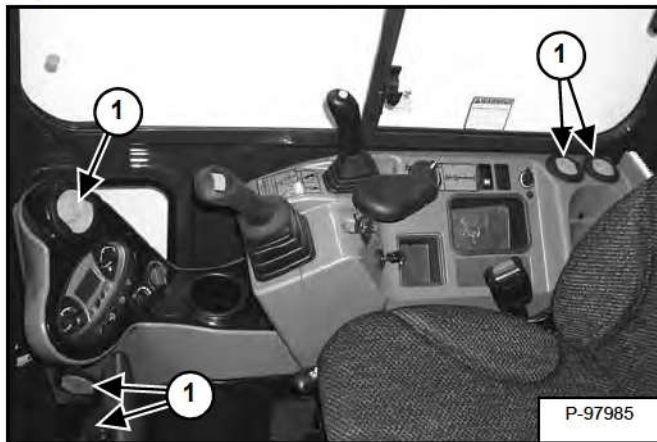
Pull up on the bottom latch (Item 1) **[Figure 37]** and push the latch forward to close the window.

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

Heating, Ventilation, And Air Conditioning Ducting

Figure 39



The HVAC louvers (Item 1) **[Figure 39]** can be positioned as needed to direct the air flow to various areas in the cab.

EMERGENCY EXIT

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

Right Side Rear Window

Figure 40



Exit through the window [Figure 40].

Front Window

Figure 41



Open the front window and exit [Figure 41].

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

MOTION ALARM SYSTEM

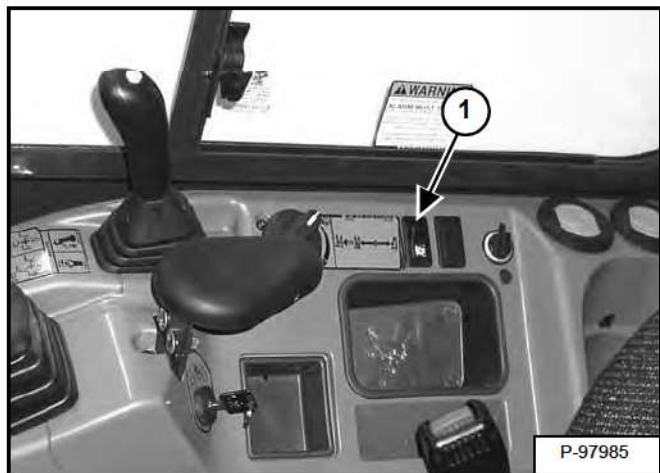
Operation

Figure 42



This excavator may be equipped with a motion alarm system. The motion alarm (Item 1) [Figure 42] is located inside the rear of the excavator.

Figure 43



The motion alarm can be temporarily disabled by pressing the motion alarm switch (Item 1) [Figure 43] while the machine is moving. As soon as the travel levers are returned to the NEUTRAL position, the motion alarm will be enabled.



WARNING

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

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

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

W-2786-0309

The motion alarm will sound when the operator moves the travel control levers (Item 1) [Figure 44] in either the forward or reverse direction.

If alarm does not sound or for adjustment instructions, see inspection and maintenance instructions for the motion alarm system in the preventive maintenance section of this manual. (See MOTION ALARM SYSTEM on Page 111.)

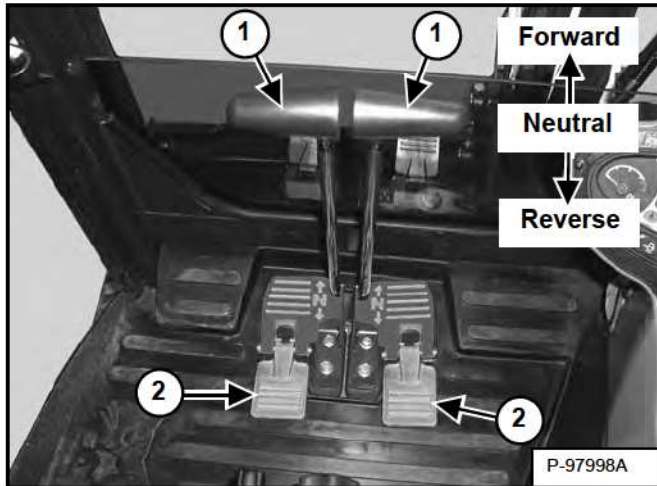
Dealer Copy -- Not for Resale

TRAVEL CONTROLS

Forward And Reverse Travel

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

Figure 44



Put the blade so that it is at the front of the machine (as you sit in the operator's seat). Slowly move both steering levers* (Item 1) [Figure 44] forward for forward travel; backward for reverse travel.

* Travel can also be controlled with foot pedals (Item 2) [Figure 44]. Pivot the heel of the pedals forward for additional space on the floor.

WARNING

AVOID INJURY OR DEATH

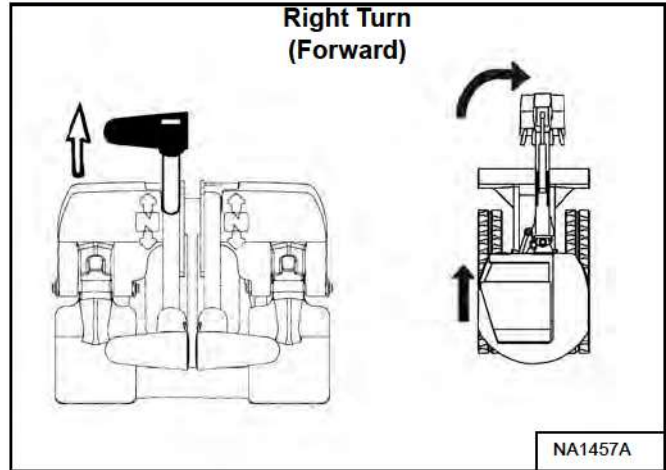
- Check the blade location before traveling. When the blade is to the rear, operate the steering levers / foot pedals in the opposite direction to when the blade is in the front.
- Move the steering levers / foot pedals slowly. Abrupt lever motion will cause the machine to jerk.

W-2235-0396

Turning

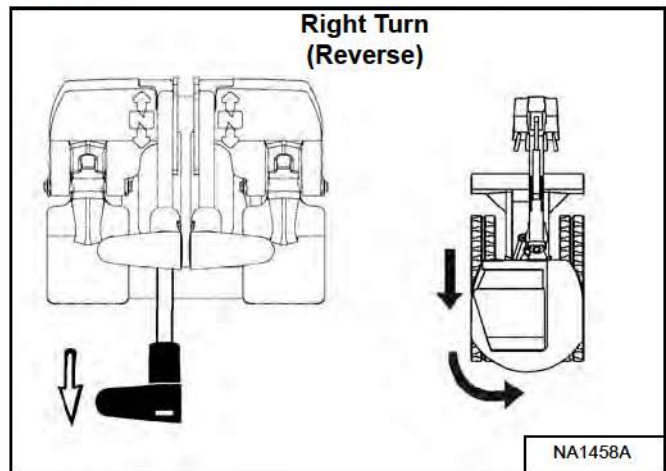
Right Turn

Figure 45



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

Figure 46



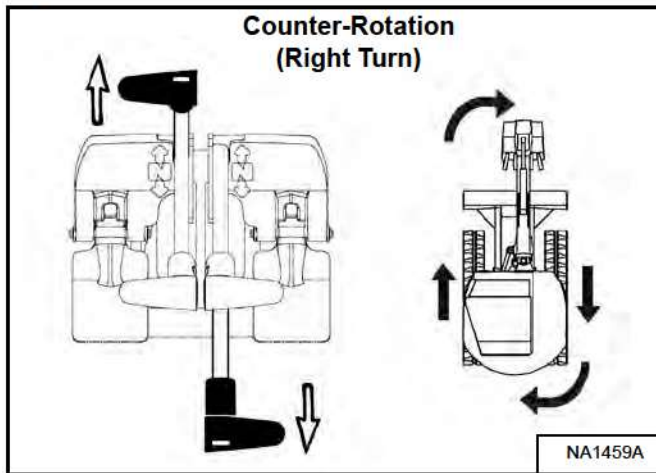
Pull the left steering lever backward to turn right while traveling backward [Figure 46]

TRAVEL CONTROLS (CONT'D)

Turning (Cont'd)

Counter-Rotation Right Turn

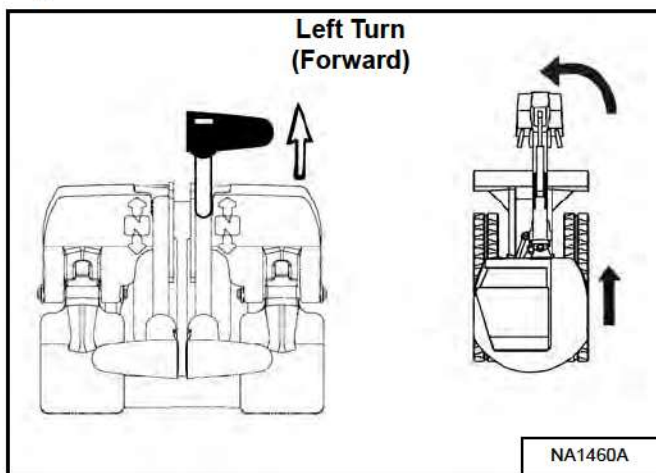
Figure 47



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

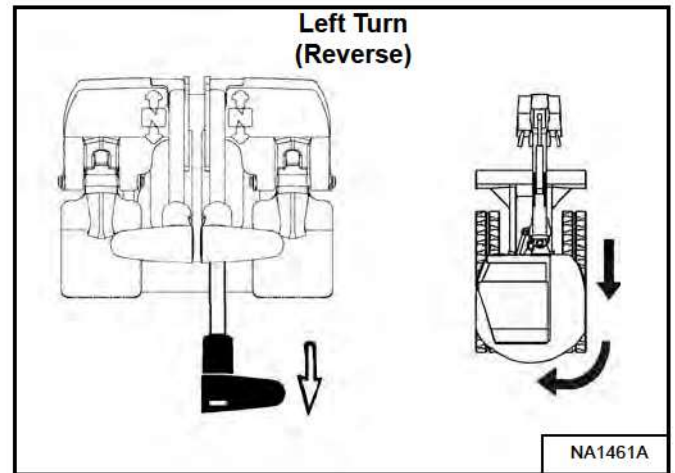
Left Turn

Figure 48



Push the right steering lever forward to turn left while traveling forward [Figure 48].

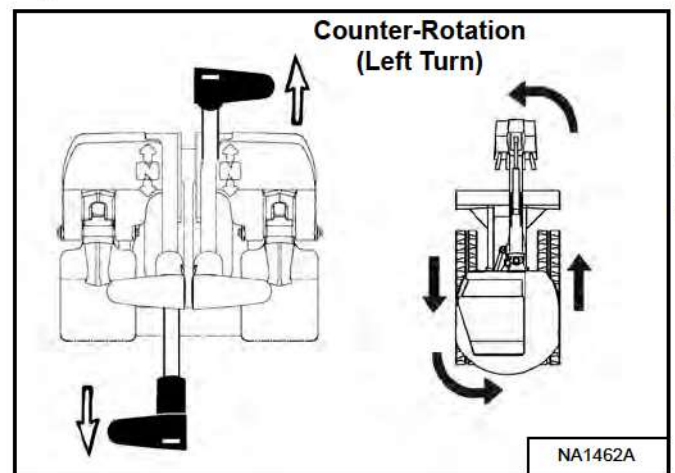
Figure 49



Pull the right steering lever backward to turn left while traveling backward [Figure 49].

Counter-Rotation Left Turn

Figure 50



Push the right steering lever forward and pull the left steering lever backward [Figure 50].

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HYDRAULIC CONTROLS

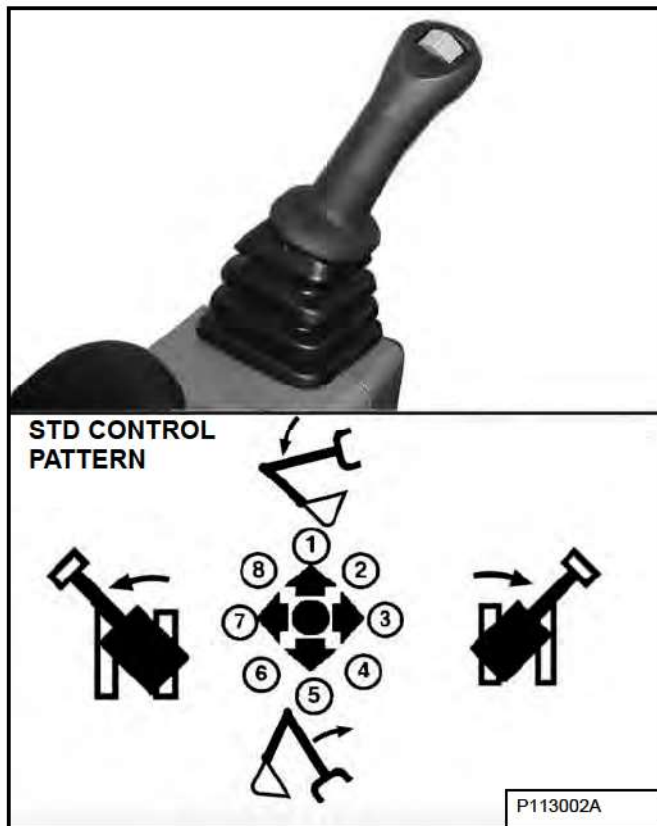
Description

The work equipment (boom, arm, bucket, and upperstructure slew) is operated by using the left and right control levers (joysticks). These joysticks can be used in either a STANDARD Control Pattern [Figure 51] and [Figure 52] or in the ISO Control Pattern [Figure 53] and [Figure 54].

STANDARD Control Pattern

Left Control Lever (Joystick)

Figure 51

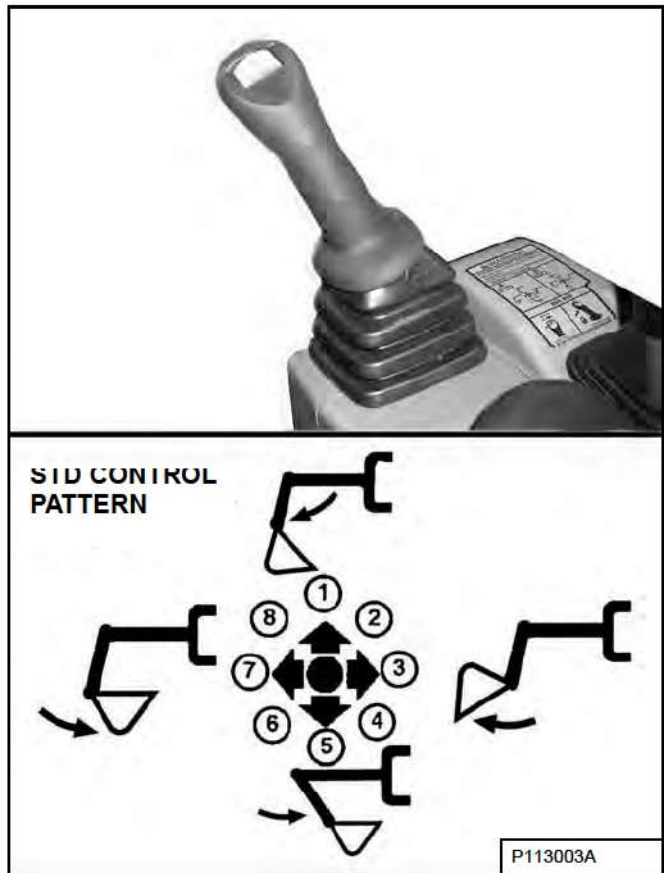


The left lever (joystick) is used to operate the boom and slew the upperstructure [Figure 51].

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

Right Control Lever (Joystick)

Figure 52



The right lever (joystick) is used to operate the arm and bucket [Figure 52].

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

! WARNING

AVOID INJURY OR DEATH

Before leaving the machine:

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

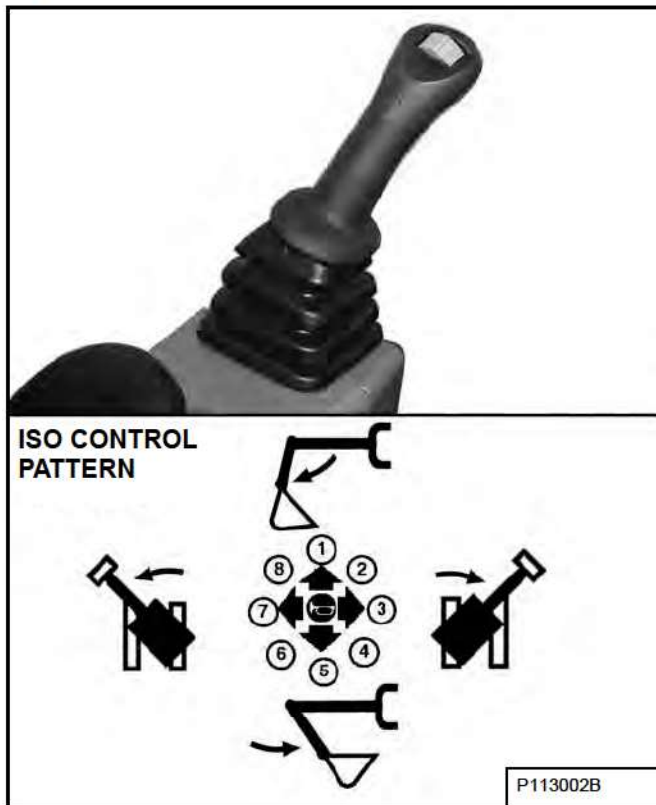
W-2780-0109

HYDRAULIC CONTROLS (CONT'D)

ISO Control Pattern

Left Control Lever (Joystick)

Figure 53

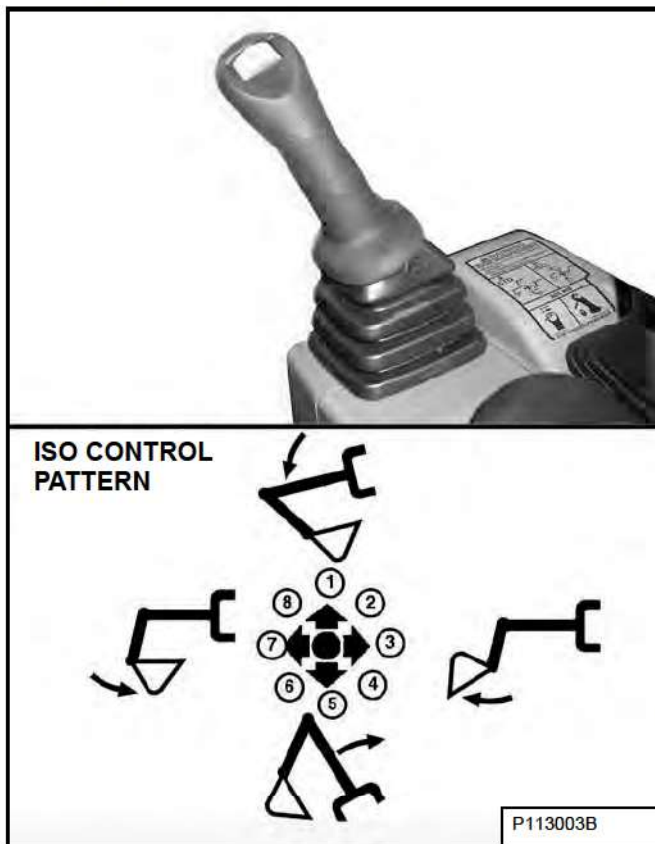


The left lever (joystick) is used to operate the arm and slew the upperstructure [Figure 53].

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

Right Control Lever (Joystick)

Figure 54



The right lever (joystick) is used to operate the boom and bucket [Figure 54].

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



WARNING

AVOID INJURY OR DEATH

Before leaving the machine:

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

W-2780-0109

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HYDRAULIC CONTROLS (CONT'D)

Quick Couplers

**WARNING**

AVOID BURNS

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

W-2220-0396

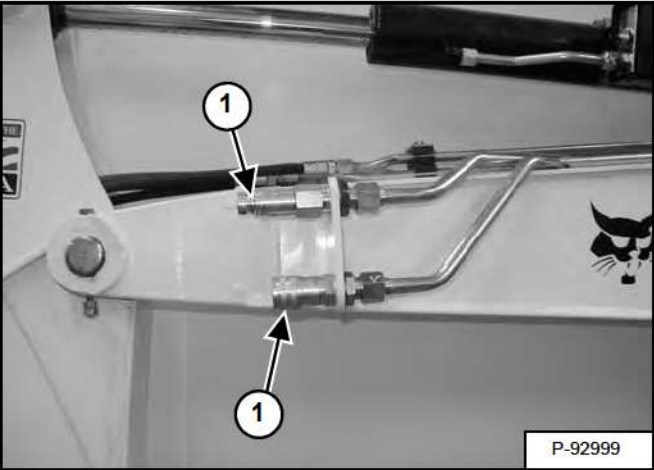
**WARNING**

AVOID INJURY OR DEATH

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

W-2072-0807

Figure 55



Excavators and attachments are supplied with flush faced couplers (Item 1) [Figure 55].

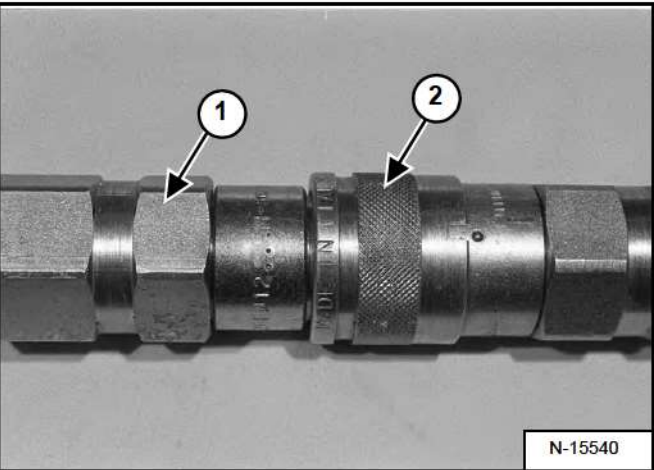
To Connect:

Remove any dirt or debris from the surface of both the male and female couplers, and from the outside diameter of the male coupler. Visually check the couplers for corroding, cracking, damage, or excessive wear, if any of these conditions exist, the coupler(s) (Item 1) [Figure 55] must be replaced.

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

To Disconnect:

Figure 56



Hold the male coupler (Item 1). Retract the sleeve (Item 2) [Figure 56] on the female coupler until the couplers disconnect.

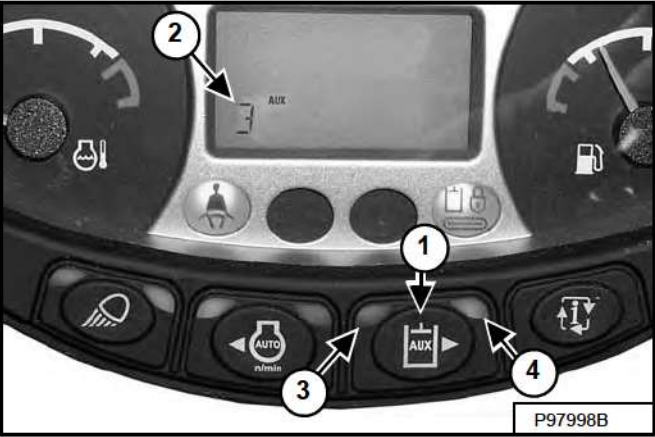
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HYDRAULIC CONTROLS (CONT'D)

Auxiliary Hydraulics - Standard Instrument Panel

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

Figure 57



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

Selectable Auxiliary Hydraulics Flow - Press the Auxiliary Hydraulics button (Item 1) (an audible beep will sound each time the auxiliary button is pressed). The last selected auxiliary hydraulic flow (Aux3, Aux2 or Aux1) will appear in the data display (Item 2). The LED (Item 3) [Figure 57] will be illuminated.

To change the auxiliary flow, press the Auxiliary Hydraulics button (Item 1) to toggle through the settings, each time the button is pressed, the next setting will appear in the data display (Item 2) [Figure 57]. Once the desired setting is selected, it will stay at that setting until a different auxiliary flow is selected by the operator. (Example: Even if the engine was STOPPED, if Aux2 has been selected, after key OFF and engine restart, the Aux2 setting will still be the active hydraulic flow when the machine is started.)

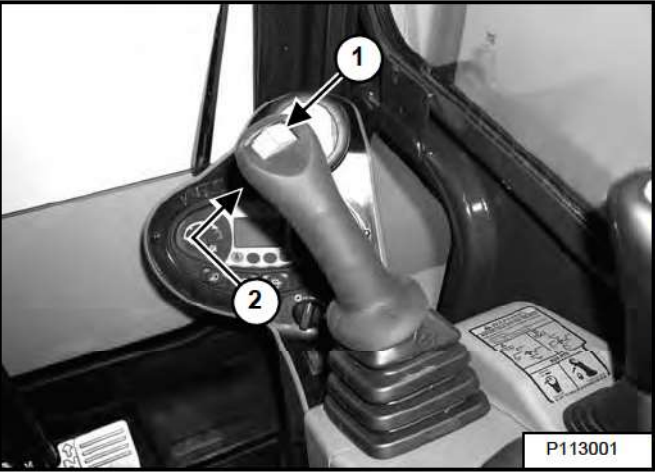
Continuous Flow Auxiliary Hydraulics - Press and hold the Auxiliary Hydraulics button (Item 1) for more than one second. The LED (Item 4) will illuminate. Press the Auxiliary Hydraulics button (Item 1) [Figure 57] again to scroll through the various continuous flow auxiliary hydraulic settings (3, 2, 1).

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

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

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

Figure 58



Move the switch (Item 1) [Figure 58] on the right control lever to the right to supply hydraulic flow to the female coupler. Move the switch to the left to supply hydraulic flow to the male coupler. If you move the switch halfway, the auxiliary functions move at approximately one-half speed.

Press the button (Item 2) [Figure 58] on the front of the handle to provide continuous flow to the female coupler.

NOTE: Pressing the switch (Item 1) to the left while pressing the button (Item 2) [Figure 58] on the front of the handle will provide continuous flow to the male coupler.

Press the button (Item 2) [Figure 58] a second time to stop auxiliary flow to the quick couplers.

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

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HYDRAULIC CONTROLS (CONT'D)

Auxiliary Hydraulics - Deluxe Instrument Panel

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

Figure 59



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

Selectable Flow Auxiliary Hydraulics - Press key pad [6] [Figure 59] to scroll through the various front auxiliary hydraulic settings (3, 2, 1).

Continuous Flow Auxiliary Hydraulics - Press and hold the key pad [6] [Figure 59] for more than one second. The continuous flow icons below will illuminate. Press the key pad [6] to scroll through the various continuous flow auxiliary hydraulic settings (3, 2, 1).

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

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

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

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

Figure 60



Move the switch (Item 1) [Figure 60] on the right control lever to the right to supply hydraulic flow to the female coupler. Move the switch to the left to supply hydraulic flow to the male coupler. If you move the switch halfway, the auxiliary functions move at approximately one-half speed.

Press the button (Item 2) [Figure 60] on the front of the handle to provide continuous flow to the female coupler.

NOTE: Pressing the switch (Item 1) to the left while pressing the button (Item 2) [Figure 60] on the front of the handle will provide continuous flow to the male coupler.

Press the button (Item 2) [Figure 60] a second time to stop auxiliary flow to the quick couplers.

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

HYDRAULIC CONTROLS (CONT'D)

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

Excavator:

Put the attachment flat on the ground.

Stop the engine and turn the key switch to ON.

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

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

Figure 61



If the auxiliary hydraulics are disabled, press AUX HYD button (Item 1) [Figure 61] and then move the switch (Item 1) [Figure 60] to the right and left several times.

If the auxiliary hydraulics are enabled, then move the switch (Item 1) [Figure 60] to the right and left several times.

Attachments:

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

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

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

Excavator:

Put the attachment flat on the ground.

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

Figure 62



Stop the engine and turn the start switch to ON. Press either Scroll button (Item 1) [Figure 62] (Deluxe Panel) until the above screen is visible.

Press button [6] [Figure 62] and the [AUX PRESSURE RELEASE] screen [Figure 63] will be visible.

Figure 63



Press the [ENTER] button (Item 1) [Figure 63] to relieve auxiliary pressure in the excavator. An hour glass symbol will appear and when pressure is relieve, the screen will show *Auxiliary Hydraulic Pressure Release*.

Attachments:

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

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

HYDRAULIC CONTROLS (CONT'D)

Secondary Auxiliary Hydraulics

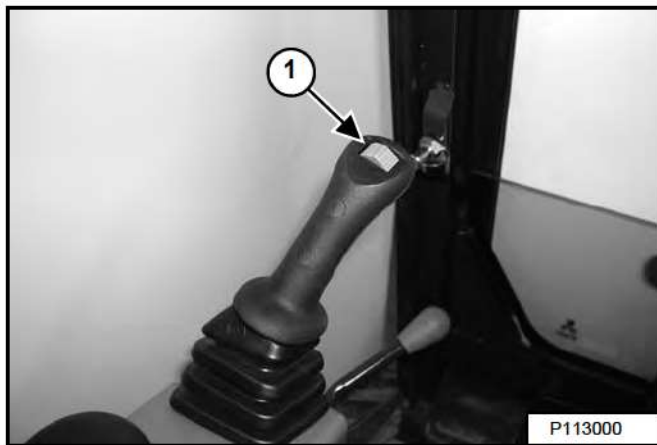
When equipped with secondary auxiliary hydraulics, the second set of hydraulic couplers will be mounted on the right side of the arm.

Figure 64



Press AUX HYD button (Item 1) [Figure 64] (if equipped) to the right, secondary auxiliary hydraulic position.

Figure 65



Move the switch (Item 1) [Figure 65] on the left control lever to the left to supply hydraulic flow to the female coupler. Move the switch to the right to supply hydraulic flow to the male coupler. If you move the switch halfway, the auxiliary functions move at approximately one-half speed.

Relieve Secondary Auxiliary Hydraulic Pressure (Excavator And Attachment)

Excavator:

Put the attachment flat on the ground.

Stop the engine and turn the key to ON.

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

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

Press AUX HYD button (Item 1) [Figure 64] and then move the switch (Item 1) [Figure 65] to the right and left several times.

Attachments:

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

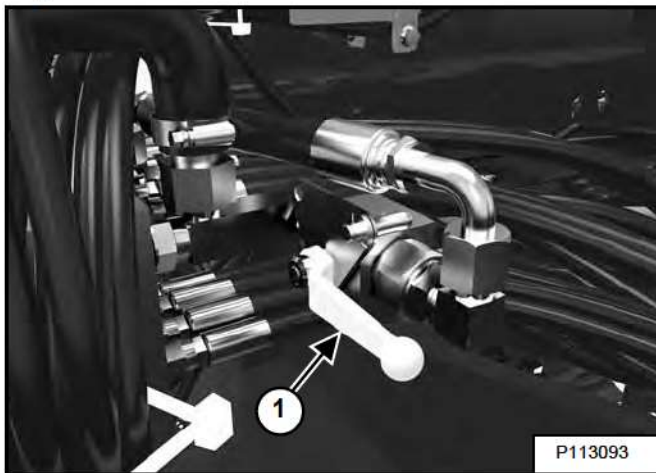
Hydraulic pressure in the auxiliary hydraulic system can make it difficult to engage quick couplers to an attachment.

HYDRAULIC CONTROLS (CONT'D)

Return To Tank Valve

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

Figure 66



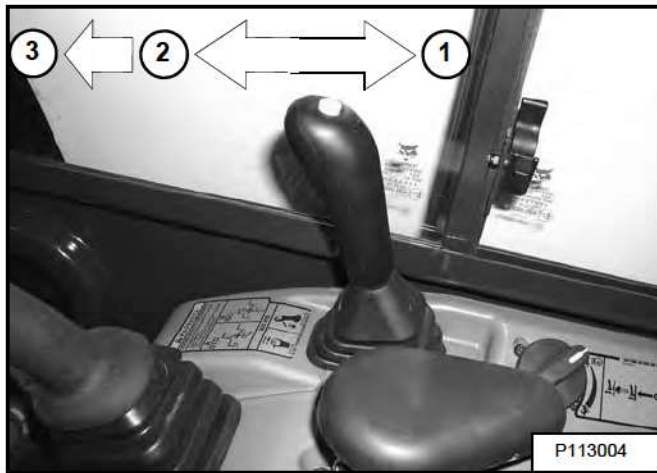
Rotate the lever (Item 1) **[Figure 66]** clockwise to direct auxiliary return hydraulic fluid to the reservoir.

Rotate the lever (Item 1) **[Figure 66]** counterclockwise for two way hydraulic auxiliary flow operation.

BLADE CONTROL LEVER

Raising And Lowering Blade

Figure 67



NOTE: The blade lever shown in [Figure 67] is for machines without angle blade. For machines with angle blade, the blade lever is shown in [Figure 68].

Pull the lever backward to raise the blade (Item 1) [Figure 67].

Push the lever forward to lower the blade (Item 2) [Figure 67].

Push the lever (Item 3) [Figure 67] forward until the lever is in the locked position to put the blade in the *float* position.

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

NOTE: Keep blade lowered for increased digging performance.

Angling Blade (If Equipped)

Figure 68

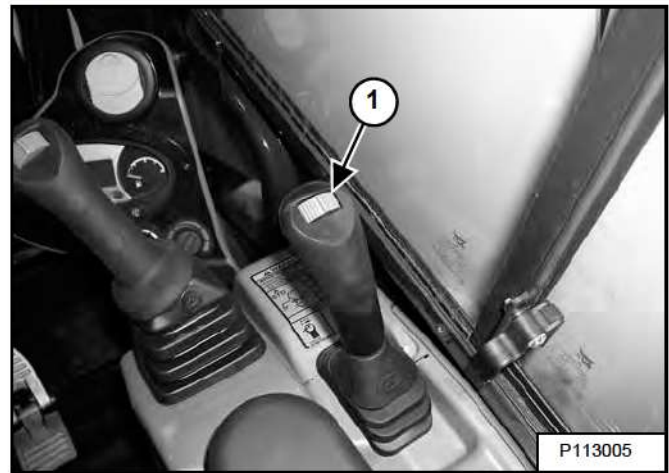
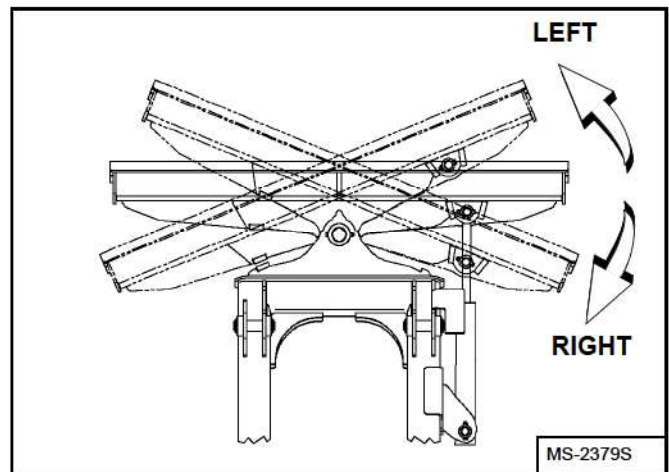


Figure 69



Move the switch (Item 1) [Figure 68] to the left to angle the blade to the left [Figure 69].

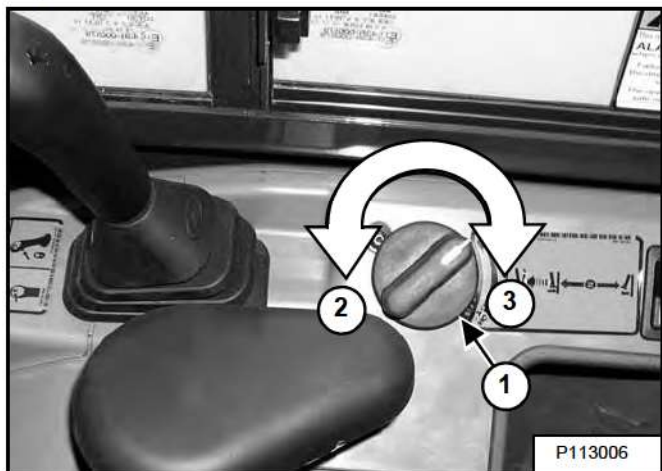
Move the switch (Item 1) [Figure 68] to the right to angle the blade to the right [Figure 69].

NOTE: Always have the blade straight for excavating or for lifting the excavator.

ENGINE SPEED CONTROL DIAL

Setting Engine Speed (RPM)

Figure 70



The engine speed control dial (Item 1) **[Figure 70]** controls engine rpm.

Rotate the engine speed control dial counterclockwise (Item 2) to reduce engine rpm. Rotate the engine speed control dial clockwise (Item 3) **[Figure 70]** to increase engine rpm.

ECO Mode (With Deluxe Instrument Panel Only)

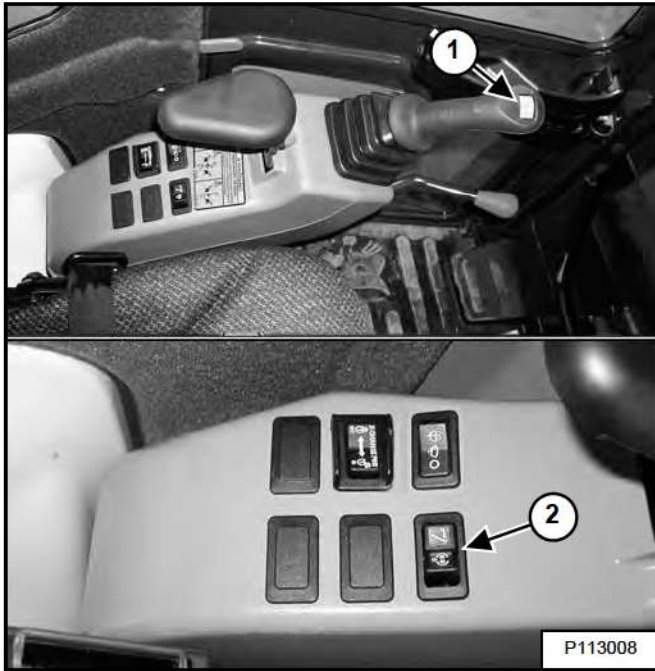
If equipped with the Deluxe Instrument Panel, ECO mode is available.

To enable ECO mode: (See ECO MODE on Page 162.)

BOOM SWING

Operation

Figure 71



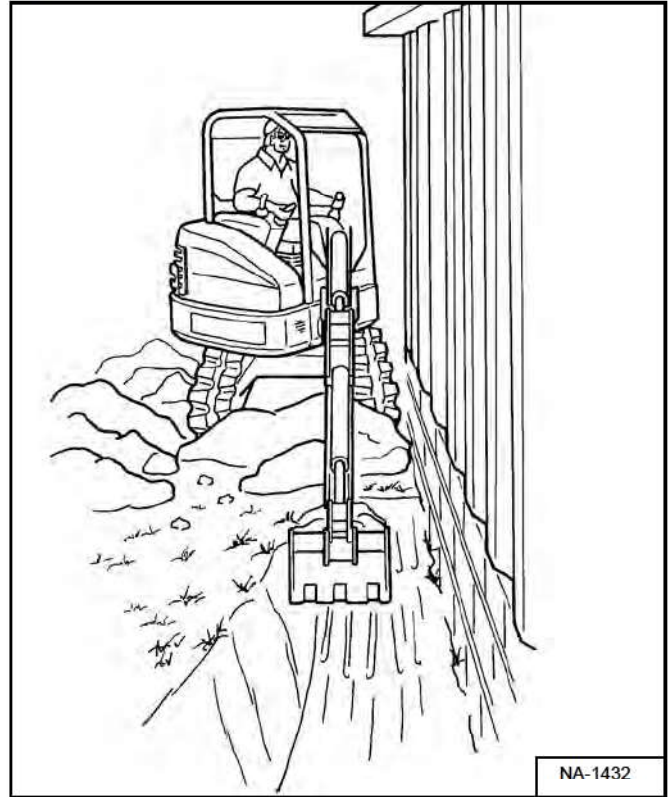
The switch (Item 1) [Figure 71] on the left control lever (joystick) controls boom swing. Move the switch to the left to swing the boom to the left. Move the switch to the right to swing the boom to the right.

If Equipped With Secondary Auxiliary Hydraulics:

If the machine is equipped with secondary auxiliary hydraulic couplers, the switch (Item 2) [Figure 71] is used to select either the boom swing function or the secondary auxiliary hydraulic function.

Move the switch (Item 2) [Figure 71] to the left to select boom swing function, move the switch to the right to select secondary auxiliary hydraulic function.

Figure 72



NOTE: The purpose of the boom swing is to offset the boom with respect to the upperstructure for digging close to a structure [Figure 72].

BOOM LOAD HOLDING VALVE

Description

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

WARNING

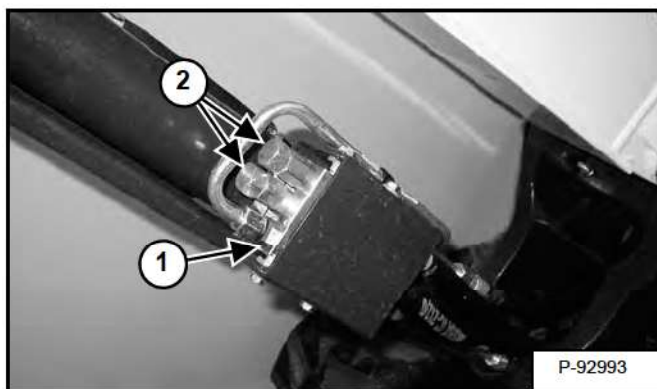
AVOID INJURY OR DEATH

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

W-2793-0409

Lowering Boom With Load Holding Valve

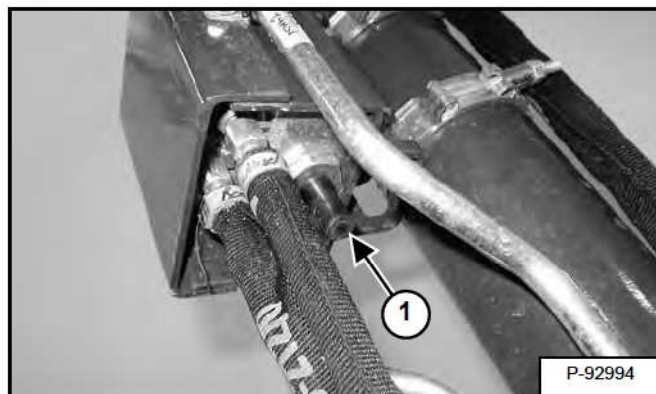
Figure 73



If the excavator is equipped with a boom load holding valve (Item 1) [Figure 73], it will be attached to the boom cylinder at the base end.

NOTE: DO NOT remove or adjust the two port relief valves (Item 2) [Figure 73]. If the port relief valves have been tampered with, see your Bobcat dealer for service.

Figure 74



Remove the plastic protective cap (Item 1) [Figure 74] from the valve.

WARNING

AVOID BURNS

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

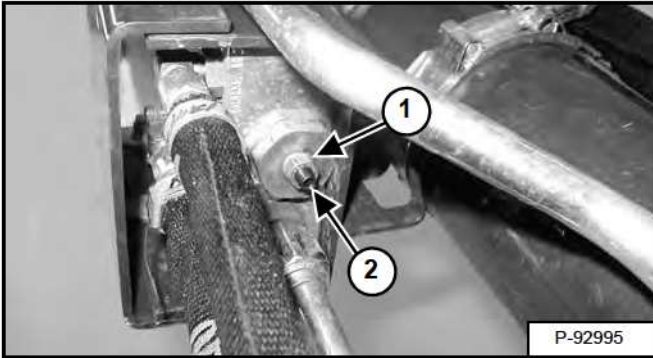
W-2220-0396

Dealer Copy -- Not for Resale

BOOM LOAD HOLDING VALVE (CONT'D)

Lowering Boom With Load Holding Valve (Cont'd)

Figure 75



Loss of hydraulic pressure:

Use the same procedure as: With rod end hose failure and NO accumulator pressure.

Lowering procedures:

With base end hose failure:

Loosen the jam nut (Item 1). Install a hex wrench into the valve screw (Item 2) [Figure 75] and slowly rotate the screw clockwise 1/8 to 1/4 turn and allow the boom to lower to the ground.

After the boom is fully lowered, rotate the screw counterclockwise (Item 2) 1/8 to 1/4 turn and tighten the lock nut (Item 1) [Figure 75].

With rod end hose failure - with accumulator pressure:

Place a container under the valve and hose end to contain hydraulic fluid. Enter the excavator and turn the key to the ON position or press the ENTER CODE Button (Keyless Panel), but do not start the engine. Slowly move the joystick boom lower function and allow the boom to lower to the ground.

With rod end hose failure and NO accumulator pressure:

Remove the boom base end hose from the boom load holding valve. Place a container under the valve and base end hose to contain hydraulic fluid.

Loosen the jam nut (Item 1). Install a hex wrench into the valve screw (Item 2) [Figure 75] and slowly rotate the screw clockwise 1/8 to 1/4 turn and allow the boom to lower to the ground.

After the boom is fully lowered, rotate the screw (Item 2) counterclockwise 1/8 to 1/4 turn and tighten the lock nut (Item 1) [Figure 75]. Reinstall the base end hose.

ARM LOAD HOLDING VALVE

Description

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

WARNING

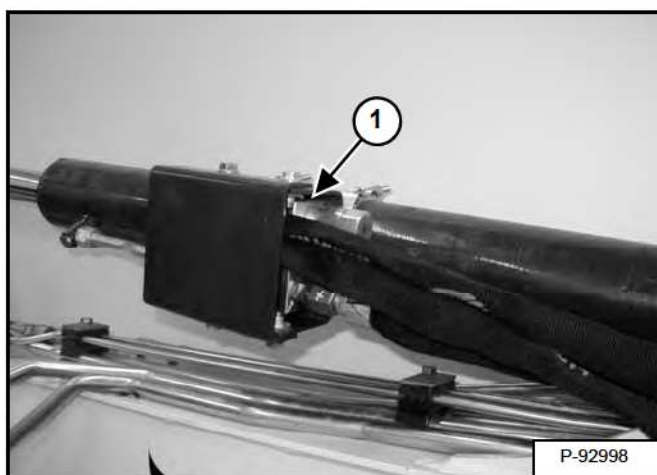
AVOID INJURY OR DEATH

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

W-2793-0409

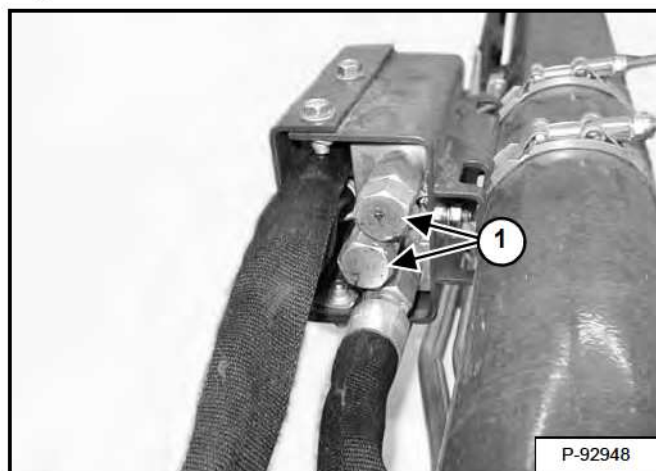
Lowering Arm With Load Holding Valve

Figure 76



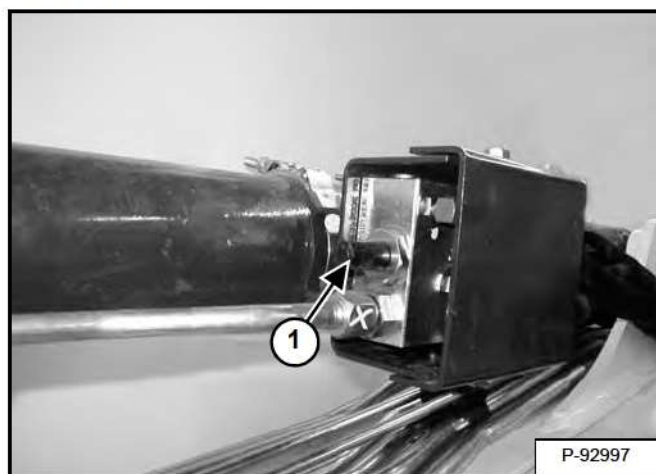
If the excavator is equipped with arm load holding valve (Item 1) [Figure 76], it will be attached to the arm cylinder base end as shown.

Figure 77



NOTE: DO NOT remove or adjust the two port relief valves (Item 1) [Figure 77]. If the port relief valves have been tampered with, see your Bobcat dealer for service.

Figure 78



Remove the plastic protective cap (Item 1) [Figure 78] from the valve.

WARNING

AVOID BURNS

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

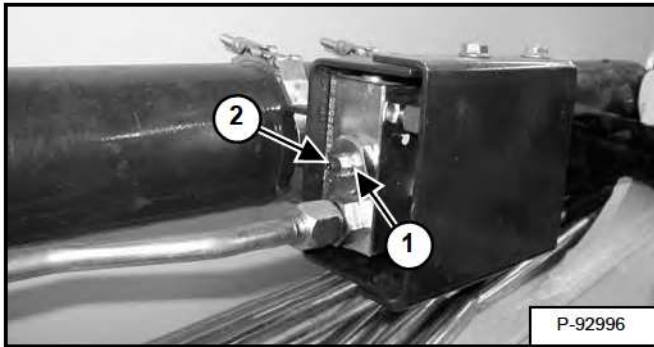
W-2220-0396

Dealer Copy -- Not for Resale

ARM LOAD HOLDING VALVE (CONT'D)

Lowering Arm With Load Holding Valve (Cont'd)

Figure 79



Loss of hydraulic pressure:

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

Lowering procedures:

With base end hose failure:

Loosen the jam nut (Item 1). Install a hex wrench into the valve screw (Item 2) [Figure 79] and slowly rotate the screw clockwise 1/8 to 1/4 turn and allow the arm to lower.

After the arm is lowered, rotate the screw counterclockwise (Item 2) the same 1/8 to 1/4 turn and tighten the lock nut (Item 1) [Figure 79].

With rod end hose failure - with accumulator pressure:

Place a container under the valve and hose end to contain hydraulic fluid. Enter the excavator and turn the key to the ON position or press the ENTER CODE Button (Keyless Panel), but do not start the engine. Move the joystick arm retract function to slowly lower the arm.

With rod end hose failure and NO accumulator pressure:

Remove the arm base end hose from the arm load holding valve. Place a container under the valve and base end hose to contain hydraulic fluid.

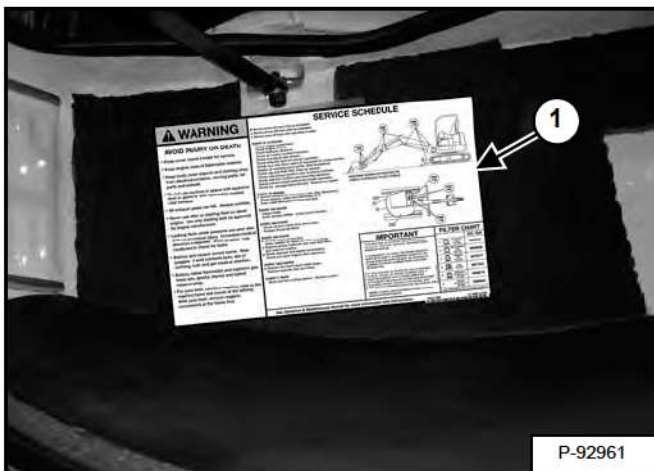
Loosen the jam nut (Item 1). Install a hex wrench into the valve screw (Item 2) [Figure 79] and slowly rotate the screw clockwise 1/8 to 1/4 turn and allow the arm to lower.

After the arm is lowered, rotate the screw (Item 2) counterclockwise 1/8 to 1/4 turn and tighten the lock nut (Item 1) [Figure 79]. Reinstall the base end hose.

DAILY INSPECTION

Daily Inspection And Maintenance

Figure 80



Maintenance work must be done at regular intervals. Failure to do so will result in excessive wear and early failures. The Service Schedule is a guide for correct maintenance of the Bobcat excavator. The decal (Item 1) [Figure 80] is located on the rear door top of the right side cover. (See SERVICE SCHEDULE on Page 107.)

Check the following items before each day of operation:

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

! WARNING

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

W-2001-0502

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

IMPORTANT

PRESSURE WASHING DECALS

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

I-2226-0910

IMPORTANT

This machine is factory equipped with a U.S.D.A. Forestry Service approved spark arrester exhaust system.

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

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

If this machine is operated on flammable forest, brush, or grass covered land, it must be equipped with a spark arrester attached to the exhaust system and maintained in working order. Failure to do so will be in violation of California State Law, Section 4442. PRC. Refer to local laws and regulations for spark arrester requirements.

I-2284-0111

PRE-STARTING PROCEDURE

Operation & Maintenance Manual And Operator's Handbook Locations

Figure 81

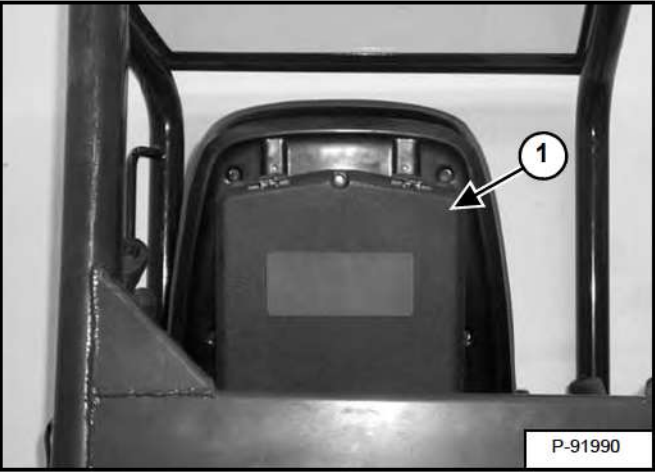
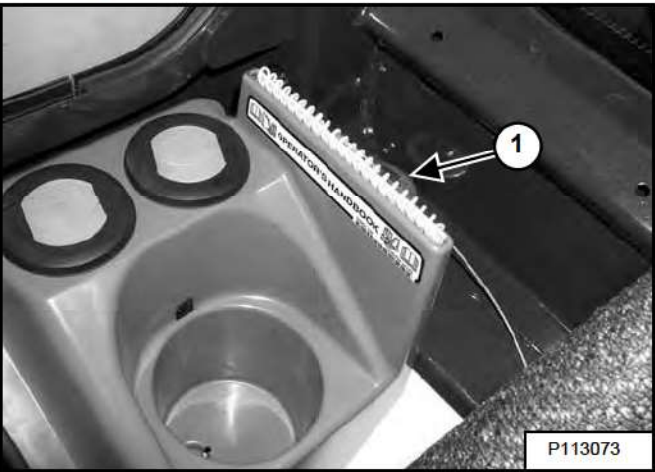


Figure 82



Read and understand the Operation & Maintenance Manual (Item 1) [Figure 81] (located inside the storage box on the back of the operator's seat) and the Operator's Handbook (Item 1) [Figure 82] before operating.

Entering The Excavator

Figure 83



Use the grab handles and tracks to enter the canopy / cab [Figure 83].

**WARNING**

AVOID INJURY OR DEATH

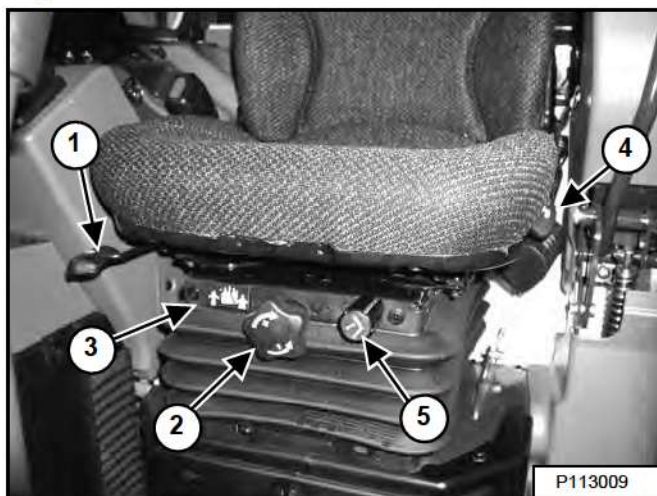
Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, Operator's Handbook and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after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

W-2003-0807

PRE-STARTING PROCEDURE (CONT'D)

Seat Adjustment

Figure 84



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

Turn the handle (Item 2) to change the adjustment for operator weight. Turn the handle until the operator's weight is shown in the window (Item 3) [Figure 84].

Release the lever (Item 4) [Figure 84] to change the incline of the seat back.

Sit in the seat and turn the knob (Item 5) [Figure 84] to adjust the height of the seat.

Seat Belt

Figure 85

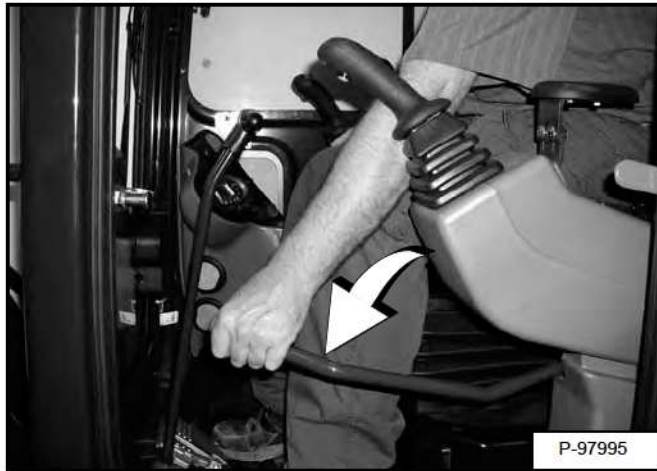


Fasten the seat belt [Figure 85].

PRE-STARTING PROCEDURE (CONT'D)

Control Console

Figure 86



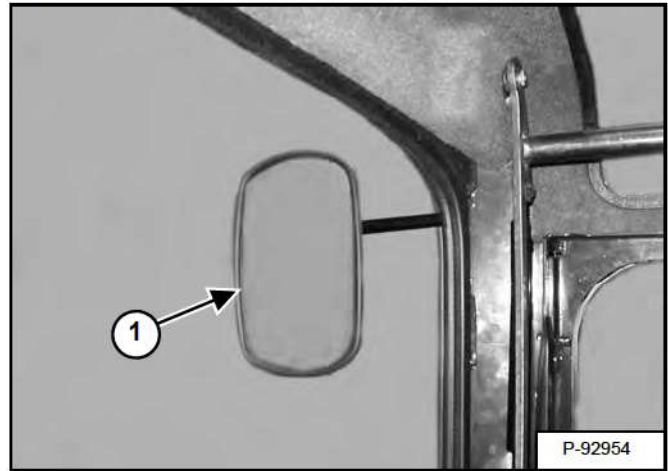
Lower the control console [Figure 86].

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

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

Mirror Adjustment

Figure 87



Adjust mirrors (Item 1) [Figure 87] (if equipped).

STARTING THE ENGINE

Key Switch

! WARNING

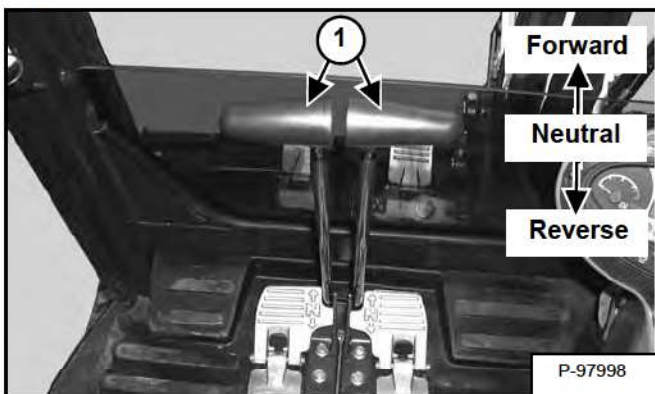
AVOID INJURY OR DEATH

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

W-2135-1108

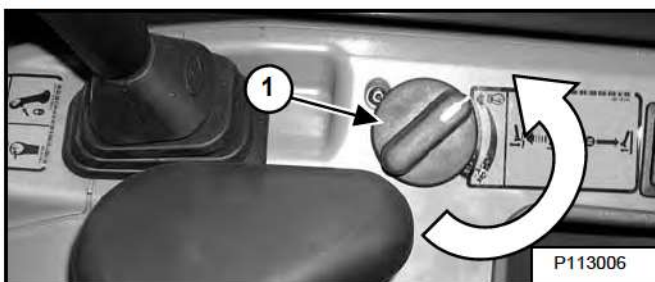
Perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page 68.)

Figure 88



Put control levers (Item 1) [Figure 88] in the NEUTRAL position.

Figure 89



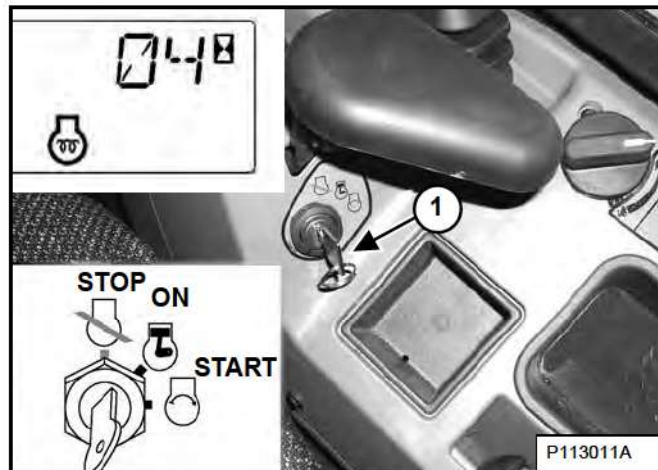
Turn the engine speed control dial (Item 1) [Figure 89] counterclockwise to low idle.

IMPORTANT

Do not engage the starter for longer than 15 seconds at a time. Longer use can damage the starter by overheating. Allow starter to cool for one minute before using starter again.

I-2034-0700

Figure 90



Turn the key (Item 1) [Figure 90] to the ON position. If preheating is required, the glow plugs will automatically cycle and the remaining preheat time (in seconds) will show in the data display screen (see inset). (Preheat icon will be ON).

Turn the key to START and release the key when the engine starts. It will return to the ON position [Figure 90].

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

Turn the key switch OFF to stop the engine.

! WARNING

AVOID INJURY OR DEATH

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

W-2050-0807

! WARNING

AVOID SERIOUS INJURY OR DEATH

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

W-2051-0212

STARTING THE ENGINE (CONT'D)

Keyless

**WARNING**

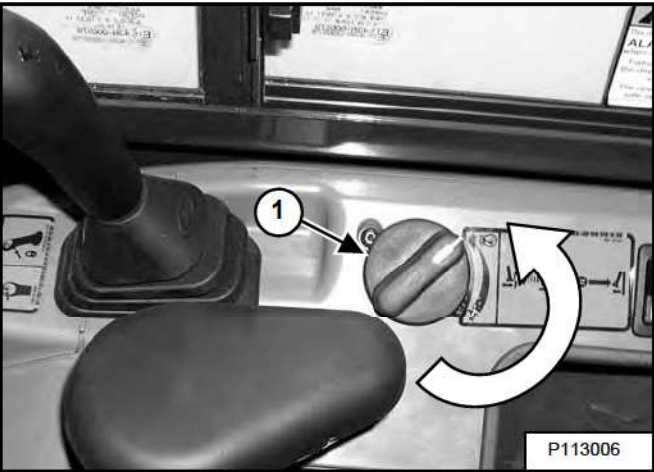
AVOID INJURY OR DEATH

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

W-2135-1108

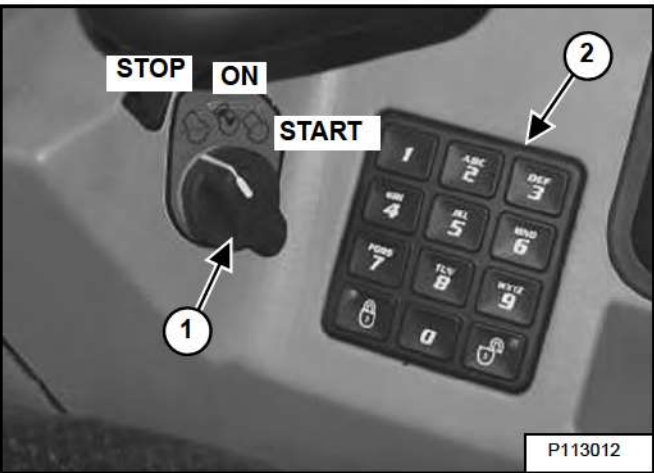
Perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page 68.)

Figure 91



Rotate the engine speed control dial (Item 1) [Figure 91] to low idle.

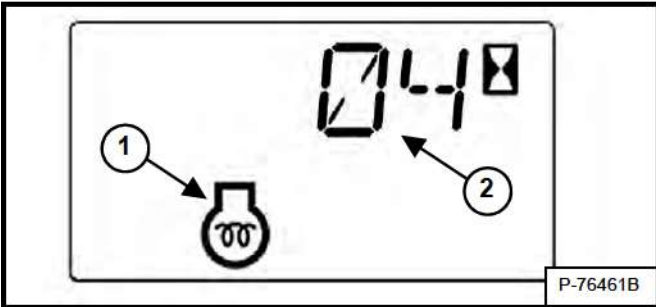
Figure 92



Turn the start switch (Item 1) [Figure 92] to ON. The indicator lights on the instrument panel will come ON briefly and the Instrument Panel / monitoring system will do a self test.

Use the keypad (Item 2) [Figure 92] to enter the password.

Figure 93



If preheating is required, the glow plugs will automatically cycle based on temperature. The engine preheat icon (Item 1) will be ON and the cycle time remaining (Item 2) [Figure 93] will be shown on the data display.

When the engine preheat icon goes OFF, turn the start switch (Item 1) [Figure 92] to START position and hold it until the engine starts. Release the switch and it will return to the ON position.

IMPORTANT

Do not engage the starter for longer than 15 seconds at a time. Longer use can damage the starter by overheating. Allow starter to cool for one minute before using starter again.

I-2034-0700

Turn the start switch (Item 1) [Figure 92] to the STOP position to stop the engine.

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

Check for the cause before starting the engine again.

Password Lockout Feature

See Password Lockout Feature. (See Password Lockout Feature on Page 166.)

STARTING THE ENGINE (CONT'D)

Deluxe Instrument Panel



WARNING

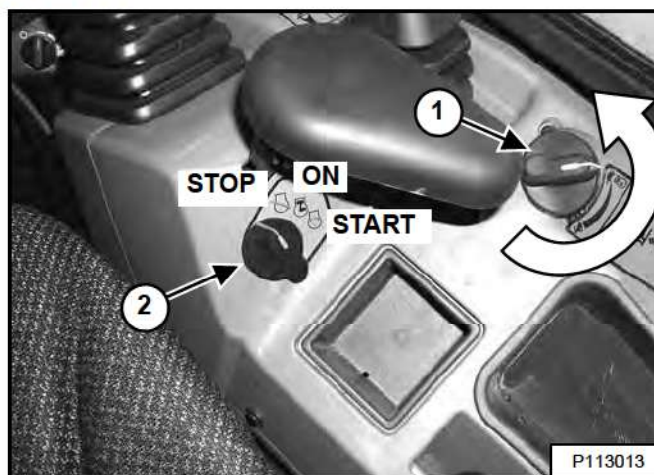
AVOID SERIOUS INJURY OR DEATH

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

W-2051-0212

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

Figure 94



Set the engine speed control (Item 1) [Figure 94] to the low idle position.

NOTE: Excavators with a Deluxe Instrument Panel have a permanent, randomly generated Master Password set at the factory. Your excavator will also be assigned an Owner Password. Your dealer will provide you with this password. Change the owner password to one that you will easily remember to prevent unauthorized use of your excavator. (See Changing The Owner, User 1 and User 2 Password on Page 165.) Keep your password in a safe location for future needs.

NOTE: The Password Lockout feature can be used to allow starting of the excavator without a password. If unlocked, the start switch will start the machine without using a password. (See Password Lockout Feature on Page 166.)

Figure 95



Turn the start switch (Item 2) [Figure 94] to ON. The message [ENTER PASSWORD] will appear on the display screen if the deluxe instrument panel is locked. (If not locked, use the start switch without a password to start the engine.)

Use the numeric keypad (Item 1) [Figure 95] to enter the password.

Figure 96



If preheating is required, the glow plugs will automatically cycle and the engine preheat icon (Item 1) [Figure 96] and will be shown in the data display.

When the engine preheat icon goes OFF, turn the key switch to START (Item 2). Release the switch when the engine starts and allow it to return to the ON position (Item 2) [Figure 95].

Turn the start switch (Item 2) [Figure 94] to the STOP position to stop the engine.

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

Check for the cause before starting the engine again.

Password Lockout Feature

See Password Lockout Feature. (See Password Lockout Feature on Page 166.)

STARTING THE ENGINE (CONT'D)

Warming The Hydraulic System

IMPORTANT

When the temperature is below -30°C (-20°F), hydrostatic oil must be warmed before starting. The hydrostatic system will not get enough oil at low temperatures and will be damaged. Park the machine in an area where the temperature will be above -18°C (0°F) if possible.

I-2007-0910

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

Cold Temperature Starting

WARNING

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

W-2071-0415

If the temperature is below freezing, perform the following to make starting the engine easier:

- Replace the engine oil with the correct type and viscosity for the anticipated starting temperature. (See Engine Oil Chart on Page 123.)
- Make sure the battery is fully charged.
- Install an engine heater.

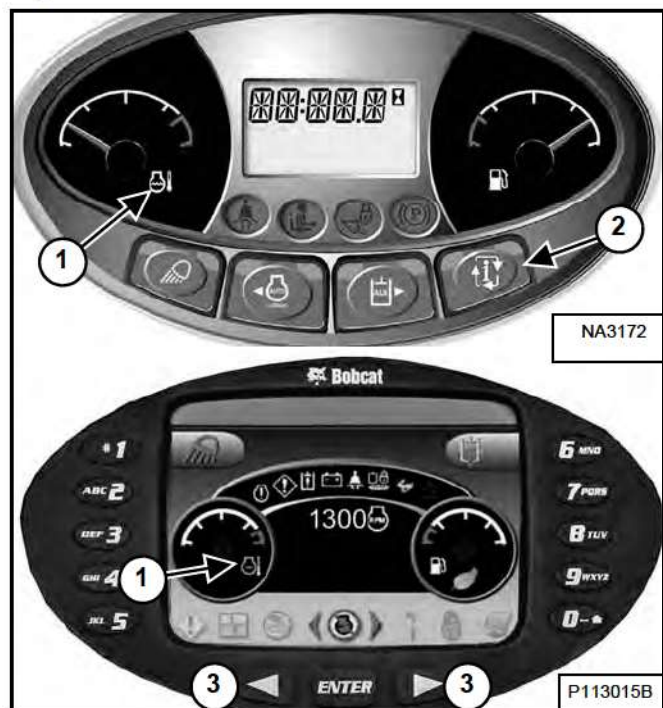
NOTE: If the battery is discharged (but not frozen) a booster battery can be used to jump start the excavator. (See Using A Booster Battery (Jump Starting) on Page 131.)

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

MONITORING THE DISPLAY PANELS

Instrument Panel

Figure 97



Frequently monitor the temperature and fuel gauges [Figure 97].

After the engine is running, frequently monitor the instrument panel [Figure 97] for machine condition.

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

EXAMPLE: Engine Coolant Temperature is High.

The Engine Coolant Temperature icon (Item 1) [Figure 97] is ON.

Press the Information button (Item 2) (Standard Panel) or press a scroll button (Item 3) [Figure 97] (Deluxe Panel) repeatedly to cycle the data display until the service code screen is displayed. One of the following SERVICE CODES is displayed.

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

Find the cause of the service code and correct before operating the excavator again. (See DIAGNOSTIC SERVICE CODES on Page 155.)

NOTE: The optional Deluxe Instrumentation Panel offers an additional view of service codes that includes a brief description. (See DIAGNOSTIC SERVICE CODES on Page 155.)

Warning And Shutdown

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

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

The SHUTDOWN feature is associated with the following icons:

General Warning
Engine Malfunction
Engine Coolant Temperature
Hydraulic Fluid Temperature

STOPPING THE ENGINE AND LEAVING THE EXCAVATOR

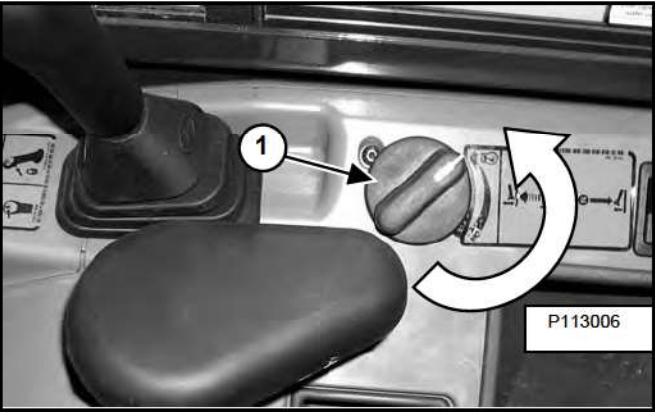
Procedure

Figure 98



Stop the machine on level ground. Lower the work equipment and the blade to the ground [Figure 98].

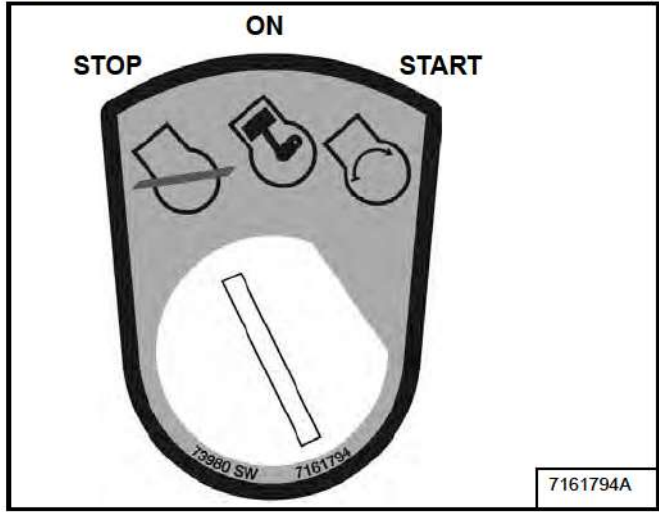
Figure 99



Rotate the engine speed control dial (Item 1) [Figure 99] counterclockwise to low idle.

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

Figure 100



Turn the switch to STOP [Figure 100].

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

ATTACHMENTS

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

Installation

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

WARNING

AVOID INJURY OR DEATH

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

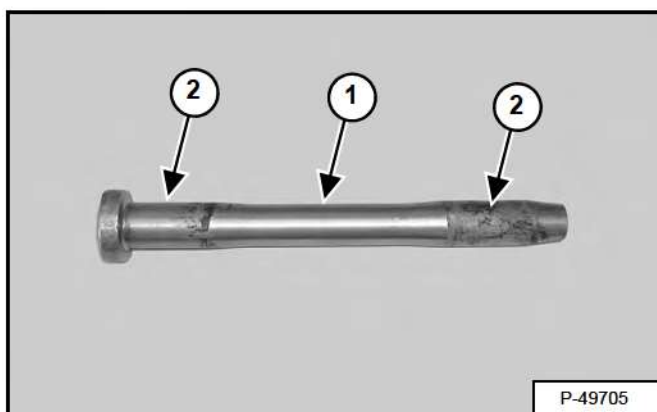
W-2052-0907

WARNING

Both hydraulic pins must be fully extended through the attachment mounting holes and locked with both retainer pins and clips. Failure to fully engage and lock hydraulic pins can allow attachment to come off and cause serious injury or death.

W-2507-0706

Figure 101



Inspect the pin (Item 1) [Figure 101] for wear or damage. Replace the pin as needed.

Apply a light coat of grease to the ends of the pin (Item 2) [Figure 101].

Figure 102



Start the engine and move the arm toward the bucket [Figure 102].

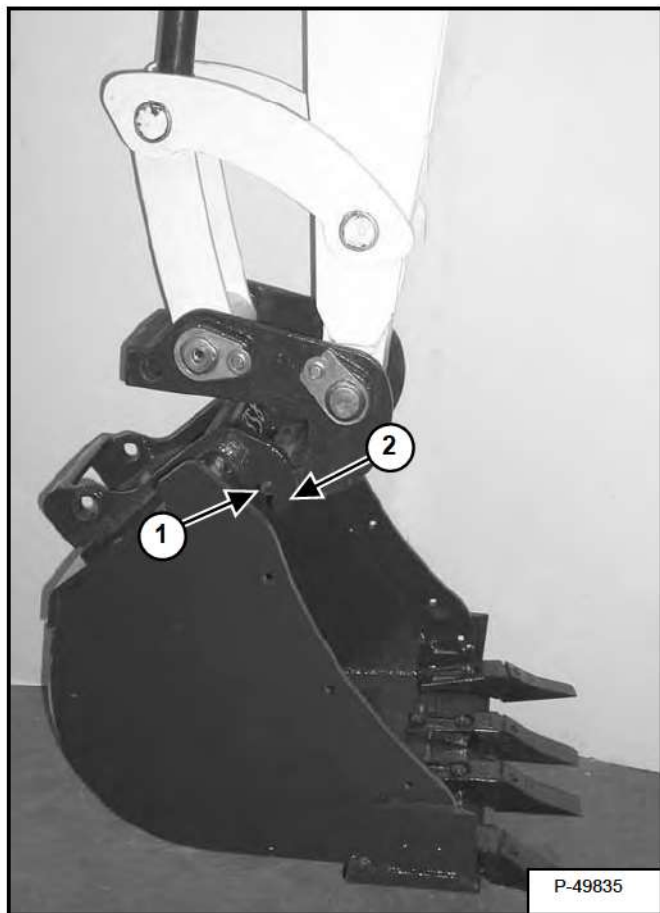
Dealer Copy -- Not for Resale

ATTACHMENTS (CONT'D)

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

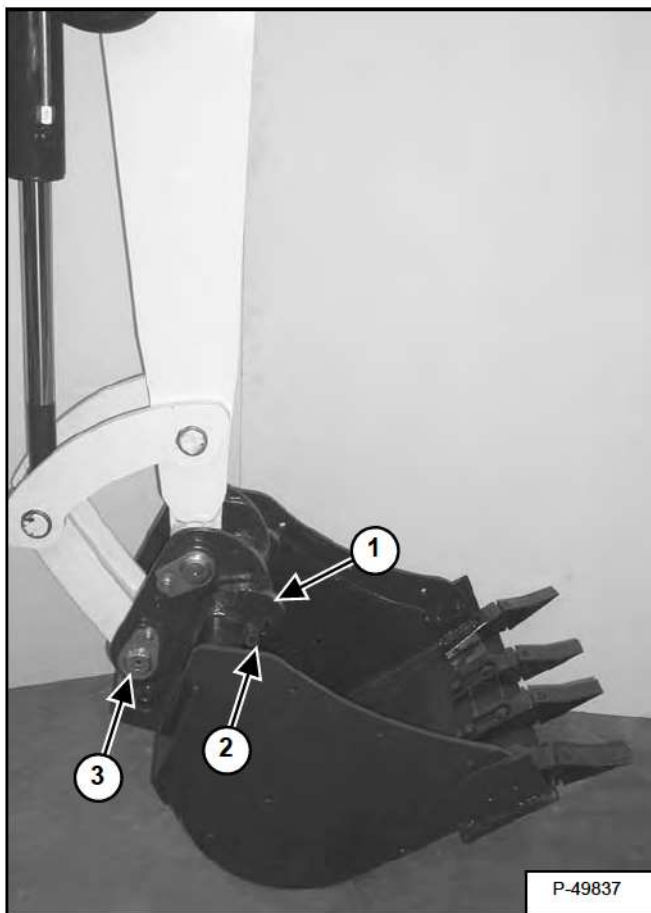
Installation (Cont'd)

Figure 103



Raise the boom until the pins (Item 1) engage the hooks (Item 2) [Figure 103] on the bucket.

Figure 104



Raise the boom and extend the bucket cylinder until the X-Change contacts the attachment back [Figure 104].

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 104] fully engages in the bucket crossmember.

WARNING

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

W-2119-0910

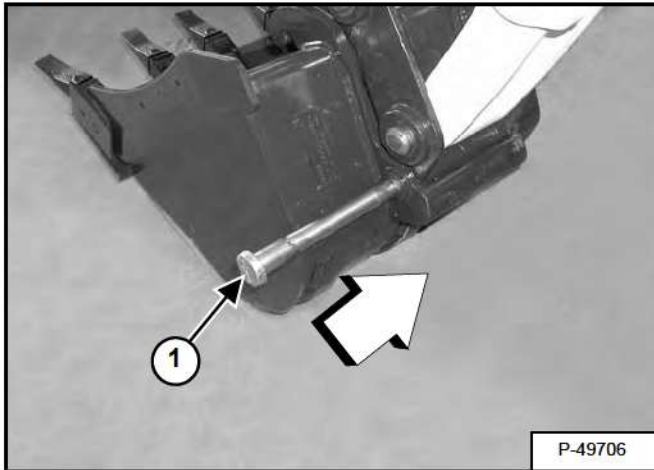
Dealer Copy -- Not for Resale

ATTACHMENTS (CONT'D)

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

Installation (Cont'd)

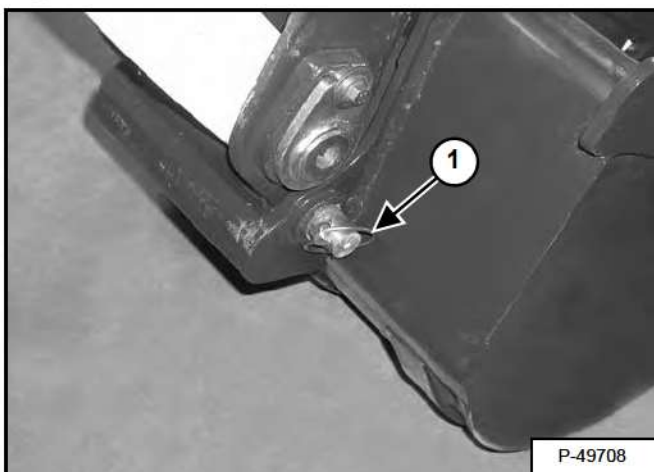
Figure 105



Stop the engine. Turn the start key to the ON position and move both hydraulic control levers to relieve hydraulic pressure.

Drive the pin (Item 1) [Figure 105] through the bucket mount and X-Change.

Figure 106



Install the retainer pin (Item 1) [Figure 106].

Check for proper installation.

Lift the attachment and fully extend and retract the bucket cylinder.

ATTACHMENTS (CONT'D)

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

Removal

Use the pin on X-Change when installing new attachments that are equipped with the pin on X-Change bracket.

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

WARNING

AVOID INJURY OR DEATH

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

W-2052-0907

Figure 107



Park the excavator on a flat level surface. Put the bucket on the ground [Figure 107].

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

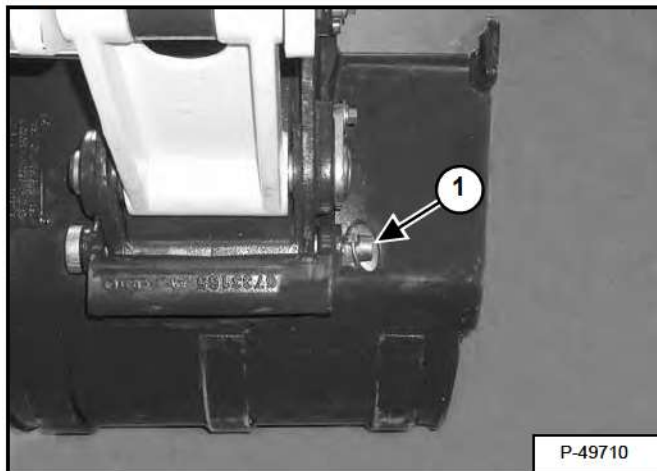
Dealer Copy -- Not for Resale

ATTACHMENTS (CONT'D)

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

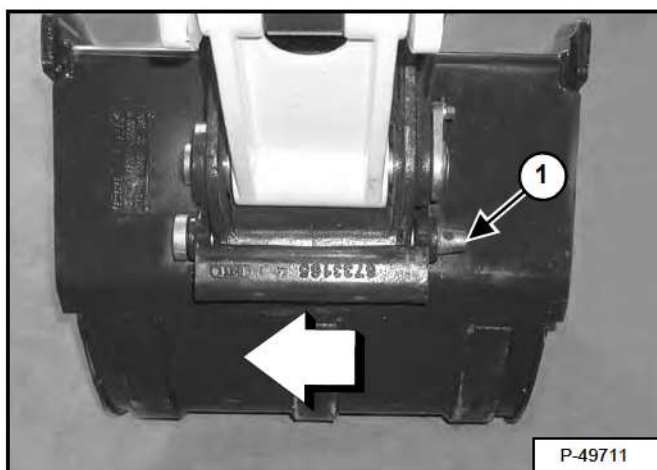
Removal (Cont'd)

Figure 108



Remove the retainer pin (Item 1) [Figure 108].

Figure 109



Drive the pin (Item 1) [Figure 109] out of the bucket and X-Change mount.



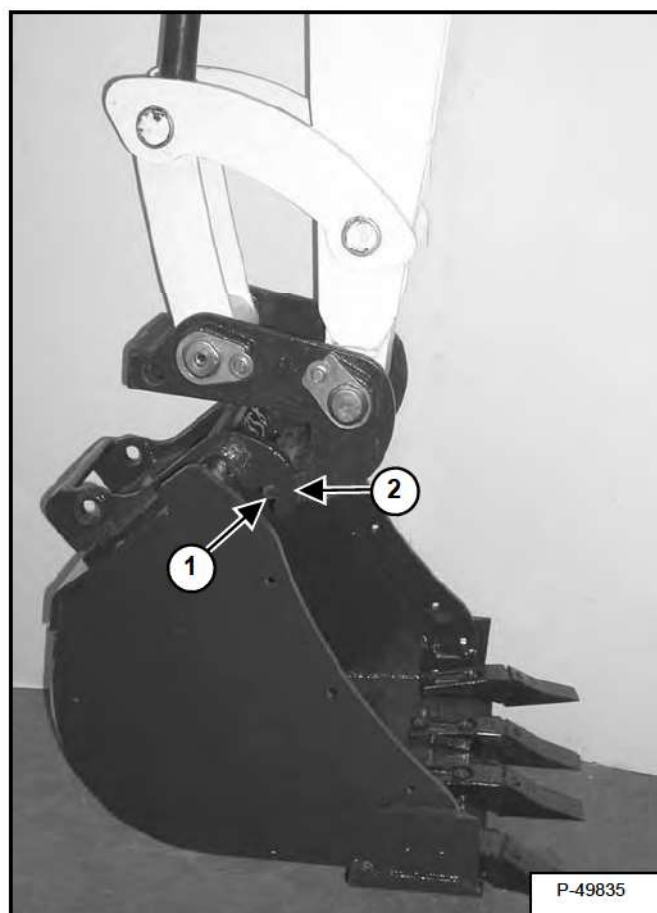
AVOID INJURY OR DEATH

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

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

W-2019-0907

Figure 110



Start the engine, raise the boom approximately one foot and retract the bucket cylinder until the X-Change pins (Item 1) engage the hooks (Item 2) [Figure 110] on the bucket.

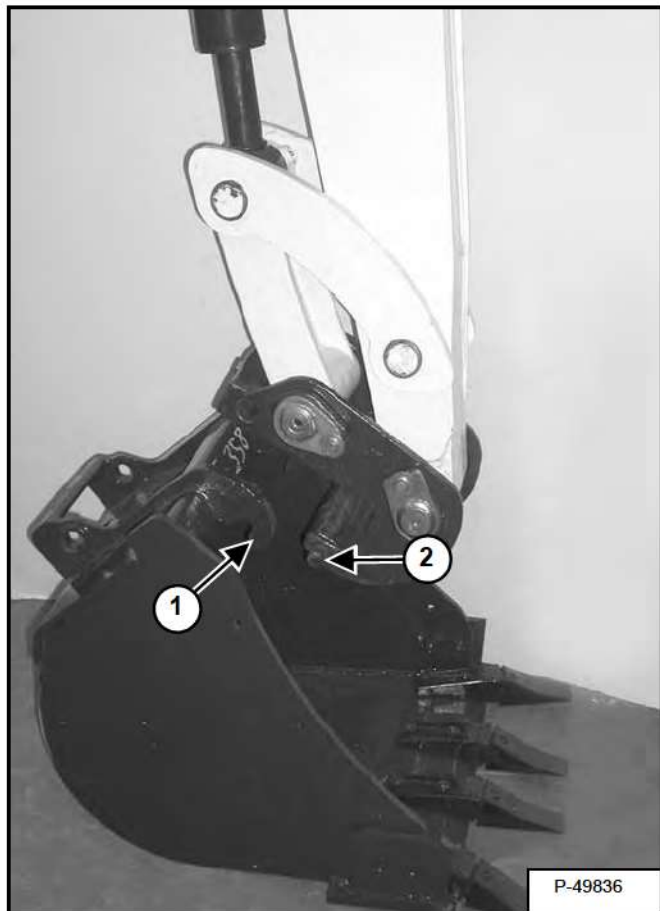
Dealer Copy -- Not for Resale

ATTACHMENTS (CONT'D)

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

Removal (Cont'd)

Figure 111



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 111].

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

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Pin-On Attachment)

Installation

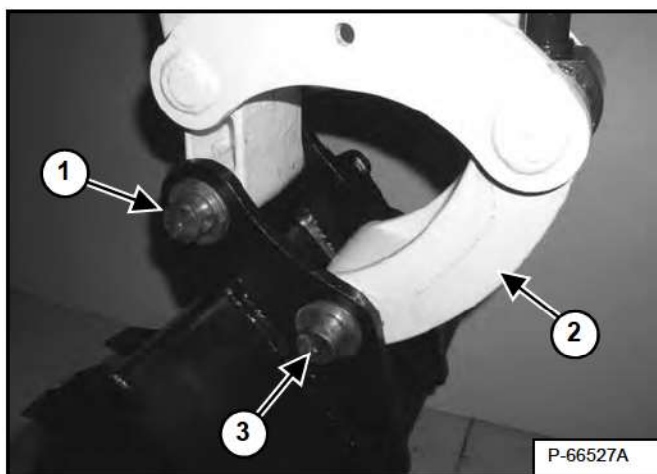
WARNING

AVOID INJURY OR DEATH

Stop the machine on a firm flat surface. When removing or installing attachments (such as a bucket), always have a second person in the operator's seat, give clear signals and work carefully.

W-2140-0189

Figure 112

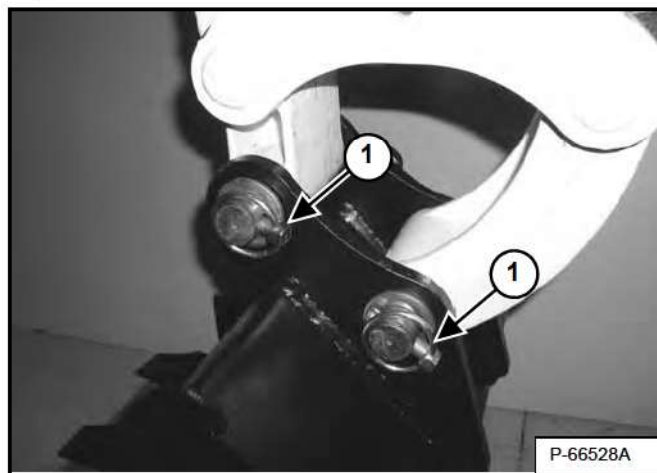


Install the arm into the bucket and align the mounting hole.

Install the pin (Item 1) [Figure 112] and washers.

Install the link (Item 2) in the bucket and align the mounting hole. Install the pin (Item 3) [Figure 112] and washers.

Figure 113



Install the two retainer pins (Item 1) [Figure 113]. Install grease in the grease fittings.

Removal

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

Remove the two retainer pins (Item 1) [Figure 113].

Remove the washers and pins (Items 1 and 3) [Figure 112].

Do not damage the dust seals in the arm.

WARNING

AVOID INJURY OR DEATH

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

W-2052-0907

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OPERATING PROCEDURE

Inspect The Work Area

Before beginning operation, inspect the work area for unsafe conditions.

Look for sharp drop-offs or rough terrain. Have underground utility lines (gas, electrical, water, sewer, irrigation, etc.) located and marked. Work slowly in areas of underground utilities.

Remove objects or other construction material that could damage the excavator or cause personal injury.

Always check ground conditions before starting your work:

- Look for signs of instability such as cracks or settlement.
- Be aware of weather conditions that can affect ground stability.
- Check for adequate traction if working on a slope.

Basic Operating Instructions

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

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

IMPORTANT

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

I-2015-0284

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

Operating Near An Edge Or Water

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

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

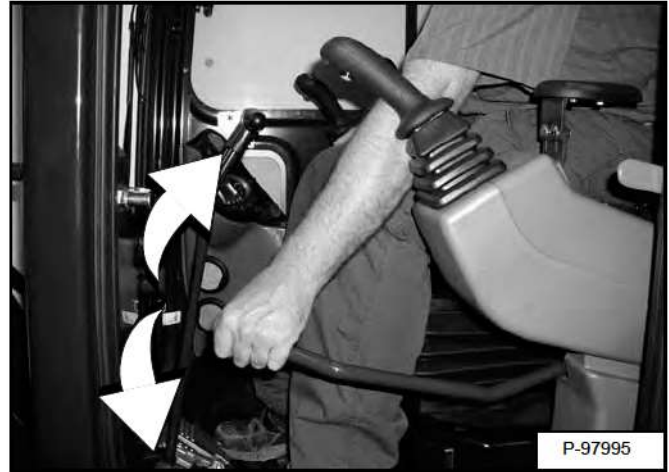
Lowering The Work Equipment (Engine STOPPED)

The hydraulic control levers control the movement of the boom, arm, bucket and upperstructure slew functions.

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

Use the control lever to lower the boom.

Figure 114



The joystick lock switch disengages the hydraulic control functions from the joysticks when the console are raised [Figure 114].

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

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

Use the control lever to lower the boom.

Lower the control console to engage the hydraulic control functions of the joysticks [Figure 114].

OPERATING PROCEDURE (CONT'D)

Object Handling With The Lifting Device

The excavator must be equipped with the optional lift eye link (Item 1) [Figure 116], the boom and arm load hold valves and the overload warning device option. See your Bobcat dealer for available Kits.

WARNING

AVOID INJURY OR DEATH

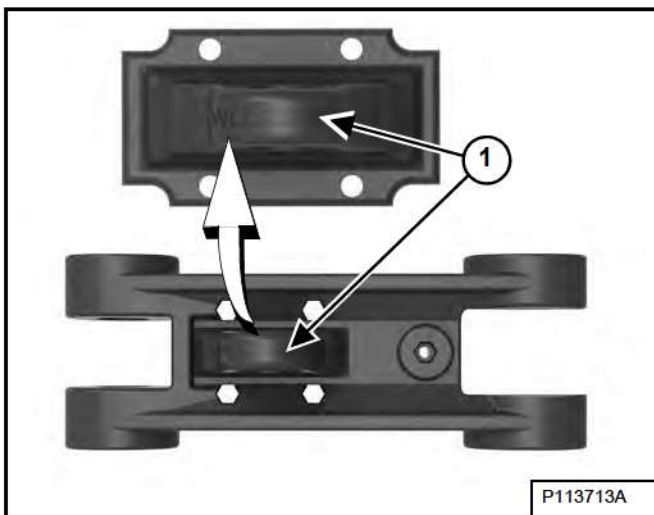
- Do not exceed rated lift capacity.
- Excessive load can cause tipping or loss of control.
- Excessive load can cause failure of the lift eye and cause the load to drop.

W-2991-0714

Do not exceed the machine's Rated Lift Capacity or the Rated Lift Load (RLL) of the lifting device (lift eye). (See Rated Lift Capacity - Standard Arm on Page 202.), (See Rated Lift Capacity - Standard Arm W/Counterweight on Page 203.) or (See Rated Lift Capacity - Long Arm on Page 204.)

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

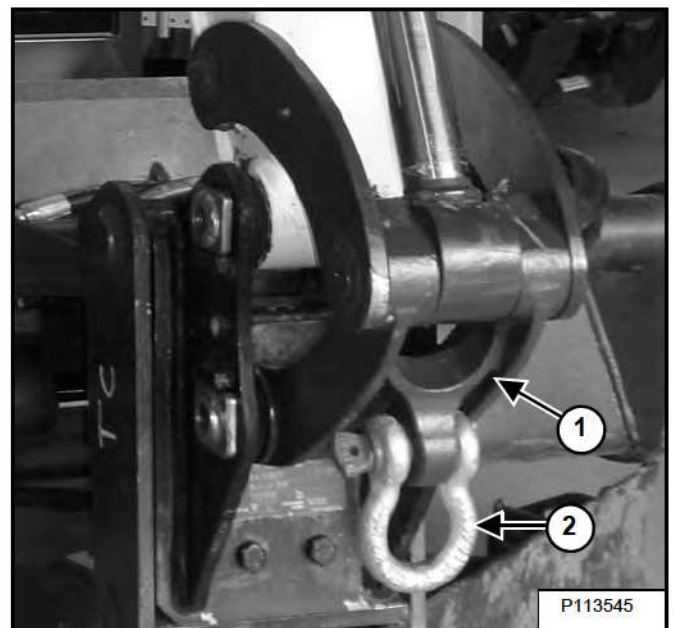
Figure 115



The maximum RLL (Item 1) [Figure 115] is shown on the lifting device.

Extend the bucket cylinder completely and lower the boom to the ground. Stop the engine. Exit the excavator. (See STOPPING THE ENGINE AND LEAVING THE EXCAVATOR on Page 76.)

Figure 116



Install the clevis (Item 2) through the lift eye (Item 1) [Figure 116].

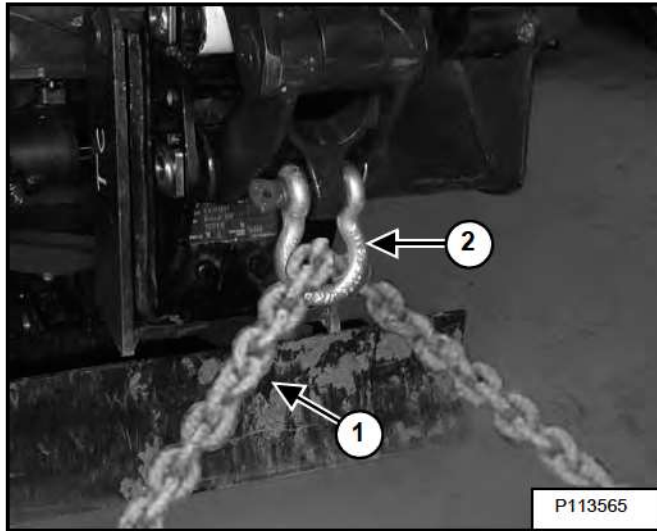
NOTE: Visually check the lifting eye, the clevis, the mounting hardware and the secondary lifting system (chain) for any damage. Replace any damage components before lifting. See your Bobcat dealer for replacement lift eye, hardware and clevis. Tighten the four lift eye mount bolts to 29 - 32 N·m (21 - 24 ft - lb) torque.

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OPERATING PROCEDURE (CONT'D)

Object Handling With The Lifting Device

Figure 117



Install a lift chain (Item 1) (or other type of lifting device) through the clevis (Item 2) [Figure 117] and connect to the object to be lifted.

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

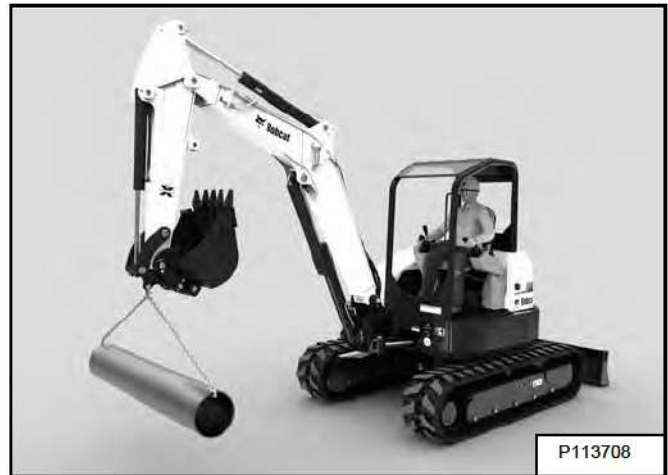
Enter the excavator, fasten the seat belt and start the engine. (See PRE-STARTING PROCEDURE on Page 68.)

Figure 118



Press the switch (Item 1) [Figure 118] to the left to activate the overload warning device.

Figure 119



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 119].

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

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

OPERATING PROCEDURE (CONT'D)

Lift Capacity

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



WARNING

AVOID INJURY OR DEATH

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

W-2374-0500

Figure 120

WARNING

OVERLOAD CAN TIP THE EXCAVATOR AND CAUSE INJURY OR DEATH

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

Where applicable, specifications conform to ISO Standards. Specifications are subject to change without notice. Lift Point is bucket hinge point with standard bucket attached and bucket cylinder fully extended.

EXCAVATOR MODEL

CIRCUIT PRESSURES

WORKING	245 bar (3550 psi)
HOLDING	290 bar (4206 psi)

BOOM LENGTH

2450 mm (96.5 in)

ARM LENGTH

1325 mm (52.2 in)

STANDARD BUCKET

610 mm (24.0 in)

101 kg (224 lb)

EXAMPLE OF LIFT CAPACITY EXAMPLE

* 626 kg
(1381 lb)

LIFT POINT HEIGHT	RATED LIFT CAPACITY OVER BLADE, BLADE DOWN - kg (lb)			RATED LIFT CAPACITY OVER BLADE, BLADE UP - kg (lb)			RATED LIFT CAPACITY OVER SIDE, BLADE UP - kg (lb)		
	LIFT RADIUS - mm (in)	LIFT @ MAXIMUM RADIUS, kg (lb) @ mm (in)		LIFT RADIUS - mm (in)	LIFT @ MAXIMUM RADIUS, kg (lb) @ mm (in)		LIFT RADIUS - mm (in)	LIFT @ MAXIMUM RADIUS, kg (lb) @ mm (in)	
4000 (157.5)	3000 (118.1)			3000 (118.1)			3000 (118.1)		
3000 (118.1)		*568 (1252)	*567 (1250) @ 4004 (158)	347 (766)	349 (770) @ 4004 (158)		373 (823)	335 (738) @ 4004 (158)	
1500 (59.1)	1580 (62.2)	*626 (1381)	*614 (1354) @ 4452 (175)	363 (801)	265 (585) @ 4452 (175)	581 (1282)	355 (782)	263 (581) @ 4452 (175)	
1000 (39.4)	*1083 (2387)	*785 (1730)	*669 (1475) @ 4585 (181)	534 (1178)	348 (768) @ 4585 (181)	520 (1148)	334 (736)	238 (524) @ 4585 (181)	
Ground	*1300 (2866)	*919 (2025)	*729 (1608) @ 4438 (175)	501 (1105)	347 (764) @ 4438 (175)	491 (1082)	317 (700)	243 (536) @ 4438 (175)	
-1000 (-39.4)	*1252 (2761)	*859 (1894)	*822 (1812) @ 3971 (156)	491 (1083)	337 (744) @ 3971 (156)	486 (1072)	317 (699)	302 (665) @ 3971 (156)	

* Rated Hydraulic Lift Capacity

82530 SW

71749

7174900

EXAMPLE OF LIFT CAPACITY EXAMPLE

* 626 kg (1381 lb)

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

The standard equipment weights used when determining lift capacity are as follows:

Standard Bucket = 102 kg (224 lb)

Pin-On X-Change = 26 kg (58 lb)

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

- Pin-on X-Change = 26 kg (58 lb)
- Hydraulic Clamp And Cylinder = 45 kg (99 lb)
- Optional Buckets and Attachments (See **NOTE** below)

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

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OPERATING PROCEDURE (CONT'D)

Lift Capacity (Cont'd)

The following is an example for determining the lift capacity using the sample chart shown above **[Figure 120]**.

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

1. Obtain Lift Capacity from Chart: 626 kg (1381 lb)
2. Subtract the difference between the weight of the standard configuration (Pin-On X-change and Standard Bucket) and optional equipment which in this case is the Hydraulic X-Change and the Hydraulic Clamp.

Quick Coupler (Pin-On X-Change minus Hydraulic X-change): 26 kg (58 lb) - 30 kg (66 lb) = minus 4 kg (8 lb)
Hydraulic Clamp and Cylinder: 45 kg (99 lb).

3. Calculate actual Lift Capacity for machine as configured:

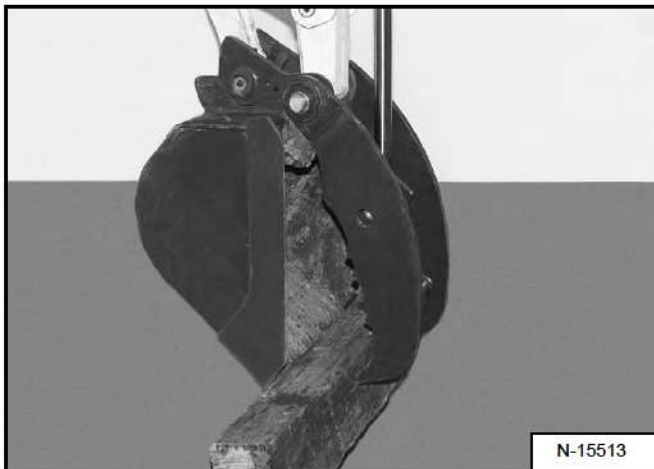
626 kg (1381 lb) - 4 kg (8 lb) (coupler difference) - 45 kg (99 lb) (hydraulic clamp and cylinder) = 578 kg (1274 lb)

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

OPERATING PROCEDURE (CONT'D)

Using The Clamp (If Equipped)

Figure 121



The optional lifting clamp attachment gives the excavator a wider range of use and mobility for debris removal [Figure 121].

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

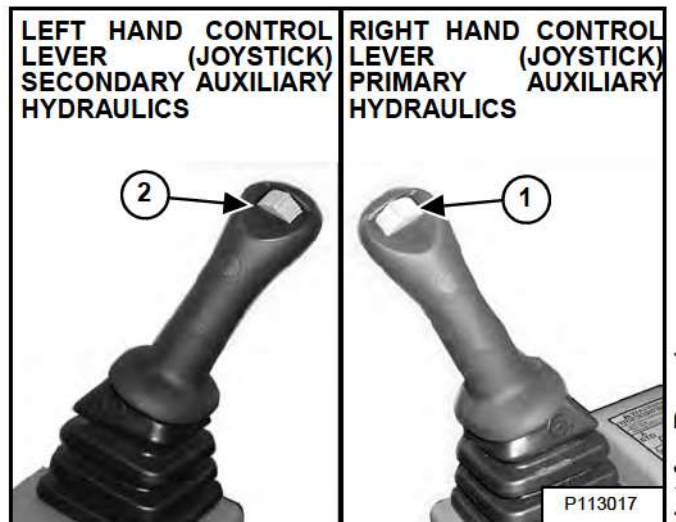
The lift capacities are reduced by 122 kg (270 lb) if the excavator is equipped with the optional lifting clamp.

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

When Using Primary Auxiliary Hydraulics To Activate Clamp

Engage the auxiliary hydraulics and toggle to the Aux2 setting. (See Auxiliary Hydraulics - Standard Instrument Panel on Page 55.) or (See Auxiliary Hydraulics - Deluxe Instrument Panel on Page 56.)

Figure 122



Move the switch (Item 1) [Figure 122] on the right control lever to the right to open the clamp. Move the switch to the left to close the clamp.

When Using Secondary Auxiliary Hydraulics To Activate Clamp

Move the switch (Item 2) [Figure 122] on the left control lever to the left open the clamp. Move the switch to the right to close the clamp.

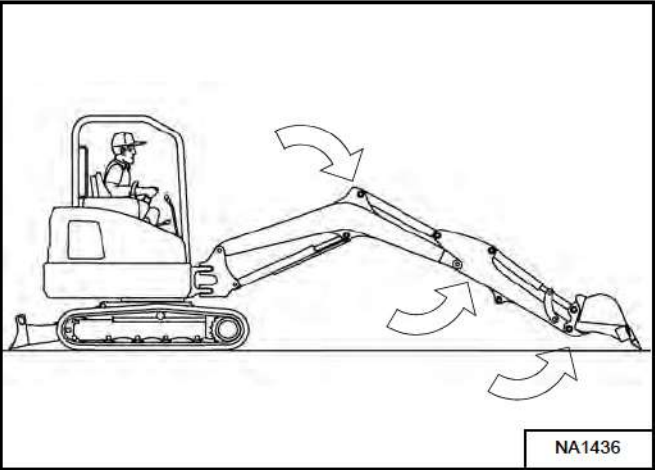
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OPERATING PROCEDURE (CONT'D)

Excavating

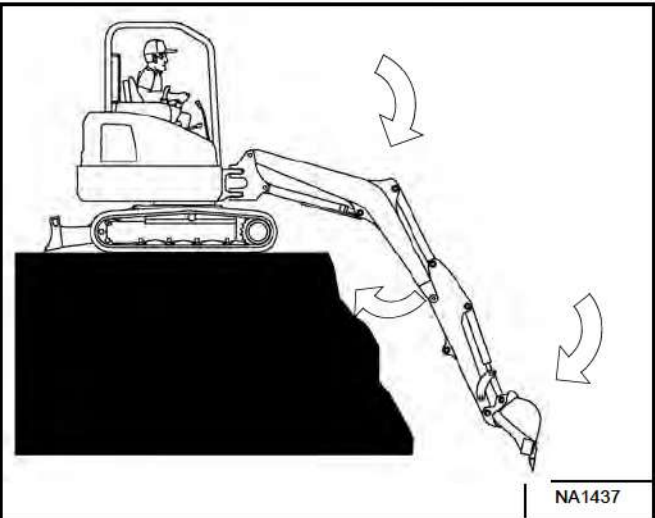
Lower the blade to increase digging performance.

Figure 123



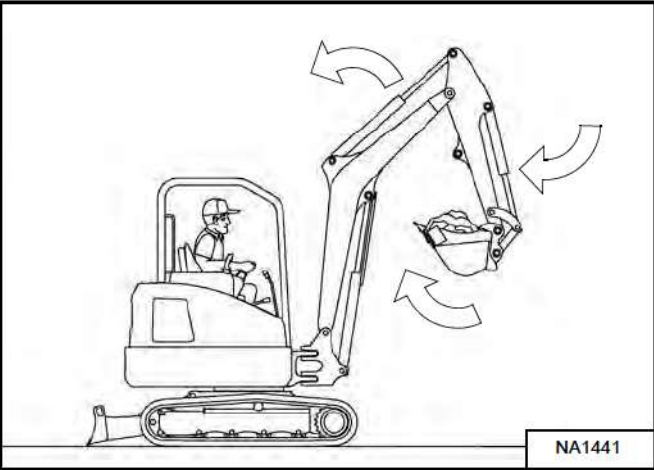
Extend the arm, lower the boom, and open the bucket [Figure 123].

Figure 124



Retract the arm, while lowering boom and curling the bucket [Figure 124].

Figure 125



Raise the boom, retract the arm and curl the bucket [Figure 125].

Rotate the upperstructure.

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

**WARNING**

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

W-2119-0910

**WARNING**

AVOID INJURY OR DEATH

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

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

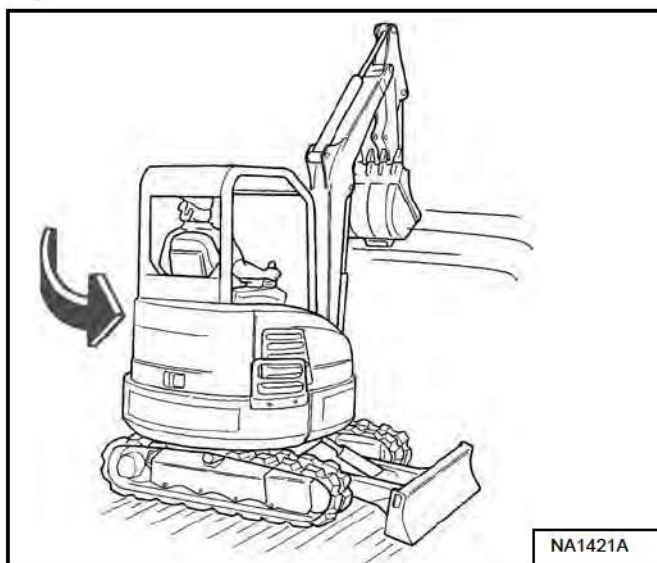
W-2757-0910

Dealer Copy -- Not for Resale

OPERATING PROCEDURE (CONT'D)

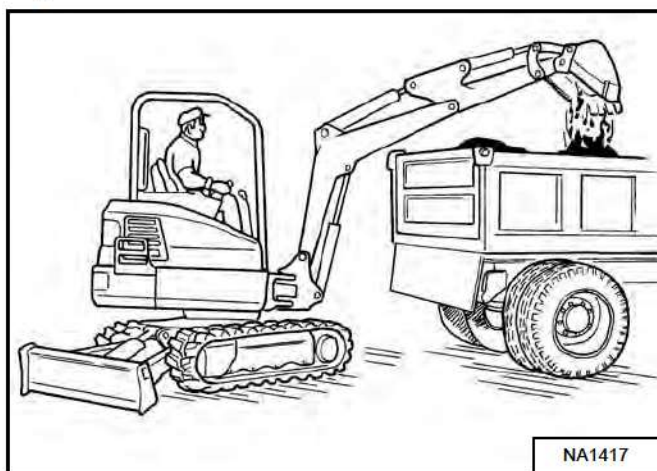
Excavating (Cont'd)

Figure 126



Look in the direction of rotation and make sure there are no bystanders in the work area before rotating the upperstructure [Figure 126].

Figure 127



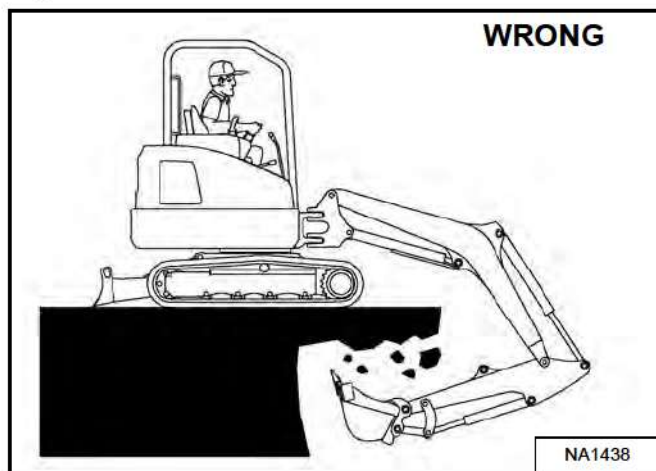
Extend the arm and uncurl the bucket to dump the material into a pile or truck [Figure 127].

IMPORTANT

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

I-2220-0503

Figure 128



Do not dig under the excavator [Figure 128].

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

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

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

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

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OPERATING PROCEDURE (CONT'D)

Boom Swing

Figure 129

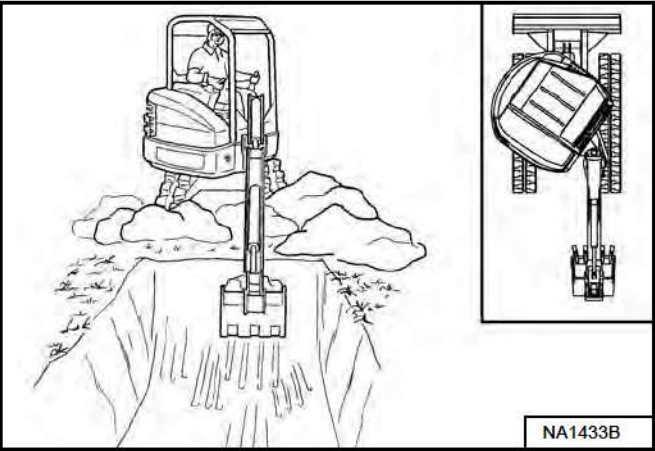


Figure 130

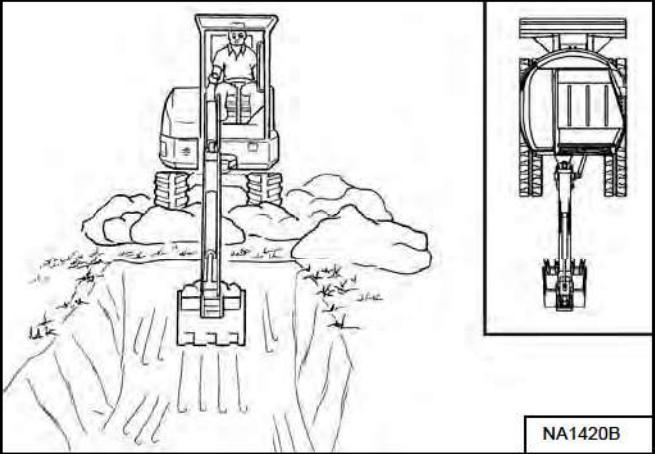
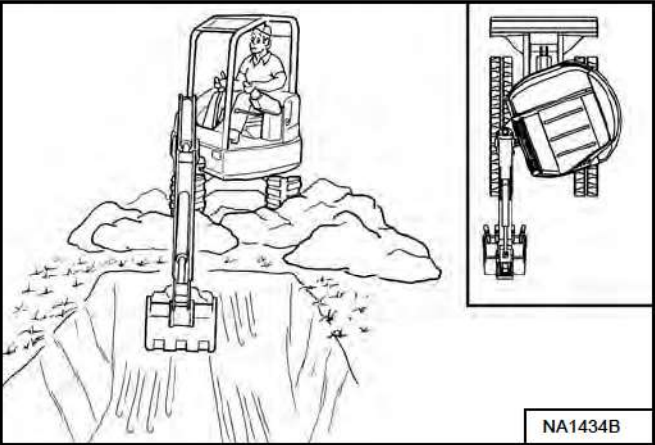


Figure 131



Slew the upperstructure, swing the boom to the right [Figure 129], center [Figure 130] and left [Figure 131] to dig a square hole the width of the machine without repositioning the excavator.

Figure 132



The boom swing allows the operator to offset the boom and dig close to buildings and other structures [Figure 132].

OPERATING PROCEDURE (CONT'D)

Backfilling

IMPORTANT

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

I-2256-0507

Figure 133



Use the blade to backfill the trench or hole after excavating [Figure 133].

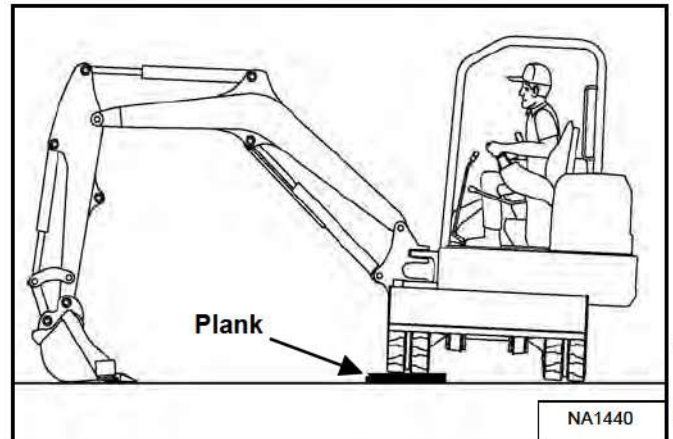
Driving The Excavator

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

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

When working on wet or soft ground, put planks on the ground to provide a solid base to travel on and prevent the excavator from getting stuck.

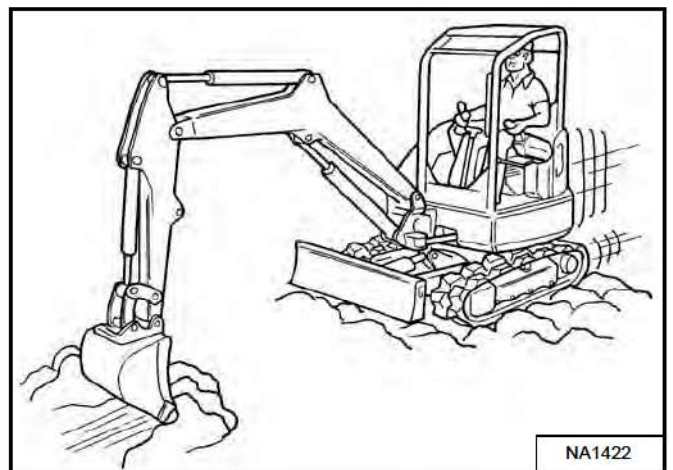
Figure 134



If one or both tracks have become stuck in soft or wet ground, raise one track at a time by turning the upperstructure and pushing the bucket against the ground [Figure 134].

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

Figure 135



The bucket may also be used to pull the excavator. Raise the blade, extend the arm and lower the boom. Operate the boom and arm in a digging manner [Figure 135].

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OPERATING PROCEDURE (CONT'D)

Operating On Slopes

! WARNING

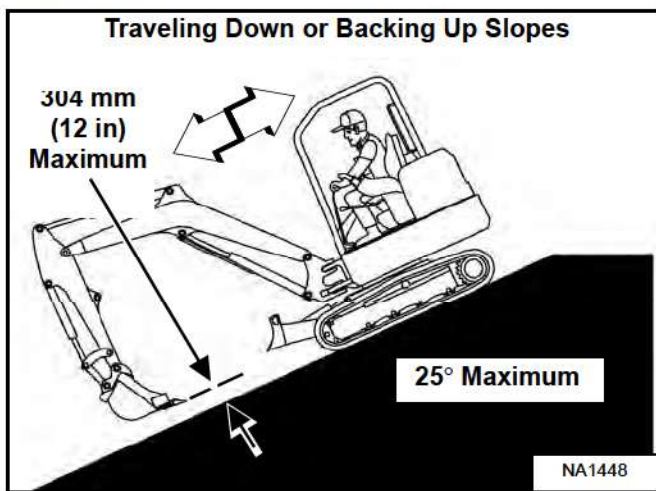
AVOID INJURY OR DEATH

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

W-2497-0304

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

Figure 136



When going down grades that exceed 15 degrees, put the machine in the position shown, and run the engine slowly [Figure 136].

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

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

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

! WARNING

AVOID INJURY OR DEATH

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

W-2498-0304

Figure 137

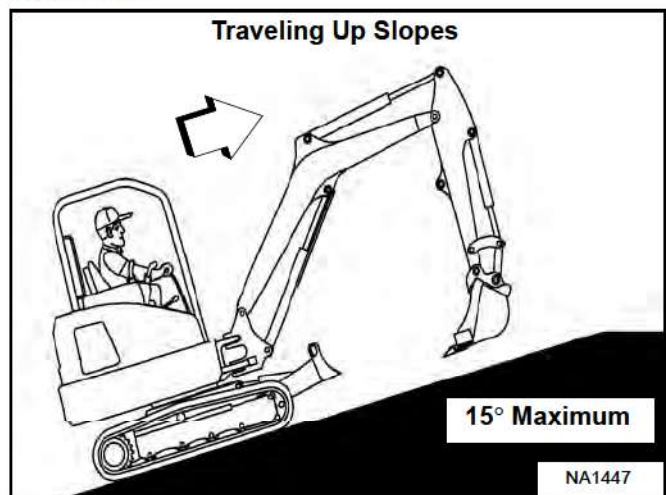
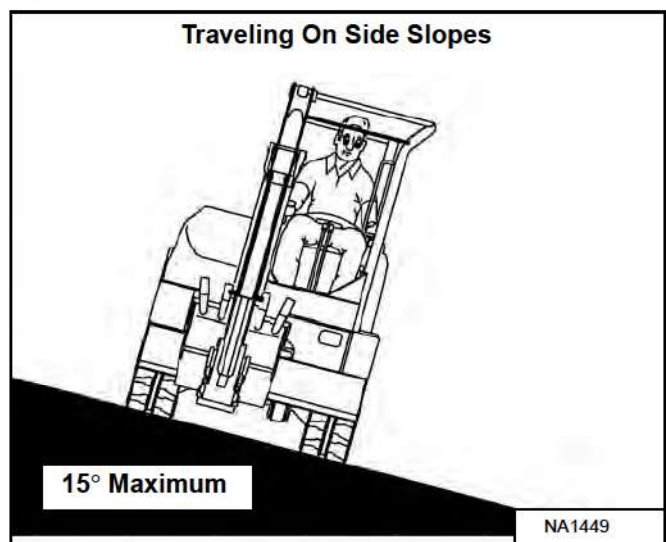


Figure 138

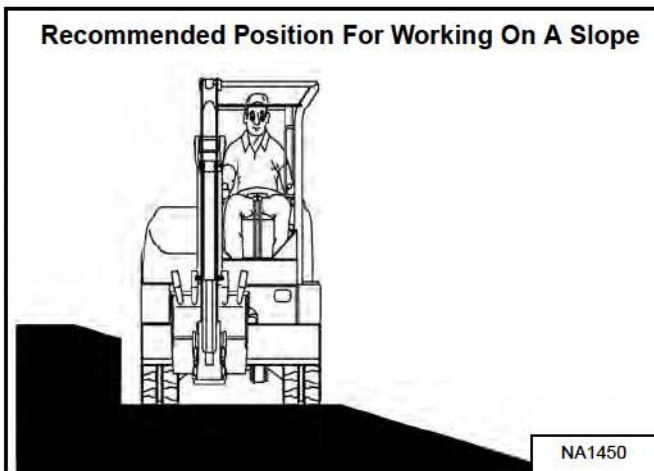


When traveling up slopes or on side slopes that are 15 degrees or less, position the machine as shown and run the engine slow [Figure 137] and [Figure 138].

OPERATING PROCEDURE (CONT'D)

Operating On Slopes (Cont'd)

Figure 139



When operating on a slope, level the work area before beginning [Figure 139].

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

Do not work on slopes which are over 15 degrees.

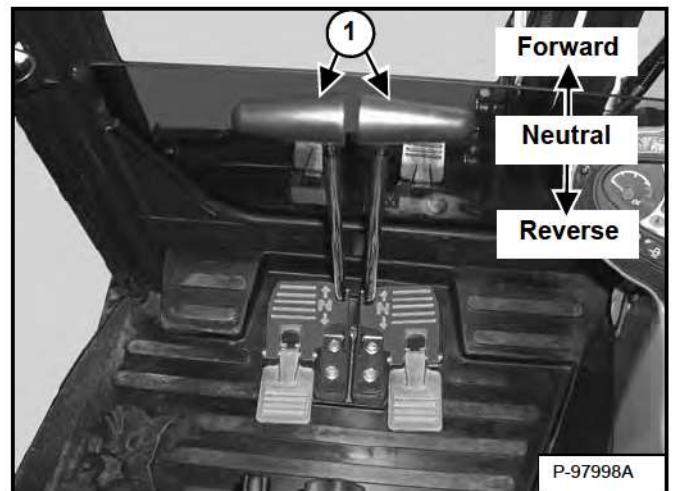
Use a slow work cycle.

Avoid working with the tracks across the slope. This will reduce stability and increase the tendency for the machine to slide. Position the excavator with the blade downhill and lowered.

Avoid swinging or extending the bucket more than necessary in a down hill direction. When you must swing the bucket downhill, keep the arm low and skid the bucket downhill.

When working with the bucket on the uphill side, keep the bucket as close to the ground as possible. Dump the spoil far enough away from the trench or hole to prevent the possibility of a cave in.

Figure 140



To brake the machine when going down a slope, move the steering levers (Item 1) [Figure 140] to the NEUTRAL position. This will engage the hydrostatic braking.

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

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

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

Use the control lever to lower the boom.

Start the engine and resume operation.

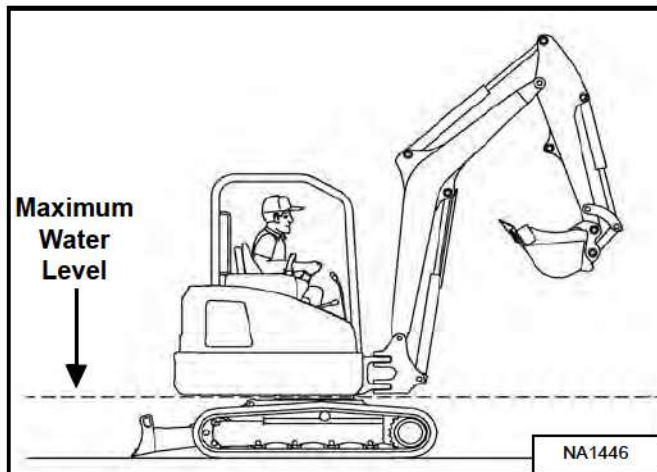
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OPERATING PROCEDURE (CONT'D)

Operating In Water

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

Figure 141



Do not operate or immerse the excavator in water higher than the bottom of the swing bearing [Figure 141].

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

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

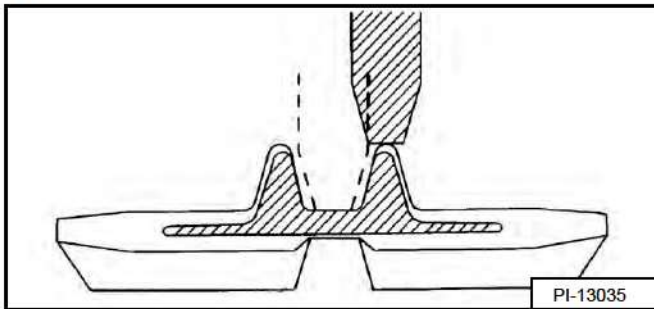
OPERATING PROCEDURE (CONT'D)

Avoiding Track Damage

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

Some Cause Of Track Damage:

Figure 142

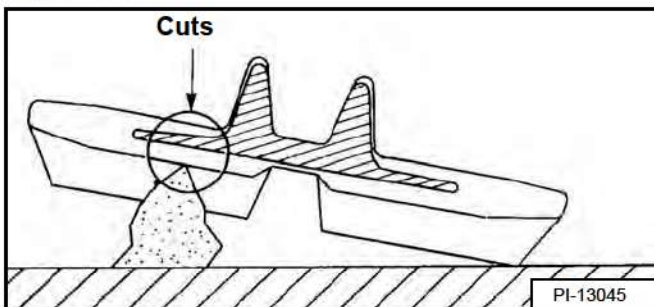


Incorrect track tension: When the rubber track is detracting, the idler or sprocket rides on the projections of the embedded metal **[Figure 142]** causing the embedded metal to be exposed to corrosion. (See TRACK TENSION on Page 138.)

If rubber track is clogged with stones or foreign objects, these can get wedged between the sprocket / rollers and cause detracting and track stress.

When moisture invades through cuts on the track, the embedded steel cords will corrode. The deterioration of the design strength may lead to the breaking of the steel cords.

Figure 143

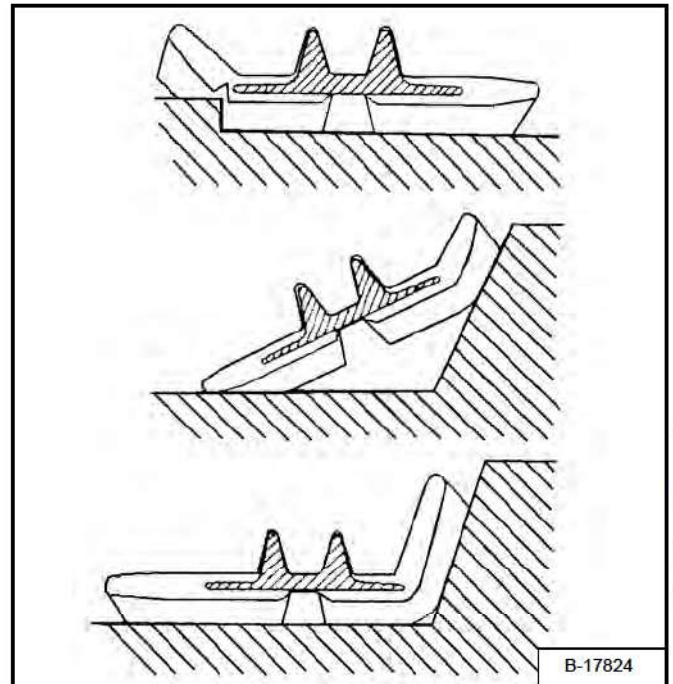


When rubber tracks drive over projections or sharp objects in the field, the concentrated forces applied cause cuts on the lug side rubber surface **[Figure 143]**. In case of making turns on projections, the lug side rubber surface will have an even higher chance to be cut. If the cuts run through the embedded steel cords, it might result in the steel cords' breakage due to their corrosion.

Avoid quick turns on bumpy and rocky fields.

Driving over sharp objects should be avoided. If this is impossible, do not make turns while driving over sharp objects.

Figure 144



When rubber tracks drive over sharp projections, intensive stress is applied to the lug side rubber surface, especially at the edges of embedded metals, causing cracks and cuts in the area around the embedded metals **[Figure 144]**.

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

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TOWING THE EXCAVATOR

Procedure

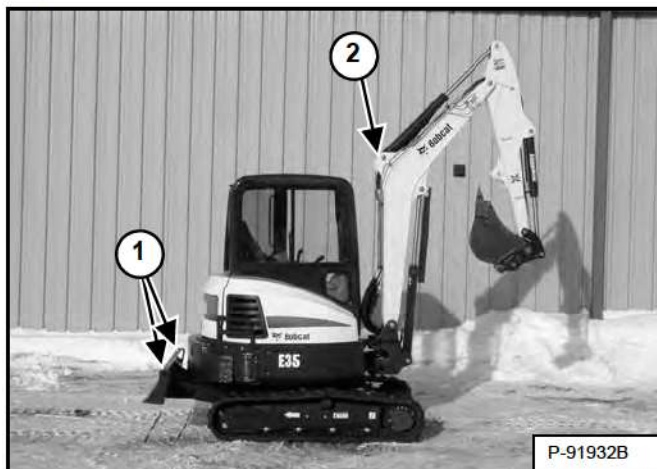
There is not a recommended towing procedure for the excavators.

- The excavator can be lifted onto the transport vehicle.
- The excavator can be skidded a short distance for service (EXAMPLE: Move onto a transport vehicle) without damage to the hydraulic system. (The tracks will not turn.) There might be slight wear to the tracks when the excavator is skidded.
- The towing chain (or cable) must be rated at 1.5 times the weight of the excavator. (See Performance on Page 180.)

LIFTING THE EXCAVATOR

Procedure

Figure 145



Fully extend the cylinders of the bucket, arm, and boom so that the excavator is in the position as shown [Figure 145].

Raise the blade all the way.

Put all the control levers in NEUTRAL.

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

WARNING

AVOID INJURY OR DEATH

- Use chains and lifting equipment with sufficient capacity for the weight of the excavator plus any added attachments.
- Maintain center of gravity and balance when lifting.
- Do not swing boom or upperstructure. Engage the upperstructure slew lock.
- Never lift with operator on machine.
- Never lift with the blade angled (if equipped).

W-2580-0607

Figure 146

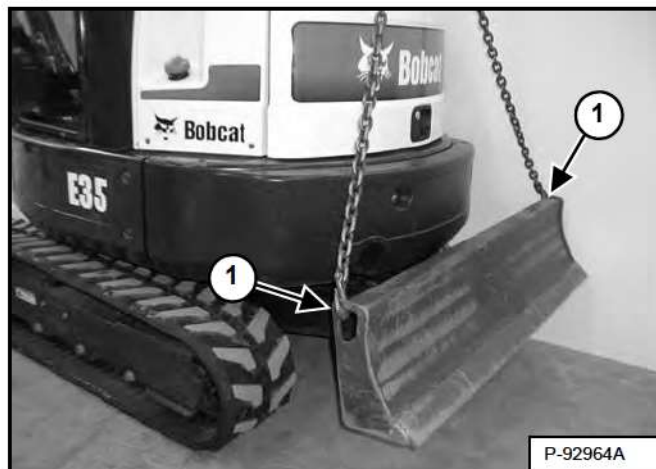
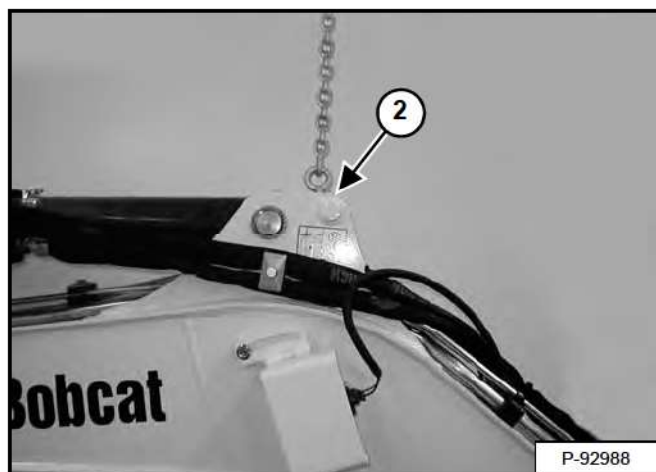


Figure 147



Fasten chains to the ends of the blade (Item 1) [Figure 145] and [Figure 146] and up to a lifting fixture above the canopy / cab. The lifting fixture must extend over the sides of the canopy / cab to prevent the chains from hitting the ROPS / TOPS.

Fasten a chain (Item 2) [Figure 147] from the rod to the lift fixture.

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TRANSPORTING THE EXCAVATOR ON A TRAILER

Loading And Unloading

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

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

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

Use metal loading ramps with a slip resistant surface.

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

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

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

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

Figure 148



Move the machine forward onto the transport vehicle [Figure 148].

Do not change direction of the machine while it is on the ramps.

Lower the boom, arm, bucket, and blade to the transport vehicle.

Stop the engine and remove the key (if equipped).

Put blocks at the front and rear of the tracks.

Fastening

Figure 149

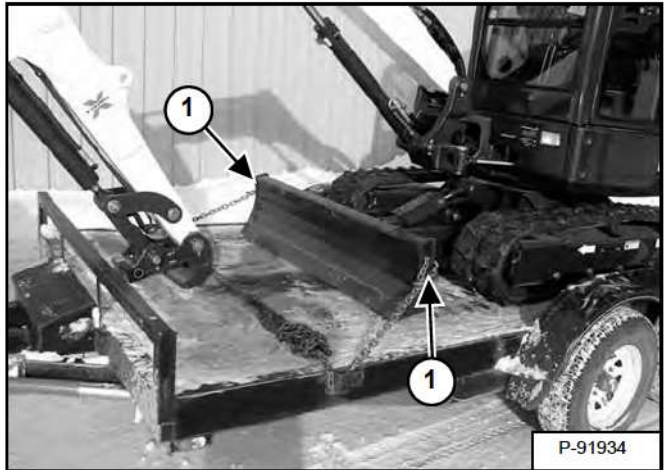
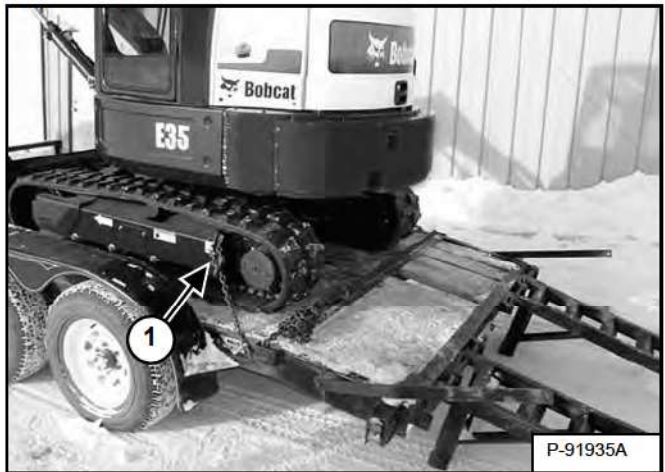


Figure 150



Fasten chains to the front corners of the blade (Item 1) [Figure 149] and to the tie down loop at both sides of the track frame (Item 1) [Figure 150] to prevent it from moving when going up or down slopes or during sudden stops.

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

WARNING

AVOID SERIOUS INJURY OR DEATH

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

W-2058-0807

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MAINTENANCE SAFETY



WARNING

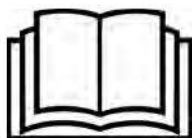
Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, Operator's Handbook and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after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

W-2003-0807



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

CORRECT



P-90216

- Never service the Bobcat Compact Excavator without instructions.

CORRECT



NA1428

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

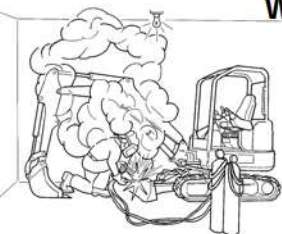
CORRECT



NA1425

- Cleaning and maintenance are required daily.

WRONG



NA1427

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

WRONG



NA1426

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

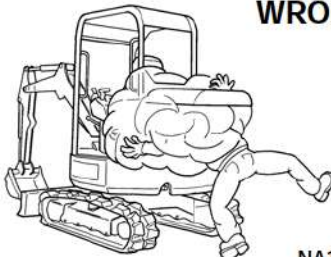
WRONG



NA1429

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

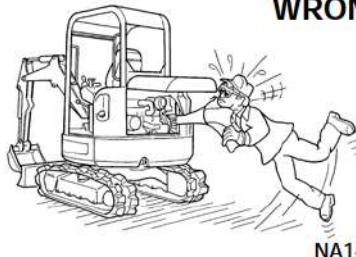
WRONG



NA1430

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

WRONG



NA1431

- Keep body, jewelry and clothing away from moving parts, electrical contact, hot parts and exhaust.
- Wear eye protection to guard from battery acid, compressed springs, fluids under pressure and flying debris when engines are running or tools are used. Use eye protections approved for type of welding.
- Keep tailgate closed except for service. Close and latch tailgate before operating the excavator.

WRONG



B-19798

- Lead-acid batteries produce flammable and explosive gases.
- Keep arcs, sparks, flames and lighted tobacco away from batteries.
- Batteries contain acid which burns eyes or skin on contact.
- Wear protective clothing. If acid contacts body, flush well with water. For eye contact flush well and get immediate medical attention.

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

MSW38-0409

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SERVICE SCHEDULE

Maintenance Intervals

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

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



WARNING

AVOID INJURY OR DEATH

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

W-2003-0807

Every 10 Hours (Before Starting The Excavator)

- **Engine Oil** - Check level and add as needed. (See Page 123.)
- **Engine Air Filters and Air System** - Check display panel. Service only when required. Check for leaks and damaged components. (See Page 117.)
- **Engine Cooling System** - Check coolant level COLD and add premixed coolant as needed. (See Page 126.) and (See Page 127.)
- **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 110.)
- **Motion Alarm** - Check for proper function. (See Page 111.)
- **Operator Canopy / Cab** - Check the canopy / cab condition and mounting hardware. (See Page 42.)
- **Operator Cab and HVAC Filters** - Clean filters. (See Page 115.)
- **Indicators and Lights** - Check for correct operation of all indicators and lights. (See Page 31.)
- **Safety Signs** - Check for damaged signs (decals). Replace any signs that are damaged. (See Page 20.)
- **Hydraulic Fluid** - Check fluid level and add as needed. (See Page 133.)
- **Track Tension** - Check tension and adjust as needed. (See Page 138.)
- **Pivot Points** - Grease all machinery pivot points. Grease clamp and angle blade (if equipped). (See Page 148.)
- **Attachment Coupler** - Check for damage or loose parts (if equipped). (See Page 145.)

Every 50 Hours

- **Swing Bearing** - Grease swing bearing and swing pinion. Service every 10 hours when operating in water. (See Page 148.)
- **Battery** - Check cables, connections, and electrolyte level; add distilled water as needed. (See Page 128.)
- **Fuel Tank** - Drain water and sediment from fuel tank and fuel filter. (See Page 121.)

Every 100 Hours

- **Spark Arrestor Muffler** - (If Equipped) - Clean spark chamber. (See Page 137.)

Every 250 Hours Or Every 12 Months

- **Fuel Filter** - Service at first 50 hours, then as scheduled. Replace filter. (See Page 121.)
- **Travel Motors (Final Drive)** - Check fluid level and add as needed. (See Page 141.)

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SERVICE SCHEDULE (CONT'D)

Maintenance Intervals (Cont'd)

Every 500 Hours Or Every 12 Months

- **Engine Oil and Filter** - Service at first 50 hours, then as scheduled. Replace oil and filter. (See Page 124.)
- **Cooling System** - Clean debris from radiator, fuel cooler, hydraulic fluid cooler, air conditioning condenser (if equipped). (See Page 126.)
- **Hydraulic Filter, Pilot Filter and Hydraulic Reservoir Breather Cap** - Replace the hydraulic filter, pilot filter and the reservoir breather cap. (See Page 134.)
- **Drive Belts (Alternator) (Air Conditioning - If Equipped)** - Check condition. Replace as needed. Service at first 50 hours, then as scheduled. (See Page 142.) and (See Page 142.)
- **Alternator and Starter** - Service at first 50 hours, then as scheduled. Check connections.
- **Engine Valves** - Adjust the engine valve clearance.
- **HVAC** - Clean housing and coils. (See Page 115.)

Every 1000 Hours Or Every 12 Months

- **Swing Cylinder Base End** - Grease swing cylinder base end grease fitting. (See Page 151.)
- **Hydraulic Fluid and Filters** - Replace hydraulic fluid and filters. (See Page 136.)
- **Travel Motors (Final Drive)** - Service at first 50 hours, then as scheduled. Replace fluid. (See Page 141.)

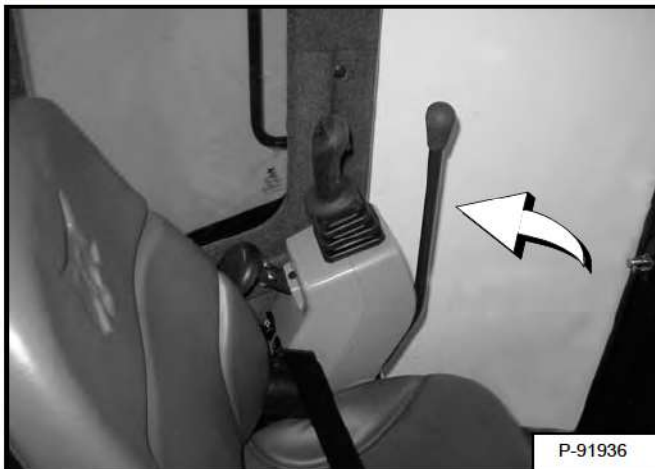
Every 24 Months

- **Coolant** - Replace the coolant. (See Page 127.)

CONTROL CONSOLE LOCKOUTS

Inspection And Maintenance

Figure 151



When the left console is raised **[Figure 151]**, the hydraulic control levers (joysticks) and traction system must not function.

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

Raise the left console **[Figure 151]**.

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

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

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

SEAT BELT

Inspection And Maintenance

WARNING

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

W-2466-0703

Check the seat belt daily for correct function.

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

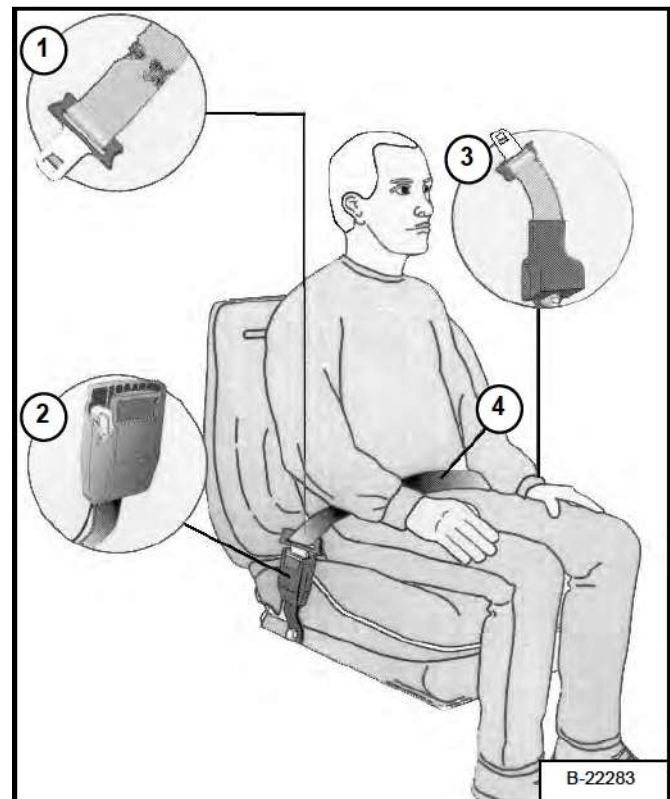
Any seat belt system that shows cuts, fraying, extreme or unusual wear, significant discolorations due to ultraviolet UV exposure, dusty / dirty conditions, abrasion to the seat belt webbing, or damage to the buckle, latch plate, retractor (if equipped), hardware or any other obvious problem should be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

The items below are referenced in **[Figure 152]**.

1. Check the webbing. If the system is equipped with a retractor, pull the webbing completely out and inspect the full length of the webbing. Look for cuts, wear, fraying, dirt and stiffness.
2. Check the buckle and latch for correct operation. Make sure latch plate is not excessively worn, deformed or buckle is not damaged or casing broken.
3. Check the retractor web storage device (if equipped) by extending webbing to determine if it looks correct and that it spools out and retracts webbing correctly.
4. Check webbing in areas exposed to ultraviolet (UV) rays from the sun or extreme dust or dirt. If the original color of the webbing in these areas is extremely faded and / or the webbing is packed with dirt, the webbing strength may have deteriorated.

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

Figure 152



MOTION ALARM SYSTEM

Description

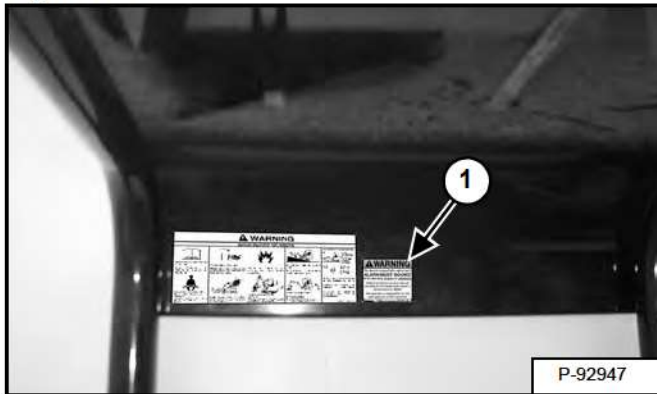
This excavator may be equipped with a motion alarm system. The motion alarm will sound when the operator moves the travel control levers in either the forward or reverse direction. Slight movement of the steering levers in either the forward or reverse direction is required with hydraulic components before the motion alarm will sound.

Inspecting

Figure 153



Figure 154



Inspect for damaged or missing motion alarm decal (Item 1) [Figure 153] (cab machine) or (Item 1) [Figure 154] (canopy machine). Replace if required.

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

WARNING

AVOID INJURY OR DEATH

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

W-2050-0807

Sit in the operator's seat and fasten the seat belt. Start the engine. (See PRE-STARTING PROCEDURE on Page 68.)

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

Figure 155



Slightly move both travel control levers in the forward direction (until the machine is slowly moving forward) and then press the motion alarm cancel switch (Item 1) [Figure 155]. The motion alarm will shut off. With the machine still moving forward, move one of the levers to the NEUTRAL position, the motion alarm must sound.

Slightly move both travel control levers in the reverse direction (until the machine is slowly moving backward) and then press the motion alarm cancel switch (Item 1) [Figure 155] (the switch icon will be illuminated when the motion alarm is deactivated). The motion alarm will shut off. With the machine still moving backward, move one of the levers to the NEUTRAL position, the motion alarm must sound.

Return both levers to NEUTRAL and turn excavator key to OFF position. Exit the excavator. (See STOPPING THE ENGINE AND LEAVING THE EXCAVATOR on Page 76.)

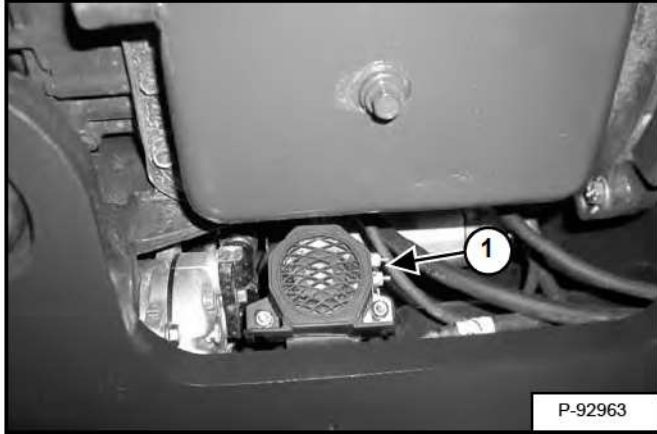
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MOTION ALARM SYSTEM (CONT'D)

Inspecting (Cont'd)

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

Figure 156

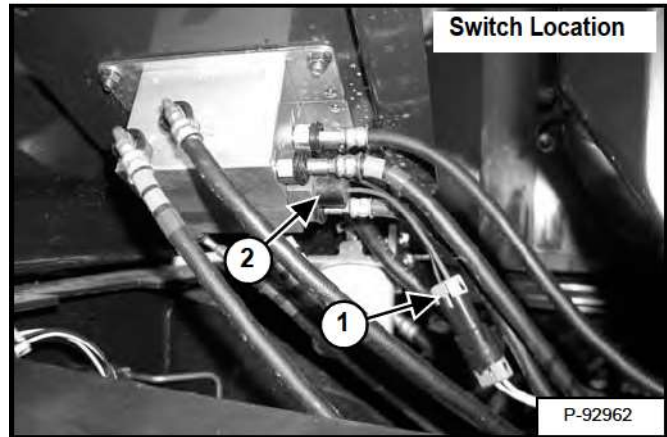


Inspect the motion alarm electrical connections and wire harness (Item 1) [Figure 156], wire harness (Item 1) [Figure 157] and motion alarm switch (Item 2) [Figure 157] for tightness and damage. Repair or replace any damaged components.

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

Adjusting Switch Position

Figure 157



The motion alarm switch (Item 2) [Figure 157] is located in the travel control valve located under the floorplate. Remove the floor mat and the floorplate to access the switch.

The switch (Item 2) [Figure 157] is non-adjustable. It must be fully installed into the travel control valve housings and tightened. Tighten the switch to 18 - 20 N•m (13 - 15 ft-lb).

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

WARNING

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

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

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

W-2786-0309

TAILGATE

Opening And Closing

WARNING

AVOID INJURY OR DEATH

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

W-2012-0497

WARNING

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

W-2020-1285

Figure 158



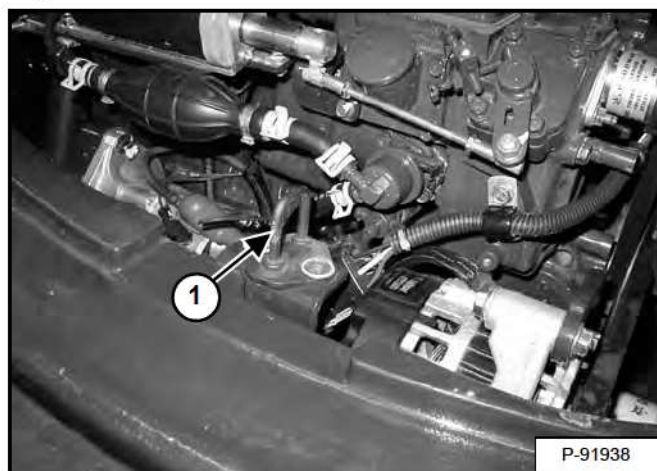
Pull the latch (Item 1) [Figure 158] and open the tailgate.

Push firmly to close the tailgate.

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

Adjusting The Latch

Figure 159



The tailgate latch (Item 1) [Figure 159] can be adjusted by loosening the two bolts, moving the latch, and tightening the two bolts.

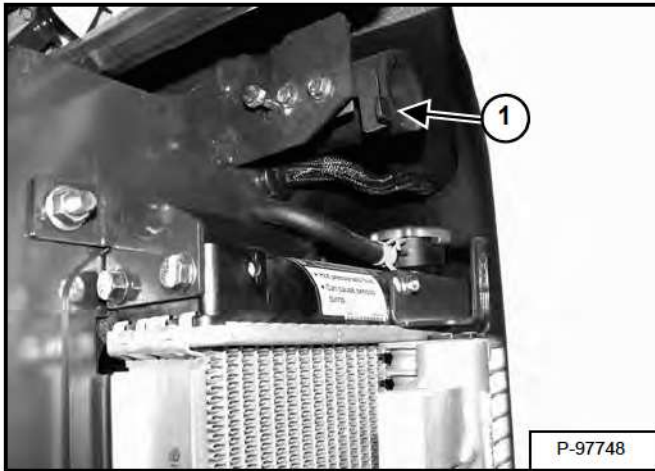
Close the tailgate before operating the excavator.

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RIGHT SIDE COVER

Opening And Closing

Figure 160



Open the tailgate to access the right side cover latch (Item 1) [Figure 160].

Pull out on the latch (Item 1) [Figure 160] to release cover.

Figure 161



Raise the right side cover and rotate forward until it is held open by the retainer (Item 1) [Figure 161].

To close the right side cover, lift up on the retainer (Item 1) [Figure 161] while raising the right side cover. Rotate the cover back until it is in the fully closed position.

Close the cover fully until the latch (Item 1) [Figure 160] locks the cover in the closed position.

CAB FILTERS

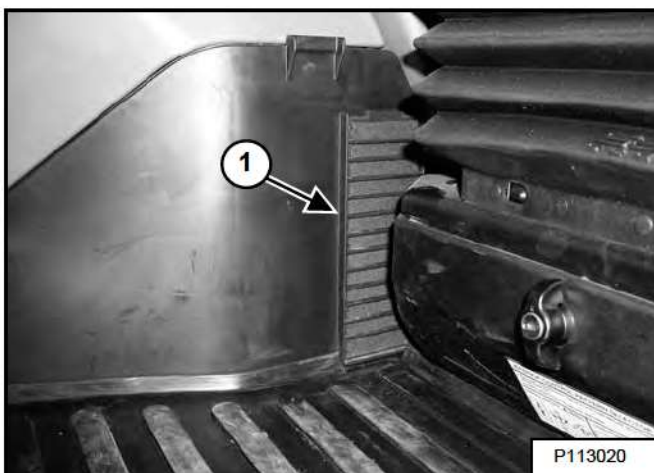
Cleaning And Maintenance

The recirculation filter and the fresh air filter must be cleaned regularly. (See SERVICE SCHEDULE on Page 107.)

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

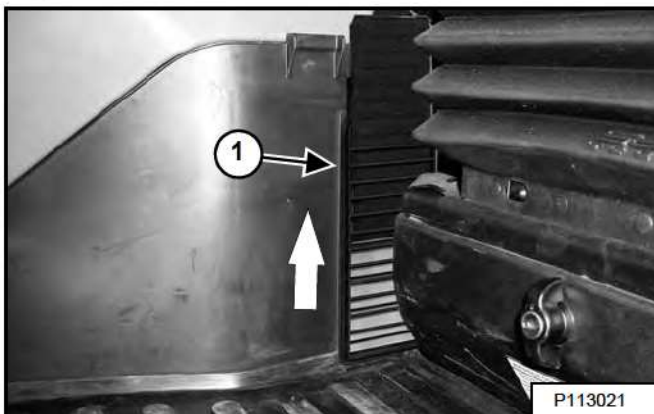
Recirculation Filter

Figure 162



The recirculation filter (Item 1) [Figure 162] is located to the right of the operator's seat.

Figure 163



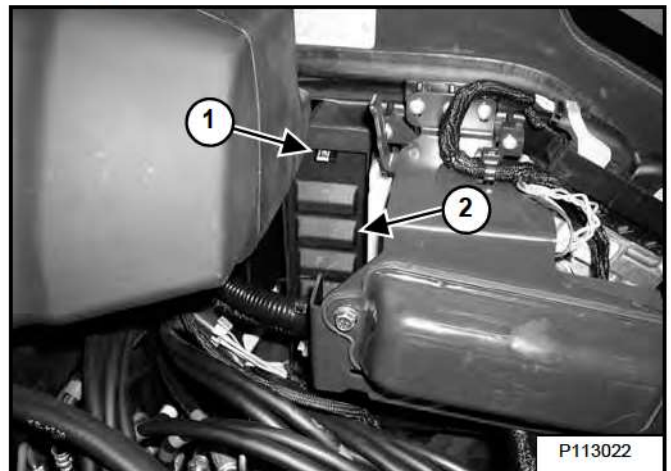
Pull up on the filter (Item 1) [Figure 163] until removed from the housing.

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

Installation: Position the bottom of the filter (Item 1) [Figure 163] into the housing and slowly push the filter down fully.

Fresh Air Filter

Figure 164

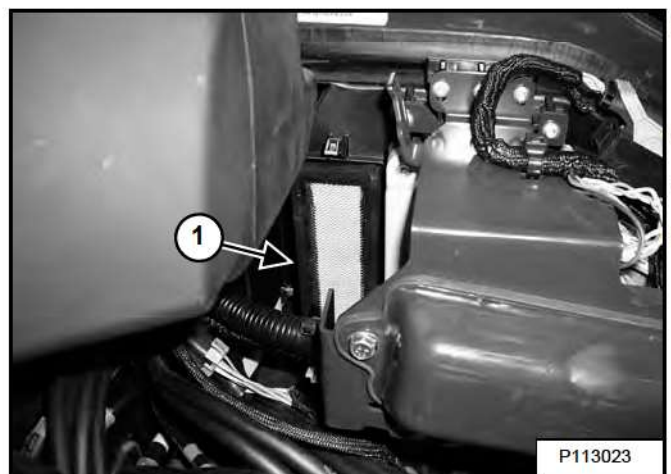


The fresh air filter is located under the right side cover.

Open the right side cover. (See RIGHT SIDE COVER on Page 114.)

Pull out on the tab (Item 1) and remove the cover (Item 2) [Figure 164].

Figure 165



Pull the filter (Item 1) [Figure 165] out of the housing.

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

Installation: Position the filter (Item 1) [Figure 163] into the housing and slowly push the filter in fully.

Place the bottom tabs of the filter cover (Item 2) into the frame and push the top in until the tab (Item 1) [Figure 164] locks to the frame.

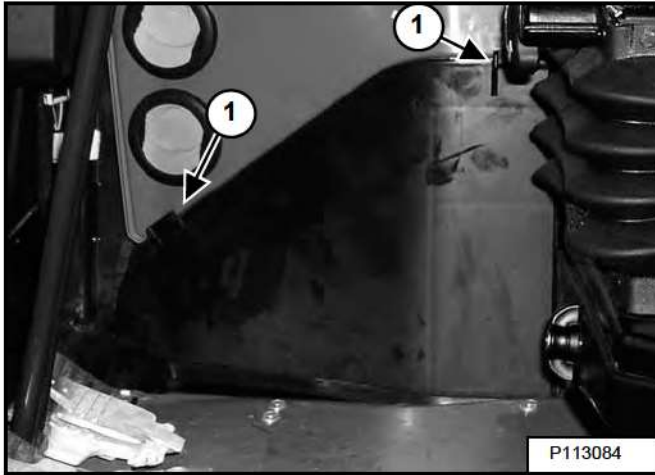
HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

Cleaning And Maintenance

The inside of the HVAC housing needs to be cleaned regularly. Dust will accumulate over time inside the housing. A dusty heater and evaporator coil will reduce heating and cooling efficiency. (See SERVICE SCHEDULE on Page 107.)

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

Figure 166



Remove the floor mat.

Pull back on the two latches (Item 1) [Figure 166] and remove the HVAC side cover.

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

Figure 167



Use a lower pressure air or a low pressure water stream to remove debris and to clean the coils (Item 1) [Figure 167].

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

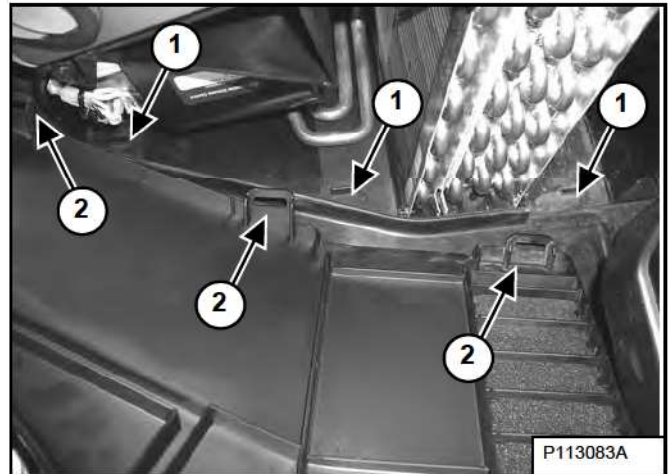
There are three rubber drain valves that allow condensation to drain from the housing during normal air conditioning usage. These drain valve can get clogged with dirt and should be cleaned at the same time the housing is cleaned.

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

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

Reinstall the center floorplate and close the right side cover.

Figure 168



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

Three tabs (Item 1) are on the bottom of the HVAC housing that the side cover retainers (Item 2) [Figure 168] fit into.

Position the side cover on the tabs and starting with the front edge of the side cover, position it into the front of the HVAC housing. Press on the front of the cover to secure the front latch (Item 1) [Figure 166]. Then press in on the top edge of the side cover and work back to the rear of the cover and secure the rear latch.

Reinstall the floor mat.

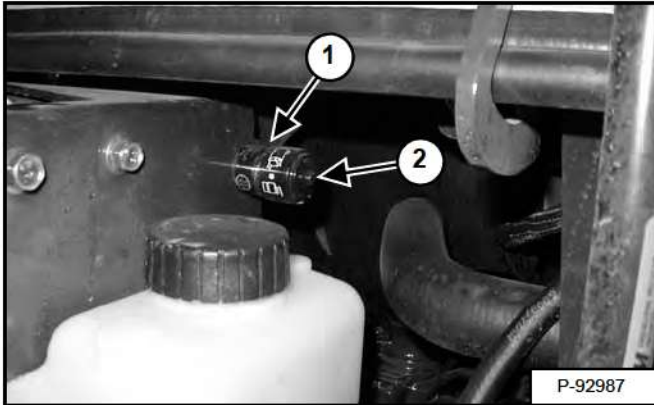
AIR CLEANER SERVICE

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 107.)

Daily Check

The air cleaner is located in the engine compartment. Open the tailgate to access the air cleaner for service. (See TAILGATE on Page 113.)

Figure 169



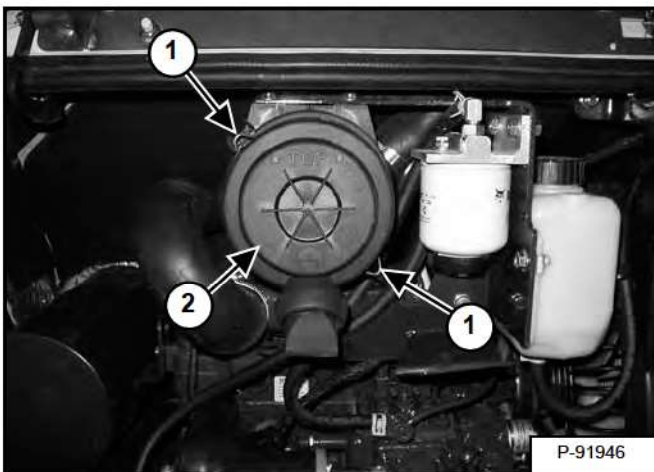
Check the condition indicator (Item 1) [Figure 169]. If the red ring shows in the condition indicator, the filter needs to be replaced.

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

Replacing The Filter Elements

Outer Filter

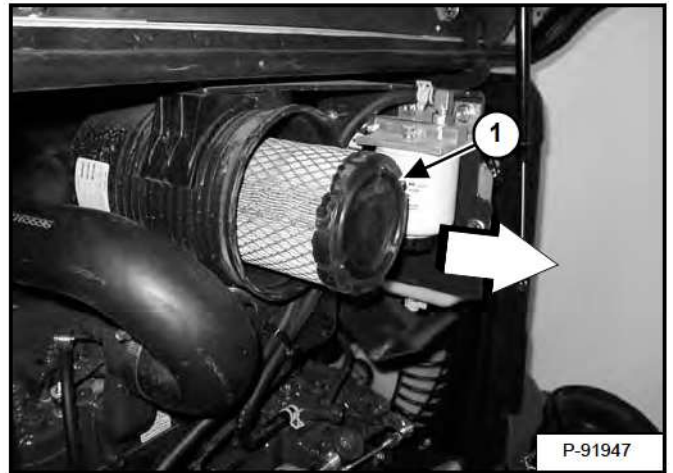
Figure 170



Release the two fasteners (Item 1) [Figure 170].

Remove and clean the dust cup (Item 2) [Figure 170].

Figure 171



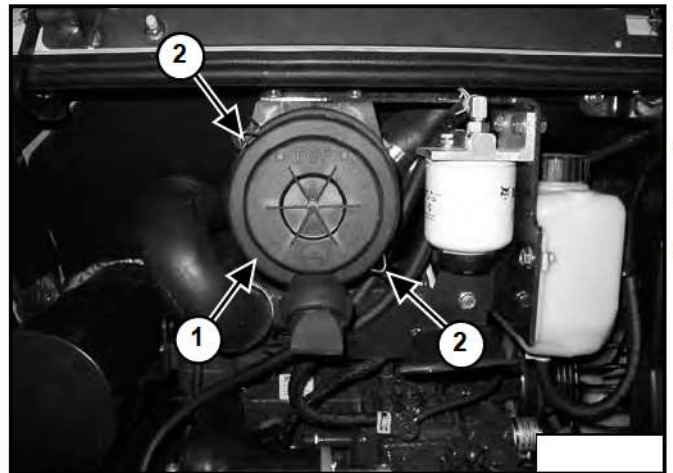
Pull the outer filter (Item 1) [Figure 171] from the air cleaner housing.

Check the housing for damage.

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

Install a new filter.

Figure 172



Install the dust cup (Item 1) and engage the fasteners (Item 2) [Figure 172].

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

After the outer filter has been replaced, press the button (Item 2) [Figure 169] on the end of the condition indicator and start the engine. Run at full rpm, then reduce engine speed and stop the engine. If the red ring (Item 1) [Figure 169] shows in the condition indicator, replace the inner filter.

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AIR CLEANER SERVICE (CONT'D)

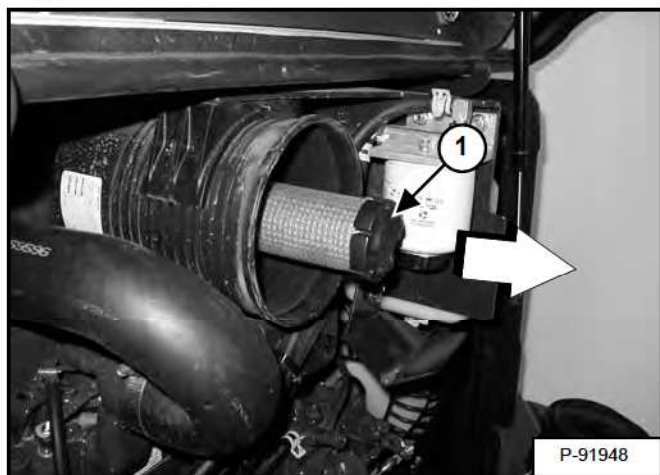
Replacing The Filter Elements (Cont'd)

Inner Filter

Only replace the inner filter under the following conditions:

- Replace the inner filter every *third* time the outer filter is replaced.
- After the outer filter has been replaced, press the button (Item 2) **[Figure 169]** on the end of the condition indicator. Start the engine. Run the engine at full rpm, then reduce engine speed. Stop the engine. If the red ring shows in the condition indicator, replace the inner filter.

Figure 173



Remove the dust cup, outer filter and inner filter (Item 1) **[Figure 173]**.

NOTE: Make sure all sealing surfaces are free of dirt and debris.

Install the new inner filter.

Install the outer filter and the dust cup.

Press the button on the condition indicator to remove the red ring.

FUEL SYSTEM

Fuel Specifications

Use only clean, high quality diesel fuel, Grade No. 2 or Grade No. 1.

The following is a suggested blending guideline which should prevent fuel gelling problems during freezing temperature

TEMP. C° (F°)	NO. 2	NO. 1
Above -9° (+15°)	100%	0%
Down to -29° (-20°)	50%	50%
Below -29° (-20°)	0%	100%

At a minimum, low sulfur diesel fuel must be used in this machine. Low sulfur is defined as 500 mg/kg (500 ppm) sulfur maximum.

The following fuels may also be used in this machine:

- Ultra low sulfur diesel fuel. Ultra low sulfur is defined as 15 mg/kg (15 ppm) sulfur maximum.
- Biodiesel blend fuel - Must contain no more than five percent biodiesel mixed with low sulfur or ultra low sulfur petroleum based diesel. This is commonly marketed as B5 blended diesel fuel.



WARNING

AVOID INJURY OR DEATH

Stop and cool the engine before adding fuel. **NO SMOKING!** Failure to obey warnings can cause an explosion or fire.

W-2063-0807



WARNING

AVOID INJURY OR DEATH

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

W-2103-0508

Biodiesel Blend Fuel

Biodiesel blend fuel has unique qualities that should be considered before using in this machine:

- Cold weather conditions can lead to plugged fuel system components and hard starting.
- Biodiesel blend fuel is an excellent medium for microbial growth and contamination which can cause corrosion and plugging of fuel system components.
- Use of biodiesel blend fuel may result in premature failure of fuel system components, such as plugged fuel filters and deteriorated fuel lines.
- Shorter maintenance intervals may be required, such as cleaning the fuel system and replacing fuel filters and fuel lines.
- Using biodiesel blended fuels containing more than five percent biodiesel can affect engine life and cause deterioration of hoses, tubelines, injectors, injector pump and seals.

Apply the following guidelines if biodiesel blend fuel is used:

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

FUEL SYSTEM (CONT'D)

Filling The Fuel Tank

WARNING

AVOID INJURY OR DEATH

Stop and cool the engine before adding fuel. **NO SMOKING!** Failure to obey warnings can cause an explosion or fire.

W-2063-0807

WARNING

AVOID INJURY OR DEATH

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

W-2103-0508

Figure 174



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

Remove the fuel fill cap (Item 1) [Figure 174].

Use a clean, approved safety container to add fuel. Add fuel only in an area that has a free movement of air and no flames or sparks. **NO SMOKING!**

Install and tighten the fuel fill cap.

Clean up any spilled fuel.

See the SERVICE SCHEDULE for the service interval when to remove water from or replace the fuel filter. (See SERVICE SCHEDULE on Page 107.)

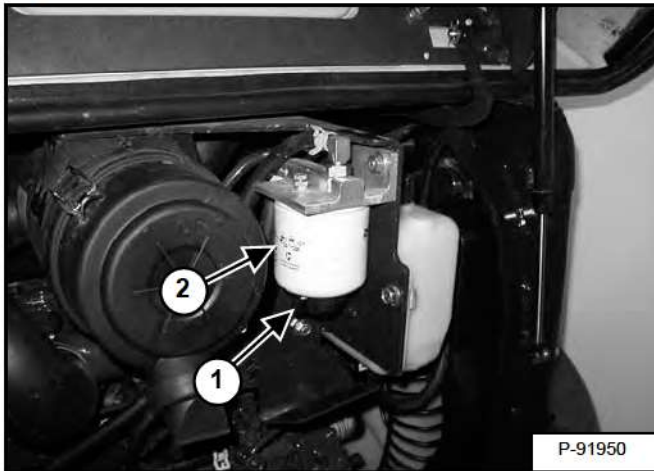
FUEL SYSTEM (CONT'D)

Fuel Filters

Removing Water

Open the tailgate. (See TAILGATE on Page 113.)

Figure 175



Loosen the drain (Item 1) [Figure 175] at the bottom of the filter to drain water from the filter into a container.

Clean up any spilled fuel.

Replacing Elements

Remove the filter (Item 2) [Figure 175].

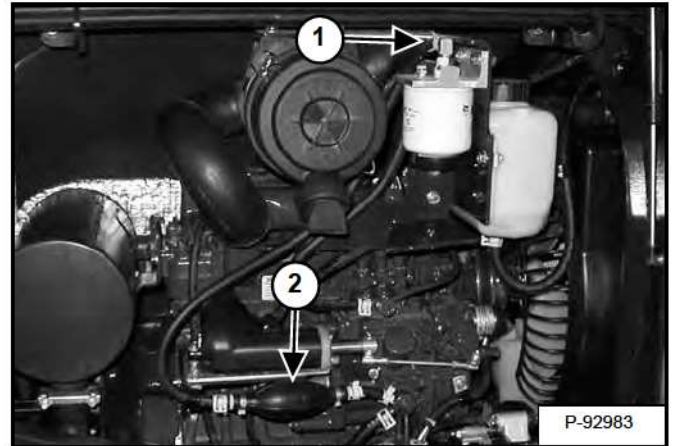
Clean the area around the filter housing. Put clean oil on the seal of the new filter. Install the fuel filter and hand tighten.

Remove the air from the fuel system. (See Removing Air From The Fuel System on Page 122.)

Draining The Fuel Tank

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 107.)

Figure 176



Remove the hose (Item 1) [Figure 176] from the fuel filter. Route the hose to a container.

Squeeze the hand pump (priming bulb) (Item 2) [Figure 176] to start the fuel siphoning from the fuel tank.

Drain the fuel into the container.

Reuse, recycle or dispose of fuel in an environmentally safe manner.

Reinstall the hose (Item 1) [Figure 176] after the fuel is removed from fuel tank.

WARNING

AVOID INJURY OR DEATH

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

W-2072-0807

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FUEL SYSTEM (CONT'D)

Removing Air From The Fuel System

After replacing the fuel filter or when the fuel tank has run out of fuel, air must be removed from the fuel system before starting the engine.

Figure 177

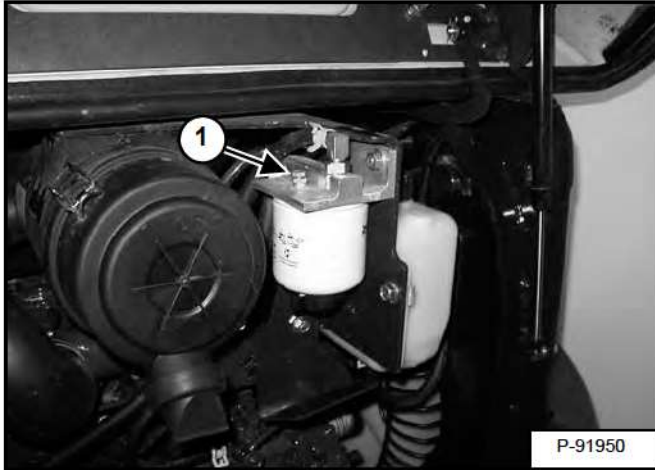
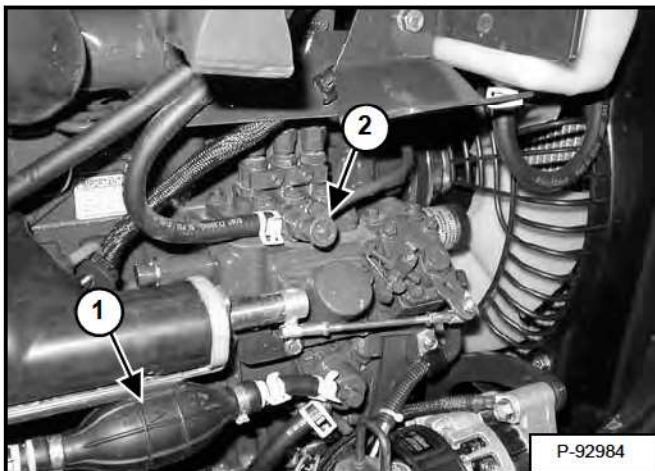


Figure 178



Open the tailgate. (See TAILGATE on Page 113.)

Open the fuel filter vent (Item 1) [Figure 177] and operate the hand pump (priming bulb) (Item 1) [Figure 178] until the fuel flows from the vent with no air bubbles.

Close the vent (Item 1) [Figure 177].

Start the engine. It may be necessary to open the vent (Item 2) [Figure 178] (at the fuel injection pump) briefly until the engine runs smoothly.

WARNING

AVOID INJURY OR DEATH

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

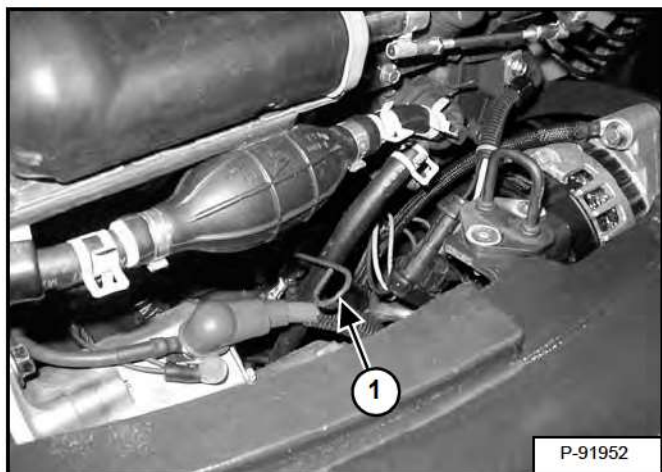
W-2072-0807

ENGINE LUBRICATION SYSTEM

Checking And Adding Engine Oil

Check the engine oil after every 8 - 10 hours of operation and before starting the engine. (See SERVICE SCHEDULE on Page 107.)

Figure 179



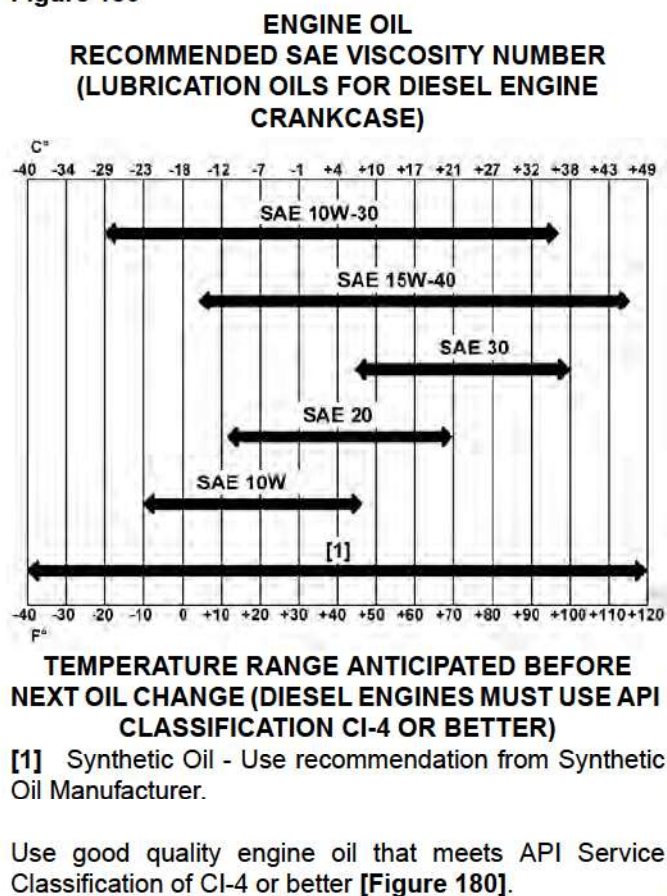
Open the tailgate and remove the dipstick (Item 1) [Figure 179].

Keep the oil level between the marks on the dipstick.

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

Engine Oil Chart

Figure 180



WARNING

AVOID INJURY OR DEATH

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

W-2103-0508

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ENGINE LUBRICATION SYSTEM (CONT'D)

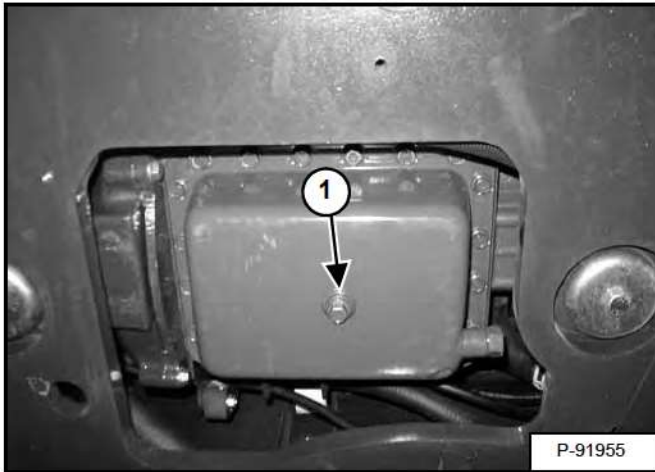
Removing And Replacing Oil And Filter

See the SERVICE SCHEDULE for the service interval for replacing the engine oil and filter. (See SERVICE SCHEDULE on Page 107.)

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

Open the tailgate. (See TAILGATE on Page 113.)

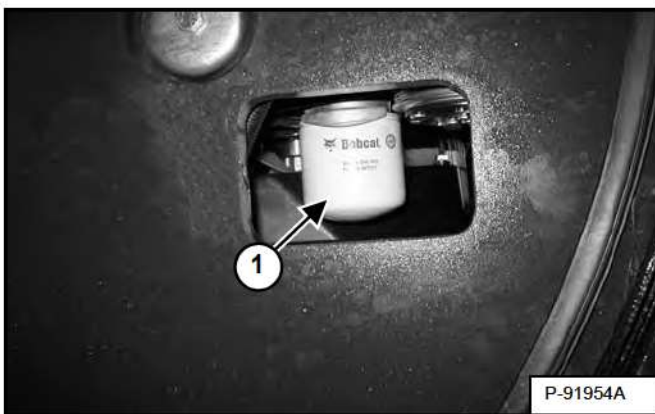
Figure 181



Place a container under the oil pan. Remove the drain plug (Item 1) [Figure 181] from the bottom of the engine oil pan.

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

Figure 182

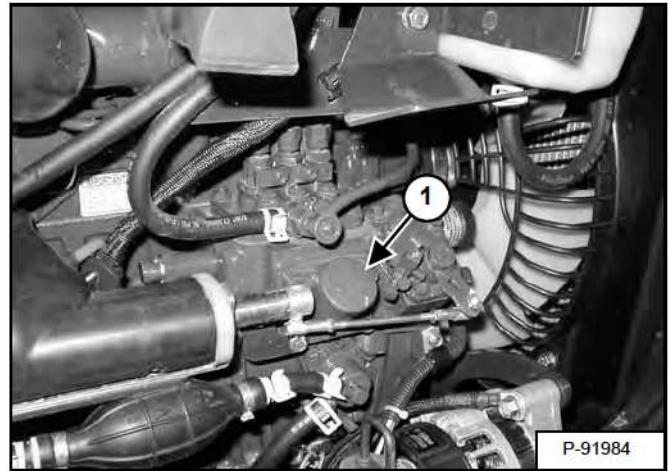


Remove the oil filter (Item 1) [Figure 182] and clean the filter housing surface.

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

Install and tighten the drain plug (Item 1) [Figure 181].

Figure 183



Remove the fill cap (Item 1) [Figure 183].

Put oil in the engine. (See ENGINE LUBRICATION SYSTEM on Page 123.)

Install the fill cap (Item 1) [Figure 183].

Start the engine and let it run for several minutes.

Stop the engine. Check for leaks at the oil filter. Check the oil level.

Add oil as needed if it is not at the top mark on the dipstick.

ENGINE COOLING SYSTEM

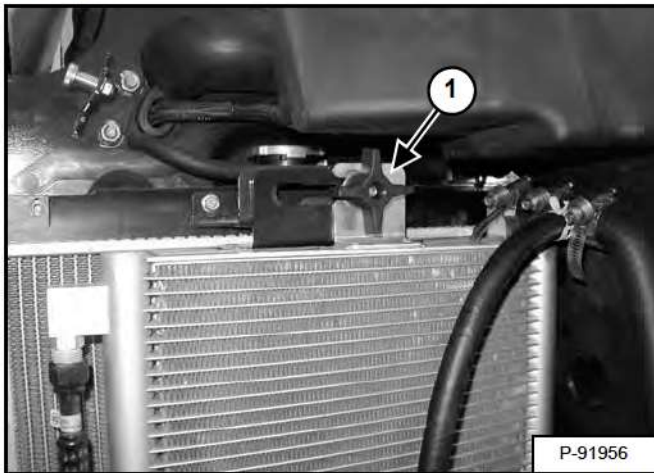
Check the cooling system every day to prevent over-heating, loss of performance or engine damage. (See SERVICE SCHEDULE on Page 107.)

Cleaning

Open the right side cover. (See RIGHT SIDE COVER on Page 114.)

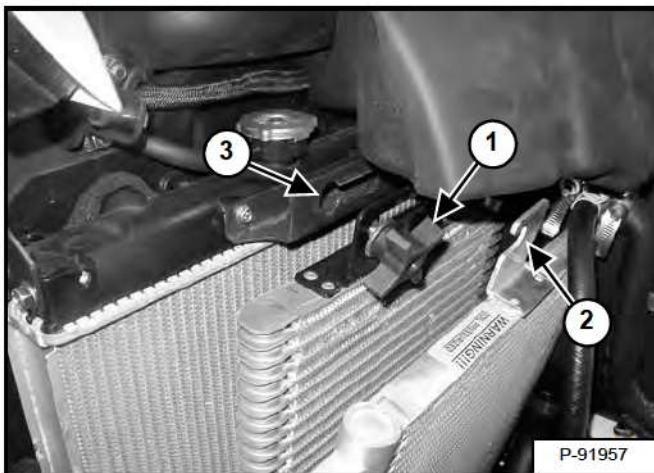
NOTE: Allow the cooling system and engine to cool before servicing or cleaning the cooling system.

Figure 184



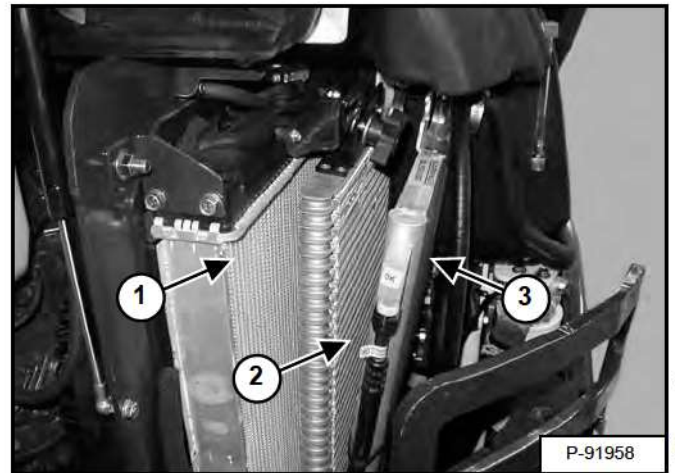
Loosen the knob (Item 1) [Figure 184]. Slide the knob toward the rear of the machine.

Figure 185



Slide the knob (Item 1) out of the condenser mount (Item 2) (if equipped) and the radiator mounting bracket (Item 3) [Figure 185]. Be careful not to damage fins.

Figure 186



Use air pressure or water pressure to clean the radiator (Item 1), oil cooler (Item 2) and condenser (Item 3) [Figure 186] (if equipped). Be careful not to damage fins when cleaning.

Position the knob (Item 1) so it fits into the radiator mount (Item 3) and the condenser mount (Item 2) [Figure 185] (if equipped).

Slide the knob (Item 1) toward the front of the machine until it is fully seated in the slots of the mounting brackets. Tighten the knob (Item 1) [Figure 184]. Be careful not to damage fins.

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ENGINE COOLING SYSTEM (CONT'D)

Checking Level

**WARNING**

AVOID BURNS

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

W-2070-1203

**WARNING**

AVOID INJURY OR DEATH

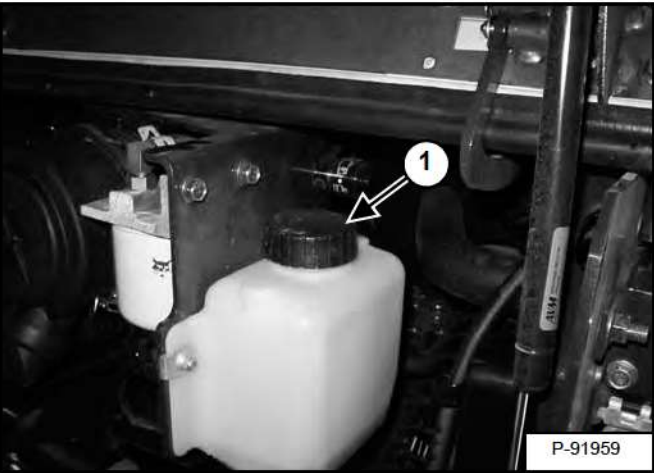
Wear safety glasses to prevent eye injury when any of the following conditions exist:

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

W-2019-0907

Open the tailgate. (See TAILGATE on Page 113.)

Figure 187



Check the coolant level in the coolant recovery tank (Item 1) [Figure 187].

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

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

IMPORTANT

AVOID ENGINE DAMAGE

Always use the correct ratio of water to antifreeze.

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

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

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

I-2124-0497

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ENGINE COOLING SYSTEM (CONT'D)

Removing And Replacing Coolant

See the SERVICE SCHEDULE for correct service intervals. (See SERVICE SCHEDULE on Page 107.)

Stop the engine. Open the tailgate. (See TAILGATE on Page 113.)



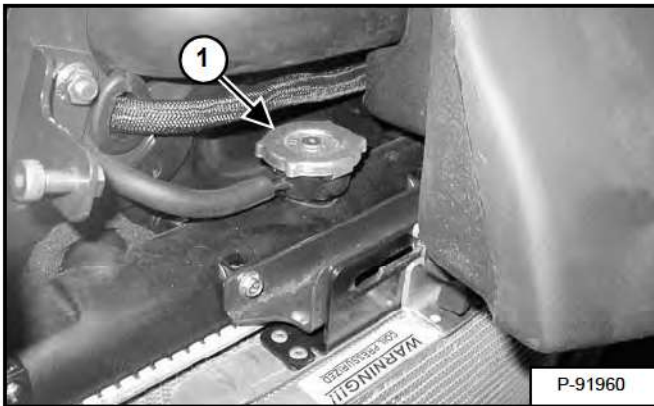
WARNING

AVOID BURNS

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

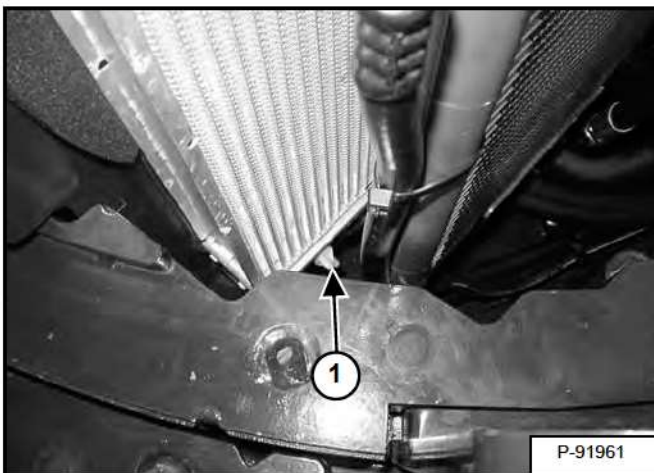
W-2070-1203

Figure 188



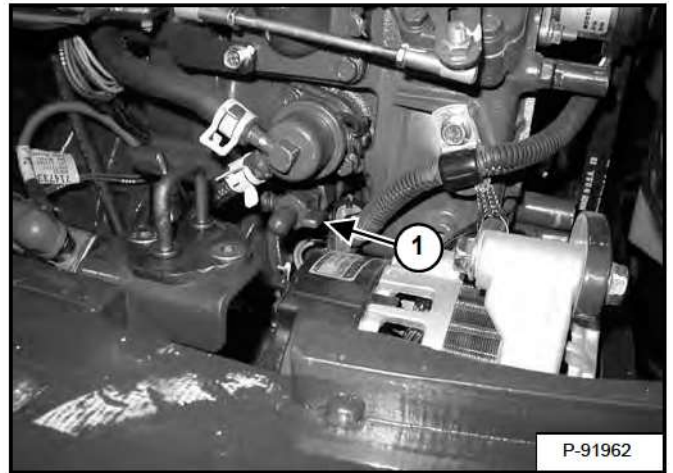
When the engine is cool, loosen and remove the radiator cap (Item 1) [Figure 188].

Figure 189



Put a hose on the drain valve at the bottom of the radiator. Open the drain valve (Item 1) [Figure 189] and drain the coolant into a container.

Figure 190



Put a hose on the drain valve on the engine block. Open the drain valve (Item 1) [Figure 190] and drain the coolant into a container.

After all the coolant is removed, close both drain valves.

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

Mix the coolant in a separate container. (See Capacities on Page 183.)

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

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

Add premixed coolant; 47% water and 53% propylene glycol to the recovery tank if the coolant level is low.

Use a refractometer to check the condition of propylene glycol in your cooling system.

Add premixed coolant until the level is correct.

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

Add coolant to the recovery tank as needed.

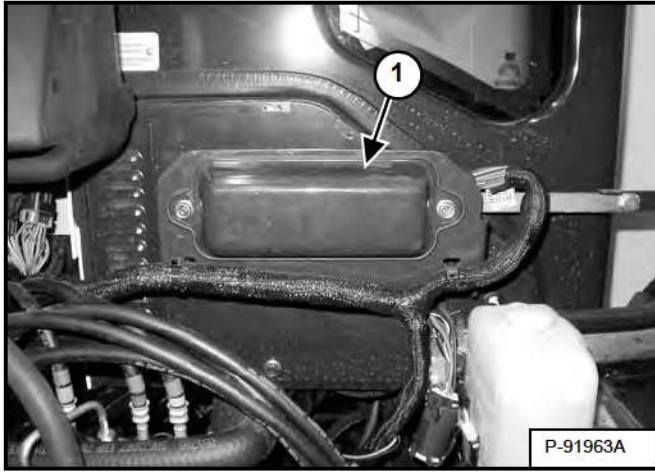
Close the tailgate.

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ELECTRICAL SYSTEM

Description

Figure 191



The excavator has a 12 volt, negative ground electrical system. The electrical system is protected by fuses located under the right side cover of the excavator (Item 1) [Figure 191]. The fuses will protect the electrical system when there is an electrical overload. The reason for the overload must be found and corrected before starting the engine again.

The battery cables must be clean and tight. Check the electrolyte level in the battery. Add distilled water as needed. Remove acid or corrosion from the battery and cables with a sodium bicarbonate and water solution.

Put Battery Saver P/N 6664458 or grease on the battery terminals and cable ends to prevent corrosion.

WARNING

AVOID INJURY OR DEATH

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

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

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

W-2065-0807

Fuse And Relay Location / Identification

A decal is inside the fuse cover to show location and amp ratings.

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

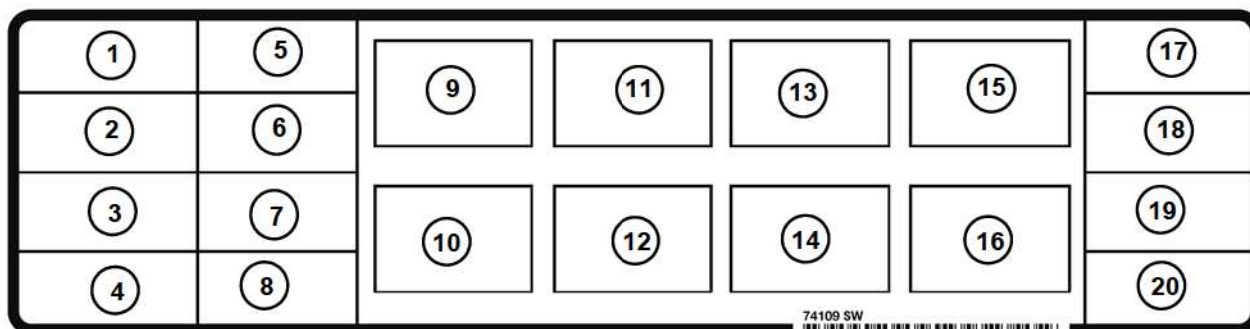
The location and sizes are shown in [Figure 192].

Always replace fuses using the same type and capacity.

ELECTRICAL SYSTEM (CONT'D)

Fuse And Relay Location / Identification (Cont'd)

Figure 192



The location and sizes are shown in the table below and on the decal [Figure 192]. Relays are identified by the letter “R” in the AMP column.

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

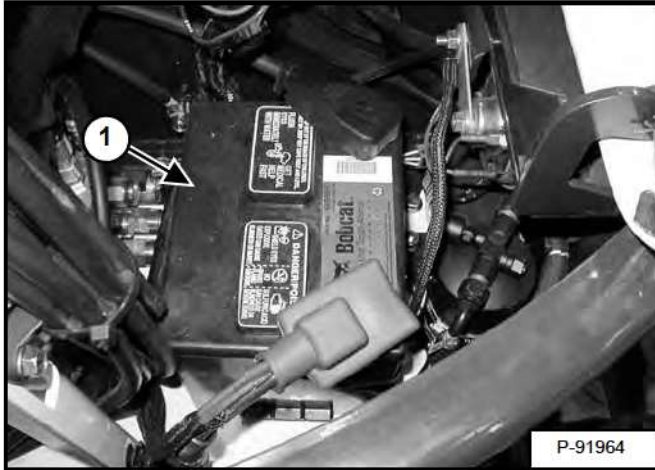
Dealer Copy -- Not for Resale

ELECTRICAL SYSTEM (CONT'D)

Battery Maintenance

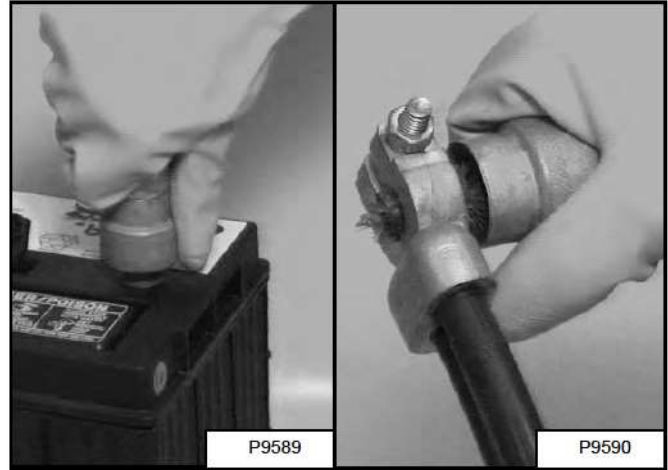
Open the right side cover. (See RIGHT SIDE COVER on Page 114.)

Figure 193



The battery (Item 1) [Figure 193] is located in the front of the right side upperstructure.

Figure 194



The battery cables must be clean and tight [Figure 194]. Remove acid or corrosion from the battery and cables using a sodium bicarbonate and water solution. Cover the battery terminals and cable ends with battery saver grease to prevent corrosion.

Check for broken or loose connections.

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

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

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

WARNING

AVOID INJURY OR DEATH

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

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

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

W-2065-0807

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ELECTRICAL SYSTEM (CONT'D)

Using A Booster Battery (Jump Starting)

IMPORTANT

If jump starting the excavator from a second machine:

When jump starting the excavator from a battery installed in a second machine, make sure the engine is **NOT** running while using the glow plugs. High voltage spikes from a running machine can burn out the glow plugs.

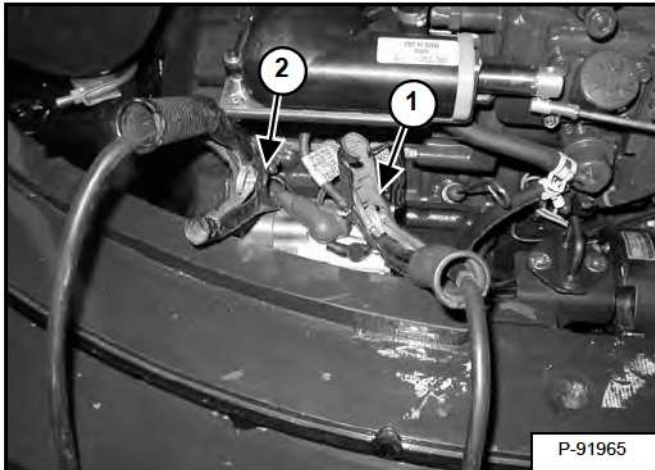
I-2060-0906

If it is necessary to use a booster battery to start the engine, **BE CAREFUL!** There must be one person in the operator's seat and one person to connect and disconnect the battery cables.

Be sure the key switch is OFF. The booster battery must be 12 volt.

Open the tailgate. (See TAILGATE on Page 113.)

Figure 195



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 195] of the excavator starter.

Connect one end of the second cable to the negative (-) terminal of the booster battery. Connect the other end of the same cable to the starter mounting bolt (Item 2) [Figure 195].

Start the engine. After the engine has started, remove the ground (-) cable first (Item 2) [Figure 195].

Disconnect the cable from the excavator starter (Item 1) [Figure 195].

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

IMPORTANT

Damage to the alternator can occur if:

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

I-2223-0903

! WARNING

AVOID INJURY OR DEATH

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

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

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

W-2065-0807

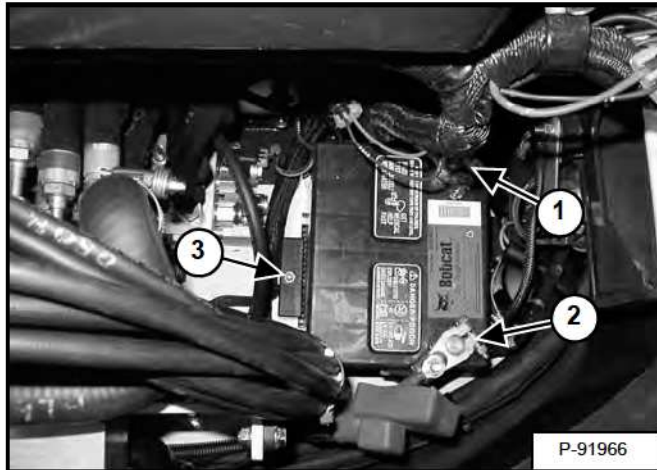
Dealer Copy -- Not for Resale

ELECTRICAL SYSTEM (CONT'D)

Removing And Installing The Battery

Open the right side cover. (See RIGHT SIDE COVER on Page 114.)

Figure 196



Disconnect the negative (-) cable (Item 1) [Figure 196] first.

Disconnect the positive (+) cable (Item 2) [Figure 196].

Remove the bolt (Item 3) [Figure 196] and remove the hold-down clamp.

Remove the battery.

Always clean the terminals and the cable ends, even when installing a new battery.

Install the battery. Install the hold-down clamp and tighten the bolts.

Connect the battery cables. Connect the negative (-) cable (Item 1) [Figure 196] last to prevent sparks.



WARNING

AVOID INJURY OR DEATH

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

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

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

W-2065-0807

HYDRAULIC SYSTEM

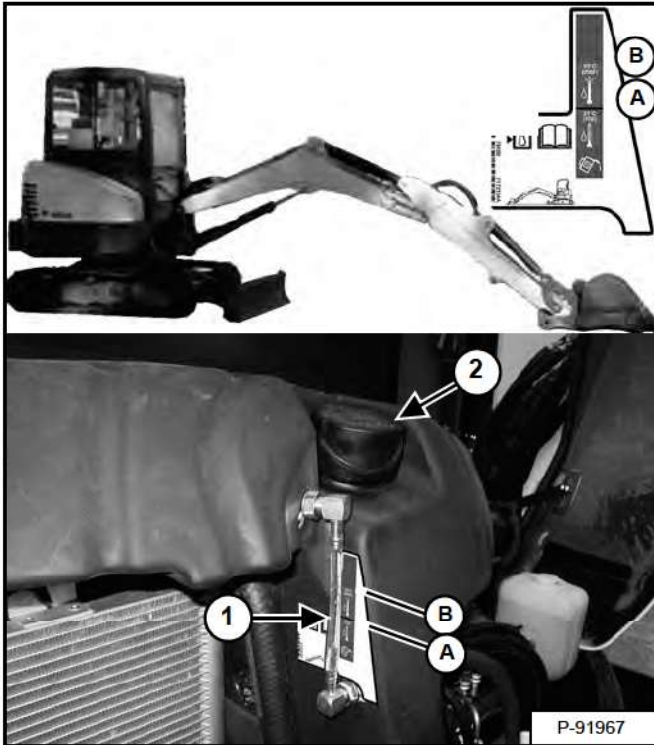
Checking And Adding Hydraulic Oil

Put the machine on a flat level surface.

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

Open the right side cover. (See RIGHT SIDE COVER on Page 114.)

Figure 197



Park the machine in the position shown [Figure 197]. (The preferred method is to check the hydraulic oil when it is cold.)

Check the hydraulic oil level, it must be visible in the sight gauge (Item 1) [Figure 197]. The decal on the hydraulic tank shows the correct fill level.

A - Correct Oil Level COLD (Preferred)

B - Correct Oil Level HOT (Optional)

Clean the surface around the reservoir cap and remove the cap from the reservoir (Item 2) [Figure 197].

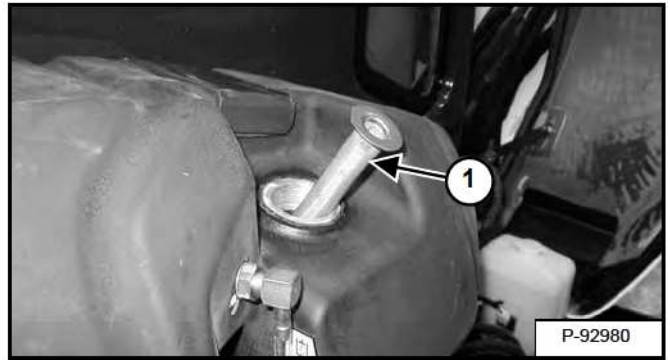
WARNING

AVOID INJURY OR DEATH

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

W-2103-0508

Figure 198



Check the condition of the fill strainer screen (Item 1) [Figure 198]. Clean or replace as necessary.

Be sure the screen is installed before adding fluid.

Add the correct fluid to the reservoir until it is visible in the sight gauge. (See HYDRAULIC SYSTEM on Page 133.)

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

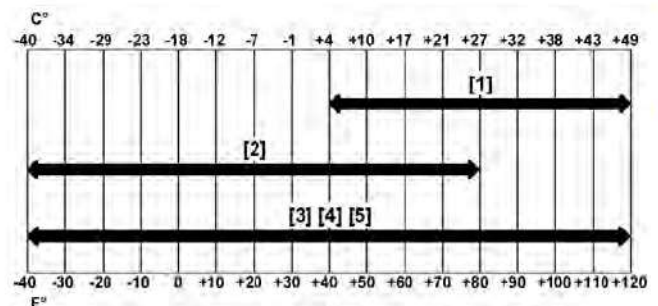
Install the cap.

Close the right side cover and tailgate.

Hydraulic / Hydrostatic Fluid Chart

Figure 199

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



TEMPERATURE RANGE ANTICIPATED DURING MACHINE USE

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

Install the oil fill cap.

Dealer Copy -- Not for Resale

HYDRAULIC SYSTEM (CONT'D)

Removing And Replacing The Hydraulic Filters

Hydraulic Filter

WARNING

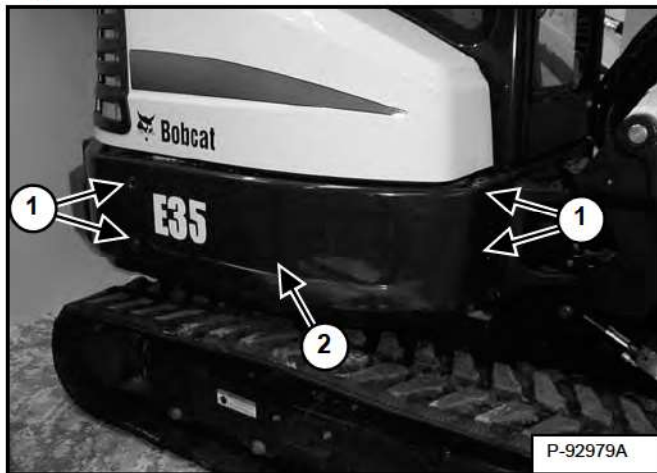
AVOID INJURY OR DEATH

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

W-2103-0508

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 107.)

Figure 200

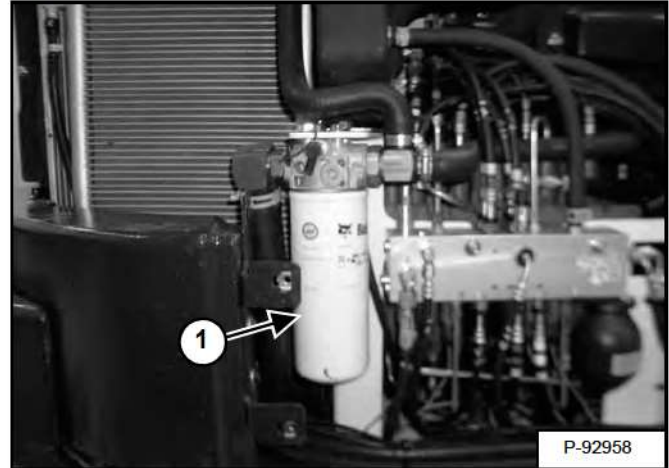


For easier access to change the hydraulic filter, remove the lower right side panel.

Remove the four bolts (Item 1) and the side panel (Item 2) [Figure 200]. Remove the side panel.

Open the right side cover. (See RIGHT SIDE COVER on Page 114.)

Figure 201



Remove the hydraulic filter (Item 1) [Figure 201].

Clean the housing where the filter gasket makes contact.

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

HYDRAULIC SYSTEM (CONT'D)

Removing And Replacing The Hydraulic Filters (Cont'd)

Case Drain Filter

WARNING

AVOID INJURY OR DEATH

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

W-2103-0508

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 107.)

The case drain filter is located below the floorplate.

Remove the floor mat.

Remove the floorplate.

Figure 202



Remove the case drain filter (Item 1) [Figure 202].

Clean the housing where the filter gasket makes contact.

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

NOTE: When changing the case drain filter, also lubricate the boom swing cylinder base end fitting while the floorplate is removed. (See SERVICE SCHEDULE on Page 107.) and (See LUBRICATION OF THE HYDRAULIC EXCAVATOR on Page 148.)

HYDRAULIC SYSTEM (CONT'D)

Removing And Replacing The Hydraulic Fluid

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 107.)

WARNING

AVOID INJURY OR DEATH

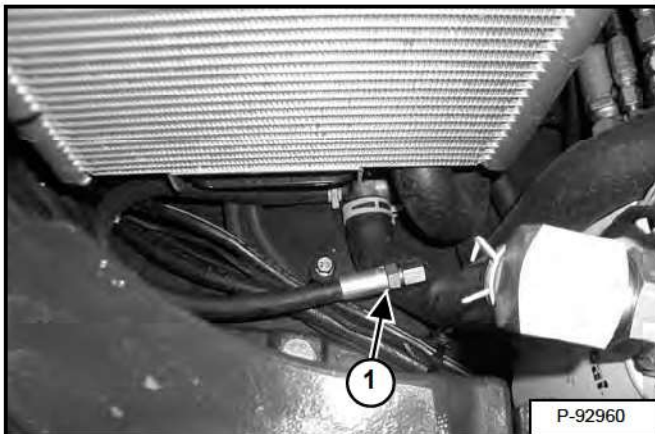
Diesel fuel or hydraulic fluid under pressure can penetrate skin or eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. Do not use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical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

W-2072-0807

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

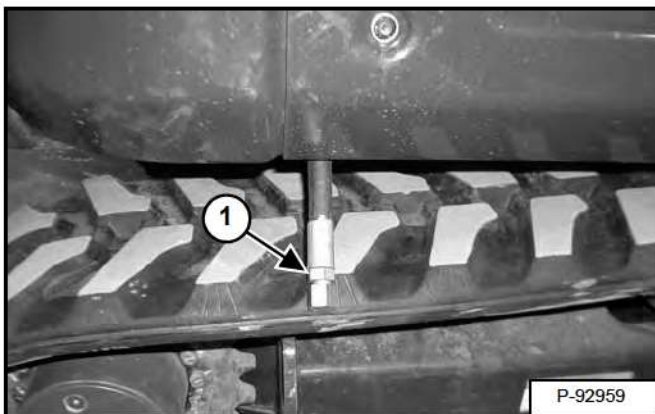
Open the tailgate. (See TAILGATE on Page 113.)

Figure 203



The hydraulic oil drain hose (Item 1) [Figure 203] is located below the oil cooler in the right rear corner of the upperstructure.

Figure 204



Reposition the drain hose out the bottom of the upperstructure and remove the cap (Item 1) [Figure 204].

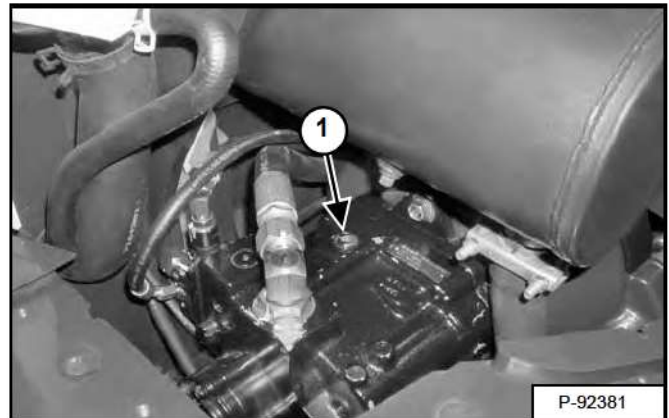
Drain the fluid into a container.

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

Install the cap (Item 1) [Figure 204] and position the drain hose back to the storage position (Item 1) [Figure 203].

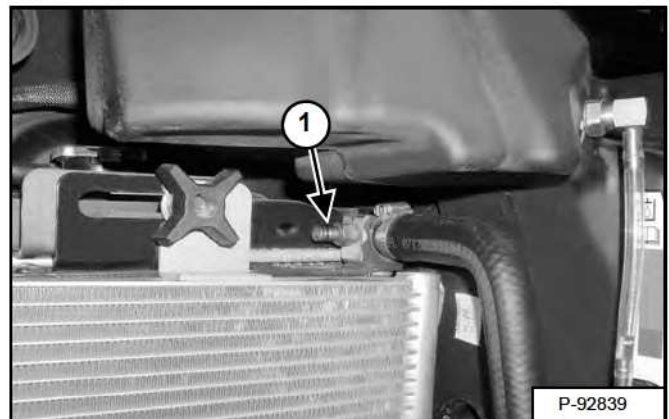
Add fluid to the reservoir. (See HYDRAULIC SYSTEM on Page 133.)

Figure 205



With the engine OFF, loosen the plug (Item 1) [Figure 205] on the hydraulic pump. Tighten the plug after a steady stream of hydraulic fluid, free of any air bubbles, drains from the plug. **DO NOT RUN THE MACHINE WITH THE PLUG OPEN.**

Figure 206



There is also a port (Item 1) [Figure 206] on the hydraulic cooler for bleeding air. Install a diagnostic coupler and hose on this fitting and to allow air to be bled from the hydraulic system after the hydraulic fluid has been replaced.

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

SPARK ARRESTER MUFFLER

Cleaning Procedure

If equipped with the spark arrester muffler, See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 107.)

WARNING

AVOID INJURY OR DEATH

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

W-2050-0807

WARNING

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

W-2011-1285

WARNING

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

W-2068-1285

WARNING

When the engine is running during service, the steering levers must be in neutral.

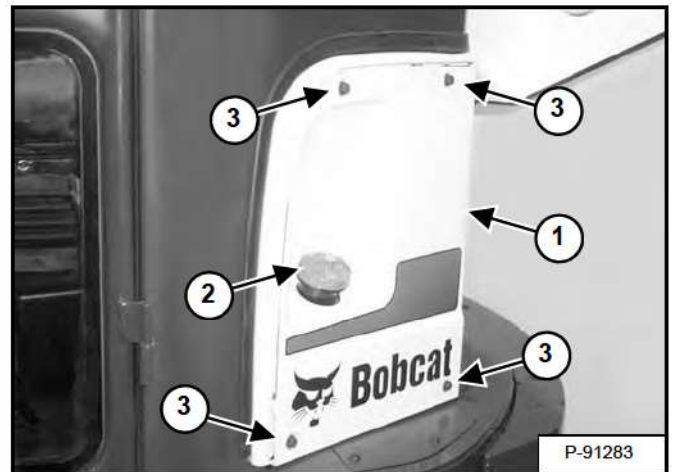
Failure to do so can cause injury or death.

W-2203-0595

Do not operate the excavator with a defective exhaust system.

Stop the engine. Open the tailgate. (See TAILGATE on Page 113.)

Figure 207

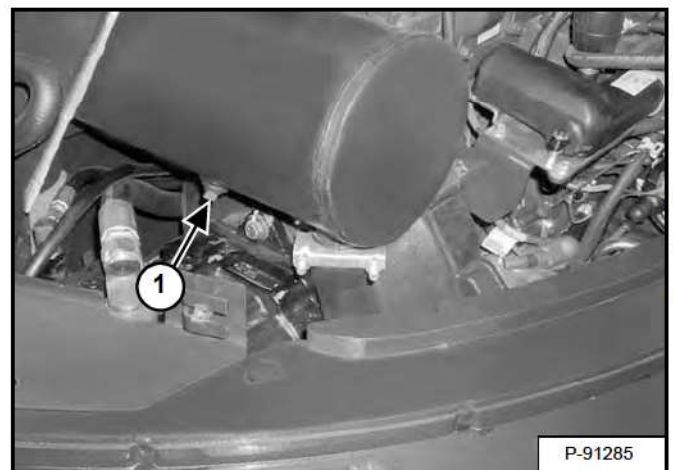


The left panel (Item 1) [Figure 207] will need to be removed for access to the spark arrester muffler.

Remove the fuel cap (Item 2) and the four bolts (Item 3) and remove the panel (Item 1) [Figure 207].

Reinstall the fuel cap (Item 2) [Figure 207].

Figure 208



Remove the plug (Item 1) [Figure 208] from the bottom of the muffler.

Start the engine and run for about 10 seconds while a second person, wearing safety glasses, holds a piece of wood over the outlet of the muffler. The carbon deposits will be forced out of the muffler plug hole (Item 1) [Figure 208].

Stop the engine. Install and tighten the plug.

Reinstall the panel (Item 1) [Figure 207].

Close the tailgate.

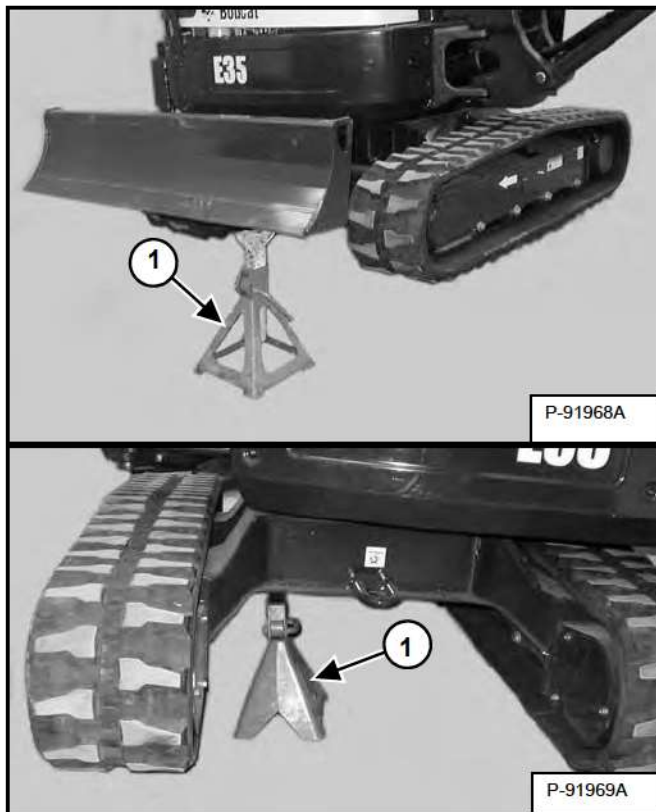
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TRACK TENSION

NOTE: The wear of the pins and bushings on the undercarriage vary with the working conditions and the different types of soil conditions. It is necessary to inspect track tension and maintain the correct tension. See **SERVICE SCHEDULE** for the correct service interval. (See **SERVICE SCHEDULE** on Page 107.)

Adjusting

Figure 209



Raise one side of the machine (Approximately four inches) using the boom and arm.

Raise the blade fully and install jackstands under the blade and track frame (Item 1) [Figure 209]. Lower the boom until all machine weight is on the jackstands.

Stop the engine.

WARNING

AVOID INJURY

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

W-2142-0903

TRACK TENSION (CONT'D)

Adjusting (Cont'd)

Rubber Track Clearance

Figure 210

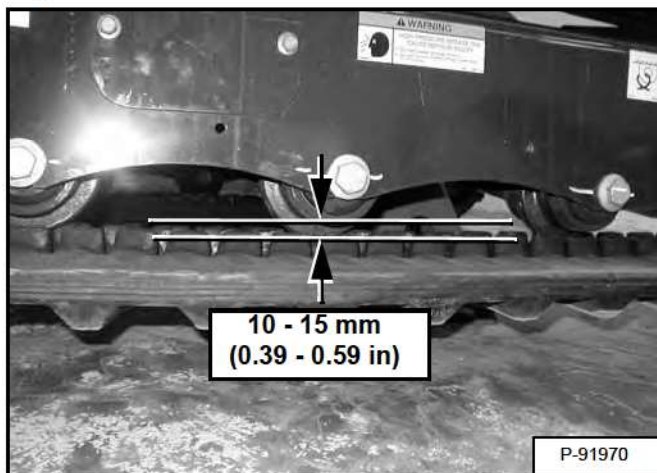
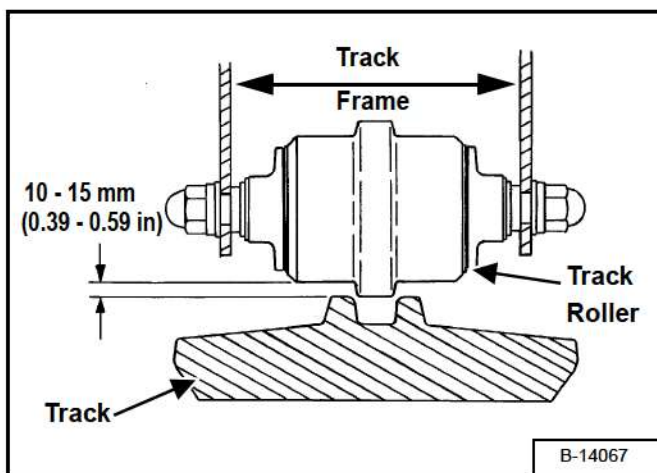


Figure 211

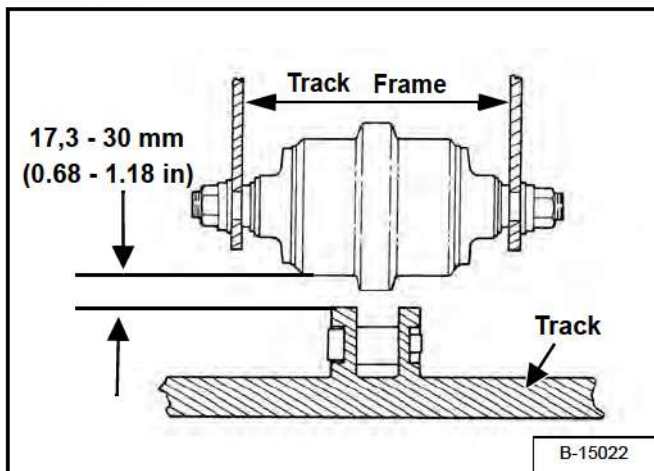


Measure the clearance at the middle track roller. Do not get fingers into pinch points between the track and the track roller. Use a bolt or a dowel of the appropriate size to check the gap between the contact edge of the roller and the top edge of the track guide [Figure 210] and [Figure 211].

Rubber Track Clearance - 10 - 15 mm (0.39 - 0.59 in)

Steel Track Clearance

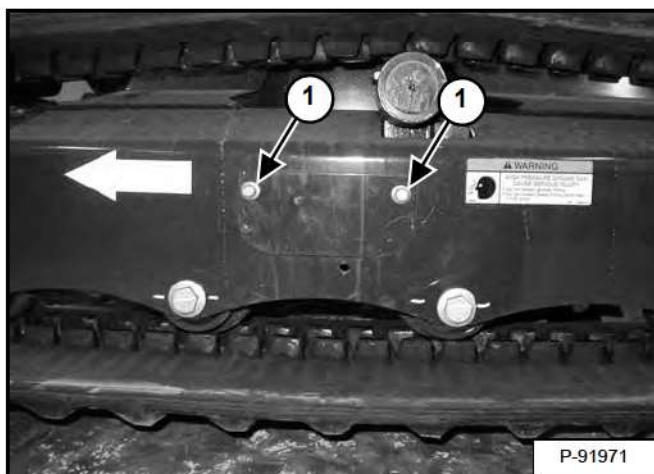
Figure 212



Measure the track clearance at the middle track roller. Do not get fingers into pinch points between the track and the track roller. Use a bolt or dowel of the appropriate size to check the gap between the contact edge of the roller and the top edge of the track guide [Figure 212].

Steel Track Clearance - 17,3 - 30 mm (0.68 - 1.18 in)

Figure 213



Loosen the two bolts from the cover (Item 1) [Figure 213]. Pivot the cover downward.

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TRACK TENSION (CONT'D)

Adjusting (Cont'd)



WARNING

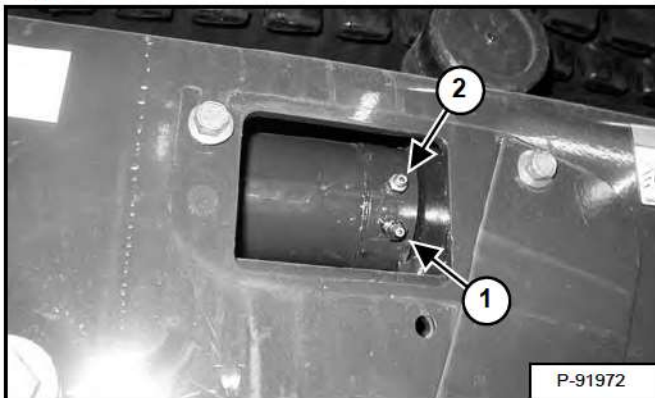
HIGH PRESSURE GREASE CAN CAUSE SERIOUS INJURY

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

W-2994-0515

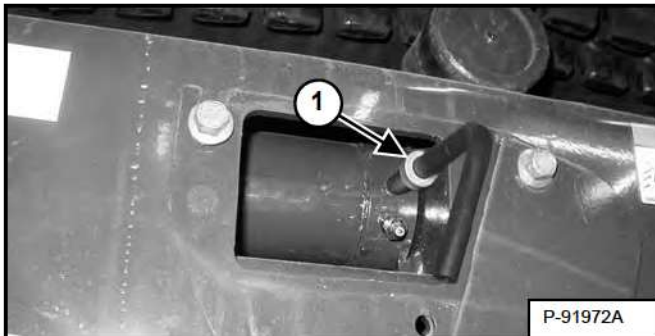
With Bleed Screw and Track Tension Fitting

Figure 214



Add grease to the track tension fitting (Item 1) [Figure 214] until the track tension is correct.

Figure 215



The tension removal tool (P/N 6675936) is available and recommended to direct the flow of grease to aid in cleanup. Always dispose of the grease in an environmentally friendly manner.

The tool is sized to fit the bleed fitting (Item 2) [Figure 214].

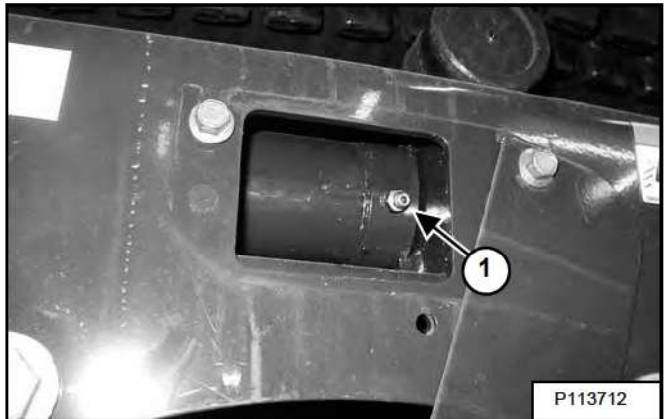
Use tool P/N 6675936 (Item 1) [Figure 215] to loosen the bleed fitting (Item 2) [Figure 214] to release tension from the track. Do not loosen the bleed fitting more than 1-1/2 turns.

NOTE: Do not loosen the grease fitting (Item 1) [Figure 214].

Repeat the procedure for the other side.

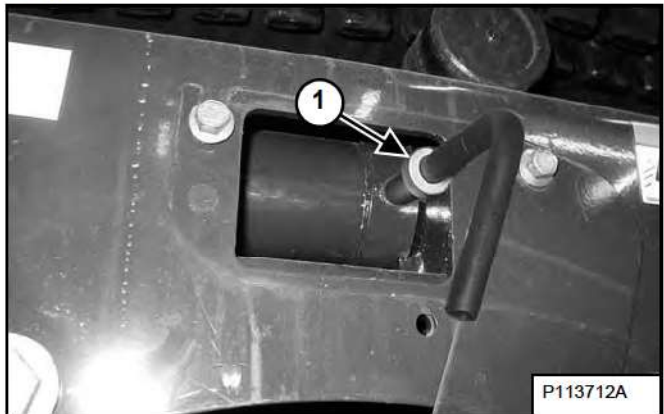
With One Piece - Track Tension Fitting

Figure 216



Add grease to the track tension fitting (Item 1) [Figure 216] until the track tension is correct.

Figure 217



The tension removal tool (P/N 7277225) is available and recommended to direct the flow of grease to aid in cleanup. Always dispose of the grease in an environmentally friendly manner.

The tool is sized to fit the one piece track tension fitting (Item 1) [Figure 216].

Use tool P/N 7277225 (Item 1) [Figure 217] to loosen the track tension fitting (Item 1) [Figure 216] to release tension from the track.

NOTE: Do not loosen the track tension fitting (Item 1) [Figure 216] more than 1-1/2 turns.

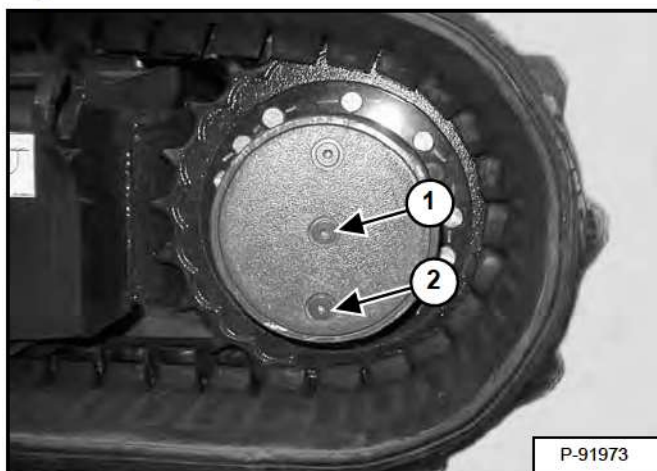
Installation: Tighten the track tension fitting to 23 N·m (17 ft-lb) torque.

Repeat the procedure for the other side.

TRAVEL MOTOR

Checking And Adding Oil

Figure 218



Park the excavator on a level surface with the plugs (Items 1 and 2) **[Figure 218]** in the vertical position as shown.

Remove the plug (Item 1) **[Figure 218]**. The lube level must be at the bottom edge of the hole.

Add lubricant (SAE 90W) through the hole if the lube level is low.

Removing And Replacing Oil

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 107.)

Park the excavator on a level surface with plugs (Items 1 and 2) **[Figure 218]** in the vertical position shown. Remove both plugs and drain the lubricant into a container.

WARNING

AVOID INJURY OR DEATH

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

W-2103-0508

Install the bottom plug (Item 2) **[Figure 218]**. Add lubricant through the center plug hole until the lube level is at the bottom edge of the hole.

Add lubricant (SAE 90W) through the hole if the lube level is low.

Install the plug (Item 1) **[Figure 218]**.

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ALTERNATOR BELT

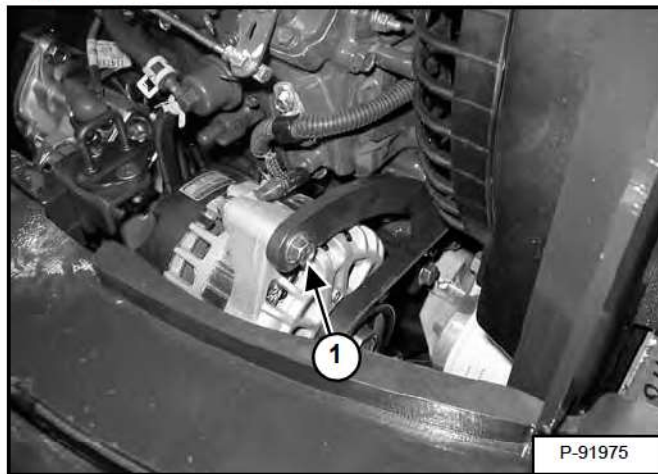
Belt Adjustment

The alternator belt is a special maintenance free type that is pretensioned over the pulleys. This belt eliminates the need for a tensioning device and does not require periodic adjustment. Contact your Bobcat dealer for replacement parts.

Belt Replacement

Stop the engine and open the tailgate. (See TAILGATE on Page 113.)

Figure 219



Loosen the bolt (Item 1) [Figure 219] and the lower alternator mounting bolt and nut (not shown).

Use a pry bar to take the pressure off of the bolt (Item 1) [Figure 219] and remove the top bolt.

Remove and replace the alternator belt.

Use the pry bar to position the alternator and install the bolt (Item 1) [Figure 219].

Tighten the top and bottom alternator mounting bolts.

Close the tailgate.

FAN BELT

Belt Adjustment

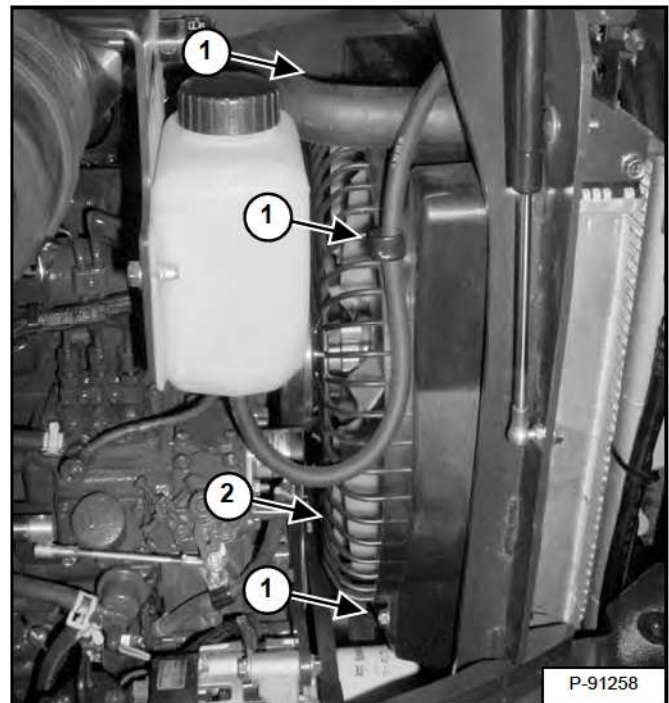
The fan belt is a special maintenance free type that is pretensioned over the pulleys. This belt eliminates the need for a tensioning device and does not require periodic adjustment. Contact your Bobcat dealer for replacement parts.

Belt Replacement

Stop the engine and open the tailgate. (See TAILGATE on Page 113.)

Remove the alternator belt. (See ALTERNATOR BELT on Page 142.)

Figure 220

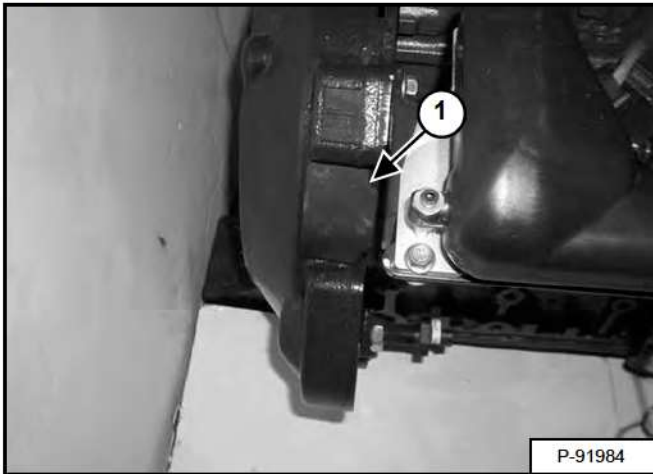


Remove the three bolts (Item 1) and the fan guard (Item 2) [Figure 220] for clearance for belt removal.

FAN BELT (CONT'D)

Belt Replacement (Cont'd)

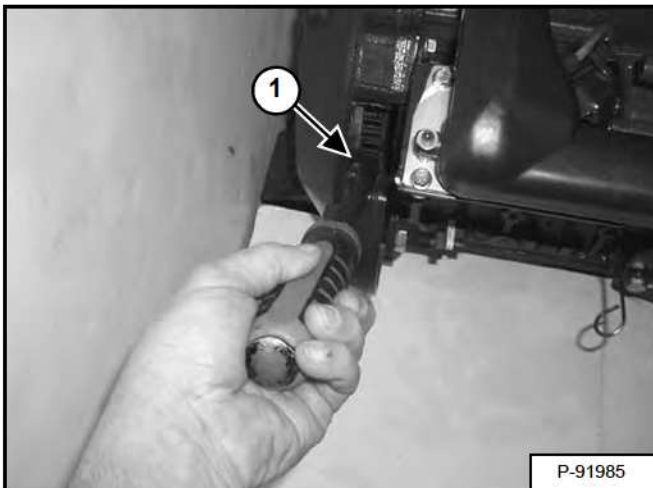
Figure 221



NOTE: The engine is removed from the machine for photo clarity only. This procedure can be performed with engine installed in machine.

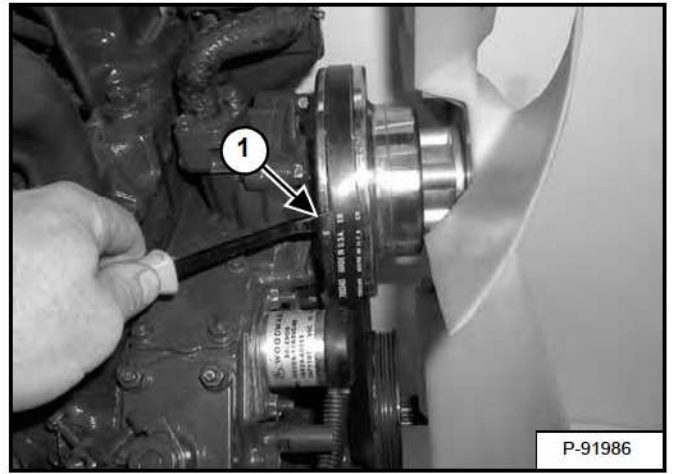
The engine will need to be rotated by hand to remove the belt. To access the flywheel, remove the plug (Item 1) [Figure 221] from the flywheel housing.

Figure 222



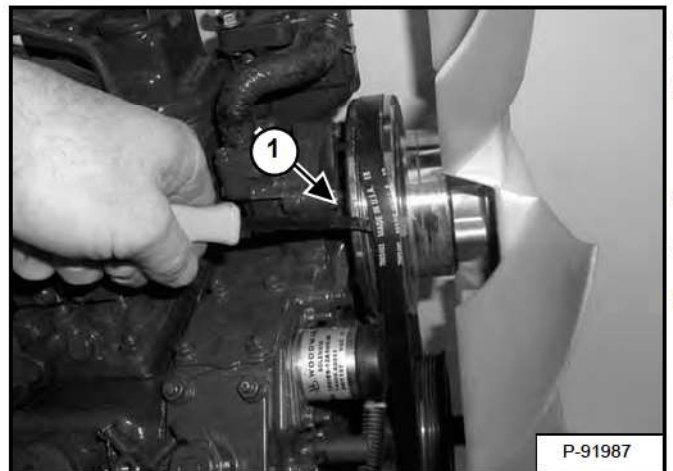
Install a pry bar (Item 1) [Figure 222] to the flywheel teeth.

Figure 223



Install a second pry bar (Item 1) [Figure 223] or flat blade screw driver between the belt and the water pump pulley.

Figure 224



Using the pry bar (Item 1) [Figure 222] to rotate the engine, start to push the belt off of the pulley using the second pry bar (Item 1) [Figure 224].

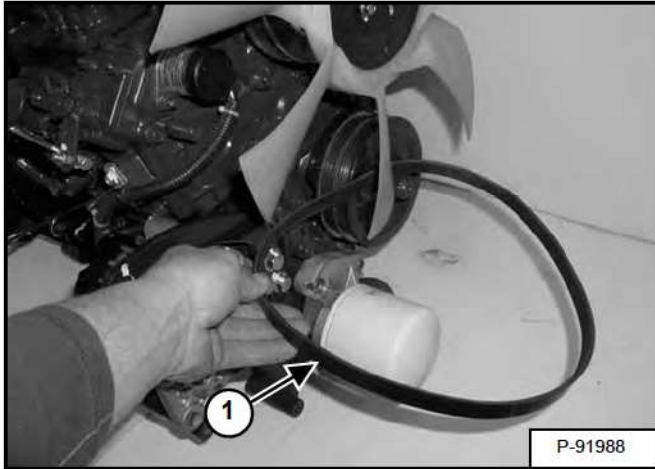
Continue to manually rotate the engine until the belt is off the pulley.

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FAN BELT (CONT'D)

Belt Replacement (Cont'd)

Figure 225

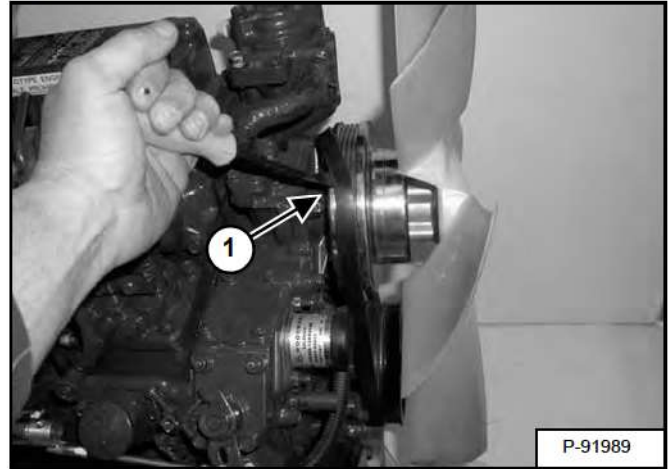


NOTE: Fan blades may be sharp, use care when removing the belt over the fan blades.

The belt (Item 1) [Figure 225] will need to be worked over the fan blades until it can be removed.

Install the new fan belt.

Figure 226



Position the belt over the water pump pulley and next to the engine block and align the lower part of the belt to the crankshaft pulley.

Using the pry bar (Item 1) [Figure 222] to rotate the engine and push the belt on the pulley using the second pry bar (Item 1) [Figure 226].

Continue rotating the engine until the belt is fully installed.

Install the flywheel plug (Item 1) [Figure 221].

Install the alternator belt. (See ALTERNATOR BELT on Page 142.)

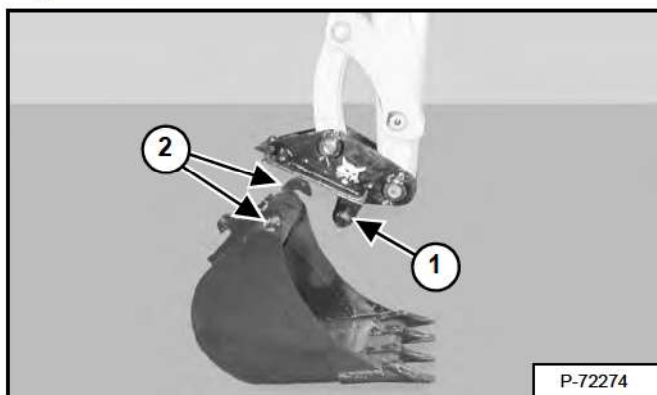
Install the fan guard (Item 1) [Figure 220].

Close the tailgate.

QUICK COUPLER

Quick Coupler And Attachment Inspection And Maintenance

Figure 227



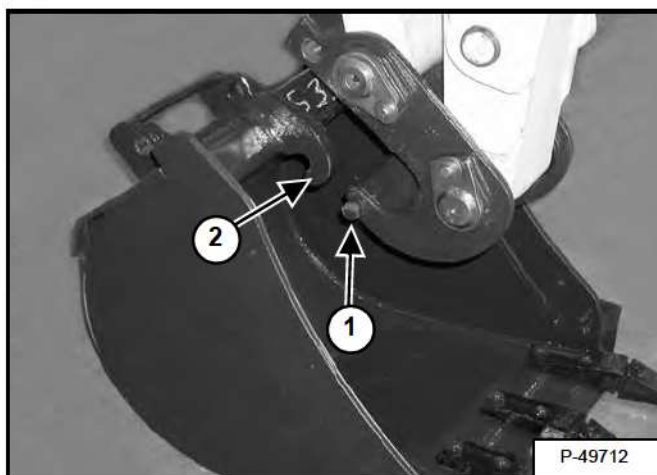
Inspect the quick coupler for wear or damage. Inspect the quick coupler pins (Item 1) and the hooks (Item 2) [Figure 227] (on the attachment) for wear or damage

Repair or replace damaged parts.

X-CHANGE

Inspection And Maintenance

Figure 228



Inspect the X-Change for wear or damage. Inspect the X-Change pins (Item 1) and hooks (Item 2) [Figure 228] (on the attachment) for wear or damage.

Repair or replace damaged parts.

TRACK ROLLER AND IDLER LUBRICATION

Procedure

The track rollers and idlers require no maintenance. The bearings are a sealed design.

BUCKET

Bucket Teeth Removal And Installation

WARNING

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

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

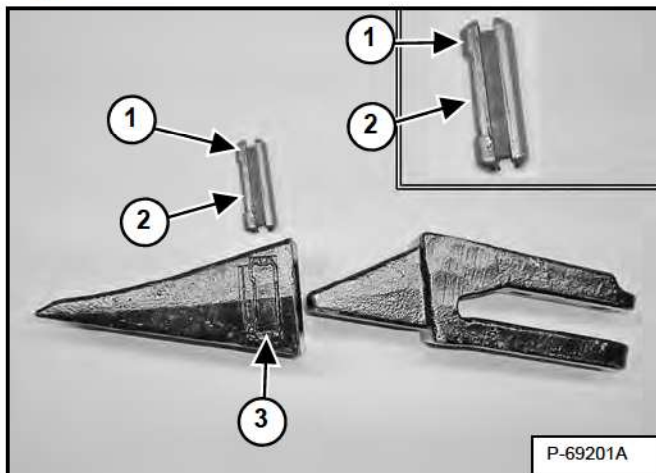
W-2505-0604

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

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

Stop the engine and exit the excavator.

Figure 229



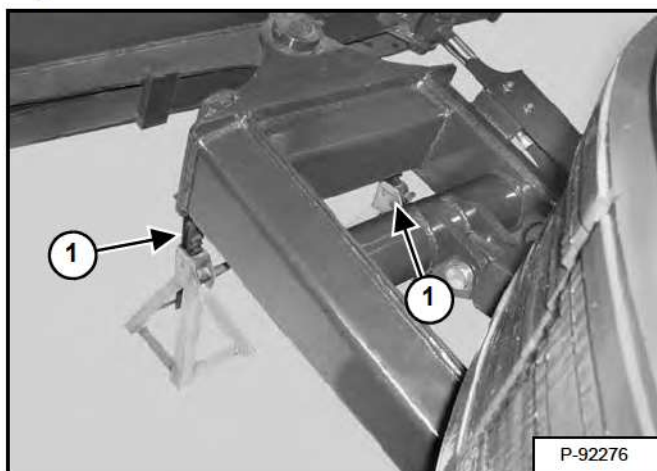
The retaining pin (Item 1) must be installed as shown [notch (Item 2) to the front] for proper fit and tooth retention. The side of the tooth point (Item 3) [Figure 229] also shows the correct orientation of the retaining pin.

Installation: Position the new tooth point on the shank and install a new retaining pin. Install the retaining pin until it is flush with the top of the point.

CUTTING EDGE (ANGLE BLADE ONLY)

Removal And Installation

Figure 230



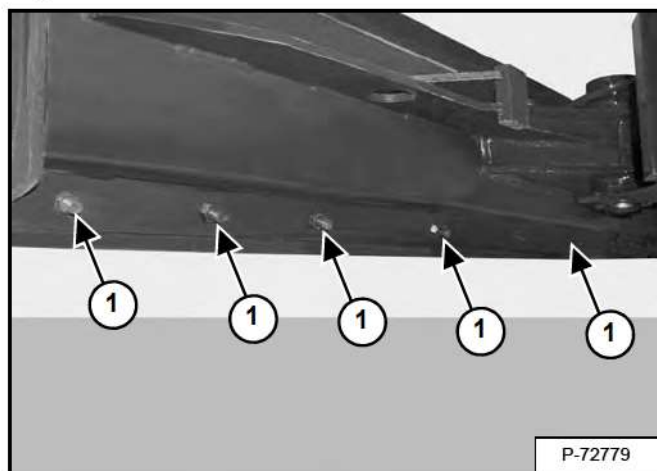
Raise the blade fully and install jackstands (Item 1) [Figure 230] under the blade arms.

Figure 231



Place a jack under the cutting edge [Figure 231].

Figure 232



Remove the nine nuts (Item 1) [Figure 232] and bolts from the cutting edge.

Lower the jack and remove the cutting edge.

Installation: Tighten nuts to 125 N·m (90 ft-lb) torque.

NOTE: Cutting edge is reversible and replaceable.

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LUBRICATION OF THE HYDRAULIC EXCAVATOR

Lubrication Locations

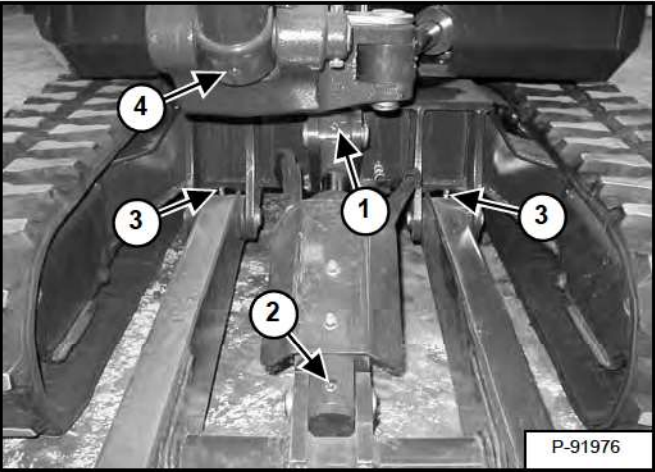
Lubricate the excavator as specified in the SERVICE SCHEDULE for the best performance of the machine. (See SERVICE SCHEDULE on Page 107.)

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

NOTE: Use Extra Heavy Gear Shield grease for grease fittings (Item 19, 20 and 21).

Lubricate the following locations on the excavator EVERY 8 - 10 HOURS:

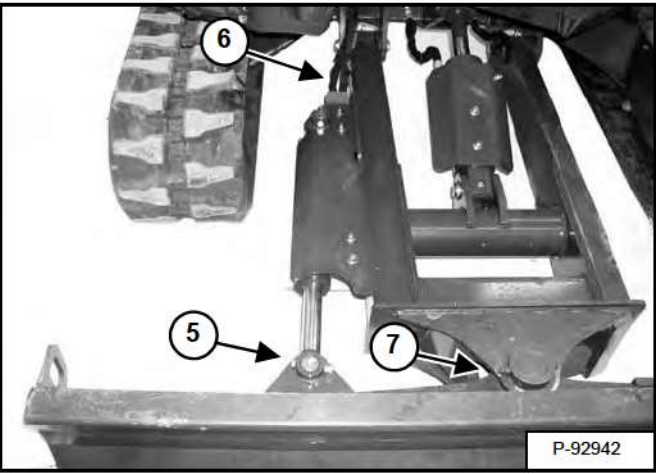
Figure 233



Ref Description (# of Fittings)

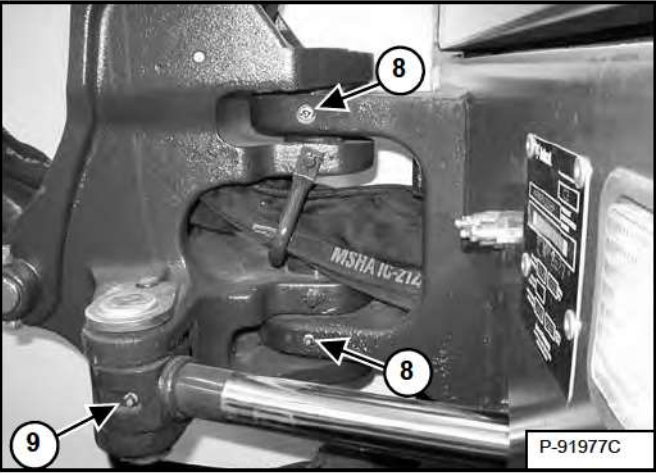
- 1. Blade Cylinder Rod End (1) [Figure 233]
- 2. Blade Cylinder Base End (1) [Figure 233]
- 3. Blade Pivots (2) [Figure 233]
- 4. Boom Cylinder Base End (1) [Figure 233]

Figure 234



- 5. Angle Blade Cylinder Rod End (1) [Figure 234] (If Equipped)
- 6. Angle Blade Cylinder Base End (1) [Figure 234] (If Equipped)
- 7. Angle Blade Pivot (1) [Figure 234] (If Equipped)

Figure 235

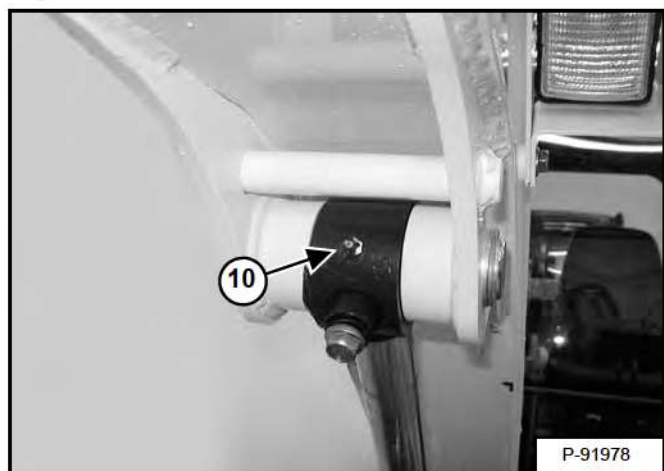


- 8. Boom Swing Pivot (3) [Figure 235]
- 9. Boom Swing Cylinder Rod End (1) [Figure 235]

LUBRICATION OF THE HYDRAULIC EXCAVATOR (CONT'D)

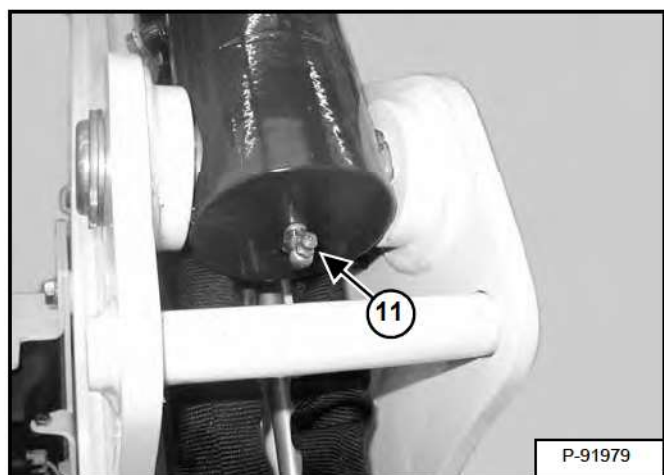
Lubrication Locations (Cont'd)

Figure 236



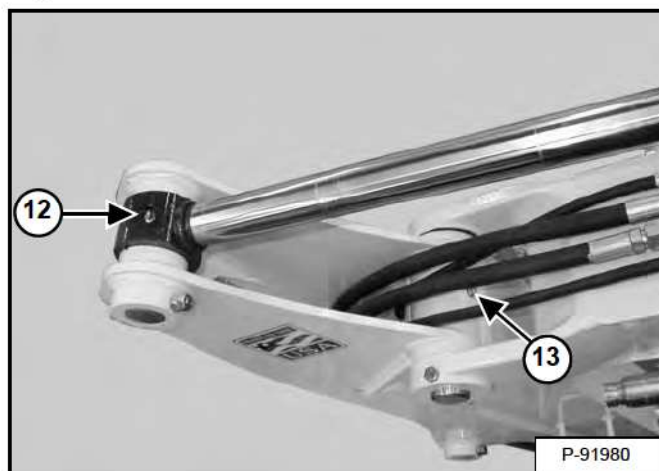
10. Boom Cylinder Rod End (1) [Figure 236]

Figure 237



11. Arm Cylinder Base End (1) [Figure 237]

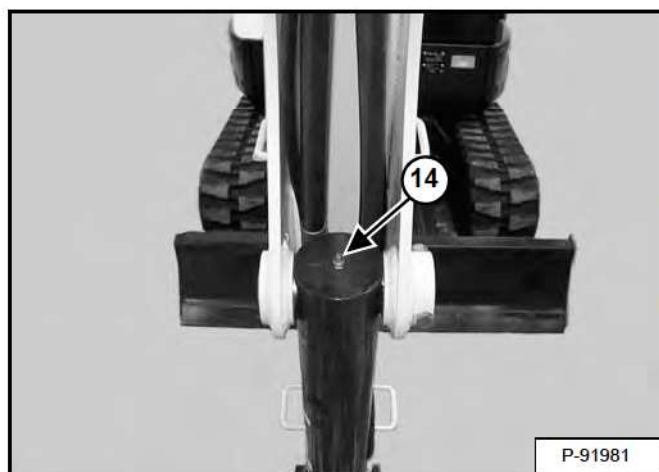
Figure 238



12. Arm Cylinder Rod End (1) [Figure 238]

13. Arm Pivot (1) [Figure 238]

Figure 239



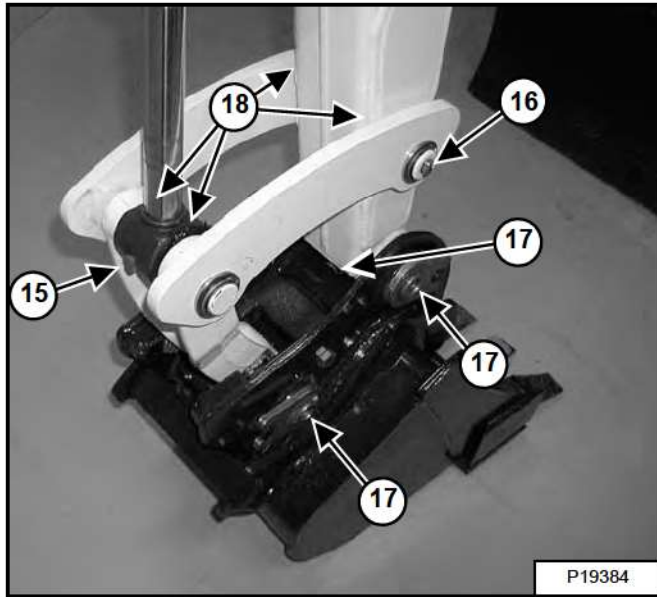
14. Bucket Cylinder Base End (1) [Figure 239]

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LUBRICATION OF THE HYDRAULIC EXCAVATOR (CONT'D)

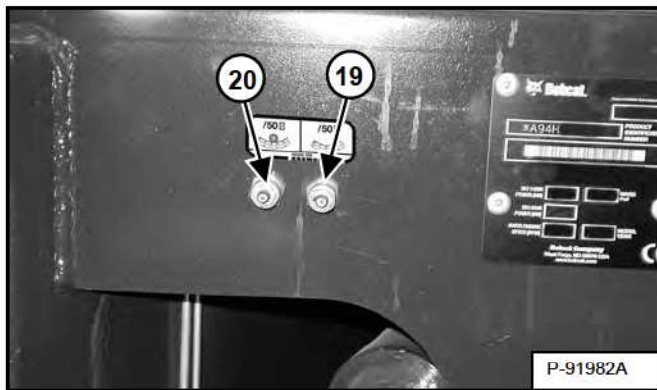
Lubrication Locations (Cont'd)

Figure 240



- 15. Bucket Cylinder Rod End (1) [Figure 240]
- 16. Bucket Link Pin (1) [Figure 240]
- 17. Bucket Pivot (3) [Figure 240]
- 18. Bucket Link - without extendable arm (2), with extendable arm (4) [Figure 240]

Figure 241



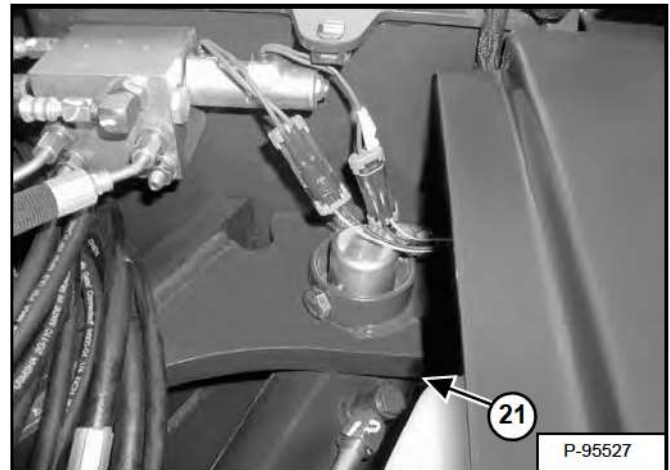
Lubricate the following locations on the hydraulic excavator **EVERY 50 HOURS**:

NOTE: Use Extra Heavy Gear Shield grease for grease fittings (Item 19, 20 and 21).

- 19. Swing Circle (1) [Figure 241].

- 20. Swing Pinion (1) [Figure 241]. (Install 3 to 4 pumps of grease then rotate the upperstructure 90°. Install 3 to 4 pumps of grease and again rotate the upperstructure 90°. Repeat this until the slew pinion has been greased at four positions.)

Figure 242



Lubricate the following location on the hydraulic excavator **EVERY 1000 HOURS**:

NOTE: Use Extra Heavy Gear Shield grease for grease fittings (Item 20, 21 and 22).

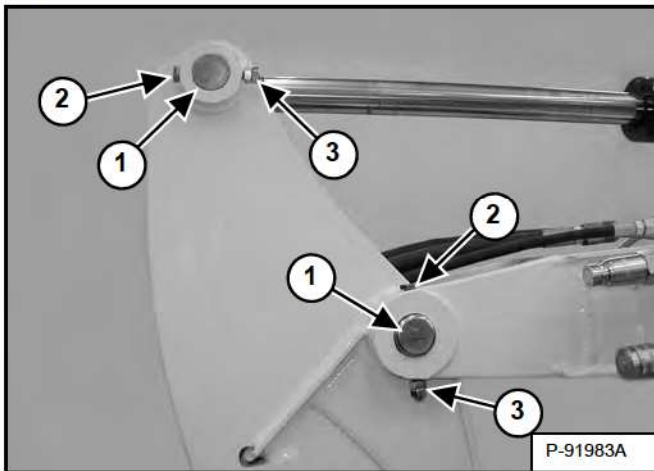
- 21. Boom Swing Cylinder Base (1) [Figure 242].

NOTE: The boom swing grease fitting is located on the side of base end of the cylinder.

PIVOT PINS

Inspection And Maintenance

Figure 243



The pivots and cylinders (Item 1) have a large pin held in position with a bolt (Item 2) and double nuts (Item 3) [Figure 243] securing the pin.

The the two nuts (Item 3) are used as jam nuts to hold the bolt (Item 2) with out tightening the bolt (Item 2) to the pin boss. After the nuts (Item 3) are tightened together, the bolt (Item 2) should be free to spin. See your Bobcat dealer for replacement parts.

EXCAVATOR STORAGE AND RETURN TO SERVICE

Storage

Sometimes it may be necessary to store your Bobcat excavator for an extend period of time. Below is a list of items to perform before storage.

- Thoroughly clean the excavator including the engine compartment.
- Lubricate the excavator.
- Replace worn or damaged parts.
- Drive the excavator onto planks in a dry protected shelter.
- Lower the boom fully with the bucket flat on the ground.
- Put grease on any exposed cylinder rods.
- Put fuel stabilizer in the fuel tank and run the engine a few minutes to circulate the stabilizer to the pump and fuel injectors.
- Drain and flush the cooling system. Refill with premixed coolant.
- Replace all fluids and filters (engine, hydraulic).
- Replace all filters (i.e.: air cleaner, heater, etc.).
- Put all controls in NEUTRAL position.
- Remove the battery. Be sure the electrolyte level is correct then charge the battery. Store it in a cool dry place above freezing temperatures and charge it periodically during storage.
- Cover the exhaust pipe opening.
- Tag the machine to indicate that it is in storage condition.

Return To Service

After the Bobcat excavator has been in storage, it is necessary to follow a list of items to return the excavator to service.

- Check the engine and hydraulic oil levels; check coolant level.
- Install a fully charged battery.
- Remove grease from exposed cylinder rods.
- Check all belt tensions.
- Be sure all shields and guards are in place.
- Lubricate the excavator.
- Remove cover from exhaust pipe opening.
- Start the engine and let run for a few minutes while observing the instrument panels and systems for correct operation.
- Drive the excavator off of the planks.
- Operate machine, check for correct function.
- Stop the engine and check for leaks. Repair as needed.

SYSTEM SETUP AND ANALYSIS

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DIAGNOSTIC SERVICE CODES

Viewing Service Codes

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

Standard Instrument Panel

Figure 244



Press the Information button (Item 2) to cycle the data display (Item 1) [Figure 244] until the service code screen is displayed. If more than one service code is present, the codes will scroll on the data display.

When no service code is present, [NONE] is displayed [Figure 244].

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

Deluxe Instrument Panel

The last 40 codes stored in history can also be viewed using the Deluxe Instrument Panel.

	Press a scroll button (Item 1) repeatedly until the Active Warnings screen icon (Inset) is highlighted.
	The ACTIVE WARNINGS screen displays active service codes. Press [9] to view the next service code if more than one is present. Press [4] to display a history of service codes.
	The WARNINGS HISTORY screen will list the Service Code Number (CODE), Hourmeter reading when the error occurred (HOUR), and the User (USER) who was logged in to operate the machine when the error occurred.
Press [9] to view the next eight service codes.	
A total of 40 codes can be stored. When more than 40 codes occur, the oldest code will disappear and the newest code will be in the number 1 position.	
	Press the list number next to the service code for more detail. Press the left scroll button to back up one screen.

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DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List

CODE		CODE	
E0105	Throttle actuator short to battery	L0102	Lights Button Error On
E0106	Throttle actuator short to ground	L0202	High Flow Button Error On
E0107	Throttle actuator open circuit	L0302	Auxiliary Button Error On
		L0402	Information Button Error On
E0123	Throttle actuator not calibrated		
		L7404	Gateway Controller No Communication
E0321	5 volt supply out of range high		
E0322	5 volt supply out of range low	L7672	Left Hand Panel Programming Error
E0421	Throttle sensor out of range high		
E0422	Throttle sensor out of range low	M0216	Hydraulic Filter Not Connected
		M0217	Hydraulic Filter Plugged
E0521	Throttle actuator feedback out of range high		
E0522	Throttle actuator feedback out of range low	M0309	Battery Voltage Low
		M0310	Battery Voltage High
E3128	Interrupted power failure log only	M0311	Battery Voltage Extremely High
		M0314	Battery Voltage Extremely Low
E3297	Controller programmed log only	M0322	Battery Voltage Out of Range Low
		M0414	Engine Oil Pressure Extremely Low
		M0415	Engine Oil Pressure Shutdown
H2521	Angle Blade Control Switch Out of Range High		
H2522	Angle Blade Control Switch Out of Range Low		
H2524	Angle Blade Control Switch Out of NEUTRAL	M0610	Engine Speed High
		M0611	Engine Speed Extremely High
H2605	Angle Blade Base Solenoid Short to Battery	M0613	Engine Speed No Signal
H2606	Angle Blade base Solenoid Short to Ground	M0615	Engine Speed Shutdown
H2607	Angle Blade Base Solenoid Open Circuit	M0618	Engine Speed Out of Range
H2632	Angle Blade Base Solenoid Overcurrent		
H2705	Angle Blade Rod Solenoid Short to Battery	M0710	Hydraulic Oil Temperature High
H2706	Angle Blade Rod Solenoid Short to Ground	M0711	Hydraulic Oil Temperature Extremely High
H2707	Angle Blade Rod Solenoid Open Circuit	M0715	Hydraulic Oil Temperature Shutdown
H2732	Angle Blade Rod Solenoid Overcurrent	M0721	Hydraulic Oil Temperature Out of Range High
		M0722	Hydraulic Oil Temperature Out of Range Low
H3128	Interrupted Power Failure		
		M0810	Engine Coolant Temperature High
H4423	Secondary Controller Not Programmed	M0811	Engine Coolant Temperature Extremely High
H4497	Secondary Controller Programmed	M0815	Engine Coolant Temperature Shutdown
		M0821	Engine Coolant Temperature Out of Range High
H4621	5V Sensor Supply Out of Range High	M0822	Engine Coolant Temperature Out of Range Low
H4622	5V Sensor Supply Out of Range Low	M0216	Hydraulic Filter Not Connected
H7404	Main Controller No Communication		
H7604	Display No Communication		

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DIAGNOSTICS SERVICE CODE (CONT'D)

Service Codes List (Cont'd)

CODE		CODE	
M0909	Fuel Level Low	M2721	Throttle Sensor Out of Range High
M0921	Fuel Level Out of Range High	M2722	Throttle Sensor Out of Range Low
M0922	Fuel Level Out of Range Low		
		M3128	Interrupted Power Failure
M1121	Console Sensor Out of Range High		
M1122	Console Sensor Out of Range Low	M3204	Throttle Controller No Communication
M1128	Console Sensor Failure		
		M3304	Deluxe Panel No Communication
M1305	Fuel Hold Solenoid Short to Battery		
M1306	Fuel Hold Solenoid Short to Ground	M3404	RFID Key Controller No Communication
M1307	Fuel Hold Solenoid Open Circuit		
		M3702	Hyd Exchange Output Error On
M1402	Fuel Pull Output Error On	M3703	Hyd Exchange Output Error Off
M1403	Fuel Pull Output Error Off		
M1407	Fuel Pull Output Open Circuit		
M1428	Fuel Pull Output Failure		
		M4109	Alternator Low
M1705	Hydraulics Enable Solenoid Short to Battery	M4110	Alternator High
M1706	Hydraulics Enable Solenoid Short to Ground		
M1707	Hydraulics Enable Solenoid Open Circuit	M4304	Keyless Start Panel No Communication
M1732	Hydraulics Enable Solenoid Overcurrent		
		M4404	Secondary Controller No Communication
M2005	Two-Speed Solenoid Short to Battery		
M2006	Two-Speed Solenoid Short to Ground	M4621	5V Sensor Supply Out of Range High
M2007	Two-Speed Solenoid Open Circuit	M4622	5V Sensor Supply Out of Range Low
M2102	Glow Plug Output Error On	M4721	8V Sensor Supply Out of Range High
M2103	Glow Plug Output Error Off	M4722	8V Sensor Supply Out of Range Low
M2107	Glow Plug Output Open Circuit		
M2128	Glow Plug Output Failure	M5002	Light Output Error On
		M5003	Light Output Error Off
M2202	Starter Output Error On		
M2203	Starter Output Error Off	M5205	Offset Base Solenoid Short to Battery
M2207	Starter Output Open Circuit	M5206	Offset Base Solenoid Short to Ground
M2228	Starter Output Failure	M5207	Offset Base Solenoid Open Circuit
		M5232	Offset Base Solenoid Overcurrent
M2302	Starter Relay Error On		
M2303	Starter Relay Error Off	M5305	Offset Rod Solenoid Error On
		M5306	Offset Rod Solenoid Short to Ground
M2402	Fuel Pull Relay Error On	M5307	Offset Rod Solenoid Open Circuit
M2403	Fuel Pull Relay Error Off	M5332	Offset Rod Solenoid Overcurrent
M2521	Load Sense Sensor Out of Range High	M5421	Offset Control Switch Out of Range High
M2522	Load Sense Sensor Out of Range Low	M5422	Offset Control Switch Out of Range Low
		M5424	Offset Control Switch Out of NEUTRAL
M2602	Glow Plug Relay Error On		
M2603	Glow Plug Relay Error Off		

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DIAGNOSTICS SERVICE CODE (CONT'D)

Service Codes List (Cont'd)

CODE		CODE	
M5505	Auxiliary Base Solenoid Short to Battery	M7423	Main Controller Not Programmed
M5506	Auxiliary Base Solenoid Short to Ground	M7497	Main Controller Software Updated
M5507	Auxiliary Base Solenoid Open Circuit		
M5532	Auxiliary Base Solenoid Overcurrent	M7604	Standard Display Panel No Communication
M5605	Auxiliary Rod Solenoid Short to Battery	M7748	Key Switch Multiple
M5606	Auxiliary Rod Solenoid Short to Ground		
M5607	Auxiliary Rod Solenoid Open Circuit	M7839	Hourmeter Changed
M5632	Auxiliary Rod Solenoid Overcurrent		
M5721	Auxiliary Control Switch Out of Range High		
M5722	Auxiliary Control Switch Out of Range Low		
M5724	Auxiliary Control Switch Out of NEUTRAL		
M6204	Load Moment Sensor In Error	R7404	No Communication To Main Controller
M6402	Switched Power Relay Error On		
M6403	Switched Power Relay Error Off		
M6702	HVAC Output Error On		
M6703	HVAC Output Error Off		
M6905	Hydraulic Throttle Solenoid Short to Battery		
M6906	Hydraulic Throttle Solenoid Short to Battery		
M6907	Hydraulic Throttle Solenoid Open Circuit		
M6923	Hydraulic Throttle Solenoid Not Calibrated		
M6932	Hydraulic Throttle Solenoid Overcurrent		
M7002	Switched Power Output Error On		
M7003	Switched Power Output Error Off		
M7007	Switched Power Output Open Circuit		
M7028	Switched Power Output Failure		

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CONTROL PANEL SETUP

Panel Setup (Deluxe Instrument Panel)

Icon Identification

Figure 245



ICON	DESCRIPTION
	DATE / TIME
	USER / USER HOURS
	MACHINE HOURS (HOURMETER)
	ACTIVE WARNINGS screen icon
	VITALS screen icon
	SERVICE screen icon
	AUTO IDLE Status icon
	ATTACHMENTS screen icon
	MACHINE SETTINGS screen icon
	DISPLAY screen icon
	HOME icon (Return to MAIN screen)
	LEFT SCROLL button
	RIGHT SCROLL button
	ENTER button

Vitals

	Press a scroll button (Item 1) repeatedly until the Vitals screen icon (Inset) is highlighted.
	Displays select system operating levels.

You can monitor real-time displays of:

- Engine Speed (RPM)
- Engine Coolant Temperature
- System Voltage
- Hydraulic Fluid Temperature

The Deluxe Instrument Panel is easy to use. Continue to set your own preferences for operating / monitoring your Bobcat excavator.

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CONTROL PANEL SETUP (CONT'D)

Panel Setup (Deluxe Instrument Panel) (Cont'd)

Date And Time

	Press a scroll button (Item 1) repeatedly until the Display screen icon (Inset) is highlighted.
	Select [1. CLOCKS] .
	Select [1. TIME] .
	Use the keypad to enter time. Select AM / PM / 24hr. Press [ENTER] to continue.
	Select [2. DATE] .
	Use the keypad to enter date. Press [ENTER] to continue.

Languages

	Press a scroll button (Item 1) repeatedly until the Display screen icon (Inset) is highlighted.
	Select [2. LANGUAGES] .
	Select the desired language.

English / Metric Display

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

CONTROL PANEL SETUP (CONT'D)

Panel Setup (Deluxe Instrument Panel) (Cont'd)

Auto Idle Time Delay

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	Select [3. MACHINE PERFORMANCE] .
	Select [1. AUTO IDLE DELAY TIME] .
	Use the keypad to enter the desired delay time between 4 and 250 seconds. Press [ENTER] to save and continue. Press left scroll button to exit without saving.

Job Clock Reset

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	Select [1. PASSWORDS / LOCKOUTS] .
	Enter owner password and press [ENTER] .
	Select [1. USER SETTINGS] .
	Select user.
	Press [9] to reset job statistics. Press left scroll button or [0] to exit without saving.

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CONTROL PANEL SETUP (CONT'D)

Panel Setup (Deluxe Instrument Panel) (Cont'd)

Alarm Clock Reset

	Press a scroll button (Item 1) repeatedly until the Display screen icon (Inset) is highlighted.
	Select [3. ALARM CLOCK] .
	Select [1. OFF ONCE] , Select [2. ON Daily] or Select [3. ON WEEKLY] .
	Select [1. OFF / ON] , Select [2. TIME] or Select [3. DAILY] .
	Use key pad numbers to set time. Select [7. AM] , Select [8. PM] or Select [9. 24 hr clock] . Select [ENTER] to save. Press left scroll to back space numbers.
	Press [4] to set alarm to sleep. (When pressed, display will return to main screen.) Press [9] to shut off alarm. Alarm will still be active for the next day alarm setting. (When pressed, display will return to main screen.)

ECO MODE

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	Select [3. MACHINE PERFORMANCE] .
	Select [2. ECO MODE] . ECO Mode will set the maximum engine rpm to be at 85% of the high idle setting. Example: If the machine maximum engine speed is 2450 rpm, when ECO Mode is enabled, the maximum engine speed will be approximately 2080 rpm.

CONTROL PANEL SETUP (CONT'D)

Panel Setup (Deluxe Instrument Panel) (Cont'd)

Machine History - Log In Information

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	MACHINE SETTINGS is visible on screen. Select [2. MACHINE HISTORY].
	Select [1. LOG-IN INFORMATION].
	View User Log hours and last time / dated used. Individual information can be viewed and reset back to zero. Select user [KEY PAD 1 - 9] to access individual user.

Machine History - User Job Statistics

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	MACHINE SETTINGS is visible on screen. Select [2. MACHINE HISTORY].
	Select [2. USER JOB STATISTICS].
	View Job Statistics (Job Hours / Idle Time) Information can be viewed and reset back to zero.

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PASSWORD SETUP (KEYLESS START PANEL)

Panel Setup (Deluxe Instrument Panel) (Cont'd)

Machine History - Overall Job Statistics

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	MACHINE SETTINGS is visible on screen. Select [2. MACHINE HISTORY].
	Select [3. OVERALL JOB STATISTICS].

Attachments

	Press a scroll button (Item 1) repeatedly until the Attachment screen icon (Inset) is highlighted.
	ATTACHMENTS is visible on screen. Press [ENTER].
	Press [4] or [9] repeatedly until the desired Attachment is visible in the display screen.
	Information about the attachment, recommended auxiliary hydraulic flow and tips about attachment operation will be displayed.

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PASSWORD SETUP (KEYLESS START PANEL) (CONT'D)

Password Description

Master Password:

A permanent, randomly selected password set at the factory that cannot be changed. This password is used for service by the Bobcat dealer if the owner password is not known or to change the owner password.

Owner Password:

Allows for full use of the excavator. Must be used to change the owner password, or user 1 / user 2 password.

User 1 and User 2 Passwords:

By default, User 1 and User 2 Passwords are not set.

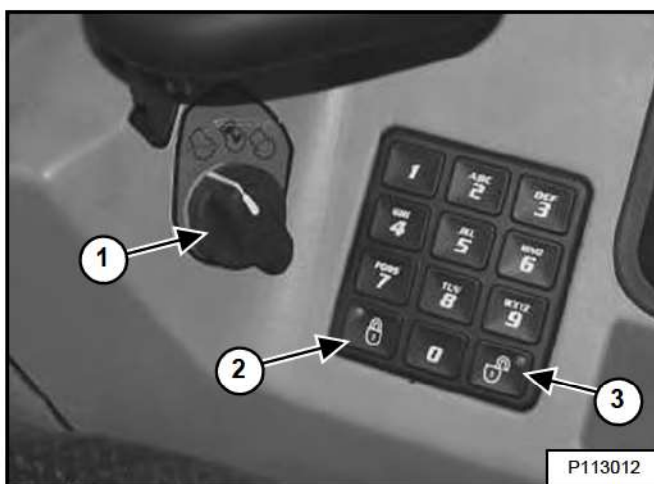
NOTE: The User 1 and User 2 Password cannot be used to change a password or to switch between the Locked / UnLocked modes.

Changing The Owner, User 1 and User 2 Password

Turn the start switch (Item 1) [Figure 246] to the ON position to turn on the excavators electrical system.

Enter the five digit owner password using the number keys (1 through 0) if locked.

Figure 246



Press and hold the lock (Item 2) and unlock (Item 3) [Figure 246] keys for 2 seconds.

The lock key red light or the unlock key green light will flash and the instrument panel display screen will show [CODE].

Enter the five digit owner or master password using the number keys (1 through 0) if locked.

The display screen will show [OWNER] for two seconds. Press the unlock key (Item 3) [Figure 246] to navigate between [OWNER], [USER 1] and [USER 2].

After two seconds, the display screen will show [ENTER].

NOTE: The lock key (Item 2), red light and the unlock key (Item 3) [Figure 246], green light will flash during the procedure.

Enter a new five digit owner, user 1 or user 2 password using the number keys (1 through 0). An asterisk will show in the display screen for each key press.

The display screen will show [AGAIN].

Enter the new five digit owner password again.

The display screen will show [ERROR] if:

- The second five digit owner, user 1 or user 2 password is different from the first one entered.
- or
- No number key was pressed for more than 20 seconds.
- or
- "00000" was entered as owner, user 1 or user 2 password.

NOTE: "00000" is not an acceptable owner, user 1 or user 2 password.

The system returns to its previous state. Either the lock key (Item 2), red light or the unlock key (Item 3) [Figure 246], green light will become solid.

PASSWORD SETUP (KEYLESS START PANEL) (CONT'D)

Password Lockout Feature

This feature allows the owner to unlock the password feature so that a password does not need to be used every time the engine is started.

NOTE: The password lockout feature does not function with the user 1 or user 2 password.

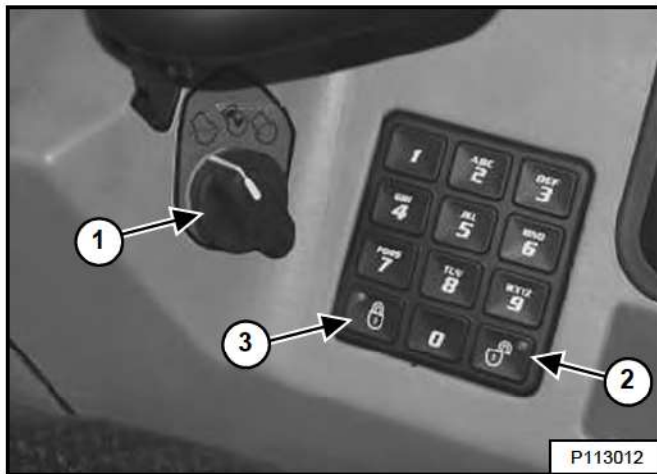
Turn the start switch (Item 1) **[Figure 247]** to the ON position to turn on the excavators electrical system.

Enter the five digit owner password using the number keys (1 through 0).

Enter the five digit owner password using the number keys (1 through 0). The unlock key green light will flash, then the lock key red light will become solid.

You must now enter the password every time to start the excavator.

Figure 247



Press the unlock key (Item 2) **[Figure 247]**.

The left panel display screen will show **[CODE]**.

Enter the five digit owner password using the number keys (1 through 0). The unlock key green light will flash, then become solid.

The excavator can now be started without using a password.

NOTE: Use the following procedure to reset the machine lock so that the excavator requires a password to start the engine.

Turn the key switch to the ON position to turn on the excavators electrical system.

Press the lock key (Item 3) **[Figure 247]**.

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

PASSWORD SETUP (DELUXE INSTRUMENT PANEL)

Password Setup is available on machines with a Deluxe Instrument Panel.

Password Description

All new machines with a Deluxe Instrument Panel arrive at Bobcat dealerships with the keypad in locked mode. Locked mode means that a password must be used to start the engine.

For security purposes, your dealer may change the password and set the keypad in the locked mode. Your dealer will provide you with the password.

Master Password:

A permanent, randomly selected password set at the factory that cannot be changed. This password is used for service by the Bobcat dealer if the owner password is not known or to change the owner password.

Owner Password:

Allows for full use of the excavator and to set up the Deluxe Instrument Panel. There is only one owner password. The owner password must be used to change the owner or user passwords. Owner should change the password as soon as possible for security of the excavator.

User Password:

Allows starting and operating the excavator; cannot change password or any of the other setup features.

For the procedures to change passwords: (See Changing The Owner Password on Page 167.) and (See Changing The User Passwords on Page 168.)

Changing The Owner Password

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	Select [1. PASSWORDS / LOCKOUTS] .
	Enter owner password and press [ENTER] .
	Select [1. USER SETTINGS] .
	Select [1. OWNER] .
	Select [2. CHANGE PASSWORD] .
	Enter new owner password and press [ENTER] . You will be prompted to reenter the new owner password.

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PASSWORD SETUP (DELUXE INSTRUMENT PANEL) (CONT'D)

Changing The User Passwords

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	Select [1. PASSWORDS / LOCKOUTS].
	Enter owner password and press [ENTER].
	Select [1. USER SETTINGS].
	Select user.
	Select [2. CHANGE PASSWORD].
	Enter new user password and press [ENTER].

Password Lockout Feature

This feature allows the owner to unlock the password feature so that a password does not need to be used every time the engine is started.

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	Select [1. PASSWORDS / LOCKOUTS].
	Enter owner password and press [ENTER].
	Select [2. MACHINE LOCK].

NOTE: The procedure above can be followed to reset the machine lock so that the machine requires a password to start the engine.

NOTE: When the password is in UNLOCKED, no password is needed. The start switch is used to start the machine.

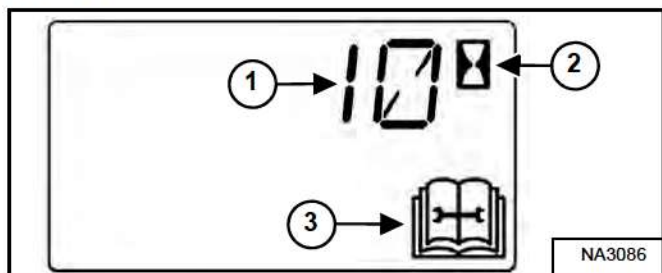
MAINTENANCE CLOCK

Description

The Maintenance Clock alerts the operator when the next service interval is due. *EXAMPLE:* The maintenance clock can be set to a 500 hour interval as a reminder for the next 500 hour planned maintenance.

Standard Instrument Panel

Figure 248



During machine operation, a 2 beep alarm will sound when there are less than 10 hours until the next planned maintenance.

The remaining hours before maintenance is required (Item 1) will appear in the data display for 5 seconds while the service icon (Item 3) and the hourmeter icon (Item 2) [Figure 248] flash.

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

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

Setup

See your Bobcat dealer about installation of this feature.

Reset

Figure 249



Press the Information button (Item 2) [Figure 249] until the display screen shows the maintenance clock.

Press and hold the Information button (Item 2) for 7 seconds until [RESET] (Item 1) [Figure 249] appears in the display screen.

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MAINTENANCE CLOCK (CONT'D)

Deluxe Instrument Panel

Figure 250



The Deluxe Instrument Panel (if equipped) will display a message (Item 1) [Figure 250] alerting the operator to service the machine.

This message will remain for 10 seconds and will appear for 10 seconds every time the machine is started until the maintenance clock is reset.

Figure 251



The Deluxe Instrument Panel (if equipped) will display a bar (Item 1) [Figure 251] showing the time remaining until next service. This bar will turn red when service is past due. NEXT MAINTENANCE DUE will change to MAINTENANCE PAST DUE and display the number of hours past due.

Keys [4] and [9] can be used to adjust the service interval when the owner is logged in [Figure 251].

SPECIFICATIONS

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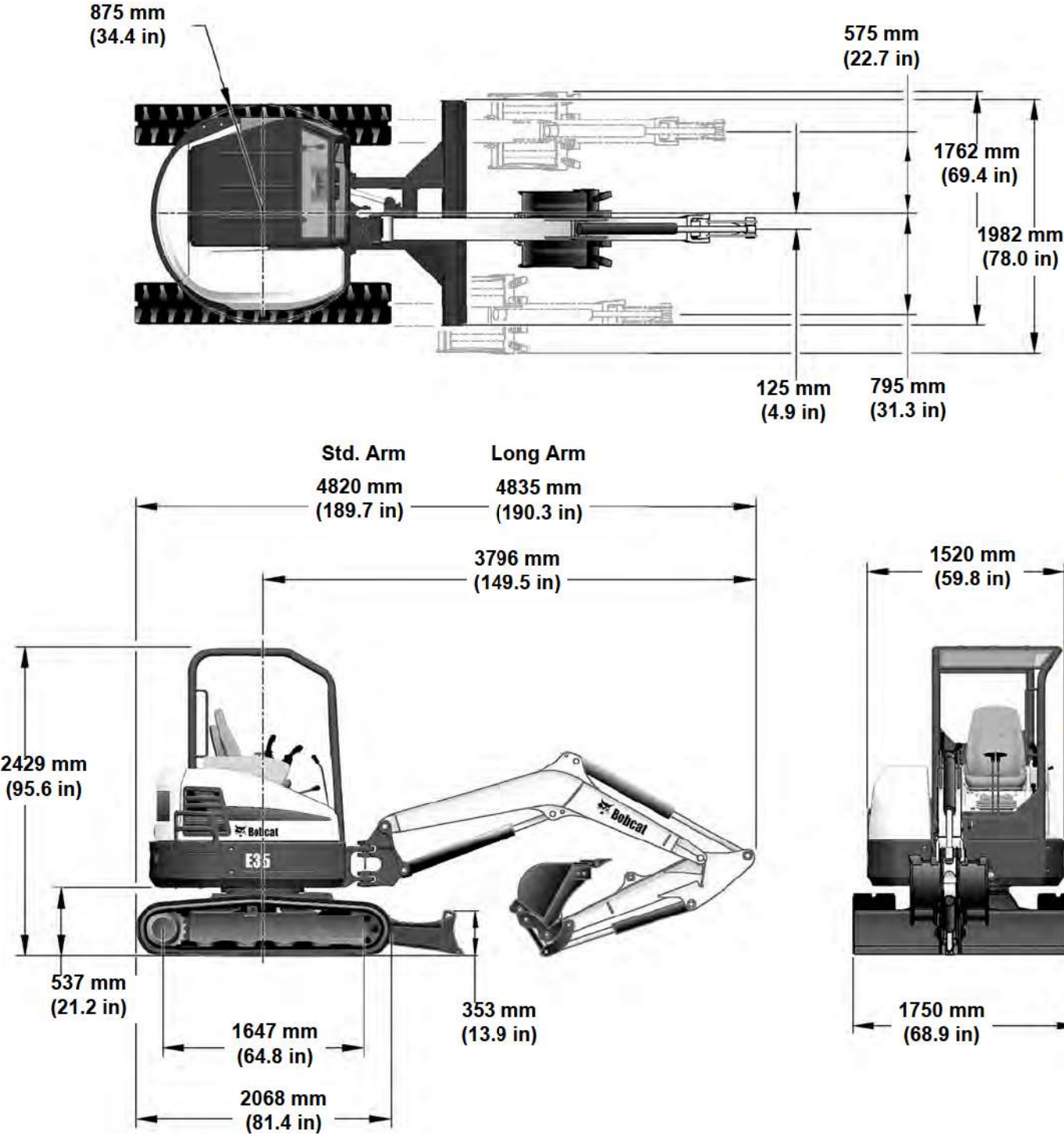
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EXCAVATOR SPECIFICATIONS

Excavator Machine Dimensions

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



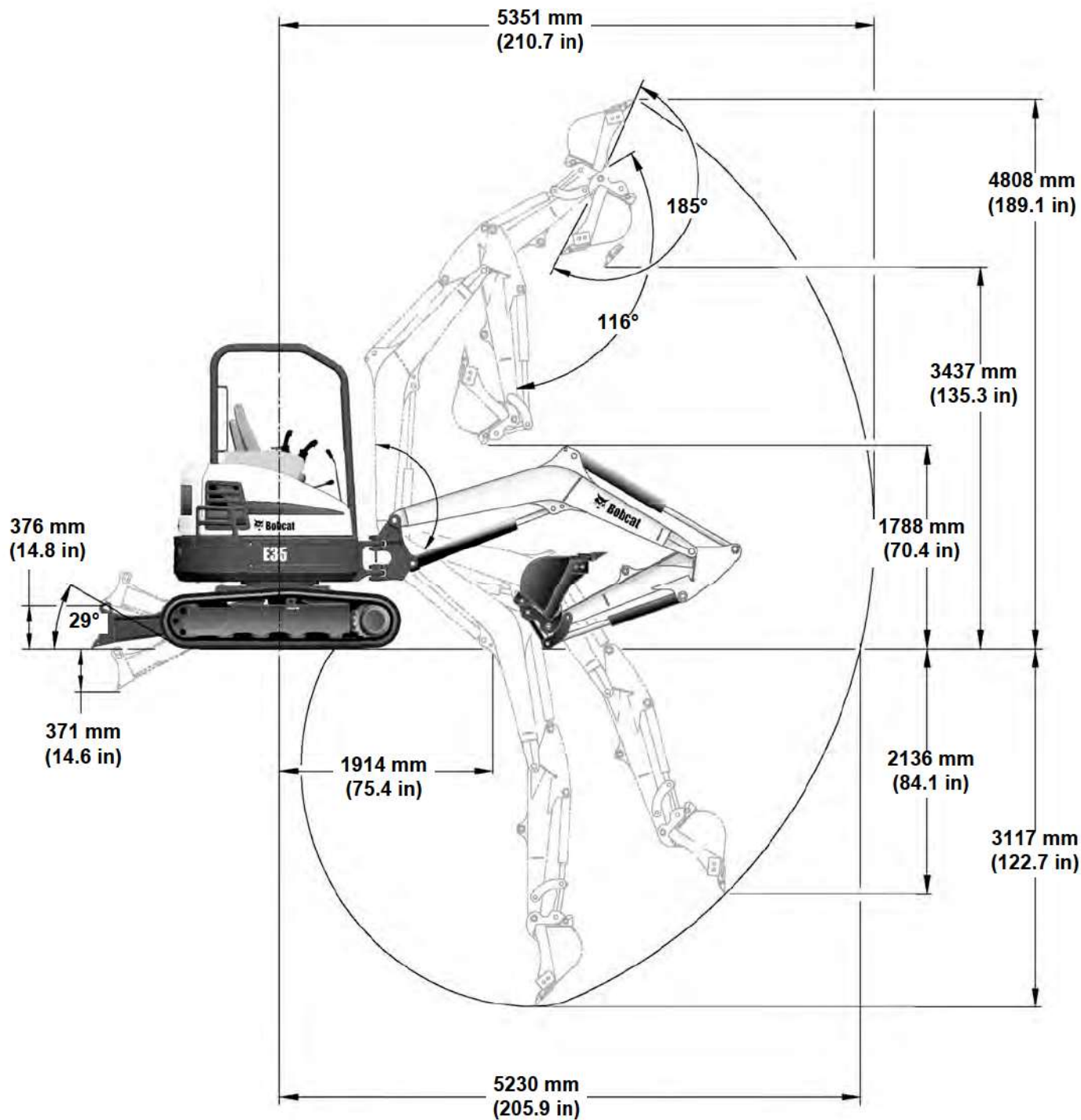
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NA1483

EXCAVATOR SPECIFICATIONS (CONT'D)

Excavator Machine Dimensions - Standard Arm

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



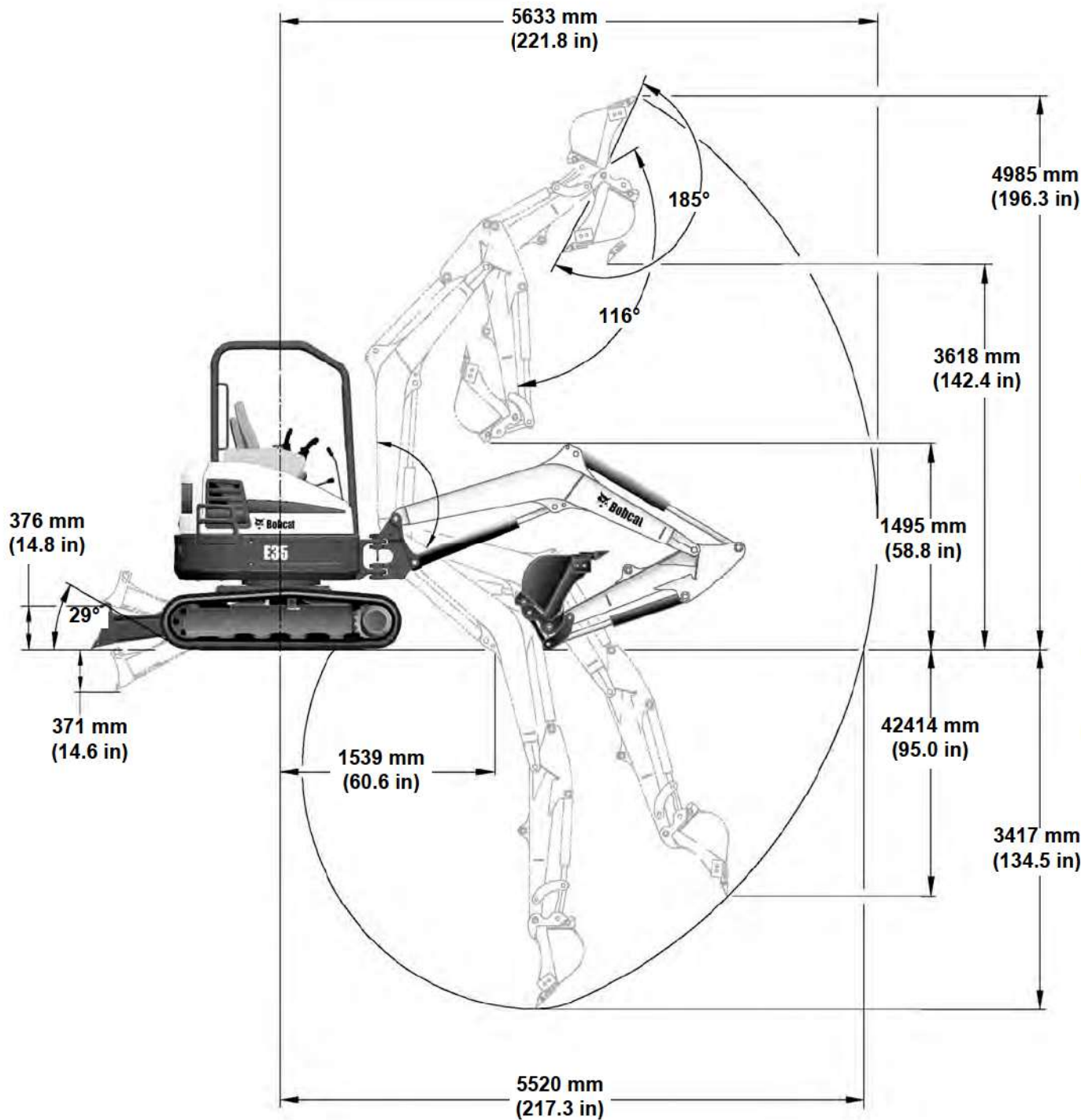
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NA1482

EXCAVATOR SPECIFICATIONS (CONT'D)

Excavator Machine Dimensions - Long Arm

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

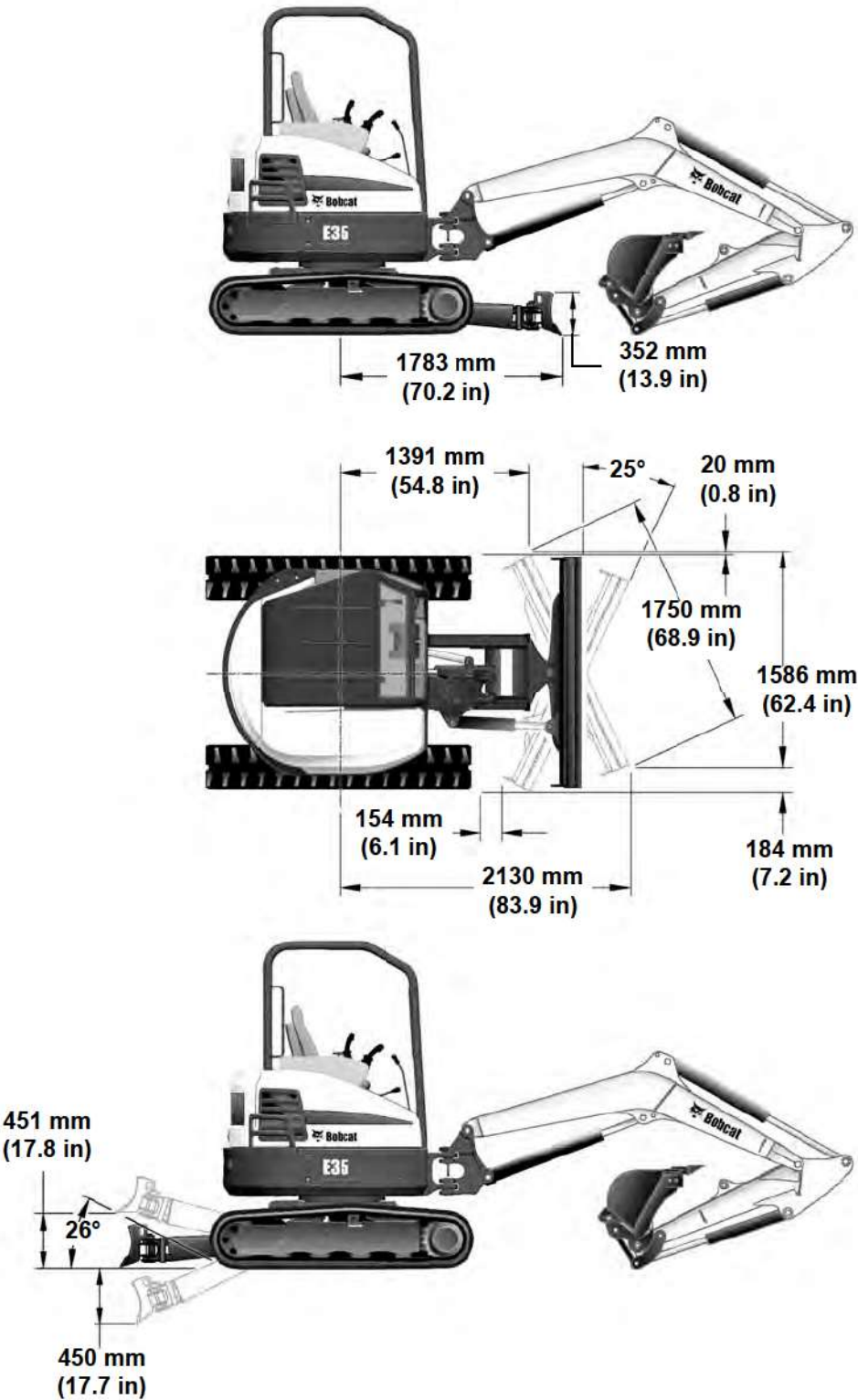


NA1482

EXCAVATOR SPECIFICATIONS (CONT'D)

Excavator Machine Dimensions - Angle Blade

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



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NA1595

EXCAVATOR SPECIFICATIONS (CONT'D)

Rated Lift Capacity - Standard Arm

E35

600 mm
90 kg

1325 mm

2450 mm

A

3000 mm

4000 mm

kg @
max. B

3000 mm

4000 mm

kg @
max. B

3000 mm

4000 mm

kg @
max. B

4000 mm

3000 mm

2000 mm

1000 mm

Ground

-1000 mm

*600 kg @
4004 mm

*647 kg @
4452 mm

*702 kg @
4585 mm

378 kg @
4004 mm

294 kg @
4452 mm

286 kg @
4585 mm

364 kg @
4004 mm

*601 kg

*660 kg

*818 kg

402 kg

384 kg

363 kg

292 kg @
4452 mm

*1116 kg

*952 kg

549 kg

519 kg

515 kg

366 kg @
3971 mm

272 kg @
4438 mm

*1286 kg

*892 kg

346 kg

346 kg

331 kg @
3971 mm

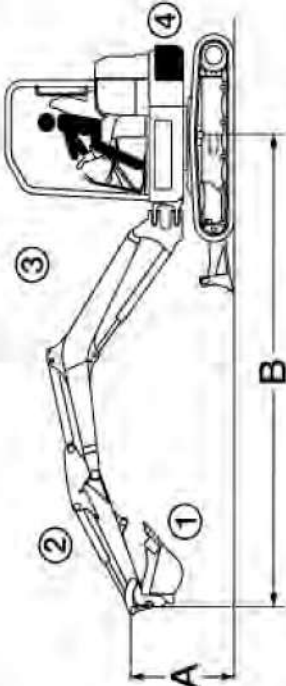
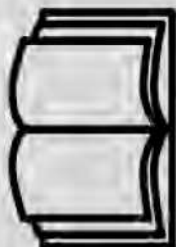
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EXCAVATOR SPECIFICATIONS (CONT'D)

Rated Lift Capacity - Standard Arm W/Counterweight

E35 										 295 kg			
		 1325 mm				 2450 mm							
A		B				B				B			
		2000 mm	3000 mm	4000 mm	kg @ max. B	2000 mm	3000 mm	4000 mm	kg @ max. B	2000 mm	3000 mm	4000 mm	kg @ max. B
4000 mm													
3000 mm				*600 kg	*623 kg @ 4086 mm								460 kg @ 4091 mm
2000 mm		*769 kg	*661 kg	*662 kg @ 4553 mm	*662 kg @ 4553 mm		*744 kg	501 kg	410 kg @ 4551 mm		*780 kg	487 kg	374 kg @ 4568 mm
1000 mm			*1146 kg	*795 kg	*721 kg @ 4677 mm		743 kg	481 kg	381 kg @ 4693 mm		702 kg	466 kg	347 kg @ 4690 mm
Ground			*1358 kg	*900 kg	*780 kg @ 4524 mm		702 kg	461 kg	396 kg @ 4571 mm		676 kg	453 kg	365 kg @ 4531 mm
-1000 mm			*1341 kg	*851 kg	*856 kg @ 4031 mm		703 kg	456 kg	460 kg @ 4069 mm		657 kg	453 kg	426 kg @ 4068 mm

75191 SW

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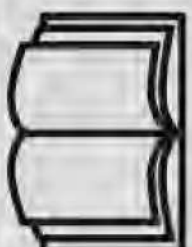
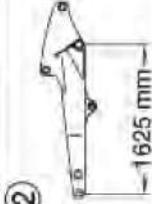
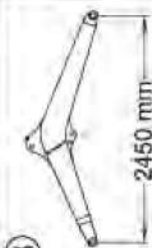
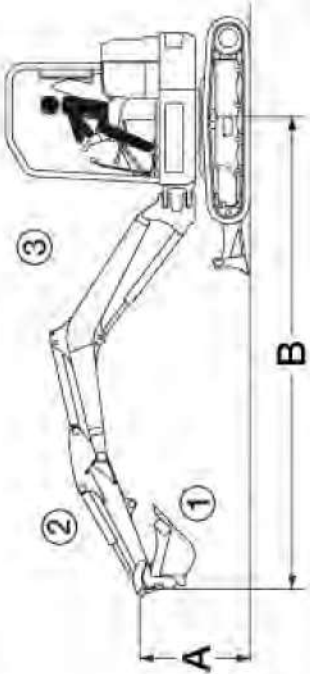
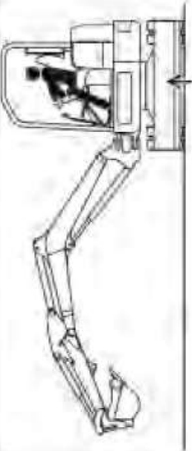


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EXCAVATOR SPECIFICATIONS (CONT'D)

Rated Lift Capacity - Long Arm

				E35	
1	 600 mm 90 kg	2	 1625 mm	3	 2450 mm
					
					
					
					
A		B		kg @ max. B	
4000 mm	3000 mm	4000 mm	3000 mm	4000 mm	3000 mm
3000 mm					
2000 mm	*630 kg	*515 kg	*583 kg @ 4744 mm	*542 kg	431 kg @ 4334 mm
1000 mm	*989 kg	*726 kg	*637 kg @ 4867 mm	422 kg	337 kg @ 4867 mm
Ground	*1269 kg	*878 kg	*714 kg @ 4731 mm	424 kg	317 kg @ 4731 mm
-1000 mm	*1301 kg	*842 kg	*765 kg @ 4305 mm	414 kg	357 kg @ 4305 mm

82630 SW 7177239B

EXCAVATOR SPECIFICATIONS (CONT'D)

Performance

E35	
operating weight (canopy w / rubber tracks, and 609 mm (24 in) bucket)	3258 kg (7468 lb)
If equipped with the following, add:	Steel tracks, add 92 kg (212 lb); Cab w/Heater, add 121 kg (267 lb); Cab w/HVAC, add 140 kg (309 lb); Long Arm (with additional counterweight), add 306 kg (675 lb); Additional Counterweight 295 kg (650 lb); Angle Blade, add 114 kg (212 lb)
Travel Speed (Low / High)	4.7 km/h / 2.6 km/h (1.6 mph / 2.9 mph)
Digging Force (per ISO 6015)	
With Standard Arm	Arm - 20413 N (4589 lbf) Bucket 30995 N (6968 lbf)
With Long Arm	Arm - 17734 N (3986 lbf) Bucket 30995 N (6968 lbf)
With Extendable Arm	Arm (Retracted)- 19921 N (4478 lbf) Arm (Extended)- 14472 N (3254 lbf) Bucket 30995 N (6968 lbf)

Controls

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

EXCAVATOR SPECIFICATIONS (CONT'D)

Engine

Make / Model	Kubota D1803-M-DI-E3B-BC-3
Fuel / Cooling	Diesel / Liquid
Horsepower (SAE Net) @ 2400 rpm	23,1 kW (31.0 hp)
Torque @ 1400 rpm (SAE Net)	
Number Of Cylinders	3
Displacement	1,862 L (111.4 in ³)
Bore / Stroke	87 x 102.4 mm (3.43 x 4.03 in)
Lubrication	Pressure System with Filter
Crankcase Ventilation	Closed Breathing
Air Cleaner	Dry replaceable paper dual cartridge
Ignition	Diesel-Compression
Low Idle Speed	975 rpm +/- 75 rpm
High Idle Speed	2550 rpm maximum
Engine Coolant	Propylene Glycol / water mixture (53% PG / 47% water)

Hydraulic System

Pump Type	Engine driven, single outlet, variable displacement, load sensing, torque limited, piston pump
Pump Capacity Piston Pump Gear Pump - Pilot	100,8 L/min (26.6 U.S. gpm) 9,6 L/min (2.5 U.S. gpm)
Auxiliary Flow (Aux3)	63,9 L/min (16.9 U.S. gpm)
Auxiliary Flow - 2nd Aux (Female coupler) (Male Coupler)	20,3 L/min (5.4 U.S. gpm) 15,0 L/min (4.0 U.S. gpm)
Hydraulic Filter	Full flow replaceable, 3 micron synthetic media element
Control Valve	9 spool closed center individually compensated
Fluid Type	Bobcat Fluid, Hydraulic / Hydrostatic 6903117 - (2.5 U.S. gal) 6903118 - (5 U.S. gal) 6903119 - (55 U.S. gal)
System Relief Pressure Slew Circuit Boom, Boom Swing Bucket, Arm, Auxiliary Blade Joystick Control Pressure	24100 kPa (241 bar) (3495 psi) 24500 kPa (245 bar) (3550 psi) 24500 kPa (245 bar) (3550 psi) 24500 kPa (245 bar) (3550 psi) 3000 kPa (30 bar) (435 psi)
Auxiliary Relief	20600 kPa (206 bar) (2987 psi)
Arm Port Relief, Base End And Rod End	27000 kPa (270 bar) (3916 psi)
Boom Port Relief, Base End And Rod End	29000 kPa (290 bar) (4206 psi)
Bucket Port Relief Base End And Rod End	27000 kPa (270 bar) (3916 psi)
Blade Port Relief Base End	27000 kPa (270 bar) (3916 psi)
Angle Blade (If Equipped) Port Relief Base End And Rod End	27000 kPa (270 bar) (3916 psi)
Main Hydraulic Filter Bypass	350 kPa (3,5 bar) (50 psi)
Case Drain	140 kPa (1,4 bar) (20 psi)

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EXCAVATOR SPECIFICATIONS (CONT'D)

Hydraulic Cylinders

Cylinder	Bore	Rod	Stroke
Boom (cushion up)	76,2 mm (3.00 in)	44,5 mm (1.75 in)	670 mm (26.38 in)
Arm (cushion retract / extend)	76,2 mm (3.00 in)	44,5 mm (1.75 in)	607 mm (23.90 in)
Bucket	69,9 mm (2.75 in)	44,5 mm (1.75 in)	466,3 mm (18.36 in)
Boom Swing	82,6 mm (3.25 in)	44,5 mm (1.75 in)	459,9 mm (18.11 in)
Blade	88,9 mm (3.50 in)	44,5 mm (1.75 in)	160 mm (6.30 in)
Extendable Arm (If Equipped) (cushion retract)	57,2 mm (2.20 in)	38,1 mm (1.50 in)	765,6 mm (30.14 in)

Hydraulic Cycle Times

Bucket Curl	2.7 Seconds
Bucket Dump	1.9 Seconds
Arm Retract	2.9 Seconds
Arm Extend	2.4 Seconds
Boom Raise	4.4 Seconds
Boom Lower	5.1 Seconds
Boom Swing Left	7.0 Seconds
Boom Swing Right	7.2 Seconds
Blade Raise	3.1 Seconds
Blade Lower	3.5 Seconds
Extendable Arm Retract	3.2 Seconds
Extendable Arm Extend	2.5 Seconds

Drive System

Final Drive	Each track is driven by hydrostatic axial piston motor
Type of Reduction	48.6:1 two stage planetary

Slew System

Slew Motor	Axial piston connected to a planetary drive
Slew Circle	Single row shear type ball bearing with internal gear
Slew Speed	8.6 rpm

Undercarriage

Crawler Track Design	Sealed track rollers with boxed section track roller frame, grease type track adjuster with shock absorbing recoil spring
Width of crawler	1520 mm (59.8 in)

EXCAVATOR SPECIFICATIONS (CONT'D)

Electrical

Starting Aid	Glow Plugs
Alternator	12 volt, 90 Amp open frame w / internal regulator
Battery	12 volt - 530 CCA @ -18°C (0°F)
Starter	2.0 kW (12 volt; gear reduction 2.7 hp)
Lights	37.5 watt (2)
Instrumentation	Gauges: Engine Coolant Temperature, Fuel Level. Warning lights: Fuel Level, Seat Belt, Engine Coolant Temperature, Engine Malfunction, Hydraulic System Malfunction, General Warning. Indicators: Two-Speed, Engine Preheat. Data Display: Operating Hours, Engine rpm, Maintenance Clock Countdown, Battery Voltage, Service Codes, Engine Preheat. Other: Audible Alarm, Lights. Optional Deluxe Instrumentation Panel: *Additional displays for: Engine rpm, Coolant Temperature and Oil Pressure; System Voltage and Hydraulic Oil Temperature. *Additional Features Included: Keyless Start, Digital Clock, Job Clock, Password Lockout, Multi-language Display, Help Screens, Diagnostic Capability and Engine / Hydraulic Systems Shutdown Function.

Capacities

Fuel Tank	53,1 L (14 U.S. gal)
Hydraulic Reservoir Only (Center of Sight Glass)	Tank Cap. 8,3 L (2.2 U.S. gal)
Hydraulic System (with Reservoir)	39,7 L (10.5 U.S. gal)
Cooling System	8.0 L (2.1 U.S. gal)
Engine Oil and Filter	5,2 L (5.5 qt)
Final Drive (each)	0,5 L (0.55 qt)
Air Conditioning Refrigerant (R-134a)	0,77 kg (1.7 lb)

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EXCAVATOR SPECIFICATIONS (CONT'D)

Tracks

Type	Rubber	Steel
Width	320 mm (12.6 in)	300 mm (11.8 in)
Number Of Shoes	Single Assembly	43
Number of Track Rollers (per side)	4	4

Ground Pressure

Rubber Tracks - Standard Arm	28,6 kPa (0,286 bar) (4.15 psi)
Long Arm	31,2 kPa (0,312 bar) (4.53 psi)
Steel Tracks - Standard Arm	31,4 kPa (0,314 bar) (4.55 psi)
Long Arm	34,2 kPa (0,342 bar) (4.96 psi)

WARRANTY

WARRANTY187

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WARRANTY

Bobcat Excavators

Bobcat Company warrants to its authorized dealers and authorized dealers of Bobcat Equipment Ltd., who in turn warrant to the owner, that each new Bobcat Excavator will be free from proven defects in material and workmanship with respect to (i) all components of the product except as otherwise specified herein for twelve (12) months, (ii) tracks for twelve (12) months on a prorated basis based on the remaining depth of the track at the time any defect is discovered, and (iii) Bobcat brand batteries, for an additional twelve (12) months after the initial twelve month warranty period, provided that Bobcat Company shall only reimburse a fixed portion of the cost of replacing the battery during such additional twelve months. The foregoing time periods shall all commence after delivery by the authorized Bobcat dealer to the original buyer.

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

This warranty does not apply to diesel engine fuel injection pumps and injectors. The owner shall rely solely on the warranty, if any, of the respective manufacturers thereof. This warranty does not cover replacement of scheduled service items such as oil, filters, tune-up parts, and other high-wear items. This warranty does not cover damages resulting from abuse, accidents, alterations, use of the Bobcat product with any accessory or attachment not approved by Bobcat Company, air flow obstructions, or failure to maintain or use the Bobcat product according to the instructions applicable to it.

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



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WARRANTY (CONT'D)

In this emissions limited warranty, the term "Manufacturer" means Kubota Corporation as the holder of the U.S. Environmental Protection Agency (U.S. EPA) Certificate of Conformity and California Executive Order for the vehicle. The emission control limited warranty is in addition to the standard limited warranty for your vehicle.

Your Bobcat dealer is authorized to perform all warranty and service repairs on your diesel engine. To locate a Bobcat dealer, visit www.bobcat.com or call 1-800-743-4340.

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

The U.S. Environmental Protection Agency (EPA), the California Air Resources Board (CARB), and KUBOTA Corporation are pleased to explain the Federal and California Emission Control System Warranty on your non-road engine. In California, new heavy duty off-road engines must be designed, built and equipped to meet California's stringent anti-smog standards adopted by the Air Resources Board pursuant to its authority in Chapter 1 and 2, Part 5, Division 26 of the California Health and Safety Code. In other states of the U.S.A., new non-road engines subject to the provisions of 40 CFR 1039 subpart A must be designed, built and equipped, at the time of sale, to meet the U.S. EPA regulations for nonroad engines.

KUBOTA must warrant the emission control system on your Compression Ignition engine for the period of time listed below provided there has been no abuse, vandalism, neglect, improper maintenance or unapproved modifications to your engine. This emission warranty is applicable in all states of the U.S.A., its provinces and territories regardless of whether an individual state, province, or territory has enacted warranty provisions that differ from the Federal warranty provisions. This emission warranty is also applicable in all provinces and territories of CANADA.

Your emission control system may include parts such as the fuel injection system and the air induction system. Also included may be hoses, belts, connectors and other emission-related assemblies.

Where a warrantable condition exists, KUBOTA will repair your engine at no cost to you, including diagnosis (if the diagnostic work is performed at an authorized dealer), parts and labor.

EMISSION DESIGN AND DEFECT WARRANTY COVERAGE

The emissions warranty period for the engine begins on the original date of sale to the initial purchaser and continues for each subsequent purchaser for the period mentioned below.

The emissions warranty period for all engines rated under 19kW (25Hp) is 2000 hours of operation or two (2) years of use, whichever first occurs.

The emissions warranty period for constant speed engines rated under 37kW (50Hp) with rated speeds greater than or equal to 3000 rpm is 2000 hours of operation or two (2) years of use, whichever first occurs.

The emissions warranty period for all other engines not already listed is 3000 hours of operation or five (5) years of use, whichever first occurs.

If any emission related part on your engine is defective, the part will be repaired or replaced by KUBOTA free of charge.

OWNER'S WARRANTY RESPONSIBILITIES

(a) As the engine owner, you are responsible for the performance of the required maintenance listed in your KUBOTA operator's manual. KUBOTA recommends that you retain all receipts covering maintenance on your engine, but KUBOTA cannot deny a warranty claim solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

(b) As the engine owner, you should be aware, however, that KUBOTA may deny your warranty coverage if your engine or a part has failed due to abuse, vandalism, neglect, improper maintenance or unapproved modifications.

(c) Your engine is designed to operate on Ultra Low Sulfur Diesel Fuel only. Use of any other fuel may result in your engine no longer operating in compliance with Federal or California's emissions requirements.

(d) You are responsible for presenting your engine to the nearest dealer or service station authorized by KUBOTA when a problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.

(e) If you have any questions regarding your warranty rights and responsibilities or the location of the nearest authorized dealer or distributor, you should contact: KUBOTA ENGINE AMERICA CORPORATION, Service department at 1-800-532-9808, EEWRI@kubotaengine.com or KUBOTA TRACTOR CORPORATION, National Service Department at 1-800-558-2682, KubotaEmissionsWarranty@kubota.com or KUBOTA CANADA LTD at (905) 294-7477.

COVERAGE

KUBOTA warrants to the initial purchaser and each subsequent purchaser that your engine will be designed, built and equipped, at the time of sale, to meet all applicable regulations. KUBOTA also warrants to the initial purchaser and each subsequent purchaser that your engine shall be free from defects in materials and workmanship which cause the engine to fail to conform to applicable regulations for the period mentioned above from the original date of sale.

KUBOTA shall remedy warranty defects at any authorized KUBOTA engine dealer or warranty station. Any authorized work done at an authorized dealer or warranty station shall be free of charge to the owner if such work determines that a warranted part is defective. Any KUBOTA approved or equivalent replacement part (including any KUBOTA approved aftermarket part) may be used for any warranty maintenance or repairs on emission related parts, and must be provided free of charge to the owner if the part is still under warranty.

KUBOTA is liable for damages to other engine components caused by the failure of a warranted part still under warranty. The use of replacement parts not equivalent to the original parts may impair the effectiveness of your engine emission control system. If such a replacement part is used in the repair or maintenance of your engine, and KUBOTA determines it is defective or causes a failure of a warranted part, your claim for repair of your engine may be denied.

Listed below are the parts covered by the Federal and California Emission Control Systems Warranty. Some parts listed below may require scheduled maintenance and are warranted up to the first scheduled replacement point for that part. The warranted parts are (if applicable):

- | | | |
|--|---------------------------------------|---|
| 1) Air-Induction System | 4) Electronic Control System | 6) Particulate Controls |
| a) Intake Manifold | a) ECU | a) Any device used to capture particulate emissions. |
| b) Turbocharger System | b) Engine Speed / Timing Sensor | b) Any device used in the regeneration of the particulate control device. |
| c) Charge Air Cooling System (Intercooler) | c) Accelerator Position Sensor | c) Control Device Enclosures and Manifolding |
| 2) Catalyst or Thermal Reactor System | d) Coolant Temperature Sensor | d) Diesel Particulate Filter Temperature Sensor |
| a) Catalytic converter | e) Atmospheric Pressure Sensor | e) Differential Pressure Sensor |
| b) Exhaust manifold | f) Intake Pressure Sensor | 7) Miscellaneous Items |
| 3) Fuel Injection System | g) Intake Manifold Temperature Sensor | a) Closed Breather System |
| a) Fuel Supply Pump | h) Intake Air Flow Sensor | b) Hoses*, Clamps*, Fittings, Tubing* |
| b) Injector | i) Common Rail Pressure Sensor | c) Gaskets, Seals |
| c) Injection Pipe | 5) Exhaust Gas Recirculation System | d) Kubota supplied engine Wiring Harnesses |
| d) Common Rail | a) EGR Valve | e) Kubota supplied engine Elec. Connectors |
| e) Smoke Puff Limiter | b) EGR Cooler | f) Air Cleaner Element*, Fuel Filter Element* |
| f) Speed Timer | c) EGR Valve Opening Rate Sensor | g) Emission Control Information Labels |
| g) Cold Advance Timer | | |
| h) Injection Pump | | |

*Warranty period is equivalent to manufacturer's recommended first replacement interval as stated in the applicable model's operator's manual and/or service (workshop) manual.

MAINTENANCE REQUIREMENTS

The owner is responsible for the performance of the required maintenance as defined by KUBOTA in the operator's manual.

LIMITATIONS

This Emission Control System Warranty shall not cover any of the following:

(a) Repair or replacement required because of misuse or neglect, improper maintenance, repairs improperly performed or replacements not conforming to KUBOTA specifications that adversely affect performance and/or durability, and alteration or modifications not recommended or approved in writing by KUBOTA.

(b) Replacement of parts and other services and adjustments necessary for required maintenance at and after the first scheduled replacement point.

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