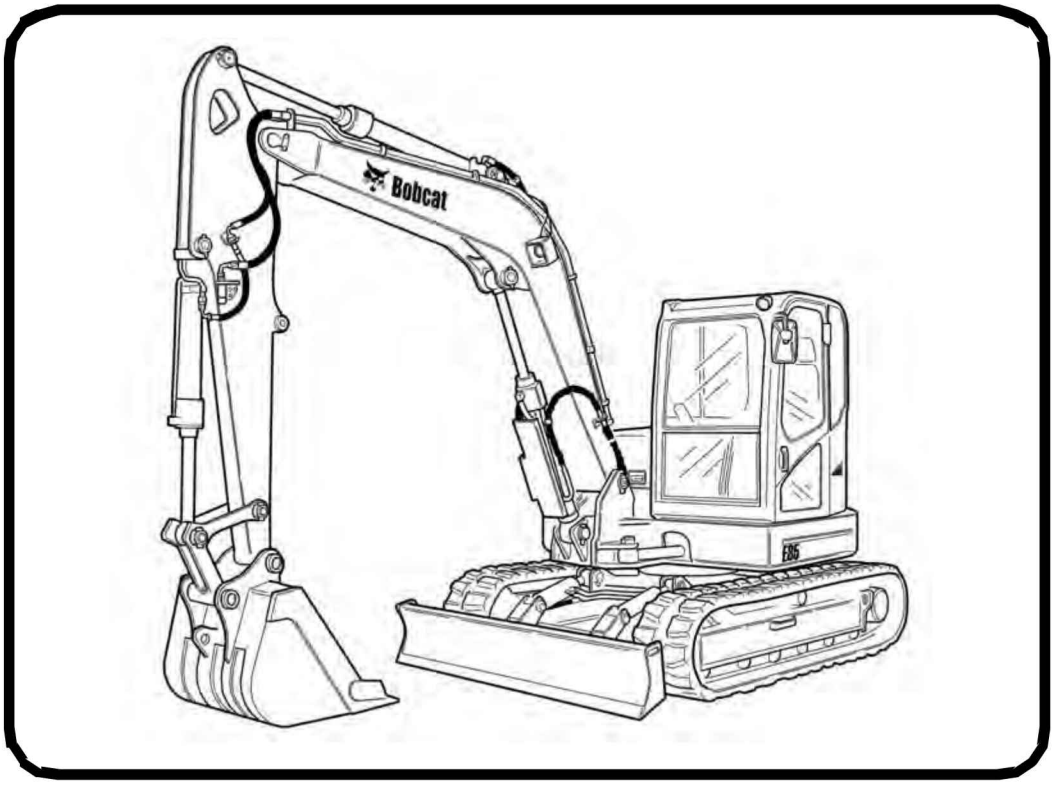
Bobcat®

Operation & Maintenance Manual
E85 Compact Excavator

S/N B34T11001 & Above



6990616 (6-13)

Printed in U.S.A.

OPERATOR SAFETY WARNING

⚠ WARNING

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

W-2001-0502

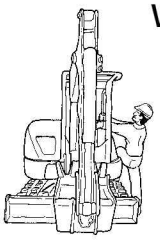
⚠ Safety Alert Symbol: This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.

CORRECT

P-90216

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

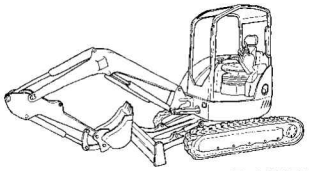
WRONG



B-19792

- ⚠ Do not grasp control handles when entering cab.
- ⚠ Be sure controls are in neutral before starting.
- ⚠ Sound horn and check behind machine before starting.

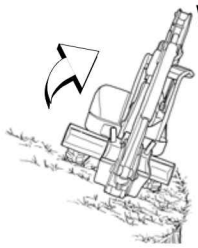
CORRECT



B-19751

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

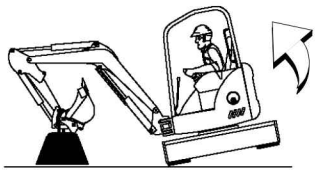
WRONG



B-19754

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

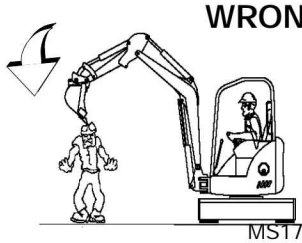
WRONG



MS-1784

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

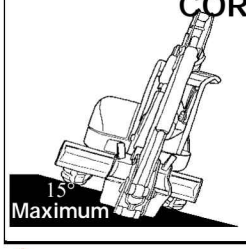
WRONG



MS1785

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

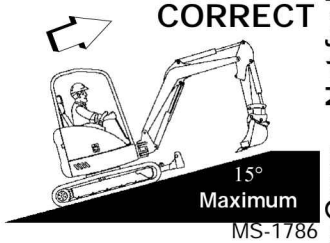
CORRECT



B-19756

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

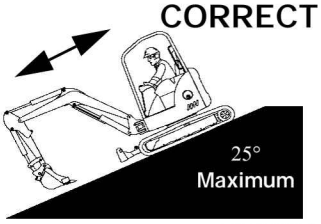
CORRECT



MS-1786

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

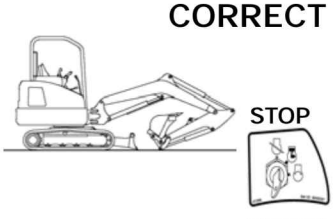
CORRECT



TS-2068A

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

CORRECT



NA-1435B 6808261

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

CORRECT

B-21928

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

CORRECT

NA-1421A

- ⚠ 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 (ROPS): Check condition and mounting hardware.
3. OPERATOR'S HANDBOOK: Must be in the cab.
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.

OSW78-0513

CONTENTS

REFERENCE INFORMATION

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

Excavator Serial Number _____

Engine Serial Number _____

NOTES:

_____

_____

_____

_____

YOUR BOBCAT DEALER:

_____

ADDRESS:

_____

PHONE:

_____

Bobcat Company
P.O. Box 128
Gwinner, ND 58040-0128
UNITED STATES OF AMERICA

Doosan Benelux SA
Drève Richelle 167
B-1410 Waterloo
BELGIUM

Bobcat®

FOREWORD

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

BOBCAT COMPANY IS IS0 9001 CERTIFIED

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

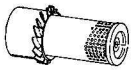
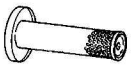
British Standards Institute (**BSI**) is the Certified Registrar Bobcat Company chose to assess the Company's compliance with the ISO 9001 at Bobcat's manufacturing facilities in Gwinner and Bismarck, North Dakota (U.S.A.), Pontchateau (France), Dobris (Czech Republic) and the Bobcat corporate offices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

CALIFORNIA
PROPOSITION 65 WARNING

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

REGULAR MAINTENANCE ITEMS

	ENGINE OIL FILTER 7025590		BATTERY 7005712
	FUEL FILTER 7029016 FUEL FILTER, water separator 7029012		ETHYLENE GLYCOL ANTI-FREEZE, 6988096 Premixed [-37°C (-34°F)] 6988097 Concentrate
	AIR FILTER, Outer 6666333		RADIATOR CAP 7028868
	AIR FILTER, Inner 6666334		
	HYDRAULIC FILTERS: MAIN FILTER 7004884 STRAINER / SUCTION FILTER 7006811 PILOT FILTER 7004879 BREATHER FILTER 7006806		FLUID, Hydraulic / Hydrostatic 6903117 - (2.5 U.S. gal) 6903118 - (5 U.S. gal) 6903119 - (55 U.S. gal)
	HVAC FILTER 7006085		GEAR LUBE 6903121 HD 80W-90 (12 qt)
ENGINE OIL 7023080 SAE 15W-40 - qt (12) 7023076 SAE 10W-30 - qt (12) 7023082 SAE 15W-40 - 2.5 U.S. gal (2) 7023078 SAE 10W-30 - 2.5 U.S. gal (2)		**ENGINE OIL** 7023081 SAE 15W-40 - U.S. gal (2) 7023077 SAE 10W-30 - U.S. gal (2)	

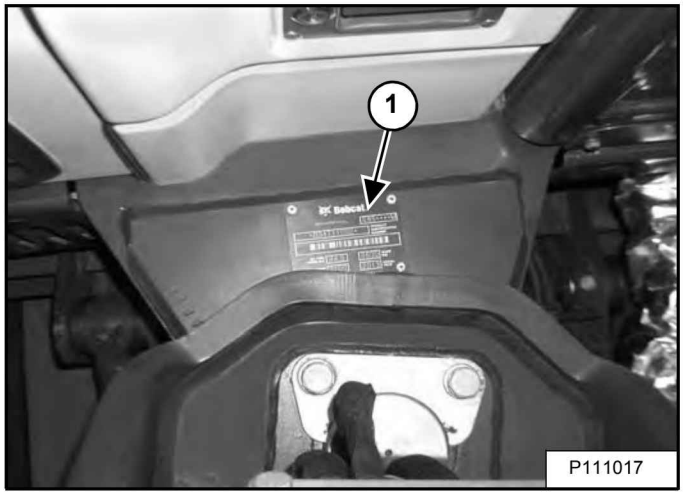
NOTE: Always verify Part Numbers with your Bobcat dealer.

SERIAL NUMBER LOCATIONS

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

Excavator Serial Number

Figure 1



The excavator serial number plate (Item 1) **[Figure 1]** is located on the swing frame on the front of the upperstructure.

Explanation of Excavator Serial Number:

XXXX XXXXX

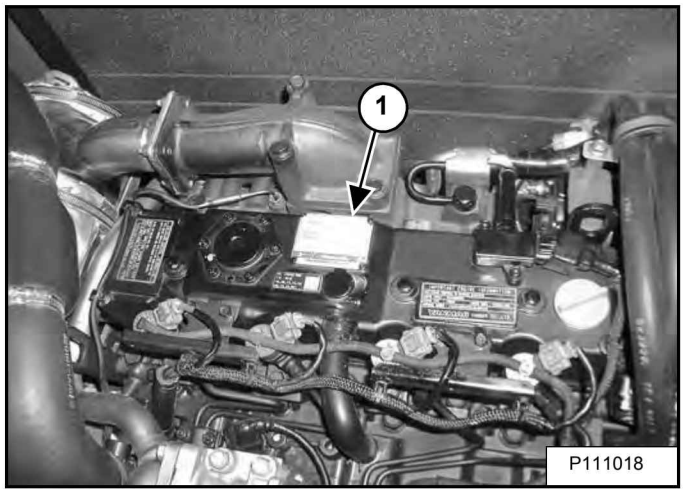
- XXXXX — Module 2. - Production Sequence (Series)
- XXXX — Module 1. - Model / Engine Combination

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

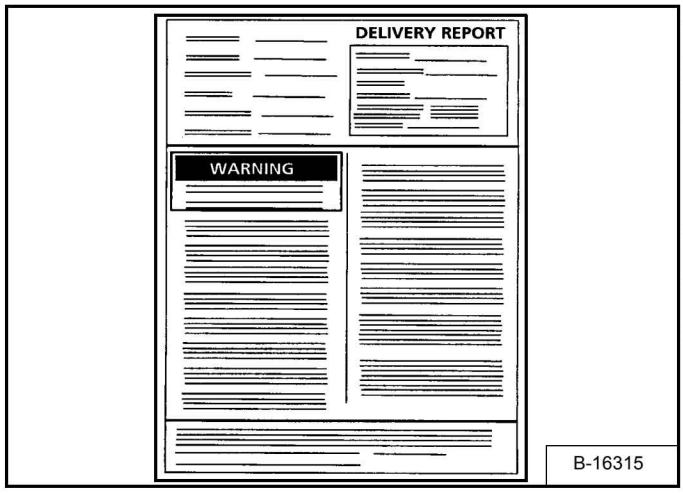
Figure 2



The engine serial number (Item 1) **[Figure 2]** is located on the top cover.

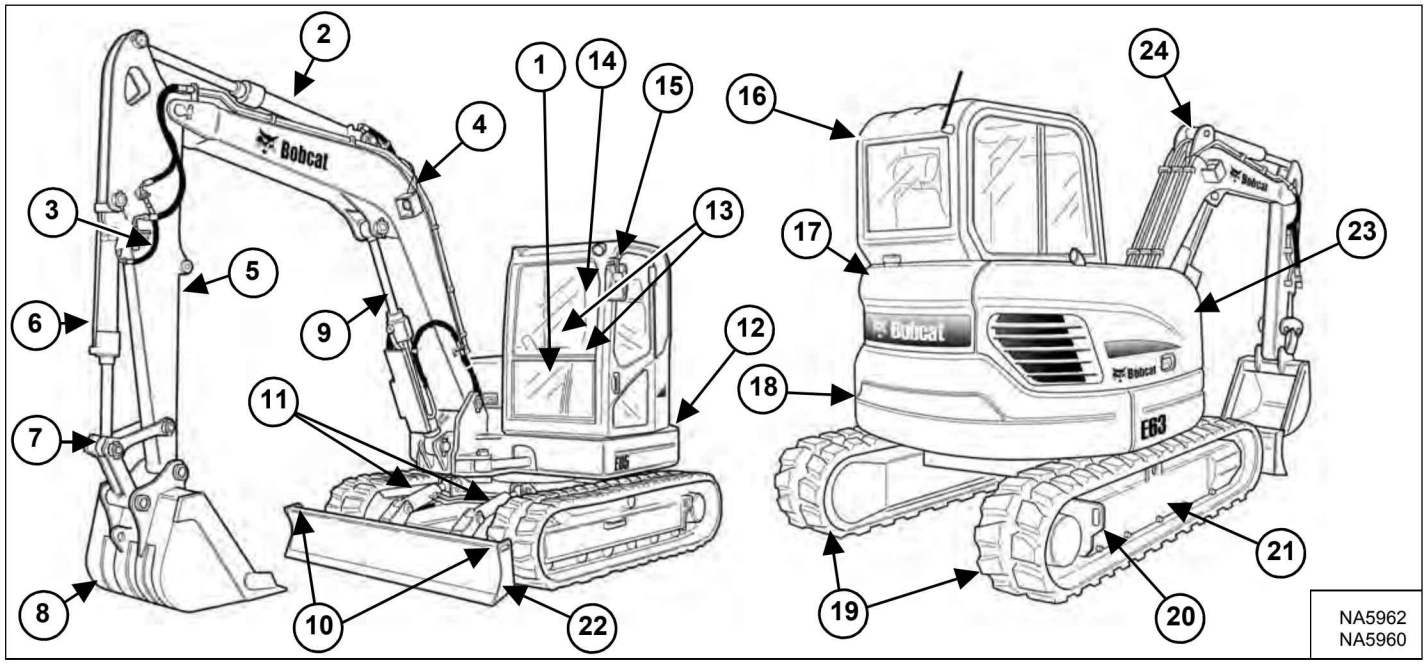
DELIVERY REPORT

Figure 3



The delivery report **[Figure 3]** must be completed by the dealer and signed by the owner or operator when the Bobcat excavator is delivered. An explanation of the form must be given to the owner.

EXCAVATOR IDENTIFICATION



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

[A] BUCKET - Several different buckets and other attachments are available for the Bobcat excavator.
[B] ROPS - (Roll Over Protective Structure) as standard equipment.
The ROPS meets ISO 12117-2; 2008.
[C] TRACKS - Optional tracks are available.

FEATURES, ACCESSORIES AND ATTACHMENTS

Standard Items

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

- Cab with ROPS
- Heater and A/C
- Cab Mounted Lights
- 450 mm (17.75 in) Rubber Tracks
- 2300 mm (91.00 in) Blade
- Two-Speed Travel (With Auto Shift)
- Auxiliary Hydraulics With Quick Couplers and Selectable Flow Rates
- Fingertip Auxiliary Hydraulics and Boom Swing
- Hydraulic and Travel Control Lockout
- Work Lights - Boom and Cab Mounted
- Engine / Hydraulic Monitor with Engine Idle
- Horn
- Hydraulic Joystick Controls
- ISO / STD Control Pattern Selection Feature
- Suspension Seat
- Tier 4 Compliant - DOC / DPF
- Advanced Diagnostics
- Counterweight
- Boom Load Hold Valve
- Boom Swing
- Direct To Tank Valve
- Mirrors (Left and Right Side)
- Travel Motion Alarm
- Password Protection System
- Auto Idle

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.

- AM / FM Radio
- Roof Guard Kit
- Front Guard Kit
- Steel Track
- Second Auxiliary Couplers
- 3 Inch Seat Belt
- Strobe
- Beacon
- Radio
- Fuel Transfer Pump
- Third Auxiliary Couplers

Specifications subject to change without notice

Attachments

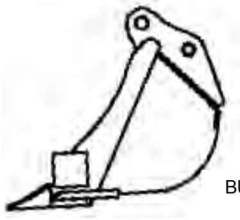
These and other attachments are approved for use on this model excavator. Do not use unapproved attachments. Attachments not manufactured by Bobcat may not be approved.

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

See your Bobcat dealer for more details on these and other attachments and field accessories.

- Auger
- Breaker
- Hydraulic Clamp
- Plate Compactor
- Tilt Bucket
- Ripper
- 1372 mm (54 in) Grading Blade
- Pin-Grabber, Attachment Quick Coupler

Buckets Available



BUCKET

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

FEATURES, ACCESSORIES AND ATTACHMENTS (CONT'D)

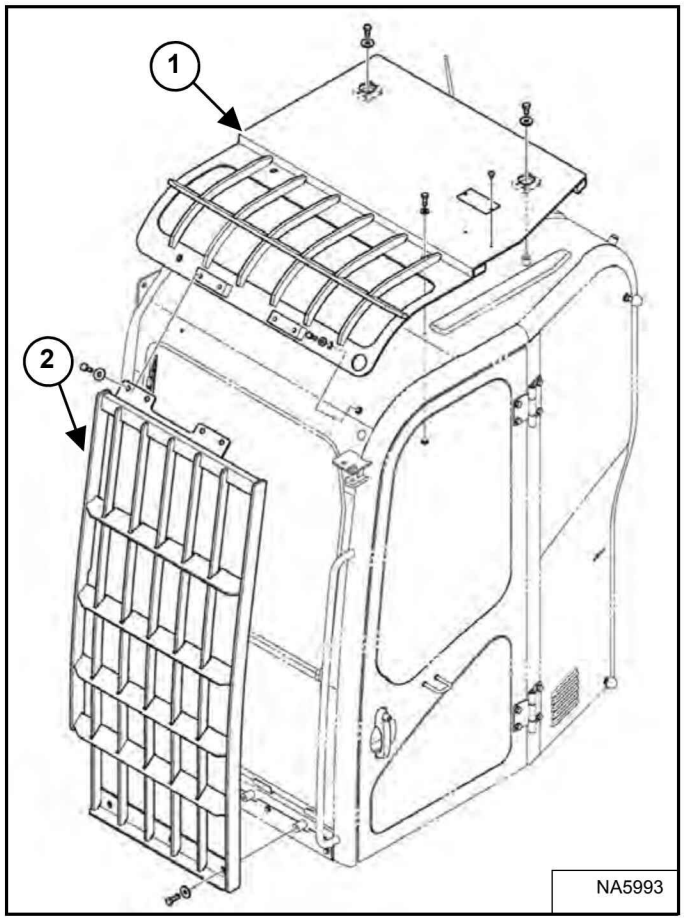
Top Guard Kit

Available for special applications that require protection from smaller objects that can fall on the cab and restrict material from entering cab.

The excavator must have the top guard (Item 1) **[Figure 4]** installed to meet the level 2 top guard requirements in ISO 10262.

See your Bobcat Dealer for more information.

Figure 4



Special Application Kit

The excavator must have the Front Guard Kit installed to meet the front guard requirements in ISO 10262. Inspect the screen for damage. Replace parts as necessary.

SAFETY AND TRAINING RESOURCES

SAFETY INSTRUCTIONS

Before Operation

Carefully follow the operating and maintenance instructions in this manual.

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

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

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

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

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

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

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

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

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

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

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

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

SI EXC-0511

Safe Operation Is The Operator's Responsibility

Safety Alert Symbol

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

WARNING

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

W-2001-0502

IMPORTANT

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

I-2019-0284

DANGER

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

D-1002-1107

WARNING

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

W-2044-1107

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

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

Safe Operation Needs A Qualified Operator

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

A Qualified Operator Must Do The Following:

Understand the Written Instructions, Rules and Regulations

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

Have Training with Actual Operation

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

Know the Work Conditions

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

SI EXC-0511

Avoid Silica Dust

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

FIRE PREVENTION

Maintenance

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

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

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

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

Operation

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

Electrical

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

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

SI EXC-0511

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.

Starting

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

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

Spark Arrester Exhaust System

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

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

Welding And Grinding

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

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

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

Fire Extinguishers

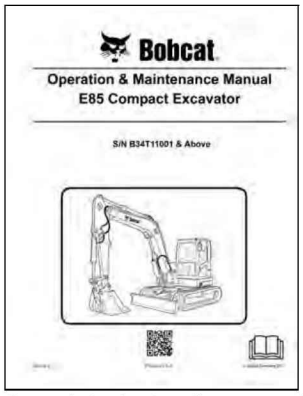
Know where fire extinguishers and first aid kits are located and how to use them. Inspect the fire extinguisher and service the fire extinguisher regularly. Obey the recommendations on the instructions plate.

SI EXC-0511

PUBLICATIONS AND TRAINING RESOURCES

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

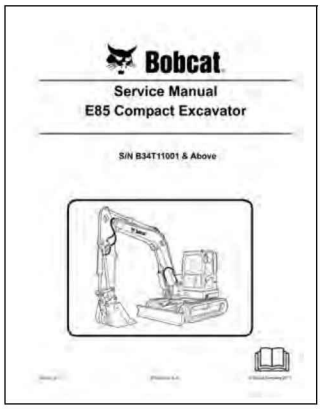
For the latest information on Bobcat product and the Bobcat Company, visit our web site at **www.training.bobcat.com** or **www.bobcat.com;**



OPERATION & MAINTENANCE MANUAL

6990616

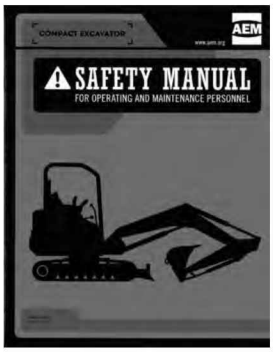
Complete instructions on the correct operation and the routine maintenance of the Bobcat excavator



SERVICE MANUAL

6990617

Complete maintenance instructions for your Bobcat excavator



SAFETY MANUAL

6901951

Provide basic safety procedures and warnings for your Bobcat excavator. Also available in Spanish 6901951AR

OPERATOR'S HANDBOOK

6990800

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.

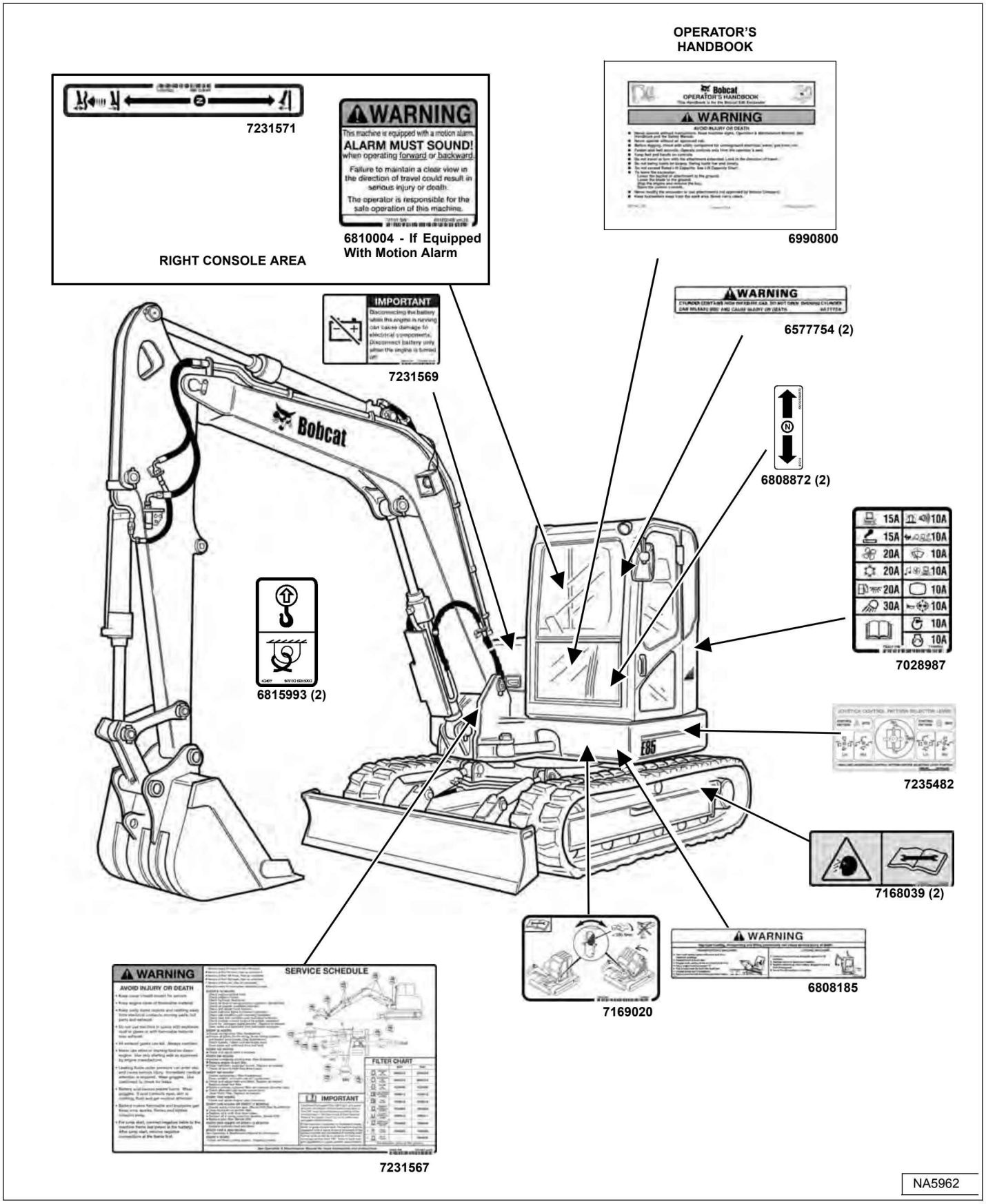
EXCAVATOR SAFETY VIDEO

(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**.

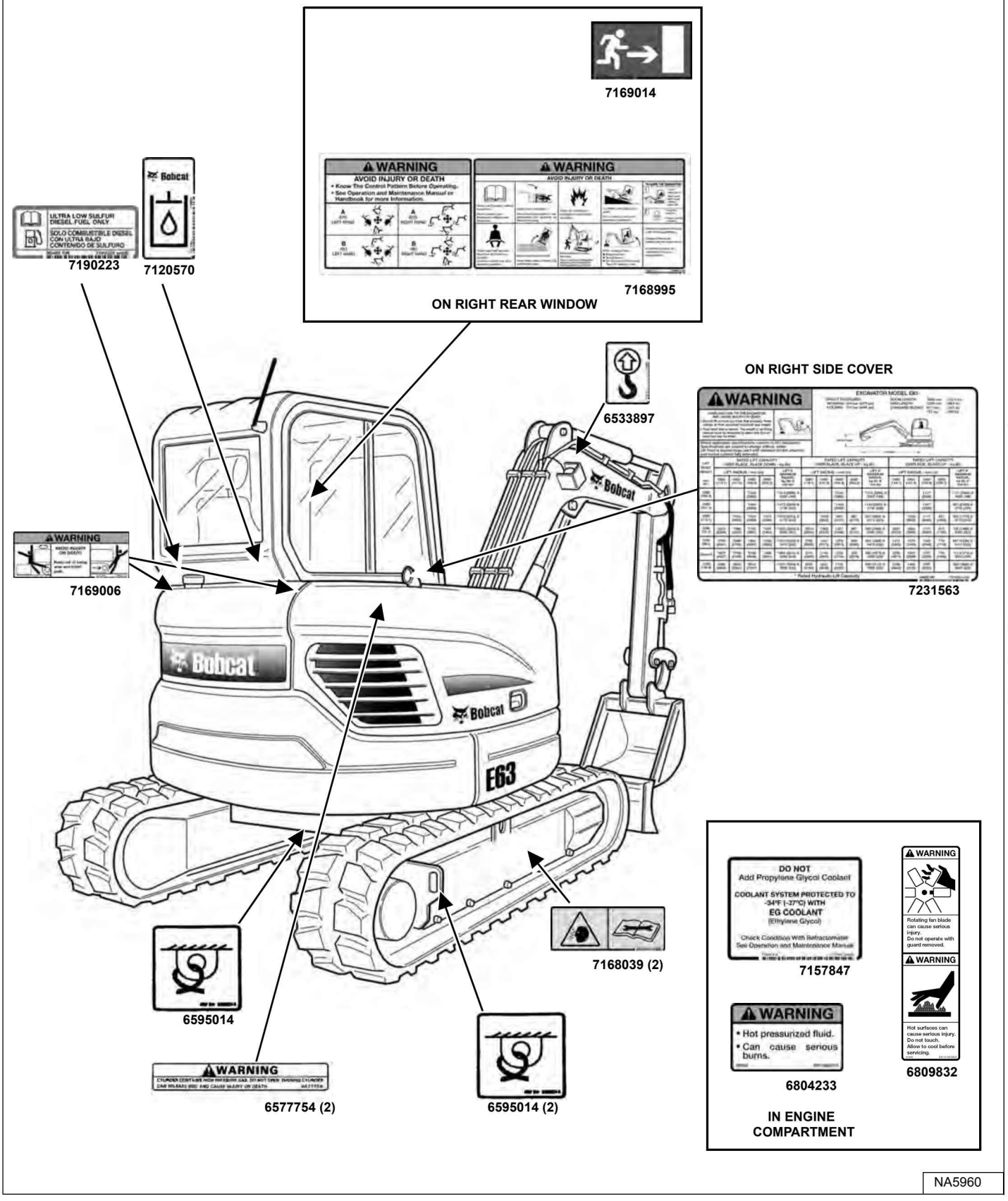
MACHINE SIGNS (DECALS)

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



MACHINE SIGNS (DECALS) (CONT'D)

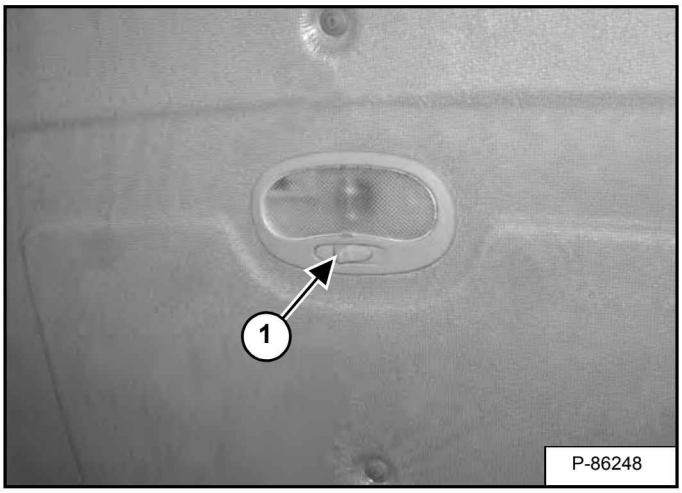
Follow the instructions on all the Machine Signs (Decals) that are on the excavator. Replace any damaged machine signs and be sure they are in the correct locations. Machine signs are available from your Bobcat excavator dealer.



INSTRUMENTS AND CONSOLES

Cab Interior Light

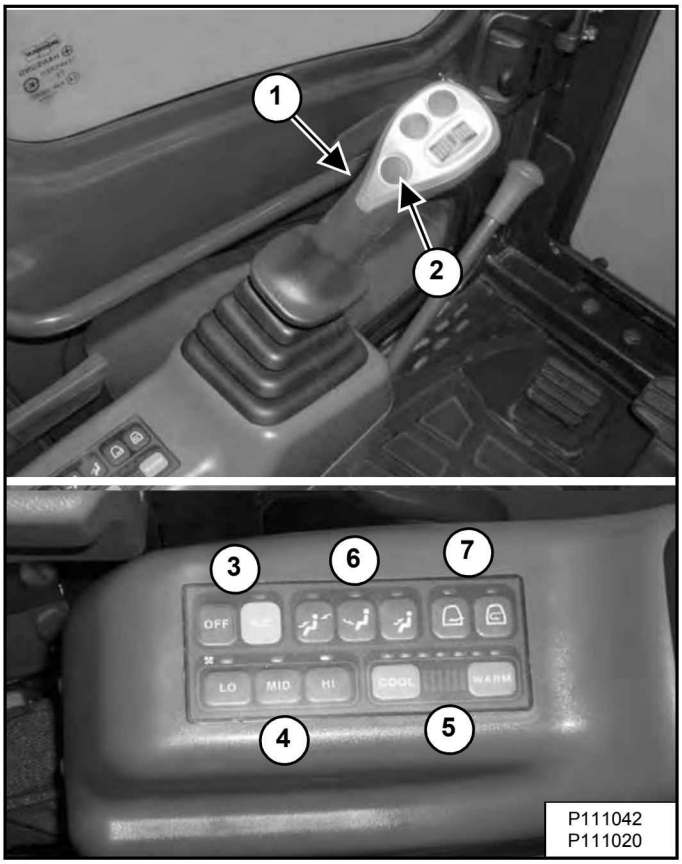
Figure 5



Slide the switch (Item 1) **[Figure 5]** to turn the cab light ON or OFF.

Left Console

Figure 6



Left Console **[Figure 6]**

REF. NO.	DESCRIPTION	FUNCTION / OPERATION
1	Left Joystick	(See HYDRAULIC CONTROLS on Page 50.)
2	Horn	Press lower button on left joystick to sound horn. (Key switch must be in ON position for horn to operate.) (The top two switches on the left joystick are not used for this model.)
3	Air Conditioner / Fan Motor	Press A/C button to turn air conditioner ON, Press OFF button to turn A/C OFF and also turns the fan motor OFF. (When the A/C button is pressed to the ON position, the fan motor speed must also be selected before the A/C will work. When both the A/C button and a fan speed button is pressed, the light above the A/C button will be ON.)
4	Fan Speed Select	Press Low - Medium - High button to select fan speed. (Light above button selected will be ON.)
5	Temperature Control / Heater Activation	Press COOL button repeatedly to lower temperature / press WARM button repeatedly to raise temperature. There are 24 positions to select the desired temperature range. (Lights above COOL / WARM buttons will show the temperature selected. Green lights indicate cool / red lights indicate warm.) To activate HEAT, the OFF button must be pressed. Press the desired fan speed button, then repeatedly press the WARM button until the desired temperature is selected. To turn heater OFF, press the OFF button to turn the fan motor to OFF.
6	Air Vent / Air Flow Location	Press the desired button to control air flow to various areas in the cab. The icons on the buttons indicate the air flow location. (See Heating, Ventilation And Air Conditioning Duct on Page 42.)
7	Fresh Air / Recirculation	Press the desired button for fresh air or cab recirculation. (See Heating, Ventilation And Air Conditioning Duct on Page 42.)

Right Console

Figure 7

Right Console (Cont'd)

Right Console **[Figure 7]**

REF. NO.	DESCRIPTION	FUNCTION / OPERATION
1	Right Joystick	(See HYDRAULIC CONTROLS on Page 50.)
2	Auxiliary Hydraulic Switch	Controls the fluid flow to the auxiliary hydraulic quick couplers (attachment). (See Auxiliary Hydraulics (Continuous Flow) on Page 55.)
3	Blade Control Lever	Blade Control: Controls raising and lowering the blade. (See BLADE CONTROL LEVER on Page 58.)
4	Engine Speed Control Dial	Controls rpm of the engine. (See Engine Speed Control Dial on Page 37.)
5	Key Switch	Always perform the *PRE-STARTING PROCEDURE* before starting the engine. (See PRE-STARTING PROCEDURE on Page 62.) and (See STARTING THE ENGINE on Page 65.)
6	Auxiliary Power Outlet	12 volt receptacle for accessories.
7	USB Port	The USB port is used for updating the display monitor.
	Output Jack	Headphone jack for radio.
8	Two-Speed Switch	Engages and disengages High Range Travel Speed. (See Two-Speed Travel on Page 37.)
9	Light Switch OFF- ON - ON	Press switch to center position to turn instrument panel lights ON, press switch fully to activate cab work lights and boom work lights.
10	Wiper Switch OFF- ON - ON	Press switch to center position for intermittent wiper mode, press switch fully for continuous wiper motion.
11	Window Washer Switch	Press switch to spray washer fluid on the front window. (Will only work when the wiper switch is ON.)
12	Boom Swing / Second Auxiliary Hydraulics Switch (If Equipped with Second Auxiliary Hydraulics)	Press switch to engage Boom Swing function or the secondary auxiliary function. (See BOOM SWING on Page 57.) or (See Auxiliary Hydraulics (Secondary Auxiliary Hydraulics) (If Equipped) on Page 55.)
13	Overload Warning	Engages or disengages the overload warning feature. (See OVERLOAD WARNING on Page 58.)
14	Beacon / Strobe Light Switch (OPTIONAL)	Press the bottom of switch to turn strobe / beacon light ON. Press top of switch to turn OFF (if equipped).
15	NA	Not used for this model.
16	DPF (Diesel Particulate Filter) Switch ON-OFF-ON	Used for manual (forced) regeneration or the inhibit (non-regeneration) of the DPF. (See DIESEL PARTICULATE FILTER (DPF) SYSTEM on Page 43.)
17	Hourmeter	Shows total hours of machine use.
18	Instrument Panel	(See Function Icons on Page 30.)
19	Engine Emergency Stop Switch	Move the switch to the emergency STOP position. Switch will return to the ON position when released.
20	NA	Not used for this model.
21	NA	Not used for this model.

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

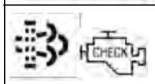
Function Icons

Figure 8

Function Icons [Figure 8]

REF	ICON	DESCRIPTION	FUNCTION / OPERATION
1		Fuel Level Gauge	Shows amount of fuel in fuel tank. WHITE area indicates normal operating range. RED area indicates the fuel level is low and fuel should be added as soon as convenient. When the gauge pointer is in the RED area, the fuel icon (Item 1A) will illuminate.
2		Coolant Temperature Gauge	Gauge indicates engine coolant temperature and allowable operating range. WHITE area indicates coolant temperature is in normal operating range. RED area indicates engine coolant temperature is too high. When in the RED area, the coolant icon (Item 2A) will illuminate, a warning buzzer will sound and engine rpm will automatically be reduced. Allow engine to idle until engine temperature is in normal operating range. Stop the engine and allow coolant to cool and service as required. (A pop-up window will also be displayed. The pop-up window will stay until the condition is corrected or the ESC button is pressed.)
3		Engine Speed Control Dial Bar Graph	The bar graph indicates the position of the engine speed control dial. There are eleven settings, from low idle to high idle.
4		ECO Symbol	The ECO symbol shows the workload (horse power) usage. GREEN colored ECO symbol indicates normal working conditions; YELLOW (amber) indicates idle condition; RED indicates high engine load; GRAY indicates the engine is OFF but the key is in the ON position.
	ECO Bar Graph 		The ECO bar graph shows the average fuel economy for one minute's operation. The more the engine is loaded, the higher the fuel consumption as indicated on the bar graph.
5		Clock	The digital clock shows: DISPLAY = DESCRIPTION WWW = Day HH = Hour mm = Minute AM (PM) = AM (PM) See USER MENU for setting clock. (See Time Setting on Page 159.)
6		Warning LED	LED illuminates or flashes when the engine or the machine needs to be checked. (Stop engine and check systems for correct operation.) A pop-up window will also display indicating a potential problem. (See Display Pop-Up Windows on Page 34.) for additional information.
7		Communication Indicator	When the communication indicator icon light is ON, this indicates that the main controller and the display monitor are communicating correctly. (The symbol will move like lightening.) If the symbol is not visible means there is a communication error. Communications error symbol will illuminate when there is a communication error.
		Communication Error	When the communication error icon is ON indicates a problem between the main controller and the display monitor. See your Bobcat dealer for service. (A pop-up window will also be displayed. The pop-up window will stay until the condition is corrected or the ESC button is pressed.)
8	Engine rpm 		Displays current engine speed (rpm).
9		USER MENU	USER MENU information (See User Menu Function Buttons on Page 35.)

Function Icons [Figure 8] (Cont'd)

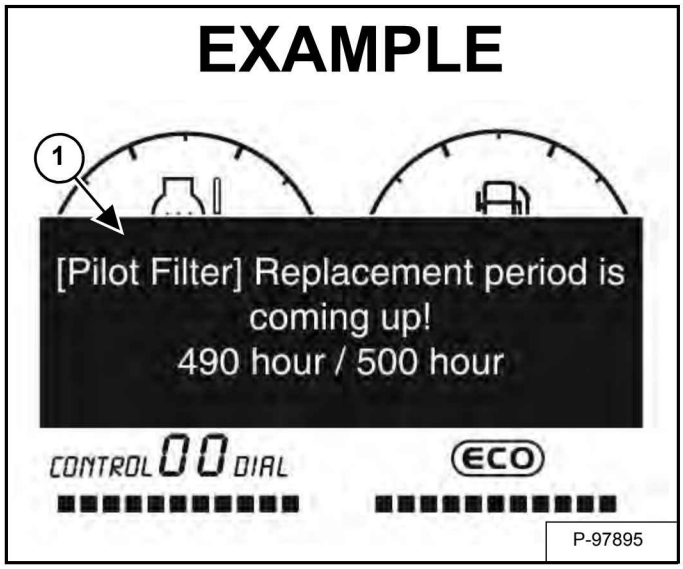
REF	ICON	DESCRIPTION	FUNCTION / OPERATION
10	ICON Status bar - Up to six of the following ICONS can be illuminated at one time.		
		Battery Charging Voltage	Voltage out of range - Light will be ON when key is turned to the ON position with engine not started, light will go OFF after engine starts. If light is ON with engine running, shut engine OFF immediately an determine cause of problem. (A pop-up window will also be displayed. The pop-up window will stay until the condition is corrected or the ESC button is pressed.)
		Engine Oil Pressure	Oil pressure low - Light will be ON when key is turned to the ON position with engine not started, light will go OFF after engine starts. If light is ON with engine running, shut engine OFF immediately. If engine is operated with light ON, serious engine damage may occur. (A pop-up window will also be displayed. The pop-up window will stay until the condition is corrected or the ESC button is pressed.)
		Engine Check	Light flashes when engine needs servicing. Stop engine and service as needed. (A pop-up window will be displayed alerting the operator to a service code fault. The pop-up window will stay illuminated until the condition is corrected or the ESC button is pressed. To view active codes, scroll down and enter Failure Information screen.)
		Hydraulic Oil Overheat	Light ON when the hydraulic oil temperature is over the allowable limit. Stop engine and service as needed. If excavator is operated with light ON, serious hydraulic damage may occur.Engine rpm will be limited to 37.5% when light is ON. (A pop-up window will also be displayed. The pop-up window will stay until the condition is corrected or the ESC button is pressed.)
		Engine Air Filter	Light ON when the air filter(s) needs servicing. Service air filter(s) as soon as possible. (A pop-up window will also be displayed. The pop-up window will stay until the condition is corrected or the ESC button is pressed.)
		Water In Fuel	Light ON when water in fuel filter is indicated. Drain water from fuel filter as soon as possible. (A pop-up window will also be displayed. The pop-up window will stay until the condition is corrected or the ESC button is pressed.)
		Low Fuel Level	When a low fuel condition exists, the fuel icon will illuminate.
		High Coolant Temperature	When an over temperature condition is present, the coolant icon will illuminate, a warning buzzer will sound and the engine rpm will automatically be reduced. (A pop-up window will also be displayed. The pop-up window will stay until the condition is corrected or the ESC button is pressed.)
		Machine Check	Indicates the electrical system needs servicing when light is ON. Check for Codes.
		Overload	Icon is ON when the overload feature is activated. Light is off when overload feature is disabled.
		DPF Regeneration	The light is ON when forced regeneration is required or during manual regeneration ready. (See Operation (Passive, Active And Inhibited Regeneration) on Page 44.) and (See Remote Parked Regeneration on Page 127.)
		DPF Regeneration Requested	The light is ON and engine rpm is reduced because of an extremely high soot level. This is limp mode and DPF service is needed as soon as possible.
		DPF Inhibited	The light is ON when the DPF inhibit switch is in the inhibit position. (See Operation (Passive, Active And Inhibited Regeneration) on Page 44.) and (See Remote Parked Regeneration on Page 127.)
		DPF High Exhaust Temperature	Light is ON when DPF regeneration is in progress. Amber colored light when in forced regeneration. Green light when in active regeneration. (See Operation (Passive, Active And Inhibited Regeneration) on Page 44.) and (See Remote Parked Regeneration on Page 127.)

Function Icons [Figure 8] (Cont'd)

REF	ICON	DESCRIPTION	FUNCTION / OPERATION
11	ICON Status bar - Up to six of the following selected Function ICONS can be illuminated at one time.		
		Auto Idle	Light is ON when the Auto Idle feature is activated. Light OFF when Auto Idle feature is disengaged. (See Automatic Idle Feature on Page 37.)
		Low Speed Travel	Light is ON when the Low Speed Travel is activated. (See Two-Speed Travel on Page 37.)
		High Speed Travel	Light is ON when the High Speed Travel is activated. (See Two-Speed Travel on Page 37.)
		Engine Pre-Heat	Light is ON when air intake heater is energized. In cold weather with the key in the ON position, the icon indicates the engine preheat feature is activated. When icon is OFF with the key in the ON position means the engine preheat cycle has finished and the engine can be started.
		Work Lights	Light is ON when working lights ON. (See Right Console on Page 28.)
		Boom Swing	Light is ON when boom swing switch is activated. (See BOOM SWING on Page 57.)
			Not used for this model
		Overload Warning	Light is ON when overload feature is enabled. An audible alarm will sound indicating the work group is overloaded. Bring the arm towards the machine, lower the boom and reduce the load before continuing operation. Reduce load immediately.
		Continuous Flow	Light is ON when continuous flow auxiliary hydraulics are enabled. (See Auxiliary Hydraulics (Continuous Flow) on Page 55.)
		Auxiliary Hydraulic Flow	Main Auxiliary Hydraulic Couplers; Light is ON when Two Way Flow auxiliary hydraulics is enabled. (See Auxiliary Hydraulics (Auxiliary Hydraulic Flow) on Page 55.)
		Secondary Auxiliary Hydraulics (If Equipped)	Light is ON when secondary auxiliary hydraulics is enabled. (See Auxiliary Hydraulics (Secondary Auxiliary Hydraulics) (If Equipped) on Page 55.)

Display Pop-Up Windows

Figure 9



When an alarm, warning or scheduled maintenance is activated, a pop-up window (Item 1) **[Figure 9]** will appear on the screen to describe the problem or alert the operator of required service. The pop-up window will disappear once the warning symbol disappears or the ESC button (Item 3) **[Figure 10]** is pressed. (See Monitoring - Real Time Functions on Page 154.)

If multiple warnings occur, each pop-up will be displayed in the order of the occurrence.

WARNING	DESCRIPTION
Check Battery	Check the charging system.
Check Oil Pressure	Check the engine oil. (See Checking And Adding Engine Oil on Page 110.)
Check Coolant Temperature.	Clean radiator. (See Cleaning on Page 112.) Check the coolant level. (See Checking Level on Page 112.)
Check Engine	(See DIAGNOSTIC SERVICE CODE on Page 147.)
Water In Fuel	Drain water from fuel / water separator. (See Removing Water on Page 108.)
Air Cleaner	Inspect and replace air filter(s) as required. (See AIR CLEANER SERVICE on Page 104.)
Stop Engine And Check Vehicle	(See Service Codes List on Page 147.)

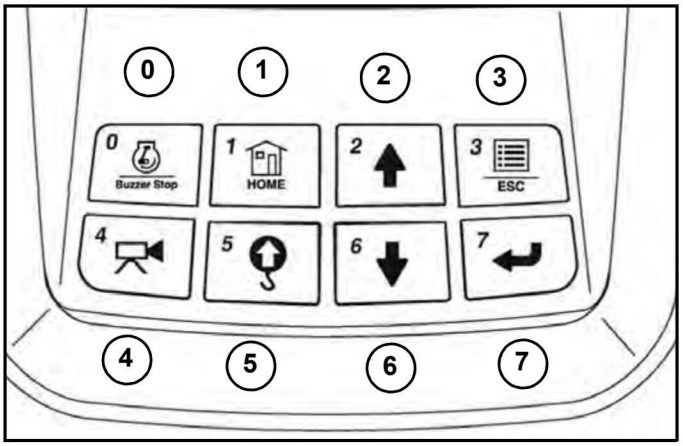
WARNING	DESCRIPTION
Start Forced Regeneration	(See Operation (Parked Regeneration) on Page 45.) and (See Remote Parked Regeneration on Page 127.)
Regeneration Is Ready	(See Operation (Passive, Active And Inhibited Regeneration) on Page 44.)
Forced Regeneration Status	(See Operation (Parked Regeneration) on Page 45.) and (See Remote Parked Regeneration on Page 127.)
DPF Active Regeneration Inhibit Status	(See Operation (Passive, Active And Inhibited Regeneration) on Page 44.)
Check Hydraulic	Hydraulic oil is overheated. Service / repair the oil system after hydraulic system has had time to cool. (See Checking And Adding Fluid on Page 119.)
Communication error	See your Bobcat dealer for service.

SCHEDULED MAINTENANCE ITEMS	DESCRIPTION
Engine Oil	Change oil, filter, and / or coolant as scheduled. (See Filter / Oil Information (Maintenance Clock Settings) on Page 155.)
Engine Oil Filter	
Coolant	
Fuel Filter	
Air Cleaner	
Hydraulic Oil	
Pilot Filter	
Return Filter	
Suction Filter	
Air Conditioning Filter	

User Menu Function Buttons

The display panel can select various functions, be used to set languages, etc. and as a key pad for changing passwords. See CONTOL PANEL SETUP for further description of screens to setup the system for your use. (See CONTROL PANEL SETUP on Page 153.)

Figure 10

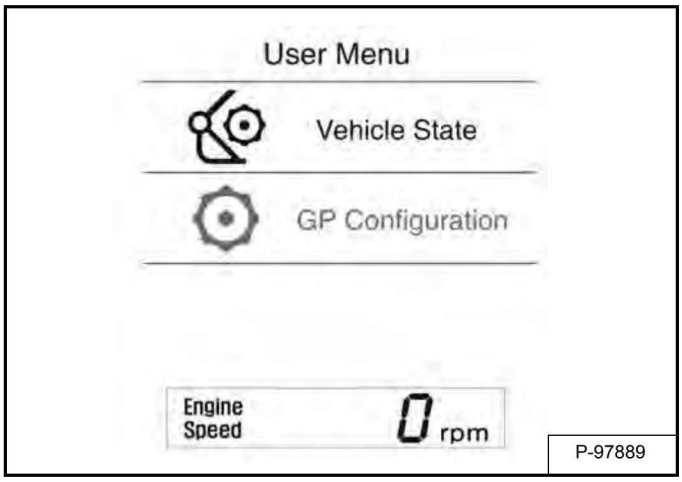


Right Console **[Figure 10]**

REF	DESCRIPTION	FUNCTION
0	Auto Idle Select Button	Press once to engage Auto Idle feature ON, press a second time to turn disengage. (See Automatic Idle Feature on Page 37.)
	Buzzer Stop	If a warning buzzer is activated, the buzzer can be deactivAted by pressing the button. (This Does Not fix the problem, it only deactivates the buzzer. Find and repair the problem as soon as possible.)
	0	Used as a numeric 0 when using as the key pad.
1	Home	Press to return to initial screen.
	1	Used as a numeric 1 when using as the key pad.
2	Arrow UP	Use for scrolling curser up on the screen.
	2	Used as a numeric 2 when using as the key pad.
3	ENTER / ESC	Use to enter the menu. Also used for returning to the previous screen.
		Used to close pop-ups
	3	Used as a numeric 3 when using as the key pad.
4	4	Used as a numeric 4 when using as the key pad.
5	Overload Warning (Must be at main screen to enable overload feature)	Press once to enable the overload warning feature; Icon 21 **[Figure 8]** will be illuminated when the activated. Press a second time to deactivate. When activated, if the machine exceeds the specified value, a warning buzzer will sound until the load has been reduced.
	5	Used as a numeric 5 when using as the key pad.
6	Arrow DOWN	Use for scrolling curser down on the screen.
	6	Used as a numeric 6 when using as the key pad.
7	Selection	Use for selecting the desired menu item.
	7	Used as a numeric 7 when using as the key pad.

User Menu Access and Escape

Figure 11



Press the button (Item 1) **[Figure 10]** to change the screen to the user menu. Press button a second time to change back to main screen **[Figure 11]**.

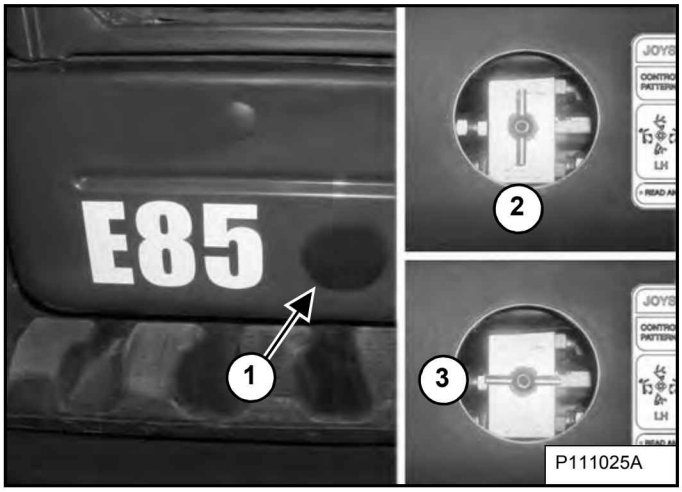
NOTE: The display will automatically switch back to the main screen in approximately 20 seconds if there is no activity for any screen changes.

NOTE: Turning the key to the OFF position will also reset the display to the main screen.

See CONTOL PANEL SETUP for further description of screens to setup the system for your use. (See CONTROL PANEL SETUP on Page 153.)

STD / ISO Selector Valve

Figure 12



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

Remove the plug (Item 1) **[Figure 12]** located below the front corner of the cab door.

Reach in through the access hole and rotate the valve handle vertically (Item 2) to select STANDARD Control Pattern. Rotate the valve handle horizontally (Item 3) **[Figure 12]** to select ISO Control Pattern.

Integrated Slew Brake

This machine is equipped with an automatically applied slew brake integrated into the slew motor.

The slew brake automatically disengages when the slew function is engaged.

Raising And Lowering The Console

Raise the console before exiting the cab.

Figure 13

Pull up on the console release handle (Item 1) **[Figure 13]**.

Lower the console before operating the excavator.

Push down on the console release handle (Item 1) **[Figure 13]** until the latch is engaged.

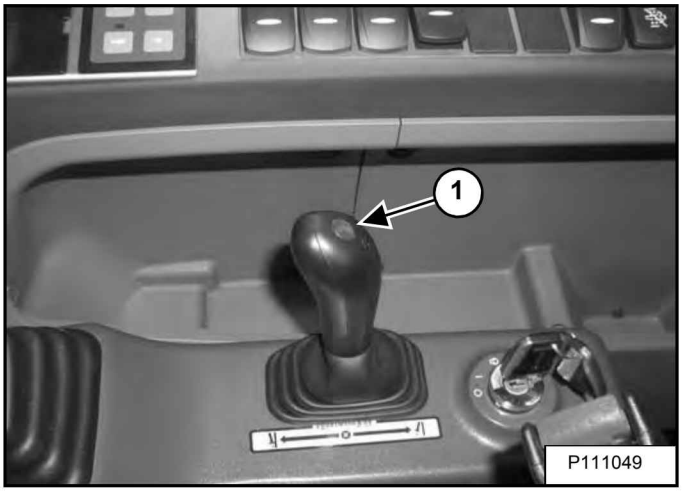
NOTE: When the console is raised, the hydraulic and traction system functions are locked and will not operate.

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

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

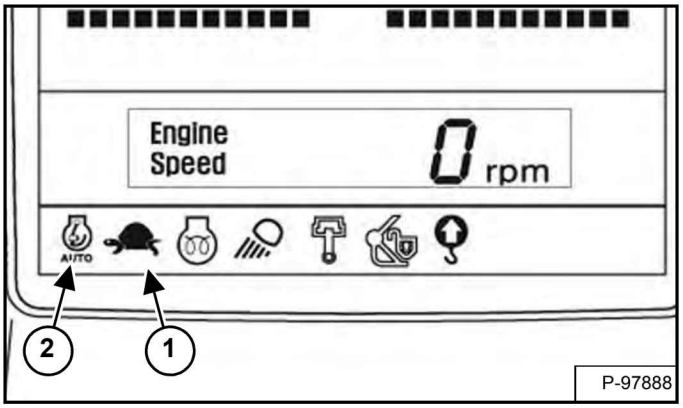
Two-Speed Travel

Figure 14



The two-speed button is located on the blade joystick. Press the two-speed button (Item 1) **[Figure 14]** once to engage the High Range. Press again to engage Low Range.

Figure 15

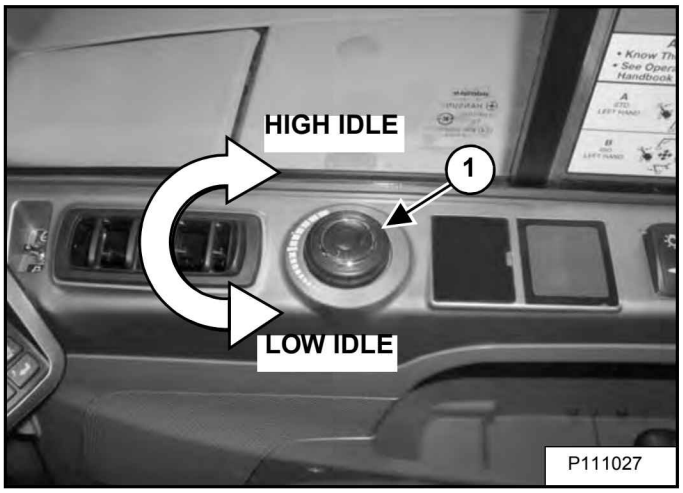


An icon (Item 1) **[Figure 15]** on the display panel will illuminate to show what range is engaged.

In low range, the icon will be a turtle (as shown in **[Figure 15]**), when high range is engaged, the icon will be a rabbit. (See Function Icons on Page 30.)

Engine Speed Control Dial

Figure 16



The engine speed control dial (Item 1) **[Figure 16]** controls the engine rpm. Rotate the knob clockwise to increase engine rpm, counterclockwise to decrease engine rpm.

Automatic Idle Feature

Figure 17

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.

The automatic idle button (Item 1) **[Figure 17]** is used to engage or disengage the automatic idle feature.

Press the button (Item 1) once to engage automatic idle, press the button (Item 1) **[Figure 17]** a second time to disengage automatic idle.

An icon (Item 2) **[Figure 15]** on the display panel will illuminate when auto idle is engaged.

NOTE: When loading or unloading the machine or when operating in confined spaces, disengage the auto idle feature.

OPERATOR CAB

Description

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

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

ROPS - Roll Over Protective Structure per ISO 12117-2: 2008.

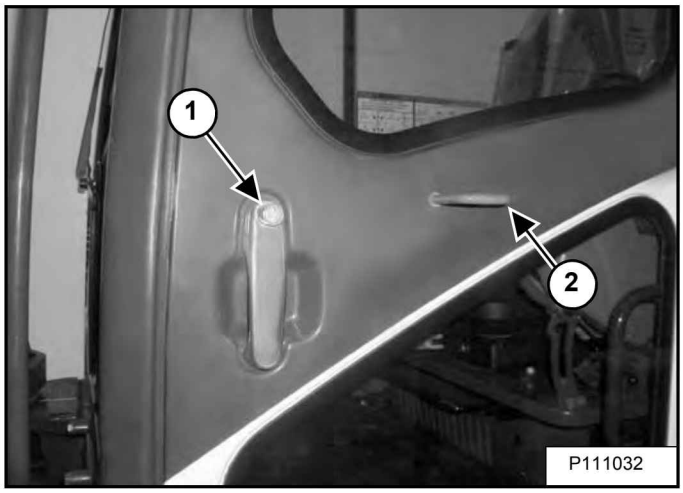
⚠ WARNING

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

W-2069-0200

Cab Door

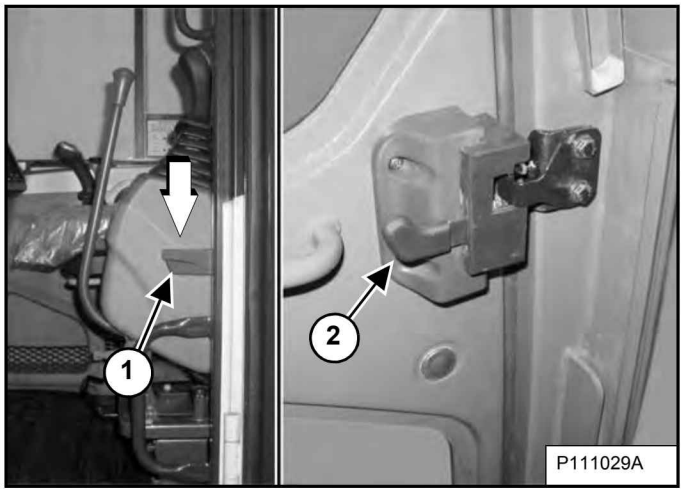
Figure 18



The cab door can be locked (Item 1) **[Figure 18]** with the same key as the starter switch.

The door can be held in the open position. Push the door all the way open until the latch (Item 2) **[Figure 18]** engages to hold the door in the open position.

Figure 19



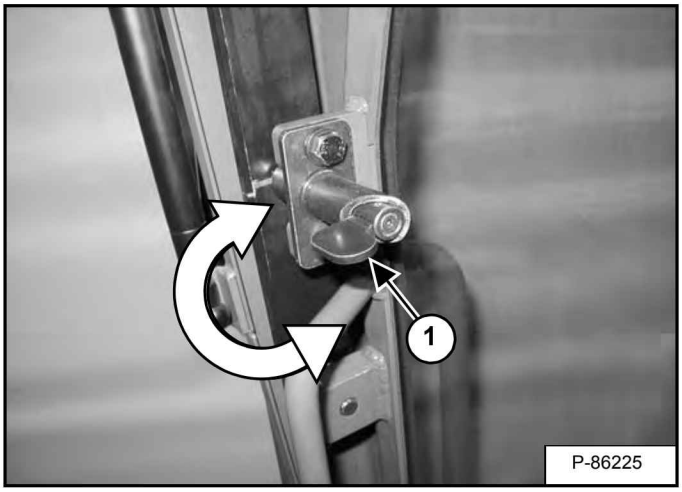
When the door is in the open position, push down on the latch (Item 1) **[Figure 19]** and close the door.

From inside the cab, open the door using handle (Item 2) **[Figure 19]**.

Front Window

Opening The Front Window

Figure 20



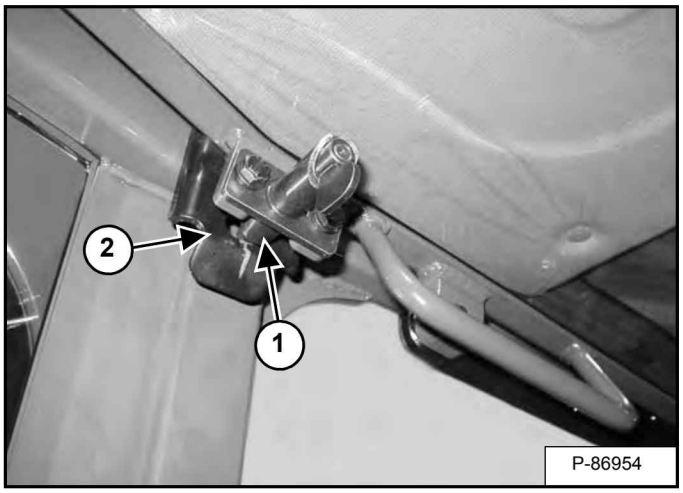
Rotate the front window latch pins (Item 1) **[Figure 20]** (both sides).

Figure 21

Use both window grab handles to pull the top of the window in **[Figure 21]**.

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

Figure 22



When the window is fully raised, push up on the window slightly until the two latch pins (Item 1) (both sides) engage into the bracket (Item 2) **[Figure 22]** to lock the window in the open position. Pull down slightly on the window to make sure the latch pins are properly seated to hold the window securely in the open position.

Closing The Front Window

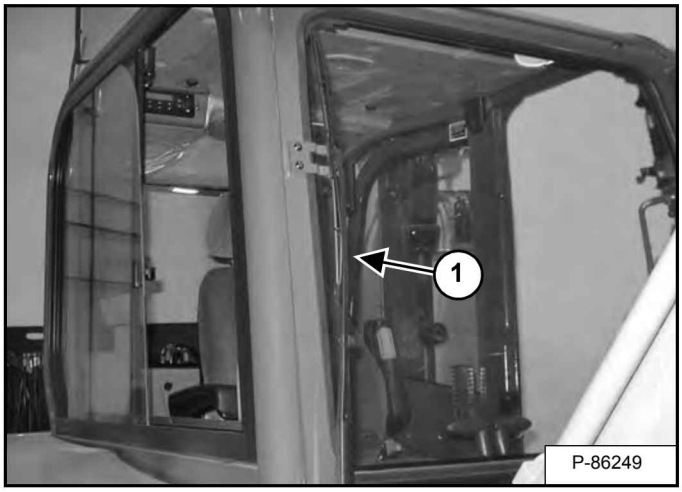
Support the window while rotating both window latch pins (Item 1) **[Figure 22]** to the unlocked position.

Using both window grab handles, pull the window forward and down to the closed position **[Figure 21]**.

When the window is fully lowered, push in on the window slightly until the two latch pins (Item 1) **[Figure 20]** (both sides) engage into the bracket to lock the window in the closed position.

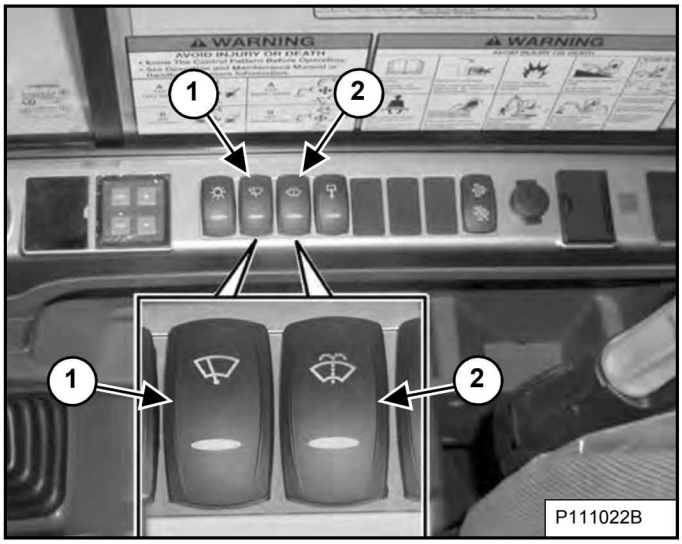
Front Wiper

Figure 23



The front window is equipped with a wiper (Item 1) **[Figure 23]** and washer.

Figure 24

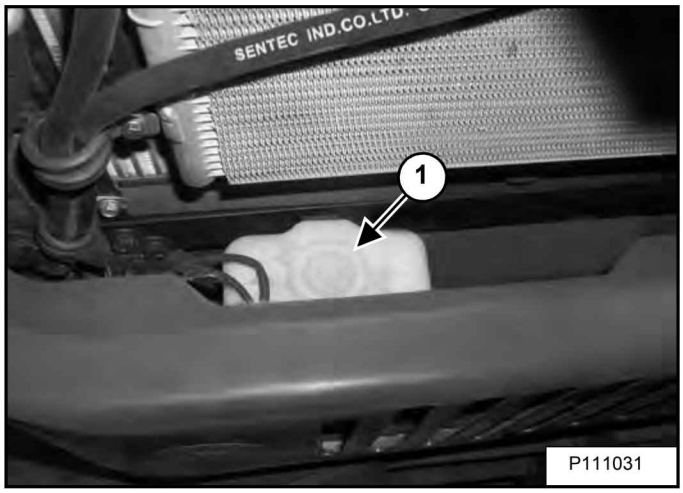


The wiper switch (Item 1) **[Figure 24]** has three positions, OFF, intermittent wiper mode and full speed.

The window washer switch (Item 2) activates the front window washer. (The wiper switch (Item 1) must be activated before the washer switch (Item 2) **[Figure 24]** will allow washer fluid to be sprayed on the front window.)

Window Washer Reservoir

Figure 25

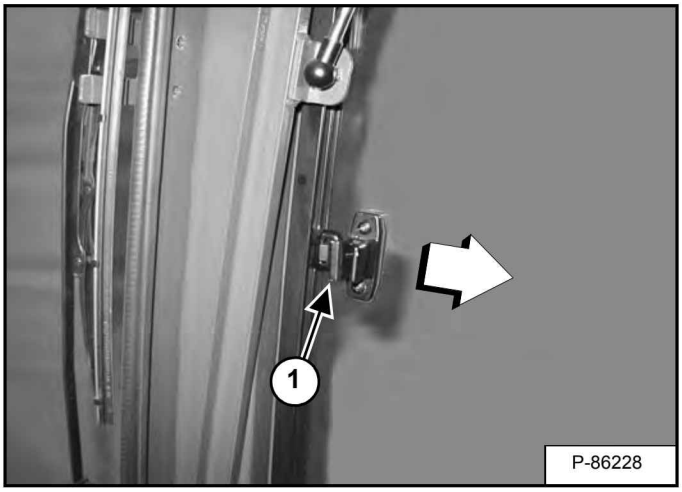


The window washer reservoir (Item 1) **[Figure 25]** is located under the right side cover. (When the temperature is 0°C (32°F) or lower, fill the washer reservoir with washer fluid specified for freezing conditions. If the washer bottle is filled with water, it will freeze and damage the washer reservoir.)

Right Side Window

Opening The Right Front Window

Figure 26



Press the latch / handle (Item 1) **[Figure 26]** together and pull back on the latch / handle to open the right side window.

Closing The Right Front Window

Push the latch / handle (Item 1) **[Figure 26]** forward until the latch / handle lock the window in the closed position.

Heating, Ventilation And Air Conditioning Duct

Figure 27

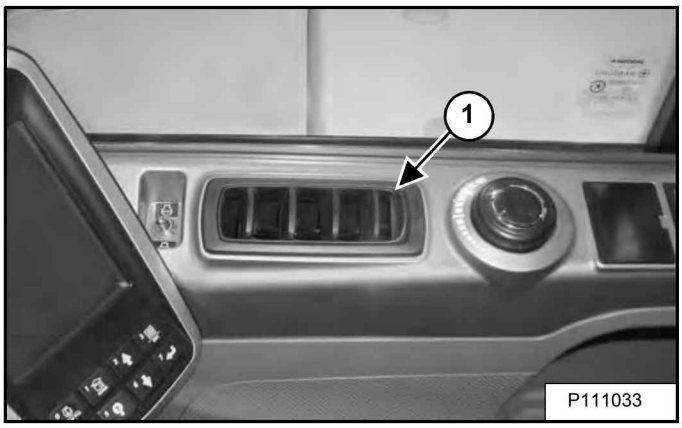


Figure 28

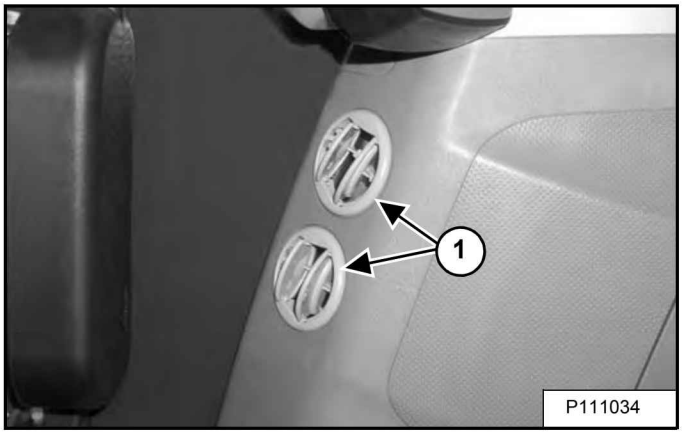
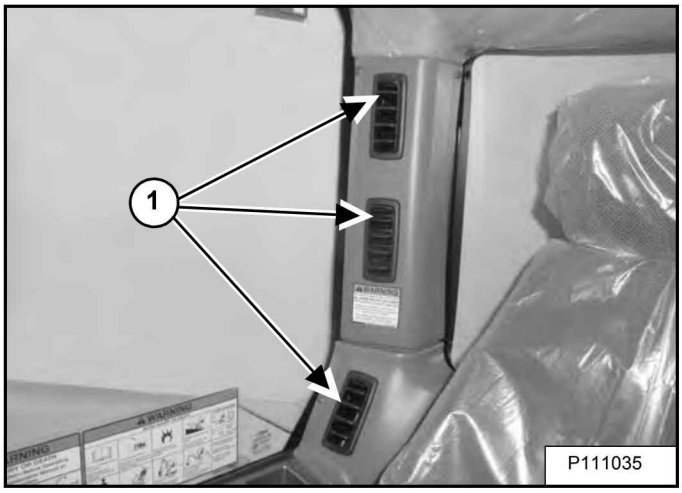


Figure 29



The excavator is equipped with seven air vents (Item 1) **[Figure 27]**, **[Figure 28]**, and **[Figure 29]** that can be adjusted to deflect air flow to the desired area of the cab.

Figure 30

Use one of the three buttons (Item 1) located in the left console to control which air ducts are active and two buttons (Item 2) **[Figure 30]** that control fresh air or recirculated air.

Operating Tip: To increase heating or cooling efficiency, move the Recirculation / Fresh Air Control (Item 2) **[Figure 30]** *to the recirculation position. This will allow the air to recirculate through the HVAC system and improve temperature control. If left in the fresh air position, the HVAC system will also need to heat or cool the ambient air that is drawn in from the outside, slowing and / or reducing the temperature change inside the cab.*

DIESEL PARTICULATE FILTER (DPF) SYSTEM

Description

The engine exhaust system is equipped with a diesel particulate filter (DPF).

The DPF is an emissions reduction device that removes diesel particulate matter (soot) from the exhaust gases of the diesel engine. The DPF will trap and collect the soot until it is burned off.

The process of burning off the collected soot is called regeneration. There are four types of regeneration, passive, active, parked, and service.

Passive Regeneration - The engine provides adequate exhaust temperature during operation for regeneration.

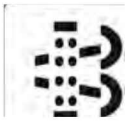
Active Regeneration - The engine control unit (ECU) automatically controls active regeneration. Active regeneration can occur anytime the engine is operating.

Parked Regeneration - The operator initiates a parked regeneration using the regeneration switch.

The instrument panel has a switch than can be enabled to inhibit regeneration or to perform a parked regeneration.

Service Regeneration - Must be performed by your Bobcat dealer.

DPF Regeneration Table

LEVEL	ENGINE DERATE	ACTIVE REGENERATION STATUS	DISPLAY SCREEN POP-UP (CODE)	DPF SWITCH (ACTIVATE REGENERATION / INHIBIT)	DPF ICON	DPF ICON	DPF ICON	SERVICE ICON
								
Inhibit	None	Inhibited		Inhibit Enabled	RED ICON	OFF	OFF	OFF
Passive	None	Regeneration during machine operation		-	OFF	OFF	GREEN ICON	OFF
Active	None	Regenerating during machine operation - ECU assisted	Pop-Up	-	OFF	RED ICON	GREEN FLASHING ICON	OFF
Active (Reset)	None	Alert to operator - forced regeneration is needed	Pop-Up	-	OFF	RED FLASHING ICON	OFF	OFF
Parked (Forced)	None	Forced regeneration in process	Pop-Up (P1421)	Regeneration Enabled	OFF	OFF	YELLOW ICON	OFF
[1] (Service)	YES	Emission particles very high, Stop engine and service emission system immediately. Service regeneration.	Pop-Up (P1424) (P2458) (P2459) (P2463)	-	OFF	RED ICON	OFF	RED ICON
[2]	YES	Stop engine and service DPF system immediately. Must be serviced by your dealer.	Pop-Up (P1420)	-	OFF	RED FLASHING ICON	OFF	RED FLASHING ICON

[1] The ECU indicates an emission system problem.Stop the engine and service the emissions system immediately. Special equipment is necessary for Service Regeneration. See you Bobcat dealer for service.

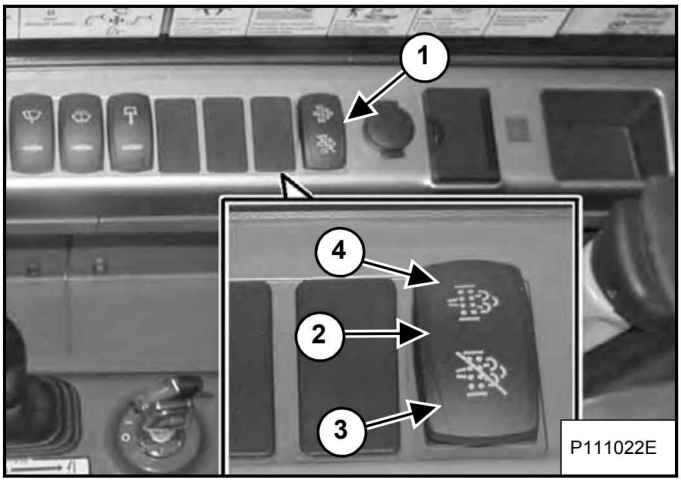
[2] The PDF soot level is at maximum level and regeneration will no longer work. Engine is derated until DPF is cleaned. See you Bobcat dealer for DPF cleaning.

NOTE: The display screen pop-up, DPF icon, and general warning icon are located on the instrument panel. The DPF Inhibit Enable / Disable / Regeneration Enable switch is located in the right console.

DIESEL PARTICULATE FILTER (DPF) SYSTEM (CONT'D)

Operation (Passive, Active And Inhibited Regeneration)

Figure 31



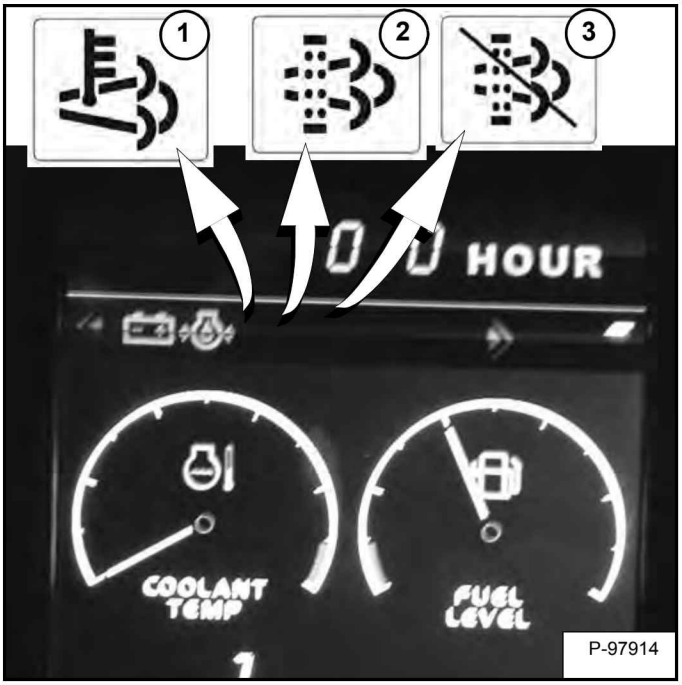
The DPF inhibit / forced regeneration switch (Item 1) **[Figure 31]** is located in the right panel.

The DPF switch has three positions:

The center position (Item 2) **[Figure 31]** is used for normal operation. The DPF will regenerate automatically as needed (Passive and Active regeneration).

NOTE: The regeneration process can last for 30 minutes or longer.

Figure 32



Passive Regeneration

Passive Regeneration occurs whenever the ECU determines the exhaust temperature is above a specified setting. Passive regeneration will occur when the machine is being operated under heavy load with the engine near high idle. As long as heavy usage is occurring, passive regeneration is occurring.

Active Regeneration

Active Regeneration occurs when the machine is used at lower engine speed and under moderate to low load. This will cause the exhaust temperature to stay lower and allow soot build-up in the DPF. When the ECU determines the soot level is above a pre-determined setting, the ECU will start ACTIVE regeneration. The light (Item 1) **[Figure 32]** (green) will be ON during active regeneration. The ECU will control engine features that increase the exhaust temperatures so that the DPF will automatically regenerate while the operator is using the machine.

NOTE: During active regeneration it is recommended to continue the work cycle until the DPF light (Item 1) [Figure 32] turns OFF. This will indicate the active regeneration cycle has been completed which may take as long as 30 minutes. During active regeneration, the operator may notice a change during low idle and low or no load condition. Also, a short duration of white smoke may be discharged from the exhaust with a cold engine or during acceleration, this is due to water vapor. As soon as the exhaust temperature increases, the white smoke will disappear.

If active regeneration is not desired when the ECU determines it is needed, the DPF regeneration can be inhibited. Press the bottom of the switch (Item 3) **[Figure 31]** to inhibit the DPF from active regeneration. The switch will return to the center position when released. The light (Item 3) **[Figure 32]** will be ON while the DPF is inhibited from regenerating.

NOTE: The DPF will be inhibited from actively regenerating until the machine is turned OFF. The machine will revert to automatic DPF regeneration the next time the machine is turned ON.

NOTE: Inhibiting the DPF from active regeneration for an extended period of time may result in the DPF reaching a service level. (See DPF Regeneration Table on Page 43.) When the service level is reached, see your Bobcat dealer for servicing the DPF.

DIESEL PARTICULATE FILTER (DPF) SYSTEM (CONT'D)

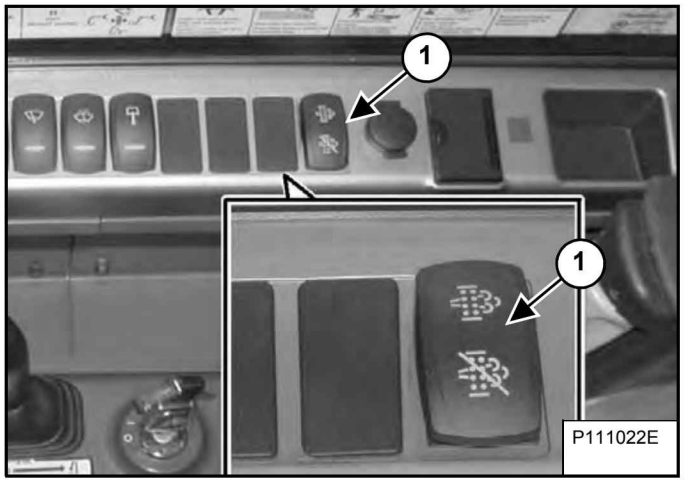
Operation (Parked Regeneration)

A parked (forced) regeneration cycle may be required if too much soot is allowed to accumulate in the DPF. This can occur in the following situations:

The excavator is often operated for brief periods (less than 30 minutes) that do not allow sufficient time for the DPF to complete an automatic regeneration cycle.

The DPF inhibit switch is left in the inhibit position for an extended period of time. This will inhibit the DPF from actively regenerating and burning off the collected soot.

Figure 33



Your excavator is equipped with the remote parked regeneration switch (Item 1) **[Figure 33]** in the right console.

The procedure for completing a remote parked regeneration is located in the preventive maintenance section of this manual. (See Remote Parked Regeneration on Page 127.)

Operation (Service Regeneration)

When the soot level exceeds a set level, the engine will be derated and service regeneration is required. Your Bobcat dealer will need to perform this procedure. See additional information on Service Regeneration in the preventive maintenance section of this manual. (See Service Regeneration on Page 129.)

TRAVEL CONTROLS

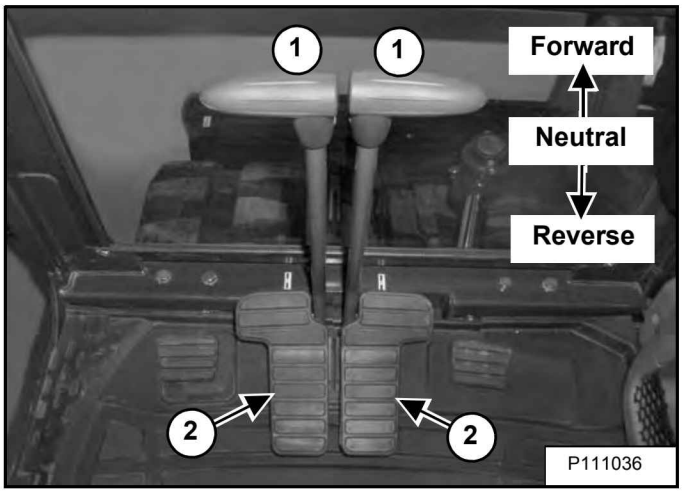
Description

The travel control levers control the movement of the excavator.

Forward And Reverse Travel

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

Figure 34



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

* Travel can also be controlled with foot pedals (Item 2) **[Figure 34]**.

⚠ 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.**

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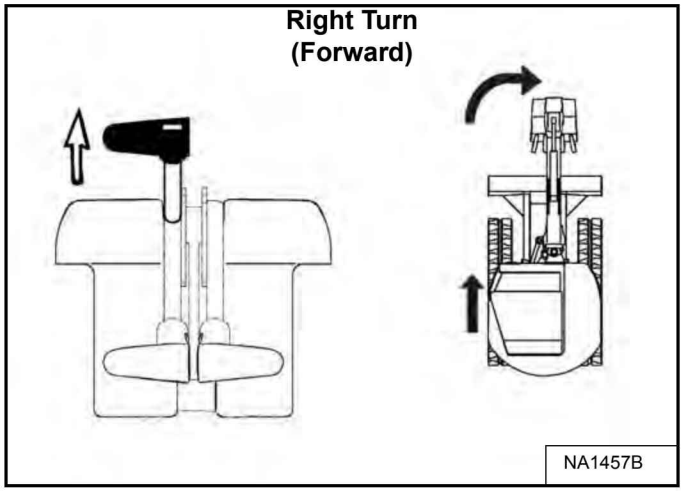
Turning

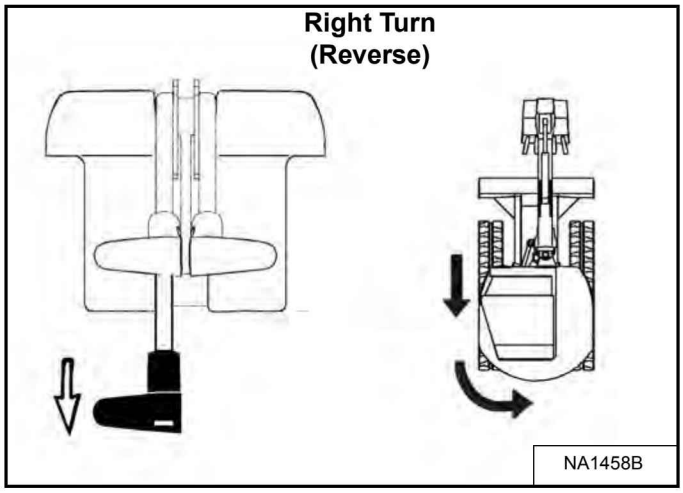
Right Turn

Figure 35



Push the left steering lever forward to turn right **[Figure 35]** while traveling forward.

Figure 36

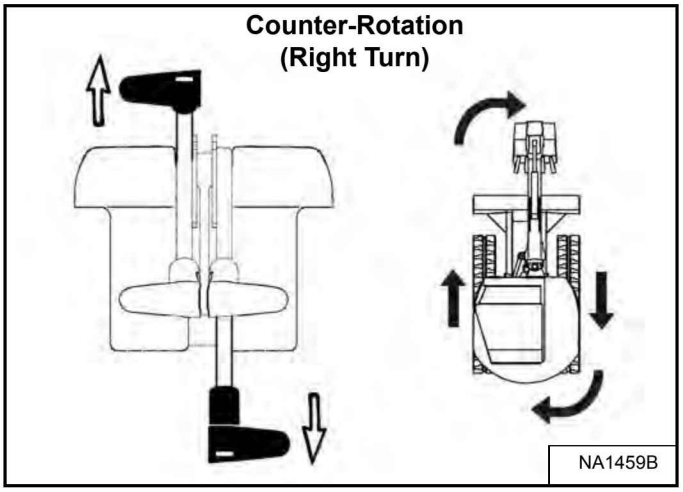


Pull the left steering lever backward to turn right while traveling backward **[Figure 36]**

Turning (Cont'd)

Counter-Rotation Right Turn

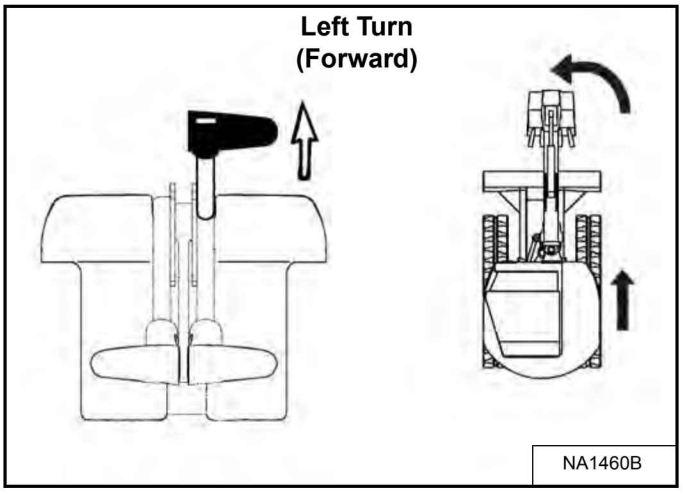
Figure 37



Push the left steering lever forward and pull the right steering lever backward **[Figure 37]**.

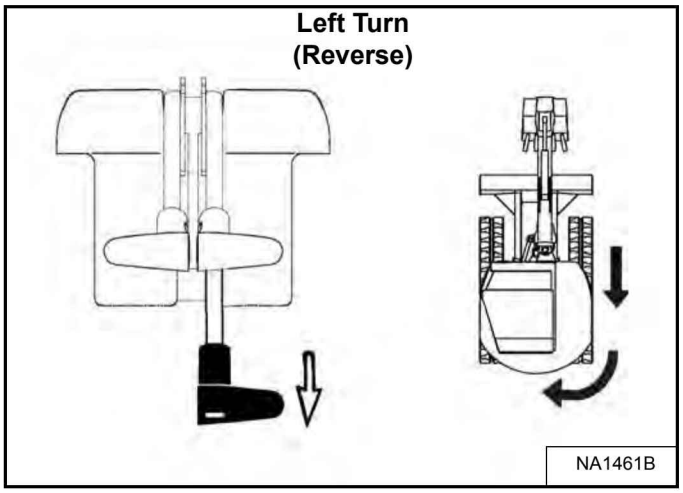
Left Turn

Figure 38



Push the right steering lever forward to turn left while traveling forward **[Figure 38]**.

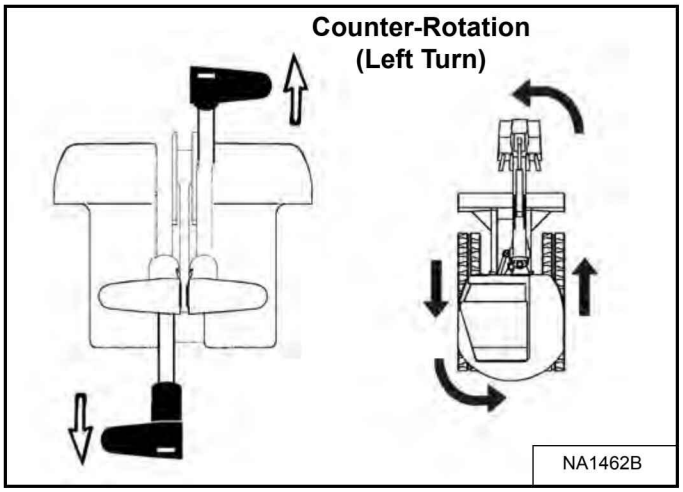
Figure 39



Pull the right steering lever backward to turn left while traveling backward **[Figure 39]**.

Counter-Rotation Left Turn

Figure 40



Push the right steering lever forward and pull the left steering lever backward **[Figure 40]**.

EMERGENCY EXITS

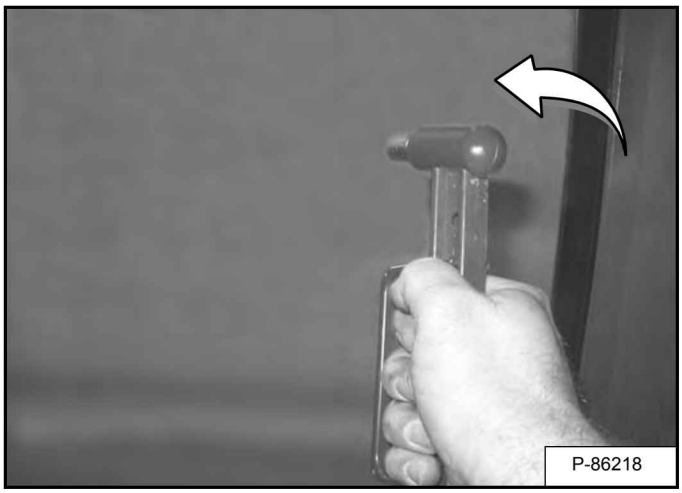
The door, the right side rear window and the front window provide emergency exits.

Right Rear Side Window

Figure 41

If emergency exit requires breaking a window, use the supplied hammer (Item 1) **[Figure 41]** located on the left side of the operator cab.

Figure 42



Remove the hammer from the storage position and strike the glass with the pointed end of the hammer **[Figure 42]**.

Use the hammer to remove broken glass from the edge of the window before exiting.

Figure 43

Exit through the right rear side window **[Figure 43]**.

Front Window

Figure 44

Open the front window and exit **[Figure 44]**.

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

MOTION ALARM SYSTEM

Operation

Figure 45

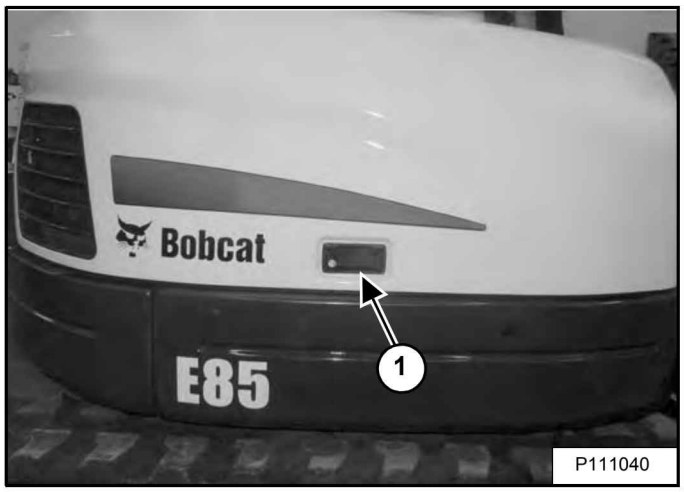
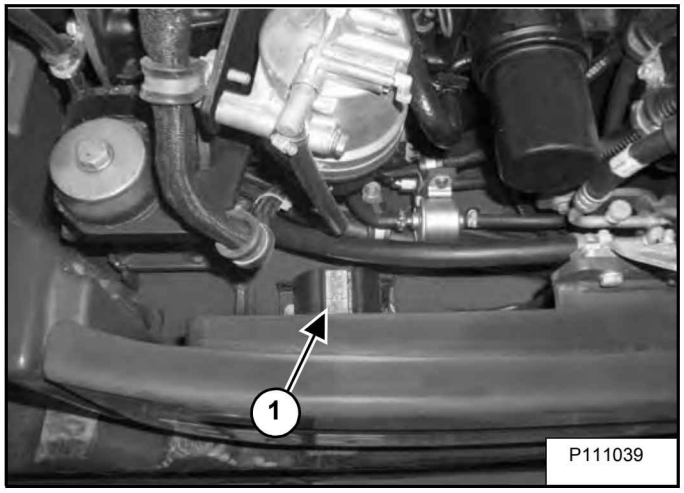


Figure 46



This excavator is equipped with a motion alarm system. The motion alarm (Item 1) **[Figure 46]** is located inside the right side cover (Item 1) **[Figure 46]** of the excavator.

⚠ 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 in the 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 99.)

HYDRAULIC CONTROLS

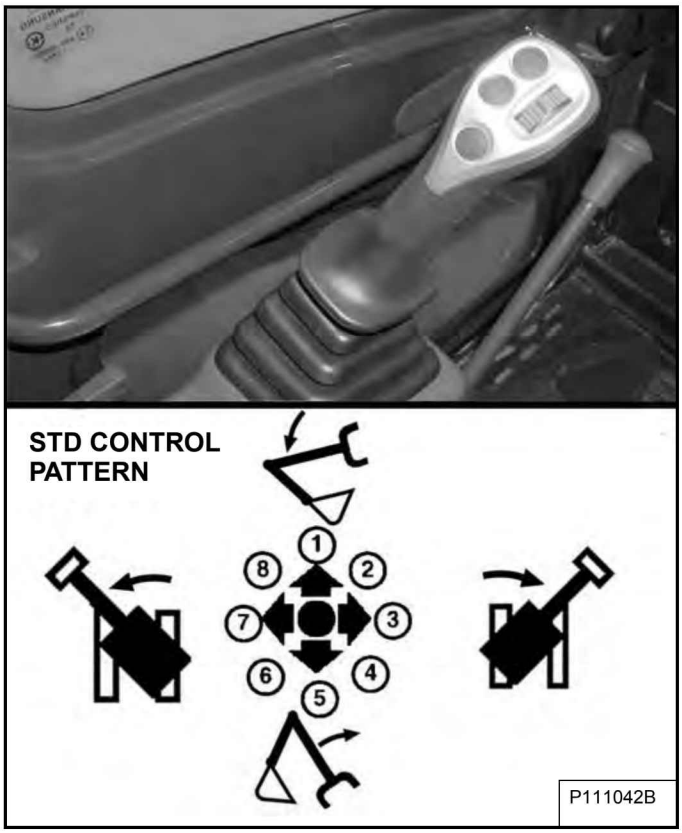
Description

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 47]** and **[Figure 48]** or in the ISO Control Pattern **[Figure 49]** and **[Figure 50]**.

STANDARD Control Pattern

Left Control Lever (Joystick)

Figure 47

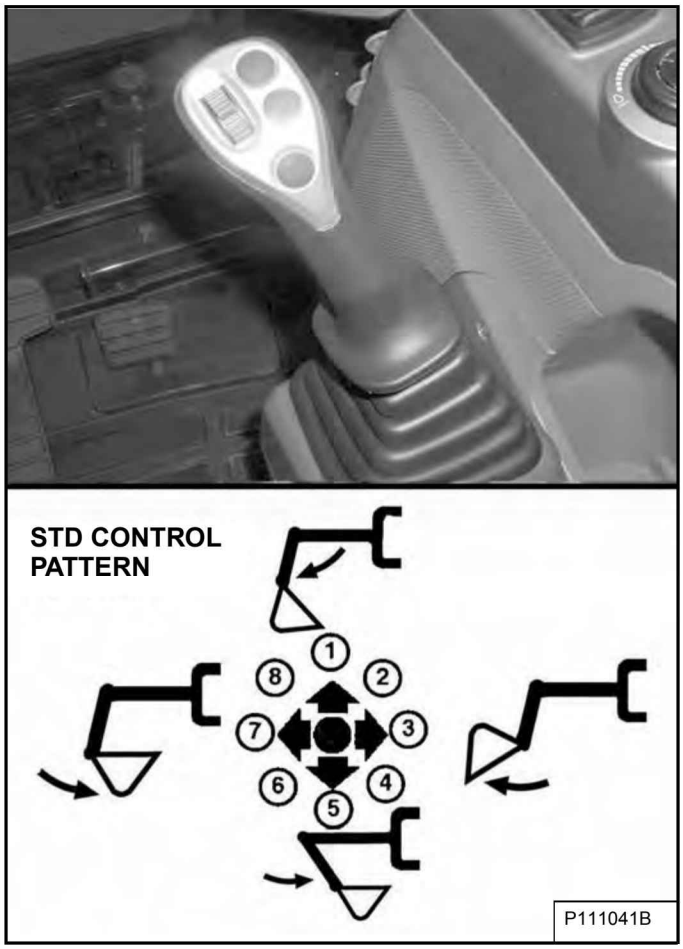


The left lever (joystick) is used to operate the boom and slew the upperstructure **[Figure 47]**.

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 48



The right lever (joystick) is used to operate the arm and bucket **[Figure 48]**.

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 & remove the key.**

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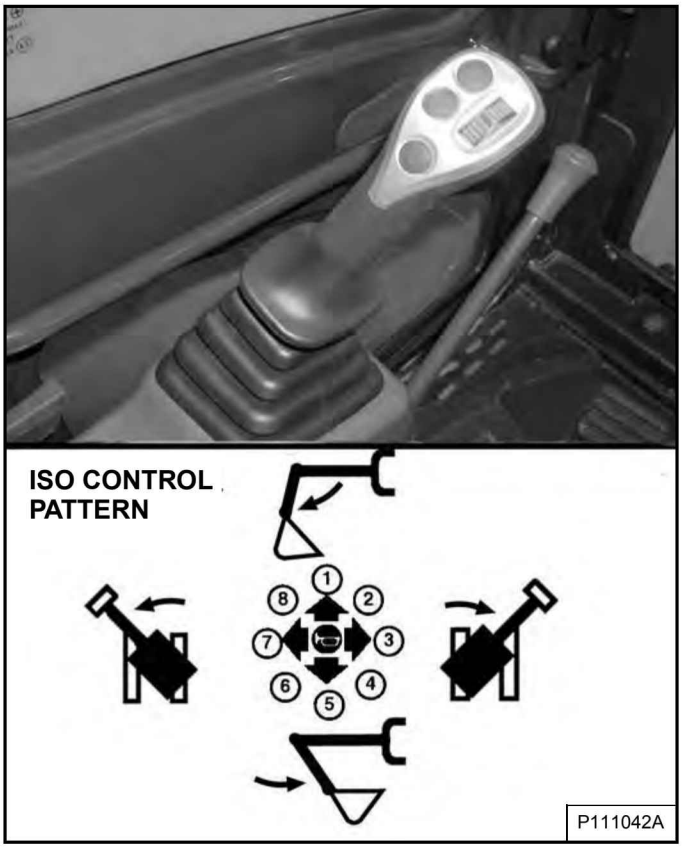
ISO Control Pattern

Left Control Lever (Joystick)

Figure 49

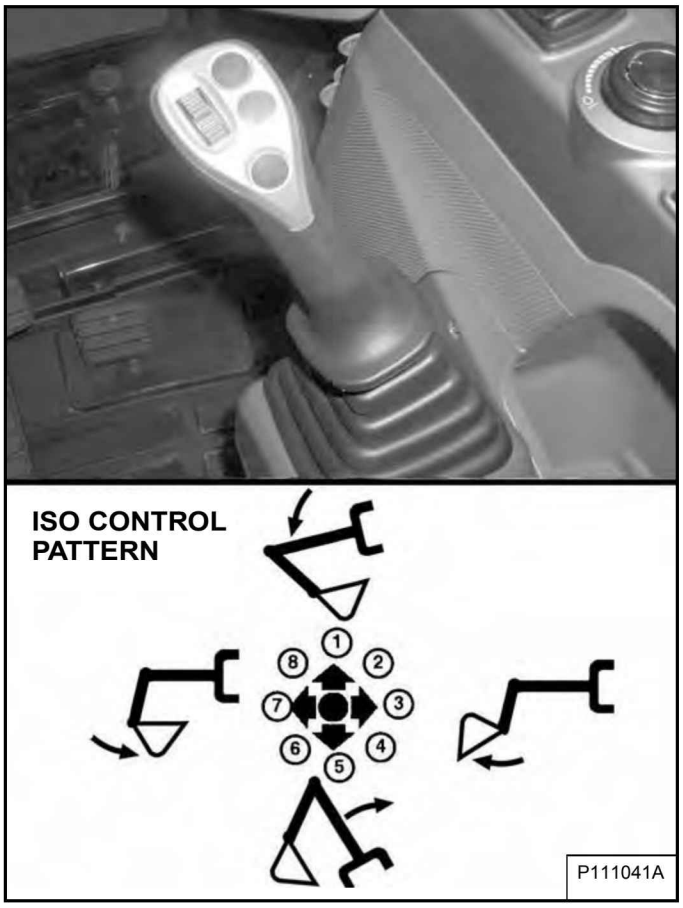


The left lever (joystick) is used to operate the arm and slew the upperstructure **[Figure 49]**.

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 50



The right lever (joystick) is used to operate the boom and bucket **[Figure 50]**.

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 & remove the key.**

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Quick Couplers

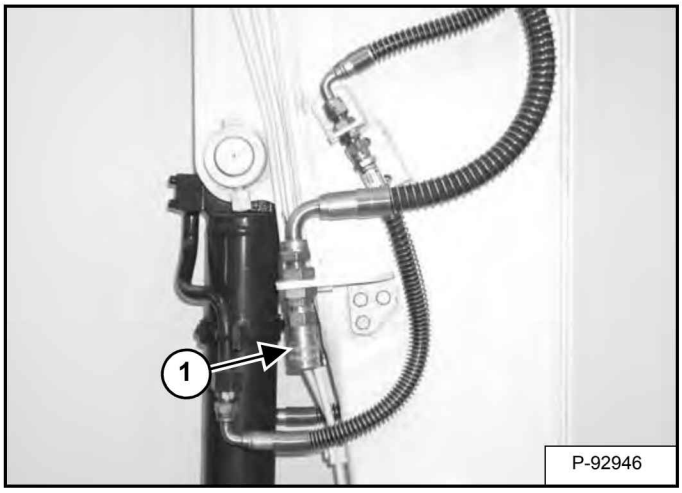
⚠ WARNING

AVOID BURNS

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

W-2220-0396

Figure 51



Excavator and attachments use flush faced couplers (Item 1) **[Figure 51]**. The male flush face coupler is located on the right side of the arm, the female coupler (shown) is located on the left side of the arm.

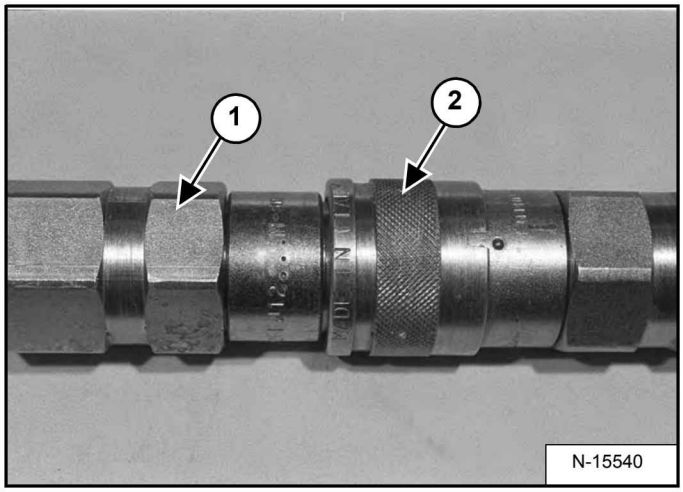
To Connect:

Remove any dirt or debris from the surface of both the male and female couplers, and from the outside diameter of the male coupler. Visually check the couplers for corroding, cracking, damage, or excessive wear, if any of these conditions exist, the coupler(s) (Item 1) **[Figure 51]** 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 52



Hold the male coupler (Item 1). Retract the sleeve (Item 2) **[Figure 52]** on the female coupler until the couplers disconnect.

Direct To Tank Valve

Figure 53

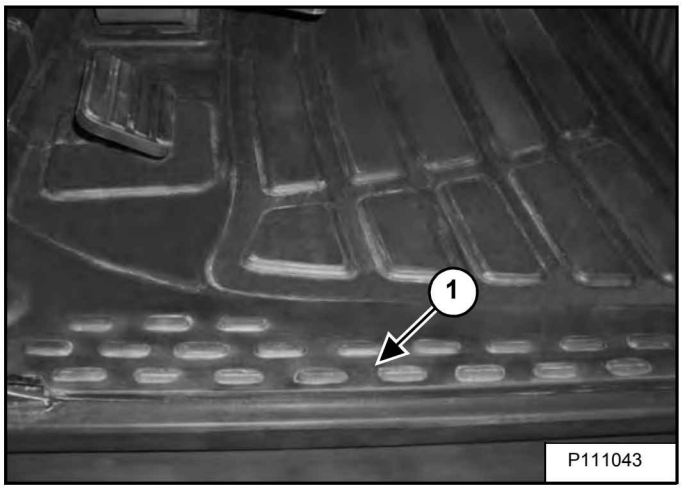
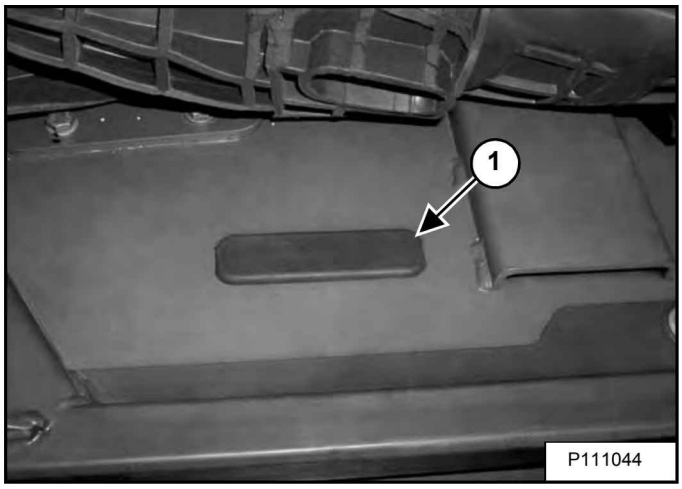


Figure 54

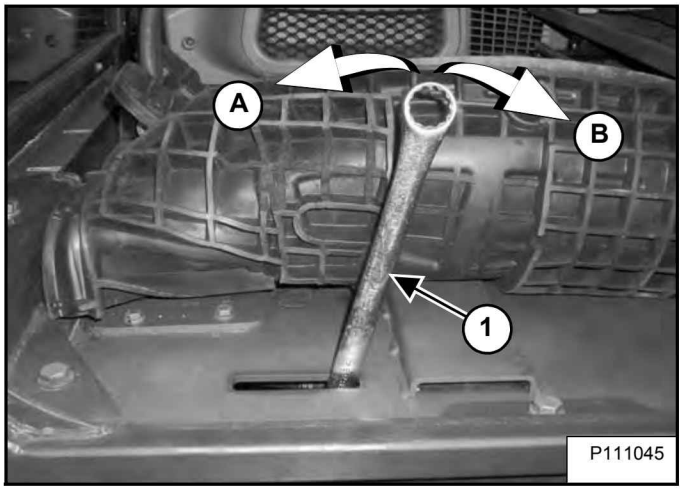


The excavator is equipped with a direct to tank valve that must be switched when using a breaker attachment.

The direct to tank valve is located under the floor boards by the door.

Pull the floor mat (Item 1) **[Figure 53]** back and remove the hole plug (Item 1) **[Figure 54]** to access the direct to tank valve opening in the floor.

Figure 55



Install an open end wrench (Item 1) **[Figure 55]** on the valve spool and rotate the direct to tank valve spool counterclockwise (A) fully for breaker operation and clockwise (B) fully for all other attachments.

The direct to tank valve, when in the breaker position (A), will direct the hydraulic return flow back to the hydraulic tank for less flow restriction and increased breaker performance.

The direct to tank valve, when in two way flow (B), allows hydraulic flow to and from both the male and female hydraulic couplers and back through the control valve.

After switching the direct to tank valve, reinstall the plug (Item 1) **[Figure 54]** and reposition the floor mat (Item 1) **[Figure 53]**.

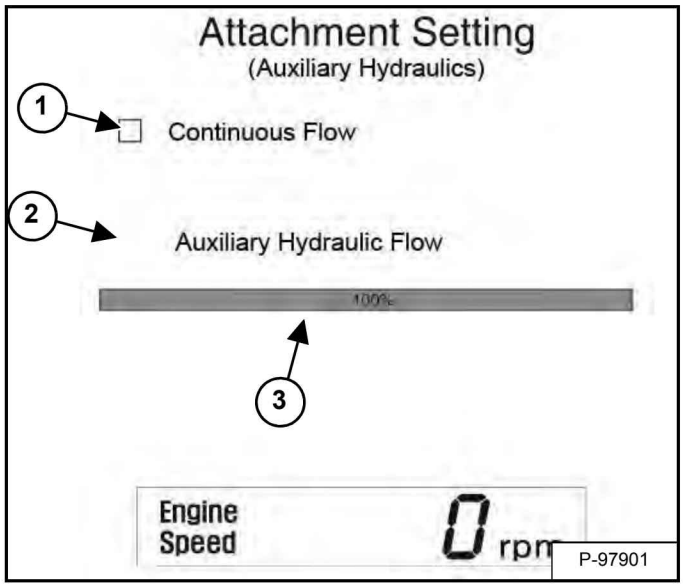
Auxiliary Hydraulics

The auxiliary hydraulics have Selectable Mode and Selectable Auxiliary Hydraulic Flow. This allows the operator to select the desired mode and the hydraulic flow that matches the attachment hydraulic requirements. The auxiliary hydraulics can be set by entering into the instrument panel settings and scrolling down to the Attachment (Auxiliary Hydraulics) Setting screen.

Auxiliary Hydraulic Setting (Continuous Flow and Auxiliary Hydraulic Flow)

Use the arrow UP and DOWN buttons (Item 2 and 6) **[Figure 10 on Page 35]** until AUXILIARY HYDRAULIC SETTINGS **[Figure 56]** is highlighted, then press the select arrow button (Item 7) **[Figure 10 on Page 35]**.

Figure 56



The Auxiliary Hydraulics Settings are used to select the desired type of hydraulic flow (check the box (Item 1 or 2) **[Figure 56]**) to enable or disable the function and to set the rate of hydraulic flow for the attachment.

Continuous Flow; when selected, activates continuous flow hydraulics to the female coupler with the return flow going through the male coupler. (For breaker operation, it is also recommended to turn the direct to tank valve to direct to tank position. This allows the return hydraulic fluid to go back to the hydraulic tank and not back through the control valve.) (See Direct To Tank Valve on Page 53.)

In Continuous Flow mode, only the female coupler can be pressurized.

Auxiliary Hydraulic Flow; when selected, allows the operator to control which coupler is pressurized (female coupler or male coupler). This is used for attachments that require two way flow hydraulics.

Auxiliary Hydraulic Setting (Setting Hydraulic Flow Rates)

When the desired mode (Continuous Flow or Auxiliary Hydraulic Flow) is checked to enable the feature, the flow rate can be adjusted by percentage (%) (Item 3) **[Figure 56]** to meet the hydraulic flow demand for each attachment. Use the up and down arrow buttons (Item 2 and 6) **[Figure 10 on Page 35]** to move the flow percentage from 100% to 0%. When the correct flow is selected, press the select arrow button (Item 7) **[Figure 10 on Page 35]**. See your attachment Operation & Maintenance Manual for the correct flow setting for your attachment.

(The percentages are approximate, the only way to know the exact flow rate is to test the hydraulic flow with a flow meter and adjust the flow setting to match the attachment requirements.)

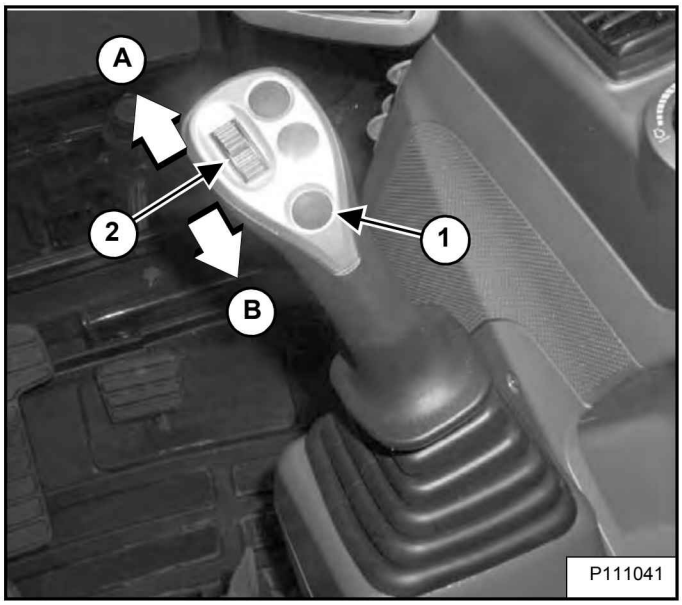
Examples For Setting Selectable Auxiliary Hydraulic Flow And The Attachment Used:

AUX FLOW SETTING	FLOW	ATTACHMENTS
	Maximum	Breaker, Vibratory Plate Compactor, Auger
	Medium	Clamp
	Low	Tilt Bucket

When finished, press the ESCAPE / ESC button (Item 3) **[Figure 10]** to return to the previous screen.

Auxiliary Hydraulics (Continuous Flow)

Figure 57



Press the button (Item 1) once on the right joystick to supply continuous hydraulic flow / pressure to the female coupler. Press the switch (Item 1) **[Figure 57]** a second time to stop auxiliary flow to the female quick coupler.

NOTE: For breaker operation, the direct to tank valve should be switched to direct to tank operation. (See Direct To Tank Valve on Page 53.)

Auxiliary Hydraulics (Auxiliary Hydraulic Flow)

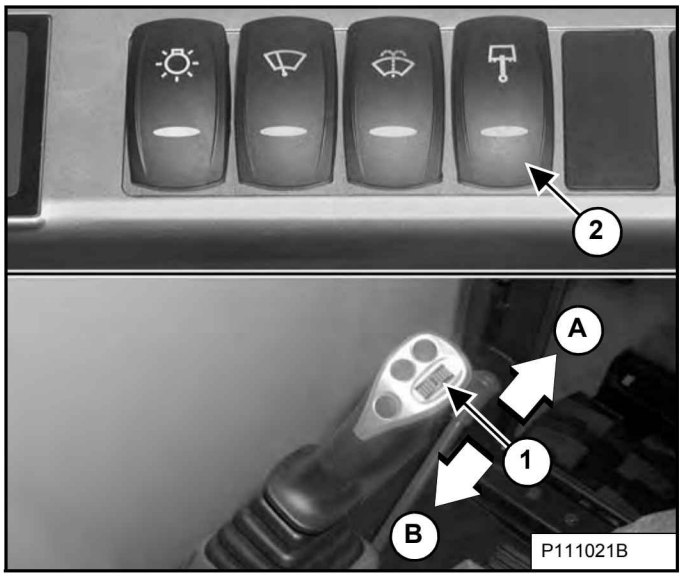
Rotate the thumb switch (Item 2) forward (A) to supply hydraulic flow and pressure to the male coupler; rotate the thumb switch (Item 2) back (B) **[Figure 57]** to supply hydraulic flow and pressure to the female coupler.

NOTE: The two way flow auxiliary hydraulics and the continuous flow auxiliary hydraulics use the same auxiliary hydraulic couplers.

NOTE: For auxiliary hydraulic flow (two way flow), make sure the direct to tank valve is in the two way flow position. (See Direct To Tank Valve on Page 53.)

Auxiliary Hydraulics (Secondary Auxiliary Hydraulics) (If Equipped)

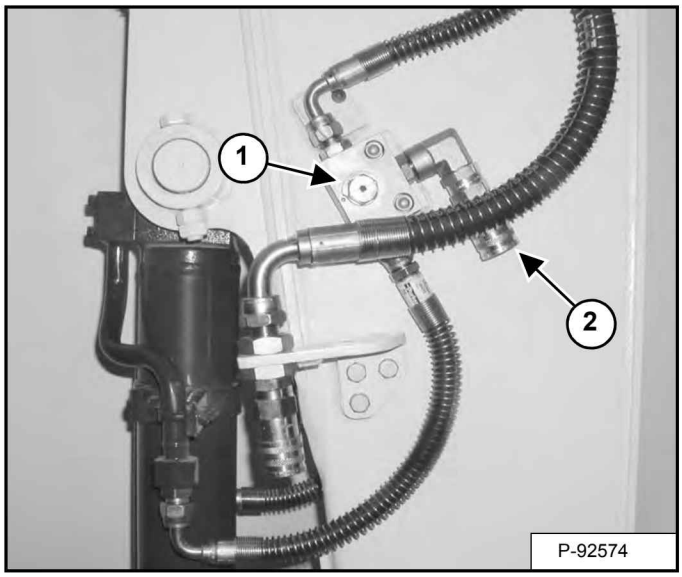
Figure 58



The left joystick switch (Item 1) controls the secondary auxiliary functions and the boom swing function. (Makes sure the boom swing / secondary hydraulic switch (Item 2) is in the secondary auxiliary hydraulic position.) Rotate the thumb switch (Item 1) forward (A) to supply hydraulic flow and pressure to the male coupler. Rotate the thumb switch (Item 1) back (B) **[Figure 58]** to supply hydraulic flow and pressure to the female coupler.

Auxiliary Hydraulics (Third Auxiliary Hydraulics)

Figure 59



If equipped with the third auxiliary hydraulics, rotate the valve (Item 1) 1/4 turn clockwise (both sides) for the third auxiliary coupler (Item 2) function. Rotate the valve (Item 1) **[Figure 59]** (both sides) 1/4 turn counterclockwise for the bucket function.

NOTE: The bucket function is not usable when the third auxiliary hydraulics are activated.

Figure 60

Use the right joystick (Item 1) **[Figure 60]** (same as the bucket function). Move the joystick to the left for hydraulic flow to the female coupler. Move the joystick to the right for hydraulic flow to the male coupler.

Relieve Auxiliary Hydraulic Pressure (Excavator And Attachment)

Excavator:

Put the attachment flat on the ground.

Stop the engine.

Turn the key to the ON position but do not start the excavator.

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

Press the auxiliary hydraulic switch (Item 1) **[Figure 57]** several times.

Rotate the right and left joystick thumb switches (Item 2) **[Figure 57]** and (Item 1) **[Figure 58]** forward and back several times.

Attachments:

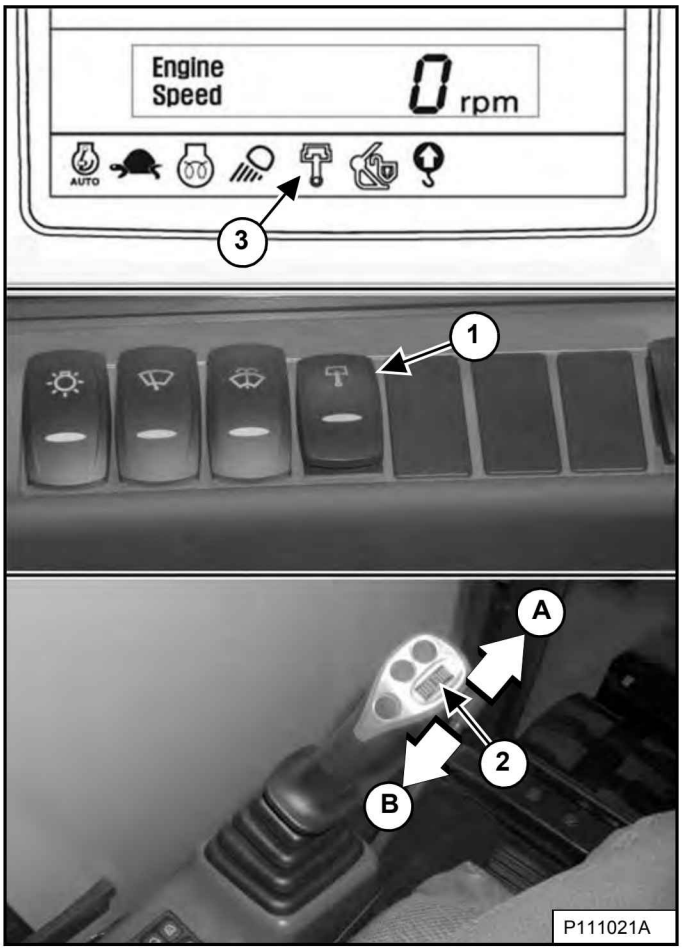
- Follow procedure above to release pressure in excavator.
- Connect male coupler from attachment to female coupler of excavator then repeat procedure above. This will release pressure in the attachment.
- Connect the female coupler from the attachment.

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

BOOM SWING

Operation

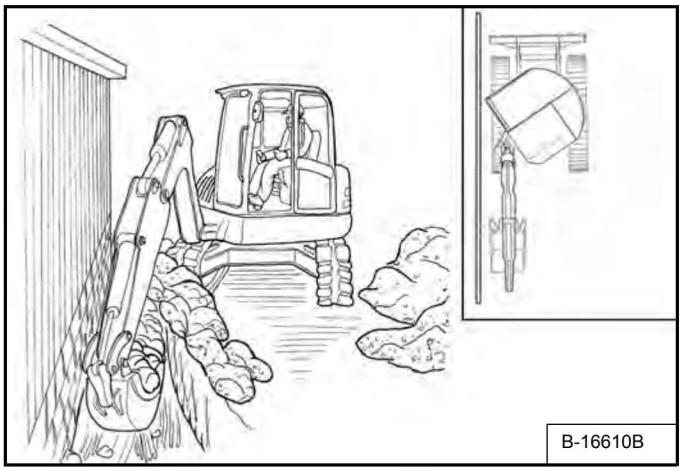
Figure 61



Press the top of the boom swing / secondary auxiliary hydraulic switch (Item 1) (If Equipped) to enable the thumb switch (Item 2) for boom swing. The icon (Item 3) **[Figure 61]** on the display panel will be illuminated when the boom swing is enabled. Rotate the switch (Item 2) forward (A) to swing the boom to the right. Rotate the switch back (B) to swing the boom to the left.

NOTE: If the boom swing switch (Item 1) is left in the enabled position, the thumb switch (Item 2) [Figure 61] will not work for secondary auxiliaries.

Figure 62

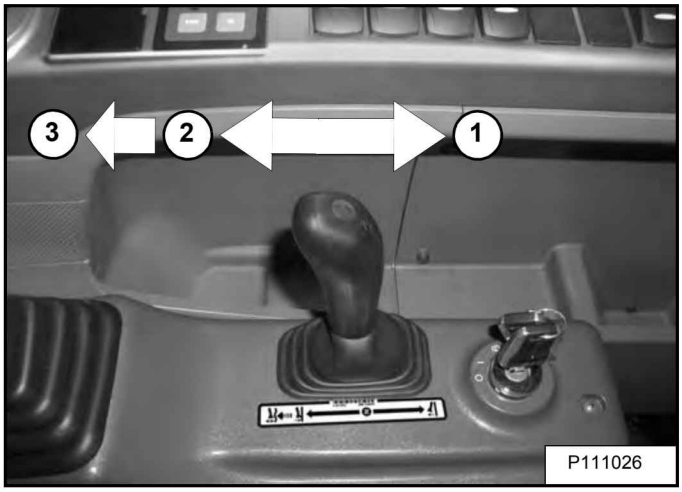


NOTE: The purpose of the boom swing is to offset the boom with respect to the upperstructure for digging close to a structure [Figure 62].

BLADE CONTROL LEVER

Operation

Figure 63



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

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

Push the lever (Item 3) **[Figure 63]** fully 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 the blade lowered for increased digging performance.

OVERLOAD WARNING

Description

The overload warning feature, when engaged, will alert the operator with a warning buzzer and overload icon on the instrument panel when the work group is overloaded.

If overload occurs, immediately bring the arm toward the machine, lower the boom and reduce the load before continuing operation.

Operation

Figure 64

To engage the overload warning feature, press the switch (Item 1). The icon (Item 2) **[Figure 64]** will illuminate when the overload warning feature is activated.

A buzzer will sound when the boom is overloaded.

To disengage the overload warning feature, press the switch (Item 1) a second time. The icon (Item 2) **[Figure 64]** will turn off when the overload warning feature is disabled.

BOOM LOAD HOLDING VALVE

Description

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

⚠ WARNING

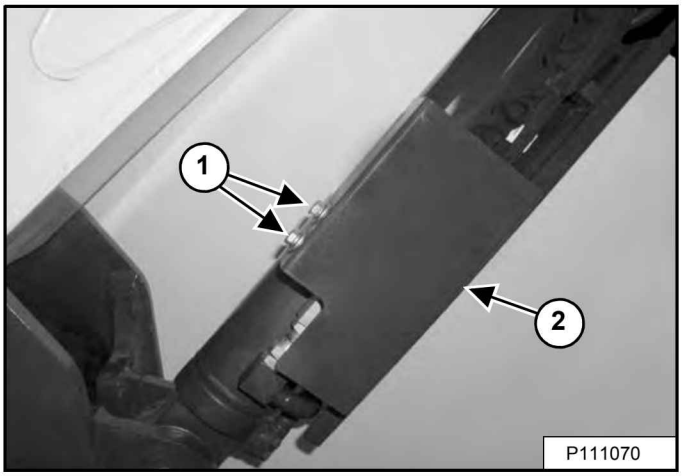
AVOID INJURY OR DEATH

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

W-2793-0409

Lowering Boom With Load Holding Valve

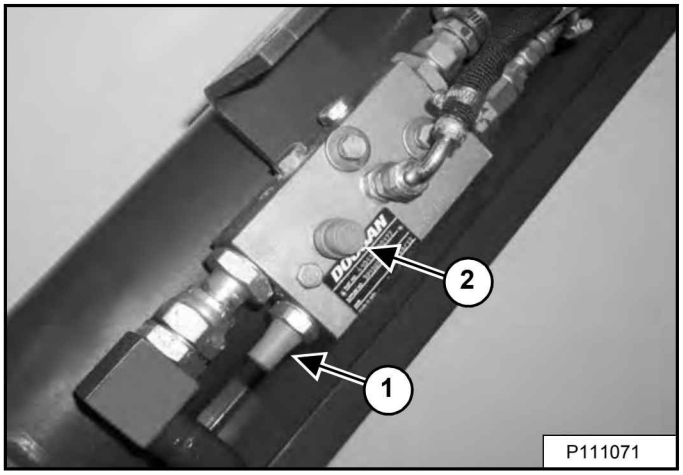
Figure 65



The boom load holding valve is attached to the boom cylinder at the base end.

Remove the two bolts (Item 1) and remove the cover (Item 2) **[Figure 65]** from the boom cylinder.

Figure 66



Remove the cap (Item 1) **[Figure 66]** from the load holding valve.

NOTE: DO NOT remove or adjust the port relief valve (Item 2) [Figure 66]. If the port relief valve has been tampered with, see your Bobcat dealer.

⚠ WARNING

AVOID BURNS

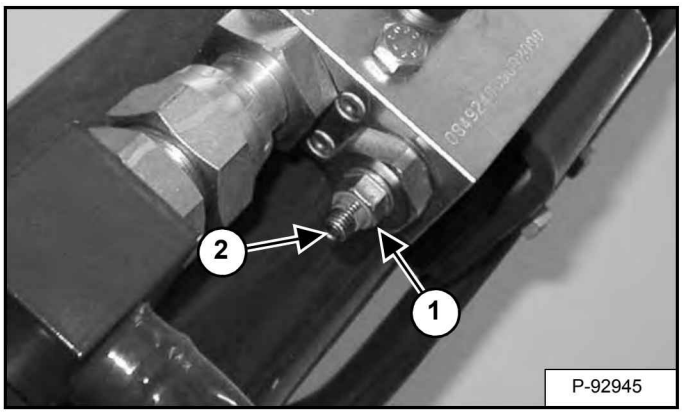
Hydraulic fluid, tubes, fittings and quick couplers can get hot when running machine and attachments. Be careful when connecting and disconnecting quick couplers.

W-2220-0396

BOOM LOAD HOLDING VALVE (CONT'D)

Lowering Boom With Load Holding Valve (Cont'd)

Figure 67



Lowering procedures:

NOTE: Mark the position of the set screw so that it can be returned to the original location after the boom has been lowered.

With base end hose failure:

Loosen the jam nut (Item 1). Install a hex wrench into the valve screw (Item 2) **[Figure 67]** and slowly rotate the screw clockwise and allow the boom to lower to the ground. (The more the screw is rotated, the faster the boom will lower.)

After the boom is fully lowered, rotate the screw (Item 2) counter clockwise (back to the original position) and tighten the lock nut (Item 1) **[Figure 67]**.

With rod end hose failure - with accumulator pressure:

Place a container under the valve and the hose end to contain hydraulic fluid. Enter the excavator and turn the key to the ON position 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 - with NO accumulator pressure:

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

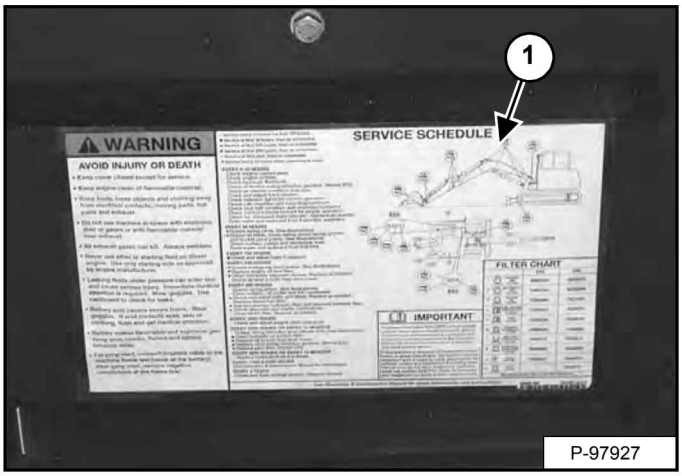
Loosen the jam nut (Item 1). Install a hex wrench into the valve screw (Item 2) **[Figure 67]** and slowly rotate the screw clockwise and allow the boom to lower to the ground. (The more the screw is rotated, the faster the boom will lower.)

After the boom is fully lowered, rotate the screw (Item 2) counter clockwise (back to the original position) and tighten the lock nut (Item 1) **[Figure 67]**.

Loss of hydraulic pressure:

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

Figure 68



The service schedule decal (Item 1) **[Figure 68]** is located under the right side cover. (See RIGHT SIDE COVER on Page 101.)

Daily Inspection And Maintenance

Maintenance work must be done at regular intervals. Failure to do so will result in excessive wear and early failures. The Service Schedule **[Figure 68]** is a guide for correct maintenance of the Bobcat excavator. It is located on the right front corner of the excavator upperstructure and also in this manual.

Check the following items before each day of operation:

- Operator Cab and mounting hardware.
- Seat belt and mounting hardware. Replace seat belt if damaged.
- Check for damaged decals, replace as needed.
- Check control console lockout.
- Check attachment mounting system (if equipped) for damage or loose parts.
- Air cleaner condition indicator 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 swing motor gear box fluid level.
- Check indicator lights for correct operation.
- Drain water and sediment from fuel tank and filter.
- Check cylinder and attachment pivot points.
- Check the track tension.
- Repair broken and loose parts.
- Clean cab filters.
- Check front horn and motion alarm 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

This machine is factory equipped with a Diesel Particulate Filter (DPF) system that must be maintained for proper function.

The Diesel Particulate Filter (DPF) acts as a spark arrester and engine exhaust emissions device. The DPF must be maintained according to the instructions in the Operation & Maintenance Manual for proper function as an emissions and spark arrester device.

(If this machine is operated on flammable forest, brush or grass covered land, the machine 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-2375-0613

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

Operation & Maintenance Manual And Operator's Handbook Locations

Figure 69

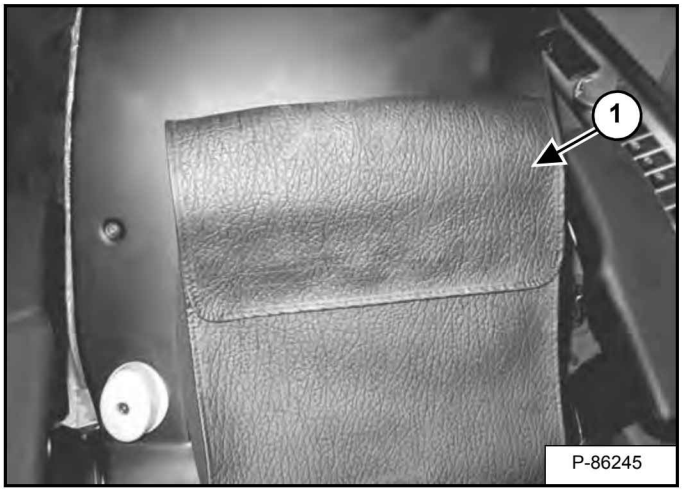
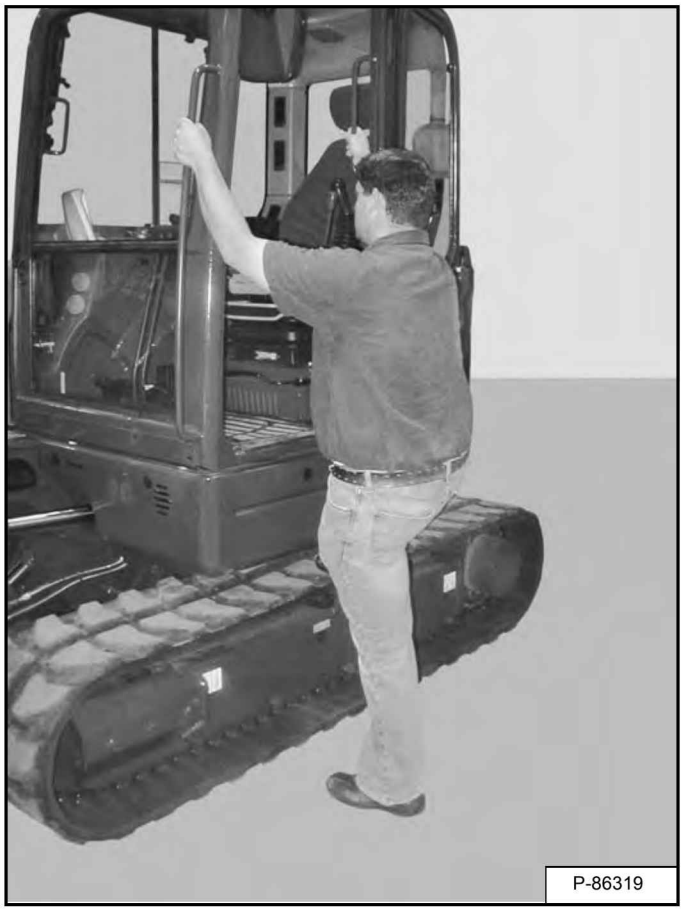


Figure 70

Read and understand the Operation & Maintenance Manual (Item 1) **[Figure 69]** (located inside the storage container on the back of the operator's seat) and the Operator's Handbook (Item 1) **[Figure 70]** before operating.

Entering The Excavator

Figure 71



Use the grab handles, tracks and steps to enter the cab **[Figure 71]**.

⚠ WARNING

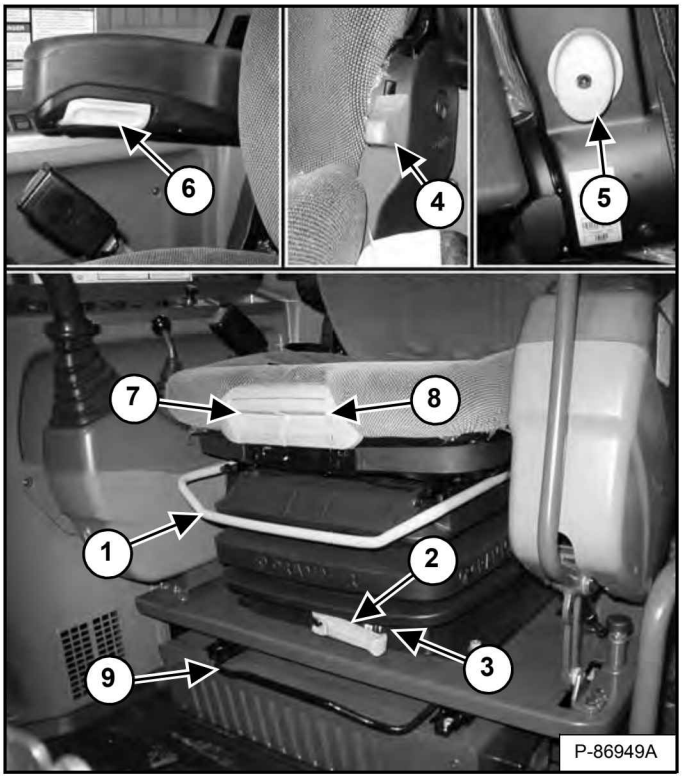
AVOID INJURY OR DEATH

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

W-2003-0807

Seat Adjustment

Figure 72



Release the seat lever (Item 1) **[Figure 72]** to adjust the seat forward or backward.

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 72]**.

Release the lever (Item 4) **[Figure 72]** (on the back of the seat) to change the lumbar support.

Rotate the knob (Item 5) **[Figure 72]** (on the lower left side of the seat) to change the incline of the seat back.

Rotate the knob (Item 6) **[Figure 72]** (on both arm rest) to change the angle of the arm rest.

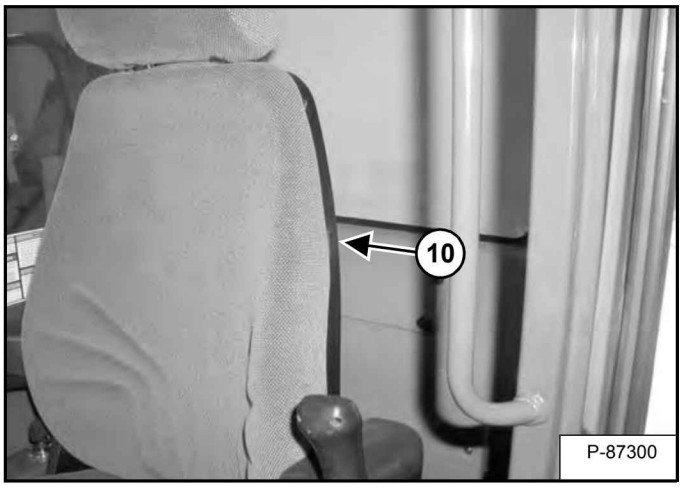
Release the lever (Item 7) **[Figure 72]** to change the position of the lower cushion forward or back.

Release the lever (Item 8) **[Figure 72]** to change the angle of the lower cushion.

The operator's group (seat and left and right consoles) can be adjusted forward or backward. Adjust the operator's group using the lever (Item 9) **[Figure 72]**.

To adjust seat height, sit in the seat and fasten the seat belt. Place your hands to the sides of the cab (not on the consoles) and lift up slowly with your arms and legs, raising the seat. The seat has four adjustment positions. When the top position is reached, the seat will reset and allow the seat to go back to the lowest position.

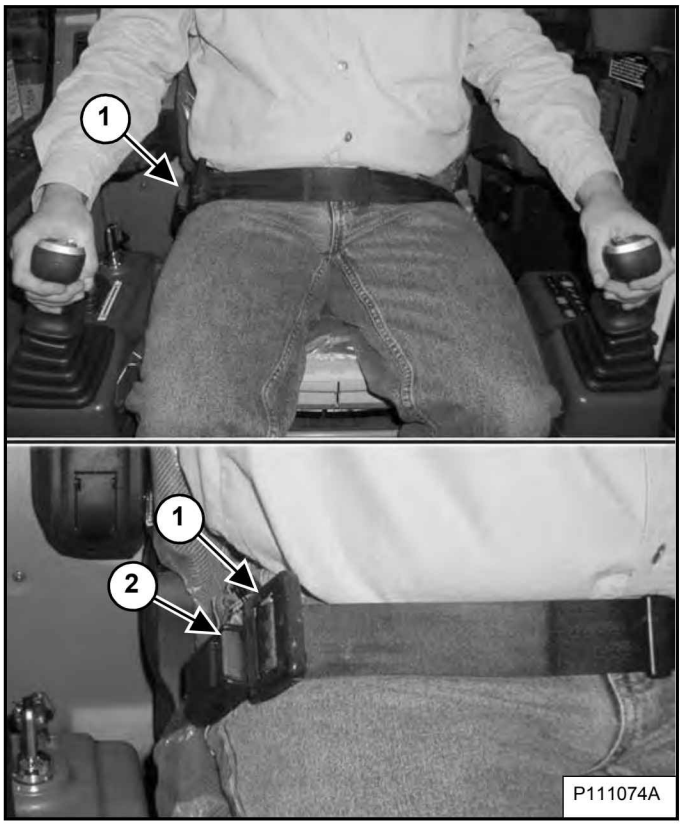
Figure 73



Heated Seat (If Equipped). The optional heated seat has a switch (Item 10) **[Figure 73]** located on the left side of the seat. Press the top of the switch to activate the heated seat. Press the bottom of the switch to turn off.

Seat Belt

Figure 74



Fasten the seat belt (Item 1) **[Figure 74]**.

Press the red button (Item 2) **[Figure 74]** to release the seat belt.

Control Console

Figure 75

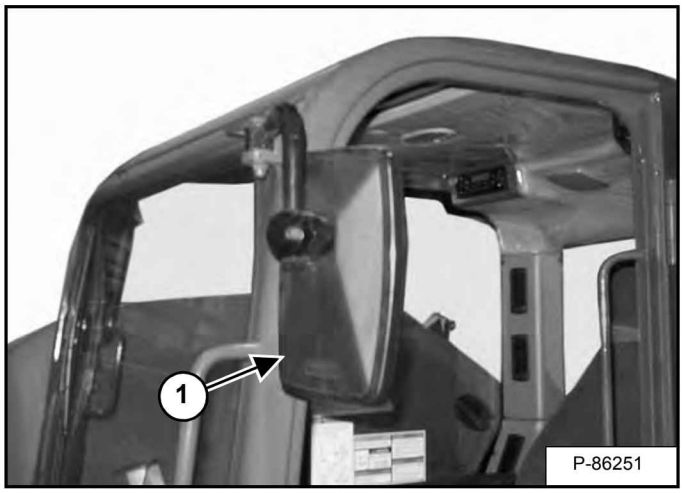
Lower the control console **[Figure 75]**.

NOTE: There is a control lock switch in the left console which deactivates the hydraulic control levers (joysticks and traction system) when the control console lock lever 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 switch does not deactivate the control levers when the console lock lever is raised, see your Bobcat dealer for service.

Mirror Adjustment

Figure 76



Adjust mirror (Item 1) **[Figure 76]**.

STARTING THE ENGINE

Key Switch

⚠ WARNING

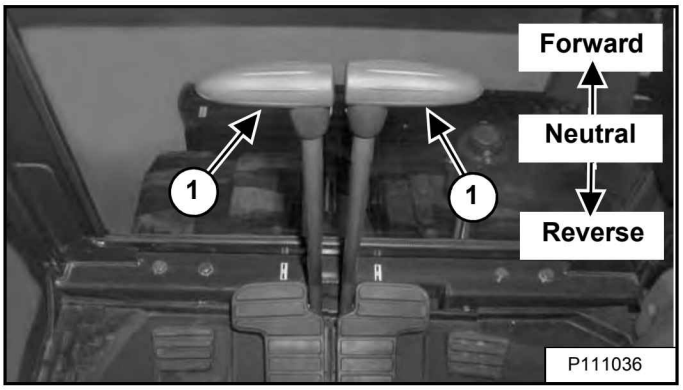
AVOID INJURY OR DEATH

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

W-2135-1108

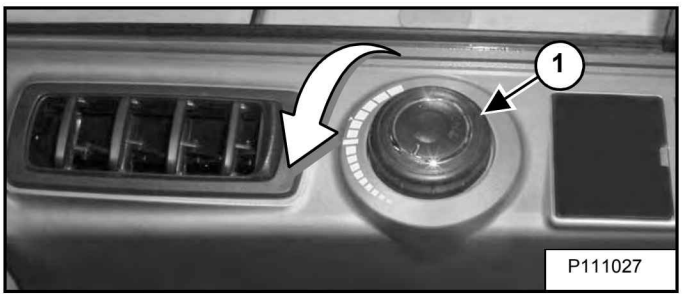
Perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page 62.)

Figure 77



Put control levers (Item 1) **[Figure 77]** in the neutral position.

Figure 78



Rotate the engine speed control dial (Item 1) **[Figure 78]** counterclockwise to low idle.

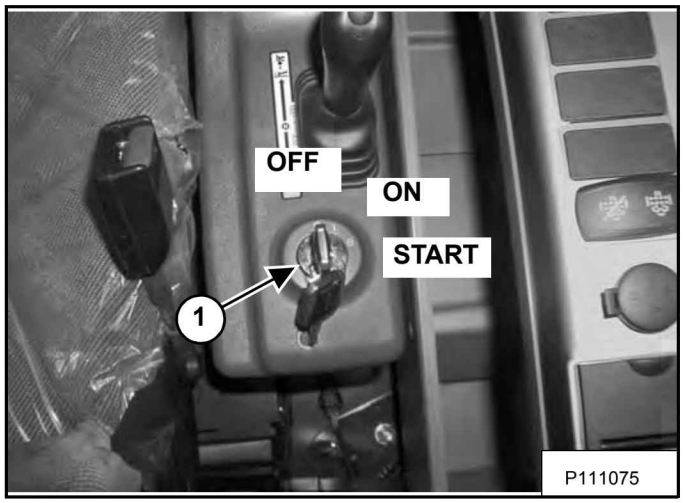
⚠ WARNING

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

Figure 79



NOTE: If the instrument panel has the user password setting activated, turn the key to the ON position. The screen will illuminate and go through the functional check first and then the PASSWORD screen will appear on the display panel. The user password must be entered before attempting to start the engine. (See User Password Setting on Page 161.)

Turn the key to START and release the key when the engine starts. It will return to the ON position **[Figure 79]**.

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.

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

⚠ 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

Cold Temperature Starting

⚠ WARNING

AVOID INJURY OR DEATH

Do not use ether with glow plug (preheat) systems. Explosion can result which can cause injury, death, or severe engine damage.

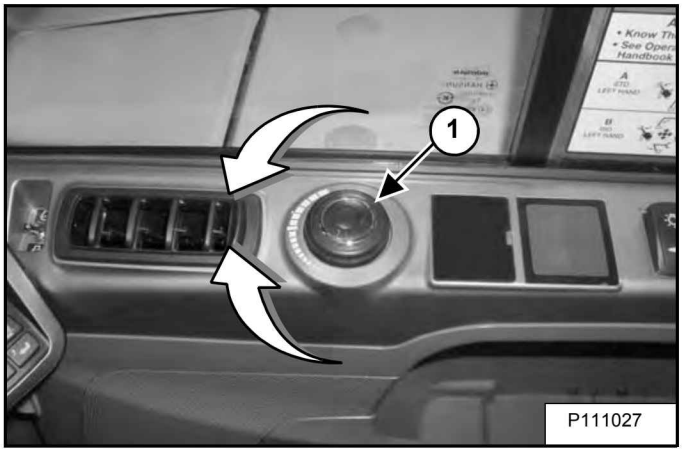
W-2071-0907

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 LUBRICATION SYSTEM on Page 110.)
- Make sure the battery is fully charged:

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 117.)

Figure 80



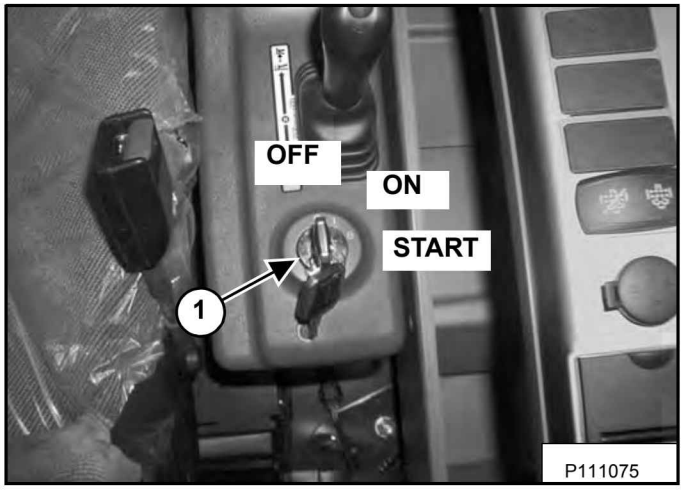
Rotate the engine speed control dial (Item 1) **[Figure 80]** half way between low and high engine speed.

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 81



NOTE: If the instrument panel has the user password setting activated, enter the user password before attempting to start the engine. (See User Password Setting on Page 161.)

Turn the key to the ON position (Item 1) **[Figure 81]**.

Figure 82

The preheat icon (Item 1) **[Figure 82]** will illuminate. The air intake heater will automatically cycle. When the icon goes off, turn the key to start.

Release the key when the engine starts, it will return to the ON position.

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

When the engine speed increases, move the engine speed control dial (Item 1) **[Figure 80]** to low idle position until the engine warms.

Warming The Hydraulic System

IMPORTANT

When the temperature is below -30°C (-20°F), hydraulic oil must be warmed before starting. The hydraulic 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-2212-0910

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

Warming The Hydraulic System

Figure 83

Frequently monitor the temperature and fuel gauges, icons and bar graphs when operating the excavator **[Figure 80]**.

See the Control Panel Setup information for various informational pop-up displays, service code information and general display panel information. (See CONTROL PANEL SETUP on Page 153.) and (See DIAGNOSTIC SERVICE CODE on Page 147.)

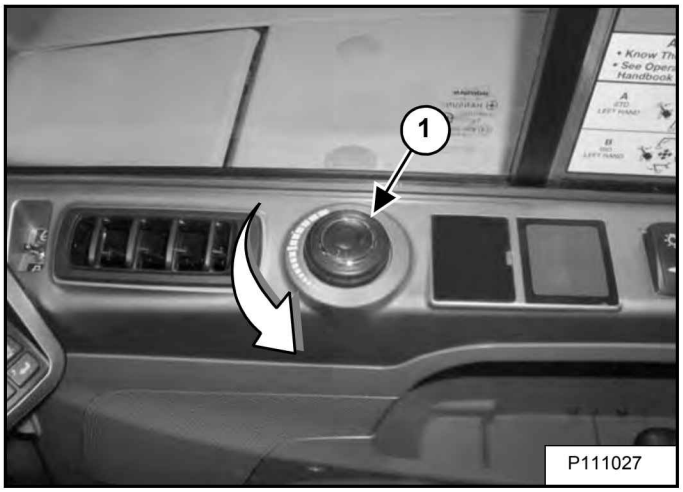
STOPPING THE ENGINE AND LEAVING THE EXCAVATOR

Procedure

Figure 84

Stop the machine on level ground. Lower the work equipment and the blade to the ground **[Figure 84]**.

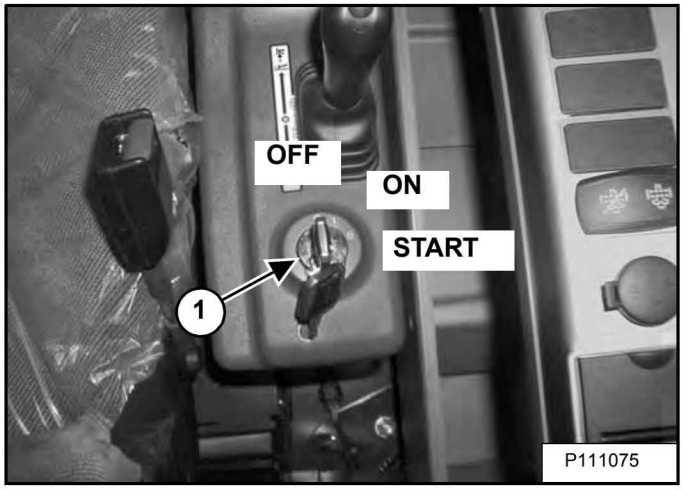
Figure 85



Move the engine speed control dial (Item 1) **[Figure 85]** to the low idle position.

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

Figure 86

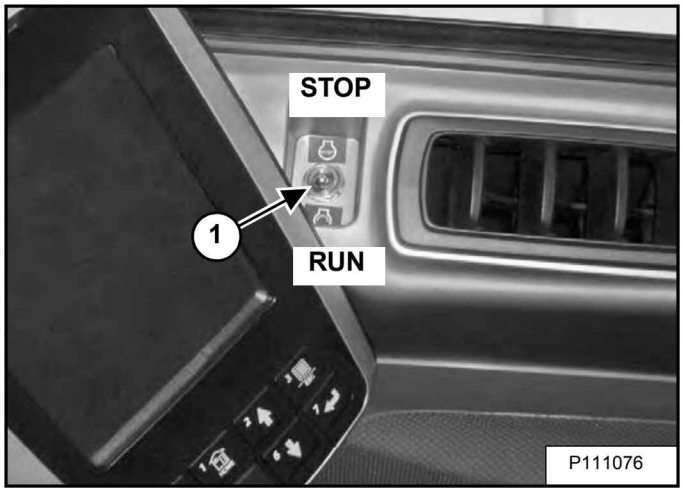


Turn the key switch to OFF (Item 1) **[Figure 86]**.

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

Emergency Shut Off

Figure 87



In case of emergency, move the switch (Item 1) **[Figure 87]** to the STOP position.

The switch will return to the to the RUN position. Restart the engine using the start key.

Installing And Removing The Attachment (Pin-On Attachment)

Installation

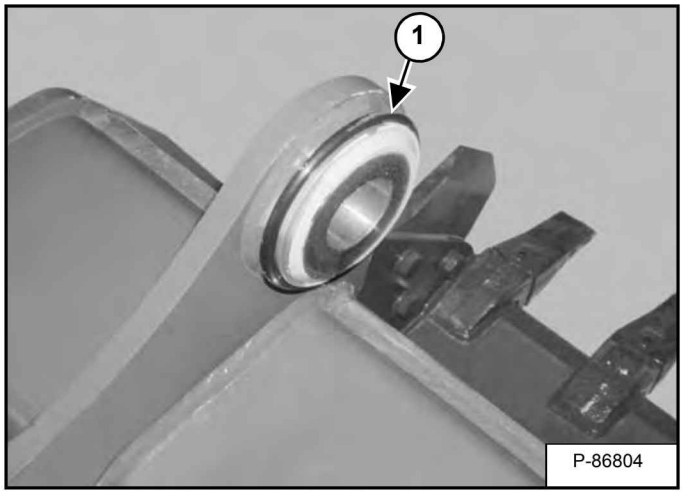
⚠ WARNING

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.

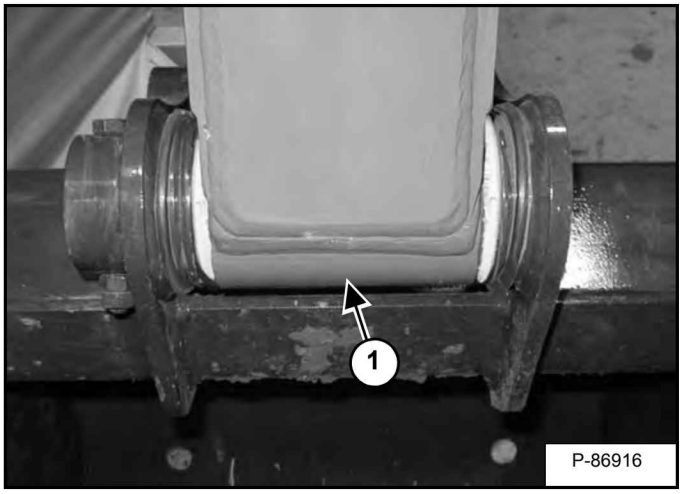
W-2140-0189

Figure 88



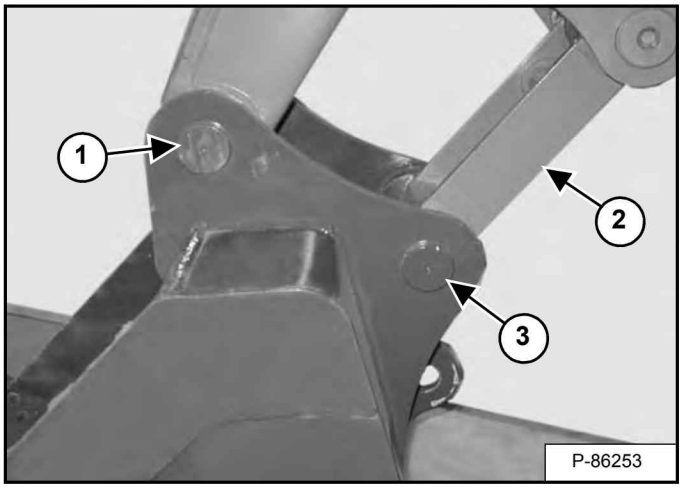
Before installing the attachment, make sure the four O-rings (Item 1) **[Figure 88]** are positioned over the attachment boss (as shown) so they are not damaged during installation.

Figure 89



Installing the arm (Item 1) **[Figure 89]** into the attachment.

Figure 90

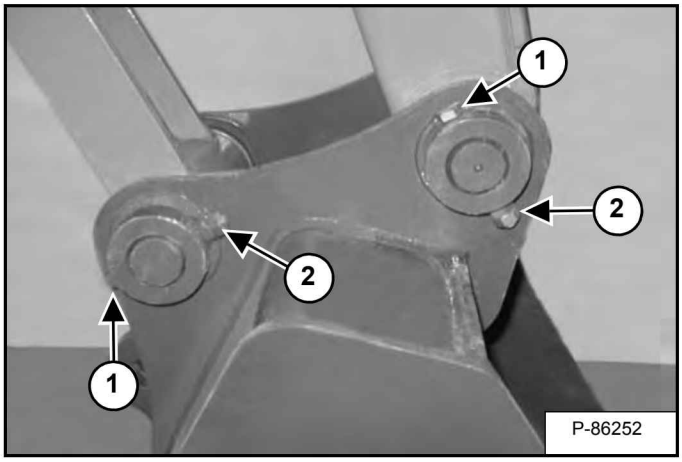


Align the arm mounting hole with the attachment and install the pin (Item 1) **[Figure 90]**.

Install the link (Item 2) in the attachment and align the mounting hole. Install the pin (Item 3) **[Figure 90]**.

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

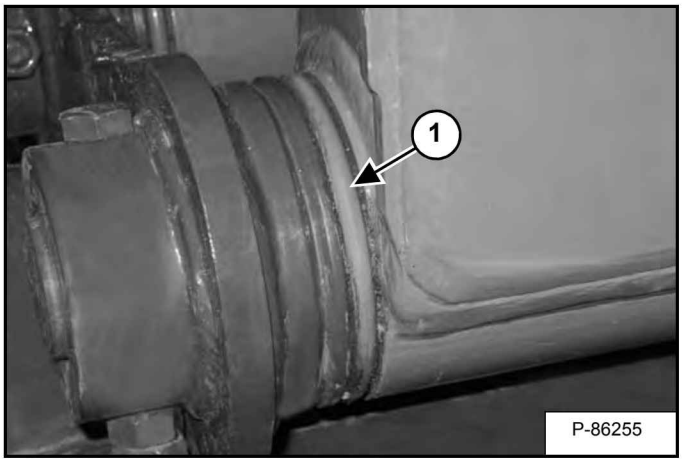
Figure 91



Install the two retainer bolts (Item 1) and jam nuts (Item 2) **[Figure 91]** and tighten the jam nuts.

NOTE: The two retaining bolts (Item 1) [Figure 91] should rotate after the two jam nuts are installed. Install the first jam nut until the bolt is finger loose on the mount. Install the second jam nut and tighten the second jam nut against the first jam nut.

Figure 92



Reposition the four O-rings (Item 1) **[Figure 92]** next to the arm.

Install grease in the grease fittings on the arm and bucket link pins.

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

Removal

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

Position the four O-rings (Item 1) **[Figure 92]** into the storage groove of the attachment so they do not get damaged during removal.

Remove the retainer bolts (Item 1) and nuts (Item 2) **[Figure 91]**.

Remove the pins (Item 1 and 3) **[Figure 90]**.

⚠ WARNING

AVOID INJURY OR DEATH

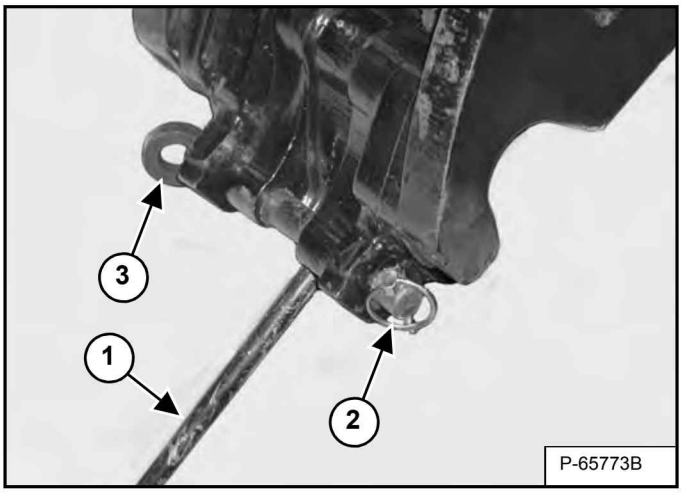
Never use attachments or buckets which are not approved by Bobcat Company. Buckets and attachments for safe loads of specified densities are approved for each model. Unapproved attachments can cause injury or death.

W-2052-0907

Installing And Removing The Attachment (Manual Spring Loaded Coupler)

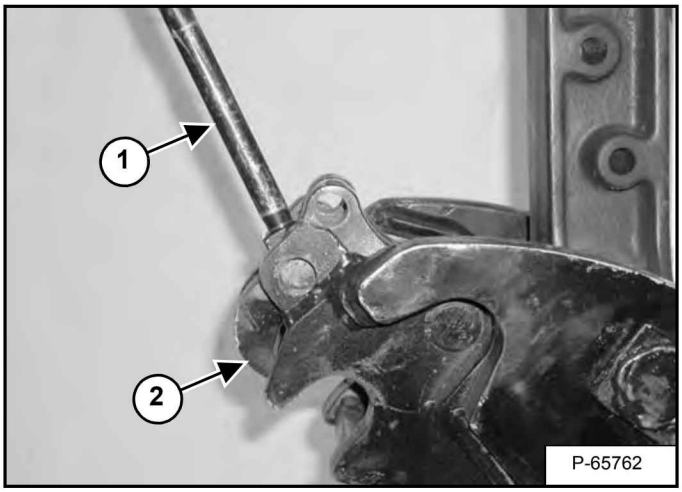
Installation

Figure 93



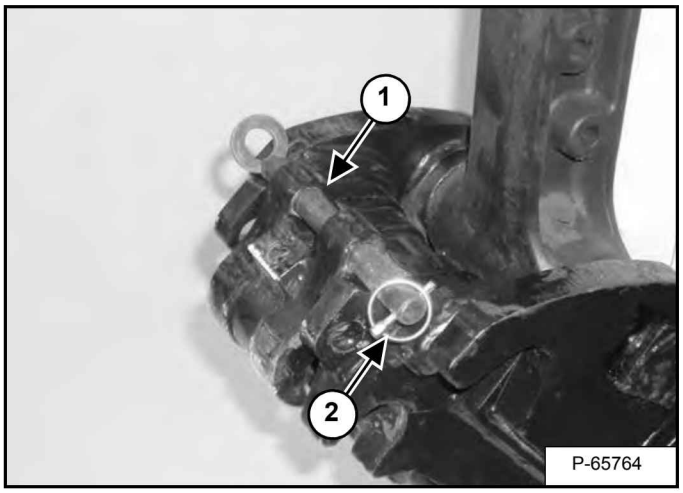
Insert the release bar (Item 1) into the manual spring loaded coupler. Remove the retainer pin (Item 2). Rotate the release bar (Item 1) upward slightly and remove the lock pin (Item 3) **[Figure 93]**.

Figure 94



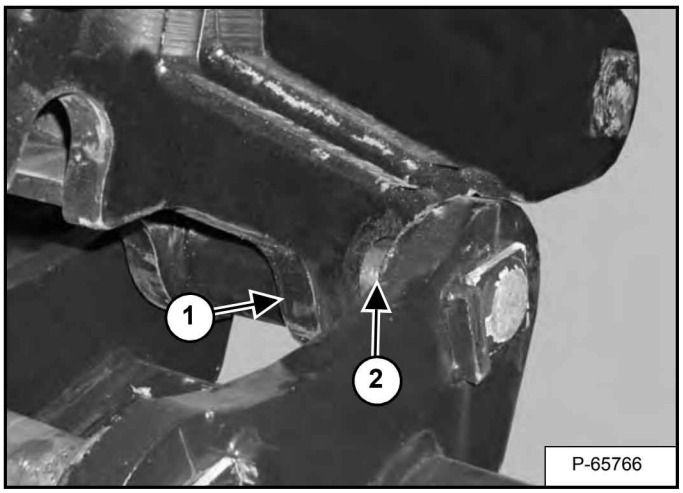
Using the release bar (Item 1), rotate the locking hooks (Item 2) **[Figure 94]** upward to the unlock position.

Figure 95



Install the lock pin (Item 1) and retainer pin (Item 2) **[Figure 95]** to hold the locking hooks in the open position. Remove the release bar.

Figure 96



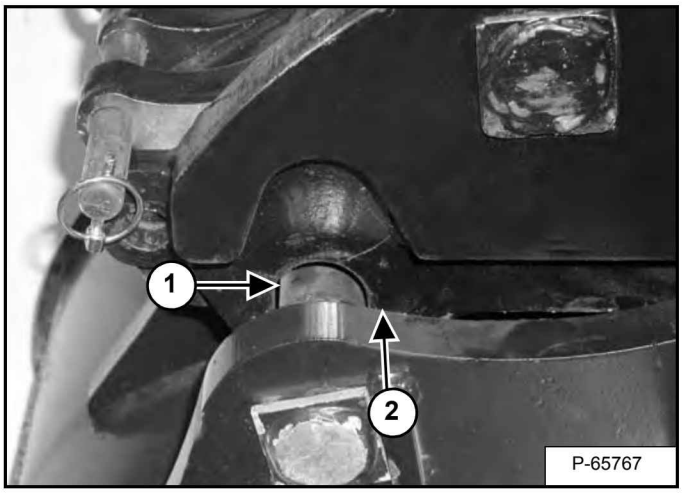
Enter the machine, fasten the seat belt and start the engine.

Position the front hooks (Item 1) over the front pin (Item 2) **[Figure 96]** of the attachment.

Installing And Removing The Attachment (Manual Spring Loaded Coupler) (Cont'd)

Installation (Cont'd)

Figure 97

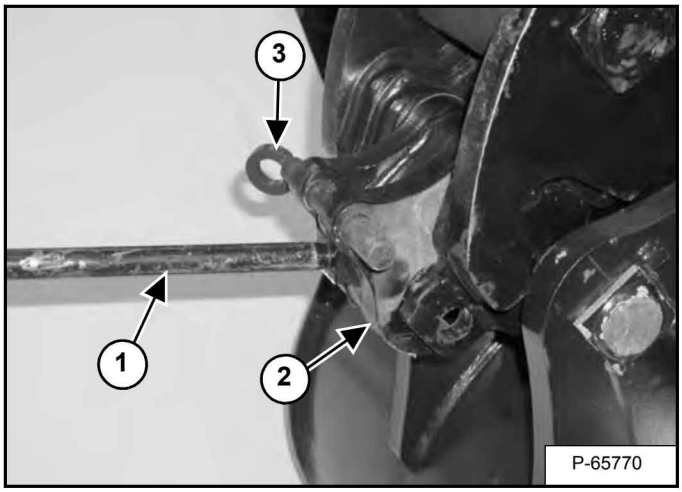


Extend the bucket cylinder (curl in) the coupler until the rear pin of the attachment (Item 1) is firmly seated in the coupler (Item 2) **[Figure 97]**.

Continue to curl the coupler and attachment until the weight of the attachment is supported by the coupler.

Stop the engine and exit the machine.

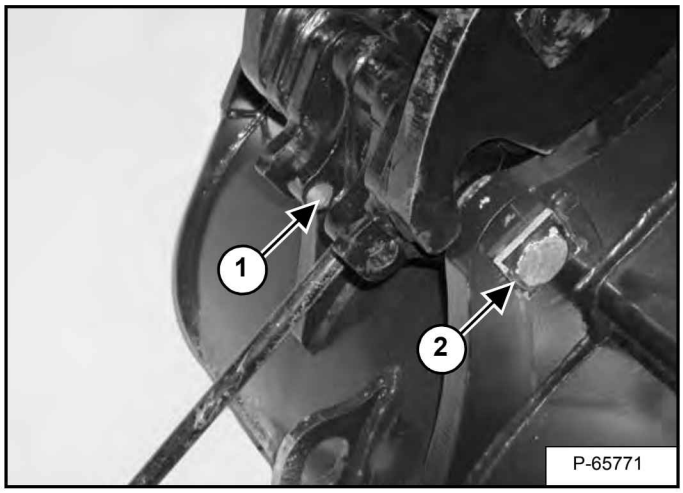
Figure 98



Reinsert the release bar (Item 1) and rotate the locking hooks (Item 2) **[Figure 98]** upward slightly.

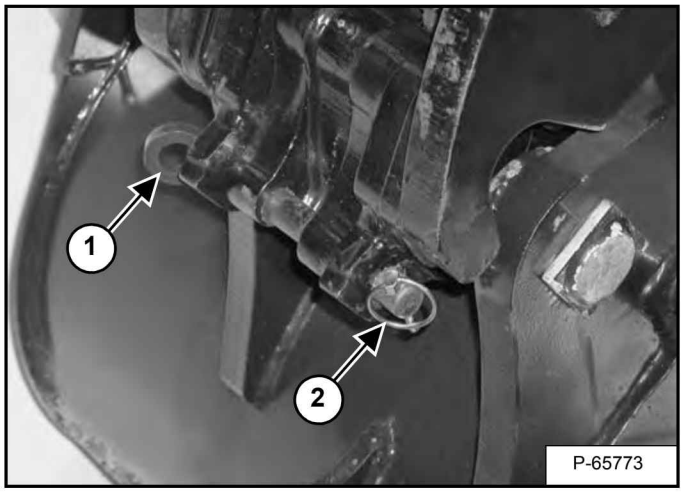
Remove the retainer pin and the locking pin (Item 3) **[Figure 98]**.

Figure 99



Rotate the locking hooks (Item 1) downward, cupping (engaging) the attachment pin (Item 2) **[Figure 99]**.

Figure 100



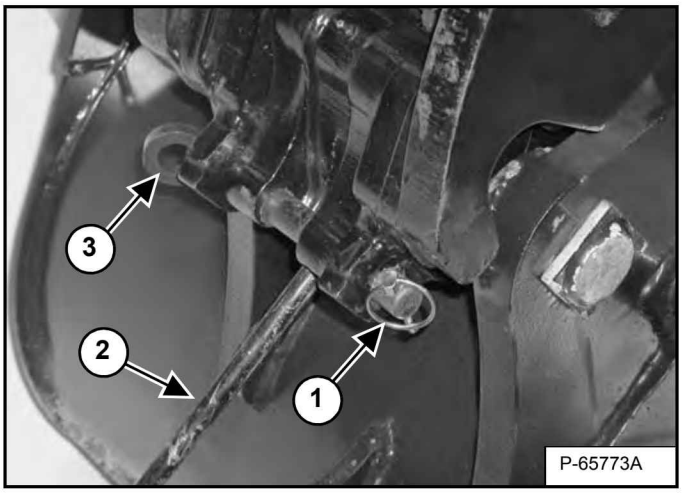
Install the locking pin (Item 1) and retainer pin (Item 2) **[Figure 100]** and remove the release bar.

Check for secure attachment. **Never operate without retainer pins (Item 2) [Figure 100] installed.**

Installing And Removing The Attachment (Manual Spring Loaded Coupler) (Cont'd)

Removal

Figure 101



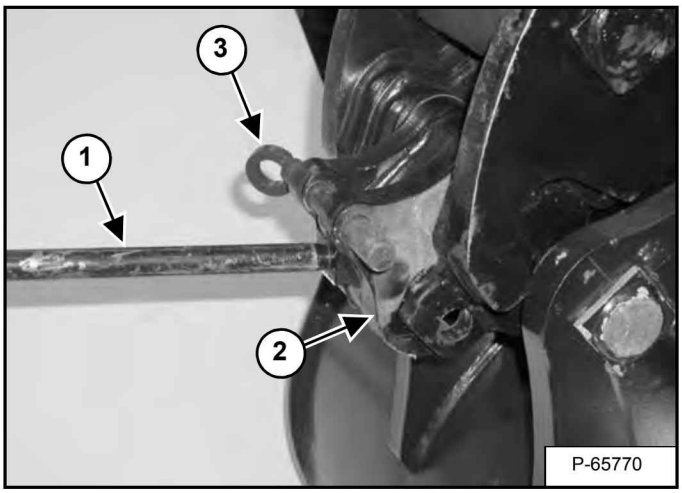
Position the attachment flat on the ground.

Stop the engine and exit the machine.

Remove the retainer pin (Item 1) **[Figure 101]**.

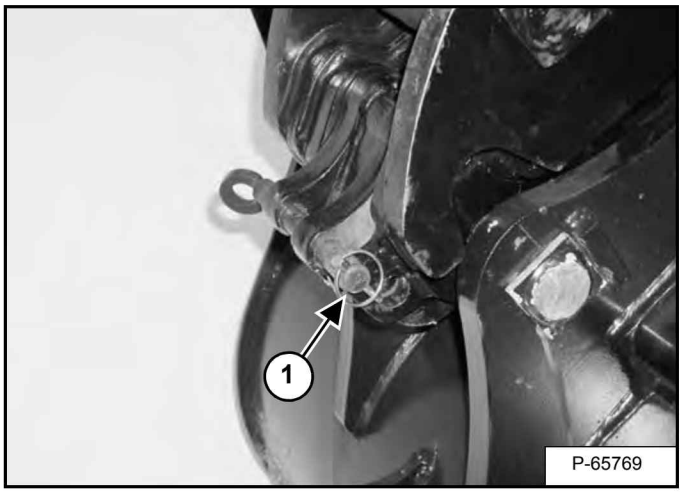
Insert the release bar (Item 2) and rotate the release bar upward slightly and remove the locking pin (Item 3) **[Figure 101]**.

Figure 102



Using the release bar (Item 1), rotate the locking hooks (Item 2) upward to the unlock position and install the locking pin (Item 3) **[Figure 102]**.

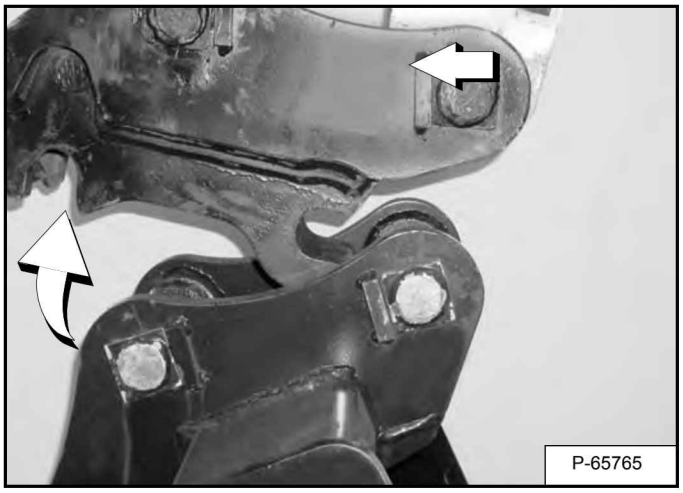
Figure 103



Install the retainer pin (Item 1) **[Figure 103]** to hold the locking hooks in the open position. Remove the release bar.

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

Figure 104



Retract the bucket cylinder and move the arm forward until the manual spring loaded coupler is clear of the attachment **[Figure 104]**.

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, 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:

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

Basic Operating Instructions

When operating on a public road or highway, always follow local regulations. For example: A slow moving vehicle (SMV) 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 (joystick) to lower the boom.

Figure 105

The console lock switch disengages the hydraulic control functions from the joysticks when the console is raised **[Figure 105]**.

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 (joystick) to lower the boom.

Lower the control console lock lever to engage the hydraulic control functions of the joysticks **[Figure 105]**.

Lifting A Load

Do not exceed the Rated Lift Capacity. (See Lift Chart (7231563) on Page 166.)

⚠ WARNING

AVOID INJURY OR DEATH

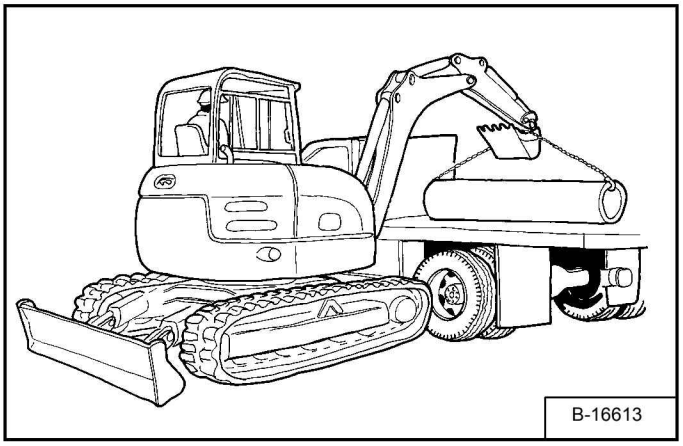
Do not exceed rated lift capacity. Excessive load can cause tipping or loss of control.

W-2374-0500

Extend the bucket cylinder completely and lower the boom to the ground. Stop the engine.

Wrap the chain assembly around the bucket mounting plate.

Figure 106

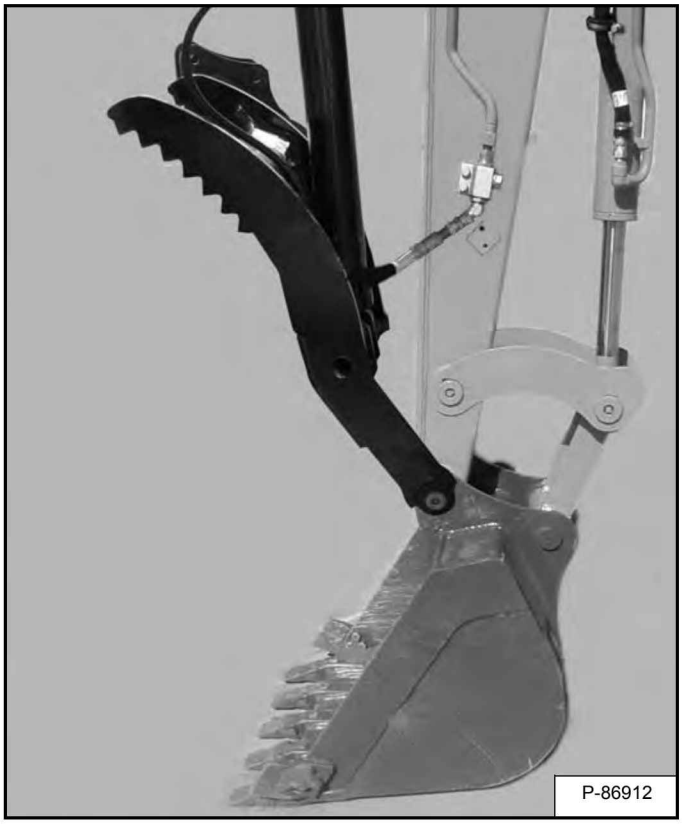


Make sure the load is evenly weighted and centered on the lifting chain, and is secured to prevent the load from shifting **[Figure 106]**.

Lift and position the load. Once the load is in position and tension is removed from the lift chain (secondary lift system), remove the secondary lift system.

Using The Clamp

Figure 107



The optional hydraulic clamp attachment gives the excavator a wider range of use and mobility for debris removal **[Figure 107]**.

The hydraulic clamp cylinder is operated by the primary auxiliary hydraulic system.

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

The lift capacities are reduced by 136 kg (300 lb) if the excavator is equipped with the optional hydraulic clamp.

⚠ WARNING

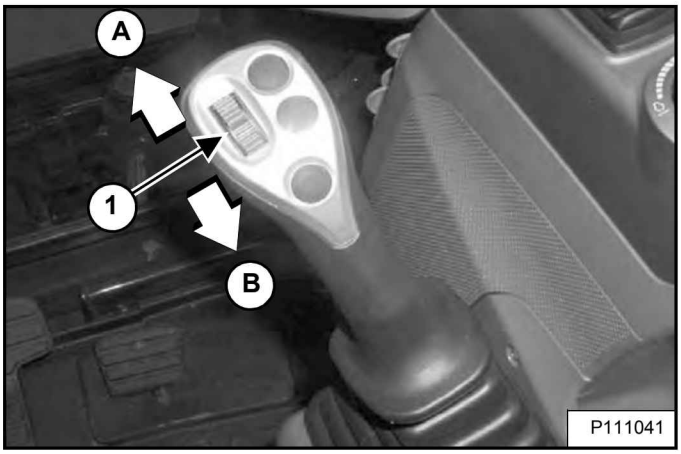
AVOID INJURY OR DEATH

Check area to be excavated for overhead or underground lines such as electrical, gas, oil, water, etc. DIAL 811 (USA Only) or 1-888-258-0808 (USA & Canada) and consult local utilities before digging. Extreme caution must be used in areas where utility lines are present.

W-2686-1007

When Using Auxiliary Hydraulics To Activate Clamp

Figure 108

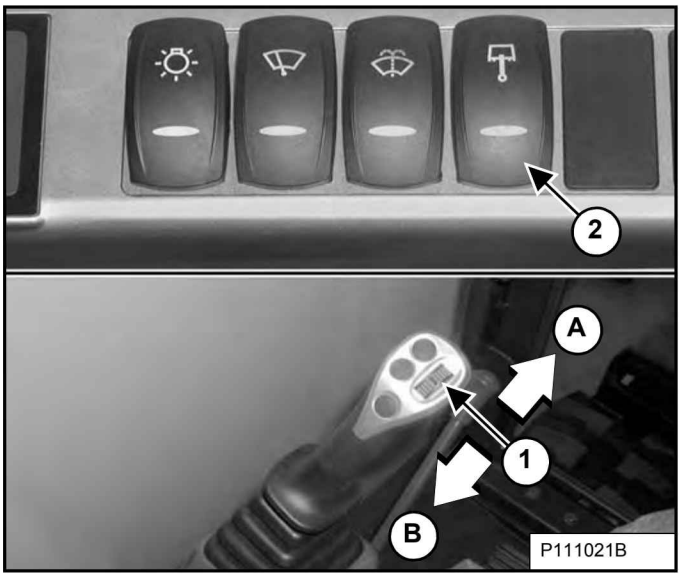


Using the right joystick, rotate the thumb switch (Item 1) forward (A) to supply hydraulic flow and pressure to the female coupler (closing the clamp); rotate the thumb switch (Item 1) back (B) **[Figure 108]** to supply hydraulic flow and pressure to the male coupler (opening the clamp).

NOTE: The primary auxiliary hydraulics and the one way flow auxiliary hydraulics use the same auxiliary hydraulic couplers.

When Using Secondary Auxiliary Hydraulics To Activate Clamp

Figure 109



The left joystick switch (Item 1) controls the secondary auxiliary functions and boom swing function. (Makes sure the boom swing / auxiliary hydraulic switch (Item 2) is disengaged by pressing the bottom of the switch.) Rotate the thumb switch (Item 1) forward (A) to supply hydraulic flow and pressure to the female coupler (closing the clamp). Rotate the thumb switch (Item 1) back (B) **[Figure 109]** to supply hydraulic flow and pressure to the male coupler (opening the clamp).

Excavating

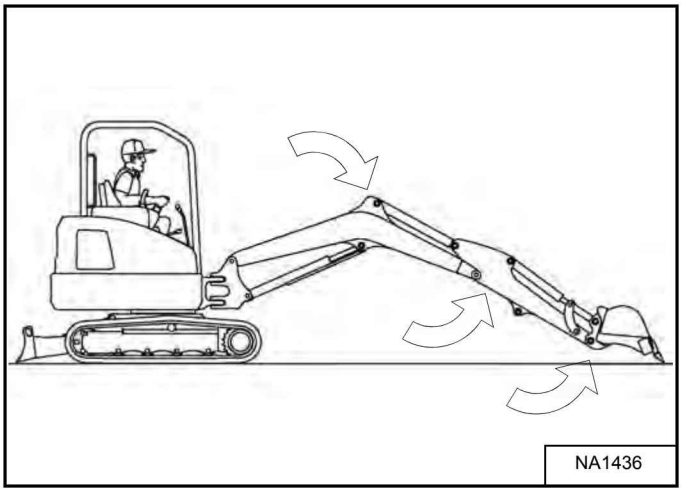
⚠ WARNING

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

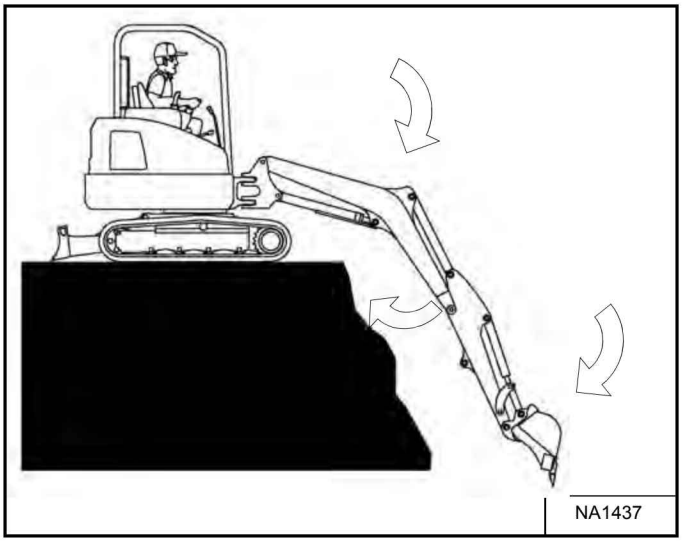
Lower the blade for increased digging performance.

Figure 110



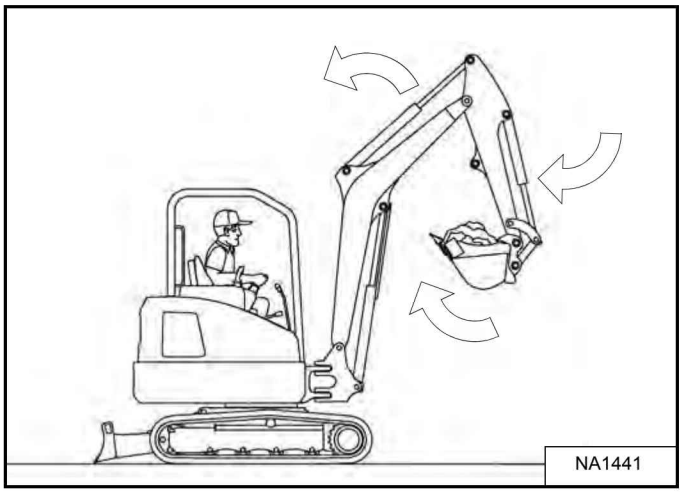
Extend the arm, lower the boom, and open the bucket **[Figure 110]**.

Figure 111



Retract the arm, while lowering boom and curling the bucket **[Figure 111]**.

Figure 112



Raise the boom, retract the arm and curl the bucket **[Figure 112]**.

Rotate the upperstructure.

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

⚠ WARNING

AVOID INJURY OR DEATH

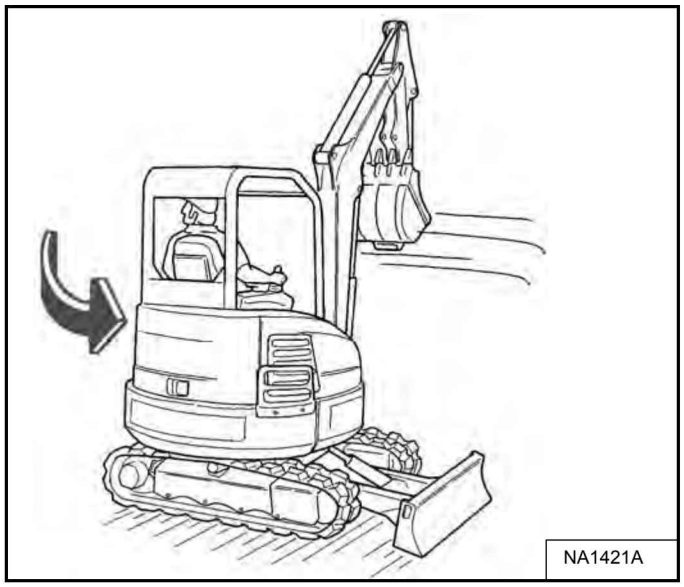
Check area to be excavated for overhead or underground electrical power lines. Keep a safe distance from electrical power lines.

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

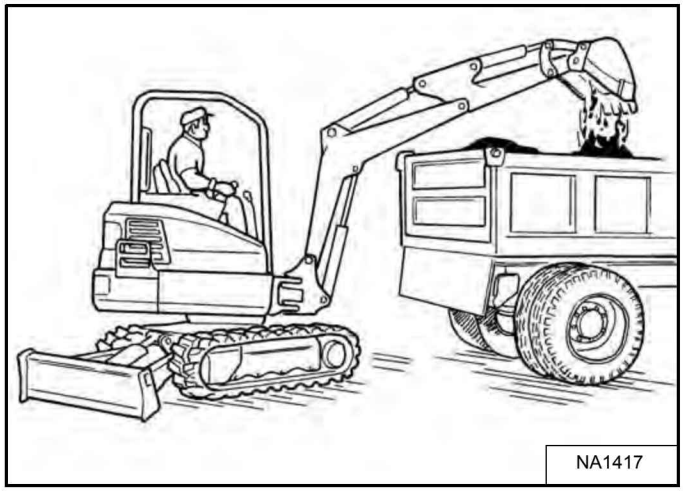
Excavating (Cont'd)

Figure 113



Look in the direction of rotation and make sure there are no bystanders in the work area before rotating the upperstructure **[Figure 113]**.

Figure 114



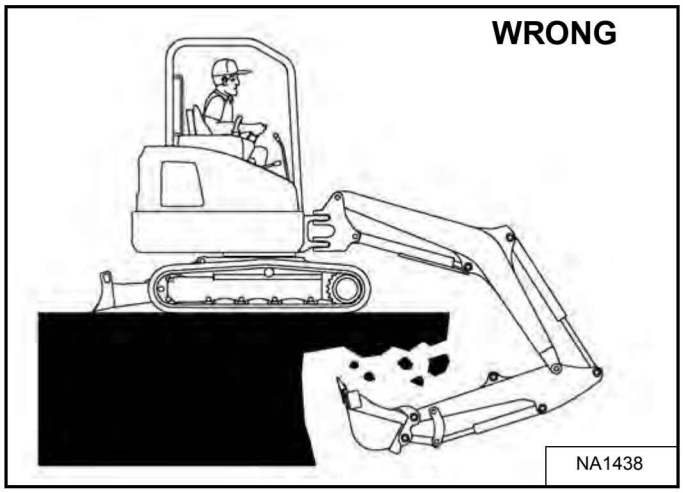
Extend the arm and uncurl the bucket to dump the material into a pile or truck **[Figure 114]**.

IMPORTANT

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

I-2220-0503

Figure 115



Do not dig under the excavator **[Figure 115]**.

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 attachment mounting frame and attachments may occur.

Boom Swing

Figure 116

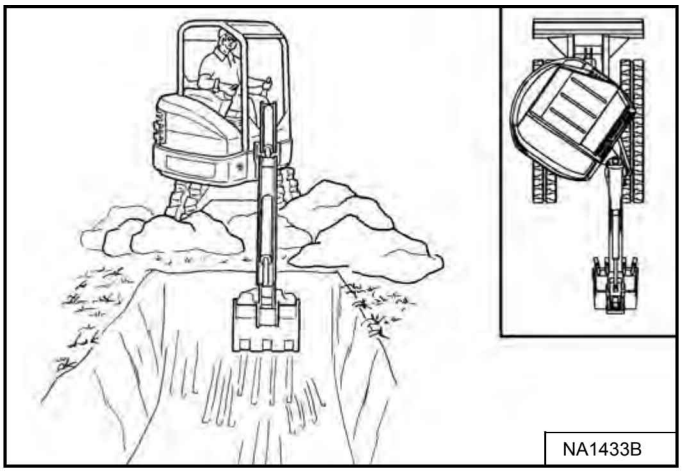


Figure 117

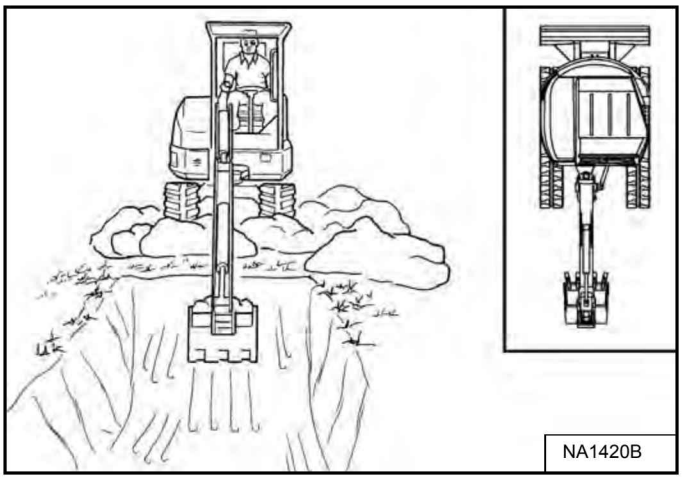
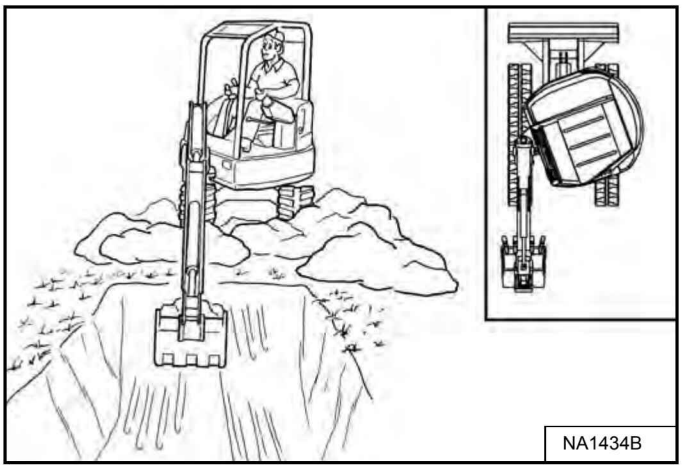


Figure 118



Slew the upperstructure, swing the boom to the right **[Figure 116]**, center **[Figure 117]** and left **[Figure 118]** to dig a square hole the width of the machine without repositioning the excavator.

Figure 119

The boom swing allows the operator to offset the boom and dig close to buildings and other structures **[Figure 119]**.

Backfilling

IMPORTANT

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

I-2256-0507

Figure 120

Use the blade to backfill the trench or hole after excavating **[Figure 120]**.

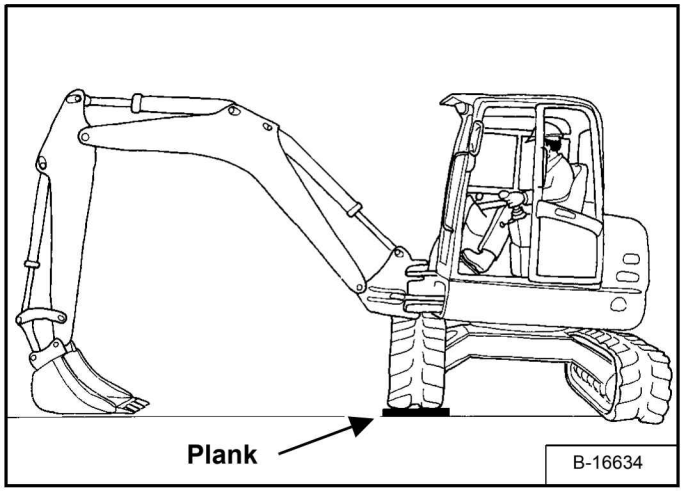
Driving The Excavator

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.

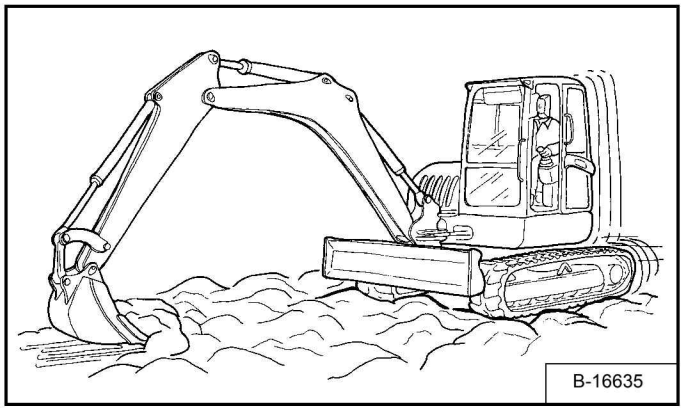
Figure 121



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 121]**.

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

Figure 122



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 122]**.

Operating On Slopes

⚠ WARNING

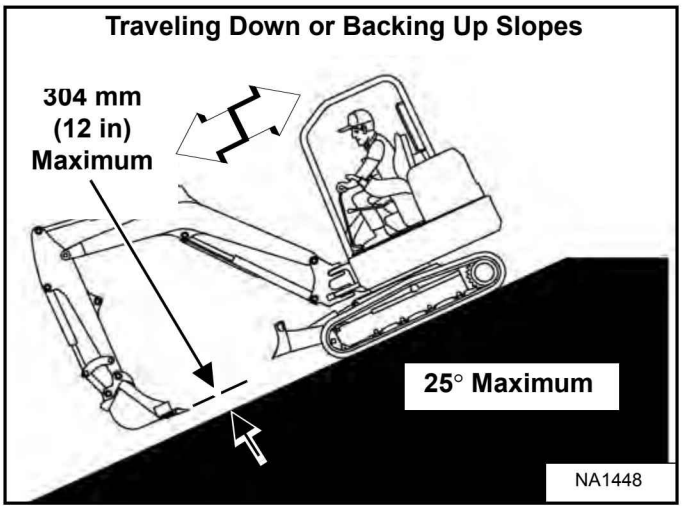
AVOID INJURY OR DEATH

- **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 123



When going down grades that exceed 15 degrees, put the machine in the position shown, and run the engine slowly **[Figure 123]**.

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 124

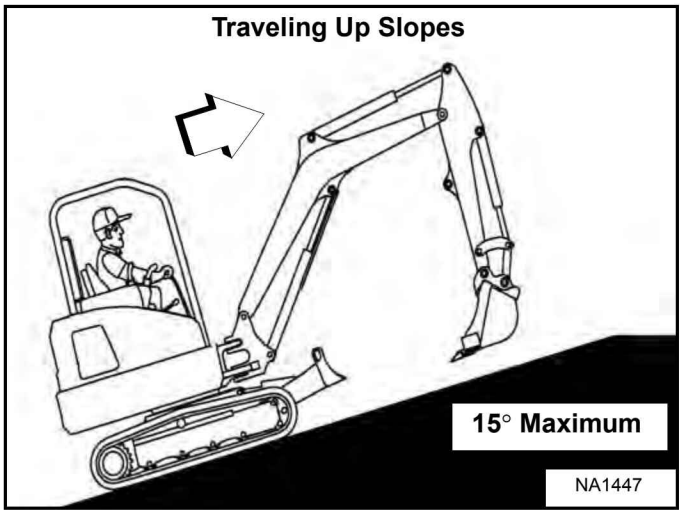
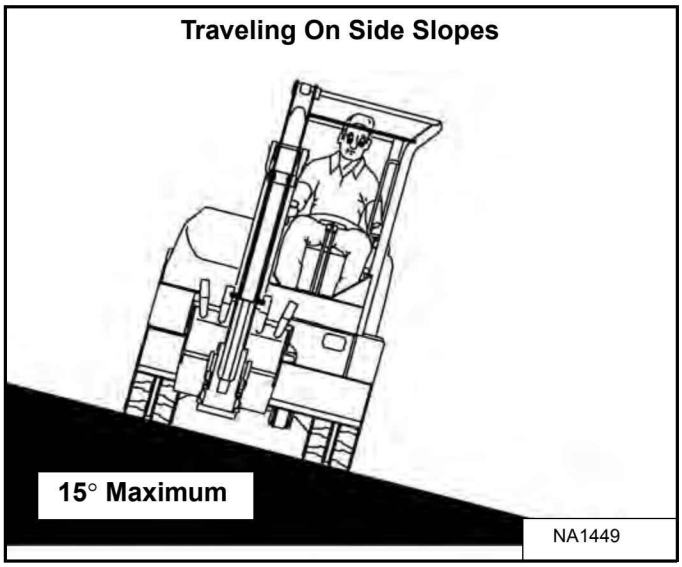


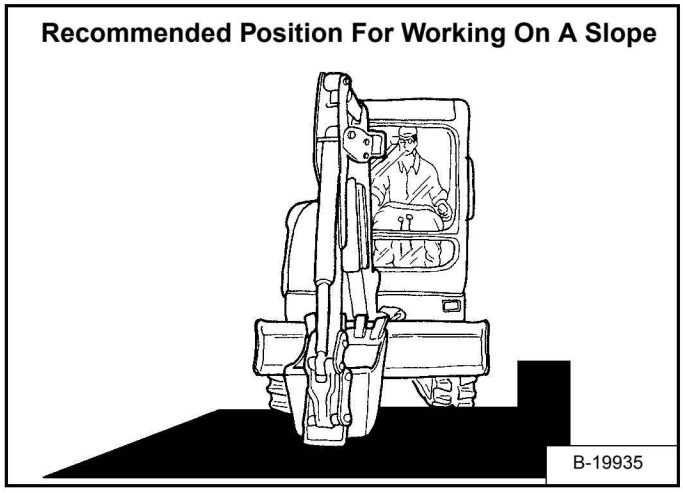
Figure 125



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 124]** and **[Figure 125]**.

Operating On Slopes (Cont'd)

Figure 126



When operating on a slope, level the work area before beginning **[Figure 126]**.

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

Do not work on slopes which are over 15 degrees.

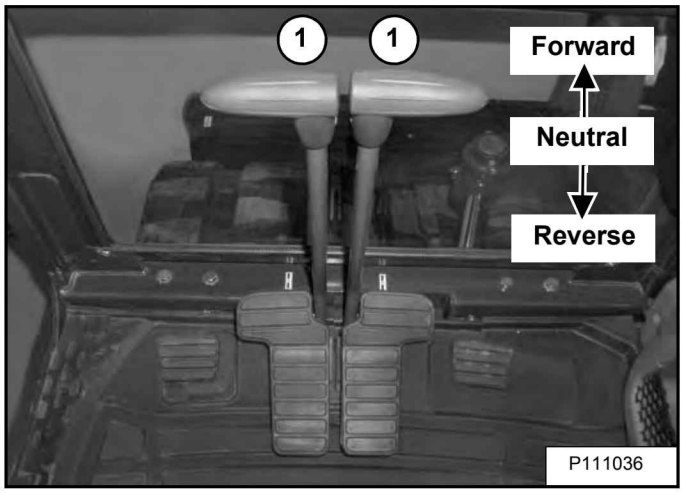
Use a slow work cycle.

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 127



To brake the machine when going down a slope, move the steering levers (Item 1) **[Figure 127]** to the *NEUTRAL* position. This will engage the hydraulic braking.

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

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

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

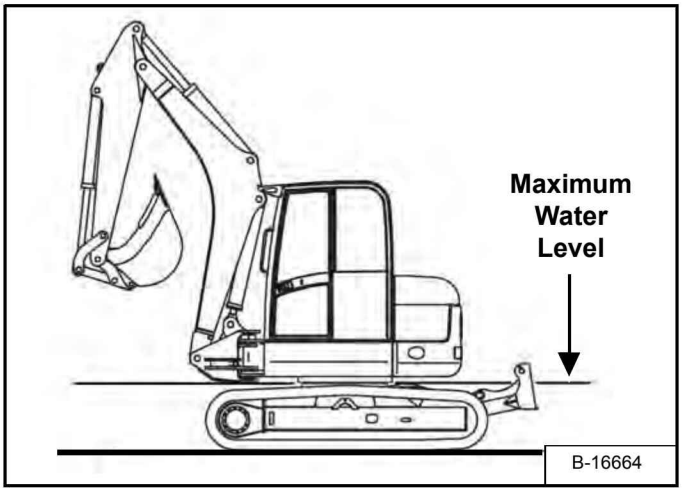
Use the control lever to lower the boom.

Start the engine and resume operation.

Operating In Water

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

Figure 128



Do not operate or immerse the excavator in water higher than the bottom of the swing bearing **[Figure 128]**.

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

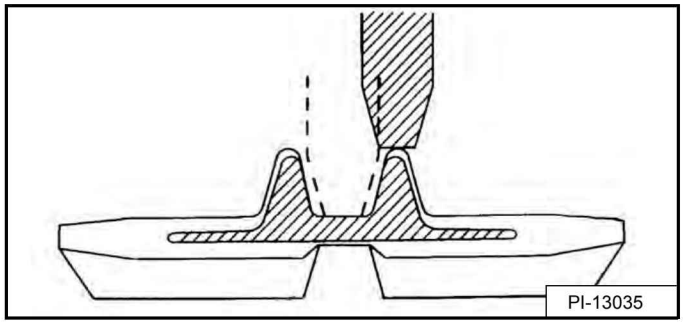
Water must be removed from the cylinder rods. If water freezes to the cylinder rod, the cylinder seals can be damaged when the rod is retracted.

Avoiding Track Damage

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

Some Cause Of Track Damage:

Figure 129

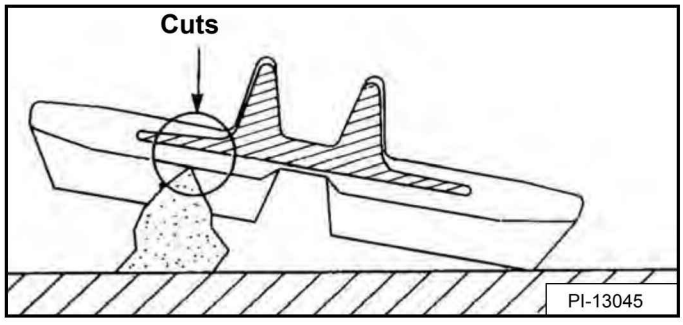


Incorrect track tension: When the rubber track is detracting, the idler or sprocket rides on the projections of the embedded metal **[Figure 129]** causing the embedded metal to be exposed to corrosion. (See TRACK TENSION on Page 130.)

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 130

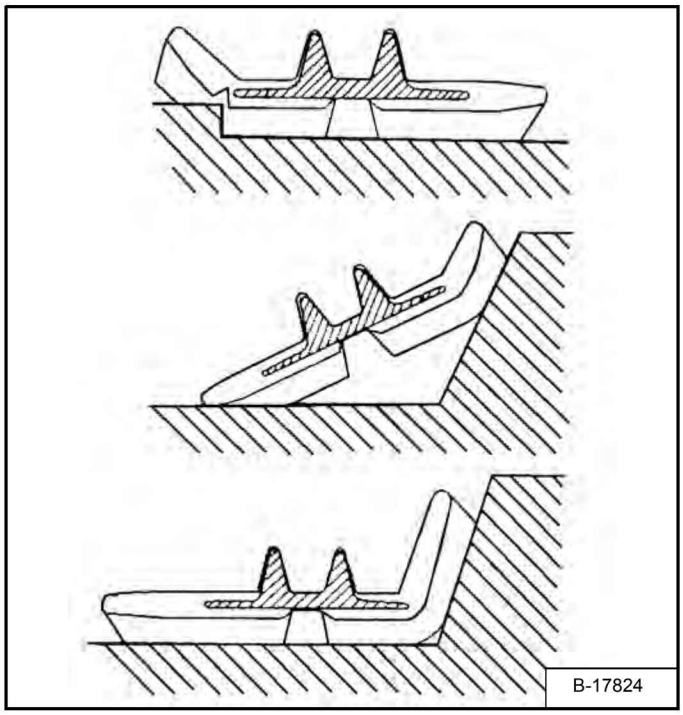


When rubber tracks drive over projections or sharp objects in the field, the concentrated forces applied cause cuts on the lug side rubber surface **[Figure 130]**. In case of making turns on projections, the lug side rubber surface will have an even higher chance to be cut. If the cuts run through the 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 131



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 131]**.

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

TOWING THE EXCAVATOR

Procedure

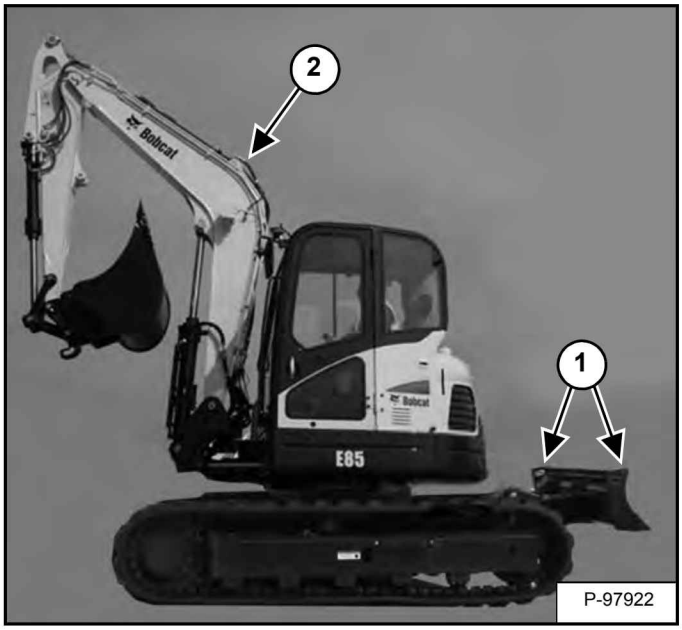
There is not a recommended towing procedure for the excavators.

- 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 185.)

LIFTING THE EXCAVATOR

Procedure

Figure 132



Fully extend the cylinders of the bucket, arm, and boom so that the excavator is in the position as shown **[Figure 132]**.

Raise the blade fully.

Put all the control levers in neutral.

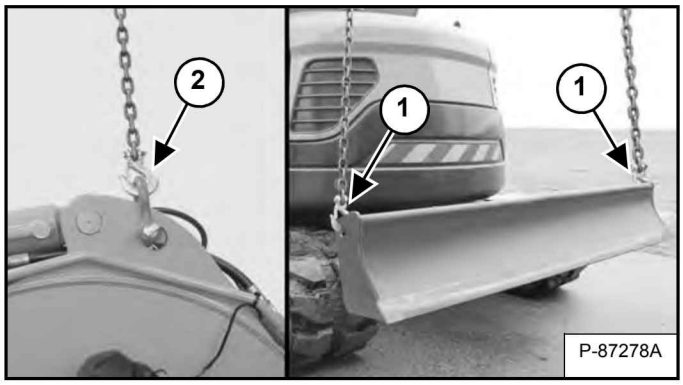
⚠ WARNING

AVOID INJURY OR DEATH

- **Use a lifting fixture 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.**
- **Never lift with operator on machine.**

W-2434-0502

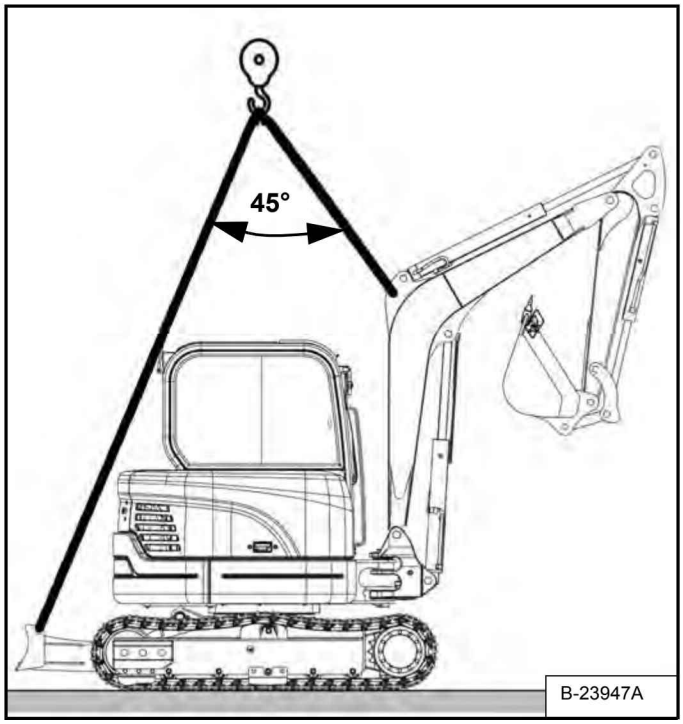
Figure 133



Fasten chains to the ends of the blade (Item 1) **[Figure 132]** and **[Figure 133]** and up to a lifting device above the cab. Place protective material between the chains and the cab and the upperstructure to prevent damage.

Fasten chains to the boom (Item 2) **[Figure 132]** and **[Figure 133]** and up to a lifting device above the cab. Place protective material between the chains and the cab and the upperstructure to prevent damage.

Figure 134



The maximum angle between the front and rear chains must not exceed 45° **[Figure 134]**.

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).

Figure 135

NOTE: When loading or unloading the machine, disengage the auto idle feature and place the two speed travel in low range.

Move the machine forward onto the transport vehicle **[Figure 135]**.

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.

Put blocks at the front and rear of the tracks.

Fastening

Figure 136

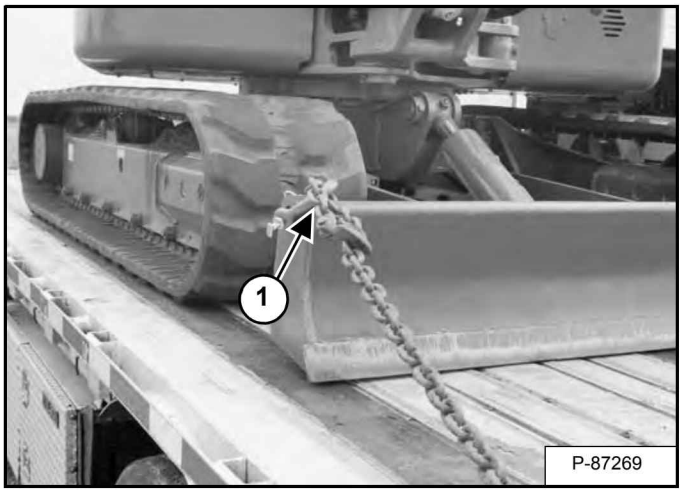
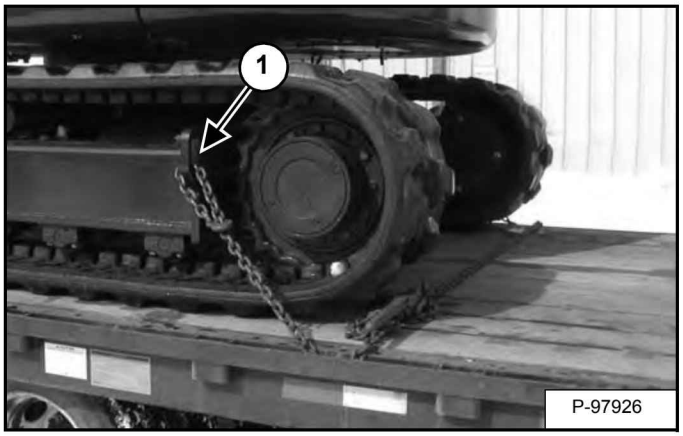


Figure 137



Fasten chains to both corners of the blade (Item 1) **[Figure 136]** (both sides) and to the tie down loop at the rear of the track frame (Item 1) **[Figure 137]** (both sides) to prevent it from moving when going up or down slopes or during sudden stops.

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

⚠ WARNING

AVOID SERIOUS INJURY OR DEATH

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

W-2058-0807

PREVENTIVE MAINTENANCE

MAINTENANCE SAFETY

WARNING

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

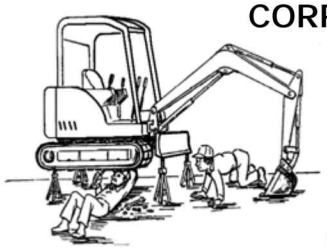
Safety Alert Symbol: This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.

CORRECT

P-90216

Never service the Bobcat Excavator without instructions.

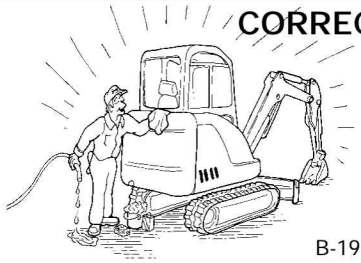
CORRECT



B-19964

Use the correct procedure to lift and support the excavator.

CORRECT



B-19959

Cleaning and maintenance are required daily.

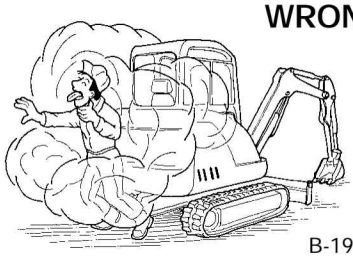
WRONG

B-19965

Have good ventilation when welding or grinding painted parts.

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

WRONG

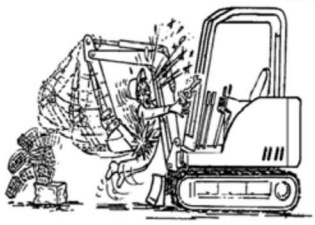


B-19960

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

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

WRONG

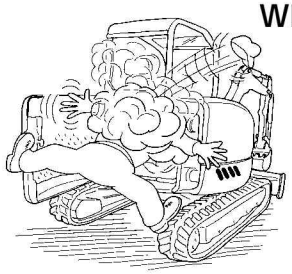


B-19966

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

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

WRONG



B-19962

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

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

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

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

WRONG

B-19958

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

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

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

WRONG

B-19798

Lead-acid batteries produce flammable and explosive gases.

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

Batteries contain acid which burns eyes or skin on contact.

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

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

MSW28-0409

SERVICE SCHEDULE

Maintenance Intervals

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

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

⚠ 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 Loader)

- **Engine Oil** - Check level and add as needed. (See Page 110.)
- **Engine Air Filters and Air System** - Check display panel. Service only when required. Check for leaks and damaged components. (See Page 104.)
- **Engine Cooling System** - Check coolant level COLD and add premixed coolant as needed. (See Page 112.) and (See Page 113.)
- **Fuel Filter** - Check display panel. Remove the trapped water when required. (See Page 108.)
- **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 98.)
- **Motion Alarm** - Check for proper function. (See Page 99.)
- **Operator Cab** - Check the cab condition and mounting hardware. (See Page 38.) and (See Page 136.)
- **Indicators and Lights** - Check for correct operation of all indicators and lights. (See Page 30.)
- **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 119.)
- **Track Tension** - Check tension and adjust as needed. (See Page 130.)
- **Swing Reduction Gearbox** - Check fluid level and add as needed. (See Page 126.)

Every 50 Hours

- **Hydraulic Hoses and Tubelines** - Check for damage and leaks. Repair or replace as needed.
- **Steering Levers and Joysticks** - Check for correct operation. Repair as needed.
- **Swing Bearing** - Grease swing bearing. Service every 10 hours when operating in water. (See Page 140.)
- **Blade, Boom Swing, Boom Swing Cylinder and Bucket Pivot Points** - Add Grease. Service every 10 hours when operating in water. (See Page 140.)
- **Battery** - Check cables, connections, and electrolyte level; add distilled water as needed. (See Page 114.)
- **Fuel Tank** - Drain water and sediment from fuel tank. (See Page 109.)

Every 100 Hours

- **Drive Belts (Alternator, air conditioning, water pump)** - Check condition. Replace as needed. Service at first 50 hours, then as scheduled. (See Page 133.) and (See Page 134.)

Every 250 Hours Or Every 12 Months

- **Boom and Arm (Workgroup) Pivot Points** - Add Grease. Service every 10 hours when operating in water. (See Page 140.)
- **Engine Oil and Filter** - Service at first 50 hours, then as scheduled. Replace oil and filter. (See Page 111.)
- **Fuel / Water Separator Screen** - Service at first 50 hours, then as scheduled. Replace as needed. (See Page 109.)
- **Travel Motors (Final Drive)** - Check fluid level and add as needed. (See Page 132.)

Maintenance Intervals (Cont'd)

Every 500 Hours Or Every 12 Months

- **Swing Pinion** - Grease swing pinion. (See Page 140.)
- **Cooling System** - Clean debris from radiator, fuel cooler, hydraulic fluid cooler, air conditioning condenser (if equipped), and front and rear grille. (See Page 112.)
- **Fuel Filter** - Replace filter element. (See Page 108.)
- **Hydraulic Filter and Hydraulic Reservoir Breather Cap** - Replace the charge filter and the reservoir breather cap. (See Page 119.)
- **Belts and Idler** - Service at first 100 hours, then as scheduled. Check condition. Replace as necessary. (See Page 133.) and (See Page 134.)
- **Alternator and Starter** - Service at first 100 hours, then as scheduled. Check connections.
- **Heater and Air Conditioning Filters** - Clean or replace filters as needed. (See Page 102.)

Every 1000 Hours

- **Engine Valves** - Adjust the engine valve clearance.

Every 1000 Hours Or Every 12 Months

- **Swing Reduction Gear** - Grease swing reduction gear. (See Page 140.)
- **Hydraulic Suction Filter** - Service at first 250 hours, then as scheduled. Clean the hydraulic suction filter, replace as needed. (See Page 121.)
- **Travel Motors (Final Drive)** - Service at first 100 hours, then as scheduled. Replace fluid. (See Page 132.)
- **Pilot Filter** - Service at first 250 hours, then as scheduled. Replace the pilot filter. (See Page 121.)
- **Swing Reduction Gear** - Service at first 100 hours, then as scheduled. Replace fluid. (See Page 126.)

Every 1500 Hours

- **Fuel Injectors** - Check for proper operation.
- **Exhaust Gas Recirculation (EGR) Cooler** - Test the EGR cooler for leaks.
- **Crankcase Ventilation Filter** - Replace the crankcase ventilation filter.
- **Positive Crankcase Ventilation (PCV) Valve** - Check the PCV valve for free movement.

Every 2000 Hours Or Every 12 Months

- **Hydraulic Reservoir** - Replace the hydraulic fluid. (See Page 125.)

Every 3000 Hours

- **Turbocharger** - Check the turbocharger for leaks. Tighten bolts, nuts, and clamps or replace gaskets, clamps, and hoses as needed. Check the wheel clearance. Replace turbocharger if the wheel touches the housing.
- **Diesel Particulate Filter (DPF)** - Disassemble, clean, and reassemble the DPF.
- **Exhaust Gas Recirculation (EGR) System** - Perform an EGR actuation test. Clean the gas and coolant passages.

Every 24 Months

- **Coolant** - Replace the coolant. (See Page 113.)

CONTROL CONSOLE LOCKOUT

Inspection And Maintenance

Figure 138

When the left console is raised **[Figure 138]**, 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.

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

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

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 yearly or more often if the machine is exposed to severe environmental conditions or applications.

The seat belt system should be repaired or replaced if it shows cuts, fraying, extreme or unusual wear, significant discolorations due to ultraviolet (UV) rays from the sun, dusty / dirty conditions, abrasion to the seat belt webbing, or damage to the buckle, latch plate, retractor (if equipped), or hardware.

Figure 139

The items below are referenced in **[Figure 139]**.

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 approved seat belt system replacement parts for your machine.

MOTION ALARM SYSTEM

Description

This excavator is equipped with a motion alarm system. The motion alarm will sound when the operator moves the travel control levers in the 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 140

Inspect for damaged or missing motion alarm decal (Item 1) **[Figure 140]**. 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.

Make sure there are no bystanders in the area.

⚠ 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

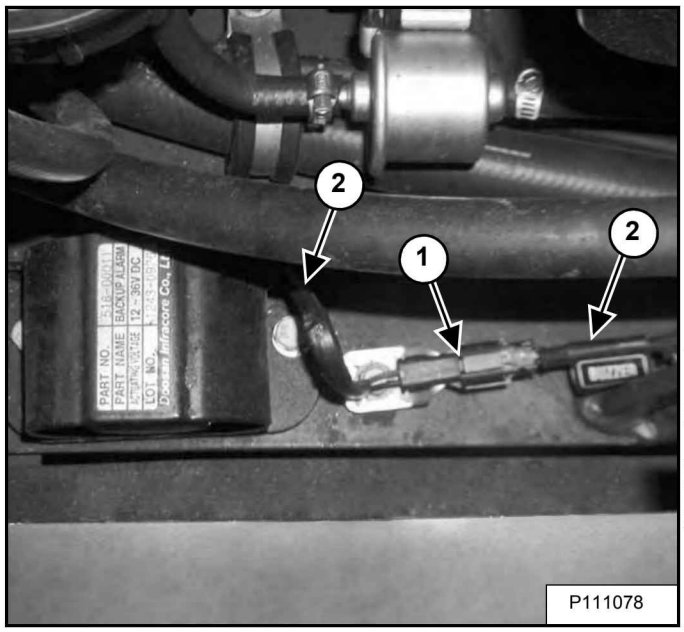
Sit in the operator's seat. Perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page 62.) Start the engine.

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.

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 68.)

The motion alarm is located inside the lower part of the engine compartment.

Figure 141



Inspect the motion alarm electrical connector (Item 1) and wire harness (Item 2) **[Figure 141]** for damage. Repair or replace any damaged components.

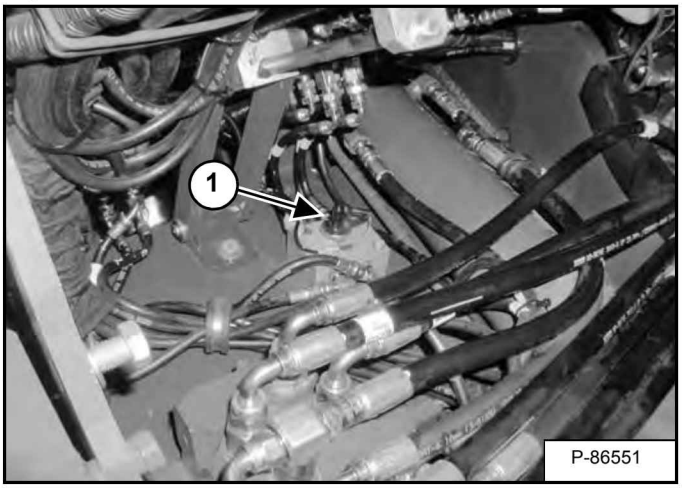
If the motion alarm sensor requires adjustment, see the following information.

MOTION ALARM SYSTEM (CONT'D)

Adjusting Switch Position

Stop the engine. Raise the operator cab. (See Service Manual for correct procedure.)

Figure 142



The motion alarm sensor (Item 1) **[Figure 142]** is hydraulic pressure activated and located under the operator cab in the motion alarm valve.

The sensor (Item 1) **[Figure 142]** is non-adjustable. It must be fully installed into the valve housings and tightened.

Inspect the motion alarm system for proper function if sensor is replaced.

⚠ 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.

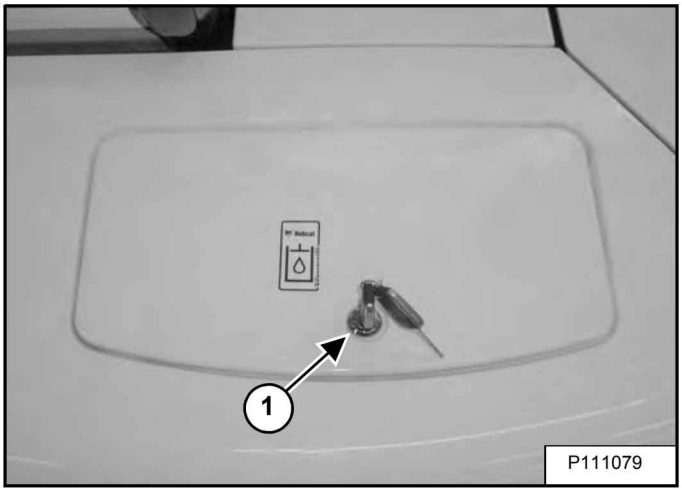
W-2786-0309

REAR COVER

Opening And Closing

The hydraulic tank breather / filter and hydraulic oil fill cover is located under the rear cover.

Figure 143



Use the start key to unlock and open the rear cover (Item 1) **[Figure 143]**.

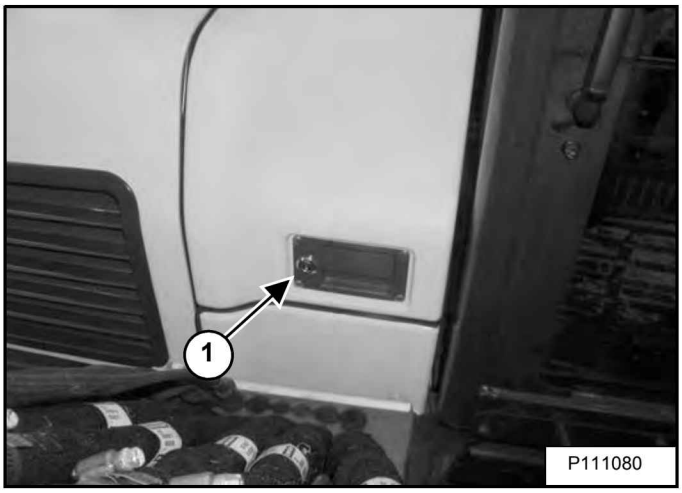
Close and lock the rear cover when the service procedure is completed.

CENTER COVER

Opening And Closing

The battery, circuit breaker, fusible links, some relays and the swing motor are located under the center cover.

Figure 144



Use the start key (Item 1) **[Figure 144]** to unlock the latch.

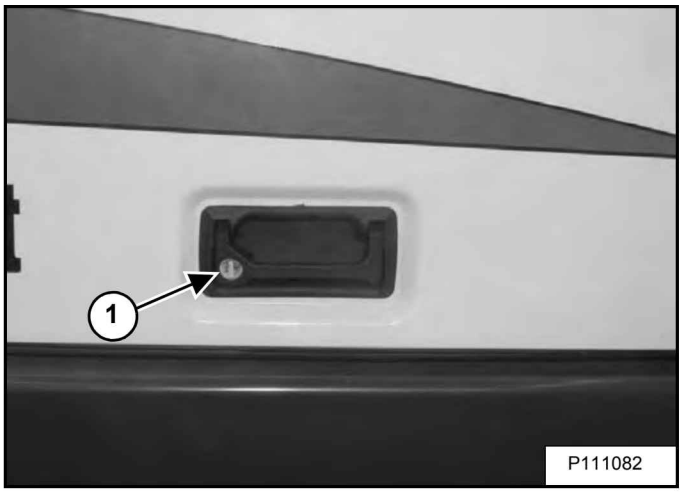
Pull the latch (Item 1) **[Figure 144]** and raise the cover.

Close and lock the center cover when the service procedure is completed.

RIGHT SIDE COVER

Opening And Closing

Figure 145



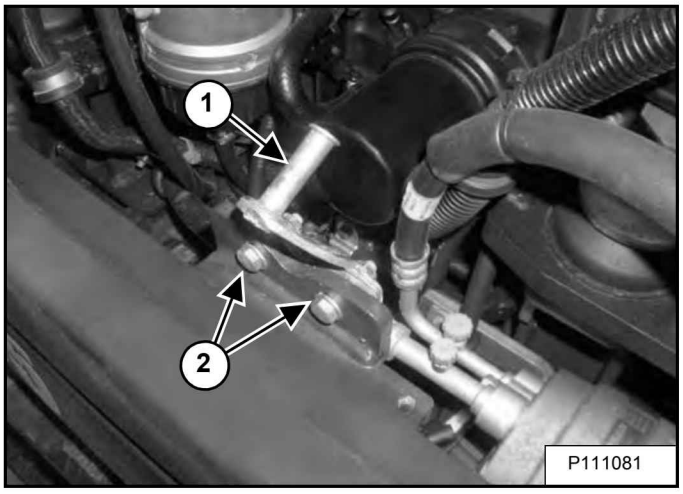
Use the start key (Item 1) **[Figure 145]** to unlock the latch.

Pull the latch (Item 1) **[Figure 145]** and raise the right side cover.

Close and lock the center cover when the service procedure is completed.

Adjusting The Latch

Figure 146



The right side cover latch (Item 1) **[Figure 146]** can be adjusted.

Loosen the bolts and nuts (Item 2) **[Figure 146]** and adjust the latch. Tighten the nuts after the adjustment is made.

Close the right side cover before operating the excavator.

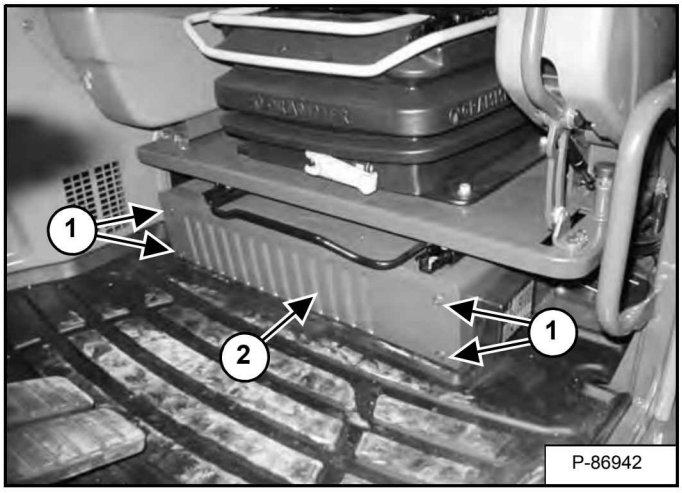
CAB FILTERS

Cleaning And Maintenance

There are two cab air filters that must be cleaned regularly. One filter is located below the operator seat. The second one is located to the left side of the operator seat. (See SERVICE SCHEDULE on Page 95.)

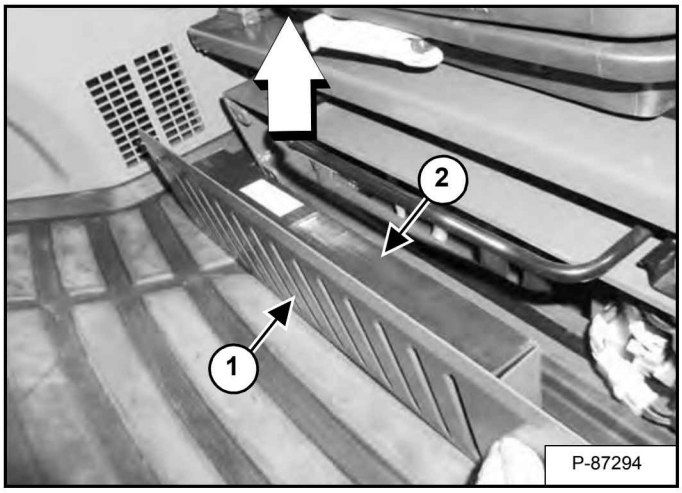
Below Seat Air Filter

Figure 147



Remove the four bolts (Item 1) from the cover (Item 2) **[Figure 147]**.

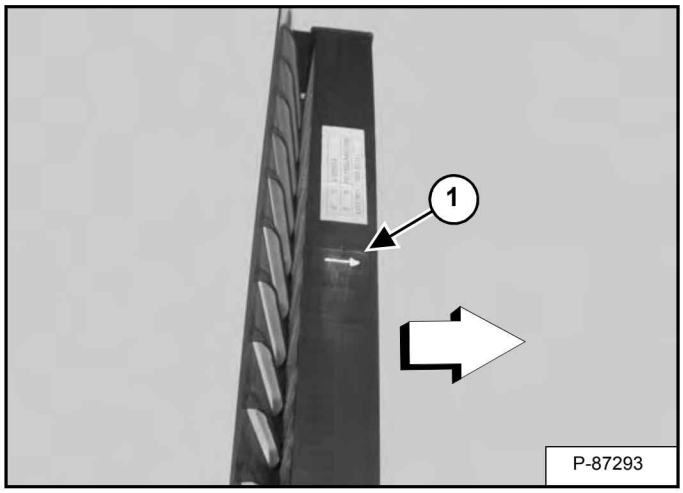
Figure 148



Remove the cover (Item 1) and pull up the filter (Item 2) **[Figure 148]** to remove from the cover.

Use low air pressure to clean the filter. Replace the filter when very dirty.

Figure 149

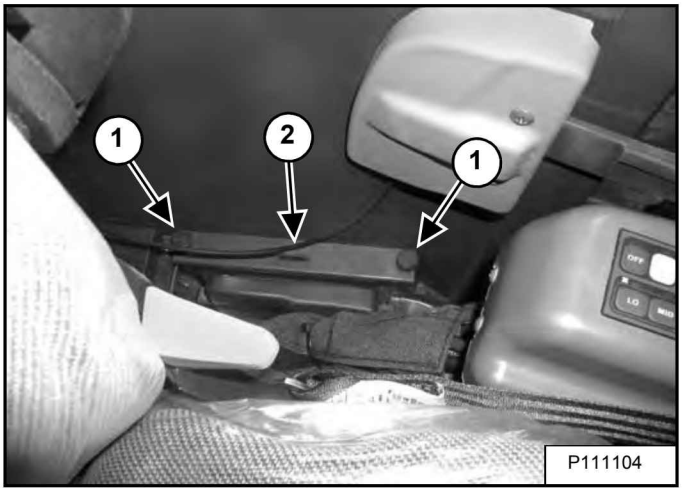


Installation: Install the filter with the arrows that indicate air flow direction (Item 1) **[Figure 149]** pointing toward the heater / A/C housing.

Cleaning And Maintenance (Cont'd)

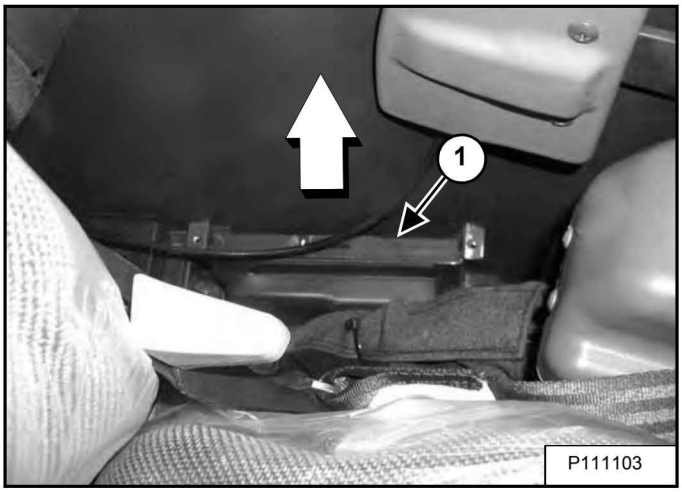
Left Side Of Seat Air Filter

Figure 150



Remove the two bolts (Item 1) and the cover (Item 2) **[Figure 150]**.

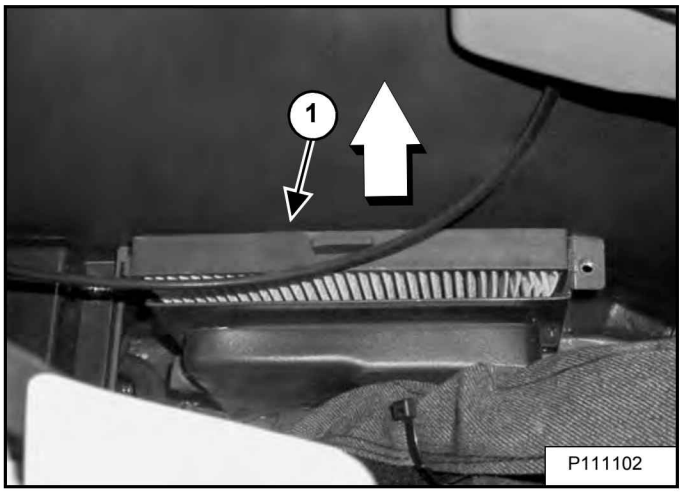
Figure 151



Pull up on and remove the filter (Item 1) **[Figure 151]**.

Use low air pressure to clean the filter. Replace the filter when very dirty.

Figure 152



Installation: Install the filter with the arrows that indicate air flow direction (Item 1) **[Figure 152]** pointing toward the outside of the cab.

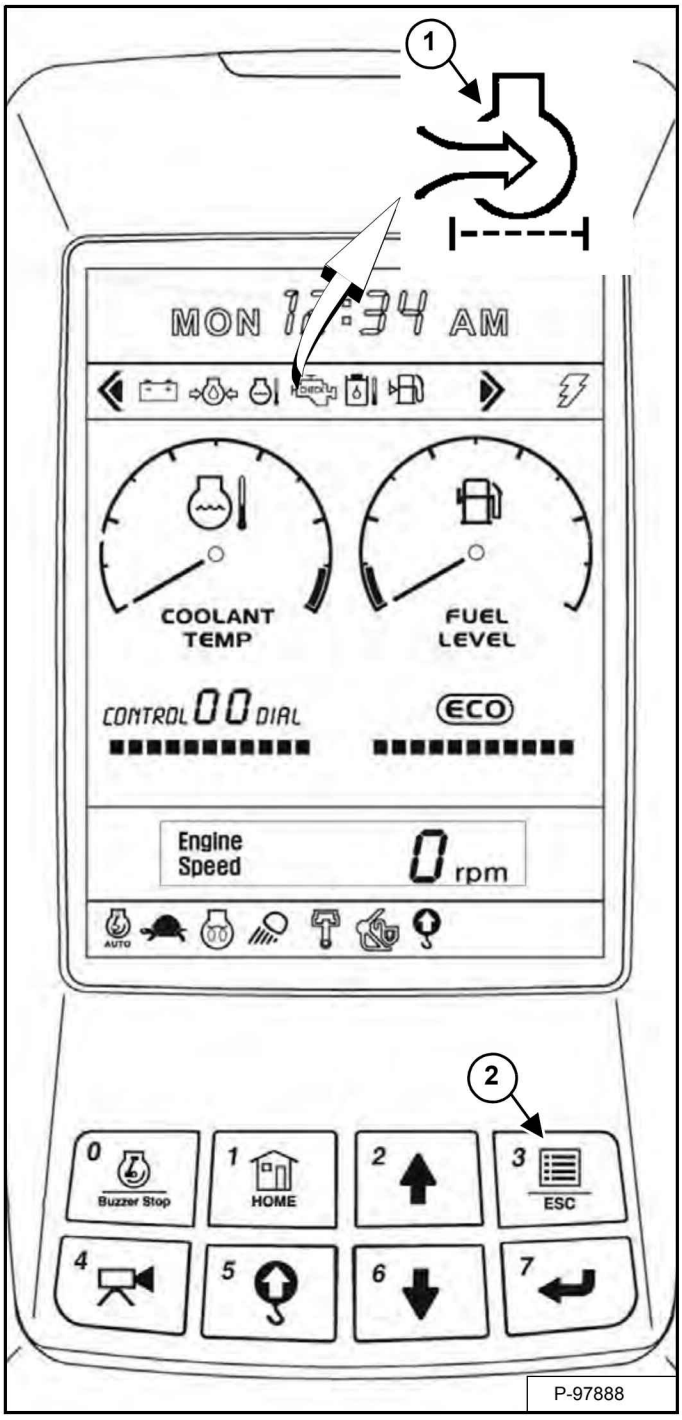
Install the cover (Item 2) and the two bolts (Item 1) **[Figure 150]**.

AIR CLEANER SERVICE

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 95.)

Daily Check

Figure 153

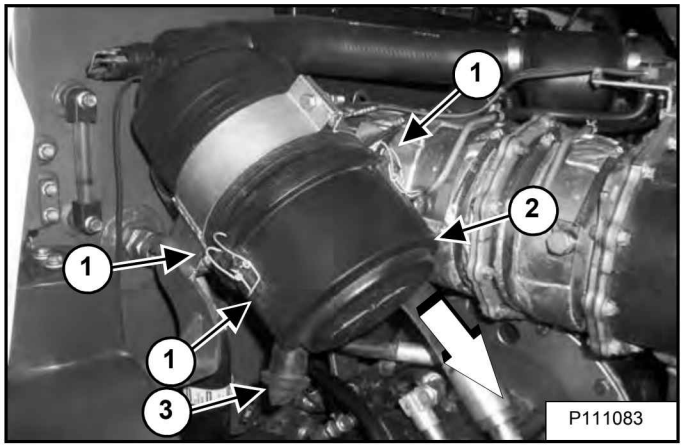


The *Check Air Cleaner Condition Icon* (Item 1) will appear in the top bar of the display panel when it is time to service the air filter. The pop-up window can be temporarily inactivated by pressing the ENTER / ESC button (Item 2) **[Figure 153]**. The pop-up will reappear each time the engine is started until the filter(s) are serviced.

Replacing Filter Elements

Open the right side cover to access the air cleaner for service. (See RIGHT SIDE COVER on Page 101.)

Figure 154



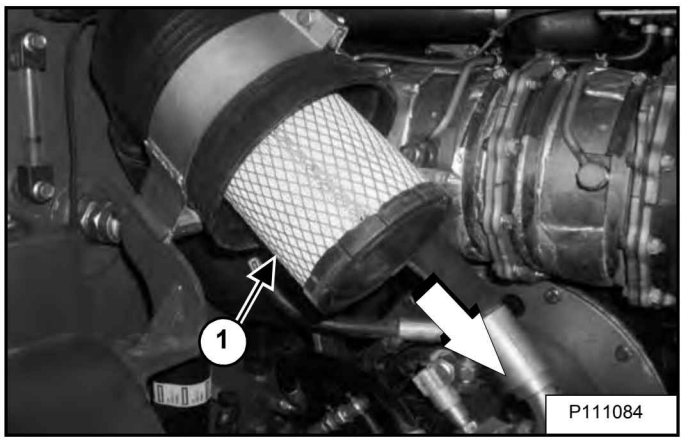
Replace the inner filter every third time the outer filter is replaced or as indicated.

Outer Filter

Release the three fasteners (Item 1) and remove the cover (Item 2) **[Figure 154]**.

Clean the dust cup (Item 3) **[Figure 154]**.

Figure 155



Pull the outer filter (Item 1) **[Figure 155]** 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.

Install the cover (Item 2) and engage the three fastener (Item 1) **[Figure 154]**.

Make sure the dust evacuator cup (Item 3) **[Figure 154]** is in the down position as shown.

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

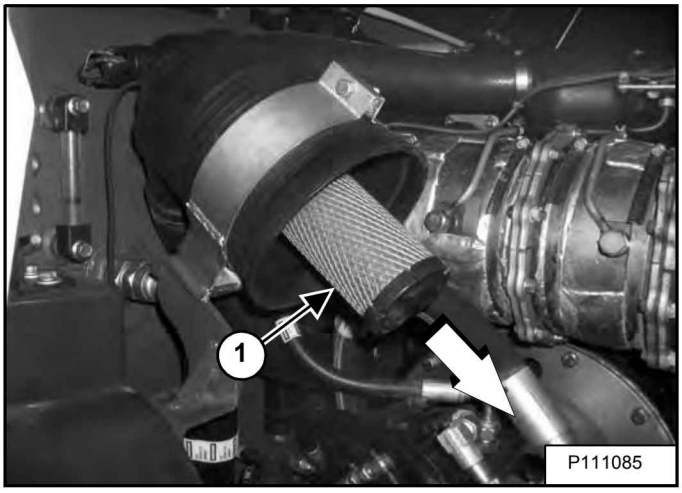
Replacing Filter Elements (Cont'd)

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, start the engine. If the air cleaner condition indicator pop up (Item 1) **[Figure 153]** remains ON, replace the inner filter.

Figure 156



Remove the air cleaner cover, the outer filter and the inner filter (Item 1) **[Figure 156]**.

NOTE: Make sure all sealing surfaces are free of dirt and debris. DO NOT use compressed air.

Install the new inner filter (Item 1) **[Figure 156]**.

Install the outer filter and the air cleaner cover.

FUEL SYSTEM

Fuel Specifications

Use only clean, high quality diesel fuel, Grade Number 2-D or Grade Number 1-D.

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

TEMPERATURE	GRADE 2-D	GRADE 1-D
Above -9°C (+15°F)	100%	0%
Down to -29°C (-20°F)	50%	50%
Below -29°C (-20°F)	0%	100%

Ultra low sulfur diesel fuel must be used in this machine. Ultra low sulfur is defined as 15 mg/kg (15 ppm) sulfur maximum.

NOTE: Biodiesel blend fuel may also be used in this machine. Biodiesel blend fuel must contain no more than five percent biodiesel mixed with ultra low sulfur petroleum based diesel. This biodiesel blend fuel is commonly marketed as B5 blended diesel fuel. B5 blended diesel fuel must meet ASTM D975 (US Standard) or EN590 (EU Standard) specifications.

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

Apply the following guidelines if biodiesel blend fuel is used:

- Ensure the fuel tank is as full as possible at all times to prevent moisture from collecting in the fuel tank.
- Ensure that the fuel tank cap is securely tightened.
- Biodiesel blend fuel can damage painted surfaces, remove all spilled fuel from painted surfaces immediately.
- Drain all water from the fuel filter daily before operating the machine.
- Do not exceed engine oil change interval. Extended oil change intervals can cause engine damage.
- Before vehicle storage; drain the fuel tank, refill with 100% petroleum diesel fuel, add fuel stabilizer, and operate the engine for at least 30 minutes.

NOTE: Biodiesel blend fuel does not have long term stability and should not be stored for more than 3 months.

Filling The Fuel Tank

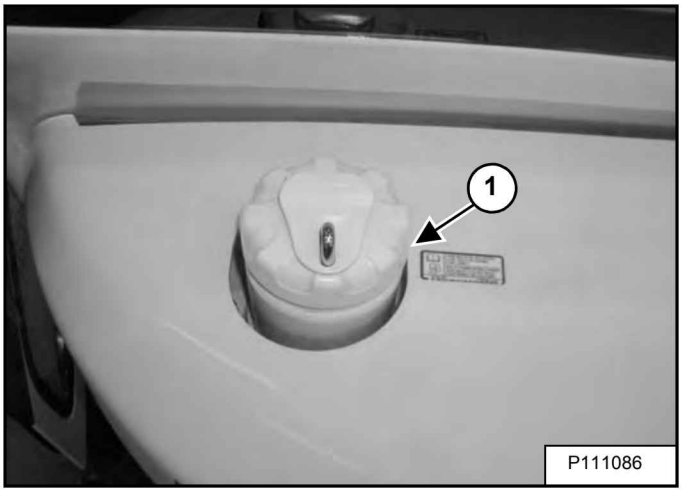
⚠ WARNING

AVOID INJURY OR DEATH

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

W-2063-0807

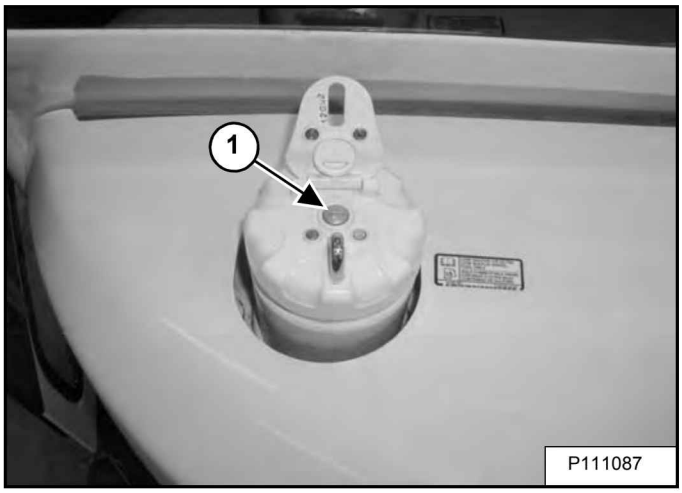
Figure 157



The fuel cap (Item 1) **[Figure 157]** is located behind the left corner of the operator cab.

Rotate the fuel fill cap (Item 1) **[Figure 157]** counterclockwise to remove.

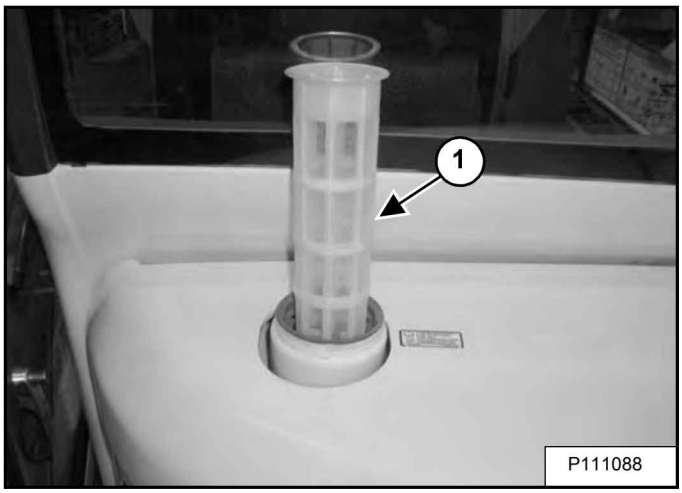
Figure 158



NOTE: The fuel cap can be locked (Item 1) [Figure 158] with the start key. The fuel cap does not automatically lock when installed. The key must be used to lock the cap.

NOTE: A paddle lock can also be used on the fuel cap latch to secure the latch closed (covering the fuel cap key lock) and not allow the start key to unlock the fuel cap.

Figure 159



Inspect the fuel strainer (Item 1) **[Figure 159]** for damage. Replace if damaged. Always have the fuel strainer installed when filling the fuel tank.

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. (Use the start key to lock the cap, if desired.)

Clean up any spilled fuel.

Fuel Filters

Removing Water

⚠ WARNING

AVOID INJURY OR DEATH

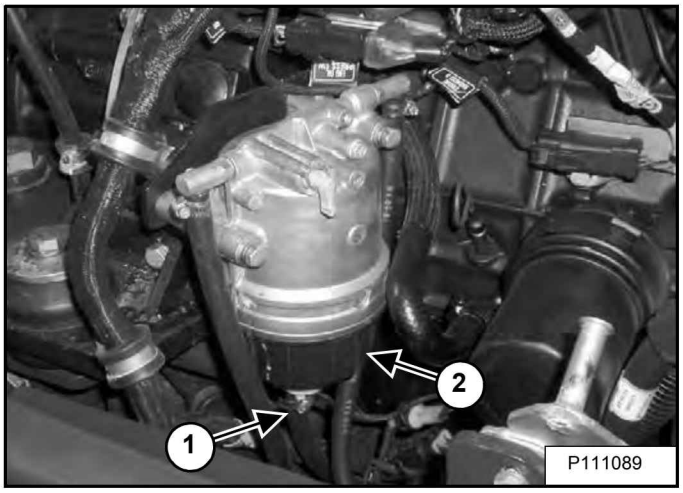
Diesel fuel or hydraulic fluid under pressure can penetrate skin or eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. Do not use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical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

W-2072-0807

See the SERVICE SCHEDULE for the service interval when to remove water from the fuel water separator. (See SERVICE SCHEDULE on Page 95.)

Open the right side cover. (See RIGHT SIDE COVER on Page 101.)

Figure 160

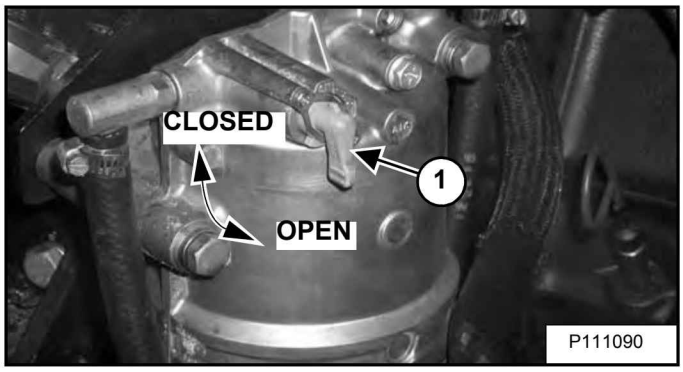


Loosen the drain (Item 1) **[Figure 160]** at the bottom of the fuel water separator to drain water from the filter into a container.

Clean up any spilled fuel.

Replacing Elements

Figure 161



See the SERVICE SCHEDULE for the service interval when to replace the fuel filter. (See SERVICE SCHEDULE on Page 95.)

Fuel Water Separator

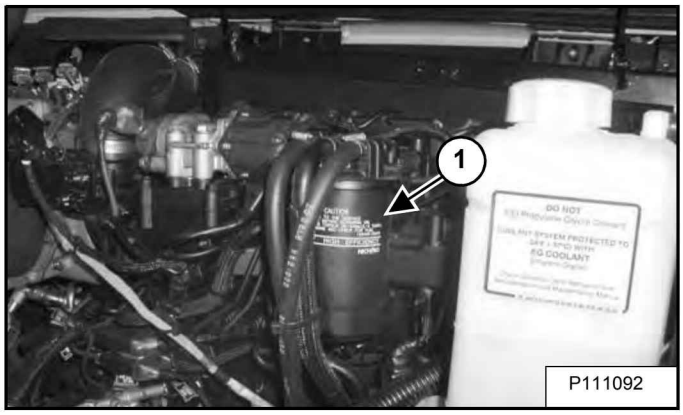
Turn the shut off valve (Item 1) **[Figure 161]** clockwise to the closed position.

Remove the housing (Item 2) **[Figure 160]** and replace the screen.

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

Turn the shut off valve (Item 1) **[Figure 161]** counterclockwise to the open position.

Figure 162



Fuel Filter

Turn the shut off valve (Item 1) **[Figure 161]** clockwise to the closed position.

Remove the filter (Item 1) **[Figure 162]**.

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

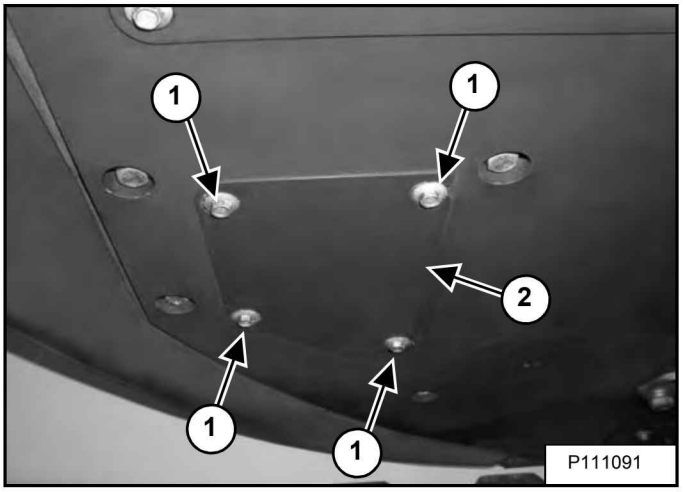
Turn the shut off valve (Item 1) **[Figure 161]** counterclockwise to the open position.

Remove the air from the fuel system. (See Removing Air From The Fuel System on Page 109.)

Draining The Fuel Tank

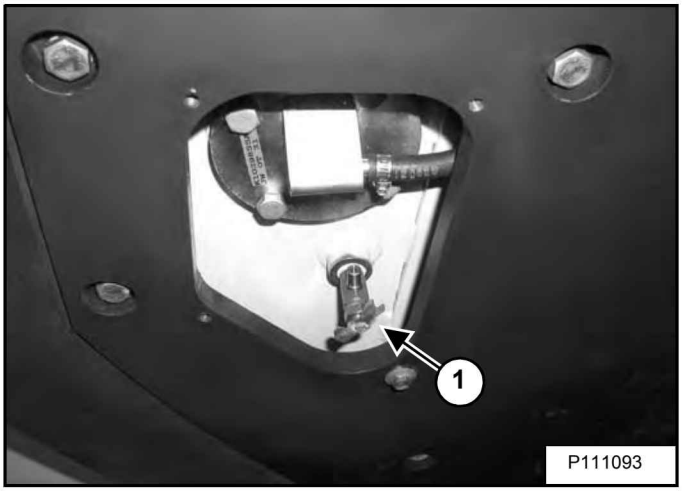
See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 95.)

Figure 163



Remove four bolts / washers (Item 1) and remove the access cover (Item 2) **[Figure 163]** from below the rear of the excavator.

Figure 164



Install a drain hose on the drain valve (Item 1) **[Figure 164]** at the bottom of the fuel tank. Route the hose to a container.

Drain the fuel into a container. Tighten the drain valve after fuel has been removed.

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

⚠ 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

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.

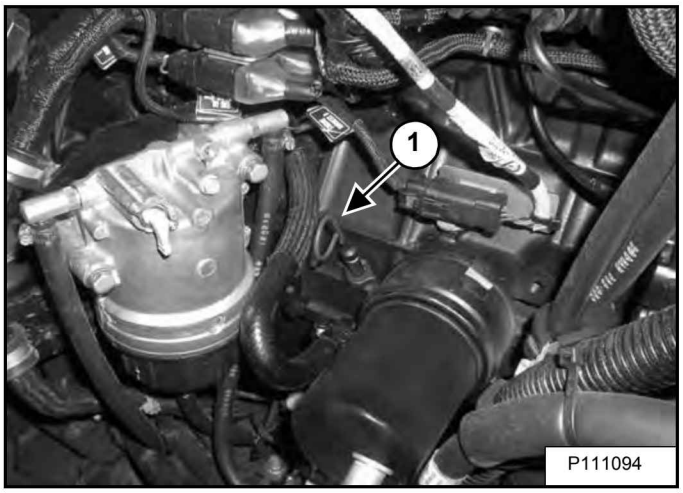
Turn the start key to the ON position for 10 - 15 seconds.

The electric fuel pump will supply fuel under pressure and force air from the system.

Checking And Adding Engine Oil

Check the engine oil every day before starting the engine for the work shift.

Figure 165



Open the right side cover. (See RIGHT SIDE COVER on Page 101.)

Remove the dipstick (Item 1) **[Figure 165]**.

Keep the oil level between the marks on the dipstick.

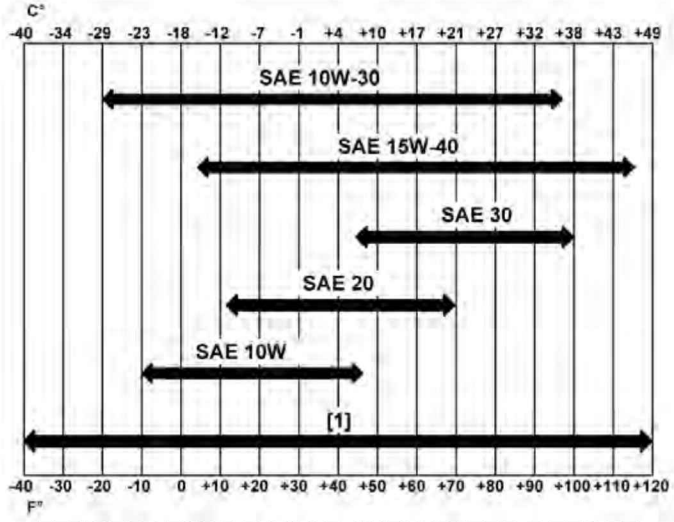
Reinstall the dipstick.

Close the right side cover. (See RIGHT SIDE COVER on Page 101.)

Engine Oil Chart

Figure 166

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



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

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

Use good quality engine oil that meets API Service Classification of CJ-4 or better **[Figure 166]**.

⚠ WARNING

AVOID INJURY OR DEATH

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

W-2103-0508

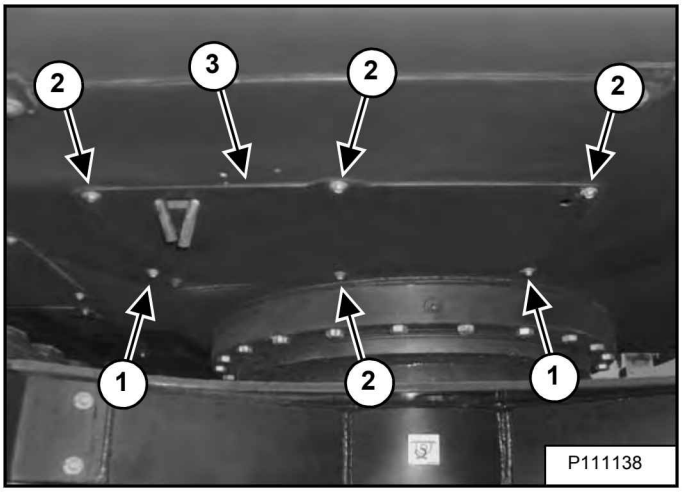
Removing And Replacing Oil And Filter

See the SERVICE SCHEDULE for the service interval for replacing the engine oil and filter. (See SERVICE SCHEDULE on Page 95.)

Run the engine until it is at operating temperature. Rotate the upperstructure 90° for access to the bottom engine cover and the engine oil pan drain plug. Stop the engine.

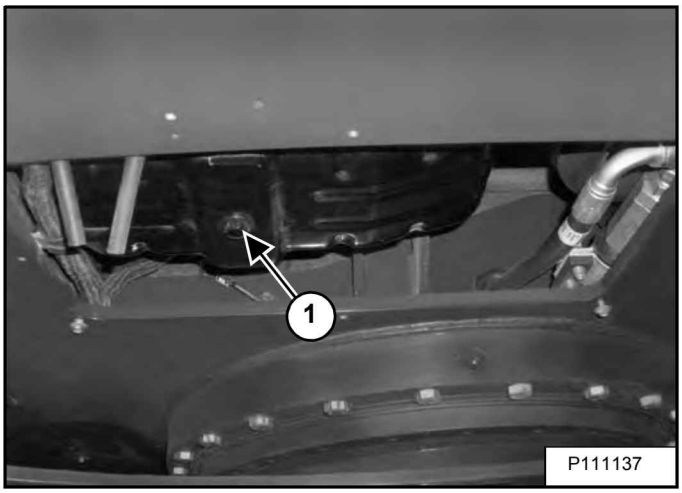
Open the right side cover.

Figure 167



From under the machine, loosen the two bolts (Item 1) and remove four bolts / washers (Item 2) from the access cover (Item 3) **[Figure 167]** from below the engine area. Remove the access cover.

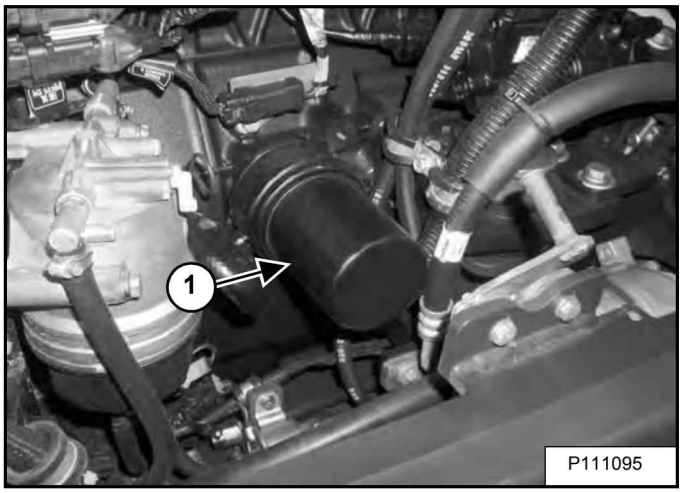
Figure 168



Remove the plug (Item 1) **[Figure 168]** from the engine oil pan. Drain the oil into a container.

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

Figure 169

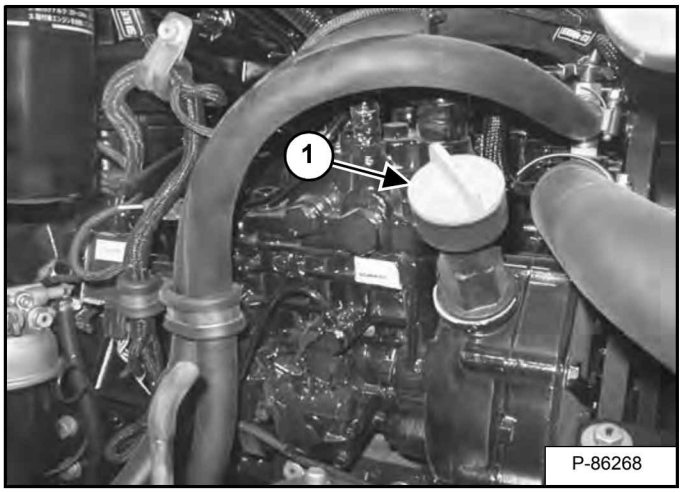


Remove the oil filter (Item 1) **[Figure 169]** and clean the filter housing surface.

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

Install and tighten the plug (Item 1) **[Figure 168]**.

Figure 170



NOTE: The engine has two fill caps. One fill cap is located on the valve cover and the second fill cap (Item 1) [Figure 170] is located on the side of the engine and is the easiest to access.

Remove the fill cap (Item 1) **[Figure 170]**.

Put the correct amount of oil in the engine. (See Capacities on Page 187.)

Install the fill cap.

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.

Reinstall the access cover (Item 3) **[Figure 167]** and tighten the bolts.

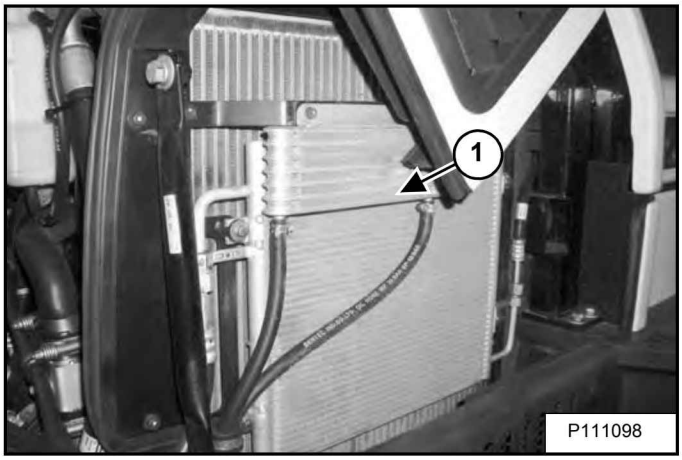
ENGINE COOLING SYSTEM

Check the cooling system every day to prevent overheating, loss of performance or engine damage.

Cleaning

Open the right side cover. (See RIGHT SIDE COVER on Page 101.)

Figure 171



Use air pressure or water pressure to clean the radiator, oil cooler, air conditioning condenser and the fuel cooler (Item 1) **[Figure 171]**. Be careful not to damage fins when cleaning.

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

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

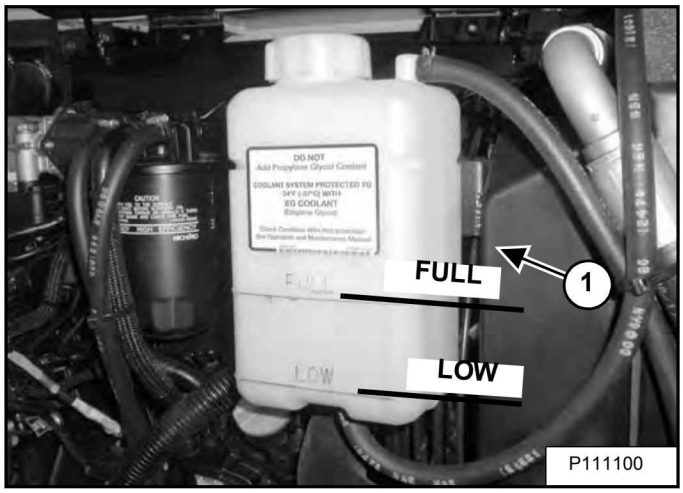
Wear safety glasses to prevent eye injury when any of the following conditions exist:

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

W-2019-0907

Open the right side cover.

Figure 172



Check the coolant level in the coolant recovery tank (Item 1) **[Figure 172]**.

The coolant level must be between the LOW and FULL marks on the coolant recovery tank (Item 1) **[Figure 172]** when the engine is cold.

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

IMPORTANT

AVOID ENGINE DAMAGE

Always use the correct ratio of water to antifreeze.

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

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

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

I-2124-0497

Removing And Replacing Coolant

See the SERVICE SCHEDULE for correct service intervals. (See SERVICE SCHEDULE on Page 95.)

Stop the engine. Open the right side cover. (See RIGHT SIDE COVER on Page 101.)

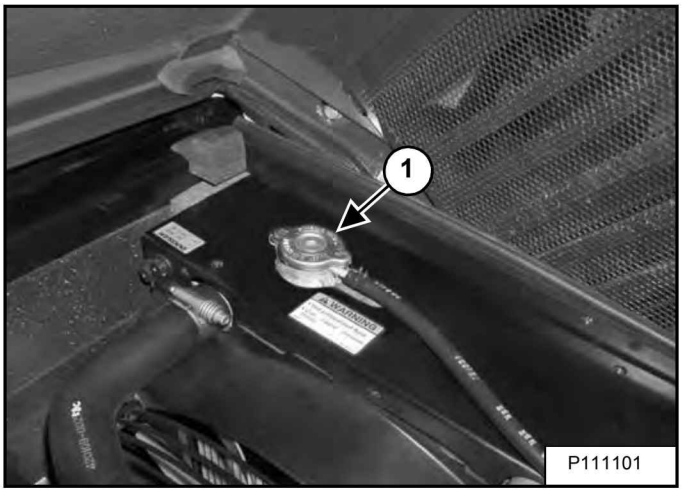
⚠ WARNING

AVOID BURNS

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

W-2070-1203

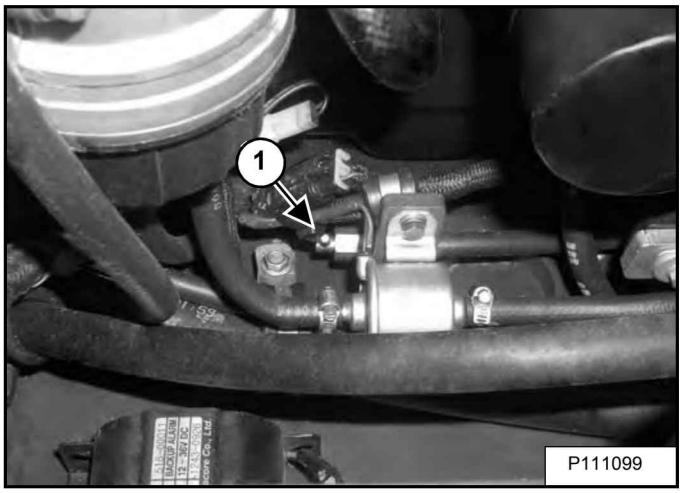
Figure 173



When the engine is cool, loosen and remove the radiator cap (Item 1) **[Figure 173]**.

Rotate the upperstructure 90° to access the lower engine access cover. Remove the lower engine access cover so coolant can be drained into a container.

Figure 174



Open the drain valve (Item 1) **[Figure 174]** (located below the engine oil filter) and drain the coolant into the container.

After all the coolant is removed, close the drain valve (Item 1) **[Figure 174]**.

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

Mix the coolant in a separate container. (See Capacities on Page 187.)

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

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

Add premixed coolant; 50% water and 50% ethylene glycol to the recovery tank if the coolant level is low.

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.

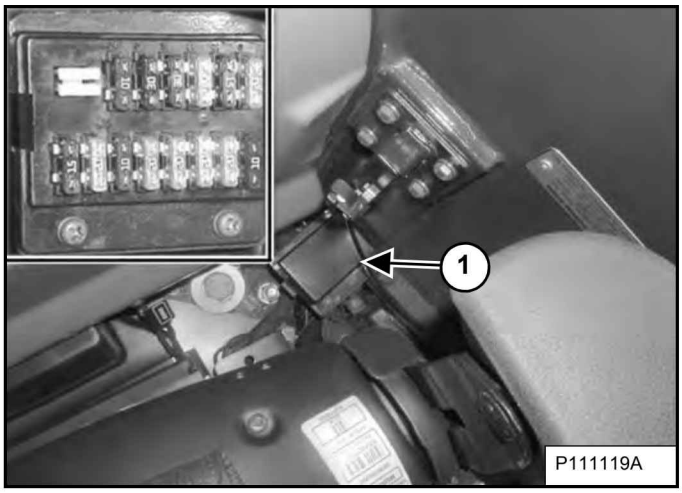
Add coolant to the recovery tank as needed.

Reinstall the lower engine access cover.

Close the right side cover.

Description

Figure 175



The excavator has a 12 volt, negative ground electrical system. The electrical system is protected by fuses located below the left rear side of the operator's seat (Item 1) **[Figure 175]**. The fuses will protect the electrical system when there is an electrical overload. The reason for the overload must be found 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.

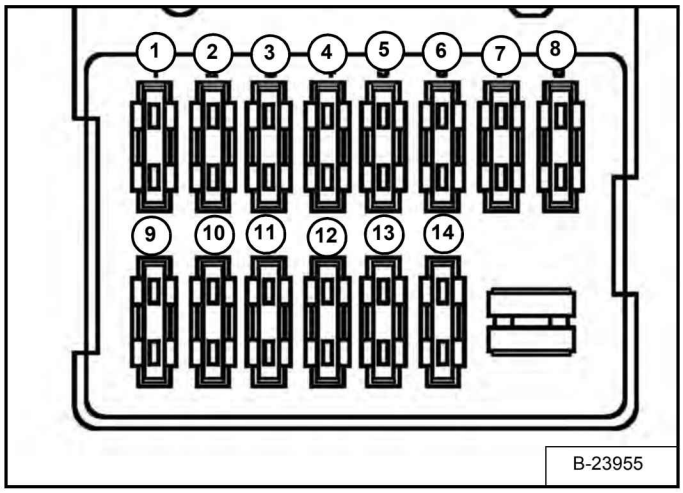
W-2065-0807

Fuse And Relay Location / Identification

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

Remove the cover to check or replace the fuses.

Figure 176

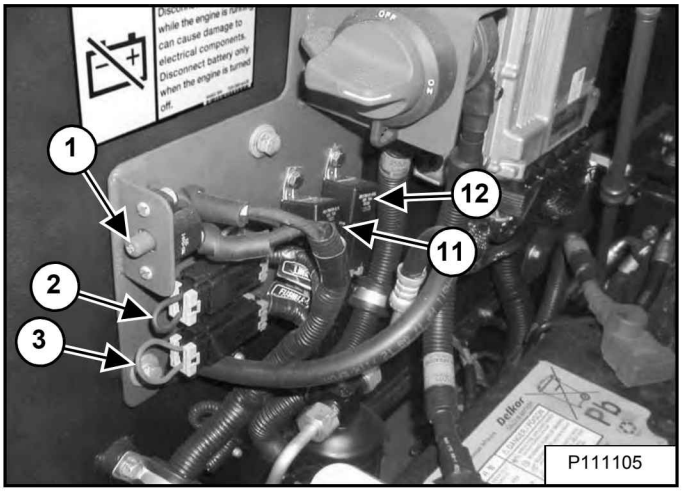


The fuse location and sizes are shown **[Figure 176]** and in the below chart.

REF	DESCRIPTION	AMP
1	Beacon / Strobe Light (Optional)	10
2	Horn, Wiper, Washer	20
3	Heated Seat (Optional), HVAC Panel	20
4	Stereo	20
5	12 Power Port, HVAC Unit	20
6	Pilot Cutoff	10
7	Work Lights	20
8	Cab Lights	15
9	Interior Lights, Fuel Pump	20
10	Start Switch	15
11	Instrument Panel, VCU, ECU	30
12	A/C Compressor	30
13	Spare Fuse	30
14	Spare Fuse	10

Fuse And Relay Location / Identification (Cont'd)

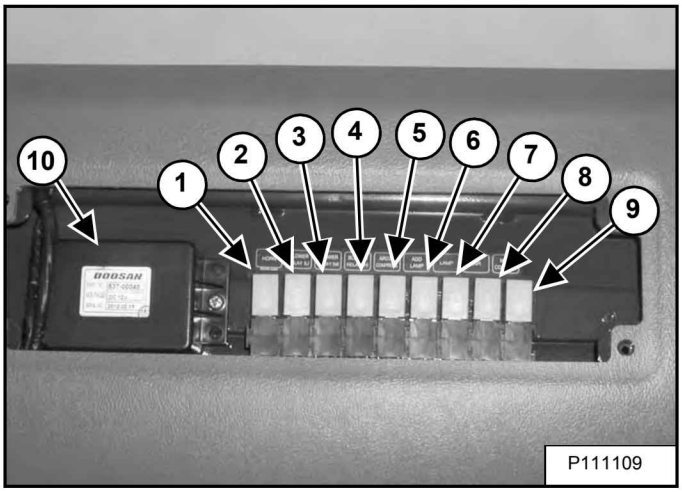
Figure 177



A 60 amp circuit breaker (Item 1) and two fusible links (Item 2) 27 amp and (Item 3) 45 amp **[Figure 177]** are located under the front center cover.

The 27 amp fusible link (Item 2) is for the start circuit and the 45 amp fusible link (Item 3) **[Figure 177]** is for the pre-heat circuit.

Figure 178



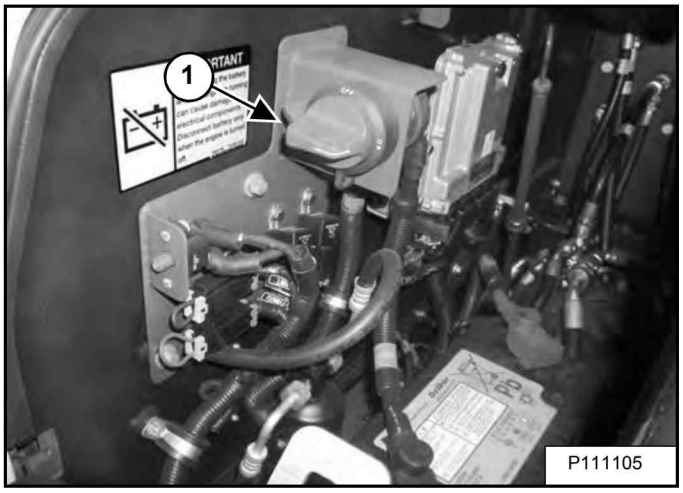
The relays are shown in **[Figure 177]** and in the below chart. The relays are located behind the access panel that is located behind the operator's seat.

REF	DESCRIPTION
1	Horn
2	Blower (1) (Lo)
3	Blower (2) (Med)
4	Blower (3) (High)
5	Compressor
6	Additional Lights (Cab Work Lights)
7	Lights
8	EGR
9	Main Controller
10	Controller
11	Pre-Heat
12	Starter

NOTE: Relays (Item 11 and 12) [Figure 177] are located under the center cover.

Master Disconnect Switch

Figure 179

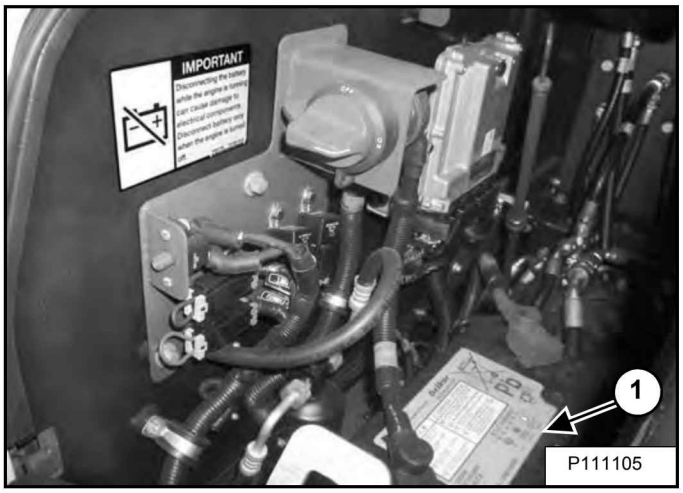


The excavator has a master disconnect switch (Item 1) **[Figure 175]** located under the center cover. The switch will disconnect the ground circuit between the battery and the frame.

Battery Maintenance

Open the center cover. (See CENTER COVER on Page 101.)

Figure 180



The battery (Item 1) **[Figure 180]** is located under the center cover.

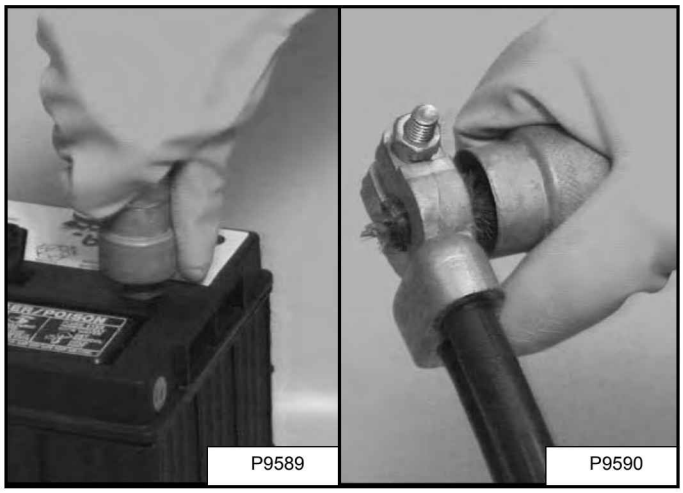
IMPORTANT

AVOID ELECTRICAL COMPONENT DAMAGE

Disconnecting the battery while the engine is running can cause damage to electrical components. Disconnect battery only when the engine is turned OFF.

I-2374-0513

Figure 181



The battery cables must be clean and tight **[Figure 181]**. Remove acid or corrosion from the battery and cables using a sodium bicarbonate and water solution. Cover the battery terminals and cable ends with battery saver grease to prevent corrosion.

Check for broken or loose connections.

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

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

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

⚠ WARNING

AVOID INJURY OR DEATH

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

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

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

W-2065-0807

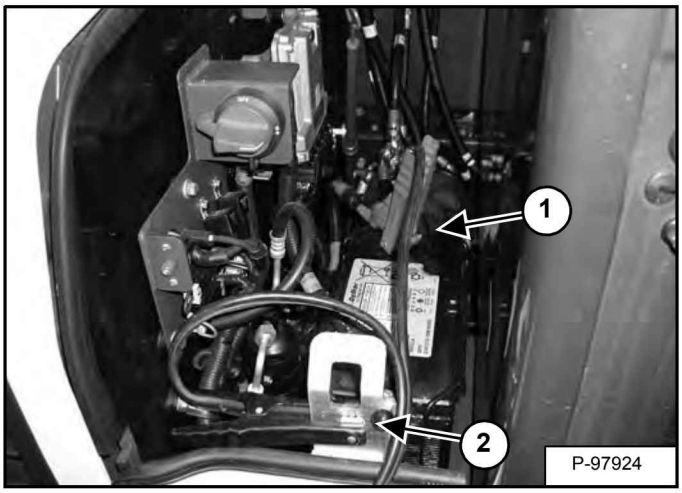
Using A Booster Battery (Jump Starting)

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 center cover. (See CENTER COVER on Page 101.)

Figure 182



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 182]** of the excavator battery.

Connect one end of the second cable to the negative (-) terminal of the booster battery. Connect the other end of the same cable to a frame ground (Item 2) **[Figure 182]** (not at the battery negative (-) post).

Start the engine. After the engine has started, remove the ground (-) cable first (Item 2) **[Figure 182]**.

Disconnect the cable from the battery (Item 1) **[Figure 182]**.

NOTE: (See Cold Temperature Starting on Page 66.)

IMPORTANT

Damage to the alternator can occur if:

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

I-2223-0903

⚠ WARNING

AVOID INJURY OR DEATH

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

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

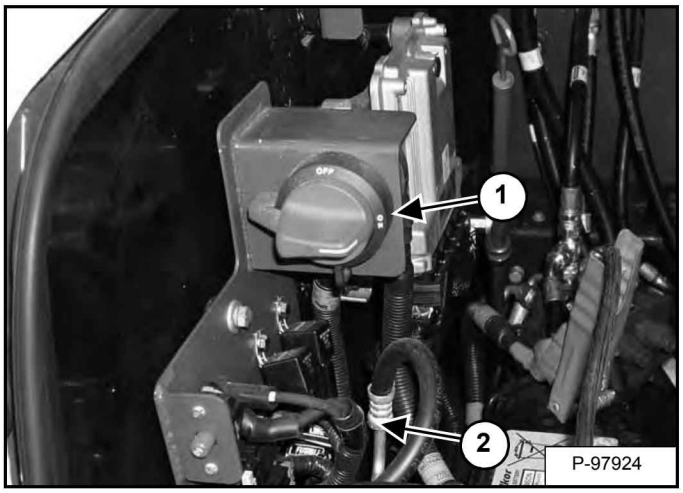
If electrolyte is taken internally drink large quantities of water or milk! DO NOT induce vomiting. Get prompt medical attention.

W-2065-0807

Removing And Installing Battery

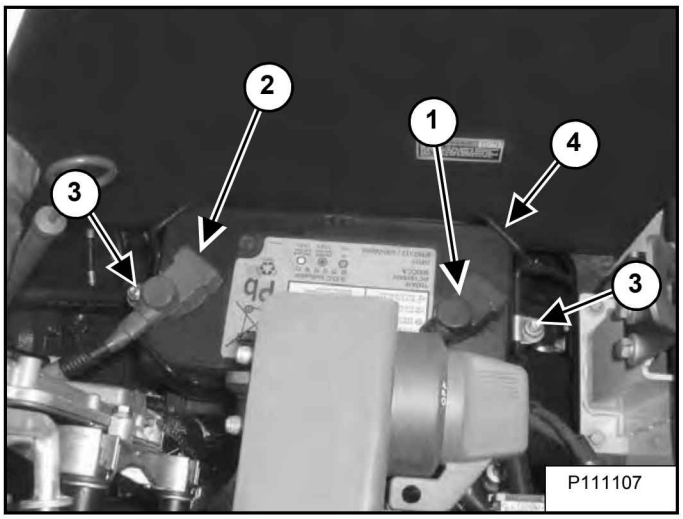
Open the center cover. (See CENTER COVER on Page 101.)

Figure 183



Rotate the master disconnect switch (Item 1) **[Figure 183]** counterclockwise to the OFF position.

Figure 184



Disconnect the negative (-) cable (Item 1) **[Figure 184]** first.

Disconnect the positive (+) cable (Item 2) **[Figure 184]**.

Remove the two nuts and washers (Item 3) and remove the hold-down clamp (Item 4) **[Figure 184]**.

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, washers and tighten the nuts.

Connect the battery cables. Connect the negative (-) cable (Item 1) **[Figure 184]** last to prevent sparks.

Rotate the master disconnect switch (Item 1) **[Figure 183]** clockwise to the ON position.

Close the center cover. (See CENTER COVER on Page 101.)

⚠ 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

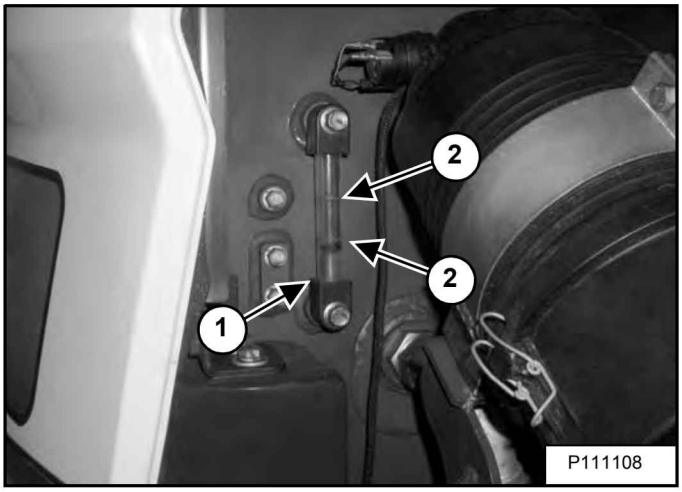
Checking And Adding Fluid

Put the machine on a 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 101.)

Figure 185



Check the hydraulic fluid level, it must be visible in the sight gauge (Item 1) between the two red lines (Item 2) **[Figure 185]**.

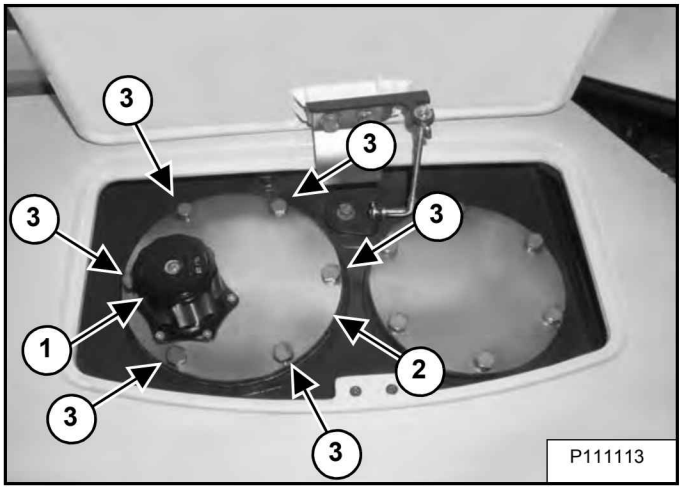
⚠ WARNING

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 186



Open the rear cover. (See REAR COVER on Page 101.)

NOTE: When removing the hydraulic cover (Item 2), there is spring pressure under the cover. Push down on the cover while removing the bolts (Item 3) [Figure 186].

Clean the surface around the reservoir (breather) cap (Item 1) and cover (Item 2) fully. Press down on the cover (Item 2) and remove the six bolts (Item 3) from the cover (Item 2) **[Figure 186]**. Remove the cover.

Add the correct fluid to the reservoir until it is visible in the sight gauge. (See REGULAR MAINTENANCE ITEMS on Page 7.)

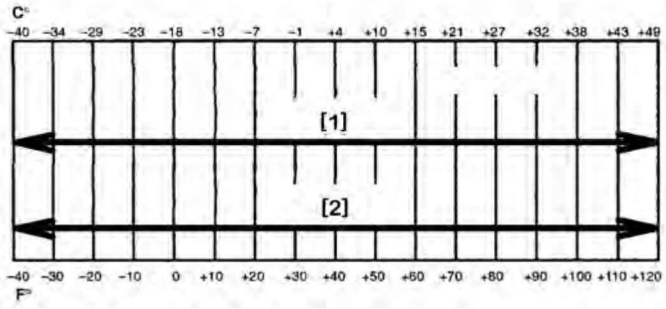
Check the O-ring under the cover (Item 2) **[Figure 186]**. Replace the O-ring if damaged.

Reinstall the cover and align the bolt holes. Press down on the cover (Item 2) and install the six bolts (Item 3) **[Figure 186]**. Tighten the bolts.

Close the rear cover.

Hydraulic Fluid Chart

Figure 187
RECOMMENDED ISO VISCOSITY GRADE (VG) AND VISCOSITY INDEX (VI)



TEMPERATURE RANGE ANTICIPATED DURING MACHINE USE

[1] Synthetic Fluid; VG 46; Minimum VI 150
[2] BOBCAT Hydraulic / Hydrostatic Fluid

Use the correct hydraulic fluid shown in chart **[Figure 187]**.

Add hydraulic fluid as needed to bring the level to the center of sight gauge (Item 1) **[Figure 185]**.

Reinstall the cover and align the bolt holes. Press down on the cover (Item 2) and install the four bolts (Item 3) **[Figure 186]**. Tighten the bolts.

Removing And Replacing Hydraulic Filters

Hydraulic Return Filter

⚠ WARNING

AVOID INJURY OR DEATH

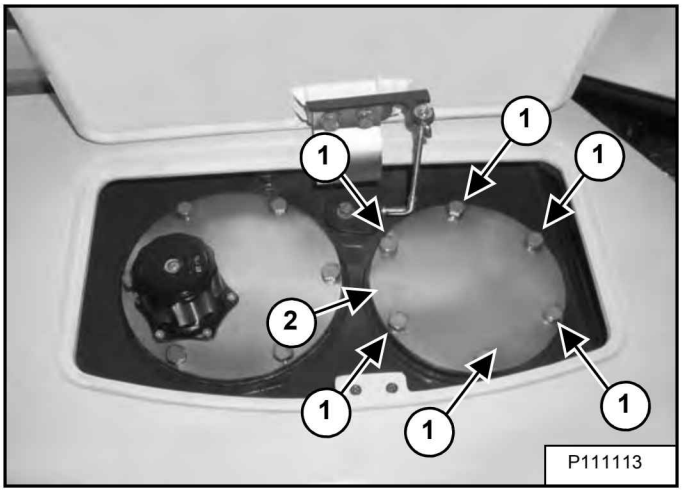
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire.

W-2103-0508

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 95.)

Open the rear cover. (See REAR COVER on Page 101.)

Figure 188

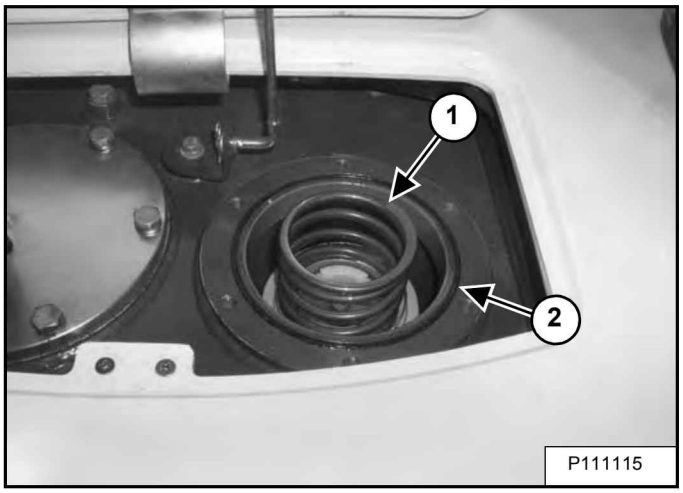


NOTE: When removing the cover (Item 2), there is spring pressure under the cover. Push down on the cover while removing the bolts (Item 1) [Figure 188].

Clean the surface around the cover (Item 2) **[Figure 188]** fully.

Press down on the cover (Item 2) and remove the six bolts (Item 1) **[Figure 188]** and remove the cover.

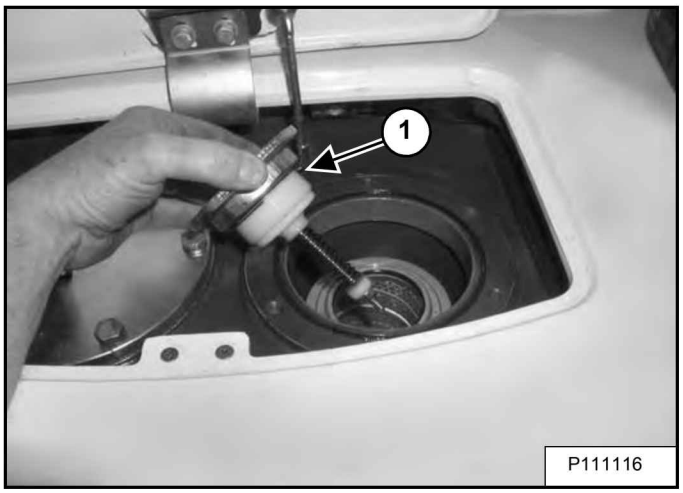
Figure 189



Remove the spring (Item 1) **[Figure 189]**.

Inspect the O-ring (Item 2) **[Figure 189]** for damage. Replace if damaged.

Figure 190

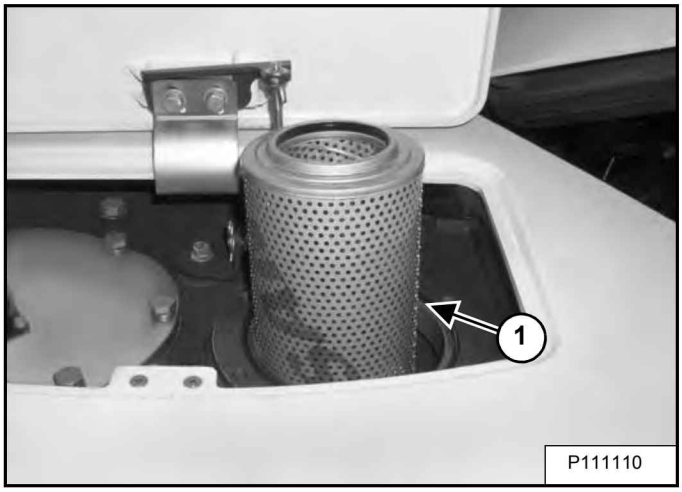


Remove the valve (Item 1) **[Figure 190]**.

Removing And Replacing Hydraulic Filters (Cont'd)

Hydraulic Return Filter (Cont'd)

Figure 191



Remove the return filter (Item 1) **[Figure 191]**.

Install the new filter (Item 1) **[Figure 191]**.

Reinstall the valve (Item 1) **[Figure 190]**.

Reinstall the spring (Item 1) **[Figure 189]**.

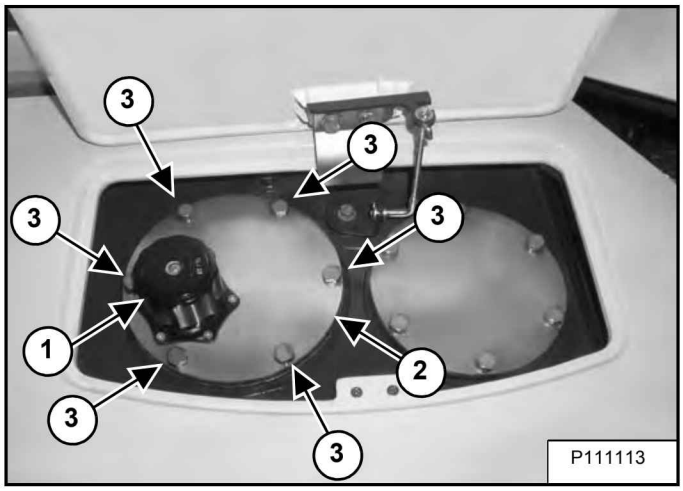
Reinstall the cover and align the bolt holes. Press down on the cover (Item 2) and install the six bolts (Item 1) **[Figure 188]** and tighten the bolts.

Hydraulic Suction Filter

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 95.)

Open the rear cover. (See REAR COVER on Page 101.)

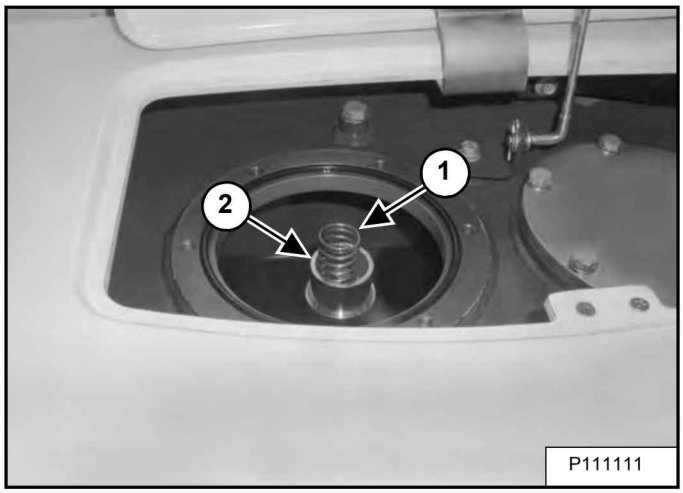
Figure 192



NOTE: When removing the cover (Item 2), there is spring pressure under the cover. Push down on the cover while removing the bolts (Item 3) [Figure 192].

Clean the surface around the reservoir (breather) cap (Item 1) and cover (Item 2) fully. Remove the six bolts (Item 3) from the cover (Item 2) **[Figure 192]** and remove the cover.

Figure 193



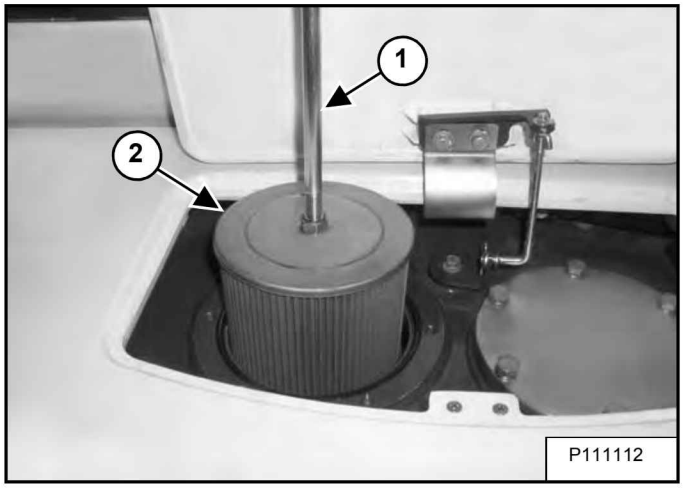
Remove the spring (Item 1) **[Figure 193]**.

Lift up on the rod (Item 2) **[Figure 193]**.

Removing And Replacing Hydraulic Filters (Cont'd)

Hydraulic Suction Filter (Cont'd)

Figure 194



Continue to lift up on the rod (Item 1) until the filter (Item 2) **[Figure 194]** is removed from the tank.

NOTE: Before removing the filter (Item 2) [Figure 194] from the rod (Item 1) [Figure 194], measure the distance from the end of the rod to the end of the filter. Install the new filter to the same measured distance so that the spring (Item 1) [Figure 193] pressure will keep the filter installed correctly in the tank.

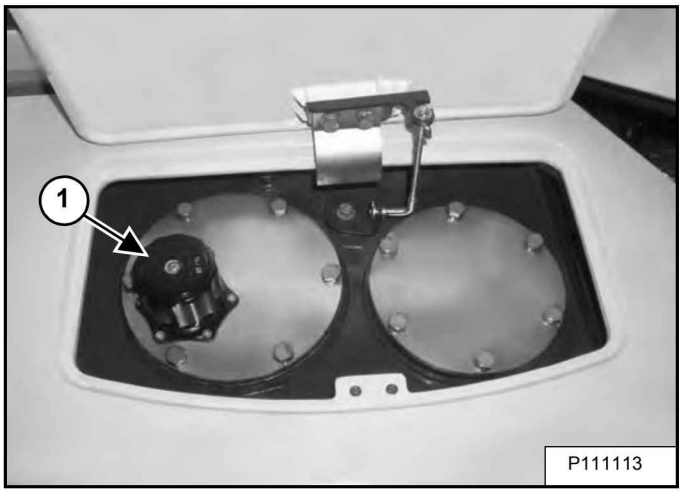
NOTE: When installing the new filter (Item 2) [Figure 194] into the hydraulic tank, make sure to get the filter positioned over the outlet port at the bottom of the hydraulic tank.

Hydraulic Breather Filter

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 95.)

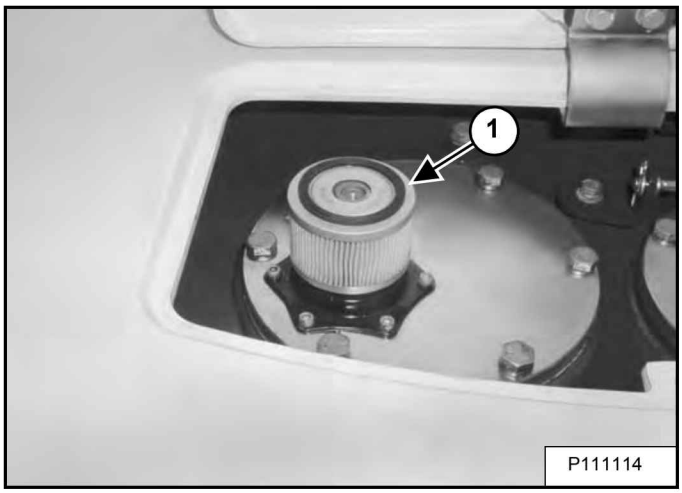
Open the rear cover. (See REAR COVER on Page 101.)

Figure 195



Clean the surface around the reservoir (breather) cap (Item 1) **[Figure 195]** and remove the cap by turning counterclockwise.

Figure 196



Remove and replace the breather filter (Item 1) **[Figure 196]**.

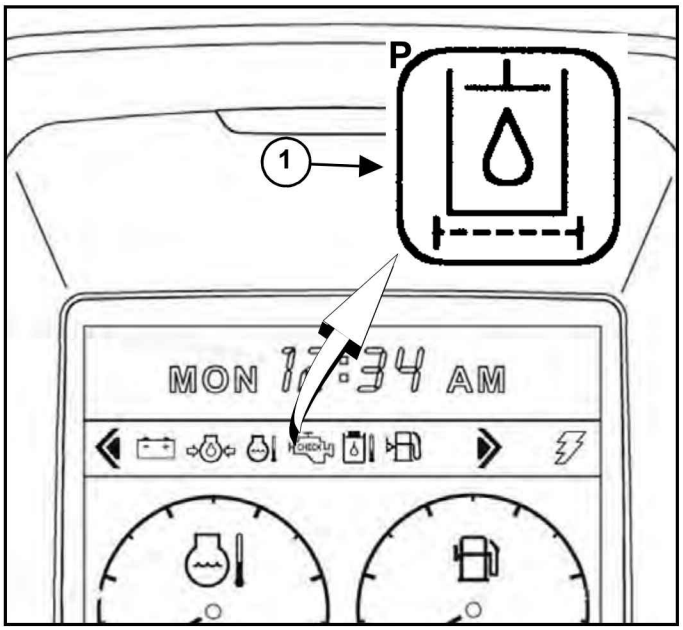
Reinstall the cap (Item 1) **[Figure 195]**.

Removing And Replacing Hydraulic Filters (Cont'd)

Hydraulic Pilot Pressure Filter

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 95.)

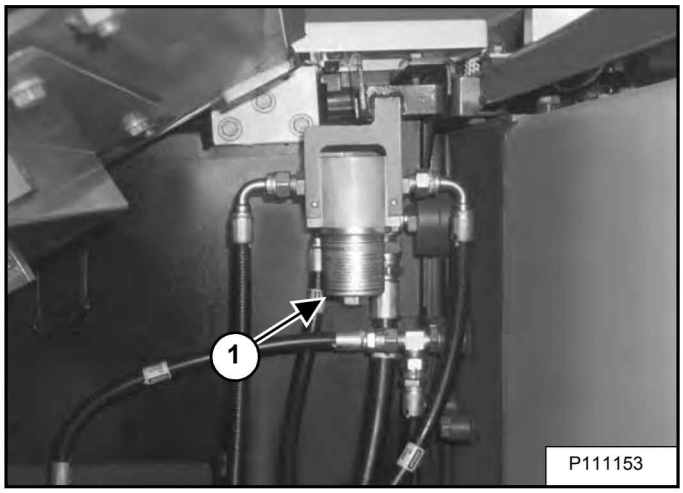
Figure 197



If the Pilot Filter Icon (Item 1) **[Figure 197]** is displayed on the instrument panel, the pilot filter will need to be changed sooner than the recommended interval on the Service Schedule.

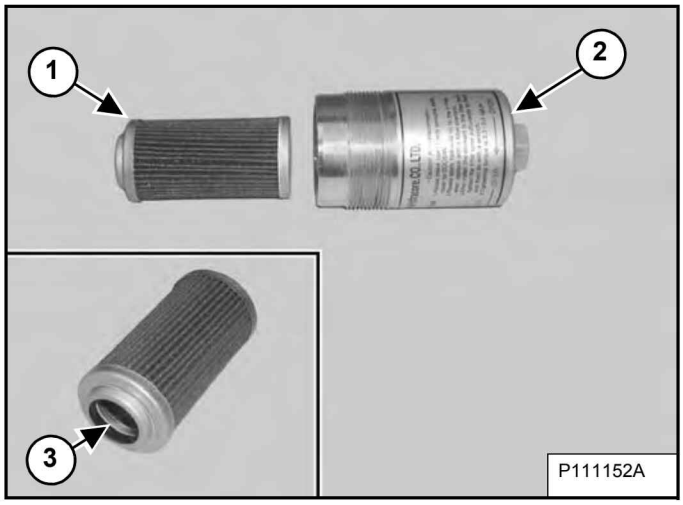
Raise the operator cab. (See CAB TILT PROCEDURE on Page 136.)

Figure 198



Clean the surface around the filter canister (Item 1) **[Figure 198]** and remove the canister.

Figure 199



Remove the filter (Item 1) from the canister (Item 2) **[Figure 199]**.

When installing the new filter, make sure the O-Ring (Item 3) **[Figure 199]** is installed inside the filter. Apply hydraulic oil to the O-Ring before reinstalling the filter.

Install the filter (Item 1) inside the canister (Item 2) **[Figure 199]**.

Install the filter / canister (Item 1) **[Figure 198]**.

Hand tighten the canister, then torque the canister to 22 - 34 N•m (17 - 25 ft-lb) torque.

Removing And Replacing Hydraulic Fluid

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 95.)

⚠ WARNING

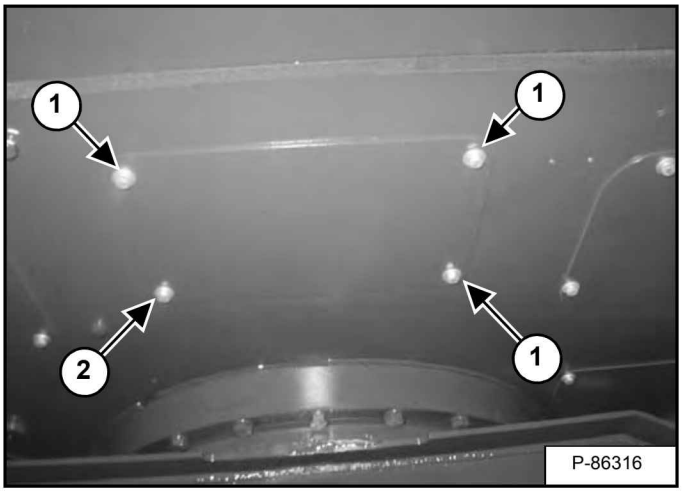
AVOID INJURY OR DEATH

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

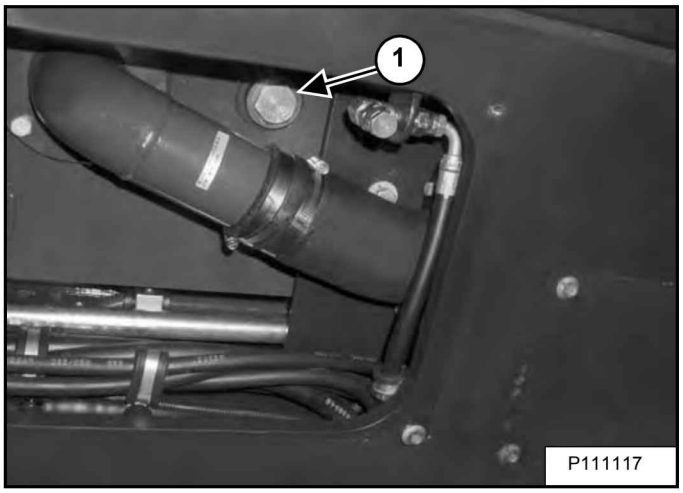
Retract the arm and bucket cylinders, lower the bucket to the ground. Lower the blade to the ground. Stop the engine.

Figure 200



From below the rear of the excavator upperstructure, remove three bolts (Item 1) and loosen the fourth bolt (Item 2) **[Figure 200]** and rotate the cover plate to the side to access the bottom of the hydraulic tank.

Figure 201



Remove the drain plug (Item 1) **[Figure 201]** from the bottom of the hydraulic tank.

Drain the fluid into a container.

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

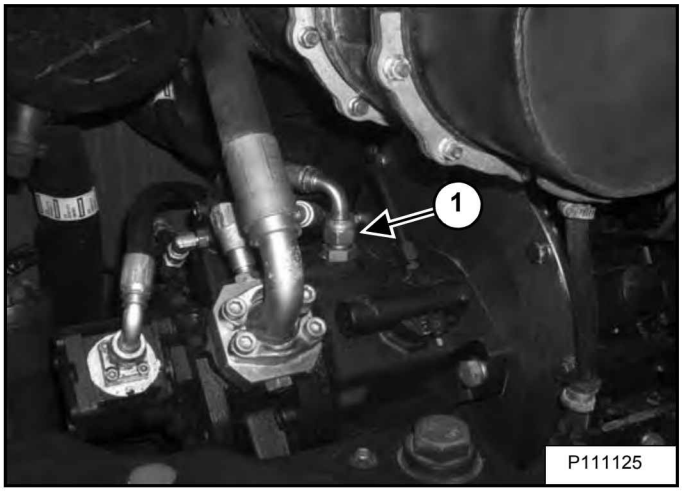
Reinstall the drain plug (Item 1) **[Figure 201]**.

Rotate the cover plate (Item 1) back to the original location and install the three bolts (Item 2) **[Figure 200]**. Tighten the four bolts.

Always replace the filters when changing the hydraulic oil. (See Removing And Replacing Hydraulic Filters on Page 121.)

Removing And Replacing Hydraulic Fluid (Cont'd)

Figure 202



After the hydraulic fluid has been drained from the excavator or after the hydraulic pump has been serviced, the hydraulic pump must be flooded with hydraulic oil. Allow sufficient time for the hydraulic fluid to gravity feed into the hydraulic pump before starting the machine.

Loosen the case drain hose (Item 1) **[Figure 202]** to see if hydraulic fluid is at the fitting. If oil is present the pump has been flooded. Reinstall the hose.

If fluid is not at the fitting, reinstall the hose (Item 1). Start the engine and run at low idle for one minute. Remove the hose (Item 1) **[Figure 202]** and verify fluid is at the plug opening. Reinstall hose before operating.

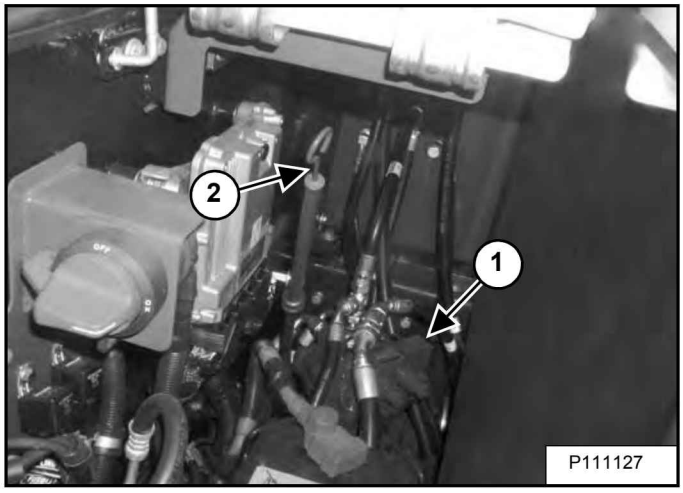
Recycle or dispose of the fluid in an environmentally safe manner.

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

Install new Bobcat hydraulic fluid. (See Hydraulic Fluid Chart on Page 120.) (See REGULAR MAINTENANCE ITEMS on Page 7.) (See Capacities on Page 187.)

Checking Swing Motor Gear Box Fluid Level

Figure 203



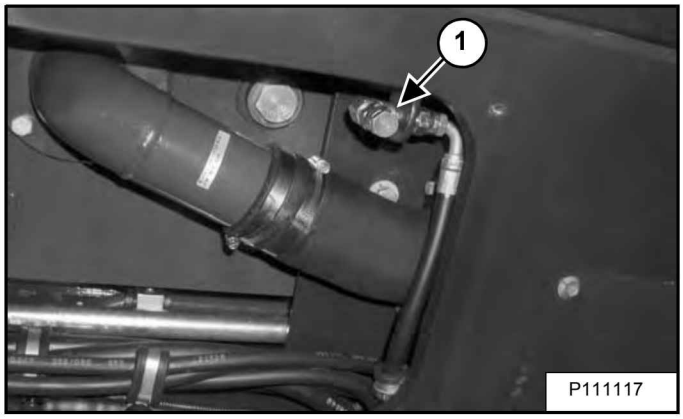
Open the center cover to access the swing motor. (See CENTER COVER on Page 101.)

The swing motor gear box (Item 1) has a dipstick (Item 2) **[Figure 203]** for checking the swing motor gear box oil level.

Keep the oil level between the marks on the dipstick.

Removing And Replacing Swing Motor Gear Box Fluid

Figure 204



The swing motor carrier drain plug is located below the engine area by the hydraulic tank drain plug.

Rotate the cover to access the drain plug. (See Removing And Replacing Hydraulic Fluid on Page 125.)

Remove the plug (Item 1) **[Figure 204]** and drain the swing motor carrier. Reinstall the drain plug.

Drain the fluid into a container.

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

Remove the dipstick (Item 2) **[Figure 203]** and add gear lube (80W-90) until it is at the correct mark on the dipstick. (See REGULAR MAINTENANCE ITEMS on Page 7.) and (See Capacities on Page 187.)

DIESEL PARTICULATE FILTER (DPF) SYSTEM

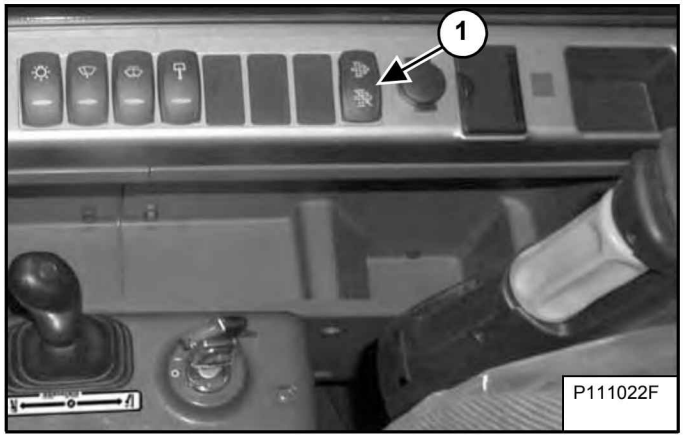
Description

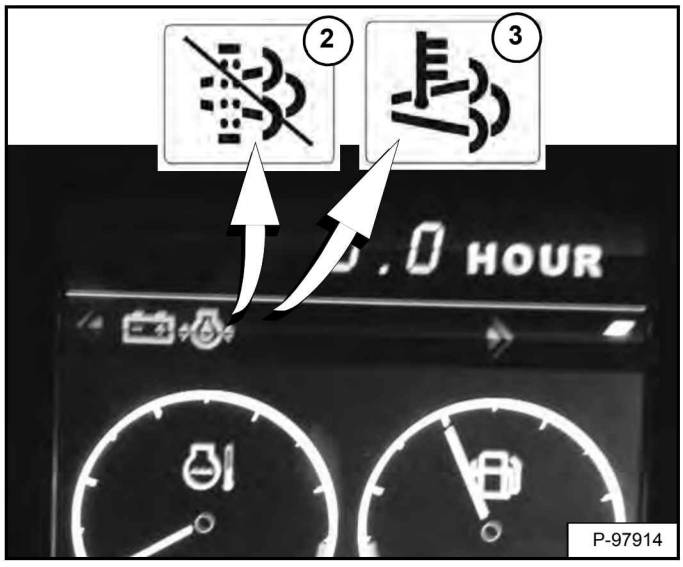
The engine exhaust system is equipped with a diesel particulate filter (DPF). The DPF is an emissions reduction device that removes diesel particulate matter (soot) from the exhaust gases of the diesel engine. The DPF will trap and collect the soot until it is burned off. The process of burning off the collected soot is called regeneration.

Ash residue will remain after the regeneration process is complete. The ash must be periodically removed from the DPF. (See DPF Cleaning on Page 129.)

Remote Parked Regeneration

Figure 205





This excavator is equipped with a remote parked regeneration / inhibit switch (Item 1) **[Figure 205]** on the right console.

A remote parked regeneration cycle may be required if too much soot is allowed to accumulate in the DPF. This can occur in the following situations:

The excavator is often operated for brief periods (less than 30 minutes) that do not allow sufficient time for the DPF to complete an automatic regeneration cycle.

When DPF remote parked regeneration / inhibit switch (Item 1) is in the inhibit enabled position for an extended period of time. This will inhibit the DPF from actively regenerating and burning off the collected soot. The inhibit ICON (Item 2) will be ON when the inhibit switch (Item 1) **[Figure 205]** is enabled.

The requirement for a remote parked regeneration is indicated by the DPF Icon (Item 3). The DPF Icon (Item 3) **[Figure 205]** will flash ON and OFF and a pop-up window in the instrument panel will be displayed when a park regeneration is required.

NOTE: Failure to perform a remote parked regeneration when required can result in the soot level exceeding the maximum allowable level and the engine being derated. Continued excavator operation will require exhaust system service by your Bobcat dealer.

Ensure the excavator has enough fuel to operate for 30 minutes minimum.

⚠ WARNING

AVOID SERIOUS INJURY OR DEATH

Exhaust gas temperature and exhaust system components are hot during regeneration. Keep flammable material, explosive dust, and explosive gases away from exhaust system.

W-2936-0412

DIESEL PARTICULATE FILTER (DPF) SYSTEM (CONT'D)

Remote Parked Regeneration (Cont'd)

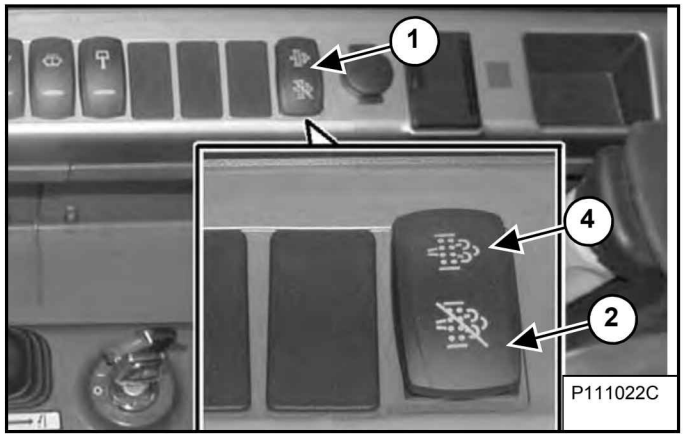
⚠ WARNING

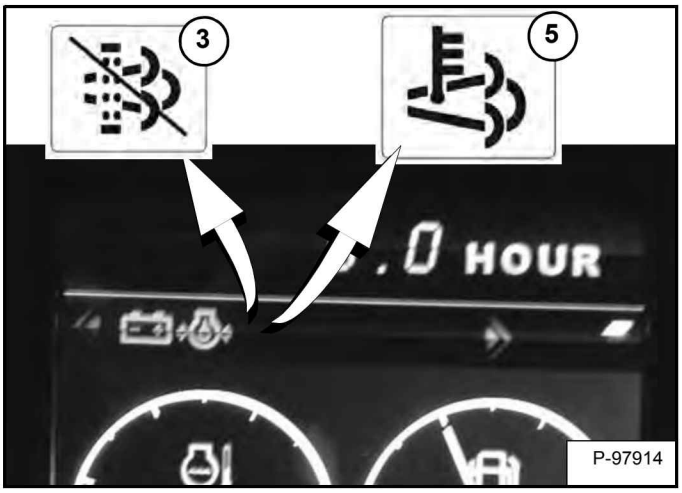
AVOID INJURY OR DEATH

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

Figure 206





1. Park the machine on flat level ground and in an open area with good ventilation. Lower the boom and blade fully.
2. Run the engine until the coolant temperature is at a minimum of 70°C (158°F) and the DPF inlet temperature is over 250°C. (482°F).
3. Move engine speed control to low idle.
4. Raise the left console to the locked out position. (See Raising And Lowering The Console on Page 36.)
5. When the ECU verifies the left console is raised to the locked out position, the engine is at low idle, the coolant and DPF temperatures are at operating temperatures; then the parked regeneration cycle can be activated.
6. Press the parked regeneration / inhibit switch (Item 1) to the inhibit position (Item 2). The inhibit icon (Item 3) **[Figure 206]** will turn ON. Press the inhibit switch a second time to turn the inhibit light OFF.
7. Now press and hold the remote parked regeneration / inhibit switch (Item 1) to the regenerate position (Item 4) for a minimum of three second to start regeneration. The regeneration light (Item 5) **[Figure 206]** will turn ON (amber colored) and start to flash.
8. Release the parked regeneration / inhibit switch (Item 1) **[Figure 206]** so it returns to the center position.
9. Now press the remote parked regeneration / inhibit switch (Item 1) to the regenerate position (Item 4) again. The regeneration light (Item 5) **[Figure 206]** will stop flashing and stay ON (amber colored).

NOTE: If the ECU detects that the DPF does Not need forced regeneration, the ECU will not allow the remote parked regeneration to start.

After the regeneration cycle starts, the engine will idle for a brief period. The engine speed will gradually increase to high idle.

The regeneration cycle will take approximately 30 minutes to complete. DO not stop this cycle unless absolutely necessary.

If the regeneration cycle must be stopped, press the DPF inhibit switch (Item 2) **[Figure 206]**, or rotate the speed control knob above the low idle position, or lower the lock lever or turn the start key to the OFF position. Any of above actions will cause the regeneration cycle to be aborted.

NOTE: If the manual regeneration cycle is not completed for two consecutive times (manually stopped), the engine check light will turn ON and engine power will be reduced.

IMPORTANT

Stopping the engine during the regeneration cycle may cause severe damage to the DPF.

I-2352-0412

10. After the DPF regeneration is complete, the engine will return to low idle and will continue to operate for a cool down period. Once the DPF Icon (Item 5) **[Figure 206]** turns OFF, the regeneration cycle is complete. The engine can now be stopped.

DIESEL PARTICULATE FILTER (DPF) SYSTEM (CONT'D)

Service Regeneration

Your machine will indicate the need for service regeneration by displaying one of the following service codes:

- **[P1421]** Remote Parked Regeneration Required
- **[P1424], [P2458], [P2459] or [P2463]** Service Regeneration Required

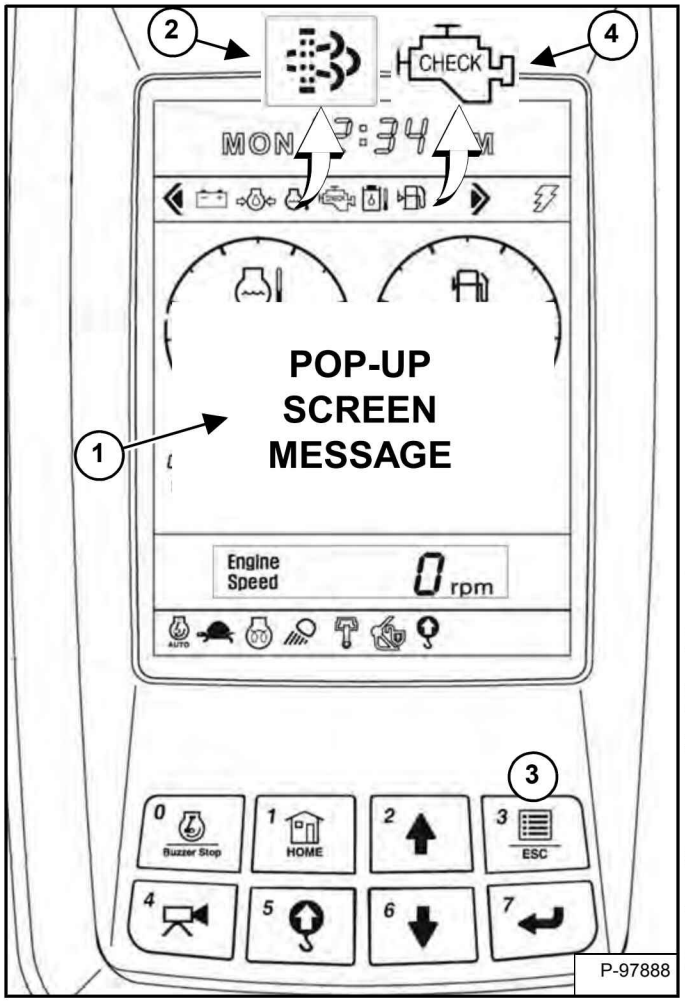
Service regeneration requires the use of specialized equipment. See your Bobcat dealer for service regeneration.

NOTE: The operator can perform a remote parked regeneration (Service Code P1421) but if service regeneration (Service Code M8554) is activated, regeneration must be performed by your Bobcat dealer. (See Remote Parked Regeneration on Page 127.)

DPF Cleaning

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 95.)

Figure 207



Clean the DPF at the specified interval or when indicated on the instrument panel.

A pop-up box (Item 1) will appear on the screen, the DPF icon (Item 2) and the service indicator (Item 4) icons will FLASH. Press the Information button (Item 3) **[Figure 207]** until the display screen shows the service codes. (See DIAGNOSTIC SERVICE CODE on Page 147.) Service code **[P1420]** (DPF Service Required) will show in the display screen when DPF cleaning is necessary.

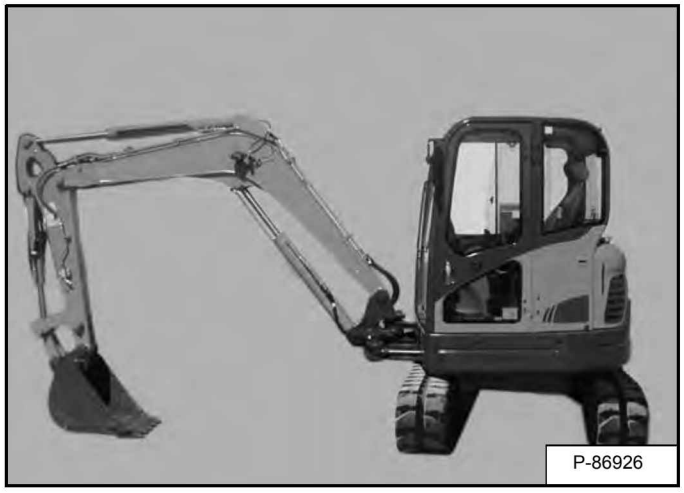
The DPF is a critical component of the engine exhaust system and must be properly maintained. Specialized equipment is required to clean the ash from the DPF. See your Bobcat dealer for DPF cleaning.

TRACK TENSION

NOTE: The wear of undercarriage parts vary with working conditions and types of soil conditions. Maintain the correct track tension by inspecting regularly. For the correct service interval (See SERVICE SCHEDULE on Page 95.)

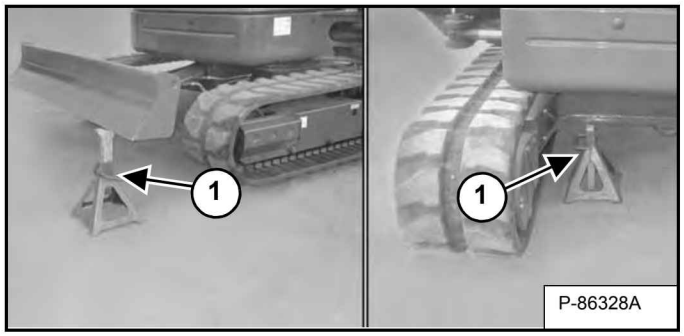
Adjusting

Figure 208



Raise one side of the machine (approximately four inches) using the boom and arm **[Figure 208]**.

Figure 209



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

Rubber Track Clearance

Figure 210

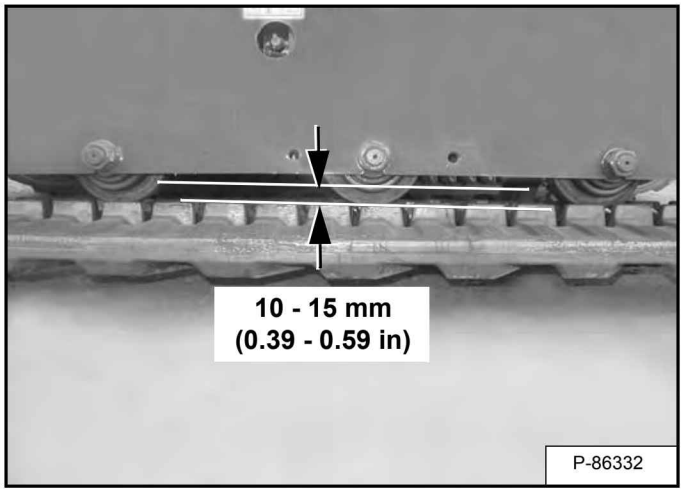
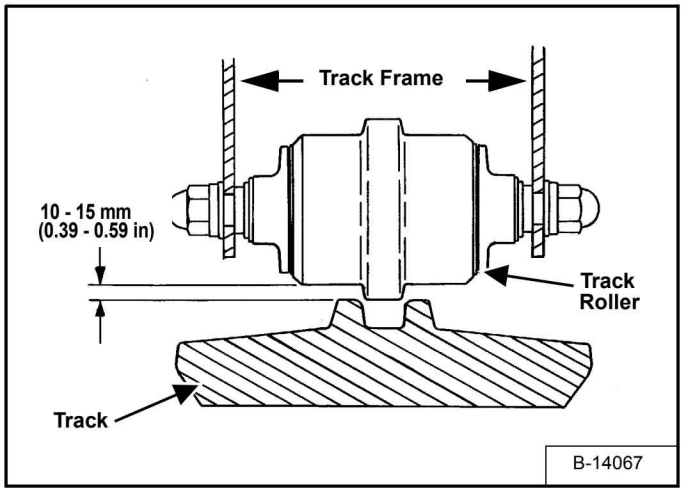


Figure 211



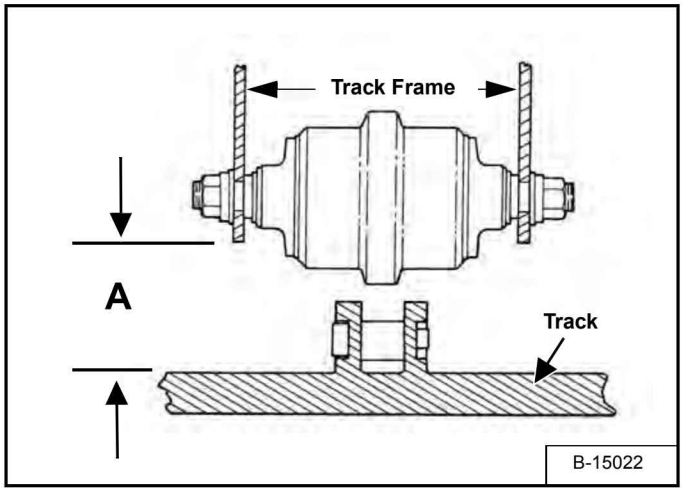
Measure the clearance at the middle track roller. Do not get fingers into pinch points between the track and the track roller. Use a bolt or a dowel of the appropriate size to check the gap between the contact edge of the roller and the top edge of the track guide **[Figure 210]** and **[Figure 211]**.

Rubber Track Clearance - 10 - 15 mm (0.39 - 0.59 in).

Adjusting (Cont'd)

Steel Track Clearance

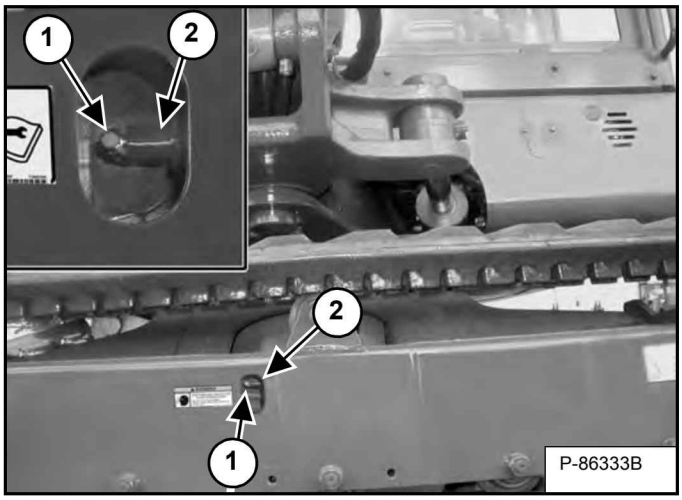
Figure 212



Measure the track clearance "A" at the middle track roller. Do not get fingers into pinch points between the track and the track roller. Check the gap between the bottom edge of the track frame and the top surface of the track **[Figure 212]**.

TERRAIN TYPE	DIMENSION "A"
Soil	140 - 150 mm (5.51 - 5.91 in)
Gravel, Sand, Soft Soil	150 - 160 mm (5.91 - 6.30 in)
Rock Bed	120 - 130 mm (4.72 - 5.12 in)

Figure 213



NOTE: The track tension grease fitting (Item 1) is installed into the end of the bleed fitting (Item 2). DO NOT loosen the grease fitting (Item 1), loosen the bleed fitting (Item 2) [Figure 213] ONLY (maximum of 1-1/2 turns) when releasing track pressure.

Add grease to the fitting (Item 1) **[Figure 213]** until the track tension is correct.

To release track pressure, loosen the bleed fitting (Item 2) **[Figure 213]** to release tension from the track.

NOTE: Do not loosen the grease fitting (Item 1) [Figure 213].

Repeat the procedure for the other side.

⚠ WARNING

HIGH PRESSURE GREASE CAN CAUSE SERIOUS INJURY

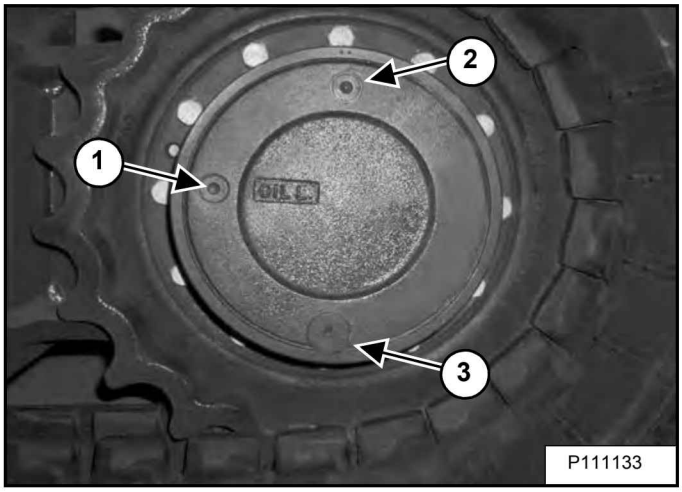
- **Do not loosen grease fitting.**
- **Do not loosen bleed fitting more than 1 - 1/2 turns.**

W-2781-0109

TRAVEL MOTOR

Checking And Adding Oil

Figure 214



Park the excavator on a level surface with the plugs (Item 1, 2 and 3) **[Figure 214]** in the position as shown.

Remove the plug (Item 1) **[Figure 214]**. The lube level must be at the bottom edge of the hole.

Add lubricant (80W-90) through hole (Item 2) **[Figure 214]** if the lube level is low. (See REGULAR MAINTENANCE ITEMS on Page 7.)

Removing And Replacing Oil

For the correct service interval (See SERVICE SCHEDULE on Page 95.)

Park the excavator on a level surface with plugs (Item 1, 2 and 3) in the position shown. Remove plugs (Item 2 and 3) **[Figure 214]** 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 3). Add lubricant (80W-90) through the top plug (Item 2) until the lube level is at the bottom edge of the plug hole (Item 1) **[Figure 214]**.

Install the plugs (Item 1 and 2) **[Figure 214]**.

Repeat the procedure for the opposite travel motor.

TRACK ROLLER AND IDLER LUBRICATION

Procedure

The track rollers and idlers require no maintenance. The bearings are a sealed design.

ALTERNATOR BELT

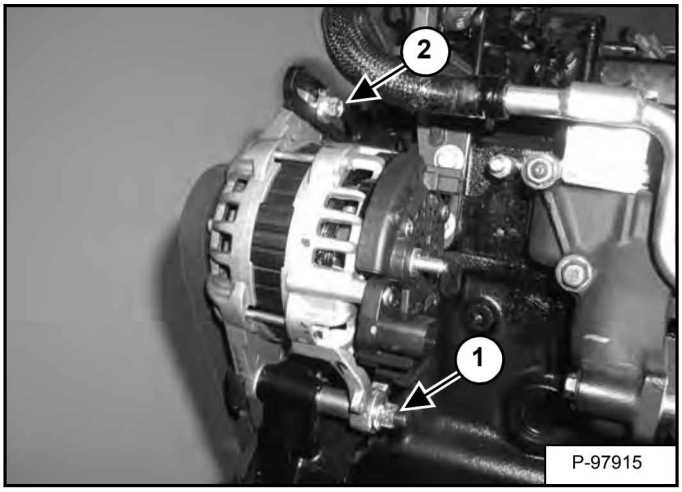
Belt Adjustment

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 95.)

Open the right side cover. (See RIGHT SIDE COVER on Page 101.)

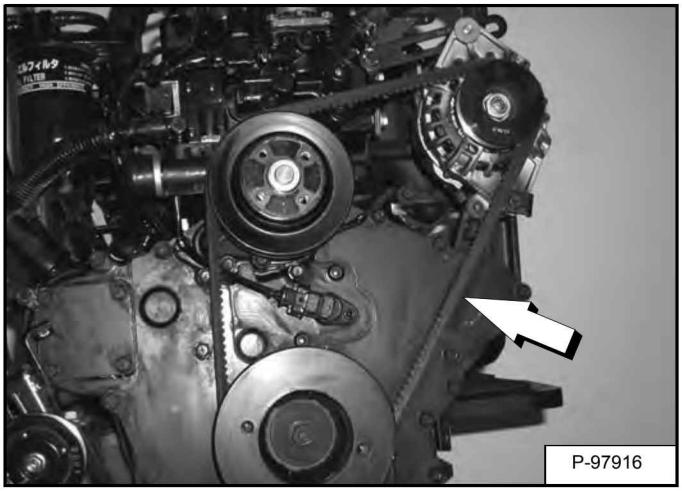
NOTE: The following photos show the engine removed for photo clarity.

Figure 215



Loosen the alternator mounting nut (item 1) and the adjusting strap mounting bolt (Item 2) **[Figure 215]**.

Figure 216

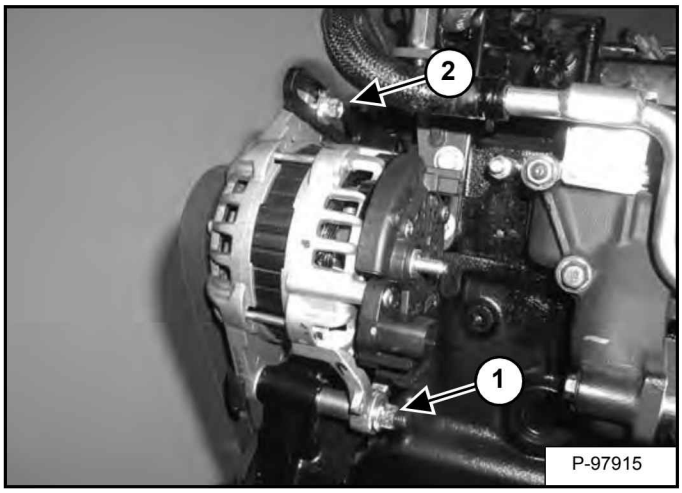


Press down on the belt midway between the fan pulley and the alternator pulley. The correct tension should allow the belt to deflect 10 mm (0.375 in) **[Figure 216]**.

When belt tension is correct, tighten the alternator bolts.

Belt Replacement

Figure 217



Loosen the alternator mounting nut (item 1) and the adjusting strap mounting bolt (Item 2) **[Figure 217]**.

Remove the old belt and install a new belt.

When belt tension is correct, tighten the alternator adjusting strap mounting bolt (Item 2) and the nut (item 1) **[Figure 217]**.

⚠ WARNING

AVOID INJURY OR DEATH

- **Do Not Operate with damaged or missing screens, shields or rubber deflectors.**
- **Stop engine before cleaning or servicing.**
- **Contact with moving parts or flying objects can cause injury or death.**

W-2528-0406

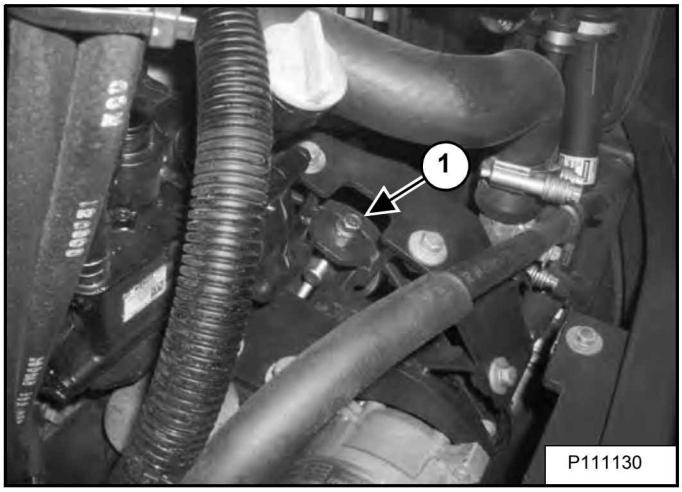
AIR CONDITIONING BELT

Belt Adjustment

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 95.)

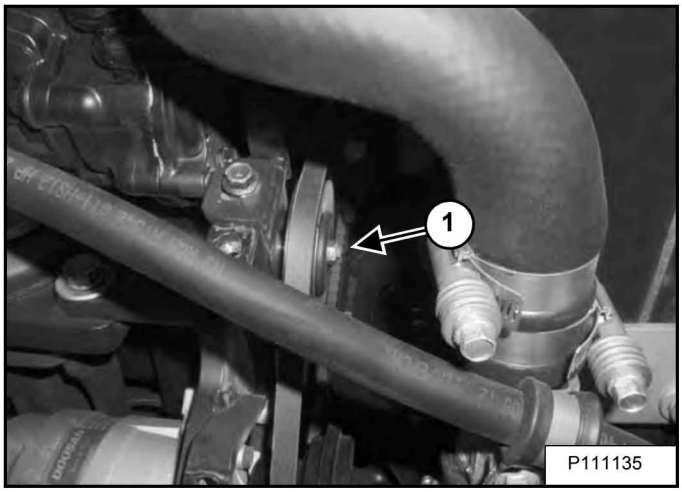
Open the right side cover. (See RIGHT SIDE COVER on Page 101.)

Figure 218



The air conditioning belt will be adjusted using the bolt (Item 1) **[Figure 218]**.

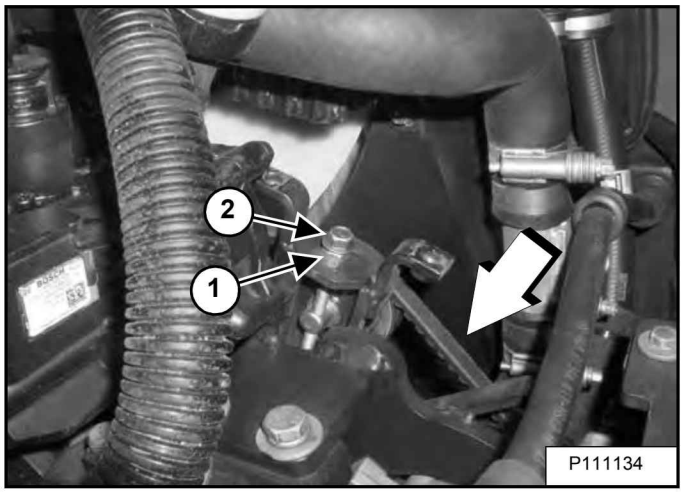
Figure 219



NOTE: Belt shield removed for photo clarity in the following two photos.

Loosen the belt idler mounting bolt (Item 1) **[Figure 219]**.

Figure 220



Press down on the belt midway between the crankshaft pulley and the compressor pulley. The correct tension should allow the belt to deflect 10 mm (0.375 in) **[Figure 220]**.

Loosen the lock nut (Item 1) and adjust the bolt (Item 2) **[Figure 220]** until the belt tension is correct.

When belt tension is correct, tighten the lock nut (Item 1) **[Figure 220]**.

Tighten the belt idler mounting bolt (Item 1) **[Figure 219]**.

Reinstall the shield (Item 2) and the two bolts and washers (Item 1) **[Figure 218]**.

⚠ WARNING

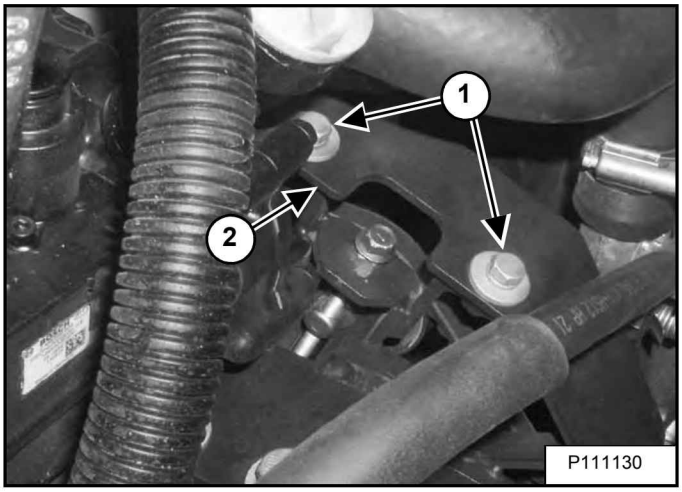
AVOID INJURY OR DEATH

- **Do Not Operate with damaged or missing screens, shields or rubber deflectors.**
- **Stop engine before cleaning or servicing.**
- **Contact with moving parts or flying objects can cause injury or death.**

W-2528-0406

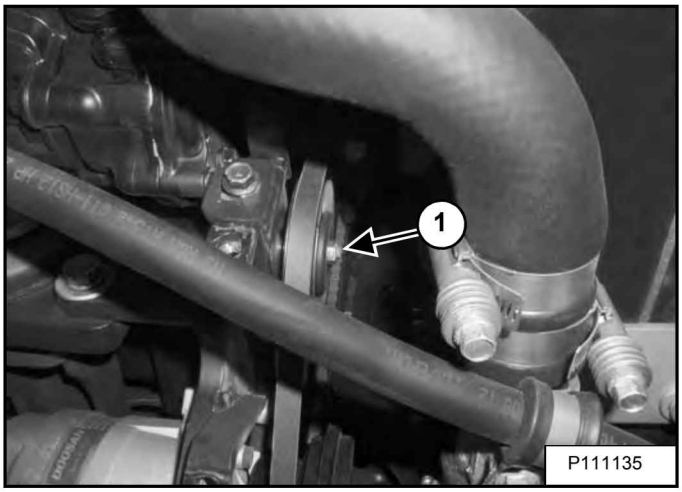
Belt Replacement

Figure 221



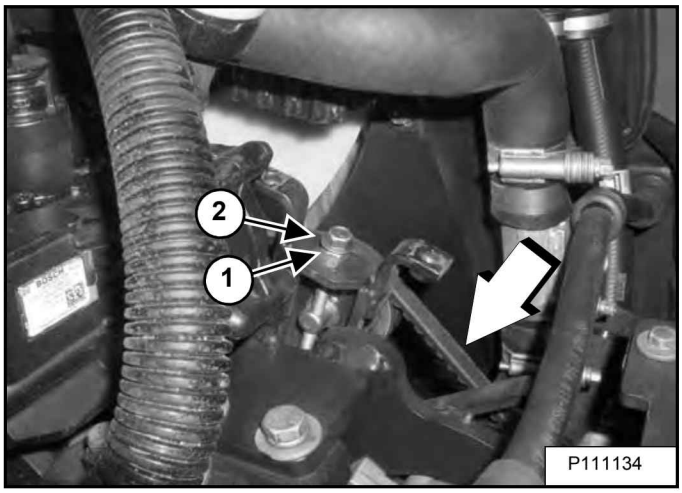
Remove the two bolts and washers (Item 1) and remove the shield (Item 2) **[Figure 221]**.

Figure 222



Loosen the belt idler mounting bolt (Item 1) **[Figure 222]**.

Figure 223



Loosen the lock nut (Item 1) and the bolt (Item 2) **[Figure 223]** until the belt can be removed.

Install a new belt.

Adjust the bolt (Item 2) until the belt tension is correct. Tighten the lock nut (Item 1) **[Figure 223]**.

Tighten the belt idler mounting bolt (Item 1) **[Figure 222]**.

Reinstall the shield (Item 2) and the two bolts and washers (Item 1) **[Figure 221]**.

⚠ WARNING

AVOID INJURY OR DEATH

- **Do Not Operate with damaged or missing screens, shields or rubber deflectors.**
- **Stop engine before cleaning or servicing.**
- **Contact with moving parts or flying objects can cause injury or death.**

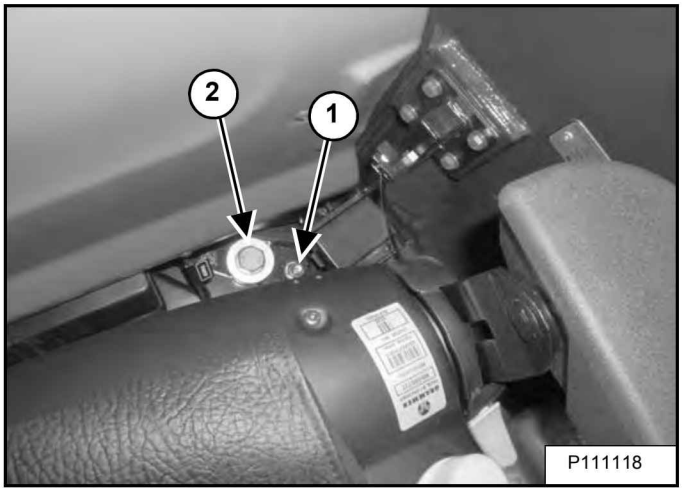
W-2528-0406

CAB TILT PROCEDURE

Raising And Lowering

Raising The Cab

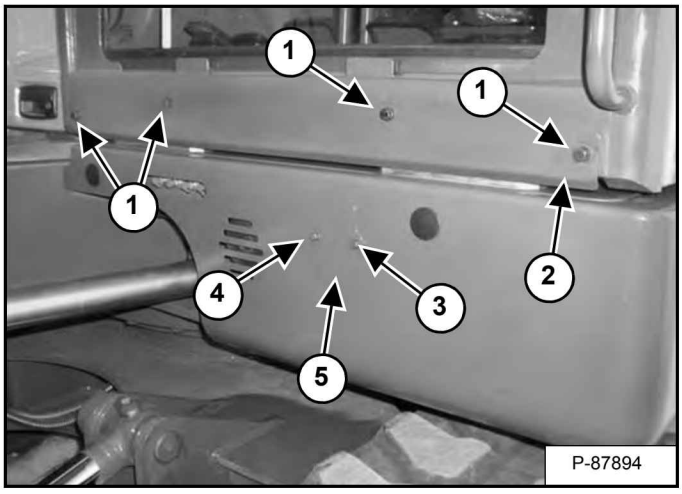
Figure 224



Remove the two nuts and washers (Item 1) **[Figure 224]** from the right and left rear corners of the cab.

Remove the bolt and washer (Item 2) **[Figure 224]** from the right rear corner of the cab.

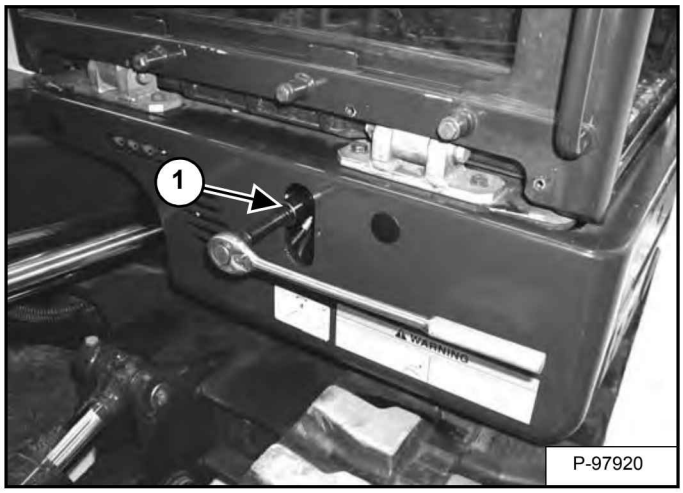
Figure 225



Remove the four bolts (Item 1) and remove the cover (Item 2) **[Figure 225]**.

Remove the bolt (Item 3), loosen the bolt (Item 4) and pivot the cover (Item 5) **[Figure 225]** down for access to the cab tilt assembly.

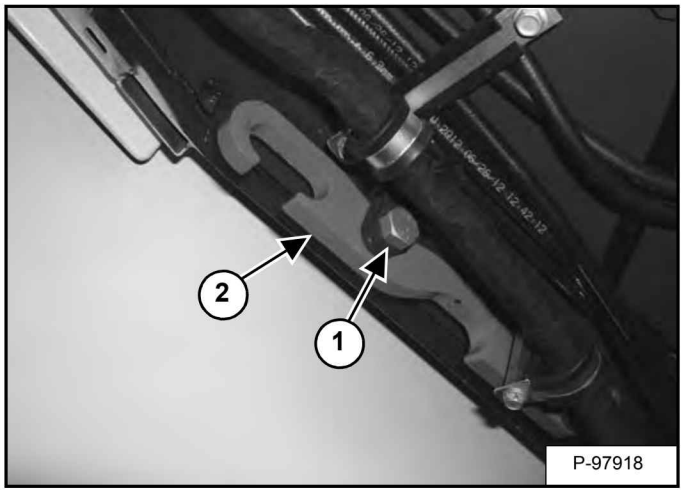
Figure 226



Install a wrench (Item 1) **[Figure 226]** and rotate the cab tilt assembly clockwise to raise the cab.

NOTE: Do Not use any type of air or electrically operated wrench. Only use hand operated wrench. Turning the tilt assembly at higher speeds can damage the tilt assembly.

Figure 227

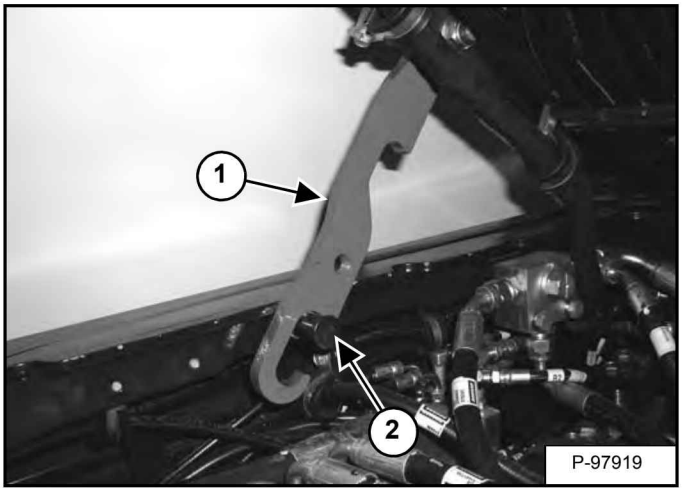


Remove the bolt (Item 1) from the cab support device (Item 2) **[Figure 227]**.

Raising And Lowering (Cont'd)

Raising The Cab (Cont'd)

Figure 228



Rotate the cab support device (Item 1) down to the support post (Item 2) **[Figure 228]**.

Slowly lower the cab until it is supported by the cab support device.

⚠ WARNING

AVOID INJURY OR DEATH

Never work under the excavator cab without installing an approved cab support device.

W-2435-0502

Lowering The Cab

Raise the cab slightly and rotate the cab support device (Item 1) **[Figure 228]** to the storage position **[Figure 227]**.

Install the bolt (Item 1) **[Figure 227]**.

Slowly lower the cab completely **[Figure 226]**.

Install the two washers and nuts (item 1) **[Figure 224]** on the left and right side of the rear of the cab.

Install the bolt and washer (Item 2) at the right rear corner of the cab. Tighten the bolt (Item 2) **[Figure 224]** to 931 N•m (688 ft-lb) torque.

Pivot the cover (Item 5) up and install the bolt (Item 3) **[Figure 225]**.

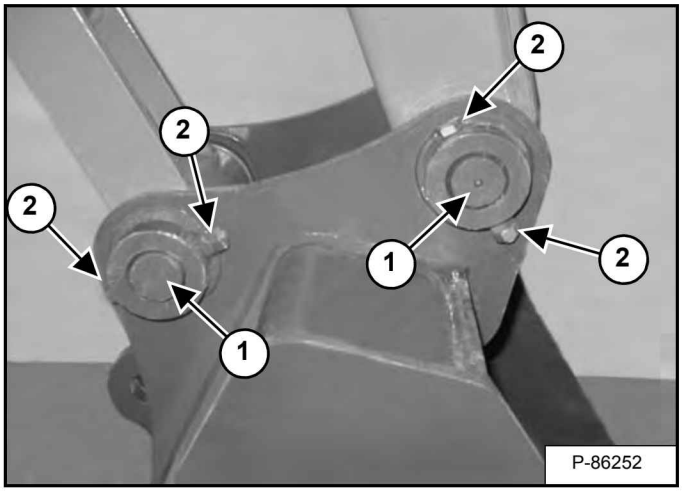
Tighten the bolts (Item 3 and 4) **[Figure 225]**.

Install the cover (Item 2) and the four bolts (Item 1) **[Figure 225]**.

ATTACHMENT

Pin-On Inspection And Maintenance

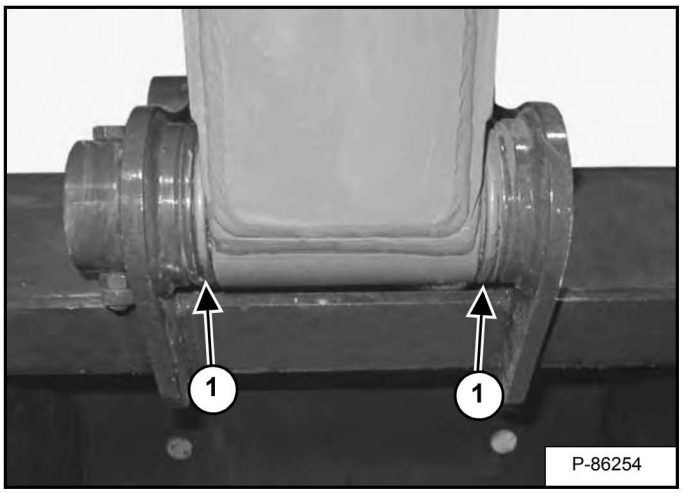
Figure 229



Inspect the bucket pins (Item 1) and hardware (Item 2) **[Figure 229]** for wear or damage. Inspect the bucket (on the attachment) for wear or damage.

Repair or replace damaged parts.

Figure 230

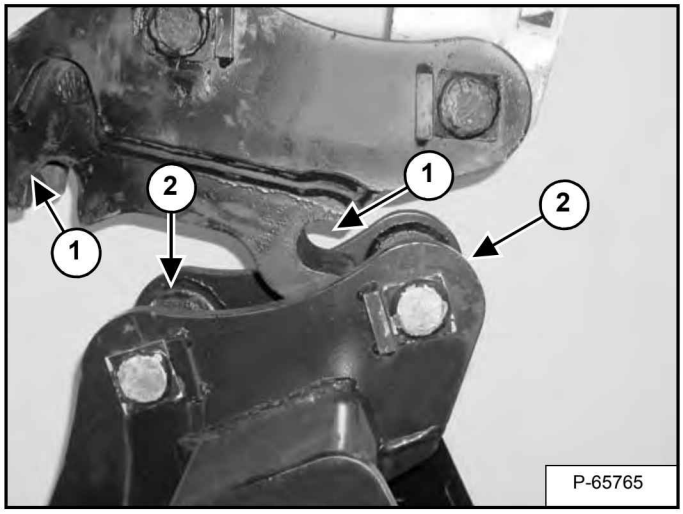


Inspect the four O-ring seals (Item 1) **[Figure 230]** for wear or damage.

Repair or replace damaged or missing parts.

Manual Spring Loaded Coupler And Attachment Inspection And Maintenance

Figure 231



Inspect the quick coupler for wear or damage. Inspect the quick coupler hooks (Item 1) and the bucket pins (Item 2) **[Figure 231]** (on the attachment) for wear or damage

Repair or replace damaged parts.

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.**

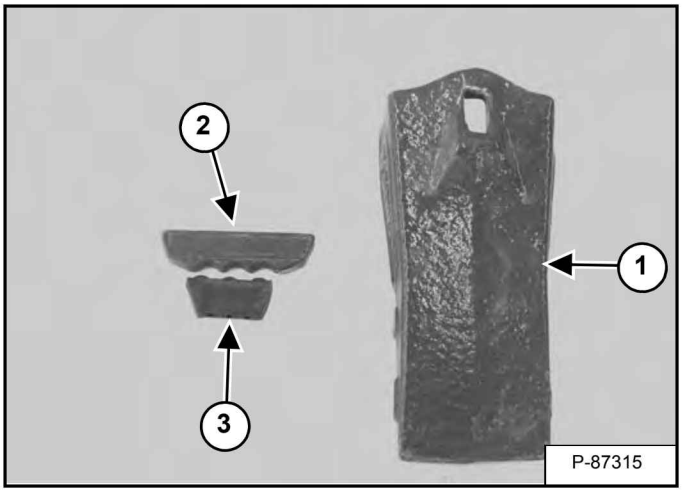
W-2505-0604

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

Lower the boom until the bucket is fully on the ground and resting on the block.

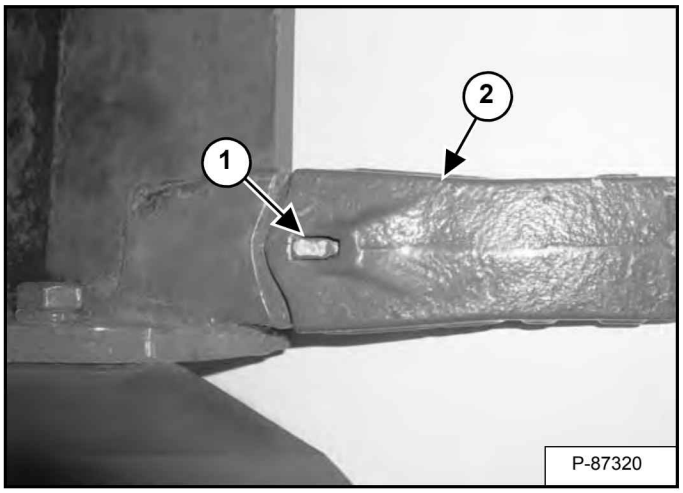
Stop the engine and exit the excavator.

Figure 232



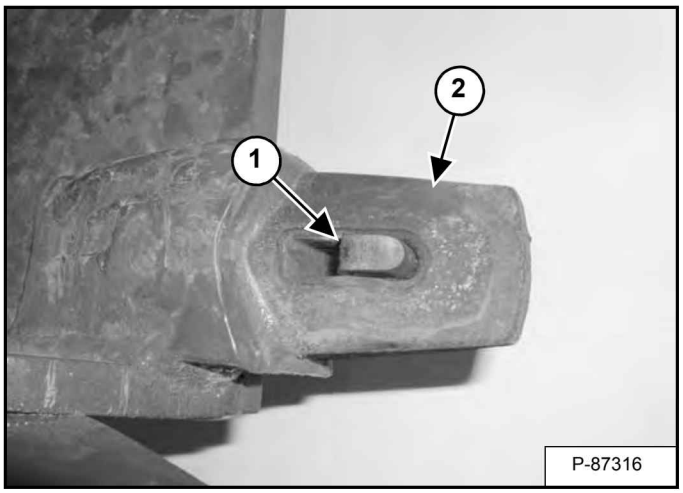
The bucket tooth (Item 1) has a unique retaining pin (Item 2) and rubber retainer (Item 3). The retaining pin (Item 2) must be installed as shown with the notch toward the rubber retainer (Item 3). The rubber retainer (Item 3) **[Figure 232]** will be installed into the shank before the tooth is installed on the shank.

Figure 233



Removal: Use a punch and a hammer and drive the retainer pin (Item 1) down and out the bottom of the tooth (Item 2) **[Figure 233]**. Remove the tooth from the shank.

Figure 234



Remove the rubber retainer (Item 1) from the shank (Item 2) **[Figure 234]**.

Installation: Install the rubber retainer (Item 1) into the tooth shank (Item 2) **[Figure 234]**.

Position the new tooth point (Item 2) **[Figure 233]** on the shank (Item 2) **[Figure 234]**.

Install the retainer pin (Item 1) **[Figure 234]** until it is flush with the top of the tooth.

LUBRICATING THE EXCAVATOR

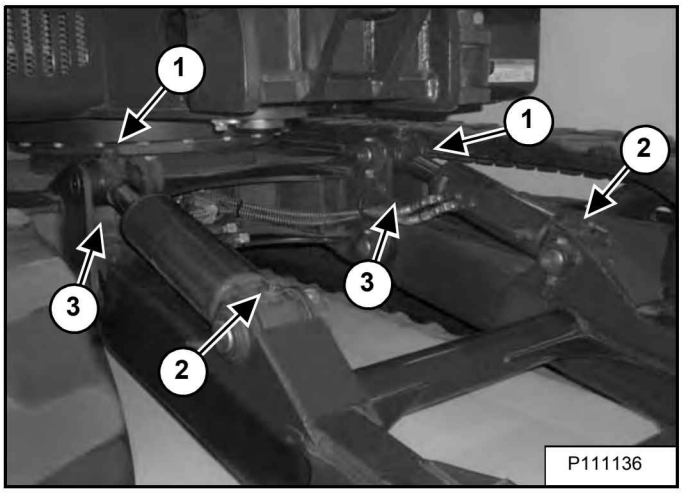
Lubrication Locations

Lubricate the excavator as specified in the SERVICE SCHEDULE for the best performance of the machine. (See SERVICE SCHEDULE on Page 95.)

Record the operating hours each time you lubricate the excavator.

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

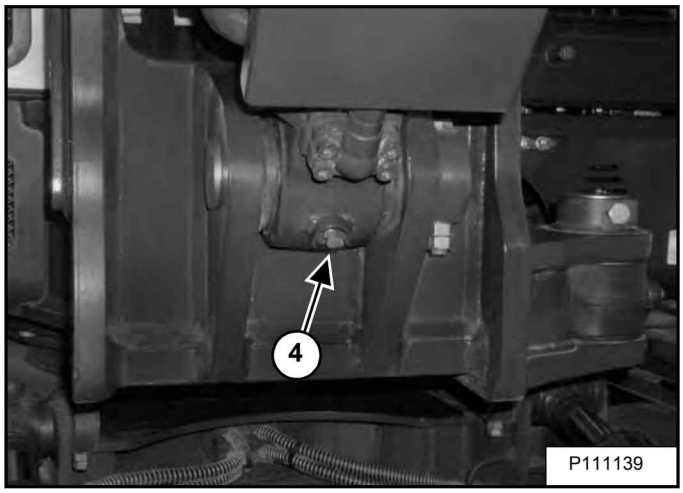
Figure 235



Ref Description (# of Fittings)

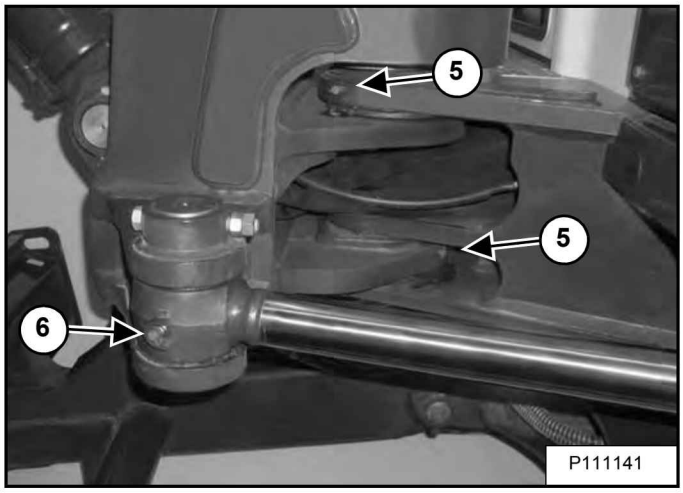
1. Blade Cylinder Rod End (2)
2. Blade Cylinder Base End (2)
3. Blade Pivots (2) **[Figure 235]**

Figure 236



4. Boom Cylinder Rod End (1) **[Figure 236]**

Figure 237



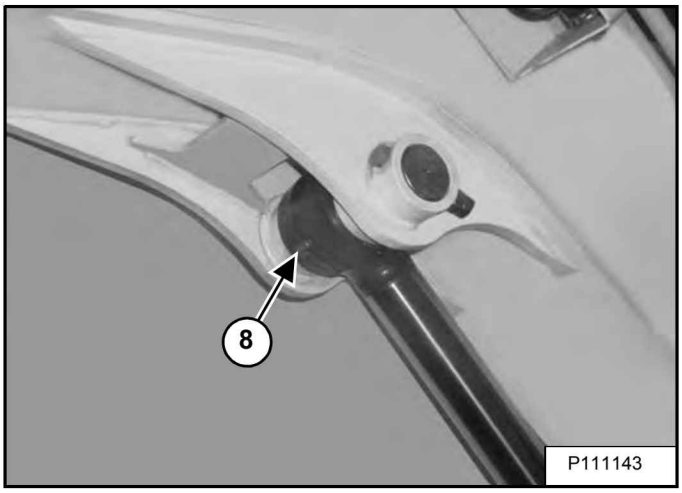
5. Boom Swing Pin (2)
6. Boom Swing Cylinder Base End (1) **[Figure 237]**

Lubrication Locations (Cont'd)

Figure 238

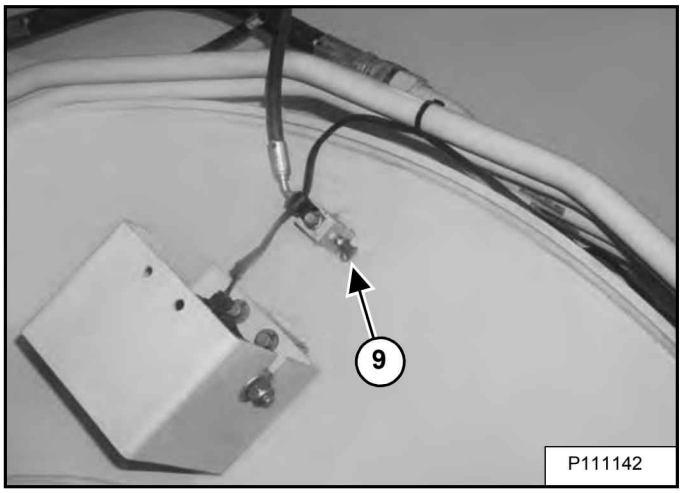
7. Boom Pivot (1) **[Figure 238]**

Figure 239



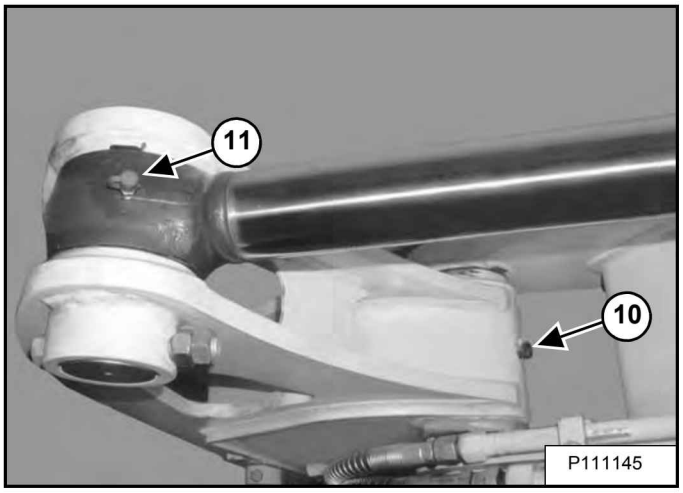
8. Boom Cylinder Rod End (1) **[Figure 239]**

Figure 240



9. Arm Cylinder Base End (1) **[Figure 240]**

Figure 241

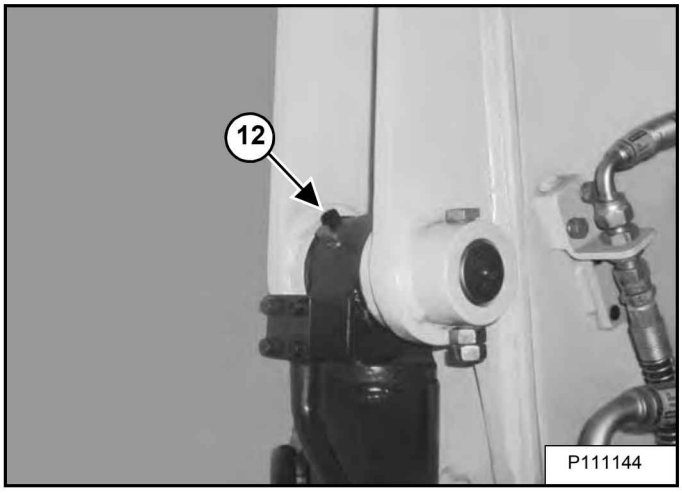


10. Arm Pivot (1) **[Figure 241]**

11. Arm Cylinder Rod End (1)

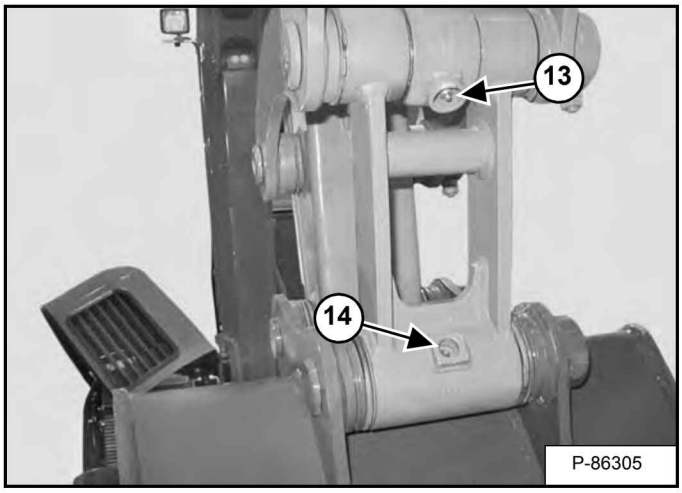
Lubrication Locations (Cont'd)

Figure 242



12. Bucket Cylinder Base End (1) **[Figure 242]**

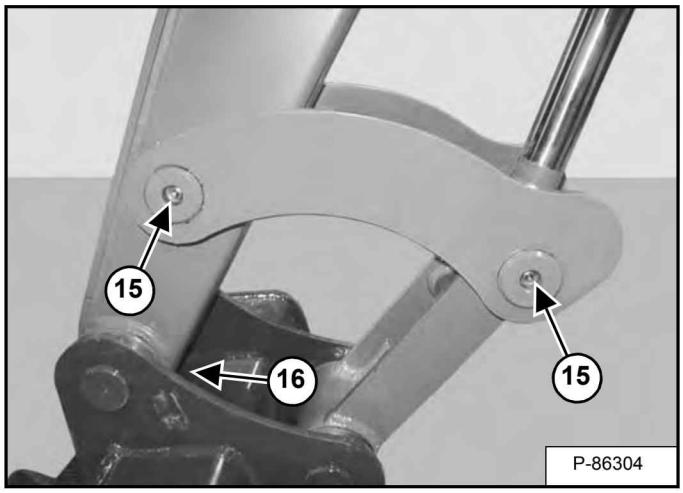
Figure 243



13. Bucket Cylinder Rod End (1)

14. Bucket Link (1) **[Figure 243]**

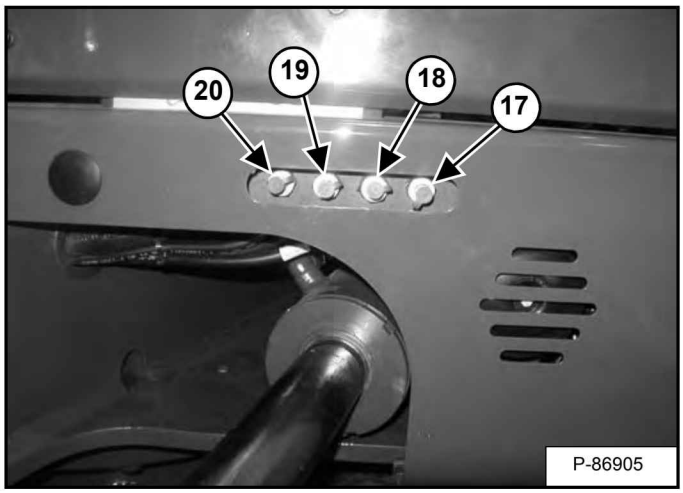
Figure 244



15. Link Pivot Pin (2)

16. Arm (1) **[Figure 244]**

Figure 245



Lubricate the following locations on the hydraulic Excavator per the SERVICE SCHEDULE for the correct lubrication intervals. (See SERVICE SCHEDULE on Page 95.)

17. Boom Swing Cylinder Base End (1)

18. Swing Motor Reduction Gear (1)

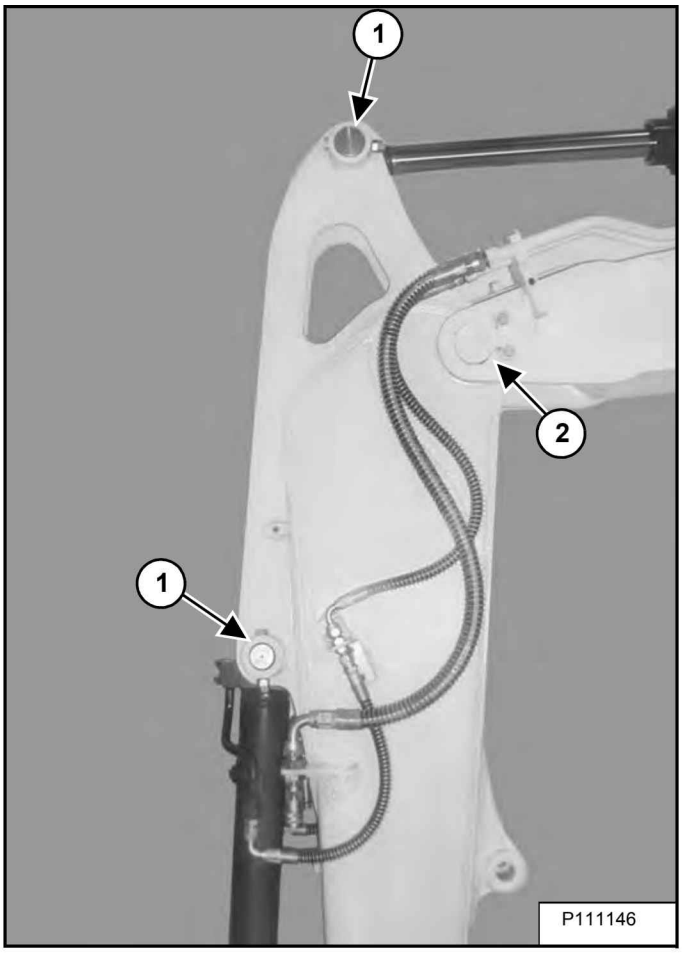
19. Slew Circle Bearing (1)

20. Slew Pinion (1). (Install 3 - 4 pumps of grease then rotate the upperstructure 90°. Install 3 - 4 pumps of grease and again rotate the upperstructure 90°. Repeat this until the slew pinion has been greased at four positions.) **[Figure 245]**.

PIVOT PINS

Inspection And Maintenance

Figure 246



The bucket and arm cylinder pivots have a large pin (Item 1) **[Figure 246]** held in position with a bolt and two nut.

The the two nuts are used as jam nuts to hold the bolt with out tightening the bolt to the pin boss. After the nuts are tightened together, the bolt should be free to spin. See your Bobcat dealer for replacement parts.

The boom / arm pivot has a large pin (Item 2) **[Figure 246]** held in position with a plate with two bolts (shown) and on the opposite side, with a nut and cotter pin. When tightening the nut, do not over tighten and deflect the two boom plates to the arm. The arm must pivot freely after the nut is tightened. Snug the nut up to the boom plate and install the cotter pin.

Check that the bolt and nut are securely tightened and are not damage. See your Bobcat dealer for replacement parts.

EXCAVATOR STORAGE AND RETURN TO SERVICE

Storage

Sometimes it may be necessary to store your Bobcat excavator for an extend period of time. Below is a list of items to perform before storage.

- Thoroughly clean the excavator including the engine compartment.
- Lubricate the excavator.
- Replace worn or damaged parts.
- Drive the excavator onto planks in a dry protected shelter.
- Lower the boom fully with the bucket flat on the ground.
- Put grease on any exposed cylinder rods.
- Put fuel stabilizer in the fuel tank and run the engine a few minutes to circulate the stabilizer to the pump and fuel injectors.

  If biodiesel fuel has been used, perform the following:

  Drain the fuel tank, refill with 100% petroleum diesel fuel, add fuel stabilizer and run the engine for at least 30 minutes.
- Drain and flush the cooling system. Refill with premixed coolant.
- Replace all fluids and filters (engine, hydraulic).
- Replace 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.

DIAGNOSTIC SERVICE CODE

Service Codes List

Figure 247

The error codes will be displayed on the instrument panel (Item 1) **[Figure 247]** under the *"Real Time Failure Information"* screen.

Enter the display panel *REAL TIME FAILURE INFORMATION* screen. (See Real Time Failure Information (Fault Codes) on Page 155.)

See the following chart for the codes.

CODE	FMI	DESCRIPTION
P0008	5	No Signal on both crank and cam speed sensor
P000F	16	PLV Open Valve
P0088	0	Actual Rail Pressure Rise Error
P0093	15	Rail Pressure Deviation error during the actual rail pressure Rise
P0094	18	Rail Pressure Deviation error during the actual rail pressure drop
P0112	4	New Air Temperature Sensor Fault (Low Voltage)
P0113	3	New Air Temperature Sensor Fault (High Voltage)
P0117	4	Cooling Water Temperature Sensor Fault (Low Voltage)
P0118	3	Cooling Water Temperature Sensor Fault (High Voltage)
P0122	4	Accelerator sensor 1 (Insufficient Sensor Output)
P0123	3	Accelerator sensor 1 (Excessive Sensor Output)
P01271	3	Injector 1 (Cylinder 4: Port 1-2) short circuit
P0168	0	Fuel Temperature Sensor Temperature Abnormal High (Overheat)
P0182	4	Fuel Temperature Sensor Fault (Low Voltage)
P0183	3	Fuel Temperature Sensor Fault (High Voltage)
P0192	4	Rail Pressure Sensor fault (Low Voltage)
P0193	3	Rail Pressure Sensor fault (High Voltage)
P0201	5	Injector 3 (Cylinder 1: Port 2-2) Open Circuit (Inherent location of the injector)
P0202	5	Injector 2 (Cylinder 2: Port 2-1) Open Circuit (Inherent location of the injector)
P0203	5	Injector 4 (Cylinder 3: Port 1-1) Open Circuit (Inherent location of the injector)
P0204	5	Injector 1 (Cylinder 4: Port 1-2) Open Circuit (Inherent location of the injector)
P0217	0	Cooling Water Temperature Sensor Temperature Abnormal High (Overheat)
P0219	16	Over speed

CODE	FMI	DESCRIPTION
P0222	4	Accelerator Sensor 2 (Insufficient Sensor Output)
P0223	3	Accelerator Sensor 2 (Excessive Sensor Output)
P0227	4	Accelerator Sensor 3 (Insufficient Sensor Output)
P0228	3	Accelerator Sensor 3 (Excessive Sensor Output)
P0236	13	EGR Low Pressure Side Sensor fault (Abnormal Learning Value)
P0237	4	EGR Low Pressure Side Sensor fault (Low Voltage)
P0238	3	EGR Low Pressure Side Sensor fault (High Voltage)
P0262	6	Injector 3 (Cylinder 1: Port 2-2) coil short circuit
P0265	6	Injector 2 (Cylinder 2: Port 2-1) coil short circuit
P0268	6	Injector 4 (Cylinder 3: Port 1-1) coil short circuit
P0271	6	Injector 1 (Cylinder 4: Port 1-2) coil short circuit
P02E8	4	Intake Throttle opening sensor fault (Low Voltage)
P02E9	3	Intake Throttle opening sensor fault (High Voltage)
P0336	2	Crank Signal Malfunction
P0337	5	No Crank Signal
P0341	2	Cam Signal Malfunction
P0342	5	No Cam Signal
P0403	12	Open circuit between the EGR motor coils
P0404	0	EGR over-voltage fault
P040C	4	Intake Manifold Temperature Sensor Fault (Low Voltage)
P040D	3	Intake Manifold Temperature Sensor Fault (High Voltage)
P041C	4	EGR Gas Temperature Sensor Fault (Low Voltage)
P041D	3	EGR Gas Temperature Sensor Fault (High Voltage)
P0420	1	DPF Intermediate Temperature Sensor Temperature Abnormal Low Temperature
P0471	13	EGR High Pressure Side Sensor fault (Abnormal Learning Value)
P0472	4	EGR High Pressure Side Sensor fault (Low Voltage)
P0473	3	EGR High Pressure Side Sensor fault (High Voltage)
P0488	12	EGR position sensor malfunction
P049D	7	EGR initialization malfunction
P0541	6	Startup Assist Relay GND Interrupted
P0543	5	Startup Assist Relay Interrupted
P0545	4	Exhaust Manifold Temperature Sensor Fault (Low Voltage)
P0546	3	Exhaust Manifold Temperature Sensor Fault (High Voltage)
P0601	12	EEPROM memory deletion error
P0611	12	Injector drive IC Error
P0627	5	High Pressure Pump Drive Circuit (Open Circuit)
P0629	3	High Pressure Pump Drive Circuit (High Side VB short-circuit)
P062A	6	High Pressure Pump Drive Circuit (Drive current (high level))
P0660	5	No-Load of throttle valve drive H bridge circuit
P068A	2	Main Relay Early Opening
P068B	7	Main Relay Contact Stuck
P1101	0	Air Cleaner Clogged Alarm

CODE	FMI	DESCRIPTION
P1125	1	Accelerator Sensor 3 (Foot Pedal in close position)
P1126	0	Accelerator Sensor 3 (Foot Pedal in open position)
P1146	6	Injector Drive Circuit Bank 1 Short Circuit (Common Circuit for No. 1 and No. 4)
P1149	6	Injector Drive Circuit Bank 2 Short Circuit (Circuit for No. 2 and No.3 Cylinders)
P1151	0	Oil / Water Separator Alarm
P1192	4	Oil Pressure Switch Open Circuit
P1198	1	Low Oil Pressure Fault Alarm
P1227	8	Pulse Sensor Failure (Pulse Communication)
P1231	10	Atmospheric Pressure Sensor Characteristic Fault
P1262	3	Injector 3 (Cylinder 1: Port 2-2) short circuit
P1265	3	Injector 2 (Cylinder 2: Port 2-1) short circuit
P1268	3	Injector 4 (Cylinder 3: Port 1-1) short circuit
P1341	7	Angle Offset Fault
P1404	1	EGR under-voltage fault
P1405	12	Short circuit between the EGR motor coils
P1409	7	EGR feedback malfunction
P1410	1	EGR high temperature thermistor malfunction
P1411	1	EGR low temperature thermistor malfunction
P1420	0	Ash Cleaning Request 2
P1421	16	Stationary Regeneration Standby
P1424	0	Backup Mode
P1425	14	Reset Regeneration Prohibited
P1426	0	DPF Intermediate Temperature Sensor Temperature Abnormal High (Post-injection failure)
P1427	4	DPF Inlet Temperature Sensor fault (Low Voltage)
P1428	3	DPF Inlet Temperature Sensor fault (High Voltage)
P1434	3	DPF Intermediate Temperature Sensor Fault (High Voltage)
P1435	4	DPF Intermediate Temperature Sensor Fault (Low Voltage)
P1436	0	DPF Inlet Temperature Sensor abnormal high
P1438	12	Exhaust Throttle (Voltage fault)
P1439	12	Exhaust Throttle (Motor Fault)
P1440	12	Exhaust Throttle (Sensor System Fault)
P1441	12	Exhaust Throttle (MPU Fault)
P1442	12	Exhaust Throttle (PCB Fault)
P1443	19	Exhaust Throttle (CAN Fault)
P1445	9	Recovery Regeneration Failure
P1446	7	Recovery Regeneration Prohibition
P1454	4	DPF High Pressure Side Sensor Fault (Low Voltage)
P1455	3	DPF High Pressure Side Sensor Fault (High Voltage)
P1463	0	Over accumulation (Method P)
P1467	6	Actuator Drive Circuit 3 short to ground
P1469	12	AD Converter Fault 1
P1470	12	AD Converter Fault 2

CODE	FMI	DESCRIPTION
P1471	12	External Monitoring IC and CPU Fault 1
P1472	12	External Monitoring IC and CPU Fault 2
P1473	12	ROM Fault
P1474	12	Shutoff path fault 1
P1475	12	Shutoff path fault 2
P1476	12	Shutoff path fault 3
P1477	12	Shutoff path fault 4
P1478	12	Shutoff path fault 5
P1479	12	Shutoff path fault 6
P1480	12	Shutoff path fault 7
P1481	12	Shutoff path fault 8
P1482	12	Shutoff path fault 9
P1483	12	Shutoff path fault 10
P1484	0	Recognition error of engine speed
P148A	7	EGR stuck open valve malfunction
P1562	5	Charge Switch Open Circuit
P1568	1	Charge Alarm
P1608	12	Excessive voltage of supply 1
P1609	12	Sensor supply voltage error 1
P160E	12	EEPROM memory read error
P160F	12	EEPROM memory write error
P1613	12	CY 146 SPI Communication Fault
P1617	12	Insufficient voltage of Supply 1
P1618	12	Sensor supply voltage error 2
P1619	12	Sensor supply voltage error 3
P1626	4	Actuator Drive Circuit 1 short to ground
P1633	4	Actuator Drive Circuit 2 short to ground
P1641	3	High Pressure Pump Drive Circuit (Low Side VB short-circuit)
P1642	6	High Pressure Pump Drive Circuit (High Side GND short-circuit)
P1643	6	High Pressure Pump Drive Circuit (Low Side GND short-circuit)
P1645	11	High Pressure Pump Drive Circuit (Pump Overload Error)
P1646	7	Dual accelerator sensor (closed position) failure
P1647	7	Dual accelerator sensor (open position) failure
P1648	13	IQA Corrected Injection Amount for Injector 1 Error
P1649	13	IQA Corrected Injection Amount for Injector 2 Error
P1650	13	IQA Corrected Injection Amount for Injector 3 Error
P1651	13	IQA Corrected Injection Amount for Injector 4 Error
P1658	3	Power short circuit of throttle valve drive H bridge Output 1
P1659	4	GND short circuit of throttle valve drive H bridge output 1
P1660	6	Overload on the drive H bridge circuit of throttle valve
P1661	3	VB Power short circuit of throttle valve drive H bridge output 2
P1662	4	GND short circuit of throttle valve drive H bridge output 2

CODE	FMI	DESCRIPTION
P1665	9	Rail pressure fault (Controlled rail pressure error after PLV Valve Opening)
P1666	0	Rail Pressure Fault (The times of PLV Valve opening error)
P1667	0	Rail Pressure Fault (The time of PLV Valve opening error)
P1668	0	Rail Pressure Fault (The actual rail pressure is too high during PRV limp home)
P1669	0	Rail Pressure Fault (Injector B/F temperature error during PLV4 Limp Home)
P1670	7	Rail Pressure Fault (Operation time error during RPS Limp Home)
P2228	4	Atmospheric Pressure Sensor Fault (Low Voltage)
P2229	3	Atmospheric Pressure Sensor Fault (High Voltage)
P242F	16	Ash Cleaning Request 1
P2452	0	DPF Differential Pressure Sensor Differential Pressure Abnormal High
P2453	13	DPF Differential Pressure Sensor (Abnormal learning value)
P2454	4	DPF Differential Pressure Sensor Fault (Low Voltage)
P2455	3	DPF Differential Pressure Sensor Fault (High Voltage)
P2458	7	Regeneration defect (Stationary Regeneration Failure)
P2459	11	Regeneration defect (Stationary Regeneration not performed)
P2463	0	Over accumulation (Method C)
U010B	9	CAN1 (for EGR) reception time out
U0168	31	VI (CAN Message) reception time out
U0292	9	TSC1 (CAN Message) reception time out (SA1)
U0401	9	EGR ECM data fault
U1107	9	Exhaust throttle (CAN message from the exhaust throttle time out)
U1292	9	Y_ECR1(CAN Message) reception time out
U1293	9	Y_EC (CAN Message) reception time out
U1294	9	Y_RSS (CAN Message) reception time out
U1296	9	VH (CAN Message) reception time out
U1298	9	Y_ECM3 (CAN Message) reception time out
U1300	9	Y_ETCP1 (CAN Message) reception time out
U1301	9	TSC1 (CAN Message) reception time out (SA2)
U1302	9	EBC1 (CAN Message) reception time out
U1303	9	Y_DPFIF (CAN Message) reception time out
U1401	12	EGR target value out of range
U3002	13	VI (CAN Message) reception data fault

DIAGNOSTIC SERVICE CODE (CONT'D)

Failure Mode Indicator Information

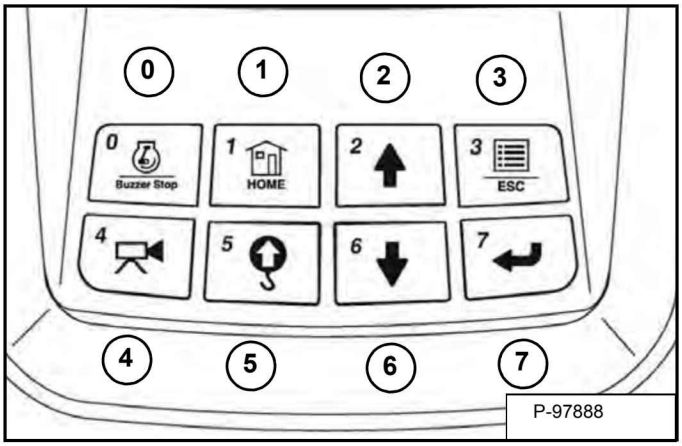
FMI (FAILURE MODE INDICATOR)	DESCRIPTION
0	Data Valid But Above Normal Operational Range Most Severe Level
1	Data Valid But Below Normal Operational Range Most Severe Level
2	Data Erratic, Intermittent Or Incorrect
3	Voltage Above Normal, Or Shorted To High Source
4	Voltage Below Normal, Or Shorted To Low Source
5	Current Below Normal Or Open Circuit
6	Current Above Normal Or Grounded Circuit
7	Mechanical System Not Responding Or Out Of Adjustment
8	Abnormal Frequency Or Pulse Width Or Period
9	Abnormal Update Rate
10	Abnormal Rate Of Change
11	Root Cause Not Known
12	Bad Intelligent Device Or Component
13	Out Of Calibration
14	Special Instructions
15	Data Valid But Above Normal Operating Range Least Severe Level
16	Data Valid But Above Normal Operating Range Moderately Severe Level
17	Data Valid But Below Normal Operating Range Least Severe Level
18	Data Valid But Below Normal Operating Range Moderately Severe Level
19	Received Network Data In Error
20	Data Drifted High
21	Data Drifted Low
31	Condition Exists

CONTROL PANEL SETUP

User Menu Function Buttons

The display panel can select various functions, be used to set languages, etc. and as a key pad for changing passwords. Use the following to access, change and set the display panel:

Figure 248

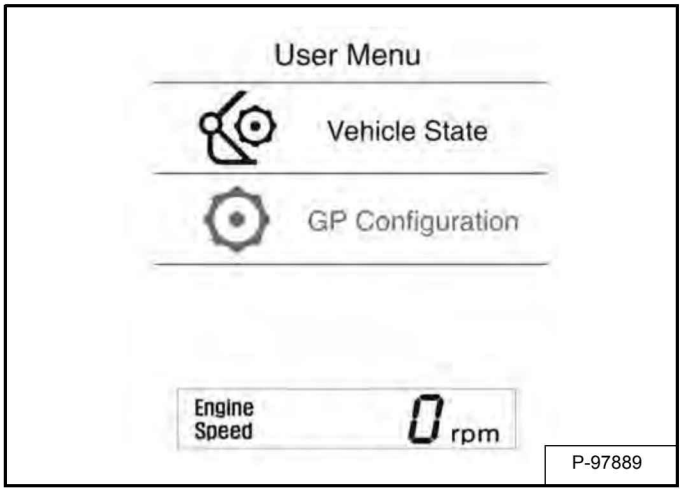


Right Console **[Figure 248]**

REF	DESCRIPTION	FUNCTION
0	Auto Idle Select Button	Press once to engage Auto Idle feature ON, press a second time to turn disengage. (See Automatic Idle Feature on Page 37.)
	Buzzer Stop	If a warning buzzer is activated, the buzzer can be deactivated by pressing the button. (This Does Not fix the problem, it only deactivates the buzzer. Find and repair the problem as soon as possible.)
	0	Used as a numeric 0 when using as the key pad.
1	Home	Press to return to initial screen.
	1	Used as a numeric 1 when using as the key pad.
2	Arrow UP	Use for scrolling curser up on the screen.
	2	Used as a numeric 2 when using as the key pad.
3	ENTER / ESC	Use to enter the menu. Also used to escape the current screen and go back to the previous screen.
		Used to close pop-ups
	3	Used as a numeric 3 when using as the key pad.
4		Not used for this model
	4	Used as a numeric 4 when using as the key pad.
5	Overload Warning	Press once to activate the overload warning feature; Icon 21 **[Figure 8]** will be illuminated when the activated. Press a second time to deactivate. When activated, if the machine exceeds the specified value, a warning buzzer will sound until the load has been reduced. (See “OVERLOAD WARNING” on page 58.)
	5	Used as a numeric 5 when using as the key pad.
6	Arrow UP	Use for scrolling curser down on the screen.
	6	Used as a numeric 6 when using as the key pad.
7	Selection	Use for selecting the desired menu item.
	7	Used as a numeric 7 when using as the key pad.

User Menu Access and Escape

Figure 249



Press the button (Item 1) **[Figure 248]** to change screen to the user menu **[Figure 249]**. Press button a second time to change back to main screen.

NOTE: The display will automatically switch back to the main screen in approximately 20 seconds if there is no activity for any screen changes.

NOTE: Turning the key to the OFF position will also reset the display to the main screen.

User Menu

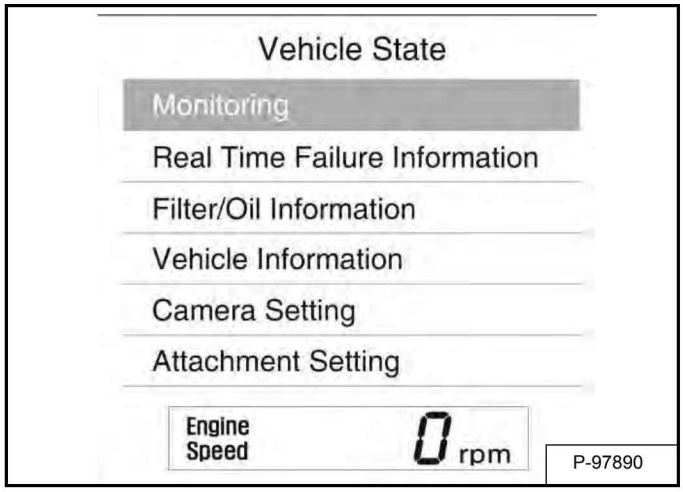
Use the menu up arrow (Item 2), down arrow (Item 6) and the select arrow (Item 7) **[Figure 248]** to navigate through the screens until the desired function is displayed.

Press the escape button (Item 3) **[Figure 248]** to return to the previous screen.

Vehicle State

The vehicle state screen will allow the display of; real time functions, failure modes (fault codes), filter / oil information (maintenance clock settings), vehicle information and attachment settings (hydraulic attachments and hydraulic flow rates).

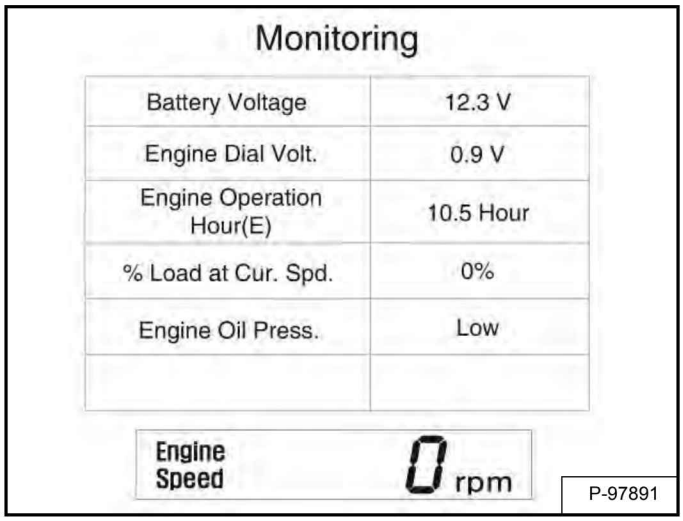
Figure 250



Monitoring - Real Time Functions

Press the UP or DOWN buttons until *Monitoring* is highlighted. Then press the select arrow button (Item 7) **[Figure 248]** to enter the monitoring screen **[Figure 250]**.

Figure 251



The following real time functions will be displayed **[Figure 251]**.

Battery Voltage

Engine Dial voltage

Engine Operation Hours

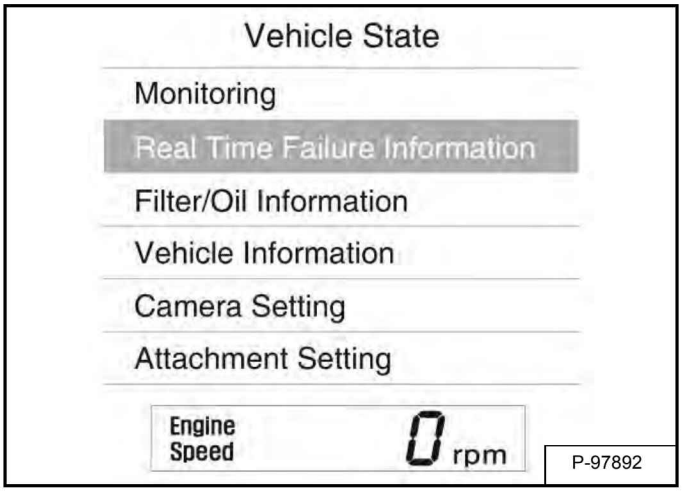
Percentage of Load at Current Speed

Engine Oil Pressure

Engine Speed (rpm)

Vehicle State (Cont'd)

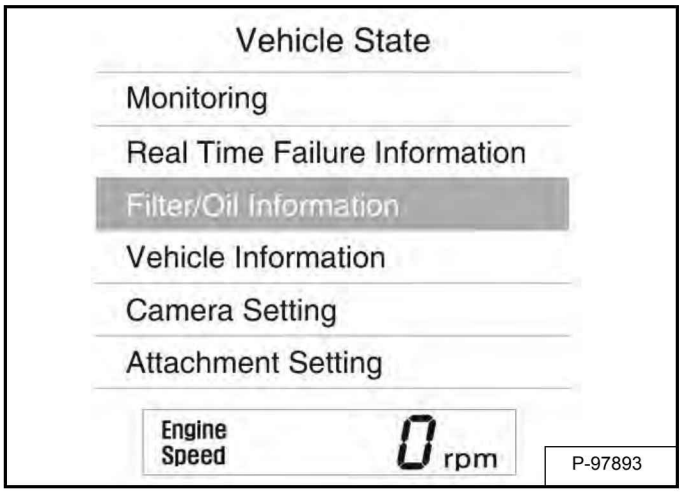
Figure 252



Real Time Failure Information (Fault Codes)

Press the UP or DOWN buttons until *Real Time Failure Information* is highlighted. Then press the select arrow button (Item 7) **[Figure 248]** to enter the information screen **[Figure 252]**.

Figure 253



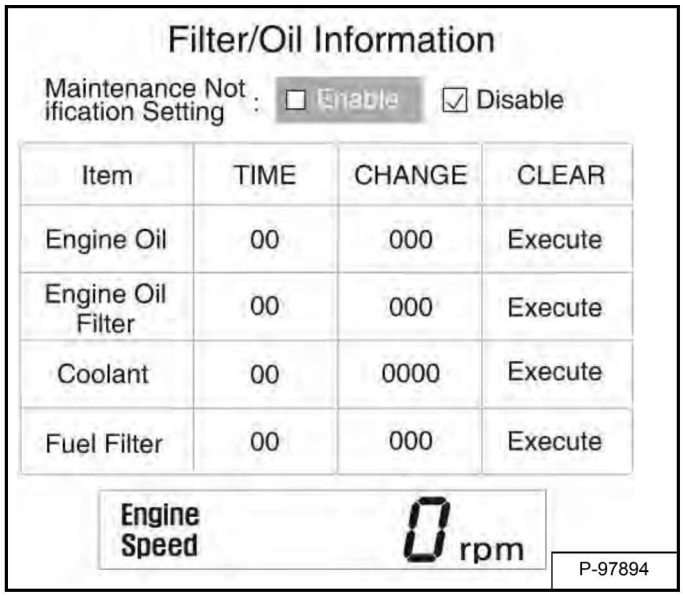
Filter / Oil Information (Maintenance Clock Settings)

Press the UP or DOWN buttons until *Filter / Oil Information* is highlighted. Then press the select arrow button (Item 7) **[Figure 248]** to enter the information screen **[Figure 253]**.

Various components can be monitored with the maintenance clock. These maintenance times can alert the operator when scheduled maintenance is needed on the machine. Once the maintenance has been performed, the maintenance clock will need to be re-set for the next scheduled service requirement.

Vehicle State (Cont'd)

Figure 254



The following items are recorded on the maintenance clock **[Figure 254]**:

Engine Oil, Engine Oil Filter, Coolant, Fuel Filter, Air Cleaner, Hydraulic Oil, Pilot Filter, Return Filter, Suction Filter and Air Conditioning Filter

NOTE: Use the arrow UP and DOWN buttons to scroll for the additional items and times.

To reset the maintenance clock; (after maintenance has been performed), use the arrow UP or DOWN buttons until the desired item is highlighted in the "CLEAR" window. Press the select arrow button (Item 7) **[Figure 248]** and then press "OK" when the confirmation window appears. The "CHANGE" window will now be highlighted. Use the arrow UP or DOWN buttons to add or subtract hours to reset the clock (in 50 hour increments). The clock can not be set higher than the factory set times shown in the TIME window, but you can set it for less time if desired. When the desired time is shown in the TIME window, press the select arrow button (Item 7) **[Figure 248]** to save the setting.

If multiple maintenance procedures are preformed, use the arrow UP and DOWN buttons (Item 2 and 6) **[Figure 248]** to go to the next item to be reset.

Press the ENTER / ESC button (Item 3) **[Figure 248]** to go to the previous screen.

NOTE: Follow the Service Schedule times for recommended service intervals when setting the maintenance clock. (See SERVICE SCHEDULE on Page 95.)

Figure 255

MAINTENANCE POP UP WINDOW

Pop-up windows are used to alert the operator that a maintenance procedure will need to be performed soon. (Press the ENTER / ESC button (Item 3) **[Figure 248]** to make the pop-up window temporarily disappear from the main screen.)

In "Disabled" mode, the pop-up window **[Figure 255]** will alert the operator 10 working hours prior to the scheduled maintenance and also when the hours reach 0. In "Enabled" mode, the pop-up will appear at 10 hours before the maintenance is due and will also appear, each time the machine is started, until the scheduled maintenance has been performed.

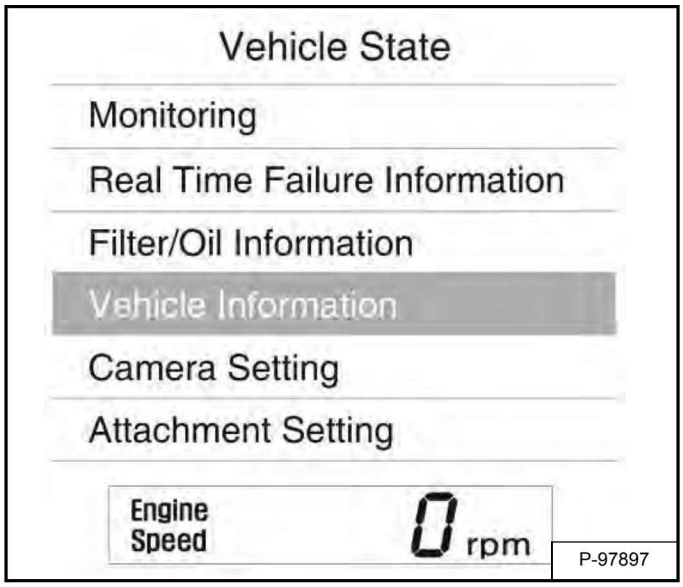
To activate "Enable" or "Disable" mode, press the UP or DOWN buttons until either the "Enable" or "Disable" is highlighted **[Figure 254]** and then press the select arrow button (Item 7) **[Figure 248]** to activate the selected feature.

Figure 256

If the service is not performed before the maintenance clock reaches the scheduled time, a pop-up window **[Figure 256]** will appear showing that service is over due. The pop-up will appear each time the machine is started until the maintenance as been performed and the clock has been reset.

Vehicle State (Cont'd)

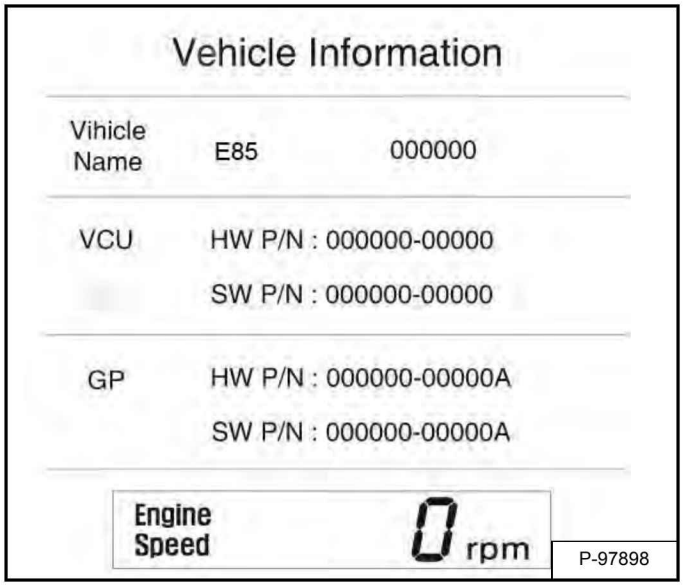
Figure 257



Vehicle Information

Use the arrow UP and DOWN buttons until VEHICLE INFORMATION **[Figure 257]** is highlighted, then press the select arrow button (Item 7) **[Figure 248]**.

Figure 258

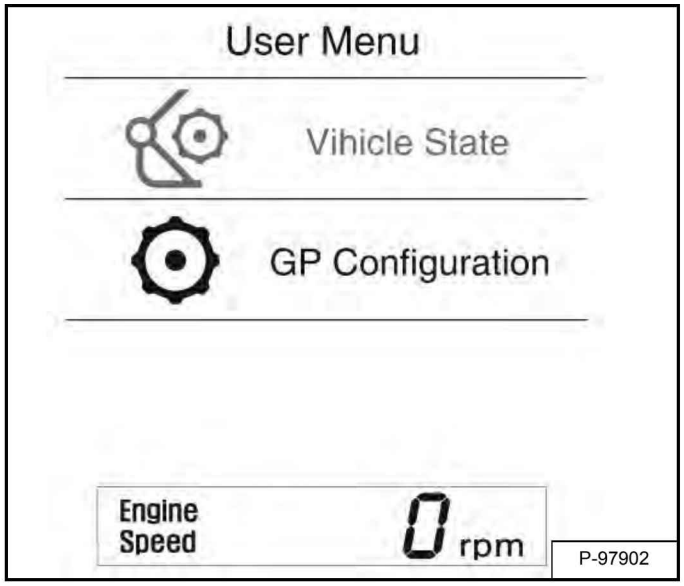


The vehicle information screen shows the machine model number, serial number, VCU (Vehicle Control Unit) and GP (Gauge panel) **[Figure 258]**. When finished, press the ESCAPE / ESC button (Item 3) **[Figure 248]** to return to the previous screen.

GP Configuration

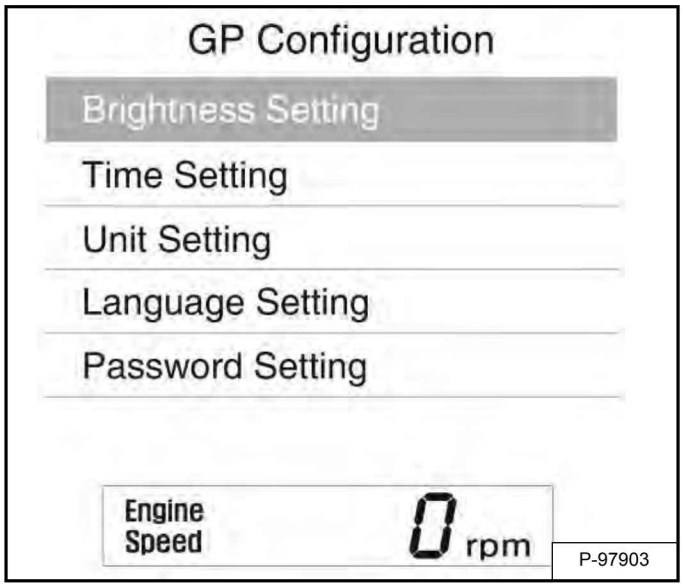
The GP (Gauge Panel) Configuration is used for setting the display screen brightness, language, Time, Units and Password.

Figure 259



Use the arrow UP and DOWN buttons until GP CONFIGURATION **[Figure 259]** is highlighted, then press the select arrow button (Item 7) **[Figure 248]**.

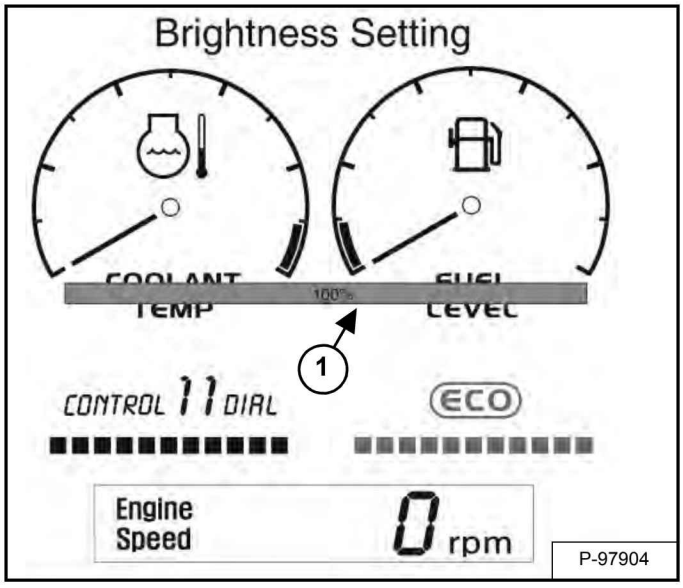
Figure 260



Brightness Setting

Use the arrow UP and DOWN buttons until BRIGHTNESS SETTING **[Figure 260]** is highlighted, then press the select arrow button (Item 7) **[Figure 248]**.

Figure 261



Use the arrow UP and DOWN buttons to change the BRIGHTNESS SETTING (Item 1) **[Figure 261]** percentage (%), then press the select arrow button (Item 7) **[Figure 248]** to save the setting.

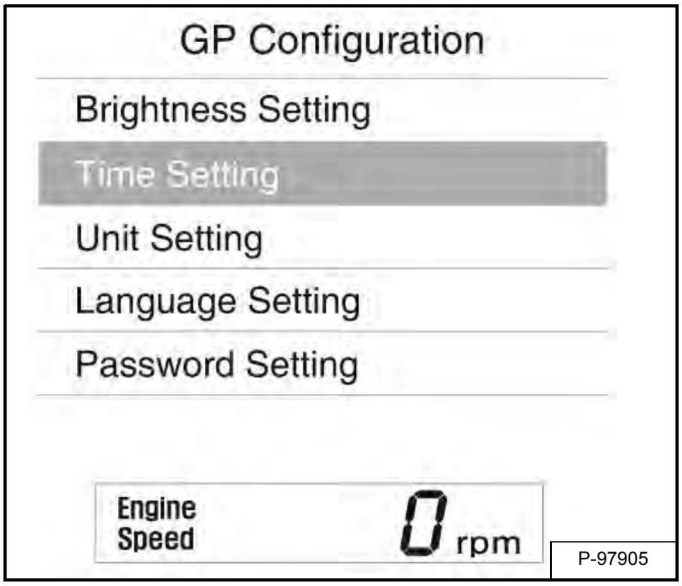
0% the lowest setting, 100% the brightest setting.

When finished, press the ENTER / ESC button (Item 3) **[Figure 248]** to return to the previous screen.

GP Configuration (Cont'd)

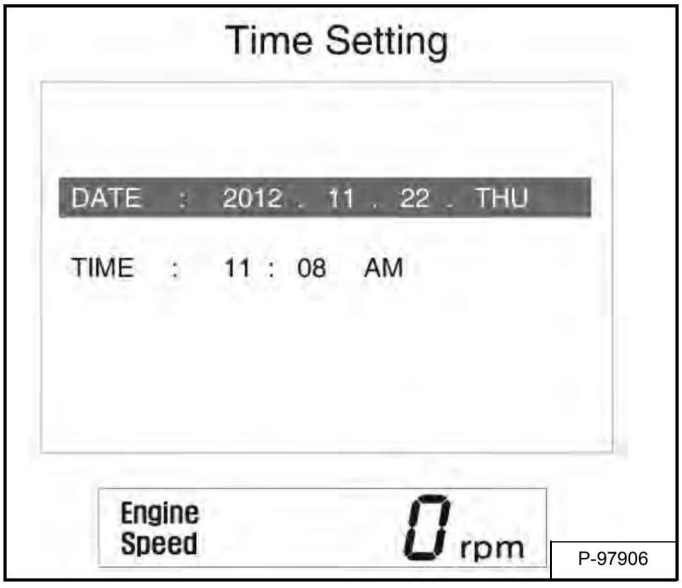
Time Setting

Figure 262



Use the arrow UP and DOWN buttons until TIME SETTING **[Figure 262]** is highlighted, then press the select arrow button (Item 7) **[Figure 248]**.

Figure 263

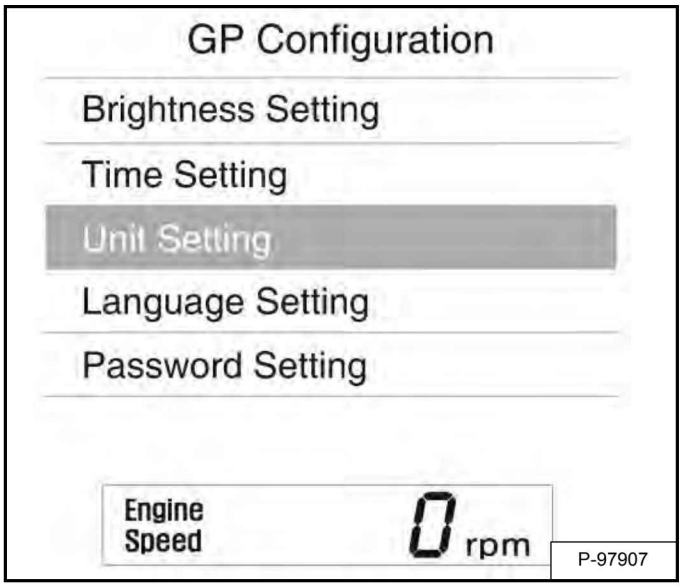


Use the arrow UP and DOWN buttons to select DATE or TIME **[Figure 263]**. Press the select arrow button (Item 7) **[Figure 248]** to enter DATE or TIME. Once selected, use the arrow UP and DOWN buttons to change the numbers on each area and then press the select arrow button (Item 7) **[Figure 248]** to save each change.

When finished, press the ENTER / ESC button (Item 3) **[Figure 248]** to go to the previous screen.

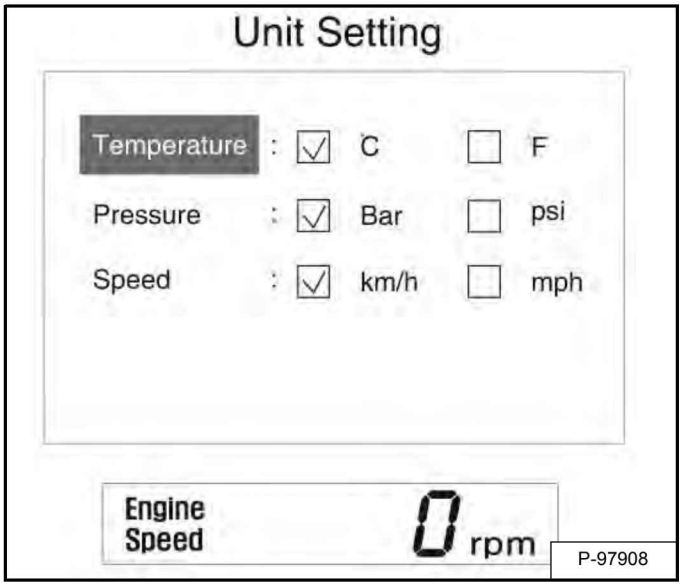
Unit Setting

Figure 264



Use the arrow UP and DOWN buttons until UNIT SETTING **[Figure 264]** is highlighted, then press the select arrow button (Item 7) **[Figure 248]**.

Figure 265



Use the arrow UP and DOWN buttons to select TEMPERATURE, PRESSURE and SPEED **[Figure 265]** settings desired. Use the arrow UP and DOWN buttons to highlight the desired UNIT and then press the select arrow button (Item 7) **[Figure 248]** to enter the selected UNIT. Once selected, use the arrow UP and DOWN buttons to change between METRIC and IMPERIAL and then press the select arrow button (Item 7) **[Figure 248]** to save each change.

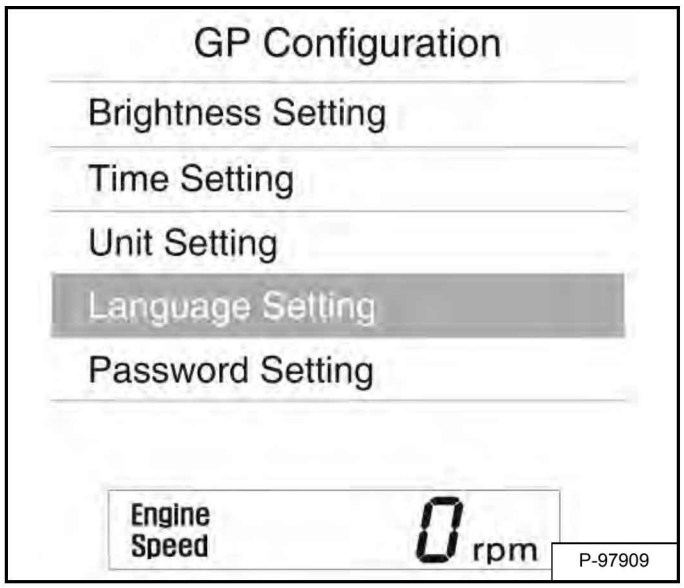
When finished, press the ENTER / ESC button (Item 7) **[Figure 248]** to go to the previous screen.

CONTROL PANEL SETUP (CONT'D)

GP Configuration (Cont'd)

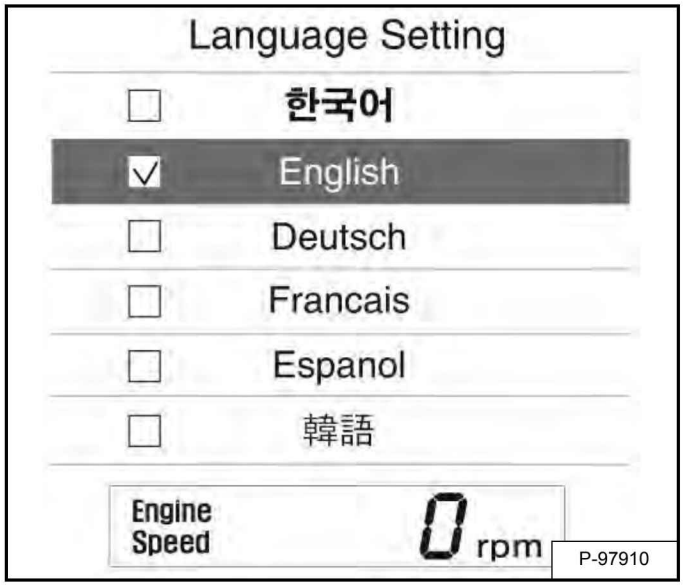
Language Setting

Figure 266



Use the arrow UP and DOWN buttons until LANGUAGE SETTING **[Figure 266]** is highlighted, then press the select arrow button (Item 7) **[Figure 248]**.

Figure 267



Use the arrow UP and DOWN buttons to select the desired language **[Figure 267]**. Press the select arrow button (Item 7) **[Figure 248]** to save the setting.

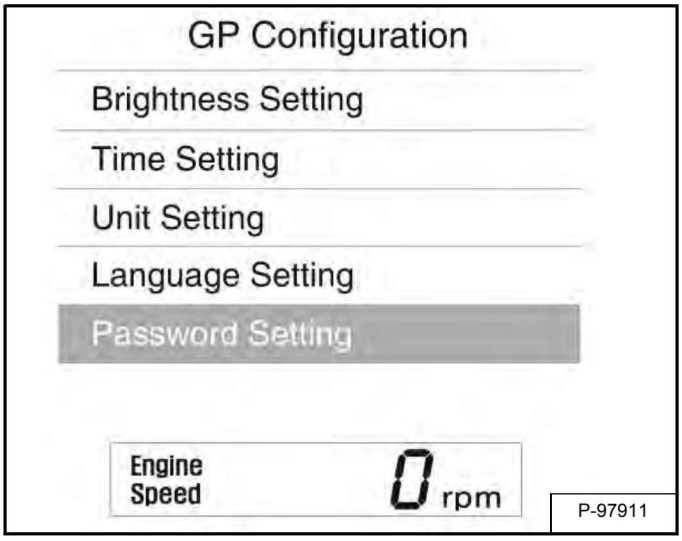
When finished, press the ENTER / ESC button (Item 3) **[Figure 248]** to go to the previous screen.

GP Configuration (Cont'd)

Password Setting

A password can be set up that must be enter into the display panel prior to starting and operating the machine. The password will help control who has access to operating the machine.

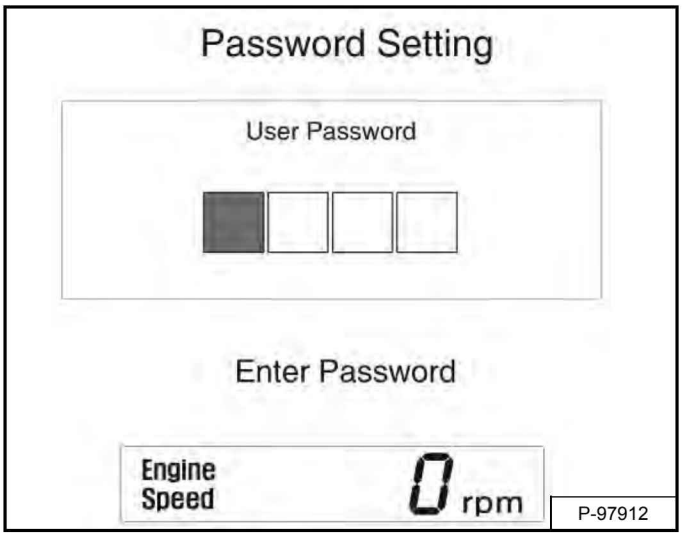
Figure 268



User Password Setting

Use the arrow UP and DOWN buttons until PASSWORD SETTING **[Figure 268]** is highlighted, then press the select arrow button (Item 7) **[Figure 248]**.

Figure 269

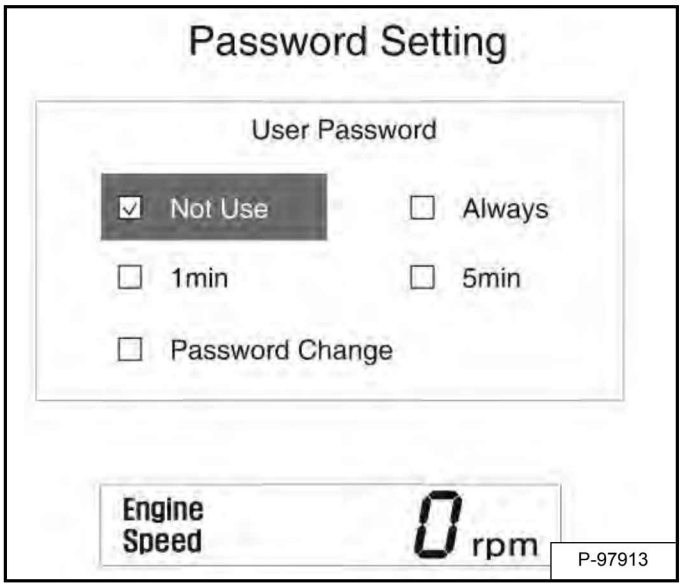


The four digit password screen will be displayed.

NOTE: The default password is 0000.

Using the key pad (using any numbers 0 through 7), enter four numbers **[Figure 259]** into the password screen. Press the select arrow button (Item 7) **[Figure 248]** to save the password.

Figure 270



There are also five different ways the password can be activated for usage or disabled.

- NOT USE - If this box is check, no password is needed to start and operate the machine.
- ALWAYS - If this box is check, a password must always be used to start and operate the machine.
- 1 min - If this box is check, a password will not be needed if the machine is re-started in less than one minute after shut down. If over one minute, the password must be re-entered to start.
- 5 min - If this box is check, a password will not be needed if the machine is re-started in less than five minutes after shut down. If over five minutes, the password must be re-entered to start.
- PASSWORD CHANGE - To change the user password, check the "password change" box. Enter a new password and save the setting by pressing the select arrow button (Item 7). Press the ENTER / ESC button (Item 3) **[Figure 248]** to return to the previous screen. Change and save the password. Then select one of the above four settings desired for controlling password setting.

NOTE: If an incorrect password has been enter three times in a row, the display screen will return to the main screen. Attempting to start the engine will be locked out for ten minutes before a new restart sequence is allowed.

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MACHINE SIGN TRANSLATIONS

Warning (6808185)

⚠ WARNING

Improper loading, transporting and lifting procedures can cause serious injury or death.

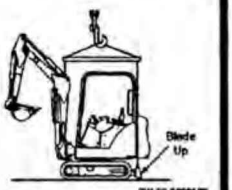
TRANSPORTING MACHINE

- Use metal loading ramps with sides and slip resistant surfaces.
- Secure ramps to truck bed.
- Engage truck parking brake and block truck tires.
- Ramp angle must not exceed 15°.
- Top of ramp must be level with truck bed.
- Engage swing lock (if equipped).
- Secure machine with tie downs and block tracks.

41742

LIFTING MACHINE

- Lifting device must have adequate capacity to lift machine.
- Maintain center of gravity and balance.
- Position machine as shown below. Engage the swing lock (if equipped).
- Never lift with operator on machine.



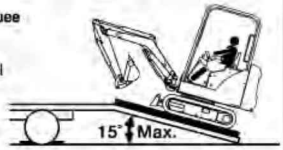
SW 00 6808185

⚠ ADVERTENCIA

Los procedimientos inadecuados de carga, transporte y elevación pueden causar lesiones graves o accidentes fatales

TRANSPORTE DE LA MÁQUINA

- Utilice rampas de carga metálicas con costados y superficies antideslizantes.
- Asegure las rampas al lecho del camión.
- Coloque el freno de estacionamiento del camión y bloquee las ruedas del camión.
- El ángulo de la rampa no debe exceder 15°.
- La parte superior de la rampa debe estar nivelada con el lecho del camión.
- Enganche el bloqueo de giro (si viene equipado).
- Asegure la máquina con ganchos de amarre y bloquee las orugas.



43407

ELEVACIÓN DE LA MÁQUINA

- El dispositivo de elevación debe tener la capacidad adecuada para elevar la máquina.
- Mantenga el centro de gravedad y el equilibrio.
- Posicione la máquina como se muestra abajo. Enganche el bloqueo de giro (si viene equipado)
- Jamás eleve con el operador en la máquina.

SW 6808185 AR

⚠ AVERTISSEMENT

Le non respect des procédures de chargement, de transport et de levage peut causer des blessures graves, voire mortelles.

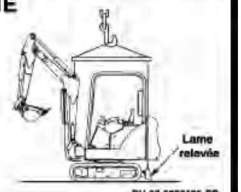
TRANSPORT DE LA MACHINE

Utilisez des rampes en acier avec rebords et revêtements anti-dérapants.
Attachez les rampes au plancher de la remorque.
Serrez le frein de stationnement et bloquez les roues du camion.
L'inclinaison de la rampe ne doit pas dépasser 15°.
L'extrémité de la rampe doit se trouver dans l'alignement du plancher de la remorque.
Engagez l'axe de verrouillage de l'orientation.
Attachez la machine avec des chaînes et bloquez les chenilles.

41742

LEVAGE DE LA MACHINE

- Le dispositif de levage doit être capable de supporter le poids de la machine.
- Maintenez le centre de gravité et l'équilibre pendant l'opération.
- Positionnez la machine comme indiqué. Engagez l'axe de verrouillage de l'orientation.
- Ne levez jamais la pelle quand l'opérateur s'y trouve.



DV-00-6806185-FR

WARNING

OVERLOAD CAN TIP THE EXCAVATOR AND CAUSE INJURY OR DEATH

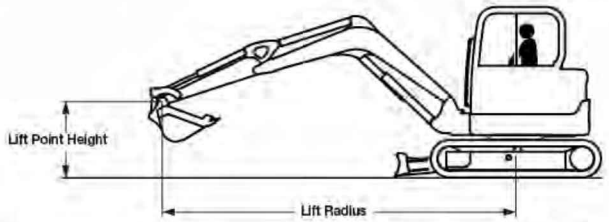
- Do not lift or hold any load that exceeds these ratings at their specified load radii and height.
- Total rated load is shown. The weight of all lifting devices must be deducted to determine the net load that can be lifted.

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 E85

CIRCUIT PRESSURES
WORKING 295 bar (4279 psi)
HOLDING 310 bar (4496 psi)

BOOM LENGTH	3380 mm	(133.1 in)
ARM LENGTH	2250 mm	(88.6 in)
STANDARD BUCKET	610 mm	(24.0 in)
	191 kg	(420 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)
mm (in.)	3000 (118.1)	4000 (157.5)	5000 (196.9)	6000 (236.2)		3000 (118.1)	4000 (157.5)	5000 (196.9)	6000 (236.2)		3000 (118.1)	4000 (157.5)	5000 (196.9)	6000 (236.2)	
5000 (196.9)			*1344 (2963)		*1314 (2896) @ 5020 (198)			*1344 (2963)		*1314 (2896) @ 5020 (198)			1137 (2506)		1127 (2484) @ 5020 (198)
4000 (157.5)			*1404 (3095)		*1472 (3246) @ 5730 (226)			*1404 (3095)		1136 (2505) @ 5730 (226)			1147 (2528)		953 (2100) @ 5730 (226)
3000 (118.1)		*1634 (3602)	*1524 (3359)	*1474 (3249)	*1476 (3254) @ 6170 (243)		*1634 (3602)	1407 (3101)	987 (2175)	937 (2065) @ 6170 (243)		*1634 (3602)	1117 (2462)	847 (1868)	803 (1770) @ 6170 (243)
2000 (78.7)	*2814 (6204)	*1965 (4333)	*1760 (3881)	*1567 (3454)	*1523 (3359) @ 6380 (251)	*2814 (6204)	*1965 (4333)	1337 (2948)	967 (2131)	905 (1995) @ 6380 (251)	2527 (5570)	1664 (3668)	1157 (2550)	810 (1785)	725 (1598) @ 6380 (251)
1000 (39.4)	*3793 (8361)	*2589 (5708)	*1942 (4281)	*1634 (3602)	*1555 (3428) @ 6410 (252)	2766 (6098)	1847 (4073)	1276 (2813)	949 (2093)	854 (1883) @ 6410 (252)	2415 (5325)	1579 (3480)	1065 (2348)	779 (1718)	697 (1538) @ 6410 (252)
Ground	*4231 (9327)	*2798 (6169)	*2108 (4646)	*1669 (3681)	*1594 (3515) @ 6260 (246)	2674 (5895)	1749 (3855)	1226 (2704)	939 (2070)	895 (1973) @ 6260 (246)	2256 (4973)	1500 (3308)	1027 (2265)	755 (1665)	714 (1575) @ 6260 (246)
-1000 (-39.4)	*4081 (8996)	*2842 (6264)	*2044 (4507)		*1630 (3594) @ 5900 (232)	2626 (5790)	1647 (3630)	1150 (2535)		959 (2115) @ 5900 (232)	2198 (4845)	1408 (3105)	1027 (2265)		820 (1808) @ 5900 (232)

* Rated Hydraulic Lift Capacity

84802 SW 7231563 enUS

Lift Chart (7231563) (Cont'd)

Translated Decals Not Available At Time Of Printing

⚠ 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 E85

CIRCUIT PRESSURES
WORKING 295 bar (4279 psi)
HOLDING 310 bar (4496 psi)

BOOM LENGTH 3380
ARM LENGTH 2250
STANDARD BUCKET 610
191

LIFT POINT HEIGHT	RATED LIFT CAPACITY OVER BLADE, BLADE DOWN - kg (lb)				RATED LIFT CAPACITY OVER BLADE, BLADE UP - kg (lb)				RATED LIFT OVER SIDE, BL				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)	LIFT RADIUS - mm (in)				
mm (in.)	3000 (118.1)	4000 (157.5)	5000 (196.9)	6000 (236.2)	3000 (118.1)	4000 (157.5)	5000 (196.9)	6000 (236.2)	3000 (118.1)	4000 (157.5)	5000 (196.9)	6000 (236.2)	
5000 (196.9)			*1344 (2963)	*1314 (2896) @ 5020 (198)			*1344 (2963)				1137 (2506)		1127 (2484) @ 5020 (198)
4000 (157.5)			*1404 (3095)	*1472 (3246) @ 5730 (226)			*1404 (3095)				1147 (2528)		953 (2100) @ 5730 (226)
3000 (118.1)		*1634 (3602)	*1524 (3359)	*1476 (3254) @ 6170 (243)		*1634 (3602)	1407 (3101)	987 (2175)		*1634 (3602)	1117 (2462)	847 (1868)	803 (1770) @ 6170 (243)
2000 (78.7)	*2814 (6204)	*1965 (4333)	*1760 (3881)	*1523 (3359) @ 6380 (251)	*2814 (6204)	*1965 (4333)	1337 (2948)	967 (2131)	2527 (5570)	1664 (3668)	1157 (2550)	810 (1785)	725 (1598) @ 6380 (251)
1000 (39.4)	*3793 (8361)	*2589 (5708)	*1942 (4281)	*1555 (3428) @ 6410 (252)	2766 (6098)	1847 (4073)	1276 (2813)	949 (2093)	2415 (5325)	1579 (3480)	1065 (2348)	779 (1718)	697 (1538) @ 6410 (252)
Ground	*4231 (9327)	*2798 (6169)	*2108 (4646)	*1594 (3515) @ 6260 (246)	2674 (5895)	1749 (3855)	1226 (2704)	939 (2070)	2256 (4973)	1500 (3308)	1027 (2265)	755 (1665)	714 (1575) @ 6260 (246)
-1000 (-39.4)	*4081 (8996)	*2842 (6264)	*2044 (4507)	*1630 (3594) @ 5900 (232)	2626 (5790)	1647 (3630)	1150 (2535)		2198 (4845)	1408 (3105)	1027 (2265)		820 (1808) @ 5900 (232)

* Rated Hydraulic Lift Capacity

84802 SW 7231563 enUS

Lift Chart (7231563) (Cont'd)

Translated Decals Not Available At Time Of Printing

⚠ 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 E85

CIRCUIT PRESSURES
WORKING 295 bar (4279 psi)
HOLDING 310 bar (4496 psi)

BOOM LENGTH 3380 r
ARM LENGTH 2250 r
STANDARD BUCKET 610 m
191 k

LIFT POINT HEIGHT mm (in.)	RATED LIFT CAPACITY OVER BLADE, BLADE DOWN - kg (lb)					RATED LIFT CAPACITY OVER BLADE, BLADE UP - kg (lb)					RATED LIFT C OVER SIDE, BLAI				
	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)
	3000 (118.1)	4000 (157.5)	5000 (196.9)	6000 (236.2)		3000 (118.1)	4000 (157.5)	5000 (196.9)	6000 (236.2)		3000 (118.1)	4000 (157.5)	5000 (196.9)	6000 (236.2)	
5000 (196.9)			*1344 (2963)		*1314 (2896) @ 5020 (198)			*1344 (2963)		*1314 (2896) @ 5020 (198)			1137 (2506)		1127 (2484) @ 5020 (198)
4000 (157.5)			*1404 (3095)		*1472 (3246) @ 5730 (226)			*1404 (3095)		1136 (2505) @ 5730 (226)			1147 (2528)		953 (2100) @ 5730 (226)
3000 (118.1)		*1634 (3602)	*1524 (3359)	*1474 (3249)	*1476 (3254) @ 6170 (243)		*1634 (3602)	1407 (3101)	987 (2175)	937 (2065) @ 6170 (243)		*1634 (3602)	1117 (2462)	847 (1868)	803 (1770) @ 6170 (243)
2000 (78.7)	*2814 (6204)	*1965 (4333)	*1760 (3881)	*1567 (3454)	*1523 (3359) @ 6380 (251)	*2814 (6204)	*1965 (4333)	1337 (2948)	967 (2131)	905 (1995) @ 6380 (251)	2527 (5570)	1664 (3668)	1157 (2550)	810 (1785)	725 (1598) @ 6380 (251)
1000 (39.4)	*3793 (8361)	*2589 (5708)	*1942 (4281)	*1634 (3602)	*1555 (3428) @ 6410 (252)	2766 (6098)	1847 (4073)	1276 (2813)	949 (2093)	854 (1883) @ 6410 (252)	2415 (5325)	1579 (3480)	1065 (2348)	779 (1718)	697 (1538) @ 6410 (252)
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* Rated Hydraulic Lift Capacity

84802 SW 7231563 enUS

⚠ WARNING

AVOID INJURY OR DEATH

- Keep cover closed except for service.
- Keep engine clean of flammable material.
- Keep body, loose objects and clothing away from electrical contacts, moving parts, hot parts and exhaust.
- Do not use machine in space with explosive dust or gases or with flammable material near exhaust.
- All exhaust gases can kill. Always ventilate.
- Never use ether or starting fluid on diesel engine. Use only starting aids as approved by engine manufacturer.
- Leaking fluids under pressure can enter skin and cause serious injury. Immediate medical attention is required. Wear goggles. Use cardboard to check for leaks.
- Battery acid causes severe burns. Wear goggles. If acid contacts eyes, skin or clothing, flush and get medical attention.
- Battery makes flammable and explosive gas. Keep arcs, sparks, flames and lighted tobacco away.
- For jump start, connect negative cable to the machine frame last (never at the battery). After jump start, remove negative connections at the frame first.

SERVICE SCHEDULE

⋆ Service every 10 hours for first 100 hours.
■ Service at first 50 hours, then as scheduled.
▲ Service at first 100 hours, then as scheduled.
● Service at first 250 hours, then as scheduled.
+ Service at first year, then as scheduled.
♦ Service every 10 hours when operating in water.

EVERY 8-10 HOURS
Check engine coolant level.
Check engine oil level.
Check hydraulic fluid level.
Check oil level in swing reduction gearbox. (Model E85)
Check air cleaner condition indicator.
Check and adjust track tension.
Check indicator lights for correct operation.
Check cab condition and mounting hardware.
Check seat belt condition and mounting hardware.
Check control console lockout for proper operation.
Check for damaged signs (decals) - Replace as needed.
Drain water and sediment from fuel/water separator.

EVERY 50 HOURS
♦ Grease swing circle. (See illustrations)
⋆♦ Grease all blade, boom swing, boom swing cylinder, and bucket pivot points. (See Illustrations)
Check battery, cables and electrolyte level.
Drain water and sediment from fuel tank.

EVERY 100 HOURS
■ Check and adjust belts if required.

EVERY 250 HOURS
⋆♦ Grease workgroup pivot points. (See illustrations)
■ Replace engine oil and filter.
■ Clean fuel/water separator screen. Replace as needed.
Check oil level in both final drive cases.

EVERY 500 HOURS
Grease swing pinion. (See illustrations)
Clean radiator, oil cooler and A/C condenser.
▲ Check and adjust belts and idlers. Replace as needed.
Replace diesel fuel filter.
● Replace primary hydraulic filter and reservoir breather filter.
▲ Check alternator and starter connections.
Clean HVAC filter. Replace as needed.

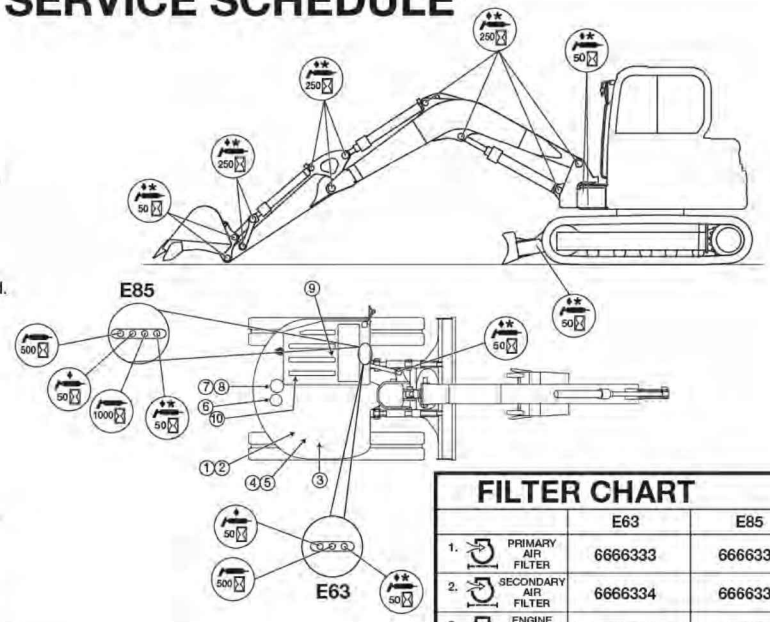
EVERY 1000 HOURS
Check and adjust engine valve clearance.

EVERY 1000 HOURS OR EVERY 12 MONTHS
Grease swing reduction gear. (Model E85) (See illustrations)
● Clean hydraulic oil suction filter.
▲ Replace oil in both final drive cases.
▲ Replace oil in swing reduction gearbox. (Model E85)
● Replace pilot filter. (Model E85)

EVERY 2000 HOURS OR EVERY 12 MONTHS
Replace hydraulic fluid and filters.

EVERY 1500 & 3000 HOURS
See Operation & Maintenance Manual for information.

EVERY 2 YEARS
+ Drain and flush cooling system - Replace coolant.



IMPORTANT

The Diesel Particulate Filter (DPF) acts as a spark arrester and engine exhaust emissions device. The DPF must be maintained according to the instructions in the Operation & Maintenance Manual for proper function as an emissions and spark arrester device.

If this machine is operated on flammable forest, brush, or grass covered land, the machine 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.

FILTER CHART

		E63	E85
1.	PRIMARY AIR FILTER	6666333	6666333
2.	SECONDARY AIR FILTER	6666334	6666334
3.	ENGINE OIL FILTER	7025590	7025590
4.	FUEL/WATER SEPARATOR SCREEN	7029012	7029012
5.	FUEL FILTER	7029016	7029016
6.	PRIMARY HYDRAULIC FILTER	7004883	7004884
7.	SUCTION HYDRAULIC FILTER	7006810	7006811
8.	HYDRAULIC BREATHER FILTER	7006806	7006806
9.	HVAC FILTER	7006085	7006085
10.	PILOT FILTER	-	7004879

- See illustrations above for filter locations.

- See Operation & Maintenance Manual for more information and instructions.

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Service Schedule (7231567) (Cont'd)

Translated Decals Not Available At Time Of Printing

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Check cab condition and mounting hardware.
Check seat belt condition and mounting hardware.
Check control console lockout for proper operation.
Check for damaged signs (decals) - Replace as needed.
Drain water and sediment from fuel/water separator.

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EVERY 100 HOURS
■ Check and adjust belts if required.

EVERY 250 HOURS
*♦ Grease workgroup pivot points. (See illustrations)
■ Replace engine oil and filter.
■ Clean fuel/water separator screen. Replace as needed.
Check oil level in both final drive cases.

EVERY 500 HOURS
Grease swing pinion. (See illustrations)
Clean radiator, oil cooler and A/C condenser.
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Replace diesel fuel filter.
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Clean HVAC filter. Replace as needed.

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Check and adjust engine valve clearance.

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● Clean hydraulic oil suction filter.
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▲ Replace oil in swing reduction gearbox. (Model E85)
● Replace pilot filter. (Model E85)

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Service Schedule (7231567) (Cont'd)

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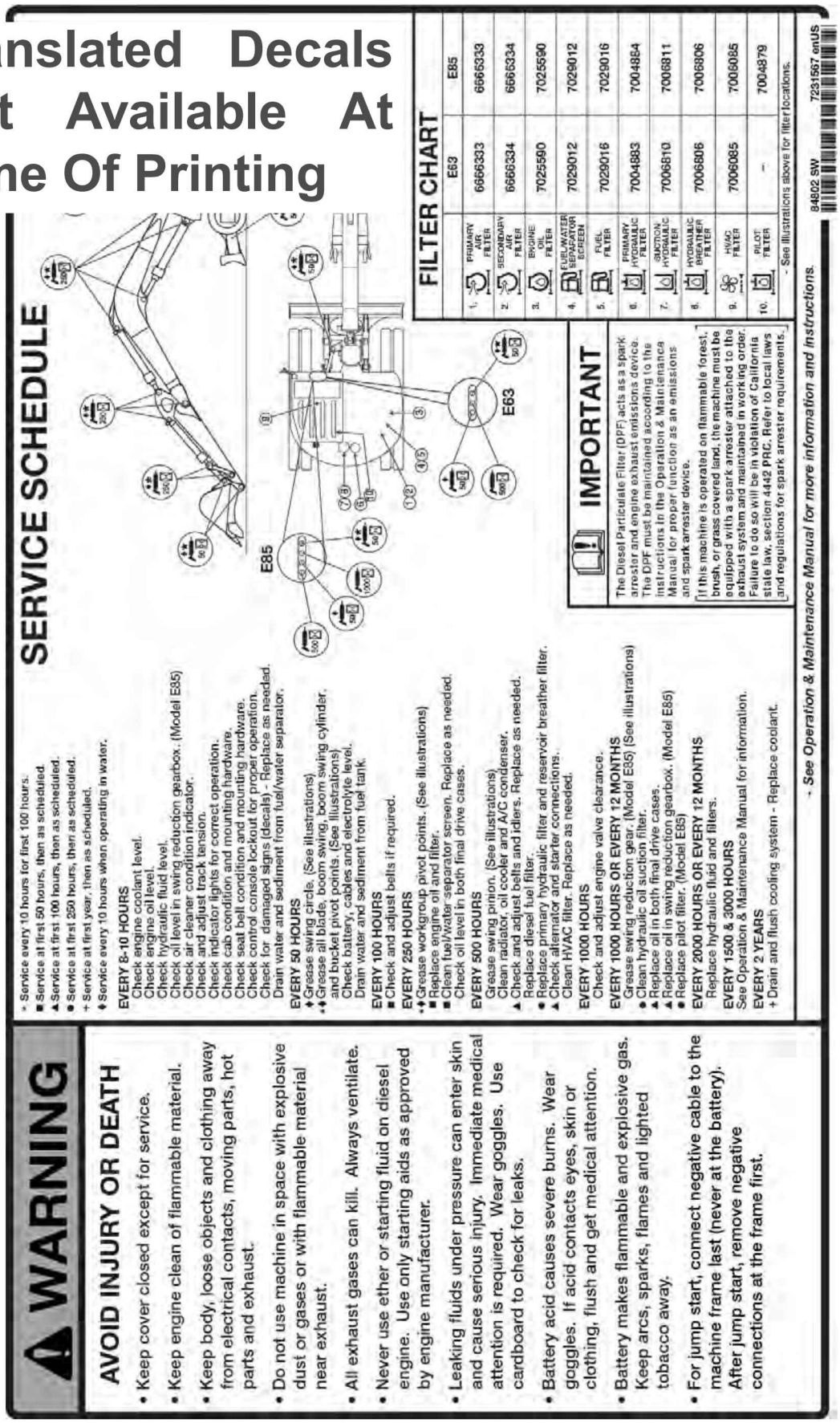
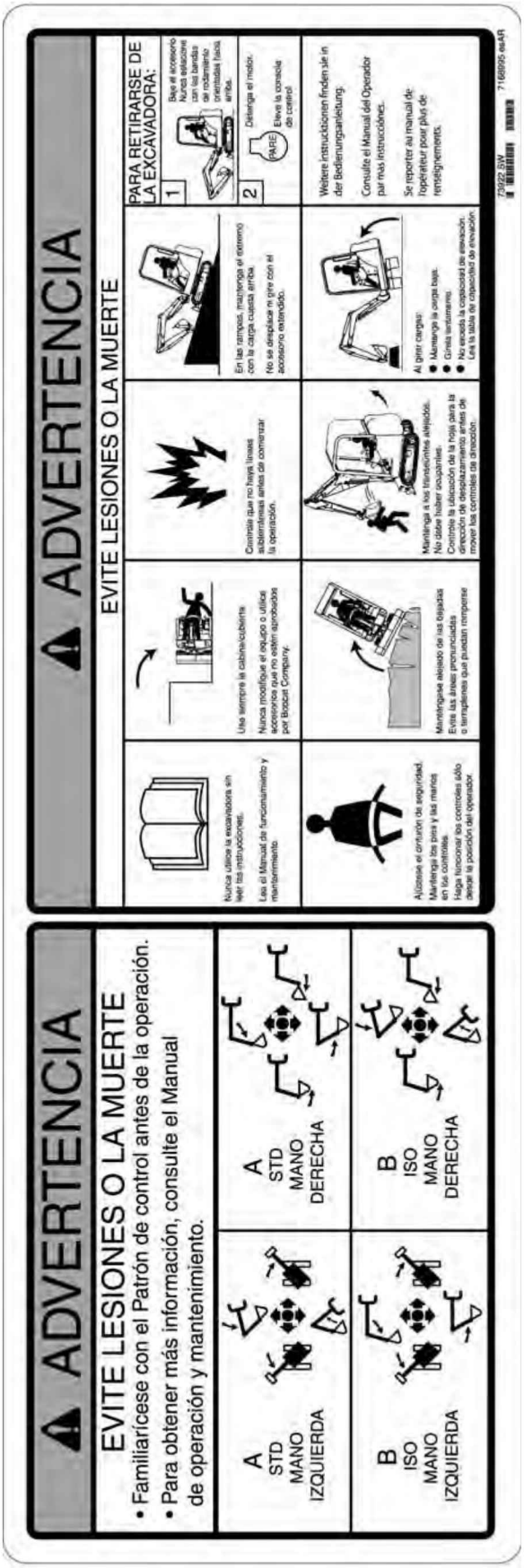
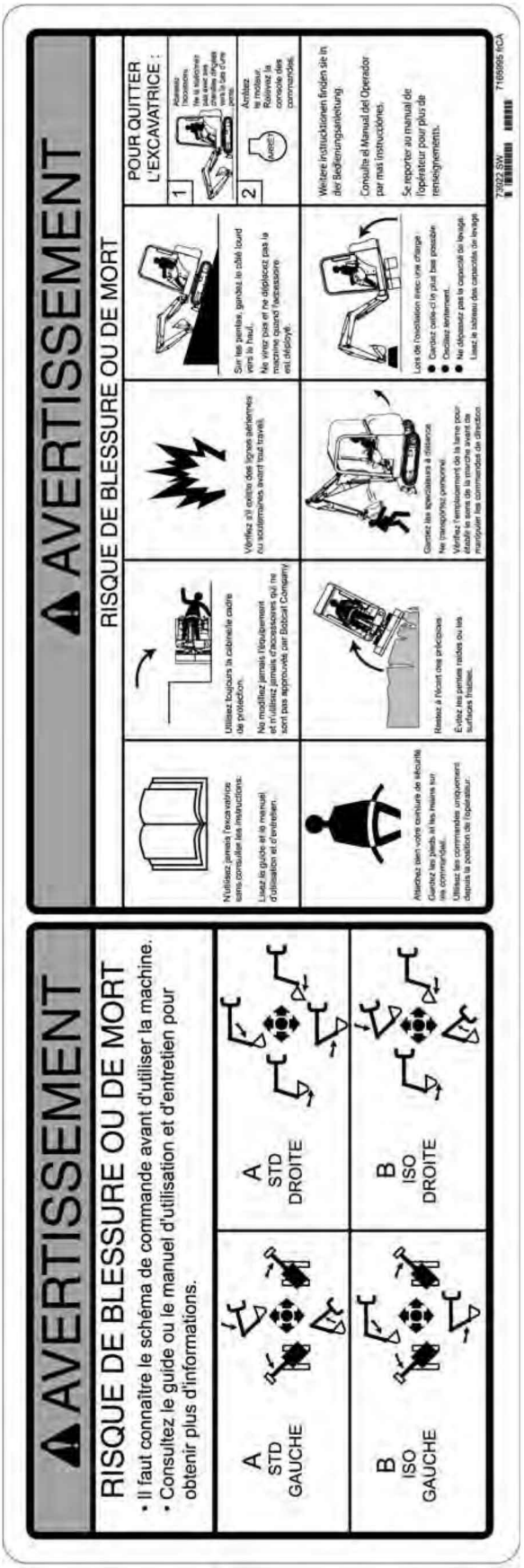


Warning (7168995)

Warning (7168995) (Cont'd)



Warning (7168995) (Cont'd)



MACHINE SIGN TRANSLATIONS (CONT'D)

Warning (6577754)

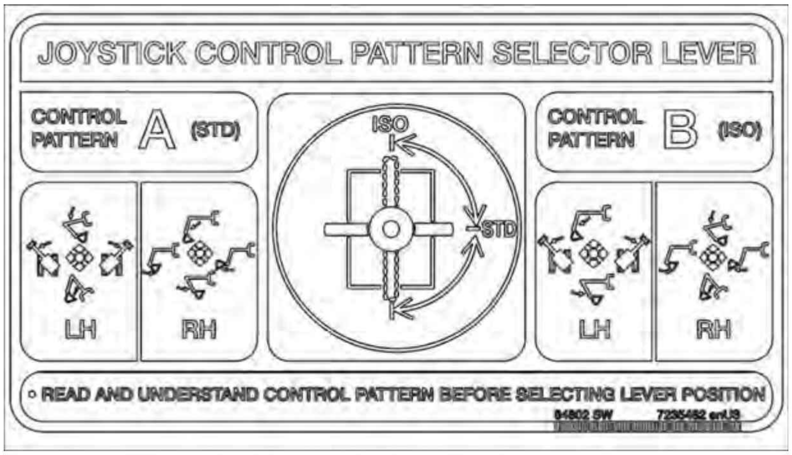
Warning (6804233)

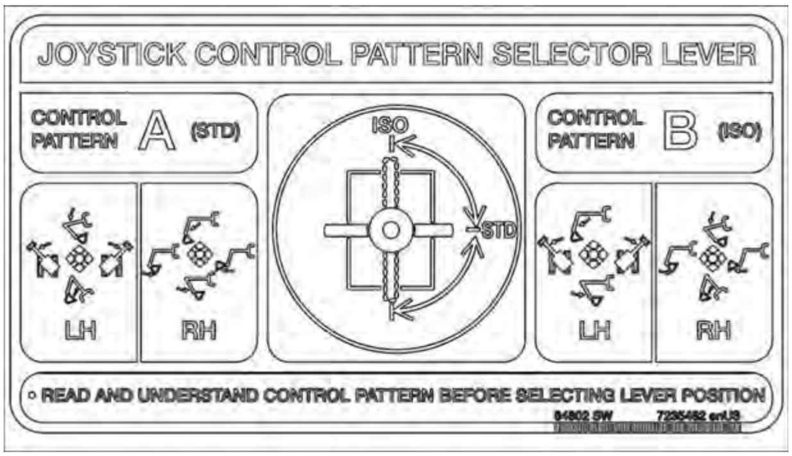
Warning (6809832)

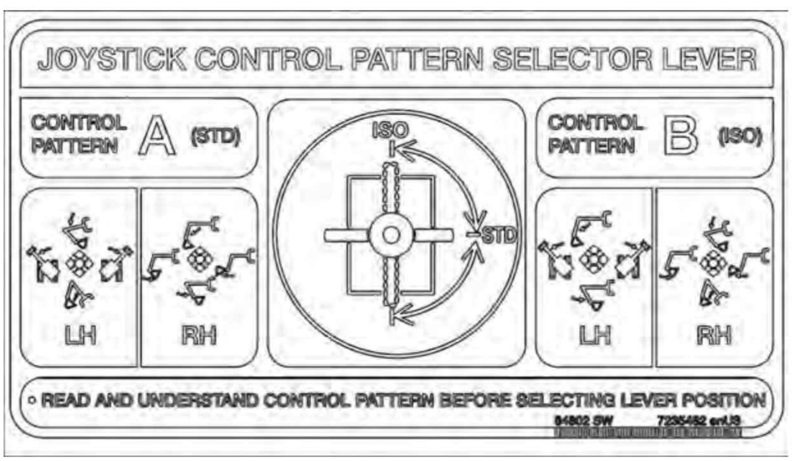
Warning (7169006)

MACHINE SIGN TRANSLATIONS (CONT'D)

Joystick Control Pattern Selector (7235482)







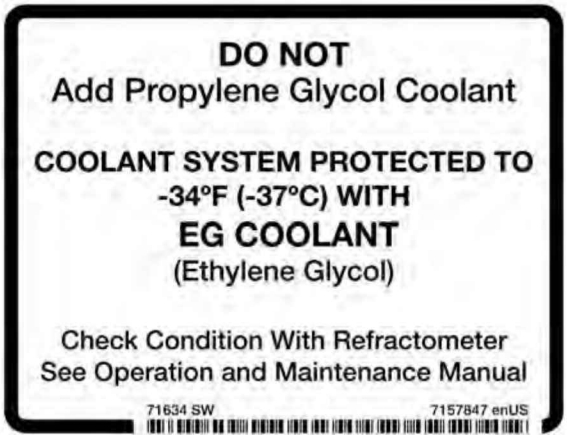
Translated Decals Not Available At Time Of Printing

MACHINE SIGN TRANSLATIONS (CONT'D)

Motion Alarm (6810004)

Low Sulfur (7190223)

Eg Coolant (7157847)

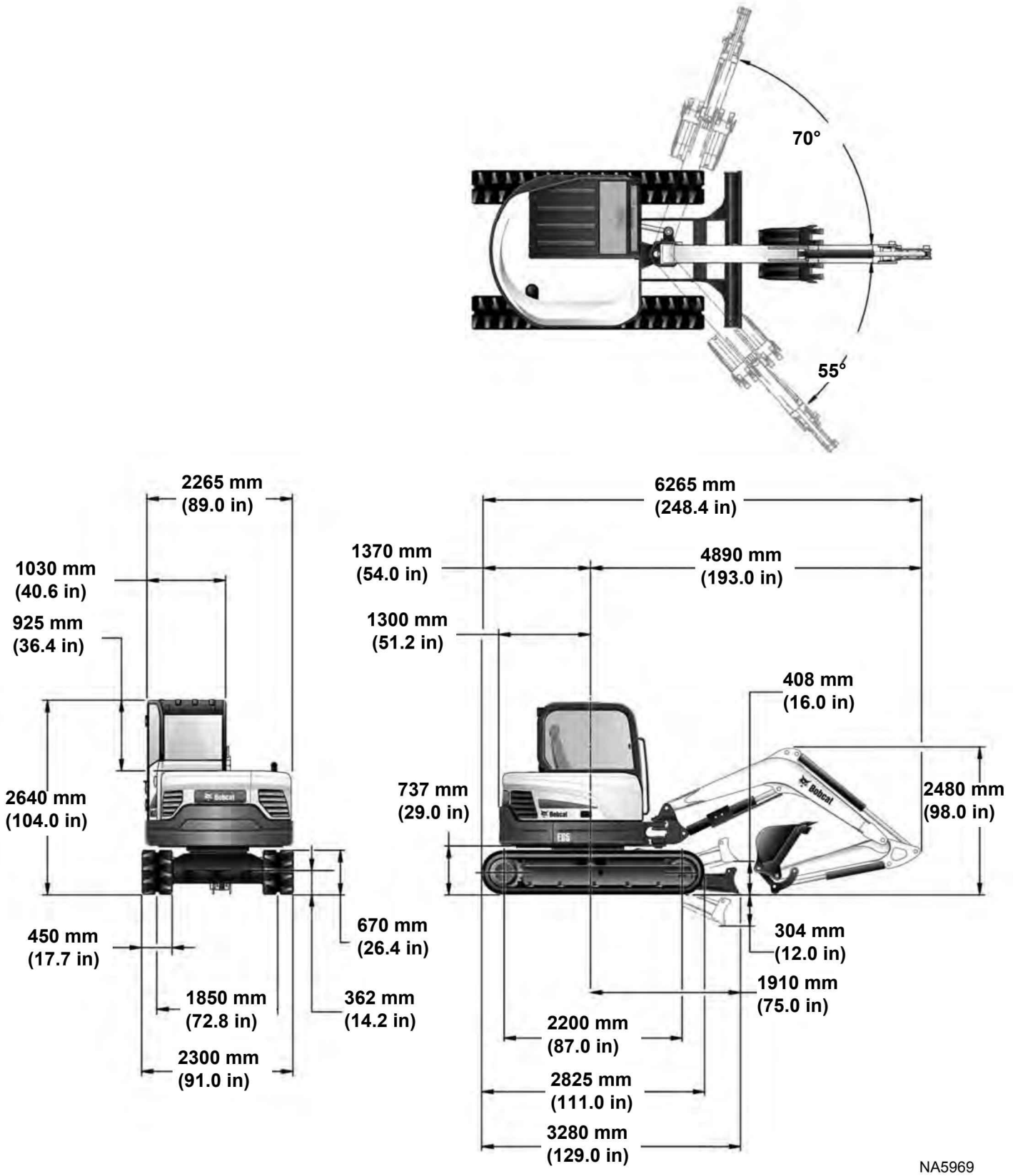


SPECIFICATIONS

EXCAVATOR SPECIFICATIONS

Dimensions

- All dimensions are shown in metric. Respective imperial dimensions are given in inches enclosed by parentheses.
- Where applicable, specification conform to SAE or ISO standards and are subject to change without notice.



EXCAVATOR SPECIFICATIONS (CONT'D)

Dimensions (Cont'd)

- All dimensions are shown in metric. Respective imperial dimensions are given in inches enclosed by parentheses.
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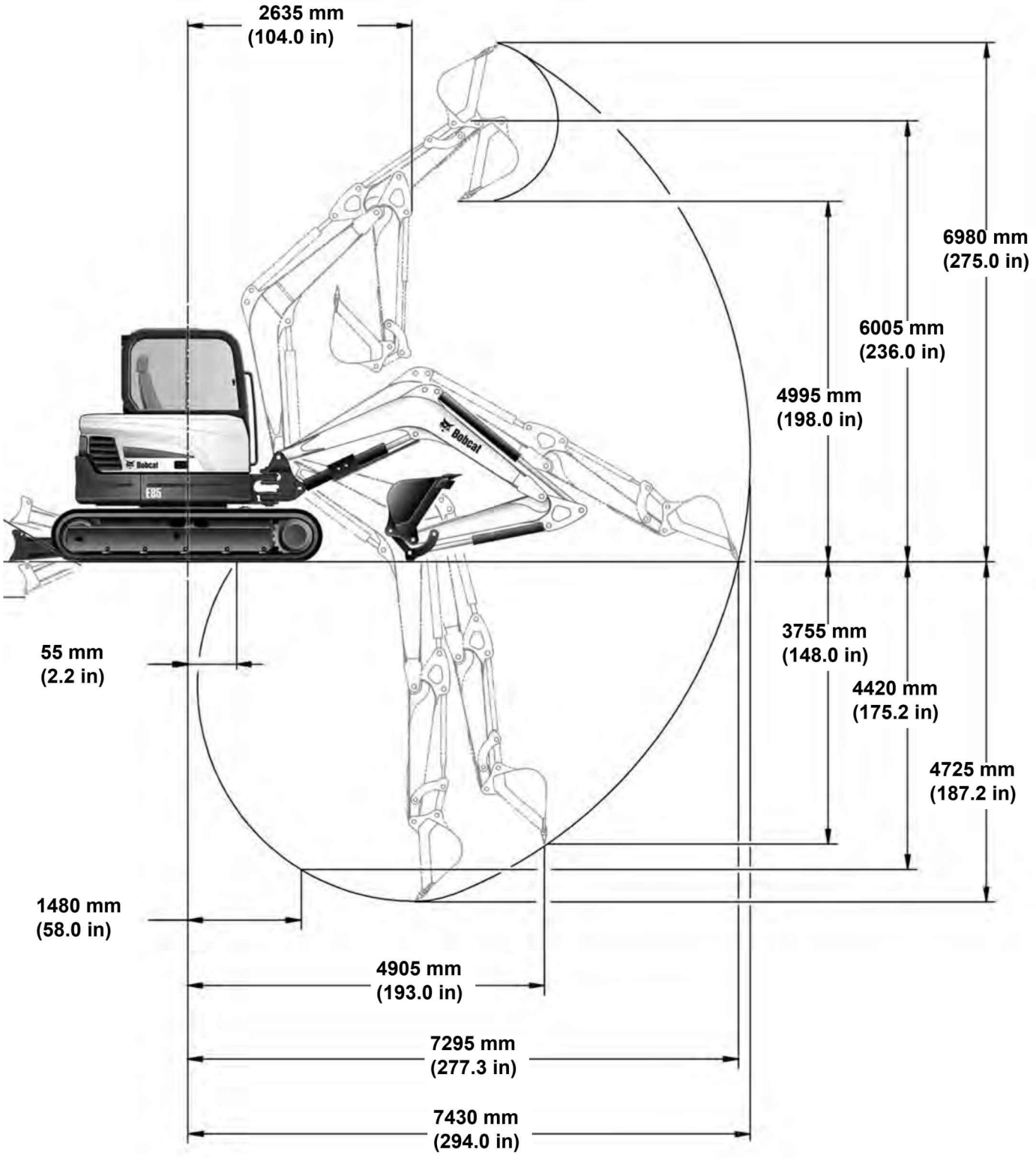

MS2792A

EXCAVATOR SPECIFICATIONS (CONT'D)

Performance

Operating weight w/ cab. HVAC, rubber tracks and 610 mm (24 in) bucket	8600 kg (18960 lb)
If equipped with steel tracks add:	30 kg (66 lb)
Travel Speed	Low Range 2,7 km/h (1.7 mph) High Range 4,7 km/h (2.9 mph)
Digging Force (per ISO 6015) Arm Bucket	 35892 N (8069 lbf) 64538 N (14509 lbf)
Boom Swing (Offset)	Left 70° Right 55°

Controls

Steering	Two hand levers or foot pedals.
Hydraulics	Two hand operated levers (joysticks) control boom, bucket, arm and upperstructure slew. Blade is controlled by a separate lever.
Auxiliary Hydraulics	Thumb swatches in joystick control auxiliary hydraulics and boom swing.
Auxiliary Pressure Release	Electric switches in joystick
Engine	Engine speed control dial with auto-idle feature, key type start switch
Starting Aid	Air Intake Heater - activated by key switch
Brakes Travel Service & Parking Swing Service Holding	 Hydraulic lock in motor Hydraulic lock in motor Hydraulic lock in motor Automatically applied slew brake integrated in slew motor

Engine

Make / Model	Yanmar 4TNV98C Tier 4 Final
Fuel / Cooling	Diesel / Liquid (Antifreeze mixture)
Horsepower (SAE Gross)	44,3 kW (59.4 hp) @ 2100 rpm
Torque	241 N•m (179.8 ft-lb) @ 1365 rpm
Number Of Cylinders	4
Displacement	3,3 L (203 in^3)
Bore / Stroke	98 x 110 mm (3.85 x 4.33 in)
Lubrication	Pressure System with Filter
Crankcase Ventilation	Closed Breather
Air Cleaner	Dual dry replaceable paper cartridges
Ignition	Diesel Compression
Low Idle	1050 rpm
High Idle	2150 rpm
Engine Coolant	Ethylene Glycol / water mixture (50% EG / 50% water)

Hydraulic System

Pump Type	Engine driven, variable displacement piston pump with pressure compensating, load sensing and torque limiter controls and gear pump.
Piston Pump Capacity	151 Lpm (39,8 U.S. gpm)
Gear Pump Capacity	23,1 Lpm (6.1 U.S. gpm)
Auxiliary Hydraulics (Continuous Flow, Auxiliary Hydraulic Flow and Secondary Auxiliary Flow)	95 Lpm (25.1 U.S. gpm)
Auxiliary Hydraulics (Secondary Auxiliary Flow)	50 Lpm (13.2 U.S. gpm)
Control Valve	12 spool closed center
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	
Travel Circuits	27503 kPa (275 bar) (3989 psi)
Slew Circuit	21601 kPa (216 bar) (3133 psi)
Boom, Arm, Bucket, Boom Swing, Blade, Auxiliary Hydraulics	29503 kPa (295 bar) (4279 psi)
Joystick Control Pressure	3200 kPa (32 bar) (464 psi)
Arm Port Relief, Base And Rod End	30999 kPa (310 bar) (4496 psi)
Boom Port Relief, Base End And Rod End	30999 kPa (310 bar) (4496 psi)
Bucket Port Relief, Base End Rod End	30999 kPa (310 bar) (4496 psi)
Primary Auxiliary Port Relief	21001 kPa (210 bar) (3046 psi)
Secondary Auxiliary Port Relief (If Equipped)	25000 kPa (250 bar) (3626 psi)
Swing Motor Cross Port Relief Valves	21994 kPa (220 bar) (3190 psi)
Hydraulic Filter Bypass	250 kPa (2,5 bar) (36 psi)
Hydraulic Pilot Filter Bypass	145 kPa (1,5 bar) (21 psi)

Hydraulic Cylinders

Cylinder	Bore	Rod	Stroke
Boom (cushion up)	115 mm (4.52 in)	75 mm (2.95 in)	775 mm (30.51 in)
Arm	100 mm (3.94 in)	65 mm (2.56 in)	866 mm (34.88 in)
Bucket (cushion extend / retract)	85 mm (3.35 in)	55 mm (2.17 in)	690 mm (27.17 in)
Boom Swing (cushion left/ right)	110 mm (4.33 in)	60 mm (2.36 in)	738 mm (29.05 in)
Blade	100 mm (3.94 in)	60 mm (2.36 in)	149 mm (5.87 in)

EXCAVATOR SPECIFICATIONS (CONT'D)

Hydraulic Cycle Times

Boom	Raise 3.2 Seconds	Lower 3.0 Seconds
Arm	Retract 3.8 Seconds	Extend 2.9 Seconds
Bucket	Curl 3.3 Seconds	Dump 2.1 Seconds
Blade	Raise 2.4 Seconds	Lower 2.9 Seconds
Boom Swing	Left 6.9 Seconds	Right 8.6 Seconds

Electrical

Starting Aid	Glow Plugs (automatic)
Alternator	12 volts, 80 Amp open frame w/ internal regulator
Battery	12 volts - 900 CCA @ -18°C (0°F)
Starter	12 volts gear reduction 3.0 kW (4.0 hp)
Instrumentation	Fuel gauge with low fuel indicator, Engine temperature gauge with audible alarm, Engine oil pressure light with audible alarm, Engine check light, Air filter restriction indicator, Auto idle indicator, Auxiliary flow mode indicator, Clock - day and time, Engine pre-heat indicator, two speed travel indicator, DPF status indicator and Hourmeter

Drive System

Final Drive	Each track is independently driven by an Axial Piston Motor
Type of Reduction	Three-stage planetary gear reduction

Slew System

Slew Motor	Axial Piston Motor
Slew Circle	Single row shear type ball bearing with internal gear
Slew Speed	9.5 rpm

Undercarriage

Crawler Track Design	Sealed track rollers with boxed section track, Roller frame, Grease type track adjuster

Capacities

Fuel Tank	110 L (29.1 U.S. gal)
Hydraulic Reservoir Only (Center of Sight Glass)	87 L (23.0 U.S. gal)
Hydraulic System (with Reservoir)	148 L (39.1 U.S. gal)
Cooling System	10,0 L (10.6 qt)
Engine Oil and Filter	10,8 L (10.2 qt)
Final Drive (each)	1,5 L (1.6 qt) 80W90 gear lube
Swing Motor Reduction Drive	1,5 L (16 qt) 80W90 gear lube

Track

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

Ground Pressure

Ground Pressure	
Rubber Tracks	38,3 kPa (0,383 bar) (5.5 psi)
Steel Tracks	38,3 kPa (0,383 bar) (5.5 psi)

WARRANTY

Bobcat Excavators

Bobcat Company warrants to its authorized dealers and authorized dealers of Bobcat Equipment Ltd., who in turn warrant to the owner, that each new Bobcat Excavator 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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In this emissions limited warranty, the term "Manufacturer" means Yanmar Company, Ltd. 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.

YANMAR CO., LTD. LIMITED EMISSION CONTROL SYSTEM WARRANTY - USA ONLY

Your Warranty Rights and Obligations:

California

The California Air Resources Board (CARB), the Environmental Protection Agency (EPA) and Yanmar Co., Ltd. hereafter referred to as Yanmar, are pleased to explain the **emissions control system warranty** on your industrial compression-ignition engine. In California, model year 2000 or later off-road compression-ignition engines must be designed, built and equipped to meet the States stringent anti-smog standards. In all states, 1998 and later non-road compression-ignition engines must be designed, built and equipped to meet the United States EPA emissions standards. Yanmar warrants the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the fuel injection system, Electronic Control Unit, Exhaust Gas Recirculation (EGR) system, after treatment system (DPF), the air induction system. Also included may be hoses, belts, connectors and other emission-related assemblies.

Where a warrantable condition exists, Yanmar will repair your non-road compression-ignition engine at no charge to you including diagnosis, parts and labor.

Manufacturer's Warranty Period:

The model year 1998 or later certified and labeled non-road compression-ignition engines are warranted for the periods listed below. If any emission-related part on your engine is found to be defective during the applicable warranty period, the part will be replaced by Yanmar.

If your engine is certified as	And its maximum power is	And its rated speed is	Then its warranty period is
Variable speed or constant speed	kW < 19	Any speed	1,500 hours or two (2) years whichever comes first. In the absence of a device to measure the hours of use, the engine has a warranty period of two (2) years.
Constant speed	19 ≤ kW < 37	3000 rpm or higher	1,500 hours or two (2) years whichever comes first. In the absence of a device to measure the hours of use, the engine has a warranty period of two (2) years.
Constant speed	19 ≤ kW < 37	Less than 3000 rpm	3000 hours or five (5) whichever comes first. In the absence of a device to measure the hours of use, the engine has a warranty period of five (5) years.
Variable speed	19 ≤ kW < 37	Any speed	3000 hours or five (5) whichever comes first. In the absence of a device to measure the hours of use, the engine has a warranty period of five (5) years.
Variable speed or constant speed	kW ≥ 37	Any speed	3000 hours or five (5) whichever comes first. In the absence of a device to measure the hours of use, the engine has a warranty period of five (5) years.

Warranty Coverage:

The warranty is transferable to each subsequent purchaser for the duration of the warranty period. Repair or replacement of any warranted part will be performed at an authorized Yanmar industrial engine dealer or distributor.

Warranted parts not scheduled for replacement as required maintenance in the operation manual shall be warranted for the warranty period. Warranted parts scheduled for replacement as required maintenance in operation manual are warranted for the period of time prior to the first scheduled replacement. Any part repaired or replaced under warranty shall be warranted for the remaining warranty period.

During the warranty period, Yanmar is liable for damages to other engine components caused by the failure of any warranted part during the warranty period.

Any replacement part which is functionally identical to the original equipment part in all respects may be used in the maintenance and repair of your engine, and shall not reduce Yanmar's warranty obligations. Add-on or modified parts that are not exempted may not be used. The use of any non-exempted add-on or modified parts shall be grounds for disallowing a warranty.

Warranted Parts:

The warranty covers engine components that are a part of the emission control system of the engine as delivered by Yanmar to the original retail purchaser. Such components may include the following:

- Fuel Injection System
- Electronic Control System
- Cold Start Enrichment System
- Intake Manifold
- Turbocharger System
- Exhaust Manifold
- EGR System
- Positive Crankcase Ventilation System
- After treatment system (Diesel Particulate Filter)
- Hoses, belts, connectors and assemblies associated with the emission control system

Since emissions-related parts may vary slightly between models, certain models may not contain all of these parts and other models may contain the functional equivalents.

Exclusions:

Failures other than those arising from defects in material and/or workmanship are not covered by this warranty. The warranty does not extend the following: malfunctions caused by abuse, misuse, improper adjustment, modification, alteration, tampering, disconnection, improper or inadequate maintenance or use of non-recommended fuels and lubricating oils; accident-caused damage, and replacement of expendable items made in connection with scheduled maintenance. Yanmar disclaims any responsibility for incidental or consequential damages such as loss of time, inconvenience, loss of use of equipment/engine or commercial loss.

Owners Warranty Responsibilities:

As the engine owner, you are responsible for the performance of the required maintenance listed in the owner's manual. Yanmar recommends that you retain all documentation, including receipts, covering maintenance on your non-road compression-ignition engine, but Yanmar cannot deny warranty solely for the lack of receipts, or for the failure to ensure the performance of all scheduled maintenance.

Yanmar may deny your warranty coverage of your non-road compression-ignition engine if a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

Your engine is designed to operate on diesel fuel only. Use of any other fuel may result in your engine no longer operating in compliance with the applicable emissions requirements.

You are responsible for initiating the warranty process. You must present your engine to a Yanmar dealer as soon as a problem exists. The warranty repairs should be completed by the dealer as expeditiously as possible. If you have any questions regarding your warranty rights and responsibilities, or would like information on your nearest Yanmar dealer or authorized service center, you should contact Yanmar America Corporation.

Website: www.yanmar.com Email: CS support@yanmar.com

Toll free telephone number: 1-800-872-2867, 1-855-416-7091

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