

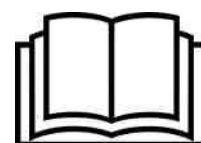
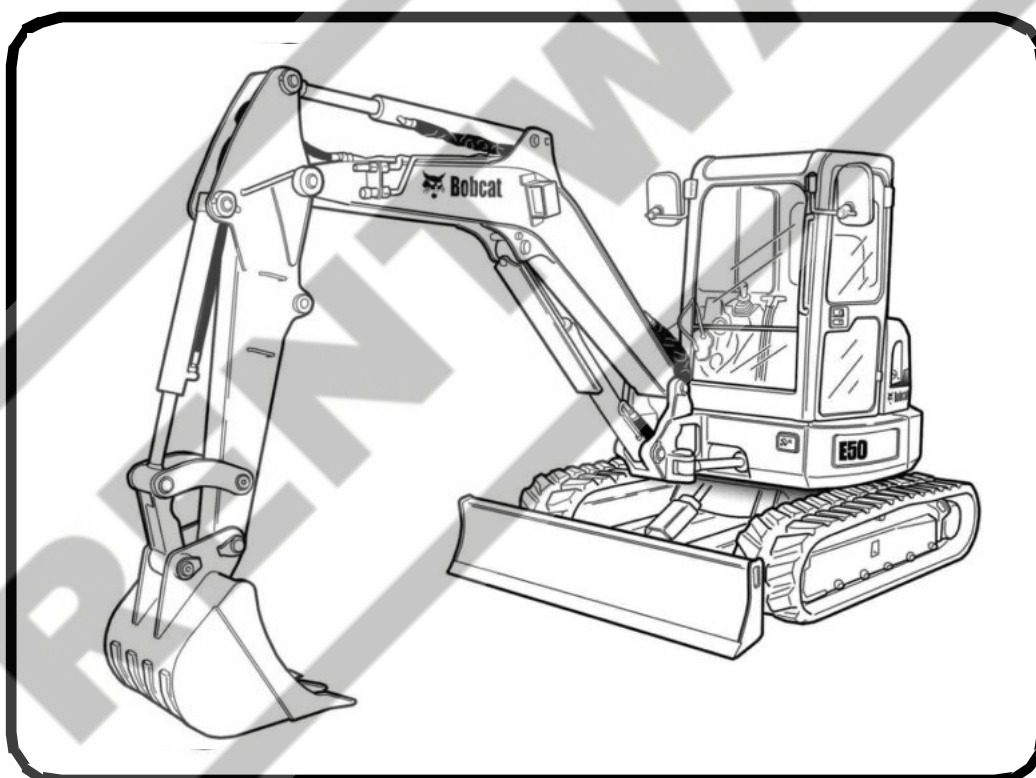


Bobcat®

EN

Operation & Maintenance Manual E50 Compact Excavator

S/N B3NS11001 & Above





RENTWAY

OPERATOR SAFETY WARNING



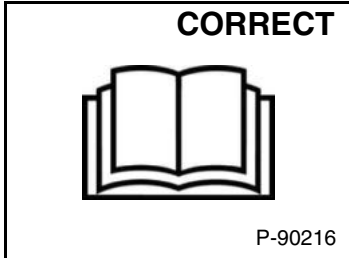
WARNING

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

W-2001-0502

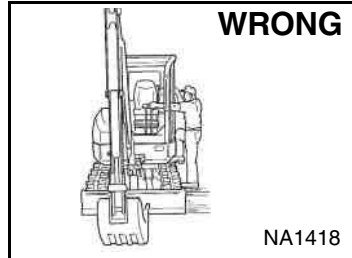


Safety Alert Symbol: This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.



⚠ Never operate without instructions.

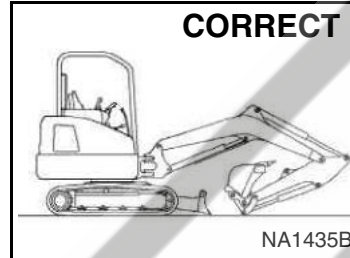
⚠ Read machine signs, and Operation & Maintenance Manual, and Operator's Handbook.



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

⚠ Be sure controls are in neutral before starting.

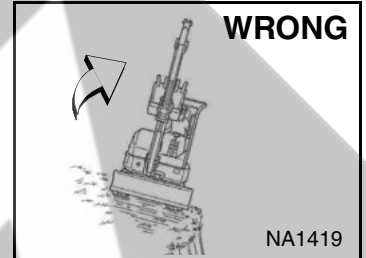
⚠ Sound horn and check behind machine before starting.



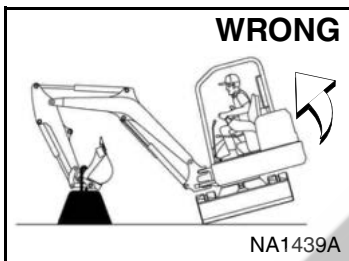
⚠ Never operate without approved cab / canopy.

⚠ Never modify equipment.

⚠ Never use attachments not approved by Bobcat Company.

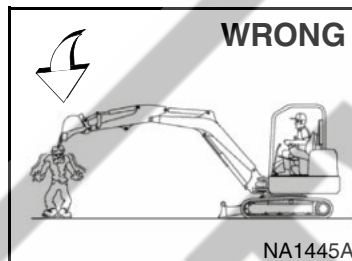


⚠ Avoid steep areas or banks that could break away.



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

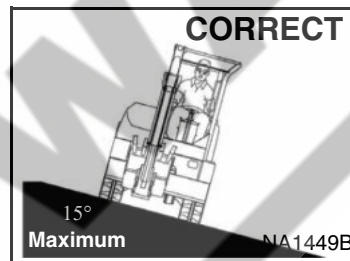
⚠ Operate on flat, level ground.



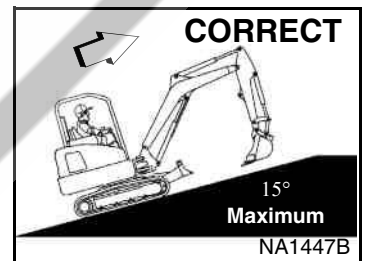
⚠ Keep bystanders out of maximum reach area.

⚠ Do not travel or turn with bucket extended.

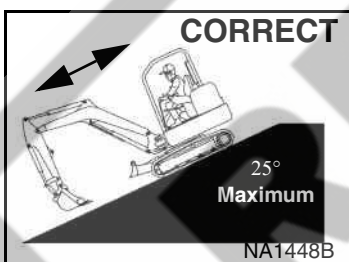
⚠ Never carry riders.



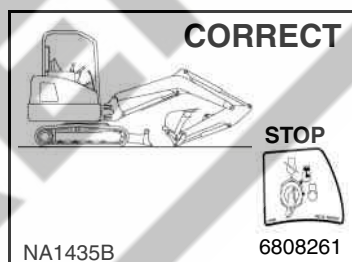
⚠ Never exceed a 15° slope to the side.



⚠ Never travel up a slope that exceeds 15°.

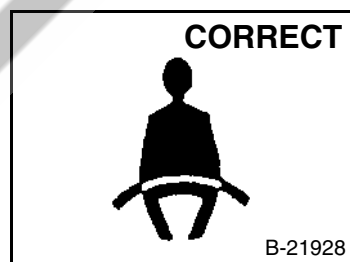


⚠ Never exceed 25° when going down or backing up a slope.



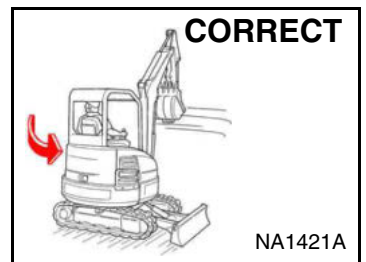
⚠ To leave excavator, lower the work equipment and the blade to the ground.

⚠ Stop the engine.



⚠ Fasten seat belt securely.

⚠ Operate controls only from operator's seat.



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

SAFETY EQUIPMENT

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

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

OSW66-EN-0117



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REFERENCE INFORMATION

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

Excavator Serial Number _____

Engine Serial Number _____

NOTES:

YOUR BOBCAT DEALER:

ADDRESS:

PHONE:



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

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



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FOREWORD

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

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DECLARATION OF CONFORMITY

For Model E50

Contents of EC Declaration of Conformity

This information is provided in the operators manual to comply with clause 1.7.4.2(c) of Annex I of Machinery Directive 2006/42/EC.

The official EC Declaration of Conformity is supplied in a separate document.

Manufacturer



Bobcat

Bobcat Company
World Headquarters
250 East Beaton Drive
West Fargo, ND 58078-6000
UNITED STATES OF AMERICA

Directive 2000/14/EC: Noise Emission in the Environment by Equipment For Use Outdoors

Notified Body

Technical and Test Institute for Construction Prague
Czech Republic
Notified Body Number: 1020

EC Certificate No.

1020-090-022395

Conformity Assessment Procedure(s)

2000/14/EC, Annex VIII, Full Quality Assurance

Sound Power Levels [Lw(A)]

Measured Sound Power	95dBA
Guaranteed Sound Power	96dBA

Technical Documentation

Homologation Manager
Doosan Bobcat Engineering s.r.o.
U Kodetky 1978
263 12 Dobris
CZECH REPUBLIC

Description of Equipment

Type of Equipment: Excavator
Model Name: E50
Model Code: B3NS

Engine Manufacturer: Kubota
Engine Model: V2403-M-DI-T-EU4
Engine Power: 36,0 kW @ 2200 RPM

Equipment conforms to CE Directive(s) Listed Below

2006/42/EC: Machinery Directive
2014/30/EU: Electromagnetic Compatibility Directive

Declaration of Conformance

This equipment conforms to the requirements specified in all the EC Directives listed in this declaration.

Effective From:

26 May 2016

DECLARATION OF CONFORMITY (CONT'D)



Homologation Manager
Doosan Bobcat Engineering s.r.o.
U Kodetky 1978
26312 Dobris
Czech Republic

Declaration of conformity with Article 14 of Regulation (EU) No 517/2014 of the European Parliament and of the Council

We Doosan Bobcat EMEA s.r.o. with VAT number CZ26489201, acting in its capacity as EU only representative for the import of goods from Doosan Infracore Co., Ltd with its address at Doosan Tower, 275, Jangchungdan-ro, Jung-gu, Seoul, 100-730, Korea, declare under our sole responsibility that when placing on the market pre-charged equipment, which we import to or manufacture in the Union, the hydrofluorocarbons contained in that equipment are accounted for within the quota system referred to in Chapter IV of Regulation (EU) No 517/2014 as:

☒ A. we hold authorisation(s) issued in accordance with Article 18(2) of Regulation (EU) No 517/2014 and registered in the registry referred to in Article 17 of that Regulation, at the time of release for free circulation to use the quota of a producer or importer of hydrofluorocarbons subject to Article 15 of Regulation (EU) No 517/2014 that cover(s) the quantity of hydrofluorocarbons contained in the equipment.

☐ B. *[for importers of equipment only]* the hydrofluorocarbons contained in the equipment have been placed on the market in the Union, subsequently exported and charged into the equipment outside the Union, and the undertaking that placed the hydrofluorocarbons on the market made a declaration stating that the quantity of hydrofluorocarbons has been or will be reported as placed on the market in the Union and that it has not been and will not be reported as direct supply for export in the meaning of Article 15(2)(c) of Regulation (EU) No 517/2014 pursuant to Article 19 of Regulation (EU) No 517/2014 and Section 5C of the Annex to Commission Implementing Regulation (EU) No 1191/2014 (2).

☒ C. *[for equipment manufactured in the Union only]* the hydrofluorocarbons charged into the equipment were placed on the market by a producer or importer of hydrofluorocarbons subject to Article 15 of Regulation (EU) No 517/2014.

Dobroslav Rak

30th January, 2017

Doosan Bobcat EMEA s.r.o. | Identification No. 264 89 201 | Prague Commercial Register Section C, Entry 85459



BOBCAT COMPANY IS ISO 9001 CERTIFIED



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

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

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

REGULAR MAINTENANCE ITEMS

	ENGINE OIL FILTER (6 Pack) 6675517		HVAC AIR FILTER (IF EQUIPPED) Fresh Air 7176099 Recirculation 7222791
	FUEL FILTER 6667352		BATTERY 6670251
	AIR FILTER, Outer 6666375		HYDRAULIC FILL / BREATHER CAP 6692836
	AIR FILTER, Inner 6666376		
	PRIMARY HYDRAULIC FILTER 6670207 CASE DRAIN HYDRAULIC FILTER 6516722		RADIATOR CAP 6646678

NOTE: Always verify Part Numbers with your Bobcat dealer.

REGULAR MAINTENANCE ITEMS (CONT'D)

Fluids, Lubricants And Fuel

The fluids, lubricants and fuel described below are those used in the factory and apply to operating conditions in European temperate climate areas. Please see your Bobcat dealer for requirements in other climate areas.

Read and understand the preventive maintenance required before adding or replacing any fluids or lubricants. (See SERVICE SCHEDULE on Page 137.) (See SERVICE SCHEDULE on Page 137.) (See SERVICE SCHEDULE on Page 137.).

ENGINE SYSTEMS				
Machine Components	Fluids And Lubricants	T° Range	Packaging**	Part Number
Engine	- Bobcat Engine Power SAE 10W30 CI4 / ACEA E7	-35°C - +30°C	A, B, C, D	6987789
	- Bobcat Engine Power SAE 15W40 CI4 / ACEA E7	-20°C - +40°C	A, B, C, D	6987790
	- Bobcat Engine Power SAE 10W30 CJ4 / ACEA E9	-25°C - +30°C	A, B, C, D	6987818*
	- Bobcat Engine Power SAE 15W40 CJ4 / ACEA E9	-20°C - +40°C	A, B, C, D	6987819
Cooling Circuit	- Bobcat PG Coolant Concentrated	-36°C	B, C, D	6987813*
	- Bobcat PG Coolant 4 Seasons	-36°C	A, B, C, D	6987793
Fuel Tank	- High-quality diesel fuel that meets EN590 (See FUEL SYSTEM on Page 149.)	-	-	*

HYDRAULIC / HYDROSTATIC SYSTEMS				
Machine Components	Fluids And Lubricants	T° Range	Packaging**	Part Number
Hydraulic Oil Tank	- Bobcat Superior SH Hydraulic / Hydrostatic	-35°C - +50°C	A, B, C, D	6987791*
	- Bobcat Bio Hydraulic Hydraulic / Hydrostatic	-35°C - +50°C	A, B, C, D	6987792

MECHANICAL SYSTEMS				
Machine Components	Fluids And Lubricants	Drop Point	Packaging**	Part Number
All Mechanical Systems	- Bobcat Multipurpose Grease	From 260°C	E	6987888*
	- Bobcat Supreme HD Grease	From 280°C	E	6987889
	- Bobcat Extreme HP Grease	From 260°C	E	6987890

(*) Factory Filled Fluids And Lubricants

(**) Packaging Available:

A = 5 L Can

B = 25 L Container

C = 209 L Drum

D = 1000 L Tank

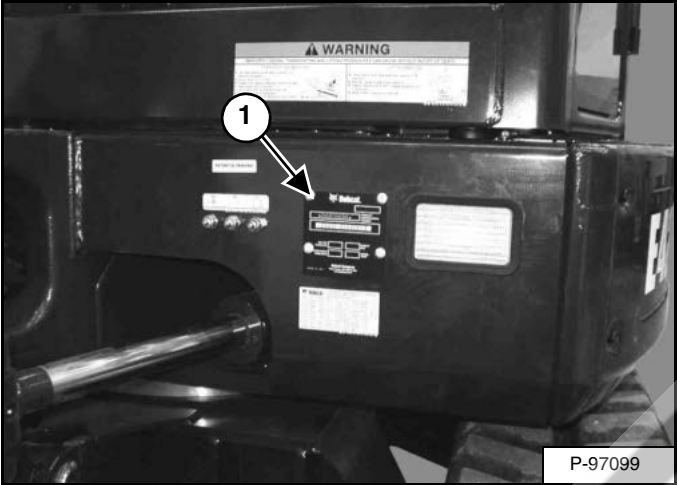
E = 400 g Tube

SERIAL NUMBER LOCATIONS

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

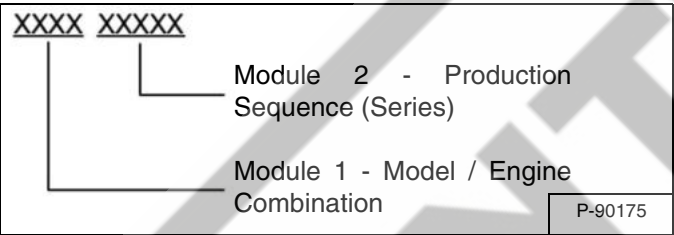
Excavator Serial Number

Figure 1



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

Figure 2

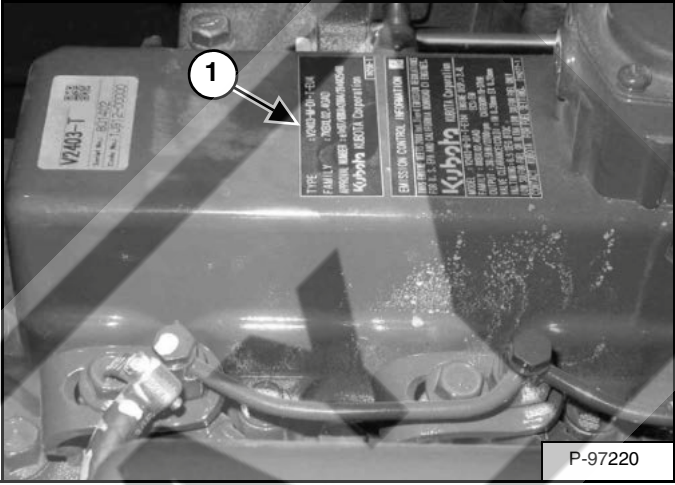


Explanation of excavator Serial Number [Figure 2]:

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

Engine Serial Number

Figure 3



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

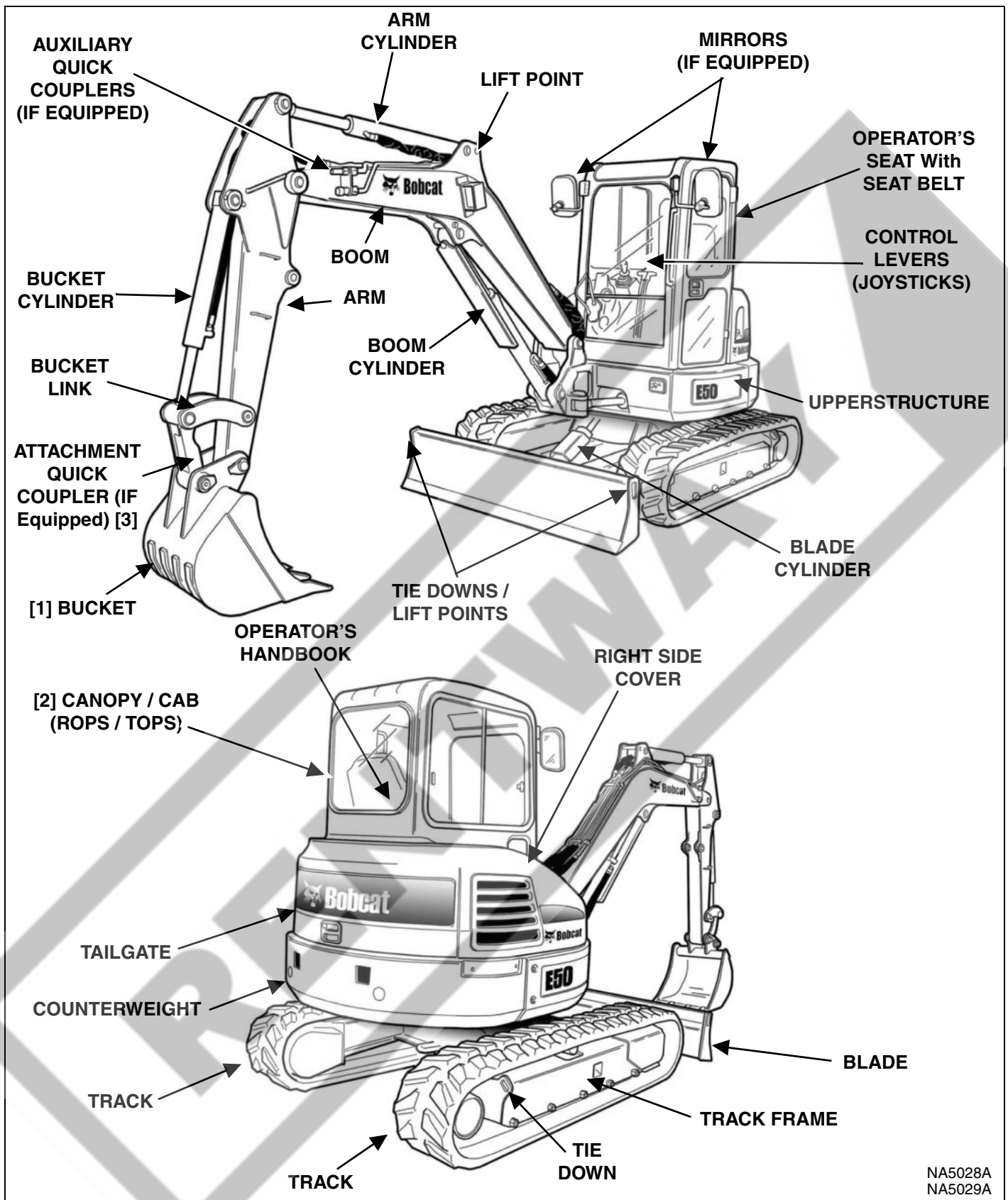
DELIVERY REPORT

Figure 4

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

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

EXCAVATOR IDENTIFICATION



NA5028A
NA5029A

- [1] BUCKET - Several different buckets and other attachments are available for the Bobcat excavator.
- [2] ROPS / TOPS - (Roll-Over Protective Structure / Tip-Over Protective Structure) as standard equipment. The ROPS / TOPS meets ISO 12117-2 and ISO 12117.
- [3] ATTACHMENT COUPLERS - Optional attachment couplers are available.

FEATURES, ACCESSORIES AND ATTACHMENTS

Standard Items

Model E50 Bobcat excavators are equipped with the following standard items:

- 1960 mm (77.2 in) Dozer Blade
- Canopy with ROPS / TOPS Approval
- 400 mm (15.7 in) Rubber Tracks
- Two-Speed Travel
- Auto-Shift Drive System
- Auxiliary Hydraulics (With Selectable Auxiliary Hydraulic Flow)
- Hydraulic and Travel Control Lockouts
- Engine Speed Control Dial With Auto Idle Feature
- Blade Float
- Work Lights - Boom and Frame Mounted
- Engine and Hydraulic system Monitor with Shut Down
- Horn
- Hydraulic Joystick Controls
- Standard Arm
- ISO / STD Control Pattern Selection Feature
- Suspension Seat
- Retractable Seat Belt
- Direct to Tank Auxiliary Hydraulics
- Spark Arrester Muffler
- Advanced Diagnostics
- Counterweight

Options And Accessories

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

- Enclosed Cab With Heater and A/C
- Enclosed Cab With Heater
- Deluxe Instrument Panel
- Depth Check
- Travel Motion Alarm
- Keyless Start
- Canopy / Cab Mounted Lights
- Catalytic Exhaust Purifier
- Top Guard Kit (FOGS)
- Special Application Kit
- Steel Tracks - 400 mm (15.7 in)
- Long Arm
- Angle Blade
- Counterweight (Additional)
- Attachment Quick Coupler
 - Klac™ System
 - German Style System
 - Bobcat Hydraulic System
 - Pin Grabber System
- Boom Load Holding Valve
- Arm Load Holding Valve
- Overload Warning Device
- Second Auxiliary Hydraulics
- Arm Mounted Auxiliary Hydraulic Couplers
- HEPA HVAC Fresh Air Filter

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

Attachments

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

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

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

- Auger
- Breaker
- Hydraulic Clamp
- Tilt Coupler
- Lazer Receiver
- Flail Mower
- Rotary Grinder

Buckets Available

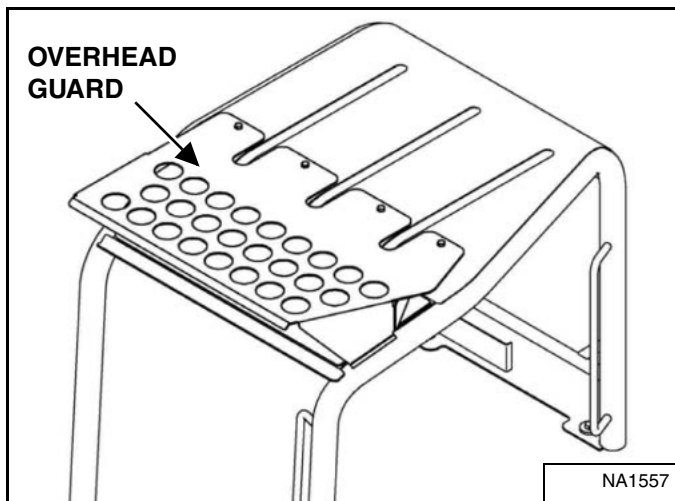
Increase the versatility of your Bobcat excavator with a variety of bucket sizes.

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

FEATURES, ACCESSORIES AND ATTACHMENTS (CONT'D)

Falling-Object Guards (FOGS)

Figure 5



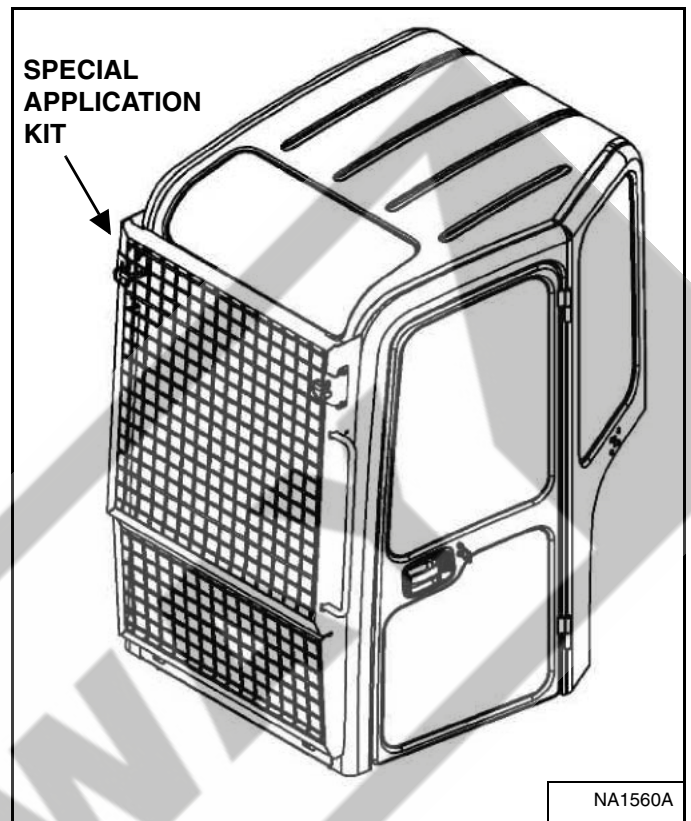
Available for special applications that require protection from smaller objects that can fall on the canopy / cab or restrict material from entering canopy / cab openings [Figure 5] and [Figure 6].

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

See your Bobcat Dealer for more information.

Special Applications Kit

Figure 6



Available for special applications that require protection from objects entering the front of the excavator.

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

Kit includes an upper and lower screen guard.

See your Bobcat Dealer for more information.

Special Applications Kit Inspection And Maintenance

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

SAFETY AND TRAINING RESOURCES

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SAFETY INSTRUCTIONS

Before Operation

Carefully follow the operating and maintenance instructions in this manual.

The Bobcat excavator is highly manoeuvrable and compact. It is rugged and useful under a wide variety of conditions. This presents an operator with hazards associated with off motorway, rough terrain applications, common with Bobcat 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. Its brief instructions are convenient to the operator. See your Bobcat dealer for more information on translated versions.

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

SAFETY INSTRUCTIONS (CONT'D)

Safe Operation Is The Operator's Responsibility



Safety Alert Symbol

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



WARNING

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

W-2001-0502

IMPORTANT

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

I-2019-0284



DANGER

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

D-1002-1107



WARNING

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

W-2044-1107

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

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

Safe Operation Needs A Qualified Operator

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

A Qualified Operator Must Do The Following:

Understand the Written Instructions, Rules and Regulations

- The written instructions from Bobcat Company include the Delivery Report, Operation & Maintenance Manual, Operator's Handbook and machine signs (decals).
- Check the rules and regulations at your location. The rules may include an employer's work safety requirements. For driving on public roads, the machine must be equipped as stipulated by the local regulations authorising operation on public roads in your specific country. Regulations may identify a hazard such as a utility line.

Have Training with Actual Operation

- Operator training must consist of a demonstration and verbal instruction. This training is given by your Bobcat dealer before the product is delivered.
- The new operator must start in an area without bystanders and use all the controls until he or she can operate the machine and attachment safely under all conditions of the work area. Always fasten seat belt before operating.

Know the Work Conditions

- Know the weight of the materials being handled. Avoid exceeding the Rated Lift Capacity of the machine. Material 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.
- 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 EMEA-0913

SAFETY INSTRUCTIONS (CONT'D)

Avoid Silica Dust



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

FIRE PREVENTION



Maintenance

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

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

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

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

Operation

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

Electrical



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 EMEA-0913

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 petrol or diesel fuel for cleaning parts. Use commercial non-flammable solvents.

Fueling



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

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

Starting

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

Fire Extinguishers



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

PUBLICATIONS AND TRAINING RESOURCES

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

For the latest information on Bobcat products and the Bobcat Company, visit our Website at **Bobcat.com**



OPERATION & MAINTENANCE MANUAL

7300147enGB

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



SERVICE MANUAL

6989441enUS

Complete maintenance instructions for your Bobcat loader.



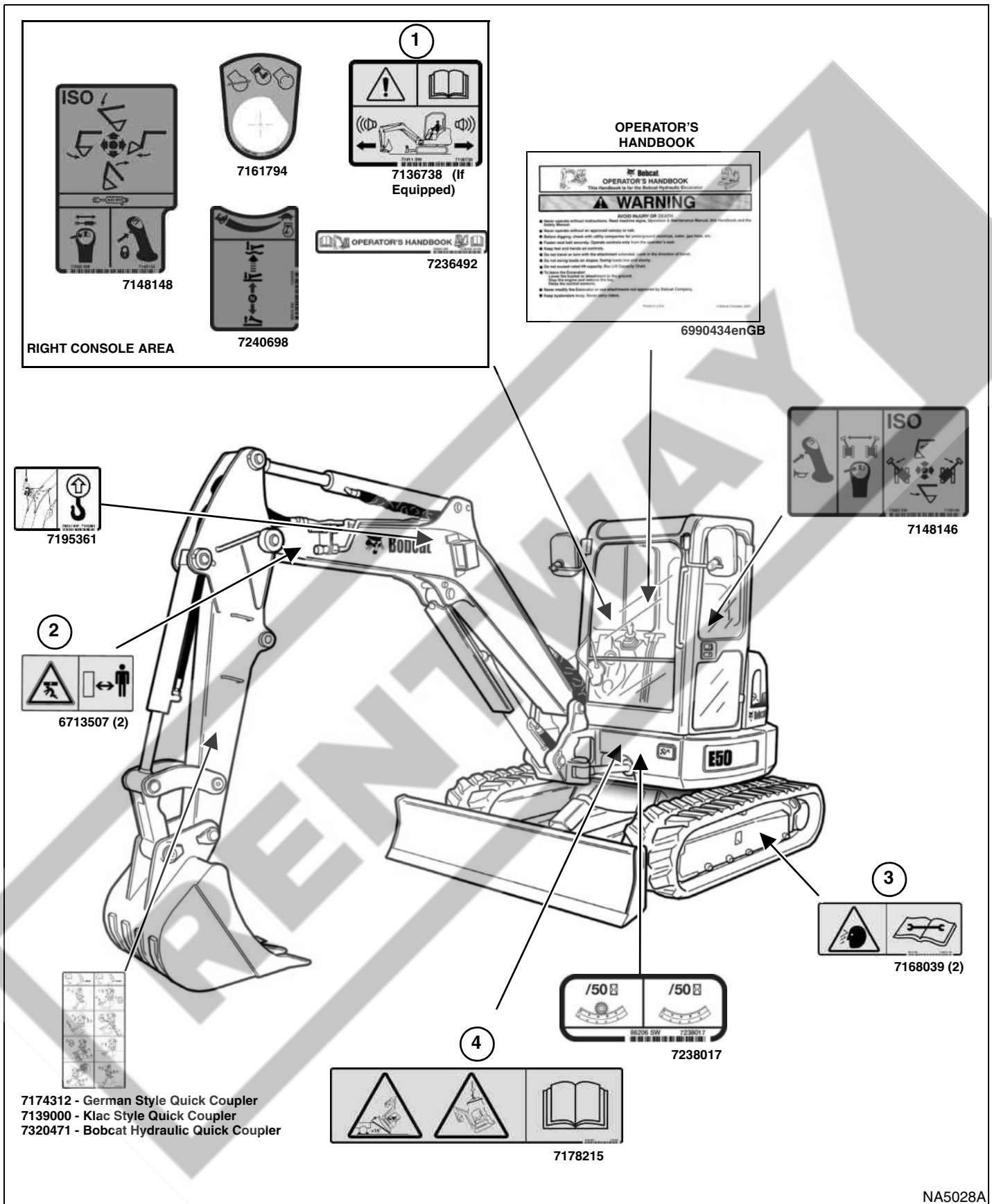
OPERATOR'S HANDBOOK

6990434enGB

Gives basic operation instructions and safety warnings.

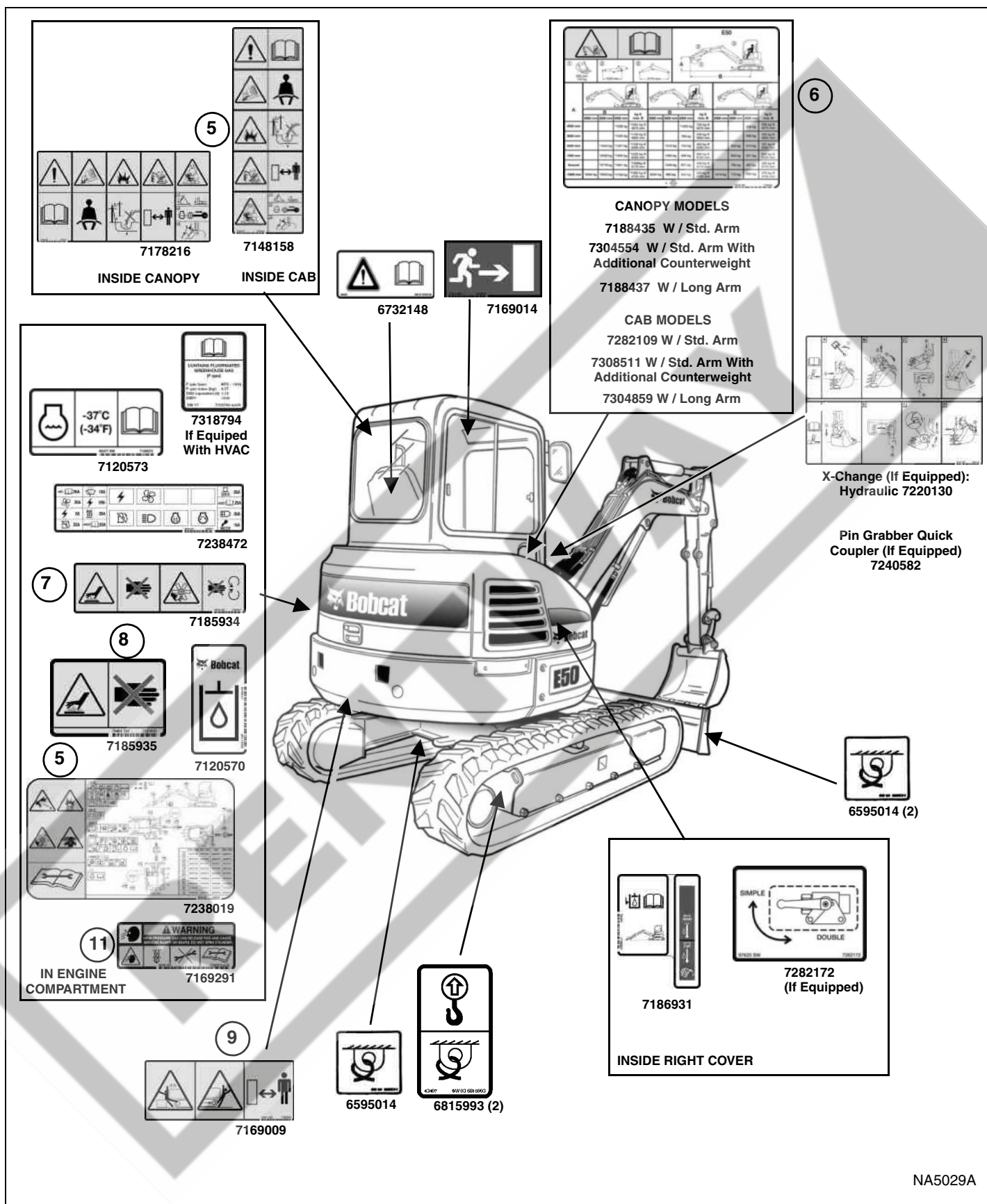
MACHINE SIGNS (DECALS)

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



MACHINE SIGNS (DECALS) (CONT'D)

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

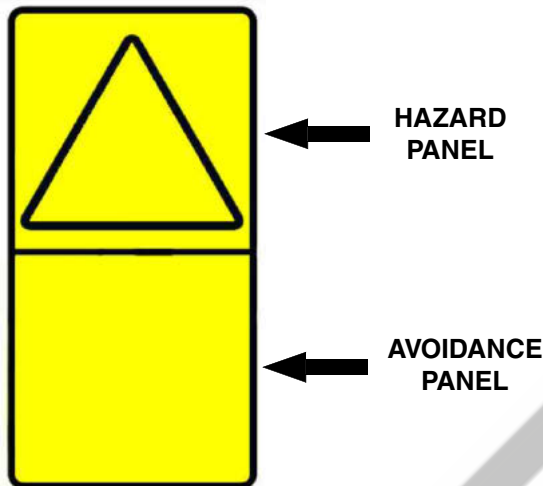


MACHINE SIGNS (DECALS) (CONT'D)

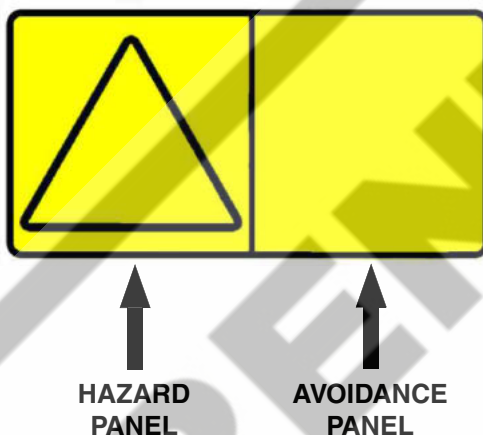
Pictorial Only Safety Signs

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

Vertical Configuration



Horizontal Configuration



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

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

Avoidance panels depict actions required to avoid the hazards.

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

NOTE: See the numbered MACHINE SIGNS (DECALS) on Page 22 and Machine Signs (Decals) (Cont'd) on Page 23 for the machine location of each corresponding numbered pictorial only decals as shown below.

1. Motion Alarm (7136738)

This safety sign is located on the right rear console.



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

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

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

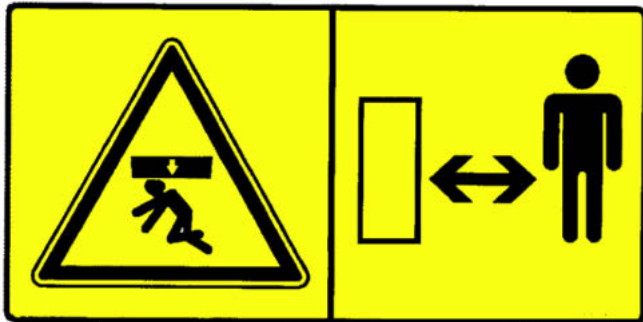
W-2786-0309

MACHINE SIGNS (DECALS) (CONT'D)

Pictorial Only Safety Signs (Cont'd)

2. Crush Hazard (6713507)

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



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

W-2520-0106

3. Thrown Or Flying Objects (7168039)

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



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

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

W-2516-0110

4. Transporting And Lifting (7178215)

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



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

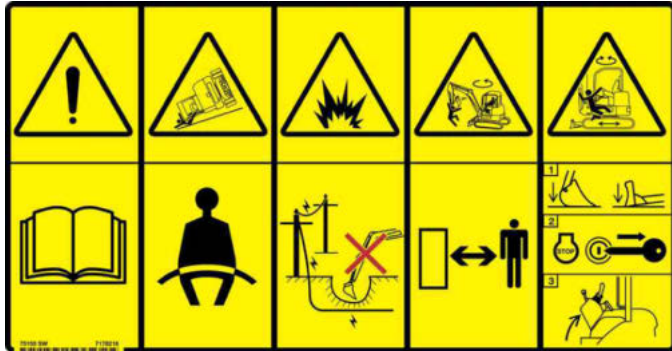
W-2517-0110

MACHINE SIGNS (DECALS) (CONT'D)

Pictorial Only Safety Signs (Cont'd)

5. General Hazard (7148158, 7178216)

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



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

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

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

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

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

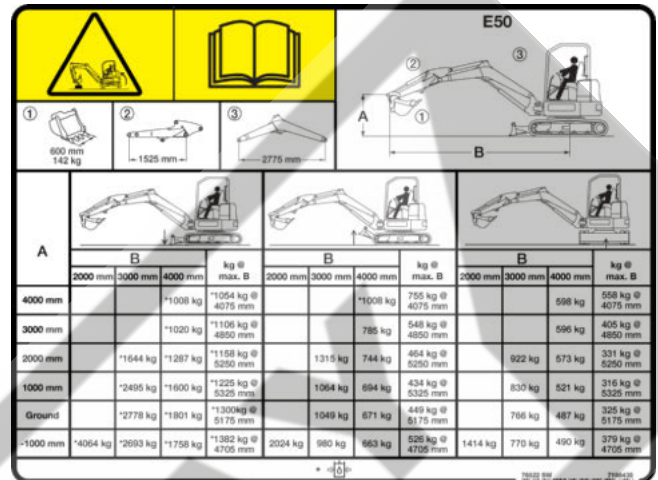
To Leave Excavator:

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

W-2518-0110

6. Lift Capacity (7188435, 7188437, 7282109, 7304554, 7304859, 7308511)

This safety sign is located on the right side cover.



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

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

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

W-2519-0110

MACHINE SIGNS (DECALS) (CONT'D)

Pictorial Only Safety Signs (Cont'd)

7. Hot Surfaces and Rotating Fan (7185934)

This safety sign is located inside the engine compartment.



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

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

W-2521-0106

8. Hot Surfaces (7185935)

This safety sign is located in the engine compartment.



AVOID BURNS

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

W-2070-1203

9. Stay Away (7169009)

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



AVOID INJURY OR DEATH

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

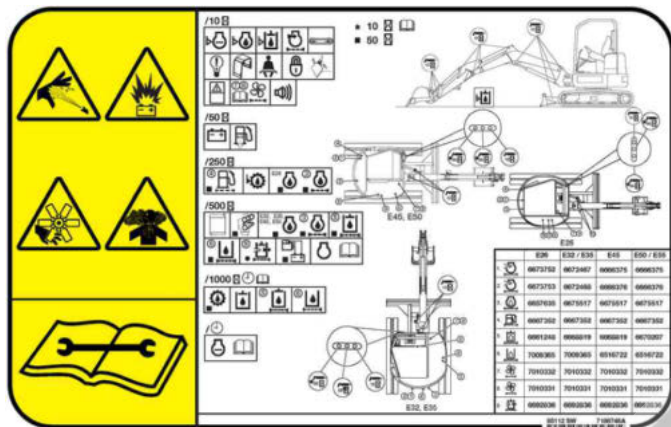
W-NEW-1108

MACHINE SIGNS (DECALS) (CONT'D)

Pictorial Only Safety Signs (Cont'd)

10. High Pressure, Battery, Rotating Fan, Exhaust Gases and Service Schedule (7188748)

This safety sign is located on the right front corner of the upperstructure. For Service Schedule Information, see (See SERVICE SCHEDULE on Page 137.)



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

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

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

All exhaust gases can kill. Always ventilate.

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

W-2522-0110

11. Thrown or Flying Objects (7169291)

This safety sign is located on the gas spring in the engine compartment.



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

W-2523-0106

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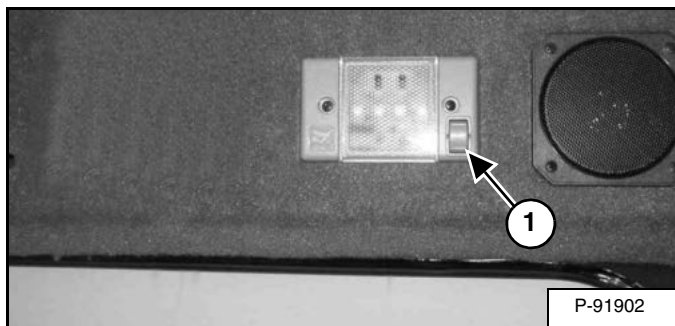
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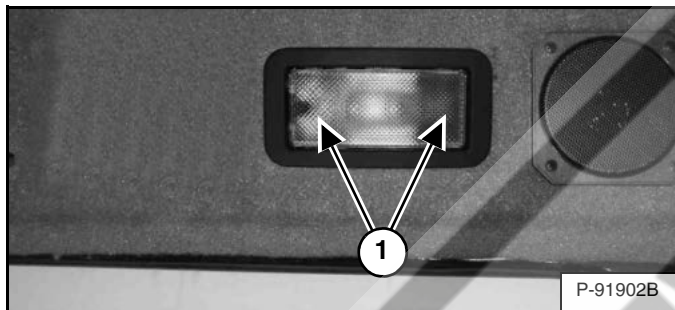
Cab Interior Light

Figure 7



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

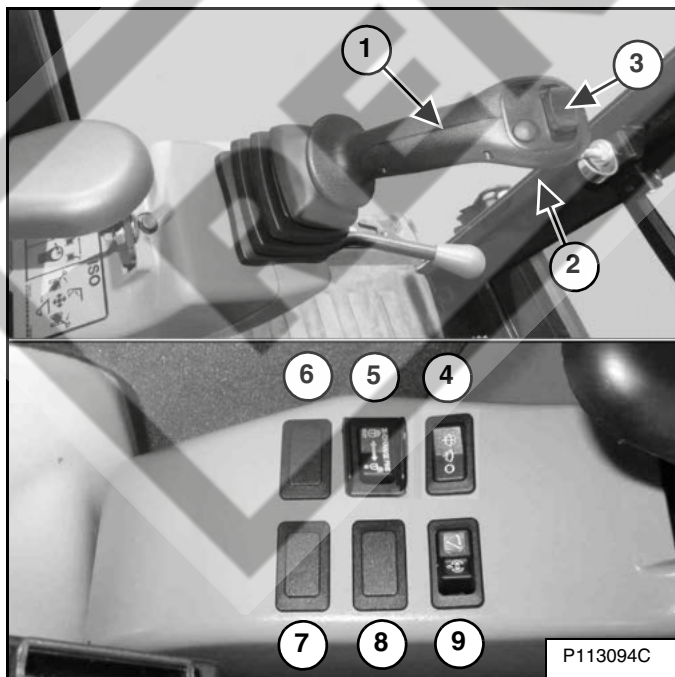
Figure 8



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

Left Console

Figure 9

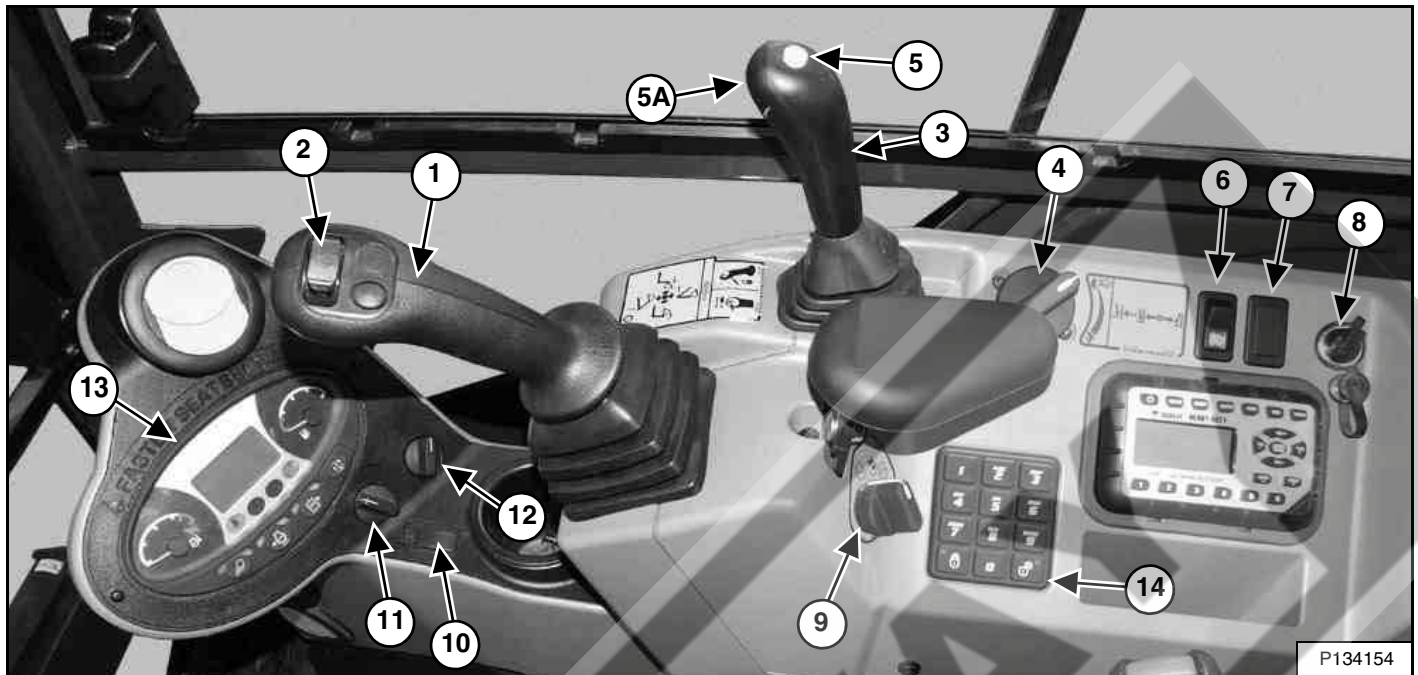


REF. NO.	DESCRIPTION	FUNCTION / OPERATION
1	Left Joystick	(See HYDRAULIC CONTROLS on Page 53.)
2	Horn	Press the switch on the bottom of the left joystick to sound horn.
3	Boom Swing Switch / Secondary Auxiliary Hydraulic (If Equipped)	Move the switch to the left to swing the boom to the left. Move the switch to the right to swing the boom to the right. (See Secondary Auxiliary Hydraulics and Boom Swing in this manual.)
4	Wiper / Washer Switch (If Equipped)	Press the switch to the left to turn wiper ON. Press and hold switch to the left to activate window washer. Press the switch to the right to turn wiper OFF.
5	Pin Grabber Quick Coupler ON / OFF Switch (If Equipped)	Press switch to the left to turn the pin grabber quick coupler ON. Press the switch to the right to turn OFF.
6	Beacon / Strobe Light (If Equipped)	Press switch to the left to turn ON the beacon / Strobe light. Press the switch to the right to turn OFF.
7	Pin Grabber Quick Coupler INTENT Switch (If Equipped)	Press switch to the left to initiate the quick coupler install or remove mode. (See Installing And Removing The Attachment (Pin Grabber Quick Coupler) in this manual.)
8	OVERLOAD WARNING SWITCH (If Equipped)	Press switch to the right to enable Overload Warning device. Press to the left to disable. (See Overload Warning Device in this manual.)
9	Boom Swing Switch / Secondary Auxiliary Hydraulic (If Equipped)	Move the switch to the right to activate the secondary auxiliary hydraulics. Move the switch to the left for boom swing function. (See Secondary Auxiliary Hydraulics and Boom Swing in this manual.)

INSTRUMENTS AND CONTROLS (CONT'D)

Right Console

Figure 10



REF	DESCRIPTION	FUNCTION / OPERATION
1	Right Joystick	(See HYDRAULIC CONTROLS in this manual.)
2	Auxiliary Hydraulic Switch (If Equipped)	Controls the fluid flow to the auxiliary quick couplers (attachment). (See Auxiliary Hydraulics in this manual.)
3	Blade Control Lever	Controls raising and lowering the blade. Pushed all the way forward puts blade in float position. (See BLADE LEVER CONTROL in this manual.)
4	Engine Speed Control Dial	Controls rpm of the engine. (See ENGINE SPEED CONTROL DIAL in this manual.)
5	Two-Speed Button (Without Angle Blade Option)	Engages and disengages High Range Travel Speed. (See Two-Speed Travel in this manual.)
5A	Two-Speed Button (With Angle Blade Option)	Engages and disengages High Range Travel Speed. (See Two-Speed Travel in this manual.) (Also see Angle Blade in this manual.)
6	Motion Alarm Cancel Switch	This switch temporarily disables the motion alarm. (See MOTION ALARM SYSTEM on Page 50.)
7	Not Used	---
8	Auxiliary Power Outlet	12 volt receptacle for accessories.
9	Key Switch	Always perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE in this manual), before starting the engine. (See STARTING THE ENGINE in this manual).
10	Air Conditioning Switch (If Equipped)	Press top of switch to turn air conditioner ON (light in switch will be ON), Press bottom of switch to turn OFF. NOTE: Operate the air conditioning for approximately 5 minutes every week to lubricate the internal components.
11	Fan Motor Switch (If Equipped)	Turn clockwise to increase fan speed; anticlockwise to decrease.
12	Temperature Control (If Equipped)	Turn clockwise to increase temperature; anticlockwise to decrease.
13	Instrument Panel	See Standard or Deluxe Instrument Panel
14	Keyless (If Equipped)	(Always perform the PRE-STARTING PROCEDURE, (See PRE-STARTING PROCEDURE in this manual), before starting the engine. (See STARTING THE ENGINE in this manual).

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

INSTRUMENTS AND CONTROLS (CONT'D)

Instrument Panel - Standard

Figure 11



P-97989

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

INSTRUMENTS AND CONTROLS (CONT'D)

Instrument Panel - Standard (Cont'd)

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

* See SYSTEM SETUP AND ANALYSIS for Service Code Description. (See DIAGNOSTIC SERVICE CODES on Page 185.)

** Icons will be ON or flashing when diagnostic system indicates a problem. (See DIAGNOSTIC SERVICE CODES on Page 185.)

*** Icons will be flashing when diagnostic system indicates a problem. (See DIAGNOSTIC SERVICE CODES on Page 185.)

INSTRUMENTS AND CONTROLS (CONT'D)

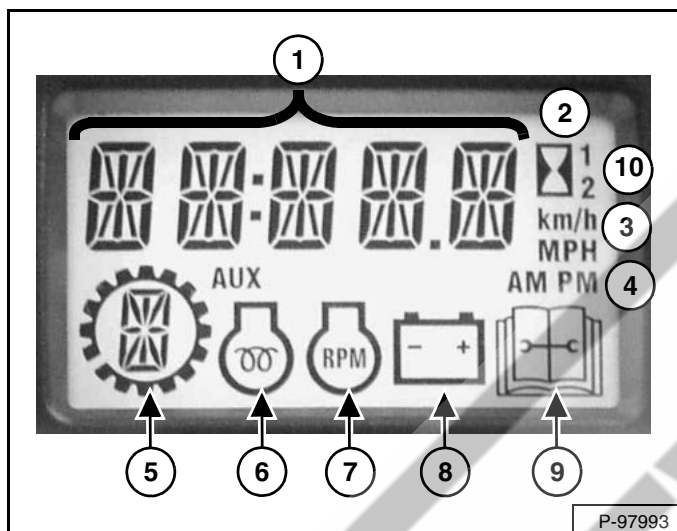
Instrument Panel - Standard (Cont'd)

Indicator Icons

The display screen can display the following information:

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

Figure 12



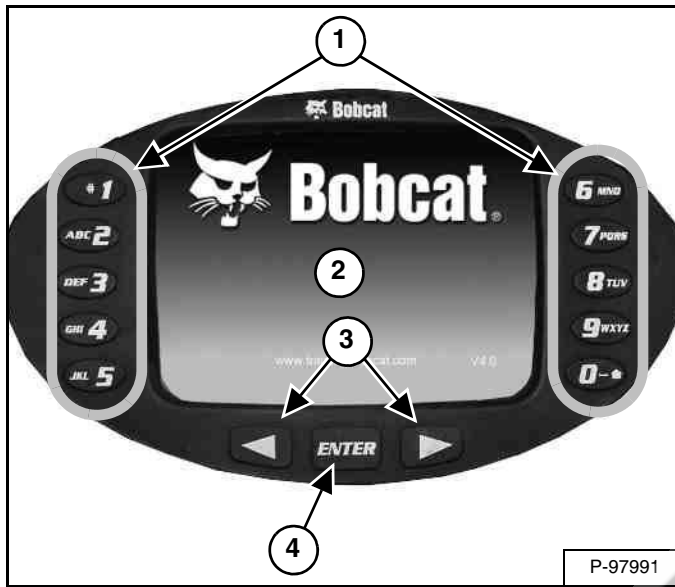
The display screen is shown in [Figure 12]. The data display will show operating hours upon startup.

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

INSTRUMENTS AND CONTROLS (CONT'D)

Instrument Panel - Deluxe

Figure 13



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

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

Figure 14



Turn the start key to the ON position.

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

NOTE: Your excavator (with Deluxe Instrument Panel) will have an Owner Password. Your dealer will provide you with this password. Change the password to one that you will easily remember to prevent unauthorised use of your excavator. (See Changing The Owner Password on Page 196.) Keep your password in a safe location for future needs.

Enter The Password:

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

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

See CONTROL PANEL SETUP for further description of screens to set up the system for your use. (See CONTROL PANEL SETUP on Page 189.)

Lights

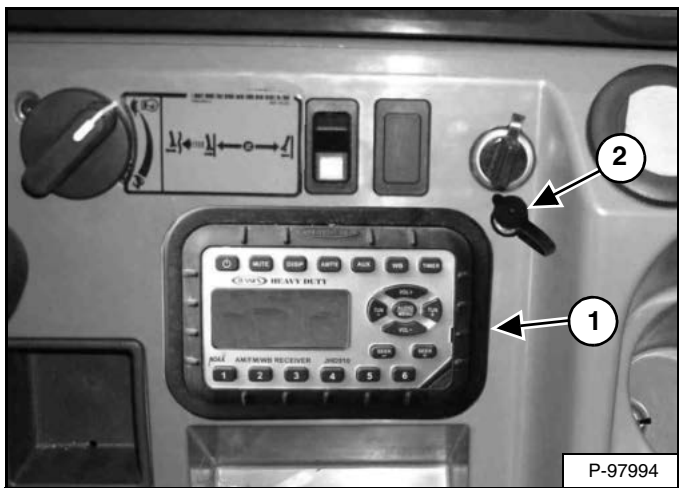
Press key pad [1] [Figure 14] once for FRONT work lights. Press a second time to turn all lights off.

Change Language:

The language can be changed at any time. (See CONTROL PANEL SETUP on Page 189.)

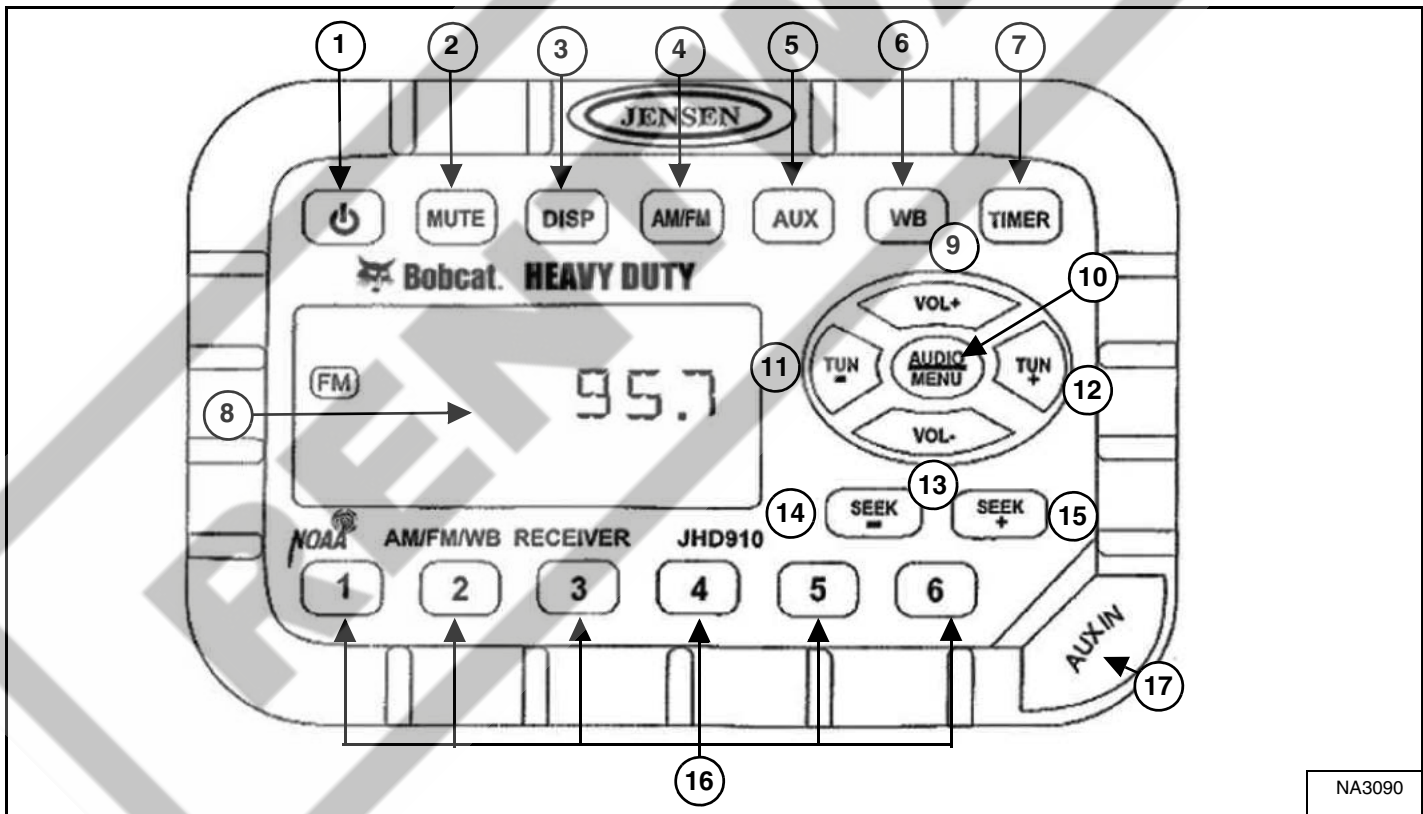
Radio Option

Figure 15



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

Figure 16



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

INSTRUMENT AND CONTROLS (CONT'D)

Radio (Cont'd)

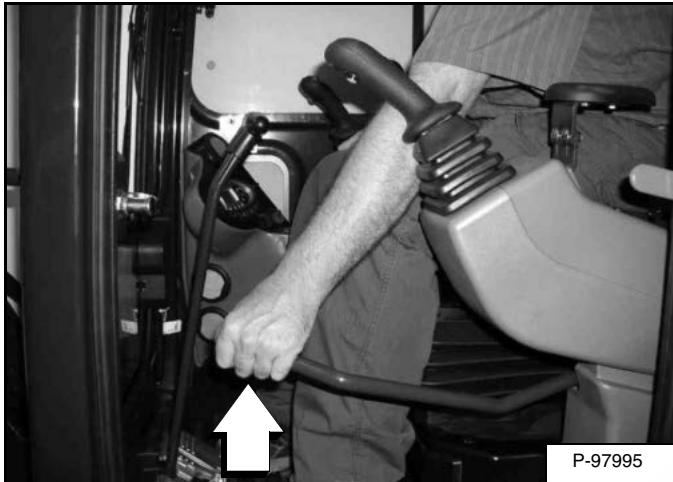
REF. NO.	DESCRIPTION	FUNCTION / OPERATION
1	POWER	Press to turn ON; press again to turn OFF.
2	MUTE	Press to mute audio output; [MUTE] will appear in display screen; press again to turn OFF.
3	DISPLAY	Press to toggle between function mode (showing tuner frequency, auxiliary input, weather band information,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

INSTRUMENTS AND CONTROLS (CONT'D)

Raising And Lowering The Console

Raise the console before exiting the cab.

Figure 17



Pull up on the release handle [Figure 17]. The lift spring will assist in raising the console.

Lower the console before operating the excavator.

Push down on the lever [Figure 17] until the latch is engaged.

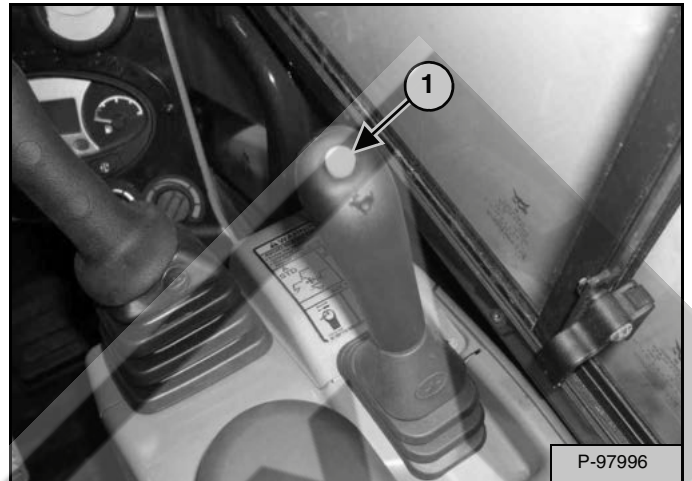
NOTE: When the console is raised, the hydraulic and traction system functions are locked and will not operate.

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

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

Two-Speed Travel

Figure 18



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

Figure 19



When high range is engaged, the two-speed travel icon (Item 1) [Figure 19] will illuminate.

Press the button (Item 1) [Figure 18] again to disengage.

Auto-Shift Drive System

When in high range, the travel motors will automatically shift to low range when more torque is required and return to high range when hydraulic pressure decreases.

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

INSTRUMENTS AND CONTROLS (CONT'D)

Auto Idle Feature

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

Figure 20



Standard Panel

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

Press the switch (Item 1) once to engage automatic idle and the LED (Item 2) will illuminate. Press the switch (Item 1) a second time to disengage automatic idle, the LED (Item 2) [Figure 20] will be OFF.

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

Figure 21



Deluxe Panel

Press ENTER (Item 1) once to engage automatic idle. Press ENTER (Item 1) [Figure 21] again and auto idle will be OFF.

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

NOTE: When equipped with the deluxe instrument panel, the time delay for auto idle to activate can be adjusted. (See Auto Idle Time Delay on Page 191.)

OPERATOR CANOPY (ROPS / TOPS)

Description

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

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

ROPS / TOPS - Roll-Over Protective Structure per ISO 12117-2, and Tip-Over Protective Structure per ISO 12117.

WARNING

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

W-2069-0200

OPERATOR CAB (ROPS / TOPS)

Description

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

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

ROPS / TOPS - Roll-Over Protective Structure per ISO 12117-2, and Tip-Over Protective Structure per ISO 12117.

WARNING

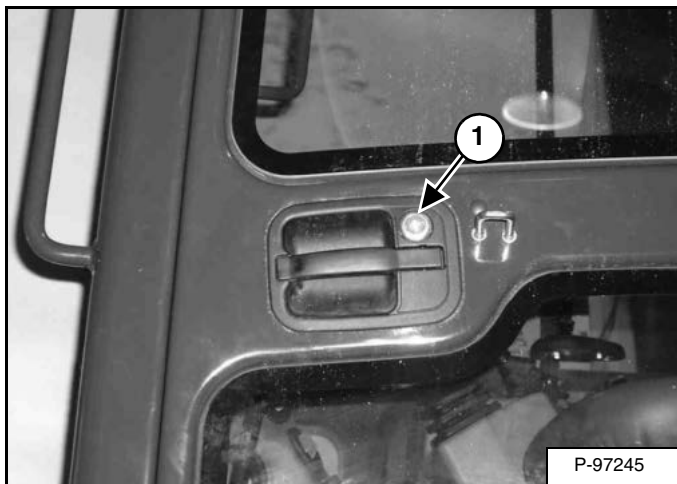
Never modify operator cab by welding, grinding, drilling holes or adding attachments unless instructed to do so by Bobcat Company. Changes to the cab can cause loss of operator protection from rollover and falling objects, and result in injury or death.

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

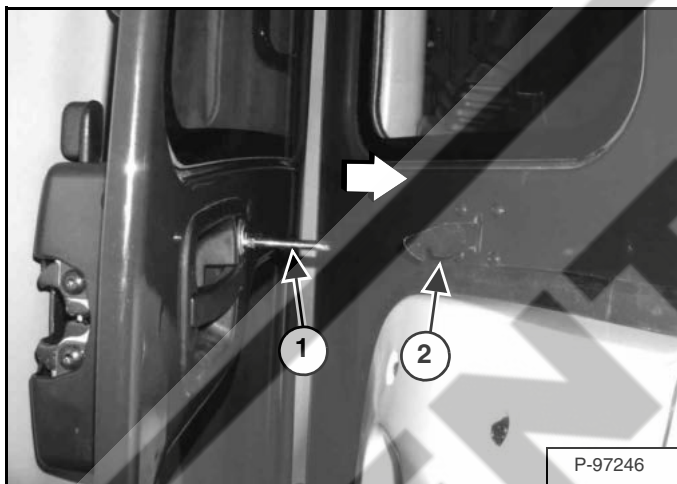
Cab Door

Figure 22



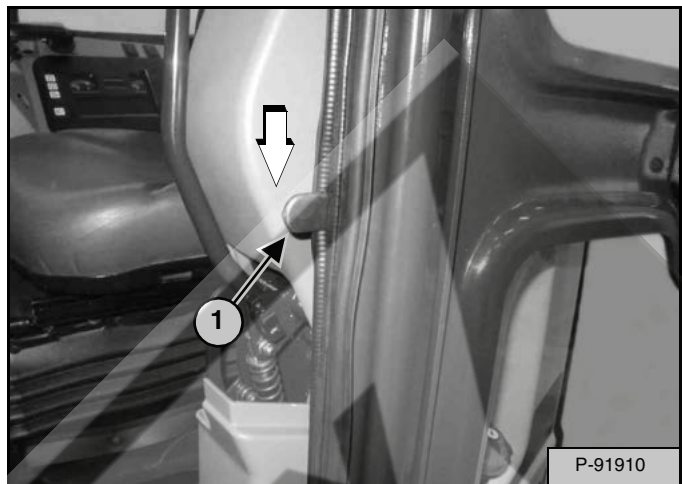
The cab door can be locked (Item 1) [Figure 22] with the same key as the starter switch.

Figure 23



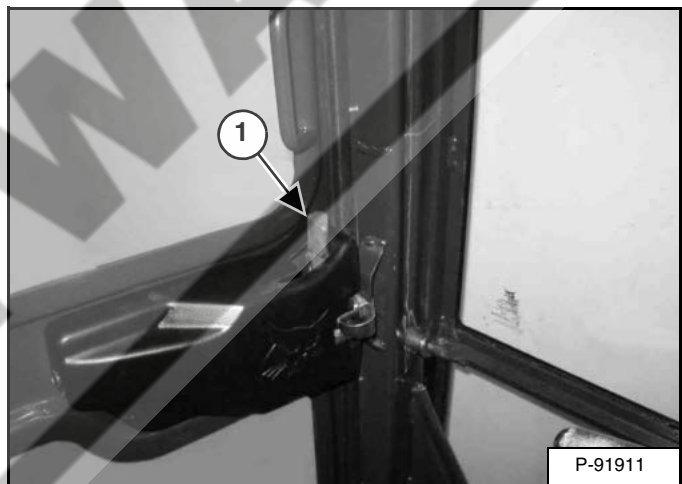
Push the door all the way open until the latch post (Item 1) engages in the latch (Item 2) [Figure 23] to hold the door in the open position.

Figure 24



When the door is in the open position, push down on the latch (Item 1) [Figure 24] and close the door.

Figure 25



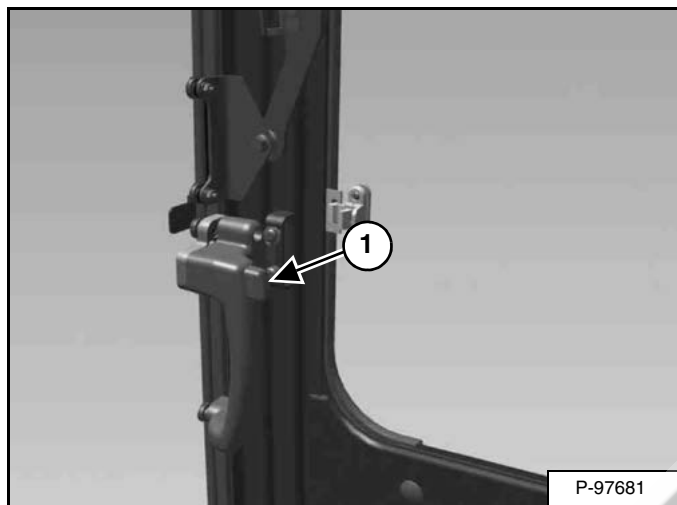
From inside the cab, open the door using handle (Item 1) [Figure 25].

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

Front Window

Opening The Front Window

Figure 26



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

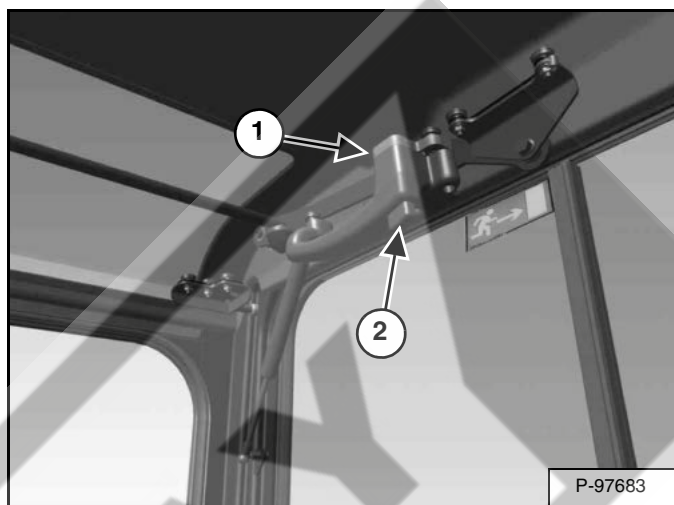
Figure 27



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

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

Figure 28



When the window is fully raised, the latch (Item 1) **[Figure 28]** (both sides) will close on the bracket in the latched position.

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

Closing The Front Window

Use both window grab handles to support the window while pressing the window latch button (Item 2) **[Figure 28]** (both sides).

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

Press the top of the window in until the latch locks into the latched position (both sides) **[Figure 26]**.

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

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

Front Wiper

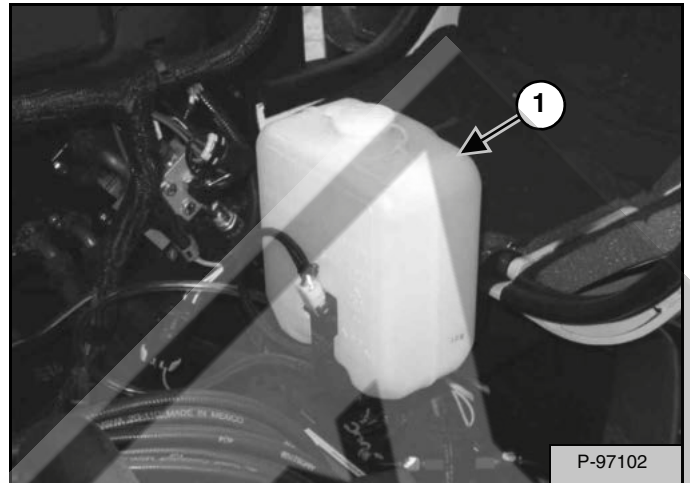
Figure 29



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

Window Washer Reservoir

Figure 30



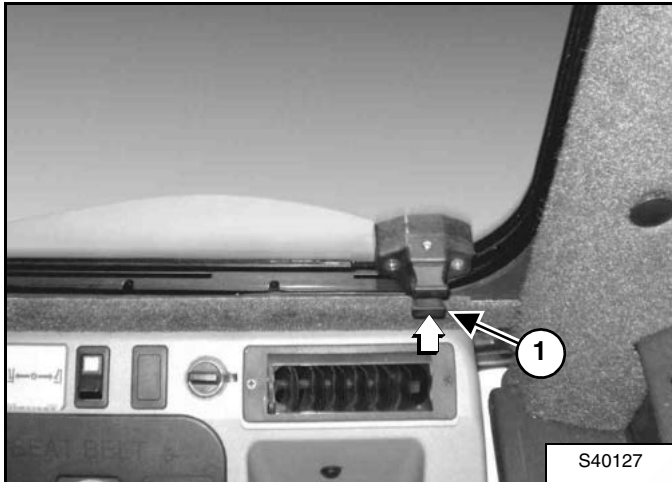
The window washer reservoir (Item 1) [Figure 30] is located under the right side cover.

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

Right Side Window

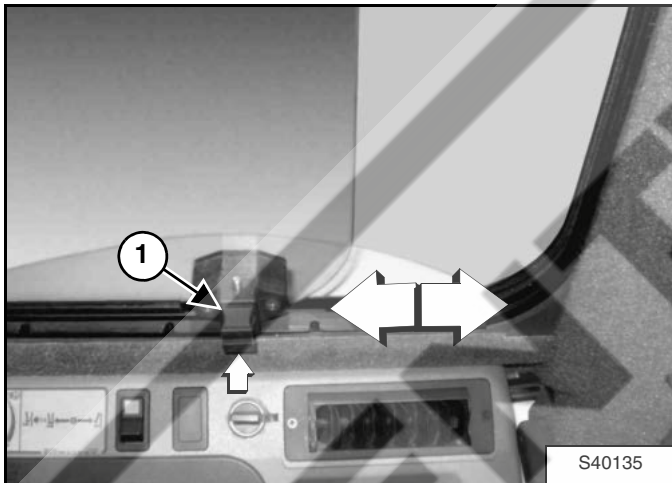
Opening The Right Rear Window

Figure 31



Pull up on the bottom latch (Item 1) [Figure 31].

Figure 32



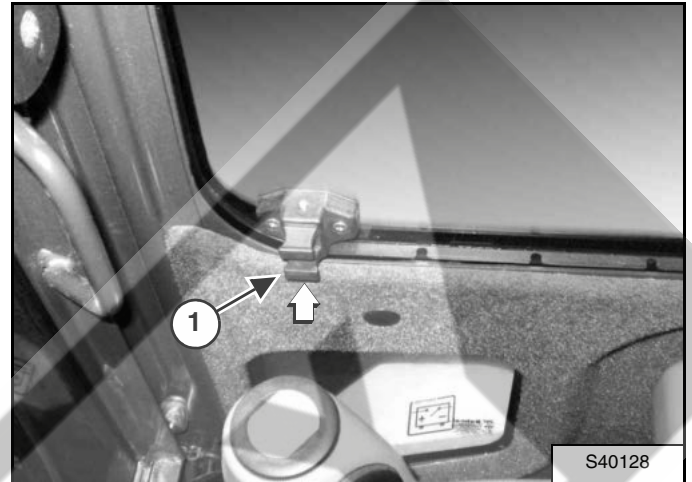
Pull the latch (Item 1) [Figure 32] forward to open the window until the desired stop. Release the bottom latch and snap the lock in place.

Closing The Right Rear Window

Pull up on the bottom latch (Item 1) [Figure 31] and push the latch back to close the window.

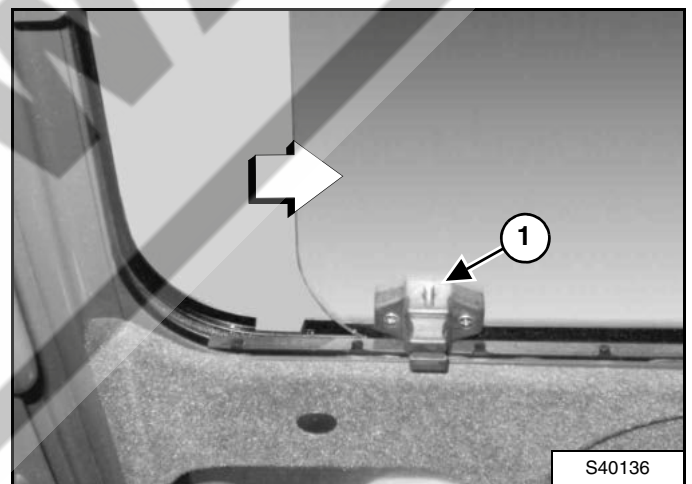
Opening The Right Front Window

Figure 33



Pull up on the bottom latch (Item 1) [Figure 33] located at the front of the front window.

Figure 34



Pull the latch (Item 1) [Figure 34] forward to open the window until the desired stop. Release the bottom latch and snap the lock in place.

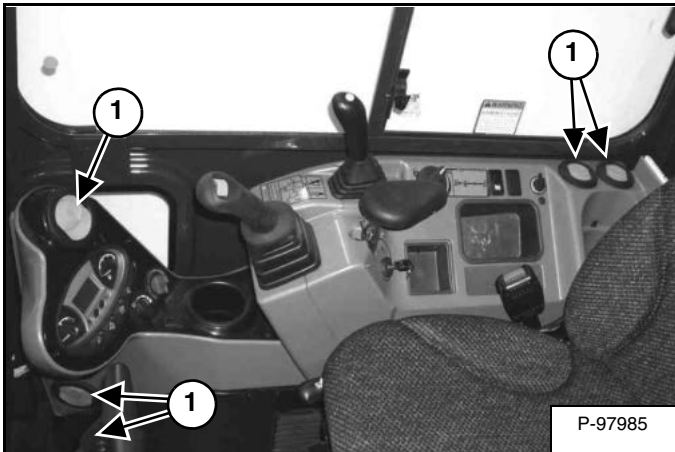
Closing The Right Front Window

Pull up on the bottom latch (Item 1) [Figure 33] and push the latch back to close the window.

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

Heating, Ventilation, And Air Conditioning Ducting

Figure 35



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

EMERGENCY EXIT

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

Right Side Rear Window

Figure 36



Exit through the window [Figure 36].

Front Window

Figure 37



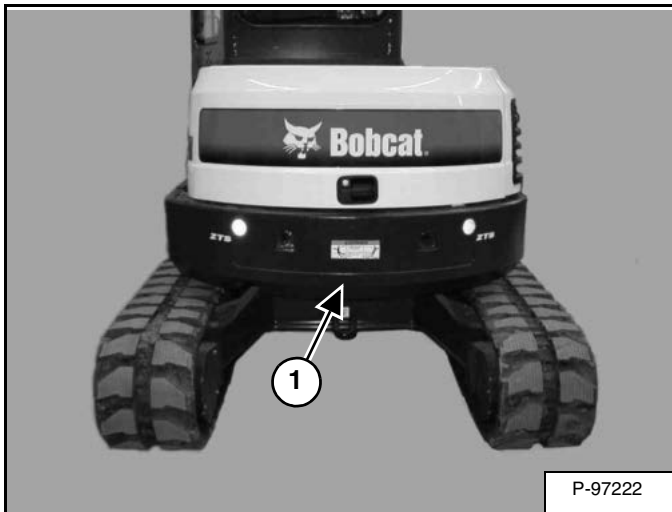
Open the front window and exit [Figure 37].

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

MOTION ALARM SYSTEM

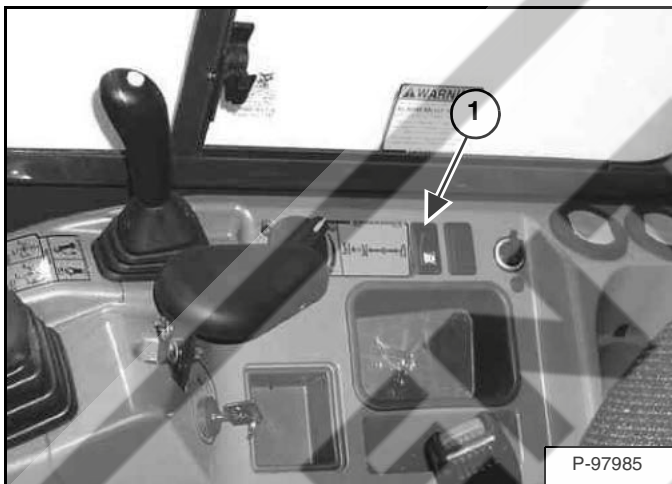
Operation

Figure 38



This excavator may be equipped with a motion alarm system. The motion alarm (Item 1) [Figure 38] is located inside the rear of the excavator.

Figure 39



The motion alarm can be temporarily disabled by pressing the motion alarm switch (Item 1) [Figure 39] while the machine is moving. As soon as the travel levers are returned to the NEUTRAL position, the motion alarm will be enabled.

WARNING

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

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

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

W-2786-0309

The motion alarm will sound when the operator moves the travel control levers (Item 1) [Figure 40] in either the forward or reverse direction.

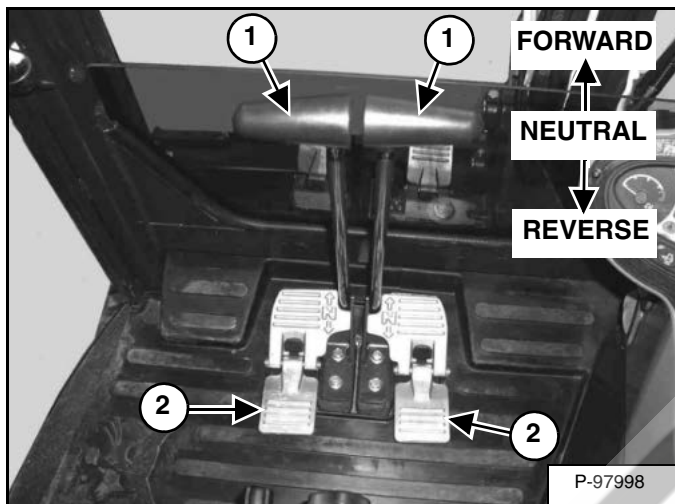
If alarm does not sound or for adjustment instructions, see inspection and maintenance instructions for the motion alarm system in the preventive maintenance section of this manual. (See MOTION ALARM SYSTEM on Page 141.)

TRAVEL CONTROLS

Forward And Reverse Travel

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

Figure 40



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 40] forward for forward travel; backward for reverse travel.

* Travel can also be controlled with foot pedals (Item 2) [Figure 40]. Pivot the heel of the pedals forward for additional space on the floor.

WARNING

AVOID INJURY OR DEATH

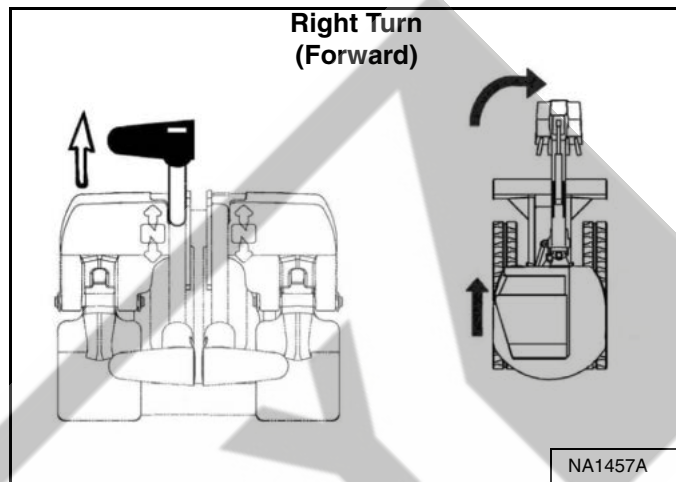
- Check the blade location before travelling. When the blade is to the rear, operate the steering levers / foot pedals in the opposite direction to when the blade is in the front.
- Move the steering levers / foot pedals slowly. Abrupt lever motion will cause the machine to jerk.

W-2235-EN-1009

Turning

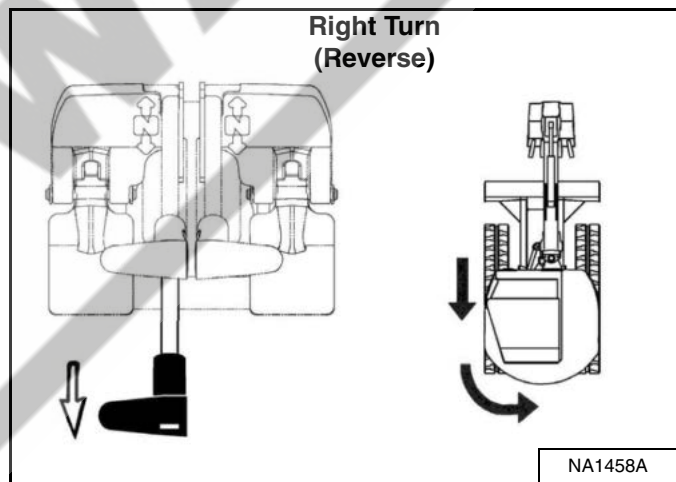
Right Turn

Figure 41



Push the left steering lever forward to turn right [Figure 41] while travelling forward.

Figure 42



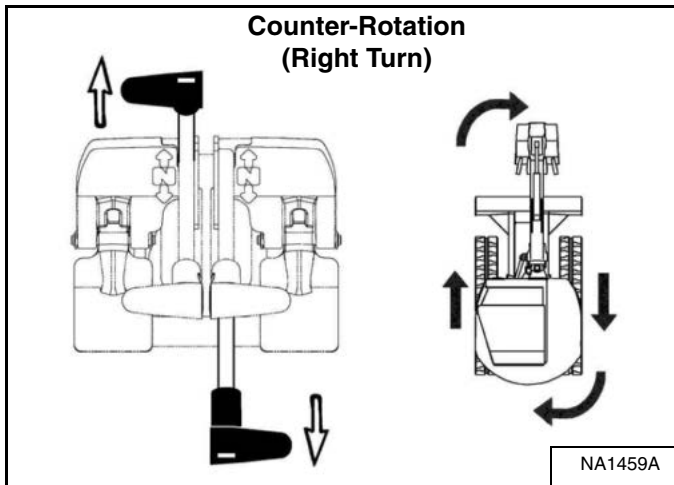
Pull the left steering lever backward to turn right while travelling backward [Figure 42]

TRAVEL CONTROLS (CONT'D)

Turning (Cont'd)

Counter-Rotation Right Turn

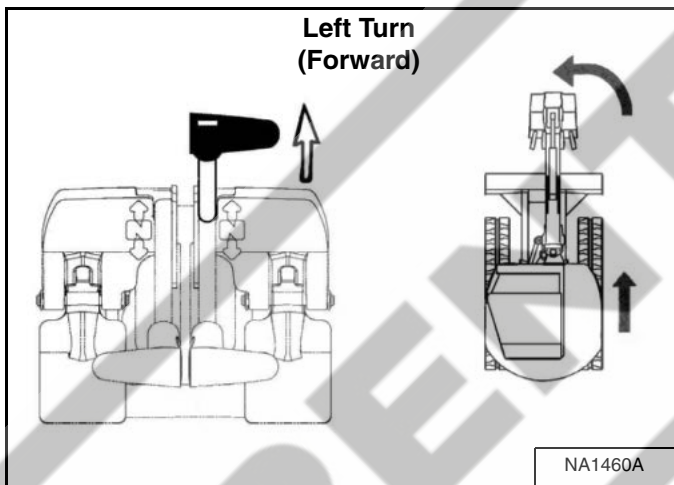
Figure 43



Push the left steering lever forward and pull the right steering lever backward [Figure 43].

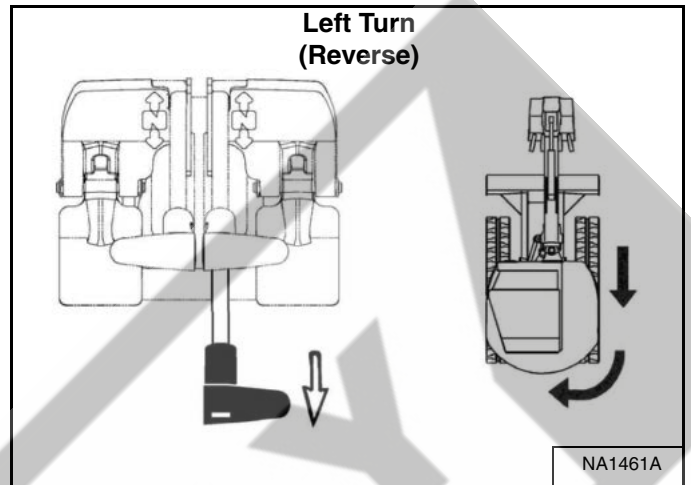
Left Turn

Figure 44



Push the right steering lever forward to turn left while travelling forward [Figure 44].

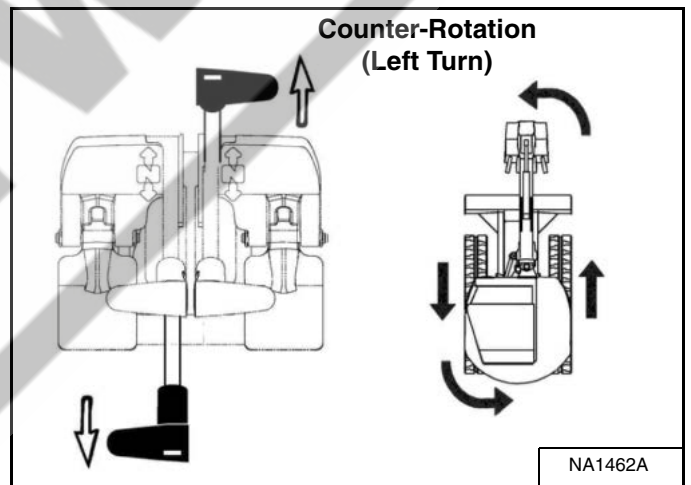
Figure 45



Pull the right steering lever backward to turn left while travelling backward [Figure 45].

Counter-Rotation Left Turn

Figure 46



Push the right steering lever forward and pull the left steering lever backward [Figure 46].

HYDRAULIC CONTROLS

Description

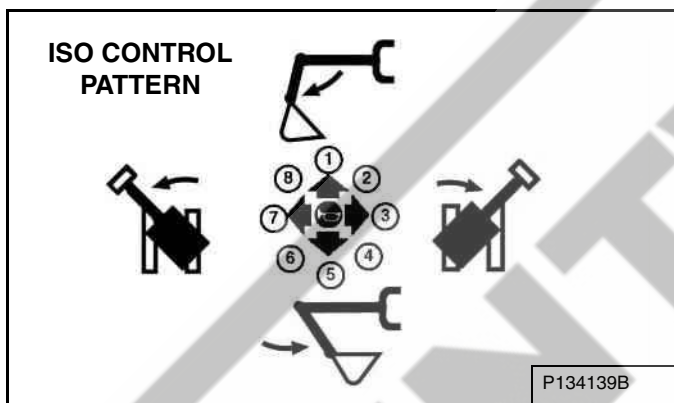
The work equipment (boom, arm, bucket, and upperstructure slew) is operated by using the left and right control levers (joysticks).

Left Control Lever (Joystick)

Figure 47



Figure 48



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

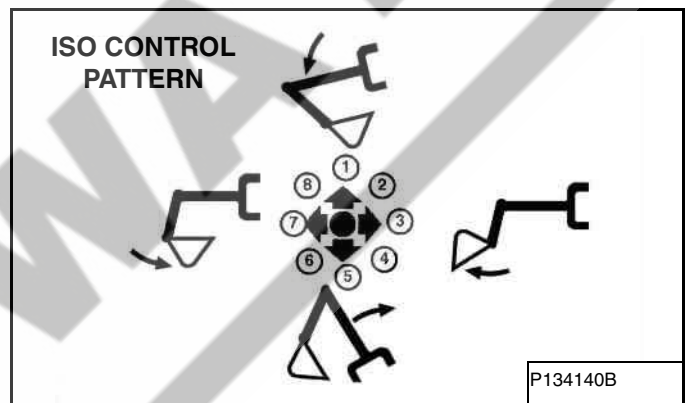
1. Arm out.
2. Arm out and slew right.
3. Slew right.
4. Arm in and slew right.
5. Arm in.
6. Arm in and slew left.
7. Slew left.
8. Arm out and slew left.

Right Control Lever (Joystick)

Figure 49



Figure 50



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

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

WARNING

AVOID INJURY OR DEATH

Before leaving the machine:

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

W-2780-0109

Quick Couplers

! WARNING

AVOID BURNS

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

W-2220-0396

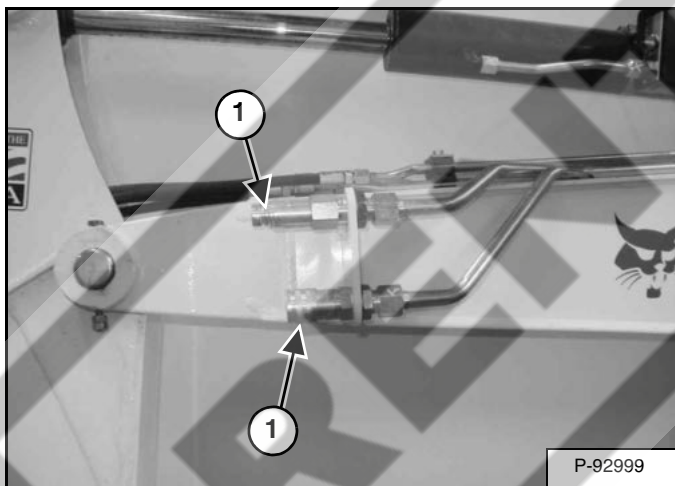
! WARNING

AVOID INJURY OR DEATH

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

W-2072-EN-0909

Figure 51



If equipped with the auxiliary hydraulics, the Excavator and attachments are supplied with flush faced couplers (Item 1) [Figure 51].

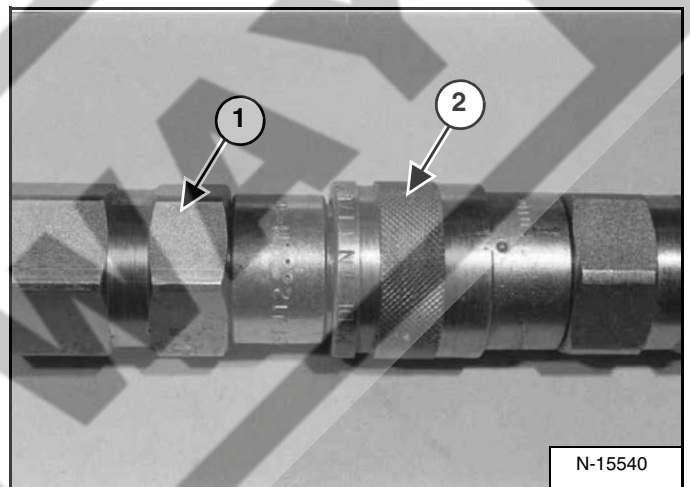
To Connect:

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.

HYDRAULIC CONTROLS (CONT'D)

Auxiliary Hydraulics - Standard Instrument Panel

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

Figure 53



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

Selectable Auxiliary Hydraulics Flow - Press the Auxiliary Hydraulics button (Item 1) (an audible beep will sound each time the auxiliary button is pressed). The last selected auxiliary hydraulic flow (Aux3, Aux2 or Aux1) will appear in the data display (Item 2). The LED (Item 3) [Figure 53] will be illuminated.

To change the auxiliary flow, press the Auxiliary Hydraulics button (Item 1) to toggle through the settings, each time the button is pressed, the next setting will appear in the data display (Item 2) [Figure 53]. Once the desired setting is selected, it will stay at that setting until a different auxiliary flow is selected by the operator. (Example: Even if the engine was STOPPED, if Aux2 has been selected, after key OFF and engine restart, the Aux2 setting will still be the active hydraulic flow when the machine is started.)

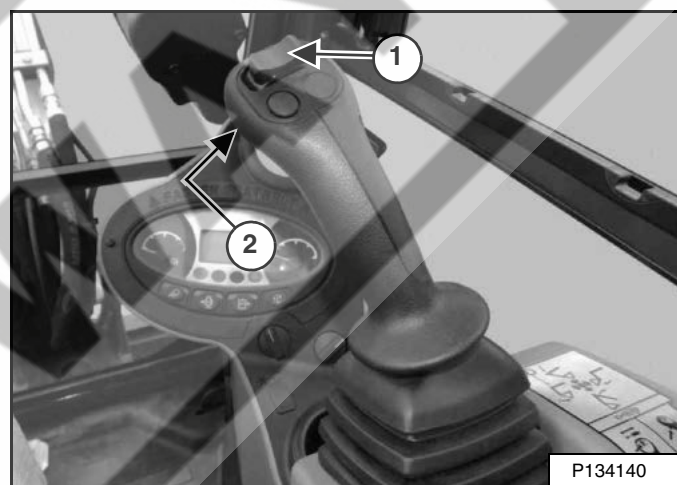
Continuous Flow Auxiliary Hydraulics - Press and hold the Auxiliary Hydraulics button (Item 1) for more than one second. The LED (Item 4) will illuminate. Press the Auxiliary Hydraulics button (Item 1) [Figure 53] again to scroll through the various continuous flow auxiliary hydraulic settings (3, 2, 1).

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

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

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

Figure 54



Move the switch (Item 1) [Figure 54] on the right control lever to the right to supply hydraulic flow to the female coupler. Move the switch to the left to supply hydraulic flow to the male coupler. If you move the switch halfway, the auxiliary functions move at approximately one-half speed.

Press the button (Item 2) [Figure 54] on the front of the handle to provide continuous flow to the female coupler.

NOTE: Pressing the switch (Item 1) to the left while pressing the button (Item 2) [Figure 54] on the front of the handle will provide continuous flow to the male coupler.

Press the button (Item 2) [Figure 54] a second time to stop auxiliary flow to the quick couplers.

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

HYDRAULIC CONTROLS (CONT'D)

Auxiliary Hydraulics - Deluxe Instrument Panel

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

Figure 55



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

Selectable Flow Auxiliary Hydraulics - Press key pad [6] [Figure 55] to scroll through the various front auxiliary hydraulic settings (3, 2, 1).

Continuous Flow Auxiliary Hydraulics - Press and hold the key pad [6] [Figure 55] for more than one second. The continuous flow icons below will illuminate. Press the key pad [6] to scroll through the various continuous flow auxiliary hydraulic settings (3, 2, 1).

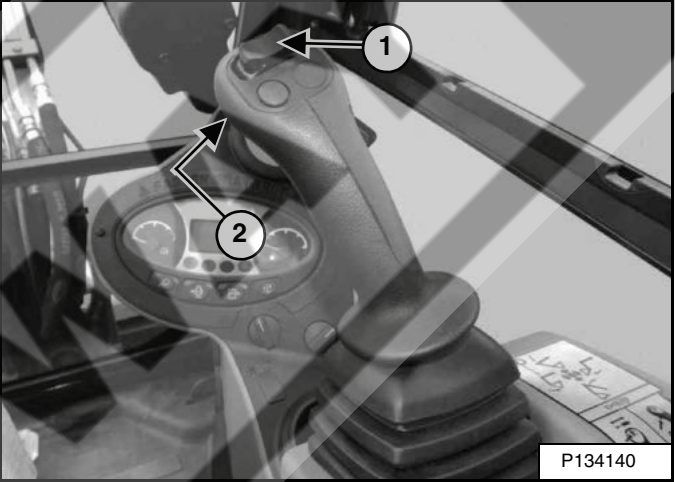
ICON	DESCRIPTION
	Engine OFF - Auxiliary Hydraulics Pressure Relieve
	Engine Running - Auxiliary Hydraulics OFF
	Auxiliary Hydraulics - Maximum Flow - Continuous Flow Disabled
	Auxiliary Hydraulics - Medium Flow - Continuous Flow Disabled
	Auxiliary Hydraulics - Low Flow - Continuous Flow Disabled
	Auxiliary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

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

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

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

Figure 56



Move the switch (Item 1) [Figure 56] on the right control lever to the right to supply hydraulic flow to the female coupler. Move the switch to the left to supply hydraulic flow to the male coupler. If you move the switch halfway, the auxiliary functions move at approximately one-half speed.

Press the button (Item 2) [Figure 56] on the front of the handle to provide continuous flow to the female coupler.

NOTE: Pressing the switch (Item 1) to the left while pressing the button (Item 2) [Figure 56] on the front of the handle will provide continuous flow to the male coupler.

Press the button (Item 2) [Figure 56] a second time to stop auxiliary flow to the quick couplers.

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

HYDRAULIC CONTROLS (CONT'D)

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

Excavator:

Put the attachment flat on the ground.

Stop the engine and turn the key switch to ON.

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

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

Figure 57



If the auxiliary hydraulics are disabled, press AUX HYD button (Item 1) [Figure 57] and then move the switch (Item 1) [Figure 56] to the right and left several times.

If the auxiliary hydraulics are enabled, then move the switch (Item 1) [Figure 56] to the right and left several times.

Attachments:

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

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

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

Excavator:

Put the attachment flat on the ground.

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

Figure 58



Stop the engine and turn the start switch to ON. Press either scroll button (Item 1) [Figure 58] (Deluxe Panel) until the above screen is visible.

Press button [6] [Figure 58] and the [AUX PRESSURE RELEASE] screen [Figure 59] will be visible.

Figure 59



Press the [ENTER] button (Item 1) [Figure 59] to relieve auxiliary pressure in the excavator. An hour glass symbol will appear and when pressure is relieve, the screen will show *Auxiliary Hydraulic Pressure Release*.

Attachments:

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

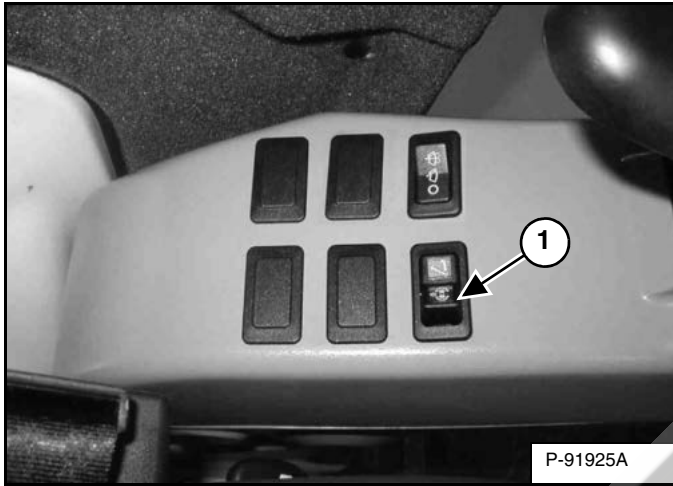
Hydraulic pressure in the auxiliary hydraulic system can make it difficult to engage quick couplers to an attachment.

HYDRAULIC CONTROLS (CONT'D)

Secondary Auxiliary Hydraulics

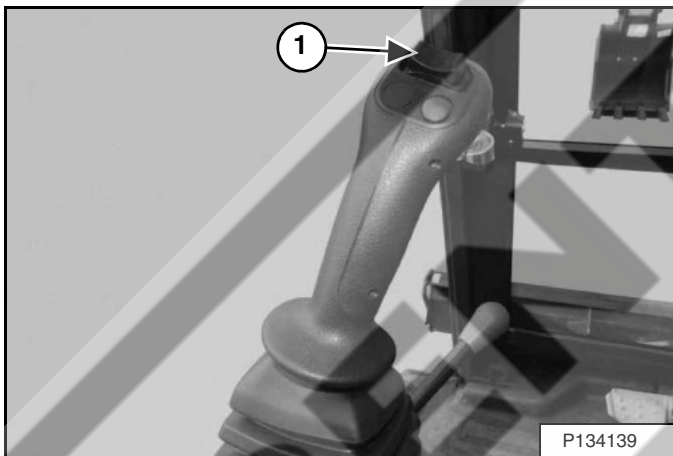
When equipped with secondary auxiliary hydraulics, the second set of hydraulic couplers will be mounted on the right side of the arm.

Figure 60



Press AUX HYD button (Item 1) [Figure 60] (if equipped) to the right, secondary auxiliary hydraulic position.

Figure 61



Move the switch (Item 1) [Figure 61] on the left control lever to the left to supply hydraulic flow to the female coupler. Move the switch to the right to supply hydraulic flow to the male coupler. If you move the switch halfway, the auxiliary functions move at approximately one-half speed.

Relieve Secondary Auxiliary Hydraulic Pressure (Excavator And Attachment)

Excavator:

Put the attachment flat on the ground.

Stop the engine and turn the key to ON.

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

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

Press AUX HYD button (Item 1) [Figure 60] and then move the switch (Item 1) [Figure 61] to the right and left several times.

Attachments:

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

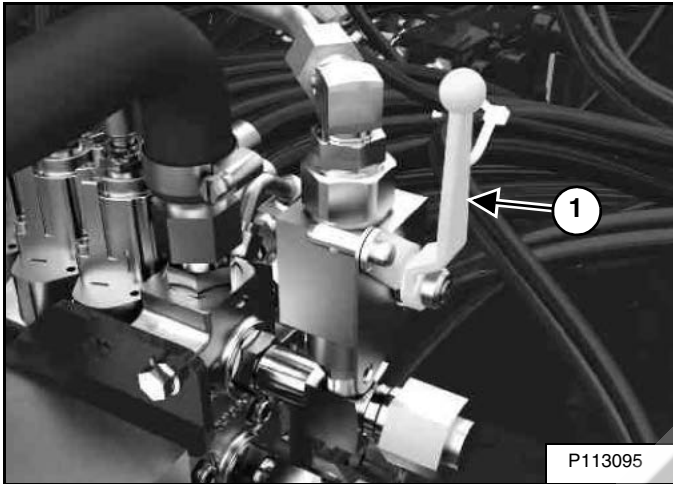
Hydraulic pressure in the auxiliary hydraulic system can make it difficult to engage quick couplers to an attachment.

HYDRAULIC CONTROLS (CONT'D)

Return To Tank Valve

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

Figure 62



Rotate the lever (Item 1) [Figure 62] clockwise to direct auxiliary return hydraulic fluid to the reservoir.

Rotate the lever (Item 1) [Figure 62] anticlockwise for two way hydraulic auxiliary flow operation.

OVERLOAD WARNING DEVICE

Description

The overload warning device, when engaged, will alert the operator with a warning buzzer and the general warning 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 63

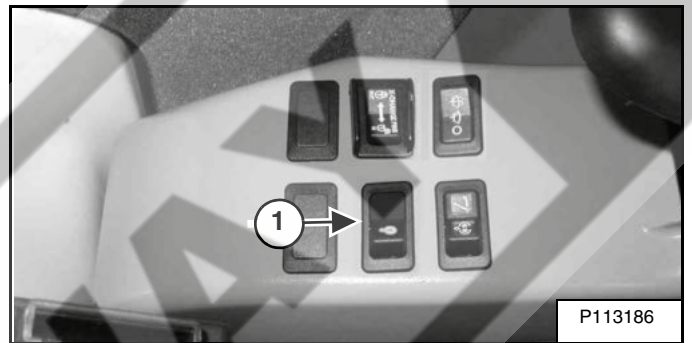
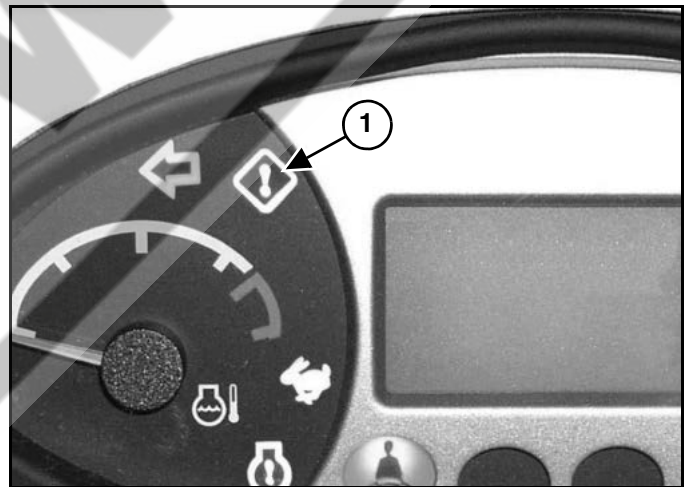


Figure 64



Press the switch (Item 1) [Figure 63] to the right to enable the overload warning device.

A buzzer will sound and the general warning icon (Item 1) [Figure 64] will illuminate when the boom is overloaded.

To disengage the overload warning device, press the switch (Item 1) [Figure 63] to the left. The icon (Item 1) [Figure 64] will turn off when the overload warning device is disabled.

NOTE: The overload warning device must be turned on for objected handling applications.

BLADE CONTROL LEVER

Raising And Lowering Blade

Figure 65



Pull the lever backward to raise the blade (Item 1) [Figure 65].

Push the lever forward to lower the blade (Item 2) [Figure 65].

Push the lever (Item 3) [Figure 65] forward until the lever is in the locked position to put the blade in the *float* position.

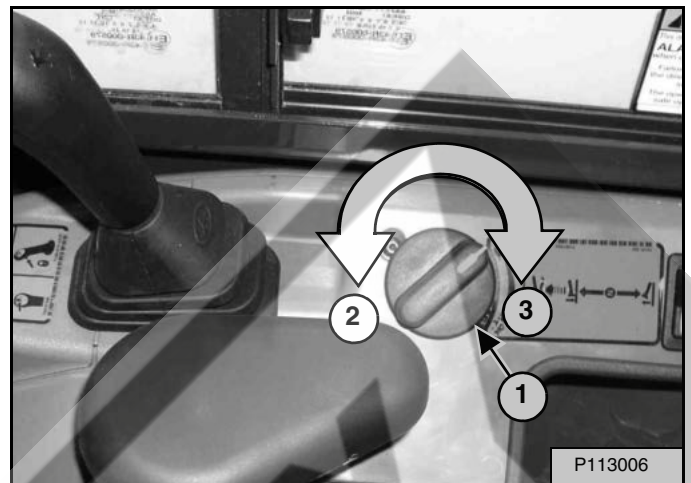
Pull the lever backward to unlock from the *float* position.

NOTE: Keep blade lowered for increased digging performance.

ENGINE SPEED CONTROL DIAL

Setting Engine Speed (RPM)

Figure 66



The engine speed control dial (Item 1) [Figure 66] controls engine rpm.

Rotate the engine speed control dial anticlockwise (Item 2) to reduce engine rpm. Rotate the engine speed control dial clockwise (Item 3) [Figure 66] to increase engine rpm.

ECO Mode (With Deluxe Instrument Panel Only)

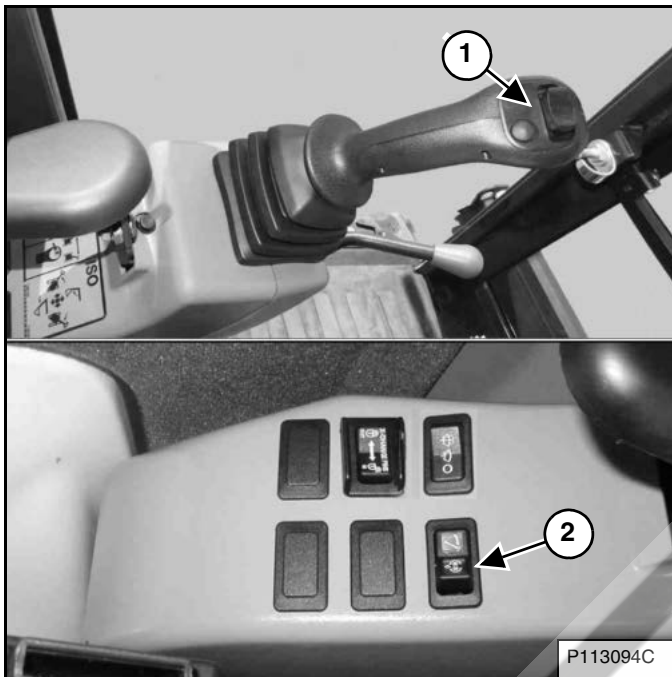
If equipped with the Deluxe Instrument Panel, ECO mode is available.

To enable ECO mode: (See ECO MODE on Page 192.)

BOOM SWING

Operation

Figure 67



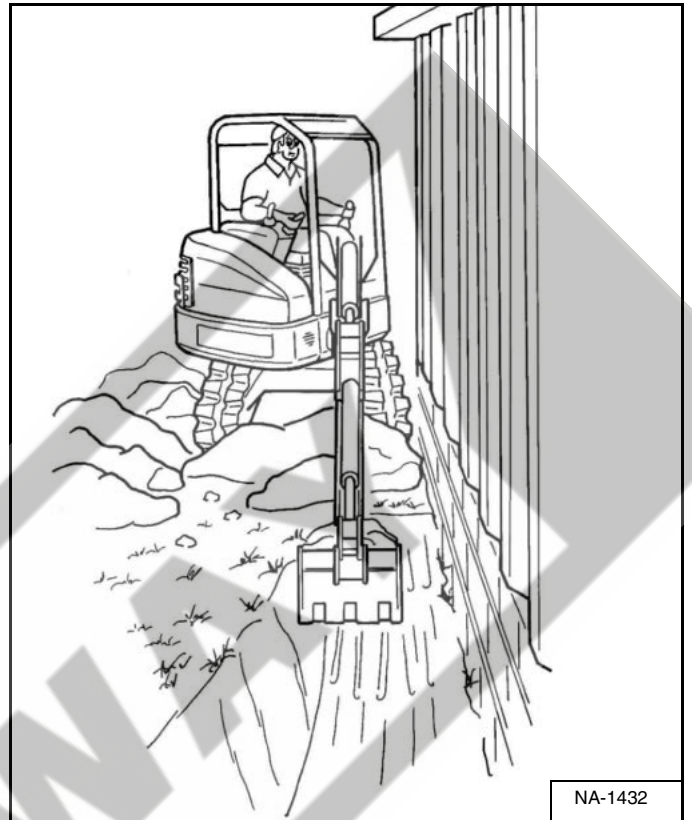
The switch (Item 1) [Figure 67] on the left control lever (joystick) controls boom swing. Move the switch to the left to swing the boom to the left. Move the switch to the right to swing the boom to the right.

Secondary Auxiliary Hydraulics:

If the machine is equipped with secondary auxiliary hydraulic couplers, the switch (Item 2) [Figure 67] is used to select either the boom swing function or the secondary auxiliary hydraulic function.

Move the switch (Item 2) [Figure 67] to the left to select boom swing function, move the switch to the right to select secondary auxiliary hydraulic function.

Figure 68



NOTE: The purpose of the boom swing is to offset the boom with respect to the upperstructure for digging close to a structure [Figure 68].

BOOM LOAD HOLDING VALVE

Description

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

NOTE: Load Holding valves may be required for lifting objects. Check the regulations in your area. See your Bobcat dealer for load holding valves for your model excavator.

WARNING

AVOID INJURY OR DEATH

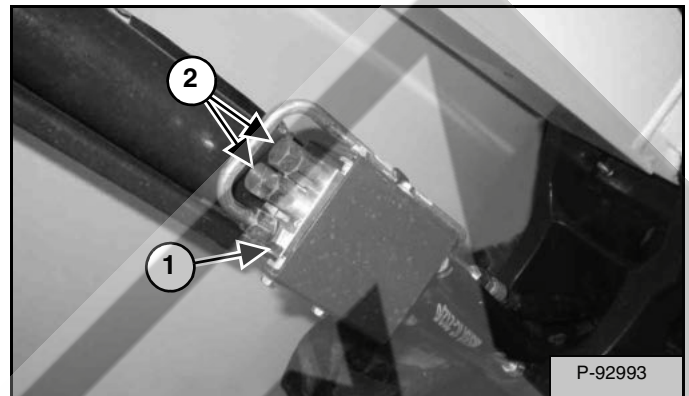
Do Not work or stand under raised work equipment or attachment.

W-2793-0409

Lowering Boom With Load Holding Valve

NOTE: The boom load holding valve is required for object handling applications.

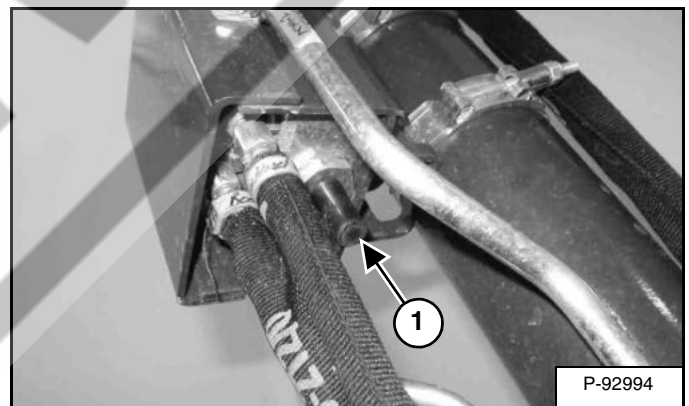
Figure 69



If the excavator is equipped with a boom load holding valve (Item 1) [Figure 69], it will be attached to the boom cylinder at the base end.

NOTE: DO NOT remove or adjust the two port relief valves (Item 2) [Figure 69]. If the port relief valves have been tampered with, see your Bobcat dealer for service.

Figure 70



Remove the plastic protective cap (Item 1) [Figure 70] from the valve.

WARNING

AVOID BURNS

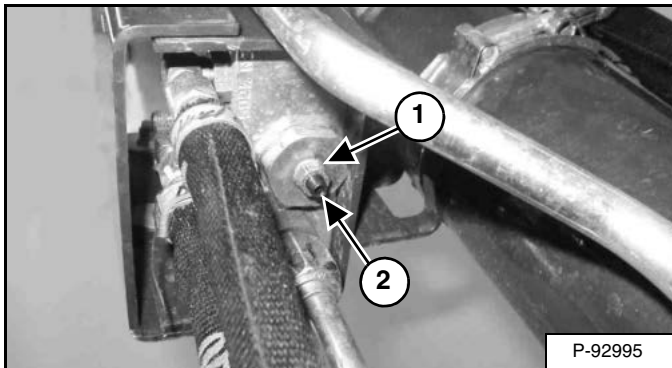
Hydraulic fluid, tubes, fittings and quick couplers can get hot when running machine and attachments. Be careful when connecting and disconnecting quick couplers.

W-2220-0396

BOOM LOAD HOLDING VALVE (CONT'D)

Lowering Boom With Load Holding Valve (Cont'd)

Figure 71



Lowering procedures:

With base end hose failure:

Loosen the jam nut (Item 1). Install a hex wrench into the valve screw (Item 2) [Figure 71] and slowly rotate the screw clockwise 1/8 to 1/4 turn and allow the boom to lower to the ground.

After the boom is fully lowered, rotate the screw anticlockwise (Item 2) 1/8 to 1/4 turn and tighten the lock nut (Item 1) [Figure 71].

With rod end hose failure - with accumulator pressure:

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

With rod end hose failure and NO accumulator pressure:

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

Loosen the jam nut (Item 1). Install a hex wrench into the valve screw (Item 2) [Figure 71] and slowly rotate the screw clockwise 1/8 to 1/4 turn and allow the boom to lower to the ground.

After the boom is fully lowered, rotate the screw (Item 2) anticlockwise 1/8 to 1/4 turn and tighten the lock nut (Item 1) [Figure 71]. Reinstall the base end hose.

Loss of hydraulic pressure:

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

ARM LOAD HOLDING VALVE

Description

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

NOTE: Load Holding valves may be required for lifting objects. Check the regulations in your area. See your Bobcat dealer for load holding valves for your model excavator.

WARNING

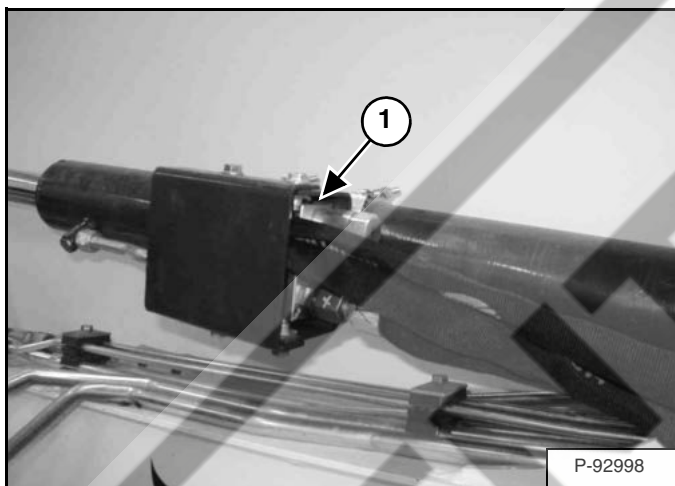
AVOID INJURY OR DEATH

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

W-2793-0409

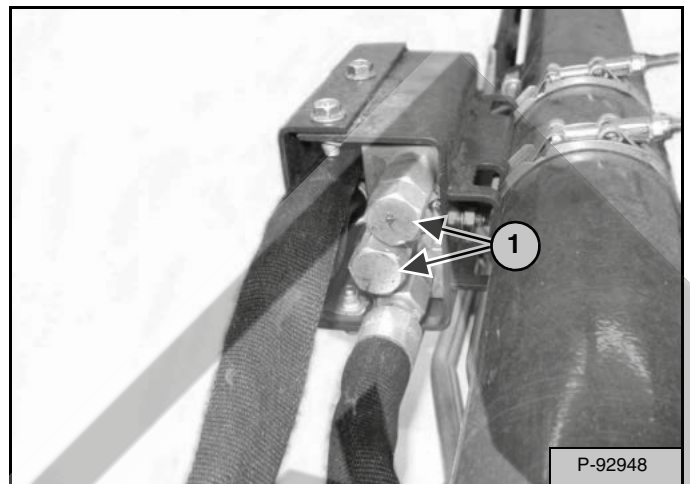
Lowering Arm With Load Holding Valve

Figure 72



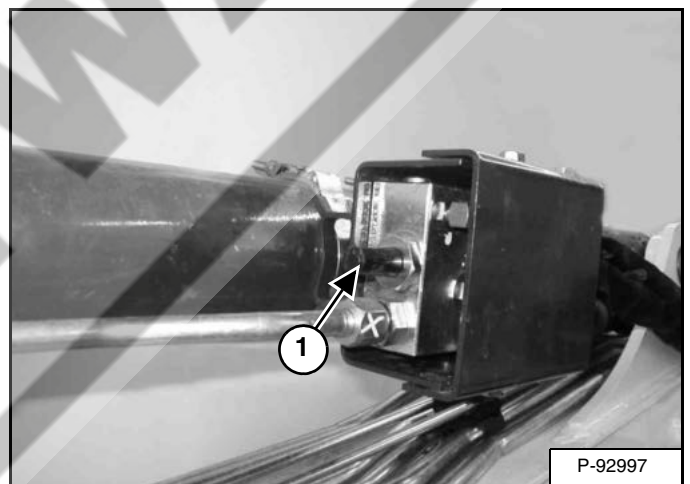
If the excavator is equipped with arm load holding valve (Item 1) [Figure 72], it will be attached to the arm cylinder base end as shown.

Figure 73



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

Figure 74



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

WARNING

AVOID BURNS

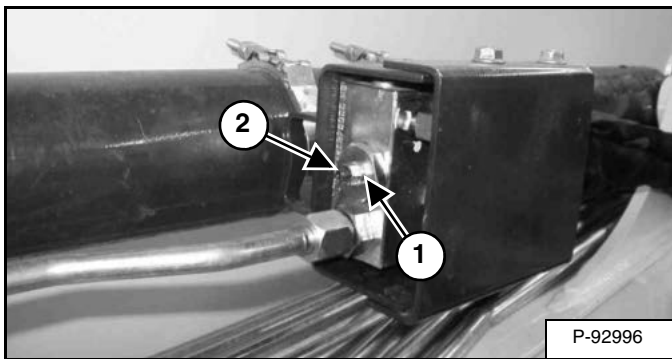
Hydraulic fluid, tubes, fittings and quick couplers can get hot when running machine and attachments. Be careful when connecting and disconnecting quick couplers.

W-2220-0396

ARM LOAD HOLDING VALVE (CONT'D)

Lowering Arm With Load Holding Valve (Cont'd)

Figure 75



Lowering procedures:

With base end hose failure:

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

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

With rod end hose failure - with accumulator pressure:

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

With rod end hose failure and NO accumulator pressure:

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

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

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

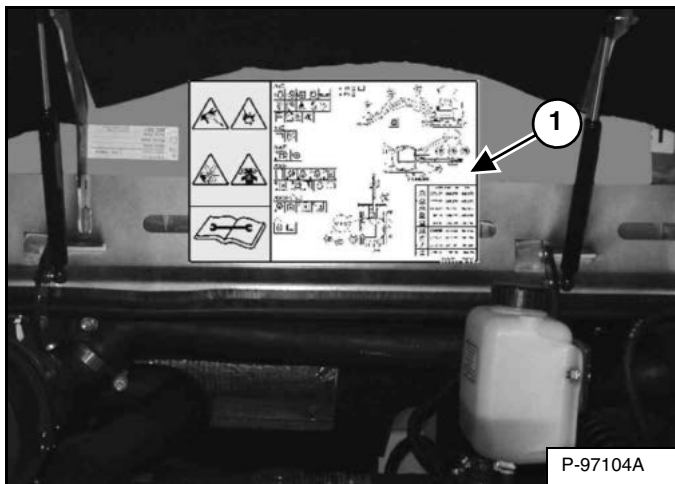
Loss of hydraulic pressure:

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

DAILY INSPECTION

Daily Inspection And Maintenance

Figure 76



Maintenance work must be done at regular intervals. Failure to do so will result in excessive wear and early failures. The Service Schedule is a guide for correct maintenance of the Bobcat excavator. The decal (Item 1) [Figure 76] is located inside the rear door. (See SERVICE SCHEDULE on Page 137.)

Check the following items before each day of operation:

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

! WARNING

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

W-2001-0502

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

IMPORTANT

PRESSURE WASHING DECALS

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

I-2226-EN-0910

IMPORTANT

This machine is factory equipped with a spark arrester exhaust system.

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

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

If this machine is operated on flammable forest, brush, or grass covered land, a spark arrester attached to the exhaust system may be required and must be maintained in working order. Refer to local laws and regulations for spark arrester requirements.

I-2284-EN-0909

PRE-STARTING PROCEDURE

Operation & Maintenance Manual And Operator's Handbook Locations

Figure 77

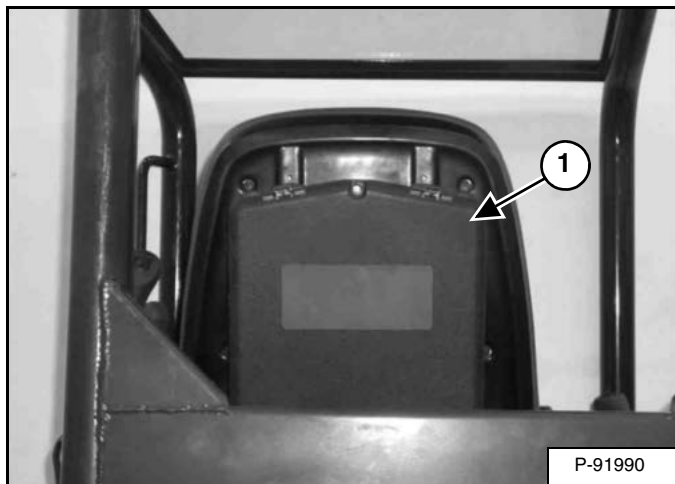
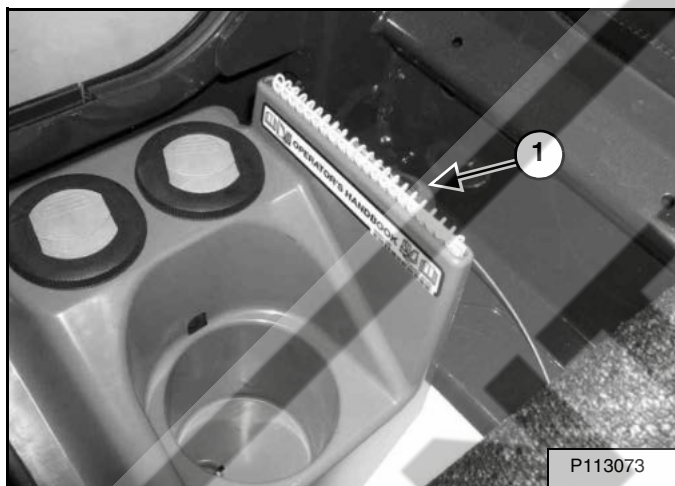


Figure 78



Read and understand the Operation & Maintenance Manual (Item 1) [Figure 77] (located inside the storage box on the back of the operator's seat) and the Operator's Handbook (Item 1) [Figure 78] before operating.

Entering The Excavator

Figure 79



Use the grab handles and tracks to enter the canopy / cab [Figure 79].



WARNING

AVOID INJURY OR DEATH

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

W-2003-0807

PRE-STARTING PROCEDURE (CONT'D)

Seat Adjustment

Standard Seat

Figure 80

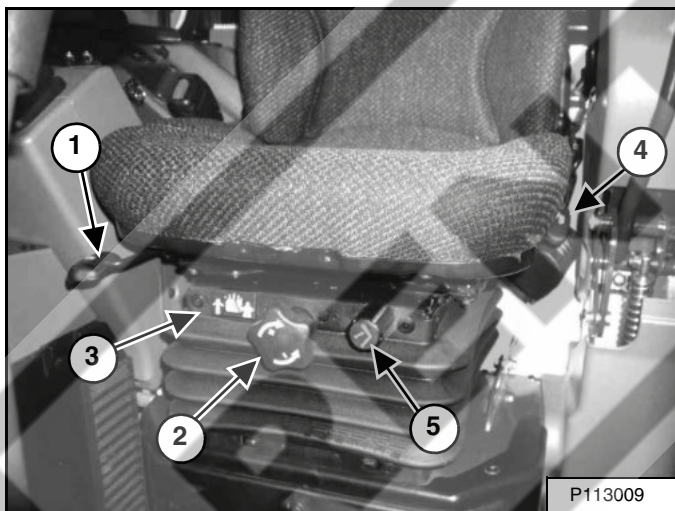


Release the seat lever (Item 1) [Figure 80] to adjust the seat forward or back.

Release the seat lever (Item 2) [Figure 80] to tilt the seat forward.

Suspension Seat (Option)

Figure 81



Release the seat lever (Item 1) [Figure 81] to adjust the seat forward or back.

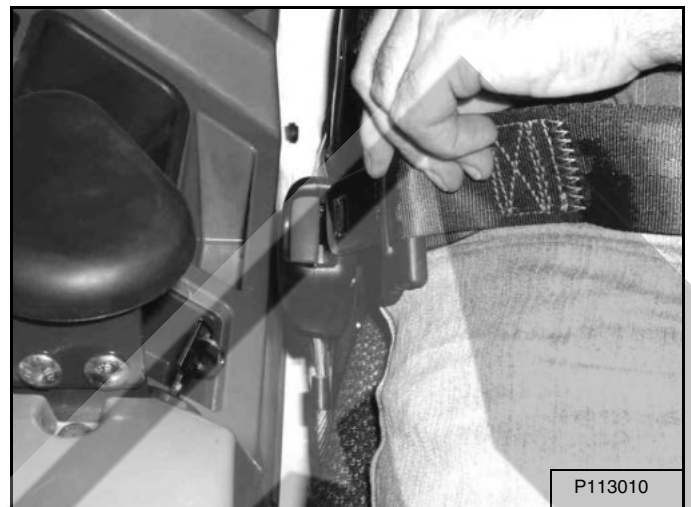
Turn the handle (Item 2) to change the adjustment for operator weight. Turn the handle until the operator's weight is shown in the window (Item 3) [Figure 81].

Release the lever (Item 4) [Figure 81] to change the incline of the seat back.

Sit in the seat and turn the knob (Item 5) [Figure 81] to adjust the height of the seat.

Seat Belt

Figure 82

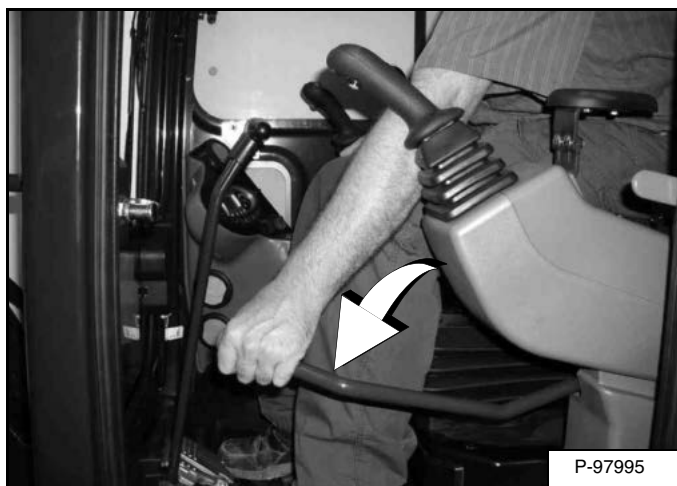


Fasten the seat belt [Figure 82].

PRE-STARTING PROCEDURE (CONT'D)

Control Console

Figure 83



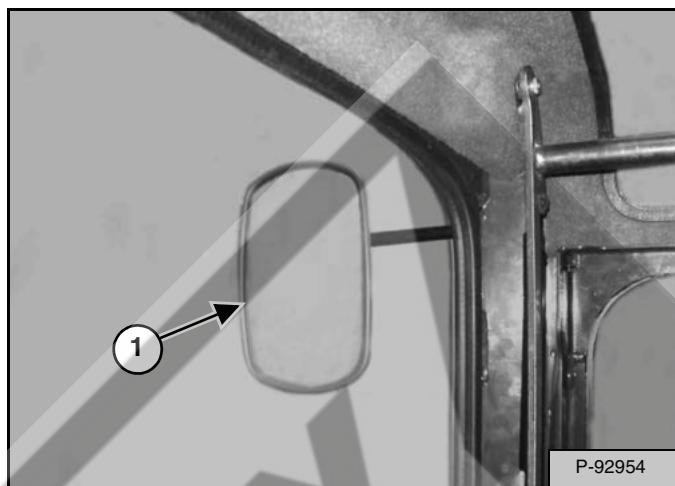
Lower the control console [Figure 83].

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

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

Mirror Adjustment

Figure 84



Adjust mirrors (Item 1) [Figure 84] (if equipped).

STARTING THE ENGINE

Key Switch

!

WARNING

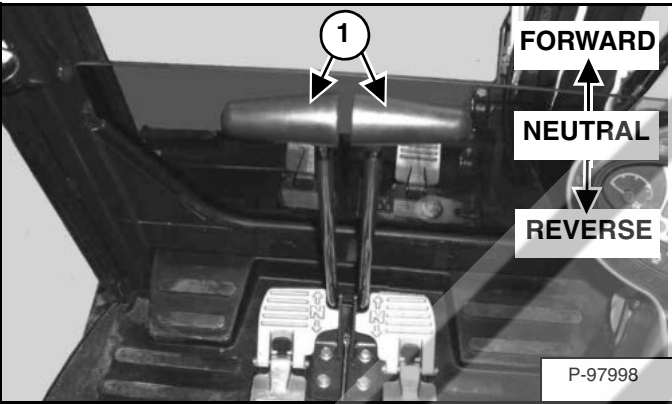
AVOID INJURY OR DEATH

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

W-2135-1108

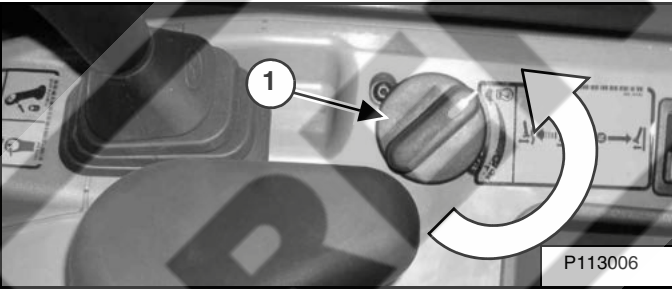
Perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page 67.)

Figure 85



Put control levers (Item 1) [Figure 85] in the NEUTRAL position.

Figure 86



Turn the engine speed control dial (Item 1) [Figure 86] anticlockwise to low idle.

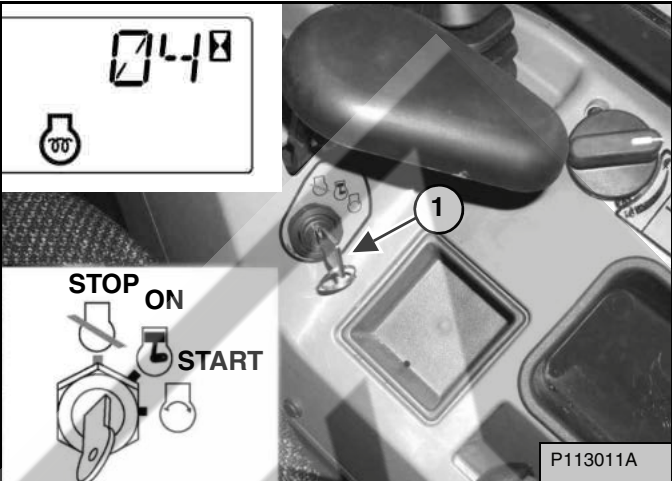
!

IMPORTANT

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

I-2034-0700

Figure 87



Turn the key (Item 1) [Figure 87] to the ON position. If preheating is required, the glow plugs will automatically cycle and the remaining preheat time (in seconds) will show in the data display screen (see inset). (Preheat icon will be ON).

Turn the key to START and release the key when the engine starts. It will return to the ON position [Figure 87].

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

Turn the key switch OFF to stop the engine.

!

WARNING

AVOID INJURY OR DEATH

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

W-2050-0807

!

WARNING

AVOID SERIOUS INJURY OR DEATH

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

W-2051-0212

STARTING THE ENGINE (CONT'D)

Keyless



WARNING

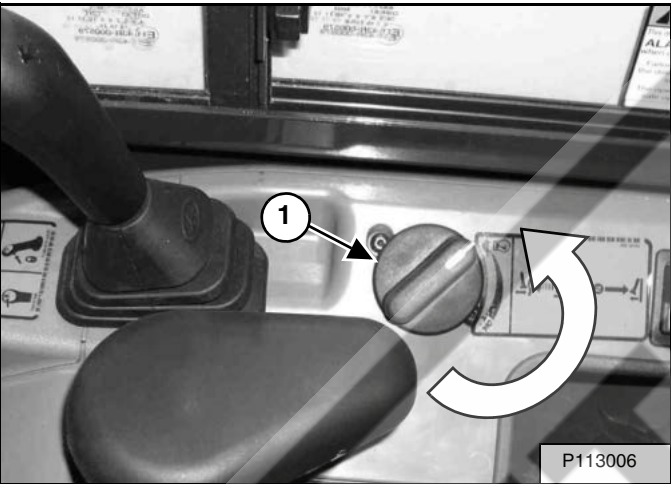
AVOID INJURY OR DEATH

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

W-2135-1108

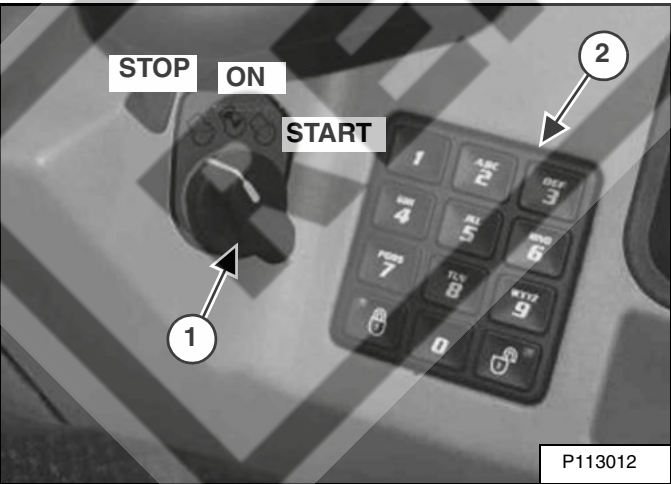
Perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page 67.)

Figure 88



Rotate the engine speed control dial (Item 1) [Figure 88] to low idle.

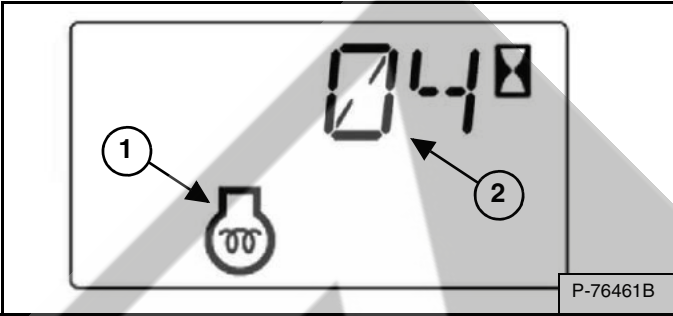
Figure 89



Turn the start switch (Item 1) [Figure 89] to ON. The indicator lights on the instrument panel will come ON briefly and the Instrument Panel / monitoring system will do a self test.

Use the keypad (Item 2) [Figure 89] to enter the password.

Figure 90



If preheating is required, the glow plugs will automatically cycle based on temperature. The engine preheat icon (Item 1) will be ON and the cycle time remaining (Item 2) [Figure 90] will be shown on the data display.

When the engine preheat icon goes OFF, turn the start switch (Item 1) [Figure 89] to START position and hold it until the engine starts. Release the switch and it will return to the ON position.

IMPORTANT

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

I-2034-0700

Turn the start switch (Item 1) [Figure 89] to the STOP position to stop the engine.

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

Check for the cause before starting the engine again.

Password Lockout Feature

See Password Lockout Feature. (See Password Lockout Feature on Page 195.)

STARTING THE ENGINE (CONT'D)

Deluxe Instrument Panel



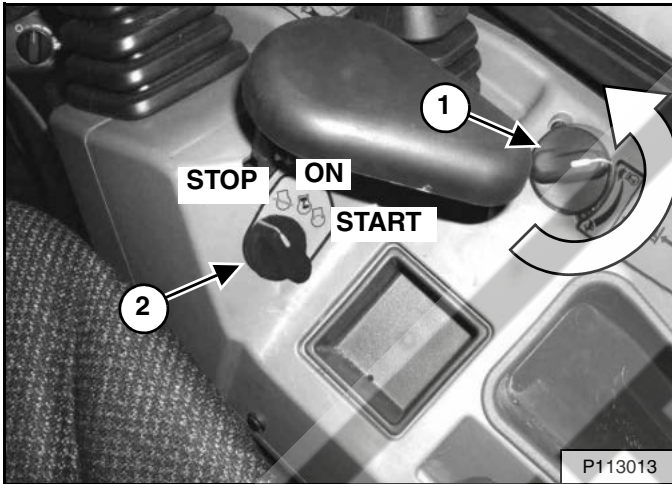
AVOID SERIOUS INJURY OR DEATH

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

W-2051-0212

Perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page 67.)

Figure 91

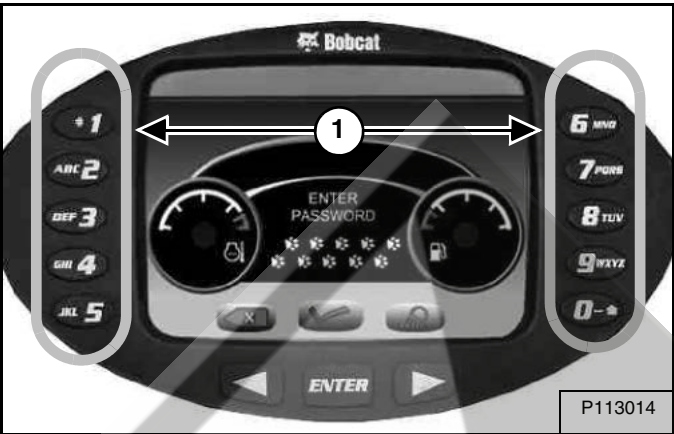


Set the engine speed control (Item 1) [Figure 91] to the low idle position.

NOTE: Excavators with a Deluxe Instrument Panel have a permanent, randomly generated Master Password set at the factory. Your excavator will also be assigned an Owner Password. Your dealer will provide you with this password. Change the owner password to one that you will easily remember to prevent unauthorised use of your excavator. (See Changing The Owner Password on Page 196.) Keep your password in a safe location for future needs.

NOTE: The Password Lockout feature can be used to allow starting of the excavator without a password. If unlocked, the start switch will start the machine without using a password. (See Password Lockout Feature on Page 195.)

Figure 92



Turn the start switch (Item 2) [Figure 91] to ON. The message [ENTER PASSWORD] will appear on the display screen if the deluxe instrument panel is locked. (If not locked, use the start switch without a password to start the engine.)

Use the numeric keypad (Item 1) [Figure 92] to enter the password.

Figure 93



If preheating is required, the glow plugs will automatically cycle and the engine preheat icon (Item 1) [Figure 93] and will be shown in the data display.

When the engine preheat icon goes OFF, turn the start switch to START (Item 3). Release the switch when the engine starts and allow it to return to the ON position (Item 2) [Figure 92].

Turn the start button (Item 2) [Figure 91] to the STOP position to stop the engine.

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

Check for the cause before starting the engine again.

Password Lockout Feature

See Password Lockout Feature. (See Password Lockout Feature on Page 195.)

STARTING THE ENGINE (CONT'D)

Warming The Hydraulic System

IMPORTANT

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

I-2007-0910

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

Cold Temperature Starting



WARNING

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

W-2071-0415

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

- Replace the engine oil with the correct type and viscosity for the anticipated starting temperature. (See Engine Oil Chart on Page 153.)
- Make sure the battery is fully charged.
- Install an engine heater.

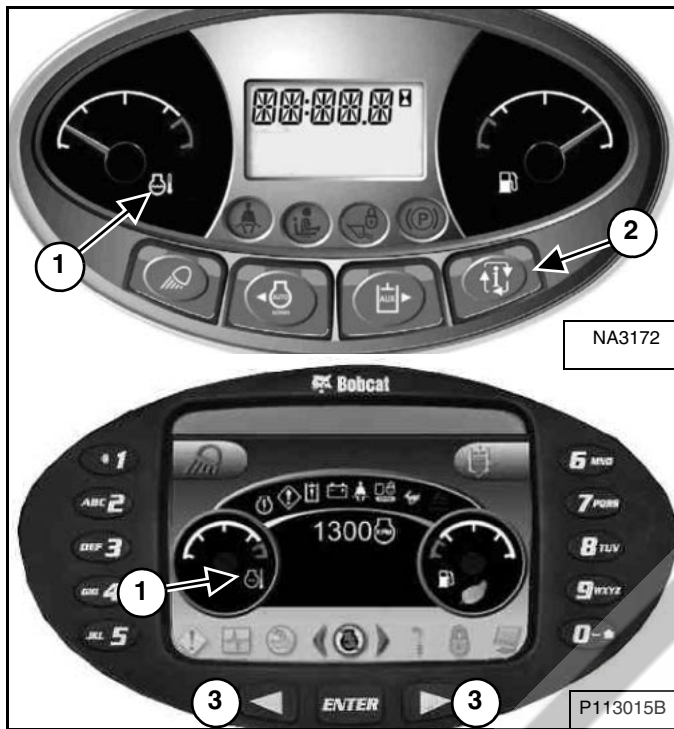
NOTE: If the battery is discharged (but not frozen) a booster battery can be used to jump start the excavator. (See Using A Booster Battery (Jump Starting) on Page 161.)

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

MONITORING THE DISPLAY PANELS

Instrument Panel

Figure 94



Frequently monitor the temperature and fuel gauges [Figure 94].

After the engine is running, frequently monitor the instrument panel [Figure 94] for machine condition.

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

EXAMPLE: Engine Coolant Temperature is High.

The Engine Coolant Temperature icon (Item 1) [Figure 94] is ON.

Press the Information button (Item 2) (Standard Panel) or press a scroll button (Item 3) [Figure 94] (Deluxe Panel) repeatedly to cycle the data display until the service code screen is displayed. One of the following SERVICE CODES is displayed.

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

Find the cause of the service code and correct before operating the excavator again. (See DIAGNOSTIC SERVICE CODES on Page 185.)

NOTE: The optional Deluxe Instrumentation Panel offers an additional view of service codes that includes a brief description. (See DIAGNOSTIC SERVICE CODES on Page 185.)

Warning And Shutdown

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

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

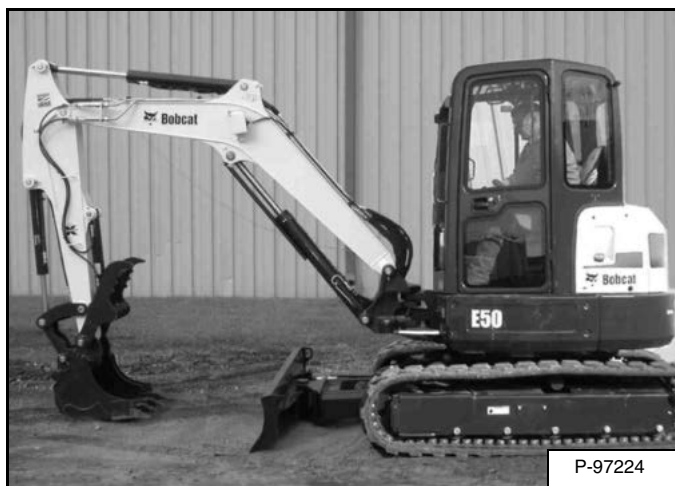
The SHUTDOWN feature is associated with the following icons:

General Warning
Engine Malfunction
Engine Coolant Temperature
Hydraulic Fluid Temperature

STOPPING THE ENGINE AND LEAVING THE EXCAVATOR

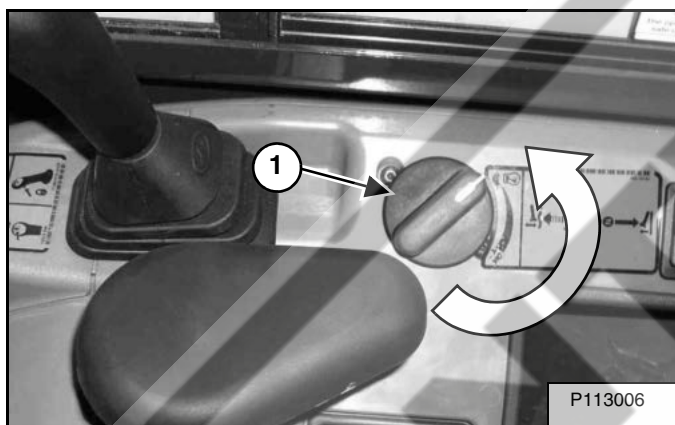
Procedure

Figure 95



Stop the machine on level ground. Lower the work equipment and the blade to the ground [Figure 95].

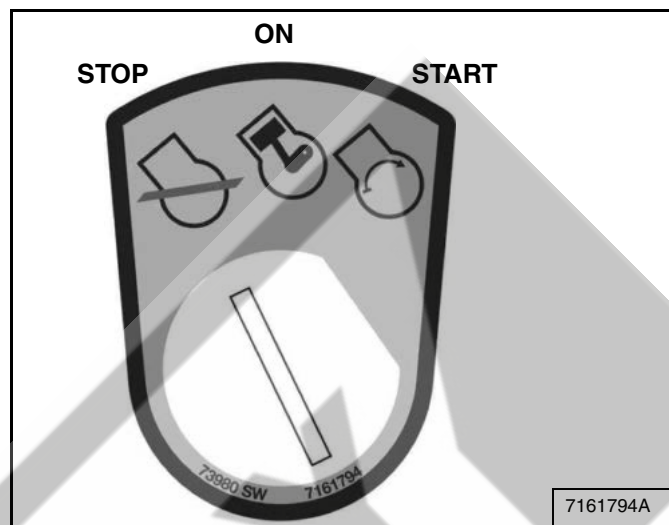
Figure 96



Rotate the engine speed control dial (Item 1) [Figure 96] anticlockwise to low idle.

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

Figure 97



Turn the switch to STOP [Figure 97].

Disconnect the seat belt. Remove the key from the switch (If Equipped) to prevent operation of machine by unauthorised personnel. Raise the control console and exit the machine.

ATTACHMENTS

Installing And Removing The Attachment (Pin-On Attachment)

Installation

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

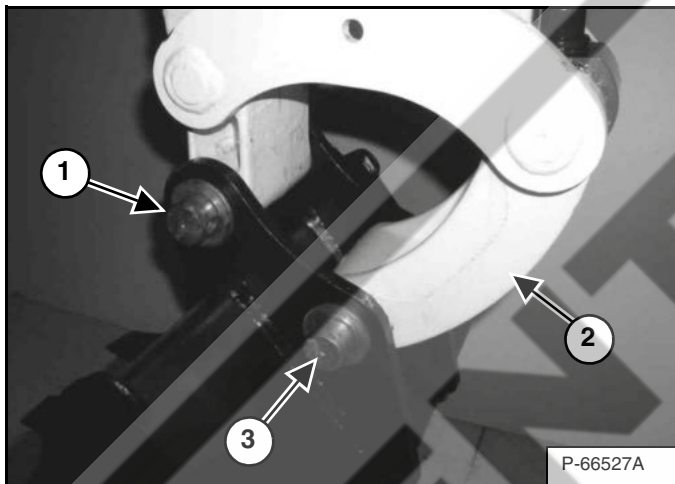
! WARNING

AVOID INJURY OR DEATH

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 98

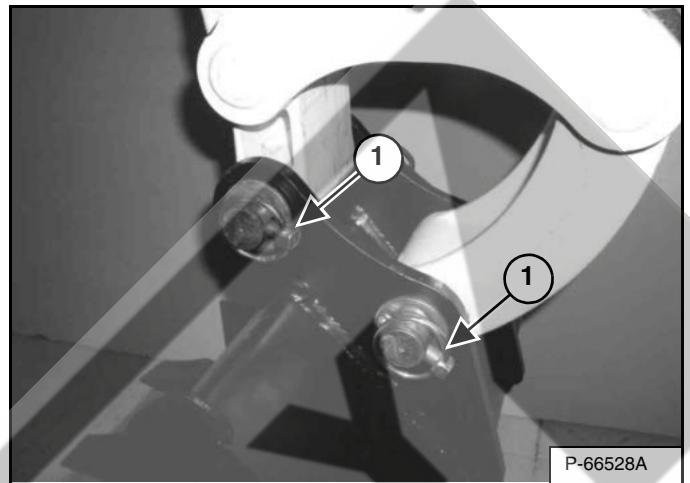


Install the arm into the bucket and align the mounting hole.

Install the pin (Item 1) [Figure 98] and washers.

Install the link (Item 2) in the bucket and align the mounting hole. Install the pin (Item 3) [Figure 98] and washers.

Figure 99



Install the two retainer pins (Item 1) [Figure 99]. Install grease in the grease fittings.

Removal

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

Remove the two retainer pins (Item 1) [Figure 99].

Remove the washers and pins (Items 1 and 3) [Figure 98].

Do not damage the dust seals in the arm.

! WARNING

AVOID INJURY OR DEATH

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

W-2052-0907

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Quick Coupler, Klac™ System)

Installation

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

! WARNING

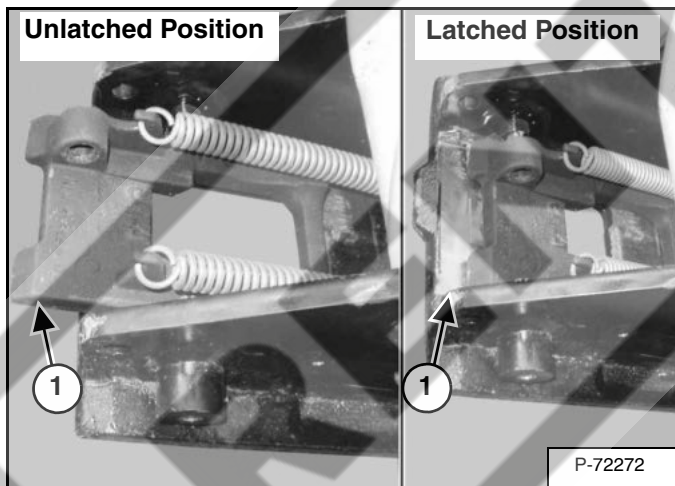
AVOID INJURY OR DEATH

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

W-2052-0907

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

Figure 100



Fully retract the bucket cylinder.

Stop the engine and exit the excavator.

Inspect the quick coupler to make sure the latch is in the unlatched position (Item 1) [Figure 100].

If in the latched position, see [Figure 101] for additional information.

If the latch is in the unlatched position, proceed to [Figure 102].

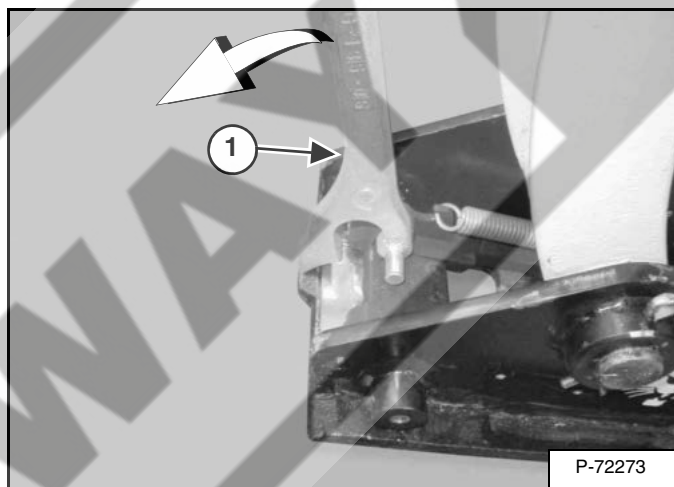
! WARNING

AVOID INJURY

Keep fingers and hands out of pinch points when latching and unlatching the attachment quick coupler.

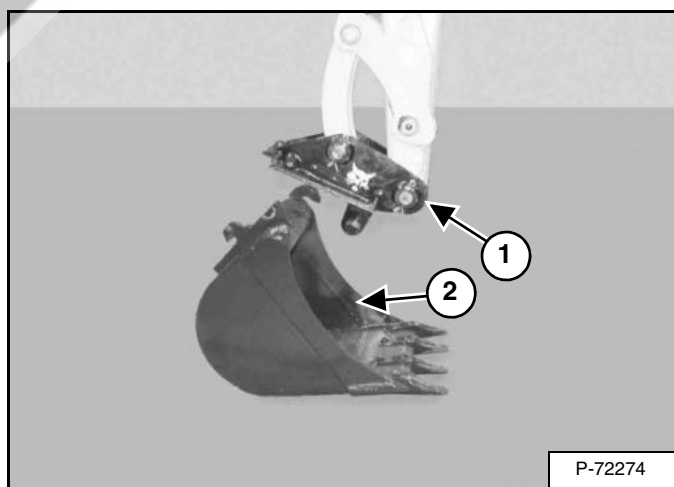
W-2541-1106

Figure 101



To unlatch the quick coupler, install the tool (Item 1) [Figure 101] and pull the handle. The latch will move completely forward. The latch will lock in the unlatched position.

Figure 102



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

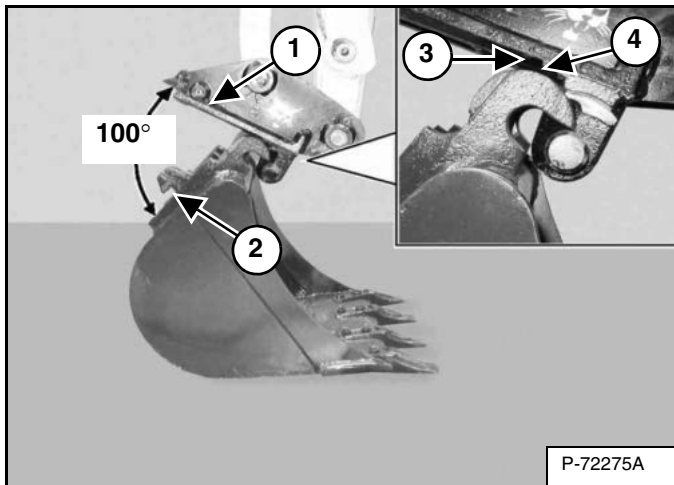
Position the quick coupler (Item 1) to the attachment (Item 2) [Figure 102].

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Quick Coupler, Klac™ System) (Cont'd)

Installation (Cont'd)

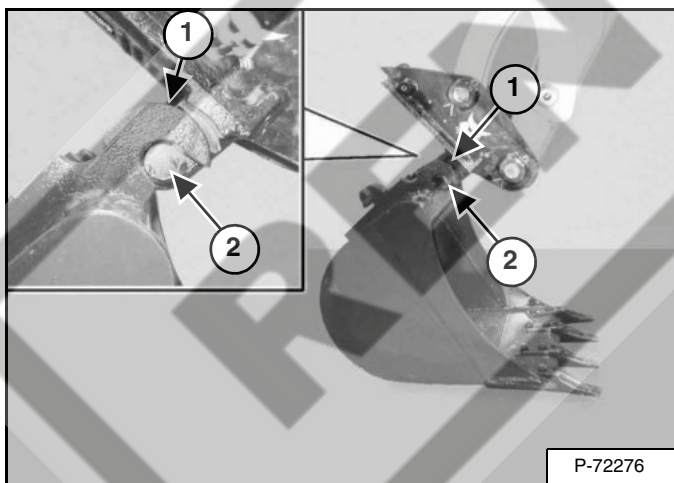
Figure 103



There must be at least 100° between the quick coupler surface (Item 1) and the attachment mounting surface (Item 2) [Figure 103]. Extend the arm out to get the required angle for proper installation.

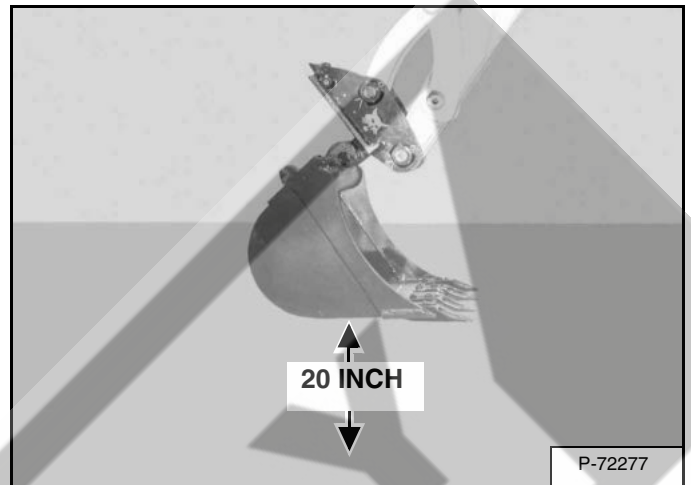
NOTE: There must be proper clearance (100° minimum) between the hook (Item 3) and the quick coupler (Item 4) [Figure 103]. Possible damage to the attachment hooks or the quick coupler could occur without proper clearance.

Figure 104



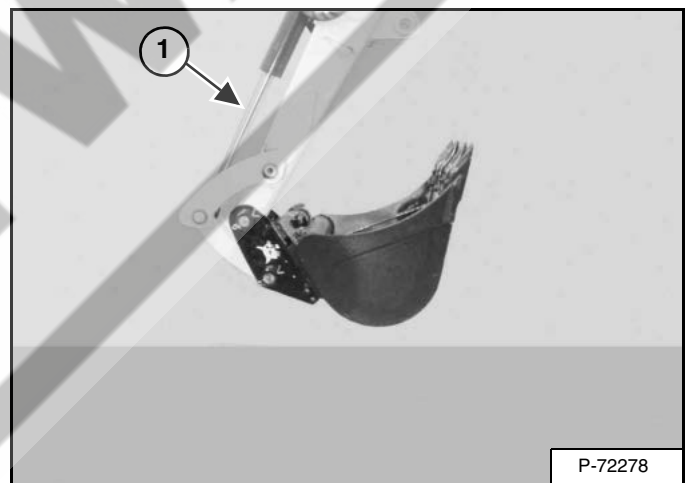
Raise the boom and extend the arm until the hooks of the attachment (Item 1) engage the pins (Item 2) of the quick coupler [Figure 104].

Figure 105



Raise the boom until there is approximately 500 mm (20.0 in) of clearance between the bottom of the attachment and the ground [Figure 105].

Figure 106



Extend the bucket cylinder (Item 1) [Figure 106] fully.

Lower the attachment until it is flat on the ground.

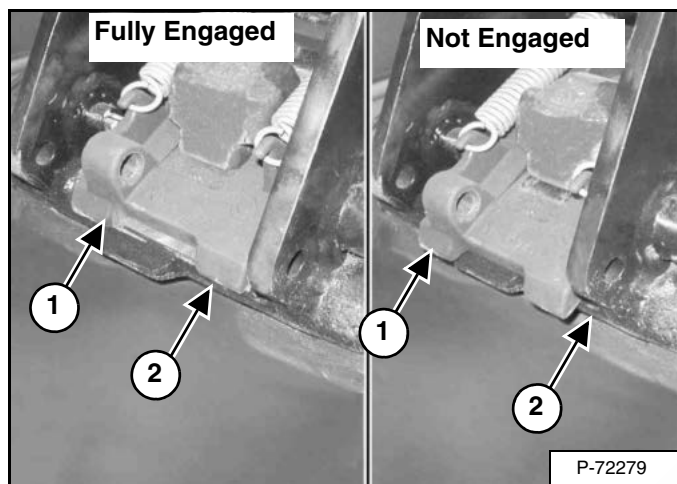
Stop the engine and exit the excavator.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Quick Coupler, Klac™ System) (Cont'd)

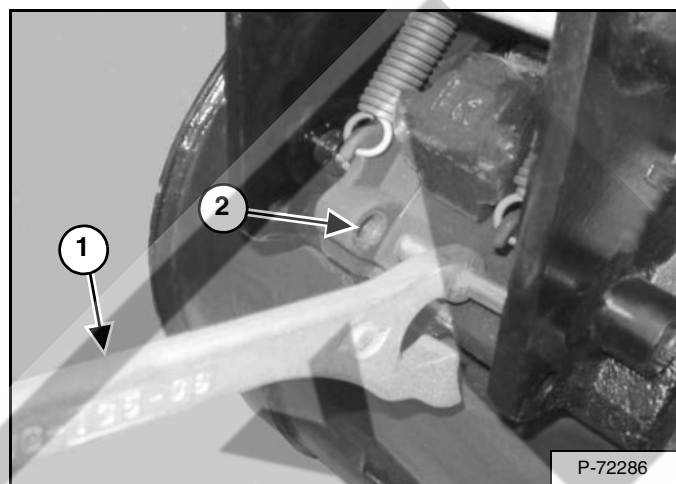
Installation (Cont'd)

Figure 107



Visually inspect the quick coupler latch (Item 1) to the bucket mount (Item 2) [Figure 107]. The latch must be fully engaged.

Figure 108



If the latch is not engaged, install the tool (Item 1) in the hole (Item 2) [Figure 108] of the quick coupler and push down to unlatch the quick coupler. Remove the tool. Enter the excavator, fasten the seat belt and start the engine. Raise the attachment 500 mm (20.0 in) off of the ground and fully extend the bucket cylinder. Lower the attachment until it is flat on the ground. Stop the engine and exit the excavator.

Again, visually inspect the quick coupler to make sure the latch (Item 1) [Figure 107] is fully engaged. If it is not fully engaged, remove the attachment and inspect both the quick coupler and the attachment for damage or debris. (See Inspection And Maintenance on Page 176.)

WARNING

AVOID INJURY

Keep fingers and hands out of pinch points when latching and unlatching the attachment quick coupler.

W-2541-1106

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Quick Coupler, Klac™ System) (Cont'd)

Removal

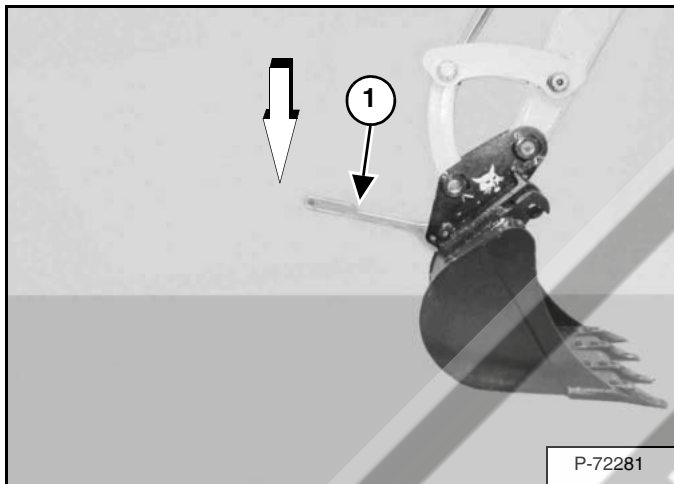
! WARNING

AVOID INJURY

Keep fingers and hands out of pinch points when latching and unlatching the attachment quick coupler.

W-2541-1106

Figure 109



Position the attachment flat on the ground.

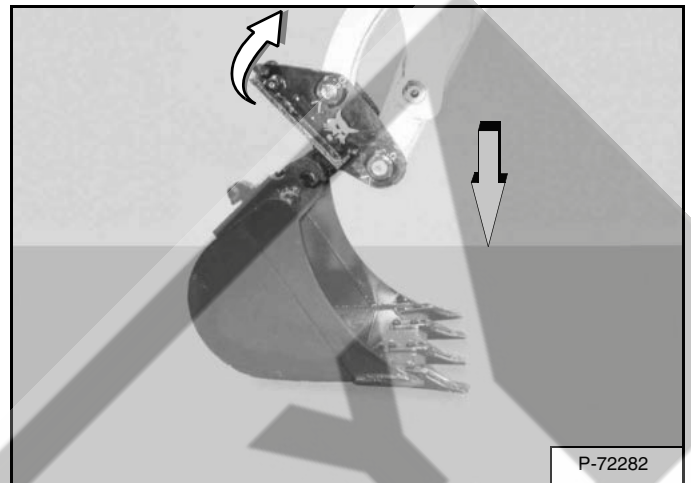
Install the quick coupler tool (Item 1) into the hole (Item 2) [Figure 108] in the quick coupler.

Push down on the tool (Item 1) [Figure 109] to unlock the latch.

Remove the tool.

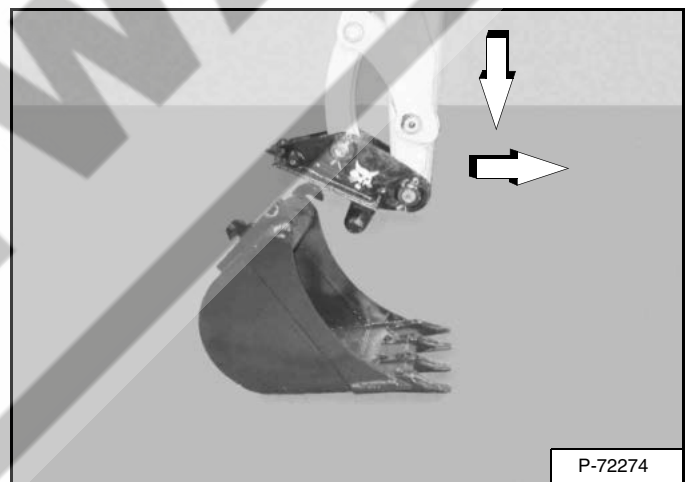
Enter the excavator, fasten the seat belt and start the engine.

Figure 110



Retract the bucket cylinder fully and lower the boom [Figure 110] until the attachment is on the ground.

Figure 111



Continue to lower the boom and move the arm towards the excavator until the quick coupler is clear of the attachment [Figure 111].

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (German Style Coupler)

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

To determine the lift capacity changes;

For the rated lift capacity charts, (See Rated Lift Capacity (Canopy - Standard Arm) on Page 206.), (See Rated Lift Capacity (Canopy - Standard Arm With Additional Counterweight) on Page 207.) (See Rated Lift Capacity (Canopy - Long Arm) on Page 208.), (See Rated Lift Capacity (Cab - Standard Arm) on Page 209.), (See Rated Lift Capacity (Cab - Standard Arm With Additional Counterweight) on Page 210.), or (See Rated Lift Capacity (Cab - Long Arm) on Page 211.)

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

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

Installation

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

Figure 112



Position the arm and quick coupler to the attachment [Figure 112].

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

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

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (German Style Coupler) (Cont'd)

Installation (Cont'd)

Figure 113

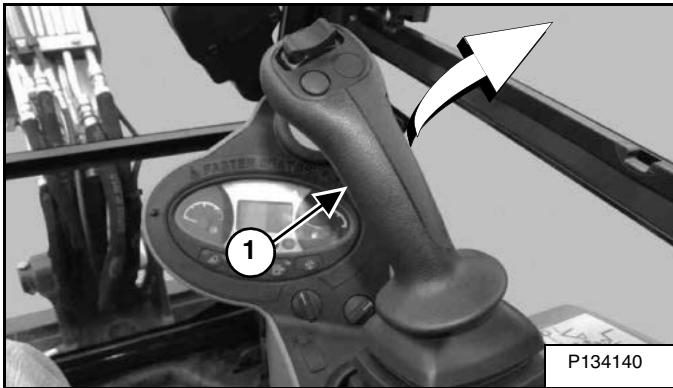
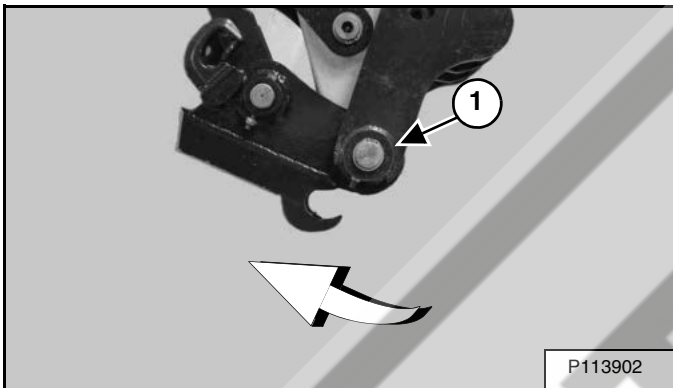


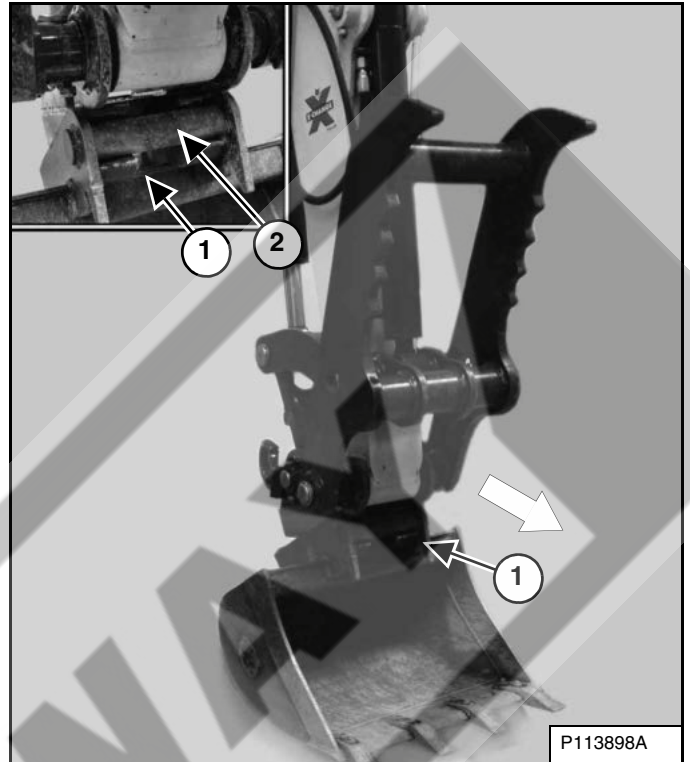
Figure 114



Move the right joystick (Item 1) [Figure 113] to the right (OUT) and curl the coupler (Item 1) [Figure 114] back away from the cab fully.

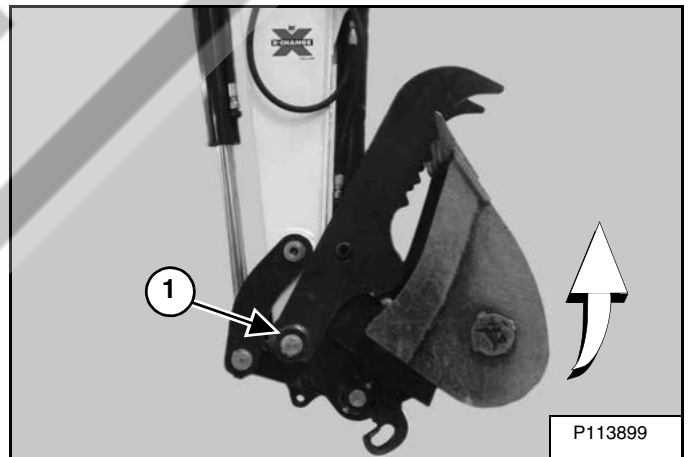
Lower the coupler onto the attachment.

Figure 115



Engage the coupler hooks (Item 1) onto the attachment shaft (Item 2) [Figure 115].

Figure 116



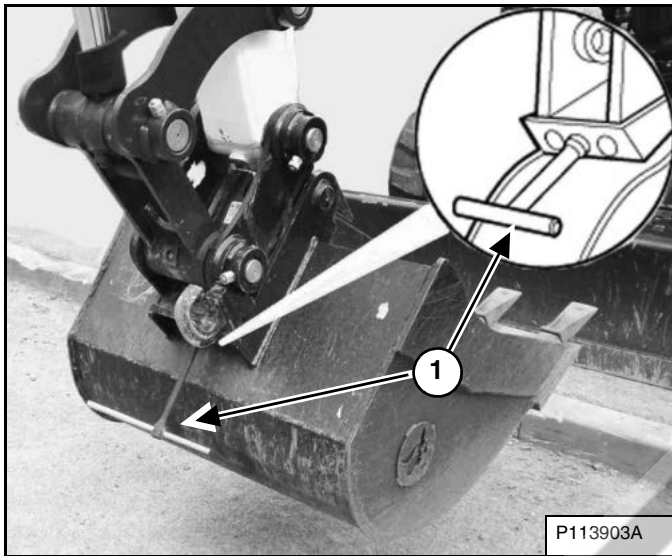
Move the right joystick (Item 1) [Figure 113] to the left (IN) and curl the coupler (Item 1) [Figure 116] toward the cab fully.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (German Style Coupler) (Cont'd)

Installation (Cont'd)

Figure 117



Stop the engine and leave the machine. (See STOPPING THE ENGINE AND LEAVING THE EXCAVATOR on Page 75.)

Use the supplied wrench (Item 1) [Figure 117] and turn the wrench clockwise until the locking pins fully engaged.

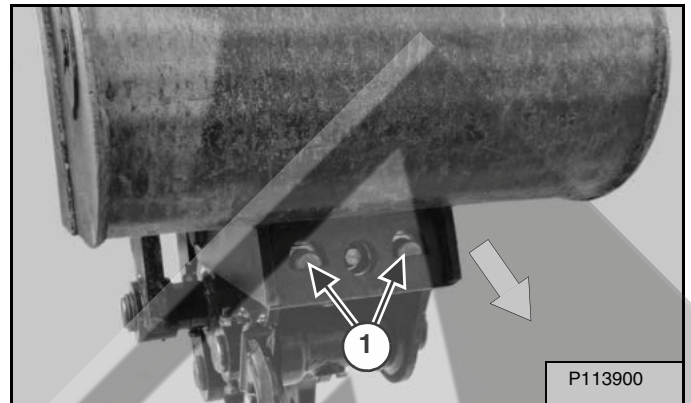
WARNING

AVOID INJURY OR DEATH

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

W-3023-0417

Figure 118



Visually check that the locking pins (Item 1) [Figure 118] are extended through the holes in the attachment mounting frame, securely fastening the attachment to the coupler.

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



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

Enter the excavator, fasten the seat belt and start the engine. (See PRE-STARTING PROCEDURE on Page 67.)

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

Lower the attachment flat to the ground.

Park the excavator on a level surface.

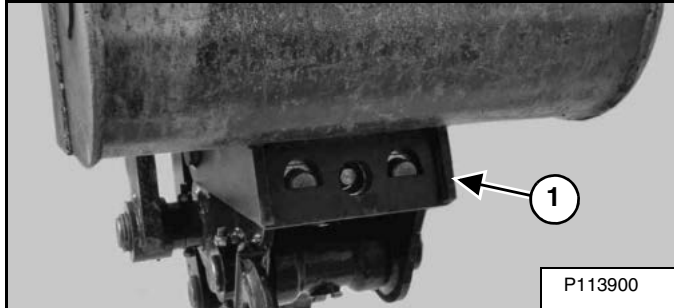
ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (German Style Coupler) (Cont'd)

Removal

Enter the excavator, fasten the seat belt and start the engine. (See PRE-STARTING PROCEDURE on Page 67.)

Figure 119

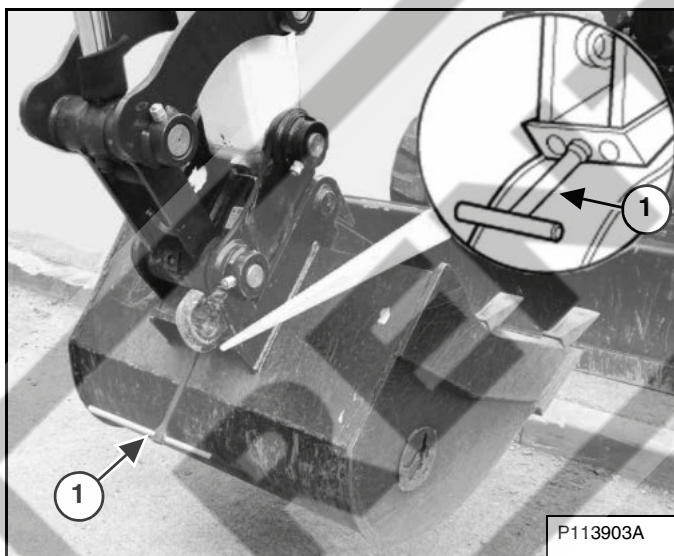


Raise the boom.

Move the right joystick (Item 1) [Figure 113] to the left (IN) and curl the coupler (Item 1) [Figure 119] toward the cab fully.

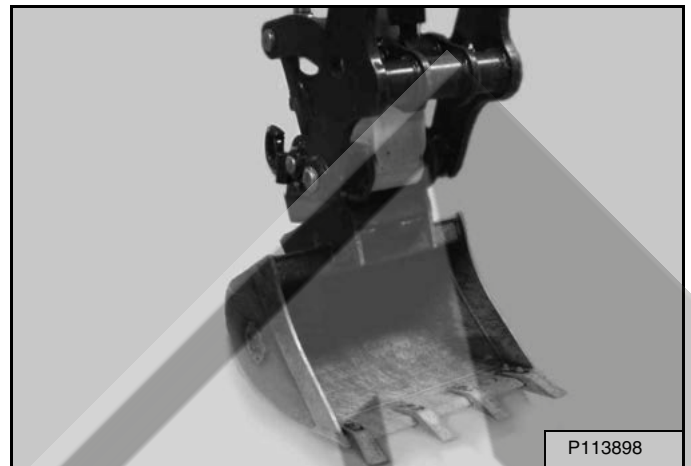
Stop the engine and exit the excavator. (See STOPPING THE ENGINE AND LEAVING THE EXCAVATOR on Page 75.)

Figure 120



Use the supplied wrench (Item 1) [Figure 120] and turn the wrench anticlockwise until the locking pins are fully disengaged.

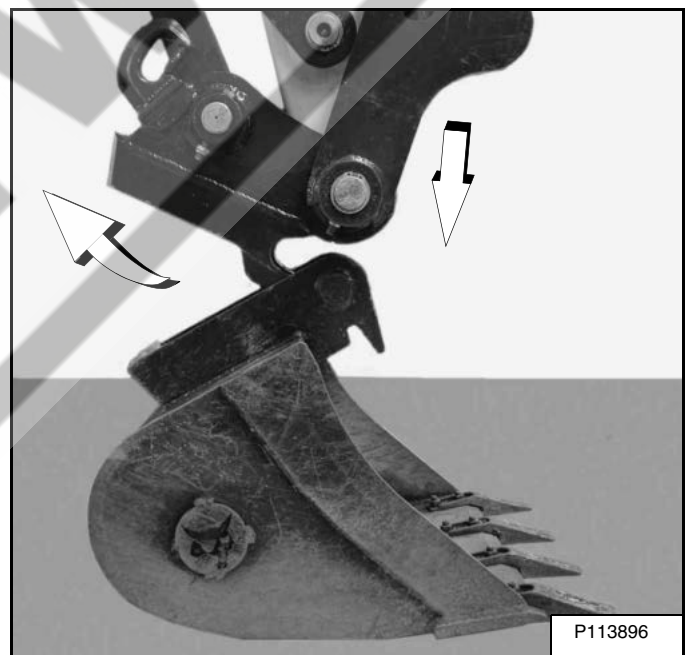
Figure 121



Enter the excavator, fasten the seat belt and start the engine. (See PRE-STARTING PROCEDURE on Page 67.)

With the attachment slightly off of the ground, roll the quick coupler back until the coupler starts to disengage from the attachment [Figure 121].

Figure 122



Roll the quick coupler back fully and lower the boom and arm until the attachment is on the ground and the quick coupler is disengaged from the attachment pins [Figure 122].

Move the arm away from the attachment.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Bobcat Hydraulic Quick Coupler)

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

To determine the lift capacity changes;

For the rated lift capacity charts, (See Rated Lift Capacity (Canopy - Standard Arm) on Page 206.), (See Rated Lift Capacity (Canopy - Standard Arm With Additional Counterweight) on Page 207.) (See Rated Lift Capacity (Canopy - Long Arm) on Page 208.), (See Rated Lift Capacity (Cab - Standard Arm) on Page 209.), (See Rated Lift Capacity (Cab - Standard Arm With Additional Counterweight) on Page 210.), or (See Rated Lift Capacity (Cab - Long Arm) on Page 211.).

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

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

Installation

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

Figure 123



Position the arm and quick coupler to the attachment [Figure 123].

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



WARNING

AVOID INJURY OR DEATH

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

W-2052-0907



WARNING

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

Start the engine. (See PRE-STARTING PROCEDURE on Page 67.)

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Bobcat Hydraulic Quick Coupler) (Cont'd)

Installation (Cont'd)



AVOID INJURY OR DEATH

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

W-3024-0417

Figure 124

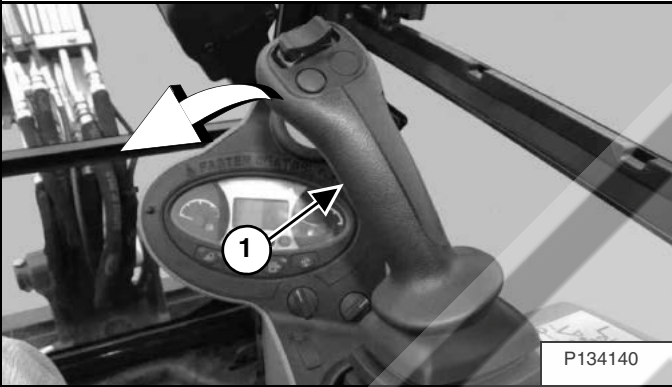
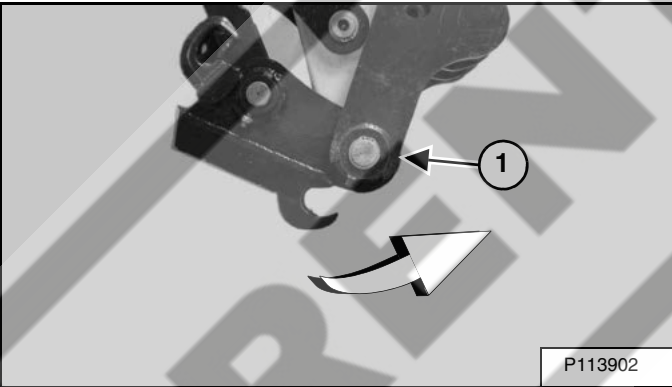
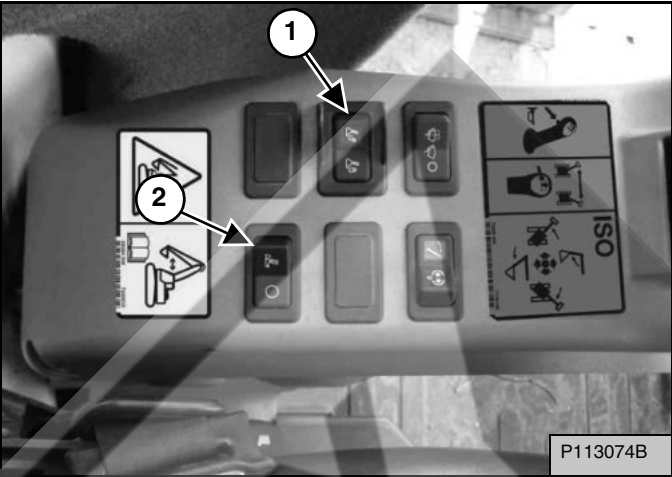


Figure 125



Move the right joystick (Item 1) [Figure 124] to the left (IN) and curl the coupler (Item 1) [Figure 125] toward the cab fully.

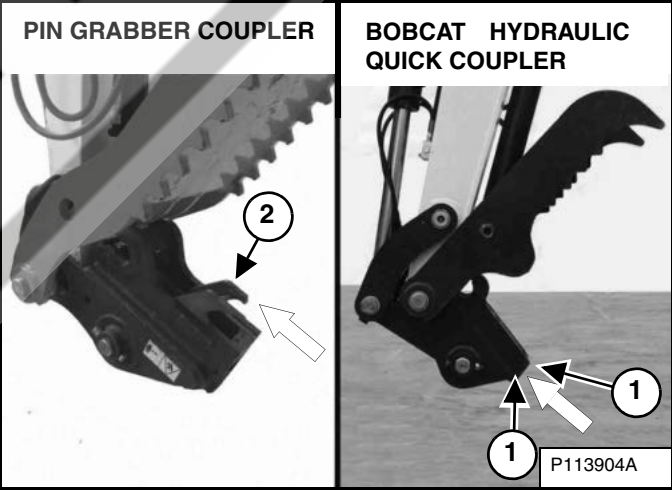
Figure 126



Press the coupler ON / OFF switch (Item 1) [Figure 126] to the left (ON) position to enable the quick coupler feature. The switch will illuminate when in the ON position and a buzzer will sound.

While holding the right joystick (Item 1) [Figure 124] to the left (IN), press and release the INTENT switch (Item 2) within five seconds after pressing the ON / OFF switch (Item 1). (The buzzer will continue to sound and the light (Item 1) [Figure 126] will stay ON.)

Figure 127



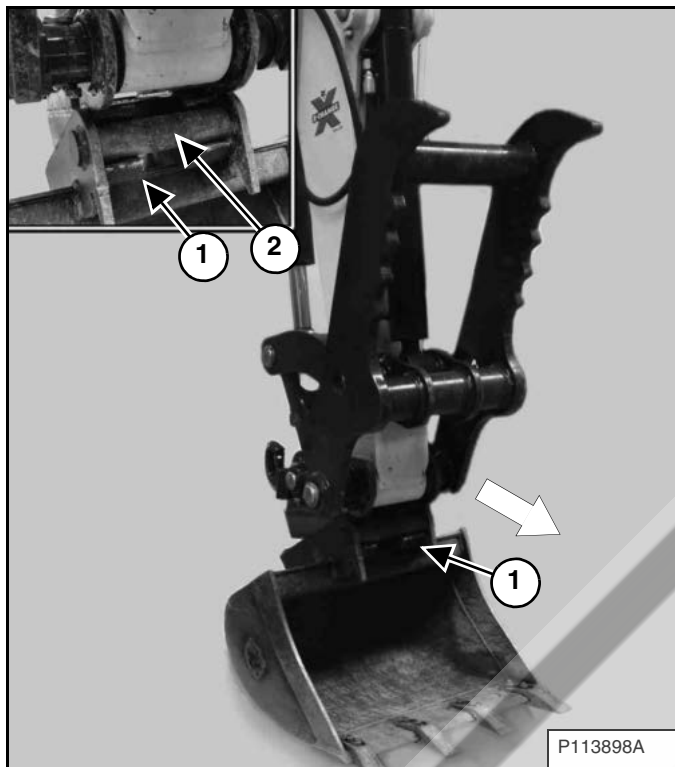
Continue holding the right joystick (Item 1) [Figure 124] to the left (IN) until the pins (Item 1) [Figure 127] are fully retracted or the locking clasp (Item 2) [Figure 127] is fully retracted.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Bobcat Hydraulic Quick Coupler) (Cont'd)

Installation (Cont'd)

Figure 128



Roll the coupler out. Move the arm toward the attachment. Reposition the boom, arm and coupler until the coupler (Item 1) is position over the attachment pin (Item 2) [Figure 128]. Raise the attachment up slightly.

Figure 129



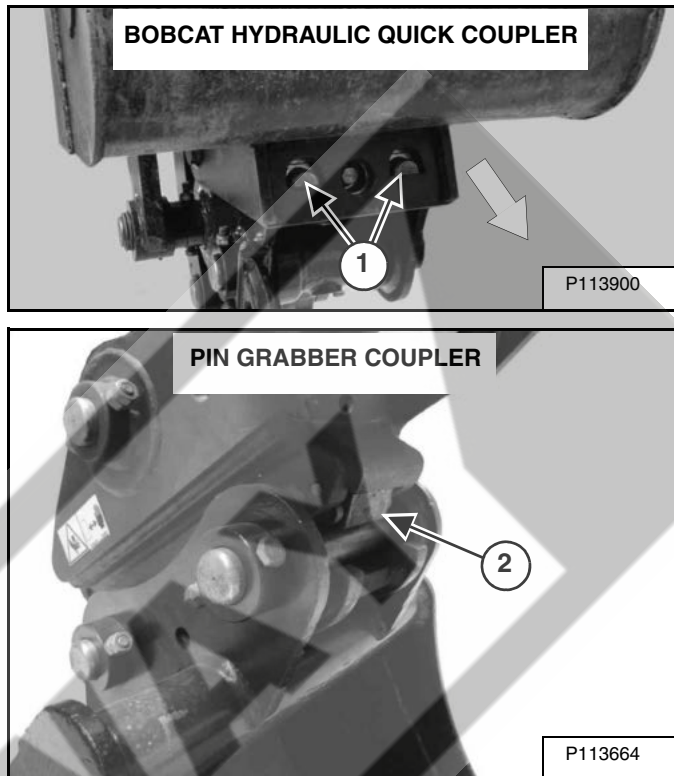
Curl the quick coupler in fully [Figure 129].

Press the coupler ON / OFF switch (Item 1) [Figure 126] to the right, (OFF) position. The switch light and buzzer will turn OFF.

For the Hydraulic German Style Coupler, The locking pins will extend and engage the attachment mount locking the attachment to the coupler.

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

Figure 130



For the Hydraulic German Style Coupler, Visually check that the locking pins (Item 1) [Figure 130] are extended through the holes in the attachment mounting frame, securely fastening the attachment to the coupler.

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

For the Pin Grabber Quick Coupler, Visually check that the green locking clasp (Item 2) [Figure 130] is FULLY ENGAGED AND LOCKED, securely fastening the attachment to the coupler.

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

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

Lower the attachment flat to the ground.

WARNING

AVOID INJURY OR DEATH

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

W-3024-0417

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Bobcat Hydraulic Quick Coupler) (Cont'd)

Removal

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

! WARNING

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

W-2119-0910

Enter the excavator and start the engine. (See PRE-STARTING PROCEDURE on Page 67.)

Figure 131

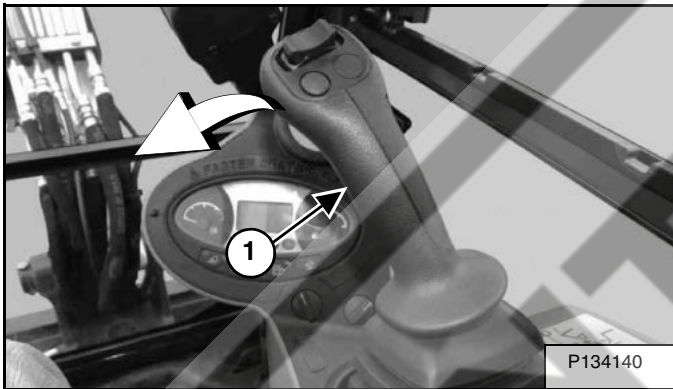
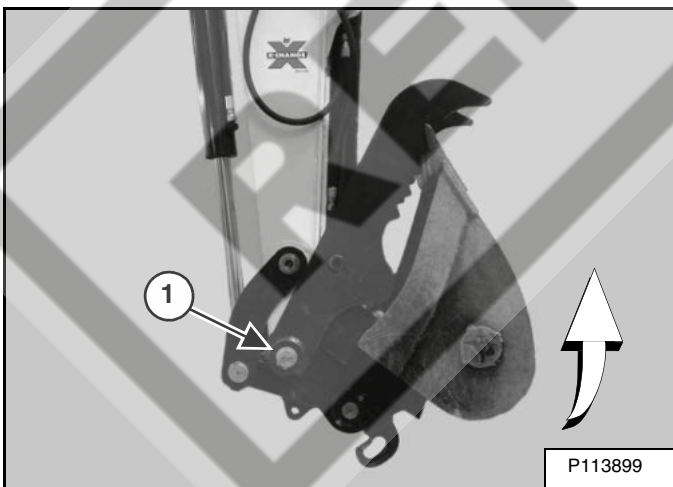


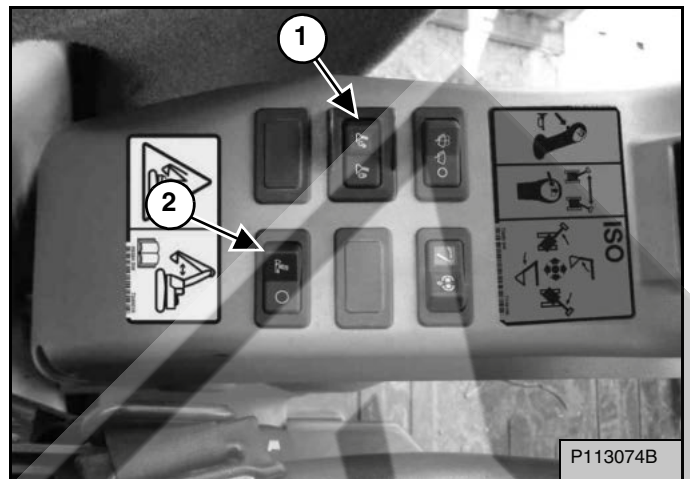
Figure 132



Raise the attachment slightly off of the ground.

Move the right joystick (Item 1) [Figure 131] to the left (IN) and curl the quick coupler (Item 1) [Figure 132] fully.

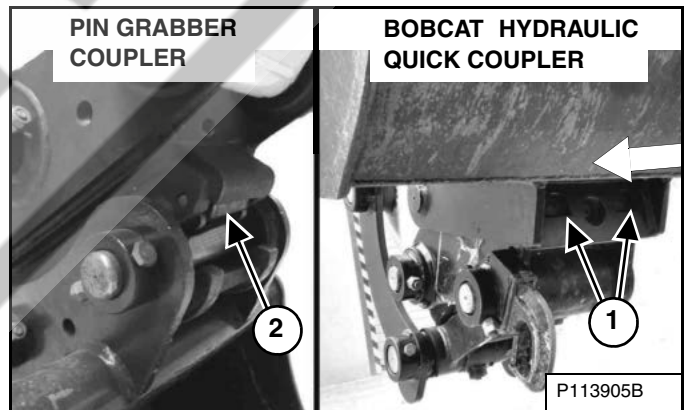
Figure 133



Press the coupler ON / OFF switch (Item 1) [Figure 133] to the left (ON) position to enable the quick coupler feature. The switch will illuminate when in the ON position and a buzzer will sound.

While holding the right joystick (Item 1) [Figure 131] to the left (IN), press and release the INTENT switch (Item 2) within five seconds after pressing the ON/OFF switch (Item 1). (The buzzer will continue to sound and the light (Item 1) [Figure 133] will stay ON.)

Figure 134



For the Hydraulic German Style Coupler, Continue holding the right joystick (Item 1) [Figure 131] to the left (IN) until the pins (Item 1) [Figure 134] are fully retracted to unlock the attachment from the quick coupler.

For the Pin Grabber Quick Coupler, Continue holding the right joystick (Item 1) [Figure 131] to the left (IN) until the green locking clasp (Item 2) [Figure 134] retracts and will unlock the attachment from the quick coupler.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Bobcat Hydraulic Quick Coupler) (Cont'd)

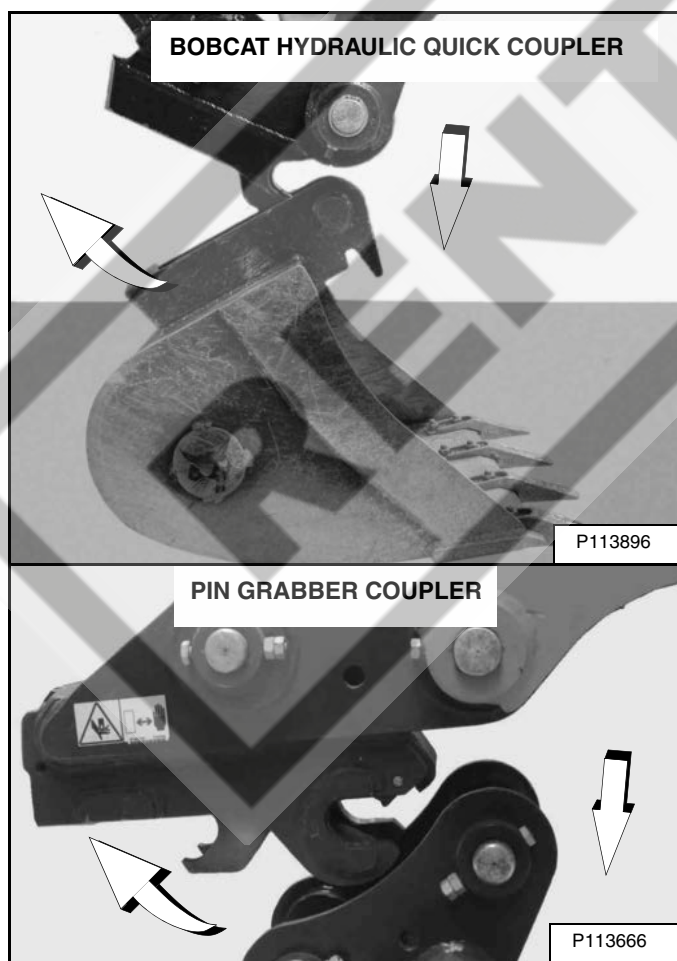
Removal (Cont'd)

Figure 135



With the attachment slightly off of the ground, roll the quick coupler back until the coupler starts to disengage from the attachment [Figure 135].

Figure 136

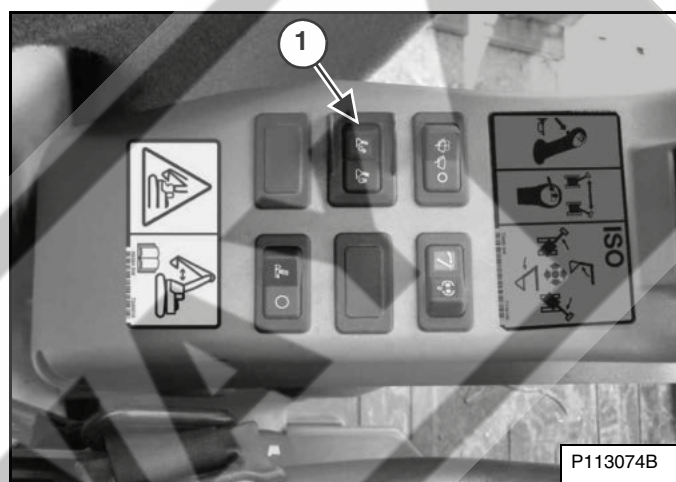


Roll the quick coupler back fully.

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

Move the arm away the excavator until the quick coupler is clear of the attachment [Figure 136].

Figure 137



Press the coupler ON / OFF switch (Item 1) [Figure 137] to the right, (OFF) position. The switch light and buzzer will turn OFF.

OPERATING PROCEDURE

Inspect The Work Area

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

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

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

Always check ground conditions before starting your work:

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

Basic Operating Instructions

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

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

IMPORTANT

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

I-2015-0284

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

Operating Near An Edge Or Water

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

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

Lowering The Work Equipment (Engine STOPPED)

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

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

Use the control lever to lower the boom.

Figure 138



The joystick lock switch disengages the hydraulic control functions from the joysticks when the console are raised [Figure 138].

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

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

Use the control lever to lower the boom.

Lower the control console to engage the hydraulic control functions of the joysticks [Figure 138].

OPERATING PROCEDURE (CONT'D)

Object Handling With The Lifting Device

The excavator must be equipped with the optional lift eye link (Item 1) [Figure 140], the boom and arm load hold valves and the overload warning device option. See your Bobcat dealer for available Kits.

WARNING

AVOID INJURY OR DEATH

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

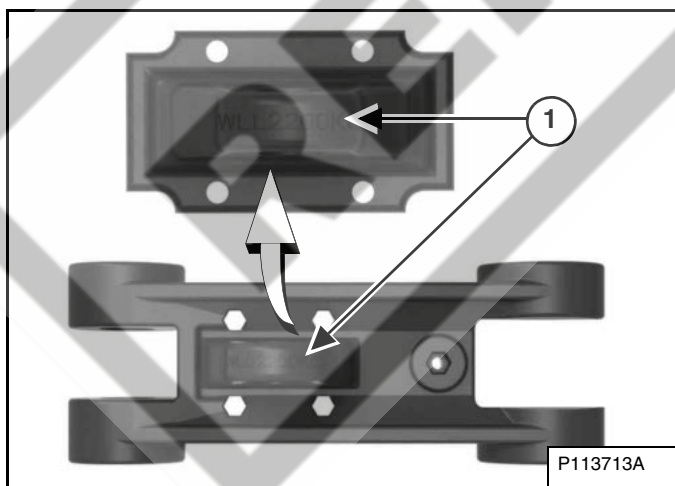
W-2991-0714

NOTE: The lifting device maybe present on the attachment quick coupler. Always use for object handling, only couplers with the lifting device of sufficient capacity (Rated Lift Load).

Do not exceed the machine's Rated Lift Capacity or the Rated Lift Load (RLL) of the lifting device (lift eye). (See Rated Lift Capacity (Canopy - Standard Arm) on Page 206.), (See Rated Lift Capacity (Canopy - Standard Arm With Additional Counterweight) on Page 207.), (See Rated Lift Capacity (Canopy - Long Arm) on Page 208.), (See Rated Lift Capacity (Cab - Standard Arm) on Page 209.), (See Rated Lift Capacity (Cab - Standard Arm With Additional Counterweight) on Page 210.) or (See Rated Lift Capacity (Cab - Long Arm) on Page 211.).

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

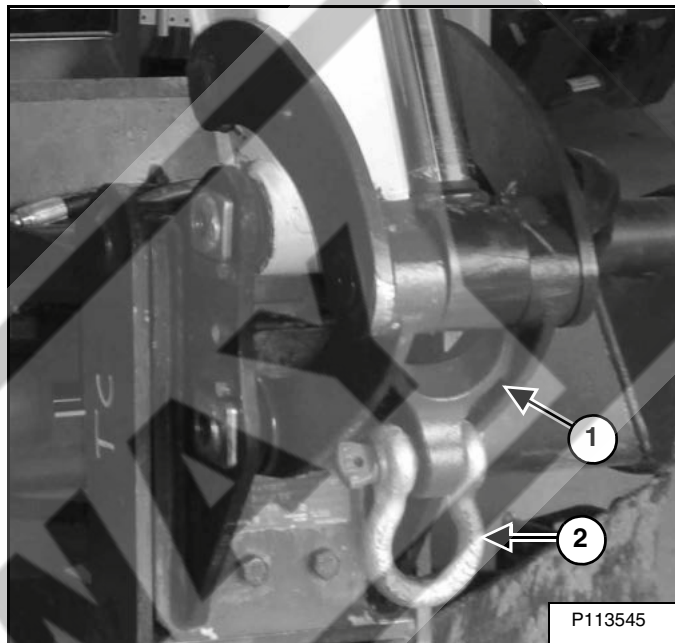
Figure 139



The maximum RLL (Item 1) [Figure 139] is shown on the lifting device.

Extend the bucket cylinder completely and lower the boom to the ground. Stop the engine. Exit the excavator. (See STOPPING THE ENGINE AND LEAVING THE EXCAVATOR on Page 75.)

Figure 140



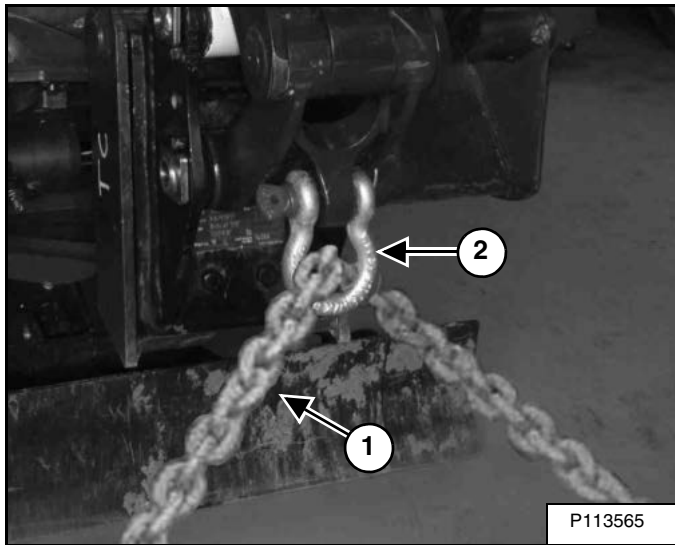
Install the clevis (Item 2) through the lift eye (Item 1) [Figure 140].

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

OPERATING PROCEDURE (CONT'D)

Object Handling With The Lifting Device (Cont'd)

Figure 141

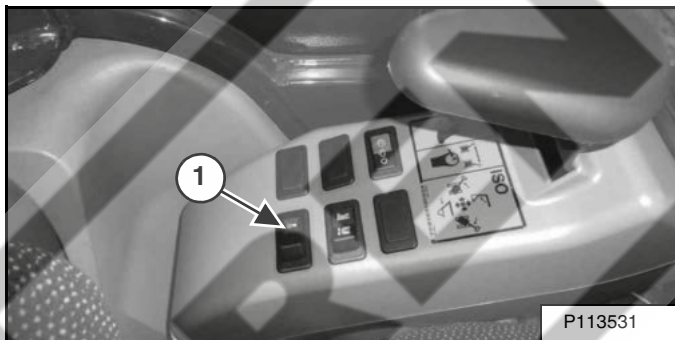


Install a lift chain (Item 1) (or other type of lifting device) through the clevis (Item 2) [Figure 141] and connect to the object to be lifted.

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

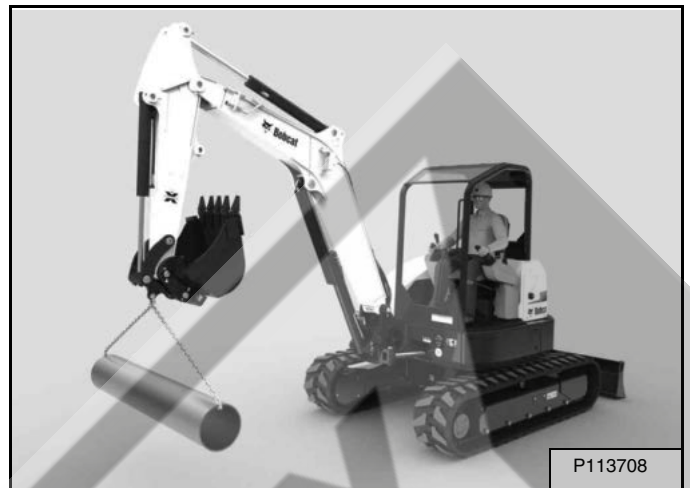
Enter the excavator, fasten the seat belt and start the engine. (See PRE-STARTING PROCEDURE on Page 67.)

Figure 142



Press the switch (Item 1) [Figure 142] to the left to activate the overload warning device.

Figure 143



Make sure the load is evenly weighted and centred on the lifting chain (or other type of lifting device), and is secured to prevent the load from shifting [Figure 143].

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

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

OPERATING PROCEDURE (CONT'D)

Lift Capacity

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



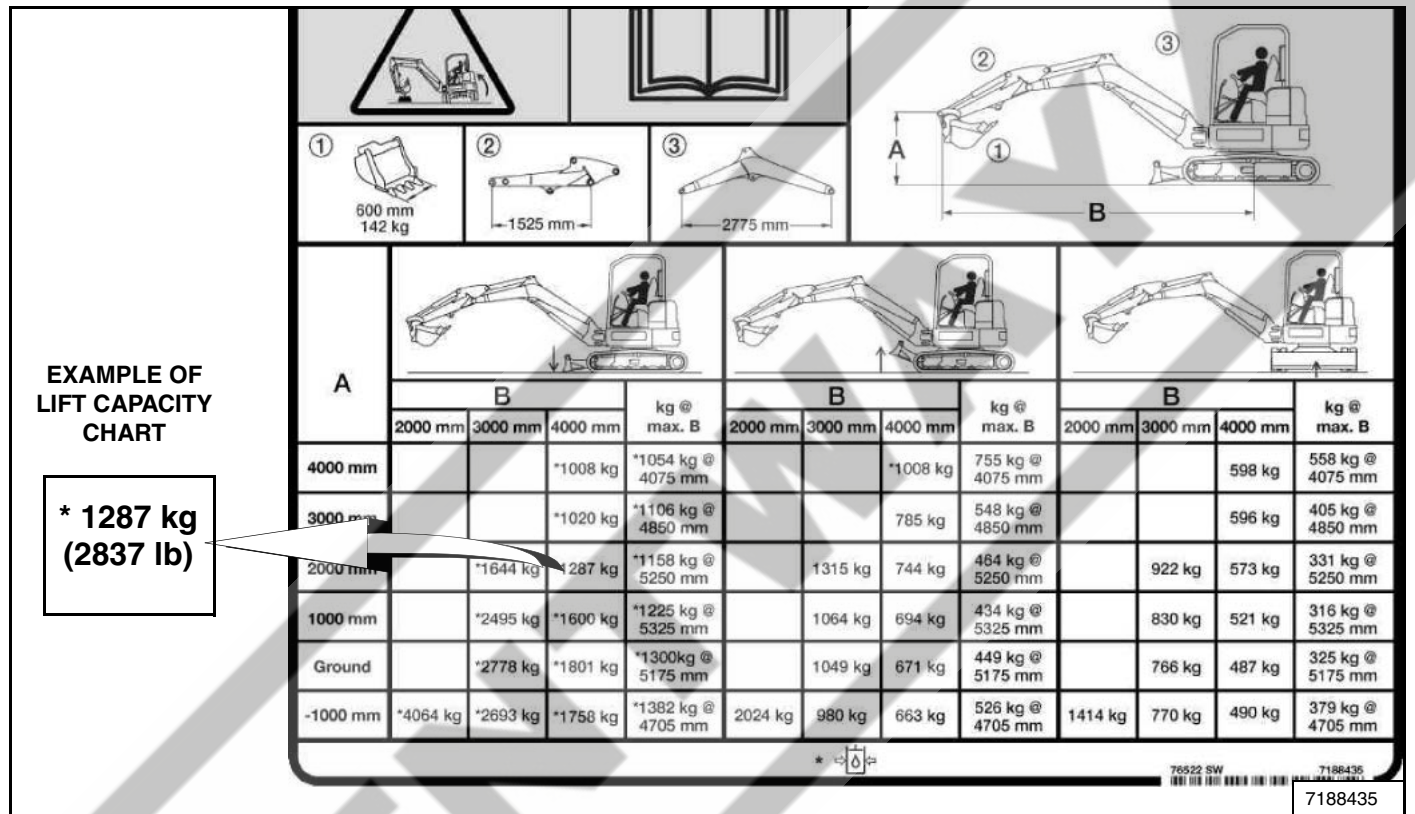
WARNING

AVOID INJURY OR DEATH

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

W-2374-0500

Figure 144



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

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

Standard Bucket = 142 kg (313 lb)

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

- Bobcat Hydraulic Quick Coupler = 65 kg (143 lb)
- Klac Quick Coupler = 43 kg (95 lb)
- German Style Coupler = 35 kg (77 lb)
- Hydraulic Clamp And Cylinder = 86 kg (190 lb)
- Optional Buckets and Attachments (See NOTE below)

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

OPERATING PROCEDURE (CONT'D)

Lift Capacity (Cont'd)

The following is an example for determining the lift capacity using the sample chart shown above **[Figure 144]**.

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

1. Obtain Lift Capacity from Chart: 1287 kg (2837 lb)
2. Subtract the difference between the weight of the standard configuration (Standard Bucket) and optional equipment which in this case is the Hydraulic Clamp.

Hydraulic Clamp and Cylinder: 86 kg (190 lb)

3. Calculate actual Lift Capacity for machine as configured:

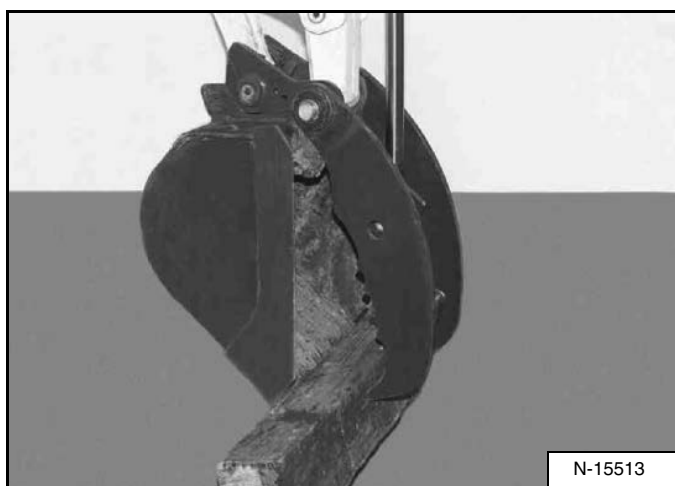
1287 kg (2837 lb) (lift capacity) - 86 kg (190 lb) (hydraulic clamp and cylinder) = 1201 kg (2647 lb)

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

OPERATING PROCEDURE (CONT'D)

Using The Clamp

Figure 145



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

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

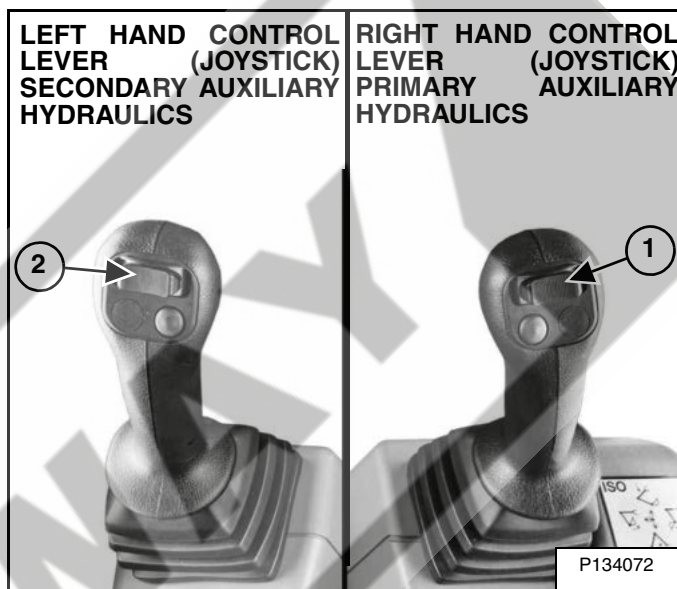
The lift capacities are reduced by 86 kg (190 lb) if the excavator is equipped with the optional lifting clamp.

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

When Using Primary Auxiliary Hydraulics To Activate Clamp

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

Figure 146



Move the switch (Item 1) [Figure 146] on the right control lever to the right to open the clamp. Move the switch to the left to close the clamp.

When Using Secondary Auxiliary Hydraulics To Activate Clamp

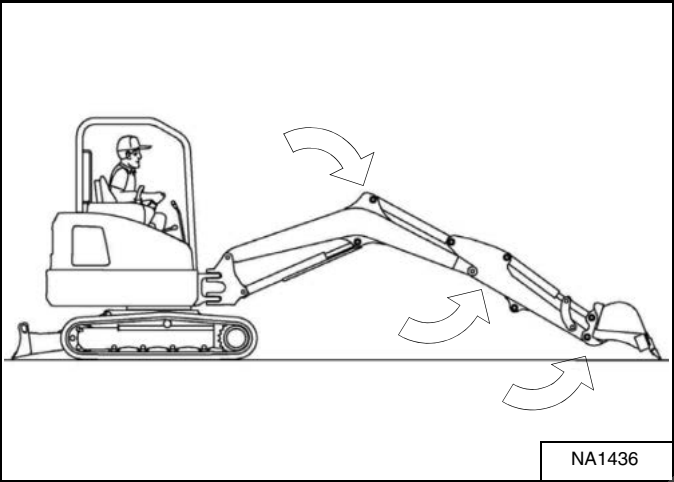
Move the switch (Item 2) [Figure 146] on the left control lever to the left open the clamp. Move the switch to the right to close the clamp.

OPERATING PROCEDURE (CONT'D)

Excavating

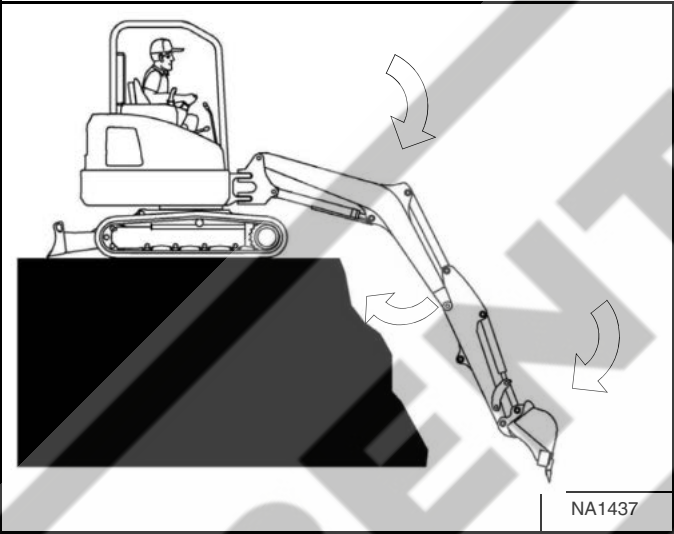
Lower the blade to increase digging performance.

Figure 147



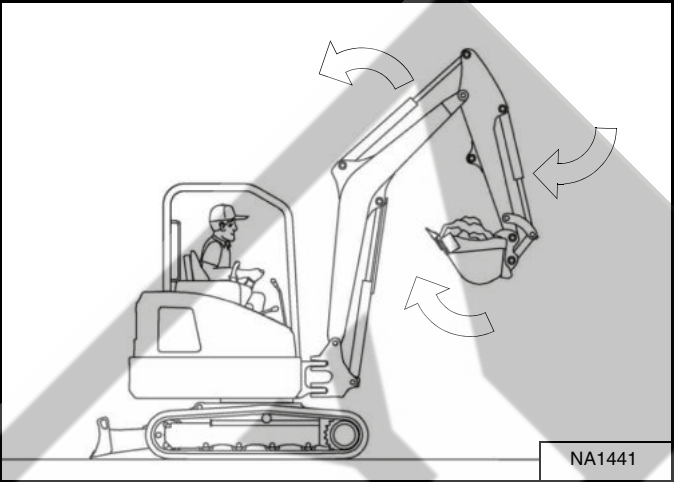
Extend the arm, lower the boom, and open the bucket [Figure 147].

Figure 148



Retract the arm, while lowering boom and curling the bucket [Figure 148].

Figure 149



Raise the boom, retract the arm and curl the bucket [Figure 149].

Rotate the upperstructure.

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

**WARNING**

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

W-2119-0910

**WARNING**

AVOID INJURY OR DEATH

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

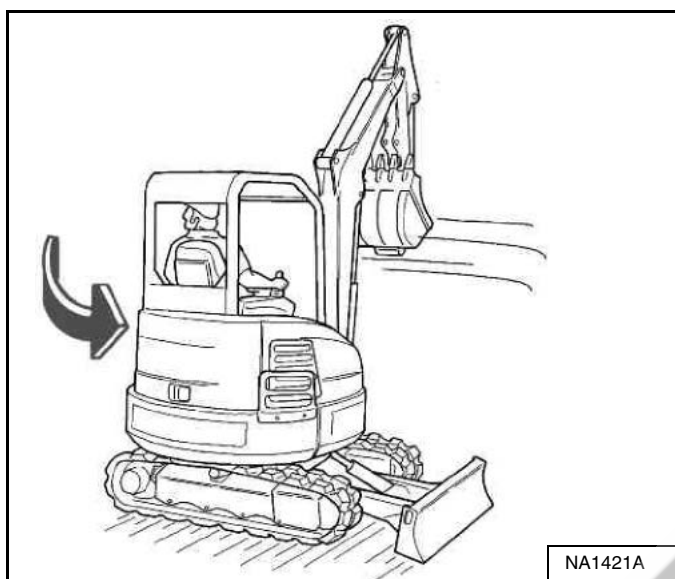
VOLTAGE	MINIMUM DISTANCE
up to 50 kV	3 m (10 ft)
beyond 50 kV	5 m (17 ft)

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OPERATING PROCEDURE (CONT'D)

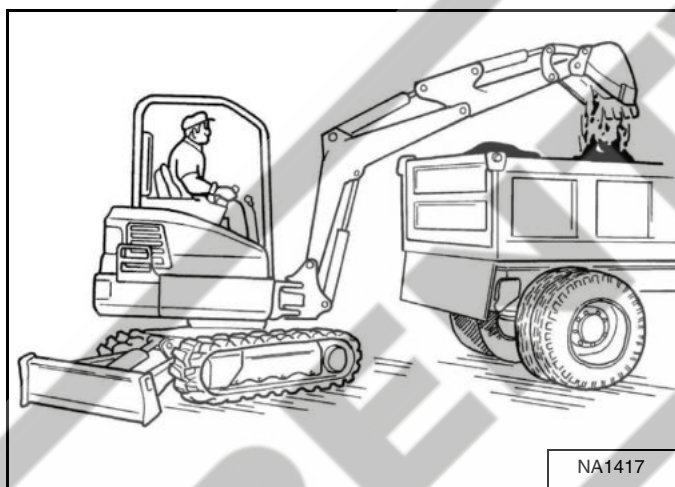
Excavating (Cont'd)

Figure 150



Look in the direction of rotation and make sure there are no bystanders in the work area before rotating the upperstructure [Figure 150].

Figure 151



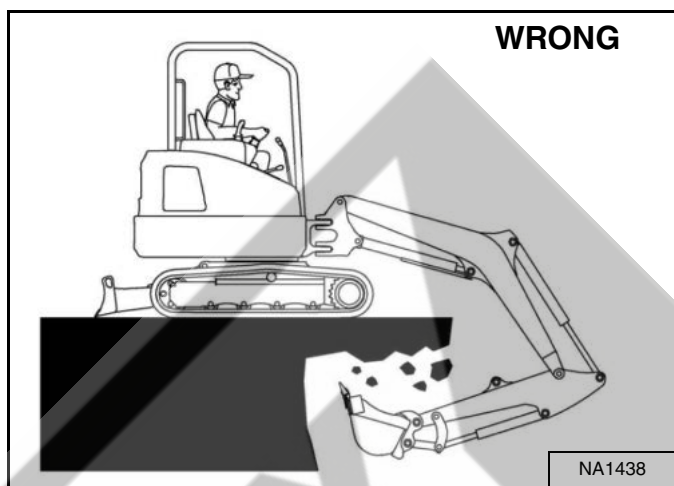
Extend the arm and uncurl the bucket to dump the material into a pile or truck [Figure 151].

IMPORTANT

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

I-2220-0503

Figure 152



Do not dig under the excavator [Figure 152].

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

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

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

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

OPERATING PROCEDURE (CONT'D)

Boom Swing

Figure 153

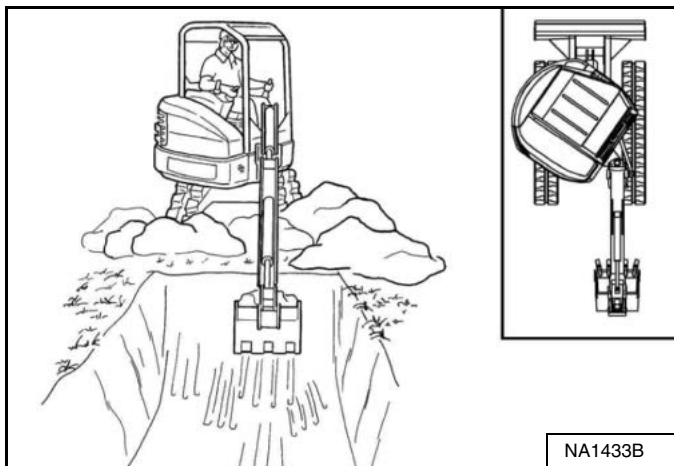


Figure 154

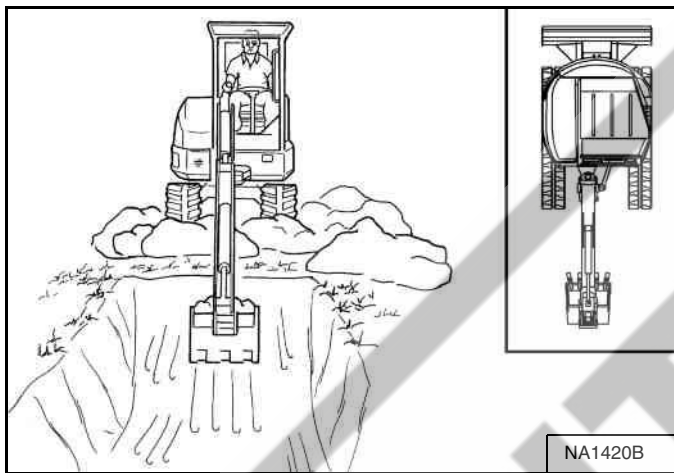
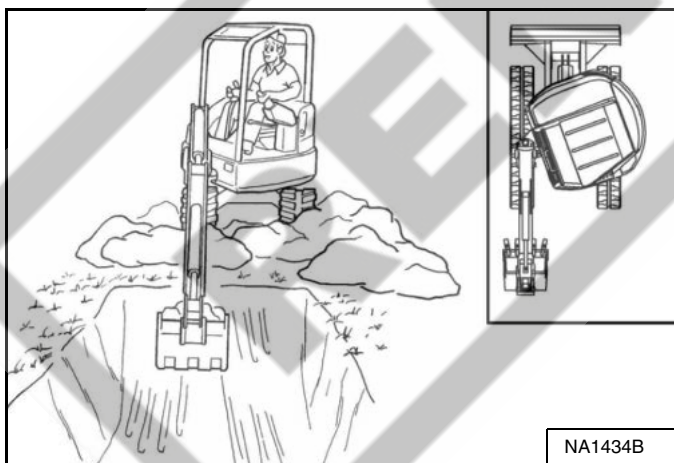
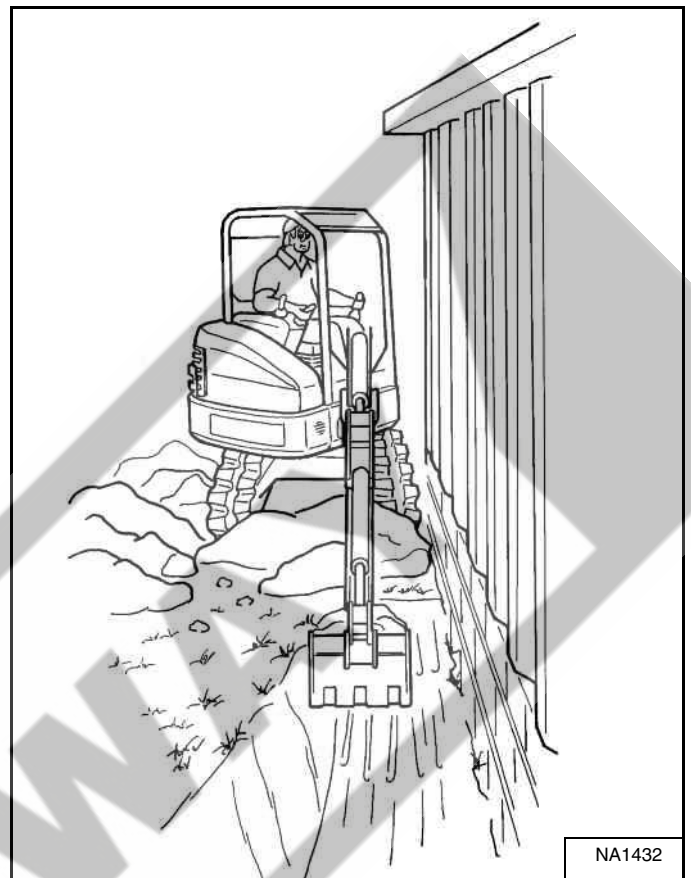


Figure 155



Slew the upperstructure, swing the boom to the right [Figure 153], centre [Figure 154] and left [Figure 155] to dig a square hole the width of the machine without repositioning the excavator.

Figure 156



The boom swing allows the operator to offset the boom and dig close to buildings and other structures [Figure 156].

Backfilling

IMPORTANT

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

I-2256-0507

Figure 157



Use the blade to backfill the trench or hole after excavating [Figure 157].

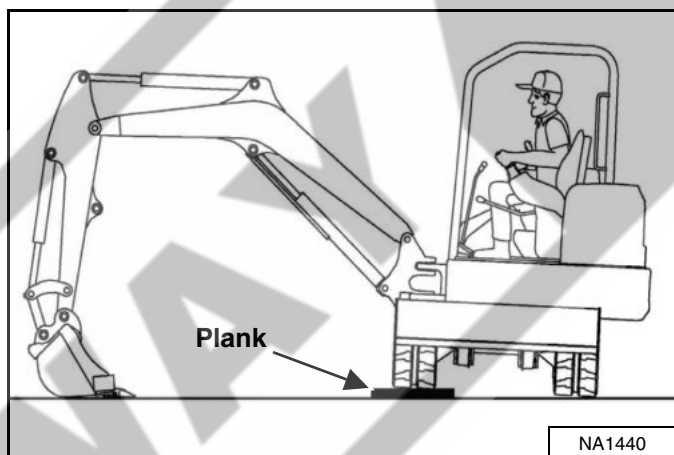
Driving The Excavator

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

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

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.

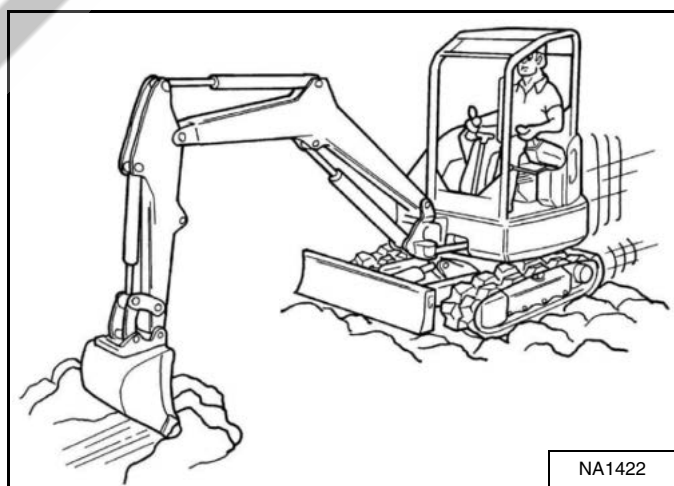
Figure 158



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 158].

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

Figure 159



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 159].

OPERATING PROCEDURE (CONT'D)

Operating On Slopes

WARNING

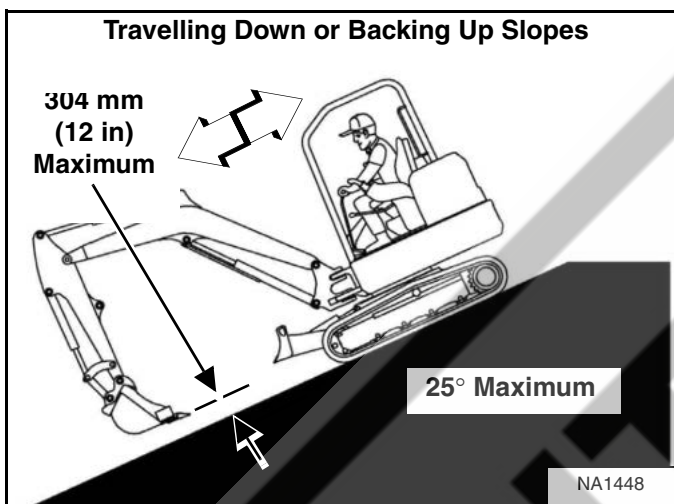
AVOID INJURY OR DEATH

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

W-2497-0304

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

Figure 160



When going down grades that exceed 15 degrees, put the machine in the position shown, and run the engine slowly [Figure 160].

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

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

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

WARNING

AVOID INJURY OR DEATH

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

W-2498-EN-1009

Figure 161

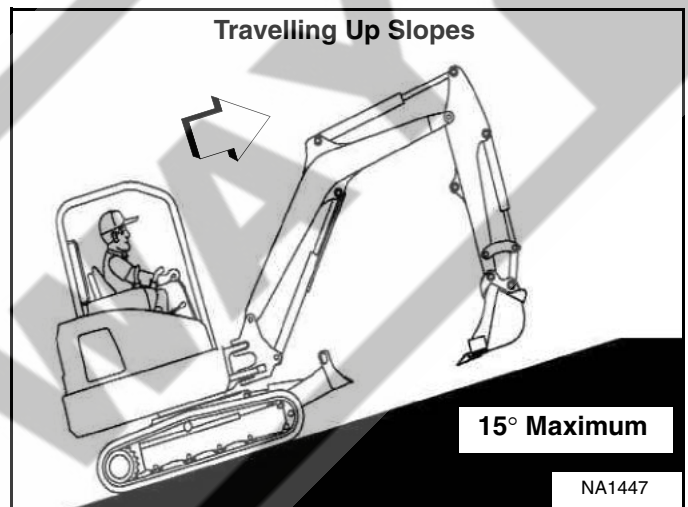
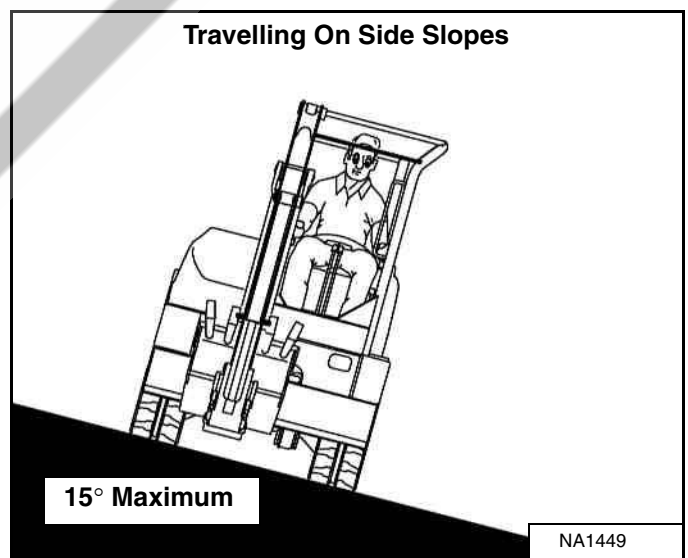


Figure 162

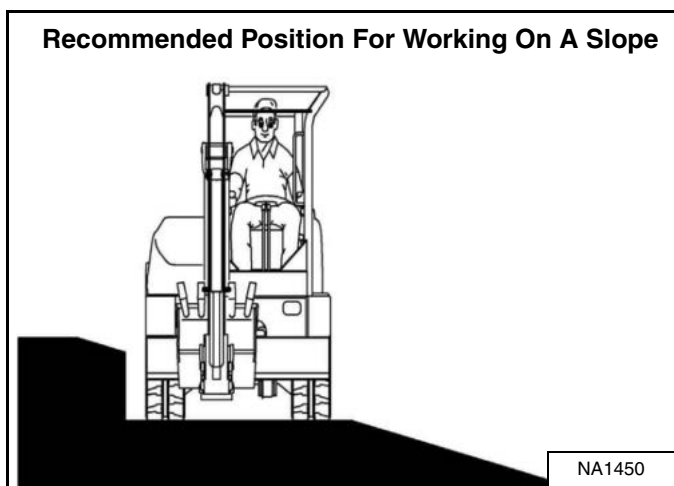


When travelling up slopes or on side slopes that are 15 degrees or less, position the machine as shown and run the engine slow [Figure 161] and [Figure 162].

OPERATING PROCEDURE (CONT'D)

Operating On Slopes (Cont'd)

Figure 163



When operating on a slope, level the work area before beginning [Figure 163].

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

Do not work on slopes which are over 15 degrees.

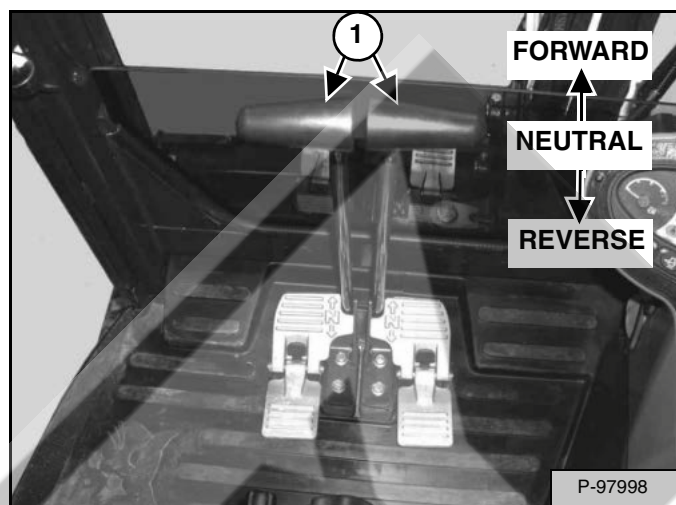
Use a slow work cycle.

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 164



To brake the machine when going down a slope, move the steering levers (Item 1) [Figure 164] to the NEUTRAL position. This will engage the hydrostatic braking.

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

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

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

Use the control lever to lower the boom.

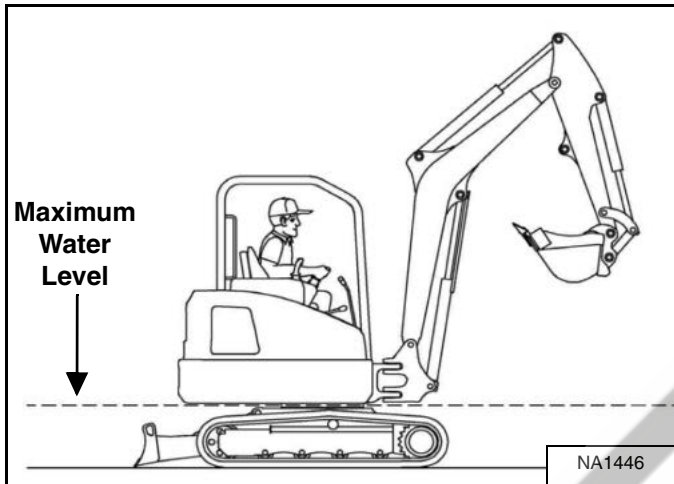
Start the engine and resume operation.

OPERATING PROCEDURE (CONT'D)

Operating In Water

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

Figure 165



Do not operate or immerse the excavator in water higher than the bottom of the swing bearing [Figure 165].

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

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

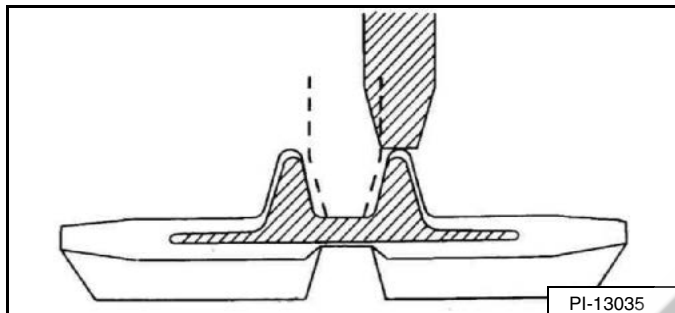
OPERATING PROCEDURE (CONT'D)

Avoiding Track Damage

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

Some Cause Of Track Damage:

Figure 166

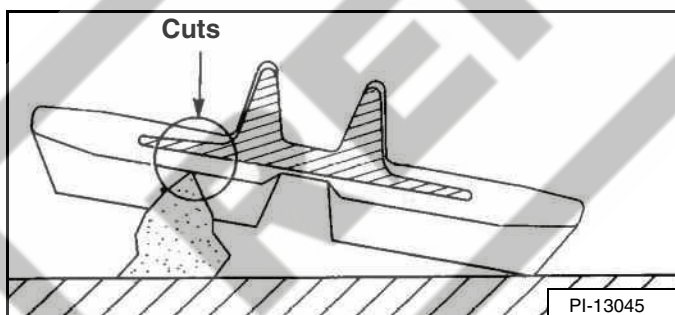


Incorrect track tension: When the rubber track is detracting, the idler or sprocket rides on the projections of the embedded metal **[Figure 166]** causing the embedded metal to be exposed to corrosion. (See TRACK TENSION on Page 168.)

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 167

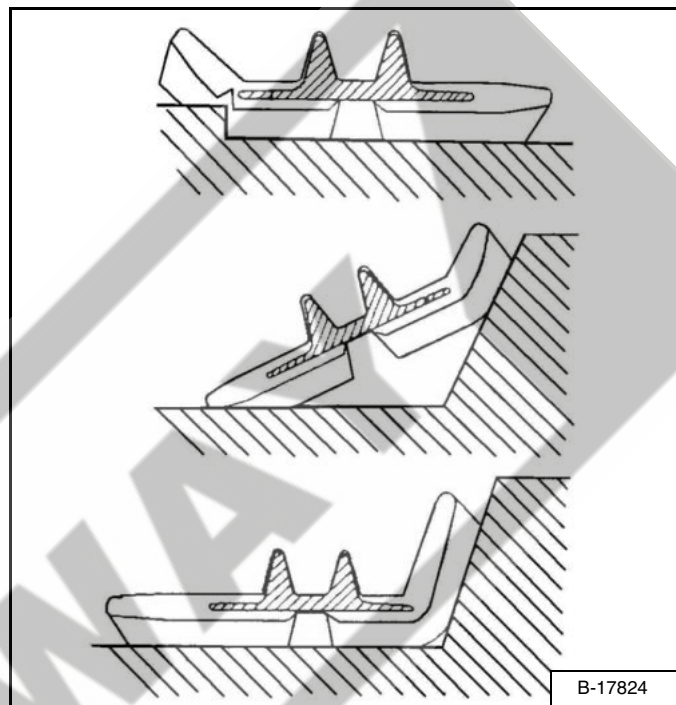


When rubber tracks drive over projections or sharp objects in the field, the concentrated forces applied cause cuts on the lug side rubber surface **[Figure 167]**. In case of making turns on projections, the lug side rubber surface will have an even higher chance to be cut. If the cuts run through the 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 168



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 168]**.

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

DEPTH CHECK

Setup / Calibration

NOTE: The machine shown in the photos may be different than your machine and this manual but the procedure is the same for all models.

WARNING

AVOID INJURY OR DEATH

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

W-2050-0807

NOTE: When the Depth Check kit was initially installed, the machine should have had the setup / calibration procedure performed. But with usage of any attachment, components and the cutting surfaces wear. The accuracy of the Depth Check system is affected by the wear of these components. If loss of accuracy is noticed, re-calibrate the attachment to reset the dimensions needed for the Depth Check system to operate correctly.

Move the machine to an open area where the boom and arm can be repositioned and there is fresh air as the engine will need to be operating during this procedure.

Park the machine on a flat level surface.

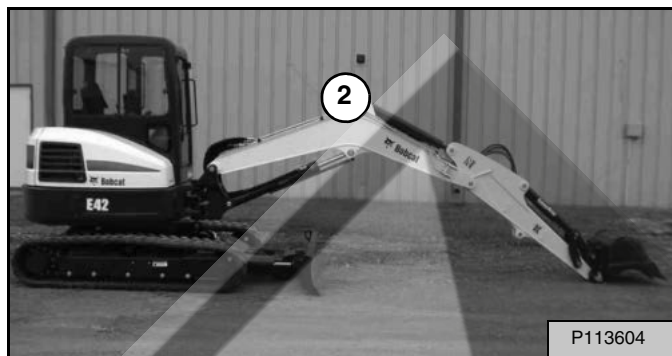
The calibration procedure is a two person operation. One person must remain in the cab to enter data into the deluxe display panel while a second person takes measurements from outside the machine. Make sure the second person is away from the machine when moving any of the work group components (boom,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

WARNING

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

W-2268-0910

Figure 169

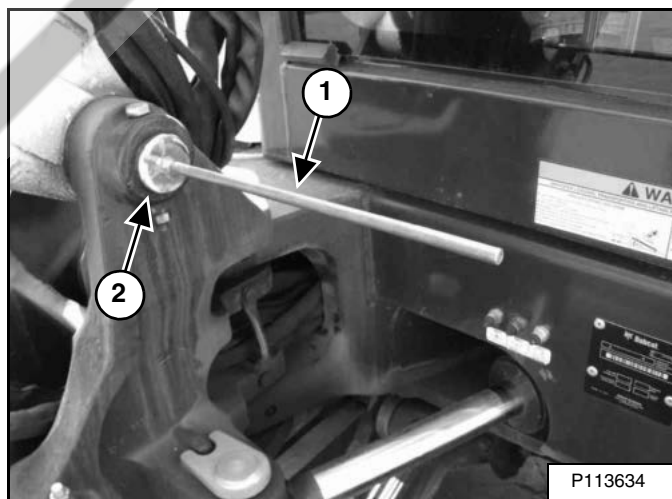


Position the excavator [Figure 169] as shown so the second person can install the magnetic tools, the plumb bob and do measurements for calibrating the system.

Two magnetic mounted tools are included with the kit for positioning the boom, arm and bucket for calibration. These magnetic tools need to be kept with the machine as the Depth Check system should be re-calibrated on a yearly basis or sooner if slight changes in accuracy are noticed.

The Depth Check system sensors are designed for high angle stability and temperature ranges. However, with the use of any mechanical components (boom, arm, bucket, etc.), there is wear on the components with normal usage and this will affect the accuracy of the Depth Check system over time. Also, if any structural changes are made, components replaced or a new attachment is installed on the excavator, it will require the setup / calibration procedure to be performed.

Figure 170

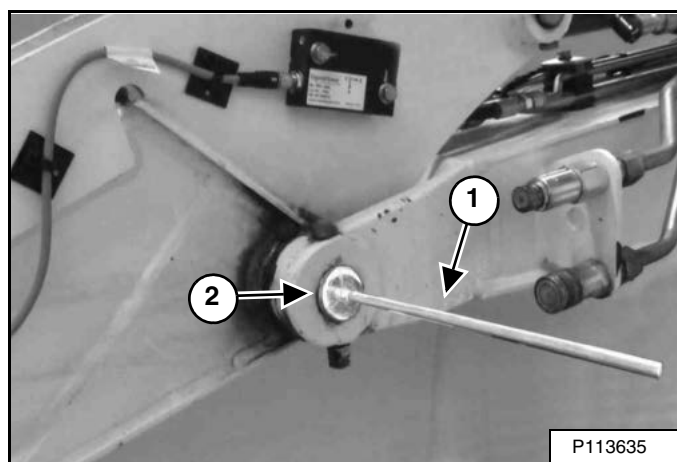


Install one of the magnetic tools (Item 1) on the boom pivot pin (Item 2) [Figure 170]. Centre the magnetic tool as close as possible to the centre of the boom pin.

DEPTH CHECK (CONT'D)

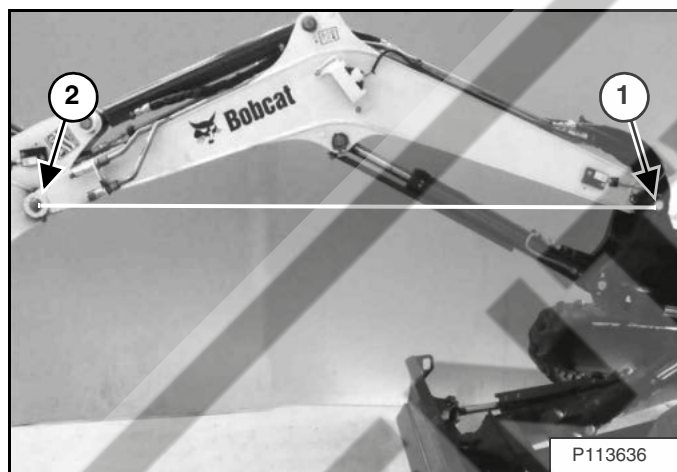
Setup / Calibration (Cont'd)

Figure 171



Install the second magnetic tool (Item 1) on the arm pivot pin (Item 2) **[Figure 171]**. Centre the magnetic tool as close as possible to the centre of the arm pin.

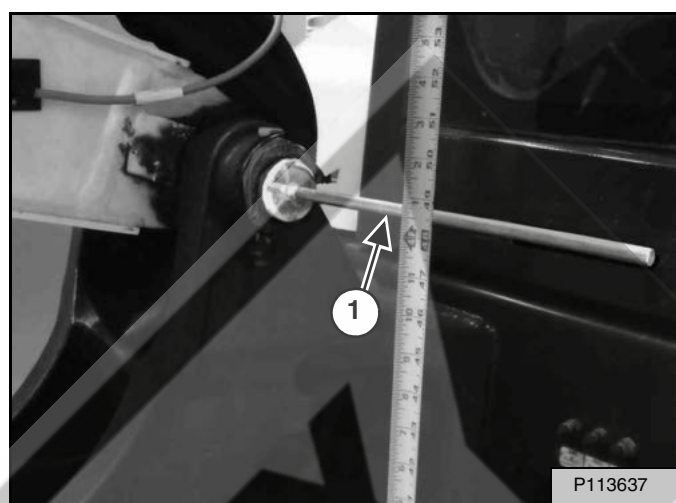
Figure 172



Position the excavator with the bucket fully rolled out and the arm fully extended. Position the workgroup so the distance from the ground to the two magnetic sensors (Item 1 and 2) **[Figure 172]** is identical.

NOTE: It may be necessary on some machines to lower the blade to raise the front of the excavator up slightly to position the boom pivot pin so that the boom and arm pivot points will be parallel to the ground when calibrating.

Figure 173

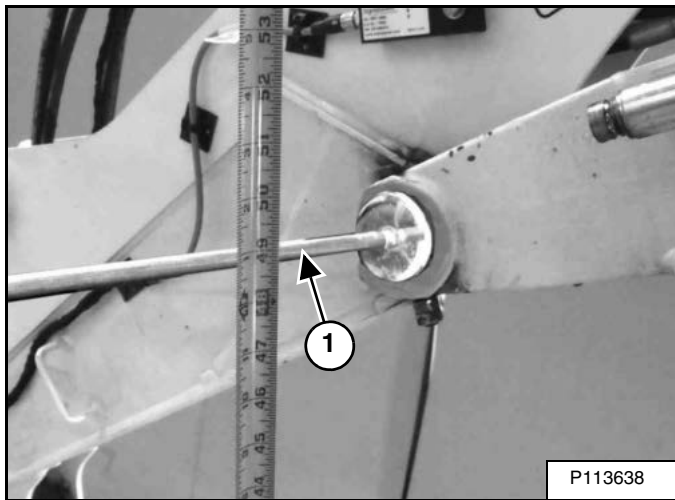


Measure the distance from the centre of the boom magnetic tool (Item 1) **[Figure 173]** to the ground. Measure as close to the boom as possible without interference from components between the boom and the ground. The closer to the boom the measurement is taken, the more accurate the measurement should be. (A laser level can also be used for locating the centrelines of the magnetic tools as this will eliminate any possible variation in the measurements to the ground.)

DEPTH CHECK (CONT'D)

Setup / Calibration (Cont'd)

Figure 174

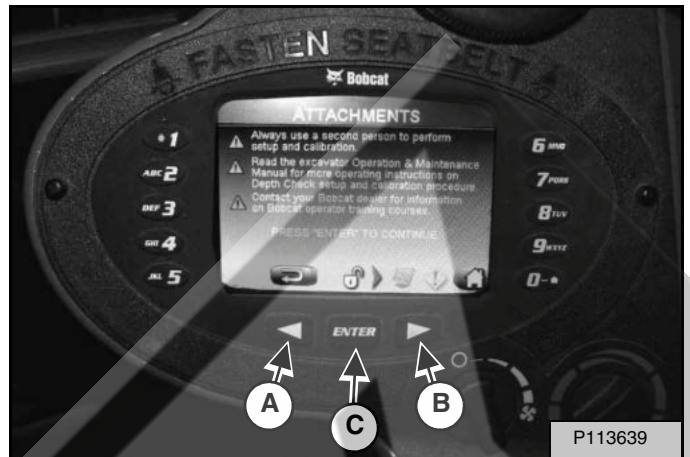


Measure the distance from the centre of the arm magnetic tool (Item 1) [Figure 174] to the ground and make sure both measurements are the same. Adjust the boom up or down as needed and remeasure until both dimensions are the same between [Figure 173] and [Figure 174].

Once the dimensions are identical, the second person in the cab will need to enter the setup / calibration information into the dash panel. *(The accuracy of these dimensions affect the accuracy of the Depth Check.)*

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

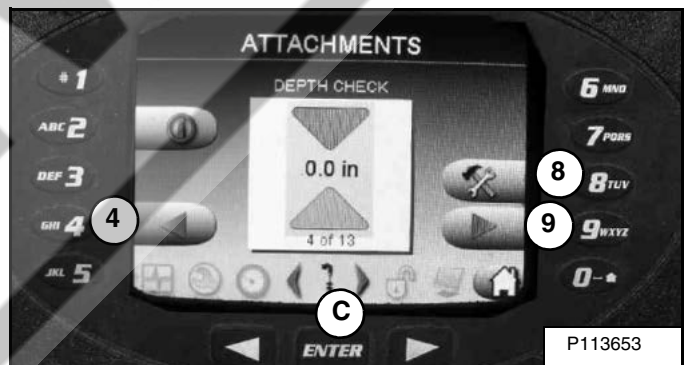
Figure 175



Scroll through the dash panel by pressing the left arrow (Item A) or the right arrow (Item B) until the [ATTACHMENTS] screen is displayed. Press the [ENTER] button (Item C) [Figure 175]

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

Figure 176



On the [ATTACHMENTS] screen, use the left arrow button (Item 4) or the right arrow button (Item 9) and scroll to the [ATTACHMENT DEPTH CHECK] screen shown here. Press the [ENTER] button (Item C) or button (Item 8) [Figure 176] to access the [DEPTH CHECK SETUP] screen.

DEPTH CHECK (CONT'D)

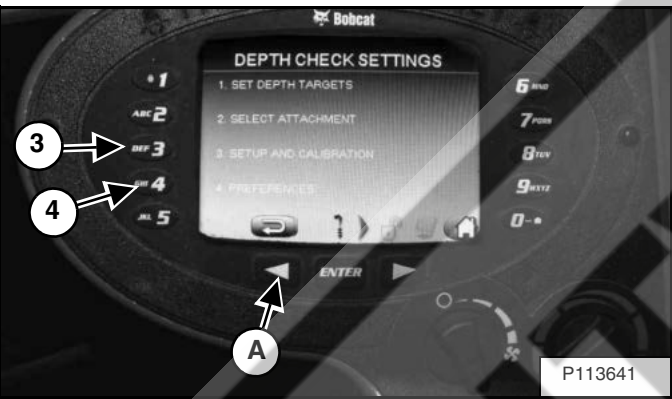
Setup / Calibration (Cont'd)

Figure 177



One of three different screens can appear. Which ever screen appears, press button (Item 2) [Figure 177] to access the [DEPTH CHECK SETUP] screen.

Figure 178



NOTE: The units of measure can be set in either millimetres or inches. Press button (Item 4) to enter the Preferences screen and select meters, millimetres, feet or inches, then press the arrow button (Item A) [Figure 178] to go back to the above screen.

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

Press the button (Item 3) [Figure 178] for setup / calibration mode.

Figure 179



Read the message on the screen and press the [ENTER] button (Item C) [Figure 179] to continue.

Figure 180

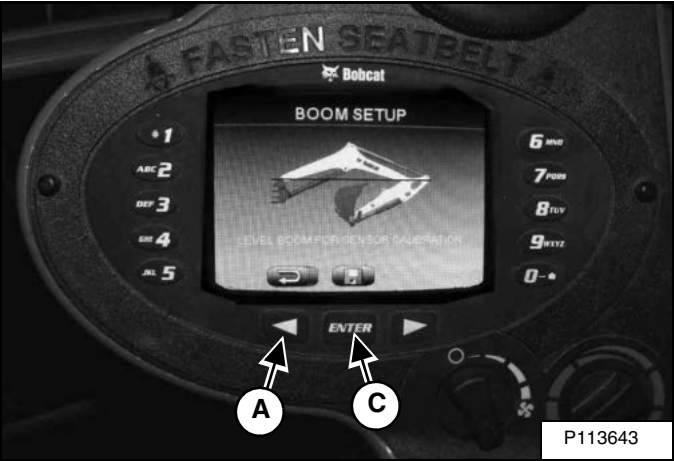


Press [1. BOOM SETUP] (Item 1) [Figure 180].

DEPTH CHECK (CONT'D)

Setup / Calibration (Cont'd)

Figure 181



With the boom levelled [Figure 173] and [Figure 174], press the [ENTER] button (Item C) [Figure 181] to store this information into the setup / calibration settings.

The next setup / calibration step will be for Arm Setup. This will require a plumb bob to make sure the arm is in the correct vertical position.

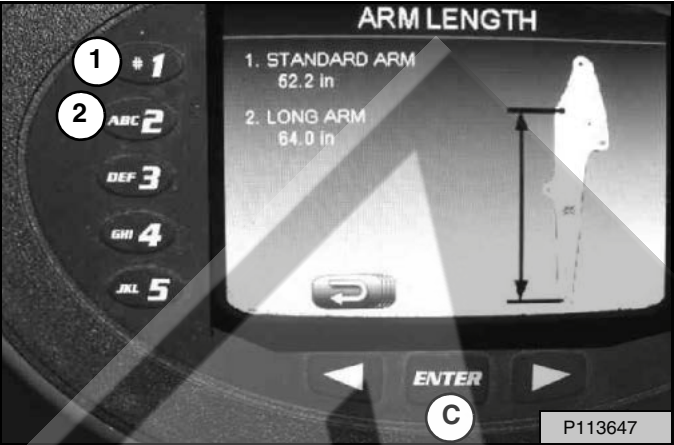
NOTE: If a plumb bob is not available, fishing line or a string with a heavy nut or two tied on one end of the string can be used in place of a plumb bob.

Figure 182



Have the second person in the cab and press the Arm Setup (Item 2) [Figure 182].

Figure 183

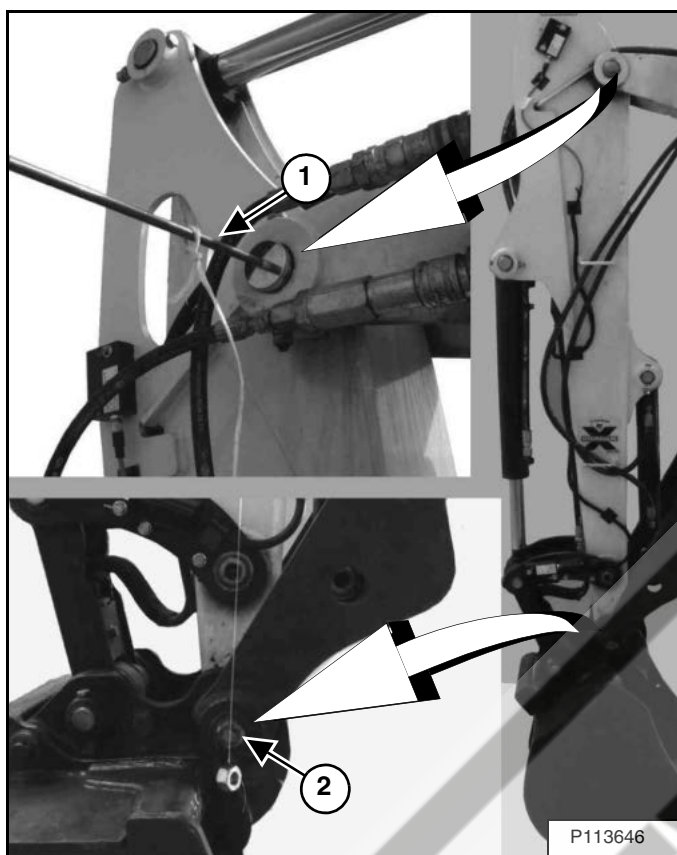


The system needs to know if the machine is equipped with a standard arm or the long arm option. The excavator ECU knows the machine model so the dimensions for the two arms is shown on the screen. For the Standard Arm, press (Item 1), for Long Arm, press (Item 2). Press the [ENTER] button (Item C) [Figure 183] to store this information into the setup / calibration settings.

DEPTH CHECK (CONT'D)

Setup / Calibration (Cont'd)

Figure 184



Place the plumb bob (Item 1) [Figure 184] on the magnetic tool that is installed on the arm pin. Raise the boom and move the arm until the arm is vertical.

Move the arm until the plumb bob line is centred on the bucket pivot pin (Item 2) [Figure 184]. *(The accuracy of the arm being vertical affects the accuracy of the Depth Check.)*

Figure 185



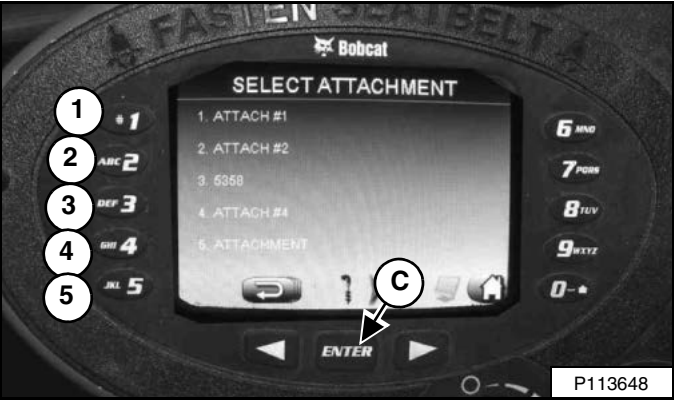
With the arm vertical [Figure 184], press the [ENTER] button (Item C) [Figure 185] to store this information into the setup / calibration settings.

Figure 186



Press the [ATTACHMENT SETUP] button (Item 3) [Figure 186].

Figure 187



Select one of the attachments (Items 1 - 5) [Figure 187] from the list.

NOTE: Up to five different attachments can be named, setup / calibrated and stored or removed to make room for a new attachment. When switching between attachments, just select the desired attachment and as long as it was correctly setup, the Depth Check system will have the information needed for that attachment.

Figure 188



On the [ATTACHMENT SETUP] screen, you can select [1. CHANGE NAME] (Item 1), [2. SETUP AND CALIBRATION] (Item 2) or [3. REMOVE] (Item 3) [Figure 188] the attachment from the saved list.

Select [1. CHANGE NAME] (Item 1) [Figure 188] to open the attachment name screen.

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

Figure 189



Use the key pads (Items 1 through 0) and enter a name or number for the attachment being setup. Press the [ENTER] button (Item C) [Figure 189] to save the name. (To add the name, press the key pad multiple times until the correct letter or number appears on the screen for the attachment name.)

If setting up additional attachments, select (Items 2 through Item 5) [Figure 187] and add the additional attachment names.

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

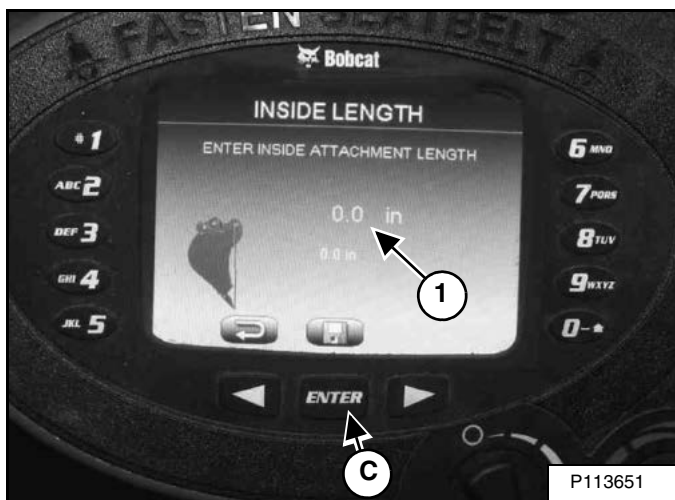
Press the arrow button (Item A) [Figure 188] and go back to the [ATTACHMENT SETUP] screen.

Press the Setup And Calibration button (Item 2) [Figure 188].

DEPTH CHECK (CONT'D)

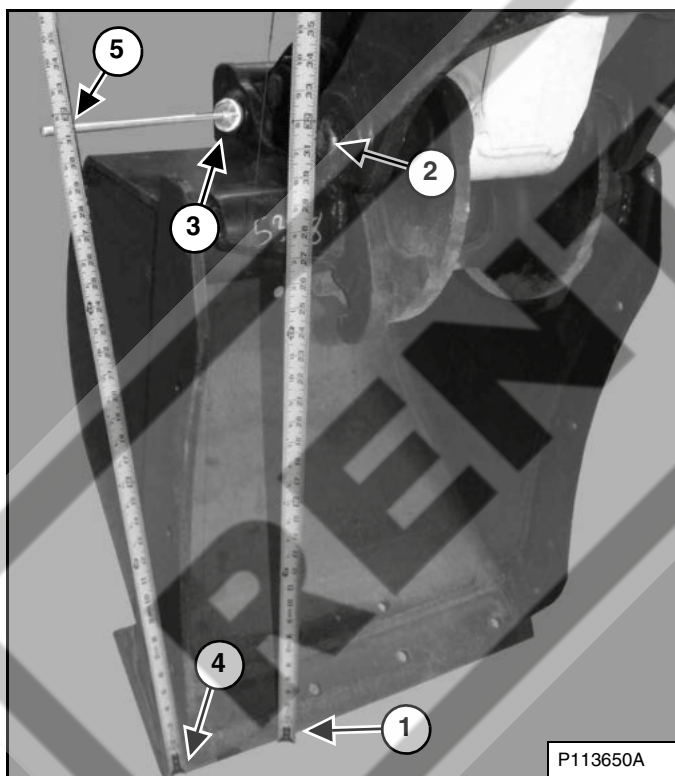
Setup / Calibration (Cont'd)

Figure 190



The inside length screen [Figure 190] is where the first attachment dimensions will be added from the information determined in step [Figure 191].

Figure 191



This two part step will measure the distance between the bucket pin (Item 2) [Figure 191] or the furthest point away from the bucket pin on any attachment used with the Depth Check system. We will be using a bucket as an example, but all attachments will be similar for this setup. *(The accuracy of these dimensions affect the accuracy of the Depth Check.)*

Position the bucket vertical. Use the plumb bob to locate the furthest vertical cutting point (Item 1) from the centre of the bucket pin (Item 2) [Figure 191].

Set the tip of the bucket (Item 1) on the ground ensuring that everything is still vertical. Using a tape measure, measure the distance between the cutting edge (Item 1) and the centre of the bucket pin (Item 2) [Figure 191].

NOTE: With usage of any attachment, the cutting surfaces wear. Example: The cutting edge (Item 1) [Figure 191] wears with the use of the bucket. The accuracy of the Depth Check system is affected by the wear of these components. If loss of accuracy is noticed, recalibrate the attachment to reset the dimensions needed for the Depth Check system to operate correctly.

The [INSIDE LENGTH] screen [Figure 190] is where the attachment dimensions will be added from the information determined in [Figure 191].

Using the key pad (Items 1 through 0) [Figure 190], enter this dimension. After the measurement is entered and verified, press the [ENTER] button (Item C) [Figure 190]. As soon as the [ENTER] button is pressed, the [OUTSIDE LENGTH] [Figure 192] screen will be activated.

DEPTH CHECK (CONT'D)

Setup / Calibration (Cont'd)

Figure 192

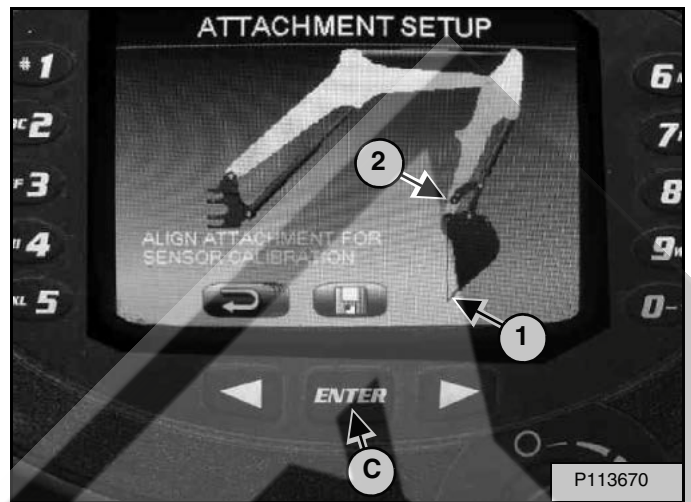


Install a magnetic pin on the second bucket pin (Item 3) [Figure 191].

The next measurement is from the cutting edge (Item 4) to the centre of the magnetic pin (Item 5) [Figure 191] for the outside length dimension.

Using the key pad (Item 1 through 0) [Figure 192] enter this dimension. After the measurement is entered and verified, press the [ENTER] button (Item C) [Figure 192]. As soon as the [ENTER] button is pressed, the screen will change to the [ATTACHMENT SETUP] screen [Figure 193].

Figure 193



Make sure the bucket is still vertical to the bucket pin (Item 2) and the cutting edge (or bucket teeth) (Item 1), and press the [ENTER] button (Item C) [Figure 193] to store the calibration information.

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

NOTE: When using an auger, it will not be as accurate as solid mounted attachments because all components are not rigidly mounted (auger bit has extra movement and rotation where the system is designed for fixed positions). When using the auger with the Depth Check system, enter zero for both attachment dimensions. When using the auger, try to keep the X-change horizontal to the ground during the dig cycle and monitor the screen depth. Using this setup should give fairly accurate Depth Check information for auger applications.

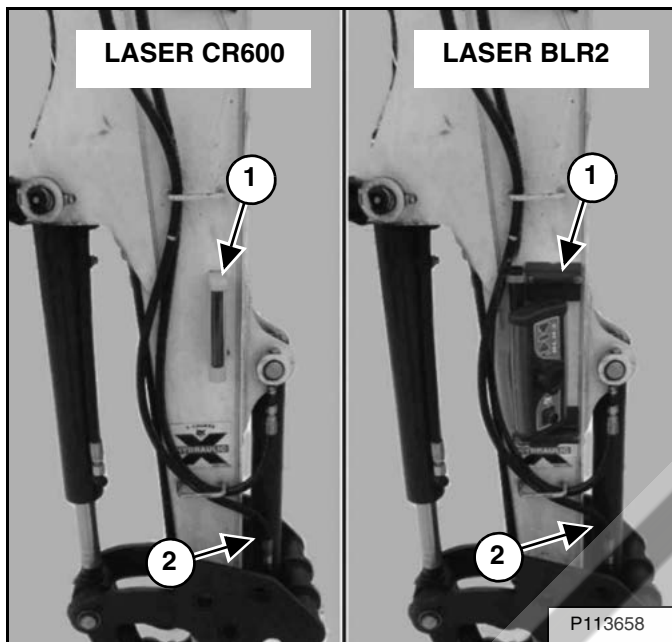
This finishes the SETUP / CALIBRATION procedure except if also installing a laser. (See If Using A Laser With Depth Check on Page 113.)

DEPTH CHECK (CONT'D)

Setup / Calibration (Cont'd)

If Using A Laser With Depth Check

Figure 194



FOR model E50 with the standard arm ONLY; If using either of the laser receivers (Item 1) on machines that have the standard arm and a hydraulic clamp installed, you will need to check the length of the hydraulic clamp rod end hose (Item 2) [Figure 194] to make sure the existing hose does not interfere with the laser.

Measure the length of the hose (Item 2) [Figure 194].

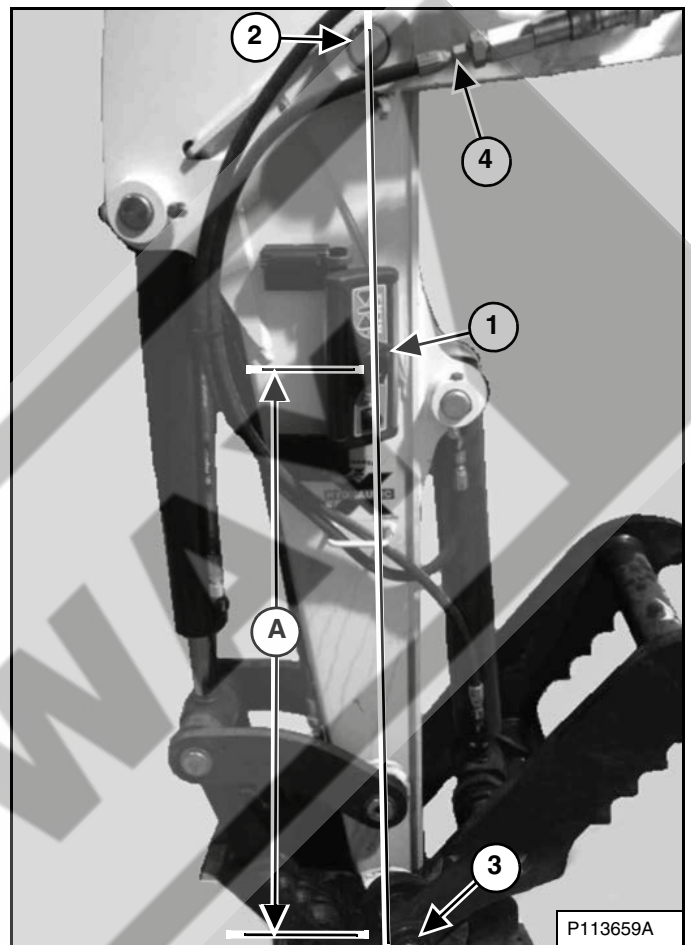
Measure the hose from the rod end of the clamp cylinder (Item 2) [Figure 194] to the end of the hose at the coupler (Item 4) [Figure 195]

The hose length must be 1245 mm (49.0 in) or a new hose (P/N 7250478) must be ordered and installed.

If the hose is incorrect, it may interfere with the laser when the hydraulic clamp is operated and possibly knock the laser receiver off of the arm. OR, the laser can be mounted on the opposite side of the arm, then the hose will not interfere with the laser.

NOTE: For excavator equipped with a clamp, (or other options or configurations added to the arm that may interfere with the laser), make sure there is no hose to laser interference. Fully curl the arm and bucket and make sure the hoses do not interfere with the laser receiver during any arm and bucket movement. Adjust the position of the laser receiver if necessary to avoid any contact with the hoses.

Figure 195



For both standard and long arm models; When installing the laser receiver (Item 1), it should be installed as close as possible in line with the arm pin (Item 2) and the bucket pivot pin (Item 3) [Figure 195].

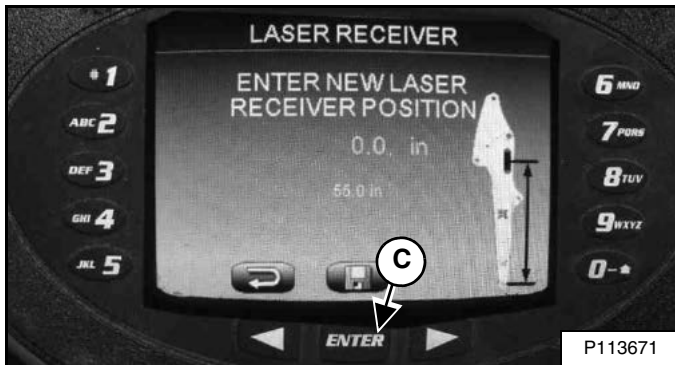
Position the laser (Item 1) approximately as shown. The dimension (Item A) will need to be added to the display screen. Measure from the centre of the bucket pin (Item 3) up to the centre of the laser receiver (Item 1) [Figure 195]

DEPTH CHECK (CONT'D)

Setup / Calibration (Cont'd)

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

Figure 196



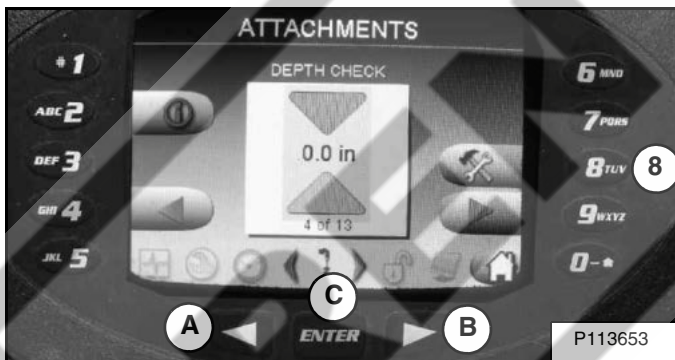
Initial Setup

The initial setup will describe adding and changing the Depth Check target settings, grade zone setting, warning zone setting, laser receiver, preferences (changing unit of measurement settings), and describe how the Depth Check system functions.

NOTE: The laser feature must be activated before you can enter the laser receiver position into the dash panel. See [Figure 210] for turning the laser ON and OFF.

Depth Check Settings

Figure 197



Using the left / right arrow buttons (Item A and B), toggle to the Attachment Depth Check screen [Figure 197].

Press the tool button (Item 8) or the [ENTER] button (Item C) [Figure 197] to go to the [DEPTH CHECK] screen [Figure 198] and [Figure 199].

Figure 198



The [DEPTH CHECK] screen [Figure 198] shows the following information. Press the numbered key pad to access each screen for setting the system:

(1) **Re-bench:** Used for setting the attachment start point to zero. (Example: Use surveyors elevation pin for the known depth to set zero.)

(2) **Setup:** Opens screen for selecting the following screens; Set Target Depth, Select Attachment, Setup and Calibration, and Preferences.

(3) **Alarm:** Sets the depth alarm to ON or OFF.

(4) **Change Screens:** Toggles through various depth screens; Depth Check, distance to target or grade check.

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

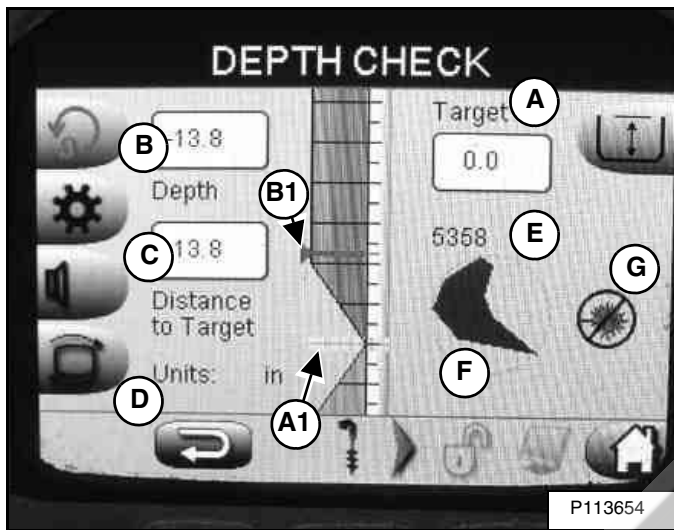
(0) **Home Screen:** Press 0 to go back to the home screen on the display panel.

DEPTH CHECK (CONT'D)

Initial Setup (Cont'd)

Depth Check Settings (Cont'd)

Figure 199



The [DEPTH CHECK] screen [Figure 199] shows the following information:

(A) Target (Dimension): The target is the depth to dig from an established starting point set by the operator. (Example: Desired dig depth from a surveyors elevation pin.)

(A1) Target (Bar Graph): The bar graph line shows where the target is at in relationship to the attachment position (Item B1).

(B) Depth (Dimension): This is the current depth of the attachment cutting edge.

(B1) Depth (Bar Graph): The bar graph line moves up and down and shows the position of attachment to the target (Item A1). (When the attachment gets close to the selected target depth, an audible alarm will start beeping. The closer the attachment gets to the target, the faster the beeps. When the alarm is continuous, you have reached the target depth. The alarm can be set ON or OFF by pressing the key pad number 3 [Figure 198]).

(C) Distance To Target (Dimension): The distance the attachment needs to travel to reach the selected target depth.

(D) Units: Shows the current selected unit of measure. (The units of measure can be set to meters, millimetres, feet or inches.)

(E) Name of attachment selected: Shows the name or the number of the selected attachment. (The attachment must be selected so that the Depth Check system knows what attachment is currently used for proper depth calculations.)

(F) Attachment: The screen uses a bucket to represent the attachment. The bucket will rotate to represent the position of the bucket (attachment) as the attachment is curled out or curled in. When the attachment is calibrated, it sets the position of bucket icon (F).

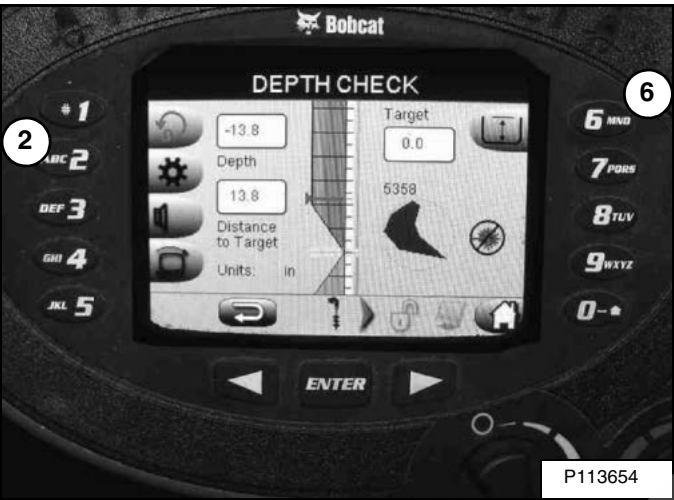
(G) Laser: The laser icon (Item G) will show if the laser is set to ON or OFF. (The laser as shown in [Figure 199] with the circle with the line through it represents the OFF position.)

DEPTH CHECK (CONT'D)

Initial Setup (Cont'd)

Depth Check Settings (Cont'd)

Figure 200



Press button (Item 6) [Figure 200] to go to the [SELECT DEPTH TARGET] screen [Figure 201].

Figure 201



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

Select (Items 1 through Item 5) [Figure 201] to select one of the existing depths.

Or, if a different depth is needed, press the return button (Item A) [Figure 201] to go back one screen, then press button (Item 2) [Figure 200] to go to the [DEPTH CHECK SETTINGS] screen [Figure 202].

Figure 202



Press (Item 1) [Figure 202] to Set Depth Targets.

Figure 203



Press (Item 1) [Figure 203] to select Depth Target.

Figure 204



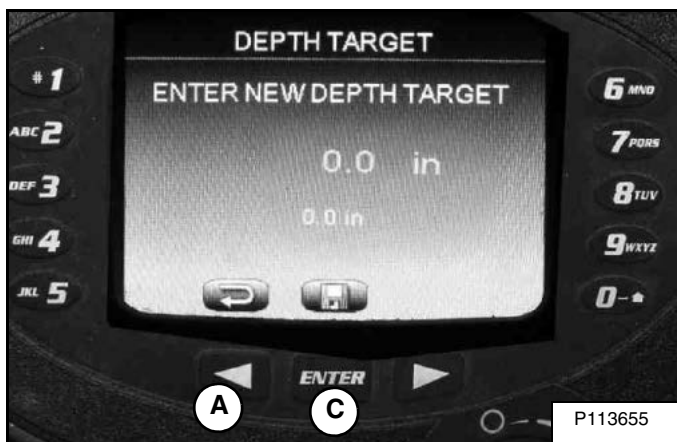
Select (Items 1 through 5) [Figure 204] to select one of the five possible stored depth settings.

DEPTH CHECK (CONT'D)

Initial Setup (Cont'd)

Depth Check Settings (Cont'd)

Figure 205



Use the key pads (Items 1 through 0) and enter the new target dimension. If the dimension entered is incorrect, press the arrow button (Item A) [Figure 205] to backspace the dimension.

Press the [ENTER] button (Item C) [Figure 205] to save the depth dimension. (Dimensions shown in inches but can be set to feet, meters or millimetres. See [Figure 217].

Grade Zone

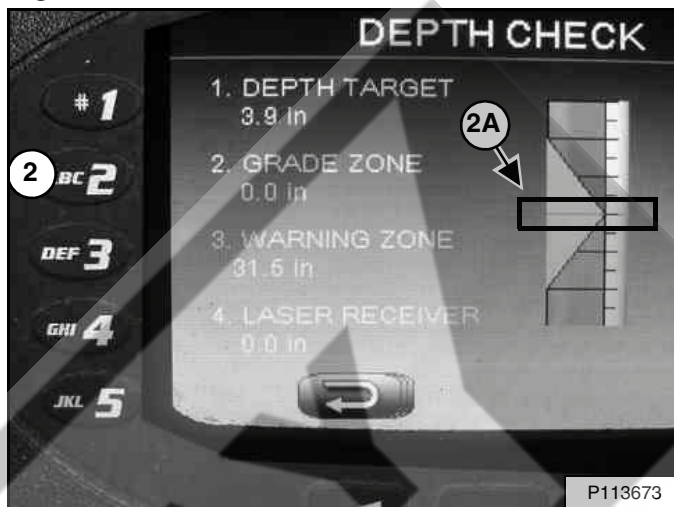
The Grade Zone sets the distance up or down from the target depth for when the warning alarm will start to be a continuous alarm. This will also increase the YELLOW highlighted area on the screen where the target zone is shown.

Figure 206



Press [1. SET DEPTH TARGETS] (Item 1) [Figure 206] to change to the next screen [Figure 207].

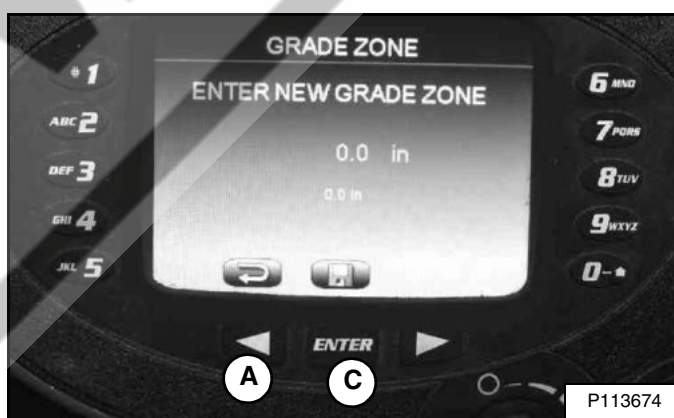
Figure 207



Press [2. GRADE ZONE] (Item 2) [Figure 207].

Grade zone area (Item 2A) [Figure 207] (in yellow on the display screen) is the area that will change with the dimensions as set in [Figure 208].

Figure 208



Use the key pads (Item 1 through 0) and enter the new grade zone dimension. If the dimension entered is incorrect, press the arrow button (Item A) [Figure 208] to backspace the dimension.

Press the [ENTER] button (Item C) [Figure 208] to save the grade zone dimension. (Dimensions shown in inches but can be set to feet, meters or millimetres. See [Figure 217].)

DEPTH CHECK (CONT'D)

Initial Setup (Cont'd)

Warning Zone

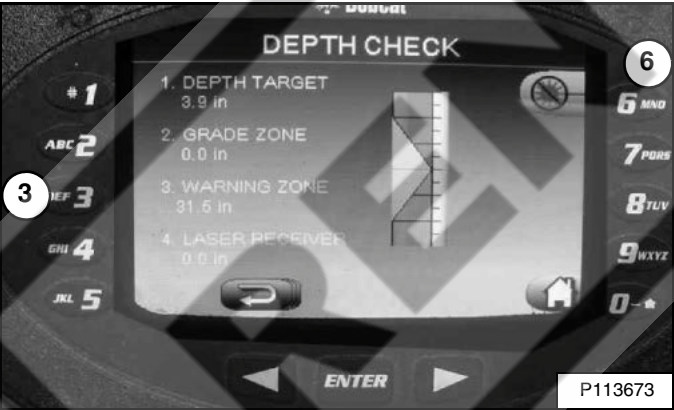
The Warning Zone sets the upper distance from the target depth when the warning alarm will start to beep. (The alarm will start beeping when getting close to the selected target depth. The closer to the target, the faster beeps until you reach the target depth, then it will be a continuous sound. If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

Figure 209



Press [1. SET DEPTH TARGETS] (Item 1) [Figure 209] to change to the next screen [Figure 210].

Figure 210



Press [3. WARNING ZONE] (Item 3) [Figure 210].

Press (Item 6) [Figure 210] to turn the laser ON or OFF.

Figure 211



Use the key pads (Items 1 through 0) and enter the new warning zone dimension. If the dimension entered is incorrect, press the arrow button (Item A) [Figure 211] to backspace the dimension.

Press the [ENTER] button (Item C) [Figure 211] to save the warning zone dimension. (Dimensions shown in inches but can be set to feet, meters or millimetres. See [Figure 217].)

DEPTH CHECK (CONT'D)

Initial Setup (Cont'd)

Laser Receiver Position On Arm

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

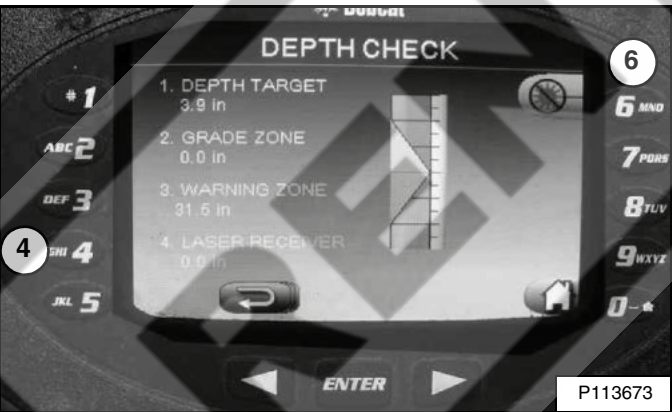
Activate the laser on the dash panel by pressing button (Item 6) [Figure 213]. Press once, laser ON. Press a second time, laser OFF.

Figure 212



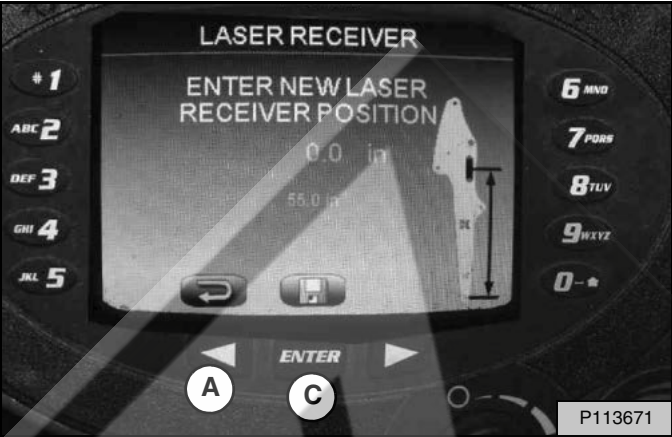
Press [1. SET DEPTH TARGETS] (Item 1) [Figure 212] to change to the next screen [Figure 213].

Figure 213



Press [4. LASER RECEIVER] (Item 4) [Figure 213].

Figure 214

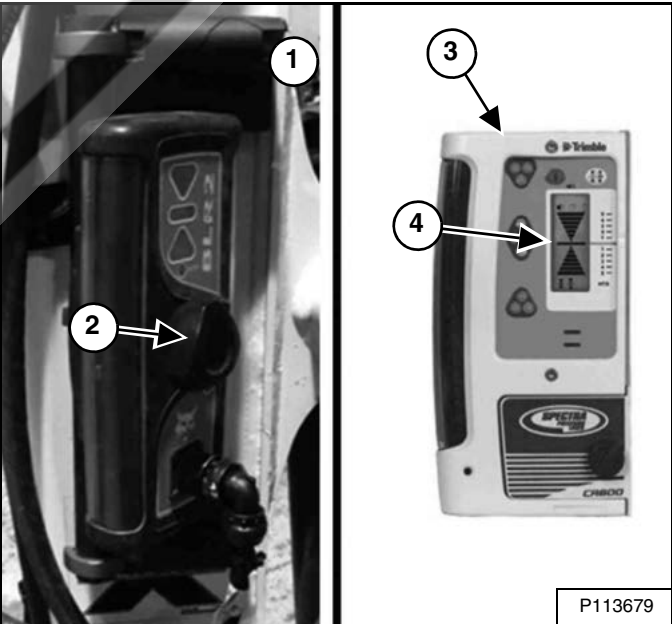


Use the key pads (Items 1 through 0) and enter the new laser receive position on the arm dimension. If the dimension entered is incorrect, press the arrow button (Item A) [Figure 214] to backspace the dimension. See [Figure 196] for additional information of the laser receiver.

Press the [ENTER] button (Item C) [Figure 214] to save the warning zone dimension. (Dimensions shown in inches but can be set to feet, meters or millimetres. See [Figure 217].)

Measuring The Laser Location

Figure 215



For the model BLR2 (Item 1), measure to the centre of the knob (Item 2) [Figure 215].

For the model CR600 (Item 3), measure to the centre of the red line (Item 4) [Figure 215].

DEPTH CHECK (CONT'D)

Initial Setup (Cont'd)

Preferences

The Preferences screen is used to set two features;

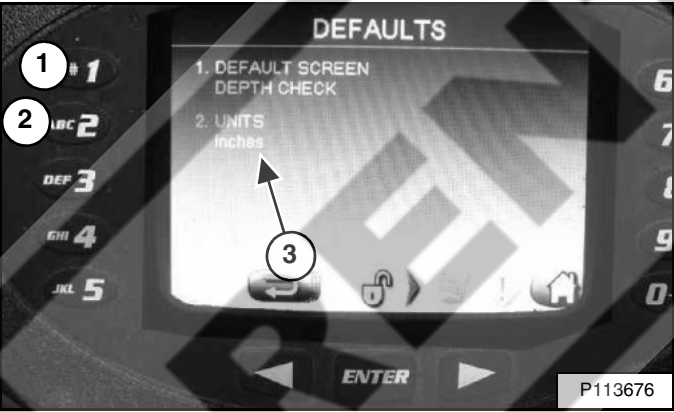
- 1. To set the screen preference for; Distance to Target, Depth Check or Grade Check.
- 2. To set units of measure (screen can be set to display; millimetres, meters, feet or inches).

Figure 216



Press [4. PREFERENCES] (Item 4) [Figure 216] to change to the Defaults screen [Figure 217].

Figure 217



Press [DEFAULT SCREEN] button (Item 1) [Figure 217] to toggle the Preference screen between the following screens; Distance to Target [Figure 218], Depth Check [Figure 219] or Grade Check [Figure 220].

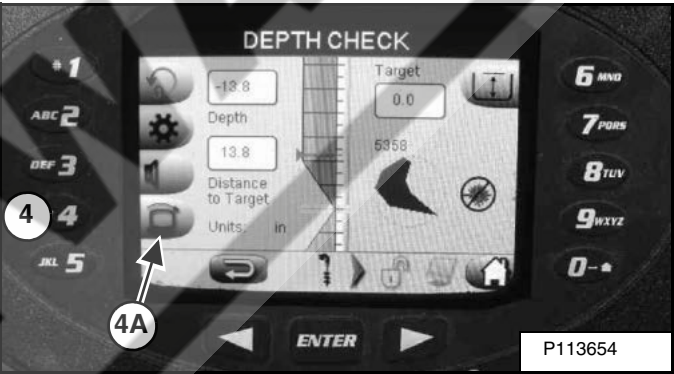
Press the [UNITS] button (Item 2) to toggle between meters, millimetres, feet or inches. This sets how you will record and enter ALL dimensions into the Depth Check system. The selected units will be displayed under the word [UNITS] (Item 3) [Figure 217] and will be visible on all Depth Check screens that show dimensions.

Figure 218



Distance to Target [Figure 218] screen.

Figure 219



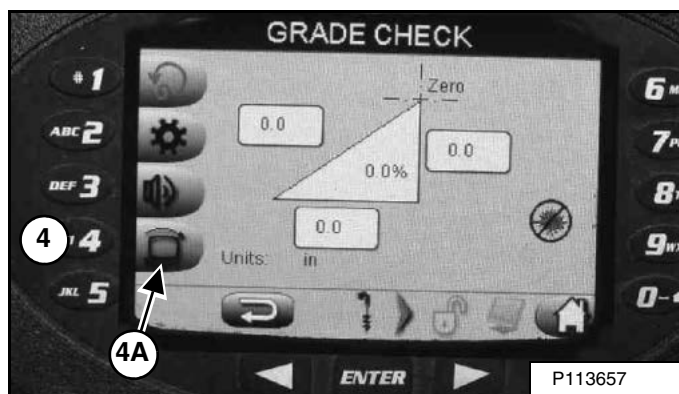
Depth Check [Figure 219] screen.

DEPTH CHECK (CONT'D)

Initial Setup (Cont'd)

Preferences (Cont'd)

Figure 220



Grade Check [Figure 220] screen.

NOTE: You can also press button (Item 4) [Figure 218], [Figure 219] or [Figure 220] to toggle between these three screens any time that the icon (Item 4A) is visible on any Depth Check screen.

Operation

The following will give some basic operation information for:

! WARNING

AVOID INJURY OR DEATH

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

W-2116-0903

IMPORTANT

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

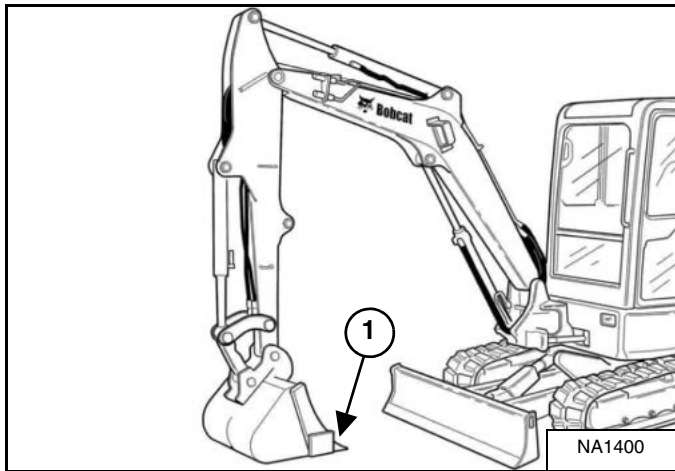
I-2383-1214

DEPTH CHECK (CONT'D)

Operation (Cont'd)

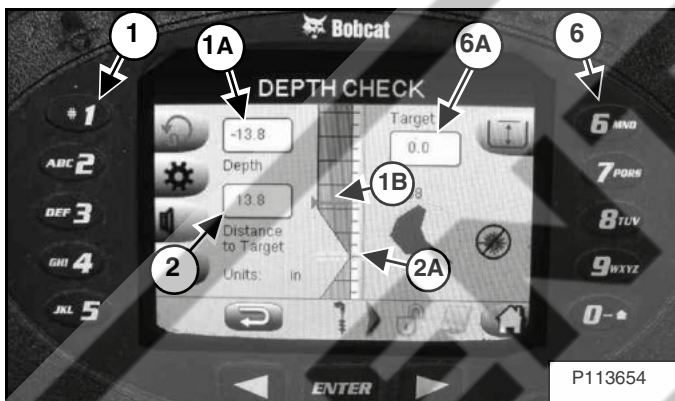
Digging A Hole To A Predetermined Depth (Re-benching Without A Laser Reference)

Figure 221



The first step is to set the position of the bucket (Item 1) [Figure 221] at the ground surface you are going to start the dig or on the surveyor mark to establish the starting ground position. Lower the bucket until it is on the ground or on the surveyor mark. This is called re-benching.

Figure 222



To set the cutting edge position (re-benching) to zero, access the Depth Check screen, and press the re-benching button (Item 1). After the button is pressed, the dimensions on the screen for depth (Item 1A) will be set to 0.0. (As the bucket is raised or lowered, the screen at (Item 1A) [Figure 222] will show the bucket position dimension moving.)

Press button (Item 6) [Figure 222] to change to the [SELECT DEPTH TARGET] screen [Figure 223].

Figure 223



Select the target depth by pressing button (Items 1 through Item 5) [Figure 223] for selecting an existing depth. (To add a new target depth or to change an existing target depth, see information shown with steps [Figure 200] through [Figure 205].)

The selected target depth will now appear on the screen at (Item 6A) [Figure 222].

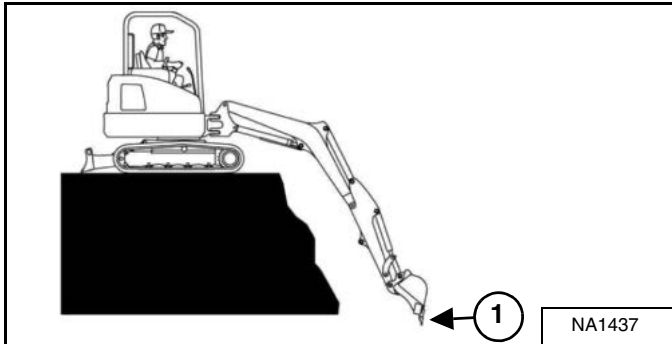
NOTE: If the excavator is at an angle (side slope) when re-benching, the system will only be accurate on the same plane (location) that it was re-benched at.

DEPTH CHECK (CONT'D)

Operation (Cont'd)

Digging A Hole To A Predetermined Depth (Re-benching Without A Laser Reference) (Cont'd)

Figure 224



As the hole is being dug, the position of the bucket (Item 1) [Figure 224] is dimensionally shown (Item 1A) [Figure 222] and shown on the bar graph at (Item 1B) [Figure 222]. The distance to target depth is dimensionally shown in (Item 2) [Figure 222] and shown on the bar graph (Item 2A) [Figure 222].

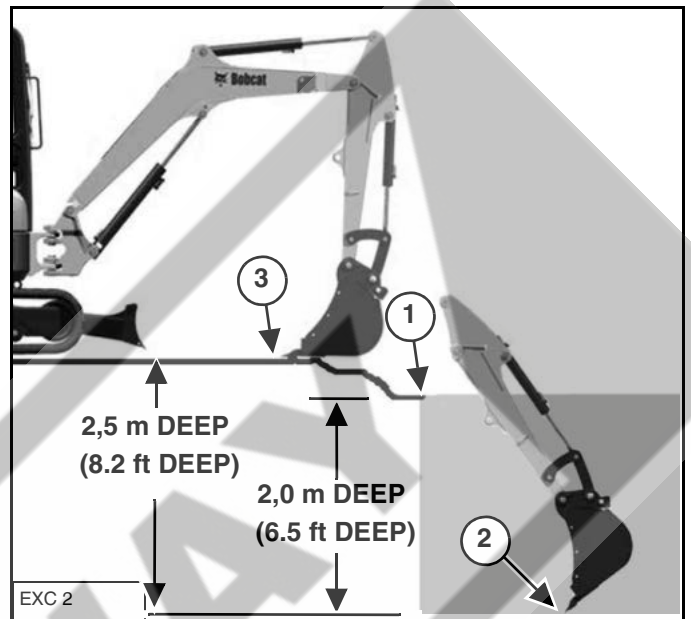
When the bucket is getting close to the target depth, a warning buzzer (if activated) will start to slowly beep. The beeps will increase in frequency the closer the bucket gets to the target depth. When the target depth is reached, the buzzer will sound continuously.

EXAMPLE: The target depth is 2 meters (6.5 ft) (Item 6A) and the position of the bucket (Item 1A) is at 1.5 meter (4.9 ft), the distance to target (Item 2) [Figure 222] will be 0.5 m (1.6 ft). [$2\text{ m} - 1.5\text{ m} = 0.5\text{ m}$ ($6.5\text{ ft} - 4.9\text{ ft} = 1.6\text{ ft}$).]

NOTE: The distance from the target depth to when the alarm starts to beep can be set using the *Warning Zone* information. (See *Warning Zone* on Page 118.).

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

Figure 225



If possible, reposition the excavator so the bucket can be re-benched off of the original starting point (Item 1) [Figure 225].

Or, If that is not possible, position the excavator so the bucket will reach to the bottom of the hole (Item 2) [Figure 225] at an area that is known to be the correct depth. (When re-benched at the bottom of the trench, set the target depth to zero to continue digging at the original depth.)

Or, With the bucket on the ground next to the excavator (Item 3) [Figure 225], re-bench the bucket to zero. Now reach into the existing hole until the bucket is touching the bottom of the hole (Item 2) [Figure 225] in an area you know is the correct depth. Example: The dimension shown in (Item 1A) [Figure 222] is now 2.5 m (8.2 ft). You now need to reset the target depth to 2.5 m (8.2 ft) to continue digging the hole at the original target depth.

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

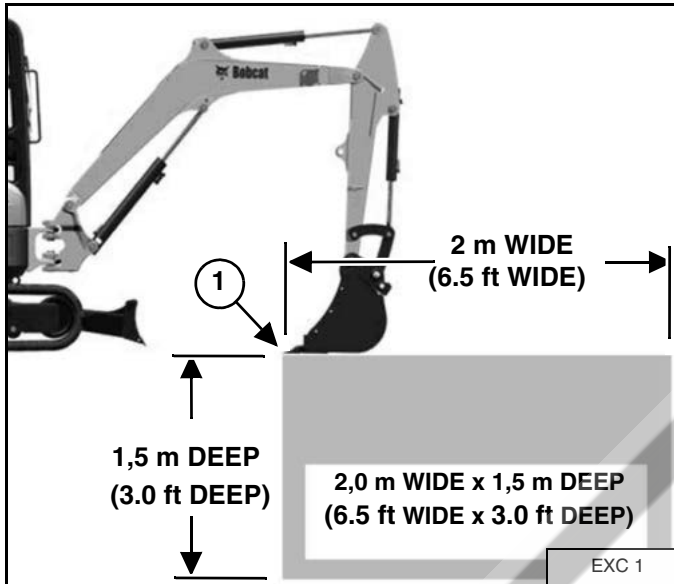
DEPTH CHECK (CONT'D)

Operation (Cont'd)

Digging A Hole To A Predetermined Width And Depth (Re-benching Without A Laser)

EXAMPLE: Digging a 2.0 meter wide x 1.5 meter deep (6.5 ft wide x 3 ft deep) hole.

Figure 226

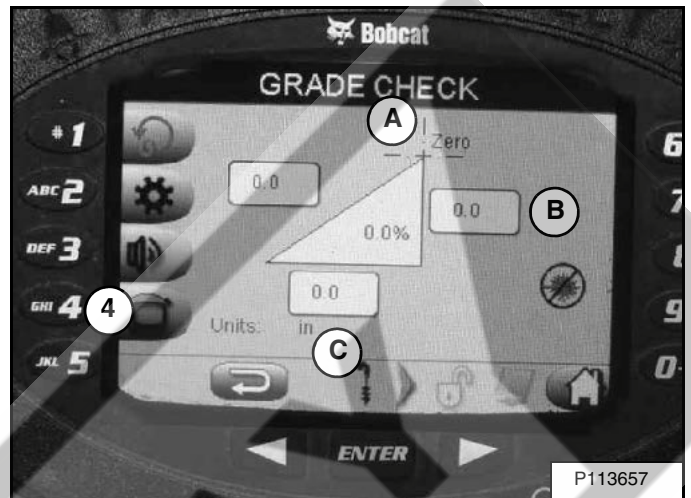


Follow the same procedure as for digging a hole except as follows. (See Digging A Hole To A Predetermined Depth (Re-benching Without A Laser Reference) on Page 122.)

When re-benching the bucket for setting to 0.0., position the bucket (Item 1) [Figure 226] at the starting point of the side of the hole that the excavator is positioned on.

This will allow the Depth Check to know the starting position of the hole for the depth and width of the hole.

Figure 227



Press (Item 4) [Figure 227] to scroll to the [GRADE CHECK] screen on the display panel. For additional information. (See Preferences on Page 120.)

The [ZERO] (Item A) is the re-benching starting point. (Item B) shows the target depth. (Item C) [Figure 227] shows the reach (distance away from the zero mark starting point (Item 1) [Figure 226].

NOTE: The warning buzzer (if activated) will start to beep when getting close to the target depth and progressively beeps faster until the target depth is reach and then the buzzer will sound continuously. The buzzer only activates on the depth, not for the reach (width of hole). That will need to be monitored visually using (Item C) [Figure 227].

WARNING

AVOID INJURY OR DEATH

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

W-2116-0903

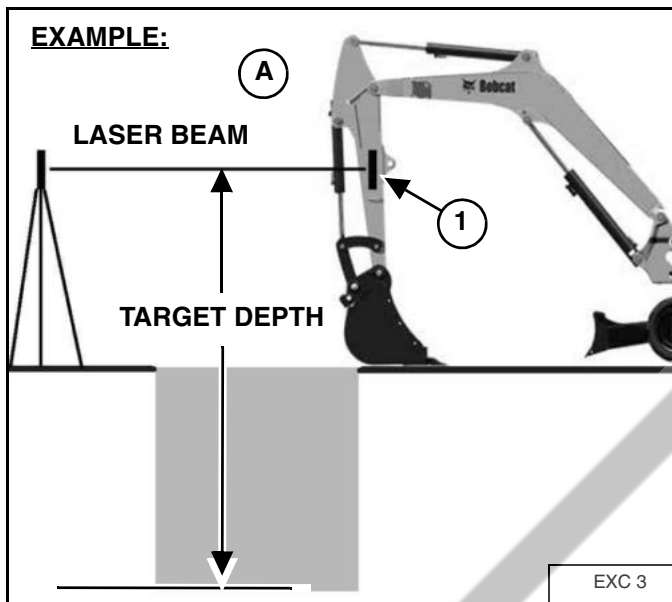
DEPTH CHECK (CONT'D)

Operation (Cont'd)

Digging A Hole Using A Laser

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

Figure 228

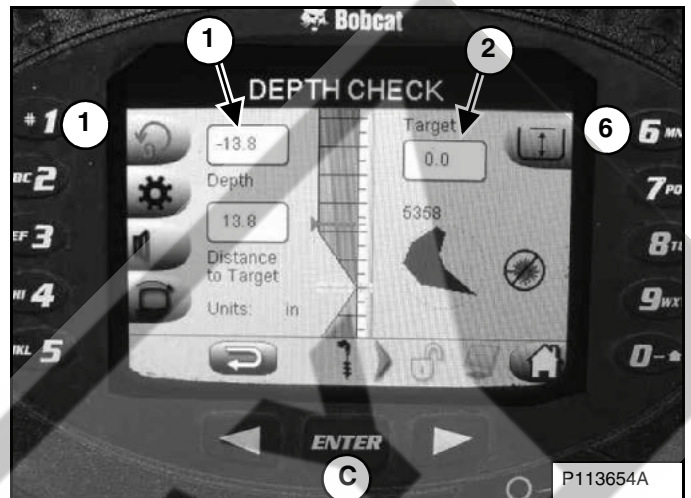


NOTE: Make sure the laser receiver dimensional location on the arm has been added into the Depth Check. For additional information. (See Laser Receiver Position On Arm on Page 119.)

With the arm vertical, raise or lower the boom and arm as needed until the laser (Item 1) strikes the receiver (Item 2) [Figure 228]. (If needed, curl the bucket fully for increased bucket ground clearance or a hole may need to be dug so that the bucket can be lowered to allow the laser to strike the receiver with the arm vertical.)

NOTE: If the arm is not vertical and you try to re-bench, a screen will tell you to make the arm vertical before it will allow the re-bench.

Figure 229



With the laser striking the receiver, press (Item 1) [Figure 229] to set the laser position.

Press (Item 6) to access the pre-set Target Depth screen or go to figure [Figure 201] to add or change the target depth. When the correct target depth is entered, press the [ENTER] button (Item C) [Figure 229] to save the setting.

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

DEPTH CHECK (CONT'D)

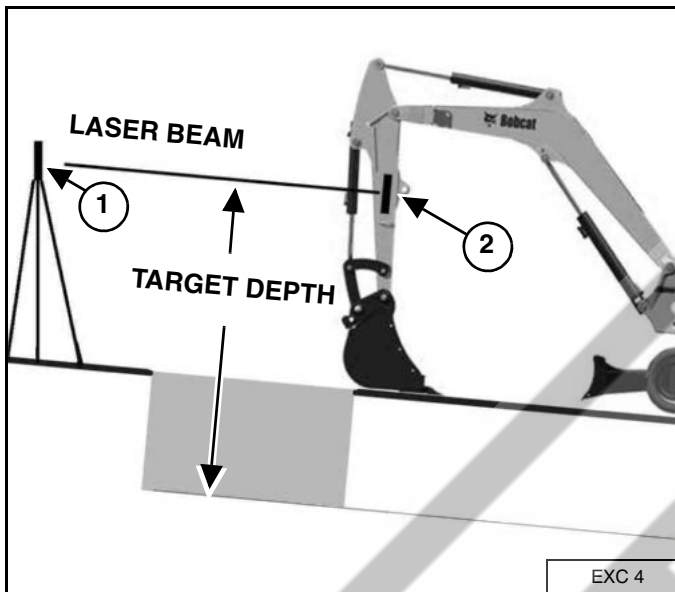
Operation (Cont'd)

Digging A Trench With Slope Using A Laser (Re-benching Using A Laser Reference)

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

NOTE: Digging a slope with a laser requires a laser that has slope capability. The laser must be positioned square with the desired direction of the slope.

Figure 230

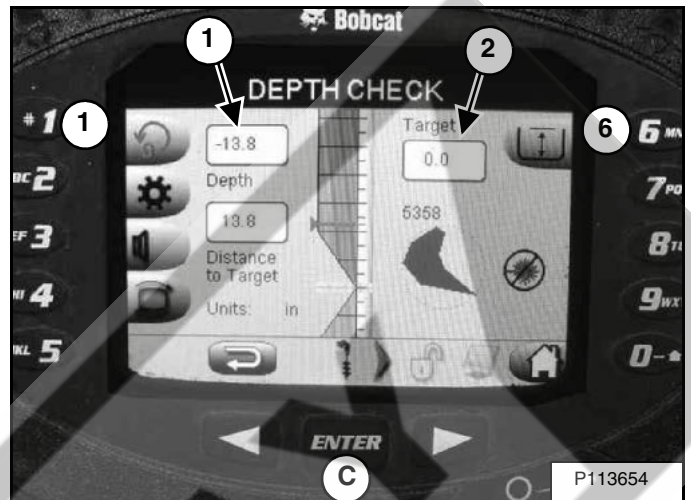


NOTE: Make sure the laser receiver dimensional location on the arm has been added into the Depth Check. For additional information. (See Laser Receiver Position On Arm on Page 119.)

With the arm vertical, raise or lower the boom and arm as needed until the laser (Item 1) strikes the receiver (Item 2) [Figure 230]. (If needed, curl the bucket fully for increased bucket ground clearance or a hole may need to be dug so that the bucket can be lowered to allow the laser to strike the receiver with the arm vertical.)

NOTE: If the arm is not vertical and you try to re-bench, a screen will tell you to make the arm vertical before it will allow the re-bench.

Figure 231



With the laser striking the receiver, press (Item 1) [Figure 231] to set the laser position.

Press (Item 6) to access the preset target depth screen or go to figure [Figure 201] to add or change the target depth. When the correct target depth is entered, press the [ENTER] button (Item C) [Figure 231] to save the setting.

With the Depth Check system set-up, the excavator can now be repositioned anywhere in the laser range and the dig depth will stay consistent to the set target depth and to the slope set with the laser.

TOWING THE EXCAVATOR

Procedure

There is not a recommended towing procedure for the excavators.

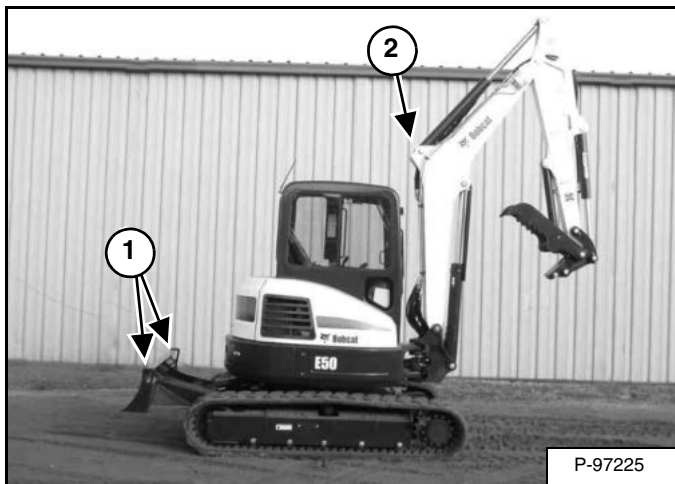
- The excavator can be lifted onto the transport vehicle.
- The excavator can be skidded a short distance for service (EXAMPLE: Move onto a transport vehicle) without damage to the hydraulic system. (The tracks will not turn.) There might be slight wear to the tracks when the excavator is skidded.
- The towing chain (or cable) must be rated at 1.5 times the weight of the excavator. (See Performance on Page 212.)

RENT
TWAY

LIFTING THE EXCAVATOR

Procedure

Figure 232



Fully extend the cylinders of the bucket, arm, and boom so that the excavator is in the position as shown [Figure 232].

Raise the blade all the way.

Put all the control levers in NEUTRAL.

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

WARNING

AVOID INJURY OR DEATH

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

W-2580-EN-0210

Figure 233

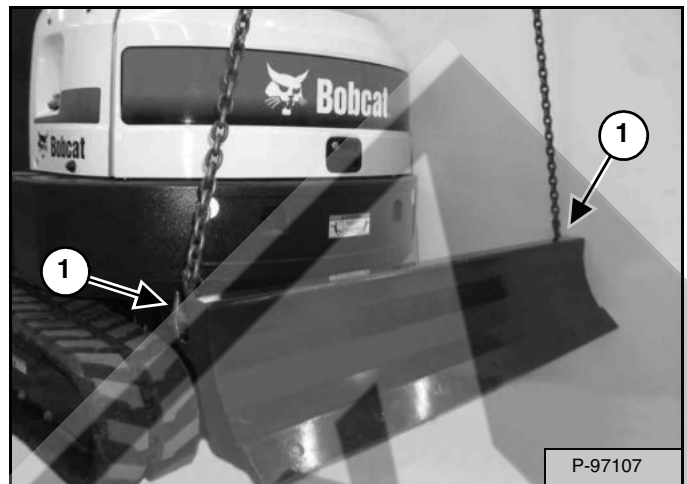
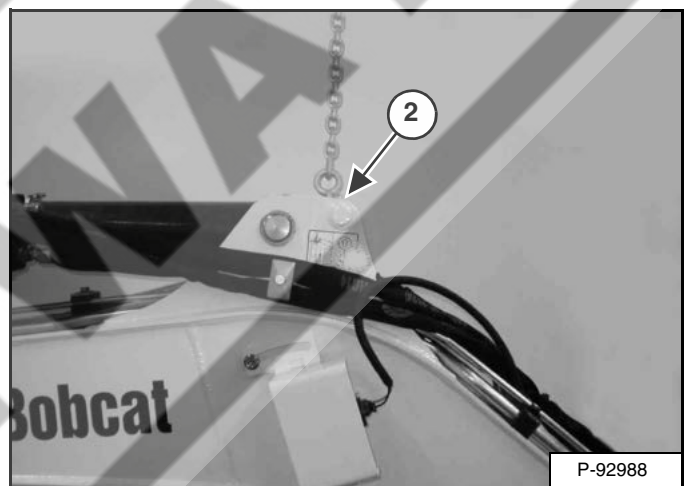


Figure 234



Fasten chains to the ends of the blade (Item 1) [Figure 232] and [Figure 233] and up to a lifting fixture above the canopy / cab. The lifting fixture must extend over the sides of the canopy / cab to prevent the chains from hitting the ROPS / TOPS.

Fasten a chain (Item 2) [Figure 232] and [Figure 234] from the rod to the lift fixture.

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

Use metal loading ramps with a slip resistant surface.

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

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

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

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

Figure 235



Move the machine forward onto the transport vehicle [Figure 235].

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

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

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

Put blocks at the front and rear of the tracks.

TRANSPORTING THE EXCAVATOR ON A TRAILER (CONT'D)

Fastening

Figure 236

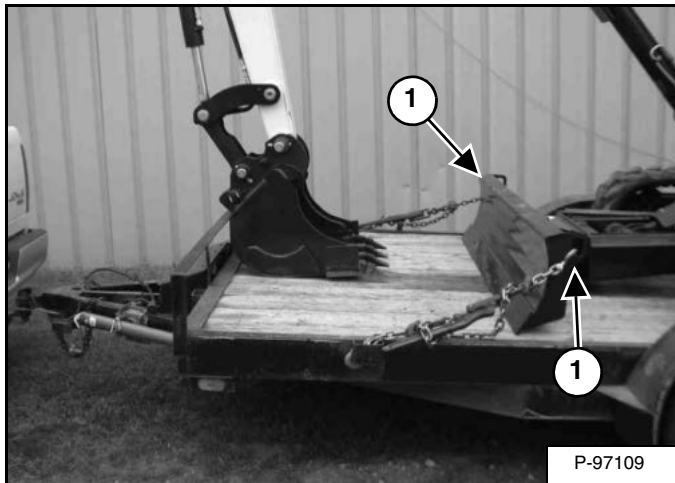


Figure 237



Fasten chains to the front corners of the blade (Item 1) [Figure 236] and to the tie down loop at both sides of the track frame (Item 1) [Figure 237] 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.



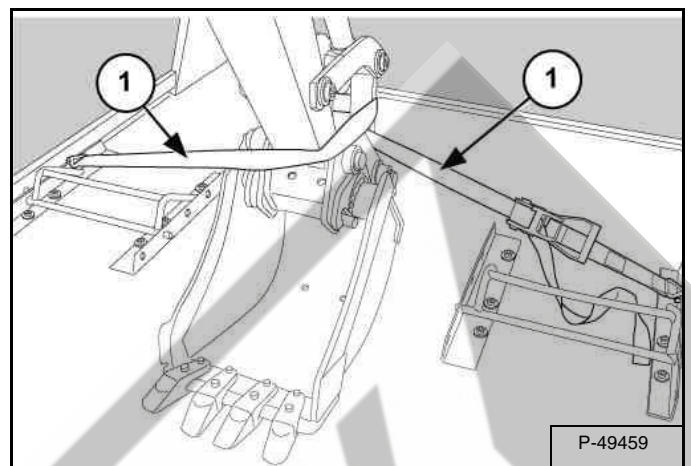
WARNING

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

Figure 238



When on the transport vehicle, loop the chains through the holes in the mounting frame.

Loop the chain (Item 1) [Figure 238] round the bucket link.

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Bobcat®

MAINTENANCE SAFETY



WARNING

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

W-2003-0807



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

CORRECT



P-90216

- Never service the Bobcat Compact Excavator without instructions.

CORRECT



NA1428

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

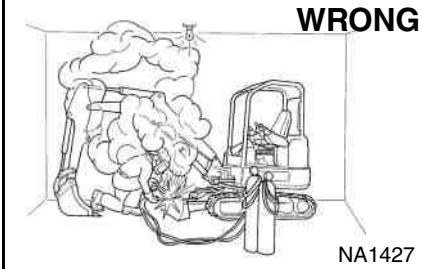
CORRECT



NA1425

- Cleaning and maintenance are required daily.

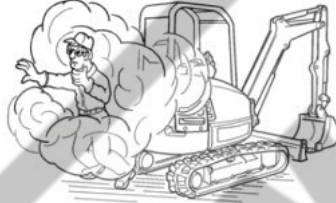
WRONG



NA1427

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

WRONG



NA1426

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

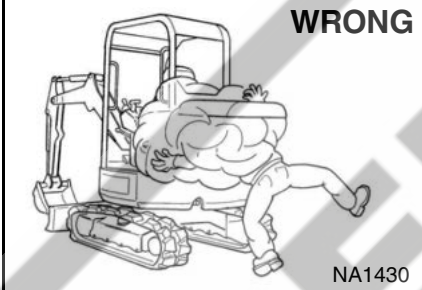
WRONG



NA1429

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

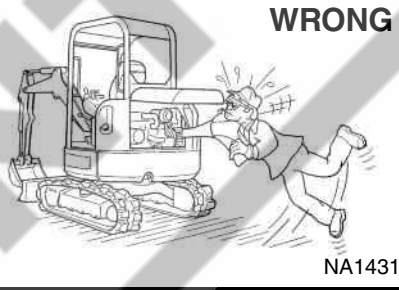
WRONG



NA1430

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

WRONG



NA1431

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

WRONG



B-19798

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

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

MSW38-0409



Bobcat®

SERVICE SCHEDULE

Maintenance Intervals

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

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



WARNING

AVOID INJURY OR DEATH

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

W-2003-0807

Every 10 Hours (Before Starting The Excavator)

- **Engine Oil** - Check level and add as needed.
- **Engine Air Filters and Air System** - Check display panel. Service only when required. Check for leaks and damaged components.
- **Engine Cooling System** - Check coolant level COLD and add premixed coolant as needed.
- **Hydraulic Fluid** - Check fluid level and add as needed.
- **Fuel Filter** - Drain water and sediment from filter.
- **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.
- **Motion Alarm** - Check for proper function.
- **Operator Canopy / Cab** - Check the canopy / cab condition and mounting hardware.
- **Operator Cab and HVAC Filters** - Clean filters as needed.
- **Indicators and Lights** - Check for correct operation of all indicators and lights.
- **Safety Signs** - Check for damaged signs (decals). Replace any signs that are damaged.
- **Track Tension** - Check tension and adjust as needed.
- **Pivot Points** - Grease all machinery pivot points. Grease clamp and angle blade (if equipped).
- **X-Change / Attachment Coupler** - Check for damage or loose parts (if equipped).

First 50 Hours

- **Engine Oil and Filter** - Service at first 50 hours, then as scheduled. Replace oil and filter. (See Page 153.)
- **Fuel Filter** - Service at first 50 hours, then as scheduled. Replace filter. (See Page 147.)
- **Alternator and Starter** - Service at first 50 hours, then as scheduled. Check connections.
- **Travel Motors (Final Drive)** - Service at first 50 hours, then as scheduled. Replace fluid. (See Page 171.)
- **Drive Belts (Alternator) (Air Conditioning- If Equipped)** - Check condition. Replace as needed. Service at first 50 hours, then as scheduled.
- **Hydraulic Filter, Case Drain Filter and Hydraulic Reservoir Breather Cap** - Service at first 50 hours, then as scheduled. Replace the hydraulic filter, case drain filter and the reservoir breather cap.

Every 50 Hours

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

Every 250 Hours Or Every 12 Months

- **Travel Motors (Final Drive)** - Check fluid level and add as needed.

SS EXC E32 - E55 iT4 T4-K-0416

SERVICE SCHEDULE (CONT'D)

Maintenance Intervals (Cont'd)

Every 500 Hours Or Every 12 Months

- **Engine Oil and Filter** - Replace oil and filter.
- **Fuel Filter** – Replace filter element.
- **Cooling System** - Clean debris from radiator, fuel cooler, hydraulic fluid cooler, air conditioning condenser (if equipped).
- **Hydraulic Filter, Case Drain Filter and Hydraulic Reservoir Breather Cap** - Replace the hydraulic filter, case drain filter and the reservoir breather cap.
- **Drive Belts (Alternator) (Air Conditioning - If Equipped)** - Check condition. Replace as needed.
- **Alternator and Starter** - Check connections.
- **HVAC** - Clean housing and coils.

Every 1000 Hours Or Every 12 Months

- **Swing Cylinder Base End** - Grease swing cylinder base end grease fitting.
- **Hydraulic Fluid and Filters** - Replace hydraulic fluid and filters.
- **Travel Motors (Final Drive)** - Replace fluid.
- **Engine Valves** - Adjust the engine valve clearance.

Every 24 Months

- **Coolant** - Replace the coolant.

SS EXC E32 - E55 iT4 T4-K-0416

NOTE: The Inspection Checkbook can be ordered for you by your local dealer. Part number 7296478.

SERVICE SCHEDULE (CONT'D)

Inspection Checkbook

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 the correct maintenance of the Bobcat excavator.

The Inspection Checkbook contains the following information:

- Doosan Bobcat EMEA s.r.o. Warranty Policy
- Doosan Bobcat EMEA s.r.o. Extended Warranty Policy

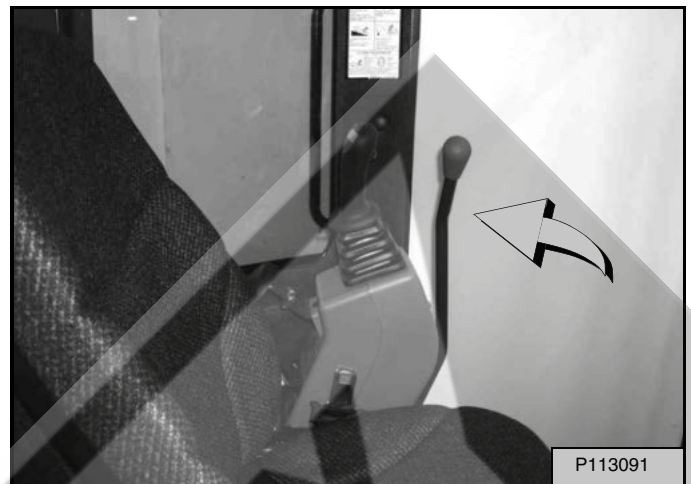
The inspection checkbook has to be filled in by the Dealer for any maintenance and service work of your Bobcat machine. This book may be required anytime by an authorised dealer or by Bobcat Europe, should be a breakdown occur on the Bobcat equipment.

Your dealer can order the Inspection Checkbook.
Part Number: 7296478.

CONTROL CONSOLE LOCKOUTS

Inspection And Maintenance

Figure 239



When the left console is raised **[Figure 239]**, the hydraulic control levers (joysticks) and traction system must not function.

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

Raise the left console **[Figure 239]**.

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

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

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

SEAT BELT

Inspection And Maintenance

! WARNING

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

W-2466-0703

Check the seat belt daily for correct function.

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

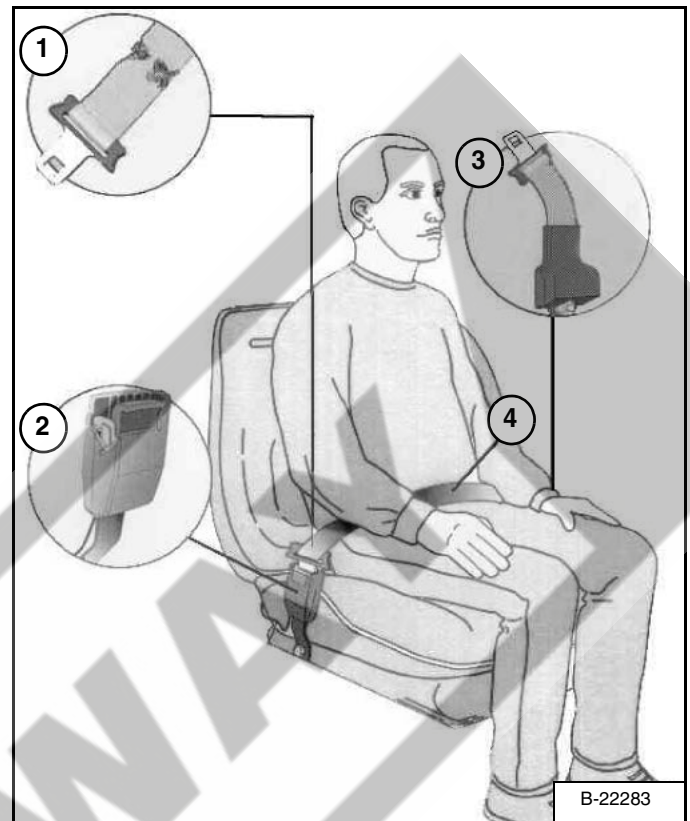
Any seat belt system that shows cuts, fraying, extreme or unusual wear, significant discolourations due to ultraviolet UV exposure, dusty / dirty conditions, abrasion to the seat belt webbing, or damage to the buckle, latch plate, retractor (if equipped), hardware or any other obvious problem should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

The items below are referenced in [Figure 240].

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

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

Figure 240



B-22283

MOTION ALARM SYSTEM

Description

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

Inspecting

Figure 241



Figure 242



Inspect for damaged or missing motion alarm decal (Item 1) [Figure 241] (cab machine) or (Item 1) [Figure 242] (canopy machine). Replace if required.

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

! WARNING

AVOID INJURY OR DEATH

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

W-2050-0807

Sit in the operator's seat and fasten the seat belt. Start the engine. (See PRE-STARTING PROCEDURE on Page 67.)

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

Figure 243



Slightly move both travel control levers in the forward direction (until the machine is slowly moving forward) and then press the motion alarm cancel switch (Item 1) [Figure 243]. The motion alarm will shut off. With the machine still moving forward, move one of the levers to the NEUTRAL position, the motion alarm must sound.

Slightly move both travel control levers in the reverse direction (until the machine is slowly moving backward) and then press the motion alarm cancel switch (Item 1) [Figure 243] (the switch icon will be illuminated when the motion alarm is deactivated). The motion alarm will shut off. With the machine still moving backward, move one of the levers to the NEUTRAL position, the motion alarm must sound.

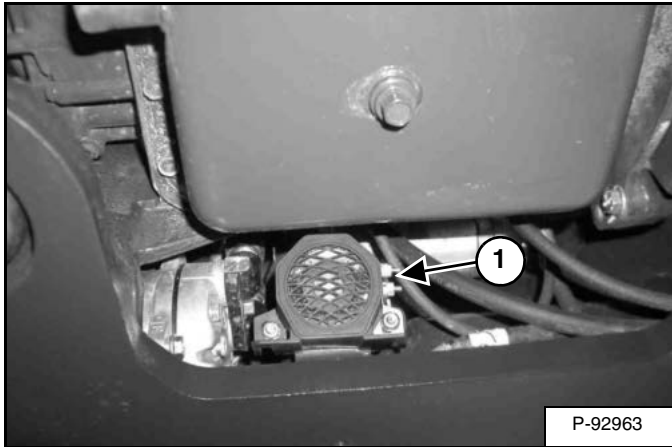
Return both levers to NEUTRAL and turn excavator key to OFF position. Exit the excavator. (See STOPPING THE ENGINE AND LEAVING THE EXCAVATOR on Page 75.)

MOTION ALARM SYSTEM (CONT'D)

Inspecting (Cont'd)

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

Figure 244

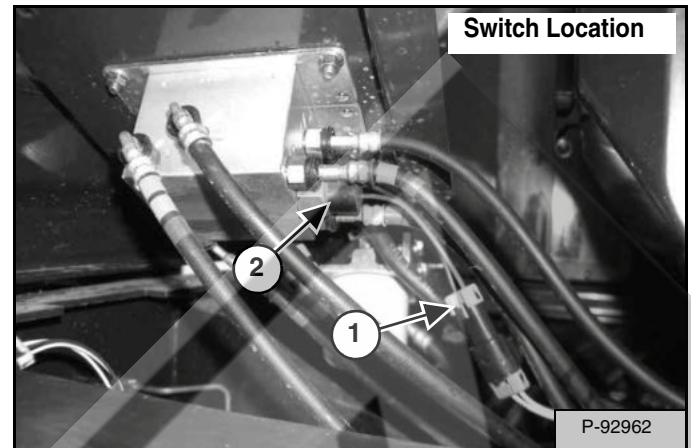


Inspect the motion alarm electrical connections and wire harness (Item 1) [Figure 244], wire harness (Item 1) [Figure 245] and motion alarm switch (Item 2) [Figure 245] for tightness and damage. Repair or replace any damaged components.

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

Adjusting Switch Position

Figure 245



The motion alarm switch (Item 2) [Figure 245] is located in the travel control valve located under the floorplate. Remove the floor mat and the floorplate to access the switch.

The switch (Item 2) [Figure 245] is non-adjustable. It must be fully installed into the travel control valve housings and tightened. Tighten the switch to 18 - 20 N•m (13 - 15 ft-lb).

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



WARNING

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

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

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

W-2786-0309

TAILGATE

Opening And Closing

! WARNING

AVOID INJURY OR DEATH

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

W-2012-0497

! WARNING

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

W-2020-1285

Figure 246



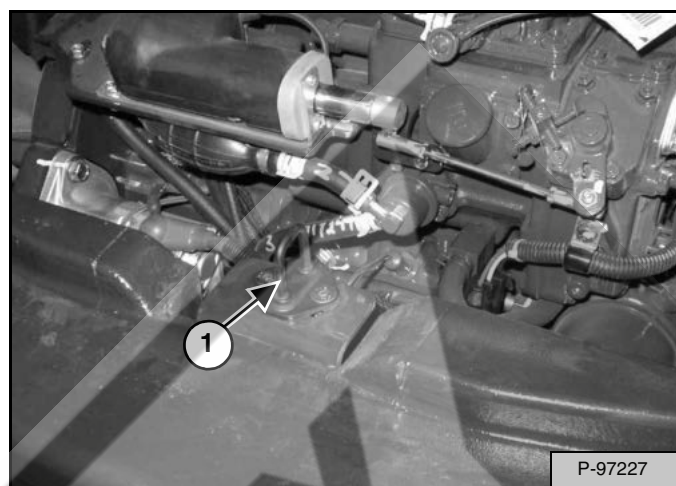
Pull the latch (Item 1) [Figure 246] and open the tailgate.

Push firmly to close the tailgate.

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

Adjusting The Latch

Figure 247



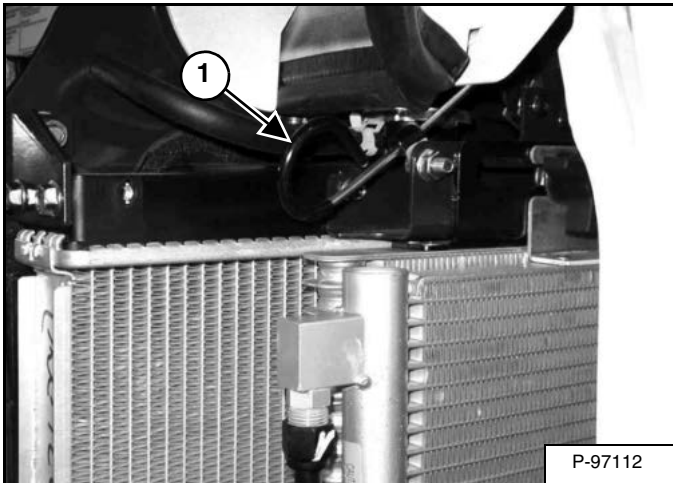
The tailgate latch (Item 1) [Figure 247] can be adjusted by loosening the two bolts, moving the latch, and tightening the two bolts.

Close the tailgate before operating the excavator.

RIGHT SIDE COVER

Opening And Closing

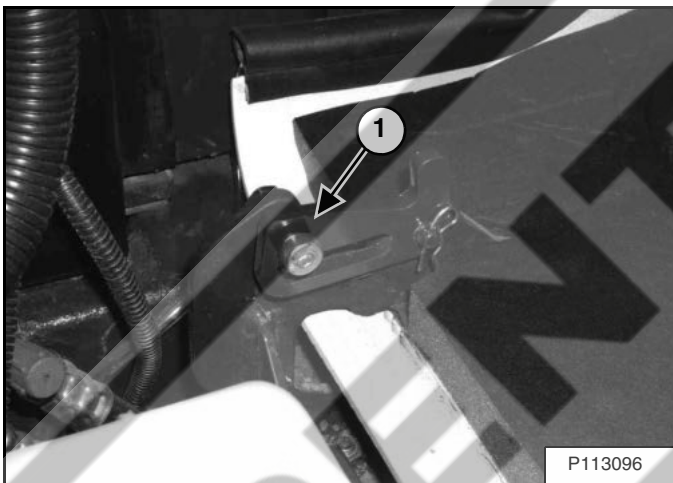
Figure 248



Open the tailgate to access the right side cover latch (Item 1) [Figure 248].

Pull the latch handle (Item 1) [Figure 248] out until the right side cover is unlatched.

Figure 249



Raise the right side cover and rotate forward until it is held open by the retainer (Item 1) [Figure 249].

To close the right side cover, lift up on the retainer (Item 1) [Figure 249] while raising the right side cover. Rotate the cover back until it is in the fully closed position. Secure the right side cover with the latch (Item 1) [Figure 248].

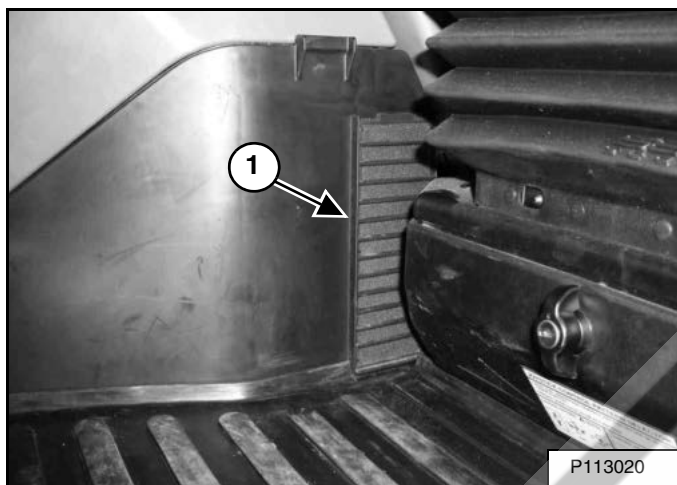
CAB FILTERS

Cleaning And Maintenance

The recirculation filter and the fresh air filter must be cleaned regularly. (See SERVICE SCHEDULE on Page 137.)

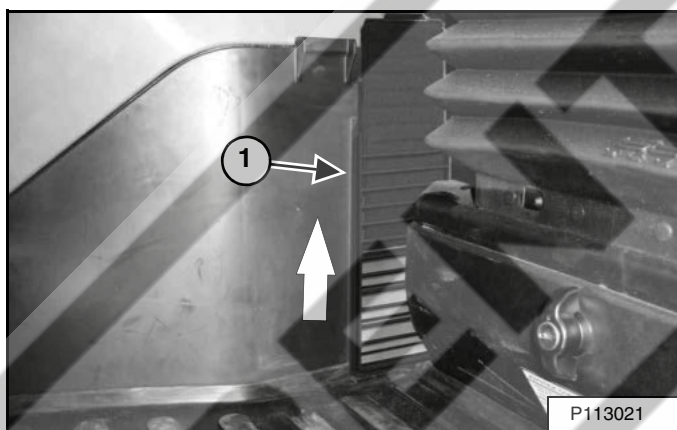
Recirculation Filter

Figure 250



The recirculation filter (Item 1) [Figure 250] is located to the right of the operator's seat.

Figure 251



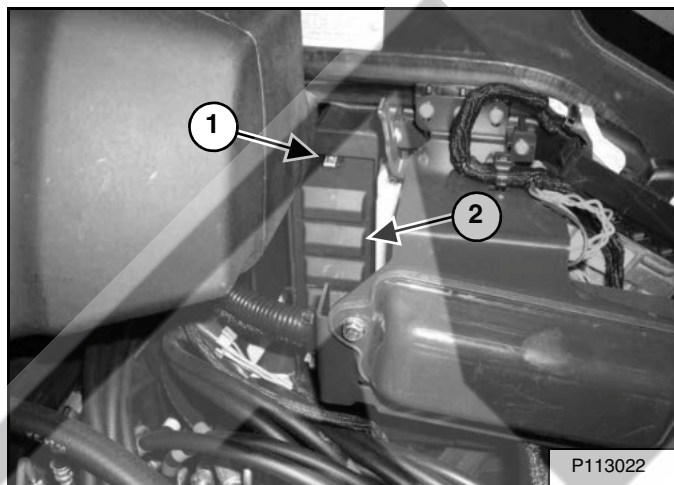
Pull up on the filter (Item 1) [Figure 251] until removed from the housing.

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

Installation: Position the bottom of the filter (Item 1) [Figure 251] into the housing and slowly push the filter down fully.

Fresh Air Filter

Figure 252

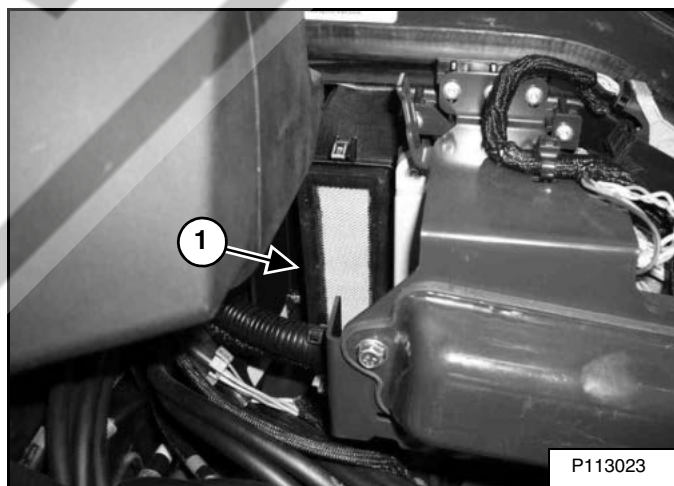


The fresh air filter is located under the right side cover.

Open the right side cover. (See RIGHT SIDE COVER on Page 144.)

Pull out on the tab (Item 1) and remove the cover (Item 2) [Figure 252].

Figure 253



Pull the filter (Item 1) [Figure 253] out of the housing.

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

Installation: Position the filter (Item 1) [Figure 251] into the housing and slowly push the filter in fully.

Place the bottom tabs of the filter cover (Item 2) into the frame and push the top in until the tab (Item 1) [Figure 252] locks to the frame.

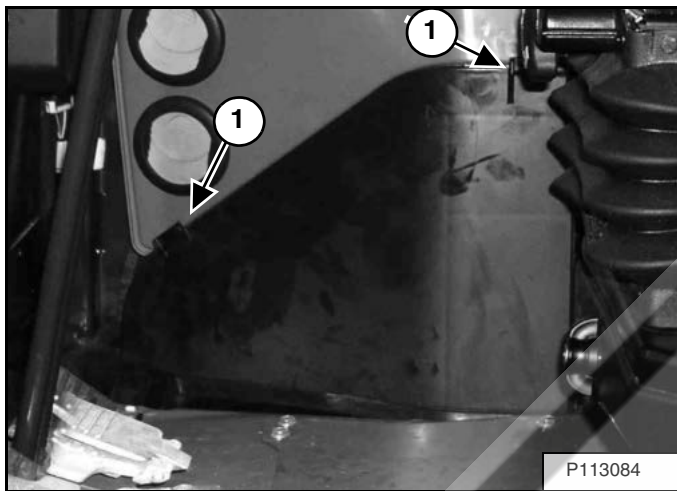
HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

Cleaning And Maintenance

The inside of the HVAC housing needs to be cleaned regularly. Dust will accumulate over time inside the housing. A dusty heater and evaporator coil will reduce heating and cooling efficiency. (See SERVICE SCHEDULE on Page 137.)

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

Figure 254

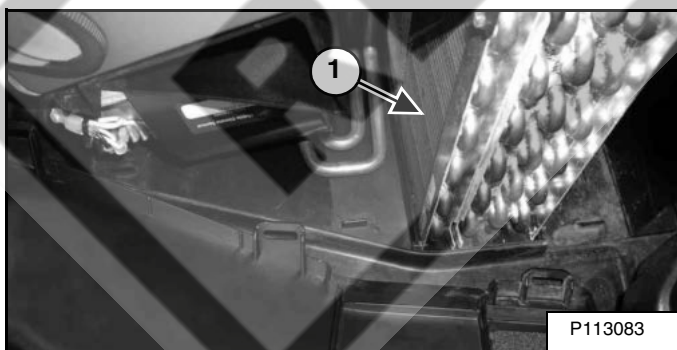


Remove the floor mat.

Pull back on the two latches (Item 1) [Figure 254] and remove the HVAC side cover.

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

Figure 255



Use a lower pressure air or a low pressure water stream to remove debris and to clean the coils (Item 1) [Figure 255].

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

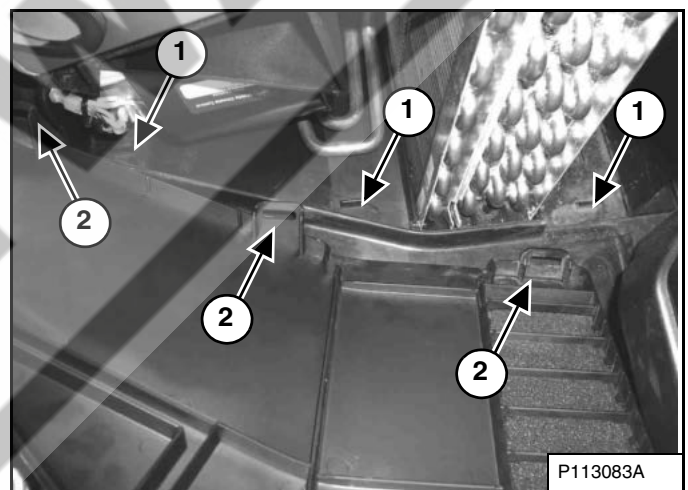
There are three rubber drain valves that allow condensation to drain from the housing during normal air conditioning usage. These drain valve can get clogged with dirt and should be cleaned at the same time the housing is cleaned.

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

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

Reinstall the centre floorplate and close the right side cover.

Figure 256



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

Three tabs (Item 1) are on the bottom of the HVAC housing that the side cover retainers (Item 2) [Figure 256] fit into.

Position the side cover on the tabs and starting with the front edge of the side cover, position it into the front of the HVAC housing. Press on the front of the cover to secure the front latch (Item 1) [Figure 254]. Then press in on the top edge of the side cover and work back to the rear of the cover and secure the rear latch.

Reinstall the floor mat.

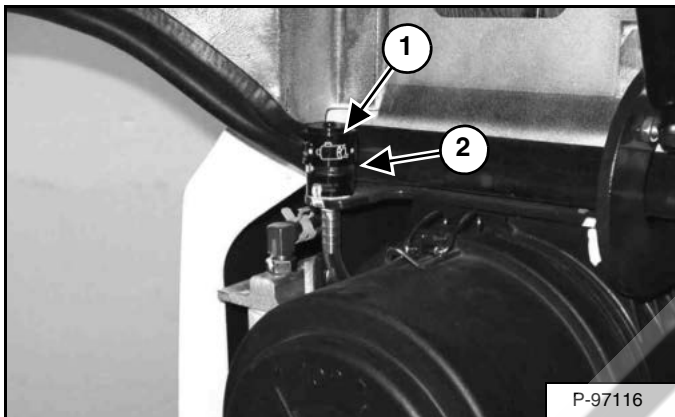
AIR CLEANER SERVICE

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 137.)

Daily Check

The air cleaner is located in the engine compartment. Open the tailgate to access the air cleaner for service. (See TAILGATE on Page 143.)

Figure 257



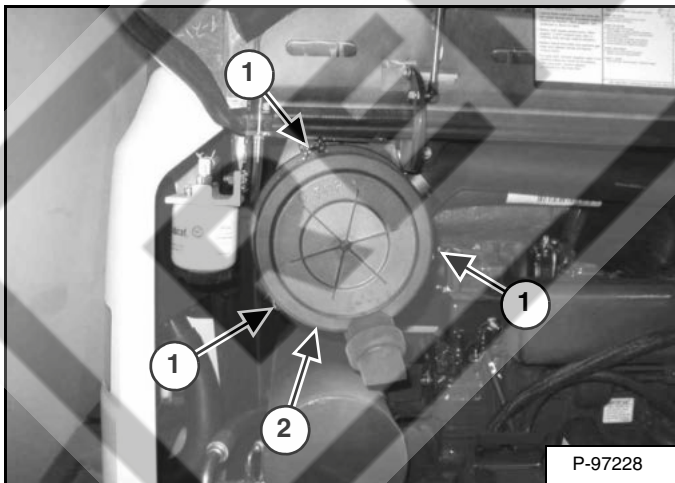
Check the condition indicator (Item 1) [Figure 257]. If the red ring shows in the condition indicator, the filter needs to be replaced.

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

Replacing The Filter Elements

Outer Filter

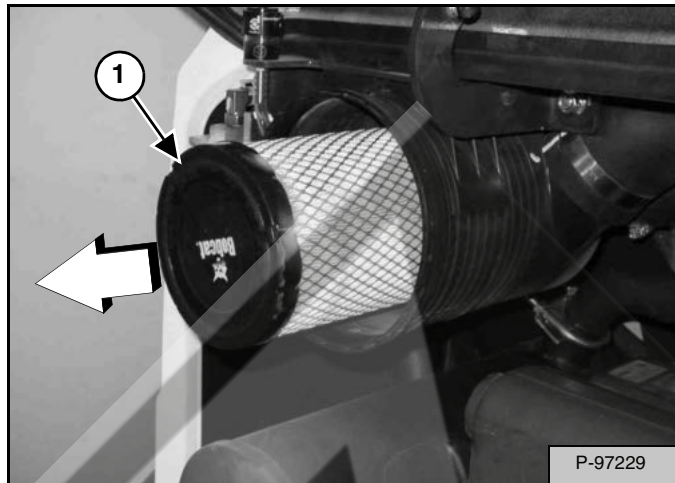
Figure 258



Release the three fasteners (Item 1) [Figure 258].

Remove and clean the dust cup (Item 2) [Figure 258].

Figure 259



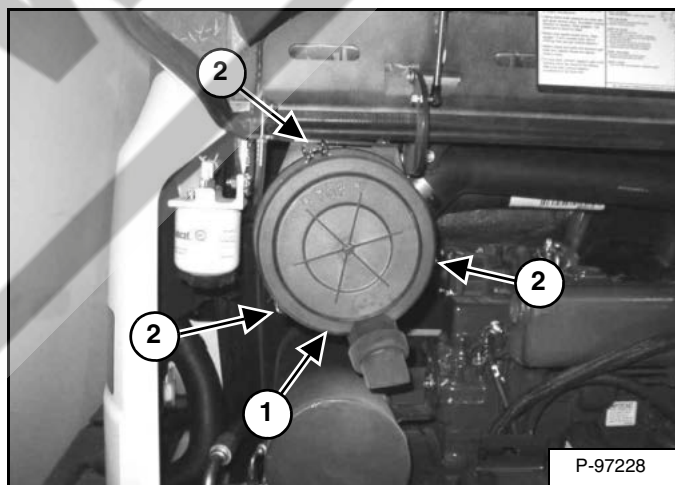
Pull the outer filter (Item 1) [Figure 259] from the air cleaner housing.

Check the housing for damage.

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

Install a new filter.

Figure 260



Install the dust cup (Item 1) and engage the three fasteners (Item 2) [Figure 260].

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

After the outer filter has been replaced, press the button (Item 1) [Figure 257] on the end of the condition indicator and start the engine. Run at full rpm, then reduce engine speed and stop the engine. If the red ring (Item 2) [Figure 257] shows in the condition indicator, replace the inner filter.

AIR CLEANER SERVICE (CONT'D)

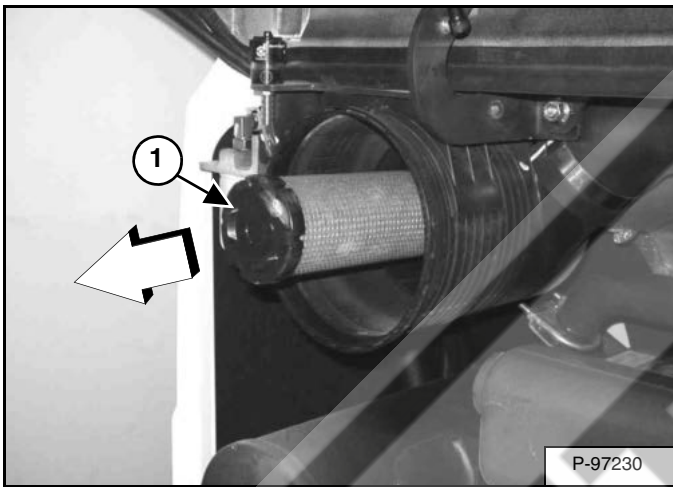
Replacing The Filter Elements (Cont'd)

Inner Filter

Only replace the inner filter under the following conditions:

- Replace the inner filter every *third* time the outer filter is replaced.
- After the outer filter has been replaced, press the button (Item 2) **[Figure 257]** on the end of the condition indicator. Start the engine. Run the engine at full rpm, then reduce engine speed. Stop the engine. If the red ring shows in the condition indicator, replace the inner filter.

Figure 261



Remove the dust cup, outer filter and inner filter (Item 1) **[Figure 261]**.

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

Install the new inner filter.

Install the outer filter and the dust cup.

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

Close the tailgate.

FUEL SYSTEM

Fuel Specifications

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

U.S. Standard (ASTM D975)

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

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

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

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

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

E.U. Standard (EN590)

Use only clean, high quality diesel fuel that meets the EN590 specifications listed below:

- Ultra low sulfur diesel fuel defined as 10 mg/kg (10 ppm) sulfur maximum.
- Diesel fuel with cetane number of 51.0 and above.

NOTE: Biodiesel blend fuel may also be used in this machine. Biodiesel blend fuel must contain no more than seven percent biodiesel mixed with ultra low sulfur petroleum based diesel. This biodiesel blend fuel is commonly marketed as B7 blended diesel fuel. B7 blended diesel fuel must meet EN590 specifications.

Biodiesel Blend Fuel

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

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

Apply the following guidelines if biodiesel blend fuel is used:

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

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

FUEL SYSTEM (CONT'D)

Filling The Fuel Tank

! WARNING

AVOID INJURY OR DEATH

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

W-2063-0807

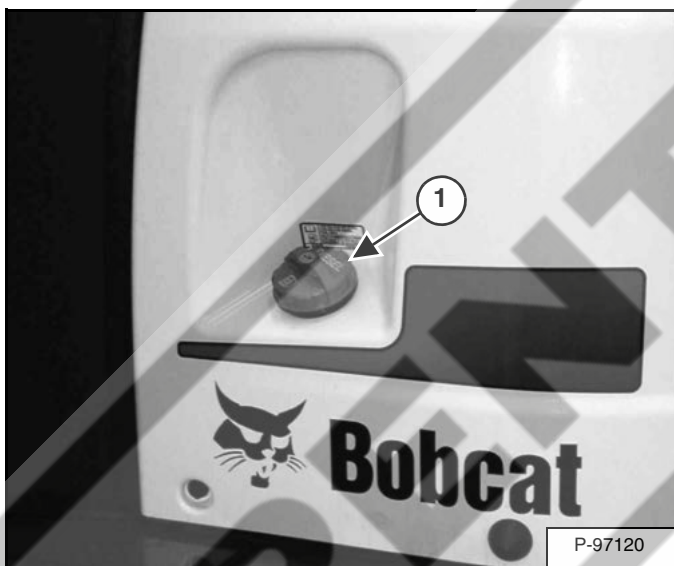
! WARNING

AVOID INJURY OR DEATH

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

W-2103-0508

Figure 262



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

Remove the fuel fill cap (Item 1) [Figure 262].

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

Install and tighten the fuel fill cap.

Clean up any spilled fuel.

See the SERVICE SCHEDULE for the service interval when to remove water from or replace the fuel filter. (See SERVICE SCHEDULE on Page 137.)

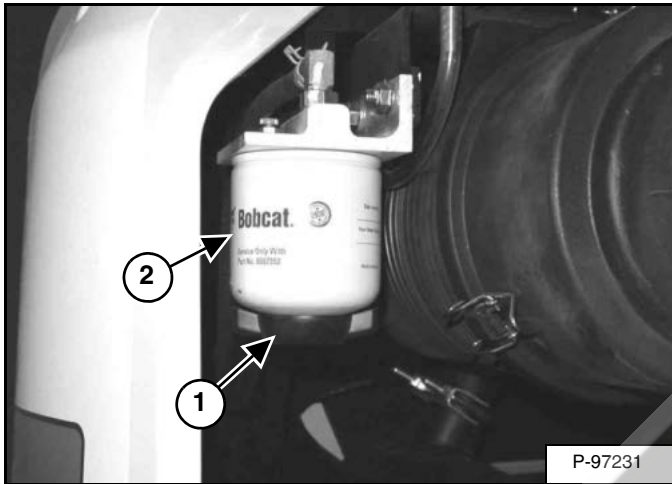
FUEL SYSTEM (CONT'D)

Fuel Filters

Removing Water

Open the tailgate. (See TAILGATE on Page 143.)

Figure 263



Loosen the drain (Item 1) [Figure 263] at the bottom of the filter to drain water from the filter into a container.

Clean up any spilled fuel.

Replacing Elements

Remove the filter (Item 2) [Figure 263].

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

Remove the air from the fuel system. (See Removing Air From The Fuel System on Page 152.)

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 doctor familiar with this injury.

W-2072-EN-0909

Draining The Fuel Tank

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 137.)

Figure 264

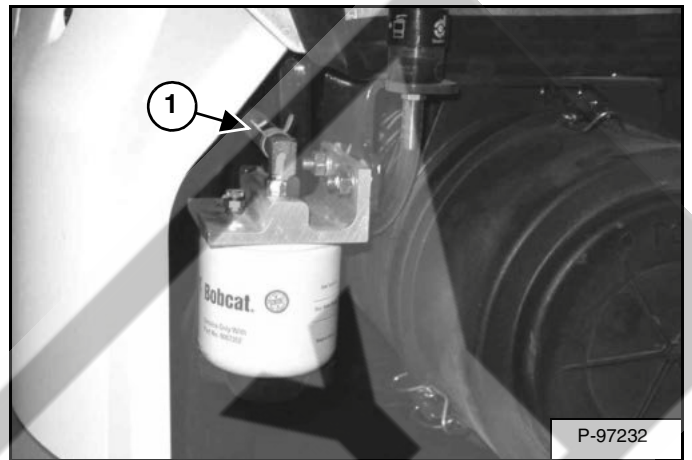
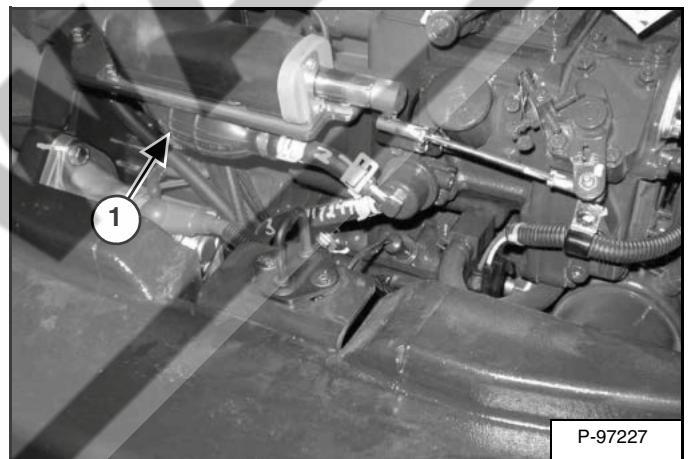


Figure 265



Remove the hose (Item 1) [Figure 264] from the fuel filter. Route the hose to a container.

Squeeze the hand pump (priming bulb) (Item 1) [Figure 265] to start the fuel siphoning from the fuel tank.

Drain the fuel into the container.

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

Reinstall the hose (Item 1) [Figure 264] after the fuel is removed from fuel tank.

FUEL SYSTEM (CONT'D)

Removing Air From The Fuel System

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

Figure 266

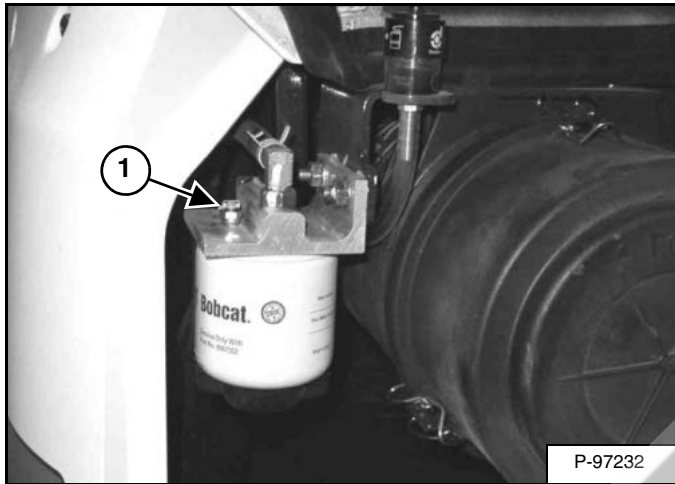
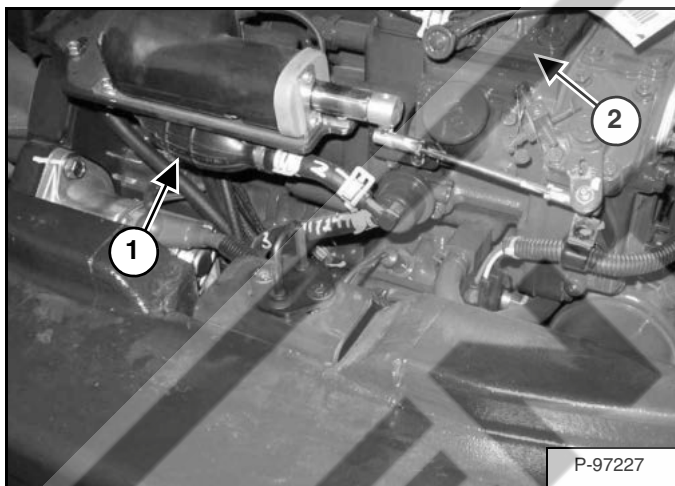


Figure 267



Open the tailgate. (See TAILGATE on Page 143.)

Open the fuel filter vent (Item 1) [Figure 266] and operate the hand pump (priming bulb) (Item 1) [Figure 267] until the fuel flows from the vent with no air bubbles.

Close the vent (Item 1) [Figure 266].

Clean up any spilled fuel.

Start the engine. It may be necessary to open the vent (Item 2) [Figure 267] (at the fuel injection pump) briefly until the engine runs smoothly.

WARNING

AVOID INJURY OR DEATH

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

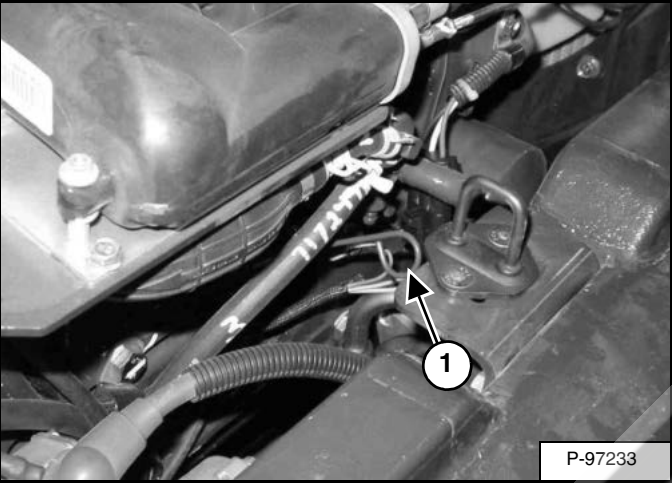
W-2072-EN-0909

ENGINE LUBRICATION SYSTEM

Checking And Adding Engine Oil

Check the engine oil after every 8 - 10 hours of operation and before starting the engine. (See SERVICE SCHEDULE on Page 137.)

Figure 268



Open the tailgate. (See TAILGATE on Page 143.)

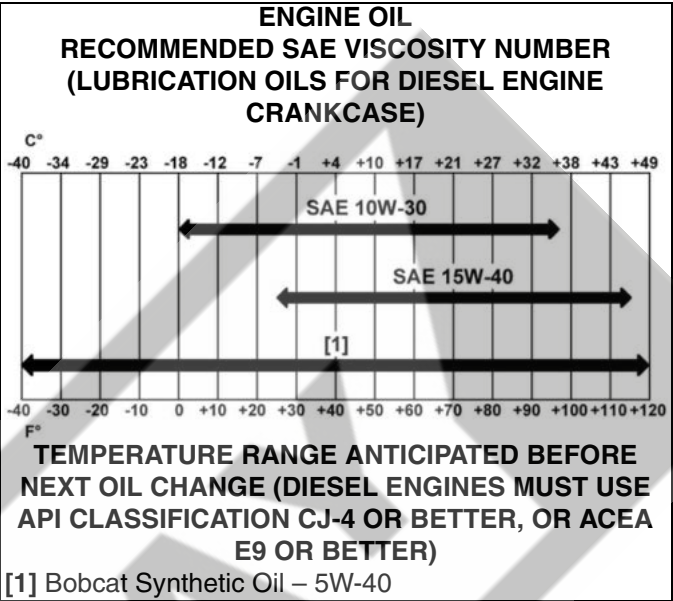
Remove the dipstick (Item 1) [Figure 268].

Keep the oil level between the marks on the dipstick.

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

Engine Oil Chart

Figure 269



Bobcat engine oils are recommended for use in this machine. If Bobcat engine oil is not available, use a good quality engine oil that meets API Service Classification of CJ-4 or better, or ACEA E9 or better [Figure 269].

**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

ENGINE LUBRICATION SYSTEM (CONT'D)

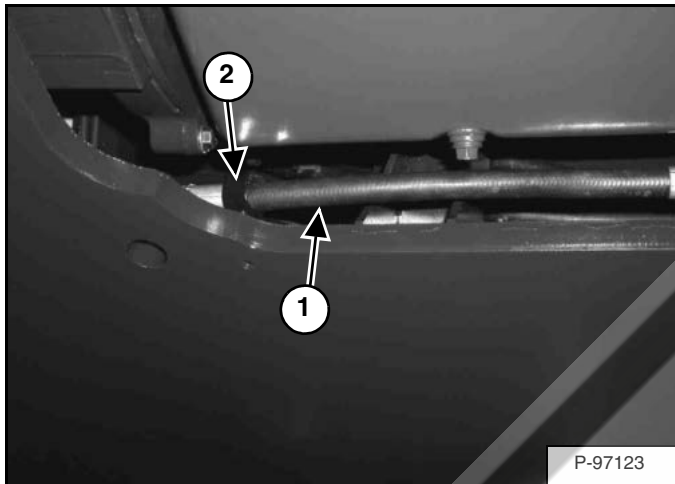
Removing And Replacing Oil And Filter

See the SERVICE SCHEDULE for the service interval for replacing the engine oil and filter. (See SERVICE SCHEDULE on Page 137.)

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

Open the tailgate. (See TAILGATE on Page 143.)

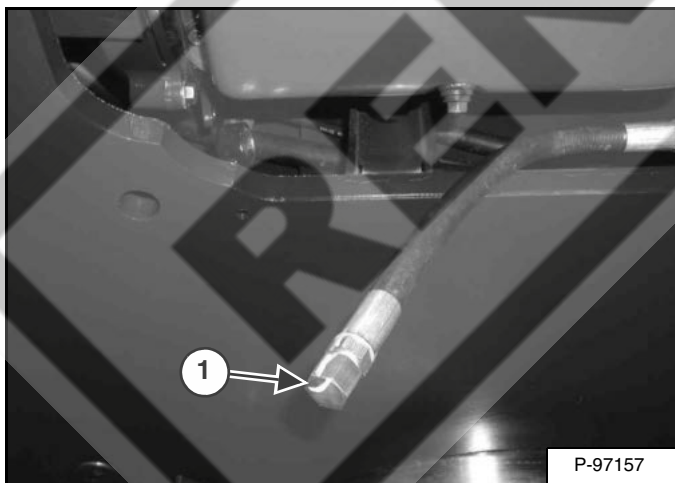
Figure 270



If equipped with the optional air deflector, remove the four bolts and the air deflector to access the drain hose (Item 1) [Figure 270].

Remove the drain hose (Item 1) from the storage clamp (Item 2) [Figure 270].

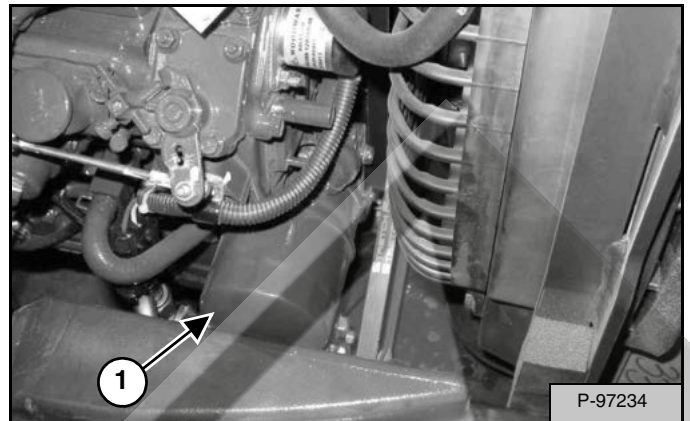
Figure 271



Place a container under the excavator. Remove the drain plug (Item 1) [Figure 271] from the drain hose.

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

Figure 272



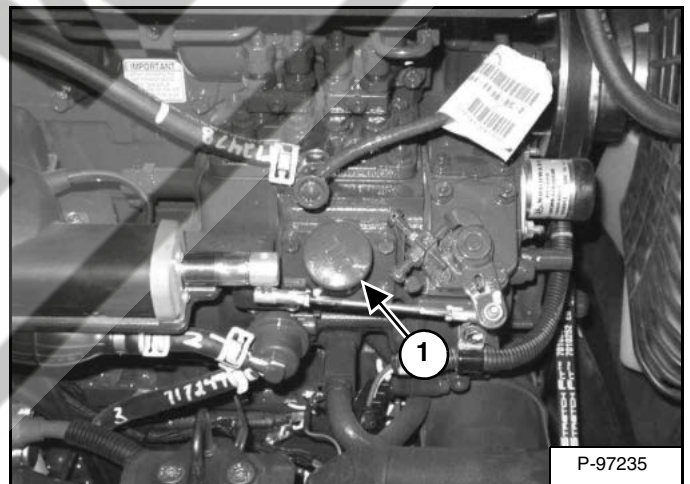
Remove the oil filter (Item 1) [Figure 272] and clean the filter housing surface.

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

Install and tighten the drain plug (Item 1) [Figure 271].

Put the drain hose (Item 1) back into the storage clamp (Item 2) [Figure 270].

Figure 273



Remove the fill cap (Item 1) [Figure 273].

Put oil in the engine. (See ENGINE LUBRICATION SYSTEM on Page 153.) and (See Capacities on Page 216.)

Install the fill cap (Item 1) [Figure 273].

Start the engine and let it run for several minutes.

Stop the engine. Check for leaks at the oil drain plug and the oil filter. Check the oil level.

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

ENGINE COOLING SYSTEM

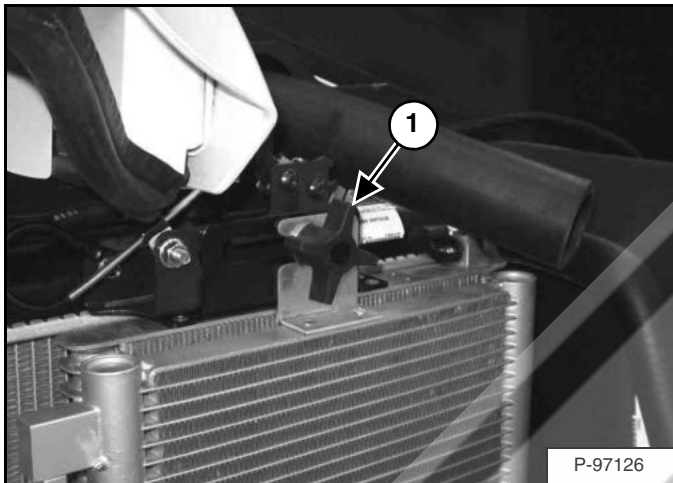
Check the cooling system every day to prevent over-heating, loss of performance or engine damage. (See SERVICE SCHEDULE on Page 137.)

Cleaning

Open the right side cover. (See RIGHT SIDE COVER on Page 144.)

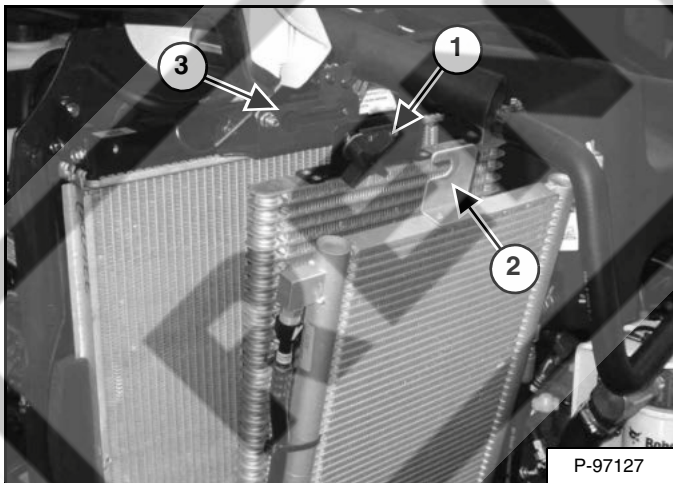
NOTE: Allow the cooling system and engine to cool before servicing or cleaning the cooling system.

Figure 274



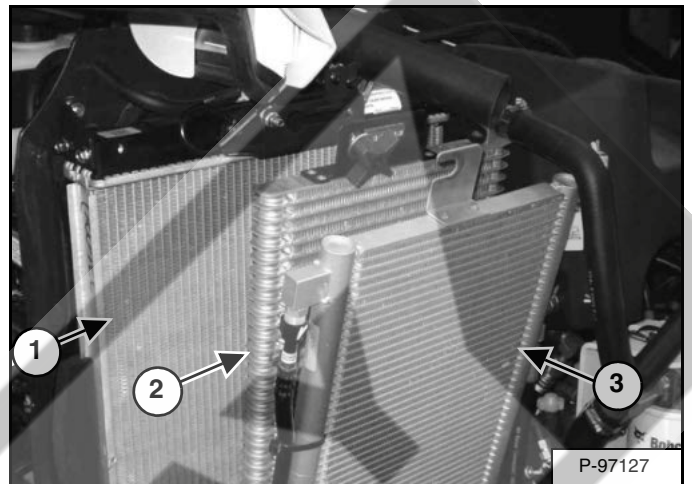
Loosen the knob (Item 1) [Figure 274]. Slide the knob toward the rear of the machine.

Figure 275



Slide the knob (Item 1) out of the condenser mount (Item 2) (if equipped) and the radiator mounting bracket (Item 3) [Figure 275]. Be careful not to damage fins.

Figure 276



Use air pressure or water pressure to clean the radiator (Item 1), oil cooler (Item 2) and condenser (Item 3) [Figure 276] (if equipped). Be careful not to damage fins when cleaning.

Position the knob (Item 1) so it fits into the radiator mount (Item 3) and the condenser mount (Item 2) [Figure 275] (if equipped).

Slide the knob (Item 1) [Figure 274] toward the front of the machine until it is fully seated in the slots of the mounting brackets. Tighten the knob (Item 1) [Figure 274]. Be careful not to damage fins.

ENGINE COOLING SYSTEM (CONT'D)

Checking Level

! WARNING

AVOID BURNS

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

W-2070-1203

! WARNING

AVOID INJURY OR DEATH

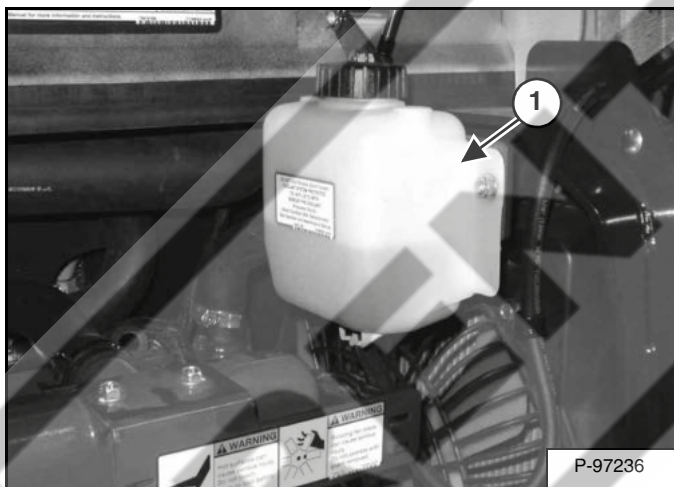
Wear safety glasses to prevent eye injury when any of the following conditions exist:

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

W-2019-0907

Open the tailgate. (See TAILGATE on Page 143.)

Figure 277



Check the coolant level in the coolant recovery tank (Item 1) [Figure 277].

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

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

IMPORTANT

AVOID ENGINE DAMAGE

Always use the correct ratio of water to antifreeze.

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

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

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

I-2124-0497

ENGINE COOLING SYSTEM (CONT'D)

Removing And Replacing Coolant

See the SERVICE SCHEDULE for correct service intervals. (See SERVICE SCHEDULE on Page 137.)

Stop the engine. Open the tailgate. (See TAILGATE on Page 143.)

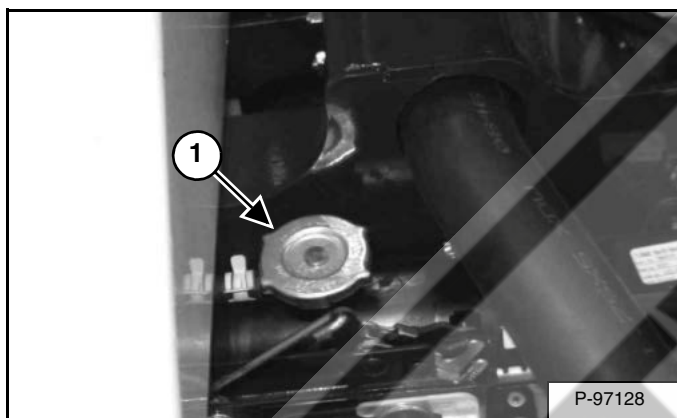
WARNING

AVOID BURNS

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

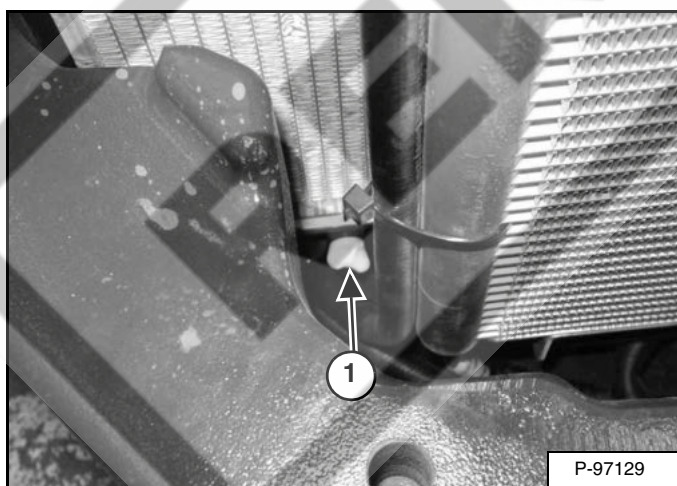
W-2070-1203

Figure 278



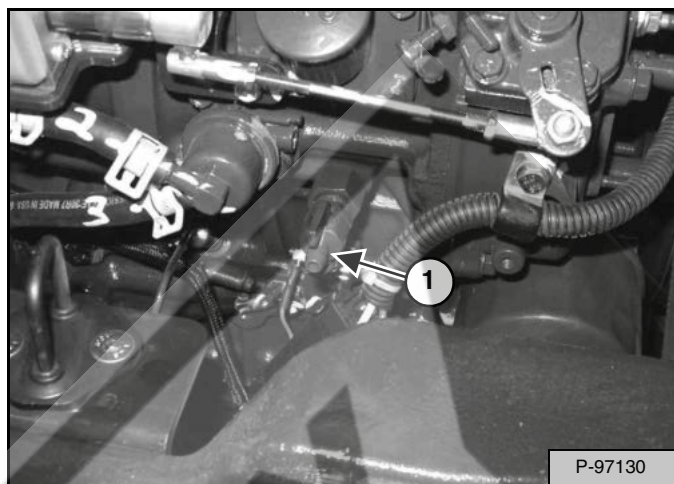
When the engine is cool, loosen and remove the radiator cap (Item 1) [Figure 278].

Figure 279



Put a hose on the drain valve at the bottom of the radiator. Open the drain valve (Item 1) [Figure 279] and drain the coolant into a container.

Figure 280



Put a hose on the drain valve on the engine block. Open the drain valve (Item 1) [Figure 280] and drain the coolant into a container.

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

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

Mix the coolant in a separate container. (See ENGINE COOLING SYSTEM on Page 155.) and (See Capacities on Page 216.)

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

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

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

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

Add premixed coolant until the level is correct.

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

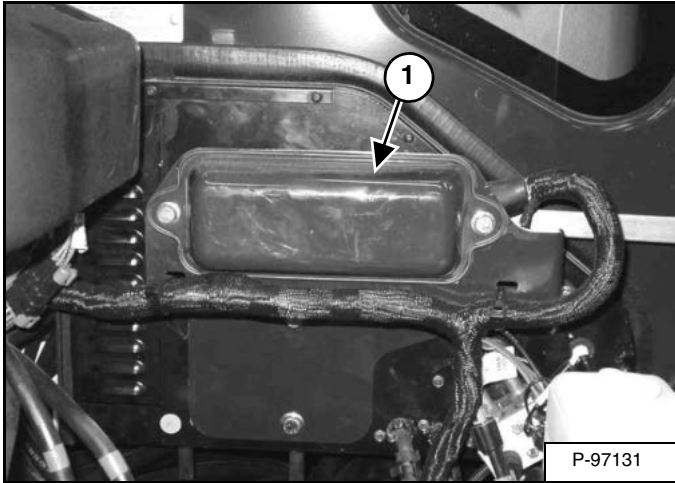
Add coolant to the recovery tank as needed.

Close the tailgate.

ELECTRICAL SYSTEM

Description

Figure 281



The excavator has a 12 volt, negative earth electrical system. The electrical system is protected by fuses (Item 1) [Figure 281] located under the right side cover of the excavator. The fuses will protect the electrical system when there is an electrical overload. The reason for the overload must be found and corrected before starting the engine again.

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

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



WARNING

AVOID INJURY OR DEATH

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

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

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

W-2065-0807

Fuse And Relay Location / Identification

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

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

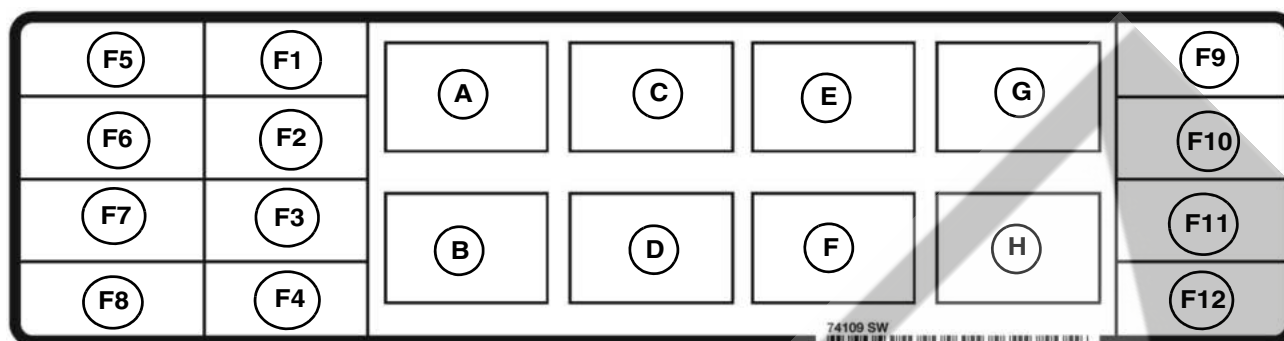
The location and sizes are shown in [Figure 282].

Always replace fuses using the same type and capacity.

ELECTRICAL SYSTEM (CONT'D)

Fuse And Relay Location / Identification (Cont'd)

Figure 282



The location and sizes are shown in the table below and on the decal [Figure 282]. Relays are identified by the letter “R” in the AMP column.

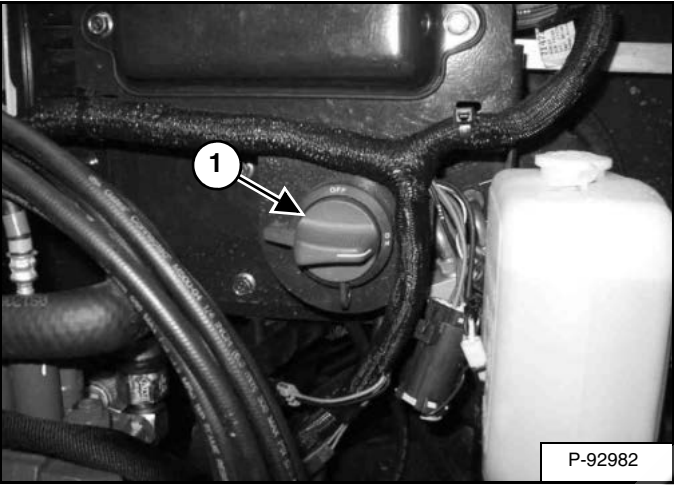
REF	ICON	DESCRIPTION	AMP	REF	ICON	DESCRIPTION	AMP	REF	ICON	DESCRIPTION	AMP
F1		Wiper / Washer	10	F9		Controller	25	A		Switched Power	R
F2		Switched Power	20	F10		ACD	25	B		Fuel Shutoff	R
F3		Alternator Excite / Heater	25	F11		Lights	20	C		HVAC	R
F4		ACD	25	F12		Power Port	15	D		Lights	R
F5		Controller	20					E		NOT USED	R
F6		HVAC	35					F		Glow Plugs	R
F7		Start Key	5					G		NOT USED	R
F8		Fuel Pull	25					H		Starter	R

ELECTRICAL SYSTEM (CONT'D)

Shut-Off Switch

Open the right side cover. (See RIGHT SIDE COVER on Page 144.)

Figure 283



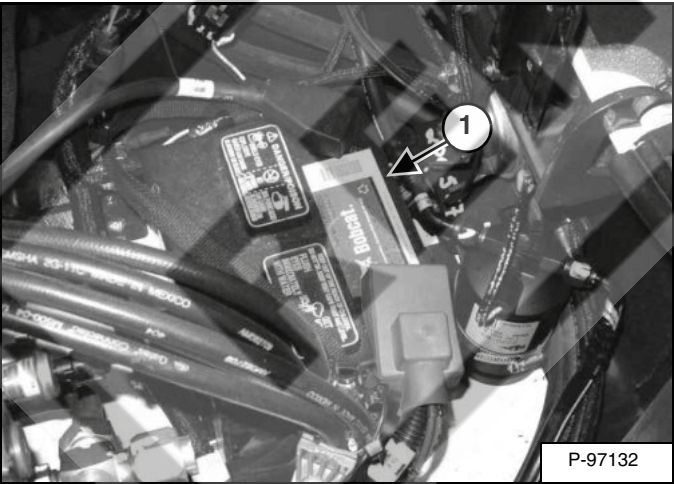
The shut-off switch (Item 1) [Figure 283] is located under the right side cover below the fuse panel.

Rotate the switch (Item 1) [Figure 283] anticlockwise to turn the switch to the OFF position, clockwise to turn to the ON position.

Battery Maintenance

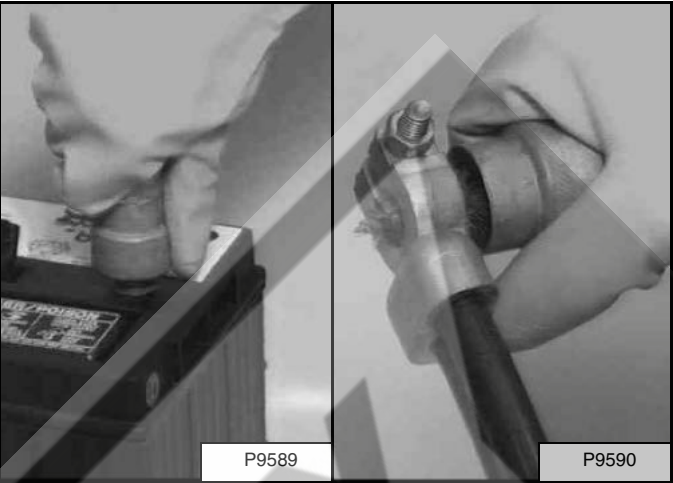
Open the right side cover. (See RIGHT SIDE COVER on Page 144.)

Figure 284



The battery (Item 1) [Figure 284] is located in the front of the right side upperstructure.

Figure 285



The battery cables must be clean and tight [Figure 285]. Remove acid or corrosion from the battery and cables using a sodium bicarbonate and water solution. Cover the battery terminals and cable ends with battery saver grease to prevent corrosion.

Check for broken or loose connections.

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

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

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

! WARNING

AVOID INJURY OR DEATH

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

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

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

W-2065-0807

Using A Booster Battery (Jump Starting)

IMPORTANT

If jump starting the excavator from a second machine:

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

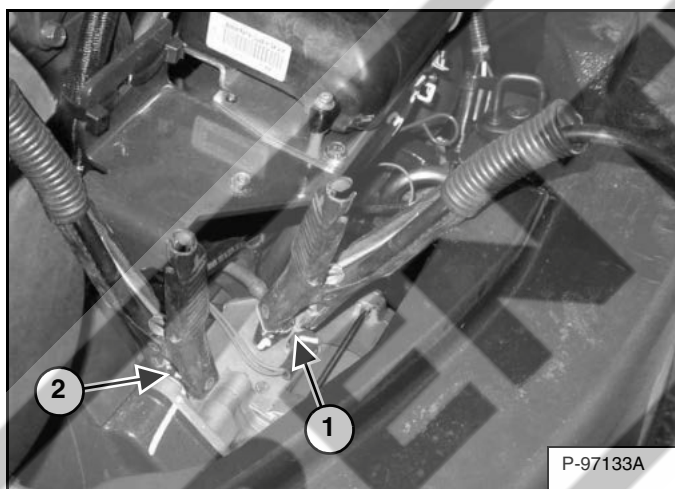
I-2060-0906

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

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

Open the tailgate. (See TAILGATE on Page 143.)

Figure 286



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 286] of the excavator starter.

Connect one end of the second cable to the negative (-) terminal of the booster battery. Connect the other end of the same cable to the starter mounting bolt (Item 2) [Figure 286].

Start the engine. After the engine has started, remove the earth (-) cable first (Item 2) [Figure 286].

Disconnect the cable from the excavator starter (Item 1) [Figure 286].

NOTE: (See Cold Temperature Starting on Page 73.)

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.

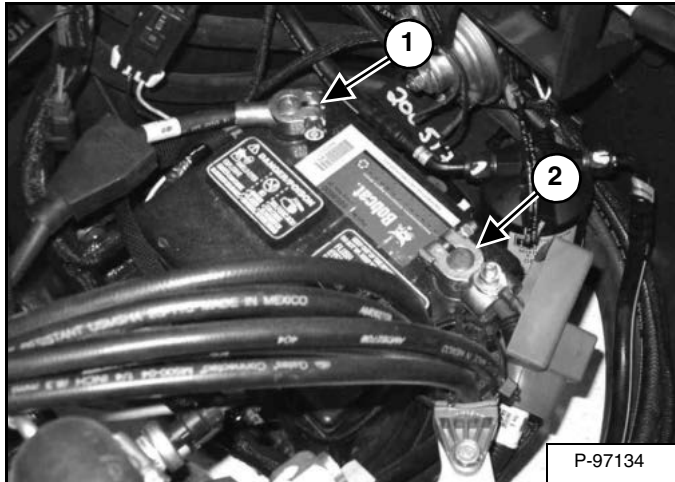
W-2065-0807

ELECTRICAL SYSTEM (CONT'D)

Removing And Installing The Battery

Open the right side cover. (See RIGHT SIDE COVER on Page 144.)

Figure 287

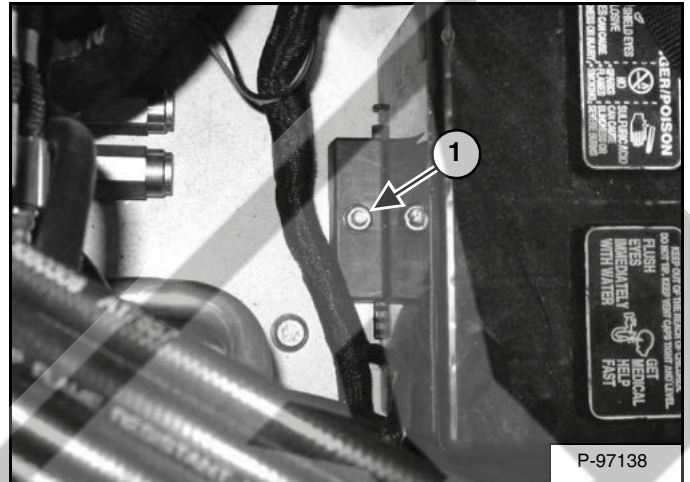


NOTE: For easier access for removing the battery, remove the lower right cover. To remove side cover, see information in [Figure 292].

Disconnect the negative (-) cable (Item 1) [Figure 287] first.

Disconnect the positive (+) cable (Item 2) [Figure 287].

Figure 288



Remove the bolt (Item 1) [Figure 288] and remove the hold-down clamp.

Remove the battery.

Always clean the terminals and the cable ends, even when installing a new battery.

Install the battery. Install the hold-down clamp and tighten the bolts.

Connect the battery cables. Connect the negative (-) cable (Item 1) [Figure 287] last to prevent sparks.

WARNING

AVOID INJURY OR DEATH

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

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

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

W-2065-0807

HYDRAULIC SYSTEM

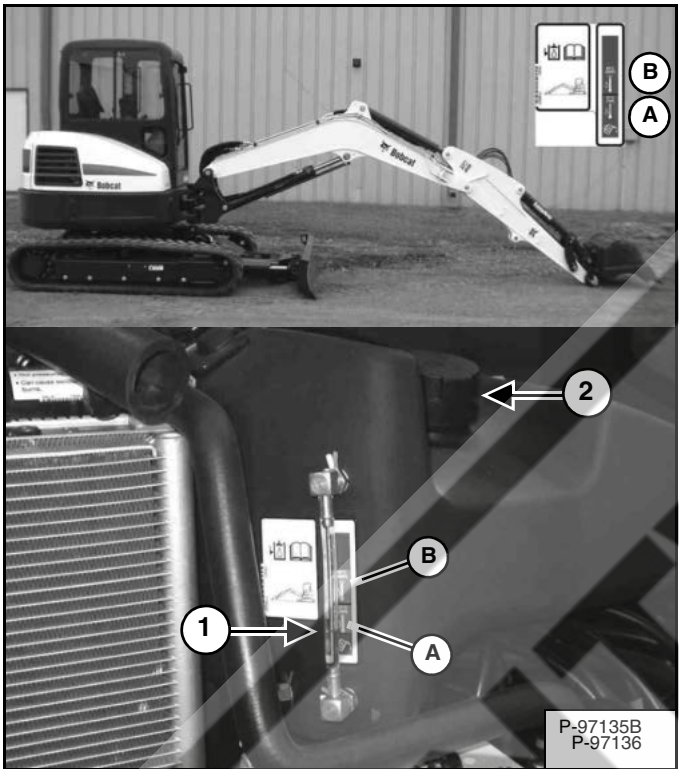
Checking And Adding Hydraulic Oil

Put the machine on a flat level surface.

Retract the arm and bucket cylinders, extend the boom cylinder, put the bucket on the ground and lower the blade. Stop the engine.

Open the right side cover. (See RIGHT SIDE COVER on Page 144.)

Figure 289



Park the machine in the position shown [Figure 289]. (The preferred method is to check the hydraulic oil when it is cold.)

Check the hydraulic oil level, it must be visible in the sight gauge (Item 1) [Figure 289]. The decal on the hydraulic tank shows the correct fill level.

- A - Correct Oil Level COLD (Preferred)
- B - Correct Oil Level HOT (Optional)

Clean the surface around the reservoir cap and remove the cap from the reservoir (Item 2) [Figure 289].



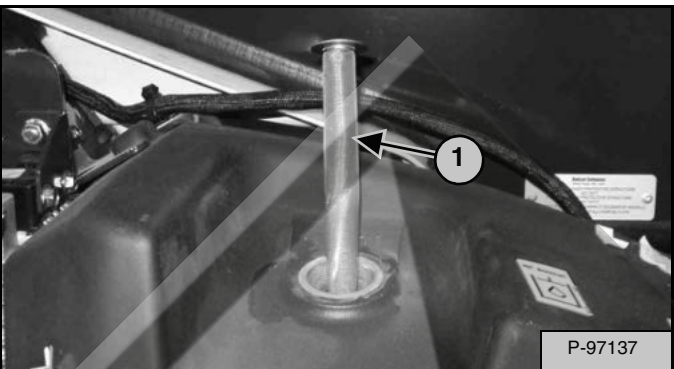
WARNING

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 290



Check the condition of the fill strainer screen (Item 1) [Figure 290]. Clean or replace as necessary.

Be sure the screen is installed before adding fluid.

Add the correct fluid (See [Figure 291]) to the reservoir until it is visible in the sight gauge. (See Capacities on Page 216.)

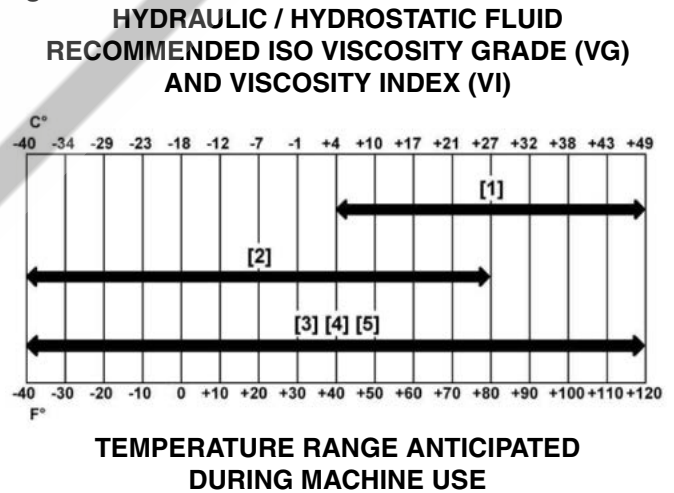
Check the cap and clean as necessary. Replace the cap if damaged.

Install the cap.

Close the right side cover and tailgate.

Hydraulic / Hydrostatic Fluid Chart

Figure 291



- [1] VG 100; Minimum VI 130
- [2] VG 46; Minimum VI 150
- [3] BOBCAT All-Season Fluid
- [4] BOBCAT Synthetic Fluid
- [5] BOBCAT Biodegradable Hydraulic / Hydrostatic Fluid (Unlike biodegradable fluids that are vegetable based, Bobcat biodegradable fluid is formulated to prevent oxidation and thermal breakdown at operating temperatures.)

Use only recommended fluid in the hydraulic system [Figure 291].

HYDRAULIC SYSTEM (CONT'D)

Removing And Replacing The Hydraulic Filters

WARNING

AVOID INJURY OR DEATH

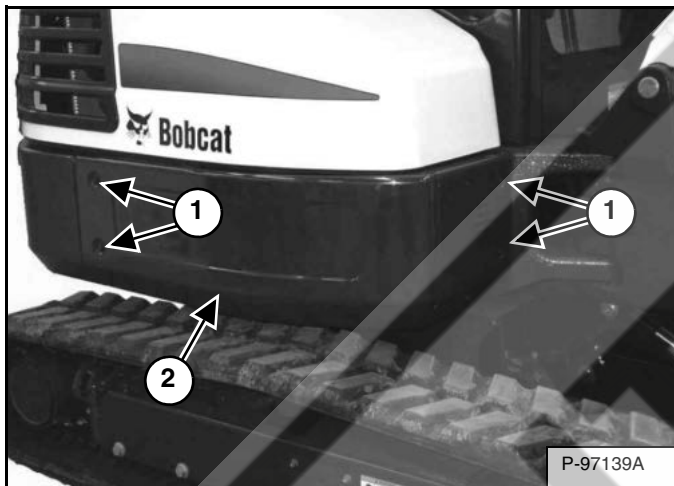
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire.

W-2103-0508

Hydraulic Filter

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 137.)

Figure 292

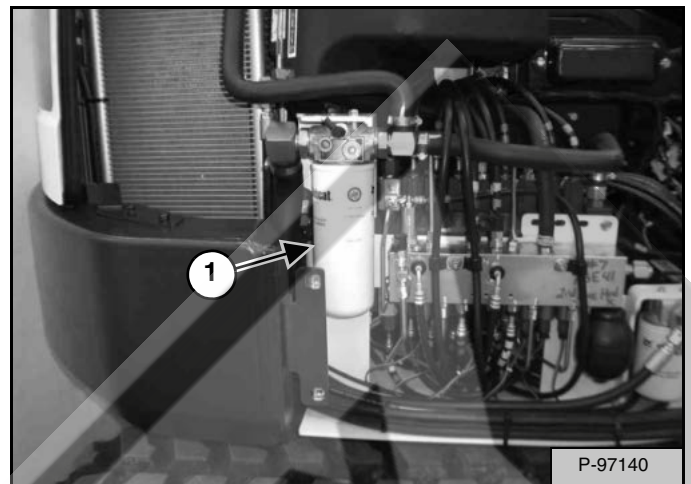


Open the right side cover. (See RIGHT SIDE COVER on Page 144.)

For easier access to change the hydraulic filter, remove the lower right side panel.

Remove the four bolts (Item 1) from the side panel (Item 2) [Figure 292]. Remove the side panel.

Figure 293



Remove the hydraulic filter (Item 1) [Figure 293].

Clean the housing where the filter gasket makes contact.

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

HYDRAULIC SYSTEM (CONT'D)

Removing And Replacing The Hydraulic Filters

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

Case Drain Filter

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 137.)

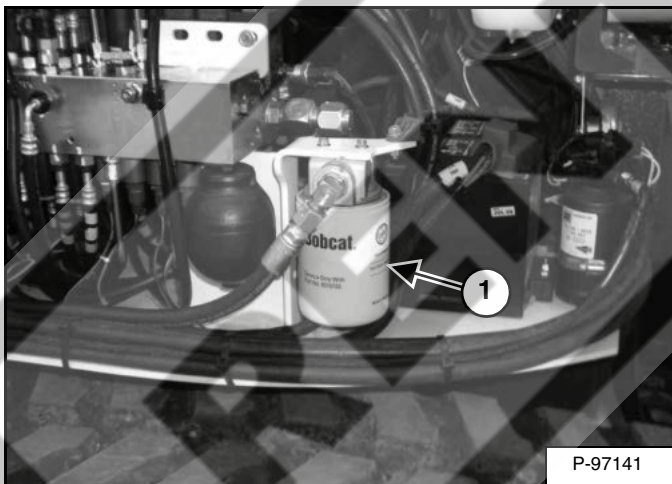
The case drain filter is located in the right front corner of the excavator.

Open the right side cover. (See RIGHT SIDE COVER on Page 144.)

For easier access to change the case drain filter, remove the lower right side panel.

Remove the four bolts (Item 1) from the side panel (Item 2) [Figure 292]. Remove the side panel.

Figure 294



Remove the case drain filter (Item 1) [Figure 294].

Clean the housing where the filter gasket makes contact.

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

HYDRAULIC SYSTEM (CONT'D)

Removing And Replacing The Hydraulic Fluid

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 137.)

WARNING

AVOID INJURY OR DEATH

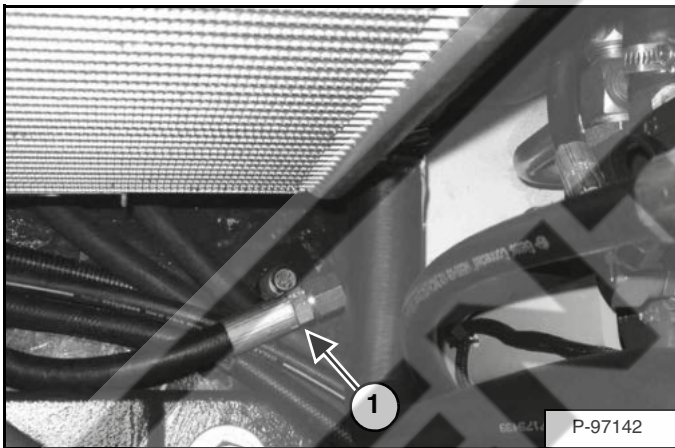
Diesel fuel or hydraulic fluid under pressure can penetrate skin or eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. Do not use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical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

W-2072-EN-0909

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

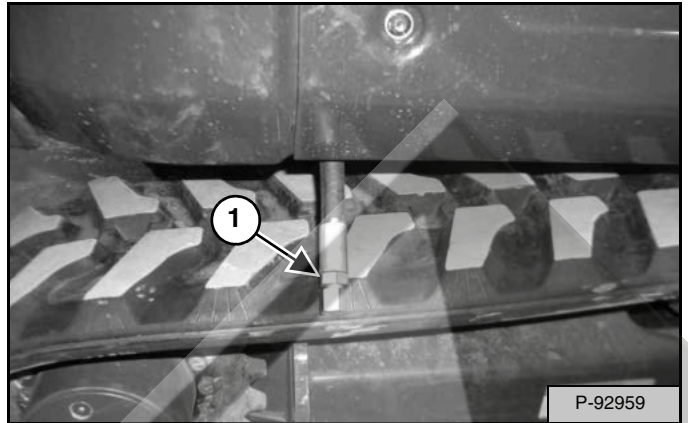
Open the tailgate. (See TAILGATE on Page 143.)

Figure 295



The hydraulic oil drain hose (Item 1) [Figure 295] is located below the oil cooler in the right rear corner of the upperstructure.

Figure 296



Reposition the drain hose out the bottom of the upperstructure and remove the cap (Item 1) [Figure 296].

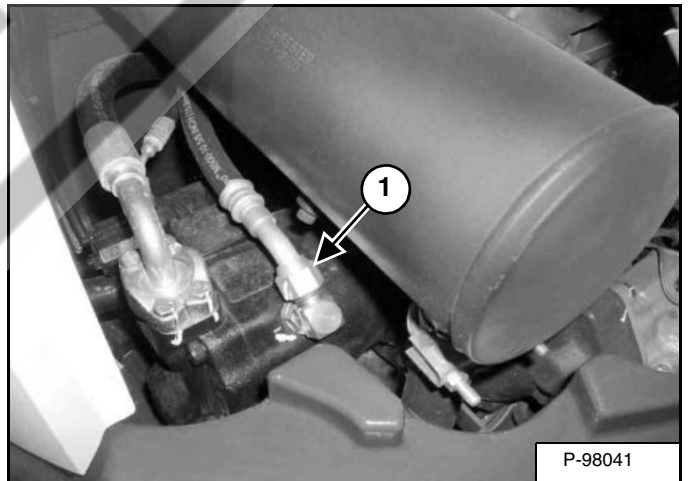
Drain the fluid into a container.

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

Install the cap (Item 1) [Figure 296] and position the drain hose back to the storage position (Item 1) [Figure 295].

Add fluid to the reservoir. (See HYDRAULIC SYSTEM on Page 163.)

Figure 297



With the engine OFF, loosen the hose (Item 1) [Figure 297] on the hydraulic pump until all air is purge from the system. Tighten the hose after a steady stream of hydraulic fluid, free of any air bubbles, drains from the hose. **DO NOT RUN THE MACHINE WITH THE HOSE LOOSE.**

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

SPARK ARRESTER MUFFLER

Cleaning Procedure

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 137.)

WARNING

AVOID INJURY OR DEATH

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

W-2050-0807

WARNING

Stop engine and allow the muffler to cool before cleaning the spark chamber. Wear safety goggles. Failure to obey can cause serious injury.

W-2011-1285

WARNING

Never use machine in atmosphere with explosive dust or gases or where exhaust can contact flammable material. Failure to obey warnings can cause injury or death.

W-2068-1285

WARNING

When the engine is running during service, the steering levers must be in neutral.

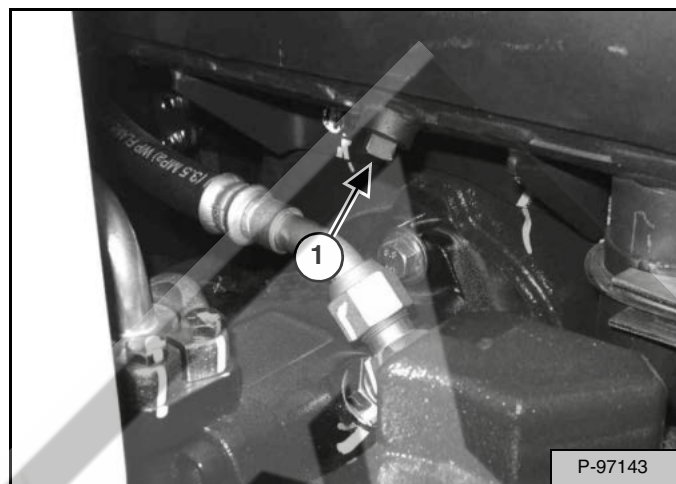
Failure to do so can cause injury or death.

W-2203-0595

Do not operate the excavator with a defective exhaust system.

Stop the engine. Open the tailgate. (See TAILGATE on Page 143.)

Figure 298



Remove the plug (Item 1) [Figure 298] from the bottom of the muffler.

Start the engine and run for about 10 seconds while a second person, wearing safety glasses, holds a piece of wood over the outlet of the muffler. The carbon deposits will be forced out of the muffler plug hole (Item 1) [Figure 298].

Stop the engine. Install and tighten the plug.

Close the tailgate.

IMPORTANT

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

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

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

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

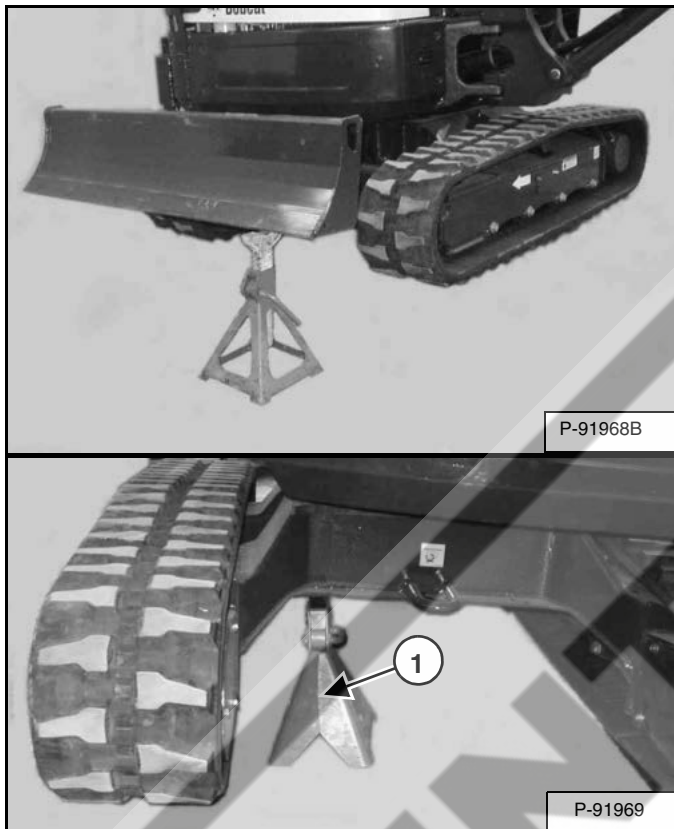
I-2284-0111

TRACK TENSION

NOTE: The wear of the pins and bushings on the undercarriage vary with the working conditions and the different types of soil conditions. It is necessary to inspect track tension and maintain the correct tension. See **SERVICE SCHEDULE** for the correct service interval. (See **SERVICE SCHEDULE** on Page 137.)

Adjusting

Figure 299



Raise one side of the machine (Approximately four inches) using the boom and arm.

Raise the blade fully and install jackstands under the blade and track frame (Item 1) [Figure 299]. Lower the boom until all machine weight is on the jackstands.

Stop the engine.



WARNING

AVOID INJURY

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

W-2142-0903

TRACK TENSION (CONT'D)

Adjusting (Cont'd)

Rubber Track Clearance

Figure 300

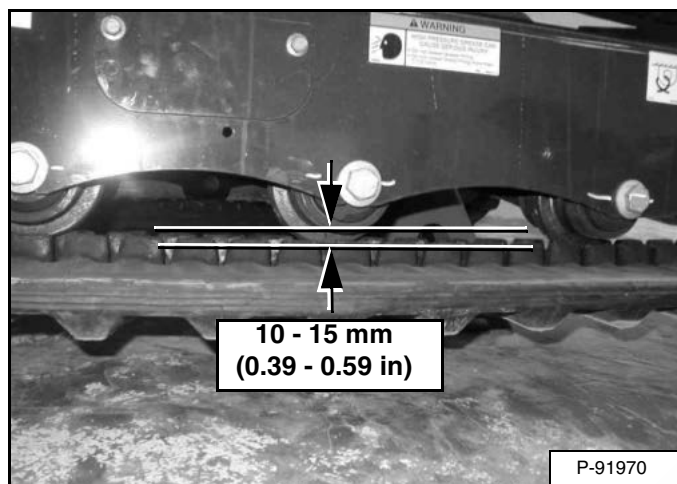
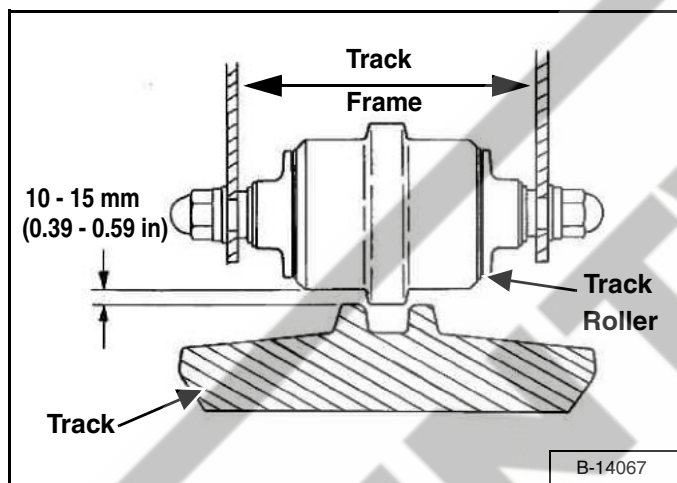


Figure 301

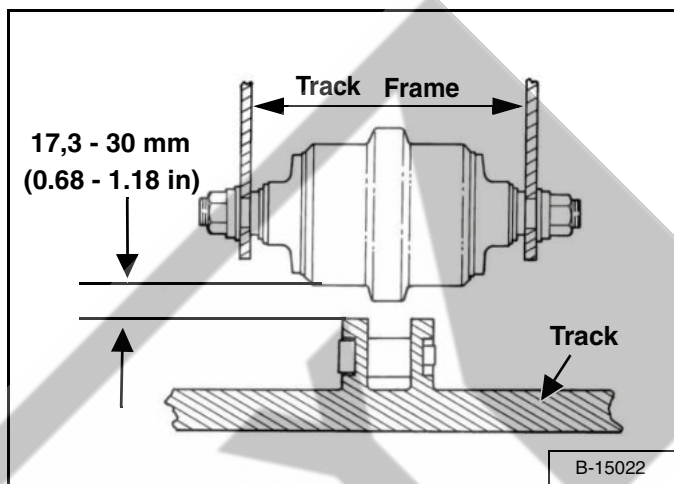


Measure the clearance at the middle track roller. Do not get fingers into pinch points between the track and the track roller. Use a bolt or a dowel of the appropriate size to check the gap between the contact edge of the roller and the top edge of the track guide [Figure 300] and [Figure 301].

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

Steel Track Clearance

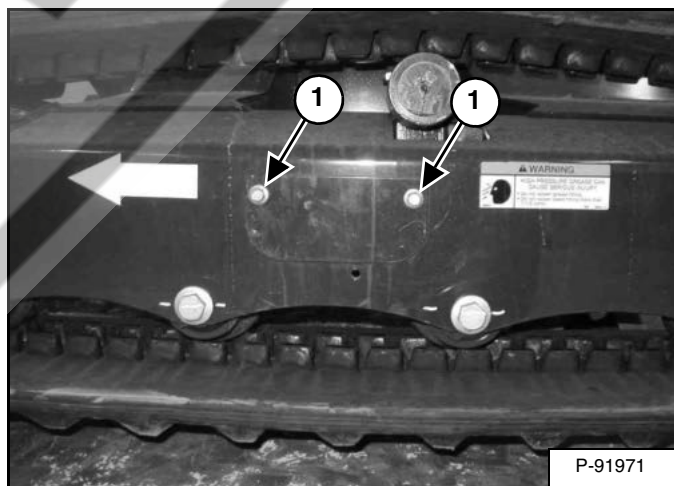
Figure 302



Measure the track clearance at the middle track roller. Do not get fingers into pinch points between the track and the track roller. Use a bolt or dowel of the appropriate size to check the gap between the contact edge of the roller and the top edge of the track guide [Figure 302].

Steel Track Clearance - 17,3 - 30 mm (0.68 - 1.18 in).

Figure 303



Loosen the two bolts from the cover (Item 1) [Figure 303]. Pivot the cover downward.

TRACK TENSION (CONT'D)

Adjusting (Cont'd)

! WARNING

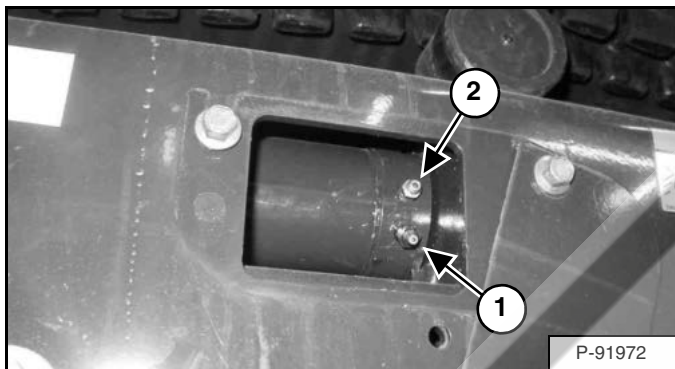
HIGH PRESSURE GREASE CAN CAUSE SERIOUS INJURY

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

W-2994-0515

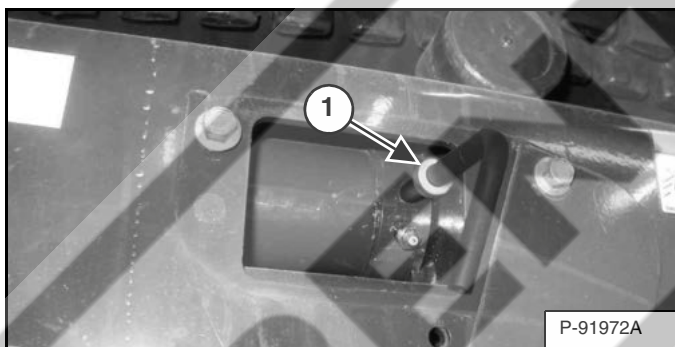
With Bleed Screw and Track Tension Fitting

Figure 304



Add grease to the track tension fitting (Item 1) [Figure 304] until the track tension is correct.

Figure 305



The tension removal tool (P/N 6675936) is available and recommended to direct the flow of grease to aid in cleanup. Always dispose of the grease in an environmentally friendly manner.

Use tool 6675936 (Item 1) [Figure 305] to loosen the bleed fitting (Item 2) [Figure 304] to release tension from the track. Do not loosen the bleed fitting more than 1-1/2 turns.

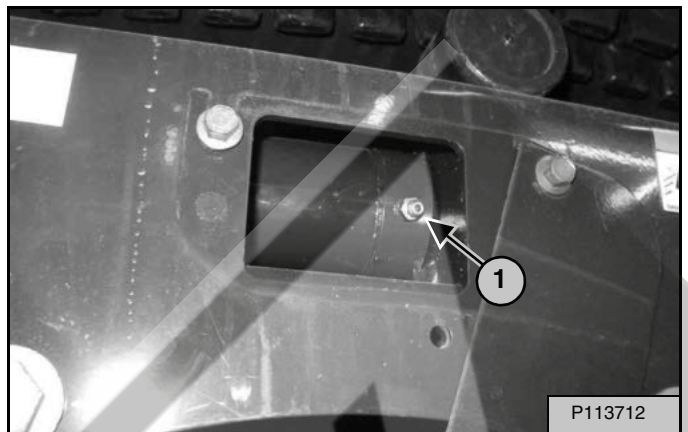
The tool is sized to fit the bleed fitting (Item 2) [Figure 304].

NOTE: Do not loosen the track tension fitting (Item 1) [Figure 304].

Repeat the procedure for the opposite side.

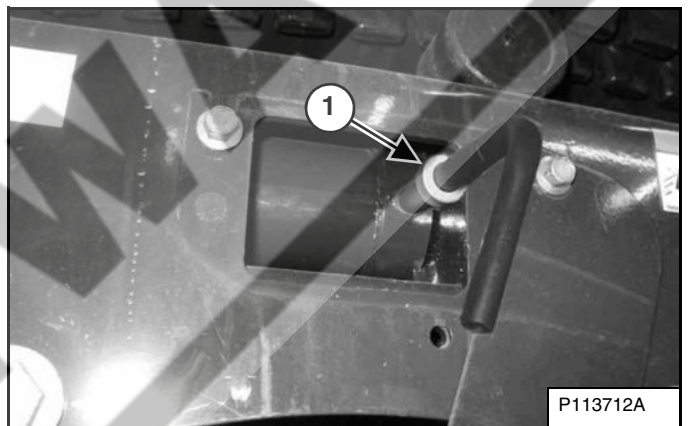
With One Piece - Track Tension Fitting

Figure 306



Add grease to the track tension fitting (Item 1) [Figure 306] until the track tension is correct.

Figure 307



The tension removal tool (P/N 7277225) is available and recommended to direct the flow of grease to aid in cleanup. Always dispose of the grease in an environmentally friendly manner.

Use tool 7277225 (Item 1) [Figure 307] to loosen the track tension fitting (Item 1) [Figure 306] to release tension from the track.

The tool is sized to fit the one piece track tension fitting (Item 1) [Figure 306].

NOTE: Do not loosen the track tension fitting (Item 1) [Figure 306] more than 1-1/2 turns.

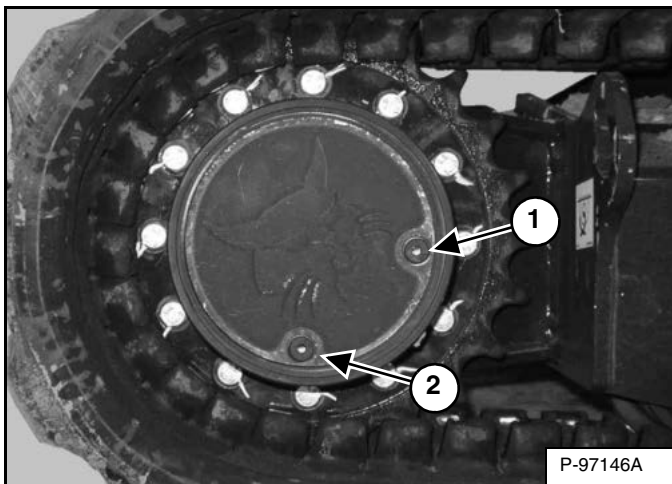
Installation: Tighten the track tension fitting to 24 - 30 N•m (18 - 22 ft-lb) torque.

Repeat the procedure for the opposite side.

TRAVEL MOTOR

Checking And Adding Oil

Figure 308



Park the excavator on a level surface with the plugs (Items 1 and 2) [Figure 308] positioned as shown.

Remove the plug (Item 1) [Figure 308]. The lube level must be at the bottom edge of the hole.

Add lubricant (SAE 90W) through the hole (Item 1) [Figure 308] if the lube level is low.

Repeat the procedure for the opposite travel motor.

Removing And Replacing Oil

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 137.)

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

Park the excavator on a level surface with plugs (Items 1 and 2) [Figure 308] positioned as shown. Remove both plugs and drain the lubricant into a container.

Install the bottom plug (Item 2). Add lubricant (SAE 90W) through the plug hole (Item 1) [Figure 308] until the lube level is at the bottom edge of the hole. (See Capacities on Page 216.)

Install the plug (Item 1) [Figure 308].

Repeat the procedure for the opposite travel motor.

ALTERNATOR BELT

Belt Adjustment

The alternator belt is a special maintenance free type that is pretensioned over the pulleys. This belt eliminates the need for a tensioning device and does not require periodic adjustment. Contact your Bobcat dealer for replacement parts.

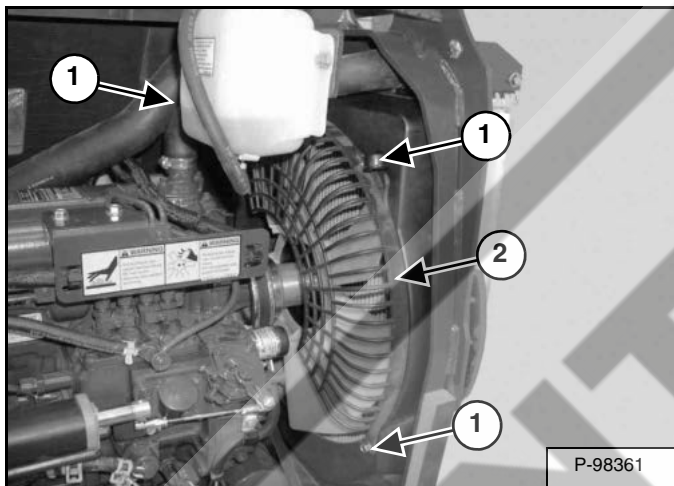
Belt Replacement

Stop the engine and open the tailgate. (See TAILGATE on Page 143.)

NOTE: If the machine is equipped with air conditioning, the compressor belt will need to be removed before the alternator belt can be removed.

Removal

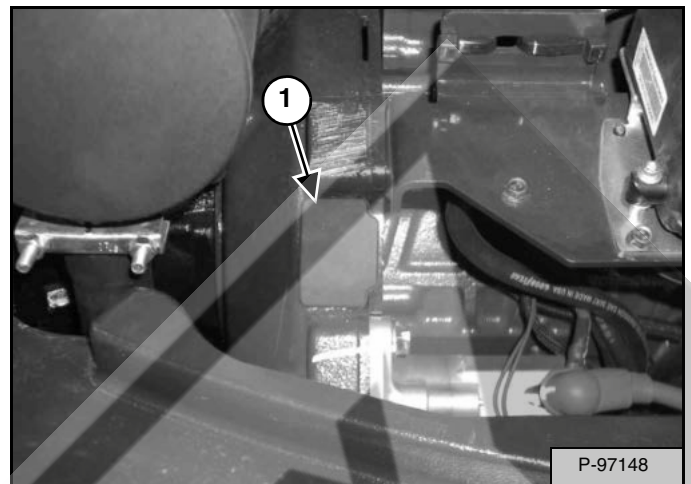
Figure 309



Remove the air conditioning compressor belt (if equipped). (See AIR CONDITIONING COMPRESSOR BELT on Page 174.)

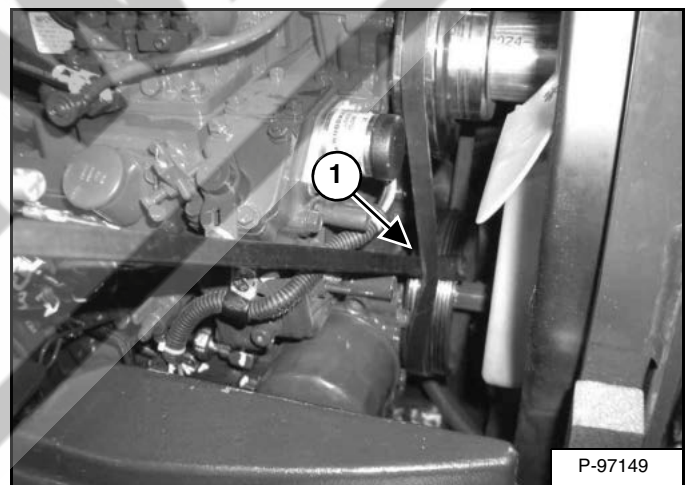
Remove the three bolts (Item 1) and remove the fan guard (Item 2) [Figure 309].

Figure 310



The engine will need to be rotated by hand to remove the belt. To access the flywheel, remove the plug (Item 1) [Figure 310] from the flywheel housing. (A pry bar will be needed to rotate the flywheel to assist in belt removal and installation.)

Figure 311



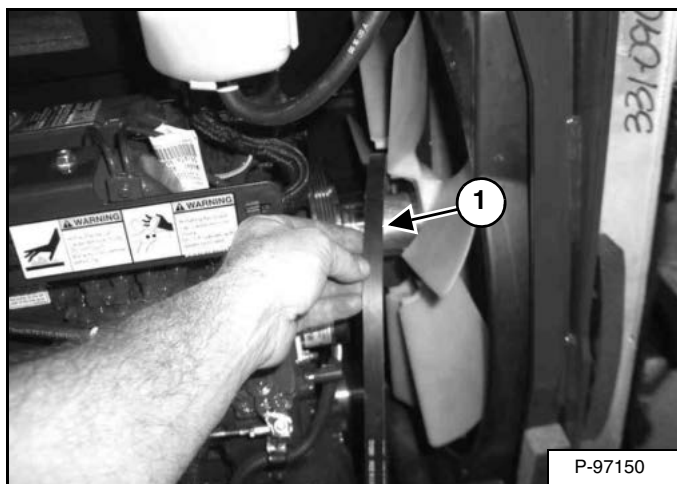
Use a pry bar between the belt and the crankshaft pulley (Item 1) [Figure 311].

Using a pry bar on the flywheel, rotate the engine by hand to push the belt off the crankshaft pulley. Continue to rotate the flywheel until the belt is loose.

ALTERNATOR BELT (CONT'D)

Belt Replacement (Cont'd)

Figure 312

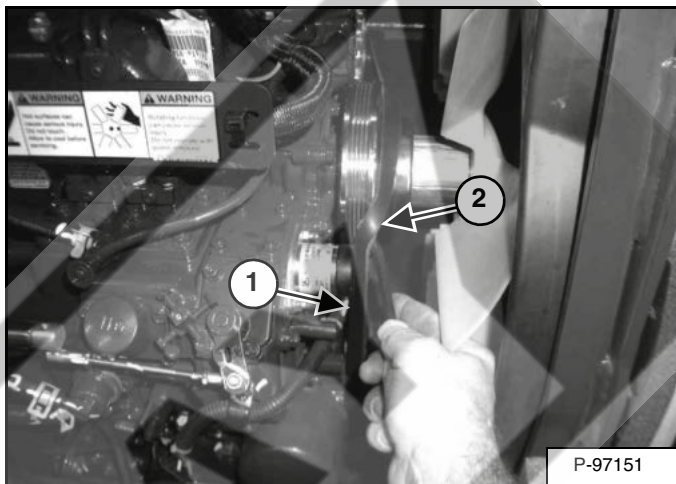


Remove the belt (Item 1) [Figure 312] by sliding it over the fan blades.

Installation

Position the belt (Item 1) [Figure 312] over the fan blades.

Figure 313



Install the belt (Item 1) [Figure 313] over the alternator pulley, the crankshaft pulley and over the fan spacer.

Use a pry bar (Item 2) [Figure 313] to position the belt onto the fan pulley.

Using a pry bar, rotate the flywheel by hand while using the second pry bar to install the belt over the fan pulley.

Continue to rotate the engine by hand until the belt is fully on the pulleys.

Reinstall the rubber plug (Item 1) [Figure 310].

Install the fan guard (Item 2) with the three bolts (Item 1) [Figure 309].

Close the tailgate.

AIR CONDITIONING COMPRESSOR BELT

Belt Adjustment

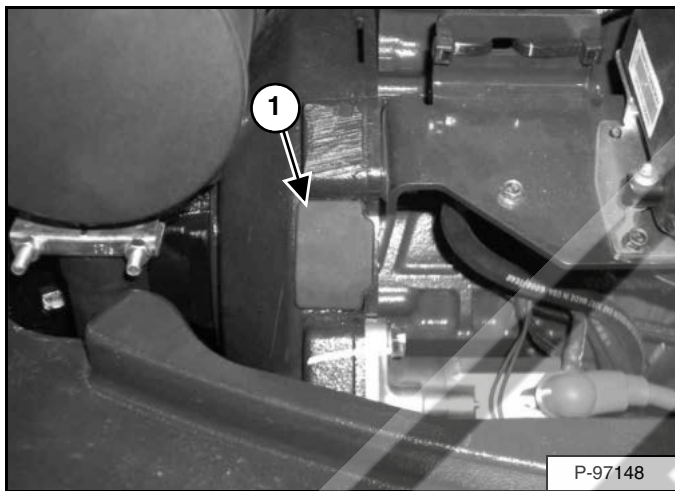
The fan belt is a special maintenance free type that is pretensioned over the pulleys. This belt eliminates the need for a tensioning device and does not require periodic adjustment. Contact your Bobcat dealer for replacement parts.

Belt Replacement

Stop the engine and open the tailgate. (See TAILGATE on Page 143.)

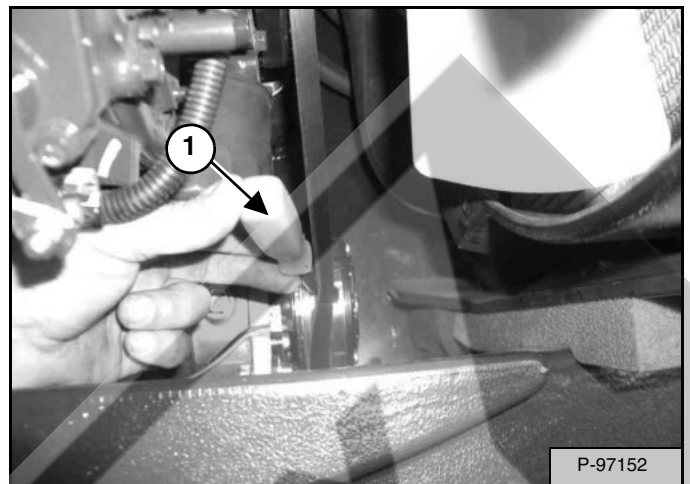
Removal

Figure 314



The engine will need to be rotated by hand to remove the belt. To access the flywheel, remove the plug (Item 1) [Figure 314] from the flywheel housing.

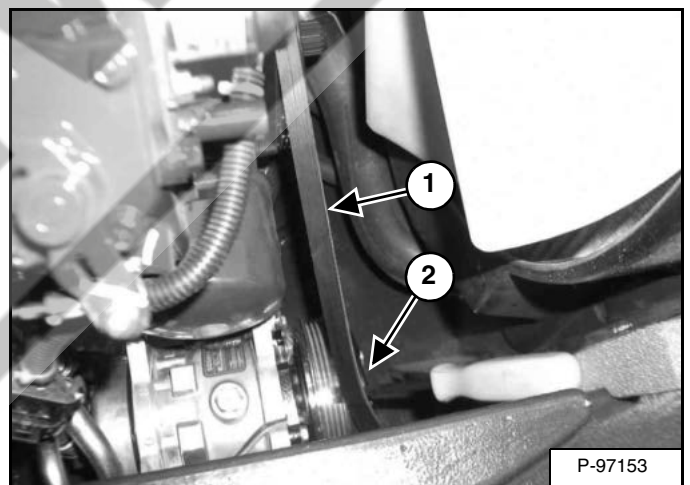
Figure 315



Use a pry bar (Item 1) [Figure 315] to push the belt off of the pulley. Using a pry bar on the flywheel, rotate the engine by hand to push the belt off the crankshaft pulley. Continue to rotate the flywheel until the belt is loose. Remove the belt.

Installation

Figure 316



Position the belt (Item 1) [Figure 316] over the crankshaft pulley and to the compressor pulley.

Use a pry bar (Item 2) [Figure 316] to position the belt on the pulley while using the second pry bar at the flywheel to rotate the engine by hand.

Continue to rotate the engine by hand until the belt is fully on the pulleys.

Reinstall the rubber plug (Item 1) [Figure 314].

Close the tailgate.

TRACK ROLLER AND IDLER LUBRICATION

Procedure

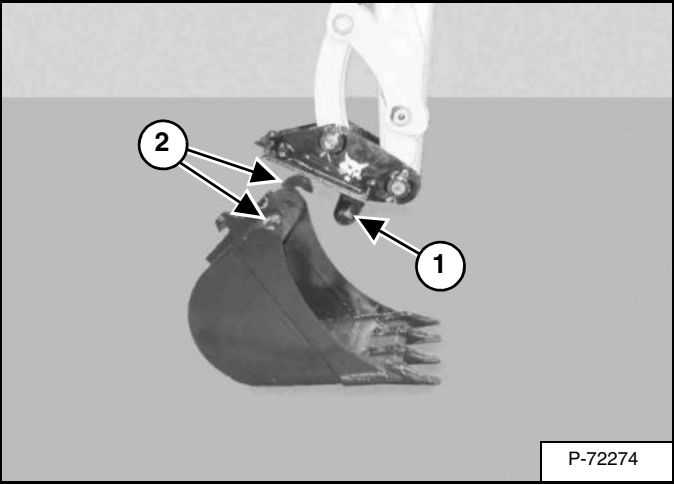
The track rollers and idlers require no maintenance. The bearings are a sealed design.

RENT
TWAY

QUICK COUPLER

Quick Coupler And Attachment Inspection And Maintenance

Figure 317



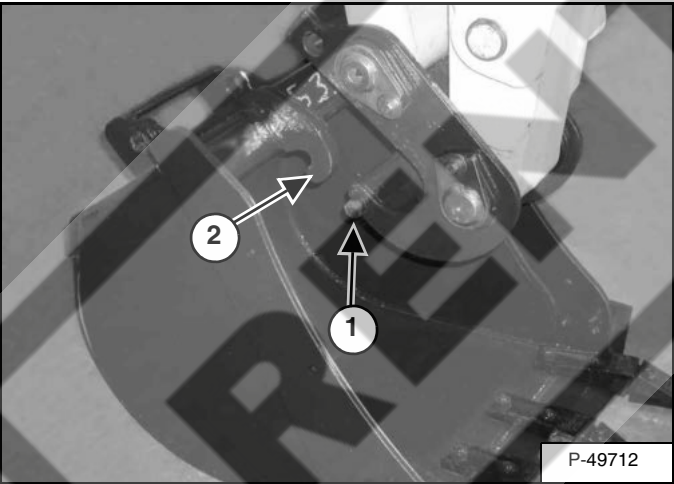
Inspect the quick coupler for wear or damage. Inspect the quick coupler pins (Item 1) and the hooks (Item 2) [Figure 317] (on the attachment) for wear or damage

Repair or replace damaged parts.

X-CHANGE

Inspection And Maintenance

Figure 318



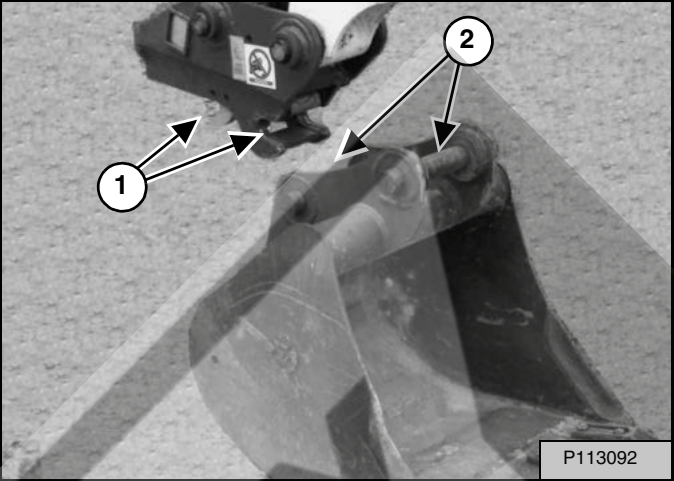
Inspect the X-Change for wear or damage. Inspect the X-Change pins (Item 1) and hooks (Item 2) [Figure 318] (on the attachment) for wear or damage.

Repair or replace damaged parts.

PIN GRABBER QUICK COUPLER

Inspection And Maintenance

Figure 319



Inspect the pin grabber clasps (Item 1) and the pins (Item 2) [Figure 319] (on the attachment) for wear or damage.

Repair or replace damaged parts.

Pin Grabber Quick Coupler Troubleshooting

If the Pin Grabber Quick Coupler does not function correctly, the following components may need servicing. See your Bobcat dealer for service.

BUZZER / BLINK CODES	COMPONENT
1 beep / 1 blink (repeating)	Solenoid
2 beep / 2 blink (repeating)	Pressure Sender
3 blink (repeating)	Buzzer
Buzzer sounds / LED not lit	Switch LED

BUCKET

Bucket Teeth Removal And Installation

! WARNING

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

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

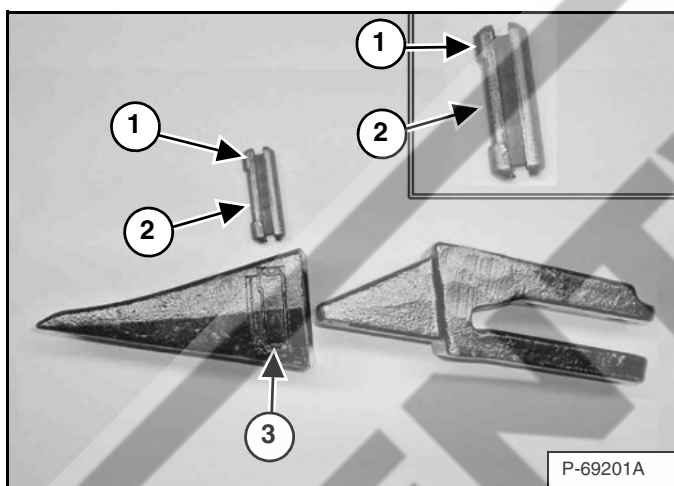
W-2505-EN-1009

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

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

Stop the engine and exit the excavator.

Figure 320



The retaining pin (Item 1) must be installed as shown [notch (Item 2) to the front] for proper fit and tooth retention. The side of the tooth point (Item 3) [Figure 320] also shows the correct orientation of the retaining pin.

Installation: Position the new tooth point on the shank and install a new retaining pin. Install the retaining pin until it is flush with the top of the point.

LUBRICATION OF THE HYDRAULIC EXCAVATOR

Lubrication Locations

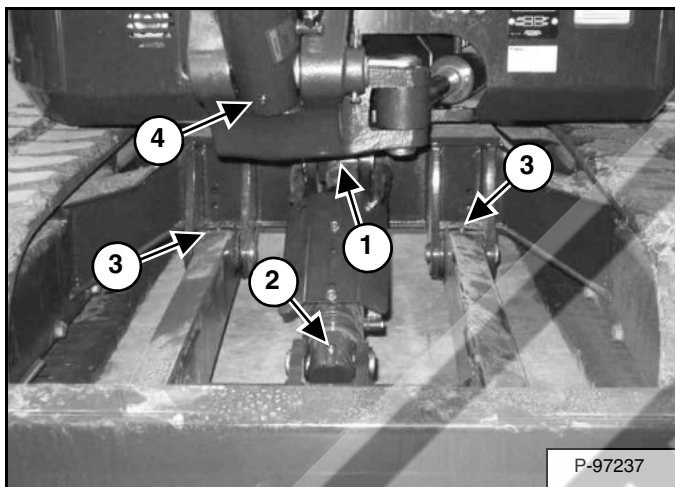
Lubricate the excavator as specified in the SERVICE SCHEDULE for the best performance of the machine. (See SERVICE SCHEDULE on Page 137.)

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

NOTE: Use Extra Heavy Gear Shield grease for grease fittings (Item 20, 21 and 22).

Lubricate the following locations on the excavator EVERY 8 - 10 HOURS:

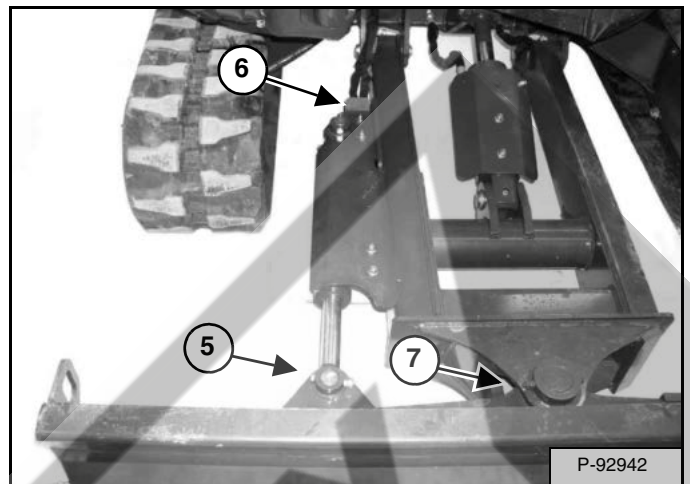
Figure 321



Ref Description (# of Fittings)

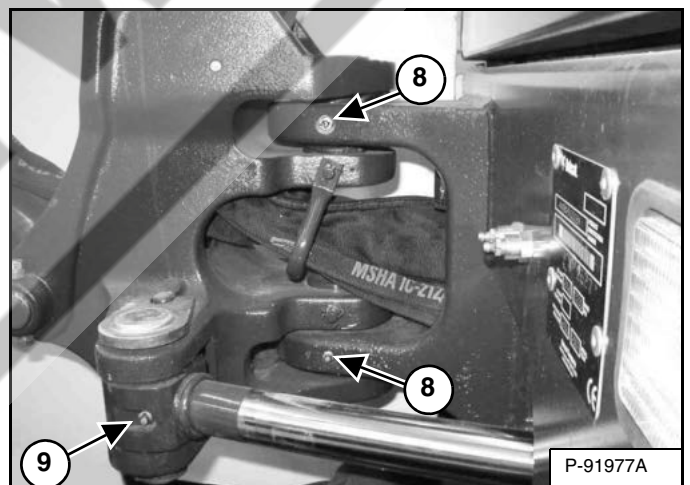
1. Blade Cylinder Rod End (1) [Figure 321]
2. Blade Cylinder Base End (1) [Figure 321]
3. Blade Pivots (2) [Figure 321]
4. Boom Cylinder Base End (1) [Figure 321]

Figure 322



5. Angle Blade Cylinder Rod End (1) [Figure 322] (If Equipped)
6. Angle Blade Cylinder Base End (1) [Figure 322] (If Equipped)
7. Angle Blade Pivot (1) [Figure 322] (If Equipped)

Figure 323

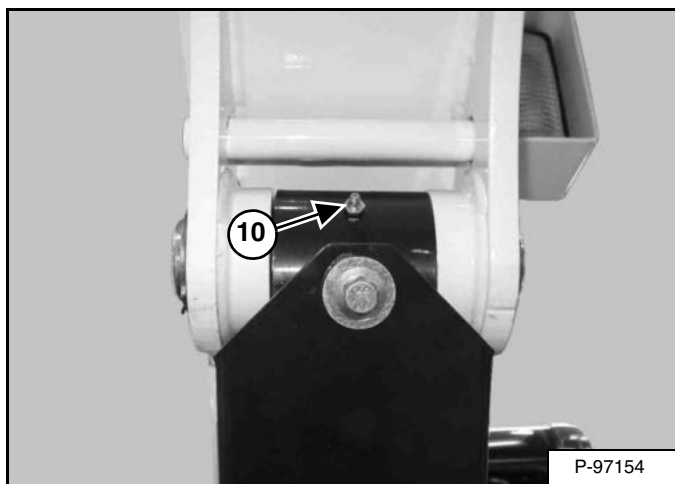


8. Boom Swing Pivot (2) [Figure 323]
9. Boom Swing Cylinder Rod End (1) [Figure 323]

LUBRICATION OF THE HYDRAULIC EXCAVATOR (CONT'D)

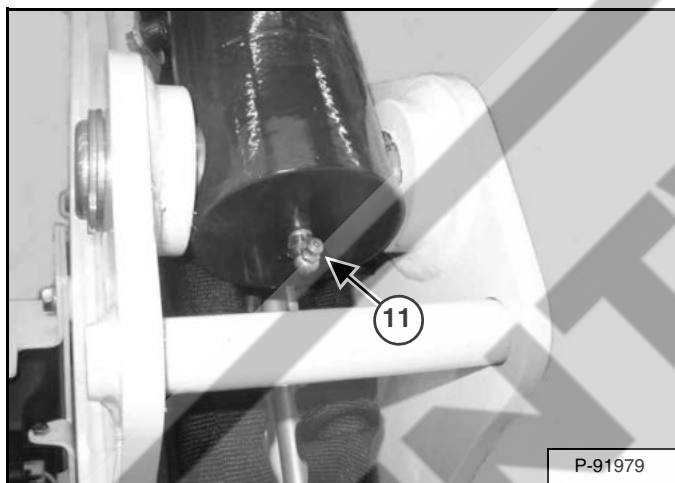
Lubrication Locations (Cont'd)

Figure 324



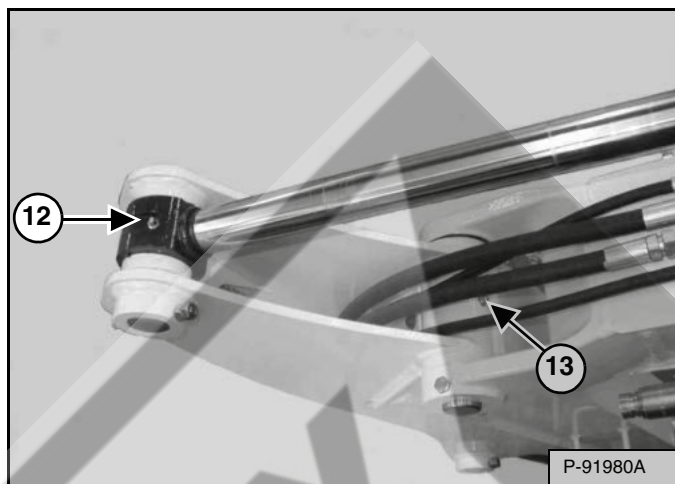
10. Boom Cylinder Rod End (1) [Figure 324]

Figure 325



11. Arm Cylinder Base End (1) [Figure 325]

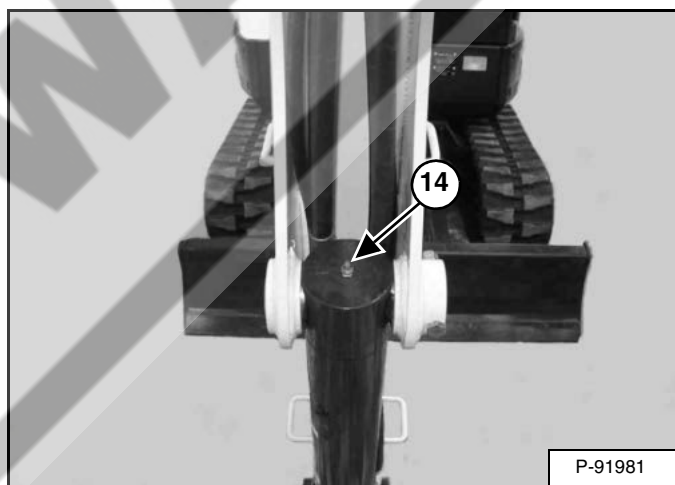
Figure 326



12. Arm Cylinder Rod End (1) [Figure 326]

13. Arm Pivot (1) [Figure 326]

Figure 327

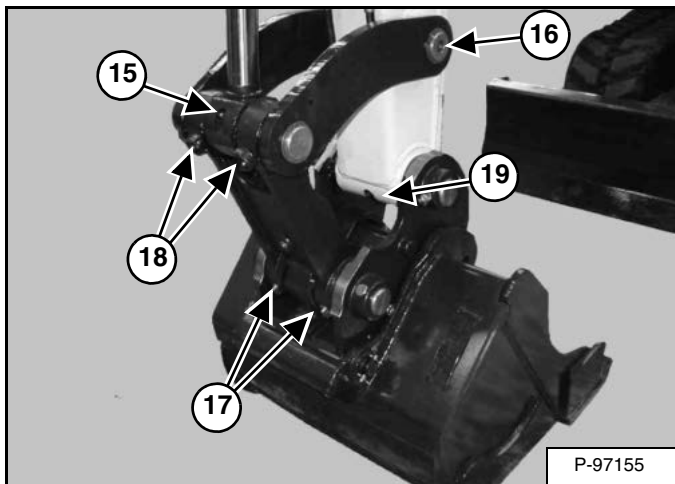


14. Bucket Cylinder Base End (1) [Figure 327]

LUBRICATION OF THE HYDRAULIC EXCAVATOR (CONT'D)

Lubrication Locations (Cont'd)

Figure 328



15. Bucket Cylinder Rod End (1) [Figure 328]

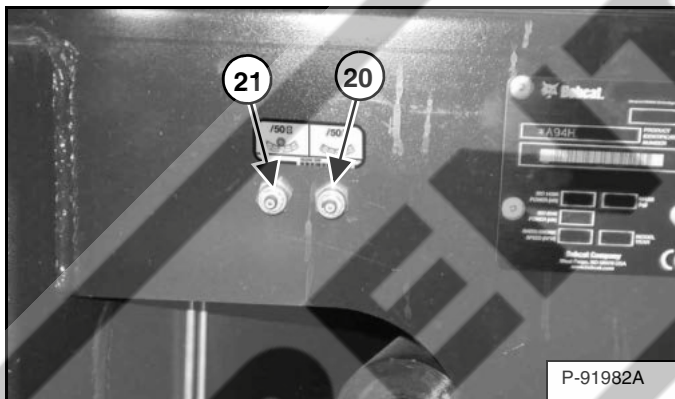
16. Bucket Link Pin (1) [Figure 328]

17. Bucket Pivot (3) [Figure 328]

18. Bucket Link (2) [Figure 328]

19. Arm (1) [Figure 328]

Figure 329



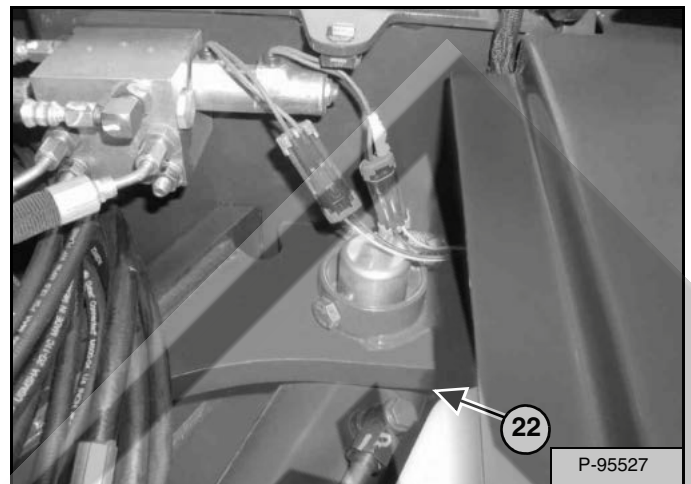
Lubricate the following locations on the hydraulic excavator **EVERY 50 HOURS**:

NOTE: Use Extra Heavy Gear Shield grease for grease fittings (Item 20, 21 and 22).

20. Swing Circle (1) [Figure 329]

21. Swing Pinion (1) [Figure 329] (Install 3 to 4 pumps of grease then rotate the upperstructure 90°. Install 3 to 4 pumps of grease and again rotate the upperstructure 90°. Repeat this until the slew pinion has been greased at four positions.)

Figure 330



Lubricate the following location on the hydraulic excavator **EVERY 1000 HOURS**:

NOTE: Use Extra Heavy Gear Shield grease for grease fittings (Item 20, 21 and 22).

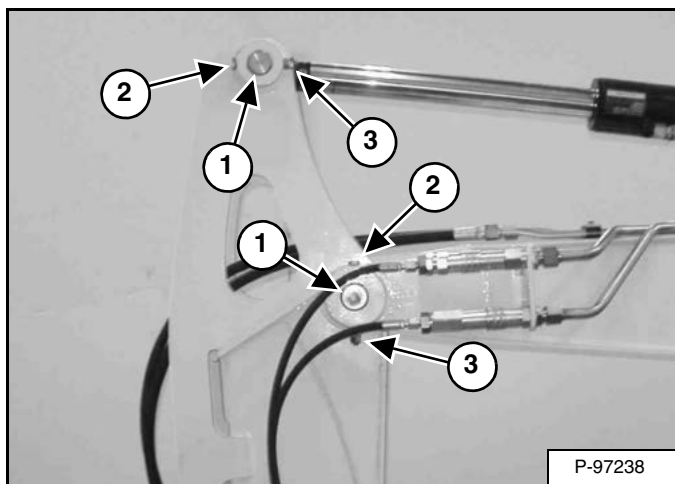
22. Boom Swing Cylinder Base (1) [Figure 330]

NOTE: The boom swing grease fitting is located on the side of base end of the cylinder.

PIVOT PINS

Inspection And Maintenance

Figure 331



The pivots and cylinders (Item 1) have a large pin held in position with a bolt (Item 2) and double nuts (Item 3) [Figure 331] securing the pin.

The two nuts (Item 3) are used as jam nuts to hold the bolt (Item 2) without tightening the bolt (Item 2) to the pin boss. After the nuts (Item 3) are tightened together, the bolt (Item 2) should be free to spin. See your Bobcat dealer for replacement parts.

EXCAVATOR STORAGE AND RETURN TO SERVICE

Storage

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

- Thoroughly clean the excavator including the engine compartment.
- Lubricate the excavator.
- Replace worn or damaged parts.
- Drive the excavator onto planks in a dry protected shelter.
- Lower the boom fully with the bucket flat on the ground.
- Put grease on any exposed cylinder rods.
- Put fuel stabiliser in the fuel tank and run the engine a few minutes to circulate the stabiliser to the pump and fuel injectors.
- Drain and flush the cooling system. Refill with premixed coolant.
- Replace all fluids and filters (engine, hydraulic).
- Replace all filters (i.e.: air cleaner, heater, etc.).
- Put all controls in NEUTRAL position.
- Remove the battery. Be sure the electrolyte level is correct then charge the battery. Store it in a cool dry place above freezing temperatures and charge it periodically during storage.
- Cover the exhaust pipe opening.
- Tag the machine to indicate that it is in storage condition.
- Clean the three HVAC drain valves.

Return To Service

After the Bobcat excavator has been in storage, it is necessary to follow a list of items to return the excavator to service.

- Check the engine and hydraulic oil levels; check coolant level.
- Install a fully charged battery.
- Remove grease from exposed cylinder rods.
- Check all belt tensions.
- Be sure all shields and guards are in place.
- Lubricate the excavator.
- Remove cover from exhaust pipe opening.
- Start the engine and let run for a few minutes while observing the instrument panels and systems for correct operation.
- Drive the excavator off of the planks.
- Operate machine, check for correct function.
- Stop the engine and check for leaks. Repair as needed.

SYSTEM SETUP AND ANALYSIS

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Bobcat®

DIAGNOSTIC SERVICE CODES

Viewing Service Codes

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

Standard Instrument Panel

Figure 332



Press the Information button (Item 2) to cycle the data display (Item 1) [Figure 332] until the service code screen is displayed. If more than one service code is present, the codes will scroll on the data display.

When no service code is present, [NONE] is displayed [Figure 332].

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

Deluxe Instrument Panel

The last 40 codes stored in history can also be viewed using the Deluxe Instrument Panel.

	Press a scroll button (Item 1) repeatedly until the Active Warnings screen icon (Inset) is highlighted.
	The ACTIVE WARNINGS screen displays active service codes. Press [9] to view the next service code if more than one is present. Press [4] to display a history of service codes.
	The WARNINGS HISTORY screen will list the Service Code Number (CODE), Hourmeter reading when the error occurred (HOUR), and the User (USER) who was logged in to operate the machine when the error occurred.
Press [9] to view the next eight service codes.	
A total of 40 codes can be stored. When more than 40 codes occur, the oldest code will disappear and the newest code will be in the number 1 position.	
	Press the list number next to the service code for more detail.
	Press the left scroll button to back up one screen.

DIAGNOSTIC SERVICE CODES (CONT'D)

Number Codes List

CODE		CODE	
E0105	Throttle actuator short to battery	L0102	Lights Button Error On
E0106	Throttle actuator short to earth	L0202	High Flow Button Error On
E0107	Throttle actuator open circuit	L0302	Auxiliary Button Error On
		L0402	Information Button Error On
E0123	Throttle actuator not calibrated		
		L7404	Gateway Controller No Communication
E0321	5 volt supply out of range high		
E0322	5 volt supply out of range low	L7672	Left Hand Panel Programming Error
E0421	Throttle sensor out of range high		
E0422	Throttle sensor out of range low	M0216	Hydraulic Filter Not Connected
		M0217	Hydraulic Filter Plugged
E0521	Throttle actuator feedback out of range high		
E0522	Throttle actuator feedback out of range low	M0309	Battery Voltage Low
		M0310	Battery Voltage High
E3128	Interrupted power failure log only	M0311	Battery Voltage Extremely High
		M0314	Battery Voltage Extremely Low
E3297	Controller programmed log only	M0322	Battery Voltage Out of Range Low
		M0414	Engine Oil Pressure Extremely Low
		M0415	Engine Oil Pressure Shutdown
H2521	Angle Blade Control Switch Out of Range High		
H2522	Angle Blade Control Switch Out of Range Low		
H2524	Angle Blade Control Switch Out of NEUTRAL	M0610	Engine Speed High
		M0611	Engine Speed Extremely High
H2605	Angle Blade Base Solenoid Short to Battery	M0613	Engine Speed No Signal
H2606	Angle Blade base Solenoid Short to Earth	M0615	Engine Speed Shutdown
H2607	Angle Blade Base Solenoid Open Circuit	M0618	Engine Speed Out of Range
H2632	Angle Blade Base Solenoid Overcurrent		
H2705	Angle Blade Rod Solenoid Short to Battery	M0710	Hydraulic Oil Temperature High
H2706	Angle Blade Rod Solenoid Short to Earth	M0711	Hydraulic Oil Temperature Extremely High
H2707	Angle Blade Rod Solenoid Open Circuit	M0715	Hydraulic Oil Temperature Shutdown
H2732	Angle Blade Rod Solenoid Overcurrent	M0721	Hydraulic Oil Temperature Out of Range High
		M0722	Hydraulic Oil Temperature Out of Range Low
H3128	Interrupted Power Failure		
		M0810	Engine Coolant Temperature High
H4423	Secondary Controller Not Programmed	M0811	Engine Coolant Temperature Extremely High
H4497	Secondary Controller Programmed	M0815	Engine Coolant Temperature Shutdown
		M0821	Engine Coolant Temperature Out of Range High
H4621	5V Sensor Supply Out of Range High	M0822	Engine Coolant Temperature Out of Range Low
H4622	5V Sensor Supply Out of Range Low	M0216	Hydraulic Filter Not Connected
H7404	Main Controller No Communication		
H7604	Display No Communication		

DIAGNOSTICS SERVICE CODE (CONT'D)

Number Codes List (Cont'd)

CODE		CODE	
M0909	Fuel Level Low	M2721	Throttle Sensor Out of Range High
M0921	Fuel Level Out of Range High	M2722	Throttle Sensor Out of Range Low
M0922	Fuel Level Out of Range Low		
		M3128	Interrupted Power Failure
M1121	Console Sensor Out of Range High		
M1122	Console Sensor Out of Range Low	M3204	Throttle Controller No Communication
M1128	Console Sensor Failure		
		M3304	Deluxe Panel No Communication
M1305	Fuel Hold Solenoid Short to Battery		
M1306	Fuel Hold Solenoid Short to Earth	M3404	RFID Key Controller No Communication
M1307	Fuel Hold Solenoid Open Circuit		
		M3702	Hyd Exchange Output Error On
M1402	Fuel Pull Output Error On	M3703	Hyd Exchange Output Error Off
M1403	Fuel Pull Output Error Off		
M1407	Fuel Pull Output Open Circuit		
M1428	Fuel Pull Output Failure		
		M4109	Alternator Low
M1705	Hydraulics Enable Solenoid Short to Battery	M4110	Alternator High
M1706	Hydraulics Enable Solenoid Short to Earth		
M1707	Hydraulics Enable Solenoid Open Circuit	M4304	Keyless Start Panel No Communication
M1732	Hydraulics Enable Solenoid Overcurrent		
		M4404	Secondary Controller No Communication
M2005	Two-Speed Solenoid Short to Battery		
M2006	Two-Speed Solenoid Short to Earth	M4621	5V Sensor Supply Out of Range High
M2007	Two-Speed Solenoid Open Circuit	M4622	5V Sensor Supply Out of Range Low
M2102	Glow Plug Output Error On	M4721	8V Sensor Supply Out of Range High
M2103	Glow Plug Output Error Off	M4722	8V Sensor Supply Out of Range Low
M2107	Glow Plug Output Open Circuit		
M2128	Glow Plug Output Failure	M5002	Light Output Error On
		M5003	Light Output Error Off
M2202	Starter Output Error On		
M2203	Starter Output Error Off	M5205	Offset Base Solenoid Short to Battery
M2207	Starter Output Open Circuit	M5206	Offset Base Solenoid Short to Earth
M2228	Starter Output Failure	M5207	Offset Base Solenoid Open Circuit
		M5232	Offset Base Solenoid Overcurrent
M2302	Starter Relay Error On		
M2303	Starter Relay Error Off	M5305	Offset Rod Solenoid Error On
		M5306	Offset Rod Solenoid Short to Earth
M2402	Fuel Pull Relay Error On	M5307	Offset Rod Solenoid Open Circuit
M2403	Fuel Pull Relay Error Off	M5332	Offset Rod Solenoid Overcurrent
M2521	Load Sense Sensor Out of Range High	M5421	Offset Control Switch Out of Range High
M2522	Load Sense Sensor Out of Range Low	M5422	Offset Control Switch Out of Range Low
		M5424	Offset Control Switch Out of NEUTRAL
M2602	Glow Plug Relay Error On		
M2603	Glow Plug Relay Error Off		

DIAGNOSTICS SERVICE CODE (CONT'D)

Number Codes List (Cont'd)

CODE		CODE	
M5505	Auxiliary Base Solenoid Short to Battery	M7423	Main Controller Not Programmed
M5506	Auxiliary Base Solenoid Short to Earth	M7497	Main Controller Software Updated
M5507	Auxiliary Base Solenoid Open Circuit		
M5532	Auxiliary Base Solenoid Overcurrent	M7604	Standard Display Panel No Communication
M5605	Auxiliary Rod Solenoid Short to Battery	M7748	Key Switch Multiple
M5606	Auxiliary Rod Solenoid Short to Earth		
M5607	Auxiliary Rod Solenoid Open Circuit	M7839	Hourmeter Changed
M5632	Auxiliary Rod Solenoid Overcurrent		
M5721	Auxiliary Control Switch Out of Range High		
M5722	Auxiliary Control Switch Out of Range Low		
M5724	Auxiliary Control Switch Out of NEUTRAL		
M6204	Load Moment Sensor In Error	R7404	No Communication To Main Controller
M6402	Switched Power Relay Error On		
M6403	Switched Power Relay Error Off		
M6702	HVAC Output Error On		
M6703	HVAC Output Error Off		
M6905	Hydraulic Throttle Solenoid Short to Battery		
M6906	Hydraulic Throttle Solenoid Short to Battery		
M6907	Hydraulic Throttle Solenoid Open Circuit		
M6923	Hydraulic Throttle Solenoid Not Calibrated		
M6932	Hydraulic Throttle Solenoid Overcurrent		
M7002	Switched Power Output Error On		
M7003	Switched Power Output Error Off		
M7007	Switched Power Output Open Circuit		
M7028	Switched Power Output Failure		

CONTROL PANEL SETUP

Panel Setup (Deluxe Instrument Panel)

Icon Identification

Figure 333



ICON	DESCRIPTION
	DATE / TIME
	USER / USER HOURS
	MACHINE HOURS (HOURMETER)
	ACTIVE WARNINGS screen icon
	VITALS screen icon
	SERVICE screen icon
	AUTO IDLE Status icon
	ATTACHMENTS screen icon
	MACHINE SETTINGS screen icon
	DISPLAY screen icon
	HOME icon (Return to MAIN screen)
	LEFT SCROLL button
	RIGHT SCROLL button
	ENTER button

Vitals

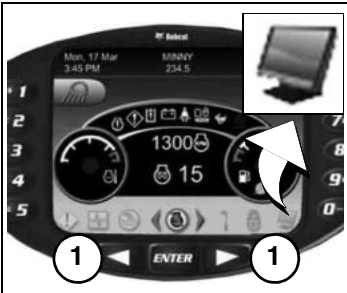
	Press a scroll button (Item 1) repeatedly until the Vitals screen icon (Inset) is highlighted.
	Displays select system operating levels.
You can monitor real-time displays of: Engine Speed (RPM) Engine Coolant Temperature System Voltage Hydraulic Fluid Temperature	

The Deluxe Instrument Panel is easy to use. Continue to set your own preferences for operating / monitoring your Bobcat excavator.

CONTROL PANEL SETUP (CONT'D)

Panel Setup (Deluxe Instrument Panel) (Cont'd)

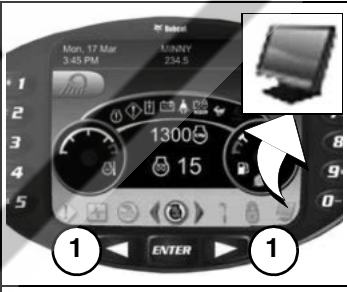
Date And Time

	Press a scroll button (Item 1) repeatedly until the Display screen icon (Inset) is highlighted.
	Select [1. CLOCKS] .
	Select [1. TIME] .
	Use the keypad to enter time. Select AM / PM / 24hr. Press [ENTER] to continue.
	Select [2. DATE] .
	Use the keypad to enter date. Press [ENTER] to continue.

Languages

	Press a scroll button (Item 1) repeatedly until the Display screen icon (Inset) is highlighted.
	Select [2. LANGUAGES] .
	Select the desired language.

English / Metric Display

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

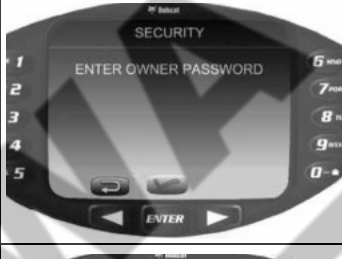
CONTROL PANEL SETUP (CONT'D)

Panel Setup (Deluxe Instrument Panel) (Cont'd)

Auto Idle Time Delay

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	Select [3. MACHINE PERFORMANCE].
	Select [1. AUTO IDLE DELAY TIME].
	Use the keypad to enter the desired delay time between 4 and 250 seconds. Press [ENTER] to save and continue. Press left scroll button to exit without saving.

Job Clock Reset

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	Select [1. PASSWORDS / LOCKOUTS].
	Enter owner password and press [ENTER].
	Select [1. USER SETTINGS].
	Select user.
	Press [9] to reset job statistics. Press left scroll button or [0] to exit without saving.

CONTROL PANEL SETUP (CONT'D)

Panel Setup (Deluxe Instrument Panel) (Cont'd)

Alarm Clock Reset

	Press a scroll button (Item 1) repeatedly until the Display screen icon (Inset) is highlighted.
	Select [3. ALARM CLOCK] .
	Select [1. OFF ONCE] , Select [2. ON Daily] or Select [3. ON WEEKLY] .
	Select [1. OFF / ON] , Select [2. TIME] or Select [3. DAILY] .
	Use key pad numbers to set time. Select [7. AM] , Select [8. PM] or Select [9. 24 hr clock] . Select [ENTER] to save. Press left scroll to back space numbers.
	Press [4] to set alarm to sleep. (When pressed, display will return to main screen.) Press [9] to shut off alarm. Alarm will still be active for the next day alarm setting. (When pressed, display will return to main screen.)

ECO MODE

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	Select [3. MACHINE PERFORMANCE] .
	Select [2. ECO MODE] . ECO Mode will set the maximum engine rpm to be at 85% of the high idle setting. Example: If the machine maximum engine speed is 2450 rpm, when ECO Mode is enabled, the maximum engine speed will be approximately 2080 rpm.

CONTROL PANEL SETUP (CONT'D)

Panel Setup (Deluxe Instrument Panel) (Cont'd)

Machine History - Log In Information

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	MACHINE SETTINGS is visible on screen. Select [2. MACHINE HISTORY].
	Select [1. LOG-IN INFORMATION].
	View User Log hours and last time / dated used. Individual information can be viewed and reset back to zero Select user [KEY PAD 1 - 9] to access individual user.

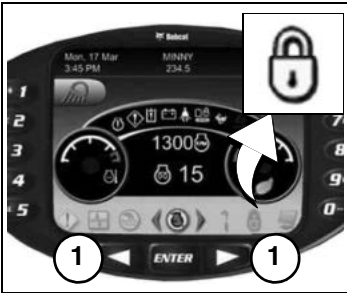
Machine History - User Job Statistics

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	MACHINE SETTINGS is visible on screen. Select [2. MACHINE HISTORY].
	Select [2. USER JOB STATISTICS].
	View Job Statistics (Job Hours / Idle Time) Information can be viewed and reset back to zero

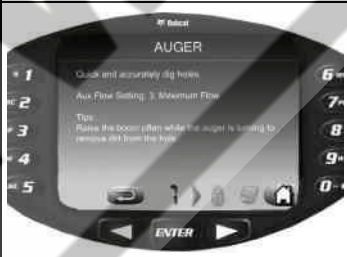
PASSWORD SETUP (KEYLESS START PANEL)

Panel Setup (Deluxe Instrument Panel) (Cont'd)

Machine History - Overall Job Statistics

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	MACHINE SETTINGS is visible on screen. Select [2. MACHINE HISTORY].
	Select [3. OVERALL JOB STATISTICS].

Attachments

	Press a scroll button (Item 1) repeatedly until the Attachment screen icon (Inset) is highlighted.
	ATTACHMENTS is visible on screen. Press [ENTER].
	Press [4] or [9] repeatedly until the desired Attachment is visible in the display screen.
	Information about the attachment, recommended auxiliary hydraulic flow and Tips about attachment operation will be displayed.

PASSWORD SETUP (KEYLESS START PANEL) (CONT'D)

Password Description

Master Password:

A permanent, randomly selected password set at the factory that cannot be changed. This password is used for service by the Bobcat dealer if the owner password is not known or to change the owner password.

Owner Password:

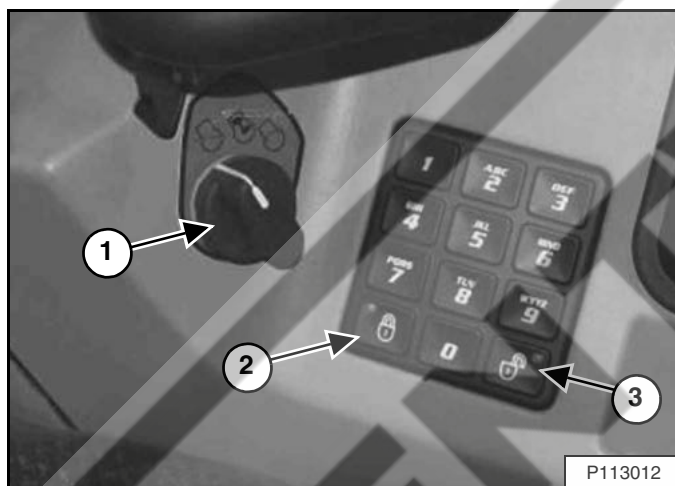
Allows for full use of the excavator. Must be used to change the owner password.

Changing The Owner Password

Turn the start switch (Item 1) [Figure 334] to the ON position to turn on the excavators electrical system.

Enter the five digit owner password using the number keys (1 through 0) if locked.

Figure 334



Press and hold the lock (Item 2) and unlock (Item 3) [Figure 334] keys for 2 seconds.

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

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

The instrument panel display screen will show [AGAIN].

Enter the new five digit owner password again.

The lock key red light will become solid.

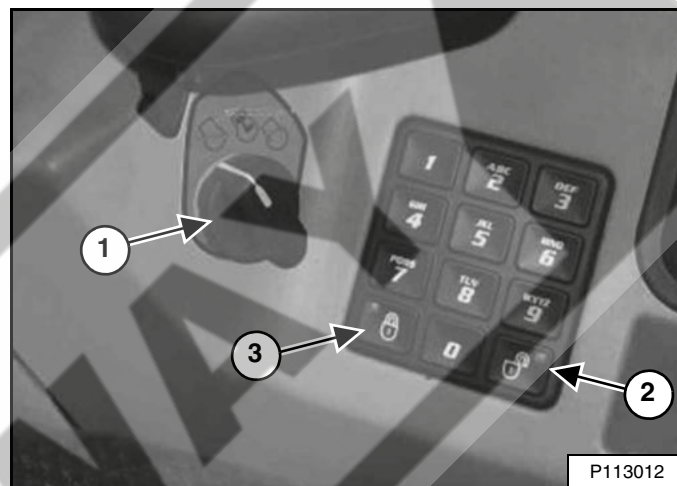
Password Lockout Feature

This feature allows the owner to unlock the password feature so that a password does not need to be used every time the engine is started.

Turn the start switch (Item 1) [Figure 335] to the ON position to turn on the excavators electrical system.

Enter the five digit owner password using the number keys (1 through 0).

Figure 335



Press the unlock key (Item 2) [Figure 335].

The left panel display screen will show [CODE].

Enter the five digit owner password using the number keys (1 through 0). The unlock key green light will flash, then become solid.

The excavator can now be started without using a password.

NOTE: Use the following procedure to reset the machine lock so that the excavator requires a password to start the engine.

Turn the key switch to the ON position to turn on the excavators electrical system.

Press the lock key (Item 3) [Figure 335].

The lock key red light will flash and the left panel display screen will show [CODE].

Enter the five digit owner password using the number keys (1 through 0). The unlock key green light will flash, then the lock key red light will become solid.

You must now enter the password every time to start the excavator.

PASSWORD SETUP (DELUXE INSTRUMENT PANEL)

Password Setup is available on machines with a Deluxe Instrument Panel.

Password Description

All new machines with a Deluxe Instrument Panel arrive at Bobcat dealerships with the keypad in locked mode. Locked mode means that a password must be used to start the engine.

For security purposes, your dealer may change the password and set the keypad in the locked mode. Your dealer will provide you with the password.

Master Password:

A permanent, randomly selected password set at the factory that cannot be changed. This password is used for service by the Bobcat dealer if the owner password is not known or to change the owner password.

Owner Password:

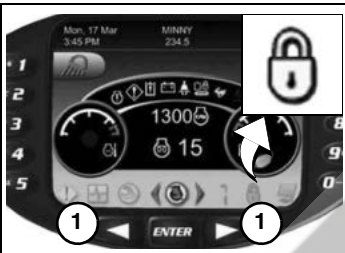
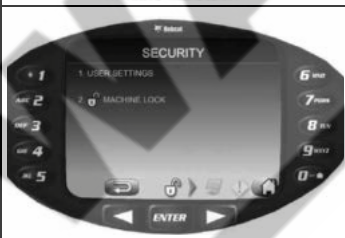
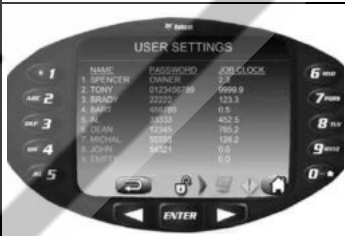
Allows for full use of the excavator and to set up the Deluxe Instrument Panel. There is only one owner password. The owner password must be used to change the owner or user passwords. Owner should change the password as soon as possible for security of the excavator.

User Password:

Allows starting and operating the excavator; cannot change password or any of the other setup features.

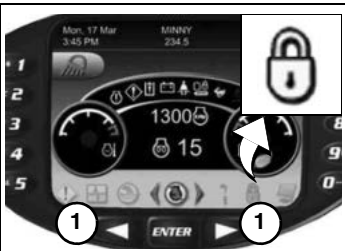
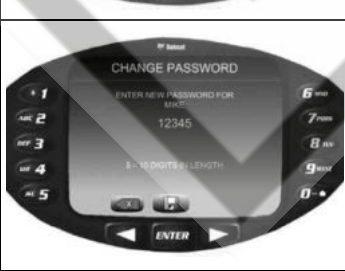
For the procedures to change passwords: (See Changing The Owner Password on Page 196.) and (See Changing The User Passwords on Page 197.)

Changing The Owner Password

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	Select [1. PASSWORDS / LOCKOUTS].
	Enter owner password and press [ENTER].
	Select [1. USER SETTINGS].
	Select [1. OWNER].
	Select [2. CHANGE PASSWORD].
	Enter new owner password and press [ENTER]. You will be prompted to reenter the new owner password.

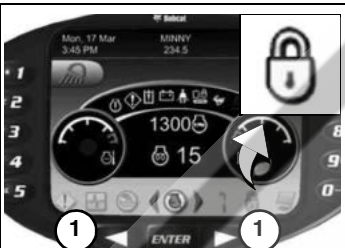
PASSWORD SETUP (DELUXE INSTRUMENT PANEL) (CONT'D)

Changing The User Passwords

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	Select [1. PASSWORDS / LOCKOUTS].
	Enter owner password and press [ENTER].
	Select [1. USER SETTINGS].
	Select user.
	Select [2. CHANGE PASSWORD].
	Enter new user password and press [ENTER].

Password Lockout Feature

This feature allows the owner to unlock the password feature so that a password does not need to be used every time the engine is started.

	Press a scroll button (Item 1) repeatedly until the Security screen icon (Inset) is highlighted.
	Select [1. PASSWORDS / LOCKOUTS].
	Enter owner password and press [ENTER].
	Select [2. MACHINE LOCK].

NOTE: The procedure above can be followed to reset the machine lock so that the machine requires a password to start the engine.

NOTE: When the password is in UNLOCKED, no password is needed. The start switch is used to start the machine.

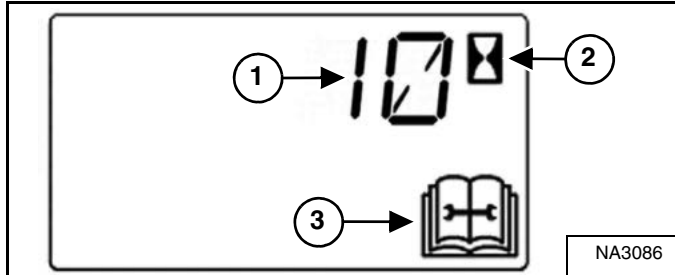
MAINTENANCE CLOCK

Description

The Maintenance Clock alerts the operator when the next service interval is due. *EXAMPLE:* The maintenance clock can be set to a 500 hour interval as a reminder for the next 500 hour planned maintenance.

Standard Instrument Panel

Figure 336



During machine operation, a 2 beep alarm will sound when there are less than 10 hours until the next planned maintenance.

The remaining hours before maintenance is required (Item 1) will appear in the data display for 5 seconds while the service icon (Item 3) and the hourmeter icon (Item 2) [Figure 336] flash.

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

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

Setup

See your Bobcat dealer about installation of this feature.

Reset

Figure 337



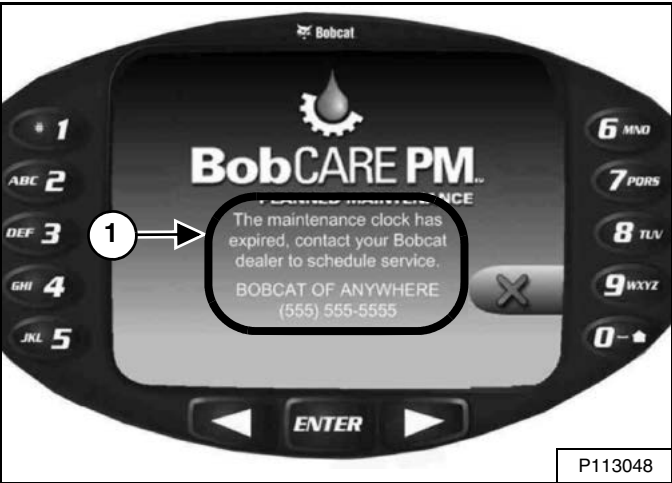
Press the Information button (Item 2) [Figure 337] until the display screen shows the maintenance clock.

Press and hold the Information button (Item 2) for 7 seconds until **[RESET]** (Item 1) [Figure 337] appears in the display screen.

MAINTENANCE CLOCK (CONT'D)

Deluxe Instrument Panel

Figure 338



The Deluxe Instrument Panel (if equipped) will display a message (Item 1) [Figure 338] alerting the operator to service the machine.

This message will remain for 10 seconds and will appear for 10 seconds every time the machine is started until the maintenance clock is reset.

Figure 339



The Deluxe Instrument Panel (if equipped) will display a bar (Item 1) [Figure 339] showing the time remaining until next service. This bar will turn red when service is past due. NEXT MAINTENANCE DUE will change to MAINTENANCE PAST DUE and display the number of hours past due.

Keys [4] and [9] can be used to adjust the service interval when the owner is logged in [Figure 339].

To reset the service clock after servicing the machine, press and hold key [1] [Figure 339] (when the owner is logged in) until the bar graph resets to 0.



Bobcat®

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Certain specification(s) are based on engineering calculations and are not actual measurements. Specification(s) are provided for comparison purposes only and are subject to change without notice. Specification(s) for your individual Bobcat equipment will vary based on normal variations in design, manufacturing, operating conditions, and other factors.

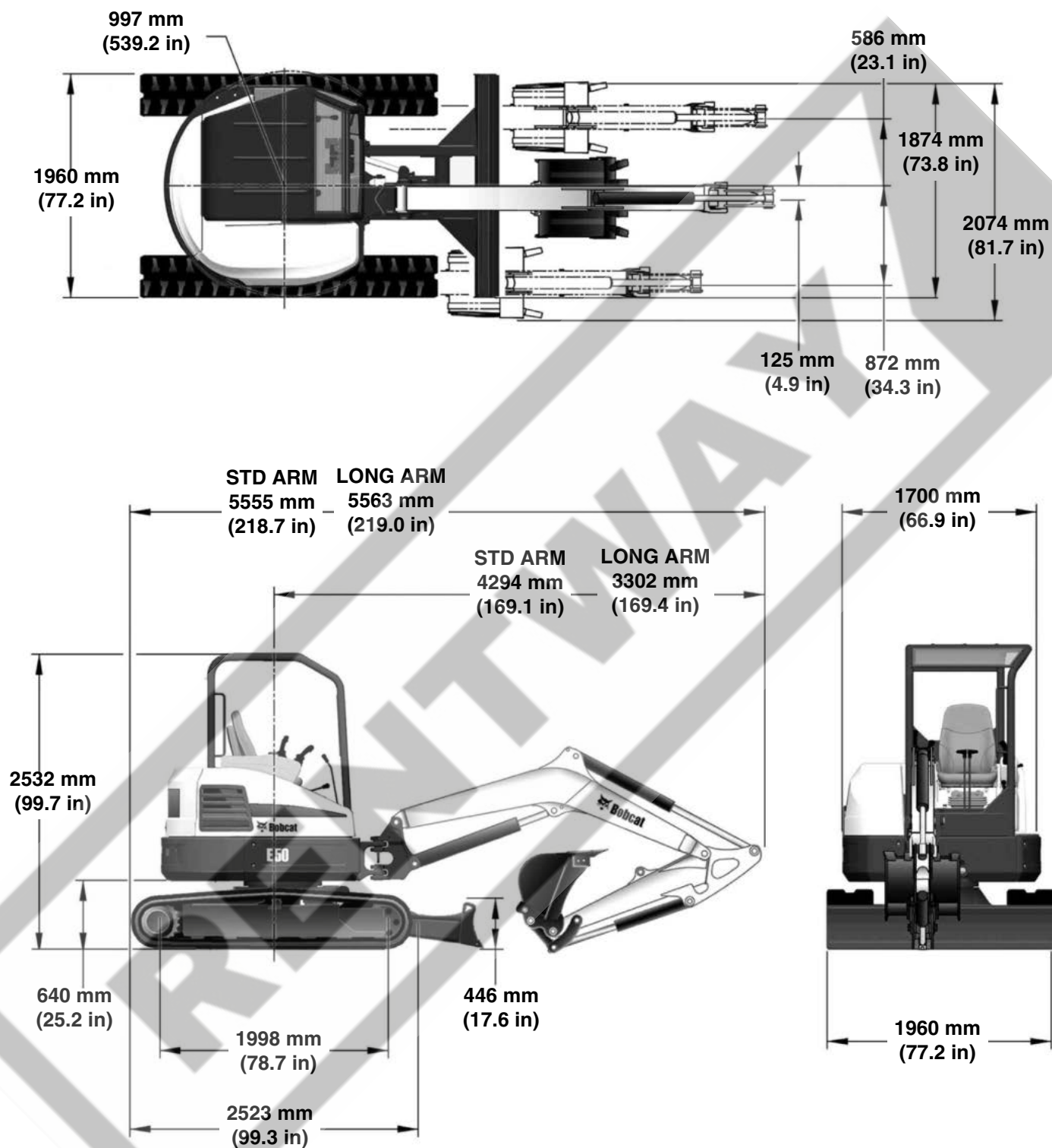


Bobcat®

E50 EXCAVATOR SPECIFICATIONS

Excavator Machine Dimensions

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



NA5066

Excavator Machine Dimensions - Standard Arm

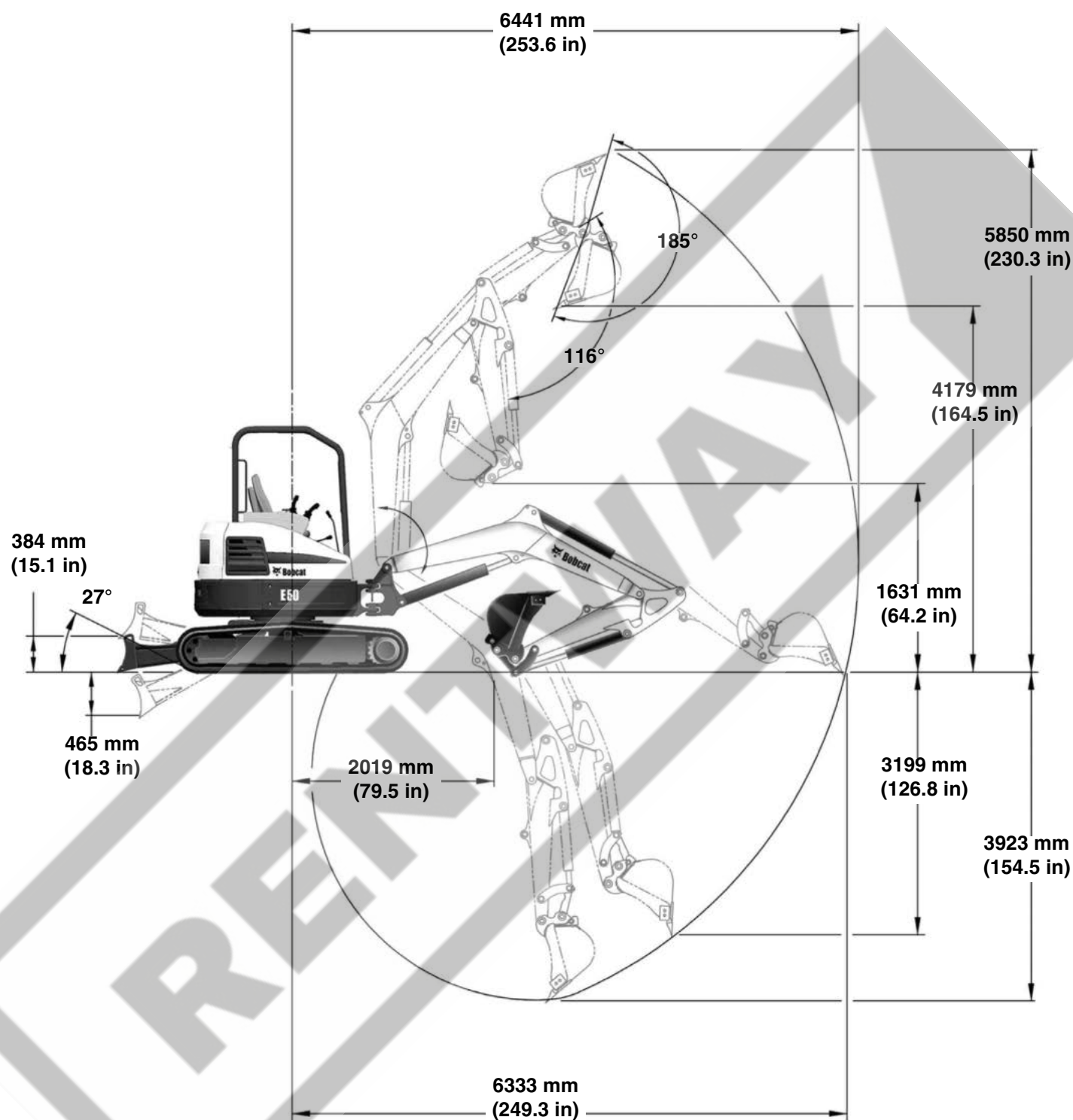
-
- Technical diagram of the Bobcat E60 compact loader showing dimensions and reach. The diagram includes the following specifications:
- Overall Width:** 6062 mm (238.7 in)
 - Overall Height:** 5595 mm (220.3 in)
 - Reach (Maximum):** 5939 mm (233.8 in)
 - Reach (Maximum):** 3924 mm (154.5 in)
 - Reach (Maximum):** 2163 mm (85.2 in)
 - Reach (Maximum):** 1926 mm (75.8 in)
 - Reach (Maximum):** 3524 mm (138.7 in)
 - Reach (Maximum):** 2019 mm (79.5 in)
 - Reach (Maximum):** 185°
 - Reach (Maximum):** 116°
 - Reach (Maximum):** 27°
 - Reach (Maximum):** 465 mm (18.3 in)
 - Reach (Maximum):** 384 mm (15.1 in)

E50 Operation & Maintenance Manual

E50 EXCAVATOR SPECIFICATIONS (CONT'D)

Excavator Machine Dimensions - Long Arm

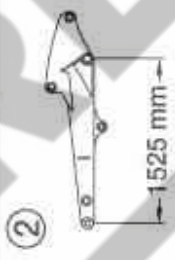
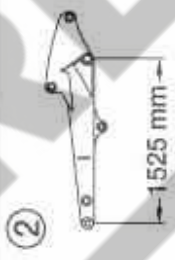
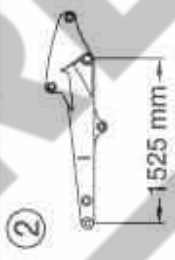
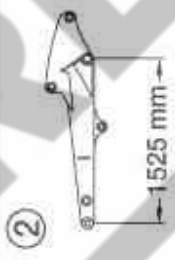
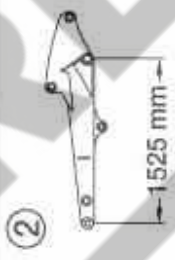
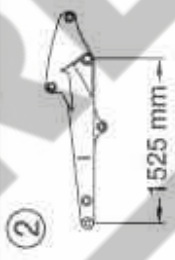
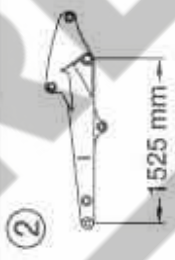
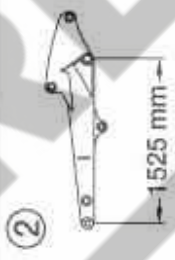
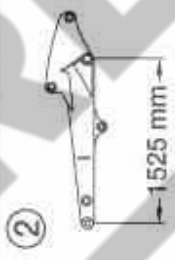
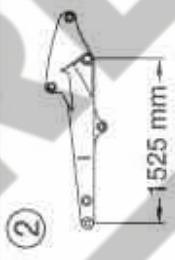
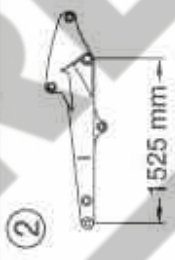
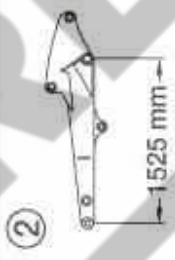
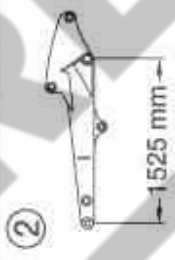
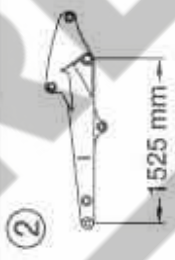
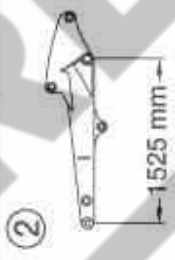
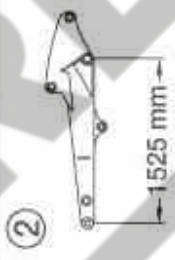
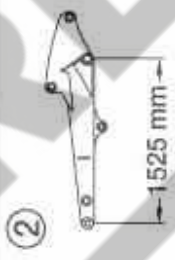
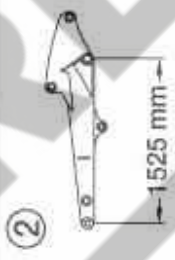
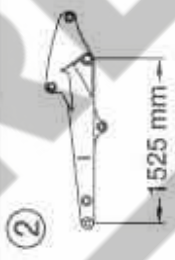
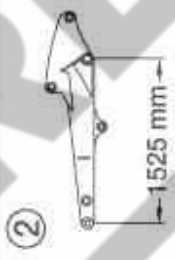
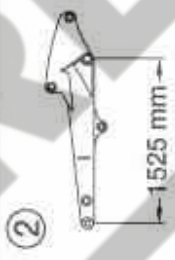
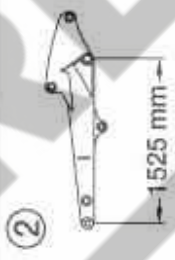
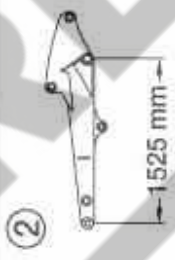
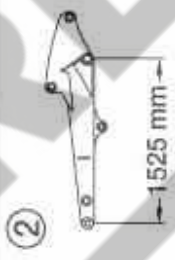
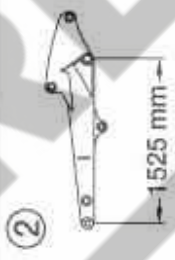
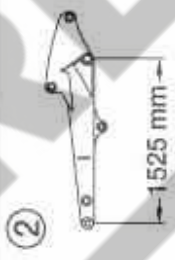
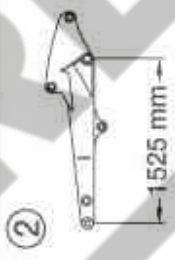
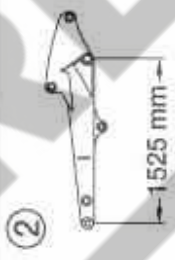
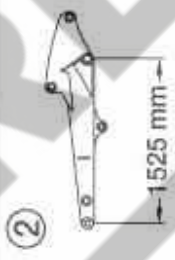
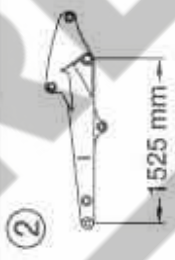
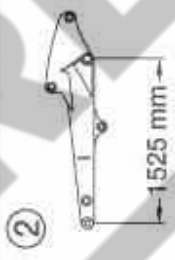
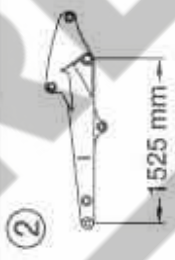
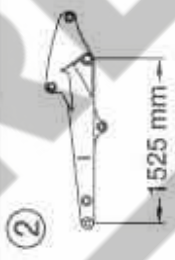
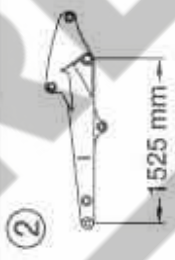
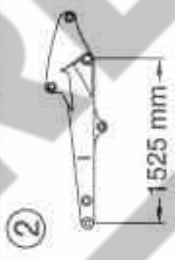
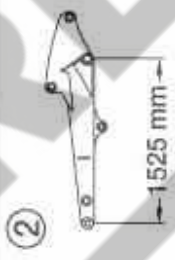
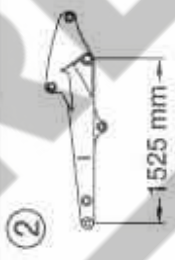
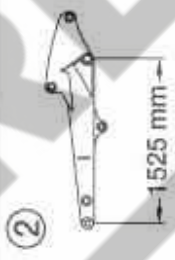
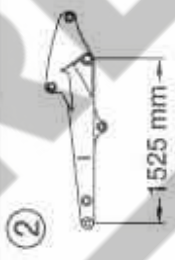
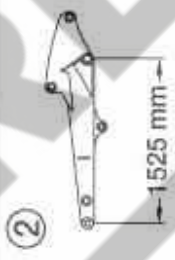
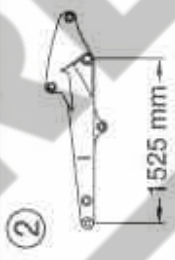
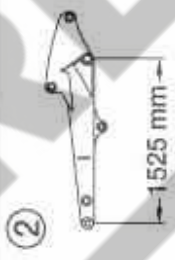
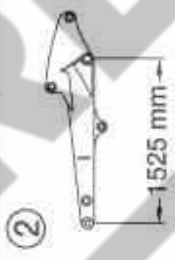
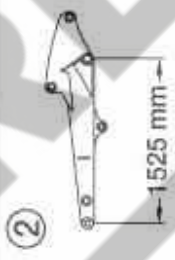
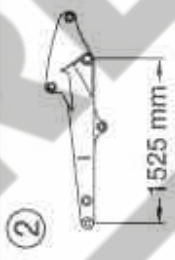
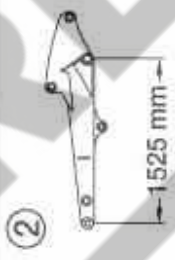
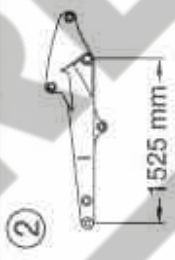
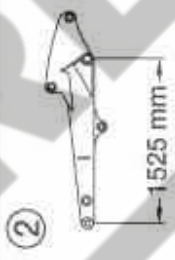
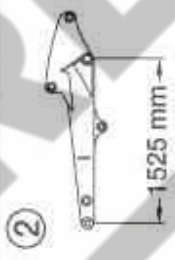
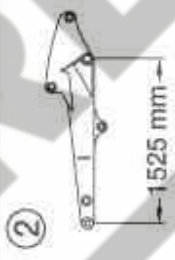
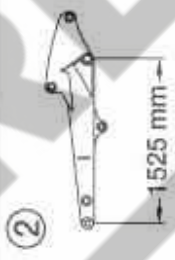
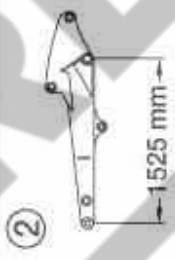
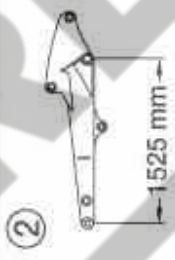
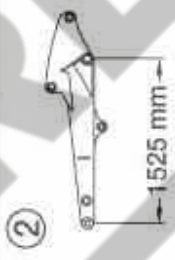
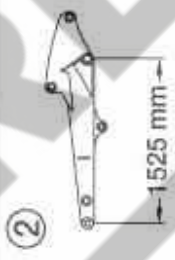
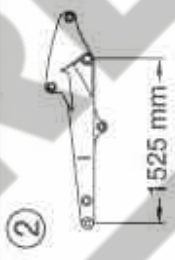
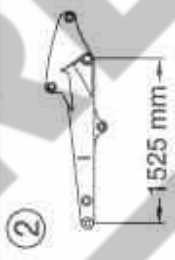
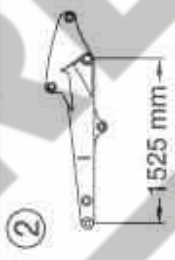
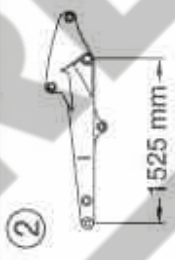
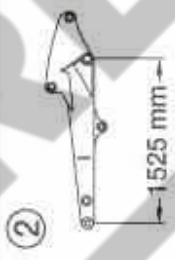
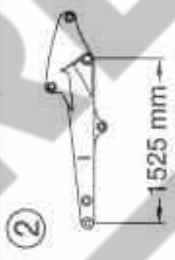
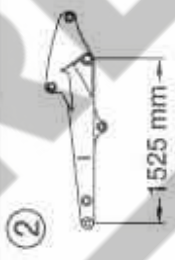
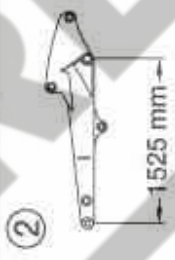
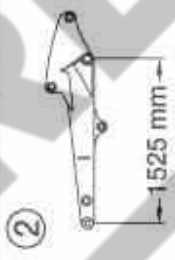
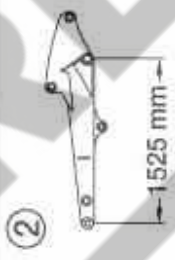
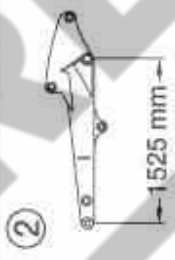
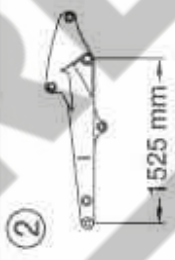
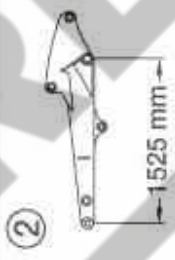
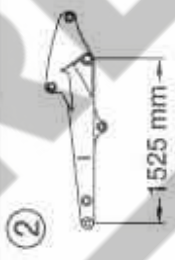
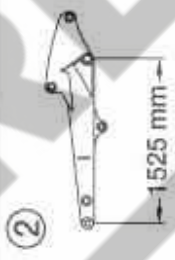
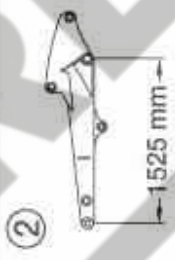
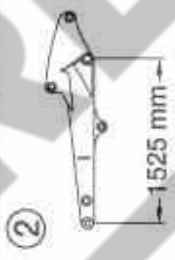
- Where applicable, specification conform to SAE or ISO standards and are subject to change without notice.



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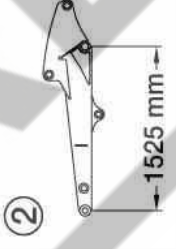
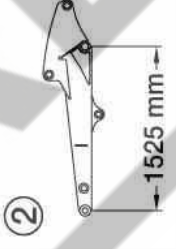
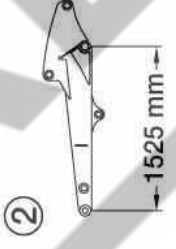
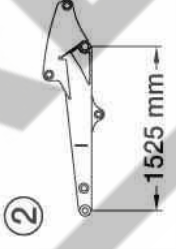
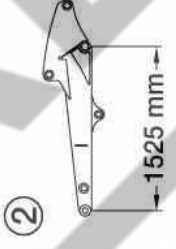
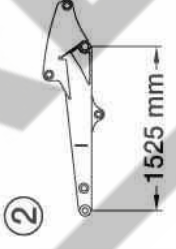
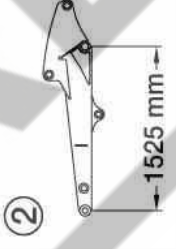
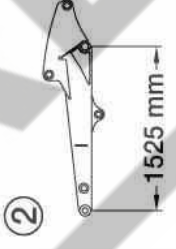
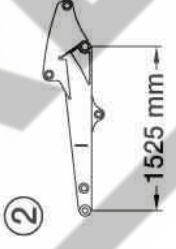
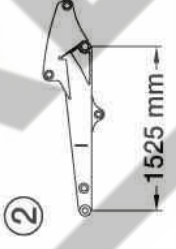
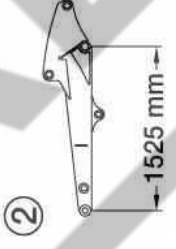
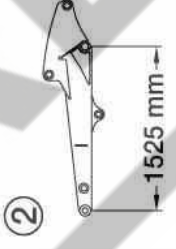
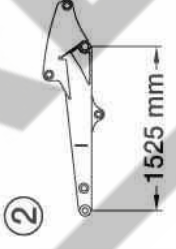
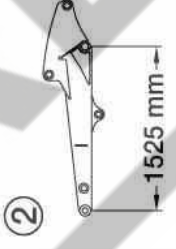
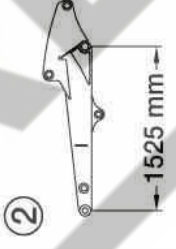
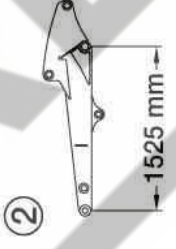
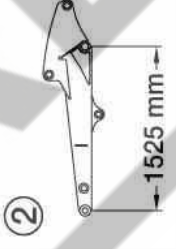
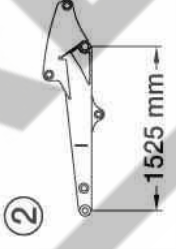
E50 EXCAVATOR SPECIFICATIONS (CONT'D)

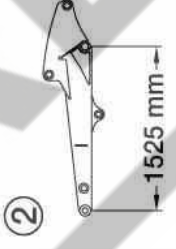
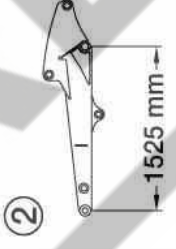
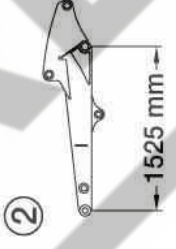
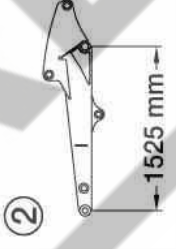
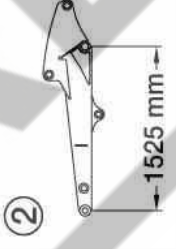
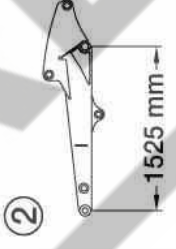
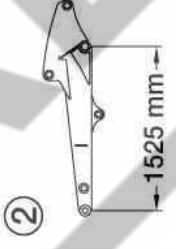
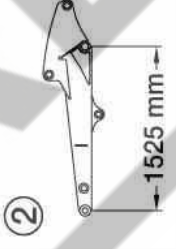
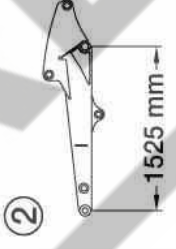
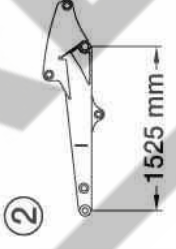
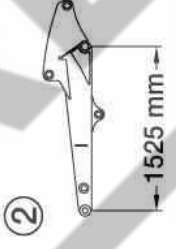
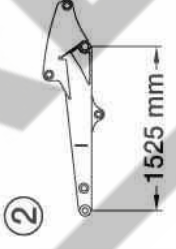
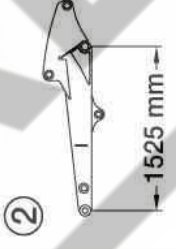
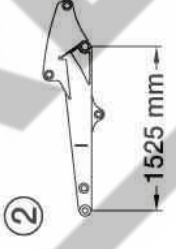
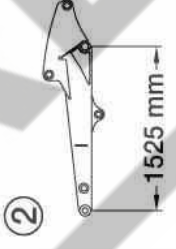
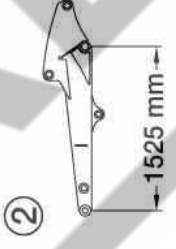
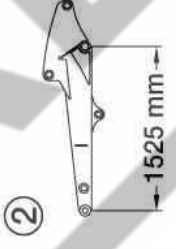
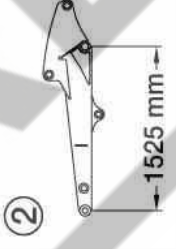
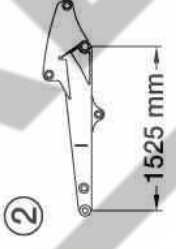
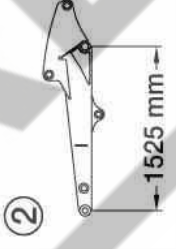
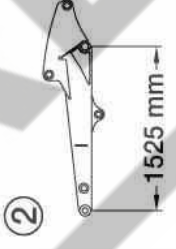
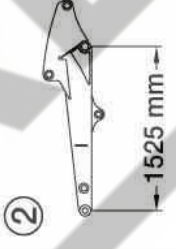
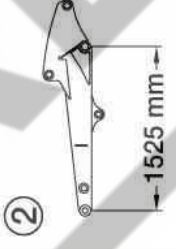
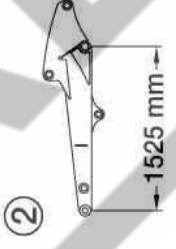
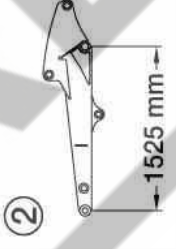
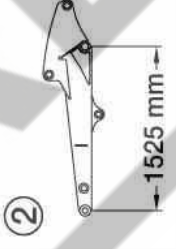
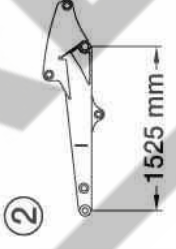
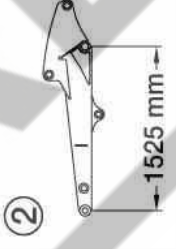
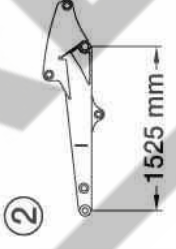
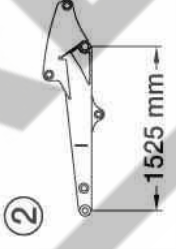
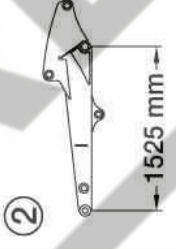
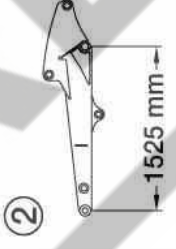
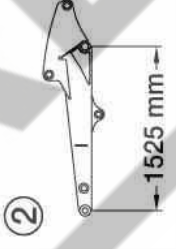
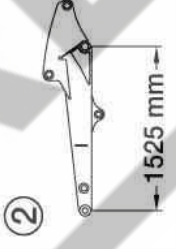
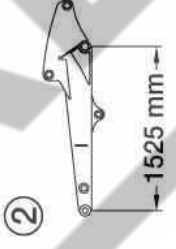
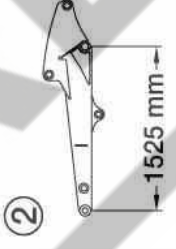
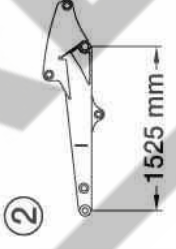
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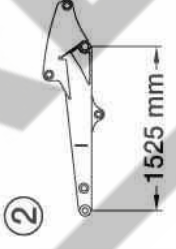
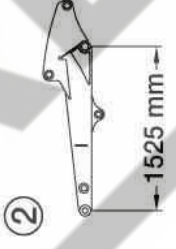
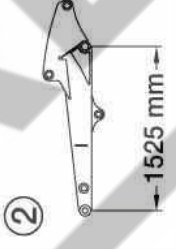
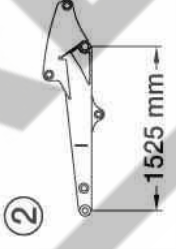
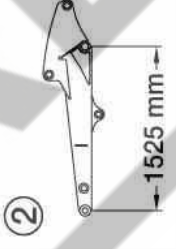
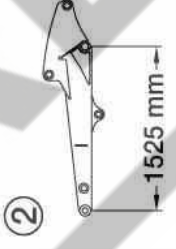
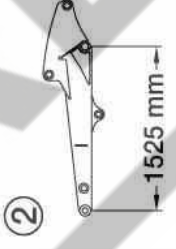
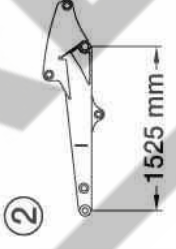
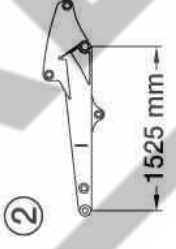
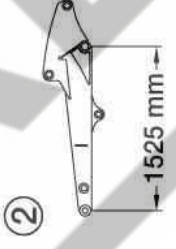
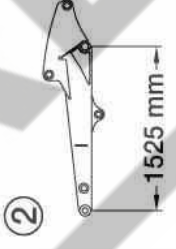
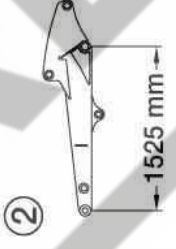
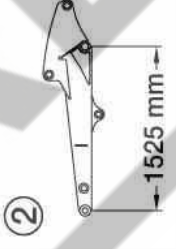
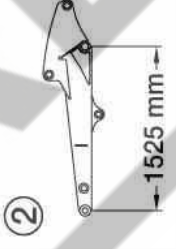
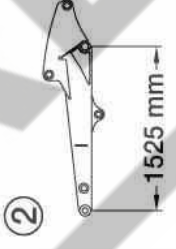
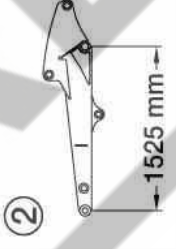
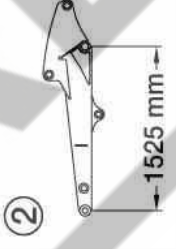
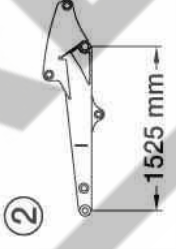
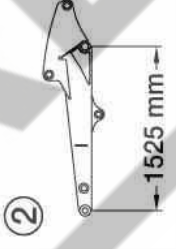
 		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  		  
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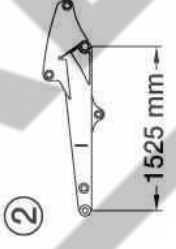
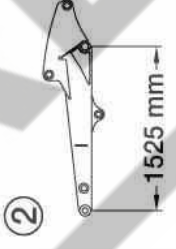
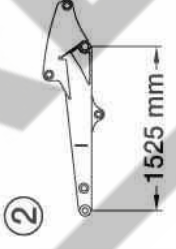
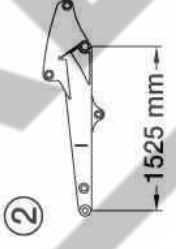
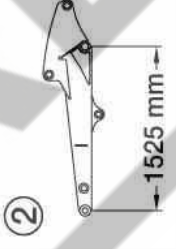
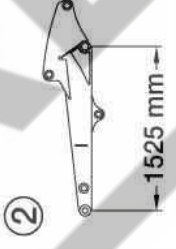
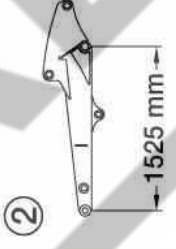
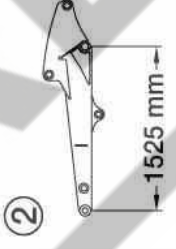
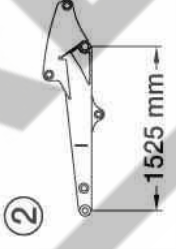
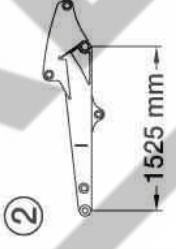
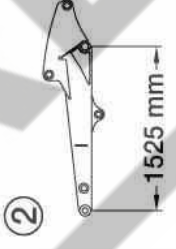
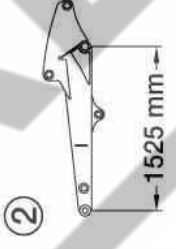
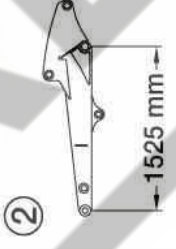
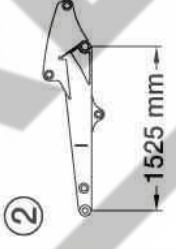
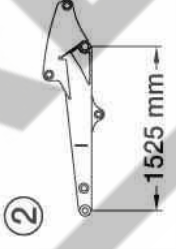
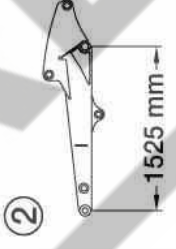
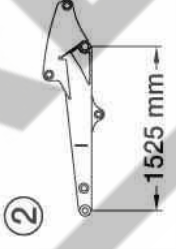
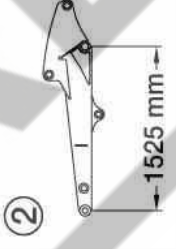
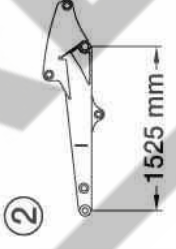
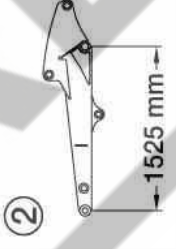
E50 EXCAVATOR SPECIFICATIONS (CONT'D)

Rated Lift Capacity (Canopy - Standard Arm With Additional Counterweight)

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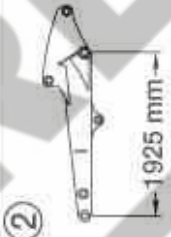
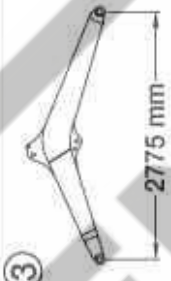
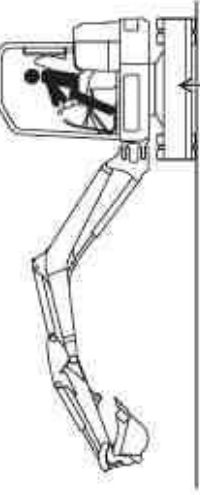
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E50 EXCAVATOR SPECIFICATIONS (CONT'D)

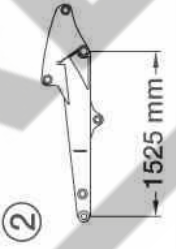
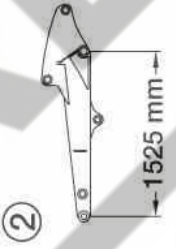
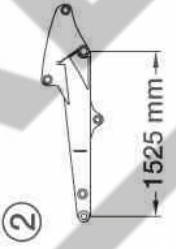
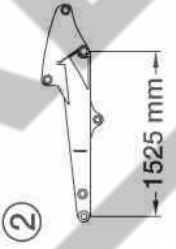
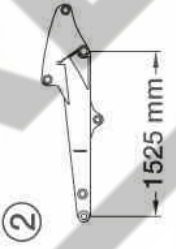
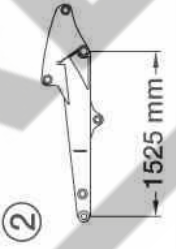
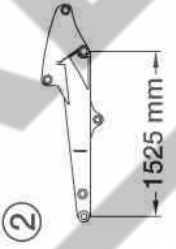
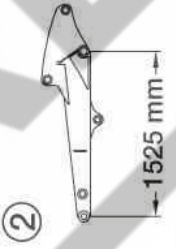
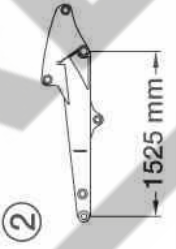
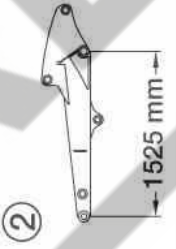
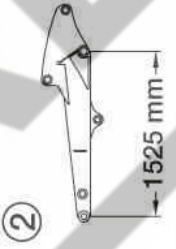
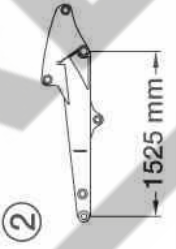
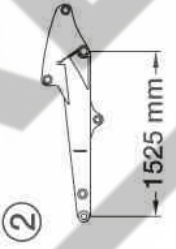
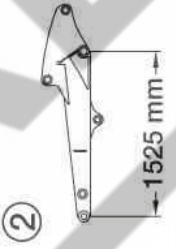
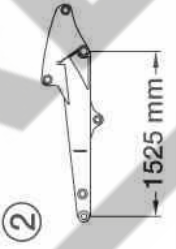
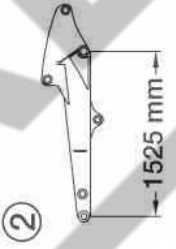
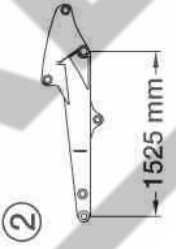
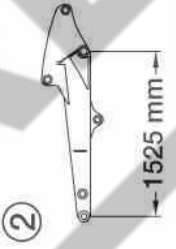
Rated Lift Capacity (Canopy - Long Arm)

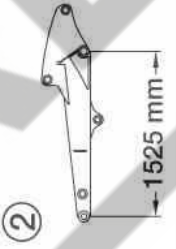
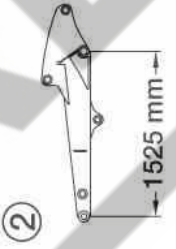
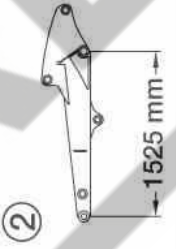
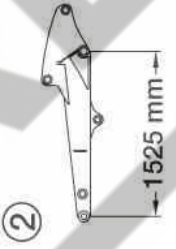
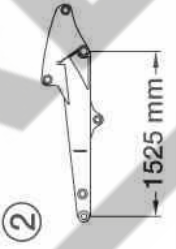
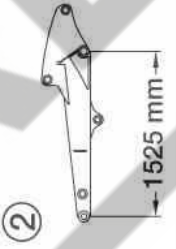
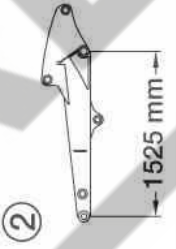
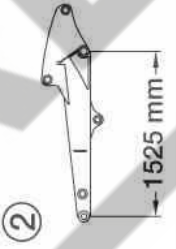
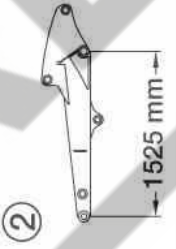
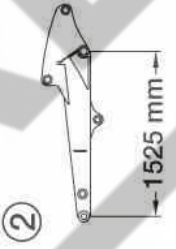
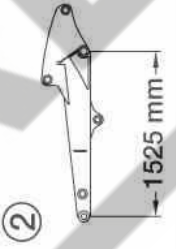
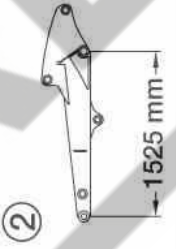
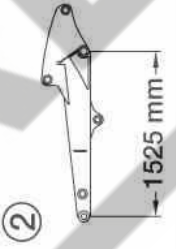
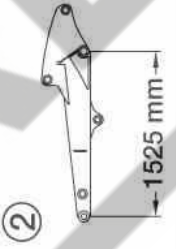
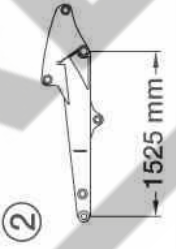
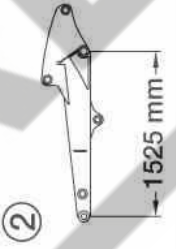
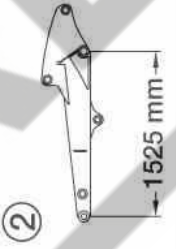
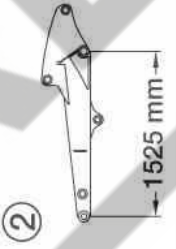
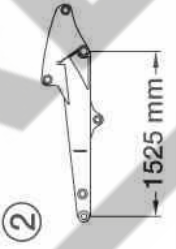
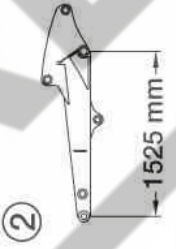
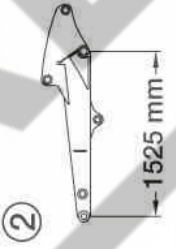
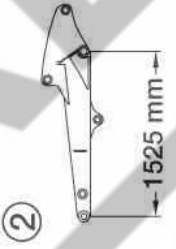
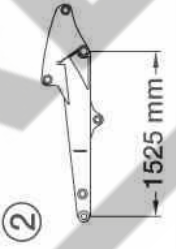
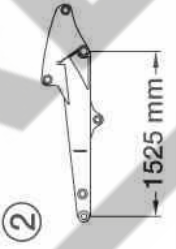
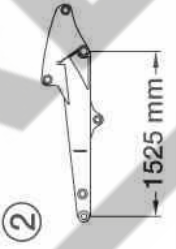
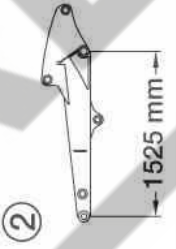
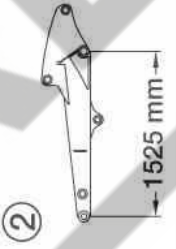
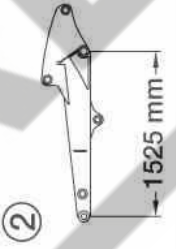
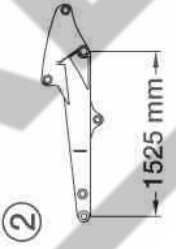
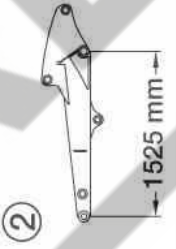
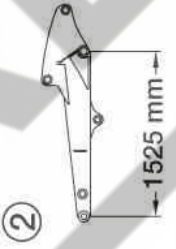
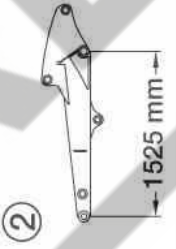
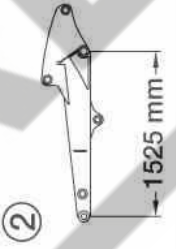
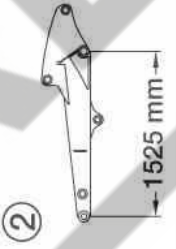
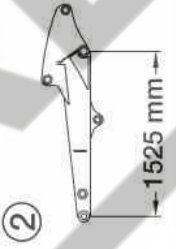
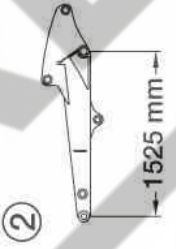
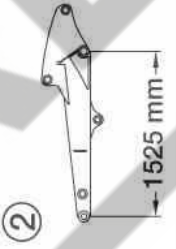
 		  		  		E50				
A	kg @ max. B	B			kg @ max. B	B			kg @ max. B	kg @ max. B
		3000 mm	4000 mm	5000 mm		3000 mm	4000 mm	5000 mm		
4000 mm			*724 kg		*595 kg @ 4600 mm				518 kg @ 4600 mm	
3000 mm			*800 kg	*770 kg	*616 kg @ 5150 mm		*800 kg	586 kg	534 kg @ 5150 mm	407 kg @ 5150 mm
2000 mm	*1243 kg	*1037 kg	*1014 kg	*1172 kg	*800 kg @ 5480 mm	*1243 kg	*1037 kg	543 kg	460 kg @ 5480 mm	338 kg @ 5480 mm
1000 mm	*2193 kg	*1447 kg	*1172 kg	*1172 kg	*973 kg @ 5570 mm	1214 kg	766 kg	518 kg	430 kg @ 5570 mm	311 kg @ 5570 mm
Ground	*2729 kg	*1727 kg	*1309 kg	*1309 kg	*1167 kg @ 5400 mm	1160 kg	736 kg	514 kg	451 kg @ 5400 mm	325 kg @ 5400 mm
-1000 mm	*2818 kg	*1811 kg	*1279 kg	*1279 kg	*1256 kg @ 5050 mm	1175 kg	732 kg	512 kg	517 kg @ 5050 mm	376 kg @ 5050 mm

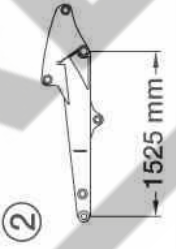
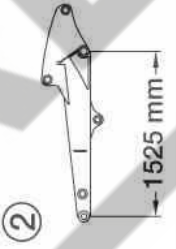
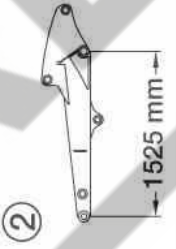
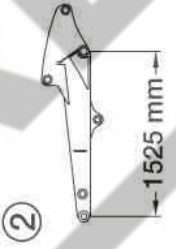
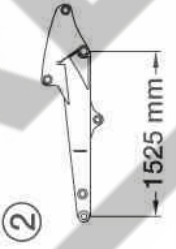
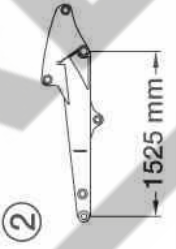
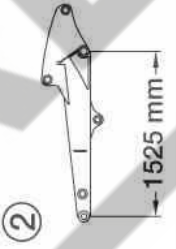
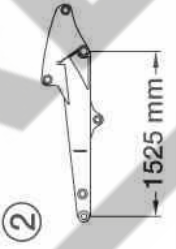
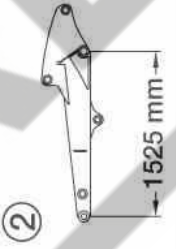
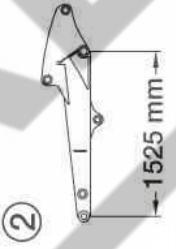
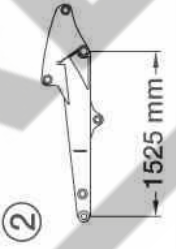
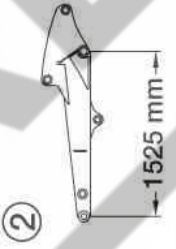
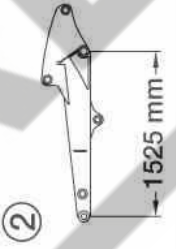
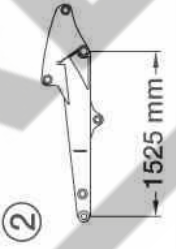
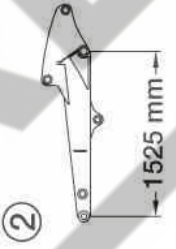
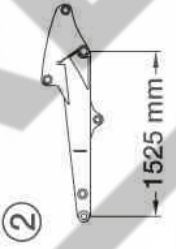
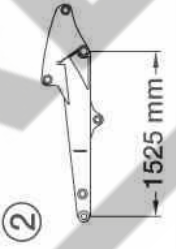
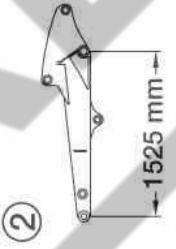
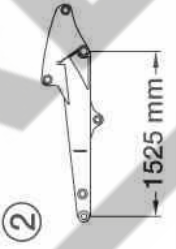
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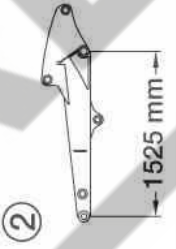
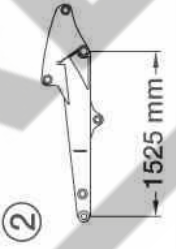
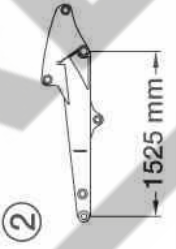
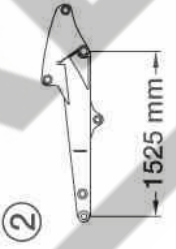
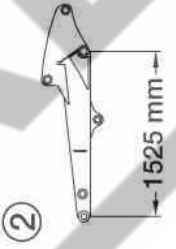
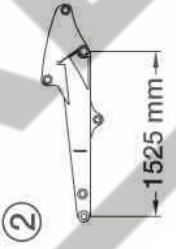
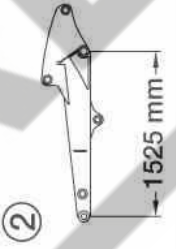
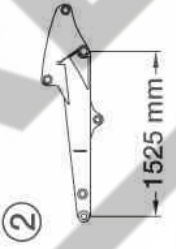
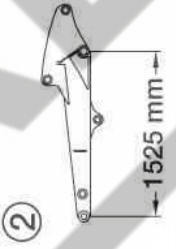
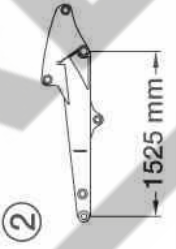
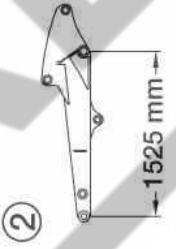
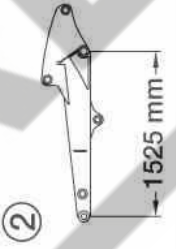
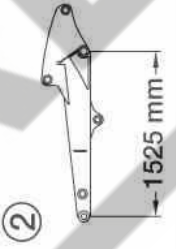
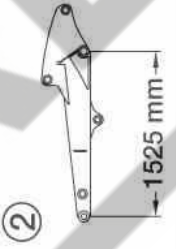
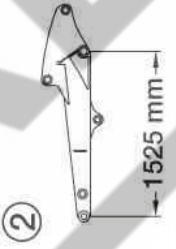
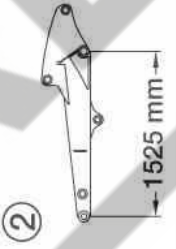
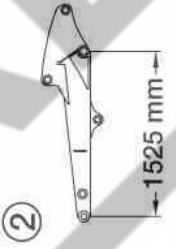
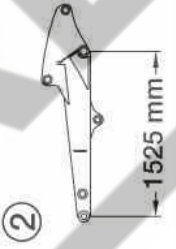
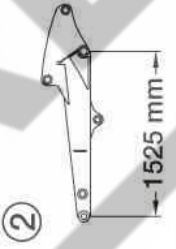
E50 EXCAVATOR SPECIFICATIONS (CONT'D)

Rated Lift Capacity (Cab - Standard Arm)

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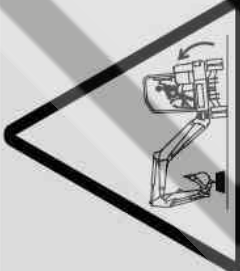
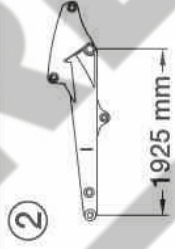
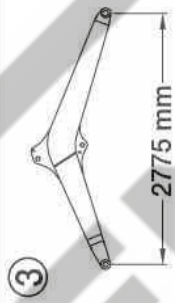
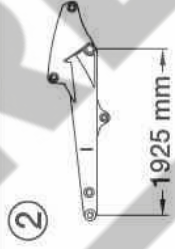
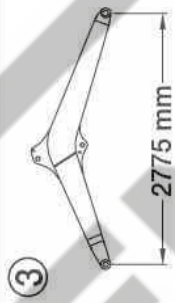
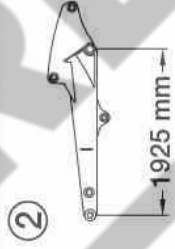
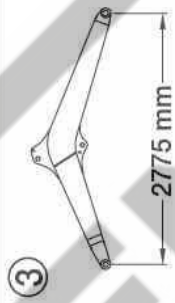
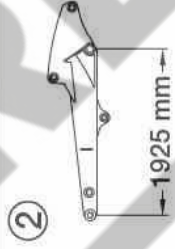
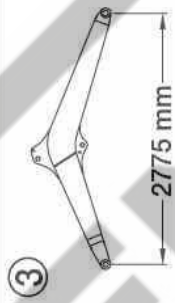
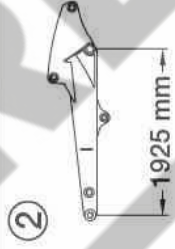
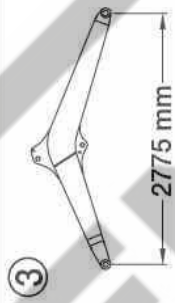
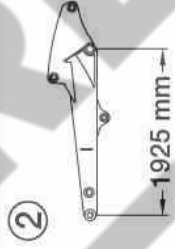
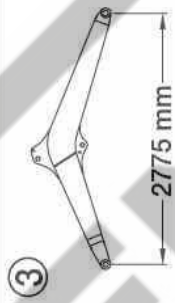
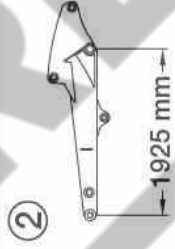
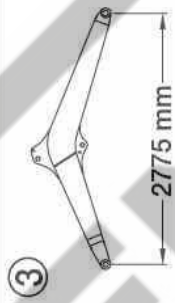
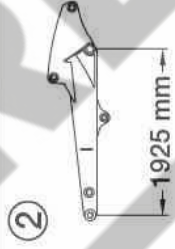
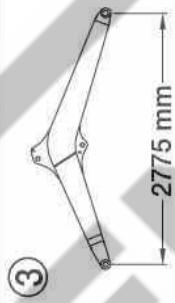
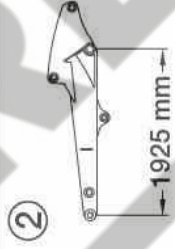
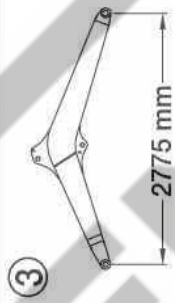
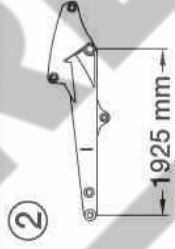
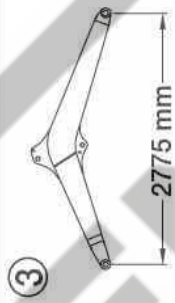
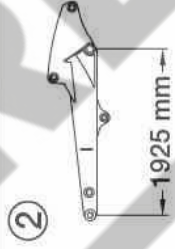
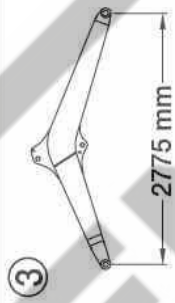
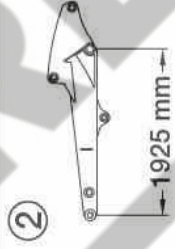
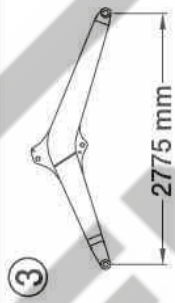
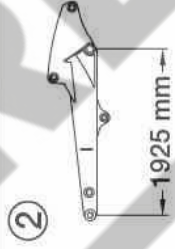
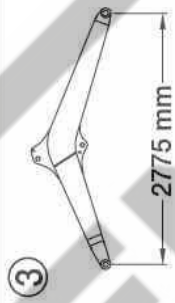
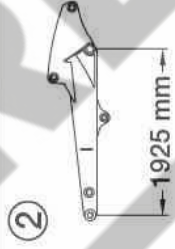
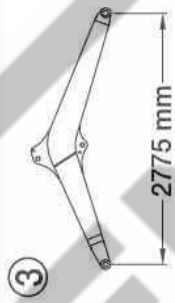
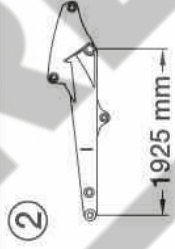
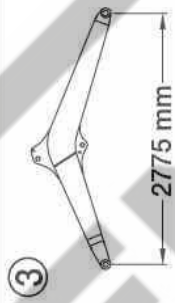
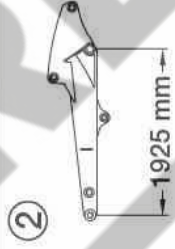
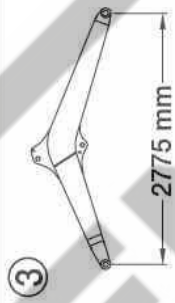
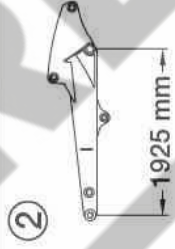
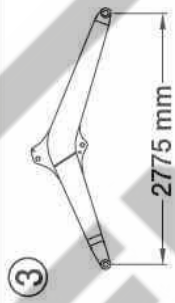
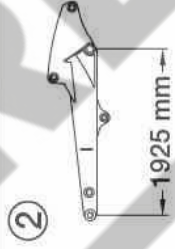
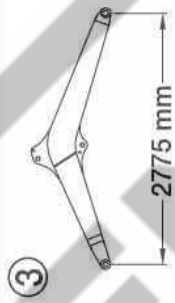
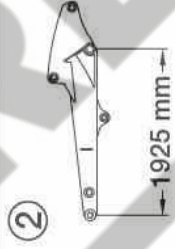
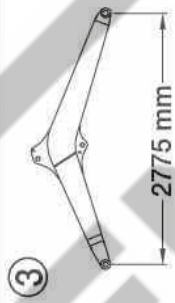
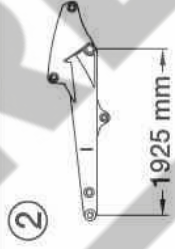
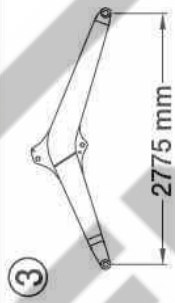
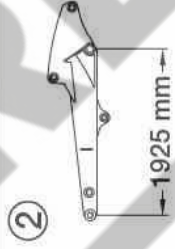
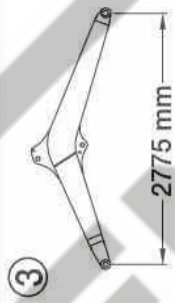
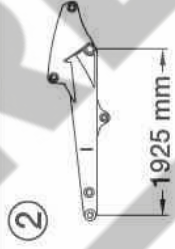
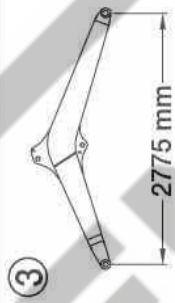
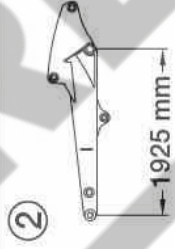
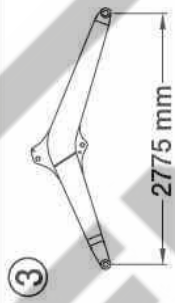
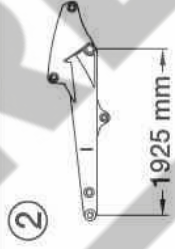
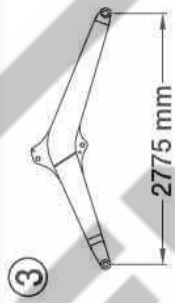
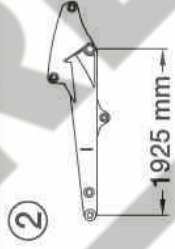
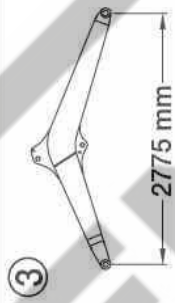
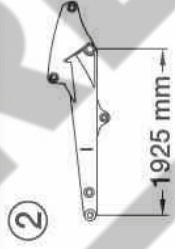
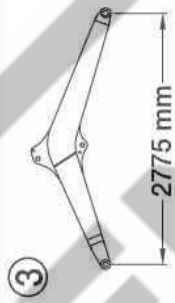
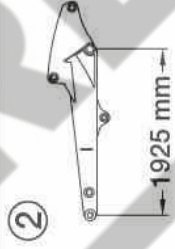
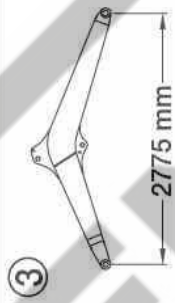
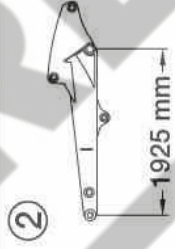
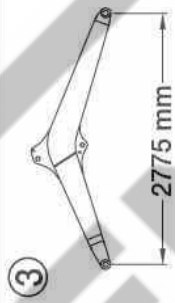
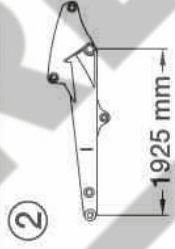
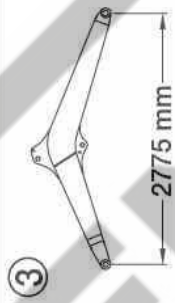
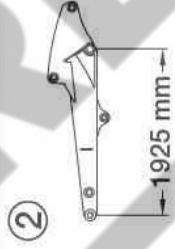
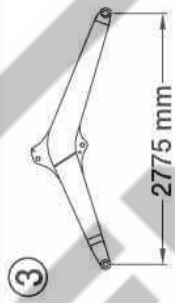
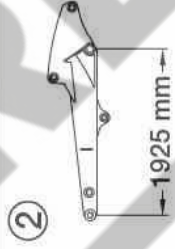
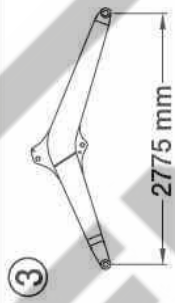
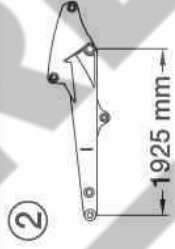
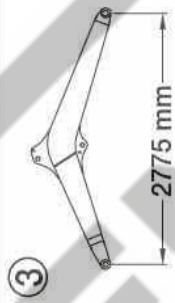
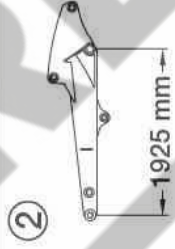
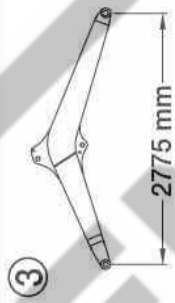
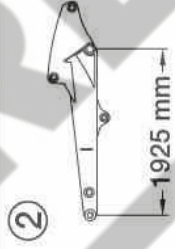
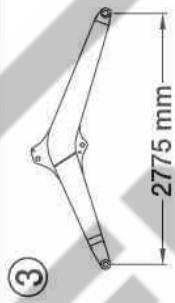
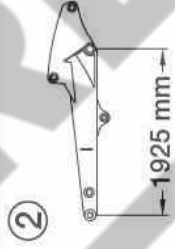
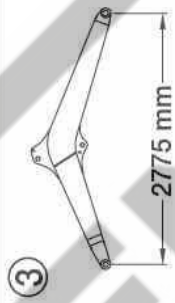
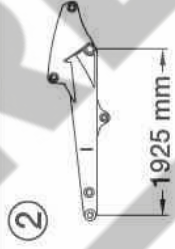
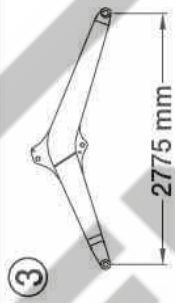
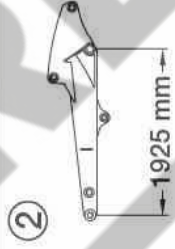
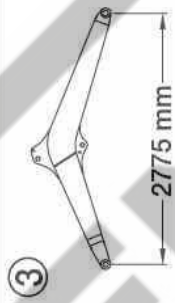
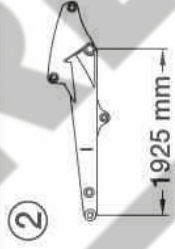
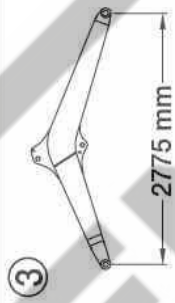
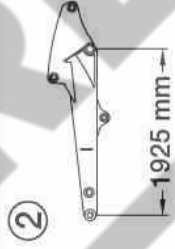
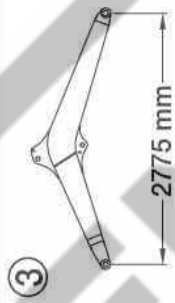
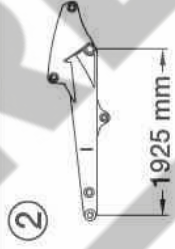
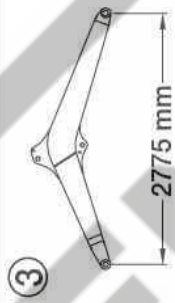
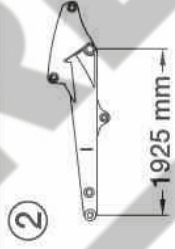
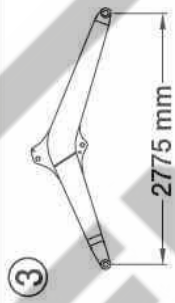
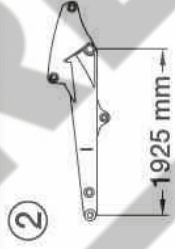
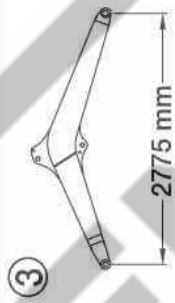
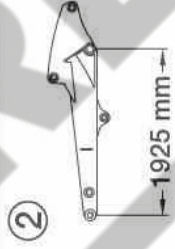
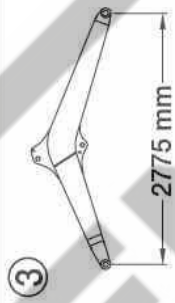
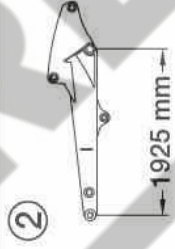
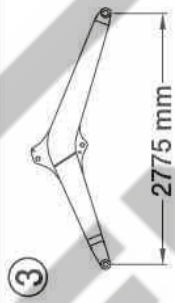
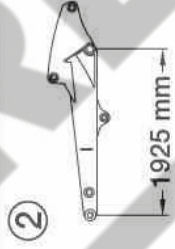
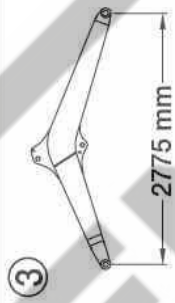
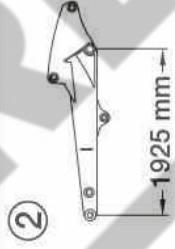
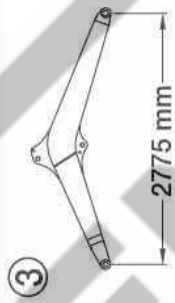
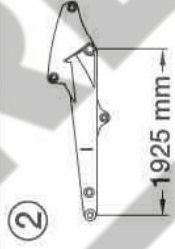
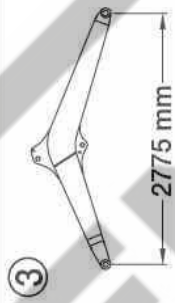
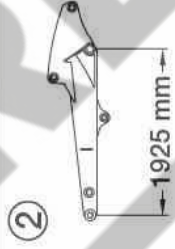
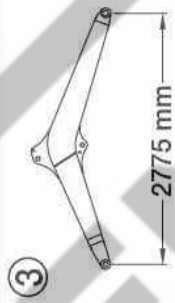
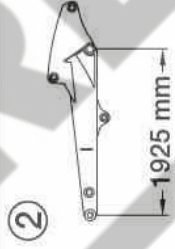
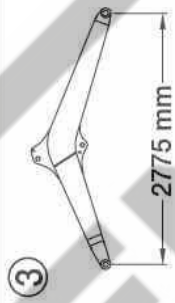
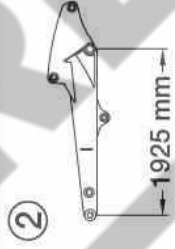
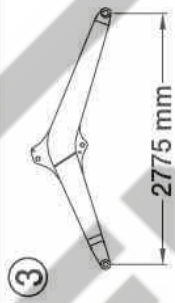
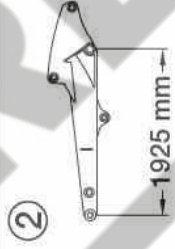
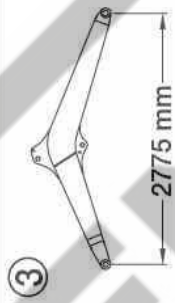
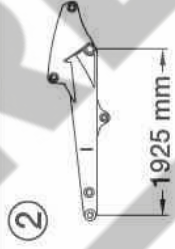
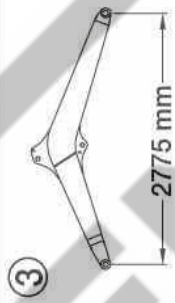
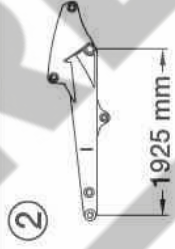
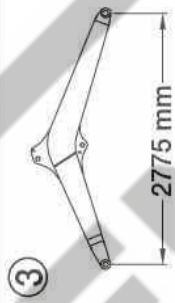
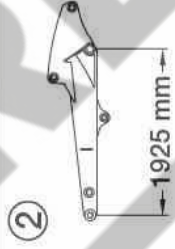
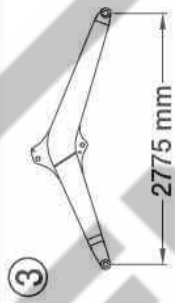
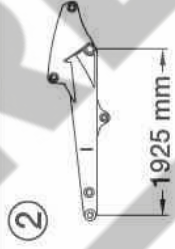
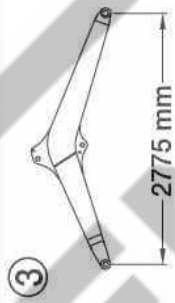
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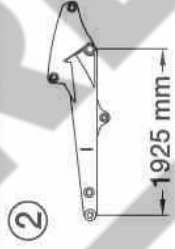
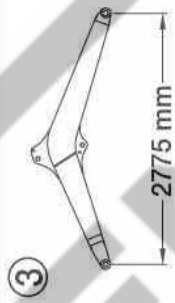
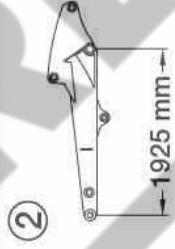
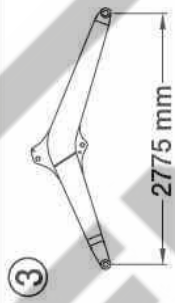
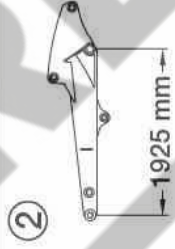
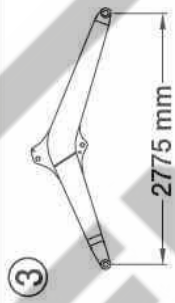
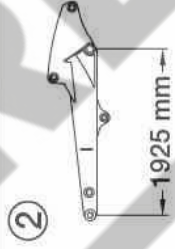
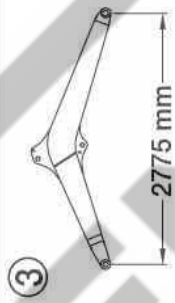
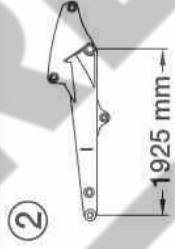
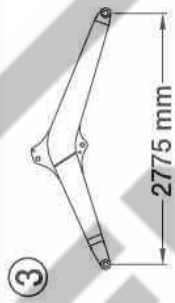
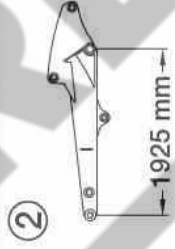
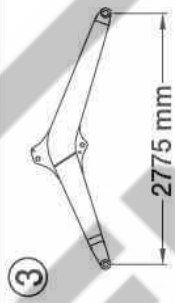
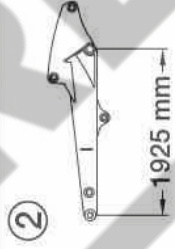
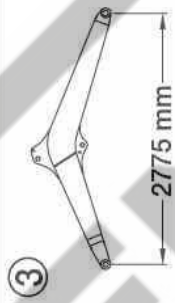
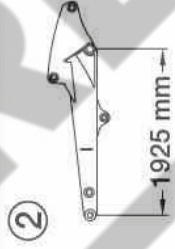
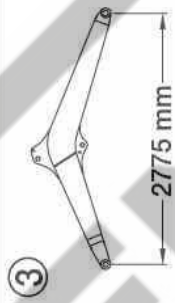
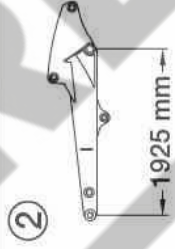
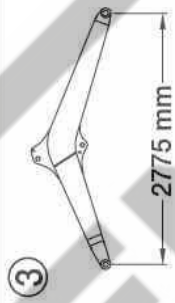
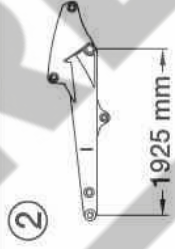
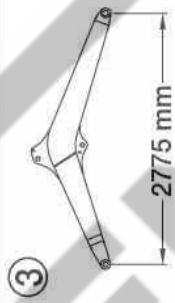
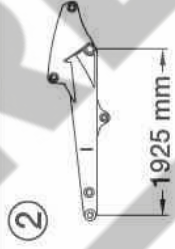
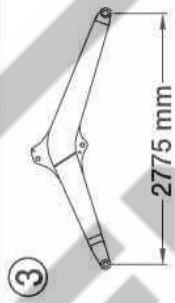
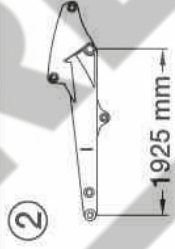
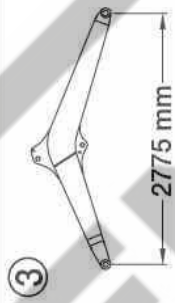
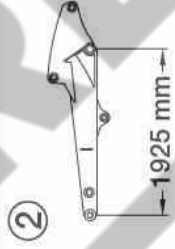
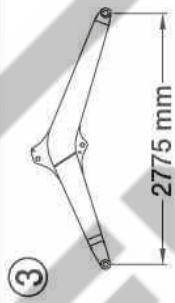
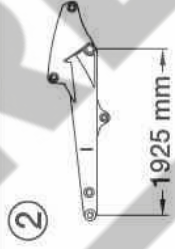
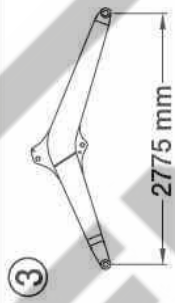
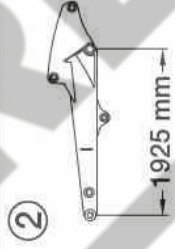
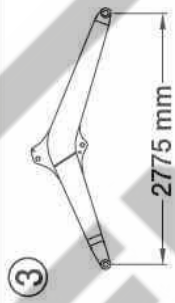
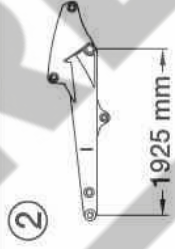
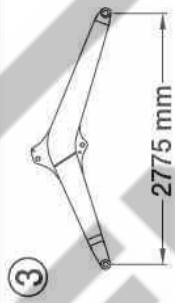
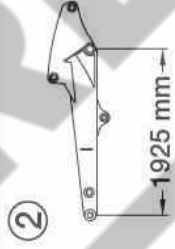
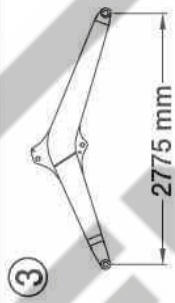
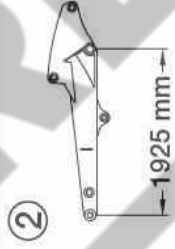
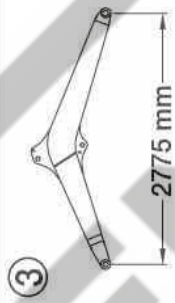
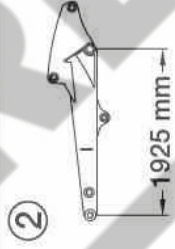
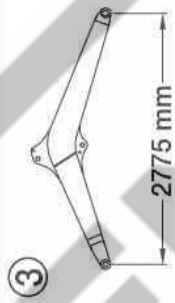
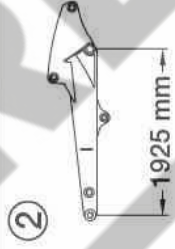
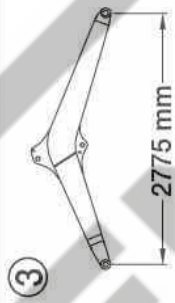
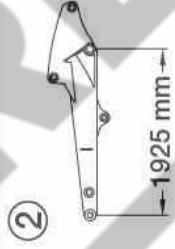
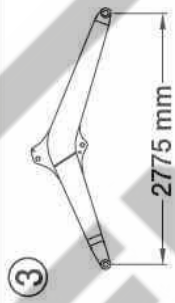
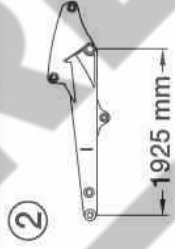
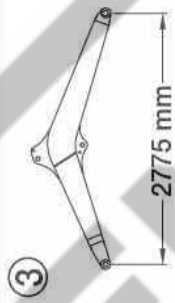
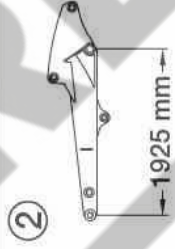
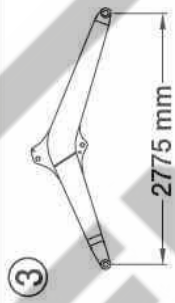
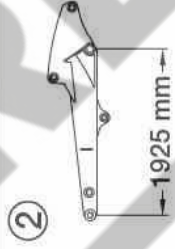
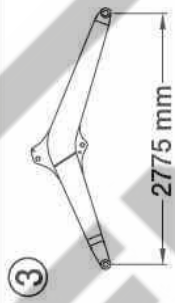
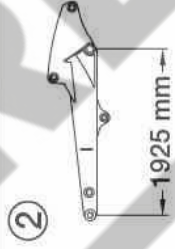
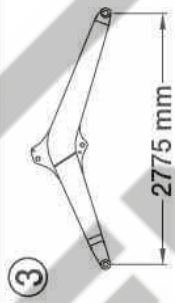
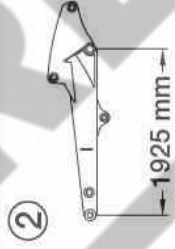
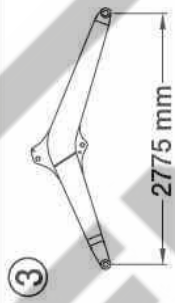
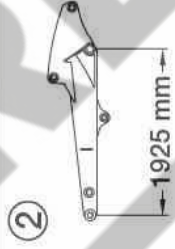
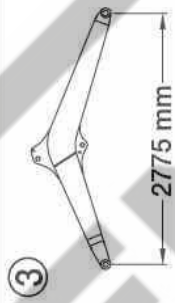
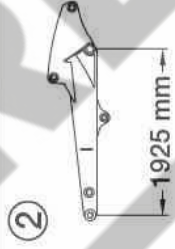
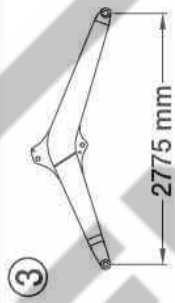
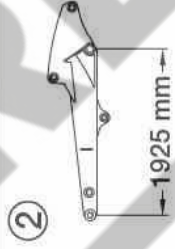
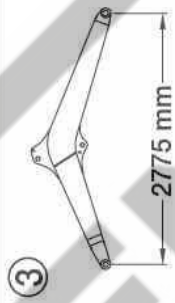
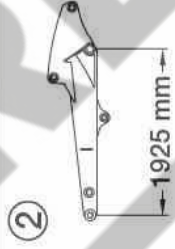
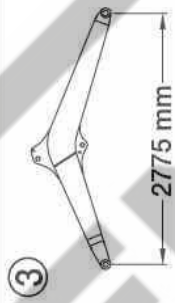
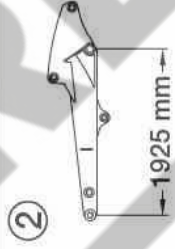
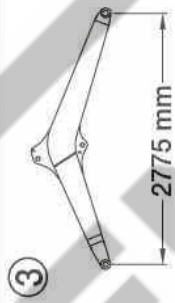
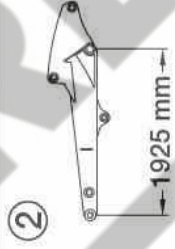
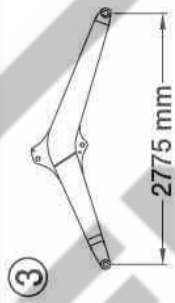
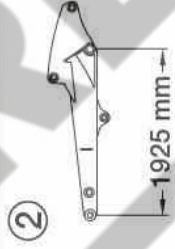
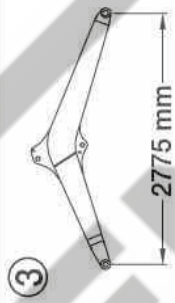
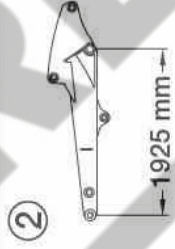
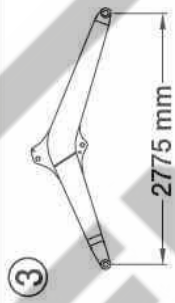
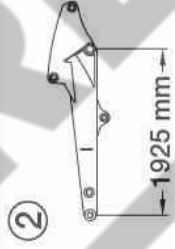
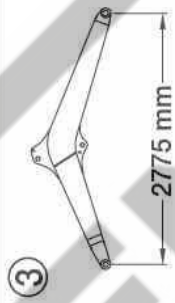
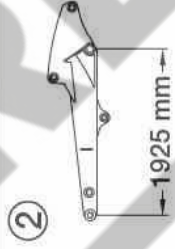
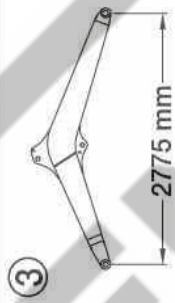
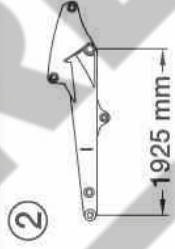
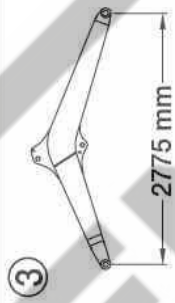
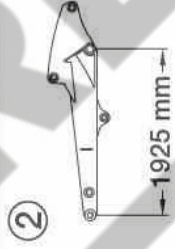
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E50 EXCAVATOR SPECIFICATIONS (CONT'D)

Rated Lift Capacity (Cab - Standard Arm With Additional Counterweight)

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E50 EXCAVATOR SPECIFICATIONS (CONT'D)

Rated Lift Capacity (Cab - Long Arm)

E50

600 mm
142 kg

1525 mm

2775 mm

A

B

B

	kg @ max. B	B			kg @ max. B	B			kg @ max. B	B			kg @ max. B	B		
		2000 mm	3000 mm	4000 mm		2000 mm	3000 mm	4000 mm		2000 mm	3000 mm	4000 mm		2000 mm	3000 mm	4000 mm
4000 mm			*1008 kg		*1054 kg @ 4075 mm											651 kg @ 4075 mm
3000 mm			*1020 kg		*1106 kg @ 4850 mm											453 kg @ 4850 mm
2000 mm			*1287 kg	*1644 kg	*1158 kg @ 5250 mm		*1644 kg	854 kg				954 kg	384 kg @ 5250 mm			
1000 mm			*1600 kg	*2495 kg	*1225 kg @ 5325 mm		1194 kg	801 kg				858 kg	357 kg @ 5325 mm			
Ground			*1801 kg	*2778 kg	*1300 kg @ 5175 mm		1118 kg	757 kg				782 kg	353 kg @ 5175 mm			
-1000 mm	*4064 kg	*2693 kg	*1758 kg		*1382 kg @ 4705 mm	2365 kg	1126 kg	759 kg		1474 kg	804 kg	548 kg	437 kg @ 4705 mm			

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E50 EXCAVATOR SPECIFICATIONS (CONT'D)

Performance

E50	
Operating weight (canopy w/ rubber tracks, and 610 mm (24 in) bucket)	4843 kg (10677 lb)
If equipped with the following, add:	Steel tracks, add 131kg (289 lb); Cab w/ Heater, add 121 kg (267 lb); Cab w/ HVAC, add 140 kg (309 lb); Long Arm (with additional counterweight), add 235 kg (518 lb); Additional Counterweight 204 kg (450 lb); Hydraulic Clamp, add 99 kg (218 lb)
Travel Speed (Low / High)	3,1 kph (1.9 mph) / 5,0 kph (3.1 mph)
Drawbar Pull	52343 N (11767 lbf)
Digging Force (per ISO 6015)	
With Standard Arm	Arm - 28700 N (6452 lbf) Bucket - 42000 N (9442 lbf)
With Long Arm	Arm - 26100 N (5868 lbf) Bucket - 42000 N (9442 lbf)
Boom Swing	Left 75° Right 50°

Controls

Steering	Two hand levers (optional foot pedals)
Hydraulics	Two hand operated levers (joysticks) control boom, bucket, arm and upperstructure slew
Blade	Hand lever
Angle Blade (If Equipped)	Switch on blade lever
Two-Speed	Switch on blade lever
Boom Switch	Electric switch in left joystick
Auxiliary Hydraulics	Electric switch in right joystick
Auxiliary Pressure Release	Electric switch in right joystick - Standard Instrument Panel Display Panel Button - Deluxe Instrument panel
Engine	Engine speed control dial with auto idle feature, key type start switch
Starting Aid	Glow Plugs - activated by key switch
Brakes Travel Service & Parking Swing Service Holding	Hydraulic lock in motor circuit Hydraulic lock on motor Spring applied - hydraulic release

E50 EXCAVATOR SPECIFICATIONS (CONT'D)

Engine

Make / Model	Kubota V2403-M-DI-TE3B-BC-4
Fuel / Cooling	Diesel / Liquid
Horsepower (SAE Net) @ 2200 RPM	35,4 kW (47.5 hp)
Torque @ 1200 RPM (SAE Net)	179,5 N•m (132.4 ft-lb)
Number Of Cylinders	4
Displacement	2,433 L (148.5 ci)
Bore / Stroke	87,1 x 102,4 mm (3.43 x 4.03 in)
Lubrication	Pressure System with Filter
Crankcase Ventilation	Closed Breathing
Air Cleaner	Dry replaceable paper dual cartridge
Ignition	Diesel-Compression
Low Idle Speed	1200 rpm +/- 75 rpm
High Idle Speed	2450 rpm
Engine Coolant	Propylene Glycol / water mixture (53% PG / 47% water)

E50 EXCAVATOR SPECIFICATIONS (CONT'D)

Hydraulic System

Pump Type	Engine driven, single outlet, variable displacement, load sensing, torque limited, piston pump
Pump Capacity Piston Pump	138,5 Lpm (36.6 gpm)
Auxiliary Flow (Aux3)	75,7 Lpm (20.0 gpm)
Auxiliary Flow - 2nd Aux (Female Coupler) (Male Coupler)	45,4 L/min (12.0 US gpm) 34,1 L/min (9.0 US gpm)
Hydraulic Filter	Full flow replaceable, 3 micron synthetic media element
Control Valve	closed centre, individually compensated
Fluid Type	Bobcat Fluid, Hydraulic / Hydrostatic 6903117 - (2.5 U.S. gal) 6903118 - (5 U.S. gal) 6903119 - (55 U.S. gal)
System Relief Pressure Slew Circuit Boom, Blade, Arm, Bucket, Boom Swing, Auxiliary Joystick Control Pressure	24097 kPa (241 bar) (3495 psi) 25580 kPa (256 bar) (3710 psi) 2999 kPa (30 bar) (435 psi)
Auxiliary Port Relief, Male And Female Couplers	20995 kPa (210 bar) (3045 psi)
Arm Port Relief, Base End And Rod End	28999 kPa (290 bar) (4206 psi)
Boom Port Relief, Base End And Rod End	28999 kPa (290 bar) (4206 psi)
Bucket Port Relief Base End And Rod End	28999 kPa (290 bar) (4206 psi)
Blade Port Relief Base End And Rod End	26000 kPa (260 bar) (3771 psi)
Angle Blade (If Equipped) Port Relief Base End And Rod End	27000 kPa (270 bar) (3916 psi)
Main Hydraulic Filter Bypass	345 kPa (3,5 bar) (50 psi)
Case Drain	172 kPa (1,7 bar) (25 psi)

E50 EXCAVATOR SPECIFICATIONS (CONT'D)

Hydraulic Cylinders

Cylinder	Bore	Rod	Stroke
Boom (Cushion Up)	101,6 mm (4.00 in)	57,1 mm (2.25 in)	697 mm (27.45 in)
Arm (Cushion Retract / Extend)	88,9 mm (3.50 in)	57,1 mm (2.25 in)	757 mm (29.82 in)
Bucket	82,6 mm (3.25 in)	50,8 mm (2.00 in)	524 mm (20.63 in)
Boom Swing	95,2 mm (3.75 in)	50,8 mm (2.00 in)	491 mm (19.32 in)
Blade	101,6 mm (4.00 in)	50,8 mm (2.00 in)	195 mm (7.68 in)
Angle Blade (If Equipped)	63,5 mm (2.50 in)	38,1 mm (1.50 in)	423 mm (16.65 in)

Hydraulic Cycle Times

Bucket Curl	2.6 Seconds
Bucket Dump	1.8 Seconds
Arm Retract	3.1 Seconds
Arm Extend	3.1 Seconds
Boom Raise	4.8 Seconds
Boom Lower	4.6 Seconds
Boom Swing Left	4.4 Seconds
Boom Swing Right	4.6 Seconds
Blade Raise	3.1 Seconds
Blade Lower	2.7 Seconds
Angle Blade Left (If Equipped)	1.9 Seconds
Angle Blade Right (If Equipped)	2.0 Seconds

Drive System

Final Drive	Each track is driven by hydrostatic axial piston motor
Type of Reduction	56.4:1 two stage planetary

Slew System

Slew Motor	Axial piston connected to a planetary drive
Slew Circle	Single row shear type ball bearing with internal gear
Slew Speed	9.0 rpm

Undercarriage

Crawler Track Design	Sealed track rollers with boxed section track roller frame, grease type track adjuster with shock absorbing recoil spring
Width Of Crawler	1960 mm (77.2 in)

E50 EXCAVATOR SPECIFICATIONS (CONT'D)

Electrical

Starting Aid	Glow Plugs
Alternator	12 volt, 90 Amp open frame w / internal regulator
Battery	12 volt - 530 CCA @ -18°C (0°F)
Starter	12 volt; gear reduction 2.0 kW (2.7 hp)
Lights	37.5 watt (2)
Instrumentation	Gauges: Engine Coolant Temperature, Fuel Level. Warning lights: Fuel Level, Seat Belt, Engine Coolant Temperature, Engine Malfunction, Hydraulic System Malfunction, General Warning. Indicators: Two-Speed, Engine Preheat. Data Display: Operating Hours, Engine rpm, Maintenance Clock Countdown, Battery Voltage, Service Codes, Engine Preheat. Other: Audible Alarm, Lights. Optional Deluxe Instrumentation Panel: *Additional displays for: Engine rpm, Coolant Temperature and Oil Pressure; System Voltage and Hydraulic Oil Temperature. *Additional Features Included: Keyless Start, Digital Clock, Job Clock, Password Lockout, Multi-language Display, Help Screens, Diagnostic Capability and Engine / Hydraulic Systems Shutdown Function.

Capacities

Fuel Tank	79,9 L (21.1 U.S. gal)
Hydraulic Reservoir Only (Centre of Sight Glass)	Tank Cap. 15,1 L (4.0 U.S. gal)
Hydraulic System (with Reservoir)	54,9 L (14.5 U.S. gal)
Cooling System	8,3 L (2.2 U.S. gal)
Engine Oil and Filter	7,1 L (7.5 qt)
Final Drive (each)	1,0 L (1.1 qt)
Air Conditioning Refrigerant (R-134a)	0,77 kg (1.7 lb)

Tracks

Type	Rubber	Steel
Width	400 mm (15.7 in)	400 mm (15.7 in)
Number Of Shoes	Single Assembly	39
Number of Track Rollers (per side)	5	5

Ground Pressure

Rubber Tracks - Standard Arm Long Arm	27,2 kPa (0,272 bar) (3.95 psi) 27,9 kPa (0,280 bar) (4.05 psi)
Steel Tracks - Standard Arm Long Arm	28,5 kPa (0,285 bar) (4.14 psi) 29,3 kPa (0,293 bar) (4.25 psi)

E50 EXCAVATOR SPECIFICATIONS (CONT'D)

Environmental

DECLARED SINGLE-NUMBER NOISE EMISSION VALUES In accordance with ISO 4871	
Noise level per Directive 2000/14/EC - L_{wA}	96 dB (A)
Operator noise level per Directive 2006/42/EC — L_{pA}	81 dB (A)

DECLARED VIBRATION EMISSION VALUES In accordance with EN 12096		
	Value	Uncertainty
Whole-body vibration per ISO 2631-1	0,157 m/s ²	---
Hand-arm vibration per ISO 5349-1	0,427 m/s ²	---

Machine equipped with optional HVAC (air condition) contains fluorinated greenhouse gas (F-gas)	
F-gas type	HFC-134a
F-gas mass (kg)	0.77
CO2 equivalent (t)	1.10
GWP	1430

Temperature Range

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

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WARRANTY

BOBCAT EXCAVATORS

Doosan Bobcat EMEA s.r.o. ("Doosan") warrants to its authorized dealers who in turn warrants to the customer that each new Bobcat Excavator will be free from defects in material and workmanship for twelve (12) months from the date of delivery to the customer or 2000 hours of machine usage, whichever occurs first. During the warranty period, the authorized Doosan dealer shall repair or replace, at Doosan's option, without charge for parts, labour and travel of technicians, any part of the Doosan product which fails because of defects in material or workmanship. The customer shall provide the authorized Doosan dealer with prompt written notice of the defect and allow reasonable time for replacement or repair. Doosan may, at its option, request failed parts to be returned to the factory or to any other designated location. Transportation of the Doosan product to the authorized Doosan dealer for warranty work is not the responsibility of Doosan. Service schedules must adhere to prescribed intervals and Bobcat genuine parts/lubricants must be used. The warranty does not apply to tyres, tracks or other accessories not manufactured by Doosan. For coverage on engines, consult with your Bobcat Dealer. For these non-covered items, the customer shall refer solely to the warranty, if any, of the respective manufacturers thereof, in accordance with the respective manufacturers warranty statement. Some Doosan parts are covered pro-rata depending on the expected life-time of the part. Coverage for batteries, air-conditioning refill, couplers and ignition system parts (glow plugs, fuel injection pumps, injectors) is reduced as failures generally originate from factors not under Doosan's control such as, but not limited to, prolonged storage, abuse or fuel quality. Reduced coverage is, depending on the component, limited from 50 to 500 operating hours. The warranty does not cover: (i) Oils and lubricants, coolant fluids, filter elements, brake linings, tune-up parts, bulbs, fuses, alternator fan belts, drive belts, pins, bushings and other high-wear items. (ii) Damages resulting from abuse, accidents, alterations, use of the product with any bucket or attachment not approved by Doosan, air flow obstructions, or failure to maintain or use the Doosan product according to the instructions applicable to it. (iii) Ground engaging parts such as bucket teeth and cutting edges. (iv) Fuel or hydraulic system cleaning, engine tune-up, brake inspection or adjustment. (v) Adjustments or slight defects which generally do not affect the stability or reliability of the machine.

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