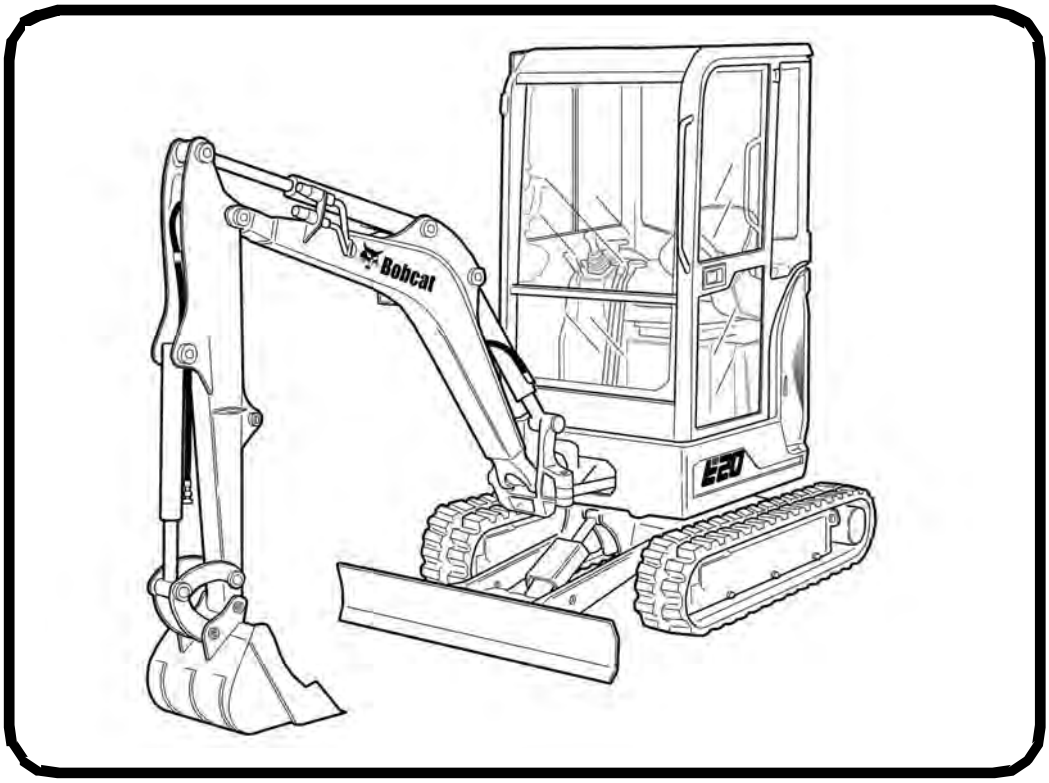
EN

Operation & Maintenance Manual
E20 Compact Excavator

S/N AWRH11001 & Above



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Original Instructions

BOBCAT COMPANY IS IS0 9001 CERTIFIED

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

British Standards Institute (**BSI**) is the Certified Registrar Bobcat Company chose to assess the company's compliance with the ISO 9001 at Bobcat's manufacturing facilities in Gwinner, 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 6671057	 BATTERY 6670251
 FUEL FILTER 6667352 FUEL FILTER - Pre-Filter 7247169	 HYDRAULIC FILL / BREATHER CAP 6692836
 AIR FILTER, Outer 6673752  AIR FILTER, Inner 6673753	 FLUID, Hydraulic / Hydrostatic 6903117 - 9,5 L (2.5 U.S. gal) 6903118 - 18,9 L (5 U.S. gal) 6903119 - 208 L (55 U.S. gal)
 PRIMARY HYDRAULIC FILTER 6661248	 ANTI-FREEZE, Propylene Glycol 6983128 - Premixed 6983129 - Concentrate
	 RADIATOR CAP 7257434

NOTE: Always verify Part Numbers with your Bobcat dealer.

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.

OPERATING INSTRUCTIONS

INSTRUMENT AND CONSOLES (CONT'D)

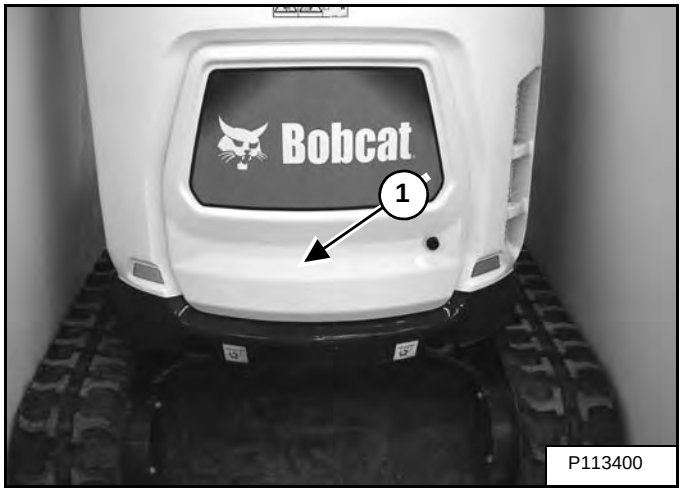
Radio (Cont'd)

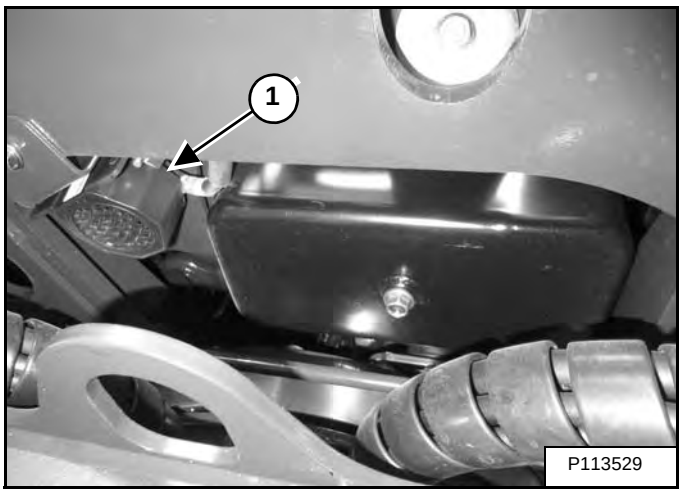
REF. NO.	DESCRIPTION	FUNCTION / OPERATION
1	POWER	Press to turn ON; press again to turn OFF.
2	MUTE	Press to mute audio output; **[MUTE]** will appear in display screen; press again to turn OFF.
3	DISPLAY	Press to toggle between function mode (showing tuner frequency, auxiliary input, weather band information, 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.

MOTION ALARM SYSTEM

Operation

Figure 33





This excavator can be equipped with a motion alarm system. The motion alarm is located inside the rear (Item 1) **[Figure 33]** of the excavator.

⚠ WARNING

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

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

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

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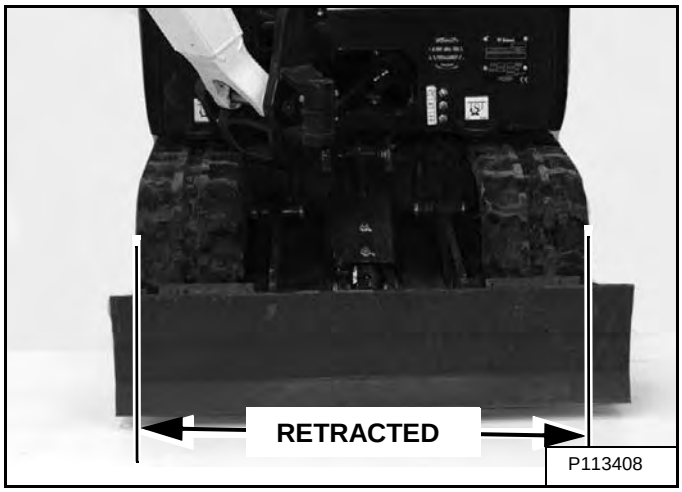
The motion alarm will sound when the operator moves the travel control levers (Item 1) **[Figure 34]** in either the forward or reverse direction.

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

TRACK FRAME RETRACTION - EXPANSION

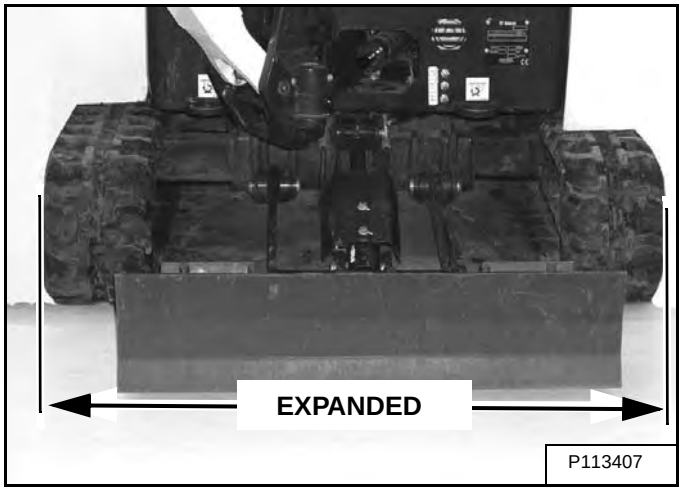
Operation

Figure 56



The excavator can be operated with the track frame retracted for transportation on a trailer or to access narrow areas **[Figure 56]**.

Figure 57



Expand the track frame for increased digging performance **[Figure 57]**.

IMPORTANT

To prevent wear and damage to the track, always lift the excavator before expanding or retracting the track frame.

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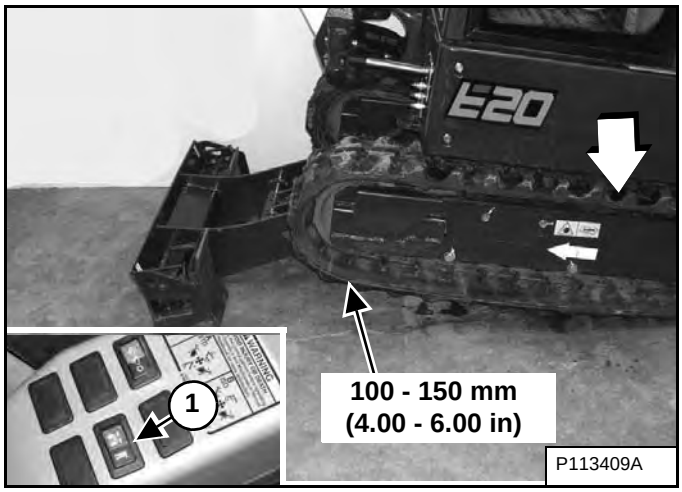
Figure 58

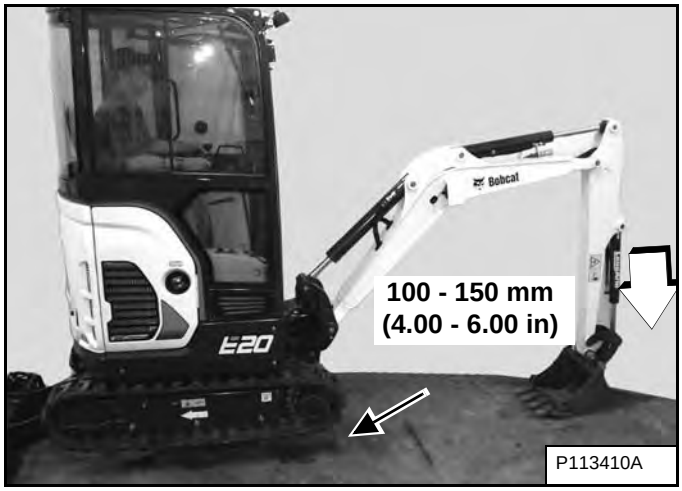


Put the Blade / Track Retraction - Expansion Switch (Item 1) **[Figure 58]** to the right in the Blade position.

With the boom and arm positioned over the blade, lower the blade until the track is raised 100 - 150 mm (4.00 - 6.00 in) off the ground **[Figure 58]**.

Rotate the upperstructure 180 degrees.

Figure 59



Lower the boom and arm to raise the rear of the excavator until the track is 100 - 150 mm (4.00 - 6.00 in) off the ground **[Figure 59]**.

Seat Adjustment

Basic Seat (If Equipped)

Figure 81

The basic seat has no adjustments **[Figure 81]**.

Standard Seat (If Equipped)

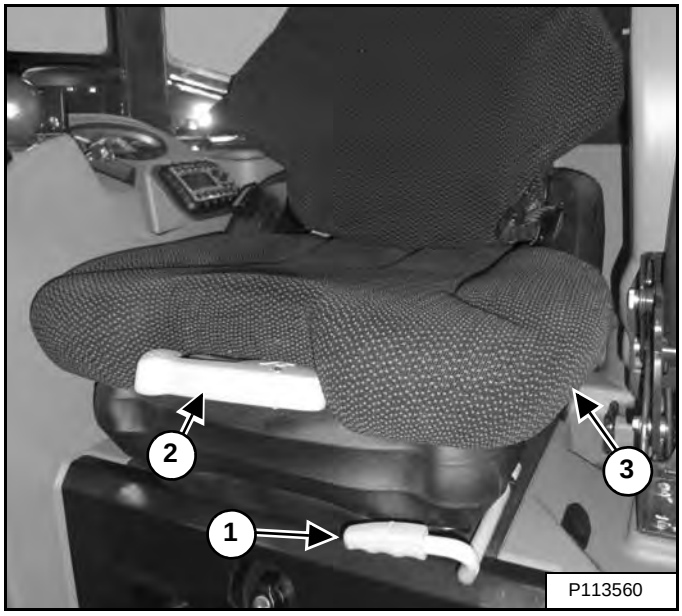
Figure 82

Release the seat lever (Item 1) **[Figure 82]** to adjust the seat forward or back.

Release the seat lever (Item 2) **[Figure 82]** to adjust the position of the back cushion.

Suspension Seat (If Equipped)

Figure 83



Release the seat lever (Item 1) **[Figure 83]** to adjust the seat forward or back.

Turn the handle (Item 2) **[Figure 83]** to change the adjustment for operator weight.

Release the lever (Item 3) **[Figure 83]** to change the incline of the seat back.

Seat Belt

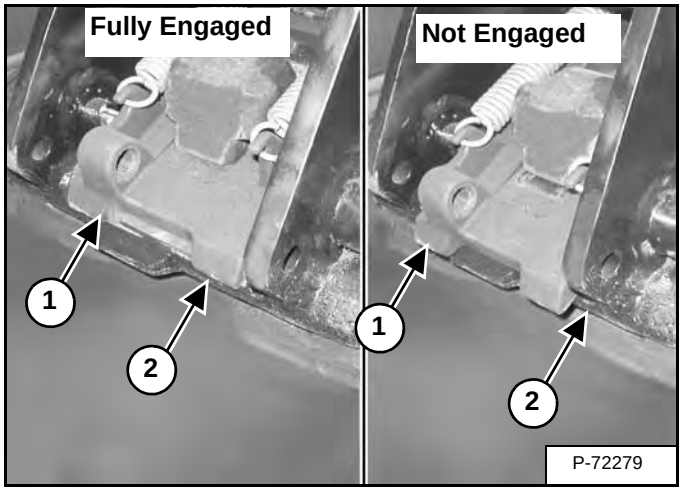
Figure 84

Fasten the seat belt **[Figure 84]**.

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

Installation (Cont'd)

Figure 106



Visually inspect the quick coupler latch (Item 1) to the bucket mount (Item 2) **[Figure 106]**. The latch must be fully engaged.

⚠ WARNING

AVOID INJURY

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

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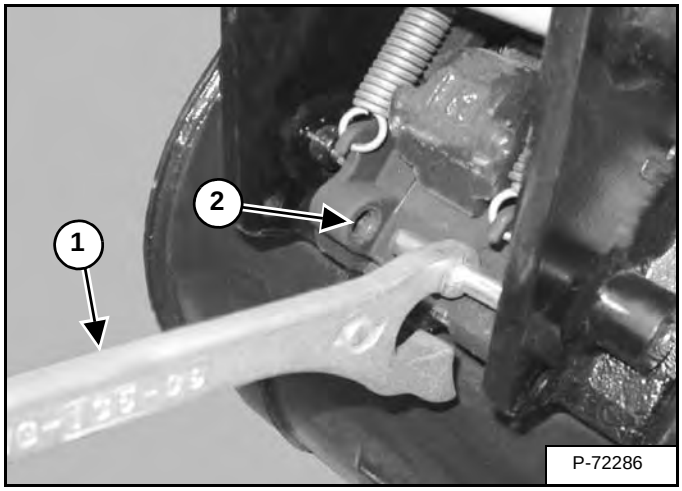
Figure 107



If the latch is not engaged, install the tool (Item 1) in the hole (Item 2) **[Figure 107]** 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 in) off of the ground and fully extend the bucket cylinder. Lower the attachment until it is flat on the ground. Engage the parking brake. Stop the engine and exit the excavator.

Again, visually inspect the quick coupler to make sure the latch (Item 1) **[Figure 106]** 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 **[Figure 111]** for *Quick Coupler And Attachment Inspection* information.)

Lift Capacity (Cont'd)

The following is an example for determining the actual lift capacity using the sample chart shown above **[Figure 127]**.

- Machine Position: Over Blade, Tracks Expanded, Blade Down
- Lift Radius: 3000 mm (118 in)
- Lift Point Height: 1000 mm (39 in)
- Hydraulic Clamp and Cylinder
- Standard Bucket

1. Obtain Lift Capacity from Chart: 423 kg (934 lb)

2. Obtain the weights of optional equipments which reduce the lift capacity of the machine (coupling interface, hydraulic clamp, attachment).

Optional Equipment Weights: Standard Bucket 42 kg (92 lb), attachment coupler system 18 kg (40 lb), Hydraulic Clamp and Cylinder 32 kg (71 lb)

3. Calculate the actual lift capacity by subtracting the weight of optional equipments from the lift capacity of standard configuration.

423 kg (934 lb) - 42 kg (92 lb) (standard bucket) - 18 kg (40 lb) (attachment coupler system) - 32 kg (71 lb) (hydraulic clamp and cylinder) = 331 kg (731 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.*

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 <$paratext> on page 168)

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

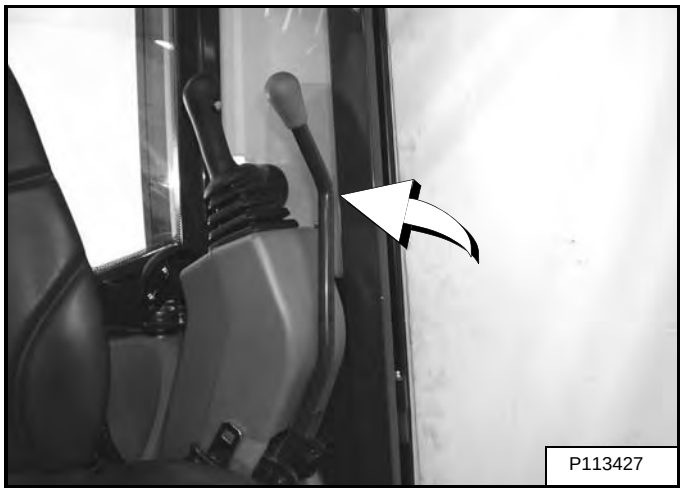
The inspection checkbook has to be filled in by the Dealer for any maintenance and service work of your Bobcat machine. This book may be required anytime by an authorised dealer or by Bobcat Europe, should be a breakdown occur on the Bobcat equipment.

Your dealer can order the Inspection Checkbook.
Part Number: 7296478.

CONTROL CONSOLE LOCKOUTS

Inspection And Maintenance

Figure 159



When the left console is raised **[Figure 159]**, 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 159]**.

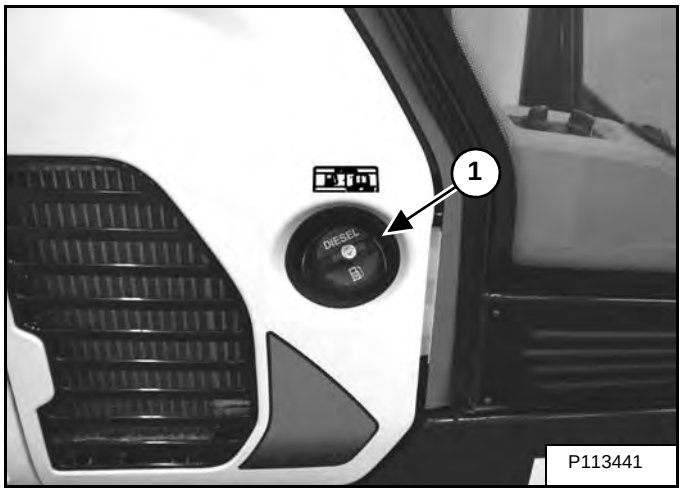
Move the joystick control levers. There should be no movement of the boom, arm, slew or bucket.

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.)

Filling The Fuel Tank

Figure 177



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

Remove the fuel fill cap (Item 1) **[Figure 177]**.

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

Install and tighten the fuel fill cap.

Clean up any spilled fuel.

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

NOTE: When filling the fuel tank, with the left console raised, turn the start switch to the ON position. As fuel is added to the tank, a buzzer will beep and the closer the tank gets to full, the quicker the beeps. When the tank is full, the buzzer will sound continuously. Stop fuelling when buzzer sounds continuously. Turn the start switch OFF.

⚠ 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.

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⚠ 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.

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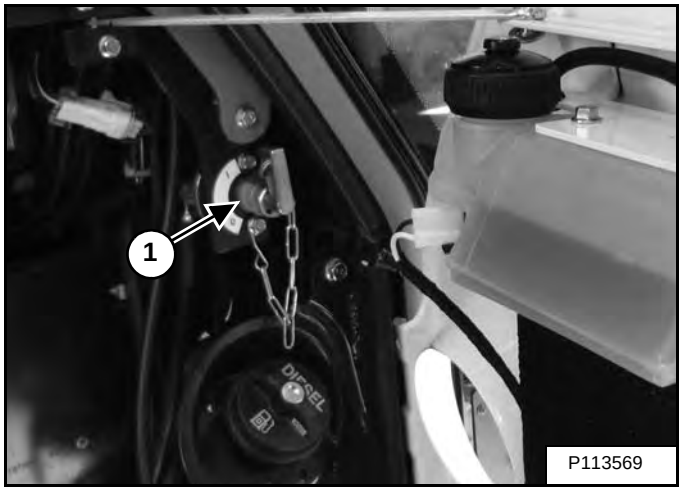
Battery Disconnect Switch

When disconnecting or connecting the battery cables, turn the disconnect switch to the OFF position first.

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

Figure 194



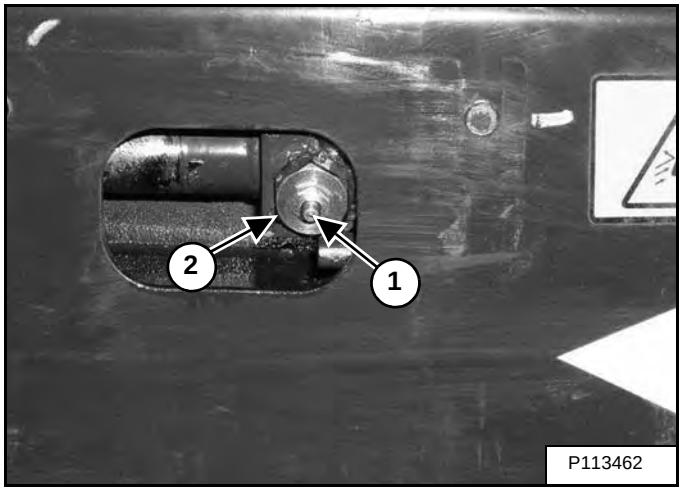
The disconnect switch (Item 1) **[Figure 194]** is located under the right side cover, above the fuel fill cap.

Rotate the switch (Item 1) **[Figure 194]** anticlockwise to turn the switch to the OFF position, clockwise to turn to the ON position (shown in ON position).

NOTE: In the OFF position the shut-off switch key can be removed from the switch. The key is secured to the switch mount with a chain.

Adjusting Tension

Figure 215



Loosen the access cover bolts and pivot the access cover open **[Figure 215]**.

Increase Track Tension

Add grease to the fitting (Item 1) **[Figure 215]** until the track tension is correct.

Decrease Track Tension

⚠ WARNING

AVOID INJURY OR DEATH

If grease fitting is removed before pressure is released, the fitting can come off with great force and cause serious injury or death.

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Pressure must be released from the grease cylinder to decrease track tension.

Loosen the bleed fitting (NOT the grease fitting) (Item 2) **[Figure 215]** and release pressure until the track tension is correct.

NOTE: DO NOT loosen the bleed fitting (Item 2) [Figure 215] for more than eight turns.

Tighten the bleed fitting to 80 - 100 N•m (59 - 74 ft-lb) torque.

Pivot the access cover closed and tighten the access cover bolts.

Raise the machine and remove the jackstands.

Repeat the procedure for the other side.

Dispose of grease in an environmentally safe manner.

SYSTEM SETUP AND ANALYSIS

SPECIFICATIONS

Certain specification(s) are based on engineering calculations and are not actual measurements. Specification(s) are provided for comparison purposes only and are subject to change without notice. Specification(s) for your individual Bobcat equipment will vary based on normal variations in design, manufacturing, operating conditions, and other factors.

EXCAVATOR SPECIFICATIONS (CONT'D)

Engine

Make / Model	Kubota D722-E2B-BCZ-7 Tier II
Fuel / Cooling	Diesel NO.2-D / Liquid
Horsepower (SAE Net) @ 2500 rpm	9,9 kW (13,3 hp)
Torque @ 2000 rpm (SAE)	42,3 N•m (31.9 ft-lb)
Number Of Cylinders	3
Displacement	0,719 L (43.9 in^3)
Bore / Stroke	67 x 68 mm (2.64 x 2.68 in)
Lubrication	Forced Lubrication / Cartridge type
Crankcase Ventilation	Closed breathing
Air Cleaner	Dual dry replacement paper elements
Ignition	Diesel-Compression
Low Idle Speed	1200 ± 50 rpm
High Idle Speed	2650 ± 20 rpm
Engine Coolant	Propylene Glycol / water mixture (53% PG / 47% water)

Hydraulic System

Pump Type	Engine driven, dual outlet, variable displacement, load sensing, torque limited, piston pump with gear pump
Pump Capacity Piston Pump Gear Pump	 2 x 15 L/min (2 x 4.0 U.S. gpm) 11,3 L/min (3.0 U.S. gpm)
Auxiliary Flow Standard Flow	 30,0 L/min (7.9 U.S. gpm)
Hydraulic Filter	Full flow replaceable, 3 micron synthetic media element
Control Valve	9 spool, parallel series type, open centre.
System Relief Pressure Blade Slew Relief Pressure Boom Swing, Boom Arm, Bucket, and Travel Joystick Control Pressure	 20600 kPa (206 bar) (2987 psi) 13700 kPa (137 bar) (1987 psi) 23097 kPa (231 bar) (3350 psi) 3103 kPa (31 bar) (450 psi)
Auxiliary Relief	17995 kPa (180 bar) (2610 psi)
Arm Port Relief Base And Rod End	24994 kPa (250 bar) (3625 psi)
Boom Port Relief Base End, Boom Port Relief Rod End	21000 kPa (210 bar) (3046 psi) 24994 kPa (250 bar) (3625 psi)
Bucket Port Relief Base And Rod End	24994 kPa (250 bar) (3625 psi)
Blade Port Relief Base End and Track Expansion Port Relief Base End	29000 kPa (290 bar) (4206 psi)
Main Hydraulic Filter Bypass	345 kPa (3,4 bar) (50 psi)