ME1503
ME1903
ME2203

Compact Excavator

OPERATOR'S MANUAL

Revision D - 10/11
PART #909825

SPECIFICATIONS

Fluid Capacities/Lubricants

Note: *Capacities indicated are approximate.*

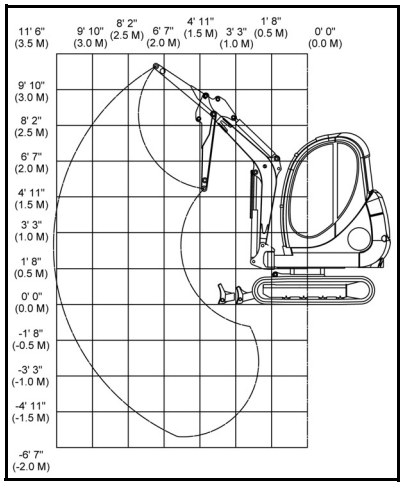
Component/Application	Lubricant	Specification	Season/Temperature	Capacity[a]
Diesel Engine	Engine Oil[b]	SAE 10W-40 (according to DIN 51502); API: CD, CF, CF-4, CI-4 SAE E3, E4, E5	-4°F (-20°C) +104°F (+40°C)	**Model ME1503:** see "Engine" on page 1-7. **Model ME1903:** see "Engine" on page 1-10. **Model ME2203:** see "Engine" on page 1-13.
Travelling Drive Gearbox Oil	Gearbox Oil[c]	Q8 T 55, SAE80W-90 FINA PONTONIC GLS SAE80W-90	Year-round	**From Serial Number AF04766:** 0.6 qts. (0.6 L) each **Up to Serial Number AF04765:** 0.5 qts. (0.5 L) each
Hydraulic Oil Tank	Hydraulic Oil[d]	HVLP46 (according to DIN 51524 section 3) HV 46 (according to ISO 6743/4)	Year-round	**Model ME1503:** see "Hydraulic System" on page 1-7. **Model ME1903:** see "Hydraulic System" on page 1-10. **Model ME2203:** see "Hydraulic System" on page 1-13.
	Biodegradable Oil[e]	PANOLIN HLP Synth 46 FINA BIOHYDRAN SE 46 BP BIOHYD SE-46		
Grease	Roller and Friction Bearings	FINA Energrease L21M	Year-round	As Required
	Open Gear (live ring gears)	BP Energrease MP-MG2		
Grease Fittings	Multipurpose Grease[f]	FINA Energrease L21M	Year-round	As Required
Battery Terminals	Acid-proof Grease[g]	FINA Marson L2	Year-round	As Required
Diesel FuelTank	Diesel Fuel[h]	2-D ASTM D975 – 94 1-D ASTM D975 – 94	Depending on outside temperatures Summer or winter diesel fuel.	**Model ME1503:** see "Engine" on page 1-7. **Model ME1903:** see "Engine" on page 1-10. **Model ME2203:** see "Engine" on page 1-13.
Engine and Hydraulic Oil Cooler	Coolant	Water + antifreeze ASTM D4985	Year-round	
Windshield Washer	Cleaning Agent	Water + Antifreeze	Year-round	1.3 qts. (1.2 L)

a. Capacities shown are approximate; use only oil level check to determine correct oil level.
b. BP Vanellus MG 15W40, BP Vanellus C-Extra 10W30, Chevron Delo 400 15W40 or equivalent; Refer to engine operator's manual for more detailed information about recommended oil grade type use depending upon ambient temperature.
c. Hypoid gearbox oil based on basic mineral oil (API GL-4, GL-5).
d. Mobile DTE15M, Amoco Rykon 46, BP Energol HLP-HD 46 or equivalent.
e. Based on saturated synthetic esters with an iodine value of < 10 g/mg, according to DIN, section 3, HVLP, HEES. IMPORTANT! Do not mix biodegradable oil types/grades; do not mix biodegradeable and mineral oils. Ensure hydraulic attachments are free of mineral oil residue before use.
f. FINA Energrease 21M, Chevron RPM Heavy-Duty Grease No. 2, Mobilgrease Moly 52, or BP Energrease Moly EP2.
g. Standard acid-proof grease.
h. Sulphur content below 0.05% cetane number over 45.

Model ME2203 Load Diagram

Maximum permissible loads

max	MAX	9' 10" (3.0 m)		8' 2" (2.5 m)		6' 7" (2.0 m)		4' 11" (1.5 m)	
A / B									
9' 10" (3.0 m)	904* (410*)	904* (410*)			871* (395*)	871* (395*)				
6' 7" (2.0 m)	871* (395*)	694 (315)	871* (395*)	794 (360)	882* (400*)	882* (400*)				
3' 3" (1.0 m)	904* (410*)	595 (270)	1036* (470*)	761 (345)	1213* (550*)	992 (450)	1676* (760*)	1356 (615)	2458* (1115*)	2127 (965)
0' 0" (0.0 m)	937* (425*)	617 (280)	1135* (515*)	739 (335)	1907* (865*)	937 (425)	2028* (920*)	1279 (585)	2998* (1360*)	2017 (915)
-3' 3" (-1.0 m)	970* (440*)	761 (345)			1290* (585*)	926 (420)	1742* (790*)	1279 (580)	2502* (1135*)	2028 (920)
-4' 11" (-1.5 m)	948* (430*)	948* (430*)					1279* (580*)	1279* (580)	1797* (815*)	1797* (815)



Maximum permissible load on dipper arm	
A	Overhang from the center of the turntable
B	Height of load fixing point
*	Lifting capacity hydraulically limited

All table values are in lbs. (kg) and for a machine in a horizontal position on firm ground without bucket.

	Dozer blade support in drive direction
	Dozer blade support 90° to drive direction

If equipped with a bucket or other implements, lift capacity or tilt load is reduced by bucket or implement weight.

Calculation basis: According to ISO 10567.

The excavator's lift capacity is restricted by the settings of the pressure relief valves and the hydraulic system's stabilizing features.

Neither 75% of the static tilt load nor 87% of the hydraulic lift capacity is exceeded.

Hydraulic Cylinder Seal Periodic Replacement

Check cylinder drift rate at regular intervals. Maximum allowable rates are included at the end of the Hydraulic section in the Excavator Service Manual. Overhaul seal kits are available through Manitou Americas dealer.

High Pressure Hydraulic Lines Store Energy

Exposed hydraulic hoses on the arm or boom could react with explosive force if struck by a falling rock, overhead obstacle or other job site hazard. Extra safety guards may be required. NEVER allow hoses to be hit, bent or interfered with during operation.

Operator's Cab and Swing Frame Deck Maintenance

Cleaning off accumulations of grease and dirt helps extend equipment service life. Cleaning also provides an opportunity to inspect equipment. Minor damage can be repaired or corrected before major problems result.

Battery Electrolyte and Explosive Gas Hazard

Flush eyes with water for 10-15 minutes if battery acid is splashed in the face. Anyone who swallows acid must have immediate medical aid. Call the Poison Control center listing in the telephone directory.

Sparks can set off explosive battery gas from incidental contact or static discharge. Turn off all switches and the engine when working on batteries. Keep battery terminals tight. Contact between a loose terminal and post can create an explosive spark.

Battery Disconnection Precaution

Remove cable to negative terminal first when disconnecting a battery. Connect positive terminal cable first when installing a battery.

Jump-starting or Charging the Battery

Turn off all electrical equipment before connecting leads to the battery, including electrical switches on the battery charger or jump-starting equipment.

When jump-starting from another machine or vehicle, do not allow the machines to touch. Wear safety glasses or goggles while battery connections are made.

Batteries contain acid and produce explosive gases. Keep sparks, flames and lit cigarettes away from batteries at all times.

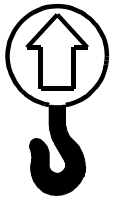
Connect positive cable first when installing jumper cables. The final cable connection, at the metal frame of the machine being charged or jump-started, should be as far away from the batteries as possible.

Disconnect the negative cable first when removing the jumper cables. For specific jump-starting instructions refer to Page 4-17 in the Maintenance chapter of this manual.

LIFTING THE MACHINE WITH A CRANE

Only lift the machine according to the following guidelines:

- The crane and rigging equipment must have sufficient capacity. See "Lifting the Machine" on page 3-33.
- Lift the machine according to "Lifting the Machine" on page 3-33.
- Secure the machine against unintentional movement. Use taglines as needed.
- Do not lift the machine with persons on or in the machine.
- Any person guiding the crane operator must be within sight or sound of the crane operator.
- Lift the machine only with the standard bucket installed, the bucket empty and in the transport position.
- Persons must stay clear of and not under the machine when it is lifted.
- Fasten the rigging equipment so the machine is horizontal when it is lifted.
- Do not lift the machine by the eye hooks on the cab. Attach the rigging equipment only at the lift points identified by this symbol:



CHAPTER 3 – OPERATION

OPERATING CONTROLS

⚠ WARNING

- **Read and understand this entire manual. Follow warnings and instructions for operation and maintenance. Failure to follow instructions can result in injury or death.**
- **Read and understand all safety decals before operating the machine. DO NOT operate the machine unless all factory-installed guards and shields are in place.**
- **Be sure you are familiar with all safety devices and controls before operating the machine.**
- **Know how to stop the machine before starting.**
- **Use only with Manitou Americas-approved accessories or referral attachments. The Manitou Americas cannot be responsible for safety if the machine is used with non-approved attachments.**
- **Check for correct function after adjustments or maintenance.**

Machine Orientation

All references to “right” and “left” are determined from the operator's position facing forward.

Guards and Shields

Whenever possible, guards and shields are used to protect potentially hazardous areas on the machine. In many places, decals are also provided to warn of potential hazards and/or to display special operating information (see “Safety Decals” starting on page 2-10).

Either of the operator’s consoles may be raised to enter and exit the machine. The left operator’s console (A) is shown in the raised position in Figure 3-1. When a console is in the raised position, all hydraulic functions of the machine are disabled.

Figure 3-1 – Operator’s Left Console in Lock-out Position

Dozer Blade

The dozer is controlled by the dozer lever (1, Figure 3-17) located next to the right control console.

- Push lever forward to lower the blade.
- Pull lever rearward to raise the blade.

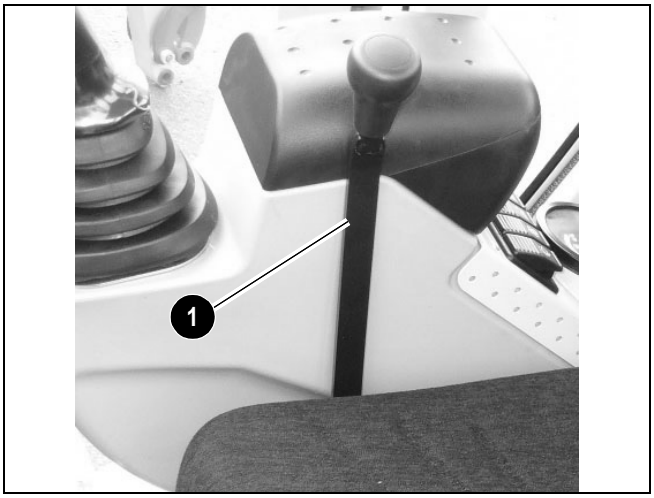


Figure 3-17 – Dozer Blade Controls

The dozer blade can be expanded or retracted in width to match the width of the tracks. The extensions are stored on the back ends of the dozer blade: one extension on each end of the blade.

To extend the dozer blade, remove the quick-lock pin (2, Figure 3-18) and remove the blade extension (1) from the stored position.

Align the upper and lower blade extension pins (3) with the holes in the main blade.

Slide the blade extension into position (5) and secure with quick lock pin (6). Make sure to secure the quick-lock pin using the round clip (4) attached to the pin.

Dozer Blade Use

See “Grading” on page 3-26.

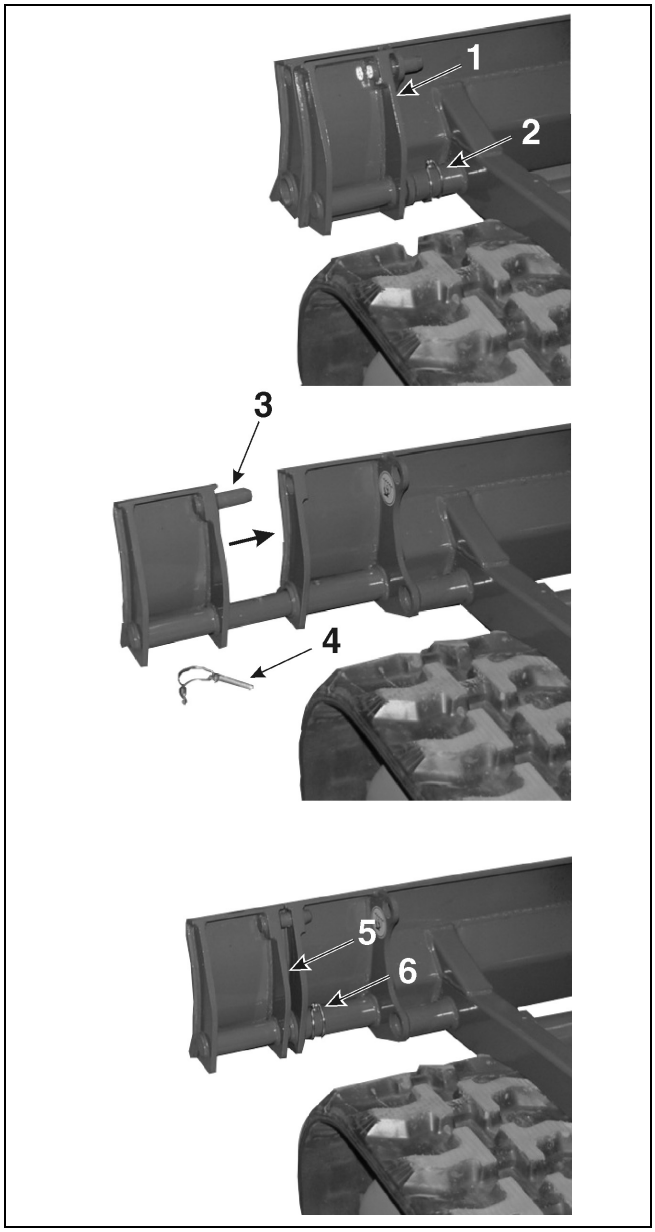


Figure 3-18 – Dozer Blade Extension

Retract the blade by reversing the extension steps. Make sure to secure the stored blade extension with the quick-lock pin.

Travel

⚠ WARNING

- **Before operating the travel levers, be sure that you know in which direction the machine is pointing. If the dozer blade is not visible from the operator's cab, you are looking at the rear of the machine and the travel controls will be reversed.**
- **Before moving, be sure that no one is in the way of the machine. Sound the horn to alert others that you are about to move the machine.**
- **Be sure the path is clear during travel.**
- **Use extreme caution when reversing travel. Be sure there is a clear path behind the machine.**
- **Operate the travel control levers smoothly to avoid sudden starts or stops.**
- **Before leaving the operator's seat, be sure to lock out all control systems and shut down the engine to avoid accidental activation.**

Travel Speed Change

Two travel speed ranges can be selected by using the Auto2Speed switch located on the control console (11, Figure 3-3) or momentary speed adjustment by pressing the overdive button (1, Figure 3-35) on the left-hand travel lever.

Travel speeds are:

- Slow-speed maximum = 1.7 mph (2.8 km/h)
- High-speed maximum = 3.3 mph (5.6 km/h)

Figure 3-35 – Travel Levers and Overdrive Button

General Travel Instructions

1. Avoid sudden movements and sharp turns.
2. Travel slowly on rough, frozen or uneven terrain.
3. Travel straight up and down slopes; never travel across the slope. See Figure 3-36. Extend the dipper arm and lower the boom to keep the bucket about 12" (300 mm) off the ground. If the machine starts to slide or becomes unstable, lower the bucket to regain control. If the engine stalls, lower the bucket, make sure all controls are in the neutral position and restart the engine.
4. To travel straight, push both travel control levers (or pedals) fully forward (or rearward). The farther the levers (or pedals) are moved, the faster the travel speed.
5. Pivot (or wide) turns are made by rotating only one track forward (or rearward). The machine will pivot on the non-moving track.
6. Spin turns are made by rotating one track forward and one track rearward. The machine will spin around its mid-point.
7. The excavator can travel in water that comes up to the top of the upper track rollers. Be sure that the footing is solid so the machine will not sink.

Digging

Proper Bucket Position

Position the flat side of the bucket so it is parallel to the ground (1, Figure 3-48).

IMPORTANT

Positions 2 and 3 in Figure 3-48 show improper positions for using the bucket. Position 2 forces the bucket downward into the ground, slowing down work and subjecting the engine and hydraulic pump to overloading.
Position 3 forces the bucket upward toward the ground surface, reducing productivity because of smaller loads being dug.

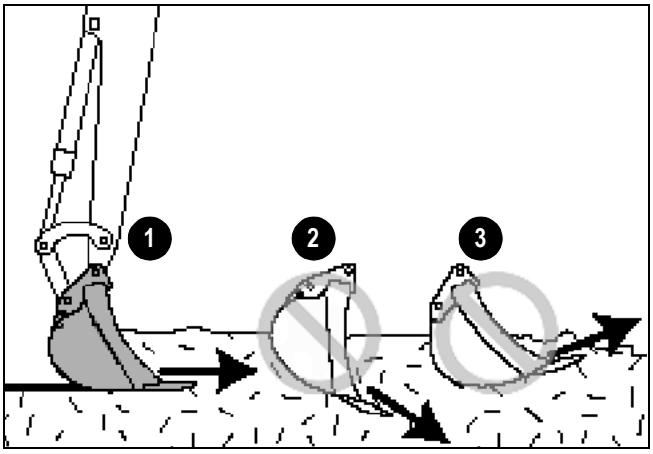


Figure 3-48 – Proper Bucket Position

Proper Digging Technique

1. Lower the bucket into the ground (4, Figure 3-49).
2. After the bucket penetrates the ground, adjust it so the flat side of the bucket is parallel to the ground (5, Figure 3-49).
3. Pull the bucket toward the excavator by:
   a. Moving the dipper arm toward the excavator, and...
   b. Lowering the boom.
4. After the bucket is sufficiently filled:
   a. Continue moving the dipper arm toward the excavator,
   b. Extend the dipper arm cylinder so the bucket is tilted upward (6, Figure 3-49), and...
   c. Raise the boom.

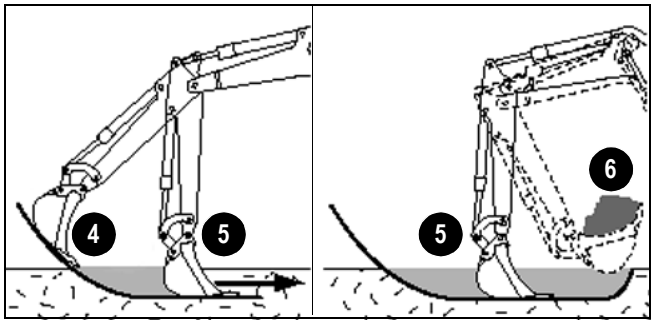


Figure 3-49 – Proper Digging Technique

Trench Excavating

Trench excavating is most efficient when the machine tracks are parallel to the line of the trench (Figure 3-50). For larger trenches, excavate each side first and then the center.

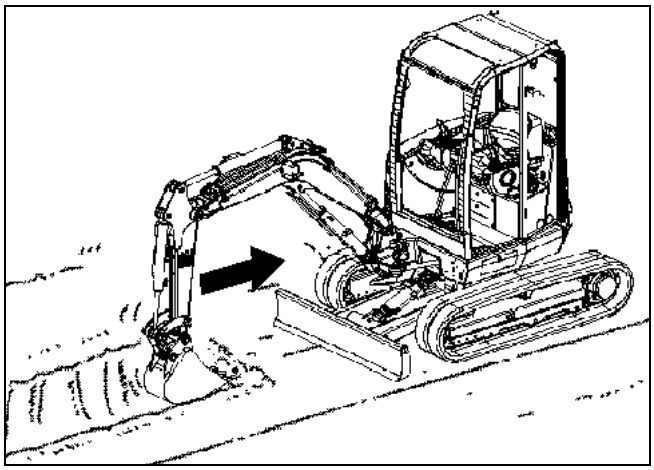


Figure 3-50 – Efficient Trench Excavating

Fluid and Filter Changes

Service Activity	Daily	Every 50 Hours	Every 250 Hours	Every 500 Hours	Every 1000 Hours	Cus-tomer	Dealer
Engine oil		x[a]	x[b]	x			x
Engine oil filter		x[a]	x[b]	x			x
Fuel filter		x[c]		x			x
Hydraulic oil filter		x[c]		x			x
Gearbox oil		x[d]			x		x
Hydraulic oil				x			x
Breather-hydraulic oil tank					x		x
Air filter element when indicator light comes on					x	x	
Engine coolant					x		x

a. Change after first 50 hrs; every 500 hrs thereafter.
b. Dusty work environment, high temperature, high rate of hammer use, and similar intensive use conditions.
c. Change after first 50 hrs; every 500 hrs thereafter.
d. Change after first 50 hrs; every 1000 hrs thereafter.

Swing Gear Ring

Service Activity	Daily	Weekly	Every 50 Hours	Every 125-250 Hours	Every 500 Hours	Every 1000 Hours	Annually
Check gear ring					x		x
Check bearing system		x					x

Cab Heating System

Service Activity	Daily	Weekly	Every 50 Hours	Every 125-250 Hours	Every 500 Hours	Every 1000 Hours	Annually
Check fan			x				
Check system function			x				
Check heating system for leaks			x				
Check seals			x				

Bucket, Arm, Boom and Dozer Blade

Service Activity	Daily	Weekly	Every 50 Hours	Every 125-250 Hours	Every 500 Hours	Every 1000 Hours	Annually
Lubricate daily service points	x						
Lubricate weekly service points		x					
Check bucket teeth for wear	x						
Check pin fastening	x						
Check hydraulic fittings for leaks	x						
Check piston rods	x						
Check hydraulic cylinder under load						x	
Check bearing play				x			

Purging Air from the Fuel System

⚠ WARNING

DO NOT air bleed a hot engine. Spilled fuel can cause a fire.

The fuel system runs from the fuel tank, through the water separator, fuel filter, fuel injection pump and high pressure piping to the fuel injection nozzles. If the fuel tank has been run dry, or if the fuel filter, water separator or fuel lines have been replaced, trapped air will have to be removed, or bled, from the fuel system.

Later machines: Turn the ignition key to the "1" position and wait five minutes.

Earlier machines: Bleed air from the fuel system according to the following steps:

1. Place throttle in the "Run" position.
2. Make sure that the valve on the water separator valve (2, Figure 4-12) and on the fuel filter (2, Figure 4-11) are in the "open" (O) position.
3. Locate the primer pump lever on the fuel injection pump. See 1, Figure 4-13.
4. While operating the priming lever on the fuel pump:
   a. Bleed air by loosening the air bleeding screws on the water separator (3 and 4, Figure 4-12).

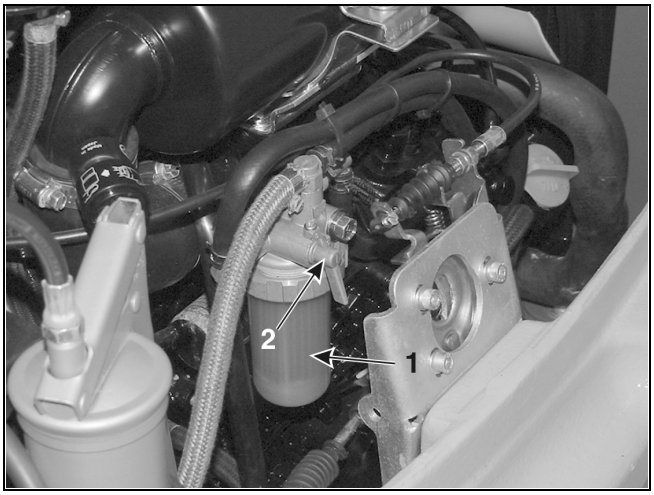


Figure 4-11 – Fuel Filter (Earlier Machines)

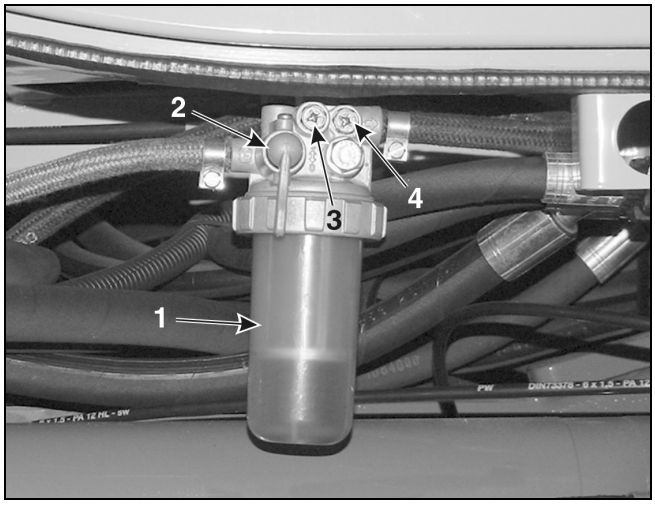


Figure 4-12 – Water Separator (Earlier Machines)

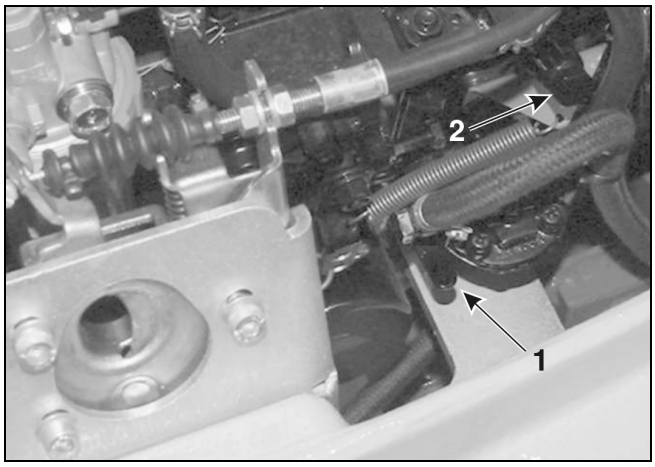


Figure 4-13 – Primer Pump Lever (Earlier Machines)

   b. Loosen bleed screw on left side of the filter (when facing filter) and allow fuel to come out until bubbles are not present in the fuel. Tighten the screw. Repeat this step for the right bleed screw.
   c. Locate the bleed screw on the injection pump (2, Figure 4-13). This bleed screw looks like a bolt head on the "banjo" fitting at the right side of the fuel injection pump. Loosen the screw and allow fuel to come out until bubbles are not present. Tighten the bleed screw.

Adjusting Track Tension

1. Position the machine on a level surface.
2. Use the bucket and dozer blade to lift the unit up until the tracks are just clear of the ground (Figure 4-30). Turn off the engine.

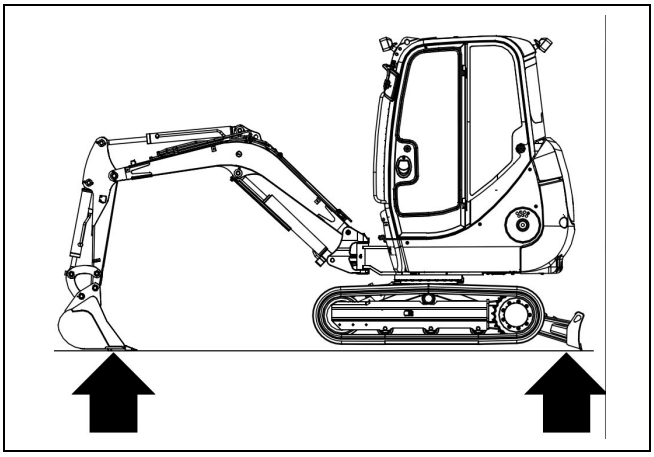


Figure 4-30 – Lifting Machine for Track Tension Adjustment

3. On newer machines, move the left track until mark (1, Figure 4-31) is at the center of the top span.
4. On earlier machines, remove side plate (3) from the left track to expose the adjustment fitting.
5. On newer machines, there should be 1/2" – 3/4" (15 – 20 mm) play between the contact area of support roller (2) and the track shoulder.
6. On earlier machines, idler wheel (3) should be centered as shown in the figure.
7. Using a grease gun, pump grease into the adjustment fitting to tighten the track as required..

Note: *A grease gun is supplied with machine tool kit.*

IMPORTANT

Do not over-tension the track. If track is too tight, loosen the grease fitting to relieve pressure.

⚠ WARNING

Do not loosen grease fitting more than two turns, or grease fitting could be ejected under pressure and cause injury.

8. On earlier machines, re-install side plate (3) and tighten securely.
9. Repeat this procedure for the right track.
10. Start the engine. Lower the machine to the ground.

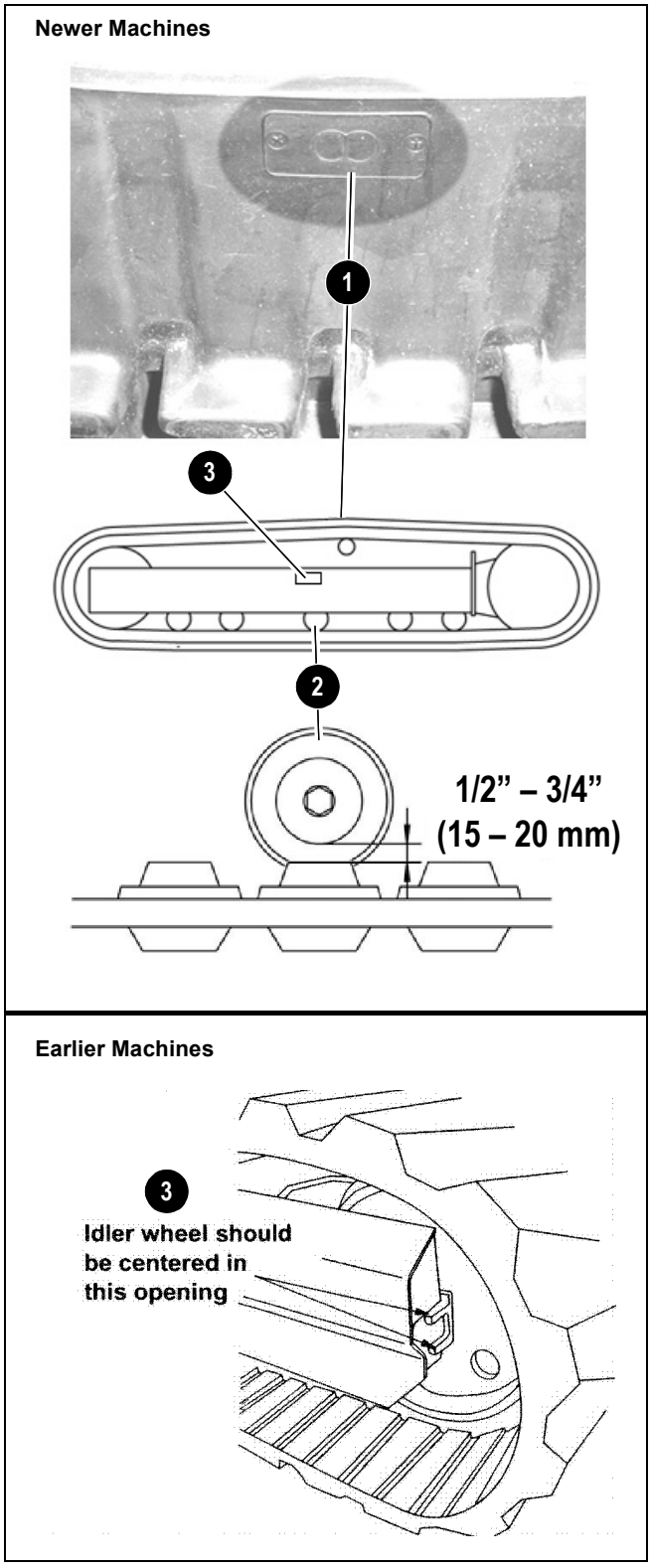


Figure 4-31 – Track Adjustment

INDICATOR LAMPS

Problem	Possible Cause	Corrective Action
Engine oil pressure indicator light comes on during operation	Engine oil pressure too low	Stop engine immediately; check oil level and add oil if necessary; see “Checking Engine Oil Level” on page 4-9; if oil level is correct, oil pump may have failed
	Engine oil level too low	Add oil; see “Checking Engine Oil Level” on page 4-9
	Oil pump not working	Stop engine immediately; replace oil pump. Contact authorized service center
	Machine inclination too high	15° maximum inclination up and across slopes; 25° maximum inclination down slopes
	Incorrect engine oil SAE grade	Replace engine oil with proper grade; see “Fluid Capacities/Lubricants” on page 1-5
Water temperature indicator illuminates during operation	Coolant level too low	Add coolant; see “Checking Coolant Level” on page 4-16
	Fan blades rotating too slowly	Adjust V-belt tension; see “Checking and Adjusting V-belt Tension” on page 4-12
	Air filter contaminated	Service air filter; see “Air Cleaner Service” on page 4-10
	Coolant system malfunction	Service cooling system; contact authorized service center
Battery voltage indicator illuminates during operation	Alternator not charging properly / malfunctioning alternator	Adjust V-belt tension; see “Checking and Adjusting V-belt Tension” on page 4-12
	Loose, or corroded charging circuit connections	Repair charging circuit; contact authorized service center
Fuel light indicator illuminates	Low fuel	Add fuel
Air filter light comes on	Air filter contaminated	Service air filter; see “Air Cleaner Service” on page 4-10