GEHL®

Form No.
918267
Revision B
Dec. 2009

Model AWS46

All-Wheel-Steer Loader

Operator's Manual

Fields of Application, Attachments

The attachments determine how the machine is used.

WARNING!

In order to avoid damage to the machine, only the attachments listed below are certified for attachment to the machine.

Use: Attachment

Possible attachments and material densities.

Description of attachment	Use
Standard bucket - normal material	Loosening, picking up, transporting and loading loose or solid material (material density ≤p = 112 lbs./ft.³ [1.8 t/m³])
Standard bucket - light weight material[1]	Picking up, transporting and loading very lightweight material (material density ≤p = 81 lbs./ft.³ [1.3 t/m³])
Standard bucket - super light weight material[1]	Picking up, transporting and loading lightweight material (material density ≤p = 56 lbs./ ft.³ [0.9 t/m³])
Multi-purpose bucket[2]	Grading, removing and scraping vegetation, for example; picking up and evenly spreading material; grabbing bulky material; loading trucks (material density ≤p = 112.3 lbs./ft.³ [1.8 t/m³])
Side-swing bucket[1, 2]	As standard bucket, however with benefits for filling and backfilling material (material density ≤p = 112 lbs./ft.³ [1.8 t/m³])
High-tilt bucket[2, 3]	As standard bucket, however with a 80 - 100 cm higher dump height (material density ≤ p = 81 lbs./ft.³ [1.3 t/m³])
Heavy duty bucket with hydraulic clamp[2, 5, 3]	Picking up and transporting e.g., bulky recycling material (material density ≤p = 81 lbs./ ft.³ [1.3 t/m³])
Heavy duty forks with hydraulic clamp (silage bucket)[2, 5, 3]	Picking up and transporting, e.g., bulky and fibrous recycling material (e.g., grass, manure, brushwood; material density ≤p = 81 lbs./ft.³ [1.3 t/m³])
Pallet forks[2, 5, 4]	Picking up and transporting pallets
Pallet forks with foldable fork arms[2, 4, 5]	Picking up and transporting pallets
Material pusher[2, 5]	For moving loose bulk material
Manure forks with grab	Picking up and transporting, e.g., grass, manure, brushwood and straw
Hydraulic round bale clamp	Picking up and transporting round bales
Tree replanter[2, 5]	Digging and transporting nursery trees

- Be aware of height obstacles. Any object in the area of the machine could represent a potential hazard, or cause the operator to react suddenly and cause an accident. Use a spotter or a signal person when working near bridges, phone lines, work site scaffolds, or other obstructions.
- If temperatures are changing, be cautious of dark and wet patches when working or traveling over frozen ground.
- In cold weather, avoid sudden travel movements and stay away from even very slight slopes. The machine can slide sideways on icy slopes.
- Snow accumulation can hide potential hazards. Use care while operating and while using the machine to clear snow.
- Stay away from ditches, overhangs and other weak support surfaces. Digging under an overhang is dangerous. Know the height and reach limits of the attachment and plan ahead while working. Avoid creating dangerous situations caused by moving around the work site while working. Move to another digging area before large overhangs are formed. Working around deep pits or along high walls or trenches may require support, especially after heavy rainfalls or during Spring thaws. Park the machine away from overhangs.
- The operator's area, steps and hand holds must be free of oil, dirt, ice and unsecured objects.
- Use warning tag/control lockout procedures during service. Alert others that service or maintenance is being performed by tagging operator's controls — and other machine areas if required — with a warning notice.
- NEVER start the engine if there is any indication that maintenance or service work is in progress, or if a warning tag is attached to the controls.
- Replace damaged safety decals and lost or damaged operator's manuals.
- Terrain and soil conditions at the work site, approaching traffic, weather-related hazards and any above- or below-ground obstacles and hazards should be observed and monitored by all work crew members.
- Read the operator's manuals provided with attachments, before using those attachments.
- Check the lighting system for proper working condition before working in darkness.
- Keep the windshield and windows clean. Poor visibility can cause accidents.

During Operation

- ALWAYS fasten the seat belt securely. Never operate the machine without the seat belt fastened.
- Check indicators and displays for normal conditions after starting the engine. Listen for unusual sounds and remain alert for other potentially hazardous conditions.
- Operate the machine cautiously and gradually until you are fully familiar with all of the controls and the machine handling.
- Do not overload the machine. – *see Weights* on page 156 for the load limits.
- Do not raise or drop a loaded bucket or attachment suddenly. Abrupt movements under load can cause serious instability.
- Check that attachments are securely fastened to the hitch before working.
- Never activate the float function with the bucket or attachment loaded or raised, because this will cause the lift arms and or bucket or attachment to drop rapidly.
- Make sure that no one enters the working area of the machine. Anyone standing near the machine is at risk of being caught between the moving parts of the machine.

☞ *Cool-down is required prior to radiator or hydraulic reservoir checks.*

- Stop the engine and allow it to cool before performing service on the engine radiator or hydraulic reservoir. Both assemblies have pressure vents at the filler cap for venting pressure. LOOSEN CAPS SLOWLY. Vent the pressure before removing the filler caps.
- **Release hydraulic system pressure by cycling controls and releasing hydraulic reservoir pressure before removing hydraulic reservoir access cover.** The hydraulic reservoir is pressurized. Vent the system pressure by rotating the filler cap. LOOSEN CAP SLOWLY prior to removal.
- Make sure to release stored hydraulic pressure in lines by cycling the operator's controls in each direction after the engine has been shut down.

☞ *Pressurized hydraulic oil leaks can be hazardous.*

- Fluid leaks from hydraulic hoses or pressurized components can be difficult to see, but pressurized oil can have enough force to pierce the skin and cause serious injury.
- Always use a piece of wood or cardboard to check for suspected hydraulic leaks. Never use your hands. Obtain immediate medical attention if pressurized oil pierces the skin. Failure to obtain prompt medical assistance could result in gangrene or other serious damage to tissue.

☞ *Use correct replacement fasteners tightened to proper torque.*

- Refer to the Parts Manual for information on torques and assembly of components. Always use the correct parts – incorrect fastener connections can dangerously weaken assemblies.

☞ *Dispose of all petroleum-based oils and fluids properly.*

- Used motor oil may pose a health risk. Wipe oil from your hands promptly and wash off any residue. Used motor oil is an environmental contaminant and may only be disposed of at approved collection facilities. Never drain any petroleum-based product on the ground or dispose of used oil in municipal waste collection containers, or in metropolitan sewer systems or landfills. Check state and local regulations for other requirements.

Safety instructions for maintenance

- Perform the Mandatory Safety Shutdown Procedure before performing any service, maintenance or repair work – *see Mandatory Safety Shutdown Procedure* on page 18.
- If you must have the engine running while performing service, maintenance or repair work:
  - Only work in groups of two or more.
  - Both persons must maintain visual contact with each other.
  - Follow the safety instructions in the Operator's Manual.
  - Keep a safe distance away from all rotating and moving parts (e.g. fan blades, V-belt drives, etc.).
- Perform service, maintenance and repair work only if:
  - Machine is positioned on firm and level ground.
  - Lever for selecting the travel direction is in neutral.
  - Parking brake is applied.
  - Hydraulic attachments and working equipment are lowered to the ground.
  - Machine is secured against unintentional movement.

Cab: Overview

Pos.	Description	For more information see page
1	Sun visor	
2	Air vent(s) – front window	
3	Wiper motor – front window	
4	Cab light	
5	Air vent(s) – floor	
6	Accelerator pedal	*53*
7	Instrument cluster	*42*
8	Window lock	*69*
9	Joystick-style control lever	*78*
10	Control lever – 3rd control circuit	*79*
11	Cab door arrester	*68*
12	Speed range switch panel	*55*
13	Lever – horizontal seat adjustment	*65*
14	Parking brake lever	*54*
15	Switch panel	*41*
16	Fuse box	*153*
17	Instrument panel	*41*
18	Storage / Radio (option)	
19	Rear wiper switch/motor	*63*
20	Left cab door arrester / right side window arrester	*68, 69*
21	Storage pocket for operator's manual	
22	Lever – backrest adjustment	*65*
23	Operator's seat	*64*
24	Air conditioning	*62*
25	Air conditioning control	*62*
26	Seat belt	*66*
27	Lever – weight adjustment	*64*
28	Hydrostatic steering	*56*
29	Multi-functional lever	*60*
30	Outside door handle	*68*
31	Hydrostatic service brake / inching pedal	*53*
32	Windshield washer fill	*63*
33	Brake fluid fill	*126*
34	Front window defroster vents	*61*

Jump-starting the engine

Safety instructions

DANGER!

Never jump-start the engine if the discharged battery is frozen, because there is a risk of explosion. Replace the battery. The machines must not touch when jump-starting because when both machines are connected by jump leads, there is a risk of sparking.

- The external power source must deliver 12 volts. Supply voltages higher than 12V will damage the electrical systems of both machines.
- Only use authorized jumper cables that are in good condition.

IMPORTANT!

The jumper cable connected to the positive (+) terminal of the starting battery must never touch electrically conductive machine parts, because there is a risk of short circuit.

- Route the jumper cables so that they cannot catch on rotating components in the engine.

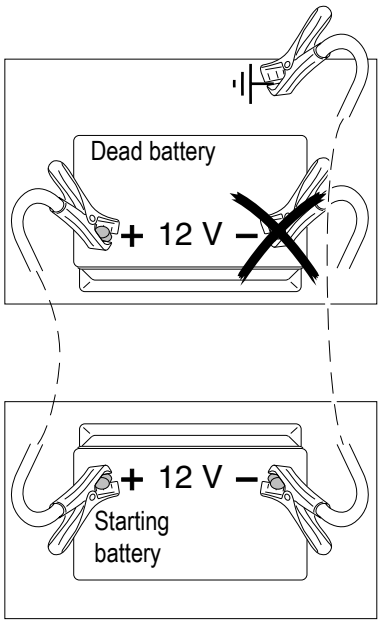


Fig. 26: Starting aid with jumper cables

Procedure

☞ *Start the engine of the jump-starting machine.*

☞ *Connect one end of the red positive (+) jumper cable to the positive (+) terminal of the dead battery, then connect the other end to the positive (+) terminal of the starting battery.*

☞ *Connect one end of the black negative (–) jumper cable to the negative (–) terminal of the starting battery.*

☞ *Clip the other end of the black negative (–) jumper cable onto the engine block.*

DANGER!

DO NOT connect the other end of the jump lead to the negative terminal of the dead battery, because gas emerging from the battery may ignite if sparks are formed.

☞ *Start the engine of the machine with the dead battery.*

After the engine has started:

☞ *While the engine is running, disconnect both jumper cables in exactly the reverse order (first the negative (–) terminal, then the positive (+) terminal to avoid sparking near the battery.*

Work lights

WARNING!

The work lights may momentary blind motorists on public roads.

☞ *Do not switch on the work lights when driving on public roads.*

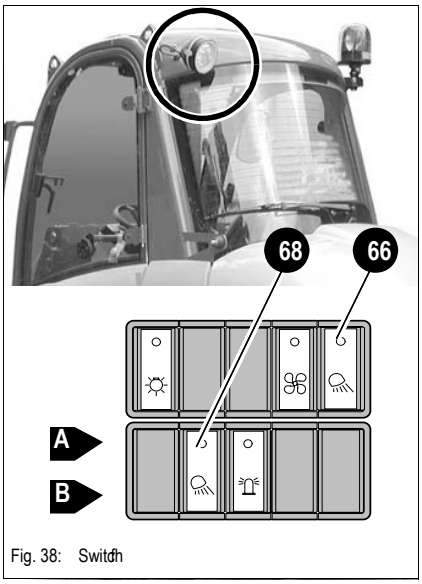


Fig. 38: Switch

Front and/or rear working lights (option)		
ON	☞ *Press switch **68** to position **B***	➥ Indicator in switch comes on
OFF	☞ *Press switch **68** to position **A***	➥ Indicator in switch goes out

2 front working lights (option)		
ON	☞ *Press switch **68** to position **B***	➥ Indicator in switch comes on
OFF	☞ *Push switch **68** to position **A***	➥ Indicator in switch goes out

2 rear working lights (option)		
ON	☞ *Press tip switch **66** briefly*	➥ Indicator in tip switch comes on
OFF	☞ *Press tip switch **66** briefly*	➥ Indicator in tip switch goes out

Interior light

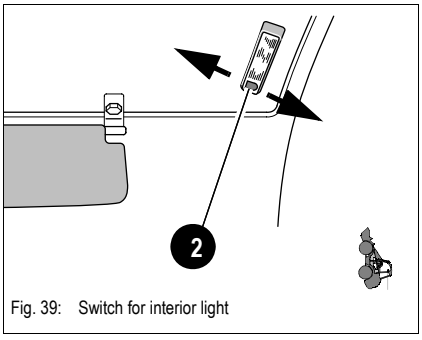


Fig. 39: Switch for interior light

Interior light	
ON	☞ *Press switch **2** to the left or right*
OFF	☞ *Move switch **2** to center position*

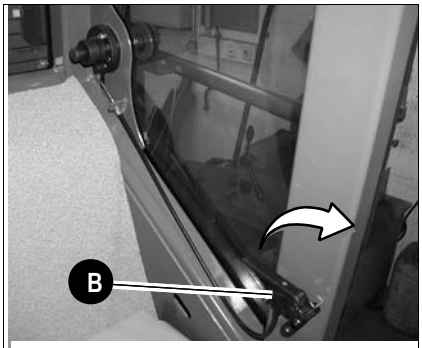


Fig. 61: Unlocking the door arrester

Releasing an open door

☞ *Press button **B** on the door arrester forward.*

➥ The door is released from the arrester.

Side Window

WARNING!

Lock the side window when driving the machine.
If the side window is not locked –

Crushing risk.

☞ *Make sure the side window is locked in place when either opened or closed.*

☞ *Make sure the open side window is engaged in the arrester.*
– see Locking the open side window on page 70.

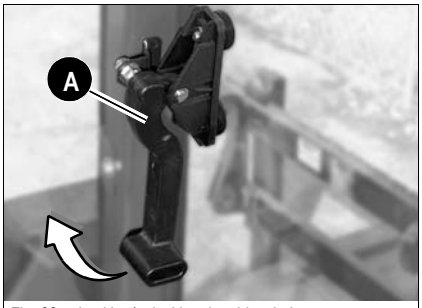


Fig. 62: Locking/unlocking the side window

Closing the side window

☞ *Turn lever **A** down.*

Opening the side window

☞ *Turn lever **A** up.*

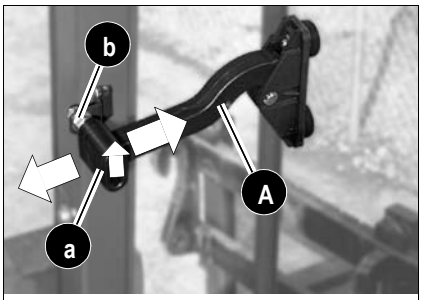


Fig. 63: Opening the side window

Opening the side window

☞ *Turn lever **A** up.*

☞ *Push lever **A** horizontally to the outside.*

☞ *To fasten the window in its final position:*
*Press the end of lever **a** downward until it is firmly seated in guide **b.***

Operation of 3rd control circuit

WARNING!

When working with attachments without a hydraulic function, operating the 3rd control circuit **10** unlocks the quickhitch –

Risk of personal injury.

☞ *Lock control lever **10** (3rd control circuit) when working with an attachment.*

– see Operation of 3rd control circuit on page 79.

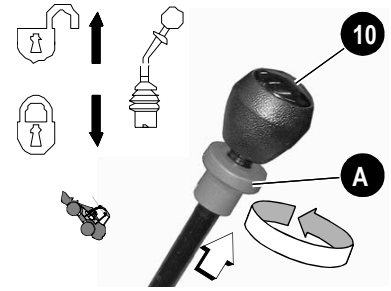


Fig. 77: Unlocking the 3rd control circuit

☞ *To unlock control lever **10**:*

- Pull lock sleeve **A** upward and rotate it counter-clockwise.

☞ *To briefly unlock control lever **10** :*

- Pull lock sleeve **A** upward and hold.

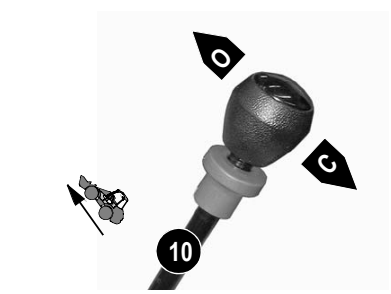


Fig. 78: Operation of 3rd control circuit

☞ *Push the control lever **10** forward:*

➥ The attachment on the quickhitch is unlocked.

Attachments with hydraulic functions

➥ Pushing the control lever forward **O** operates hydraulic attachment functions, such as closing the multi-purpose bucket.

☞ *Pull the control lever **C** to the rear.*

➥ The attachment on the quickhitch is locked.

➥ Pulling the control lever to the rear **C** operates hydraulic attachment functions, such as opening the multi-purpose bucket.

3rd control circuit continuous operation

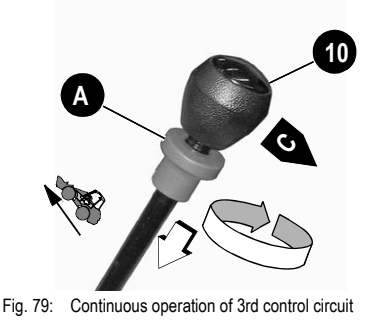


Fig. 79: Continuous operation of 3rd control circuit

IMPORTANT!

3rd control circuit continuous operation is useful when using attachments with additional hydraulic functions, or when operating hydraulic motors (e.g., rotary broom) or attachments with separate control valves.

3rd control circuit continuous operation is controlled with the control lever.

☞ *Pull control lever **10** to the rear **C.***

☞ *Unscrew lock sleeve **A** clockwise until it is pulled down by spring action and engage control lever **10** in position **C**.*

➥ The control lever is locked in this position and cannot be moved.

Removing material/digging in hard soil

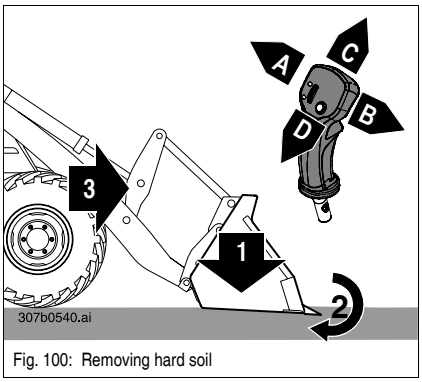


Fig. 100: Removing hard soil

☞ *Lower the bucket horizontally to the ground **1** by pushing control lever forward **C.***

☞ *Set the digging angle α (downward) **2** by pushing control lever to the left **A.***

☞ *Drive the machine forward **3**.*

☞ *Press the bucket downward slightly by pushing control lever forward **C.***

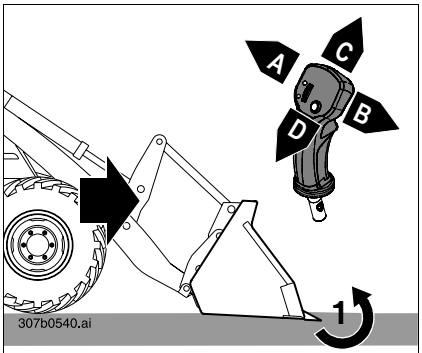


Fig. 101: Setting the digging angle flatter

After the bucket has penetrated the soil:

☞ *Set the digging angle α (slightly flatter) **1** by pushing control lever to the left **A**, so that the:*

- Layer being removed is as even as possible.
- Wheel spin is reduced.

☞ *Push control lever to the left **A**, or move it alternately to the left and right **A** and **B** to loosen the material.*

☞ *Proceed as for loading material hard to penetrate.*

Loading heaped material (non-compacted material)

WARNING!

Digging under heaped material can cause it to collapse –

Accident risk.

☞ *Never undermine heaped material.*

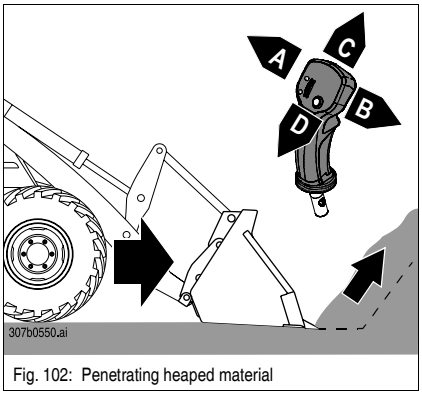


Fig. 102: Penetrating heaped material

☞ *Set the cutting edge parallel to the ground by pushing control lever to the left or right **A** and **B.***

☞ *Lower the bucket horizontally to the ground by pushing control lever forward **C.***

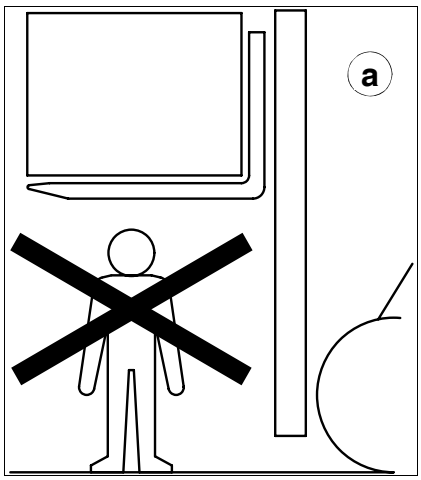
☞ *Drive forward.*

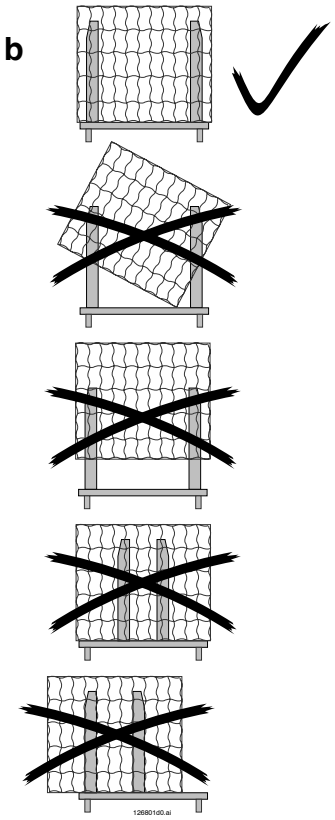
After penetrating the heaped material:

☞ *Smoothly raise the lift arm.*

☞ *Keep the bucket level.*

0.1 Working with Pallet Forks





- Read and follow all instructions in the operator's manual provided with the pallet forks.
- Maintain a minimum distance of 20' (6 m) between loader unit/load and overhead lines.
- Before working, be sure that the fork arms on the fork frame are safely locked.
- Always approach the material with the machine wheels in the straight-ahead position.
- Always tilt the forks slightly back (toward the machine) for transport.
- Always transport the load close to the ground. Observe minimum ground clearance.
- Only set loads onto designated areas, with a stable base, that have load-bearing capacity.
- Only load on firm and level ground with sufficient load-bearing capacity (for a fully loaded machine).
- Only stack loads up to the authorized maximum pallet height.
- Only place loads in designated areas within the construction site. Set down loads only in places where they will stand safely without tilting, falling down or sliding. Appropriately label loads that have been set down, especially in high-traffic areas.
- Do not set down loads in transit or escape routes, or in front of safety facilities or equipment that must be accessible at all times.
- Move the fork arms all the way under the pallets so that the load is picked up as closely as possible to the fork frame.
- Do not carry passengers on the pallet forks.
- Move under the load with the straight fork arms as far apart as possible and at an equal distance to the left and right side of the load (figure **b**).
- Lock the adjustable fork arms with the locking lever before moving the machine (with loaded or unloaded pallet forks).
- Lower the forks as near as possible to the ground for transport. Follow minimum ground clearance.
- Drive slowly with a raised load, especially in off-road applications, to avoid swinging movements of the load.
- When driving or working across a slope, the load must be on the uphill side of the machine/attachment.
- On sloping terrain, drive the machine rearward to prevent the load from falling off and the machine from tilting forward when braking.
- When transporting large bulk loads, drive the machine rearward for improved visibility.
- Learn the loa- bearing capacity of bridges, basement ceilings, vaults and similar structures before moving the machine onto them.
- Learn the clearances of underpasses, tunnels, gates and similar structures before driving through or under them.
- Follow the load-bearing capacity of the set-down area (e.g., truck platforms, storage areas in high-bay warehouses).
- Position and distribute the load evenly on the front tires.
- Never raise a load with only one fork arm.
- Never operate the machine and loaded attachment at high speeds.
- Never leave the machine with the load raised.
- Never work or stand under raised or suspended loads (figure **a**).
- Never use the controls, movable lines or cables as handles.

Maintenance

Introduction

Operational readiness and the service life of the machine can be increased through proper maintenance.

Before performing service and maintenance work, always read, understand and follow the instructions starting on:

- *– see Safety* on page 17.
- The operator's manuals of the attachments.

Daily service and maintenance work, and maintenance according to maintenance plan **"A"** must be completed *– see Maintenance Schedule* on page 139.

DANGER!

Do not perform assembly or maintenance work if the loader unit is raised and **not** secured -

Danger of crushing and injury!

☞ *Secure the loader unit with an appropriate prop or support to prevent it from being lowered unintentionally.*

☞ *Also follow the instructions in the "Safety" chapter of this operator's manual.*

☞ *Also follow the instructions in the operator's manuals of the attachments.*

V-belt

DANGER!

Only check, tension, or replace the V-belt after the engine is shut off –

Risk of personal injury.

☞ *Shut off the engine before working on or around the engine.*

IMPORTANT!

Cracked and stretched V-belts cause engine damage.

☞ *Have the V-belt replaced by an authorized dealer.*

Check the V-belt after 50 service hours (or weekly if the machine is used for less than 50 hours per week). Tension the V-belt if necessary.

Re-tension new V-belts after about 15 minutes of running time.

Checking V-belt tension

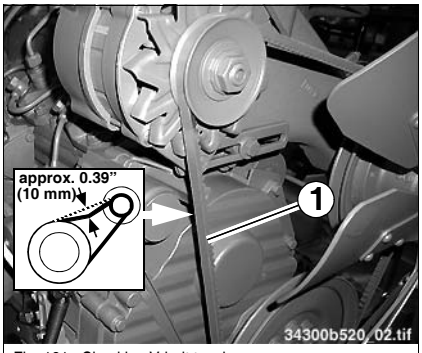


Fig. 121: Checking V-belt tension

☞ *Check the V-belt tension as follows:*

- Shut off the engine.
- Prevent the machine from rolling away and remove the ignition key – *see Parking the Machine* on page 57.
- Open the engine cover.
- Carefully inspect V-belt **1** for damage.
- If the V-belt is damaged:
  - Have the V-belt replaced by authorized staff.
- Press with your thumb to be sure that the V-belt cannot be deflected between the pulleys by more than about 0.39" (10 mm).
- Re-tension the V-belt if necessary. See below.

Tensioning the V-belt

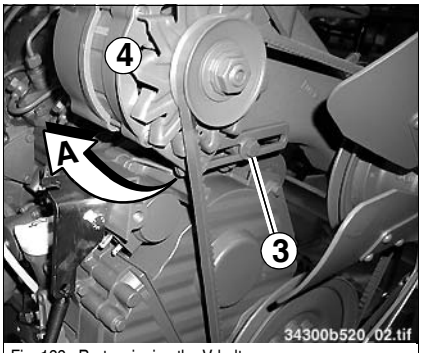


Fig. 122: Re-tensioning the V-belt

☞ *Tension the V-belt as follows:*

- Shut off the engine.
- Prevent the machine from rolling away and remove the ignition key. – *see Parking the Machine* on page 57.
- Open the engine cover.
- Slacken attachment screws **3** of alternator **4**.
- Use a suitable tool to push the alternator in the direction of arrow **A** until the correct V-belt tension is obtained (fig. 121).
- Keep the alternator in this position, and at the same time tighten attachment screws **3**.
- Run the engine for 15 minutes.
- Repeat the V-belt tension (fig. 121) procedure.

Heating

The machine's heating system is equipped with a dust filter that must be cleaned regularly and replaced yearly.

The filter is located in the cab behind the maintenance cover on the right outside of the cab.

Cleaning the dust filter of the heating system

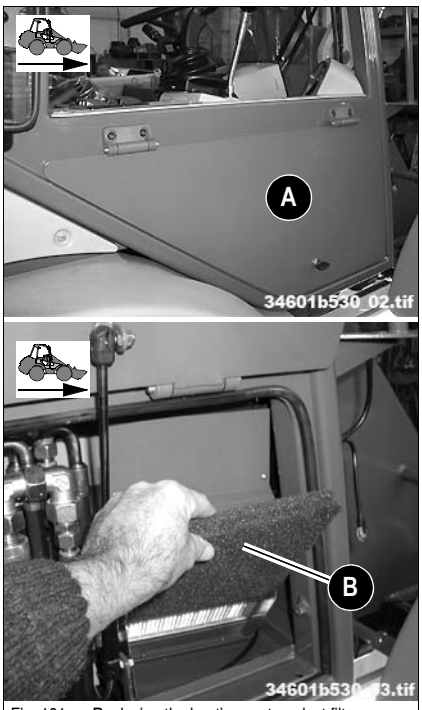


Fig. 131: Replacing the heating system dust filter

A dust filter cleans the air taken in by the heater. Clean the filter with compressed air as required, but at least yearly. The air that flows from the vents decreases as dust on the filter increases.

☞ *Clean the filter as follows:*

- Open cover **A**.
- Remove dust filter **B**.
- Clean dust filter **D;** replace it if necessary.
  - ☞ *Replace the filter every 500 hours.*
- Close cover **A**.

Maintenance Schedule

Work description

For service and maintenance work on the attachment, also refer to the operation and maintenance manual of the attachment manufacturer.

	Maintenance schedule/service hours					
	Regular maintenance (daily)	Delivery inspection	"A" every 50 hours (weekly)	1st Inspection[1] at 100 hours	"B" every 500 hours[2] 2nd Inspection	"C" every 1500 service hours (yearly)
Oil and filter changes ( ):						
Carry out the following oil and filter changes (check oil levels after test run):						
• Engine oil				●	●	●
• Engine oil filter				●	●	●
• Fuel filter, Fuel pre-filter				●	●	●
• Air filter[3, 4] replace safety element every third time the primary air filter element is replaced					●	●
• Gearbox oil in front and rear axle differentials and in rear axle gearbox				●		●
• Gearbox oil in front and rear axle planetary drives, left and right				●		●
• Hydraulic oil[5]						●
• Hydraulic oil filter				●		●
• Breather filter – hydraulic oil reservoir [4]						●
• Heater: fine-dust filter [6]					●	●
Inspections ( ):						
Check the following items. Refill if necessary.						
• Engine oil	●	●	●			
• Hydraulic oil	●	●	●	●	●	●
• Gearbox oil in front and rear axle differentials and in rear axle gearbox		●			●	●
• Gearbox oil in front and rear axle planetary drives, left and right side		●			●	●
• Brake fluid[7]	●	●	●	●	●	●
Check radiator for engine and hydraulic oil for contamination. Clean if necessary[8]			●	●	●	●
When using biodegradable oil: Drain the condensation water in the hydraulic oil reservoir [5]	●				●	●
Clean dust valve on air filter housing [3]	●	●	●	●	●	●
V-belt: Check condition and pre-tension. Tighten or replace if necessary[9]	●	●	●	●	●	●
Check the fuel/water separator. Drain water if necessary			●	●	●	●
Engine coolant [10](also check antifreeze in autumn/winter and temperatures below 40º F [4º C])		●		●	●	●

Specifications

Frame

Sturdy steel frame, rubber-mounted engine.

Engine

Engine	
Product	Deutz diesel engine
Model	D 2011 L04 W - Tier III
Type	In-line
No. of cylinders	4
Displacement	221 in.³ (3620 cm³)
Bore and stroke	3.7 x 4.92” (92 x 125 mm)
Compression ratio	18:1
Output (per ISO 9249)	78 DIN hp (58 kW) at 2300 rpm
Max. torque	199 lb.-ft. (270 Nm) at 1600 rpm
Min. idling speed	900 rpm
Specific minimum fuel consumption	315 g/hph (235 g/kWh)
Fuel injection system	Direct fuel injection
Firing order	1 – 3 – 4 – 2
Starting aid	Glow plug
Max. inclined position (engine no longer supplied with oil)	Max. lateral left/right inclination: 30°/57% Max. uphill/downhill inclination: 30°/57% **Follow tilting limit of the machine.**
Oil pressure	44 – 65 psi (3.0 – 4.5 bar) at 2300 rpm
Valve clearance (engine cold)	Intake valve 0.01” (0.3 mm) Exhaust valve 0.02” (0.5 mm)