

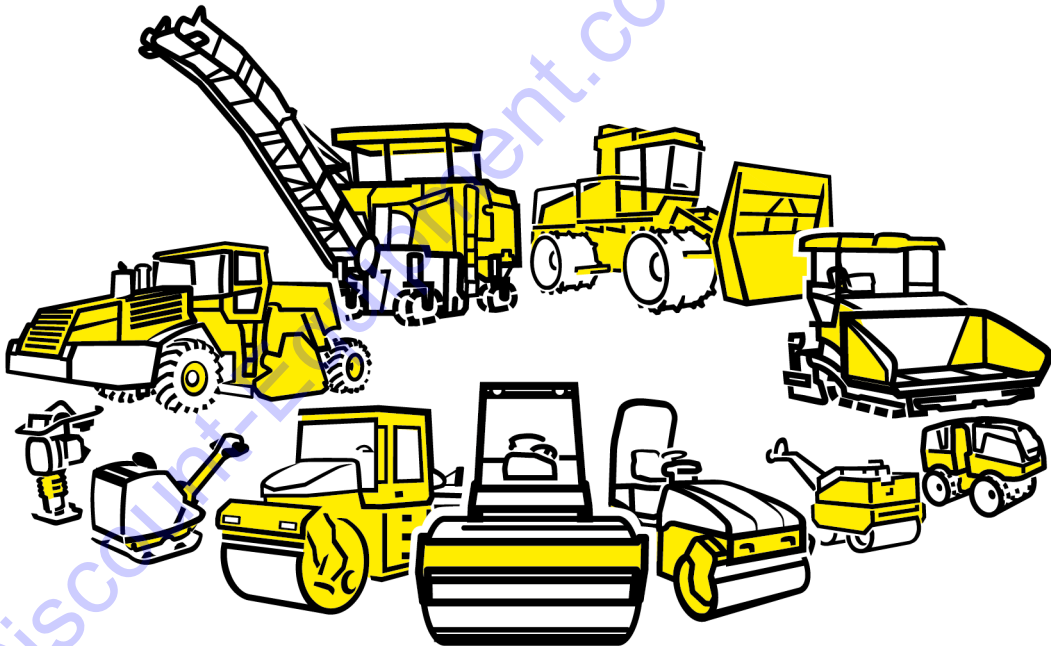
BOMAG

FAYAT GROUP

Operating Instruction Maintenance Instruction

Original Operating Instructions

BW 900-50



S/N 861 834 07 1001> / S/N 101 834 51 1001>

Tandem vibratory roller



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⚠️ WARNING: Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to www.P65warnings.ca.gov/diesel.

⚠️ WARNING: Crude oil, gasoline, diesel fuel and other petroleum products can expose you to chemicals including toluene and benzene, which are known to the State of California to cause cancer and birth defects or other reproductive harm.

These exposures can occur in and around oil fields, refineries, chemical plants, transport and storage operations such as pipelines, marine terminals, tank trucks and other facilities and equipment.

For more information go to www.P65Warnings.ca.gov/petroleum.

Table of contents

1	Introduction	5
	1.1 Foreword.....	6
	1.2 Machine type plate and engine type plate.....	8
2	Technical data	9
3	Safety regulations	13
	3.1 Signage.....	22
4	Indicators and control elements	29
	4.1 Description.....	31
5	Operation	37
	5.1 Checks prior to start up.....	38
	5.2 Starting the engine.....	39
	5.3 Driving the machine.....	42
	5.4 Stopping the machine, operating the parking brake.....	44
	5.5 Shutting down the engine.....	45
	5.6 Switching the vibration on and off.....	46
	5.7 Switching the pressure sprinkling system on and off.....	48
	5.8 Towing.....	49
	5.9 Loading and transport.....	51
6	Maintenance	55
	6.1 General notes on maintenance.....	56
	6.2 Fuels and lubricants.....	58
	6.3 Table of fuels and lubricants.....	60
	6.4 Running-in instructions.....	61
	6.5 Maintenance Table.....	62
	6.6 Every 10 operating hours.....	63
	6.6.1 Checking the engine oil level.....	63
	6.6.2 Checking the fuel level.....	63
	6.6.3 Checking the hydraulic oil level.....	65
	6.6.4 Checking the hydraulic oil filter element.....	65
	6.6.5 Checking the water level.....	66
	6.6.6 Cleaning the scrapers.....	66
	6.6.7 Cleaning the cooling air intake openings.....	67
	6.7 Every 125 operating hours.....	68
	6.7.1 Check, clean the air filter, replace if necessary.....	68
	6.7.2 Clean, check the spark plugs, replace if necessary.....	69
	6.7.3 Changing engine oil and oil filter.....	71
	6.7.4 Lubricating the rear drum bearings.....	72
	6.8 Every 250 operating hours.....	73
	6.8.1 Change the fuel pre-filter.....	73
	6.8.2 Clean the water sprinkler system.....	73
	6.8.3 Battery service.....	74
	6.8.4 Checking, adjusting the valve clearance.....	76
	6.8.5 Check, adjust the idle speed.....	77

Table of contents

6.9	Every 2000 operating hours	78
6.9.1	Changing the hydraulic oil.....	78
6.9.2	Change the hydraulic oil filter.....	79
6.9.3	Checking fuel lines and clamps.....	80
6.10	As required	82
6.10.1	Water sprinkler system, maintenance in case of frost.....	82
6.10.2	Engine conservation.....	82
7	Troubleshooting	85
7.1	Preliminary remarks.....	86
7.2	Starting the engine with jump leads.....	87
7.3	Engine problems	88
8	Disposal	91
8.1	Final shut-down of machine.....	92

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1.1 Foreword

BOMAG manufactures machines for earth, asphalt and refuse compaction, stabilizers/recyclers as well as planers and pavers.

BOMAG's vast experience in connection with state-of-the-art production and testing methods, such as lifetime tests of all important components and highest quality demands guarantee maximum reliability of your machine.

These operating and maintenance instructions are part of your machine.

They provide necessary information to operate your machine safely and properly.

They also contain information on required operating, maintenance and repair measures.

Carefully read the operating and maintenance instructions before taking your machine into operation.

Please observe the safety regulations strictly and follow all instructions to ensure safe operation.

If you are not yet acquainted with the controls and indicating elements on this machine, you should thoroughly read the corresponding chapter ↪ *Chapter 4 „Indicators and control elements“ on page 29.*

The description of the individual operating steps including the notes on safety to be followed can be found in chapter “Operation” ↪ *Chapter 5 „Operation“ on page 37.*

Before every start up, carry out all required visual inspections and function tests.

Ensure the compliance with the specified operating, maintenance and repair measures to maintain the functional safety of your machine.

A description of all necessary maintenance work, maintenance intervals as well as information on fuels and lubricants can be found in the chapter “Maintenance” ↪ *Chapter 6 „Maintenance“ on page 55.*

Do not service or repair your machine by yourself to avoid harming persons or damaging material or environment.

The machine must only be serviced and repaired by qualified and authorized personnel.

Contact our Customer Service to carry out the required maintenance work or necessary repairs.

In case of operating errors, inadequate maintenance or the use of unapproved fuels and lubricants all warranty claims will become null and void.

For your own personal safety you should only use original parts from BOMAG.

For your machine we offer service kits to make maintenance easier.

In the course of technical development we reserve the right for technical modifications without prior notification.

These operating and maintenance instructions are also available in other languages.

Apart from that, you can also order the spare parts catalogue against the serial number of your machine.

The above notes do not constitute an extension of the warranty and liability conditions specified in the general sales and delivery conditions of BOMAG GmbH.

We wish you successful work with your BOMAG machine.

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1.2 Machine type plate and engine type plate

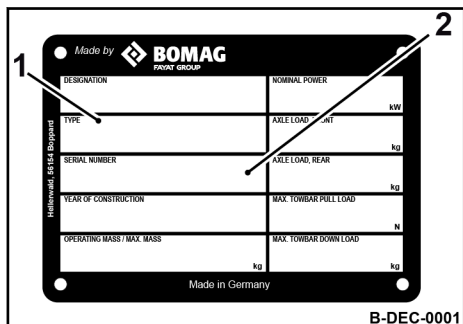


Fig. 1: Machine type plate (example)

Engine type and engine number

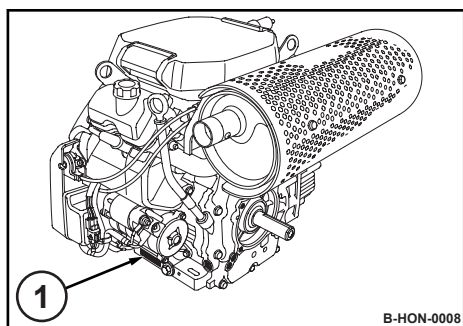


Fig. 2

Please enter here:

Machine type (1):

Serial number (2):

Please enter here:

Engine type:

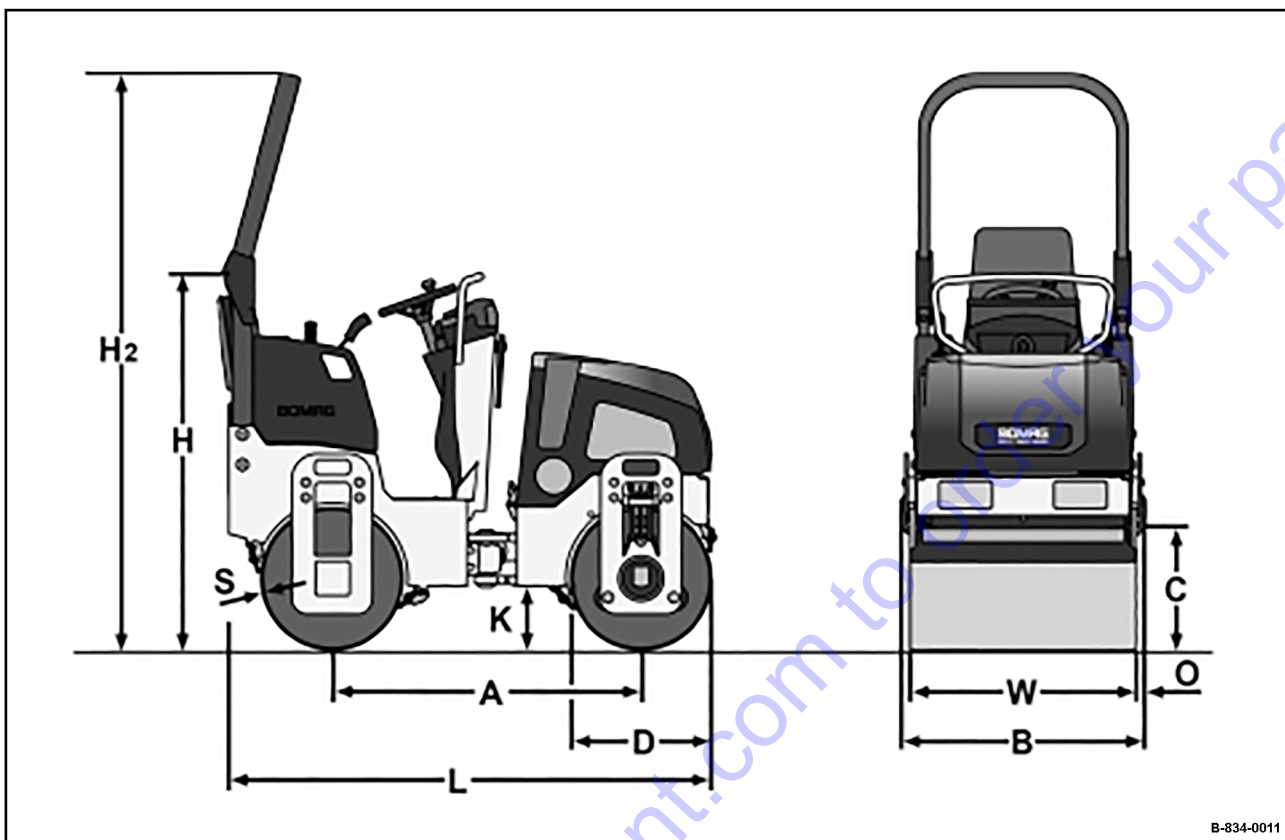
Engine number:

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Technical data

Dimensions



B-834-0011

Fig. 3

A	B	C	D	H	H ₂	K	L	O	S	W
1223	961	450	560	1727	2290	250	1967	31	8	900
(48)	(38)	(18)	(22)	(68)	(90)	(10)	(86)	(1.2)	(0.3)	(35)

Dimensions in millimetres

(Dimensions in inch)

Weights			
Max. operating weight		1200	kg
		(2646)	(lbs)
Operating weight (CECE)		1600	kg
		(3527)	(lbs)
Average static linear load (CECE)		6.7	kg/cm
		(37.5)	(pli)

Technical data

Travel characteristics		
Travel speed	0 – 8.7 (0 – 5.4)	km/h (mph)
Working speed with vibration	0 – 4 (0 – 2.5)	km/h (mph)
Max. gradeability without/with vibration (soil dependent)	40/30	%

Drive		
Engine manufacturer	Honda	
Type	GX 630	
Cooling system	Air	
Number of cylinders	2	
Rated power SAE J 1349	14.9	kW
Rated speed	3300	min ⁻¹
Driven drum	front + rear	

Electric system		
Voltage	12	V

Brakes		
Service brake	hydrostatic	
Parking brake	hydro-mechanical	

Steering		
Type of steering	Oscill.-articul.	
Steering operation	hydrostatic	
Steering angle	+/- 33	°
Oscillation angle	+/- 6	°
Inner track radius	1647 (65)	mm (in)

Technical data

Exciter system		
Vibrating drum	front	
Drive system	hydrostatic	
Frequency	70 (4200)	Hz (vpm)
Amplitude	0.50 (0.020)	mm (in)
Centrifugal force	15 (3372)	kN (lbf)

Water sprinkler system		
Type of sprinkling	Pressure	

Filling capacities		
Fuel (gasoline)	27 (7)	l (gal us)
Water	137 (36)	l (gal us)

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Safety regulations

General

This BOMAG machine has been built in compliance with the latest technical standard and complies with the applicable regulations and technical rules. However, dangers for persons and property may arise from this machine, if:

- it is used for purposes other than the ones it is intended for,
- it is operated by untrained personnel,
- it is changed or converted in an unprofessional way,
- the safety instructions are not observed.

Each person involved in the operation, maintenance and repair of the machine must therefore read and comply with these safety regulations. If necessary, this must be confirmed by obtaining the signature of the customer.

Furthermore, the following obviously also applies:

- applicable accident prevention instructions,
- generally accepted safety and road traffic regulations,
- country specific safety regulations. It is the duty of the operator to be acquainted with these instructions and to apply these accordingly. This applies also for local regulations concerning different types of handling work. Should the recommendations in these instructions be different from the regulations valid in your country, you must comply with the safety regulations valid in your country.

Intended use

This machine must only be used for:

- Compaction of bituminous material, e.g. road surface layers,
- light to medium compaction work in earth construction or road sub-bases.

Improper use

Dangers may arise from the machine when it is used for purposes other than the one it is intended for.

Any danger caused by improper use is the sole responsibility of the operating company or driver/operator, the manufacturer cannot be made liable.

Examples for improper use are:

- work with vibration on hard concrete, cured bitumen layers or extremely frozen ground
- cleaning the drums while driving or changing nozzles during travel.
- driving on subsoils with too low load bearing capacity
- driving on slippery subsoils (e.g. ice and snow)
- driving on surfaces of insufficient size (danger of turning over)
- Passing over too high borders (e.g. curbstones, embankments, trenches, potholes)
- unauthorized use of public roads
- Using the machine for towing

transporting persons, except the machine driver, is prohibited.

starting and operation of the machine in explosive environments and in underground mining is prohibited.

Remaining dangers, remaining risks

Despite careful work and compliance with standards and regulations it cannot be ruled out that further dangers may arise when working with and handling the machine.

Both the machine as well as all other system components comply with the currently valid safety regulations. Nevertheless, remaining risks cannot be ruled out completely, even when using the machine for the purpose it is intended for and following all information given in the operating instructions.

A remaining risk can also not be excluded beyond the actual danger zone of the machine. Persons remaining in this area must pay particular attention to the machine, so that they can react immediately in case of a possible malfunction, an incident or failure etc.

All persons remaining in the area of the machine must be informed about the dangers that arise from the operation of the machine.

Regular safety inspections

Have the machine inspected by an expert (capable person) as required for the condition the machine is working under, but at least once every year.

Who is allowed to operate the machine?

Only trained, instructed and authorized persons of at least 18 years of age are permitted to drive and operate this machine. For operation of the machine the responsibilities must be clearly specified and complied with.

Persons under the influence of alcohol, medicine or drugs are not allowed to operate, service or repair the machine.

Maintenance and repair work requires specific knowledge and must therefore only be performed by trained specialists.

Changes and conversions to the machine

Unauthorized changes to the machine are prohibited for safety reasons.

Original parts and accessories have been specially designed for this machine.

We wish to make explicitly clear that we have not tested or approved any parts or accessories not supplied by us.

The installation and/or use of such products may have an adverse effect on the active and/or passive safety.

The manufacturer explicitly excludes any liability for damage caused by the use of non-original parts or accessories.

Damage, deficiencies, misuse of safety installations

Machines which are not safe to operate or in traffic must be immediately taken out of service and shall not be used, until these deficiencies have been properly rectified.

Safety installations and switches must neither be removed nor must they be made ineffective.

Safety regulations

Notes on safety in the operating and maintenance instructions



WARNING!

Paragraphs marked like this highlight possible dangers for persons.



NOTICE!

Paragraphs marked like this highlight possible dangers for machines or parts of the machine.



Paragraphs marked like this contain technical information for the optimal economical use of the machine.



ENVIRONMENT!

Paragraphs marked like this point out practices for safe and environmental disposal of fuels and lubricants as well as replacement parts.

Observe the regulations for the protection of the environment.

Loading the machine

Check the fastening of the central lifting hook before each use.

Use only stable loading ramps of sufficient load bearing capacity. The ramp inclination must be less than the gradability of the machine.

Secure the machine against tipping or slipping off.

Secure the machine on the transport vehicle against rolling, slipping and turning over.

Persons are highly endangered if

- they step or stand under loads being lifted
- they remain in the drive range of the machine during an instruction and during loading.

The machine must not swing about when being lifted.

Use only safe lifting gear of sufficient load bearing capacity

Fasten the lifting gear only at the specified lifting points.

Towing the machine

Apply appropriate measures (e.g. with metal wheel chocks, to be provided by the operating company) to secure the machine against rolling away before releasing the parking brake.

Use a tow bar (to be provided by the operating company).

Use a towing vehicle with sufficient traction and braking power for the unbraked towed load.

The machine cannot be steered.

Tow the machine only after having released the parking brake.

Max. towing speed 1 km/h (0.6 mph), max. towing distance 500 m (0.3 mi).

Checking the Roll Over Protective Structure (ROPS)

The frame of the machine must not be warped, bent or cracked in the area of the ROPS fastening.

The ROPS must not show any rust, damage, hairline cracks or open fractures.

The real machine weight must never exceed the testing weight for the ROPS.

The ROPS must not rattle about when driving. This indicates that it is not properly fastened. All bolted connections must comply with the specifications and should be absolutely tight (observe the tightening torques). Screw and nuts must not be damaged, bent or deformed.

No accessories may be welded or bolted on and no additional holes must be drilled without the consent of the manufacturer, since this will impair the strength of the unit.

The ROPS must therefore also not be straightened or repaired if it is damaged.

A defect ROPS must generally be replaced with an original spare part in close coordination with the manufacturer.

Starting the machine

Before starting

Use only machines which are serviced at regular intervals.

Become acquainted with the equipment, the control elements, the working principle of the machine and the working area.

Wear your personal protective outfit (hard hat, safety boots, etc.).
Wear ear defenders.

Before mounting the machine check whether:

- persons or obstructions are beside or under the machine.
- the machine is free of oily and combustible material.
- all grips, steps and platforms are free of grease, oils, fuel, dirt, snow and ice.
- the engine hood is closed and locked.

Use steps and grips to mount the machine.

Before starting the machine check whether:

- the machine shows any obvious faults.
- all guards and safety elements are in place.
- steering, brakes, control elements, light system and warning horn work correctly.
- the seat is correctly adjusted
- mirrors (if present) are clean and correctly adjusted.

Do not start the machine with defective gauges, control lights or control elements.

Safety regulations

Do not take any loose objects with you or fasten them to the machine.

On machines with roll over protection system you must always wear your seat belt!

Starting

Start and operate the machine only from the driver's seat.

For starting set all control levers to 'neutral position'.

Do not use any starting aids like start pilot or ether.

After starting check all display instruments.

Starting with jump wires

Connect plus to plus and minus to minus (ground cable) – always connect the ground strap last and disconnect it first! A wrong connection will cause severe damage in the electric system.

Do not start the engine by shorting the electric terminals on the starter motor, because the machine may start to drive immediately.

Starting and operation of the machine in closed rooms and trenches

Exhaust gases are extremely dangerous! Always ensure an adequate supply of fresh air when starting and operating in closed rooms and trenches!

Driving the machine

Persons in the endangered area

Before starting or resuming work and especially when reversing, check that there are not any persons or obstructions in the endangered area.

If necessary give warning signals. Stop work immediately if persons remain in the danger area despite the warning.

Do not step or stand in the articulation area of the machine when the engine is running. Risk of squashing!

Driving

In events of an emergency operate the emergency stop switch immediately. Do not use the emergency stop switch as a service brake.

Restart the machine only after the danger, that has caused the actuation of the emergency stop, has been eliminated.

If the machine has come in contact with high-voltage power lines:

- do not leave the operator's stand
- warn others from coming too close to the machine or touching it
- if possible drive the machine out of the danger zone
- have the power shut off

Operate the machine only from the operator's seat.

Do not adjust the seat while driving.

Do not climb onto or off the machine while driving.

Change the travel direction only while the machine is standing.

Do not use the machine to transport persons.

Stop the machine if you notice unusual noises or the development of smoke. Investigate the cause and have the fault corrected.

Keep a sufficient distance to excavations and embankments and make sure that your work does not impair the stability of the machine.

Do not work with vibration on hard concrete, on a cured bitumen surface or heavily frozen ground.

When passing under flyovers, bridges, tunnels, electric power lines etc. keep a sufficient distance.

Driving on slopes and gradients

Do not drive up and down gradients, which exceed the max. gradability of the machine.

Always drive extremely carefully on slopes and always straight up and down the slope. Change to the lower speed range before approaching the slope.

Wet and loose soils reduce the ground adhesion of the machine on gradients and slopes. Higher risk of accident!

Behaviour in traffic

Match the speed of the machine to the working conditions.

Always allow loaded transport vehicles to pass.

Switch the lights on when the visibility is poor.

Keep clear of edges and embankments.

Check the effect of vibration

When compacting with vibration check the effect of the vibration on nearby buildings and underground supply lines (gas, water, sewage, electric power supply), stop vibratory compaction if necessary.

Do not activate the vibration on hard (frozen, concrete) ground. Risk of bearing damage!

Parking the machine

Park the machine on horizontal, level, firm ground.

Before leaving the machine:

- return the control lever to neutral position
- apply the parking brake
- shut down the engine, pull off the ignition key

Mark machines, which could be in the way, with a clearly visible sign.

Parking on slopes and inclinations

Apply appropriate measures (e.g. with metal wheel chocks, to be provided by the operating company) to secure the machine against rolling away.

Refuelling

Do not inhale any fuel fumes.

Safety regulations

Refuel only with the engine shut down.

Do not refuel in closed rooms.

No open fire, do not smoke.

Monitor the entire refuelling process.

Do not spill any fuel. Catch running out fuel, do not let it seep into the ground.

Wipe off spilled fuel. Keep dirt and water away from the fuel.

A leaking fuel tank can cause an explosion. Ensure tight fit of the fuel tank cover, if necessary replace immediately.

Fire protection measures

Familiarise yourself with the location and the operation of fire fighting equipment. Observe all fire reporting and fire fighting possibilities.

Maintenance work

Comply with the maintenance work described in the operating and maintenance instructions, including the information concerning the replacement of parts.

Maintenance work must only be performed by qualified and authorized persons.

For overhead maintenance and assembly work use the access steps and working platforms provided or other secure means. Do not use machine parts as access steps.

Keep unauthorized persons away from the machine.

Do not perform maintenance work while the machine is driving or the engine is running.

Park the machine on horizontal, level, firm ground.

Pull the key out of the ignition switch.

Secure the articulated joint with the articulation lock.

Work on hydraulic lines

Relieve hydraulic pressures before working on hydraulic lines. Hydraulic oil escaping under pressure can penetrate the skin and cause severe injury. When being injured by hydraulic oil consult a medical doctor immediately, as otherwise this may cause severe infections.

Do not step in front of or behind the drums/wheels when performing adjustment work in the hydraulic system.

Do not change the setting of pressure relief valves.

Drain the hydraulic oil at operating temperature – danger of scalding!

Catch running out hydraulic oil and dispose of environmentally.

Always catch and dispose of hydraulic oils separately.

Do not start the engine after draining the hydraulic oil.

Once all work is completed (with the system still depressurized!) check all connections and fittings for leaks.

Changing hydraulic hoses

Hydraulic hoses must be visually inspected at regular intervals.

Hydraulic hoses must be immediately replaced if:

- the outer layer is damaged down to the inlay (e.g. chafing, cuts, cracks)
- the outer layer is brittle (formation of cracks in the hose material)
- the hose shows deformations in pressurized and depressurized condition, which do not comply with the genuine shape of the hydraulic hose
- the hose shows deformations in bends, e.g. squeezing, buckling, layer separation, formation of blisters
- parts of the hose are leaking.
- hoses are not correctly installed.
- the hydraulic hose has separated from the fitting
- the fitting shows corrosion that impairs both function and strength.
- hoses are mixed up by mistake.
- fittings are damaged or deformed, whereby the function and strength of the hose/hose connection is impaired.

Only genuine BOMAG replacement hydraulic hoses ensure that the correct hose type (pressure range) is used at the right location.

Working on the engine

Shut the engine down before opening the engine hood.

Drain the engine oil at operating temperature – danger of scalding!

Wipe off spilled oil, catch running out oil and dispose of environmentally.

Store used filters and other oil contaminated materials in a separate, specially marked container and dispose of environmentally.

Do not leave any tools or other objects, that could cause damage, in the engine compartment.

Working on electric parts of the machine

Before starting to work on electric parts of the machine disconnect the battery and cover it with insulating material.

Do not use fuses with higher ampere ratings and do not repair fuses with a piece of wire. Fire hazard!

Disconnect the battery before starting welding work on the machine.

Working on the battery

When working on the battery do not smoke, do not use open fire!

Do not let acid come in contact with hands or clothes! When injured by acid flush off with clear water and seek medical advice.

Metal objects (e.g. tools, rings, watch straps) must not come in contact with the battery poles – danger of short circuit and burning!

When recharging serviceable batteries remove all plugs, to avoid the accumulation of explosive gases.

Observe the applicable instructions when starting with an auxiliary battery.

Dispose of old batteries according to regulations.

Switch off the charging current before removing the charging clamps.

Ensure sufficient ventilation, especially if the battery is to be charged in a closed room.

Working on the fuel system

Do not inhale any fuel fumes.

Avoid open fire, do not smoke, do not spill any fuel.

Catch running out fuel, do not let it seep into the ground and dispose off environmentally.

Cleaning work

Do not perform cleaning work while the motor is running.

Do not use gasoline or other easily inflammable substances for cleaning.

When cleaning with steam cleaning equipment do not subject electrical parts and insulation material to the direct jet of water, or cover it beforehand.

- Do not guide the water jet into the exhaust and into the air filter.

After maintenance work

After all maintenance work is completed reinstall all guards and safety installations.

Repair

Mark a defective machine by attaching a warning tag to the steering wheel.

Repair work must only be performed by qualified and authorized persons. Use our repair instructions for this work.

Exhaust gases are highly dangerous! Always ensure an adequate supply of fresh air when starting in closed rooms!

Test

The safety of compaction equipment must be checked by a specialist as required in dependence on the application and the operating conditions, however at least once every year.

3.1 Signage

Keep stickers and signage in good and legible condition and comply with their meaning.

Replace damaged and illegible stickers or signage immediately.

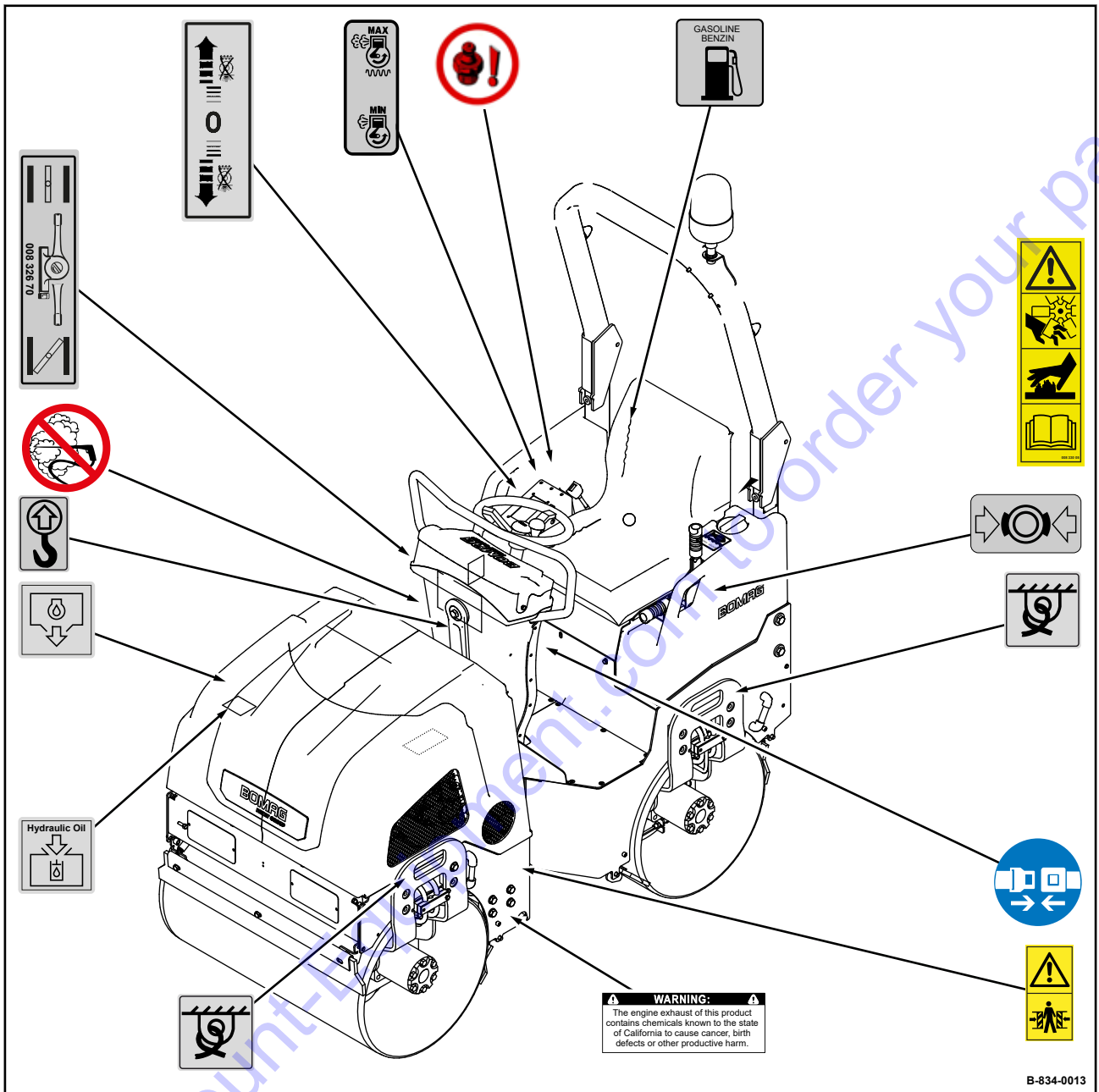


Fig. 4

Safety regulations – Signage



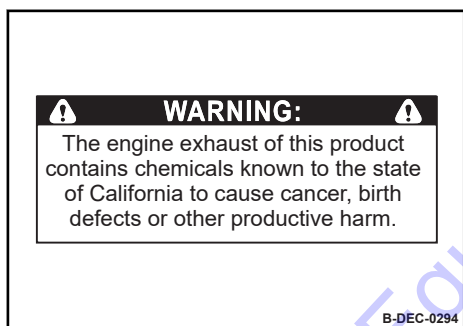
Warning sticker - Danger of being pulled in by cooling fan, and hot surface Follow operating instructions

Fig. 5



Warning sticker - Danger of crushing

Fig. 6



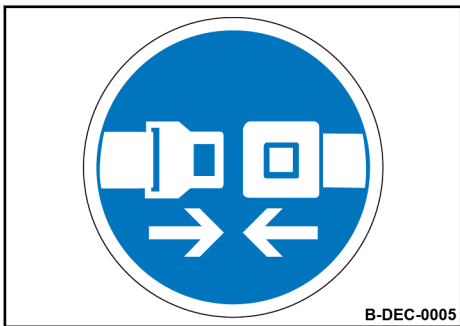
Warning sticker - Warning of engine exhaust gases

Fig. 7



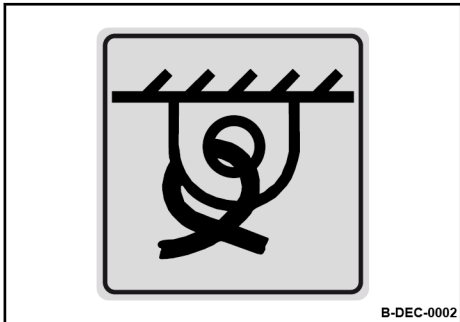
Prohibition sticker - High pressure cleaning

Fig. 8



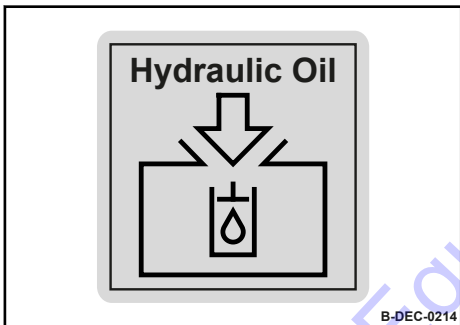
Instruction sticker - Always wear your seat belt

Fig. 9



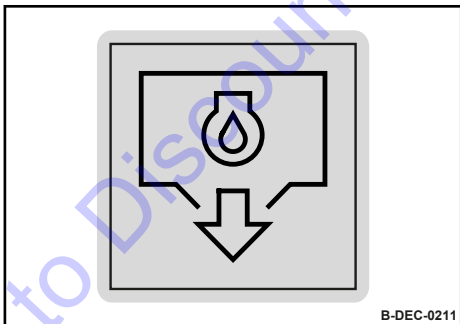
Information sticker - Lashing point

Fig. 10



Information sticker - Filler opening for hydraulic oil

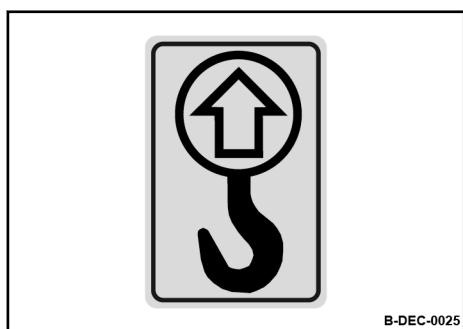
Fig. 11



Information sticker - Engine oil drain

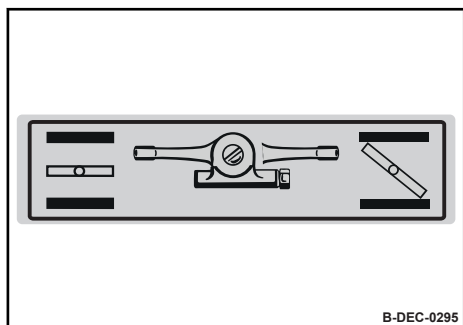
Fig. 12

Safety regulations – Signage



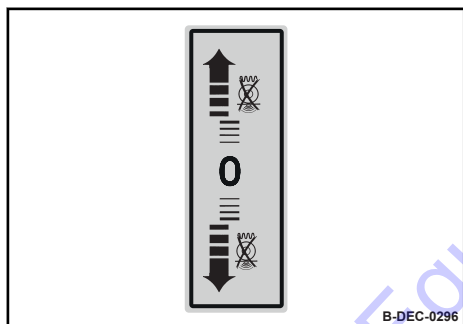
Information sticker - Lifting point

Fig. 13



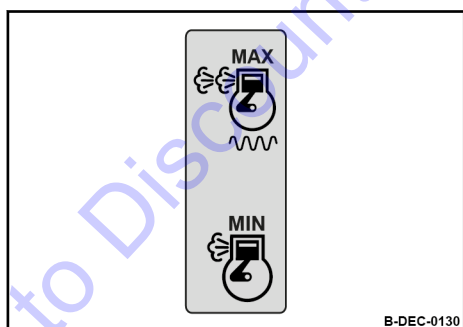
Information sticker - Choke control

Fig. 14



Information sticker - Travel lever control

Fig. 15



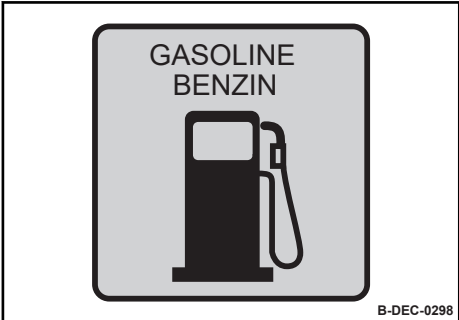
Operation sticker - Throttle lever

Fig. 16



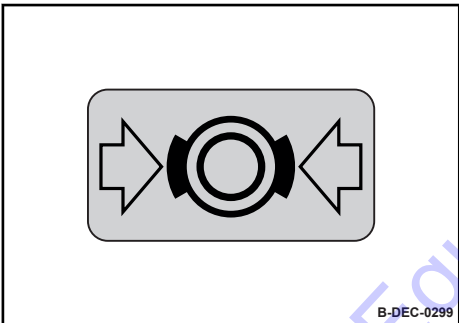
Information sticker - Lubrication nipple

Fig. 17



Information sticker - Gasoline

Fig. 18



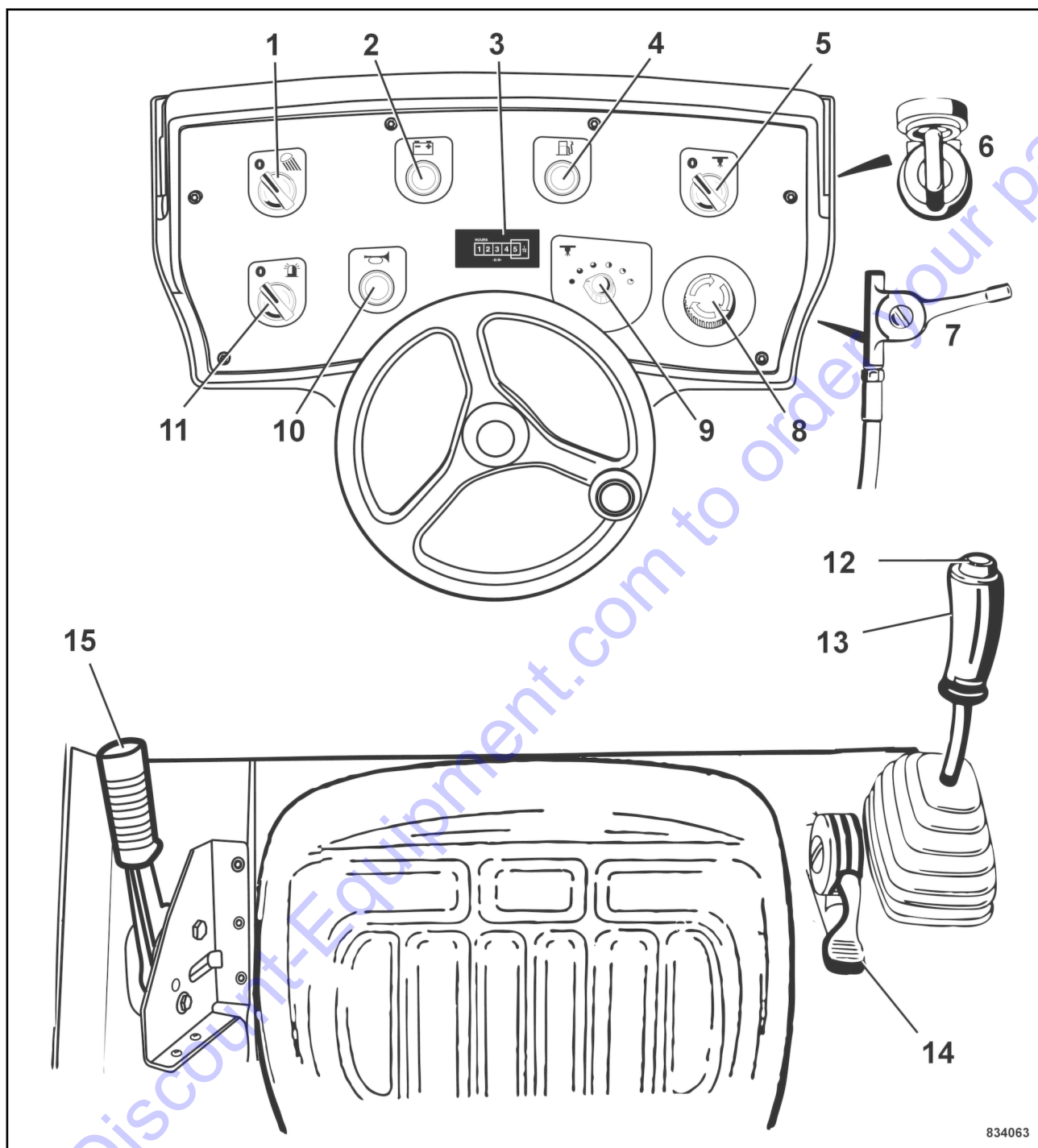
Information sticker - Travel lever control

Fig. 19

Go to Discount-Equipment.com to order your parts

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Indicators and control elements



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Fig. 20

- 1 Rotary switch for working lights¹
- 2 Charge control lamp
- 3 Operating hour meter
- 4 Fuel level warning light
- 5 Rotary switch for sprinkling system
- 6 Ignition switch
- 7 Choke lever

- 8 Emergency stop push button
- 9 Rotary switch for interval sprinkling
- 10 Push button for warning horn
- 11 Rotary switch for flashing beacon¹
- 12 Push button for vibration
- 13 Travel lever
- 14 Throttle lever
- 15 Parking brake lever

1 ¹ Optional equipment

4.1 Description



Fig. 21

- Rotary switch for working lights^{Optional equipment}

Position Left	Working lights off
Position Right	Working lights on, with ignition switch in position "I".

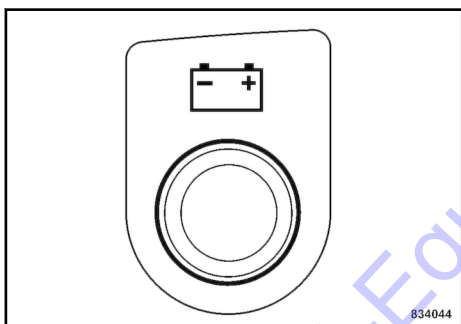


Fig. 22

- Charge control light

lights	when switching on the ignition (test), if the battery is not being charged.
goes out	after starting the engine.

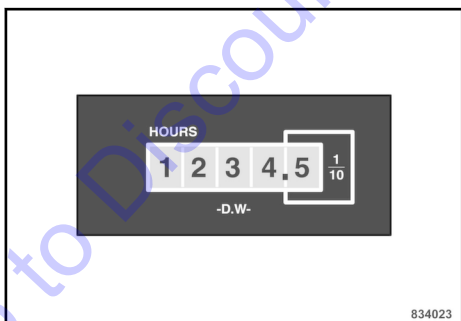


Fig. 23

- Operating hour meter

Counts the operating hours while the engine is running.

All maintenance work must be performed according to the indicated operating hours.

Indicators and control elements – Description

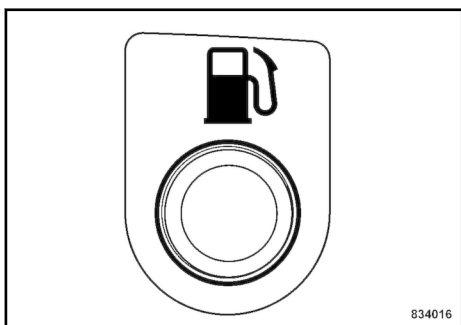


Fig. 24

- Fuel level warning lamp

lights	if fuel needs to be filled up
--------	-------------------------------

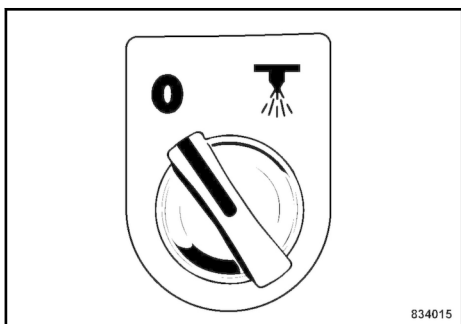


Fig. 25

- Rotary switch for sprinkling system

Position Left	Sprinkling off
Position Right	Sprinkling on

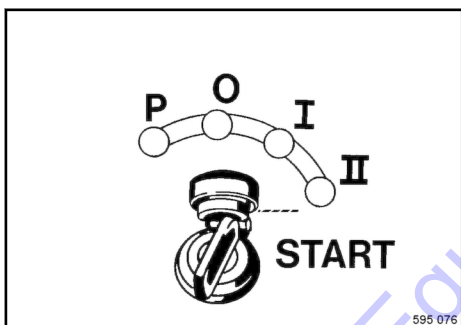


Fig. 26

- Ignition switch

Position "P"/"0"	Ignition off, key can be pulled out, engine off.
Position "I"	Ignition on, the lighting system can be switched on.



The engine can only be started if the travel lever is in neutral position, the emergency stop switch is unlocked and the driver has occupied the driver's seat (seat contact switch).

The ignition switch is designed with a re-start lock. For a new starting attempt the ignition key must first be turned back to position "0".

Position "II"	turn further against spring pressure, the engine starts, turn the ignition key back to position "I" once the engine has started.
---------------	--



NOTICE!

Run the engine warm for a short while before starting work. Do not rev up a cold engine to high idle speed/full load speed.

Do not shut down the engine all of a sudden from full load speed, but let it idle for about 2 minutes.

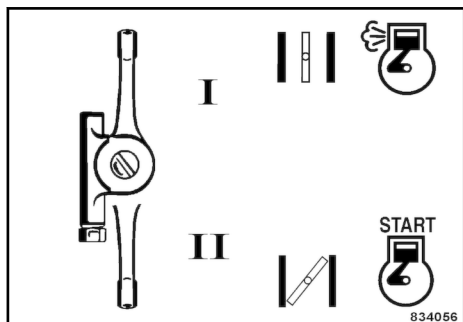


Fig. 27

■ Choke lever

Position "I"	Choke opened
--------------	--------------

Position "II"	Choke closed
---------------	--------------



Always close the choke if the engine is cold or has cooled down.

Always open the choke if the engine is warm.

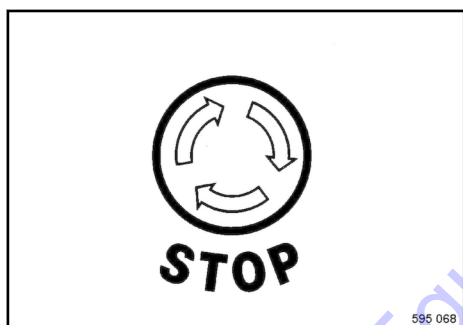


Fig. 28

■ Emergency stop push button

The engine is shut down.



WARNING!

Danger of accident!

Actuate only in events of emergency during operation, do not use as service brake.

Restart the machine only after the danger that caused the actuation of the emergency stop switch has been eliminated.

actuate	Press the button completely down, it automatically locks in fully pressed position.
---------	---

unlock	Turn the button clockwise and let it go.
--------	--

to drive	return the travel lever first to neutral position, then start the engine and actuate the travel lever again.
----------	--

For safety reasons the machine can only start to drive after returning the travel lever to neutral position.

Indicators and control elements – Description

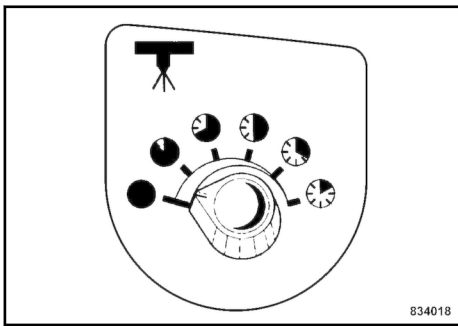


Fig. 29

- Interval switch for pressure sprinkler system

Position Left, stage 6	permanent sprinkling when pressure sprinkling is switched on
Stage 5	5 seconds on, 2 seconds pause
Stage 4	4 seconds on, 4 seconds pause
Stage 3	4 seconds on, 8 seconds pause
Stage 2	4 seconds on, 16 seconds pause
Position Right, stage 1	4 seconds on, 32 seconds pause

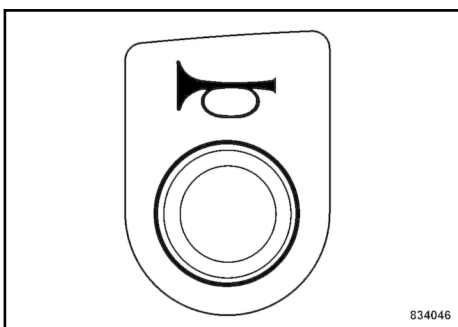


Fig. 30

- Push button for warning horn

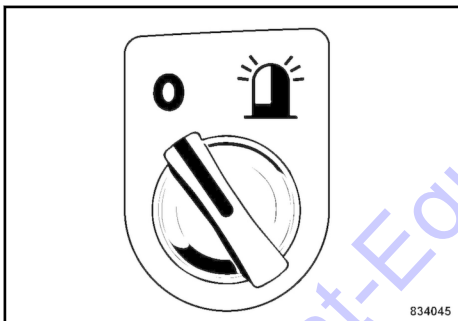


Fig. 31

- Rotary switch for flashing beacon^{Optional equipment}

Position Left	Flashing beacon off
Position Right	Flashing beacon on

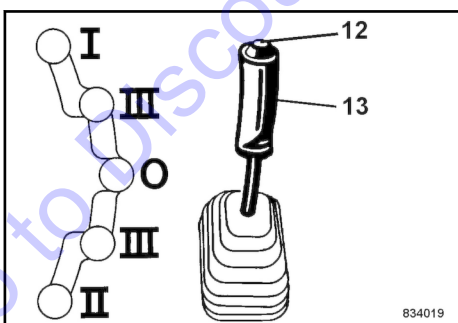


Fig. 32

- Push button for vibration

press	to switch the vibration on
press again	to switch the vibration off

- Travel lever

Indicators and control elements – Description

Position "0"	Neutral position, service brake, the machine is automatically braked by the hydrostatic drive.
Position "I"	Forward travel without vibration
Position "II"	Reverse travel without vibration
Position "III"	Max. forward/reverse travel with vibration

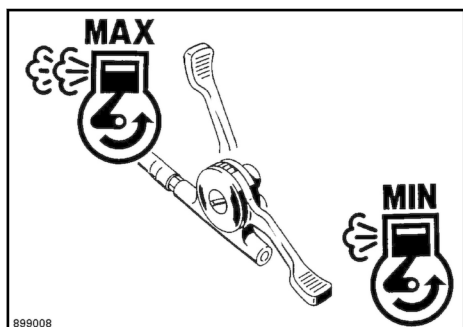


Fig. 33

■ Throttle lever

Position "MAX"	full speed position, operating position for driving and vibration.
Position "MIN"	idle speed position



NOTICE!

Always drive and vibrate with max. engine speed!
Control the travel speed with the travel lever.

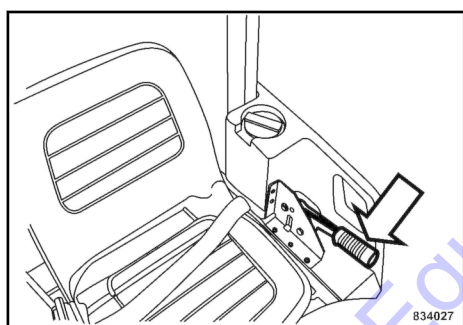


Fig. 34

■ Parking brake lever

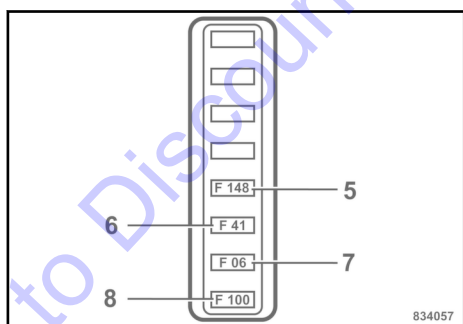


Fig. 35

■ Fuse box



The fuse box is located behind the steering column covering.



WARNING! Fire hazard!

Do not use fuses with higher ampere ratings and do not repair fuses with a piece of wire.

Indicators and control elements – Description

(5) 25A	(F148) Fuse control MESX (potential 15)
(6) 15A	(F41) Flashing beacon
(7) 15A	(F06) Water sprinkling system
(8) 20A	(F100) Working head lights

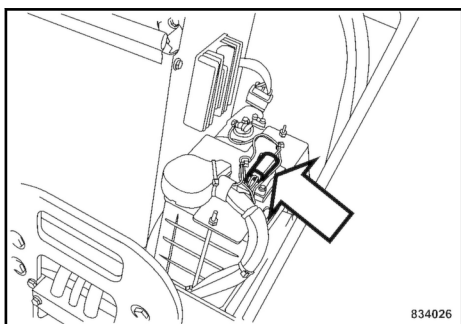


Fig. 36

■ Main fuse



WARNING!

Fire hazard!

Do not use fuses with higher ampere ratings and do not repair fuses with a piece of wire.

25A	F 00
-----	------

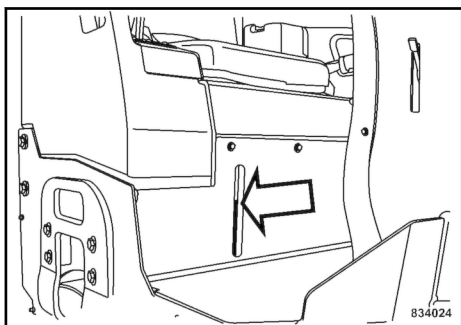


Fig. 37

■ Water level gauge

Go to Discount-Equipment.com to order your parts

5.1 Checks prior to start up

Before the everyday use or before a longer working period the following tests and inspections must be performed.



WARNING!

Please observe strictly the safety regulations in the corresponding section of this instruction manual!

Park the machine on ground as level as possible.

Check:

Hydraulic oil tank and hydraulic lines for leaks
Fuel tank and fuel lines for leaks
Cooling system for contamination, damage and leaks
Screw connections
Engine and exhaust system for leaks
Belt drive for damage
Function of steering
Function of parking brake
Function of emergency stop
Machine for cleanliness and for damage
Presence of the appropriate operating and maintenance instructions
Proper maintenance of the machine



For a description of the following tasks refer to the chapter "maintenance every 10 operating hours".

Engine oil level, top up if necessary
Fuel level, top up if necessary
Hydraulic oil level, top up if necessary
Hydraulic oil filter element, change if necessary

5.2 Starting the engine



WARNING!

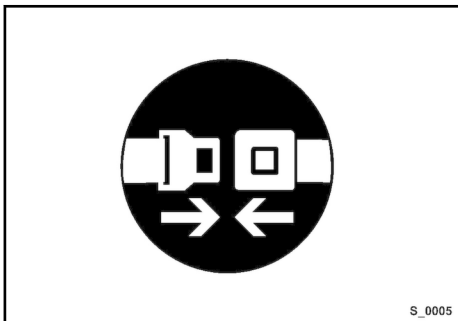
Wear your personal noise protection means (ear defenders) before starting operation.

Start the engine only from the operator's seat.



NOTICE!

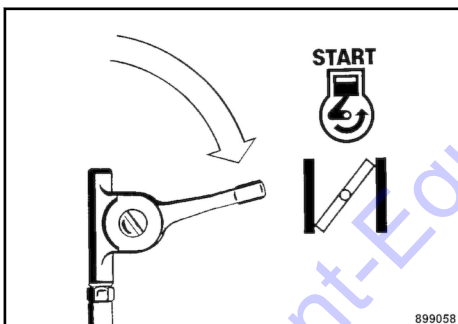
In this chapter it is assumed that the operator is fully acquainted with the function of the different control elements on the machine.



S_0005

Fig. 38

Fasten your seat belt ↪ Fig. 38.



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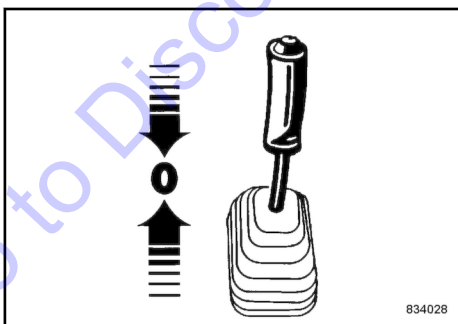
Fig. 39

Close the choke ↪ Fig. 39.



Always close the choke if the engine is cold or has cooled down.

Always open the choke if the engine is warm.



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Fig. 40

Check whether travel lever ↪ Fig. 40 is in neutral position.

Operation – Starting the engine

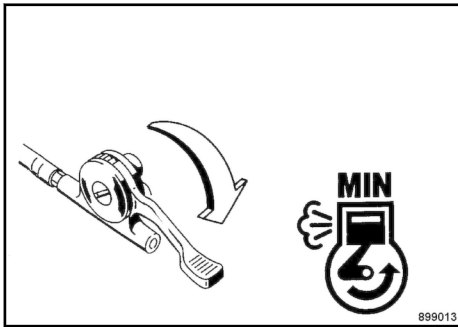


Fig. 41

Set the throttle lever ↪ Fig. 41 to position "MIN".

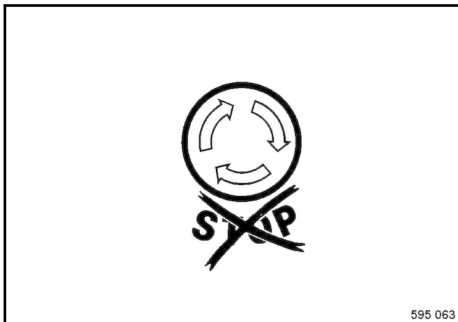


Fig. 42

Check, whether the emergency stop switch ↪ Fig. 42 is unlocked.

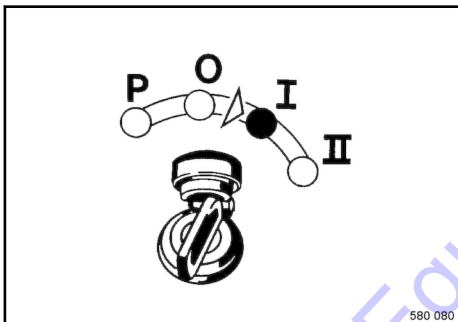


Fig. 43

Turn the ignition key ↪ Fig. 43 to position "I".



NOTICE!

Run the starting process for maximum 20 seconds without interruption and pause for a minute between starting attempts.

If the engine has not started after two attempts, determine the cause.

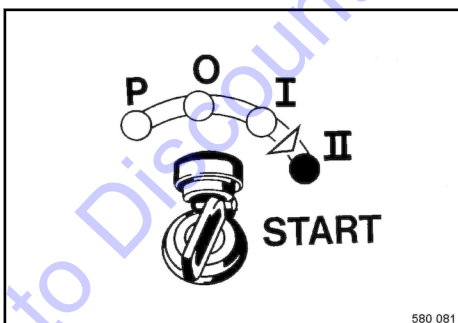


Fig. 44

Turn the ignition key ↪ Fig. 44 to position "II", the starter will crank the engine.

As soon as the engine ignites return the ignition key to position "I".

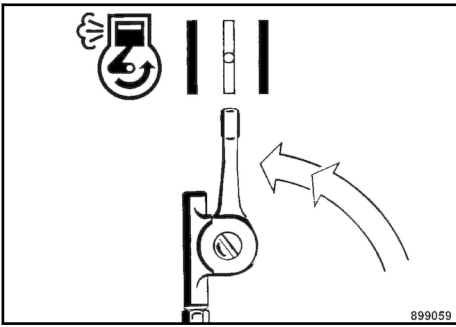


Fig. 45

Slowly open the choke ↪ Fig. 45.



NOTICE!

Run the engine warm for a short while before starting work. Do not rev up a cold engine to high idle speed/full load speed.

Go to Discount-Equipment.com to order your parts

5.3 Driving the machine



WARNING!

Danger of accident!

Wet and loose soils considerably reduce the ground adhesion of the machine on inclinations and slopes.

Soil conditions and weather influences impair the gradability of the machine.

Do not drive up and down inclinations which exceed the maximum gradability of the machine (see chapter "technical data").

Do not drive without wearing your seat belt.

Always give way to loaded transport vehicles!

Before starting to drive make sure that the drive range is absolutely safe.

Drive and operate the machine only from the driver's seat.

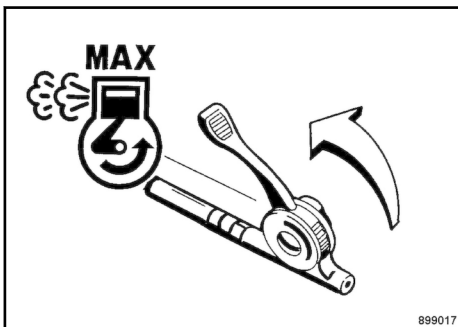


Fig. 46

Set the throttle lever ↗ Fig. 46 to position "MAX".



NOTICE!

During operation the throttle lever always remains in "MAX" position. Control the travel speed with the travel lever.

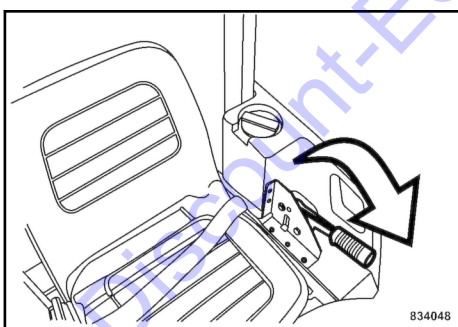


Fig. 47

Release the parking brake lever ↗ Fig. 47.

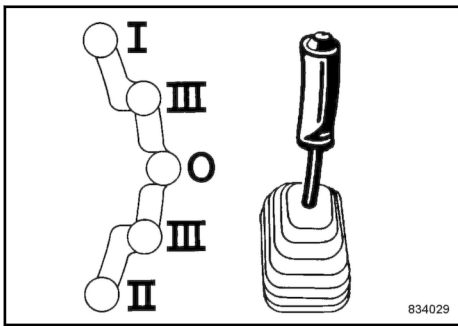


Fig. 48



NOTICE!

When changing the travel direction hold the travel lever for a moment in "0"-position, until the machine has stopped, before actuating to the new travel direction.

Shift the travel lever ↪ Fig. 48 slowly to the desired travel direction.

Position "0"	Neutral position, service brake, the machine is automatically braked by the hydrostatic drive.
Position "I"	Forward travel without vibration
Position "II"	Reverse travel without vibration
Position "III"	Max. forward/reverse travel with vibration

5.4 Stopping the machine, operating the parking brake

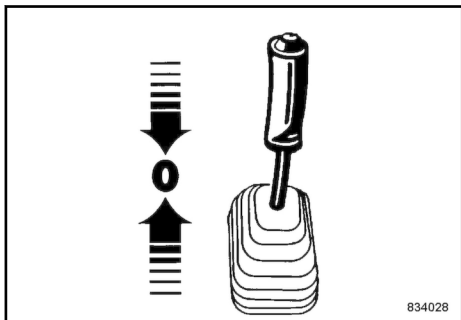


Fig. 49

Shift the travel lever ↵ Fig. 49 slowly to "0"-position.

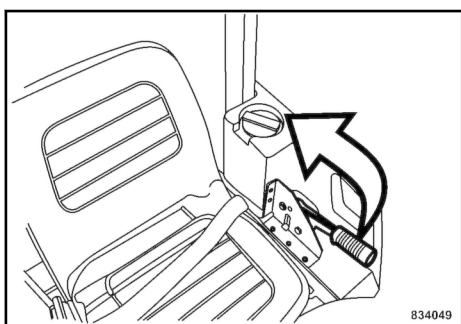


Fig. 50

Pull up the hand brake lever ↵ Fig. 50.

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5.5 Shutting down the engine

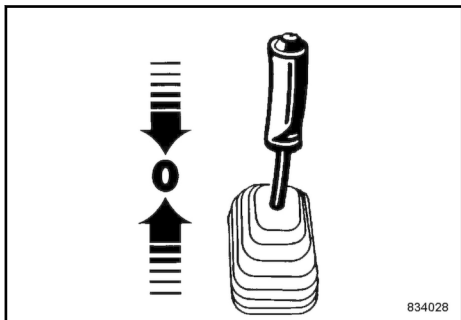


Fig. 51

Shift the travel lever ↩ Fig. 51 slowly to "0"-position.

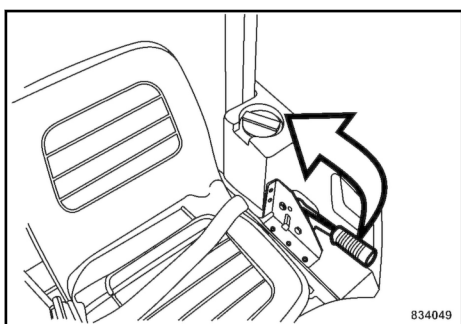


Fig. 52

Pull up the hand brake lever ↩ Fig. 52.

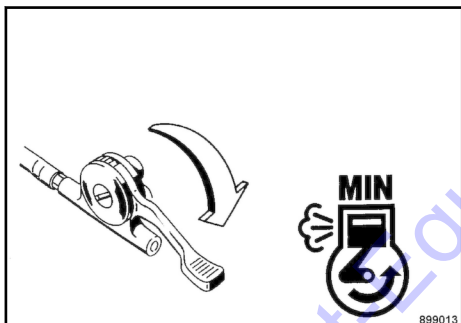


Fig. 53

Set the throttle lever ↩ Fig. 53 to position "MIN".



NOTICE!

Do not shut down the engine all of a sudden from full load speed, but let it idle for about 2 minutes.

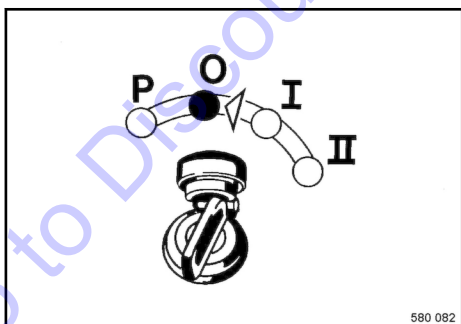


Fig. 54

Turn the starter switch ↩ Fig. 54 to position "0" or "P" and pull out the ignition key.



WARNING!

Danger of accident!

Secure the machine against unauthorized use, pull the ignition key out.

Operation – Switching the vibration on and off

5.6 Switching the vibration on and off



WARNING!

Risk of damage!

When compacting with vibration you must check the effect of nearby buildings and underground supply lines (gas, water, sewage, electric power), if necessary stop compaction with vibration.



NOTICE!

Danger of bearing damage!

Do not activate the vibration on hard (frozen, concrete) ground.



NOTICE!

During operation the throttle lever always remains in "MAX" position. Control the travel speed with the travel lever.



Switch the vibration on only at maximum engine speed.

Vibration at standstill causes transverse ruts, therefore:

switch the vibration on only after shifting the travel lever to the desired travel direction.

Switch the vibration off before stopping the machine.

Switching the vibration on

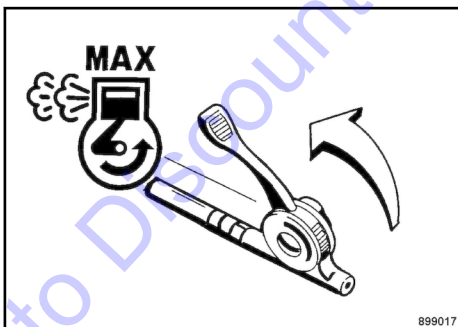


Fig. 55

Set the throttle lever ↪ Fig. 55 to position "MAX".

Operation – Switching the vibration on and off

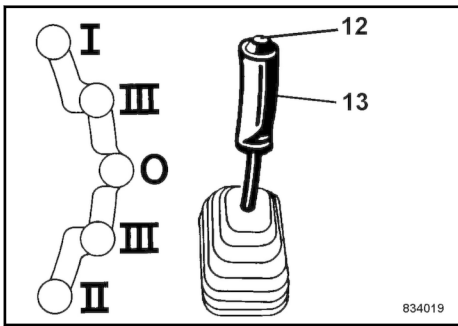


Fig. 56

Shift the travel lever (13) ↗ Fig. 56 slowly to the desired travel direction to position "III".

Actuate the vibration push button (12).

Switching off vibration

Actuate the vibration push button (12) again.

Go to Discount-Equipment.com to order your parts

5.7 Switching the pressure sprinkling system on and off

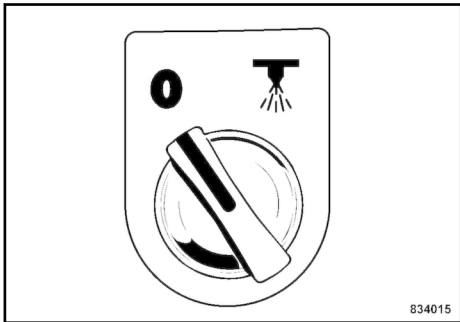


Fig. 57

Turn the rotary switch for pressurized sprinkling ↻ Fig. 57 "clockwise" to switch on.

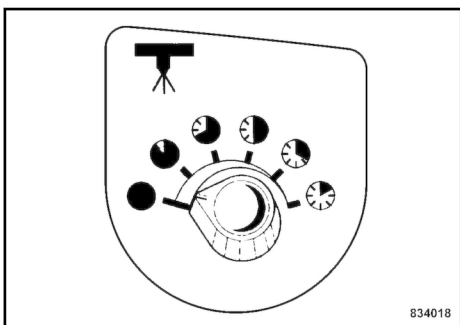


Fig. 58

Set the interval switch ↻ Fig. 58 to the desired sprinkling interval.

Position "Left", stage 6	permanent sprinkling when pressure sprinkling is switched on
Stage 5 - 1	Sprinkling intervals of 32, 24, 16, 8 and 4 seconds, Activation time always 4 seconds.

5.8 Towing



WARNING!

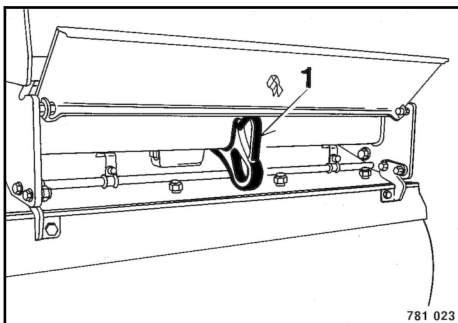
Danger of accident!

Before releasing the parking brake secure the machine against unintended rolling by using appropriate means (e.g. metal wheel chocks).

Use a towing vehicle with sufficient traction and braking power for the unbraked towed load.

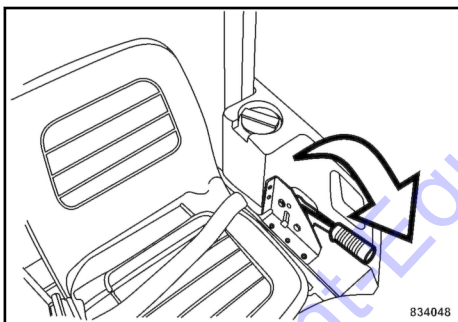
Use a tow bar.

Using the machine as towing vehicle is not permitted.



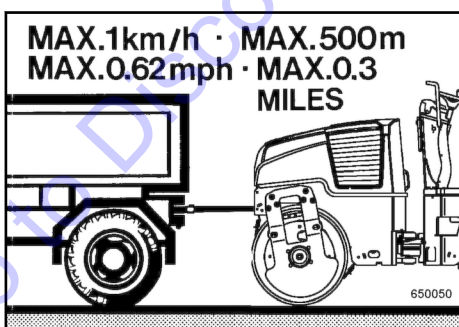
Attach the drawbar to the front or rear towing hitch (1)
↪ Fig. 59.

Fig. 59



Release the parking brake ↪ Fig. 60.

Fig. 60



NOTICE!

Tow the machine only after having released the parking brake.

Towing speed 1 km/h, max. towing distance 500 m.

Fig. 61

Operation – Towing

After towing



WARNING!

Danger of accident!

Before loosening the drawbar secure the machine against unintended rolling by using appropriate means (e.g. metal wheel chocks), or apply the parking brake.

Go to Discount-Equipment.com to order your parts

5.9 Loading and transport



WARNING!

Danger of accident! Life hazard!

Use only stable loading ramps of sufficient load bearing capacity.

Make sure that persons are not endangered by the machine tipping or sliding off.

Always use shackles on the lifting points for loading or tying the machine down.

Check all lifting and lashing points for damage before lifting or lashing down the machine.

Lift the machine by the central lifting point only with suitable lifting gear. Weights: see chapter "Technical Data".

Lash the machine down, so that it is secured against rolling, sliding and turning over.

Secure the machine with the articulation lock after driving it on the transport vehicle.

After transport release the articulation lock again and store it in the receptacle.

The machine must not swing about when being lifted.

Do not step or stand under suspended loads.

During demonstration do not remain in the travel range of the machine.

Drive the machine on the transport vehicle.

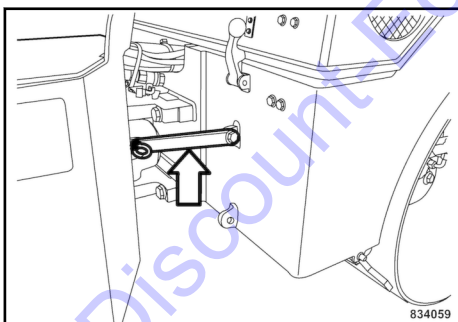


Fig. 62

After driving the machine onto the transport vehicle swing the articulation lock ↙ Fig. 62 out of its receptacle and lock it in place.

Operation – Loading and transport

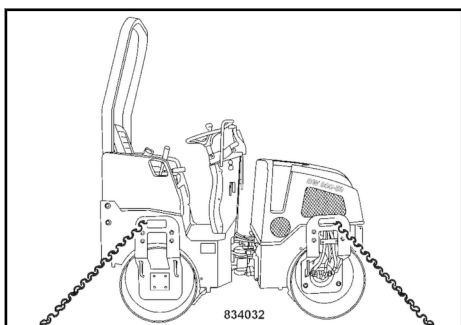


Fig. 63

Lash the machine to the transport vehicle, use the lashing eyes ↪ Fig. 63 on front and rear frame for this purpose.

Loading

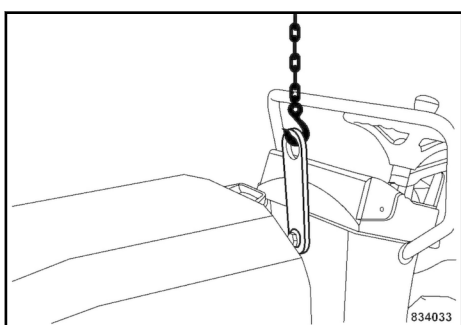


Fig. 64

Use the central lifting facility ↪ Fig. 64 to lift the machine.

After transport

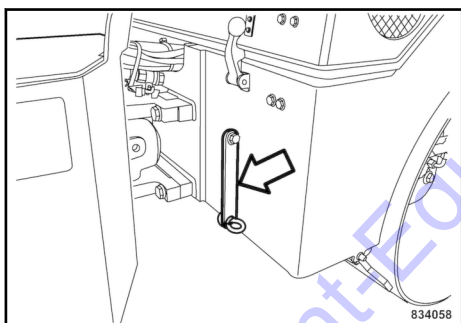


Fig. 65

After transport release the articulation lock ↪ Fig. 65 again and swing it back into the holding bracket.

Foldable ROPS Optional equipment

Fold down for transport

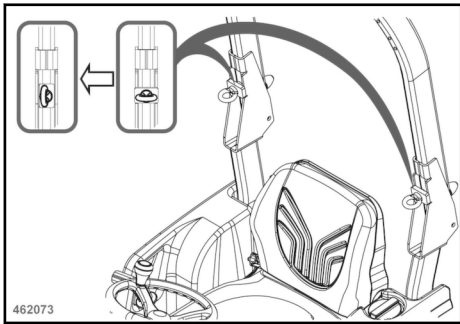


Fig. 66

Loosen the eye bolts ↩ Fig. 66 and adjust the clamping plates vertically.

Fold the foldable ROPS back.

Fold back up after transport



WARNING! **Life hazard!**

Operate the machine only with the ROPS folded up and the fastening screws tightened with the correct tightening torque.

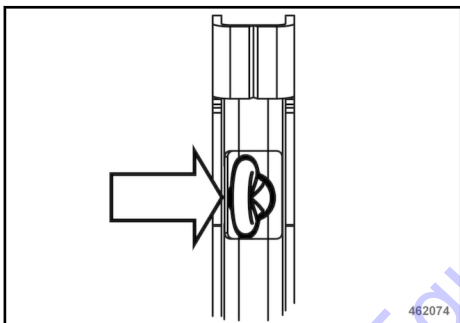


Fig. 67

Adjust the clamping plates on both sides vertically ↩ Fig. 67.

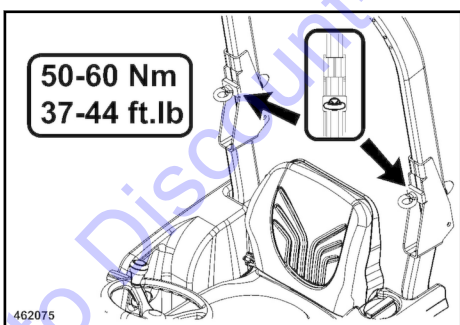


Fig. 68

Fold up the foldable ROPS ↩ Fig. 68.

Turn the clamping plates to horizontal position and tighten the eye bolts with a tightening torque of 37 – 44 lbf-ft (50 – 60 Nm).

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6.1 General notes on maintenance

When performing maintenance work always comply with the appropriate safety regulations.

Thorough maintenance of the machine guarantees far longer safe functioning of the machine and prolongs the lifetime of important components. The effort needed for this work is only little compared with the problems that may arise when not observing this rule.

The terms right/left correspond with travel direction forward.

Always clean machine and engine thoroughly before starting maintenance work.

For maintenance work stand the machine on level ground.

Perform maintenance work only with the engine shut down.

Relieve hydraulic pressures before working on hydraulic lines.

Before working on electric parts of the machine disconnect the battery and cover it with insulation material.

When working in the area of the articulated joint attach the articulation lock (transport lock).



ENVIRONMENT!

During maintenance work catch all oils and fuels and do not let them seep into the ground or into the sewage system. Dispose of oils and fuels environmentally.

Keep used filters in a separate waste container and dispose of environmentally.

Catch biodegradable oils separately.

Notes on the fuel system

The lifetime of the engine mainly depends on the purity of the fuel.

Keep fuel free of contaminants and water, since this will damage the injection elements of the engine.

Drums with inside zinc lining are not suitable to store fuel.

Keep used filters in a separate waste container and dispose of environmentally.

The fuel drum must rest for a longer period of time before drawing off fuel.

Under no circumstances must the drum be rolled to the tapping point just before drawing out fuel.

When choosing the storage place for fuel make sure that spilled fuel will not harm the environment.

Do not let the hose stir up the slurry at the bottom of the drum.

Do not draw off fuel from near the bottom of the drum.

Maintenance – General notes on maintenance

The rest in the drum is not suitable for the engine and should only be used for cleaning purposes.

Notes on the performance of the engine

On engines both combustion air and fuel injection quantities are thoroughly adapted to each other and determine power, temperature level and exhaust gas quality of the engine.

If your engine has to work permanently in "thin air" (at higher altitudes) and under full load, you should consult the customer service of BOMAG or the customer service of the engine manufacturer.

Notes on the hydraulic system

During maintenance work on the hydraulic system cleanliness is of major importance. Make sure that no dirt or other contaminating substances can enter into the system. Small particles can produce flutes in valves, cause pumps to seize, clog nozzles and pilot bores, thereby making expensive repairs inevitable.

If, during the daily inspection of the oil level the hydraulic oil level is found to have dropped, check all lines, hoses and components for leaks.

Seal leaks immediately. If necessary inform the responsible customer service.

We recommend to use our filling and filtering unit with fine filter to fill the system. This ensures finest filtration of the hydraulic oil, prolongs the lifetime of the hydraulic oil filter and protects the hydraulic system.

Clean fittings, filler covers and the area around such parts before disassembly to avoid entering of dirt.

Do not leave the tank opening unnecessarily open, but cover it so that nothing can fall in.

6.2 Fuels and lubricants

Engine oil

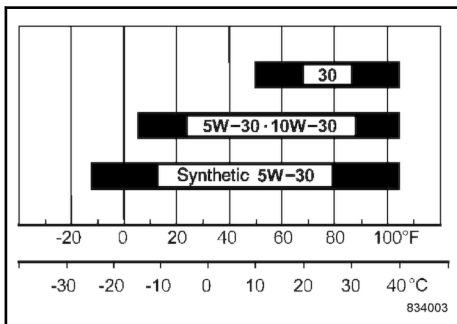


Fig. 69

Quality

The oil is an essential factor for the performance and lifetime of the engine.

Use engine oil for four-stroke engines which meets or even exceeds the requirements for API-service class SJ or higher (or equivalent).

Viscosity

Since lubrication oil changes its viscosity with the temperature, the ambient temperature at the operating location of the engine is of utmost importance when choosing the viscosity class (SAE-class) (see diagram ↪ Fig. 69).

SAE10W-30 or 5W-30 is recommended for general use under any temperature.

For starting/operating temperatures between 14 °F (-10 °C) and -13 °F (-25 °C) you should use a fully synthetic oil 5W-30.

When using single purpose oil you must choose the correct viscosity for the average temperature in the area of use.

Change intervals

The longest permissible time the lubrication oil should remain in an engine is 1/2 year or 100 operating hours.

Fuel

Quality

The engine has been approved for operation with unleaded gasoline with a octane number of 91 or higher (or Pump Octane Number" 86 or higher).

Use only commercially available brand fuel.

You can use unleaded standard grade petrol with maximum 10 percent by volume of ethanol (E10) or maximum 5 percent by volume of methanol.

Methanol must also contain co-solvents and corrosion inhibitors.

Using fuels with higher ethanol or methanol contents exceeding the values specified above may cause starting difficulties and/or performance problems. Damage may also occur to metal, rubber or plastic parts in the fuel system.

Engine damage and performance problems caused by the use of fuels with higher ethanol or methanol percentages than the ones specified above are not covered under warranty.

Mineral oil based hydraulic oil

The hydraulic system is operated with hydraulic oil HV 46 (ISO) with a kinematic viscosity of 46 cSt (46 mm²/s) at 104 °F (40 °C) and 8 cSt (8 mm²/s) at 212 °F (100 °C). For topping up or for oil changes use only high-quality hydraulic oil, type HVLP according to DIN 51524, part 3, or hydraulic oils type HV according to ISO 6743/3. The viscosity index (VI) should be at least 150 (observe information of manufacturer).

Lubrication grease

For lubrication purposes use an EP-high pressure grease, lithium saponified (penetration 2), acc. to DIN 51502 KP 2G.

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Maintenance – Table of fuels and lubricants

6.3 Table of fuels and lubricants

Assembly	Fuel or lubricant		Quantity
	Summer	Winter	Attention
motor			Observe the level marks
- Engine oil	Engine oil API SJ or higher		approx. 0.5 gal (approx. 1.9 l)
	SAE 5W-30 (-4 °F to +86 °F) (-20 °C to +30 °C)		
	SAE 10W-30 (5 °F to +86 °F) (-15 °C to +30 °C)		
	SAE 30 (+50 °F to +104°F) (+10 °C to +40 °C)	Synthetic SAE 5W-30 (-13 °F to +104°F) (-25 °C to +40 °C)	
- Fuel	Gasoline (unleaded)		approx. 7 gal (approx. 27 l)
Hydraulic system	Hydraulic oil (ISO), HLP 46 or ester based biodegradable hydraulic oil		approx. 5 gal (approx. 19 l)
Sprinkler system	Water	Anti-freeze mixture water Mix water and anti-freeze agent by following the instructions of the manufacturer.	approx. 36 gal (approx. 137 l)
Rear drum bearings	High pressure grease (lithium saponified)		as required

6.4 Running-in instructions

The following maintenance work must be performed when running in new machines or overhauled engines:



NOTICE!

Up to approx. 250 operating hours check the engine oil level twice every day.

Depending on the load the engine is subjected to, the oil consumption will drop to the normal level after approx. 100 to 250 operating hours.

Maintenance after 20 operating hours

Change engine oil and filter

Check the engine for leaks

Retighten the fastening screws on air filter, exhaust and other attachments.

Check screw connections on the machine, retighten as necessary.

Maintenance – Maintenance Table

6.5 Maintenance Table

No.	Maintenance works	Page
Every 10 operating hours		
6.6.1	Checking the engine oil level	63
6.6.2	Checking the fuel level	63
6.6.3	Checking the hydraulic oil level	65
6.6.4	Checking the hydraulic oil filter element	65
6.6.5	Checking the water level	66
6.6.6	Cleaning the scrapers	66
6.6.7	Cleaning the cooling air intake openings	67
Every 125 operating hours		
6.7.1	Check, clean the air filter, replace if necessary	68
6.7.2	Clean, check the spark plugs, replace if necessary	69
6.7.3	Changing engine oil and oil filter	71
6.7.4	Lubricating the rear drum bearings	72
Every 250 operating hours		
6.8.1	Change the fuel pre-filter	73
6.8.2	Clean the water sprinkler system	73
6.8.3	Battery service	74
6.8.4	Checking, adjusting the valve clearance	76
6.8.5	Check, adjust the idle speed	77
Every 2000 operating hours		
6.9.1	Changing the hydraulic oil	78
6.9.2	Change the hydraulic oil filter	79
6.9.3	Checking fuel lines and clamps	80
As required		
6.10.1	Water sprinkler system, maintenance in case of frost	82
6.10.2	Engine conservation	82

6.6 Every 10 operating hours

6.6.1 Checking the engine oil level



NOTICE!

The machine must be in horizontal position.

For quality of oil refer to the "table of fuels and lubricants".

Start the engine and run it 1 to 2 minutes with idle speed.

Shut the engine down and wait 2 to 3 minutes.

Pull the dipstick ↘ Fig. 70 out, wipe it off with a lint-free, clean cloth and reinsert it until it bottoms.

Pull the dipstick back out.

The oil level must always be between the "MIN"- and "MAX"-marks.

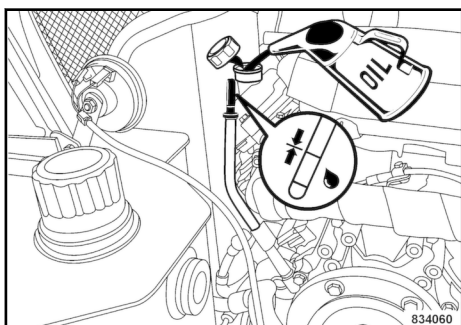


Fig. 70

If the oil level is too low top up oil immediately.

If the oil level is too high, determine the cause and drain the oil off.

6.6.2 Checking the fuel level



NOTICE!

Do not drive the fuel tank dry, as otherwise the fuel system needs to be bled.



If fuel needs to be filled up, the fuel level warning lamp ↘ Fig. 71 will light up.

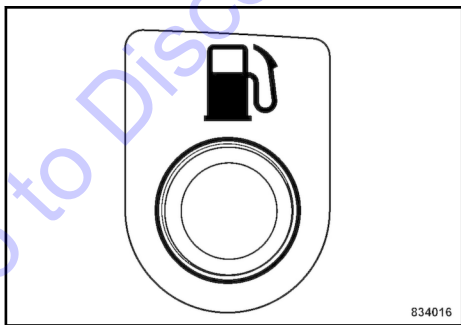


Fig. 71

Maintenance – Every 10 operating hours

Refuelling



WARNING!

Fire hazard!

When working on the fuel system do not use open fire, do not smoke, do not spill any fuel.

Do not refuel in closed rooms.

Shut down the engine.



WARNING!

Health hazard!

Do not inhale any fuel fumes.



NOTICE!

Contaminated fuel can cause malfunction or even damage of the engine. If necessary, fill in fuel through a funnel with screen.

Monitor the entire refuelling process.

For quality and quantity of fuel refer to the "table of fuels and lubricants".



ENVIRONMENT!

Catch running out fuel, do not let it seep into the ground.

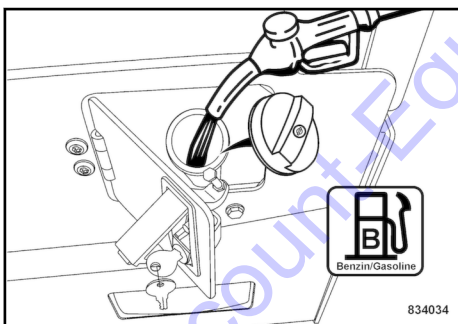


Fig. 72

Shut down the engine.

Open the fuel filler cap ↪ Fig. 72.

Clean the area around the filler opening.

Open the cover.

Fill in fuel.

Screw the cover back on again.

Close the tank lock.

6.6.3 Checking the hydraulic oil level



NOTICE!

If, during the daily inspection of the oil level the hydraulic oil level is found to have dropped, check all lines, hoses and components for leaks.

In hydraulic systems filled with Panolin Synth. 46 use only the same oil to top up. With other ester based oils consult the lubrication oil service of the respective oil manufacturer.

For quality of oil refer to the "table of fuels and lubricants".

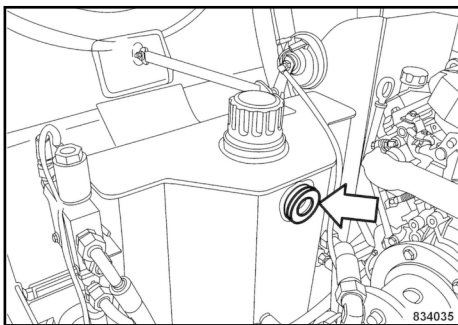


Fig. 73

Check the oil level in the oil level inspection glass ↪ Fig. 73.



At room temperature of approx. 68 °F (20 °C) the hydraulic oil level should reach approx. the middle of the inspection glass.

If the oil level is too low top up hydraulic oil immediately.

6.6.4 Checking the hydraulic oil filter element



NOTICE!

If the hydraulic oil is very cold the pin may pop up, you should therefore only check the filter and press the pin in at operating temperature.

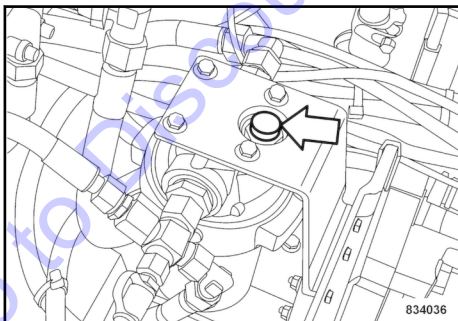


Fig. 74

Check the contamination indicator ↪ Fig. 74 at operating temperature and with the engine running at maximum speed.

If necessary press the pin in.

Pin remains pressed in	Hydraulic oil filter element o.k.
Pin pops out	Replacing the hydraulic oil filter element

6.6.5 Checking the water level



NOTICE!

If there is a risk of frost observe the special service instructions in chapter "water sprinkler system, maintenance in case of frost".

Make sure that the ventilation bore in the filler cap is free.

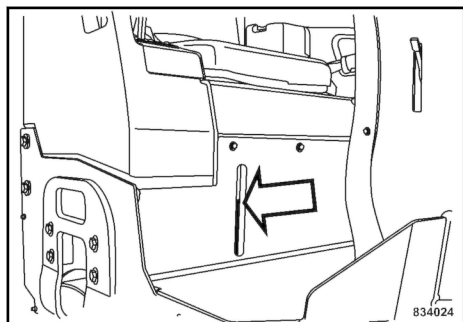


Fig. 75

Check the water tank filling level on the water level gauge
↪ Fig. 75.

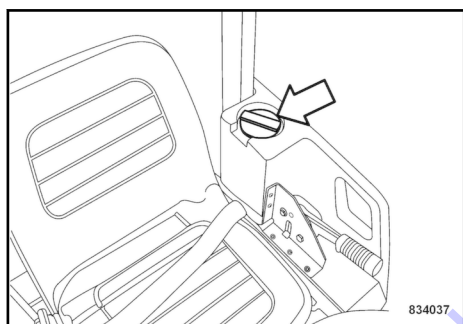


Fig. 76

Open the cover ↪ Fig. 76 and fill in water.
Close the cover again.

6.6.6 Cleaning the scrapers

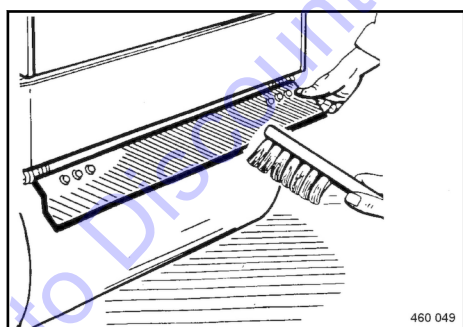


Fig. 77

Fold the scrapers up and clean them ↪ Fig. 77. This is of particular importance before compacting asphalt surfaces.

6.6.7 Cleaning the cooling air intake openings



NOTICE!

Dirt in the cooling air intake openings reduces the cooling effect.

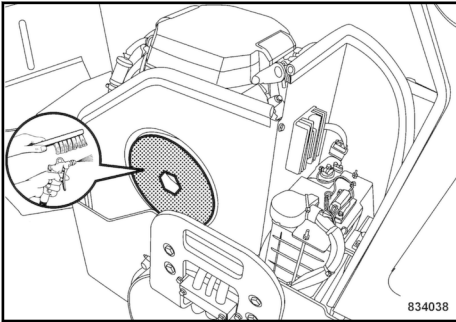


Fig. 78

Clean the cooling air intake openings ↗ Fig. 78.

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6.7 Every 125 operating hours

6.7.1 Check, clean the air filter, replace if necessary



NOTICE!

A dirty oil filter obstructs the air flow to the carburettor, which then reduces the engine power.

In a dusty environment you should clean the air filter every day.

Damaged air filters must be replaced in any case. It is therefore recommended to keep at least one air filter in stock.

The air filter must be changed after 500 operating hours, but at the latest after 2 years.

Incorrectly handled filter cartridges may become ineffective because of damage (e.g. cracks) and cause damage to the engine.

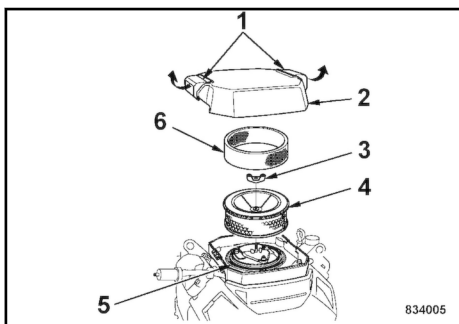


Fig. 79

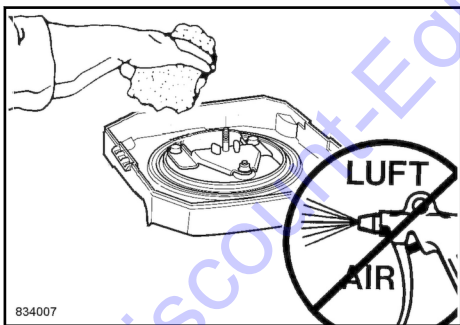


Fig. 80

Unscrew the air filter cover locking nut (1) ↪ Fig. 79 and remove the cover (2).

Unscrew the wing nut (3).

Take out the paper (4) and foam rubber inserts (6).

Separate the foam rubber element from the paper filter insert.

Check both filter elements and replace if damaged.

Clean out the air filter housing with a cloth ↪ Fig. 80.



NOTICE!

Do not use compressed air to blow out the air filter housing.

Maintenance – Every 125 operating hours

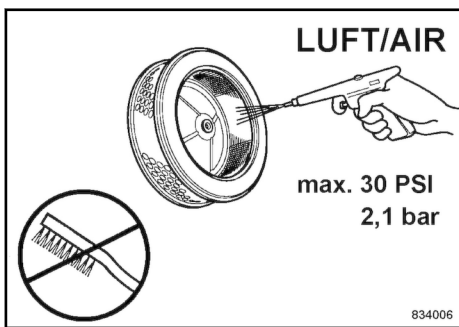


Fig. 81



WARNING!

Eye injury!

Wear safety goggles.



NOTICE!

Do not hold the compressed air nozzle closer to the filter than 1 in (3 cm)

Bang the paper filter element several times against a hard surface.

Blow out the paper filter element with clean compressed air and a maximum air pressure (max. 30 PSI/2.1 bar)

↪ Fig. 81.

Clean the foam rubber element in warm soapsuds, rinse and dry thoroughly.

Then submerge the foam rubber element in clean engine oil and finally press out all excess oil.



If the amount of oil remaining in the foam rubber element is too high, the engine will develop smoke during starting.

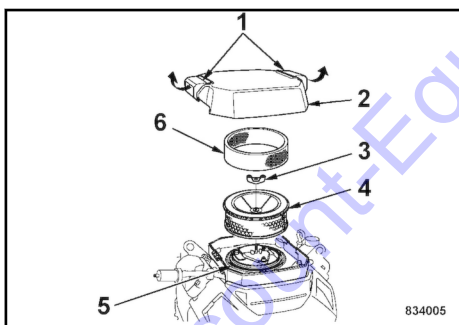


Fig. 82

Place the foam rubber element (6) ↪ Fig. 82 on the paper element (4).

Reinstall the assembled air filter. Make sure that the seal (5) under the air filter is present.

Tighten the wing nut (3). Tighten the screw (3).

Attach the filter cover (2) to the air filter housing and secure it with the air filter cover lock (1).

6.7.2 Clean, check the spark plugs, replace if necessary



WARNING!

Danger of burning!

Let the engine cool down for approx. 15 minutes before unscrewing the spark plugs.

Maintenance – Every 125 operating hours



NOTICE!

Renew the spark plugs at the latest after 250 operating hours or once every year.

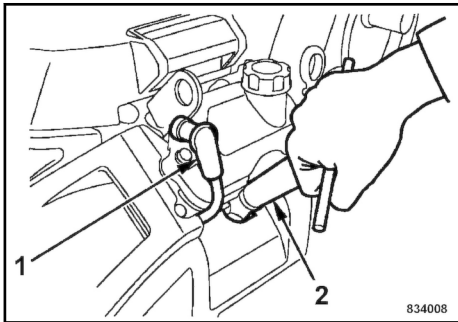


Fig. 83

Pull off the spark plug socket (1) ↪ Fig. 83 and clean off any dirt in the spark plug area.

Unscrew the spark plug with a spark plug spanner (2).

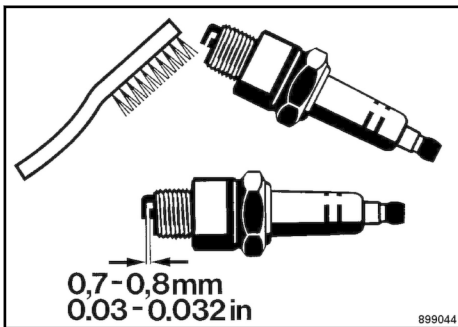


Fig. 84

Check the spark plug visually and clean it if necessary ↪ Fig. 84.



NOTICE!

In case of excessive combustion residuals or burned off electrodes replace the spark plug, ensure correct heat value of the spark plug.

Do not use spark plugs with incorrect heat value.

Recommended spark plug: ZFR5F (NGK)

Check the electrode gap with a feeler gauge, if necessary adjust the gap to 0.03 - 0.032 in (0.7 - 0.8 mm).

Turn the spark plug carefully in by hand.

Tighten the spark plug with a spark plug spanner, until it is correctly seated.

Tighten a new spark plug for another 1/2 turn.

Tighten used spark plugs by another 1/8 to 1/4 turn.



NOTICE!

A loose spark plug can overheat and damage the engine.

Overtightening the spark plug can damage the thread in the cylinder head.

Press the spark plug socket back on.

6.7.3 Changing engine oil and oil filter



WARNING!

Danger of scalding!

When draining off hot oil.

By hot oil when unscrewing the engine oil filter.



NOTICE!

Drain the engine oil only when the engine is warm.

For quality and quantity of oil refer to the "table of fuels and lubricants".



ENVIRONMENT!

Catch running out oil and dispose of environmentally together with the oil filter cartridge.

Unscrew the oil filler plug.

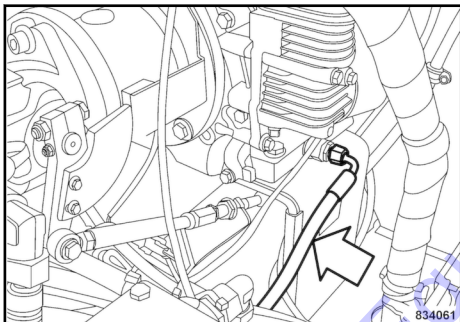


Fig. 85

Place the drain hose ↘ Fig. 85 into the collecting container and open the drain plug. Catch running out oil.

Turn the oil drain plug back in with a new seal ring.

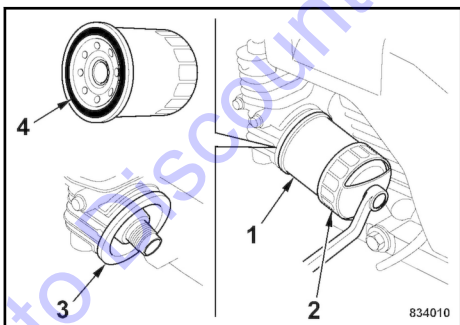


Fig. 86

Unscrew the filter cartridge (1) ↘ Fig. 86 using an appropriate tool (2).

Clean the sealing face on the filter carrier (3) from any dirt.

Slightly oil the rubber seal (4) on the new filter cartridge.

Turn the new filter cartridge on by hand, until the seal contacts.

Tighten the filter cartridge for another 3/4 turn.

Maintenance – Every 125 operating hours

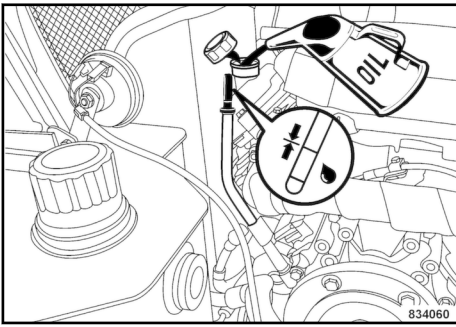


Fig. 87

Fill in new engine oil ↗ Fig. 87.

Screw the oil filler cover back on again.

After a short test run check the oil level once again , if necessary top up to the top mark (Max).

6.7.4 Lubricating the rear drum bearings



NOTICE!

For quality of grease refer to the "table of fuels and lubricants".

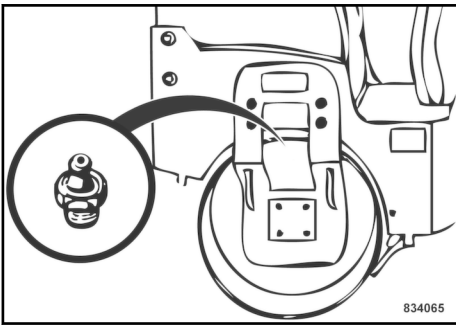


Fig. 88

Clean the grease nipple of the bearing on the rear drum ↗ Fig. 88.

Lubricate the grease nipple with a grease gun, until grease starts to run out of the bearing.

6.8 Every 250 operating hours

6.8.1 Change the fuel pre-filter



WARNING!

Fire hazard!

When working on the fuel system do not use open fire, do not smoke, do not spill any fuel.



WARNING!

Health hazard!

Do not inhale any fuel fumes.



ENVIRONMENT!

Catch running out fuel, do not let it seep into the ground.

Dispose of the used fuel precleaners environmentally.

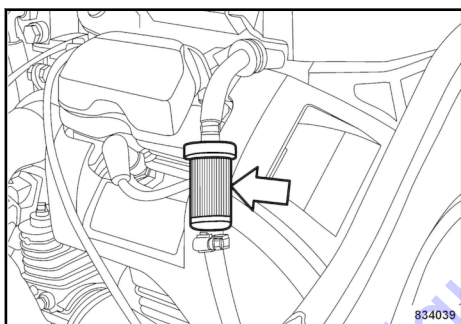


Fig. 89

Loosen the hose clamps ↺ Fig. 89.

Pull the fuel filter out of the top and bottom hoses.

Install the new fuel filter by observing the flow direction.

Retighten the hose clamps.

6.8.2 Clean the water sprinkler system



If there is a risk of frost observe the special service instructions under "sprinkler system, maintenance in case of frost".

Drain the water tank

Maintenance – Every 250 operating hours

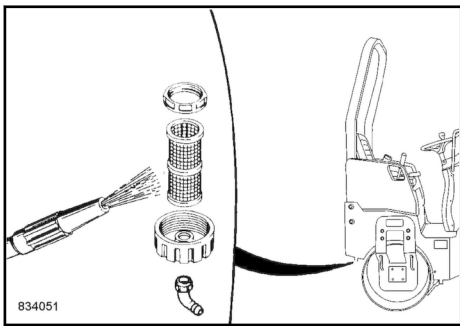


Fig. 90

Unscrew the cap nut of the hose ↗ Fig. 90.

Unscrew and clean the water filter.

Flush the water tank thoroughly.

Screw the water filter back in, tighten the cap nut again.

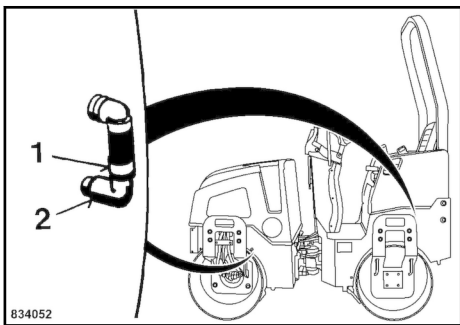


Fig. 91

Loosen hose clamp (1) ↗ Fig. 91 and pull the hoses (2) off the sprinkler tube.

Pull out the sprinkler tubes and flush them thoroughly.

Install the sprinkler tubes and fasten hoses and hose clamps.

6.8.3 Battery service



WARNING!

Danger of cauterisation ! Danger of explosion!

When working on the battery do not use open fire, do not smoke!

The battery contains acid. Do not let acid come in contact with skin or clothes!

Wear protective clothing!

Do not lay any tools on the battery!

For recharging remove the plugs from the battery to avoid the accumulation of highly explosive gases.



ENVIRONMENT!

Dispose of the old batteries environmentally.

i *Maintenance free batteries also need care. Maintenance free only means that the fluid level does not need to be checked. Each battery suffers under self-discharge, which may, if not checked occasionally, even cause damage to the battery as a result of exhaustive discharge.*

The following therefore applies for the service life:

Switch off all consumers (e.g. ignition, light, inside light, radio).

Check open-circuit voltage of the battery at regular intervals. At least once per month.

Reference values: 12.6 V = fully charged; 12.3 V = 50% discharged.

Recharge the battery immediately after an open-circuit voltage of 12.25 V or less is reached. Do not perform quick charging.

The open-circuit voltage of the battery occurs approx. 10 hours after the last charging process or one hour after the last discharge.

After each charging process allow the battery to rest for one hour before taking it into service.

For resting periods of more than one month you should always disconnect the battery. Do not forget to perform regular open-circuit voltage measurements.



NOTICE!

Exhausted batteries (batteries with formation of sulphate on the plates) are not covered under warranty!

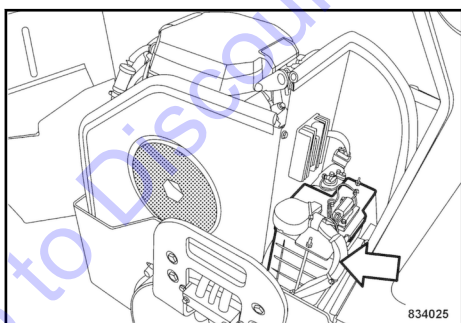


Fig. 92

Open the engine hood.

Clean battery ↪ Fig. 92 and battery compartment.

Clean battery poles and pole clamps and grease them with pole grease (Vaseline).

Retighten the pole clamps.

Check the fastening of the battery.

6.8.4 Checking, adjusting the valve clearance



NOTICE!

We recommend to have this work carried out by trained personnel or our after sales service.

Check and adjust only when the engine is cold.

Adjusting values intake valves: $0.0031 \text{ in} \pm 0.0079 \text{ in}$ ($0.08 \pm 0.02 \text{ mm}$)

Adjusting values exhaust valves $0.0039 \text{ in} \pm 0.0079 \text{ in}$ ($0.10 \pm 0.02 \text{ mm}$)

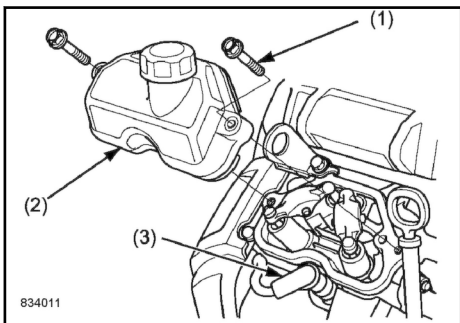


Fig. 93

Unscrew the cylinder head cover fastening screws (1) ↪ Fig. 93 and take off both cylinder head covers (2).

Pull off spark plug socket (3).

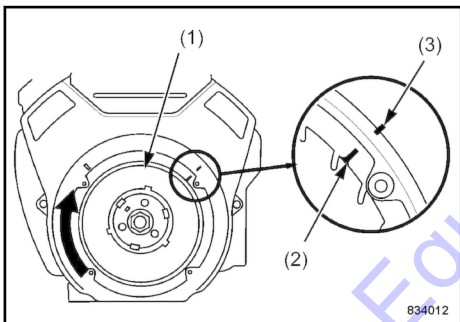


Fig. 94

Turn the flywheel (1) ↪ Fig. 94 clockwise until the marks (2, 3) are in line.



Cylinder 1 in top dead centre position in compression stroke. Both valves closed. If not, crank the engine for 360°

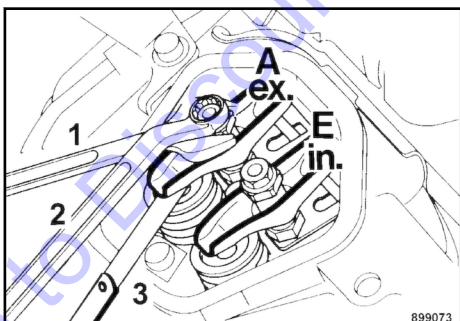


Fig. 95

A feeler gauge of appropriate thickness ↪ Fig. 95 must fit with little resistance between rocker arm and valve.

If the gap is too narrow or too wide for the feeler gauge, the valve must be adjusted.

After the adjustment tighten the nut with 5.5 lbf·ft (7.5 Nm).

Maintenance – Every 250 operating hours

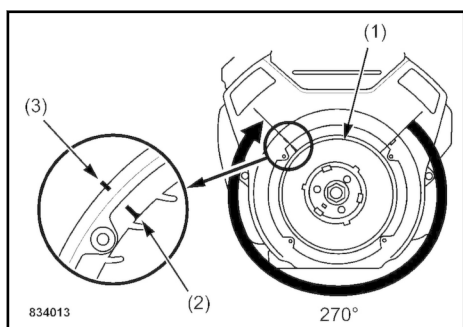


Fig. 96

Turn the flywheel clockwise further ↻ Fig. 96, until the marks (2, 3) are in line.

Check and, if necessary, adjust the valve clearance of the 2nd cylinder.

After checking and adjusting reassemble the cylinder head covers with new gaskets.

Tighten the cylinder head screws.



After a short test run check the engine for leaks.

6.8.5 Check, adjust the idle speed



NOTICE!

We recommend to have this work carried out by trained personnel or our after sales service.

Check and adjust only at operating temperature of the engine.

Setting: $1400 \pm 150 \text{ min}^{-1}$

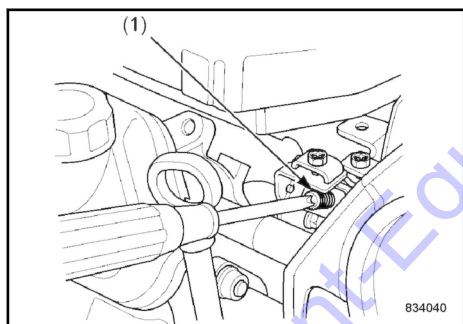


Fig. 97

Run the engine to warm it up to operating temperature.

Adjust the engine idling speed with the setscrew (1) ↻ Fig. 97.

6.9 Every 2000 operating hours

6.9.1 Changing the hydraulic oil



See also the notes on the hydraulic system in the chapter "General notes on maintenance".



WARNING!

Danger of scalding!

When draining off hot hydraulic oil!



NOTICE!

The hydraulic oil must also be changed after major repairs in the hydraulic system.

Perform the oil change when the hydraulic oil is warm.

Replace the hydraulic oil filter elements with every hydraulic oil change.

Change the filter only after the hydraulic oil change and after the test run.

Clean the area round hydraulic oil tank, filler opening and breather filter.

Do not start the engine after draining the hydraulic oil.

Do not use any detergents to clean the system.

For quality and quantity of oil refer to the "table of fuels and lubricants".

When changing from mineral oil based hydraulic oil to an ester based biologically degradable oil, you should consult the lubrication oil service of the oil manufacturer for details.



ENVIRONMENT!

Catch running out oil and dispose of environmentally.

Drive the machine, until the hydraulic oil has reached operating temperature.

Shut down the engine.

Maintenance – Every 2000 operating hours

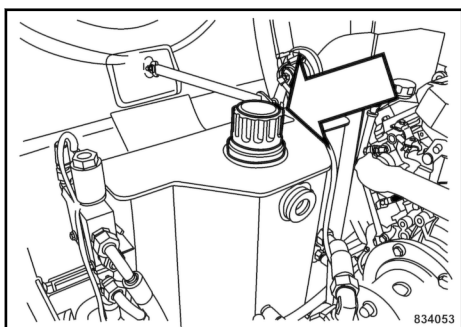


Fig. 98

Remove the cap from the hydraulic oil tank ↗ Fig. 98.

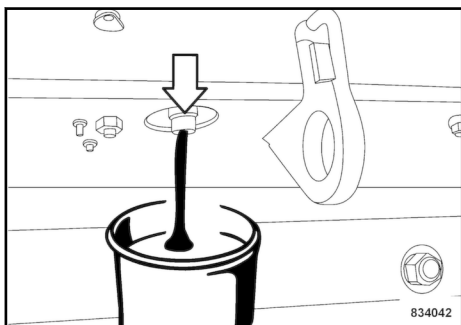


Fig. 99

Unscrew the plug from the hydraulic oil tank ↗ Fig. 99, drain off and collect all hydraulic oil.

Turn the plug tightly back in.

i We recommend to use our filling and filtering unit with fine filter to fill the system. This ensures finest filtration of the hydraulic oil, prolongs the lifetime of the hydraulic oil filter and protects the hydraulic system.

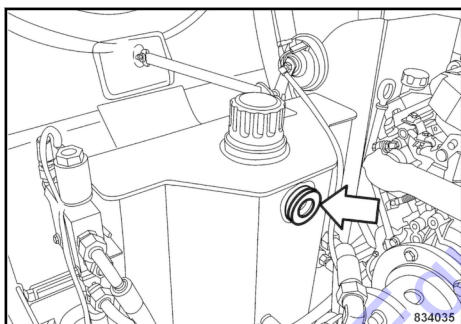


Fig. 100

Fill in new hydraulic oil.

Check the hydraulic oil level in the inspection glass ↗ Fig. 100.



NOTICE!

The breather filter for the hydraulic oil tank is integrated in the filler cap, you must therefore replace the complete filler cap.

Close the tank with a new cover.

Perform a test run and check the system for leaks.

6.9.2 Change the hydraulic oil filter



WARNING!

Danger of scalding!

Danger of scalding by hot oil when unscrewing the oil filter.



NOTICE!

If the filter has to be changed together with the hydraulic oil, the filter must only be changed after the oil change and after the test run.

Do not use the oil in the filter bowl again.

Visible dirt may be an early sign for the failure of system components and indicate the possible failure of components. In this case determine the cause and replace or repair the defective components, if necessary. Negligence may cause destruction to the entire hydraulic system.

Do not clean or reuse the filter element.

Apart from the normal oil change intervals, the filter element must also be changed after major repairs in the hydraulic system.



ENVIRONMENT!

Catch running out oil, dispose of oil and filter element environmentally.

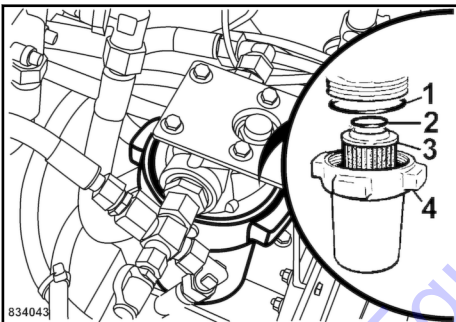


Fig. 101

Remove filter bowl (4) ↘ Fig. 101 with filter element (3).

Examine the surface of the filter element thoroughly for any visible dirt.

Take out the old filter element and clean filter bowl and thread.

Reassemble the filter bowl with a new filter element and new loop rings (1) and (2).

After a short test run check the filter for leaks.

6.9.3 Checking fuel lines and clamps



WARNING!

Danger of burning!

Perform inspection work only after the engine has cooled down and with the engine stopped.



NOTICE!

If fuel lines or hose clamps are found to be damaged, the corresponding parts must be immediately repaired or replaced.

After replacing lines or hose clamps the fuel system needs to be bled.

Disassembled or new fuel lines must be closed with clean cloths on both ends, to make sure that no dirt will enter into the fuel system. Dirt particles can destroy the injection pump.

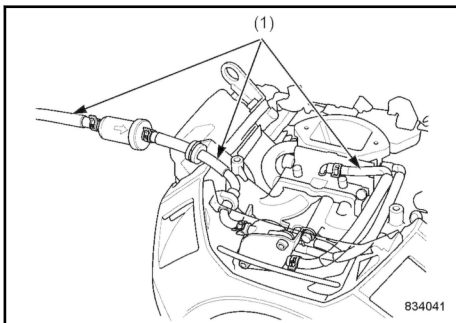


Fig. 102

Check the condition and tight fit of all fuel lines (1)
↪ Fig. 102 and hose clamps.

Replace damaged parts immediately with original spare parts.

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6.10 As required

6.10.1 Water sprinkler system, maintenance in case of frost



NOTICE!

If there is a risk of frost the water sprinkler system must be emptied or filled with an anti-freeze mixture.

Drain off all water.

Switch the sprinkler system on and drain all water from the piping.

Fill the water tank with approx. 1.5 gal (5 l) of an anti-freeze mixture (water and anti-freeze agent, e.g. glysantene).

Switch the sprinkler system on, until anti-freeze mixture comes running out of the sprinkler tubes.

6.10.2 Engine conservation



NOTICE!

A machine with conserved engine must be clearly marked by attaching a clear warning tag.



Depending on the weather condition these conserving measures will provide protection for approx. 6 - 12 months.

The conserving oil must be replaced by engine oil (refer to the section "Fuels and lubricants") according to the API- (MIL) classification before taking the machine into operation.

Anti-corrosion oils are those that comply with the specification MIL-L-21260 B or TL 9150-037/2 resp. Nato Code C 640/642.

If the engine is to be shut down for a longer period of time (e.g. during winter) we recommend the following conservation measures for the engine to avoid corrosion:

Clean engine and cooling system: With cold cleansing agent and water jet or, even better, with steam cleaning equipment.

Run the engine warm and shut it down.

Drain the still warm engine oil and fill in anti-corrosion engine oil.

Drain the fuel from the fuel tank.

Remove the cylinder head covers, spray the rocker chambers with anti-corrosion oil. Then fasten the covers again.

Unscrew both spark plugs and spray anti-corrosion oil through the spark plug openings. Crank the engine several times and install the spark plugs again.

Close air intake on air filter and exhaust opening tightly.

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7.1 Preliminary remarks

Malfunctions are frequently caused by incorrect operation of the machine or insufficient maintenance. Whenever a fault occurs you should therefore thoroughly read these instructions on correct operation and maintenance.

If you cannot locate the cause of a fault or rectify it yourself by following the trouble shooting chart, you should contact our customer service department.

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7.2 Starting the engine with jump leads



NOTICE!

A wrong connection will cause severe damage in the electric system.

- Bridge the machine only with a 12 Volt auxiliary battery.

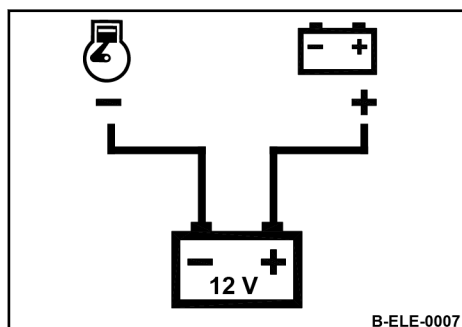


Fig. 103



NOTICE!

Danger of damage to the electronic system!

If no powerful consuming device is switched on, voltage peaks may occur when separating the connecting cables between the batteries, which could damage electrical components.

Once the engine is running switch on a powerful consumer (working light, etc.).

After starting disconnect the negative poles first and the positive poles after.

Switch off the consumer.

7.3 Engine problems

Fault description	Cause	Remedy
Engine does not start	Fuel tank empty	Fill fuel tank
	Fuel filter clogged	Change the filter
	Fuel lines leaking	Check all line connections for leaks and tighten the fittings
	Emergency stop switch locked	Unlock the emergency stop switch
	Driver not seated (seat contact switch)	Occupy the driver's seat when starting.
	Travel lever not in neutral position	Return the travel levers to neutral position.
	Battery not charged or not connected	Charge the battery, check the pole clamps
	Operating error	see section "Starting the engine"
	Incorrect valve clearance	Adjust the valve clearance
	Lack of oil	Fill up engine oil
	Spark plugs defective, soiled, incorrect electrode gap	Unscrew the spark plugs, check, replace if necessary
Poor starting of engine or engine works irregularly with poor power	Battery power too low	Have battery checked
	Battery pole clamps loose or oxidized, causing the starter to turn too slow	Clean the pole clamps, tighten and cover them with acid-free grease
	Especially in winter: use of too viscous engine oil	Use an engine oil complying with the ambient temperatures
	Fuel supply too low, fuel system clogged	Change the fuel filter. Check the line connections for leaks and tighten the fittings.
	The specified valve clearance is not correct	Adjust the valve clearance
	Carburettor defective	Have examined by a specialist
	Air filter dirty	Clean air filter, change if necessary
	Excessive play in throttle cable	Adjust the throttle cable, replace if necessary
Engine loses power and speed, excessive exhaust smoke	Engine oil level too high	Drain the oil down to the top dipstick mark
	Poor quality fuel	Use specified fuel
	Air filter dirty	Clean air filter, change if necessary
	Poor compression due to burned or broken piston rings or incorrect valve clearance	Have piston rings and pistons examined by a specialist, adjust the valve clearance

Troubleshooting – Engine problems

Fault description	Cause	Remedy
Engine overheating, engine must be shut down immediately!	Cooling air inlets heavily soiled	Clean the cooling air inlets
	Air filter dirty	Clean air filter, change if necessary

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Disposal – Final shut-down of machine

8.1 Final shut-down of machine

If the machine can no longer be used and needs to be finally shut down you must carry out the following work and have the machine disassembled by an approved specialist workshop.



ENVIRONMENT!

Catch all fuels and lubricants, do not let them seep into the ground and dispose of in compliance with legal regulations.

Remove the battery and dispose off according to legal regulations.

Empty the fuel tank.

Drain the hydraulic oil tank.

Drain the lubrication oil from the engine.



WARNING!

Danger of explosion!

Parts that previously contained combustible fluids must not be cut with a cutting torch.

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