

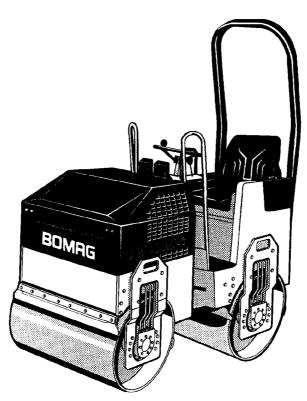
Operating instructions Maintenance instructions

Original operating instructions

BW 80 AD-2/BW 90 AD-2/BW 100 ADM-2

BW 90 AC-2

S/N 101 460 42 > / S/N 101 460 52 > / S/N 101 460 62 > S/N 101 460 72 >



Tandem Vibratory Roller

Combination Roller

If the machine is equipped with a battery:

CALIFORNIA

Proposition 65 Warning

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Wash hands after handling.

If the machine is equipped with a diesel engine :

CALIFORNIA

Proposition 65 Warning

The engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects, and other reproductive harm.

These BOMAG machines are products from the wide product range of BOMAG machines for earth and asphalt construction, refuse compaction and stabilizing/recycling.

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.

This manual comprises:

- Safety regulations
- Operating instructions
- Maintenance instructions
- Trouble shooting

Using these instructions will

- help you to become familiar with the machine.
- avoid malfunctions caused by unprofessional operation.

Compliance with the maintenance instructions will

- enhance the reliability of the machine on construction sites,
- prolong the lifetime of the machine,
- reduce repair costs and downtimes.

BOMAG will not assume liability for the function of the machine

- if it is handled in a way not complying with the usual modes of use,
- if it is used for purposes other than those mentioned in these instructions.

No warranty claims can be lodged in case of damage resulting from

- operating errors,
- insufficient maintenance and
- wrong fuels and lubricants.

Please note!

This manual was written for operators and maintenance personnel on construction sites.

Always keep this manual close at hand, e.g. in the tool compartment of the machine or in a specially

provided container. These operating and maintenance instructions are part of the machine.

You should only operate the machine after you have been instructed and in compliance with these instructions.

Strictly observe the safety regulations.

Please observe also the guidelines of the Civil Engineering Liability Association "Safety Rules for the Operation of Road Rollers and Soil Compactors" and all relevant accident prevention regulations.

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

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, the spare parts catalogue is available from your BOMAG dealer against the serial number of your machine.

Your BOMAG dealer will also supply you with information about the correct use of our machines in soil and asphalt construction.

The above notes do not constitute an extension of the warranty and liability conditions specified in the general terms of business of BOMAG.

We wish you successful work with your BOMAG machine.

BOMAG GmbH

Printed in Germany

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Foreword

Please fill in Machine type (Fig. 1) Serial No. (Fig. 1 and 2) Engine type (Fig. 3)

i Note

Engine No. (Fig. 3)

Fill in the above listed data when receiving the machine.

Upon receipt of the machine our organization will instruct you about correct operation and maintenance.

Please observe strictly all safety regulations and notes on potential dangers!

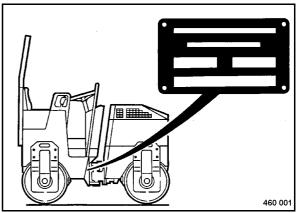
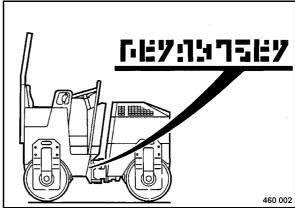


Fig. 1



Fia. 2

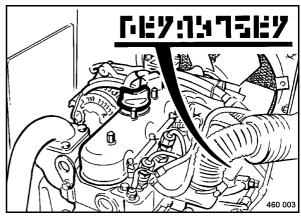


Fig. 3

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1 Technical Data

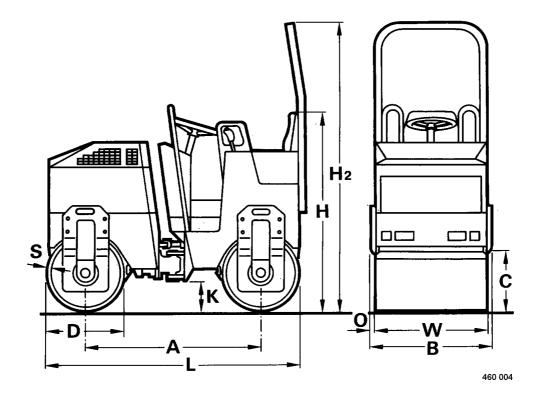


Fig. 4

Dimensions in mm	Α	В	С	D	Н	H2	K	L	0	S	W
BW 80 AD-2	1282	856	458	580	1482	2300	250	1862	28	13	800
BW 90 AD-2	1282	956	458	580	1482	2300	250	1862	28	12	900
BW 100 ADM-2	1282	1056	458	580	1482	2300	250	1862	28	12	1000

*		BW 80 AD-2	BW 90 AD-2	BW 100 ADM-2
Weights				
Operating weight (CECE)	kg	1470	1520	1570
Mean static linear load (CECE)	kg/cm	9.2	8.4	7.9
Max. operating weight	kg	1540	1600	1650
Dimensions				
Inner track radius	mm	2020	1970	1920
Length with ROPS	mm	1934	1934	1934
Travel characteristics				
Travel speed (1)	km/h	0 to 4.5	0 to 4.5	0 to 4.5
Travel speed (2)	km/h	0 to 8	0 to 8	0 to 8
Max. gradability without/with vibration (soil dependent)	%	40/30	40/30	40/30

*		BW 80 AD-2	BW 90 AD-2	BW 100 ADM-2
Drive				
Engine manufacturer Type		Kubota D 722	Kubota D 722	Kubota D 722
Cooling Number of cylinders		Water 3	Water 3	Water 3
Rated power ISO 9249 Rated power SAE J 1995	kW hp	12.4 16.6	12.4 16.6	12.4 16.6
Rated speed	rpm	3000	3000	3000
Fixed engine speed 1 Fixed engine speed 2	rpm rpm	3000 2000	3000 2000	3000 2000
Electrical equipment	V	12	12	12
Drive system Driven axles		hydrost. front + rear	hydrost. front + rear	hydrost. front + rear
Brake				
Service brake Parking brake		hydrost. hydro-mech.	hydrost. hydro-mech.	hydrost. hydro-mech.
Faiking brake		nyaro-mech.	nyuro-mecn.	nydro-mecn.
Steering				
Type of steering Steering operation		Oscillarticul. hydrost.	Oscillarticul. hydrost.	Oscillarticul. hydrost.
Steering operation Steering angle	Degree	31	31	31
Oscillation angle	Degree	6	6	6
Vibration system				
Vibrating drum Drive system		front + rear hydrostatic	front + rear hydrostatic	front + rear hydrostatic
Frequency 1/2	Hz	60/40	60/40	60/40
Amplitude	mm	0.52	0.46	0.50
Centrifugal force 1/2	kN	15/7	16/7	15/7
Water sprinkler system				
Type of sprinkling		Gravity feed	Gravity feed	Gravity feed
Filling capacities				
Fuel (diesel) Water	 	23 100	23 100	23 100
Hydraulic oil		9	9	9

^{*} The right for technical modifications remains reserved

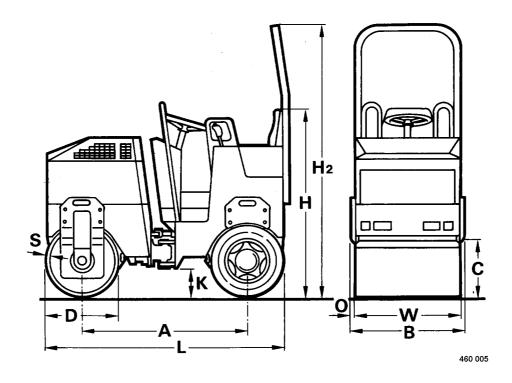


Fig. 5

Dimensions in	Α	В	С	D	Н	H2	K	L	0	S	W
mm											
BW 90 AC-2	1282	956	458	580	1562	2380	250	1870	28	12	900

*		BW 90 AC-2
Weights		
Operating weight with ROPS (CECE)	kg	1670
Axle load drum/wheels (CECE)	kg	700/970
Wheel load (CECE)	kg	243
Mean static linear load	kg/cm	7.8
Max. operating weight	kg	1750
Dimensions		
Inner track radius	mm	1970
Length with ROPS	mm	1890
Travel characteristics		
Travel speed (1)	km/h	0 to 4.5
Travel speed (2)	km/h	0 to 8
Max. gradability without/with vibration (soil dependent)	%	40/30
Drive		
Engine manufacturer/type		Kubota
Туре		D 722

*		BW 90 AC-2
Cooling Number of cylinders		Water 3
Rated power ISO 9249	kW	12.4
Rated power SAE J 1995	hp	16.6
Rated speed	rpm	3000
Fixed engine speed 1 Fixed engine speed 2	rpm rpm	3000 2000
Electrical equipment	V	12
Drive system		hydrost.
Driven axles		front + rear
Tires		
Number of tires		4
Tire size		175/70-14
Brake		
Service brake		hydrost.
Parking brake		hydro-mech.
Steering		0 " " "
Type of steering Steering operation		Oscillarticul. hydrost.
Steering operation Steering/oscillation angle	+/-°	31/6
Vibration system		f.,
Vibrating drum Drive system		front hydrost.
Frequency 1/2	Hz	60/40
Amplitude	mm	0.50
Centrifugal force 1/2	kN	15/7
Water sprinkler system		
Type of sprinkling		Pressure sprinkling
		system
Filling capacities		
Fuel (diesel)	<u> </u>	23
Water Emulsion	l I	100 10
Hydraulic oil	' 	9
•		

^{*} The right for technical modifications remains reserved

Technical Data

The following noise and vibration data acc. to

- EC Machine Regulation edition 2006/42/EC
- the noise regulation 2000/14/EG, noise protection guideline 2003/10/EC
- Vibration Protection Regulation 2002/44/EC

were determined during conditions typical for this type of equipment and by application of harmonized standards.

During operation these values may vary because of the existing operating conditions.

Noise value

Sound pressure level on the place of the operator:

```
BW 80 AD-2: L_{pA} = 81 dB(A), determined acc. to ISO 11204 and EN 500 BW 90 AD-2: L_{pA} = 84 dB(A), determined acc. to ISO 11204 and EN 500 BW 100 ADM-2: L_{pA} = 82 dB(A), determined acc. to ISO 11204 and EN 500 BW 90 AC-2: L_{pA} = 84 dB(A), determined acc. to ISO 11204 and EN 500
```

Guaranteed sound power level:

```
BW 80 AD-2: L_{WA} = 100 dB(A), determined acc. to ISO 3744 and EN 500 BW 90 AD-2: L_{WA} = 100 dB(A), determined acc. to ISO 3744 and EN 500 BW 100 ADM-2: L_{WA} = 100 dB(A), determined acc. to ISO 3744 and EN 500 BW 90 AC-2: L_{WA} = 100 dB(A), determined acc. to ISO 3744 and EN 500
```

▲ Danger

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

Vibration value

Vibration of the entire body (driver's seat)

The weighted effective acceleration value determined according to ISO 7096 is $\leq 0.5 \text{ m/s}^2$.

Hand-arm vibration values

The weighted effective acceleration value determined according to ISO 5349 is ≤ 2.5 m/s².

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 compaction work in earth construction (road sub-bases).

Unintended use

However, dangers may arise from this machine if it is operated by untrained personnel or if it is subjected of unintended use.

For example:

- work with vibration on hard concrete, cured bitumen layers or extremely frozen ground
- the drum is wider than the working width (danger of tipping over)
- the machine is too heavy for the sub-structure
- unauthorized use of public roads
- using the machine for towing
- driving on unstable subbases or insufficient grip

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 ion 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 (properly trained person) 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.

Conversions and changes to the machine

Unauthorized alterations 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 driving 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.

Notes on safety in the operating and maintenance instructions:

A Danger

Paragraphs marked like this highlight possible dangers for persons.

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

i Note

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 environmental regulations.

Loading the machine

Always check the fastening of the central lifting hook before attempting to lift the machine.

Use only strong and stable loading ramps. The ramp inclination must not exceed the gradability of the machine.

Secure the machine against turning over or slipping off.

Secure the machine on the transport vehicle against rolling, sliding and tipping over.

Persons are highly endangered if

- they step or stand under loads being lifted
- they remain in the drive range of the machine during a demonstration or during loading.

The machine must not swing about when lifted off the ground.

Use only safe lifting gear of sufficient load bearing capacity.

Attach the lifting gear only to the specified lifting points.

Towing the machine

You should generally use a tow bar.

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

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

Before releasing the multi-disc brake secure the machine against unintended rolling.

Checking the Roll Over Protective Structure (ROPS)

i Note

On machines with cab the ROPS is an integral part of the cab.

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, hair-line cracks or open fractures.

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.

With the cab assembled check also the state of the cabin mounts (rubber elements and screws).

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

The machine must only be operated from the driver's seat.

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.).

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
- 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.

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 gauges and control lights.

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 is closed rooms and trenches

Exhaust gases are highly 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
- secure the machine against unintended use.

Do not jump off the machine, but use hand grips and access steps.

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.

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

Observe the maintenance tasks described in the operating and maintenance instructions, including the exchange of parts.

Maintenance work must only be carried out by qualified and authorized personnel.

For overhead service and assembly work use the provided access installations or any other safe access ladders and work platforms. Do not use machine parts as access steps.

Keep unauthorized persons away from the machine.

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

Park the machine on horizontal, level and stable ground.

Pull the key out of the ignition switch.

Lock the articulated joint with the articulation lock.

Working on hydraulic lines

Always depressurize the hydraulic lines before starting to work on them. Hydraulic oil escaping under pressure can penetrate the skin and cause severe injury. If injured by hydraulic oil seek medical advice immediately as otherwise severe infections may result.

When adjusting the hydraulic system do not stand behind or in front of the drum/wheels.

Do not change the setting of high pressure relief valves.

Drain hydraulic oil at operating temperature - danger of scalding!

Catch running out hydraulic oil and dispose of environmentally.

Always catch and dispose of biological hydraulic oils separately.

Do not start the engine after draining off the hydraulic oil.

After finishing work (with the system still depressurized!) check all connections and fittings for leaks.

Changing hydraulic hoses

All hydraulic hoses must be inspected visually at regular intervals.

Hydraulic hoses must be changed immediately if:

- the outer layer is worn down to the metal lining (e.g. chafing, cuts, cracks)
- embrittlement of the outer layer (development of cracks in the hose material)
- deformation under pressurized and depressurized condition, which are not in accordance with the normal shape of the hydraulic hose
- deformation in bends, e.g., squeezes, kinks, layer separation, formation of blisters
- leakages.
- non-observance of the installation requirements
- separation of the hydraulic hose from the fitting
- corrosion of the fitting, which impairs the function and the strength.
- Do not mix up hoses by mistake.
- damage or deformation of the fitting, which impairs the function and strength of the hose/ hose connection.

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

Working on the engine

Shut the engine down before opening the engine compartment 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 oily materials in a separate, specially marked container and dispose of environmentally.

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

Check and change the coolant only when the engine is cold.

Catch the coolant and dispose of environmentally.

Working on electrical equipment

Before working on electrical equipment disconnect the battery and cover it with insulating material.

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

Always disconnect the battery before starting to weld on the machine.

Working on the battery

When working on the battery do not smoke, no open flames!.

Do not let your hands or clothes come in contact with acid. In case of injuries caused by acid, flush off with clear water and consult a doctor.

Metal objects (e.g. tools, rings, wrist watches) must not contact the battery poles - danger of short circuit and burns!

When recharging maintenance free batteries remove the plugs to avoid the accumulation of explosive gases.

When using an external battery to start the machine follow the respective instructions.

Dispose of old batteries environmentally.

Switch the charging current off before removing the charge clamps.

Ensure good ventilation, especially when charging the battery in a closed room.

Working on the fuel system

Do not inhale fuel fumes.

No open fire, do not smoke, do not spill any fuel. Catch running out fuel, do not let it seep into the

ground and dispose of environmentally.

Working on wheels and tires

Explosion-like bursting of tires and parts of rims and tires can cause severe or even deadly injuries.

You should only assemble tires if you have the necessary experience and with the proper equipment. If necessary have the tires mounted by a specialised workshop.

Ensure correct tire pressure and do not exceed the highest specified pressure.

Check tires and wheels every day for pressure drop, cuts, bulges, damaged rims, missing wheel studs and nuts. Do not drive with damaged tires or wheels.

Non-sticking emulsions for tires must only be made up of a mix of water and a concentrated antistick agent according to the instructions of the manufacturer. Observe the regulations for the protection of the environment.

Cleaning

Do not clean the machine while the engine is running.

Do not use gasoline or other combustible substances for cleaning purposes.

When using steam cleaning equipment do not subject electrical components and insulating materials to the direct water jet, but cover them beforehand.

 Do not guide the water jet into the exhaust or into the air filter.

After maintenance work

Reinstall all protective devices after completing the maintenance work.

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.

Information and safety stickers/decals on the machine

Keep safety stickers in good and legible condition (see parts manual) and comply with their meaning.

Replace damaged and illegible stickers/decals.

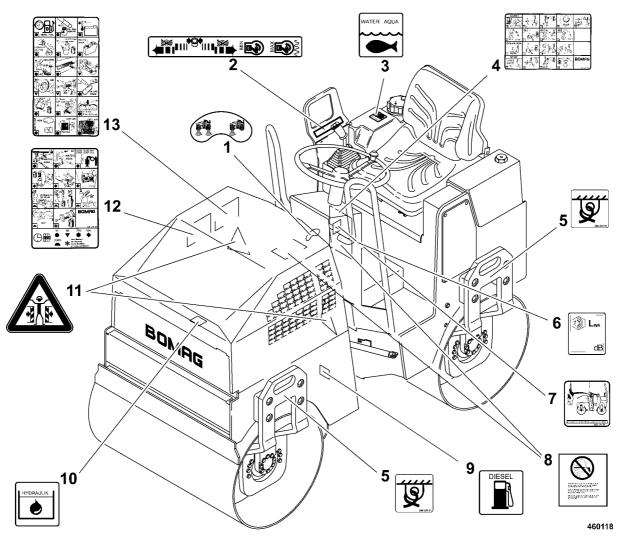


Fig. 6

Stickers and decals BW 80 AD-2 / BW 90 AD-2 / BW 100 ADM-2

- 1 Information sticker "Ball valve vibration"
- 2 Operation sticker "Travel lever"
- 3 Information sticker "Water"
- 4 Brief operating instructions
- 5 Information sticker "Lashing points"
- 6 Information sticker "Guaranteed sound capacity level"
- 7 Information sticker "Central lifting point"
- 8 Maintenance sticker "High pressure cleaner"
- 9 Information sticker "Diesel"
- 10 Information sticker "Hydraulic oil"
- 11 Warning sticker "Danger of crushing"

- 12 Maintenance sticker
- 13 Maintenance sticker

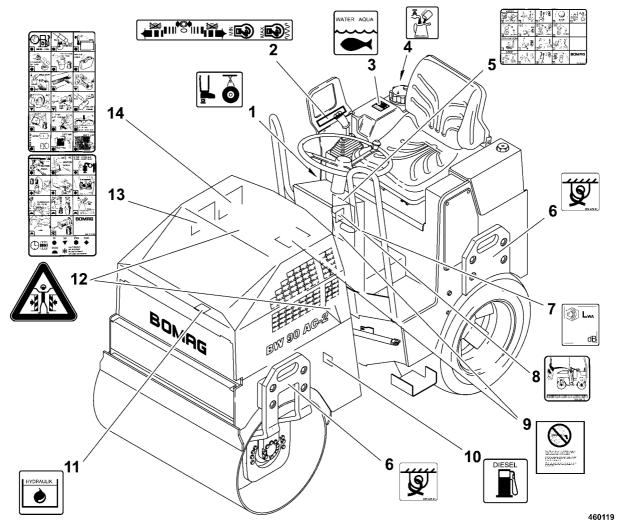


Fig. 7

Stickers and decals BW 90 AC-2

- 1 Information sticker (Foot switch tire sprinkling system"
- 2 Operation sticker "Travel lever"
- 3 Information sticker "Water"
- 4 Information sticker "Emulsion"
- 5 Brief operating instructions
- 6 Information sticker "Lashing points"
- 7 Information sticker "Guaranteed sound capacity level"
- 8 Information sticker "Central lifting point"
- 9 Maintenance sticker "High pressure cleaner"
- 10 Information sticker "Diesel"

- 11 Information sticker "Hydraulic oil"
- 12 Warning sticker "Danger of crushing"
- 13 Maintenance sticker
- 14 Maintenance sticker

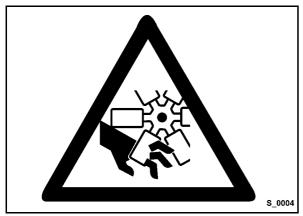


Fig. 8

Danger of cutting



Fig. 9

Danger of being pulled in

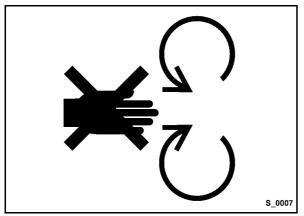


Fig. 10

Danger of being pulled in

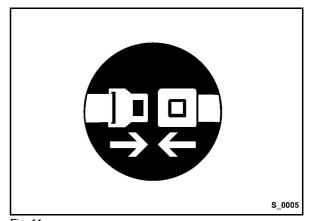


Fig. 11

Fasten your seat belt

3 Indicators and Controls

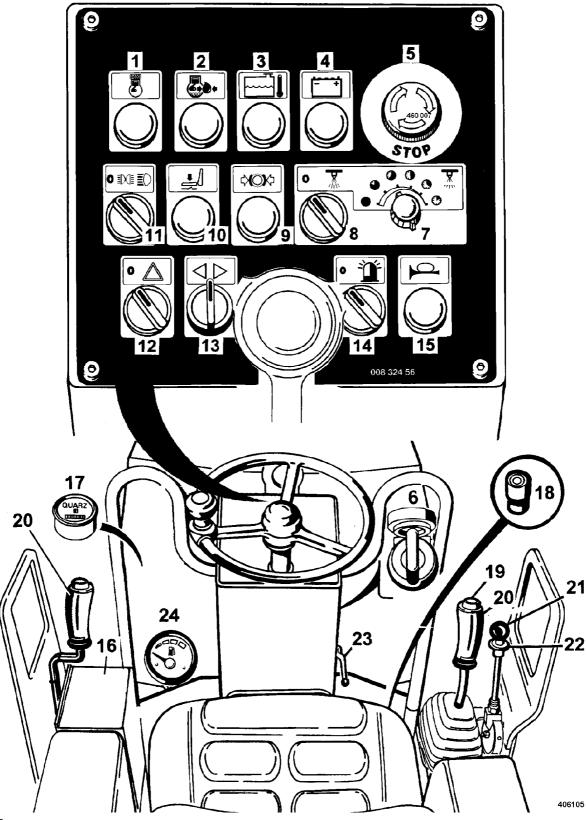


Fig. 12

Indicators and Controls

- 1 Pre-heating control light
- 2 Oil pressure warning light
- 3 Coolant temperature warning light
- 4 Charge control light
- 5 Emergency stop push button
- 6 Ignition switch
- 7 Interval switch for pressure sprinkler system
- 8 Rotary switch for sprinkling system
- 9 Parking brake warning light
- 10 Warning light for seat contact switch
- 11 Rotary switch for StVZO lighting* or working lights*
- * Optional equipment

- 12 Rotary switch for hazard light system*
- 13 Rotary switch for direction indicators*
- 14 Rotary switch for flashing beacon*
- 15 Push button for warning horn
- 16 Fuse box
- 17 Operating hour meter (in engine compartment)
- 18 Foot switch for tire sprinkler system (only AC)
- 19 Push button vibration
- 20 Travel lever
- 21 Throttle lever
- 22 Locking plate for throttle lever
- 23 Ball valve, vibration (not on AC)
- 24 Fuel level gauge (in engine compartment)

3.1 General notes

Please read this section thoroughly before operating this machine if you are not yet conversant with the indicators and control elements. All functions are described in detail hereunder.

Paragraph 4 "Operation" contains only concise descriptions of the individual operating steps.

3.2 Description of indicators and control elements

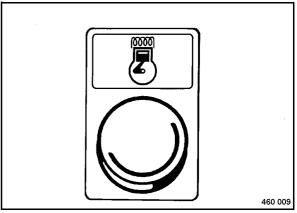


Fig. 13

No. 1 = Preheating control light

lights up = for approx. 6

= for approx. 6 seconds with the ignition switch (6) in position

"II".

goes out = after approx. 6 seconds with the ignition switch in position

"II", at this point start the en-

gine immediately.

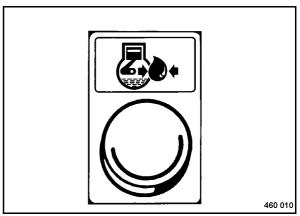


Fig. 14

No. 2 = Oil pressure warning light

lights up = with the ignition switch in posi-

tion "I" (test) in case of insufficient oil pressure the engine will be shut down immediately.

goes out = after starting the engine

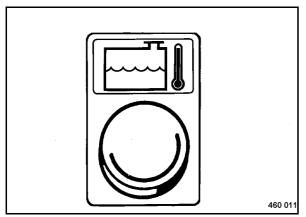


Fig. 15

No. 3 = Coolant temperature warning light

lights up = if the coolant temperature is too high, the warning buzzer

will sound.

Clean the radiator. Check the coolant level

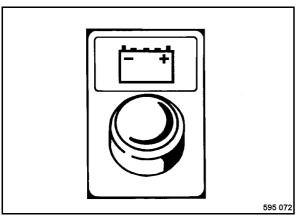


Fig. 16

No. 4 = Charge control light

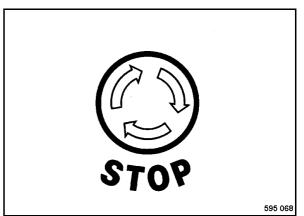
lights up = when switching the ignition on (test), in case of charging

faults during operation.

goes out = after starting the engine

⚠ Caution

If the control light lights up while the engine is running, the battery is not being charged. Detect the cause and eliminate the fault.



Fia 17

No. 5 = Emergency stop push button

▲ Danger

Danger of accident!

Use only in events of emergency during operation.

Do not use as parking brake.

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

The machine is braked immediately, the engine is shut down.

actuate = press the button completely

down, it automatically locks in fully pressed position.

switch off/un-

lock = Turn button clockwise. Re-

start the engine.

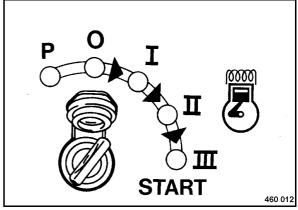


Fig. 18

No. 6 = Ignition switch

Indicators and Controls

Position "P"/"0" = Ignition off, key can be pulled

ou

Position "I" = Ignition on, all control and warning lights light up (test function). The lighting system

can be switched on.

Position "II" = Pre-heating position, starting

at temperatures below +10 °C, hold ignition key in position "II", until the pre-heating control light in the instrument cluster

goes out.

i Note

The engine can only be started if the travel lever is in braking position and the emergency stop switch is unlocked.

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 "III" = Turn further against spring pressure, the engine starts,

turn the ignition key back to position "I" once the engine

has started.

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.

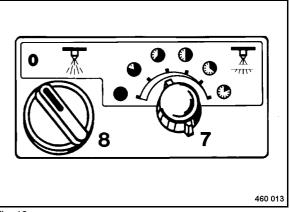


Fig. 19

No. 7 = Interval switch for pressure sprinkler system*

turn clockwise

Position "left" = Permanent sprinkling

further posi-

tions = various interruption intervals

during sprinkling ranging from 4...32 seconds, with an ontime of 5 seconds each.

No. 8 = Rotary switch for sprinkling system

Position "left" = Sprinkling "OFF" Position "right" = Sprinkling "ON"

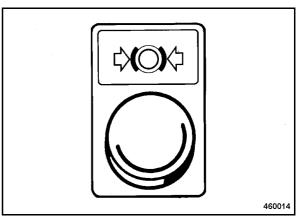


Fig. 20

No. 9 = Parking brake warning light

lights up = with the ignition switch in posi-

tion "I" (Test) with the travel lever in "0"-position the parking

brake is applied.

goes out = when moving the travel lever

out of neutral position and sit-

* Optional equipment

ting down on the operator's seat. Parking brake released.

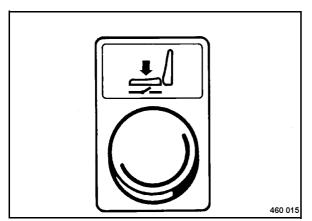


Fig. 21

No. 10 = Warning light for seat contact switch

goes out

= when the driver's seat is occupied and the travel lever is in brake position.

lights up when the machine is at

rest

with the ignition switch in position "I" (test), if the driver's seat is not occupied and the parking brake is closed, when actuating the travel lever while the driver's seat is not occupied.

i Note

Standard design

lights when the machine is driv-

ing

= when the driver's seat is unoccupied.

i Note

Design with seat contact for engine shut-down

lights when the machine is driv-

ing

 when the driver's seat is unoccupied. Warning buzzer sounds. Engine is shut down after 8 seconds.

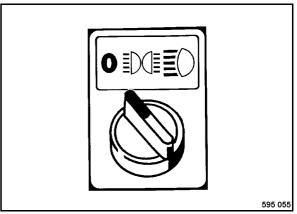


Fig. 22

No. 11 = Rotary switch for lighting acc. to StV-ZO* or working lights**

Lighting acc. to StVZO

Position "left" = light off

Position"mid-

dle" = fender lights on, ignition switch

in position "I" or "P",

Position "right" = travel light on, with ignition

switch in position "I".

Working light

Position "left" = light off

Position "right" = working lights on, with ignition

switch in position "I".

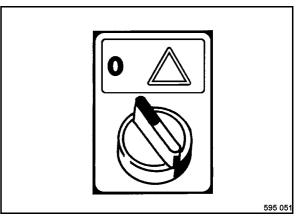


Fig. 23

No. 12 = Rotary switch for hazard light system***

Position "left" = hazard light switched off, the control lights go out.

- * Option
- ** Option
- *** Option

Indicators and Controls

Position "right" = hazard light switched on, the control light in the rotary switch lights.

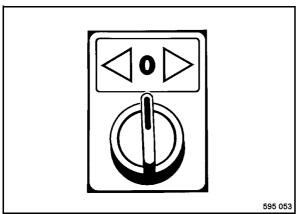


Fig. 24

No. 13 = Rotary switch for direction indicators*

Position "mid-

dle" = Direction indicators disabled

Position "left or

right"

The control lights in the switch and the front and rear direction indicators for the corresponding side are flashing.

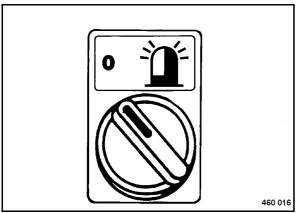


Fig. 25

No. 14 = Rotary switch for flashing beacon*

Position "left" = flashing beacon off Position "right" = flashing beacon on

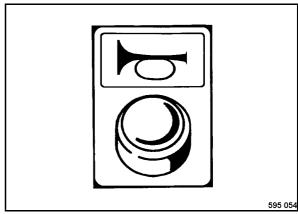


Fig. 26

No. 15 = Push button for warning horn

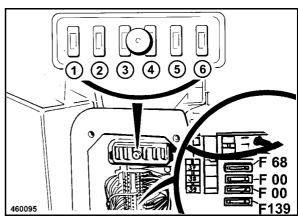


Fig. 27

No. 16 = Fuses

▲ Danger

Fire hazard!

Do not use fuses with higher ampere ratings and do not bridge fuses.

Fuse box

(1), 15A = (F14) Engine solenoid

(2), 15A = (F25) solenoid valve for driving and braking

(3), 20A = (F03) Vibration

(4), 15A = (F08) direction indicators, working head lights*

(5), 15A = (F11) head lights, left* (6), 15A = (F12) head lights, right*

Fuses on terminal strip

F68 = (20A) potential 30

^{*} Option

F00 = (30A) battery F00 = (30A) battery

F139 = (30A) engine solenoid*

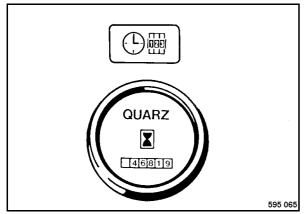


Fig. 28

No. 17 = Operating hour meter

counts the operating hours while the engine is running

All service work must be carried out according to the reading of the operating hour meter.

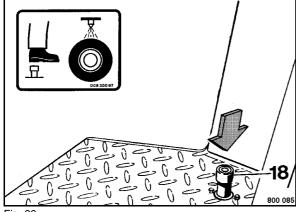


Fig. 29

No. 18 = Foot switch for tire sprinkling system (only AC)

depress

= to switch the tire sprinkler system on or off.

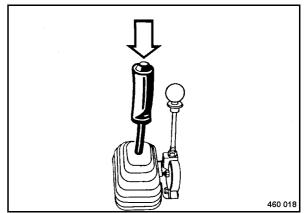


Fig. 30

No. 19 = Push button vibration

press = Switching the vibration on and off

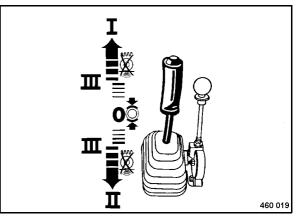


Fig. 31

No. 20 = Travel lever

i Note

Double travel lever, optional

shift through position"0", engage

to the right

Parking brake applied, the engine can be started. Sprinkler system switched off (exception: Version "water sprinkling system without shut-down in braking position**").

Position "0"

 Service brake, the machine is automatically braked by the hydrostatic drive.

^{*} Optional equipment

^{**} Optional equipment

Indicators and Controls

Position direction

Position direction

"I" = the forward speed is adjusted

according to the travel lever

position.

"II" = the reverse speed is adjusted

according to the travel lever

position.

Position "III" = Max. forward/reverse travel

with vibration

i Note

When shifting the travel lever through position "III" to position "I" or "II", the vibration will be automatically switched off.

On machines with double travel lever the travel lever cannot be engaged to the right. The parking closes automatically in "0"-position and is released when shifting the travel lever out of neutral.

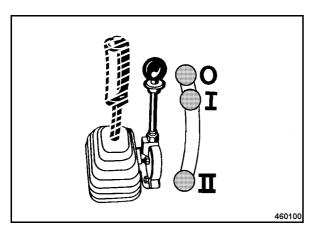


Fig. 32

No. 21 = Throttle lever

Position "0" = Idle speed position

Position "I" = Full load position (2000 rpm),

operating position for driving and vibration (40 Hz).

Position "II" = Full load position (300

 Full load position (3000 rpm), operating position for driving

and vibration (60 Hz).

Always drive and vibrate in throttle lever position "I" or "II"!

Control the travel speed only with the travel lever!

Note

Pull up the locking plate to move the throttle lever.

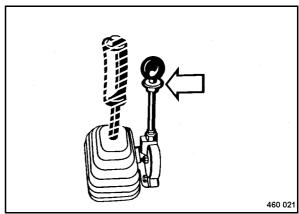


Fig. 33

No. 22 = Locking plate for throttle lever

pull = throttle lever can be moved.
release = throttle lever is locked in place.

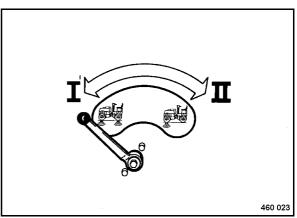


Fig. 34

No. 23 = Ball valve, vibration

Position "I" = Vibration of both drums
Position "II" = Vibration of front drum only

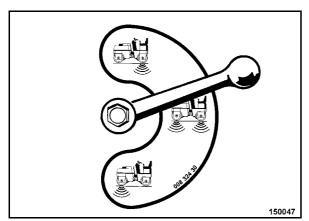


Fig. 35

Ball valve for 3-stage vibration*

Position up-

ward = Vibration of rear drum only

Position horizon-

tal = Vibration of both drums

Position down-

ward = Vibration of front drum only

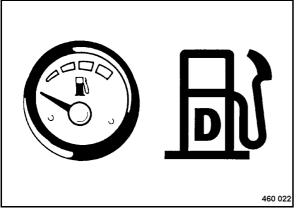


Fig. 36

No. 24 = Fuel gauge

shows the filling level in the fuel tank

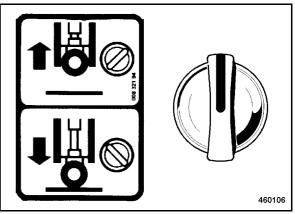


Fig. 37

No. 25 = Rotary momentary contact switch for edge cutter**

Position "mid-

dle" = Edge cutter stops at the pres-

ently reached position

Position "left" = Edged cutter is lowered.

Position "right" = Edged cutter is raised.

^{*} Optional equipment

^{**} Optional equipment

Indicators and Controls	

4 Operation

4.1 General

If you are not yet acquainted with the controls and indicating elements on this machine you should thoroughly read chapter 3 "Indicators and control elements" before starting work.

All indicators and control elements are described in detail in this chapter.

4.2 Tests before taking into operation

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

▲ Danger

Danger of accident!

Please observe strictly the safety regulations in chapter 2 of this instruction manual!

 Park the machine on ground as level as possible.

Check:

- fuel tank and fuel lines for leaks
- · screw joints for tight fit
- function of steering
- function of emergency stop
- function of parking brake
- machine for cleanliness, damage
- Air pressure in rubber tires (only AC machines)
- Presence of the appropriate operating and maintenance instructions
- proper maintenance of the machine

i Note

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.
- Contamination indicator for hydraulic filter element
- Coolant level, top up if necessary
- Check the sprinkler system water level, fill up if necessary.
- Emulsion level, fill up if necessary (only AC machines)
- Clean the scrapers

4.3 Electronic immobilizer*

Before starting the engine the anti-theft protection* must be disarmed by entering a code.

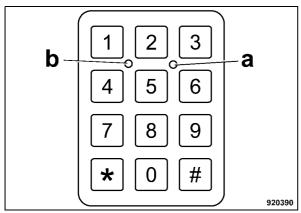


Fig. 38

i Note

With the electronic immobilizer armed, the light emitting diode (a) (Fig. 38) flashes slowly.

Slowly enter the six-digit user code.

i Note

When entering the code, the light emitting diode (6) lights up with every digit.

- Press the diamond button.
- The electronic immobilizer is now disarmed and the engine can be started within the next 30 seconds.

i Note

After entering the service code (for maintenance work) the electronic immobilizer remains switched off.

4.4 Adjusting the operator's seat

▲ Danger

Danger of accident!

Do not adjust the seat while driving.

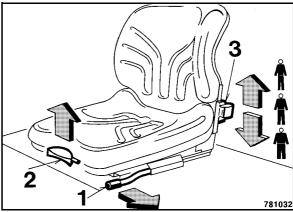


Fig. 39

- To adjust the seat in longitudinal direction push the lever 1 (Fig. 39) outwards.
- Pull the lever (2) up and adjust the backrest.
- Operate the lever (3) to adjust the weight of the operator.

i Note

In its setting the lever (3) is locked in upwards direction. This lock can be released by pressing the lever down against the end stop. Then adjust the operator's weight by sliding the lever downwards.

4.5 Starting the engine

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

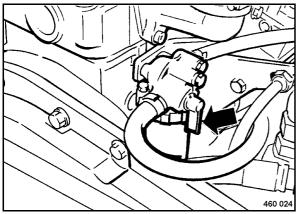


Fig. 40

• Check whether the fuel shut-off lever (Fig. 40) is pointing vertically down.

A Danger

Danger of accident!

Start the engine only from the operator's seat.

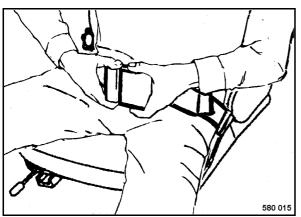
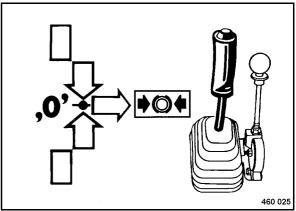


Fig. 41

• Fasten your seat belt (Fig. 41).



Fia. 42

Check whether travel lever (Fig. 42) is in braking position.

i Note

On machines with double travel lever* the travel lever cannot be engaged to the right. The parking closes automatically in "0"-position and is released when shifting the travel lever out of neutral.

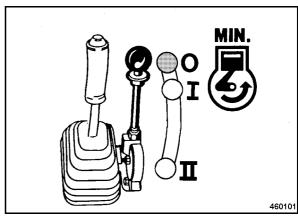


Fig. 43

Set the throttle lever (Fig. 43) to position "0".

Optional equipment

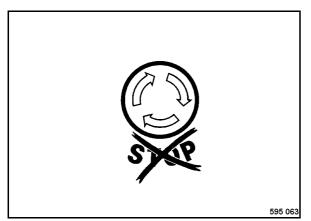


Fig. 44

 Check, whether the emergency stop switch (Fig. 44) is unlocked.

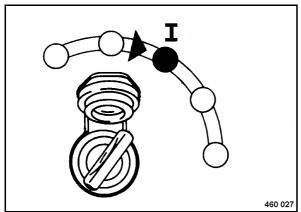


Fig. 45

• Turn the ignition key (Fig. 45) to position "I".

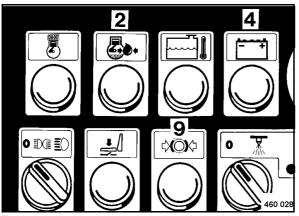


Fig. 46

Oil pressure warning light (2) (Fig. 46), charge control light (4) and parking brake warning light (9) light up.

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 perform trouble shooting.

i Note

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".

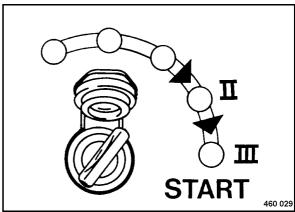


Fig. 47

- Turn the ignition key (Fig. 47) through position "II" to position "III", the starter will crank the engine.
- As soon as the engine ignites return the ignition key to position "I".

The oil pressure warning light and the charge control light go out. The parking brake warning light stays on.

△ Caution

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.

4.6 Starting under low temperatures

At temperatures below approx. +10 °C:

- Check, whether the travel lever is engaged to the right in brake position.
- Check, whether the emergency stop switch is unlocked.

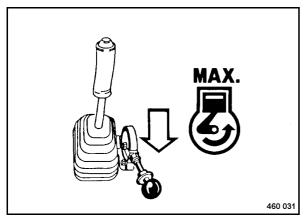


Fig. 48

 Set the throttle lever (Fig. 48) to position "MAX" and lock it.

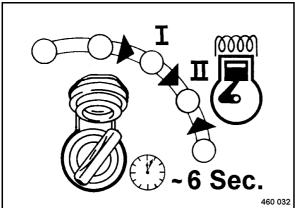


Fig. 49

 Turn the ignition key (Fig. 49) through position "I" to position "II" and hold it in this position for about 6 seconds.

i Note

The ignition key may be held in position "II" longer than 6 seconds, if this should be necessary. The preheating time extends accordingly.

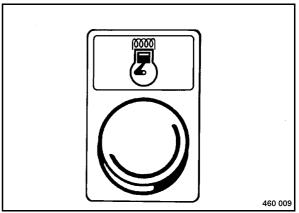


Fig. 50

The preheating control (Fig. 50) lights up.

⚠ Caution

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 perform trouble shooting.

i Note

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".

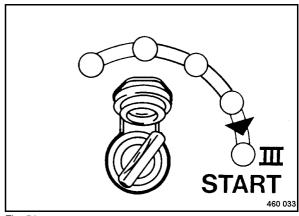


Fig. 51

- Turn the ignition key to position "III" (Fig. 51), the starter will crank the engine.
- As soon as the engine ignites return the ignition key to position "I".

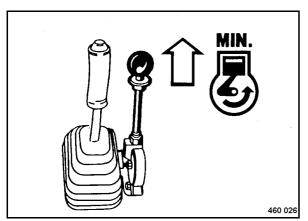


Fig. 52

 Once the engine runs properly pull up the locking plate and return the throttle lever (Fig. 52) to position "MIN".

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.

4.7 Starting with jump wires

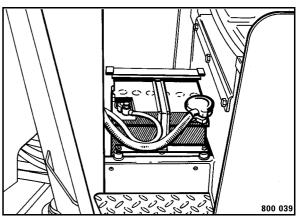


Fig. 53

 Remove the covering hood from the foot area (Fig. 53).

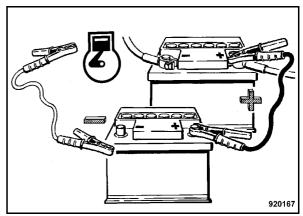


Fig. 54

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

- Only use a 12 Volt battery to bridge the machine.
- When jump starting with an external battery connect both plus poles first.
- Then connect the ground cable first to the minus pole of the current supplying battery and then to engine or chassis ground, as far away from the battery as possible (Fig. 54).
- Start as described under 'Starting the engine'.
- Once the engine is running switch on a powerful consumer (working light, etc.).

Operation

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

- After starting disconnect the negative poles (ground cable) first and the positive poles after.
- Switch off the consumer.
- Reinstall the battery compartment cover.

4.8 Driving the machine

▲ Danger

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.

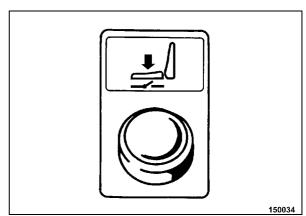


Fig. 55

Warning light for seat contact switch (Fig. 55):

goes out = when the driver's seat is occupied.

lights up when the machine is at

rest = the machine can not start to drive with the seat not occu-

pied (brake is closed).

i Note

Standard design

lights when the machine is driv-

ing = when the driver's seat is unoccupied.

i Note

Design with seat contact for engine shut-down

lights when the machine is driv-

ing

= when the driver's seat is unoccupied. Warning buzzer sounds. Engine is shut down after 8 seconds.

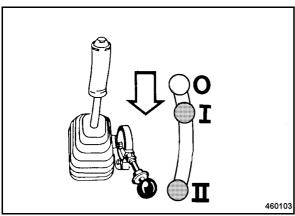


Fig. 56

 Always shift the throttle lever (Fig. 56) to full load position "I" or "II" and lock it.

During operation the throttle lever always remains locked in one of the full load positions. Control the travel speed with the travel lever.

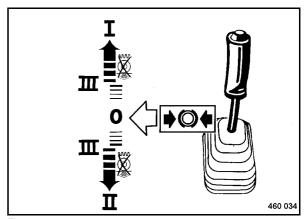


Fig. 57

⚠ Caution

Do not operate jerkily!

 Disengage the travel lever (Fig. 57) out of braking position and move it slowly to the desired travel direction.

Position "I" = max. forward travel without vi-

bration

Position "II" = max. backward travel without

vibration

Position "III" = Max. forward/backward travel

with vibration

i Note

When shifting the travel lever through position "III" to position "I" or "II", the vibration will be automatically switched off.

Important notes on travel operation

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.

Do not operate jerkily! Control the travel speed with the travel lever.

When driving up and down inclinations move the travel lever slowly back towards neutral to brake the machine.

4.9 Stopping the machine, operating the parking brake

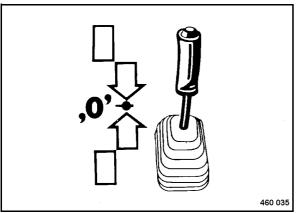


Fig. 58

 Shift the travel lever (Fig. 58) slowly to "0"-position. The machine is automatically braked by the hydrostatic drive.

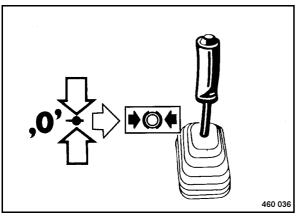


Fig. 59

• Engage the travel lever (Fig. 59) to the right in parking brake position.

i Note

When releasing the travel lever in "0"-position it will automatically return to parking brake position.

The pressure sprinkling system is automatically switched off (exception: Machines with "water sprinkling system without shut-down in braking position*").

Optional equipment

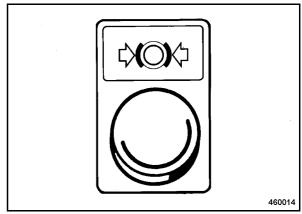


Fig. 60



The parking brake warning light (Fig. 60) stays on.

4.10 Shutting down the engine

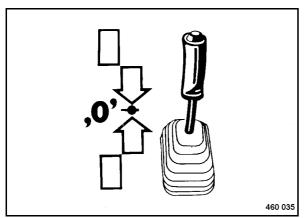


Fig. 61

Shift the travel lever (Fig. 61) slowly to "0"-position.

The machine is automatically braked hydrostatically.

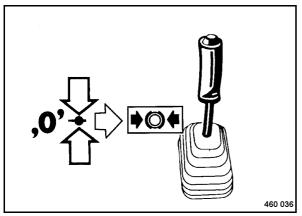


Fig. 62

• Engage the travel lever (Fig. 62) to the right in parking brake position.

i Note

When releasing the travel lever in "0"-position it will automatically return to parking brake position.

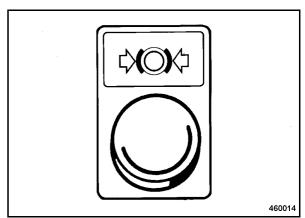


Fig. 63

The parking brake warning light (Fig. 63) lights up.

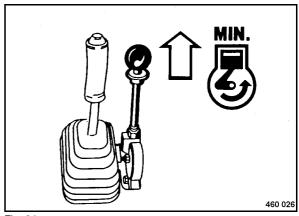


Fig. 64

Pull up the locking plate and set the throttle lever (Fig. 64) to position "MIN".

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

Operation

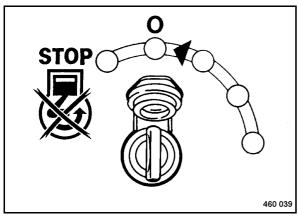


Fig. 65

 Turn the ignition switch (Fig. 65) to position "0" and pull out the ignition key.

A Danger

Danger of accident!

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

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

4.11 Switching the vibration on and off

Danger

Risk of damage!

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

Danger of bearing damage!

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

⚠ Caution

Switch on vibration only with the throttle lever in full load position "MAX I" or "MAX II".

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.

Pre-selecting vibration (only AD)

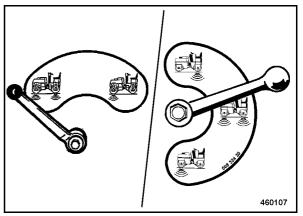


Fig. 66

⚠ Caution

Destruction of hydraulic components!

Switch the ball valve only when the vibration is switched off.

 Pre-select the desired drum or drums with the ball valve (Fig. 66).

Switching the vibration on

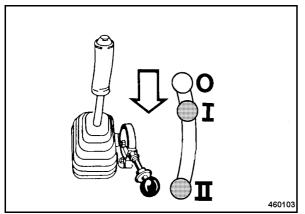


Fig. 67

 Shift the throttle lever (Fig. 67) to position "I" (40 Hz) or "II" (60 Hz) and lock it.

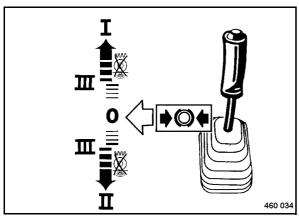


Fig. 68

• Shift the travel lever (Fig. 68) slowly to the desired travel direction to position "III".

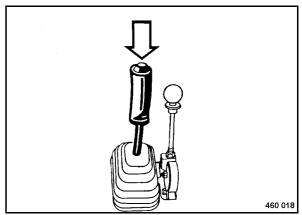


Fig. 69

• Actuate the vibration push button (Fig. 69).

i Note

When actuating the travel lever (Fig. 68) through position "III", vibration will be automatically switched off.

Switching the vibration off

• Press the vibration push button (Fig. 69) again.

4.12 Switching the gravity sprinkling system on and off

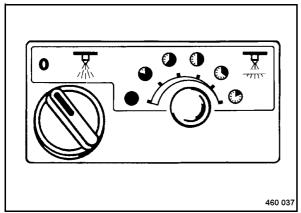


Fig. 70

 Turn the rotary switch for the water sprinkling system (Fig. 70) to position "Right".

The gravity fed sprinkler system is switched on.

 Turn the rotary switch for the water sprinkling system to position "Left".

The gravity fed sprinkler system is switched off.

4.13 Switching the pressure sprinkling system on and off*

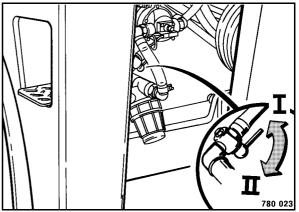


Fig. 71

• Open the drain cock (Fig. 71).

Position "I" = open
Position "II" = closed

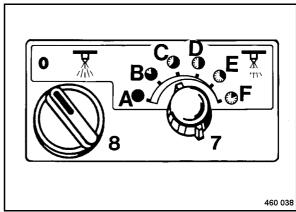


Fig. 72

Rotary switch for sprinkling system (8) (Fig. 72)

Position left = Sprinkling "OFF" Position right = Sprinkling "ON"

 Set the interval switch (7) to the desired flow interval.

Position "A" = Permanent sprinkling

Optional equipment

Position "B" to

"F"

 Interruption intervals of sprinkling of 4, 8, 16, 24 and 32 seconds, always switched on for 5 seconds.

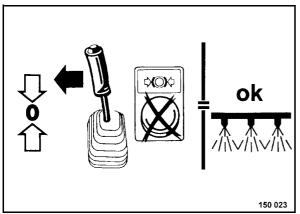


Fig. 73

On machines equipped with "water sprinkling system without shut-off in braking position*" the sprinkling system is already activated when the rotary switch for sprinkling is switched to position "ON".

 To switch on the sprinkling system move the travel lever out of braking position towards "0"position (Fig. 73).

i Note

The sprinkling system is only active when the travel lever is held in direction of "0"-position (complies with contact position for pressure sprinkling system). Exception: Version "water sprinkling system without shut-down in braking position*".

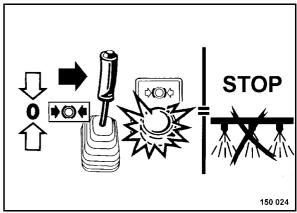
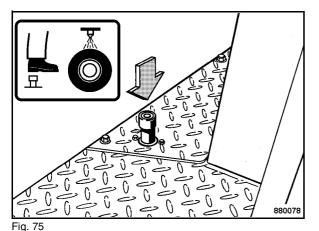


Fig. 74

 To switch off the sprinkling system shift the travel lever to position "brake closed" (Fig. 74) or turn the rotary switch for pressure sprinkling system to position "0".

4.14 Switching the tire sprinkling system on and off (only AC)



Actuate the foot switch (Fig. 75).

The tire sprinkling system is switched on.

Release the foot switch.

The tire sprinkling system is switched off.

4.15 Towing

▲ Danger

Danger of accident and injury!

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.

The machine cannot be steered.

Using the machine as towing vehicle is not permitted.

When releasing the brake do not touch hot engine parts.

⚠ Caution

Tow the machine only with the brake releasing device* attached, otherwise lift only by central lifting hook.

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

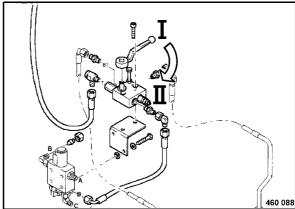


Fig. 76

- Unscrew the locking bolt (Fig. 76).
- Switch the ball valve over.

Position "I" = Brake released
Position "II" = Brake applied

- Turn the steering wheel anti-clockwise until the brake is released.
- * Optional equipment

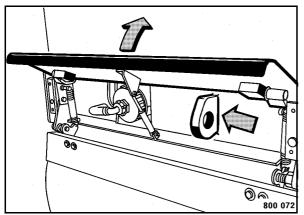


Fig. 77

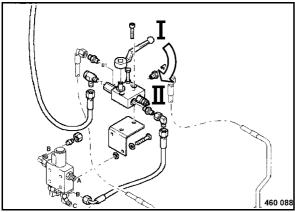
 Open the rear flap, attach the drawbar to the towing eye (Fig. 77) and tow the machine.

After towing

▲ Danger

Danger of accident!

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



Fia. 78

 Switch the ball valve back to position "II", turn the locking screw back in and counter it with the hexagon nut (Fig. 78).

4.16 Loading and transport

▲ Danger

Danger of accident!

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.

Lift the machine 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.

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

During demonstration and when loading the machine do not remain in the danger zone of the machine.

Do not stand or step under loads being lifted.

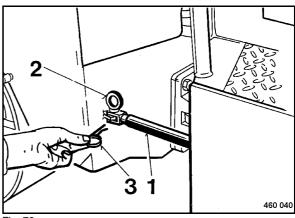


Fig. 79

After driving the machine on the transport vehicle swing the articulation lock 1 (Fig. 79) out of its holding bracket to the front. Insert the bolt (2) and secure it with the cotter pin (3).

Operation

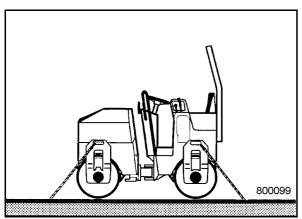


Fig. 80

- Lash the machine to the transport vehicle, use the lashing eyes (Fig. 80) on front and rear frame for this purpose.
- On BW 80 AD/ADH-2 use the fastening bows as lashing points.

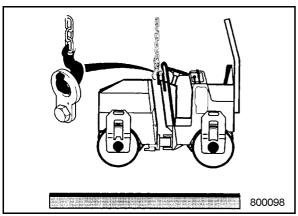


Fig. 81

 Use the central lifting facility (Fig. 81) to lift the machine.

After transport

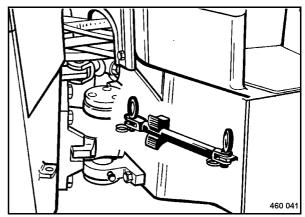


Fig. 82

 After transport release the articulation lock again and swing it back into the holding brakket (Fig. 82).

Foldable ROPS*

Fold down for transport

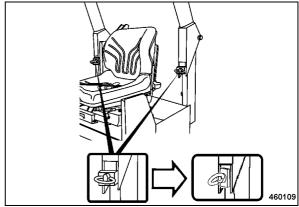
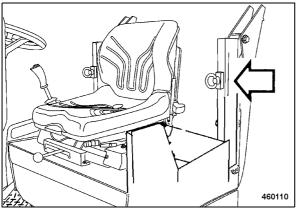


Fig. 83

- Loosen the eye bolts (Fig. 83) and adjust the clamping plates vertically.
- Fold the foldable ROPS back.

Optional equipment

Fold back up after transport



Fia. 84

 Adjust the clamping plates on both sides vertically (Fig. 84).

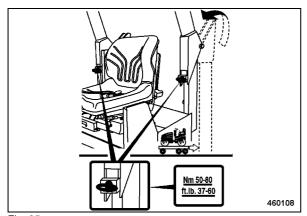


Fig. 85

- Fold up the foldable ROPS (Fig. 85).
- Turn the clamping plates to horizontal position and tighten the eye bolts with a tightening torque of 50 - 80 Nm.

Operation

5 Maintenance

5.1 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.
- Always remove the main battery switch for all maintenance work.
- Perform maintenance work only with the motor switched off.
- 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 diesel engine depends to a great extent on the cleanliness 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.
- 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.
- The fuel drum must rest for a longer period of time before drawing off fuel.
- 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 diesel 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 cooling system

Prepare and check coolant with highest care, since otherwise the engine may be damaged by corrosion, cavitation and freezing.

The coolant is prepared by mixing a cooling system protection agent (ethylene glycol) into the coolant.

Mixing with cooling system protection agent is necessary in all climatic zones. It prevents corrosion, lowers the freezing point and raises the boiling point of the coolant.

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.
- Always use the filling and filtering unit (BOMAG part-no. 007 610 01) to fill the hydraulic system. This unit is fitted with a fine filter to clean the hydraulic oil, thereby prolonging the lifetime of the filter.
- 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.

5.2 Fuels and lubricants

Engine oil

Quality

Lubrication oils are classified according to their performance and quality class. Oils according to other comparable specifications may be used.

In compliance with currently valid exhaust emission regulations the lubrication oils CF-4 and CG-4 were developed for use in diesel engines designed for operation with low sulphur fuels.

If the engine is operated with a fuel with higher sulphur content, we recommend the use of a class CD, CE or CF lubrication oil with a higher total base number.

When using class CF-4 or CG-4 lubrication oil in connection with a high sulphur fuel, the lubrication oil needs to be changed in shorter intervals.

Oil viscosity

Multi-purpose oils should be generally used.

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).

Optimal operating conditions can be achieved by using the following oil viscosity chart as a reference.

Ambient temperature	Viscosity
	SAE 30
over 25 °C!	SAE10W-30
	SAE 15W40
	SAE 20
0°C to 25°C	SAE10W-30
	SAE 15W40
below 0 °C	SAE 10
	SAE10W-30
	SAE 15W40

Occasionally falling short of the temperature limits will impair the cold starting ability, but will not cause any engine damage. In order to keep the

Maintenance

occurring wear as low as possible, occasional exceeding of the limits should not happen over a longer period of time.

With their better temperature and oxidation stability synthetic lubrication oils offer quite a few benefits.

Oil change intervals

The longest permissible time a lubrication oil should remain in an engine is 1 year. If the following oil change intervals are not reached over a period of 1 year, the oil change should be performed at least once per year, irrespective of the operating hours reached.

API: CD/CE/CF/

CF-4/CG-4 = 250 operating hours

Fuels

Quality

Cetan index number: The recommended minimum index number for the Cetan value is 45. A Cetan index number higher than 50 should preferably be used, especially at ambient temperatures below - 20 °C and when working at altitudes of 1500 m and more.

Diesel fuel specifications: With respect to the percentage (ppm) of sulphur the fuel used in the engine must comply with all relevant exhaust emission regulations in the are of use of the engine.

It is highly recommended to use a fuel with a sulphur content of less than 0,10 % (1000 ppm).

When using a diesel fuel with a high sulphur content of 0.50 % (5000 ppm) to 1.0 % (10.000 ppm), the engine oil change intervals must behalved.

Do not use any fuels with a sulphur content of more than 1,0 % (10000 ppm).

It is recommended to use diesel fuel that complies with the specifications EN590 or ASTM D975.

The fuel level should always be topped up in due time so that the fuel tank is never run dry, as otherwise filter and injection lines need to be bled.

Winter fuel

Danger

Fire hazard!

Diesel fuels must never be mixed with gasoline.

For winter operation use only winter diesel fuel, to avoid clogging because of paraffin separation. At very low temperatures disturbing paraffin separation can also be expected when using winter diesel fuel.

Coolant

Always use a mixture of anti-freeze agent and clean, dehardened water with a mixing ratio of 1:1.

Under particularly extreme temperature conditions you should consult the service representation of the engine manufacturer with respect to the antifreeze agent to be used.

There are various types of anti-freeze agents available. For this engine you should use ethylene glycol.

Before filling in the coolant mixed with anti-freeze agent the radiator must be flushed with clean water. This procedure should be repeated two to three times to clean the inside of radiator and engine block.

Mixing the anti-freeze agent: Prepare a mixture of 50 % anti-freeze agent and 50 % low mineral, clean water. Stirr well before filling it into the radiator. The method for mixing water and anti-freeze agent depends on the brand of the anti-freeze agent. In this respect see standard SAE J1034 and also the standard SAE J814c.

Add anti-freeze agent: If the coolant level drops because of evaporation, only clean water is to be used for topping up. In case of leakages you must always fill in anti-freeze agents of the same brand and the same mixing ratio.

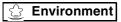
Do not mix different coolants and additives of any other kind.

Do not use any radiator cleaning agent after the anti-freeze agent has been mixed in. The anti-freeze agent also contains a corrosion protection agent. If this mixes with cleaning agent it may

cause the development of sludge, which could damage the cooling system.

Anti-freeze concentration

 $50\% = -37 \, ^{\circ}\text{C}$



Coolant must be disposed of environmentally.

Mineral oil based hydraulic oil

The hydraulic system is operated with hydraulic oil HV 32 (ISO) with a kinematic viscosity of $32 \text{ mm}^2/\text{s}$ at $40 \, ^{\circ}\text{C}$.

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).

Bio-degradable hydraulic oil

The hydraulic system can also be operated with a synthetic ester based biodegradable hydraulic oil.

This biologically degradable hydraulic oil Panolin HLP Synth.32 meets all demands of a mineral oil based hydraulic oil according to DIN 51524.

In hydraulic systems filled with Panolin HLP Synth.32 always use the same oil to top up.

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.

△ Caution

Check the filter more frequently after this change.

Perform regular oil analyses for content of water and mineral oil.

Replace the hydraulic oil filter element every 500 operating hours.

Lubrication grease

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

5.3 Table of fuels and lubricants

Assembly	Fuel or I	Quantity approx.	
	Summer	Winter	Attention Observe the level marks
Engine			
- Engine oil	Engine oil API: CD	3,9 litres	
	SAE 10W/30 (-		
	SAE 15W/40 (-1		
	SAE 30 (+5 °C to +30 °C)		
- Fuel	Diesel	Winter diesel fuel (down to -12 °C)	23 litres
- Coolant	Mixture of water ar	approx. 1,9 litres	
Hydraulic system	Hydraulic oil (ISO), F 32 mm ² /s biodegradable este	approx. 9 litres	
Sprinkler system	Water Anti-freeze mixture water *		100 litres
	Emu	10 litres	
Oscillating articulated joint	High pressure greas	as required	

^{*} Mix water and anti-freeze agent by following the instructions of the manufacturer

5.4 Running-in instructions

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

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 50 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.

5.5 Maintenance table

No.	Maintenance work	Comment	every 10 operating hours, daily	every 50 operating hours	every 250 oper. hours	every 500 oper. hours	every 1000 oper. hours	every 2000 oper. hours	every 3000 oper. hours	as required
5.6	Check the engine oil level	Dipstick mark	Х							
5.7	Check the fuel level		Χ							
5.8	Check the hydraulic oil level	Dipstick mark	Х							
5.9	Check the hydraulic oil filter element	Contamination indicator	Х							
5.10	Check the coolant level		Х							
5.11	Check the water level		Х							
5.12	Check the emulsion level	only AC-machines	Х							
5.13	Clean the scrapers		Х							
5.14	Grease the articulated joint			Х						
5.15	Check, clean, replace the dry air filter			Х						
5.16	Change engine oil and oil filter*	min. 1x per year see foot note			Х					
5.17	Check condition and tension of V-belt, replacing the V-belt				Х					
5.18	Check condition and tension of pump drive toothed belt				Х					
5.19	Change the fuel pre-cleaner, bleed the fuel system				Х					
5.20	Clean radiator and hydraulic oil cooler				Х					
5.21	Clean the water sprinkler system				Х					
5.22	Change the main fuel filter					Х				
5.23	Drain the fuel tank sludge					Х				

No.	Maintenance work	Comment	every 10 operating hours, daily	every 50 operating hours	every 250 oper. hours	every 500 oper. hours	every 1000 oper. hours	every 2000 oper. hours	every 3000 oper. hours	as required
5.24	Battery service	pole grease				Χ				
5.25	Check, adjust the valve clearance	Intake and exhaust: 0.14 - 0.18 mm on cold engine					X			
5.26	Change the hydraulic oil**	at least every 2 years						Х		
5.27	Change the hydraulic oil filter**	at least every 2 years						Х		
5.28	Change the coolant							Χ		
5.29	Change the fuel lines							Χ		
5.30	Replace the pump drive toothed belt							Х		
5.31	Check the injection valves							Х		
5.32	Check the fuel injection pump								Χ	
5.33	Check the tire pressure	only AC-machines								Х
5.34	Replace the dry air filter cartridge	min. 1x per year								Х
5.35	Water sprinkler system, maintenance in case of frost									Х
5.36	Tightening torques									Х
5.37	Engine conservation									Х

^{*} oil change after 50 and 250 operating hours, then every 250 operating hours

** Also in case of repair in the hydraulic system.

Maintenance

5.6 Checking the engine oil level

The machine must be in horizontal position. When the engine is warm, shut it down and check the oil level after five minutes. With a cold engine the oil level can be checked immediately.

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

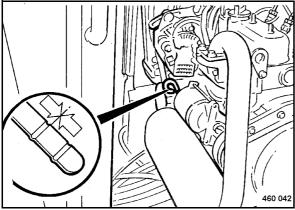


Fig. 86

- Pull the dipstick (Fig. 86) 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.

- 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.

5.7 Checking the fuel level

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

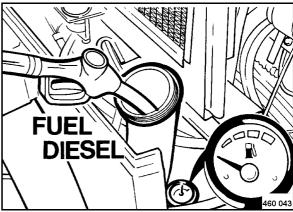


Fig. 87

Check the fuel level on the fuel gauge (Fig. 87).

Refuelling

▲ Danger

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.

▲ Danger

Health hazard!

Do not inhale any fuel fumes.

△ Caution

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".

Every 10 operating hours

Environment

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

- Shut down the engine.
- Clean the area around the filler opening.
- Open the fuel tank cover.
- Top up with fuel (diesel or winter diesel).
- Screw the fuel tank cover back on.

5.8 Checking the hydraulic oil level

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 HLP Synth. 32 always use 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".

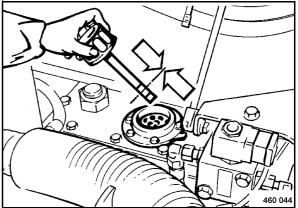


Fig. 88

- Clean the area around the filler opening.
- Remove the filler cap.
- Check the oil level on the oil dipstick. The oil level must be between the "MIN" and "MAX" marks (Fig. 88).
- If the oil level is too low top up hydraulic oil immediately.

5.9 Checking the hydraulic oil filter element

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.

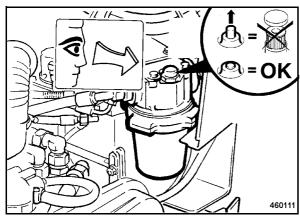


Fig. 89

- Check the contamination indicator (Fig. 89) 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

5.10 Check the coolant level

▲ Danger

Danger of scalding!

Open the cap on the coolant compensation tank only when the engine is cold.

If, during the daily inspection the coolant level is found to have dropped, check all lines, hoses and engine for leaks.

For quality of coolant refer to the chapter on "fuels and lubricants".

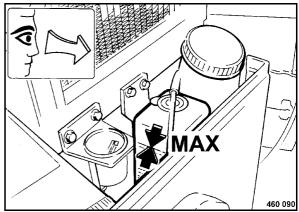


Fig. 90

- Check the coolant level (Fig. 90).
- To top up unscrew the filler cap and fill in coolant up to the MAX-mark.

5.11 Checking the water level

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.

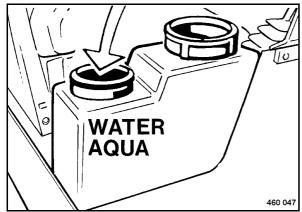


Fig. 91

- Open the cap (Fig. 91) and check the water level.
- If necessary top up water and close the cap .

5.12 Checking the emulsion level*

Risk of damage!

Do not step on the emulsion tank and do not place any heavy objects on it.

Different emulsions must not be mixed. If necessary drain off the emulsion beforehand.

For mixing ratio of water and emulsion refer to the specification of the respective manufacturer.

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

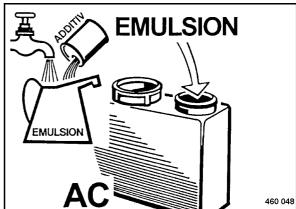
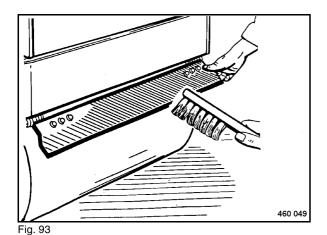


Fig. 92

 Open the lid (Fig. 92) on the tank, fill up with emulsion as necessary and close the lid again.

5.13 Cleaning the scrapers



Fold the scrapers up and clean them (Fig. 93).
 This is of particular importance before compacting asphalt surfaces.

1	

Every 10 operating hours

5.14 Greasing the articulated joint

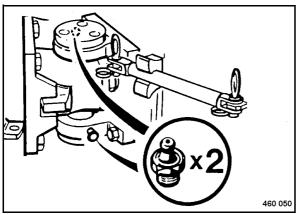


Fig. 94

Clean the grease nipples (Fig. 94) and lubricate with approx. 5 strokes from the grease gun.

For quality of oil refer to the section about fuels, lubricants and filling capacities.

5.15 Checking, cleaning, replacing the dry air filter

A dirty dry air filter element can be noticed by excessive exhaust smoke.

Dry air filter cartridges with damaged filter element or seal ring must be replaced in any case. It is therefore recommended to keep at least one filter element in stock.

The air filter cartridge must be replaced after 6 cleaning intervals, but at the latest after one year.

Each cleaning interval must be marked with a cross on the filter element.

Cleaning does not make sense if the cartridge is covered with a sooty deposit. Use a new filter cartridge.

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

In case of wet or oily dirt replace the filter element.

Do not use gasoline or hot fluids to clean the filter cartridge.

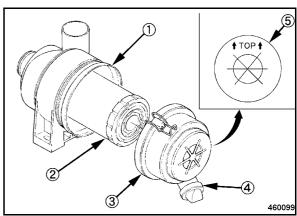


Fig. 95

 Under normal conditions open the evacuation valve (4) (Fig. 95) once per week (or every day under very dusty conditions), in order to remove big dust and dirt particles.

Every 50 operating hours

- Unclip the clamps on the housing cover (3) and take off the cover.
- Pull the air filter cartridge (2) out of the air filter housing (1).

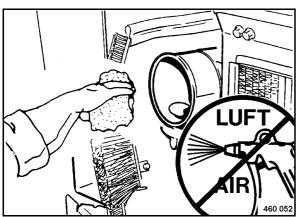


Fig. 96

Clean out the air filter housing with a cloth (Fig. 96).

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

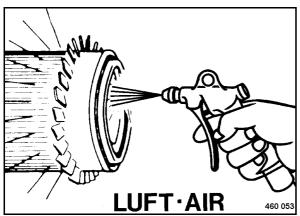


Fig. 97

▲ Danger

Eye injury!

Wear safety goggles.

 Blow the air filter cartridge (Fig. 97) clean with clean and dry compressed air (max. 2 bar (30 psi)) by blowing along the inner creases.

Do not hold the compressed air nozzle closer to the filter than 3 cm

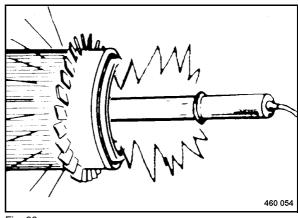


Fig. 98

- Check the air filter cartridge (Fig. 98) from inside with a torch for holes, cracks, flutes or other damage.
- Always replace damaged filter cartridges.

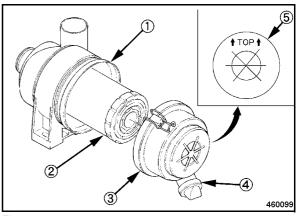


Fig. 99

- Before reassembling check the sealing faces on the air filter cartridge (2) (Fig. 99).
- Insert the air filter cartridge, attach the housing cover (3) with the "TOP" marking (5) pointing up and fasten it with the clamps.

If the clamps are not fastened correctly dirt and dust may be drawn in. This can damage the engine.

5.16 Changing engine oil and oil filter

▲ Danger

Danger of scalding!

When draining off hot oil.

By hot oil when unscrewing the engine oil filter.

⚠ Caution

The oil change at 250 operating hours refers to the use of oils of oil quality class API CD, CE, CF, CF-4 or CG-4 and a fuel sulphur content of less than 0.5%.

When using fuels with a sulphur content higher than 0.5% with oils of oil quality class API CF-4 or CG-4, the oil change intervals must be halved.

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

Drain the engine oil only when the engine is warm.

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

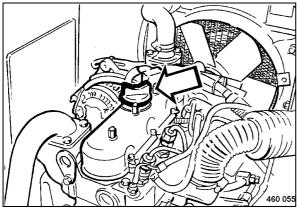


Fig. 100

• Unscrew the oil filler plug (Fig. 100).

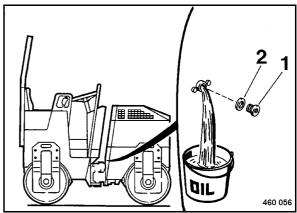


Fig. 101

- Unscrew the drain plug (1) (Fig. 101) and catch running out oil.
- Turn the drain plug (1) tightly back in with a new seal ring (2).

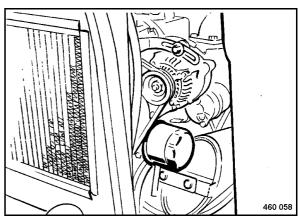


Fig. 102

- Unscrew the filter cartridge (Fig. 102) using an appropriate filter wrench.
- Clean the sealing face on the filter carrier from any dirt.
- Slightly oil the rubber seal on the new filter cartridge.
- Turn the new filter cartridge on by hand, until the seal contacts.
- Tighten the filter element for another half turn.

Every 250 operating hours

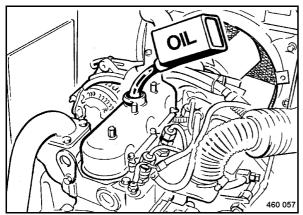


Fig. 103

- Fill in new engine oil (Fig. 103).
- Tighten the oil filler cap properly.

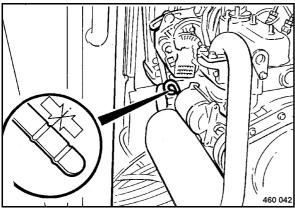


Fig. 104

 After a short test run check the oil level once again (Fig. 104), if necessary top up to the top mark (MAX).

5.17 Checking, tensioning, replacing the V-belt

Checking the V-belt

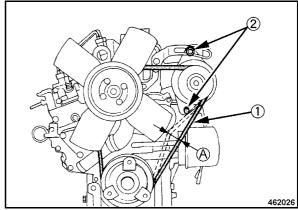


Fig. 105

- Inspect the entire circumference of the V-belt
 (1) (Fig. 105) visually for damage and cracks.
- Replace a damaged or cracked V-belt immediately.
- Check with thumb pressure whether the V-belt can be depressed more than 7 to 9 mm between the V-belt pulleys, retighten if necessary.

Tightening the V-belt

- Slightly slacken the fastening screws (2).
- Press the generator in direction outward using a lever, until the correct V-belt tension is reached.
- Retighten all fastening screws and check the V-belt tension once again.

Changing the V-belt

- Slightly slacken the fastening screws (2).
- Press the generator completely against the engine.
- Remove the old V-belt.
- Fit the new V-belt to the V-belt pulleys.
- Tension the V-belt as previously described.

5.18 Checking the condition and tension of the toothed belt for the pump drive

▲ Danger

Danger of accident!

This work must only be performed with the engine shut down!

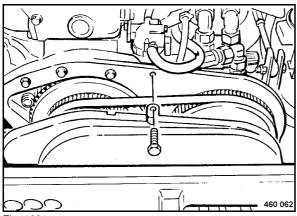


Fig. 106

Remove the protection hood (Fig. 106).

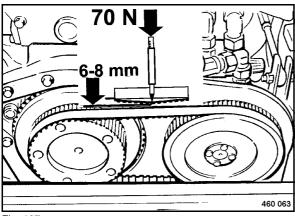


Fig. 107

- Check the entire circumference of the toothed belt (Fig. 107) for starting cracks in the area of the basis and the back of the teeth.
- Have the toothed belt replaced if starting cracks are found.
- Use the belt tension tester (BOMAG P/N 079 947 10) to check whether the toothed belt can be depressed 6 to 8 mm between the

toothed belt pulleys when applying a pressing force of 70 N.

- Required frequency 100-130 Hz.
- Reassemble the protection hood.

5.19 Changing the fuel precleaner, bleeding the fuel system

▲ Danger

Fire hazard!

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

Do not spill any fuel.



Environmental hazard!

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

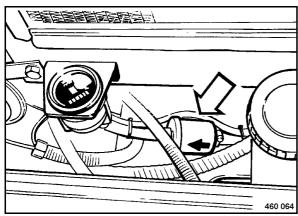


Fig. 108

- Loosen the hose clamp (Fig. 108).
- Pull the fuel filter out of the bottom and the top hoses
- Install a new fuel filter by observing the flow direction.

Bleeding the fuel system

Danger

Fire hazard!

Do not bleed the fuel system while the engine is hot. Fuel may drip onto the hot exhaust.

 In the following cases the fuel system needs to be bled: after changing the fuel filter, after running the fuel tank dry, after a long resting period of the machine.

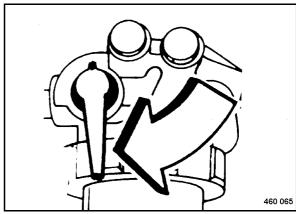


Fig. 109

 Set the fuel shut-off lever (Fig. 109) to vertical position.

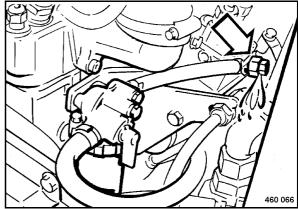


Fig. 110

- Open the bleeding screw (Fig. 110) on the injection pump for a few turns.
- Crank the engine with the starter until fuel runs out without air bubbles.
- Retighten the bleeding screw.

5.20 Clean radiator and hydraulic oil cooler

▲ Danger

Danger of injury!

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

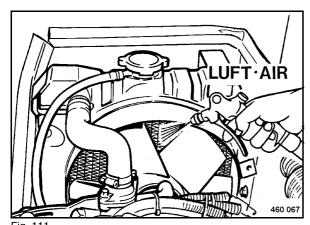
⚠ Caution

Do not damage any cooling fins on the cooler core when cleaning.

i Note

Dirt on fan blades and radiator reduce the cooling effect. Dirt deposits in these areas are substantially supported by oil and fuel on these surfaces. For this reason you should always seal any oil or fuel leaks in the vicinity of the cooling fan or the radiator and clean the cooling surfaces after.

Radiator



-ig. 111

Remove the fan grille.

i Note

Start to blow out from the exhaust side.

 Blow the radiator (Fig. 111) out with compressed air from the air discharge side.

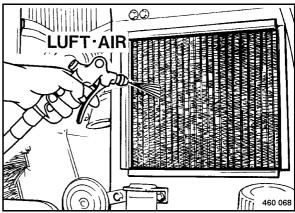


Fig. 112

• Blow the radiator (Fig. 112) out with compressed air from the air intake side.

Hydraulic oil cooler

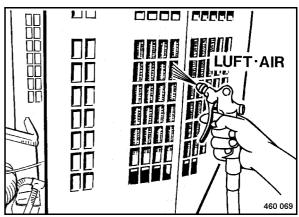


Fig. 113

 Blow the hydraulic oil cooler (Fig. 113) out with compressed air from the air discharge side.

Every 250 operating hours

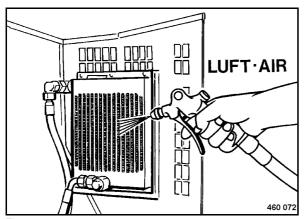


Fig. 114

 Blow out the air supply side of the hydraulic oil cooler (Fig. 114).

Cleaning with cold cleansing agent

Protect electrical equipment such as generator, regulator and starter against the direct water jet.

- Spray engine and cooler with a suitable cleansing agent, e.g. cold cleanser, let it soak in for a while and spray it off with a strong water jet.
- Run the engine warm for a while to avoid corrosion.
- Reassemble the fan grille.

5.21 Cleaning the water sprinkler system

j Note

In the event of frost observe the special maintenance notes 'water sprinkler system, maintenance in the event of frost'.

Drain the water tank.

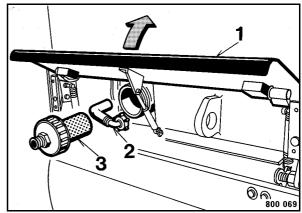


Fig. 115

- Open the rear flap 1 (Fig. 115).
- Unscrew the spigot nut (2).
- Unscrew the water filter (3) and clean it.
- Flush the water tank thoroughly.
- Screw the water filter back in, tighten the spigot nut and close the flap.

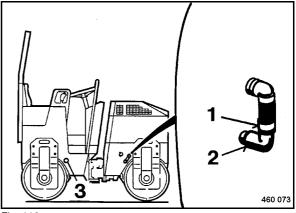


Fig. 116

• Pull the caps 3 (Fig. 116) off both sprinkler tubes.

- Loosen the hose clamps (2) and pull the hoses of the sprinkler tubes.
- Pull the sprinkler tubes (3) out and flush them thoroughly.
- Assemble the sprinkler tubes and fill the water tank.

Dispose of emulsion fluid environmentally.

Drain the emulsion tank.

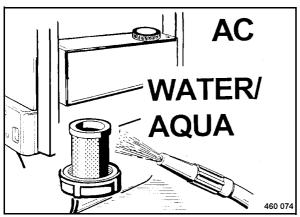


Fig. 117

- Unscrew the fitting.
- Take the emulsion filter (Fig. 117) out and clean it.
- Thoroughly rinse the emulsion tank.
- Reinsert the emulsion filter.
- Turn the fitting back on.

Every 250 operating hours				

5.22 Changing the main fuel filter

▲ Danger

Fire hazard!

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

Environment

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

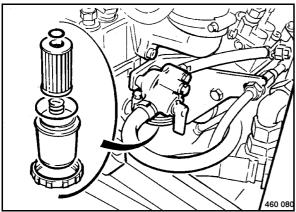


Fig. 118

- Unscrew the filter bowl (Fig. 118).
- Take the filter element out.
- Check O-rings and springs, replace if necessary.
- Wash the filter bowl out with diesel fuel.
- Insert the new filter element.
- Screw the filter bowl back on and bleed the fuel system, refer to the section "changing the fuel precleaner".
- Check the fuel lines for wear and damage, replace if necessary.

5.23 Draining the fuel tank sludge

▲ Danger

Fire hazard!

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

Do not spill any fuel.

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

j Note

For this work the fuel tank should not hold more than max. 5 I of fuel, if necessary pump off down to this level.

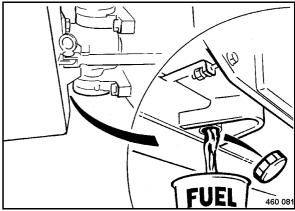


Fig. 119

- Unscrew the screw cap (Fig. 119) under the fuel tank and drain the fuel out.
- After draining the fuel screw the screw cap back on with a new seal ring.

5.24 Battery service

▲ Danger

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 Note

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, in 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.

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

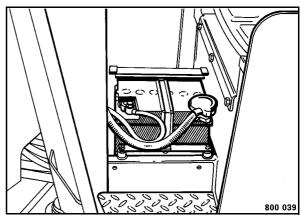


Fig. 120

- Remove the covering hood from the foot area (Fig. 120).
- Clean battery 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.

5.25 Checking, adjusting the valve clearance

i Note

The valve clearance must only be checked and adjusted when the engine is cold.

The first cylinder is at the front on the blower end.

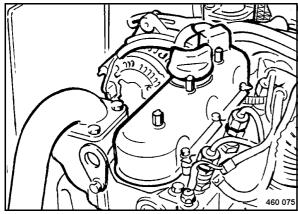
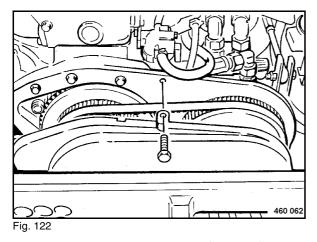


Fig. 121

• Remove the cylinder head cover (Fig. 121).



Remove the protection hood (Fig. 122).

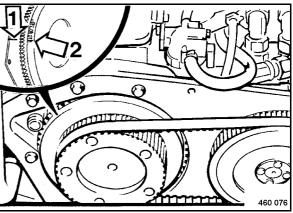


Fig. 123

 Align the mark "1TC" 2 (Fig. 123) on the flywheel to the mark (1) on the housing.

i Note

the piston of cylinder 1 is in top dead center. The "1TC"-mark is only valid for cylinder 1.

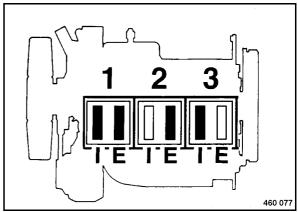


Fig. 124

 Check whether the piston of cylinder 1 is in compression position or in overlap position, to do so turn the flywheel 15° to right or left respectively.

Overlapping = both valves are moving and

cannot be checked or adjust-

ed.

Compression po-

sition = none of the valves moves and can be checked or adjusted.

i Note

= Inlet valve

Every 1000 operating hours

E = Exhaust valve

• Check the valves marked black (Fig. 124) on cylinders 1, 2 and 3, adjust if necessary.

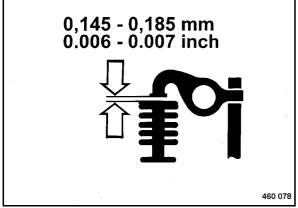


Fig. 125

 Check the gap between rocker arm and valve with a feeler gauge (Fig. 125).

Valve clearance:

Inlet valve and exhaust valve 0,145 - 0,185 mm.

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

i Note

Mark checked and adjusted valves with chalk.

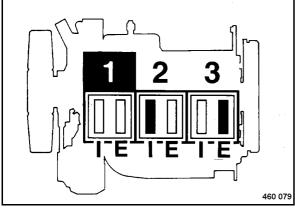


Fig. 126

 Turn the flywheel for another 360° and align the "1TC"-mark with the mark on the mark on the housing.

- Check the valves marked black on cylinders 2 and 3 (Fig. 126), adjust if necessary.
- Install the cylinder head cover with a new gasket.

i Note

After a short test run check the engine for leaks.

5.26 Changing the hydraulic oil

▲ Danger

Danger of scalding!

Danger of scalding by hot oil.

Perform the oil change when the hydraulic oil is warm.

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

Do not use any detergents to clean the system.

Do not start the engine after draining the hydraulic oil. Do not run the pumps without oil.

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

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.



Environmental damage!

Catch old oil and dispose of environmentally.

i Note

Generally replace the hydraulic oil filter element after the test run.

- Drive the machine, until the hydraulic oil has reached operating temperature.
- Shut down the engine.

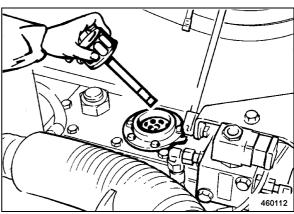


Fig. 127

 Remove the cap from the hydraulic oil tank (Fig. 127).

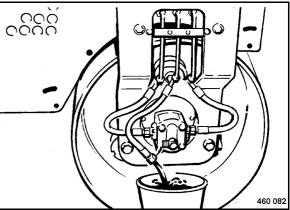


Fig. 128

- Disconnect the hydraulic hose from the vibration motor and catch old oil (Fig. 128).
- Connect the hydraulic hose again.

We recommend to use the filling and filtering unit (BOMAG part-no. 079 930 35) with fine filter to fill the hydraulic system. This ensures finest filtration of the hydraulic oil, prolongs the lifetime of the hydraulic oil filter and protects the hydraulic system.

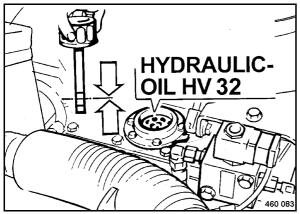


Fig. 129

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

- Fill in new hydraulic oil (Fig. 129), do not take out the screen filter when filling.
- Perform a test run and check the system for leaks.
- Check the oil level on the dipstick.
- Close the tank with a new cover.

i Note

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

Bleeding the hydraulic system

 Run the engine for about 3 minutes with low speed, this will bleed the hydraulic system.

5.27 Changing the hydraulic oil filter

Danger

Danger of scalding!

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

↑ Caution

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.

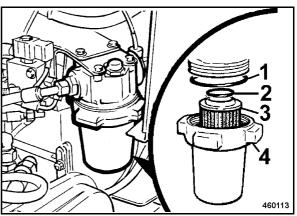


Fig. 130

• Remove filter bowl (4) (Fig. 130) 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.

5.28 Changing the coolant

▲ Danger

Danger of scalding!

Change the coolant only when the engine is cold.

Do not remove the radiator cap when the engine is still hot.

Always wear gloves when handling anti-freeze agent.

Always screw the radiator cap tightly back on (second detent).

Always fill the engine cooling system with an anti-freeze mixture (corrosion protection).

Do not use more than 50% anti-freeze.

Do not mix different types of anti-freeze.

Environment

Catch running out coolant and dispose of environmentally.

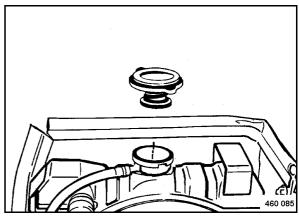


Fig. 131

• Remove the radiator cap (Fig. 131).

Every 2000 operating hours

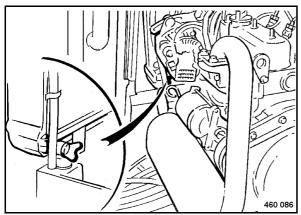


Fig. 132

- Unscrew the drain cock (Fig. 132).
- Drain the coolant completely off and collect it.
- Screw the drain plug back in.

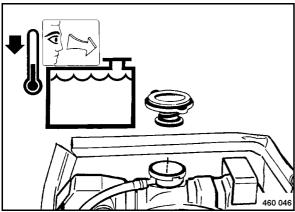


Fig. 133

 Fill in coolant until the level reaches the bottom edge of the filler socket (Fig. 133).

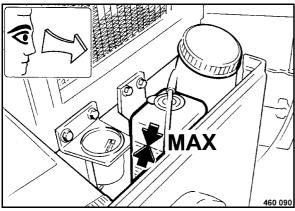


Fig. 134

Fill in coolant up to the "MAX" mark (Fig. 134).

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

- Reattach the radiator cap and the cap of the compensation tank.
- Start the diesel engine and run it warm to operating temperature.
- Let the engine cool down and check the coolant level again, if necessary top up in the compensation tank.

5.29 Changing fuel lines

i Note

For safety reasons this work should be performed every two years.

Hoses consist of rubber or plastic material and age over the course of time.

▲ Danger

Fire hazard!

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

Do not inhale any fuel fumes.

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

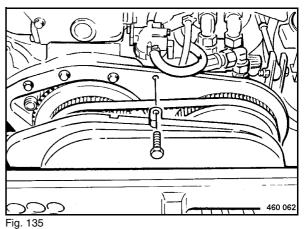
Replace all fuel hoses, including their hose clips.

5.30 Replacing the pump drive toothed belt

▲ Danger

Danger of accident!

Perform this work only with the engine shut down!



Disassemble the protection hood (Fig. 135).

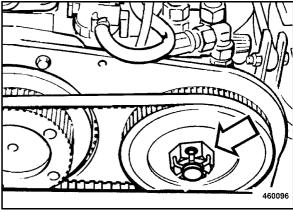


Fig. 136

 Pull out the cotter pin and unscrew the castle nut (Fig. 136) from the toothed belt pulley on the hydraulic pump.

Every 2000 operating hours

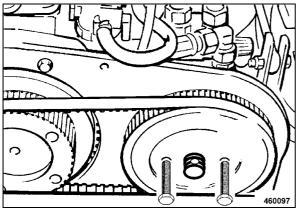


Fig. 137

- Use two forcing screws M8 X60 to press the toothed belt pulley off the retaining taper (Fig. 137) and take off toothed belt with toothed belt pulley.
- Take off the woodruff key.

i Note

When reassembling hold the new toothed belt and the toothed belt pulley always as close as possible to the pump carrier.

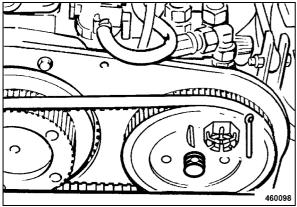


Fig. 138

- Insert the woodruff key into the groove (Fig. 138).
- Screw on the castle nut and tighten with a torque of 50Nm
- Lock the castle nut with the cotter pin.

i Note

If the bore is not in line with the recess in the castle nut, turn the castle nut further, do not turn back.

5.31 Check the injection valves

i Note

This work must only be performed by authorized service personnel.

5.32 Checking the fuel injection pump

i Note

This work must only be performed by authorized service personnel.

Every 3000 operating hours				

5.33 Checking the tire pressure

i Note

AC-machines only

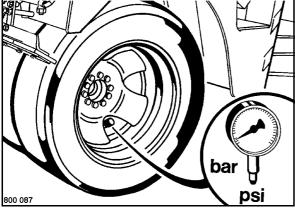


Fig. 139

 Check the tire pressure with a pressure gauge on the tire inflation valve (Fig. 139).

i Note

Ensure even pressure in all tires.

Specified value 2 ... 2,5 bar (29 ... 36 psi)

5.34 Replacing the dry air filter cartridge

Perform cleaning, maintenance and repair work only with the engine shut down. Do not start the engine after removing the filter element.

The air filter cartridge must be replaced after 6 cleaning intervals, but at the latest after one year.

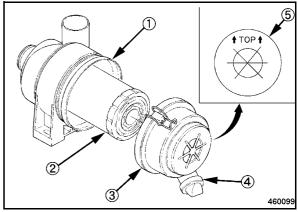


Fig. 140

- Unclip the clamps on the housing cover (3) (Fig. 140) and take off the cover.
- Pull the air filter cartridge (2) out of the air filter housing (1).

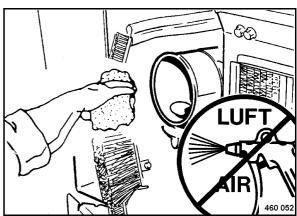


Fig. 141

• Clean out the air filter housing with a cloth (Fig. 141).

As required

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

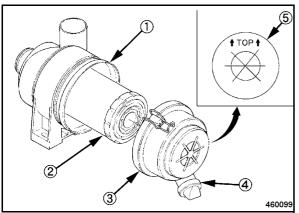


Fig. 142

 Insert the new air filter cartridge (2) (Fig. 142), attach the housing cover (3) with the "TOP" marking (5) pointing up and fasten it with the clamps.

If the clamps are not fastened correctly dirt and dust may be drawn in. This can damage the engine.

5.35 Water sprinkler system, maintenance in the event of frost

In the event of frost the water sprinkler system must be drained or filled with an anti-freeze mixture respectively.

- Drain all water off.
- Switch the water sprinkler system on and let all remaining water run out.
- Fill the water tank with approx. 5 I of antifreeze mixture (water and anti-freeze agent, e.g. glycol).
- Run the sprinkler system, until the anti-freeze mixture starts to run out from the sprinkler tubes.

5.36 Tightening torques for screws with metric unified thread

Bolt dimensions	Tightening torques* ft - Ib		
Bott dilliensions	8.8	10.9	12.9
M4	2	3	4
M5	4	7	7
M6	7	11	13
M8	18	26	33
M10	37	55	61
M12	65	91	108
M14	101	145	173
M16	156	221	264
M18	213	303	361
M20	304	426	513
M22	413	559	695
M24	524	738	885
M27	774	1092	1308
M30	1047	1482	1770

Fig. 143

* Strength classes for screws with untreated, nonlubricated surface. The quality designation of the screws is stamped on the screw heads.

8.8 = 8G

10.9 = 10K

12.9 = 12K

The values result in a 90% ige utilization of the screws yield point, at a coefficient of friction of tot. = 0.14.

The compliance with the specified tightening torques is checked with torque wrenches.

The specified tightening torques do not apply when using a MoS₂ lubricant.

j Note

Self locking nuts must always be replaced after they have been unscrewed.

5.37 Engine conservation

Mark a machine with conserved engine by attaching a clearly visible warning tag.

i Note

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 the engine, including the cooling system: With cold cleansing agent and a 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 anticorrosion engine oil.
- Drain the fuel from the fuel tank, mix it well with 10% anti-corrosion oil and fill it in again. Instead of mixing anti-corrosion oil to the fuel the tank may also be filled with injection pump testing oil with anti-corrosive properties (e.g. Calibration Fluid B).
- Run the engine for 10 minutes until all lines, filter, pump and nozzles are filled with the conserving mixture and the new engine oil is distributed to all parts.
- After this run remove the cylinder head cover and spray the rocker chamber with a mixture of diesel fuel and 10% anti-corrosion oil. Reassemble the hood.
- Now crank the engine several times (throttle lever in stop-position) to spray the combustion chamber.

As required

- Take the V-belt off and spray the grooves on the V-belt pulleys with anti-corrosion oil. Remove the anti-corrosion oil before restarting the machine.
- Close the air intake opening on the air filter and the exhaust opening.

6 Trouble shooting

6.1 General notes

The following work must only be carried out by qualified and trained personnel or by the BOMAG sales service.

Please observe strictly the safety regulations in chapter 2 of these operating and maintenance instructions.

Malfunctions are frequently caused by incorrect operation of the machine or insufficient maintenance. Whenever a fault occurs you should therefore thoroughly read these instruction 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 the service departments at our branch offices or dealers.

On the following pages you will find a selection of fault remedies. It goes without saying that not all possible reasons for faults could be listed.

▲ Danger

Danger of injury!

Do not touch rotating parts of the engine.

6.2 Engine problems

Fault	Possible cause	Remedy
No or poor start- ing of engine	Fuel tank empty	Fill fuel tank
	Fuel filter clogged, in winter due to paraf- fin separation	Change the fuel filter, use winter fuel
	Fuel lines leaking	Check all line connections for leaks and tighten the fittings, bleed the fuel system
	Travel lever not in "0"-position	Shift the travel lever to position "0".
	Battery discharged or not connected, battery power too low	Charge the battery, clean the terminal clamps, tighten and cover them with acid-free grease, have battery tested
	Emergency stop push button is locked	Unlock the emergency stop switch
	Incorrect valve clearance	Adjusting the valve clearance
	especially during winter: use of too viscous engine oil	Use the correct engine oil for the ambient temperatures
Engine runs ir- regularly with poor power	Fuel supply too low, fuel system clogged by paraffin separation (winter operation)	Change the fuel filter, check line connections for leaks and tighten fittings, us winter fuel under cold conditions
	The specified valve clearance is not correct	Adjusting the valve clearance
	Injection valve or injection pump defective	Have examined by a specialist
	Air filter cartridge soiled	clean, if necessary use a new one
	Excessive play in throttle cable	Adjust the throttle cable, replace if necessary
Engine looses power and speed, exces- sive 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, if necessary use a new one
	Poor compression due to burned or bro- ken piston rings or incorrect valve clear- ance	Have piston rings and pistons examined by a specialist, adjust the valve clearance
	Injection valve defective	Have examined by a specialist

Trouble shooting

Fault	Possible cause	Remedy
Engine over- heating, engine must be shut down immedi- ately!	Radiator heavily soiled	Clean the cooling fins
	Coolant level too low.	Fill up coolant
	Injection valve defective	Have examined by a specialist
	Engine oil level too low	Fill up oil down to the top dipstick mark
	Injection pump displacement not correctly adjusted	Have corrected by a specialist
	Insufficient cooling air supply to the cooling fan	Remove any clogging from the cooling air duct
	V-belt loose or broken	Retighten or replace the V-belt
	Air filter cartridge soiled	clean, if necessary use a new one
Engine has too low oil pressure, engine must be immediately shut down!	Leaks in the lubrication system, oil level too low Engine oil with wrong SAE viscosity class	Check fittings on oil lines and lubrication oil filter for leaks, if necessary tighten all fittings Fill up engine oil down to the top mark on the dipstick Engine oil change
Charge control light lights up during operation	The generator does not charge the battery, because of defect on generator or regular	Have examined by a specialist



We will help you - immediately!

Operating, maintenance, repair instructions and spare parts catalogues



- in situ:

- · Safe and simple trouble shooting
- Secure access to required spare parts
- Easy to understand from experts for users
 Contact us or your BOMAG distributor!

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