



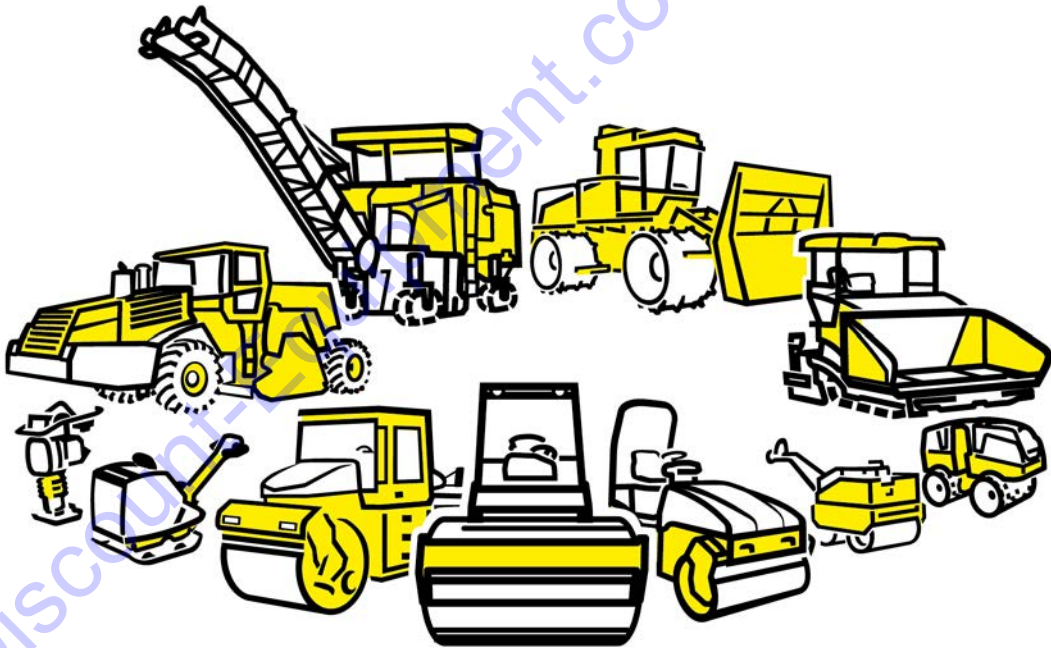
BOMAG

FAYAT GROUP

Operating Instruction Maintenance Instruction

Original Operating Instructions

BP 25/50



S/N 101 230 17 1001>

Single direction vibratory plate



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Table of contents

1	Introduction.....	7
1.1	Foreword.....	8
1.2	Machine type plate and engine type plate.....	10
2	Technical data.....	11
2.1	Noise and vibration data.....	14
2.1.1	Noise data.....	14
2.1.2	Vibration data.....	14
3	Concerning your safety.....	15
3.1	General prerequisites.....	16
3.1.1	General.....	16
3.1.2	Explanations to signal words used:.....	16
3.1.3	Personal protective outfit.....	17
3.1.4	Intended use.....	18
3.1.5	Unintended use.....	18
3.2	Terminological definition of the responsible persons.....	20
3.2.1	Operating company.....	20
3.2.2	Expert / qualified person.....	20
3.2.3	Driver / operating personnel.....	20
3.3	Fundamentals for safe operation.....	22
3.3.1	Remaining dangers, remaining risks.....	22
3.3.2	Regular safety inspections.....	22
3.3.3	Changes and conversions to the machine.....	22
3.3.4	Damage, deficiencies, misuse of safety installations.....	22
3.4	Handling fuels and lubricants.....	23
3.4.1	Preliminary remarks.....	23
3.4.2	Safety regulations and environmental protection regulations for handling oil.....	24
3.4.3	Safety regulations and environmental protection regulations for handling gasoline.....	25
3.4.4	Safety regulations and environmental protection regulations for handling fuel stabiliser.....	26
3.5	Loading/transporting the machine.....	27
3.6	Taking the machine into service.....	28
3.6.1	Before commissioning.....	28
3.6.2	Spark protection.....	28
3.6.3	Starting the engine.....	28
3.7	Operation.....	29
3.7.1	Persons in the danger area.....	29
3.7.2	Operation.....	29
3.7.3	Parking the machine.....	29
3.8	Refuelling.....	30
3.9	Maintenance work.....	31
3.9.1	Preliminary remarks.....	31
3.9.2	Maintenance work on the engine.....	31
3.9.3	Cleaning work.....	31
3.9.4	After maintenance work.....	31
3.10	Repair.....	32

Table of contents

3.11	Stickers and decals.....	33
4	Display and control elements.....	35
4.1	Engine.....	36
4.1.1	Overview.....	36
4.1.2	Start switch.....	36
4.1.3	Throttle lever.....	37
4.1.4	Choke lever.....	37
4.1.5	Recoil starter.....	37
4.1.6	Fuel valve.....	38
4.2	Water sprinkling system.....	39
4.2.1	Rotary button for water sprinkling system.....	39
4.3	Transport wheels.....	40
4.3.1	Transport wheels with steering bow in middle position.....	41
5	Tests before taking into operation.....	43
5.1	Notes on safety.....	44
5.2	Visual inspections and function tests.....	45
5.3	Checking the engine oil level.....	46
5.4	Checking the fuel level, topping up fuel.....	47
5.5	Checking the water level, topping up.....	48
6	Operation.....	49
6.1	Assembling the steering bow.....	50
6.2	Start the engine.....	51
6.3	Operation.....	54
6.4	Switching the water sprinkling system on/off.....	55
6.5	Park the machine in secured condition.....	56
7	Loading/transporting the machine.....	57
7.1	Loading the machine.....	58
7.2	Lashing the machine to the transport vehicle.....	59
7.3	Transport wheels.....	60
7.3.1	Transport wheels with steering bow in middle position.....	61
8	Maintenance.....	63
8.1	Preliminary remarks and safety notes.....	64
8.2	Fuels and lubricants.....	65
8.2.1	Engine oil.....	65
8.2.2	Fuel.....	65
8.3	Table of fuels and lubricants.....	67
8.4	Running-in instructions.....	68
8.4.1	General.....	68
8.4.2	After 25 operating hours.....	68
8.5	Maintenance table.....	69
8.6	Weekly.....	70
8.6.1	Check, clean the air filter, replace if necessary.....	70
8.7	Monthly.....	73
8.7.1	Clean the cooling fins and the cooling air intake openings.....	73
8.8	Half-annually.....	75

8.8.1	Changing the engine oil.....	75
8.8.2	Cleaning, checking the spark plug, replacing if necessary.....	76
8.8.3	Cleaning the slurry filter.....	77
8.8.4	Checking the oil level in the exciter housing.....	78
8.8.5	Servicing the V-belt.....	78
8.9	Annually.....	81
8.9.1	Checking, adjusting the valve clearance.....	81
8.9.2	Cleaning the fuel screen.....	83
8.9.3	Replacing the starter rope.....	85
8.9.4	Change the oil in the exciter housing.....	87
8.9.5	Checking the rubber buffers.....	87
8.10	As required.....	89
8.10.1	Cleaning the machine.....	89
8.10.2	Cleaning the water sprinkling system.....	89
8.10.3	Measures to be applied for longer periods of rest.....	90
9	Trouble shooting.....	93
9.1	Preliminary remarks.....	94
9.2	Engine faults.....	95
9.3	What to do if the engine has flooded.....	97
10	Waste disposal.....	99
10.1	Final shut-down of machine.....	100
11	List of special tools.....	101

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1.1 Foreword

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

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

The machine described in this manual complies with the applicable standards and safety regulations.

If your machine is used in traffic on public roads, it must comply with all applicable national legal regulations. The driving permit must be acquired from the responsible authorities.

The machine is equipped with latest technology. Now it's a matter of handling your machine properly and keeping it in good shape.

These instructions will provide you with all necessary information. Read and follow these notes before starting to operate your machine!

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

This manual was written for operators and maintenance personnel.

These operating and maintenance instructions are part of the machine.

You should only operate the machine in compliance with these instructions.

Strictly observe the safety regulations.

If you are not yet acquainted with the controls and indicating elements on this machine, you should thoroughly read the corresponding section *Chapter 4 'Display and control elements' on page 35* beforehand.

The description of the individual operating steps, including the notes on safety to be followed, can be found in chapter "Operation" *Chapter 6 'Operation' on page 49*.

Thorough maintenance of the machine guarantees far longer safe functioning of the machine and prolongs the lifetime of important components. The effort required for this purpose is by any means lower than the faults that may occur in case of non-compliance.

The machine must only be serviced by qualified and authorized personnel. A description of all necessary service work as well as information on fuels and lubricants can be found in the chapter "Maintenance" *Chapter 8 'Maintenance' on page 63*.

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

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

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

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

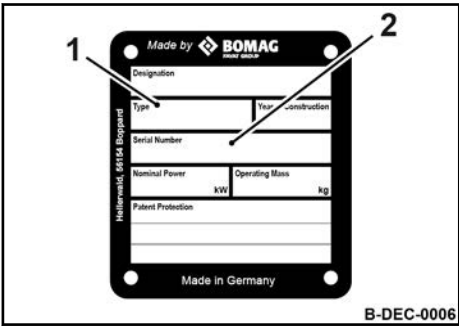
Apart from that, you can also order the spare parts catalogue against the serial number of your machine.

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

We wish you successful work with your BOMAG machine.

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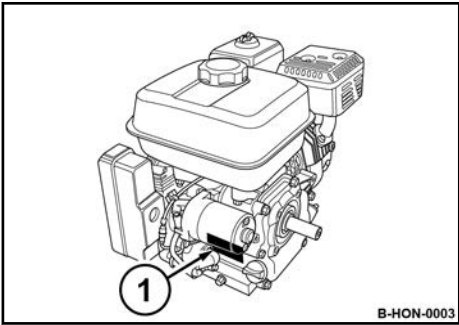
1.2 Machine type plate and engine type plate



Please enter here:	
Machine type (1):	
Serial number (2):	

Fig. 1: Machine type plate (example)

Engine type and engine number



Please enter here:	
Engine type:	
Engine number:	

Fig. 2

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Technical data

Dimensions

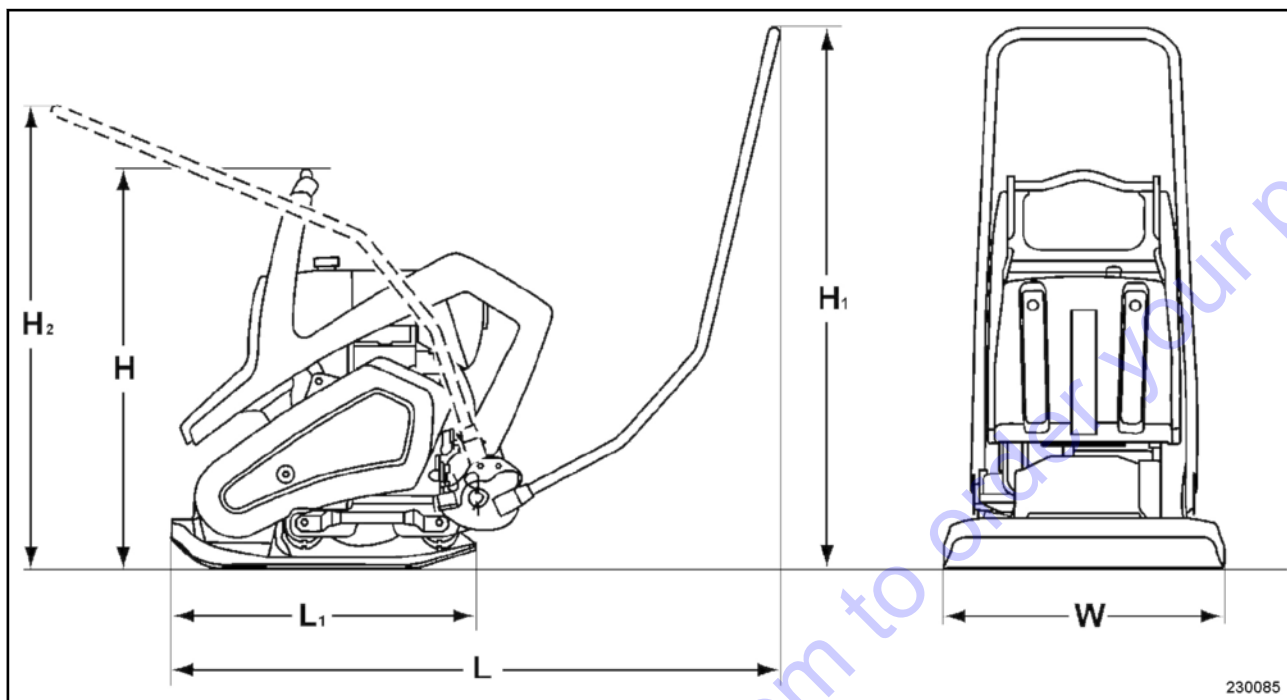


Fig. 3

H	H ₁	H ₂	L	L ₁	W
658	962	700	1084	542	500
(25.9)	(37.9)	(27.6)	(42.7)	(21.3)	(19.7)

Dimensions in millimetre
(Dimensions in inch)

Weights			
Operating weight (CECE)		108	kg
		(238)	(lbs)
Basic weight		107	kg
		(236)	(lbs)
Water sprinkling system (<i>optional equipment</i>)		+ 10	kg
		(+ 22)	(lbs)
Transport wheels (<i>optional equipment</i>)		+ 4	kg
		(+ 9)	(lbs)

Technical data

Travel characteristics		
Max. working speed	30 (98)	m/min (ft/min)
Max. gradability (depending on soil)	30	%

Drive		
Engine manufacturer	Honda	
Type	GX 160	
Cooling	Air	
Number of cylinders	1	
Rated power SAE J 1349	3.6 (4.8)	kW (hp)
Rated speed	3600	min ⁻¹
Drive system	mechanical	

Exciter system		
Frequency	92 (5520)	Hz (vpm)
Centrifugal force	25 (5620)	kN (lbf)
Amplitude	1.11 (0,044)	mm (in)

Water sprinkling system (optional equipment)		
Type of sprinkling	Gravity feed	

Filling capacities		
Fuel (gasoline)	3.1 (0.8 each)	l (gal us)
Water sprinkling system	13.5 (3.6 each)	l (gal us)

2.1 Noise and vibration data

The following noise and vibration data were determined in accordance with the following guidelines under equipment specific conditions and by using harmonized standards:

- EC Machine Directive edition 2006/42/EC
- Noise Emission Directive 2000/14/EC, Noise Protection Directive 2003/10/EC
- Vibration Protection Directive 2002/44/EC

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

2.1.1 Noise data

Sound pressure level at the operator's place

$L_{pA} = 94$ dB(A), determined acc. to ISO 11204 and EN 500.



WARNING!

Loss of hearing caused by too high noise burdens!

- Wear your personal protective outfit (ear defenders).

Guaranteed sound power level

$L_{WA} = 108$ dB(A), determined acc. to ISO 3744 and EN 500.

2.1.2 Vibration data

Hand-arm vibration

Vector total of the weighted effective acceleration in three orthogonal directions:

Weighted total vibration value

$a_{hv} = 5.2$ m/s² on crushed rock determined acc. to ISO 5349 and EN 500.

Observe the daily vibration load (Industrial safety acc. to 2002/44/EEC).

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3.1 General prerequisites

3.1.1 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, the customer must obtain the relevant signatures as confirmation.

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 the safety regulations and to apply these accordingly. This also applies for local regulations and regulations concerning different types of handling activities. 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.

3.1.2 Explanations to signal words used:



DANGER!

Danger to life if failing to comply!

Sections marked like this point to an extremely dangerous situation that could lead to fatal or severe injuries, if this warning is disregarded.



WARNING!

Danger to life or danger of severe injuries if failing to comply!

Sections marked like this point to a dangerous situation that could lead to fatal or severe injuries, if this warning is disregarded.

Concerning your safety – General prerequisites



CAUTION!

Danger of injury if failing to comply!

Sections marked like this point to a dangerous situation that could lead to minor injuries, if this warning is disregarded.



NOTICE!

Danger of material damage if failing to comply!

Sections marked like this highlight possible dangers for machines or components.



Sections marked like this provide technical information or notes on using the machine or its components.






ENVIRONMENT!

Environmental damage if failing to comply!





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

3.1.3 Personal protective outfit

Depending on the work to be carried out, personal protective outfit is required (to be provided by the operating company):

	Working clothes	Tight fitting working clothes with low tear resistance, tight sleeves and without any projecting parts protects against being caught by moving components.
	Safety shoes	To protect against heavy falling parts and slipping on slippery ground.
	Protective gloves	To protect the hands against excoriation, punctures or deep injuries, against irritating and caustic substances as well as against burns.

Concerning your safety – General prerequisites

	Safety goggles	To protect the eyes against airborne particles and fluid squirts.
	Face protection	To protect the face against airborne particles and fluid squirts.
	Hard hat	To protect the head against falling parts and to protect against injuries.
	Hearing protection	To protect the hearing against too loud noise.

3.1.4 Intended use

This machine must only be used for:

- Compaction of all types of soils
- Repair work on all types of soil
- Paving of walkways
- Work in trenches
- Underfilling and compaction of hard shoulders

Intended use also includes compliance with the specified operating, maintenance and repair measures.

3.1.5 Unintended use

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

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

Examples for unintended use are:

- dragging the machine along as a measure of transportation
- throwing the machine off the transport vehicle
- attaching an additional weight to the machine

It is not permitted to stand on the machine while working.

Concerning your safety – General prerequisites

Any transport ropes fastened to the machine must be removed before operation.

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

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3.2 Terminological definition of the responsible persons

3.2.1 Operating company

The operating company is the natural or juridical person who uses the machine or in who's name the machine is used.

The operating company must make sure that the machine is only used for the purpose it is intended for and in strict compliance with the safety regulations mentioned in these operating and maintenance instructions.

The operating company must determine and assess the danger in his operation. It must then take appropriate action to ensure health and safety at work for his employees and point out any remaining dangers.

The operating company must make sure that all users read and understand the information concerning safety.

The operating company is responsible for the planning and professional execution of regular safety inspections.

3.2.2 Expert / qualified person

An expert / qualified person is a person who, based on his/her professional education and experience, has profound knowledge in the field of construction equipment and the machine in question in particular.

This person is acquainted with the applicable governmental industrial safety regulations, accident prevention instructions, guidelines and generally acknowledged technical rules and regulations (standards, directives, technical rules of other member states of the European Union or other contractual states concerning the agreement about the European Economic Area) in as far as is necessary to be able to judge the safe condition of these machines.

3.2.3 Driver / operating personnel

This machine must only be operated by trained, instructed persons entrusted by the operating company aged 18 or more.

Observe your local laws and regulations.

Rights, obligations and rules of conduct for driver / operating personnel:

The driver or the operating personnel must:

- be instructed about his rights and obligations,
- wear protective equipment as appropriate for the application,
- have read and understood the operating instructions,
- have made himself familiar with the operation of the machine,
- be physically and psychologically able to drive and operate the machine.

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

Concerning your safety – Terminological definition of the responsible persons

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

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3.3 Fundamentals for safe operation

3.3.1 Remaining dangers, remaining risks

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

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

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

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

3.3.2 Regular safety inspections

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

3.3.3 Changes and conversions to the machine

Unauthorized changes to the machine are prohibited for safety reasons.

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

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

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

3.3.4 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.

3.4 Handling fuels and lubricants

3.4.1 Preliminary remarks

The operating company must ensure that all professional users have read and follow the corresponding safety data sheets for the individual fuels and lubricants.

Safety data sheets provide valuable information about the following characteristics:

- Designation of the substance
- Possible dangers
- Composition / information about constituents
- First-Aid measures
- Fire fighting measures
- Measures in case of accidental release
- Handling and storage
- Limitation and monitoring of exposure / personal protective equipment
- physical and chemical properties
- Stability and reactivity
- Toxicological data
- Environmental data
- Notes on waste disposal
- Information on transport
- Legislation
- other data

3.4.2 Safety regulations and environmental protection regulations for handling oil

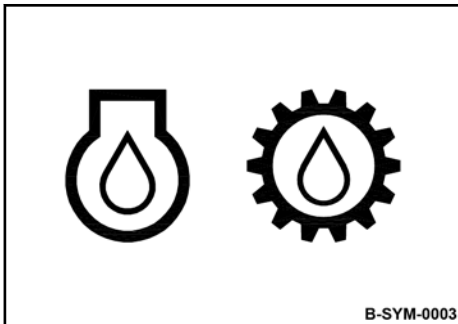


Fig. 4



WARNING!

Danger of burning by ignited oil!

- Do not allow oil to come into contact with hot components.
- Smoking and open fire is prohibited!
- Wear your personal protective outfit (protective gloves, protective clothing).



CAUTION!

Health hazard caused by contact with oil!

- Wear your personal protective outfit (protective gloves, protective clothing).
- Do not inhale any oil vapours.
- Avoid contact.



CAUTION!

Danger of slipping on spilled oil!

- Immediately bind spilled oil with an oil-binding agent.



ENVIRONMENT!

Oil is an environmentally hazardous substance

- Always keep oil in proper containers.
- Immediately bind spilled oil with an oil-binding agent.
- Dispose of oil and oil filter according to regulations.

3.4.3 Safety regulations and environmental protection regulations for handling gasoline

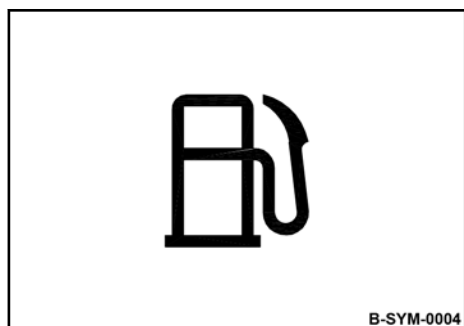


Fig. 5



DANGER!

Danger to life caused by explosive gas-air mixes!

- Do not allow gasoline to come into contact with hot components.
- Smoking and open fire is prohibited.
- Keep away from heat sources, sparks and other sources of ignition.
- Do not spill any gasoline.



WARNING!

Health hazard caused by contact with gasoline!

- Wear your personal protective outfit (protective gloves, protective clothing).
- Do not inhale any fuel fumes.
- Do not swallow gasoline.
- Avoid contact with gasoline.



ENVIRONMENT!

Gasoline is an environmentally hazardous substance!

- Always keep gasoline in proper containers.
- Immediately bind spilled gasoline with an oil-binding agent and dispose of in accordance with regulations.
- Dispose of gasoline and fuel filter according to regulations.

3.4.4 Safety regulations and environmental protection regulations for handling fuel stabiliser



WARNING!

Danger of burning by ignited fuel stabilizer!

- Do not allow fuel stabilizer to come into contact with hot components.
- Smoking and open fire is prohibited.



WARNING!

Health hazard caused by contact with fuel stabilizer!

- Wear your personal protective outfit (protective gloves, protective clothing).
- Do not inhale any fuel stabilizer fumes.
- Do not swallow fuel stabilizer.
- Avoid contact with fuel stabilizer.



ENVIRONMENT!

Fuel stabilizer is an environmentally hazardous substance!

- Immediately bind spilled fuel stabilizer with an oil-binding agent and dispose of according to regulations.
- Dispose of fuel stabilizer according to regulations.

3.5 Loading/transporting the machine

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

Do not use damaged or in any other way impaired lashing points.

Always use appropriate lifting and lashing means on the lifting and lashing points.

Use lifting and lashing gear only in the prescribed direction of load application.

Lifting tackle must not be damaged by machine components.

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

Loads must only be attached and hoisted by an expert / capable person.

Use only lifting gear and lifting tackle with sufficient load bearing capacity for the weight to be loaded.

Fasten the lifting gear only at the specified lifting points.

Danger to the life of persons if they step or stand under a suspended load.

When lifting the machine avoid uncontrolled movements of the load. If necessary hold the load with guide ropes.

3.6 Taking the machine into service

3.6.1 Before commissioning

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.

Use your personal protective outfit (hard hat, safety boots, if necessary also goggles and ear defenders).

Before starting the machine check whether:

- the machine shows any obvious faults,
- all guards and safety elements are in place,
- the controls are fully functional,
- that the machine is free of oily and combustible materials,
- all grips are free of grease, oils, fuel, dirt, snow and ice.

If the following tests reveal damages or other faults, the machine must not be operated, until these deficiencies have been corrected.

3.6.2 Spark protection

The spark protection is optional.

In some areas of use operation of an engine without spark protection is not permitted.

Check the locally valid legislation and regulations.

3.6.3 Starting the engine

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

The machine must not be operated with damaged, missing or non-functional safety installations.

Before starting and moving the machine make sure that there are no persons inside the danger zone.

Operate the machine only with the steering bow mounted and lowered.

Always keep an eye on the machine when the engine is running and hold it by the steering bow.

Do not inhale exhaust fumes, because they contain toxic substances, which could cause damage to health, unconsciousness or even death.

Avoid operation in closed or partly closed rooms, or ensure adequate ventilation when working in trenches.

3.7 Operation

3.7.1 Persons in the danger area

Before taking up work, also after breaks, you should always convince yourself that the danger zone is free of persons or obstructions.

Give warning signals, if necessary. Stop work immediately if persons remain in the danger zone, despite the warning.

3.7.2 Operation

Steer the machine only by the steering bow.

Guide the machine so that your hands do not hit against solid objects.

Watch out for unusual noises and development of smoke. Perform trouble shooting and have the fault corrected.

3.7.3 Parking the machine

Park the machine on horizontal, level, firm ground.

Before leaving the machine:

- Shut down the engine,
- Secure the machine against accidental tipping over,
- Secure the machine against unauthorized use.

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

3.8 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.

Keep away from ignition and heat sources.

Apply measures against electrostatic charging.

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.

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3.9 Maintenance work

3.9.1 Preliminary remarks

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

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

Do not touch hot engine parts.

Keep unauthorized persons away from the machine.

Generally perform maintenance work only with the engine shut down and the spark plug socket disconnected.

Park the machine on horizontal, level, firm ground.

3.9.2 Maintenance work on the engine

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

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

When working on the air filter no dirt should fall into the air duct.

Do not work on the hot exhaust - danger of burning!

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

3.9.3 Cleaning work

Do not perform cleaning work while the motor is running.

Allow the engine to cool down before starting cleaning work.

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

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

Do not direct the water jet directly into the air filter, carburettor, recoil starter, air intake or starter switch.

3.9.4 After maintenance work

Reassemble all guards and protections.

3.10 Repair

Identify a defect machine with a warning sign.

Only operate the machine after it has been repaired.

When replacing safety relevant components, only original spare parts must be used.

Repairs must only be performed by an expert/qualified person.

When performing welding work on the machine you should cover the fuel tank with insulating material.

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3.11 Stickers and decals

Keep stickers/decals in good and legible condition (see spare parts catalogue) and comply with their meaning.

Replace damaged and illegible stickers/decals immediately.

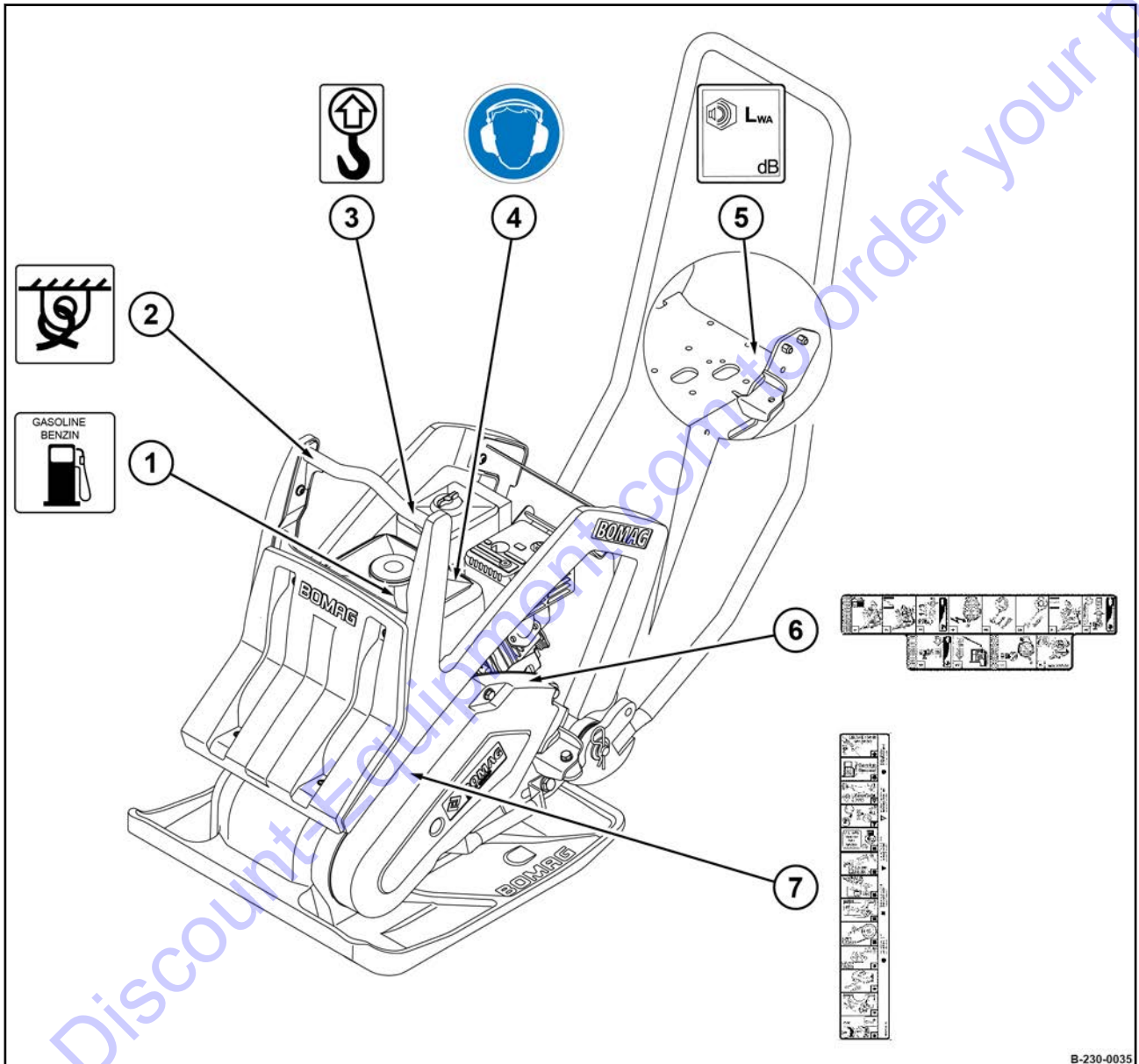
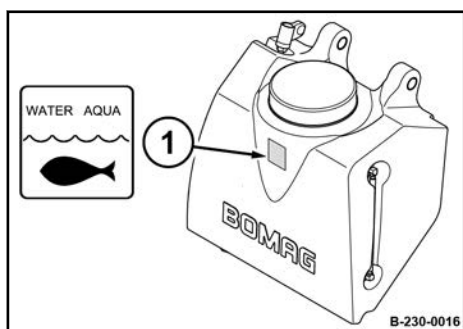


Fig. 6: Stickers and decals

- 1 Information sticker - Gasoline
- 2 Information sticker - Lashing point
- 3 Information sticker - Lifting point
- 4 Instruction sticker - Wear ear defenders
- 5 Information sticker - Guaranteed sound capacity level
- 6 Brief operating instructions
- 7 Maintenance sticker

Concerning your safety – Stickers and decals



1 Information sticker - Water

Fig. 7: Stickers on water tank

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Go to Discount-Equipment.com to order your parts

4.1 Engine

4.1.1 Overview

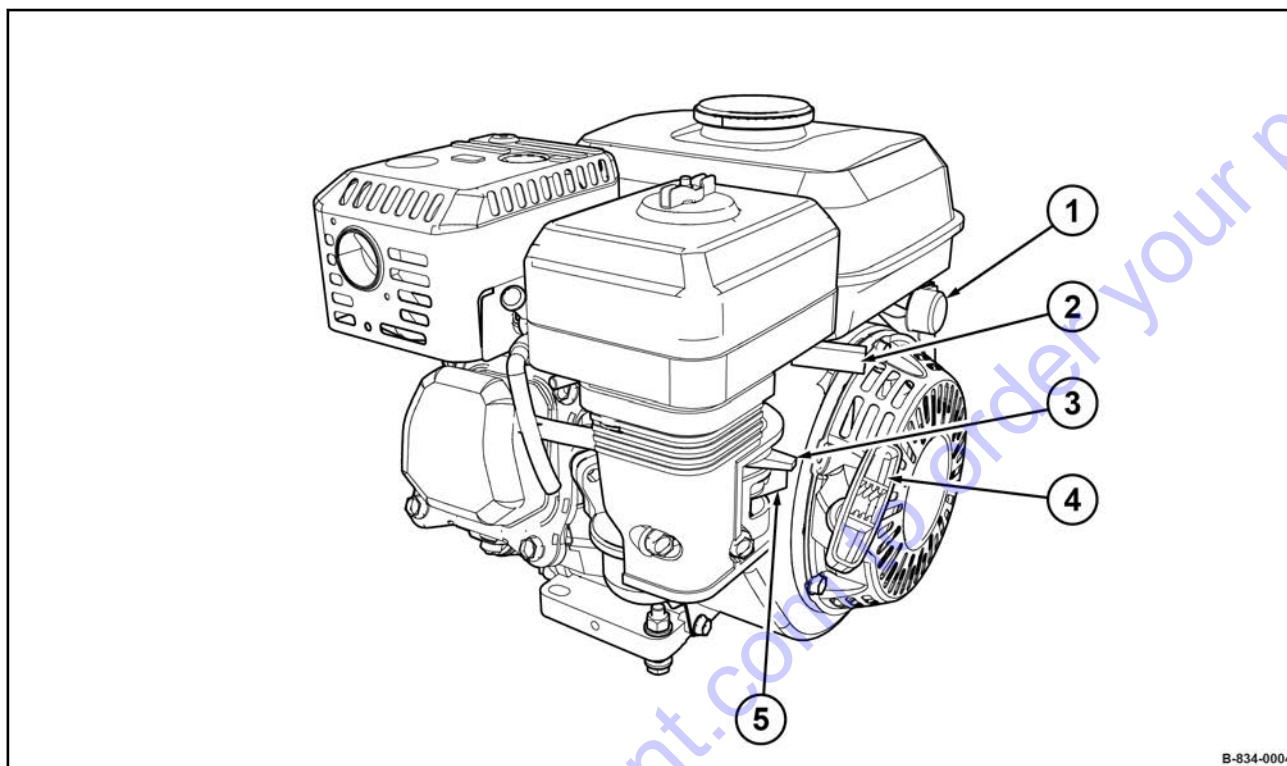


Fig. 8

- 1 Start switch
- 2 Throttle lever
- 3 Choke lever
- 4 Recoil starter
- 5 Fuel valve

4.1.2 Start switch

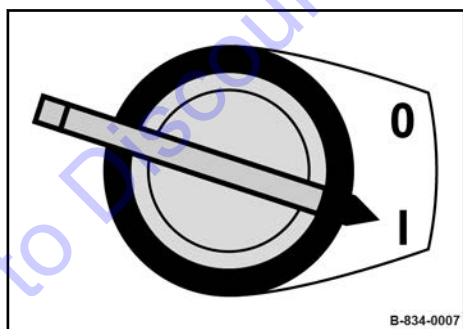
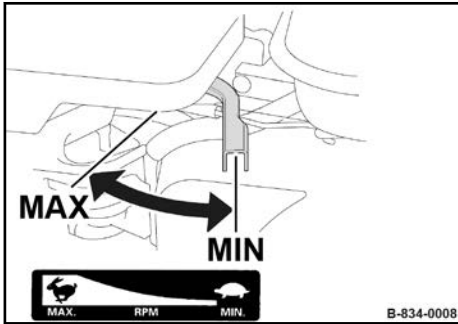


Fig. 9

Position "0"	Ignition off
Position "I"	Ignition on

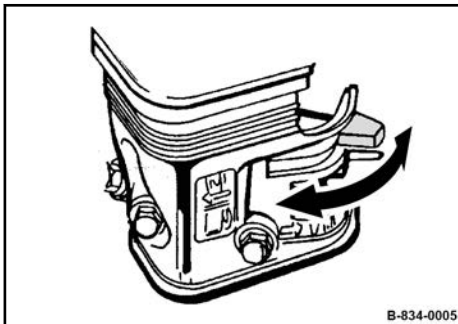
4.1.3 Throttle lever



Position "MIN"	Idle speed
Position "MAX"	Maximum speed

Fig. 10

4.1.4 Choke lever



Position "Left"	Choke closed
Position "Right"	Choke open

Fig. 11

4.1.5 Recoil starter

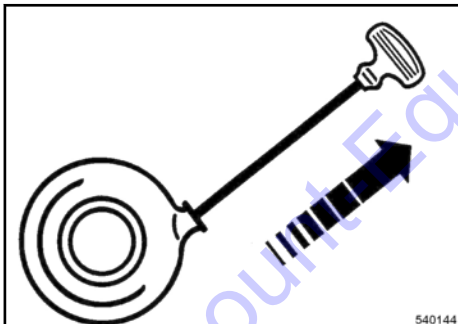


Fig. 12

4.1.6 Fuel valve

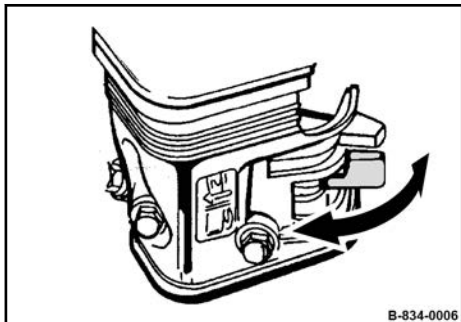


Fig. 13

Position "Left"

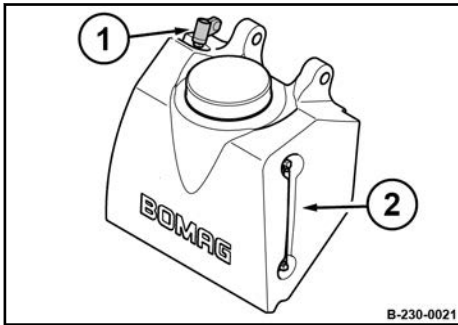
Fuel valve closed

Position "Right"

Fuel valve open

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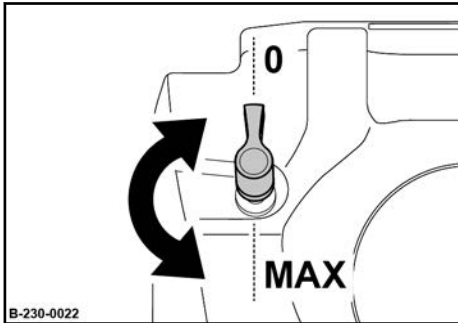
4.2 Water sprinkling system



- 1 Rotary button for water sprinkling system
- 2 Water level gauge

Fig. 14

4.2.1 Rotary button for water sprinkling system



Position "0"	Water sprinkling system off
turn anticlockwise	Water sprinkling system on infinite adjustment of the sprinkling quantity up to position "MAX"

Fig. 15

4.3 Transport wheels

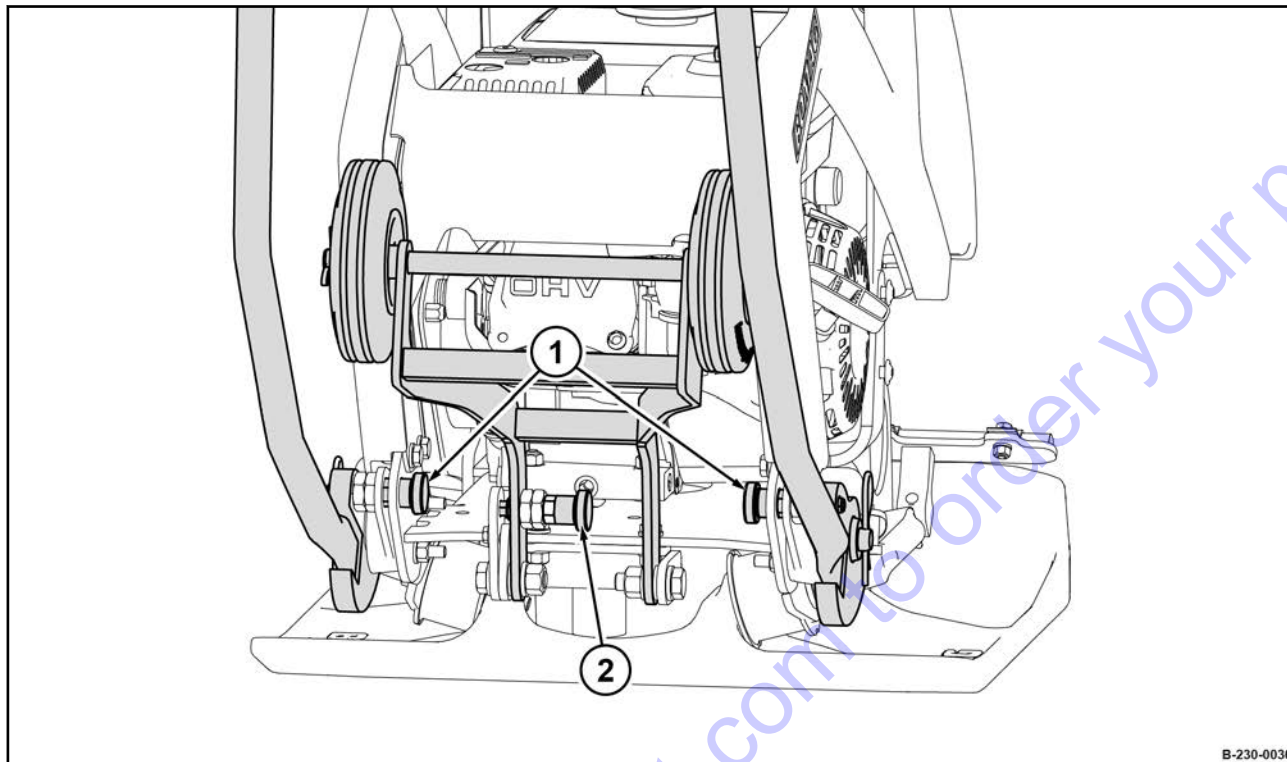


Fig. 16

- 1 Locking of guide handle
- 2 Locking of transport wheels



Optional equipment

4.3.1 Transport wheels with steering bow in middle position

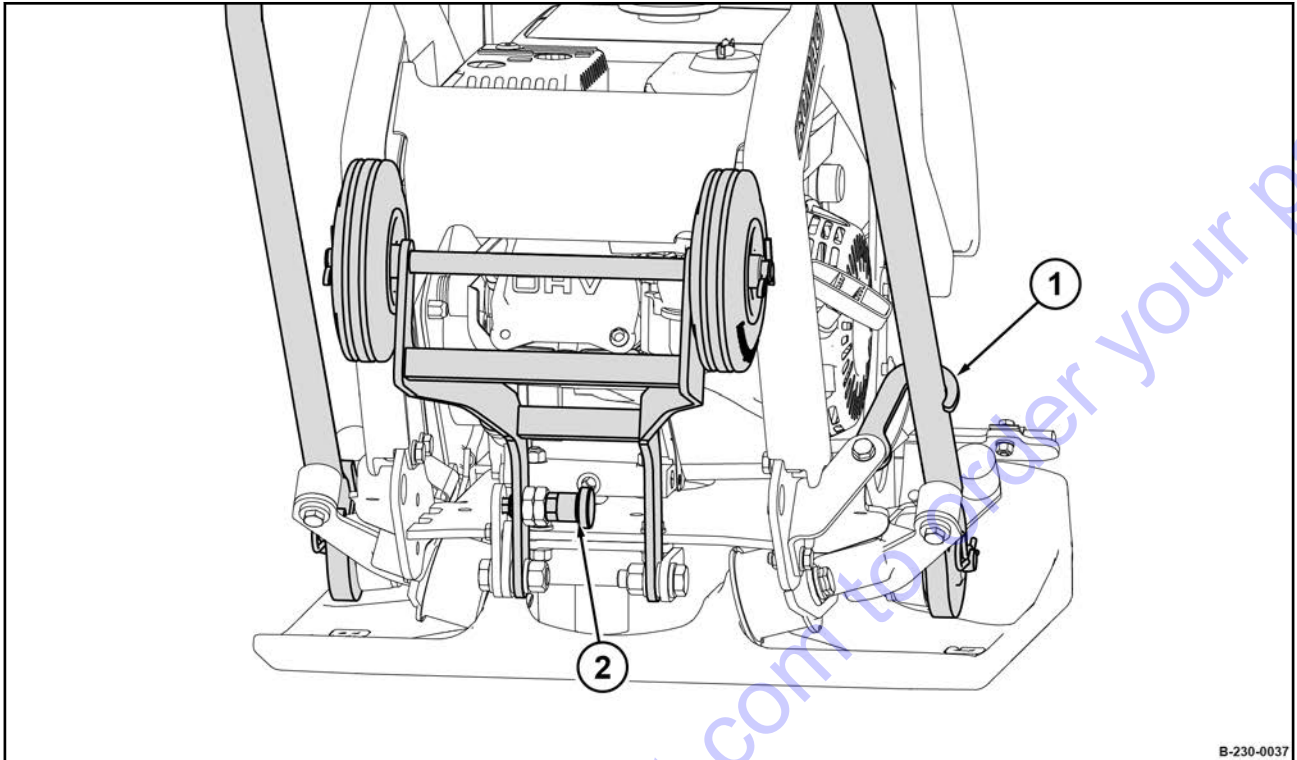


Fig. 17

- 1 Locking of guide handle
- 2 Locking of transport wheels

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5.1 Notes on safety

If the following tests reveal damages or other faults, the machine must not be operated, until these deficiencies have been corrected.

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

Do not change any fixed settings.



WARNING!

Health hazard caused by fuels and lubricants!

- Safety regulations and environmental protection regulations when handling fuels and lubricants must be followed ↪ *Chapter 3.4 'Handling fuels and lubricants' on page 23.*



WARNING!

Danger of injury caused by rotating parts!

- Before starting work on the machine make sure that the engine can not be started.

1. Park the machine in secured condition ↪ *Chapter 6.5 'Park the machine in secured condition.' on page 56.*

5.2 Visual inspections and function tests

1. Check fuel tank and lines for condition and leaks.
2. Check bolted connections for tight fit.
3. Check machine for contamination and damage.
4. Check the starter rope for chafing.

Go to Discount-Equipment.com to order your parts

5.3 Checking the engine oil level



NOTICE!

Danger of engine damage!

- Use only oil of the permitted specification ↪ Chapter 8.2.1 'Engine oil' on page 65.

Protective equipment: ■ Protective gloves

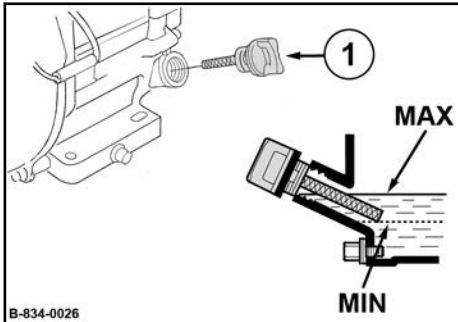


Fig. 18

1. Clean the area around the oil dipstick (1).
2. Unscrew the dipstick and wipe it clean with a lint-free, clean cloth.
3. Insert the dipstick into the oil filler socket, do not screw it in, but pull it out again to check the oil level.



NOTICE!

Danger of engine damage!

- Do not overfill with engine oil.

The oil level must always be between the "MIN"- and "MAX"-marks. If the oil level is too low, top up oil to the "MAX" mark immediately.

5.4 Checking the fuel level, topping up fuel



DANGER!

Danger to life caused by explosive gas-air mixes!

- Do not allow gasoline to come into contact with hot components.
- Smoking and open fire is prohibited.
- Keep away from heat sources, sparks and other sources of ignition.
- Do not spill any gasoline.



NOTICE!

Danger of engine damage!

- Monitor the entire refuelling process.
- Contaminated fuel can cause malfunction or even damage of the engine. If necessary, fill in fuel through a screen filter.
- Use only fuel of the permitted specification ↪ *Chapter 8.2.2 'Fuel' on page 65.*

Protective equipment: ■ Working clothes
■ Protective gloves

1. Park the machine in secured condition ↪ *Chapter 6.5 'Park the machine in secured condition.' on page 56.*
2. Clean the area around the filler opening.
3. Remove the tank filler cap.
4. Fill in fuel through a funnel with screen filter.
5. Close the fuel tank tightly.



Fig. 19

Tests before taking into operation – Checking the water level, topping up

5.5 Checking the water level, topping up



NOTICE!

Dirty or contaminated water can block the nozzles!

- Fill only with clean water.



NOTICE!

Components may get damaged by frost!

- Drain all water off if there is a risk of frost.
- The water system can alternatively be filled with an anti-freeze mixture.



ENVIRONMENT!

Anti-freeze mixture is an environmentally hazardous substance

After the frost period drain off the anti-freeze mixture, catch it and dispose of environmentally.

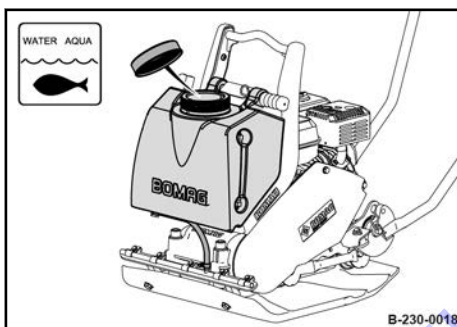


Fig. 20

1. Check the water tank filling level, replenish as necessary.
2. For filling up remove the locking cap and fill in clean water.

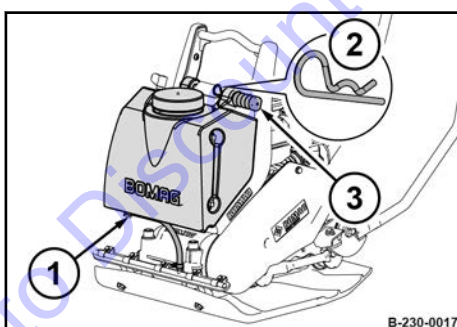


Fig. 21

The water tank can alternatively also be removed for filling.

1. Pull the hose (1) off the water tank.
2. Pull out the spring pin (2).
3. Pull out the bolt (3) and take off the water tank.
4. Insert the bolt through the guides on the water tank and insert the spring pin to lock.
⇒ The water tank can now be carried by the bolt.

Go to Discount-Equipment.com to order your parts

Operation – Assembling the steering bow

6.1 Assembling the steering bow

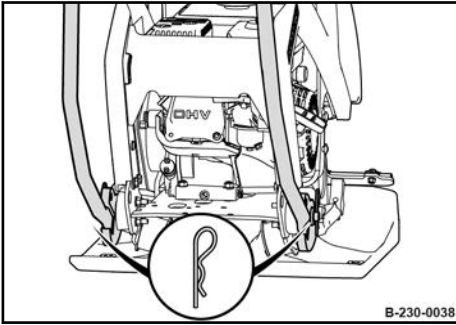


Fig. 22

1. Force the steering bow apart and plug it onto the bracket.
2. Lock and secure the steering bow on both sides with split pins.

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6.2 Start the engine

Exhaust fumes contain toxic substances, which could cause damage to health, unconsciousness or even death.



WARNING!

Danger of poisoning by exhaust gases!

- Do not inhale exhaust gases.
- Avoid operation in closed or partly closed rooms, or ensure adequate ventilation when working in trenches.



WARNING!

Loss of hearing caused by too high noise burdens!

- Wear your personal protective outfit (ear defenders).

Protective equipment: ■ Hearing protection
 ■ Safety shoes



The engine does not start if the oil level is too low.



Fig. 23

1. Fully open the fuel tap .

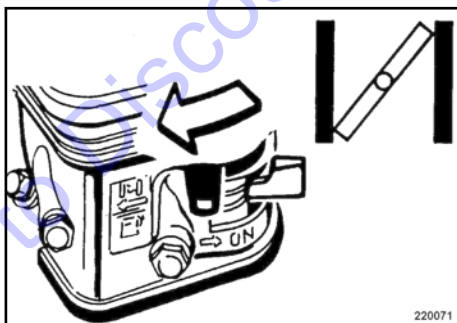


Fig. 24

- 2.



Do NOT operate the choke lever when the engine is warm or at high ambient temperatures.

Close the choke.

Operation – Start the engine

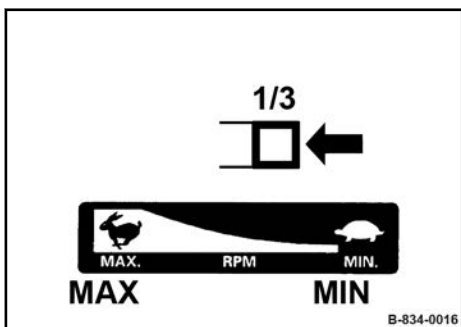


Fig. 25

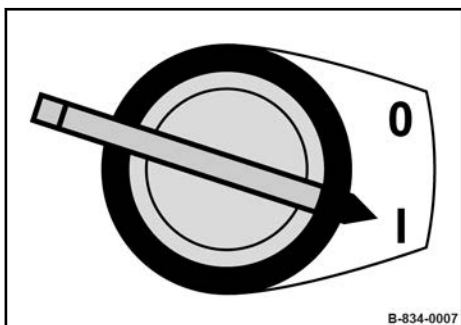


Fig. 26

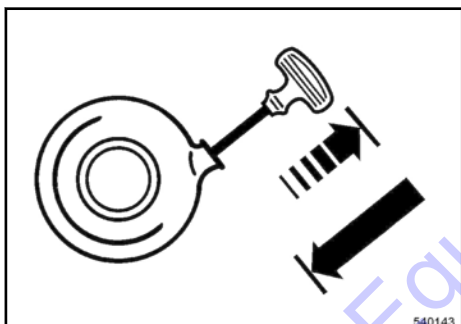


Fig. 27

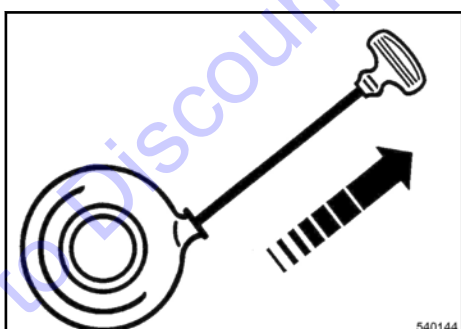


Fig. 28

3. Set the throttle lever to 1/3 throttle position.

4. Turn the starter switch to position "I" .

5. Pull the rope by the starter handle until resistance can be felt.

6. Guide the starter handle back to initial position.

7.



CAUTION!

Danger of injury caused by uncontrolled machine movement!

- Always hold on to a running machine.
- Always keep an eye on a running machine.



NOTICE!

The starter rope may tear off!

- Do not pull the starter rope all the way against the end stop.

Pull the starter handle quickly and with power.

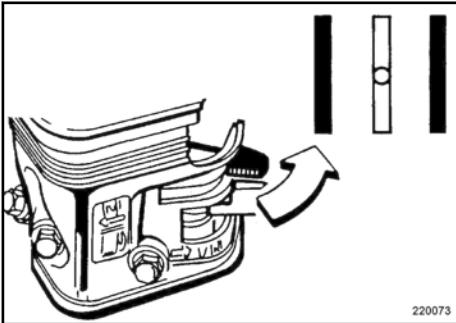


Fig. 29

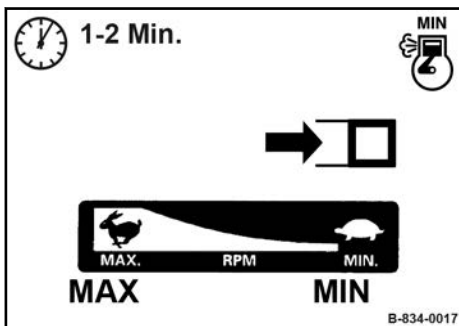


Fig. 30

8. Guide the starter handle back to initial position by hand.
9. If the engine does not start during the first attempt, repeat the starting process.
10. Open the choke bit by bit when the engine is running.

11. Set the throttle lever to position "MIN" and let the engine run at idle speed to warm up for 1 to 2 minutes.



NOTICE!

Danger of engine damage!

- Run the engine warm for a short while before starting work. Do not operate the engine immediately under full load.

⇒ Operation of the machine can be started as soon as the engine responds to short throttle commands.

12. Should the engine stop again after approx. 3 to 5 seconds:
 - Close the choke again.
 - Repeat the starting procedure.



If the recoil starter is frequently operated with the choke closed, the engine will draw in too much fuel and is unable to start. Chapter 9.3 'What to do if the engine has flooded' on page 97.

6.3 Operation

Steer the machine only by the guide handle.

Guide the machine so that your hands do not hit against solid objects.



CAUTION!

Danger of injury caused by uncontrolled machine movement!

- Always hold on to a running machine.
- Always keep an eye on a running machine.

Protective equipment: ■ Hearing protection
■ Safety shoes

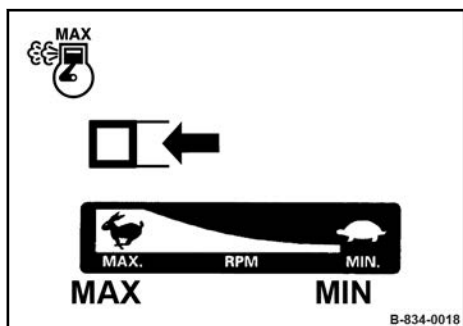


Fig. 31

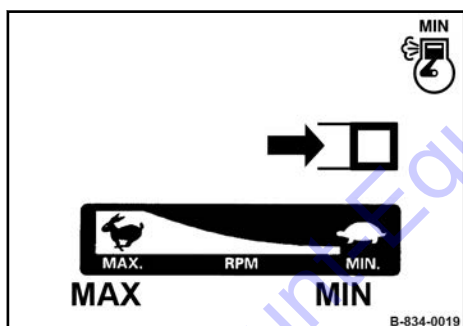


Fig. 32

1.



NOTICE!

The centrifugal clutch may be damaged!

- Operate the machine only with full engine speed.

Set the throttle lever to position "MAX".

⇒ The machine works with highest frequency.

2.

Always shift the throttle lever to position "MIN" for short work breaks.

⇒ This prevents premature wear of the centrifugal clutch.

6.4 Switching the water sprinkling system on/off

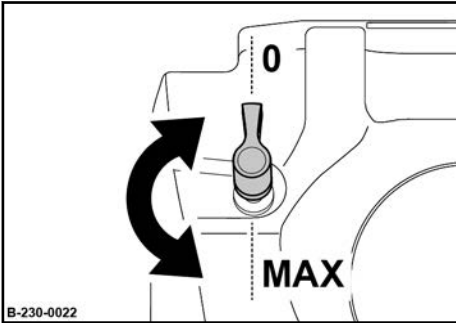


Fig. 33

1. Switch the water sprinkling system on or off with the rotary button:

Position "0"	Water sprinkling system off
turn anticlockwise	Water sprinkling system on infinite adjustment of the sprinkling quantity up to position "MAX"

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Operation – Park the machine in secured condition.

6.5 Park the machine in secured condition.

1. Park the machine on level and firm ground.
2. Set the throttle lever to position "MIN" (idle speed).

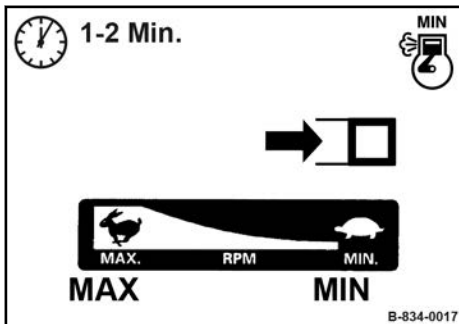


Fig. 34

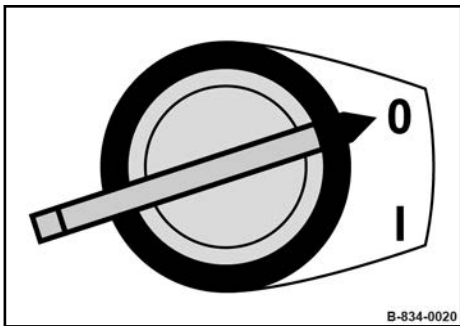


Fig. 35

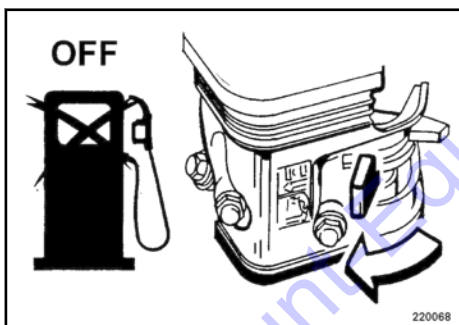


Fig. 36

3. **NOTICE!**
Danger of engine damage!
 - Do not shut down the engine all of a sudden from full load speed, but let it idle for about 2 minutes.

Switch the starter switch to position "0".

⇒ The engine is shut down.

4. Close the fuel valve completely.

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7.1 Loading the machine

Loads must only be attached and hoisted by an expert / capable person.

Do not use damaged or in any other way impaired lashing points.

Use only lifting gear and lifting tackle with sufficient load bearing capacity for the weight to be loaded. Minimum load bearing capacity of lifting gear: see operating weight ↪ *Chapter 2 'Technical data' on page 11.*

Always use appropriate lifting and lashing means on the lifting and lashing points.

Use lifting and lashing gear only in the prescribed direction of load application.

Lifting tackle must not be damaged by machine components.

When lifting the machine avoid uncontrolled movements of the load. If necessary hold the load with guide ropes.

Protective equipment: ■ Protective gloves

1. Park the machine in secured condition ↪ *Chapter 6.5 'Park the machine in secured condition.' on page 56.*

2. Allow the engine to cool down.

3. Attach the lifting tackle to the dedicated lifting eye.

4.



DANGER!

Danger to life caused by suspended loads!

– Do not step or stand under suspended loads.

Lift the machine carefully and lower it again at the intended location.

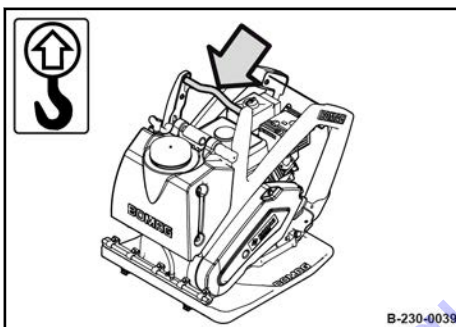


Fig. 37

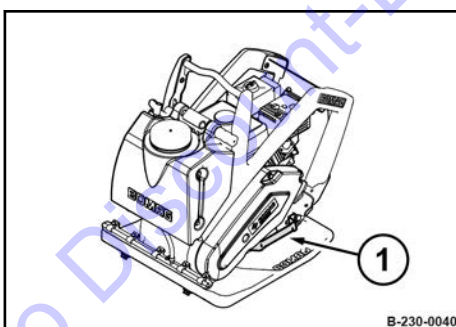


Fig. 38

5. Use these handles (1) to pull the machine on and even surface.

7.2 Lashing the machine to the transport vehicle

Do not use damaged or in any other way impaired lashing points.

Always use appropriate lifting and lashing means on the lifting and lashing points.

Use lifting and lashing gear only in the prescribed direction of load application.

Lifting tackle must not be damaged by machine components.

Protective equipment: ■ Protective gloves

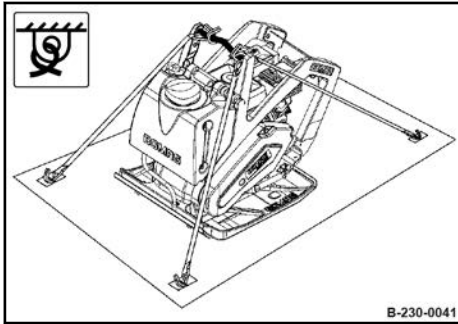


Fig. 39

1. Fasten the lashing gear to the marked lashing points.
2. Lash the machine securely to the transport vehicle.

7.3 Transport wheels

1. Park the machine in secured condition ↪ *Chapter 6.5 'Park the machine in secured condition.'* on page 56.
2. Lock the steering bow with the locking bolts (1).

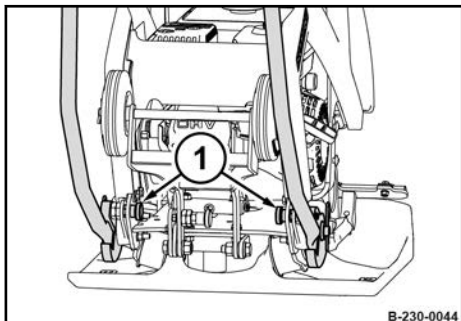


Fig. 40

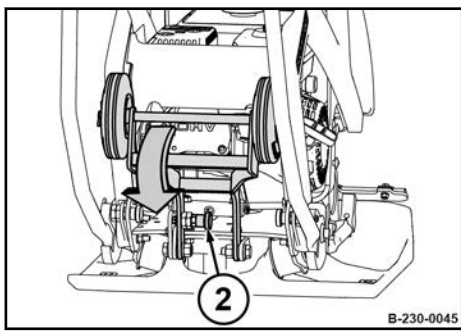


Fig. 41

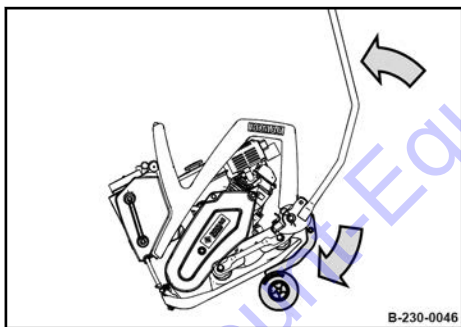


Fig. 42

3. Unlock the safety bolt (2) and fold down the transport wheels.

4. Push the machine up by the steering bow and fold the transport wheels under the base plate.

⇒ The machine can now be moved.

7.3.1 Transport wheels with steering bow in middle position

1. Park the machine in secured condition ↪ *Chapter 6.5 'Park the machine in secured condition.'* on page 56.
2. Lock the steering bow with the hook (1).

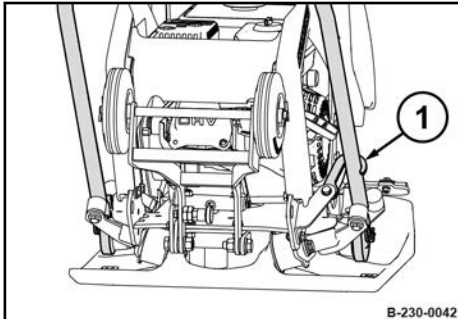


Fig. 43

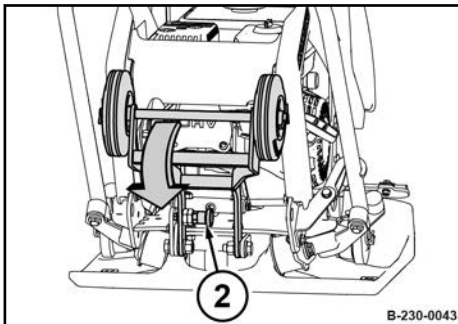


Fig. 44

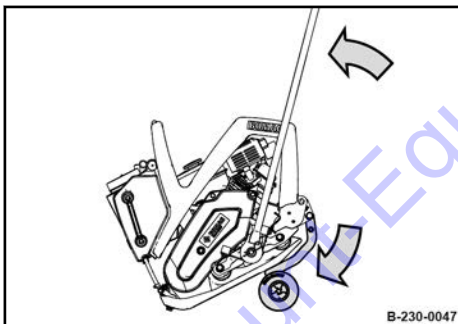


Fig. 45

3. Unlock the safety bolt (2) and fold down the transport wheels.
4. Push the machine up by the steering bow and fold the transport wheels under the base plate.
⇒ The machine can now be moved.

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8.1 Preliminary remarks and safety notes



DANGER!

Danger to life caused by an operationally unsafe machine!

- The machine must only be serviced by qualified and authorized personnel.
- Follow the safety regulations for maintenance work ↪ *Chapter 3.9 'Maintenance work' on page 31.*



WARNING!

Health hazard caused by fuels and lubricants!

- Safety regulations and environmental protection regulations when handling fuels and lubricants must be followed ↪ *Chapter 3.4 'Handling fuels and lubricants' on page 23.*

1. Thoroughly clean machine and engine before starting maintenance work.
2. For all maintenance work park the machine in secured condition ↪ *Chapter 6.5 'Park the machine in secured condition.' on page 56.*
3. Wear your personal protective outfit.
4. Do not touch hot engine parts.
5. Generally perform maintenance work only with the engine shut down and the spark plug socket disconnected.
6. After all maintenance work is completed reinstall all guards and safety installations.

8.2 Fuels and lubricants

8.2.1 Engine oil

8.2.1.1 Oil quality

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

Use engine oil for four-stroke engines which meets or even exceeds the requirements for API-classification SJ or higher.

8.2.1.2 Oil viscosity

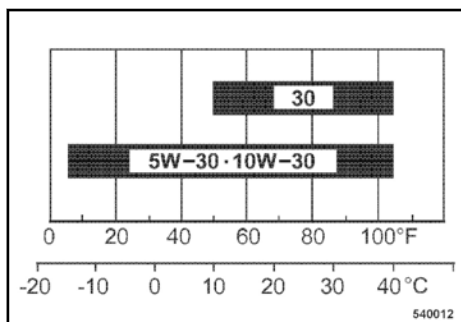


Fig. 46

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).

Temperature related lubrication oil changes can be avoided by using multi-purpose oils. The following oil change intervals apply also when using multi-purpose oils.

SAE 10W-30 is recommended for general use. Other viscosities from the illustration can be used as long as the average temperatures at the place of use stay within the specified limits.

You may alternatively use 15W-40 (except under low temperatures).

8.2.1.3 Oil change intervals

Oil change interval for API SJ: every half year or every 100 operating hours.

8.2.2 Fuel

8.2.2.1 Fuel quality

Use unleaded gasoline with a research octane number of 91 or higher (or octane number 86 or higher).

Use unleaded standard grade gasoline with maximum 10 percent by volume of ethanol (E10) or maximum 5 percent by volume of methanol.

Methanol must also contain co-solvents and corrosion inhibitors.

Do not use any fuel with a higher ethanol or methanol content.

The use of fuels with a higher ethanol or methanol content will cause starting and/or power problems or even cause damage in the fuel system.

8.2.2.2 Fuel stabilizer

If the machine is only occasionally used (if it is out of use for longer than four weeks), mix in the correct amount of fuel stabilizer directly after you have purchased fresh fuel.

The fuel stabilizer has a limited shelf life.

Please follow the instructions of the manufacturer concerning the correct mixing ratio and shelf life.

Mixing in fuel stabilizer does not regenerate old fuel.

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8.3 Table of fuels and lubricants

Assembly	Fuel or lubricant		Spare parts number	Filling quantity
	Summer	Winter		Observe the level mark!
Engine oil	SAE 10W-30 Specification: ↪ <i>Chapter 8.2.1 'Engine oil' on page 65</i>			0.6 l (0.16 gal us)
	SAE 30			
Fuel	Gasoline (unleaded) Specification: ↪ <i>Chapter 8.2.2 'Fuel' on page 65</i>			3.1 l (0.8 gal us)
	Fuel stabilizer Specification: ↪ <i>Chapter 8.2.2.2 'Fuel stabilizer' on page 66</i>			009 940 20
Vibrator shaft housing	as engine oil			0.3 l (0.08 gal us)
Water tank	Water	Anti-freeze mixture		13.5 l (3.6 gal us)

8.4 Running-in instructions

8.4.1 General

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

8.4.2 After 25 operating hours

1. Change the engine oil ↪ *Chapter 8.8.1 'Changing the engine oil' on page 75.*
2. Check engine and machine for leaks.
3. Retighten the fastening screws on air filter, exhaust and other attachments.
4. Retighten the bolted connections on the machine.
5. Checking the V-belt ↪ *Chapter 8.8.5 'Servicing the V-belt' on page 78.*
6. Check the oil level in the vibrator housing ↪ *Chapter 8.8.4 'Checking the oil level in the exciter housing' on page 78.*

8.5 Maintenance table

No.	Maintenance works	Page
Weekly		
8.6.1	Check, clean the air filter, replace if necessary	70
Monthly		
8.7.1	Clean the cooling fins and the cooling air intake openings	73
Half-annually		
8.8.1	Changing the engine oil	75
8.8.2	Cleaning, checking the spark plug, replacing if necessary	76
8.8.3	Cleaning the slurry filter	77
8.8.4	Checking the oil level in the exciter housing	78
8.8.5	Servicing the V-belt	78
Annually		
8.9.1	Checking, adjusting the valve clearance	81
8.9.2	Cleaning the fuel screen	83
8.9.3	Replacing the starter rope	85
8.9.4	Change the oil in the exciter housing	87
8.9.5	Checking the rubber buffers	87
As required		
8.10.1	Cleaning the machine	89
8.10.2	Cleaning the water sprinkling system	89
8.10.3	Measures to be applied for longer periods of rest	90

8.6 Weekly

8.6.1 Check, clean the air filter, replace if necessary

i Contamination of the air filter depends mainly on the proportion of dust in the intake air, if necessary clean several times a day.



NOTICE!

Danger of engine damage!

- Do not start the engine after having removed the air filter.
- Do not let dirt drop into the air duct.
- The air filter may be cleaned up to three times, if required. The air filter must be replaced at the latest after one year or 300 operating hours.
- In case of wet or sticky contamination replace the air filter.
- Do not use gasoline or hot fluids to clean the filter element.
- Do not continue to use a damaged air filter element. If in doubt use a new air filter.

Protective equipment: ■ Working clothes
■ Protective gloves
■ Safety goggles

1. Park the machine in secured condition ↪ *Chapter 6.5 'Park the machine in secured condition.'* on page 56.
2. Allow the engine to cool down.

Disassembling the air filter

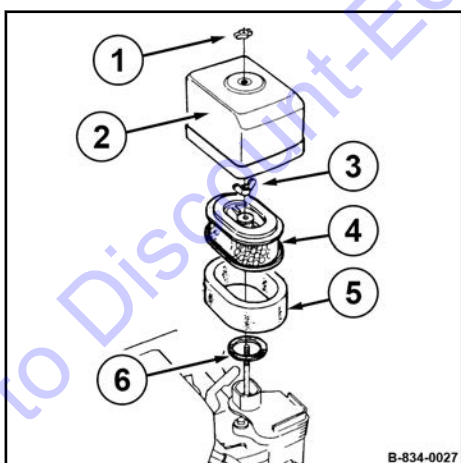


Fig. 47

3. Disassemble wing nut (1) and air filter lid (2).
4. Clean the air filter lid.
5. Disassemble wing nut (3) and take off the paper element (4) with the foam rubber insert (5).
- 6.



The rubber seal frequently sticks to the paper element.

Check the rubber seal (6), replace if necessary.

Checking, cleaning the air filter

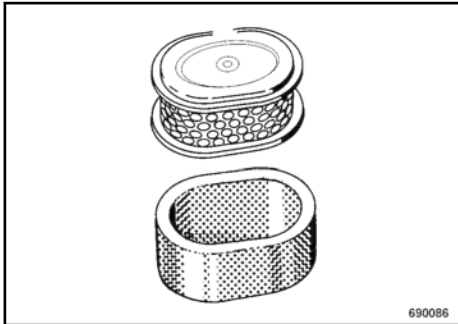


Fig. 48

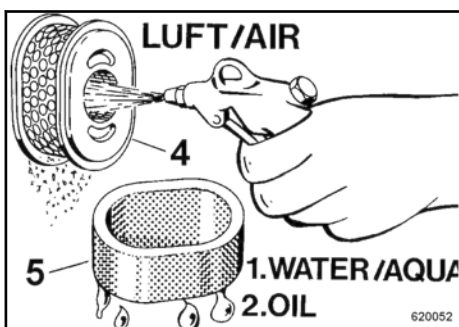


Fig. 49

7. Separate paper element and foam insert.

- 8.



CAUTION!

Danger of eye injuries caused by particles flying around!

- Wear your personal protective equipment (safety gloves, protective working clothes, goggles).

Blow the paper element (4) out with dry compressed air (max. 2 bar (29 psi)) from inside to outside by moving the gun up and down inside the element, until it is free of dust.

9. In case of excessive dirt replace the paper element.
10. Clean the foam insert (5) in warm soapy water, rinse it and let it dry thoroughly.
11. Soak the foam insert in clean engine oil and press excessive oil out.
12. Check both elements thoroughly for holes and cracks.
13. Replace if damaged.

Assembling the air filter



NOTICE!

Danger of engine damage!

- Insert the air filter .

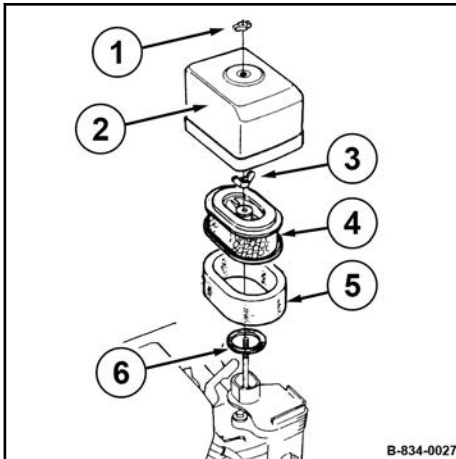


Fig. 50

14. Pull the foam rubber element (5) over the paper element (4).
15. Install the rubber seal (6).
16. Insert the air filter correctly and tighten it with the wing nut (3).
17. Reassemble the housing cover (2) with the wing nut (1).

8.7 Monthly

8.7.1 Clean the cooling fins and the cooling air intake openings



NOTICE!

Danger of engine damage caused by reduced cooling!

- For this reason you should always seal any oil or fuel leaks in the vicinity of the cooling fan or the coolers and clean the cooling fins after.

Protective equipment: ■ Working clothes
 ■ Protective gloves
 ■ Safety goggles

1. Park the machine in secured condition ↪ *Chapter 6.5 'Park the machine in secured condition.'* on page 56.
2. Allow the engine to cool down.
3. Loosen dried on dirt with a suitable brush from all cooling fins and cooling air intake openings.
- 4.

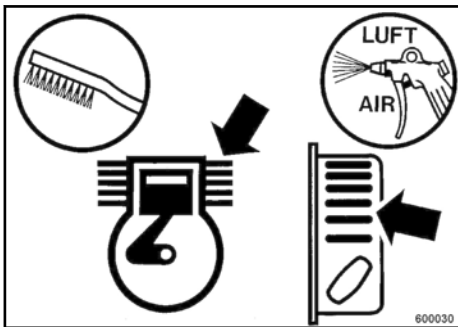


Fig. 51



CAUTION!

Danger of eye injuries caused by particles flying around!

- Wear your personal protective equipment (safety gloves, protective working clothes, goggles).

Blow cooling fins and cooling air intake openings out with compressed air.

Cleaning with cold cleansing agent

On an oil contaminated engine use a cold cleansing agent for cleaning.



NOTICE!

Components can be damaged by water entering into the system!

- Do not direct the water jet directly into the air filter, carburettor, recoil starter, air intake or starter switch.

1.



CAUTION!

Danger of eye injuries caused by particles flying around!

- Wear your personal protective equipment (safety gloves, protective working clothes, goggles).

Spray the engine with a suitable, non-inflammable cleansing agent, let it soak in for a while, clean it off with water and blow out with compressed air.

2. Run the engine warm for a while to avoid corrosion.
3. Look for the cause of oily contamination and have any leaks sealed by our customer service.

8.8 Half-annually

8.8.1 Changing the engine oil



Perform this maintenance work at the latest after 100 operating hours



NOTICE!

Danger of engine damage!

- Change the oil only with the engine at operating temperature.
- Use only oil of the permitted specification ↪ Chapter 8.2.1 'Engine oil' on page 65.
- Filling quantity: ↪ Chapter 8.3 'Table of fuels and lubricants' on page 67

Protective equipment: ■ Working clothes
■ Protective gloves

1. Park the machine in secured condition ↪ Chapter 6.5 'Park the machine in secured condition.' on page 56.

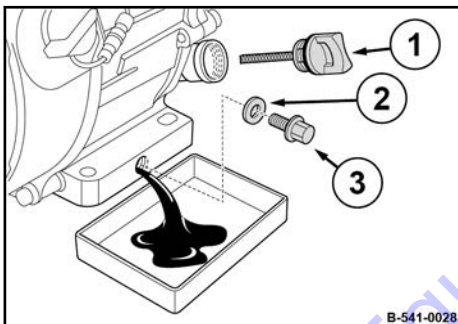


Fig. 52

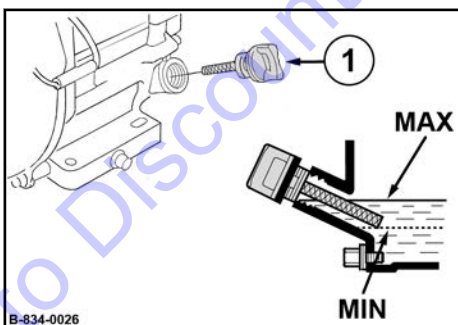


Fig. 53

- 2.



WARNING!

Danger of burning on hot components!

- Wear your personal protective outfit (protective gloves, protective clothing).

Clean the area around oil dipstick (1) and drain plug (3).

3. Unscrew the oil dipstick.
4. Unscrew the oil drain plug and catch any oil running out.
5. Clean the oil drain plug and screw it back in with a new seal ring (2).
6. Fill in oil up to the bottom edge of the filler bore.
7. Push the oil dipstick (1) back in.
8. Check for leaks after a short test drive.
9. Check the oil level on the dipstick, correct if necessary.
10. Dispose of old oil environmentally.

8.8.2 Cleaning, checking the spark plug, replacing if necessary



NOTICE!

Danger of engine damage!

- Do not use spark plugs with incorrect heat value.

Recommended spark plugs:

NGK	BPR6ES
DENSO	W20EPR-U

- Protective equipment:
- Working clothes
 - Protective gloves

- Special tool:
- 13/16 inch spark plug spanner

1. Park the machine in secured condition ↪ *Chapter 6.5 'Park the machine in secured condition.'* on page 56.
2. Allow the engine to cool down for at least 15 minutes.
3. Clean the area around the spark plug.
4. Unscrew the spark plug using a 13/16 inch spark plug spanner.

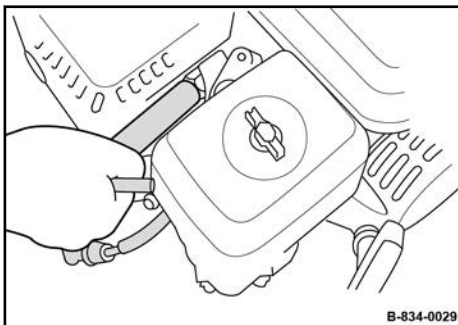


Fig. 54

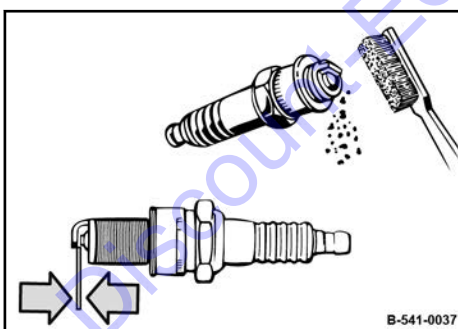


Fig. 55

5. Check the condition of the spark plug, clean if necessary.
6. In case of excessive combustion residues or burned off electrodes replace the spark plug.
7. Check the electrode gap of the spark plug with a feeler gauge, if necessary adjust the gap.
⇒ **Nominal value:** 0.7 - 0.8 mm (0.028 - 0.032 in)
8. Turn the spark plug carefully in by hand.
9. Once the sealing surface of the new spark plug is in contact tighten for another 1/2 turn with the spark plug spanner.
10. Once the sealing surface of the used spark plug is in contact tighten for another 1/8 to 1/4 turn with the spark plug spanner.



NOTICE!

Danger of engine damage caused by a loose spark plug!

- Always screw the spark plug in correctly.

8.8.3 Cleaning the slurry filter



DANGER!

Danger to life caused by explosive gas-air mixes!

- Do not allow gasoline to come into contact with hot components.
- Smoking and open fire is prohibited.
- Keep away from heat sources, sparks and other sources of ignition.
- Do not spill any gasoline.

Protective equipment: ■ Working clothes
 ■ Protective gloves

1. Park the machine in secured condition ↪ *Chapter 6.5 'Park the machine in secured condition.'* on page 56.
2. Close the fuel valve.

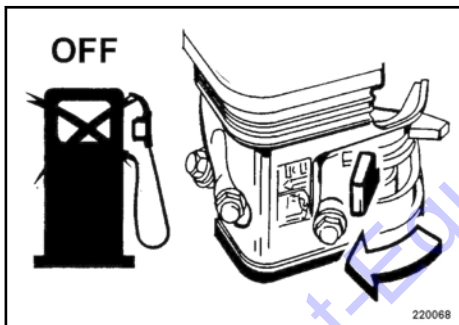


Fig. 56

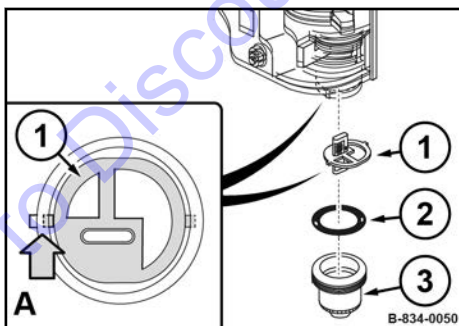


Fig. 57

3. Disassemble filter bowl (3), O-ring (2) and filter (1).
4. Clean filter bowl and filter in a non-flammable solvent, dry thoroughly after.
5. Check the O-ring for damage, replace if necessary.
6. Assemble the filter.
 Observe the alignment (A) of the filter on the housing.
7. Assemble the filter bowl with the O-ring.

Maintenance – Half-annually

A View from underneath: Alignment of filter during installation

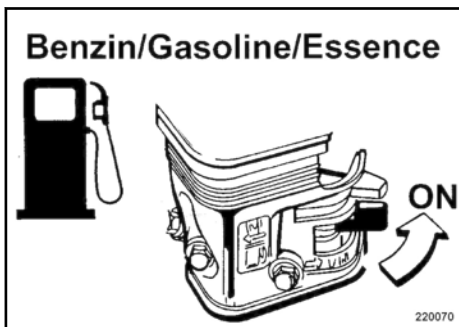


Fig. 58

8. Open the fuel valve and check the filter bowl for leaks.
9. Close the fuel valve again.
10. Dispose of fuel environmentally.

8.8.4 Checking the oil level in the exciter housing



NOTICE!

Components may get damaged!

- Use only oil of the permitted specification ↪ Chapter 8.3 'Table of fuels and lubricants' on page 67.

Protective equipment: ■ Working clothes
■ Protective gloves

1. Park the machine on level ground.
2. Park the machine in secured condition ↪ Chapter 6.5 'Park the machine in secured condition.' on page 56.
3. Allow the machine to cool down.
4. Unscrew the oil level inspection plug (1) and check the oil level.
⇒ The oil level must reach the bottom edge of the opening, if necessary fill in oil.
5. Turn the locking screw (1) in.

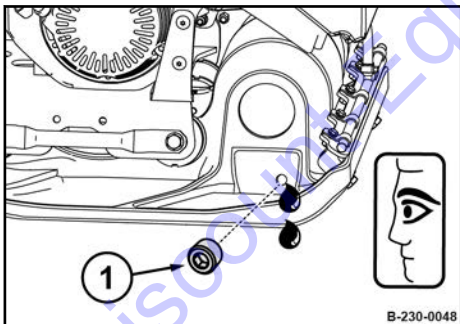


Fig. 59

8.8.5 Servicing the V-belt

Preparations

1. Park the machine in secured condition ↪ Chapter 6.5 'Park the machine in secured condition.' on page 56.
2. Allow the engine to cool down.

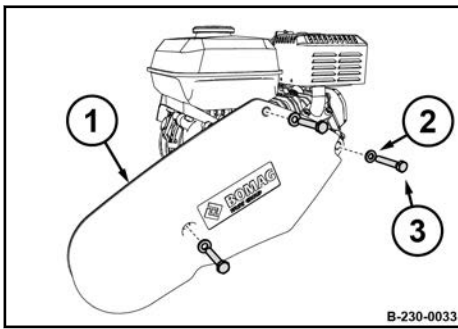


Fig. 60

Checking the V-belt

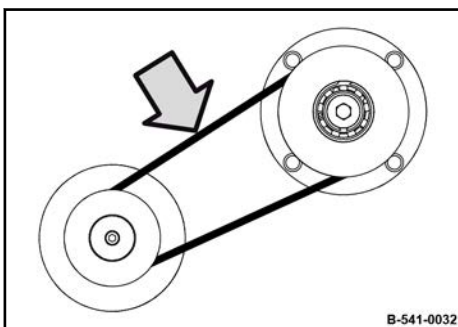


Fig. 61

Replacing the V-belt

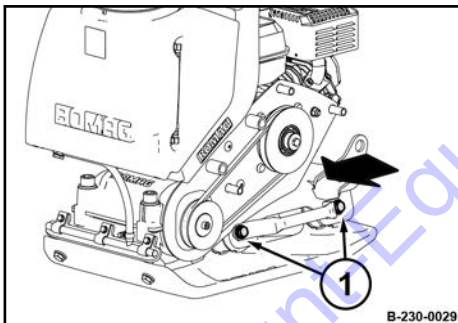


Fig. 62

3. Disassemble fastening screws (3), washers (2) and V-belt guard (1).

1. Check condition and tension of the V-belt, replace if necessary.
⇒ **Compression measurement:** 5 - 10 mm (0.2 - 0.4 in).
2. Replace a damaged V-belt.

1. Slightly loosen the fastening screws (1) on both sides.
2. Pull the engine carrier forward and take the V-belt off.
3. Install the new V-belt and tighten it.

Tightening the V-belt

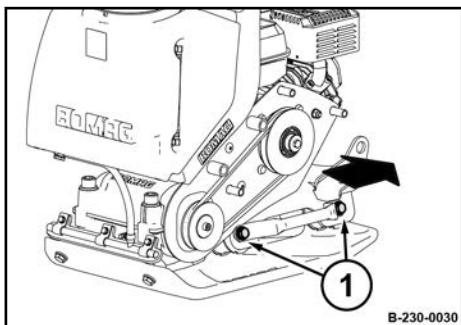


Fig. 63

1. Pull the engine carrier back, until the correct V-belt tension is reached.
2. Tighten the fastening screws (1) on both sides.

Final work

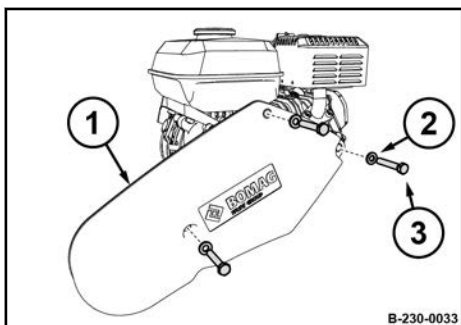


Fig. 64

1. Assemble V-belt guard (3) with washers (2) and fastening screws (1).
2. Check the V-belt tension again after 25 operating hours, tighten if necessary.

8.9 Annually

8.9.1 Checking, adjusting the valve clearance



Perform this maintenance work at the latest after 300 operating hours



NOTICE!

Danger of engine damage!

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

- Before checking the valve clearance let the engine cool down.
- After a short test run check the engine for leaks.

Preparations

Protective equipment: ■ Working clothes
■ Protective gloves

1. Park the machine in secured condition *Chapter 6.5 'Park the machine in secured condition.'* on page 56.
2. Let the engine cool down to 20 °C (68 °F).
3. Unscrew the fastening screws (1).
4. Remove valve cover (2) with gasket (3).

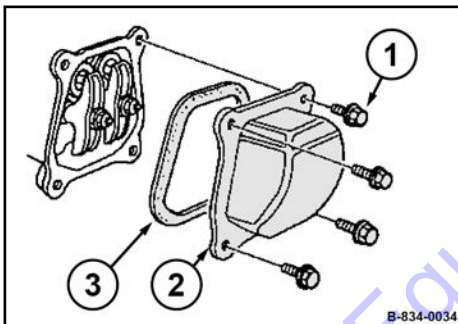


Fig. 65

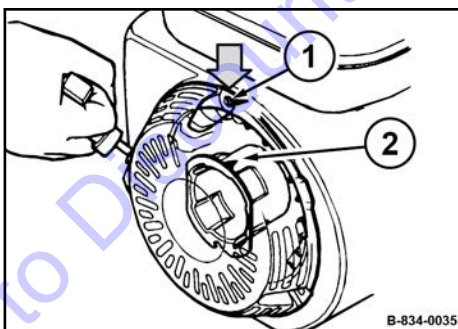


Fig. 66

5. Set the piston to top dead centre position of the compression stroke.

For this purpose align the alignment mark (2) on the starter disc to the top bore (1).

Maintenance – Annually

Checking the valve clearance

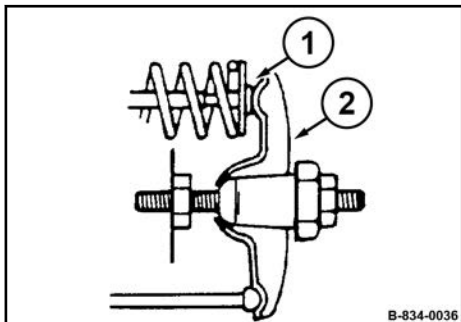


Fig. 67

Valve clearance:

Intake valve (IN)	0.08 mm (0,003 in)
Exhaust valve (EX)	0.10 mm (0,004 in)

1. Check the valve clearance with a feeler gauge between rocker arm (2) and valve shaft (1) on both valves, adjust if necessary.

Adjusting the valve clearance

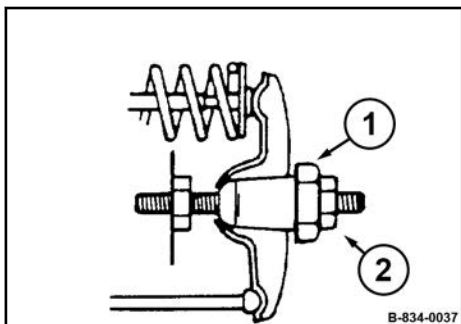


Fig. 68

1. Hold the hexagon nut (1) on the rocker arm and loosen counter nut (2).
2. Adjust the hexagon nut, until the feeler gauge can be inserted and pulled out with little resistance after retightening the counter nut.

Final work

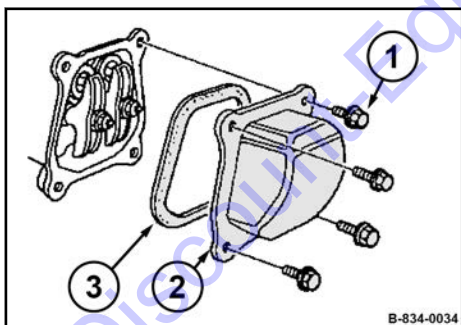


Fig. 69

1. Install the valve cover (2) with a new gasket (3).
2. Tighten the fastening screws (1).

8.9.2 Cleaning the fuel screen



DANGER!

Danger to life caused by explosive gas-air mixes!

- Do not allow gasoline to come into contact with hot components.
- Smoking and open fire is prohibited.
- Keep away from heat sources, sparks and other sources of ignition.
- Do not spill any gasoline.

Protective equipment: ■ Working clothes
 ■ Protective gloves

1. Park the machine in secured condition & Chapter 6.5 'Park the machine in secured condition.' on page 56.
2. Allow the engine to cool down.
3. Close the fuel valve.

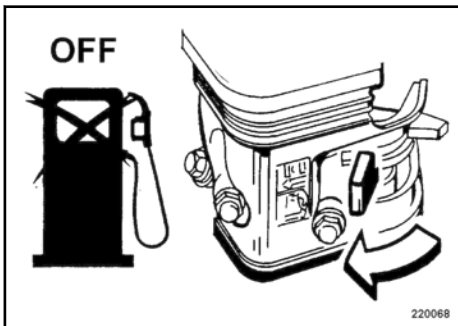


Fig. 70

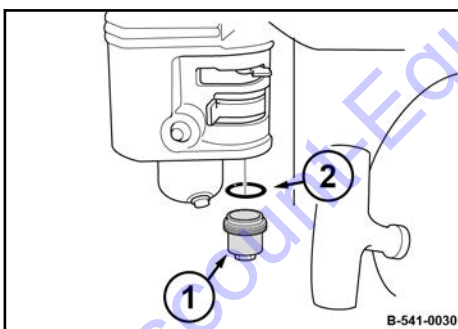


Fig. 71

4. Disassemble filter bowl (1) and O-ring (2).

Maintenance – Annually

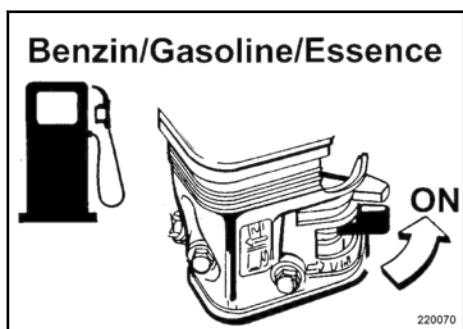


Fig. 72

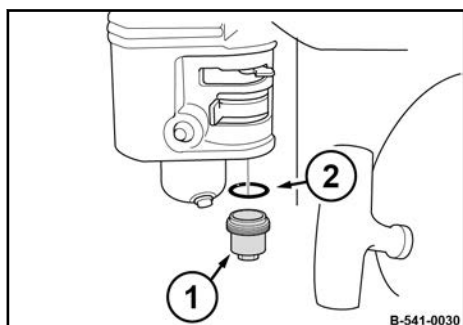


Fig. 73

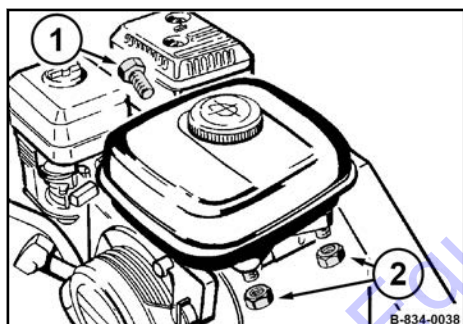


Fig. 74

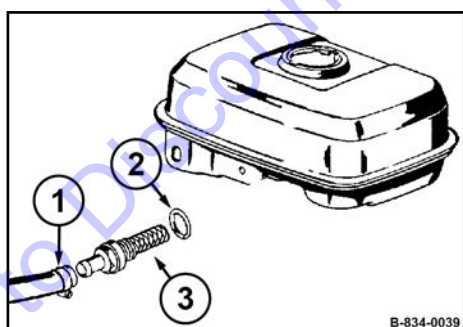


Fig. 75

5. Open the fuel valve and catch running out fuel.
6. Close the fuel valve.
7. Check the O-ring (2) for damage, replace if necessary.
8. Assemble the filter bowl (1) with the O-ring.
9. Unscrew the hexagon nut (2) and the hexagon screw (1) and take off the fuel tank.
10. Loosen the hose clamp (1) and pull off the fuel hose.
11. Unscrew the fuel screen (3) with the seal (2).
12. Clean the fuel screen, check the condition of the screen (holes), replace if necessary.
13. Turn the fuel screen filter tightly in with the new seal.
14. Assemble the fuel hose with the hose clamp.

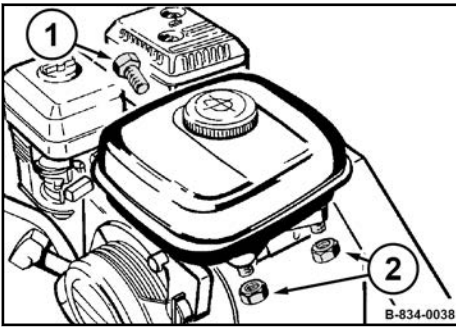


Fig. 76

15. Assemble the fuel tank with hexagon nuts (2) and hexagon screw (1).
16. Check the fuel system for leaks.
17. Dispose of fuel environmentally.

8.9.3 Replacing the starter rope

Protective equipment: ■ Working clothes
 ■ Protective gloves

1. Park the machine in secured condition ☞ *Chapter 6.5 'Park the machine in secured condition.'* on page 56.
2. Allow the engine to cool down.
3. Disassembling the recoil starter.

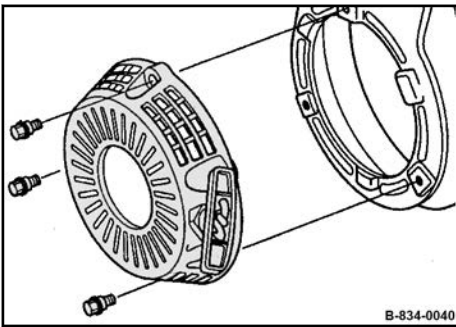


Fig. 77

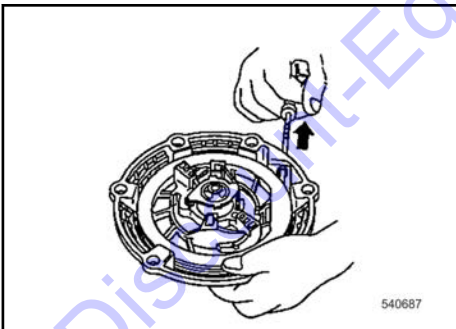


Fig. 78

4. Pull the starter rope with the starter handle out completely.

Maintenance – Annually

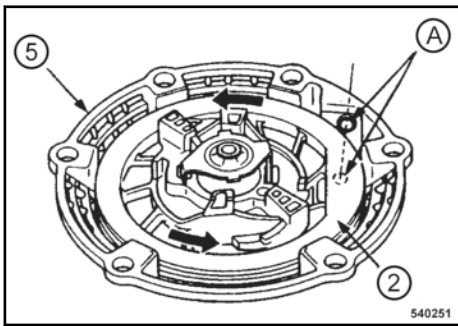


Fig. 79

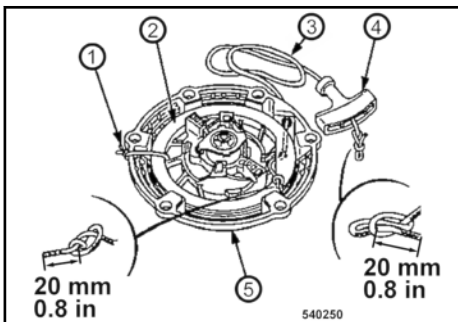


Fig. 80

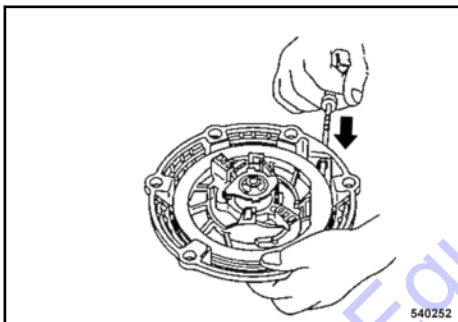


Fig. 81

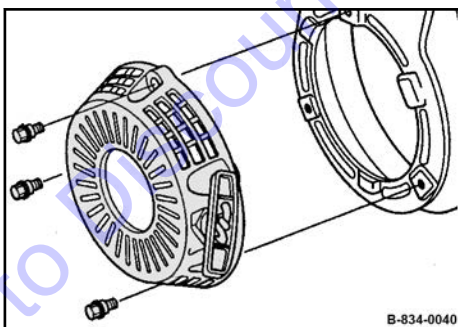


Fig. 82

5. If the starter rope has been torn or the coil has recoiled completely:

- Before assembling the rope, turn the coil (2) 5 revolutions in anti-clockwise direction and align the rope openings in coil and housing (5) to one another (A).

6. Secure the coil against winding up. For this purpose tie the coil (2) to the housing (5) with a cable strap (1).

7. Untie the knots of the starter rope at both ends and remove the old starter rope.

8. Thread in the new starter rope (3) and fix it with knots on both ends.

9.



CAUTION!

Danger of injury caused by the starter handle hitting against your body!

- Do not let the starter handle hit back.

Remove the fixing of the coil and run the starter handle slowly back to initial position.

10. Pull the starter handle to check the function and light movement of the recoil starter.

11. Assemble the recoil starter.

8.9.4 Change the oil in the exciter housing

i Perform this maintenance work at the latest after 500 operating hours



NOTICE!

Components may get damaged!

- Use only oil of the permitted specification ↪ Chapter 8.3 'Table of fuels and lubricants' on page 67.

Protective equipment: ■ Working clothes
 ■ Protective gloves

1. Park the machine on level ground.
2. Park the machine in secured condition ↪ Chapter 6.5 'Park the machine in secured condition.' on page 56.
3. Tilt the machine slightly towards the oil drain side and support it safely.
4. Unscrew oil drain plug (1) and catch running out oil.

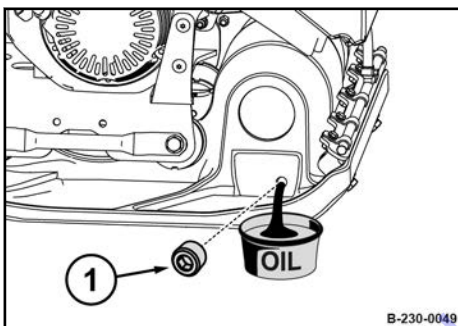


Fig. 83

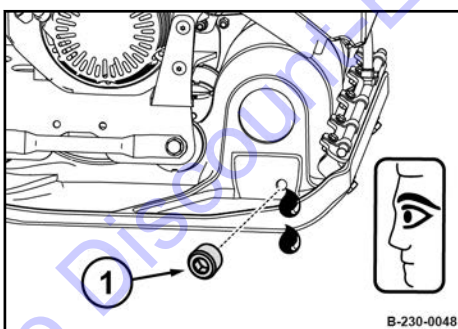


Fig. 84

5. Stand the machine horizontally.
6. Fill in oil up to the bottom edge of the bore.
7. Turn the locking screw (1) in.
8. Dispose of old oil environmentally.

8.9.5 Checking the rubber buffers

1. Park the machine in secured condition ↪ Chapter 6.5 'Park the machine in secured condition.' on page 56.
2. Allow the engine to cool down.

Maintenance – Annually

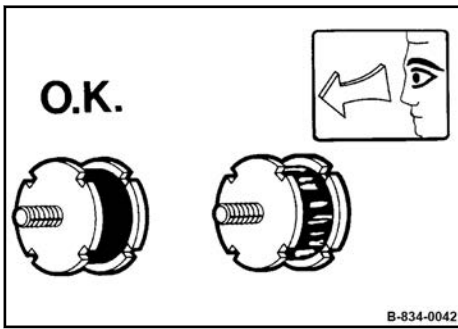


Fig. 85

3. Check all rubber buffers for tight fit, cracks and tear-offs.
4. Replace damaged rubber buffers immediately.

Go to Discount-Equipment.com to order your parts

8.10 As required

8.10.1 Cleaning the machine



NOTICE!

Danger of engine damage caused by reduced cooling!

- Immediately seal any oil or fuel leaks near fuel tank, cylinder or cooling air intake.

1. Park the machine in secured condition ↪ *Chapter 6.5 'Park the machine in secured condition.'* on page 56.
2. Allow the engine to cool down for at least 30 minutes.



NOTICE!

Components can be damaged by water entering into the system!

- Do not direct the water jet directly into the air filter, carburettor, recoil starter, air intake or starter switch.

3. Clean the machine with a water jet.
4. Run the engine warm for a while to avoid corrosion.

8.10.2 Cleaning the water sprinkling system

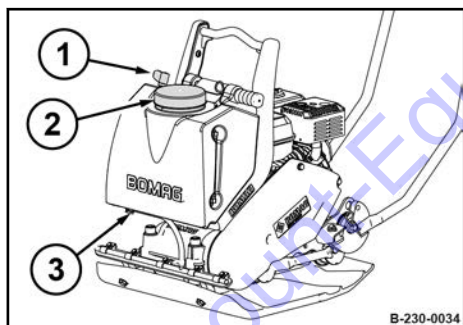


Fig. 86

1. Remove the locking cap (2).
2. Pull the hose (3) off the water tank.
3. Open the rotary knob (1) completely and let all water run out.



Alternatively you may also remove the water tank for cleaning.

4. Flush the water tank with a strong water jet, until all dirt has run out.
5. Connect the hose to the water tank again.
6. Fill the water tank with clean water and close the locking cap.

8.10.3 Measures to be applied for longer periods of rest

8.10.3.1 Measures before shutting down



DANGER!

Danger to life caused by explosive gas-air mixes!

- Do not allow gasoline to come into contact with hot components.
- Smoking and open fire is prohibited.
- Keep away from heat sources, sparks and other sources of ignition.
- Do not spill any gasoline.

If the machine is shut down for a longer period of time, e.g. winter season, the following work must be carried out.

Depending on weather conditions these conservation measures will protect the machine for approx. 6 to 12 months.

1. Park the machine in secured condition ↪ *Chapter 6.5 'Park the machine in secured condition.'* on page 56.
2. Allow the engine to cool down for at least 30 minutes.
3. Clean the machine thoroughly.
4. Change the engine oil ↪ *Chapter 8.8.1 'Changing the engine oil'* on page 75.
5. Use fuel stabilizer or drain off fuel completely.

Using fuel stabilizer

1. Mix fresh fuel with fuel stabilizer (follow the instructions of the manufacturer).
2. Empty the fuel tank and fill it with the prepared fuel mix.
3. Start the engine and run the machine for approx. 10 minutes in the open.
4. Park the machine in secured condition.

Emptying the fuel tank.

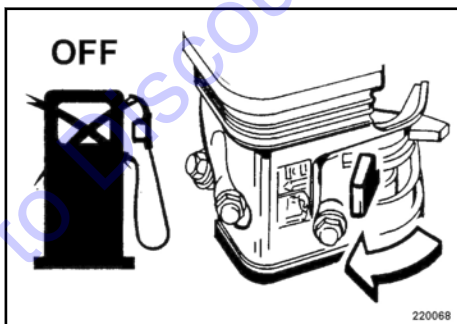


Fig. 87

1. Close the fuel valve.

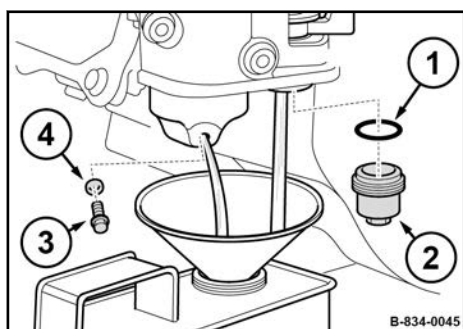


Fig. 88

Protecting the cylinder

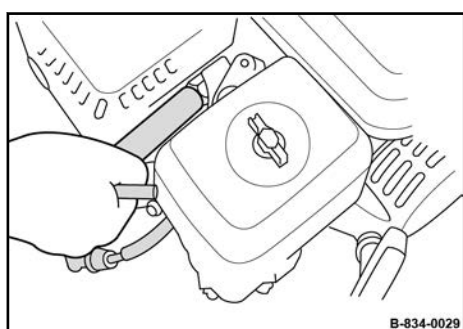


Fig. 89

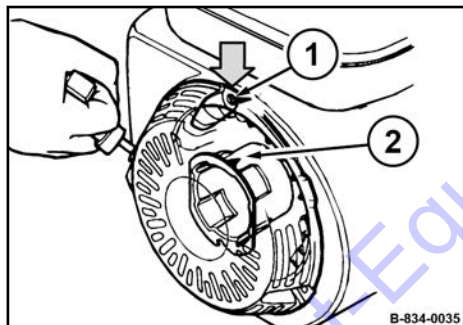


Fig. 90

Parking the machine

2. Disassemble the drain plug (3) and the seal (4) from the carburettor and catch running out fuel.
3. Disassemble filter bowl (2) and O-ring (1).
4. Open the fuel valve and catch running out fuel.
5. Close the fuel valve.
6. Install the drain plug with the seal on the carburettor.
7. Assemble the filter bowl with the O-ring.
8. Dispose of fuel environmentally.

Special tool: ■ 13/16 inch spark plug spanner

1. Unscrew the spark plug using a 13/16 inch spark plug spanner.
2. Fill in several drops of fresh engine oil through the ignition plug opening.
3. Crank the engine several times with the recoil starter to distribute the oil in the cylinder.
4. Screw the spark plug back in.
5. Slowly pull the starter rope until resistance can be felt and the alignment mark (2) on the starter disc is in line with the upper bore (1).
 - ⇒ Valves will be closed so that no moisture can enter into the cylinder.
6. Slowly guide the starter rope back.

1. After shutting down store the machine under cover in a dry and well ventilated room.
2. Cover the engine to protect it against dust and moisture.
3. A machine with conserved engine must be clearly marked by attaching an information sign.

8.10.3.2 Measures before restarting



DANGER!

Danger to life caused by explosive gas-air mixes!

- Do not allow gasoline to come into contact with hot components.
- Smoking and open fire is prohibited.
- Keep away from heat sources, sparks and other sources of ignition.
- Do not spill any gasoline.

1. Check the oil levels.
2. If the fuel has been drained off before shutting down, you must now fill in fuel.
3. Check hoses and lines for cracks and leaks.
4. Clean the machine thoroughly.
5. Start the engine and run it 15 to 30 minutes with idle speed.

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9.1 Preliminary remarks

Malfunctions are frequently caused by incorrect operation of the machine or insufficient maintenance. Whenever a fault occurs you should therefore thoroughly read these 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 our customer service department.

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9.2 Engine faults

Fault	Possible cause	Remedy
Engine does not start	Fuel tank empty	Check, fill up if necessary
	Fuel valve closed	Open the fuel valve
	Fuel system clogged	Clean the fuel screen
		Check the fuel screen in the carburettor Have checked by qualified expert personnel
	Switch the starter switch to position "0"	Turn the starter switch to position "I"
	Engine oil level too low	Check the engine oil level, correct if necessary
	No ignition spark	Clean the spark plug, replace if necessary
	Starter switch defective	Have checked by qualified expert personnel
	No fuel in carburettor	Check the fuel supply
Have checked by qualified expert personnel		
Engine does not crank when operating the recoil starter	Recoil starter defective	Replace the recoil starter
	Spring broken	Replace the recoil starter
Starter rope of recoil starter does not return to initial position	Recoil starter dirty	Clean the recoil starter
	Pretension of spring too weak	Check the pretension of the spring, adjust if necessary
	Spring broken	Replace the recoil starter
Low engine power	Air filter clogged	Clean the air filter, replace if necessary
	Throttle cable defective	Have checked by qualified expert personnel
	Engine defective	Have checked by qualified expert personnel
	Carburettor defective	Have checked by qualified expert personnel
Engine overheating	Lack of cooling air	Clean the air filter, replace if necessary Clean the cooling fins and the cooling air intake openings
Engine stops	Fuel system clogged	Clean the fuel screen
		Check the fuel screen in the carburettor Have checked by qualified expert personnel
	Fuel tank empty	Check, fill up if necessary

Trouble shooting – Engine faults

Fault	Possible cause	Remedy
	Poor fuel quality	Check the fuel quality, if necessary change the fuel
	Engine oil level too low	Check the engine oil level, correct if necessary
Engine runs with high speed, but no vibration	Centrifugal clutch defective	Have checked by qualified expert personnel
	V-belt broken	Replace the V-belt

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9.3 What to do if the engine has flooded

Protective equipment: ■ Hearing protection
■ Safety shoes

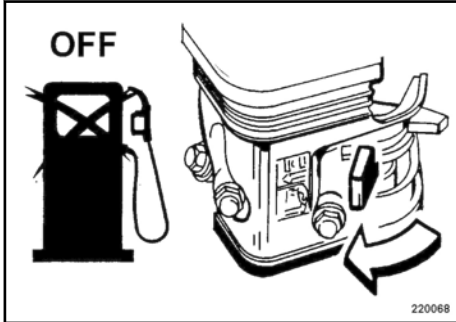


Fig. 91

1. Close the fuel valve.

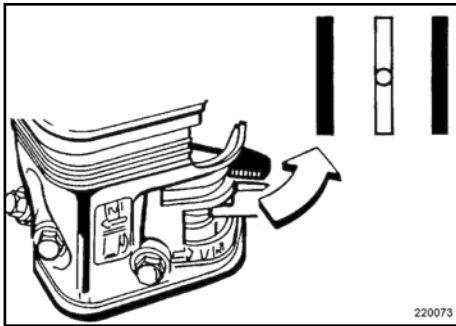


Fig. 92

2. Open the choke.

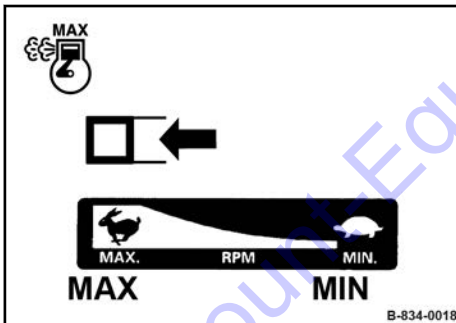


Fig. 93

3. Set the throttle lever to position "MAX".

Trouble shooting – What to do if the engine has flooded

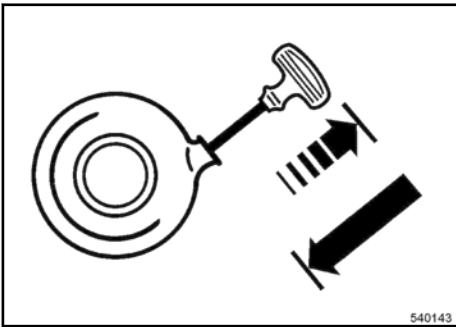


Fig. 94

Cleaning the spark plug

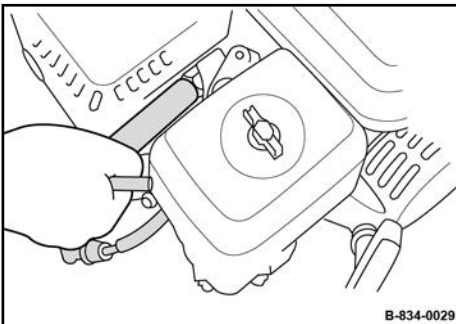


Fig. 95

4.



CAUTION!

Danger of injury caused by uncontrolled machine movement!

- Always hold on to a running machine.
- Always keep an eye on a running machine.

Operate the recoil starter, until the engine starts.



If the engine does not start after 10 to 20 attempts, clean the spark plug.

Protective equipment: ■ Working clothes
■ Protective gloves
■ Safety goggles

Special tool: ■ 13/16 inch spark plug spanner

2. Pull off the spark plug socket.
3. Unscrew the spark plug using a 13/16 inch spark plug spanner.
4. Operate the recoil starter several times.

5.



CAUTION!

Danger of eye injuries caused by particles flying around!

- Wear your personal protective equipment (safety gloves, protective working clothes, goggles).

Dry the spark plug with a clean cloth or blow it dry with compressed air.

6. If necessary clean the spark plug with a wire brush.
7. Screw the spark plug carefully in by hand and once the sealing surface of the used spark plug is in contact tighten for another 1/8 to 1/4 turn with the spark plug spanner.
8. Plug the spark plug socket back on.
9. Repeat the starting procedure.

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10.1 Final shut-down of machine

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



DANGER!

Danger to life caused by explosive gas-air mixes!

- Do not allow gasoline to come into contact with hot components.
- Smoking and open fire is prohibited.
- Keep gasoline away from heat sources, sparks and other sources of ignition.
- Do not spill any gasoline.
- Components that previously contained gasoline must not be cut with a cutting torch.



WARNING!

Health hazard caused by fuels and lubricants!

- Safety regulations and environmental protection regulations when handling fuels and lubricants must be followed ↪ *Chapter 3.4 'Handling fuels and lubricants' on page 23.*

Protective equipment: ■ Working clothes
■ Safety shoes
■ Protective gloves
■ Safety goggles

1. Empty the fuel tank. Empty the fuel tank.
2. Drain lubrication oil from engine and exciter housing.

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List of special tools

13/16 inch spark plug spanner

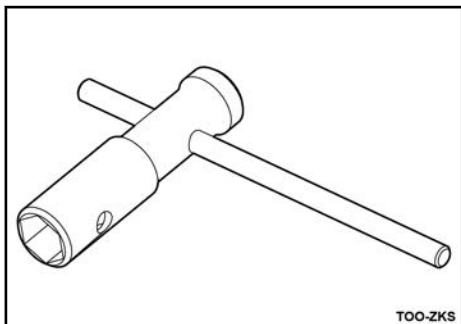


Fig.

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