



Scrubmaster B120 R (7177)

Operating Manual

Part number 88-10-3105 - 3954-00

Valid as from: 07.2017

Introduction

Foreword

Dear Customer,

We are certain that the excellent qualities of the machine will justify the faith you have shown in us by your purchase.

To guarantee safe working with the machine, please read the Safety Notes chapter before putting it into service.

Your own safety, as well as the safety of others, depends essentially on your ability to control the vehicle. Please read this **original operating manual** before you use the vehicle for the first time, act accordingly and keep these instructions for future reference or subsequent users. The operating manual contains all important information for operation, maintenance and care. We have provided the places in this operating manual concerning your safety with a danger pictogram. Your authorised Hako dealer is available at all times to answer further questions about the vehicle or the operating manual.

We would expressly advise you that no legal claims may be asserted based on the contents of this operating manual. In the case of necessary repair work, please make sure that only original spare parts are used. Spare parts must be original spare parts to guarantee safety. We reserve the right to make changes in the interests of further technical development.

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Issue:

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Intended use

Scrubmaster B120 R is a scrubber-drier for the wet cleaning of hard indoor floor surfaces. This machine is intended for commercial use, e.g. in shopping centres, swimming pools, shops, airports, schools and hotels. Any use extending beyond this is not intended use. The manufacturer is not liable for any damage resulting from this and the user alone bears the risk. Intended use also includes compliance with the operating, maintenance and servicing conditions specified by the manufacturer.

The Scrubmaster B120 R may be used, maintained and repaired only by persons who are familiar with this work and instructed about the dangers. The relevant accident prevention regulations as well as the other generally recognised safety engineering and occupational medical rules must be complied with.

The machine corresponds by virtue of its design and construction as well as in the version distributed by us to the usual health and safety requirements of the EC Directives (see Declaration of Conformity). This declaration loses its validity in the event of a modification to the machine not authorised by us. The manufacturer is not deemed liable for any damage resulting from unauthorised modifications to the machine.

Notes on warranty

The terms defined in the purchase agreement apply. Claims for compensation in relation to damage are excluded from the terms of the warranty when the damage is the result of the failure to observe rules concerning servicing and maintenance. Maintenance work must be carried out by an authorised Hako service workshop and confirmed in the "Maintenance Report", which serves as a warranty logbook.

The following are excluded from the terms of warranty: wear and tear through overuse, defective fuses, improper handling and use and unauthorised modifications. Claims under the terms of the warranty are also annulled when damage occurs to the machine resulting from the use of parts or accessories not explicitly approved of by us or from failure to observe maintenance rules.

Acceptance of the machine

Inspect the machine immediately on delivery for signs of transport damage. You will be compensated for transport damage provided you immediately have the damage confirmed by the transport company and send in the damage report together with the consignment note to us.

Machine data

Your machine is described clearly by the following data. Please always quote these data in correspondence or when making a telephone query to your authorised Hako dealer or our company.

- Machine type _____
- Manufacturing no. _____
- Start-up on: _____

Your nearest authorised Hako dealer:

- Address: _____

- Telephone: _____

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1 Safety instructions

1.1 Warning and danger symbols

Important tasks concerning the safety of the operator and machine are named as follows in this operating manual and emphasised by symbols.



Danger

Indication of a direct danger with high risk, in which death or severe physical injury can occur if it is not avoided.



Warning

Indication of a possible danger with average risk, in which death or severe physical injury can occur if it is not avoided.



Caution

Indication of a danger with low risk, in which light to medium severe physical injury or material damage can occur if it is not avoided.



Attention

Attention indicates a hazard that can lead to technical damage when not observed.



Environmental danger

Environmental danger due to the use of substances from which a health and environmental risk proceeds.



Note

Indication of information that facilitates more effective and economical use of the machine.

**Note**

Before starting up the machine, read the following safety instructions and act accordingly. Machine operating errors can be avoided and trouble-free operation can be guaranteed only with precise factual knowledge.

1.2 General safety instructions

- Apart from the instructions in this operating manual, the general safety and accident prevention regulations of the legislation must be taken into account.
- Before the machine is put into service, please carefully read the operating manual you receive as well as further separate instructions for additional implements or attachments and observe them in all aspects of your work.
- The machine may be used, maintained and repaired only by persons who have been instructed by Hako experts.
- The machine is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities or by persons lacking the required experience and knowledge.
- Children should be supervised to ensure they do not play with the machine.
- The operating manual should always be available at the machine's place of use and should therefore be stored with the machine.
- Please hand over these documents to the new owner/operator on sale or rental of the device. Have the hand-over confirmed!
- The labels attached to the machine provide important information for safe operation. Renew labels that are no longer legible or present.
- With Hako-AntiBac® machine variants, the plastic inner surface of the fresh water and waste water tanks contains silver ions in nanoparticle form.
- Spare parts must be original spare parts to guarantee safety.

1.3 Operating safety instructions

Before putting into service

- Before initially starting up the machine, charge the used battery fully and appropriately with commissioning charge. Please observe the operating manual of the charger and the operating manual of the battery manufacturer. Hako assumes no liability for battery damage resulting from insufficient commissioning charge.
- Check the machine for operating safety before every start-up! Eliminate faults immediately.
- Before starting work, the operator must familiarise himself with all the equipment, controls and actuating elements as well as with their function! It is too late to do this during operation!

During operation

- Sturdy and slip-proof shoes must be worn when working with the machine.
- Only those surfaces approved by the contractor or its authorised representative for use of the machine may be driven on.
- Never use the machine at places where objects can fall down.
- When working with the machine, pay special attention to third persons, especially children.
- When driving over thresholds, raise the brush head.
- Only use detergents suitable for automatic machines (foam retarded) and observe the application, disposal and warning instructions provided by the detergent manufacturer.
- The machine is not suitable for removing liquids, dusts or materials that are dangerous to health, combustible or explosive. It is also prohibited to collect burning objects, e.g. glowing cigarettes. The collection of wood dust, e.g. beech and oak dust, is also prohibited – health hazard!
- For reasons of safety, the driver's seat is equipped with a seat contact switch. The machine can only be started when the driver is sitting on the driver's seat. The function of the seat contact switch must not be bypassed.
- The machine must not be used in potentially explosive atmospheres.
- It is not permitted to transport other people or heavy objects.
- When transporting the machine, raise the squeegee and the brush head. Adjust your way of driving to local conditions.
- Drive slowly on wet surfaces, particularly in bends, due to the risk of skidding.
- Drive slowly into the bend when driving downhill.
- For cleaning, the machine must only be used on a level surface with a maximum slope of 2 %.

- Transport journeys on slopes of up to 10 % must only be executed for 1 minute and with special caution.
- Manipulating the switches and protective devices is forbidden.

After operation

- Remove the key when leaving the machine to prevent unauthorised use.
- After use, park the machine in a dry, indoor location with the brush head and squeegee raised.

1.4 Maintenance instructions

- Daily and weekly maintenance work must be done in accordance with the maintenance plan by the operating staff. In all other maintenance work, please contact your nearest Hako service centre.
- The maintenance work and maintenance intervals specified in the operating manual must be complied with.
- Use suitable tools for the cleaning and maintenance work.
- Have the machine checked for safe condition by an expert in accordance with the accident prevention regulations at appropriate intervals (we recommend at least once yearly).
- Spare parts must at least comply with the technical requirements specified by the manufacturer. This is guaranteed by original spare parts.
- Turn the machine off for cleaning and maintaining the machine as well as before replacing parts.
- To prevent unauthorised use of the machine, remove the ignition key.
- Cleaning the machine with a high-pressure cleaner or steam jet is not allowed.
- Application of aggressive and corrosive detergents is not allowed.
- After cleaning, let the machine air dry, e.g. over the weekend.
- Only put the machine into service when all the protective devices are attached and in protection position.

1.5 Information about special risks

Electrical system

- If the electrical system is faulty, always turn off the machine and eliminate the fault.
- Work on the electrical system may be done only in accordance with electrical engineering standards by a specialist trained for this work.
- Regularly inspect/check the electrical system of the machine. Defects such as loose connections, loose nuts of electrified bolts, electrical components or damaged cables must be eliminated immediately.
- Only use original fuses with the specified current. If stronger fuses are used, the electrical system can be destroyed and there can be fires.

Batteries



- Observe the operating manuals and safety instructions provided by the battery manufacturer.
- Never connect or disconnect batteries when the machine is turned on.
- Make sure the batteries are never fully discharged; recharge them as quickly as possible.
- Only instructed maintenance personnel must handle and replace batteries.
- Only batteries approved by Hako may be used at the intended position.
- **Danger!** Make sure that the insulation of the battery cables is not damaged. The battery cables should not rub against anything. If the insulation is defective, no longer use the machine and have the battery cables replaced by the Hako customer service immediately.
- **Caution!** Always make sure that the batteries are clean and dry to avoid creeping currents and corrosion damage. Protect the batteries, in particular, against conductive contamination, e.g. metal dust.
- **Risk of short circuits and spark formation!** Never place tools or other electrically conductive objects on the battery!
- Do not remove insulating caps and covers, if necessary re-install them after carrying out work on the battery cables.
- **Caution!** Explosive gases can develop when charging the batteries. Avoid smoking, fire or naked light in the vicinity of batteries. Ensure sufficient ventilation when charging the batteries.
- For further safety instructions, see Hako supplementary sheet 88-60-2556 – information for drive batteries.

Power connection and mains plug

- Only connect the machine to an electrical connection installed by an electrician in accordance with IEC 60364-1.
- We recommend connection to a fused socket with a residual current circuit breaker (max. 30 mA).
- We recommend use of splash water protected sockets according to DIN VDE 0620-1.
- Make sure the socket is dry!
- Only touch the mains plug and the mains cable with dry hands.
- Never insert the mains plug into the socket when the floor is wet or damp.
- Never dip the mains cable or mains plug in water or other liquids or clean it under running water.
- Damp mains plugs or mains plugs that have become wet must no longer be used. Water can enter the mains plug. Only qualified electricians must carry out recommissioning.
- Check the mains cable regularly for damage. If damage is detected, the machine must no longer be used. Have a qualified electrician replace the mains cable.
- Make sure that no water or liquid can come into contact with live parts of the machine. If water has still entered parts, immediately disconnect the mains plug and have the machine checked by the authorised Hako service.

1.6 Environmental protection instructions and disposal

If the end of use of the machine or of its components is reached and this is handed over for scrapping, the components must be correctly disposed of. Further information about disposal is available through the competent local authorities and the authorised Hako dealers.

	Do not dispose of products with this symbol in domestic waste. Disposal takes place through local collecting points or the manufacturer.
	Recycle used materials with this symbol according to their labelling and do not dispose of them in domestic waste.

- Observe the applicable laws and local regulations when disposing of dirt, waste water and detergents, also see the German Water Resources Law (WHG).
- Used batteries with the recycling symbol contain reusable commodities. In accordance with the symbol showing the crossed-out garbage bin, these batteries must not be disposed of in the domestic waste. Return and recycling have to be arranged with the authorised Hako dealer as required in § 6 and § 8 of the German battery law (BattG)!

1.7 Labels on the machine

The following safety and instruction labels are affixed to the machine in a clearly visible and legible manner.



Attention

Renew missing or illegible labels immediately!

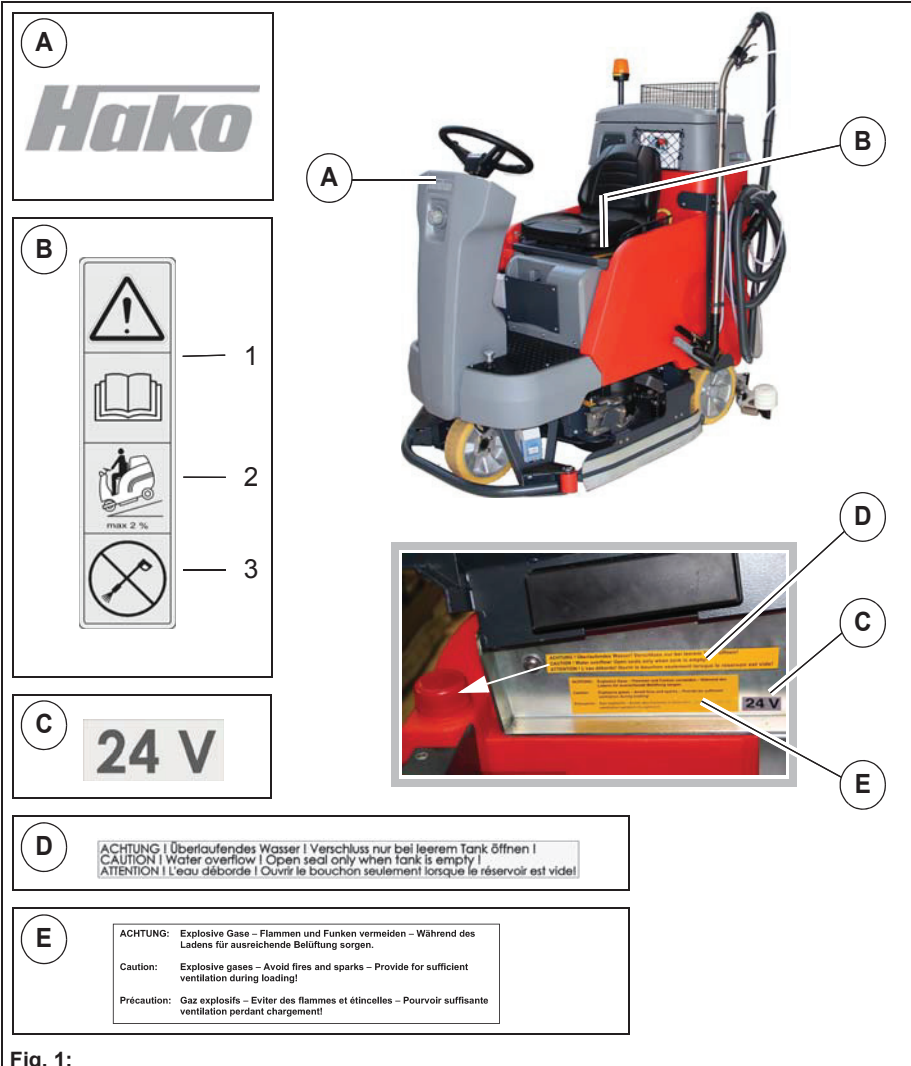


Fig. 1:



Fig. 2:

Label – Logo Fig. 1-A

The Hako logo is located at the front on the steering column and at the rear on the hopper.

Label

- **Read and observe the operating manual Fig. 1-B1**
- **Maximum permissible slope 2 % when cleaning Fig. 1-B2**
- **Never clean the machine with a high-pressure cleaner Fig. 1-B3**

The label is located on the left hand side next to the driver's seat.

Label – 24 V Fig. 1-C

The label is located on the right hand side of the battery compartment.

Label – Overflowing water Fig. 1-D

The label is located on the right hand side of the battery compartment.

Label – Explosive gases Fig. 1-E

The label is located on the right hand side of the battery compartment.

Label – Type plate Fig. 2-F

The type plate is located on the right-hand side of the chassis in front of the rear wheel.

Label – QR code Fig. 2-G

The label is located on the control panel.

Label – Maintenance parts (yellow dot) Fig. 2-H

The yellow dot is located on the cover of the fresh water filter.

Label – Drain waste water Fig. 2-I

The label is located on the drain hose.

Label – Drain fresh water Fig. 2-J

The label is located on the cover of the maintenance opening.

Label – Keep off! Fig. 2-K

The label is located on the rotating brush or roller brush unit.

2 Operation

2.1 Overviews

The description in chapter 2 contains information on the function and handling of the individual controls on the machine. The controls always have the same item number in all chapters.

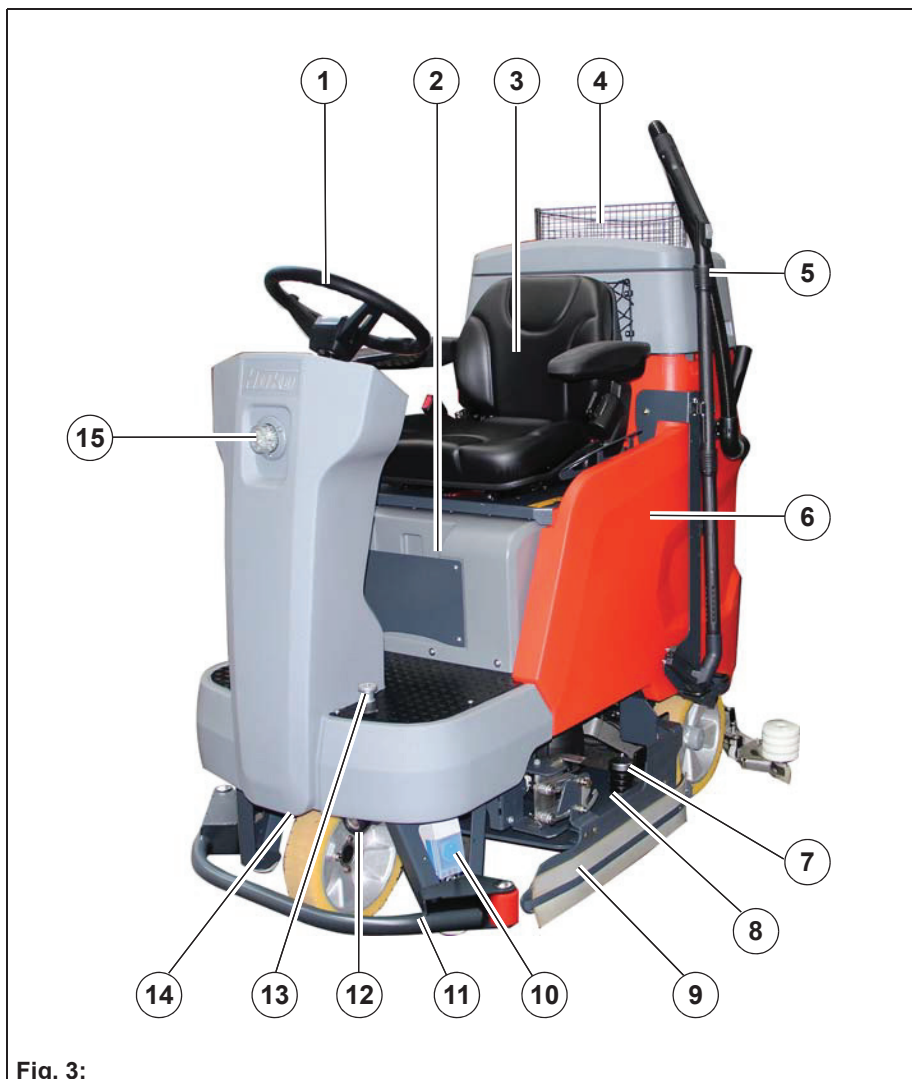


Fig. 3:

2.1.1 Front view

Item	Designation
1	Steering wheel
2	Mains cable on-board charger
3	Driver's seat
4	Tray (option)
5	Manual suction tool or manual spray suction tool (option)
6	Solution tank
7	Brush decoupler rotating brush
8	Rotating brush unit
9	Wiper
10	On-board dosing system (option)
11	Collision protection
12	Working spotlights (option)
13	Operating brake
14	Travel drive
15	Warning device (option)



Fig. 4:

2.1.2 Rear view

Item	Designation
16	Suction filter
17	Waste water tank
18	Coarse dirt sieve (option)
19	Automatic filling unit (option)
20	Filling opening solution tank
21	Cleaning opening solution tank
22	Accelerator pedal
23	Roller brush unit
24	Fresh water filter
25	Ball cock
26	Squeegee
27	Drain hose waste water
28	Suction hose squeegee
29	Maintenance opening solution tank
30	Fresh water level indicator
31	Battery compartment
32	Flashlight on pole

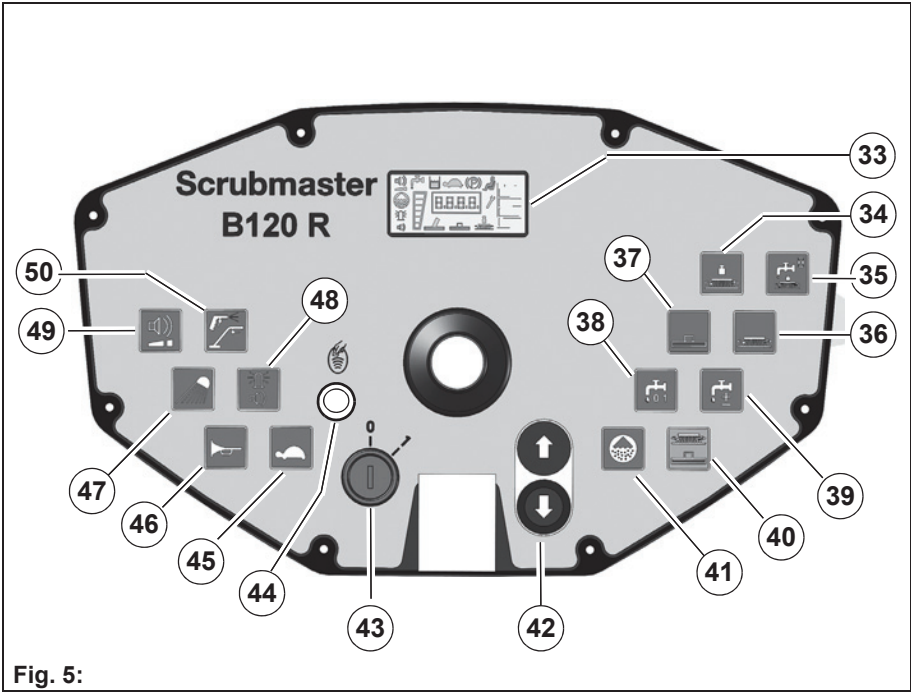


Fig. 5:

2.1.3 Control panel

Item	Designation
33	Display panel
34	Button – brush pressure increase
35	Button – boost function
36	Button – brush unit
37	Button – squeegee
38	Button – fresh water supply
39	Button – fresh water dosing
40	Button – brush unit and squeegee
41	Button – on-board dosing system (option)
42	Driving direction button

43	Key switch
44	I-Button-Reader – Fleet-Recorder Standard (option)
45	Button – speed reduction forwards gear
46	Button – signal horn
47	Button – working spotlights (option)
48	Button – warning device (option)
49	Button – silent operation
50	Button – tool operation (option)

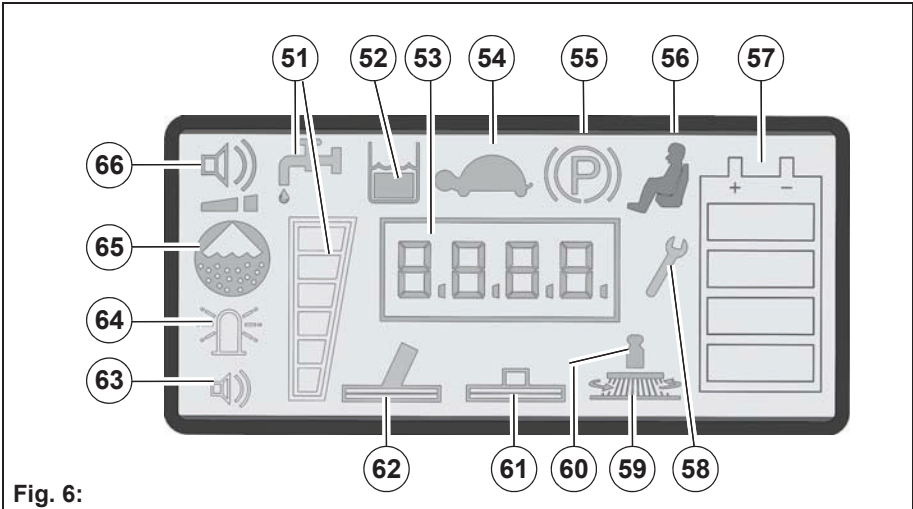


Fig. 6:

2.1.4 Display panel

Item	Designation	Meaning
51	Fresh water dosing	The symbol is displayed when the fresh water supply is switched on and the brush unit is lowered. The respective selected level of the water quantity can be read in the display panel. If there are only 10 litres left in the solution tank, the symbol flashes and a warning sound is output. Fill the solution tank immediately, see section 5.4
52	Waste water tank full	The symbol is displayed when the waste water tank is full. A warning sound is additionally output. Empty the waste water tank immediately, see section 5.5.1.
53	Number field	Display panel for: -Operating hours meter -Service code -Release indicator for Fleet-Recorder option

54	Speed reduction	The symbol is displayed when the machine is driving at reduced speed.
55	Parking brake	The symbol is displayed when the parking brake is activated.
56	Seat contact	The warning symbol lights up if the driver gets up from the driver's seat during operation. Main functions, e.g. scrubbing, vacuuming and driving, are no longer possible.
57	Indicator - battery management system (BMS) and charging process	If the machine is ready for use, the current charging state of the batteries is displayed. When the battery is charged, the charge control indicator is displayed in the display panel.
58	Service indicator	The symbol is displayed in case of a system fault. A warning signal is additionally output and a service code displayed in the number field, see section 3.6
59	Brush drive	The symbol is displayed when the rotating or roller brushes are switched on.
60	Brush pressure increase	The symbol is displayed when the brush pressure increase is activated.
61	Suction turbine drive	The symbol is displayed when the suction turbine drive is switched on. After switching off the suction function, the suction turbine continues to run for 15 seconds as standard. The symbol flashes during this time.
62	Tool operation (option)	The symbol is displayed when the manual suction tool or the spray suction tool is being used.
63	Acoustic warning signal (option)	The symbol is displayed when the acoustic warning signal is switched on.
64	Warning device (option)	The symbol is displayed when the warning device is switched on.
65	On-board dosing system (option)	The symbol is displayed when the dosing system is switched on.
66	Silent operation	The symbol is displayed when the machine is working in silent operation.

2.2 Controls and display elements

2.2.1 Control panel

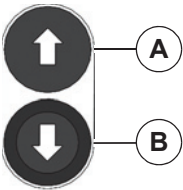
The individual functions of the buttons on the control panel are described below. The respective activated functions are visible as corresponding symbols in the display panel.



Key switch Fig. 5-43

The electrical system is switched on and off with the key switch.

- Position 0: The electrical system is switched off. The key can be pulled out.
- Position 1: The electrical system is switched on.
 - The software version is displayed for approx. 1 second in the number field **Fig. 6-53**, possibly followed by the last service code for approx. 3 seconds. The operating hours meter is then displayed.
 - The current charging state of the batteries is displayed in the BMS display panel **Fig. 6-57**.



Driving direction selection button Fig. 5-42

The driving direction is selected with this button. The driving direction can be changed while driving.

- Push the button (A): Forwards gear
- Push the button (B): Reverse gear



Note

A warning signal is output when in reverse gear. The maximum speed when reversing is half of the maximum speed when driving forwards.



Speed reduction button Fig. 5-45

The maximum speed when driving forwards is reduced by approx. 50 % with this button.

- Push the button: Speed reduction ON
- Push the button again: Speed reduction OFF



Signal horn button Fig. 5-46

The signal horn is switched on and off with this button.

- Push the button: Signal horn ON
- Release the button: Signal horn OFF



Fresh water supply button Fig. 5-38

The fresh water supply is switched on and off with this button.

- Push the button: Fresh water supply ON
- Push the button again: Fresh water supply OFF



Fresh water dosing button Fig. 5-39

After the fresh water supply has been switched on, the fresh water quantity can be set to six different levels with this button.

Push the button to increase the water quantity by one level. After reaching level 6, pushing the button again switches back to the lowest water quantity (level 1).

The respectively set level is displayed in the display panel **Fig. 6-51**.



Brush unit button Fig. 5-36

The brush unit is lowered and raised with this button.

- Push the button: The brush unit is lowered. When actuating the accelerator pedal, the brush drive and the water supply are switched on.
- Push the button again: The brush drive and the water supply are switched off. The brush unit is raised.



Note

If the accelerator pedal is not actuated, the brush drive and the water supply are switched off.



Squeegee button Fig. 5-37

The squeegee is lowered/raised and the suction turbine switched on and off with this button.

- Push the button: The squeegee is lowered and the suction turbine switched on.
- Push the button again: The squeegee is raised. The symbol for the suction turbine drive begins to flash in the display panel. After a delay time of approx. 15 seconds, the suction turbine is switched off.



Note

The suction turbine drive works independently of the driving direction. The squeegee is raised automatically when reversing.



Brush unit and squeegee button Fig. 5-40

The brush and suction turbine drive are switched on and off simultaneously with this button.

- Push the button: The brush unit and the squeegee are lowered, the suction turbine is switched on. The brush drive and the water supply are switched on when the accelerator pedal is actuated.
- Push the button again: The brush unit is raised. The brush drive and the water supply are switched off. The squeegee continues to run for approx. 15 seconds to absorb residual water.



Brush pressure increase button Fig. 5-34

When the cleaning program is switched on, it is possible to increase the brush pressure and thus enhance the cleaning result with this button.

- Push the button: Brush pressure increase ON
- Push the button again: Brush pressure increase OFF



Boost function button Fig. 5-35

In order to remove heavy contamination, it is possible to boost the cleaning program scrubbing-vacuuming (green button **Fig. 5-40**) and scrubbing (button **Fig. 5-35**) via the boost function.

- Push and hold the button: The highest level of fresh water dosing and the increased brush pressure are activated simultaneously.
- Release the button: The machine switches back to the operating mode it was in before the boost function.



On-board dosing system button (option) Fig. 5-41

The dosing system for the detergent is switched on and off with this button.

- Push the button: Dosing system ON
- Push the button again: Dosing system OFF



Warning device button (option) Fig. 5-48

Two functions can be selected with this button:

- Push the button once: The warning light flashes. A warning signal is additionally output when driving forwards.
- Push the button again: The warning light flashes.
- Push the button again: Warning device OFF



Working spotlights button (option) Fig. 5-47

The working spotlight is switched on and off with this button.

- Push the button: Working spotlights ON
- Push the button again: Working spotlights OFF



Tool operation button (option) Fig. 5-50

Tool operation is switched on and off with this button when the manual suction or manual spray suction tool is connected. The driver must not be on the driver's seat.

- Push the button: Tool operation ON
- Push the button again: Tool operation OFF



Silent operation button (option) Fig. 5-49

The suction turbine is switched to silent operation with this button.

- Push the button: Silent operation ON
- Push the button again: Silent operation OFF



I-Button-Reader Fleet-Recorder (option) Fig. 5-44

The I-Button-Reader is used to activate the functions.

Red illuminated LED or warning sound after switching on the machine request the activation of the operating data recording system via the I-Button-Key.

- Push the I-Button-Key for approx. 2 seconds against the I-Button-Reader.
- The red LED goes out. The machine is ready for operation.

2.2.2 Controls at the machine

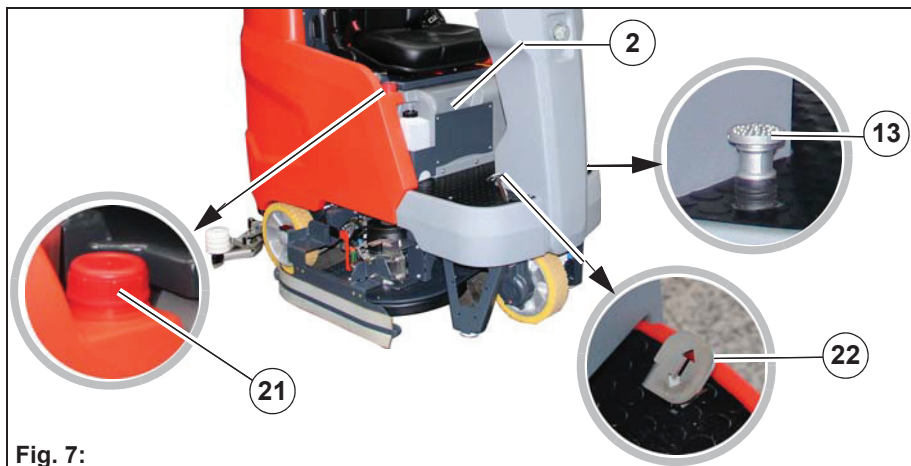


Fig. 7:

Mains cable Fig. 7-2

The mains connection supplies voltage to the on-board charger.

Operating brake Fig. 7-13

When the accelerator pedal is released, the machine comes to a stop due to the braking effect of the travel drive. If this braking effect is not sufficient, the operating brake can be applied in addition.

Accelerator pedal Fig. 7-22

The accelerator pedal is used to drive forwards or reverse and continuously adjust the speed at the same time.



Note

Set the driving direction in advance with the driving direction selection button Fig. 5-42.

If the accelerator pedal is not actuated, it automatically returns to the zero position and the machine stops.

Cleaning opening solution tank Fig. 7-21

The cleaning opening is used for cleaning the solution tank.

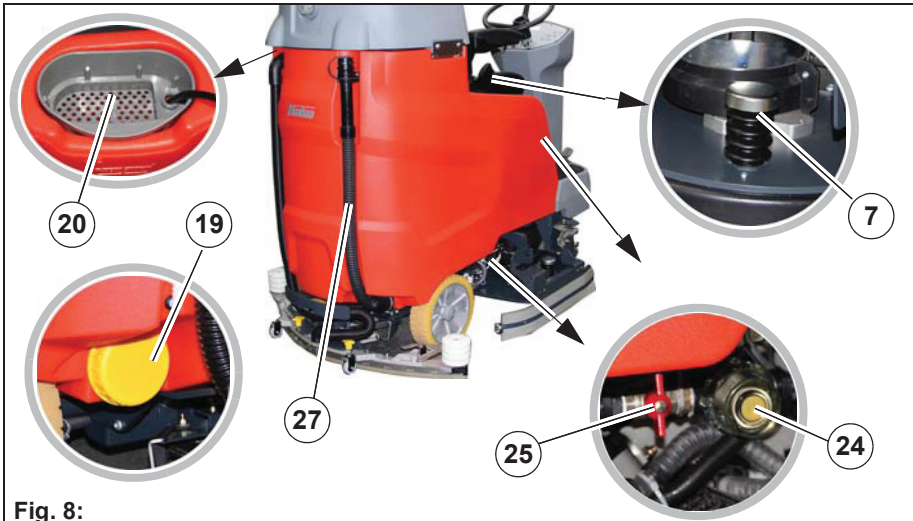


Fig. 8:

Brush decoupler rotating brush Fig. 8-7

By actuating the brush decoupler, the rotating brushes can be disassembled quickly and without tools.

Fresh water filter Fig. 8-24

When supplying water from the solution tank to the brush unit, the fresh water is cleaned by the filter insert.

Ball cock Fig. 8-25

The ball cock is used to switch the water supply on and off manually in case the fresh water filter needs to be unscrewed.

Drain hose for waste water Fig. 8-27

The absorbed waste water is drained with the drain hose of the waste water tank.

Maintenance opening Fig. 8-19

The maintenance opening is used to drain fresh water.

Filling opening fresh water Fig. 8-20

The solution tank is filled via the filling opening.

Optionally, the solution tank can be filled via the automatic filling unit, see section 5.4.2.

2.3 General principle of operation

Scrubmaster B120 R is a ride-on scrubber-drier for wet cleaning hard floor surfaces.

In cleaning mode, the cleaning solution is supplied from the solution tank to the rotating brushes in the brush unit. When the machine is moving forwards, the used waste water is absorbed by the squeegee and conveyed into the waste water tank.

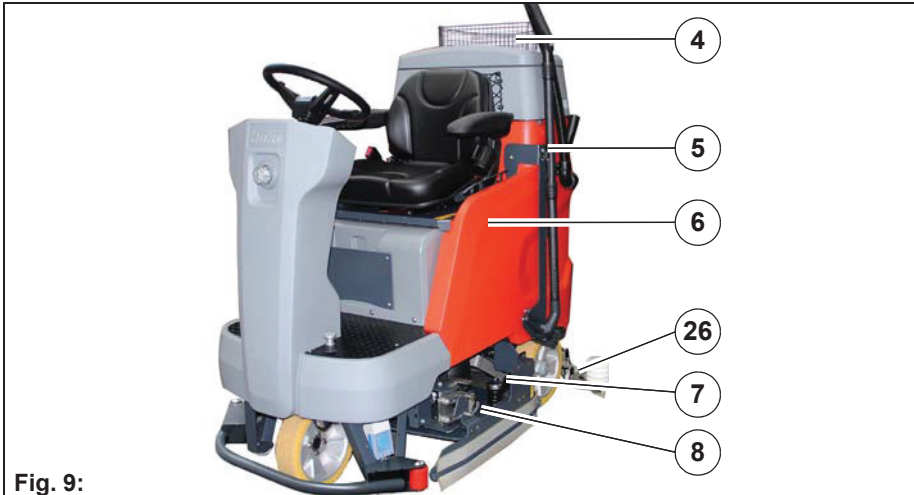


Fig. 9:

2.3.1 Solution tank

The solution tank **Fig. 9-6** is filled via the filling opening **Fig. 4-20**. The solution tank has a capacity of 120 litres. The level can be determined via a transparent hose **Fig. 10-30**. If there are only 10 litres of fresh water left in the tank, the ball cock symbol flashes in the display panel and a warning sound (approx. 30 seconds) requests refilling.

2.3.2 Brush unit

The brushes in the brush unit **Fig. 9-8** are driven by two electric motors. The brush unit is lowered with the brush unit button **Fig. 5-36**. When actuating the accelerator pedal, the brush motors and the water supply are switched on. The floor is cleaned by the rotating brushes and the supply of cleaning solution.

For maintenance purposes, the brushes in the rotating brush unit can be decoupled via the foot lever brush decoupler **Fig. 8-7**.

2.3.3 Squeegee

The movable, hinged squeegee **Fig. 9-26** is lowered and switched on with the squeegee button **Fig. 5-37**. The squeegee withdraws the waste water from the floor using a sealing strip. The suction turbine vacuums the waste water from the floor. If the machine passes through narrow sections, e.g. checkout areas, the squeegee can be removed by loosening the star-shaped handle and hooked into the cover **Fig. 10-A** of the waste water tank.



Fig. 10:

2.3.4 Waste water tank

The waste water vacuumed by the squeegee is conveyed via a suction hose **Fig. 10-28** from the squeegee into the waste water tank **Fig. 10-17**.

A manual suction tool or manual spray suction tool **Fig. 9-5** is optionally available for cleaning and water absorption in difficult-to-reach positions.

2.3.5 Drain hose waste water

The waste water is drained from the waste water tank with the drain hose **Fig. 10-27**.

2.3.6 Tray (option)

The tray **Fig. 9-4** is used to transport cleaning utensils.



Note

Before opening the tank cap, remove the tray!

3 Putting into service

3.1 Instruction

Instruction is required before the first start-up. The first-time instruction of the machine must be provided only by a specialist of your authorised Hako dealer. This person will be notified immediately after delivery of the machine from the factory and will contact you to make an instruction appointment.

3.2 Before putting into service



Attention

- Before initially starting up the machine, charge the used batteries fully and appropriately with commissioning charge. Please observe the operating manual of the charging device and the operating manual of the battery manufacturer. Hako assumes no liability for battery damage resulting from insufficient commissioning charge.
- Before the machine is initially put into service, install the country-specific Hako mains cable.
- Check the machine for operating safety before every start-up! Eliminate faults immediately.
- Before starting work, the operator must familiarize himself with all equipment, operating and actuating elements as well as with their function.

3.3 Checklist – before machine start-up

No.	Description
1	Checking the parking area for signs of leaks. Cables and tanks must not show any sign of leaks or damage
2	Installing the mains cable, see section 3.3.1
3	Mounting the brushes and squeegee, see chapter Maintenance
4	Adjusting the driver's seat, if necessary, see section 3.3.2
5	Checking the battery charge and recharge it as required, see section 5.3
6	Emptying the waste water tank and clean it as required, see section 5.5
7	Filling the solution tank (see chapter Maintenance) and add detergent according to the manufacturer's specifications

3.3.1 Installing the mains cable

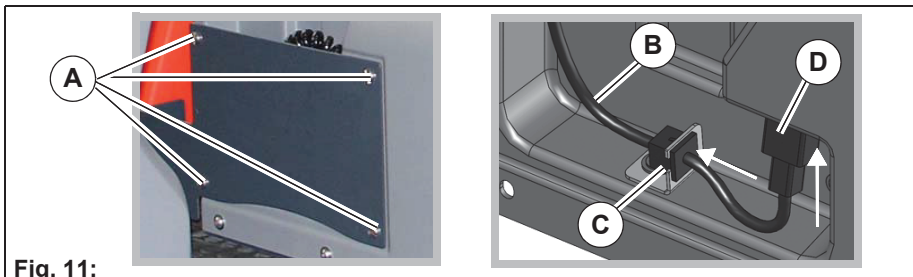


Fig. 11:

1. Loosen the bolts of the cover **Fig. 11-A** using the supplied socket wrench and remove the cover.
2. Route the cable of the mains plug **Fig. 11-B** through the opening in the bracket **Fig. 11-C**. Ensure that the side of the strain relief without a latch faces the front towards the opening.
3. Press the strain relief into the bracket until all latches have engaged.
4. Plug the mains plug **Fig. 11-D** straight and firmly into the holder.
5. Reinstall the cover using the available screws.

3.3.2 Driver's seat



Attention

For reasons of safety, the driver's seat is equipped with a seat contact switch. The function of the seat contact switch must not be bypassed.

Adjusting the standard driver's seat



Fig. 12:

Adjust the driver's seat with the lever **Fig. 12-A** so that all the controls can be reached effortlessly.

Adjusting the comfort driver's seat (option)



Fig. 13:

Adjust the comfort driver's seat as follows:

Adjusting in longitudinal direction

Press the lever **Fig. 13-A** slightly outwards and move the seat forwards or backwards.

Adjusting the tilt of the backrest

Use the handwheel **Fig. 13-B** to adjust the backrest to the desired tilt.

Adjusting the driver's weight

- Drivers who weigh less turn the handwheel **Fig. 13-C** to the left.
- Drivers who weigh more turn the handwheel to the right.

3.4 Cleaning



Attention

- Before operating the machine, read and observe the safety instructions in chapter 1.
- The machine can only be put into service when the driver is sitting on the driver's seat.
- The travel drive can only be started when the accelerator pedal is not actuated when turning the machine on.

No.		Description
1		Turn on the machine.
2		Activate the Fleet-Recorder (option)
3		Use the driving direction selection button to select the driving direction
4		Select the cleaning programme
5		Actuate the accelerator pedal. The brushes and the water supply of the last selected setting are switched on.
6		If necessary, switch on the fresh water supply.
7		Adjust the fresh water quantity using the respective button.
8		In case of heavy contamination increase the brush pressure, or actuate the boost button for 1 minute.

3.4.1 Fleet-Recorder Standard (option)

The Fleet-Recorder records operating times and further operating conditions of the machine.



Fig. 14:

Putting into service

1. Turn the machine on with the key switch **Fig. 14-A**.
 - Red LED of the I-Button-Reader ON.
2. Press the I-Button-Key **Fig. 14-B** against the I-Button-Reader **Fig. 14-C** for one to two seconds.
 - Red LED OFF.
 - Operating data recording system active.

If the machine is **not** registered with the I-Button-Key, the following condition arises according to the selected option:

Option	Display LED	Machine function*	Data recording
Standard	Red LED ON	Fully functional	The operating data recording is activated or fully suppressed according to the presetting.
Option 5400.00	Red LED ON	Function of the working tools locked, transport possible	GPS data is recorded as standard.
Option 5400.10	Red LED ON, a warning sound is additionally output after approx. 5 seconds	Fully functional	

*deviating machine functions depending on the respective customer configuration possible



Note

Red illuminated LED or warning sound request the activation of the operating data recording system via the I-Button-Key!

Ending operation

Switch off the machine using the key switch.

3.4.2 On-board dosing system (option)

The on-board dosing system is used for optimum dosing of the detergent.



Attention

Only use detergents suitable for automatic machines (foam retarded). We recommend use of our detergents and care agents specifically developed for the machines. These products meet the requirements of the German Detergent and Detergent Act (WRMG).

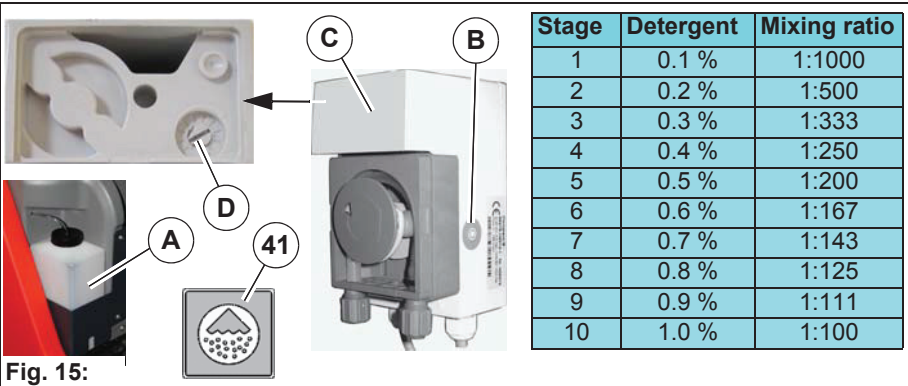


Fig. 15:

Putting into service

1. Fill the canisters **Fig. 15-A** with detergent.
2. Turn the machine on with the key switch.
3. Switch on the dosing system with the on-board dosing system button **Fig. 15-41**.
4. Press the quick ventilation switch **Fig. 15-B** at the dosing pump until detergent is available at the non-return valve.

Setting the mixing ratio

1. Remove the grey cover **Fig. 15-C** at the dosing pump.
2. Set the mixing ratio according to the detergent being used.
3. Basic setting = 1:700
Set the rotary knob **Fig. 15-D** between stage 1 and 2, see table.

Maintenance

Check the hose section **Fig. 15-D** in the hose pump (length approx. 23 mm) and replace it if necessary.

3.4.3 Spray suction tool (option)

The manual spray suction tool **Fig. 16-5** is used for manually cleaning difficult-to-reach points.

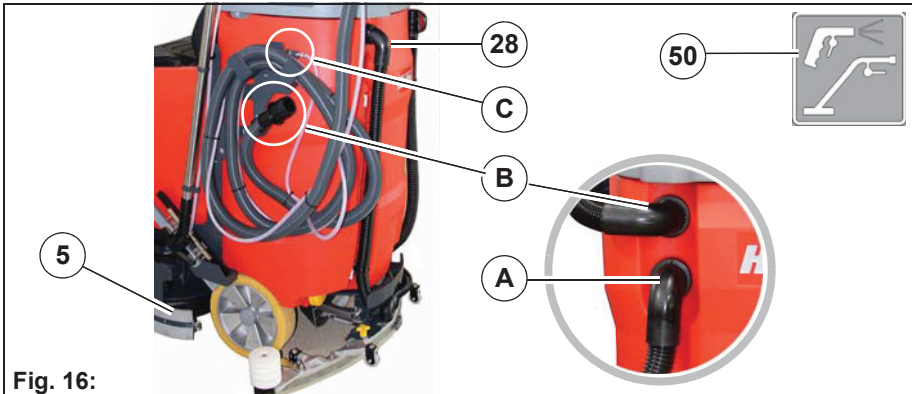


Fig. 16:

1. Reconnect the suction hose **Fig. 16-28** to park position **Fig. 16-A**.
2. Insert the hose of the tool into the opening of the vacuum system **Fig. 16-B**.
3. Connect the hose to the water connection of the machine **Fig. 16-C**.
4. Use the tool operation button **Fig. 16-50** on the control panel to switch the tool on and off.

3.4.4 Manual suction tool (option)

The manual suction tool **Fig. 17-5** is used for manually cleaning difficult-to-reach points.

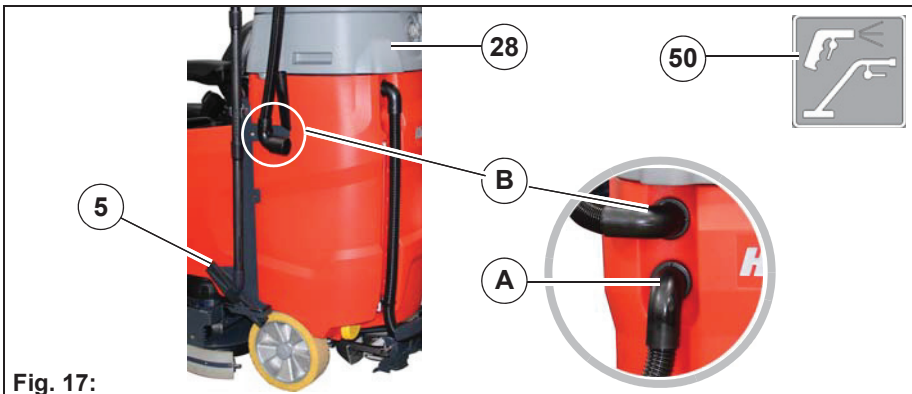


Fig. 17:

1. Reconnect the suction hose **Fig. 17-28** to park position **Fig. 17-A**.
2. Insert the hose of the tool into the opening of the vacuum system **Fig. 17-B**.

- Use the tool operation button **Fig. 17-50** on the control panel to switch the tool on and off.

3.4.5 Spray nozzle (option)

The spray nozzle is used to flush the fresh water and waste water tank.

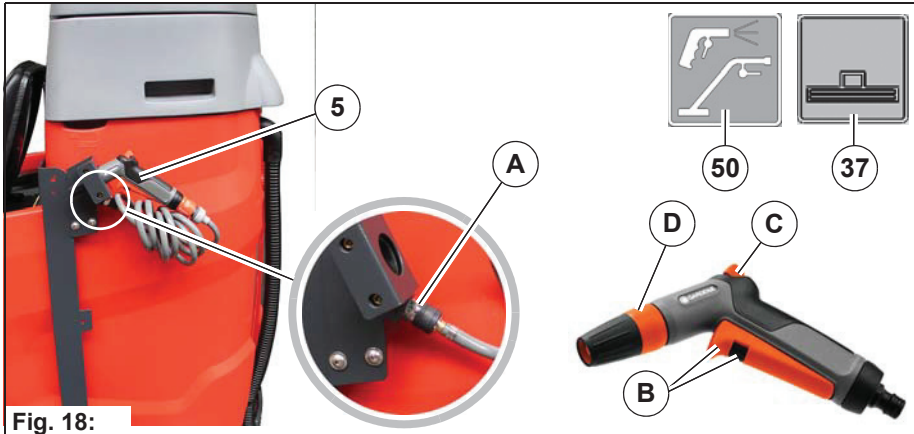


Fig. 18:

- Connect the hose to the water connection of the machine **Fig. 18-A**.
- Use the tool operation button **Fig. 18-50** on the control panel to turn the water supply on and off.
As the vacuum system is not required during tool operation, the turbine can be switched off using the squeegee button **Fig. 18-37**.
- Fig. 18-B** = operating handle for turning the water supply with locking mechanism on and off.
Fig. 18-C = adjusting lever for water dosing.
Fig. 18-D = setting the type of water jet.

3.4.6 Useful cleaning tips

Sweep the floor before carrying out wet cleaning. This not only enhances the cleaning effect but also reduces wear of the machine's working tools.

If the floors are really dirty or wax needs to be removed, treat the floor twice. In the first step, scrub the floor with a detergent suitable for the degree of soiling; the squeegee remains raised for this.

Leave the detergent for approx. 5 to 10 minutes; subsequently scrub the floor again and work with a lowered squeegee.



Note

- Only use detergents suitable for automatic machines (foam retarded). We recommend use of our detergents and care agents specifically developed for the machine. These products meet the requirements of the German Detergent and Cleaning Agent Act (WRMG).
- Observe correct dosing of the detergent. Correct dosing saves money and protects the environment. Strong foam formation is a sign of excessive dosing and impairs machine operation.

3.4.7 Handling and braking the vehicle

**Note**

Set the key switch to '0' to immediately disable all the functions.

Danger

- Danger of tilting over when driving on excessively steep slopes
Transport journeys on slopes of up to 10 % must only be executed for 1 minute and with special caution.
- Risk of skidding when driving on wet surfaces.
Drive very carefully into the bend when driving downhill.

Observe the following points when driving:

- Driving speed and braking of the machine are controlled via the accelerator pedal.
- When releasing the accelerator pedal, the engine brake is activated automatically. This also applies to slopes and when driving downhill.
- Stop the machine: Release the accelerator pedal.
- When the machine is at standstill, the parking brake is activated audibly. It is no longer possible to push the machine, see section 3.4.8.

Overload protection

In case of an overload, e.g. excessively steep slopes, the drive motor is switched off after a certain period of time.

- Let the machine cool down for approx. 15 minutes.
- Restart the machine.

3.4.8 Pushing the machine



Danger

Risk of accident! When pushing the machine, it does not have any braking effect.
After pushing the machine, only re-start it if the lever has been positioned and the cover installed.

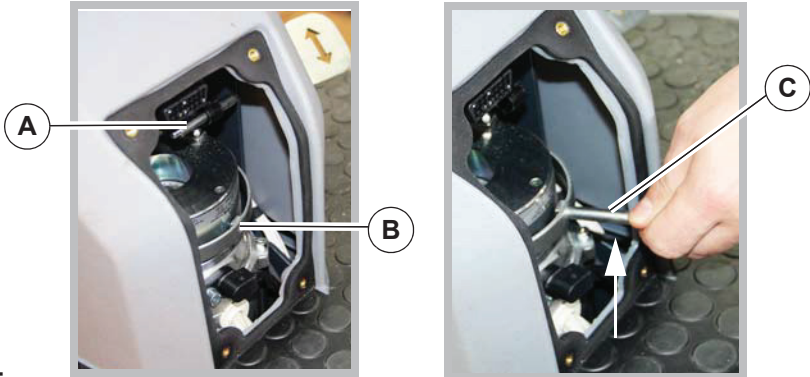


Fig. 19:

In order to push the machine, carry out the following steps:

1. Loosen the bolts of the cover to the drive using the supplied socket wrench and remove the cover.
2. Remove the pin **Fig. 19-A** from the holder and screw it into the ring **Fig. 19-B**.
3. In order to unlock the parking brake, slightly pull the pin upwards and simultaneously push the machine.
4. Disassembly is in reverse order.

3.4.9 Turning off the machine

1. Slowly bring the accelerator pedal to the zero position. The machine slows down to standstill. A better braking effect is achieved when the machine is slowed down by applying the brake.
2. When the machine is at standstill, the parking brake is activated audibly.
3. Switch off the cleaning functions.
4. Switch off the machine using the key switch.



Note

Remove the key when leaving the machine to prevent unauthorised use.

3.4.10 Checklist – after cleaning



Environmental danger

Observe the applicable laws and local regulations when disposing of detergents.



Attention

Do not use a high-pressure cleaner or steam cleaner to clean the machine.

No.	Description
1	Drive to a suitable maintenance location.
2	Switch the machine off and pull out the key.
3	Empty and clean the waste water tank, see section 5.5.2.
4	Check the fresh water filter, see section 5.4.5.
5	Check the sealing strips and suction hose, see chapter Maintenance and Servicing.
6	Check the functions and settings.
7	Charge the battery, see section 5.3.5.
8	Clean the machine. If the machine is not used over a longer period of time, the solution tank must be fully emptied.

3.5 Loading and transporting



Attention

- When loading and subsequently transporting the machine to the work site, the squeegee and brush head must be raised.
- Risk of skidding! Drive very carefully and, if possible, only on dry ramps.

Loading

When loading the machine, observe its weight, see Section 4 *Technical data*.

Transporting

When transported on a vehicle or trailer, the machine must be secured against tilting and rolling away. To do so, tie the machine down tightly using clamping bands.

3.6 Service information

In case problems occur with the machine, a four-digit service code is output in the display panel in addition to the service indicator (tool key).

The dots of the service code flash. Eliminate the cause or note down the service code and inform your authorised Hako service partner.

If the cause has been eliminated, the fault must be acknowledged via the key switch OFF/ON.

Service code	Fault	Cause	Remedy
1.2.2.1	Brushes/Roller stop	Electrical defects	Contact the customer service
1.2.5.2.	Brushes stop	Foreign particles between brush and shaft	Inspect the brushes for foreign particles and remove them if necessary
1.2.6.1.	Brushes stop	<ul style="list-style-type: none"> • Foreign particles block the brush • Brush not positioned correctly in the holder 	<ul style="list-style-type: none"> • Inspect the brushes for foreign particles and remove them if necessary • Actuate the brush decoupling system, contact the service partner, if necessary
1.2.6.3.	Brush lift system, brush and suction turbine have been switched off	<ul style="list-style-type: none"> • Foreign particles between brush head and machine • Foreign particles between squeegee and machine • Squeegee jammed 	<ul style="list-style-type: none"> • Inspect the brush head for foreign particles and remove them if necessary • Inspect the lift system for foreign particles and remove them if necessary • Make the squeegee accessible
1.4.6.1.	Squeegee lift system stops	Overload due to foreign particles	Inspect for foreign particles and remove them if necessary

Service code	Fault	Cause	Remedy
1.4.6.3.	Suction turbine stops	<ul style="list-style-type: none"> Foreign particles in the suction turbine Faulty suction turbine 	Contact the customer service
3.2.6.6.	Service code indicator when turning on the machine	Discharged capacity of the internal back-up battery of the machine control	Contact the customer service
3.3.1.1.	Service interval expired		See maintenance plan
3.4.1.2.	Driving not possible	Error in the drive control	Turn the machine OFF/ON, contact the customer service if necessary
3.4.5.1.	Cleaning function switches off	<ul style="list-style-type: none"> Drive wheel becomes sluggish due to foreign particles Drive motor overheats 	<ul style="list-style-type: none"> Remove foreign particles Let the engine cool down
3.6.6.4.	Driving and cleaning not possible	Seat permanently loaded	Relieve seat
5.8.7.0.	Batteries are not being charged	<ul style="list-style-type: none"> Cables on the battery poles loose or detached Incorrect type of battery installed 	Contact the customer service
5.8.7.1.	Batteries are not being charged	<ul style="list-style-type: none"> Mains plug not inserted correctly Incorrect type of battery installed 	Insert the mains plug correctly
Flashing number field	Driving not possible	<ul style="list-style-type: none"> Seat not occupied Start sequence not observed 	<ul style="list-style-type: none"> Occupy seat Observe start sequence

4 Technical data

Dimensions

Name	Unit	TB 750	TB 900	WB 700	WB 850
Length of machine with squeegee	mm	1675	1675	1675	1675
Width of machine with squeegee	mm	960	1120	960	1120
Width of machine without squeegee	mm	810	950	810	950
Height of machine	mm	1440	1440	1440	1440

Working width

Brush unit	mm	750	900	700	850
Squeegee	mm	950	1100	950	1100

Weights

Weight (empty, without batteries)	kg	340	355	324	326
Total weight (ready for use)	kg	723	738	707	709
Permissible total weight	kg	870	870	870	870

Driving performance

Driving speed transportation (forwards/reverse)	km/h	6.7/3.9	6.7/3.9	6.7/3.9	6.7/3.9
Climbing capacity when cleaning	%	2	2	2	2
Climbing capacity during transport journey (ready for operation, max. 1 minute)	%	10	10	10	10
Ramp angle/Slope angle	%	18	18	18	18
Turning circle (with squeegee)	mm	2470	2470	2470	2470

Wheels

Wheel diameter	mm	305	305	305	305
Specific wheel contact pressure front/rear	N/mm ²	0,49/ 0,48	0,49/ 0,48	0,49/ 0,48	0,49/ 0,48

Tank contents

Name	Unit	TB 750	TB 900	WB 700	WB 850
Solution tank	Litre	120	120	120	120
Waste water tank	Litre	120	120	120	120

Brush head

Number of brushes	Piece	2	2	2	2
Brush speed	rpm	210	210	850	850
Min./Max. brush pressure	kg	37/60	50/70	26/33	28/35

Vacuum system

Air quantity	m ³ /h	110	118	110	118
Vacuum (maximum)	mbar	170	170	170	170

Electrical system

Nominal voltage	V	24	24	24	24
Nominal output (max.) (P1)	W	3260	3260	3100	3100
Power consumption drive motor (P1) S2-120 min	W	816	816	816	816
Power consumption vacuum motor (P1)	W	528	528	528	528
Power consumption brush motor (P1)	W	2x960	2x960	2x876	2x876
Power consumption water pump (P1)	W	100	100	100	100
Type of protection		IPX3	IPX3	IPX3	IPX3
Protection class		III	III	III	III

On-board charger

Rated input/output voltage	V	230/24	230/24	230/24	230/24
Nominal output	W	1130	1130	1130	1130
Type of protection		IP20	IP20	IP20	IP20
Protection class		I	I	I	I

Noise emission value

The sound power level (L_{wAd}) measured under the customary conditions of use according to DIN EN 60335-2-72 is:	dB (A)	85
The sound pressure level (L_{pA}) (at the ear of the driver) measured under the customary conditions of use according to DIN EN 60335-2-72 is:	dB (A)	66
Measuring uncertainty (K_{pA})	dB (A)	2

Vibration

Under the customary conditions of use, the weighted effective value of the acceleration to which the upper limbs (hand-arm) are subjected to according to DIN EN ISO 5349 is:	m/s^2	≤ 2.5
Under the customary conditions of use, the weighted effective value of the acceleration to which the body (feet or seat surface) is subjected to DIN EN ISO 2631-1 is:	m/s^2	≤ 0.5

5 Maintenance and Servicing

General

The operator is instructed fully on delivery of the machine.



Attention

Before undertaking servicing and maintenance work, read and observe the safety instructions in chapter 1 of this operating manual!

Compliance with the maintenance work recommended by us gives you the certainty of always having an operational machine available.

Daily and weekly maintenance and repair work can be undertaken by a driver trained for this, all further Hako system maintenance work may be undertaken only by trained and qualified personnel.

Please contact your nearest Hako service centre or authorised Hako dealer. Any warranty claim is null and void if this is not complied with and damage results.

Please always state the serial number in all enquiries and spare parts orders, see section 1.7 – type plate.

Hako system maintenance

The Hako system maintenance specifies in single modules the special technical work to be done and the periods of time for the maintenance activities. Parts to be replaced for the individual maintenance tasks are determined.

Hako system maintenance:

- Assures the reliable readiness for use of the Hako cleaning machines (preventive maintenance).
- Minimises operating costs, repair costs, costs for maintenance.
- Assures long life and readiness for use of the machine.



Note

Maintenance parts in the machine are marked with a yellow dot and yellow areas.

5.1 Maintenance certificate

<p>Handover</p> <p>Equipment Trial run Handover to customer Instruction performed on:</p> <p>at _____ operating hours</p>	<p>Hako system maintenance I 250 operating hours Workshop stamp</p> <p>performed on:</p> <p>at _____ operating hours</p>	<p>Hako system maintenance II 500 operating hours Workshop stamp</p> <p>performed on:</p> <p>at _____ operating hours</p>
<p>Hako system maintenance I 750 operating hours Workshop stamp</p> <p>performed on:</p> <p>at _____ operating hours</p>	<p>Hako system maintenance S 1000 operating hours Workshop stamp</p> <p>performed on:</p> <p>at _____ operating hours</p>	<p>Hako system maintenance I 1250 operating hours Workshop stamp</p> <p>performed on:</p> <p>at _____ operating hours</p>
<p>Hako system maintenance II 1500 operating hours Workshop stamp</p> <p>performed on:</p> <p>at _____ operating hours</p>	<p>Hako system maintenance I 1750 operating hours Workshop stamp</p> <p>performed on:</p> <p>at _____ operating hours</p>	<p>Hako system maintenance S 2000 operating hours Workshop stamp</p> <p>performed on:</p> <p>at _____ operating hours</p>
<p>Hako system maintenance I 2250 operating hours Workshop stamp</p> <p>performed on:</p> <p>at _____ operating hours</p>	<p>Hako system maintenance II 2500 operating hours Workshop stamp</p> <p>performed on:</p> <p>at _____ operating hours</p>	<p>Hako system maintenance I 2750 operating hours Workshop stamp</p> <p>performed on:</p> <p>at _____ operating hours</p>
<p>Hako system maintenance S 3000 operating hours Workshop stamp</p> <p>performed on:</p> <p>at _____ operating hours</p>	<p>Hako system maintenance I 3250 operating hours Workshop stamp</p> <p>performed on:</p> <p>at _____ operating hours</p>	<p>Hako system maintenance II 3500 operating hours Workshop stamp</p> <p>performed on:</p> <p>at _____ operating hours</p>

5.2 Maintenance plan

Hako system maintenance customer:

Work to be performed by the customer by reference to the servicing and maintenance instructions specified in the operating manual.

Activity / interval
Daily
<ul style="list-style-type: none">• Empty the waste water tank, clean the waste water tank, drain hose, coarse dirt sieve (option) and suction filter
<ul style="list-style-type: none">• Check the cover seal of the waste water tank, clean if necessary
<ul style="list-style-type: none">• Check the battery, charge if necessary
<ul style="list-style-type: none">• Check the squeegee, clean if necessary
Weekly
<ul style="list-style-type: none">• Clean the machine as required
<ul style="list-style-type: none">• Clean the solution tank
<ul style="list-style-type: none">• Check the sieve insert in the fresh water filter, clean or replace if necessary
<ul style="list-style-type: none">• Check the scrubbing performance of the brushes/pads, clean if necessary
<ul style="list-style-type: none">• Check the brushes and water retaining ring for proper fit and wear, replace if necessary
<ul style="list-style-type: none">• Check the suction performance of the squeegee, clean or replace the sealing strips if necessary
<ul style="list-style-type: none">• Check the fresh water supply to the brushes, clean if necessary
<ul style="list-style-type: none">• Check the drain hose for tight fit and damage, clean if necessary
<ul style="list-style-type: none">• Check the rubber of the lateral wiper, replace if necessary
<ul style="list-style-type: none">• Trial run and function test

Hako system maintenance I:

Performance by an expert of an authorised Hako workshop by reference to the machine-specific system maintenance.

Activity / interval
Every 250 hours
<ul style="list-style-type: none"> • Check the battery and the charger • Check the battery acid level and acid density, refill demineralised water if necessary • Check the air inlet grilles, air duct and filter mat of the on-board charger for contamination, clean or replace if necessary • Check the steering pinion and gear rim for damage, replace if necessary. Lubricate as required. • Check the brake for proper functioning • Check the cover seal of the waste water tank, replace if necessary • Check the seal at the drain hose, replace if necessary • Check the leak tightness of the seal at the inspection cover, replace if necessary • Check the sealing strip/slot strip of the squeegee, turn or replace if necessary • Check the sieve insert and cover seal of the fresh water filter for damage, replace if necessary • Check the transparency of the level indicator hose, replace if necessary • Check the rear wheel mounting screws, re-tighten if necessary (42 Nm) • Check the condition of tyres • Check the waste water and suction system, replace worn parts if necessary • Check the fresh water supply, replace worn parts if necessary • Check the electrical system (lighting, fuses and relays), replace parts if necessary • Remove fluff and dirt from the air inlet grilles of the brush motors • Check the squeegee setting, reset if necessary • Check the front collision protection with deflecting roller for damage

Hako system maintenance I (continued):

Activity / interval
Every 250 hours
<ul style="list-style-type: none">• Check the hoses and connecting pieces to the differential pressure switch in the tank cap for contamination, clean or replace if necessary• Check the optical condition of the machine (corrosion and labels)• Trial run and function test

Hako system maintenance II:

Performance by an expert of an authorised Hako workshop by reference to the machine-specific system maintenance.

Activity / interval
Every 500 hours
<ul style="list-style-type: none">• All maintenance work according to Hako system maintenance I• Read the error memory and evaluate the error messages• Check electrical performance (drive motor, brush motor and suction turbine)• Replace the backup battery of the electrical control and set a real-time clock• Trial run and function test

Hako system maintenance III/S (safety check)


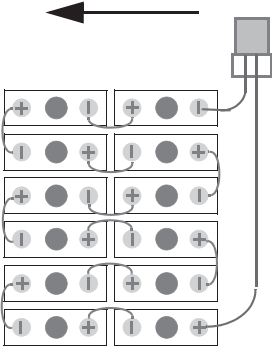

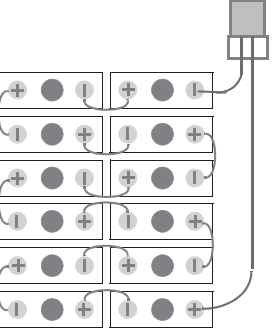
Performance by an expert of an authorised Hako workshop by reference to the machine-specific system maintenance. Performance of all legally stipulated safety-relevant tests according to the BGV specifications.

Activity / interval
Every 1000 hours
<ul style="list-style-type: none">• All maintenance work according to Hako system maintenance II• Remove coal dust from the brush motors and check the carbon brushes for ease of movement and wear, replace carbon brushes if necessary• Trial run and function test

5.3 Battery system

5.3.1 Type of battery

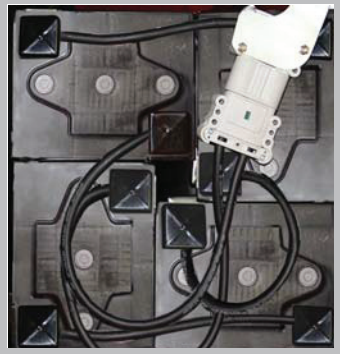
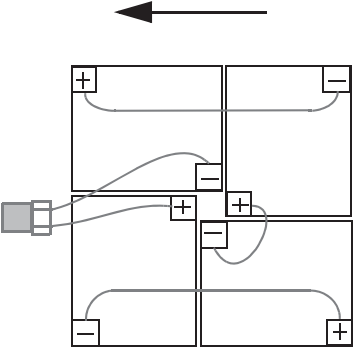
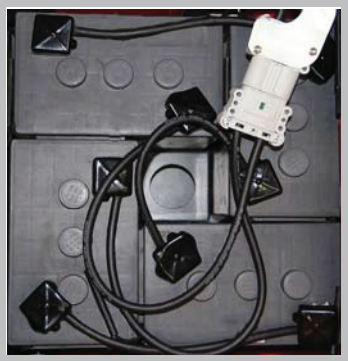
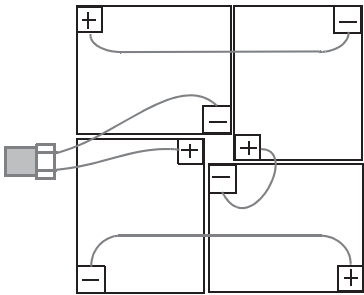
The machine variants are equipped with different maintenance-free battery types. When using other batteries which have been approved by Hako, corresponding settings must be carried out in the configuration menu. These settings should only be carried out by a workshop authorised by Hako!

Type of battery	Connection diagram
<p>Trough battery 24 V/320 Ah PzS, wet</p> 	<p>Driving direction:</p> 
<p>Trough battery 24 V/280 Ah PzS, gel maintenance-free</p> 	



Note

Pay attention to the installation position of the trough batteries!

Type of battery	Connection diagram
<p data-bbox="165 225 538 284">Block battery 6 V/180 Ah GiV, gel maintenance-free</p> 	<p data-bbox="710 225 902 252">Driving direction</p> 
<p data-bbox="174 679 529 738">Block battery 6 V/240 Ah GiV, gel maintenance-free</p> 	<p data-bbox="804 687 813 703">:</p> 

5.3.2 Battery plug coding

The plug connectors between the battery **Fig. 20-A**, the machine **Fig. 20-B** and the charger **Fig. 20-C** are coded with coloured coded pins (yellow, grey or green) **Fig. 20-D** depending on the type of battery and rated voltage.

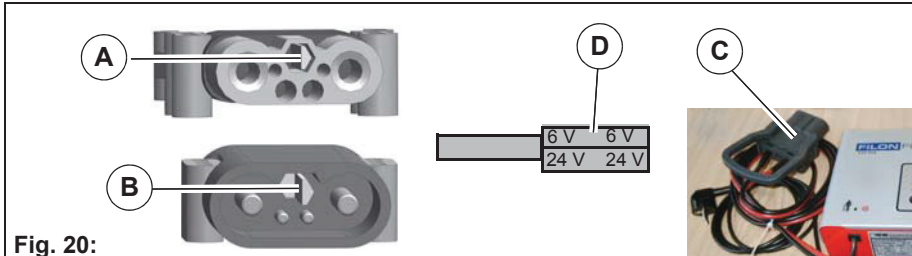


Fig. 20:

When using other batteries which have been approved by Hako, the plugs must be re-coded.

The following three prerequisites must be met for the whole system:

- Voltage coding (24 V) must be identical for all plugs and bushes.
- The colour of the coded pin in the connector housing of the machine is always yellow.
- The colour of the coded pin in the charger plug (machines without built-in charger) and in the bush housing of the battery must be identical:
 - Grey for wet batteries
 - Green for maintenance-free gel batteries



Warning

Risk of short circuit! The coding of the plugs should only be carried out by a workshop authorised by Hako!

5.3.3 Battery management system (BMS)

The battery management system (BMS) ensures the battery system is monitored and secure. The BMS is responsible for:

- determining the battery charging state during operation
- switching off the cleaning functions when the discharge limit has been reached to protect the battery against total discharge



Attention

When using other batteries which have been approved by Hako, the BMS must be reset in order to protect the battery against total discharge. The settings of the BMS should only be carried out by a workshop authorised by Hako!

5.3.4 Checking the charging state

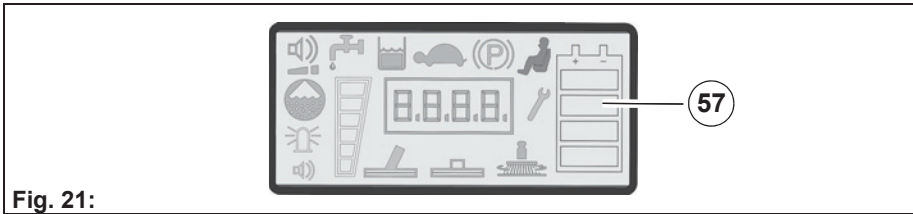


Fig. 21:

During operation, the charging state of the batteries is displayed in the display panel **Fig. 21-57**. Different numbers of fields are displayed depending on the charging state.

Battery charging state indicator	Charging state	Notes
	Four fields visible: Battery is fully charged	
	Three fields visible: Battery is charged to approx. 2/3	Charging / recharging of the batteries is not recommended.
	Two fields visible: Battery is charged to approx. 1/3	Battery can be charged.
	One field visible:	Cleaning functions are switched off after 3 minutes.
	One field is flashing and a signal is output	Machine can only be further operated at reduced speed. Charge the batteries immediately!

5.3.5 Charging the batteries



Warning

- Risk of explosion! Explosive gases can develop when charging the batteries.
Avoid smoking, fire or naked light in the vicinity of batteries. Ensure sufficient ventilation when charging the batteries. Do not inhale battery gases!
- Danger of explosion due to short circuits and spark formation! Never place tools or other electrically conductive objects on the battery!

Attention

- Before initially starting up the machine, charge the used batteries fully and appropriately with commissioning charge. Please observe the operating manual of the charging device and the operating manual of the battery manufacturer. Hako assumes no liability for battery damage resulting from insufficient commissioning charge.
- Never leave batteries discharged, always recharge them immediately.
- If possible, charge the batteries fully to ensure optimum service life of the batteries. The charger is designed as a continuous charger and retains the charging state of the batteries (trickle charge) after completing the charging process.
- The battery should always be charged without being interrupted.
- During the charging process it is not possible to turn on the machine.
- The seat console must remain open when charging the batteries.

Charging the batteries with the on-board charger

The batteries are charged via the integrated on-board charger. The batteries can be charged if two fields of the charging state indicator **Fig. 21-57** have gone out, at the latest, however, after the cleaning functions have been switched off (one field flashes).

1. Place the machine on a level surface and turn it off.
2. Remove the mains plug **Fig. 3-2** from the tray and plug it into a 230 V socket.
3. The charging process now starts automatically.



Note

If the battery is not used for longer than three months, interim charge the batteries.

Only park unused machines when switched off and in a dry location.

Checking the charging process



Fig. 22:

During the charging process, the charging progress is displayed in the display panel **Fig. 22-57**:

- Field 1 permanently ON, running light in fields 2, 3 and 4:
Main charge <50 % charged battery capacity
- Fields 1 and 2 permanently ON, running lights in fields 3 and 4:
Main charge >50 % charged battery capacity
- Fields 1, 2 and 3 permanently ON, field 4 flashes: Recharge
- All fields permanently ON: End of charging process / trickle charge



Note

An error is present when the battery symbol flashes in connection with a field, see operating manual of the charger, contact the Hako customer service if necessary.

Charging the battery with a stationary charger

**Attention**

Observe the information in the instruction manual of the charger manufacturer!

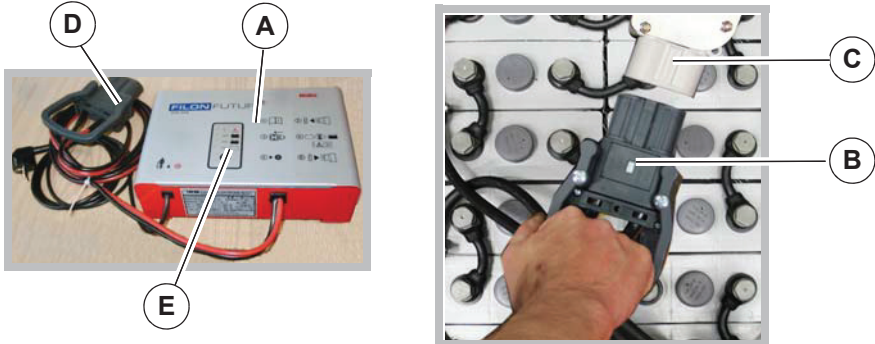


Fig. 23:

Charge the batteries with a stationary charger as, for example, shown in **Fig. 23-A**. The batteries can be charged when two fields in the charging status indicator **Fig. 22-57** have gone out.

1. Place the machine on a level surface and turn it off.
2. Disconnect the battery plug **Fig. 23-B** from the machine plug **Fig. 23-C**.
3. Connect the battery plug to the plug of the charger **Fig. 23-D**.
4. Switch on the charger.
5. The progress of the charging process is displayed in the display **Fig. 23-E** of the charger. In the meantime, the charging control indicator **Fig. 22-57** in the display panel is not active!
6. Once the battery is fully charged, terminate the charging process:
 - Switch off the charger.
 - Disconnect the battery plug from the plug of the charger and reconnect it to the plug of the machine.

5.3.6 Checking the acid level



Warning

Risk of explosion and fire! When handling batteries, it is prohibited to smoke and use an open fire.

Attention

- Observe the information in the operating manual of the battery manufacturer!
- Refilling must only take place once the battery charging process has been terminated.



Note

Batteries approved by Hako are equipped with an aquamatic system.

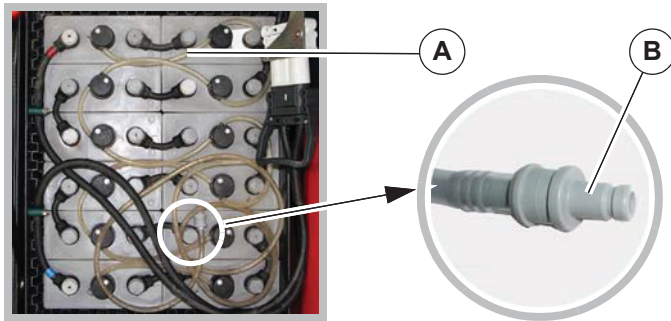


Fig. 24:

The customer has to check the acid level of the battery weekly, demineralised water (according to DIN 43530-4) must be refilled if necessary.

If the trough battery is equipped with an aquamatic system **Fig. 24-A**, each individual cell features a sealing plug with float indicator. The white dot must be located at the top and must be clearly visible. If this is not the case, refill demineralised water.

To do so, connect the end piece of the aquamatic system **Fig. 24-B** to a container with demineralised water. Observe sufficient gradient, ensuring the water can flow into the cells. If the required level has been reached, the plugs automatically seal the cells and indicate “full”.

5.3.7 Replacing the batteries



Attention

- Only use batteries approved by Hako at the intended position!
- Use suitable lifting equipment when inserting/replacing batteries.
- When changing the type of battery, the battery holder in the battery compartment might have to be adjusted to prevent slipping.
- The batteries should only be replaced by qualified service personnel!
For reasons of safety, we recommend that an authorised Hako workshop carries out these tasks.
- When using other batteries which have been approved by Hako, the BMS must be reset to protect the battery against total discharge. The settings of the BMS should only be carried out by a workshop authorised by Hako!

5.3.8 Maintaining drive batteries

For maintaining and servicing drive batteries, see Hako supplementary sheet 88-60-2556 – information for drive batteries.

5.3.9 Disposing of batteries

Used batteries with the recycling symbol contain reusable commodities. They must not be disposed of in domestic waste, see Section 1 *Environmental protection instructions and disposal*.

5.4 Solution tank

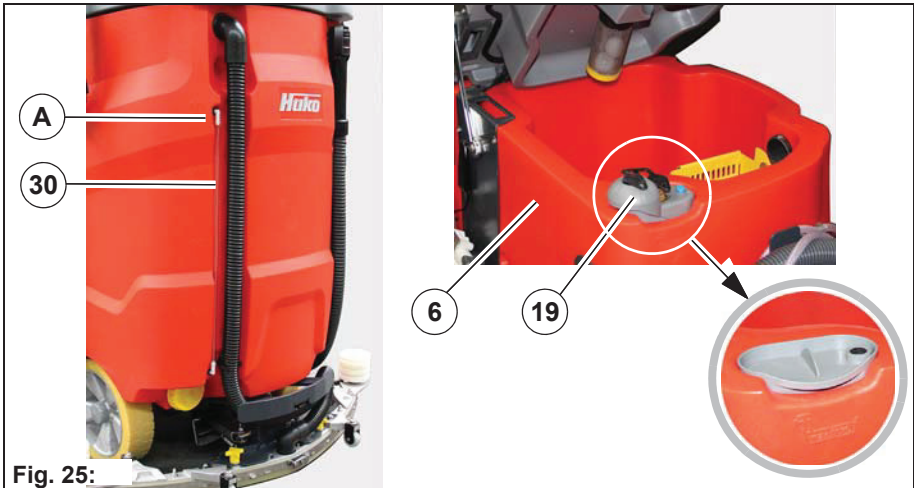


Fig. 25:

5.4.1 Filling the solution tank

Fill the solution tank **Fig. 28-6** before commencing work or as required.

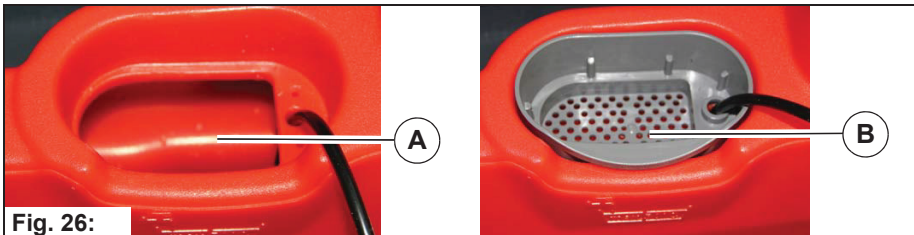


Fig. 26:

1. Place the machine on a level surface.
2. Open the tank cap.
3. Remove the insert of the filling opening **Fig. 26-A**.
4. Fill the solution tank up to the maximum (1/1) mark **Fig. 25-A** (maximum water temperature 50 °C).
5. Add detergent according to the manufacturer's regulations via the sieve insert **Fig. 26-B**.

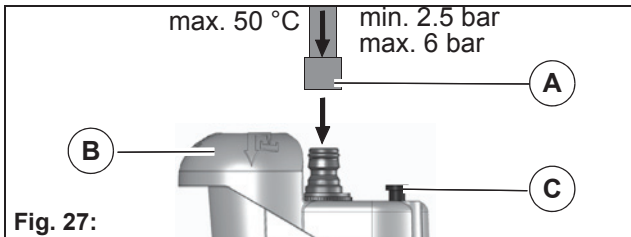
5.4.2 Automatic filling unit (option)

Optionally, the solution tank can be filled via the automatic filling unit.



Attention

According to DIN EN 1717, the automatic filling unit must not be operated without a system separator (operating manual).



1. Fit the water connection **Fig. 27-A**. Do not yet open the water supply!
2. Push the operating button **Fig. 27-B**. The indicator knob **Fig. 27-C** protrudes.
3. Open the water supply – water starts to flow.
4. The filling unit switches off automatically when the tank is full. The indicator knob **Fig. 27-C** no longer protrudes.
5. Close the water supply and remove the water connection.
Use a water line fitted with a stop valve!



Note

The machine can also be filled manually through the opening in the operating button **Fig. 27-B**. Check the level in the level indicator **Fig. 25-30**.

5.4.3 Emptying the solution tank



Fig. 28:

There are three options to empty the solution tank:

Emptying the solution tank via the fresh water filter

Position the machine ensuring the fresh water filter **Fig. 28-24** is above a drain in the ground.

1. Close the ball cock **Fig. 28-B** located in front of the fresh water filter.
2. Unscrew the filter cover by hand.
3. Open the ball cock fully. The solution tank is emptied via the fresh water filter.

Emptying the solution tank via the maintenance opening

Position the machine ensuring that the maintenance opening **Fig. 28-29** is above a drain in the ground.

1. Turn and remove the cover of the maintenance opening.
2. The solution tank is emptied via the maintenance opening.
3. After emptying the tank, place the cover on the maintenance opening and screw tight.



Note

To facilitate loosening and closing the cover, use the supplied handle **Fig. 28-A**.

Emptying the solution tank via the vacuum system

This method is recommended if no drain is available and the waste water tank is empty.

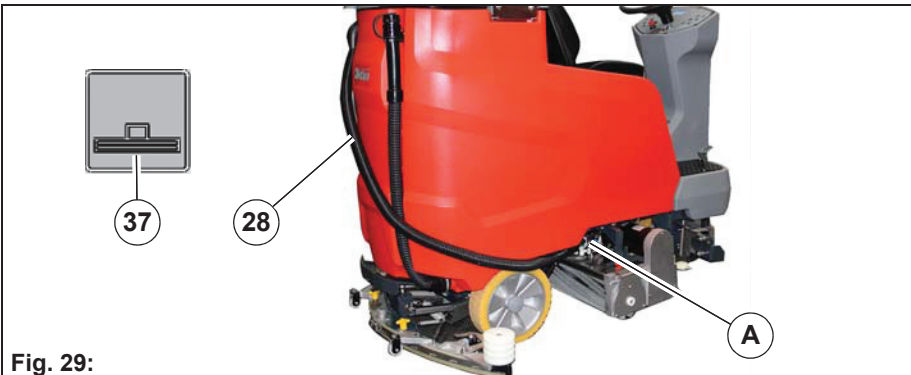


Fig. 29:

1. Turn off the machine.
2. Close the ball cock **Fig. 28-B**.
3. Turn and remove the filter cover of the fresh water filter **Fig. 28-24**.
4. Remove the suction hose **Fig. 29-28** from the squeegee **A** and plug it onto the filter housing **Fig. 29-A**.
5. Open the ball cock fully.
6. Switch on the suction turbine via button **Fig. 29-37**. The fresh water is conveyed into the waste water tank.

5.4.4 Cleaning the solution tank



Attention

Overflowing water! Only open the cleaning opening **Fig. 28-21** when the solution tank is empty.



Note

To facilitate loosening and closing the cover of the maintenance unit, use the supplied handle **Fig. 28-A**.

1. Empty the solution tank, see section 5.4.3.
2. Turn and remove the cover of the maintenance opening **Fig. 28-29**.
3. Unscrew the cover of the cleaning opening **Fig. 28-21**.
4. Feed the water hose through the cleaning opening and clean the solution tank thoroughly.
5. After cleaning the tank, close the cleaning opening with the cover.
6. Place the cover onto the maintenance opening and screw tight.
7. After filling the solution tank, check the cover of the maintenance unit for leak tightness. If necessary, screw the cover tighter.

5.4.5 Cleaning the fresh water filter

Check the filter sieve **Fig. 30-B** of the fresh water filter **Fig. 28-24** weekly and clean or replace it as required.

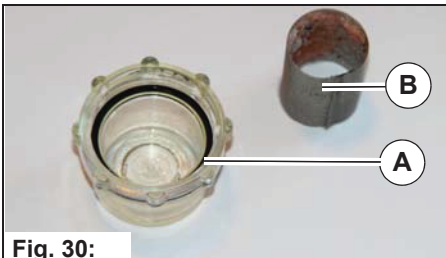


Fig. 30:

1. Close the ball cock **Fig. 28-B**.
2. Turn and remove the filter cover **Fig. 30-A**.
3. Remove the filter sieve **Fig. 30-B** from the filter housing and clean it under running water. Replace the filter sieve as required.
4. Reinsert the filter sieve and filter cover and open the ball cock.

5.5 Waste water tank

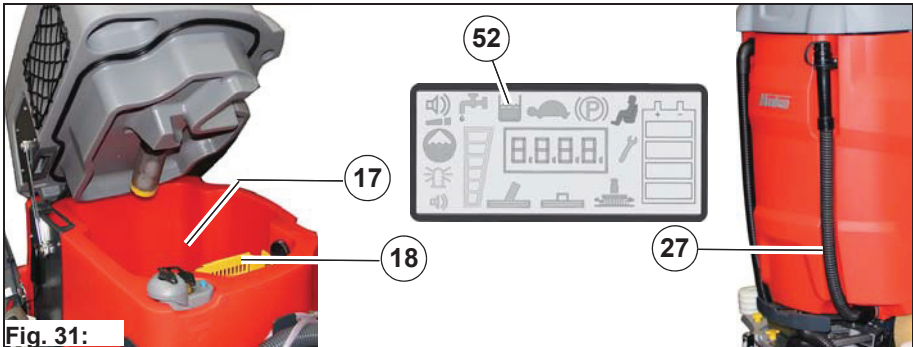


Fig. 31:

5.5.1 Emptying the waste water tank

Clean the waste water tank **Fig. 31-17** daily or as required. When the waste water tank full symbol **Fig. 31-52** is displayed in the display panel and an acoustic warning signal is output, the cleaning functions are switched off and the waste water tank should be cleaned immediately.



Environmental danger

Observe applicable laws and local regulations when disposing of detergents!



Fig. 32:

1. Drive to a suitable disposal centre.
2. Position the machine, ensuring the drain hose **Fig. 31-27** reaches the drain in the ground.

3. Turn off the machine.
4. Remove the drain hose from the holder. Push the suction hose **Fig. 32-A** slightly to the side so that the waste water tank can be emptied fully via the drain hose.
5. Bend the squeeze nozzle in the front section **Fig. 32-B**.
6. Remove the cap **Fig. 32-C**.
7. Return the drain hose to its original position **Fig. 32-D** and empty the waste water tank fully.
8. After emptying the tank, seal the drain hose with the cap.

5.5.2 Cleaning the waste water tank

Clean the waste water tank daily or as required.



Fig. 33:

1. Empty the waste water tank, see section 5.5.1.
The drain hose with open cap remains positioned at the drain in the ground.
2. Open the tank cap **Fig. 33-A** of the waste water tank.
 - Put one hand in the recessed grip **Fig. 33-B** of the tank cap.
 - Open the tank cap until the support **Fig. 33-C** engages.
3. Clean the waste water tank thoroughly with the water hose.
4. Also flush the drain hose.
5. Close the tank cap:
 - Put one hand into the recessed grip **Fig. 33-A** and open the tank cap a little further.
 - Unlock the support **Fig. 33-B** with your left hand and close the tank cap.

5.5.3 Coarse dirt sieve (option)

A coarse dirt sieve **Fig. 31-18** is optionally located in the waste water tank. Clean the sieve daily or as required.

5.5.4 Cleaning the suction filter

Check the function of the suction filter **Fig. 33-16** daily and clean it as required.

1. Remove the suction filter from the neck.
2. Clean the suction filter under running water.
3. Mount the suction filter on the neck again.

5.5.5 Checking the seal at the drain hose



Fig. 34:

Check the function of the seal at the drain hose **Fig. 34-A** daily, replace it after 125 operating hours at the latest.

After use, check the drain hose for soiling and clean if necessary.

5.5.6 Checking the seal in the tank cap

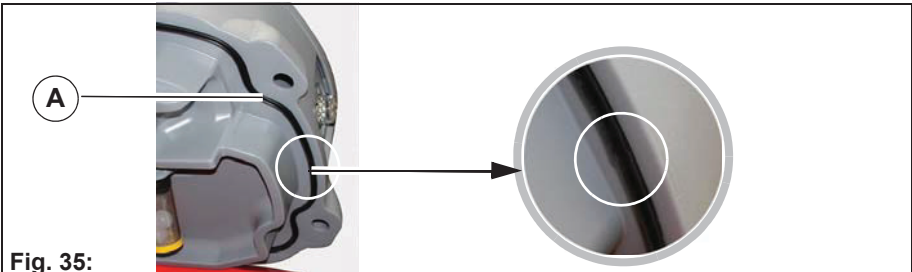


Fig. 35:

Check the function of the seal in the tank cap **Fig. 35-A** daily and replace it if damaged.

When replacing the seal:

- Ensure that the installation position is correct.
- Ensure that the seal is pressed fully into the groove.
- Ensure that the seal is seated correctly.

5.6 Rotating brush unit

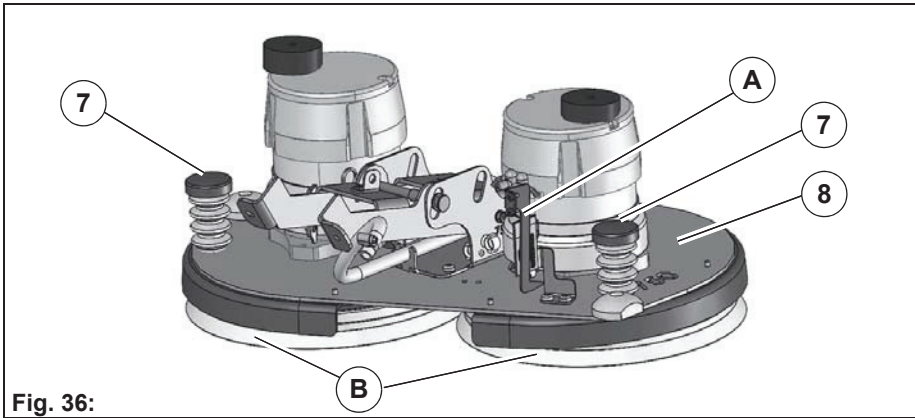


Fig. 36:

5.6.1 Replacing the brushes/pads

Use the indicator **Fig. 37-A** on the rotating brush unit to:

- determine the wear of the brushes/pads (the rotating brush unit must be lowered)
- determine whether the brushes/pads have been assembled.

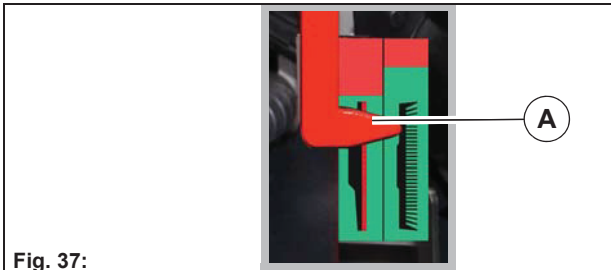


Fig. 37:

Change the brushes/pads at the latest when the red pointer is in the red zone.

1. Decouple the brush/pad, see section 5.6.3
2. Insert the new brush/pad, see section 5.6.4



Attention

If **no** brushes/pads have been assembled, the red pointer is in the red zone of the indicator.

5.6.2 Cleaning the brushes

Clean the brushes **Fig. 36-B** in the rotating brush unit **Fig. 36-8** daily or as required.

1. Decouple the brush, see section 5.6.3.
2. Thoroughly clean the brush under running water.
3. Couple the brush, see section 5.6.4.



Note

Make sure that the cleaned brushes are installed on the same side in the rotating brush unit where they were removed.

5.6.3 Decoupling the brushes/pads



Fig. 38:

1. Turn off the machine.
2. Swing down the wiper, see section 5.7.1.
3. To decouple the brushes/pads, press down the brush decoupler **Fig. 38-7** with your foot.

5.6.4 Coupling the brushes/pads



Fig. 39:

1. Make sure that the rotating brush unit has been raised and the machine has been switched off.
2. Place the brush/pad underneath the brush head holder.
3. Raise the brush/pad and press it firmly into the holder **Fig. 39**.
4. Turn the brush/pad fully and use your hand to press it again until the brush/pad has engaged completely.

5.7 Wiper

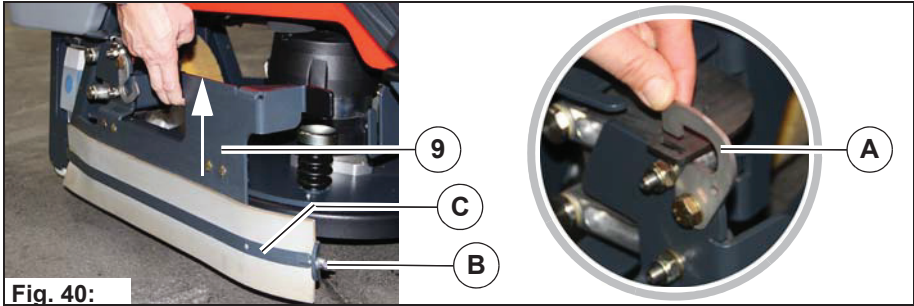


Fig. 40:

5.7.1 Swinging down the wiper

In order to change the brushes, raise the wiper **Fig. 40-9** at the handle and swing it to the side.

When raised, the wiper can be fixed into position with the locking lever **Fig. 39-A**.

5.7.2 Replacing the rubber of the wiper

Check the rubber of the wiper weekly for wear, turn or replace the rubber if necessary.

1. Loosen the wing nut **Fig. 40-B**.
2. Remove the clamping band **Fig. 40-C**.
3. Turn the rubber of the wiper (can be used 4 times) or replace it.
4. Assembly is in reverse order.

5.8 Roller brush unit

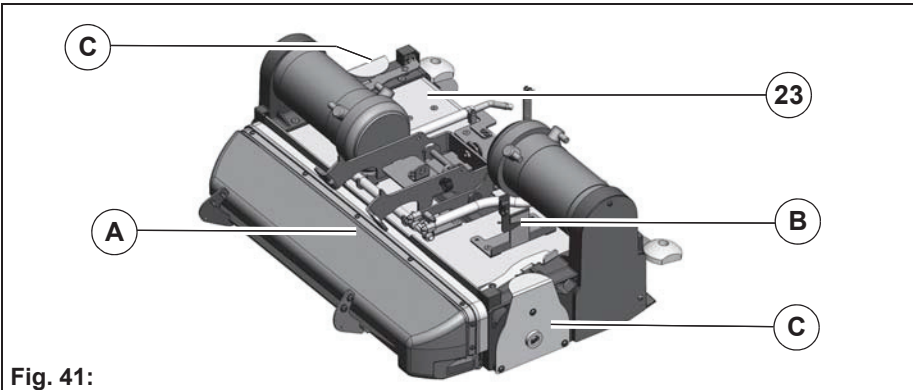


Fig. 41:

5.8.1 Emptying the dirt hopper

Empty the dirt hopper **Fig. 41-A** daily or as required.

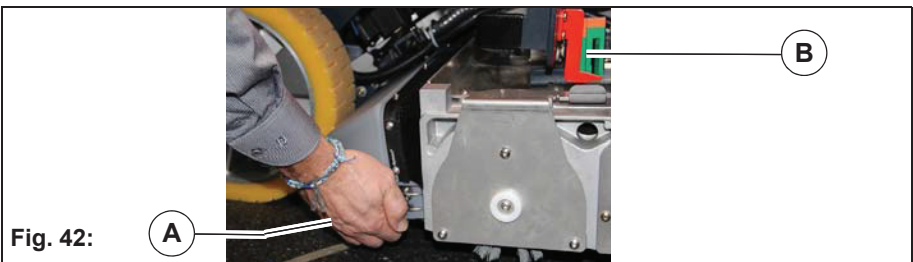


Fig. 42:

1. Turn off the machine.
2. Swing down the wiper on the right-hand side of the machine.
3. Put one hand in the recessed grip below the dirt hopper and remove the dirt hopper.
4. Empty the dirt hopper.
5. Assembly is in reverse order.

5.8.2 Replacing the brushes

Change the brushes at the latest when the pointer in the indicator **Fig. 42-B** is in the red zone, also see section 5.6.1

1. Disassemble the brushes, see section 5.8.4
2. Install the brushes, see section 5.8.5

5.8.3 Cleaning the brushes

Clean the brushes **Fig. 41-C** in the roller brush unit **Fig. 41-23** daily or as required.

1. Disassemble the brush, see section 5.8.4.
2. Thoroughly clean the brush under running water.
3. Install the brush, see section 5.8.5.

5.8.4 Disassembling the brushes

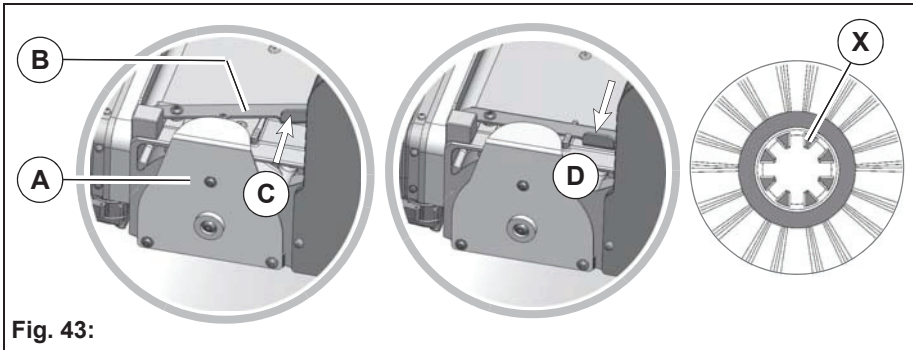


Fig. 43:

1. Turn off the machine.
2. Swing down the wiper, see section 5.7.1.
3. Unlock the brush holder **Fig. 43-A**:
Press the locking lever **Fig. 43-B** into position **C** and remove the brush holder.
4. Pull out the brush.

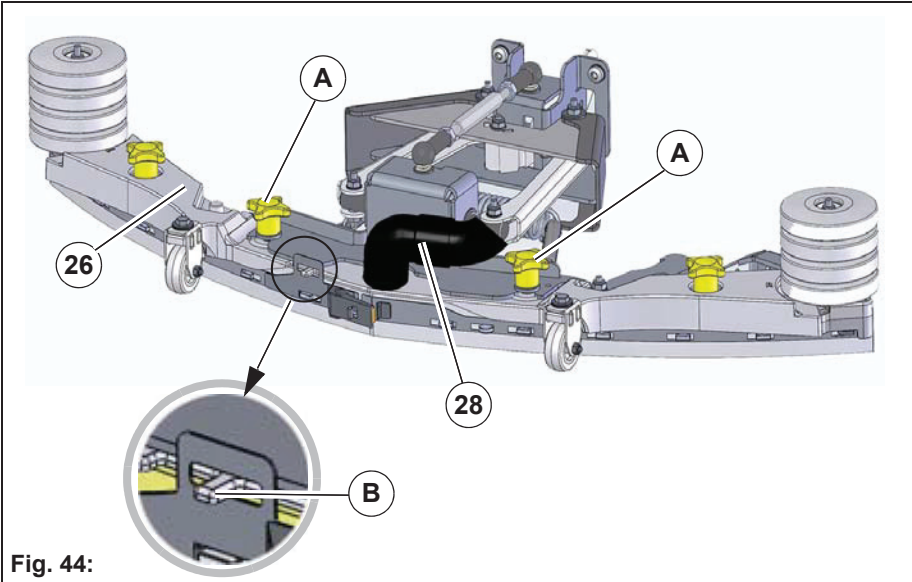
5.8.5 Installing the brushes

1. Push the brush into the housing (teeth **X** must point to the outside) and let the catch on the opposite side engage audibly.
2. Press the locking lever **Fig. 43-B** into position **C** and install the brush holder.
3. Lock the brush holder:
Push the locking lever into position **D**.
4. Swing up the wiper, see section 5.7.1.

5.8.6 Squeegee

Optimum vacuuming is achieved through:

- clean and undamaged or not worn sealing strips
- correctly set inclination angle and correct height adjustment of the sealing strips.



5.8.7 Cleaning the squeegee

Check the squeegee **Fig. 44-26** daily for soiling and foreign particles and clean it as required.

1. Pull out the suction hose **Fig. 44-28**, loosen the two star-shaped handles **Fig. 44-A** and remove the squeegee.
2. Thoroughly clean the squeegee and remove foreign particles.
3. Assembly is in reverse order.

5.8.8 Replacing the sealing strips

Check the sealing strips **Fig. 45-A** at the squeegee weekly for wear and intactness. If the used sealing edge of the sealing strip is worn or damaged, turn or replace the sealing strip. Each sealing strip can be used four times before it needs replacing.

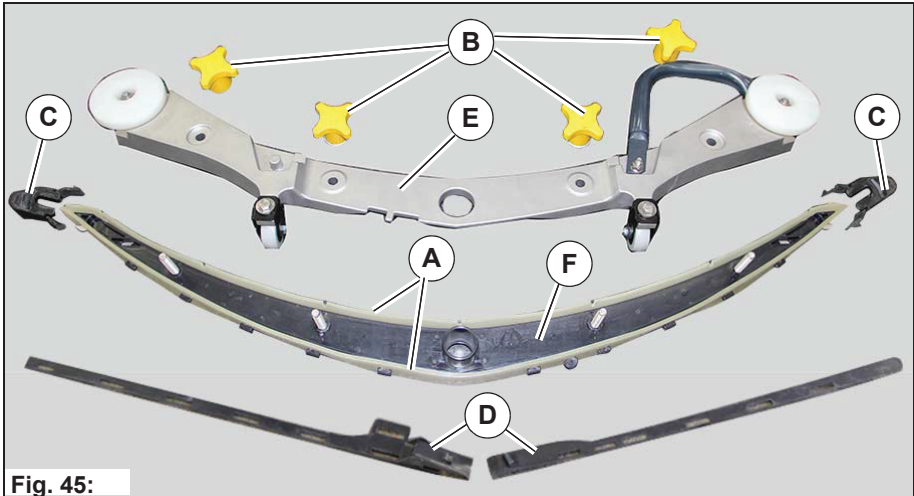


Fig. 45:

Size 950 squeegee:

1. Pull out the suction hose **Fig. 44-26**.
2. Loosen the star-shaped handles **Fig. 44-B** and remove the squeegee.
3. Press together the protective caps **Fig. 45-C** and pull them out.
4. Loosen the clamping band **Fig. 45-D** and remove it from the catch **Fig. 44-B**.
5. Pull out the aluminium body **Fig. 45-E** from the top.
6. Remove the sealing strips **Fig. 45-A** from the plastic body **Fig. 45-F**.
7. Before turning or replacing the sealing strips, thoroughly clean the plastic body!
8. Assembly is in reverse order.

Size 1100 squeegee (not shown):

1. Pull out the suction hose.
2. Loosen the star-shaped handles and remove the squeegee.
3. Press together the protective caps and remove them.
4. Open and remove the inner and outer clamping bands.
5. Turn or replace the sealing strips.
6. Assembly is in reverse order.

5.8.9 Adjusting the sealing strips

Inclination adjustment

The correct inclination adjustment is decisive for:

- ensuring that the sealing strips of the squeegee rest evenly with the complete contact surface on the ground
- ensuring that the squeegee runs smoothly and evenly during the suction process.

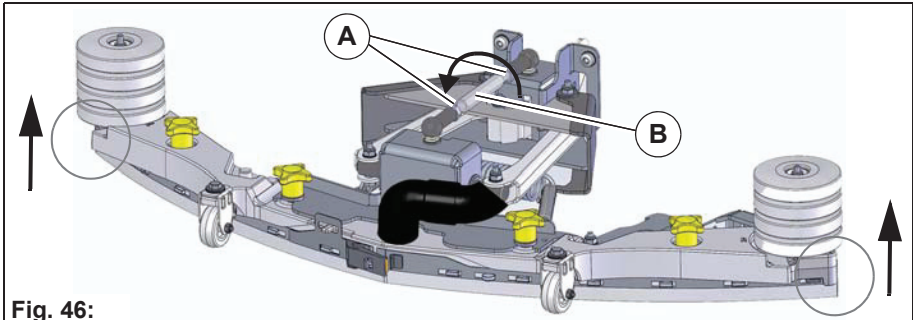


Fig. 46:

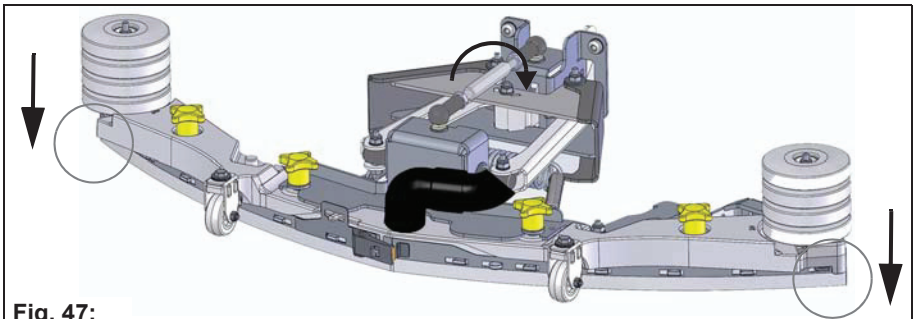


Fig. 47:

1. Place the machine on a level surface and lower the squeegee.
2. Loosen the lock nuts **Fig. 46-A** and turn the threaded bar **Fig. 46-B** to adjust the squeegee ensuring both ends of the sealing strips barely have contact with the ground.
 - Turn the threaded bar counter-clockwise: The distance of the sealing strip to the ground increases at the ends **Fig. 46**.
 - Turn the threaded bar clockwise: The distance of the sealing strip to the ground decreases at the ends **Fig. 47**.
3. Turn on the machine and check the suction pattern. When driving, the sealing strips must be turned over evenly everywhere (centre and outside).
4. Tighten the lock nuts of the threaded bar to 54 Nm.

Height adjustment

The height adjustment (X) of the supporting rollers **Fig. 48-A** has been set to 3 mm in the factory. If striping still occurs despite optimum inclination adjustment, set the distance of the supporting rollers to the lower edge of the sealing strip by adjusting the number of washers under the supporting roller holder.

Number of washers / distance to the ground (X)	Use
1/2 mm	Very smooth floor surfaces, e.g. coated screed, PVC, linoleum
2/3 mm	Standard setting
3/4 mm	Very uneven floor surfaces, e.g. poorly laid tiles (water does not drain off)

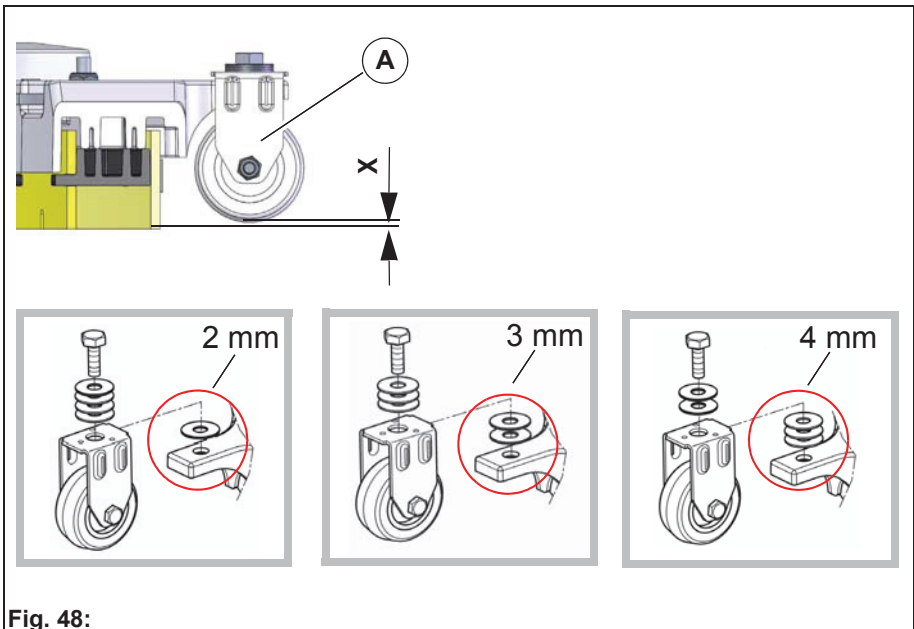


Fig. 48:

5.9 Options

The following options are available for Scrubmaster B120 R.

Designation	Order no.
On-board chemical dosing system, see section 3.4.2	7678.50
Comfort driver's seat	7093.20
Working spotlight	7091.20
Warning device	7091.30
Coarse dirt sieve, see section 5.5.3	7060.50
Manual suction tool, including holder	7036.80
Manual spray suction tool	7036.90
Holder for cleaning utensils	7031.20
Tray, see section 2.3.6	7009.50
Automatic filling unit	7743.10
Fleet-Recorder Standard	5301.20



Note

Please refer to the price list for information on pads, rotating and roller brushes as well as more options.

EC Declaration of Conformity

Hako GmbH
Hamburger Str. 209-239
23843 Bad Oldesloe, Germany

declare in sole responsibility that the following product

Scrubmaster B120 R, type: 7177

on which this declaration is based corresponds with the relevant basic safety and health requirements of the EC Directive 2006/42/EC as well as the requirements according to 2014/30/EC and 2014/53/EC.

The following standard(s) and technical specifications was/were referred to for the correct implementation of the safety and health requirements named in the EC Directive:

EN 60335-2-72
EN 55012
EN 61000-6-2

Name of the authorised person who compiles the technical documents for Hako:
Ludger Lüttel

Bad Oldesloe, 23.01.2018



Ricardo Ruiz Porath
Productlinemanager - Cleaning Technology



Hako: environmentally friendly from the start

We want to leave a clean earth behind. Protecting resources, environment and the climate therefore governs all our activities. Independent institutes have confirmed this. You will find out more about our commitment on www.hako.com

Everywhere and quite close to you

Our efficient distribution and service network guarantees short journeys and fast help.

Purchasing, rental, leasing

We offer you a multitude of individual and attractive financing and procurement possibilities.

We are here for you day and night

The Hako stand-by and spare parts express service guarantees the highest availability.

Reliable cleanliness

Our machines satisfy your highest demands. Reliability thanks to quality "Made by Hako".



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