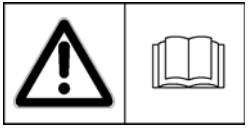

Hako
Clean ahead

Instruction Manual

Scrubmaster B100R (7300.10/.20)

Preface

Dear customer, It is our desire that the good characteristics of the Scrubmaster B100R should justify the confidence you demonstrated by making this purchase.

Prior to the first drive, carefully read the chapter "Safety Information" as well, in order to ensure you a safe working with the machine.

Your own safety, as well as the safety of others, depends to a great extent on how the vehicle is moved and operated.

Before using the equipment for the first time, read this original manual thoroughly, act according to the information contained and keep it in a safe place for future reference or subsequent owners.

The manual provides valuable information about operation, service and maintenance. The warning symbols as used in this manual identifies items relevant to safety. Please observe the safety provisions (see chapter "Safety Information").

Your authorised Hako dealer will be pleased to answer further questions regarding the vehicle or the operation and maintenance manual.

Please be advised explicitly that we cannot accept any legal issues out of the contents of this manual.

If repair work has to be performed make sure that only genuine spare parts are used; only genuine spare parts may guarantee a dependable machine.

We reserve the right for technical improvement.

Valid as of: April 2014

Hako GmbH
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Hamburger Str. 209-239
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Intended use

The Scrubmaster B100R is a Scrubbing Machine conceived for the wet cleaning of hard floors. This machine is intended for commercial use, for example in hotels, schools, hospitals, factories, shops, offices and rental businesses. Any use beyond this is regarded as improper use. The manufacturer is not considered liable for any damage resulting from improper use; the user is solely responsible for all the risks.

Intended use also includes maintaining and observing the operating, maintenance and repair conditions prescribed by the manufacturer.

The Scrubmaster B100R may only be operated, serviced and repaired by personnel who are familiar with the work involved and are aware of the risks.

The applicable accident prevention laws must be observed and any generally accepted health and safety directives must be maintained.

Based on the conception, design and construction of the vehicle introduced onto the market by us, the vehicle complies with the applicable basic safety and health requirements stipulated in

the EC Directive (refer to the Declaration of Conformity). This declaration is no longer considered valid in the event of modifications to the vehicle not authorized by us. The manufacturer is not deemed liable for any damage resulting from unauthorized modifications to the vehicle.

Notes on warranty

The terms of the sales contract apply. Damages are not subject to warranty if they are due to non-compliance with the maintenance and service provisions. The maintenance work has to be performed by an authorized Hako service center and confirmed in the "Maintenance certificate" which is the warranty document.
The following is excluded from warranty: fuses, natural wear, damages caused by overload, inexpert handling and unauthorized modification of the machine. Moreover, any claim for warranty cannot be accepted if damages of the machine are caused by fitting parts or accessories without Hako's prior and explicit consent or by non-compliance with the maintenance instructions.

Acceptance of the machine

Upon arrival, check machine for possible damages in transit. Follow unpacking instructions on shipping pallet. Each unit has been tested and throughly inspected before shipment. Any damage is the responsibility of the delivery carrier who should be notified immediately.

Disposing of the machine

Render the machine inoperable. It must not represent a source of risks to children. Dispose of the machine in accordance with the applicable local regulations. For further information on disposal and recycling, contact the authorized Hako dealer where you purchased the machine.
Used batteries with the recycling symbol contain reusable commodities. The heavy metals contained simultaneously represent a serious risk to health and to the environment. Never open batteries or damage them. Never touch, inhale or swallow any material inside batteries. Health hazard! Never allow batteries to pollute the environment. Risk of contaminating the ground and water! In accordance with the symbol with the crossed out bin, these batteries must not be disposed of in domestic waste. The return and recycling of old batteries must be agreed on with your authorized Hako dealer in accordance with the Battery Law § 6 and § 8 (BattG).

Table of Content

1 Safety information

1.1 Safety and Warning Symbols

All paragraphs in this manual referring to your personal safety, the safety of your machine and the environment protection are attributed one of the following warning symbols:

Symbol	Hazardous for...	Description
Safety Provisions 	persons and goods	Safety Provisions in dangerous situation caused by misuse inaccurate adherence of instructions or prescribed work routine.
CAUTION 	the machine	important information on handling the machine in order to maintain operability.
Ecological hazard 	the environment	due to use of substances representing an inherent danger to health of environment

1.2 General Provisions

- Apart from the provisions contained in this instruction manual, the general safety provisions and the accident prevention regulations as imposed by law have to be complied with.
- Before taking your machine into operation, carefully read the instruction manual as well as other separate instructions for accessories or attached implements and comply with all points mentioned there during work.
- Persons being trained by qualified Hako technicians only are authorised to operate, service and repair the machine.
- This vehicle is not intended to be used by persons (including children) with limited physical or mental capabilities or persons without sufficient experience and ability.
- You are advised to thoroughly study the safety instructions since precise knowledge only helps avoiding errors during operation of the machine and thus guarantee faultless usage of the machine.
- The operating instructions have to be at hand at the place of use of the machine, and therefore have to be kept readily available at the machine.
- When selling or letting the machine for rent, hand out these documents to the new owner/operator and have the transfer certified!
- The warning and instruction plates attached to the machine contain valuable advice about safe operation. Immediately replace incomplete or illegible labels.
- As far as safety standards are concerned, spare have to equal genuine spare parts!

1.3 Operating information

- Before starting up the vehicle, check that the vehicle is safe for operation and all the components are installed.
- In the event of faults, shut the vehicle down, lock it to prevent it being used further, place a sign on it indicating "Defective, do not put into operation“. Clear the cause of the fault as quickly as possible, only then can the vehicle be started up again.
- Before starting work, the operator must be fully familiar with all adjustment, operating and control elements as well as their respective function!
- Always wear heavy duty, non-slip footwear when working with the vehicle.
- The vehicle may only be driven and the equipment used on those surfaces which have been approved by the contractor or person appointed by him.
- Only use cleaning agents suitable for the vendor (non-foaming) and observe all the use, disposal and warning information provided by the cleaning agent manufacturer.
- Only open empty recovery tanks. – Risk of tipping.
- Before starting with wet cleaning, the area in question should have been swept clean.
- When transporting the vehicle, the squeegee and brush head must be raised. – Risk of damage.
- The way of driving must be adapted to the local conditions. When driving the vehicle, pay attention to persons, particularly children.
- On finishing work, remove the ignition key to prevent the vehicle being used without authorization.

- It is forbidden to use the vehicle in potentially explosive atmospheres.
- The vehicle may only be used on level, stable floors with a maximum gradient of 6%.

1.4 Maintenance information

- Maintenance and repair work may only be carried out by properly trained personnel. It is essential to observe the directives in this operating manual, the applicable legal regulations as well as state-of-the-art technology.
- Operating personnel must complete the necessary daily and weekly maintenance work. All other maintenance work must be completed at your nearest authorized Hako service center.
- The maintenance work and maintenance intervals prescribed in the operating manual must be adhered to.
- Suitable tools must be used for cleaning and maintenance work.
- The vehicle must be inspected by a recognized technical expert in respect of operational safety, within the terms of the applicable accident prevention laws, at reasonable intervals (we recommend at least once a year) and following modification or repairs.
- Spare parts must comply with the minimum technical requirements stipulated by the manufacturer! This is ensured by the use of original spare parts.
- The ignition key must be removed before cleaning and servicing the vehicle or prior to changing parts.
- Always disconnect the battery plug before starting any work on the electrical installation.
- The recovery tank must always be opened fully. – Risk of snapping shut.
- It is not permitted to clean the vehicle with a pressure washer or steam blaster.
- It is not permitted to use aggressive and corrosive cleaning agents.
- It is forbidden to transport people on the vehicle!

1.5 Particular risks

Electronics

- Always disconnect the battery plug before starting any work on the electrical equipment. – Risk of short-circuit.

Batteries

- Observe the information in the operating manual provided by the battery manufacturer.
- The equipment may only be operated using a maintenance-free AGM battery recommended by the manufacturer with the corresponding layout and connections.
- Never lay any metallic objects or tools on batteries. - Risk of short circuit!
- Ensure sufficient ventilation in the charging area when charging the batteries. – Risk of explosion!
- For further safety information, see supplementary sheet 88-60-2556 - Notes on driving batteries.

Information on the power plug

- Only take hold of the power plug and power cable when your hands are dry.

- Never insert the power plug in the socket if the base is wet or damp.
- Never immerse the power cable or power plug in water or other fluids clean them in running water. Risk of electric shock!
- Dry any power plugs and power cables which have become damp with a dry cloth before connecting them in power sockets.
- Pay attention that the power socket is dry.
- We recommended the use of splash-proof power sockets complying with DIN VDE 0620-1.
- Pay attention that no water or fluids can get on to live machine parts. If water should penetrate to such parts, disconnect the power plug immediately and have the vehicle checked at an authorized Hako service center.
- The power connection cable must be inspected for signs of damage at regular intervals. If damage is detected, the cable must be replace prior to further use.

1.6 Information for Protection of Environment

- For safe use of substances inheriting a danger to health and environment specific knowledge is required.
- Observe the legal directives and local regulations for disposal of detergents, see Water Management Act.
- Used batteries labelled as recyclable contain reusable economic goods. According to the crossed dustbin label these batteries must not be added to the normal waste.The return and recycling of old batteries must be agreed on with your authorized Hako dealer in accordance with the Battery Law § 6 and § 8 (BattG).

1.7 Labels on the vehicle

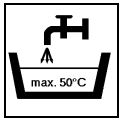
The following safety and warning labels are attached to the vehicle where easily legible. Missing or illegible labels must be replaced immediately.

Company logo (Fig. 1/1)

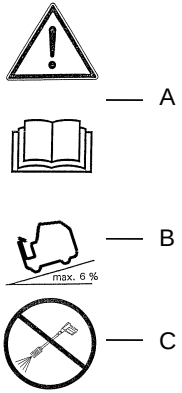
Hako

Rating plate (Fig. 1/2)

Only fill water at max. 50 °C (Fig. 1/3)



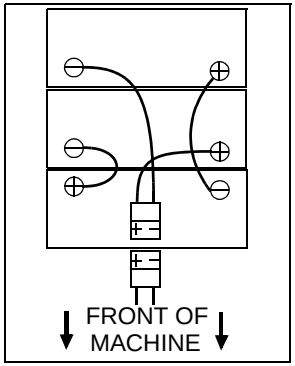
A = Read and observe the operating manual (Fig. 1/4)
B = Maximum permissible gradient 10% (Fig. 1/4)
C = Do not clean the machine with a pressure washer (Fig. 1/4)



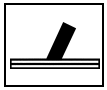
Type name (Fig. 1/5)

Scrubmaster B100R

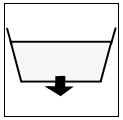
Connection scheme for batteries (Fig. 1/6)



Scrubbing tool (Fig. 1/7)



Waste water draining hose (Fig. 1/8)



Fill level for solution tank (Fig. 1/9)

- 1/1

OVERFILL SIGHT GAUGE

- 1/2

Explosive gases (Fig. 1/10)

ACHTUNG:	**Explosive Gase – Flammen und Funken vermeiden – Während des Ladens für ausreichende Belüftung sorgen.**
Caution:	**Explosive gases – Avoid fires and sparks – Provide for sufficient ventilation during loading!**
Précaution:	**Gaz explosifs – Eviter des flammes et étincelles – Pourvoir suffisante ventilation perdant chargement!**

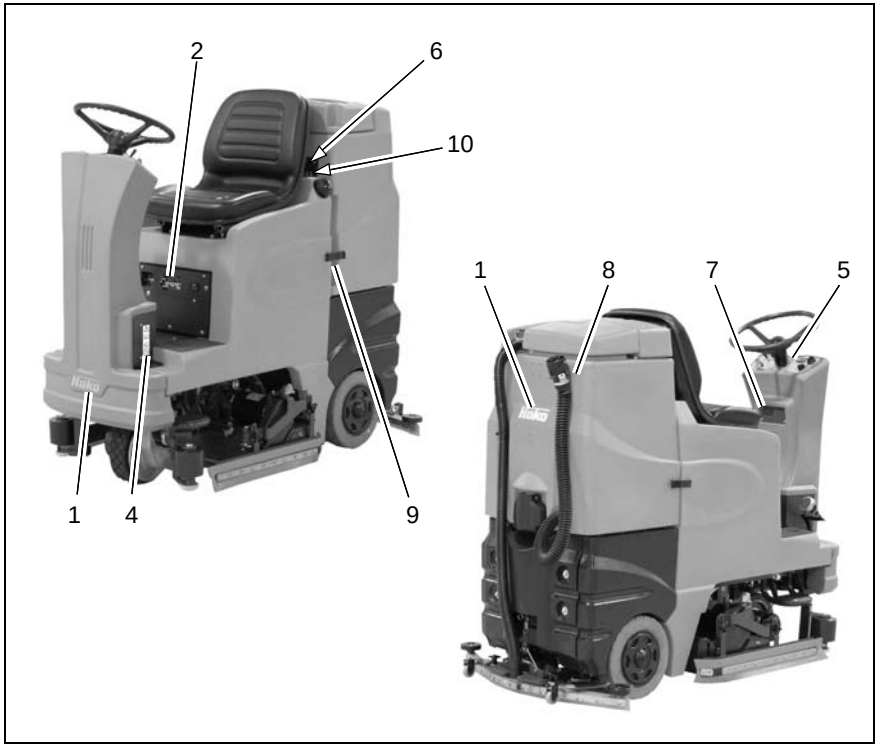


Fig.1

2 First Operation

2.1 Instruction

Instruction is required before first operation. First instruction into handling of the machine must be held by a qualified person sent by your local Hako contract dealer. Your Hako dealer will be informed by the manufacturer upon delivery of the machine and will contact you to make a date for instruction.

2.2 Initial charging procedure

Before first operation of the machine, fully charge the battery with an initial charging procedure and comply with the operating instructions of the charger as well as with those of the battery manufacturer. Hako cannot be held liable for damages resulting from an insufficient initial charge.

2.3 Prior to starting up

1. Check the parking space for signs of leaks. Hoses, lines and tanks must show no signs of leaks or damage.
2. Check that the brushes and squeegee are mounted, refer to Chapter "Maintenance".
3. Check that the solution tank is filled and the recovery tank is empty.
4. Check that the battery plug is connected, refer to Chapter "Maintenance".

2.4 Switching the vehicle on

Do not actuate the direction switch.

1. Check that the main fuse lever is at the top.
2. Insert the ignition key in the key switch and turn from position (0) to position (1).
3. Check the battery indicator to ensure that the battery is sufficiently charged.

2.5 Operation

1. Switch the vehicle on.
2. Set the direction switch to forward or reverse.
3. Set the function selection switch to drive mode.
4. Tread on the throttle slowly to start moving. – On releasing the throttle, the machine stops and when at a stop, the parking brake is activated.
5. Drive the vehicle in drive mode to the site which is to be scrubbed and vacuumed.
6. Set the function selection switch to scrubbing with vacuuming (green field). – If only scrubbing or vacuuming is required, set the function selection switch to the corresponding field.
7. Starting up. – The brush head and squeegee are lowered automatically and start operating.
8. In the case of stubborn dirt, set the function selection switch to the field with the weight symbol to increase the brush pressure. – The vehicle should not be operated permanently with increased brush pressure.
9. On completing the scrubbing and vacuuming operation, set the function selection switch back to drive mode.

2.6 Interrupting operation

1. Release the throttle. – The vehicle stops.
2. In the case of longer operation stoppages, turn the ignition key from (1) to (0) and remove it from the key switch.
3. If the vehicle is parked on sloping ground, secure it from rolling away by placing wheel chocks under the wheels.

2.7 End of operation

1. Drive to an appropriate maintenance area.
2. Turn the ignition key from (1) to (0) and remove it from the key switch.
3. Empty the recovery tank and rinse out, if necessary.

Observe the applicable laws and local regulations when disposing of cleaning agents.

4. Fill the solution tank and cleaning agent in accordance with the manufacturer's mixing directives.

Only use cleaning agents suitable for the equipment (non-foaming). We recommend using our clean and care products which are specially balanced for the vehicles. These products meet the requirements stipulated in the washing and cleaning agent directive.

If the machine is to be shut down for a longer time, the solution tank must be emptied.

5. Check the sealing strips and suction hose.
6. Charge the battery.
7. Clean the vehicle if dirty.

It is not permitted to clean the vehicle with a pressure washer or steam blaster.

2.8 Transport mode

When driving on areas which do not need to be scrubbed or vacuumed, set the function selection switch to drive mode. – Otherwise, there is unnecessary wear of the brushes and sealing strips as well as use of the batteries.

2.9 Loading the vehicle

1. Empty the solution tank and recovery tank.
2. Fix a strapping belt (Fig. 2/1) through the eyelets behind the rear axle.
3. Lay another strapping belt (Fig. 2/2) over the foot space.
4. Tension both strapping belts.
5. Secure the vehicle with wheel chocks on all sides.

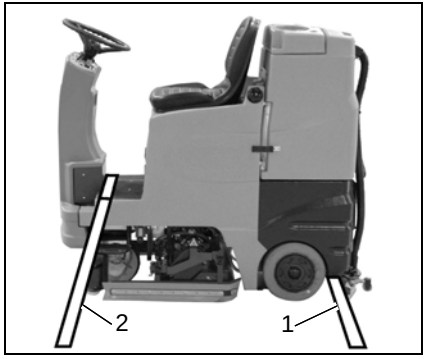


Fig.2

3 Operation

The working steps necessary to start the vehicle and select the operating mode are described in Chapter 2 *Starting Up*.
The various operating and indicator elements are described in Chapter 3.2 *Operating and indicator elements*.
The working steps to fill the solution tank, empty the recovery tank and other maintenance tasks are described in Chapter 5 *Maintenance and Service*.

3.1 Method of operation

3.1.1 General information

The Scrubmaster B100R is a floor scrubbing vehicle conceived for the wet cleaning of hard floors.

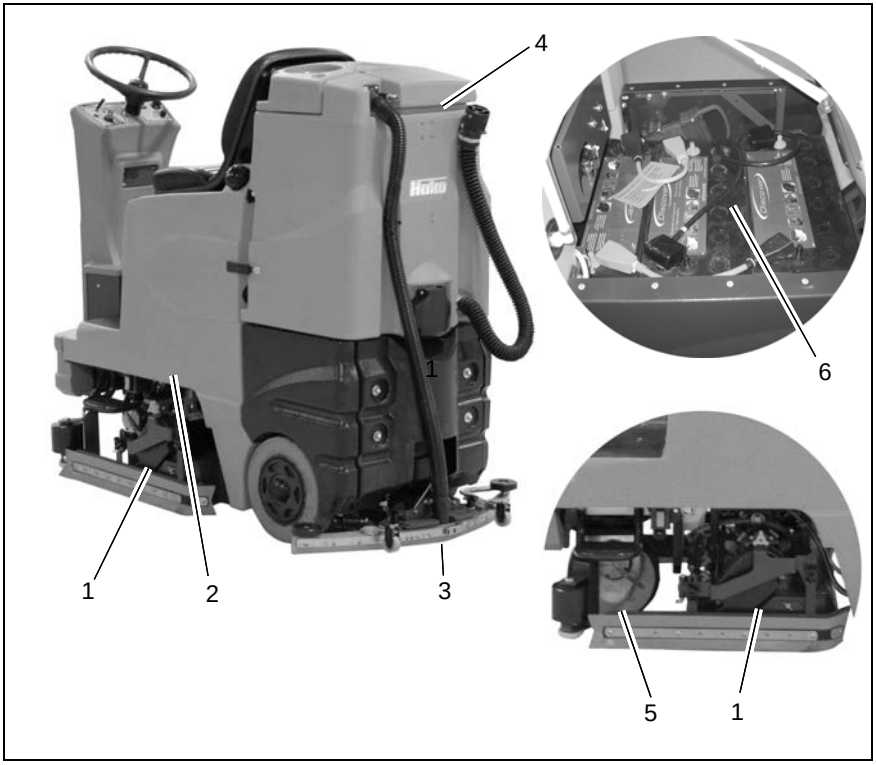


Fig.3

3.1.2 Scrubbing

The figures in this operating manual generally illustrate the rotary brush head. The vehicle can also be equipped with a circular brush head.

The vehicle implements a brush head (Fig. 3/1) with two rotating brushes for the scrubbing operation. You must decide whether to use a brush head with circular brushes or roller brushes.
When scrubbing mode is activated, the brush head is automatically lowered by an electric servomotor on starting to drive, the brushes start to rotate and solution supply to the nozzles is automatically activated. When the vehicle is stopped, the brush head is automatically raised and the brushes and solution supply are switched off.
The solution tank (Fig. 3/2) provides the solution necessary for the scrubbing operation.

3.1.3 Vacuuming

After scrubbing, the resulting dirty water on the floor is normally vacuumed up. To do this, the adjustable squeegee (Fig. 3/3) draws the waste water from the floor by means of a sealing strip. When vacuuming mode is activated, the squeegee is automatically lowered by an electric servomotor on starting to drive and the suction turbine is switched on. When driving in reverse, the squeegee remains in its raised position.
The dirty water drawn up by the squeegee is fed into the recovery tank (Fig. 3/4).

3.1.4 Driving

The vehicle is driven by an electric motor on the front wheel (Fig. 3/5). The electronic control unit converts the position of the throttle and throttle to driving speed, driving direction and deceleration.
The vehicle is provided with the electrical power necessary for operation from batteries (Fig. 3/6). The batteries must be recharged regularly by means of an external charger.

3.1.5 Options

- Scrubbing-vacuuming tool for spraying, scrubbing and vacuuming. It serves to clean areas which the vehicle cannot access.

To connect the scrubbing-vacuuming tool, disconnect the top end of the suction hose from the vehicle nozzles and connect the hose from the scrubbing-vacuuming tool. The solution hose continues to be connected to the coupling beside the nozzles. The scrubbing-vacuuming tool is ready for operation after pressing the relevant switch below the steering wheel.
A brush and suction adapter, which can be screwed out and changed, are mounted at the bottom end of the extendible telescopic rod. When the grip switch is pressed, a jet of the solution is sprayed out of the nozzle above the brush.

Please refer to the spare parts catalogue on our internet site at www.hako.com for accessories, such as brushes and suction lips.

3.1.6 Solution and waste water

1 Solution tank
2 Solution tank filling neck
3 Solution level indicator
4 Solution draining hose
5 Recovery tank
6 Recovery tank locks
7 Waste water draining hose
8 Waste water drain
9 Air intake filter
10 Suction turbine fine particle filter
11 Waste water service access
12 Scrubbing-vacuum tool water connection
13 Solution pump
14 Solution filter

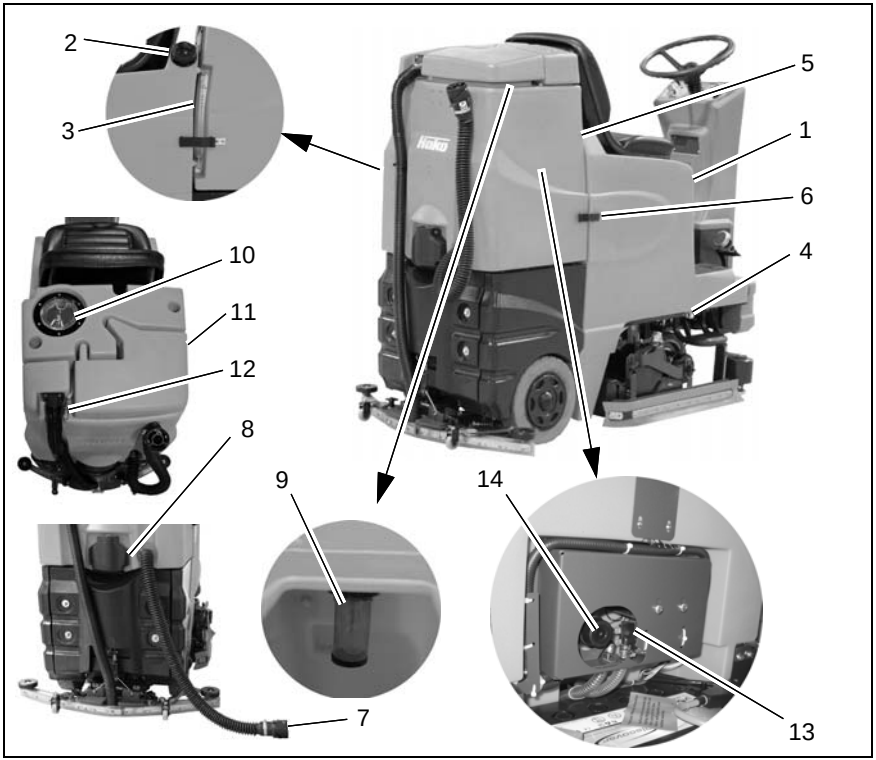


Fig.4

Solution tank (Fig. 4/1)
The solution tank contains the solution required for the scrubbing operation, the solution being made up of water and cleaning agents. The solution is supplied from a fresh water pipe at the bottom, the pipe connecting both sides of the tank. The solution is drawn by the solution pump and forced to the nozzles which are arranged in front of the rotary brushes. The electric valve prevents the tanks running empty when the vehicle has stopped.
The solution tank has a volume of 100 liters.

Solution tank filling neck (Fig. 4/ 2)
The filling neck is closed by means of a screw cap and is used for filling the solution tank.

Solution tank indicator (Fig. 4/3)
A transparent hose connected to the solution tank serves as a fill level indicator.

Solution draining hose (Fig. 4/4)
In order to complete service work or transport the vehicle, for example, the solution tank can be emptied by means of a draining hose.

Recovery tank (Fig. 4/5)
The recovery tank collects the waste water drawn up by the squeegee. It is fed to the recovery tank by means of the intake air current via the suction hose. Due to the tank volume, it acts as a separator, so that the waste water and waste vacuumed up fall from the air current. The air flows on via the air intake filter and fine particle filter to the suction turbine and is then discharged.
The recovery tank has a volume of 96 liters.

Recovery tank locks (Fig. 4/6)
Locks on both sides fix the recovery tank, which can be tilted, firmly to the vehicle. The recovery tank may only be tilted when empty or almost empty. A strap restricts the tipping angle.

Waste water draining hose (Fig. 4/7)
The waste water can be drained from the recovery tank through the draining hose. The draining hose is connected directly above the base of the recovery tank so that to empty it, only the draining end of the draining hose needs to be disconnected from the holder and laid to a floor drainage system, for example. A reducer can be mounted on the draining end to reduce the escaping flow, thus preventing the floor drainage system overflowing.

Waste water drain (Fig. 4/8)
The waste water drain serves for cleaning the recovery tank and removing larger pieces of waste vacuumed up. It is comprised of a flap and a plug, located directly behind, which is plugged into the drain inlet and tightened by means of a wing nut.

Air intake filter (Fig. 4/9)
The air intake filter in the recovery tank prevents larger pieces of waste being drawn into the suction turbine.

Suction turbine fine particle filter (Fig. 4/10)
The fine particle filter located above the suction turbine ensures that no particles of dirt can enter into the suction turbine.

Waste water service access (Fig. 4/11)
The waste water service access enables access to the inside of the recovery tank and, in particular, to the preliminary filter.

Scrubbing-vacuuming tool water connection (Fig. 4/12)
This water connection supplies solution to the scrubbing-vacuuming tool (option) if connected.

Solution pump (Fig. 4/13)
The solution pump feeds the fresh water from the solution tank to the nozzles near the brushes.

Solution filter (Fig. 4/14)
While solution flows from tank to the nozzles, it is cleaned by the filter element.

3.1.7 Brush head

1 Rotary brush head
2 Side sealing strips
3 Star-sharped knob for side sealing strips
4 Star-sharped knobs for side sealing strips
5 Brush cover
6 Rotary brush
7 Waste tank
8 Nozzles
9 Deflector roller, front
10 Circular brush head
11 Circular brush
12 Cover
13 Star-sharped knobs for sealing strip
14 Star-sharped knobs for cover

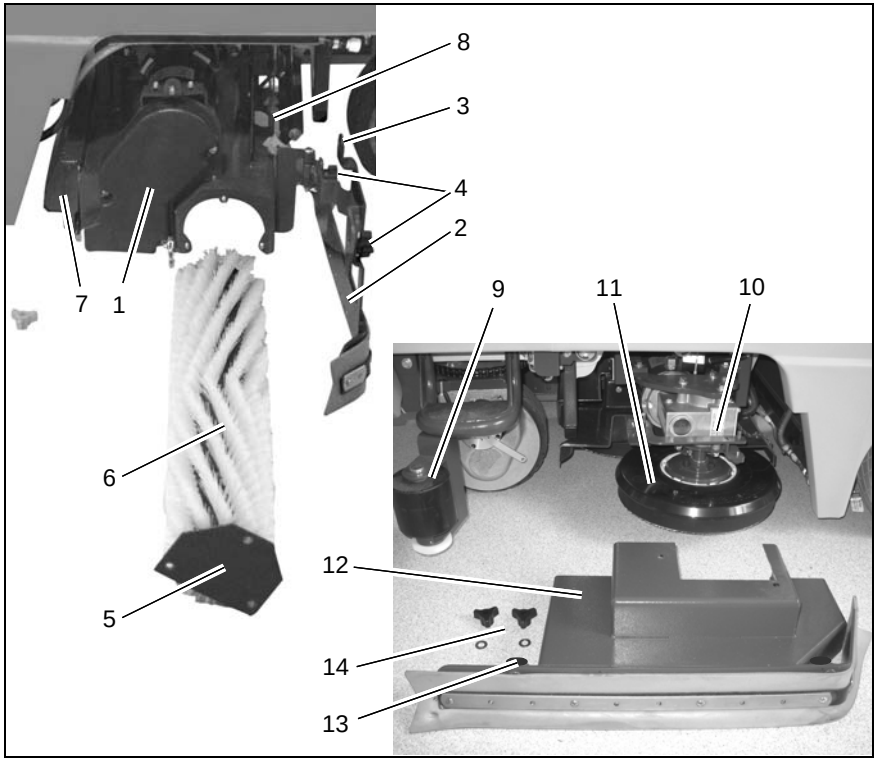


Fig.5

Rotary brush head (Fig. 5/1)
The rotary brush head is lowered and raised by means of a servomotor. The arrangement of rods for parallel extension ensure that the rotary brush head touches down parallel to the floor. Two rollers, driven in opposite directions individually by electric motors, rotate inside the rotary brush head. A jet of solution is sprayed from four nozzles located in front of the head. Larger items on the floor are swept into the waste container as a result of the rotation movement.

Side sealing strips (Fig. 5/2)
In the case of the rotary brush head, the side sealing strips prevent the sprayed solution splashing to the side under the vehicle and feed the splashed solution to the squeegee. The side sealing strips are made of rubber and screwed to the holders. They are symmetrical so that all four edges can be used by turning them before the sealing strips are worn out.

Star-sharped knob for side sealing strips (Fig. 5/3)
The star-sharped knob hold the pivoting holders for the side sealing strips in position.

Star-sharped knobs for side sealing strips (Fig. 5/4)
The two star-sharped knobs can be used to adjust the side sealing strips so that they form a seal at the bottom but are not worn too quickly as a result of too high a pressing force.

Brush cover (Fig. 5/5)
The brush covers on both sides of the brush head serve as a seal and bearings for the rotary brushes. After removing the three knobs, the brush covers can be removed and the rotary brush mounted on it pulled out of the brush head.

Rotary brushes (Fig. 5/6)
The two rotary brushes are identical. They are provided with two slits on one side which serve as holders for the drive, they are held by the brush covers on the other side.

Waste container (Fig. 5/7)
The waste container collects the items swept up by the rotary brushes.

Nozzles (Fig. 5/8)
Solution is applied to the front rotary brush by means of the four nozzles.

Deflection roller, front (Fig. 5/9)
The deflection rollers prevent damage when cleaning against walls. It also simplifies driving adjacent to walls.

Circular brush head (Fig. 5/10)
The circular brush head is extended in the same way as the rotary brush head. Two circular brushes, driven by an electric motor, rotate in the circular brush head. Each circular brush is supplied with solution from a nozzle located near the pivoting axle.

Circular brushes (Fig. 5/11)
The two circular brushes are identical. They are equipped with hooks which are hooked in the drives when changing the circular brushes.

Covers (Fig. 5/12)
The covers must be removed in order to change the circular brushes.

Star-sharped knobs for sealing strip (Fig. 5/13)
The sealing strips are fixed to the covers by means of star-sharped knobs so that they can be vertically adjusted.

Star-sharped knobs for covers (Fig. 5/14)
The star-sharped knobs hold the covers on the brush head.

3.1.8 Squeegee

1 Squeegee
2 Squeegee roller
3 Suction hose
4 Star-sharped knob for squeegee
5 Squeegee sealing strip
6 Deflector roller, rear
7 Deflecting bar
8 Ball-head rod
9 Hanger
10 Angle adjustment
11 Pivoting axle

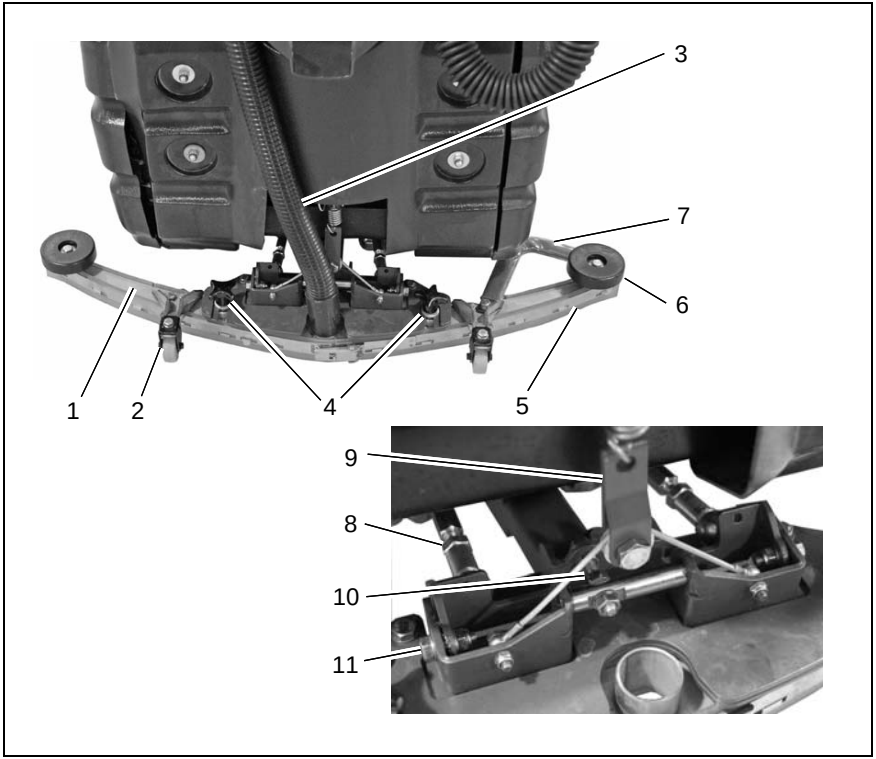


Fig.6

Squeegee (Fig. 6/1)
The squeegee is equipped with sealing strips and is lowered and raised by means of a servomotor. The angle of the squeegee can be adjusted so that it applies pressure to the floor optimally.

Squeegee rollers (Fig. 6/2)
The squeegee rollers guide the squeegee over the floor and limit the pressing force.

Suction hose (Fig. 6/3)
The suction hose connects the squeegee and recovery tank to each other.

Star-sharped knobs for squeegee (Fig. 6/4)
After removing the knobs, the squeegee can be removed in order to

Squeegee sealing strips (Fig. 6/5)
The sealing strips on the squeegee are made of PU. They are fixed to the squeegee by tightening straps and lugs which project through breakouts in the sealing strips. The sealing strips are symmetrical so that all four edges can be used by turning them before the sealing strips are worn out and have to be changed.

Deflection rollers, rear (Fig. 6/6)
The deflection rollers prevent damage when cleaning against walls. They also simplify driving adjacent to walls.

Deflecting bar (Fig. 6/7)
The deflecting bar prevents getting caught by obstructions.

Ball-head rods (Fig. 6/8)
The two ball-head rods ensure the squeegee remains in the correct position to draw up the waste water even when driving around corners.

Hanger (Fig. 6/9)
The squeegee hangs on a servomotor and is lowered or raised by it. The spring serves as a buffer and gives way in the case of obstacles.

Angle adjustment (Fig. 6/10)
The angle adjustment is used to set the squeegee so that it is held tipped slightly towards the rear, thus ensuring both sealing strips make correct contact with the floor.

Pivoting axle (Fig. 6/11)
When adjusting the angle, the squeegee is turned about the pivoting axle.

3.1.9 Drive and batteries

1 Throttle
2 Drive motor
3 Energy chain
4 Control unit
5 Batteries
6 Charging plug

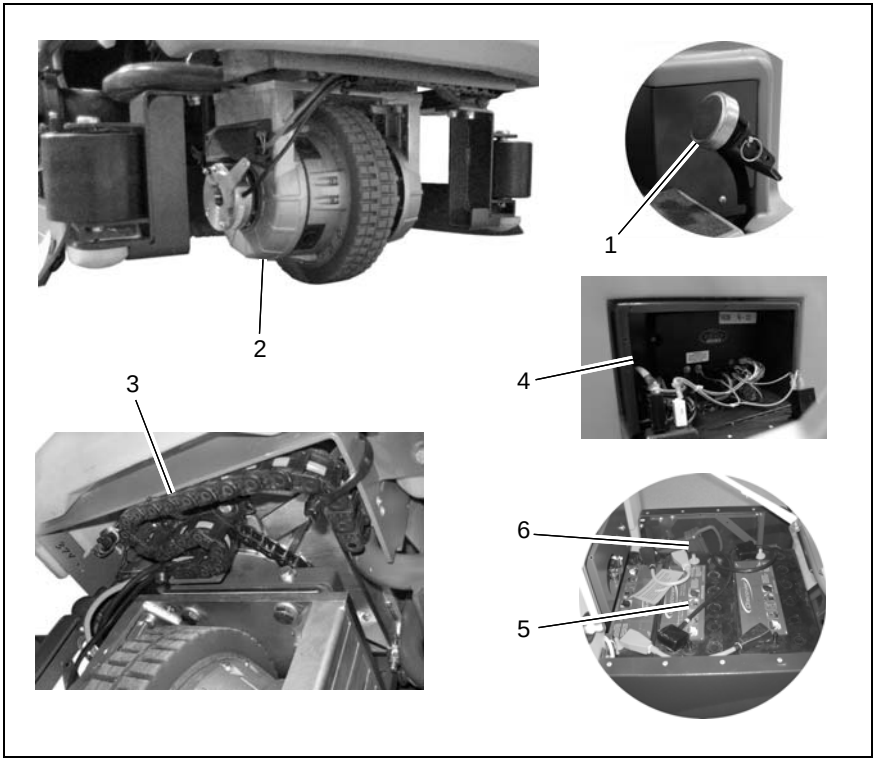


Fig.7

Throttle (Fig. 7/1)
The position of the throttle defines the vehicle driving speed. On releasing the throttle, the vehicle decelerates, comes to a stop and the parking brake is activated.

Drive motor with parking brake (Fig. 7/2)
The motor is maintenance-free. The motor is connected to a parking brake which is activated when the vehicle stops.

Energy chain (Fig. 7/3)
The motor power cables are fed inside the energy chain and enable the front wheel to be turned 90° without any excessive bending or kinking pressure being applied to the cable.

Control unit (Fig. 7/4)
The control unit converts the commands received from the throttle and various switches and controls the motor, brush and servomotors, suction turbine, pump and electric valve accordingly. The control unit also monitors the battery charge status.

Batteries (Fig. 7/5)
The batteries are installed under the recovery tank and supply power to the electrical consumers. The vehicle is equipped with three low-maintenance 210Ah20(192Ah5) batteries connected in series.
For information on the driving batteries, refer to supplementary sheet 88-60-2556

Charging plug (Fig. 7/6)
The charging plug connects the vehicle's electrical system to the batteries. To recharge the batteries, the charging plug must be disconnected and connected to a suitable charger.

3.2 Operating and indicator elements

3.2.1 Operating panel

1 Indicator field
2 Key switch
3 Horn
4 Direction switch
5 Driving direction indicators
6 Low discharge signal indicator (LDS) / Diagnostic codes
7 Solution dosing
8 Function selection switch
9 Scrubbing-vacuuming tool (option)
10 Operating hour counter
11 Fuses

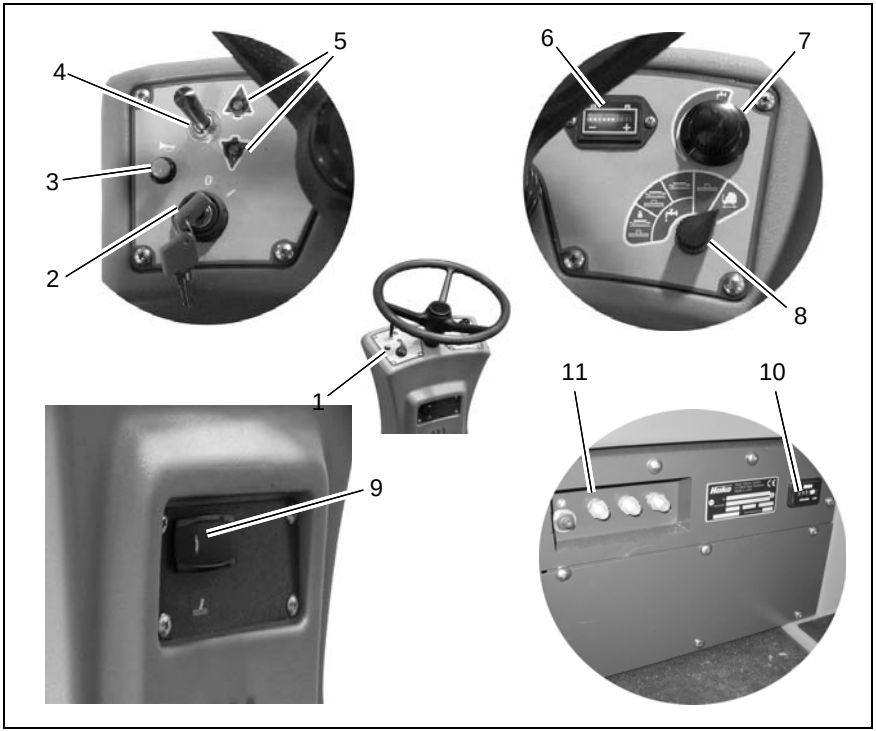


Fig.8

Indicator field (Fig. 8/1)
The indicator field provides a central function monitoring facility and indicates all operating states.

Key switch (Fig. 8/2)
The key switch is used to switch the electrical system on and off.

Remove the ignition key to prevent unauthorized use of the vehicle.

Horn (Fig. 8/3)
The horn is used to alert others to dangerous situations.

Direction switch(Fig. 8/4)
The direction switch is used to select the driving direction required.
- to front = forwards
- to rear = reverse

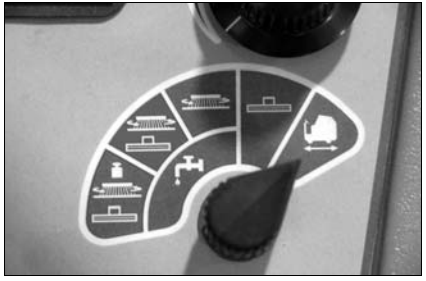
Driving direction indicators (Fig. 8/5)
The two driving direction indicators indicate the driving direction selected by the direction switch.

Low discharge signal indicator(LDS) / Diagnostic codes (Fig. 8/6)
After switching the vehicle on, the low discharge signal indicator (LDS) appears in the indicator field. The current battery charge status is indicated during operation.
The number of flashing bars on the batterx indicator represent fault codes as indicated below:
1 Low battery voltage: Charge batteries
2 Traction motor fault: Inform Hako-Service
3 Brush motor fault: Inform Hako-Service
4 Actuator fault: Inform Hako-Service
5 Vacuum motor fault: Inform Hako-Service
6 Off-aisle wand activated
7 Throttle fault: Inform Hako-Service
8 Control system fault: Inform Hako-Service
9 Solution tank empty: Fill solution tank
10 High battery voltage: Inform Hako-Service
Ripple: Throttle displaced on start up or the brush head is switched to manual mode.

Solution dosing (Fig. 8/7)
The solution dosing function is used to set the solution quantity to be sprayed from the nozzles during scrubbing.

Function selection switch (Fig. 8/8)
The function selection switch is used to select the required operating mode. The operating modes available for selection are (indicated counterclockwise):

- Drive only mode
- Vacuuming
- Scrubbing
- Scrubbing and vacuuming
- Scrubbing and vacuuming at increased pressure



Scrubbing-vacuuming tool (Fig. 8/9)
This switch is used to activate the scrubbing-vacuuming tool (option). The vehicle remains at a standstill when the scrubbing-vacuuming tool is in operation.

1.1.1.1

Operating hour counter (Fig. 8/10)

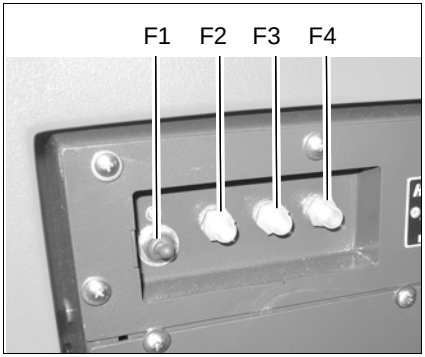
The operating hour counter indicates the number of operating hours currently accumulated.

Main fuse (Fig. 8/11)

The main fuse interrupts the entire power supply to the vehicle. In the event of faults in the electrical system, the vehicle must be shut down by means of the main fuse. The switch positions are:

- up = on
- down = off

Further fuses:
F2=Small consumer
F3=Rotary brush motor (M1)
F4=Rotary brush motor (M2)



3.2.2 Seat

1 Seat adjustment lever
2 Seat switch

Seat adjustment lever (Fig. /1)
When the lever is pulled out, the seat can be adjusted to the required position.

Seat switch (Fig. /2)
The seat switch prevents the vehicle from being driven without anyone sitting in the seat.

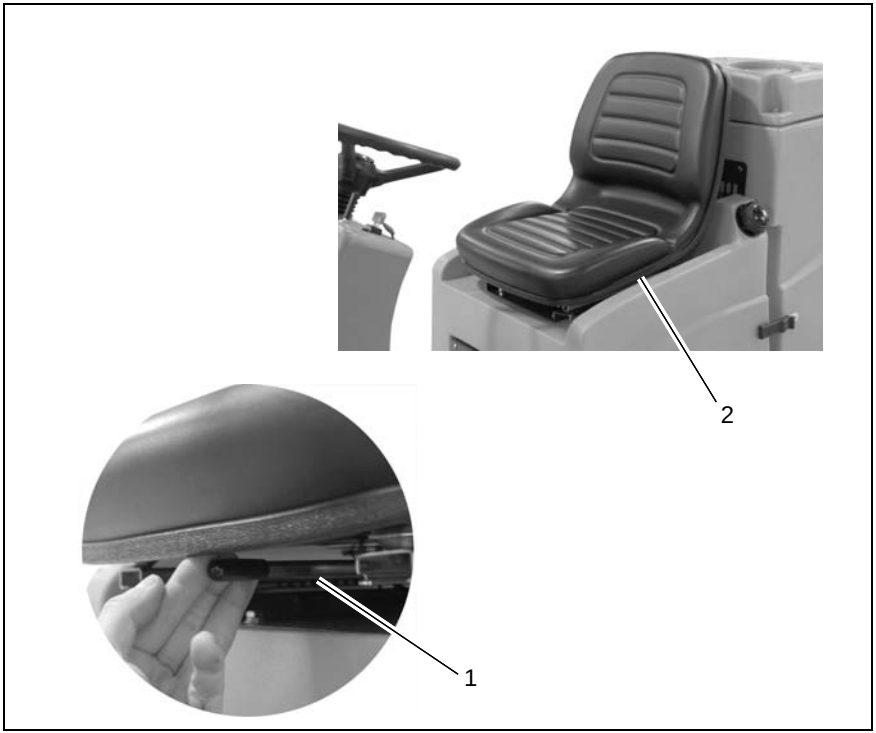


Fig.9

4 Technical Data

	Unit	Circular brush	Rotary brush
Vehicle length	cm	155	155
Vehicle height	cm	137	137
Vehicle width, without squeegee	cm	75	75
Vehicle width, with squeegee	cm	86	86
Working width	cm	65	65
Squeegee width	cm	86	86
Area coverage, theoretic	m²/h	2925	2925
Nominal voltage	V	36	36
Power consumption, drive motor (P1)	W	756	756
Power consumption, aspirating engine (P1)	W	648	648
Power consumption, brush motor (P1)	W	1 x 1188	2 x 684
No. of brushes	Pieces	2	2
Brush diameter	cm	330	133
Working speed	kph	5	5
Solution tank	Liter	100	100
Recovery tank	Liter	96	96
Weight without batteries and solution	kg	279	289
Weight with batteries and solution	kg	584	594

Noise emission value	Unit	
Max. sound power level (L_{WAd}) measured at extreme operating conditions in compliance with DIN EN 60335-2-72:	dB (A)	82
The sound pressure level (L_{pA}) (at the ear of the operator) measured according to DIN IEC 60335-2-72 under normal working conditions:	dB (A)	72
Measurement inaccuracy (KpA):	dB (A)	2
Vibration		
The weighted effective value of acceleration, measured in accordance with DIN EN ISO 5349-1, to which the upper parts of the body (hand-arm) are exposed under normal working conditions	m/s²	< 2.5
The weighted effective value of acceleration, measured in accordance with DIN EN ISO 2631-1, to which the upper parts of the body (feet-seat) are exposed under normal working conditions:	m/s²	< 0,5

5 Maintenance and Service

General information

It is essential to pay attention to the information in Chapter "Safety Information" before completing any service or maintenance work!

By adhering to the maintenance work recommended by us, you can be sure that the vehicle is always ready to be put into operation.
Maintenance and repair work necessary on a daily and weekly basis can be carried out by a driver trained to complete the work, all other Hako system maintenance may only be completed by personnel who are correspondingly qualified and trained. Please contact your nearest Hako service center or Hako authorized dealer. Failure to observe this annuls any rights to claims under the terms of guarantee in respect of resulting damage or consequential damage.
Always specify the serial number in the case of inquiries and spare parts orders, refer to section 1.7 - Rating plate.

5.1 Hako system maintenance

Hako system maintenance:

- ensures that the Hako vehicle is always ready for operation (preventive maintenance),
- minimizes operating costs, maintenance and repair costs,
- ensures the vehicle has a long service life.

Hako system maintenance provides individual modules explaining the special technical work to be carried out and prescribes the intervals at which the work should be performed. Parts to be replaced for the individual maintenance tasks are defined and provided in spare parts kits.

Hako system maintenance K:
Work to be carried out by the customer according to the service and maintenance instructions in the operating manual (daily and weekly). The driver/ operator receives proper instruction when the vehicle is delivered.

Hako system maintenance I:
(every 250 operating hours)
Completed by technical experts from an authorized Hako service center in accordance with the specific vehicle system maintenance using spare parts kits.

Hako system maintenance II:
(every 500 operating hours)
Completed by technical experts from an authorized Hako service center in accordance with the specific vehicle system maintenance using spare parts kits.

Hako system maintenance S:
(every 1000 operating hours, safety check)
Completed by technical experts from an authorized Hako service center in accordance with the specific vehicle system maintenance using spare parts kits.
Completion of all legally prescribed, safety-related tests in accordance with UVV-BGV-TÜV-VDE.

5.2 Proof of maintenance

Hand-over Upgrading Test drive Hand-over to customer Instruction completed on: at _____ operating hours	Hako System Maintenance I 250 operating hours Workshop Stamp completed on: at _____ operating hours	Hako System Maintenance II 500 operating hours Workshop Stamp completed on: at _____ operating hours	Hako System Maintenance I 750 operating hours Workshop Stamp completed on: at _____ operating hours
Hako System Maintenance S/I 1000 operating hours Workshop Stamp completed on: at _____ operating hours	Hako System Maintenance II 1250 operating hours Workshop Stamp completed on: at _____ operating hours	Hako System Maintenance I 1500 operating hours Workshop Stamp completed on: at _____ operating hours	Hako System Maintenance I 1750 operating hours Workshop Stamp completed on: at _____ operating hours
Hako System Maintenance S/I 2000 operating hours Workshop Stamp completed on: at _____ operating hours	Hako System Maintenance I 2250 operating hours Workshop Stamp completed on: at _____ operating hours	Hako System Maintenance II 2500 operating hours Workshop Stamp completed on: at _____ operating hours	Hako System Maintenance I 2750 operating hours Workshop Stamp completed on: at _____ operating hours

5.3 Maintenance plan

Hako system maintenance customer

The following maintenance work must be completed by the customer at the intervals stipulated.

Activity	Interval	
	Daily	Weekly
Check the battery charge	o	
Fill the solution tank	o	
Empty the recovery tank	o	
Visual inspection of the vehicle	o	
Check the brushes		o
Check the sealing strips on the brush head; adjust, if necessary		o
Check the solution supply		o
Clean the suction turbine fine particle filter		o
Check the squeegee		o
Clean the vehicle		o
Test drive and function test		o
Check the sealing strips on the squeegee and squeegee adjustment		o

Hako system maintenance I

The following maintenance work must be completed by an authorized Hako service center.

Activity	**Interval**
	Every 250 operating hours
Check the recovery tank cover seal	**o**
Rinse the solution tank draining hose	**o**
Check the recovery tank draining hose and suction hose	**o**
Check the support wheels on the squeegee	**o**
Check the front defector rollers and those on the squeegee	**o**
Check the condition of the tires	**o**
Test drive and function test	**o**

Hako system maintenance II

The following maintenance work must be completed by an authorized Hako service center.

Activity	**Interval**
	Every 500 operating hours
All maintenance work in accordance with Hako system maintenance I	**o**
Grease the hinging points on the brush attachment	**o**
Grease the support wheels on the squeegee	**o**
Grease the hinging points on the squeegee holder	**o**
Grease the front defector rollers and those on the squeegee	**o**
Check the carbon brushes on the rotary brush motors	**o**
Check the carbon brushes on the suction turbine motor	**o**
Check the fixation of the squeegee	**o**
Check the angle of the squeegee	**o**
Check the hang and parallel release of the brush head	**o**
Check the increased pressing force	**o**
Check the battery capacity	**o**
Test drive and function test	**o**

Hako system maintenance S (safety check)
The following maintenance work must be completed by an authorized Hako service center at least once a year.

Activity	**Interval**
	Every 1000 operating hours
All maintenance work in accordance with Hako system maintenance II	**o**
Check parking brake	**o**
Check the key switch, main fuse and horn	**o**
Check the cable connections	**o**
Check the seat latching mechanism	**o**
Check the acoustic reversing signal	**o**
Test drive and function test	**o**

5.4 Battery system

1 Batteries
2 Battery plug
3 Low discharge signal indicator (LDS)
4 Lock
5 Recovery tank
6 Wiring diagram

Batteries may only be handled and changed by properly skilled maintenance personnel.

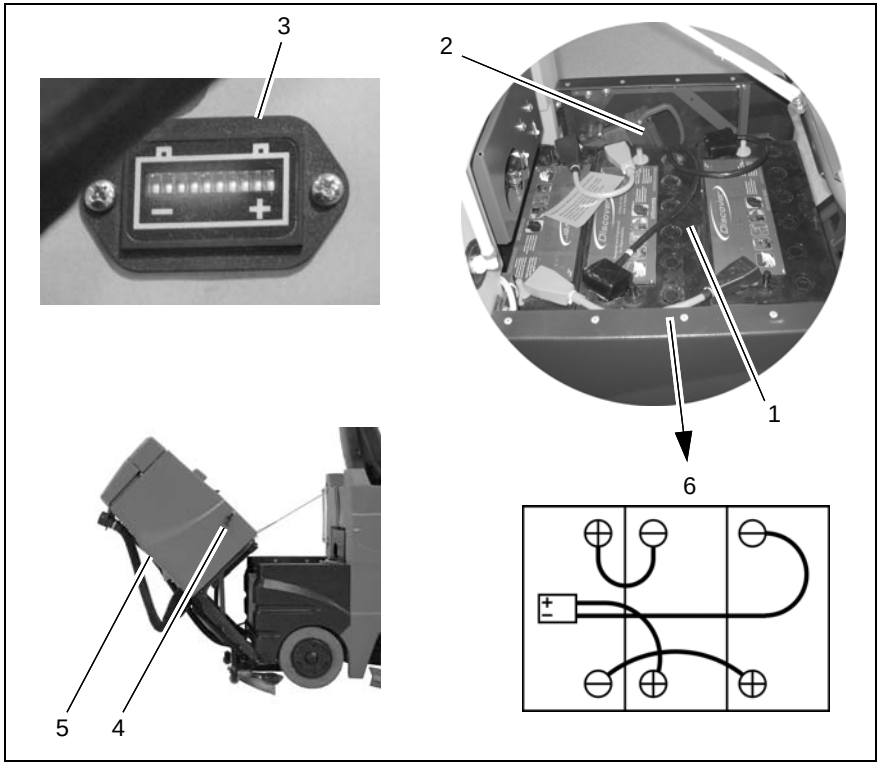


Fig.10

5.4.1 Charging batteries

The batteries (Fig. 10/1) are charged using an appropriate battery charging device. The charger is connected via the battery plug (Fig. 10/2). We recommend charging the battery when at least one LED on the total discharge signal transducer display (Fig. 10/3) has gone out after operating the vehicle. Pay attention to the information in the operating manuals supplied with the 88-60-2723 charger and the battery manufacturer.

Before starting the vehicle up for the first time, the batteries to be used must be fully charged, properly, by implementing the initial battery charge routine. Hako assumes no liability for damage to the battery caused by a fault when the battery is charged for the first time.

Ensure sufficient ventilation in the charging area when charging the batteries. – Risk of explosion.

5.4.2 Low discharge signal indicator (LDS)

The machine is equipped with a charge indicator to preclude the batteries from low discharge. This low discharge signal indicator (Fig. 10/3) is integrated in the electronics. If other batteries are used, re-adjustment of the low discharge signal indicator is required.

The low discharge signal indicator may only be adjusted by an authorized Hako service center.

5.4.3 Servicing the driving batteries

For information on servicing driving batteries, refer to operating manual 88-60-2556.

5.4.4 Removing the batteries

1. Park the vehicle on a level floor.
2. Switch off the vehicle by turning the key switch.
3. Release the side locks (Fig. 10/4) and open the empty recovery tank (Fig. 10/5).
4. Disconnect the battery plug (Fig. 10/2).
5. Remove the battery connection cable.
6. Remove the batteries.

5.4.5 Inserting the batteries

Due to a change in the center of gravity, only approved batteries may be installed at the intended position.

1. Switch off the vehicle by turning the key switch.
2. Release the side locks (Fig. 10/4) and open the empty recovery tank (Fig. 10/5).
3. Position the batteries in the battery tray in accordance with the figure.
4. Connect the battery poles to the connection cables in the accessories kit according to the wiring diagram (Fig. 10/5). Pay attention they are firmly fixed and grease the poles.

5.5 Solution tank

1 Solution tank
2 Tank cap
3 Marking
4 Fill level indicator
5 Draining hose
6 Bracket

5.5.1 Filling the solution tank

Fill the solution tank (Fig. 11/1) before starting work or as necessary. Park the vehicle on a level floor area.
Open the tank cap (Fig. 11/2) and fill the solution tank up to the maximum marking (1/1) (Fig. 11/3) on the fill level indicator (Fig. 11/4).

5.5.2 Emptying the solution tank

Park the vehicle so that the draining hose (Fig. 11/5) is above a drain in the floor. Remove the draining hose from the holder (Fig. 11/6) and remove the cover.

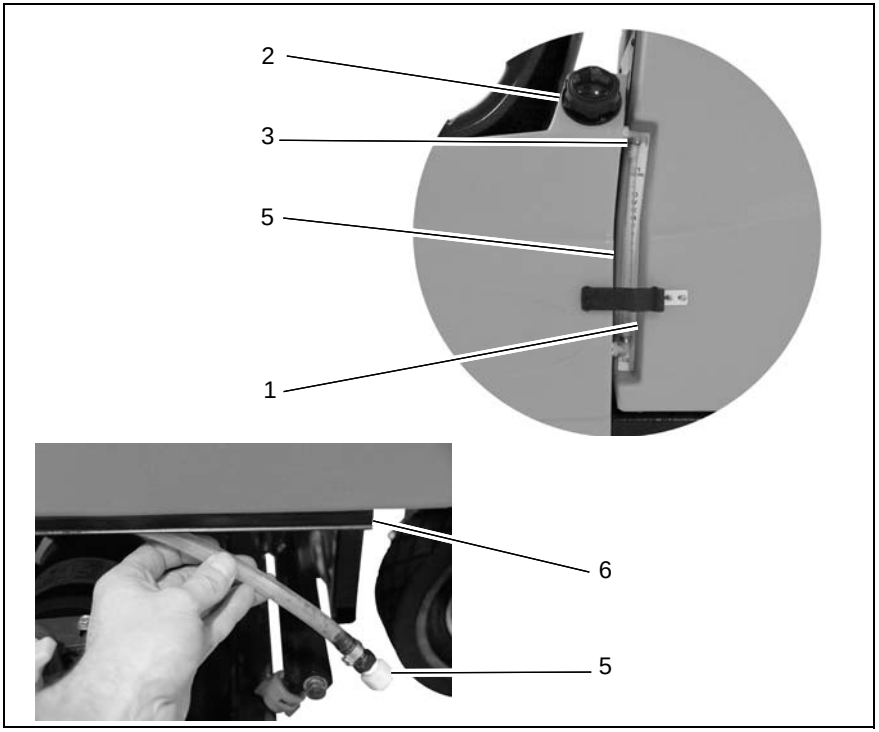


Fig.11

5.6 Recovery tank

1 Recovery tank
2 Draining hose
3 Draining hose cap
4 Tank cap
5 Flap
6 Plug
7 Recovery tank locks
8 Air intake filter

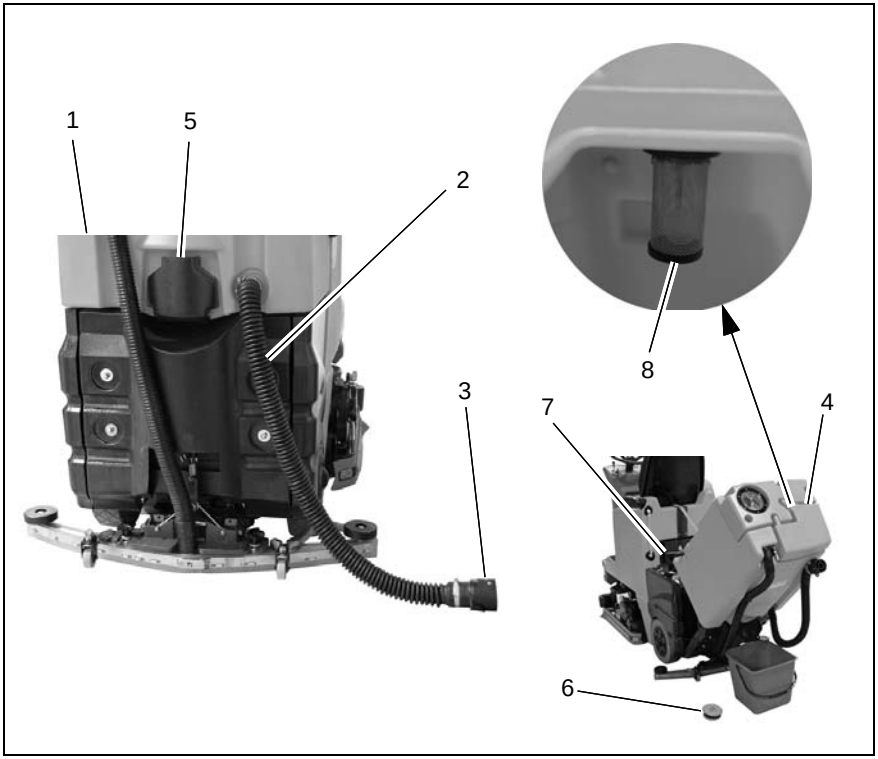


Fig.12

5.6.1 Emptying the recovery tank

Empty the recovery tank (Fig. 12/1) every day or as necessary.

1. Drive to an appropriate disposal point.
2. Park the vehicle so that the draining hose (Fig. 12/2) reaches the drain in the floor.
3. Switch off the vehicle.

Observe the applicable laws and local regulations when disposing of cleaning agents!

4. Remove the draining hose from the holder, open the lock (Fig. 12/3) and empty the recovery tank completely.

5.6.2 Cleaning the recovery tank

Clean the recovery tank (Fig. 12/1) every day or as necessary.

1. Drain off the recovery tank, see paragraph 5.6.1.
2. Open the tank cap (Fig. 12/4) on the recovery tank.
3. Open the flap (Fig. 12/5), loosen the wing nuts on the plugs (Fig. 12/6) a little and remove the plugs.
4. Open the locks (Fig. 12/7) on the recovery tank and pivot the recovery tank to the rear.
5. Flush out the remaining dirt with fresh water.
6. Also flush the draining hose.

5.6.3 Cleaning the air intake filter

Check the function of the air intake filter (Fig. 12/8) and clean it as necessary. The air intake filter can be accessed over the tank cap and it can be pulled from the nozzles.

5.7 Circular brush head

1 Brush
2 Cover
3 Brush holder
4 Sealing strip

Fig.13

5.7.1 Cleaning the brushes

1. Remove the covers (Fig. 13/2) from the brushes (Fig. 13/1).
2. Unhook the brushes by pressing them down.
3. After cleaning the brushes, hook them back in at the side in the holder (Fig. 13/3) and press up around the circumference.

5.7.2 Changing the brushes

In cases where brushes are worn to a length of 1.5 cm, the brushes must be changed. To disassemble and assemble them, see paragraph 5.7.1.

5.7.3 Checking the sealing strip

Check the height of the sealing strip and readjust, if necessary. To do this, loosen the knobs and fix the sealing strip at the required height.
Change the sealing strip, if necessary. To do this, remove the retaining screws and remove the sealing strip. Installation is carried out in the reverse sequence.

5.8 Rotary brush head

1 Latching handle to enable pivoting
2 Sealing strip
3 Waste bin
4 Star-sharped knobs for bearing cap
5 Brush
6 Bearing cap
7 Height adjustment knobs

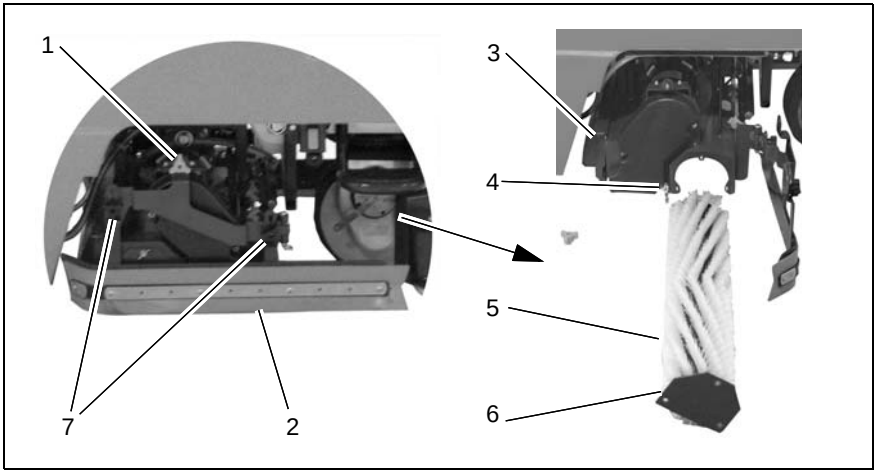


Fig.14

5.8.1 Cleaning the waste container

Unscrew the latching handles (Fig. 14/1) and pivot the sealing strip (Fig. 14/2) up. Then remove the waste bin (Fig. 14/3) to the side and clean it.

5.8.2 Cleaning the brushes

1. Unscrew the latching handles and pivot the sealing strip up.
2. Remove the knobs (Fig. 14/4), pull out the brush (Fig. 14/5) and remove the bearing cap (Fig. 14/6). Clean the brush.
3. Attach the bearing cap on the brush.
4. Slide the brush in the brush head and allow it to snap in place (pay attention to the position of the pin in the drive).
5. Fix the bearing cap in place with the knobs.
6. Pivot the sealing strip to close it and secure with the yellow latching handle.

5.8.3 Changing the brushes

In cases where bruses are worn to a length of 1.5 cm, the brushes must be changed. To disassemble and assemble them, see paragraph 5.8.2.

5.8.4 Checking the sealing strip

Check the height of the sealing strip and readjust, if necessary. Release the height adjustment knobs (Fig. 14/7) and secure the sealing strip at the required height. Change the sealing strip, if necessary. To do this, remove the retaining screws and remove the sealing strip. Installation is carried out in the reverse sequence.

5.9 Squeegee

1 Squeegee
2 Suction hose
3 Star-shaped knob
4 Sealing strip
5 Fastening device
6 Adjusting nuts
7 Support roller

5.9.1 Cleaning the squeegee

To clean the squeegee (Fig. 15/1), raise it, disconnect the suction hose (Fig. 15/2), loosen the two star-shaped knobs (Fig. 15/3) and remove the squeegee.

5.9.2 Changing the sealing strips

Check the inner and outer sealing strips (Fig. 15/4) on the squeegee for signs of wear. The sealing strips can be turned four times (90°) and reused.

1. Raise the squeegee.
2. Disconnect the suction hose.
3. Loosen the two star-shaped knobs and disassemble the squeegee.
4. Loosen the fastening device (Fig. 15/5) and remove the outer sealing strip. Turn the sealing strip or replace it, as necessary. Change the inner sealing strip in the same way.

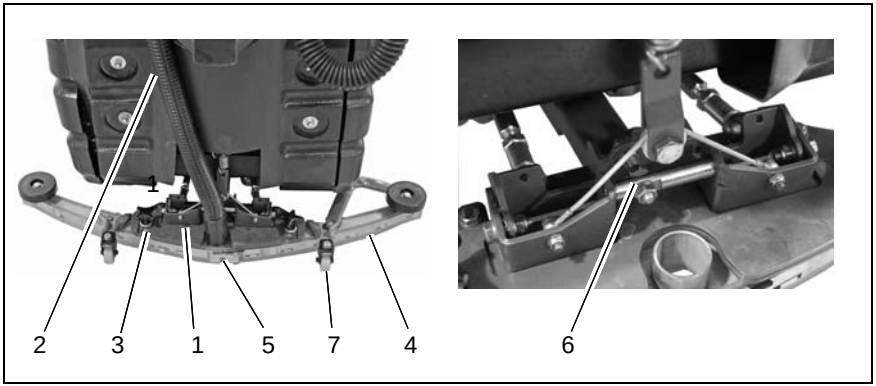


Fig.15

5.9.3 Adjusting the squeegee

Angle Adjustment

The angle adjustment is the decisive factor in ensuring that the sealing strips on the squeegee lie evenly on the floor.

1. Park the machine on a level surface and lower the squeegee.
2. Loosen the counternut on the adjusting screw (Fig. 15/6) and adjust the squeegee using the adjusting screw so that the ends of the sealing strips still have contact with the floor.
   Figure A
   Turn the adjusting screw counterclockwise: The clearance between sealing strip and floor is reduced in the centre.
   Figure B
   Turn the adjusting screw clockwise: The clearance between sealing strip and floor is increased in the centre.
3. Switch the machine on and check the suction pattern. When the machine is in operation, the entire surface of the sealing strips (centre and outer areas) must be applied as evenly as possible.
4. Tighten the counternut on the adjusting screw at 5 lb ft.

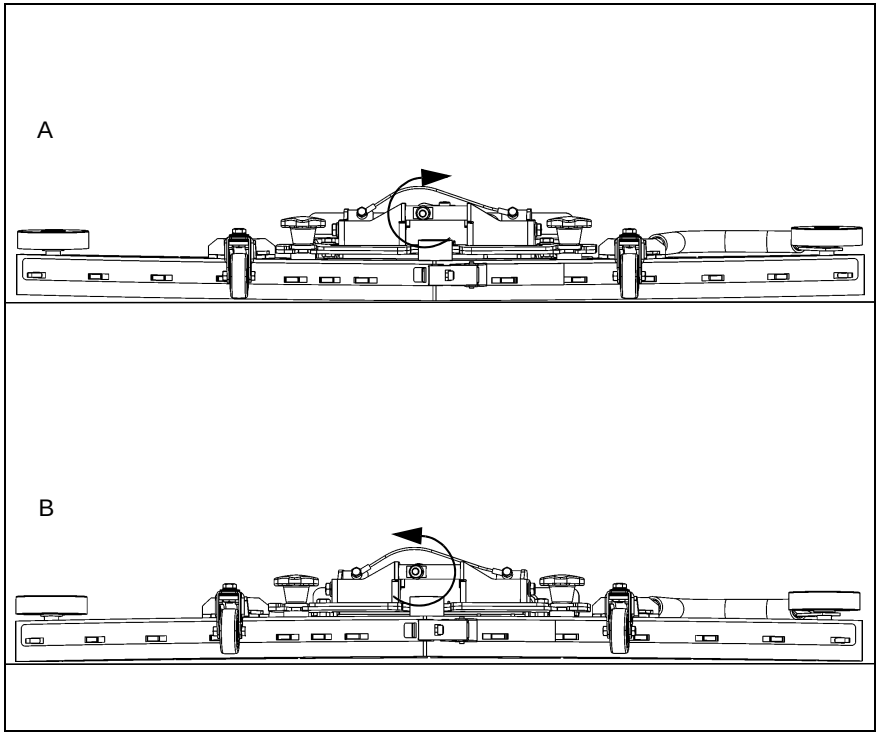


Fig.16

Height Adjustment

The height adjustment is set to 3 mm at the factory. If streaks are produced, despite an optimum angle adjustment, the clearance between the rollers and floor must be adjusted by changing the number of washers on the holder.

In the case of very smooth floors, e.g. finished floors, PVC, linoleum, etc. Number of washers = 2. This corresponds to a clearance of approx. 2 mm.

In the case of very uneven floors, e.g. poorly laid tiles (water does not run off) Number of washers = 4. This corresponds to a clearance of approx. 4 mm.

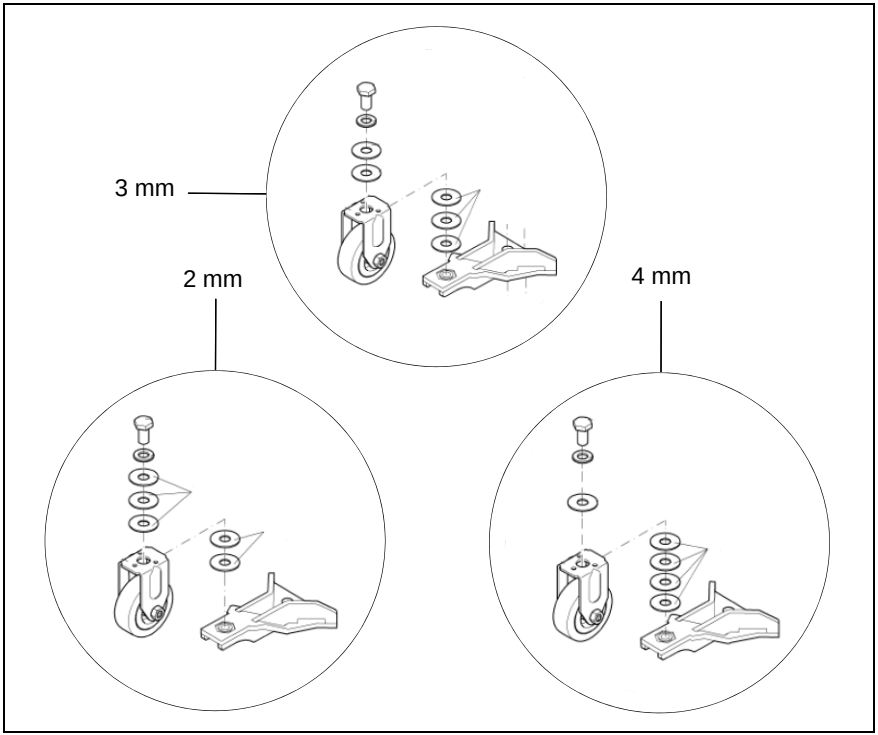


Fig.17

5.10 Troubleshooting

Problem	Possible Cause	Remedy
Poor water pick-up	Worn or torn squeegee blades	Rotate or replace squeegee blades
	Squeegee out of adjustment	Adjust squeegee
	Recovery tank full	Empty recovery tank
	Recovery tank drain hose leak	Secure drain hose or replace
	Recovery tank lid gasket leak	Replace gasket lid
	Debris cought in squeegee	Clean squeegee
	Vacuum hose clogged or damaged	Remove debris or replace vacuum hose
Poor scrubbing performance	Worn brushes	Bürsten drehen oder wechseln
	Wrong brush or cleaning chemical	Hako-Service
	Debris cought on brushes	Remove debris
	Moving machine to fast	Slow down
	Low battery charge	Recharge batteries
Poor sweeping performance (cylindrical system)	Debris box full	Empty and clean debris box
	Worn brushes	Replace brushes
	Bristles have taken a set	Rotate brushes

Problem	Possible Cause	Remedy
Inadequate solution flow or no solution to the floor	Recovery tank full	Empty recovery tank
	Solution tank empty	Fill solution tank
	Solution lines, valves, filter or spray jets clogged	Clean Solution lines, valves, filter or spray jets
Machine does not run	Emergency stop switch tripped	Activate switch by turning as indicated by arrows
	Operator seat safety switch	Operator has to be seated. Check for open circuit and replace
	Main system controller	Check error fault codes
	Tripped 100 amp circuit breaker	Check for electrical short circuit. Reset machine: Reset breaker and turn key switch off and restart
Solution tank empty indicator light on	Solution tank empty	Refill solution tank
	Faulty float switch	Replace float switch
Recovery tank full indicator light on	Recovery tank full	Refill solution tank
	Faulty switch full of debris	Clean float switch
	Faulty float switch	Replace float switch

EC-Declaration of Conformity (in accordance with EC Directive 2006/42/EC)

Hako GmbH
Hamburger Straße 209-239
D-23843 Bad Oldesloe

declare under our sole responsibility, that the product

Scrubmaster B100R Disk Brush
Type: 7300.10

Scrubmaster B100R Cylindrical Brush
Type: 7300.20

o which this declaration relates, conforms with the relevant provisions of the safety and health requirements stipulated in EU Directive 2006/42/EC and is in accordance with 2004/108/EC.

For the relevant implementation of the safety and health requirements mentioned in the Directives, the following standard (s) and / or technical specification (s) has (have) been respected:

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

Bad Oldesloe, 22.04.2014

Dr. Rainer Bavendiek
Director R&D

Name of the authorized person who compiles the technical documents for Hako:

Ludger Lüttel

Hako

Clean ahead

Advanced Technology for a Cleaner, Better Environment

88-10-2801 - 3100-04

TÜV CERT DIN EN ISO 9001

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