



***Hako***

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# Instruction Manual

**Hakomatic 1800 V/LPG (7574.10/20)**

## Table of Content

<b>1</b>	<b>Safety information . . . . . 6</b>	<b>3</b>	<b>Operation . . . . . 17</b>	<b>5</b>	<b>Maintenance and Care . . . . 34</b>
1.1	Safety and Warning Symbols. 6	3.1	Method of Operation . . . . . 17	5.1	General . . . . . 34
1.2	General Provisions. . . . . 7	3.1.1	General . . . . . 17	5.2	Hako System Maintenance . 34
1.3	Provisions for Operation. . . . 7	3.1.2	Sweeping Unit . . . . . 17	5.3	Maintenance document . . . 35
1.4	Maintenance Instructions . . . 8	3.1.3	Water Tank. . . . . 17	5.4	Maintenance Schedule. . . . 35
1.5	Specific Hazards . . . . . 9	3.1.4	Scrubbing Unit . . . . . 18	5.5.1	Open Engine Frame. . . . . 43
1.6	Instructions for Protection of Environment . . . . . 11	3.1.5	Squeegee. . . . . 18	5.5.2	Refill Engine Oil . . . . . 43
1.7	Labels at the Machine . . . . . 12	3.1.6	Travel Drive and Work Hydraulics . . . . . 18	5.5.3	Change Engine Oil and Oil Filter . . . . . 43
<b>2</b>	<b>First Operation . . . . . 14</b>	3.1.7	Options. . . . . 18	5.5.4	Change fuel filter . . . . . 44
2.1	Instruction. . . . . 14	3.2	Control and Display Elements . . . . . 19	5.6.1	Remove Main Filter . . . . . 45
2.2	Before First Operation . . . . 14	3.2.1	Overview . . . . . 19	5.6.2	Clean Main Filter . . . . . 45
2.3	Start Vehicle. . . . . 14	3.2.2	Main Control Panel. . . . . 21	5.6.3	Install Main Filter . . . . . 45
2.4	Slow Down and Stop . . . . . 15	3.2.3	Left-hand Control Panel. . . . 25	5.6.4	Change Main Filter. . . . . 45
2.5	Riding Up- and Downhill. . . . 15	3.2.4	Controls of the Machine . . . . 26	5.6.5	Change Safety Cartridge . . . 45
2.6	Work with the Machine. . . . . 15	<b>4</b>	<b>Technical Data . . . . . 29</b>	5.6.6	Clean Dust Discharge Valve 45
2.7	After Work . . . . . 15			5.7.1	Clean Radiator . . . . . 47
2.9	Tie-down points . . . . . 16			5.7.2	Re-fill Coolant. . . . . 47
2.10	Towing . . . . . 16			5.7.3	Change Coolant. . . . . 47
2.11	Support Points . . . . . 16			5.8	Liquid Propellant Gas System . . . . . 48
				5.8.1	Change Liquid Propellant Gas Tank. . . . . 49
				5.8.2	Change liquid propellant gas tank (option). . . . . 49

## Table of Content

5.9	Hydraulic System . . . . .	50	5.14	Squeegee . . . . .	61
5.9.1	Re-fill Hydraulic Fluid . . . . .	51	5.14.1	Remove Squeegee . . . . .	62
5.9.2	Change hydraulic fluid . . . . .	51	5.14.2	Change Seals . . . . .	62
5.9.3	Change hydraulic fluid filter . . . . .	51	5.14.3	Adjust Squeegee . . . . .	62
5.10	Dirt Hopper . . . . .	52	5.15	Water Supply . . . . .	63
5.10.1	Clean Dust Filter . . . . .	53	5.15.1	Fill Clear Water Tank . . . . .	64
5.10.2	Change Dust Filter . . . . .	53	5.15.2	Drain Clear Water . . . . .	64
5.10.3	Empty dirt hopper . . . . .	53	5.15.3	Clean Clear water filter . . . . .	64
5.11	Side Brush . . . . .	54	5.15.4	Empty Soiled Water Tank . . . . .	64
5.11.1	Adjust Inclination Side Brushes . . . . .	55	5.15.5	Clean Soiled Water Tank . . . . .	64
5.11.2	Wearing Compensation of Side Brushes . . . . .	55	5.16	Tyres . . . . .	65
5.11.3	Change Side Brushes . . . . .	55	5.16.1	Check Tyre Wearing . . . . .	65
5.12	Cylindrical Broom . . . . .	56	5.16.2	Remove Tyres . . . . .	65
5.12.1	Adjust Wearing Compensation of Cylindrical Broom . . . . .	57	5.16.3	Install Tyres . . . . .	65
5.12.2	Adjust Parallelism of Cylindrical Broom . . . . .	57	5.17	Brakes . . . . .	65
5.12.3	Change Cylindrical Broom . . . . .	58	5.18	Electrical System . . . . .	66
5.12.4	Change Cylindrical Broom Apron . . . . .	58	5.18.1	Change Fuse . . . . .	66
5.13	Scrubbing Unit . . . . .	59	5.18.2	Change Battery . . . . .	66
5.13.1	Change Scrubbing Brushes . . . . .	60		Declaration of Conformity . . . . .	67
5.13.2	Change Seals . . . . .	60			
5.13.3	Adjust wiper . . . . .	60			

## Introduction

### Introduction

Dear customer, It is our desire that the good characteristics of the Hakomatic 1800 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 be prepared for possible dangerous situations.

Your own safety, as well as the safety of others, depends to a great extent on how the vehicle is moved and operated. Therefore, carefully read and understand this operation and maintenance manual prior to the first drive.

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: Mai 2006

**Hako GmbH**  
**D-23843 Bad Oldesloe**  
**Hamburger Str. 209-239**  
**Telefon ++49 (04531) 8060**

### Proper use

The Hakomatic 1800 is a large-area scrubber with integrated sweeping system for dry and wet cleaning of hard-surfaced floors. Using the machine beyond this scope of application will be deemed improper use; The manufacturer cannot be held liable for consequential damages; the user alone bears the risk.

The term of proper use also includes operation, maintenance and repair work to be performed in compliance with the manufacturer's specifications.

The Hakomatic 1800 may be used by persons only that are familiar with the machine and aware of possible hazards involved.

The applicable Accident Prevention Regulations, Road Traffic Regulations and further regulations in vigour concerning aspects of safety and working medicine will have to be complied with.

If modifications to the machine are made in absence of the manufacturer's prior consent, the latter cannot be held liable for damage resulting from such unauthorized modification.

## Introduction

### **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. For refund of such damage, have the Deutsche Bahn AG or your freight forwarder confirm such damage. Mail notification and waybill to:




**Hako GmbH**  
**Hamburger Strasse 209-239**  
**23843 Bad Oldesloe**

## Safety information

### 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
DANGER 	persons and goods	<b>dangerous situation</b> caused by misuse inaccurate adherence of instructions or prescribed work routine
CAUTION 	the machine	important information on handling the Hakomatic 1800 in order to maintain operability
Ecological hazard 	the environment	due to use of substances representing an inherent danger to health of environment

## Safety information

### 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 Hakomatic 18000 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 Hakomatic 1800.
- You are advised to thoroughly study the safety instructions since precise knowledge only helps avoiding errors during operation of the Hakomatic 1800 and thus guarantee faultless usage of the machine.
- The operating instructions have to be at hand at the place of use of the Hakomatic 1800, 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!
- Smoking and handling flames are prohibited during filling fuel tanks and during work at or in the vicinity of fuel-containing components.
- Do not exceed the maximum inclination of 12% for operation rides. Do not exceed the maximum inclination of 16% for transport rides.
- Use only the brushes released by the manufacturer. The use of other brushes can impair the security.

### 1.3 Provisions for Operation

- Before taking into operation, check the Hakomatic 1800 for operational and traffic safety! Immediately remedy malfunctions!
- It is indispensable for the operator to get acquainted with all attached implements and controls as well as

with their function before operation begins. Once you have started to work, no time will be left to do so!

- The machine may be used only on such surfaces clearly specified by the owner or his authorised representative.
- For safety reasons, the driver seat is equipped with a seat contact switch. Bypassing function of the seat contact switch is prohibited!
- Do not run engine in closed rooms! Intoxication hazard!
- Never operate the Hakomatic 1800 without operable safety devices installed. (These include in particular the engine fairing door).
- When working with the machine take notice of third persons, especially children.
- Passenger transport is prohibited.
- Operate control panel only when seated.
- Never leave the driver's station during ride!
- Use only cleaning agents suitable for automatic machines (low-foaming) and comply with the instructions for use, disposal and with the warning information specified by the cleaning

## Safety information

- agent's manufacturer.
- The Hakomatic 1800 is not designed for collecting hazardous, inflammable or explosive dusts or substances.
- Usage of the machine in explosive areas is prohibited.
- Do not lift the dirt hopper but directly before disposal; mind sufficient stability.
- Stop the Hakomatic 1800 in work pauses or at the end of shift on solid and even ground and protect it against moving!
- Turn off engine and engage parking brake before leaving the Hakomatic 1800 unattended! Pull ignition key. Never leave the Hakomatic 1800 unattended if engine is running!
- In order to preclude unauthorised use of the machine switch off machine by pulling the ignition key and closing the gas cylinder valve if required.
- Before transport of the Hakomatic 1800, stop all motors and lower the dirt hopper. Adapt driving habit to local conditions.
- Always protect the lifted dirt hopper by safety stand.
- Use tool to open the engine hood,

open the lateral cover for maintenance purposes only and after standstill of machine.

- Caution - burning parts: a pressure-relief valve is fitted to the radiator.
- Clean dirt hopper and soiled water tank at regular intervals. Recommendation: at the end of working day.
- Do not collect burning or glowing object with the machine.
- To preclude creeping, generally actuate the parking brake when leaving the machine unattended.
- Mind rotating parts when opening the engine compartment.
- Start machine only with all units being off and engine speed switch set to idle position.

### 1.4 Maintenance Instructions

- Observe the maintenance activities and intervals set out in the instruction manual.
- Have the machine checked for safe condition by an expert at regular intervals (recommendation: at least once yearly) as well as after modifications or repair (Check CO-value of the exhaust gas every six months at

least).

- Spare parts have to equal the technical requirements as specified by the manufacturer! Genuine spare parts guarantee compliance with these requirements.
- Stop engine before proceeding to inspection and maintenance work.
- If the Hakomatic 1800 is jacked, have it additionally supported according to prescriptions.
- Nobody is allowed to stay on a jacked or lifted Hakomatic 1800.
- Before working at the tyres, make sure to have the Hakomatic 1800 safely parked and protected against rolling off (blocks). Sufficient knowledge and appropriate mounting tools are required for mounting tyres.



## Safety information

- Do not clean the electrical parts by means of high-pressure cleaning equipment.
- Do not proceed to welding, boring, sewing and grinding of the frame and parts of it. A qualified Hako workshop only is authorised to replace damaged parts.
- Handle battery acid with utmost care - caustic
- Before proceeding to electro-welding at the Hakomatic 1800 disconnect battery.
- Fluids such as fuel or hydraulic oil escaping under high pressure and penetrating the skin may cause severe injuries. Immediately contact a doctor to preclude infections.
- Proceed to draining of hot oil with utmost care - burning hazard.
- Check function of steering and brakes before daily work and at a safe place.
- Submit brake systems to thorough inspection at regular intervals! Qualified Hako workshops only are authorised to proceed to setting and repair works at the brake system.

- Check hydraulic lines at regular intervals. Qualified Hako workshops only are authorised to proceed to repair works at the hydraulic system.

### 1.5 Specific Hazards

#### Liquid propellant gas system (LPG)

- Apart from the safety provisions contained in the instruction manual for the machine and the accident prevention regulation BGV D 34 directive Handling of LPG, the following safety provisions have to be complied with:
- Scrubber-driers may be operated only by appropriate persons who have been trained in operating and in handling LPG systems, who have testified their capability to the owner of the unit or his authorised representative, and who have been ordered explicitly by him to operate the machine.
- Use the LPG system only if it is in proper condition.
- Only use replacement cylinder according to labelling i.e. collar opening pointing down because of discharge from liquid phase.
- Discharge from liquid phase by e.g.

overturning the collar opening is not admitted.

- The operator has to use the machine within its design limits and has to take notice of local conditions during riding.
- Change the LPG reservoir after standstill of engine only.
- Smoking and handling open flames are prohibited during change of gas reservoir. Operate machine from one gas reservoir only! Connecting reservoirs is prohibited. Use blind plug to close unused reservoir ports.
- If stored in garages or halls, do not park the vehicle in direct vicinity of heating elements. When parking the vehicle immediately close discharge valves of the tanks and ride until lines are empty.
- Gas cylinder change in garages or below ground level is prohibited. Check the gas system for leakage at regular intervals. Provide for safe placement of vehicles equipped with LPG systems (e.g. provide for sufficient ventilation; park above ground level; keep clear of openings, pits, wells and other; close outlet valve).
- According to § 33, 37 of BGV D 34

## Safety information

directive, vehicles equipped with LPG systems have to be inspected by an expert for safe condition at regular intervals, at least once yearly.

- The exhaust gas has to be checked for its contents of contaminants at half-yearly intervals and has to be set to a maximum CO content of 0.1 percent by volume with warm engine at idling speed. Document the results in a test certificate according to BGV D 34.
- Only experts and qualified personnel is authorised to work at the gas system.
- When fitting or replacing parts of the gas system, only use parts approved by the manufacturer.
- After repair work and modifications having an influence on operational safety as well as after interruption periods of more than a year, check the LPG system for proper condition, function or leakage.
- Sweepers which are equipped with liquid propellant gas system must not be parked in the vicinity of heat sources; this includes e.g. exposure to strong insolation.
- Have LPG systems checked for pro-

per condition, function or leakage at regular intervals.

### **Elektrik system**

- Only use genuine fuses with prescribed connecting load!
- In case of malfunctions of the electric system, immediately shutdown vehicle and remedy!
- Qualified personnel only is authorised to proceed to works at the electric equipment and only according to electro-technical rules!
- Inspect/check the electrical equipment of the vehicle at regular intervals. Immediately remedy defects such as e.g. loose connections or scorched cables.
- Generally disconnect the battery earth strap before working at the electric system or before welding!
- If improperly executed, starting by means of jumper cable may be dangerous. Observe safety provisions for batteries!

### **Hydraulic system**

- Qualified Hako workshops only are authorised to proceed to works at the hydraulic system of the vehicle!
- Check all lines, hoses and screwed connections for leakage and visible

damages in regular intervals! Have such damages and leakages remedied by return! Leaking oil may cause injuries and fire!

- Wear ear protection if required!

### **Oil, grease and other chemical substances**

- Comply with the safety provisions applicable for the product (safety leaflet) when handling oil, grease and other chemical substances (battery acid — sulphuric acid)!
- Utmost care is advised when handling hot operating and auxiliary media – Burning hazard!

### **Battery**

- Observe the specific safety provisions and accident prevention regulations when handling batteries. Batteries contain sulphuric acid – Caustic!
- During the charging procedure in particular but as well during normal use of batteries, an air-hydrogen mixture is formed in the cells – Explosion hazard! Provide for sufficient ventilation.
- Do not try to start engine by means of jumper cable in case of insufficient electrolyte level; the battery may ex-

## Safety information

plode

### **Tyres**

- Qualified personnel or qualified workshops only are authorised to proceed to repair work at tyres and rims!
- Damaged tyres and/or insufficient inflation pressure of tyres significantly reduce operational safety of the vehicle. Check tyres for prescribed inflation pressure or damages at regular intervals.
- Do not inflate tyres by combustible gas – Explosion hazard!

### **Total weight**

- Respect the admissible total weight, see technical data.

### **1.6 Instructions for Protection of Environment**

- For safe use of substances inheriting a danger to health and environment such as e.g. oil, detergent, lubricating grease and other, specific knowledge is required.
- Substances such as oil, grease, detergent, paint etc. have to be stored in appropriate reservoirs and treated in compliance with the safety instructions issued by the manufacturer but

never on the Hakomatic 1800.

- During maintenance and repair work and oil changes, collect all operating media in appropriate reservoirs and provide for disposal according to the Waste Recycling and Disposal Act and Used Oil Regulations.
- Leaking oil and lubricant must not get into the soil. Danger of groundwater contamination!
- Immediately wipe away spilled substances and provide for disposal in compliance with the regulations. Depending on the filtered substances, used filter elements have to be disposed of as special waste. Batteries contain caustic sulphuric acid. Utmost care is advised for handling batteries. Used batteries have to be disposed of as hazardous waste.

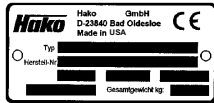
## Safety information

### 1.7 Labels at the Machine

The following safety and information labels are legibly attached to the vehicle. Replace missing or illegible labels immediately.

Hako nameplate (Fig. 1/1)

Vehicle identification number (Fig. 1/2)



Instruction manual (Fig. 1/3)



High-pressure cleaner (Fig. 1/4)



Rotating parts at the left/right side of the radiator and at the suction fan of the sweeping und the suction unit (Fig. 1/5)



Pinching hazard: Use safety stand with an opened dirt hopper! (Fig. 1/6)



Burning hazard: Caution inside the en-

gine compartment. Burning hazard! Engine has not yet cooled down! (Fig. 1/7)



Liquid discharge only! (Fig. 1/8)

For all works at the engine: fully open side door (Fig. 1/9)

After all works at the engine: re-mount fixing plate! (Fig. 1/10)

Hydraulic tank: Do not fill fuel oil or other inflammable or combustible substances! (Fig. 1/11)

Caution - Explosion hazard! (Fig. 1/12)

Caution - Lifted-up disposal! (Fig. 1/13)

## Safety information



Fig.1 shows LPG variant

## First Operation

### 2 First Operation

#### 2.1 Instruction

Instruction is required before first operation.

First instruction into handling of the Hakomatic 1800 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 vehicle and will contact you to make a date for instruction.

#### 2.2 Before First Operation

Proceed to the following controls before first operation of the Hakomatic 1800:

1. Re-fill fuel tank of fuel variant. Check liquid propellant gas level of LPG variant. Replace liquid gas tank, see Maintenance chapter.
2. Check engine oil level by means of dipstick. Refill engine oil, see chapter Maintenance.
3. Check hydraulic fluid level by means of dipstick. Refill fluid, see chapter Maintenance.
4. Check coolant level. Refill coolant, see chapter Maintenance.
5. Check brake system.
6. Check steering.

7. Check lighting, see chapter Operation.
8. Check parking surface for signs of leakage. Hoses, lines and tanks must not be leaky or damaged.
9. Check condition of tyres, see chapter Maintenance.
10. Empty dirt hopper, see chapter Maintenance.
11. Refill clear water tank, see chapter Maintenance.
12. Empty soiled water tank and clean if required, see chapter Maintenance.

#### 2.3 Start Vehicle

The driver has to be seated and made sure that the parking brake is engaged before starting the engine.

1. Make sure that the accelerator pedal is in neutral position.
2. Make sure that the engine speed switch is in idling position.
3. Actuate parking brake.
4. Turn ignition switch to start position and release.
5. Fold down armrest.



Should the engine not crank within 10 seconds, interrupt start procedure. Let the starter cool down between two start trials.

6. Let the engine run for approx. 2 minutes.

## First Operation

### 2.4 Slow Down and Stop

Take the accelerator pedal to neutral position. The vehicle slows down to complete standstill.

### 2.5 Riding Up- and Downhill

Utmost care is advised when riding at right angles to the hill or when turning while riding up- or downhill. Mind the tipping angle!

### 2.6 Work with the Machine

1. Start vehicle and select working speed.
2. Before sweeping, set lever of broom ground pressure (Fig. 5/8) into top position
3. Switch on cylindrical broom by switch (Fig. 7/10).
4. Switch on side brush by switch (Fig. 7/9).
5. Switch on scrubbing unit by switch (Fig. 7/11).
6. Switch on squeegee by switch (Fig. 7/12).

In case of wet surfaces, switch off dust extraction (save dust filter)!

7. Adjust chemical dosage (option) by regulator (Fig. 8/5).
8. Adjust water amount by regulator (Fig. 8/6).

9. Adjust brush ground pressure by regulator (Fig. 8/7).
10. If required, switch on lighting
11. Slowly depress accelerator pedal and clean desired surface (accelerator pedal activates water supply and the brushes of the scrubbing unit).

### 2.7 After Work

1. Ride vehicle to suitable site for cleaning.



Proceed to eco-friendly disposal of dirt and soiled water!

2. Empty dirt hopper
3. Empty soiled water tank.
4. Empty clear water tank.
5. Check clear water filter.
6. Check seals and suction hose.
7. Check operating media levels, function and setting, see chapter Maintenance.
8. Turn off engine, engage parking brake and pull ignition key.

### 2.8 Load

1. Park machine on a transport vehicle or trailer and engage parking brake.
2. Secure machine by straps.



Fasten straps at the chassis only and not at the engine swing frame.

## First Operation

### 2.9 Tie-down points

The front sides of both wheel housings are equipped with an opening (Fig. 2/2) for tying down the front part of the machine. Secure the rear part of the machine with a hook or an eye (Fig. 2/3).

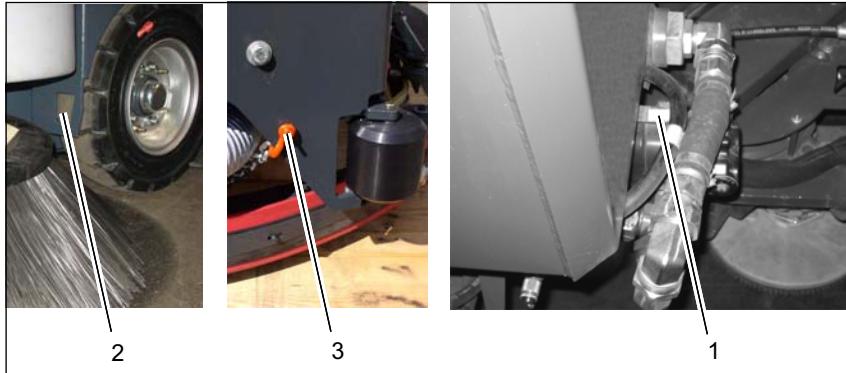


Fig.2

### 2.10 Towing



Do not tow the vehicle for a distance of 800 metres and more and do not exceed a towing velocity of 1.5 km/h. If these limit values are not adhered to, the hydraulic system may be damaged. If the above mentioned values are exceeded lift-up the rear wheel or place it on a roll board.

Actuate the bypass valve before towing.

1. Open engine hood, siehe Abschnitt 5.5.1.
2. The bypass valve is located at the front wall of the hydraulic tank.
3. Turn lever (Fig. 2/1) of the bypass valve clockwise by 90°.
4. The vehicle then can be pushed or towed.

Generally tow the vehicle with the rear wheel lifted!

### 2.11 Support Points



Safely jack the vehicle. Do not rely on stands alone.

Place stands under the front border of the wheel housing at the chassis. Support the rear vehicle part by placing jacks under the chassis next to the rear lights.



## 3 Operation

### 3.1 Method of Operation

#### 3.1.1 General

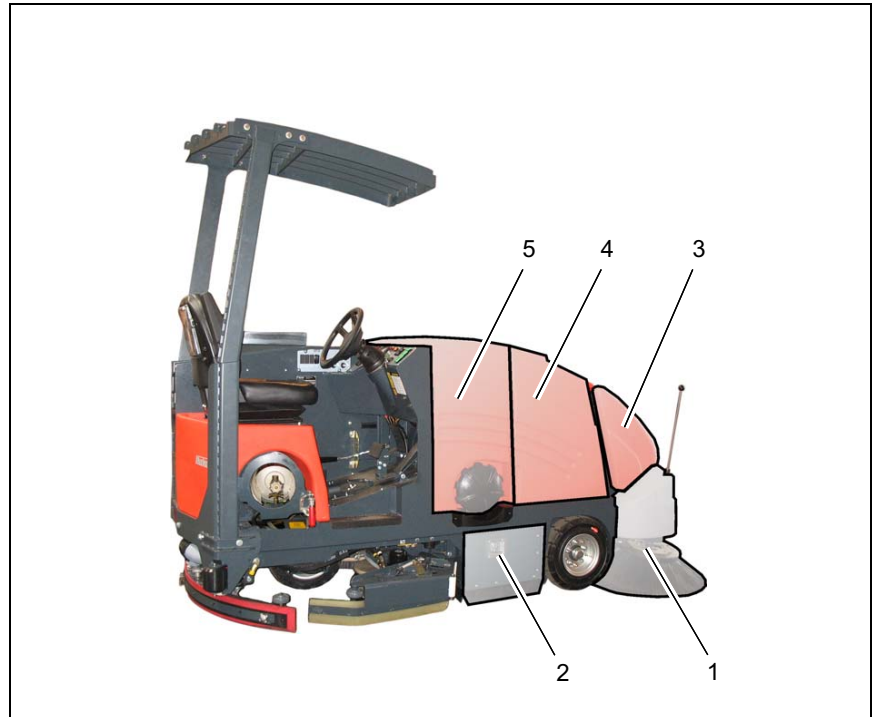
The Hakomatic 1800 is an automatic large-surface scrubbing machine with integrated sweeping system for efficient dry and wet cleaning of hard floorings.

#### 3.1.2 Sweeping Unit

The sweeping unit collects the dirt into a hopper. But before, two side brushes (Fig. 3/1) sweep the dirt and direct it into the track of the cylindrical broom (Fig. 3/2). The suction fan then takes it into the dirt hopper (Fig. 3/3). A dust filter separates fine dusts.

#### 3.1.3 Water Tank

A flexible pane separates the water tank into two chambers: soiled water tank (Fig. 3/5) and clean water tank (Fig. 3/4). A pump delivers the clean water to the scrubbing unit.



**Fig.3** (shows LPG variant)

## Operation

### 3.1.4 Scrubbing Unit

The suspended scrubbing unit (Fig. 4/1) comprises three hydraulically driven scrubbing brushes, the lateral wipers and a water supply system.

### 3.1.5 Squeegee

The suspended squeegee (Fig. 4/2) comprises the squeegee lift-out system, suction turbine and sealing strips. These sealing strips wipe the soiled water off the floor by and a suction turbine takes it into the soiled water tank. In reverse ride, the squeegee is automatically lifted out.

### 3.1.6 Travel Drive and Work Hydraulics

The combustion engine (Fig. 4/3) provides for direct drive of the drive pump and the hydraulic pumps for steering/ sweeping unit and scrubbing unit. Travel drive assembly and work hydraulics are protected by oil cooler and corresponding filters.

### 3.1.7 Options

Protective roof, rotating beacon and second liquid propellant gas tank (Fig. 4/4)



Fig.4

## Operation

### 3.2 Control and Display Elements

#### 3.2.1 Overview

- 1 Main control panel
- 2 Left-hand control panel
- 3 Driver seat
- 4 Accelerator pedal
- 5 Brake
- 6 Parking brake
- 7 Wearing compensation for cylindrical broom
- 8 Broom ground pressure
- 9 Valve for gas cylinder
- 10 Clear water drain valve
- 11 Clean water sieve
- 12 Safety stand
- 13 Wearing compensation for side brushes
- 14 Clear water stop valve

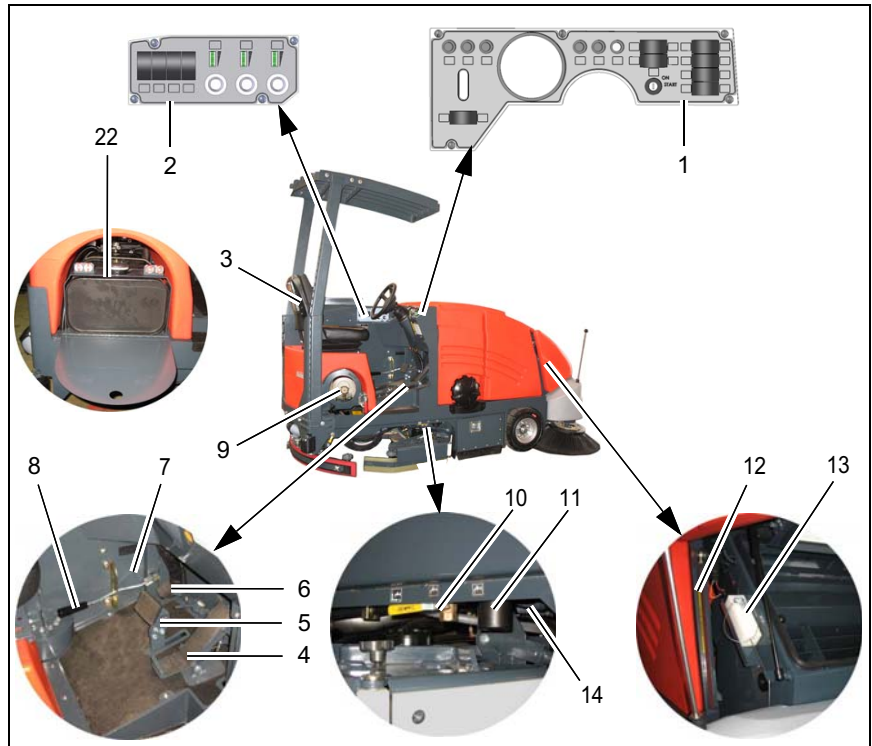


Fig.5

## Operation

Overview, continued:

15 Locking for dust filter removal

16 Engine oil dipstick

17 Maintenance indicator for air cleaner

18 Hydraulic fluid level

19 Soiled water drain hose

20 Opening (both sides) for cleaning  
soiled water tank

21 Fuel filter

22 Fuel tank

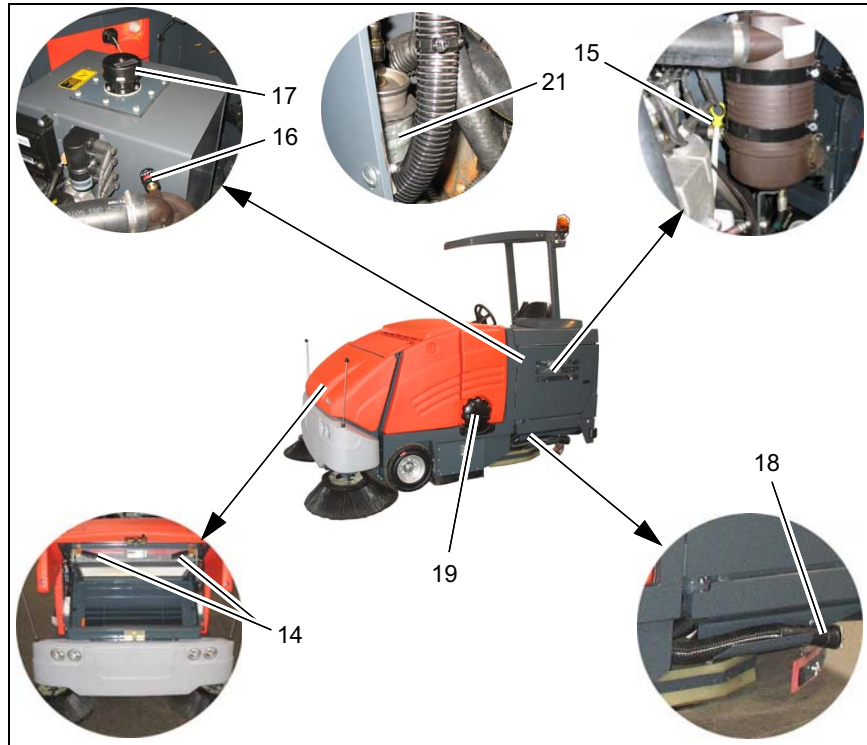


Fig.6

## Operation

### 3.2.2 Main Control Panel

- 1 Spark sensor pilot lamp (optional)
- 2 Brake pilot lamp
- 3 Dust filter pilot lamp
- 4 Multi-function display
- 5 Clean water pilot lamp
- 6 Soiled water pilot lamp
- 7 Engine temperature pilot lamp
- 8 Engine speed switch
- 9 Side brush switch
- 10 Sweeping mode switch
- 11 Scrubbing unit switch
- 12 Squeegee switch
- 13 Ignition switch
- 14 Light switch
- 15 Signal horn switch
- 16 Jolter switch
- 17 Hopper flap switch
- 18 Dirt hopper lever

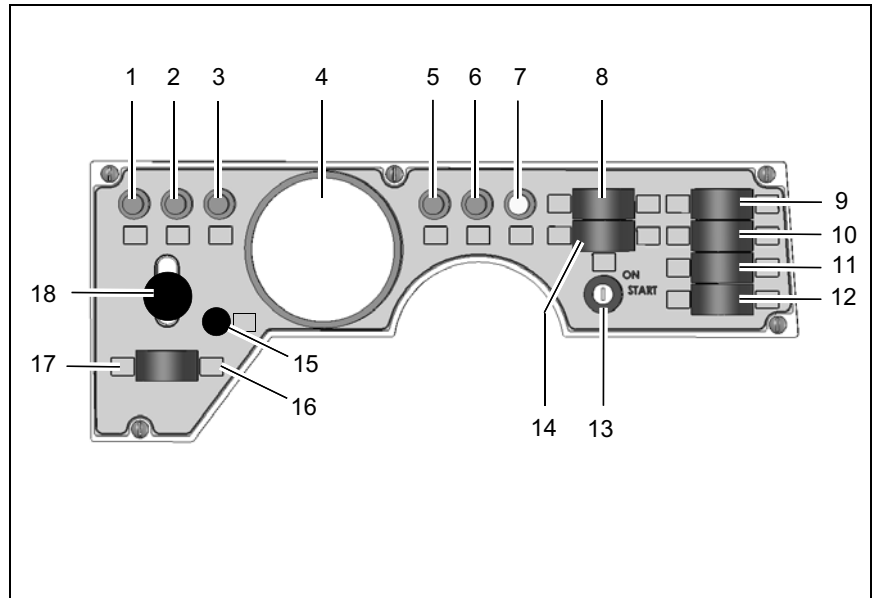


Fig.7



### **Spark sensor pilot lamp (Option) (Fig. 7/1)**

lights if sensor detects objects such as glowing cigarette ends.



### **Brake pilot lamp (Fig. 7/2)**

lights after actuation of brake or if parking brake has been engaged.



### **Dust filter pilot lamp (Fig. 7/3)**

The pilot lamp lights after dust filter has attained maximum degree of soiling. Switch on jolter by switch (Fig. 7/16).

### **Multi-function display (Fig. 7/4)**

Multi-functional display holds indicators for fuel level, battery charge, oil pressure, coolant temperature and hourmeter. Fuel gauge indicates fuel filling level, but only for petrol and diesel versions, for liquid propellant gas versions this gauge is off.

Battery display shows charge status or generator charge. Equally displays discharge by machine operation if generator does not charge battery.

Oil pressure indication shows current engine oil pressure

Radiator temperature gauge shows engine coolant temperature. If temperatures of 110° C and more are attained, overheating is indicated.  
Hourmeter indicates the time with running motor.



### **Clean water pilot lamp (Fig. 7/5)**

lights if clean water tank is empty. For re-filling clean water tank, see chapter Maintenance.



### **Soiled water pilot lamp (Fig. 7/6)**

lights if soiled water tank is filled. For emptying soiled water tank, see chapter Maintenance.

## Operation



### Engine pilot lamp (Fig. 7/7)

Upon occurrence of a critical error at the engine or the controller, the pilot lamp lights permanently. If it does not extinguish, immediately turn off machine and inform the Hako service. A flashing pilot lamp indicates a less critical error. Inform the Hako service.



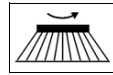
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### Accelerator switch (Fig. 7/8)

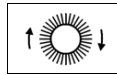
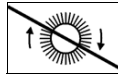
Activate working units at working speed only.

- Set the switch to idling position before starting engine and before switching off machine
- Two positions are available for sweeping and scrubbing: higher speed adjustment makes sweeping performance more efficient while lower speed adjustment provides for low-noise operation



### Side brush switch (Fig. 7/9)

Actuate this switch to lower and switch on side brush. This function is available only with the broom (Fig. 7/10) being switched on.



### Sweeping mode switch (Fig. 7/10)

Switch on to activate:

- opening of hopper discharge
- lowering of broom
- the broom drive
- the dust extraction (depending on switch position)

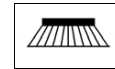
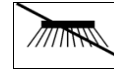
In its left position, the switch opens hopper discharge after lifting of the hopper; see chapter maintenance.



Sweeping mode may be used alone or together with side brush operation.

Switch off to activate:

- closing of hopper discharge
- lifting of broom
- switching off the broom motor
- switching off the suction turbine motor



### Scrubbing unit switch (Fig. 7/11)

The switch is used to lift and lower the scrubbing unit and to switch on and off the scrubbing brush drives. The scrubbing unit is automatically lifted out if:

- turned off by switch.
- the suction fan is still on

To preclude the floor from being damaged, the scrubbing brushes will start rotating only after actuation of the pedal. If working without suction fan, switch it on for a short time before lifting the scrubbing unit.

## Operation



### Squeegee switch (Fig. 7/12)

This switch allows lifting and lowering of the squeegee and switching on and off the suction fan.



### Ignition switch (Fig. 7/13)



Close and lock the engine swing frame and open the gas valve before starting.

Switch on the electrical system and start engine by means of the ignition key.  
Turn key fully right to start engine and release key after engine cranks.  
To stop engine turn ignition key to the left to OFF position.



### Light switch (Fig. 7/14)

to switch the head- and rear lights on and off.



### Signal horn switch (Fig. 7/15)

to switch the signal horn on.



### Jolter switch (Fig. 7/16)

This tipswitch allows switching on the jolter motor in the sweeping unit for cleaning of the dust filter.



### Hopper flap switch (Fig. 7/17)

to open the dirt hopper flap. If dirt hopper flap is opened with the hopper being lifted, manual closing is not available. Hopper flap will be automatically locked upon lowering.



### Dirt hopper lever (Fig. 7/18)

This lever is used to lift and lower the dirt hopper.

- Push lever: dirt hopper lowers
- Pull lever: dirt hopper lifts



Fit safety stand before working under the dirt hopper. Pinching hazard!



## Operation

### 3.2.3 Left-hand Control Panel

- 1 not assigned
- 2 not assigned
- 3 not assigned
- 4 Switch for dust extraction in sweeping mode
- 5 Chemical agent control (optional)
- 6 Water dosage control
- 7 Control of scrubbing brush ground pressure

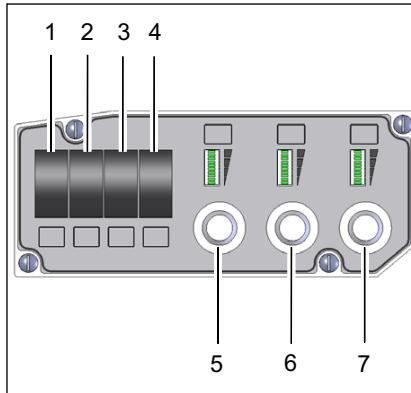


Fig.8



#### Switch for scrubbing unit suction fan (Fig. 8/4)

to switch suction fan on and off. Switch off dust extraction when working on wet surfaces (Protect dust filter from dust deposits!).



#### Chemical agent control (optional) (Fig. 8/5)

This controller is used to adjust one of four stages for cleaning lye supply to the scrubbing unit.

Stage 1 = Off  
Stage 2 = minimum supply  
Stage 3 = medium supply  
Stage 4 = maximum supply  
Supply is switched off when scrubbing unit lifts. If it is lowered again, supply of the adjusted amount is re-activated.



#### Clean water control (Fig. 8/6)

This controller is used to adjust one of four stages for clean water supply to the scrubbing unit.

Stage 1 = Off  
Stage 2 = minimum supply  
Stage 3 = medium supply  
Stage 4 = maximum supply  
Supply is switched off when scrubbing unit lifts. If it is lowered again, supply of the adjusted amount is re-activated.



#### Control of scrubbing brush ground pressure (Fig. 8/7)

Use this regulator to set scrubbing brush ground pressure to one of three stages. Excessive ground pressure causes higher brush wearing and may damage the floor surface!

## Operation

### 3.2.4 Controls of the Machine



#### Driver seat (Fig. 5/3)

Inclination of the arm rest is adjusted by hand wheel (A). Backrest is adjusted by hand wheel (B). Seat suspension is continuously adjusted to driver weight (45 to 125kg) by hand wheel (C).



The driver seat is equipped with a seat contact switch. Excessive seat suspension adjustment thus precludes activation of travel drive!

#### Accelerator pedal (Fig. 5/4)

The accelerator pedal allows modification of velocity and driving direction. It may be equally used to slow down and stop the vehicle.

- Depress the front end of the pedal to start up; velocity increases as depressing force applied to the pedal increases
- Depress the rear end of the pedal for reverse ride
- Take the pedal to neutral position to slow down and stop the machine
- Take the accelerator pedal over the neutral position immediately into opposite position for emergency braking.



Use emergency brake actions for cases of emergency only! Steady emergency braking cause damages of the drive components!

#### Service brake (Fig. 5/5)

Release of the accelerator pedal (in forward or reverse ride) rapidly slows the vehicle down to standstill due to the hydrostatic braking effect. If the effect is not sufficient, additionally use the service brake.

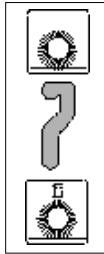
#### Parking brake (Fig. 5/6)

The parking brake actuates mechanical drum brakes acting on both front wheels. Simultaneously actuate service and parking brake!

#### Wearing compensation for cylindrical broom (Fig. 5/7)

The adjusting device for broom wearing compensation is located behind the cover plate. If bristles shorten due to wearing, this device allows re-adjustment, see chapter Maintenance.

## Operation



### Cylindrical broom ground pressure (Fig. 5/8)

The lever at the left of the driver seat allows brief increase of broom ground pressure.

Top position = normal operation

Bottom position = strong ground pressure

Working with the lever in bottom position makes working on extremely uneven floors very easy. Service life of the cylindrical broom, however, then reduced!

### Liquid propellant gas valve (Fig. 5/9)



Comply with the safety instructions for liquid propellant gas, see Safety chapter! Risk of injury!

Open the valve of the liquid propellant gas tank before starting engine and close it again after stopping engine. If machine is taken out of operation for a longer period (longer than one hour), close valve and let the engine die away before switching off ignition!

### Clean water drain valve (Fig. 5/10)

A drain valve is located on the right side of the vehicle (seen in direction of travel) above the scrubbing unit. This drain valve allows draining the clean water tank as required, see chapter Maintenance.

### Clean water sieve (Fig. 5/11)

The sieve is located next to the stop valve and can be removed for cleaning after unscrewing the cap, see Maintenance. Close stop valve (Fig. 5/14) before removal!

### Safety stand (Fig. 5/12)



Fit safety stand before working under the dirt hopper. Pinching hazard!

Before working under the dirt hopper, install safety stand. Keep clear during lifting and lowering of the dirt hopper.

## Operation

### **Wearing compensation for side brushes (Fig. 5/13)**

An adjustment device for wearing compensation of side brushes is located under the front hood at the right vehicle side (seen in direction of travel). If bristles shorten due to wearing, this device allows re-adjustment, see chapter Maintenance.

### **Clear water stop valve (Fig. 5/14)**

At the right vehicle side (seen in direction of travel), a clear water stop valve is over the scrubbing unit. For cleaning the clear water filter close the valve, see chapter maintenance

### **Dust filter lock (Fig. 5/15)**

The dust filter is located under the front hood. Before dismounting the dust filter, open both levers of the lock, see chapter Maintenance.

### **Dipstick for engine oil level (Fig. 5/16)**

The dipstick is situated on the right engine side. Check the engine oil level at daily intervals (before work) and re-fill oil if required, see chapter Maintenance

### **Maintenance indication for air cleaner (Fig. 5/17)**

The air cleaner is situated at the right engine side. Check the maintenance indication at weekly intervals and change filter element if required, see chapter Maintenance

### **Dipstick for hydraulic fluid level (Fig. 5/18)**

The dipstick for hydraulic fluid level is located in the cap of the hydraulic fluid tank. Check hydraulic fluid level at weekly intervals and refill hydraulic fluid if required, see chapter Maintenance.

### **Soiled water drain hose (Fig. 5/19)**

A hose is located above the scrubbing unit on the left vehicle side (seen in direction of travel) for draining soiled water. If soiled water indication flashes, empty soiled water tank, see chapter Maintenance.

### **Opening (both sides) for cleaning soiled water tank (Fig. 5/20)**

The lid provided on both sides of the soiled water tank allows easy cleaning. Clean soiled water tank, see chapter Maintenance.

## Technical Data

### 4 Technical Data

<b>Dimensions</b>		
Length	mm	2700
Width	mm	1600
Height	mm	1500
Turning circle	mm	1348
<b>Weights</b>		
Empty weight (acc. to equipment)	kg	1940
Maximum weight	kg	2500
<b>Axle loads (with a weight of 2450 kg)</b>		
Front axle load left / right	kg	560 / 530
Rear axle load	kg	1400
Specific wheel load (rear)	N/cm <sup>2</sup>	71
<b>Riding velocities</b>		
Transport ride	km/h	12
Work ride	km/h	10
Reverse ride	km/h	10
Gradability at work ride	%	12
Gradability at transport ride	%	16

## Technical Data

<b>Engine</b>		
Type		Petrol engine
fuel type		LPG/gasoline
Oil capacity with oil filter	Litres	3,5
Oil type		SAE 15W40
Coolant system: Shell DEXCOOL or Total COOLELF AUTO SUPRA or Total GLACELF AUTO SUPRA	Litres	9,5
Manufacturer		General Motors
Maximum power LPG/gasoline	PS	45/52
Cubic capacity	cm <sup>3</sup>	1600
Qty. of cylinders		4 Zylinder Reihe
Work speed: turtle/rabbit	1/min	2150/2400
<b>Running gear</b>		
Wheel diameter	mm	410
<b>Hydraulic system</b>		
Oil capacity	Litres	53
Oil type		SAE 15W40
<b>Clean water tank</b>		
Capacity gross	Litres	380
<b>Soiled water tank</b>		
Capacity gross	Litres	400

## Technical Data

<b>Cylindrical broom</b>		
Length	mm	1050
Diameter	mm	355
Speed	1/min	440
Sweeping track	mm	55
Cylindrical Broom (spare) 1x steel-perlon or polyamide or natural fibre	Order-no.	7326/7327/7329
<b>Dirt hopper</b>		
Lift-up height	mm	1550
Capacity gross	Litres	240
<b>Side brushes</b>		
Diameter	mm	660
Speed	1/min	95
Side brushes (spare) 2x polyamide	Order-no.	7335
<b>Filter system</b>		
Dust filter (spare)	Order-no.	01280210

## Technical Data

<b>Scrubbing unit</b>		
Qty. of brushes	Pcs.	3
Brush diameter	mm	410
Brush speed	1/min	200
Brush ground press., stage 1/2/3/4	kg	Off/easy/middle/strong
Brush (spare) 3x polyamide or K 180 or SIC PA grain 120	Order-no.	7337/7339/7340
Brush (spare) 3x SIC PA grain 80 or SIC PA grain 46 or wire	Order-no.	7341/7343/7346
Sealing (spare) 2x rear/front	Order-no.	01285130/01285140
<b>Squeegee</b>		
Working width	mm	1350
Sealing (spare) 1x outside/inside	Order-no.	01285130/01285140
<b>Suction fan scrubbing unit</b>		
Max. low pressure	mbar	80
Speed	1/min	9300
<b>Suction fan sweeping unit</b>		
Max. low pressure	mbar	13
Speed	1/min	3900



## Technical Data

<b>Electric system</b>		
Starter battery	V	12
<b>Noise emission</b>		
The sound pressure level measured under maximum conditions of use (LwA) according to DIN EN ISO 3744 amounts to:	dB (A)	99
The sound pressure level measured (at the ear of the driver) under normal conditions of use (LpA) according to DIN EN ISO 11201 amounts to:	dB (A)	84
<b>Vibration</b>		
The frequency weighted acceleration measured according to EN 1033 which have an effect upon the upper limbs (hand-arm-system) amounts under normal working conditions:	m/s <sup>2</sup>	<2,5
The frequency weighted acceleration measured according to EN 1032 which have an effect upon the lower limbs (feet and seat) amounts under normal working conditions:	m/s <sup>2</sup>	<0,5

### 5 Maintenance and Care

#### 5.1 General



Before proceeding to maintenance and care work you are advised to read and comply with the Safety Information chapter!

Compliance with the recommended maintenance works will give you the certitude of always having a reliable machine at disposition.

Daily or weekly maintenance and repair works may be executed by the driver/operator having been trained accordingly. Further Hako system maintenance works have to be executed by qualified personnel only. Please contact your local Hako Service Centre or Hako contract dealer. We cannot be held liable for damages resulting from non-compliance with these instructions.

Please indicate the machine's serial number with any enquiry or spare part order, see paragraph 1.7 - Nameplate.

#### 5.2 Hako System Maintenance

The Hako System Maintenance:

- guarantees reliable operability of the Hako machines (preventive maintenance)
- minimizes operating costs, repair costs and maintenance costs
- ensures long service life and operability of the machine

The Hako System Maintenance is structured in separate modules and determines specific technical works to be executed as well as the intervals for such maintenance works. For any specific maintenance type, the replacement parts are determined and listed in spare part kits.

##### **Hako System Maintenance K:**

To be performed by the customer in accordance to the maintenance and care instructions contained in the operating instructions (daily or weekly). The driver/operator will be instructed upon delivery of the machine.

##### **Hako-System Maintenance I :**

(uniquely after 50 hours of operation)  
Applies for machines which are operated by internal combustion engines, first oil change, filter etc.

To be performed by qualified personnel

of authorised Hako Service Centre.

##### **Hako-System Maintenance II:**

(250 hours of operation)

To be performed by qualified personnel of authorised Hako Service Centre in accordance with the machine-specific system maintenance including spare part kit.

##### **Hako-System Maintenance III:**

(500 hours of operation)

To be performed by qualified personnel of authorised Hako Service Centre in accordance with the machine-specific system maintenance including spare part kit.

##### **Hako-System Maintenance S:**

(1000 hours of operation safety check)

To be performed by qualified personnel of authorised Hako Service Centre in accordance with the machine-specific system maintenance including spare part kit. Execution of all safety-relevant inspections according to UVV-BGV-TÜV-VDE as prescribed by law.

# Maintenance and Care

## 5.3 Maintenance document

<p>Übergabe</p> <p>Aufrüstung Probefahrt Übergabe an Kunden Einweisung Fahrschulung carried out on:</p> <p>at _____ operatin hours</p>	<p>Hako-System-Maintenance I 50 operating hours Workshop stamp</p> <p>carried out on:</p> <p>at _____ operatin hours</p>	<p>Hako-System-Maintenance II 250 operating hours Workshop stamp</p> <p>carried out on:</p> <p>at _____ operatin hours</p>	<p>Hako-System-Maintenance III 500 operating hours Workshop stamp</p> <p>carried out on:</p> <p>at _____ operatin hours</p>
<p>Hako-System-Maintenance II 750 operating hours Workshop stamp</p> <p>carried out on:</p> <p>at _____ operatin hours</p>	<p>Hako-System-Maintenance S 1000 operating hours Workshop stamp</p> <p>carried out on:</p> <p>at _____ operatin hours</p>	<p>Hako-System-Maintenance II 1250 operating hours Workshop stamp</p> <p>carried out on:</p> <p>at _____ operatin hours</p>	<p>Hako-System-Maintenance III 1500 operating hours Workshop stamp</p> <p>carried out on:</p> <p>at _____ operatin hours</p>
<p>Hako-System-Maintenance II 1750 operating hours Workshop stamp</p> <p>carried out on:</p> <p>at _____ operatin hours</p>	<p>Hako-System-Maintenance S 2000 operating hours Workshop stamp</p> <p>carried out on:</p> <p>at _____ operatin hours</p>	<p>Hako-System-Maintenance II 2250 operating hours Workshop stamp</p> <p>carried out on:</p> <p>at _____ operatin hours</p>	<p>Hako-System-Maintenance III 2500 operating hours Workshop stamp</p> <p>carried out on:</p> <p>at _____ operatin hours</p>

## 5.4 Maintenance Schedule Hako System Maintenance K

The following maintenance works are to

be executed by customer/operator in  
the following intervals.

## Maintenance and Care

To be performed	Intervals	
	daily	weekly
Check engine oil level and refill if required	o	
Check hydraulic fluid level and refill if required	o	
Check engine coolant level and refill if required	o	
Engine suction filter: check degree of soiling on maintenance indicator and clean filter element and dust discharge valve if required	o	
LPG system: change liquid propellant gas tank if required	o	
Engine and hydraulic system: visual check for leakage	o	
Check accelerator pedal function	o	
Squeegee: check function, adjust ground pressure and contact if required	o	
Suction hose: check function and remove jamming if required	o	
Empty and clean soiled water tank	o	
Clean soiled water drain hose	o	
Remove foreign particles from cylindrical broom and duct	o	
Clean clear water filter	o	

## Maintenance and Care

### Hako-Systemwartung K

The following maintenance works are to be executed by customer/operator in the following intervals.

To be performed	Intervals	
	daily	weekly
Check radiator fins and engine cooling and clean if required		o
Check hydraulic fluid radiator fins and clean if required		o
Steering: check function		o
Check dust filter of sweeping unit and clean or replace if required		o
Jolter motor: check function		o
Dirt hopper: check seals and re-adjust or change if required		o
Dirt hopper flap: check function and clean or change if required		o
Check side brushes for wearing and re-adjust or change if required		o
Check sealing strips of cylindrical broom and re-adjust or change if required		o
Check cylindrical broom/cylindrical broom apron for wearing and re-adjust or change if required		o
Scrubbing unit: check seals/brushes and turn or change if required		o
Squeegee: check seals and turn or change if required		o
Tank lid: check seals and change if required		o
Check optical condition of machine		o

## Maintenance and Care

### Hako System Maintenance I

The following maintenance works are to be executed by an authorised Hako Service workshop.

To be performed	Intervals
	50 hours of operation (uniquely)
Change engine oil and engine oil filter	o
Change fuel filter (of fuel variant)	o
Change hydraulic fluid filter	o
Hydraulic system: check function	o
Engine and hydraulic system: visual check for leakage	o
Check engine idling and service speeds	o
Electrical system: check starter battery, lighting and pilot lamps	o
Check liquid propellant gas system	o
Service and parking brake: check function	o
Steering: check function	o
Check operating mode: accelerator pedal, forward and reverse ride and neutral position	o
Check optical condition of machine	o
Trial ride	o

## Maintenance and Care

### Hako System Maintenance II

The following maintenance works are to be executed by an authorised Hako Service workshop at least once yearly.

To be performed	Intervals
	every 250 hours of operation
Change engine oil and engine oil filter	o
Engine suction filter: check degree of soiling according to maintenance indicator, clean filter element and dust discharge valve if required	o
Engine and hydraulic system: visual check for leakage	o
Check engine idling and service speeds	o
Check and clean service brake	o
Check and clean parking brake	o
Check liquid propellant gas system (check CO-value every six months at least)	o
Wheels: check torque	o
Hydraulic system: check function of motors, valves and pumps	o
Electrical system: check starter battery, lighting and pilot lamps	o
Check optical condition of machine	o
Trial ride	o

## Maintenance and Care

### Hako System Maintenance III

The following maintenance works are to be executed by an authorised Hako Service workshop at least once yearly.

To be performed	Intervals
	every 500 hours of operation
Perform maintenance works according to Hako System Maintenance II	o
Engine suction filter: change filter element	o
Change fuel filter (of fuel variant)	o
Check antistatic chain and replace if required	o
Change hydraulic fluid filter	o



## Maintenance and Care

### Hako System Maintenance S (Safety check)

The following maintenance works are to be executed by an authorised Hako Service workshop at least once yearly.

To be performed	Intervals
	every 1000 hours of operation
Perform maintenance works according to Hako System Maintenance III	o
Engine suction filter: change filter and safety element	o
Change engine coolant	o
Change hydraulic fluid	o
Brake system: change brake shoes	o
Change side brush hoist rope and brake cable	o

## Maintenance and Care

### 5.5 Engine

The engine is located in the rear of the vehicle and is easily accessible for maintenance and care due to a swing frame.

- 1 Lid
- 2 Dipstick
- 3 Oil filter
- 4 Oil sump
- 5 Engine frame
- 6 Lock
- 7 Left and right access doors
- 8 Cooling system
- 9 Air filter
- 10 Safety pin

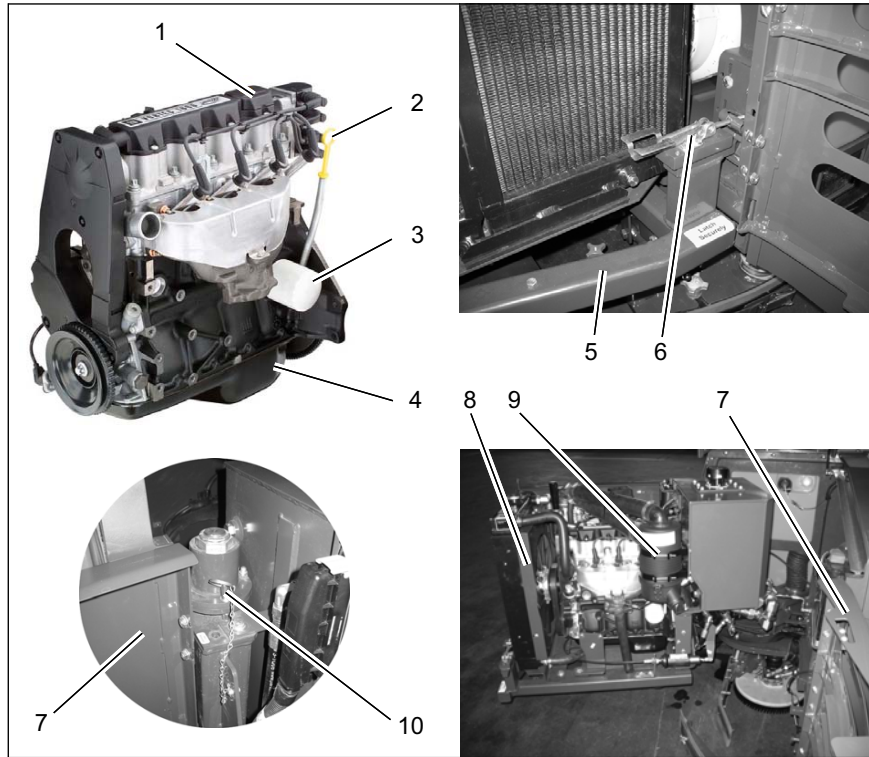


Fig.9

## Maintenance and Care

### 5.5.1 Open Engine Frame



Do not open engine frame before engine has cooled down. Risk of injury!

1. Park vehicle with warmed engine on level ground. Turn engine off and let it cool down. Engage parking brake.
2. Unlock and swing up engine cover hood.
3. Swing open left and right engine access doors (Fig. 9/7).
4. Open lock (Fig. 9/6) and swing aside engine frame (Fig. 9/5).
5. Secure engine frame with safety pin (Fig. 9/10).

### 5.5.2 Refill Engine Oil

Check engine oil level at daily intervals by means of dipstick (Fig. 9/2). Refill oil if required or when engine oil pilot lamp lights.



Use prescribed engine oil type, see Technical Data.

1. Park vehicle on level ground and open engine frame, siehe Abschnitt

- 5.5.1
2. Pull dipstick and wipe with clean cloth.
3. Check oil level on the markings at the lower end of the dipstick.
4. Do not fill oil all at once. Wait some minutes until oil has flown into the oil sump before checking filling level again.
5. Re-install lid and dipstick.
6. Lock engine frame. Close access doors and cover hood.
7. Engine pilot lamp has to extinguish some seconds after engine has cranked.

### 5.5.3 Change Engine Oil and Oil Filter

Change engine oil after first 50 hours of operation and after every 250 hours of operation but in yearly intervals at the latest.



Utmost care is recommended at hot engine parts and boiling engine oil! Risk of burning!

1. Stop vehicle on level ground and open engine frame, siehe Abschnitt 5.5.1.

2. Place appropriate receptacle under drain plug of the oil sump.  
Oil filling with oil filter: 3.5 litres  
Oil filling without oil filter: 3.2 litres
3. Remove drain plug from oil sump (Fig. 9/4) and collect engine oil in receptacle.
4. Remove oil filter (Fig. 9/3) and insert new oil filter with new sealing ring (Fasten oil filter hand-tight).



Provide for eco-friendly disposal of used oil and used oil filters!

5. Insert drain plug with new sealing ring.
6. Re-fill engine oil, siehe Abschnitt 5.5.2.

### 5.5.4 Change fuel filter

The fuel filter is located at the left engine frame side. Change filter after first 50 hours of operation, then after every 500 hours of operation.

1. Open engine side flap.
2. Loosen fixing screws (Fig. 9/4).
3. Pull out filter holder (Fig. 9/3).
4. Loosen by pulling the quick release (Fig. 9/1) the fuel filter (Fig. 9/2) and change.

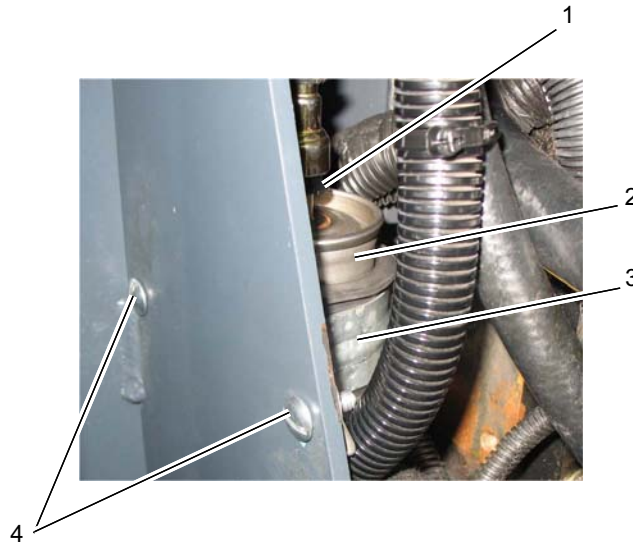


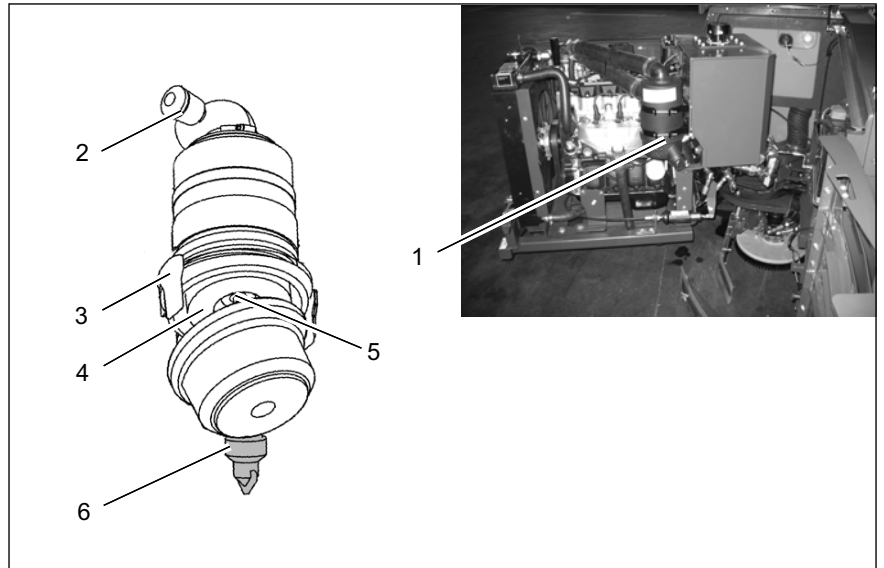
Fig.9

## Maintenance and Care

### 5.6 Air Filter

The air filter (Fig. 10/1) is located at the right of the engine. Air filter soiling is shown on maintenance indicator (Fig. 10/2). Check maintenance indicator at daily intervals.

- 1 Air filter
- 2 Maintenance indicator
- 3 Brackets
- 4 Main filter
- 5 Safety cartridge
- 6 Dust discharge valve



**Fig.10**

## Maintenance and Care

### 5.6.1 Remove Main Filter

1. Open engine frame, siehe Abschnitt 5.5.1.
2. Loosen brackets (Fig. 10/1) located at the air filter (Fig. 10/3) and remove bottom housing part.
3. Remove main filter (Fig. 10/4) from housing.

### 5.6.2 Clean Main Filter

1. Use damp cloth to clean bottom housing part inside.
2. Blow out the main filter with compressed air of a maximum pressure of 3bar from inside to outside.
3. Use lamp to check main filter for perforation.
4. Check main filter sealing for damages.

### 5.6.3 Install Main Filter

1. Carefully insert the main filter by the open side into the top housing part.
2. Re-install bottom housing part while having in mind the correct seating of the dust discharge valve (Fig. 10/6) achten.
3. Re-tighten brackets.

### 5.6.4 Change Main Filter

Change main filter (Fig. 10/4) if damaged or, at the latest, after every 500 hours of operation.

1. Remove main filter, siehe Abschnitt 5.6.1.
2. Insert new main filter.
3. Install main filter, siehe Abschnitt 5.6.3

### 5.6.5 Change Safety Cartridge



The safety cartridge (Fig. 10/5) must not be cleaned nor reused after removal!

Change safety cartridge after every 1000 hours of operation at the latest.

1. Remove main filter, siehe Abschnitt 5.6.1.
2. Insert new safety cartridge.
3. Install main filter, siehe Abschnitt 5.6.3

### 5.6.6 Clean Dust Discharge Valve

Press together dust discharge valve (Fig. 10/6) to remove dust deposits.

## Maintenance and Care

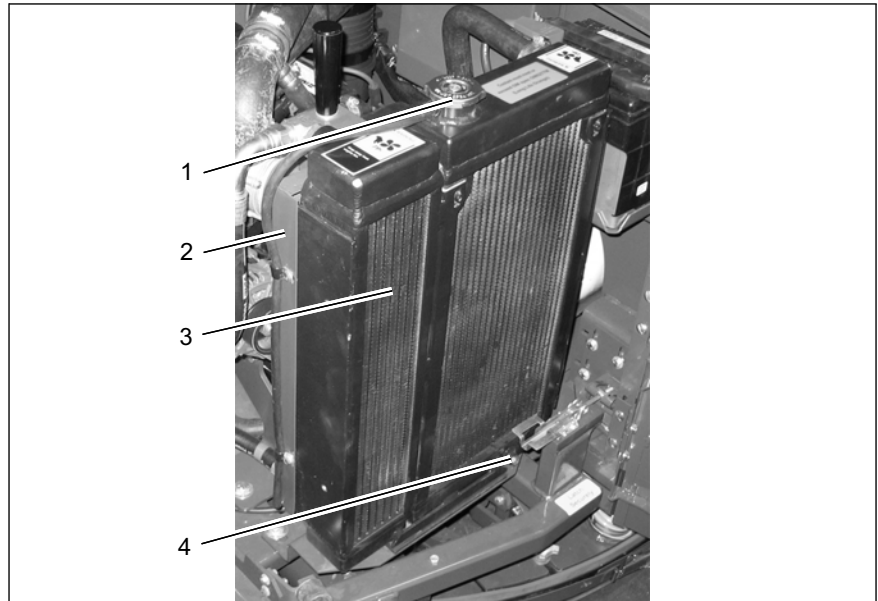
### 5.7 Cooling System

The coolant temperature is reduced in the radiator (Fig. 11/3) by a fan (Fig. 11/2). Exceeding coolant temperature will be shown on main control panel.



Rotating parts in the near of the fan. Risk of injury!

- 1 Lid
- 2 Fan
- 3 Radiator
- 4 Drain plug



**Fig.11**

## Maintenance and Care

### 5.7.1 Clean Radiator

Check radiator (Fig. 11/3) at daily intervals and clean if required. Dirt deposits on the fins reduce cooling performance.



The radiator fins are very thin and may be easily damaged!

1. Open engine frame, siehe Abschnitt 5.5.1.
2. Carefully blow out the radiator fins with compressed air from the engine side to the outside.

### 5.7.2 Re-fill Coolant



Do not open radiator before engine has cooled down since cooling system is under high pressure. Risk of injury! Wear protective gloves!

Insufficient coolant amount reduces cooling performance. Check coolant level at weekly intervals and re-fill if required.



Use prescribed coolant types only, see Technical Data! Do not mix different coolant types!

1. Open engine frame, siehe Abschnitt 5.5.1.
2. Carefully open lid (Fig. 11/1) after engine has cooled down.
3. Check coolant level. Coolant level should range between 20 and 30mm below the contact surface of the lid. Re-fill if required.
4. Re-install lid.
5. Let engine run for some minutes.
6. Turn engine off and let it cool down.
7. Check coolant level again and re-fill if required.

### 5.7.3 Change Coolant

Change coolant after every 1000 hours of operation at the latest.

1. Open engine frame, siehe Abschnitt 5.5.1.
2. Place appropriate receptacle under radiator drain plug (Fig. 11/4).
3. Open drain plug and completely drain coolant.  
Coolant = 9.5 litres



Collect used coolant and provide for eco-friendly disposal!

4. Re-plug drain plug.

5. Fill new coolant, see Technical Data
6. Close lid.
7. Let engine run for some minutes.
8. Turn engine off and let it cool down.
9. Check coolant level again and re-fill if required.



## Maintenance and Care

### 5.8 Liquid Propellant Gas System



Qualified persons only are authorised to work at the liquid propellant gas system! Only use parts as released by the manufacturer for installation or replacement of parts of the liquid propellant gas system! Smoking and handling open flames is prohibited in the near of liquid propellant gas systems! Work in sufficiently ventilated rooms only!

#### Standard

- 1 Standard liquid propellant gas tank
- 2 Quick release
- 3 Stop valve
- 4 Lock

#### Second liquid propellant gas tank option

- 5 Stop valve
- 6 Quick release
- 7 Second liquid propellant gas tank
- 8 Fixing
- 9 Change cock

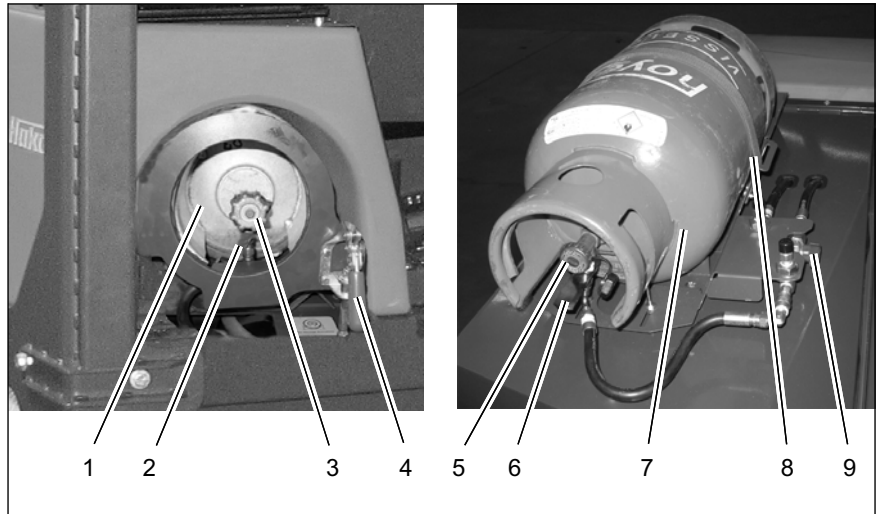


Fig.12

## Maintenance and Care

### 5.8.1 Change Liquid Propellant Gas Tank



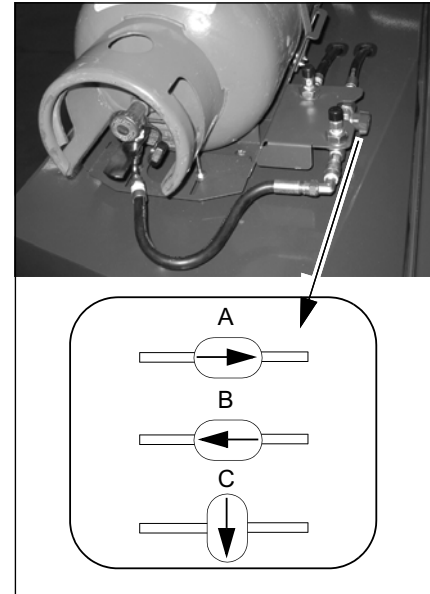
Changing gas cylinders in garages and below soil level is prohibited! Provide for safe parking of vehicles equipped with liquid propellant gas systems (mind sufficient ventilation)! When parked above soil level, provide for sufficient distance to basement floor openings, pits, light-wells or others and close outlet valve! Wear protective gloves for separating ports!

1. Safely park vehicle on level ground, turn off engine and engage parking brake.
2. Close stop valve (Fig. 12/3) and open quick release (Fig. 12/2).
3. Open lock (Fig. 12/4) and remove the empty liquid propellant gas tank (Fig. 12/1).
4. Insert new liquid propellant gas tank into the tank compartment under driver seat with bottom first. Collar opening has to point downwards (liquid phase removal)

5. Connect quick release to liquid propellant gas tank and fix.
6. Fold up lock.

### 5.8.2 Change liquid propellant gas tank (option)

1. Safely park vehicle on level ground, turn off engine and engage parking brake.
2. Set change cock (Fig. 12/9) to standard liquid propellant gas tank (Fig. 13/A).
3. Close stop valve (Fig. 12/5) and open quick release (Fig. 12/6).
4. Remove fixing (Fig. 12/8) and remove empty liquid propellant gas tank (Fig. 12/7).
5. Insert new liquid propellant gas tank. Collar opening has to point downwards (liquid phase removal).
6. Connect quick release to liquid propellant gas tank.
7. Clamp liquid propellant gas tank by means of fixing.



A) Standard liquid propellant gas tank  
B) Second liquid propellant gas tank (option)  
C) No liquid propellant gas tank selected  
**Fig.13**

## Maintenance and Care

### 5.9 Hydraulic System



Qualified persons only are authorised to work at the hydraulic system! Hydraulic fluid escaping under high pressure may cause serious injuries! De-pressurise all hydraulic lines! Turbid hydraulic fluid is an indicator for water or air penetrating the hydraulic system! Insufficient or wrong hydraulic fluid causes damages at the hydraulic system!

- 1 Lid with ventilation filter and dipstick
- 2 Hydraulic fluid tank
- 3 Drain plug
- 4 Sicherheitsstütze
- 5 Hydraulikölfilter

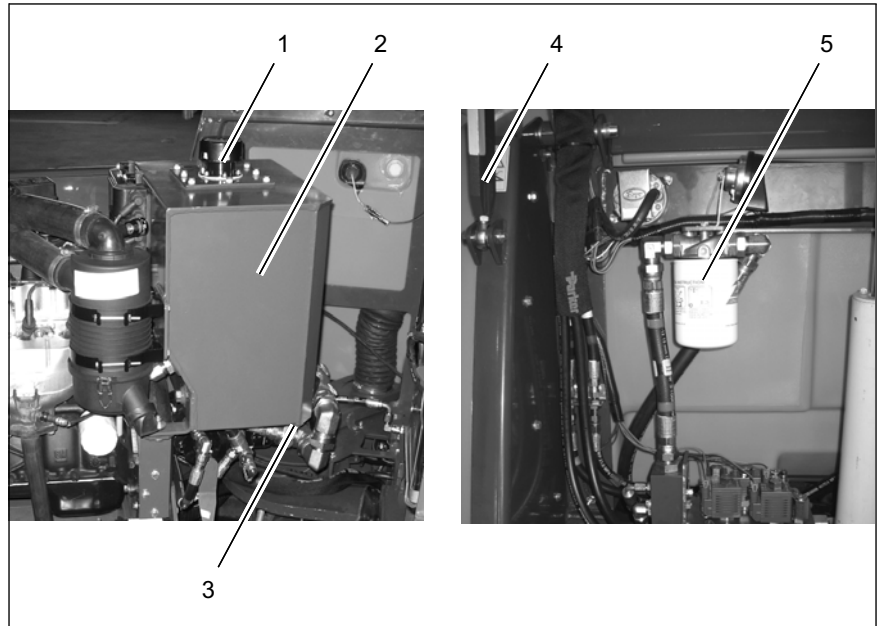


Fig.14

## Maintenance and Care

### 5.9.1 Re-fill Hydraulic Fluid



Use prescribed hydraulic fluid type, see Technical Data!

1. Open engine frame, siehe Abschnitt 5.5.1
2. Remove lid (Fig. 14/1) and wipe dipstick with clean cloth.
3. Check fluid level by the marking at the bottom dipstick end.
4. Do not fill excessive amounts of fluid. Wait some minutes till the fluid has flown into the hydraulic fluid tank before proceeding to second fluid level measurement.
5. Re-install lid.
6. Lock engine frame. Close access doors and cover hood.

### 5.9.2 Change hydraulic fluid

Change hydraulic fluid after every 1000 hours of operation.



Caution when draining hot hydraulic fluid. Risk of injury!

1. Park vehicle on level ground and lo-

wer dirt hopper. Turn engine off and engage parking brake.

2. Open engine frame, siehe Abschnitt 5.5.1.
3. Place appropriate receptacle under drain plug (Fig. 14/3) of hydraulic fluid tank.  
Amount of fluid: 53 litres
4. Remove drain plug and collect hydraulic fluid.



Provide for eco-friendly disposal of used hydraulic fluid!

5. Insert drain plug with new sealing ring and refill hydraulic fluid, siehe Abschnitt 5.9.1.
6. Start engine and, at low speed, check all hydraulically function. Raise and empty the dirt hopper several times. Then turn off engine again.
7. If required, re-fill hydraulic fluid again. Check hydraulic system for leakage.

### 5.9.3 Change hydraulic fluid filter

Change hydraulic fluid filter after first 50 hours of operation and then after every 1000 hours of operation.



Caution when draining hot hydraulic fluid. Risk of injury!

1. Park vehicle on level ground and lift dirt hopper. Turn engine off and engage parking brake.



Mount safety stand (Fig. 7/4) before working under the dirt hopper. Pinching hazard!

2. Unscrew hydraulic fluid filter (Fig. 7/5)



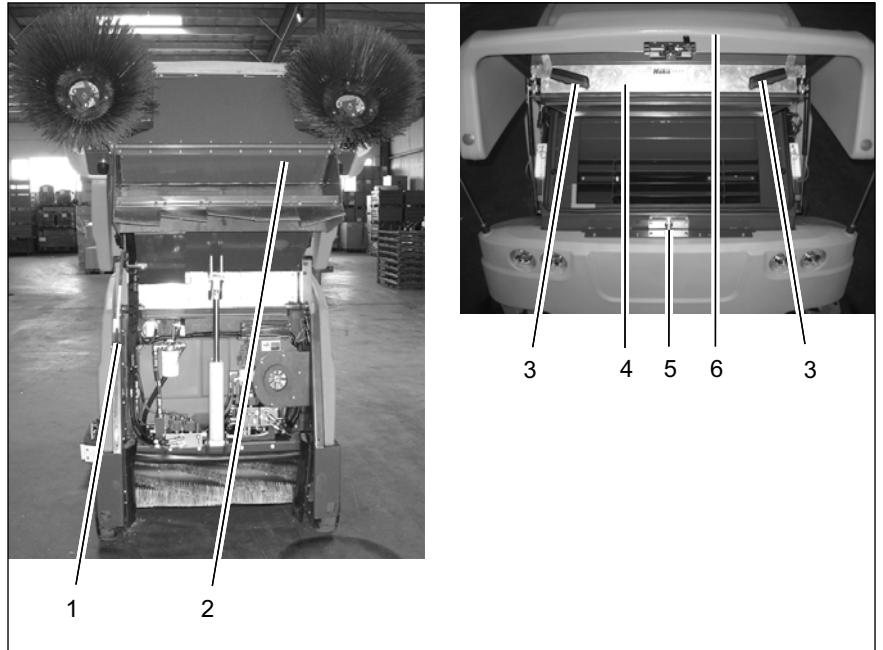
Provide for eco-friendly disposal of used hydraulic fluid filter!

3. Insert a new hydraulic fluid filter with new sealing ring. Lightly grease sealing ring (Fasten oil filter hand-tight).
4. Start and stop engine. Check hydraulic system for leakage.
5. Remove safety stand, start vehicle and lower dirt hopper.

## Maintenance and Care

### 5.10 Dirt Hopper

- 1 Safety stand
- 2 Dirt hopper
- 3 Holding bar
- 4 Dust filter
- 5 Lock
- 6 Front hood



**Fig.15**

## Maintenance and Care

### 5.10.1 Clean Dust Filter

The dust filter is located under the front hood. The fine dust raised by the cylindrical broom is taken to the filter element by suction blower. Check dust filter (Fig. 15/4) for soiling in weekly intervals. Clean dust filter if required.



Clean the dust filter outdoor and wear dust protection! Provide for eco-friendly disposal of dust!

1. Safely park vehicle on level ground. Turn engine off and engage parking brake.
2. Open lock (Fig. 15/5) of the front hood (Fig. 15/6).
3. Swing out both holding bars (Fig. 15/3) and remove dust filter.
4. Hold the dust filter in vertical position and let it fall down from a height of 1 m to the even floor. The dirt side of the filter must point to the floor.
5. Re-install dust filter in inverse order of removal procedure.

### 5.10.2 Change Dust Filter

1. Check dust filter (Fig. 15/4) for damages in weekly intervals. Replace

dust filter if required.

2. Safely park vehicle. Turn engine off and engage parking brake.
3. Open lock (Fig. 15/5) of front hood (Fig. 15/6).
4. Swing open both holding bars (Fig. 15/3) and remove dust filter.
5. Install new dust filter in inverse order of removal procedure.

### 5.10.3 Empty dirt hopper

1. Take vehicle to discharge point.
2. Use jolter tipswitch (Fig. 7/16) to jolt the dust filter for about 20 to 30 seconds.
3. Use accelerator pedal to position vehicle such that the distance between vehicle and container or waste collection truck is sufficient for lifting out of the dirt hopper.
4. Use lever (Fig. 7/18) to lift up dirt hopper over the container.



Stay clear from the lifting arms during discharge procedure.

5. Use accelerator pedal to slowly and carefully forward the vehicle until dirt hopper is adequately positioned for discharge into container.

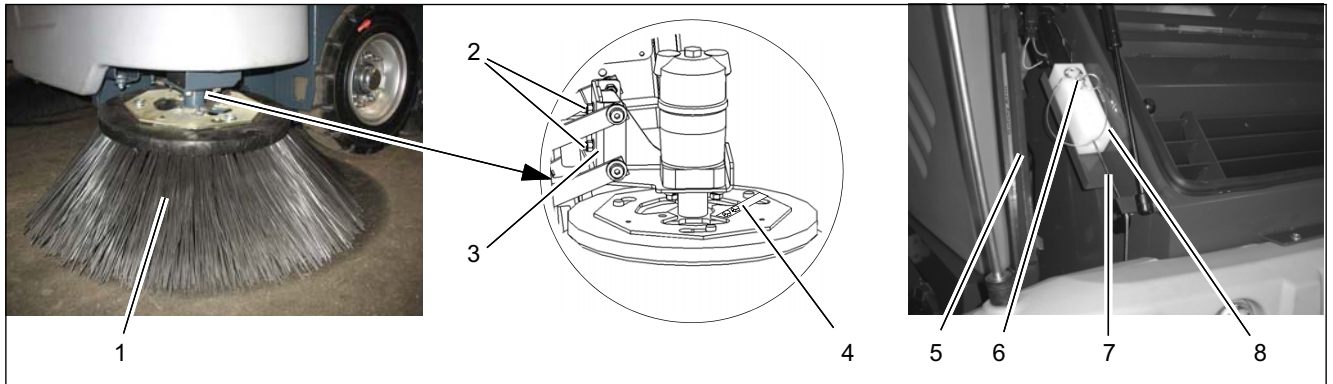


Longer riding with lifted dirt hopper is dangerous. With the dirt hopper being lifted up it is admitted only to ride a short distance for correct positioning above the container.

6. Press switch (Fig. 7/17) to open the dirt hopper flap.
7. After emptying, ride a short distance away from the container.
8. Use lever (Fig. 7/18) to lower dirt hopper again (flap closes automatically upon lowering of the hopper).

## Maintenance and Care

### 5.11 Side Brush



**Fig.16**

- 1 Side brush
- 2 Nuts
- 3 Adjustment plate
- 4 Locking plate
- 5 Safety stand
- 6 Pins
- 7 Cord
- 8 Adjustment block

## Maintenance and Care

### 5.11.1 Adjust Inclination Side Brushes

1. Park vehicle on level ground. Turn engine off and engage parking brake.
2. Loosen nuts (Fig. 16/2) of the adjustment plate (Fig. 16/3).
3. Adjust side brush (Fig. 16/1) inclination to approx. 3° - 5° and re-tighten both nuts.

### 5.11.2 Wearing Compensation of Side Brushes

Check side brushes (Fig. 16/1) for wearing at weekly intervals. In case of wearing or after replacement adjust the side brushes as follows:

1. Park vehicle on level ground and lift dirt hopper. Turn engine off and engage parking brake.
2. Position safety stand (Fig. 16/5).
3. Pull upper pin (Fig. 16/6) out of the adjustment block (Fig. 16/8) and insert it under the second pin. Make sure that the pin is plugged through the cable loop (Fig. 16/7).



Re-insert pins into the upper two boreholes after side brush replacement.

4. Remove safety stand. Start vehicle and lower dirt hopper.

### 5.11.3 Change Side Brushes

Replace side brushes if bristles are worn to a length of 8cm or less. A quick release allows easy side brush removal.

1. Park vehicle on level ground and lift dirt hopper. Turn engine off and engage parking brake.



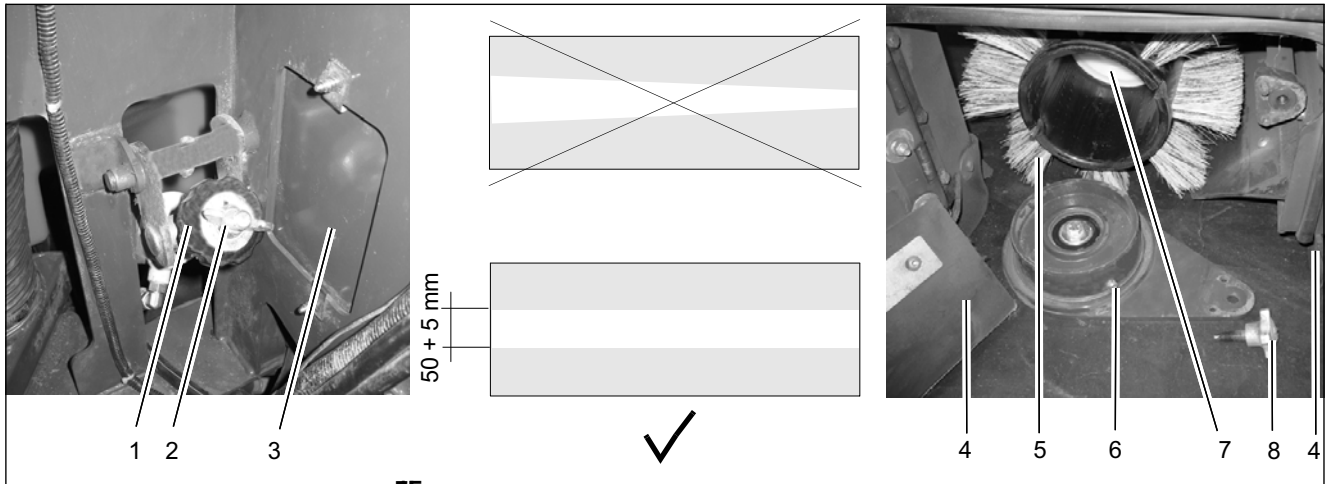
Fit safety stand (Fig. 16/5) before working under the dirt hopper. Pinching hazard!

2. Rotate side brushes (Fig. 16/1) until locking plate (Fig. 16/4) is visible.
3. Lift up locking plate, twist side brush towards the right side and remove.
4. Insert new side brush and secure by locking plate.
5. Adjust side brush, siehe Abschnitt 5.11.2
6. Remove safety stand, start vehicle and lower dirt hopper.



## Maintenance and Care

### 5.12 Cylindrical Broom



- 1 Adjustment screw
- 2 Wing nut
- 3 Cover plate
- 4 Left side door
- 5 Cylindrical broom
- 6 Cylindrical broom seating
- 7 Driver
- 8 Star-shape knob

## Maintenance and Care

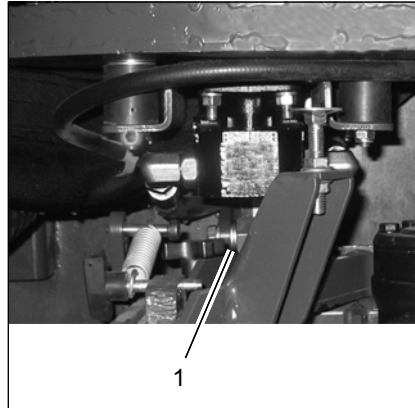
### 5.12.1 Adjust Wearing Compensation of Cylindrical Broom

Check cylindrical broom (Fig. 17/5) for wearing at weekly intervals. In case of wearing or after replacement adjust the cylindrical broom as follows:

1. Lower cylindrical broom on smooth ground and let it run for a short time.
2. Lift cylindrical broom and advance vehicle a short distance.
3. Turn engine off and engage parking brake.
4. Check wearing. If correctly adjusted, the bristling of the cylindrical broom leaves a parallel pattern of 50 mm width on the floor, see sketch.
5. Remove cover plate (Fig. 17/3) and loosen wing nut (Fig. 17/2). Use adjustment screw (Fig. 17/1) to correct sweeping pattern width.
  - Turn adjustment screw to the right: widening sweeping pattern
  - Turn adjustment screw to the left: narrowing sweeping pattern
6. Counter-lock adjustment screw by wing nut.

### 5.12.2 Adjust Parallelism of Cylindrical Broom

Parallelism of the cylindrical broom has been set in the factory. If sweeping pattern is out of parallel, re-adjust by screw (Fig. 18/1). Adjustment screw is located underneath the fan drive in the scrubbing unit area.



**Fig.18**

## Maintenance and Care

### 5.12.3 Change Cylindrical Broom

In case of wearing to a bristle length of minimal 35 mm, change cylindrical broom. Cylindrical broom is accessible from the left side (direction of travel) and can be removed as follows:

1. Park vehicle on level ground.
2. Lower cylindrical broom and set broom ground pressure lever (Fig. 5/8) to lower position.
3. Turn engine off and engage parking brake.
4. Open left side door (Fig. 17/4).
5. Remove star-shaped knob (Fig. 17/8) and pull out cylindrical broom seating (Fig. 17/6)
6. Pull out cylindrical broom (Fig. 17/5)
7. Insert new cylindrical broom in inverse order.



Driver (Fig. 17/7) of the cylindrical broom (inside) has to catch in drive. When fitting the cylindrical broom seating, both guide pins have to catch into the grooves of the broom as well.

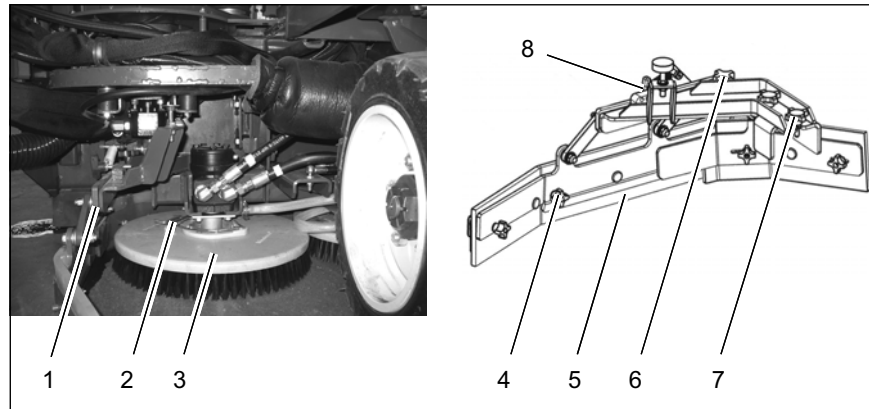
### 5.12.4 Change Cylindrical Broom Apron

Check the cylindrical broom apron (Fig. 17/4) at the side doors at weekly intervals for wearing. Immediately replace worn aprons.

1. Park vehicle on level ground. Turn engine off and engage parking brake.
2. Loosen plates, nuts and hexagonal screws and remove aprons.
3. Proceed to mounting of new cylindrical broom apron in inverse order.
4. Adjust ground clearance to approx. 3mm after fitting of the aprons.

### 5.13 Scrubbing Unit

- 1 Wiper
- 2 Quick release
- 3 Scrubbing brush
- 4 Star-shaped knobs for clamping strips
- 5 Sealing
- 6 Adjusting screw for inclination
- 7 Star-shaped knobs for wiper
- 8 Spring clamping bolt for ground pressure



**Fig.19**

## Maintenance and Care

### 5.13.1 Change Scrubbing Brushes

Check the scrubbing brushes (Fig. 19/3) for damages at weekly intervals. Replace scrubbing brushes in case of wearing to a bristle length of minimal 15 mm. A quick release makes brush removal easy.

1. Park vehicle on level ground.
2. Switch off scrubbing unit.
3. Open engine frame, siehe Abschnitt 5.5.1.
4. Push the quick release (Fig. 19/2) from the scrubbing brush. Remove old scrubbing brush.
5. Install new scrubbing brush in inverse order.

### 5.13.2 Change Seals

Check seals (Fig. 19/5) for wearing at weekly intervals. 2-fold use of the sealing strips is possible by turning strips round.

1. Park vehicle on level ground.
2. Switch off scrubbing unit
3. Turn engine off and engage parking brake.
4. Loosen star-shaped knobs for wiper (Fig. 19/6) and remove together with wiper.
5. Loosen star-shaped knobs for clam-

ping strips (Fig. 19/4) Remove clamping strips and sealing.

6. Turn sealing round or change if required (If turning of sealing strip is not possible due to its asymmetrical shape use sealing strip on the other side of machine).
7. Install wipers in inverse order.

### 5.13.3 Adjust wiper

#### Parallel to the floor:

Use adjustment screws (Fig. 19/6) to adjust the wiper in parallel to the floor. Turn adjustment screw clockwise to lift up wiper and counter-clockwise to lower the wiper.

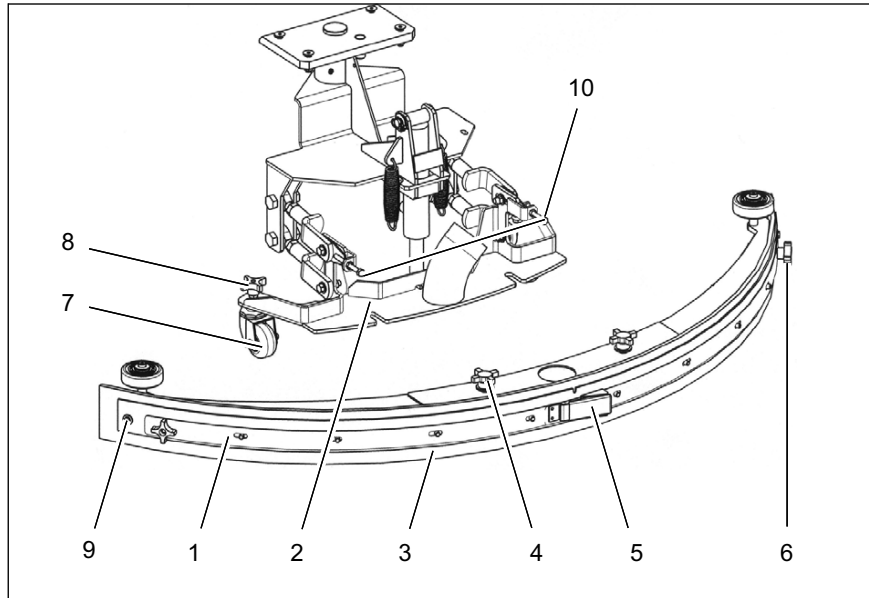
#### Ground pressure:

By increasing the spring tension via spring clamping bolt (Fig. 19/8), the pressure acting on the sealing strip and thus on the floor will be raised. This higher force is used for all cases of rough or uneven floors and surfaces. Softer surfaces require less strong ground pressure.

## Maintenance and Care

### 5.14 Squeegee

- 1 Squeegee
- 2 Squeegee lift-out
- 3 Sealing
- 4 Star-shaped knobs for squeegee
- 5 Clamp
- 6 Star-shaped knobs for seal
- 7 Support rollers
- 8 Star-shaped knobs for support roller
- 9 Wing screws
- 10 Inclination adjustment screws



**Fig.20**

## Maintenance and Care

### 5.14.1 Remove Squeegee

1. Park vehicle on level ground.
2. Turn engine off and engage parking brake.
3. Loosen star-shaped knobs for squeegee (Fig. 20/4) and pull squeegee (Fig. 20/1) to the rear for removal.
4. Proceed to fitting in inverse order.

### 5.14.2 Change Seals

Check seals (Fig. 20/3) for wearing at weekly intervals. 2-fold use of the sealing strips is possible by turning inner strips round. By turning the outer strips round even 4-fold use is possible.

Remove seals without tools as follows:

1. Open clamps (Fig. 20/5) and remove star-shaped knobs (Fig. 20/6) and wing screws (Fig. 20/9). Remove seals (Fig. 20/3).
2. Turn seals round or change as required.
3. Proceed to fitting in inverse order.
4. Adjust sealing strips straight and in parallel to squeegee body.

### 5.14.3 Adjust Squeegee

#### Parallel adjustment

1. Park vehicle on level ground.
2. Turn engine off and engage parking brake.
3. Check sealing strips for straight fitting in parallel to the squeegee body. Re-align sealing strips to parallel if required.
4. Before parallel adjustment of the squeegee, loosen the adjustment screws before and behind the plate on the threaded rod (Fig. 20/10) and unscrew them each 10mm away from the plate.
5. Start engine and lower squeegee. The squeegee aligns in parallel to the floor upon lowering. The sealing strips then should stand vertically and must not bend.
6. Fix this position with adjustment screws (Fig. 20/10) by screwing closer to the plate and tightening of the nuts.
7. Check parallelism by riding forward with lowered squeegee. The sealing strips at the centre and at the border of the squeegee should evenly and lightly bend to the rear.

#### Adjust height

1. Park vehicle on level ground and engage parking brake.
2. Start engine and lower squeegee. Make sure that the sealing strips stand vertically and do not bend.
3. Loosen both support rollers (Fig. 20/7) of squeegee lift-out by means of star-shaped knobs (Fig. 20/8).
4. Use washers to adjust support rollers until clearance between rollers and floor amounts to 5 to 7mm.
5. Tighten both knobs again.
6. Check correct height by riding in working mode with use of water. If the rear squeegee will be partly torn to the front by low pressure, correct adjustment by lowering squeegee. If heavy noise is occurring, correct adjustment by lifting squeegee.

# Maintenance and Care

## 5.15 Water Supply

- 1 Soiled water tank
- 2 Marking
- 3 Clear water tank
- 4 Drain hose
- 5 Plug
- 6 Drain valve
- 7 Stop valve
- 8 Clear water filter
- 9 Flap

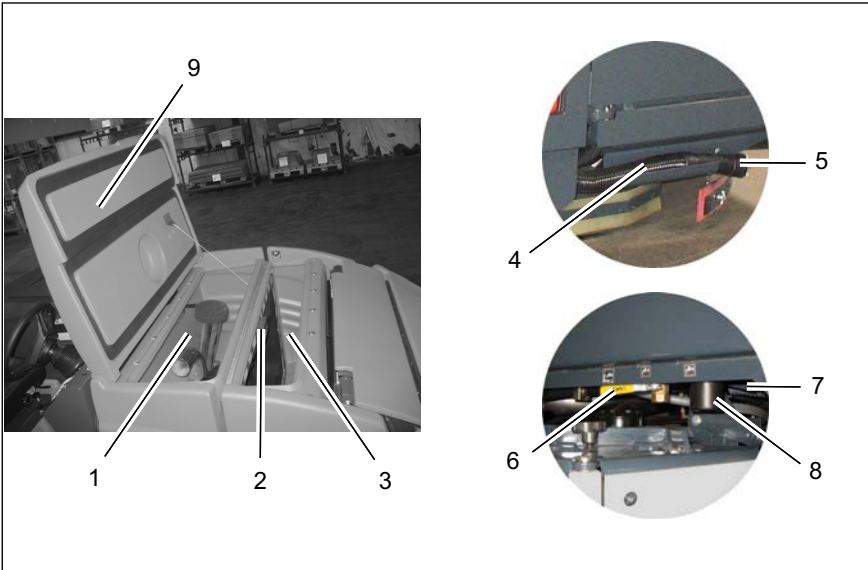


Fig.21



## Maintenance and Care

### 5.15.1 Fill Clear Water Tank

Fill the clear water tank (Fig. 21/1) as required or upon lighting of the pilot lamp at the latest. Park vehicle on level ground and engage parking brake.

Open flap (Fig. 21/9) and fill clear water tank up to maximum marking (Fig. 21/2).

### 5.15.2 Drain Clear Water

Park vehicle such that the drain valve (Fig. 21/6) is located above discharge point. Turn drain valve by 90° to open.

### 5.15.3 Clean Clear water filter

Clean clear water filter (Fig. 21/8) at daily intervals and check for damages. Change clear water filter if required. Cleaning and changing the clear water filter is possible even with filled clear water tank.

1. Turn stop valve (Fig. 21/7) by 90° to close.
2. Unscrew filter housing.
3. Take filter element from housing and clean. If required change filter element.
4. Re-install filter element and housing.
5. Re-open stop valve.

### 5.15.4 Empty Soiled Water Tank

Empty the soiled water tank (Fig. 21/1) as required or upon lighting of the pilot lamp at the latest. Park vehicle on level ground and engage parking brake.

1. Ride to appropriate cleaning site and park vehicle such that the drain hose reaches to the discharge point.



Provide for eco-friendly disposal of soiled water!

2. Turn machine off and engage parking brake.
3. Take drain hose (Fig. 21/4) from holder and kink flexible hose end to block water flow. Then remove drain plug (Fig. 21/5). The flexible hose end allows dosage of drain flow.
4. Completely drain soiled water tank.

### 5.15.5 Clean Soiled Water Tank

Clean soiled water tank (Fig. 21/1) at daily intervals.

1. Empty soiled water tank, siehe Abschnitt 5.15.4
2. Remove both large caps (Fig. 6/20) of the soiled water tank.
3. Take drain hose (Fig. 21/4) from holder and place on appropriate point on the floor for draining.
4. Then remove drain plug (Fig. 21/5).
5. Use clear water to clean the soiled water tank and rinse dirt through all opening.
6. Screw cap again.
7. Rinse drain hose as well.
8. Hinge drain hose again.

### 5.16 Tyres

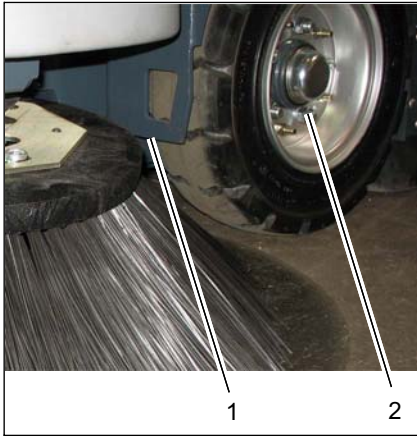


Fig.22

#### 5.16.1 Check Tyre Wearing

Check wearing or tread depth of tyres at weekly intervals.

#### 5.16.2 Remove Tyres



Qualified persons only are authorised to work at tyres!

The following description exclusively refers to solid rubber tyres.

1. Park vehicle on level ground and secure it against rolling off.
2. Turn engine off and pull ignition key.
3. Position car jack at chassis (Fig. 22/1).
4. Before removing the tyres from the vehicle, lightly loosen the five inner hexagon flanged nuts (Fig. 22/2).
5. Lift up vehicle by means of car jack.
6. Remove hexagon flanged nuts.
7. Remove tyre together with rim.

#### 5.16.3 Install Tyres

1. Remove old tyres from rim and mount new ones.
2. Lower vehicle with car jack.
3. Tighten hexagon flanged nuts with a torque of 135 Nm.
4. Check torque after approx. 5 hours of operation.

### 5.17 Brakes



Qualified persons only are authorised to work at the brake system!

Check function of service and parking brake after first 50 hours of operation and after every 250 hours of operation. Replace brake shoes after every 1000 hours of operation.

### 5.18 Electrical System

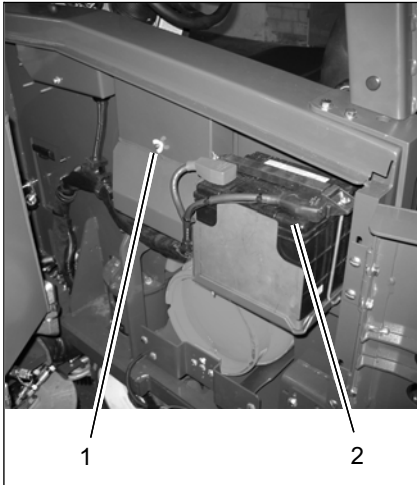


Fig.23

#### 5.18.1 Change Fuse

The fusebox (Fig. 23/1) is located in the engine compartment under a cover next to the battery. Remove wing screw and cover. All current circuits are protected by fuses. Apart from the normal fuses, the ignition point and, additionally, the lighting circuit are protected by temperature fuses. Find further fuses for engine control directly at the engine.

#### 5.18.2 Change Battery



To preclude short-circuiting and injuries, pull negative lead of battery (Fig. 23/2) first and then the positive lead!

1. Park vehicle on level ground. Turn off engine and engage parking brake.
2. Pull negative lead first and then the positive lead.
3. Remove battery.
4. Insert new battery
5. Connect positive lead first and then the negative lead.

# Hakomatic 1800 V/LPG/D

## Changes Due to Machine Directive 2006/42/EC



**Clean ahead**

### **Preface**

Modified text in paragraph Preface:  
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.

### **Intended use**

Modified text in paragraph Intended Use:

Based on the conception, design and construction of the model introduced onto the market by us, the machine complies with the applicable basic safety and health requirements stipulated in the EC Directive (refer to Declaration of Conformity). This declaration is no longer considered valid in the event of modifications to the machine not authorized by us. The manufacturer is not deemed liable for any damage resulting from unauthorized modifications to the machine.

### **General safety information**

The machine may be used only for operation on plane areas with a maximum inclination of up to 13 %.

### **Disposal**

New text in Chapter Introduction:  
Render the machine inoperable. It must not represent a potential source of danger for children.

Dispose of the device according to the applicable local regulations. For further information on handling and recycling, please contact your authorized Hako dealer where you purchased the device.

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)

### **Noise emission value**

The sound pressure level (LpA) (at the ear of the operator) measured according to DIN IEC 60335-2-72 under normal working conditions: 83 dB (A)  
Measurement inaccuracy (KpA): 2 dB (A)  
Sound power level (LwAd) measured according to DIN EN 60335-2-72 under maximum working conditions: 99 dB (A)

### **Vibration**

The weighted effective value of acceleration, measured in accordance with ISO 5349-1, to which the upper parts of the body (hand-arm) are exposed under normal working conditions: < 2,5 m/s<sup>2</sup>  
The weighted effective value of acceleration, measured in accordance with ISO 2631-1, to which the upper parts of the body (feet-seat) are exposed under normal working conditions: < 0,5 m/s<sup>2</sup>

## EC Declaration of Conformity (corresponds to EC Directive 2006/42/EC)

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

declares that the products

**Hakomatic 1800 V, Typ: 7574.10**  
**Hakomatic 1800 LPG, Typ: 7574.20**  
**Hakomatic 1800 D, Typ: 7574.30**

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

Reference was made to the following standards and/or norms and/or technical specifications to ensure proper implementation of the safety and health requirements in the EC Directive:

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

Bad Oldesloe, 27.10.2010



Dr. Rainer Bavendiek  
Director R&D

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

Ludger Lüttel

# *Hako*

## Spitzentechnik für eine saubere und schönere Umwelt

Superior technology for a cleaner and better environment



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