Cleaning technology – municipal technology

Hako
Clean ahead

Citymaster 2000
Euro 5 with 2-Brush-System (1480)
Euro 5 with 3-Brush-System (1481)
Operating Manual

Part-number: 88-10-2906-3451-01

Index	Part-number	Valid as from:	VIN
0	88-00-2906	03.2010	148000010182 / 148100010122
1	88-00-2906-3111-00	10.2013	148000316224 / 148100316265
2	88-00-2906-3451-01	04.2016	148000619942 / 148100619861

The technical data, options and illustrations in this operating manual are valid only under reservation.

It is possible that certain options described in the operating manual was not available at the time of delivery.

This operating manual only applies for the:

- Citymaster 2000 Euro 5 with 2-brush system (1480)
- Citymaster 2000 Euro 5 with 3-brush system (1481)

The vehicles illustrated in the operating manual could display optional equipment.

Hako GmbH
Hamburger Straße 209-239
D-23843 Bad Oldesloe
Telephone (04531) 806-0

1 Introduction

1.1 Information on the operating manual

This original operating manual contains important information on how to operate the **Citymaster** safely, properly and economically. It is, therefore, not only intended for newly trained operating personnel but also as a reference manual for experienced workers. It helps prevent risks and to reduce repair costs and downtimes. In addition, it also helps increase the reliability and service life of the vehicle. For these reasons, the operating manual **must** always be available in the vehicle.

Your own safety, and that of others, basically lies in your ability to control and operate the vehicle. Therefore, read this operating manual thoroughly before driving the vehicle for the first time. The operating manual will help you become familiar with the vehicle more quickly and be able to use it safely and effectively.

Before driving the vehicle for the first time, ensure you read the Chapter "Safety Information" in order to be prepared for any dangerous situations which could arise. It is too late to do this when work has actually started! The following basic rule applies:

Working considerately and carefully provides the best protection from accidents!

Operational safety and deployability of the vehicle are not only dependent on your working capabilities but also on the servicing and maintenance performed on the vehicle. For this reason, regular maintenance and service work are absolutely essential. Larger scale maintenance and repair work should always be carried out by appropriately skilled staff. Only original spare parts may be used for repairs. You then have the guarantee that the vehicle's operational safety, deployability, prescribed condition and worth are retained.

Should you have any questions in respect of the vehicle or operating manual, your authorized Hako dealer is available to provide help at any time.

We strongly recommend that you read this manual before you put the Citymaster into operation!

1.2 Information on using the reference numbers

Each operating element is assigned a reference number which is retained throughout the entire manual.

The pages containing the overviews can be folded out to ensure they are available to view regardless of the page you are currently reading.

The symbols which appear in the descriptions have the following significance:

- Indicates enumeration.
  - Indicates a subdivision of an enumeration/activity. The recommended sequence should be maintained here.

☞*Indicates an activity to be completed.*

③ Description of the effects of an activity.

1.3 Abbreviations/Symbols

Abbreviation/ Symbol	Explanation
	Provides a better indication of the direction of travel in diagrams and illustrations.
ADR	Working speed control
AWS	Substructure change system
BG	Construction size
Bh	Operating hours
DIN	German industrial standard
EBD	Electronic brake force distribution
EOBD	Electronic brake force distribution
EN	European standard
NW	Nominal width
o. Abb.	No illustration
SO	Option "Option" appears beside operating elements or other vehicle components which can be installed optionally (on customer request).
StVO	German road traffic regulations
StVZO	German road traffic licensing regulations
SWV	Quick coupler
UVV	German accident prevention regulations

1.4 Vehicle data

The vehicle is uniquely identified based on the following data. Always specify this data on all correspondence or telephone inquiries to your authorized Hako dealer or the factory.

- Vehicle type: _____
- Vehicle identification no.WMU _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
- Hako part number: _____
- Commissioning/Registration date: _____
- Operating hours / Mileage: _____
- Engine no.: _____
- Hydraulic pump no.: _____
- Hydraulic motor no.: _____
- Front axle number: _____
- Rear axle number: _____
- Options: _____

Please enter the data relevant to your vehicle in the above form. The information is then immediately available in the case of inquiries or orders for spare parts.

Your nearest authorized Hako service center

- Address: _____
- Telephone: _____

1.5 Short description

The Citymaster has been conceived as an tool carrier and working vehicle. Due to the wide range of deployment possibilities, it is suited to all-year-round operation. This means the Citymaster is not only useful as a road sweeper but can also be equipped for deployment as a snow clearing and gritting vehicle.

The vehicle fulfills the German road traffic licensing regulations (StVZO).

Its construction enables a top speed of 50 kph with 215/70 - R15C tires fitted.

The main components are:

- A modern, comfortable driver's cab in a "space frame design" with a three-way adjustable suspension seat for the driver and unsprung passenger seat, tinted all-round glazing, heated windscreen, warm water heater.
- 4-cylinder, turbo diesel engine with 75 kW power output, fulfills emission standard Euro 5 in accordance with 2005/55/EC.
- Torsionally flexible, welded ladder-type chassis, front section is offset and angled.
- High level of driving comfort due to spring suspension, auxiliary rubber springs and hydraulic vibration absorbers.
- Rigid axles guided on 4 trailing arms and Panhard rod, front axle as steering axle, rear axle as steering drive axle
- Hydrostatic steering, optionally with all-wheel steering (not in transport mode)
- Hydrostatic drive with automatic control and differential lock connectable when a load is applied
- Drive modes:
  - Transport mode: 0-50 kph, infinitely variable
  - Work mode: 0-15 kph, infinitely variable
  - Transition mode: 0-20 kph, infinitely variable
  - Reverse mode: 0-10 kph (transport, transition and work modes)
- Hydraulic, 2-circuit brake system with brake booster on front and rear wheels. Load-dependent brake force regulator on the rear axle, mechanical hand brake on separate brake drum on transfer gearbox acts on the rear axle.
- Powerful, user-friendly hydraulic system. Adjustable axial piston pump (116 l/min at 210 bar) with connectors at the front and rear.
- Front hydraulic lift with attachment mounting triangle.

1.6 Attachment devices

Where and how the vehicle is deployed is mainly based on the attachment devices available for it.

The following attachment options are available:

- Outdoor cleaning:
  - Compact sweeping vehicle with sweeping unit, vacuum nozzle and dirt hopper.
  - Hand-held suction hose (option).
  - High-pressure washer (option).
  - Weed brush (option).
- Winter service accessories (option):
  - Additional parts for the attachment of winter service devices (option).
  - Dozer blade, 150 cm and 170 cm (option).
  - Sand, salt and grit spreader (option).
  - Front sweeping unit (option).
  - Tipping platform (option).

Your authorized Hako service center can tell you what attachment devices are available and permissible for your vehicle. All the attachment devices must have been approved by Hako.

Observe the following when driving on public roads:

- The applicable road traffic licensing regulations, particularly the information on attachment devices (BMV/S 33/66.02.80-02 dated 25.03.1999).
- The stipulations defined in the licensing document Part 1 (until now the registration certificate) and licensing document Part 2 (until now the registration document).
- The axle loads defined in the licensing documents Part 1 and Part 2 and the permissible total weight.

The applicable accident prevention regulations of the relevant insurance associations (e.g. Germany: BGV D 29 Vehicles) must also be observed.

1.7 Directives

Driving license

According to the old Driving License Act of the Federal Republic of Germany, the driver of the Citymaster used as a working machine or other vehicle tool carrier must in possession of a driving license of the following classes:

- Class 2: Motor vehicle of 7.5 tons or more or combination with more than 3 axles whereby the total weights of the combination must be taken into account!
- Class 3: Motor vehicle up to 7.5 t. Applies for drawbar combinations as well (= Citymaster as tool carrier plus trailer) and including not more than three axles; (towing a single-axle trailer only is admitted; two axles with a distance of 100 cm and less are considered as one axle.

According to the reformed German Driving License Act applicable from 1.1.1999, drivers of the Citymaster used as a working machine or other motor vehicle tool carrier must be in possession of a driving license of the following classes:

- Class C: Motor vehicle of 3.5 tons and more with trailer of up to 750 kg.
- Class CE: Motor vehicle of 3.5 tons and more with trailer of 3.5 tons and more (but limited to up to a total combination weight as specified by the manufacturer).
- Classes B and BE: Motor vehicle of up to 3.5 tons and trailer of up to 750 kg (admissible total weight) or trailer of up to the empty weight of the towing vehicle as long as an admissible total weight of 3.5 tons for the combination is adhered to.

Equipment

In accordance with §53 StVZO (German road traffic licensing regulations), the vehicle must be equipped with the following (not included in the scope of delivery):

- 1 warning triangle with design certification,
- 1 warning light with design certification,
- 1 high visibility jacket,
- 1 first-aid kit complying to the directives in DIN 13 164 Sheet 1.

Observe the applicable national and international regulations in the country of use.

Related documents

German regulations require that the following documents must always be available:

- Vehicle registration certificate (Part I).
- Valid driving license of vehicle driver.

Observe the applicable national and international regulations in the country of use.

Vehicle inspection

- All German employers' liability insurance associations require a **safety-related inspection** of the vehicle, in accordance with BGV D 29, at least once a year to be completed by an authorized body.
  In order that the driver knows when the next official inspection is due, an inspection label should be attached to the vehicle.
- In accordance with §29 StVZO (German road traffic licensing regulation), a general inspection (**MOT**) must be performed regularly:
  - every 24 months for motor vehicles up to 3.5 t gross total weight (every 12 months for vehicles which are commercially rented without provision of a driver),
  - every 12 months for motor vehicles in excess of 3.5 t gross total weight.

Observe the applicable national and international regulations in the country of use.

1.8 Labels on the vehicle

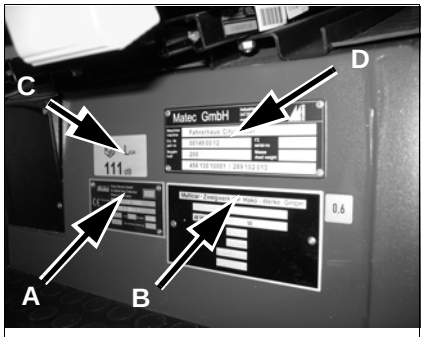


Fig. 1:

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

Name plate

The following are located in the driver's cab under the driver's seat:

Name plate **(A)**, vehicle identification number **(B)**, noise emission value **(C)** and driver's cab number **(D)**.

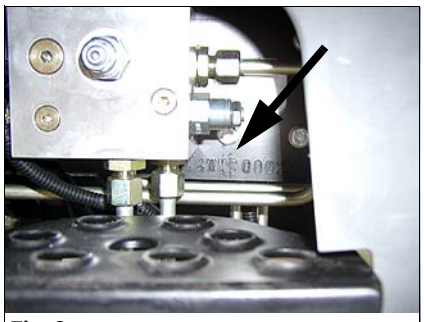


Fig. 2:

Vehicle identification number

The vehicle identification number is stamped on the vehicle frame at the front right (behind the step).

Example:

WMU2X56E59W000001

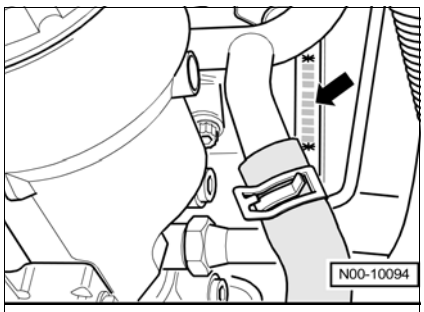


Fig. 3:

Engine number

The engine number is located on the joint between engine/gear.

In addition, a sticker is attached on the toothed belt cover labeled with the "Engine code letter" and "Serial number".

Example:

CJD 001 041

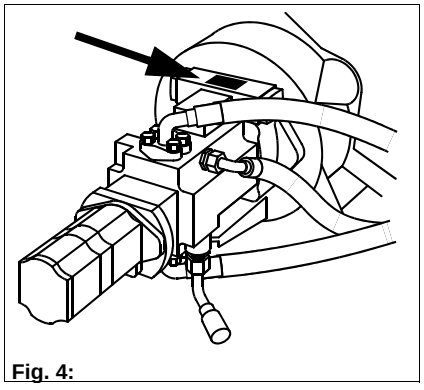


Fig. 4:

Hydraulic pump

The rating plate (arrow) is located at the top of the flange connecting the pump to the engine.

Example:

A4VG40 EP1DT1/32R-NAC02F025LT
9602124 252.15.41.10
Serial no. 4420219

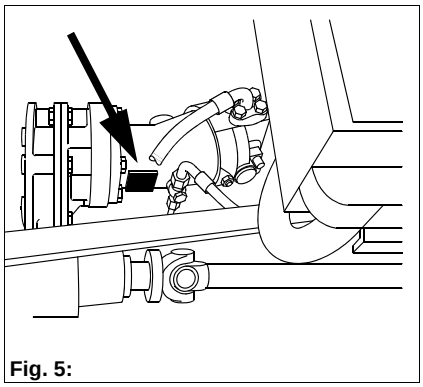


Fig. 5:

Hydraulic motor

The rating plate (arrow) is located at the bottom of the hydraulic motor housing.

Example:

A6VM 80 EP1/63W-VZB017DAT
9604224 262.20.42.75
Serial no. 4465615

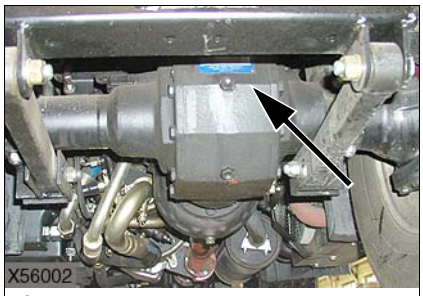


Fig. 6:

Rear axle

The rear axle number is stamped at the top of the drive flange.

Example:

Y 732211

Fig. 7:

Label - risk of crushing (safety support)

It is forbidden to stand under the dirt hopper when it is not supported.

The self-folding safety support must be fixed in place properly before starting any work under the dirt hopper. The "Risk of crushing" labels are located on the left of the superstructure, viewing to the front.

Fig. 8:

Label - speed limit

This states the speed limit of the vehicle in kph. The labels are located on the rear of the vehicle and on the sides of the hopper.

Fig. 9:

Hako label

The Hako labels are located on the front windscreen and at the rear on the toolbox.

Safety foil

The safety foils (red/white) are locates at the front under the headlights and at the rear on the toolbox.

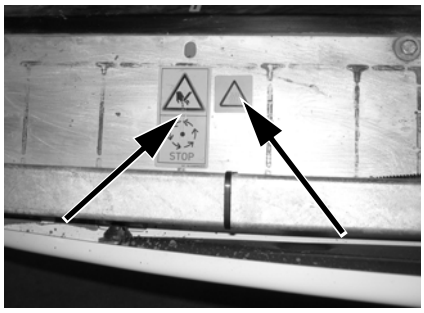


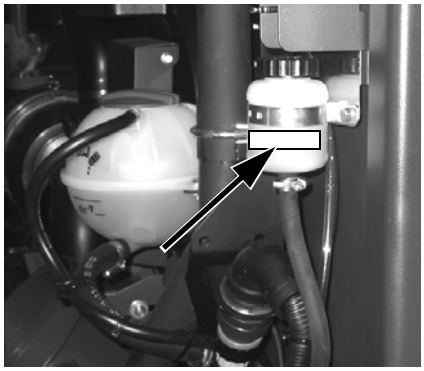
Fig. 10:

Hot surfaces

Risk of burns from the hot surfaces of the engine and hydraulic cooling system.

Rotating parts

Risk of injury through rotating parts of the cooling system. The label is located on the radiator.



Label on the expansion tank

Label on the hopper

2 Safety Information

2.1 Identification of information on warnings and hazards

Important information regarding the safety of operating personnel and the vehicle are indicated in this operating manual by the following terms and symbols:

Danger!

Failure to observe the instructions identified by this symbol may result in fatal or severe personal injury of the operator or other persons.

☞*Measures for avoiding dangers*

Attention!

Failure to observe the instructions identified by this symbol may result in damage to the vehicle.

☞*Measures for avoiding damage to the vehicle*.

Note!

This symbol indicates information which enables a more effective, economic use of the vehicle.

Environment!

Failure to observe the instructions identified by this symbol may result in risks to the environment.
The environment is put at risk if environmentally hazardous material (e.g. waste oil) is not used or disposed of properly..

2.2 Warranty

Warranty claims can only be made if the conditions of warranty have been observed. These conditions are stipulated in the General Conditions of Sales and Delivery for vehicles and spare parts manufactured or sold by Hako GmbH. Furthermore, the instructions in this operating manual must be observed.

2.3 Intended use and exemption from liability

- The Citymaster 2000 is used as tool carrier / working machine for industrial and municipality work all year round. This relates to outdoor cleaning by use of the sweeping unit, vacuum nozzle and dirt hopper as well as the optional winter service facilities including a snow blade, sand and salt spreader and front sweeping unit.

  Any use beyond this is regarded as improper use. Hako GmbH is not considered liable for any damage resulting from improper use; the user is solely responsible for all the risks.
  Intended use also includes observing the instructions in the operating manual and observing the conditions of maintenance and service.
- The applicable accident prevention regulations, other generally accepted industrial health and safety regulations and road traffic licensing regulations (StVZO) must be maintained. Hako GmbH is not considered liable for any damage resulting from failure to observe these regulations.
- The safety of the vehicle can be negatively affected by carrying out vehicle modifications without proper authority and by using spare parts, equipment, attachment devices and optional equipment which have not been checked and approved for release by Hako GmbH. Hako GmbH is not considered liable for any consequential damage.
  Unauthorized modification can lead to invalidation of the type approval complying with §19(2) StVZO. The vehicle no longer complies with the model described in the manufacturer's documentation. This entitles the manufacturer to reject any warranty claims of the operator against the manufacturer.
- Based on the conception, design and construction of the model introduced onto the market by us, the Citymaster 2000 complies with the applicable basic safety and health requirements stipulated in the EC Directive (refer to EC Declaration of Conformity at the end of this manual). This Declaration of Conformity is no longer considered valid in the event of modifications to the vehicle not authorized by us.
- Hako GmbH is not be liable when:
  - attachments are implemented other than those tested and approved by Hako GmbH,
  - the service and maintenance work specified in the operating manual has not been performed correctly or not at all.
- Hako GmbH will not be liable for personal injury and/or property damage caused by failure to observe the safety instructions and the operating manual, and through negligence of the duty to exercise due care when: handling, operating, servicing, maintaining and repairing the vehicle.

2.4 General instructions on conduct and safety

Organizational measures

- The vehicle may only be used when in a technically perfect condition, for its intended purpose, by safety-conscious persons aware of the risks involved in its use and taking the information in the operating manual into account! Any faults, particularly those which could impair safety, must be cleared immediately!
  Basic rule:
  Before starting up the vehicle at any time, inspect the vehicle in terms of its roadworthiness and operational safety!
- Working considerately and carefully provides the best protection from accidents!
- The operating manual must always be at hand at the place of use of the vehicle and must, therefore, be kept in the storage compartment provided for it in the cab.
  Immediately replace the operating manual if it is lost or becomes illegible.
- Also read carefully all additional instructions which may have been handed out to you before carrying out activities with which you are not familiar!
- When using attachment devices and superstructures are used, also pay attention to the operating manual provided by the respective manufacturer.
- In addition to the operating instructions, observe all other generally applicable legal and mandatory regulations relevant to accident prevention and environmental protection.
  These duties may also concern handling hazardous substances, issuing and/or wearing personal protective equipment or implementing traffic regulations.
- Persons entrusted with work on the vehicle must have read and understood the operating manual and, in particular, Section 2 "Safety Information" before beginning work. This applies particularly to persons who only work on the vehicle occasionally, e.g. setup or maintenance personnel.
- The user/owner himself is obliged to ensure the vehicle is only operated when in perfect condition and, where necessary or required by law, to ensure operating or maintenance personnel wear protective clothing.

- Never make any modifications, additions or conversions to the vehicle and its attachments which might affect safety without obtaining approval from Hako GmbH! This also applies to the installation and the adjustment of safety devices and valves, as well as to welding work on load-bearing parts.
- Spare parts must comply with the technical requirements defined by Hako GmbH. Original spare parts can be relied on to do so.
- Check hydraulic lines regularly for signs of damage.
- Before working on or with the vehicle, remove any jewelry such as rings, wristwatches, bracelets, etc., tie back long hair and do not wear loose-fitting garments such as unbuttoned or unzipped jackets, ties or scarves.
  There is a risk of injury e.g. by becoming caught or entangled!
- Keep the vehicle clean. This reduces:
  - the risk of fire, e.g. due to oil-soaked cloths lying around,
  - the risk of injury, e.g. due to dirt or debris on steps,
  - the risk of accident, e.g. due to dirt on the brake or accelerator pedal!
- Observe all safety, warning and information signs and labels on the vehicle.
- Observe all prescribed intervals or those specified in the operation manual in respect of routine checks/inspections and maintenance work!
- In order to complete service, inspection, maintenance or repair work, it is essential to have the necessary tools and workshop equipment required for the tasks at hand.
- Any work on or with the vehicle may only be executed by suitably qualified personnel. Do not let any unauthorized persons drive or work with the vehicle! Observe statutory minimum age limits!
- Operating personnel must be in possession of the necessary driving license!
- Ensure only properly trained or instructed staff work on the vehicle and appoint individual responsibilities of personnel for operation, setup, maintenance and repair clearly and unequivocally!
- Work on the electrical installations, chassis, steering and brake systems may only be carried out by correspondingly skilled personnel specially trained for such work.
  Work on the vehicle's hydraulic system may only be performed by personnel with special training and experience of hydraulic equipment!
- A mobile phone may only be used when the vehicle has been stopped and via a separate outdoor antenna.
- Switch the engine off and wait for the fan to stop before removing dirt from the clogged suction pipe.

2.5 Safety information regarding operation

Normal operation

- Before beginning work at the work site, familiarize yourself with the working environment. Aspects of the working environment include obstacles in the working and traveling area, the ground load-bearing capacity and any barriers which may be necessary to separate the work site from public roads and paths.
- Take the necessary precautions to ensure that the vehicle is only used when in a safe and reliable condition!
  Only operate the vehicle if all the protective and safety-related devices, such as removable safety devices, sound insulation and exhaust equipment etc., are in place and fully functional!
- Check the vehicle at least once a day/working shift for visible signs of damage and defects! Report any changes (incl. changes in the vehicle's working behavior) to the department/person responsible immediately! If necessary, stop the vehicle immediately and lock it!
- In the event of malfunctions, stop the vehicle immediately and lock it! Have any defects rectified immediately!
- The vehicle may only be started from the driver's seat!
- Carry out startup and shutdown procedures in accordance with the operating manual, and observe the control indicators!
- Before starting up (switching on/moving) the vehicle/attachment device, ensure that nobody is at risk through starting up the vehicle/attachment device!
- Before driving with the vehicle, and also after interrupting work, check that the emergency steering function is functional!
- Before putting the vehicle into motion, always check that the auxiliary equipment and attachment devices have been safely stowed away or fixed in place!
- Always switch on the lights in poor visibility and after dark!
- Persons accompanying the operator must sit on the passenger seats provided for this purpose. It is forbidden to carry persons on the dirt hopper, attachment devices or superstructures!!
- When working in buildings or in enclosed areas, pay attention to the ceiling height, access and entrance widths, max. load-bearing capacities of floors. Ensure sufficient room ventilation – risk of poisoning!
- Avoid any operation that might put the vehicle's stability at risk!

- When deployed on slopes, drive/work directly uphill or downhill where possible. There is a risk of tipping when driving across slopes!
  Always keep attachment devices/working equipment close to the ground in such cases! This also applies when driving downhill!
  Adapt your driving speed to the local conditions when driving on slopes!
  Never change to a lower gear when driving on a slope, always before reaching it!
- When the vehicle is fully loaded and driving down a steep slope, the driver must actuate the brakes in order to maintain the top speed permitted. A message appears in the multifunctional display prompting the drive to brake.
- Before leaving the driver's seat, always secure the vehicle against inadvertent movement and unauthorized use!
  Lower the working equipment/attachment devices on the ground.
- Before starting work, check that all safety devices are properly installed and functional and that all warning triangles, approved warning light and first-aid kit are available.
- Before driving the vehicle or starting work:
  - Make sure visibility is sufficient (do not forget the rear-view mirrors)!
  - Adjust the seat to its correct position (it must be possible to depress brake pedal fully)! Never adjust the driver's seat when driving or working!
  - Fasten your safety belt.
  - Check the immediate surroundings (children)!

  The driver is responsible to third-parties in the work area!
- Take the utmost care when handling fuel - increased risk of fire!

  Make sure fuel does not come into contact with hot parts!
  Never fill fuel in the vicinity of naked flames or sparks! Switch off the vehicle before filling fuel and do not smoke!
- When traveling through underpasses, tunnels, on bridges, passing overhead cables etc., always ensure sufficient clearance!
- Always ensure sufficient clearance to the edges of construction pits and embankments!
- Activate the vehicle's all-wheel drive on slippery roads and pathways.
- The utmost caution must be taken when driving on slippery roads and pathways. When the vehicle is empty and has a low rear axle load, actuate the accelerator pedal slowly and apply the brake pedal carefully!

- Never jump on or off a moving vehicle!
- If the vehicle lights prove insufficient for the safe execution of certain work processes, provide additional lighting of the work area.
- Installed work lights must not be switched on during travel on public roads. They can be switched on to complete work when it is certain that public roads users will not be dazzled.
- It takes some time to adjust to the hydrostatic all-wheel steering. Therefore, adjust the driving speed to your ability and the circumstances. Only select and change the steering mode when the vehicle is at a standstill!

Attachment devices

- Attachment devices and ballast weights affect the vehicle handling as well as its steering and braking capabilities! Adapt your driving style accordingly!
- Always use the prescribed elements to fix the attachment devices!
- Secure attachment devices from rolling away!
- Observe the max. permissible vertical load on the coupling point and trailer load on the tow-bar!
- Hitching attachment devices requires particular care and attention!
- Before connecting or disconnecting hydraulic hoses/lines (hydraulic quick-couplers)
  - Switch off the engine,
  - Depressurize hydraulic connections.
- Only put the vehicle into operation when all the safety equipment has been installed and is functional and when all the brake, lighting and hydraulic connections have been connected!
- Do not exceed the admissible total weights as specified in the type approval and applicable for the vehicle, for the front and rear axle loads and the entire combination (vehicle plus trailer or attached device).
- If optional equipment is installed, all additionally required light installations, control lamps, etc. must be installed and functional.

- Only install attachment devices when the engine has been stopped and the drive switched off.
- Particularly in the case of vehicles provided with a quick-coupler facility for attachment devices, make sure that the attachment device is safely locked in the quick-coupler. Check this before starting work.
- Make sure hydraulic hoses are connected correctly when subsequently connecting hydraulic cylinders and hydraulic motors.
- There is a risk of crushing and shearing when coupling attachment devices. Make sure nobody is between the vehicle and the attachment device without securing the vehicle and device against movement.

Installing electrical devices

- The vehicle is equipped with electronic components and parts whose function can be affected by the electromagnetic emissions from other devices. Such effects can put persons and safety-relevant functions at risk if the following safety information is ignored:
- In the case of a later installation of electric and electronic devices and/or components in the vehicle involving connection to the on-board power supply, the user is responsible for verifying whether the installation causes interference in the vehicle electronics or on other components; a new acceptance test may be necessary.
- Pay particular attention that the electrical and electronic components subsequently installed comply with the valid version of the EMC Directive 2004/108/EEC and that the CE Mark is applied or an e1 approval is provided.
- In the case of subsequent installation of mobile communication systems (e.g. radio, telephone), the following requirements must also be fulfilled:
  - Only devices may be installed which have been approved in accordance with the valid national regulations (e.g. BZT approval in Germany).
  - The device must be permanently installed.
  - The operation of portable or mobile devices within the vehicle is only permitted via a connection to a permanently installed outdoor antenna.
  - The transmission part must be installed spatially separated from the vehicle electronics.
  - When installing the antenna, pay attention to correct installation with a good ground connection between the antenna and chassis ground.

Transport

- The vehicle must be towed, loaded and transported in accordance with the operating manual, see Section 3.5.9.
- When towing the vehicle, observe the prescribed transport position, admissible speed and travel distances.
- Secure the vehicle properly on the transporting vehicle! Use appropriate attachment points.
- Proceed exactly as described in the operating manual when restarting!

2.6 Safety information for maintenance and service

In addition to the regular general inspection (MOT), the Citymaster must be maintained at regular intervals in accordance with BGV D 29 and inspected in terms of its operational safety at least once a year.

- Avoid any method of operation that could be prejudicial to safety!
- Observe the adjusting, maintenance and inspection activities and intervals set out in the operating and maintenance manual, including information on the replacement of parts/partial equipment!
  These activities may only be completed by skilled personnel.
- The vehicle may not be serviced, repaired or test-driven by unauthorized personnel.
- For any work concerning the operation, conversion or adjustment of the vehicle and its safety-related devices, or any work related to maintenance, inspection and repairs, observe the startup and shutdown procedures described in the operating and maintenance manual and the information on maintenance work.
- Where necessary, cordon off the maintenance area appropriately!
- Prior to performing service, maintenance and repair work, attach a warning label, such as "Repair work - do not start vehicle", to the ignition lock/steering wheel or to the control elements. Remove the ignition key.
- Inform operating personnel/driver before starting any particular work or maintenance! Appoint a supervisor!
- Only complete service, maintenance and repair work when:
  - the vehicle is positioned on firm and level ground,
  - the driving direction lever is in its neutral position,
  - the parking brake has been applied,
  - all hydraulically movable working devices and equipment have been lowered to the ground,
  - the engine has stopped,
  - the ignition key has been removed,
  - the vehicle has been secured against rolling away,
- If it is essential for maintenance or repair work to be completed with the engine running:
  - always work in pairs,
  - both persons must be authorized to operate the vehicle,
  - one person must be seated on the driver's seat and maintain visual contact with the other person,
  - observe any special safety information in the respective work instruction,
  - maintain a safe distance from all rotating and moving parts, such as fan blades, V-belt drives, PTO shaft drives, blowers, etc.

- Prior to performing assembly work on the vehicle, make sure all movable parts will not roll away or start moving.
- Never work or stand under suspended loads!
- Never use vehicle parts or attachment devices as climbing aids!
- Clean the vehicle, especially connections and threaded unions, of any traces of oil, fuel or preservatives before carrying out maintenance/ repair work!
  Do not use aggressive cleaning agents!
  Use lint-free cleaning cloths!
- Before cleaning the vehicle with water, a steam jet (high-pressure cleaning) or detergents, cover or tape up all openings which – for safety and functional reasons – must be protected against penetration by water, steam or detergent. Special care must be taken with the electrical system. Do not aim the steam jet or high-pressure washer directly at electric or electrical components.
- After cleaning, the covers/tapes must be removed completely!
- After cleaning, examine all fuel, lubricant and hydraulic oil lines for leaks, chafe marks and damage!
  Any defects found must be rectified without delay!
- Always retighten any screwed connections that have been loosened for maintenance and repair work!
- Any safety devices removed for setup, maintenance or repair purposes must be refitted and checked immediately after completion of the maintenance and repair work.
- Ensure that all consumables and replacement parts are disposed of safely and according to the applicable environmental laws!
- Do not use work equipment as lifting platforms for persons!
- Perform maintenance and repair work beneath a raised vehicle, work equipment/attachment devices or additional equipment only if a safe and secure support has been installed (the sole use of hydraulic cylinders, jacks, etc. does not sufficiently secure raised vehicles or equipment/attachment devices).
- Avoid contact with hot parts, such as the engine block or the exhaust system, during operation of the vehicle and for some time afterwards – risk of burns!
- Do not use starting fuel! This especially applies to those cases in which heater plugs (intake-air preheating) are used at the same time – risk of explosions!
- Take extra care when working on the fuel system – increased risk of fire!

2.7 Information on particular risks

Electrical energy

- Only use original fuses with the prescribed amperage.
  In the case of defects in the electrical system, switch the vehicle off immediately and clear the fault.
- Work on the electrical equipment may only be performed by electricians who have been trained properly and in accordance with the applicable electrotechnical regulations.
- The vehicle's electrical equipment must be inspected/checked at regular intervals. Defects, such as loose contacts and scorched cable, must be rectified immediately.
- Observe the operating voltage of the vehicle/attachment device!
- In the case of work on the electrical system or welding work, disconnect the grounding strap from the battery!
- Starting with a battery jump cable can be dangerous if performed improperly. Observe the safety instructions regarding the battery!

Gas, dust, steam, smoke

- Only operate the vehicle in adequately ventilated premises! Before switching on the combustion engine or starting up a fuel driven heater in closed rooms, pay attention to adequate ventilation! Observe the applicable regulations for the respective area of use!
- Only carry out welding, flame-cutting and grinding work on the vehicle if it has been expressly authorized. E.g. there may be a risk of explosion and fire!
- Before carrying out welding, flame-cutting and grinding work, clean the vehicle and immediate environment from dust and other inflammable substances, and make sure that the premises are adequately ventilated – risk of explosions!

Noise

- All sound insulating devices must be closed during operation.
- Wear ear protectors if necessary!

Oils, greases and other chemical substances

- When handling oil, grease and other chemical substances (e.g. battery acid -sulphuric acid), observe the product-related safety regulations (safety data sheet)!
- Be careful when handling hot consumables – risk of burning or scalding!!

Hydraulics

- Work on the vehicle's hydraulic system my only be performed by personnel with special training and experience of hydraulic equipment!
- Check all lines, hoses and screwed connections regularly for signs of leaks and damage! Repair any damage and leaks immediately! Splashed oil may cause injury and fire!
- Depressurise all system hydraulic lines to be opened, in accordance with the operating manual/assembly description, before completing any installation/repair work!
- Ensure that no hydraulic connections are interchanged! The fittings, lengths and quality of the hoses must comply with the technical requirements.
- Hydraulic spare parts must comply with the technical requirements defined by Hako GmbH. Original spare parts can be relied on to do so.
- All hydraulic oil supply lines must be depressurized before beginning any maintenance and repair work:

  ☞lower all hydraulic devices to the ground and

  ☞actuate all the operating elements for the work hydraulics several times.
- Secure the vehicle against rolling by applying the parking brake before beginning any maintenance and repair work.
- Pressurized hydraulic oil which escapes can penetrate the skin and cause severe injuries. Therefore, contact a doctor immediately, even in the case of a small wound, otherwise there is a risk of serious infection!
- Cloudy hydraulic oil in the sight glass indicates that water or air has penetrated into the hydraulic system! This could damage the hydraulic pump!

  ☞Contact your authorized Hako service center immediately
- Insufficient or incorrect hydraulic oil causes damage to the hydraulic system! Therefore:
  - Only use the oil types prescribed.
  - Always refill hydraulic oil in good time.
  - If the hydraulic system is filled with bio-oil, only bio-oil of the same type may be refilled – pay attention to the label on the hydraulic oil tank!
  - If the hydraulic filters are contaminated by metallic splinters, inform customer service technicians immediately in order to prevent consequential damage!

Battery

- Observe the special industrial health and safety regulations when handling batteries. Batteries contain sulphuric acid - corrosive!
- An oxyhydrogen mixture is formed in the battery cells during normal battery operation and particularly during charging – risk of explosion!
- In the case of a frozen battery or an insufficient electrolyte level, do not try to start with a battery jump cable; the battery can burst or explode.
- The battery contains sulphuric acid! The acid must not come into contact with the skin, eyes, clothing or vehicle.

  Therefore, when charging the battery or working near the battery, always wear protective goggles and protective clothing with long arms. If acid is spilled, flush all the surfaces affected immediately with water and wash thoroughly any parts of the body which have come into contact with sulphuric acid immediately and contact a doctor directly after!
- Only store battery acid in sealed, original containers and keep out of reach of children!
- Do not use a charger to start the engine.
- When charging the battery, keep it isolated from the vehicle's electric circuit.
- Prevent any naked flames or spark development and **do not smoke** in the vicinity of open battery cells – the gas which forms during normal battery operation could ignite!
- Only use a 12 V power source because higher voltages can damage the electric components.
- Never lay down tools or other conductive items on the battery – **risk of short circuit!**
- Observe the precautionary measures stipulated in the operating manual and product description supplied with the battery!

Tires

- Repair work on tires and rims may be only carried out by skilled personal or at an authorized workshop!
- Damaged tires and/or wrong tire pressures reduce the operational safety of the vehicle. Therefore, check tires regularly in respect of:
  - prescribed air pressure,
  - damage.
- Do not inflate tires with inflammable gas – risk of explosion!
- Check the tightness of the wheel nuts at regular intervals. After changing tires, check the wheel nuts after 50 km, retighten as necessary!

Axle loads and total weights

- Ensure the values comply with the admissible axle load and total weight values, refer to the Technical Data.

Sweeping unit

- Raise the sweeping unit and secure it in its transport position before driving the vehicle to work sites!
- During sweeping operations, the operator must make sure that no persons are inside the hazard zone of the sweeping unit and that all objects have been removed from the working area!

Dirt hopper

- The dirt hopper must be completely lowered when driving the vehicle to a work site!
- The stability of the vehicle is significantly affected by a filled dirt hopper! Adapt your driving style accordingly!
- Empty the hopper and ensure the safety support is in place before starting any work under the dirt hopper!
- It is forbidden for anyone to stand in the hazard zone when the dirt hopper is being raised and lowered!
- Pay attention that the automatically folding safety support is locked in place!
- The vehicle may only be started up, driven and stopped from the seat.
- The fan must be checked regularly for signs of wear and imbalance!
- Be careful of hot parts of the exhaust system accessible after lifting it out of the hopper!
- The dirt hopper and hopper support are connected by means of two locking pins. Before putting into operation, pay attention that the pins are fitted in the hopper support and secured properly. There is a risk of the dirt hopper tipping over!

2.8 Shutting down and disposal

When the vehicle or components of it have reached the end of their service life and they are assigned for scrapping, the components must be disposed of properly. The regulations of the local authorities responsible must be observed. Service fluids used in the vehicle are subject to special disposal and must not pollute the environment. Further information on disposal can be obtained from the local authorities responsible, authorized Hako dealers or Hako service personnel.

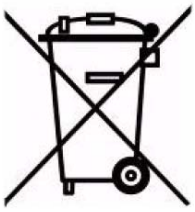


Fig. 11:

- Do not throw products with the label (Fig. 11) attached into normal household waste at the end of their service life.
- Recycle materials with the label (Fig. 12) attached according to its identification.
- Recycle packaging material and do not dispose of it in household waste.
- Plastics on which the materials contained are identified, e.g. PPTV20, must be recycled and not disposed of in household waste.

Fig. 12:

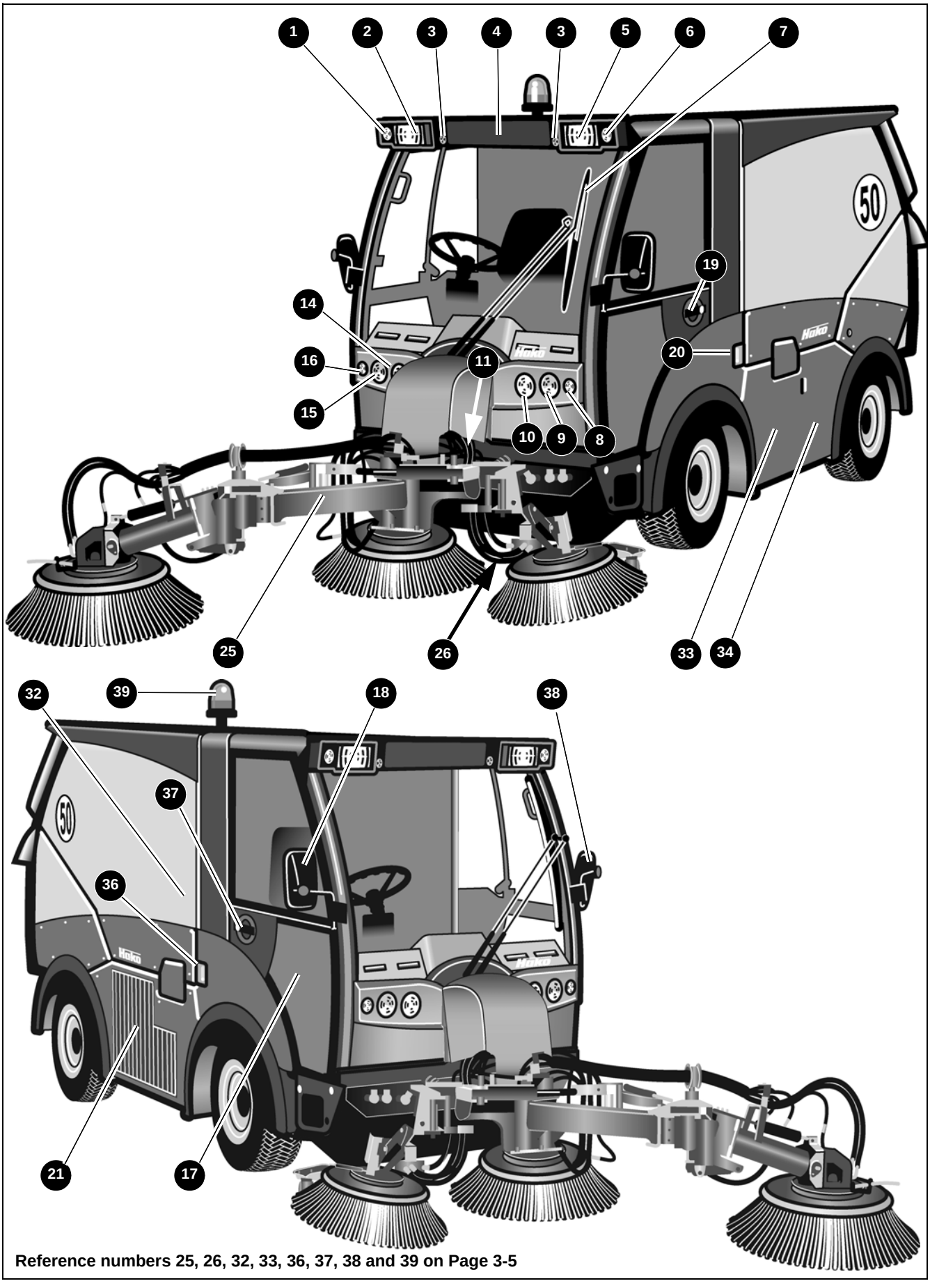
- Old batteries contain pollutants; they must be returned to the point of sale and disposed of properly or brought to a collection point. Do not dispose of old batteries in household waste.
- Operating fluids such as oils, hydraulic fluids, brake fluid or fuel must be treated as hazardous waste and disposed of properly.
- Refrigerants may only be disposed of by specialist firms employing competent personnel and with the necessary technical equipment. Refrigerants must never get into the ambient air. Have refrigerants disposed of by an authorized Hako service center.
- Observe the applicable national regulations.

3 Operation

3.1 Introduction

The description of the operating elements contains information on the function and operation of the individual control indicators and operating elements on the vehicle.

Each operating element is assigned a reference number which is retained throughout the entire manual.



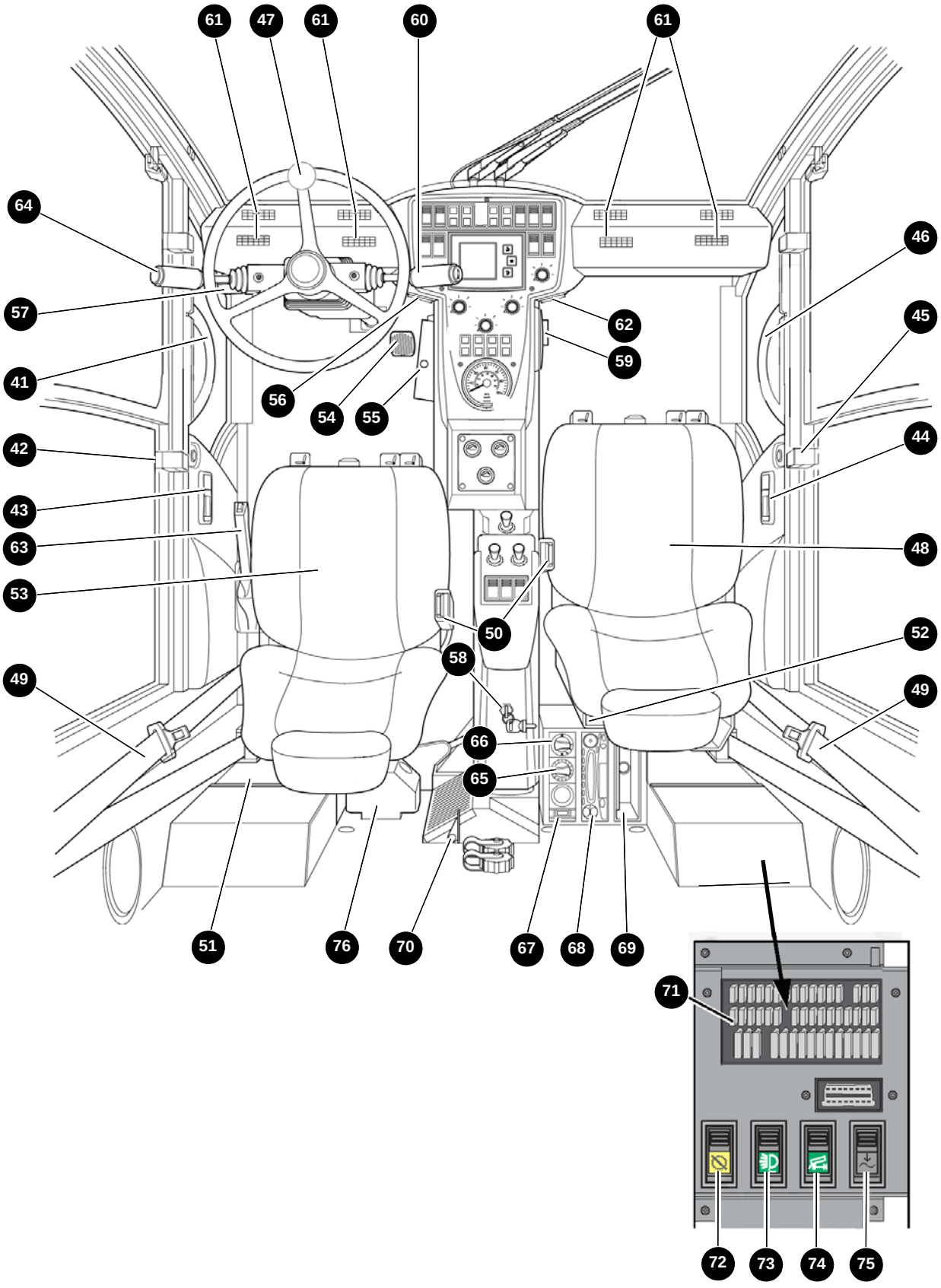
Reference numbers 25, 26, 32, 33, 36, 37, 38 and 39 on Page 3-5

3.1.1 Views of vehicle

Front view of vehicle		
Ref.	**Name**	
1	Additional indicator light, right	
2	Auxiliary headlight for low/high beam headlight, right (option)	
3	Working light, front (option)	
4	Number plate bracket, front	
5	Auxiliary headlight for low/high beam headlight, left	
6	Additional indicator light, left	
7	Windscreen wipers	
8	Indicator light, left	
9	High beam headlight, left	
10	Low beam headlight, left	
11	Quick coupler for attachment devices	
12	Not connected	
13	Not connected	
14	Low beam headlight, right	
15	High beam headlight, right	
16	Indicator light, right	
17	Cab access, left	
18	Rear-view mirror	
19	Door handle / lock, right	
20	Side indicator light, left	
21	Radiator cover	

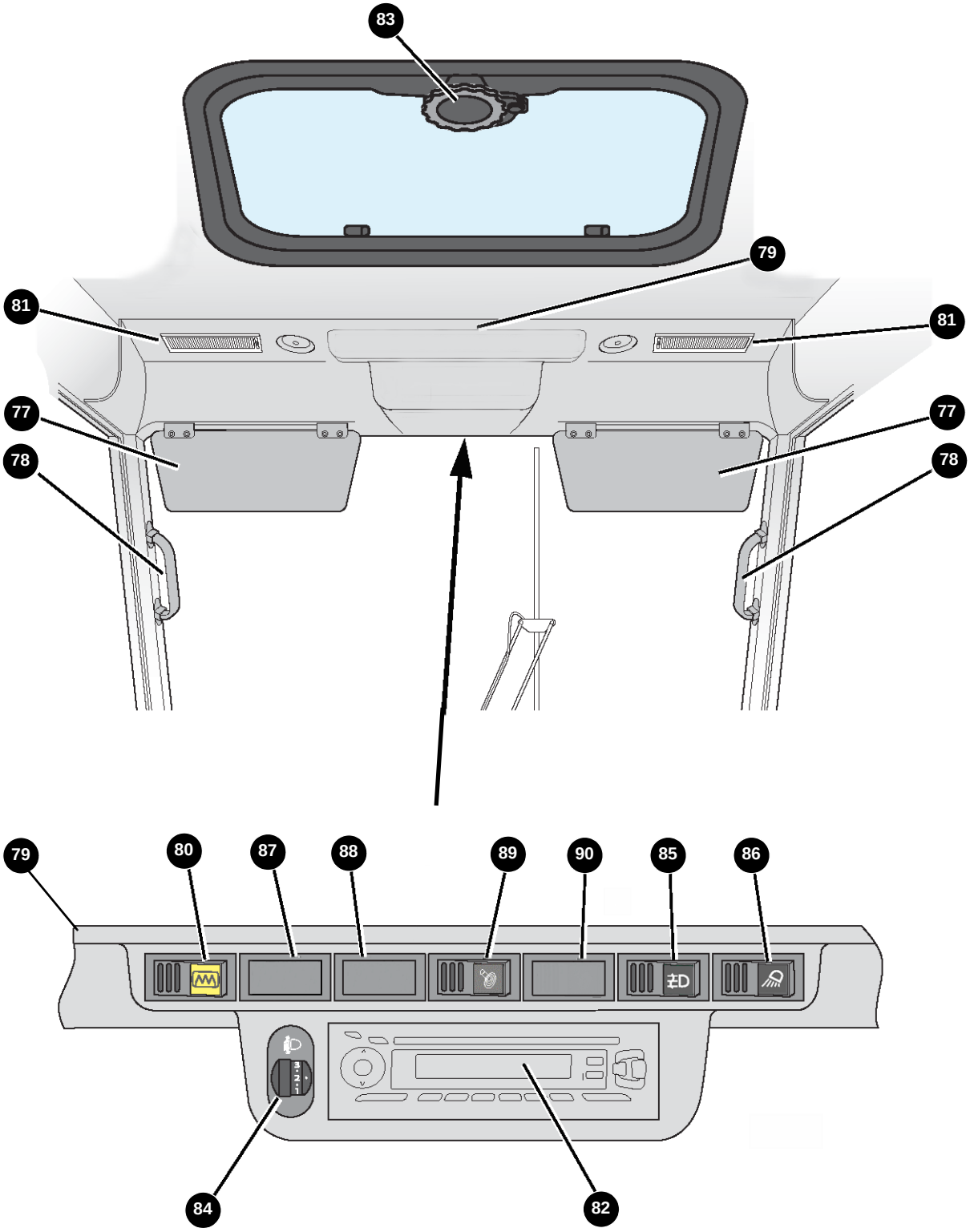

40
31
24
23
28
27
30
22
29
50

Views of vehicle		
Ref.	**Name**	
22	Brake light, rear light, indicator light, right, reversing light	
23	Superstructure	
24	Dirt hopper	
25	Sweeping unit	
26	Suction nozzle	
27	Toolbox	
28	Fresh water tank	
29	Number plate bracket, rear	
30	Brake light, rear light, indicator light, rear fog lamp, left, with number plate light	
31	Hand-held suction hose (option).	
32	Safety support	
33	Fuel tank	
34	Hydraulic oil tank	
35	Warning sign	
36	Side indicator light, right	
37	Door handle / lock, left	
38	Rear-view mirror, left	
39	Flashing beacon	
40	2nd flashing beacon (option)	


61
47
61
60
61
64
46
57
62
45
59
41
56
54
55
42
44
43
63
48
53
50
52
58
49
49
66
65
51
76
70
67
68
69
71
72
73
74
75

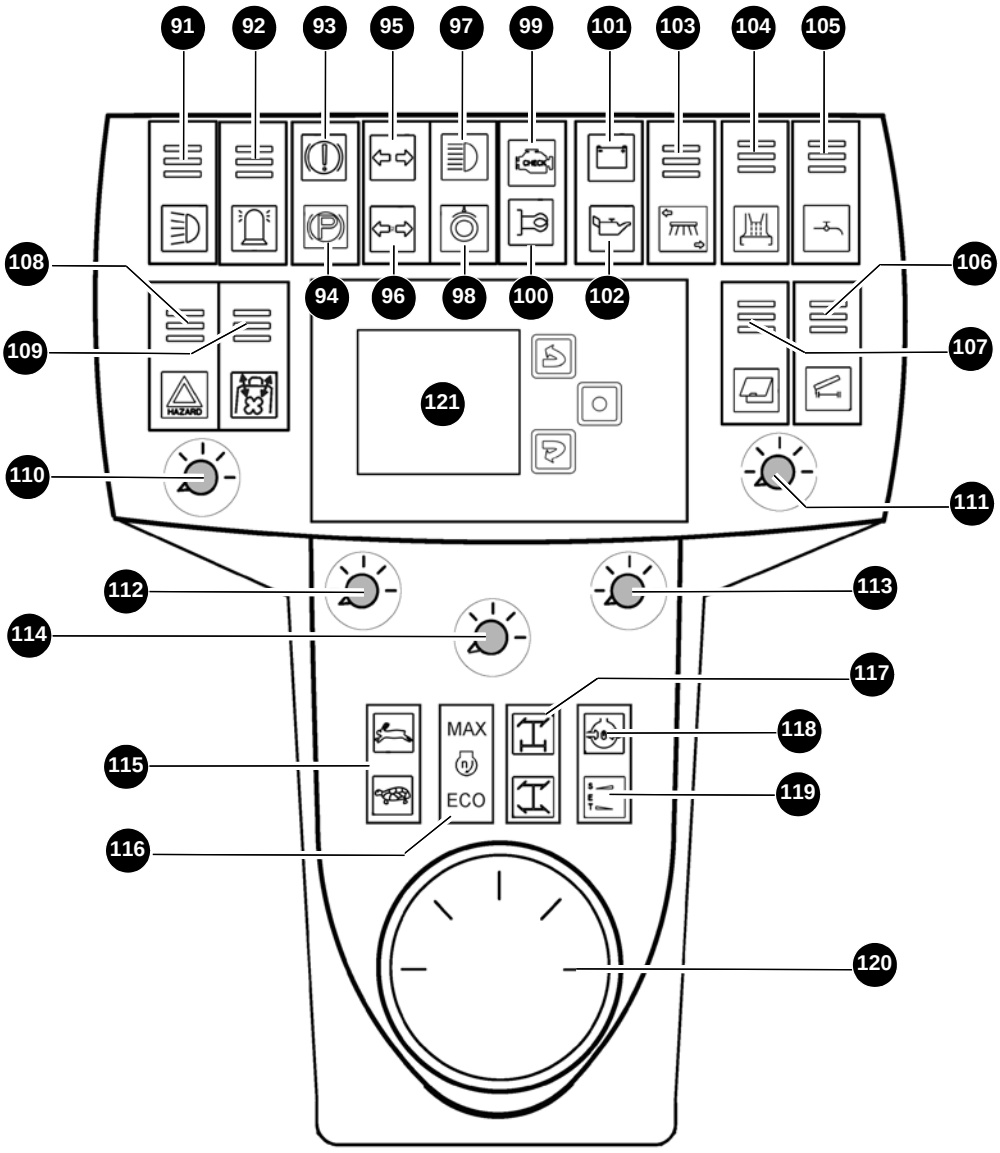
3.1.2 Vehicle doors, driver's cab (left-hand drive)

Vehicle doors and driver's cab (left-hand drive)		
Ref.	**Name**	
41	Grab handle, left	
42	Lock for sliding window, left	
43	Door opener/lock, left	
44	Door opener/lock, right	
45	Lock for sliding window, right	
46	Grab handle, right	
47	Steering wheel for servo-hydraulic steering	
48	Passenger seat	
49	Three-point seat belt	
50	Seat belt buckle	
51	Storage compartment for tool kit, warning triangle and first-aid kit (behind passenger's seat), control units	
52	Storage compartment for operating manual (behind passenger seat)	
53	Driver's seat	
54	Brake pedal (service brake)	
55	Accelerator pedal/drive pedal	
56	Leg room air vent, left	
57	Lever on steering column, left, for steering column adjustment	
58	Ignition switch	
59	Cigarette lighter / 3-pin socket (option)	
60	Combined switch on steering column (right) for windscreen wiper, washer system, low/high beam headlights, headlight flasher and horn, direction indicator	
61	Windscreen air vent	
62	Leg room air nozzle, right	
63	Hand brake lever (parking brake)	
64	Drive lever (forwards/neutral/reverse)	
65	Rotary knob, hot/cold	
66	Rotary knob, fan, 3-stage	
67	Air conditioning unit switch (option)	
68	Radio/transceiver installation area (option)	
69	Not connected	
70	Recirculated air control lever	
71	Fuse box	
72	Towing mode switch (lockable)	
73	Toggle switch, additional headlights ON/OFF (lockable)	
74	Tipping construction locking switch (lockable)	
75	Pressure relief switch for rear hydraulic connections	
76	Windscreen washer tank	


83
79
81
81
77
77
78
78
79
80
87
88
89
90
85
86
84
82

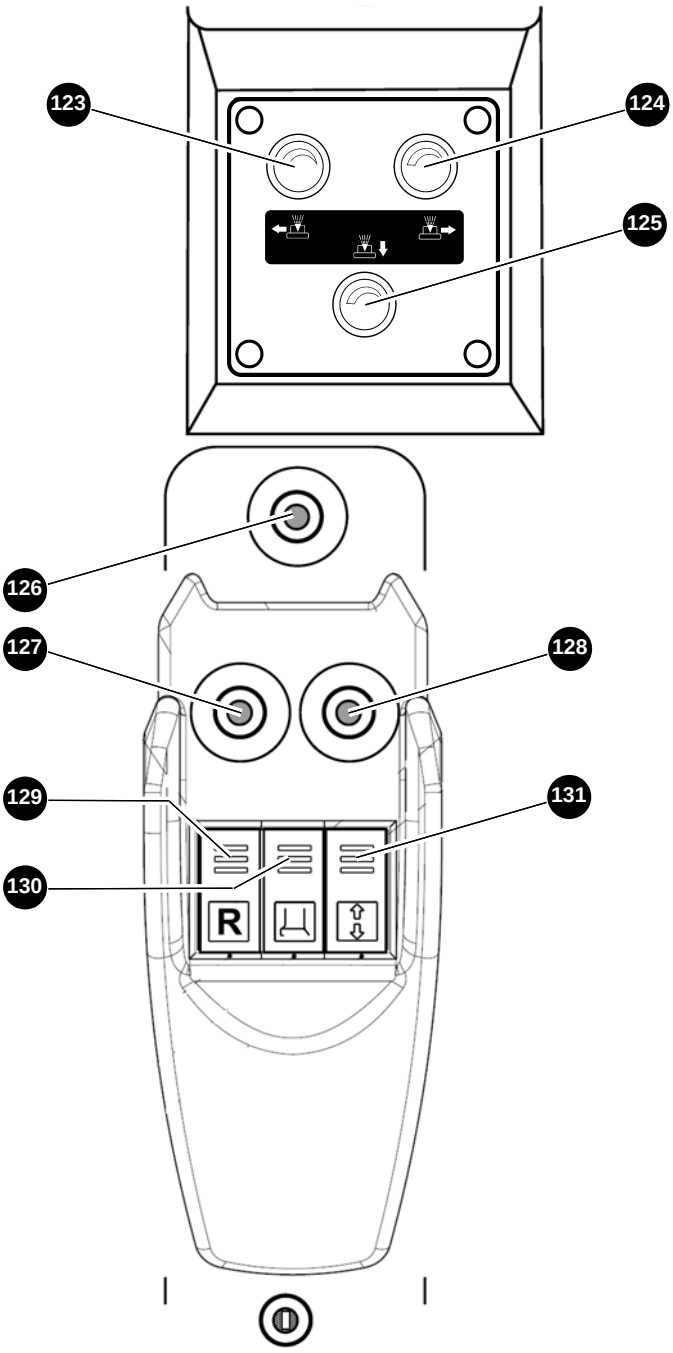
3.1.3 Operating elements, roof panel

Operating elements, roof panel		
Ref.	**Name**	
77	Sun visor, left/right	
78	Grab handle, left/right	
79	Roof panel	
80	Heated windscreen button (series production) heated wing mirror (option)	
81	Interior light	
82	Tachograph (option) / Radio (option)	
83	Sunshine roof knob (option)	
84	Headlight leveling	
85	Rear fog lamp button (yellow)	
86	Working lights toggle switch, front, ON/OFF (option)	
87	Not connected	
88	Not connected	
89	Fast winter service toggle switch (option)	
90	Not connected	


91
92
93
95
97
99
101
103
104
105
94
96
98
100
102
108
109
106
107
121
110
111
112
113
114
117
118
115
119
116
120
MAX
ECO
HAZARD

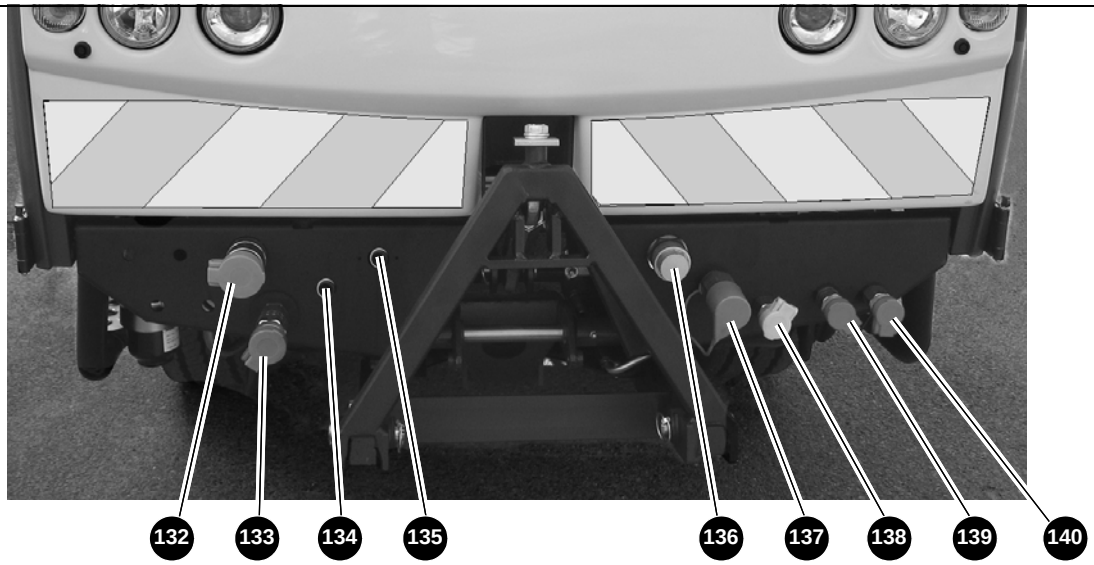
3.1.4 Operating elements, center panel

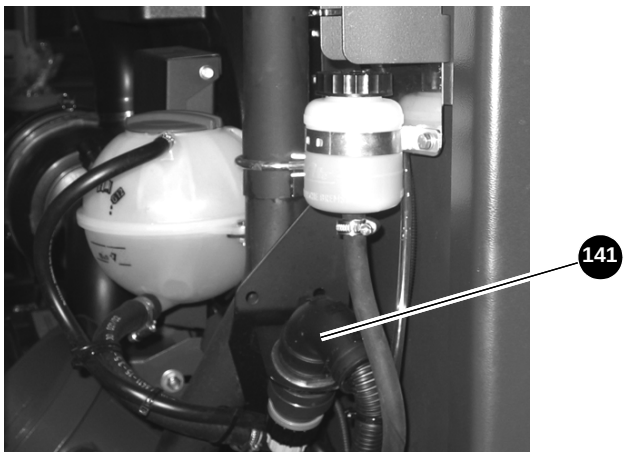
Operating elements, center panel		
Ref.	**Name**	
91	Driving lights switch, ON/OFF (green)	
92	Flashing beacon toggle switch (yellow)	
93	Brake fluid level warning light (red)	
94	Parking brake warning light	
95	Direction indicator control lamp (green)	
96	Direction indicator, trailer, control lamp (green)	
97	High beam control lamp (blue)	
98	Dirt hopper overloaded warning light	
99	On board diagnostics system (OBD) control lamp	
100	Engine preheating system control lamp (yellow)	
101	Generator battery charge warning light (red)	
102	Engine oil pressure warning light (red)	
103	Reverse rotation switch, 3rd brush (not used for 2-brush system)	
104	Recirculatory water valve switch	
105	Switch, position 1: Fresh water pump ON/OFF and position 2: 2nd water pump ON (option)	
106	Dirt hopper button, RAISE/LOWER	
107	Dirt hopper flap button, OPEN/CLOSE	
108	Hazard lights toggle switch ON/OFF (red)	
109	Reversible fan button (option)	
110	Control for brush pressure of 3rd brush (left-hand brush with 2-brush system)	
111	Control for brush pressure of left/right brush (right-hand brush with 2-brush system)	
112	Control for brush speed of 3rd brush (left-hand brush with 2-brush system)	
113	Control for brush speed of left/right brush (right-hand brush with 2-brush system)	
114	Fan speed control	
115	Drive mode button (transport mode/ transition mode / work mode with control lamp)	
116	Engine RPM knob, MAX = 2300 rpm; Standard = 1900 rpm; ECO (option) = 1600 rpm	
117	Front wheel steering / All-wheel steering button with control lamp	
118	Differential lock button (option)	
119	Cruise control (option)	
120	Speedometer	
121	Multifunctional display	
122	Not connected	

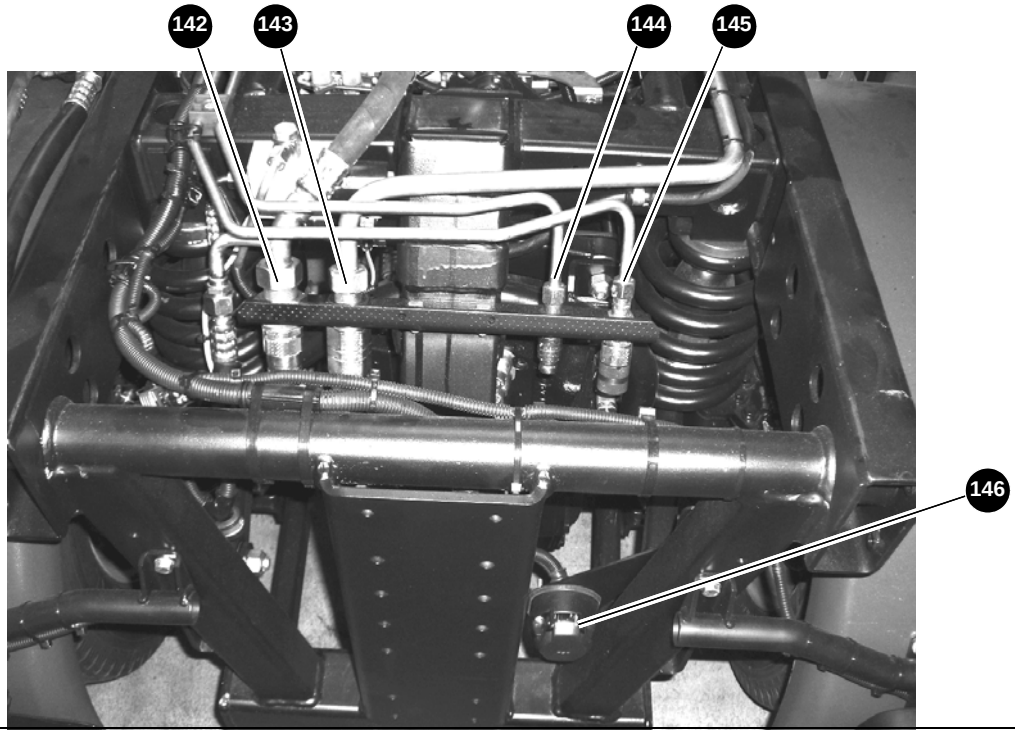

123
124
125
126
127
128
129
131
130
R

3.1.5 Operating elements, center panel

Operating elements, center panel	
Ref.	**Name**
123	Valve for water nozzle, 3rd brush (left-hand brush with 2-brush system)
124	Valve for water nozzle, left/right-hand brush (right-hand brush with 2-brush system)
125	Valve for water nozzle, vacuum nozzle
126	Joystick, 3rd brush (INCLINATION) (not used with 2-brush system or weed brush (option)
127	Joystick, 3rd brush (RAISE/LOWER/PIVOT) (left-hand brush with 2-brush system)
128	Joystick, left/right-hand brush (RAISE/LOWER/PIVOT) (right-hand brush with 2-brush system)
129	Work deployment button (reversing)
130	Vacuum nozzle flap switch
131	Front attachment device support button (RAISE/LOWER)


132
133
134
135
136
137
138
139
140


141


142
143
144
145
146

3.1.6 Operating elements on vehicle exterior

Operating elements on vehicle exterior		
Ref.	**Name**	
	Front of vehicle	
132	Return external valve manifold/winter service: Return snow sweeper (blue)	
133	Winter service: advance snow sweeper (green)	
134	Water connection, spray jet for left-hand brush	
135	Water connection, spray jet for right-hand brush	
136	23-pin socket	
137	Advance to external valve manifold (green)	
138	Cables (demand-dependent oil supply) to external valve manifold (yellow)	
139	Winter service (e.g. snow plough), pivot to left (red)	
140	Winter service (e.g. snow plough), pivot to right (red)	
	Rear of vehicle	
141	23-pole socket for sweeping process	
142	Return fan drive	
143	Advance fan drive	
144	Return left and right-hand hydraulic cylinder of dirt hopper flap	
145	Advance left and right-hand hydraulic cylinder of dirt hopper flap	
146	13-pin socket, e.g. spreader	

3.2 Starting Up

3.2.1 Safety information

- Only use the steps and grip handles provided to get in and out of the cab.
- Never use the control elements or movable lines and cables as grip handles.
- Never jump on or off the vehicle while it is moving.

3.2.2 Starting up for the first time

Important information

- The vehicle may only be put into service by authorized personnel – also refer to the Section "Directives" in this operating manual.
- Operating personnel must have read and understood this operating manual before starting the vehicle up.
- The vehicle may only be used when in a technically perfect condition, for its intended purpose, by safety-conscious persons aware of the risks involved in its use and taking the information in the operating manual into account!
- Go through the "Start-up" checklist in the following section.

Running-in period

Drive and work with the vehicle carefully during its first 100 operating hours.

The future performance and service life of the vehicle are heavily dependent on observing the following recommendations during the running-in period.

- Do not overload the vehicle but, at the same time, do not drive too cautiously either or the vehicle will never reach its proper operating temperature.
- Do not run the engine at top speed for long periods.
- Increase the load gradually whilst varying the engine speed.
- Pay strict adherence to the maintenance plans, refer to Maintenance Schedule.

3.2.3 Checklists

The checklists below are intended to assist you in checking and monitoring the vehicle before, during and after operation.

These checklists do not claim to provide complete lists; they are merely intended as an aid for you in fulfilling your duties conscientiously.

The checking and monitoring tasks listed below are described in greater detail in subsequent sections.

If the answer to one of the following questions is "NO", clear the cause of the fault first before commencing or continuing work.

"Start-up" checklist

Check the following points before putting the vehicle into service or starting up the engine:

No	Question	✔
1	Sufficient fuel in the tank?	
2	Coolant level OK?	
3	Engine oil level OK?	
4	Oil level in hydraulic oil tank OK?	
5	Oil level in brake fluid tank OK?	
6	Water level in windscreen wiper tank OK?	
7	Condition of V-belt OK?	
8	Brake system (incl. parking brake) OK?	
9	Emergency steering function OK? (Wheels must be capable of being steered by the steering wheel when the diesel engine is switched off.)	
10	Tire condition and pressure OK?	
11	Wheel nuts securely tightened (especially after changing a wheel)?	
12	Lights, signals, indicators, warning lights and control lamps OK?	
13	Are the windows, mirrors, lighting facilities and steps clean?	
14	Dirt hopper emptied and lowered?	
15	Has the vehicle been cleaned?	
16	Has the solution tank been filled?	
17	Has the circulating water tank been filled?	
18	Particularly after cleaning, maintenance or repair work: Have all cloths, tools and other loose objects been removed?	
19	Approved warning triangle, hazard light, high visibility vest and first aid kit in the vehicle?	
20	Steering wheel, seat position and rearview mirror correctly adjusted?	
21	Seat belt fastened?	

"Operation" checklist

Check and observe the following points after switching on the engine and during operation: "Parking the vehicle" checklist

No	Question	✔
1	Have the warning lights for engine oil pressure, alternator and coolant level message switched off?	
2	Are there any warning messages in the multifunctional display?	
3	Braking effect sufficient?	
4	Engine coolant in normal range?	
5	Is the steering working properly?	
6	Is anyone inside the vehicle's danger zone?	
When traveling on public roads, particular attention should be paid to the following points:		
1	Pivot brushes to their transport position.	
2	If necessary, switch the steering to front wheel steering.	
3	Activate transport drive mode.	
In work mode (sweeping operation)		
1	Activate work driving mode	
2	Activate the operating mode required: ECO (option) / STANDARD / MAX	
3	Select brush speed, brush ground pressure, fan speed according to the degree of soiling encountered.	
4	Switch on the solution pump for the brush spray jets and adjust the quantity of solution so that the dust in the sweeping area is bound optimally.	
5	If necessary, switch on the industrial water to moisten the vacuum nozzle and adjust the water quantity.	
6	Switch on the flashing beacon and lighting, if necessary.	
Interrupting work mode briefly:		
1	Activate transition mode.	
2	Interrupt work mode.	
3	After the interruption, reactivate work mode again. (All the functions for sweeping operation are reactivated.)	

Check and observe the following points when parking the vehicle:

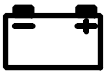
No	Question	✔
1	Has work mode been switched off?	
2	Has the parking brake been actuated?	
3	Has the driver's cab been locked? Particularly important when the vehicle will be left unattended.	
Parking on public roads:		
4	Has the vehicle been secured properly?	
Parking on inclines:		
5	Has the vehicle been additionally secured with chocks under one of the wheels to prevent it from rolling away?	

3.3 Indicator and operating elements

3.3.1 Important indicator and warning lights

Attention!

If you ignore control lamps which have lit up and/or warning messages with the corresponding descriptions and warnings, the result could be personal injury or vehicle damage!

Symbol	Color	Function	Lights up/flashes:
	Green	Direction indicator, towing vehicle	• Periodically on actuating the direction indicator.
	Green	Direction indicator, trailer	• Periodically on actuating the direction indicator when an electrical connection to the trailer exists.
	Blue	High beam	• When high beam is switched on. • When the headlight flasher is activated.
	Yellow	EOBD	• Flashes in the case of a fault in the exhaust after-treatment system • Continue driving carefully and visit an authorized service center immediately!
	Yellow	Preheating system and engine control unit	• Lights up when the key in the ignition starter switch is in Pos. **1**. • Does not light up when the engine is already at operating temperature. The engine can be started immediately. • Goes out after reaching ignition temperature. • When the control lamp flashes, the preheating process has been interrupted and must be repeated. • The control lamp flashes when the key in the ignition starter switch is in Pos. **1** or, quickly or slowly during operation, when a fault has occurred in the engine control unit. • Visit an authorized Hako service center!
	Red	Battery charging, alternator	• When the ignition is switched on, but goes out as soon as the engine is started. • When the engine is running, it indicates a defect in the alternator fan belt or the alternator charging circuit. The battery is no longer charged.

Symbol	Color	Function	Lights up/flashes:
	Red	Engine oil pressure	• When the ignition is switched on, but goes out as soon as the engine is started. • When the engine oil pressure is too low.

Attention!

If the engine oil pressure warning lamp lights up while the engine is running, there is a risk of engine damage!

☞*Stop the vehicle in a safe place without delay*.

☞*Switch off the engine immediately and check the oil level.*

☞*Clear the cause for insufficient engine oil pressure (or have it rectified).*

Symbol	Color	Function	Lights up:
	Red	Brake warning light	• When the brake fluid level in the brake system tank is too low.

Danger!

If the brake warning light lights up, there is a

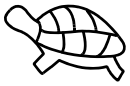
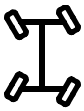
Risk of accident!

☞*Stop the vehicle in a safe place without delay*

☞*Clear the cause of the noise or loss of brake fluid (or have it cleared)*

☞*Check the brake fluid level, correct as necessary*

The brake warning light goes out when the brake fluid level is in the admissible range again and/or the fault in the brake system has been corrected.

Symbol	Color	Function	Lights up:
	Yellow	Rear fog lamp	• When the rear fog light is switched on.
	Green	Windscreen and mirror heating (option)	• When the windscreen heating and the mirror heating (option) is switched on.
	Green	Work mode	• When work mode is switched on.
	Green	Transport mode	• When transport mode is switched on.
	Green	Front wheel steering	• When front wheel steering is switched on, in work mode only.
	Green	All-wheel steering	• When all-wheel steering is switched on, in work mode only. • Flashes during synchronization until the process is completed. • Flashes when the rear axle is locked.
	Yellow	OBD	• Flashes when there is a malfunction of the exhaust gas after-treatment system. (Visit an authorized Hako service center if necessary!)
	Red	Axle load	• When the admissible axle load is exceeded.
	Red	Parking brake	• On actuating the hand brake lever of the parking brake.

Attention!

There is a risk of overheating if the parking brake is not fully released!

☞*Always release the parking brake completely until the parking brake warning lamp goes out before driving away.*

3.3.2 Multifunctional display

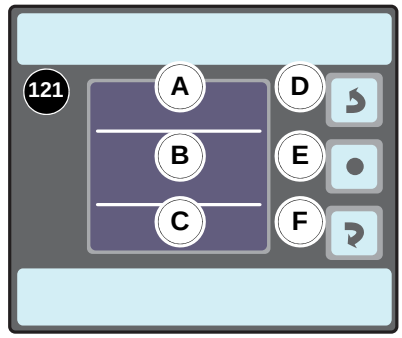


Fig. 13:

The multifunctional display **121** monitors a variety of functions and operating parameters of the vehicle. The multifunction display also provides information as to the vehicle status and maintenance as well as malfunctions.

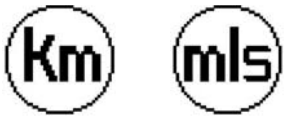
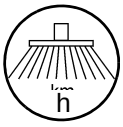
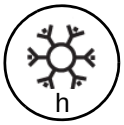
The multifunction display is split into the top, middle and bottom areas. A maximum of two operating parameters can be displayed at the same time.

- Top section **A** of the multifunctional display:
  - Parameter values
- Middle section **B** of the multifunctional display:
  - Driving modes
  - Steering modes
  - Information and service messages
- Lower section **C** of the multifunctional display:
  - Parameter values

Use the buttons **D** and **F** to move between the various parameters. If a parameter value appears for longer than 4 seconds, this value is saved and is displayed the next time the ignition is switched on.

The button **E** serves to acknowledge (OK) warning and error messages.

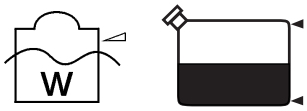
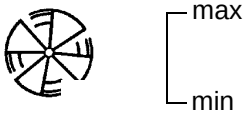
Top section of the multifunctional display:

Symbol	Parameter:	Unit:	Comment:
	Engine speed	rpm	
	Total driving distance	km/mls	Is permanently saved, cannot be deleted.
	Day's driving distance	km/mls	Is permanently saved, can be deleted.
	Operating hours, vehicle	h / min	Is permanently saved, cannot be deleted.
	Operating hours, work hydraulics	h / min	Is permanently saved, cannot be deleted.
	Brush	h	
	Winter service	h	

Middle section of the multifunctional display:

Symbol	Parameter:	Unit:	Comment:
	Transport mode		Transport mode active
	Work mode		Work mode active
	Front wheel steering		Front wheel steering activated
	All-wheel steering		All-wheel steering activated
	Main consumer axle, rear		Locked rear axle activated
	Towing mode		Towing mode activated
SERVICE 10 H	Service information	h	Indicates the operating hours until the next service is due
10:28 26.02.2009	Time Date	h:min Day, Month, Year	

Parameters in the bottom section of the multifunctional display:

Symbol	Parameter:	Unit:	Comment:
	Diesel fuel quantity	l	The symbol on the right indicates the fill level graphically
	Cooling water temperature	°C	
	Hydraulic oil temperature	°C	
	Time	Hours / Minutes	
	Solution	l	The symbol on the right indicates the fill level graphically
	Fan speed	rpm	

The following messages are displayed as plain text in the multi-function display:

Service information

All service information are displayed with a "STOP" symbol.

Plain text	Cause
CU HYDROSTAT	Hydrostat
CU WORKHYDR.	Work hydraulics
CU STEERING	Steering
CU DISPLAY	Multifunction display

Continuous warnings

All continuous messages are displayed with a "WARNING" symbol (exclamation mark in a triangle) accompanied by a cyclical dual tone.

Plain text	Cause
HYDRAULIC OIL LEVEL!	Hydraulic oil level too low
COOLANT LEVEL!	Coolant level too low
HYDRAULIC OIL TEMPERATURE TOO HIGH!	Hydraulic oil temperature too high
COOLANT TEMPERATURE TOO HIGH!	Coolant temperature too high

Warnings

All warnings are displayed with a "WARNING" symbol (exclamation mark in a triangle). All warnings are only reset following a vehicle RESET (ignition off -> on).

Plain text	Cause
AIR FILTER SOILED!	Soiled air filter
RETURN FILTER SOILED!	Return flow filter is soiled
PRESSURE FILTER SOILED!	Hydraulic pump pressure filter is soiled
BRUSH SYSTEM!	Incorrect attachment connected (brush system detected as being in Winter service)

Information

All information is displayed with the "INFO" symbol (in a circle).

Plain text	Cause
FRONT IMPLEMENT CARRIER!	Front attachment support is lowered!
FRESH WATER RESERVE!	Solution level too low
PLEASE REFUEL!	Diesel level too low
HOPPER!	Dirt hopper is raised
PARTICLE FILTER	Diesel particulate filter regeneration
HAND BRAKE!	Hand brake is applied
HYDRAULIC PUMP UNDERPOWERED!	Hydraulic pump undersupply
SEAT CONTACT SWITCH!	Seat contact switch measure is active
TURN INDICATOR SWITCH!	Drive control must be set to the neutral position

The messages are subdivided into:

Symbol	Message:	Function:	Buzzer:	Reaction:
	**Information**	Message concerning an uncritical vehicle status.	Sounds only in respect of undersupply, does not have to be acknowledged.	☞*Follow information, clear error*
	**Warning**	Message concerning a critical vehicle status.	Sounds several times, must be acknowledged by pressing the button.	☞*Investigate the cause* ☞*Contact authorized service center*
	**Service information**	Message concerning a very critical vehicle status.	Sounds continuously, must be acknowledged by pressing the button. In the event of warnings related to the coolant level, coolant temperature, hydraulic oil level, hydraulic temperature, the buzzer sounds continually and rhythmically.	☞*Stop the vehicle immediately* ☞*Contact authorized service center*
	**Safety monitoring**	Message indicating the vehicle has been set to a safe condition.	No buzzer signal.	Creeping speed; continue drive is possible after restarting the engine.

Note!

If several messages occur simultaneously, they are displayed in the sequence in which they were received. If the message is acknowledged by pressing a button, the next message is displayed.
Acknowledged messages are displayed in the middle part of the multifunctional display as a reminder.
When the ignition is switched off and switched back on again, all messages are redisplayed and have to be acknowledged again.

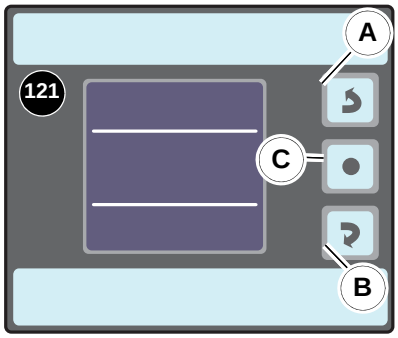


Fig. 14:

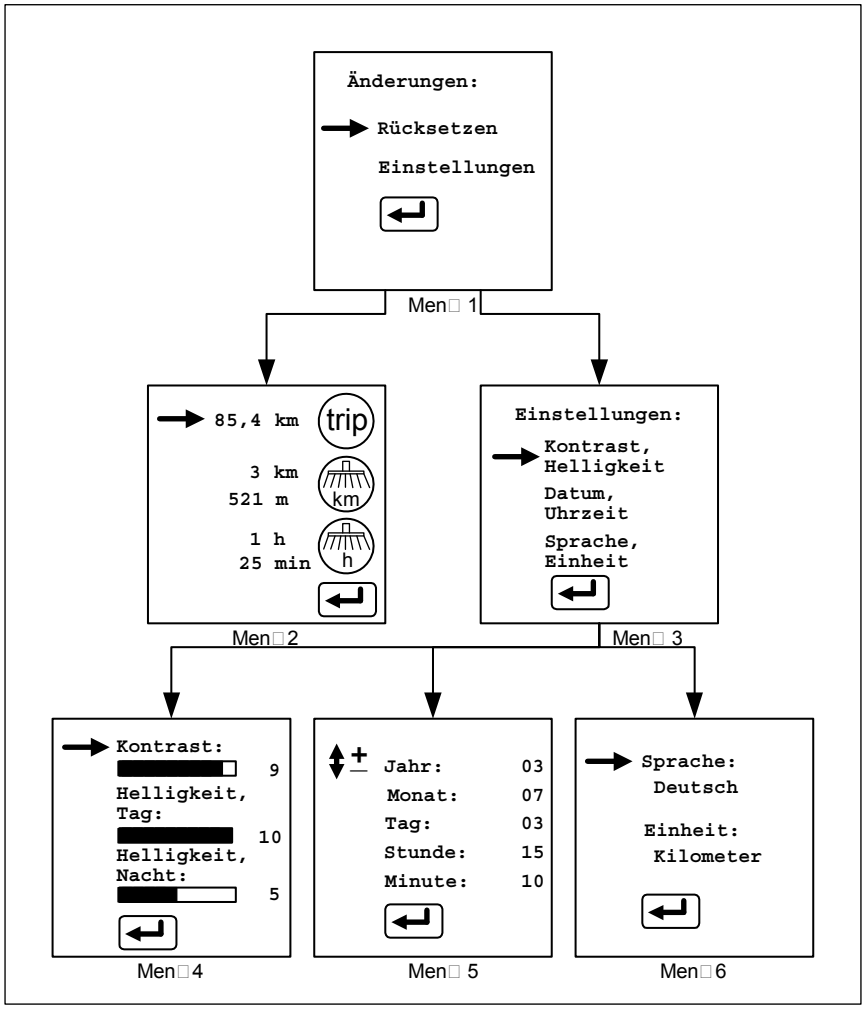
Setting the multifunctional display – setting mode

Setting mode can be used to *reset* the day's driving distance to zero or *adjust* the brightness, contrast, time and language.

☞Press *button* **C** *for approx. 1.5 seconds*

- Menu 1: Setting mode activated
  - ☞ *Select an option by pressing button* **A** *(move up) or* **B** *(move down).*
  - ☞ *The selection (arrow) is confirmed by pressing the button* **C***.*

.



MFA_Menue.eps

means move one menu level up.

3.3.3 Speedometer

Fig. 15:

Function:

It indicates the current driving speed kph (kilometers per hour) and mph (miles per hour).

Note!

The speedometer is adjusted to the size of the tires mounted when delivered from the factory. If a different tire size is used, the hydrostat control unit must be programmed accordingly by means of a diagnosis unit at an authorized service center!

3.3.4 Start system (option)

Function:

The main battery switch is on the left-hand side of the vehicle between the driver's cab and superstructure. The main battery switch interrupts the power supply to all the electrical consumers in the vehicle except the tachograph.

Note!

The engine can only be started when the main battery switch is switched on!

Interrupt the power supply

Turn the key A counterclockwise (horizontal) and remove it.

Switching on the power supply

Insert the key A.

Turn the key A clockwise until it latches (vertical)

3.3.5 Ignition switch

Note!

The engine can only be started when the drive lever **64** is in its neutral position.
The ignition starter switch is provided with a start repeat interlock so that the starter cannot engage in the diesel engine while running: Turn back to position **0 (Stop)** before attempting to switch from position **1** to position **2** again.

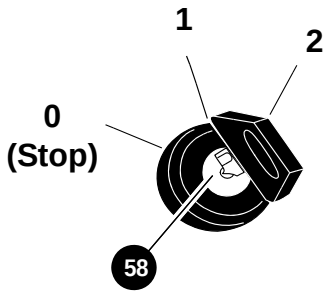


Fig. 16:

Pos.	Function	Power consumer
0 (Stop)	Ignition OFF / parking position Insert or remove ignition key	• Parking light, cigarette lighter, interior lights, flashing beacon, hazard lights
1	Ignition ON / driving position	• All control and warning lights, except preheating, light up for approx. 2 s • Warning lamp for parking brake lights up, if necessary
	System check	• All control and warning lamps light up for approx. 3 seconds • Battery charge and engine oil pressure warning lamps light up
	Engine preheating (below 5 °C approx. 20 seconds)	• Preheating control lamp lights up, engine is preheated until control lamp goes out • All functions are switched on
2	Start the engine	• Starter is actuated • Control and warning lamps must go out
1	Ignition ON / diesel engine ON	• Control and warning lamps must go out • Warning lamp for parking brake lights up, if necessary

3.3.6 Brakes

General information

The level of wear of the brake linings is heavily dependent on:

- the conditions of use, e.g. short or long travel distances,
- flat land, hills,
- manner of driving.

Therefore, it may be necessary to have the brake linings checked between the maintenance intervals specified by your authorized Hako service center.

The braking effect may be negatively affected by:

- wet and/or cold,

  ☞Apply the brakes until they are dry.
- de-icing salt,

  ☞The salt layer on brake discs and brake linings must first be worn off during braking.
- overheating

  ☞Do not "ride" the brakes by pressing the pedal lightly.

  ☞When driving downhill, reduce speed in time.

  ☞Exploit the braking effect of the diesel engine.

  ☞During long downhill routes, apply the brake at additional intervals.

  ☞Drive carefully and with foresight.

Danger!

The braking effect can change in certain operating conditions, such as after driving through puddles of water, driving in heavy rainfall, after cleaning the vehicle or driving on de-ice salted roads!

Risk of accident!

☞The brakes must be ground in again by driving slowly and carefully actuating the brake pedal!

Brake booster

The brake booster operates by means of a negative pressure which is only produced when the engine is running.

Danger!

The brake booster does not work when the engine is switched off. The brake pedal has to be pressed in much harder!
Take this into account, especially when towing the vehicle!

Risk of accident!

☞*Use a tow-bar whenever possible!*

The brake control lamp **93** lights up to indicate the brake fluid level is too low.

Hand brake lever (parking brake)

Function

- To park the vehicle and secure it against rolling away (parking brake).
- Emergency brake should the service brake fail.

Danger!

The parking brake may only be used as a service brake in an emergency, i.e. if the service brake fails. The brake lights donot light up in this case. **Risk of accident!**
Bring the vehicle to a service center immediately.
*In normal operation, only the brake pedal **54** is used as the service brake because this causes the rear brake lights to light up.*

The braking power of the parking brake is determined by the rear wheel with the least friction value to the driving surface. When the vehicle is parked on a slope with one rear wheel parked on solid and dry ground while the other rear wheel is parked on ice or snow, the maximum brake power is determined by the friction factor between the wheel and the ice.
If the vehicle rolls away, it represents a **risk of accident!**
When parking on a slope, also switch on all-wheel drive.
When parking on a slope, secure the vehicle with wheel chocks!

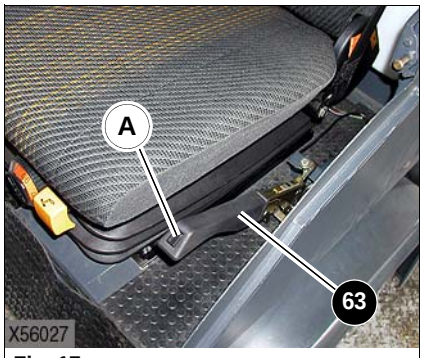


Fig. 17:

Preventing the vehicle from rolling away

☞*Pull the hand brake lever **63** upwards to apply the parking brake.*

- The warning light **94** lights up.

You should notice firm resistance after pulling past 6 to 8 latching points.

- If not, the parking brake is not in working order!

  ☞ *Have the parking brake inspected by a specialist immediately.*

Releasing the parking brake

☞*Pull up the hand brake lever slightly, press in the button **A** on the hand brake lever and move the hand brake lever downwards.*

- The parking brake is released and the warning light **94** goes out.

While driving, only use the parking brake as an auxiliary brake in an emergency. PARKING BRAKE! appears in the multifunctional display.

☞***In an emergency**, pull the hand brake lever **63** upwards, forcefully.*

Note!

The hand brake lever acts on a separate brake drum on the gear shaft via a brake cable.

Brake pedal

Fig. 18:

Function

- Decelerates the vehicle.

Actuating the service brake

☞*Press the brake pedal **54** down according to the braking effect required*

Note!

When the vehicle is fully loaded, a higher braking pressure is required to decelerate it.

- The pedal travel foot power which must be applied increases.
- The maximum braking effect which can be achieved with a loaded vehicle is reduced as compared to an unloaded vehicle.

Danger!

When a brake circuit fails (brake warning light ***93*** lights up), the pedal can be pressed through much further and the braking effect which can be achieved is considerably lower. There is a

Risk of accident!

☞*Press the pedal in further, quickly*

☞*Stop the vehicle in a safe place without delay.*

☞*Clear the cause of the noise or loss of brake fluid (or have it cleared)*

☞*Check the brake fluid level, correct it as necessary; refer to Chapter "Maintenance".*

3.3.7 Steering

Danger!

In the case of failure of steering assistance:
Turning the steering wheel requires greater effort! Take this into account, especially when towing the vehicle!
The vehicle is no longer operational and represents a

Risk of accident

☞*Drive the vehicle to the next possible parking area!*

☞*Adapt the towing speed to the altered steering behavior!*

Note!

The steering system is only operational when the engine is running! If the diesel engine breaks down or the hydraulic powered steering fails (e.g. due to breakdown of the pump drive), the vehicle can still be steered – emergency steering facility.
Check the emergency steering function every time before starting to drive as follows. With the diesel engine off, turn the steering wheel to the left and to the right. It must be possible to turn the steering wheel with some strength, and the wheels must follow the steering movement

Do not leave the steering wheel in a full lock position for more than 15 seconds. A continuous full lock causes the servo pump to heat the hydraulic oil very strongly. This can damage the servo steering system.

Every full lock while at a standstill is also noticeable through noise because of the strong load applied to the servo pump. In addition, the idle speed of the engine is reduced for a short time.

Steering column adjuster

The height and inclination of the steering wheel and steering column **47** can be adjusted to suit each driver.

Adjust the steering column as follows before starting to drive

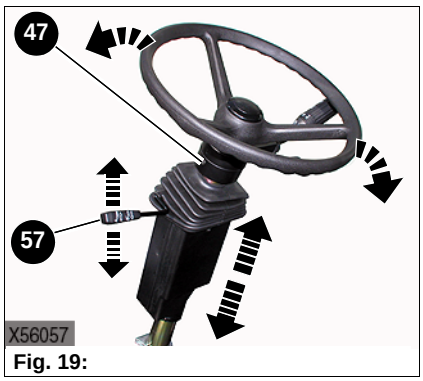


Fig. 19:

Steering column adjuster		
Height	☞*Pull up lever **57***	• The height of the steering column **47** can be adjusted.
Inclination	☞*Press down the lever **57***	• The inclination of the steering wheel **47** can be adjusted.

Steering modes

The following steering modes are available for selection:

- Front wheel steering, for transport mode when driving to work sites on roads, and for work mode.
- All-wheel steering (only available in work mode).
  All-wheel steering is automatically activated on selecting work mode.

Danger!

Only change the steering mode when the vehicle has stopped.

Risk of accident

☞*First, stop the vehicle.*

☞*Synchronize the steering.*

Note!

Before changing over to transport mode after termination of operating with four-wheel drive, stop the vehicle and turn the steering wheel slowly to the left or the right past the straight ahead position.

☞*Select a new steering mode*

Front wheel steering

- Steering mode which is normally used

Note!

Always engage front wheel steering when driving on public roads in transport mode (0 - 50 km/h).

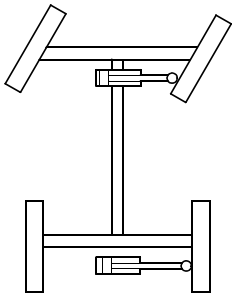


Fig. 20:

All-wheel steering

- In this steering mode, the rear axle wheels are steered in the direction opposite to the front axle wheels.
  Advantage: Small turning radius.
- This steering mode is only available in work mode.

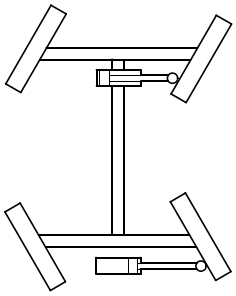


Fig. 21:

Steering mode switch

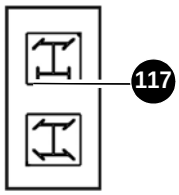


Fig. 22:

The all-wheel steering can only be activated in work mode.

Steering mode	Tip switch 117	Effect
All-wheel steering	☞*Press the tip switch **117** on the bottom symbol*	• Control lamp (all-wheel steering) flashes until the front axle has reached the straight ahead position. • All-wheel steering is automatically activated. • Control lamp (all-wheel steering) lights up.
Front wheel steering	☞*Press the top section of tip switch **117***	• Control lamp (front wheel steering) flashes until the rear axle has reached the straight ahead position. • Front wheel steering is automatically activated. • Control lamp (front wheel steering) lights up.

3.3.8 Traction drive

Selecting the driving mode

The Citymaster has two driving modes available for selection, one for driving in respect of driving to a work site and one for driving when completing work. Select the modes as recommended below according to the type and duration of use.

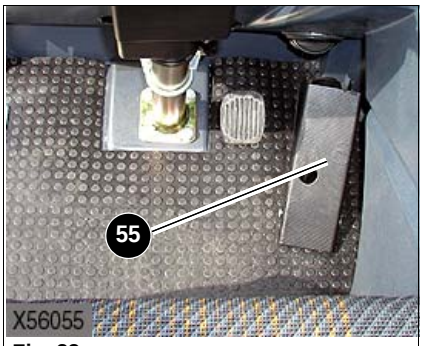


Fig. 23:

Automotive drive

This represents the normal driving mode (transport mode) when driving the vehicle on public roads between work sites. The vehicle is then driven in the same way as a "car":

☞*The driving direction is selected with the drive lever **64** on the steering wheel column.*

☞*Tread on the accelerator pedal **55** to move the vehicle in the direction selected to its maximum speed.*

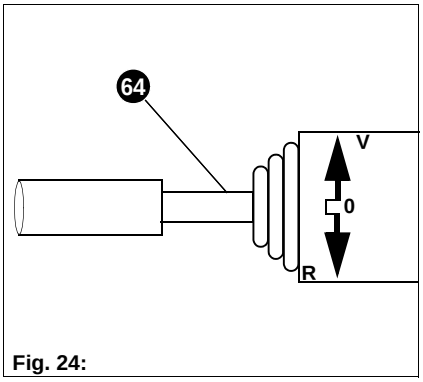


Fig. 24:

Cruise control

Use the switch **119** to drive the vehicle at a constant speed. Accelerate/ Decelerate to the desired speed (min. 2 kph) with the accelerator pedal and then press the switch to accept it.

Cruise control is interrupted by actuation of the brake or by pressing the tip switch.

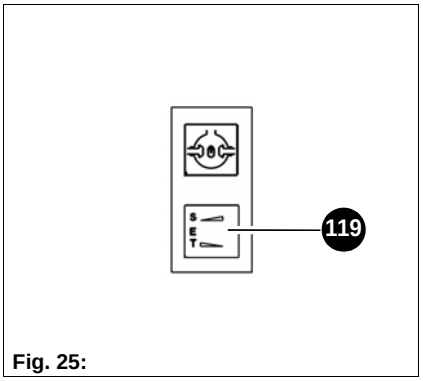


Fig. 25:

Danger!

Increased risk of accident due to reduced caution of the driver and due to delayed braking (according to position of the foot).

Risk of accident

☞*Keep foot ready to apply the brakes.*

☞*Increased vigilance.*

Accelerator pedal

Fig. 26:

Different drive modes are available which can be selected according to the task at hand. Normally, the vehicle is operated in automotive mode. In this case, the accelerator pedal **55** regulates the speed of the diesel engine:

Accelerator	Effect
• Tread down	• Engine speed, driving speed increase
• Release pedal slowly	• Engine speed, driving speed decrease
• Release pedal fully	• Braking effect of the hydrostatic drive and diesel engine takes effect

Note!

The maximum speed possible is dependent on the drive mode selected with the tip switch **115**.
The strong braking effect of the hydrostatic drive which occurs when the accelerator is suddenly released represents a risk of the wheels on the rear axle blocking in the event of bad weather condition (wet or dirty roads, ice and/or snow)!
When the vehicle brakes are applied abruptly with the hydrostatic drive or the foot is removed from the accelerator pedal suddenly, the brake lights are switched on to warn following traffic.

Attention!

In the case of hydraulic oil temperatures under 10 °C, the diesel engine speed is reduced by the drive control to prevent damage to the hydraulic pumps.

Attention!

The drive control is limited by a sensor on the pressure filter in the case of a soiled pressure filter. Under certain conditions, the vehicle no longer reaches top speed.
The "PRESSURE FILTER SOILED!" warning message appears. Replace the pressure filter cartridges!

Drive lever

Danger!

There is a strong braking effect of the hydrostatic drive when the driving direction is changed abruptly.

Risk of accident

☞*Stop the vehicle before changing the driving direction!*

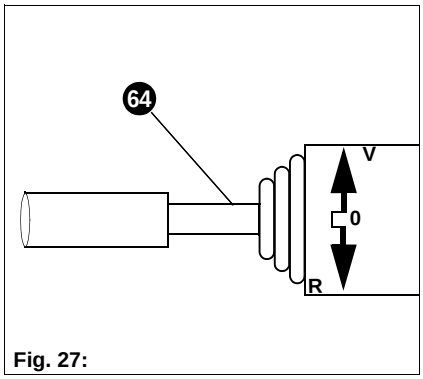


Fig. 27:

Function:

- Select the driving direction, forwards or reverse
- Neutral position

Note!

The engine can only be started when the drive switch **64** is in its neutral position. If this is not the case, DRIVE LEVER! appears in the multifunctional display.

Selecting the driving direction using the drive lever 64

The drive lever has the following lever settings:

Position	Drive lever	Effect
• **V**	☞***64*** *Move forward*	• Drive forwards.
• **o**	☞***64*** *Set to center position*	• Neutral position.
• **R**	☞***64*** *Move back*	• Drive in reverse. • The reversing light lights up. • If a reversing warning system (option) is installed, a pulsing acoustic alarm is issued.

Drive mode switch

The following drive modes can be selected using the tip switch **115**:

- Work mode (sweeping operation)
- Transition mode
- Transport mode

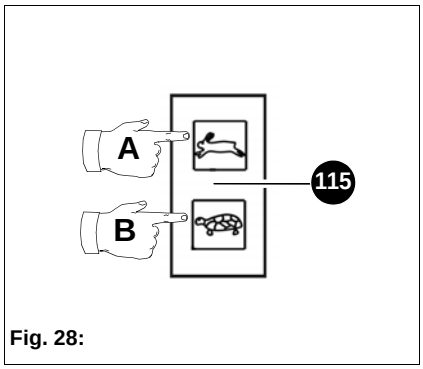


Fig. 28:

Activating work mode

In work mode, the driving speed (0 to 15 kph) can be more precisely adapted to the task at hand when using higher driving torques; it enables a smoother working process.

- Switching on work mode from transition mode
  - Press the tortoise **(B)** on tip switch **115** once.
- Switching on work mode from transport mode
  - Press the tortoise **(B)** on tip switch **115** twice.

The following functions are activated in work mode:

- Fan drive ON/OFF
- Fresh water pump ON/OFF
- Recirculatory water valve ON/OFF
- Vacuum nozzle RAISE/LOWER
- Brush RAISE/LOWER
- Brush drive ON/OFF

Note!

The engine speed remains constant in work mode. The driving speed is regulated via the accelerator pedal.
The fan only operates when the dirt hopper is lowered and the hopper flap is closed.

Activating transition mode.

Use the tip switch **115** to interrupt work mode, e.g. for a short transition drive to a different work area, and then reactivate work mode by simply pressing the switch again. When transition mode is activated, the driving speed range is 0 to 20 kph.

- Activating transition mode from work mode
  - Press the hare **(A)** on tip switch **115** once.
- Activating transition mode from transport mode
  - Press the tortoise **(B)** on tip switch **115** once.

Activating transport mode

When transport mode is activated, the driving speed range is 0 to 50 kph.

- Switching on work mode from transition mode
  - Press the hare **(A)** on tip switch **115** once.
- Activating transport mode from work mode
  - Press the hare **(A)** on tip switch **115** twice.

Operating mode switch

The switch **116** is used to select the required engine speed.

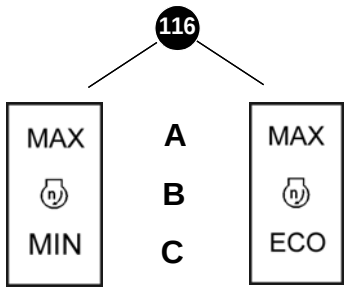


Fig. 29:

MAX operation

MAX operation is activated by setting the switch **116** to position **(A)**. The engine speed is increased to 2300 rpm.

Standard operation

STANDARD operation is activated by setting the switch **116** to position **(B)**. The engine speed is set to 1900 rpm.

MIN operation

MIN operation is activated by setting the switch **116** to position **(C)**. The engine speed is set to 1900 rpm.

ECO operation (option)

ECO operation (option) is activated by setting the switch **116** to position **(C)**. The engine speed is reduced to 1600 rpm. The brush and fan speeds are limited. After switching ECO operation off, the engine speed reverts to 1900 rpm. ECO operation should not be activated for winter service.

3.3.9 Light and signal system

Note!

Observe the applicable national regulations in the country of use when using the light and signal system described!

Driving lights switch

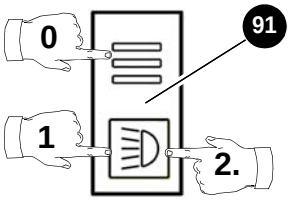


Fig. 30:

Function

The switch **91** in the center panel is used to control the following functions:

- Switching the headlights (parking/low beam), clearance lights, rear lights, dashboard lighting on and off.

Operation

Parking light, driving lights		
1.	☞*Press on the symbol of the tip switch **91** to Position 1*	• Parking light on • Control lamp in tip switch **91** on • Dashboard lighting on
2.	☞*Press on the symbol of the tip switch **91** to Position 2*	• Low beam or high beam on (depending on the position of the combined switch **60**) • Control lamp in switch **91** on • Dashboard lighting on
OFF (0)	☞*Press the top section of the tip switch **91***	• Parking light and low beam off • Control lamp in tip switch **91** off • Dashboard lighting off

Daytime running light (option)

For countries in which daytime lights are compulsory, press the top section of tip switch **91**: Parking light and low beam on, control lamps and dashboard lighting off.

When tip switch **91** is in its OFF position, the parking light and low beam are switched on. The working lights (option) and rear fog lamp cannot be switched on.

Combined switch on the left of the steering column

Function

The combined switch **60** on the left of the steering column controls the following functions:

- Headlights (low beam/high beam)
- Headlight flasher
- Direction indicator
- Horn
- Windscreen wipers and washer system

Operating the headlights

Note!

If the ignition is switched off – key in ignition starter switch **58** turned to position **0** – while the low beam or high beam are switched on, only the parking light remains on!

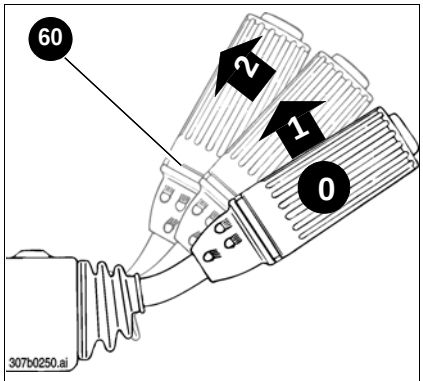


Fig. 31:

Low beam/High beam/Headlight flasher		
0	☞*Move the combined switch **60** to its home position*	• High beam off • Control lamp **97** off
1	☞*Move the combined switch **60*** up	• Headlight flasher on • Control lamp **97** on
2	☞*With low beam on, move the combined switch **60** up*	• High beam on • Control lamp **97** on
1	☞*With high beam on, move the combined switch **60** up*	• Low beam on • Control lamp **97** off

Headlight leveling

To prevent dazzling other road users, the headlight setting can be adjusted or changed when heavy loads are being transported.

☞*Check the headlight leveling adjustment following every change of weight!*

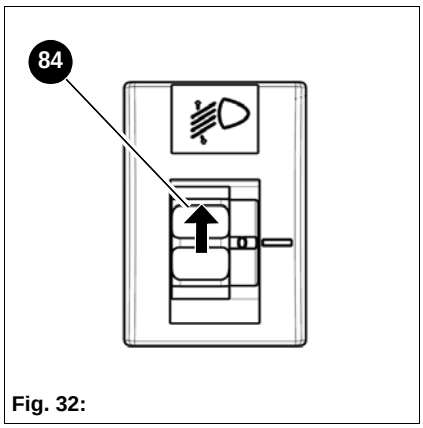


Fig. 32:

Headlight leveling		
0	☞*With low beam switched on, turn the rotary knob **84** to position* **0**	• Home position when the vehicle has no load and up to 500 kg load capacity
1	☞*With low beam switched on, turn the rotary knob **84** to position **1, 2**, **3** or **4***	• Between 500 kg and 1000 kg load capacity
2		• Between 1000 kg and 1500 kg load capacity
3		• Over 1500 kg load capacity
4		• Special use with heavy rear attachment devices

Note!

The headlight leveling knob **84** does not affect the auxiliary headlights (option).

Always have your authorized Hako service center set the basic setting of the headlights. The headlight leveling knob **84** must be in its home position (**0**) to do this!

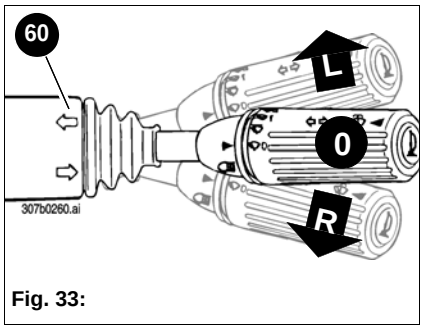


Fig. 33:

Indicator lights		
LEFT (L)	☞*Move the combined switch **60** to the front.*	• Control lamp **95** flashes; in the case of trailer mode, control lamp **96** also flashes.
RIGHT (R)	☞*Move the combined switch **60** to the rear*.	• Control lamp **95** flashes; in the case of trailer mode, control lamp **96** also flashes.
OFF (O)	☞*Combined switch **60** in center position*	• Control lamps **95** and **96** are off.

Attention!

If control lamp **95** or **96** flashes approx. twice as fast as normal, the indicator system is defective!

☞*Check the indicator lights at the front, rear and sides immediately as well as those on the trailer.*

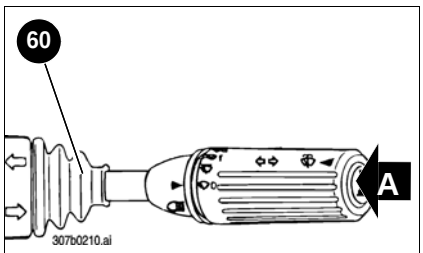


Fig. 34:

Horn		
0	☞*Move the lever **60** to its home position*	• Horn off.
1	☞ *Press the knob **A** on the lever **60**.*	• Horn on.

Rear fog lamp tip switch

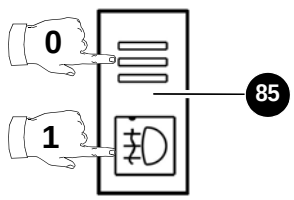


Fig. 35:

Rear fog lamp		
ON (1)	☞*When low beam is switched on, press the symbol on the tip switch **85**.*	• Control lamp on.
OFF (0)	☞*When low beam is switched on, press the top of the tip switch **85**.*	• Control lamp off.

Attention!

Only switch the rear fog lamp on in conditions of poor visibility (e.g. below 50 m in Germany) to avoid dazzling motorists behind you!

☞*Observe legal requirements!*

Note!

The rear fog lamp only lights up when the low beam or high beam are on but not the parking light.
The rear fog lamp can also be switched off by switching off the lights. When the lights are switched on again, the rear fog lamp must be switched on again, if required.

Hazard lights tip switch

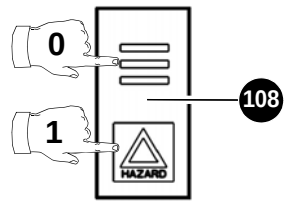


Fig. 36:

Hazard lights		
ON (1)	☞*Press on the symbol on the tip switch **108**.*	• The control lamp in the tip switch flashes.
OFF (0)	☞*Press the top section of the tip switch **108**.*	• Control lamp off.

Flashing beacon tip switch

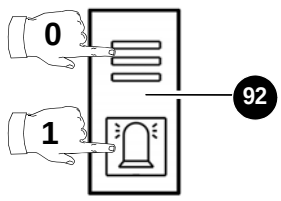


Fig. 37:

Flashing beacon		
ON (1)	☞*Press on the symbol on the tip switch **92**.*	• The control lamp in the tip switch lights up.
OFF (0)	☞*Press the top section of the tip switch **92**.*	• The control lamp in the tip switch goes out.

Note!

According to §52 StVZO (the German road traffic licensing regulation), the flashing beacon may only be used on public roads when the working area of the vehicle includes areas used by road traffic and the vehicle represents an obstruction to the normal flow of traffic when in operation.
Observe the applicable national and international regulations in the country of use.

Front working lights tip switch

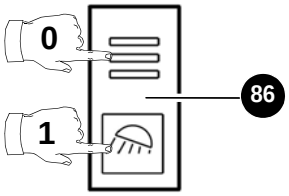


Fig. 38:

Working lights, front		
ON (1)	☞*Press on the symbol on the tip switch **86**.*	• The control lamp in the tip switch lights up.
OFF (0)	☞*Press the top section of the tip switch **86**.*	• Control lamp off.

Note!

The working lights only light up when the parking light or low beam are on, but not the high beam. The working lights can also be switched off by switching off the lights.

The working lights may only be switched on when the vehicle is working and only it is ensured they will not dazzle other road users.

Auxiliary headlight toggle switch

When using attachment devices with which the lower lighting facilities are covered, e.g. in winter service when using a snow plough, auxiliary headlights are necessary. Toggle switch **73** is provided under the cover underneath the fuse box in order to switch over from the lower main headlights and direction indicators to the auxiliary headlights and indicators.

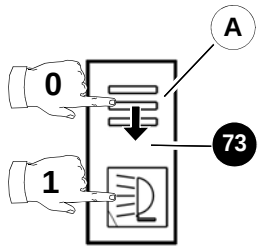


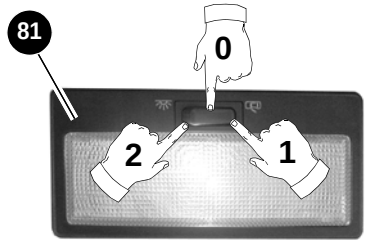
Fig. 39:

Auxiliary headlight toggle switch (option)		
ON (1)	☞*Press the lock **A** downwards and press the symbol on tip switch **73**.*	• Auxiliary headlights in operation. • The control lamp in the tip switch lights up.
OFF (0)	☞*Press the lock **A** downwards and press the top section of the tip switch **73.***	• Lower headlights in operation. • Control lamp off.

Note!

The headlight leveling switch **84** has no effect on the auxiliary headlights.

Interior light



M3003026.tif

Fig. 40:

Interior light		
OFF (0)	☞*Set the interior light tip switch **81** to its center position **(0)***	• Interior light off.
ON (1)	☞*Press the interior light tip switch **81** on the right **(1)**.*	• Interior light lights up on opening the doors.
ON (2)	☞*Press the interior light tip switch **81** on the left **(2)**.*	• Interior light lights up continuously.

3.3.10 Windscreen wiper system

Combined switch on the steering column

Function

The combined switch **60** on the steering column controls the following functions:

- Operation of the windscreen wipers.
- Operation of the windscreen washer system.
- Operation of the lighting system and horn.

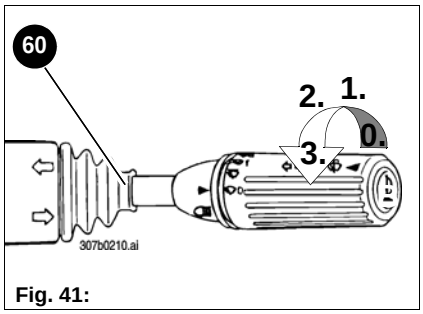


Fig. 41:

Windscreen wipers		
0	☞*Combined switch **60** in its home position*	• Windscreen wipers OFF
1	☞*Turn the combined switch **60** to position **1.***	• Interval timing.
2	☞*Turn the combined switch **60** further to position **2.***	• Slow.
3	☞*Turn the combined switch **60** further to position **3.***	• Fast.

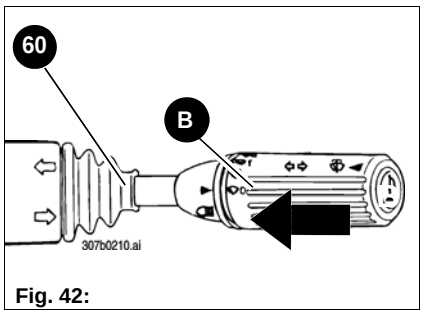


Fig. 42:

Windscreen washer system		
0	☞*Combined switch **60** in its home position*	• Windscreen washer system OFF.
1	☞*Press the rotary knob **B** of the combined switch **60** to the left*	• Windscreen washer system ON • Windscreen wipers wipe briefly.

Attention!

Do not let the windscreen wipers wipe over the windscreen for long if it is dry. If you do, the wiper blades wear quickly and the windscreen wiper motor can overheat!

☞*Switch the windscreen wipers off when the windscreen is dry!*

Note!

The tank for the windscreen washer system is located behind the passenger seat.

3.3.11 Cab heating and ventilation

Danger!

Good visibility is important for road safety and is only ensured if all windows are free of ice, snow and condensation.

Risk of accident!

☞*Familiarize yourself with the correct operation of heating and ventilation elements as well as with clearing/defrosting the windows of the vehicle.*

☞*Maximum heating output and quick defrosting of the windows can only be achieved after the engine has reached operating temperature.*

Note!

The vehicle is equipped with a warm-water fan heating. The vehicle's heater can be set to one of two operating states:

- Ventilation
- Heating

A 3-stage fan blows air to the heater nozzles **61** for the windscreen and via the legroom area nozzles **56** and **62** in the driver's cab.

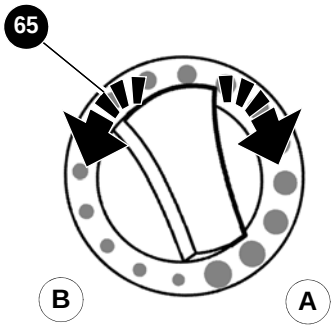


Fig. 43:

Temperature setting	
Warmer	☞*Turn the rotary knob **65** clockwise to **A**.*
Colder	☞*Turn the rotary knob **65** counterclockwise to **B**.*

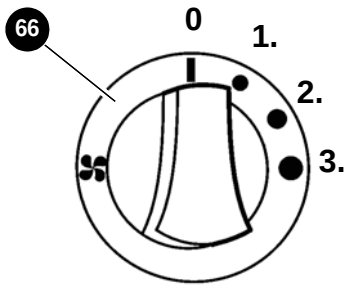


Fig. 44:

Fan for ventilation and heating		
OFF	☞*Turn the rotary knob **66** to the fan symbol.*	• Fan OFF.
Pos. 1	☞*Turn the rotary knob **66** clockwise to position **1** .*	• Fan runs at low speed.
Pos. 2	☞*Turn the rotary knob **66** clockwise further to position **2** .*	• Fan runs at middle speed.
Pos. 3	☞*Turn the rotary knob **66** clockwise further to position **3** .*	• Fan runs at high speed.

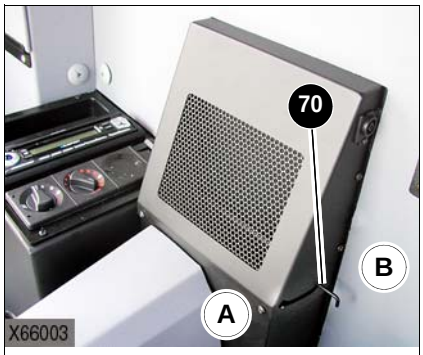


Fig. 45:

Recirculated air control lever		
A	☞*Pivot the control lever **70** to **(A)**.*	• Recirculated air position, air is drawn in from the cab
B	☞*Pivot the control lever **70** to **(B)**.*	• Air is drawn in from outside

To clear condensation/ice from the windscreen quickly:

☞*Start the vehicle.*

☞*Pivot the recirculated air control lever **70** to **(A)**.*

☞*Turn the rotary knob **66** to set the fan to position **3**.*

☞*Turn the temperature control **65** as far as possible towards **(A)**.*

☞*Actuate the heated windscreen (option) tip switch **80**.*

Tip switch for heated windscreen and heated wing mirror (option)

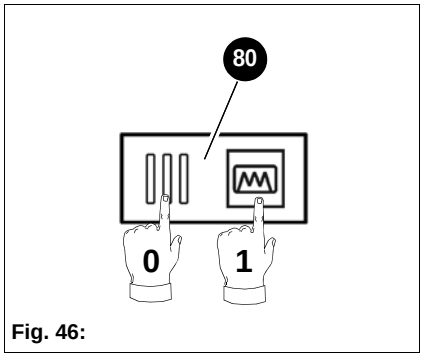


Fig. 46:

Heated windscreen (standard) heated wing mirror (option)		
ON	☞*Press the tip switch **80** on the symbol **(1)**.*	• Control lamp on.
OFF	☞*Press tip switch **80** on the top section **(0)**.*	• Control lamp off.

Note!

Switch off the windscreen/wing mirror heating facility when the windscreen/wing mirror are clear. High power consumption!
The heated windscreen/wing mirror switches off automatically after approx. 10 minutes (time relay).

3.3.12 Air-conditioning unit (option)

Danger!

The coolant contained in the air-con unit is stored under high pressure. There represents a

Risk of injury!

☞Do not open any components in the air-conditioning unit.

☞Maintenance work on the air-conditioning unit may only be performed at authorized service centers.

Note!

The vehicle can be equipped with an air-conditioning unit (option). The air-conditioning unit is well-suited to dehydrating the air in the vehicle and, thus, preventing the development of condensation on the windows.
The flow of air is forced via a 3-stage fan to the heating nozzles **61** of the windscreen and via the interior nozzles **56** and legroom nozzles **62** in the driver's cab.

The air-conditioning unit can only be operated when the engine is running.
The air-conditioning unit can only be switched on when the fan is at least set to position 1.

Extreme temperature differences can have negative effects on health!

Differences of 5 to 6 °C to the outdoor temperature are recommended.

For more information on operating the air-conditioning unit, read the separate operating manual provided by the air-conditioning unit manufacturer.

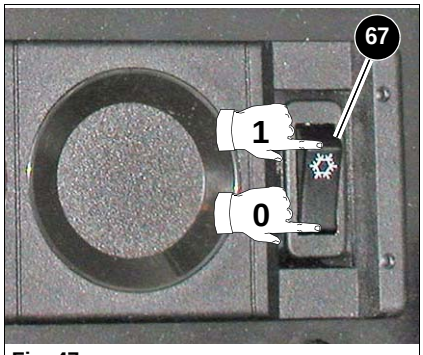


Fig. 47:

Air-Conditioning Unit	
ON (1)	☞*Switch the fan on using the switch **66** (min. position 1)* *Switch the air-conditioning unit on using the switch **67.***
OFF (0)	☞*Switch the air-conditioning unit off using the switch **67**.*

3.3.13 Driver's seat/Passenger's seat

Danger!

The driver's seat must never be adjusted while driving.

Risk of accident!

☞*Adjust the driver's seat before starting to drive the vehicle!*

☞*Observe the information in the seat manufacturer's operating manual!*

Note!

The driver's seat is equipped with a seat contact switch. The vehicle can only be started up when the driver is seated in the seat. If there is no contact with the seat contact switch and the drive lever **64** or accelerator pedal **55** is actuated, the "SEAT CONTACT SWITCH" message appears in the multifunctional display **121**. If the driver raises from the driver's seat while driving, the vehicle stops.

Note!

If the driver raises from the driver's seat (e.g. driver gets out) and the drive lever **64** is not in its neutral position, the "TURN INDICATOR SWITCH" message appears in the multifunctional display **121** when the driver sits on the seat again. Move the drive lever **64** to its neutral position and then accelerate again.

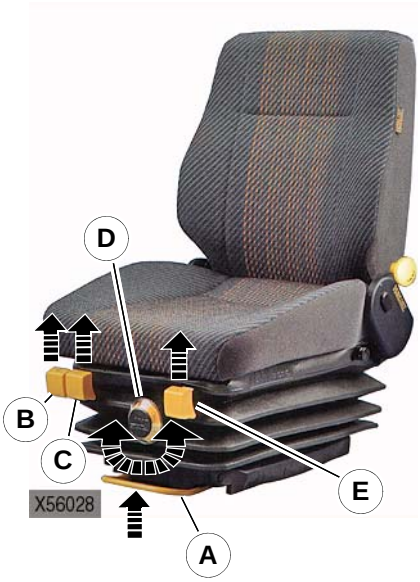


Fig. 48:

Longitudinal adjustment A (driver's seat only)

☞*Sit down on the seat*.

- Pull the lever **A** upwards.
- Slide the seat forwards or back.
- Release the lever **A** and let the driver's seat latch in place.

Adjusting the height of the rear edge of seat B (driver's seat only)

☞*Sit down on the seat*.

- Pull the lever **B** upwards.

Adjusting the height of the front edge of seat C (driver's seat only)

☞*Sit down on the seat*.

- Pull the lever **C** upwards.

Weight adjustment D (driver's seat only)

☞*Sit down on the seat*.

- Turn the handwheel **D** to adjust the seat suspension.

Note!

The driver can enjoy extra driving comfort when the seat suspension is set correctly. The seat suspension is adjusted to the weight of the driver (50 - 130 kg) using the infinitely variable handwheel **D**.

Backrest adjustment E

☞*Sit down on the seat*.

- Press your back lightly against the seat backrest and, at the same time, pull the lever **E** upwards
- Release the lever **E** and let the backrest latch in place.

Comfort seat (option)

The following comfort seats are available on option:

- driver's seat with air cushioning (1418),
- driver's seat with mechanical suspension (1419),
- passenger's seat with mechanical suspension (1420).

Please observe the information in the operating manual from the manufacturer!

Headrest F (option)

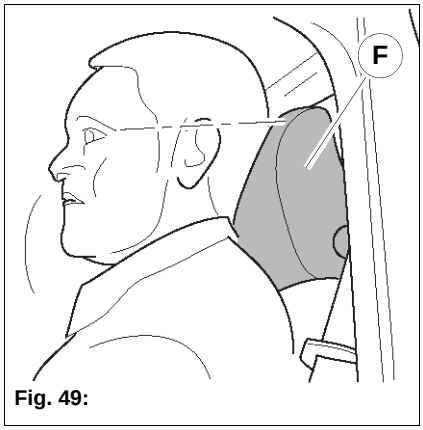


Fig. 49:

Danger!

Driving with the headrest incorrectly adjusted represents a

Risk of injury!

☞*Adjust the headrest so that back of the head is supported at about the height of the ears.*

☞*Sit down on the seat*.

- Pull the headrest **F** upwards or push it downwards.
- Pull the headrest **F** forwards or push it back.

3.3.14 Seat belt

Danger!

Driving or working without the seat belt fastened represents a

Risk of injury!

☞*Before starting to drive or work, fasten your seat belt!*

- Ensure the seat belt is not twisted!
- The seat belt must run across the pelvis – not the stomach – and sit firmly!
- Do not draw the seat belt over hard, sharp-edged or breakable items (tools, meter rules, spectacles, ball-point pens) placed in your clothes!
- Never secure 2 persons (children!) with one seat belt!
- Check the condition of the seat belts regularly. Have damages parts replaced by an authorized Hako service center immediately!
- Keep the seat belt clean because coarse dirt can impair the automatic belt functions!
- The belt buckle must not be blocked by foreign bodies (paper or such) otherwise the tongues cannot latch in the lock!

The seat belt is stretched following an accident and, therefore, must no longer be used. This means that, following an accident, this overstretched belt 43

no longer provides sufficient safety!

☞*The seat belt must be replaced following an accident!*

☞*Have the belt anchoring points and seat fixations checked for further damage!*

The three-point seat belts serve for the driver's and passenger's safety.

Fasten your seat belt each time before you drive.

Fastening the seat belt

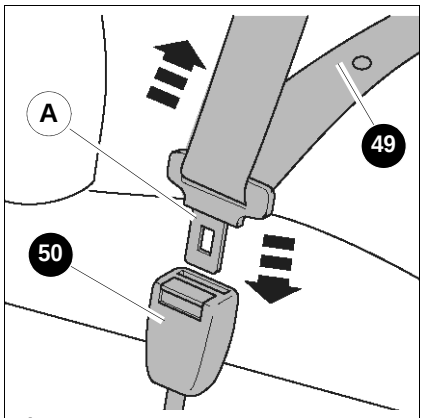


Fig. 50:

☞*Fasten your seat belt **49** before driving as follows:*

- Take hold of the belt via the belt tongue **A** and draw it slowly and evenly over the pelvis to the belt buckle **50**.
- Fit the belt tongue **A** in the belt buckle **50** until it audibly latches in place (**pull test**).
- Tighten the seat belt by pulling at the end.
  - The seat belt must always lie firmly against the pelvis!

Releasing the seat belt

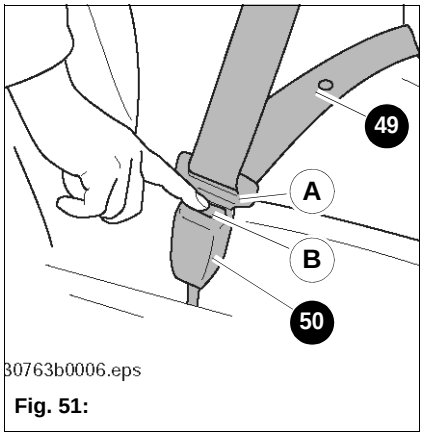


Fig. 51:

☞*Release the seat belt **49** as follows:*

- Hold the seat belt.
- Press the red button **B** on the belt buckle **50**.
  The tongue **A** automatically springs out of the belt buckle **50** due to the force of the spring.
- Feed the seat belt slowly back to the winding mechanism.

Note!

The automatic seat belt can be moved freely when pulled slowly. It blocks, however, when the brakes are applied suddenly.
The automatic seat belt can also block when driving through pot-holes or other uneven surfaces.

Note!

Only clean the seat belt using lukewarm water; never use solvents!

3.3.15 Cab doors

Danger!

Driving with the cab doors open represents a

Risk of accident

☞*The doors must remain closed when driving on public roads and completing work!*

☞*Always use the handles **41** and **46** to close the doors!*

Fig. 52:

Door levers, interior

☞*To open the doors, pull the levers **43** and **44**.*

Note!

The doors can only be opened and closed from the outside using the corresponding door key.

Side windows, left/right

The left and right side windows are opened and closed using the latches **42** and **45**.

Side windows, left/ right	Activity.....
Open/Close	☞*Press the latch **42** or **45** down and slide the window accordingly.* ☞*Release the latch **42** or **45**.*

3.3.16 Sunshine roof (optio`

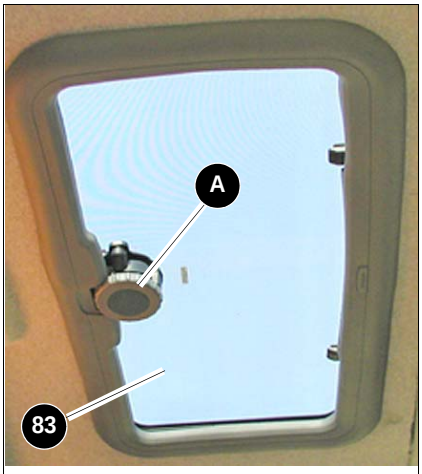


Fig. 53:

Attention!

Close the sunshine roof when driving where there is little overhead clearance!

To open the sunshine roof **83**, turn the rotary knob **A** counterclockwise.

To close the sunshine roof **83**, turn the rotary knob **A** clockwise.

3.3.17 Tachograph (option)

dig_fahrt_schr.tif

Fig. 54:

The tachograph **82** is located in the roof panel.

The tachograph stores the driving and stoppage times, the speeds and travel distances.

Any malfunction is indicated in the tachograph display.

Note!

Observe the applicable road traffic licensing regulations and the operating manual supplied by the tachograph manufacturer!

3.3.18 Electric sockets

3-pin socket

The socket **59** is located on the center panel underneath the ashtray.

Socket for additional units.

The 3-pin socket fulfills the following functions:

- + pole (terminal X, ignition ON)
- C3 signal
- – pole (ground)

The cigarette lighter A on the center panel underneath the ashtray.

Danger!

When the cigarette lighter has heated, it represents a

Risk of burns!

Do not come into contact with the heating coil!

Do not set the hot cigarette lighter down on inflammable material!

Cigarette lighter

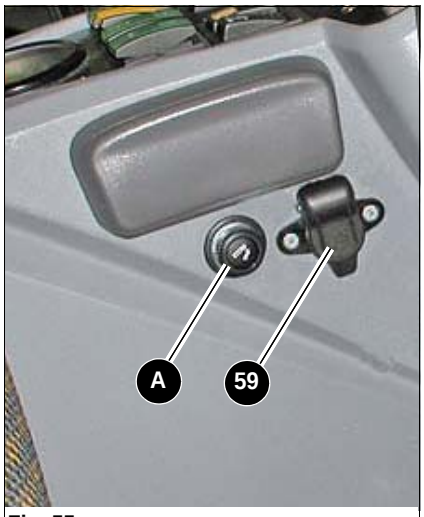


Fig. 55:

Function:

Cigarette lighter **A** and socket for portable lamp, etc.

Operation:

To use as a cigarette lighter:

- Press the cigarette lighter in.
- The cigarette lighter automatically springs back out to its initial position after a few seconds and can then be removed to light a cigarette.

To use as a socket:

- Pull out the cigarette lighter and lay it aside.
- The opening serves as a 12 V, max. 10 A socket.

Note!

The cigarette lighter and socket also work when the diesel engine is switched off but drains the battery when used.

Front socket

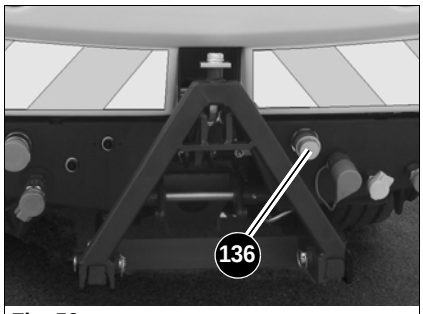


Fig. 56:

The socket at the front **136** and socket **141/146** at the rear of the vehicle serve for communication with and control of the attachment devices using the operating panel in the driver's cab.

- Socket at the front **136** (23-pin) for the sweeping unit.

Socket at rear

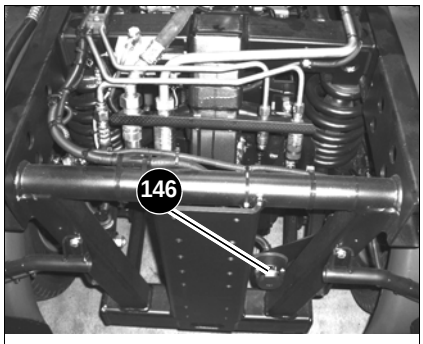


Fig. 57:

- Socket at the rear **146** (13-pin) for the spreader.

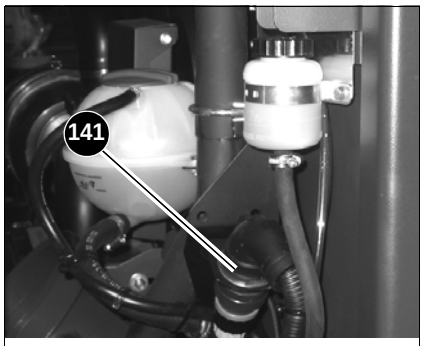


Fig. 58:

- Socket behind the cab **141** (23-pin) for the superstructure.

3.4 Driving the Citymaster

3.4.1 Before starting the engine

☞*Go through the "Startup" checklist*.

☞*Check the seat position and weight adjustments*.

☞*Check the steering column and steering wheel adjustments.*

☞*Adjust the side-view mirrors.*

Note!

All the operating elements must be within easy reach. The driver must be able to press the brake and accelerator pedals down fully!

☞*Fasten the seat belt.*

☞*Ensure that:*

- the drive lever **64** is in its neutral position,
- all the attachment device drives are switched off,
- the parking brake **63** is applied.

☞Press the *brake pedal **54** down to check that there is a firm resistance to the movement at half the pedal travel at the latest*.

3.4.2 Starting the engine

General Information

- The engine can only be started when the drive lever **64** is in its neutral position.
- The starter cannot be actuated when the engine is already running (start repeat interlock).
- Interrupt an attempt to start the engine after max. 10 seconds.
- Wait for about 1 minute before trying to start up again, thus allowing the batteries to recover.

Danger!

Allowing the engine to run in closed rooms represents a

Risk of poisoning!

☞*Do not allow the engine to run inside closed rooms! The engine exhaust gas contains carbon monoxide, which is colorless and odorless. Inhaling this gas can cause health damage.*

Prodecure

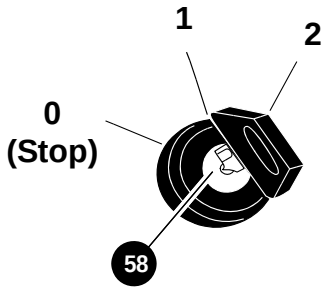


Fig. 59:

After carrying out startup preparations in accordance with Kapitel 3:

☞*Insert the ignition key in the ignition starter switch **58**.*

☞*Turn the ignition key to position "**1**".*

- Check the control units.
- The warning light **94** lights up if the parking brake **63** is applied.
- Warning lights **102**, **101** light up.
- Information appears in the multifunctional display.

☞*At temperatures below 5 °C:*

- The engine is preheated (approx. 20 seconds) until the control lamp **100** goes out.
  The engine must be started immediately after the control lamp **100** has gone out.

☞*Do not actuate the accelerator pedal **55** during the startup routine.*

☞*Turn the ignition key to position "**2**" and hold in this position until the engine starts to run*.

☞*Release the ignition key.*

When the engine has started:

☞*Check that the following warning lights have gone out:*

- Warning light **102**
  if not, switch off the engine and check the engine oil level!
- Warning light **101**
  if not, switch off the engine and check the ribbed V-belt connection to the alternator!

In the cold season or after longer periods out of operation:

☞*Increase the speed slowly.*

☞*Only run the engine at full load when it has reached operating temperature.*

Attention!

In the case of hydraulic oil temperatures under 10 °C, the diesel engine speed is restricted by the drive control to prevent damage to the hydraulic pumps.

Note!

In the cold season, use oil which is suitable for the temperature, *refer to Service Fluids and Lubricants*.

3.4.3 Before moving away

Special information for driving on public roads

In Germany, the vehicle is subject to

- the applicable, valid StVZO (road traffic licensing regulations),
- the regulations defined in the general vehicle type approval or vehicle registration documents.

The applicable accident prevention regulations defined by the employer's liability insurance associations must also be observed.

Observe the applicable national and international regulations in the country of use.

Before moving away

☞*Complete a function control, refer to Checklist, Section 3.2.3.*

Checking important functional units

Steering

☞*The functional check involves moving the steering wheel to the left and right. Check that the wheels move accordingly (depending on the steering mode selected).*

Service brake

Danger!

The brake lights at the rear of the vehicle do not light up when:

- the parking brake is applied.

☞*Use the brake pedal **54** to slow the vehicle down when driving on public roads and working to ensure the brake lights light up.*

Dirt accumulation in the area of the brake pedal can result in brake malfunctions. There is a

Risk of accident!

☞*Always keep the brake pedal **54** clean!*

☞*Before moving away, actuate the brake pedal **54** to check whether*

- you notice a firm resistance to the pedal when it is pressed in half of the pedal travel.
- the brake lights light up when the brake pedal is pressed.

☞*When completing the checks, take a look in the rear view mirror to ensure that no other vehicles will be obstructed by a braking maneuver*.

☞*Check the brakes while driving slowly.*

Lights

☞*To complete a functional check, test all the lighting facilities on the vehicle.*

3.4.4 Accelerating

Attention!

Make sure that you have released the parking brake because driving with the parking brake applied leads to overheating of the parking brake and eventually causes it to fail!

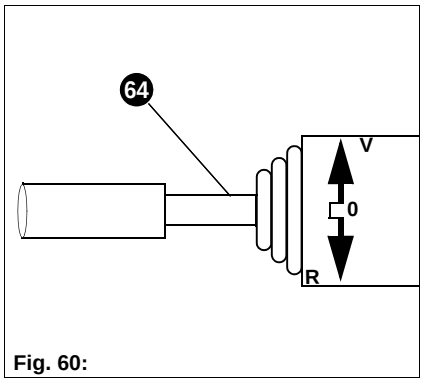


Fig. 60:

After having started the engine:

☞*Select a driving mode using the lever **115**.*

☞*Use the drive lever **64** to select a driving direction.*

☞*Release the parking brake using the hand brake lever **63**.*

- Warning light **94** goes out.

☞*Press the accelerator pedal **55** down slowly.*

☞*Test the brakes while driving slowly.*

☞*Allow the engine to warm up before moving to top speed.*

Note!

The vehicle only pulls away when the driver is seated on the driver's seat (seat contact switch).

3.4.5 Driving

Fig. 61:

The driving speed is determined by means of the infinitely variable accelerator pedal **55**. Depending on the tires, the vehicle reaches top speed on level ground at an engine speed of 2700 to 2900 rpm. This means that, after completing the accelerating phase, the accelerator pedal **55** can be withdrawn a little without the driving speed being affected.
This actively contributes to reduction of noise and fuel consumption.

In order to achieve maximum acceleration or the maximum speed when driving up a slope, drive at full throttle so that the diesel engine operates at its rated horsepower at approx. 3100 rpm.

Attention!

In the case of hydraulic oil temperatures under 10 °C, the diesel engine speed is restricted by the drive control to prevent damage to the hydraulic pumps.
If the hydraulic pump pressure filter is soiled (warning message PRESSURE FILTER SOILED! appears in the multifunctional display), the hydraulic pump no longer supplies the full flow rate and the vehicle does not reach its top speed.

3.4.6 Stopping the vehicle

Decelerating

☞*Release the force applied to the accelerator pedal **55** and move the drive lever **64** slowly to its neutral position.*

☞*Press down on the brake pedal **54** gently.*

Note!

When the vehicle brakes are applied abruptly with the hydrostatic drive or the foot is removed from the accelerator pedal suddenly, the brake lights are switched on to warn following traffic.

Stopping

☞*Take your foot from the accelerator pedal **55**.*

☞*Press the brake pedal **54** until the vehicle has stopped.*

☞*Move the drive lever **64** to its neutral position.*

☞*Pull up the hand brake lever **63**.*

- The warning light **94** lights up.

3.4.7 Stopping / Parking the vehicle

Danger!

If the vehicle is stopped on slopes, it could roll away.

☞*Secure the vehicle from rolling away by applying the parking brake!*

☞*Also secure the vehicle by placing chocks under the downhill sides of the wheels!*

☞*Stop the vehicle.*

☞*Apply the parking brake.*

After operation at full power:

☞*Allow the engine to run on for approx. 60 sec. so that the temperature can stabilize.*

☞*Switch the engine off by turning the ignition key to position "**0**".*

☞*Remove the ignition key.*

☞*Lock the doors after getting out of the driver's cab.*

On slopes:

☞*Also secure the vehicle by placing chocks under the wheels on the downhill side!*

3.4.8 Differential lock (option)

The differential lock can be used when one wheel on the rear axle spins and it is not possible to drive on.

The differential lock can only be activated in work mode.

When the differential lock is activated, a rigid connection of the drive shaft transfers the drive torque to both wheels on the rear axle evenly.

Attention!

If the differential lock is switched on incorrectly, it is possible that the differential of the rear axle will be damaged.
The differential lock can only be switched on **when**:

- *the drive **is not under load**,*
- *the **wheels are not spinning.***

Differential lock switch

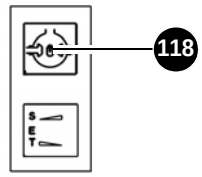


Fig. 62:

The differential lock of the is activated by pressing the button **118**.

Differential lock	
ON (1)	☞*Press on the symbol on the tip switch **118**.*
OFF	☞*Release the tip switch **118**.*

Note!

The differential lock can be switched on while driving, but only if the wheels are not spinning, i.e. as long as the wheels turn with ground contact and only while driving straight ahead.
The differential lock engages after the occurrence of low speed differences by the wheels of rear axle (e.g. when cornering).
The differential lock only remains active as long as the tip switch is pressed.
Driving on firm ground with the differential lock switched on increases tire wear.
Never use the differential lock longer than necessary.

3.4.9 Towing and transporting the vehicle

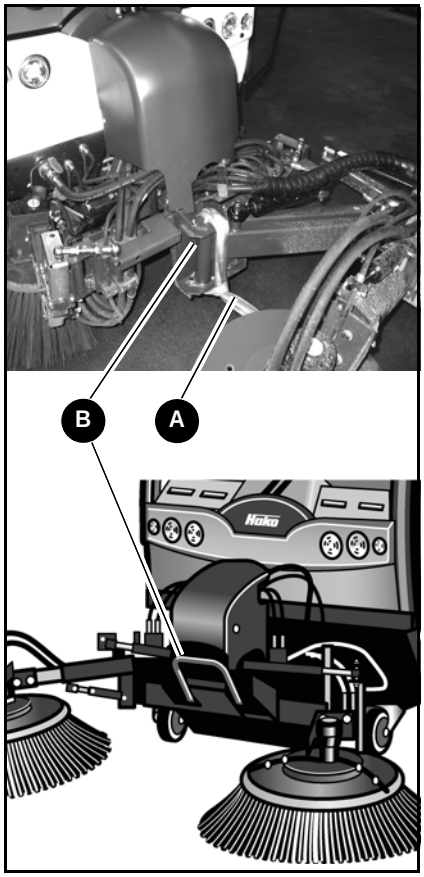
Safety information

- Only tow the vehicle using appropriate towing equipment (towing rope **A**) in conjunction with suitable towing facilities **B**, such as towing hitch, hook, eye (refer to figure)!
  In this case, unscrew the 3rd sweeping brush.
- Accelerate slowly! Pay attention that there are no persons in the area of the tow-bar.
- The vehicle may only be towed using the towing rope when the service brake and steering are functional!

When loading and transporting the vehicle:

- The transporting vehicle must be of adequate size – refer to Section *Specifications* for the dimensions of the vehicle!
- Remove any mud, snow or ice from the tires so that the vehicle can be driven safely onto ramps.
- Secure the vehicle against unintentional movement! The best positions to secure the vehicle are the front and rear wheels.

Towing the vehicle



Danger!

If the diesel engine has broken down, strength is required to turn the steering.
The brake booster does not work when the engine is switched off. The brake pedal has to be pressed in much harder!
Take this into account, especially when towing the vehicle!

Risk of accident!

☞*Drive the vehicle to the next possible parking area!*

☞*In the case of cold hydraulic oil, load the vehicle, do not tow it!*

☞*Maximum towing speed: 10 kph!*

☞*Towing is only permitted with front wheel steering!*

☞*Use a tow-bar whenever possible!*

Attention!

If the drive lever **64** is not in its neutral position when the engine is running and the switch **72** has not been actuated, the vehicle must not be towed!
The hydrostatic drive could be damaged by towing!

☞***When the engine is running:***
Tow the vehicle at max. 10 kph and for max. 10 km!

☞***When the engine is off:***
Tow the vehicle at max. 5 kph and for max. 2 km!

Towing mode switch

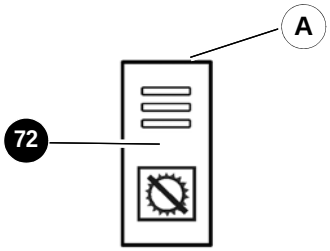


Fig. 63:

The towing mode switch **72** is on the right of the rear cab panel under the fuse box cover.

towing mode	
ON (1)	☞*Press the lock **A** downwards and press the tip switch **72** upwards.*
OFF (0)	☞*Press the lock **A** downwards and press the tip switch **72*** downwards.

Proceed as follows to tow the vehicle:

☞*Move the drive lever **64** to its neutral position.*

☞*Switch off the attachment device drives.*

☞*Raise the attachment devices.*

☞*Lower the dirt hopper.*

☞*Activate front wheel steering!*

☞*Set the drive mode lever **115** to transport mode.*

☞*Switch on the towing mode switch **72**.*

☞*Assemble a sufficiently dimensioned tow-bar on the towing equipment.*

☞*When towing, allow the engine to run at idle speed, if possible.*

☞*Drive the shortest possible route to your nearest authorized Hako service center!*

3.4.10 Diesel particulate filter

The vehicle is equipped with a diesel particulate filter.

The soot produced when burning diesel fuel is collected in the diesel particulate filter and burnt at regular intervals.

Danger!

The diesel particulate filter becomes very hot and represents a

Risk of fire and risk of burns!

- Never reach into the area of the exhaust outlet, keep children and other persons away!
- When operating the vehicle, pay attention that no easily flammable materials are in the direct vicinity of the exhaust system, particularly in the exhaust pipe!
- When parking the vehicle with engine running, pay attention that no easily flammable or combustible materials are in the direct vicinity of the exhaust outlet (e.g. paper, dry grass, straw, wood, oil, fuels, etc.).
- Do not park the vehicle in tall, dry grass.
- Never use additional underbody coatings or anticorrosives for the exhaust pipes, heat shields or diesel particulate filter. They could ignite when the engine gets hot.

Attention!

Only fill the vehicle with commercially available diesel fuel otherwise the fuel system will be damaged and reliable diesel particulate filter regeneration is no longer guaranteed. Operation with RME/PME fuel (bio-diesel) or vegetable oils is not permitted!
If diesel fuels with an increased sulphur content are used, the service life of the diesel particulate filter can be considerably reduced. Please contact the service center responsible for information on countries in which diesel with an increased sulphur content is used.

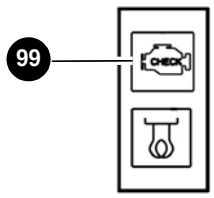


Fig. 64:

If the EOBD control lamp **99** flashes in the center panel, an error has occurred in the valve timing which negatively affects the exhaust composition:

- Continue driving carefully and visit an authorized service center immediately!

In addition to control lamp **99**, the "PARTICLE FILTER" message may appear in the multifunctional display.

The diesel particulate filter could not regenerate in the engine modes used to date (e.g. extremely short distances). In order for the diesel particulate filter to regenerate reliably:

- run the vehicle for at least 30 minutes in drive mode (operation of attachment devices is possible).

The diesel particulate filter regenerates most efficiently:

- at speeds in excess of 10 kph and/or
- engine speeds in excess of 2000 rpm.

As a result of temperature increases achieved in this way, the soot in the filter can be burned off.

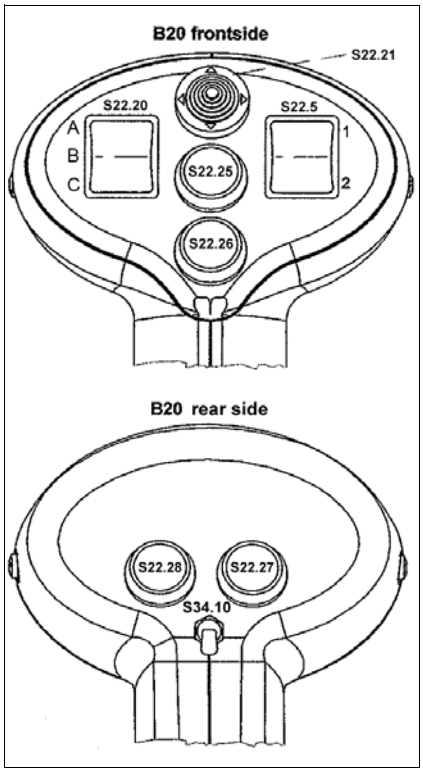
If the warning message is not cleared:

- Bring the vehicle to an authorized service center!

Note!

As long as the warning message appears, you can expect increased fuel consumption and, under certain circumstances, reduced engine output.

3.4.11 Multipurpose Handle (SO)



The multipurpose handle enables convenient operation of the following functions:

Switch	Operation
S22.5	• Actuating the larger debris flap
S22.20	• Setting the sweeping brush A) Left and right sweeping brushes (raising, lowering and pivoting) B) 3rd sweeping brush (raising, lowering and pivoting) C) 3rd sweeping brush (tilting down and up)
S22.21	• Operating modes Raising, lowering and pivoting the sweeping brushes Tilting the third sweeping brush down and up (tilting up only with working speed)
Button	**Operation**
S22.25	• Raising the attachment support
S22.26	• Lowering the attachment support
S22.27	• Raising the left-hand sweeping brush individually
S22.28	• Raising the right-hand sweeping brush individually
S34.10	• Reversing button

Note!

The connection between the weed brush and multipurpose handle creates the possibility of cardanic adjustment via two axles.

3.5 Working with the vehicle

3.5.1 Hydraulics

Work hydraulics

The work hydraulic unit is equipped with a load sensing hydraulic pump. This ensures the following hydraulic functions are completed by the vehicle:

- Front power lift
  - Raise/Lower front power lift
- Vacuum nozzle
  - Raise/Lower vacuum nozzle
  - Open/Close vacuum nozzle
- Sweeping unit
  - Raise/Lower brush arms
  - Pivot sweeping brush left / right
  - Brush drive, left/right
- Superstructure
  - Raise/Lower dirt hopper
  - Open/Close hopper flap
  - Fan drive
- Front and rear connections for attachment devices

Safety circuit

A safety circuit is installed in order to protect the vehicle‘s work hydraulics from overheating.

From a hydraulic oil temperature of 75 °C, the warning message "HYDRAULIC OIL TEMPERATURE TOO HIGH!" appears in the multifunctional display and an acoustic alarm is issued.

If the oil temperature in the oil circuit increases to 85 °C, the main consumer axles are switched off. If the oil temperature drops below 75 °C, the main consumer axles can be activated again by the operator.

When the engine speed is too low for the required volume flow, "HYDRAULIC PUMP UNDERPOWERED" appears in the multifunctional display.

Auxiliary functions, such as lifting, lowering and swiveling the attachment devices or tipping the dirt hopper, are not switched off with the second stage of the safety circuit.

Drive

The vehicle is driven by a hydrostatic drive.
A diesel engine drives the hydraulic pump. The hydraulic pump generates a volume flow for the hydraulic motor. The differential lock and recirculatory water valve are also supplied hydraulically by the hydraulic pump.

Steering

The hydrostatic front wheel steering with selectable all-wheel steering is supplied by a separate steering pump.

Fan drive

The fan drive for the engine cooling system is supplied by a separate hydraulic pump.

3.5.2 Reversible fan (option)

In the case of deployment for special work (mowing, road sweeping, etc.) causing excessive soiling of the radiator, the vehicle can be supplied from the factory equipped with a reversible fan.

By reversing the fan blades briefly, accumulated dust, foliage or grass is blown back out from the fan grill.

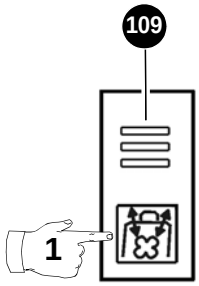


Fig. 65:

Danger!

Never switch the reversible fan on in the vicinity of persons or road traffic. There is a

Risk of accident!

☞*Ensure that there are no persons or vehicles in the direct vicinity of the vehicle.*

☞*Only switch on the reversible fan in open spaces (fields)!*

Press the tip switch **109** on the center panel to activate the reversible fan.

Switch	Effect
Press briefly	• The blowing direction of the fan blades is reversed for approx. 15 seconds.
Press longer	• The blowing direction of the fan blades is reversed for approx. 30 seconds.

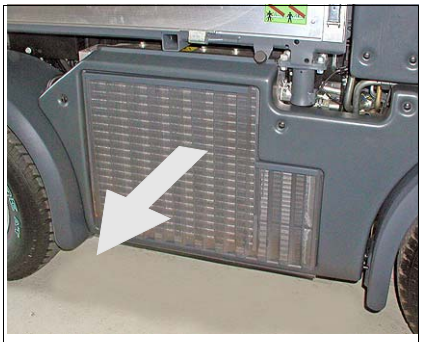


Fig. 66:

Attention!

The reversible fan (option) is no substitute for regular cleaning of the radiator!

☞*Blow the radiator ribs regularly with compressed air or spray out with water.*

Manual EMERGENCY control for hydraulics

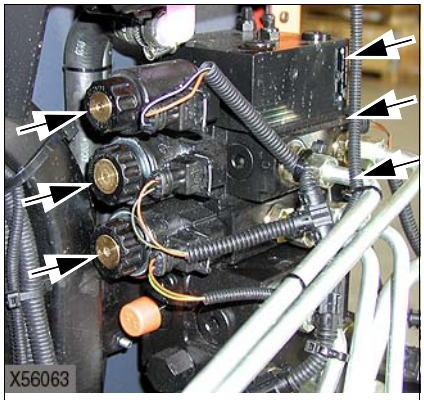


Fig. 67:

Danger!

Actuating the manual EMERGENCY control while the engine is running represents a

Risk of accident!

☞*Manual EMERGENCY control may only be used to stop a working process begun beforehand and make the vehicle ready for driving! Not intended for continuous operation!*

Attention!

Manual EMERGENCY control may only be operated by trained service personnel in emergencies!

The electromagnetically operated load sensing control blocks with manual EMERGENCY control are located behind the driver's cab on the left, on the right-hand side of the frame and on the sweeping unit. This manual EMERGENCY control enables the hydraulic to be controlled by hand in the case of damage to the vehicle's electric system.

Operation:

The manual EMERGENCY control is operated by pressing on the central pins of the electromagnets (with a suitable screwdriver).

3.5.3 Front power lift

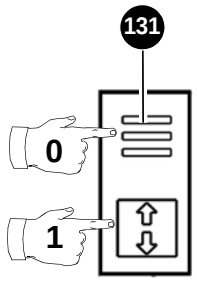


Fig. 68:

In the case of a 2-brush system operating in work mode and transition mode, the switch **131** can be used to raise and lower the vacuum nozzle and sweeping unit.

In the case of a 3-brush system, the switch **131** is only used to raise and lower the vacuum nozzle.

Note!

If the front hydraulic lift has not been raised for transport mode or transition mode, FRONT IMPLEMENT CARRIER appears in the multifunctional display.

Note!

If the vehicle is retrofitted for winter service, the switch **131** is used to raise and lower the front attachment device (e.g. rotary brush).

Switch	Effect
1	• Front hydraulic lift is fully lowered to its floating position.
0	• Press briefly to interrupt the lowering process. • Press again to raise the front hydraulic lift.

3.5.4 Sweeping unit

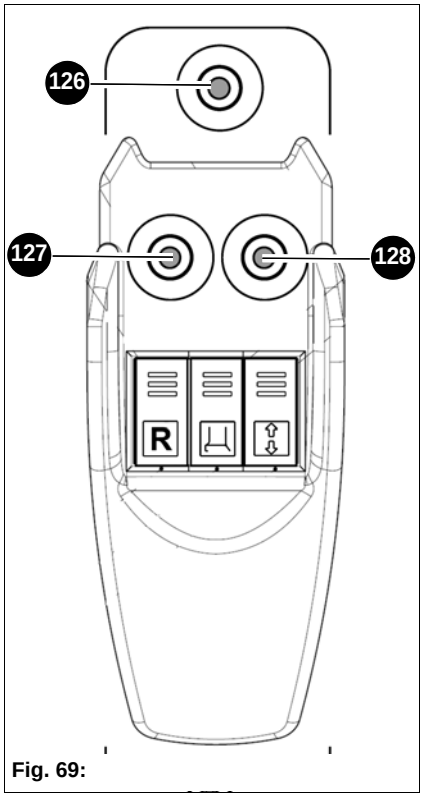


Fig. 69:

Raising/Lowering/Pivoting the sweeping brushes

The sweeping unit with a 3-brush system makes it possible to clean at two different levels simultaneously. The 3rd brush at the front increases the sweep width.

The sweeping unit **25** sweeps the dirt towards the vacuum nozzle. The joysticks **126**, **127** and **128** are used to control and regulate the raise/lower and pivoting functions of the sweeping brushes **25A** in the sweeping unit.

Joystick	Effect
126	• Joystick, adjust angle of 3rd brush (not used with 2-brush system or weed brush (option))
127	• 3rd brush is raised/lowered/pivoted left/pivoted right (left-hand brush with 2-brush system)
128	• Left-hand/right-hand brush is raised/lowered/pivoted left/pivoted right (right-hand brush with 2-brush system)

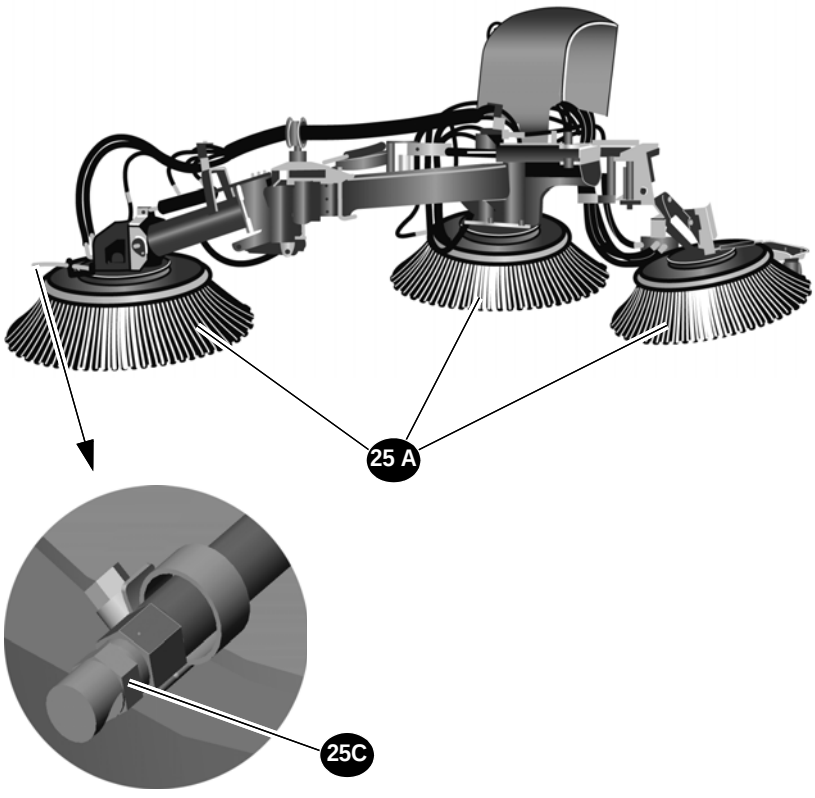


Fig. 70:

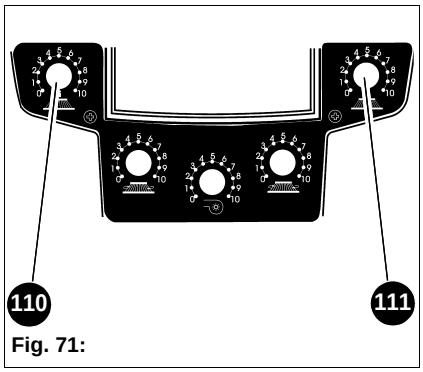


Fig. 71:

Brush pressure

The pressure applied by the brush on the ground is adjusted between 0 and 10 by the infinitely variable control knobs **110** and **111**.

Knob	Effect
110	• 3rd brush is relieved. (left-hand brush with 2-brush system)
Knob	**Effect**
111	• Left and right-hand brushes are relieved (right-hand brush in 2-brush system)

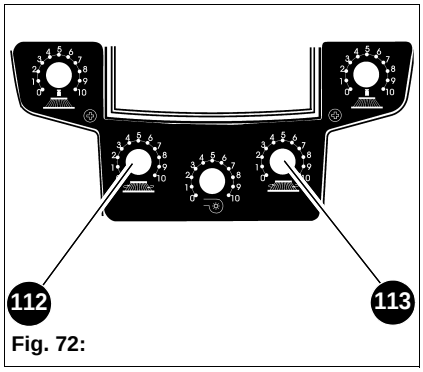


Fig. 72:

Brush rotating speed

The speed of the brush drive **25B** is adjusted between 0 and 10 by the infinitely variable control knobs **112** and **113**.

Knob	Effect
112	• 3rd brush drive is supplied with hydraulic oil (left-hand brush with 2-brush system)
Knob	**Effect**
113	• Left and right-hand brush drive are supplied with hydraulic oil (right-hand brush with 2-brush system)

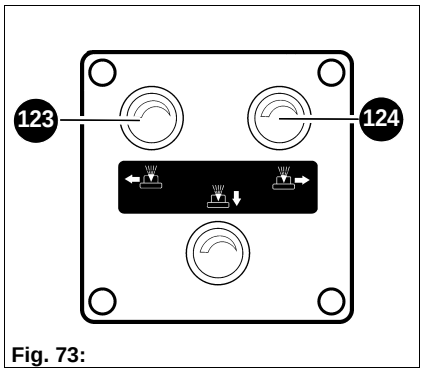


Fig. 73:

Spray nozzle valves

The spray nozzles **25C** are arranged on the sweeping unit so that a water jet is sprayed in front of the brush which binds the dust and dampens the area to be cleaned in front of the brush. The fresh water pump for the spray nozzles is switched on and off with the switch **105**.

The valves **123** and **124** regulate the flow rate at the spray nozzles.

Valve	Effect
123	• 3rd brush drive is supplied with water (left-hand brush with 2-brush system)
Valve	**Effect**
124	• Left and right-hand brushes are supplied with fresh water (left-hand brush with 2-brush system)

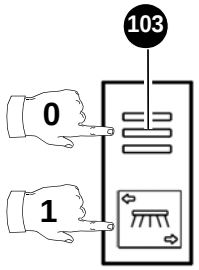


Fig. 74:

3rd brush reverse rotation

To switch the 3rd brush sweeping direction to the other side, press the switch **103** to reverse the direction of rotation.

Switch,	Effect
1	• Reverse rotation is activated.
0	• Reverse rotation is deactivated.

3rd brush angle

In the case of even ground, adjust the brush angle using the switch **126**.

Joystick	Effect
126	• Adjust the angle of the 3rd brush. • (not connected or weed brush with 2-brush system option)

3.5.5 Vacuum nozzle

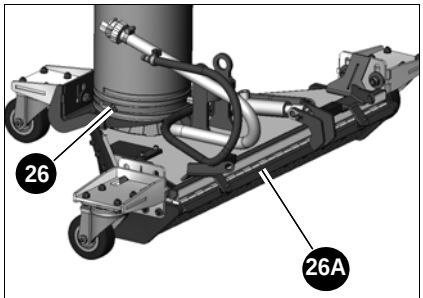


Fig. 75:

The vacuum nozzle **26** runs flexibly and shockproof, suspended on the castors between the front wheels. The vacuum nozzle is lowered and raised in work mode. In the case of accumulations of coarse dirt in front of the vacuum nozzle, the vacuum nozzle flap **26A** can be opened using the switch **130**. Use the switch **104** to switch the circulation water feed for the vacuum nozzle on and off. Use the switch **116** to switch the fresh water supply for the vacuum nozzle on and off. The volume flow is regulated by means of the valve **135**.

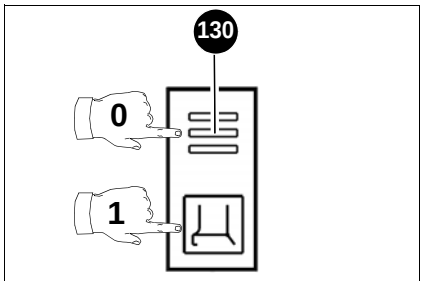
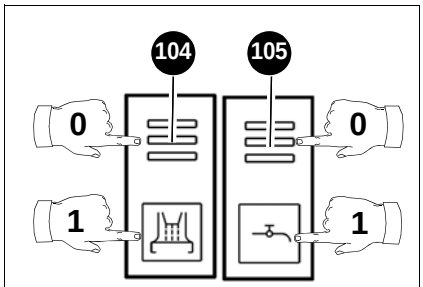


Fig. 76:

Switch 130 for the vacuum nozzle flap

Switch	Effect
1	• The vacuum nozzle flap is opened.
0	• The vacuum nozzle flap is closed.



Switch 104 for the recirculatory water valve

Switch	Effect
1	• The recirculatory water valve is switched on/off. The control lamp only lights up after the fan has reached a minimum speed.
0	• The recirculatory water valve is switched off.

To clean the recirculating water system, refer to Chapter "Maintenance"!

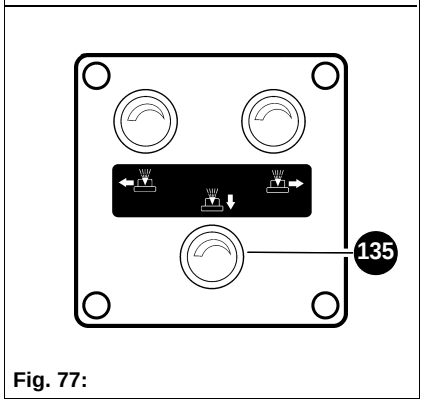


Fig. 77:

Switch 105 for the fresh water pump

Switch	Effect
2	• The second fresh water pump (option) is switched on.
1	• The fresh water pump is switched on.
0	• The fresh water pump is switched off.

Valve 135 for fresh water at vacuum nozzle

VALVE	Effect
0 - 10	• Fresh water is supplied to the vacuum nozzle.

3.5.6 Superstructure

Danger!

When the superstructure is raised, it represents a

Risk of injury!

☞*When any work needs to be performed under the* superstructure*, check that the safety support* ***32****, which automatically drops into place, is fully functional!*

☞*Never stand under the* superstructure *when the* superstructure *is being raised or lowered*.

The following assemblies are installed in the superstructure **23**:

- fresh water tank,
- recirculating water system,
- dirt hopper.
- toolbox.

Note!

If the superstructure has not been lowered for transport or transition driving modes, HOPPER! appears in the multifunctional display.

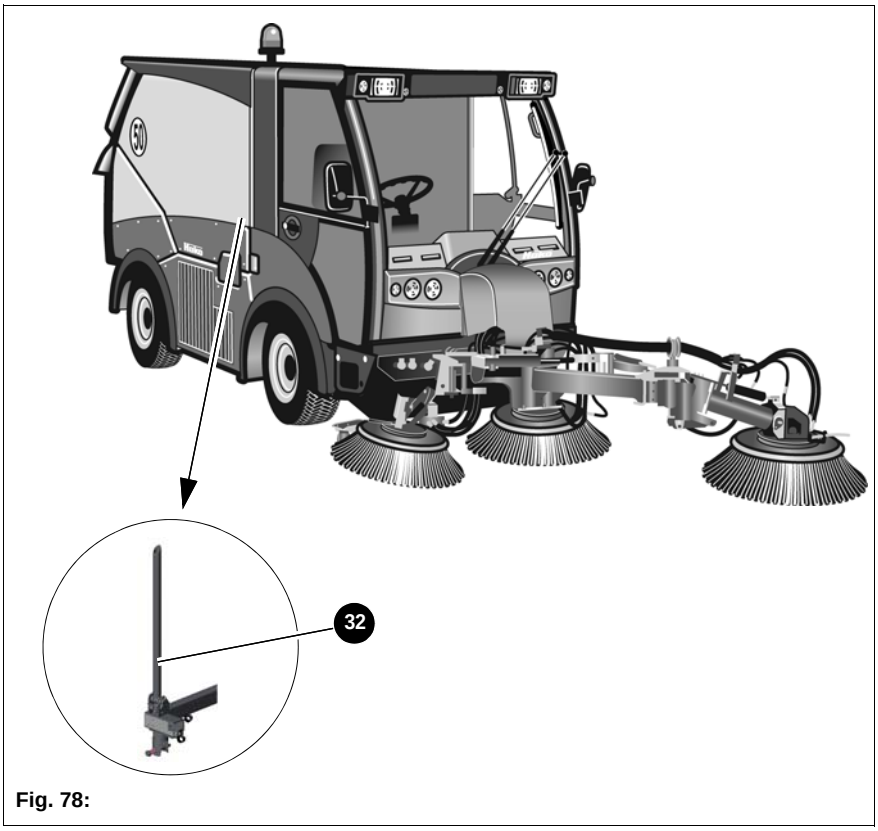


Fig. 78:

3.5.7 Fresh water tank

The fresh water tank **28** is located under the dirt hopper and has a capacity of approx. 330 liters. The fresh water pump **28D** contains the fresh water and feeds it to the spray jets on the brushes and to the intake pipe at the vacuum nozzle. The fresh water filter **28B** must be checked daily and cleaned as necessary, refer to Chapter "Maintenance".

Attention!

In the case of temperatures below 0 degrees (risk of frost), the fresh water must be drained from all components which feed fresh water.

Filling the fresh water tank

Fill the fresh water tank before starting work or as necessary.

☞*Open the fresh water tank cap* **28A***.*

☞*Fill fresh water in the tank using a water hose. The tank volume is approx. 330 liters.*

Emptying the fresh water tank

To empty the fresh water tank, open the hand valve **28C**.

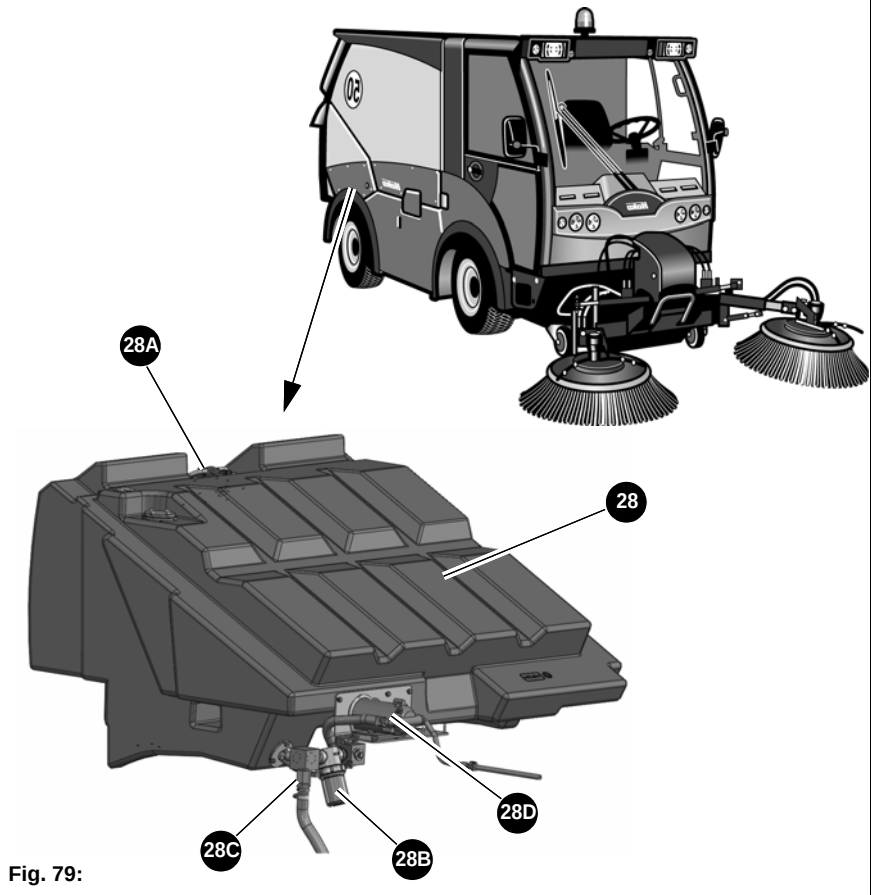


Fig. 79:

3.5.8 Recirculating water system

To enable long, dust-free sweeping operations, fill approx. 100 liters of water in the dirt hopper before starting each sweeping operation. Actuate the switch **104** to switch the recirculating water system on.

Attention!

In the case of temperatures below 0 degrees (risk of frost), the fresh water must be drained from all components which feed fresh water.

Checking the recirculating water system

Check the recirculating water system before starting work. To do this, fill the dirt hopper with circulation water (approx. 100 liters), switch off the recirculatory water valve with the switch **104** and turn the vehicle off. Then:

- Switch on the ignition and activate the recirculatory water valve after approx. 10 seconds.
- Inspect the vacuum nozzle to see if the circulation water flows freely. If it does not, the recirculating water system must be cleaned, refer to Chapter "Maintenance".

Filling circulation water

To fill the circulating water system, open the dirt hopper flap **24A** using the button **107**. Insert a water hose and fill the dirt hopper with approx. 100 liters of water.

Draining the circulation water

If too much circulating water is taken in during the sweeping operation (due to rainwater, for example), drain off the excess water from the dirt hopper by actuating the hand valve **24B**. Clean the circulating water system daily, refer to Chapter "Maintenance".

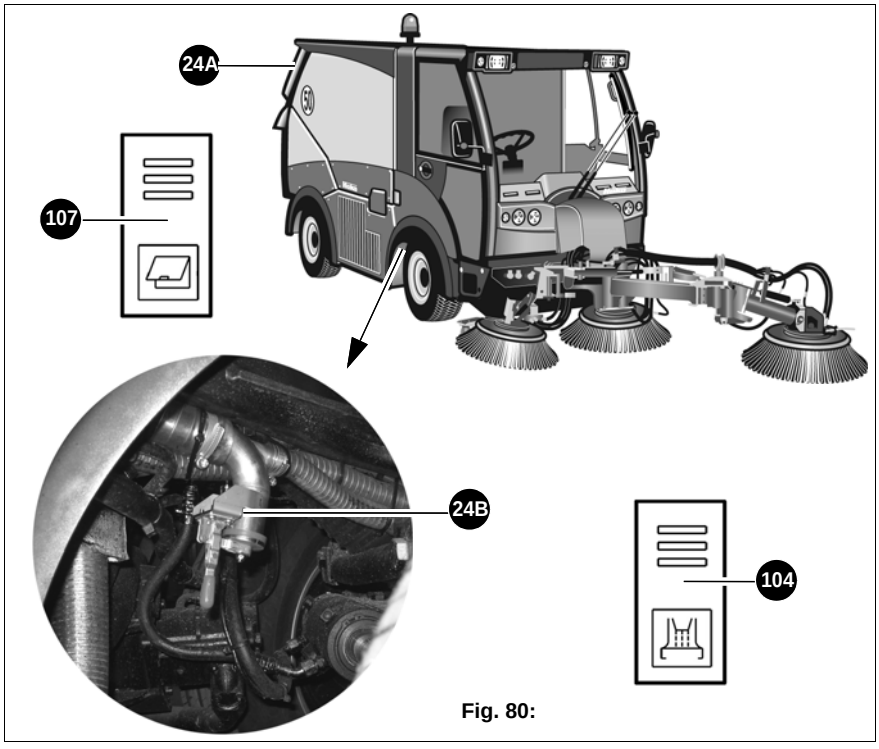


Fig. 80:

3.5.9 Dirt hopper

The waste swept up is drawn into the dirt hopper **24** by the vacuum produced by a suction fan. The dirt hopper can be raised and the dirt hopper flap opened for cleaning and maintenance purposes.

Opening/Closing the dirt hopper flap

Use the tip switch **107** to open and close the dirt hopper flap **24A** on the dirt hopper.

Switch	Effect
1	• The dirt hopper flap is closed.
0	• The dirt hopper flap is opened.

Raise/Lower the dirt hopper

Use the tip switch **106** to raise and lower the dirt hopper **24**.

Switch	Effect
1	• The dirt hopper is lowered.
0	• The dirt hopper is raised.

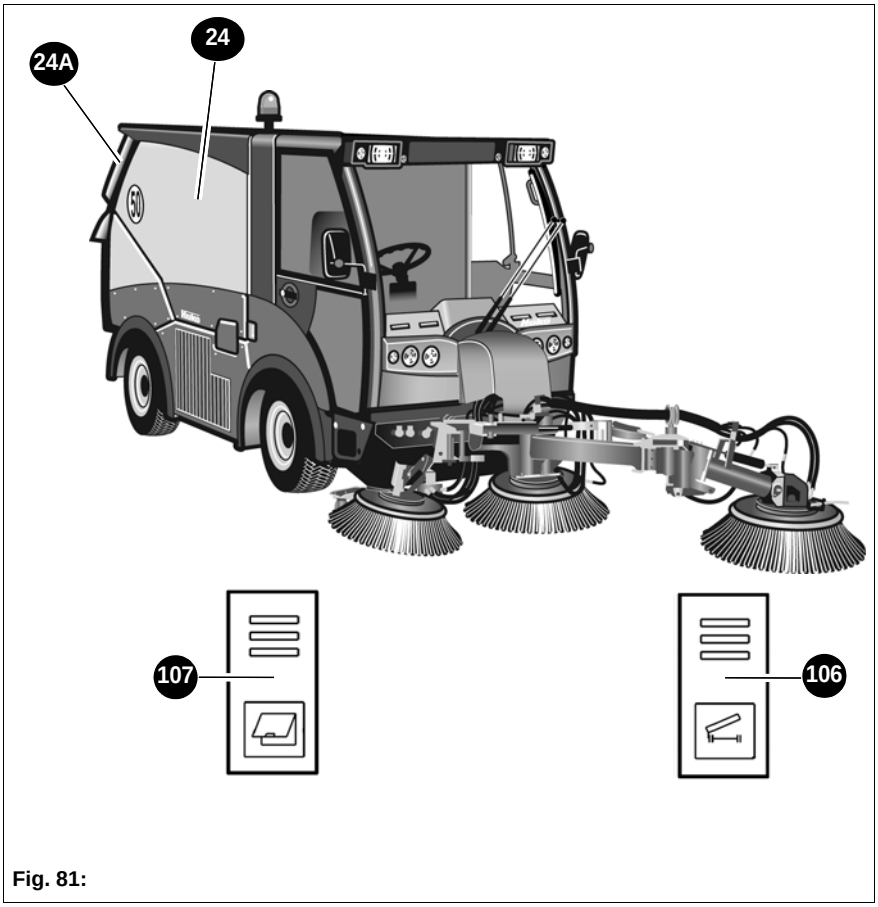


Fig. 81:

Regulating the fan speed

The speed of the fan drive **24B** is regulated by means of the control knob **114**.

Knob	Effect
0 - 10	• Hydraulic oil is supplied to the fan drive.

Note!

The fan only operates when the dirt hopper is lowered and the hopper flap is closed.

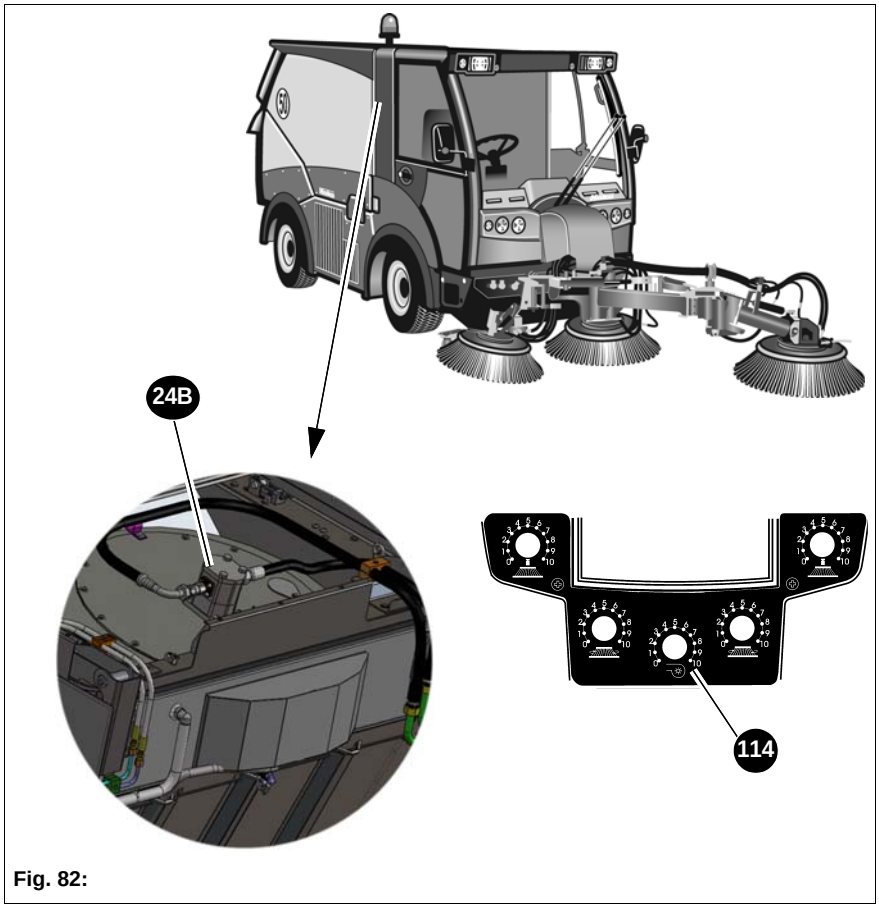


Fig. 82:

Emptying the dirt hopper

Attention!

The engine must be run at an increased idling speed to empty the dirt hopper **24**.

When the suction power deteriorates or the waste is not sucked up, carry out the following working steps:

☞*Drive to an appropriate cleaning area. Reverse to the dumping position, brake and apply the hand brake.*

☞*Open the dirt hopper flap* **24A** *by pressing the tip switch* ***107****.*

☞*Raise and empty the dirt hopper* **24** *by pressing the tip switch* ***106****.*

☞*Clean the dirt hopper, if necessary.*

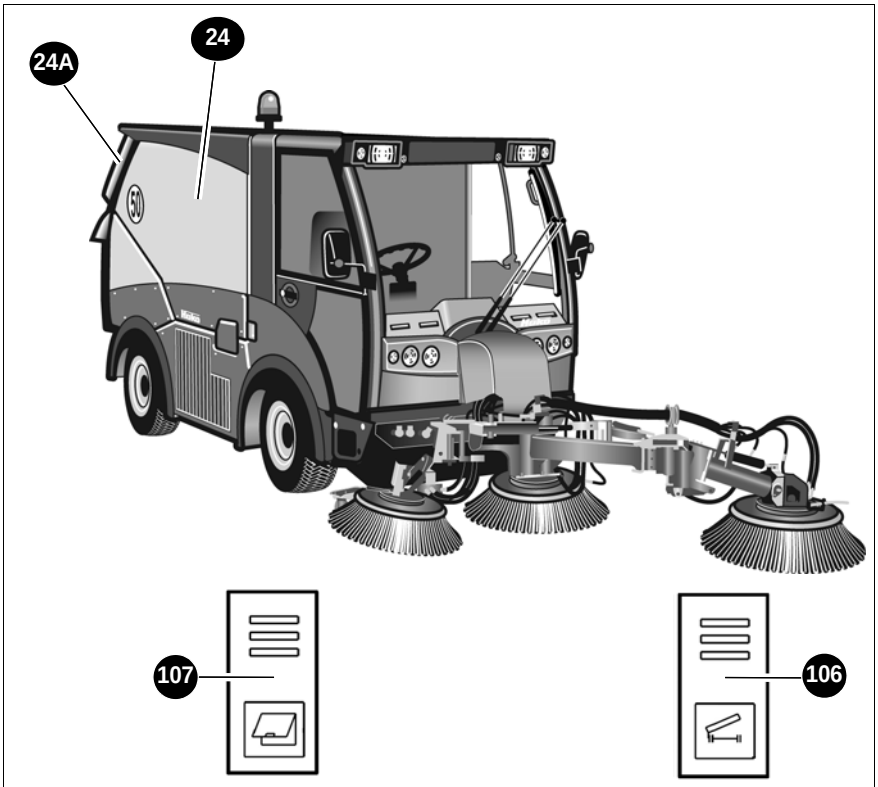


Fig. 83:

3.5.10 Toolbox

The toolbox **27** is located at the rear under the dirt hopper. The toolbox can be used to store tools, such as scrapers for the sweeping unit, lances and hoses for the high-pressure washer (option) etc.

Opening the toolbox:

Pivot the handles **27A** up and turn them until the flap can be opened.

Fig. 84:

3.5.11 Hand-held suction hose (option)

Cleaning with the hand-held suction hose

The hand-held suction hose **31** serves for the effective cleaning of grass verges and flower beds as well as emptying waste paper baskets etc.

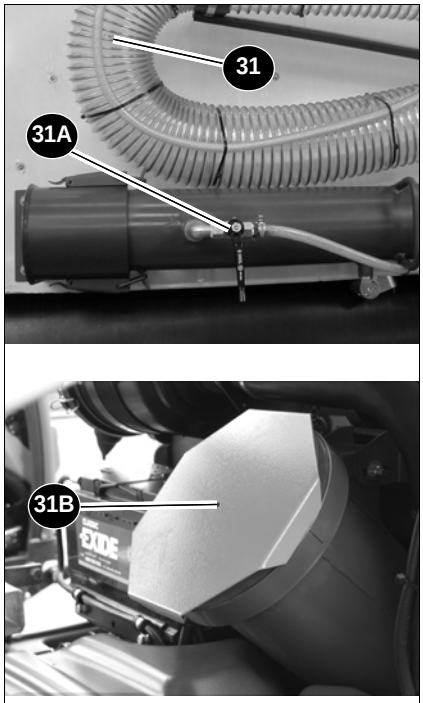


Fig. 85:

Raise the dirt hopper using the tip switch **106** and place the insert plate **31B**, stored in the toolbox, on the intake pipe. Lower the dirt hopper again.

To use the hand-held suction hose for cleaning, close the spray jets with the regulators **31A** and switch on the fresh water pump by actuating the tip switch **105**.

Remove the hand-held suction hose from the bracket and activate the fresh water supply by opening the valve **31A**.

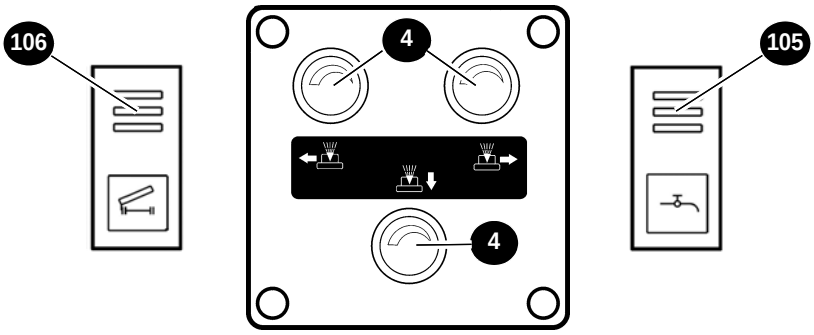


Fig. 86:

3.5.12 Winter service operating elements

If the sweeping unit is disassembled and the coded plug disconnected from the socket **136**, the control unit automatically detects Winter service.

Note!

When the coded plug is connected and the sweeping unit assembled, the BRUSH SYSTEM! warning appears in the multifunctional display.

In the case of a front rotary brush, a jumper connector must also be plugged in the socket **136**. The socket **146** is for the sand and salt spreader.
The operating elements for snow plow, front rotary brush and sand and salt spreader are assigned as follows:

Snow plow (option)

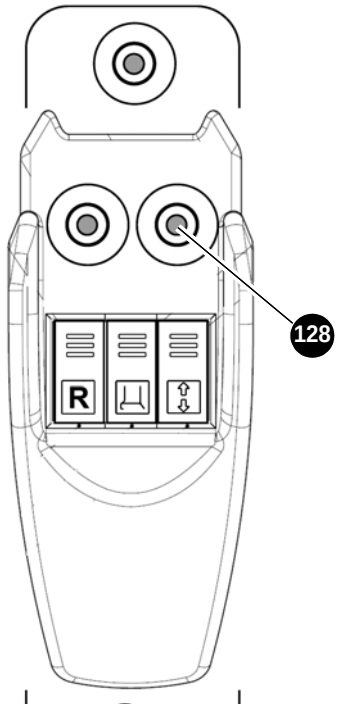


Fig. 87:

The joystick **128** is used to control the raise/lower and pivot functions for the snow plow.

Joystick	Effect
	• The snow plow is lowered.
	• The snow plow is raised.
	• The snow plow is pivoted to the left.
	• The snow plow is pivoted to the right.

Fast winter service (option)

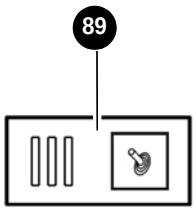


Fig. 88:

An additional switch **89** on the roof panel means that the winter service function can also be activated in Transport mode. The switch must be unlocked to switch the function on and off. The snow flake icon appears in the multifunctional display.

Front brush (option)

The speed of the front brush can be adjusted from the driver's seat.

The infinitely variable regulator **113** is used to regulate the flow volume of hydraulic oil in the rotary brush drive.

The joystick **128** is used to control the raise/lower (rotary brush drive ON/ OFF) and pivot functions of the rotary brush.

Knob	Effect
0 - 10	• Hydraulic oil is supplied to the rotary brush drive.
Joystick	**Effect**
	• The front rotary brush is lowered. • When lowered, the front rotary brush drive is activated.
	• The front rotary brush is raised. • When raised, the front rotary brush drive is deactivated.
	• The front rotary brush is pivoted to the left.
	• The front rotary brush is pivoted to the right.

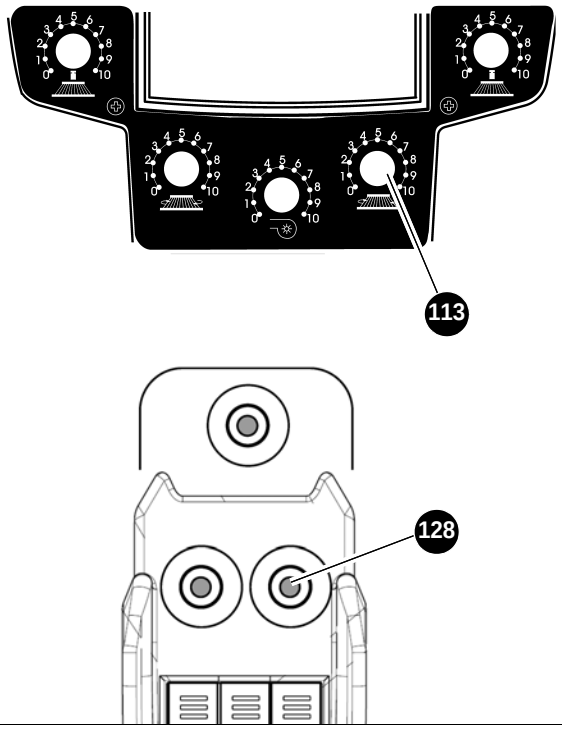


Fig. 89:

Spreader cylinder (option)

The speed of the spreader cylinder can be adjusted from the driver's seat. The infinitely variable regulator **114** is used to regulate the flow volume of hydraulic oil in the spreader cylinder drive. The work mode tip switch **115** is used to switch the spreader cylinder drive on and off.

Knob	Effect
0 - 10	• Hydraulic oil is supplied to the spreader cylinder drive.
Switch	**Effect**
1	• The spreader cylinder drive is switched on.
0	• The spreader cylinder drive is switched off.

Emptying the spreader when stopped

When the vehicle has stopped, use the tip switch **104** for circulation water to empty the spreader. The tip switch **114** also regulates the spreader speed.

Switch	Effect
1	• The spreader cylinder is switched on.
0	• The spreader cylinder is switched off.

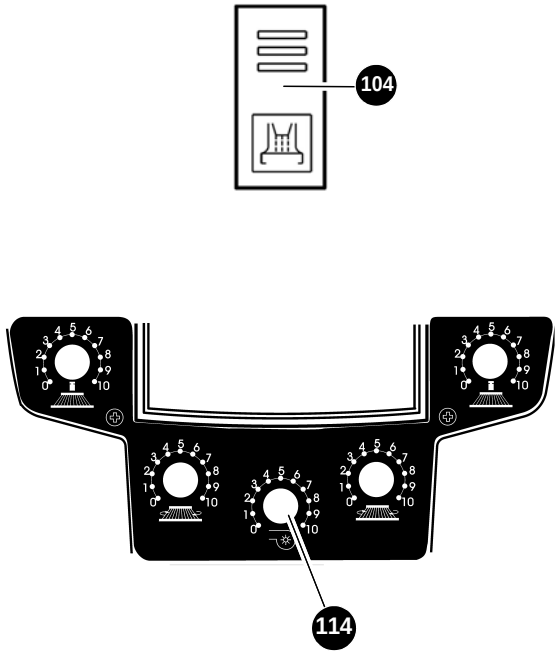


Fig. 90:

3.5.13 Attachment devices

If nothing else is stipulated by the manufacturer, attachment devices may only be operated in work mode! Only the attachment devices approved by Hako GmbH may be installed and operated. The following information only relates to attachment devices such as: snow plows, dozer blades or front sweeping unit.

Danger!

Attachment devices which are not properly fixed to the quick coupler could fall off while driving, representing a

Risk of accident!

☞*Always fix attachment devices with fixation facilities intended for attachment devices!*

☞*Observe the information in the attachment device manufacturer's operating manual!*

☞*Only those attachment devices may be installed and operated which have been approved by Hako GmbH or are offered as retrofit equipment by them and comply with the applicable installation directives!*

In the case of particularly heavy attachment devices, it may be necessary to add ballast to the vehicle; observe permissible axle loads and minimum axle loads.

Danger!

If the load applied to the rear axle after installation of an attachment device is below the minimum value, it can cause critical driving situations particularly in the event of abrupt braking. There is a

Risk of accident!

☞*Maintain the minimum axle load on the rear axle!*

☞*Do not exceed axle loads and admissible total weight!*

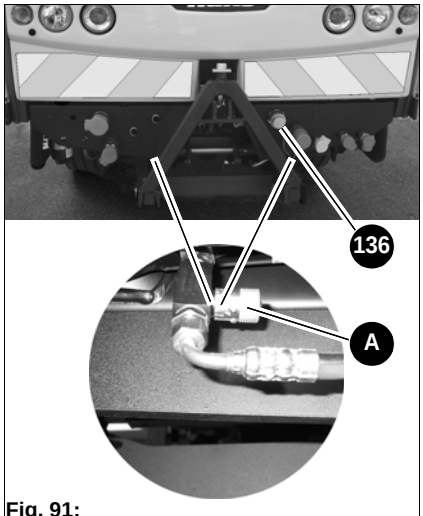


Fig. 91:

Pay attention to the following procedure when lowering the front attachment holder:

- Remove the coded plug **136**.
- Disassemble the hydraulic hoses.
- Open the chokes **A** of the two hydraulic cylinders on the front attachment holder.

Installing the attachment devices using a coupling carrier

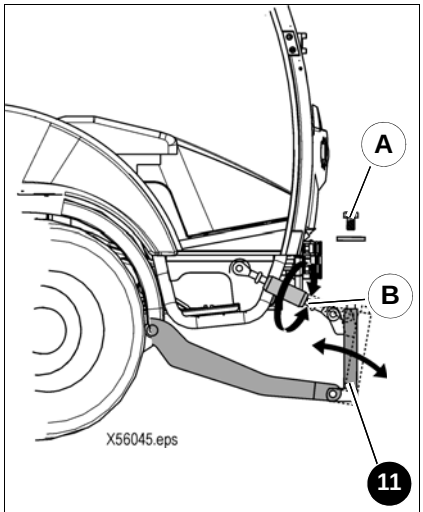


Fig. 92:

☞*Lower the quick coupler **11** and secure the vehicle against rolling away.*

☞*Disassemble the transport lock from the front attachment device* **A** *(hexagon head bolt and washer).*

☞*If necessary, bend the coupling triangle slightly to the front at the upper link **B**.*

☞*Drive slowly and straight positioning the quick coupler **11** under the holding bracket on the attachment devices*.

☞*Raise the quick coupler **11** slowly.*
When raising the quick coupler, pay attention that the quick coupler is fitted properly in the holding bracket; if it is not:

- Lower the quick coupler **11**.
- Align the vehicle and attachment device exactly to each other.
- Drive under the holding bracket of the attachment device again.

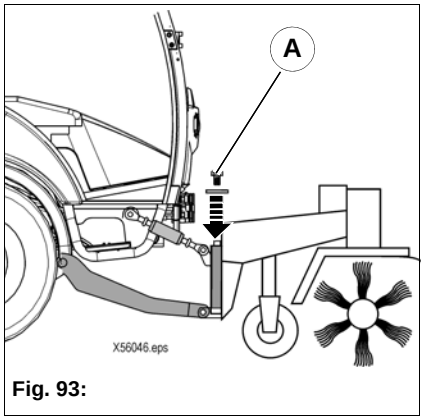


Fig. 93:

When the attachment device has been raised properly:

☞*Switch off the engine.*

☞*Apply the parking brake.*

☞*Assemble the fixation lock for the front attachment device **A** (hexagon head bolt M16 with washer).*

☞*Connect the hydraulic connections (if necessary).*

☞*Connect the electrical connections (if necessary).*

☞*Remove the storage facilities from the attachment device (if necessary).*

☞*Before starting to drive, check and verify the following:*

- Has the attachment device been assembled and secured properly?
- Is there sufficient space for movement of the attachment device for its entire height when raised?
  Pay particular attention here that the electrical and hydraulic lines are not twisted, kinked, crushed, have too small a bending radius or are stretched.
- Has all the necessary safety equipment been mounted on the attachment device and is it all fully functional?
- Can the attachment device be operated without any risks?
- Have the maximum lifting force and axle loads been observed?

Hydraulic connections

Note!

If hydraulic connections are still pressurized, it is possible that connectors from the attachment devices cannot be connected.

Fig. 94:

☞*Depressurize the hydraulic connections as follows:*

- Turn on the ignition (do not start the engine!).
- Front attachment devices: Actuate the relevant operating element (tip switch/joystick) up and down or to and fro several times.
- Rear attachment devices: Press the pressure relief switch **75** for the rear hydraulic connections 142 - 145.

☞*Connecting hydraulic connections*

The hydraulic couplings to which an attachment device must be connected depends on the equipment installed in the vehicle. Refer to the attachment device operating manual.

☞*If necessary, connect the auxiliary lights to the electrical socket (option).*

☞*Remove any supports holding the attachment device, if present.*

Disassembling an attachment device

☞*Raise the attachment device.*

☞*Switch off the engine.*

☞*Apply the parking brake.*

☞*Disconnect the electrical connections (if provided).*

☞*Depressurize the hydraulic connections and disconnect them (if provided).*

☞*Mount the storage facilities on the attachment device (if necessary) or*

☞*Support the attachment device securely from below (if necessary).*

☞*Disassemble the front attachment device fixation locks.*

☞*Lower the quick coupler.*

When the attachment device has been lowered and set down safely, the quick coupler has been released from the holding bracket of the attachment device and all the connections between the attachment device and vehicle have been disconnected, then:

☞*Reverse carefully.*

☞*Raise the quick coupler.*

Operating the attachment device

Danger!

Attachment devices which are not properly fixed to the quick coupler could fall off while driving, representing a

Risk of accident!

☞*Always secure attachment devices with the locking facility (eye bolt and hexagon nut)!*

☞*Observe the information in the attachment device manufacturer's operating manual!*

☞*Only those attachment devices may be installed and operated which have been approved by Hako GmbH or are offered as retrofit equipment by them and comply with the applicable installation directives!*

Unintentional actuation of operating elements for the work hydraulics, particularly in road traffic, represents a

Risk of accident!

Note!

If hydraulic connections are still pressurized, it is possible that hydraulic couplings of attachment devices cannot be connected; refer to Section "Hydraulic connections".

4 Maintenance

4.1 Introduction

Pay strict attention to the following before starting any service or maintenance work:

- Chapter 2 "SAFETY INFORMATION" in this operating manual.
- Information in the manufacturer's operating manual supplied with the attachment devices.

Daily and weekly maintenance and service work can be completed by a driver who has received the necessary training, all the other maintenance work may only be carried out by properly trained, qualified mechanics.

All rights to claims under the terms of warranty are annulled if this information is not observed and damage ensues.

In order to keep your Citymaster in perfect working condition, there is an extensive network of authorized dealers and service centers available to you which contain skilled personnel, modern equipment and all the necessary special tools. You will be provided with expert advice and fast, effective help.

The maintenance schedules in Chapter "MAINTENANCE" stipulate when the maintenance work described below must be carried out.

4.1.1 Access to the components

The components to be serviced must be accessed as follows:

- Water tank for the windscreen wiper system,
  fuse box, relay: In the driver's cab
- Dry air filter: Behind the driver's cab
- Hydraulic tank, vacuum/return flow filter hydraulics, fuel tank, dipstick for engine oil: On the chassis, left
- Coolant expansion tank: On the chassis, right
- Cooling system, radiator: Remove the right-hand radiator cover
- Filling neck for engine oil, engine oil filter, fuel filter, ventilation filter of hydraulic oil tank, lubricating nipple of hand brake cam shaft: Raise the dirt hopper and remove the engine cover
- Battery: Under the battery cover, behind the driver's cab, to the left
- Brake fluid tank, steering: Under the left side entry, behind the rear panel
- Hydraulic valve, air-con unit drier (option): Under the right side entry, behind the rear panel
- Ribbed V-belt generator/water pump, oil drain bolt of engine oil, axles, differential of front and rear axles, drive shafts, cardan shaft to rear axle, transfer gearbox, pressure filter of drive hydraulics: Access from underneath the vehicle

4.1.2 Removing the covers

Removing the engine cover

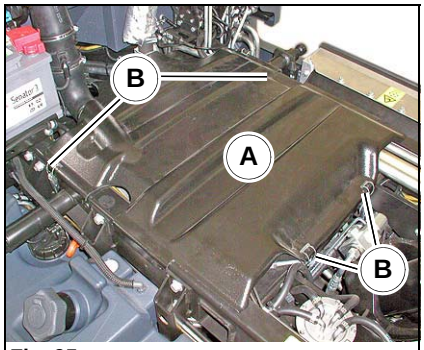


Fig. 95:

To complete maintenance and repair work on the engine and/or fuel system, the engine cover **A** must be removed as follows:

☞*Park the vehicle on a level piece of ground and secure it from rolling away.*

☞*Raise the tipping superstructure and ensure it is secured in place.*

☞*Switch off the engine, remove the ignition key.*

☞*Remove the engine cover **A**; to do this*

- Release the snap-in clips **B.**
- Remove the engine cover **A**.

☞*When the maintenance and repair work is finished, replace the engine cover in the reverse working order*.

Removing the radiator cover

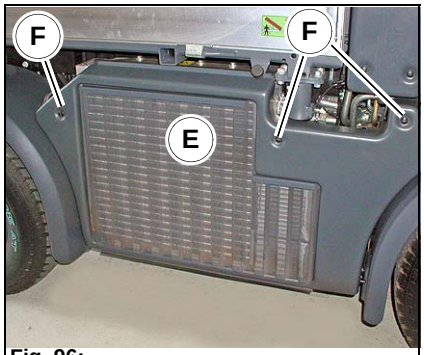


Fig. 96:

To complete any maintenance and repair work on the radiator, the radiator cover **E** must be removed as follows:

☞*Park the vehicle on a level piece of ground and secure it from rolling away.*

☞*Switch off the engine, remove the ignition key.*

☞*Remove the radiator cover **E**; to do this*

- Release the quick release fasteners **F.**
- Unhook the radiator cover **E** at the bottom and remove it.

☞*When the maintenance and repair work is finished, replace the radiator cover in the reverse working order*.

4.2 Fuel system

4.2.1 Special safety information

- Take the utmost care when handling fuel - increased risk of fire!
- Due to the high pressure of the fuel in the fuel injection system, the fuel can reach temperatures up to 70 °C, particularly when the level of fuel in the fuel tank is low – risk of scalding!
- Never work on the fuel system when there are naked flames or incendive sparks in the vicinity!
- Do not smoke when working on the fuel system or filling fuel!
- Before refueling, switch off the engine and remove the ignition key!
- Never fill fuel in closed rooms!
- Wipe up any spilled fuel immediately!
- Keep the vehicle clean to reduce the risk of fire!
- When working on the fuel system, ensure absolute cleanliness!

Environment!

Use a suitable vessel to collect any spilt fuel and dispose of it according to the applicable environmental laws!

4.2.2 Specification of the diesel fuel

Only use high-grade fuels complying with **EN 590** with a cetane rating of at least CN 51.

Winter operation

As the outdoor temperature decreases, the fluidity of the diesel fuel is reduced due to paraffin formation. This can lead to operational malfunctions if **"summer diesel fuel"** is used. Therefore, a more cold-resistant **"winter diesel fuel"** is available in Germany during the winter months which can be used reliably between -15 and -22 °C, depending on the fuel brand.

If nighttime temperatures drop below -25 °C, the diesel fuel can still become so viscous that the engine does not start. We therefore recommend parking the vehicle in a heated room.

Fuel additives (flow improvers) and similar agents must **not** be mixed with the diesel fuel!

Attention!

If diesel fuels with an increased sulphur content are used, the service life of the diesel particulate filter can be considerably reduced. Please contact the service center responsible for information on countries in which diesel with an increased sulphur content is used.

PME fuel (biodiesel fuel)

The vehicle **cannot** be run on PME fuels (**P**alm **M**ethyl **E**ster).

PME fuels have not been tested and approved by Hako GmbH, they could impair the safety of the vehicle. Hako GmbH is not considered liable for any consequential damage.

Attention!

Only fill the vehicle with diesel fuel otherwise the fuel system will be damaged and reliable diesel particulate filter regeneration is no longer guaranteed. The use of RME/PME fuels (biodiesel) or vegetable oils is not permitted for diesel particulate filter systems!

4.2.3 Refueling

Danger!

Handling fuel always represents an increased

risk of fire and risk of poisoning!

☞*Do not refuel in closed rooms!*

☞*Never work on the fuel system when there are naked flames or incendive sparks in the vicinity!*

Environment!

Use a suitable vessel to collect any spilt fuel and dispose of it according to the applicable environmental laws!

Note!

Never run the fuel tank completely empty, otherwise dirt is drawn into the fuel system.
The fuel system is not vented automatically. If the fuel tank is too low, PLEASE REFUEL! appears in the multifunctional display.

Fuel pumps

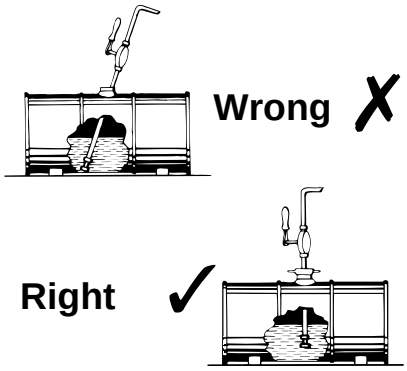


Fig. 97:

General information

Where possible, always refuel at stationary fuel pumps. Fuel from drums or canisters is usually impure.

Even the smallest particles of dirt can cause:

- increased engine wear,
- malfunctions in the fuel system,
- reduced effectiveness of the fuel filter.

Refueling from drums

If refueling from drums cannot be avoided, observe the following points; refer to the figure:

- Do not roll or tilt the drum prior to refueling.
- Protect the intake pipe opening of the drum pump with a fine-mesh filter.
- Immerse the intake pipe opening of the drum pump to max. 15 cm from the drum base.
- Only fill the tank with refueling aids (funnels or filler pipes) provided with an integrated fine particle filter.
- Keep all refueling containers clean at all times.

Refueling the vehicle

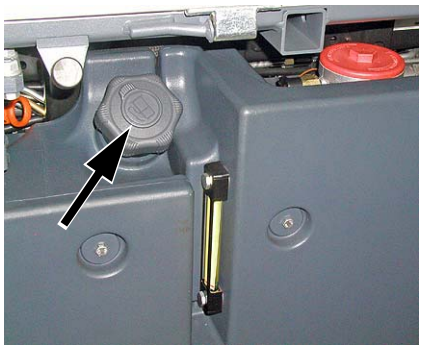


Fig. 98:

Environment!

When refueling, make sure that no fuel flows out next to the tank filling opening!! Never refuel up to the upper edge of the filling neck - the fuel expands when it heats up and can overflow! Use a suitable vessel to collect any spilt fuel and dispose of it according to the applicable environmental laws!

☞*Open the tank flap and unlock the tank cap.*

☞*Insert the nozzle of the fuel pump as far as possible in the neck of the tank to prevent the diesel fuel splashing or spilling.*

☞*After refueling, replace the tank cap and turn it clockwise until it audibly locks into place.*

☞*Lock the tank cap and close the tank flap.*

Attention!

If the wrong fuel was refueled by mistake, do not start up the engine in order to prevent damage.

☞*Have the fuel system drained by an authorized service center according to the applicable environmental laws and fill again with diesel fuel!*

4.2.4 Venting the fuel system

The fuel system is normally vented automatically by the fuel pump when the ignition is turned on.

After working on the fuel system, it is possibly sufficient to turn on the ignition. Then turn the ignition off again after approx. 20 seconds. Repeat this process three times.

However, it must be vented in the following cases:

- After installing a new fuel filter.
- After the fuel tank was run completely empty.
- After repairs to the fuel system.

Danger!

When fuel spills onto hot engine parts or the exhaust pipe, it represents a

risk of fire and risk of scalding!

☞*Wear protective goggles and protective gloves!*

☞*Never open the fuel system when the engine is hot!*

4.3 Engine lubrication system

4.3.1 Specification of the engine oil

Attention!

Never add any additives to lubricants. Damage caused by such agents is excluded from the terms of warranty.

In the case of the VW engine, an engine oil complying with the SAE 5W-30 specification, in accordance with the VW 507 00 specification (for multi-viscosity oil), must be filled to ensure a high cold start capability.

4.3.2 Checking the oil level

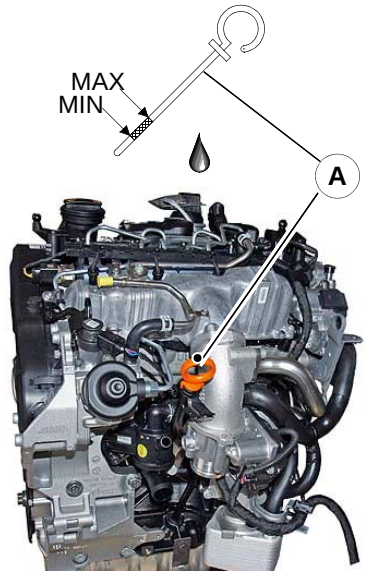


Fig. 99:

Attention!

Engines always consume a certain amount of oil. Oil consumption can reach up to 0.5% of the fuel consumption, depending on the operating conditions and manner of driving. Oil consumption can be even higher during the initial operating hours! Therefore, we recommend:

☞***Check the engine oil level every 10 operating hours or every day*** *(preferably before starting work) with the oil dipstick!*

The engine oil dipstick **A** is located on the left side of the vehicle above the fuel tank and is accessible from the outside.

Check the engine oil level

☞*When the engine oil pressure warning light* **84** lights up.

☞*After 10 operating hours or daily*.

- When the vehicle is parked on al level piece of ground
- Before starting the engine.
- 5 minutes after turning off the engine, at the earliest.

Proceed as follows to check the oil level:

☞*Park the vehicle on a level piece of ground and secure it against rolling away.*

☞*Switch off the engine, remove the ignition key.*

☞*Dipstick* **A**

- Pull it out
- Wipe the end with a lint free cloth.
- Insert it again as far as possible.
- Pull it out.
- Read the oil level.

☞*Refill oil as necessary (at the latest when the oil has reached the MIN mark on the dipstick).*

The volume of engine oil to be refilled between the MIN and MAX marks on the oil dipstick is about 0.5 l.

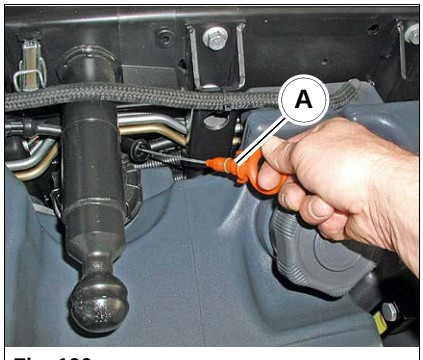


Fig. 100:

4.3.3 Filling engine oil

Attention!

Too much or incorrect engine oil can lead to engine damage! Therefore:

☞*Never fill engine oil beyond the MAX mark on the dipstick*.

☞*Only use the prescribed engine oil, refer to the service fluids and lubricants.*

Environment!

Collect any escaping oil in an appropriate vessel and dispose of according to the applicable environmental laws!

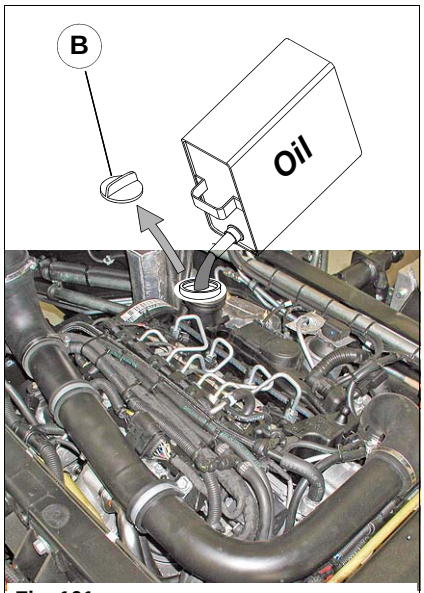


Fig. 101:

Proceed as follows to refill engine oil:

☞*Park the vehicle on a level piece of ground and secure it against rolling away.*

☞*Switch off the engine, remove the ignition key.*

☞Raise the *dirt hopper and check the correct position the safety support.*

☞*Remove the engine cover.*

☞*Clean the area around the cap* **B** *with a lint-free cloth.*

☞*Open the cap* **B**.

☞*Fill engine oil using an appropriate oil can.*

☞*Wait a few minutes until the oil has settled in the oil sump.*

☞*Check the oil level.*

☞*Top up the oil as necessary and check the oil level again.*

☞*Replace the cap* **B**.

☞*Insert the dipstick as far as possible again in the filler.*

☞*Clean up any spilled oil thoroughly from the engine.*

4.4 Cooling system

The combined charge air/oil/water radiator is located on the right-hand side of the vehicle behind the engine. It cools both the charge air of the turbocharger, the cooling water of the diesel engine as well as the hydraulic oil drive and work hydraulics. The expansion tank for the cooling water is to the right behind the driver's cab.

4.4.1 Special safety information

Danger!

Never open the radiator or drain coolant when the engine is hot because, in this case, the cooling system is under a high pressure. There is a

risk of scalding!

☞*After switching off the engine, wait at least 10 minutes!*

☞*Wear personal protective equipment and gloves.*

☞*Always start by actuating the safety valve in the cap of the expansion tank; to do this, open the cap to the first notch and allow the pressure to escape.*

- The coolant additive and the coolant represent health hazards! Therefore, store the coolant agent in the original container and keep it out of reach of children!
- Accumulations of dirt on the cooling ribs reduces the cooling capacity of the radiator! Therefore:

☞Clean the exterior of the radiator regularly, refer to the maintenance schedule.

☞Cleaning must be carried out more frequently than specified in the maintenance schedule if the vehicle is used in an extremely dusty or dirty working environment.

- Too little coolant also reduces the cooling capacity and can lead to engine damage! Therefore:

☞Check the coolant level regularly, refer to the maintenance schedule.

☞If the coolant needs to be topped up frequently, check the cooling system for leaks and/or contact your authorized service center!

☞Never refill cold water/coolant when the engine is hot!

☞After filling the radiator, test run the engine and then check the coolant level again when the engine has stopped.

- Incorrect coolant can damage the engine and radiator beyond repair, therefore:

☞Only use radiator additive labeled **G 12** or one with the specification TL-VW 774 F because these already contain an anticorrosion agent, refer to service fluids and lubricants.

☞Do not use radiator cleaning compounds if antifreeze has already been added to the coolant because this causes sludge to form, which can damage the engine.

Fig. 102:

Environment!

Collect any escaping coolant in an appropriate vessel and dispose of according to the applicable environmental laws!

4.4.2 Specification of the engine coolant

The coolant additive prevents damage by frost and corrosion, prevents lime deposits and also raises the boiling point of the water. For these reasons, the cooling system must be filled with coolant additive the whole year round.
Particularly in countries with a tropical climate, the coolant additive contributes to operational safety by increasing the boiling point when the engine is exposed to higher loads.

The cooling system must be filled with a mixture of water and coolant additive **G 12** (observe information on the label) or an additive with the specification TL-VW 774 D.

The cooling system contains approx. 12 l coolant. The permanent filling of the cooling system consists of 50% – but never more than 55% – coolant agent **G 12** and provides frost protection up to -35 °C.

The water must have the following properties:

- Total hardness 3 - 8 ° dH (German hardness)
- ph value 7 - 8
- Chlorine content < 75 mg/l

Ask your local water authority for tap water specifications.

Unsuitable coolants include saltwater, rainwater, distilled water, water with a high chloride content and fully demineralized water from ion exchangers.

4.4.3 Checking the coolant level / Refilling coolant

Note!

Check the coolant level regularly. We recommend checking it before starting the engine.

A warning message appears in the multifunction display if the coolant level is too low.

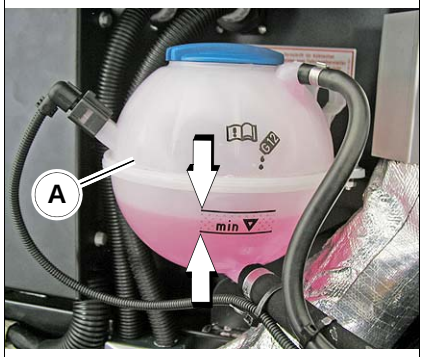


Fig. 103:

Checking the coolant level

☞*Park the vehicle on a level piece of ground and secure it from rolling away.*

☞*Switch off the engine, remove the ignition key.*

☞*Allow the engine to cool down.*

☞*Check the coolant level:*

- The coolant must be visible between the MIN and MAX marks of the expansion tank **A** when the engine is cold; if the engine is warm, it may be slightly above the middle position.

If the coolant level is below the MIN mark:

☞*Refill coolant.*

☞*Check the mixture ratio of the coolant.*

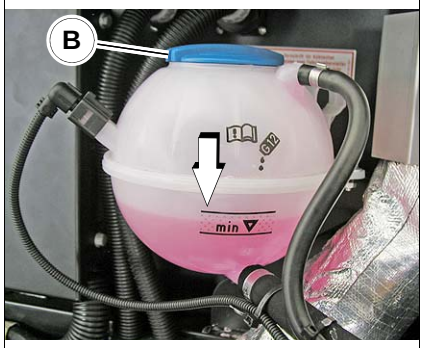


Fig. 104:

Refilling coolant

☞Raise the dirt hopper *and check the correct position the safety support.*

☞*Switch off the engine and allow to cool down.*

☞*Cover the cap **B** with a cloth.*

☞*Unscrew the cap **B** carefully and in steps as far as possible.*

☞*Wait until no more vapor escapes.*

☞*Press the cap **B** downwards and open fully.*

☞*Refill coolant slowly.*

When the radiator is filled to its maximum coolant level:

☞*Close the filling neck.*

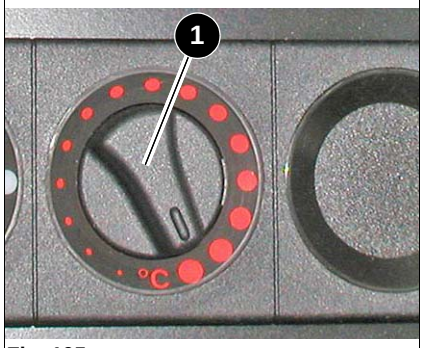


Fig. 105:

☞*Turn the hot/cold rotary knob **1** as far as possible towards red (hot).*

☞*Allow the engine to run at increased idling speed for a few minutes until warm.*

☞*Switch off the engine.*

☞*Check the coolant level again and top up as necessary; pay attention to expansion of the coolant at higher temperatures.*

☞*Check the mixture ratio of the coolant*

4.4.4 Clean the cooling ribs

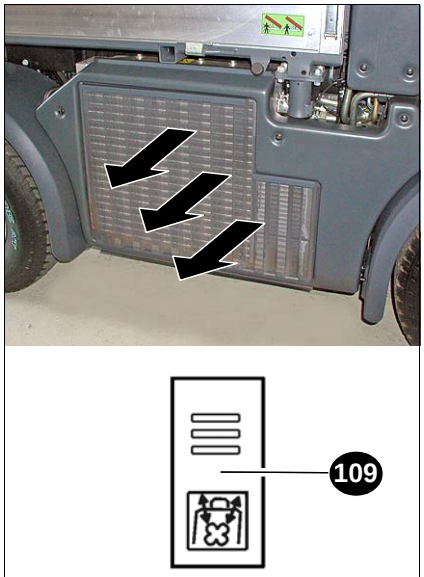


Fig. 106:

Attention!

Take care when cleaning the radiator with high-pressure washers or steam blasters! The cooling ribs are composed of metal plates which are 0.1 mm thick and can be easily damaged.

☞*Maintain a clearance of at least 30 cm between the nozzle and radiator ribs!*

A slow increase in the coolant and/or hydraulic oil temperature indicates the cooling system is soiled.

If the coolant temperature is too high (over 110 °C), the corresponding warning message appears in the multifunctional display.

When completing the work assigned, it may be sufficient to actuate the reversible fan (option) at regular intervals by pressing the button **109**.

Inspect the exterior of the radiator regularly for signs of dirt, refer to the maintenance schedule. Foreign bodies on the radiator ribs must be cleared thoroughly.

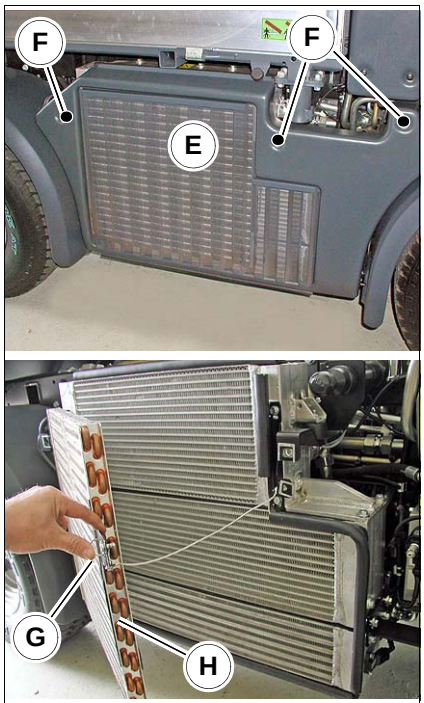


Fig. 107:

Exterior cleaning of charge air cooler and radiator:

☞*Park the vehicle on a level piece of ground and secure it from rolling away.*

☞*Switch off the engine, remove the ignition key.*

☞*Remove the radiator cover **E**; to do this*

- Loosen the quick release catches **F** and unhook the radiator cover from the bottom.

Also, in the case of an air-con unit (option):

- Unfasten the quick release catch **G** on the capacitor **H** and pivot capacitor **H** outwards.

☞*Blast the radiator ribs and capacitor from the engine side clean either with compressed air or water.*
If a brush is used, complete the working movements parallel to the longitudinal direction of the ribs.

☞*Assemble the capacitor **H**.*

☞*Assemble the radiator cover **E**.*

☞*Reassemble the quick-release catches **F**.*

4.4.5 Checking the ribbed fan belt

Danger!

Only check or replace the fan belts when the engine has stopped. There is a

Risk of injury!

☞*Turn off the engine before starting any maintenance work in the engine compartment!*

Attention!

Do not change the ribbed fan belt for the generator and air conditioning compressor of the air-con unit (option) yourself!

☞*Check the ribbed fan belt for signs of damage!*

☞*Have the ribbed fan belt changed by your authorized service center if it is damaged!*

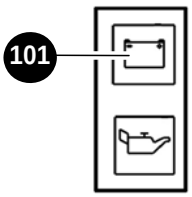


Fig. 108:

If the belt tension of the generator is too low or the ribbed fan belt is torn, the warning lamp **101** lights up in the dashboard.

Check the ribbed fan belt for the generator and air conditioning compressor, refer to the maintenance schedule.

Check the new fan belt after approx. 15 minutes in operation.

Regular checks can prevent premature wear of the fan belt.

4.5 Air filter

Fig. 109:

The air filter is located behind the driver's cab.

Attention!

The filter cartridge will be damaged if it is washed, brushed or blasted clean!

☞*Do not clean the filter cartridge.*

☞*Replace the filter cartridge when the service indicator appears!*

☞*Never attempt to reuse a damaged filter element; if in doubt, replace it!*

When servicing of the filter element is necessary, the AIR FILTER SOILED! warning message appears in the multifunctional display. The filter element must be changed. The maintenance interval for the air filter is stipulated in the maintenance schedule.

4.6 Hydraulic system

4.6.1 Checking the hydraulic oil level

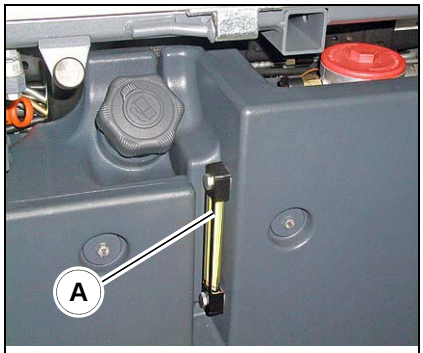


Fig. 110:

The hydraulic oil tank is located on the left-hand side of the vehicle underneath the superstructure.

The oil level is controlled through the sight glass **A**. The maintenance interval for the hydraulic system is stipulated in the maintenance schedule.

The hydraulic oil level must be checked on a weekly basis and topped up as necessary!

Environment!

Escaped or spilled hydraulic oil must be collected in an appropriate vessel and disposed of according to the applicable environmental laws!

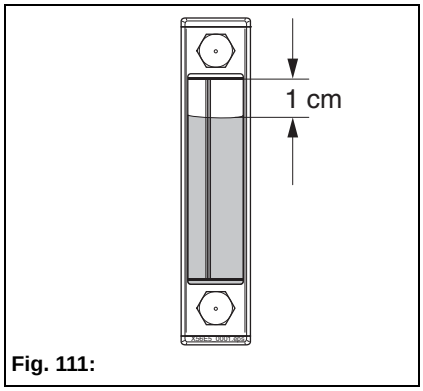


Fig. 111:

If the hydraulic oil level is too low, the HYDRAULIC OIL LEVEL TOO LOW! warning message appears in the multifunctional display.

☞*Proceed as follows:*

- Park the vehicle on a level piece of ground and secure it from rolling away.
- Switch off the engine, remove the ignition key.
- Retract all the hydraulic cylinders.

After all the oil has returned to the hydraulic tank:

- Check the oil level in through the sight glass **A**.

If the oil level is below that depicted:

- Refill hydraulic oil.

4.6.2 Refilling hydraulic oil

Attention!

The cap of the filter housing for the hydraulic oil is made of plastic.

☞*Be careful when opening or closing the filter housing – risk of breaking!*

☞*Do not tilt the cap as this could damage the thread!*

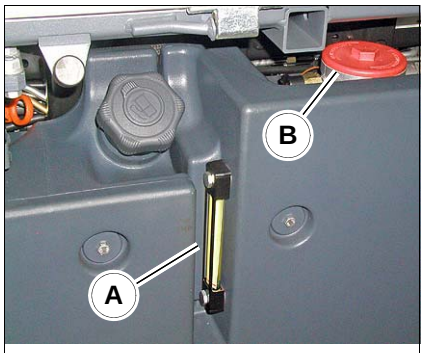


Fig. 112:

Only top up the hydraulic oil when the engine has stopped. Otherwise, the hydraulic oil will run out of the filling neck of the hydraulic oil tank.

☞*Proceed as follows when refilling:*

- Park the vehicle on a level piece of ground and secure it from rolling away.
- Retract all the hydraulic cylinders.
- Turn off the engine.
- Apply the parking brake.

After all the oil has returned to the hydraulic tank:

- Clean the area around the filling neck with a cloth.
- Unscrew the screw plug **B** (a/f 32) of the return flow filter.
- Refill hydraulic oil slowly.
- Check the hydraulic oil level through the sight glass **A**.
- Top up the oil as necessary and check the oil level again.
- Screw the screw plug **B** back in.

Important information when using biodegradable hydraulic oil

- Only use the biodegradable hydraulic fluids approved by Hako GmbH, refer to service fluids and lubricants. It is essential to consult with Hako before using another product which has not been recommended. A written guarantee must also be obtained from the oil supplier. This guarantee is applicable in cases where damage occurs to hydraulic units which can be traced back to the hydraulic fluid.
- When refilling and completing an oil change, only use biodegradable hydraulic oil of the same type. In order to prevent misunderstandings, a clear identification of the oil type currently used must be applied or attached to the hydraulic oil tank near the filler!
  Mixing two different biodegradable oils can affect the properties of one of the oil types. Therefore, pay attention that when changing the biodegradable oil, that the residual quantity of hydraulic fluid currently in the hydraulic system does not exceed 8% of the total volume (manufacturer information).
- Do not top up with mineral oil – the content of mineral oil should not exceed 2% by weight in order to prevent problems with foaming and to ensure biological degradability is not impaired.
- When running the vehicle with biodegradable oil, the same oil and filter replacement intervals are valid as for mineral oils, refer to service fluids and lubricants.
  The condensation in the hydraulic oil tank must be drained off prior to the cold season starting. The water content should not exceed 0.1% by weight.
- The information in this operating manual concerning environmental protection is also valid for the use of biodegradable oil.
- If additional hydraulic units are installed and operated, they must be run using the same types of biodegradable oil to prevent mixing in the hydraulic system.

If you subsequently change from mineral oil to biodegradable oil, you must flush the hydraulic components completely and thoroughly.

4.6.3 Hydraulic pressure lines

Special safety information

Danger!

Take the utmost care while checking hydraulic lines, especially when searching for leaks. Pressurized hydraulic oil which escapes can penetrate the skin and cause serious injuries.

Risk of injury!

☞*Therefore, contact a doctor immediately, even in the case of apparently small injuries, otherwise there is a risk of severe infection!*

☞*Pay attention to the following information:*

- Only retighten loosened screw connections and hose connections in a depressurized state, i.e., depressurize the system prior to working on pressurized lines!
- Never weld or solder defective or loosened pressure lines but replace the defective parts with new ones!
- Never search for leaks with your bare hands, wear protective gloves!
- Use paper or wood to check for minor leaks but never an unprotected light or open flame!
- When changing hose lines, pay attention that they are not twisted when installed!

- Leakages and damaged lines must be repaired or replaced as soon as possible. This not only increases operational safety of the vehicle but also contributes to environmental protection.
- Replace hydraulic hoses **every 5 years** from the date of manufacture even if they do not seem to be damaged.

We would like to refer to the following in this respect:

- BGR 237 "Hydraulic lines", issued by the German employer's liability insurance association for the chemical industry dated April 2008,
- ZH1/74 "Safety regulations for hydraulic lines", current version, issued by the German Federation of the statutory accident insurance institutions for the industrial sector,
- DIN 20066 Part 5.

Identification of hydraulic lines

Each hydraulic line must be permanently identified by the following information on the crimping, regardless of the hose line:

- Name or identification of the manufacturer, e.g. XXX.
- Operating pressure (maximum working pressure) of the hydraulic line, e.g. 330 bar.
- The last two digits of the year of manufacture and the month, e.g. 0907 for July 2009.

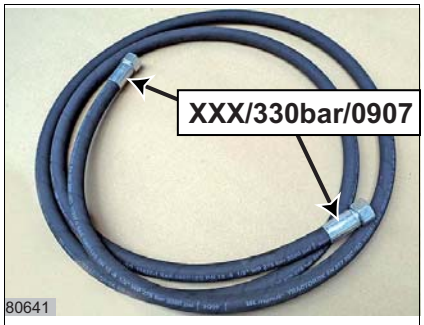


Fig. 113:

4.7 Gearbox

The maintenance of this assembly is limited to checking the oil levels and changing the engine oil at the prescribed intervals, refer to the maintenance schedule.

Danger!

Draining hot gear oil represents a

risk of scalding!

☞*Wear protective gloves.*

☞*Use appropriate tools; e.g. to loosen the oil drain bolt.*

Attention!

The gearboxes of the Citymaster are filled with different oils according to their function. Therefore, never attempt to adjust oil levels yourself because the wrong oil could cause extensive damage. Always go to an authorized service center if leaks are detected!

Environment!

Escaped or spilled gear oil must be collected in an appropriate vessel and disposed of according to the applicable environmental laws!

Note!

The control, fill and drain plugs for the individual gears can be accessed best from the underside of the vehicle.
Only use new sealing rings on fill and drain plugs. Only drain oil after the vehicle has been driven for a longer period of time!

4.8 Axles

The maintenance of these assemblies is limited to checking the oil levels and engine oil change at the prescribed intervals, refer to the maintenance schedule.

Danger!

Draining hot gear oil represents a

risk of scalding!

☞*Wear protective gloves.*

☞*Use appropriate tools; e.g. to loosen the oil drain bolt.*

Environment!

Escaped or spilled gear oil must be collected in an appropriate vessel and disposed of according to the applicable environmental laws!

Note!

Only use new sealing rings on fill and drain plugs. Only drain oil after the vehicle has been driven for a longer period of time!

4.8.1 Stub axle bearings

Greasing the stub axle bearings

Grease the stub axle bearings of the rear and front axles, refer to the maintenance schedule.

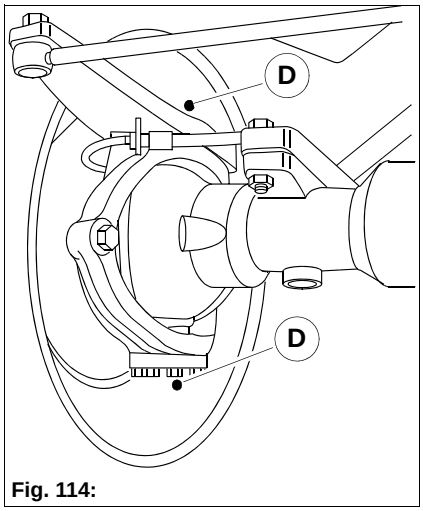


Fig. 114:

There are two lubrication nipples on each side of the axle.

In the case of all-wheel steering, the rear axle must be greased accordingly!

☞*Grease the stub axle bearings at the lubrication nipples **D** using lithium saponified multipurpose grease, refer to service fluids and lubricants.*

4.9 Brake system

4.9.1 Special safety information

Brakes are top priority safety components; incorrect handling can cause complete failure of the brakes. All maintenance and repair work on the brake system must be carried out by skilled personnel. In addition, the following activities must be completed by the vehicle driver:

- checking the fill level of the brake fluid tank.
- checking the efficiency of the brakes, daily, before starting to drive.

The brake fluid must not come into contact with the vehicle paintwork as it could dissolve the paint.

Danger!

Caution when handling brake fluid. There is a

Risk of poisoning!

☞*Only keep brake fluid in the closed, original containers and take special precautions to keep them out of reach of children!*

Environment!

Escaped or spilled brake fluid must be collected in an appropriate vessel and disposed of according to the applicable environmental laws!

Note!

For information on the maintenance intervals for the hydraulic brake system, refer to the maintenance schedule.

- Never use brake fluid based on a mineral oil!
- Only use the original brake fluid for refilling purposes, refer to service fluids and lubricants.
- When the brake fluid level is too low, the warning light **86** lights up in the dashboard.
- Check the level of brake fluid **daily** and refill as necessary!
  If brake fluid must be refilled more frequently, it indicates leaks in the brake system.
- Have the brake system serviced immediately by your authorized Hako service center.

4.9.2 Brake fluid

Checking the brake fluid level

The brake fluid tank **A** is on the left under the driver's cab. The fill level can be checked from outside. There is a filling neck under the footmat. Proceed as follows:

- Park the vehicle on a level piece of ground and secure it from rolling away.
- Switch off the engine, remove the ignition key.
- If the brake fluid level in the brake fluid tank is not between the MIN and MAX marks.
  - Refill brake fluid.

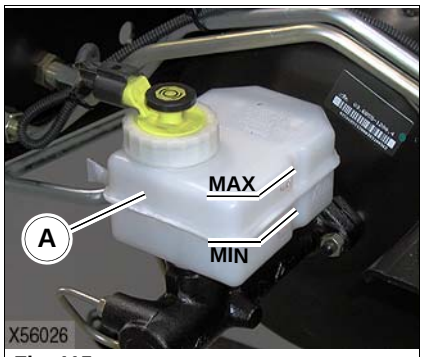


Fig. 115:

Refilling brake fluid

Refill brake fluid as follows:

- Lay the footmat to the side and remove the cap **C**.
- Clean the cap **B** and area around the filling neck.

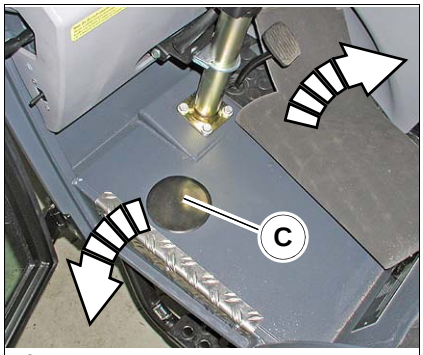


Fig. 116:

Attention!

Soiling of the brake fluid could cause the brake system to fail!

☞*Absolute cleanliness is essential when working on the brake system!*

- Remove the cap **B**.
- Fill original brake fluid to the MAX mark, refer to service fluids and lubricants.
- Screw the cap **B** back on tight.
- Pay attention there are no leaks.

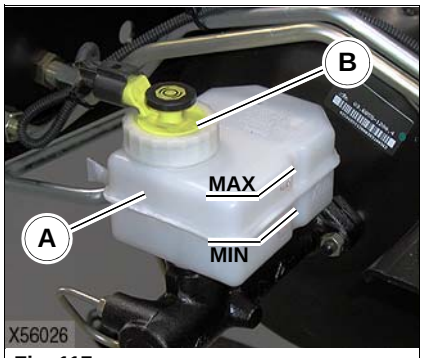


Fig. 117:

4.10 Air-conditioning unit (option)

Special safety information

All maintenance and repair work on the air-con unit may only be completed by skilled personnel from authorized service centers.

Danger!

Caution when handling refrigerants. There is a

risk of accidents and poisoning!

☞*Avoid any contact with the refrigerant!*

☞*Maintenance and repair work on the air-con unit may only be completed by skilled personnel!*

☞*The cooling circuit must not be opened!*

☞*If fluid splashes into the eyes, immediately rinse them thoroughly and contact a doctor!*

☞*Never carry out welding work on coolant circuit components and their immediate vicinity!*

☞*Only keep refrigerants in the closed, original containers and take special precautions to keep them out of reach of children!*

Environment!

Escaped or spilled refrigerants must be collected in an appropriate vessel and disposed of according to the applicable environmental laws!

Note!

Have the air-con unit inspected by an authorized service center every two years, preferably in spring.
For information on maintenance intervals, refer to the maintenance schedules.
For information on lubricant specifications, refer to service fluids and lubricants.

4.10.1 Checking and cleaning the air-con unit (option)

Capacitor

The air-con unit capacitor is located on the right-hand side of the vehicle in front of the combined radiator.

Check the capacitor daily for signs of soiling, clean with compressed air every 3 months or according to the accumulation of dirt.

If the capacitor is clogged, the heat cannot be dissipated, the refrigerant warms up and expands. This increases the pressure in the system.

Environment!

The system could burst, refrigerant could escape rendering the air-con unit no longer functional.

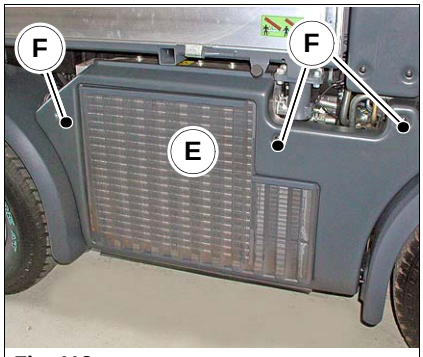


Fig. 118:

Clean the capacitor as follows:

☞*Park the vehicle on a level piece of ground and secure it from rolling away.*

☞*Switch off the engine, remove the ignition key.*

☞*Remove the radiator cover **E**; to do this*

- Loosen the quick release catches **F** and unhook the radiator cover from the bottom.

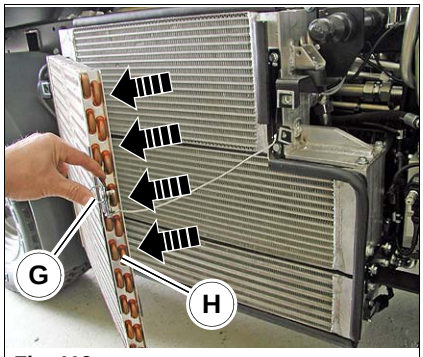


Fig. 119:

☞*Pivot out the capacitor **H**, to do this:*

- Unfasten the quick-release catches **G** on the capacitor **H** and pivot capacitor **H** outwards.

☞*Clean the capacitor **H** using compressed air, blowing from the interior outwards*.

☞*Pivot the capacitor **H** to the radiator and fasten the quick-release catches **G**.*

☞*Replace the radiator cover **E** in the reverse sequence*.

Seal quality of vehicle air-con units

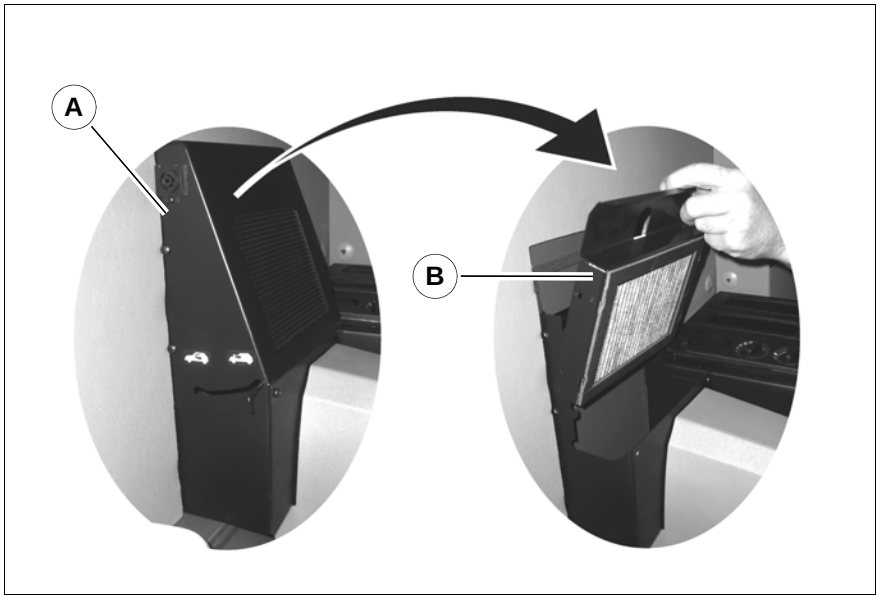
Vehicle air-con units can be designed as hermetically sealed systems. Therefore, (a certain amount of) creeping loss of refrigerant is accepted by the automobile industry. As a result, it is presumed that the performance of every vehicle's air-con unit is reduced over the years and must be refilled.

Changing the panel air filter

The panel air filter (B) must be checked for soiling once a month, more often if deployed in dusty conditions.

Disassemble the panel air filter as follows:

- Remove the screws in the panel air filter housing (A)
- Remove the panel air filter housing (A)
- Remove the panel air filter (B) nd clean or replace it.



Changing refrigerant

The filter drier must be replaced with a new one following any work in the cooling circuit or at the latest, however, every two years.

Attention!

The refrigerant may only be filled using a filling system which complies with regulations and only by properly trained technicians!

Environment!

Escaped or spilled refrigerants must be collected in an appropriate vessel and disposed of according to the applicable environmental laws!

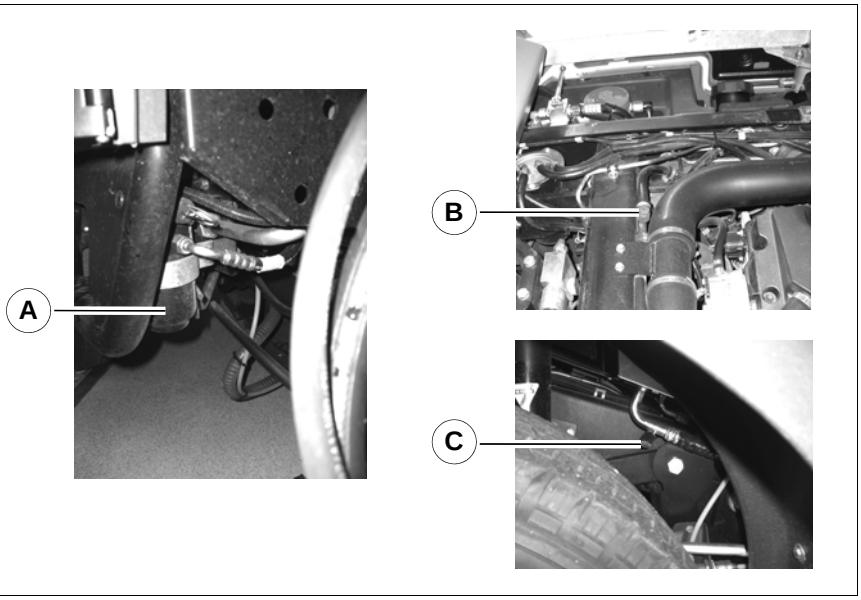
The filter drier (A) serves as a supply tank for the refrigerant. The filling and service connections are located:

- in the engine compartment under the sweepings container (low-pressure valve) (B) and
- behind the collector drier (high-pressure valve) (C)

Fill quantity: Approx: 1100g

Refrigerant: R 134 a

Air conditioning oil/compressor oil: 0,3l



4.11 Sweeping unit

4.11.1 Cleaning the sweeping unit

The cleaning work described below must be completed at least once a day and more often, if necessary, according to the accumulation of dirt.

Attention!

Do not use steam blasters or high-pressure washers. Never aim water jets directly at electrical or electronic components!

☞*Switch on the suction turbine with the switch **115**, use the regulator **114** to increase the fan speed, if necessary.*

☞*Slide the water hose in the front of the vacuum nozzle **26** and let the water run.*

☞*Allow water to be drawn into the dirt hopper until the vacuum nozzle and intake pipe are clean*.

☞*Switch the suction turbine off again.*

☞*Clean the exterior of the sweeping unit.*

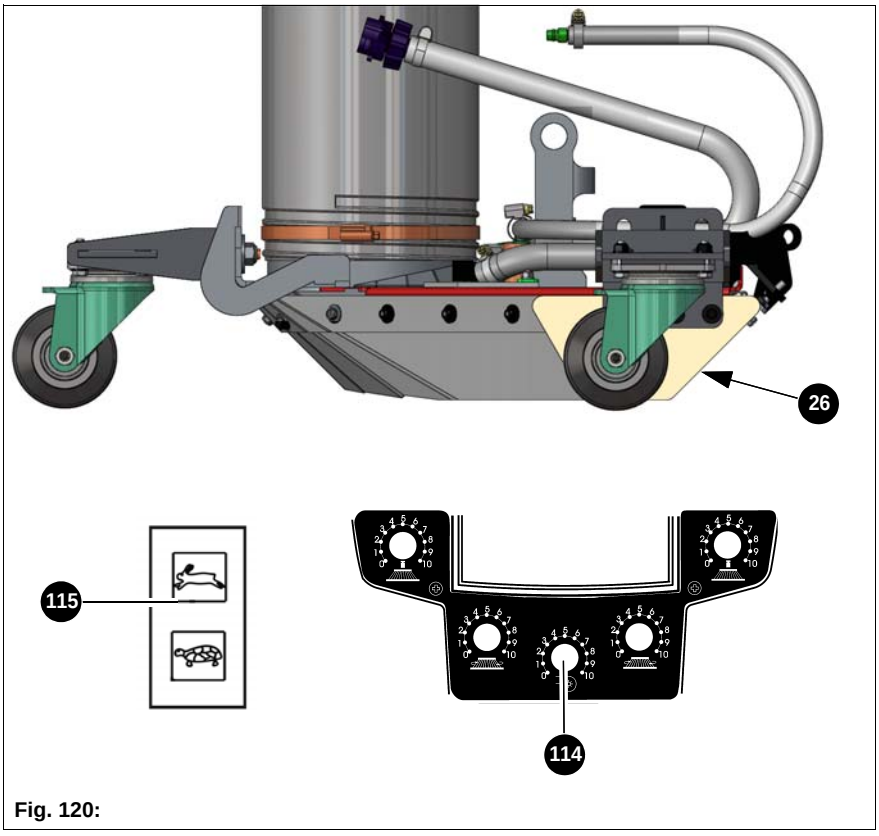


Fig. 120:

4.11.2 Setting the sweeping pattern

The contact surfaces of the brushes **25A** on the ground (sweeping pattern) and the lifting arms are adjusted at the factory. The contact pattern (refer to **X** in diagram) must have the following floor contact pattern when the sweeping unit is lowered:

- Brush, right = 10 to 4 o'clock
- Brush, left = 8 to 2 o'clock

Wear of brushes

The brushes must be adjusted to maintain the sweeping pattern as the brushes wear. When the brushes are worn by half, loosen the screws **25B** and tip the brushes to the front.

4.11.3 Working position, 3rd brush

Two working positions are possible for the 3rd brush:

- 0° position for working close to the vehicle (Figure **A**) (only possible on right-hand side)
- 40° position for symmetrical operation (Figure **B**) (right and left-hand sides)

☞*Proceed as follows to switch from the 0° position to the 40° position:*

- Lower the 3rd brush.
- Pivot out the brush arm **25C** manually.
- Position the contact buffer **25D** as illustrated in Figure **B**.

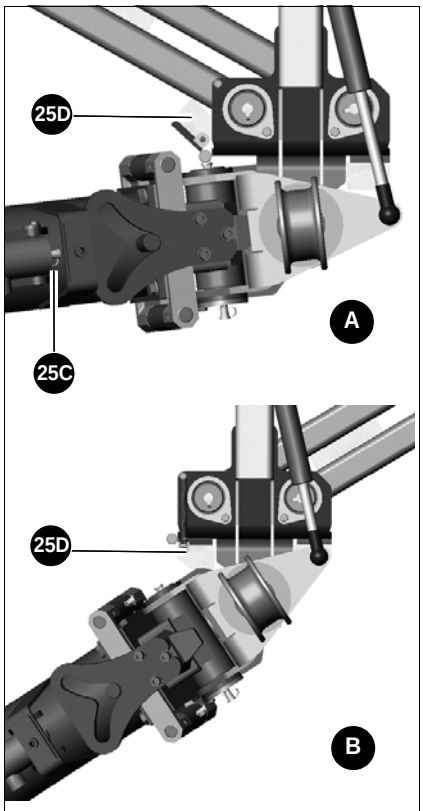


Fig. 121:

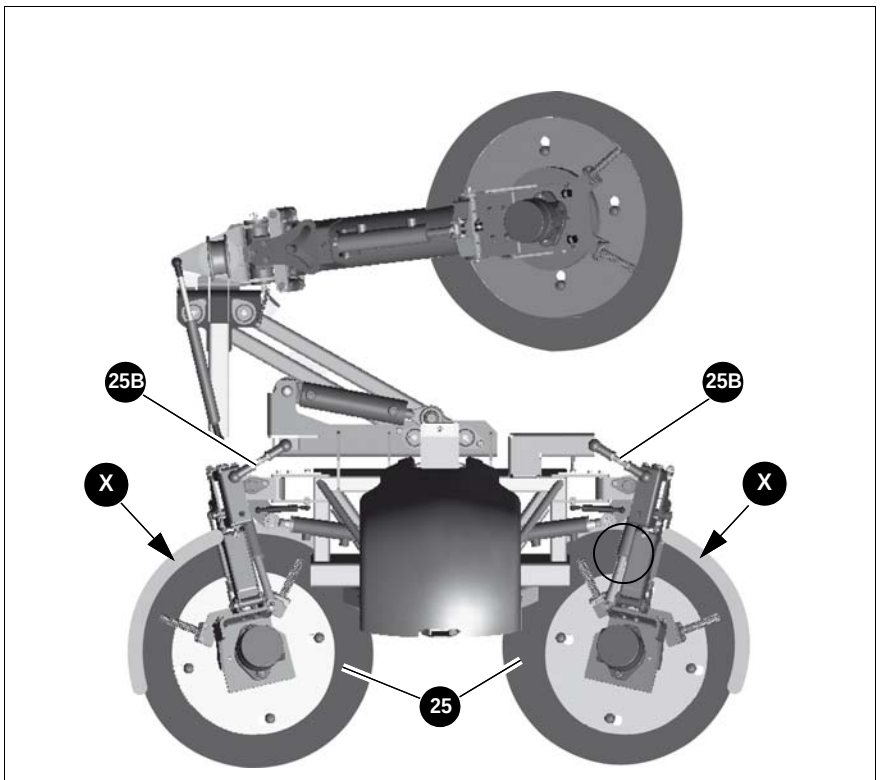


Fig. 122:

4.12 Vacuum nozzle

The waste swept up is vacuumed up by the suction power of the suction turbine by means of the vacuum nozzle **26** and transported through the suction pipe **26A** to the dirt hopper.

4.12.1 Adjusting the sealing strips

The sealing strips on the vacuum nozzle must be checked on a daily basis and adjusted as necessary. Defective sealing strips **26D**, or defective coarse material flap **26D**, must be replaced immediately because such defects impair the suction power.

2-brush system: The rear and two side sealing strips **26B** on the vacuum nozzle must have 10 mm clearance from the ground about its circumference. The coarse material flap **26D** must have 16 mm clearance from the ground.

3-brush system: The sealing strips **26B** must have 5 mm clearance from the ground at the front inclined to 15 mm at the rear. The coarse material flap **26D** must have 19 mm clearance from the ground.

To adjust the sealing strips, loosen the holders **26C** from the wheels.

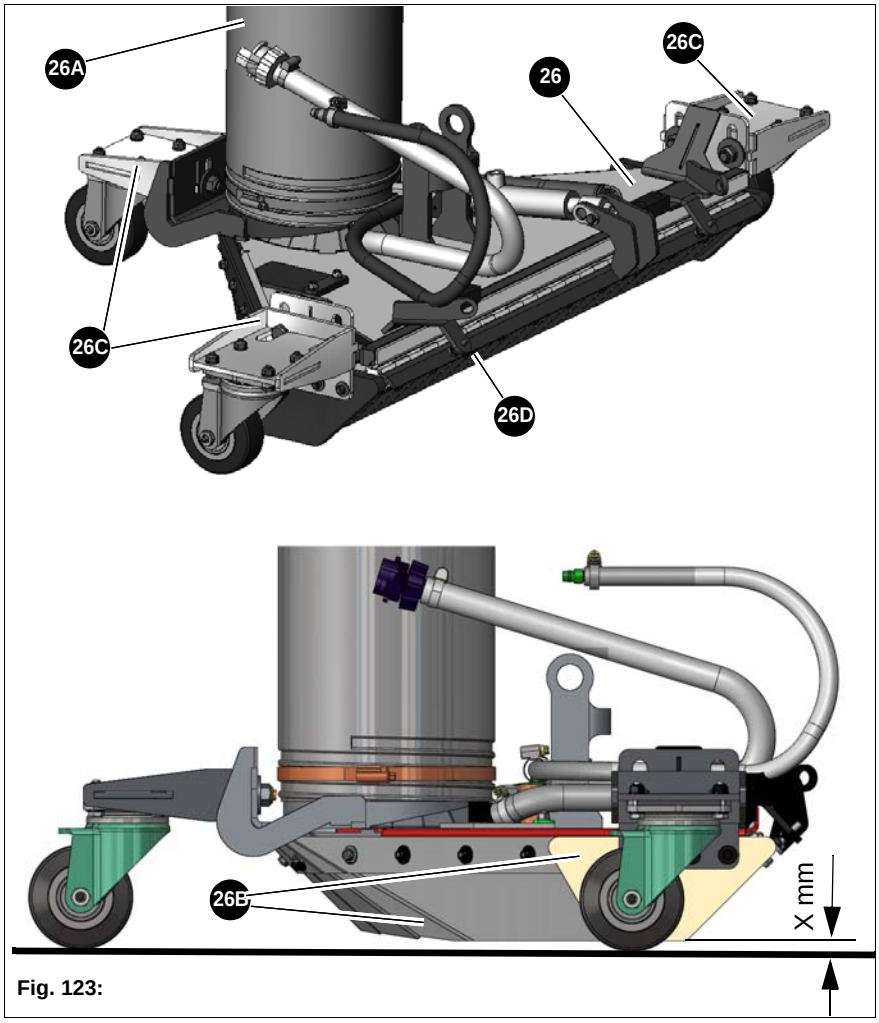


Fig. 123:

4.13 Dirt hopper

4.13.1 Cleaning the dirt hopper

Check the dirt hopper daily for soiling and clean it as necessary.

☞*Open the dirt hopper flap by means of the tip switch **107** and clean the grating of the suction turbine with a water hose.*

☞*Open the floor flap **24B** in the dirt hopper using the lever extension **24C**. Clean the inside of the dirt hopper thoroughly using a water hose. Close the floor flap again.*

☞*Raise and empty the dirt hopper by pressing the tip switch **106**. The engine must be run at an increased idling speed to empty the dirt hopper.*

☞*Lower the dirt hopper and close the dirt hopper flap.*

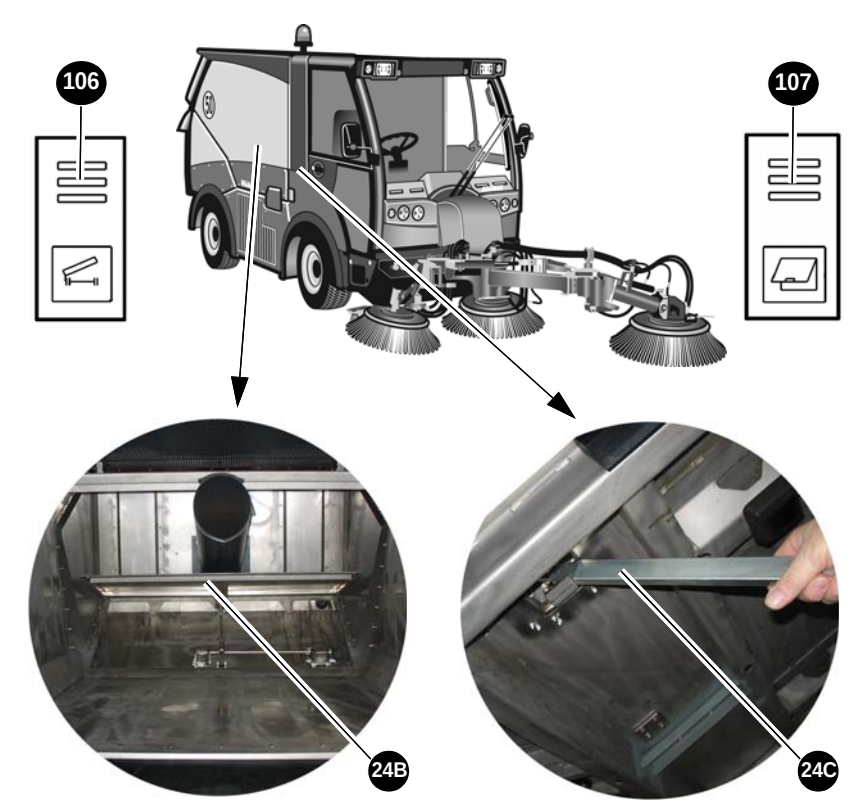


Fig. 124:

4.13.2 Cleaning the suction turbine

Check the suction turbine daily for soiling and clean it as necessary. A water connection **24D** is provided on the dirt hopper to clean the suction turbine.

☞*Raise the dirt hopper using the tip switch **106**.*

☞*Switch on the suction turbine with the tip switch **115**, use the regulator **114** to increase the fan speed, if necessary.*

☞Connect the water hose to the water connection **24D** and clean the suction turbine with a water pressure of approx. 3 bar.

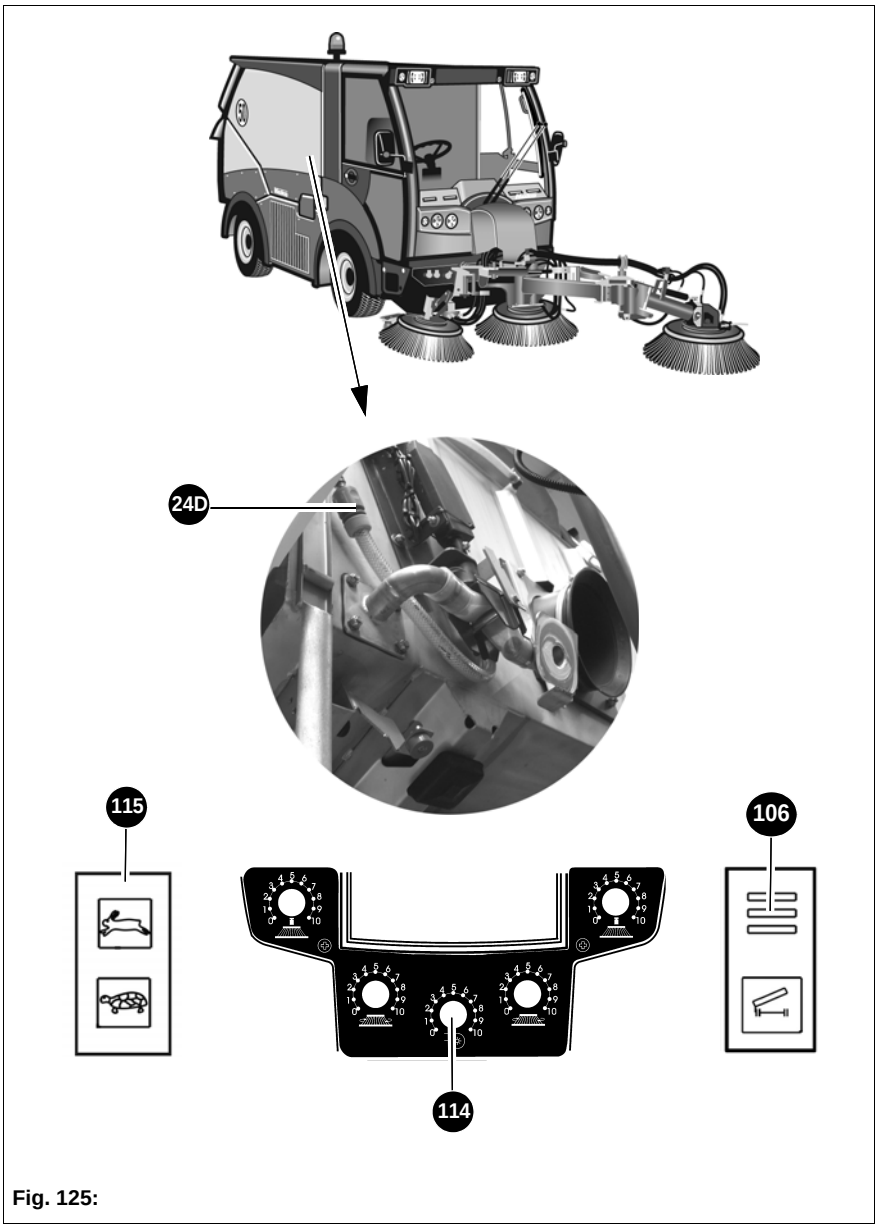


Fig. 125:

4.13.3 Cleaning the circulating water system

Check the circulating water system daily for soiling and clean it as necessary. The dirt hopper must have been emptied and cleaned before starting to clean the circulating water system.

☞*Open the dirt hopper flap by pressing the tip switch **107**.*

☞*Fill water in the dirt hopper using a water hose*.

☞*Switch off the vehicle.*

☞*Switch the ignition on. Activating work mode.*

☞*Actuate the tip switch **104** to open the recirculatory water valve and flush the entire system*.

☞*In the case of excessive soiling, the entire system must be flushed using a water hose.*

- *Remove the water hose **24E** from the vacuum nozzle and flush the entire system upwards using a water hose*.
- *Open the bayonet joint **24F** and flush downwards and upwards using a water hose*.

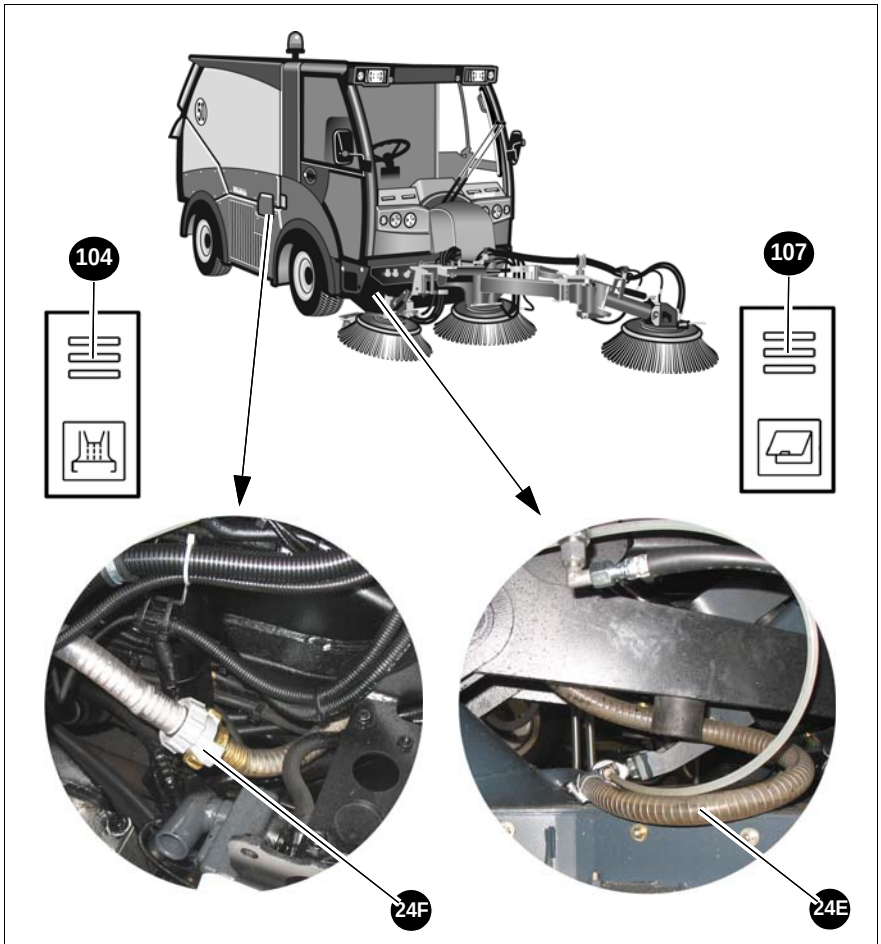


Fig. 126:

4.13.4 Dirt hopper emergency operation

Should the diesel engine breakdown, the dirt hopper can be raised by means of the hydraulic hand pump **24H**. Disassemble the cover in order to actuate the hopper lifting attachment, refer to Section 4.1.2. The control lever **24G** for the hydraulic hand pump is in the tool kit.

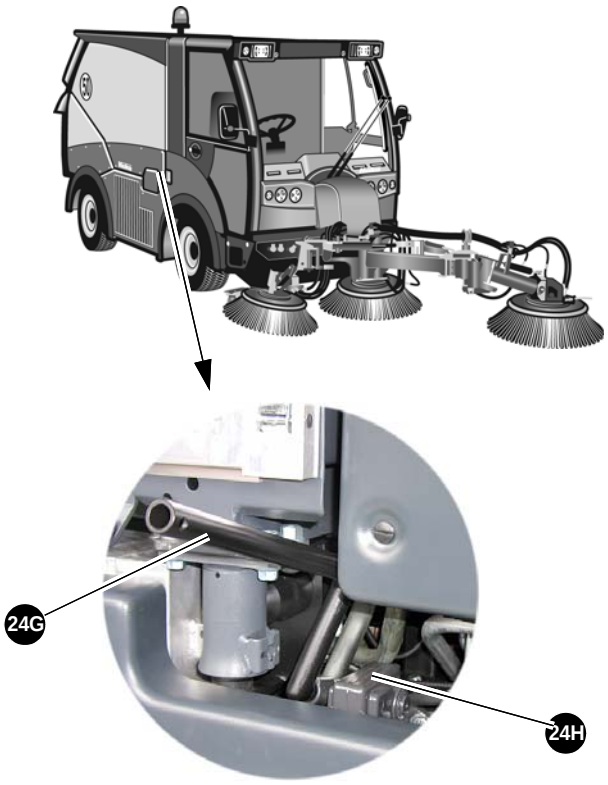


Fig. 127:

4.14 Fresh water tank

4.14.1 Cleaning the fresh water tank

Check the fresh water tank daily for soiling and clean it as necessary.

☞*Open the tank cap* **28A** *and valve* **28C**.

☞*Clean the fresh water tank using a water hose.*

4.14.2 Cleaning the sieving filter

Check the sieving filter **28B** daily for soiling and clean it as necessary.

☞*Emptying the fresh water tank.*

☞*Unscrew the filter housing.*

☞*Remove the filter element and clean it; replace it, if necessary*.

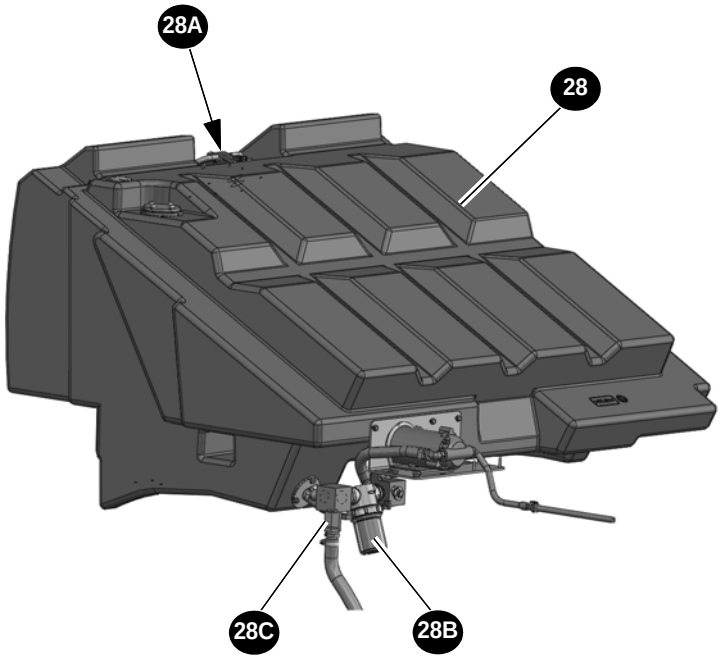


Fig. 128:

4.15 Tire care

Danger!

Improper repairs to tires represent a

Risk of accident!

☞*Repairs to tires and rims may only be completed by authorized service centers.*

☞*Following a change of tires, the wheel must be balanced by your authorized Hako service center prior to fitting.*

☞*When changing tires, only the wheels and tires approved by Hako may be used!*

Environment!

Old tires must be disposed of by your authorized Hako service center according to the applicable environmental laws!

Note!

Regular control of the tires:

- increases operational safety.
- increases the service life of the tires.
- reduces the vehicle's periods out of service.

The permissible tire types and their correct pressures are listed in the table in Chapter "Technical data".

New tires do not have the optimal grip and, therefore, should be run in for about 100 kilometers, driving with the corresponding care.

Worn tires have reduced grip on the ground surface, particularly when wet! Therefore, they should be changed when the tread is below 3 mm!

Goodyear Wrangler HP (wide base tires) 265/70 R15 have proven a good choice because their physical properties are perfectly tuned to the constructional characteristics of the road sweeper and its handling. Greater deformation at lower tire pressures represents a risk of the vehicle skidding or drifting.

Tires older than 6 years must not be used!

4.15.1 Inspections

Daily checks

☞*Carry out the following maintenance work on a daily basis:*

- Check the tire pressure (visual inspection).

Weekly checks

☞*Carry out the following maintenance work on a weekly basis:*

- Check the tire pressure (when the tires are cold).
- Check the tires and rims for damage (cracks, aging, etc.) – also on the inside.
- Remove any foreign bodies from the tire treads.
- Remove traces of oil and grease from the tires.
- Check the wheel nuts are fitted tight.
- Check the tires for wear and measure the depth of the tread.
- If the wear of the individual tires differs greatly:
  Check the track, or have it checked, and change the wheels diagonally:
  front right with rear left, and front left with rear right.

4.15.2 Changing a wheel

Attention!

Repair work on tires and rims may only be carried out by skilled personal or by an authorized workshop! The wheels are heavy and can damage the threads on the wheel studs if they are handled incorrectly!

☞*Use appropriate assembly aids, such as covering sleeves for the studs, a jack etc.*

Disassembling

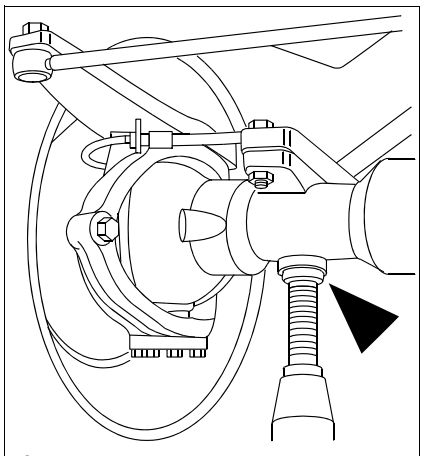


Fig. 129:

☞*Proceed as follows:*

- Park the vehicle on a level piece of ground and secure it from rolling away.
- Switch off the engine, remove the ignition key.
- Remove the cover caps from the wheel bolts.
- Loosen the wheel nuts of the wheel you want to remove.
- Position a jack safely under the axle casing.
- Raise the relevant side of the axle.
- Ensure the vehicle is standing securely.
- Remove all the wheel nuts.
- Remove the wheel.

Installation

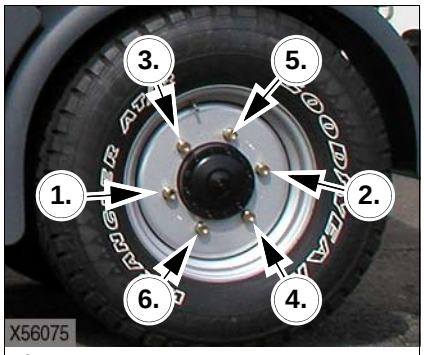


Fig. 130:

☞*Proceed as follows:*

- Place the wheel on the locating collar.
- Tighten all the wheel nuts slightly.
- Lower the raised side of the axle.
- Tighten the wheel nuts at a torque of 280 $^{+20}$ Nm in a diagonally opposite sequence, as illustrated.
- Put the cover caps back on the wheel nuts.
- Retighten the wheel nuts after driving approx. 50 km in the adjacent sequence and at the prescribed torque.

4.15.3 Snow chains (option)

Snow chains are only intended for tires of type **225/70 R15**.

☞*Park the vehicle on a level piece of ground and secure it from rolling away.*

☞*Switch off the engine, remove the ignition key.*

☞*Mount, tighten and remove snow chains in accordance with the manufacturer's instructions.*

4.16 Windscreen wiper system

4.16.1 Filling the windscreen wiper system

Attention!

If insufficient antifreeze has been added, the windscreen washer fluid could freeze which can lead to severe damage to the windscreen washing system motor.

☞When mixing the windscreen washer fluid with the washing additive or antifreeze, pay attention to the correct mixture ratio. Observe the information from the manufacturer on the packaging of the washing additive or antifreeze.

Fig. 131:

The windscreen washer tank is located in the cab behind the driver's seat.

☞*Park the vehicle on a level piece of ground and secure it from rolling away.*

☞*Switch off the engine, remove the ignition key.*

☞*Fold the backrest of the driver's seat forward.*

☞*Open the cover **A** of the windscreen washer tank and fill the tank.*

Note!

Only fill clean tap water!
If necessary, a suitable cleaning agent can be added, refer to service fluids and lubricants.
In winter:
Add antifreeze suited to the windscreen wiper system to the water. Information on mixture ratios is provided in the instructions supplied with the antifreeze. If, for any reason, no cleaning agent with antifreeze is available, use methylated spirit.
Never use coolant or other additives!

Daily checks

☞*Check the fill level of the windscreen wiper system, top up as necessary.*

Weekly checks

☞*Check the condition of the wiper blades. When soiled or damaged, they can impair visibility considerably.*

☞*Clean any grease, dirt and tar from the windscreen at regular intervals. This increases the service life of the wiper blades considerably.*

☞*Check the nozzles of the windscreen washer system to see whether the water jet sprays correctly. Clear any blockages in the nozzle openings with a needle.*

4.17 Electrical system

The vehicle is equipped with an electrical system providing a vehicle voltage of 12 V. It is equipped with a lighting and indicator system complying with StVZO (German road traffic licensing regulation).

The drive modes, switching steering modes and work hydraulics are each controlled by their individual electronic control unit. These three control units are networked to a common display to indicate operating values and messages via a CAN bus in accordance with ISO 11898 (2.0a).

Vehicle voltage	14 V
Three-phase generator	14 V / 140 A
Starter	12 V / 2.0 kW
Battery	12 V 100 Ah
Socket	Cigarette lighter; max. 10 A (120 W)

4.17.1 Fuses

Fuse box

The fuse box **A** is located behind the passenger seat on the driver's cab rear panel.

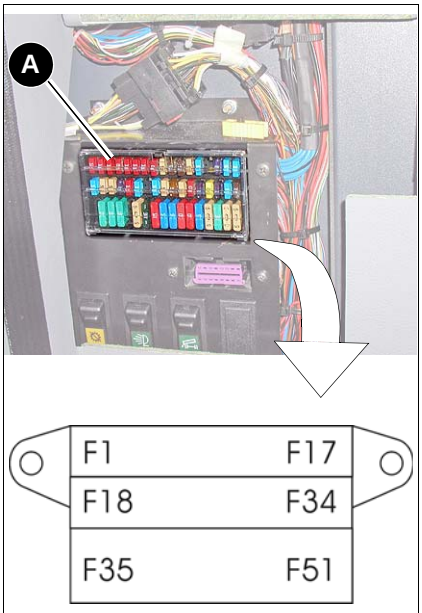


Fig. 132:

No.	Rated current (A)	Termi-nal	Protected circuit
F1	10 A	56	High beam, left
F2	10 A	56	High beam, right
F3	10 A	56	Low beam, left
F4	10 A	56	Low beam, right
F5	10 A	56	Auxiliary headlight, high beam, left (option)
F6	10 A	56	Auxiliary headlight, high beam, right (option)
F7	10 A	56	Auxiliary headlight, low beam, left (option)
F8	10 A	56	Auxiliary headlight, low beam, right (option)
F9	5 A	56	Rear fog lamp
F10	7,5 A	58	Parking light, left
F11	7,5 A	58	Parking light, right
F12	5 A	58	Lighting: speedometer, multifunction display; switch: light, working lights relay front/rear
F13	15 A4	x	Working lights, front (option)
F14	20 A	30	Fresh water pump, joystick function swivel/ lower brush
F15	3 A	15R	Control lamps: charge control, preheating, OEBD; diagnostics connector, oil pressure control lamp relay
F16	15 A4	x	Windscreen wiper/washer system, horn
F17	15 A4	15R	Indicator lamp system
F18	15 A4	x	13-pin trailer socket
F19	5 A	x	Multifunction display, hydrostat control unit, TOG_sensor
F20	5 A	15R	Reversible fan valve (option)
F21	5 A	x	Steering control unit – electronic
F22	10 A	x	Steering control unit - power circuit, steering type valve, differential lock, ADR On/Off switch
F23	15 A4	x	3-pole socket, center panel
F24	10 A	x	Working lights, rear (option)
F25	15 A4	x	Work hydraulics
F26	5 A	15R	Work hydraulics control unit - electronic
F27	10 A	15R	Reversing light, reversing buzzer

No.	Rated current (A)	Termi-nal	Protected circuit
F28	5 A	30	Radio, two-way radio, tachograph
F29	5 A	15R	Supply/Lighting switch/tip switch, high beam relay
F30	1 A	15R	Hydrostat control unit - power-on signal
F31	20 A	15R	Hydrostat control unit - electronic supply and charge outputs
F32	3 A	15R	Axle center position transducer, brake light switch opener, sensor for hopper/flap, fan speed, water tank, summer/winter service
F33	15 A4	x	Heater blower, air-con compressor (option)
F34	7,5 A	15	Diesel engine control unit, air flow meter, pressure filter soiling transducer
F35		x	Spare (max. 20 A)
F36	30 A	30	Windscreen/Mirror heater (option)
F37	30 A	x	Work hydraulics power circuit control unit
F38	30 A	x	Circulating water circuit pump
F39	30 A	15	Streetwasher control unit
F40	5 A	30	Radio, two-way radio, tachograph, speedometer
F41	30 A	HRM	Power supply, diesel engine control unit
F42	10 A	HRM	Load pressure control relief valve, heater exhaust gas oxygen sensor, high pressure control valve, fuel metering valve high pres-sure pump
F43	15 A4	30	Hazard lights
F44	15 A4	30	Flashing beacon (option)
F45	10 A	30	Brake lights
F46	15 A4	30	Interior light, cigarette lighter
F47	15 A4	30	13-pin trailer socket
F48	5 A	30	Diagnostics connector, diesel engine control unit, multifunction display control unit (seat contact monitoring)
F49	30 A	30	Fuel pump
F50	10 A	30	Compressor, driver's seat (option)
F51	5 A	HRM	Automatic glow duration control unit, heater for crankcase ventilation system
F52	50 A	30	Glow plugs

4.17.2 Relay assignment

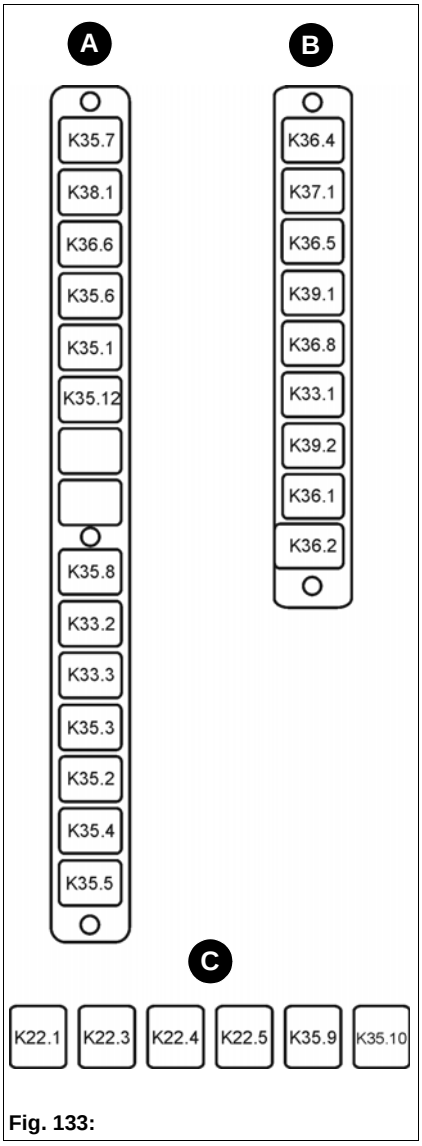


Fig. 133:

Relay no.	Relay switching function
A = Relay strip (microrelay)	
K35.7	Rear fog lamp relay
K38.1	Brake light relay
K36.6	Oil pressure relay
K35.6	Reversing light relay
K35.1	Working lights relay, front (option)
K35.12	High beam relay
	Spare
	Spare
K35.8	Low beam relay
K33.2	Indicator light left, changeover relay
K33.3	Indicator light right, changeover relay
K35.3	Parking light right, changeover relay
K35.2	Parking light left, changeover relay
K35.4	Low beam changeover relay
K35.5	High beam changeover relay
B = Relay strip (mini/maxi relay)	
K36.4	Fuel pump relay
K37.1	AFM / steering control unit relay
K36.5	Engine main relay
K39.1	Windscreen wiper interval relay
K36.8	Terminal 15 relay
K33.1	Flashing unit
K39.2	Windscreen/Mirror heater relay (option)
K36.1	Starter lock relay
K36.2	Terminal X relay
C = Relay underneath the fuse box	
K22.1	Fresh water pump relay
K22.3	Open circulating water system relay
K22.4	Close circulating water system relay
K22.5	Work hydraulics relay
K35.9	Parking light during daytime running relay (option)
K35.10	Low beam during daytime running relay (option)

4.17.3 Changing light bulbs

Danger!

When loosening the headlight from the ball pin there is a

Risk of injury!

☞*Pay attention to sources of injury and pad them, if necessary*.

Attention!

Before exchanging a light bulb, switch off the ignition to disconnect the consumers from the electric circuit.
Only replace light bulbs with new ones of the same type and rating (amperage).

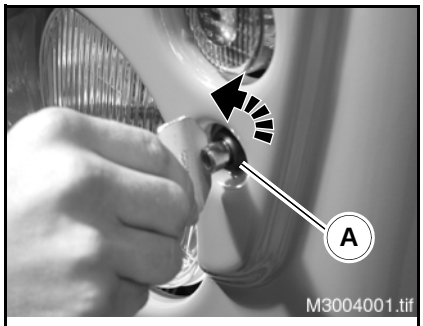
☞*Do not touch the glass jacket of the halogen light with your bare hands! The fingerprint left behind would evaporate due to the heat generated by the light bulb when switched on and deposit on the reflector surface which would make it dull!*

Note!

We recommend carrying spare light bulbs in the vehicle because they are important for maintaining traffic safety.

The following instructions describe how to change the most important light bulbs.

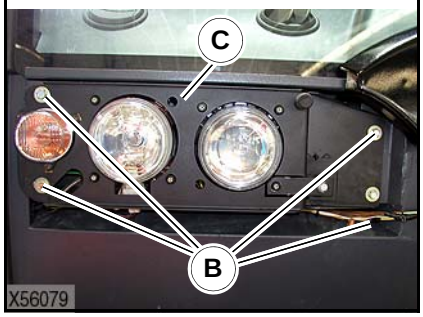
Front headlight



To change the light bulbs in the front main headlights:

☞*Open the front flap:*

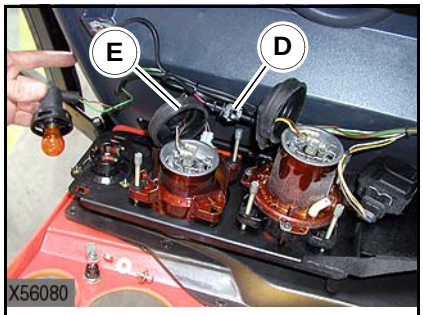
- Turn the locks **A** on the left and right of the front flap 90° to their vertical position using the special key kept in the tool kit.
- Fold the front flap to the front.



☞*Remove hexagon nuts **B**.*

☞*Tip the headlight plate **C** down.*

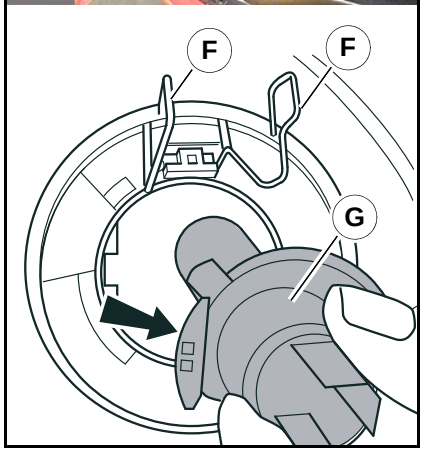
Front high beam headlight



To change the light bulb in the high beam headlight:

☞*Disconnect the cable plug **D**.*

☞*Remove the sealing cap **E**.*

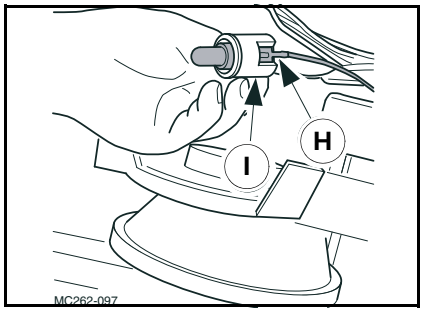


☞*Press the tension spring **F** together with your fingers and remove the light bulb **G**.*

☞*Take hold of the new light bulb **G** by the bulb socket, not by the glass jacket, and insert it in the headlight.*

☞*Pay attention to the locking device which ensures the correct position of the light bulb **G** in the headlight (refer to figure).*

☞*Fit the tension spring **F**, sealing cap **E** and cable plug **D** back in place in the reverse sequence*.



Front low beam headlight

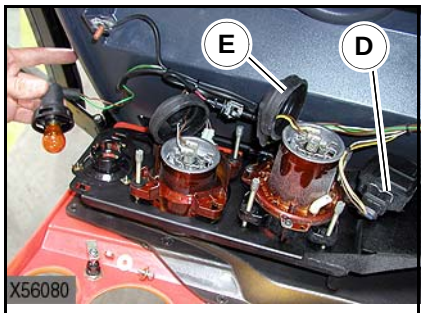
To change the light bulb in the parking light:

☞*Disconnect the cable plug **H**.*

☞*Loosen the lamp jacket **I** by turning it and pull it from the reflector.*

☞*Replace a new light bulb.*

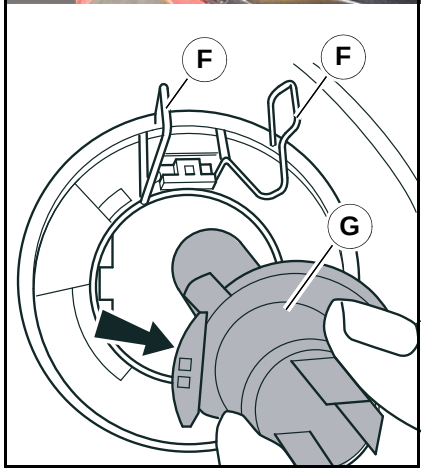
☞*Reassemble in the reverse sequence.*



To change the light bulb in the low beam headlight:

☞*Disconnect the cable plug **D**.*

☞*Remove the sealing cap **E**.*



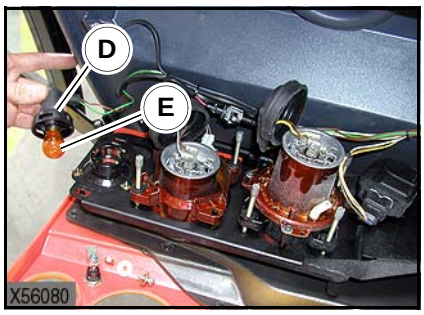
Right indicator light

☞*Press the tension spring **F** together with your fingers and remove the light bulb **G**.*

☞*Take hold of the new light bulb **G** by the bulb socket, not by the glass jacket, and insert it in the headlight.*

☞*Pay attention to the locking device which ensures the correct position of the light bulb **G** in the headlight (refer to figure).*

☞*Fit the tension spring **F**, sealing cap **E** and cable plug **D** back in place in the reverse sequence*.



To change the light bulbs of the front indicators:

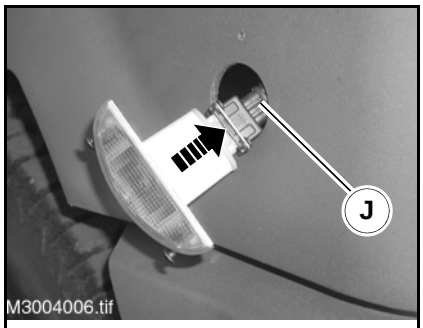
☞*Turn the lamp housing **D** to the left, exerting a little force.*

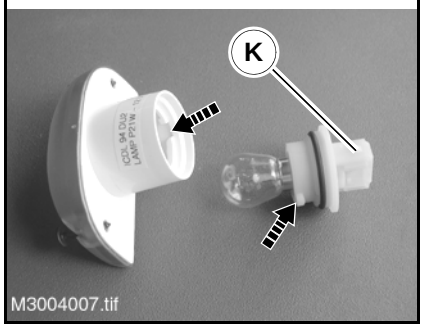
☞*Press the light bulb **E** down lightly, turn it half a revolution and remove it.*

☞*Press in a new light bulb **E** , turn it half a revolution.*

☞*Replace the lamp housing **D** and force it lightly clockwise.*

Side indicator lights





To change the light bulbs of the side indicators:

Note!

The indicator light need not be disassembled to change the light bulb. For a clearer illustration, the indicator lamps are depicted disassembled.

☞*Disconnect the connector **J** from the indicator light:*

- Press in the bow clip (arrow) and simultaneously disconnect the connector **K**.

☞*Turn the bulb socket 90° counterclockwise while holding the indicator light.*

☞*Pull the bulb socket from the indicator light.*

☞*Press the light bulb down lightly, turn it half a revolution counterclockwise and remove it.*

☞*Press a new light bulb in and turn it half a revolution clockwise.*

☞*Plug the bulb socket in the indicator light.*

☞*Turn the bulb socket 90° clockwise while holding the indicator light.*

☞*Replace the connector **K** and press it until it audibly snaps into place.*

Rear lights

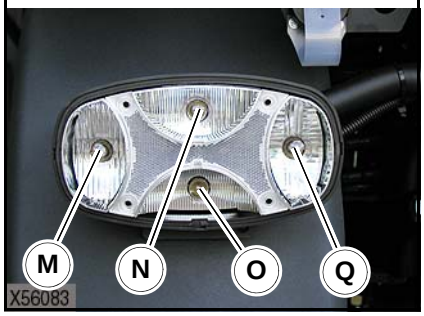
To change the light bulbs of the rear lights:

☞*Remove the screws **L**.*

☞*Remove the light cover.*

☞*The right rear light accommodates the light bulbs for*

- Indicator lights **M**
- Brake light **N**
- Rear light **O**
- Reversing light **P**



☞*The left rear light accommodates the light bulbs for*

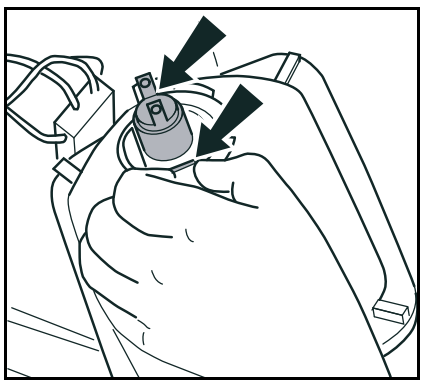
- Indicator lights **M**
- Brake light **N**
- Rear light and license plate light **O**
- Rear fog lamp **Q**

☞*Press the corresponding light bulb down lightly, turn it half a revolution and remove it.*

☞*Press in a new light bulb and turn it half a revolution.*

☞*Replace the light cover and fix in place with the screws **L**.*

Auxiliary headlights (option) and working light (option)



To change the light bulbs of the auxiliary headlights and working light (option):

☞*Remove the lamp cover.*

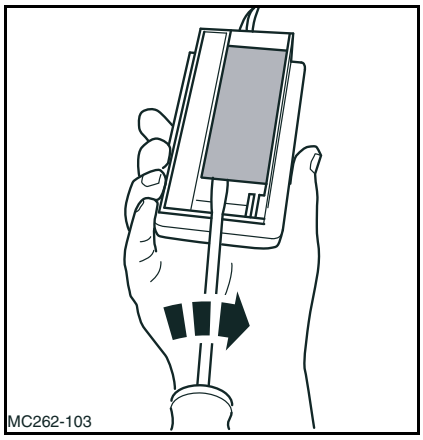
☞*Unscrew the lamp cover or lamp reflector.*

☞*Press the tension spring down and to the side (refer to figure), take hold of the lamp by the socket and unscrew it.*

☞*Unplug the lamp cable of the auxiliary headlight and connect the cable to the new lamp.*

☞*Fasten the tension spring again and then reassemble the lamp.*

Interior light



To change the light bulb of the interior light:

☞*Use a screwdriver to carefully lever the interior light from the roof lining.*

☞*Open the cover of the reflector by inserting the screwdriver and turning it slightly as shown in the figure.*

☞*Change the light bulb and replace the interior light.*

Flashing beacon

To change the light bulb of the flashing beacon:

☞*Press in the lock (arrow) on the bottom of the lamp with your thumb.*

☞*Hold on the bottom part of lamp and turn top part of lamp clockwise to unscrew it.*

☞*Remove the defective light bulb **R** from the holder and replace a new one.*

☞*Replace top of lamp and turn counterclockwise until the lock audibly locks into place.*

4.17.4 Regular maintenance and service work

Before driving the vehicle

☞*Check the following each time before starting to drive:*

- Lighting system
- Signal and warning features
- Fuses
- Headlight adjustments
- Charge status and battery fill level
- Condition of the battery terminals

4.17.5 Information on special components

Electric lines, bulbs and fuses

It is essential to observe the following information:

- Defective parts of the electrical system should generally be replaced by skilled personnel. Light bulbs and fuses can also be changed by unskilled personnel
- Before beginning any repair work on the electrical system, disconnect the negative pole from the battery.
- When completing any maintenance work on the electrical system, pay particular attention to good contact between the connection lines and fuses.
- Frequently blown fuses indicate overloading or short circuits. Have the electrical system checked by your authorized Hako service center before installing a new fuse.
- Only use fuses with the specified load capacity (amperage).
- Only subject the engine to a test run with the battery connected.
- When connecting the battery, ensure that the poles are not reversed.
- Always disconnect the battery before carrying out welding work or connecting a quick battery charger.

Electronic control units

Observe the following basic rules to prevent work being completed which could damage the control units installed permanently or cause malfunctions:

- When performing welding work on the chassis:
  - Disconnect the negative terminal first, then the positive terminal and connect the cables to each other.
  - Disconnect the central electric system and disassemble the central electric system when performing welding work near it.
  - Attach the ground terminal of the welding equipment as close as possible to the area to be welded.
  - Do not lay the cable of the welding equipment parallel to the vehicle cable.
- Do not disconnect any control unit connections while the engine is running or the control units are switched on.
- Remove control units if temperatures above 80 °C could be generated during the work.
- Disconnect the battery leads from the central electric system prior to the removal of the engine starter relay.

Battery

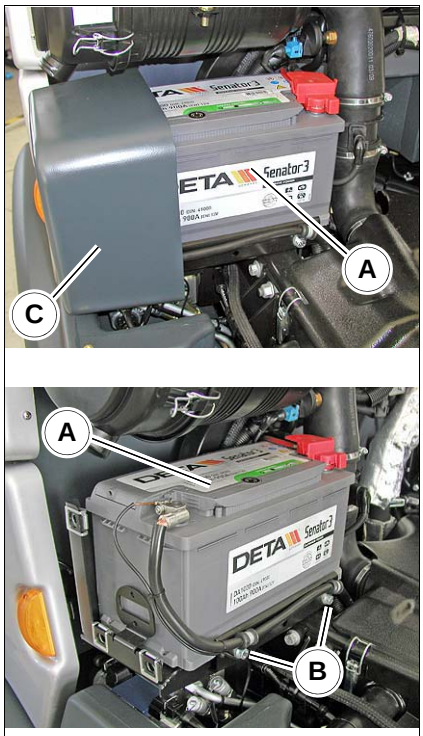


Fig. 134:

The batter **A** is located to the left, behind the driver's cab.

Note!

The battery **A** is a low-maintenance type and cannot be refilled.
It is essential to observe the related safety information in Chapter 2.

Removing the battery

☞*Proceed as follows:*

- Park the vehicle on a level piece of ground and secure it from rolling away.
- Switch off the engine, remove the ignition key.
- Remove the battery cover **C**.
- If available, switch off the battery switch and remove the key.
- Disconnect the connection cable **first at the negative pole** and **then the positive pole** of the battery **A**.
- Unscrew the screws **B** fixing the battery.
- Remove the battery.
- When reconnecting the battery, **connect the positive pole** first and **then the negative pole**.
- Following any maintenance work which involved disconnecting the battery, pay attention that the terminals are fixed firmly to the poles on reinstallation!
- Old batteries must be disposed of according to the applicable environmental laws!

4.18 General service and maintenance work

4.18.1 Cleaning

Cleaning the vehicle is divided into 3 separate areas:

- Inside the cab
- Exterior of the vehicle
- Engine compartment

The wrong choice of cleaning equipment and agents could impair the operating safety of the vehicle and also undermine the health of the cleaning personnel deployed. It is therefore essential to observe the following instructions.

Environment!

Only use authorized washing areas for cleaning the vehicle!

General information for all vehicle areas

When using washing solutions

- Ensure adequate room ventilation.
- Wear appropriate protective clothing.
- Do not use flammable liquids, such as petrol or diesel.

When using compressed air

- Work carefully.
- Wear goggles and protective clothing.
- Do not aim the compressed air at the skin or at other people.
- Do not use compressed air to clean your clothing.

When using a high-pressure cleaner or steam jet

- Maintain a minimum distance of at least 30 cm!
- Max. pressure 120 bar at max. 80 °C.
- Cover electrical components and insulating mats, and do not expose them directly to the jet.
- Do not expose the ventilation grid on the rear wall of the cab, the breather filter of the hydraulic oil tank or the lids of the fuel and hydraulic oil tanks etc. to the direct jet, or cover these parts.
- Protect the following components from moisture:
  - Electrical components, such as three-phase alternator, sensors, electrical plug and socket connections, engine control block etc.
  - Control devices and seals.
  - Air intake filters, etc.

When using volatile and easily flammable anticorrosion agents and sprays:

- Ensure adequate room ventilation.
- Avoid unprotected fire and light sources!
- Do not smoke!

Exterior of the vehicle

Wash the vehicle at regular intervals with water and a mild cleaning agent.

How often the vehicle has to be washed depends on the following factors:

- Conditions at the working site of the vehicle.
- Driving on roads spread with salt.
- Parking under trees where resin can drip on the vehicle.

Observe the following when washing:

- Do not use coarse brushes or dirty cloths to prevent the paint from being scratched and becoming dull.
- Do not wash the vehicle after it has been standing in the sun for a long time, the paint could loose its gloss.

Cleaning plastic parts

Clean the outside plastic parts in the same manner as the vehicle. If the dirt cannot be removed in this way, we recommend special cleaning agents for plastic materials. You can also use these cleaning agents for plastic parts inside the vehicle.

Do not use paint cleaners or products containing solvents, methanol or hydrocarbon.

Cleaning glass surfaces

Use special glass cleaning agents and clean cloths to prevent scratches and dullness.

Inside the cab

Attention!

Never use high-pressure cleaners, steam jets or high-pressure water to clean the inside of the driver's cab. Water under high pressure may:
• get into the electrical systems and cause short circuits!
• damage seals and disable the controls!

We recommend the following aids to clean the driver's cab:

- Vacuum cleaner.
- Damp cloth.
- Soft brush.
- Bucket of water.

Cleaning fabric surfaces

Remove dust from seats and other cloth surfaces with a soft brush or a vacuum cleaner. More thorough cleaning can be achieved with special upholstery cleaning agents. Observe instructions on use and warning information from the manufacturer!

Do not use solvents on a chlorine basis.

Engine compartment

Danger!

Only clean the engine when it has stopped, otherwise there is a

Risk of injury!

☞*Switch off the engine before cleaning.*

Attention!

When cleaning the engine using a water jet or steam jet, ensure the jet is not directly aimed at electrical connections and sensors, such as the oil pressure switch.
Otherwise, liquid penetrating such units can lead to corrosion and subsequent failure of the function!

4.18.2 Screw connections

Screw connections on parts subjected to heavy loads (e.g. axles, engine, chassis, trailer coupling etc.) should be checked regularly every 300 operating hours, especially if they have been loosened for maintenance and repair work.
Tighten loose screw connections immediately.

4.18.3 Pivots and hinges

All mechanical pivoting points on the vehicle (e.g. door hinges, joints) and fittings (e.g. door holders) should be lubricated regularly every 300 operating hours even if they are not listed in the lubrication plan.

4.19 Maintenance report

The following table provides a general overview of the maintenance work to be carried out after the corresponding number of operating hours. You will find the maintenance schedules in Section 4.21.
Completion of the work must be confirmed by the service center contracted in the following table.
Warranty and claims under the terms of warranty will only be considered only when all maintenance work has been performed by an authorized service center and registered Hako GmbH. In this context, we refer you to the warranty conditions of Hako GmbH.

After op. hr.	Maintenance plan	Date	Operating hour reading	Company/ Signature
	Handover			
50	**1st inspection**			
250	**2nd inspection**			
500	**A**			
1000	**A**			
1,500	**B**			
2,000	**A**			
2,500	**A**			
3,000	**B**			
3,500	**A**			
4,000	**A**			
4,500	**B**			
5,000	**A**			
5,500	**A**			
6,000	**B**			
6,500	**A**			

After op. hr.	Maintenance plan	Date	Operating hour reading	Company/ Signature
7,000	A			
7,500	B			
8,000	A			
8,500	A			
9,000	B			
9,500	A			
10,000	A			
10,500	B			
11,000	A			
11,500	A			
12,000	B			
12,500	A			
13,000	A			
13,500	B			
14,000	A			
14,500	A			
15,000	B			

4.20 Service fluids and lubricant

Component/Application	Service fluid	SAE grade Specification	Season/ Temperature	Capacities a)
VW turbodiesel engine	Engine oil	SAE 5W-30 according to VW 507 00 fo multigrade oils	Year-round	5.3 l, of which approx. 0.3 l in the oil filter
Engine cooling, heating	Coolant	G12 according to TL-VW 774 min. 40% to -25°C max. 60% to -40°C + water	Year-round	12.0 l
Hydraulic oil tank	Hydraulic oil HVLP 46 as per DIN 51524 Part 3	Mobil DTE 15M Mobil DTE 10 Excel 46	Year-round	58 l
	Biodegradable oil on ester basis	Panolin HLP SYNTH 46 Plantosyn 3268 ECO Aral Vitamin EHF 46	Year-round	
Reduction gearbox and transfer gearbox	Hypoid gearbox oil	SAE 85 W-90 MIL-L-2105; API - GL5	Year-round	1.15 l
Differential on rear axle				2.5 l each
Lubrication points	Grease	DIN 51825, KP 2N-20	Year-round	As required
Cardan shafts	Multipurpose grease	DEA Paragon EP 2; Shell Alvania EP 2; Retinax MS / LX	Year-round	As required
Battery terminals	Acid-proof grease		Year-round	As required
Paint preservative	Anticorrosion agent	Förch L 250 black	Year-round	Approx. 1 l
Fuel tank	Diesel fuel	EN 590, min 49 CZ	Year-round	56 l
Brake system	Brake fluid	DOT 5.1 - FMVSS 116	Year-round	2.0 l
Windscreen wiper system	Cleaning agent	Water + antifreeze	Year-round	1.5 l
Air-con unit (option)	Refrigerant	R134a	Year-round	1100 g
Air-con compressor (option)	Lubricating oil	L-BAR 134 (FL lubricant)	Year-round	0.5 l.

a) The capacities indicated are approximative values; the oil level check alone is relevant for the correct oil level

4.21 Maintenance schedule (overview)

Work description Explanation of symbols: ● Check or clean/top up ■ Change ▲ Lubricate	Ref. no. in lubrication plan	Service work (driver)		Maintenance work (authorized service center)				
		Daily	Weekly	1st insp. after 50 hours	2nd insp. after 250 hours	A every 500 hours	B every 1500 hours	At the latest after
Oils and filters, service fluids:								
• Engine oil level, refill as necessary	**1**	●	●					
• Engine oil, engine oil filter	**2, 3**			■	■	■	■	■ Every year
• Check engine coolant, refill or change as necessary, check antifreeze	**6**		●	●	●	●	●	■ Every 2500 hours or Every 5 years
• Change the fuel filter	**15**			■		■	■	■ Every year
• Change air filter insert, clean air filter housing	**21**			●	●	■	■	● Acc. to indicator
• Breather filter of vacuum valves							■	■ Every 3 years
• Check gear oil in differential gear of rear and front axles, refill or change as necessary	**24, 10**			■	●	●	■	■ Every 4 years
• Check gear oil in reduction gear unit, refill or change as necessary	**8**			■	●	●	■	■ Every 3 years
• Check gear oil between hydraulic motor and transfer gearbox, refill as necessary				●			●	
• Check the brake fluid in the service brake,refill and change as necessary	**25**		●	●	●	●	●	■ Every 2 years
• Check hydraulic oil, refill or change as necessary	**16, 17**		●	■	■			■ Every 3000 hours
• Change hydraulic oil filter insert (return flow filter)	**16**			■	■			■ Every 1000 hours
• Change pressure filter and O-ring on hydrostat drive	**5**			■	■			■ Every 1000 hours
• Change air filter on hydraulic oil tank	**19**						■	■ Every 2 years
• Change air filter of heater ventilation system in driver's cab					■	■	■	■ Every year
• Refill windscreen washer fluid	**22**	●	●	●	●	●	●	
• Battery: Check acid level/charge status, clean/grease battery terminals	**20**		●	●▲	●▲	●▲	●▲	

Work description Explanation of symbols: ● Check or clean/top up ■ Change ▲ Lubricate	Ref. no. in lubrication plan	Service work (driver)		Maintenance work (authorized service center)				
		Daily	Weekly	1st insp. after 50 hours	2nd insp. after 250 hours	A every 500 hours	B every 1500 hours	At the latest after
Checks and inspection work:								
• Read out, evaluate entries in error memory of engine electronics, clear any faults if necessary, delete error memory, execute software update if necessary				●	●	●	●	
• Read out, evaluate entries in hydrostat CU, steering CU and work hydraulics CU error memories, clear any faults if necessary, delete error memory, execute software update if necessary				●	●	●	●	
• Check toothed belts, belt pulleys, tension pulleys and guide pulleys of engine control and water pump, replace if necessary	**4**							■ Every 2500 hours or Every 5 years
• Check ribbed V-belt, condition and function of automatic belt tensioner, replace if necessary	**26**			●	●	●	●	■ Every 2500 hours
• Check, clean alternator for dirt				●	●	●	●	
• Check radiator for charge air, water and hydraulic oil, clean as necessary	**7**	●	●	●	●	●	●	
• Check and clean capacitor of air-con unit (option)	**7**	●	●	●	●	●	●	
• Change filter drier and refrigerant of air-con unit (option)	**7**						■	■ Every 2 years
• Clean and check brake linings, brake drum; replace if necessary						●	●	
• Check brake hoses, replace if necessary				●	●	●	●	■ Every 5 years
• Check parking brake function, have readjusted if necessary				●	●	●	●	
• Check parking brake bearing and sealing ring						●	●	
• Check tires (damage, air pressure, depth of tread)		●	●	●	●	●	●	
• Change high pressure hoses of drive system								■ Every 3000 hours or every 5 years
• Change hydraulic hoses								■ Every 5 years

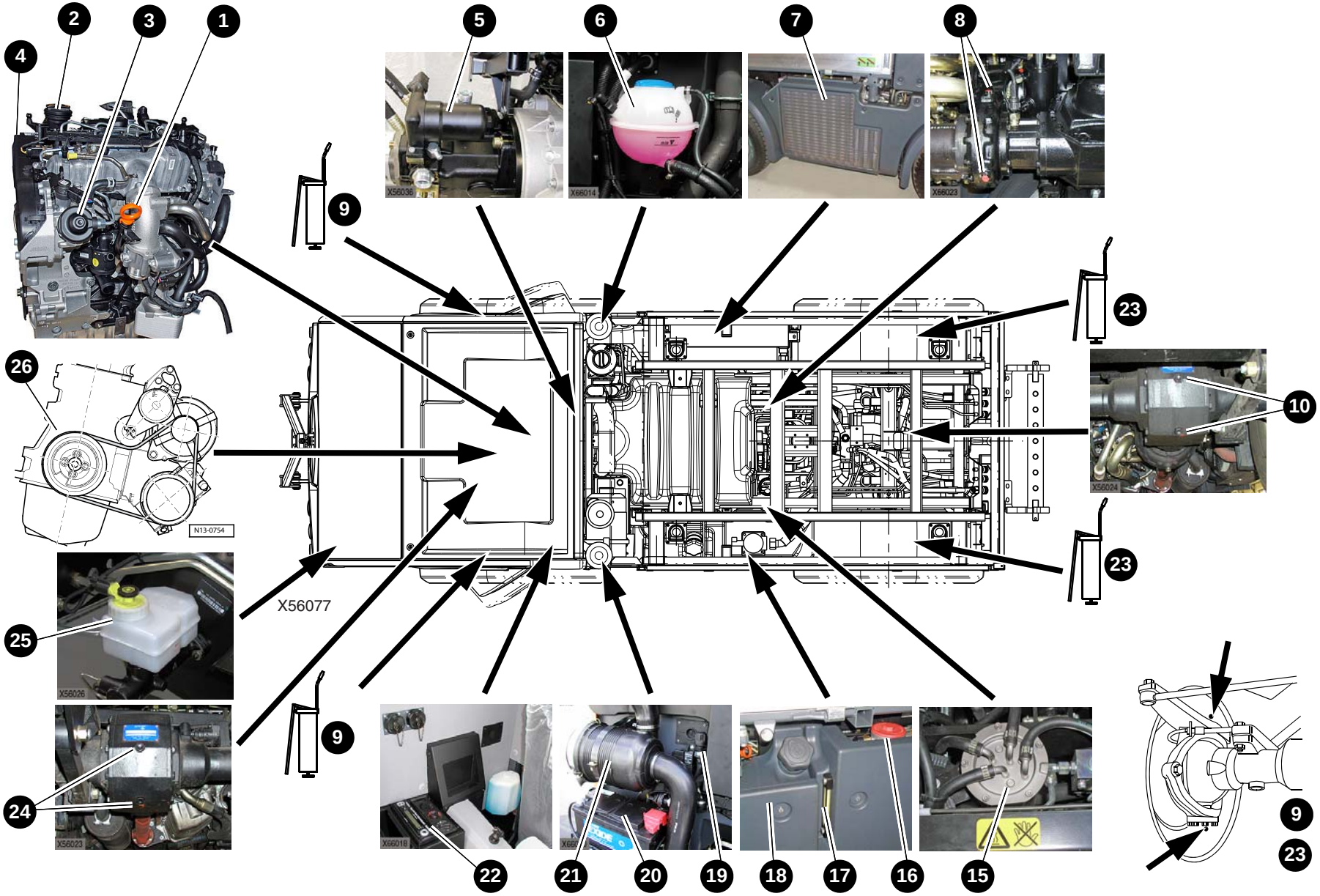
Work description Explanation of symbols: ● Check or clean/top up ■ Change ▲ Lubricate	Ref. no. in lubrication plan	Service work (driver)		Maintenance work (authorized service center)				
		Daily	Weekly	1st insp. after 50 hours	2nd insp. after 250 hours	A every 500 hours	B every 1500 hours	At the latest after
Checks and inspection work:								
• Clean and check transducer for tachograph (option) in differential gear of rear axle	**10**			●	●	●	●	
• Check wheel bearings of front axle / rear axle, change if necessary				●	●	●	●	■ Every 3000 hours
• Check track rod ends of front axle and rear axle, change if necessary				●	●	●	■	■ Every 3000 hours
• Check backlash of differential gear pinion and crown wheel						●	●	
• Check full floating axle						●	●	
• Sweeping unit: Check spray jet and brush wear		●	●					
• Sweeping unit: Check sweeping pattern				●	●	●	●	
• Vacuum nozzle: Check sealing strip wear		●	●					
• Vacuum nozzle: Check coarse material flap, check vacuum nozzle for wear, check vacuum nozzle adjustment, check suction hose and sealing strip setting				●	●	●	●	
• Vacuuming area: Check suction hose and seals in intake pipe				●	●	●	●	
• Fresh water tank: Check sieving filter		●	●	●	●	●	●	
• Dirt hopper: Check circulating water system, filter and sieves		●	●					
• Dirt hopper: Check seals				●				
• Dirt hopper: Check seals, check suction turbine, check impact plate, check hopper flap hinge and check exhaust air side of the hopper flap				●	●	●	●	

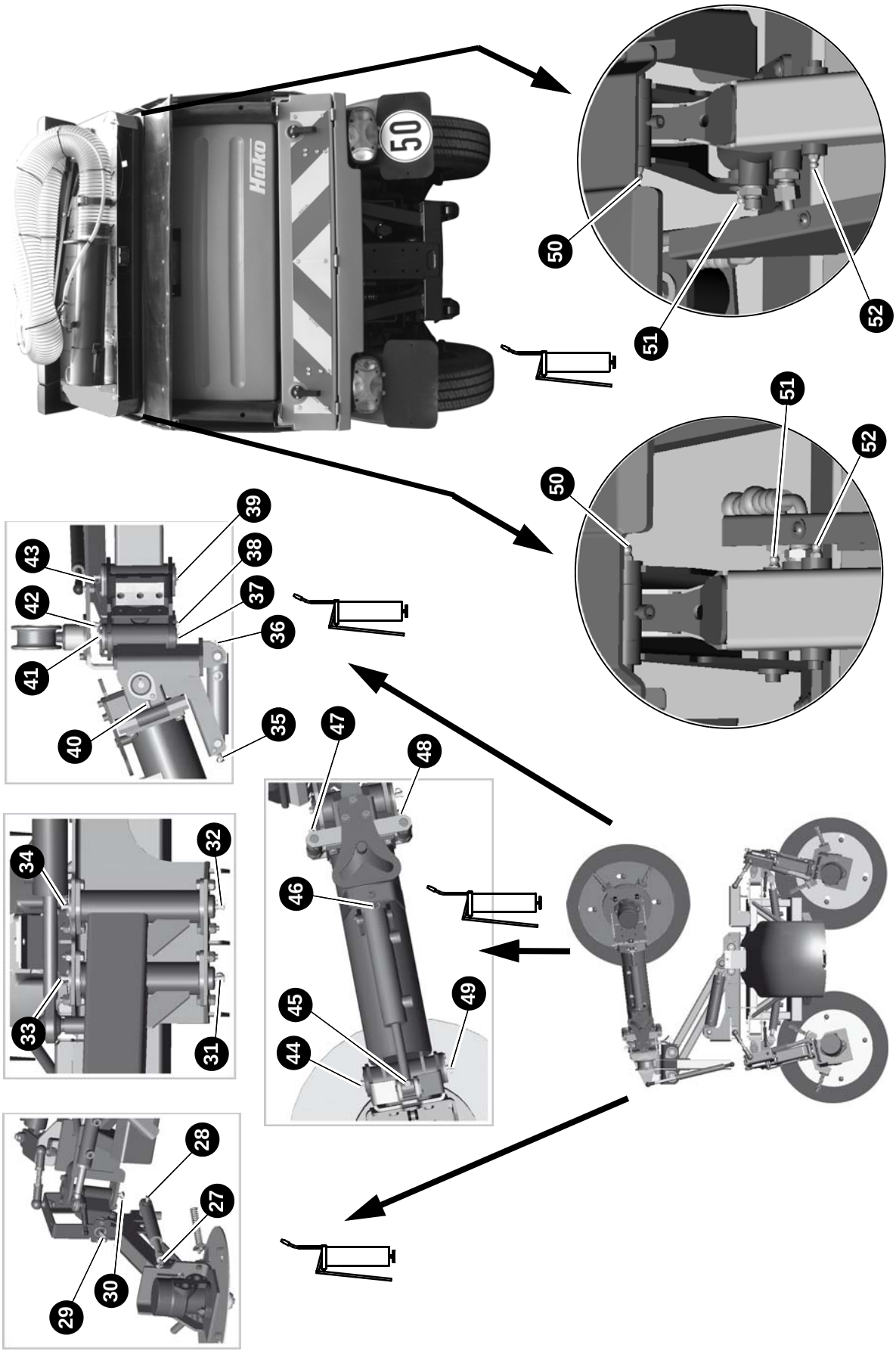
Work description Explanation of symbols: ● Check or clean/top up ■ Change ▲ Lubricate	Ref. no. in lubrication plan	Service work (driver)		Maintenance work (authorized service center)				
		Daily	Weekly	1st insp. after 50 hours	2nd insp. after 250 hours	A every 500 hours	B every 1500 hours	At the latest after
Check screw connections are fixed tight, retighten if necessary:								
• Engine and engine suspension, gearbox				●	●	●	●	● And after repairs
• Steering system				●	●	●	●	
• Hydraulic system				●	●	●	●	
• Axle mounting, axle suspension, frame components				●	●	●	●	
• Check retaining screws of cardan shafts, play of joints	**13**			●	●	●	●	
• Retighten wheel nuts				●	●	●	●	
Lubrication ( ):								
• Cardan shafts	**14**		▲	▲	▲	▲	▲	▲ And after cleaning with high pressure washer
• Stub axle bearing of front axle and rear axle (option)	**9, 23**		▲	▲	▲	▲	▲	
• Hinges, joints and fittings (e.g. driver's cab, safety support)			▲	▲	▲	▲	▲	
• Sweeping unit	**27 - 49**		▲	▲	▲	▲	▲	
• Vacuum nozzle	**XX**		▲	▲	▲	▲	▲	
• Dirt hopper	**50 - 52**		▲	▲	▲	▲	▲	

Work description Explanation of symbols: ● Check or clean/top up ■ Change ▲ Lubricate	Ref. no. in lubrication plan	Service work (driver)		Maintenance work (authorized service center)				
		Daily	Weekly	1st insp. after 50 hours	2nd insp. after 250 hours	A every 500 hours	B every 1500 hours	At the latest after
Functional check, leakage check:								
Check pipe, hose line and screw connections for firm fitting, leaks and signs of chaffing and damage; repairs at your authorized service center if necessary:								
• Engine / Drive				●	●	●	●	
• Air intake line (air filter - turbocharger - charge-air cooler - engine)				●	●	●	●	
• Engine lubrication (engine – filter)	**2, 3**			●	●	●	●	
• Exhaust system including diesel particulate filter				●	●	●	●	
• Fuel lines	**15**			●	●	●	●	● And after repairs
• Cooling system (engine oil cooler, radiator, heating)	**7, 6**	●	●	●	●	●	●	
• Air-con unit (option)	**7, 6**		●	●	●	●	●	
• Service and parking brake		●	●	●	●	●	●	
• Steering system, emergency steering function		●	●	●	●	●	●	
• Transmission, axles	**8, 10, 24**				●	●	●	● And after repairs
• Hydraulic system								
• Work hydraulics function test and pressure measurement				●			●	
• Check hydraulic lines and hydraulic hoses				●	●	●	●	

Work description Explanation of symbols: ● Check or clean/top up ■ Change ▲ Lubricate	Ref. no. in lubrication plan	Service work (driver)		Maintenance work (authorized service center)				
		Daily	Weekly	1st insp. after 50 hours	2nd insp. after 250 hours	A every 500 hours	B every 1500 hours	At the latest after
Functional check, leakage check:								
Check pipe, hose line and screw connections for firm fitting, leaks and signs of chaffing and damage; repairs at your authorized service center if necessary:								
• Check function of hand pump on dirt hopper				●	●	●	●	
• Check hydraulic cylinder of sweeping unit				●	●	●	●	
• Check lifting cylinder of front hydraulic lift				●	●	●	●	
• Check lifting cylinder of dirt hopper				●	●	●	●	
• Electrical system								
• Check lighting, heater fan, horn, windscreen wipers etc.				●	●	●	●	
• Check headlight adjustment, adjust if necessary				●	●	●	●	
• Check cables for chaffing and damage					●	●	●	
• Check line and ground connections					●	●	●	
• Exhaust gas test (AU) according to StVZO § 47a		**N1:** For the first time after 36 months, thereafter every 24 months **N2:** After every 12 months						
• General inspection (HU) in accordance with StVZO § 29		**N1:** For the first time after 36 months, thereafter every 24 months **N2:** After every 12 months						

4.22 Lubrication plan, Citymaster




50
Hako
50
51
52
51
52
50
39
38
37
36
43
42
41
40
35
47
48
46
45
44
49
32
34
33
31
28
27
29
30

5 Technical Data

5.1 Frame

Torsionally flexible, welded ladder-type frame, offset and inclined at the front part of the frame. Four-point ball joints for superstructure

5.2 Engine

Engine	2.0 l VW-TDI diesel engine
Product:	Volkswagen AG
Model:	CJDA
Cylinder arrangement:	4-cylinder, four-stroke diesel engine with exhaust gas turbocharger and charge-air cooling, exhaust gas recirculation particulate filter
Control:	Engine management with electronic diesel control (Bosch)
Cooling:	Water cooling as closed overpressure system with water pump installed on the engine block and separate expansion tank
Capacity:	1968 cm^3
Bore and stroke:	81 x 95.5 mm
Compression ratio:	16.5 : 1
Valves:	4 valves per cylinder; valve control via overhead camshaft, with toothed belt drive, hydraulic valve clearance compensation
Power:	75 kW (102 HP) at 3000 rpm
Maximum torque:	285 Nm at 1750 rpm
Idling speed:	900 rpm
Lubricating oil consumption:	0.05 – 0.1 l/h
Exhaust gas values:	Fulfills the requirements of EURO 5 in accordance with 2005/55/EC

5.3 Cooling

Combined water, hydraulic oil and charge-air cooler, electrohydraulic fan control, AC condenser (option) fitted in front. Reversible fan (option) to blow dirt away.

5.4 Drive

The vehicle is driven by a hydrostatic drive. The hydraulic pump is directly connected with the crankshaft of the diesel engine via a torsional elastic (not shiftable) clutch. The hydraulic motor transfers its torque to a transfer gearbox which transmits the torque either to the rear axle only or, for four wheel drive, to the front and rear axle.

Hydraulic motor and hydraulic pump are proportionally adjusted electrically. The adjustment is performed by the control unit of the hydrostatic drive. The respective high pressure side of the closed circuit is safeguarded by a pressure relief valve.

Drive engine		
Design	Skewed axis, axial piston motor	
Driving speed (standard) Working mode: Transition mode: Transport mode:	 0 - 15 kph, forward and reverse 0 - 10 kph 0 - 20 kph, forward and 0 - 10 kph reverse 0 - 50 kph, forward and 0 - 25 kph reverse	
Minimum driving speed	0.5 kph, forward and reverse	

5.5 Steering

Both axles have steering cylinders, so that four-wheel steering can be activated in work mode. Only front wheel steering can be activated in transport mode.

Steering	**Citymaster**
Design	Hydrostatic single-circuit steering with emergency steering features
Steering mode	Front wheel steering in transport mode All-wheel steering also available in work mode and transition mode
Maximum steering angle Front axle: Rear axle:	 35° (inside wheel in curve) 35° (inside wheel in curve)
Turning circle with brush attachment	7.37 m (Sweeping unit 2-brush system) 8.60 m (Sweeping unit 3-brush system)

5.6 Tires

Tires	Standard	Wide base tire ***	Winter tire*
Tire manufacturer	Conti	Goodyear	Conti**
Tire dimension	215/70 R15C	265/70 R15	225/70 R15C
Tread pattern	Vanco 8	Wrangler HP M+S	Vanco Winter M+S
Rim size	6J15	7J15	6J15
Rolling circumference in mm	2069	2295	2112
Static imbalance	311	335	317
Rolling circumference in mm	2069	2295	2112
Operating identification	109R	112h	(112/110)R(115N)
Tire pressure front/rear	5.5 bar / 5.5 bar	3.0 bar / 3.0 bar	5.0 bar / 5.0 bar
Wheel nuts tightening torque	280^{+5} Nm	280^{+5} Nm	280^{+5} Nm
Snow chains (SO)	Yes	No	Yes
Snow chains (SO)	Yes	No	Yes
3.5 t side walk version	No	Yes	No
4.5 t sweeper	Yes	Yes	Yes
4.9 t winter service with spreader attachment	Yes*	Yes	Yes
4.9 t winter service with loading platform and spreader	Yes*	No	Yes
Option only from factory	No	Yes	No
Speedometer adjustment: large => small	No	No	No
Speedometer adjustment: small => large	No	Yes	No

* In the case of winter service, the manufacturer recommends fitting winter tires!

** Recommended manufacturer or tires with equivalent load certification

*** Also approved: Fulda 265/70 R15

5.7 Weights and loads

	Total	Front axle	Rear axle
Admissible axle load		2450 kg	2450 kg
Dead weight, 2-brush	3075 kg	2010 kg	1065 kg
Dead weight, 3-brush	3135 kg	2130 kg	1005 kg
Permissible total weight	4500 kg*	2450 kg	2450 kg

Dead weight in accordance with EN 15429-1 with driver (75 kg), full fuel tank, without water and without optional equipment.

* Winter service 4900 kg

5.8 Brakes

The vehicle brake system is designed as a servo power boosted hydraulic two-circuit brake system with brake power control on the rear axle. The parking brake acts as a drum brake on the transfer gearbox to the rear axle.

Service brake	
Type	Hydraulic, 2-circuit brake system with brake booster
Brake fluid	DOT 5.1 - FMVSS 116
Fill quantity	2.0 liter
Parking brake	
Design	Mechanically actuated drum brake via pull cable and cam
Diameter:	180 x 30 mm

5.9 Driver's cab

Driver's cab	
Seats:	2
Heating / Air-conditioning:	Warm water heating with 3-stage fan, manually operated air conditioning system (SO)
Standard fittings:	Three-point seat belts, windscreen heating

5.10 Sweeping unit/Dirt hopper

Sweeping unit, 2-brush system	
Brushes (pieces/diameter)	2 x 900 mm
Brush speed (rpm)	120+/- 10
Sweeping unit, 3-brush system	
Brushes (pieces/diameter)	1 x 900 mm and 2 x 750 mm
Brush speed (rpm)	120+/- 10
Dirt hopper	
Suction fan speed	1500 - 3000 rpm
Suction tube diameter	200 mm
Dirt hopper (cubic capacity)	1850 l
Clean water (cubic capacity)	330 l
Circulating water system (including sedimentation tank)	160 l

5.11 Vehicle dimensions

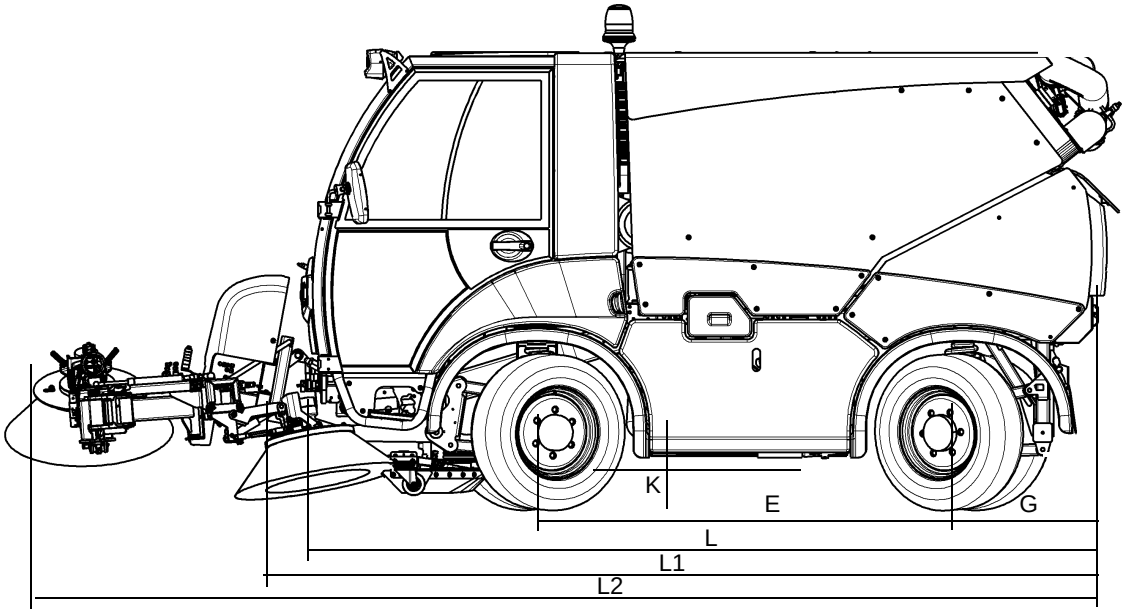
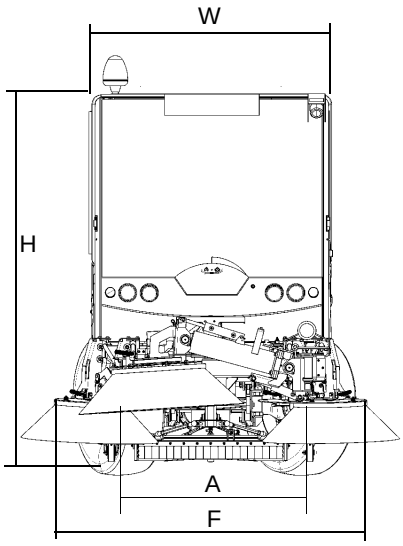


Fig. 135:



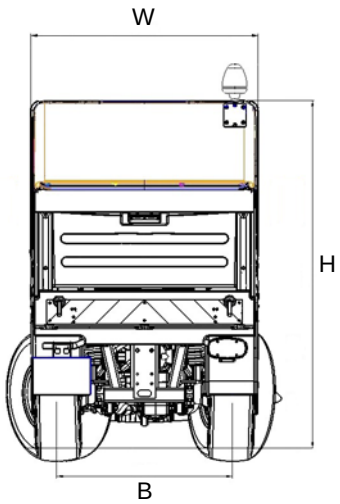


Fig. 136:

Dimensions with tires (1) in mm		215/70 R15
A	Front track width	1033
B	Rear track width	1033
E	Wheelbase	1900
F	Front overhang with sweeping unit	1197
G	Rear overhang with super-structure	643
	Front clearance angle	11°
	Rear clearance angle	34°
H	Overall height	1995
	Height of flashing beacon	2200
K	Height of upper edge of frame	850
L	Length with front hydraulic lift	3737
L1	Length with sweeping unit and superstructure (2-brush system)	4550
L2	Length with sweeping unit and superstructure (3-brush system)	4860
W	Overall width (2-brush system)	1300
W	Overall width (3-brush system)	1300
	Overall width with rearview mirrors	1690

1. All dimensions with unloaded vehicle

5.12 Noise levels

Standard version

The sound pressure level (LpA) measured in accordance with EN 11201 (at the driver's ear) under normal working conditions is:	81 db(A)
Measurement inaccuracy (KpA):	2 db(A)
The sound power level (LwAd) measured in accordance with EN 23744 under normal working conditions is:	112 db(A)

Noise insulation kit (engine speed 2100 rpm/fan speed 3000 rpm)

The sound pressure level (LpA) measured in accordance with EN 11201 (at the driver's ear) under normal working conditions is:	78 db(A)
Measurement inaccuracy (KpA):	1 db(A)
The sound power level (LwAd) measured in accordance with EN 23744 under normal working conditions is:	107 db(A)

Noise insulation kit (engine speed 2100 rpm/fan speed 2250 rpm)

The sound pressure level (LpA) measured in accordance with EN 11201 (at the driver's ear) under normal working conditions is:	75 db(A)
Measurement inaccuracy (KpA):	1 db(A)
The sound power level (LwAd) measured in accordance with EN 23744 under normal working conditions is:	99 db(A)

5.13 Vibration

The weighted, effective value of the vibration, established in accordance with ISO 5349-1 to which the upper limbs (hand-arm) are exposed under normal working conditions is:	< 2.5 m/s^2
The weighted, effective value of the acceleration, established in accordance with ISO 2631-1 to which the lower limbs (feet-seat surface) are exposed under normal working conditions is:	< 0.5 m/s^2

5.14 Tightening torques

5.14.1 Specific tightening torques

Description	Tightening torque
Wheel nuts M 18x1.5	280^{+20} Nm
Engine oil pan drain plug	30 Nm
Engine oil filter (seal oiled)	25 Nm
Pressure filter, hydrost. drive	45 Nm
Proximity switch of steering on rear axle	20 Nm

EC-Declaration of Conformity *(corresponding to the EC Directive 2006/42/EC)*

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

declaire under our sole responsibility, that the product

Citymaster 2000 Euro 5 with 2-Brushes-System

Citymaster 2000 Euro 5 with 3-Brushes-System

Type: 1480/1481

to witch this declaration relates, corresponds to the relevant basic safety and health requirement of the Directive 2006/42/EC, and to the requirements of the other relevant Directive 2014/30/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:

EN ISO 13019

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

Ludger Lüttel

Bad Oldesloe, 01.04.2016

Dr. Rainer Bavendiek

Director R&D

Hako

Clean ahead

Hako: environmentally friendly from the start

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

Everywhere and quite close to you

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

Reliable cleanliness

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

Purchasing, rental, leasing

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

We are here for you day and night

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

BLUEcoMPETENCE Alliance Member
Partner of the Engineering Industry Sustainability Initiative

TÜV NORD CERT GmbH ISO 9001/14001

Hako GmbH
Head Office
Hamburger Str. 209-239
23843 Bad Oldesloe
Germany
Tel. +49 (0) 4531 - 806 0
info@hako.com
www.hako.com