Cleaning technology · ***Municipal technology***

Hako
Clean ahead

Citymaster 1600 (1491)
Operating Manual

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Introduction

Foreword

Dear Customer,
We are certain that the excellent qualities of the vehicle will justify the faith you have shown in us by your purchase.
To guarantee you safe working with the vehicle, please read the Safety Notes chapter before putting it into service.
Your own safety, as well as the safety of others, depends essentially on your ability to control the vehicle. Please read this **original operating manual** before you use the vehicle for the first time, act accordingly and keep these instructions for future reference or subsequent users. The operating manual contains all important information for operation, maintenance and care. We have provided the places in this operating manual concerning your safety with a danger pictogram. Your authorised Hako dealer is available at all times to answer further questions about the vehicle or the operating manual.

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

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Applications

The Citymaster 1600 is a multi-purpose machine for commercial and municipal use throughout the year. Thanks to special attachments, the Citymaster 1600 can be used for various applications. The basic vehicle **Fig. 1-A** without attachments is described in chapter 1 to 5. The following attachments are described in chapter 6.

- Vacuum sweeping system with the sweeping unit, suction mouth, dirt hopper and trolley
- Lawn mowing system with the front mower
- Sweeping system with the front sweeping machine
- Snow clearing system with the front sweeping machine or a folding snow blade. A roller spreader as rear attachment. The loading platform is used for holding salt and grit.
- Transport system with the loading platform or trailer operation.
- Wet cleaning system with scrubbing deck, squeegee and trolley.

The Classic vehicle version is equipped with hot water heating. The Comfort vehicle version is equipped in addition with an air conditioner. Your authorised Hako dealer is available to you at all times to answer questions on further applications.

Fig. 1:

Vehicle data

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

- Vehicle type: _____
- Chassis No.: _____
- Engine No.: _____
- Start-up on: _____

Please enter the data applicable to your vehicle in the list above. The data are immediately available in the case of enquiries or spare parts orders.

Your nearest authorised Hako dealer

- Address: _____
  _____
  _____
- Telephone: _____

Intended use

The Citymaster 1600 is a multi-purpose machine intended for commercial and municipal use throughout the year and with the attachments approved by Hako it is suitable for use in agriculture and forestry, mowing and sweeping, marketplaces and car parks and for snow clearing. Any use extending beyond this is not intended use. The manufacturer is not liable for any damage resulting from this and the user alone bears the risk. Intended use also includes compliance with the operating, maintenance and servicing conditions specified by the manufacturer. The vehicle may be used, maintained and repaired only by persons who are familiar with this work and instructed about the dangers. The vehicle and its attachments correspond by virtue of their design and construction as well as in the version distributed by us to the usual health and safety requirements of the EC Directives (see Declaration of Conformity and CoC documents). These documents lose their validity in the event of a modification not authorised by us. The manufacturer is not deemed liable for any damage resulting from unauthorised modifications to the machine.

Notes on warranty

The terms defined in the purchase agreement apply. Claims for compensation in relation to damage are excluded from the terms of the warranty when the damage is the result of the failure to observe rules concerning servicing and maintenance. Maintenance work must be carried out by authorised Hako dealers and confirmed in the “Maintenance Report”, which serves as a warranty logbook. The following are excluded from the terms of warranty: wear and tear through overuse, defective fuses, improper handling and use and unauthorised modifications. Claims under the terms of the warranty are also annulled when damage occurs to the vehicle resulting from the use of parts or accessories not explicitly approved of by us or from failure to observe maintenance rules.

Acceptance of the vehicle

Inspect the vehicle immediately on delivery for signs of transport damage. You will be compensated if the damage is immediately confirmed by the haulage contractor and the damage report is sent to our authorised Hako dealer together with the consignment note.

Conditions for approval

The Citymaster 1600 is a multi-purpose machine (tractor for use in agriculture or forestry) in terms of the EC Directive 2003/37/EC. The manufacturer provides an EC Certificate of Conformity and an EC Declaration of Conformity. Based on the EC Certificate of Conformity, the local licensing authorities will produce the registration certificate part 2 (vehicle registration) and part 1 (vehicle registration). For use on public roads, paths and areas the Citymaster 1600 has to be licensed and display an official license plate. In accordance with the StVZO, in Germany the vehicle must carry a first aid kit, warning triangle and the vehicle type approval when used on public roads, paths and pedestrian precincts. In Germany the Citymaster 1600 is subject to regular general inspection according to § 29 StVZO (every 24 months).

	**Warning** If any modifications or additions are made to the Citymaster 1600, which affect the contents and are not contained in the registration certificate, it will become void. In consequence the insurance cover and the vehicle tax will also become void.

To acquire a new registration certificate, the vehicle must be presented to an officially accepted expert to produce a new report. The modifications have to be included in the registration certificate by the registration authorities. In the EC Declaration of Conformity the manufacturer declares that the attachments approved by Hako adhere to the rulings in the EC Directive 2006/42/EC.
In other countries, the corresponding national regulations must be complied with.

Driving license

According to the driving license law in Germany the Citymaster 1600 may be driven as a multi-purpose machine (tractor) by drivers with the following classes of driving license:
Class L (Class L is contained in Class B):
Tractors which according to their construction are intended for use in agriculture or forestry and are used for such purposes, with a maximum speed determined by the construction of not more than 40 km/h and combinations of these vehicles and trailers, if they are driven at a speed of not more than 25 km/h and, provided the maximum speed determined by the construction of the traction vehicle is more than 25 km/h, they are identified in the manner specified by § 58 of the Road Traffic Approval Order (StVZO) for a maximum speed of not more than 25 km/h as well as self-propelled working machines, lift trucks, self-propelled forage wagons and industrial trucks with a maximum speed determined by their construction of not more than 25 km/h and combinations of these vehicles and trailers.
In other countries, the corresponding national regulations must be complied with.

Equipment

According to § 53 StVZO the following equipment has to be kept with the vehicle in the Federal republic of Germany (not included in the scope of supply):

- 1 warning triangle of approved type
- 1 warning light of approved type
- 1 warning vest
- 1 first aid kit corresponding at least to the requirements of DIN 13164, Sheet 1 standard. In other countries, the corresponding national regulations must be complied with.

Required documents

Within the Federal Republic of Germany, the following documents must always be available:

- Approval certificate (Part I) of the vehicle
- Valid driving license of the driver
- Operating manual (kept in the left-hand operating console)

In other countries, the corresponding national regulations must be complied with.

Vehicle inspection

- All occupational accident insurance schemes in the Federal Republic of Germany require a **safety inspection** of your vehicle according to BGV D 29, which must be made at least once annually by an expert.
  A inspection label should be attached to the vehicle in addition so that the driver knows when the next expert inspection is due.
- According to § 29 StVZO of the Federal Republic of Germany, a general inspection (**HU**) must be made regularly:
  - For vehicles of less than / equal to 3.5 t permitted overall weight every 24 months (for vehicles which are hired commercially without provision of a driver, 12 months apply).
  - For vehicles of more than 3.5 t permitted overall weight every 12 months.

In other countries, the corresponding national regulations must be complied with.

1 Safety Instructions

1.1 Marking of warning and danger symbols

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

	**Danger** Indication of a direct danger with high risk, in which death or severe physical injury can occur if it is not avoided.
	**Warning** Indication of a possible danger with average risk, in which death or severe physical injury can occur if it is not avoided.
	**Caution** Indication of a danger with low risk, in which light to medium severe physical injury or material damage can occur if it is not avoided.
	**Attention** Attention indicates a hazard that can lead to technical damage when not heeded.
	**Environmental danger** Environmental danger due to the use of substances from which a health and environmental risk proceeds.
	**Note** Indication of information that facilitates more effective and economical use of the vehicle.

1.2 General safety instructions

- Apart from the instructions in this operating manual, the general safety and accident prevention regulations of the legislation must be taken into account.
- Before the vehicle is put into service, please read carefully the operating manual you receive as well as further separate instructions for additional implements or attachments and observe them in all aspects in your work.
- The vehicle may be used, maintained and repaired only by persons who have been instructed by Hako experts.
- This device may not be used by persons (including children) with reduced physical or mental abilities or by persons without sufficient experience and skills.
- You should pay special attention to the safety instructions. For errors in operating the vehicle can be avoided and trouble-free operation can be guaranteed only with precise factual knowledge.
- Please hand over these documents as well as the approval documents to the new owner/operator on sale or rental of the vehicle. Have the hand-over confirmed!
- The labels attached to the vehicle provide important information for safe operation. Renew labels that are no longer legible or present.
- The approval certificate (Part 1), valid driver's license of the vehicle driver and the operating manual must be present constantly at the place of use of the vehicle and should therefore be kept carefully in the driver's cab.
- Spare parts must be original spare parts to guarantee safety.
- The Citymaster 1600 is equipped with a safety cab (ROPS – roll-over protection system) according to 86/298/EEC.

1.3 Operating safety instructions

Before putting into service

- Risk of accident! If the steering column is unlocked while driving, it can come unexpectedly out of adjustment. You can then lose control over the vehicle.
- Risk of accident! Adjust the driver's seat only when the vehicle is stationary. You will otherwise be diverted from the traffic and could lose control over the vehicle by moving the seat. You could cause an accident by this.
- Risk of accident! A dirty, damaged seat belt or one stressed or changed in an accident may not offer the intended protection. You could therefore suffer severe injuries or death in an accident. Please check regularly that the seat belts are not damaged and not contaminated. Always have damaged seat belts or those stressed in an accident renewed by an authorised workshop.
- Risk of accident! Good viewing conditions contributing to traffic safety are guaranteed only if all windows are free of ice, snow and condensation. Make yourself familiar with the correct operation of the heating and ventilation system as well as de-moisturising/defrosting the windows. Maximum heating power and fast thawing of the windows can be achieved only if the engine has reached its operating temperature.
- There is a risk of accidents when driving with open doors! The doors must remain closed when driving on public roads and when working.
- Check the vehicle for its correct condition and operating safety before using it. The vehicle must not be used if it is not in order.
- Before starting work, the operator must familiarize himself with all equipment, operating and actuating elements as well as with their function. It is too late to do this during operation!
- A warning triangle, a warning light, a warning vest and a first aid kit must be in the vehicle during operation.
- Sturdy and slip-proof shoes must be worn when working with the vehicle.
- This device may not be used by persons (including children) with reduced physical or mental abilities or by persons without sufficient experience and skills.
- Carrying persons is not permitted!
- Only those surfaces approved by the contractor or its authorised representative for use of the vehicle may be driven on.
- The vehicle is not suitable for removing dangerous, combustible or explosive liquids, dusts or materials.
- Observe the maximum gradability of the vehicle, see Technical data.

During operation

- Toxic engine exhaust gases! Inhaling exhaust gases is injurious to health and can lead to unconsciousness and to death! Never let the engine run in enclosed spaces.
- Danger to life in the danger area of the vehicle! Special caution is required in the area of the articulated steering, under the raised tipper, in the area of the front and rear attachment and in the area of the trailer.
- Danger of tilting over when driving uphill or downhill and transversely to a slope. Avoid sudden turns when driving uphill or downhill or across slopes. There is a risk of tilting over in an inclined position! The vehicle speed must always be adapted to the surrounding conditions and the load condition.
- Danger of tilting due to wrong steering! Note that the steering behaviour of an articulated steered vehicle differs essentially from that of a car. Sudden steering movements at high speed or too high speeds when turning can cause the vehicle to tilt over.
- Risk of accident! Note that there is a risk of skidding on unpaved ground or snow and ice. This can lead to uncontrolled behaviour of the vehicle. Drive correspondingly carefully!
- Risk of accident! Use the cruise control and the speed limiter only when the traffic situation allows!
- For reasons of safety, the vehicle is equipped with a seat contact switch and the function of the seat contact switch must not be bypassed.
- In the case of restricted vision, especially when reversing the vehicle, it is necessary to have a second person who gives the driver appropriate signals. The second person must always be in the field of view of the driver.
- When working with the vehicle, pay special attention to third persons, especially children.
- In transport journeys on public roads the working spotlights must be switched off.

Shutting down the vehicle

- Risk of accident! Adopt measures against erroneous starting and unwanted movement. Operate the parking brake. Switch the engine off and pull out the ignition key.
- Risk of accident! The vehicle must be parked on firm ground. On inclinations secure the vehicle additionally against rolling away with a wheel chock.

Transporting and towing the vehicle

- Danger to life! Start driving slowly! Make sure that there are no persons in the towing area.
- Risk of injury! The vehicle may be loaded only using suitable loading aids, such as a loading ramp or drive-up planks.
- Risk of injury! After loading, make sure that the vehicle is secured according to regulations against rolling off and tilting. Use the wheels for securing the vehicle.
- Tow the vehicle using only suitable towing gear!
- The vehicle may be towed with a towing rope only if the brakes and steering are functioning!
- When the engine is still the steering has only emergency steering properties!
- Secure the vehicle against unintended movement! Lock the parking brake and insert the locking bolt on the articulated joint. Note that the steering is then blocked!

1.4 Safety instructions for attachments

General

- Danger to life in the danger area of the vehicle! Special caution is required under the raised tipper, in the area of the front and rear attachment and in the area of the trailer.
- Risk of injury! Put the attachment into service only if all protective devices are attached and in protection position.
- Risk of injury! Make sure that the attachments are suitable for the set oil volume. An oil volume set too high can lead to injuries due to a defect of the attachment!
- Risk of injury! High-pressure hoses, fittings and couplings are important for equipment safety. Use only high-pressure hoses, fittings and couplings recommended by the manufacturer.
- Risk of accident! When connecting attachments to the hydraulic system, ensure that the hydraulic hoses are connected correctly. Swapping the connections can lead to reverse functioning of the attachment, e.g. movement to the right rather than the left.
- Risk of accident! Front attachments not correctly fastened to the front tool carrier can drop down while driving. Always secure the front attachment with the locking devices.
- Risk of accident! You must consult Hako before attaching other attachments not approved by Hako! Check in the individual case that the relevant axle loads and total weights are complied with.

- Risk of accident! Handling, steering and braking as well as stability are influenced by attachments, trailers and the vehicle payload (e.g. full dirt hopper). For this reason, pay attention to adequate steering and braking capability as well as stability.
- Risk of accident! In Germany, if attachments extend beyond the outer lighting equipment of the vehicle or if the maximum distances of the outer lighting equipment specified according to StVZO are exceeded, the lighting equipment of the vehicle must be extended (see Merkblatt StVZO § 30, explanations 11 and 12).

Ballast

- Risk of accident! When attaching other attachments not approved by Hako, consult Hako as to whether the relevant axle loads and total weights are complied with!
- Risk of accident! The front axle of the working machine must always be loaded with at least 25 % of the empty weight and the rear axle with at least 37 % of the empty weight of the working machine.
- Risk of accident! The attachment of front and rear attachments must not lead to exceeding the permissible total weight, the permissible axle load and the tyre load capacity of the working machine!
- Make sure before purchasing the attachment that these requirements are fulfilled by weighing the working machine attachment combination!

Vacuum sweeping system

- Danger to life in the danger area of the vehicle! Special caution is required under the raised tipper and in the area of the sweeping unit.
- Danger of tilting over when driving uphill or downhill and transversely to a slope! Avoid sudden turns when driving uphill or downhill or across slopes. There is a risk of tilting over in an inclined position! The vehicle speed must always be adapted to the surrounding conditions and the load condition.
- Danger of tilting due to wrong steering! Note that the steering behaviour of an articulated steered vehicle differs essentially from that of a car. Sudden steering movements at high speed or too high speeds when turning can cause the vehicle to tilt over.
- Risk of injury! Frequently check the filling level of the dirt hopper. Switch the suction fan off for this! The lid and the side doors of the dirt hopper must not be opened when the suction fan is running.
- Risk of accident! Make transport journeys only with the sweeping unit raised and secured in the transport position.
- Risk of accident! Make transport journeys only with a completely lowered dirt hopper!
- Risk of accident! The stability of the vehicle is influenced by a filled dirt hopper. Handling of the vehicle must be adapted accordingly.
- Risk of accident! Do not exceed the permissible total weight of the vehicle!
- Risk of accident! When the dirt hopper is emptied, the Citymaster 1600 must be on a sufficiently load bearing, horizontal surface. Driving with the dirt hopper tilted is not permitted.
- When removing blockages in the suction hose or attaching the hand suction hose (optional), switch off the engine and wait for the suction fan to come to a standstill.
- The sweeping system may be operated only in connection with the Citymaster 1600. The safety regulations for the Citymaster 1600 must be complied with absolutely.

Lawn mowing system

- Danger to life in the danger area of the vehicle! Special caution is required under the raised tipper and in the area of the front mower.
- Risk of injury! Make sure that the attachments are suitable for the set oil volume. An oil volume set too high can lead to injuries due to a defect of the attachment!
- Risk of injury! Always wear protective gloves when changing blades!
- Risk of injury! Immediately renew damaged or highly unbalanced mowing blades to avoid damage to the blade bearings.
- Risk of injury! Before reinstalling, balance the blades and check them for out of true in height.
- Risk of injury! The V-belt is self-tensioning by spring force. Do not hook tension springs in or out with your bare hand.
- Risk of injury! Do not exceed the permissible total weight. There is a risk of accidents! Frequently check the filling level of the dirt hopper. Switch the suction fan off for this! The lid of the dirt hopper must not be opened when the suction fan is running.
- Risk of injury! Modifying the safety equipment is not permitted.
- Risk of accident! You must consult Hako before attaching other attachments not approved by Hako!
- The lawn mowing system may be put into operation only with the suction nozzles raised! Refer to mounting the mower on page 161!

- The lawn mowing system may be operated only in connection with the Citymaster 1600. The safety regulations for the Citymaster 1600 must be complied with absolutely.

Sweeping system

- Danger to life in the danger area of the vehicle! Special caution is required in the area of the articulated steering, under the raised tipper and in the area of the front sweeping roller.
- Risk of injury! When sweeping with the front sweeping machine, small stones or other parts in the snow can be thrown out by the rotating sweeping roller.
- Risk of injury! Secure the front sweeping machine against rolling away when mounting it.
- The sweeping system may be operated only in connection with the Citymaster 1600. The safety regulations for the Citymaster 1600 must be complied with absolutely.

Snow clearing system

- Danger to life in the danger area of the vehicle! Special caution is required in the area of the articulated steering, under the raised tipper and in the area of the front and rear attachment.
- Risk of accident due to unintended lowering of the attachment! Activate winter operation in the configuration menu only in connection with an uncoded snow blade. The front lift is then not limited downwards. Winter operation must be deactivated immediately after use.
- The snow clearing system may be operated only in connection with the Citymaster 1600. The safety regulations for the Citymaster 1600 must be complied with absolutely.

Transport system

- Danger to life in the danger area of the vehicle! Special caution is required in the area of the articulated steering, under the raised tipper and in the area of the trailer.
- Danger to life due to inadequately secured load! The load must be correctly distributed and fastened on the loading surface.
- Risk of injury! Modifying the safety equipment is not permitted.
- Risk of accident! Adopt measures against erroneous starting and unwanted movement. Switch the engine off and pull out the ignition key.
- Risk of accident! You must consult Hako before attaching other attachments not approved by Hako!
- The transport system may be operated only in connection with the Citymaster 1600. The safety regulations for the Citymaster 1600 must be complied with absolutely.

Wet cleaning system

- Risk of crushing! The squeegee of the CityCleaner weighs more than 25 kg. Body parts may be crushed if the squeegee falls down or falls over. Always use suitable load-carrying equipment.
- Risk of injury! Wear suitable protective clothing (protective gloves and safety goggles) when using detergents.
- Risk of injury! There is a risk of tilting over if the squeegee is located on the trolley without the scrubbing deck. Observe the correct assembly and disassembly sequence.
- Risk of injury! Always wear protective gloves when working on the lateral deflectors and brushes.

1.5 Information about special risks

Exhaust gases

- Toxic engine exhaust gases! Inhaling exhaust gases is injurious to health and can lead to unconsciousness and to death! Never let the engine run in enclosed spaces.

Re-fuelling the vehicle

- Risk of fire! Diesel fuel is flammable! Take the utmost care when handling fuel. Never refuel close to naked flames or ignitable sparks. Do not smoke during fuelling. Switch off the engine, pull out the ignition key and apply the parking brake before fuelling.

Danger areas at the vehicle

- Danger to life in the danger area of the vehicle! Special caution is required in the area of the articulated steering, under the raised tipper, in the area of the front and rear attachment and in the area of the trailer.

Danger of tilting over

- Danger of tilting over when driving uphill or downhill and transversely to a slope! Avoid sudden turns when driving uphill or downhill or across slopes. There is a risk of tilting over in an inclined position! The vehicle speed must always be adapted to the surrounding conditions and the load condition.
- Danger of tilting due to wrong steering! Note that the steering behaviour of an articulated steered vehicle differs essentially from that of a car. Sudden steering movements at high speed or too high speeds when turning can cause the vehicle to tilt over.

Unsecured load

- Danger to life due to inadequately secured load! The load must be correctly distributed and fastened on the loading surface.

Suspended loads

- Danger to life due to suspended loads! Do not stay or work under suspended loads!

Battery

- Danger of explosion due to smoking, fire or open light! Especially when being charged, but also in the normal use of batteries, batteries emit explosive gases! Avoid smoking, fire, sparks or open light in the vicinity of batteries!
- Danger of explosion due to sparks! Never place tools or other electrically conductive objects on the battery! Sparks that can ignite escaping gases arise if the poles are short-circuited.
  Always observe the correct order when connecting and disconnecting the battery!
  - Disconnecting the battery: First the minus pole and then the plus pole!
  - Connecting the battery: First the plus pole and then the minus pole!
- Danger of explosion due to frozen battery or too low acid level! With a frozen battery or if the acid level is too low, do not attempt to start with a jumper cable, the battery can burst or explode.
- Danger of burns due to battery acid! The special safety and accident prevention regulations must be complied with when handling the battery. Batteries contain sulphuric acid.

Noise

- Danger of injury due to noise! Sound insulation devices on the vehicle must be in their protection position during operation. If required, wear hearing protectors!

Hydraulics

- Risk of injury! Hydraulic oil issuing under high pressure can penetrate the skin and cause severe injuries. Therefore, even with the smallest wounds, consult a doctor since otherwise severe infections can arise!
- Hydraulic pipes must be run and installed correctly! The work may be done only by authorised skilled persons. Make sure that no connections are mixed up! Fittings, length and quality, especially resistance to pressure and temperature of hydraulic pipes, must comply with the requirements.

Operating and auxiliary materials

- Risk of injury! Observe the safety regulations applicable for the product when handling oils, greases and other chemical substances (e.g. battery acid or sulphuric acid)!
- There is a risk of burns and scalds! Caution when handling hot operating and auxiliary materials.

1.6 Safety instructions for maintenance and servicing

General

- Daily and weekly maintenance work must be done by the operating staff. In all other maintenance work, please contact your nearest authorised Hako dealer.
- Apart from the regular general inspection (HU), the vehicle, the attachments and the trolley must be maintained at regular intervals according to BGV, D 29 and be checked at least annually for operationally safe condition.
- Risk of accident! Adopt measures against erroneous starting and unwanted movement. Operate the parking brake. Switch the engine off and pull out the ignition key.
- Spare parts must be original spare parts to guarantee safety.
- Use suitable tools for the cleaning and maintenance work.
- Cleaning the electrical and electronic components as well as the engine space with a high-pressure cleaner or steam cleaner is not allowed.
- Do not perform any welding, drilling, sawing or grinding work on parts of the frame. Damaged parts may be replaced only by your authorised Hako dealer.
- After cleaning, examine all fuel, engine oil and hydraulic pipes for leaks, abrasion places and damage. Immediately rectify any damage found!
- Always tighten screw connections loosened in maintenance and repair work.
- If dismantling safety devices is required in equipping, maintenance and repair work, fit and check the safety devices immediately after completion of the work.
- Perform maintenance and repair work under a jacked up vehicle or attachment only if it is safely and securely supported (hydraulic cylinders, jacks, etc. alone do not secure a jacked-up vehicle).

Engine

- Toxic engine exhaust gases! Inhaling exhaust gases is injurious to health and can lead to unconsciousness and to death! Never let the engine run in enclosed spaces.
- Danger of burns from hot parts! Do not touch any parts such as engine block, cooling system and exhaust system during operation and for some time after. Let the engine cool down.
- Risk of injury due to rotating parts of the cooling system. Injury of limbs or hair or clothing getting caught up. Switch the engine off and pull out the ignition key.
- If the engine oil pressure warning symbol in the multifunction display lights up with the engine running, there is a risk of engine damage! Stop the vehicle in the safe range. Turn the engine off immediately and check the oil level. Have the cause of the inadequate engine oil pressure removed.
- If the diesel particulate filter in the multifunction display lights up red, the vehicle engine must be switched off immediately. Serious engine damage can be caused if this is not complied with.

Fuel system

- Risk of fire! Diesel fuel is flammable! Take the utmost care when handling fuel. Never refuel close to naked flames or ignitable sparks. Do not smoke during fuelling. Switch off the engine, pull out the ignition key and apply the parking brake before fuelling.
- Danger of burns from hot parts! Do not touch any parts such as engine block, cooling system and exhaust system during operation and for some time after. Let the engine cool down.
- There is a risk of engine damage if the fuel system is run completely empty! Inform an authorised workshop!

Diesel particulate filter

- Danger of fire and burning! The diesel particulate filter gets very hot. Do not grasp in the area of the diesel particulate filter. Do not park the vehicle in the direct vicinity of flammable substances.

Cooling system

- Danger of burns from hot parts! Do not touch any parts such as engine block, cooling system and exhaust system during operation and for some time after. Let the engine cool down.
- Risk of scalding from hot coolant! The cooling system is under pressure. If the cooling system cap is opened with a hot engine there is a risk of scalding. Let the engine cool down.
- Risk of injury due to rotating parts! Injury of limbs or hair or clothing getting caught up. Switch the engine off and pull out the ignition key.
- The cooling fins are very thin and can be damaged easily.
- Small air bubbles can form when the radiator is filled. Therefore the cooling system must be vented at the same time. Have this done by an authorised workshop!

Air filter

- Danger of burns from hot parts! Do not touch any parts such as engine block, cooling system and exhaust system during operation and for some time after. Let the engine cool down.
- We can assume no liability for cleaned filter inserts. Never let the engine run without a filter insert!
- Only replace the safety cartridge, do not clean it! Never let the engine run without safety cartridge!

Hydraulic system

- Risk of injury from hydraulic oil! Hydraulic oil issuing under high pressure can penetrate the skin and cause severe injuries. Therefore, even with the smallest wounds, consult a doctor since otherwise severe infections can arise!
- Danger of burns from hot parts! Do not touch any parts such as engine block, cooling system and exhaust system during operation and for some time after. Let the engine cool down.
- Work on the hydraulic system of the vehicle may be done only by persons with special knowledge and experience in hydraulics.
- Regularly check all pipes, hoses and screw connections for leaks and external visible damage. Immediately rectify damage and leaks. Oil squirting out can cause injuries and fires. Observe the recommended replacement intervals for hydraulic pipes. With normal requirements 6 years, with increased requirements on safety 2 years!
- Do not change over hydraulic pipes! Fittings and the length and quality of the hose line must comply with the requirements.

Air conditioning system

- Risk of injury! The coolant in the air conditioning system is under high pressure. Do not open any parts of the air conditioning system. Have maintenance work on the air conditioning system done only by authorised workshops.
- Danger of burns from hot parts! Do not touch any parts such as engine block, cooling system and exhaust system during operation and for some time after. Let the engine cool down.

Wheels

- Risk of accident! Repair work on tyres and rims may be undertaken only by skilled personnel or authorised workshops.
- When changing wheels, make sure that the jack is applied to the specified jacking point.
- Damaged tyres and/or incorrect tyre pressure reduce the operating safety of the vehicle. There is a risk of an accident with tyres with too low or too high tyre pressure!
- Check the wheel nuts regularly for firm seating. After a tyre change check the wheel nuts after 50 km and tighten them if necessary.

Electrical system

- Danger of explosion due to smoking, fire or open light! Especially when being charged, but also in the normal use of batteries, batteries emit explosive gases! Avoid smoking, fire, sparks or open light in the vicinity of batteries!
- Danger of explosion due to sparks! Never place tools or other electrically conductive objects on the battery! Sparks that can ignite escaping gases arise if the poles are short-circuited,
  Always observe the correct order when connecting and disconnecting the battery!
  - Disconnecting the battery: First the minus pole and then the plus pole!
  - Connecting the battery: First the plus pole and then the minus pole!
- Danger of explosion due to frozen battery or too low acid level! With a frozen battery or if the acid level is too low, do not attempt to start with a jumper cable, the battery can burst or explode.
- Danger of burns due to battery acid! The special safety and accident prevention regulations must be complied with when handling the battery. Batteries contain sulphuric acid.
- Work on the electrical system may be done only in accordance with electrical engineering standards by a specialist trained for this work.
- Regularly inspect/check the electrical equipment of the vehicle. Defects such as loose connections or scorched cables must be removed immediately.
- Note the operating voltage of the vehicle!
- Use only original fuses. If stronger fuses are used, the electrical system can be destroyed and there can be fires.
- Welding work on the vehicle may be done only by authorised Hako dealers. Welding work on the vehicle leads to damage to the control electronics and can impair driving safety.

Installation of electrical devices

- The vehicle is equipped with electronic components and parts whose function can be influenced by electromagnetic emissions of other devices. Such influence can lead to danger to persons and safety-relevant functions if the following safety instructions are not complied with:
- If electrical and electronic devices and/or components, which also are connected to the vehicle electrical system, are installed subsequently in the vehicle, the user must examine in his own responsibility whether the installation causes interference to the vehicle electronics or to other components, a renewed acceptance test may be necessary.
- Above all it must be ensured that the subsequently installed electrical and electronic components comply with the EMC Directive 2004/108/EC in the relevant valid edition and bear the CE marking or an E1 approval is available.
- In addition, the following requirements especially must be fulfilled for the subsequent installation of mobile communication systems (e.g. radio, telephone):
  - Only devices with approval according to the valid national regulations (e.g. BZT approval in the Federal Republic of Germany) may be installed.
  - The device must be installed permanently.
  - Operation of portable or mobile devices inside the vehicle is permitted only through a connection to a permanently installed outside antenna.
  - The transmitter must be installed in a separate location from the vehicle electronics.
  - When installing the antenna, pay attention to correct installation with good ground connection between antenna and vehicle ground.

1.7 Environmental protection instructions

- Adequate knowledge is required for the safe handling of substances which could represent a risk to health and the environment.
- Observe the applicable laws and local regulations when disposing of detergents.
- During maintenance work and repairs, operating substances and filters have to be collected in suitable containers and properly disposed of observing the applicable laws and local regulations.
- Leaked oil, diesel fuel and lubricants etc. must not enter into the soil. Otherwise this would create a serious risk of groundwater contamination.
- Any contamination from leakages has to be cleared up without delay and disposed of properly. Used filters usually have to be disposed of as special waste (e.g. fuel filters) depending on the filtered substance.
- Ensure safe and environment-conserving disposal of operating and auxiliary materials. Take up escaping or spilled operating materials in suitable containers and dispose of them in an environmentally friendly manner.
- Used batteries with the recycling symbol contain reusable commodities. In accordance with the symbol showing the crossed-out garbage bin, these batteries must not be disposed of in the domestic waste. Return and recycling have to be arranged with the authorised Hako dealer as required in § 6 and § 8 of the German battery law (BattG)!

1.8 Shutting down and disposal

If the end of use of the vehicle or of its components is reached and this is handed over for scrapping, the components must be correctly disposed of. Here the regulations of the competent local authorities must be observed. The operating materials in the vehicle require special disposal and may not get into the environment. Further information about disposal is available through the competent local authorities and the authorised Hako dealer.

- Do not dispose of products with the symbol  at the end of their life in the domestic waste.
- Recycle used materials with the symbol  according to their labelling.

- Recycle packaging materials and do not throw them into the domestic waste.
- Recycle plastics that are identified with statement of the material, such as PPTV20 for example, and do not throw them into the domestic waste.
- Old batteries contain hazardous materials and must be returned to the distributor, disposed of correctly or delivered to a collecting point. Do not throw old batteries into the domestic waste.
- Treat operating materials such as oils, hydraulic fluids or fuels as hazardous waste and dispose of them correctly.
- Have refrigerants disposed of only by specialist firms with expert staff and the required technical equipment. Refrigerant may under no circumstances get into the atmosphere. Have refrigerants disposed of by an authorised Hako dealer.
- Observe national regulations.

1.9 Labels on the vehicle

The following safety and instruction labels are affixed well legibly to the vehicle. Renew missing or illegible labels immediately.

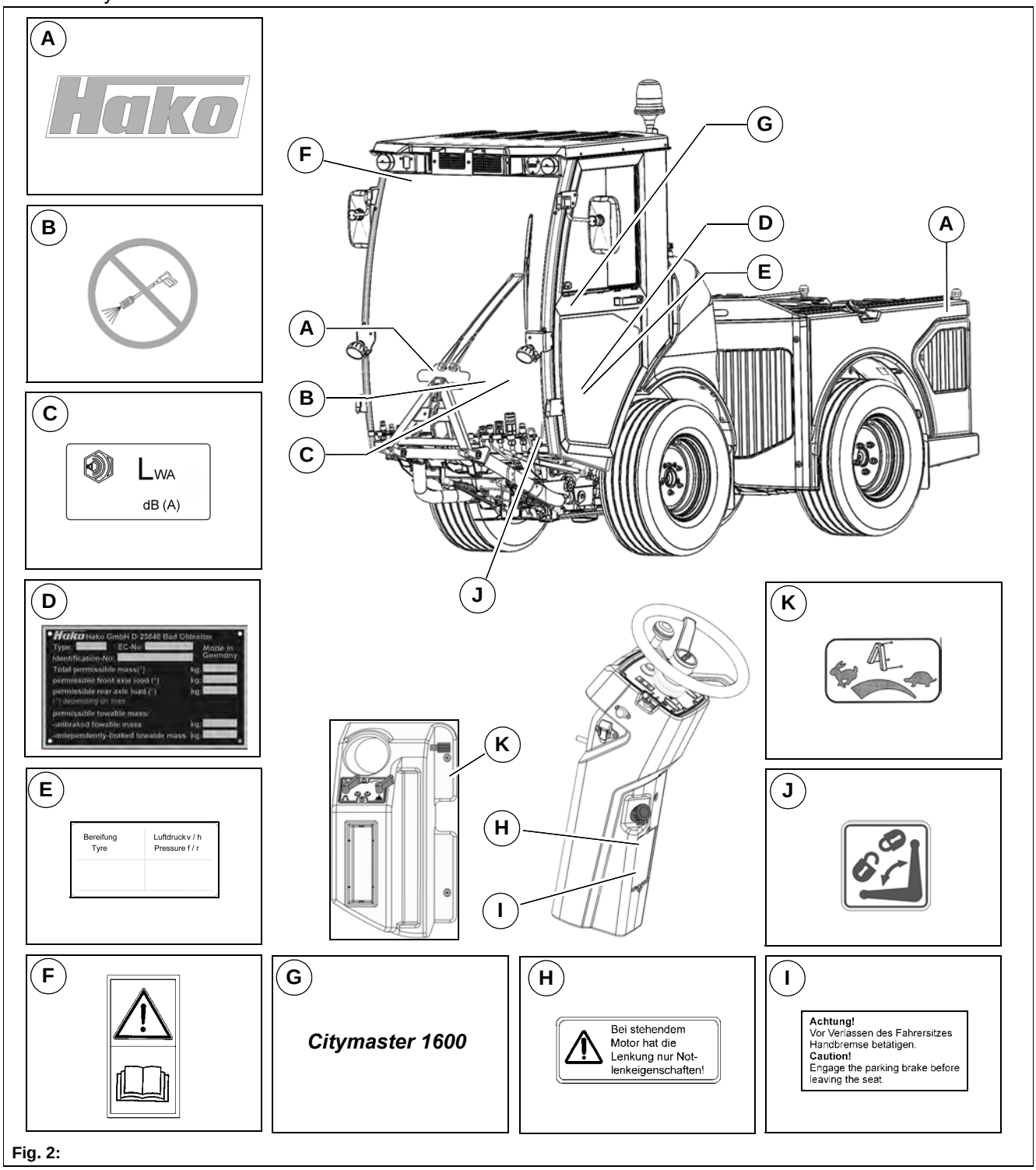


Fig. 2:

Hako company logo Fig. 2-A

The Hako company logo (147 mm x 40 mm) is located on the left and right cover of the engine.
The Hako company logo (220 mm x 60 mm) is located on the windscreen.

Label – High-pressure cleaner Fig. 2-B

The High-pressure cleaner label is located in the driver's cab under the driver's seat.

Label – Noise measurements Fig. 2-C

The Noise measurements label is located in the driver's cab under the driver's seat.

Label – Type plate Fig. 2-D

The Type plate label is located in the driver's cab under the driver's seat.

Label – Tyre pressure Fig. 2-E

The Tyre pressure label is located in the driver's cab under the driver's seat.

Label – Operating manual Fig. 2-F

The Operating manual label is located in the driver's cab on the front bar top right.

Label – Machine type Fig. 2-G

The Machine type label is located on both driver's doors.

Label – Emergency steering Fig. 2-H

The Emergency steering label is located in the driver's cab on the steering column.

Label – Parking brake Fig. 2-I

The Parking brake label is located in the driver's cab on the steering column.

Label – Suction mouth Fig. 2-J

The Suction mouth label is located behind the front tool carrier.

Label – Front tool carrier lowering valve Fig. 2-K

The Front tool carrier lowering valve label is located on the left control panel.

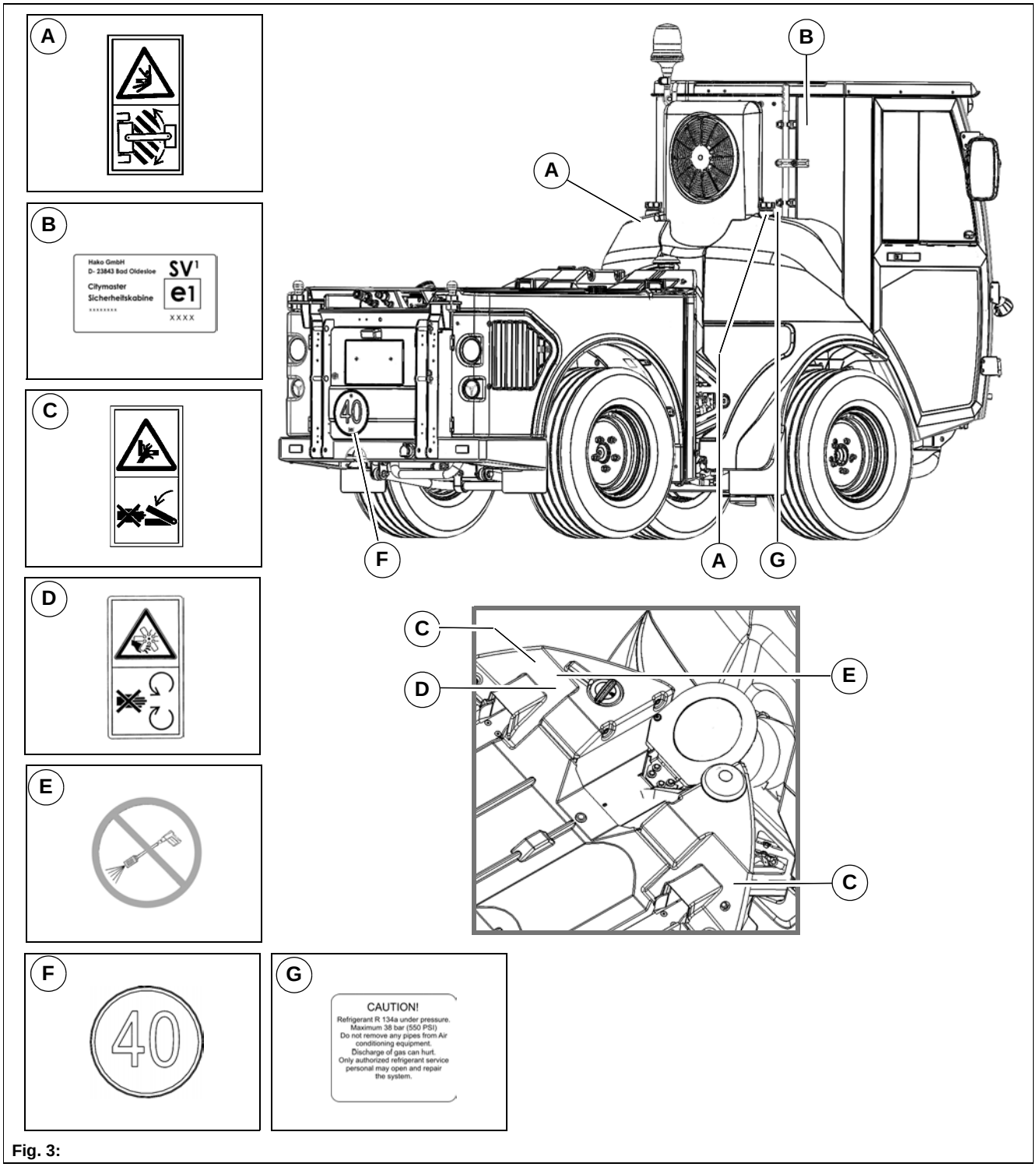

A
B
Hako GmbH
D- 23843 Bad Oldesloe
Citymaster
Sicherheitskabine
SV1
e1
XXXX
C
D
E
F
40
G
CAUTION!
Refrigerant R 134a under pressure.
Maximum 38 bar (550 PSI)
Do not remove any pipes from Air conditioning equipment.
Discharge of gas can hurt.
Only authorized refrigerant service personal may open and repair the system.
A
B
C
D
E
F
A
G

Fig. 3:

Labels – Danger in articulation area Fig. 3-A

The Danger in articulation area labels are located on the driver's cab at the rear on the left and right.

Label – Safety cab Fig. 3-B

The Safety cab label is located in the driver's cab at the rear in the centre.

Labels – Risk of crushing Fig. 3-C

The Risk of crushing labels are located on the rear wagon on the left and right next to the suction pipe.

Label – Rotating parts Fig. 3-D

The Rotating parts label is located on the rear wagon on the left next to the suction pipe.

Label – High-pressure cleaner Fig. 3-E

The High-pressure cleaner label is located on the rear wagon on the right next to the suction pipe.

Label – Allowed maximum speed Fig. 3-F

Allowed maximum speed of the vehicle in km/h. The Allowed maximum speed label is located at the driver's cab at the rear on the right.

Label – Air-conditioner Fig. 3-G

The Air-conditioner label is located at the driver's cab at the rear on the right.

2 Operation

2.1 Overviews

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

Fig. 4:

2.1.1 Front view

Item	Designation
1	Driver's cab
2	Additional working spotlight (optional) or driving light above (optional)
3	Direction indicator (front) with side lights
4	Beacon
5	Outside mirror (optionally heated)
6	Windscreen wiper
7	Doors
8	Fresh water tank
9	Fuel tank
10	Ball cock circulating water
11	Front attachment connections
12	Front tool carrier
13	Working spotlight
14	Head light
15	Number plate holder

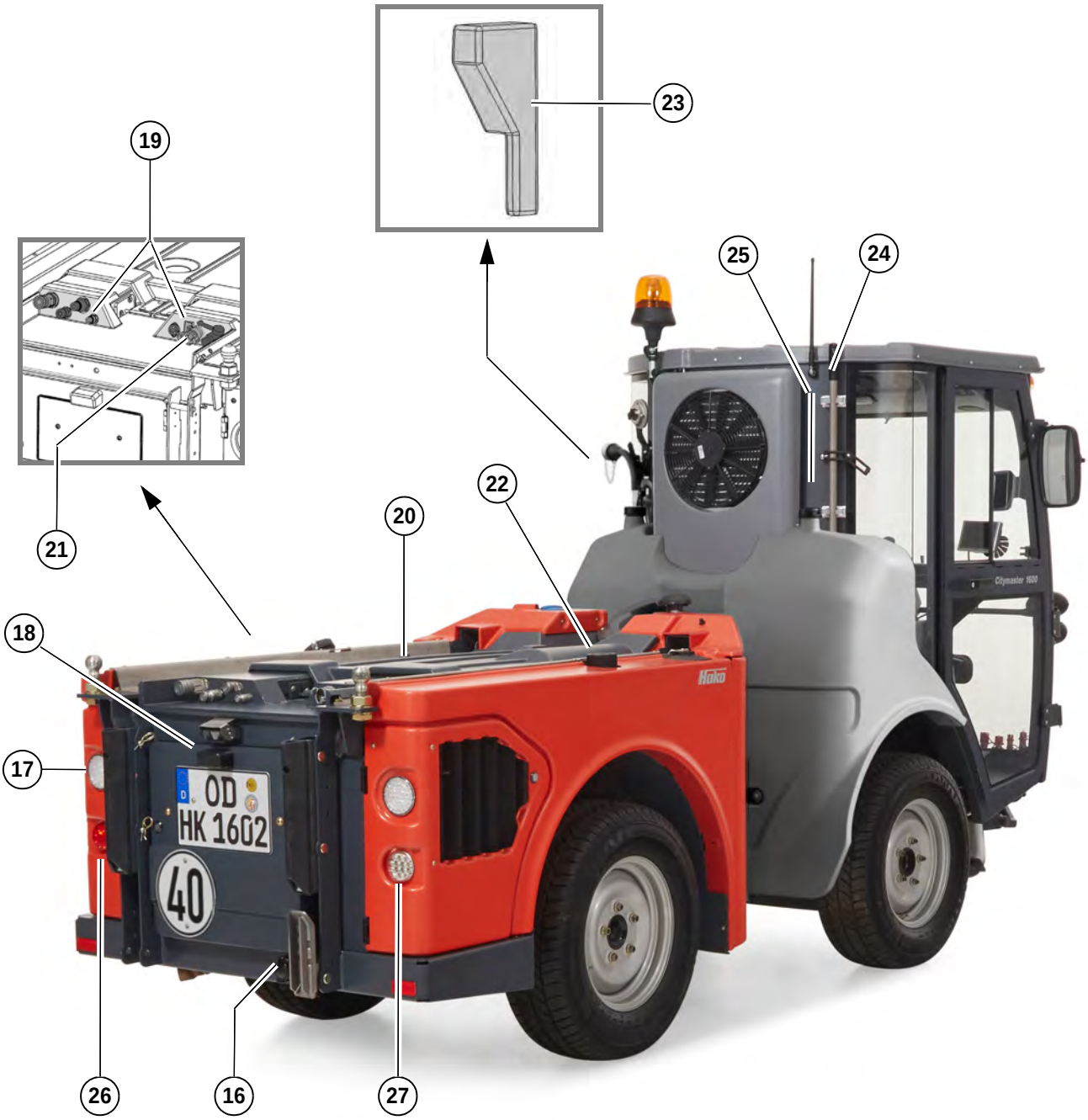


Fig. 5:

2.1.2 Rear view

Item	Designation
16	7-pin socket for trailer operation
17	Direction indicator with rear light and brake light
18	Number plate light
19	Rear attachment connections
20	Engine space cover
21	Circulating water coupling
22	Hydraulic oil tank
23	First aid box and warning triangle (optional)
24	Auxiliary tool
25	7-pin socket for spreader control cable (optional)
26	Fog tail light (optional)
27	Reversing light (optional)

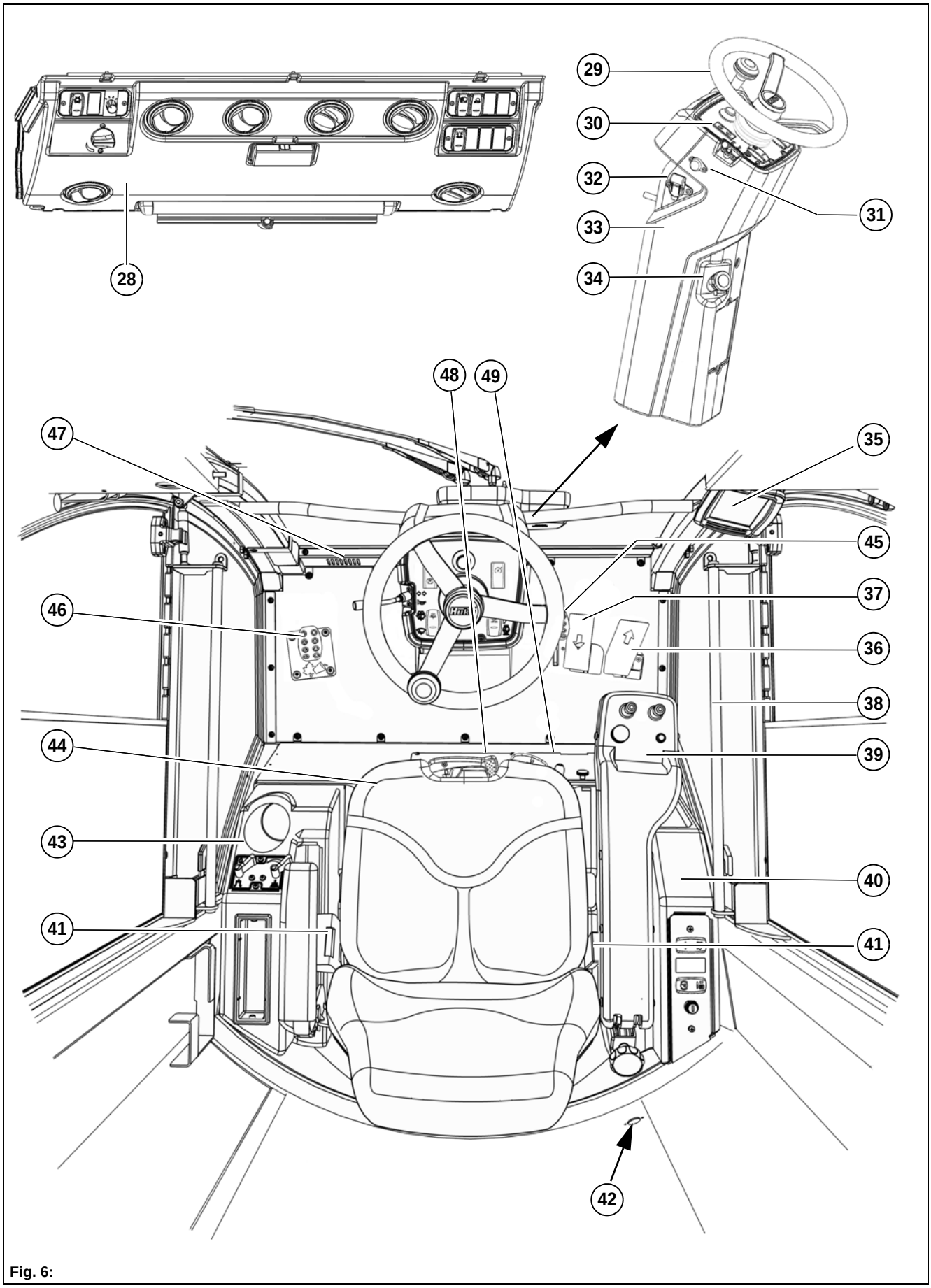


Fig. 6:

2.1.3 Driver's cab

Item	Designation
28	Inside roof control panel
29	Steering wheel
30	Steering column control panel
31	Socket for spreader control cable on the steering column
32	3-pin socket
33	Steering column
34	Windscreen wiper system filling opening
35	Multifunctional display
36	Forwards accelerator pedal
37	Reverse accelerator pedal
38	Door handle
39	Right arm rest control panel
40	Right-hand control panel
41	Seat belt
42	Socket for spreader control cable on the driver's cab outside
43	Left-hand control panel
44	Driver's seat
45	Brake pedal
46	Coarse material flap pedal
47	Foot space air vent
48	Electrical system cover
49	Water filter cover

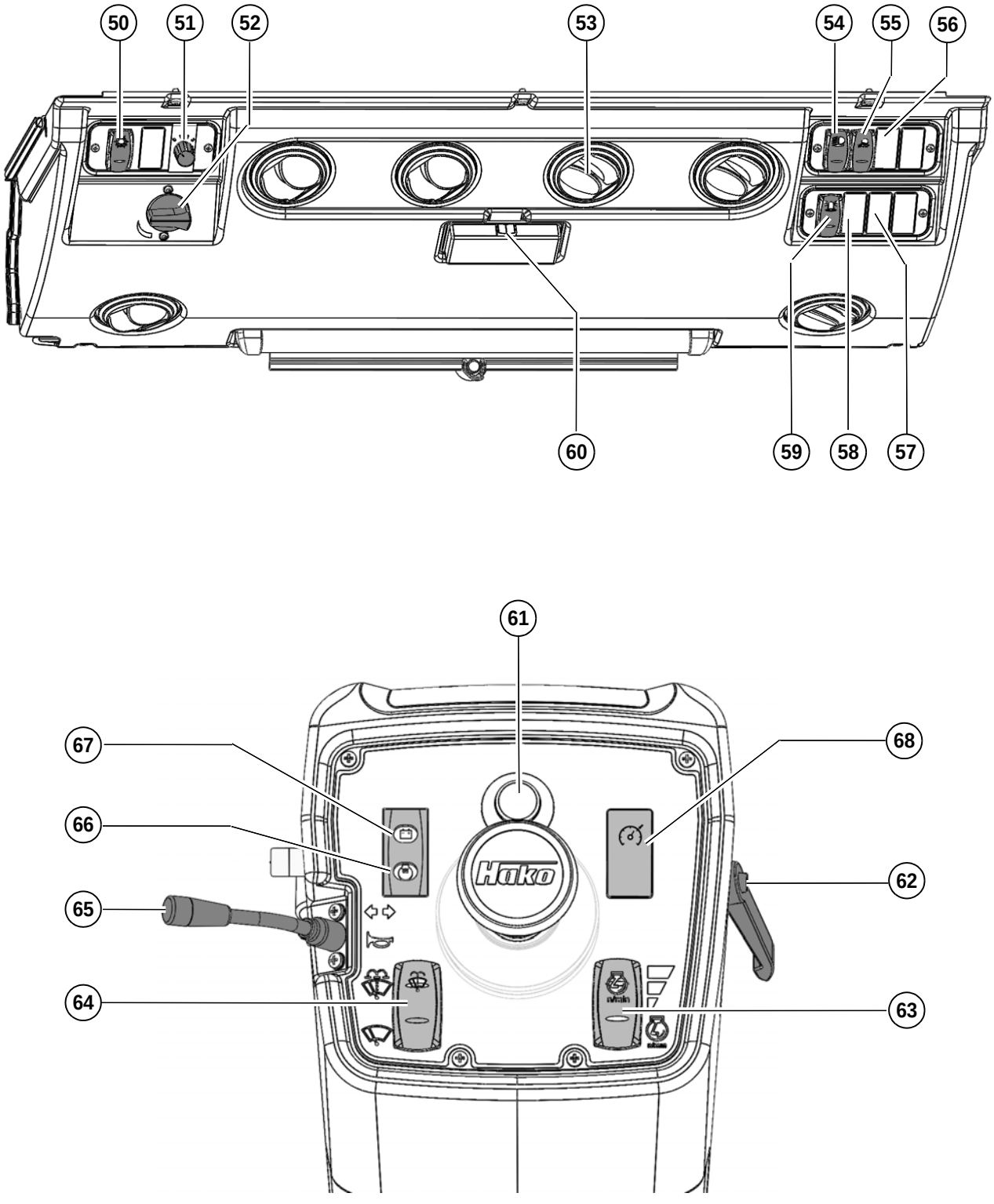


Fig. 7:

Continued – Driver's cab

Item	Designation
	Inside roof control panel
50	Air-conditioner switch
51	Suction fan controller
52	Heating controller
53	Air vent
54	Head light/side light switch
55	Working spotlight switch
56	Top driving light switch (optional)
57	Mirror heating switch (optional)
58	Fog tail light switch (optional)
59	Beacon switch
60	Inside light switch
	Steering column control panel
61	Emergency flasher system switch
62	Steering column lever
63	Engine fixed speed button
64	Windscreen wiper motor/water pump switch
65	Direction indicator switch/horn button
66	Preheat control light
67	Generator control light
68	Cruise control switch/limiter (optional)

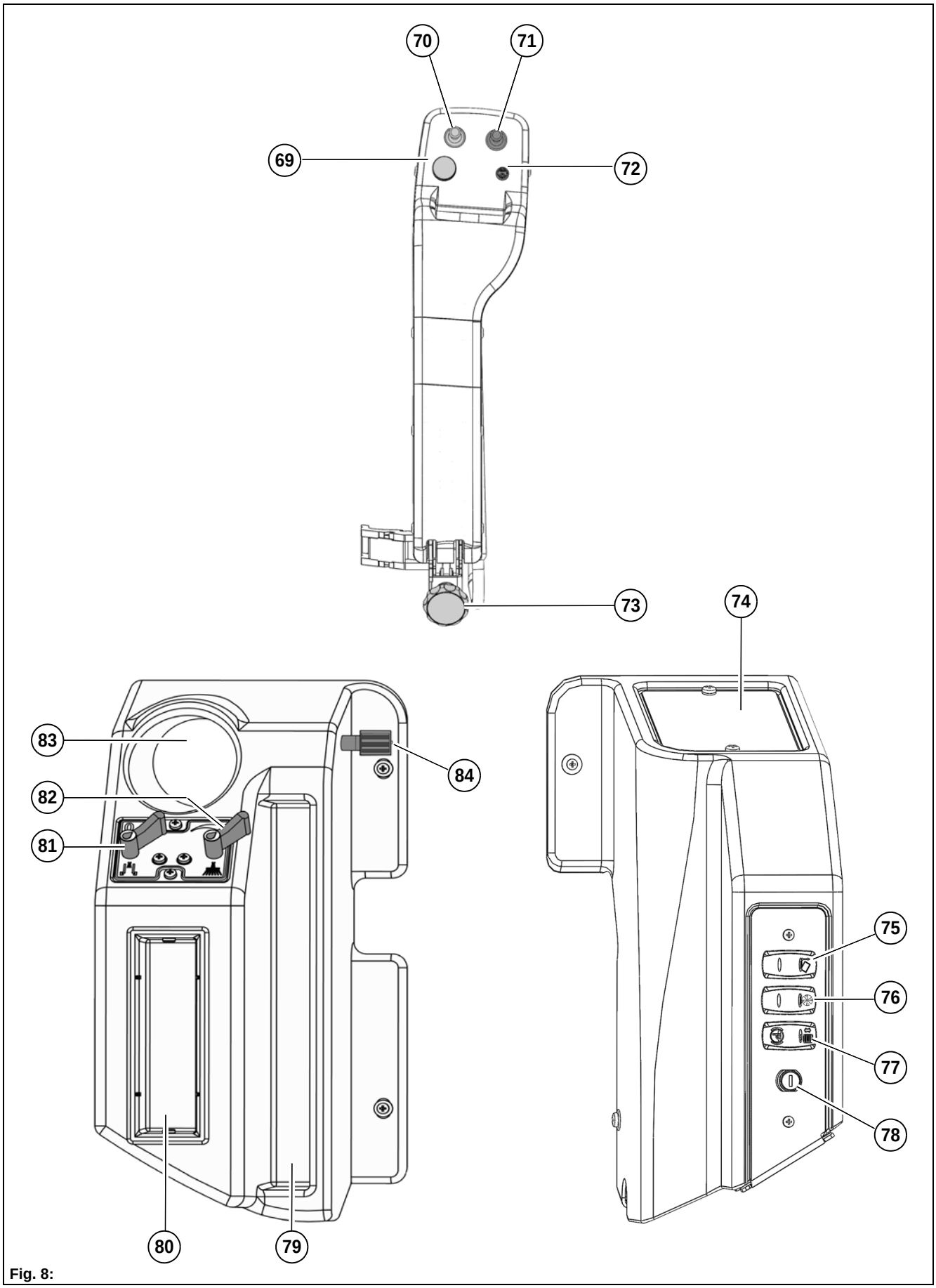


Fig. 8:

Continued – Driver's cab

Item	Designation
	Arm rest control panel
69	Turn-push knob for the multifunctional display
70	Joystick lowering front tool carrier (configuration depending on the attachment)
71	Joystick raising front tool carrier (configuration depending on the attachment)
72	Hako button
73	Armrest tilt star-shaped handle
	Right-hand control panel
74	Fuse box
75	Raise/lower dirt hopper switch
76	Cooling system reversing fan switch
77	Electrical parking brake
78	Ignition switch
79	Operating manual shelf
	Left-hand control panel
80	Radio installation space
81	Fresh water amount at the suction mouth lever
82	Sweeper fresh water amount lever
83	Drink holder
84	Front tool carrier lowering valve

2.2 Multifunctional display

2.2.1 Start screen

Fig. 9:

Functions and indicators of the vehicle are set and displayed with the multifunctional display **Fig. 9-35**.
After the vehicle is switched on, the operating system and data are loaded and the start screen appears on the display. The version number of the control unit is shown on the start screen at the bottom left and the version number of the display software at the bottom right.

2.2.2 Menu guidance

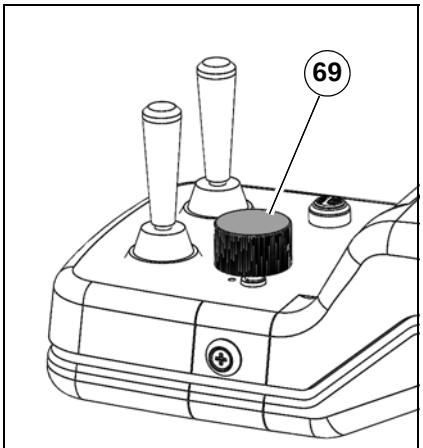


Fig. 10:

The menu is operated with the turn-push knob **Fig. 10-69**. The turn-push knob is located in the right armrest of the driver's seat.
Menus and submenus are selected in the multifunctional display and the individual menu item values are set or changed with the turn-push knob.
The basic principles in this case are:

- Turn to select a menu item.
- Push to activate a menu item.
- Turn to change a value.

If no setting is made for around two seconds, the cursor jumps back again.

2.2.3 Menu structure

The menu structure of the multifunctional display is divided into several levels.

- The information and warning symbols and the most important operating data are shown in the normal view.
- Operating settings such as the output of the hydraulic oil circuit I/II or the loading and unloading of the front tool carrier (optional) are made in the working menu.
- Operating menu (B menu):
  The pre-settings for the normal view are made in the operating menu.
- Configuration menu (C menu):
  Basic settings such as date, time, units etc., are made in the configuration menu.

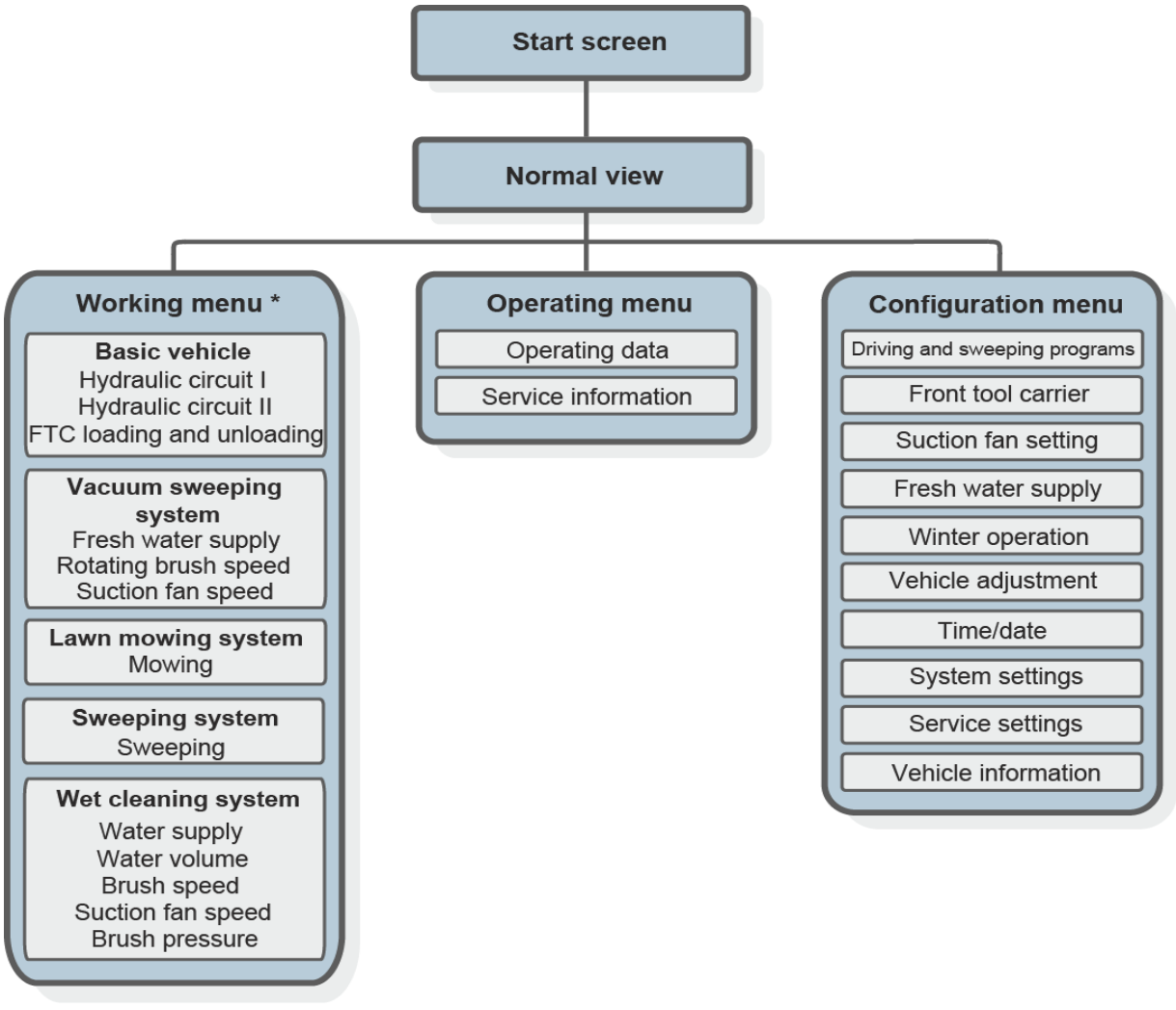


Fig. 11:

*) according to the option or attachment

2.2.4 Normal view

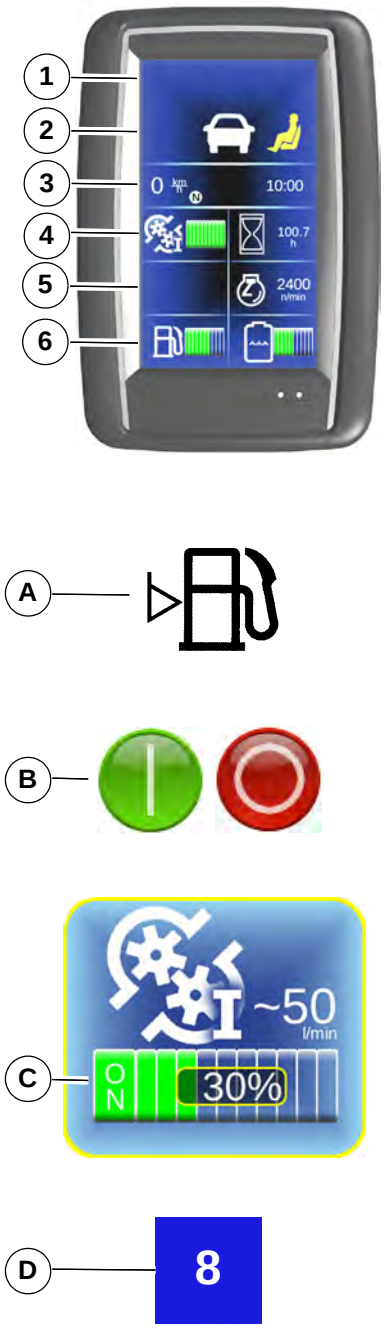


Fig. 12:

General structure

The normal view appears automatically after the start screen. The current vehicle data are displayed in the normal view. The user can determine partially in the operating menu the vehicle data that are displayed. The other part of the vehicle data is determined by the vehicle condition (e.g. current engine speed).

The normal view **Fig. 12** is structured as follows:

1 Warning and information symbols

2 Warning and information symbols (left and right)
recognised attachment (centre)

3 Speed, pedal indicator, blinkers, time

4 Attachment parameters (left)
Operating times and operating kilometres (right)

5 Service information (left)
Current engine speed (right)

6 Engine values (left)
Hydraulic values and fresh water level (right)

The vehicle data are displayed as symbols, switches, bar charts or numbers.

A Symbols
- Example: Fuel supply low
  Special feature:
  Warning symbols are displayed red or yellow shining or flashing.
  Information symbols are displayed green or white.

B On and Off switches

C Bar chart
- Example: Hydraulic circuit I
  The bar chart can be set from 0 to 100 %.
  Special feature: The range can be restricted for certain parameters.
  For example, the suction fan has a setting range of 30 % to 100 %.

D Numbers
- Example: Suction fan run-on (8 seconds)

2.2.5 Working menu (A menu)

Adjustable indications are displayed on entry into the working menu **Fig. 13**. All indications are displayed one after the other by pushing the turn-push knob **Fig. 13-69.** The operator can change the values in the current display by turning the turn-push knob.
The following displays are possible according to the attachment/option:

1 Basic vehicle:
- Setting hydraulic circuit I (front attachment), see page 66
- Setting hydraulic circuit II (rear attachment), see page 68
- Loading and unloading the front tool carrier

2 Vacuum sweeping system:
- Switching the fresh water pump on/off, see page 142
- Setting the rotating brush speed, see page 141
- Setting the suction fan speed, see page 142

3 Lawn mowing system:
- Setting hydraulic circuit I (50 litres/minute), see page 163

4 Sweeping system:
- Setting hydraulic circuit I (70 litres/minute), see page 174

5 Wet cleaning system:
- Setting the water supply, see page 207
- Setting the water volume, see page 207
- Setting the brush speed, see page 208
- Setting the suction fan speed, see page 208
- Setting the brush pressure, see page 208

Fig. 13:

Example: Setting the output of hydraulic circuit I

The following example shows how the output of hydraulic circuit I can be changed in the working menu.

1 The normal view **(A)** is displayed.
2 Turn the turn-push knob **Fig. 14-69**: The last active function **(B)** is selected. (For example: hydraulic circuit I with maximum 50 litres/ minute to 30 %)
3 Turn the turn-push knob: The current value is changed. (For example, hydraulic circuit I with 80 %).

⚠	**Danger** Risk of injury! Make sure that the attachments are suitable for the set oil volume. An oil volume set too high can lead to injuries due to a defect of the attachment! As a reminder, the setting process is interrupted briefly at 70 %.

The change is made immediately in working travel. If the change is made in the transport driving mode, it is activated only on changing to the working driving mode.

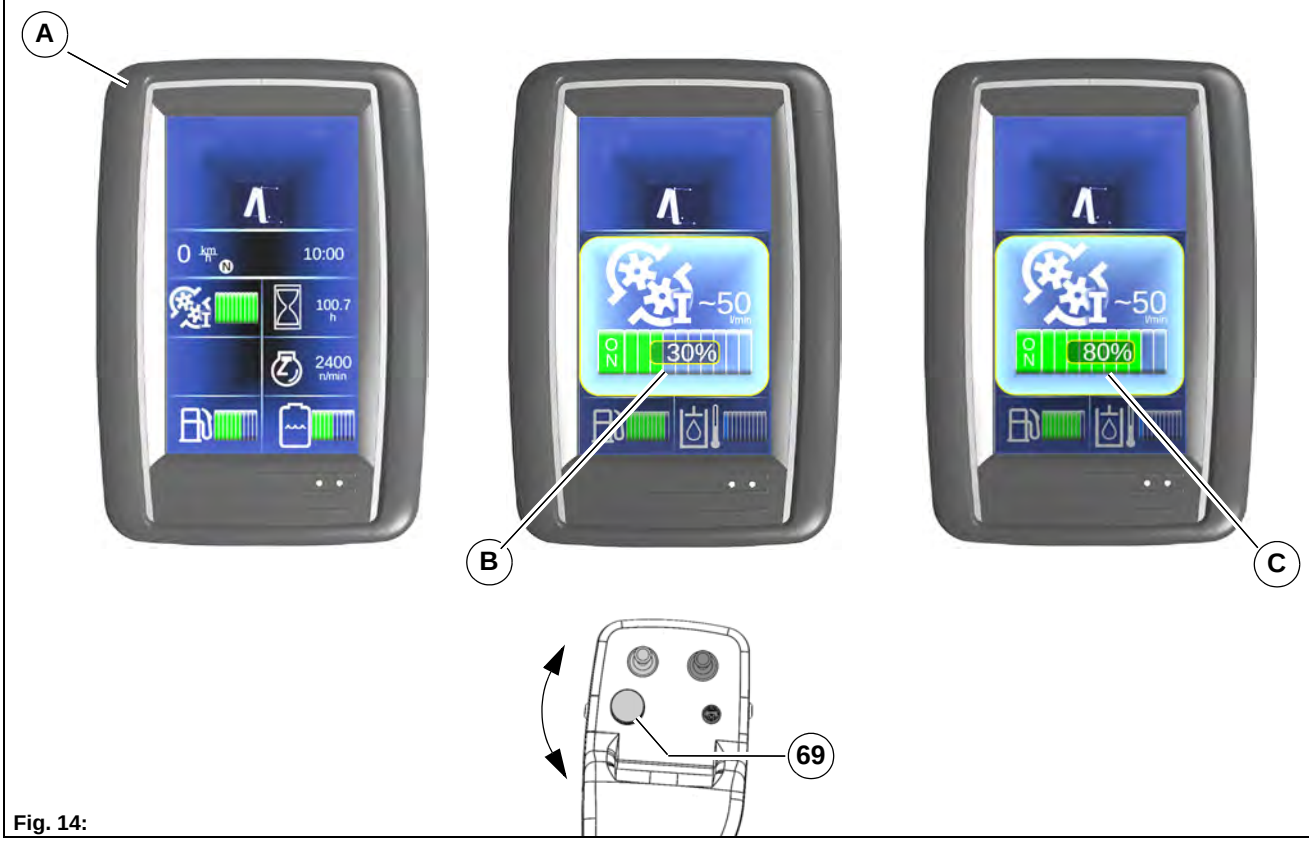


Fig. 14:

2.2.6 Operating menu (B menu)

The displays of the normal view can be combined for the corresponding requirements in the operating menu **Fig. 15**. Different functions can be selected in the fields **(A)**, **(B)** and **(C)**.
The service information is displayed in the field **(D)**.

Operating data
The distances are displayed in kilometres (km) or miles (mi) depending on the system setting in the configuration menu. System setting, see page 41.
The displayed counter is reset by pushing the turn-push knob **Fig. 15-69** for a long time.

Field A:
1 Operating hours total
2 Operating hours resettable
3 Work hours total
4 Work hours resettable
5 Sweeping kilometres total
6 Sweeping kilometres resettable
7 Distance total
8 Distance resettable

Field B:
9 Fuel supply
10 Cooling water temperature

Field C:
11 Fresh water supply
12 Hydraulic temperature

Service information
If a service information has occurred since the ignition was switched on, a 4-digit code is displayed in **field D**. If the code is currently active, a red flashing wrench appears in addition.

☞	**Note** The displayed service information can be hidden after error rectification by pushing the turn-push knob for a long time.

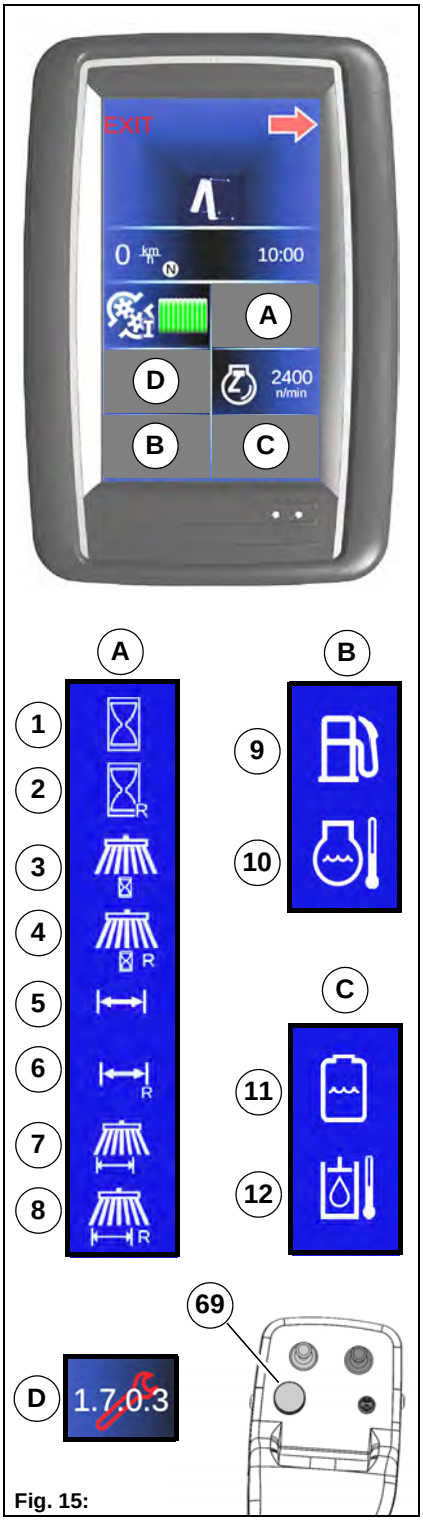


Fig. 15:

Example: Selecting the fuel gauge

The following example explains how to change the operating data display from cooling water temperature to fuel gauge in the operating menu.

1. In the normal view **(A)**, push the turn-push knob **Fig. 16-69** for at least two seconds. The operating menu is activated. The cursor stands on the EXIT symbol **(B)**.
2. Turn the turn-push knob and move to the field **(C)**.
3. Push the turn-push knob: Field **(C)** is activated.
4. Turn the turn-push knob and select the fuel gauge **(D)**.
5. Push the turn-push knob. The new function is taken over.
6. Turn the turn-push knob and exit the operating menu via the EXIT symbol **(E)**.

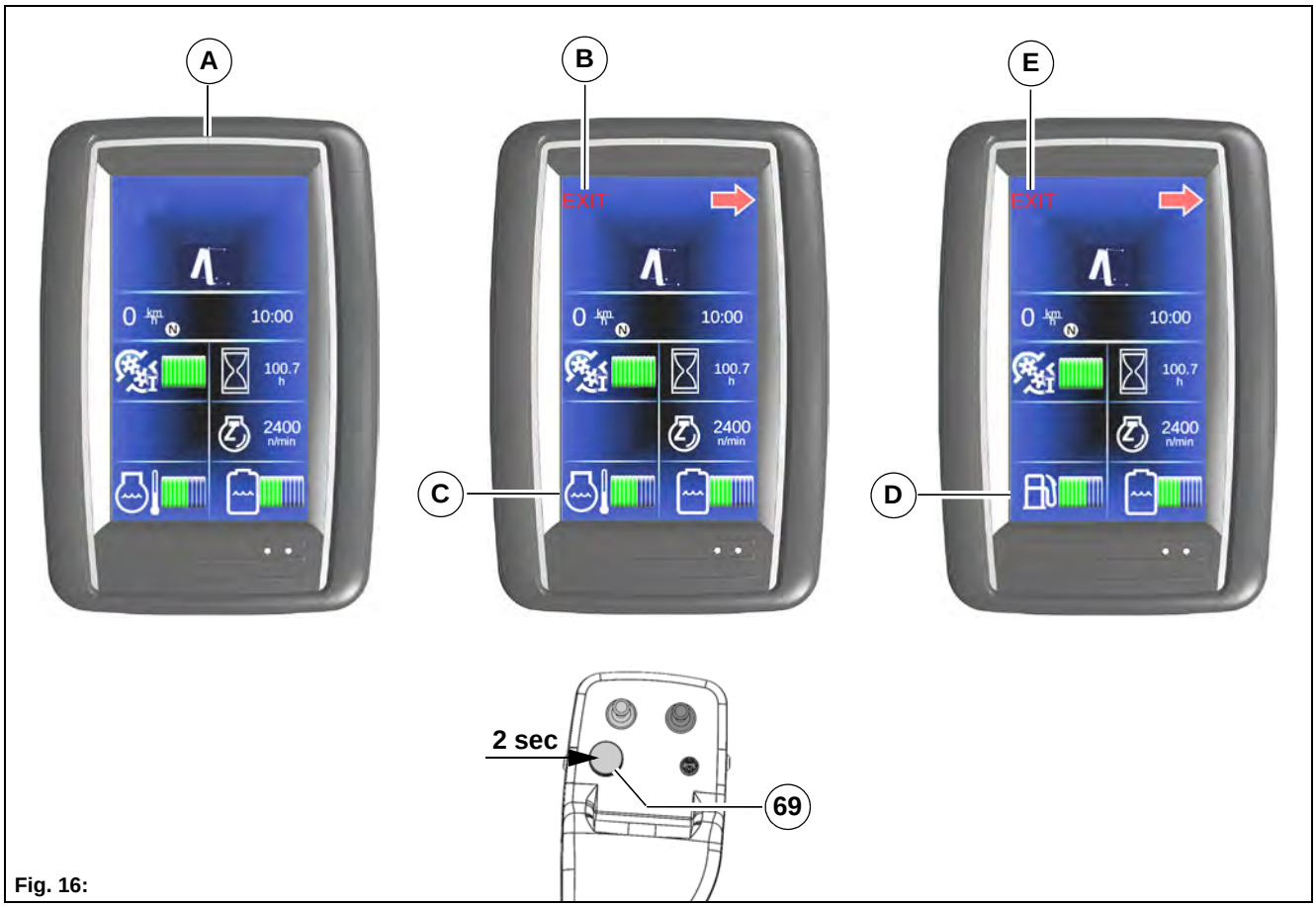


Fig. 16:

2.2.7 Configuration menu (C menu)

The configuration menu **Fig. 17** consists of a table of contents. The menu items to be changed can be selected in the table of contents. When you select a menu item, you branch into a sub menu in which you can make settings.
A condition is that the accelerator pedal is in neutral position.
There are the following menu items in the configuration menu:

1 Driving profile
2 Suction fan settings
3 Winter operation
4 Time/date
5 Service information
6 Front tool carrier
7 Fresh water supply
8 Driving settings
9 System settings
10 System information

Fig. 17:

Driving profile Fig. 18

A Loading a sweeping program
B Saving the current parameters
C Resetting to defaults
D Selecting storage place for saving or loading

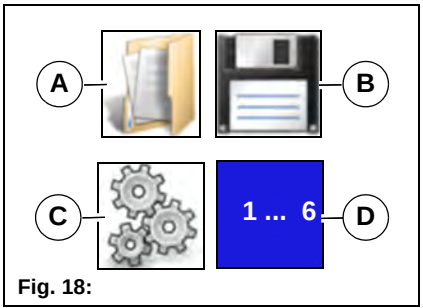


Fig. 18:

Suction fan settings Fig. 19

A Suction fan after ignition ON
- 0 ... OFF
- 1 ... ON
- 2 ... Last value in ignition OFF

B Suction fan run-on
- 0 to 15 seconds (standard): 8 seconds)

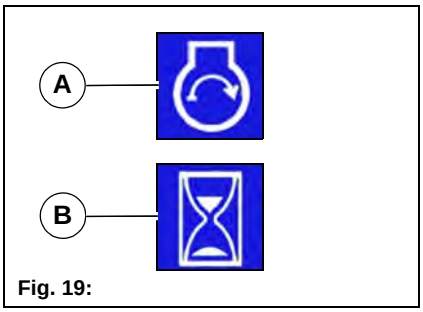


Fig. 19:

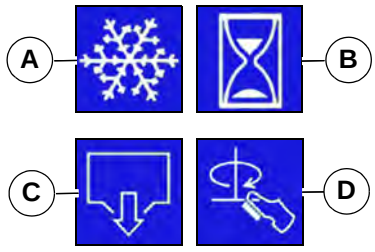


Fig. 20:

Winter operation Fig. 20

Danger
Risk of accident due to unintended lowering of the attachment! Activate winter operation in the configuration menu only in connection with an uncoded snow blade. The front lift is then not limited downwards. Winter operation must be deactivated immediately after use.

A Winter operation ON/OFF
- 0 ... OFF (standard)=
- 1 ... ON

B Spreader run-on
- 0 to 4 seconds (standard): 0 seconds)

C Spreader fast emptying ON/OFF
- 0 ... OFF
- 1 ... ON

D Spreader corresponding to the pedal setting
- 0 ... OFF
- 1 ... ON (standard)

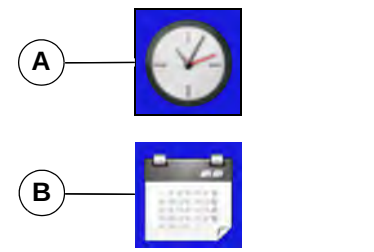


Fig. 21:

Time/date Fig. 21

A Time in hours/minutes
B Date in day/month/year

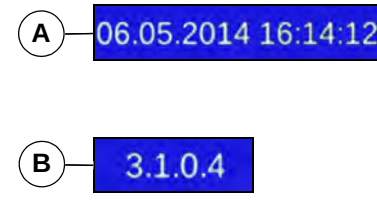


Fig. 22:

Service information Fig. 22

The last ten items of service information are displayed with time stamp **Fig. 22-A** and error number **Fig. 22-B**.
If no time stamp is available, the error occurred immediately at ignition ON or the display was switched off or not ready.

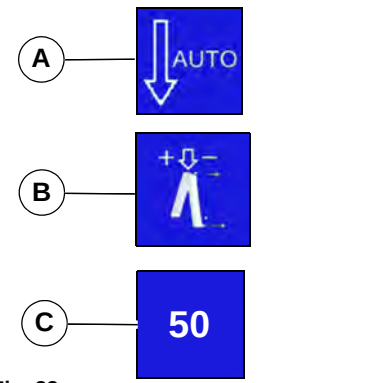


Fig. 23:

Front tool carrier Fig. 23

A Lower front tool carrier
- 0 ... Automatic OFF
- 1 ... Automatic ON

B Loading and unloading the front tool carrier
- 0 ... Last value
- 1 ... Always floating position

C Front tool oil volume
- 0 ... 50 litres/min
- 1 ... 70 litres/min

Fresh water supply Fig. 24

A Water pump to last set value (standard)
- 0 ... Last value
- 1 ... Always ON

B Water pump for uncoded attachment
- 0 ... Not available
- 1 ... Available

C Water supply for the 3rd rotating brush (optional)
- 0 ... OFF
- 1 ... ON

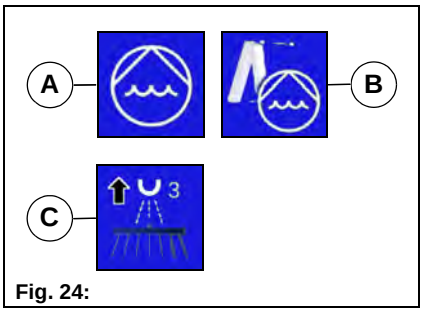


Fig. 24:

Driving settings Fig. 25

A Signal tone on flashing
- 0 ... OFF
- 1 ... ON (standard)

B Signal tone on reversing
- 0 ... OFF
- 1 ... ON (standard)

C Tyre type
- see selection list

D Warning tone when driving with raised dirt hopper
- 0 ... OFF
- 1 ... ON (standard)

E Speed reduction in working travel
- Limit value in %

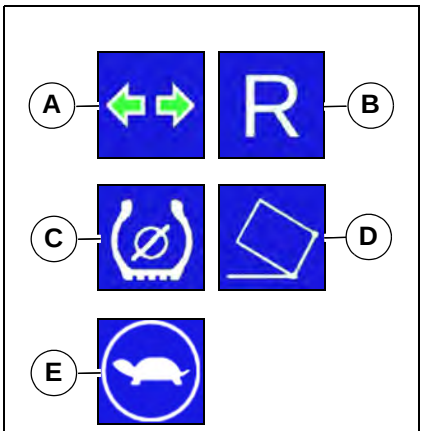


Fig. 25:

System settings

A Setting units
- km/h (standard)
- mi/h

B Display brightness
- Standard: 80 %

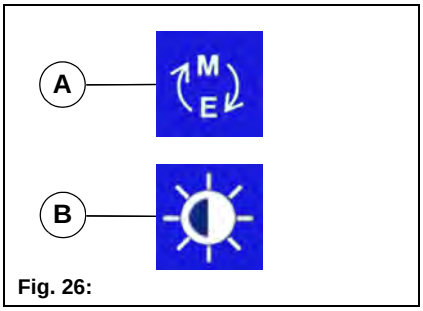


Fig. 26:

System information

A Vehicle type

B Recognised attachment
- Example: Sweeping system with two rotating brushes

C Software statuses

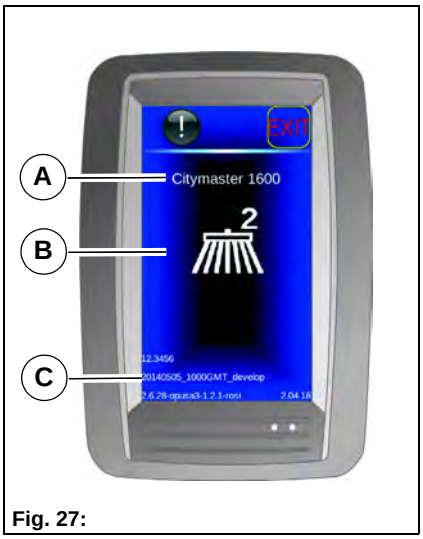


Fig. 27:

Example: Driving profile setting

The following example explains how to make a setting in the driving and sweeping program.

1. In the normal view **(A)**, push the turn-push knob **Fig. 16-69** for at least two seconds. The operating menu is activated. The cursor stands on the EXIT symbol **(B)**.
2. In the operating menu turn the turn-push knob and move to the arrow symbol **(C)**.
3. In the operating menu push the turn-push knob. The configuration menu is activated. The cursor stands on the EXIT symbol **(D)**.
4. In the configuration menu turn the turn-push knob and move to the driving profile menu item **(E)**.
5. In the configuration menu push the turn-push knob. The driving profile sub-menu is selected. The cursor stands on the EXIT symbol **(F)**.
6. Turn the turn-push knob in the driving profile sub-menu. There are the following possibilities:
   - Loading a sweeping program with the symbol **(G)**
   - Resetting to defaults with the symbol **(H)**
   - Saving the current parameters with the symbol **(I)**
   - Selecting the storage place for loading or saving: 1 to 6 **(J)**

Use the EXIT symbol to exit the sub menu.

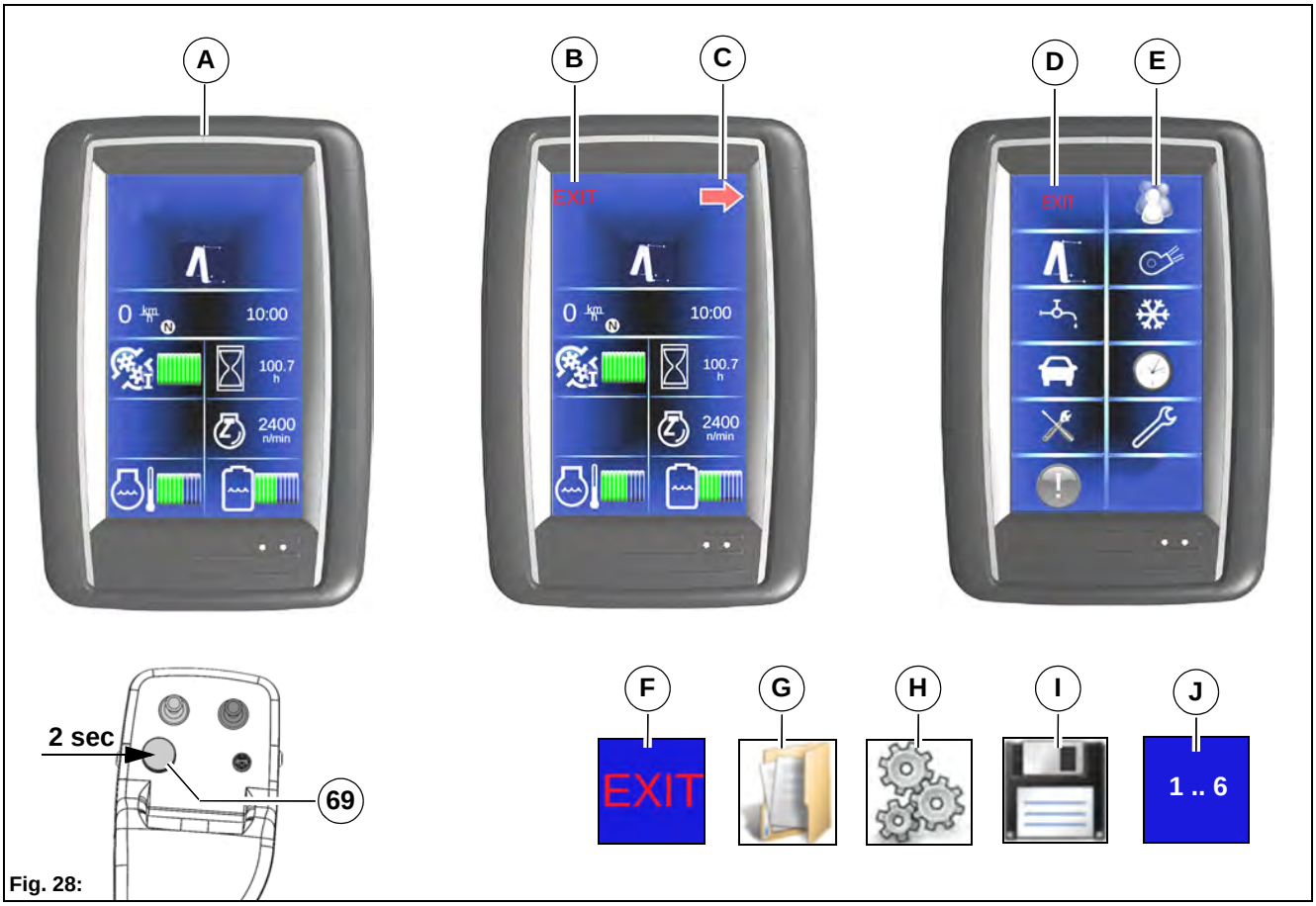


Fig. 28:

2.2.8 Warning and information symbols

Warning symbols

Item	Symbol	Colour	Function	Remedy
1		Red	Charge control	The control light of the generator lights up when the ignition is switched on, but goes out as soon as the engine is started. If the control light goes on when the engine is running, this signals: Defect on the V-belt of the generator or defect in the charge circuit of the generator. The battery is no longer being charged! Immediately stop the vehicle safely and if necessary notify an authorised workshop.
2		Red	Engine oil pressure low	If the warning symbol appears, there is a risk of engine damage. Immediately stop the vehicle safely and check the engine oil level.
3		Red	Cooling water temperature too high	If the warning symbol appears, there is a risk of engine damage. Immediately stop the vehicle safely and check the engine oil level.
4		Red	Hydraulic oil temperature	If the warning symbol appears, there is a risk of operating failure of the hydraulic system. The hydraulic oil temperature is too high! Stop the vehicle safely and switch off all hydraulic units.
5		Red	Parking brake on	The warning symbol appears if the parking brake is on.
6		Red	Hopper overload (optional)	Empty the dirt hopper immediately if the warning symbol appears.
7		Yellow	Engine fault	If the warning symbol appears with the engine running, there is a risk of engine damage. Immediately stop the vehicle safely and if necessary notify an authorised workshop.
8		Yellow	Fuel supply low	If the warning symbol flashes, then refuel without delay. There is a risk of engine damage if the fuel system is run completely empty! Inform an authorised workshop!
9		Yellow	Hopper raised	As long as the dirt hopper is not in its lower end position, the warning symbol appears.
10		Yellow	Driver not on driver's seat	The warning symbol appears if the driver leaves the driver's seat during operation.
11		Yellow	Preheat (see page 48)	There is an engine fault if the warning symbol flashes. There is a risk of engine damage. Immediately stop the vehicle safely and notify an authorised workshop.

Information symbols

Item	Symbol	Colour	Function
12		Green	Vehicle blinker
13		Green	Trailer blinker
14		Green	Side and rear lights
15		White	Front tool carrier floating position
16		White	Front tool carrier upper stop
17		White	Transport mode
18		White	Work mode with front tool carrier or unknown attachment
19		White	Winter operation
20		White	Work mode with 2-brush system
21		White	Work mode with 3-brush system
22		White	Work mode with front sweeping machine
23		White	Work mode with front mower
24		White	Work mode with CityCleaner
25		White	Accelerator pedal in neutral position
26		White	Speed level 1 lights up constantly or flashes
27		White	Speed level 2 lights up constantly or flashes

2.3 Controls in the driver's cab

2.3.1 Steering column control panel

Adjusting the steering column

⚠	**Danger** Risk of accident! If the steering column **Fig. 29**-**33** is unlocked while driving, it can come unexpectedly out of adjustment. You can then lose control over the vehicle.

The steering column **Fig. 29**-**33** can be adjusted to the corresponding driver position with a lever.

- Turn the lever **Fig. 29-A** counter-clockwise until the steering column is unlocked.
- Set the required steering column adjustment.
- Turn the lever clockwise until the steering column is locked.

Check that the steering column is locked. To do this, move the steering wheel **Fig. 29-29** in the longitudinal direction.

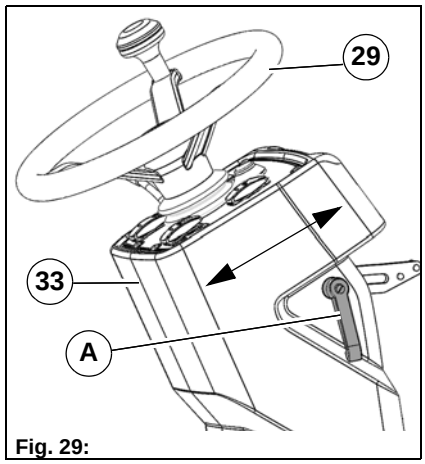


Fig. 29:

Setting the fixed engine speed

The fixed engine speed and thus the system output of the vehicle in the work mode is set with the button **Fig. 30-63**.

Stage	Rpm	Hydraulic circuit I Litres/minute	Hydraulic circuit II Litres/minute
1-ECO	1600	50	20
2-STANDARD	2000	50/70	27
3-MAXIMUM	2400	50/70	32

The overview illustrates that sufficient power is available already in the ECO mode for many applications.
The full hydraulic output is reached as from the Standard speed.
Additional energy is available in the driving mode as well as in hydraulic circuit II at Maximum. Set the speed corresponding to the requirements.
Operation primarily in the ECO mode lowers consumption and noise. See pages 66 and 68 for information about setting the hydraulic circuits.

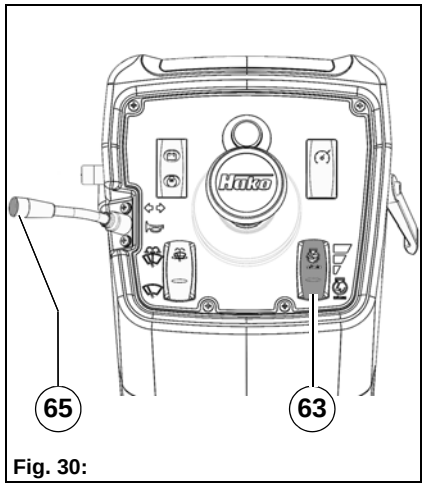


Fig. 30:

Horn

The horn is switched on and off with the button **Fig. 30-65**.

- Push the button: Horn ON
- Release the button: Horn OFF

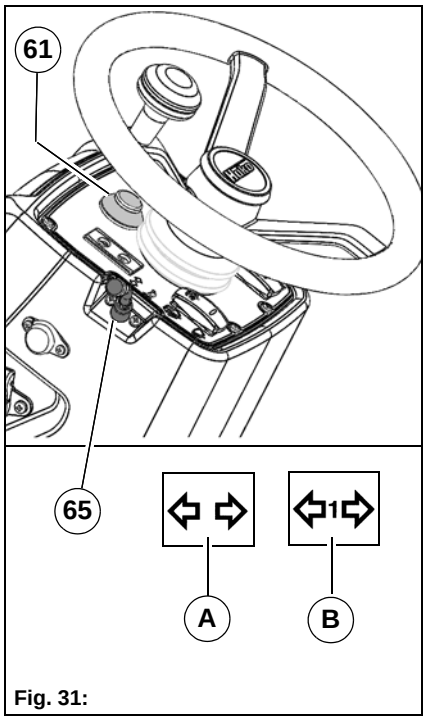


Fig. 31:

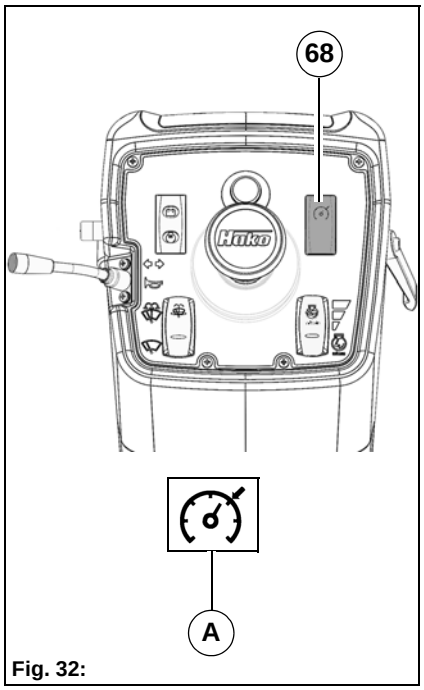


Fig. 32:

Switching the emergency flasher system on and off

The emergency flasher system is switched on and off with the switch **Fig. 31-61**. The direction indicators **Fig. 4-3** and **Fig. 5-17** flash. The emergency flasher system also functions in position P of the ignition switch.

- Switch in stage I: Emergency flasher system OFF
- Switch in stage II: Emergency flasher system ON

The lamps are monitored. Fast flashing signals a defective lamp.

In the multifunctional display, the flasher information symbol **Fig. 31-A** appears, or in trailer operation the trailer operation flasher information symbol **Fig. 31-B**.

Direction indicators

The direction indicators **Fig. 31-65** and **Fig. 4-3** are switched on and off with the switch **Fig. 5-17**. The direction indicators also function in position P of the ignition switch.

- Switch in stage I: Left direction indicator switch ON
- Switch in stage II: Direction indicator switch OFF
- Switch in stage III: Right direction indicator switch ON

The lamps are monitored. Fast flashing signals a defective lamp.

In the multifunctional display, the flasher information symbol **Fig. 31-A** appears, or in trailer operation the trailer operation flasher information symbol **Fig. 31-B**.

Cruise control and speed limiter (optional)

The cruise control and speed limiter is available only in work mode. The current speed is set in the first position of the switch **Fig. 32-68**. In this case the road speed is controlled so that it is not lower or higher than the speed set with the cruise control. The cruise control information symbol **Fig. 32-A** appears in the multifunctional display. The cruise control is switched off again in the neutral position of the switch.

If the driver presses the accelerator pedal, the road speed is increased without the cruise control being deactivated. For reasons of safety, the cruise control switches off immediately when the brake pedal is operated.

The speed limiter determines the maximum road speed with the accelerator pedal pushed down fully. This serves for convenient control of the road speed especially at low working speeds. The speed must be set on the configuration menu. It is activated via the second switch position of the switch **Fig. 32-68**.

⚠	**Danger** Risk of accident! Use the cruise control and the speed limiter only when the traffic situation allows!

Generator control light

The control light of the generator **Fig. 33-66** lights up when the ignition is switched on, but goes out as soon as the engine is started. If the control light goes on when the engine is running, this signals: Defect on the V-belt of the generator or defect in the charge circuit of the generator. The battery is no longer being charged! Immediately stop the vehicle safely and if necessary notify an authorised workshop.

Preheat control light

The preheat control light **Fig. 33-67** lights up with the ignition switched on. The engine is preheated until the control light goes out.

If the preheat control light flashes, the preheat procedure has been interrupted and must be repeated.

If the preheat control light flashes when the key in the ignition switch is in position 1, or during operation slowly or fast, then a fault in the engine control has occurred.

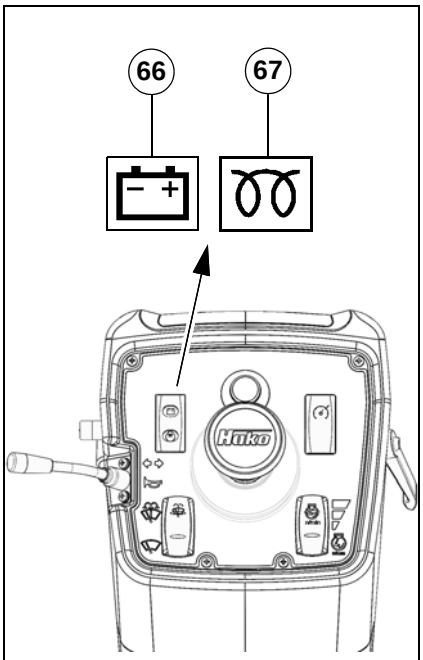


Fig. 33:

Windscreen washer system

The windscreen washer system is used for cleaning the windscreen.

The water sprayed onto the windscreen supports the cleaning effect of the windscreen wipers **Fig. 34-6**.

The windscreen washer system is supplied from the water tank **Fig. 34-34**. Detergents and antifreeze are added to the water as required.

☞	**Note** Do not let the windscreen wipers **Fig. 34-6** wipe over dry windscreens for a longer time. Wiper blades wear prematurely due to this and the wiper motor can overheat! Switch the windscreen wipers off with dry windscreens.

The windscreen wiper motor and the water pump are switched on and off with the switch **Fig. 34-64**.

The switch has three positions:

- Position 1: Functions of the windscreen washer system OFF
- Position 2: Functions of the windscreen washer system ON (continuous mode)
- Position 3 (pressed briefly): Interval operation ON/OFF

Position 3 (pressed longer): Interval operation ON and water pump ON

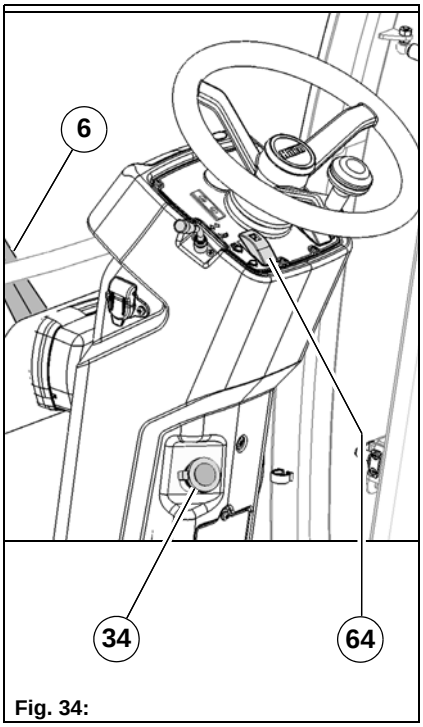


Fig. 34:

2.3.2 Left-hand control panel

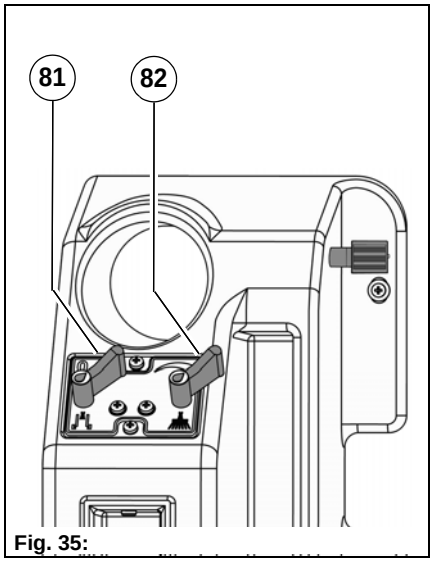


Fig. 35:

Switching on fresh water for the suction mouth

	Note Switch the fresh water pump on in the configuration menu before adjusting the fresh water volume, see page 41.

For binding dust the suction mouth is supplied with water from the circulating water system.
In addition, fresh water can be supplied to the suction mouth as required with the lever **Fig. 35-81** in the left-hand control panel.

	Note Make sure that the ball cock for the circulating water is opened, see page 62.

Setting the fresh water volume for the sweeping unit

The volume of the fresh water at the spray nozzles is set with the lever **Fig. 35-82** in the left-hand control panel. Set the volume corresponding to the requirements.

- Light contamination: Reduce fresh water volume with the lever.
- Heavy contamination: Increase fresh water volume with the lever.

2.3.3 Right-hand control panel

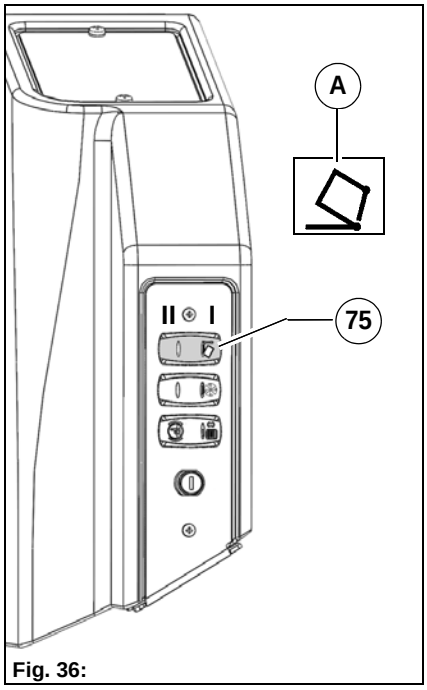


Fig. 36:

Raising and lowering the tipper body

	Danger Danger to life in the danger area of the vehicle! Special caution is required in the area of the raised tipper body.

The following functions on the tipper body are switched on with the button **Fig. 36-75**:

- Button in position **I**: Tipper body is raised until the button is released.
- Button in position **II**: Tipper body is lowered until the button is released.

As long as the tipper body is not in its lower end position, the tipper body raised warning symbol **Fig. 36-A** appears.

	Note For reasons of safety, the road speed is limited when the tipper body is raised (hopper or load platform)! With the tipper body removed, the warning signal and the road speed limitation must be deactivated for normal travel (configuration menu, vehicle settings, see page 41). Each time the button **Fig. 36-75** is pushed, the warning and safety function is switched back on automatically.

Cooling system reversing fan switch (optional)

Should the radiator cover of the cooling system get dirty during sweeping or mowing, it is possible to clean it with the reversing fan. To do this, press the switch **Fig. 37**-**76**. In this way the reversing fan runs for a certain time in the reverse direction.

- The reversing fan runs for approx. 10 seconds when the button is pressed briefly.
- The reversing fan runs for approx. 30 seconds when the button is pressed longer.

The Reversing fan information symbol **Fig. 37-A** appears in the multifunctional display.

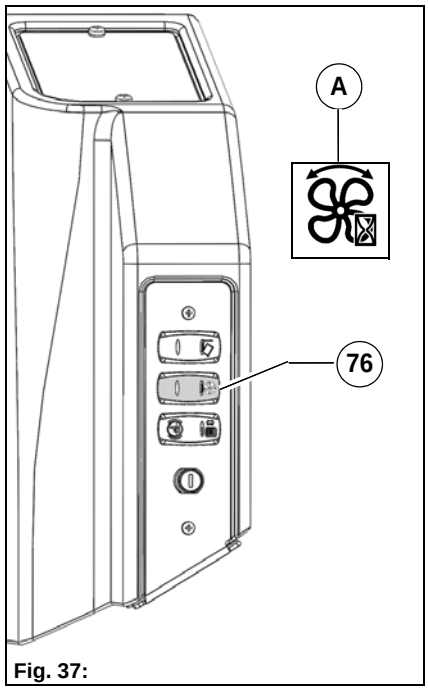


Fig. 37:

Parking brake (electrical) switch

⚠	**Danger** Risk of accident! Adopt measures against erroneous starting and unwanted movement. Operate the parking brake. Switch the engine off and pull out the ignition key.

The parking brake **Fig. 38-77** prevents the vehicle from rolling away. If the vehicle still moves, activation of the parking brake is not possible.

Holding the vehicle with the parking brake:

- Push the brake pedal **Fig. 38-45**.
- Unlock the parking brake and press the switch **Fig. 38-77**.
- The warning symbol **Fig. 38-A** appears in the multifunctional display.
- If the accelerator pedal is deflected with the parking brake locked, a warning signal sounds.

Releasing the parking brake:

- Press the switch **Fig. 38-77**. The parking brake is released again.

With the parking brake released the warning light **Fig. 38-A** goes out.

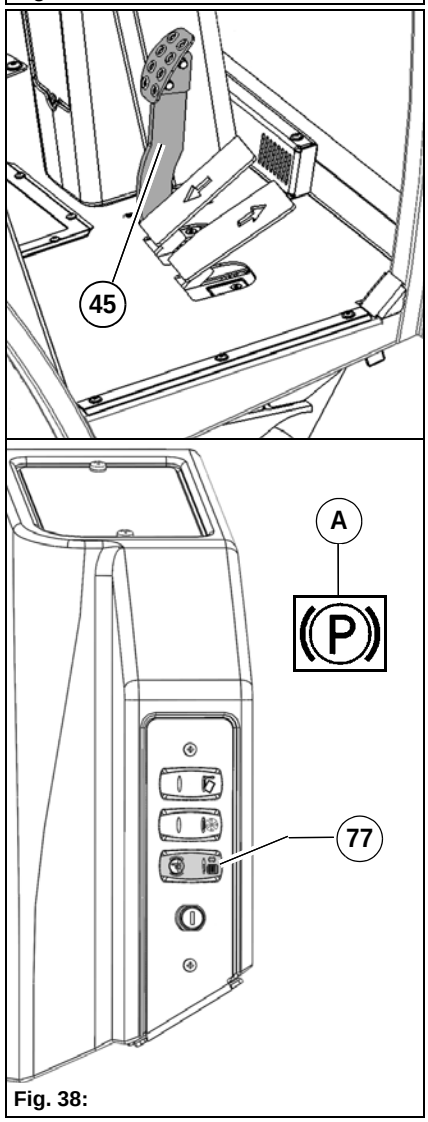


Fig. 38:

Ignition switch

Warning

- If the engine oil pressure symbol **Fig. 39-A** in the multifunctional display lights up with the engine running, there is a risk of engine damage! Stop the vehicle in the safe range. Turn the engine off immediately and check the oil level. Have the cause of the inadequate engine oil pressure removed.

Note

- The engine can be started only if the accelerator pedals **Fig. 6-36** and **Fig. 6-37** are in neutral position.
- The ignition switch **Fig. 8-78** has a start repeating interlock. Switch back to position 0 for a further start.
- Do not repeat the starting procedure more than 3 times, then let the starter cool down.
- After starting the cold engine, let it warm up with slightly increased idling speed.
- At temperatures below 10 °C, the engine speed is electronically limited to prevent damage to the hydraulic system. Above 10 °C the permissible engine speed is increased linearly up to 30 °C. Above 30 °C hydraulic oil temperature, the maximum engine speed is available.
- Do not actuate the accelerator pedal during the starting procedure!

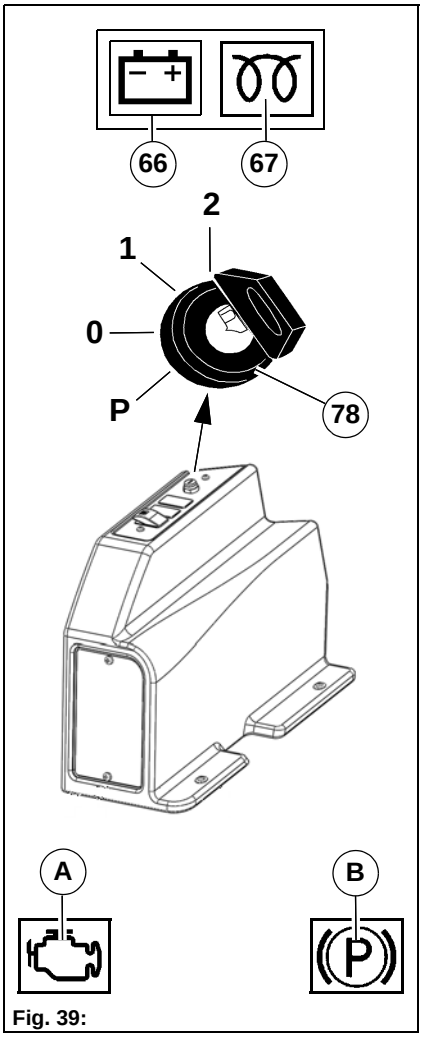


Fig. 39:

The ignition switch **Fig. 8-78** is used for starting the engine and for switching the electrical system on and off.

- Position P: The emergency flasher light, side lights, beacon, number plate light, rear fog light (optional) and interior light are functioning. The key can be pulled out. Position P can be reached from position 0. Push the key down and then turn it to the left.
- Position 0: The emergency flashing light is functioning. The electrical system and the engine are switched off. The key can be pulled out.
- Position 1: The electrical system and the engine are switched on.
  - The parking brake warning symbol **Fig. 39-B** in the multifunctional display may light up.
  - The generator control light **Fig. 41-66** lights up briefly and goes out after the engine has started and has sufficient engine speed.
  - The preheat control light **Fig. 41-67** lights up, the engine is preheated until the control light goes out.
- Position 2: Start the engine.
  - The parking brake warning light may light up.
  - Warning lights must go out.
    - If the preheat control light flashes when the key in the ignition switch is in position 1, or during operation slowly or fast, then a fault in the engine control has occurred. Refer to troubleshooting on page 77 or contact an authorised Hako dealer.
    - If a service information is displayed in the multifunctional display with a flashing wrench then there is an error. Refer to trouble-shooting on page 77 or contact an authorised Hako dealer.
  - The ignition switch goes back into position 1.

2.3.4 Arm rest control panel

Hako button

The Hako button **Fig. 40-72** switches from transport mode to work mode or vice versa and starts automated procedures according to the attachment.

The accelerator pedals must be in the neutral position.

In the multifunctional display, the transport mode **Fig. 40-A**, or front tool carrier symbol **Fig. 40-B** appears.

The vehicle speed is in the:

- transport mode is 0 to 40 km/h
- work mode is 16/20/24 km/h according to selected engine speed

You will find the functional description of the Hako button for attachments in chapter 6.

Joystick

The front tools are operated with the joystick **Fig. 40-70** and the joystick **Fig. 40-71**.

The joystick **Fig. 40-70** acts on the front tool carrier **Fig. 40-12** and on the hydraulic connections **Fig. 40-11A**.

- Joystick forwards: Lowering front tool carrier (floating position)
- Joystick back: Raising front tool carrier
- Joystick to the left: the left-hand actuator swings to the left
- Joystick to the right: the left-hand actuator swings to the right

In the multifunctional display, the upper stop information symbol **Fig. 40-C** or floating position symbol **Fig. 40-D** appears.

The joystick **Fig. 40-71** acts on the hydraulic connections **Fig. 40-11B**.

- Joystick to the left: The right-hand actuator swings to the left
- Joystick to the right: The right-hand actuator swings to the right

⚠	**Note** • For reasons of safety, lowering the front tool carrier with the vehicle moving is possible only in the work mode. In the transport mode, the front tool carrier can be lowered only at a road speed of <5 km/h. • If the front tool does not have to be lowered completely, interrupt the lowering movement by briefly pulling the joystick back. • If the movement of the front tool does not agree with the movement of the joystick, change over the hydraulic connections.

Turn-push knob

The turn-push knob **Fig. 40-69** is located in the right armrest of the driver's seat. Menus and submenus are selected in the multifunctional display and the individual menu item values are set or changed with the turn-push knob, see page 34.

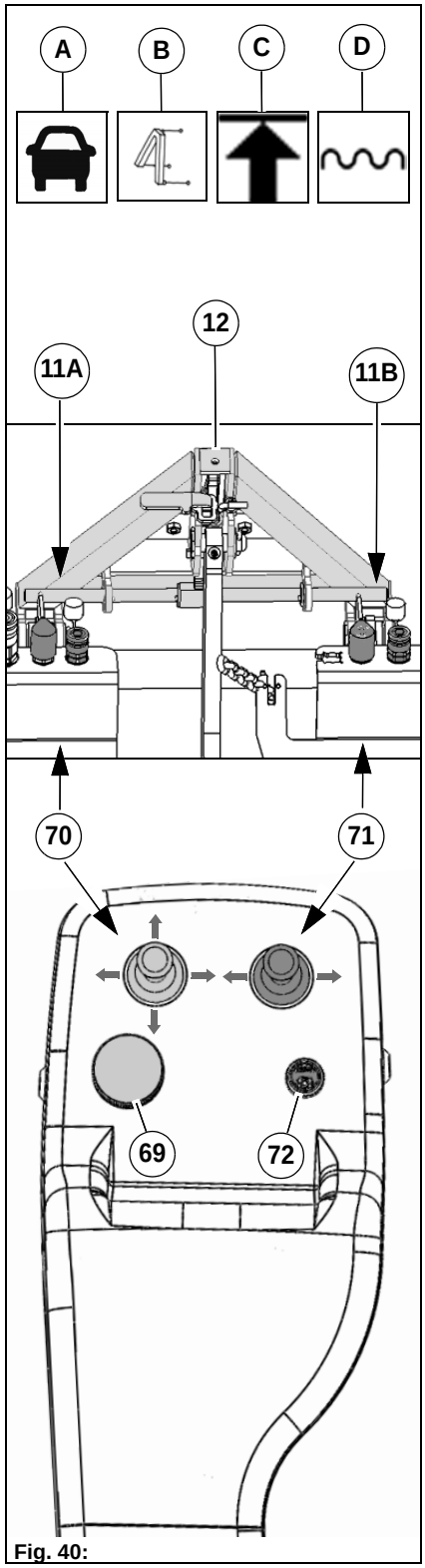


Fig. 40:

2.3.5 Roof control panel

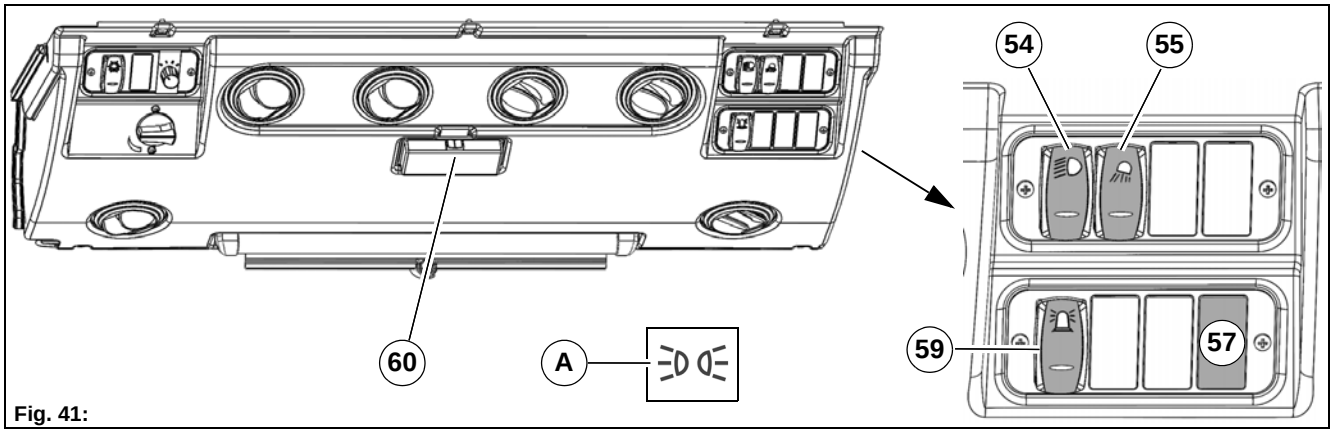


Fig. 41:

Working spotlight
The switch **Fig. 41-55** switches the working spotlights **Fig. 4-13** (or additional working spotlight **Fig. 4-2**) in the work area on and off.
- Switch in stage I: Working spotlights OFF
- Switch in stage II: Working spotlights (series) ON
- Switch in stage III: Additional working spotlights (optional) ON

Head light and side lights
The switch **Fig. 41-54** switches the head light **Fig. 4-14**, the side lights **Fig. 4-3** and the number plate light **Fig. 5-18** on and off. The side lights also function in position P of the ignition switch.
- Switch in stage I: Head light and side lights OFF
- Switch in stage II: Side lights ON
- Switch in stage III: Head light and side lights ON

With the multifunctional display switched on, the head light and side lights information symbol **Fig. 41-**A appears.

Beacon
The beacon **Fig. 41-59** is switched on and off with the switch **Fig. 4-4**. The beacon also functions in position P of the ignition switch.
- Switch in stage I: Beacon OFF
- Switch in stage II: Beacon ON

Interior lighting
The interior lighting is switched on and off with the switch **Fig. 41-60**.
- Switch in stage I: Interior lighting OFF
- Switch in stage II: Interior lighting ON

Outside mirror heating (optional)
The switch **Fig. 41-57** switches the optional outside mirror heating on and off.
- Switch in stage I: Outside mirror heating OFF
- Switch in stage II: Outside mirror heating ON

2.3.6 Accelerator pedal

Accelerator pedal for forwards and reverse

The accelerator pedals **Fig. 42-36** for forwards **Fig. 42-37** and for reverse are used for continuously changing the road speed. Push the accelerator pedal down to increase the driving speed. If you release the accelerator pedal, it goes back automatically to zero position, the vehicle stops. The warning symbol **Fig. 42-A** appears in the multifunctional display.

In forwards gear up to a speed of approx. 15 km/h the vehicle is in speed level 1, The warning symbol **Fig. 42-B** appears in the multifunctional display.

If the temperature of the hydraulic oil is below 15 °C, the vehicle remains in speed level 1 and the information symbol flashes.

Above a speed of approx. 20 km/h the vehicle is in speed level 2 **Fig. 42-C**.

This can be delayed depending on the acceleration and the load. In this case the information symbol flashes.

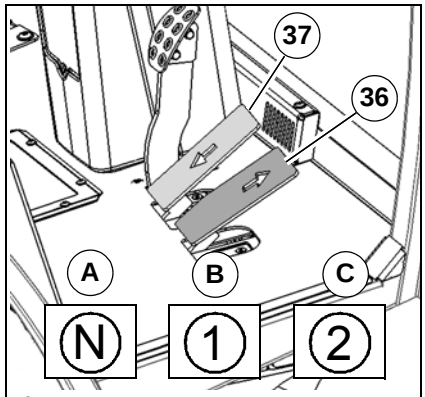


Fig. 42:

2.3.7 Brake

When the accelerator pedal is released (forwards or reverse) the vehicle comes to a stop because of the hydrostatic braking effect. If this braking effect is not sufficient, the brake **Fig. 43-45** must be applied in addition.

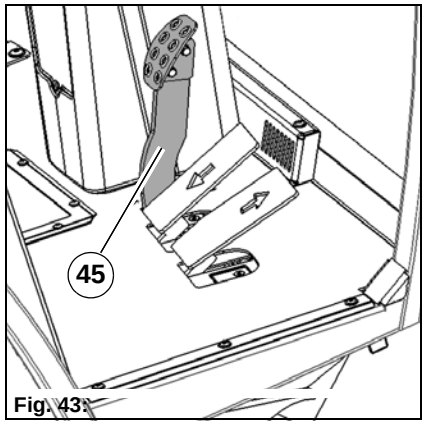


Fig. 43:

2.3.8 Coarse material flap

Operating the coarse material flap

If there are larger objects or coarse dirt (cans, bottles, leaves, etc.) in front of the suction mouth, you can open the coarse material flap on the suction mouth by pressing down on the pedal **Fig. 44-46**.

The pedal can be locked by shifting it to the right when it is operated.

Pushing and shifting the pedal to the left with your foot will unlock it.

☞	**Note** • The coarse material flap pedal **Fig. 44-46** cannot be operated with the suction mouth raised! • The coarse material flap must be closed again after picking up the coarse material. Fine sand is not taken up if the coarse material flap is open.

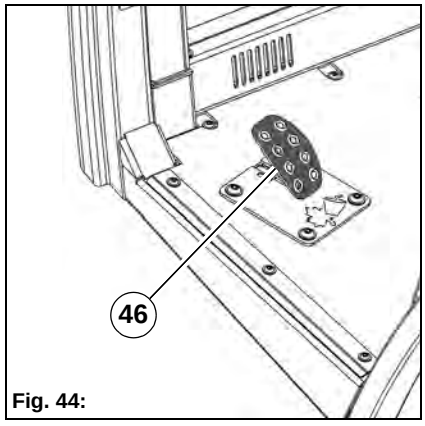


Fig. 44:

2.3.9 Driver's seat

The driver's seat **Fig. 45**-**44** is air-cushioned. To reach the controls easily, the right armrest, height and longitudinal setting can be adjusted.
If the driver leaves the driver's seat during operation, then the driver's seat warning symbol **Fig. 45-A** in the multifunctional display flashes. The warning symbol goes out as soon as the driver is back on the driver's seat.

Danger
- Risk of accident! Adjust the driver's seat only when the vehicle is stationary. You will otherwise be diverted from the traffic and could lose control over the vehicle by moving the seat. You could cause an accident by this.

Warning
- For reasons of safety, the vehicle is equipped with a seat contact switch and the function of the seat contact switch must not be bypassed.

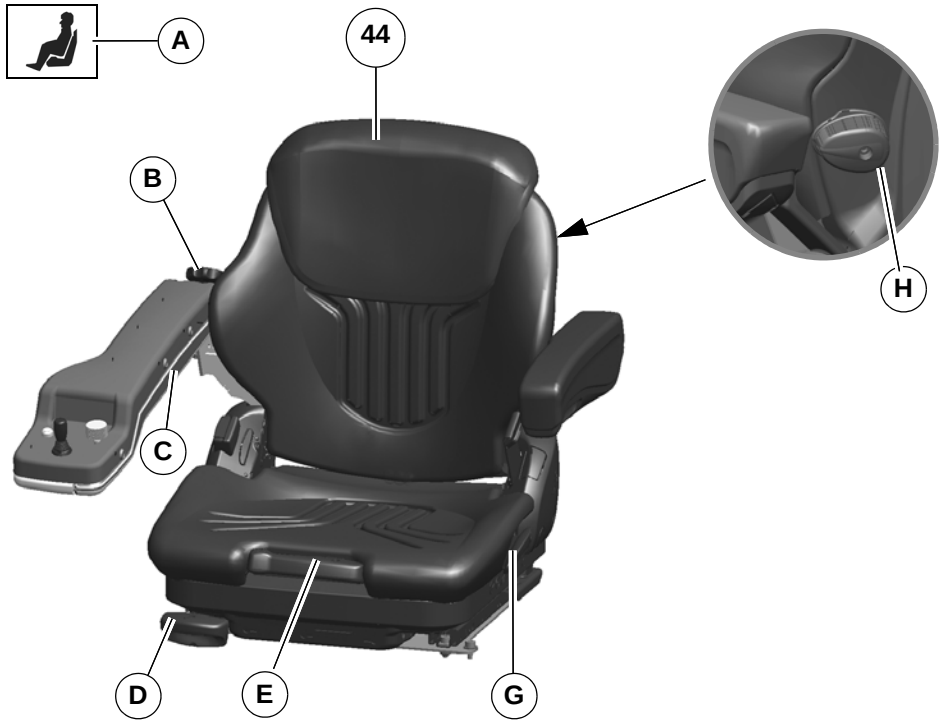


Fig. 45:

Adjusting the armrest

The armrest can be folded and its inclination can be adjusted. Turn the wheel **Fig. 45-B** to adjust the inclination. The right armrest can be unlocked with the lever **Fig. 45-C**.

Lever for longitudinal adjustment

Adjust the seat in the longitudinal direction with the lever **Fig. 45-D**.

- Pull lever up = seat unlocked. Set the seat forwards or backwards.
- Let the lever snap back after the adjustment.

Weight adjustment

For optimum suspension, the driver's seat must be adjusted to the weight of the driver with the knob **Fig. 45-E**.

- Pull knob up = increase driver's weight
- Pull knob down = decrease driver's weight

The suspension is adjusted optimally if the indicator is in the middle.

Backrest adjustment

Adjust the backrest with the lever **Fig. 45-G**. You should be on the driver's seat for the adjustment.

- Pull the lever up with your left hand.
- Move the backrest back (inclined position) by leaning your upper body back.
- Move the backrest forwards (vertically) by leaning your upper body forwards.
- Let the lever go when you have reached the optimum position of the backrest, the lever then snaps back into the desired position.

Spine support adjustment

Turn the wheel **Fig. 45-H** of the backrest to adjust the spine support.

2.3.10 Seat belt

The seat belt **Fig. 46-41** serves for the safety of the driver. The seat belt assures complete freedom of movement when pulled slowly. However, it is blocked in sudden braking. The seat belt can also be blocked when driving over potholes or other bumps in the road.

⚠	**Danger** Risk of accident! A dirty, damaged seat belt or one stressed or changed in an accident may not offer the intended protection. You could therefore suffer severe injuries or death in an accident. Please check regularly that the seat belts are not damaged and not contaminated. Always have damaged seat belts or those stressed in an accident renewed by an authorised workshop.

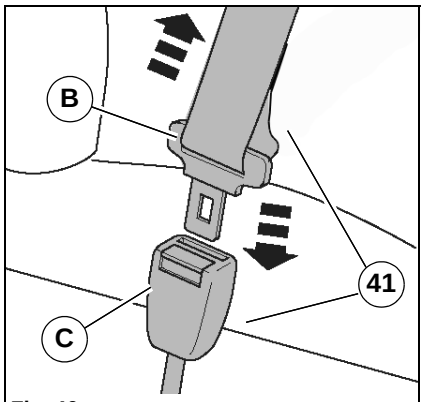


Fig. 46:

Putting seat belts on and off

Insert the buckle latch **Fig. 46-B** into the belt buckle **Fig. 46-C** until it snaps in audibly (check by pulling). Tension the seat belt by pulling on the end. The seat belt must always lie firmly against your pelvis.

Make sure you are sitting upright and the belt runs correctly!

To take off the seat belt hold it firmly and press the red button on the belt buckle **Fig. 46-C**. Guide the seat belt slowly up to the reel.

2.3.11 Cab heating

⚠	**Danger** Risk of accident! Good viewing conditions contributing to traffic safety are guaranteed only if all windows are free of ice, snow and condensation. Make yourself familiar with the correct operation of the heating and ventilation system as well as de-moisturising/defrosting the windows. Maximum heating power and fast thawing of the windows can be achieved only if the engine has reached its operating temperature.

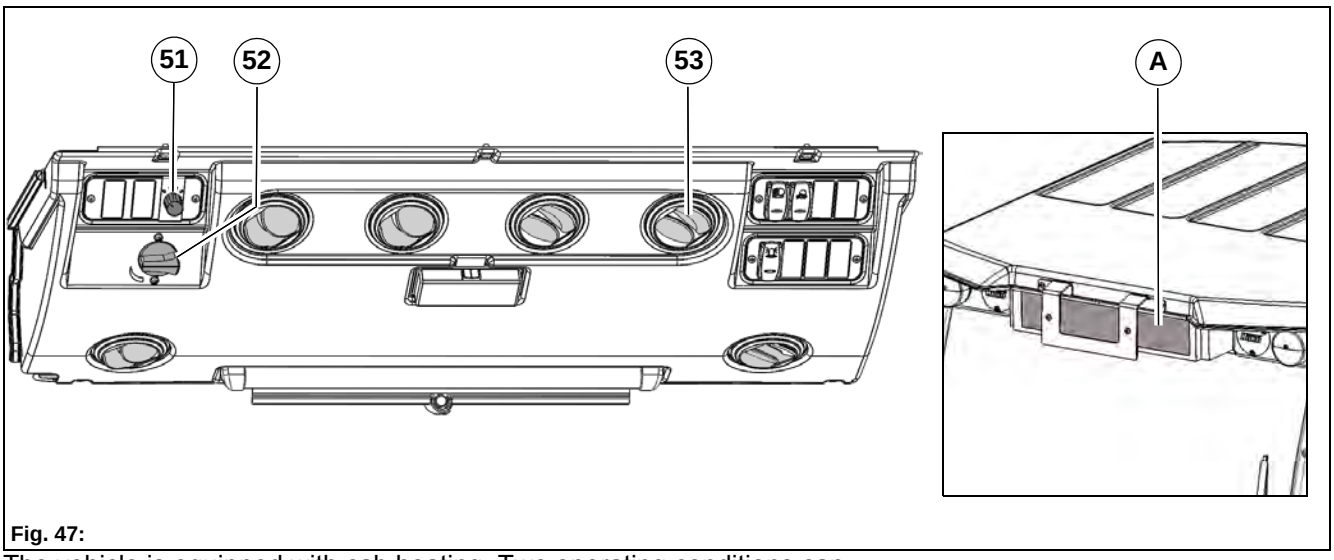


Fig. 47:

The vehicle is equipped with cab heating. Two operating conditions can be selected with the cab heating:

- Ventilation
- Heating

The air flow is transported by a 3-stage suction fan to the air vents **Fig. 47-53** of the windscreen and through the air vents **Fig. 6-47** of the foot well into the driver's cab.

Adjusting the ventilation

The ventilation is set with the controller **Fig. 47-51**.

- Controller in position 0: Suction fan OFF
- Controller in position 1: Suction fan runs in stage 1
- Controller in position 2: Suction fan runs in stage 2
- Controller in position 3: Suction fan runs in stage 3

Setting the temperature

The temperature is set with the controller **Fig. 47-52**.

- Setting warmer: Turn the controller counter-clockwise
- Setting colder: Turn the controller clockwise

Cab air filter

The installed cab air filter **Fig. 47-A**, which is located beneath the number plate holder **Fig. 4-15**, filters out largely dust and pollen. A clogged filter reduces the air supply into the vehicle interior. Therefore please observe the filter changing intervals, see page 90.

2.3.12 Air conditioning system

⚠	**Danger** Risk of injury! The coolant in the air conditioning system is under high pressure. Do not open any parts of the air conditioning system. Have maintenance work on the air conditioning system done only by authorised workshops.

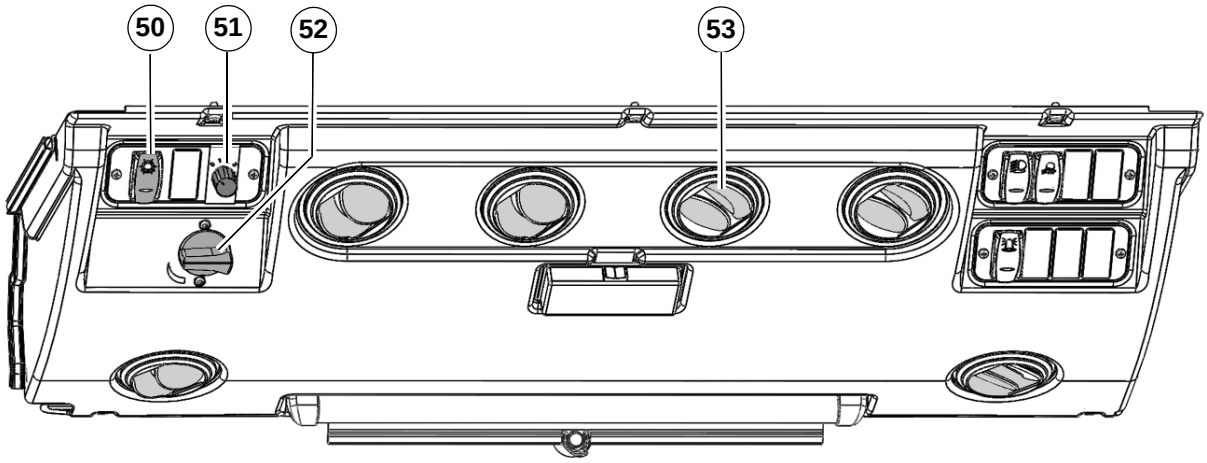


Fig. 48:

The air conditioning system regulates the temperature and humidity of the vehicle interior and filters unwanted substances out from the air.

The air conditioning system is operational only when the engine is running. It functions optimally only if the side windows are closed.

The air flow is transported by a 3-stage suction fan to the air vents **Fig. 48-53** of the windscreen and through the air vents **Fig. 6-47** of the foot well into the driver's cab.

In warm weather ventilate the vehicle for a short time only. In this way you accelerate the cooling process and the desired vehicle interior temperature is reached faster.

Observe the recommended setting, otherwise the windows can mist over. Switch the air conditioning off only briefly and the circulating air on only briefly.

Switching the air conditioning on

- Switch the air conditioning on with the switch **Fig. 48-50**. The control light on the switch goes on.
- Set the air supply on the controller **Fig. 48-51**.
- Set the temperature with the controller **Fig. 48-52** to 18 °C to 22 °C.

2.3.13 Doors

Danger
- There is a risk of accidents when driving with open doors **Fig. 49-7**! The doors must remain closed when driving on public roads and when working.
- The outside mirrors **Fig. 47-5** image reduced in size. The visible objects are closer than they appear. Thus you can incorrectly estimate the distance from road users driving behind you, e.g. when changing lanes. There is a risk of accidents! Therefore check the actual distance from road users driving behind you by glancing over your shoulder.

Opening doors from the outside
To open the doors **Fig. 49-7** insert the key in the door lock **Fig. 49-A**, turn it counter-clockwise and push it.

Opening doors from the inside
To open the doors pull the lever **Fig. 49-B** upwards.

Adjusting the side windows
The left and right side windows are opened or closed with the catches **Fig. 49-C**. Push the catch up and move the window correspondingly.

Outside mirrors
You have an extended field of view due to the convex outside mirrors **Fig. 49-5**.

Adjusting the outside mirrors
Adjust the outside mirrors so that the roadway and the rear work area are completely visible.
The outside mirrors can be folded down.

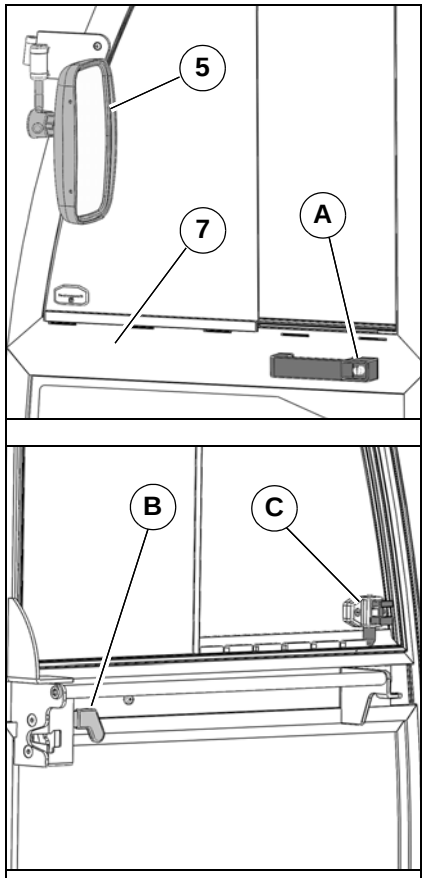


Fig. 49:

2.4 Operating equipment of the vehicle

2.4.1 Auxiliary tool

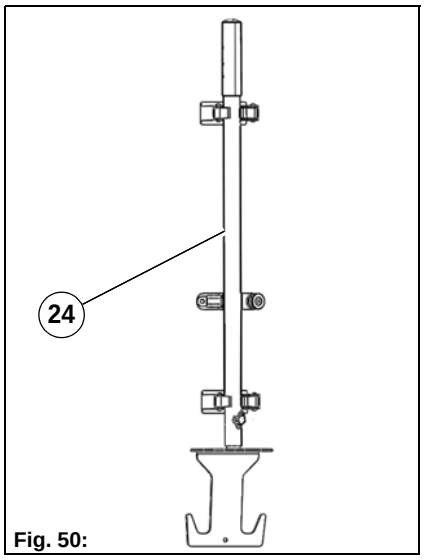


Fig. 50:

The auxiliary tool **Fig. 50-24** is located on the driver's cab at the rear on the right. This auxiliary tool has the following functions:

- For mounting the suction mouth, see page 120.
- For removing coarse dirt from the suction mouth and suction duct, see page 144.
- For cleaning the dirt hopper, e.g. if leaves clog up the sieves, see page 145.
- As lever for the hand pump of the rear structure (optional). For raising the dirt hopper/loading platform in the case of an engine failure.
- For releasing the parking brake on the rear axle.

2.4.2 Ball cock circulating water

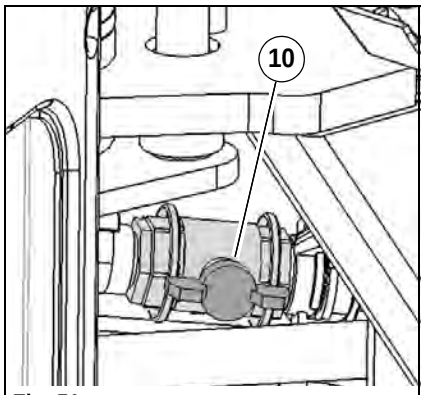


Fig. 51:

The circulating water is closed off only with the ball cock **Fig. 51-10** for maintenance purposes. In normal operation the ball cock must be opened!

- Circulating water supply opened: Ball cock in flow direction
- Circulating water supply closed: Ball cock at right angles to the flow direction

	Note Close off the circulating water supply only if there is circulating water in the dirt hopper and the suction mouth should be mounted or dismounted, see page 120.

2.4.3 Front tool carrier

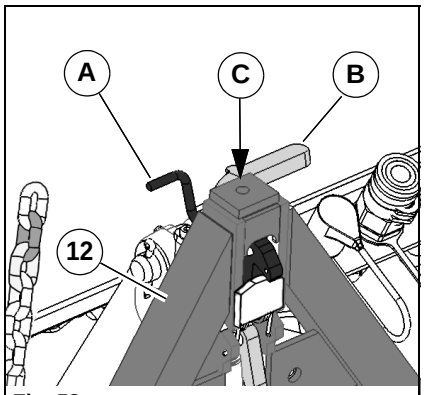


Fig. 52:

The front tool carrier **Fig. 52-12** is used for holding an attachment.

	Danger Risk of accident! Front attachments not correctly fastened to the front tool carrier can drop down while driving. Always secure the front attachment with the locking devices **Fig. 52-A and B**. Always secure non-Hako tools with the locking device **Fig. 52-C**.

Taking up and securing the front tool

1 Drive the vehicle up to the attachment and lower the front tool carrier with the joystick **Fig. 53-70**.
2. Bring the locking hook **Fig. 53-A** into the rear position and the lever **Fig. 53-B** into the upper position **(II)**. Pick up the chain **Fig. 53-C** and hook in onto the hook **Fig. 53-E**.
3. Drive under the take-up of the attachment and carefully raise the attachment with the joystick **Fig. 53-70**. Raising the front tool carrier is interrupted if the driver leaves the driver's seat.
4. Bring the locking hook into the front position and the lever into the lower position **(I)**.
5. Adjusting the movement limiter of the front tool carrier:
   - For sweeping hook the chain **Fig. 53-C** onto the holder **Fig. 53-D**. Observe the hooking point **Fig. 53-G**!
   - For attachments with floating position the chain must be hooked onto the hook **Fig. 53-E**! (parking position)
6. Check the locking plate **Fig. 53-F** on the attachment. If necessary, loosen the screws and shift the locking plate.

The position of the front tool carrier is shown in the multifunctional display.

- Upper end position **Fig. 53-X1**
- Floating position **Fig. 53-X2**
- Lowered and fixed **Fig. 53-X3**

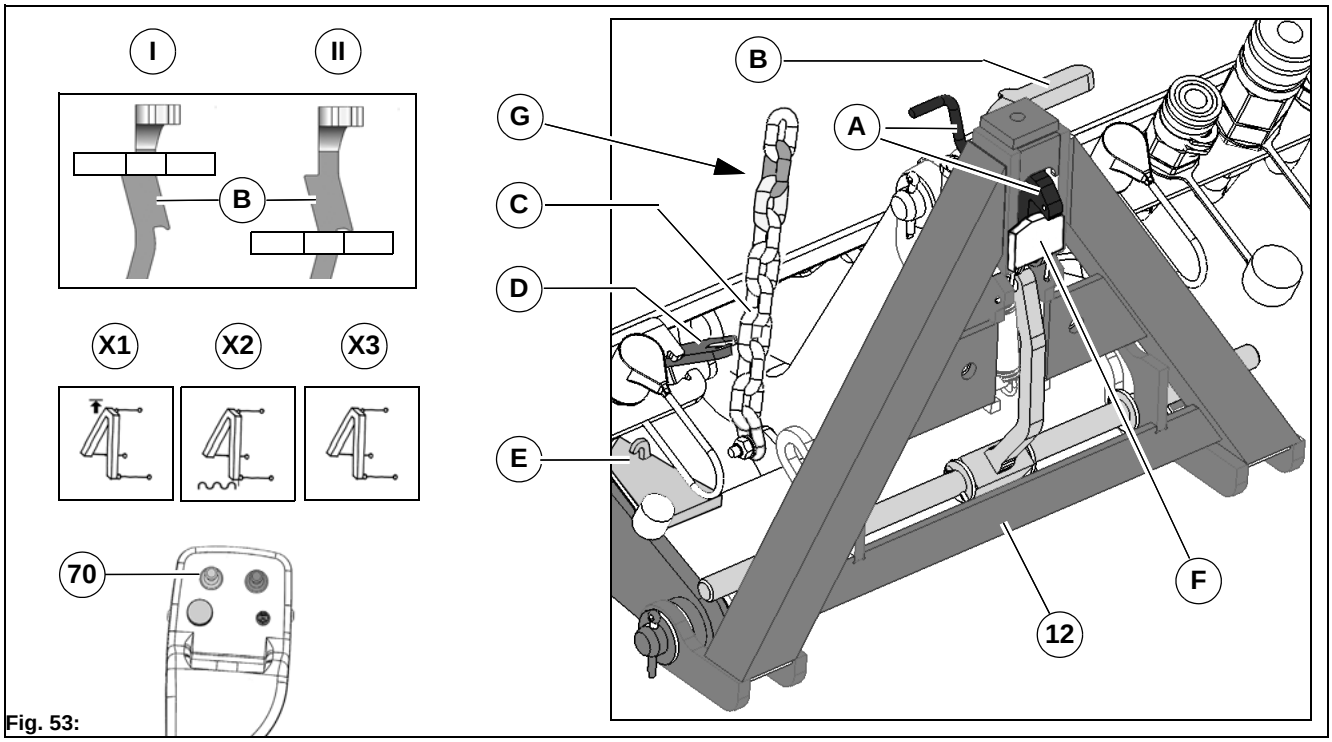


Fig. 53:

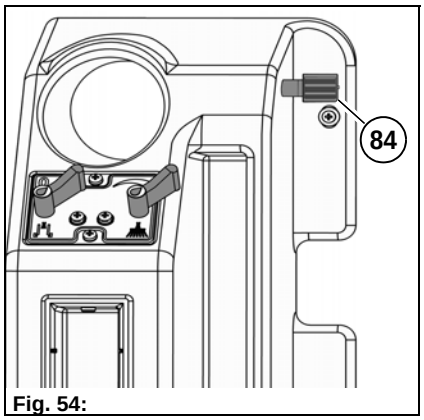


Fig. 54:

Adjusting the lowering valve

The lowering valve **Fig. 55-84** is used to adjust the lowering speed of the front tool carrier.

- Turn the lowering valve clockwise = lowering speed lower
- Turn the lowering valve counter-clockwise = lowering speed higher

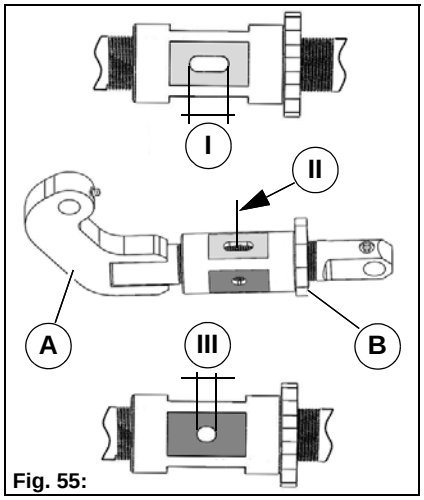


Fig. 55:

Adjustable upper link (optional)

The adjustable upper link **Fig. 55-A** is provided for the fine adjustment of attachments and for simplified take-up of attachments with conventional A-frames type 0. Loosen the nut **Fig. 55-B** and adjust the middle section with a suitable tool to the required length. Then secure with the nut **Fig. 55-B**.

- Turn the middle section clockwise = the front tool carrier inclines to the front
- Turn the middle section counter-clockwise = the front tool carrier inclines to the back

Maximum **(I)**: The spindle touches the edges of the long elongated hole.
Minimum **(II)**: both spindles are flush
Standard length **(III)**: The spindle touches the edges of the short elongated hole.

	Note When the sweeping system is used, adjustment to position III **Fig. 55** is required for correct operation of the sweeping unit.

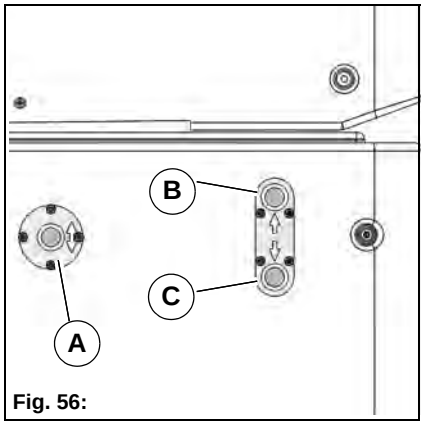


Fig. 56:

Lift system tipper body (optional)

With the optional lift system tipper body, additional controls for raising or lowering the tipper body are located on the left side of the rear wagon.

	Danger Risk of crushing! When carrying out work on the tipper body, always operate the controls in two-handed operation.

- Raise tipper body: Press the button **Fig. 56-A** and the button **Fig. 56-B** simultaneously
- Lower tipper body: Press the button **Fig. 56-A** and the button **Fig. 56-C** simultaneously

2.4.4 Connections for front attachments

The following devices can be operated with the connections for the front attachments **Fig. 57-12**:

- **X63** = 19-pin socket for front attachments
- **A** = supply/LS for optional 3-brush system
- **B** = water connection for sweeping unit spray nozzles
- **C** = supply/return right-hand actuator
- **D** = supply/return left-hand actuator
- **E** = return leakage oil pipe (e.g. for front mower)
- **F** = supply/return maximum 70 litres/min (hydraulic circuit I)
  Setting the output, see page 66.
- **G** = ball cock for the suction mouth lift system:
  - Vacuum sweeping system: Suction mouth lift system can be moved freely, open the ball cock
  - Mowing system: Bring the suction mouth lift system into the upper position and close the ball cock
  - Sweeping system: Bring the suction mouth lift system into the upper position and close the ball cock
  - Snow clearing system: Bring the suction mouth lift system into the upper position and close the ball cock
  - Transport system: Bring the suction mouth lift system into the upper position and close the ball cock
  - Wet cleaning system: Suction mouth lift system can be moved freely, open the ball cock

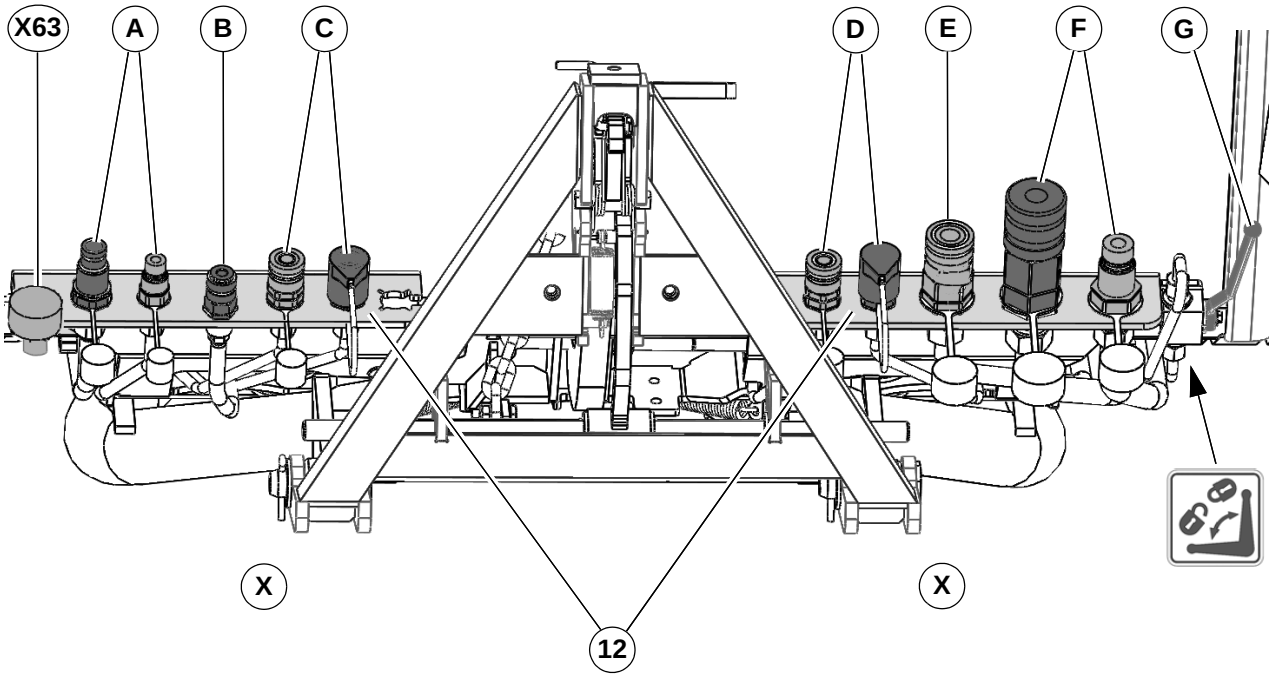


Fig. 57:

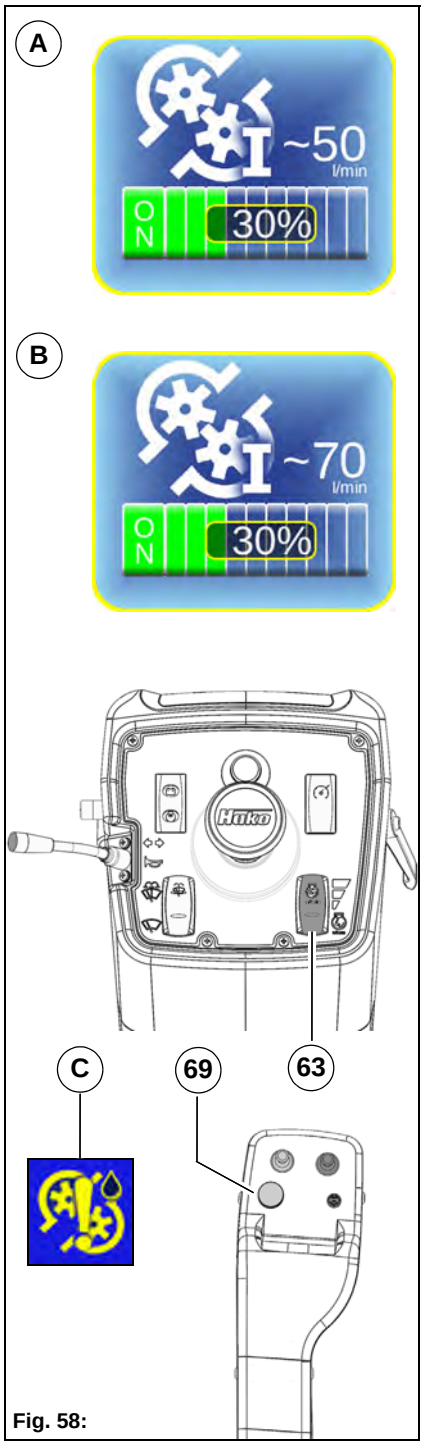


Fig. 58:

Output setting for hydraulic circuit I

The maximum delivery of hydraulic circuit I is determined by the coding plugs on the attachment. Two selectable oil flows with a maximum flow of 50 l/min (**Fig. 58-A**) or 70 l/min (**Fig. 58-B**) are available for attachments without coding plugs. The adjustment is made on the configuration menu, see page 41.

In the working menu, the hydraulic circuit I **Fig. 58-A** is activated and set to the required value with the turn-push knob **Fig. 58-69**. Setting range: OFF/ON or 0 to 100 % In the setting to 70 l/min the adjustment process stops initially at 70 % (corresponds to 50 l/min setting), but can be continued by renewed turning of **Fig. 58-69** up to 100 % (70 l/min).

⚠	**Danger** Risk of injury! Make sure that the attachments are suitable for the set oil volume. An oil volume set too high can lead to injuries due to a defect of the attachment! As a reminder, the setting process is interrupted briefly at 70 %.

☞	**Note** The hydraulic circuit I is switched off if the driver leaves the driver's seat. The driver switches the hydraulic circuit I back on with **Fig. 58-69** after returning to the driver's seat. In connection with the sweeping unit and the universal hopper, the brush is restarted by pushing the left joystick to the front!

☞	**Note** The delivery of hydraulic circuit I depends to a large extent on the engine speed set on the tip switch **Fig. 58-63**. Select the ECO mode as often as possible in the sense of the most energy-saving operation of the vehicle. If the oil flow requested by **Fig. 58-69** does not reach the set value, then the warning **Fig. 58-C** appears in the multifunctional display. Cancel the adjustment or increase the engine speed until the warning symbol goes out. Also increase the engine speed if you require additional power for driving (e.g. driving uphill or propulsion work in winter service). If the additional power requirement is no longer required, reduce the power step by step.

2.4.5 Connections for rear attachments

The following devices can be operated with the connections for the rear attachments **Fig. 59-19**:

- **X64** = 7-pin socket for rear attachments
- **A** = supply/return maximum 35 litres/min (hydraulic circuit II)
  Setting the output, see page 68.
- **B** = supply/return for lift system hydraulic cylinder
- **C** = dirt hopper circulating water
- **D** = fresh water for high-pressure cleaner (optional)
- **X65** = 7-pin socket for lights
- **X68** = 7-pin socket for spreader control cable
- **X67** = 7-pin socket for spreader control cable

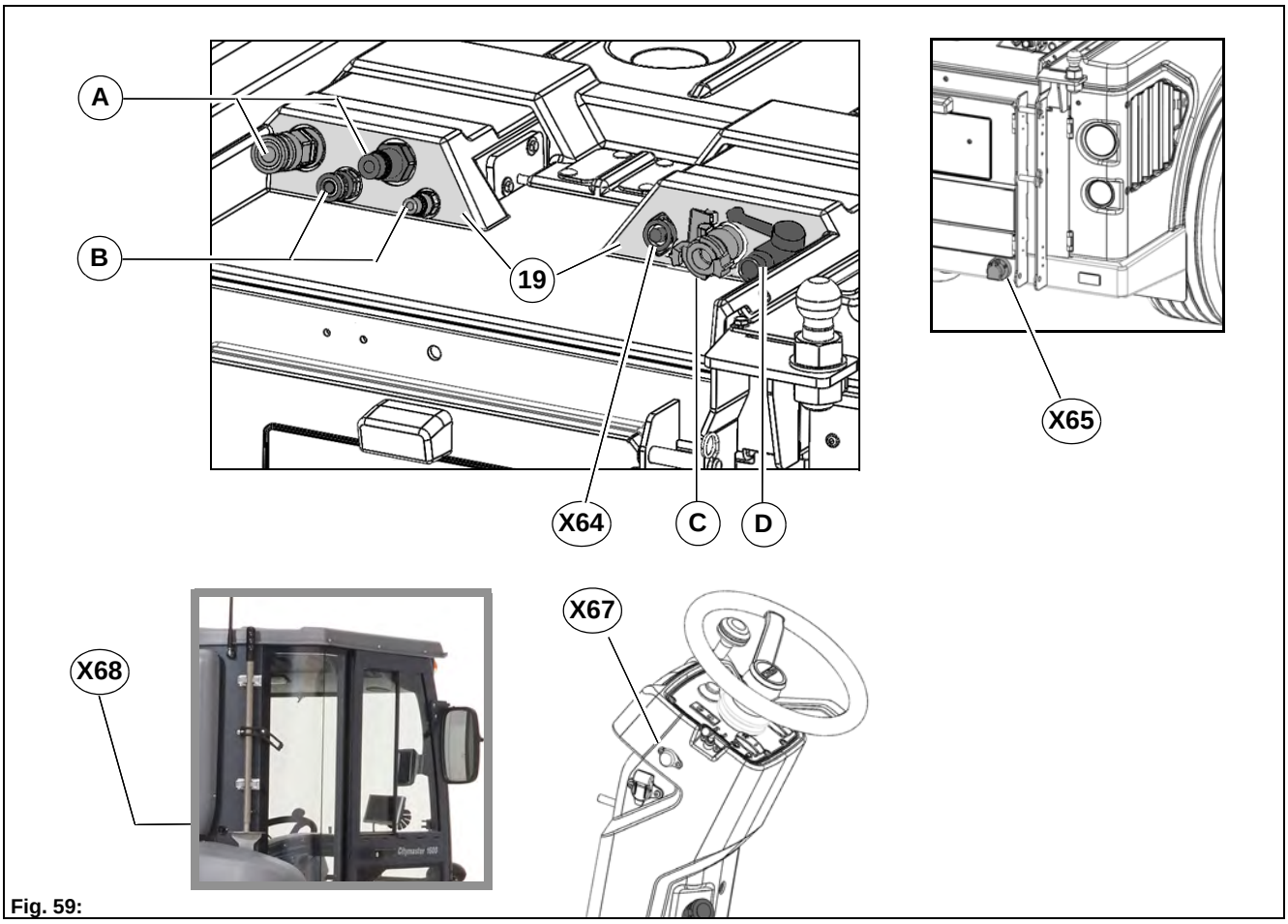


Fig. 59:

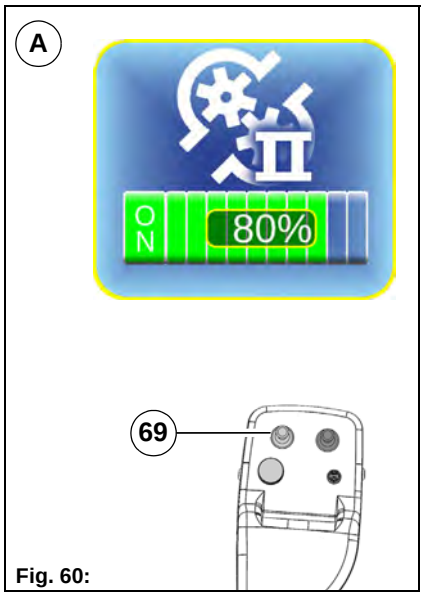


Fig. 60:

Output setting for hydraulic circuit II

The delivery of hydraulic circuit II is in the range between 0 and 32 l/min. In the working menu, the hydraulic circuit II **Fig. 58-A** is activated and set to the required value with the turn-push knob **Fig. 60-69**. Setting range: OFF/ON or 0 to 100 %

When the vehicle is used with the sweeping unit and the dirt hopper, the power range is set automatically with the coding plugs. The maximum suction power is reached only at standard speed. Operation in the ECO mode ensures noise and consumption-optimised operation of the sweeping machine.

⚠	**Danger** Risk of injury! Make sure that the attachments are suitable for the set oil volume. An oil volume set too high can lead to injuries due to a defect of the attachment!

☞	**Note** The hydraulic circuit II is switched off if the driver leaves the driver's seat. Restarting by **Fig. 60-69** is also possible without the operator on the driver's seat. The driver switches the hydraulic circuit I back on with **Fig. 60-69** after returning to the driver's seat. In connection with the sweeping unit and the dirt hopper, hydraulic circuit II remains in operation even when the driver's seat is left (operation of hand suction hose and high-pressure cleaner possible).

☞	**Note** Note that attachments driven on hydraulic circuit II without the presence of the operator at the workplace (driver's seat) can possibly lead to danger to the operator and third parties. Observe the safety instructions and danger warnings for the corresponding attachment. Secure the vehicle by operating the parking brake.

3 Starting up

3.1 Instruction

Instruction is required before the first start-up.
The first-time instruction of the Citymaster 1600 may be provided only by a specialist of your authorised Hako dealer.
This person will be notified immediately after delivery of the vehicle from the factory and will contact you to make an instruction appointment.

3.2 Before start-up of the vehicle

⚠	**Danger** • Risk of accident! If the steering column is unlocked while driving, it can come unexpectedly out of adjustment. You can then lose control over the vehicle. • Risk of accident! Adjust the driver's seat only when the vehicle is stationary. You will otherwise be diverted from the traffic and could lose control over the vehicle by moving the seat. You could cause an accident by this. • Risk of accident! A dirty, damaged seat belt or one stressed or changed in an accident may not offer the intended protection. You could therefore suffer severe injuries or death in an accident. Please check regularly that the seat belts are not damaged and not contaminated. Always have damaged seat belts or those stressed in an accident renewed by an authorised workshop. • Risk of accident! Good viewing conditions contributing to traffic safety are guaranteed only if all windows are free of ice, snow and condensation. Make yourself familiar with the correct operation of the heating and ventilation system as well as de-moisturising/defrosting the windows. Maximum heating power and fast thawing of the windows can be achieved only if the engine has reached its operating temperature. • There is a risk of accidents when driving with open doors! The doors must remain closed when driving on public roads and when working.
⚠	**Warning** • Check the vehicle for its correct condition and operating safety before using it. The vehicle must not be used if it is not in order. • Before starting work, the operator must familiarize himself with all equipment, operating and actuating elements as well as with their function. It is too late to do this during operation! • A warning triangle, a warning light, a warning vest and a first aid kit must be in the vehicle during operation. • Sturdy and slip-proof shoes must be worn when working with the vehicle. • Carrying persons is not permitted! • Only those surfaces approved by the contractor or its authorised representative for use of the vehicle may be driven on. • The vehicle is not suitable for removing dangerous, combustible or explosive liquids, dusts or materials. • Observe the maximum gradability of the vehicle, see Technical data.

3.2.1 Checklist – Before start-up of the vehicle

No.	Description
1	Checking the engine oil level
2	Checking the coolant level
3	Checking the hydraulic oil level
4	Checking the fuel supply
5	Checking the lighting system
6	Checking the outside mirrors
7	Checking the windscreen washer system
8	Checking the tyre pressure
9	Checking the locking bolt

Note
Start-up of the vehicle also includes setting the operating data.

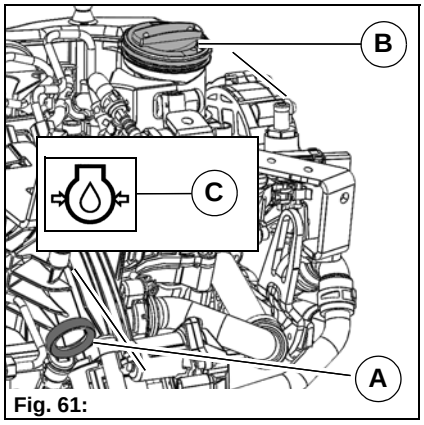


Fig. 61:

Checking the engine oil level

Danger
Caution when handling hot operating and auxiliary materials. There is a risk of burns and scalds!

Check the engine oil level with the dip stick **Fig. 61-A**. Refill engine oil if required. To do this, open the cap **Fig. 61-B**. Filling volume, see Technical data on page 87.
If the warning symbol **Fig. 61-C** appears, there is a risk of engine damage. Immediately turn off the engine and check the engine oil level.

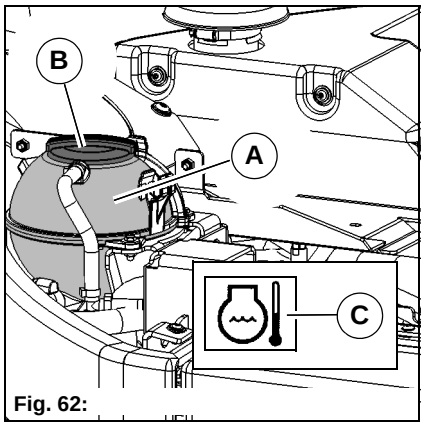


Fig. 62:

Checking the coolant level

Danger
Caution when handling hot operating and auxiliary materials. There is a risk of burns and scalds!

Check the coolant level at the coolant tank **Fig. 62-A**, if necessary top up with coolant. To do this, open the cap **Fig. 62-B**. Filling volume, see Technical data on page 87.
If the warning symbol **Fig. 62-C** appears, there is a risk of engine damage. Immediately turn off the engine and check the coolant level.

Checking the hydraulic oil level

⚠	**Danger** There is a risk of burns and scalds! Caution when handling hot operating and auxiliary materials.

Check the hydraulic oil level with the level indicator **Fig. 63-A**, if necessary top up hydraulic oil. To do this, open the cap **Fig. 63-B**. Filling volume, see Technical data on page 87.
If the warning symbol **Fig. 63-C** appears, there is a risk of operating failure of the hydraulic system. Immediately switch the engine off and check the hydraulic oil level.

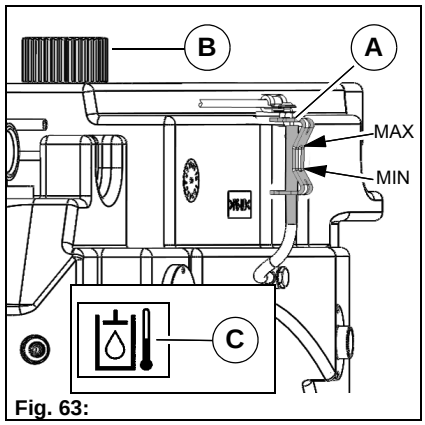


Fig. 63:

Checking the fuel supply

⚠	**Danger** Risk of fire! Diesel fuel is flammable! Take the utmost care when handling fuel. Never refuel close to naked flames or ignitable sparks. Do not smoke during fuelling. Switch off the engine, pull out the ignition key and apply the parking brake before fuelling.

The current fuel supply is shown in the multifunctional display. Refuel as required.
To do this, open the cap **Fig. 64-A**. Filling volume, see Technical data on page 87.
If the warning symbol **Fig. 64-B** appears, then refuel without delay. There is a risk of engine damage if the fuel system is run completely empty! Inform an authorised workshop!

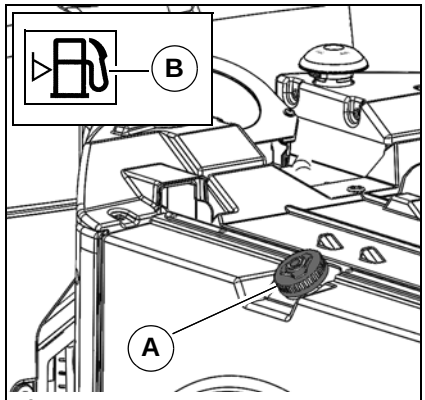


Fig. 64:

Checking the lighting system

Check all lighting equipment on the vehicle with the switches **Fig. 65-A** on the control panel in the roof and the direction indicator in the steering column.

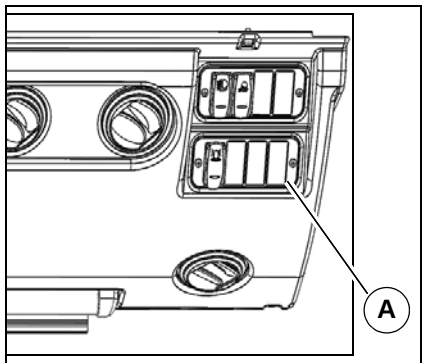


Fig. 65:

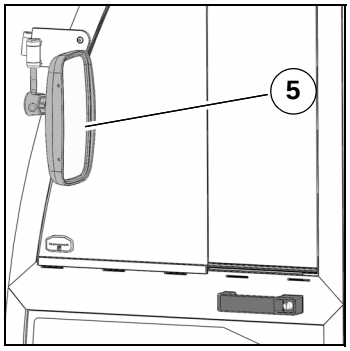


Fig. 66:

Checking the outside mirrors

Adjust the outside mirrors **Fig. 66-5**. Adjust the outside mirrors so that the roadway and the rear work area are completely visible.

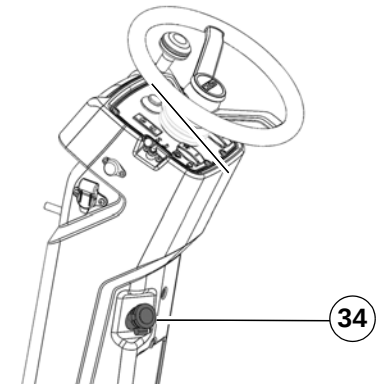


Fig. 67:

Checking the windscreen washer system

Fill the windscreen washer system tank **Fig. 67-34**.
Filling volume: 2.0 litres.

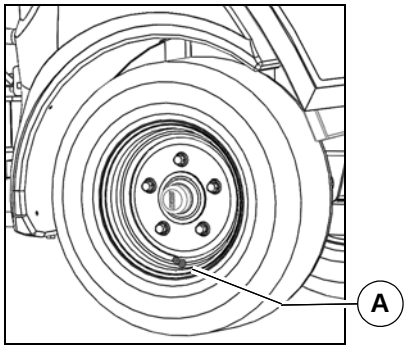


Fig. 68:

Checking the tyre pressure

Remove the valve cap **Fig. 68-A** and adjust the tyre pressure with a compressed air unit, see Technical data on page 87.

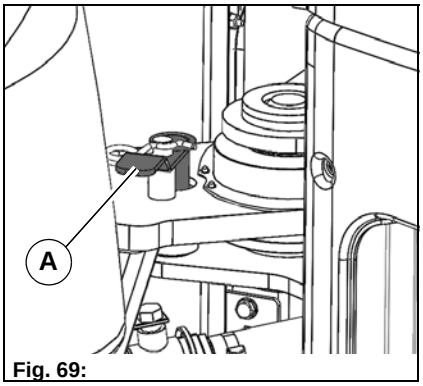


Fig. 69:

Checking the locking bolt

⚠	**Danger** Danger to life in the danger area of the vehicle! Special caution is required in the area of the articulated steering.

Before start-up, loosen the locking bolt **Fig. 69-A** on the articulated joint and bring it into the working position. The vehicle cannot be steered with the locking bolt engaged!

3.3 Starting and driving the vehicle

Danger

- Toxic engine exhaust gases! Inhaling exhaust gases is injurious to health and can lead to unconsciousness and to death! Never let the engine run in enclosed spaces.
- Danger to life in the danger area of the vehicle! Special caution is required under the raised tipper, in the area of the front and rear attachment and in the area of the trailer.
- Danger of tilting over when driving uphill or downhill and transversely to a slope. Avoid sudden turns when driving uphill or downhill or across slopes. There is a risk of tilting over in an inclined position! The vehicle speed must always be adapted to the surrounding conditions and the load condition.
- Danger of tilting due to wrong steering! Note that the steering behaviour of an articulated steered vehicle differs essentially from that of a car. Sudden steering movements at high speed or too high speeds when turning can cause the vehicle to tilt over.
- Risk of accident! Note that there is a risk of skidding on unpaved ground or snow and ice. This can lead to uncontrolled behaviour of the vehicle. Drive correspondingly carefully!
- Risk of accident! Use the cruise control and the speed limiter only when the traffic situation allows!

Warning

- For reasons of safety, the vehicle is equipped with a seat contact switch and the function of the seat contact switch must not be bypassed. The vehicle may be started, put into motion and stopped only from the driver's seat. Do not press on the accelerator pedal when starting!
- In the case of restricted vision, especially when reversing the vehicle, it is necessary to have a second person who gives the driver appropriate signals. The second person must always be in the field of view of the driver.
- When working with the vehicle, pay special attention to third persons, especially children.
- In transport journeys on public roads the working spotlights must be switched off.

Attention

- If the engine oil pressure warning symbol **Fig. 72-A** in the multifunctional display lights up with the engine running, there is a risk of engine damage! Stop the vehicle in the safe area. Turn the engine off immediately and check the oil level. Have the cause of the inadequate engine oil pressure removed.

3.3.1 Starting and driving the vehicle

No.	Description	Reference
1	Accelerator pedal in zero position	Page 74
2	Engaging parking brake	Page 74
3	Starting engine and releasing parking brake	Page 75
4	Starting transport mode	Page 75
5	Activating work mode	Page 76
6	Setting engine fixed speed for attachments/options	Page 76
7	Activating front tool carrier	Page 76

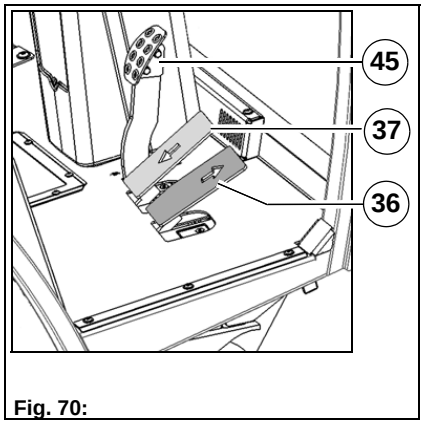


Fig. 70:

Accelerator pedal in zero position
The accelerator pedals **Fig. 70-36** and **Fig. 70-37** must be in the zero position to start the engine.

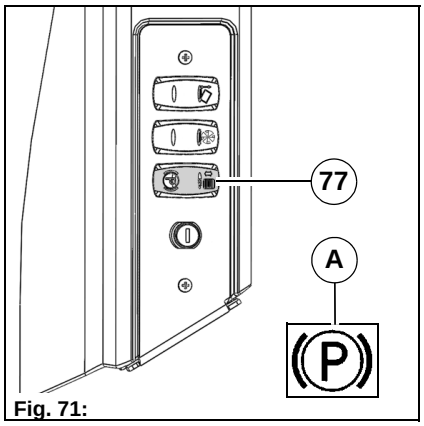


Fig. 71:

Engaging parking brake
The electrical parking brake **Fig. 71-77** stops the vehicle from rolling away.

- Press the brake pedal **Fig. 70-45** until the vehicle stops.
- Unlock the parking brake and press the switch **Fig. 71-77**.
- The warning symbol **Fig. 71-A** appears in the multifunctional display.

Starting the engine

Start the engine with the ignition switch **Fig. 72-78**.

- Position 1: Preheat the engine until the control light **Fig. 72-A** goes out.
- Position 2: Start the engine.
  - The ignition switch goes back into position 1.

Note the information on the ignition switch on page 55.

Releasing the parking brake

Press the switch **Fig. 72-77**. The parking brake is released again. With the parking brake released the warning light **Fig. 71-A** goes out.

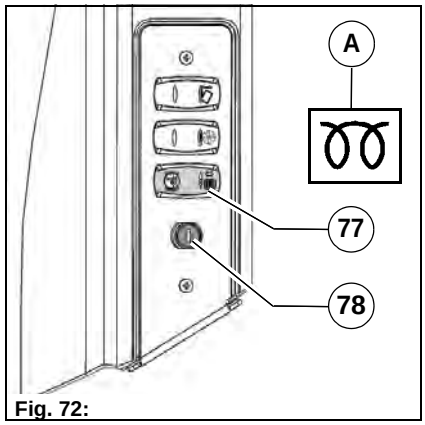


Fig. 72:

Starting transport mode

Slowly press down the accelerator pedal **Fig. 73-36** or **Fig. 73-37** for the required direction and speed. The vehicle moves away. The corresponding engine speed and the transport mode information symbol **Fig. 73-A** appear in the multifunctional display.

The speed in the transport mode is 0 to 40 km/h.

When the accelerator pedal is released (forwards or reverse) the vehicle comes to a stop quickly because of the hydrostatic braking effect.

In forwards gear up to a speed of approx. 15 km/h the vehicle is in speed level 1. The warning symbol **Fig. 73-B** appears in the multifunctional display.

If the temperature of the hydraulic oil is below 15 °C, the vehicle remains in speed level 1 and the information symbol flashes.

Above a speed of approx. 20 km/h the vehicle is in speed level 2 **Fig. 73-C**.

This can be delayed depending on the acceleration and the load. In this case the information symbol flashes.

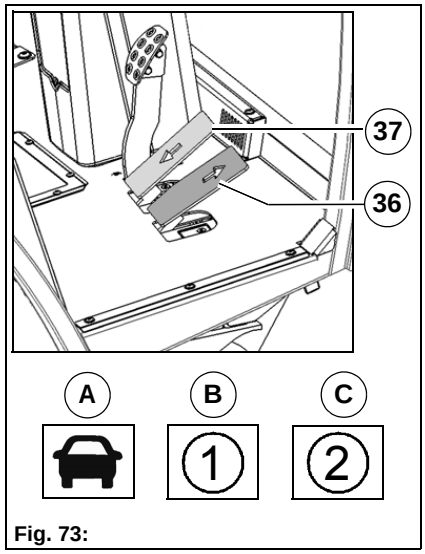


Fig. 73:

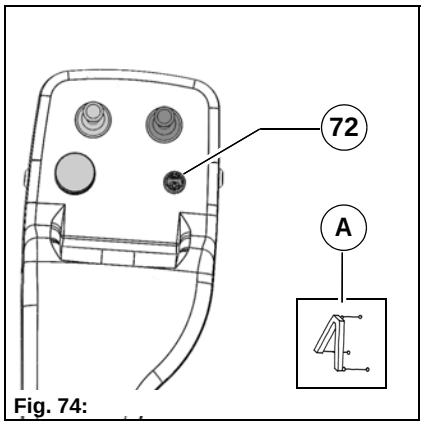


Fig. 74:

Activating work mode

Use the Hako button **Fig. 74-72** to change over from the transport mode to the work mode.
The accelerator pedals must be in the neutral position.
The work mode with front tool carrier information symbol **Fig. 74-A** appears in the multifunctional display.
The road speed in the work mode is maximum 16/20/24 km/h according to the selected engine speed.

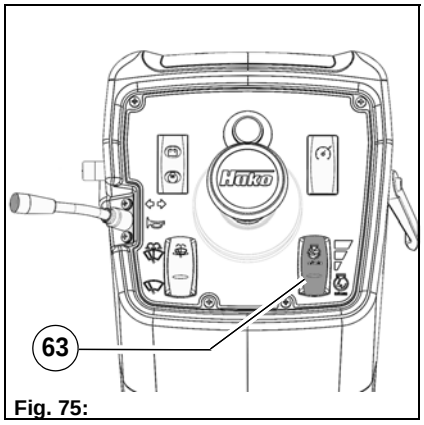


Fig. 75:

Setting the fixed engine speed

The fixed engine speed and thus the system output of the vehicle in the work mode is set with the button **Fig. 75-63**.

Stage	Rpm	Hydraulic circuit I Litres/minute	Hydraulic circuit II Litres/minute
1-ECO	1600	50	20
2-Standard	2000	50/70	27
3-Maximum	2400	50/70	32

The overview illustrates that sufficient power is available already in the ECO mode for many applications.
The full hydraulic output is reached as from the Standard speed.
Additional energy is available in the driving mode as well as in hydraulic circuit II at Maximum. Set the speed corresponding to the requirements.
Operation primarily in the ECO mode lowers consumption and noise. See pages 66 and 68 for information about setting the hydraulic circuits.

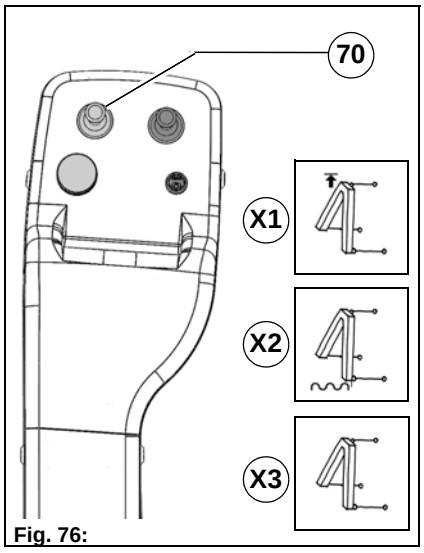


Fig. 76:

Activating the front tool carrier

The front tool carrier is activated with the joystick **Fig. 76-70**. The following functions are possible for a vehicle without attachment:

- Raising front tool carrier
- Front tool carrier in floating position
- Lower the front tool carrier.

The position of the front tool carrier is shown in the multifunctional display. Upper end position **Fig. 76-X1** / floating position **Fig. 76-X2** / lowered and fixed **Fig. 76-X3**
Further settings of the joystick, see page 53.
Raising the front tool carrier is interrupted if the driver leaves the driver's seat.

3.3.2 Troubleshooting

The engine does not start, the starter works audibly.	**Remedy**
The fuel tank was run completely empty.	There is a risk of engine damage if the fuel system is run completely empty! Inform an authorised workshop!
The engine electronics are faulty. The fuel supply is faulty.	Do not repeat the starting procedure more than 3 times, then let the starter cool down. If the engine does not start even after several starting attempts: inform an authorised workshop!
The engine does not start, the starter is not audible.	**Remedy**
The electrical system voltage is too low because the battery is too weak or empty.	Have starting help applied. If the engine does not start despite starting help: inform an authorised workshop!
The starter was exposed to too high thermal loading.	Let the starter cool down for around 2 minutes. Start the engine again. If the engine still does not start: inform an authorised workshop!

3.4 Shutting down the vehicle

Danger
- Risk of accident! Adopt measures against erroneous starting and unwanted movement. Engage the parking brake. Switch the engine off and pull out the ignition key.
- Risk of accident! The vehicle must be parked on firm ground. On inclinations secure the vehicle additionally against rolling away with a wheel chock.

Attention
- Do not switch the engine off in normal operating condition from the high speed range, only in the case of faults.
- After full load operation, let the engine idle on for 1 to 2 minutes.
- Do not switch the engine off when an attachment is switched on.

3.4.1 Shutting down after the end of work

1. Bring the accelerator pedal back into the neutral position or take your foot off from the accelerator pedal. The hydrostatic drive brakes to standstill.
2. Engage the parking brake.
3. Switch the engine off and pull out the ignition key.
4. Close the driver's cab if necessary.

3.4.2 Shutting down in work breaks

The driver must also bring all operating devices into zero position even in short work breaks before leaving the vehicle. Engage the parking brake and secure it against unauthorised use.

3.4.3 Shutting down on occurrence of faults

The engine of the Citymaster 1600 must be switched off immediately on the occurrence of faults. A vehicle left lying on public roads must be secured with the emergency signal system and warning triangle. If the electrical system has failed, the vehicle must be secured with the warning light.

3.5 Transporting and towing the vehicle

Danger
- Danger to life! Start driving slowly! Make sure that there are no persons in the towing area.
- Risk of injury! The vehicle may be loaded only using suitable loading aids, such as a loading ramp or drive-up planks.
- Risk of injury! After loading, make sure that the vehicle is secured according to regulations against rolling off and tilting. Use the wheels for securing the vehicle.

Warning
- Tow the vehicle using only suitable towing gear!
- The vehicle may be towed with a towing rope only if the brakes and steering are functioning!
- When the engine is still the steering has only emergency steering properties!
- Secure the vehicle against unintended movement! Engage the parking brake and insert the locking bolt on the articulated joint. Note that the steering is then blocked!

Attention
- The towing speed may be at most 2 km/h, the towing time at most 3 minutes and the towing distance at most 100 m!

3.5.1 Transporting the vehicle

Securing the vehicle:
- Place a wheel chock diagonally before and behind any front or rear wheel.
- Additional security by one three-point belt each.

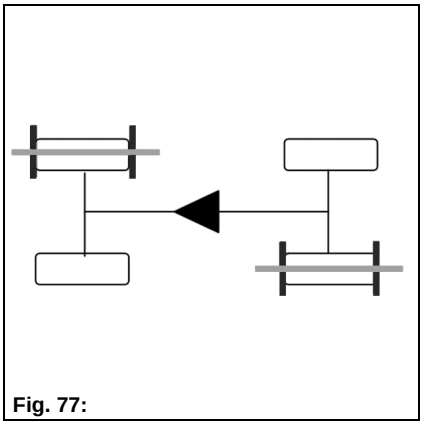


Fig. 77:

3.5.2 Towing the vehicle

The wheels are blocked when the vehicle is at a standstill. Proceed as follows for towing or displacing.

1. The towing eye **Fig. 78-A** is located in the rear wagon on the right and must be mounted on the holder **Fig. 78-B** of the front tool carrier **Fig. 78-12**.
2. Turn the lever of the hand pump **Fig. 78-D** into the upper position.
   - upper position = unlock the parking brake
   - lower position = raise/lower the dirt hopper
3. Close the ball cock **Fig. 78-E** to the right of the hand pump (see symbol).
4. Open the ball cock **Fig. 78-F** of the bypass valve (see symbol).
5. Insert the auxiliary tool **Fig. 78-G** in the hand pump **Fig. 78-C** and pump so long (approx. 25 times) until the parking brake is unlocked.

Caution
After completing the towing process, open the ball cock **Fig. 78-E** again and close the ball cock **Fig. 78-F** of the bypass valve again. Set the lever of the hand pump **Fig. 78-C** to the lower position again!

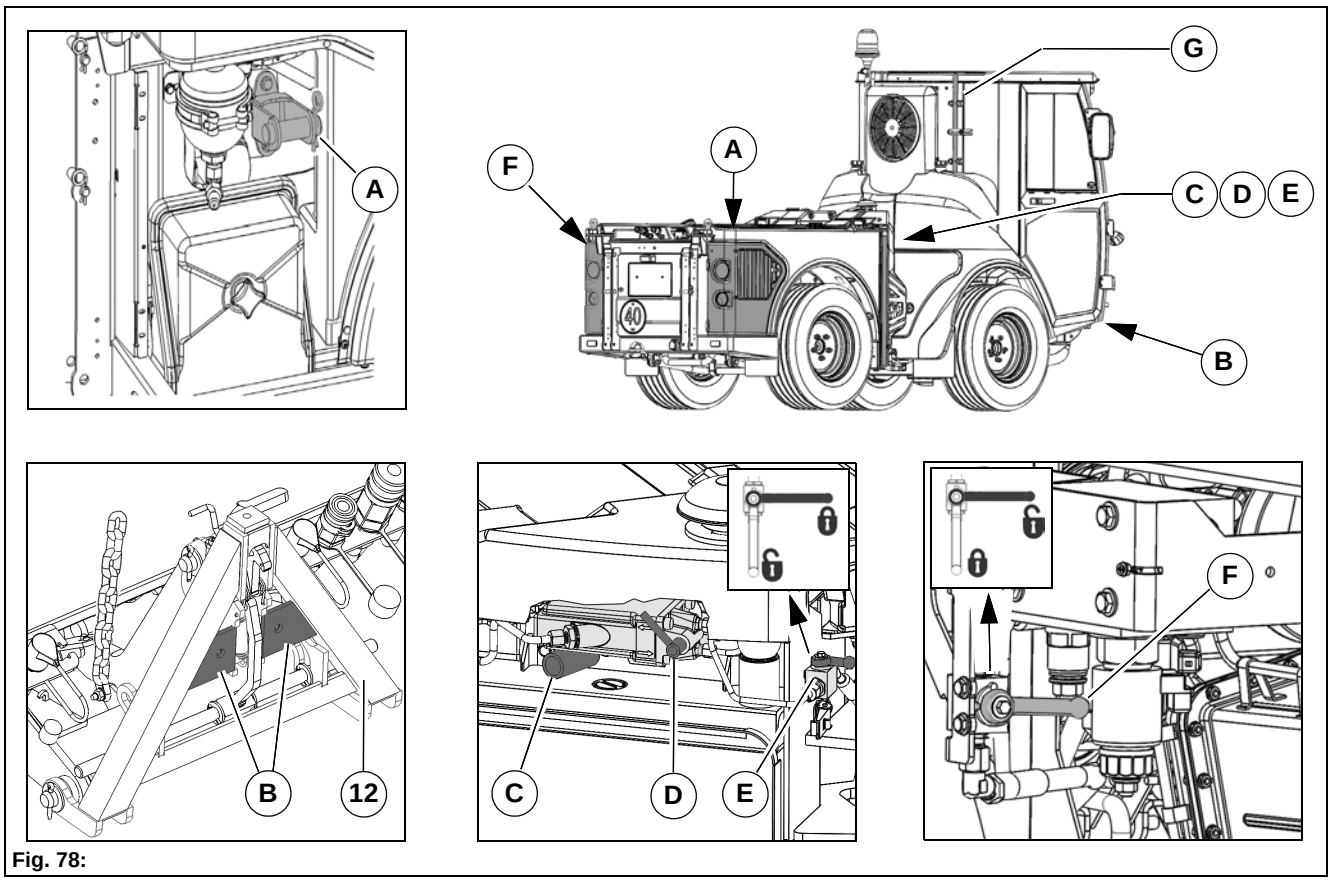


Fig. 78:

3.6 Working with attachments

Danger

- Danger to life in the danger area of the vehicle! Special caution is required under the raised tipper, in the area of the front and rear attachment and in the area of the trailer.
- Risk of injury! Put the attachment into service only if all protective devices are attached and in protection position.
- Risk of injury! Make sure that the attachments are suitable for the set oil volume. An oil volume set too high can lead to injuries due to a defect of the attachment!
- Risk of injury! High-pressure hoses, fittings and couplings are important for equipment safety. Use only high-pressure hoses, fittings and couplings recommended by the manufacturer.
- Risk of accident! When connecting attachments to the hydraulic system, ensure that the hydraulic hoses are connected correctly. Swapping the connection can lead to reverse functioning of the attachment, e.g. movement to the right rather than the left.
- Risk of accident! Front attachments not correctly fastened to the front tool carrier can drop down while driving. Always secure the front attachment with the locking devices.
- Risk of accident! You must consult Hako before attaching other attachments not approved by Hako! Check in the individual case that the relevant axial loads and total weights are complied with.
- Risk of accident! Handling, steering and braking as well as stability are influenced by attachments, trailers and the vehicle payload (e.g. full dirt hopper). For this reason, pay attention to adequate steering and braking capability as well as stability.
- Risk of accident! In Germany, if attachments extend beyond the outer lighting equipment of the vehicle or if the maximum distances of the outer lighting equipment specified according to StVZO are exceeded, the lighting equipment of the vehicle must be repeated (see Merkblatt StVZO § 30, explanations 11 and 12).

3.6.1 Hako attachments

You will find the descriptions for the attachment of the vacuum sweeping system, lawn mowing system, sweeping system, snow clearing system and transport system as from page 117.

3.6.2 Non-Hako attachments

You will find the description for the attachment of non-Hako attachments as from page 62.

3.6.3 Ballast

Danger
- Risk of accident! When attaching other attachments not approved by Hako, check in the individual case whether the relevant axle loads and total weights are complied with!
- Risk of accident! The front axle of the working machine must always be loaded with at least 25 % of the empty weight and the rear axle with at least 37 % of the empty weight of the working machine.
- Risk of accident! The attachment of front and rear attachments must not lead to exceeding the permissible total weight, the permissible axle load and the tyre load capacity of the working machine!

Warning
- Make sure before purchasing the attachment that these requirements are fulfilled by weighing the working machine attachment combination!

Calculating ballast

You require the following data to calculate the total weight, the axle loads and the tyre load capacity as well as the required minimum ballast:

Note
All weight data in (kg)
All dimensions in (m)

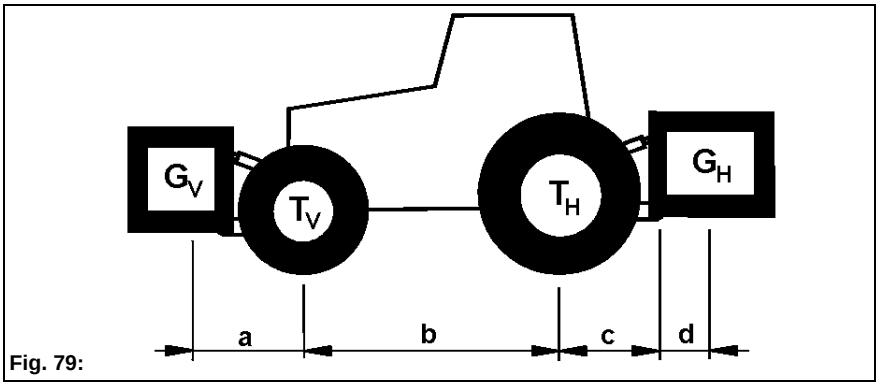


Fig. 79:

1) See Citymaster 1600 technical data.

2) See price list and/or operating manual of the attachment

3) Dimensioning

- $\mathbf{T_L}$ (kg) = empty weight of the vehicle (1)
- $\mathbf{T_V}$ (kg) = front axle load of the empty vehicle (1)
- $\mathbf{T_H}$ (kg) = rear axle load of the empty vehicle (1)
- $\mathbf{G_H}$ (kg) = total weight of rear attachment/rear ballast (2)
- $\mathbf{G_V}$ (kg) = total weight of front attachment/front ballast (2)
- **a** (m) = distance between centre of gravity of front attachment (front ballast) and middle of front axle max. = 1.75 m (2 and 3)
  At maximum front ballast 280 kg.
- **b** (m) = vehicle wheelbase (1 and 3)
- **c** (m) = 0.941 m
- **d** (m) = distance between middle of attachment-side fixing point and centre of gravity of rear attachment/rear ballast max. 0.185 m (2 and 3)
  At maximum rear ballast 450 kg.

1 Calculation of the minimum front ballast for rear attachments

$$G_{V\,min} = \frac{G_H \times (c+d) - T_V \times b + 0{,}2 \times T_L \times b}{a+b}$$

Enter the value in the table.

2 Calculation of the minimum rear ballast for front attachments

$$G_{H\,min} = \frac{G_V \times a - T_H \times b + x \times T_L \times b}{b+c+d}$$

(Value "x" see manufacturer's data, if no information x = 0.45)
Enter the value in the table.

3 Calculation of the actual front axle load $T_{V\,tat}$

If the required minimum front ballast ($G_{V\,min}$) is not reached with the front attachment (G_V), the weight of the front attachment must be increased to the weight of the minimum front ballast!

$$T_{V\,tat} = \frac{G_V \times (a+b) + T_V \times b - G_H \times (c+d)}{b}$$

Enter the calculated actual front axle load and the permissible front axle load stated in the operating manual of the work machine in the table.

4 Calculation of the actual total weight

(If the required minimum rear ballast ($G_{H\,min}$) is not reached with the rear attachment (G_H), then the weight of the rear attachment must be increased to the weight of the minimum rear ballast!)

$$G_{tat} = G_V + T_L + G_H$$

Enter the calculated actual total weight and the permissible total weight stated in the operating manual in the table.

5 Calculation of the actual rear axle load

$$T_{H\,tat} = G_{tat} - T_{V\,tat}$$

Enter the calculated actual rear axle load and the permissible rear axle load stated in the operating manual of the work machine in the table

6 Tyre load capacity

Enter double the value (two tyres) of the permissible tyre load capacity (see for example documents of the tyre manufacturer) in the table.

Ballast table
The calculated values must be less than or equal to the permissible values!

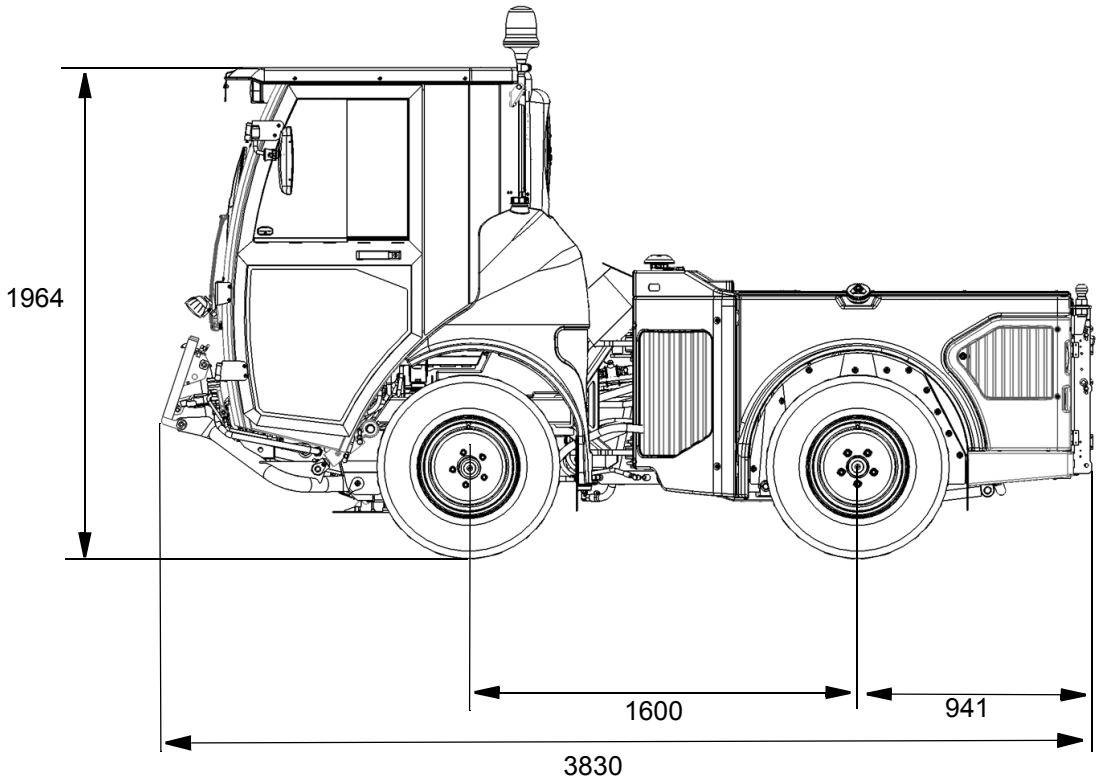
	Actual value according to calculation		Permissible value according to operating manual		
Front/rear minimum ballast	kg	≤			
Total weight	kg		kg		
Front axle load	kg	≤	kg	≤	kg
Rear axle load	kg	≤	kg	≤	kg

The minimum ballast must be attached to the vehicle as attachment or ballast weight!

The following accessories are available for ballast:

Accessories	Type
Front weight holder for max. 9 ballast weights	344000
Rear weight holder for max. 10 ballast weights	344120
Ballast weight 17 kg	344130

4 Technical Data



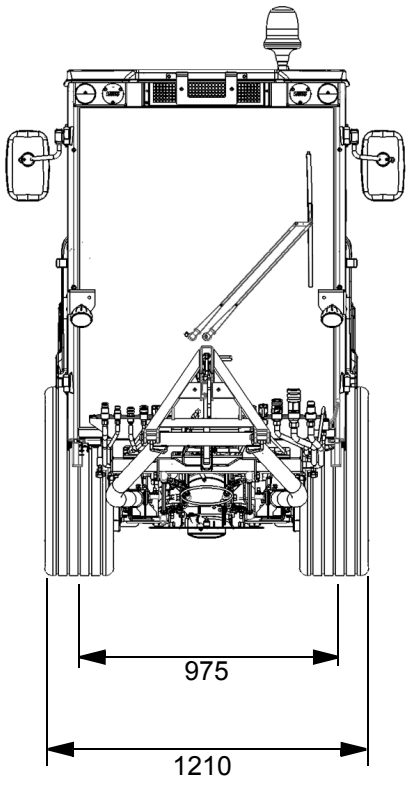


Fig. 80:

Dimensions

Name	Unit	
Length	mm	3830
Width (with standard tyres)	mm	1210
Height (with standard tyres)	mm	1970
Wheelbase	mm	1600
Tread width (with standard tyres)	mm	975
Turning circle inside/outside (DIN EN 15429-1)	mm	1290/2760

Weights and loads

Name	Unit	
Empty weight (deviations according to equipment)	kg	1975
Permissible total weight	kg	3500
Permissible total combination weight unbraked	kg	4250
Permissible total combination weight braked	kg	5250
Permissible front axle load	kg	1700
Permissible rear axle load	kg	2400

Driving speeds and inclination values

Name	Unit	
Transport mode/work mode forwards	km/h	40
Transport mode/work mode reverse	km/h	12
Gradability basic vehicle in work mode (forwards/reverse)	%	24
Gradability basic vehicle in transport mode (forwards/reverse)	%	24

Noise emission values – basic vehicle

The driving noise according to 2009/63/EC Annex VI at 1830 rpm is:	82 dB(A)
Standing noise according to 2009/63/EC Annex VI at 2400 rpm is:	73 dB(A)
Noise at driver's ear according to 2009/76/EC Annex VI is:	79 dB(A)

Vibration values – basic vehicle

The weighted effective value of the acceleration to which the body (feet or seat surface) is subjected to according to EN 1032 is under the customary conditions of use no more than:	0.5 m/s2

Engine

Manufacturer		VW
Type		TDI 2.0l CR CPYA
Number of cylinders		4
Displacement	cm3	1968
Power	kW	55/2700
Speed	rpm	3100
Torque	Nm	240/1750
Engine oil filling volume with oil filter	litre	4.3
Cooling water volume	litre	12

Fuel system

Fuel		Diesel
Tank volume	litre	52

Hydraulic system

Hydraulic oil		HVLP 46
Tank volume	litre	45

Tyre pressure

Standard tyres: 225/70 R15C 112R	bar	5.0
Wide tyres (optional) 255/65 R16C 109H 320/55-15 123 A8 LT325/60R15	 bar bar bar	 3.0 2.8 2.5

Electrical system

Starter	kW	2.0
Nominal voltage	Volt	12
Generator	Ampere	140

Windscreen washer system

Tank volume	litre	2.0

5 Maintenance and Servicing

General

Before undertaking servicing and maintenance work observe without fail chapter 1 Safety Instructions in this operating manual.

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

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

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

Please always state the serial number in all enquiries and spare parts orders, see the Labels on the vehicle section.

Always have the following work on the vehicle done in an authorised workshop.

- Safety-relevant work
- Maintenance work
- Changes as well as installations and conversions
- Work on electronic components

Hako system maintenance

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

- assures the reliable readiness for use of the vehicle (preventive maintenance)
- minimises operating costs, repair costs, costs for maintenance
- assures long life and readiness for use of the vehicle.

	**Note** Compile the maintenance work by reference to the maintenance plans. Example: After 2000 operating hours the maintenance work from the 500, 1000 and 2000 hours maintenance plan must be performed.

5.1 Maintenance certificate

Handover Equipment Trial run Handover to customer Instruction performed on: at _____ operating hours	Hako system maintenance 50 operating hours once Workshop stamp performed on: at _____ operating hours	Hako system maintenance 250 operating hours once Workshop stamp performed on: at _____ operating hours	Hako system maintenance I 500 operating hours Workshop stamp performed on: at _____ operating hours
Hako system maintenance II/S 1000 operating hours Workshop stamp performed on: at _____ operating hours	Hako system maintenance I 1500 operating hours Workshop stamp performed on: at _____ operating hours	Hako system maintenance II/S 2000 operating hours Workshop stamp performed on: at _____ operating hours	Hako system maintenance I 2500 operating hours Workshop stamp performed on: at _____ operating hours
Hako system maintenance II/S 3000 operating hours Workshop stamp performed on: at _____ operating hours	Hako system maintenance I 3500 operating hours Workshop stamp performed on: at _____ operating hours	Hako system maintenance II/S 4000 operating hours Workshop stamp performed on: at _____ operating hours	Hako system maintenance I 4500 operating hours Workshop stamp performed on: at _____ operating hours
Hako system maintenance II/S 5000 operating hours Workshop stamp performed on: at _____ operating hours	Hako system maintenance I 5500 operating hours Workshop stamp performed on: at _____ operating hours	Hako system maintenance II/S 6000 operating hours Workshop stamp performed on: at _____ operating hours	Hako system maintenance I 6500 operating hours Workshop stamp performed on: at _____ operating hours
Hako system maintenance II/S 7000 operating hours Workshop stamp performed on: at _____ operating hours	Hako system maintenance I 7500 operating hours Workshop stamp performed on: at _____ operating hours	Hako system maintenance II/S 8000 operating hours Workshop stamp performed on: at _____ operating hours	Hako system maintenance I 8500 operating hours Workshop stamp performed on: at _____ operating hours
Hako system maintenance II/S 9000 operating hours Workshop stamp performed on: at _____ operating hours	Hako system maintenance I 9500 operating hours Workshop stamp performed on: at _____ operating hours	Hako system maintenance II/S 10000 operating hours Workshop stamp performed on: at _____ operating hours	Hako system maintenance I 10500 operating hours Workshop stamp performed on: at _____ operating hours
Hako system maintenance II/S 11000 operating hours Workshop stamp performed on: at _____ operating hours	Hako system maintenance I 11500 operating hours Workshop stamp performed on: at _____ operating hours	Hako system maintenance II/S 12000 operating hours Workshop stamp performed on: at _____ operating hours	Hako system maintenance I 12500 operating hours Workshop stamp performed on: at _____ operating hours

5.2 Maintenance plan

Maintenance plan – daily
Vehicle cleaning • Vehicle cleaning as required
Engine • Checking engine oil level, replenishing if necessary • Checking and if necessary refilling coolant level in coolant tank • Checking combination radiator and radiator grille for dirt, cleaning with compressed air if necessary • Checking fuel supply, refuelling if required • Checking maintenance indicator of the air filter, cleaning filter elements if necessary
Steering • Checking the emergency steering function
Brake • Checking the operating and parking brakes for function
Electrical system • Checking lighting, work functions, horn, etc.

Maintenance plan – weekly
Vehicle cleaning • Vehicle cleaning as required
Engine • Checking engine oil level, replenishing if necessary • Checking and level in coolant tank, refilling if necessary • Checking combination radiator and radiator grille for dirt, cleaning with compressed air if necessary • Checking fuel supply, refuelling if required • Checking maintenance indicator of the air filter, cleaning filter elements if necessary • Emptying the water trap of the fuel system
Cab • Checking and the windscreen washing agent level, refilling if necessary • Checking air conditioning system (optional) for function • Checking heating for function
Steering • Checking the emergency steering function • Checking steering cylinder for play
Brake • Checking the operating and parking brakes for function • Braking test
Hydraulics • Checking and if necessary refilling the hydraulic oil level
Lubrication service (see section 5.13) • Door hinges (4x) • Front lifting cylinder (4x), front lift (2x) and upper link (2x) • Steering cylinder (4x)
Tyres • Checking the air pressure of the tyres

Maintenance plan – once after 50 operating hours
Engine • Changing engine oil • Changing engine oil filter • Replacing the fuel filter • Emptying the water trap of the fuel system • Checking coolant hoses and radiator • Checking and coolant level in coolant tank, refilling if necessary • Checking combination radiator and radiator grille for dirt, cleaning with compressed air if necessary • Checking engine bearings for damage and cracks • Checking ribbed V-belt for condition and function • Checking generator for soiling and cleaning if required • Checking ECO, standard and maximum speed • Checking the exhaust system for function and tightness • Checking the fuel pipes for function and tightness • Checking air suction pipe for function and tightness
Vehicle control • Reading and evaluating the service information of the vehicle control system and removing faults if necessary • Checking the software status, updating if necessary
Electrical system • Checking horn, lighting and working functions • Checking cabling for abrasion points and damage • Checking battery charge condition, cleaning and greasing battery poles
Hydraulics • Changing the return filter • Checking the hydraulic oil level, refilling if necessary • Checking the lifting cylinder of the front power lift for function and tightness • Checking hydraulic pipes for function and tightness • Checking the hand pump for function
Chassis and axles • Checking chassis springs for damage and ease of movement • Checking shock absorbers for function and tightness • Checking bearing bushes of the axle suspension for cracks and damage • Checking buffers for cracks and damage
Steering • Checking function and ease of movement • Checking steering cylinder for play
Brake • Checking the operating brake for function • Checking the brake fluid • Checking the brake hoses for damage • Checking the parking brake for function
Cab • Checking air conditioning system (optional) for function • Checking heating for function • Checking window washing agent

Maintenance plan continued – once after 50 operating hours
Wheels and tyres • Tightening the wheel nuts • Checking tyres for damage and air pressure
Lubrication service (see section 5.13) • Door hinges (4x) • Front lifting cylinder (4x), front lift (2x) and upper link (2x) • Steering cylinder (4x)

Maintenance plan – once after 250 operating hours
Engine • Changing engine oil • Changing engine oil filter • Replacing the fuel filter • Emptying the water trap of the fuel system • Checking coolant hoses and radiator • Checking coolant level in coolant tank, refilling if necessary • Checking combination radiator and radiator grille for dirt, cleaning with compressed air if necessary • Checking engine bearings for damage and cracks • Checking ribbed V-belt and tensioning roller for condition and function, replacing if necessary • Checking ribbed V-belt and belt tensioner of the generator • Checking generator for soiling and cleaning if required • Checking ECO, standard and maximum speed • Checking the exhaust system for function and tightness • Checking the fuel pipes for function and tightness • Checking air suction pipe for function and tightness
Vehicle control • Reading and evaluating the service information of the vehicle control system and removing faults if necessary • Checking the software status, updating if necessary
Electrical system • Checking horn, lighting and working functions • Checking cabling for abrasion points and damage • Checking battery charge condition, cleaning and greasing battery poles
Hydraulics • Checking the hydraulic oil level, refilling if necessary • Checking the lifting cylinder of the front power lift for function and tightness • Checking hydraulic pipes for function and tightness • Checking the hand pump for function
Chassis and axles • Checking chassis springs for damage and ease of movement • Checking shock absorbers for function and tightness • Checking bearing bushes of the axle suspension for cracks and damage • Checking buffers for cracks and damage

Maintenance plan continued – once after 250 operating hours
Steering • Checking function and ease of movement • Checking steering cylinder for play
Brake • Checking the operating brake for function • Checking the brake fluid • Checking the brake hoses for damage • Checking the parking brake for function
Cab • Checking air conditioning system (optional) for function • Cleaning the cab air filter • Checking heating for function • Checking window washing agent
Wheels and tyres • Tightening the wheel nuts • Checking tyres for damage and air pressure
Lubrication service (see section 5.13) • Door hinges (4x) • Front lifting cylinder (4x), front lift (2x) and upper link (2x) • Steering cylinder (4x)

Maintenance plan – every 500 operating hours
Engine • Changing engine oil • Changing engine oil filter • Replacing the fuel filter • Emptying the water trap of the fuel system • Changing filter insert of the air filter • Checking coolant hoses and radiator • Checking coolant level in coolant tank, refilling if necessary • Checking combination radiator and radiator grille for dirt, cleaning with compressed air if necessary • Checking engine bearings for damage and cracks • Checking ribbed V-belt and tensioning roller for condition and function, replacing if necessary • Checking ribbed V-belt and belt tensioner of the generator • Checking V-belt for tension and condition • Checking generator for soiling and cleaning if required • Checking ECO, standard and maximum speed • Checking the exhaust system for function and tightness • Checking the fuel pipes for function and tightness • Checking air suction pipe for function and tightness • Performing service regeneration of the diesel particulate filter. Only vehicles with diesel particulate filters!
Vehicle control • Reading and evaluating the service information of the vehicle control system and removing faults if necessary • Checking the software status, updating if necessary

Maintenance plan continued – every 500 operating hours
Electrical system • Checking horn, lighting and working functions • Checking cabling for abrasion points and damage • Checking battery charge condition, cleaning and greasing battery poles
Hydraulics • Checking the hydraulic oil level, refilling if necessary • Checking the lifting cylinder of the front power lift for function and tightness • Checking hydraulic pipes for function and tightness • Checking the hand pump for function
Chassis and axles • Checking chassis springs for damage and ease of movement • Checking shock absorbers for function and tightness • Checking bearing bushes of the axle suspension for cracks and damage • Checking buffers for cracks and damage
Steering • Checking function and ease of movement • Checking steering cylinder for play
Brake • Checking the operating brake for function • Checking the brake fluid • Checking the brake hoses for damage • Checking the parking brake for function
Cab • Checking air conditioning system (optional) for soiling • Cleaning the cab air filter • Cleaning the condenser on the cab rear wall with compressed air • Checking heating for function • Checking and if necessary refilling the windscreen washing agent level
Wheels and tyres • Tightening the wheel nuts • Checking tyres for damage and air pressure
Lubrication service (see section 5.13) • Door hinges (4x) • Front lifting cylinder (4x), front lift (2x) and upper link (2x) • Steering cylinder (4x)

Maintenance plan – every 1000 operating hours
Engine • Changing the safety cartridge
Hydraulics • Checking the hydraulic oil. Taking and sending in a sample • Changing the hydraulic oil filter • Changing the venting filter of the hydraulic oil tank • Checking the hydraulic oil level, refilling if necessary
Cab • Changing the cab air filter

Maintenance plan – every 2000 operating hours
Bowden cable • Checking the coarse material flap and suction mouth lift for function, ease of movement and zero point

Maintenance plan – every 2500 operating hours
Engine • Changing the coolant VW G13 Note: Even in warm countries, never drive without coolant additive, since the coolant additive protects the engine against corrosion and increases the boiling point of the cooling water! The coolant additive must be at least 40 % and may be a maximum of 60 %. Use only distilled water for mixing! • Changing V-belt and V-belt pulleys • Changing the water pump • Changing the ribbed V-belt and belt tensioner of the generator

Maintenance plan – every 3000 operating hours
Hydraulics • Changing hydraulic oil

5.3 Panelling and covers

Danger
- Risk of injury! Put the vehicle into service only if all protective devices are attached and in protection position.
- Danger of burning! Do not touch any parts such as engine block, cooling system and exhaust system during operation and for some time after.

5.3.1 Opening the engine cover, engine flap and side door

The engine cover **Fig. 81-A**, the engine flap **Fig. 81-B** and the side doors **Fig. 81-C** are opened with a square key.

5.3.2 Removing side cover

Loosen the mounting screws of the side cover **Fig. 81-C** and pull the side cover out to the side.

5.3.3 Opening the radiator cover

Open the lock **Fig. 81-E** and swing down the radiator cover.

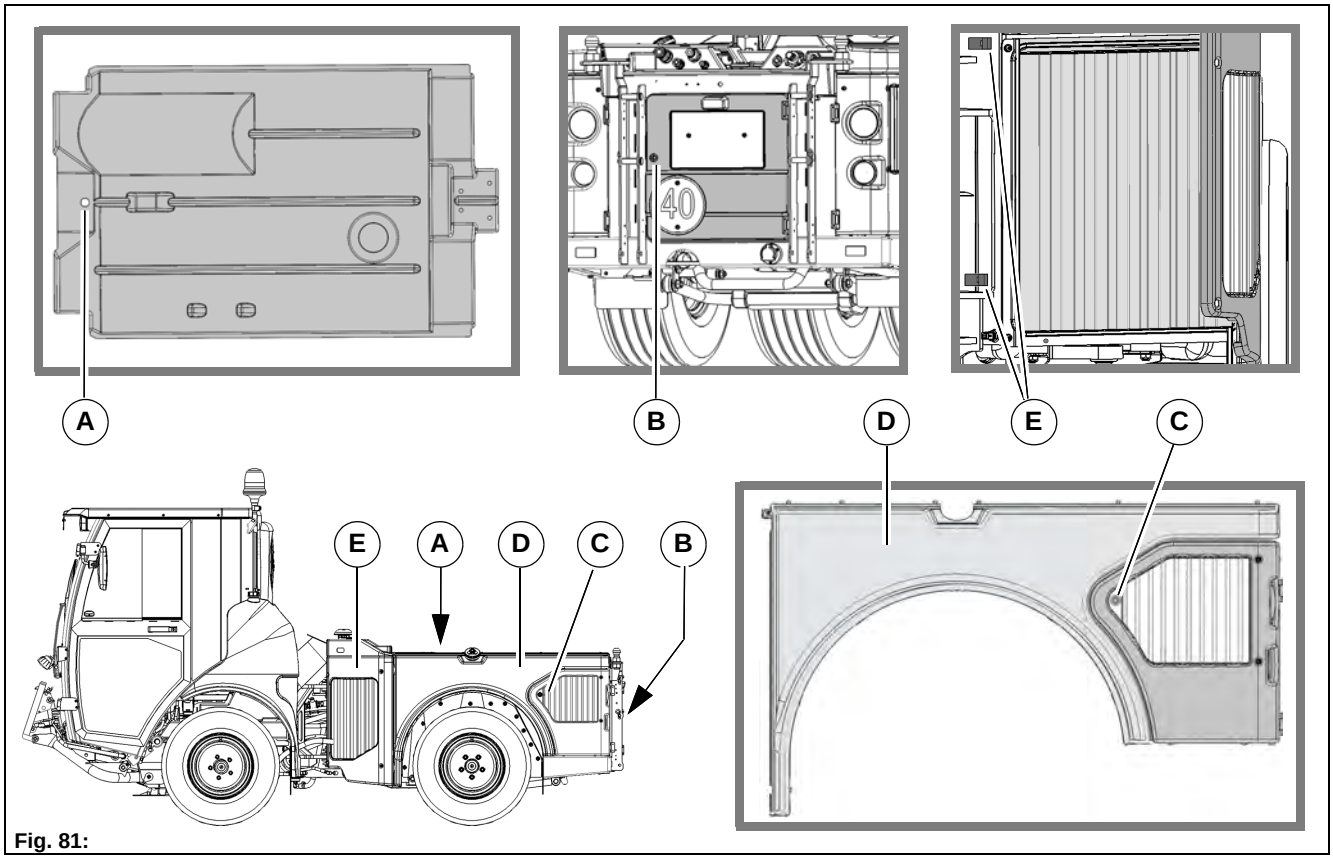


Fig. 81:

5.4 Engine

Danger
- Toxic engine exhaust gases! Inhaling exhaust gases is injurious to health and can lead to unconsciousness and to death! Never let the engine run in enclosed spaces.
- Danger of burns from hot parts! Do not touch any parts such as engine block, cooling system and exhaust system during operation and for some time after. Let the engine cool down.
- Risk of injury due to rotating parts of the cooling system. Injury of limbs or hair or clothing getting caught up. Switch the engine off and pull out the ignition key.

Attention
- If the engine oil pressure warning symbol **Fig. 82-A** in the multifunctional display lights up with the engine running, there is a risk of engine damage! Stop the vehicle in the safe area. Turn the engine off immediately and check the oil level. Have the cause of the inadequate engine oil pressure removed.

Environmental danger
- Ensure safe and environment-conserving disposal of operating and auxiliary materials. Take up escaping or spilled operating materials in suitable containers and dispose of them in an environmentally friendly manner.

5.4.1 Checking the engine oil level

Check the engine oil level daily and refill as required.

1. Place the vehicle on a level surface and hold it with the parking brake. Switch the engine off and pull out the ignition key. Let the engine cool down.

Note
The circulating engine oil requires a few minutes to flow back to the oil sump.

2. Check the engine oil level with the dip stick **Fig. 82-B**.
3. The engine oil level should lie between the MAX and MIN mark of the dip stick and may never drop below the MIN mark.
4. Refill engine oil as required and check the engine oil level once again. Only use branded oils 5W-30 to oil specification VW507.00.

Note
The engine oil level must not be above the MAX mark. There is a risk of damage to the catalytic converter.

5. Reinsert the dip stick.

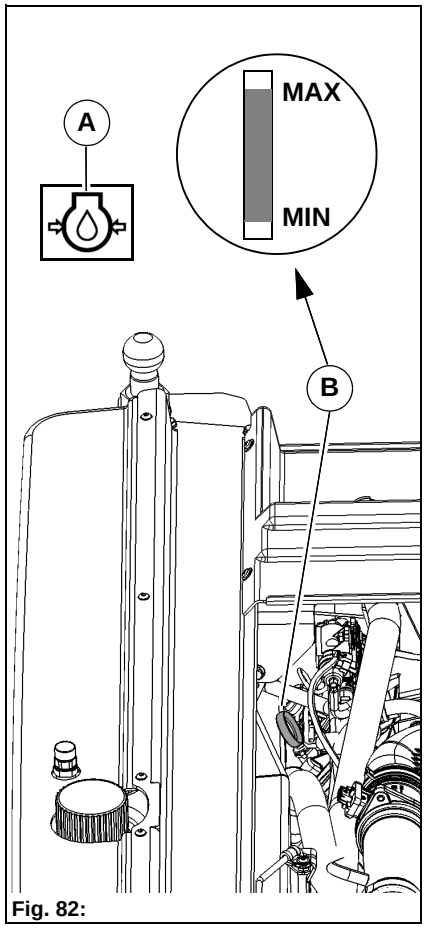


Fig. 82:

5.5 Fuel system

Danger

- Risk of fire! Diesel fuel is flammable! Take the utmost care when handling fuel. Never refuel close to naked flames or ignitable sparks. Do not smoke during fuelling. Switch off the engine, pull out the ignition key and engage the parking brake before fuelling.
- Danger of burns from hot parts! Do not touch any parts such as engine block, cooling system and exhaust system during operation and for some time after. Let the engine cool down.

Attention

- If the fuel system has been run empty, the vehicle must be stopped immediately. Serious engine damage can be caused if this is not complied with. The fuel system must be vented. Have this done by an authorised workshop!

Environmental danger

- Ensure safe and environment-conserving disposal of operating and auxiliary materials. Take up escaping or spilled operating materials in suitable containers and dispose of them in an environmentally friendly manner.

5.5.1 Emptying the water trap

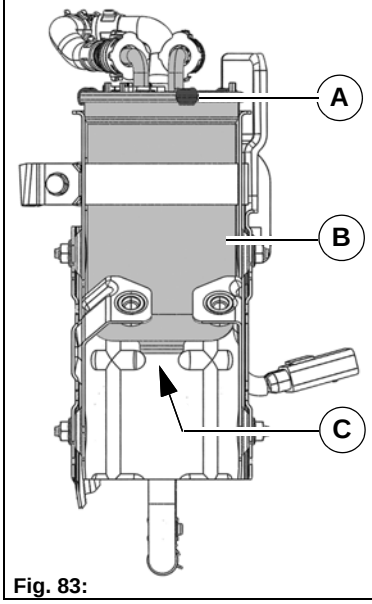


Fig. 83:

Check the water trap weekly and drain the condensed water out from the water trap if required.

1. Place the vehicle on a level surface and hold it with the parking brake. Switch the engine off and pull out the ignition key. Let the engine cool down.
2. Loosen the clips **Fig. 83-A** and remove the fuel filter **Fig. 83-B** from the holder.
3. Place a suitable vessel under the water trap.
4. Open the drain screw **Fig. 83-C** and collect the condensed water.
5. Close the drain screw again.

5.6 Diesel particle filter

Danger
- Danger of fire and burning! The diesel particulate filter gets very hot. Do not grasp in the area of the diesel particulate filter. Do not park the vehicle in the direct vicinity of flammable substances.

Attention
- If the diesel particulate filter symbol **Fig. 84-A** in the multifunction display lights up red, the vehicle engine must be switched off immediately. Serious engine damage can be caused if this is not complied with.

The diesel particulate filter filters damaging soot particles from the engine exhaust gases. The engine control system automatically initiates cleaning of the diesel particulate filter.
If the diesel particulate filter is soiled so much that it can no longer be regenerated by automatic cleaning, then the diesel particulate filter symbol appears in the multifunctional display.

- The diesel particulate filter symbol lights up yellow:
  Automatic cleaning could not be performed.
  The shift can still be worked up to the end.
  Have a service regeneration performed by the Hako service.
- The diesel particulate filter symbol lights up red:
  The diesel particulate filter has reached its maximum level.
  Immediately stop the vehicle to avoid engine damage!
  Have a service regeneration performed by the Hako service.

Fig. 84:

5.7 Cooling system

Danger
- Danger of burns from hot parts! Do not touch any parts such as engine block, cooling system and exhaust system during operation and for some time after. Let the engine cool down.
- Risk of scalding from hot coolant! The cooling system is under pressure. If the cooling system cap is opened with a hot engine there is a risk of scalding. Let the engine cool down.
- Risk of injury due to rotating parts! Injury of limbs or hair or clothing getting caught up. Switch the engine off and pull out the ignition key.

Attention
- Small air bubbles can form when the radiator is filled. Therefore the cooling system must be vented at the same time. Have this done by an authorised workshop!
- The cooling fins are very thin and can be damaged easily.

Environmental danger
- Ensure safe and environment-conserving disposal of operating and auxiliary materials. Take up escaping or spilled operating materials in suitable containers and dispose of them in an environmentally friendly manner.

5.7.1 Cleaning the cooling system

Check the grille screen **Fig. 85-A** and the cooling fins of the combination cooler located behind **Fig. 85-B** and of the hydraulic oil cooler **Fig. 85-C** daily and clean as required.

1. Place the vehicle on a level surface and hold it with the parking brake. Switch the engine off and pull out the ignition key. Let the engine cool down.
2. Open the lock **Fig. 85-D** (see sketch) and swing down the radiator cover **Fig. 85-E**.
3. Check the grille screen and the cooling fins of the combination cooler located behind daily and clean with compressed air or water jet as required.

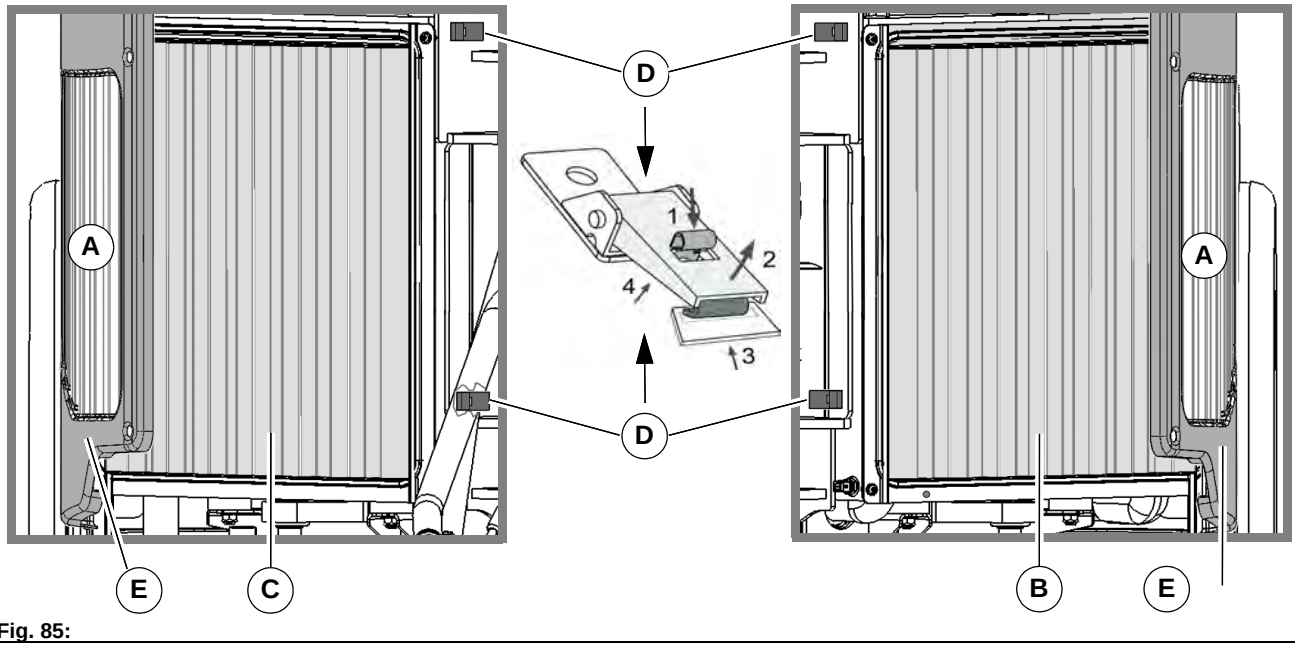


Fig. 85:

5.7.2 Checking the coolant level

Check the coolant level in the coolant tank **Fig. 86-A** daily and refill as required.

1. Place the vehicle on a level surface and hold it with the parking brake. Switch the engine off and pull out the ignition key. Let the engine cool down.
2. Check the coolant level.
   With the engine cooled down, the coolant must be visible between the MIN and MAX mark of the coolant tank.
3. Unscrew the cap **Fig. 86-B** carefully step by step from the coolant tank.
4. Refill coolant:
   Coolant: VW G13
   The coolant additive must be at least 40 % and may be a maximum of 60 %. Never drive without coolant additive!
5. Check the coolant level, refill once again if necessary.
6. Close the cap again

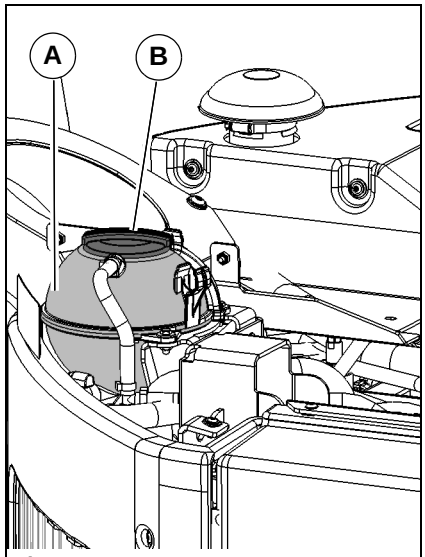


Fig. 86:

5.8 Air filter

Warning
- Danger of burns from hot parts! Do not touch any parts such as engine block, cooling system and exhaust system during operation and for some time after. Let the engine cool down.

Attention
- We can assume no liability for cleaned filter inserts. Never let the engine run without a filter insert!
- Only replace the safety cartridge, do not clean it! Never let the engine run without safety cartridge!

Environmental danger
- Ensure safe and environment-conserving disposal of operating and auxiliary materials. Take up escaping or spilled operating materials in suitable containers and dispose of them in an environmentally friendly manner.

5.8.1 Checking the air filter

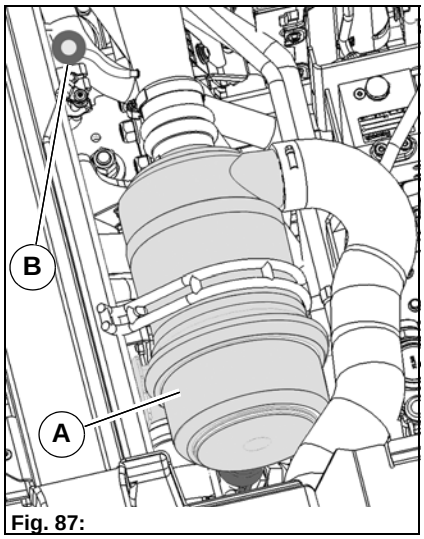


Fig. 87:

Check the contamination of the air filter **Fig. 87-A** daily. The maintenance indicator **Fig. 87-A** indicates the degree of contamination.
The maintenance indicator is red if the air filter is contaminated.
The maintenance indicator can be read with the engine switched off. The indication is reset to zero with the reset knob.

5.8.2 Cyclone separator and dust ejection valve

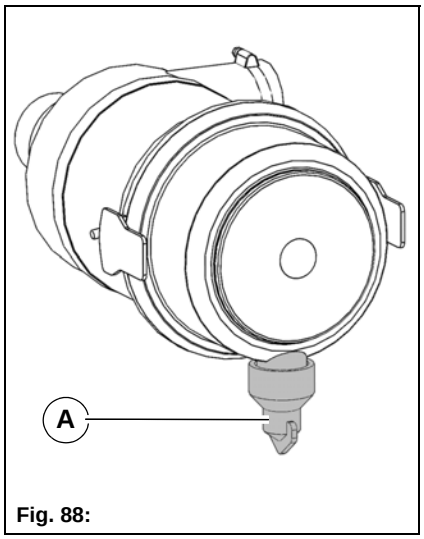


Fig. 88:

The air filter has a cyclone separator incorporated in the filter housing. This lengthens considerably the service life of the filter insert. The dust particles separated in the filter housing are ejected from the dust ejection valve **Fig. 88-A**.

5.8.3 Cleaning/changing the air filter

Clean the filter insert **Fig. 89-C** as required. Change the filter insert at the latest every 500 operating hours.

1. Place the vehicle on a level surface and hold it with the parking brake. Switch the engine off and pull out the ignition key. Let the engine cool down.
2. Unhook the guide rubber **Fig. 89-A** and remove the filter cover **Fig. 89-B**.
3. Remove the filter insert **Fig. 89-C** and clean it from inside to outside carefully with dry compressed air (max. 3 bar) by up and down movements of the compressed air tube.
4. Immediately renew a very dirty or damaged filter insert.
5. Clean the filter housing from the inside.
6. Refit the filter insert.

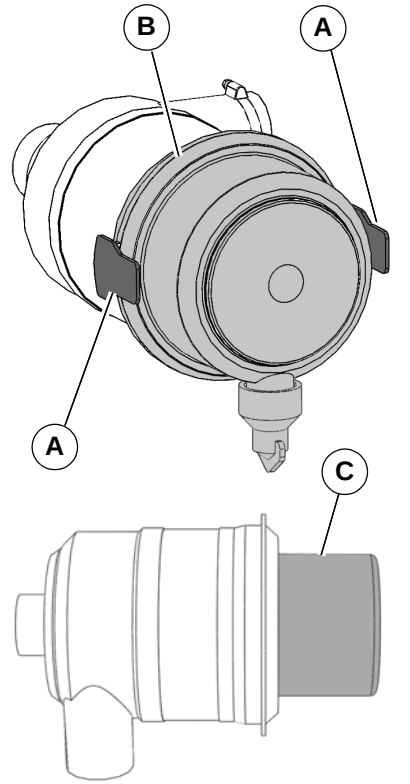


Fig. 89:

5.9 Hydraulic system

Danger

- Risk of injury from hydraulic oil! Hydraulic oil issuing under high pressure can penetrate the skin and cause severe injuries. Therefore, even with the smallest wounds, consult a doctor since otherwise severe infections can arise!
- Danger of burns from hot parts! Do not touch any parts such as engine block, cooling system and exhaust system during operation and for some time after. Let the engine cool down.

Warning

- Do not touch any parts such as engine block, cooling system and exhaust system during operation and for some time after – risk of burns!
- Work on the hydraulic system of the vehicle may be done only by persons with special knowledge and experience in hydraulics.
- Regularly check all pipes, hoses and screw connections for leaks and external visible damage. Immediately rectify damage and leaks. Oil squirting out can cause injuries and fires. Observe the recommended replacement intervals for hydraulic pipes. With normal requirements 6 years, with increased requirements on safety 2 years!
- Do not change over hydraulic pipes! Fittings and the length and quality of the hose line must comply with the requirements.

Environmental danger

- Ensure safe and environment-conserving disposal of operating and auxiliary materials. Take up escaping or spilled operating materials in suitable containers and dispose of them in an environmentally friendly manner.

5.9.1 Important information for using BIO OIL

Attention

- Use only the BIO hydraulic fluids approved by the Hako GmbH, see Operating materials and lubricants. Use of another not recommended product must be agreed with Hako without fail. In addition, a written guarantee declaration must be obtained from the supplier. This guarantee applies for the case that damage to hydraulic units occurs that is demonstrably attributable to the hydraulic fluid.
- Use only BIO oil of the same grade for topping up and oil changing. Clear information about the momentary oil grade used must be placed close to the filler cap! Mixing two BIO oil grades can impair the properties of one grade. Make sure that when the BIO oil is changed, the remaining residual volume of the original hydraulic fluid in the hydraulic system does not exceed 8 % (manufacturer's data).
- Do not top up with mineral oil. The mineral oil content should not exceed 2 % by weight to avoid foaming problems and not to impair the biological degradability of the BIO oil.
- The same oil and filter changing intervals apply for operation with BIO oils as for mineral oils, see Operating materials and lubricants. The condensed water in the hydraulic oil tank must be drained off before the cold season. The water content should not exceed 0.1 % by weight.
- All information about environmental protection in this operating manual also applies when BIO oils are used.
- If additional hydraulic devices are attached and operated, then operate these with the same BIO oil grades, so that mixing in the hydraulic system is avoided.
- In subsequent oil changing from mineral to BIO oil, the hydraulic units must be scavenged completely.

5.9.2 Checking the hydraulic oil level

Check the hydraulic oil level weekly at the level indicator **Fig. 90-A** and top up as required. Use only hydraulic oils approved by the manufacturer (HVLP 46) e.g. Mobiloil DTE 10 Excel.

1. Place the vehicle on a level surface and hold it with the parking brake. Switch the engine off and pull out the ignition key. Let the engine cool down.
2. Unscrew the cap **Fig. 90-B** and top up with hydraulic oil.
3. The hydraulic oil level should lie between the MIN and MAX mark.
4. Refit the cap.

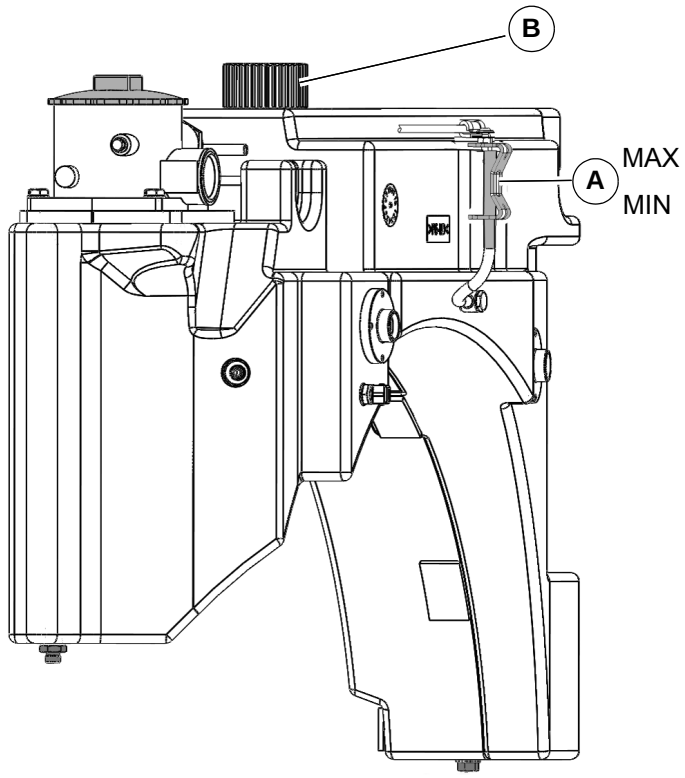


Fig. 90:

5.10 Driver's cab

5.10.1 Changing the cab air filter

Check the cab air filter weekly for contamination, more frequently in dusty work. Remove it as follows:

1. Place the vehicle on a level surface and hold it with the parking brake. Switch the engine off and pull out the ignition key.
2. Loosen the four mounting screws of the protective grille **Fig. 91-A** and remove the protective grille.
3. Remove and clean the cab air filter **Fig. 91-B** and renew it if necessary.

Summer operation

Insert the perforated plate **Fig. 91-C** located behind the cab air filter so that the mark points to the "**S**".

Winter operation

Insert the perforated plate located behind the cab air filter so that the mark points to the "**W**".

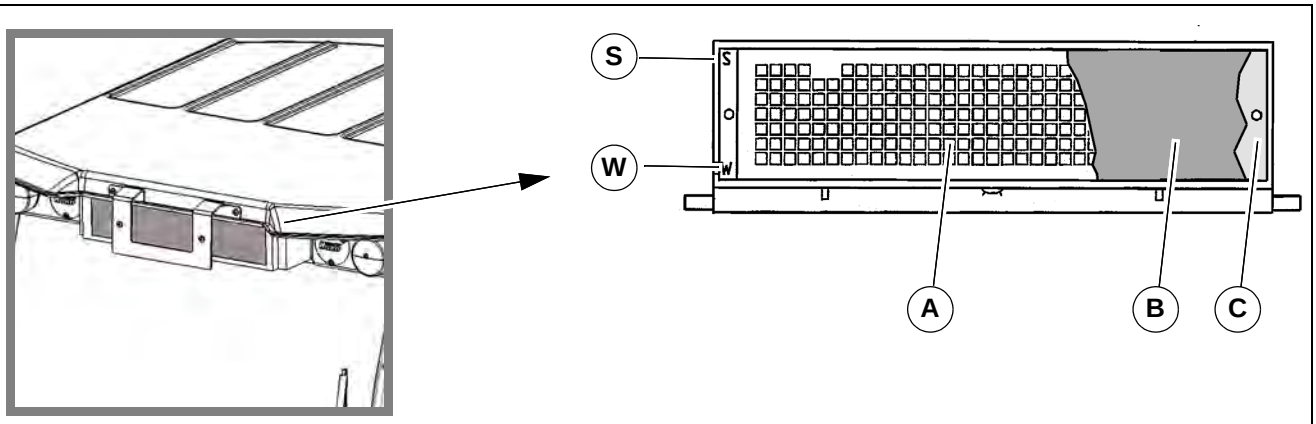


Fig. 91:

5.11 Wheels

Warning
- Risk of accident! Repair work on tyres and rims may be undertaken only by skilled personnel or authorised workshops.
- Use only tyres approved by Hako, see Technical data on page 87.
- When changing wheels, make sure that the jack is applied to the specified jacking point.
- Damaged tyres and/or incorrect tyre pressure reduce the operating safety of the vehicle. There is a risk of an accident with tyres with too low or too high tyre pressure!
- Check the wheel nuts regularly for firm seating. After a tyre change check the wheel nuts after 50 km and tighten them if necessary.

5.11.1 Tyre changing

Dismantling
1. Place the vehicle on a level surface and hold it with the parking brake. Switch the engine off and pull out the ignition key. Let the engine cool down.
2. Attach the jack stably to the jacking point **Fig. 92-A** or **Fig. 92-B**.
3. Raise the corresponding axle side and check the vehicle once again for stability.
4. Remove the wheel bolts and remove the wheel.

Assembly
1. Fit the wheel on the centring hub and tighten all wheel bolts slightly.
2. Jack the raised axle side down.
3. Tighten the wheel bolts crosswise with a torque wrench. The necessary tightening torque is: 180 Nm
4. The wheel bolts must be tightened again as described above after approx. 50 operating hours.

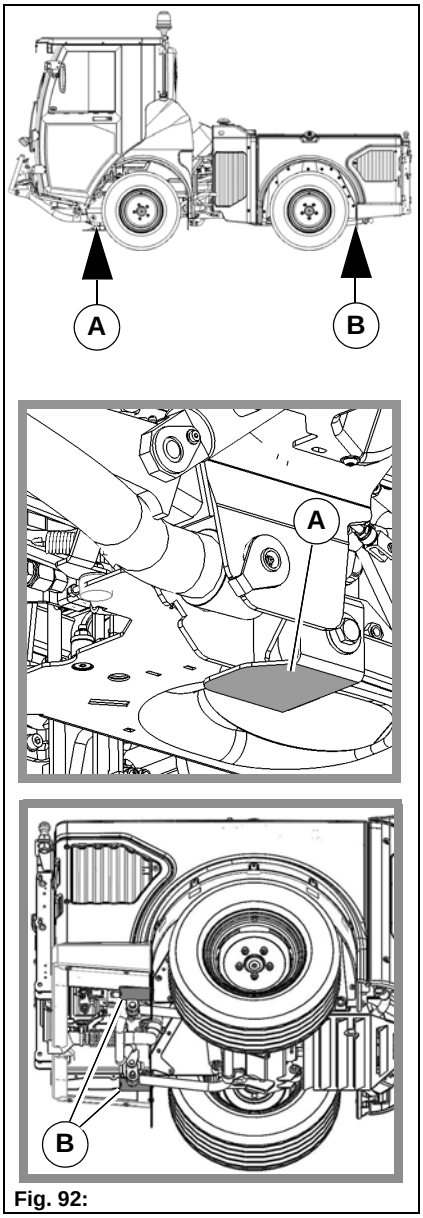


Fig. 92:

5.12 Electrical system

5.12.1 Changing lamps

Beacon
Loosen the screw **Fig. 93-A** and unscrew the cover.
Electrical rating of the beacon: 12 V - 55 W.

Working spotlight
Pull out the plug **Fig. 93-B** of the working spotlight and turn the base counter-clockwise and pull it out.
Electrical rating of the working spotlight: 12 V - 50 W

Direction indicators with side light
Loosen the screw **Fig. 93-C** and unscrew the cover.
Electrical rating of the direction indicators: 12 V - 21 W
Electrical rating of the side light: 12 V - 5 W

Head light
Loosen the two screws **Fig. 93-D** and remove the cover.
Electrical rating of the head light: 12 V - 55 W

Direction indicator with brake light
Open the side door. Loosen the two screws **Fig. 93-E** and remove the cover. Pull out the plug and replace the LED housing.

Reversing light (optional)
Open the side door. Press the two retaining springs **Fig. 93-F** together and push the housing out. Pull out the plug and replace the LED housing.

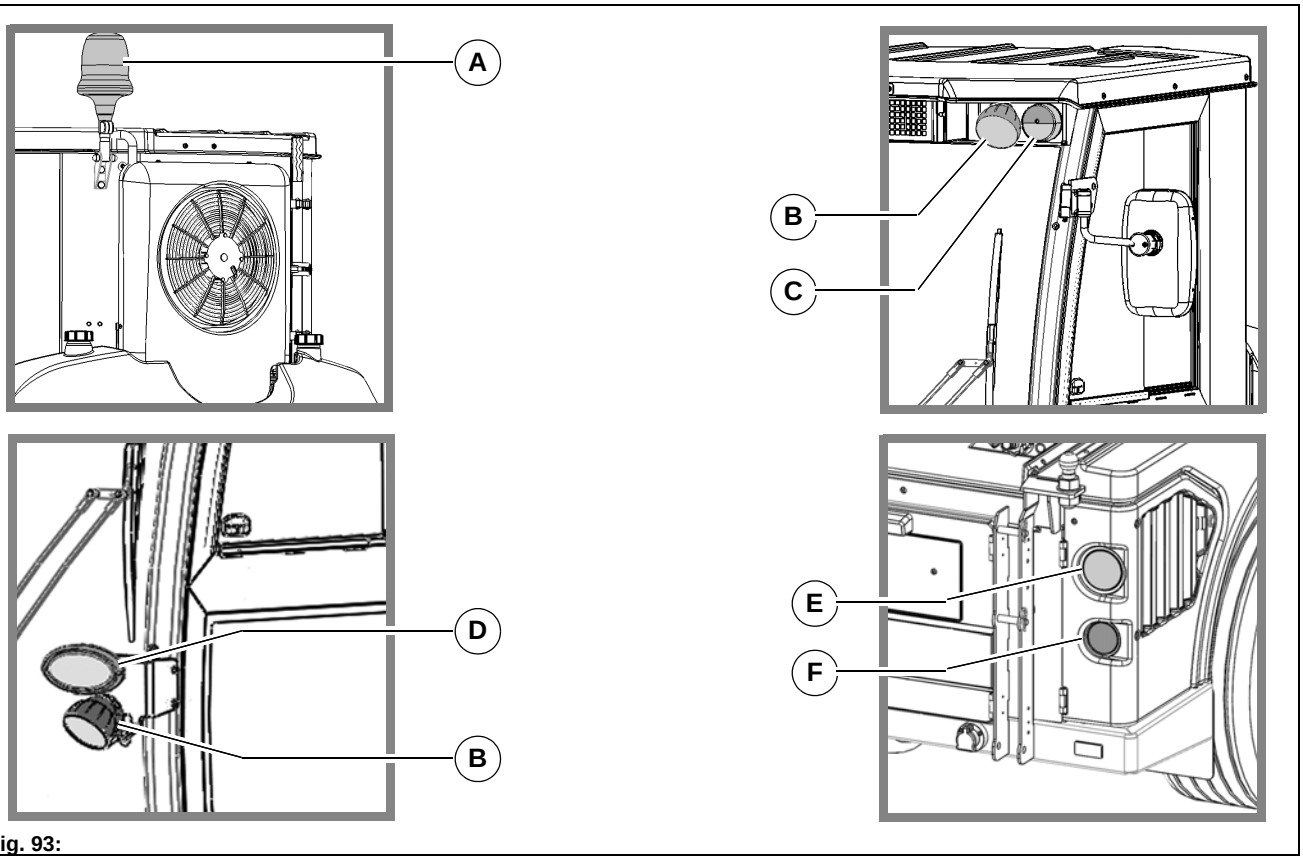


Fig. 93:

5.12.2 Fuses and relays

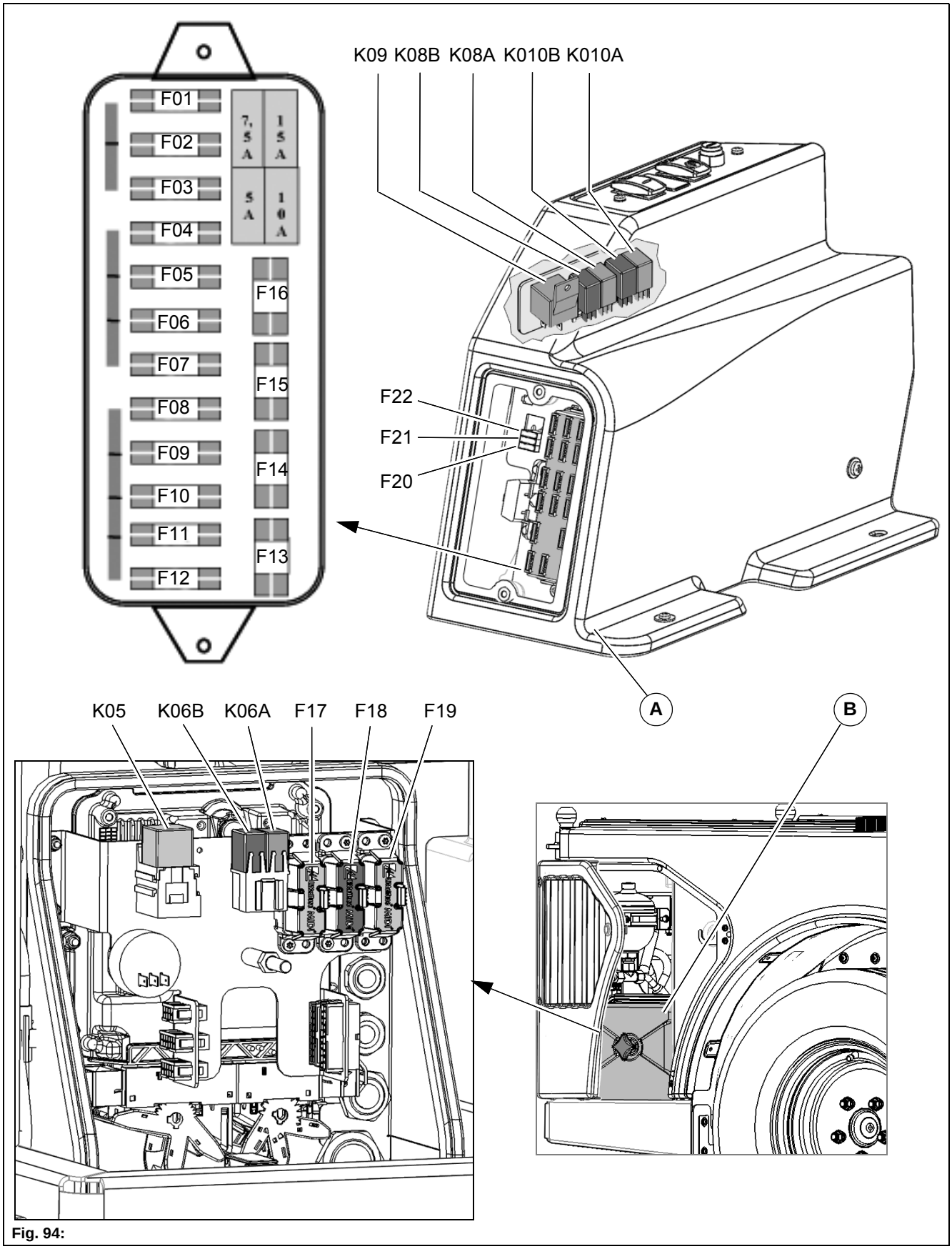


Fig. 94:

No.:	Value	Function
		Fuses – control panel on the right Fig. 94-A:
F01	20 A	Air-conditioning M04 and Y09, mirror heating R17* and R18*, mirror heating LED S05*
F02	30 A	Drive control supply A03, reversing light E21, valve Y01-Y06, Y31, Y32*, reversing signal X73*
F03	20 A	Supply A04, signal generator H02, relief relay K05, proportional valve relay K10B, socket X63 and X64, valves Y10, Y13, Y14, Y17, Y18, Y21, Y29 and Y33
F04	10 A	3-pin socket X61 and video socket X73, radio connection socket X71*
F05	5 A	Engine and preheat control light H03, relief relay K10A, hydraulic control A04, fresh water level sensor B25, mirror heating control A06*, diagnosis socket X60, fuel level sensor B04, load indicator B26*, multifunctional display P01
F06	10 A	Engine electrical box A01, drive control A03, starter relay K06A, brake light relay K06B, brake light E05 and E06, trailer socket X65
F07	15 A	Drive control A04 (front socket X63)
F08	15 A	Windscreen wiper relay K08A, valves Y12, Y15, Y16, Y19, Y20, socket X64
F09	10 A	Windscreen wiper M05, washing pump M06, hydraulic control A04 (washing pump)
F10	15 A	Ventilation M07, air-conditioning relay K09, LED S13
F11	15 A	Driver's seat compressor B08*, upper working spotlight E09 and E10*, lower working spotlight E11 and E12, LED S04, front socket X63*
F12	15 A	Trailer socket X65, lower headlights E01 and E02, upper headlights E22 and E23*, fog tail light relay K08B, fog tail light E14*, LED S12*
F13	15 A	Beacon E18, inside light E19, rear attachment socket X64*, fuse F15 and F16
F14	15 A	Hydraulic control A04 supply flasher lights, front/left flasher E03, front/right flasher E04, rear/left flasher E05, rear/right flasher E06, trailer socket X65, horn H01
F15	7.5 A	LED f0r S04-S05*-S06-S07-S08-S10-S11-S12*-S16*-S18*-S28*, front/left position light E03, trailer socket X65, left tail light E05, rear socket X64, radio isolation plug X71*, hydraulic control A04
F16	7.5 A	Front/right position light E04, front socket X63, trailer socket X65, right tail light E06, number plate light E15
F20	7.5 A	Starter release A01
F21	10 A	Isolation plug X71*, valve Y10, Y21, Y33*
F22	5 A	Drive control A03, multifunctional display P01, diagnosis socket X60, multifunctional display programming interface X58, hydraulic control A04

* Optional

No.:	Value	Function
		Relays – control panel on the right Fig. 94-A:
K08A		Windscreen wiper
K08B		Fog tail light
K09		Air conditioning system
K10A		Relief valve
K10B		Proportional valves
		Electrical box fuses Fig. 94-B:
F17	50 A	Pre-fuse
F18	50 A	Pre-fuse
F19	50 A	Engine main fuse
		Electrical box relays Fig. 94-B:
K05		Supply 75
K06A		Starter operated
K06B		Brake light relay

* Optional

5.12.3 Battery

Danger

- Danger of explosion due to smoking, fire or open light! Especially when being charged, but also in the normal use of batteries, batteries emit explosive gases! Avoid smoking, fire, sparks or open light in the vicinity of batteries!
- Danger of explosion due to sparks! Never place tools or other electrically conductive objects on the battery! Sparks that can ignite escaping gases arise if the poles are short-circuited. Always observe the correct order when connecting and disconnecting the battery!
  - Disconnecting the battery: First the minus pole and then the plus pole!
  - Connecting the battery: First the plus pole and then the minus pole!
- Danger of explosion due to frozen battery or too low acid level! With a frozen battery or if the acid level is too low, do not attempt to start with a jumper cable, the battery can burst or explode.
- Danger of burns due to battery acid! The special safety and accident prevention regulations must be complied with when handling the battery. Batteries contain sulphuric acid.

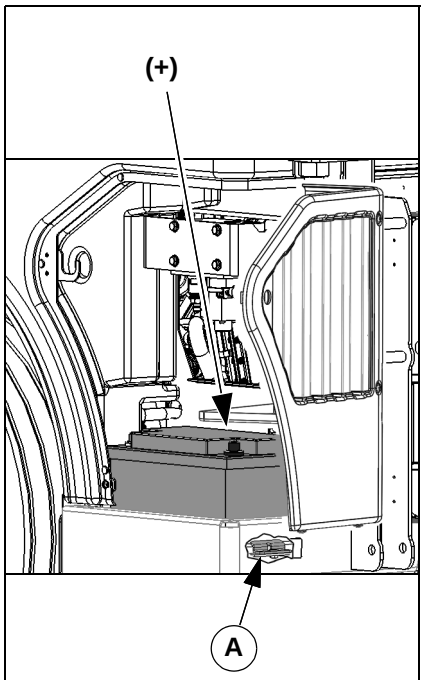


Fig. 95:

Removing the battery

1. Place the vehicle on a level surface and hold it with the parking brake. Switch the engine off and pull out the ignition key. Let the engine cool down.
2. If present, switch the battery isolating switch off and remove the key.
3. Open the left side door and loosen the battery holder of the battery **Fig. 95-A**.
4. Disconnecting the battery: First the minus pole and then the plus pole!
5. Remove the battery. Clean and grease the battery poles.
6. Recharge the battery or replace it by a new battery of the same strength.
7. Connecting the battery: First the plus pole and then the minus pole!

Starting with jumper cables

1. Place the vehicle on a level surface and hold it with the parking brake. Switch the engine off and pull out the ignition key. Let the engine cool down.
2. Switch engine and electrical consumers of both vehicles off.
3. Connect the plus cable (red) with one end to the plus pole (+) of the empty battery and with the other end to the plus pole (+) of the assisting vehicle.
4. Connect the minus cable (black) to the minus pole (-) of the supporting vehicle and to the minus pole (-) of the Citymaster 1600.
5. Start the engine of the assisting vehicle.
6. Start the Citymaster 1600.
7. When removing the jumper cable, first remove the minus poles (-) and then the plus poles (+).

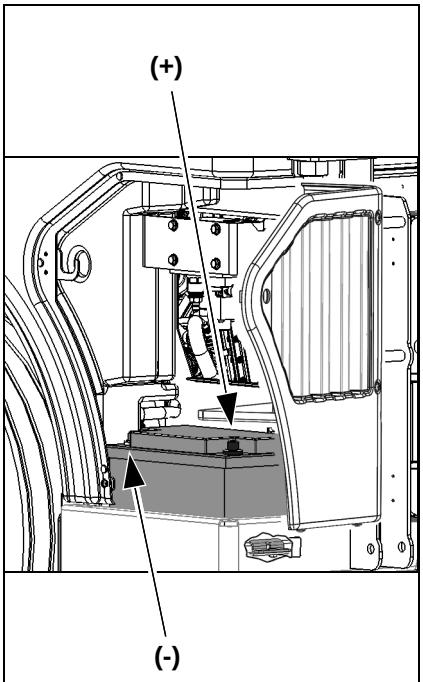


Fig. 96:

5.13 Lubrication plan

Item	Name
A	Door hinge left, right, above and below (4x)
B	Rigid upper link (2x)
C	Front lifting cylinder left, right, above and below (4x)
D	Front lift left/right (2x)
E	Adjustable upper link (2x) (optional)

Lubricants
Grease DIN 51825, KP 2N-20

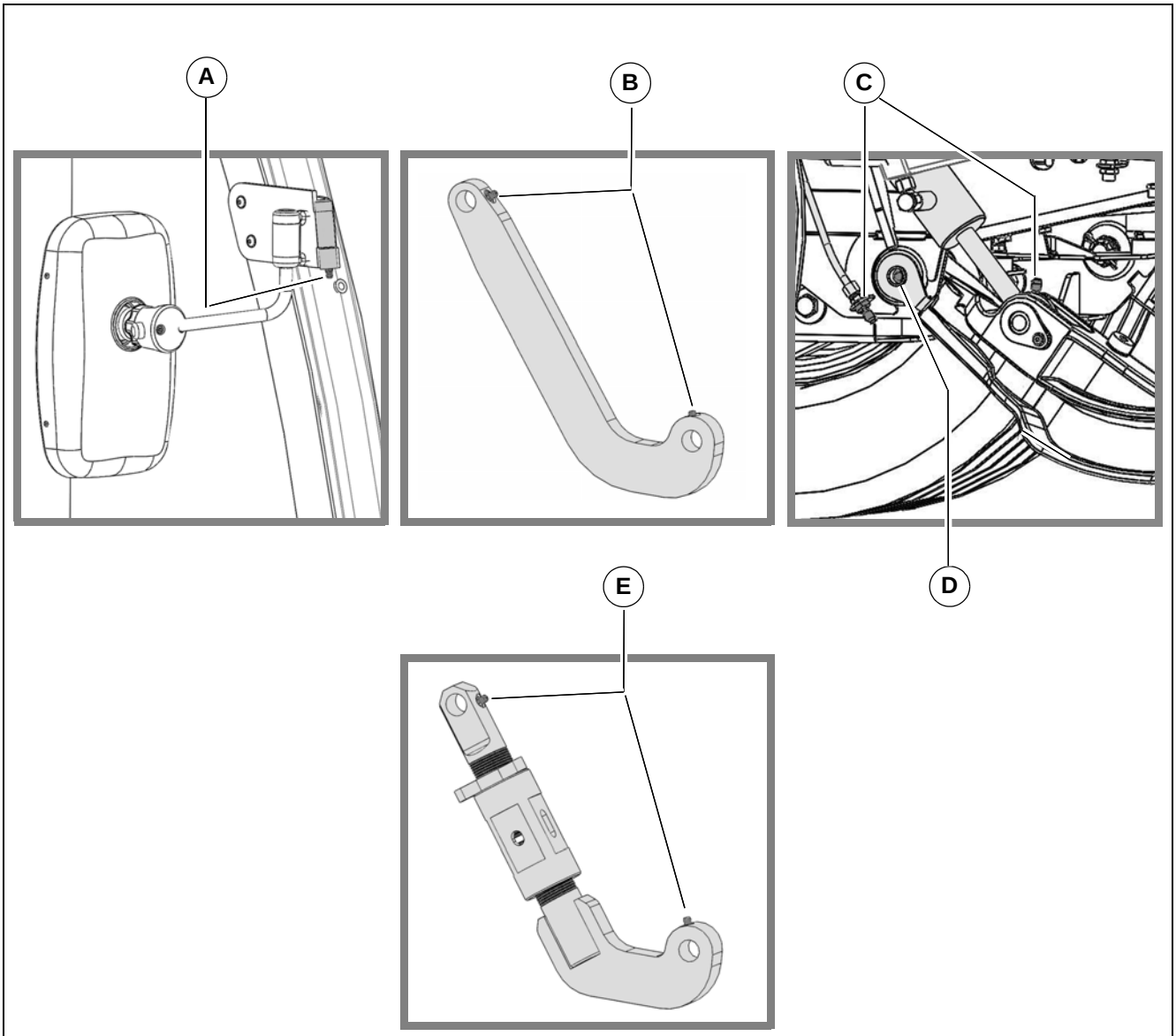


Fig. 97:

5.14 Cleaning the vehicle

Warning
- Danger of burns from hot parts! Do not touch any parts such as engine block, cooling system and exhaust system during operation and for some time after. Let the engine cool down.
- Use only dedicated washing places for cleaning the vehicle.

Attention
- When cleaning the engine with a water or steam jet cleaner, do not expose electrical plug connections and sensors, such as oil pressure switch, to a direct jet. Otherwise penetrating moisture can lead to corrosion and to failure of the measuring function!
- Never clean the driver's cab inside with a high-pressure cleaner, steam jet cleaner or with a strong water jet. Water under high pressure can:
  - Penetrate the vehicle electrical system and cause a short circuit,
  - Damage seals and make operating elements defective!

5.14.1 General notes

A distinction is made between 3 areas in vehicle cleaning:
- Driver's cab inside
- Complete vehicle outside
- Engine space

Here the wrong choice of cleaning equipment and agents can impair the operating safety of the vehicle and also endanger the health of the cleaning personnel. Therefore the following instructions should be followed without fail:

When using washing solutions
- Ensure sufficient room ventilation
- Wear suitable protective clothing
- Do not use any combustible liquids such as petrol or diesel fuel

When using compressed air
- Work carefully
- Wear eye protection and protective clothing
- Do not direct compressed air onto the skin or towards other persons
- Do not use compressed air for cleaning clothes

When using a high-pressure cleaner or steam jet cleaner
- Maintain a minimum distance of at least 30 cm!
- Max. pressure 120 bar at max. 80 °C
- Cover electrical parts and insulating mats and do not expose them to a direct jet.
- Do not expose the venting filter of the hydraulic oil tank and lid of the fuel and hydraulic oil tank to a direct jet or cover these parts.
- Protect the following components against moisture:
  - Electrical parts, such as three-phase generator, sensors, electrical plug connections, engine control unit, etc.
  - Control devices and seals
  - Air suction filter etc.

When using volatile and easily flammable anti-rust agents and sprays:
- Ensure sufficient room ventilation!
- Use no naked fire or light!
- Do not smoke!

Care of the outside body

Wash your vehicle at regular intervals with water and a mild detergent.

How frequently the vehicle has to be washed depends on the following factors:

- Area of use of the vehicle
- Driving on roads spread with salt
- Parking under trees with resinous excretions

Observe the following when washing:

- Do not use any coarse brushes or dirty cloths to prevent scratching and dulling the paintwork
- Do not wash the vehicle if it has been exposed to sunshine for a long time, the paintwork could lose its gloss by this

Cleaning plastic parts

Clean outer plastic parts like the vehicle. If dirt cannot be removed in this way, we recommend special plastic cleaners. You can also use these inside the vehicle for plastic parts.

Do not use any paint cleaners or products containing solvents, methanol or hydrocarbons.

Cleaning glass areas

Use special glass cleaners and clean cloths to avoid scratches and dulling.

Driver's cab inside

We recommend the following aids for cleaning the driver's cab:

- Vacuum cleaner
- Damp cloths
- Soft brush
- Bucket of water

Cleaning fabric surfaces

Remove dust on seats and other fabric surfaces with a soft brush or vacuum cleaner. More thorough cleaning can be achieved with special upholstery detergents. Observe the directions for use and danger notes of the manufacturer!

Solvents on a chlorine basis may not be used.

6 Attachments and Options

Safety instructions for attachments

Danger

- Danger to life in the danger area of the vehicle! Special caution is required under the raised tipper, in the area of the front and rear attachment and in the area of the trailer.
- Risk of injury! Put the attachment into service only if all protective devices are attached and in protection position.
- Risk of injury! Make sure that the attachments are suitable for the set oil volume. An oil volume set too high can lead to injuries due to a defect of the attachment!
- Risk of injury! High-pressure hoses, fittings and couplings are important for equipment safety. Use only high-pressure hoses, fittings and couplings recommended by the manufacturer.
- Risk of accident! When connecting attachments to the hydraulic system, ensure that the hydraulic hoses are connected correctly. Swapping the connection can lead to reverse functioning of the attachment, e.g. movement to the right rather than the left.
- Risk of accident! Front attachments not correctly fastened to the front tool carrier can drop down while driving. Always secure the front attachment with the locking devices.
- Risk of accident! You must consult Hako before attaching other attachments not approved by Hako! Check in the individual case that the relevant axial loads and total weights are complied with.
- Risk of accident! Handling, steering and braking as well as stability are influenced by attachments, trailers and the vehicle payload (e.g. full dirt hopper). For this reason, pay attention to adequate steering and braking capability as well as stability.
- Risk of accident! In Germany, if attachments extend beyond the outer lighting equipment of the vehicle or if the maximum distances of the outer lighting equipment specified according to StVZO are exceeded, the lighting equipment of the vehicle must be repeated (see Merkblatt StVZO § 30, explanations 11 and 12).

Safety instructions for ballast

Danger

- Risk of accident! When attaching other attachments not approved by Hako, check in the individual case whether the relevant axle loads and total weights are complied with!
- Risk of accident! The front axle of the working machine must always be loaded with at least 25 % of the empty weight and the rear axle with at least 37 % of the empty weight of the working machine.
- Risk of accident! The attachment of front and rear attachments must not lead to exceeding the permissible total weight, the permissible axle load and the tyre load capacity of the working machine!

Warning

- Make sure before purchasing the attachment that these requirements are fulfilled by weighing the working machine attachment combination!

6.1 Vacuum sweeping system

	Note The vacuum sweeping system can be equipped with a 2-brush system or a 3-brush system. Any deviations due to the 3-brush system are listed accordingly at the respective position.

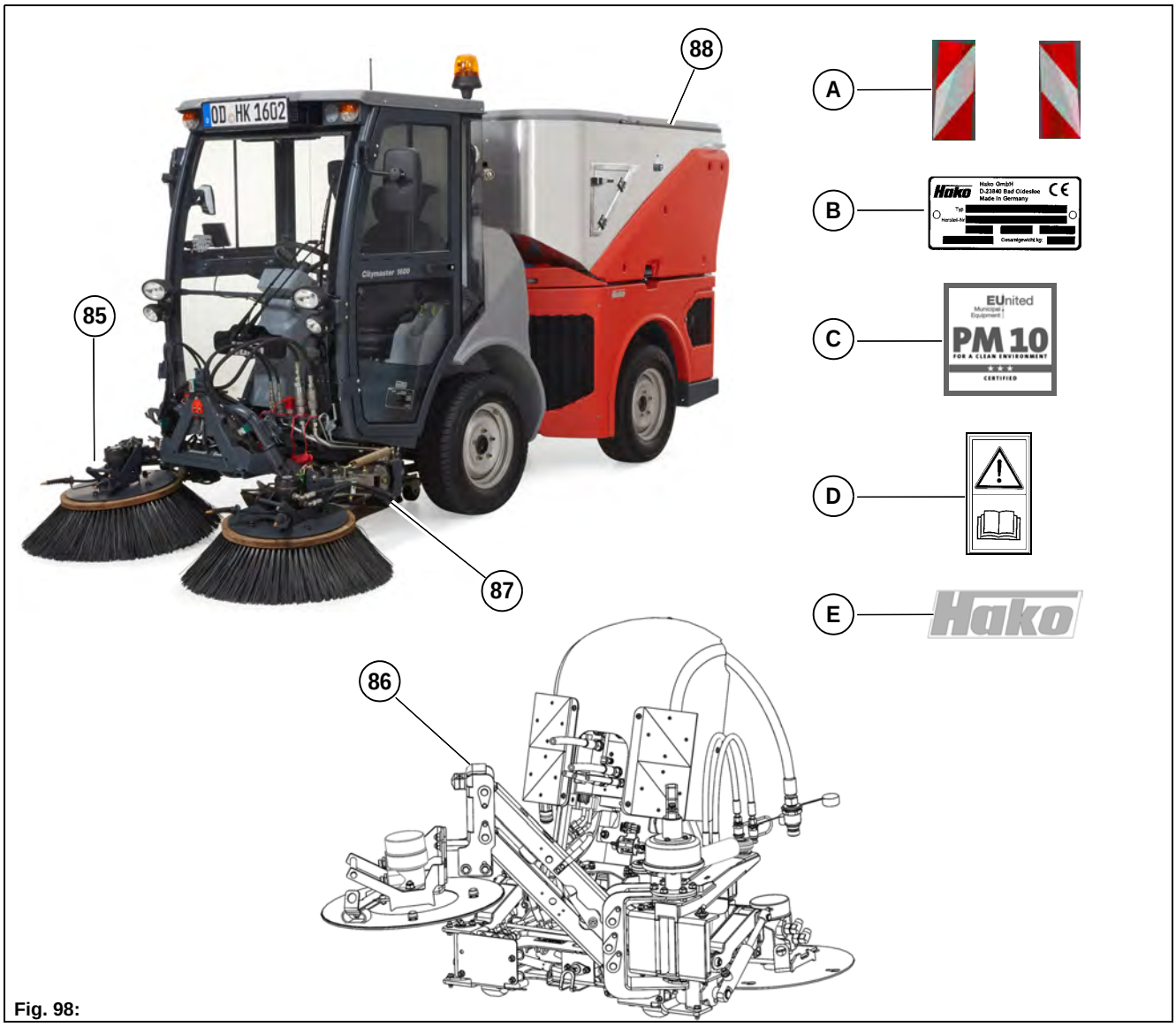


Fig. 98:

Item	Designation
85	Sweeping unit 2-brush system
86	Sweeping unit 3-brush system
87	Sweeping unit suction mouth
88	Dirt hopper

6.1.1 Labels on the unit

Reflector
The reflectors (red/white) **Fig. 98-A** are located on the cover of the sweeping unit of the 2-brush system, the 3-brush system and at the back of the dirt hopper.

Type plate
The type plates **Fig. 98-B** are located on the sweeping unit of the 2-brush system, the 3-brush system, on the dirt hopper, on the trolley and on the supports.

Label PM10
The fine dust certificate label PM10 **Fig. 98-C** is located on the dirt hopper.

Label – Read operating manual
The label – Read operating manual **Fig. 98-D** is located on the sweeping unit of the 3-brush system.

Hako name plate
The Hako name plate **Fig. 98-E** is located on the sweeping unit of the 2-brush system and the 3-brush system.

6.1.2 Vacuum sweeping system safety instructions

Danger
- Danger to life in the danger area of the vehicle! Special caution is required under the raised tipper and in the area of the sweeping unit.
- Danger of tilting over when driving uphill or downhill and transversely to a slope! Avoid sudden turns when driving uphill or downhill or across slopes. There is a risk of tilting over in an inclined position! The vehicle speed must always be adapted to the surrounding conditions and the load condition.
- Danger of tilting due to wrong steering! Note that the steering behaviour of an articulated steered vehicle differs essentially from that of a car. Sudden steering movements at high speed or too high speeds when turning can cause the vehicle to tilt over.
- Risk of injury! Frequently check the filling level of the dirt hopper. Switch the suction fan off for this! The lid and the side doors of the dirt hopper must not be opened when the suction fan is running.
- Risk of accident! Make transport journeys only with the sweeping unit raised and secured in the transport position.
- Risk of accident! Make transport journeys only with a completely lowered dirt hopper!
- Risk of accident! The stability of the vehicle is influenced by a filled dirt hopper. Handling of the vehicle must be adapted accordingly.
- Risk of accident! Do not exceed the permissible total weight of the vehicle!
- Risk of accident! When the dirt hopper is emptied, the Citymaster 1600 must be on a sufficiently load bearing, horizontal surface. Driving with the dirt hopper tilted is not permitted.

Warning
- When removing blockages in the suction hose or attaching the hand suction hose (optional), switch off the engine and wait for the suction fan to come to a standstill.
- The sweeping system may be operated only in connection with the Citymaster 1600. The safety regulations for the Citymaster 1600 must be complied with absolutely.

Caution
- The labels attached to the vehicle provide important information for safe operation. Renew labels that are no longer legible or present.
- Spare parts must be original spare parts to guarantee safety.

6.1.3 Mounting

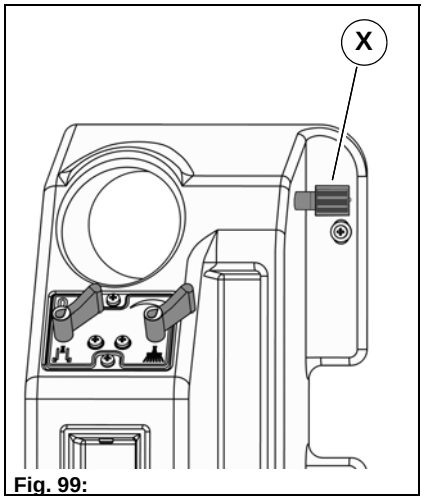


Fig. 99:

Mounting the suction mouth

	Note If circulating water is in the dirt hopper, the circulating water must be shut off using the ball cock **Fig. 100-10**!

1. Place the vehicle on a level surface and hold it with the parking brake.
2. Raise the front tool carrier and fix it in the upper position with the lowering valve **Fig. 99-X.**
3. Position the suction mouth **Fig. 100-87** by hand or with the auxiliary tool **Fig. 100-A** centrally under the holding plate **Fig. 100-B**.
4. Open the valve **Fig. 100-H**. Push the joystick **Fig. 100-70** forwards. When the valve is open, the holding plate is lowered onto the suction mouth.
5. Shift the suction mouth centrally under the holding plate until the stops **Fig. 100-C** come up to the points **Fig. 100-D**.
6. With the lever **Fig. 100-E** lock and secure the suction mouth on the counter bearing **Fig. 100-F** of the holding plate, see sketch **Fig. 100-G**.
7. Open the lowering valve **Fig. 99-X** again.

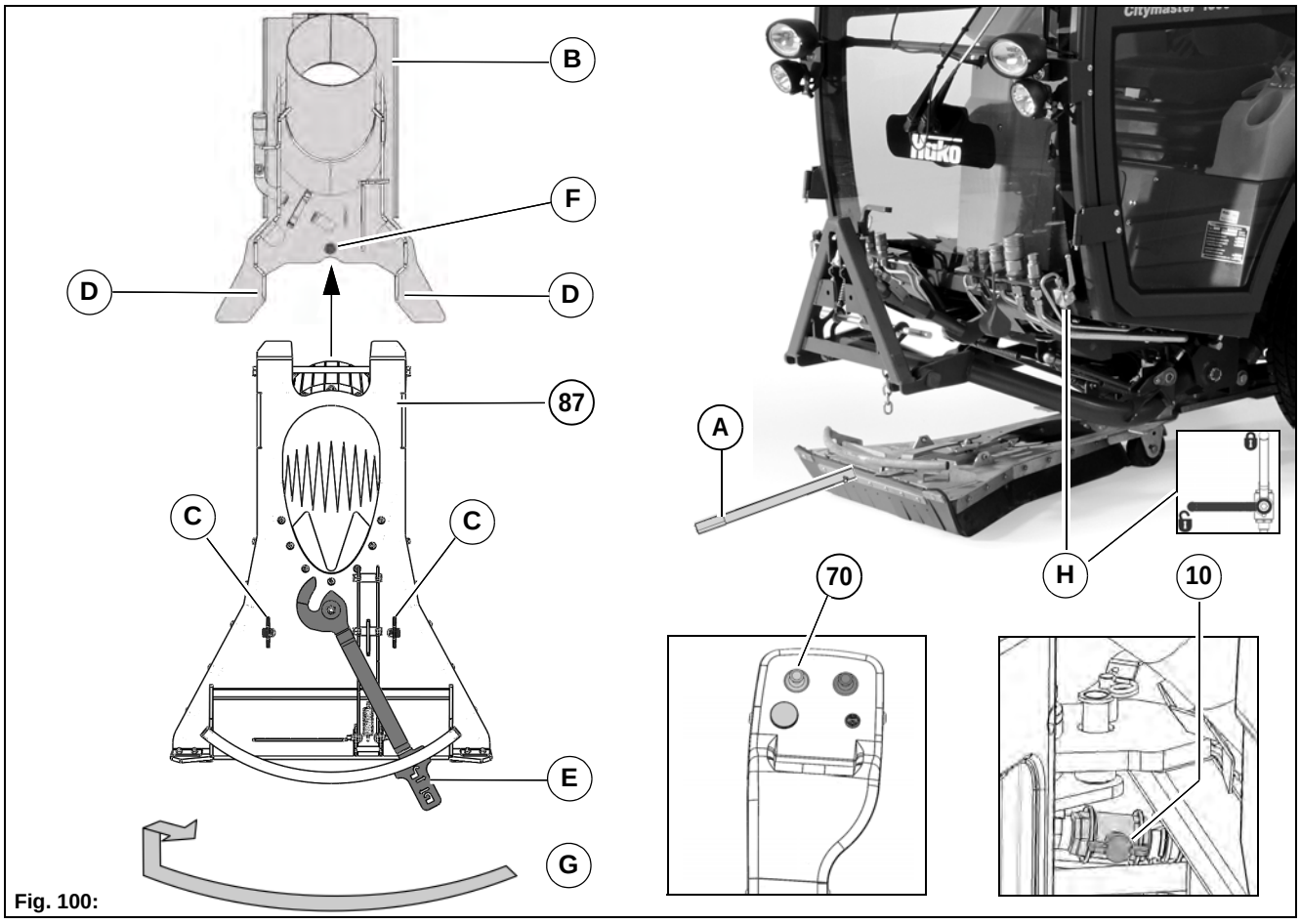


Fig. 100:

Mounting the sweeping unit (2-brush system)

1. Unlock the locking hook **Fig. 101-A** and locking rod **Fig. 101-B** on the front tool carrier **Fig. 101-12**. Lower the front tool carrier with the joystick **Fig. 101-70**.
2. With the trolley **Fig. 101-C** (optional), align the sweeping unit **Fig. 101-85** centrally and in alignment with the front tool carrier.
3. With an adjustable upper link (optional), set the standard length, see page 64.
4. Raise the front tool carrier with the joystick **Fig. 101-70** and attach the sweeping unit.
5. Lock the sweeping unit with the locking hook and locking rod. Check the backlash on the locking hook, see **Fig. 101-E**, adjust if necessary with elongated holes.
6. Push down the upper part **Fig. 101-D** of the trolley and pull it out from the sweeping unit.

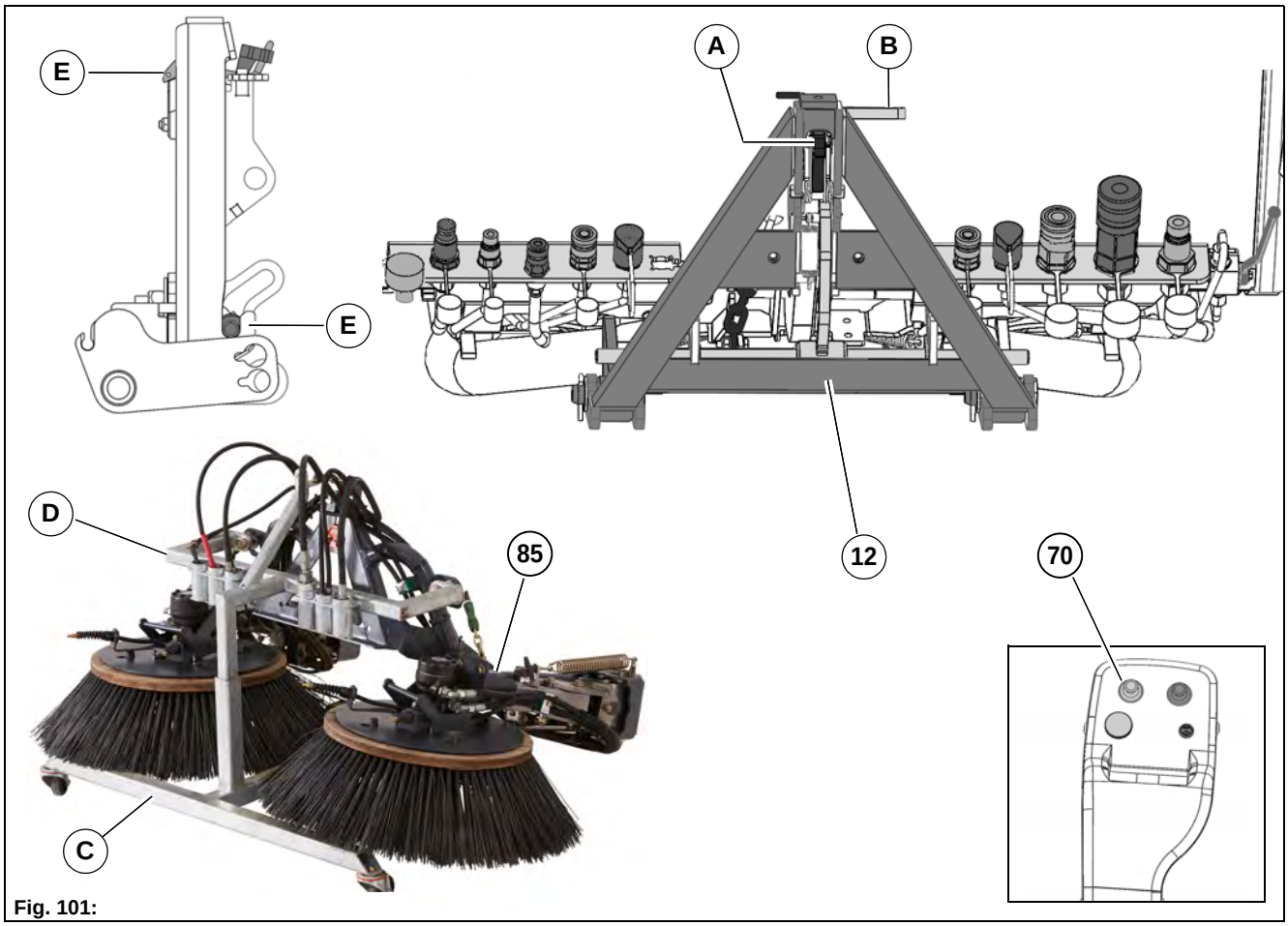


Fig. 101:

Continued – Mounting the sweeping unit (2-brush system)

7. Make the connections.
   - Right actuator – Supply/return = **Fig. 102-D**
   - Left actuator – Supply/return = **Fig. 102-D**
   - 19-pin coding plug = **Fig. 102-F**
   - Water connection for sweeping unit spray nozzles = **Fig. 102-G**
   - Sweeping unit hydraulic motors – Supply/return = **Fig. 102-H**
8. Hook the chain **Fig. 102-M** in the first chain link. Lower the front tool carrier and drive the brush arms apart. Check that the edge **Fig. 102-N** stands vertically. Change the hooking position of the chain as required.

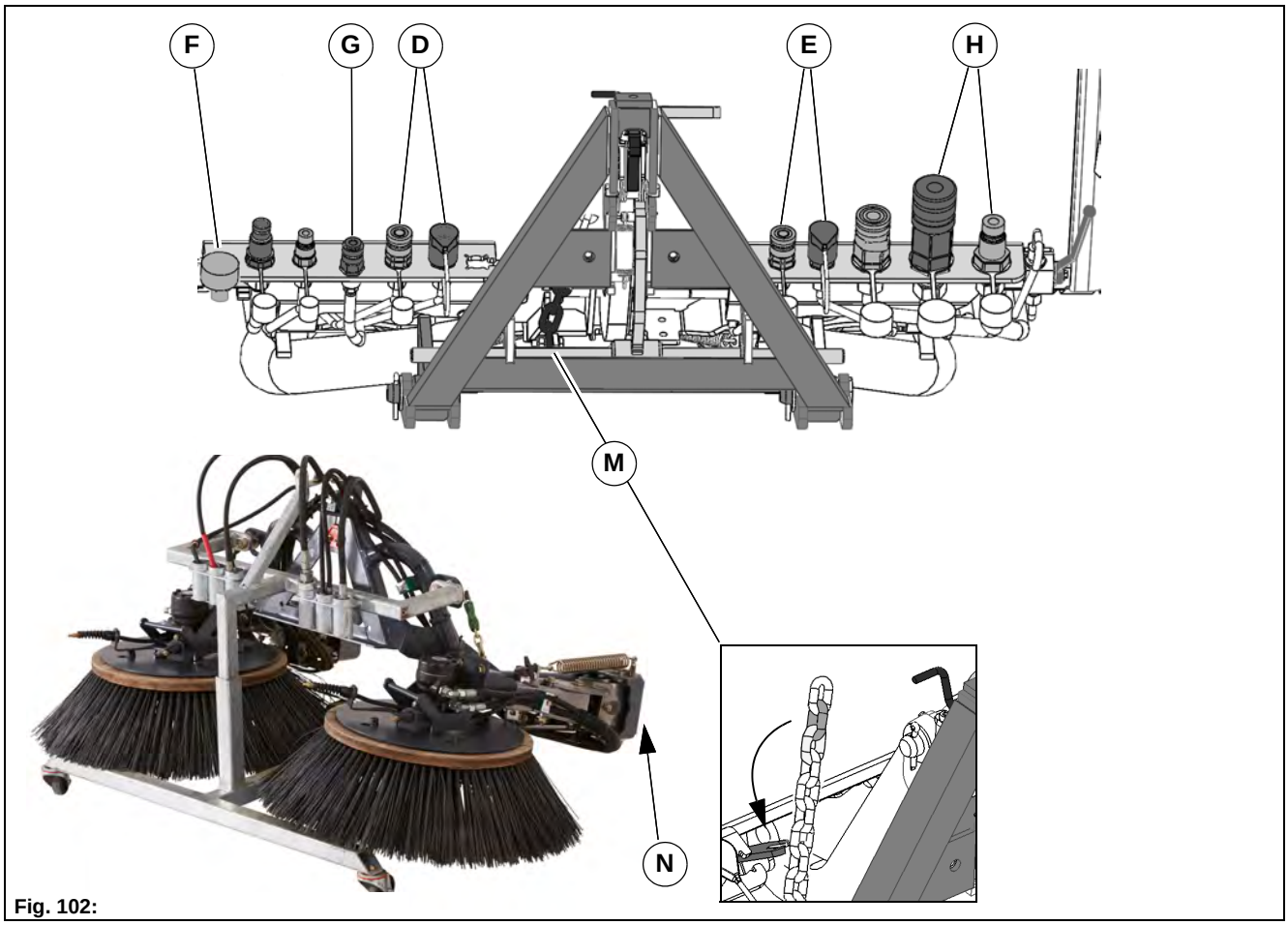


Fig. 102:

Mounting the sweeping unit (3-brush system)

1. Unlock the locking hook **Fig. 103-A** and locking rod **Fig. 103-B** on the front tool carrier **Fig. 103-12**. Lower the front tool carrier with the joystick **Fig. 103-70**.
2. With the trolley **Fig. 103-C** (optional), align the sweeping unit **Fig. 103-86** centrally and in alignment with the front tool carrier.
3. With an adjustable upper link (optional), set the standard length, see page 64 (Set the arm **Fig. 103-D** of the sweeping unit parallel to the floor).
4. Raise the front tool carrier with the joystick **Fig. 103-70** and attach the sweeping unit.
5. Lock the sweeping unit with the locking hook and locking rod. Check the backlash on the locking hook, see **Fig. 103-E**, adjust if necessary with elongated holes.
6. Disassemble the bolts **Fig. 103-F** of the trolley and pull the trolley out from the sweeping unit.

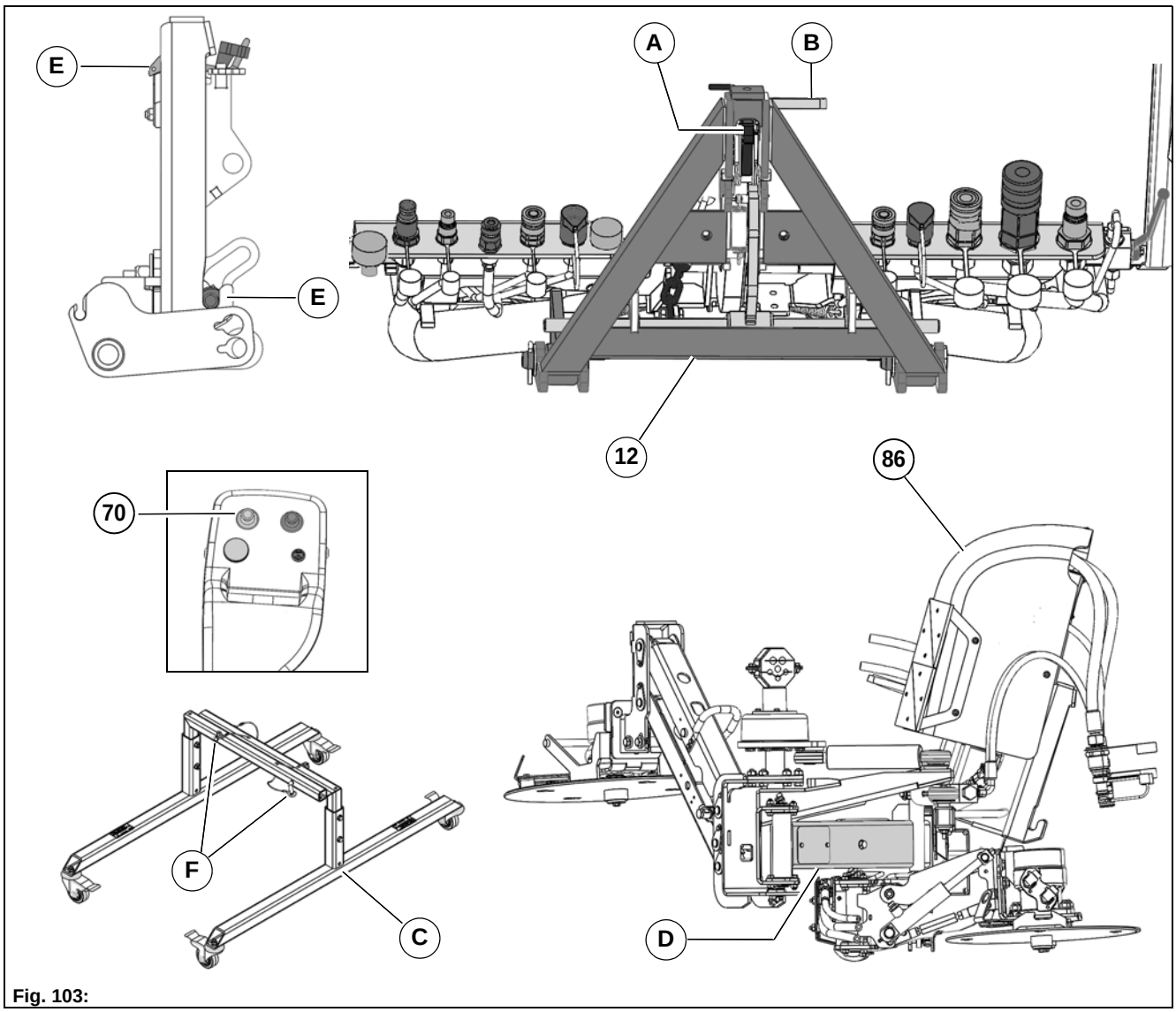


Fig. 103:

Continued – Mounting the sweeping unit (3-brush system)

	Note For the 3-brush system, the front tool carrier must be fixed in the upper end position. After mounting, move the front tool carrier to the upper end position and close the lowering valve **Fig. 104-F**.

7. Make the connections.
   - Supply control unit 3-brush system = **Fig. 104-A**
   - LS for control unit 3-brush system = **Fig. 104-B**
   - Water connection for spray nozzles = **Fig. 104-C**
   - Actuator – supply/return = **Fig. 104-D**
   - Return control unit 3-brush system = **Fig. 104-E**
   - 9-pin plug = **Fig. 104-X66**
   - 19-pin coding plug = **Fig. 104-X63**

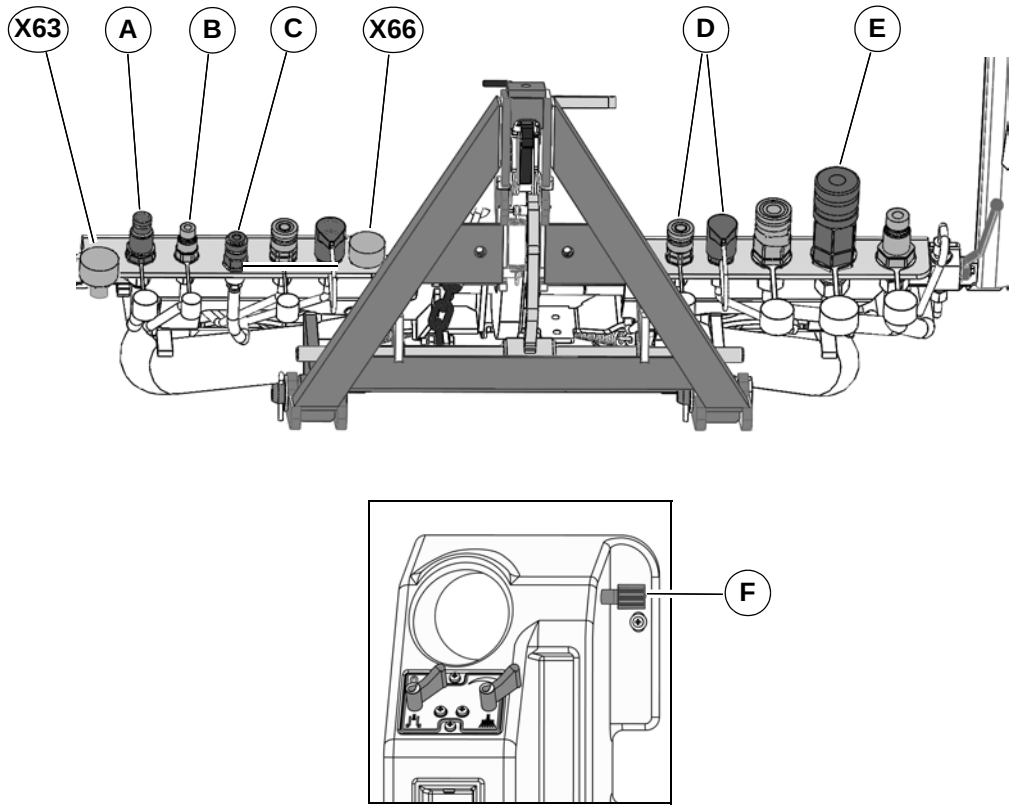


Fig. 104:

Mounting the dirt hopper

1. Place the vehicle on a level surface and hold it with the parking brake.
2. Unlock the lever **Fig. 105-A** of the trolley **Fig. 105-E** (optional) and swing it into the upper position.
3. Hold the lever **Fig. 105-A** in the upper position with one hand. With your other hand plug the mounting bolt **Fig. 105-B** on the Citymaster 1600.

⚠	**Danger** Risk of injury! The lever **Fig. 105-A** can swing over.

4. Unlock the sledge **Fig. 105-C** with the lever and push it into the rear position.
5. Open the lock of the lid on the dirt hopper **Fig. 105-D** and swing the lid up.

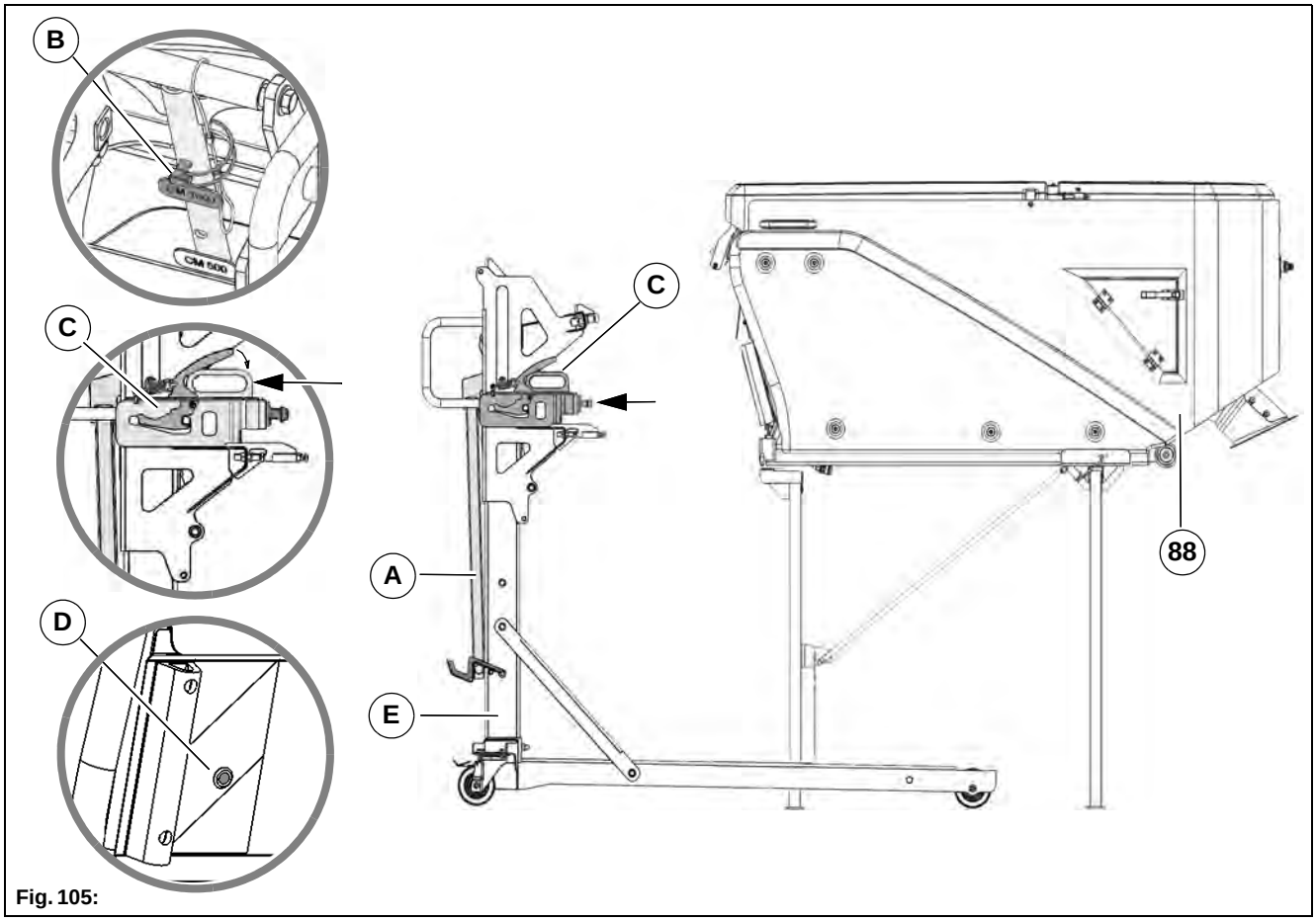


Fig. 105:

Continued – Mounting the dirt hopper

⚠	**Danger** Risk of injury due to tilting over! Make sure that the cross strut **Fig. 106-D** (optional) has been inserted when transporting the dirt hopper on the supports **Fig. 106-L**. Secure the supports with bolts and splints.

6 Push the trolley **Fig. 106-J** (optional) with the lower positioning aid **Fig. 106-E** into the spars **Fig. 106-G** and against the fixed bearings **Fig. 106-H** of the dirt hopper. The screw **Fig. 106-F** must be adjusted to 38.5 mm!

7 Carefully lower the lever **Fig. 106-A** of the trolley and make sure that the upper positioning aid **Fig. 106-I** sits behind the plate **Fig. 106-J** of the dirt hopper. Lock the lever.

8 Remove the supports **Fig. 106-L**. To do this, pull out the split pins and the bolts.

☞	**Note** During mounting protect the seal **Fig. 106-K** of the suction mouth with a cover plate.

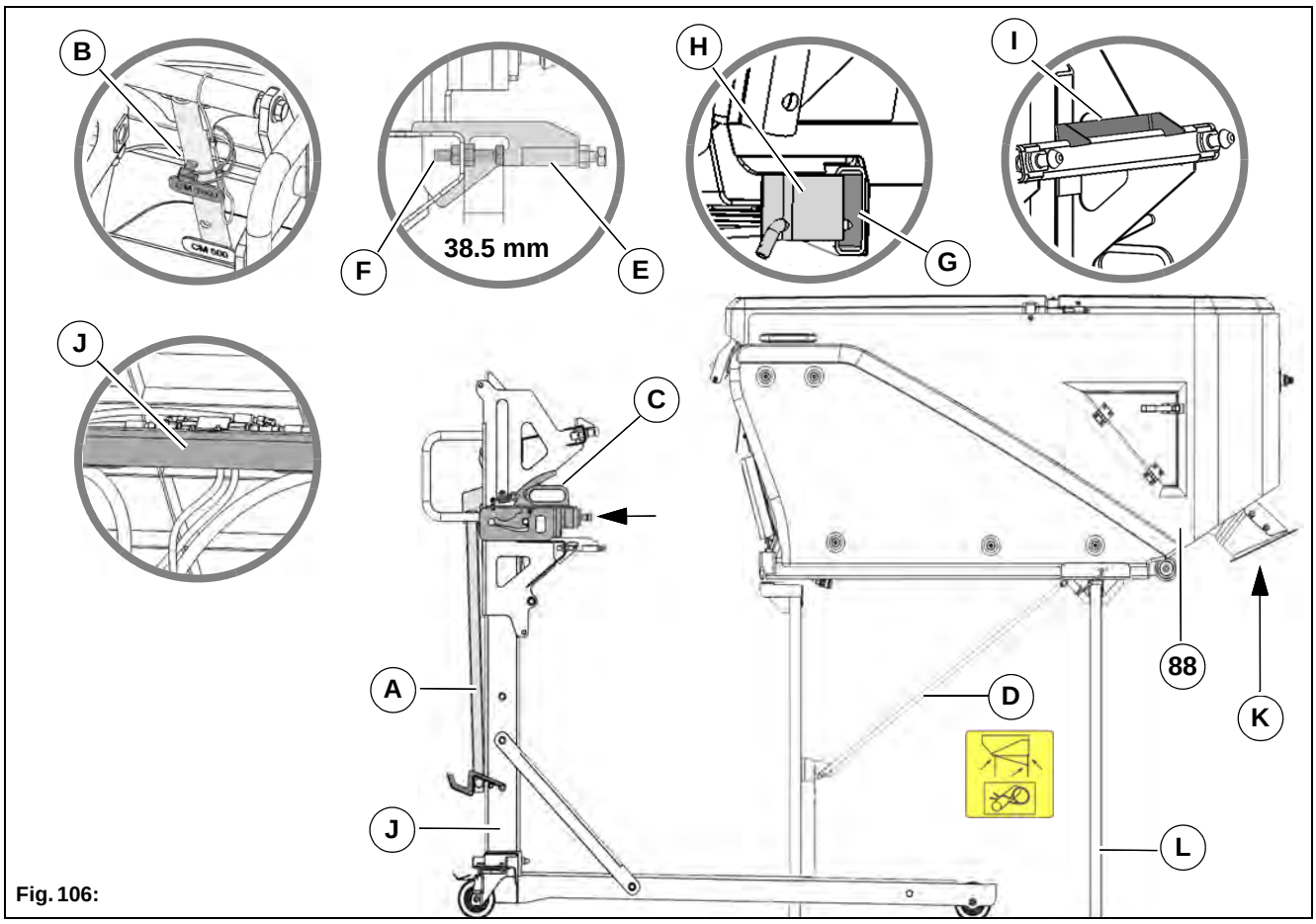


Fig. 106:

Mounting the dirt hopper continued

9. Align the dirt hopper to the rear wagon.
   Procedure:
   - Position the dirt hopper over the rear wagon and check the gap size **Fig. 107-X** with 5-10 mm. If necessary, correct with the screw **Fig. 107-A**.
   - Push the rollers of the dirt hopper up into the pockets **Fig. 107-B**.
   - The fixed bearings **Fig. 107-C** of the dirt hopper and the holders **Fig. 107-D** of the rear wagon must be in alignment.
10. Unlock the lever **Fig. 107-E** of the trolley **Fig. 107-I** (optional) and swing it into the upper position. Let the dirt hopper down slowly! Withdraw the trolley and close the lid.
11. Secure the dirt hopper with bolts and splints.
12. Make the connections.
    - Lift system hydraulic cylinder – supply/return = **Fig. 107-F**
    - Suction fan hydraulic motor – supply/return = **Fig. 107-G**
    - Circulating water = **Fig. 107-H**

Dismantling is in the reverse order.

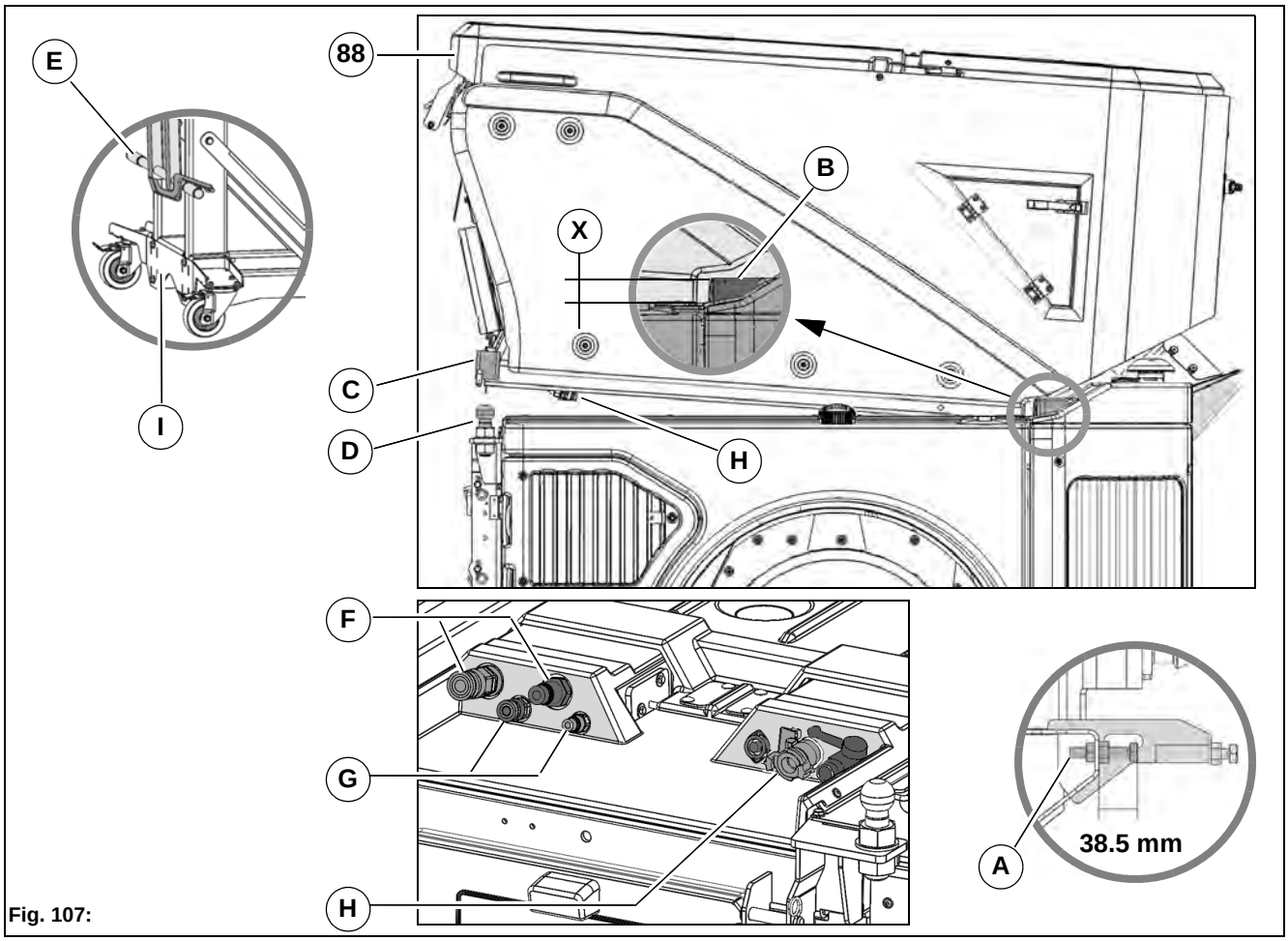


Fig. 107:

6.1.4 Operation

Check-list – Before start-up of the vehicle

No.	Description	Reference
1	All items from the checklist – Check before starting the vehicle	Page 70
2	Filling fresh water	Page 128
3	Filling circulating water	Page 129
4	Checking the ball cock circulating water	Page 129
5	Checking transport protection device	Page 130
6	Checking sweeping level	Page 154
7	Checking rotating brush pressure	Page 153
8	Checking suction mouth sealing strips	Page 155
9	Checking suction duct seal	Page 156
10	Checking lubrication points	Page 156

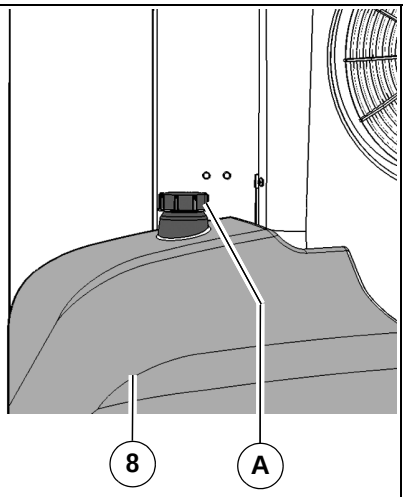


Fig. 108:

Filling fresh water

Open the cap **Fig. 108-A** and fill the fresh water tank **Fig. 108-8** until the level indicator in the multifunctional display shows maximum.

Hydrant kit (optional)

Filling the fresh water tank from the public water mains with the D hose connection is possible with the hydrant kit (optional). The hydrant kit is mounted above the filling cap and contains a C hose connection, a D hose connection, an installation key and a free-fall section.

	Note Water may be taken from the mains of public water connections only through the "D-hose connection"!

Filling circulating water

1. Switch off the suction fan of the dirt hopper!
2. Open the lock **Fig. 109-A** of the dirt hopper.
3. Adjust the rear flap with the lever **Fig. 109-B**.
4. Fill the dirt hopper using a water hose. Use the side C hose connection as an alternative.
5. Fill the dirt hopper up to the mark of the plate **Fig. 109-C**. Filling volume for circulating water approx. 180 litres. After filling, check the function of the supply to the suction mouth.

☞	**Note** Fill less circulating water into the dirt hopper when it is raining or wet. The vehicle sucks the remaining water off from the road when sweeping.

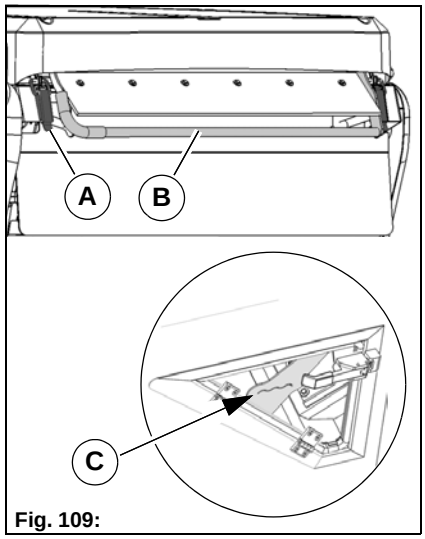


Fig. 109:

Checking the ball cock circulating water

The circulating water is closed off only with the ball cock for maintenance purposes. In normal operation the ball cock **Fig. 110-10** must be opened!

- Circulating water supply opened: Ball cock in flow direction
- Circulating water supply closed: Ball cock at right angles to the flow direction

☞	**Note** Close off the circulating water supply only if there is circulating water in the dirt hopper and the suction mouth should be mounted or dismounted.

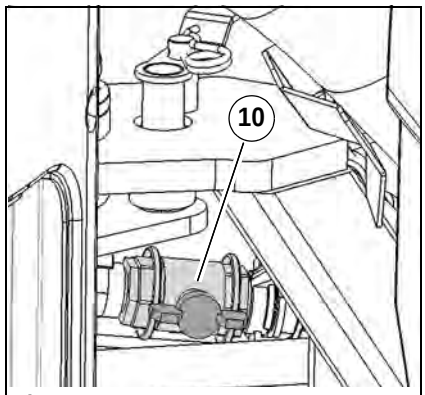


Fig. 110:

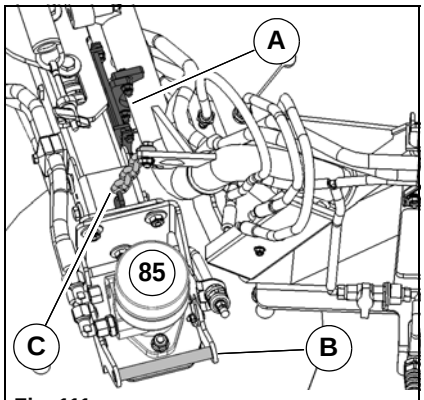


Fig. 111:

Checking the transport protection device (2-brush system)

The automatic transport protection device **Fig. 111-A** is located on the brush arms of the sweeping unit **Fig. 111-85** and has the task of moving the rotating brush up when the sweeping unit is raised.

The brush arms are locked automatically when the brush arms are swung down with the joysticks **Fig. 114-70 and Fig. 114-71**. For reasons of safety, raise the brush arms with the handle **Fig. 111-B** and lock them with the chain **Fig. 111-C** before transporting.

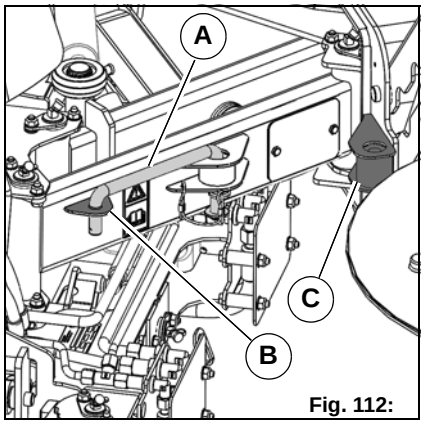


Fig. 112:

Checking the transport protection device (3-brush system)

The bow **Fig. 112-A** of the transport protection device is located on the brush arm of the 3rd rotating brush.

- Position **Fig. 112-B** = for work mode
- Position **Fig. 112-C** = for transport mode

For reasons of safety, lock the 3rd rotating brush with a bow **Fig. 112-A** before transporting. Mount the bow in position **Fig. 112-C**.

Checklist – Vacuum sweeping

No.	Description	Reference
1	Driving to the work site	Page 131
2	Switching vacuum sweeping on	Page 131
3	Setting the fixed engine speed	Page 132
4	Starting vacuum sweeping	Page 132
5	Sweeping dry surfaces	Page 132
6	Sweeping wet surfaces	Page 132
7	Sweeping larger objects	Page 133
8	Changing the sweeping width	Page 133
9	Checking the overload protection	Page 134

Driving to the work site

1. Start the vehicle with the ignition switch **Fig. 113-78**.
2. As required, switch on the dipped headlight **Fig. 113-54**, working spotlight **Fig. 113-55** and beacon **Fig. 113-59**.
3. Prepare the transport mode. The brush arms must be swung in for the transport mode. For this, use the joysticks **Fig. 114-70 and Fig. 114-71**. The sweeping unit must be in the upper end position. For this, use the joystick **Fig. 114-70**.
4. Check the transport protection device, see page 130.
5. Drive to the work site. The transport mode information symbol **Fig. 113-A** appears in the multifunctional display.
6. Loosen the transport protection device, see page 130.

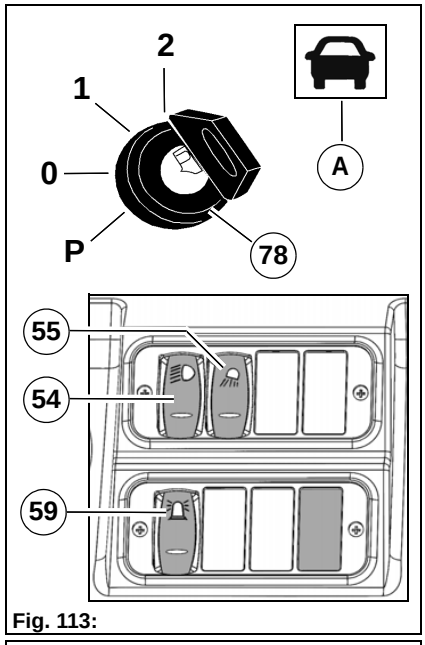


Fig. 113:

Switching vacuum sweeping on

Switch on the work mode with the Hako button **Fig. 114-72**. The accelerator pedals must be in the neutral position. In the multifunctional display, the information symbol for the vacuum sweeping system work mode **Fig. 114-A** appears as 2-brush system or **Fig. 114-B** as 3-brush system.

For a coded attachment, the Citymaster 1600 can automatically activate the following functions through the Hako button:

- The rotating brushes are lowered (floating position)
- The rotating brush drives are switched on
- The rotating brush speed is activated
- The fresh water pump is switched on
- The circulating water supply is switched on
- The suction fan is switched on

The fresh water supply is interrupted and the rotating brush stopped if the driver leaves the driver's seat! Restarting by pushing the left joystick **Fig. 114-70** forwards.

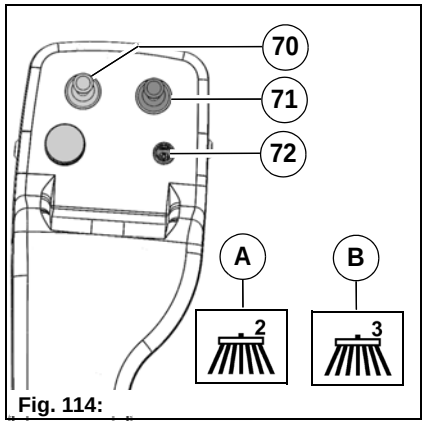


Fig. 114:

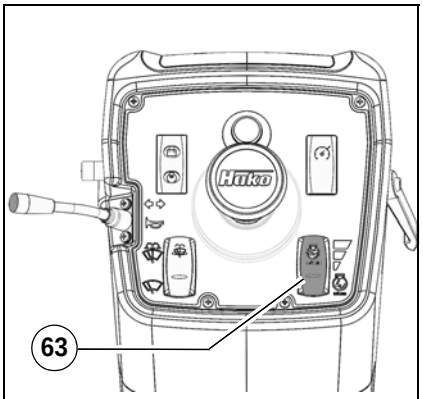


Fig. 115:

Setting the fixed engine speed

The fixed engine speed is set with the tip switch **Fig. 115-63**. Set the speed corresponding to the requirements.

Stage	Rpm	Use
1 - ECO	1600	Slight soiling/operation on flat ground
2 - Standard	2000	All soiling/operation on medium slopes
3 - Maximum	2400	All soiling/operation on steep slopes

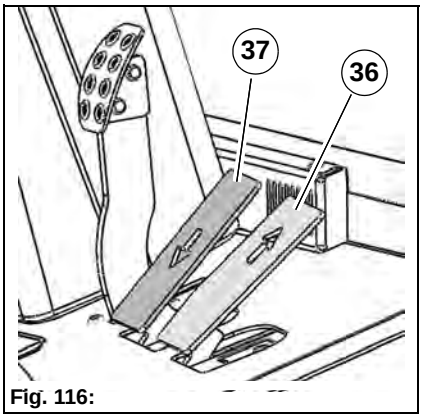


Fig. 116:

Starting vacuum sweeping

The accelerator pedal **Fig. 116-36** is used for continuously changing the speed for driving forwards.

The accelerator pedal **Fig. 116-37** is used for continuously changing the speed for reversing.

Push the accelerator pedal down slowly until the vehicle starts, the speed is increased further by pressing on the pedal.

Slowing down or braking the vehicle: Slowly reduce the pressure on the accelerator pedal, the vehicle slows down or stops.

The vehicle speed in the:

- transport mode is 0 to 40 km/h
- work mode is 16/20/24 km/h according to selected engine speed

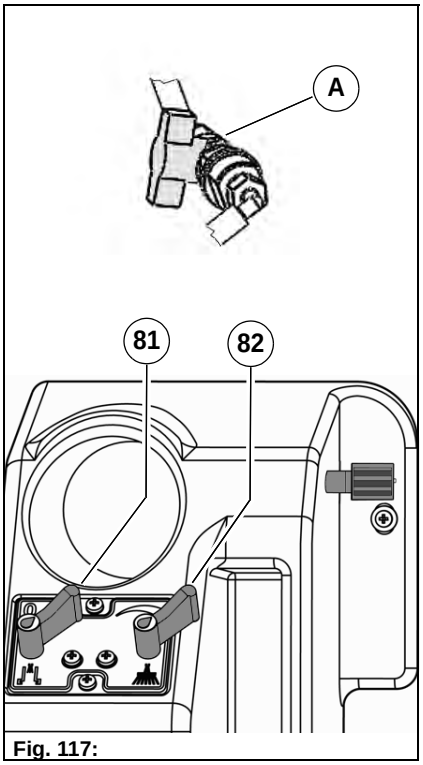


Fig. 117:

Sweeping dry/wet surfaces

To avoid the formation of dust, circulating water and fresh water are available in vacuum sweeping. The circulating water is supplied to the suction duct. Switch on the fresh water pump in the multifunctional display in the configuration menu, see page 142. The fresh water is supplied to the sweeping unit. The volume of fresh water for the spray nozzles of the sweeping unit is set with the lever **Fig. 117-82**.

Set the volume corresponding to the requirements.

- Less dust formation at the rotating brushes – reduce fresh water volume with the lever.
- Severe dust formation at the rotating brushes – increase the fresh water volume with the lever.
- Fresh water can be supplied between the rotating brushes by a fresh water nozzle with the lever **Fig. 117-A** of the sweeping unit.
- If no circulating water is available, fresh water can be switched on optionally for the suction duct with the lever **Fig. 117-81**.

	Note Dry leaves can be swept best of all at medium suction fan speed. The suction power is sufficient and the coarse sieve on the suction fan of the dirt hopper does not clog so quickly.

Sweeping larger objects

If there are larger objects or coarse dirt (cans, bottles, leaves, etc.) in front of the suction mouth, you can open the coarse material flap on the suction mouth by pressing down on the pedal **Fig. 118-46**.

The pedal can be locked by shifting it to the right when it is operated. Pushing and shifting the pedal to the left with your foot will unlock it.

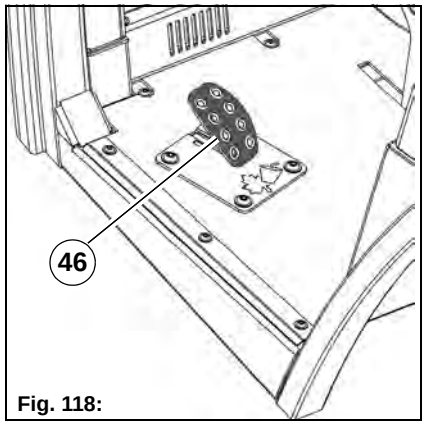


Fig. 118:

Changing the sweeping width (2-brush system)

The sweeping width can be changed with the joystick **Fig. 119-70** and **Fig. 119-71** in the armrest.

1st rotating brush and 2nd rotating brush:

- Joystick **Fig. 119-70** to the left/right – the left rotating brush swings out/in
- Joystick **Fig. 119-71** to the left/right – the right rotating brush swings in/out

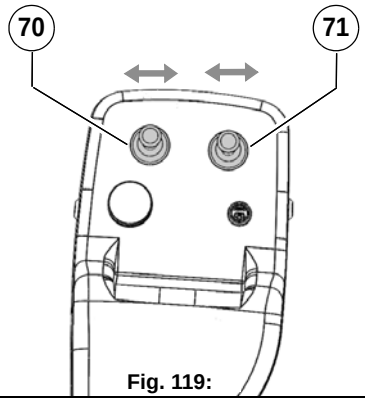


Fig. 119:

Changing the sweeping width (3-brush system)

The sweeping width can be changed with the joystick **Fig. 119-70** and **Fig. 119-71** in the armrest.

1st rotating brush and 2nd rotating brush:

- Move the joystick **Fig. 120-70 (A)** to the left – the pulled rotating brushes swing in
- Move the joystick **Fig. 120-70 (B)** to the right – the pulled rotating brushes swing out

3rd rotating brush:

- Changeover to the left-hand side:
  Press the button **Fig. 120-C** and simultaneously move the joystick **Fig. 120-71 (A)** to the left.
  The 3rd rotating brush swings to the left-hand side. The rotation of the 3rd rotating brush is adjusted automatically.
- Move the joystick **Fig. 120-71** to the left or right.
  The 3rd rotating brush is adjusted to the respective sweeping width.

- Changeover to the right-hand side:
  Press the button **Fig. 120-C** and simultaneously move the joystick **Fig. 120-71 (A)** to the right.
  The 3rd rotating brush swings to the right-hand side. The rotation of the 3rd rotating brush is adjusted automatically.
- Move the joystick **Fig. 120-71** to the left or right.
  The 3rd rotating brush is adjusted to the respective sweeping width.

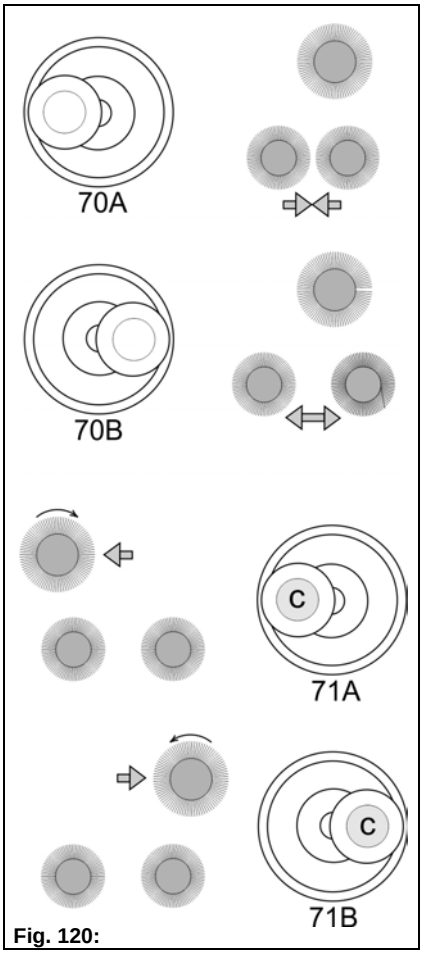


Fig. 120:

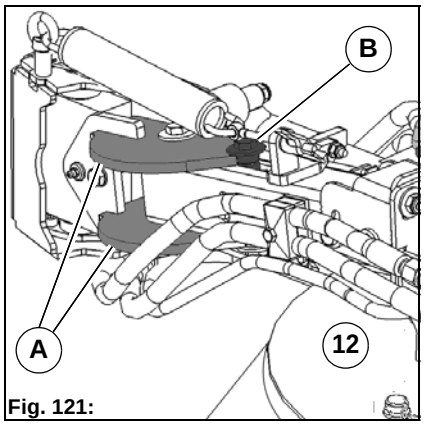


Fig. 121:

Checking the overload protection (2-brush system)

The overload protection device **Fig. 121-A** is located on the brush arm of the sweeping unit **Fig. 121-12** and has the task of protecting the sweeping unit in a collision. The overload protection device is unlocked in a collision. Before you can carry on working, you must lock the brush arm again. To do this, swing the brush arm until the overload protection device **Fig. 121-B** engages.

	Note Check the sweeping unit for damage!

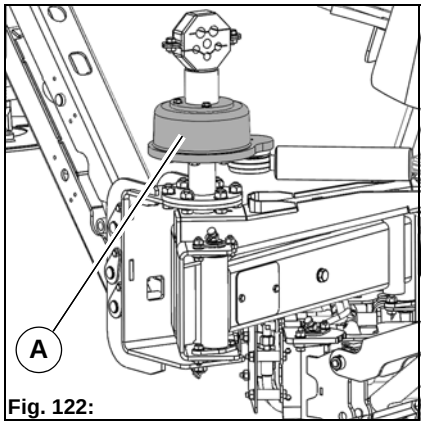


Fig. 122:

Checking the overload protection (3-brush system)

The overload protection device **Fig. 121-A** is located on the brush arm of the sweeping unit and has the task of protecting the sweeping unit in a collision. The overload protection device is unlocked in a collision. Before you can carry on working, you must lock the brush arm again. To do this, use the joystick to swing the brush arm until the overload protection device engages.

	Note Check the sweeping unit for damage!

Circulating water drain (optional)
If vacuum sweeping is done in the rain and too much rain water is taken up, the surplus water can be drained off by a drain. The drain is located next to the wheel case of the right-hand rear wheel.
To open the drain, pull out the lid **Fig. 123-A**. To close, push the lid back in.

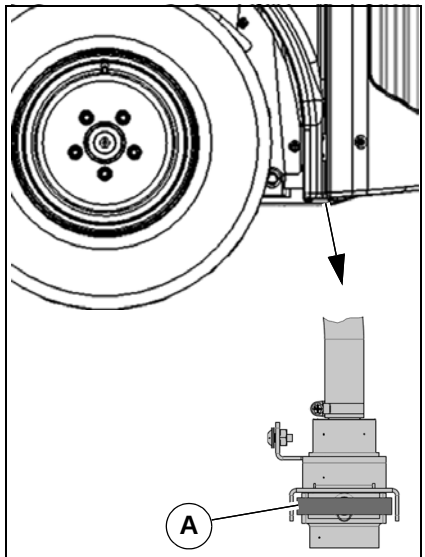


Fig. 123:

Hand suction hose (optional)
The 4 metre long hand suction hose **Fig. 124-D** is used for effectively cleaning places difficult to reach.

1. Start the vehicle and drive to the work site. Engage the parking brake. Switch the suction fan on, see page 142.
2. If necessary take the insert plate **Fig. 124-A** out from the holder and push it under the rubber seal.
   - Work with the insert plate in the case of heavy soiling. The suction force is increased. The circulating water supply is shut off with the suction mouth lifted.
   - Work without the insert plate in the case of slight soiling. With the suction mouth lowered, additional circulating water is supplied to bind the dust.
3. Loosen the lock **Fig. 124-B** and pull the hand suction hose down and out from the holder.
4. Hold the hand suction hose with the handle **Fig. 124-C** and clean the surface. If required, adjust the handle rod to length with the locking bolt. After cleaning push the hand suction hose against the holder. The hand suction hose withdraws automatically due to the vacuum.
5. If necessary fasten the insert plate back on the holder.
6. Close the handle rod.
7. Lock the hand suction hose again.

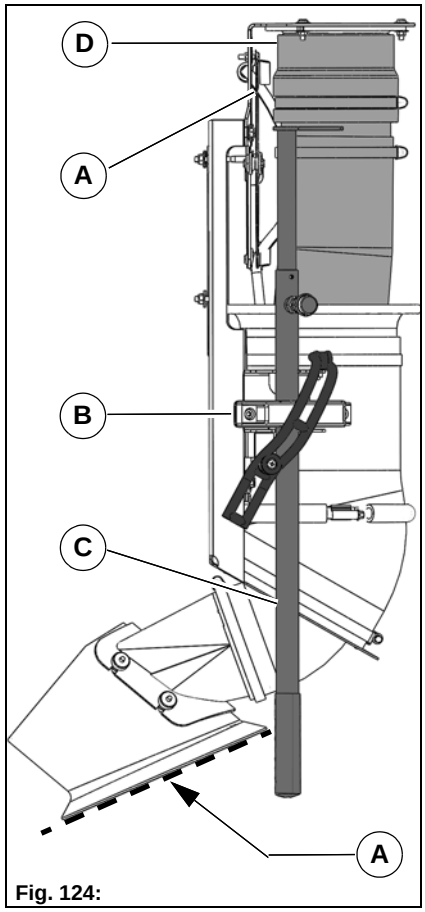


Fig. 124:

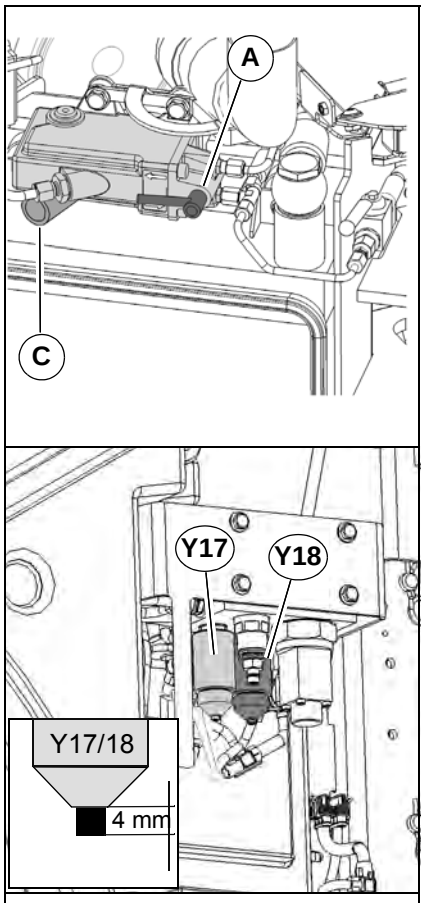


Fig. 125:

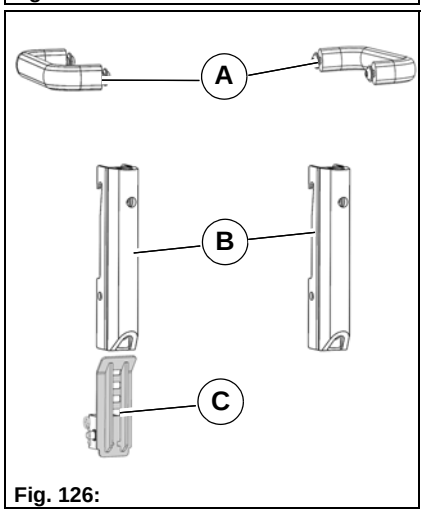


Fig. 126:

Hydraulic hand pump

The hydraulic hand pump **Fig. 125-A** is used for the following tasks:

- Raising and lowering the dirt hopper on failure of the vehicle hydraulics.
- Unlocking the parking brake for the towing process, see page 80

	Note A hexagon socket wrench (3 mm) is required for the set-screws of the valves **Fig. 125-Y17** and **Fig. 125-Y18**.

Raise the dirt hopper:

1. The lever of the hand pump **Fig. 125-A** must be in the lower position.
2. Screw in the setscrew in valve **Fig. 125-Y17** by 4 mm.
3. Insert the auxiliary tool in the hand pump **Fig. 125-C** and pump so long until the dirt hopper is in position.
4. Unscrew the setscrew in valve **Fig. 125-Y17** by 4 mm again.

Lower the dirt hopper:

1. The lever of the hand pump **Fig. 125-A** must be in the lower position.
2. Screw in the setscrew in valve **Fig. 125-Y18** by 4 mm.
3. Insert the auxiliary tool in the hand pump **Fig. 125-C** and pump so long until the dirt hopper is in position.
4. Unscrew the setscrew in valve **Fig. 125-Y18** by 4 mm again.

	Caution • The two setscrews of the valves **Fig. 125-Y17** and **Fig. 125-Y18** (rear wagon left side door) may not be screwed in too far (max. by 4 mm)! • Do not screw in the setscrews simultaneously! • In normal operation, both setscrews must be unscrewed by 4 mm again, see sketch!

Comfort package for the dirt hopper (optional)

The comfort package contains the handles **Fig. 126-A**, the extended collision protection **Fig. 126-B** and the step **Fig. 126-C**.

Convenient inspection of the dirt hopper is possible with the folding step and the handles.

High-pressure cleaner (optional)

The high-pressure cleaner **Fig. 128-H** is located behind the rear flap of the dirt hopper. Check the following before starting up:

- Fill the fresh water tank, see page 128.
- Check the water filter **Fig. 128-C** of the high-pressure cleaner and clean it if necessary.

1. Start the vehicle and drive to the work site. Engage the parking brake. Open the flap **Fig. 127-A**. Remove the pressure hose from the hose holder and plug it on at the connection **Fig. 128-B**.
2. Set the changeover valve **Fig. 128-F** to the high-pressure cleaner position.
   - Position I: Suction fan hydraulics
   - Position II: High-pressure cleaner hydraulics
3. Open the fresh water supply **Fig. 128-D**.
4. Switch the engine and suction fan on.
5. Set the pressure controller **Fig. 128-A** to the required working pressure.
6. Clean the surface with the lance **Fig. 128-G**.

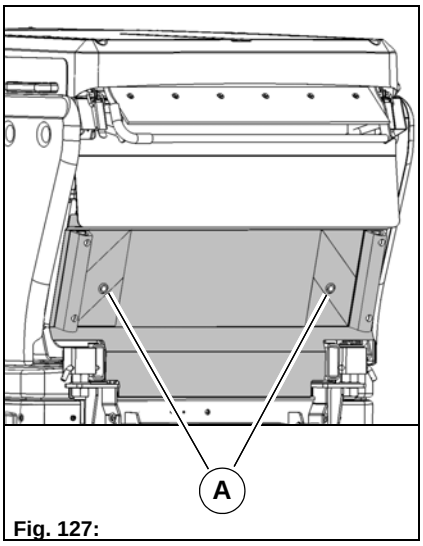


Fig. 127:

☞	**Danger** The jet of the high-pressure cleaner must not be directed to persons. There is danger of injury! Do not use steam cleaners and high-pressure cleaners for cleaning electrical/electronic components and the engine compartment!

7. Reset the changeover valve to the suction fan position and close the fresh water supply again. After cleaning stow the lance and the pressure hose back in the stowage **Fig. 128-E**.

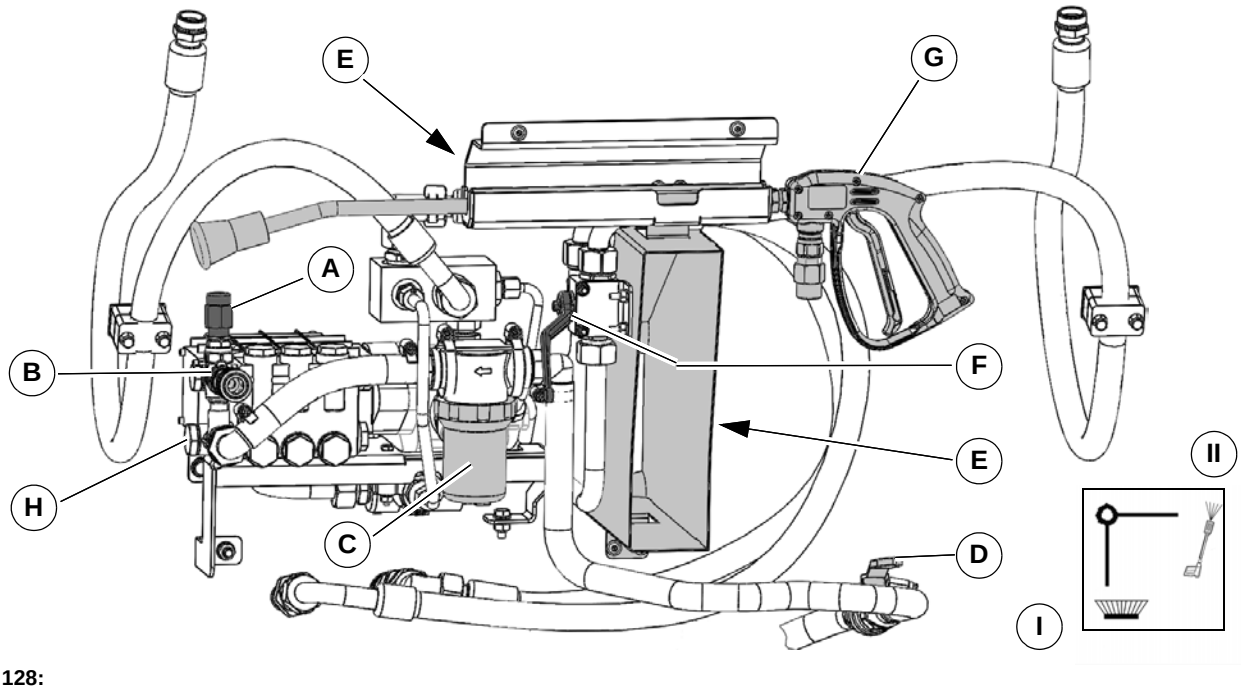


Fig. 128:

Checklist – settings for vacuum cleaning

No.	Description	Reference
1	Adjusting the sweeping unit with the joystick	Page 138
2	Raising/lowering the dirt hopper	Page 138
3	Setting the rotating brush speed	Page 141
4	Switching the fresh water pump on and off	Page 142
5	Switching the suction fan on and off	Page 142

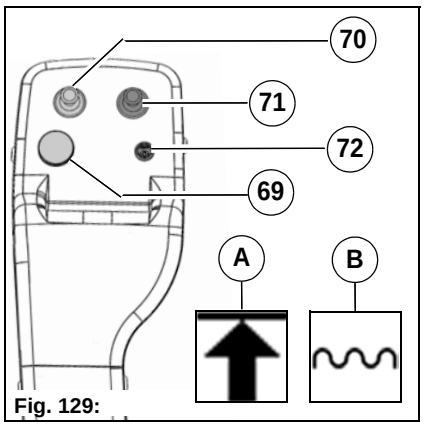


Fig. 129:

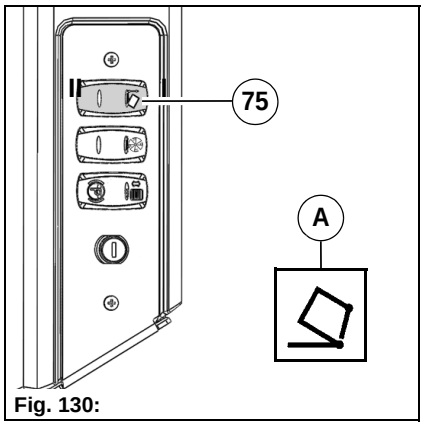


Fig. 130:

Adjusting the sweeping unit with the joystick (2-brush system)
The sweeping unit can be adjusted with the joystick **Fig. 129-70** and **Fig. 129-71** in the armrest.
Joystick **Fig. 129-70:**
- Joystick forwards: Lowering front tool carrier (floating position)
- Joystick back: Raising front tool carrier
- Joystick to the left: The left-hand rotating brush swings out
- Joystick to the right: The left-hand rotating brush swings in

In the multifunctional display, the upper stop information symbol **Fig. 129-A** or floating position symbol **Fig. 129-B** appears.
Joystick **Fig. 129-71:**
- Joystick to the left: The right-hand actuator swings in
- Joystick to the right: The right-hand actuator swings out

Raising/lowering the dirt hopper
The following functions on the dirt hopper are switched on with the button **Fig. 130-75**:
- Button in position **I**: The dirt hopper is raised until the button is released
- Button in position **II**: The dirt hopper is lowered until the button is released

	Note The lock must be opened before you empty the dirt hopper, see page 143.

As long as the dirt hopper is not in its lower end position, the warning symbol **Fig. 130-A** appears.

Adjusting the sweeping unit with the joystick (3-brush system)
The sweeping unit can be adjusted with the joystick **Fig. 131-70** and **Fig. 131-71** in the armrest.

Joystick **Fig. 131-70:**
- Move joystick forwards into position **(70A)**: The pulled rotating brushes are lowered (floating position)
- Move joystick backwards into position **(70B)**: The pulled rotating brushes are raised
- Move joystick backwards into position **(70C)** and hold for more than 2 seconds: The pulled rotating brushes and the suction mouth are raised
- Move joystick backwards into position **(70D)** and press the button **(E)**: The suction mouth is raised

Joystick **Fig. 131-71:**
- Move joystick forwards into position **(71A)**: The 3rd rotating brush is lowered (floating position)
- Move joystick backwards into position **(71B)**: The 3rd rotating brush is raised

In the multifunctional display, the upper stop information symbol **Fig. 131-F** or floating position symbol **Fig. 131-G** appears.

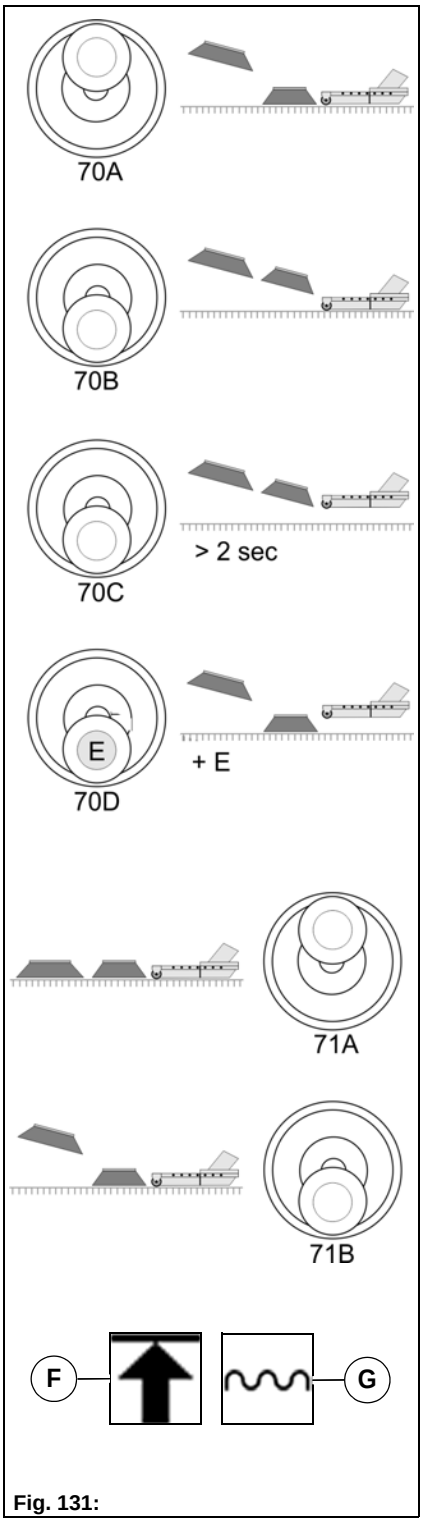


Fig. 131:

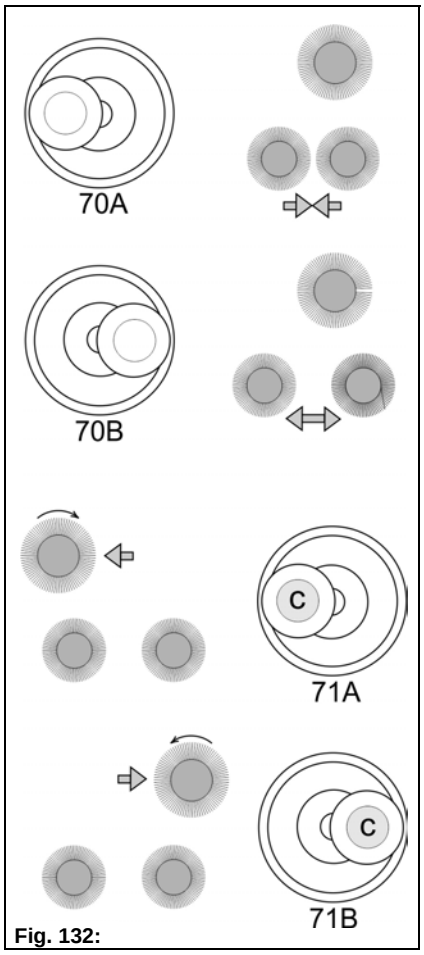


Fig. 132:

1st rotating brush and 2nd rotating brush:

- Move the joystick **Fig. 132-70 (A)** to the left – the pulled rotating brushes swing in
- Move the joystick **Fig. 132-70 (B)** to the right – the pulled rotating brushes swing out

3rd rotating brush:

- Changeover to the left-hand side:
  Press the button **Fig. 132-C** and simultaneously move the joystick **Fig. 132-71 (A)** to the left.
  The 3rd rotating brush swings to the left-hand side. The rotation of the 3rd rotating brush is adjusted automatically.
- Move the joystick **Fig. 132-71** to the left or right.
  The 3rd rotating brush is adjusted to the respective sweeping width.

- Changeover to the right-hand side:
  Press the button **Fig. 132-C** and simultaneously move the joystick **Fig. 132-71 (B)** to the right.
  The 3rd rotating brush swings to the right-hand side. The rotation of the 3rd rotating brush is adjusted automatically.
- Move the joystick **Fig. 132-71** to the left or right.
  The 3rd rotating brush is adjusted to the respective sweeping width.

Setting the rotating brush speed
Select the working menu in the multifunctional display with the turn-push knob **Fig. 129-69**.
Change the current value in the brush speed menu item **Fig. 133-A**.

If the right-hand joystick **Fig. 129-69** is used for the 3rd rotating brush with a 3-brush system, the menu item **Fig. 133-B** appears automatically.

Setting range: 0 to 100 %

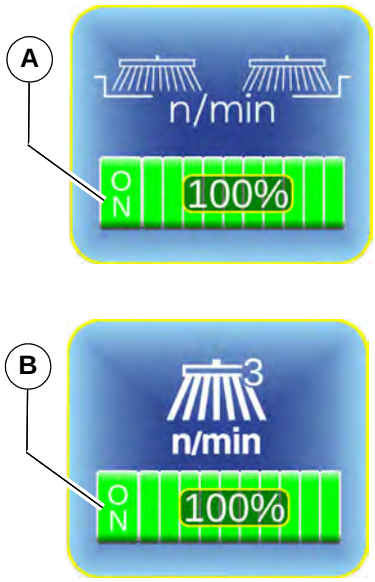


Fig. 133:

Adjusting the brush pressure (3-brush system) (optional)
Using this option it is possible to reduce the brush pressure of the rotating brushes.
Select the working menu in the multifunctional display with the turn-push knob **Fig. 129-69**. Change the current value in the brush pressure menu item.
If the left-hand joystick is used for the 1st rotating brush and the 2nd rotating brush with a 3-brush system, the menu item **Fig. 134-A** appears automatically.
If the right-hand joystick is used for the 3rd rotating brush with a 3-brush system, the menu item **Fig. 134-B** appears automatically.

The higher the setting, the more the brushes are relieved.
Setting range: 0 to 100 %

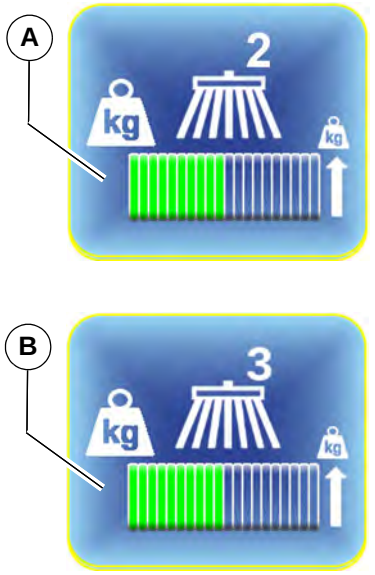


Fig. 134:

Fig. 135:

Switching the fresh water pump on and off

Select the working menu in the multifunctional display with the turn-push knob **Fig. 129-69**. Change the current value in the fresh water menu item **Fig. 135-A**.

Setting range: On/Off

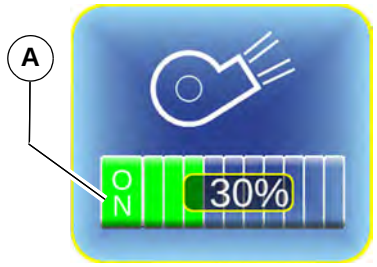


Fig. 136:

Switching the suction fan on and off

Select the working menu in the multifunctional display with the turn-push knob **Fig. 129-69**. Change the current value in the suction fan menu item **Fig. 136-A**. Noise-reduced operation is obtained in the ECO mode when the suction fan output is reduced to 30 %.

Setting range: On/Off or 30 % to 100 %.

Checklist – Cleaning the vacuum sweeping system

No.	Description	Reference
1	Emptying the dirt hopper	Page 143
2	Cleaning the sweeping unit	Page 144
3	Cleaning the dirt hopper and circulating water system	Page 145
4	Emptying the fresh water tank	Page 145
5	Emptying the circulating water tank	Page 145

Caution
- Do not exceed the permissible total weight. There is a risk of accidents!
- Frequently check the filling level of the dirt hopper. Switch the suction fan off for this! The lid and the side doors of the dirt hopper must not be opened when the suction fan is running. There is danger of injury!

Attention
- Do not use steam cleaners and high-pressure cleaners for cleaning electrical/electronic components and the engine compartment!
- The cleaning work listed below must be done after every emptying, at least once daily.

Emptying the dirt hopper

1. Lock the dirt hopper with the transport protection device, see page 130. Drive the vehicle to a suitable cleaning place.
2. Reverse carefully to the offloading place and engage the parking brake. Switch the suction fan off!
3. Before emptying the dirt hopper **Fig. 137-88** open the lock **Fig. 137-A** of the lid.
4. Raise and empty the dirt hopper with the button **Fig. 137-75**.
5. Lower the dirt hopper and lock the lid again.

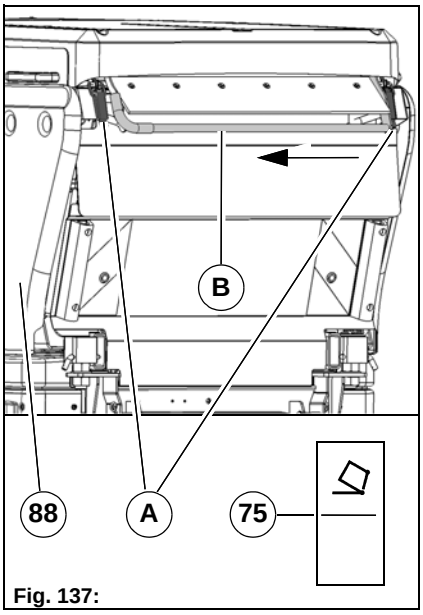


Fig. 137:

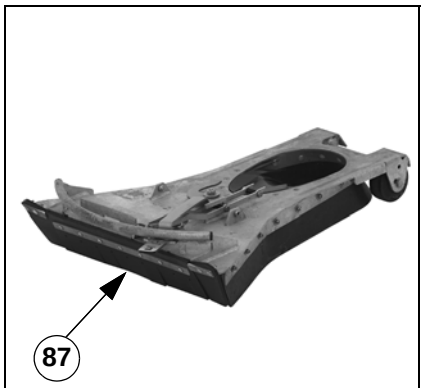


Fig. 138:

Cleaning the suction mouth

1. Lock the dirt hopper with the transport protection device, see page 130. Drive the vehicle to a suitable cleaning place.
2. Select the working menu in the multifunctional display with the turn-push knob. Switch the suction fan on in the suction fan menu item.
3. Push a water hose into the suction mouth **Fig. 138-87** and loosen the dirt with the water jet. The dirt is drawn with the water into the dirt hopper.
4. Empty the dirt hopper, see page 143.

In the case of heavy soiling, dismantle and clean the suction mouth, see page 120.

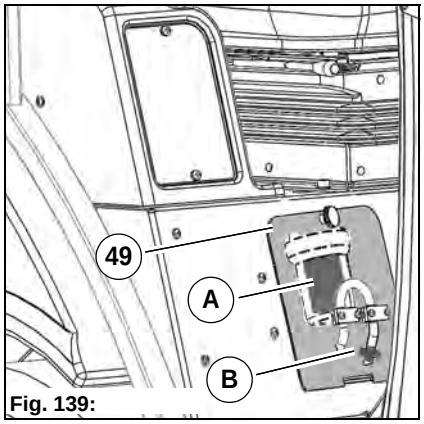


Fig. 139:

Cleaning the dust filter and reducing piece

In the driver's cab under the driver's seat behind the cover plate **Fig. 139-49** are located the sieve filter **Fig. 139-A** and the reducing piece **Fig. 139-B** of the water pump. Unscrew the filter housing, check the sieve filter and the reducing piece for openness and clean if necessary.

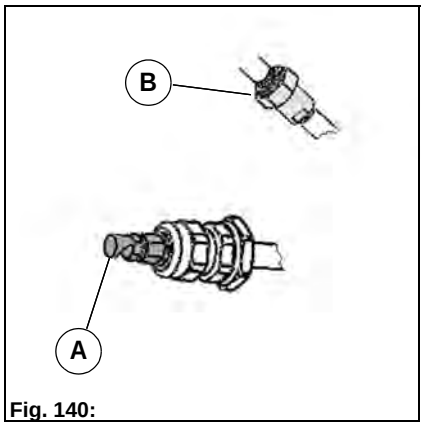


Fig. 140:

Cleaning spray nozzles and ball valve filter

The spray nozzles **Fig. 140-A** for the rotating brushes are located on the sweeping unit. A ball valve filter is located in the filter holder **Fig. 140-B** in front of a distributor. Dismantle and clean the spray nozzles and ball valve filter.

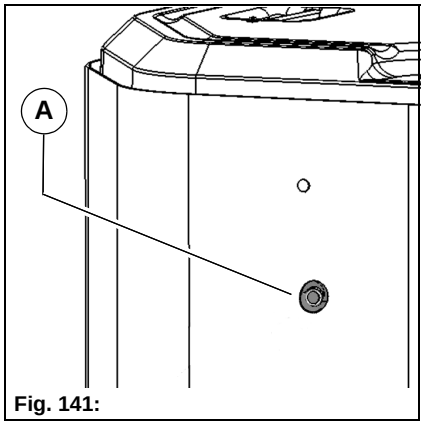


Fig. 141:

Cleaning the suction fan

1. Lock the dirt hopper with the transport protection device, see page 130. Drive the vehicle to a suitable cleaning place.
2. Connect a water hose to the water connection **Fig. 141-A** of the dirt hopper.
3. Push the Hako button **Fig. 8-72** and let the water be drawn as required by the suction fan into the dirt hopper.
4. Open the lid of the dirt hopper and raise the dirt hopper up to the end stop with the button **Fig. 8-75** and drain off the water taken up!

Cleaning the dirt hopper and circulating water system

1. Lock the dirt hopper with the transport protection device, see page 130. Drive the vehicle to a suitable cleaning place and empty it.
2. Half raise the dirt hopper and open the lock **Fig. 142-E** of the sump flap (hopper floor). Then bring the dirt hopper into its end position.
3. Clean the dirt hopper from the inside with a water hose or a high-pressure cleaner. Pay special attention to the lateral filter sieve **Fig. 142-A** and the filter sieve **Fig. 142-B** in the lid.
   The dirt hopper can also be cleaned through the side doors **Fig. 142-D**. The suction fan of the dirt hopper must be switched off so that the doors can be opened!
   Clean with the auxiliary tool as required or remove the contaminated filter sieve.
4. When the dirt hopper is raised, the valve of the settling tank**Fig. 142-C** opens. Clean the settling tank and flush the circulating water system thoroughly with water.
5. Half lower the dirt hopper and close the sump flap lock.
6. Lower the dirt hopper fully with the joystick **Fig. 8-70** and let the water run until clear water emerges at the suction mouth.
7. Fill the dirt hopper with circulating water, see page 129.

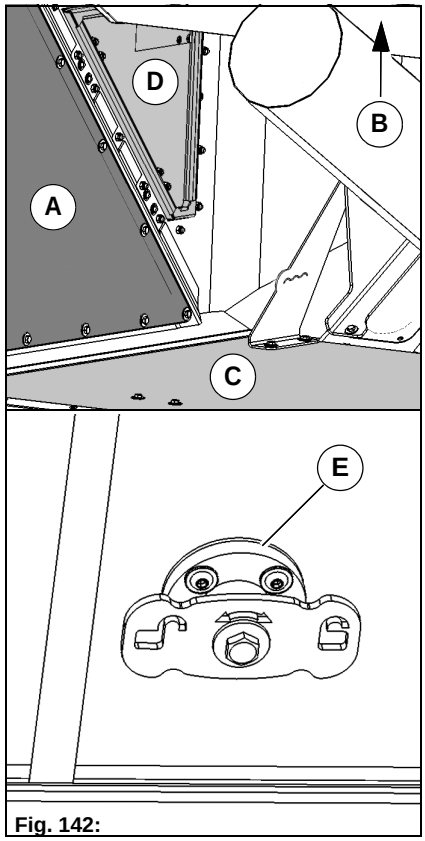


Fig. 142:

Draining the fresh water

☞	**Note** At temperatures below 0 degrees (risk of frost) drain the water out from all water-conducting components.

1. Lock the dirt hopper with the transport protection device, see page 130. Drive the vehicle to a suitable cleaning place.
2. Unscrew the drain screws **Fig. 143-A** on both sides of the fresh water tank **Fig. 143-43** and empty the tank. Use a new seal when screwing in.
3. Also empty the sieve filter, **Fig. 139-A**.

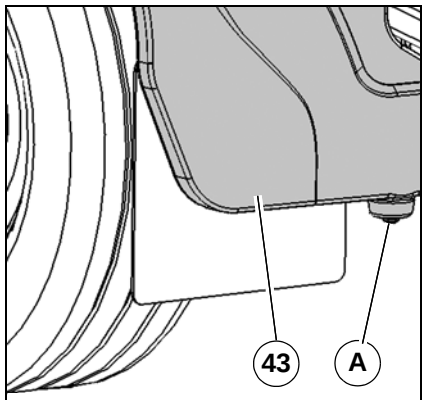


Fig. 143:

Draining the circulating water

☞	**Note** At temperatures below 0 degrees (risk of frost) drain the water out from all water-conducting components.

1. Lock the dirt hopper with the transport protection device, see page 130. Drive the vehicle to a suitable cleaning place.
2. Unlock the transport protection device.
3. Lower the sweeping unit with the joystick **Fig. 8-70** and drain off the circulating water.
   Optionally with circulating water drain, see page 135.

6.1.5 Technical data

Fig. 144:

Complete vehicle with vacuum sweeping system (2-brush system)

Dimensions	**Unit**	
Length	mm	4510
Width	mm	1580 to 2250
Height	mm	2215
Sweeping width	mm	1580 to 2250
Inside sweeping radius	mm	1330
Weights and loads	**Unit**	
Empty weight according to StVZO	kg	2490
Dirt hopper payload	kg	1000
Sweeping unit/dirt hopper	**Unit**	
Brush diameter	mm	900
Brush speed	rpm	0 to 120
Dirt hopper nominal volume	litre	1350
Circulating water system settling tank	litre	80
Fresh water tank capacity	litre	188

Complete vehicle with vacuum sweeping system (3-brush system)

Dimensions	**Unit**	
Length	mm	5170
Width	mm	1248
Height	mm	2215
Sweeping width	mm	2450
Inside sweeping radius	mm	1494
Weights and loads	**Unit**	
Empty weight according to StVZO	kg	2681
Sweeping unit	**Unit**	
Brush diameter pulled rotating brushes Brush diameter 3rd rotating brush	mm	720 900
Brush speed pulled rotating brushes Brush speed 3rd rotating brush	rpm	30 to 140 30 to 120

Noise emission values	Unit	Value
Sound pressure level		
The sound pressure level at the workplace (LpA) measured under the customary conditions of use at **1600 rpm** according to Directive 2006/42/EC with measuring standard DIN EN ISO 11201 is: • at 30 % suction fan power (measuring uncertainty KpA)	dB(A)	71 (1.0)
The sound pressure level at the workplace (LpA) measured under the customary conditions of use **at 2000 rpm** according to Directive 2006/42/EC with measuring standard DIN EN ISO 11201 is: • at 30 % suction fan power (measuring uncertainty KpA) • at 100 % suction fan power (measuring uncertainty KpA)	dB(A) dB(A)	74 (1.2) 75 (1.0)
The sound pressure level at the workplace (LpA) measured under the customary conditions of use at **2400 rpm** according to Directive 2006/42/EC with measuring standard DIN EN ISO 11201 is: • at 30 % suction fan power (measuring uncertainty KpA) • at 100 % suction fan power (measuring uncertainty KpA)	dB(A) dB(A)	79 (2.9) 79 (2.4)
Sound power level		
The sound power level (LWAd) measured under the customary conditions of use at **1600 rpm** according to Directive 2000/14/EC with measuring standard DIN EN ISO 3744 is: • in the **ECO mode** at 30 % suction fan power	dB(A)	99
The sound power level (LWAd) measured under the customary conditions of use at **2000 rpm** according to Directive 2000/14/EC with measuring standard DIN EN ISO 3744 is: • at 30 % suction fan power • at 100 % suction fan power	dB(A) dB(A)	102 105
The sound power level (LWAd) measured under the customary conditions of use at **2400 rpm** according to Directive 2000/14/EC with measuring standard DIN EN ISO 3744 is: • at 30 % suction fan power • at 100 % suction fan power	dB(A) dB(A)	103 106
Vibration values	**Unit**	**Value**
The weighted effective value of the acceleration to which the body (feet or seat surface) is subjected to according to directive 2006/42/EC with measuring standard DIN/EN ISO 5349-1 is under the customary conditions of use no more than:	m/s2	<2.5
The weighted effective value of the acceleration to which the upper limbs (hand-arm) are subjected to according to directive 2006/42/EC with measuring standard DIN/EN ISO 2631-1 is under the customary conditions of use no more than:	m/s2	<0.5

6.1.6 Maintenance

Sweeping system maintenance plan

Maintenance plan – daily
Sweeping unit • Checking wear and damage of the sweeping unit • Checking the sweeping level, adjusting if necessary • Fresh water system: Checking the spray nozzles, spray nozzle filter and sieve filter, cleaning if necessary

Maintenance plan – weekly
Sweeping unit • Checking wear and damage of the sweeping unit • Checking the sweeping level, adjusting if necessary • Fresh water system: Checking the spray nozzles, spray nozzle filter and sieve filter, cleaning if necessary
Suction mouth and suction duct • Checking wear and damage at the suction mouth • Checking the suction mouth setting, adjusting if necessary • Checking the suction hose for wear and seating • Checking the seal between suction duct and dirt hopper • Checking the coarse material flap on the suction mouth
Dirt hopper • Checking the circulating water system incl. settling tank • Checking the dirt hopper for soiling • Checking the impact plate for wear and damage, changing if required
Lubrication service on the vacuum sweeping system (see page 156) • Sweeping unit brush arm rotating joint left/right (4 pcs.) • Sweeping unit swivelling cylinder left/right (4 pcs.) • Dirt hopper lifting cylinder up/down and left/right (4 pcs.) • Dirt hopper raising joint left/right (2 pcs.)

Maintenance plan – once after 50 operating hours
Sweeping unit • Checking wear and damage • Checking the sweeping level, adjusting if necessary • Checking the lifting cylinder and hydraulic pipes for function and tightness • Checking the spray nozzles, spray nozzle filter and sieve filter of the water system, cleaning if necessary
Suction mouth and suction duct • Checking wear and damage • Checking the suction mouth setting, adjusting if necessary • Checking the coarse material flap and suction mouth lift for function and damage • Checking the suction hose for wear and seating • Checking the seal between suction duct and dirt hopper
Dirt hopper • Checking the suction fan for speed and contamination • Checking the V-belt of the suction fan for condition and tension, tensioning or replacing them if required. • Checking the lifting cylinder and hydraulic pipes for function and tightness • Checking the seals of the hopper lid for tightness and damage • Checking the dirt hopper hand pump for function

Maintenance plan – once after 250 operating hours
Sweeping unit • Checking wear and damage • Checking the sweeping level, adjusting if necessary • Checking the spray nozzles, spray nozzle filter and sieve filter of the water system, cleaning if necessary • Check the trailing rubber strap at the 3rd rotating brush (3-brush system only)
Suction mouth and suction mouth duct • Checking the suction mouth setting, adjusting if necessary • Checking the coarse material flap and suction mouth lift for function and damage • Checking the suction hose for wear and seating • Checking the seal between suction duct and dirt hopper
Dirt hopper • Checking the suction fan for soiling • Checking the V-belt of the suction fan for condition and tension, tensioning or replacing it if required. • Checking the impact plate of the hopper lid for wear • Checking the seals of the hopper lid for tightness and damage • Checking the joints and bearings of the hopper lid • Checking the exhaust side of the hopper lid for contamination • Checking the lifting cylinder and hydraulic pipes for function and tightness • Checking the dirt hopper hand pump for function

Maintenance plan – every 500 operating hours
Sweeping unit • Checking wear and damage • Checking the sweeping level, adjusting if necessary • Checking the spray nozzles, spray nozzle filter and sieve filter of the water system, cleaning if necessary
Suction mouth and suction mouth duct • Checking the suction mouth setting, adjusting if necessary • Checking the coarse material flap and suction mouth lift for function and damage • Checking the suction hose for damage and seating • Checking the seal between suction duct and dirt hopper
Dirt hopper • Checking the suction fan for soiling • Checking the V-belt of the suction fan for condition and tension, tensioning or replacing if required. • Checking the suction fan for vibration, checking the bearings if necessary • Checking the impeller for damage and wear, replacing if necessary • Checking the impact plate of the hopper lid for wear • Checking the seals of the hopper lid for tightness and damage • Checking the joints and bearings of the hopper lid • Checking the exhaust side of the hopper lid for contamination • Checking the lifting cylinder and hydraulic pipes for function and tightness • Checking the dirt hopper hand pump for function

Maintenance plan – every 2000 operating hours
Suction mouth and suction mouth duct • Changing the Bowden cable for the coarse material flap
Dirt hopper • Changing V-belt on the suction fan

Maintenance work

⚠	**Danger** • Always bring and insert the safety strut **Fig. 145-B** of the dirt hopper into the upper position during maintenance and cleaning work under the raised dirt hopper. There is danger of injury! • Staying in the danger area is forbidden when raising and lowering the dirt hopper! There is danger of injury! **Caution** • At temperatures below 0 degrees (risk of frost) drain the water out from all water-conducting components.

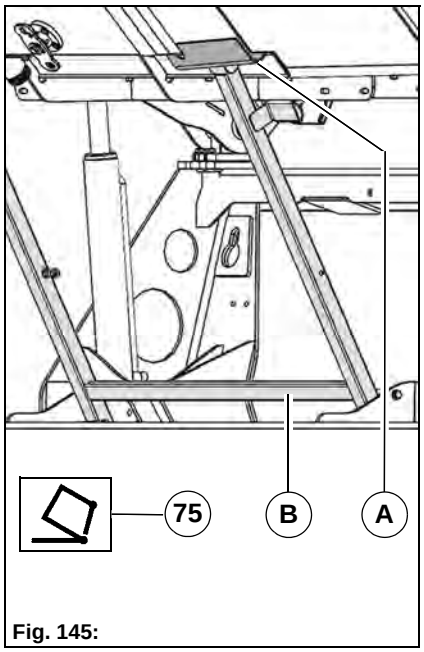


Fig. 145:

Inserting the safety strut

Raise the emptied dirt hopper with the button **Fig. 145-75** up into its end position.

Hinge over the safety strut **Fig. 145-B**.

Lower the dirt hopper with the button **Fig. 145-75** and insert the safety strut in the recess **Fig. 145-A**.

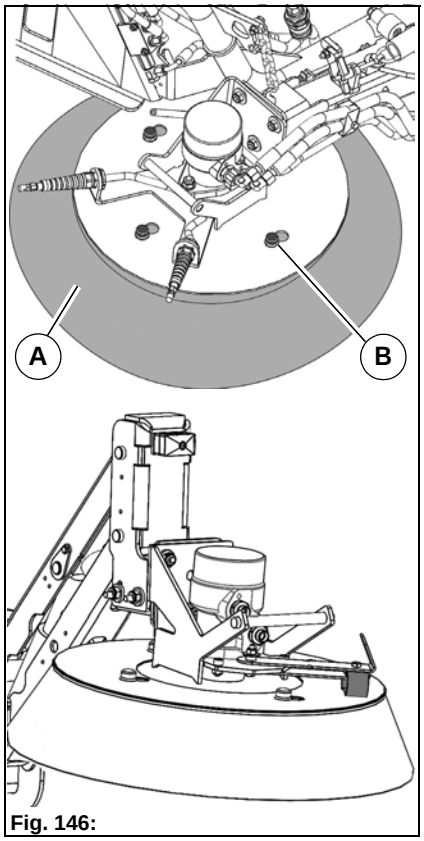


Fig. 146:

Checking the rotating brushes

Check the rotating brushes **Fig. 146-A** daily. Adjust the rotating brush pressure as required, see page 153. If the rotating brush pressure is changed, the sweeping level must be reset, see page 154.

Change worn out rotating brushes.

To do this, raise the sweeping unit with the joystick **Fig. 150-70**. Remove the caps **Fig. 146-B** and loosen the nuts located below. Turn the rotating brush counter-clockwise and push it downwards.

Checking the trailing rubber strap (3rd rotating brush)

Check the trailing rubber strap **Fig. 146-C** every 250 operating hours. If required, replace the trailing rubber strap.

Checking the rotating brush pressure

Adjust the rotating brush pressure with the adjusting screw **Fig. 147-A**. The sweeping level must be adjusted with increasing wear.

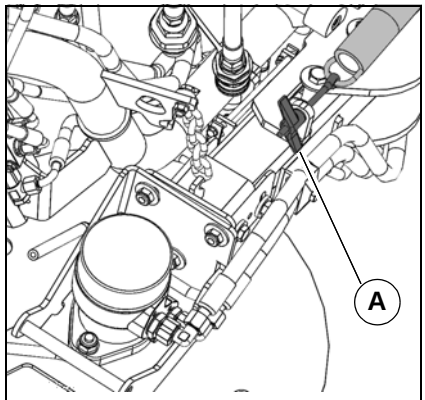


Fig. 147:

Checking the sweeping level (2-brush system)

The sweeping level **Fig. 149-A** is adjusted in the factory with the screws **Fig. 148-A** and **Fig. 148-B**.

1. Raise the front sweeping machine with the joystick **Fig. 149-70**.
2. Drive over a level surface covered with dust or chalk.
3. Lower the sweeping unit and let the rotating brushes turn for a short time.
4. With correctly adjusted sweeping level, the following pattern must result in driving direction:
   - Right rotating brush from 10 a.m. to 4 p.m.
   - Left rotating brush from 8 a.m. to 2 p.m.

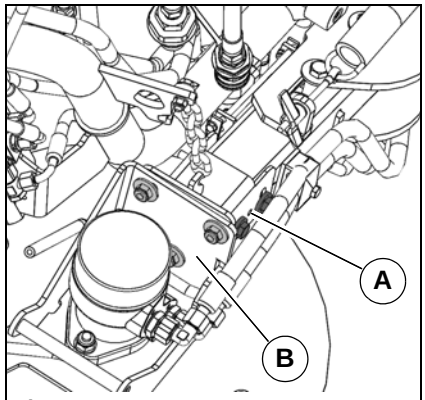


Fig. 148:

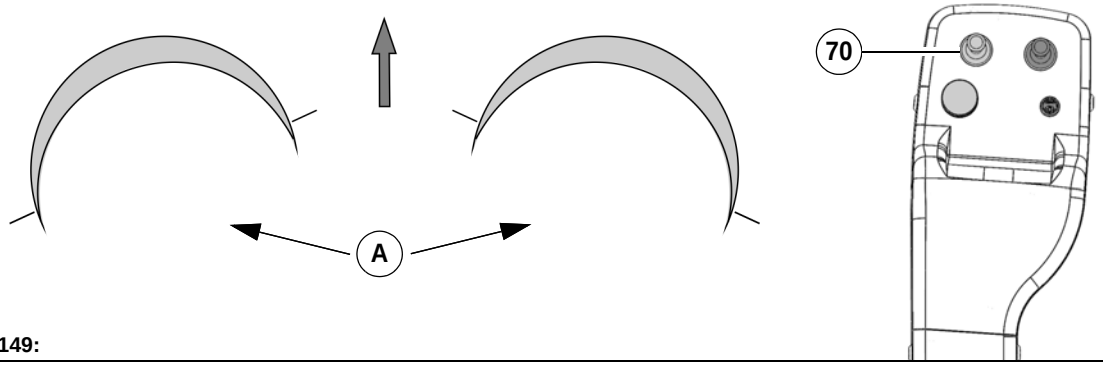


Fig. 149:

Checking the sweeping level (3-brush system)

The sweeping level **Fig. 150-A** and **Fig. 150-B** for the pulled rotating brushes is adjusted in the factory with the screws **Fig. 150-D** and **Fig. 150-E**.

The sweeping level **Fig. 150-C** for the 3rd rotating brush is adjusted in the factory with the screws **Fig. 150-F**.

1. Raise the sweeping unit with the joystick **Fig. 150-70** and **Fig. 150-71**.
2. Drive over a level surface covered with dust or chalk.
3. Lower the sweeping unit and let the rotating brushes turn for a short time.
4. With correctly adjusted sweeping level, the following pattern must result in driving direction:
   - Pulled rotating brushes:
     - Left rotating brush **Fig. 150-A** from 10 a.m. to 4 p.m.
     - Right rotating brush **Fig. 150-B** from 8 a.m. to 2 p.m.
   - 3rd rotating brush **Fig. 150-C**:
     - from 10 a.m. to 4 p.m.

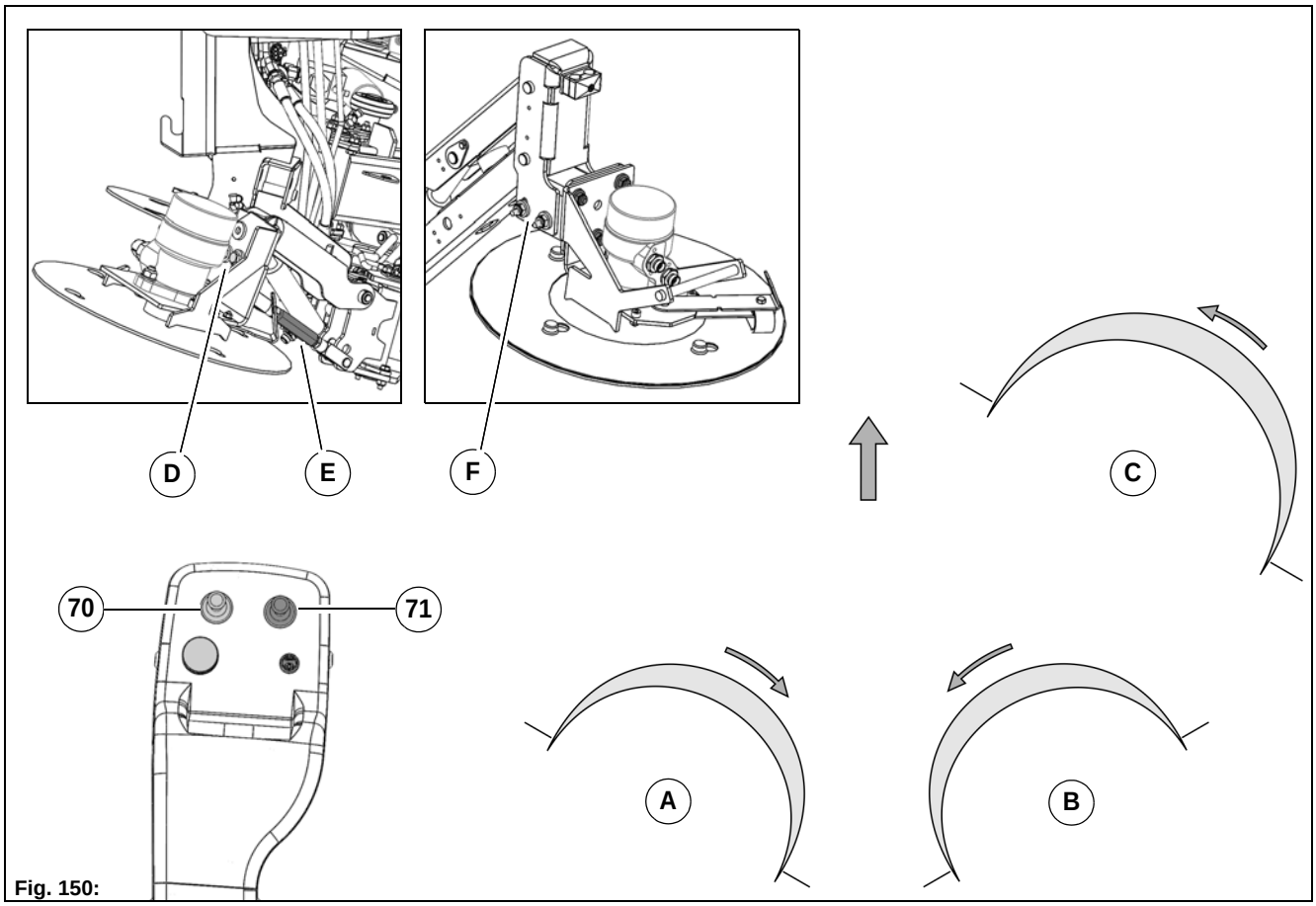


Fig. 150:

Checking the suction mouth sealing strips

Check the sealing strips **Fig. 151-A** of the suction mouth daily. Immediately replace defective seals, also on the coarse material flap, since the suction power is reduced.

The gap **Fig. 151-B1** between the side sealing strip and ground must be approx. 5 mm.

The gap **Fig. 151-B2** between the rear sealing strip and ground must be approx. 10-15 mm.

In the case of wear of the sealing strips, fasten the rollers **Fig. 151-C** in the next higher hole **Fig. 151-D**.

Make sure that the gap size is maintained!

Make sure that the rollers are again fastened in the lower hole after the sealing strips have been changed!

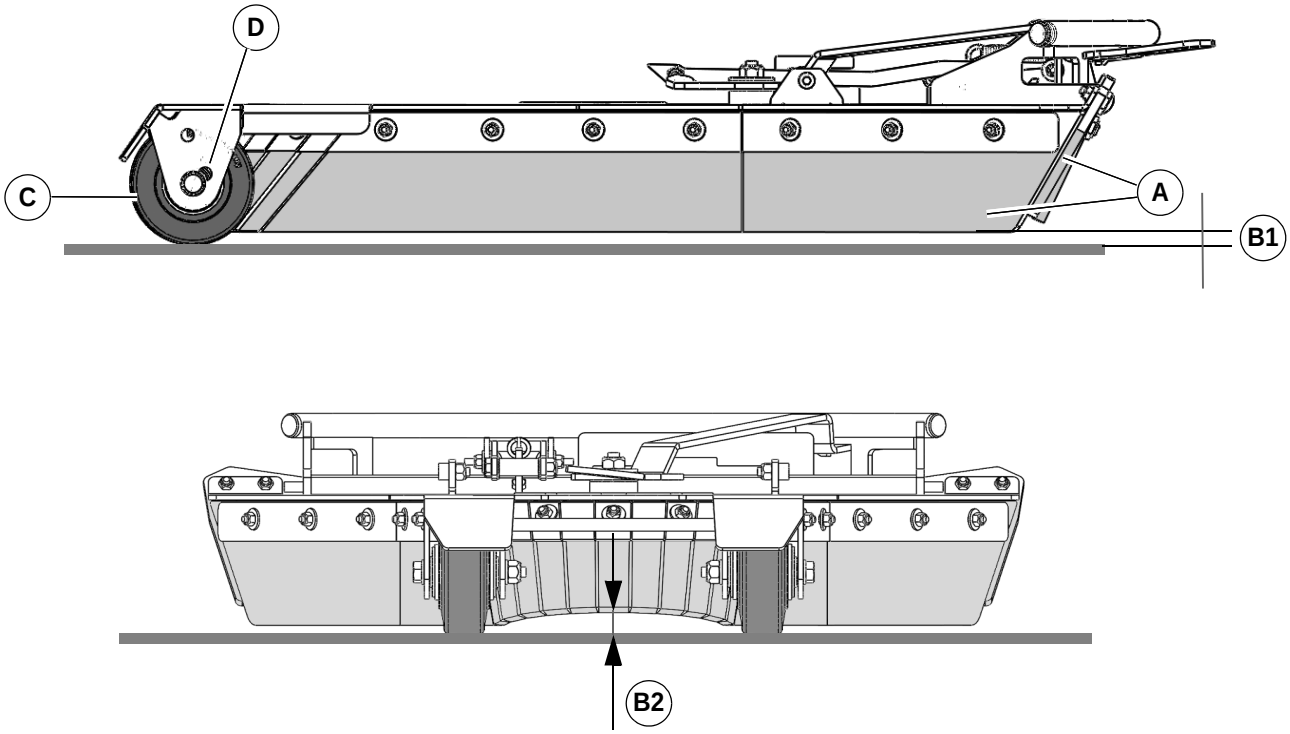


Fig. 151:

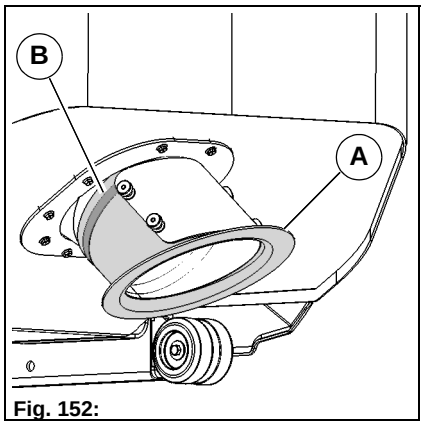


Fig. 152:

Checking the suction duct seal

Check the suction duct seal **Fig. 152-A** on the dirt hopper daily. Immediately replace a defective suction duct seal, since the suction power is reduced. To do this, loosen the clamping band **Fig. 152-B**.

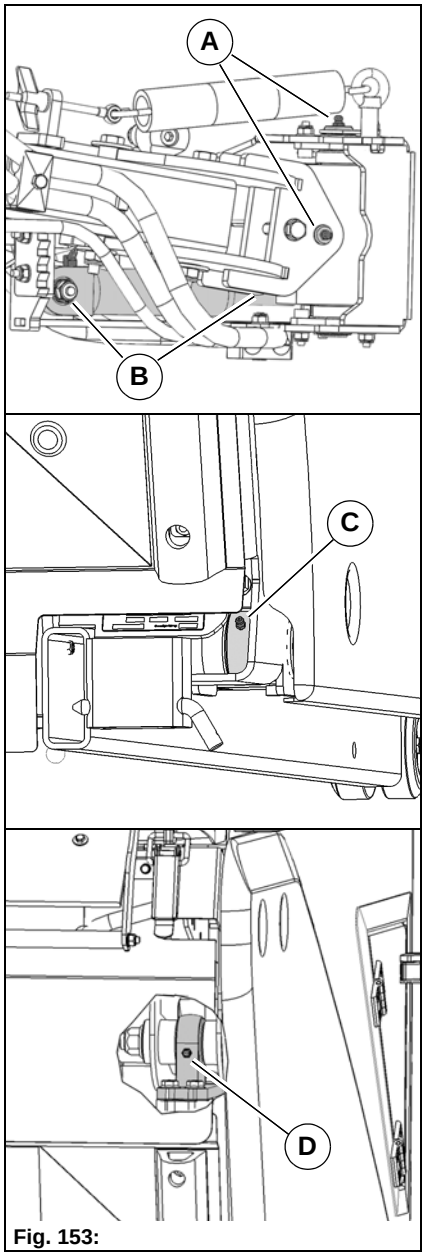


Fig. 153:

Lubrication points (2-brush system)

Check the lubrication points weekly.

Grease: Mobilgrease MP

- Sweeping unit brush arm rotating joint left/right (4 pcs.) **Fig. 153-A**
- Sweeping unit swivelling cylinder left/right (4 pcs.) **Fig. 153-B**
- Dirt hopper lifting cylinder up/down and left/right (4 pcs,) **Fig. 153-C**
- Dirt hopper raising joint left/right (2 pcs.) **Fig. 153-D**

Lubrication points (3-brush system)
Check the lubrication points weekly.
Grease: Mobilgrease MP
Pulled rotating brushes in driving direction:
- at the hydraulic cylinders on the left and right **Fig. 154-A** (x 4)
- at the bearing bolts in the left and right panel **Fig. 154-B** (x 2)
- at the hydraulic cylinder for the sweeping width **Fig. 154-C** (x 2)
- at the bearing bolts in the rocker **Fig. 154-D** (x 1)

3rd rotating brush:
- at the hydraulic cylinders of the horizontal arm **Fig. 154-E** (x 4)
- at the bearing bolts of the horizontal arm **Fig. 154-F** (x 4)
- at the hydraulic cylinder for the vertical arm **Fig. 154-G** (x 2)
- at the bearing bolt for the coupling **Fig. 154-H** (x 1)

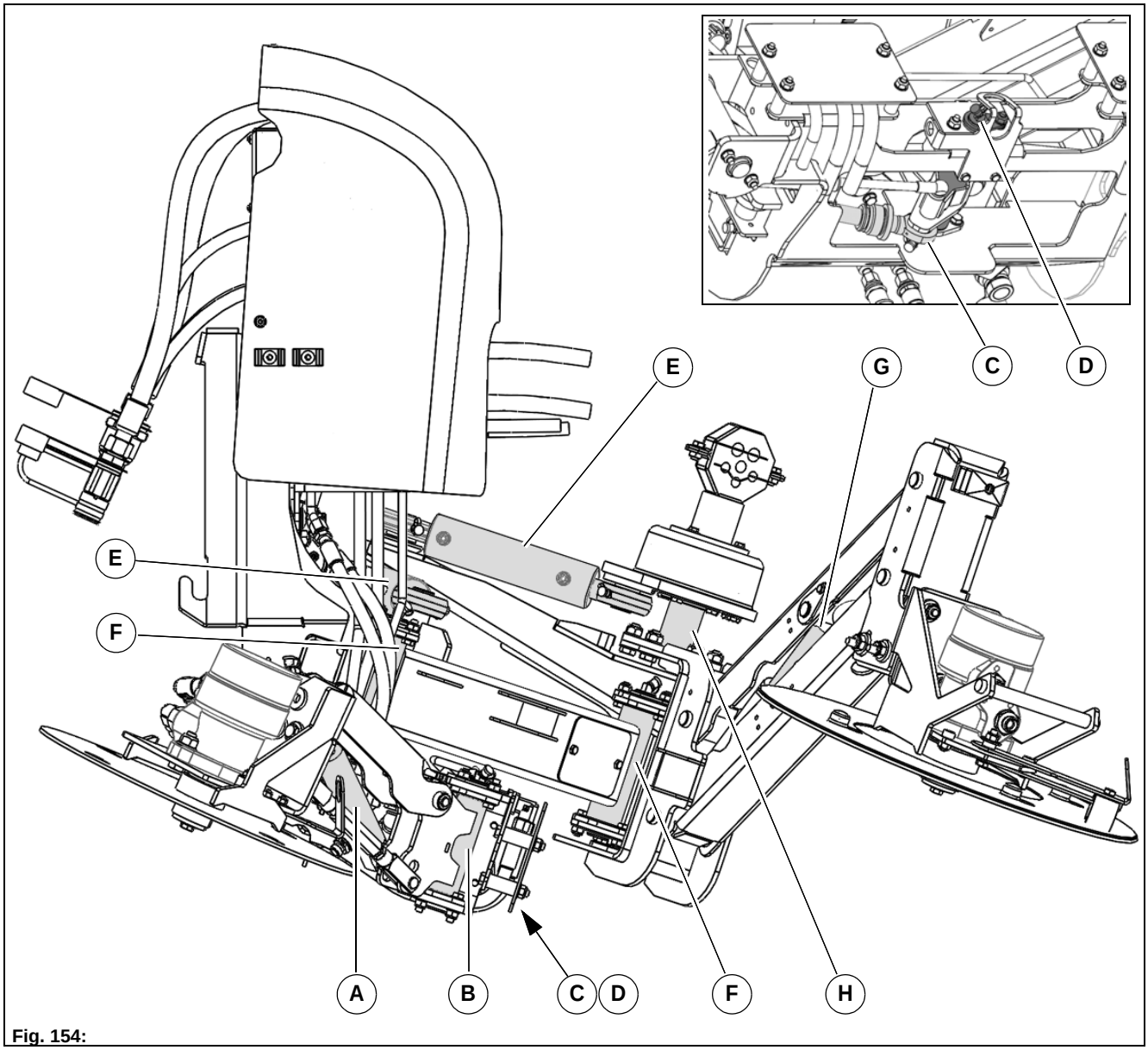


Fig. 154:

6.1.7 Troubleshooting

The fresh water supply is interrupted	**Remedy**	**Reference**
The fresh water tank is empty	Fill the fresh water tank according to the indicator	Page 128
The fresh water system is clogged	Cleaning the sieve filter and reducing piece Cleaning the spray nozzles and ball valve filter	Page 144 Page 144
The circulating water supply is interrupted	**Remedy**	
The circulating water system is empty	Filling the dirt hopper up to the mark	Page 129
The circulating water system is clogged	Flushing the circulating water system with water	Page 145
The sweeping power is reduced	**Remedy**	**Reference**
The coarse material flap is still open	Closing the coarse material flap	Page 133
The dirt hopper is full	Emptying the dirt hopper	Page 143
The flap of the dirt hopper is not locked	Locking the dirt hopper	Page 143
The suction fan is contaminated	Cleaning the suction fan	Page 144
The dirt hopper and sieve are contaminated	Cleaning the dirt hopper	Page 145
The circulating water system is contaminated	Cleaning the circulating water system	Page 145
The vacuum system is clogged	Cleaning the suction mouth with the auxiliary tool	Page 144
The suction mouth sealing strips are defective	Checking suction mouth sealing strips	Page 155
The suction duct seal is defective	Replacing the suction duct seal	Page 156
The sweeping level is not adjusted correctly	Adjusting the sweeping level	Page 154
The rotating brush pressure is not correctly set	Setting the rotating brush pressure	Page 153
The hand suction hose is not correctly set on	Setting the hand suction hose	Optional

6.1.8 Accessories

Your authorised Hako dealer is available to you at any time to answer questions on accessories for the vacuum sweeping system.

6.2 Lawn mowing system

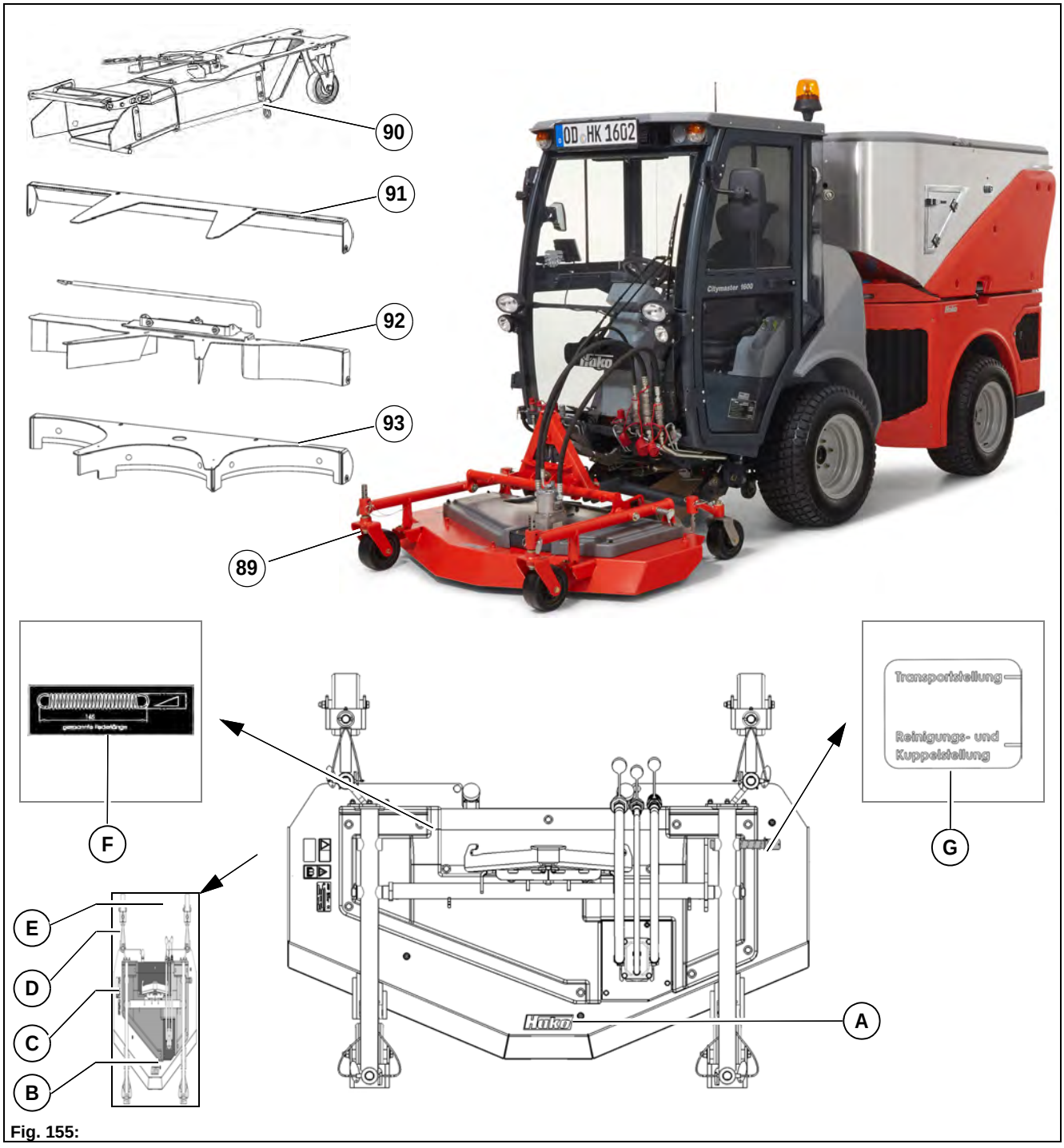


Fig. 155:

Item	Designation
89	Front mower 150 cm
90	Suction pipe
91	Tail ejector attachment parts
92	Vacuum system attachment parts
93	Mulching attachment parts

6.2.1 Labels on the unit

Hako logo
The Hako logo **Fig. 155-A** is located on the mower cover.
Type plate
The type plate **Fig. 155-B** is located on the right side of the mower.
Label – Read operating manual
The Read operating manual label **Fig. 155-C** is located on the right side of the mower.
Label – Rotating parts
The Rotating parts label **Fig. 155-D** is located on the right side of the mower.
Label – Keep distance
The Keep distance label **Fig. 155-E** is located on the right side of the mower.
Label – Spring length
The Spring length label **Fig. 155-F** is located on the right side of the mower under the cover.
Label – Transport and work position
The Transport and work position label **Fig. 155-G** is located on the left side of the mower under the cover.

6.2.2 Lawn mowing system safety instructions

Danger
- Danger to life in the danger area of the vehicle! Special caution is required under the raised tipper and in the area of the front mower.
- Risk of injury! Make sure that the attachments are suitable for the set oil volume. An oil volume set too high can lead to injuries due to a defect of the attachment!
- Risk of injury! Always wear protective gloves when changing blades!
- Risk of injury! Immediately renew damaged or highly unbalanced mowing blades to avoid damage to the blade bearings.
- Risk of injury! Before reinstalling, balance the blades and check them for out of true in height.
- Risk of injury! The V-belt is self-tensioning by spring force. Do not hook tension springs in or out with your bare hand.
- Risk of injury! Do not exceed the permissible total weight. There is a risk of accidents! Frequently check the filling level of the dirt hopper. Switch the suction fan off for this! The lid of the dirt hopper must not be opened when the suction fan is running.
- Risk of injury! Modifying the safety equipment is not permitted.
- Risk of accident! You must consult Hako before attaching other attachments not approved by Hako!

Warning
- The lawn mowing system may be put into operation only with the suction pipe raised! Refer to mounting the mower on page 161!
- The lawn mowing system may be operated only in connection with the Citymaster 1600. The safety regulations for the Citymaster 1600 must be complied with absolutely.

Caution
- The labels attached to the vehicle provide important information for safe operation. Renew labels that are no longer legible or present.
- Spare parts must be original spare parts to guarantee safety.

6.2.3 Mounting

Mounting the mower

1 Place the vehicle on a level surface and hold it with the parking brake.
2. Fit the suction pipe **Fig. 156-91**, see page 120.
3. Install the vacuum system **Fig. 156-90** on the lawn mower **Fig. 156-89**. Make sure that the blade can move easily! Adjust with washer as required.
4. Unlock the locking hook **Fig. 156-A** and locking rod **Fig. 156-B** on the front tool carrier. The mower must be mounted in the coupling position **X**!
5. Align the mower **Fig. 156-89** centrally and in alignment with the front tool carrier.
6. Raise the front tool carrier **Fig. 156-12** with the joystick **Fig. 156-70** and hook the chain **Fig. 156-C** on the hook **Fig. 156-D**.
7. Take up the mower and lock the locking hook and locking rod.
8. Close the valve **Fig. 156-E** for raising the suction mouth in the raised position!
9. Lock the suction pipe **Fig. 156-91** at the suction system with the bow **Fig. 156-F**.
10. Make the connections.
    - Max. 50 litres/min. – Supply/return (hydraulic circuit I) = **Fig. 156-G**
    - Leakage oil pipe = **Fig. 156-H**

Dismantling is in the reverse order.

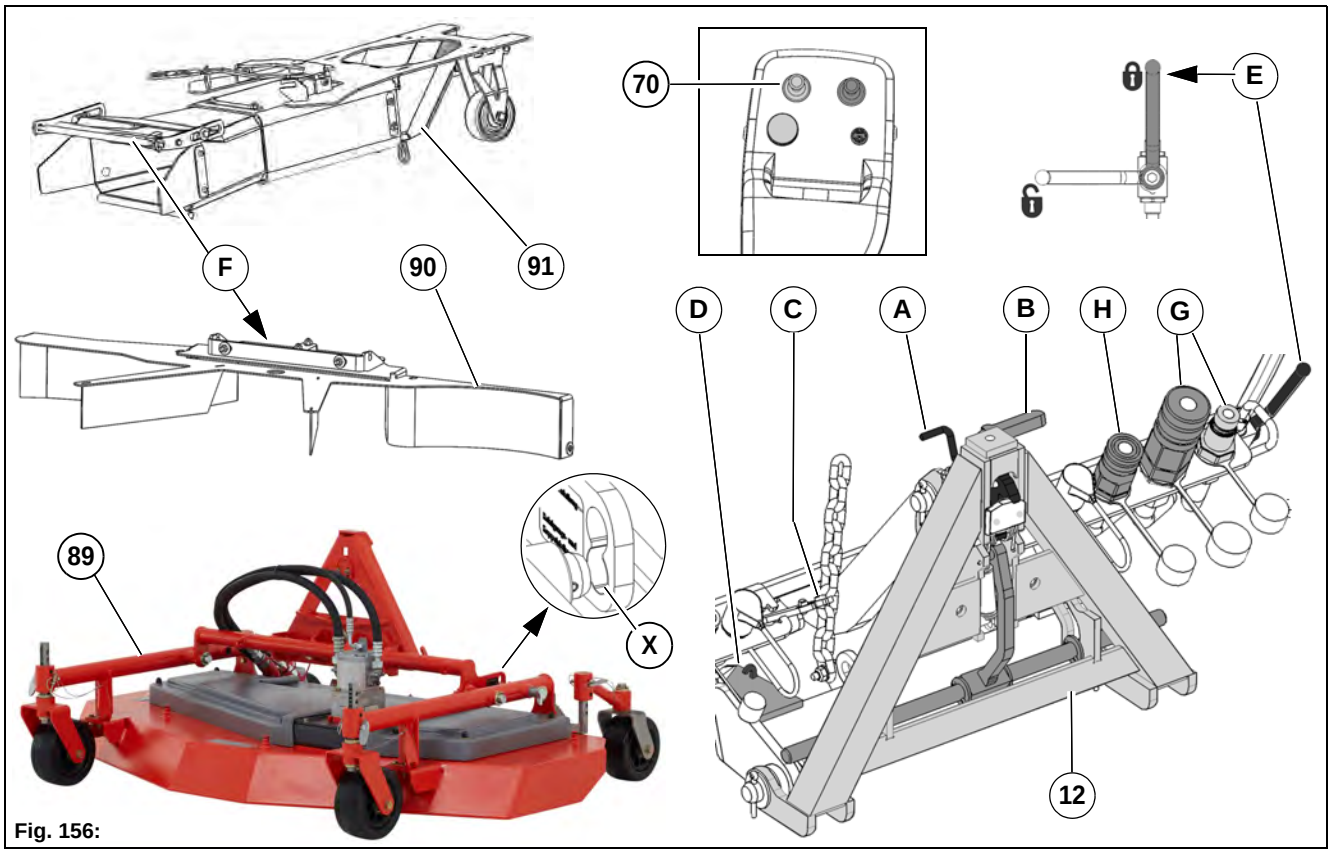


Fig. 156:

6.2.4 Operation

Checklist – Before start-up of the mowing system

No.	Description	Reference
1	Checking transport protection device	Page 162
2	Adjusting the cutting height	Page 162
3	Preparing the dirt hopper	Page 162
4	Checking and if necessary changing the mowing blades and V-belt	Page 168

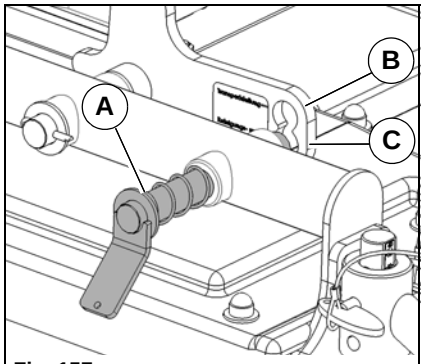


Fig. 157:

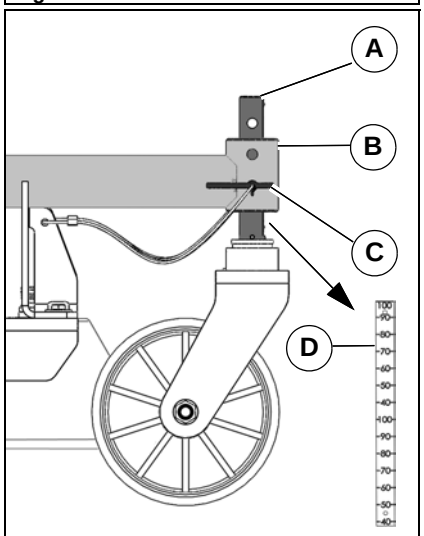


Fig. 158:

Checking the transport protection device

The transport protection device is located on the left side of the mower. The mower is set for the relevant operation with the mounting bolt **Fig. 157-A**. The following settings are possible:

- Mowing: Take the mounting bolt out from the mounting position, see the illustration (the mower must float freely).
- Transport: The mounting bolt must secure the mower in the upper position **Fig. 157-B**.
- Cleaning: The mounting bolt must secure the mower in the lower position **Fig. 157-C**.

Adjusting the cutting height

1. Place the vehicle on a level surface and hold it with the parking brake. Raise the mower with the joystick **Fig. 160-70**. Switch the engine off and pull out the ignition key.
2. Pull the mounting bolt **Fig. 158-C** out and push the bolt **Fig. 158-A** of the wheel fork into the bush **Fig. 158-B** of the wheel spar until the wanted cutting height is set. You can adjust the cutting height centimetre by centimetre with the two mounting holes in the bush.
3. You can read off the cutting height on the scale **Fig. 158-D**.
4. Secure the set cutting height with the mounting bolt.

	Note The setting of the cutting height must be the same for all wheels. If the grass is very long and wet, you are recommended firstly to cut high and then to cut low once again.

Preparing the dirt hopper

	Note Mowing without circulating water! Lock the sump valve, see page 145.

Checklist – mowing

No.	Description	Reference
1	Driving to the work site	Page 163
2	Switching mowing on	Page 163
3	Setting the fixed engine speed	Page 164
4	Starting mowing	Page 164

Driving to the work site

1. Bring the mower into the transport position, see page 162.
2. Start the vehicle with the ignition switch **Fig. 159-78**.
3. As required, switch on the dipped headlight **Fig. 159-54**, working spotlight **Fig. 159-55** and beacon **Fig. 159-59**.
4. Drive to the work site in the transport mode. The mower must be in the upper end position for the transport mode. Push the joystick **Fig. 160-70** back for this purpose.
5. At the work site bring the mower into its working position, see page 162.

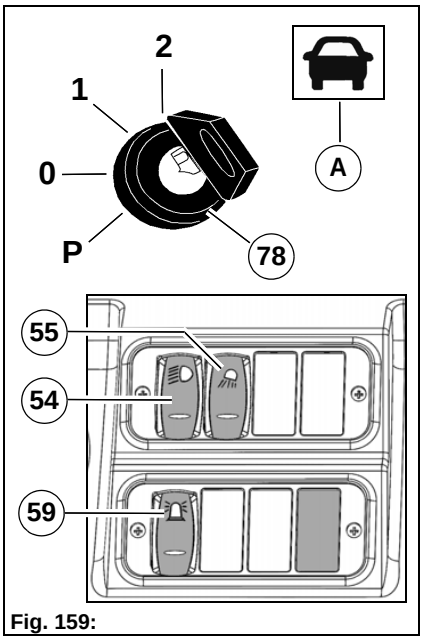


Fig. 159:

Switching the mower on

1. Switch on the work mode with the Hako button **Fig. 160-72**. The accelerator pedals must be in the neutral position. The coupling triangle work mode symbol appears in the multifunctional display Fig. 160-**A**.
2. Switch on the hydraulic circuit I for front tool carriers **Fig. 160-B** and set it to 50 litres/min. with the turn-push knob **Fig. 160-69** in the working menu of the multifunctional display.
3 Lower the mower with the joystick **Fig. 160-70**. The following functions are activated:
   - The mower is lowered (floating position).
   - Mowing is switched on.

☞	**Note** The lowering valve for front lifting (left-hand control panel) must be opened fully for mowing, since otherwise the floating position of the mower is impaired, see page 64!

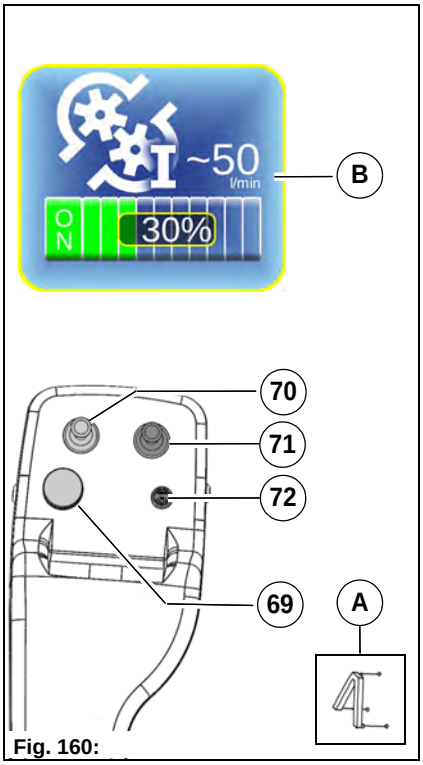


Fig. 160:

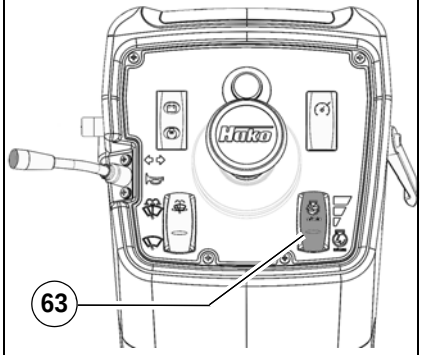


Fig. 161:

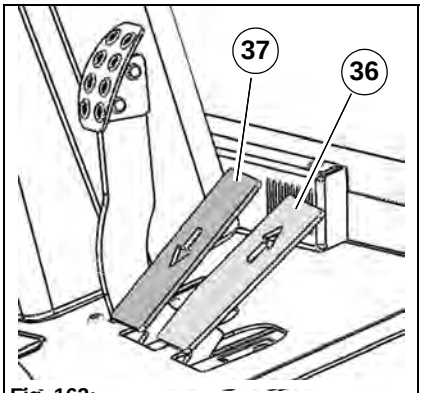


Fig. 162:

Setting the fixed engine speed

The fixed engine speed is set with the tip switch **Fig. 161-63**. Set the speed corresponding to the requirements.

Stage	Rpm	Use
1 - ECO	1600	Not suitable for mowing
2 - Standard	2000	For medium load
3 - Maximum	2400	For high load

Starting mowing

The accelerator pedal **Fig. 162-36** is used for continuously changing the speed for driving forwards.

The accelerator pedal **Fig. 162-37** is used for continuously changing the speed for reversing.

Push the accelerator pedal down slowly until the vehicle starts, the speed is increased further by pressing on the pedal.

Slowing down or braking the vehicle: Slowly reduce the pressure on the accelerator pedal, the vehicle slows down or stops.

The vehicle speed in the work mode is 16/20/24 km/h according to the selected engine speed.

Checklist – Cleaning the lawn mowing system

No.	Description	Reference
1	Emptying the dirt hopper	Page 143
2	Cleaning the dirt hopper	Page 145
3	Cleaning the mower and suction pipe	Page 165

Cleaning the mower and suction pipe

1. Raise the mower with the joystick **Fig. 164-70**, mount it in the transport position and drive to a suitable cleaning place.
2. Turn the steering wheel as far as possible to the right at the cleaning place. Switch the engine off and pull out the ignition key.
3. With the lance **Fig. 163-A** open the flap **Fig. 163-B** of the suction mouth and remove the coarse dirt. Lock the flap again with the lance.
4. Switch the vehicle on and switch on the suction fan **Fig. 163-E** in the working menu of the multifunctional display and let it run for one to two minutes.
5. Pull the mounting bolt **Fig. 164-A** out and lower the mower with the joystick.
6. Plug a water hose onto the hose coupling **Fig. 163-B** and let the mower run for one to two minutes.
7. Clean the mower from the outside with a water hose or a high-pressure cleaner.

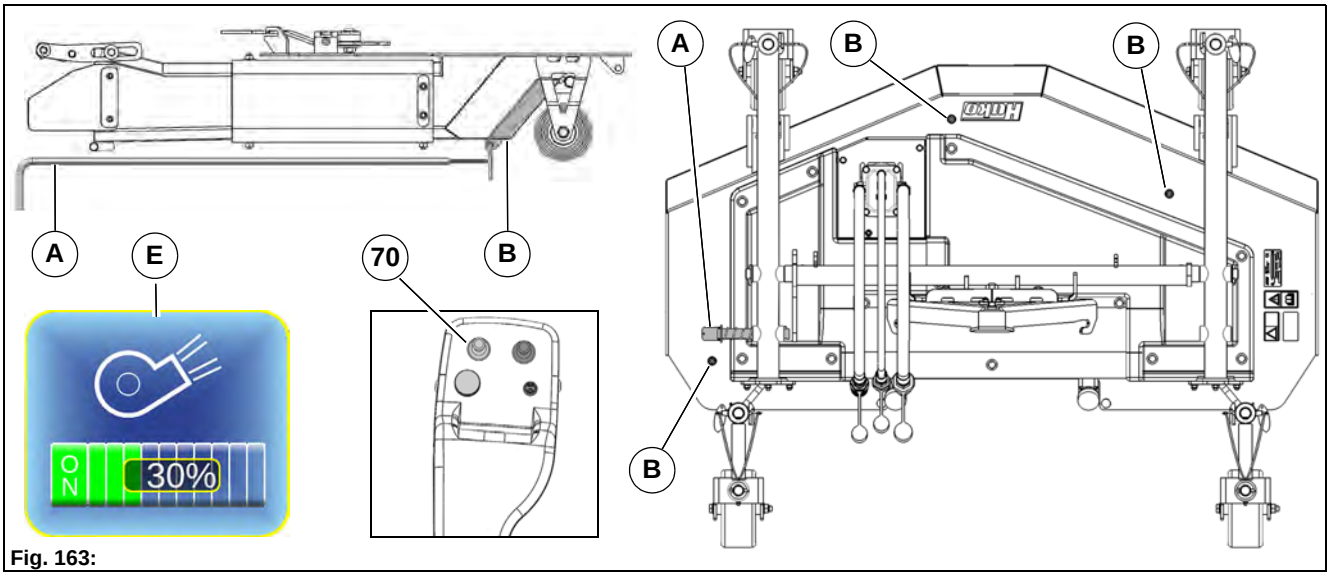


Fig. 163:

6.2.5 Technical data

Front mower	**Unit**	
Length	mm	980
Width	mm	1540
Height	mm	660
Working width	mm	1500
Weight (mower, vacuum system and suction pipe)	kg	172
Cutting height in 10 mm steps	mm	40-100
Blade speed	rpm	2594

6.2.6 Maintenance

Maintenance plan

Daily
• Checking wear and damage to the mower
Weekly
• Checking lubrication points

Maintenance work

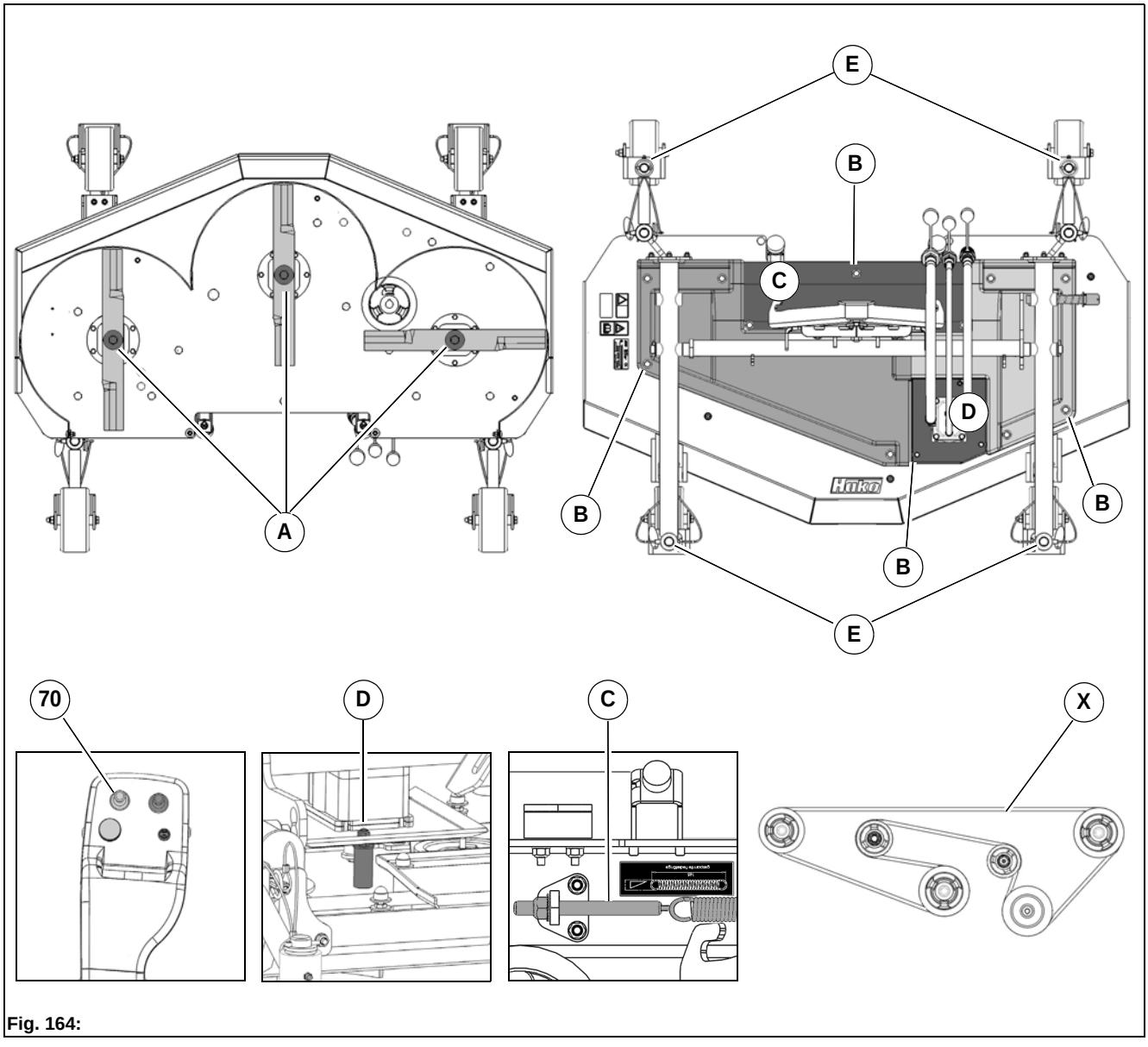


Fig. 164:

Changing mowing blades

1. Place the vehicle on a level surface and hold it with the parking brake. Raise the mower with the joystick **Fig. 164-70**. Switch the engine off and pull out the ignition key.
2. Loosen the screw **Fig. 164-A** and take off the disk and mowing blade.
3. Fit new mowing blade with disk and screw.

	**Note** Tightening torque of the mowing blades: 120 Nm

Changing the V-belt

1. Place the vehicle on a level surface and hold it with the parking brake. Raise the mower with the joystick **Fig. 164-70**. Switch the engine off and pull out the ignition key.
2. Loosen the screws on the covers **Fig. 164-B** and remove the covers.
3. Relax the tension spring with the screw **Fig. 164-C** and unhook it.
4. Remove the screws of the gearbox holder **Fig. 164-D** and remove the defective V-belt.
5. Insert the new V-belt corresponding to **Fig. 164-X**.
6. Fasten the screws on the gearbox holder.
7. Adjust the clamping screw again corresponding to the clamping length of the label (165 mm).
8. Refit the covers correctly.

Lubrication points

Check the lubrication points weekly.

Grease: Mobilgrease MP

- Bushes of the wheel holders **Fig. 164-E** (4 pcs.)

6.2.7 Troubleshooting

Grass remains lying	**Remedy**	**Reference**
Outlet clogged	Cleaning the mower	Page 168
Suction nozzle clogged	Cleaning the suction pipe	Page 165
Grass too high or wet	Changing the fixed engine speed Changing the cutting height	Page 164 Page 162
Blades blunt	Grinding the blades	Page 168
Blades do not rotate	**Remedy**	**Reference**
V-belt defective	Changing the V-belt	Page 168
Ground irregularities are not compensated for	**Remedy**	**Reference**
Mounting bolt not fitted as specified	Checking transport protection device	Page 162
Wheels do not turn	**Remedy**	**Reference**
Wheels dirty	Cleaning wheels and hubs	Page 168
Mower runs loud and sounds hard	**Remedy**	**Reference**
Checking the blade bearings	Balancing the blades	

6.2.8 Accessories

Your authorised Hako dealer is available to you at any time to answer questions on accessories for the lawn mowing system.

6.3 Sweeping system

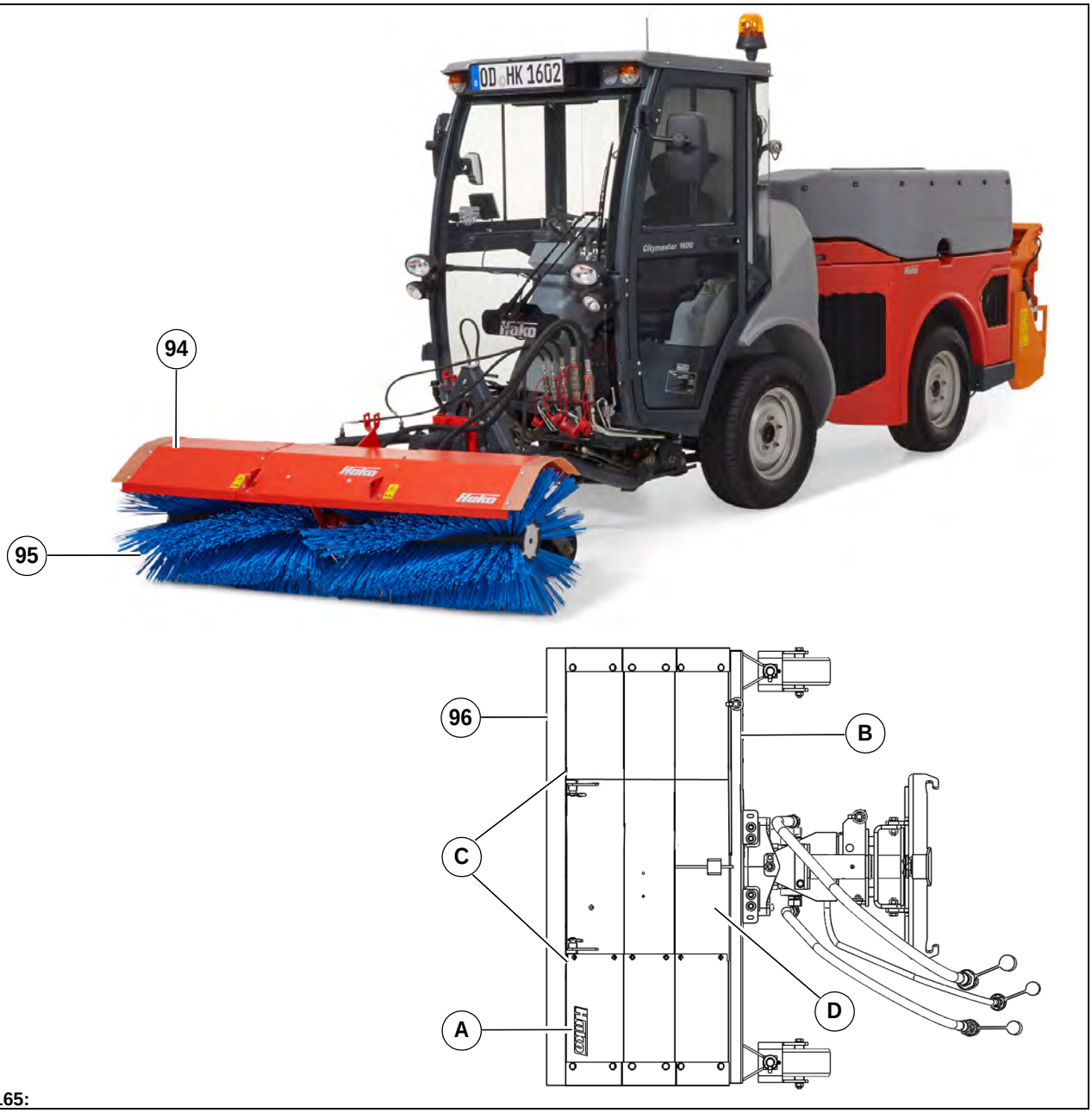


Fig. 165:

Item	Designation
94	Front sweeping machine
95	Cylindrical sweeping roller
96	Spray shield

6.3.1 Labels on the unit

Hako logo
The Hako logo **Fig. 155-A** is located on the right side of the front sweeping machine.

Type plate
The type plate **Fig. 155-B** is located on the left side of the front sweeping machine.

Label – Read operating manual
The Danger of crushing labels **Fig. 155-C** are located on the left and right side of the front sweeping machine.

Labels – Read operating manual
The Read operating manual labels **Fig. 155-D** are located on the left and right side of the front sweeping machine.

6.3.2 Sweeping system safety instructions

Danger
- Danger to life in the danger area of the vehicle! Special caution is required in the area of the articulated steering, under the raised tipper and in the area of the front sweeping roller.
- Risk of injury! When sweeping with the front sweeping machine, small stones or other parts in the snow can be thrown out by the rotating sweeping roller.
- Risk of injury! Secure the front sweeping machine against rolling away when mounting it.

Warning
- The sweeping system may be operated only in connection with the Citymaster 1600. The safety regulations for the Citymaster 1600 must be complied with absolutely.

Caution
- The labels attached to the vehicle provide important information for safe operation. Renew labels that are no longer legible or present.
- Spare parts must be original spare parts to guarantee safety.

Attention
- Thorough and frequent cleaning is especially important after sweeping material containing salt.
- Check the secure seating of the sweeping roller before every sweeping operation.

Environmental danger
- Ensure safe and environment-conserving disposal of operating and auxiliary materials.
  Take up escaping or spilled operating materials in suitable containers and dispose of them in an environmentally friendly manner.

6.3.3 Assembly

Mounting the front sweeping machine

1 Place the vehicle on a level surface and hold it with the parking brake.
2. Unlock the locking hook **Fig. 166-A** and locking rod **Fig. 166-B** on the coupling triangle.
3. Align the front sweeping machine **Fig. 166-94** centrally and in alignment with the coupling triangle.
4. Raise the front tool carrier **Fig. 166-12** with the joystick **Fig. 166-70** and attach the front sweeping machine.
5. Lock the front sweeping machine with locking hook and locking rod.
6. Close the valve **Fig. 166-G** for raising the suction mouth in the raised position!
7. Make the connections.
   - Left actuator – Supply/return = **Fig. 166-E** (optional side adjustment)
   - 19-pin coding plug = **Fig. 166-C**
   - Front sweeping machine hydraulic motors – Supply/return = **Fig. 166-F**
8. Remove the support.

Dismantling is in the reverse order.

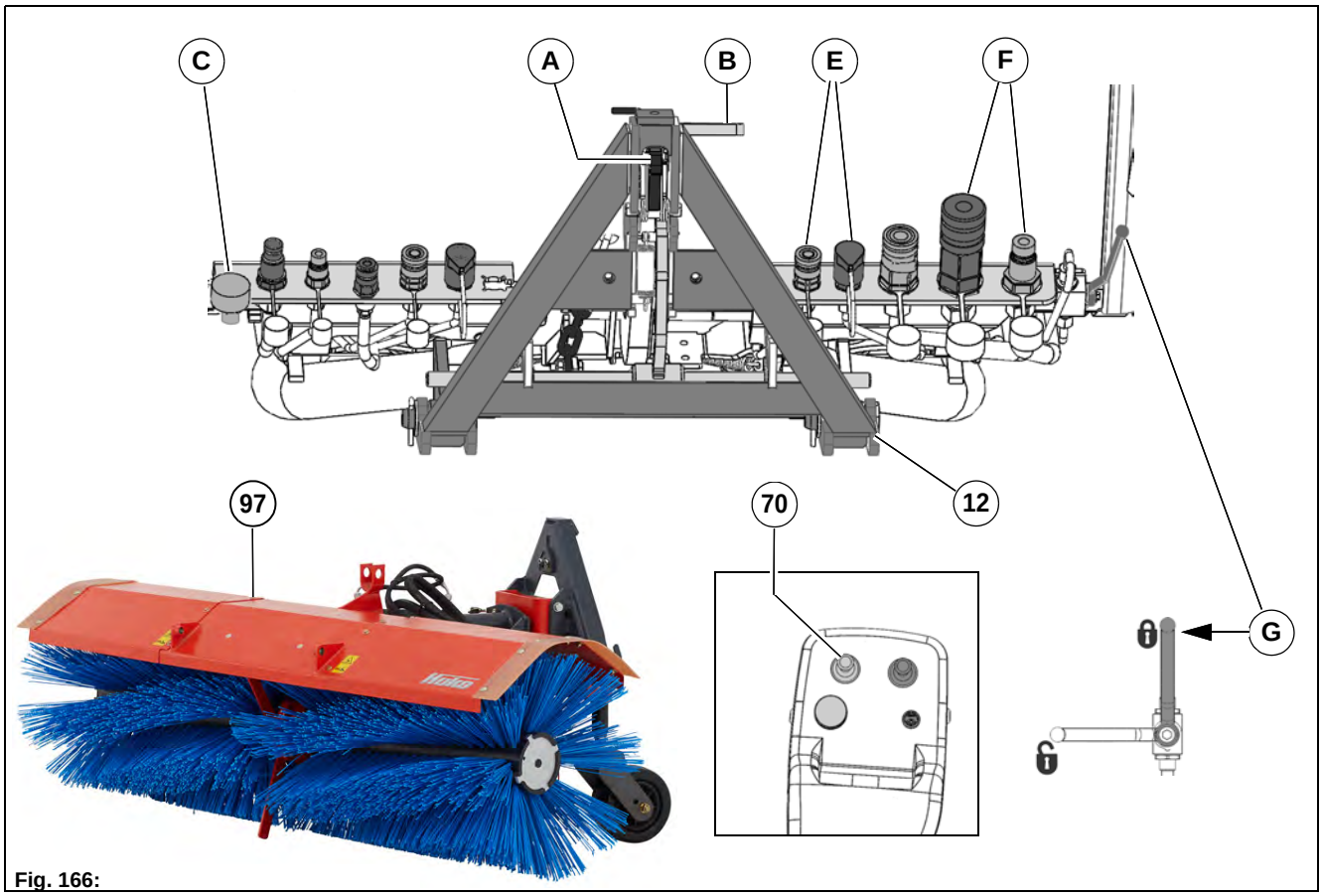


Fig. 166:

6.3.4 Operation

Checklist – Before start-up of the sweeping system

No.	Description	Reference
1	Checking sweeping level	Page 177
2	Mounting the spray shield for summer operation (optional)	Page 173
3	Adjusting the sweeping direction	Page 173

Mounting the spray shield for summer operation (optional)
For summer operation set the spray shield **Fig. 167-96** on the holders **Fig. 167-A** of the front sweeping machine and secure with bolts and split-pins.

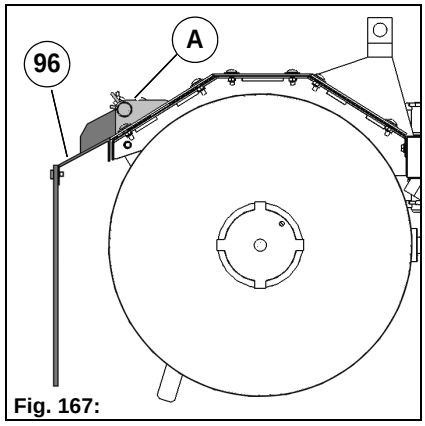


Fig. 167:

Adjusting the sweeping direction
Set the sweeping direction of the front sweeping machine with the joystick **Fig. 168-70**.
- Joystick to the left: The front sweeping machine swivels to the left.
- Joystick to the right: The front sweeping machine swivels to the right.

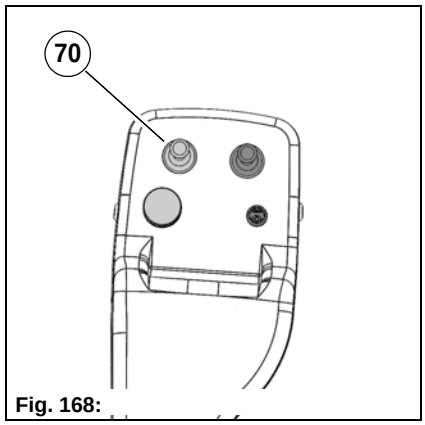


Fig. 168:

Checklist – Sweeping

No.	Description	Reference
1	Driving to the work site	Page 174
2	Switching sweeping on	Page 174
3	Setting the fixed engine speed	Page 175
4	Starting sweeping	Page 175

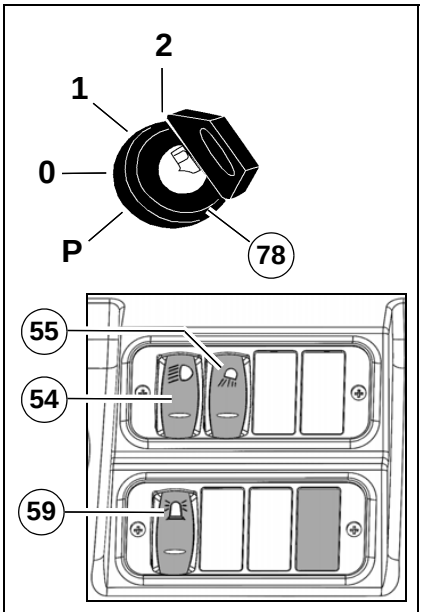


Fig. 169:

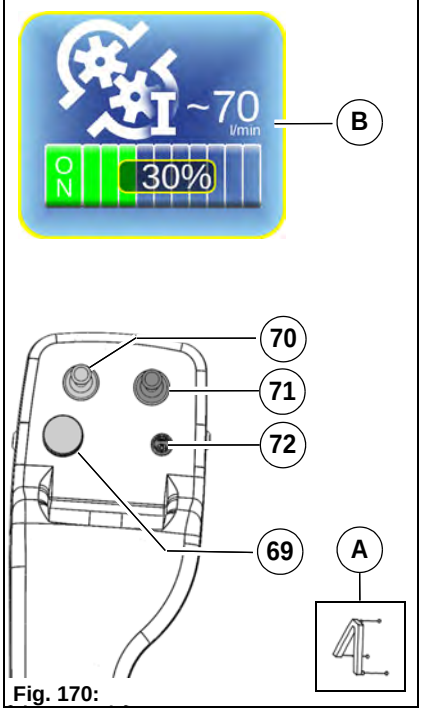


Fig. 170:

Driving to the work site

1. Bring the front sweeping machine into the transport position, see page 162.
2. Start the vehicle with the ignition switch **Fig. 169-78**.
3. As required, switch on the dipped headlight **Fig. 169-54**, working spotlight **Fig. 169-55** and beacon **Fig. 169-59**.
4. Drive to the work site in the transport mode. The front sweeping machine must be in the upper end position for the transport mode. Push the joystick **Fig. 170-70** back for this purpose.

Switching sweeping on

1. Switch on the work mode with the Hako button **Fig. 170-72**. The accelerator pedals must be in the neutral position. The coupling triangle work mode symbol appears in the multifunctional display Fig. 170-**A**.
2. Set the oil flow to 70 litres/min with the turn-push knob **Fig. 170-69** in the configuration menu of the multifunctional display in the front tool carrier menu item. In the working menu switch the hydraulic circuit I for front attachments **Fig. 170-B** on and set it to maximum 70 litres/min.
3 Lower the front sweeping machine with the joystick **Fig. 170-70.** The following functions are activated:
   - The front sweeping machine is lowered (floating position).
   - The sweeping drive is switched on.
   - The sweeping roller speed is activated.

Setting the fixed engine speed

The fixed engine speed is set with the tip switch **Fig. 171-63**. Set the speed corresponding to the requirements.
The speed must be set so that a centrifuging effect is achieved.

Stage	Rpm	Use
1 - ECO	1600	For low load
2 - Standard	2000	For medium load
3 - Maximum	2400	For high load

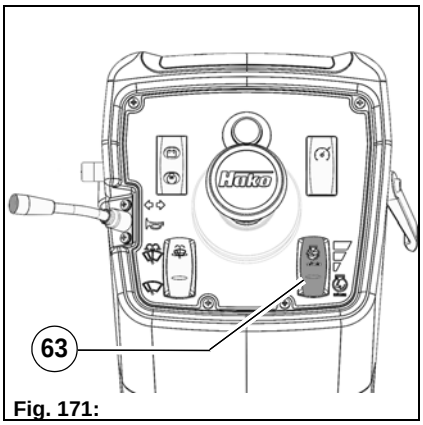


Fig. 171:

Starting sweeping

The accelerator pedal **Fig. 172-36** is used for continuously changing the speed for driving forwards.
The accelerator pedal **Fig. 172-37** is used for continuously changing the speed for reversing.
Push the accelerator pedal down slowly until the vehicle starts, the speed is increased further by pressing on the pedal.
Slowing down or braking the vehicle: Slowly reduce the pressure on the accelerator pedal, the vehicle slows down or stops.
The vehicle speed in the:

- transport mode is 0 to 40 km/h
- work mode is 16/20/24 km/h according to selected engine speed

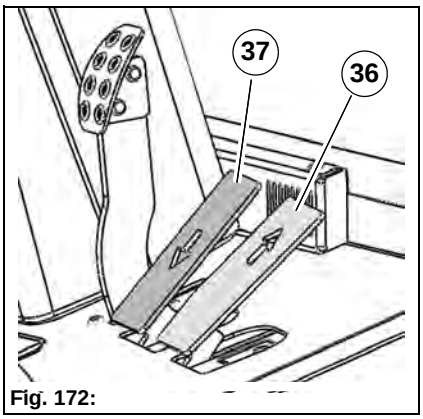


Fig. 172:

Setting down the front sweeping machine

Set the front sweeping machine down so that the bristles of the sweeping roller do not touch the ground.

1. Insert the support **Fig. 173-A** (optional) in the front holder **Fig. 173-B**.
2. Secure with bolts and splints when the required supporting height is reached.

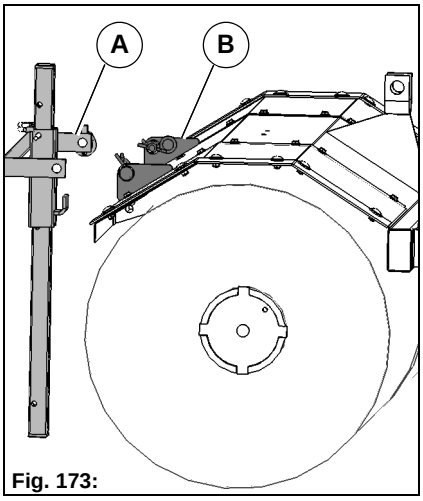


Fig. 173:

6.3.5 Technical data

Front sweeping machine	Unit	
Length	mm	1050
Width	mm	1600
Height	mm	720
Sweeping width	mm	1600
Weight	kg	147
Sweeping roller diameter	mm	600

6.3.6 Maintenance

Maintenance plan

Daily
• Checking wear and damage to the front sweeping machine
Weekly
• Checking lubrication points
Every 500 operating hours
• Changing the gearbox oil

Maintenance work

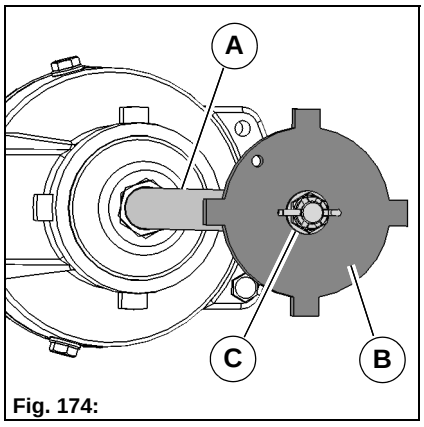


Fig. 174:

Changing the sweeping rollers

1. Place the vehicle on a level surface and hold it with the parking brake. Raise the front sweeping machine with the joystick **Fig. 170-70**. Switch the engine off and pull out the ignition key.
2. The sweeping rollers are fastened to the support tube **Fig. 174-A** with flange **Fig. 174-B**, and crown nut **Fig. 174-C**. Loosen the crown nuts and remove everything.
3. Mount new sweeping rollers.

You must readjust the sweeping level after changing the sweeping rollers.

Checking the sweeping level

Check the sweeping rollers daily. Change worn sweeping rollers.

1. Place the vehicle on a level surface and hold it with the parking brake. Raise the front sweeping machine with the joystick **Fig. 170-70**.
2. Remove the split-pin **Fig. 175-A** from the bolt of the wheel fork and withdraw the supporting wheels **Fig. 175-B** downwards.
3. Adjust the sweeping level with the washers **Fig. 175-C** on both supporting wheels. For optimum sweeping effect the bristles should press over the ground approx. 20 mm.
4. Reattach the supporting wheels and secure them with split-pins.
5. Check the sweeping level on dust and chalk.

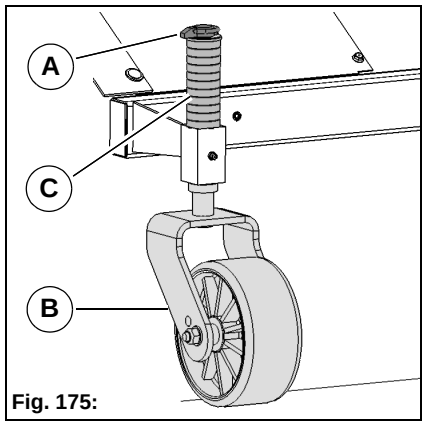


Fig. 175:

Changing the gearbox oil

Check and if necessary top up the oil level in the gearbox. An oil change is necessary after 500 operating hours (at the latest after two years).

1. Place a suitable collecting pan under the drain screw **Fig. 176-A**.
2. Unscrew the drain screw and drain off the gearbox oil completely.
3. Insert the drain screw with new seal.
4. Unscrew the filling screw **Fig. 176-B** and fill with SAE 80W90 gearbox oil. Filling volume = 0.4 litres.
5. Insert the filling screw with new seal.

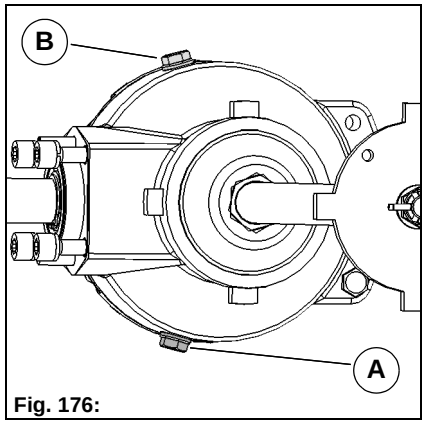


Fig. 176:

Lubrication points

Check the lubrication points weekly.

Grease: Mobilgrease MP

- Left/right supporting wheels (2 pcs.) **Fig. 177-A**
- Supporting tube on the coupling triangle (1 pc.) **Fig. 177-B**
- Bearing bolt (2 pcs.) **Fig. 177-C**

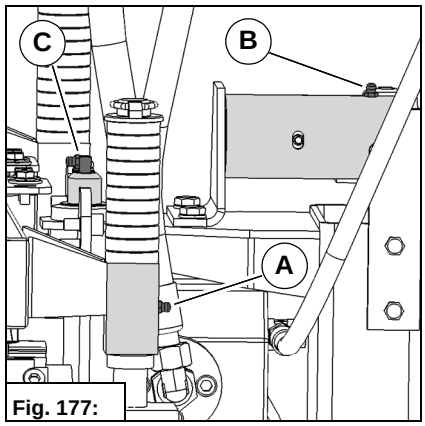


Fig. 177:

6.3.7 Troubleshooting

Sweeping performance is bad	Remedy	Reference
Speed of the cylinder broom too low	Increasing the fixed engine speed	Page 175
Sweeping level out of adjustment	Adjusting the sweeping level	Page 177
Sweeping roller worn	Changing the sweeping roller	Page 176

6.3.8 Accessories

Your authorised Hako dealer is available to you at any time to answer questions on accessories for the sweeping system.

6.4 Snow clearing system

Fig. 178:

Item	Designation	Type
97	Folding snow blade 140 cm	576352
98	Hydraulic loading platform	143830
99	Roller spreader	577800

6.4.1 Labels on the unit

Hako logo
A Hako logo **Fig. 178-A** is located on the snow blade, the loading platform and the spreader.

Type plate
A type plate **Fig. 178-B** is located on the snow blade, the loading platform and the spreader.

Label – Read operating manual
The Read operating manual label **Fig. 178-C** is located on the snow blade, the loading platform and the spreader.

6.4.2 Snow clearing system safety instructions

Danger
- Danger to life in the danger area of the vehicle! Special caution is required in the area of the articulated steering, under the raised tipper and in the area of the front and rear attachment.
- Risk of accident due to unintended lowering of the attachment! Activate winter operation in the configuration menu only in connection with an uncoded snow blade. The front lift is then not limited downwards. Winter operation must be deactivated immediately after use.

Warning
- The snow clearing system may be operated only in connection with the Citymaster 1600. The safety regulations for the Citymaster 1600 must be complied with absolutely.

Caution
- The labels attached to the vehicle provide important information for safe operation. Renew labels that are no longer legible or present.
- Spare parts must be original spare parts to guarantee safety.

Attention
- Thorough and frequent cleaning is especially important after sweeping material containing salt.

6.4.3 Assembly

Mounting the snow blade

1 Place the vehicle on a level surface and hold it with the parking brake. Switch the engine off and pull out the ignition key.
2. Unlock the locking hook **Fig. 179-A** and locking rod **Fig. 179-B** on the front tool carrier **Fig. 179-12**.
3. Align the mower **Fig. 179-97** centrally and in alignment with the front tool carrier.
4. Raise the snow blade with the joystick **Fig. 179-70** up into the end position.
5. Lock the snow blade with the locking hook and locking rod.
6. Close the valve **Fig. 179-C** for raising the suction mouth in the raised position!
7. Make the connections.
   - Swivel snow blade – supply = **Fig. 179-D**
   - Swivel snow blade – return = **Fig. 179-E**

Dismantling is in the reverse order.

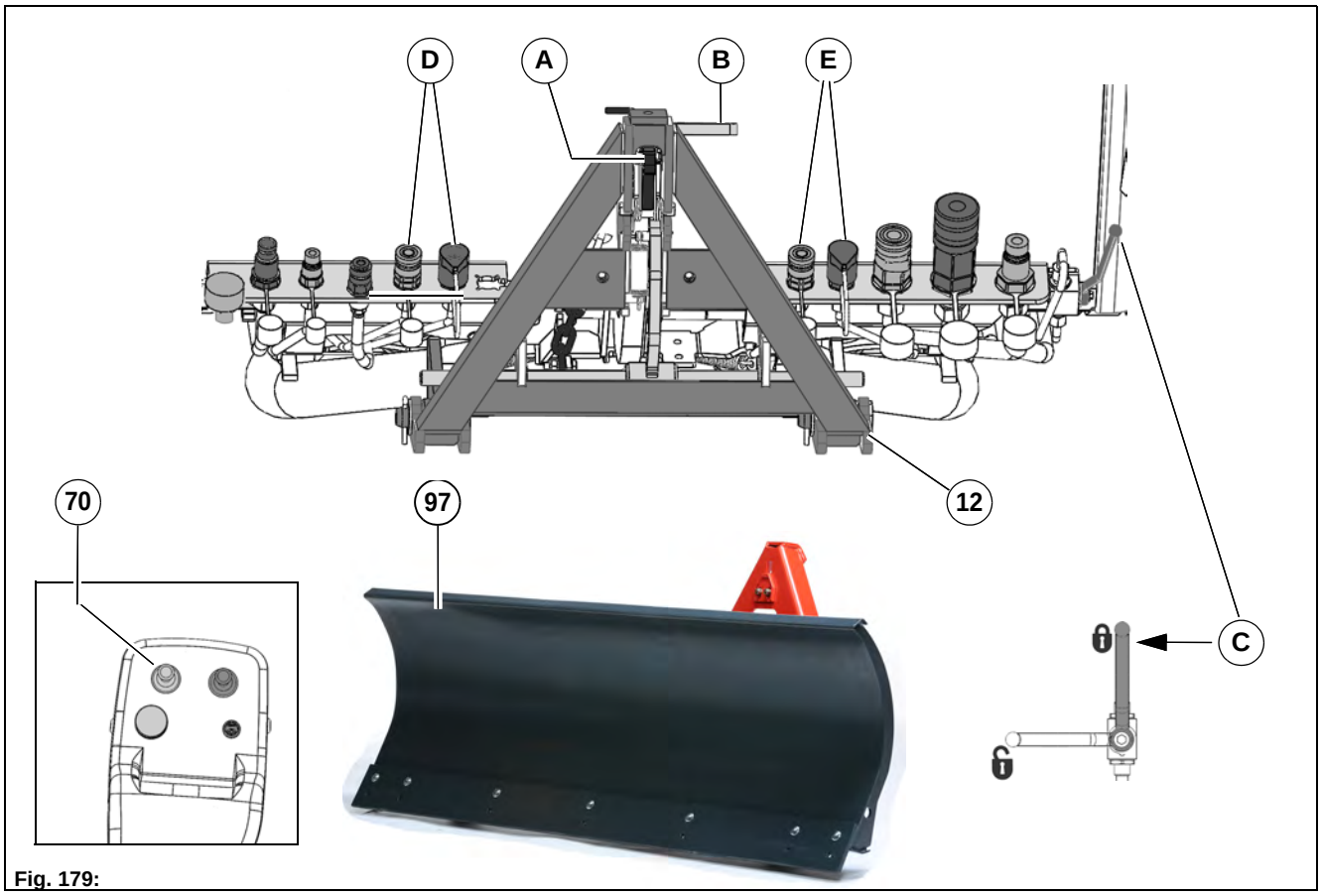


Fig. 179:

Mounting the loading platform

1. Place the vehicle on a level surface and switch off the engine. Engage the parking brake.
2. Unlock the lever **Fig. 180-A** of the trolley **Fig. 180-D** (optional) and swing it into the upper position.
3. Hold the lever **Fig. 180-A** in the upper position with one hand and with the other hand fit the mounting bolt **Fig. 180-B** on the Citymaster 1600.

⚠	**Danger** Risk of injury! The lever **Fig. 180-A** can swing over.

4. Unlock the sledge **Fig. 180-C** with the lever and push it into the rear position.

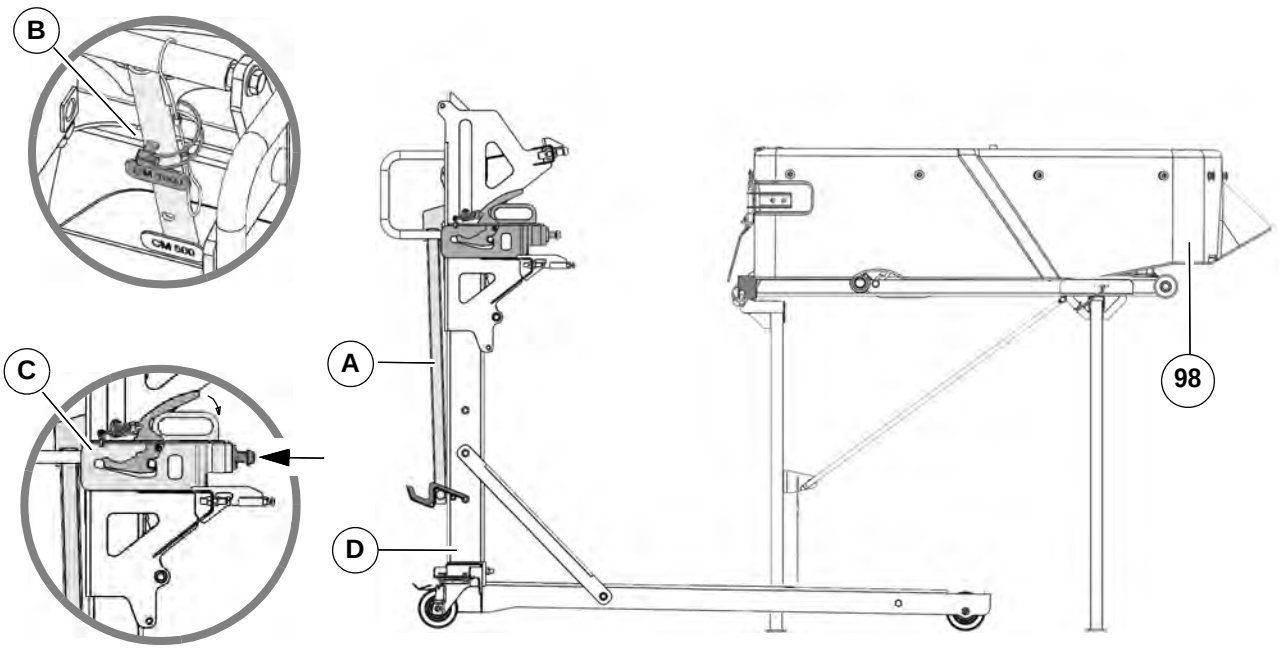


Fig. 180:

Continued – Mounting the loading platform

⚠	**Danger** Risk of injury due to tilting over! Make sure that the cross strut **Fig. 181-B** has been inserted when transporting the loading platform on the supports **Fig. 181-K**. Secure the supports with bolts and splints.

5 Push the trolley **Fig. 181-J** (optional) with the lower positioning aid **Fig. 181-E** into the spars **Fig. 181-G** and against the fixed bearings **Fig. 181-H** of the loading platform **Fig. 181-98**. The screw **Fig. 181-F** must be adjusted to 38.5 mm!

6 Carefully lower the lever **Fig. 181-A** of the trolley and make sure that the locking pins **Fig. 181-I** sit in the holders of the loading platform. Lock the lever.

7 Remove the supports **Fig. 181-K** (optional). To do this, pull out the split pins and the bolts.

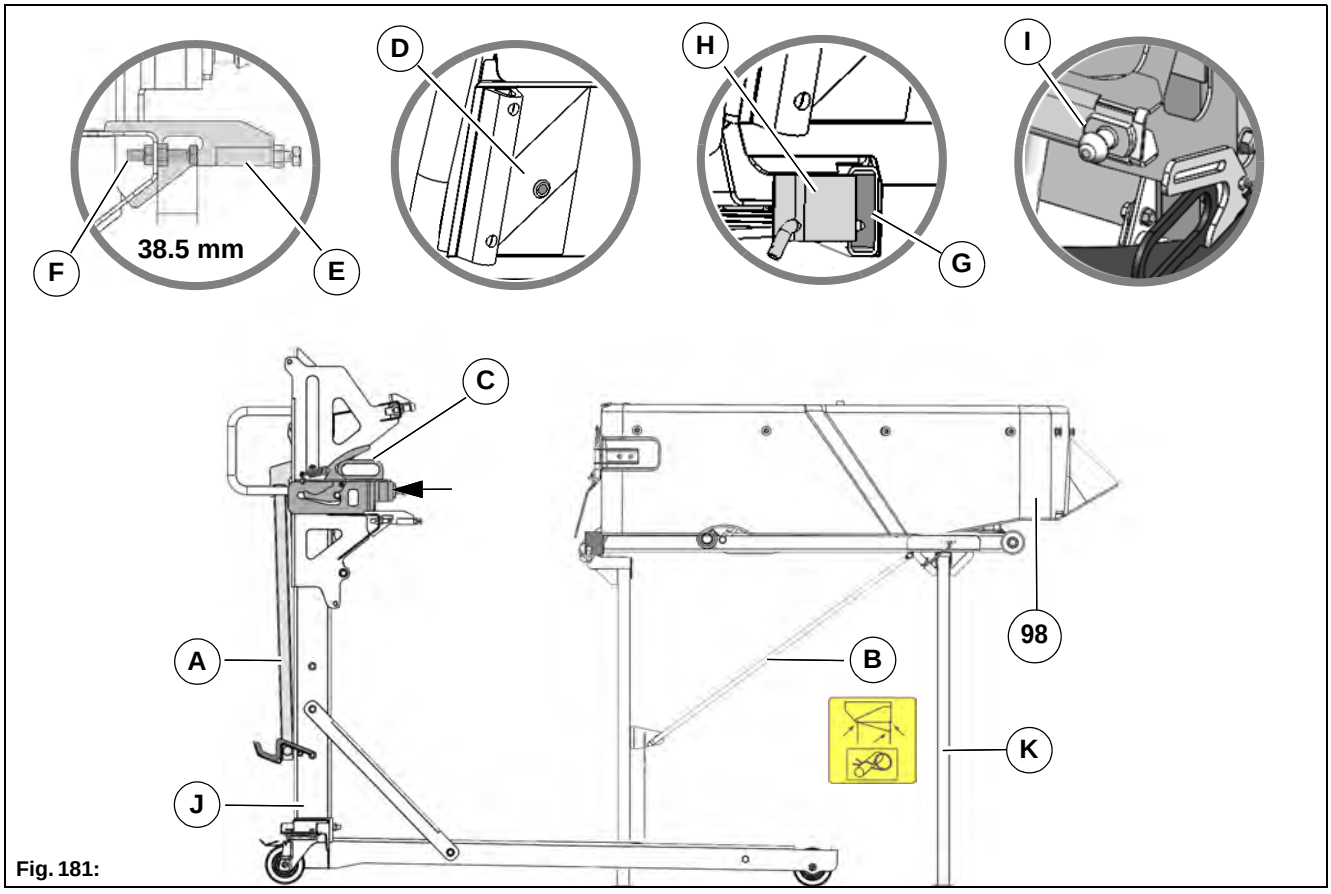


Fig. 181:

Continued – Mounting the loading platform

8. Align the loading platform to the rear wagon:
   Procedure:
   - Position the loading platform over the rear wagon and check the gap size **Fig. 107-X** with 5-10 mm. If necessary, correct with the screw **Fig. 107-A**.
   - Push the rollers of the loading platform up into the pockets **Fig. 107-B** of the rear wagon.
   - The fixed bearings **Fig. 107-C** of the loading platform and the holders **Fig. 107-D** of the rear wagon must be in alignment.
9. Unlock the lever **Fig. 107-E** of the trolley and swing it into the upper position. Let the loading platform down slowly! Withdraw the trolley.
10. Secure the loading platform with bolts and splints.
11. Make the connections.
    - Loading platform raising/lowering – Supply/return = **Fig. 182-F**

Dismantling is in the reverse order.

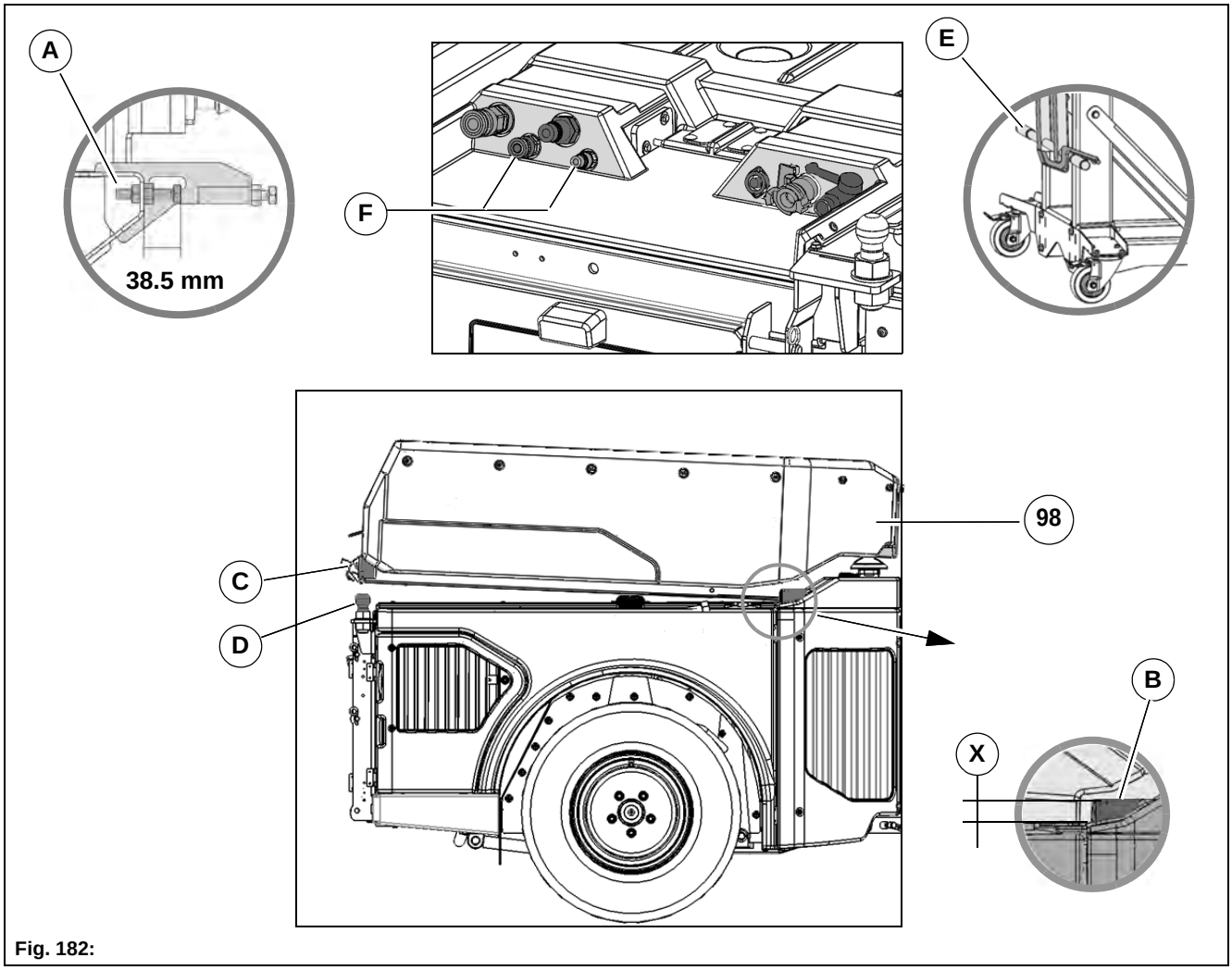


Fig. 182:

Mounting the spreader

1 Place the vehicle on a level surface and hold it with the parking brake. Switch the engine off and pull out the ignition key.
2. Move the spreader with mounting wagon carefully to the tail of the vehicle and align it.
3. Make the connections.
   - Spreader roller hydraulic motor – Supply/return **Fig. 183-A**
   - Spreader plate hydraulic motor – Supply/return **Fig. 183-A**
   - X65 – 7-pin socket for lighting **Fig. 183-C**
   - X67 – 7-pin socket for spreader **Fig. 183-D**
   - X68 – 7-pin socket for spreader **Fig. 183-E**
4. With both cranks **Fig. 183-F** of the trolley lower the spreader evenly onto the holding points **Fig. 183-G** of the vehicle tail end and secure with bolts.
5. Remove the trolley.

Dismantling is in the reverse order.

An optional control cable is required for the socket X68.

The optional odometer is required for the distance-dependent spreading function.

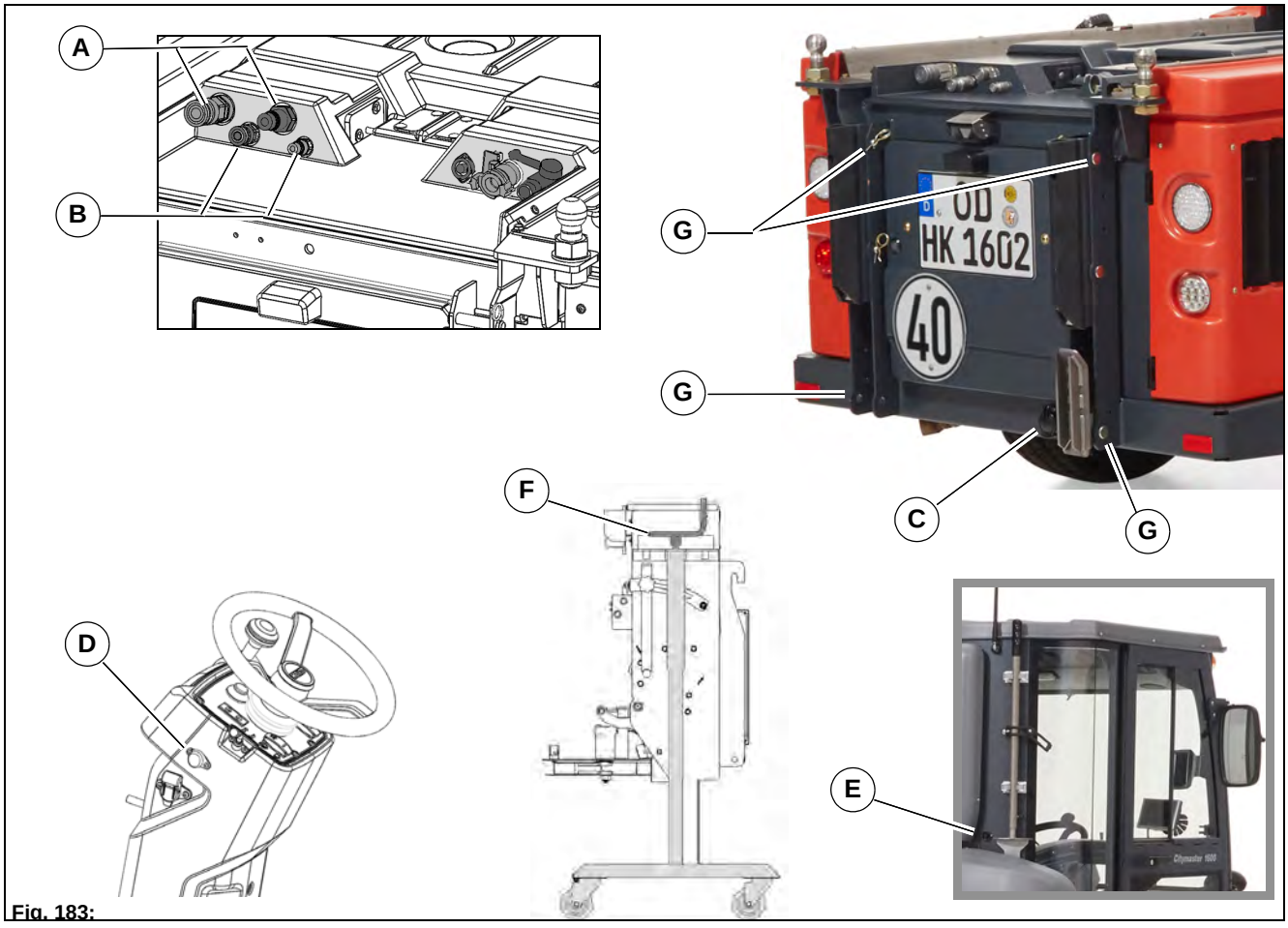


Fig. 183:

6.4.4 Operation

Checklist – Before start-up of the snow clearing system

No.	Description	Reference
1	Switching winter operation on	Page 186
2	Adjusting the attack angle	Page 186
3	Loading the loading platform and spreader	Page 186
4	Adjusting the spreading volume	Page 186
5	Adjusting the spreading width	Page 186

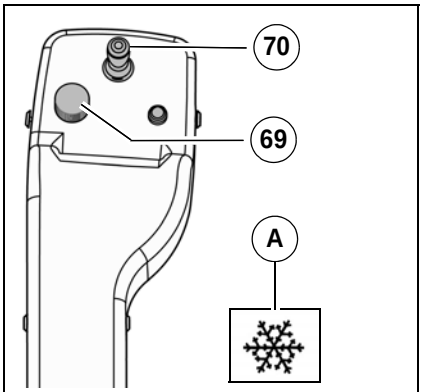


Fig. 184:

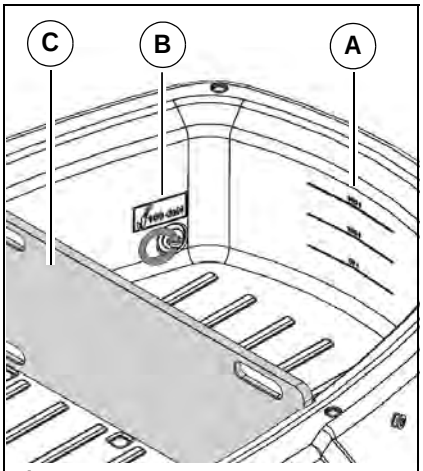


Fig. 185:

Switching winter operation on

Select the configuration menu in the multifunctional display with the turn-push knob **Fig. 184-69** and activate winter operation. The Winter service information symbol **Fig. 184-A** appears in the multifunctional display.

Warning
Activate winter operation in the configuration menu only in connection with an uncoded snow blade. In winter operation the front lift system is not limited downwards. There is a risk of an accident on unintended lowering of the attachment!

Adjusting the attack angle

Adjust the attack angle with the joystick **Fig. 184-70**.

- Joystick to the left: The front attachment swivels to the left
- Joystick to the right: The front attachment swivels to the right

Loading the loading platform

Observe the maximum permissible load of 500 kg when loading the loading platform.

Filling height of the loading platform, see mark **Fig. 185-A**. Load capacity of the tie-down eyes **Fig. 185-B**: max. 250 daN. You can use the separating board **Fig. 185-C** for different materials.

Loading the spreader

Different specific weights arise according to the condition of the spread material (wet or dry). Check the specific weight of the spread material before filling.

Payload of the spreader, see operating manual of the spreader.

Adjusting the spread volume

Adjusting the spread volume, see operating manual of the spreader.

Adjusting the spreading width

The spreading width depends on the condition of the spread material and the speed of the spreading disk. The more coarse grained the spread material is, the larger is the possible spreading width.

Adjusting the spreading width, see operating manual of the spreader.

Checklist – Snow clearing

No.	Description	Reference
1	Driving to the work site	Page 187
2	Switching snow clearing on	Page 187
3	Setting the fixed engine speed	Page 188
4	Starting snow clearing	Page 188

Driving to the work site

1. Bring the snow blade into the transport position, see page 162.
2. Start the vehicle with the ignition switch **Fig. 186-78**.
3. As required, switch on the dipped headlight **Fig. 186-54**, working spotlight **Fig. 186-55** and beacon **Fig. 186-59**.
4. Drive to the work site in the transport mode. The front attachment must be in the upper end position for the transport mode. Push the joystick **Fig. 187-70** back for this purpose.

Switching snow clearing on

1. With the joystick **Fig. 187-70** lower the snow blade into the floating position.
2. Start snow clearing in the transport mode.

☞	**Note** For snow clearing with the front sweeping machine, the procedure is similar to that described on page 170.

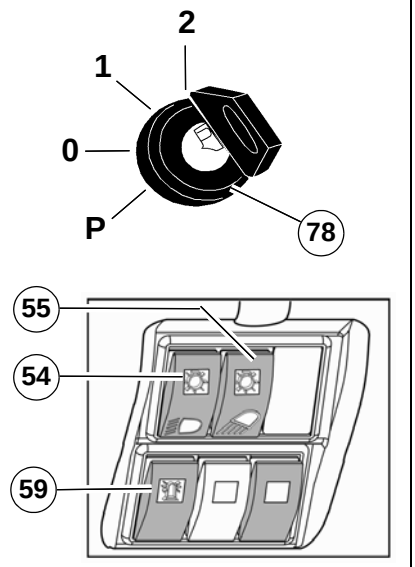


Fig. 186:

Switching spreading on

1. Switch the hydraulic oil circuit II for rear attachments on with the turn-push knob **Fig. 187-69**.
2. Start spreading in the transport mode.

☞	**Note** Switch the spreader off with a time delay: The spreading run-on time can be set between 0 and 4 seconds in the configuration menu in the winter service menu item. Spreader fast emptying: Spreader fast emptying can be switched on and off in the configuration menu in the winter service menu item.

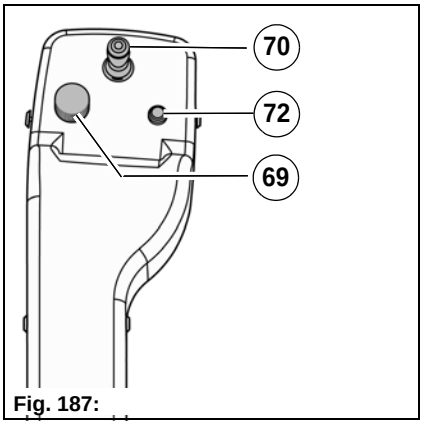


Fig. 187:

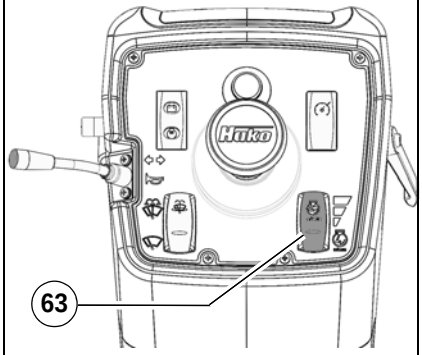


Fig. 188:

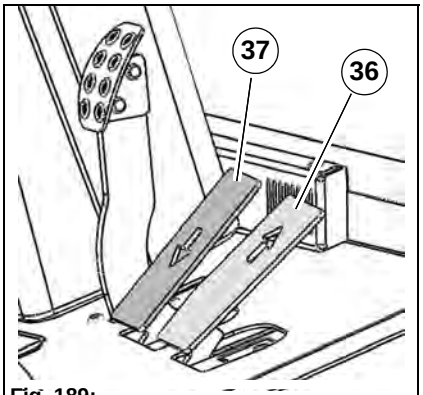


Fig. 189:

Setting the fixed engine speed

The fixed engine speed is set with the tip switch **Fig. 188-63**. Set the speed corresponding to the requirements.

Stage	Rpm	Use
1 - ECO	1600	For low load
2 - Standard	2000	For medium load
3 - Maximum	2400	For high load

Starting snow clearing

The accelerator pedal **Fig. 189-36** is used for continuously changing the speed for driving forwards.

The accelerator pedal **Fig. 189-37** is used for continuously changing the speed for reversing.

Push the accelerator pedal down slowly until the vehicle starts, the speed is increased further by pressing on the pedal.

Slowing down or braking the vehicle: Slowly reduce the pressure on the accelerator pedal, the vehicle slows down or stops.

The vehicle speed in the:

- transport mode is 0 to 40 km/h
- work mode is 16/20/24km/h according to selected engine speed

6.4.5 Technical data

Snow blade	Unit	
Working width	mm	1400
Share height	mm	500

Loading platform	Unit	
Load on the loading platform	kg	max. 500

You will find information on technical data in the operating manual of the spreader.

6.4.6 Maintenance

You will find information about the maintenance plan and maintenance work in the operating manual of the snow blade.

6.4.7 Accessories

Your authorised Hako dealer is available to you at any time to answer questions on accessories for the transport system.

6.5 Transport system

Fig. 190:

Item	Designation
100	Trailer
101	Trailer hitch plate

6.5.1 Labels on the unit

Labels on the unit, see operating manual of the trailer.

6.5.2 Safety instructions

Danger
- Danger to life in the danger area of the vehicle! Special caution is required in the area of the articulated steering, under the raised tipper and in the area of the trailer.
- Danger to life due to inadequately secured load! The load must be correctly distributed and fastened on the loading surface.
- Risk of injury! Modifying the safety equipment is not permitted.
- Risk of accident! Adopt measures against erroneous starting and unwanted movement. Switch the engine off and pull out the ignition key.
- Risk of accident! You must consult Hako before attaching other attachments not approved by Hako!

Warning
- The transport system may be operated only in connection with the Citymaster 1600. The safety regulations for the Citymaster 1600 must be complied with absolutely.

Caution
- The labels attached to the vehicle provide important information for safe operation. Renew labels that are no longer legible or present.
- Spare parts must be original spare parts to guarantee safety.

6.5.3 Assembly

Mounting the trailer hitch plate (optional)
The trailer hitch plate **Fig. 191-101** is mounted without tools to the tail of the vehicle.
1. Remove the locking pins **Fig. 191-B** of the four bolts **Fig. 191-C** of the trailer hitch plate and withdraw the bolts.
2. Position the trailer hitch plate on the vehicle.
3. Secure the trailer hitch plate with bolts and locking pins to the holding points **Fig. 191-D** of the vehicle tail.
4. If necessary, remove the footrest (optional) and collision protection (optional).
5. Affix the Speed label at position **Fig. 191-X**.
6. Close the valve **Fig. 191-E** for the suction mouth lift system!

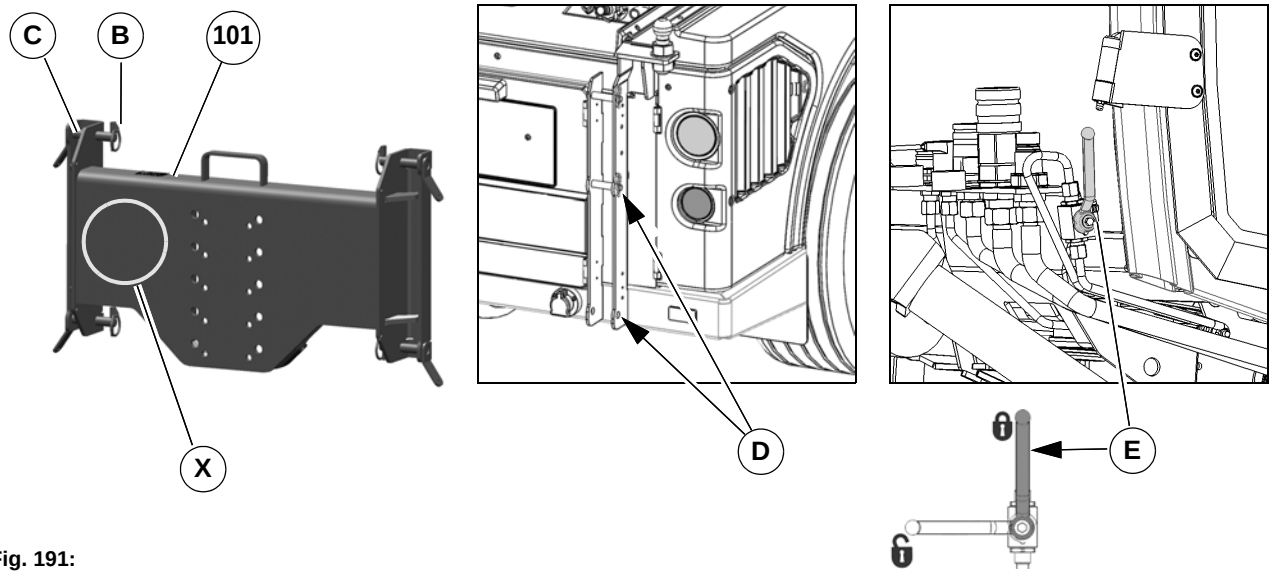


Fig. 191:

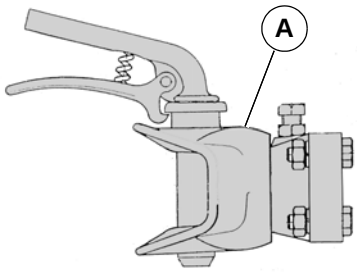


Fig. 192:

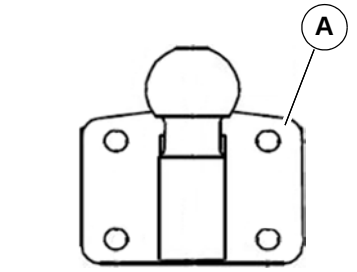


Fig. 193:

Mounting the jaw coupling (optional)

	Note The trailer hitch plate option is required for mounting the jaw coupling.

Mount the jaw coupling **Fig. 192-A** with the bolts, washers and nuts to the optional trailer hitch plate in the wanted height.
Four setting heights are available.

Mounting the ball head coupling (optional)

	Note The trailer hitch plate option is required for mounting the ball head coupling.

Mount the ball head coupling with the bolts, washers and nuts to the optional trailer hitch in the wanted height.
Four setting heights are available.

6.5.4 Operation

Starting transport
The accelerator pedal **Fig. 194-36** is used for continuously changing the speed for driving forwards.
The accelerator pedal **Fig. 194-37** is used for continuously changing the speed for reversing.
Push the accelerator pedal down slowly until the vehicle starts, the speed is increased further by pressing on the pedal.
Slowing down or braking the vehicle: Slowly reduce the pressure on the accelerator pedal, the vehicle slows down or stops.
The vehicle speed in the:

- transport mode is 0 to 40 km/h
- work mode is 16/20/24 km/h according to selected engine speed

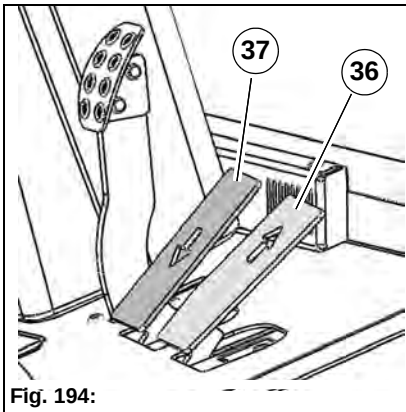


Fig. 194:

6.5.5 Technical data

Single-axle trailer	**Unit**	
Length	mm	2200
Width	mm	1300
Height	mm	300
Payload	kg	1450
Gradability in trailer operation at total combination load	%	20
Trailer hitch plate	**Unit**	
Trailer load braked	kg	1750
Trailer load unbraked	kg	750
Support load	kg	max. 150

6.5.6 Maintenance

You will find information about the maintenance plan and maintenance work in the operating manual of the trailer.

6.5.7 Accessories

Your authorised Hako dealer is available to you at any time to answer questions on accessories for the transport system.

6.6 Wet cleaning system

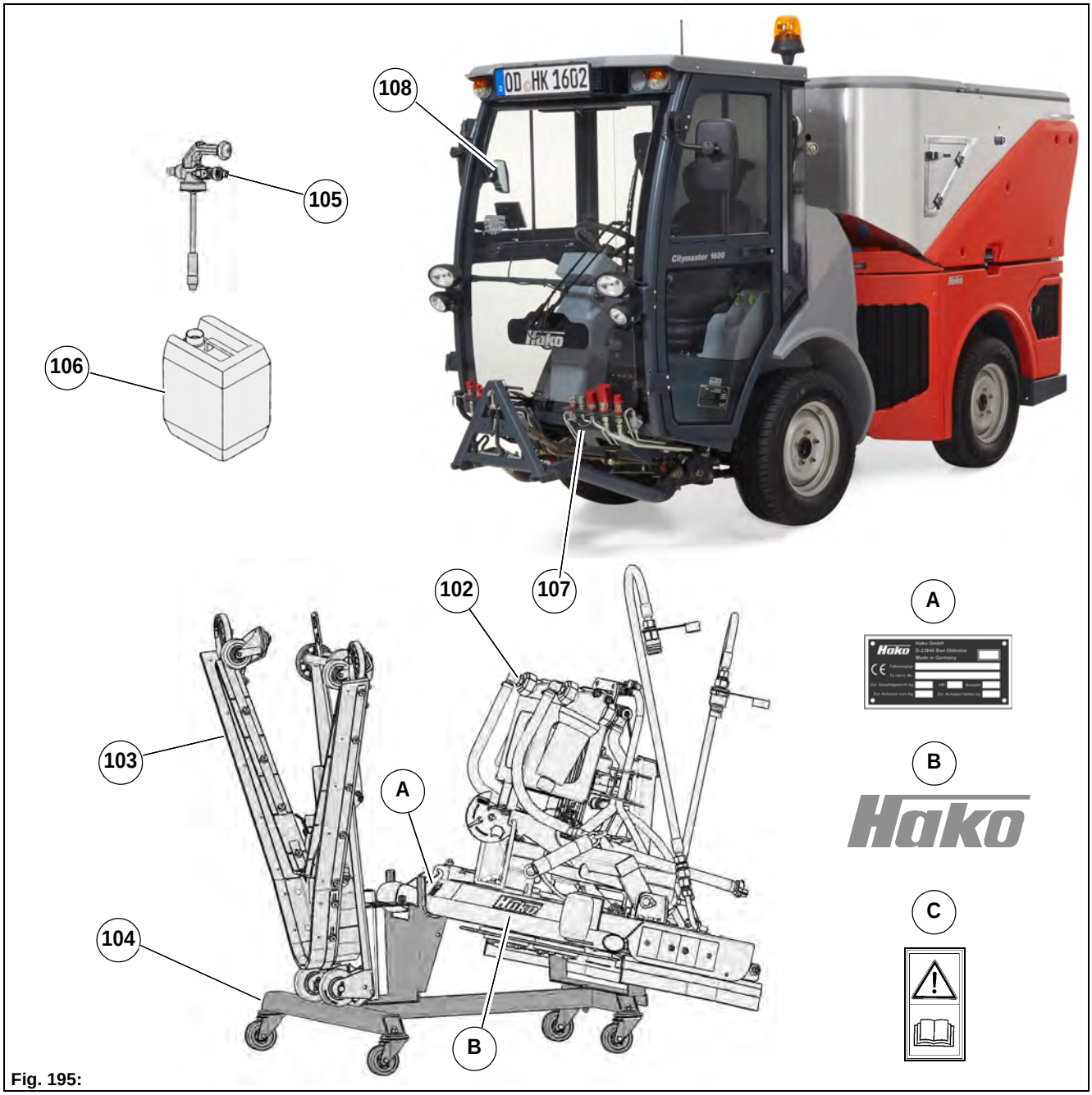


Fig. 195:

Item	Designation
102	Scrubbing deck of the CityCleaner
103	Squeegee of the CityCleaner
104	Trolley (optional)
105	Chemical dosing system (optional)
106	Detergent (optional) CityClean-O and CityClean-S
107	Water supply (optional)
108	Brush pressure (optional)

6.6.1 Labels on the unit

Type plate
The type plate **Fig. 195-A** is located at the front of the CityCleaner.

Hako name plates
The Hako name plates **Fig. 195-B** are located at the front left and right of the CityCleaner.

6.6.2 Mounting

Mounting sequence
1. Remove the squeegee from the trolley and mount it on the vehicle.
2. Remove the scrubbing deck from the trolley and mount it on the vehicle.
3. Mounting the dirt hopper

Disassembly sequence
1. Disassembling the dirt hopper
2. Disassemble the scrubbing deck from the vehicle and place it onto the trolley.
3. Disassemble the squeegee from the vehicle and place it onto the trolley.

Note
Mounting of the dirt hopper is described in the Vacuum sweeping system section.

Danger
- Danger to life in the danger area of the vehicle! Special caution is required in the area of the articulated steering, under the raised tipper and in the area of the trailer.
- Risk of injury! Modifying the safety equipment is not permitted.
- Risk of accident! Adopt measures against erroneous starting and unwanted movement. Switch the engine off and pull out the ignition key.
- Risk of accident! You must consult Hako before attaching other attachments not approved by Hako!

Warning
- Risk of crushing! The squeegee of the CityCleaner weighs more than 25 kg. Body parts may be crushed if the squeegee falls down or falls over. Always use suitable load-carrying equipment.
- Risk of injury! Wear suitable protective clothing (protective gloves and safety goggles) when using detergents.
- Risk of injury! There is a risk of tilting over if the squeegee is located on the trolley without the scrubbing deck. Observe the correct assembly and disassembly sequence.
- Risk of injury! Always wear protective gloves when working on the lateral deflectors and brushes.

Caution
- The labels attached to the vehicle provide important information for safe operation. Renew labels that are no longer legible or present.
- Spare parts must be original spare parts to guarantee safety.
- Limited ground clearance! When driving on the kerb, a max. threshold of 120 mm can be driven on with a mounted squeegee.
- After disassembling the CityCleaner, secure the trolley against rolling away.

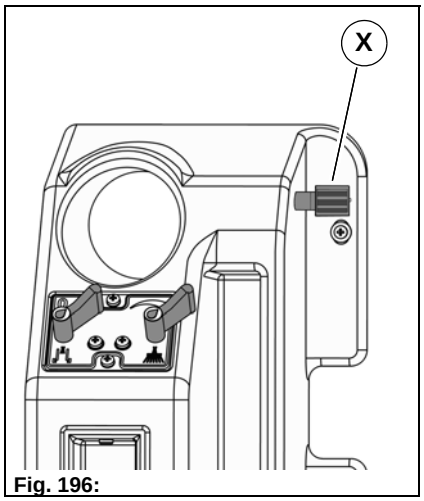


Fig. 196:

Mounting the squeegee

Note
If there is circulating water in the dirt hopper, the ball cock **Fig. 197-10** of the circulating water stop valve (right side of articulation area) must be shut off!

1. Place the vehicle on a level surface and hold it with the parking brake.
2. Raise the front tool carrier and fix it in the upper position with the lowering valve **Fig. 196-X.**
3. Remove the squeegee **Fig. 197-103** from the trolley and position it by hand centrally under the holding plate **Fig. 197-A**.
4. Open the ball cock **Fig. 197-G**. Push the joystick **Fig. 197-70** forwards. When the ball cock is open, the holding plate is lowered onto the squeegee.
5. Shift the squeegee centrally under the holding plate until the stops **Fig. 197-B** come up to the points **Fig. 197-C**.
6. With the lever **Fig. 197-D** lock and secure the squeegee on the counter bearing **Fig. 197-E** of the holding plate, see sketch **Fig. 197-F**.
7. Open the lowering valve **Fig. 196-X** again.

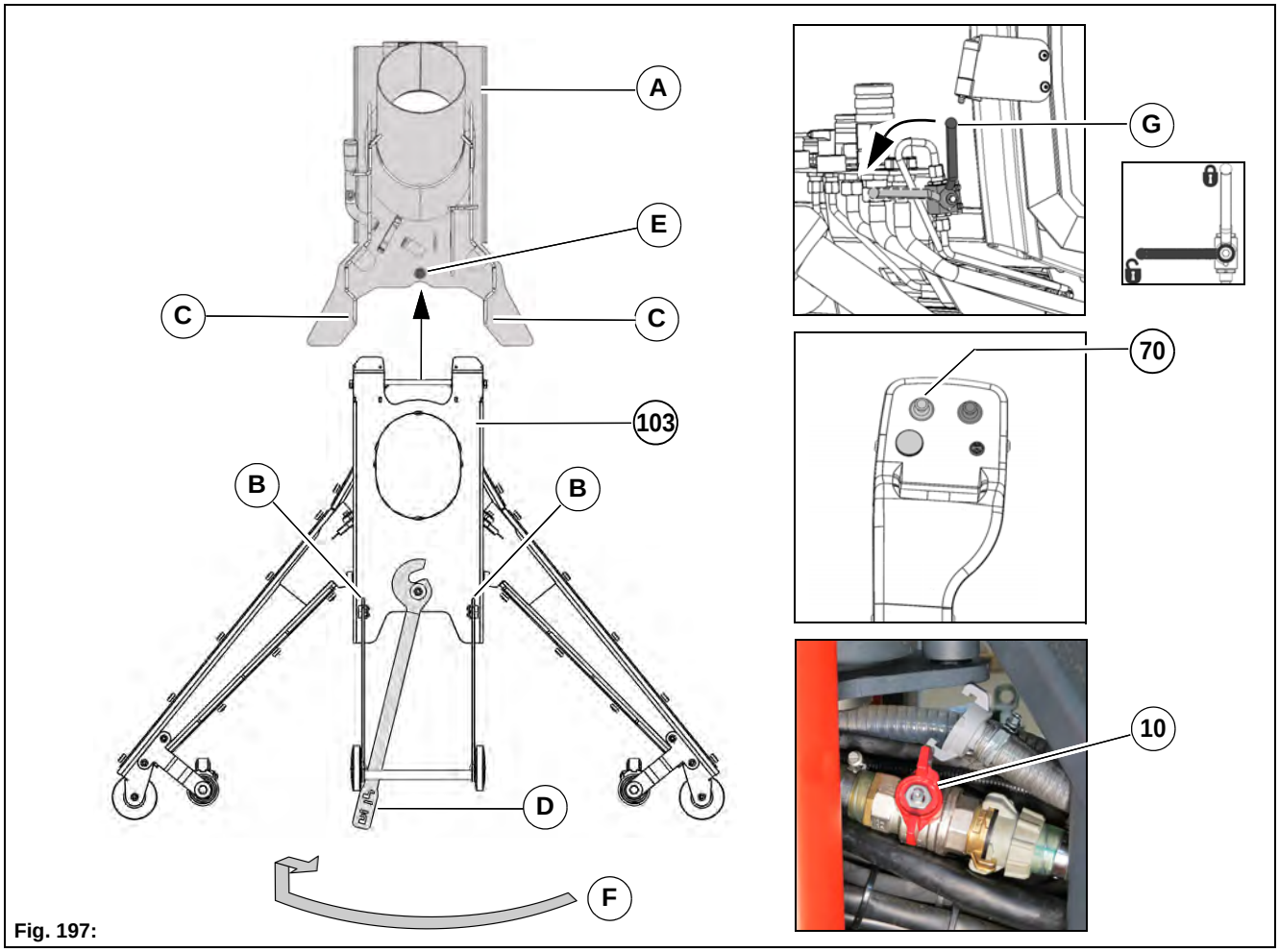


Fig. 197:

Mounting the scrubbing deck

1 Unlock the locking hook **Fig. 198-E** and the locking rod **Fig. 198-F** on the front tool carrier **Fig. 198-12**. Position the front tool carrier to the holder of the scrubbing deck with the joystick **Fig. 198-70**.
2. Bring the locking bow **Fig. 198-D** into the working position.
   - Working position = **Fig. 198-A** (brush symbol)
   - Maintenance position = **Fig. 198-B** (wrench symbol)
   - Transport position = **Fig. 198-C** (vehicle symbol)
3. Use the trolley **Fig. 198-104** (optional) to align the scrubbing deck **Fig. 198-102** centrally and in alignment with the front tool carrier.
4. Raise the front tool carrier **Fig. 198-12** with the joystick **Fig. 198-70** and attach the scrubbing deck.
5. Lock the scrubbing deck with the locking hook and the locking rod.

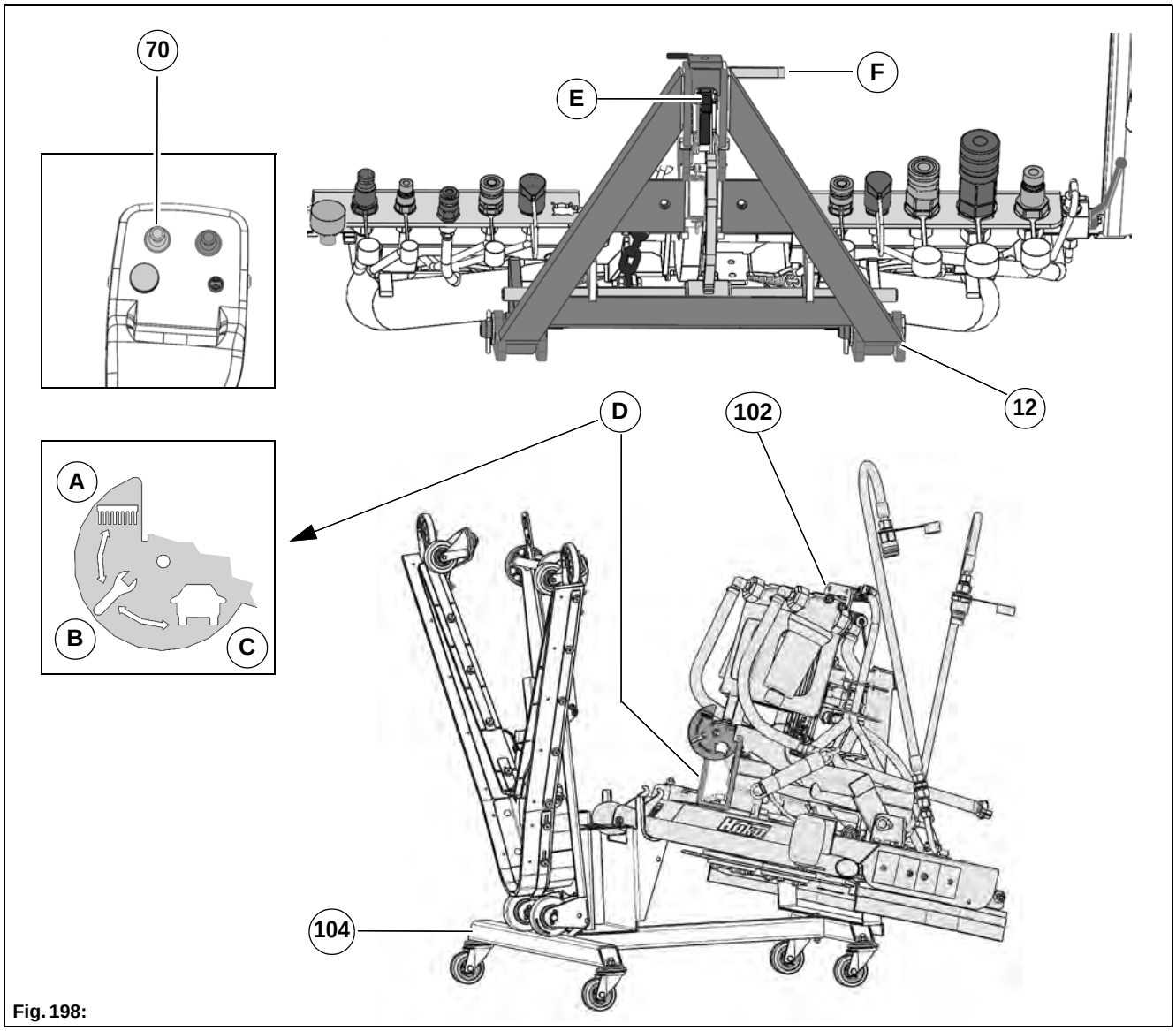


Fig. 198:

Continued – Mounting the scrubbing deck

6. Withdraw the trolley.
7. Remove the circulating water hose **Fig. 199-A** of the vacuum sweeping system at the ball cock.
8. Mount the yellow marked circulating water hose **Fig. 199-B** of the scrubbing deck (rotating coupler).
9. Establish the connections at the scrubbing deck:
   - Scrubbing deck hydraulic motors – Supply/return = **Fig. 199-C**
   - 19-pin coding plug = **Fig. 199-D**
   - Fresh water coupling (quick coupler) = **Fig. 199-E**
   - Circulating water coupling (rotating coupler) = **Fig. 199-F**.
10. Hook the chain **Fig. 199-G** onto the hook **Fig. 199-H**.
11. Open the ball cock **Fig. 199-10** of the circulating water stop valve (right side of articulation area) again.

Dismantling is in the reverse order.

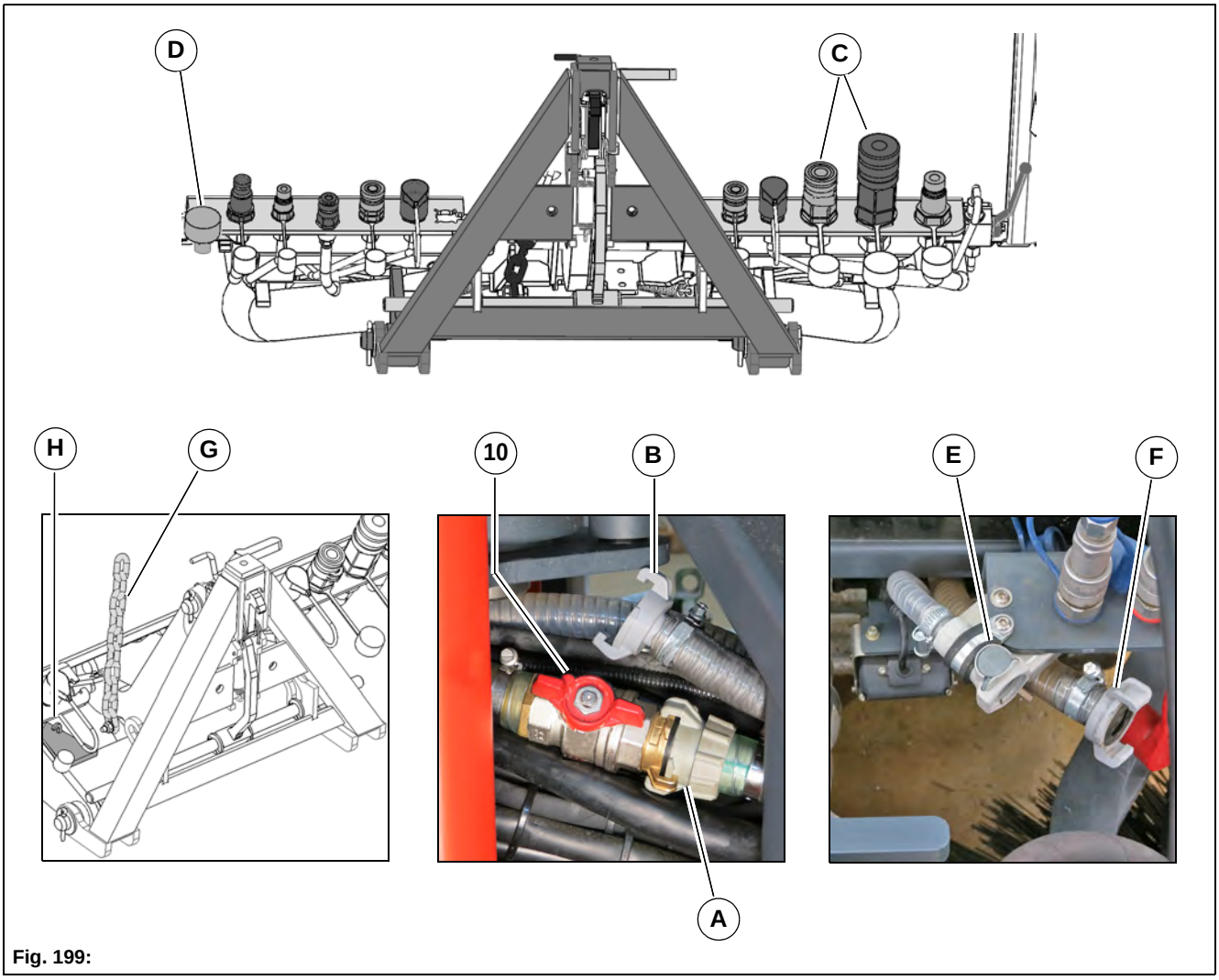


Fig. 199:

Water diagram

1 Dirt hopper
2 Fresh water tank
3 Ball cock circulating water in the articulation area
4 Circulating water rotating coupler in the articulation area
   • Wet cleaning system = small hose (yellow mark)
   • Vacuum sweeping system = large hose
5 Fresh water quick coupler (at the front tool carrier)
6 Circulating water rotating coupler (at the front tool carrier)
7 Solenoid valve (at the scrubbing deck)
8 Circulating water filter (at the scrubbing deck)
9 Water pump (at the scrubbing deck)
10 Shut-off valve (at the scrubbing deck)
11 Quick coupler (at the scrubbing deck)
12 Brushes (at the scrubbing deck)
13 Chemical dosing system (at the scrubbing deck)

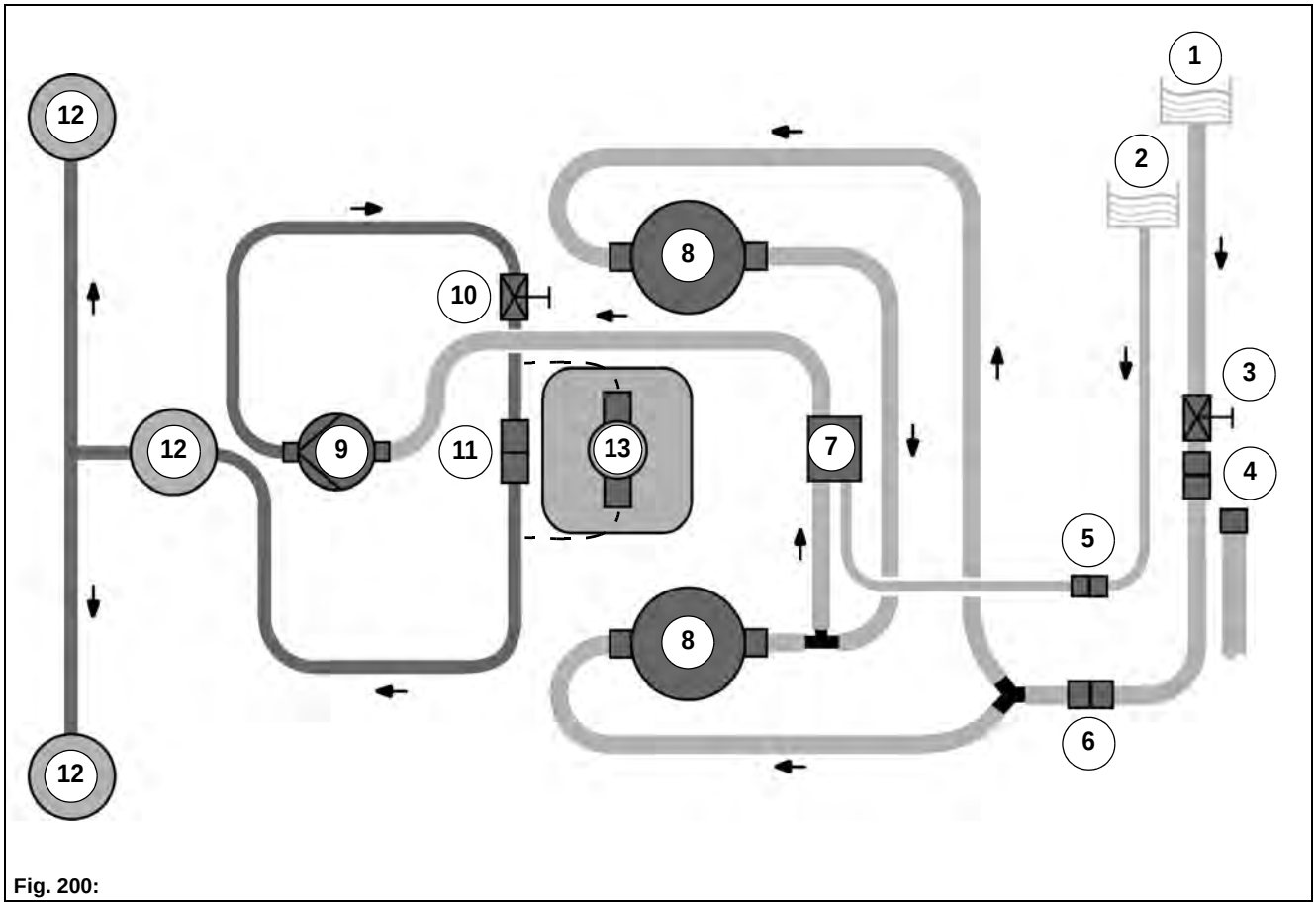


Fig. 200:

Mounting the chemical dosing system (optional)

⚠	**Warning** Risk of injury! Wear suitable protective clothing (protective gloves and safety goggles) when using detergents.

Insert the chemical hopper **Fig. 201-106** into the holding box **Fig. 201-A**. Remove the lid of the chemical hopper and insert the chemical dosing system **Fig. 201-105** and screw it to the chemical hopper. Open the quick coupler **Fig. 201-B** and connect it to the chemical dosing system.

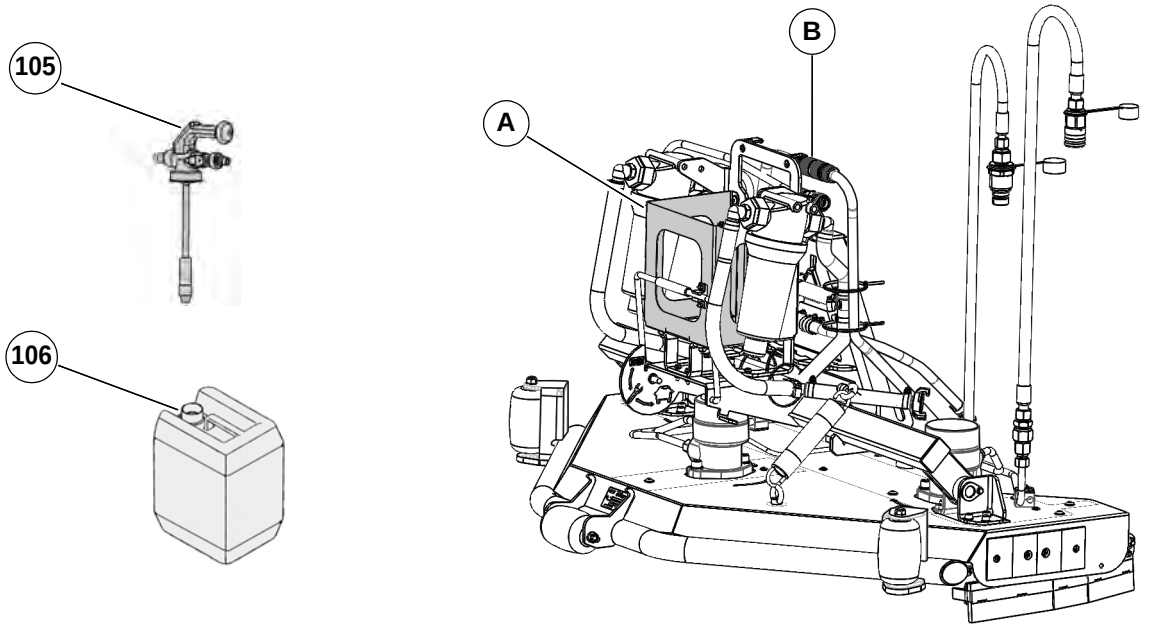


Fig. 201:

6.6.3 Operation

Checklist – Before start-up of the wet cleaning system

No.	Description	Reference
1	All items from the checklist – Check before starting the vehicle	Page 70
2	Filling fresh water	Page 128
3	Filling circulating water	Page 201
4	Checking the ball cock circulating water	Page 129
5	Checking the chemical dosing system (optional)	Page 202
6	Checking the squeegee sealing strips, turn or replace them if necessary	Page 211
7	Checking the lateral deflectors, turn or replace them if necessary	Page 212
8	Checking the brushes, replace them if necessary	Page 213

Filling fresh water

Open the cap **Fig. 108-A** and fill the fresh water tank **Fig. 108-8** until the level indicator in the multifunctional display reaches the maximum level or it looks full.

Hydrant kit (optional)

Filling the fresh water tank from the public water mains with the D hose connection is possible with the hydrant kit (optional). The hydrant kit is mounted above the filling cap and contains a C hose connection, a D hose connection, an installation key and a free-fall section.

☞	**Note** Water may be taken from the mains of public water connections only through the "D-hose connection"!

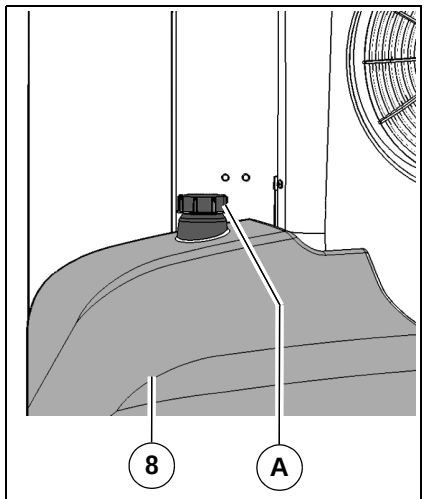


Fig. 202:

Filling circulating water

1. Switch off the suction fan of the dirt hopper!
2. Open the lock **Fig. 109-A** of the dirt hopper.
3. Adjust the rear flap with the lever **Fig. 109-B**.
4. Fill the dirt hopper using a water hose. Use the side C hose connection as an alternative.
5. Fill the dirt hopper up to the upper mark of the hinge pivotal point **Fig. 109-C**. Filling volume for circulating water approx. 390 litres.

☞	**Note** Fill less circulating water into the dirt hopper when it is raining or wet.

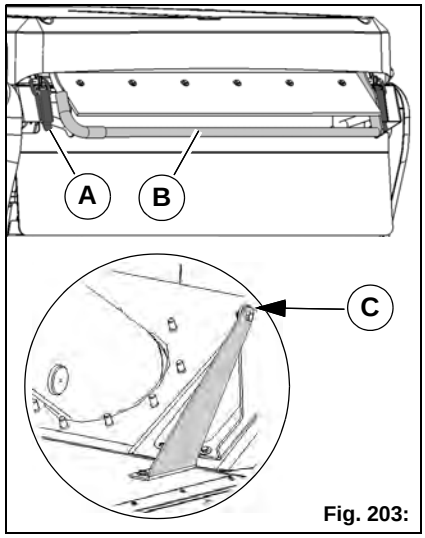


Fig. 203:

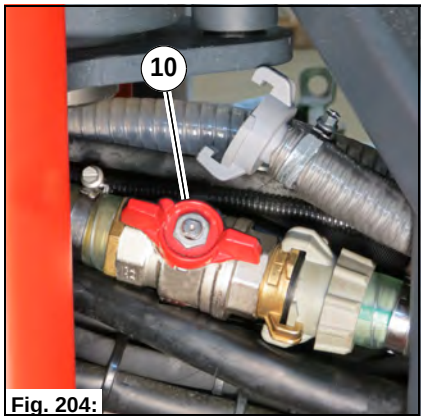


Fig. 204:

Checking the ball cock circulating water

The circulating water is closed off only with the ball cock for maintenance purposes. In normal operation the ball cock **Fig. 204-10** must be opened!

- Circulating water supply opened: Butterfly handle in flow direction
- Circulating water supply closed: Butterfly handle at right angles to the flow direction

	Note Close off the circulating water supply only if there is circulating water in the dirt hopper and the squeegee should be mounted or dismounted.

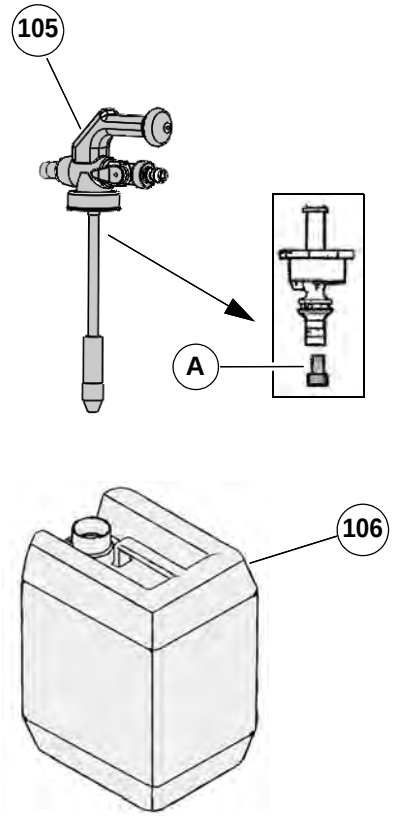


Fig. 205:

Checking the chemical dosing system (optional)

Remove the quick coupler at the chemical dosing system. Loosen the screw connection and remove the chemical dosing system **Fig. 205-105** from the chemical hopper **Fig. 205-106**. Check the level of the detergent. If required, insert a new chemical hopper.

Select detergent/set mixing ratio:

- CityCleaner-S (7386)
  - Yellow nozzle = 128:1 (0.77 %) for normal soiling
- CityCleaner-O (7385) for removing oil leaks
  - Yellow nozzle = 128:1 (0.77 %) for light oil contamination
  - Brown nozzle = 96:1 (1.03 %) for heavy oil contamination

	Note The concentration of the detergent increases with every cycle of the circulating water!

Setting the mixing ratio:

The nozzle **Fig. 205-A** is located in the suction hose of the chemical dosing system. The mixing ratio of the detergent is set by selecting the nozzle. The various nozzles are located in the accessories kit of the chemical dosing system.

	Note Please also observe the information of the chemical dosing system and the detergent.

Checklist – Wet cleaning

No.	Description	Reference
1	Driving to the work site	Page 203
2	Switching wet cleaning on	Page 204
3	Setting the fixed engine speed	Page 132
4	Basic and upkeep cleaning	Page 204
5	Cleaning heavily soiled surfaces	Page 205
6	Starting wet cleaning	Page 206

Driving to the work site

1. Start the vehicle with the ignition switch **Fig. 113-78**.
2. As required, switch on the dipped headlight **Fig. 113-54**, working spotlight **Fig. 113-55** and beacon **Fig. 113-59**.
3. Prepare the transport mode:
   - Raise the front tool carrier with the joystick **Fig. 114-70**.
   - Bring the scrubbing deck into the transport position (vehicle symbol) using the locking bow **Fig. 113-A**.
4. Push the accelerator pedal **Fig. 113-36** down slowly until the vehicle starts, the speed is increased further by pressing on the pedal. The transport mode information symbol **Fig. 113-C** appears in the multifunctional display.
5. Slowing down or braking the vehicle: Slowly reduce the pressure on the accelerator pedal, the vehicle slows down or stops. The driving speed in the transport mode is 0 to 40 km/h.
6. At the work site, bring the locking bow **Fig. 113-A** into the working position (brush symbol) and clamp it to the holder **Fig. 113-B**.

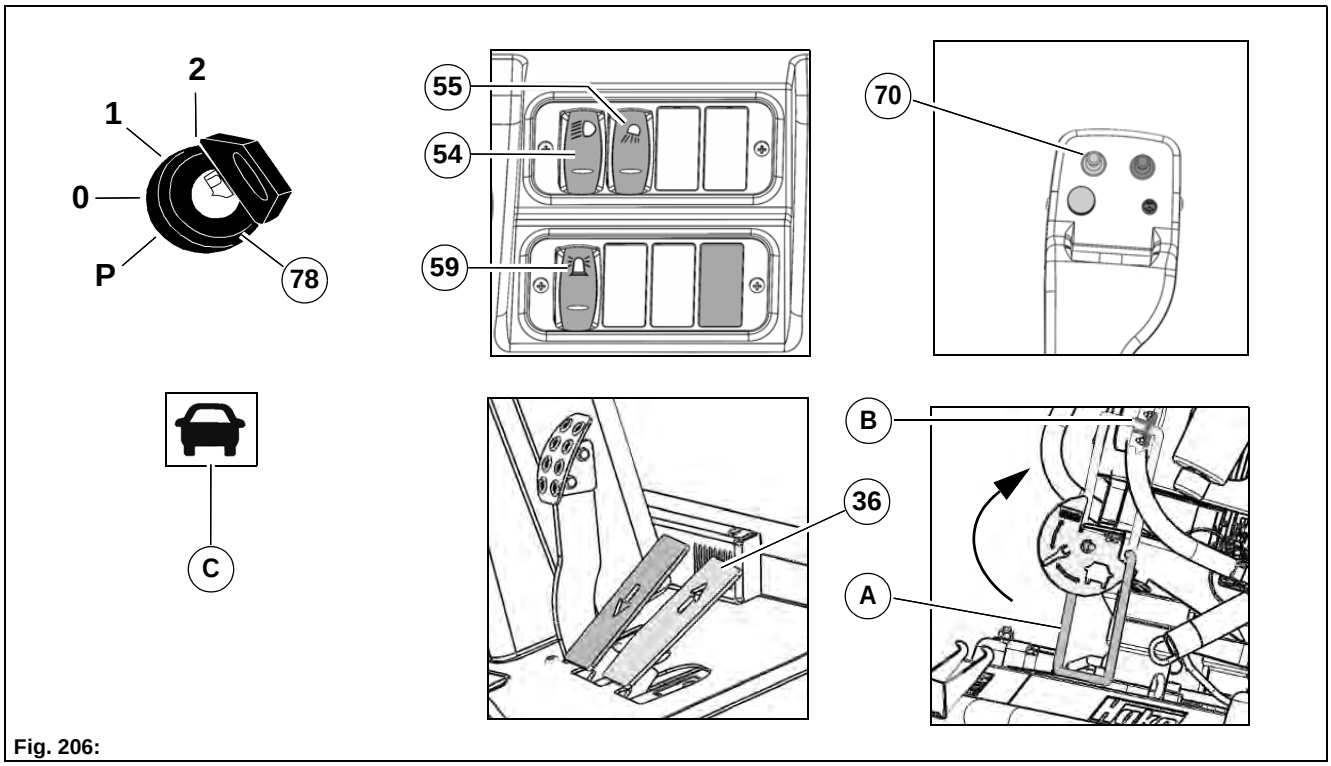


Fig. 206:

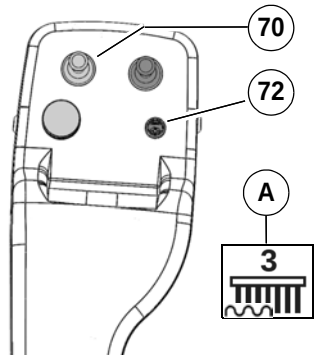


Fig. 207:

Switching wet cleaning on

Switch on the work mode with the Hako button **Fig. 114-72**. The accelerator pedals must be in the neutral position.

The wet cleaning system work mode information symbol appears in the multifunctional display **Fig. 114-A**.

For a coded attachment, the Citymaster 1600 can automatically activate the following functions through the Hako button:

- The scrubbing deck is lowered (floating position)
- The brush drives of the scrubbing deck are switched on
- The brush speed is activated
- The water pump is switched on
- The suction fan is switched on

The settings for wet cleaning can be changed in the multifunctional display, see Checklist – Settings for wet cleaning. The last saved settings are activated automatically when pressing the Hako button **Fig. 114-72**.

If the driver leaves the driver's seat, the water supply is interrupted and the brush drives switched off.

Restarting:

- The driver must be on the driver's seat.
- Move the joystick **Fig. 114-70** forwards.

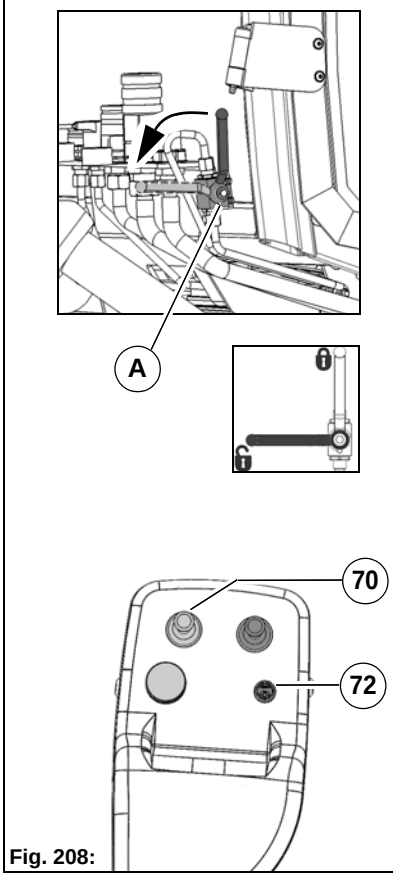


Fig. 208:

Basic and upkeep cleaning

- Select the detergent, see Section Maintenance
- Set the mixing ratio, see Section Maintenance
- Select the brushes, see Section Maintenance
- Set the brush speed, suction fan speed and brush pressure in the working menu of the multifunctional display, see Section Checklist – Settings for wet cleaning.

Apply and remove detergent in a single workstep. The squeegee can still move freely. To do this, open the ball cock **Fig. 208-A**. Press the Hako button **Fig. 208-72** and start the workstep.

Cleaning heavily soiled surfaces

- Select the detergent, see Section Maintenance
- Set the mixing ratio, see Section Maintenance
- Select the brush, see Section Maintenance
- Set the brush speed, suction fan speed and brush pressure in the working menu of the multifunctional display, see Section Checklist – Settings for wet cleaning.

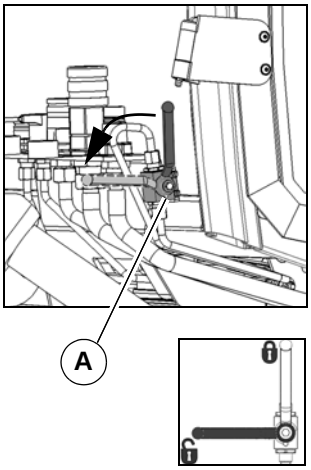
Furthermore, it is possible to enhance the cleaning result by performing the cleaning process in two worksteps.

First workstep (soaking):

Move the CityCleaner into the upper position with the joystick **Fig. 209-70** and fix the squeegee into position by closing the ball cock **Fig. 209-A**. Press the Hako button **Fig. 209-72** and start the first workstep. During this workstep, the applied detergent remains on the surface in order to soak into the dirt.

Second workstep (vacuuming):

After the detergent has been allowed to soak in, clean and vacuum the same surface again. To do this, open the ball cock **Fig. 209-A** again. Press the Hako button **Fig. 209-72** and start the second workstep.



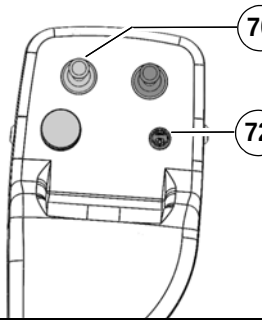


Fig. 209:

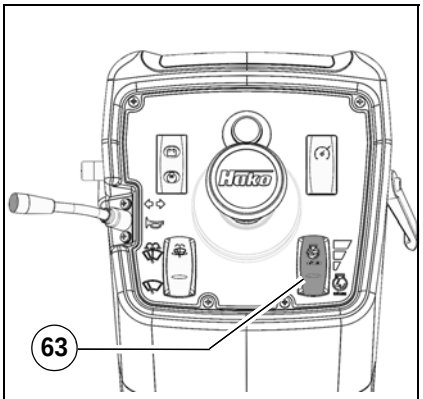


Fig. 210:

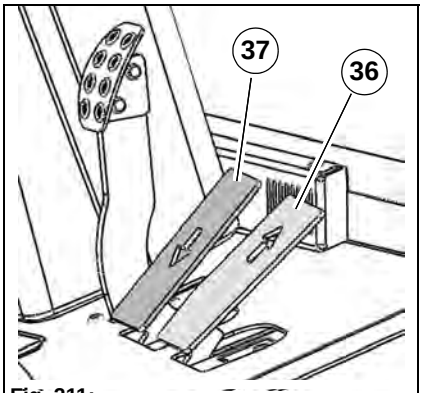


Fig. 211:

Setting the fixed engine speed

The fixed engine speed is set with the tip switch **Fig. 115-63**. Set the speed corresponding to the requirements.

Stage	Rpm	Use
1 - ECO	1600	Normal and heavy soiling

Starting wet cleaning

The accelerator pedal **Fig. 116-36** is used for continuously changing the speed for driving forwards.

The accelerator pedal **Fig. 116-37** is used for continuously changing the speed for reversing.

Push the accelerator pedal down slowly until the vehicle starts, the speed is increased further by pressing on the pedal.

Slowing down or braking the vehicle: Slowly reduce the pressure on the accelerator pedal, the vehicle slows down or stops.

The maximum vehicle speed in the work mode is 16/20/24 km/h according to the selected engine speed.

Note

- For an effective and efficient cleaning result, a maximum vehicle speed of 4 km/h (depending on the degree of soiling) is recommended.
- The brush drives and the water pump are switched off when standing. This protects the floor. Move the left joystick forwards to rotate the brushes even whilst standing!
- When reversing on an uneven floor, the squeegee must be raised. Do not reverse over edges and thresholds!

Checklist – Settings for wet cleaning

No.	Description	Reference
1	Setting the water supply	Page 207
2	Switching the water pump on and off	Page 207
3	Setting the brush speed	Page 208
4	Setting the brush pressure (optional)	Page 208
5	Switching the suction fan on and off	Page 208

Setting the water supply

Fresh water from the fresh water tank or circulating water from the dirt hopper can be supplied to the scrubbing deck for wet cleaning. Select the working menu in the multifunctional display with the turn-push knob **Fig. 213-69**. Change the current value in the water supply menu item **Fig. 212-A**.
Select either fresh water or circulating water via the settings **Fig. 212-B** or **Fig. 212-C**.

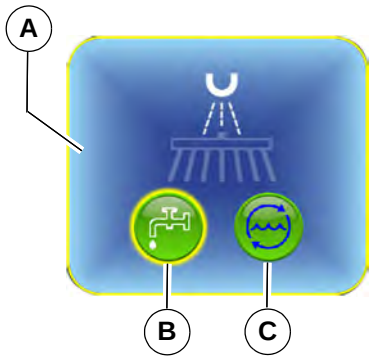


Fig. 212:

Setting the water volume

The water pump of the scrubbing deck can be switched on and off. Select the working menu in the multifunctional display with the turn-push knob **Fig. 213-69**. Change the current value in the water pump menu item **Fig. 213-A**.
Setting range: On/Off or 0 to 100 %

Note
The ball cock **Fig. 213-B** on the scrubbing deck must be open to ensure the water pump can supply water!
- Water supply opened: Butterfly handle in flow direction
- Water supply shut off: Butterfly handle at right angles to the flow direction

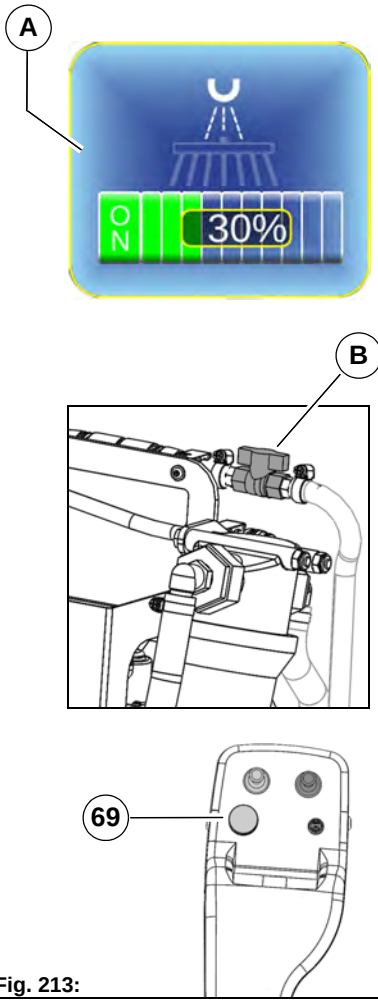


Fig. 213:

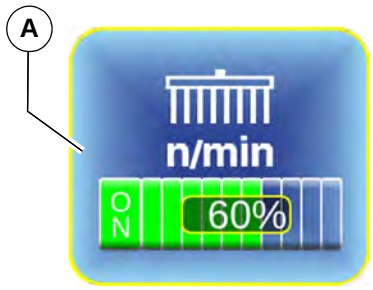


Fig. 214:

Setting the brush speed

The scrubbing result is influenced by changing the brush speed. Select the working menu in the multifunctional display with the turn-push knob **Fig. 213-69**. Change the current value in the brush speed menu item **Fig. 214-A**.

Setting range: On/Off or 0 to 100 %

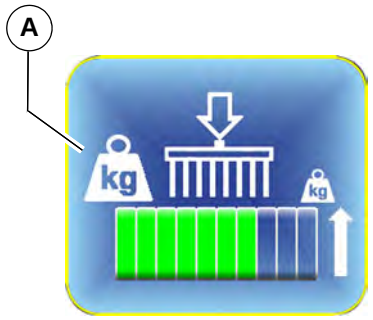


Fig. 215:

Setting the brush pressure (optional)

Using this option it is possible to reduce the brush pressure of the brushes. This is necessary for delicate surfaces or to increase the service life of the brushes.

Select the working menu in the multifunctional display with the turn-push knob **Fig. 213-69**. Change the current value in the brush pressure menu item **Fig. 215-A**.

The higher the setting, the more the brushes are relieved.

Setting range: 0 to 100 %

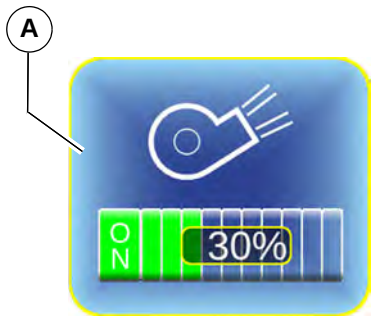


Fig. 216:

Setting the suction fan speed

The vacuuming result is influenced by changing the suction fan speed. Select the working menu in the multifunctional display with the turn-push knob **Fig. 213-69**. Change the current value in the suction fan menu item **Fig. 216-A**. Noise-reduced operation is obtained in the ECO mode at suction fan output reduced to 30 %.

Setting range: On/Off or 30 to 100 %

Checklist – Cleaning the wet cleaning system

No.	Description	Reference
1	Emptying the dirt hopper	Page 143
2	Cleaning the dirt hopper and circulating water system	Page 145
3	Emptying the fresh water tank	Page 145
4	Emptying the circulating water tank	Page 145

6.6.4 Technical data

Vehicle with CityCleaner

Dimensions	**Unit**	
Length	mm	4634
Width	mm	1370
Height	mm	2215
Working width scrubbing deck	mm	1240
Working width squeegee	mm	1333
Weight	**Unit**	
Empty weight according to StVZO	kg	2488
Scrubbing deck	**Unit**	
Brush diameter	mm	460
Brush speed	rpm	140 to 200

6.6.5 Maintenance

☞	**Note** Maintenance of the dirt hopper is described in the Vacuum sweeping system section.

Wet cleaning system maintenance plan

Daily
Squeegee • Checking the squeegee sealing strips, turn or replace them if necessary
Scrubbing deck • Checking the lateral deflectors, turn or replace them if necessary • Checking the brushes, replace them if necessary • Checking the circulating water filter, clean it if necessary • Checking the chemical dosing system (optional)
Every 250 operating hours
Scrubbing deck • Check the locking device for wear and damage. Turn or replace it if necessary.

Maintenance work

⚠	**Danger** • Always bring and insert the safety strut **Fig. 145-B** of the dirt hopper into the upper position during maintenance and cleaning work under the raised dirt hopper. There is danger of injury! • Staying in the danger area is forbidden when raising and lowering the dirt hopper! There is danger of injury! **Warning** • Risk of crushing! The squeegee of the CityCleaner weighs more than 25 kg. Body parts may be crushed if the squeegee falls down or falls over. Always use suitable load-carrying equipment. • Risk of injury! Wear suitable protective clothing (protective gloves and safety goggles) when using detergents. • Risk of injury! There is a risk of tilting over if the squeegee is located on the trolley without the scrubbing deck. Observe the correct assembly and disassembly sequence. • Risk of injury! Always wear protective gloves when working on the lateral deflectors and brushes. **Caution** • At temperatures below 0 degrees (risk of frost) drain the water out from all water-conducting components.

Checking the squeegee sealing strips

Check the external squeegee sealing strips **Fig. 151-A** daily for wear.

1. Remove the scrubbing deck and the squeegee, see page 195.
2. Loosen the knurled nuts **Fig. 151-B**.
3. Remove the attachment strips **Fig. 151-C** and the external squeegee sealing strip **Fig. 151-A**.
4. Turn the squeegee sealing strip or replace it if necessary. The squeegee sealing strip can be used four times. Always use the hole pattern at the top for attachment.

	**Note** Observe the maximum wear limit! In order to use the squeegee strip effectively, each of the four edges must only be used up to the centre. A fully worn squeegee sealing strip, see **Fig. 151-D,** must be replaced.

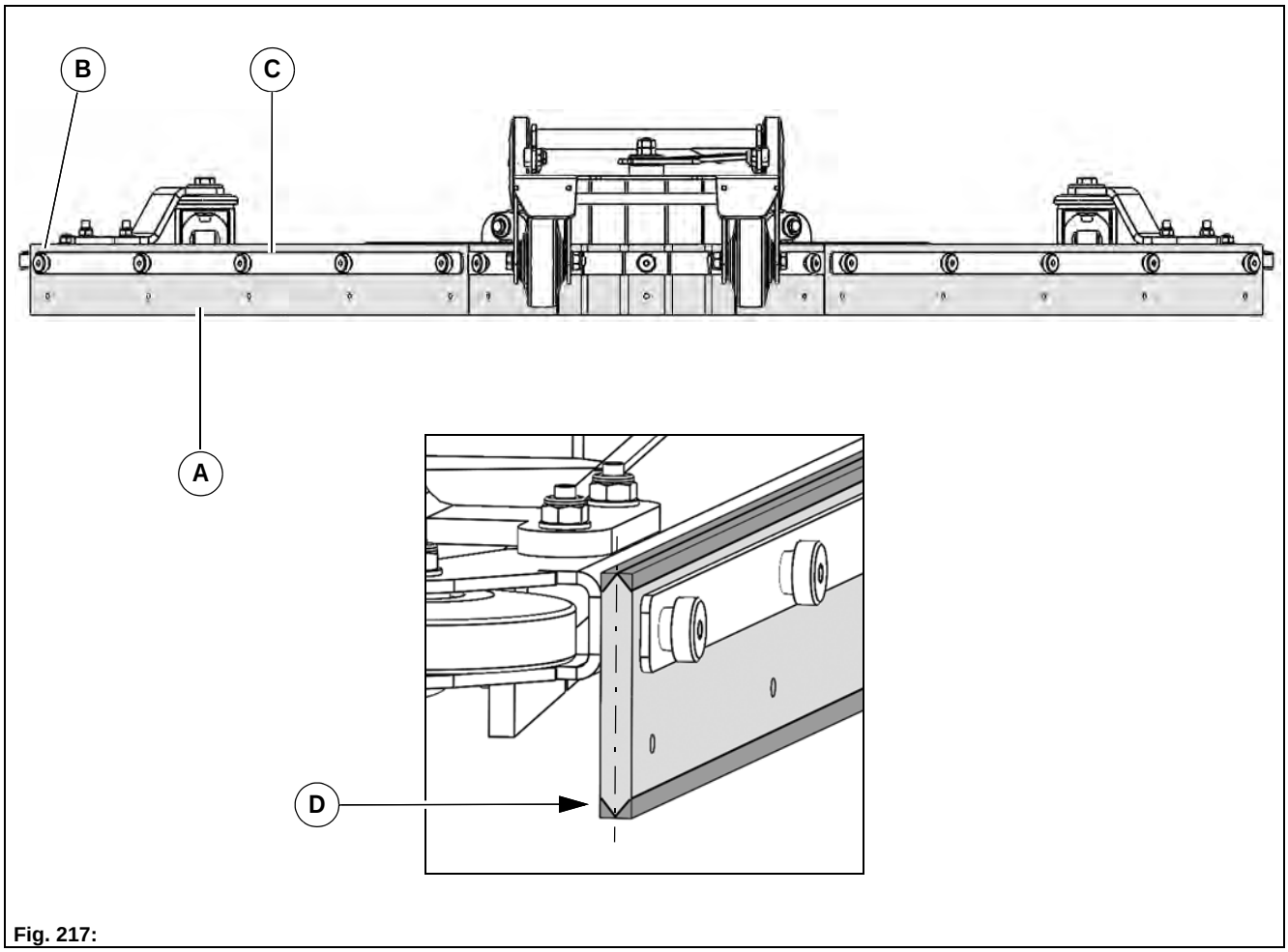


Fig. 217:

Checking the lateral deflectors

⚠	**Warning** Risk of injury! Always wear protective gloves when working on the lateral deflectors.

Check the lateral deflectors **Fig. 218-A** of the scrubbing deck daily. Turn or replace worn sealing strips **Fig. 218-B**. The sealing strips **Fig. 218-B** and mounting clamps **Fig. 218-C** can be removed without tools.

1. Raise the scrubbing deck with the joystick **Fig. 218-70**.
2. The sealing strip can be removed with the mounting clamps by laterally pulling on the clamp **Fig. 218-C** of the mounting clamps.
3. Insert the new or turned sealing strip into the mounting clamps.
4. Insert the sealing strip and the mounting clamps on one side **Fig. 218-F** of the holder. The guide lugs slide into the slots **Fig. 218-G**. This ensures the correct height position.

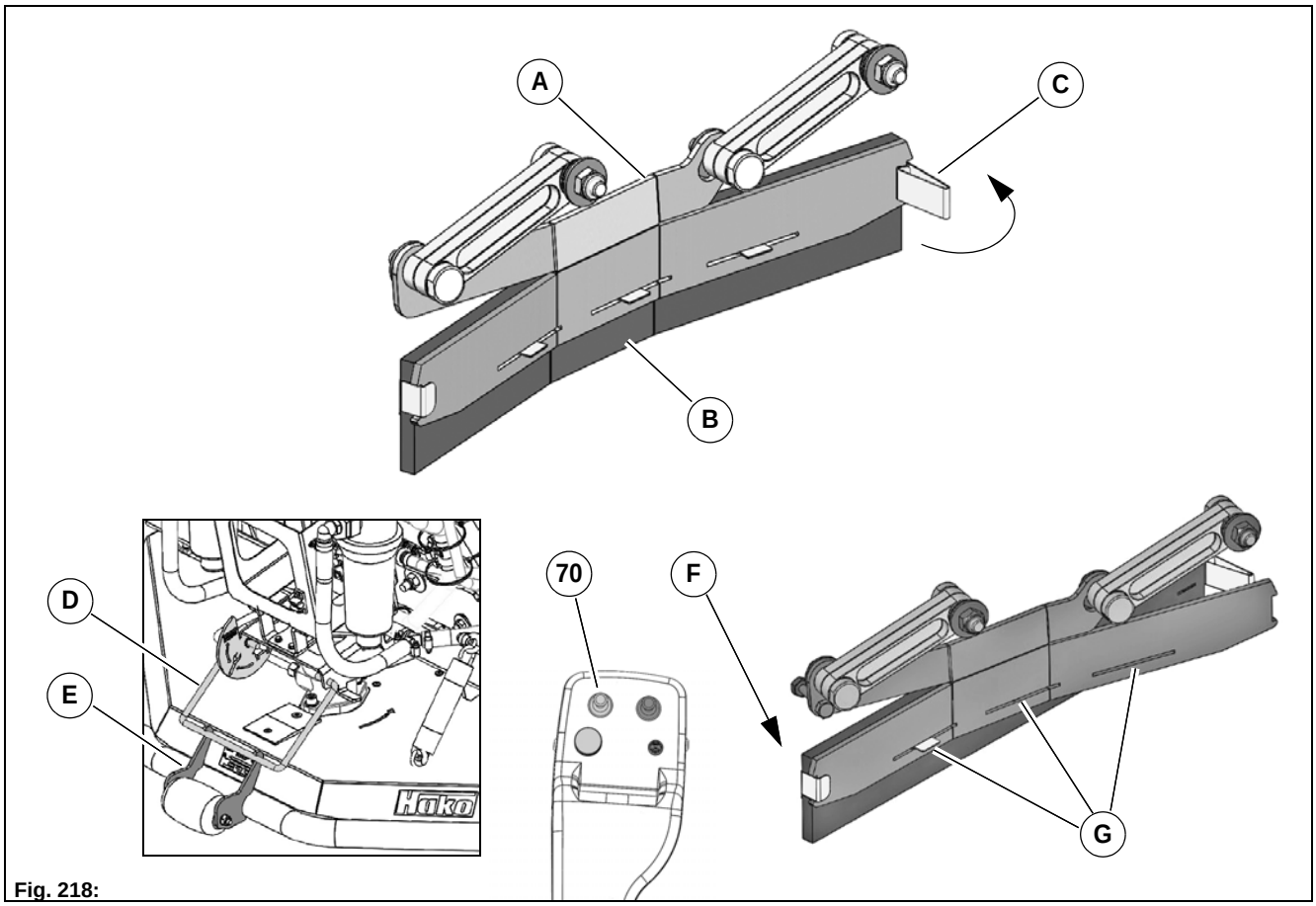


Fig. 218:

Checking the brushes

Warning
- Risk of injury! Always wear protective gloves when working on the brushes.
- Risk of injury! Please be particularly careful in the area of the scrubbing deck when brushes are ejected automatically.

Check the brushes **Fig. 219-A** of the scrubbing deck daily.
Replace worn brushes. The dimension **Fig. 219-X** must be at least 10 mm. The brushes can be removed without tools.

Remove brushes by hand:
1. Raise the scrubbing deck with the joystick **Fig. 219-70**.
2. Bring the locking bow **Fig. 219-B** into the service position (wrench symbol) and hook it onto the holder **Fig. 219-C**.
3. Remove the worn brushes from the carrier plates **Fig. 219-D**. To do this, remove the brush from the catch up **Fig. 219-E** by rotating it jerkily in the motor's direction of rotation (see arrow **Fig. 219-G** at the housing).
4. Mount the new brushes one after the other to the carrier plates. For this, align the carrier disks **Fig. 219-F** of the brushes to the carrier plate **Fig. 219-D** and let the brush engage at the catch up (click sound) by rotating it against the motor's direction of rotation.

Automatic brush ejection:
1. Raise the scrubbing deck with the joystick **Fig. 219-70**.
2. Pull the left joystick **Fig. 219-70** back and press the right joystick **Fig. 219-71** forward at the same time. The brushes are ejected.
3. Remove the worn brushes from the scrubbing deck.
4. Mount the new brushes one after the other to the carrier plates. For this, align the carrier disks **Fig. 219-F** of the brush to the carrier plate **Fig. 219-D**. Let the brush engage at the catch up (click sound) by rotating it against the motor's direction of rotation.

Note
Only perform automatic brush ejection when the vehicle has stopped. The driver must be on the driver's seat for ejecting the brushes!

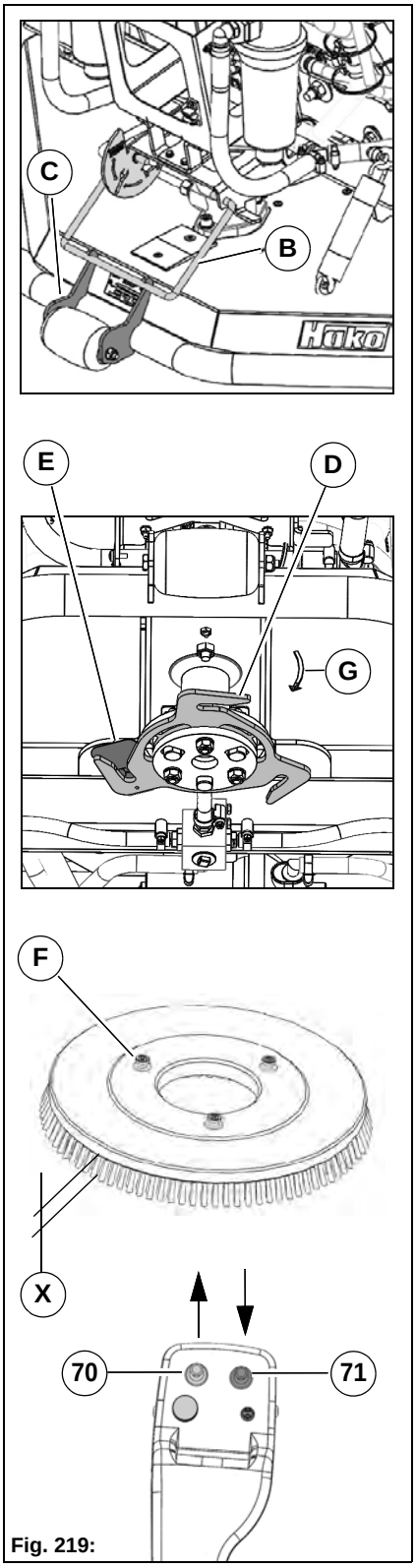


Fig. 219:

Checking the locking device

Check the locking device **Fig. 220-A** at the carrier plate of the scrubbing deck every 250 operating hours. Check the locking device for wear and damage. Turn or replace it if necessary. The maximum gap **Fig. 220-X** between the bolt and the locking device should not be greater than 5 mm.

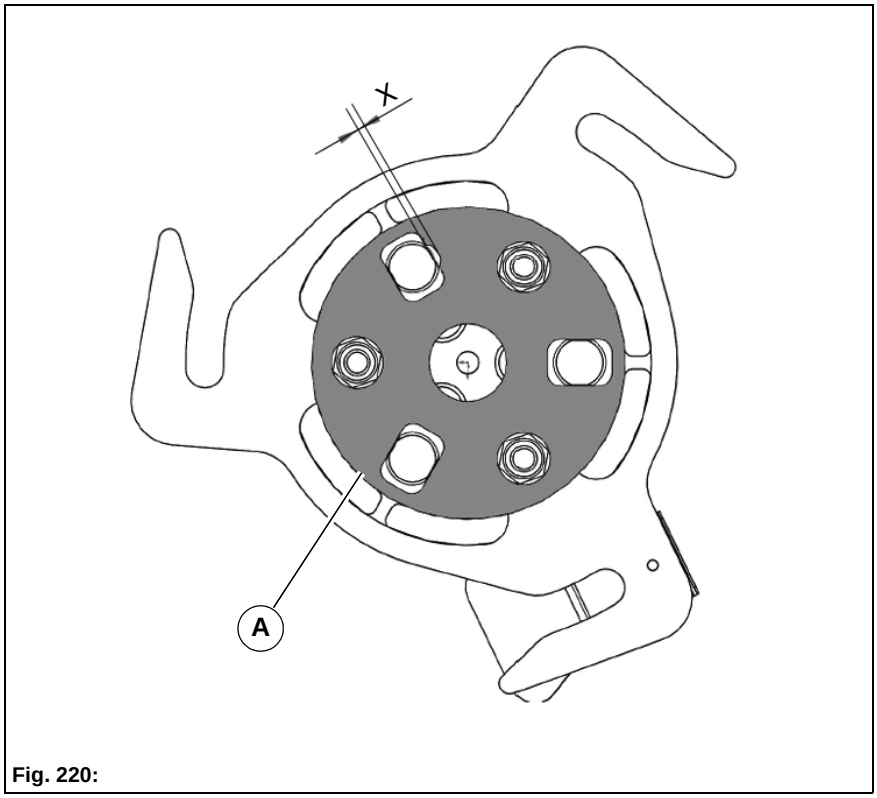


Fig. 220:

Checking the circulating water filter

Check the filter inserts of both circulating water filters **Fig. 221-A** after each use. Clean them if required.

Simple flushing:

1. Fill the dirt hopper with clean circulating water, see page 201.
2. Unscrew the locking cap **Fig. 221-B** and flush with circulating water until the water jet is clear.
3. Close the ball cock **Fig. 221-10** and re-attach the locking caps.
4. Open the ball cock **Fig. 221-10** again.

Thorough cleaning:

1. Shut off the ball cock **Fig. 221-10**.
2. Unscrew the circulating water filter **Fig. 221-A**.
3. Remove the filter insert and clean it thoroughly using a water hose.
4. Re-attach the circulating water filter.
5. Open the ball cock **Fig. 221-10** again!

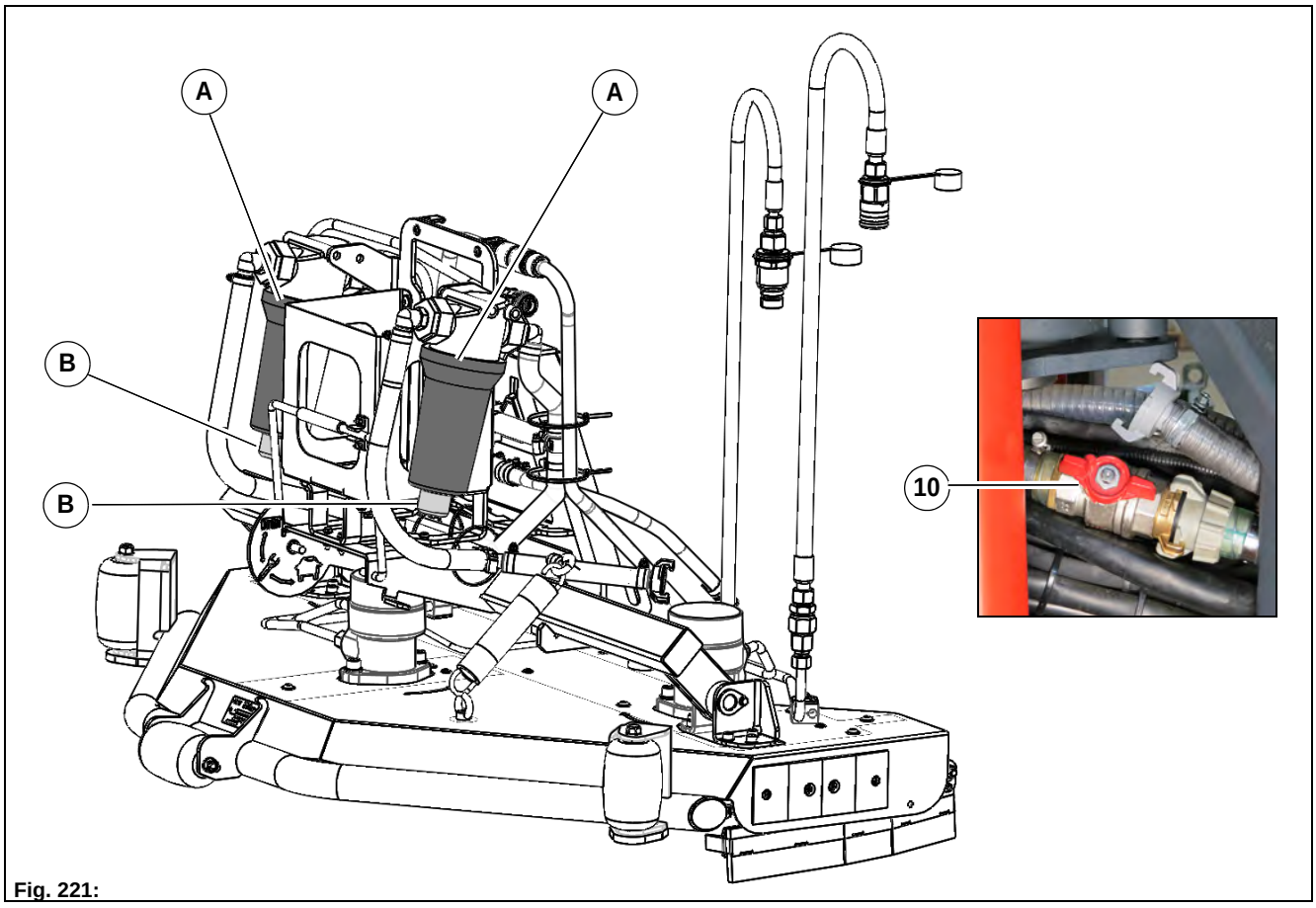


Fig. 221:

6.6.6 Troubleshooting

No water at the brushes	**Remedy**
	Open the ball cock in the articulation area or on the scrubbing deck
	Fill the fresh water tank
	Fill the dirt hopper
	Switch on the water pump
	Switch on the water supply
	Clean the circulating water filter
	Check for frost damage
Foam formation	**Remedy**
	Set the chemical dosing system
The dirt hopper loses water	**Remedy**
	Level in the dirt hopper too high
	Fill less circulating water into the dirt hopper when it is raining or wet
	Start or brake movement too strong
Bad vacuuming result	**Remedy**
	Increase the suction fan speed
	Empty the dirt hopper
	Check the supporting wheels at the squeegee
	Check the sealing strips at the deflector and at the squeegee
	Check whether the squeegee is positioned correctly
Noise emission at the scrubbing deck	**Remedy**
	Change the speed of the brushes
	Check the locking device

6.6.7 Accessories

Your authorised Hako dealer is available to you at any time to answer questions on accessories for the CityCleaner.

Selecting the brushes

Brush selection depends on the surface quality and the level of contamination.

No.	Floor quality	Brush
1	Light upkeep cleaning on coated and smooth surfaces	Plastic PPN 0.8
2	Basic and upkeep cleaning	SIC PA 6 grain size 180 grey
3	Basic and upkeep cleaning on rugged surfaces	SIC PA 6.12 grain size 120 green
4	Basic cleaning on heavily soiled surfaces	SIC PA 6.12 grain size 46 grey
5	Natural stone with a structured surface	SIC 120 / PPN 0.5

Selecting the detergent

Detergent selection depends on the surface quality and the level of contamination.

No.	Floor quality	Detergent
1	Light to heavy soiling	CityClean-S
2	Soiling due to oil, diesel or similar liquids	CityClean-O

6.7 Options

Options for the basic unit	Type
Axle load indicator	262300
Contact pressure adjustment	145930
Heatable outside mirror	843130
Hydraulic oil (biodegradable)	143930
Hydrant kit	113410
Adjustable upper link	351239
Preparation for radio	261310
Reversing camera	144610
Reversing light and signal generator	144730
Fog tail light LED	262400
Safety package	145700
Cruise control and speed control	262500
Left-hand door shelf	843000
Ballast weight 17 kg	343900
Rear attachment weight holder	344130
Front attachment weight holder	344000
Cab roof repeat lighting for driving on the right	261810
Cab roof repeat lighting for driving on the left	261812
Additional working spotlights above	261800

Options for the vacuum sweeping system	Type
Trolley for the sweeping unit (2-brush system)	148610
Trolley for the sweeping unit (3-brush system)	148925
Trolley for dirt hopper and loading platform	148602
Hand suction hose	144530
High-pressure cleaner	113930
Supports	148820
Dirt hopper comfort and safety package	147510
Circulating water drain	148830
Dirt hopper vacuum indicator	843502
Tool holder	113340

Options for the mowing system	Type
Mudguard extension	307139
Lawn tyres	302000
Additional camera	144611

Options for the sweeping system	Type
Hydraulic side adjustment	588031
Support	5949

Attachment kit (upon request)	
Compact brushes (upon request)	
Spray shield (upon request)	
Water sprinkling device (upon request)	

Options for the snow clearing system	Type
Odometer	577620
7-pin control cable	262200
Level sensor (upon request)	
Spreading control sensor (upon request)	
Spreader spray shield (upon request)	
Spreader gas pressure spring (upon request)	
Tarpaulins and tarpaulin bows (upon request)	
Spreader control (upon request)	
Additional working spotlights (upon request)	
Additional beacon (upon request)	
Additional number plate holder (upon request)	

Options for the transport system	Type
Trailer jaw coupling	350300
Trailer ball head coupling	350500

Options for the wet cleaning system	Type
Contact pressure adjustment	145930
Chemical dosing	705402
Trolley for the scrubbing deck	615420
CityCleaner-O	7385
CityCleaner-S	7386

EC Declaration of Conformity (corresponding to the EC Directive 2006/42/EC)

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

declare in sole responsibility that the following products

Dirt hopper – Citymaster 1600 / type: 1488
Sweeping unit – Citymaster 1600 / type: 1489
Front mower – Citymaster 1600 / type: 8131
Front sweeping machine – Citymaster 1600 / type: 589530
Loading platform – Citymaster 1600 / type: 143830
CityCleaner – Citymaster 1600 / type: 615400

on which this declaration is based correspond with the relevant basic safety and health requirements of the EC Directive 2006/42/EC as well as the requirements according to 2014/30/EC.
The following standard(s) and technical specification(s) was/were referred to for the correct implementation of the safety and health requirements named in the EC Directive:

EN 13019 for dirt hopper – Citymaster 1600 / type: 1488
EN 13019 for sweeping unit – Citymaster 1600 / type: 1489
EN 836 for front mower – Citymaster 1600 / type: 8131
EN 13524 for front sweeping machine – Citymaster 1600 / type: 589530
EN 12100 for loading platform – Citymaster 1600 / type: 143830
EN 13019 for CityCleaner – Citymaster 1600 / type: 615400

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

Bad Oldesloe, 01.04.2016

Dr. Rainer Bavendiek
Development Manager

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

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