

Cleaning technology · municipal technology

Hako
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Citymaster 600 (1470) 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 these operating instructions. 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 600 is a multi-purpose machine for commercial and municipal use throughout the year. The Citymaster 600 can be used as vacuum sweeping system, lawn mowing system, sweeping system, snow clearing system and transport system. The basic vehicle **Fig. 1-A** without attachments is described in chapter 1 to 5. The following attachments are described in chapter 6.

- Sweeping suction system with the sweeping unit and the sweepings bin **Fig. 1-B**
- Lawn mowing system with the mower **Fig. 1-C**
- Sweeping system with front sweeping machine **Fig. 1-D**
- Snow clearing system with the front sweeping machine or a snow blade. The salt and grit spreader **Fig. 1-E** can be used for spreading.. The loading platform **Fig. 1-F** is used for holding salt and grit.
- Transport system with the loading platform or trailer operation.

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.



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 number: _____
- 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 600 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 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 600 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 600 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 600 is subject to regular general inspection according to § 29 StVZO (every 24 months).



Warning

If any modifications or additions are made to the Citymaster 600, 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 600 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 or 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.

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

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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.

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

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 600 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.
- Risk of accident! The outside mirrors 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. Therefore check the actual distance from road users driving behind you by glancing over your shoulder.
- 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 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!
- 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. 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.

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!
- The towing speed may be at most 2 km/h, the towing time at most 30 minutes and the towing distance at most 1 km!
- Secure the vehicle against unintended movement! Lock the parking brake and insert the locking strap 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 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).

Ballast

- Risk of accident! When attaching other devices 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 21 % of the empty weight and the rear axle with at least 42 % 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 600 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 vacuum sweeping system may be operated only in connection with the Citymaster 600. The safety regulations for the Citymaster 600 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 147!!
- The lawn mowing system may be operated only in connection with the Citymaster 600. The safety regulations for the Citymaster 600 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 600. The safety regulations for the Citymaster 600 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 600. The safety regulations for the Citymaster 600 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 600. The safety regulations for the Citymaster 600 must be complied with absolutely.

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 engage the parking brake before fuelling.

Danger areas at the vehicle

- 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

- 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 Citymaster 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. Engage 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 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.
- 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 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.
- There is a risk of engine damage if the fuel system is run completely empty! Inform an authorised workshop!

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 done only by specialists or authorised repair 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 cleaning agents.
- 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. Collect 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 an authorised workshop with expert staff and the required technical equipment. Refrigerant may under no circumstances get into the atmosphere.
- 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.

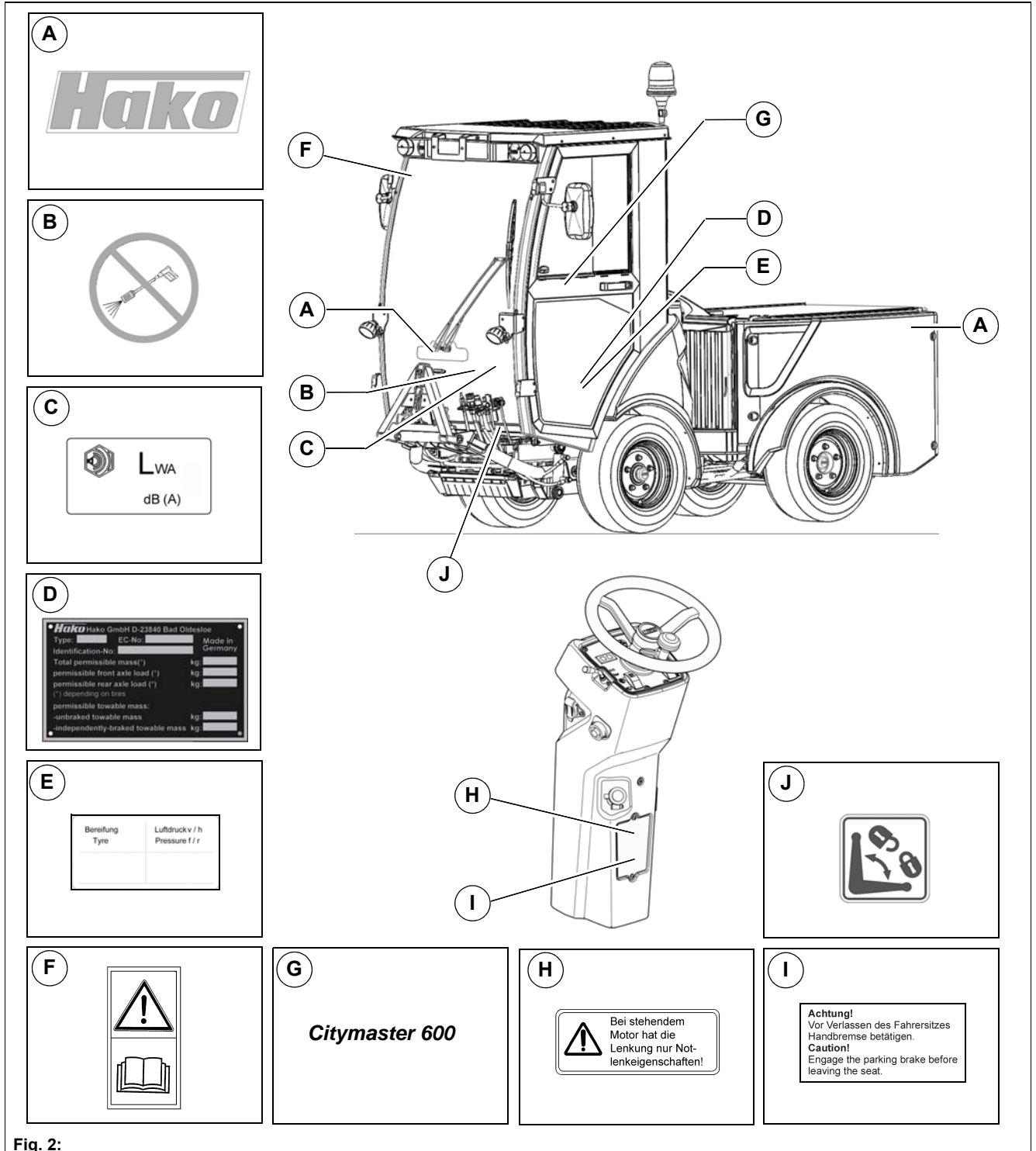


Fig. 2:

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 – hydraulic connection Fig. 2-J

The Hydraulic connection label is located behind the front tool carrier.

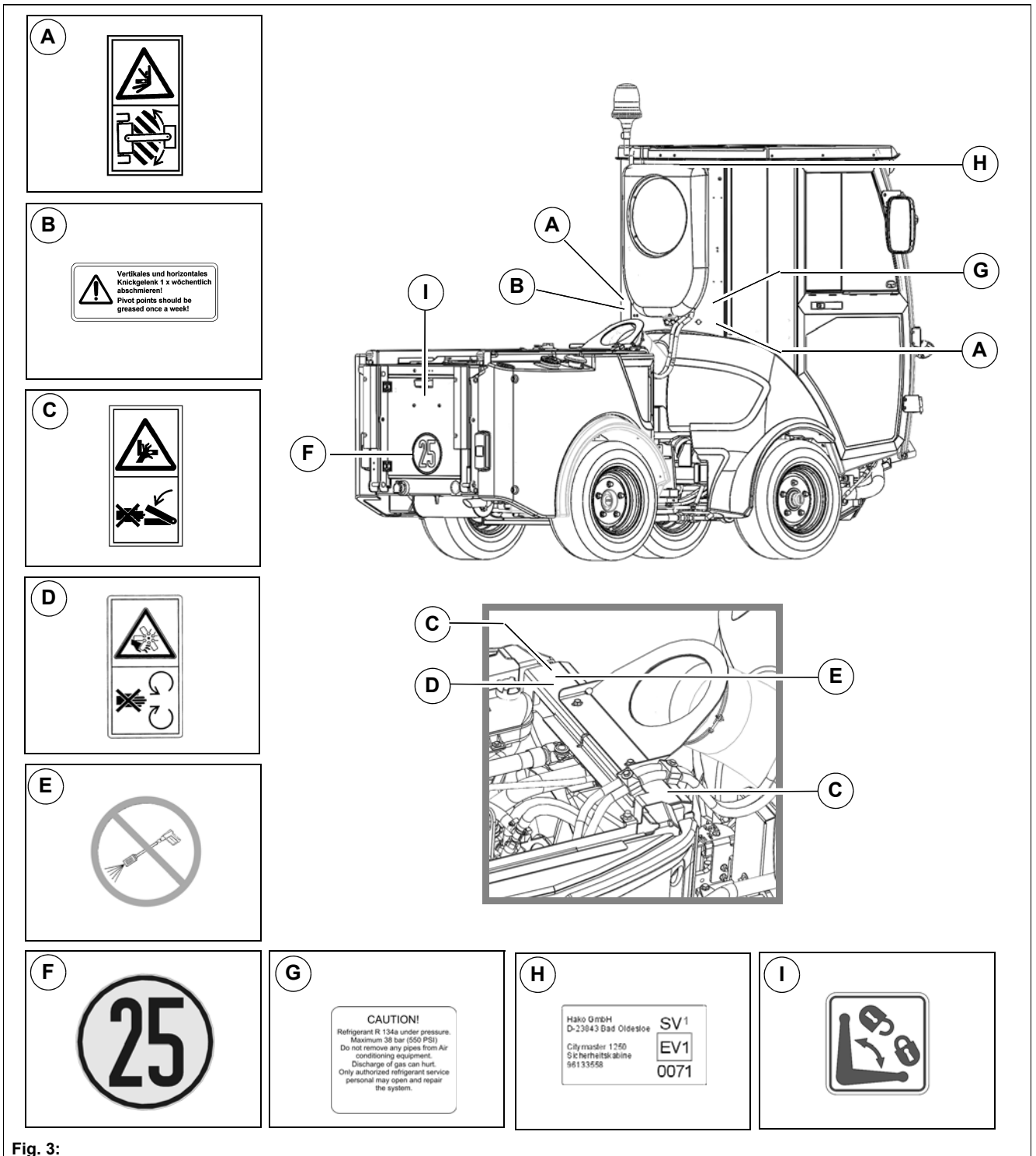


Fig. 3:

Label – 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 – lubricate articulated joint Fig. 3-B

The Lubricate articulated joint label is located at the driver's cab at the rear on the left.

Label – 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– 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.

Label – safety cab Fig. 3-H

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

Label – towing Fig. 3-I

The Towing label is located behind the door of the rear wagon.

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.

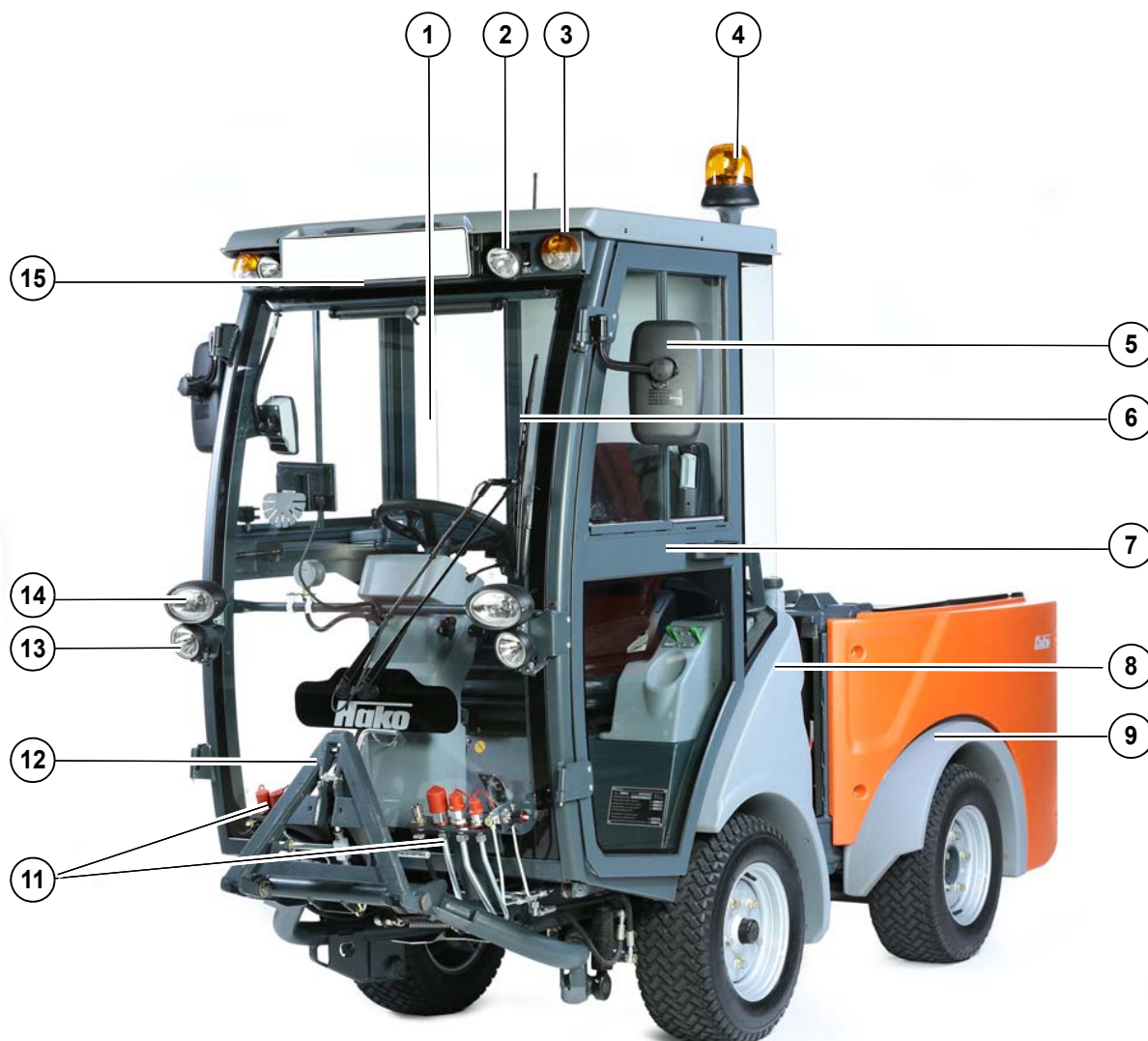


Fig. 4:

2.1.1 Front view

Item	Designation
1	Driver's cab
2	Additional working spotlight (optional) Top driving light (optional) for attachments that cover the standard driving light
3	Direction indicator (front) with side lights
4	Beacon
5	Outside mirror (optionally heated)
6	Windscreen wiper
7	Doors
8	Fresh water tank
9	Hydraulic 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
21	Circulating water coupling
22	Fuel tank
23	First aid box and warning triangle (optional)
24	Auxiliary tools
25	7-pin socket for spreader control cable (optional)

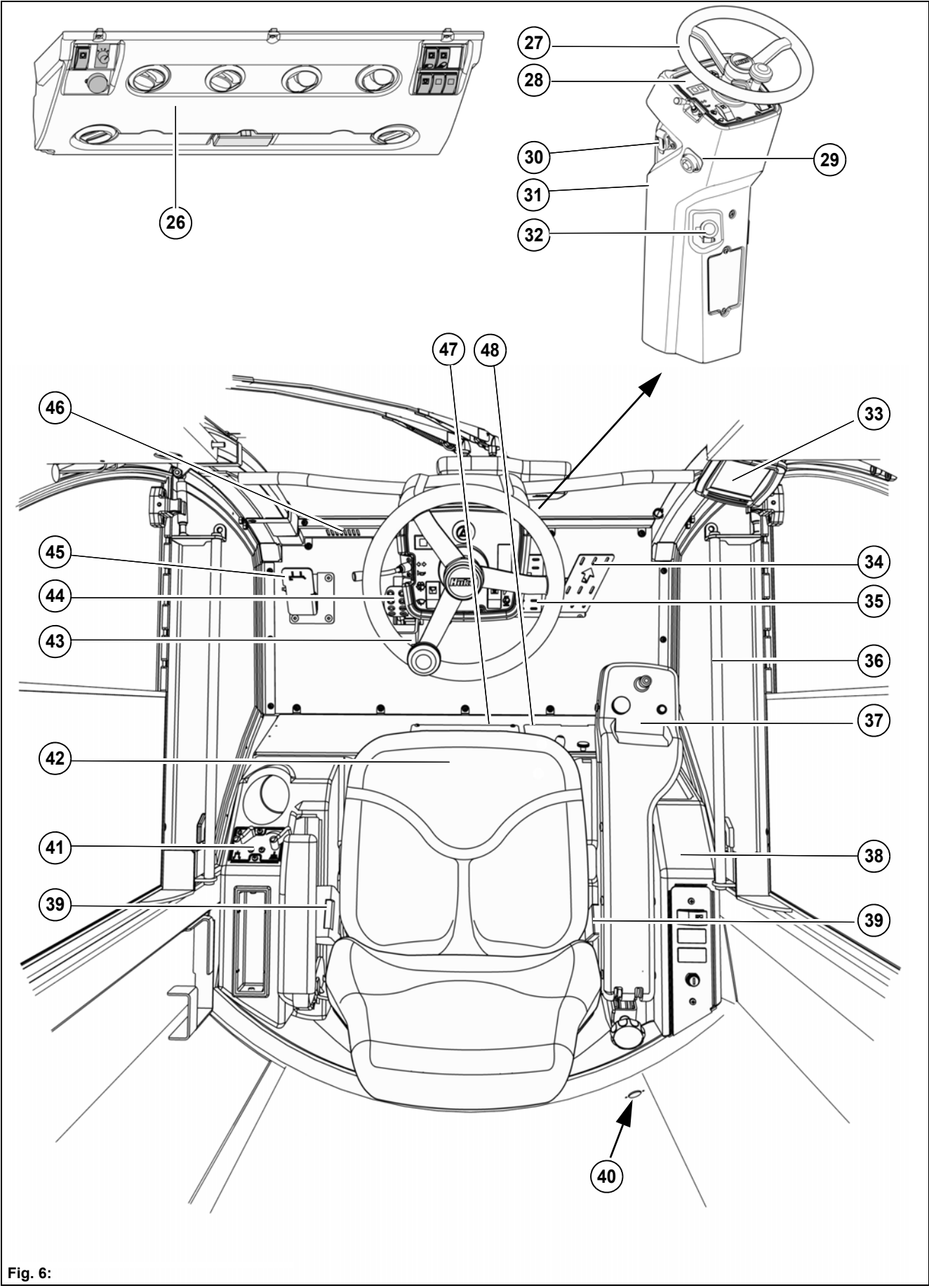


Fig. 6:

2.1.3 Driver's cab

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

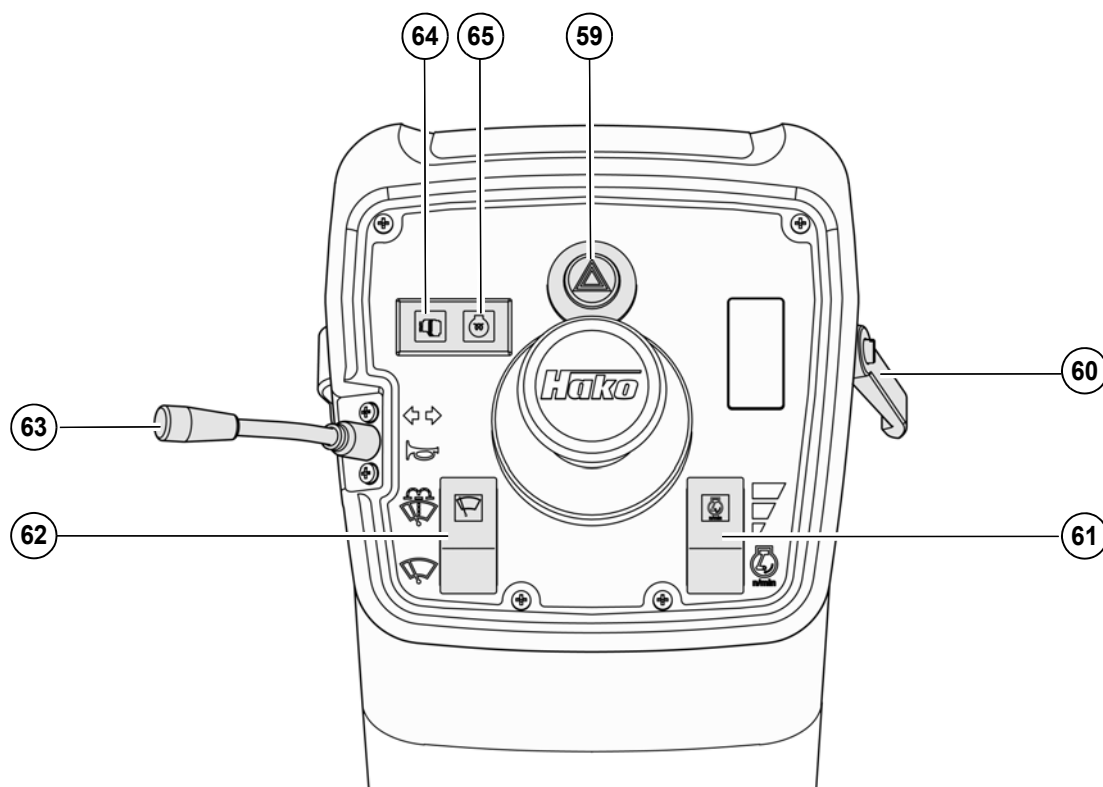
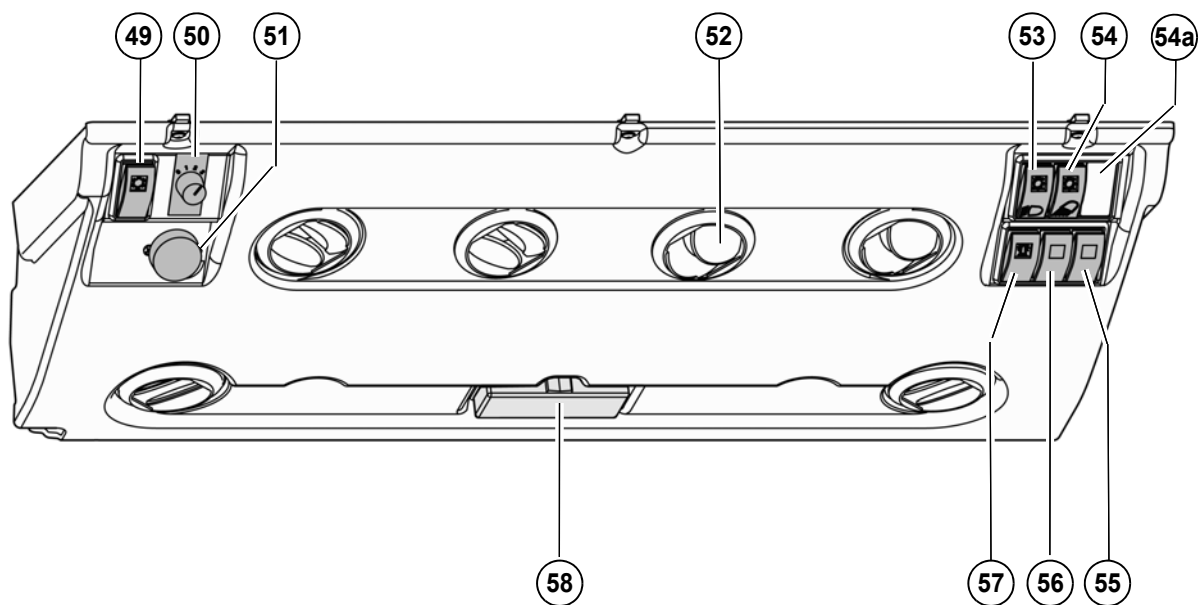


Fig. 7:

Continued – Driver's cab

Item	Designation
Inside roof control panel	
49	Air-conditioner switch
50	Suction fan controller
51	Heating controller
52	Air vent
53	Head light/side light switch
54	Working spotlight switch 54a top driving light switch (optional)
55	Mirror heating switch (optional)
56	Not used
57	Beacon switch
58	Inside light switch
Steering column control panel	
59	Emergency flasher system switch
60	Steering column lever
61	Engine fixed speed switch
62	Windscreen wiper motor/water pump switch
63	Direction indicator switch/horn button
64	Engine control light
65	Preheat control light

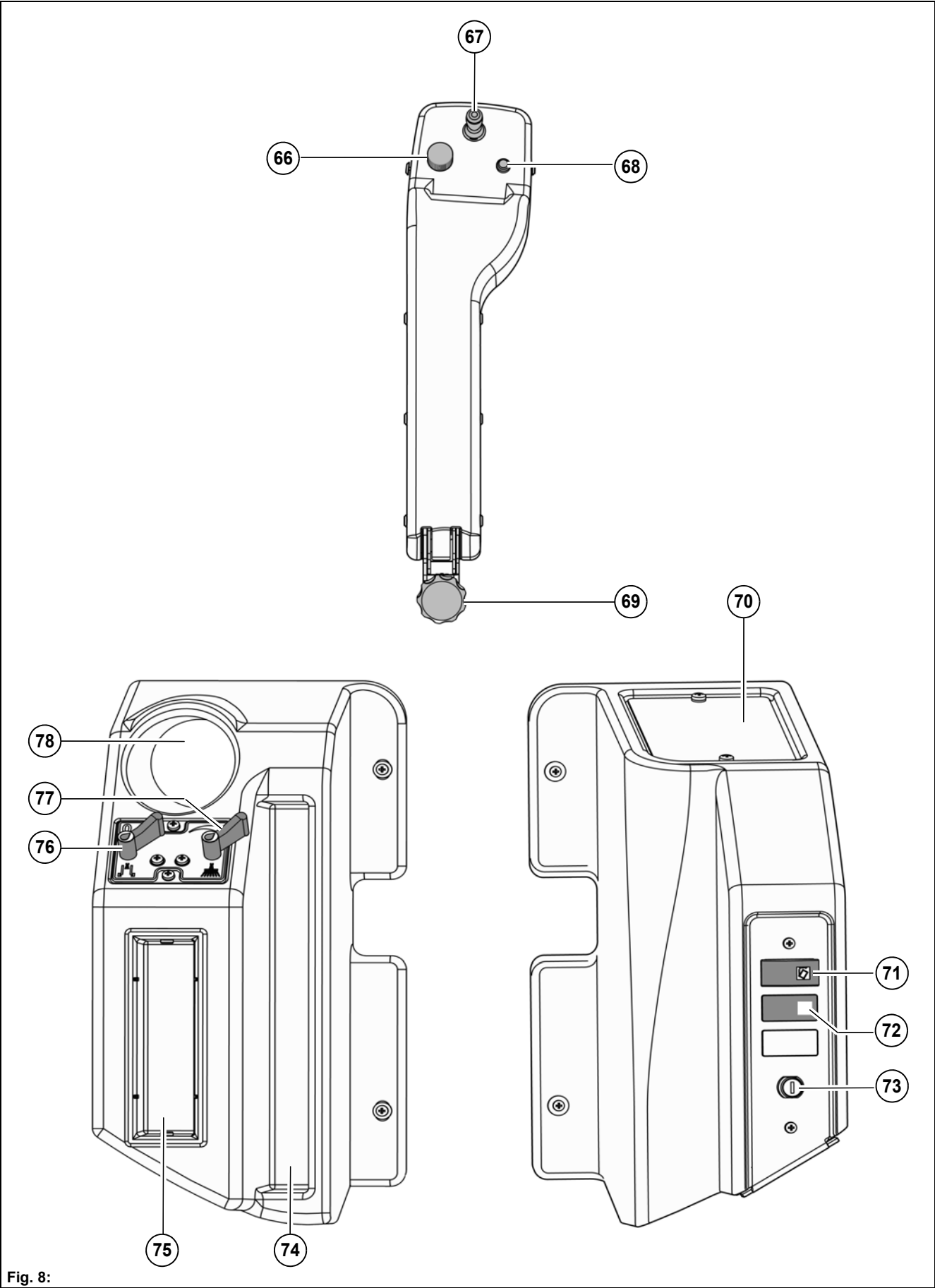


Fig. 8:

Continued – Driver's cab

Item	Designation
Arm rest control panel	
66	Turn-push knob for the multifunctional display
67	Joystick
68	Hako button
69	Armrest tilt star handle
Right-hand control panel	
70	Fuse box
71	Raise/lower dirt hopper switch
72	Charge control light
73	Ignition switch
74	Operating manual shelf
Left-hand control panel	
75	Radio installation space
76	Fresh water amount at the suction mouth lever
77	Sweeper fresh water amount lever
78	Drink holder

2.2 Multifunctional display

2.2.1 Start screen

Functions and indicators of the vehicle are set and displayed with the multifunctional display **Fig. 9-33**.

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.



Fig. 9:

2.2.2 Menu guidance

The menu is operated with the turn-push knob **Fig. 10-66**. 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.

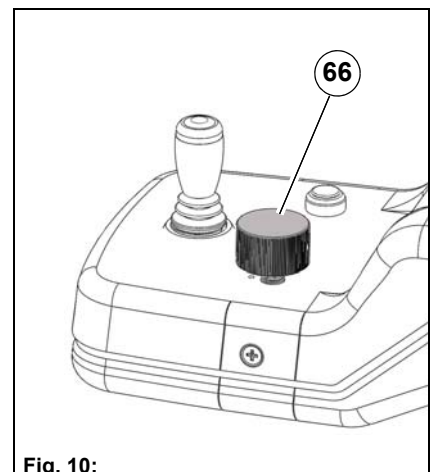


Fig. 10:

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 hydraulic circuit or fresh water supply, 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.

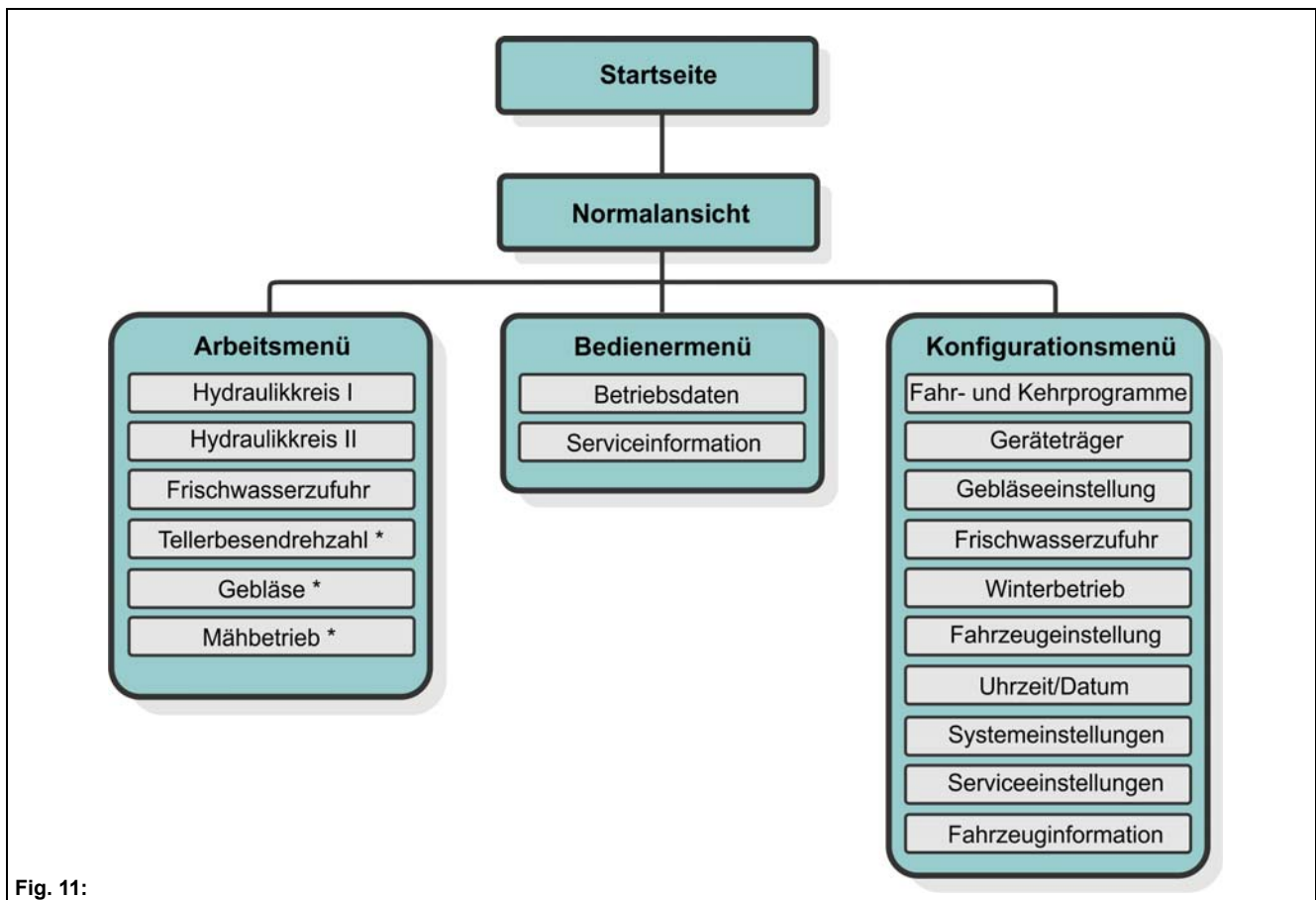


Fig. 11:

+) Optional or attachment

2.2.4 Normal view

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 (optional), pedal indicator, blinkers, time
- 4 Attachment parameters (left)
Operating times and operating kilometres (right)
- 5 Error codes (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: Brush speed
The bar chart can be set from 0 to 100 %.

D Numbers

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

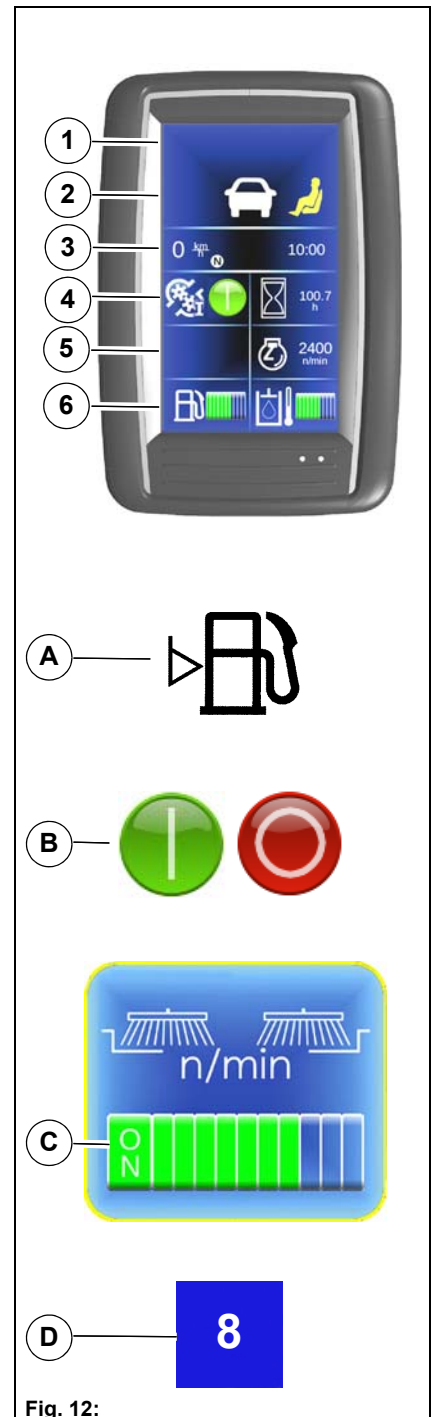


Fig. 12:

2.2.5 Working menu (A menu)

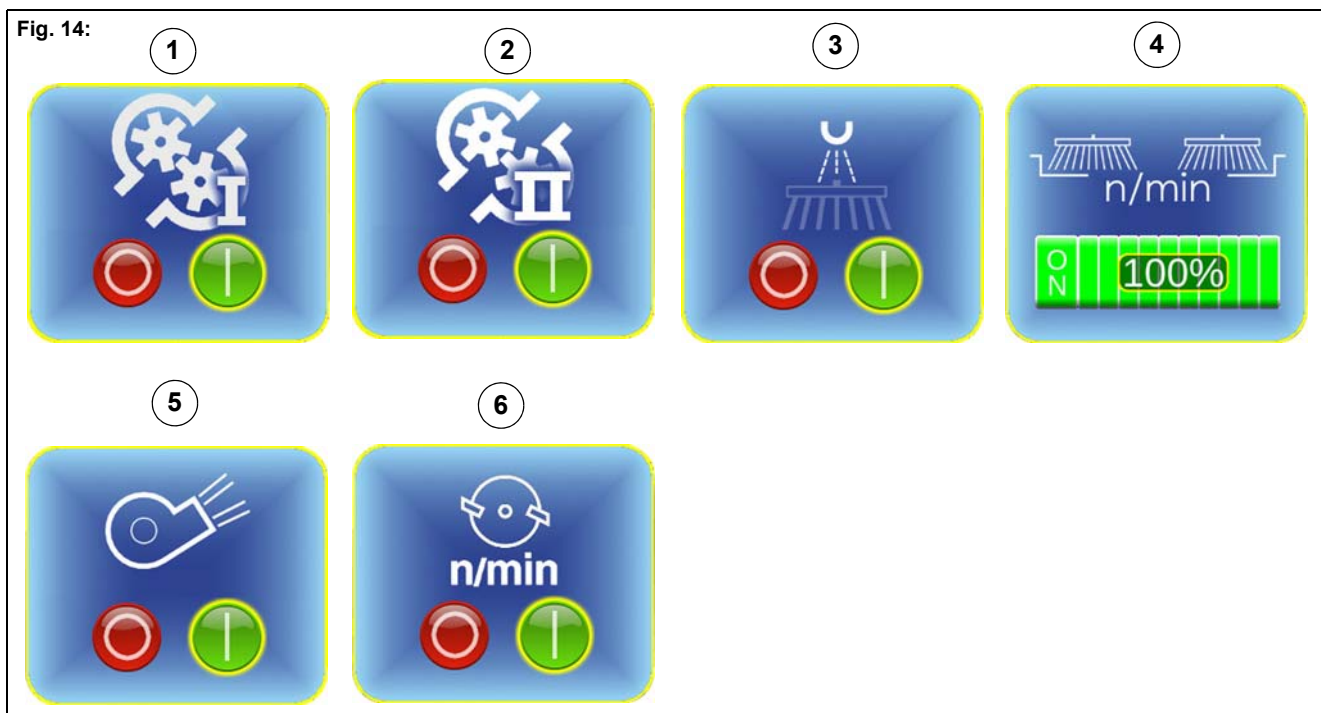


Fig. 13:

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. 13-66**. 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:

- 1 Hydraulic circuit I (front attachment)
Setting range: ON/OFF
- 2 Hydraulic circuit II (rear attachment)
Setting range: ON/OFF
- 3 Fresh water supply
Setting range: ON/OFF
- 4 Rotating brush speed (optional)
Setting range: 0 to 100 %
- 5 Suction fan (optional)
Setting range: ON/OFF
- 6 Mowing system (optional)
Setting range: Mowing ON/OFF



Example: Switching off the hydraulic circuit

The following example **Fig. 15** explains how an hydraulic circuit is switched off in the working menu.

1. The normal view (**A**) is displayed.
2. Turn the turn-push knob **Fig. 15-66**: The last active function (**B**) is selected (for example: hydraulic circuit I = ON).
3. Turn the turn-push knob: The current value (**C**) is changed (for example, hydraulic circuit I = OFF)

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. 15:

2.2.6 Operating menu (B menu)

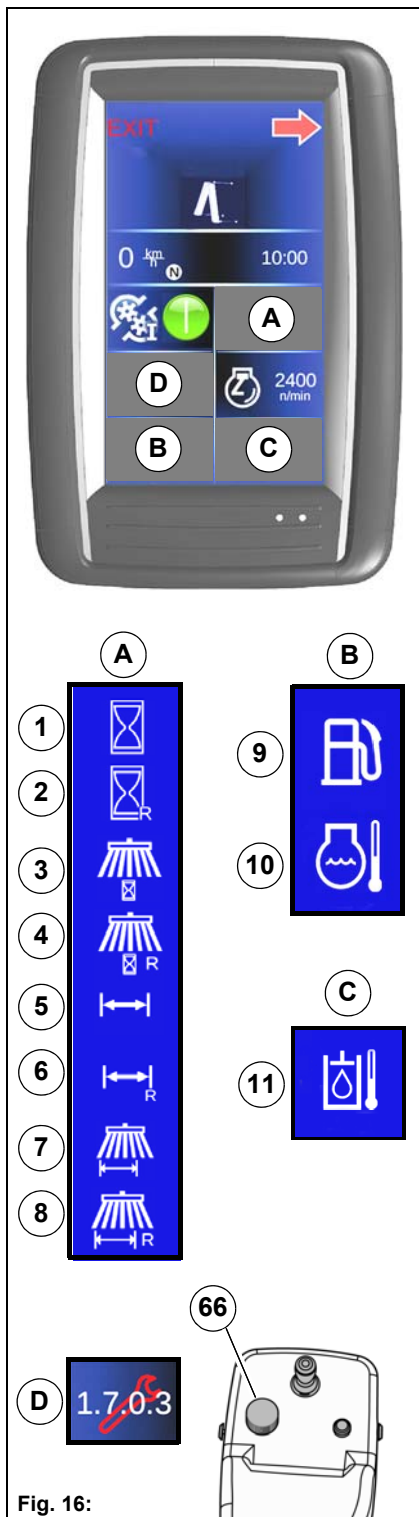


Fig. 16:

The displays of the normal view can be combined for the corresponding requirements in the operating menu **Fig. 16**. 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 44.

The displayed counter is reset by pushing the turn-push knob **Fig. 16-66** 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 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.

	<p>Note</p> <p>The displayed service information can be hidden after error rectification by pushing the turn-push knob for a long time.</p>
---	--

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. 17-66** 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)**.

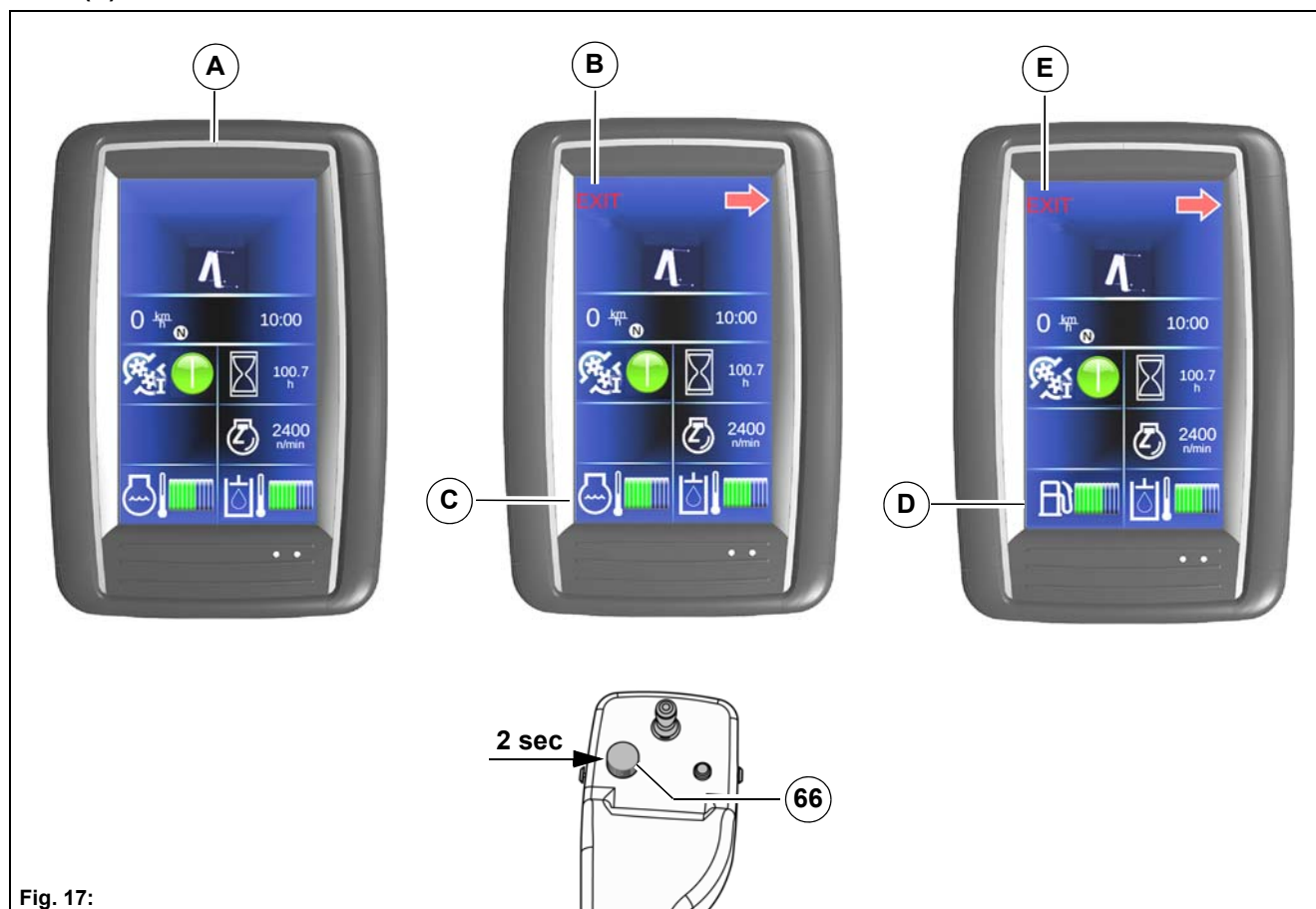


Fig. 17:

2.2.7 Configuration menu (C menu)



Fig. 18:

The configuration menu **Fig. 18** 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

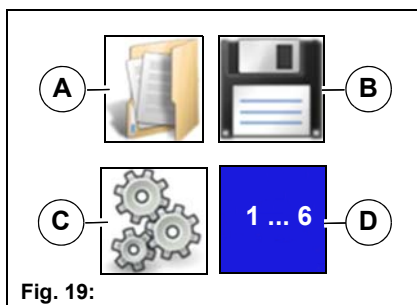


Fig. 19:

Driving profile Fig. 19

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

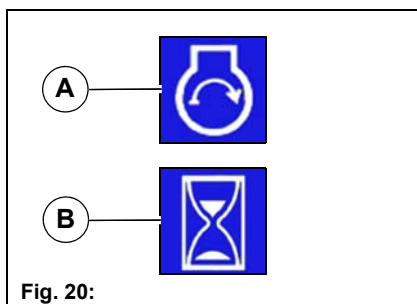



Fig. 20:

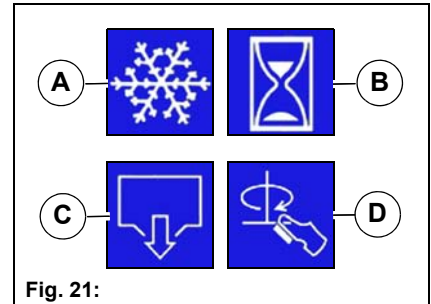
Suction fan settings Fig. 20

- A Suction fan after ignition ON
 - 0 ... OFF
 - 1 ... ON
 - 2 ... saves the last value at ignition OFF
- B Suction fan run-on
0 to 15 seconds (standard: 8 seconds)

Winter operation Fig. 21

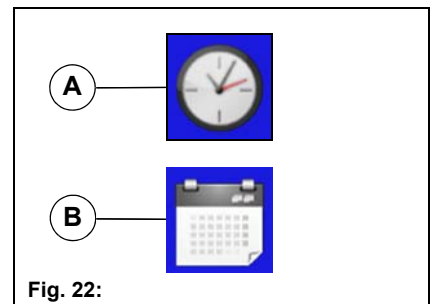
	<p>Danger Risk of accident due to unintended lowering of the attachment! Activate winter operation in the configuration menu only in connection with an uncoded snow blade. The front lift is then not limited downwards. Winter operation must be deactivated immediately after use.</p>
---	--

- 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)



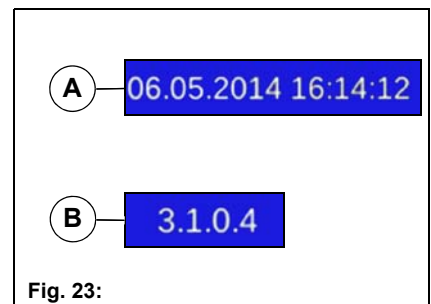
Time/date Fig. 22

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



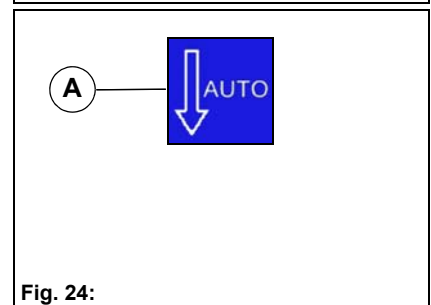
Service information Fig. 23

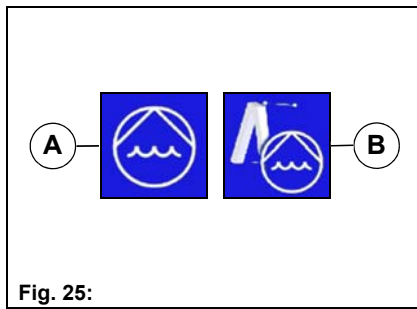
The last ten items of service information are displayed with time stamp **Fig. 23-A** and 4-digit code **Fig. 23-B**.
If no time stamp is available, the code occurred immediately at ignition ON or the display was switched off or not ready.



Front tool carrier Fig. 24

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





Fresh water supply Fig. 25

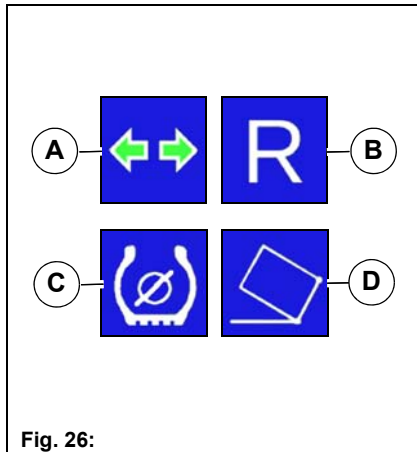
A Water pump to last set value (standard)

- 0 ... Last value
- 1 ... Always ON

B Water pump for uncoded attachment

- 0 ... Not available
- 1 ... Available

Fig. 25:



Driving settings Fig. 26

A Signal tone on flashing

- 0 ... OFF
- 1 ... ON (standard)

B Signal tone on reversing

- 0 ... OFF
- 1 ... ON (standard)

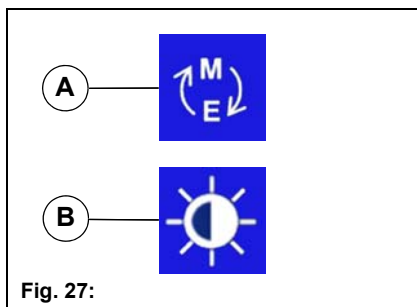
C Tyre type

- see selection list

D Warning tone when driving with raised dirt hopper

- 0 ... OFF
- 1 ... ON (standard)

Fig. 26:



System settings Fig. 27

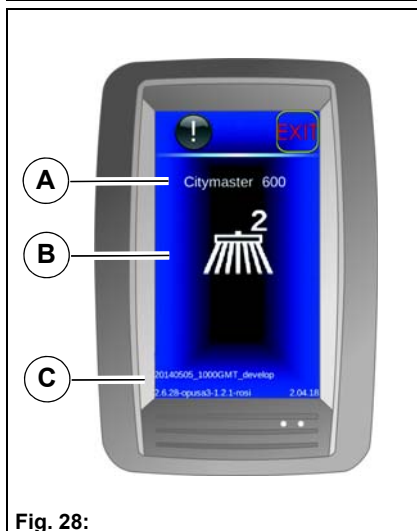
A Setting units

- km/h (standard)
- mi/h

B Display brightness

- Standard: 80 %

Fig. 27:



System information Fig. 28

A Vehicle type

B Recognised attachment

- Example: Sweeping system with two rotating brushes (optional)

C Software statuses

Fig. 28:

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. 29-66** 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. 29:

2.2.8 Warning and information symbols

Warning symbols

Item	Symbol	Colour	Function
1		Red	Charge control warning
2		Red	Engine oil pressure low warning
3		Red	Cooling water temperature too high warning
4		Red	Hydraulic oil temperature warning
5		Red	Parking brake on warning
6		Yellow	Engine fault warning
7		Yellow	Fuel supply low warning
8		Yellow	Hopper raised warning
9		Yellow	Driver not on driver's seat warning


Information symbols

Item	Symbol	Colour	Function
10		Green	Vehicle blinker information
11		Green	Trailer blinker information
12		Green	Side and rear lights information
13		Yellow	Preheat information
14		White	Front tool carrier floating position information
15		White	Front tool carrier upper stop information
16		White	Transport mode information
17		White	Work mode with front tool carrier information
18		White	Winter service information
19		White	Work mode with 2-brush system information
20		White	Work mode with front sweeping machine information
21		White	Work mode with mower information
22		White	Accelerator pedal in neutral position information

2.3 Controls in the driver's cab

2.3.1 Steering column control panel

Adjusting the steering column

	<p>Danger Risk of accident! If the steering column Fig. 30-31 is unlocked while driving, it can come unexpectedly out of adjustment. You can then lose control over the vehicle.</p>
---	--

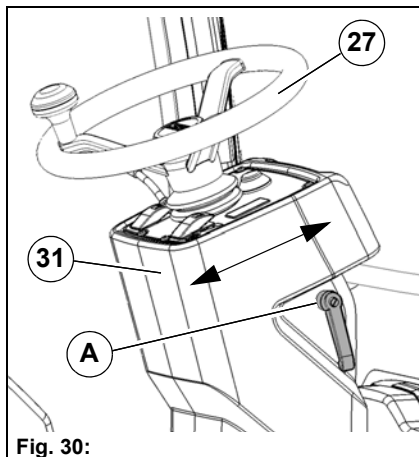


Fig. 30:

The steering column **Fig. 30-31** can be adjusted to the corresponding driver position with a lever.

- Turn the lever **Fig. 30-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. 30-27** in the longitudinal direction.

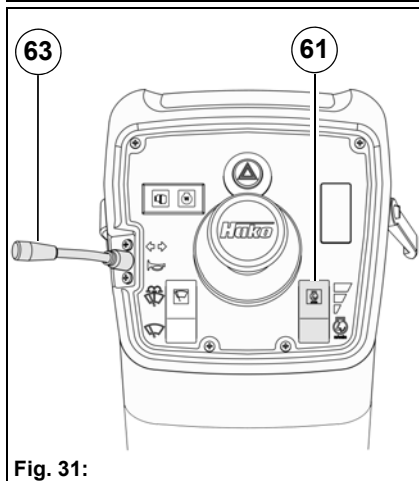


Fig. 31:

Setting the fixed engine speed

The fixed engine speed is set with the switch **Fig. 31-61**. In this case the hydraulic circuit for the front and rear attachments is changed. Set the speed corresponding to the requirements.

Stage	Rpm	Front attachment device: l/min	Rear attachment device: l/min
1-ECO	1900	25	19
2-Standard	2250	29	22
2-Maximum	2630	35	27

Horn

The horn is switched on and off with the button **Fig. 31-63**.

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

Switching the emergency flasher system on and off

The emergency flasher system is switched on and off with the switch **Fig. 32-59**. 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. 32-A** appears, or in trailer operation the trailer operation flasher information symbol **Fig. 32-B**.

Direction indicators

The direction indicators **Fig. 32-63** 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. 32-A** appears, or in trailer operation the trailer operation flasher information symbol **Fig. 32-B**.

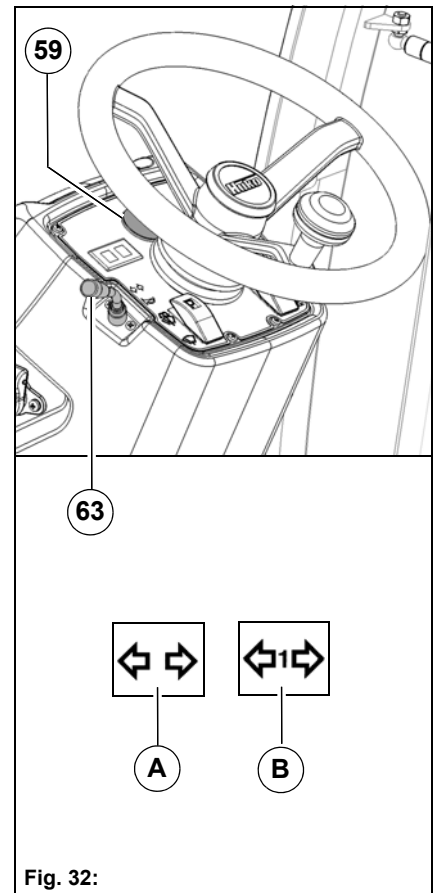


Fig. 32:

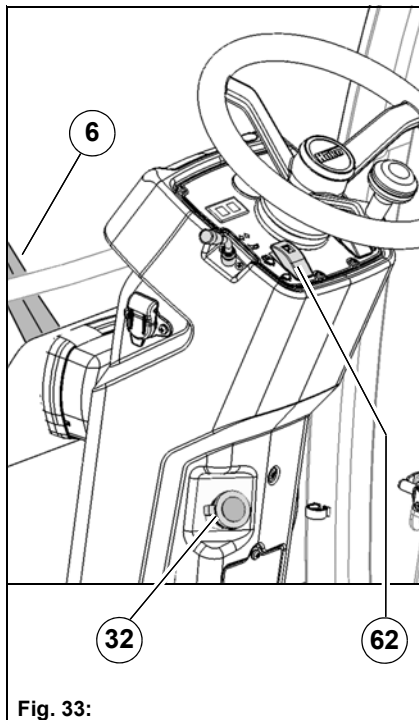


Fig. 33:

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. 33-6**.

The windscreen washer system is supplied from the water tank **Fig. 33-32**. Cleaning agents and antifreeze are added to the water as required.



Note

Do not let the windscreen wipers **Fig. 33-6** 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. 33-62**.

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

2.3.2 Left-hand control panel

Switching on fresh water for the suction mouth

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. 34-76** in the left-hand control panel.



Note

Make sure that the ball cock for the circulating water is opened, see page 63.

Setting the fresh water volume for the sweeping unit

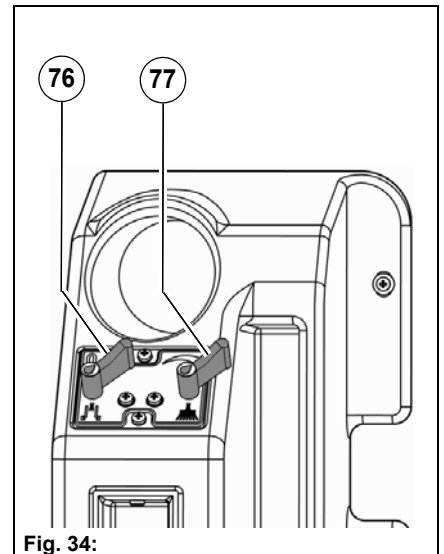
The volume of the fresh water at the spray nozzles is set with the lever **Fig. 34-77** in the left-hand control panel. Set the volume corresponding to the requirements.

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



Note

Switch the fresh water pump on in the C menu before adjusting the fresh water volume, see page 42.



2.3.3 Right-hand control panel

Raising and lowering the tipper body

The following functions on the tipper body are switched on with the button **Fig. 35-71**:

- 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. 35-A** appears.



Note

The warning sound for the raise/lower tipper body function can be switched on and off in the C menu, see page 42. Push the button again to reset the function.

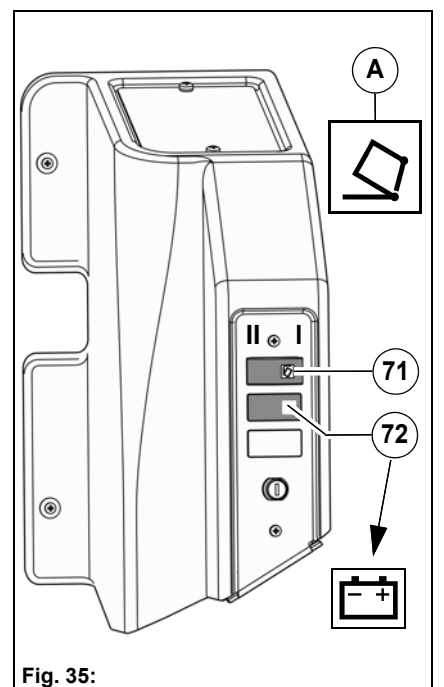
Charge control light

The charge control light **Fig. 35-72** lights up when the ignition is switched on, but goes out as soon as the engine is started.

If the charge control light goes on when the engine is running, this signals:

- Defective generator V-belt or
- Defect in the generator charging circuit

The battery is no longer being charged!



2.3.4 Arm rest control panel

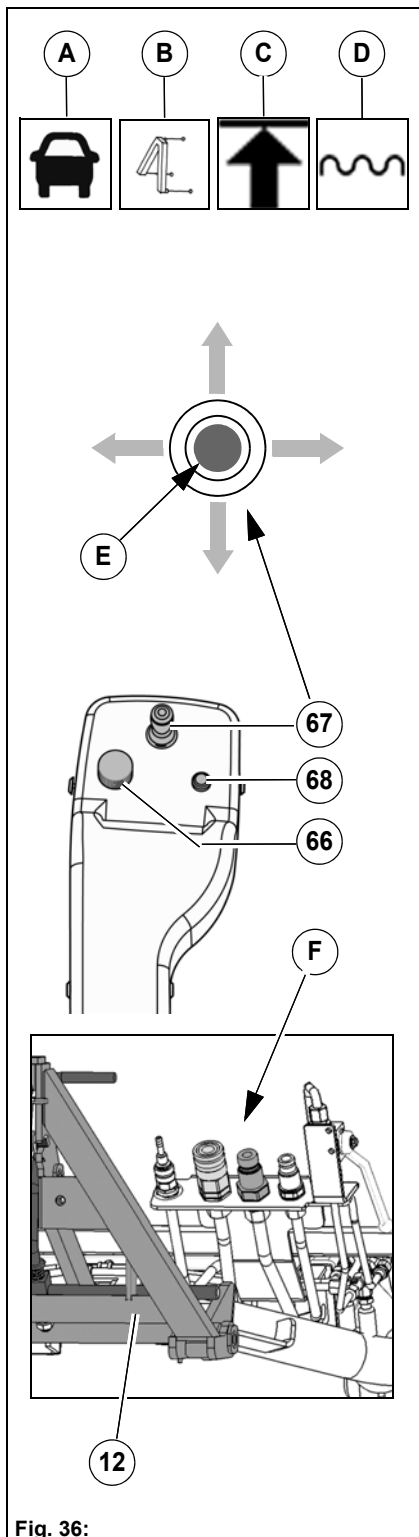


Fig. 36:

Hako button

The Hako button **Fig. 36-68** 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. 36-A**, or front tool carrier symbol **Fig. 36-B** appears.

The vehicle speed in the:

- transport mode is 0 to 25 km/h
- work mode 15/20/25 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. 36-67**. The joystick acts on the front tool carrier **Fig. 36-12** and on the hydraulic connections **Fig. 36-F**.

The following functions are possible:

- Joystick forwards: Lowering front tool carrier (floating position)
- Joystick back: Raising front tool carrier
- Joystick to the left: The front tool swivels to the left
- Joystick to the right: The front tool swivels to the right

In the multifunctional display, the upper stop information symbol **Fig. 36-C** or floating position symbol **Fig. 36-D** appears.

The function of the joystick with an attachment is described in chapter 6.

Using the button **Fig. 36-E** in the joystick it is possible to control an additional hydraulic component via a changeover valve (e.g. wedge snowplough). To do so, the changeover valve of the attachment must be connected to the 19-pin X63 socket, see page 66. The additional function is active if the button is pressed and the joystick simultaneously moved.



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 if the accelerator pedals are in neutral position.
- 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. 36-66** 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 35.

2.3.5 Roof control panel

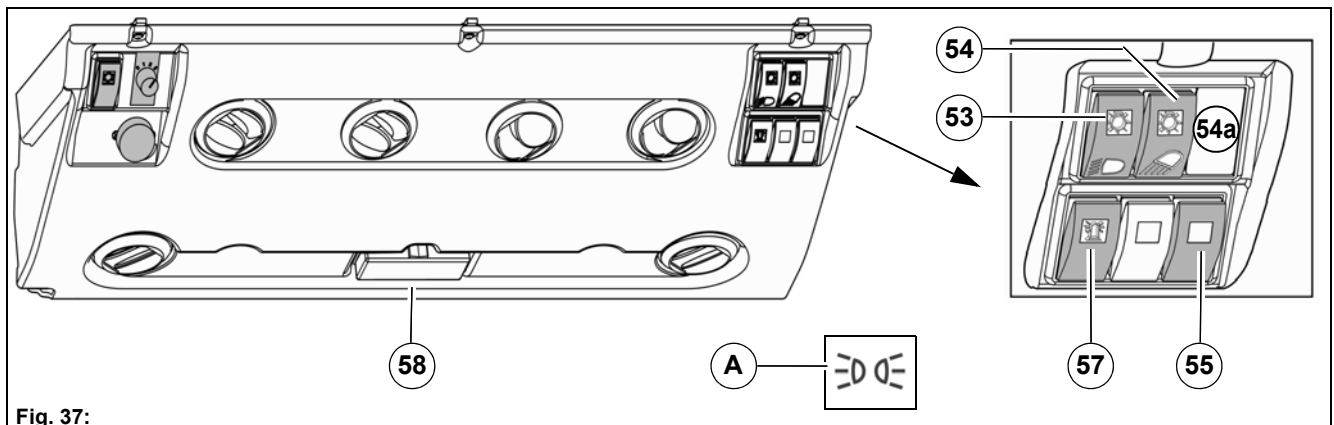


Fig. 37:

Working spotlight

The switch **Fig. 37-54** 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 spotlight OFF
- Switch in stage II: Working spotlight (series) ON
- Switch in stage III: Additional working spotlight (optional) ON

Head light and side lights

The switch **Fig. 37-53** (or the switch **Fig. 37-54a** with the optional top driving light), 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. 37-A** appears.

Beacon

The beacon **Fig. 37-57** 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. 37-58**.

- Switch in stage I: Interior lighting OFF
- Switch in stage II: Interior lighting ON

Outside mirror heating (optional)

The switch **Fig. 37-55** 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 Ignition switch



Warning

- If the engine oil pressure warning symbol **Fig. 38-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. 6-34** and **Fig. 6-35** are in neutral position.
- The ignition switch **Fig. 38-73** 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.
- In ambient temperatures of -10 °C around 20 minutes, as from +10 °C warming up is no longer required.
- The driver must be on the driver's seat for starting. Do not actuate the accelerator pedal during the starting procedure!

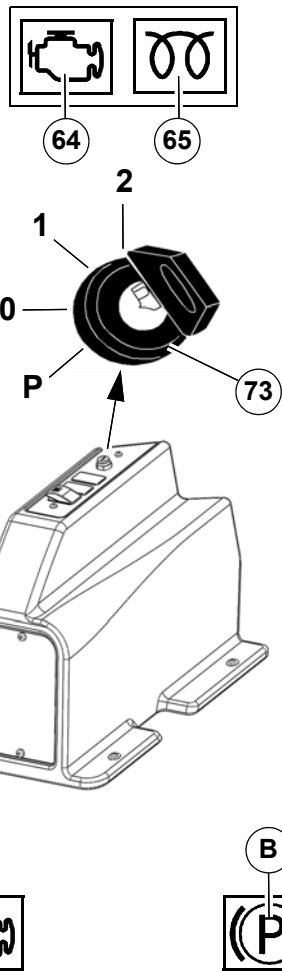


Fig. 38:

The ignition switch **Fig. 38-73** is used for starting the engine and for switching the electrical system on and off.

- Position P: The emergency flasher lights, 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 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. 38-B** in the multifunctional display may light up.
 - The engine warning light **Fig. 38-64** lights up.
 - The preheat control light **Fig. 38-65** 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 warning light flashes, the preheat procedure has been interrupted and must be repeated.
 - If the engine warning 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. Contact an authorised Hako workshop.
 - The ignition switch goes back into position 1.

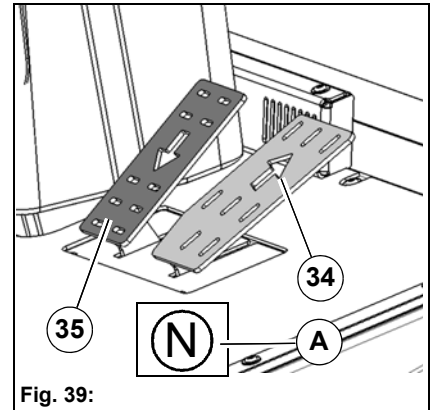
2.3.7 Accelerator pedal

Accelerator pedal for forwards and reverse

The accelerator pedal **Fig. 39-34** is used for continuously changing the speed for driving forwards. Push the accelerator pedal down increases the driving speed. If you release the accelerator pedal, it goes back automatically to zero position, the vehicle stops.

The accelerator pedal **Fig. 39-35** is used for continuously changing the speed for reversing. 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.

If the accelerator pedal is in neutral position, the information symbol **Fig. 39-A** in the multifunctional display lights up



2.3.8 Coarse material flap



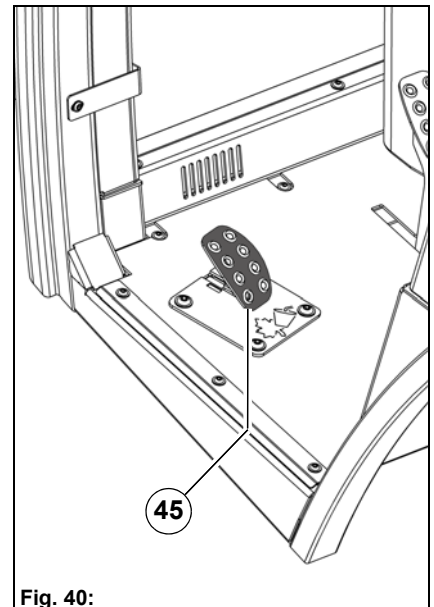
Note

- The coarse material flap pedal **Fig. 40-45** 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.

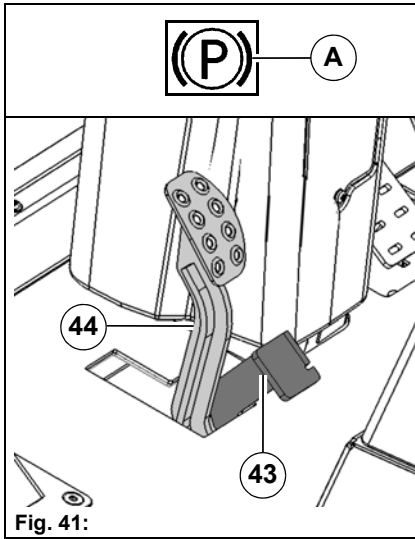
Operating the coarse material flap

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. 40-45**.

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.



2.3.9 Parking brake



Operating the parking brake

The parking brake **Fig. 41-43** stops the vehicle from rolling away.

Holding the vehicle with the parking brake:

- First press the brake pedal **Fig. 41-44** and then the parking brake **Fig. 41-43**. The parking brake is locked.
- The warning symbol **Fig. 41-A** appears.
- If you drive with the parking brake on, a warning signal sounds in addition.

Releasing the parking brake:

- Press the brake pedal. The parking brake is released.
- With the parking brake released the warning light **Fig. 41-A** goes out.

2.3.10 Driver's seat

The seat adjustments of the driver's seat **Fig. 6-42** depend on the equipment. The standard seat **Fig. 42-42a** has a mechanical suspension. The comfort seat **Fig. 42-42b** is air-cushioned. To reach the controls easily, the right armrest, height and longitudinal setting can be adjusted. The driver's seat is equipped with a suspension for additional comfort.

If the driver leaves the driver's seat during operation, then the driver's seat warning symbol **Fig. 42-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.

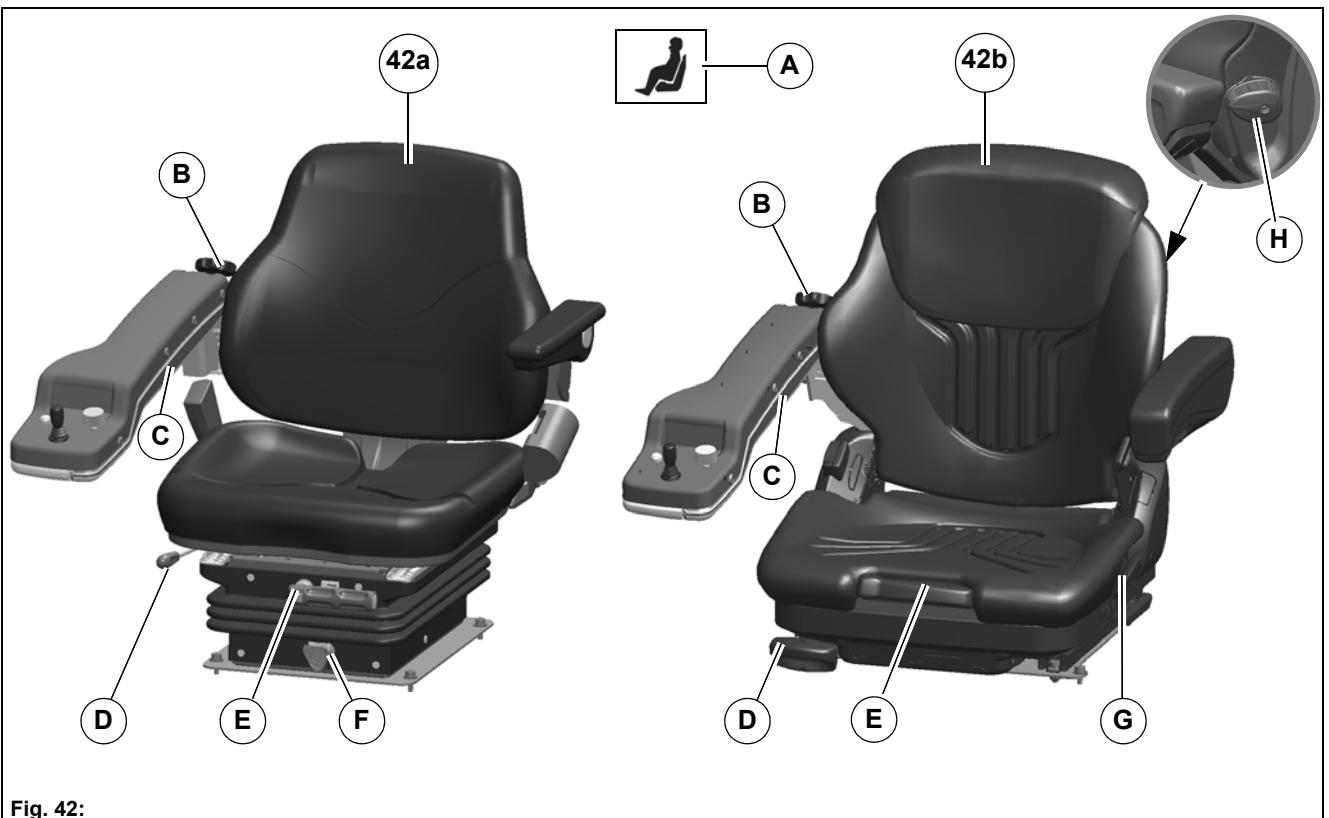


Fig. 42:

Adjusting the armrest

The armrest can be folded and its inclination can be adjusted. Turn the wheel **Fig. 42-B** to adjust the inclination. The right armrest can be unlocked with the lever **Fig. 42-C**.

Lever for longitudinal adjustment

Adjust the seat in the longitudinal direction with the lever **Fig. 42-D**.

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

Weight setting (standard seat)

For optimum suspension, the driver's seat must be adjusted to the weight of the driver with the lever **Fig. 42-E**.

- Turn lever clockwise = increase driver's weight.
- Turn lever counter-clockwise = decrease driver's weight.

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

Weight setting (comfort seat)

For optimum suspension, the driver's seat must be adjusted to the weight of the driver with the knob **Fig. 42-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.

Adjusting the height (standard seat)

Turn the wheel **Fig. 42-F** to adjust the height of the driver's seat.

- Turn the wheel clockwise = driver's position higher
- Turn the wheel counter-clockwise = driver's position lower

Adjusting the backrest (comfort seat)

Adjust the backrest with the lever **Fig. 42-G**. You should be on the driver's seat for the adjustment.

- Pull the lever up with you 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.

Adjusting the spine support (comfort seat)

Turn the wheel **Fig. 42-H** of the backrest to adjust the spine support.

2.3.11 Seat belt

The seat belt **Fig. 43-39** 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.

Putting seat belts on and off

Insert the buckle latch **Fig. 43-B** into the belt buckle **Fig. 43-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. 43-C**. Guide the seat belt slowly up to the reel.

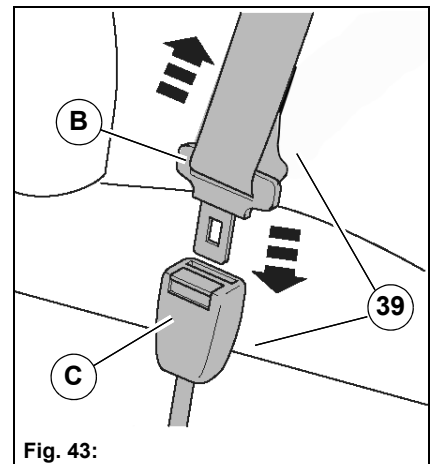


Fig. 43:

2.3.12 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.

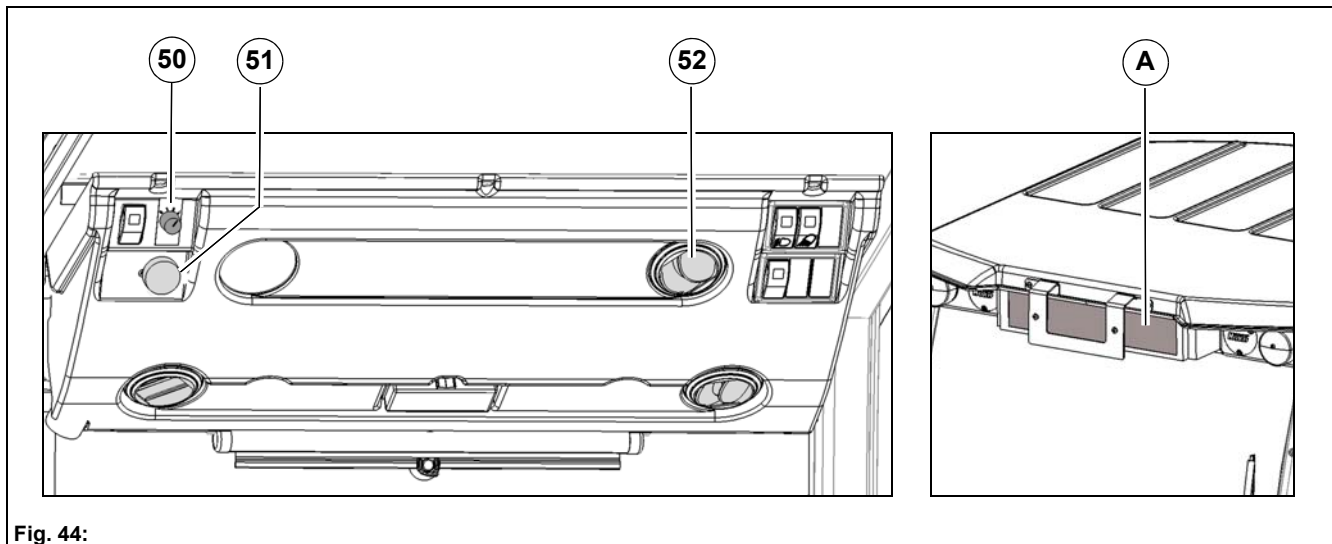


Fig. 44:

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. 44-52 of the windscreen and through the air vents **Fig. 6-46** of the foot well into the driver's cab.

Adjusting the ventilation

The ventilation is set with the controller **Fig. 44-50**.

- 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. 44-50**.

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

Cab air filter

The installed cab air filter **Fig. 44-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 89.

2.3.13 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.

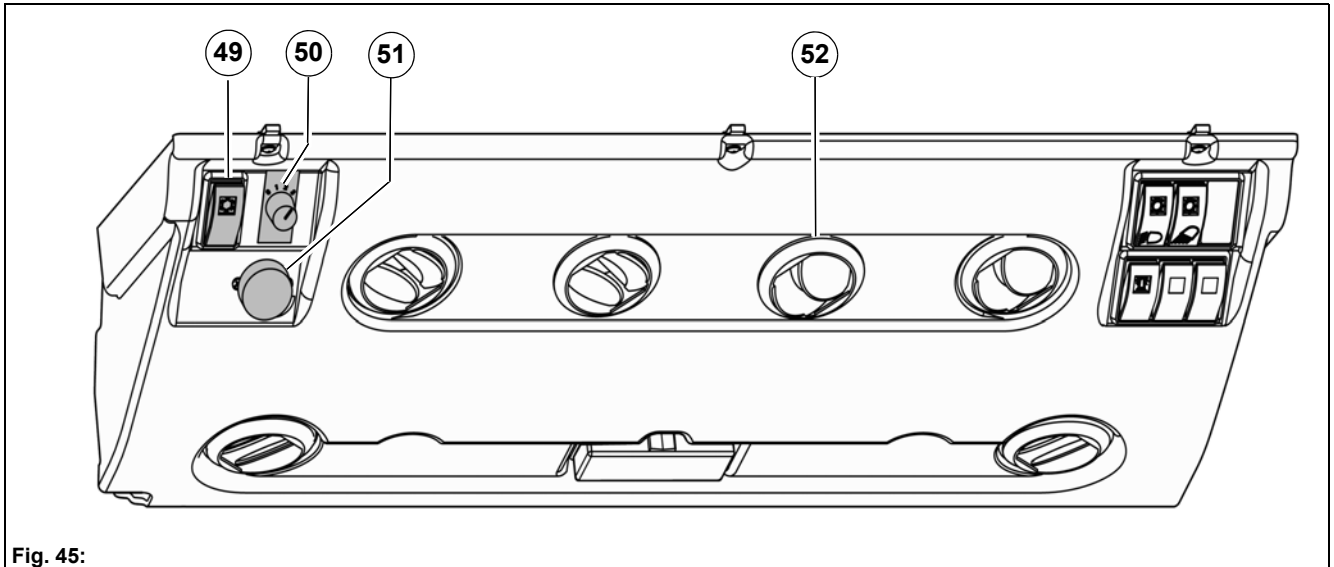


Fig. 45:

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. 45-52 of the windscreen and through the air vents **Fig. 6-46** 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. 45-49**. The control light on the switch goes on.
- Set the air supply on the controller **Fig. 45-50**.
- Set the temperature with the controller **Fig. 45-51** to 18 °C to 22 °C.

2.3.14 Doors

	<p>Danger</p> <ul style="list-style-type: none"> • There is a risk of accidents when driving with open doors! The doors Fig. 46-7 must remain closed when driving on public roads and when working. • Risk of accident! The outside mirrors Fig. 46-5 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. Therefore check the actual distance from road users driving behind you by glancing over your shoulder.
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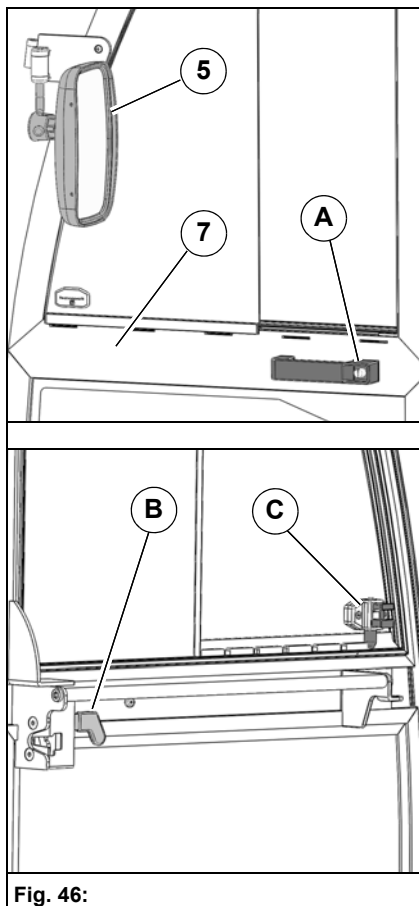


Fig. 46:

Opening doors from the outside

To open the doors **Fig. 46-7** insert the key in the door lock **Fig. 46-A**, turn it counter-clockwise and push it.

Opening doors from the inside

To open the doors pull the lever **Fig. 46-B** upwards.

Adjusting the side windows

The left and right side windows are opened or closed with the catches **Fig. 46-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. 46-5**.

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.

2.4 Operating elements on the vehicle

2.4.1 Auxiliary tool

The auxiliary tool **Fig. 47-24** 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 118.
- For removing coarse dirt from the suction mouth and suction duct, see page 135.
- For cleaning the dirt hopper, e.g. if leaves clog up the sieves, see page 136.
- 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.

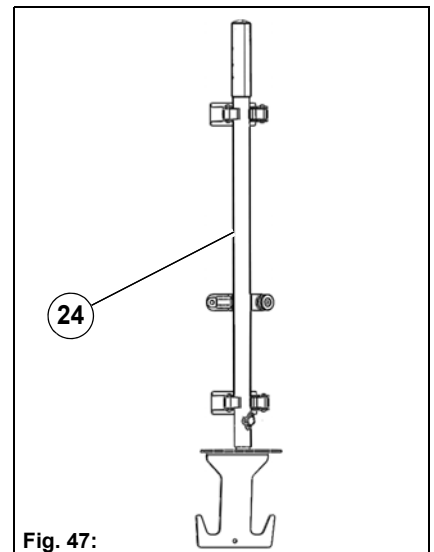


Fig. 47:

2.4.2 Ball cock circulating water

The circulating water is locked only with the ball cock **Fig. 48-10** for maintenance purposes. In normal operation the ball cock must be opened!

- Circulating water supply opened: Ball cock in position **Fig. 48-I**
- Circulating water supply closed: Ball cock in position **Fig. 48-II**



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 dismantled, see page 118.

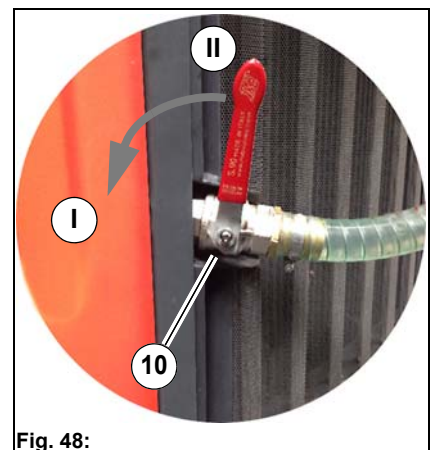


Fig. 48:

2.4.3 Front tool carrier

The front tool carrier **Fig. 49-12** is used for holding an attachment.



Danger

Risk of accident! Front tools not correctly fastened to the front tool carrier can drop down while driving. Always secure the front tool with the locking devices **Fig. 49-A** and **Fig. 49-B**. Always secure non-Hako tools with the locking device **Fig. 49-C**.

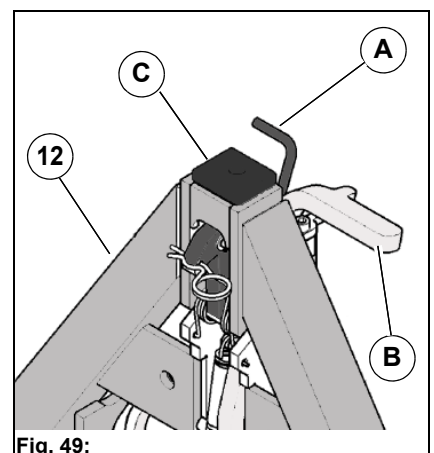


Fig. 49:

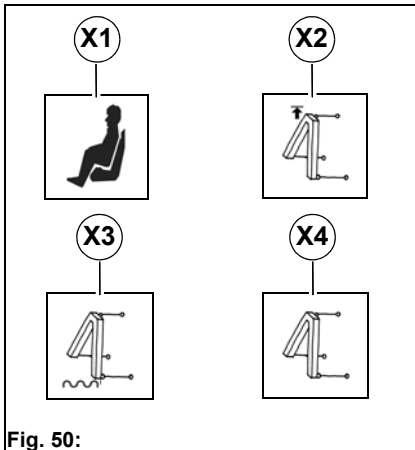


Fig. 50:

Taking up and securing the front tools

1. Drive the vehicle up to the attachment and lower the front tool carrier with the joystick **Fig. 8-67**.
2. Bring the locking hook **Fig. 51-A** into the rear position and the lever **Fig. 51-B** into the upper position (II). Pick up the chain **Fig. 51-C** and hook in onto the hook **Fig. 51-E**.
3. Drive under the take-up of the attachment and carefully raise the attachment with the front tool carrier. 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. The movement limiter of the front tool carrier is determined by the chain **Fig. 51-C** and the hooking point of the chain.
 - For vacuum sweeping, hook the chain in the holder **Fig. 51-D** with the first link.
 - For attachments with floating position the chain must be hooked onto the hook **Fig. 51-E!**
6. Check the locking plate **Fig. 51-F** on the attachment. If necessary, loosen the screws and shift the locking plate.

The following is shown in the multifunctional display: Driver not on driver's seat **Fig. 50-X1**; Upper end position of the front tool carrier **Fig. 50-X2**; Floating position of the front tool carrier **Fig. 50-X3**; Front tool carrier lowered and fixed **Fig. 50-X4**.

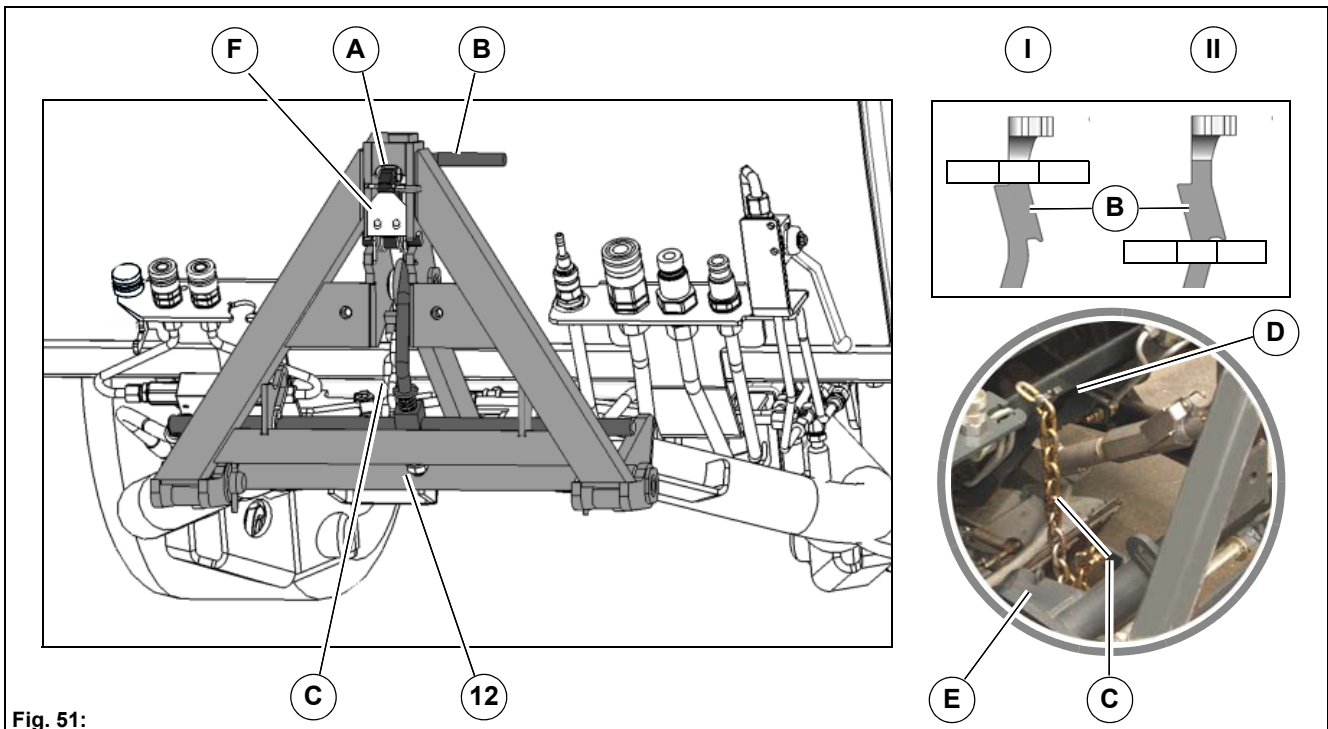


Fig. 51:

Adjustable upper link (optional)

The adjustable upper link **Fig. 52-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. 52-B** and adjust the middle section with a suitable tool to the required length. Then secure with the nut **Fig. 52-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.

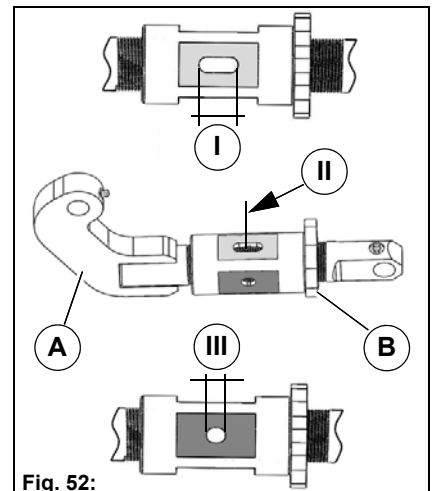


Fig. 52:



Note

When the sweeping system is used, adjustment to position III **Fig. 52** is required for correct operation of the sweeping unit.

Weight holder (optional)

Weight counterbalance **Fig. 53-A** at the tail is required for all heavy front attachments. A weight holder is optionally available. A maximum of six counterweights **Fig. 53-C** (17 kg each) can be hooked into the bars **Fig. 53-B**.

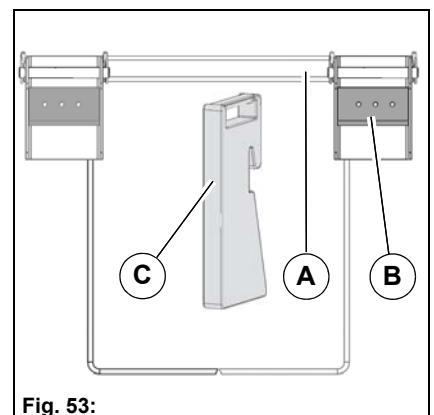


Fig. 53:

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. 54-A** and the button **Fig. 54-B** simultaneously
- Lower tipper body: Press the button **Fig. 54-A** and the button **Fig. 54-C** simultaneously

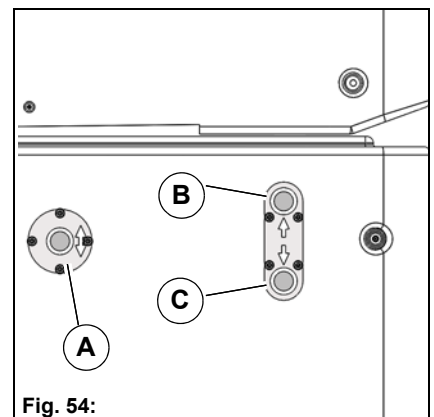


Fig. 54:

2.4.4 Connections for front attachments

The following devices can be operated with the connections for the front attachments **Fig. 55-12**:

- **A** = Supply for hydraulic cylinder for side adjustment
- **B** = Return for hydraulic cylinder for side adjustment
- **C** = water connection for sweeping unit spray nozzles
- **D** = Return 25/29/35 l/min (hydraulic circuit I)
- **E** = Supply 25/29/35 l/min (hydraulic circuit I)
- **F** = Return leakage oil pipe (e.g. for mower)
- **G** = Ball cock for locking suction mouth lift (e.g. mower)
- **H** = X63 socket 19-pin for attachments

Switching on the hydraulic circuit

Select the A menu in the multifunctional display with the turn-push knob **Fig. 55-66**. Change the current value in the hydraulic circuit I menu item **Fig. 55-X**. Setting range: ON/OFF. Required for attachments without coding plug! The hydraulic circuit is switched off if the driver leaves the driver's seat.

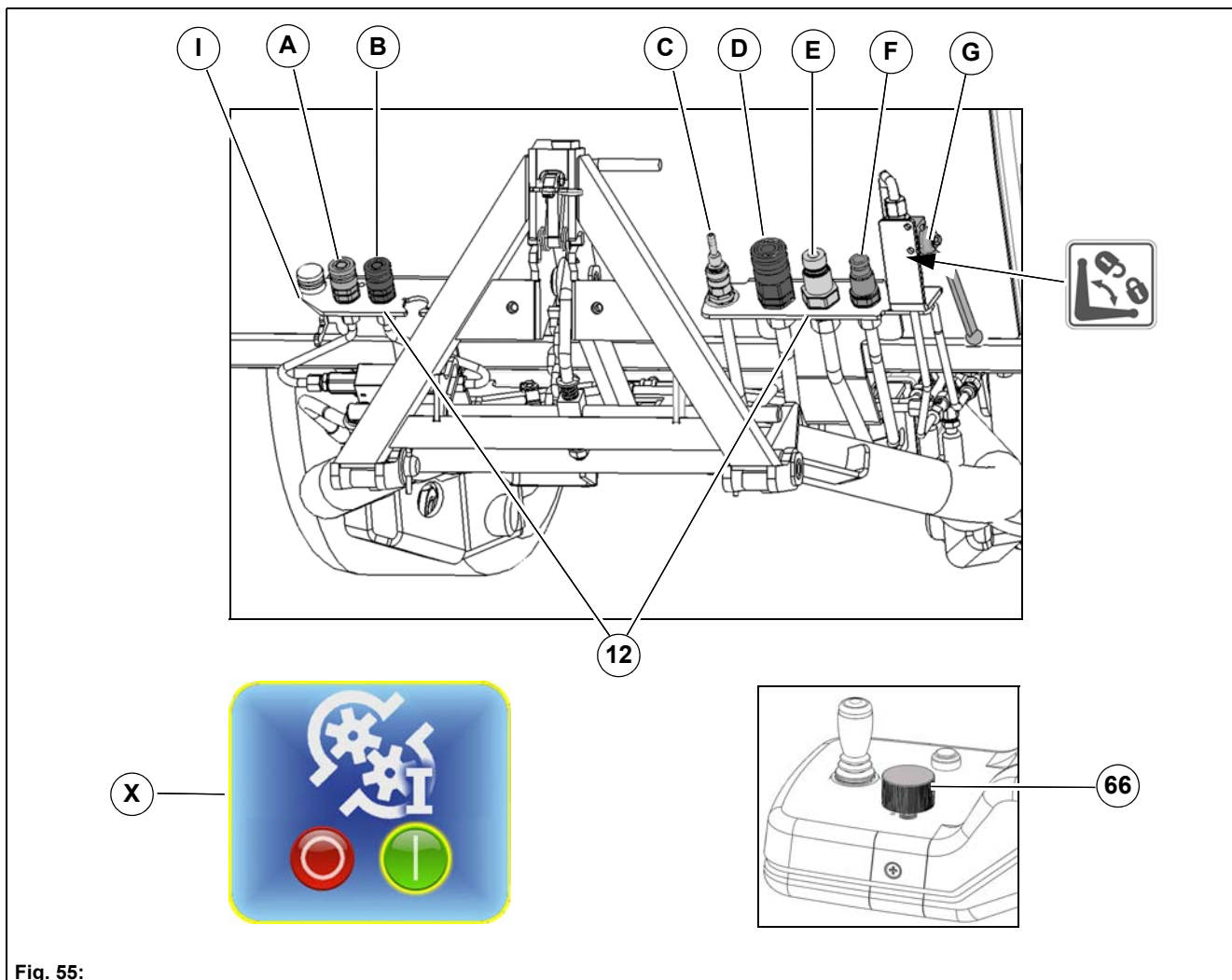


Fig. 55:

2.4.5 Connections for rear attachments

The following devices can be operated with the connections for the rear attachments **Fig. 56-19**:

- **A** = X64 socket for additional functions of control cable
- **E** = Supply 19/22/17, I(min (hydraulic circuit II)
- **C** = Supply for lift system hydraulic cylinder
- **C** = Return for lift system hydraulic cylinder
- **E** = Return 19/22/27, I(min (hydraulic circuit II)
- **F** = X65 7-pin socket for lighting
- **C** = X68 7-pin socket for spreader control cable
- **C** = X67 7-pin socket for spreader control cable

Switching on the hydraulic circuit

Select the A menu in the multifunctional display with the turn-push knob **Fig. 56-66**. Change the current value in the hydraulic circuit II menu item **Fig. 56-X**. Setting range: ON/OFF

Required for attachments without coding plug! The hydraulic circuit is switched off if the driver leaves the driver's seat.

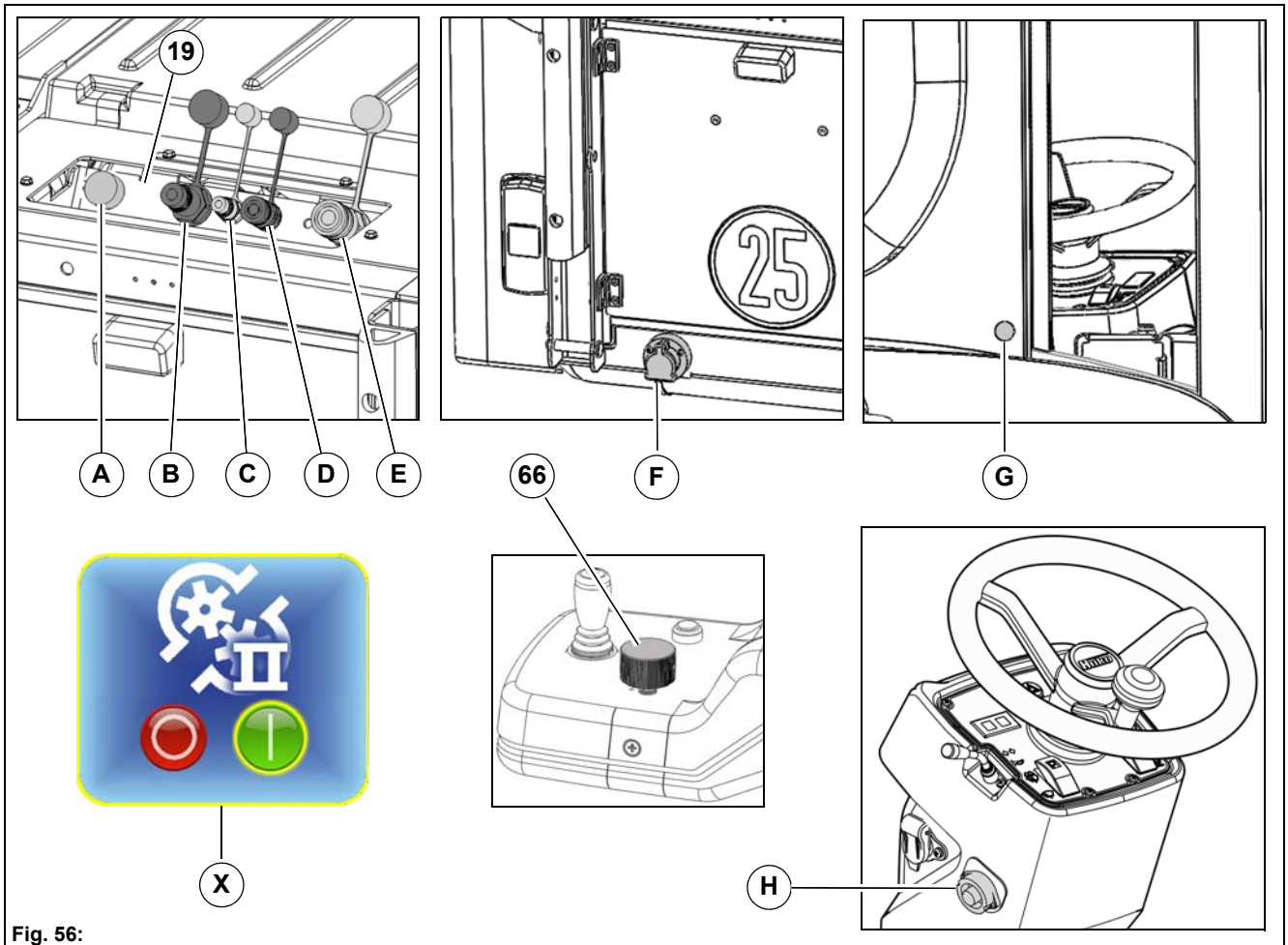




Fig. 56:

3 Operation

3.1 Instruction

Instruction is required before the first start-up.
 The first-time instruction of the Citymaster 600 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


	<p>Danger</p> <ul style="list-style-type: none"> • 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.
	<p>Warning</p> <ul style="list-style-type: none"> • 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.

3.2.1 Check-list – Before start-up of the vehicle

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

Checking the locking shackle

Before start-up, loosen the locking shackle on the articulated joint **Fig. 57-A** from the locking bolt and bring it into the working position. The vehicle cannot be steered with the locking shackle engaged!

	<p>Danger Staying in the danger area (e.g. in the area of the articulated steering or when coupling attachments and trailers) is not permitted. There is danger to life!</p>
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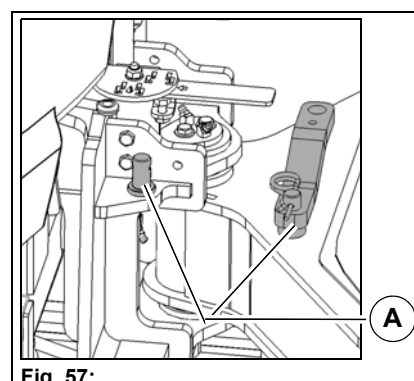



Fig. 57:

Checking the fuel supply

The current fuel supply is shown in the multifunctional display. Refuel as required.

To do this, open the cap **Fig. 58-A**. Filling volume, see Technical data on page 86.

If the warning symbol **Fig. 58-B** appears, then refuel without delay.

	<p>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.</p>
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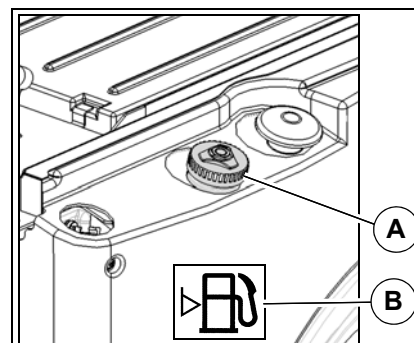



Fig. 58:

Checking the engine oil level

Check the engine oil level with the dip stick **Fig. 59-A**. Refill with engine oil if required. To do this, open the cap **Fig. 59-B**. Filling volume, see Technical data on page 86.

If the warning symbol **Fig. 59-C** appears, there is a risk of engine damage. Immediately switch the engine off and check the engine oil level.

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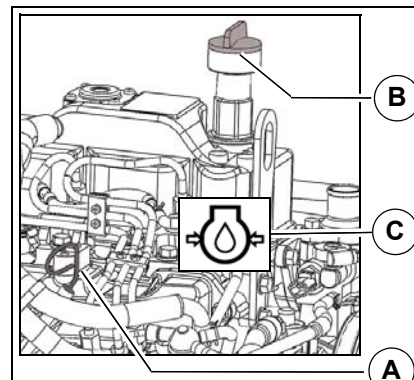


Fig. 59:

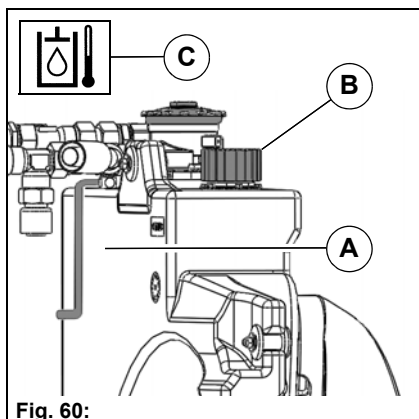


Fig. 60:

Checking the hydraulic oil level

Check the hydraulic oil level with the level indicator **Fig. 60-A**, if necessary top up hydraulic oil. To do this, open the cap **Fig. 60-B**. Filling volume, see Technical data on page 86.

If the warning symbol **Fig. 60-C** appears, there is a risk of operating failure of the hydraulic system. Immediately switch the engine off and check the hydraulic oil level.

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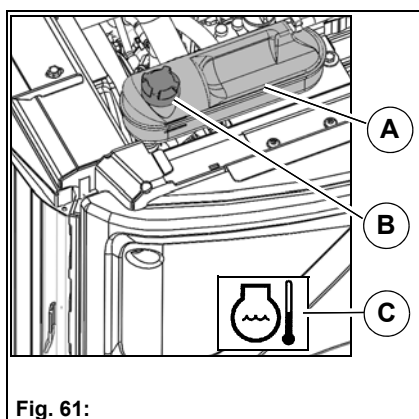


Fig. 61:

Checking the coolant level

Check the coolant level at the coolant tank **Fig. 61-A**, if necessary top up with coolant. To do this, open the cap **Fig. 61-B**. Filling volume, see Technical data on page 86.

If the warning symbol **Fig. 61-C** appears, there is a risk of engine damage. Immediately switch the engine off and check the coolant level.

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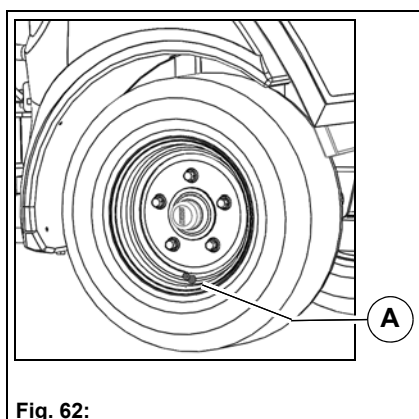


Fig. 62:

Checking the tyre pressure

Remove the valve cap **Fig. 62-A** and adjust the tyre pressure with a compressed air unit, see Technical data on page 86.

Checking the windscreen washer system

Fill the windscreen washer system tank **Fig. 63-32**. Filling volume, see Technical data on page 86.

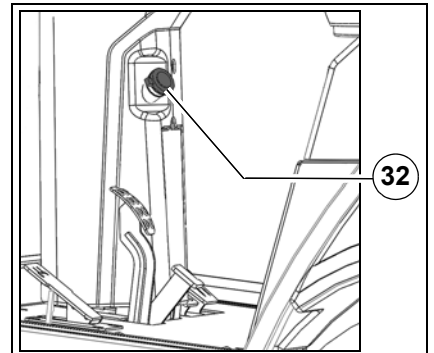


Fig. 63:

Checking the outside mirrors

Adjust the outside mirrors **Fig. 64-5**. Adjust the outside mirrors so that the roadway and the rear work area are completely visible.

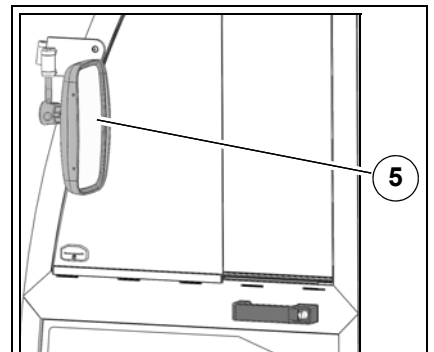


Fig. 64:

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.

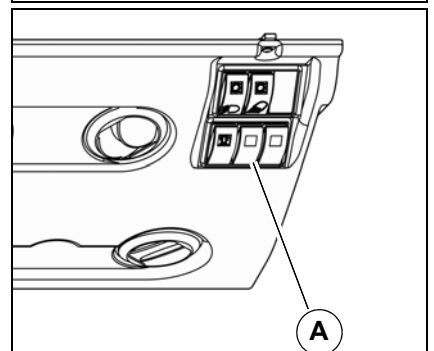


Fig. 65:

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!

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.
- 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. 78-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.

3.3.1 Starting and driving the vehicle

No.	Description	Reference
1	Accelerator pedal in zero position	Page 73
2	Engaging parking brake	Page 73
3	Starting engine and releasing parking brake	Page 74
4	Starting transport mode	Page 74
5	Activating work mode	Page 75
6	Setting engine fixed speed for attachments/options	Page 75
7	Activating front tool carrier	Page 75

Accelerator pedal in zero position

The accelerator pedals **Fig. 66-34** and **Fig. 66-35** must be in the zero position to start the engine.

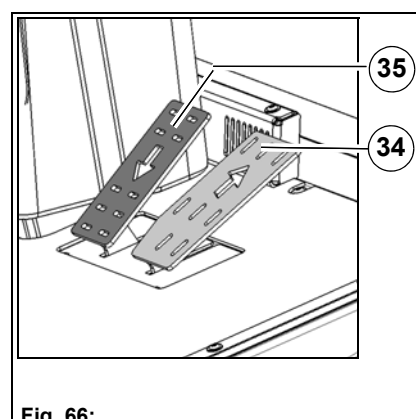


Fig. 66:

Engaging parking brake

The parking brake **Fig. 67-43** stops the vehicle from rolling away. First press the brake pedal **Fig. 67-44** and then the parking brake with your foot. The parking brake is locked. The parking brake warning symbol **Fig. 67-A** appears in the multifunctional display.

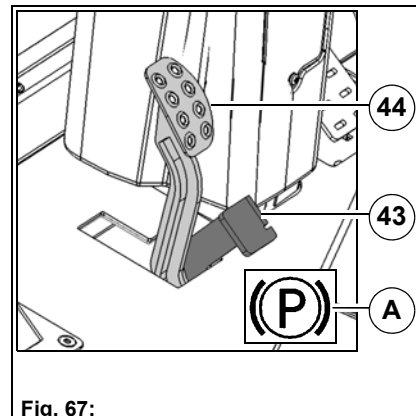


Fig. 67:

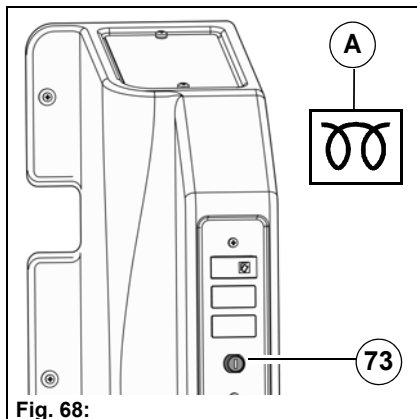


Fig. 68:

Starting the engine

Start the engine with the ignition switch **Fig. 68-73**.

- Position 1: Preheat the engine until the control light **Fig. 68-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 54.

Releasing the parking brake

Press the brake pedal **Fig. 67-44** without operating the parking brake **Fig. 67-43**.

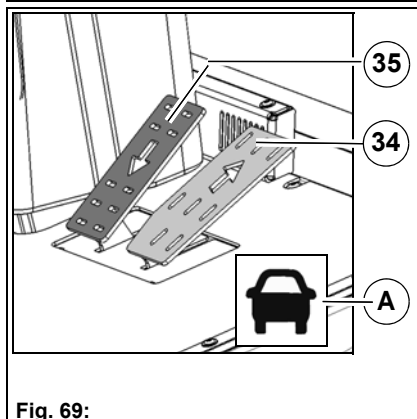


Fig. 69:

Starting transport mode

Slowly press down the accelerator pedal **Fig. 69-34** or **Fig. 69-35** for the required direction and speed. The vehicle moves away. Engine speed in transport mode = 1100 to 2630 rpm. The corresponding engine speed and the transport mode information symbol **Fig. 69-A** appear in the multifunctional display.

The speed in the transport mode is 0 to 25 km/h.

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

Activating work mode

Use the Hako button **Fig. 70-68** 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. 70-A** appears in the multifunctional display.

The driving speed in the work mode is 0 to 25 km/h.

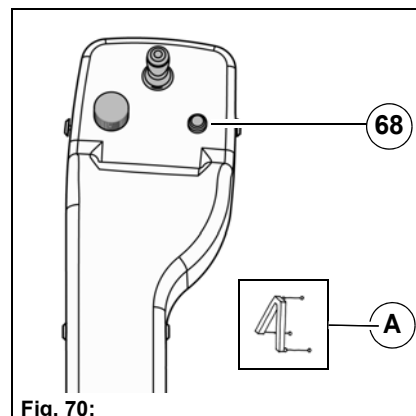


Fig. 70:

Setting engine fixed speed for attachments/options

The engine speed for attachments or options is set with the switch **Fig. 71-A** Set the speed corresponding to the requirements.

Stage	Rpm	Front attachment device: l/min	Rear attachment device: l/min
1-ECO	1900	25	19
2-Standard	2250	29	22
2-Maximum	2630	35	27

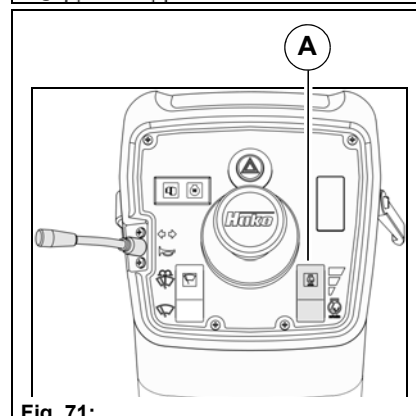


Fig. 71:

Activating the front tool carrier

The front tool carrier is activated with the joystick **Fig. 72-A**. The following functions are possible for a vehicle without attachment:

- Raising front tool carrier
- Lowering front tool carrier (floating position)

The function of the joystick with an attachment is described in chapter 6. Raising the front tool carrier is interrupted if the driver leaves the driver's seat.

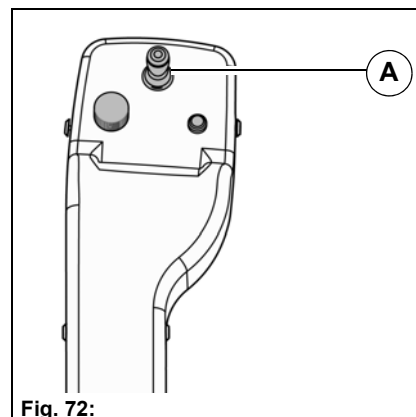


Fig. 72:

3.3.2 Troubleshooting

The engine does not start, the starter works audibly.	Remedy
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: Notify 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: Notify 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: Notify 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 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 600 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

	<p>Warning</p> <ul style="list-style-type: none"> • 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. <p>Warning</p> <ul style="list-style-type: none"> • 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 strap on the articulated joint. Note that the steering is then blocked! <p>Attention</p> <ul style="list-style-type: none"> • The towing speed may be at most 2 km/h, the towing time at most 30 minutes and the towing distance at most 1 km!
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3.5.1 Transporting the vehicle

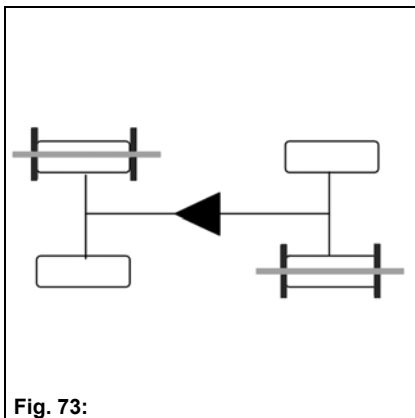


Fig. 73:

Securing the vehicle

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

3.5.2 Towing the vehicle

Opening the bypass valve

The wheels are blocked when the vehicle is at a standstill. Should it be necessary for you to tow or move the vehicle, you must open the bypass valve **Fig. 74-A**.

- Bypass valve lever in position **B** = valve closed
- Bypass valve lever in position **C** = valve opened

Towing eye

The towing eye **Fig. 74-D** is located in the rear wagon and must be fitted to the front tool carrier **Fig. 74-12**.

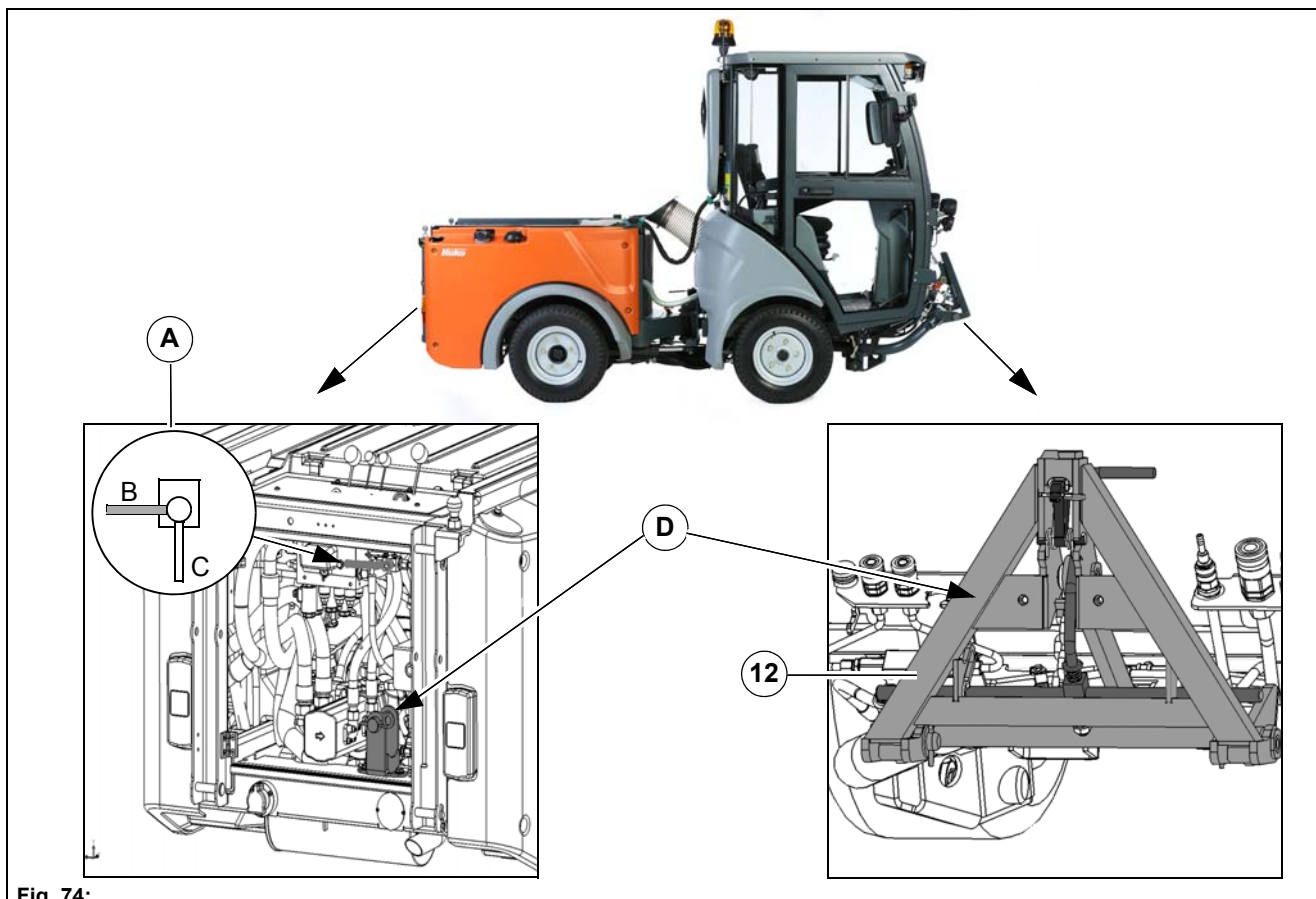


Fig. 74:


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 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 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).

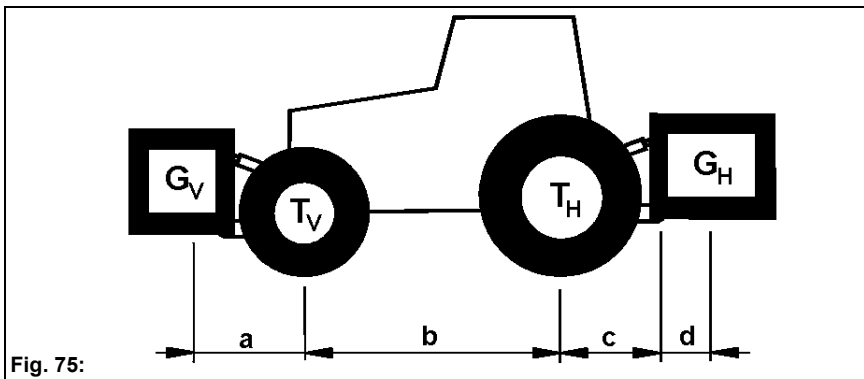
3.6.1 Ballast

	<p>Danger</p> <ul style="list-style-type: none"> • Risk of accident! When attaching other devices 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 21 % of the empty weight and the rear axle with at least 42 % 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! <p>Warning</p> <ul style="list-style-type: none"> • 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:

	<p>Note</p> <p>All weight data in (kg) All dimensions in (m)</p>
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- T_L (kg) = empty weight of the vehicle (1)
- T_V (kg) = front axle load of the empty vehicle (1)
- T_H (kg) = rear axle load of the empty vehicle (1)
- G_H (kg) = total weight of rear attachment/rear ballast (2)
- 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. = 1.565 m (2 and 3)
At maximum front ballast 180 kg.
- b (m) = vehicle wheelbase (1 and 3)
- c (m) = 0.796 m
- d (m) = distance between middle of attachment-side fixing point and centre of gravity of rear attachment/rear ballast max. 0.175 m (2 and 3)
At maximum rear ballast 400 kg.

1. See Citymaster 600 technical data.
2. See price list and/or operating manual of the attachment
3. Measure.

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 $T_{V \text{tat}}$

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!

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

Enter the calculated actual front axle load and the permissible front axle load stated in the operating instructions 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!)

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

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

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

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.

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

Ballast table

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

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

The following accessories are available for ballast:

Accessory	Type
Front weight holder for max. 9 ballast weights	344000
Rear weight holder for max. 6 ballast weights	344110
Ballast weight 17 kg	343900

4 Technical Data

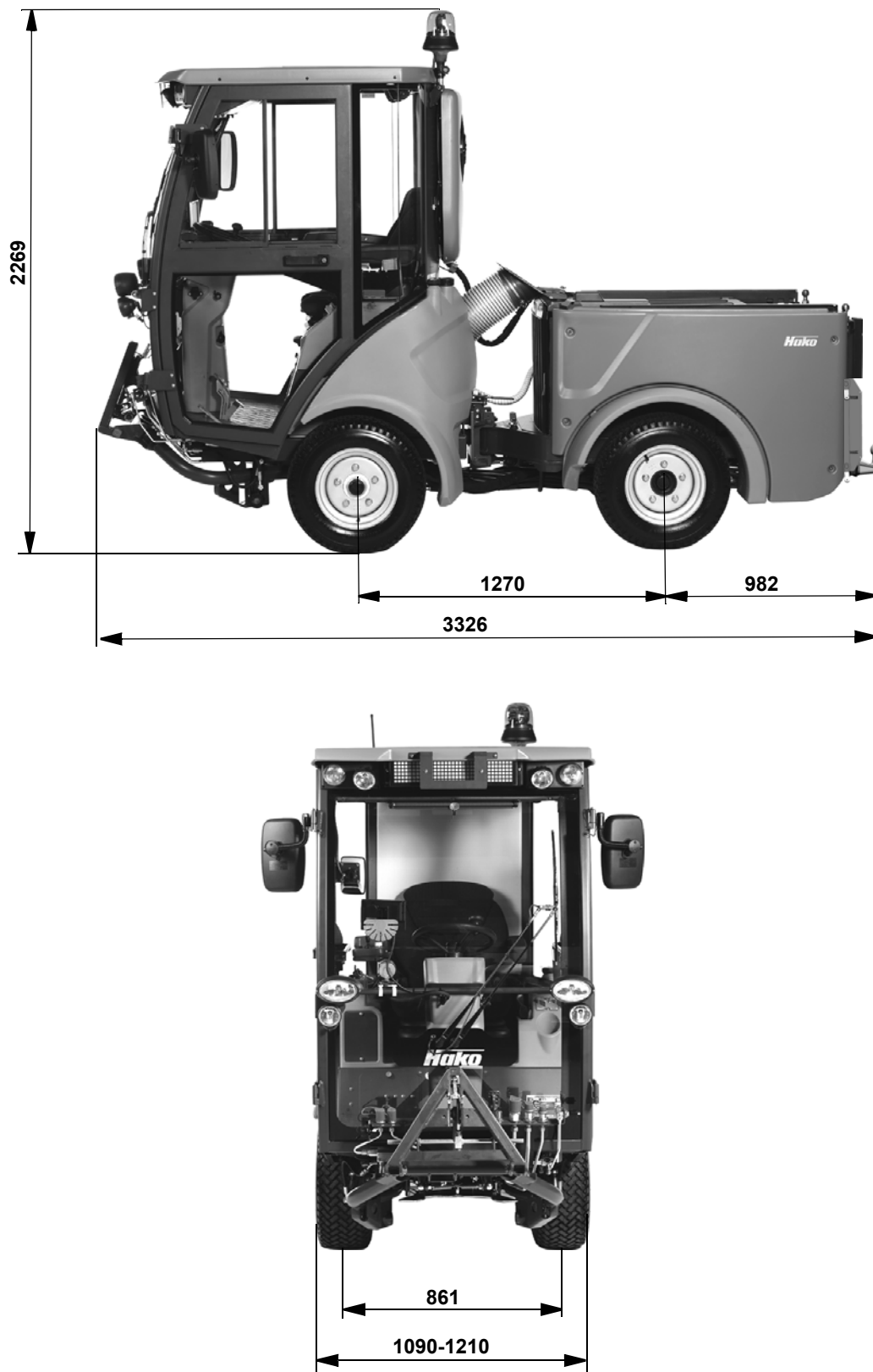


Fig. 76:

Dimensions

Name	Unit	
Length	mm	3326
Width (according to tyres)	mm	1090-1210
Height	mm	2269
Wheelbase	mm	1270
Tread width	mm	861
Turning circle (DIN EN 15429-1)	mm	4071

Weights and loads

Name	Unit	
Empty weight	kg	1380
Permissible total weight	kg	2200
Permissible total combination weight unbraked	kg	2700
Permissible total combination weight braked	kg	3950
Permissible front axle load	kg	1200
Permissible rear axle load	kg	1500
Permissible supporting load in the coupling point of the jaw coupling	kg	150
Permissible supporting load in the coupling point of the ball head coupling	kg	150

Driving speeds and inclination values

Name	Unit	
Transport mode/work mode forwards	km/h	25
Transport mode/work mode reverse	km/h	10
Gradability basic machine in work mode (forwards/reverse)	%	25
Gradability trailer operation at permissible total combination load braked (forwards/reverse)	%	15

Noise emission values - basic vehicle

Noise emission values – basic vehicle Driving noise according to 2009/63/EC Annex VI at 2630 rpm is:	78 dB(A)
Standing noise according to 2009/63/EC Annex VI at 2630 rpm is:	80 dB(A)
Noise at driver's ear according to 2009/76/EC Annex I is:	80 dB(A)

Oscillation 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/s ²
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Technical Data

Engine

Manufacturer		Yanmar
Type		3TNV88-ZMHW
Number of cylinders		3
Displacement	cm ³	1642
Power	kW	24.2
Speed	rpm	2600
Torque	Nm	104.8
Engine oil volume	litre	6.5
Cooling water volume	litre	7.5

Fuel system

Fuel		Diesel
Tank volume	litre	41

Hydraulic system

Hydraulic oil		HVLP 46
Tank volume	litre	35

Tyre pressure

Standard tyres: Trelleborg 23x8.5-12TT 10PR T539 (front/rear)	bar	1.9/2.7
Wide tyres: Optional Trelleborg 23x10.5-12TL 16PR T539 (front/rear)	bar	1.5/2.0

Electrical system

Starter		Yanmar DC12V
Nominal voltage	Volt	12
Generator		Iskra AAK4301

Windscreen washer system

Tank volume	litre	2.0
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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 workshop. 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

5.1 Maintenance certificate

<p>Handover</p> <p>Equipment Trial run Handover to customer Instruction performed on: at _____ operating hours</p>	<p>Hako system maintenance 50 operating hours once Workshop stamp</p> <p>performed on: at _____ operating hours</p>	<p>Hako system maintenance I 250 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>	<p>Hako system maintenance II 500 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>
<p>Hako system maintenance I 750 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>	<p>Hako system maintenance III/S 1000 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>	<p>Hako system maintenance I 1250 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>	<p>Hako system maintenance II 1500 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>
<p>Hako system maintenance I 1750 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>	<p>Hako system maintenance III/S 2000 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>	<p>Hako system maintenance I 2250 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>	<p>Hako system maintenance II 2500 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>
<p>Hako system maintenance I 2750 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>	<p>Hako system maintenance III/S 3000 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>	<p>Hako system maintenance I 3250 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>	<p>Hako system maintenance II 3500 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>
<p>Hako system maintenance I 3750 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>	<p>Hako system maintenance III/S 4000 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>	<p>Hako system maintenance I 4250 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>	<p>Hako system maintenance II 4500 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>
<p>Hako system maintenance I 4750 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>	<p>Hako system maintenance III/S 5000 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>	<p>Hako system maintenance I 5250 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>	<p>Hako system maintenance II 5500 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>
<p>Hako system maintenance I 5750 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>	<p>Hako system maintenance III/S 6000 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>	<p>Hako system maintenance I 6250 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>	<p>Hako system maintenance II 6500 operating hours Workshop stamp</p> <p>performed on: at _____ operating hours</p>

5.2 Maintenance plan

Work to be performed by the customer by reference to the servicing and maintenance instructions specified in the operating manual (daily or weekly). The driver/operator is instructed fully on delivery of the vehicle.

**Hako system maintenance
Customer**

Activity / interval
Daily
• Vehicle cleaning as required
• Checking and if necessary refilling engine oil level
• Checking and if necessary refilling coolant level in coolant tank
• Checking fuel supply, refuelling if required
• Checking maintenance indicator of the air filter, cleaning filter elements if necessary
• Checking and if necessary cleaning the engine radiator
• Checking and if necessary refilling the windscreen washing agent level
Weekly
• Vehicle cleaning as required
• Checking and if necessary cleaning the engine radiator
• Checking and if necessary refilling the windscreen washing agent level
• Emptying the water trap of the fuel system
• Lubricating according to lubrication plan
• Checking and if necessary refilling the hydraulic oil level
• Checking the lighting system
• Checking the air pressure of the tyres
• Trial run with braking test

Maintenance and Servicing

Hako system maintenance
Once after 50 operating hours

Applies for vehicle with internal combustion engine drive, 1st oil change, filter, etc. Performance by an expert of an authorised Hako workshop.

Activity / interval
Once after 50 operating hours
Engine <ul style="list-style-type: none"> • Changing engine oil • Changing engine oil filter • Changing fuel filter • Emptying the water trap of the fuel system • Checking ECO, standard and maximum speed • Checking generator and air conditioning system V-belt • Checking radiator and coolant hoses • Checking combination radiator and radiator grille for dirt, cleaning with compressed air if necessary
Brakes <ul style="list-style-type: none"> • Checking and if necessary readjusting the parking brake • Checking the Bowden cable of the parking brake for abrasion points
Wheels <ul style="list-style-type: none"> • Checking wheel bolts for seating (also after wheel change) • Checking the tyre pressure
Hydraulics <ul style="list-style-type: none"> • Changing the return filter • Checking and if necessary refilling the hydraulic oil level • Checking function and tightness
Steering <ul style="list-style-type: none"> • Checking function and ease of movement • Checking steering cylinder for play
Bowden cable <ul style="list-style-type: none"> • Checking function, ease of movement and zero point
Electrical system <ul style="list-style-type: none"> • Checking horn, lighting and working functions • Checking cabling for abrasion points and damage • Checking battery charge condition, cleaning and greasing battery poles
Cab <ul style="list-style-type: none"> • Cleaning the cab air filter • Checking heating for function • Checking air conditioning system for function • Checking window washing agent
Lubrication service (see section 5.12) <ul style="list-style-type: none"> • Door hinges (4x) • Front lifting cylinder (4x) and front lift system (2x) • Coarse material flap (1x) • Articulated joint (4x) • Steering cylinder (1x)
Miscellaneous <ul style="list-style-type: none"> • Checking optical condition • Trial run • Cleaning vehicle if required

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

Hako system maintenance I
Every 250 operating hours

Activity / interval
Every 250 operating hours
<p>Engine</p> <ul style="list-style-type: none"> • Changing engine oil, changing engine oil filter • Emptying the water trap of the fuel system • Checking generator and air conditioning system V-belt • Checking radiator and coolant hoses • Checking combination radiator and radiator grille for dirt, cleaning with compressed air if necessary
<p>Brakes</p> <ul style="list-style-type: none"> • Checking and if necessary readjusting the parking brake • Checking the Bowden cable of the parking brake for abrasion points
<p>Wheels</p> <ul style="list-style-type: none"> • Checking wheel bolts for seating (also after wheel change) • Checking the tyre pressure
<p>Hydraulics</p> <ul style="list-style-type: none"> • Checking oil level, checking function and tightness
<p>Accelerator pedal</p> <ul style="list-style-type: none"> • Checking zero position and mobility
<p>Steering</p> <ul style="list-style-type: none"> • Checking function and ease of movement • Checking steering cylinder for play
<p>Bowden cable</p> <ul style="list-style-type: none"> • Checking function, ease of movement and zero point
<p>Electrical system</p> <ul style="list-style-type: none"> • Checking horn, lighting and working functions • Checking cabling for abrasion points and damage • Checking battery charge condition, cleaning and greasing battery poles
<p>Cab</p> <ul style="list-style-type: none"> • Cleaning the cab air filter • Checking heating for function • Checking air conditioning system for function • Checking the condenser of the air conditioning system for contamination, cleaning with compressed air if necessary • Checking window washing agent
<p>Lubrication service (see section 5.12)</p> <ul style="list-style-type: none"> • Door hinges (4x) • Front lifting cylinder (4x) and front lift system (2x) • Coarse material flap (1x) • Articulated joint (4x) • Steering cylinder (1x)
<p>Miscellaneous</p> <ul style="list-style-type: none"> • Checking optical condition • Trial run • Cleaning vehicle if required

Hako system maintenance II
Every 500 operating hours

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

Activity / interval
Every 500 operating hours
Engine <ul style="list-style-type: none"> • Changing engine oil, changing engine oil filter • Changing filter insert of the air filter • Changing fuel filter and emptying the water trap of the fuel system • Checking generator and air conditioning system V-belt • Checking radiator and coolant hoses • Checking combination radiator and radiator grille for dirt, cleaning with compressed air if necessary
Hydraulics <ul style="list-style-type: none"> • Checking oil level, checking function and tightness
Steering <ul style="list-style-type: none"> • Checking function and ease of movement • Checking steering cylinder for play
Electrical system <ul style="list-style-type: none"> • Checking horn, lighting and working functions • Checking cabling for abrasion points and damage • Checking battery charge condition, cleaning and greasing battery poles
Cab <ul style="list-style-type: none"> • Cleaning the cab air filter • Checking heating for function • Checking air conditioning system for function • Checking window washing agent • Checking the zero position and mobility of the accelerator pedal
Brakes and wheels <ul style="list-style-type: none"> • Checking and if necessary readjusting the parking brake • Checking the Bowden cable of the parking brake for abrasion points • Checking wheel bolts for seating (also after wheel change) • Checking the tyre pressure
Lubrication service (see section 5.12) <ul style="list-style-type: none"> • Door hinges (4x) • Front lifting cylinder (4x) and front lift system (2x) • Coarse material flap (1x) • Articulated joint (4x) • Steering cylinder (1x)
Miscellaneous <ul style="list-style-type: none"> • Checking optical condition • Trial run • Cleaning vehicle if required

Performance by an expert of an authorised Hako workshop by reference to the machine-specific system maintenance with spare parts kit. Performance of all legally stipulated safety-relevant tests.

**Hako system maintenance
III/S1
Every 1000 operating hours**

Activity / interval
<p>Engine</p> <ul style="list-style-type: none"> • Changing engine oil, changing engine oil filter • Changing filter insert and safety cartridge of the air filter • Changing fuel filter and emptying the water trap of the fuel system • Checking generator and air conditioning system V-belt • Checking radiator and coolant hoses. Changing the coolant, at the latest after 2 years (observe antifreeze for winter operation!) • Checking combination radiator and radiator grille for dirt, cleaning with compressed air if necessary • Checking ECO, standard and maximum speed • Checking and if necessary adjusting valve play with cold engine • Changing membrane in the valve lid of the engine ventilation
<p>Hydraulics</p> <ul style="list-style-type: none"> • Changing the return filter and venting filter • Taking and sending in sample of the hydraulic oil. Changing if contaminated too much or at the latest after 3000 operating hours • Checking oil level, checking function and tightness
<p>Steering</p> <ul style="list-style-type: none"> • Checking function and ease of movement • Checking steering cylinder for play
<p>Electrical system</p> <ul style="list-style-type: none"> • Checking horn, lighting and working functions • Checking cabling for abrasion points and damage • Checking battery charge condition, cleaning and greasing battery poles
<p>Cab</p> <ul style="list-style-type: none"> • Changing the cab air filter • Checking heating for function • Checking air conditioning system for function • Checking the air conditioning system for dirt, cleaning with compressed air if necessary • Checking window washing agent • Checking the zero position and mobility of the accelerator pedal
<p>Brakes and wheels</p> <ul style="list-style-type: none"> • Checking and if necessary readjusting the parking brake • Checking the Bowden cable for abrasion points (changing after 2000 operating hours) • Checking wheel bolts for seating (also after wheel change) • Checking the tyre pressure
<p>Lubrication service (see section 5.12)</p> <ul style="list-style-type: none"> • Door hinges (4x) • Front lifting cylinder (4x) and front lift system (2x) • Coarse material flap (1x) • Articulated joint (4x) • Steering cylinder (1x)
<p>Miscellaneous</p> <ul style="list-style-type: none"> • Checking and if necessary changing the vehicle labels • Checking all function and safety-relevant components • Trial run, certificates, inspection tag and inspection book

**Hako system maintenance
IV/S2
Every 2000 operating hours**

Performance by an expert of an authorised Hako workshop by reference to the machine-specific system maintenance with spare parts kit. Performance of all legally stipulated safety-relevant tests.

Activity / interval
<p>Engine</p> <ul style="list-style-type: none"> • Changing engine oil, changing engine oil filter • Changing filter insert of the air filter • Changing fuel filter and emptying the water trap of the fuel system • Checking generator and air conditioning system V-belt • Checking radiator and coolant hoses. Changing the coolant, at the latest after 2 years (observe antifreeze for winter operation!) • Checking combination radiator and radiator grille for dirt, cleaning with compressed air if necessary • Checking ECO, standard and maximum speed • Checking and if necessary adjusting valve play with cold engine • Changing membrane in the valve lid of the engine ventilation
<p>Hydraulics</p> <ul style="list-style-type: none"> • Changing the return filter and venting filter • Taking and sending in sample of the hydraulic oil. Changing if contaminated too much or at the latest after 3000 operating hours • Checking oil level, checking function and tightness
<p>Steering</p> <ul style="list-style-type: none"> • Checking function and ease of movement • Checking steering cylinder for play
<p>Electrical system</p> <ul style="list-style-type: none"> • Checking horn, lighting and working functions • Checking cabling for abrasion points and damage • Checking battery charge condition, cleaning and greasing battery poles
<p>Cab</p> <ul style="list-style-type: none"> • Changing the cab air filter • Checking heating for function • Checking air conditioning system for function • Checking the air conditioning system for dirt, cleaning with compressed air if necessary • Checking window washing agent • Checking the zero position and mobility of the accelerator pedal • Checking for wear and if necessary changing cab rubber buffers
<p>Bowden cable</p> <ul style="list-style-type: none"> • Changing the Bowden cable of the parking brake and the coarse material flap
<p>Brakes and wheels</p> <ul style="list-style-type: none"> • Checking and if necessary readjusting the parking brake • Checking the Bowden cable of the parking brake for abrasion points • Checking wheel bolts for seating (also after wheel change) • Checking the tyre pressure
<p>Lubrication service (see section 5.12)</p> <ul style="list-style-type: none"> • Door hinges (4x) • Front lifting cylinder (4x) and front lift system (2x) • Coarse material flap (1x) • Articulated joint (4x) • Steering cylinder (1x)
<p>Miscellaneous</p> <ul style="list-style-type: none"> • Checking and if necessary changing the vehicle labels • Checking all function and safety-relevant components • Trial run, certificates, inspection tag and inspection book

5.3 Panelling and covers



Danger

- Risk of injury! Put the attachment into service only if all protective devices are attached and in protection position.
- 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.

5.3.1 Removing the engine cover

Open the lock **Fig. 77-A** with a square key and pull the engine cover **Fig. 77-B** out in travel direction and upwards.

5.3.2 Removing side cover

Loosen the mounting screws **Fig. 77-C** and pull the side cover **Fig. 77-D** out to the side.

5.3.3 Removing radiator cover

Pull the lever **Fig. 77-E** to the front and remove the radiator cover **Fig. 77-F** to the side and front.

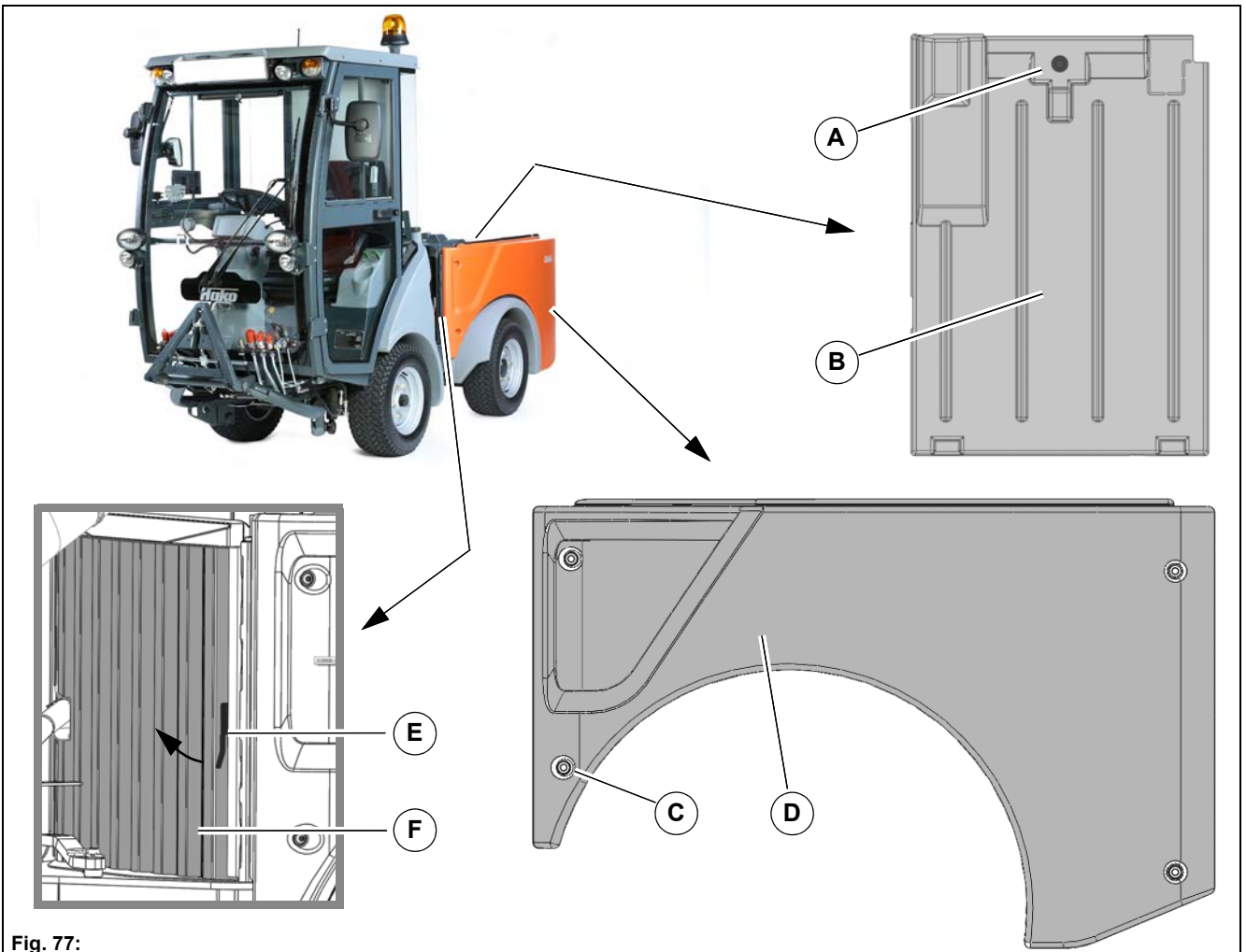



Fig. 77:

5.4 Engine

	<p>Danger</p> <ul style="list-style-type: none"> • 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. <p>Attention</p> <ul style="list-style-type: none"> • If the engine oil pressure warning symbol Fig. 78-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. <p>Environmental danger</p> <ul style="list-style-type: none"> • 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.
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5.4.1 Checking the engine oil level

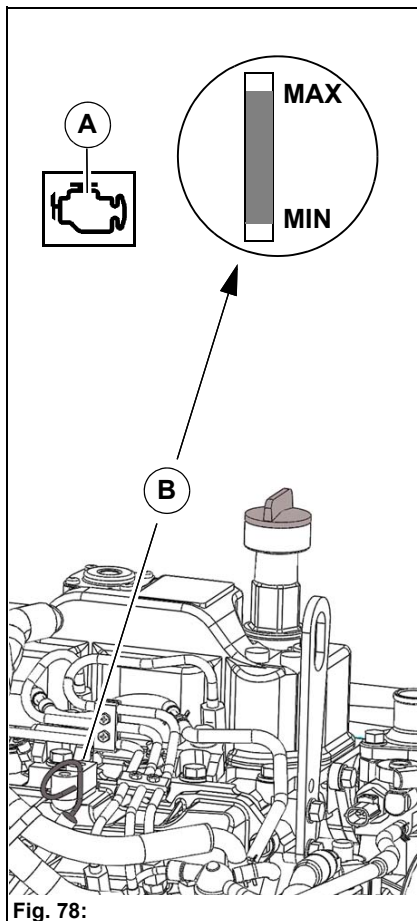




Fig. 78:

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.

	<p>Note</p> <p>The circulating engine oil requires a few minutes to flow back to the oil sump.</p>
---	---

2. Check the engine oil level with the dip stick **Fig. 78-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 (Mobil DELVAC MX 15W-40 or equivalent) as required and check the engine oil level once again.

	<p>Note</p> <p>The engine oil level must not be above the MAX mark.</p>
---	--

5. Reinsert the dip stick.

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.

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

Check the water trap **Fig. 79-A** 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. Place a suitable vessel under the water trap.
3. Open the drain screw **Fig. 79-B** and collect the condensed water.
4. Close the drain screw again.

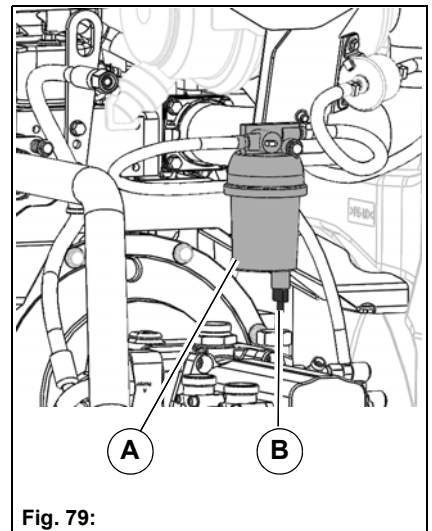

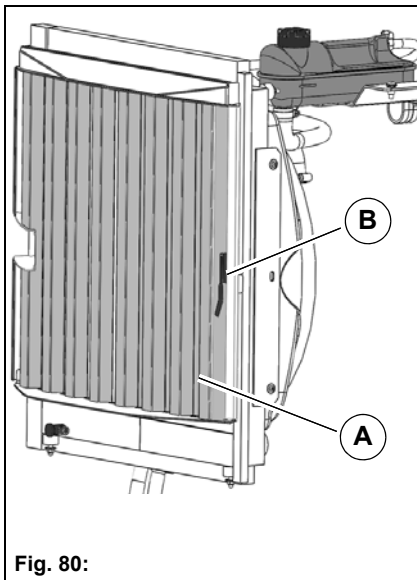


Fig. 79:

5.6 Cooling system

	Danger
	<ul style="list-style-type: none">• 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
	<ul style="list-style-type: none">• 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!
	Environmental danger
	<ul style="list-style-type: none">• 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.

5.6.1 Cleaning the cooling system



Check the grille sieve and the combination radiator located behind it 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 grille sieve **Fig. 80-A** with the catch **Fig. 80-B**.
3. Check the grille sieve and the combination radiator located behind it for contamination and clean as required with compressed air or water jet.

5.6.2 Checking the coolant level

Check the coolant level in the coolant tank **Fig. 81-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. 81-B** carefully step by step from the coolant tank.
4. Refill coolant:
Coolant: Glaceelf Auto Supra
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

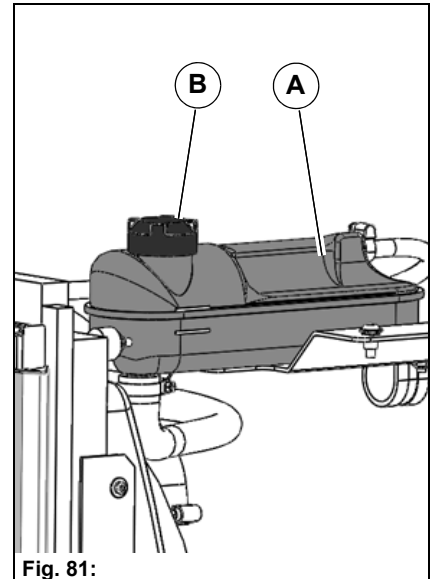



Fig. 81:

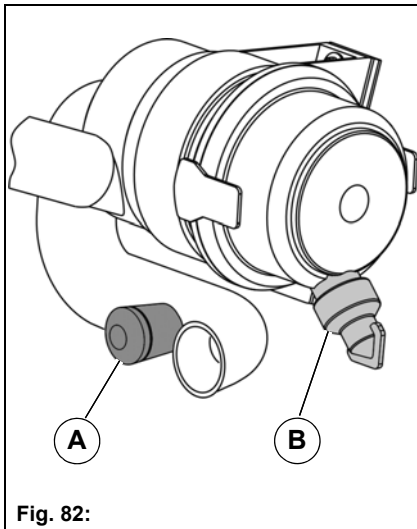
5.7 Air filter

	Danger
	<ul style="list-style-type: none">• 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
	<ul style="list-style-type: none">• 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
	<ul style="list-style-type: none">• 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 Checking the air filter

Check the contamination of the air filter daily. The maintenance indicator **Fig. 82-A** indicates the degree of contamination.

5.7.2 Cyclone separator and dust ejection valve



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. 82-B**.

5.7.3 Cleaning/changing the air filter

Check the filter insert **Fig. 83-D** corresponding to the maintenance indicator **Fig. 83-A** and clean it if 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. Open the clips **Fig. 83-B** and remove the filter lid **Fig. 83-C**.
3. Remove the filter insert **Fig. 83-D** 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.

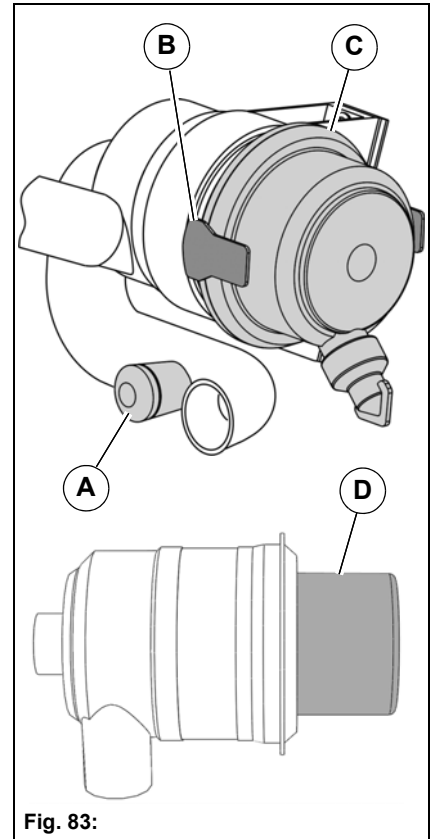


Fig. 83:

5.7.4 Changing the safety cartridge

Renew the safety cartridge **Fig. 84-A** at the latest every 1000 operating hours when changing the filter insert.

There is a safety cartridge in the centre of the filter insert. The purpose of this safety cartridge is to prevent dirt reaching the suction opening during filter cleaning or filter changing.

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 clips **Fig. 83-B** and remove the filter lid **Fig. 83-C**.
3. Remove the filter insert **Fig. 83-D**.
4. Remove and change the safety cartridge **Fig. 84-A**.

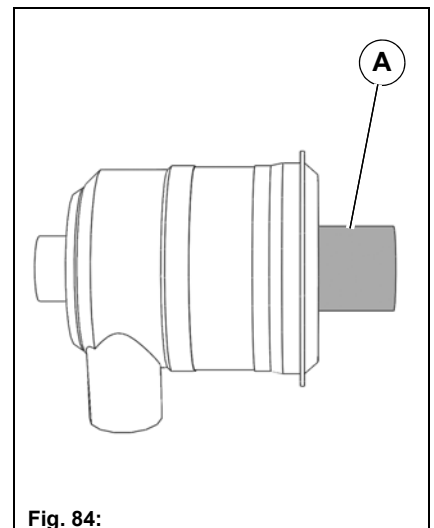




Fig. 84:

5.8 Hydraulic system

	<p>Danger</p> <ul style="list-style-type: none"> • 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. <p>Warning</p> <ul style="list-style-type: none"> • Do not touch any parts such as engine block 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. <p>Environmental danger</p> <ul style="list-style-type: none"> • 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.
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5.8.1 Important information for using BIO OIL

	<p>Attention</p> <ul style="list-style-type: none"> • Use only the BIO hydraulic fluids approved by the Hako GmbH, see Operating materials and lubricants. Use of another not recommended products 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. To prevent misunderstanding, a clear indication of the currently used oil grade is or must be affixed to the hydraulic tank in the vicinity of the filler pipe. 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.
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5.8.2 Checking the hydraulic oil level

Check the hydraulic oil level weekly at the level indicator **Fig. 85-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. 85-B** and top up with hydraulic oil.
3. The hydraulic oil level should lie between the MIN and MAX mark.
4. Refit the cap.

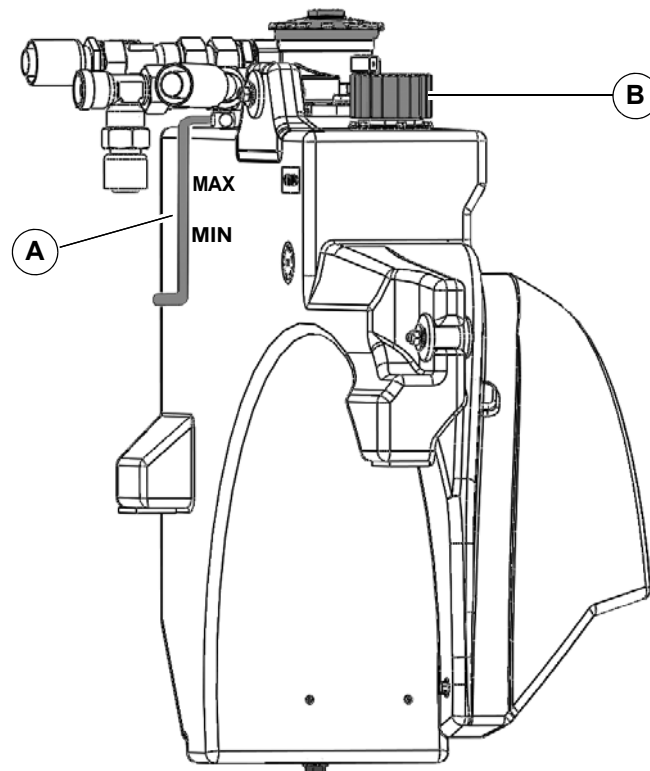


Fig. 85:

5.9 Driver's cab

5.9.1 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. 86-A** and remove the protective grille.
3. Remove and clean the cab air filter **Fig. 86-B** and renew it if necessary.

Summer operation

Insert the perforated plate **Fig. 86-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".

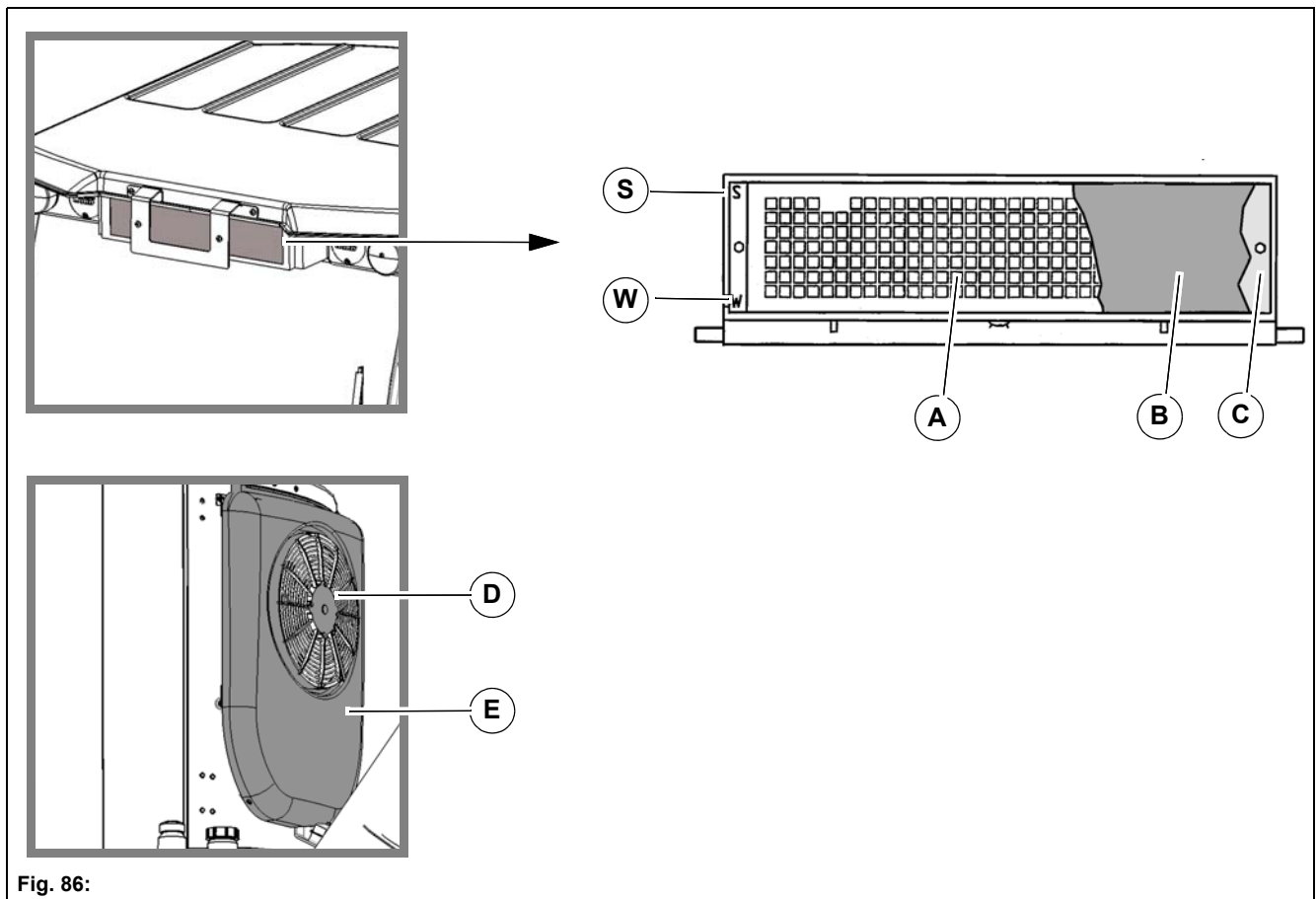


Fig. 86:


5.9.2 Checking the air conditioning system

Check the condenser **Fig. 86-D** of the air conditioning system for contamination every 250 operating hours and clean it 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 mounting screws of the cover **Fig. 86-E** above and below.
3. If required, clean the contaminated parts with a soft brush or a light water jet (do not use a high-pressure cleaner) or with compressed air. Watch out for hot parts if the system was previously switched on.

Checking the condenser

5.10 Wheels

	Danger <ul style="list-style-type: none">• Risk of accident! Repair work on tyres and rims may be undertaken only by skilled personnel or authorised workshops.
	Warning <ul style="list-style-type: none">• 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.

5.10.1 Tyre changing

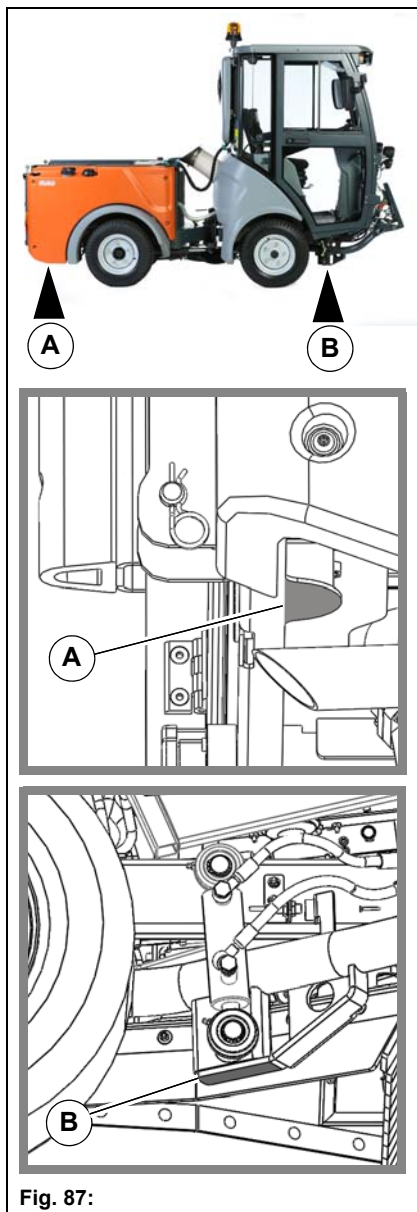


Fig. 87:

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. 87-A** or **Fig. 87-B**.
3. Raise the corresponding axle side and check the vehicle once again for stability.
4. Remove the wheel bolts and remove the wheel.

Fitting

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 permissible tightening torque is: 130 Nm
4. The wheel bolts must be tightened again as described above after approx. 50 operating hours.

5.11 Electrical system

5.11.1 Changing lamps

Beacon

Loosen the screw **Fig. 88-A** and unscrew the cover.

Beacon 12 V-55 W

Working spotlight

Pull out the plug **Fig. 88-B** of the working spotlight and turn the base counter-clockwise and pull it out.

Working spotlight: 12 V-50 W

Direction indicators with side light

Loosen the screw **Fig. 88-C** and unscrew the cover.

Direction indicator: 12 V-21 W

Side light: 12 V-5 W

Head light

Loosen the two screws **Fig. 88-D** and remove the cover.

Head light: 12 V-55 W

Direction indicator with rear light and brake light

Loosen the two screws **Fig. 88-E** and remove the cover.

Direction indicator: 12 V-21 W

Brake light: 12 V-5 W

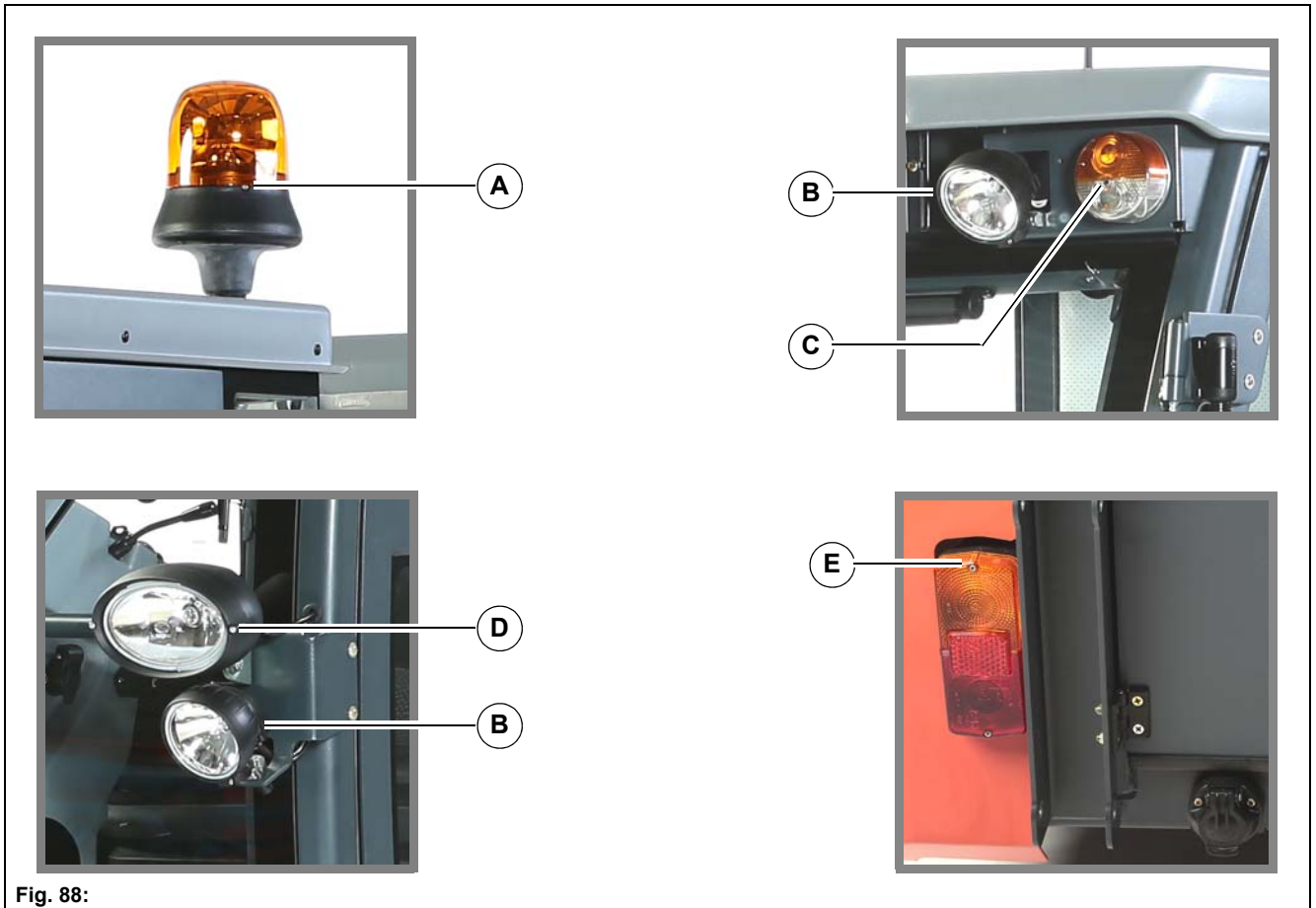


Fig. 88:

5.11.2 Fuses and relays

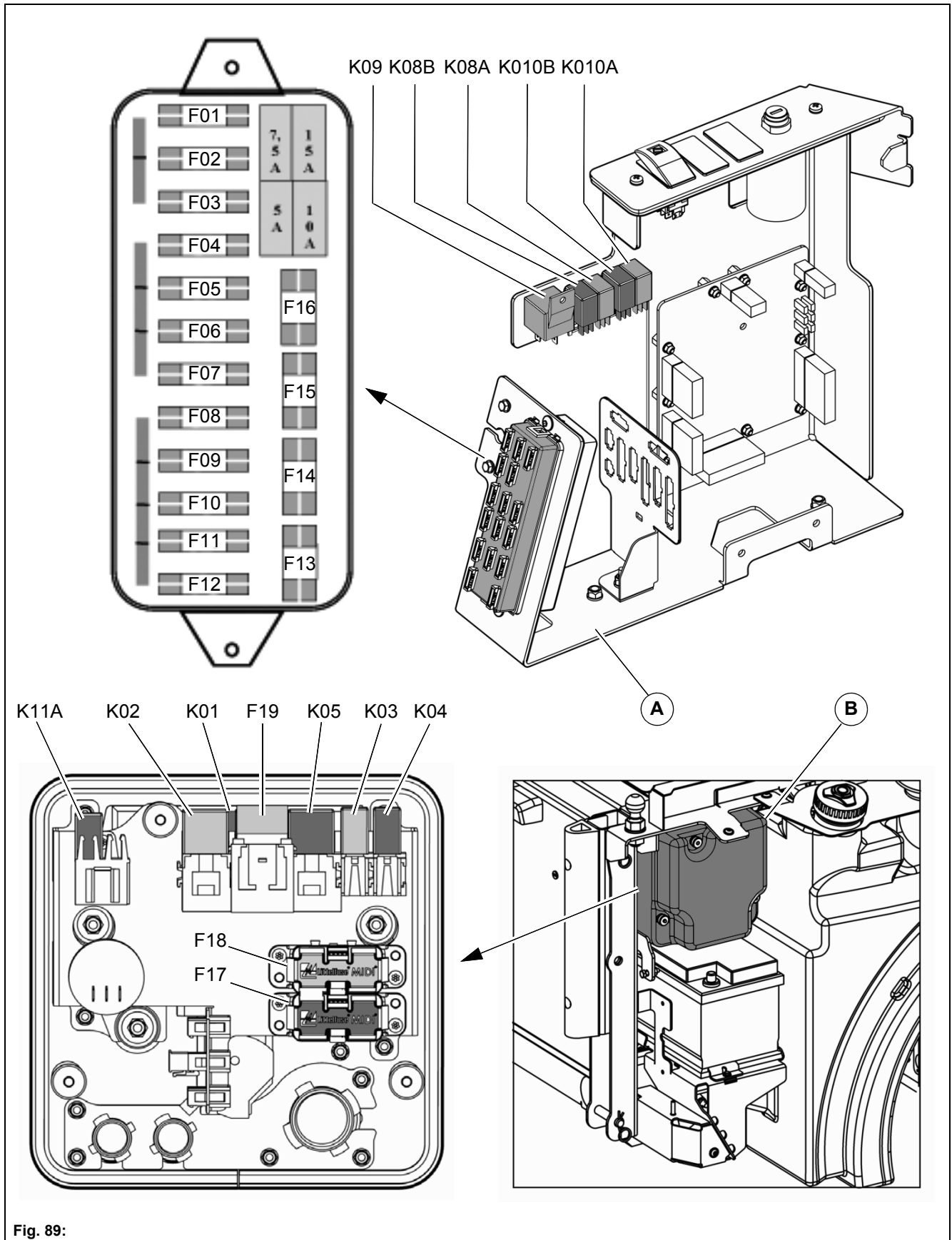



Fig. 89:

No.:	Value	Function
		Fuses – control panel on the right Fig. 89-A:
F01	15 A	Air conditioning, mirror heating, radio
F02	10 A	Relief relay for engine control, injection pump, odometer, mirror heating, engine warning lamp, fuel pump, supply terminal 75, oil pressure, generator excitation, fuel tank sensor
F03	10 A	Multifunctional display, multifunctional display programming interface, diagnosis OBD II
F04	10 A	3-pin socket, camera connection, radio
F05	5 A	Working hydraulics control unit, engine control, diagnosis OBD II, Yanmar diagnosis, multifunctional display, relief relay 1 and 2
F06	10 A	Reversing light, overload sensor, brake light, compressor, driver's seat
F07	15 A	Control unit for working hydraulics
F08	15 A	Control unit for working hydraulics, rear socket
F09	10 A	Windscreen wiper motor, screen washer pump
F10	15 A	Ventilation
F11	15 A	Working spotlight, lighting
F12	10 A	Spotlight, fog tail light relay
F13	10 A	Beacon, inside light
F14	10 A	Warning flasher, horn
F15	7.5 A	Radio lighting, tail light, left flasher
F16	7.5 A	Right flasher
		Relays – control panel on the right Fig. 89-A:
K01		Starter relay
K02		Preheat relay
K03		Motor control unit relay
K04		Injection pump relay
K05		Supply relay
K11A		Flasher relay
		Fuses – electrical box Fig. 89-B:
F17	50 A	Working spotlight, lighting
F18	50 A	Spotlight, fog tail light relay
F19	40 A	Beacon, inside light
		Relays – electrical box Fig. 89-B:
K08A		Windscreen wiper
K08B		Fog tail light
K09		Air conditioning system
K10A		Relief relay 1
K10B		Relief relay 2

5.11.3 Battery

	<p>Danger</p> <ul style="list-style-type: none"> • 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! <ul style="list-style-type: none"> • 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.
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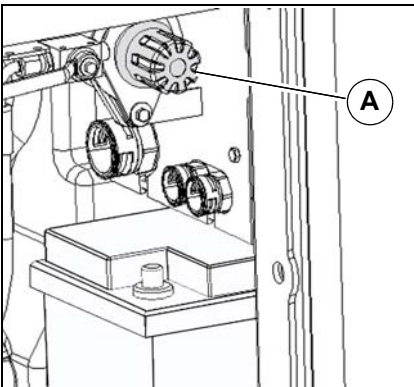


Fig. 90:

Battery isolating switch (optional)

For disconnecting the voltage supply completely (required when shipping the vehicle or during longer shutdown periods).

- Open the cover **Fig. 90-B** to switch on the voltage supply. Turn the battery isolating switch **Fig. 90-A** clockwise.
- Open the cover **Fig. 90-B** to switch off the voltage supply. Press the battery isolating switch **Fig. 90-A**.

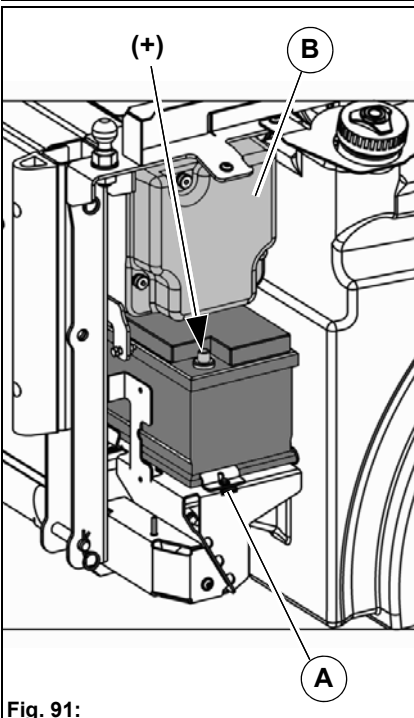


Fig. 91:

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. Remove the right side cover and loosen the battery holder **Fig. 91-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 assisting vehicle and to the Citymaster 600 at the screw **Fig. 92-A** of the vehicle frame.
5. Start the engine of the assisting vehicle.
6. Start the Citymaster 600.
7. When removing the jumper cable, first remove the minus poles (-) and then the plus poles (+).

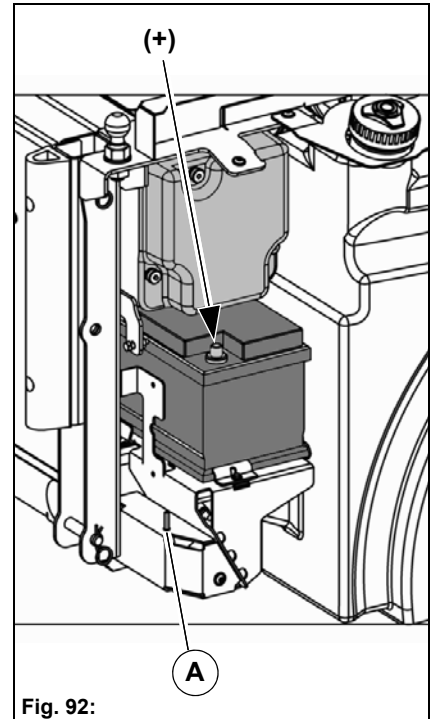
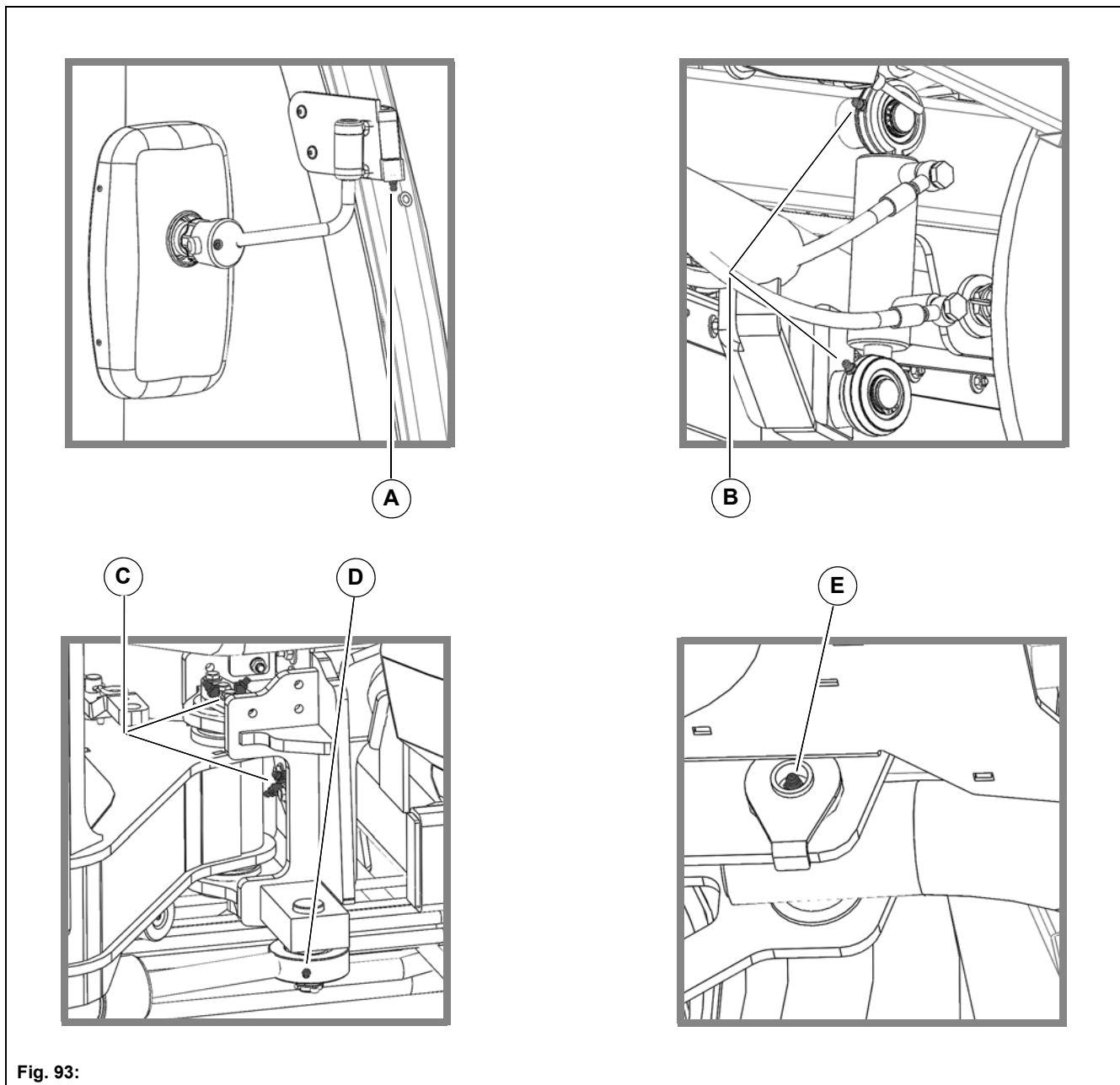


Fig. 92:

5.12 Lubrication plan

Item	Name
A	Door hinge left, right, above and below (4x)
B	Front lifting cylinder left, right, above and below (4x)
C	Articulated joint (4x)
D	Steering cylinder (2x)
E	Front lift left/right (2x)



5.13 Cleaning the vehicle



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.

Attention

- Use only dedicated washing places for cleaning the vehicle.
- 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!

5.13.1 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.
- Cover these parts and do not expose them to a direct jet: vent grilles on the rear wall of the driver's cab, venting filter of the hydraulic oil tank and lid of fuel and hydraulic oil tank etc.
- 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 cleaning agent.

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 cleaning agents. 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

	<p>Danger</p> <ul style="list-style-type: none"> • 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 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).
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Safety instructions for ballast

	<p>Danger</p> <ul style="list-style-type: none"> • Risk of accident! When attaching other devices 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 21 % of the empty weight and the rear axle with at least 42 % 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! <p>Attention</p> <ul style="list-style-type: none"> • Make sure before purchasing the attachment that these requirements are fulfilled by weighing the working machine attachment combination!
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6.1 Vacuum sweeping system



Fig. 94:

Item	Designation	Type
79	Sweeping unit rotating brush	
80	Sweeping unit suction mouth	
81	Dirt hopper	

6.1.1 Labels on the unit

Safety foil

The safety foils (red/white) **Fig. 94-A** are located on the cover of the sweeping unit and at the back of the dirt hopper.

Hako logo

The Hako logo **Fig. 94-B** is located on the cover of the sweeping unit.

Type plate

A type plate **Fig. 94-C** is located on the sweeping unit, on the dirt hopper, on the trolley and on the supports.

Label PM10

The fine dust certificate label PM10 **Fig. 94-D** is located on the dirt hopper.

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 600 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 vacuum sweeping system may be operated only in connection with the Citymaster 600. The safety regulations for the Citymaster 600 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

Mounting the suction mouth

1. Place the vehicle on a level surface and hold it with the parking brake.
 2. Position the suction mouth **Fig. 95-80** by hand or with the auxiliary tool **Fig. 95-A** centrally under the holding plate **Fig. 95-B**. If required, fix the front tool carrier with the chain **Fig. 95-H** in the upper position. Release the fixation after mounting!
 3. Push the joystick **Fig. 95-67** forwards. The holding plate is lowered onto the suction mouth.
 4. Shift the suction mouth centrally under the holding plate until the stops **Fig. 95-C** come up to the points **Fig. 95-D**.
 5. With the lever **Fig. 95-E** lock and secure the suction mouth on the counter bearing **Fig. 95-F** of the holding plate, see sketch **Fig. 95-G**.
- Dismantling is in the reverse order.



Note

If circulating water is in the dirt hopper, the circulating water must be shut off using the ball cock!
Bring the ball cock **Fig. 95-10** into position **II**.

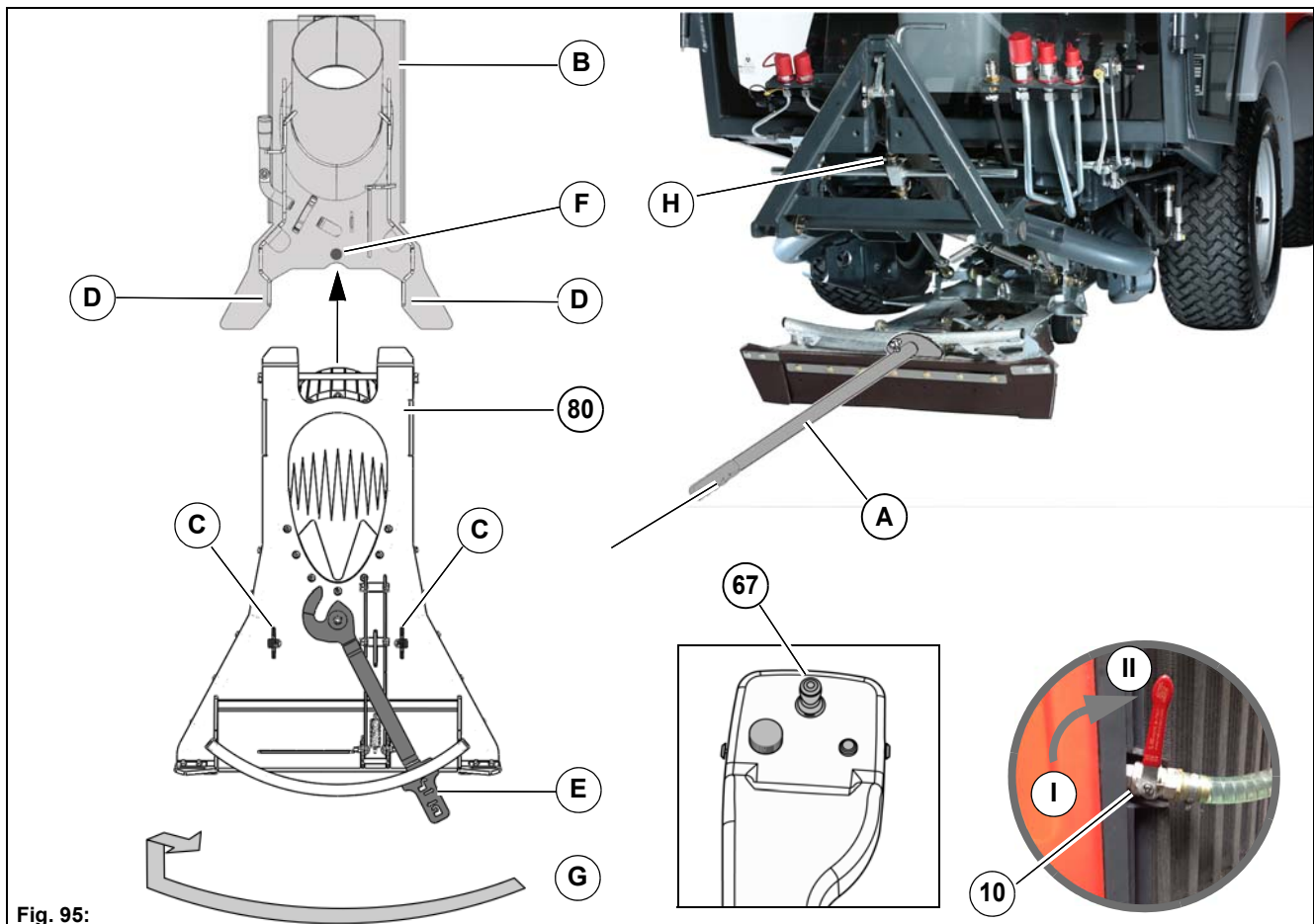
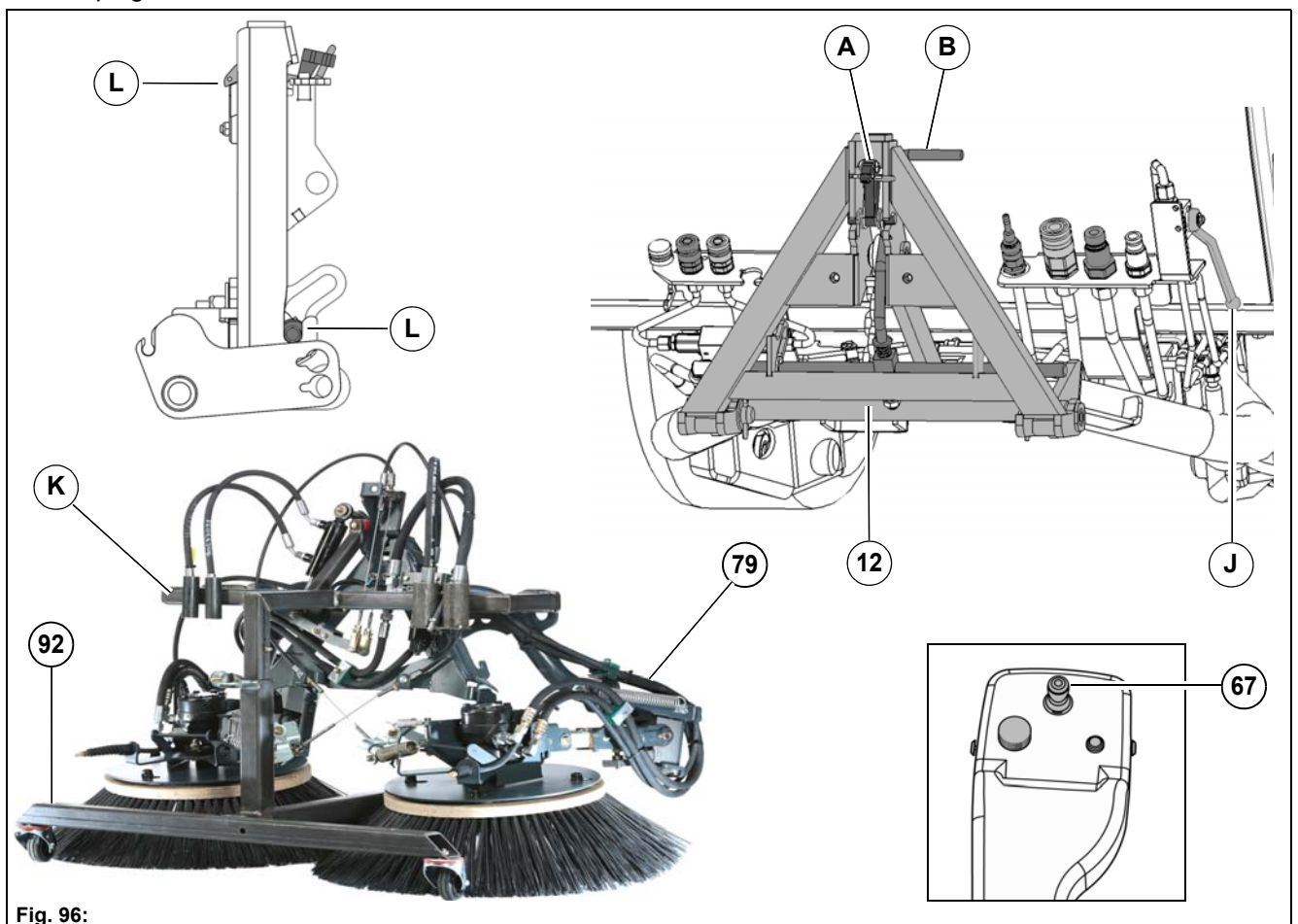


Fig. 95:

Mounting the sweeping unit

1. Place the vehicle on a level surface and hold it with the parking brake.
2. Unlock the locking hook **Fig. 96-A** and locking rod **Fig. 96-B** on the front tool carrier **Fig. 96-12**. Close the valve **Fig. 96-J** for raising the suction mouth and lower the front tool carrier.
3. With an adjustable upper link (optional), set the standard length, see page 63.
4. With the trolley **Fig. 96-92** align the sweeping unit **Fig. 96-79** centrally and in alignment with the front tool carrier.
5. Raise the front tool carrier with the joystick **Fig. 96-67** and attach the sweeping unit.
6. Lock the sweeping unit with the locking hook and locking rod. Check the backlash on the locking hook, see **Fig. 96-L**, adjust if necessary with elongated holes.
7. Open the valve **Fig. 96-J** for raising the suction mouth.
8. Push down the upper part **Fig. 96-K** of the trolley and pull it out from the sweeping unit.



Continued – Assembling the sweeping unit

9. Make the connections.

- Swivelling sweeping unit – supply/return = **Fig. 97-D/E**
- 19-pin coding plug = **Fig. 97-F**
- Fresh water connection for the spray nozzles = **Fig. 97-G**
- Sweeping unit hydraulic motors – supply/return = **Fig. 97-I/H**

10. Hook the chain **Fig. 97-M**.

Dismantling is in the reverse order.

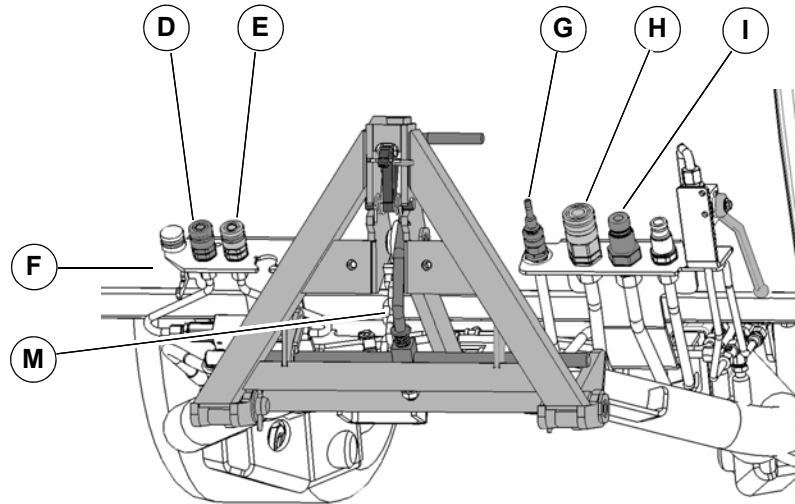


Fig. 97:

Mounting the dirt hopper

1. Place the vehicle on a level surface and hold it with the parking brake.
2. Unlock the lever **Fig. 98-A** of the trolley **Fig. 98-93** and swing it into the upper position.
3. Hold the lever **Fig. 98-A** in the upper position with one hand. With your other hand plug the mounting bolt **Fig. 98-B** on the Citymaster 600.

	<p>Danger Risk of injury! The lever Fig. 98-A can swing over.</p>
---	---

4. Unlock the sledge **Fig. 98-C** with the lever and push it into the rear position.
5. Open the lock **Fig. 98-D** of the lid **Fig. 98-E** and swing the lid downwards.

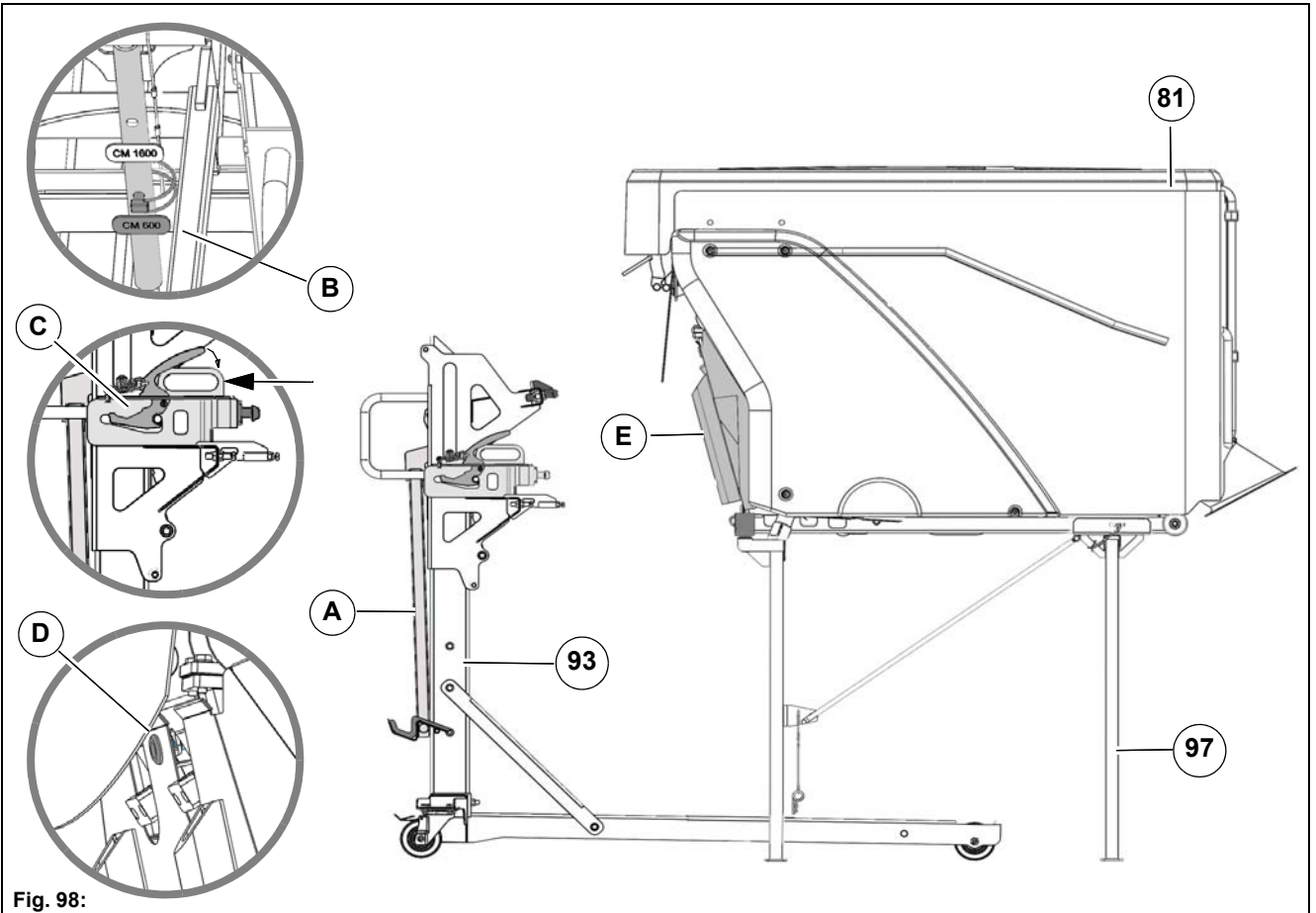


Fig. 98:

Continued – Mounting the dirt hopper



Danger

Risk of injury due to tilting over! Make sure that the cross strut **Fig. 99-G** has been inserted when transporting the dirt hopper on the supports **Fig. 99-97**. Secure the supports with bolts and splints.

6. Push the trolley with the positioning aid **Fig. 99-B** against the fixed bearings **Fig. 99-D** of the dirt hopper. The screw **Fig. 99-C** must be adjusted to 26 mm!
7. Carefully lower the lever **Fig. 99-A** of the trolley and make sure that the upper locking pins **Fig. 99-E** sit in the holders of the dirt hopper **Fig. 99-F**. Lock the lever **Fig. 99-A**.
8. Remove the supports **Fig. 99-97**. To do this, pull out the split pins and the bolts.



Note

Protect the seal of the suction mouth **Fig. 99-H** with a cover plate.

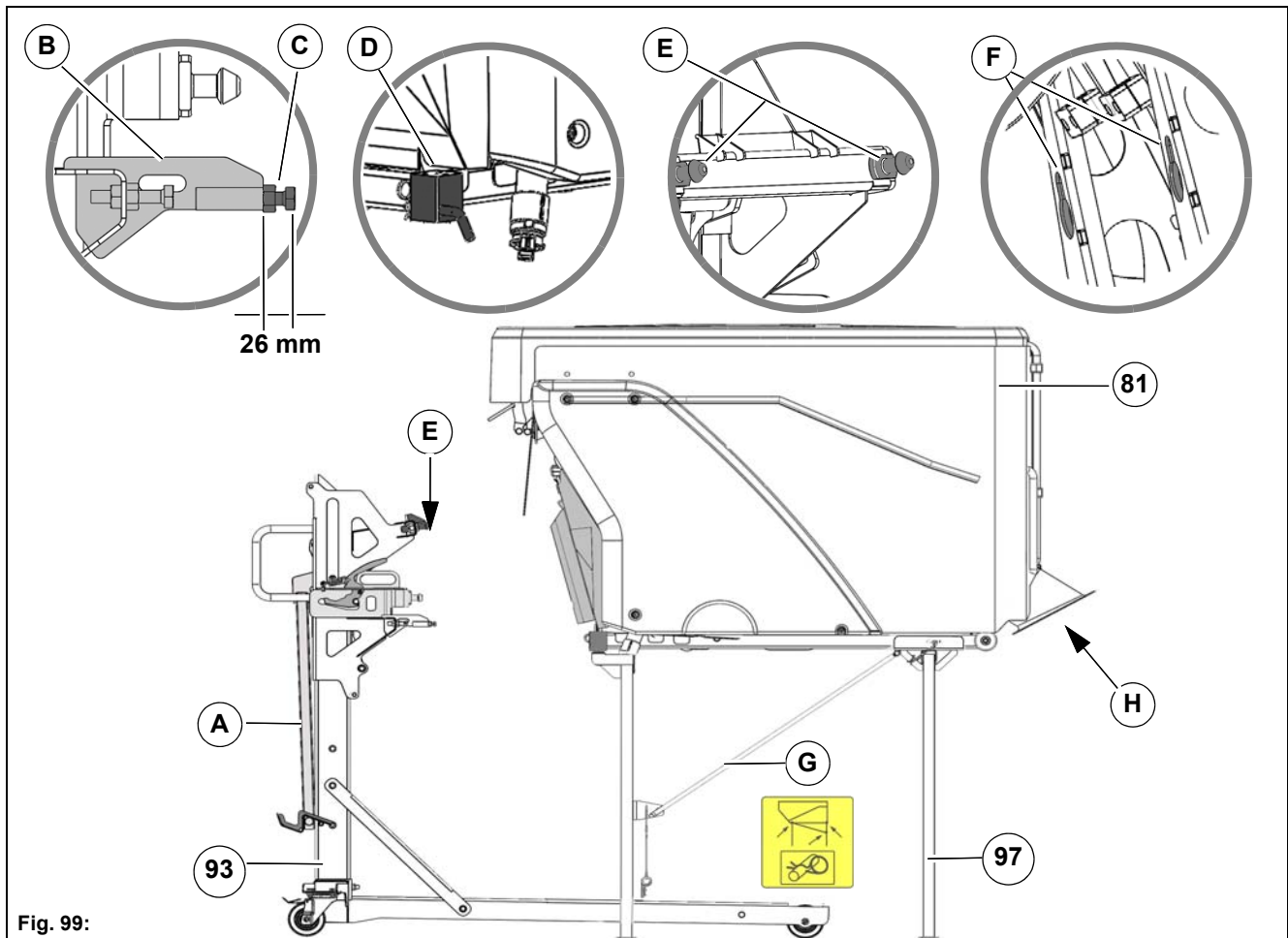


Fig. 99:

Continued – Mounting the dirt hopper

9. Align the dirt hopper to the rear wagon. Procedure:
 - Position the dirt hopper over the rear wagon and check the gap size **Fig. 100-X** with 5-10 mm. If necessary, correct with the screw **Fig. 100-A**.
 - Push the rollers of the dirt hopper up into the pockets **Fig. 100-B**.
 - The fixed bearings **Fig. 100-C** of the dirt hopper and the holders **Fig. 100-D** of the rear wagon must be in alignment.
10. Unlock the lever **Fig. 100-E** of the trolley **Fig. 100-93** 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. 100-F**
 - Suction fan hydraulic motor – supply/return = **Fig. 100-G**
 - Circulating water = **Fig. 100-H**

Dismantling is in the reverse order.

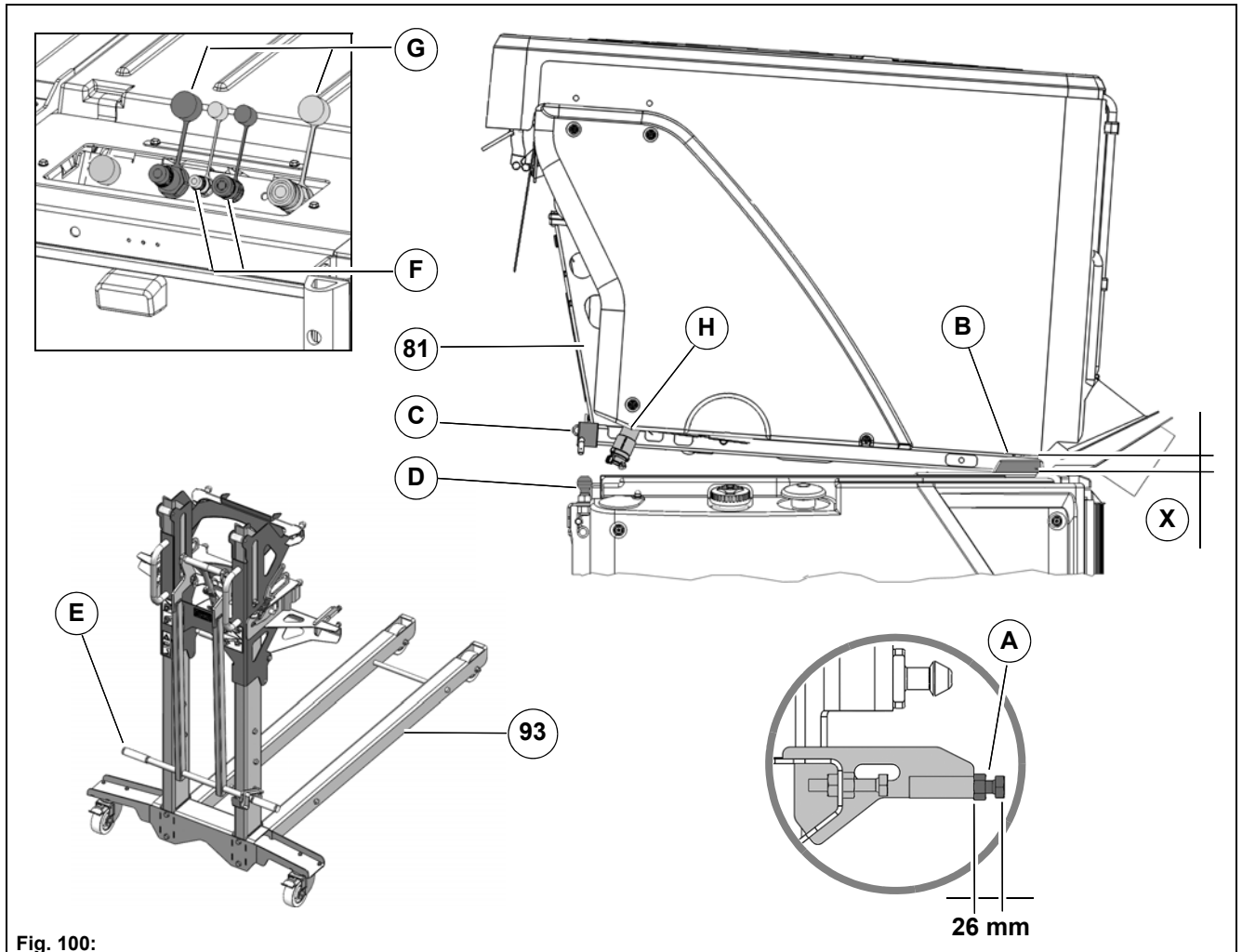


Fig. 100:

6.1.4 Operation

Check-list – Before start-up of the vehicle

No.	Description	Reference
1	All items from the check-list – Check before starting the vehicle	Page 69
2	Filling fresh water	Page 124
3	Filling circulating water	Page 124
4	Checking suction mouth lift system	Page 125
5	Checking front tool carrier	Page 125
6	Checking the ball cock circulating water	Page 127
7	Checking transport protection device	Page 125
8	Checking sweeping level	Page 142
9	Checking rotating brush pressure	Page 142
10	Checking suction mouth sealing strips	Page 143
11	Checking suction duct seal	Page 143
12	Checking lubrication points	Page 143

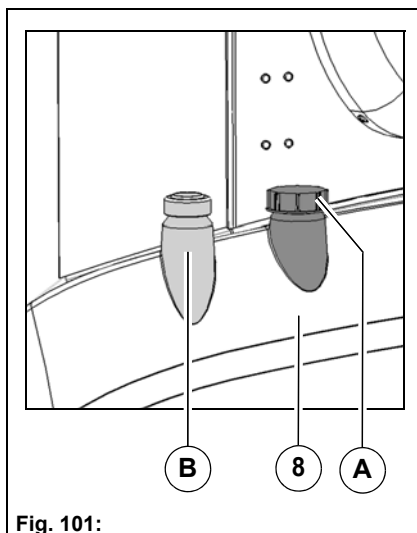



Fig. 101:

Filling fresh water

Open the cap **Fig. 101-A** and fill the fresh water tank **Fig. 101-8** until the level indicator **Fig. 101-B** 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.

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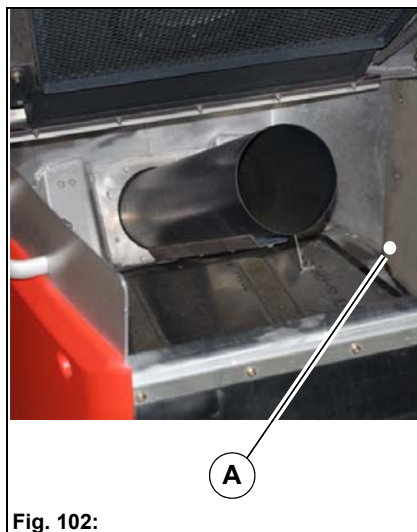



Fig. 102:

Filling circulating water


Open the lock of the dirt hopper. Fill the dirt hopper with a water hose. Filling volume for circulating water approx. 150 litres. Fill the dirt hopper up to the red mark **Fig. 102-A** at the lower mounting screw of the lateral sieve in the dirt hopper. After filling, check the function of the supply to the suction mouth.

	<p>Note In wet weather fill the dirt hopper only with approx. 100 litres of water. The vehicle sucks the remaining water off from the road when sweeping.</p>
---	--

Checking the ball cock circulating water

The circulating water is closed off only with the ball cock **Fig. 103-10** for maintenance purposes. In normal operation the ball cock must be opened!

- Circulating water supply opened: Ball cock in position **Fig. 103-I**
- Circulating water supply closed: Ball cock in position **Fig. 103-II**

	<p>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.</p>
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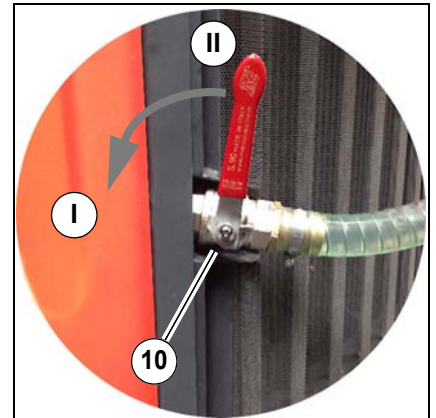


Fig. 103:

Checking suction mouth lift system

Open or close the valve **Fig. 104-A** of the suction mouth according to the attachment.

- Valve opened (position **I**) for:
 - Vacuum sweeping system (sweeping unit)
- Valve closed (position **II**) for:
 - Sweeping system (front sweeping machine)
 - Lawn mowing system (mower)
 - Snow clearing system (snow blade etc.)
 - Transport system

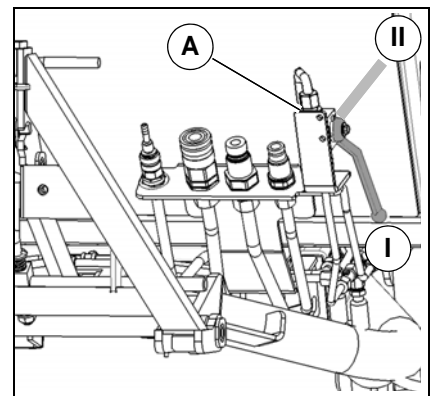


Fig. 104:

Checking the front tool carrier

The adjustment range of the front tool carrier is limited downwards with the chain **Fig. 105-A**. To do this, raise the front tool carrier with the joystick **Fig. 108-67** and hook the chain in the holder **Fig. 105-B**.

- For vacuum sweeping, hook the chain in the holder with the first link.
- For transportation, fix the front tool carrier with the chain in the topmost position.

If the chain is not required, hook it into the hook **Fig. 105-C!** (parking position)

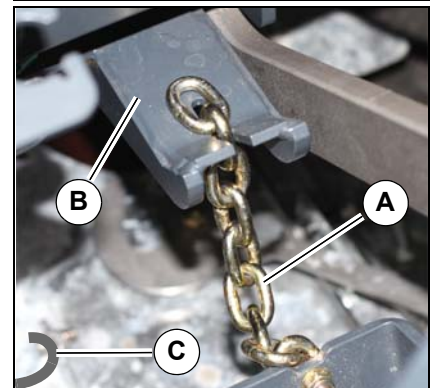


Fig. 105:

Checking the transport protection device

The transport protection device **Fig. 106-A** is located on both sides of the sweeping unit **Fig. 106-79** and has the task of protecting the rotating brushes during transport.

- Locking: Raise the brush arm using the handle **Fig. 106-B**. Lock the brush arm with the hook of the transport protection device.
- Unlocking: Raise the brush arm using the handle **Fig. 106-B**. Unlock the brush arm with the hook of the transport protection device and carefully let the brush arm down.

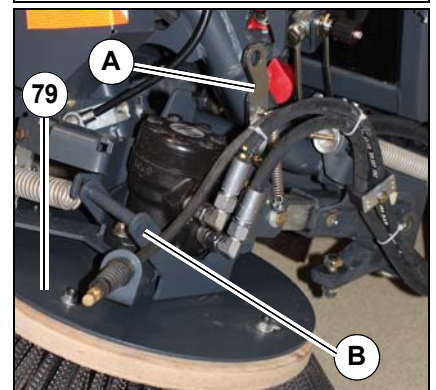


Fig. 106:

Check-list – Vacuum sweeping

No.	Description	Reference
1	Drive to the work site	Page 126
2	Switching vacuum sweeping on	Page 126
3	Setting the fixed engine speed	Page 127
4	Starting vacuum sweeping	Page 127
5	Sweeping dry surfaces	Page 127
6	Sweeping wet surfaces	Page 127
7	Sweeping larger objects	Page 128
8	Changing the sweeping width	Page 128
9	Checking the overload protection	Page 128

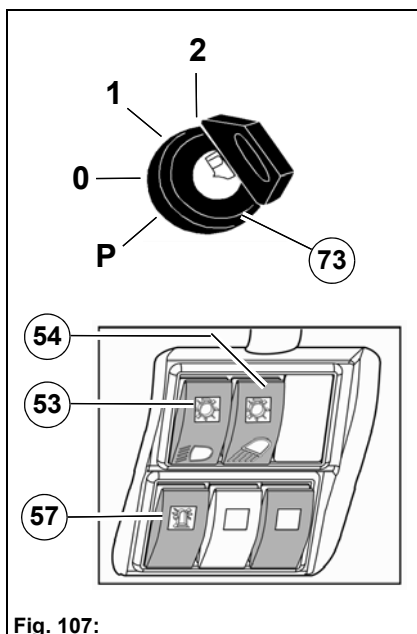


Fig. 107:

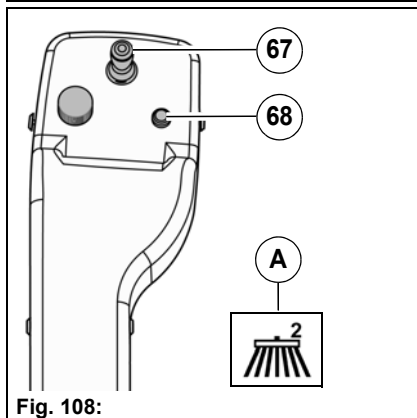


Fig. 108:

Driving to the work site

1. Lock the sweeping unit with the transport protection device **Fig. 106-A**, see page 125.
2. Start the vehicle with the ignition switch **Fig. 107-73**.
3. As required, switch on the dipped headlight **Fig. 107-53**, working spotlight **Fig. 107-54** and beacon **Fig. 107-57**.
4. Drive to the work site in the transport mode. The sweeping unit must be in the upper end position for the transport mode. Push the joystick **Fig. 108-67** back for this purpose.
5. Unlock the transport protection device at the work site, see page 125.

Switching vacuum sweeping on

Switch on the work mode with the Hako button **Fig. 108-68**. The accelerator pedals must be in the neutral position.

The vacuum sweeping system work mode information symbol **Fig. 108-A** is displayed in the multifunctional display as a 2-brush system.

The following functions are activated automatically by pressing the Hako button:

- The sweeping unit is 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 if the driver leaves the driver's seat!

Setting the fixed engine speed

The fixed engine speed for the suction fan of the dirt hopper is switched on with the switch **Fig. 109-61**. Set the speed corresponding to the requirements.

Stage	Rpm	Use
1 – ECO	1900	In slight contamination
2 – Standard	2250	In medium contamination
3 – Maximum	2630	In heavy contamination

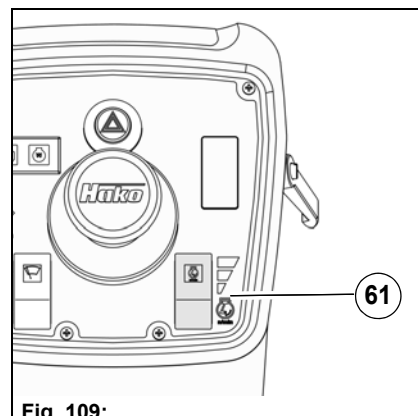


Fig. 109:

Starting vacuum sweeping

The accelerator pedal **Fig. 110-34** is used for continuously changing the speed for driving forwards.

The accelerator pedal **Fig. 110-35** 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 25 km/h
- work mode 15/20/25 km/h according to selected engine speed.

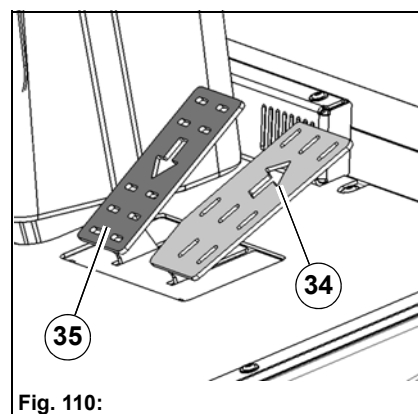


Fig. 110:

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. 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. 111-77**.

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.

If no circulating water is available, fresh water can be switched on optionally for the suction duct with the lever **Fig. 111-76**.

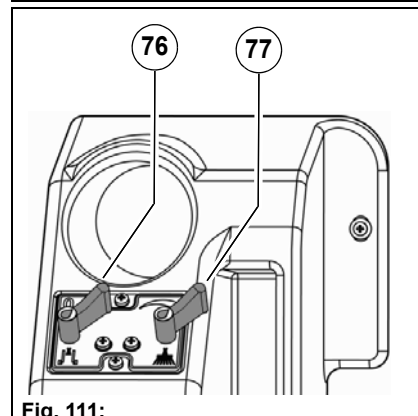


Fig. 111:



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.

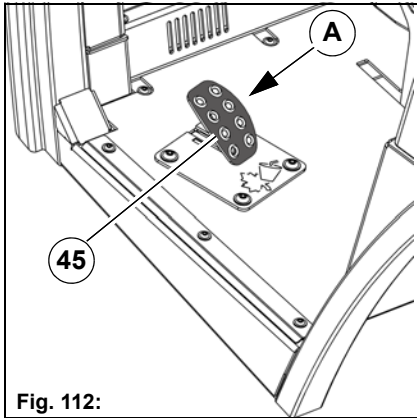


Fig. 112:

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. 112-45**.

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.

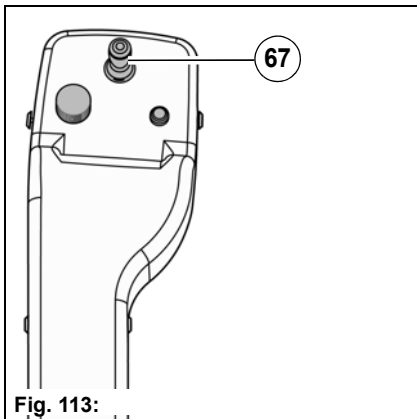


Fig. 113:

Changing the sweeping width

You can change the sweeping width with the joystick **Fig. 113-67** in the armrest.

- Joystick to the right – swivel the sweeping unit out up to the maximum width of 1780 mm.
- Joystick to the left – swing the sweeping unit in to the minimum width of 1380 mm.

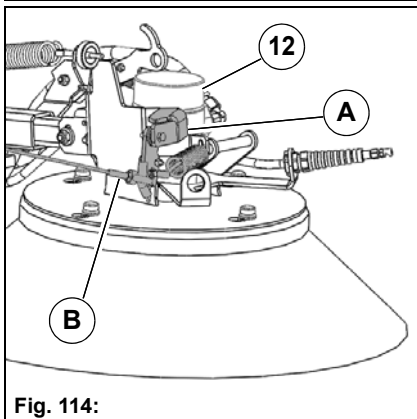


Fig. 114:

Checking the overload protection

The overload protection device **Fig. 114-A** is located on the brush arm of the sweeping unit **Fig. 114-12** 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, swivel the rotating brush and fasten the eye of the Bowden cable **Fig. 114-B** to the hook of the overload protection device.



Note

Check the sweeping unit for damage and secure the sweeping unit again!

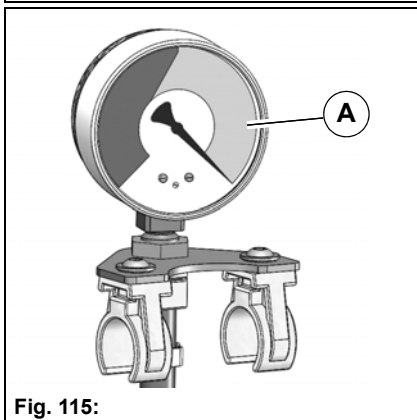


Fig. 115:

Dirt hopper vacuum indicator (optional)

The vacuum indicator **Fig. 115-A** is used for monitoring the suction power, displaying decreasing suction power when the maximum hopper filling level has been reached as well as indicating clogging.

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 the drain. To open, pull the handle **Fig. 116-A** under the front right wheel case. To close, push the handle back in.



Fig. 116:

Hand suction hose (optional)

The 4 metres long hand suction hose **Fig. 117-94** 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.
2. If necessary take the insert plate **Fig. 117-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. 117-B** and pull the hand suction hose down and out from the holder.
4. Hold the hand suction hose with the handles **Fig. 117-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.

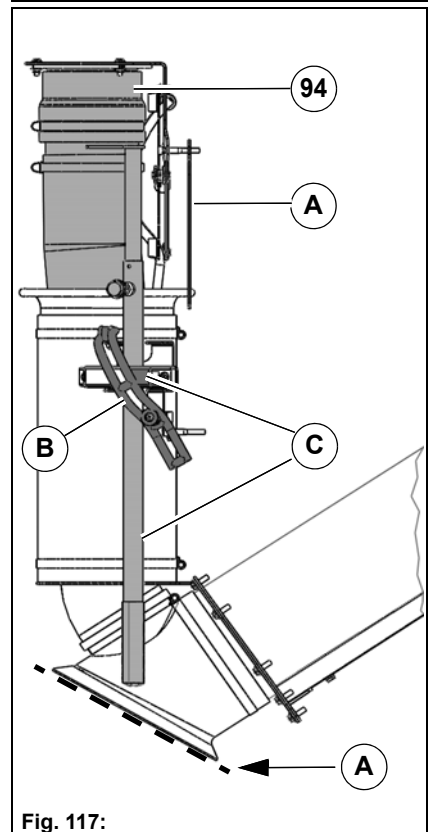


Fig. 117:

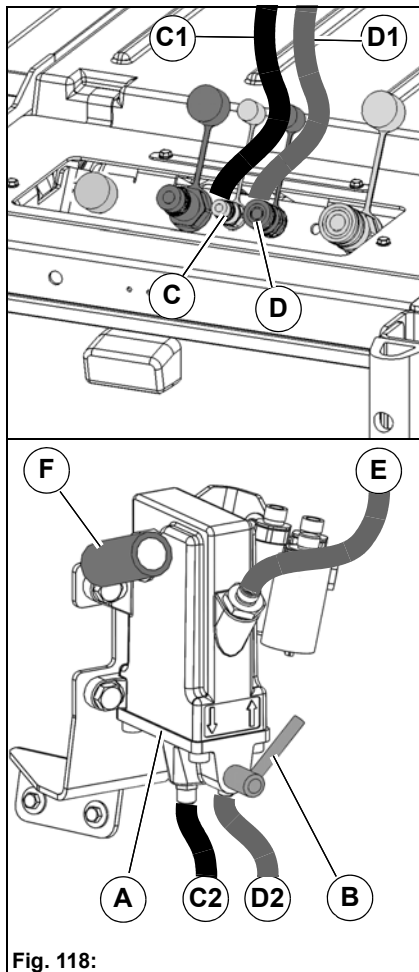


Fig. 118:

Hydraulic hand pump (optional)

The hydraulic hand pump **Fig. 118-A** is used for raising the dirt hopper on failure of the vehicle hydraulics.

Hydraulic connections of the hand pump:

- Remove the supply hose **Fig. 118-C1** from the supply connection **Fig. 118-C** of the rear wagon.
- Remove the return hose **Fig. 118-D1** from the return connection **Fig. 118-D** of the rear wagon.
- Connect the supply hose **Fig. 118-C1** to the supply hose **Fig. 118-C2** of the hand pump.
- Connect the return hose **Fig. 118-D1** to the return hose **Fig. 118-D2** of the hand pump.
- Connect the hydraulic hose **Fig. 118-E** (hydraulic tank of the hand pump) to the return connection **Fig. 118-D** of the rear wagon.

Operating the hydraulic hand pump:

- Raising the dirt hopper: Lever **Fig. 118-B** to the right
- Lowering the dirt hopper: Lever **Fig. 118-B** to the left
- Insert the pipe of the auxiliary tool **Fig. 47-24** as a lever into the sleeve **Fig. 118-F**

	<p>Note The hydraulic connections must be backfitted for vacuum sweeping!</p>
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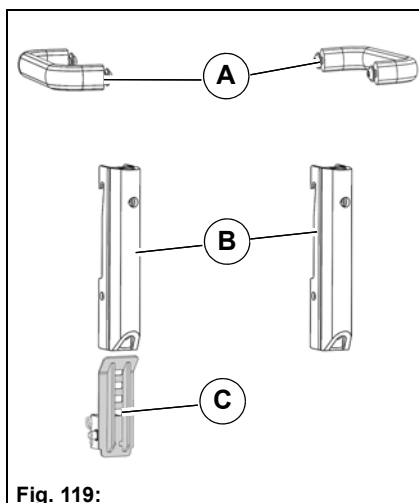


Fig. 119:

Comfort package for the dirt hopper (optional)

The comfort package contains the handles **Fig. 119-A**, the extended collision protection **Fig. 119-B** and the step **Fig. 119-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. 120-95** is equipped with a 10 metre long pressure hose. Check the following before starting up:

- Fill the fresh water tank, see page
 - Check the water filter **Fig. 120-D** 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. 120-E**.
 2. Set the changeover valve **Fig. 120-B** to position II.
 - Position I: Suction fan hydraulics
 - Position II: High-pressure cleaner hydraulics
 3. Switch the engine and suction fan on.
 4. Set the pressure controller **Fig. 120-C** to the required working pressure.
 5. Take up the lance **Fig. 120-A** with the pressure hose and clean the surface.

Do not use steam cleaners and high-pressure cleaners for cleaning electrical/electronic components and the engine compartment!
 6. After cleaning, stow the lance and the pressure hose back in the rear wagon and set the changeover valve back.

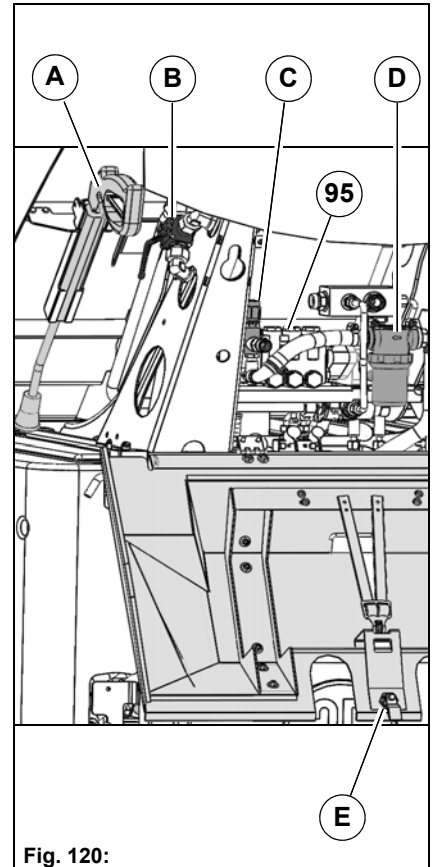


Fig. 120:

Check-list – Settings for vacuum cleaning

No.	Description	Reference
1	Adjusting the sweeping unit with the joystick	Page 132
2	Raising/lowering the dirt hopper	Page 132
3	Setting the rotating brush speed	Page 132
4	Switching the fresh water pump on and off	Page 133
5	Switching the suction fan on and off	Page 133

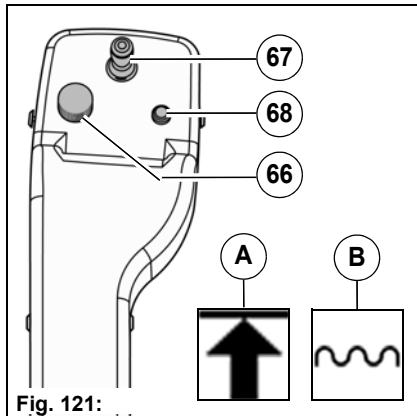


Fig. 121:

Adjusting the sweeping unit with the joystick

You adjust the sweeping unit with the joystick **Fig. 121-67** in the armrest.

The following functions are possible:

- Lift sweeping unit – joystick to the rear
 - The information symbol **Fig. 121-A** appears in the upper end position.
- Lower the sweeping unit (floating position) – joystick to the front
 - The information symbol **Fig. 121-B** appears in the floating position.
- Swivel the sweeping unit out – joystick to the right
- Swivel the sweeping unit in – joystick to the left

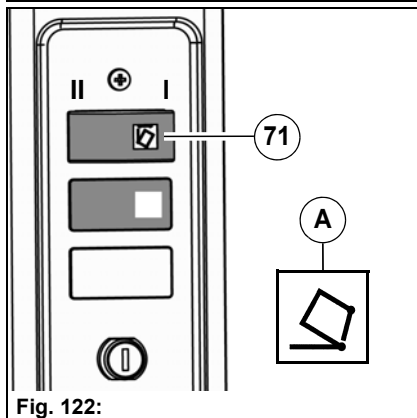


Fig. 122:

Raising/lowering the dirt hopper

The following functions on the dirt hopper are switched on with the button **Fig. 122-71**:

- 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.

Raising and lowering the dirt hopper at 2250 rpm (switch for engine fixed speed in stage 2).

The lock must be open before you empty the dirt hopper, see page 134.

As long as the dirt hopper is not in its lower end position, the warning symbol **Fig. 122-A** appears.

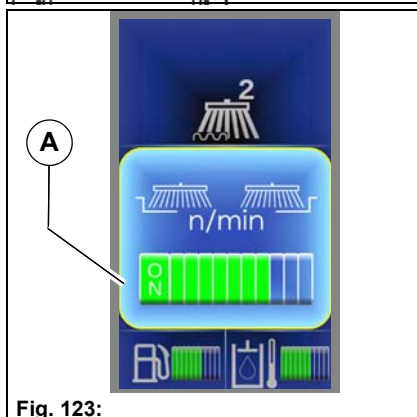


Fig. 123:

Setting the rotating brush speed

Select the A menu in the multifunctional display with the turn-push knob

Fig. 121-66. Change the current value in the brush speed menu item

Fig. 123-A.

Setting range: 0 to 120 rpm

Switching the fresh water pump on and off

Select the A menu in the multifunctional display with the turn-push knob
Fig. 121-66. Change the current value in the fresh water menu item
Fig. 124-A.

Setting range: ON or OFF

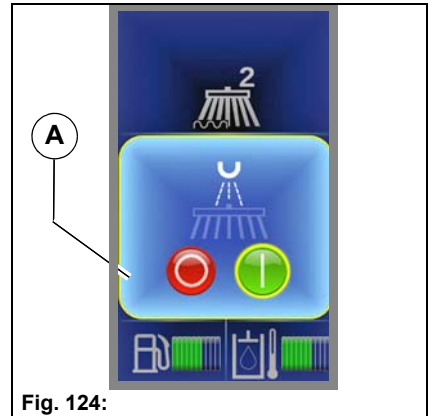


Fig. 124:

Switching the suction fan on and off

Select the A menu in the multifunctional display with the turn-push knob
Fig. 121-66. Change the current value in the suction fan menu item
Fig. 125-A.

Setting range: ON or OFF

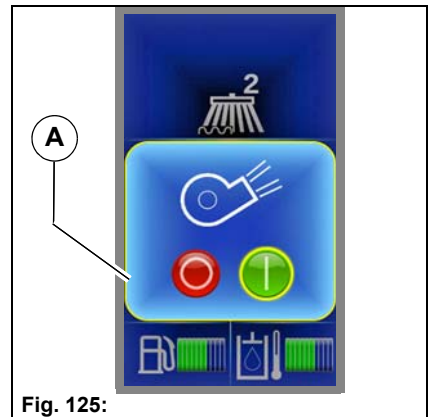




Fig. 125:

Check-list – Cleaning the vacuum sweeping system

No.	Description	Reference
1	Emptying the dirt hopper	Page 134
2	Cleaning the sweeping unit	Page 135
3	Cleaning the dirt hopper and circulating water system	Page 136
4	Emptying the fresh water tank	Page 136
5	Emptying the circulating water tank	Page 136

	<p>Caution</p> <ul style="list-style-type: none"> 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. There is danger of injury! Do not use steam cleaners and high-pressure cleaners for cleaning electrical/electronic components and the engine compartment!
	<p>Note</p> <ul style="list-style-type: none"> The cleaning work listed below must be done after every emptying, at least once daily.

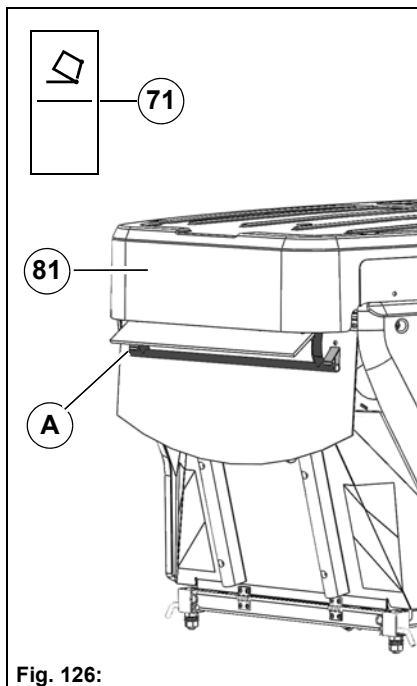


Fig. 126:

Emptying the dirt hopper

1. Lock the sweeping unit, start the vehicle with the ignition key and drive 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. 126-81** open the lock **Fig. 126-A** of the lid.
 - Pull the handle out from the lock to open.
 - Push the handle into the lock to close.
4. Raise and empty the dirt hopper with the button **Fig. 126-71**.
5. Lower the dirt hopper and lock the lid again.

Cleaning the suction mouth

1. Lock the dirt hopper with the transport protection device, see page 125. Drive the vehicle to a suitable cleaning place.
 2. Select the A menu in the multifunctional display with the turn-push knob. Switch the suction fan on in the blower menu item.
 3. Push a water hose into the suction mouth **Fig. 127-80** 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 134.
- In the case of heavy soiling, dismantle and clean the suction mouth, see page 118.

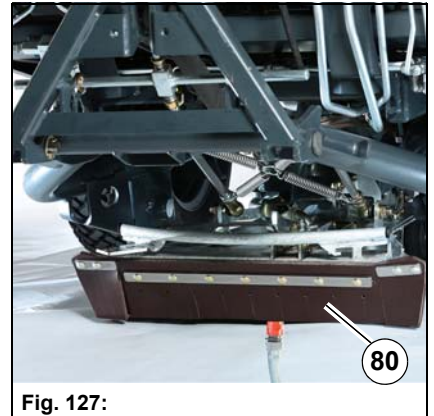


Fig. 127:

Cleaning the suction fan

1. Lock the dirt hopper with the transport protection device, see page 125. Drive the vehicle to a suitable cleaning place.
2. Connect a water hose to the water connection **Fig. 128-A** of the dirt hopper.
3. Push the Hako button **Fig. 8-68** 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. 8-71** and drain off the water taken up!

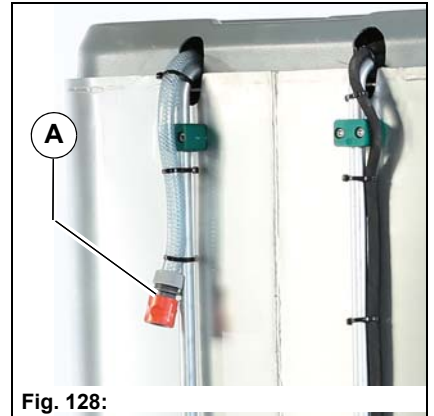


Fig. 128:

Cleaning the dust filter reducing piece

The sieve filter **Fig. 129-A** and the reducing piece **Fig. 129-B** of the water pump are located in the driver's cab under the driver's seat behind the cover plate **Fig. 129-48**. Unscrew the filter housing, check the sieve filter and the reducing piece for openness and clean if necessary.

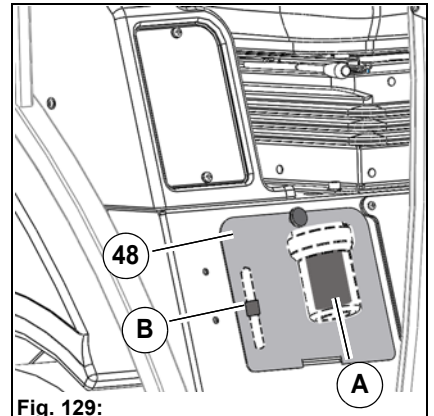


Fig. 129:

Cleaning spray nozzles and ball valve filter

The spray nozzles **Fig. 130-A** for the rotating brushes are located on the sweeping unit. A ball valve filter is located in the filter holder **Fig. 130-B** in front of a distributor. Dismantle and clean the spray nozzles and ball valve filter.

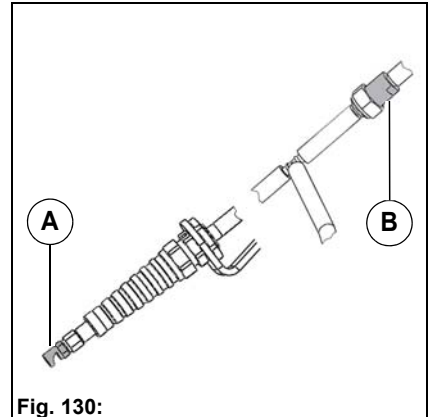


Fig. 130:

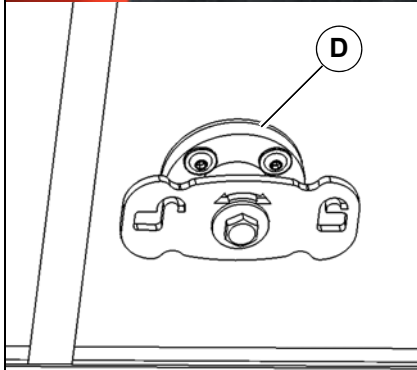
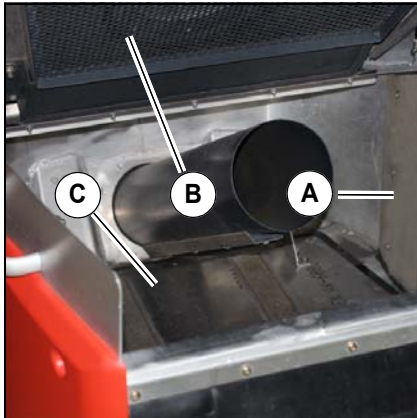


Fig. 131:

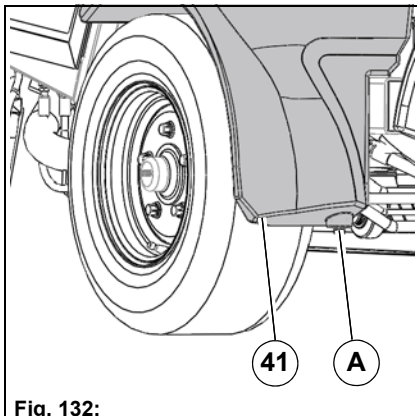


Fig. 132:

Cleaning the dirt hopper and circulating water system

1. Lock the dirt hopper with the transport protection device, see page 125. Drive the vehicle to a suitable cleaning place and empty it.
2. Half raise the dirt hopper and open the lock **Fig. 131-D** of the sump flap. 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. 131-A** and the filter sieve **Fig. 131-B** in the lid. 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. 131-C** opens. 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. 8-67** and let the water run until clear water emerges at the suction mouth.

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 125. Drive the vehicle to a suitable cleaning place.
2. Unscrew the drain screws **Fig. 132-A** on both sides of the fresh water tank **Fig. 132-41** and empty the tank.
3. Also empty the sieve filter **Fig. 129-B**.

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 125. Drive the vehicle to a suitable cleaning place.
2. Lower the sweeping unit with the joystick **Fig. 8-67** and drain off the circulating water.

6.1.5 Technical Data

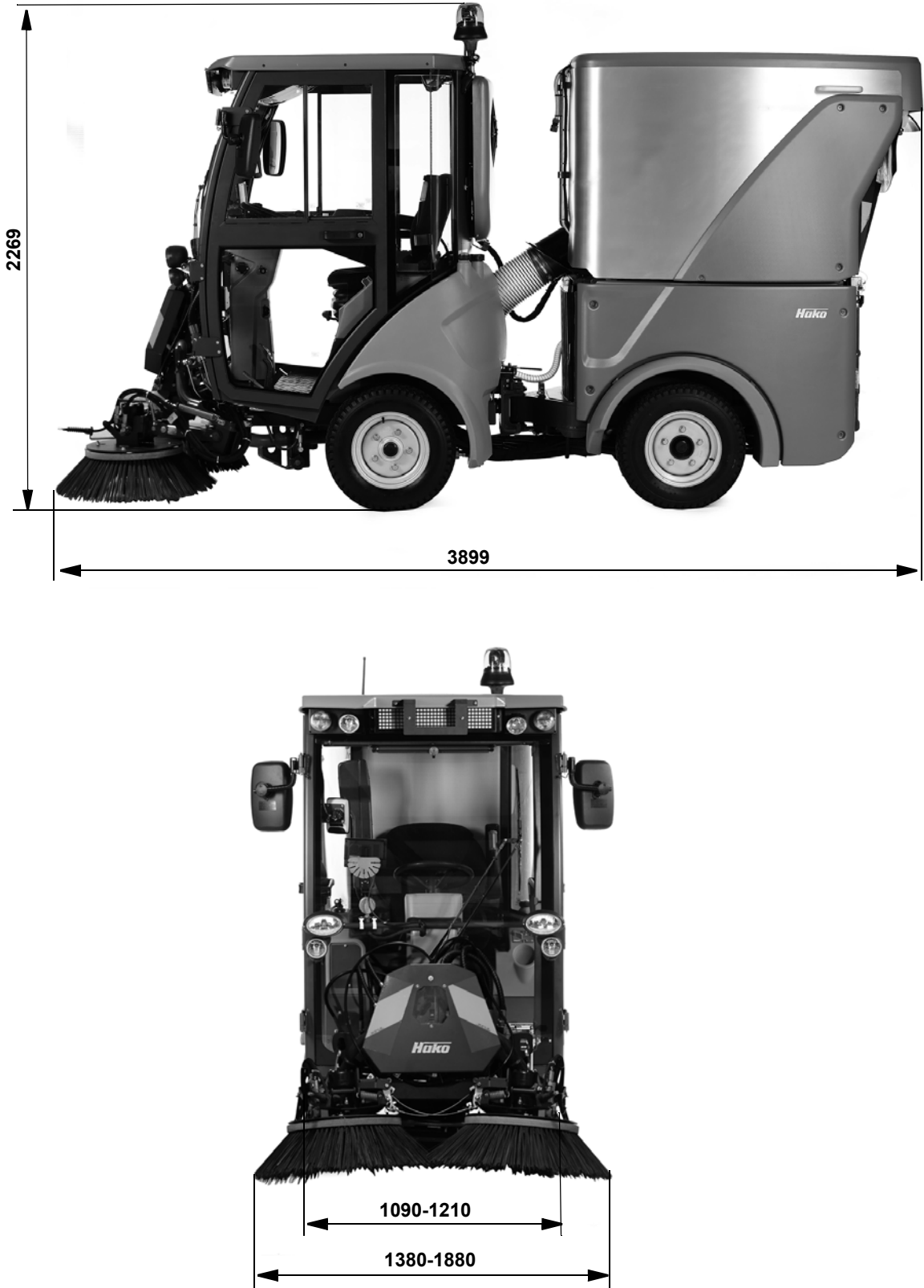


Fig. 133:

Vacuum sweeping system

Dimensions	Unit	
Length	mm	3899
Width	mm	1090 to 1210
Height	mm	2269
Sweeping width	mm	1380 to 1880
Weights and loads	Unit	
Basic unit empty weight with vacuum sweeping system without water	kg	1704
Basic unit empty weight with vacuum sweeping system ready for operation	kg	1930
Dirt hopper load	kg	496
Sweeping unit/dirt hopper	Unit	
Brush diameter	mm	720
Brush speed	rpm	0 to 120
Dirt hopper total volume	litre	997
Circulating water system settling tank	litre	38
Fresh water tank capacity	litre	150
Noise emission values	Unit	Value
The sound pressure level at the workplace (LpA) measured under the customary conditions of use at 1900 rpm according to Directive 2006/42/EC with measuring standard DIN EN ISO 11201 is: Measuring uncertainty KpA	dB(A)	78 3.5
The sound pressure level at the workplace (LpA) measured under the customary conditions of use at 2250 rpm according to Directive 2006/42/EC with measuring standard DIN EN ISO 11201 is: Measuring uncertainty KpA	dB(A)	81 3.5
The sound pressure level at the workplace (LpA) measured under the customary conditions of use at 2630 rpm according to Directive 2006/42/EC with measuring standard DIN EN ISO 11201 is: Measuring uncertainty KpA	dB(A)	84 3.5
The sound pressure level at the workplace (LpA) measured under the customary conditions of use at 1900 rpm with the sound insulation package according to Directive 2006/42/EC with measuring standard DIN EN ISO 11201 is: Measuring uncertainty KpA	dB(A)	75 3.5
The sound power level (LWAd) measured under the customary conditions of use at 2000 rpm according to Directive 1900/14/EC with measuring standard DIN EN ISO 3744 is:	dB(A)	104
The sound power level (LWAd) measured under the customary conditions of use at 2000 rpm according to Directive 2250/14/EC with measuring standard DIN EN ISO 3744 is:	dB(A)	106
The sound power level (LWAd) measured under the customary conditions of use at 2000 rpm according to Directive 2630/14/EC with measuring standard DIN EN ISO 3744 is:	dB(A)	109
The sound power level (LWAd) measured under the customary conditions of use at 1900 rpm with sound insulation package according to Directive 1900/14/EC with measuring standard DIN EN ISO 3744 is:	dB(A)	99

6.1.6 Maintenance

Maintenance plan

Weekly
<ul style="list-style-type: none"> • Checking wear and damage at the suction mouth • Checking and if necessary adjusting the suction mouth setting • Checking the suction hose for wear and seating • Checking the seal between suction duct and dirt hopper • Checking the circulating water system • Checking the coarse material flap on the suction mouth
<ul style="list-style-type: none"> • Checking wear and damage of the sweeping unit • Checking and if necessary adjusting the sweeping level • Checking and if necessary cleaning the sieve filter and reducing piece of the fresh water system
<ul style="list-style-type: none"> • Lubricating lubrication points on the vacuum sweeping system: • Front lift system cylinder • Rotating brush articulated joints • Dirt hopper lifting cylinder and bedding • Cleaning the machine at the vacuum sweeping system: Suction mouth, suction pipe, suction fan and circulating water system
Once only after 50 operating hours – additionally to the Hako system maintenance
<p>Sweeping unit</p> <ul style="list-style-type: none"> • Checking wear and damage • Checking and if necessary adjusting the sweeping level • Checking and if necessary cleaning the spray nozzles, spray nozzle filter and sieve filter of the water system
<p>Suction mouth</p> <ul style="list-style-type: none"> • Checking wear and damage • Checking and if necessary adjusting the suction mouth setting • Checking the suction hose for wear and seating • Checking the seal between suction duct and dirt hopper • Checking the fresh water nozzle and circulating water system at the suction mouth • Checking the suction mouth flap
<p>Dirt hopper</p> <ul style="list-style-type: none"> • Checking contamination • Checking the settling tank • Checking the suction fan for speed and contamination • Checking the hydraulic pipes of the suction fan motor for leaks • Checking the impact plate of the hopper lid for wear • Checking the seals of the hopper lid for tightness and damage • Checking the exhaust side of the hopper lid for contamination • Raising the dirt hopper with hand pump (optional)

Continued – Maintenance plan

Every 250 operating hours – additionally to the Hako system maintenance
Sweeping unit <ul style="list-style-type: none"> • Checking wear and damage • Checking and if necessary adjusting the sweeping level • Checking and if necessary cleaning the spray nozzles, spray nozzle filter and sieve filter of the water system • Checking the Bowden cable of the sweeping unit for function and ease of movement
Suction mouth <ul style="list-style-type: none"> • Checking wear and damage • Checking and if necessary adjusting the suction mouth setting • Checking the suction hose for wear and seating • Checking the seal between suction duct and dirt hopper • Checking the fresh water nozzle and circulating water system at the suction mouth • Checking the suction mouth flap
Dirt hopper <ul style="list-style-type: none"> • Checking contamination • Checking the settling tank • Checking the suction fan for speed and contamination • Checking the bedding of the suction fan (rubber-metal buffer) • Checking the intake sieve in the dirt hopper • Checking the hydraulic pipes of the suction fan motor for leaks • 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 flap • Checking the exhaust side of the hopper lid for contamination
Every 1000 operating hours – additionally to the Hako system maintenance
Dirt hopper <ul style="list-style-type: none"> • Changing the bedding of the suction fan (rubber-metal buffer) • Raising the dirt hopper with hand pump (optional)
Sweeping unit <ul style="list-style-type: none"> • Changing the Bowden cable of the sweeping unit
Every 2000 operating hours – additionally to the Hako system maintenance
Bowden cable <ul style="list-style-type: none"> • Changing the Bowden cable for the coarse material flap

Maintenance work



Warning

- Always bring and insert the safety strut **Fig. 134-A** 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!

Inserting the safety strut

Raise the emptied dirt hopper with the button **Fig. 134-71** up into its end position.

Hinge over the safety strut **Fig. 134-B**.

Lower the dirt hopper with the button **Fig. 134-71-** and insert the safety strut in the recess **Fig. 134-A**.

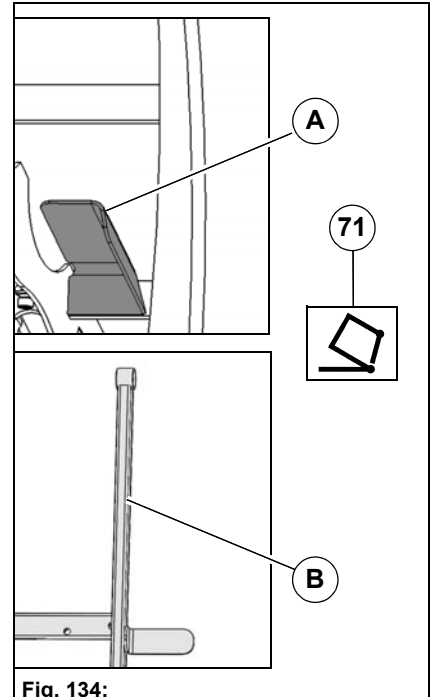


Fig. 134:

Checking the rotating brushes

Check the rotating brushes **Fig. 135-A** daily. Adjust the rotating brush pressure as required, see page 142. If the rotating brush pressure is changed, the sweeping level must be reset, see page 142.

Change worn out rotating brushes.

To do this, raise the sweeping unit with the joystick **Fig. 138-67**. Remove the caps **Fig. 135-B** and loosen the nuts located below. Turn the rotating brush counter-clockwise and push it downwards.

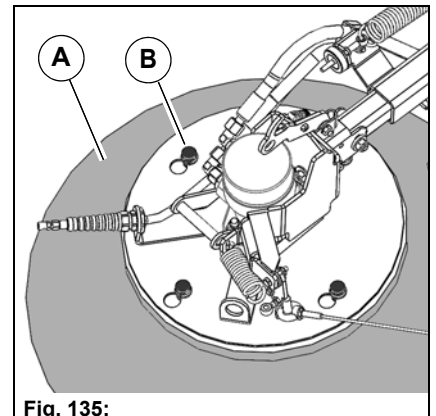
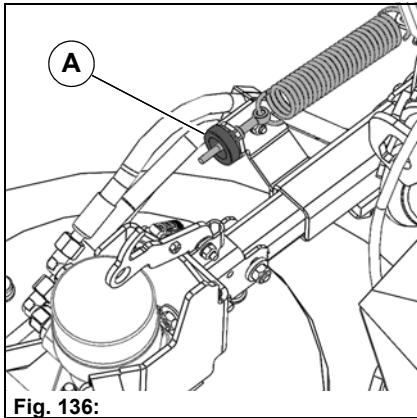
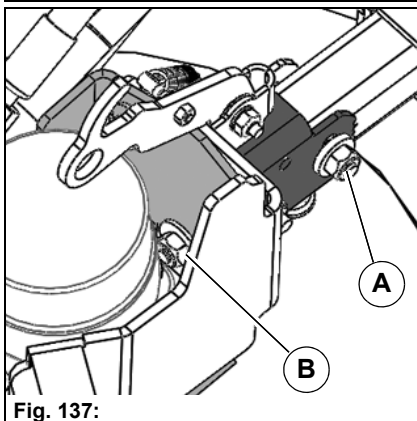


Fig. 135:



Checking the rotating brush pressure

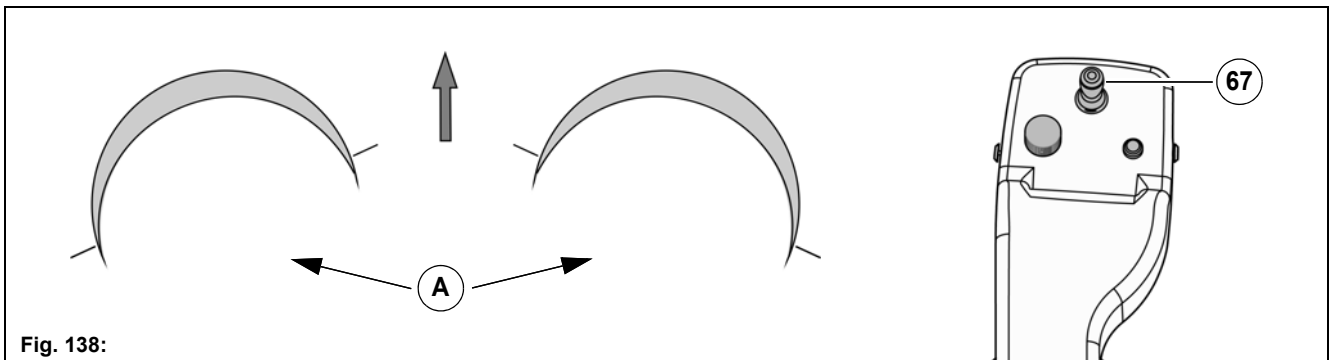
Adjust the rotating brush pressure with the adjusting screw **Fig. 136-A**. The sweeping level must be adjusted with increasing wear.



Checking the sweeping level

The sweeping level **Fig. 138-A** is adjusted in the factory with the screws **Fig. 137-A** and **Fig. 137-B**.

1. Raise the front sweeping machine with the joystick **Fig. 138-67**.
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.



Checking the suction mouth sealing strips

Check the sealing strips **Fig. 139-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. 139-B1** between the side sealing strip and ground must be approx. 5 mm.

The gap **Fig. 139-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. 139-C** in the next higher hole **Fig. 139-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!

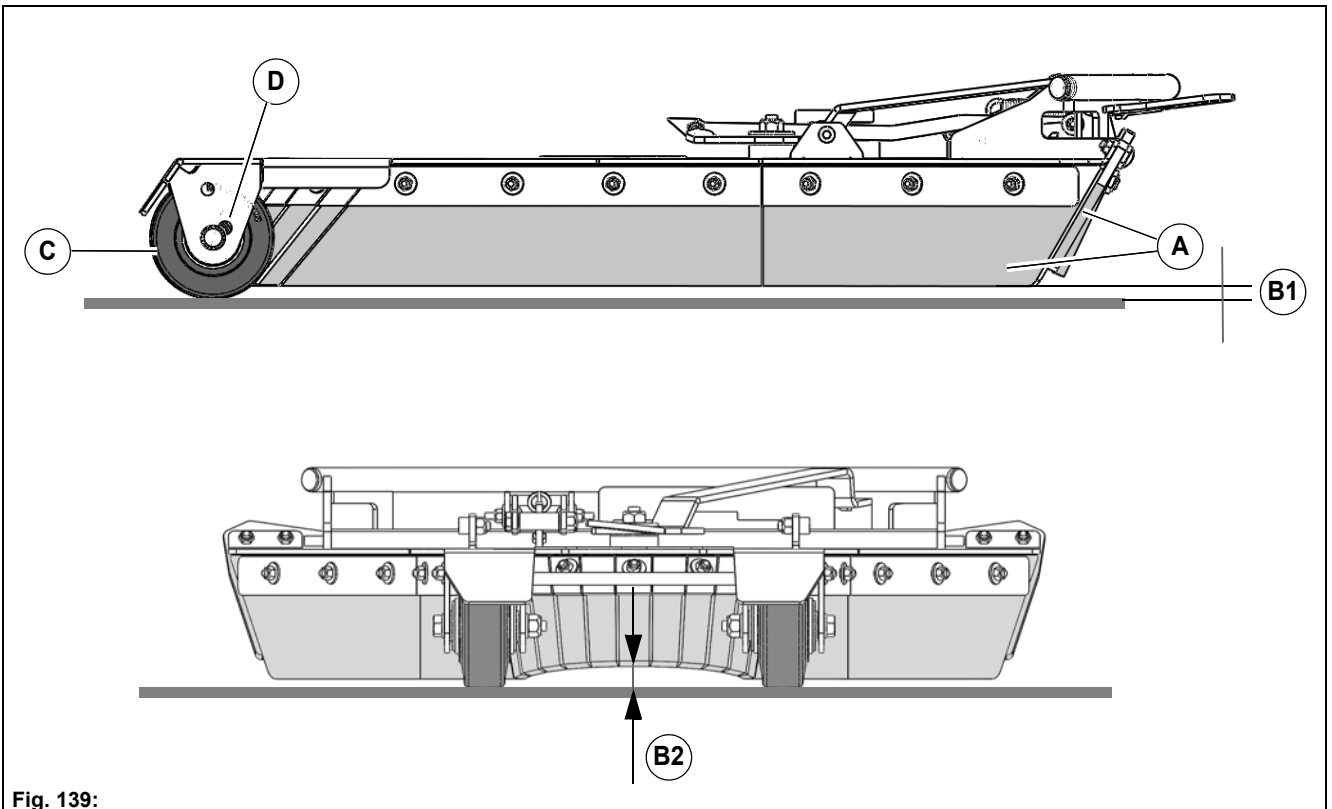


Fig. 139:

Checking the suction duct gasket

Check the suction duct seal **Fig. 140-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. 140-B**.

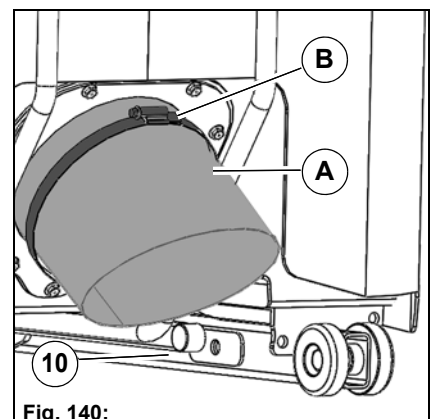


Fig. 140:

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 124
The fresh water system is clogged	Cleaning the sieve filter and reducing piece Cleaning the spray nozzles and ball valve filter	Page 135 Page 135
The circulating water supply is interrupted	Remedy	Reference
The circulating water system is empty	Filling the dirt hopper up to the mark	Page 124
The circulating water system is clogged	Flushing the circulating water system with water	Page 136
The sweeping power is reduced	Remedy	Reference
The coarse material flap is still open	Closing the coarse material flap	Page 128
The dirt hopper is full	Emptying the dirt hopper	Page 134
The flap of the dirt hopper is not locked	Locking the dirt hopper	Page 134
The suction fan is contaminated	Cleaning the suction fan	Page 135
The dirt hopper and sieve are contaminated	Cleaning the dirt hopper	Page 136
The circulating water system is contaminated	Cleaning the circulating water system	Page 136
The vacuum system is clogged	Cleaning the suction mouth with the auxiliary tool	Page 135
The suction mouth sealing strips are defective	Checking suction mouth sealing strips	Page 143
The suction duct seal is defective	Checking suction duct seal	Page 143
The sweeping level is not adjusted correctly	Checking the sweeping level	Page 142
The rotating brush pressure is not correctly set	Checking the rotating brush pressure	Page 142
The hand suction hose is not correctly set on	Setting on the hand suction hose correctly	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

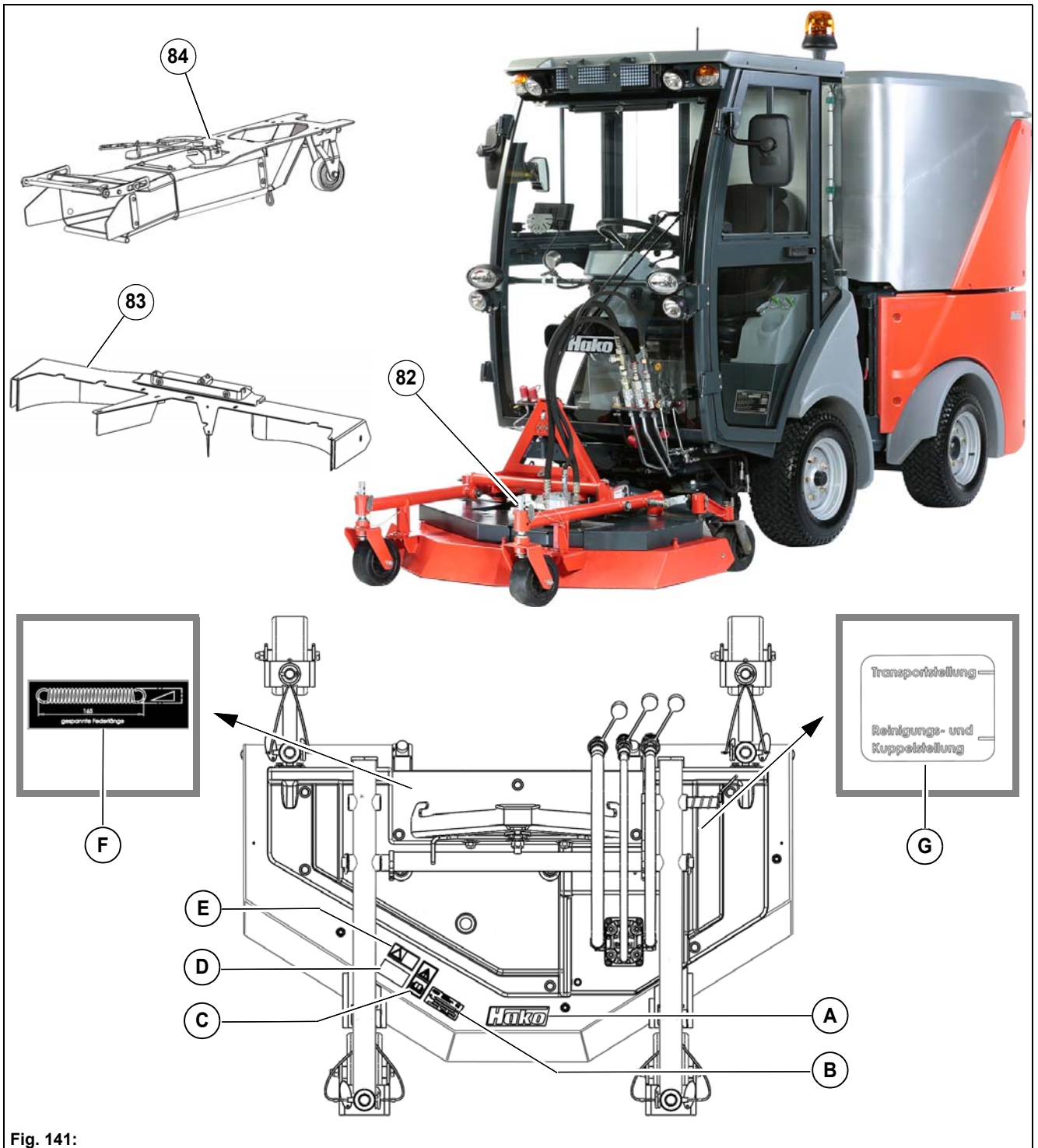


Fig. 141:

Item	Designation	Type
82	Mower	810100
83	Vacuum system	810110
84	Suction nozzles	147810

6.2.1 Labels on the unit

Hako logo

The Hako logo **Fig. 141-A** is located on the mower cover.

Type plate

The type plate **Fig. 141-B** is located on the right side of the mower.

Label – Read operating manual

The Read operating manual label **Fig. 141-C** is located on the right side of the mower.

Rotating parts label

The Rotating parts label **Fig. 141-D** is located on the right side of the mower.

Keep distance label

The Keep distance label **Fig. 141-E** is located on the right side of the mower.


Spring length label

The Spring length label **Fig. 141-F** is located on the right side of the mower under the cover.

Transport and work position

The Transport and work position label **Fig. 141-G** is located on the left side of the mower under the cover.

6.2.2 Mowing system safety instructions

	<p>Warning</p> <ul style="list-style-type: none">• You must consult Hako before attaching other attachments not approved by Hako.• 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.• Always wear protective gloves when changing blades! There is danger of injury!• Immediately renew damaged or highly unbalanced mowing blades to avoid damage to the blade bearings.• Before reinstalling, balance the blades and check them for out of true in height.• Adopt measures against erroneous starting and unwanted movement. Pull out the ignition key.• The safety regulations for the Citymaster 600 must be complied with absolutely.• The V-belt is self-tensioning by spring force. Do not hook tension springs in or out with your bare hand. Risk of crushing!• The lawn mowing system may be operated only in connection with the Citymaster 600.• The lawn mowing system may be put into operation only with the suction pipe raised! Refer to mounting the mower on page 147!
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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. 142-84**, see page 118.
3. Fit the suction system **Fig. 142-83** with six flat round screws **Fig. 142-L** to the lawn mower **Fig. 142-82**.
4. Unlock the locking hook **Fig. 142-A** and locking rod **Fig. 142-B** on the front tool carrier.
5. Align the mower **Fig. 142-82** centrally and in alignment with the front tool carrier.
6. Raise the front tool carrier **Fig. 142-12** with the joystick **Fig. 142-67** and attach the mower.
7. Lock the mower with locking hook and locking rod.
8. **Close the valve Fig. 142-J for the suction mouth lift system!**
9. Lock the suction pipe **Fig. 142-84** at the suction system with the bow **Fig. 142-K**.
10. Make the connections.
 - Mower hydraulic motors – return = **Fig. 142-G**
 - Mower hydraulic motors – supply = **Fig. 142-H**
 - Leakage oil pipe = **Fig. 142-I**

Dismantling is in the reverse order.

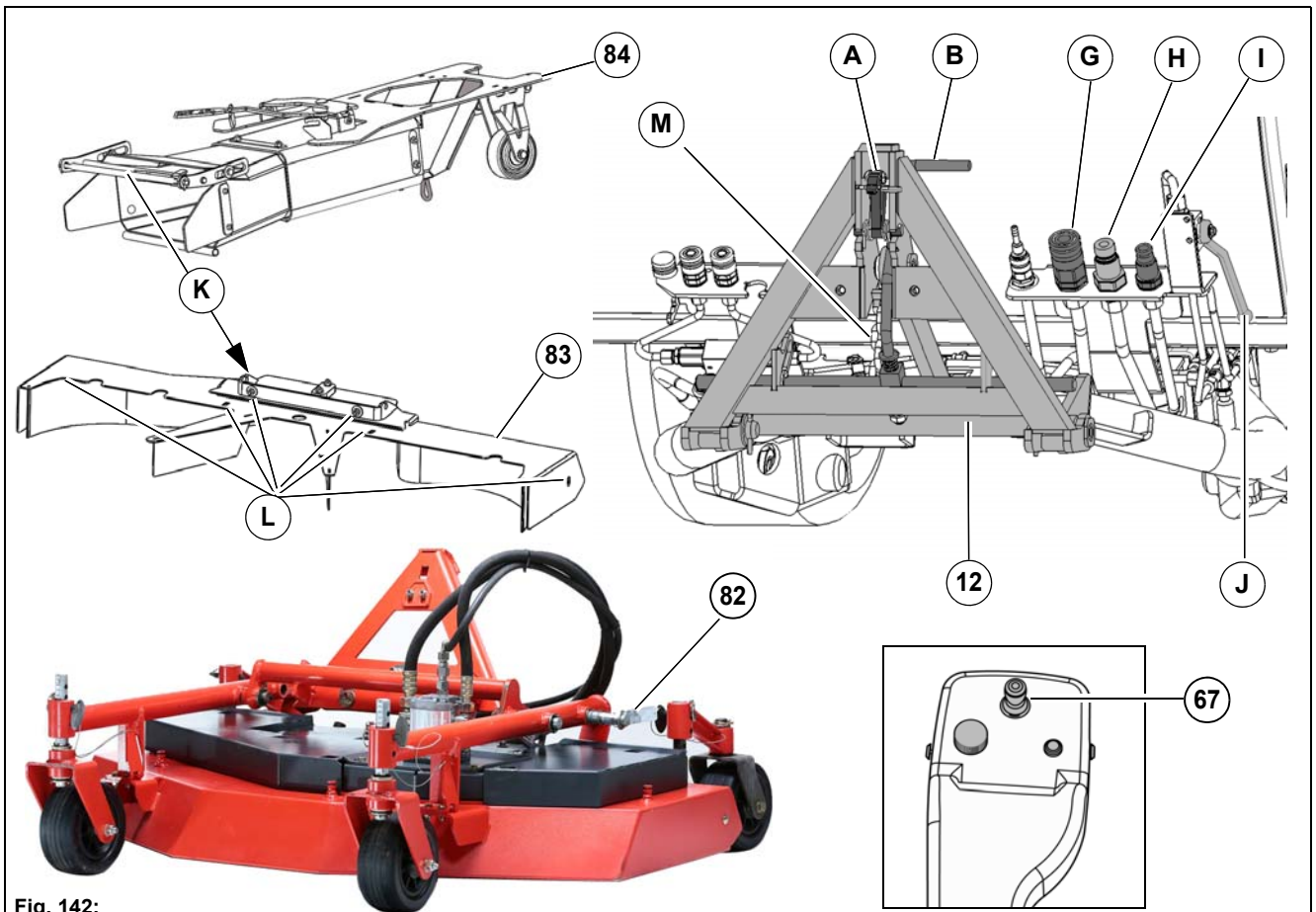


Fig. 142:

6.2.4 Operation

Check-list – Before start-up of the mowing system

No.	Description	Reference
1	Checking suction mouth lift system	Page 125
2	Checking front tool carrier	Page 125
3	Checking transport protection device	Page 148
4	Adjusting the cutting height	Page 148
5	Checking and if necessary changing the mowing blades	Page 152
6	Checking and if necessary changing the V-belt	Page 152

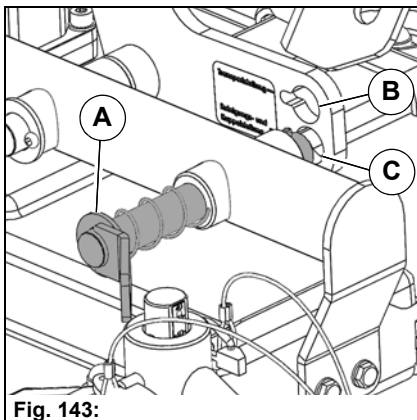


Fig. 143:

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. 143-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. 143-B**.
- Cleaning: The mounting bolt must secure the mower in the lower position **Fig. 143-C**.

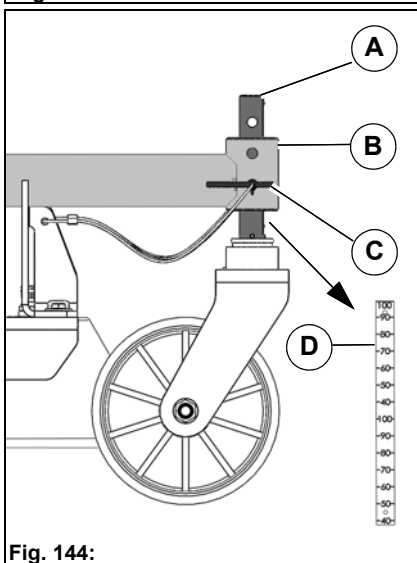


Fig. 144:

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. 146-67**. Switch the engine off and pull out the ignition key.
2. Pull the mounting bolt **Fig. 144-C** out and push the bolt **Fig. 144-A** of the wheel fork into the bush **Fig. 144-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. 144-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.

Check-list – Mowing

No.	Description	Reference
1	Driving to the work site	Page 149
2	Switching mowing on	Page 149
3	Setting the fixed engine speed	Page 150
4	Starting mowing	Page 150

Driving to the work site

1. Bring the mower into the transport position, see page 148.
2. Start the vehicle with the ignition switch **Fig. 145-73**.
3. If required, switch on the working spotlight **Fig. 145-54** and the beacon **Fig. 145-57**.
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. 146-67** back for this purpose.
5. At the work site bring the mower into its working position, see page 148.

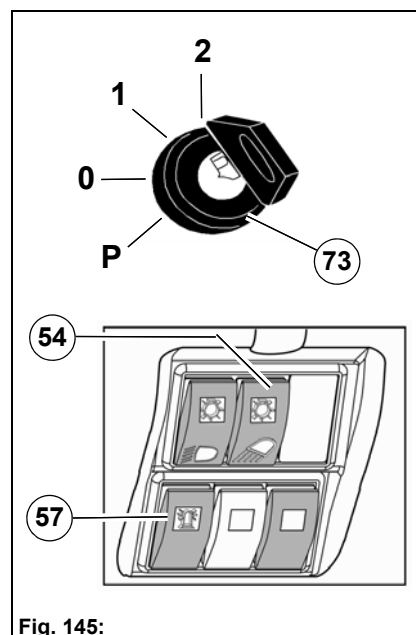


Fig. 145:

Switching the mower on

1. Switch on the work mode with the Hako button **Fig. 146-68**. The accelerator pedals must be in the neutral position. The coupling triangle work mode symbol appears in the multifunctional display **Fig. 146-A**.
2. Switch on the hydraulic circuit. Switch on the hydraulic circuit I for front attachments and hydraulic circuit II for rear attachments (suction fan) with the turn-push knob **Fig. 146-66**.
3. Lower the mower with the joystick **Fig. 146-67**. The following functions are activated:
 - The mower is lowered (floating position).
 - Mowing is switched on.

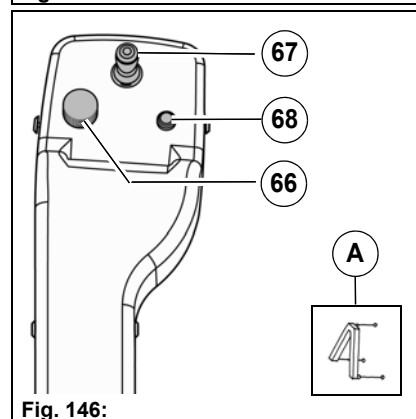


Fig. 146:

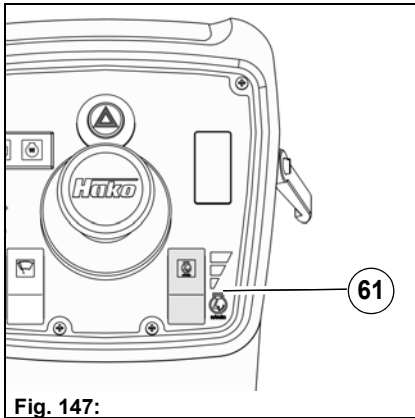


Fig. 147:

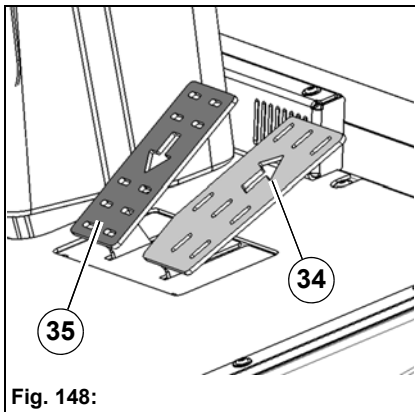


Fig. 148:

Setting the fixed engine speed

The fixed engine speed is set with the switch **Fig. 147-61**. Set the speed corresponding to the requirements.

Stage	Rpm	Use
1 – ECO	1900	Not for mowing
2 – Standard	2250	For medium load
3 – Maximum	2630	For high load

The height of the speed has a direct influence on the circumferential speed of the mowing blades!

Starting mowing

The accelerator pedal **Fig. 148-34** is used for continuously changing the speed for driving forwards.

The accelerator pedal **Fig. 148-35** 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 15/20/25 km/h according to the selected engine speed.

6.2.5 Technical data

Mower	Unit	
Length	mm	1155
Width	mm	1270
Height	mm	660
Working width	mm	1220
Weight (mower, vacuum system and suction nozzles)	kg	172
Cutting height in 10 mm steps	mm	40-100
Blade speed	rpm	3070

6.2.6 Maintenance

Maintenance plan

Daily
<ul style="list-style-type: none"> • Checking wear and damage to the mower
Weekly
<ul style="list-style-type: none"> • Checking lubrication points

Maintenance work

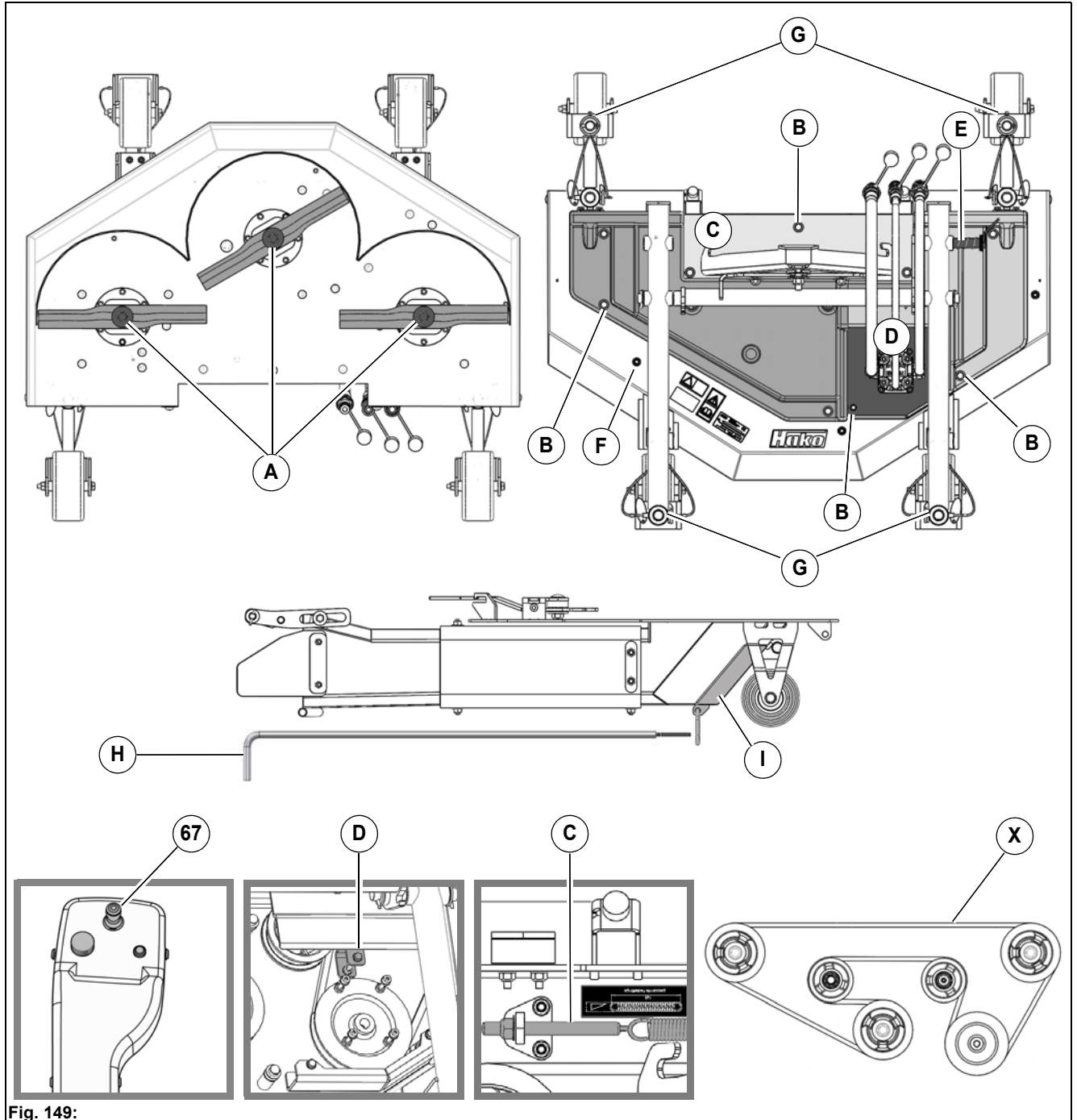


Fig. 149:

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. 149-67**. Switch the engine off and pull out the ignition key.
2. Loosen the screw **Fig. 149-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. 149-67**. Switch the engine off and pull out the ignition key.
2. Loosen the screws on the covers **Fig. 149-B** and remove the covers.
3. Relax the tension spring with the screw **Fig. 149-C** and unhook it.
4. Remove the screws of the gearbox holder **Fig. 149-D** and remove the defective V-belt.
5. Insert the new V-belt corresponding to **Fig. 149-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.

Cleaning the mower

1. Place the vehicle on a level surface and hold it with the parking brake. Raise the mower with the joystick **Fig. 149-67**. Switch the engine off and pull out the ignition key.
2. Bring the mower into the cleaning position with the mounting bolt **Fig. 149-E**.
3. Clean the mower from the outside with a water hose or a high-pressure cleaner.
4. Plug the water hose onto the three hose couplings **Fig. 149-F** one after the other and clean with a water hose. Let the mower run for one to two minutes for this.

Cleaning the suction nozzle

1. Place the vehicle on a level surface and hold it with the parking brake. Raise the mower with the joystick **Fig. 149-67**. Switch the engine off and pull out the ignition key.
2. Turn the steering wheel as far as possible to the right
3. Open the flap **Fig. 149-I** with the lance **Fig. 149-H**. Let the suction fan run for one to two minutes.
4. Lock the flap again with the lance.

Lubrication point

Check the lubrication points weekly.

Grease: Mobilgrease MP

- Bushes of the wheel holders **Fig. 149-G** (4 pieces)

6.2.7 Troubleshooting

Grass remains lying	Remedy	Reference
Outlet clogged	Cleaning the mower	Page 152
Suction nozzle clogged	Cleaning the suction pipe	Page 152
Grass too high or wet	Changing the fixed engine speed Changing the cutting height	Page 150 Page 148
Blades blunt	Grinding the blades	Page 152
Blades do not rotate	Remedy	Reference
V-belt defective	Changing the V-belt	Page 152
Ground irregularities are not compensated for	Remedy	Reference
Mounting plug not fitted as specified	Checking transport protection device	Page 148
Wheels do not turn	Remedy	Reference
Wheels dirty	Cleaning wheels and hubs	Page 152
Mower runs loud and sounds hard	Remedy	Reference
Checking the blade bearings	Balancing the blades	
Gearbox defective or without oil	Checking the gearbox	

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

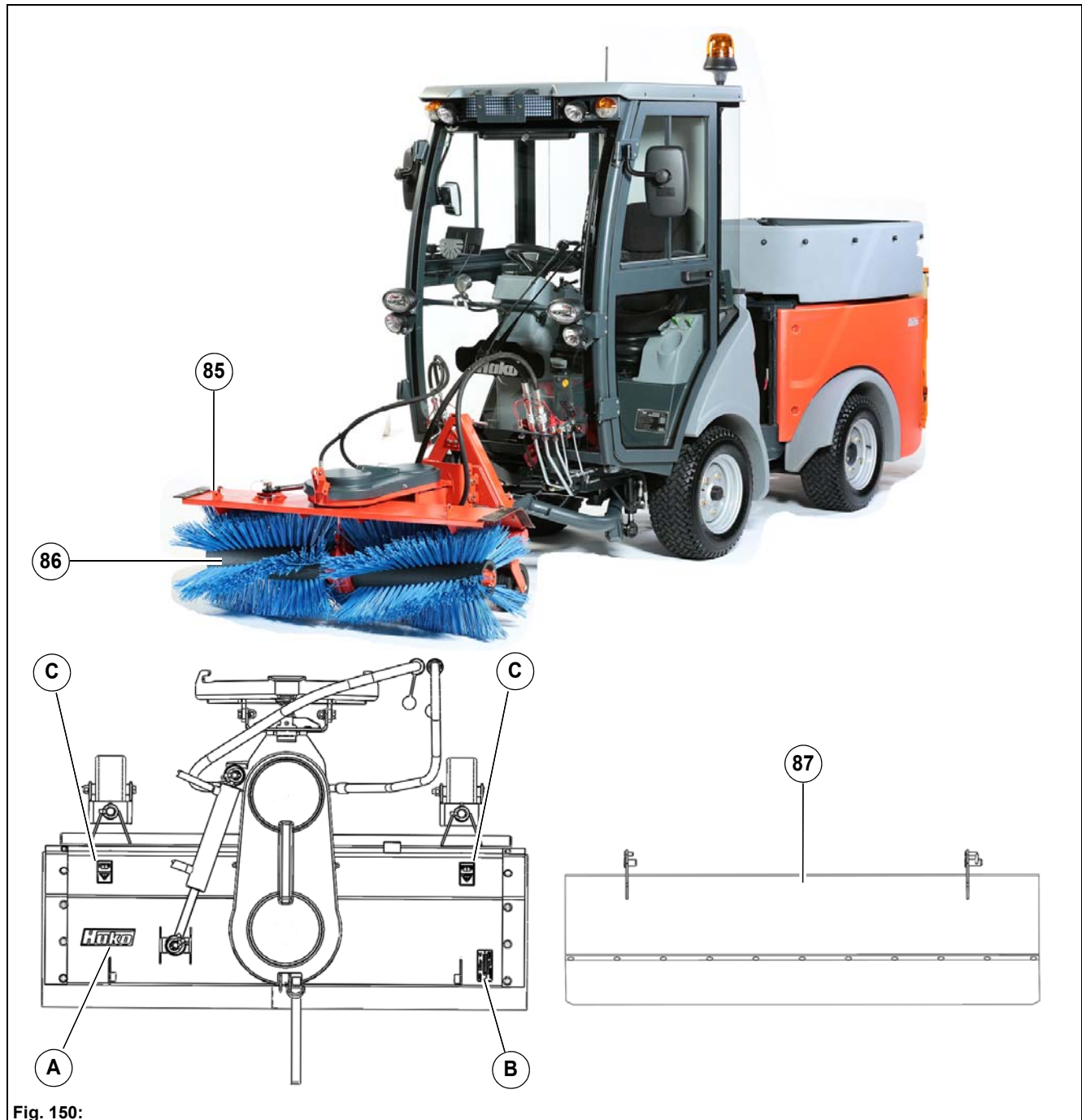


Fig. 150:

Item	Designation	Type
85	Front sweeping machine 130 cm	590110
86	Sweeping roller	5902
87	Spray shield	590210

6.3.1 Labels on the unit

Hako logo

The Hako logo **Fig. 150-A** is located on the right side of the front sweeping machine.

Type plate

The type plate **Fig. 150-B** is located on the left side of the front sweeping machine.

Label – Read operating manual

The Read operating manual label **Fig. 150-C** is located on the left and right side of the front sweeping machine.

6.3.2 Sweeping system safety instructions



Warning

- You must consult Hako before attaching other attachments not approved by Hako.
- 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.
- Adopt measures against erroneous starting and unwanted movement. Pull out the ignition key.
- Thorough and frequent cleaning is especially important after sweeping material containing salt during snow clearing.
- When sweeping with the front sweeping machine, small stones or other parts in the snow can be thrown out by the rotating brush. Check the secure seating of the sweeping brush before every sweeping operation. Secure the front sweeping machine against rolling away when mounting it.
- Check the secure seating of the sweeping brush before every sweeping operation.
- Modifying the safety equipment is not permitted!
- Secure the front sweeping machine against rolling away when mounting it.

Environmental protection

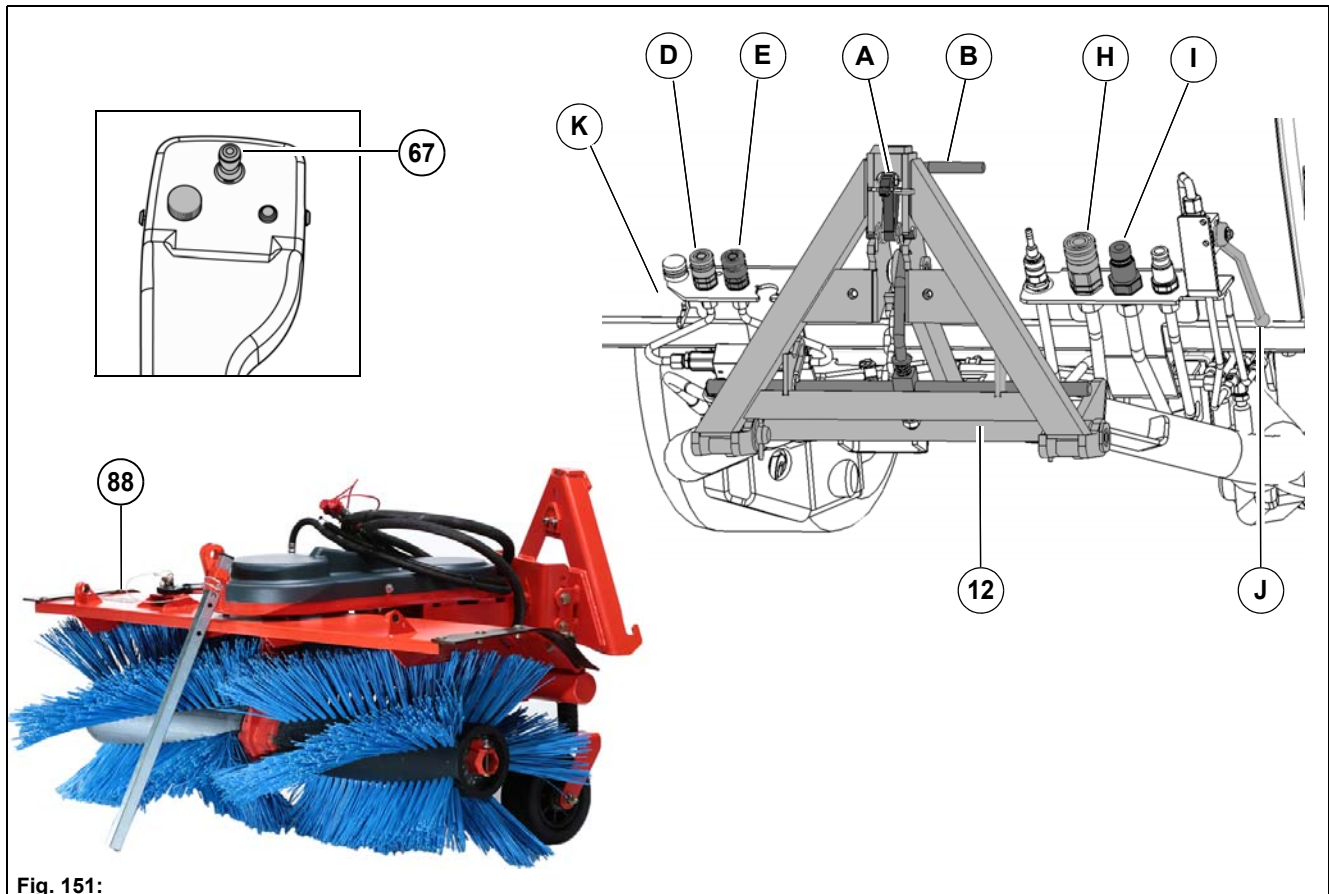
- Ensure safe and environment-conserving disposal of operating and auxiliary materials. Take up escaping or spilled operating materials in suitable containers and dispose of them in an environmentally friendly manner.

6.3.3 Mounting

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. 151-A** and locking rod **Fig. 151-B** on the coupling triangle.
3. Align the front sweeping machine **Fig. 151-88** centrally and in alignment with the coupling triangle.
4. Raise the front tool carrier **Fig. 151-12** with the joystick **Fig. 151-67** and attach the front sweeping machine.
5. Lock the front sweeping machine with locking hook and locking rod.
6. Close the valve **Fig. 151-J** for the suction mouth lift system.
7. Make the connections.
 - Front sweeping machine hydraulic motors – return = **Fig. 151-H**
 - Front sweeping machine hydraulic motors – supply = **Fig. 151-I**
 - Swivelling front sweeping machine – supply = **Fig. 151-D**
 - Swivelling front sweeping machine – return = **Fig. 151-E**
 - Coding plug X 63 = **Fig. 151-K**

Dismantling is in the reverse order.



6.3.4 Operation

Check-list – Before start-up of the sweeping system

No.	Description	Reference
1	Checking suction mouth lift system	Page 125
2	Checking front tool carrier	Page 125
3	Checking sweeping level	Page 160
4	Mounting the spray shield (summer operation)	Page 157
5	Setting the speed	Page 157
6	Adjusting the sweeping direction	Page 157

Mounting the spray shield

For summer operation set the spray shield **Fig. 152-87** on the holders **Fig. 152-A** of the front sweeping machine and secure with bolts and split-pins.

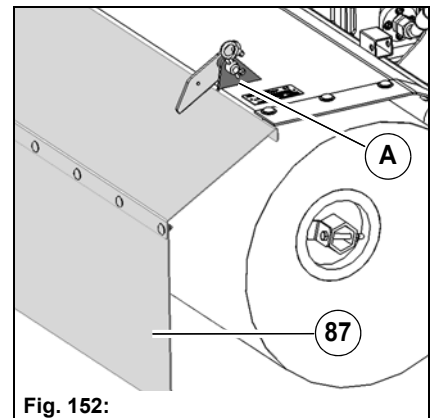


Fig. 152:

Adjusting the speed

The brush speed of the front sweeping machine can be adapted to the working conditions with the two-stage belt drive. The V-belt can be loosened by moving the handle **Fig. 153-A** so that it can be placed effortlessly in another stage. The speed can be further adapted with the switch for the fixed engine speed, see page 159.

- Summer operation: Stage **Fig. 153-B** (low speed)
- Winter operation: Stage **Fig. 153-C** (high speed)

Use a snow blade or a rotary snow plough in greater depths of snow.

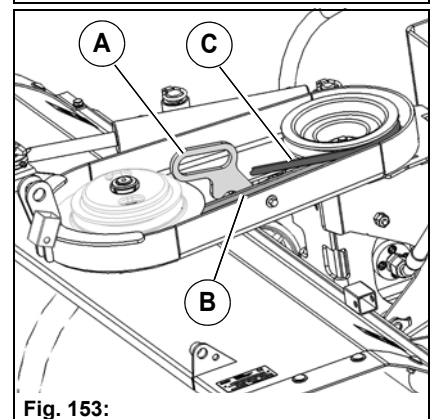


Fig. 153:

Adjusting the sweeping direction

Set the sweeping direction of the front sweeping machine with the joystick **Fig. 154-67**.

- Joystick to the left: The front sweeping machine swivels to the left.
- Joystick to the right: The front sweeping machine swivels to the right.

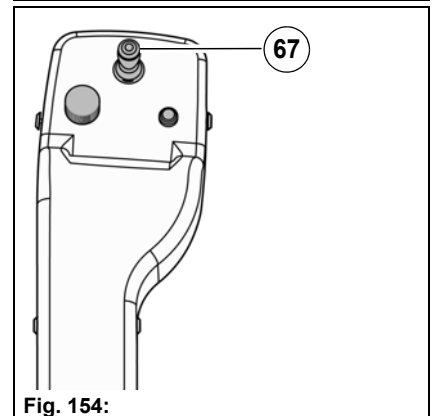


Fig. 154:

Check-list – Sweeping

No.	Description	Reference
1	Driving to the work site	Page 158
2	Switching sweeping on	Page 158
3	Setting the fixed engine speed	Page 159
4	Starting sweeping	Page 159

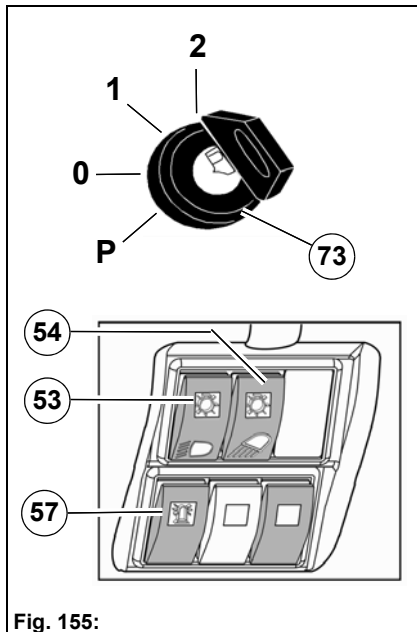


Fig. 155:

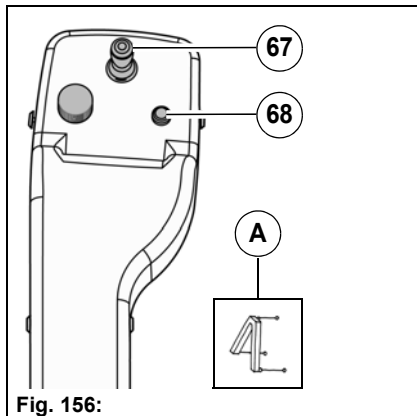


Fig. 156:

Driving to the work site

1. Bring the front sweeping machine into the transport position, see page 148.
2. Start the vehicle with the ignition switch **Fig. 155-73**.
3. As required, switch on the dipped headlight **Fig. 155-53**, working spotlight **Fig. 155-54** and beacon **Fig. 155-57**.
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. 156-67** back for this purpose.

Switching sweeping on

1. Switch on the work mode with the Hako button **Fig. 156-68**. The accelerator pedals must be in the neutral position. The coupling triangle work mode symbol appears in the multifunctional display **Fig. 156-A**.
2. Switch on the hydraulic circuit. Switch the hydraulic oil circuit I for front attachments on with the turn-push knob **Fig. 156-66**.
3. Lower the front sweeping machine with the joystick **Fig. 156-67**. 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 switch **Fig. 157-61**. Set the speed corresponding to the requirements.
The speed must be set so that a centrifuging effect is achieved.

Stage	Rpm	Use
1 – ECO	1900	At low load
2 – Standard	2250	For medium load
3 – Maximum	2630	For high load

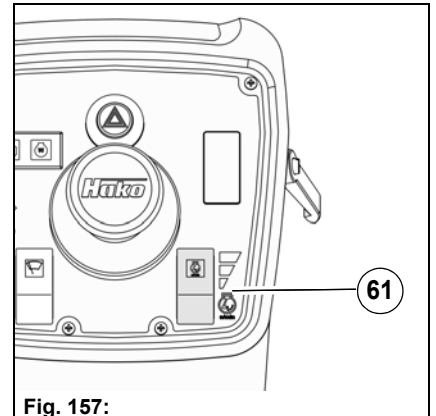


Fig. 157:

Starting sweeping

The accelerator pedal **Fig. 158-34** is used for continuously changing the speed for driving forwards.

The accelerator pedal **Fig. 158-35** 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 25 km/h
- work mode 15/20/25 km/h according to selected engine speed.

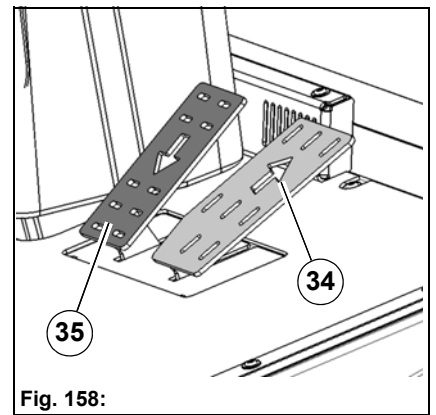


Fig. 158:

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. Loosen the support **Fig. 159-A** from the rear holder **Fig. 159-B** of the front sweeping machine by removing the bolt and split-pin.
2. Insert the support in the front holder **Fig. 159-C**.
3. Secure with bolt and split pin when the required supporting height is reached.

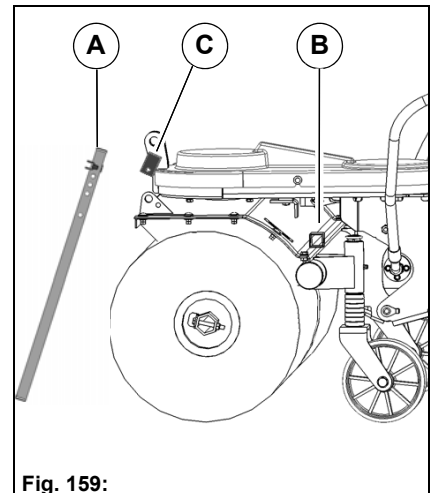


Fig. 159:

6.3.5 Technical data

Front sweeping machine	Unit	
Length	mm	900
Width	mm	1300/1500
Height	mm	673
Sweeping width	mm	1300/1500
Weight	kg	109
Sweeping roller diameter	mm	420

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

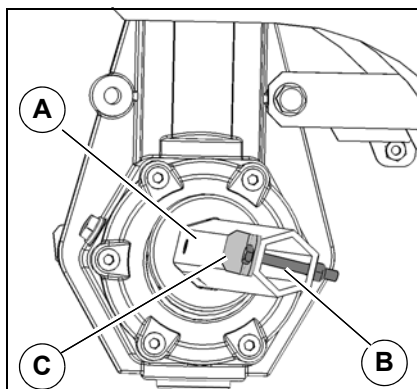


Fig. 160:

Changing the sweeping roller

1. Place the vehicle on a level surface and hold it with the parking brake. Raise the front sweeping machine with the joystick **Fig. 156-67**. Switch the engine off and pull out the ignition key.
2. The sweeping rollers are fastened to the support tube **Fig. 160-A** with screw **Fig. 160-B**, washer and angle plate **Fig. 160-C**. Loosen the screw and take everything off.
3. Fit a new sweeping roller with screw, washer and angle plate. You must readjust the sweeping level after changing the sweeping rollers.

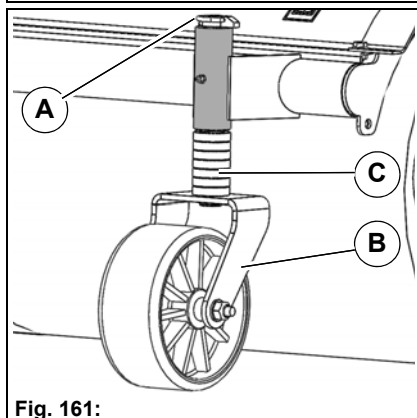


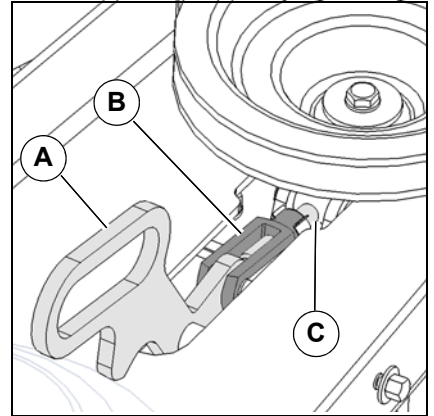
Fig. 161:

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. 156-67**.
 2. Remove the split-pin **Fig. 161-A** from the bolt of the wheel fork and withdraw the supporting wheels **Fig. 161-B** downwards.
 3. Adjust the sweeping level with the washers **Fig. 161-C** on both supporting wheels. For optimum sweeping effect the bristles should press over the ground approx. 20 cm.
 4. Reattach the supporting wheels and secure them with split-pins.
 5. Check the sweeping level on dust and chalk.

Checking the V-belt tension

1. Loosen the screws and remove the cover.
2. Pull up the handle **Fig. 163-A** for adjusting the V-belt.
3. Open the locking clamp and unhook the fork head **Fig. 163-B**.
4. Adjust the V-belt tension with the bolt **Fig. 163-C**.
5. Hook in the fork head, close the locking clamp and push the handle back down.



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. 163-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. 163-B** and fill with SAE 80W90 gearbox oil. Filling volume = 0.4 litres.
5. Insert the filling screw with new seal.

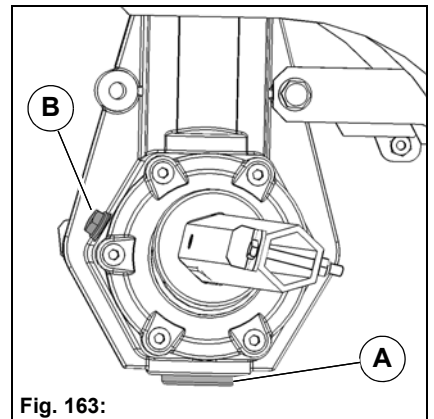


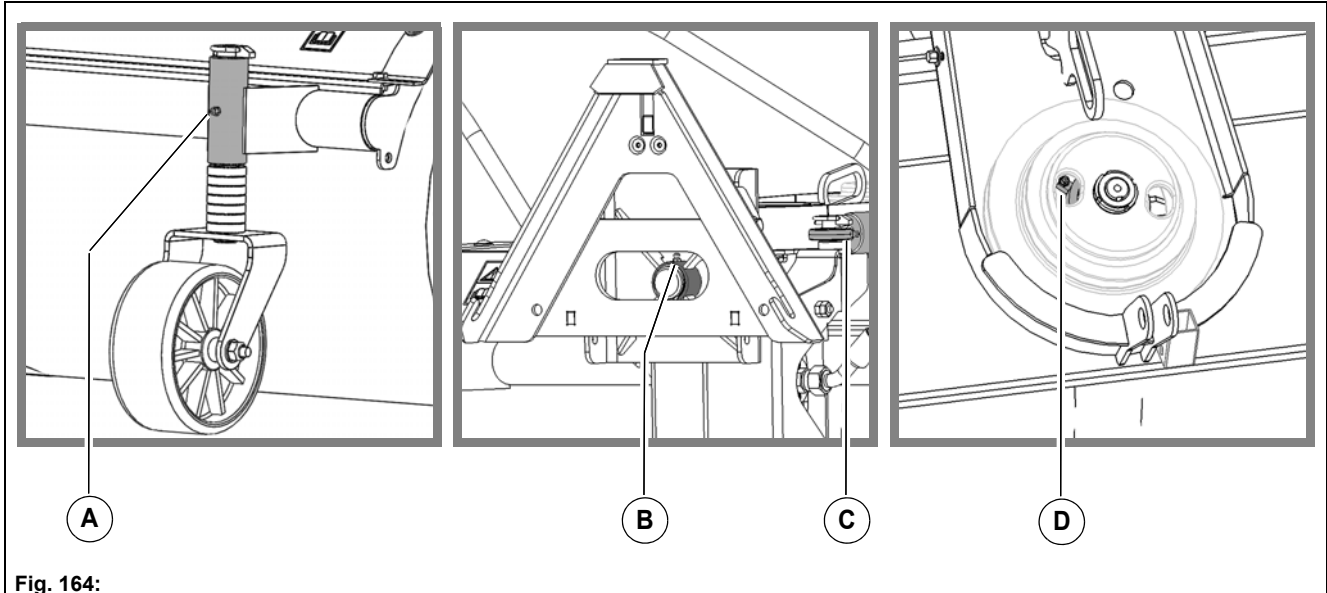
Fig. 163:

Lubrication points

Check the lubrication points weekly.

Grease: Mobilgrease MP

- Left/right supporting wheels (2 pcs.) **Fig. 164-A**
- Supporting tube on the coupling triangle (1 pc.) **Fig. 164-B**
- Rod eyes on the hydraulic cylinder (2 pcs.) **Fig. 164-C**
- Central drive shaft (2 pcs.) **Fig. 164-D**



6.3.7 Troubleshooting

Sweeping performance is bad	Remedy	Reference
Speed of the sweeping brush too low	Increasing the fixed engine speed	Page 159
Sweeping level out of adjustment	Adjusting the sweeping level	Page 160
V-belt slips	Tensioning the V-belt	Page 161
Sweeping roller worn	Changing the sweeping roller	Page 160

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

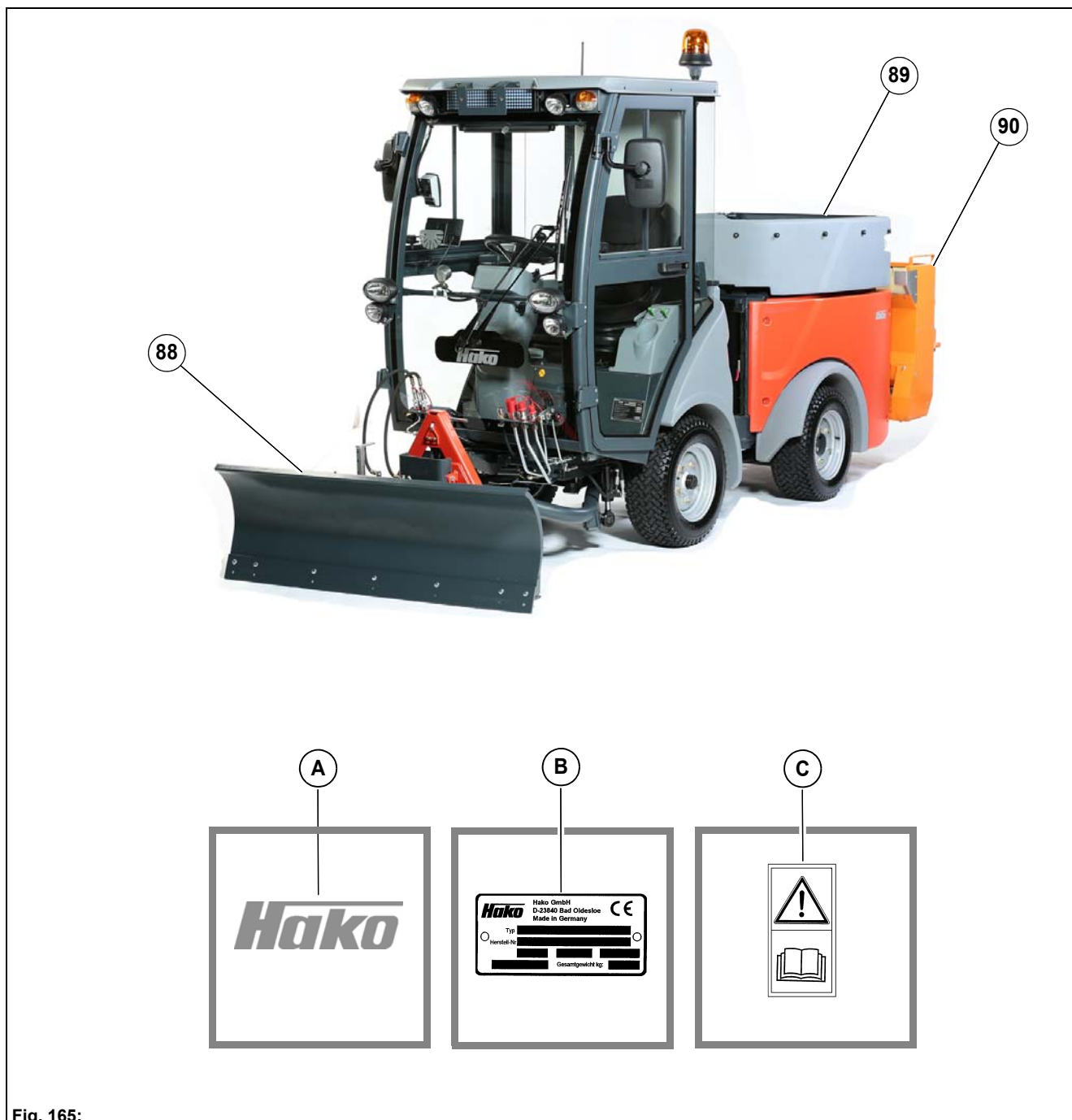


Fig. 165:

Item	Designation	Type
88	Snow blade 135 cm	570130
89	Loading platform	143810
90	Spreader	577600

6.4.1 Labels on the unit

Hako logo

A Hako logo **Fig. 165-A** is located on the snow blade, the loading platform and the spreader.


Type plate

A type plate **Fig. 165-B** is located on the snow blade, the loading platform and the spreader.

Label – Read operating manual

The Read operating manual label **Fig. 165-C** is located on the snow blade, the loading platform and the spreader.

6.4.2 Snow clearing system safety instructions

	<p>Warning</p> <ul style="list-style-type: none">• You must consult Hako before attaching other attachments not approved by Hako!• 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.• Adopt measures against erroneous starting and unwanted movement. Pull out the ignition key.• Thorough and frequent cleaning is especially important after sweeping material containing salt.• Modifying the safety equipment is not permitted!• Use winter operation only in connection with an uncoded attachment. In winter operation the front lift system is not limited downwards. There is a risk of an accident on unintended lowering of the attachment.
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6.4.3 Mounting

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. 166-A** and locking rod **Fig. 166-B** on the front tool carrier **Fig. 166-12**.
3. Align the mower **Fig. 166-88** centrally and in alignment with the front tool carrier.
4. Raise the snow blade with the joystick **Fig. 166-67** up into the end position.
5. Lock the snow blade with the locking hook and locking rod.
6. Close the valve **Fig. 166-C** for the suction mouth lift system.
7. Make the connections.
 - Swivel snow blade – supply = **Fig. 166-D**
 - Swivel snow blade – return = **Fig. 166-E**
 - Coding plug X 63 = **Fig. 166-F**

Dismantling is in the reverse order.

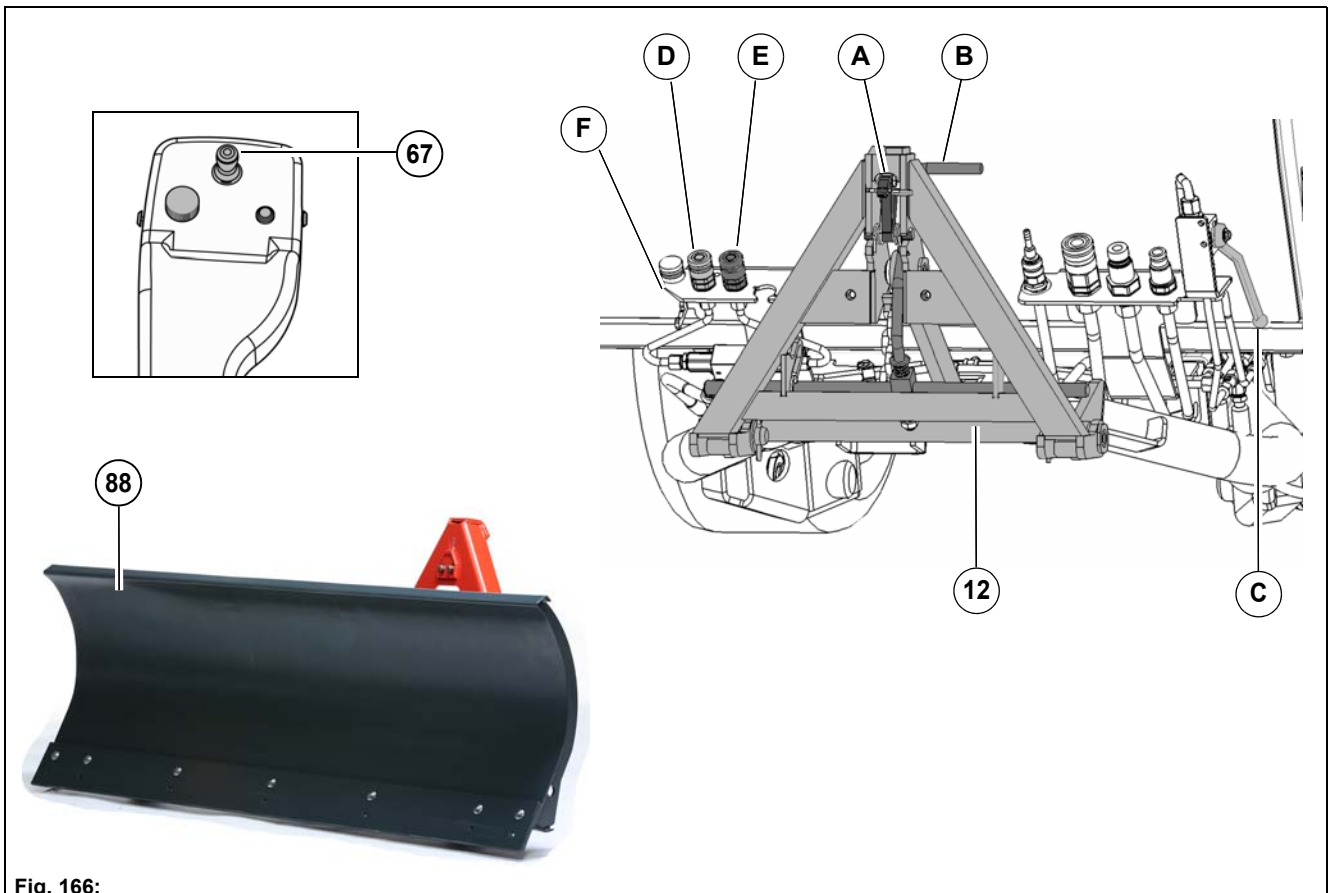


Fig. 166:

Mounting the loading platform

1. Place the vehicle on a level surface and hold it with the parking brake.
2. Unlock the lever **Fig. 167-A** of the trolley **Fig. 167-93** and swing it into the upper position.
3. Hold the lever **Fig. 167-A** in the upper position with one hand. With your other hand plug the mounting bolt **Fig. 167-B** on the Citymaster 600.

	Danger Risk of injury! The lever Fig. 167-A can swing over.
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4. Unlock the sledge **Fig. 167-C** with the lever and push it into the front position.

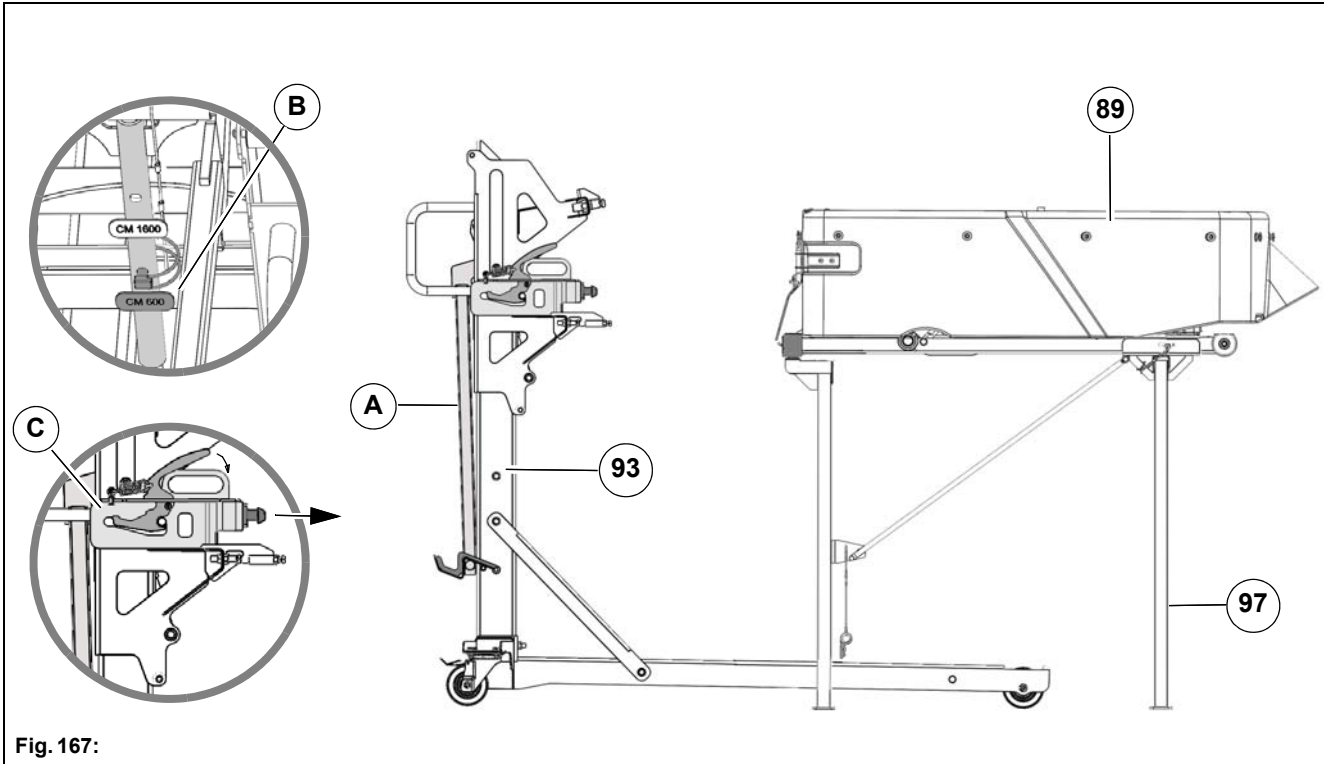


Fig. 167:

Continued – Mounting the loading platform



Danger

Risk of injury due to tilting over! Make sure that the cross strut **Fig. 168-G** has been inserted when transporting the loading platform on the supports **Fig. 168-97**. Secure the supports with bolts and splints.

5. Push the trolley with the lower positioning aid **Fig. 168-B** against the fixed bearings **Fig. 168-D** of the loading platform. The screw **Fig. 168-C** must be adjusted to 26 mm!
6. Carefully lower the lever **Fig. 168-A** of the trolley and make sure that the locking pins **Fig. 168-E** sit in the holders **Fig. 168-F** of the loading platform. Lock the lever **Fig. 168-A**.
7. Remove the supports **Fig. 168-97**. To do this, pull out the split pins and the bolts.

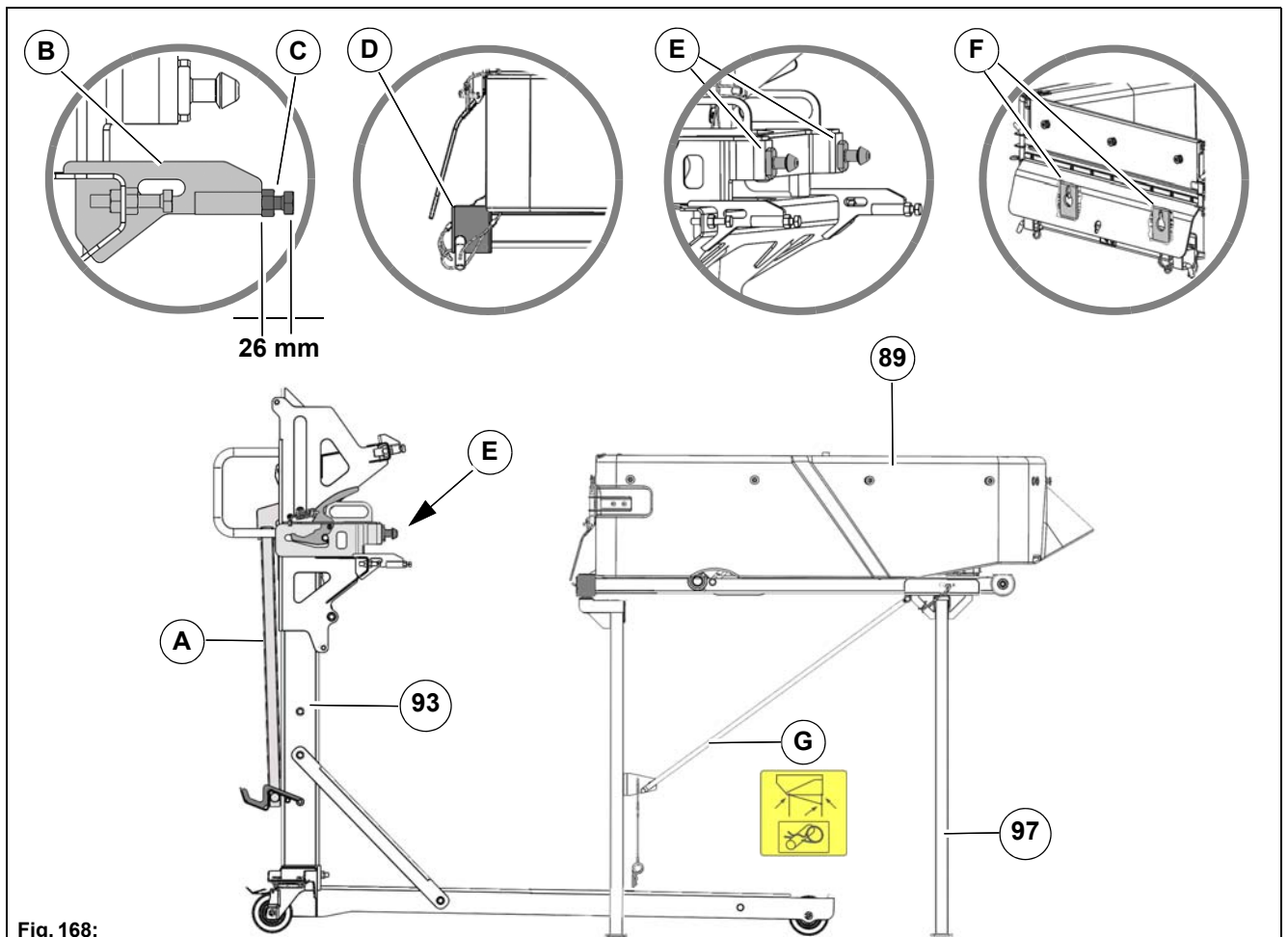


Fig. 168:

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. 169-X** with 5-10 mm. If necessary, correct with the screw **Fig. 169-A**.
 - Push the rollers of the loading platform up into the pockets **Fig. 169-B** of the rear wagon.
 - The holders **Fig. 169-C** of the loading platform and the holders **Fig. 169-D** of the rear wagon must be in alignment.
9. Unlock the lever **Fig. 169-E** of the trolley and lift the trolley carefully. 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 = **Fig. 169-D**
 - Loading platform raising/lowering – return = **Fig. 169-E**
- Dismantling is in the reverse order.

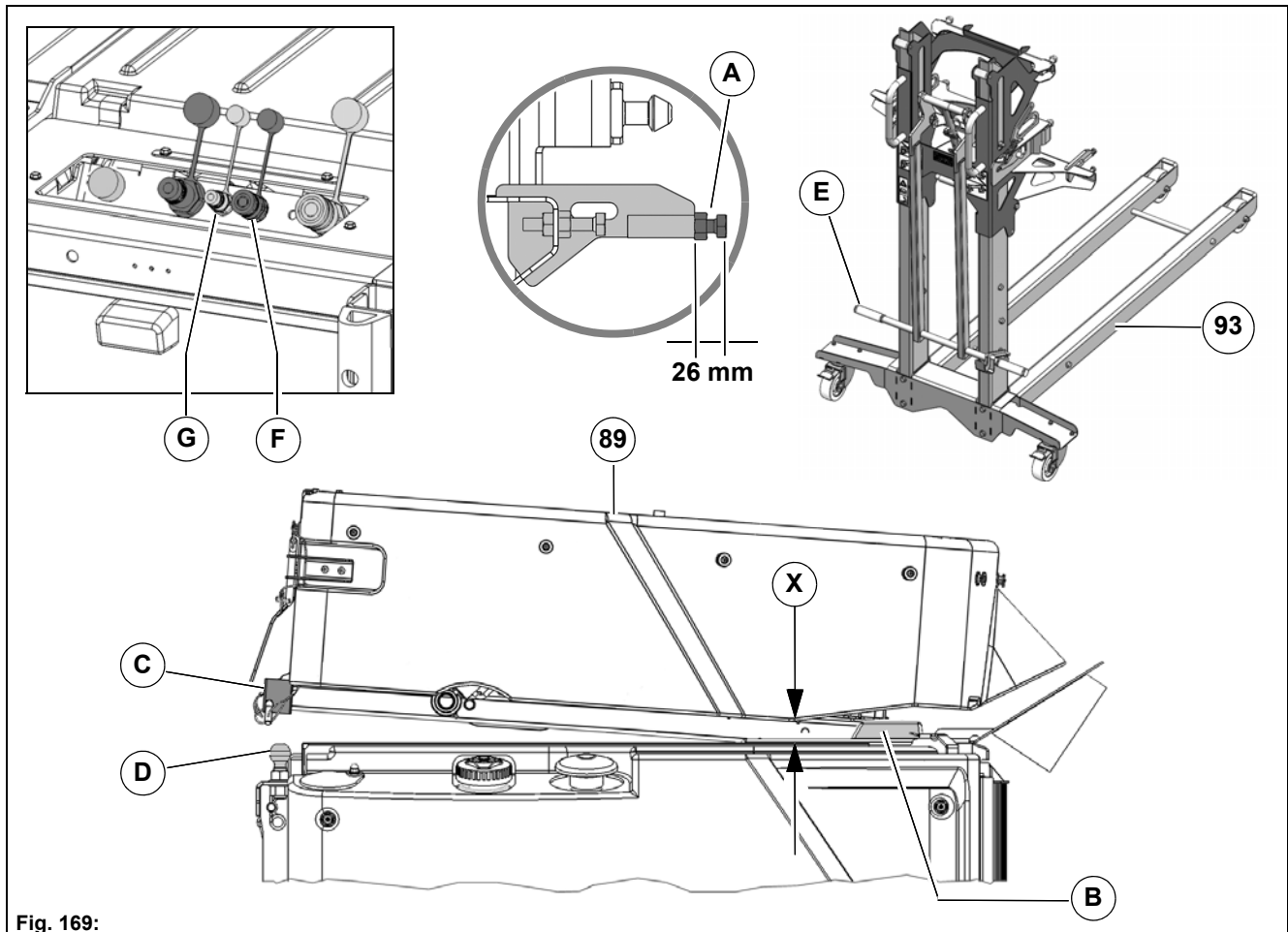


Fig. 169:

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 **Fig. 170-B**
 - Spreader roller hydraulic motor – return **Fig. 170-E**
 - Spreading disk hydraulic motor – supply **Fig. 170-C**
 - Spreading disk hydraulic motor – return **Fig. 170-D**
 - X65 – 7-pin socket for lighting **Fig. 170-G**
 - X67 – 7-pin socket for spreader **Fig. 170-H**
 - X68 – 7-pin socket for spreader **Fig. 170-I**
4. With both cranks **Fig. 170-J** of the trolley lower the spreader evenly onto the holding points **Fig. 170-F** 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.

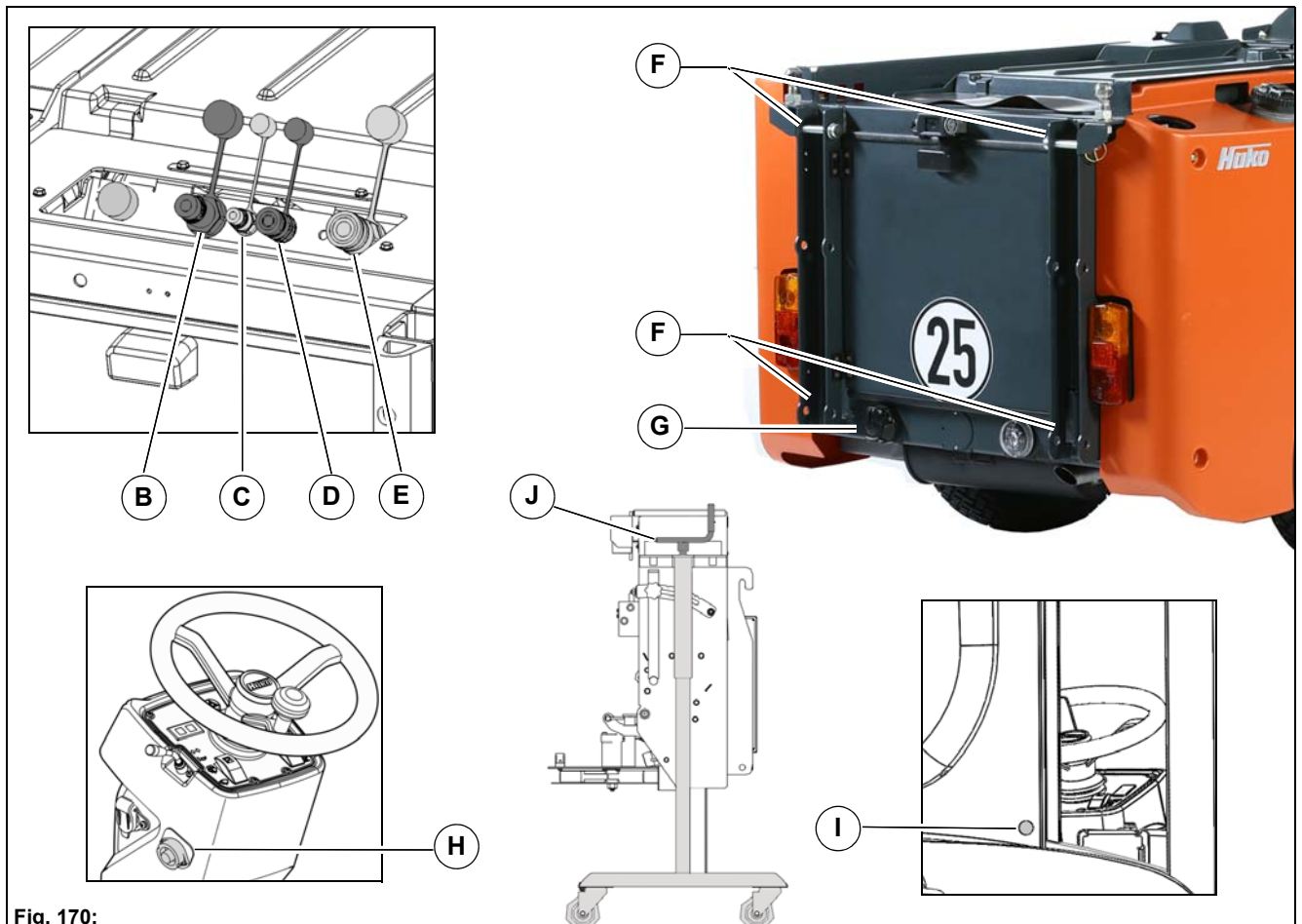
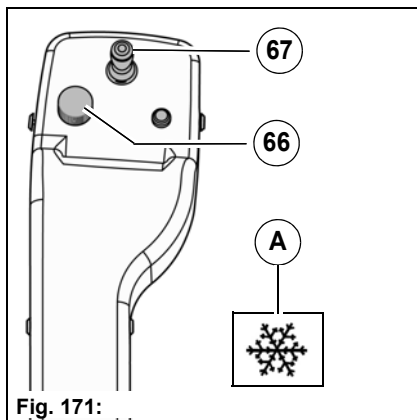


Fig. 170:

6.4.4 Operation

Check-list – Before start-up of the snow clearing system

No.	Description	Reference
1	Checking suction mouth lift system	Page 125
2	Checking front tool carrier	Page 125
3	Switching winter operation on	Page 170
4	Adjusting the attack angle	Page 170
5	Loading the loading platform and spreader	Page 170
6	Adjusting the spreading volume	Page 170
7	Adjusting the spreading width	Page 170



Switching winter operation on

Select the C menu in the multifunctional display with the turn-push knob **Fig. 171-66** and activate winter operation in the menu item E, see page 42. The Winter service information symbol **Fig. 171-A** appears in the multifunctional display.



Warning

Use winter operation only in connection with an uncoded attachment. 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. 171-67**.

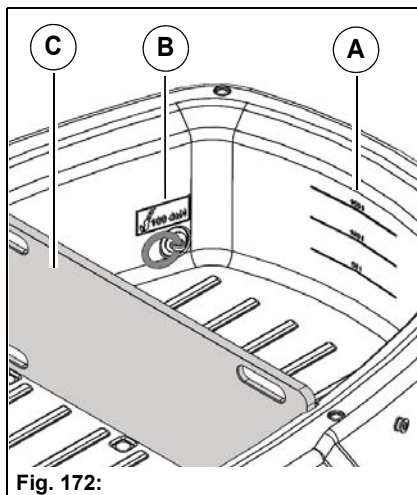
- Joystick to the left: The front attachment swivels to the left
- Joystick to the right: The front attachment swivels to the right

Loading the loading platform

Note when loading the loading platform:

- Load on the loading platform (bulk goods) with spreader attached maximum 150 kg.
- Load on the loading platform (bulk goods) with spreader not attached maximum 400 kg
- Load on the loading platform (piece goods) with spreader attached: max. 100 kg

Filling height of the loading platform, see mark **Fig. 172-A**. Load capacity of the tie-down eyes **Fig. 172-B**: max. 100 daN. You can use the separating board **Fig. 172-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.

Check-list – Snow clearing


No.	Description	Reference
1	Driving to the work site	Page 171
2	Switching snow clearing on	Page 171
3	Setting the fixed engine speed	Page 172
4	Starting snow clearing	Page 172

Driving to the work site

1. Bring the snow blade into the transport position, see page 148.
2. Start the vehicle with the ignition switch **Fig. 173-73**.
3. As required, switch on the dipped headlight **Fig. 173-53**, working spotlight **Fig. 173-54** and beacon **Fig. 173-57**.
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. 174-67** back for this purpose.

Switching snow clearing on

1. With the joystick **Fig. 174-67** lower the snow blade into the floating position.
2. Start snow clearing in the transport mode.

	<p>Note For snow clearing with the front sweeping machine, the procedure is similar to that described on page 154.</p>
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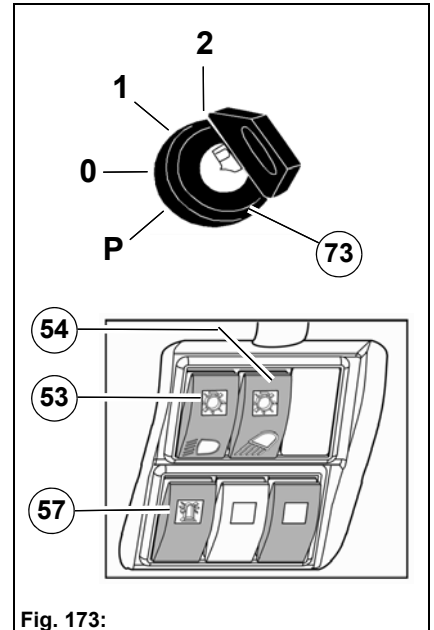



Fig. 173:

Switching spreading on

1. Switch the hydraulic oil circuit II for rear attachments on with the turn-push knob **Fig. 174-66**.
2. Start spreading in the transport mode.

	<p>Note Switch the spreader off with a time delay: The spreading run-on time can be set between 0 and 4 seconds in the C menu in menu item E (winter operation). Spreader fast emptying: Spreader fast emptying can be switched on and off in the C menu in menu item E (winter operation)</p>
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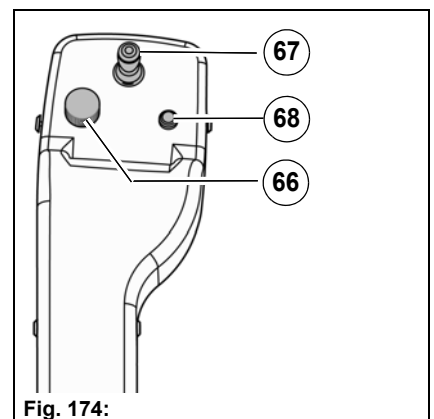


Fig. 174:

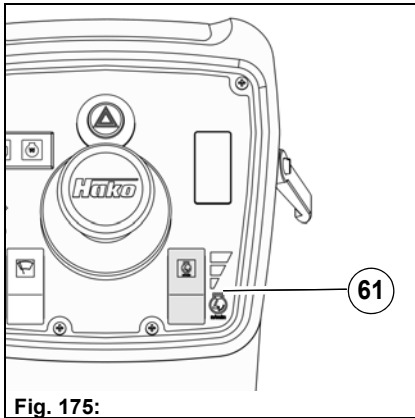


Fig. 175:

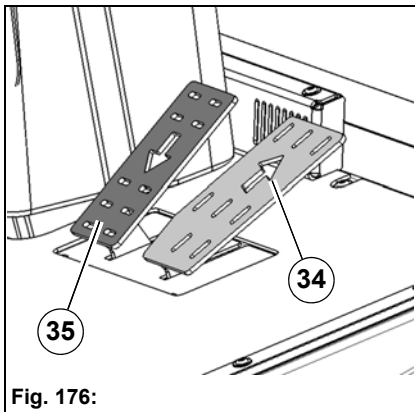


Fig. 176:

Setting the fixed engine speed

The fixed engine speed is set with the switch **Fig. 175-61**. Set the speed corresponding to the requirements.

Stage	Rpm	Use
1 – ECO	1900	At low load
2 – Standard	2250	For medium load
3 – Maximum	2630	For high load

Starting snow clearing

The accelerator pedal **Fig. 176-34** is used for continuously changing the speed for driving forwards.

The accelerator pedal **Fig. 176-35** 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 25 km/h
- work mode 15/20/25 km/h according to selected engine speed.

6.4.5 Technical data

Snow blade	Unit	
Working width	mm	1350
Share height	mm	450

Loading platform	Unit	
Load on the loading platform (bulk goods) with attached spreader	kg	max. 150
Load on the loading platform (bulk goods) with not attached spreader	kg	max. 400
Load on the loading platform (piece goods) with not attached spreader	kg	max. 100

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 snow clearing system.

6.5 Transport system



Fig. 177:

Item	Designation	Type
91	Trailer	2516

6.5.1 Labels on the unit

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

6.5.2 Safety instructions



Warning

- You must consult Hako before attaching other attachments not approved by Hako.
- 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.
- Adopt measures against erroneous starting and unwanted movement. Pull out the ignition key.

6.5.3 Mounting

Mounting the trailer hitch plate (optional)

The trailer hitch plate **Fig. 178-A** is mounted without tools to the tail of the vehicle.

1. Remove the locking pins **Fig. 178-B** of the four bolts **Fig. 178-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. 178-D** of the vehicle tail.

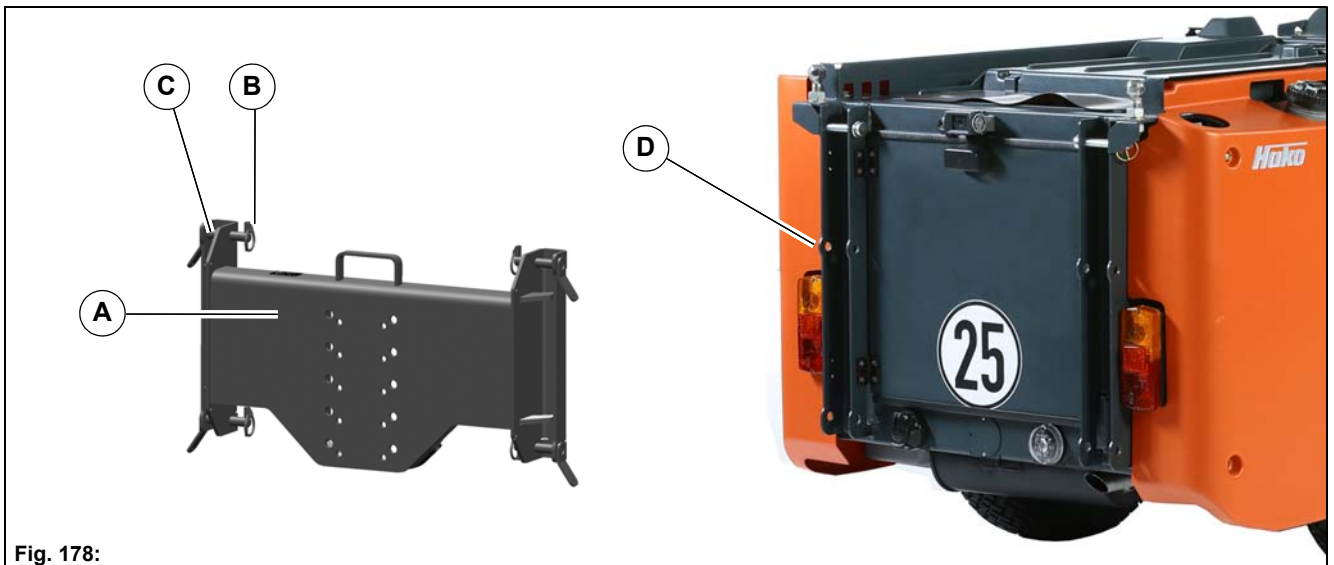


Fig. 178:

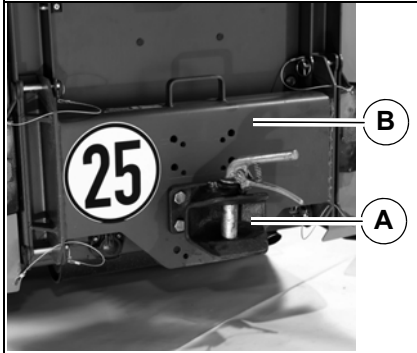


Fig. 179:

Mounting the jaw coupling (optional)



Note

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

Mount the jaw coupling **Fig. 179-A** with the bolts, washers and nuts to the optional trailer hitch plate **Fig. 179-B** in the wanted height. Four setting heights are available.

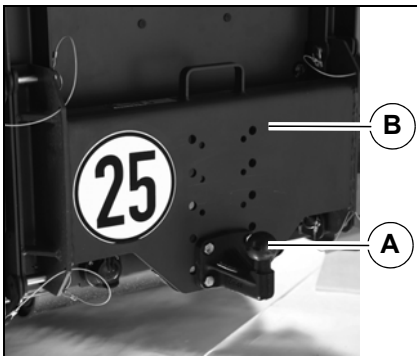


Fig. 180:

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 **Fig. 180-A** with the bolts, washers and nuts to the optional trailer hitch plate **Fig. 180-B** in the wanted height. Four setting heights are available.

Mounting the loading platform

Mounting the loading platform, see page 166.

6.5.4 Operation

Starting transport

The accelerator pedal **Fig. 181-34** is used for continuously changing the speed for driving forwards.

The accelerator pedal **Fig. 181-35** 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 25 km/h
- work mode 15/20/25 km/h according to selected engine speed.

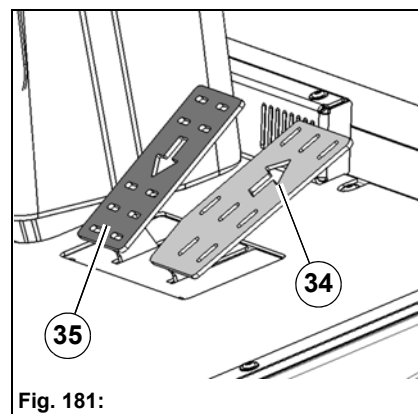


Fig. 181:

6.5.5 Technical data

Single-axle trailer	Unit	
Length	mm	1800
Width	mm	1000
Height	mm	300
Payload	kg	800
Trailer hitch plate	Unit	
Trailer load braked	kg	1750
Trailer load unbraked	kg	500
Support load	kg	max. 150

Technical data of the loading platform, see page 173.

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 Options

Item	Designation	Type
92	Trolley for sweeping unit	148610
93	Trolley for dirt hopper and loading platform	148602
94	Hand suction hose	144510
95	High-pressure cleaner	113910
96	Trailer hitch	350402
97	Supports	148620
98	Hydrant kit	113410
99	Reversing camera	144610
100	Dirt vacuum indicator	843500
101	7-pin control cable	262200
102	Odometer	261910
103	Preparation for radio	261310
104	Lawn tyres	301600
105	Mudguard extension	307110
106	Additional working spotlights above	261800
107	Reversing light and signal generator	144710
108	Comfort driver's seat	844702
109	Heatable outside mirror	843130
110	Battery isolating switch	261410
111	Cab roof repeat lighting for driving on the right	261810
112	Cab roof repeat lighting for driving on the left	261812
113	Sound insulation package	147300
114	Additional camera	144611
115	Dirt hopper comfort and safety package	147510
116	Adjustable upper link	351200
117	Rear attachment weight holder	344110
118	Ballast weight 17 kg	343900
119	Hydraulic hand pump	147520
120	Front attachment weight holder	344000
121	Path-dependent roller spreader control	577620

**Hako GmbH
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declare in sole responsibility that the following products

**Front sweeping machine – Citymaster 600 Type: 5901
Snow blade – Citymaster 600 Type: 5701
Loading platform – Citymaster 600 Type: 2508
Dirt hopper – Citymaster 600 Type: 1475
Sweeping unit – Citymaster 600 Type: 1476
Fast-changing trolley – Citymaster 600 Type: 1486**

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 specifications was/were referred to for the correct implementation of the safety and health requirements named in the EC Directive:

EN 13019

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

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

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

We are here for you day and night

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

Reliable cleanliness

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

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