KRAMER

Operator's Manual

Wheel loader

8105
8115 / 8115L

Machine model	**352-03S / 352-04S / 352-04L**
From serial no.	**352 03 0001 / 352 04 0001**
Version	**3.0**
Doc. Number	**1000328043**
Language	**[en]**

Further documentation	Order no.	Order no.
Service Booklet	[de]	1000159213
	[en]	1000159214
	[fr]	1000159215
Spare parts list model **352-03S**	[de, en, fr]	1000322212
Spare parts catalogue model **352-04S / 352-04L**	[de, en, fr]	1000322213

Legend	
Original Operator's Manual	**x**
Translation of original Operator's Manual	–
Version	3.0
Date	03/2016
Document	BA 35203_04 *

KRAMER-WERKE GmbH keep abreast of the latest technical developments and constantly improve their products. For this reason, we may from time to time need to make changes to figures and descriptions in this documentation that do not reflect products that have already been delivered and that will not be implemented on these machines.

Technical data, dimensions and weights are only given as an indication. Responsibility for errors or omissions not accepted.

The cover features the machine with possible optional equipment.

Kramer-Werke GmbH

Wacker-Neuson-Str. 1

D-88630 Pfullendorf

Tel. 0080090209020
E-mail info@kramer.de
www.kramer.de

Table of contents

EC Declaration of Conformity

Original declaration of conformity

Manufacturer

Kramer-Werke GmbH, Wacker-Neuson-Str. 1, D-88630 Pfullendorf

Product

Vehicle designation model	Wheel loader 352					
Ausführung	352-03S			352-04S (352-04L)		
Trade name	8105			8115 (8115L)		
Serial number	352 03 _ _ _ __ _ _ __ _ _ _			352 04 _ _ _ __ _ _ __ _ _ _		
Engine/output kW	TCD 2.9 /55.4	TCD 3.6 / 74.4		TCD 2.9 / 55.4	TCD 3.6 / 74.4	
Measured sound power level dB(A)	100,4	100,8		100,4	100,8	
Guaranteed sound power level dB(A)	101	102 level IIIb	101 level IV	101	102 level IIIb	101 level IV

Conformity assessment procedure

According to 2000/14/EC appendix VIII

Notified body involved in procedure

DGUV Test Prüf- und Zertifizierungsstelle (EU identification number: 0515)
Fachbereich Bauwesen
Landsberger Str. 309
D-80687 Munich

Applied directives and standards

We hereby declare that this product corresponds to the relevant regulations and requirements of the following EC Directives and standards:
2006/42/EC, 2000/14/EC, 2003/37/EC, EN 13309
DIN EN ISO 12100: 2010, DIN EN 474-1 and 3

Authorized representative for the compilation of technical documentation

Kramer-Werke GmbH
Product Development
Wacker-Neuson-Str. 1
D-88630 Pfullendorf

Pfullendorf, (date) _ _ . _ _ _ _

M. Arndt
Head of product development
Kramer-Werke GmbH

1 Preface

1.1 Operator’s Manual

Important information on the operating personnel

This operator's manual only applies to the machines on the cover sheet.

It provides information on how to use, adjust and operate the machine, and on how to perform maintenance on it, and is therefore only intended for the operator and operating company.

Before driving or using the machine for the fi?rst time, the user must be briefed on this machine and must carefully read and understand this operator's manual, in particular chapter **"Safety instructions"**.

Work on the machine may only be performed by trained and instructed technical personnel that has been authorized by the operating company. Any person involved in operation, inspection, maintenance, servicing, repair work or transport of the machine must read, understand and follow the complete instructions in the Operator’s Manual and in particular the safety instructions.

The buyer/operating company is responsible for the operators’ training in safe working on and with the machine. Kramer-Werke GmbH recommends repeating training at regular intervals.

The buyer/operating company is responsible for ensuring that any additional safety regulations applicable in the country of use of the machine are followed.

The machine may only be operated by persons who are physically, mentally and professionally suited for this work.

- Persons under the influence of alcohol or drugs may **not** use the machine.

The operator is the person performing machine operation and/or travel.

- Before putting the machine into operation, the operator of the machine must ensure that it is in a perfect condition, and during operation he must pay attention to the regulations regarding operation.
- The operator is responsible for ensuring that the machine and its use do not pose a risk.
- Before working with the machine, the operator must familiarize himself with all the control elements and their functions, and with the handling of the machine.

Information

Careful and prudent working is the best way to avoid accidents!

Important information on this Operator’s Manual

- The operator's manual and any amendments form part of the machine and must always be available at the place of use of the machine.
- Store this Operator’s Manual in the storage compartment or net provided for this in the cabin.
- Immediately replace an incomplete or illegible operator's manual by a new one.
- In addition to the operator's manual, observe and instruct the operator in all other generally applicable, legal and other mandatory regulations relevant to accident prevention and environmental protection.
- Please contact your dealer if you require more information on the machine and the Operator’s Manual.
- We keep abreast of the latest technical developments and constantly improve our products. For this reason, we may from time to time need to make changes to figures and descriptions in this documentation that do not reflect products that have already been delivered and that will not be implemented on these machines.
- Technical data, dimensions and weights are only given as an indication. Responsibility for errors or omissions not accepted.

Explanation of symbols

The indication **left** or **right** in the descriptions always refers to the travel direction of the machine.

Symbols	Explanation
•	Identifies a general list
1	Identifies a list in a table (position numbers)
2	
1.	Identifies activities that must be performed in a certain order
2.	
➥	Identifies results
▶	Identifies things to be avoided in the warning and safety instructions

Abbreviations

Abbreviation	Explanation
(opt)	Option
Fig.	Figure
General certification	National Type Approval (Germany)
ATF	Automatic Transmission Fluid (lubricant)
Order no.	Order, item or part number
BG	Employer's liability insurance association
BGG	Employer's liability insurance association principles
BGV	Employer's liability insurance association rules and regulations
o/h	Operating hours
resp.	respectively
approx.	circa (about)
DGUV	German statutory accident insurance
DIN	German Institute of Standardization
Doc.	Document
EBE	Authorisation for stand-alone operation
EC	European Community
EN	European Standard
etc.	et cetera
EU	European Union
poss.	possibly
FOPS	Falling Object Protective Structure
FZV	Vehicle licensing regulation
if nec.	if necessary
ISO	International Organization of Standardization
LED	Light Emitting Diode
Trucks	Trucks
LoF	Agricultural or forestry
LWA	Sound power level
max./MAX.	maximum
min./MIN.	minimum
No.	Number
o.s.	or similar
OK	okay
Cars	Cars

Abbreviation	Explanation
ROPS	Roll Over Protective Structure
RZ	Ripper tooth
SAE	Society of Automotive Engineers, viscosity class for motor oil
StVZO (German traffic regulations)	German Traffic Regulation
etc.	et cetera
VDE	Association of Electrical Engineering, Electronics and Information Technology
e.g.	for example

1.2 Warranty and liability

Warranty claims can be made only if the conditions of warranty have been observed.

They are included in the General Conditions of Sales and Delivery for new machines and spare parts sold by the dealers. Furthermore, the instructions in this Operator's Manual must be observed.

Information on maintenance, repairs and spare parts

Operational safety and readiness of the machine do not only depend on your reliable control, but also on maintenance and servicing of the machine. This is why regular maintenance and servicing is absolutely necessary.

Information

Repair work, maintenance or modifications may only be performed by specifically trained technical personnel or by an authorized service center!

Pay particular attention to chapters "Information on maintenance" and "Maintenance overview".

Information

Insist on using original spare parts for repairs!

The machine's permits, certifications, registrations, etc., may be withdrawn if machine parts/components with a prescribed condition or quality, or machine parts/components that can put persons at risk during operation, are subsequently modified or exchanged.

2 Safety

2.1 Safety symbols and signal words

Explanation

The following symbol identifies safety instructions. It is used for warning against potential personal risk or danger.

DANGER

DANGER identifies a situation causing death or serious injury if it is not avoided.

Consequences in case of non-observance.

► Avoidance of injury or death.

WARNING

WARNING identifies a situation that can cause death or serious injury if it is not avoided.

Consequences in case of non-observance.

► Avoidance of injury or death.

CAUTION

CAUTION identifies a situation that can cause injury if it is not avoided.

Consequences in case of non-observance.

► Avoidance of injury.

NOTICE

IMPORTANT identifies a situation that causes damage to the machine if it is not observed.

► Avoidance of damage to property.

2.2 Conduct and safety instructions

Prerequisites for operation

- The machine has been designed and built in accordance with state-of-the-art standards and the recognized safety regulations. Nevertheless, its use can cause danger to the operator or other persons, or damage to the machine.
- Store this Operator's Manual in the place provided for this in or on the machine. Immediately replace a damaged or illegible Operator's Manual and any supplements to it.
- The machine must only be operated in accordance with its designated use and the instructions set forth in this Operator's Manual.
- The operator and owner are obligated not to put into operation or operate a damaged or malfunctioning machine.
  - If a damage or malfunction occurs during operation, put the machine out of operation immediately and secure it against restart.
  - Have all malfunctions jeopardizing the safety of the operator or other persons immediately repaired by an authorized service center.
- Do not put the machine into operation or operate it after an accident; have it inspected for damage by an authorized service center.
  - Have the seat belt replaced by an authorized service center after an accident, even if there is no visible damage.
  - Cabin and protective structures
- Remove all dirt, snow and ice from climbing aids (for example handholds, footholds, handrails).
- The owner is responsible for requiring the operating and maintenance personnel to wear protective clothing and equipment as required by the circumstances.

2.3 Qualification of operating and maintenance personnel

Owner's duties

- Only allow specifically authorized, trained and experienced persons to operate, drive and perform maintenance on the machine.
- Do not allow persons to be trained or instructed by anyone other than an authorized and experienced person.
- Have persons to be trained or instructed practice under supervision until they are familiar with the machine and its behavior (for example with the steering and braking behavior).
- Access to the machine or machine operation is prohibited for children and persons under the influence of alcohol, drugs or medicine.
- Clearly and unequivocally define the responsibilities of the operating and maintenance personnel.
- Clearly and unequivocally define the responsibilities on the job site, also in view of traffic regulations.
- Give the operator the authority to refuse instructions by other persons that are contrary to safety.
- Have the machine serviced and repaired only by an authorized service center.

Required knowledge of operator

- The operator is responsible for other persons.
- Avoid any operational mode that might be prejudicial to safety.
- The specific national driving license is required.
- The machine may only be operated by authorized and safety-conscious persons who are fully aware of the risks involved in operating the machine.
- The operator and owner are obligated to operate the machine only in a safe and working condition.
- All persons working on or with the machine must have read and understood the safety instructions in this Operator's Manual before starting work.
- Follow, and instruct the operator in, legal and other mandatory regulations relevant to accident prevention.
- Observe and instruct the operator in regulations regarding road traffic and environmental protection.
- Use only the defined accesses for getting on and off the machine.
- Be familiar with the emergency exit of the machine.

Preparatory measures for the operator

- Before starting, check the machine whether it can be driven and operated safely.
- Tie back long hair and remove all jewelry.
- Wear close-fitting work clothes that do not hinder movement.

2.4 Operation

Preparatory measures

- Operation is only allowed with correctly installed and intact protective structures.
- Keep the machine clean. This reduces injury, accident and fire hazards.
- Safely store objects you carry with you in the places provided for this (for example in the storage compartment, drinks holder).
- Do not carry objects with you that protrude into the operator's work space. They can create another danger in case of an accident.
- Observe all safety, warning and information labels.
- Start and operate the machine only with the seat belt fastened and only from the place provided for this.
- Check the condition and the fastening of the seat belt.
  Have malfunctioning seat belts and mounting hardware replaced by an authorized service center.
- Before starting work, adjust the seating position so that all control elements can be reached and fully operated.
- Perform the personal adjustment at machine standstill only (for example of the operator seat, steering column).
- Ensure that all safety devices are properly installed and functional before starting work.
- Before starting work or after interrupting work, ensure that the brake, steering, signaling and light systems are functional.
- Before putting the machine into operation, ensure that nobody is in the danger zone.

Job site

- The operator is responsible for other persons.
- Before starting work, familiarize yourself with the job site.
  This applies to, for example:
  - Obstacles in the job site and machine travel area
  - Any barriers separating the job site from public roads
  - Soil weight-bearing capacity
  - Existing overhead and underground lines
  - Special operating conditions (for example dust, steam, smoke, asbestos)
- The operator must know the maximum dimensions of the machine and the attachment – see “Technical data”.
- Maintain a safe distance
  (for example from buildings, edges of building pits).
- During work in buildings or in enclosed areas, look out for:
  - Height of the ceiling/clearances
  - Width of entries/passages
  - Maximum load of ceilings and floors
  - Sufficient room ventilation (for example risk of carbon monoxide poisoning)
- Use existing visual aids to stay aware of the danger zone.
- In conditions of darkness and poor visibility, switch on existing work lights and ensure that motorists are not blinded by these lights.
- If the existing lights of the machine are not sufficient for performing work safely, ensure additional lighting of the job site.
- Due to hot machine parts, maintain a safe distance from easily flammable material (for example from hay, dry leaves).

Danger zone

- The danger zone is the area in which persons are in danger due to the movements of the machine, attachment and/or load.
- The danger zone also includes the area that can be affected by falling material, equipment or by parts that are thrown out.
- Extend the danger zone sufficiently in the immediate vicinity of buildings, scaffolds or other elements of construction.
- Seal off the danger zone should it not be possible to keep a sufficient safety distance.
- Stop machine operation immediately if persons do not stay clear of the danger zone.

Carrying passengers

- Carrying passengers with the machine is PROHIBITED.
- Carrying passengers on/in attachments/tools is PROHIBITED.
- Carrying passengers on/in trailers is PROHIBITED.

Mechanical integrity

- The operator and owner are obligated to operate the machine only in a safe and working condition.
- Operate the machine only if all protective and safety-oriented equipment (for example protective structures such as a cabin or rollbar, removable safety devices) is installed and functional.
- Check the machine for visible damage and defects.
- In case of damage and/or unusual behavior, put the machine out of operation immediately and secure it against restart.
- Have all malfunctions jeopardizing the safety of the operator or other persons immediately repaired by an authorized service center.

Starting the engine of the machine

- Start the engine only according to the Operator's Manual.
- Observe all warning and indicator lights.
- Do not use any liquid or gaseous starting aids (for example ether or starting fuel).

Machine operation

- Start and operate the machine only with the seat belt fastened and only from the place provided for this.
- Put the machine into operation only if visibility is sufficient (have another person guide you if necessary).
- Operation on slopes:
  - Travel/work only uphill or downhill.
  - Avoid machine travel across a slope, observe the machine's permissible inclination (and of the trailer if necessary).
  - Keep loads on the uphill side of the machine and as close as possible to it.
  - Keep attachments/work equipment close to the ground.
- Adapt the travel speed to the circumstances (for example the ground conditions, weather conditions).
- There is increased danger during backward machine travel. Persons in the blind spot of the machine cannot be seen by the operator.
  - Ensure that nobody is in the danger zone when you change the travel direction.
- Never get on a moving machine and never jump off the machine.

Machine travel on public roads/sites

- The specific national driving license is required.
- Observe the national regulations (for example the road traffic regulations) during machine travel on public roads/sites.
- Ensure that the machine is in compliance with the national regulations.
- In order not to blind other motorists, using the existing work lights during machine travel on public roads/site is prohibited.
- When crossing for example underpasses, bridges, tunnels, ensure that the clearance height and width is sufficient.
- The attachment fitted onto the machine must be certified for travel on public roads/sites (see for example the registration documents).
- The attachment fitted onto the machine must be empty and in transport position.
- The mounted attachment must be equipped with the mandatory lighting and protective devices.
- Take measures against unintentional operation of the operating hydraulics.
- If the machine has different steering modes, ensure that the mandatory steering mode is selected.

Stopping the engine of the machine

- Stop the engine only according to the Operator's Manual.
- Before stopping the engine, lower the work equipment/attachment to the ground.

Stopping and securing the machine

- Unbuckle the seat belt only after stopping the engine.
- Before leaving the machine, secure it to prevent it from rolling away (for example with the parking brake, suitable wheel chocks).
- Remove the starting key and secure the machine against unauthorized operation.

2.5 Lifting gear applications

Requirements

- Have loads fastened and the operator guided by a qualified person having specific knowledge of lifting gear applications and the usual hand signals.
- The person giving instructions to the operator must stay in visual contact with the operator when fastening, guiding or removing the load (maintain visual contact).
- If this not be possible, ask one more person with the same qualifications to guide.
- The operator may not leave his seat as long as the load is raised.

Fastening, guiding and removing loads

- Follow the applicable specific regulations for fastening, guiding and removing a load.
- Wear protective clothing and equipment when fastening, guiding and removing loads (for example a hard hat, safety glasses, protective gloves, safety boots).
- Do not place lifting and fastening gear over sharp edges or rotating parts. Loads must be fastened so as to prevent them from slipping or falling.
- Move loads only on horizontal, level and firm ground.
- Move loads close to the ground.
- In order to avoid oscillating movements of loads:
  - Perform smooth, slow movements with the machine.
  - Use cables to guide the load (do not use hands to guide).
  - Bear in mind the weather conditions (for example the wind force).
  - Keep a minimum safety distance from objects.
- The operator may allow the load to be fastened and removed only if the machine and its work equipment are not being moved.
- Danger zones must not overlap with the work zones of other machines.

Lifting gear applications

- The machine must be certified for lifting gear applications.
- Observe the national regulations for lifting gear applications.
- Lifting gear applications are procedures involving raising, transporting and lowering loads with the help of lifting and fastening gear.
- The help of an accompanying person is necessary for fastening, guiding and removing the load.
- There must be nobody under the load.
- Stop the machine immediately and stop the engine if persons enter the danger zone.
- Use the machine for lifting gear applications ONLY if the mandatory lifting gear (for example a joint rod and load hook) and safety equipment (for example optical and acoustic warning devices, hose burst valve, stability table) is installed and functional.
- Use only lifting and fastening gear certified by a test/certification body, observe the inspection intervals (Use only chains and shackles. No belts, slings or cables).
- Do not use any lifting and fastening gear that is dirty, damaged or not of sufficient size.
- Do not interrupt the work process with a load attached.

2.6 Trailer operation

Trailer operation

- The machine must be certified for trailer operation.
- Observe the national regulations for trailer operation.
- The specific national driving license is required.
- Carrying passengers on/in trailers is PROHIBITED.
- Observe the maximum permissible vertical and trailer load.
- Do not exceed the permissible trailer speed.
- A front attachment has to be installed during trailer operation.
- Trailer operation with the towing gear of the machine is prohibited.
- Trailer operation changes the machine’s operating behavior, the operator must be familiar with this and act accordingly.
- Bear in mind the machine’s steering mode and the trailer’s turning circle.
- Before hitching/unhitching the trailer, secure it to prevent it from rolling away (for example with the parking brake, suitable wheel chocks).
- There must be nobody between the machine and the trailer when hitching a trailer.
- Hitch the trailer onto the machine correctly.
- Ensure that all equipment works correctly (for example the brakes, lights).
- Before starting machine travel, ensure that nobody is between the machine and the trailer.
- If the vehicle has no license for agricultural and forestry applications, only the machine’s own attachments may be transported with a trailer.
- Start machine travel carefully, in particular on slopes.

2.7 Attachment operation

Attachments

- Use only attachments that are certified for the vehicle or its protective device (for example a shatter protection).
- All other attachments require the machine manufacturer's release.
- The danger zone and the work zone depend on the attachment used – see the Operator's Manual of the attachment.
- Secure the load.
- Do not overload attachments.
- Check the correct position of the lock.

Operation

- Carrying persons on/in an attachment is prohibited.
- Installing a work platform is prohibited.
  - Exception: The machine is certified and equipped with the necessary safety equipment.
- Attachments and counterweights modify handling, as well as the steering and braking capability of the machine.
- The operator must be familiar with these modifications and act accordingly.
- Before starting work, operate the attachment to check that it works correctly.
- Before putting the attachment into operation, ensure that nobody is in danger.
- Lower the attachment to the ground before leaving the operator seat.

Removing and fitting attachments

- Before uncoupling or coupling hydraulic connections:
  - Stop the engine.
  - Release the pressure of the work hydraulics.
- Picking up and lowering attachments to the ground requires special care:
  - Pick up and safely lock the attachment in accordance with the Operator's Manual.
  - Lower the attachment only to firm, level ground and secure it to prevent it from tipping over or rolling away.
- Put the machine and the attachment into operation only if:
  - The protective equipment has been installed and is functional.
  - The connections for the lights and the hydraulic system have been established and are functional.
- Perform a visual check of the lock after locking the attachment.
- There must be nobody between the machine and the equipment when picking up or lowering an attachment to the ground.

2.8 Towing, loading and transporting

Towing

- Seal off the danger zone.
- Ensure that no one is near the towing bar or cable. The safety distance is equal to 1.5 times the length of the towing equipment.
- Observe the mandatory transport position, permissible speed and itinerary.
- A tractor vehicle of the same weight category must be used as a minimum. Furthermore, the tractor vehicle must be equipped with a safe braking system and sufficient tractive power.
- Use only towing bars or cables certified by a test/certification body, observe the inspection intervals.
- Do not use any towing bars or cables that are dirty, damaged or not of sufficient size.
- Fasten towing bars or cables only at the defined points.
- Tow away only in accordance with this Operator's Manual to avoid damage to the machine.
- Observe the national regulations (for example the light regulations) when towing on public roads/sites.

Crane-lifting

- Seal off the danger zone.
- The crane and the lifting gear must have suitable dimensions.
- Observe the machine's overall weight – see "Technical data".
- Wear protective clothing and equipment when fastening, guiding and removing the machine (for example a hard hat, safety glasses, safety boots).
- Use only lifting and fastening gear certified by a test/certification body (for example cables, belts, hooks, shackles), observe the inspection intervals.
- Do not use any lifting and fastening gear that is dirty, damaged or not of sufficient size.
- Perform a visual check to ensure that all slinging points are neither damaged nor worn (no widening, no sharp edges, no cracks).
- Have loads fastened and crane operators only guided by experienced persons.
- The person guiding the crane operator must be within sight or sound of him.
- Observe all movements of the machine and lifting gear.
- Secure the machine against unintentional movement.
- Raise the machine only after it is safely attached and the person attaching the machine has given his approval.
- Use only the slinging points provided for fastening the lifting gear (for example cables, belts).
- Do not attach the machine by twining the lifting gear (for example cables, belts) around it.
- Ensure an even load distribution (center of gravity!) when fastening the lifting gear.
- Ensure that no one is in, on or under the machine when loading the machine.
- Observe the national regulations (for example "Merkheft Erdbaumaschinen", leaflet on earth moving machines of the German employers' liability insurance association for construction engineering).
- Load the machine only in accordance with this Operator's Manual to avoid damage to the machine.
- Do not raise a machine that is for example stuck or frozen onto the ground.
- Bear in mind the weather conditions (for example the wind force, visibility conditions).

Transportation

- For the safe transportation of the machine:
  - The transport vehicle must have a sufficient load capacity and platform – see “Technical data”
  - The maximum weight rating of the transport vehicle must not be exceeded.
- Use only lifting and fastening gear certified by a test/certification body, observe the inspection intervals.
- Do not use any lifting and fastening gear that is dirty, damaged or not of sufficient size.
- In order to secure the machine on the platform, use only the fastening points provided for this purpose.
- Ensure that nobody is in or on the machine during transportation.
- Observe the national regulations (for example “Merkheft Erdbau-maschinen”, leaflet on earth moving machines of the German employers’ liability insurance association for construction engineering).
- Bear in mind the weather conditions (for example ice, snow).
- Ensure the minimum load on the steering axle(s) of the transport vehicle, and ensure an even load distribution.

2.9 Maintenance

Maintenance

- Observe the intervals prescribed by law and those specified in this Operator's Manual for routine checks/inspections and maintenance.
- For inspection and maintenance, ensure that all tools and service center equipment are adapted to the performance of the task described in this Operator's Manual.
- Do not use any damaged or malfunctioning tools.
- Have hydraulic hoses replaced within stipulated intervals even if no visual defects can be detected.
- The machine and the engine must be stopped during maintenance.
- Once maintenance is over, correctly install safety equipment again that has been removed.
- Wait for the machine to cool down before touching components.

Personal safety measures

- Avoid any operational mode that might be prejudicial to safety.
- Wear protective clothing and equipment (for example a hard hat, protective gloves, safety boots).
- Tie back long hair and remove all jewelry.
- If maintenance on a running engine cannot be avoided:
  - Only work in groups of two.
  - Both persons must be authorized and trained for the operation of the machine.
  - One person must be seated on the operator's seat and stay in contact with the second person.
  - Keep a safe distance from rotating parts (for example from fan blades, belts).
  - Keep a safe distance from hot parts (for example from the exhaust system).
  - Perform maintenance only in well-ventilated rooms or rooms with an exhaust-gas suction system.
- Safely lock/support machine components before starting work.
- Apply special care when working on the fuel system due to the increased fire hazard.

Preparatory measures

- Attach a warning label to the control elements (for example “Machine being serviced, do not start”).
- Before performing assembly work on the machine, support the areas to be serviced and use suitable lifting and supporting equipment for the replacement of parts over 9 kg (20 lbs.).
- Perform maintenance only if:
  - the machine is positioned on firm and level ground
  - the machine is secured to prevent it from rolling away (for example with the parking brake, wheel chocks), and if all attachments/the work equipment is lowered to the ground
  - the engine is stopped
  - the starting key has been removed
  - the pressure in the operating hydraulics has been released
- If maintenance has to be performed under a raised machine/ attachment, support the machine/attachment (for example with a lift platform, trestles) ensuring safety and stability.
- Hydraulic cylinders or jacks alone do not sufficiently secure a raised machine/attachment.

Measures for performing maintenance

- Perform only the maintenance described in this Operator’s Manual.
- All work that is not described in this operator’s manual must be performed by qualified and authorized, technically trained personnel.
- Follow the maintenance plan – see “Maintenance plan”.
- Always use specially designed or otherwise safety-oriented ladders and working platforms to perform overhead maintenance. Do not use machine parts or attachments as a climbing aid.
- Do not use attachments/work equipment as a lift platform for persons.
- Remove all dirt, snow and ice from climbing aids (for example handholds, footholds, handrails).
- Disconnect the negative terminal of the battery before working on the electrical system.

Modifications and spare parts

- Do not modify the machine and the work equipment/attachment (for example, the safety devices, lighting, tires, straightening and welding work).
- Modifications must be approved by the manufacturer and performed by an authorized service center.
- Use only original spare parts.

Protective structures

- The cabin, rollbar and protective screen are tested protective structures and may not be modified (for example no drilling, bending, welding).
- Perform a visual check according to the maintenance plan (for example check the fastenings for damage).
- If damage or defects are detected, have them immediately checked and repaired by an authorized service center.
- Have retrofitting work only performed by an authorized service center.
- Replace self-locking fasteners (for example self-locking nuts) by new ones after removing them.

2.10 Measures for avoiding risks

Tyres

- Have repair work on the tires only performed by trained technical personnel.
- Check the tires for correct pressure and visible damage (for example cracks, cuts).
- Check the wheel nuts for tightness.
- Use only approved tires.
- The machine must have identical tires (for example profile, revolutions per mile).

Tracks

- Repair work on tracks may be performed only by trained technicians.
- Check the tracks for correct tension and visible damage (for example cracks, cuts).
- Proceed with extreme care on slippery ground (for example on steel plates, ice), increased slipping hazard.
- Use only approved tracks.

Hydraulic and compressed-air system

- Check all lines, hoses and threaded fittings regularly for leaks and visible damage.
- Splashed oil can cause injury and fire.
- Leaking hydraulic and compressed-air lines can cause the full loss of the brake effect.
- Have damage and leaks immediately repaired by an authorized service center.
- Have hydraulic hoses replaced by an authorized service center within stipulated intervals even if no visual defects can be detected.

Electrical system

- Use only fuses with the specified current rating.
- In case of damage or malfunction in the electrical system:
  - Put the machine out of operation immediately and secure it against restart
  - Disconnect the battery or operate the battery master switch
  - Have the malfunction repaired
- Ensure that work on the electrical system is only performed by trained technical personnel.
- Have the electrical system checked regularly and malfunctions repaired immediately (for example loose connections, scorched cables).
- The operating voltage of machine, the attachment and the trailer must be the same (for example 12 V).

Battery

- Batteries contain caustic substances (for example sulfuric acid). When handling the battery observe the specific safety instructions and regulations relevant to accident prevention.
- A volatile oxyhydrogen mixture forms in batteries during normal operation and especially during charging. Always wear gloves and eye protection when working with batteries.
- Do not perform battery maintenance near open flames.
- Perform battery maintenance only in well-ventilated areas (for example due to vapors harmful to health, explosion hazard).
- Starting the machine with battery jumper cables is dangerous if performed improperly. Observe the safety instructions regarding the battery.

Safety instructions regarding internal combustion engines

- Internal combustion engines present special hazards during operation and fueling.
- Failure to follow the warnings and safety instructions can cause serious injury or death.
- Keep the area around the exhaust system free of flammable materials.
- Check the engine and fuel system for leaks (for example loose fuel lines). Do start or let the engine run in case of leaks.
- Breathing the exhaust fumes causes death very quickly.
- Engine exhaust contains gases you cannot see or smell (for example carbon monoxide and dioxide).
  - Never operate the machine in enclosed premises or areas (for example in pits), if there is no suitable ventilation (for example exhaust-gas filters, suction systems).
- Do not operate the machine in potentially explosive areas.
- Do not touch the engine, exhaust system and cooling system as long as the engine is still running or has not cooled down yet.
- Do not remove the radiator cap when the engine is running or hot.
- The coolant is hot, under pressure and can cause serious burns.

Bleeding the fuel system and refueling

- Do not bleed the fuel system or refuel near open flames.
- Bleed the fuel system and refuel only in well-ventilated areas (for example due to vapors harmful to health, explosion hazard).
- Wipe away fuel spills immediately (for example due to fire hazard, slipping hazard).
- Firmly close the fuel tank cap, replace a malfunctioning fuel tank cap.

Handling oil, grease and other substances

- When handling oil, grease and other chemical substances (for example the battery acid, coolant), observe the safety data sheets.
- Wear appropriate protective equipment (for example protective gloves, safety glasses).
- Be careful when handling hot consumables – burn hazard.
- In polluted environment (dust, vapors, smoke, asbestos), work only with appropriate personal protective equipment (for example with a breathing mask).

Fire hazard

- Fuel, lubricants and coolants are flammable.
- Do not put the machine into operation if there is a fire hazard.
- Do not use flammable detergents.
- Keep the area around the exhaust system free of flammable materials.
- Due to hot machine parts, maintain a safe distance from easily flammable material (for example from hay, dry leaves).
  - Stop and park the machine only in fire-protected areas.
- If the machine is equipped with a fire extinguisher, have it installed in its specific location.
- Keep the machine clean to reduce the fire hazard.

Working near electric supply lines

- Before performing any work, the operator must check whether there are any electric supply lines in the job site.
- If there are electric supply lines, only a machine with cabin may be used (Faraday cage).
- Keep a safe distance from existing electric supply lines.
- If this is not possible, the operator must take other safety measures (for example switching off the current) in agreement with the operating company or owner of the supply lines.
- If supply lines are exposed, they must be fastened, supported and secured accordingly.
- If live supply lines are touched nevertheless:
  - Do not leave/touch the cabin (Faraday cage)
  - If possible, drive the machine out of the danger zone
  - Warn others against approaching and touching the machine
  - Have the live wire de-energized
  - Do not leave the machine until the supply lines that have been touched or damaged have been safely de-energized

Working near non-electric supply lines

- Before performing any work, the operator must check whether there are any non-electric supply lines in the job site.
- If there are non-electric supply lines, the operator must take safety measures (for example switching off the supply line) in agreement with the operating company or owner of the supply lines.
- If supply lines are exposed, they must be fastened, supported and secured accordingly.

Behavior during thunderstorm

- Stop machine operation if a thunderstorm is gathering, stop the machine, secure and leave it, and avoid being near it.

Noise

- Observe the noise regulations (for example during applications in enclosed premises).
- Bear in mind external sources of noise (compressed-air hammer, concrete saw).
- Do not remove the sound baffles of the machine/attachment.
- Have damaged sound baffles immediately replaced (for example an insulating mat, muffler).
- Before starting work, get informed on the noise level of the machine/ attachment (for example on the adhesive label) – wear ear protectors.
- Do not wear ear protectors during machine travel on public roads/sites.

Clean

- Injury hazard from compressed air and high-pressure cleaners.
  - Wear appropriate protective clothes.
- Do not use any dangerous and aggressive detergents.
  - Wear appropriate protective clothes.
- Operate the machine only in a clean condition.
  - Remove all dirt, snow and ice from climbing aids (for example handholds, footholds, handrails).
  - Keep the cabin glazing and visual aids clean.
  - Keep the light system and reflectors clean.
  - Keep the control elements and indicators clean.
  - Keep the safety, warning and information labels clean, and replace damaged and missing labels by new ones.
- Perform cleaning work only if the engine is stopped and cooled down.
- Bear in mind sensitive components and protect them accordingly (for example electronic control units, relays).

3 Introduction

3.1 Machine overview

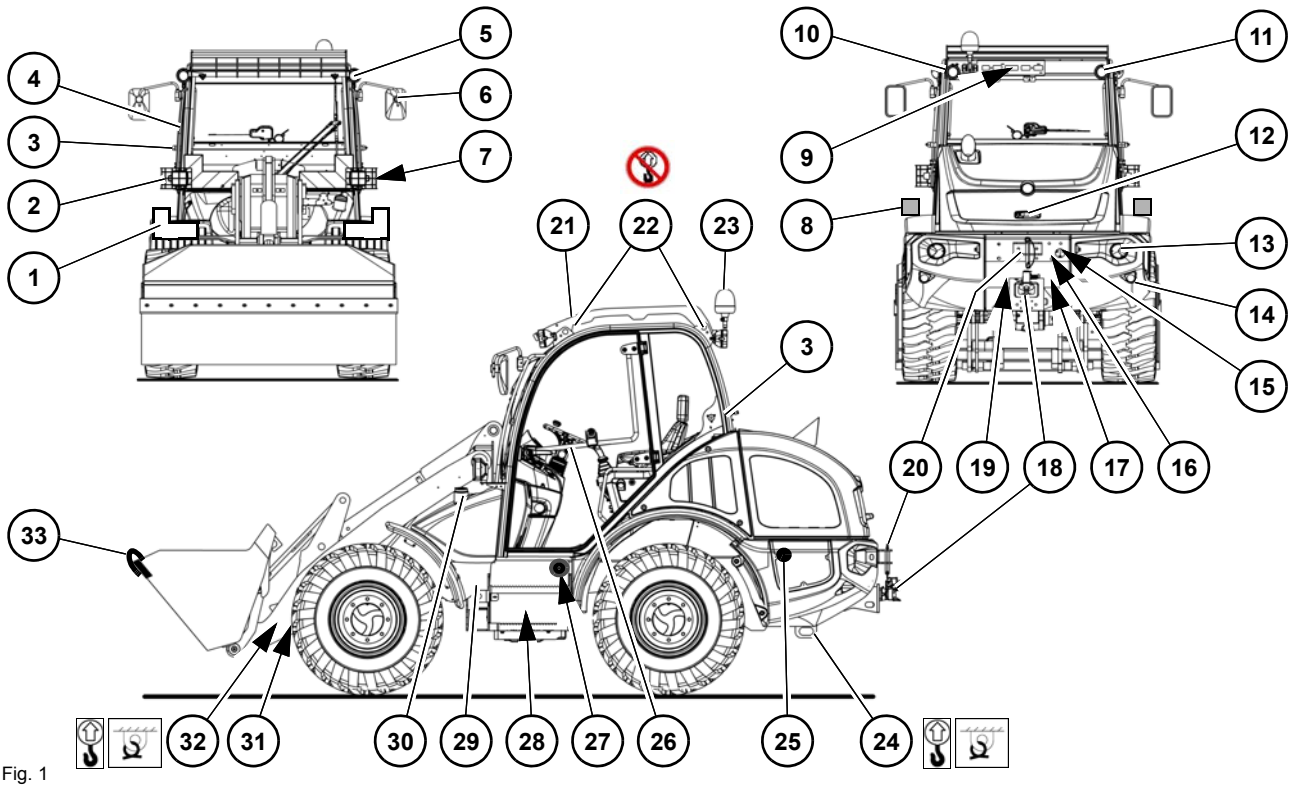


Fig. 1

	Designation
1	Bracket for warning stripe (option)
2	Headlights (left/right) with turn indicators
3	Door arrester
4	Handle for access (left/right)
5	Front left/right working lights (option)
6	Left/right rearview mirrors
7	Numberplate bracket (option)
8	Left/right side marker lights with reflectors (option)
9	Number plate bracket (optional)
10	Rear working light (standard)
11	Rear right working light (option)
12	Engine cover lock
13	Turn indicator/brake/rear light
14	Reflectors
15	Connections for pneumatic (compressed-air) trailer brake (option)
16	Rear socket
17	Plug coupling for hydraulic trailer brake (option)
18	Ball hitch (optional)
19	Plug couplings for additional control circuit (option) and tipping trailer (option)

	Designation
20	Towing gear[1]
21	Protective FOPS screen (option)
22	4 x eye hooks for removing the cabin[2]
23	Rotating beacon (option)
24	Rear hooks for loading/tying down the machine (left/right)
25	Socket for hydraulic oil preheater (option)
26	Door handle with lock
27	Filler neck for urea container (optional)
28	Safety support for locking pin (optional) (example site of installation)
29	Wheel chock
30	Fuel tank filler inlet
31	Front right towing gear [1]
32	Hooks for loading/tying down the machine at front of chassis (left/right)
33	Front-edge protection

1. **Not** certified as a trailer coupling or for loading or tying down the machine.
2. Eye hooks are for removing the cabin only, and may **not** be used for lifting the machine.

Models and trade names (overview)

The machine is identified by two designations.

- **“Model designation”** => stamped on the type label in square 5 *– see “Type label” on page 3-24*.
- **"Trade name**” => affixed outside on the machine.

Letters **S** or **L** in the model designation identify the loader unit version:

- **S** = standard loader unit
- **L** = higher loader unit

Model designation	Trade name
352-03S	8105
352-04S	8115
352-04L	8115L

3.2 Brief description of machine

Main components of machine

- Sturdy steel sheet frame; Engine stored on suspension elements.
- ROPS/FOPS tested cabin (roll-over/falling object protection); Category I (standard), category II (optional)
  – see chapter 4 “Cabin/control stand” on page 4-1.
  - ROPS is the abbreviation for “Roll Over Protective Structure”.
  - FOPS is the abbreviation for “Falling Object Protective Structure”.
- Deutz four-cylinder diesel engine, water-cooled and equipped with exhaust after-treatment system. Exhaust emissions according to standards 2011/88 and 2012/46 EC.
- Automotive drive, progressive hydrostatic axial-piston gearbox
  - Standard – maximum speed 20 km/h (12.43 mph)
  - Optional maximum speed 30 or 40 km/h (18.64 or 24.85 mph)
- Hydraulic four-wheel power steering with emergency steering features (diagonal steering option)
- Front and rear planetary steering axles, rear axle with oscillation.
- Service brake:
  - With the 20 km/h (12.43 mph) version: brake disc on drive shaft of the front axle. Braking effect is transferred to the rear axle via the universal joint shaft.
  - With the 30 or 40 km/h (18.64 or 24.85 mph) variant: brake disc on front and rear axle drive shaft (optional).
- Parking brake on brake disc on front axle drive shaft.

Information

For the operator's safety, the vehicle can optionally be outfitted with a seat contact switch. In this case:

► The diesel engine will not start unless the operator is seated on the seat.

► The drive switches off after 5 seconds if the load on the operator seat is reduced when driving the machine.

Information

The machine can be equipped with the **“Telematic” option (transmission of operational data, location, etc. via satellite)**!
Please contact your dealer if you require information on the “Telematic” option.

Hydrostatic drive

The diesel engine permanently drives a gear pump (variable displacement pump), whose oil flow is sent to a hydraulic motor on the transfer gearbox (standard - 20 km/h/12.43 mph) or to a high-speed gearbox (option – 30 and 40 km/h/18.64 and 24.85 mph).

The hydraulic motor transmits its power to the rear axle (via the transfer gearbox) and to the front axle (via the cardan shaft) to create permanent 4 wheel drive. If the machine is equipped with a high-speed gearbox, power is transmitted to the front and rear axles via the cardan shaft.

Operating hydraulics and 4 wheel steering

The diesel engine also drives the joint gear pump for the operating hydraulics and the hydrostatic 4 wheel steering. The oil flow of this pump depends on the diesel engine speed only.

When the machine is in operation, the entire diesel engine output can be transmitted to the gear pump for the operating hydraulics and steering. This is made possible by a so-called inching valve that responds as soon as the brake/inching pedal is used, reducing or cutting off power input of the drive.

Therefore, engine output is fully available for the operating hydraulics (loader unit) by pressing the accelerator pedal and the brake-inch pedal at the same time.

Cooling system

To cool the engine and the hydraulics, a combined water-hydraulic radiator is located in the engine compartment. The fan motor is hydraulically operated.

Furthermore, the charge air of the engine is cooled by an intercooler.

3.3 Information and regulations on use

General information on the machine

This machine is a versatile and powerful helper on construction sites, in agriculture and for recycling applications. The wide range of attachments accounts for the numerous applications of the machine: as a snowplow, a construction machine, a forklift truck for applications with palletized goods, or as a tractor for transport applications in agriculture (agriculture and forestry certification).

- Possible applications
  – *see “Use of attachments on the machine” on page 3-11*.
- Retrofit the corresponding safety devices accordingly when using the vehicle as lifting gear:
  – *see chapter 2 “Lifting gear applications” on page 2-9*,
  – *see chapter 5 “Load hook (option)” on page 5-105*.

Information

The machine can be equipped with the “Telematic” option (transmission of operational data, location, etc. via satellite)!

Please contact your dealer if you require more information on the “Telematic” option.

Safe machine operation

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

Read this Operator’s Manual carefully prior to the first drive.

Basic rule: careful and prudent working is the best way to avoid accidents!

Operational safety and readiness of the machine do not only depend on your reliable control, but also on maintenance and servicing.
This is why regular maintenance and servicing is absolutely necessary
– *see chapter 7 “Cleaning and maintenance” on page 7-18*.

Information

Repair work, maintenance or modifications may only be performed by specifically trained technical personnel or by an authorized service center!

Insist on using original spare parts for repairs.

The machine’s permits, certifications, registrations, etc., may be withdrawn if machine parts/components with a prescribed condition or quality, or machine parts/components that can put persons at risk during operation, are subsequently modified or exchanged.

Designated use

The machine can be used as a self-propelled work machine or tractor if registered accordingly (**LoF** agricultural or forestry registration).
EC test number, see page – *see "Type label" on page 3-24*.

The available and authorized attachments will decide in the first place how the machine is used.

NOTICE

In order to avoid damage to the machine, only the attachments listed in the table on page *3-11* have been authorized for installation on the machine.

Note that **not all** specified attachments are allowed for machine travel on public roads in the Federal Republic of Germany.

If the machine is registered as a "self-propelled work machine", please refer to the **National Type Approval (Germany) or the Data Confirmation** for the equipment items (authorized attachments) and specific requirements!

No attachments are specified in the registration certificates if the machine is registered for agriculture or forestry (**LoF**). Only the attachments (in connection with the specific requirements) listed in this operator's manual are authorized for use on public roads
– see "Use of attachments on the machine" on page 3-11!

Attachments without a National Type Approval (Germany) or Data Confirmation require a **special registration** made out by the competent authorities. The special measures stated in "Merkblätter für Anbaugeräte" (leaflet with specific instructions for attachments) §30 clauses 10/11/12 StVZO (German traffic regulations) must be observed!
– see "Use of attachments on the machine" on page 3-11.

Get informed on and follow the legal regulations of your country.

Improper use

Not using the machine according to its designated use means that it is used for an application that is not specified by the manufacturer. Therefore, this is misuse in the terms of the Machine Guideline.

Alone the user, and not the manufacturer, shall be liable for damage resulting from this.

Misapplications with the machine are, for example:

- Use of surfaces and spaces that are not described as work or maintenance spaces in the Operator's Manual.
- Machine travel with liquid material in the bucket.
- Machine and attachment modifications without proper authority.
- Fastening/installation of additional equipment that has not been certified or released.
- Use for spraying applications.
- Use for forestry applications.
- Use for below-ground or mining applications.
- Use in contaminated areas.
- Use as a carrier machine for equipment that has not been certified/ released by the manufacturer.
- Use in stretches of water or flood areas.
- Transport of persons.
- Installation of work platforms.
- Raising heavy loads (overload).
- Machine operation although the machine operator is not on the operator seat.
- Adjustment, cleaning and maintenance contrary to the instructions given in the Operator's Manual.
- Troubleshooting and maintenance with running drives and/or a running diesel engine.
- Failure to follow warning instructions on the machine and in the Operator's Manual.
- Maintenance and repair work by untrained personnel.
- Use of non-original spare parts.

Information

The vehicle is not approved for being lifted by hoists. No hooks, eyelets, etc., may be installed on the attachments or loader unit!

Failure to observe this results in loss of warranty, liability and certification for the machine.

Driving license

Wheel loaders may be driven on public roads only if the operator has a driving licence as defined by national traffic regulations.

In Germany, § 5 StVZO (German traffic regulations) requires the following driving licenses for machine operation:

- **Driving licence category L (European Union)**
  - Self-propelled work machines **up to 25 kph**
  - Agricultural or forestry tractors **up to 40 km/h** (with trailer 25 kph)
- **Driving licence category C (European Union)**
  - Motor vehicles with over 3500 kg gross weight rating (with trailers up to 750 kg)
- **Driving licence category C1 (European Union)**
  - Motor vehicles between 3500 and 7500 kg gross weight rating (with trailers up to 750 kg)
- **Driving licence category CE (European Union)**
  - Motor vehicles with over 3500 kg gross weight rating (with trailers over 750 kg)
- **Driving licence category T (European Union)**
  - Self-propelled work machines for agriculture and forestry **up to 40 kph**
  - Tractors and agricultural or forestry machinery **up to 60 kph**

Get informed on and follow the legal regulations of your country.

Number plate (machine)

§ 3 FZV (German vehicle licensing ordinance) requires self-propelled work machines with maximum speeds **over 20 kph** to be fitted with their own numberplates **in accordance with §8 FZV (German vehicle licensing ordinance)**.

§ 4b of FZV (German vehicle licensing ordinance) requires owners of self-propelled work machines with maximum speeds **below 20 kph** to affix their first name, surname and place of **residence** (company and registered office) in indelible print on the left side of their machines.

Get informed on and follow the legal regulations of your country.

Machine inspections

Fig. 2

In Germany, legislation, supplemented by the technical rules for operational safety (TRBS) 1201, requires all machine operators to have all machines and equipment inspected regularly (BGV A1/BetrSichV §10).

Inspections must be performed as required, but at least once a year, by an expert and must be documented in written form. Subsequent inspections of detected defects must be performed, too.

The competent inspection authority may require the inspection report to be available at the place where the machine is used.

Affix inspection label **A** for evidence (see example in *Fig. 2*).

Ensure that all work equipment is inspected, not only the machine but also all technical auxiliary means, tools and attachments. (Work equipment is defined as all tools, attachments, machines or systems.)

This requirement is fulfilled, for instance, when the results are logged in a test booklet, file or report; Also see the professional association principle "Testing vehicles by an expert" (BGG 916).

When operating vehicles, the national safety regulations must be observed, such as in the Federal Republic of Germany the accident prevention regulations "German Inspection Authority for Agricultural and Forestry Technology" (DPLF) and accident prevention regulation "Vehicles" (BGV D29 § 57 para. 1).

Get informed on and follow the legal regulations of your country.

Documents

German traffic regulations (StVZO) require to have the following documentation on board:

- National Type Approval (Germany), machine documentation or licence certificate
- Driving license
- Test report according to BGV D29 § 57 para. 2 of the accident prevention regulation "Vehicles“
- Operator’s Manual

Get informed on and follow the legal regulations of your country.

On-board equipment

In Germany, **§53 StVZO** (German road traffic regulations) requires the following equipment to be supplied by the operating company and to be fitted on the machine:

- 1 warning triangle with design certification
- 1 warning light with design certification
- 1 safety vest with design certification
- 1 first-aid kit in compliance with DIN 13 164 sheet 1

Get informed on and follow the legal regulations of your country.

Machine warning identification

According to § 52 clause 4.1 of StVZO German road traffic regulations, from 01.10.1998 onwards machines that are used on public roads for the construction, maintenance and cleaning of roads or facilities can be fitted with the red and white warning identification as per DIN 30 710, also in connection with a yellow rotating beacon (option).

Get informed on and follow the legal regulations of your country.

Permissible operating temperature range

The operating temperature range for a machine serviced in compliance with the maintenance instructions is between -15°C and +40°C (+5 and +104 °F) during normal operation with short intervals of operation at maximum output.

Operating temperatures below −15 °C (+5 °F) or over +40 °C (+104 °F) require special equipment and/or material (fuel, engine and hydraulic oil).

Please contact your dealer if you require more information on operation in extreme temperature ranges.

Use of attachments on the machine

The attachments will decide in the first place how the machine is used.

- Different quickhitches are available for the machine. Refer to the following tables for the corresponding attachments and the specific requirements:
  - *Attachments for Kramer quickhitch on page 3-12*,
  - *Attachments for SKID STEER quickhitch on page 3-19*,
  - *Attachments for EURO quickhitch on page 3-20*,
  - *Attachments for Volvo quickhitch on page 3-21*.
- Attachments certified for travel on public roads must also be listed in the National Type Approval (Germany)/Data Confirmation or in the licence certificate of self-propelled work machines.
- For attachments that are not listed in the National Type Approval (Germany), the Data Confirmation (Germany), the registration documents or the following lists for the specific quickhitch, get in touch with a dealer for authorization (warranty claims)! A Separate Certification for Vehicles (Germany) made out by the appropriate national authorities is required!
- This operator's manual only describes how to install, use and remove the standard bucket, multipurpose bucket and pallet forks.
  - *Standard bucket on page 5-71*
  - *Multipurpose bucket on page 5-72*
  - *Pallet forks on page 5-73*
  - *Pick up the attachment on page 5-58*
  - *Lower the attachment on page 5-62*
  - Refer to the operator's manuals of the attachments for information on installing, removing and using other attachments.

Get informed on and follow the legal regulations of your country.

Attachments for Kramer quickhitch

NOTICE

Damage to the machine due to the use of uncertified attachments!

► Use only attachments that are certified for the existing quickhitch and that are fitted with a load diagram certified for the specific attachment.

► If other attachments are used, conformity (stability test) in accordance with the EC machine guideline or the EN 474-3 standard must be checked and documented by an authorized service centre.

Information

Machine travel on public roads with a full bucket is prohibited in the Federal Republic of Germany!

Information

Observe the following for attachments that are not certified for use on public roads in the Federal Republic of Germany:

► Remove the attachments for transport on public roads.

► Load the attachment on a transport vehicle and transport it to the job site.

Information

Observe the footnotes in the tables!

- If uncertified attachments are installed, or if parts of the quickhitch or attachment are subsequently modified or replaced, the operation license and the warranty become void.
- In addition to the Operator's Manual, observe and instruct the operator in all other generally applicable, legal and other mandatory regulations relevant to accident prevention and environmental protection.
- Please contact your dealer if you require more information on the quickhitch and the specific attachments.

KRAMER attachments model 352-03 (overview)

Attachment	Machine model	Part no. (model)	Dimension mm (in)	Capacity[1] m^3 (ft3)	Use
Approved attachments for machine travel on public roads (Federal Republic of Germany)					
Standard bucket (normal material)	352-03 S	1000233659 1000233791	2050 (80.70) with teeth 2050 (80.70) o. RZ	0,85 / 1,0 (30.0 / 35.31)	Loosening, picking up, transporting and loading loose or solid material (material density ≤ p = 1.8 t/m³ (112 lb/ft³))
Multipurpose bucket[2]	352-03 S	1000242243 1000242322	2050 (80.70) with teeth 2050 (80.70) o. RZ	0,7 / 0,9 (24.72 / 31.78)	for grading, removing and scraping vegetation, for example stripping grass; for picking up and evenly spreading bulk material; for grabbing bulky material; truck loading (bulk material density ≤ p=1.8 t/m³ (112 lb./ft³))
Standard bucket (lightweight material)[3]	352-03 S	1000330536	2150 (84.64) without RZ	1,1 / 1,3 (38.84 / 45.90)	Picking up, transporting and loading very lightweight material (material density ≤ p = 1.3 t/m³ (81 lb/ft³))
Standard bucket (super lightweight material)[3, 4]	352-03 S	1000245412	2300 (90.55) without RZ	1,1 / 1,3 (38.84 / 45.90)	Picking up, transporting and loading lightweight material (material density ≤ p = 0.9 t/m³ (56 lb/ft³))
Pallet forks with foldable fork arms[2, 5, 6]	352-03 S	1000237336	1200 (47.24)	–	Picking up and transporting pallets
Salt spreader[2, 7, 8]	352-03 S	1000249568	–	–	Winter service

Attachment	Machine model	Part no. (model)	Dimension mm (in)	Capacity[1] m^3 (ft3)	Use
Non-approved attachments for machine travel on public roads (Federal Republic of Germany)					
Side swing bucket[2, 9]	352-03 S	1000176121	1844 (72.59) without RZ	0,6 / 0,75 (21.18 / 24.72)	Standard bucket, however with benefits for filling and backfilling material (material density ≤p = 1.8 t/m³ (112 lb/ft³))
High tip bucket[2, 9]	352-03 S	1000290188 1000154475 1000244915[10]	1400 (55.12) without RZ 1850 (72.83) without RZ 1750 (68.90) without RZ	–	As standard bucket, however with a 80 – 100 cm higher tilt height (material density ≤ p = 1.3 t/m³ (81 lb/ft³))
Pallet forks	352-03 S	1000237357 1000237358	1000 (24.72) 1200 (47.24)	–	Picking up and t ransporting pallets
Pallet forks (hydraulic lateral displacement)[2]	352-03 S	1000247565	1200 (47.24)	–	Picking up and transporting pallets
Pallet forks (floating fork arms)[2]	352-03 S	1000177240	1000 (39.37)	–	
Material pusher[2]	352-03 S	1000330950	3000 (118.11)	–	For moving loose bulk material
		1000330961	4000 (157.48)	–	
Round bale clamp[2]	352-03 S	1000177701	800 – 1800 (31.49 – 70.86)	–	Picking up and transporting silage, straw and hay bales

Attachment	Machine model	Part no. (model)	Dimension mm (in)	Capacity[1] m^3 (ft3)	Use
Non-approved attachments for machine travel on public roads (Federal Republic of Germany)					
3-point adapter with drive[2]	352-03 S	1000251812 1000251813	–	–	Installing special CAT II attachments (for example a mower)
Quickhitch triangle[2]	352-03 S	1000252244	–	–	
Load hook[11]	352-03 S	1000290054	–	–	Picking up and transporting loads with lifting gear
Rotary broom[2, 12]	352-03 S	1000291632	–	–	Sidewalk and street cleaning
Work platform[2, 13, 14]	352-03 S	1000336399 1000331537	–	–	Mounting work

1. Capacity struck according to ISO 7546/capacity heaped
2. See the Operator's Manual of the attachment for putting the attachment into operation and using it
3. During machine travel on public roads (Federal Republic of Germany), additional side marker lights (order no. 1000185392) with reflectors must be installed on the left and right of the cabin. Observe the legal regulations of your country.
4. With screwed-on blade
5. Authorized for use on public roads (Germany) only with additional clearance lights to the rear (option)
6. Fork arms must be folded up and secured during machine travel on public roads (Federal Republic of Germany).
7. In order to ensure the correct load on the front axle, fit a snow plough or bucket onto the machine if it is equipped with a salt spreader.
8. Only in connection with rotating beacon
9. Only authorized in connection with option "Throttle orifice in tilt ram".
10. Stainless-steel hydraulic lines
11. Only in conjunction with load diagram (order no. 1000244885
12. Authorized for use on public roads only with EBE (separate certification for operation, Federal Republic of Germany)
13. Installation only allowed with assembly 1000293620 and handrail 1000337981.
    Follow the instructions in the "work platform" operator's manual under all circumstances.
14. Not certified for transporting persons and for machine travel on public roads

For more information on attachments, see:
Data sheet for attachments §30 para. 10/11/12 StVZO (Federal Republic of Germany)
Merkblatt für angehängte land- oder forstwirtschaftliche Arbeitsgeräte (leaflet with specific instructions for hitching agricultural or forestry equipment onto the machine according to German legislation)

KRAMER attachments model 352-04 (overview)

Attachment	Machine model	Part no. (model)	Dimension mm (in)	Capacity[1] m^3 (ft3)	Use
Approved attachments for machine travel on public roads (Federal Republic of Germany)					
Standard bucket[2] (normal material)	352-04 S 352-04 L	1000154387	2150 (84.64) with teeth	0,95 / 1,15 (33.54 / 40.61)	Loosening, picking up, transporting and loading loose or solid material (material density ≤ p = 1.8 t/m³ (112 lb/ft³))
		1000185123[3]	2150 (84.64) without RZ		
Multipurpose bucket[2, 4]	352-04 S 352-04 L	1000251201 1000251215	2150 (84.64) with teeth 2150 (84.64) without RZ	0,7 / 0,9 (24.72 / 31.78)	for grading, removing and scraping vegetation, for example stripping grass; for picking up and evenly spreading bulk material; for grabbing bulky material; truck loading (bulk material density ≤ p=1.8 t/m³ (112 lb/ft³))
Standard bucket (lightweight material)[2, 5, 6]	352-04 S 352-04 L	1000330311	2300 (90.55) without RZ	1,1 / 1,3 (38.84 / 45.90)	Picking up, transporting and loading very lightweight material (material density ≤ p = 1.3 t/m³ (81 lb/ft³))
Standard bucket – (super lightweight material)[2, 3, 6]	352-04 S 352-04 L	1000179389	2300 (90.55) without RZ	1,4 / 1,7 (49.44 / 60.03)	Picking up, transporting and loading lightweight material (material density ≤ p = 0.9 t/m³ (56 lb/ft³))
Pallet forks with foldable fork arms[4, 7]	352-04 S 352-04 L	1000330158	1200 (47.24)	–	Picking up and transporting pallets
Salt spreader[4, 8, 9]	352-04 S 352-04 L	1000249568	–	–	Winter service

Attachment	Machine model	Part no. (model)	Dimension mm (in)	Capacity[1] m^3 (ft3)	Use
Non-approved attachments for machine travel on public roads (Federal Republic of Germany)					
Side swing bucket[4, 10]	352-04 S 352-04 L	1000176655	2044 (80.48) without RZ	–	Standard bucket, however with benefits for filling and backfilling material (material density ≤p = 1.8 t/m³ (112 lb/ft³))
High tip bucket[4, 10]	352-04 S 352-04 L	1000255230	2050 (80.70) without RZ	–	As standard bucket, however with a 80 – 100 cm higher tilt height (material density ≤ p = 1.3 t/m³ (81 lb/ft³))
Heavy duty bucket with hydraulic clamp[4, 10]	352-04 S 352-04 L	1000260453	2150 (84.64) without RZ	–	Picking up and transporting for example bulky recycling material (material density ≤ p = 1.3 t/m³ (81 lb/ft³))
Pallet forks	352-04 S 352-04 L	1000237338 1000237339 1000330157	1000 (39.37) 1200 (47.24) 1200 (47.24)	–	Picking up and transporting pallets
Pallet forks (hydraulic lateral displacement)[4]	352-04 S 352-04 L	1000330156	1200 (47.24)	–	
Material pusher[4]	352-04 S 352-04 L	1000330950	3000 (118.11)	–	For moving loose bulk material
		1000330961	4000 (157.48)	–	
Tree replanter[4, 10]	352-04 S 352-04 L	1000100840	–	–	Digging and transporting nursery trees
Front scarifier[4]	352-04 S 352-04 L	1000100841	–	–	Scarifying dense soil, loosening humus soil
3-point adapter with drive[4]	352-04 S 352-04 L	1000251812 1000251813	–	–	Installing special CAT II attachments (for example a mower)
Quickhitch triangle[4]	352-04 S 352-04 L	1000252244	–	–	
Snow plow[4, 9, 11]	352-04 S 352-04 L	1000267514	–	–	Winter service
Load hook[12]	352-04 S 352-04 L	1000290054	–	–	Picking up and transporting loads with lifting gear

Attachment	Machine model	Part no. (model)	Dimension mm (in)	Capacity[1] m^3 (ft3)	Use
Non-approved attachments for machine travel on public roads (Federal Republic of Germany)					
Rotary broom[4, 11]	352-04 S 352-04 L	1000291632	–	–	Sidewalk and street cleaning
Work platform[4, 13, 14]	352-03 S	1000336399 1000331537	–	–	Mounting work
Log fork[4, 15]	352-04 S 352-04 L	1000274182	1600 (62.99)	Payload 1550 kg (3417.1 lb)	For loading logs and small-diameter timber
Manure forks[4]	352-04 S 352-04 L	1000292232	Tines 1000 (24.72) Width 2300 (90.55)	–	Picking up and transporting silage, straw and hay bales
Round bale clamp[4]	352-04 S 352-04 L	1000177701	Clamping width 800 – 1800 (31.49 – 70.86)	Payload 1550 kg (3417.1 lb)	
Bale spike [4]	352-04 S 352-04 L	1000292209	Tines 1000 (24.72) Width 1200 (47.24)	Payload 1800 kg (3968.2 lb)	
Silage bucket with hydraulic clamp[4]	352-04 S 352-04 L	1000292256	2200 (86.61)	–	
Silage cutting clamps[4]	352-04 S 352-04 L	1000295642	2200 (86.61)	–	
Multipurpose forks with grab[4]	352-04 S 352-04 L	1000292245	Tines 800 (31.49) Width 2100 (82.67)	–	

1. Capacity struck according to ISO 7546/capacity heaped
2. For driving on public roads (Federal Republic of Germany), only approved in conjunction with transport hooks (order no. 1000155020) and reverse mounted to quickhitch facility. The steering column must also be locked in the front position. Observe the legal regulations of your country.
3. With screwed-on blade
4. See the Operator's Manual of the attachment for putting the attachment into operation and using it
5. During machine travel on public roads (Federal Republic of Germany), additional side marker lights (order no. 1000185392) with reflectors must be installed on the left and right of the cabin. Observe the legal regulations of your country.
6. Authorized for use on public roads (Germany) only with additional clearance lights to the rear (option)
7. Fork arms must be folded up and secured during machine travel on public roads (Federal Republic of Germany)
8. In order to ensure the correct load on the front axle, fit a snow plough or bucket onto the machine if it is equipped with a salt spreader.
9. Only in connection with rotating beacon
10. Only authorized in connection with option "Throttle orifice in tilt ram".
11. Authorized for use on public roads only with EBE (separate certification for operation, Federal Republic of Germany)
12. Only in conjunction with load diagram (order no. 1000244885
13. Installation only allowed with assembly 1000293620 and handrail 1000337981.
    Follow the instructions in the "work platform" operator's manual under all circumstances.
14. Not certified for transporting persons and for machine travel on public roads
15. Only in conjunction with load diagram (order no. 1000274183

For more information on attachments, see:
Data sheet for attachments §30 para. 10 / 11 / 12 StVZO (Federal Republic of Germany)
Merkblatt für angehängte land- oder forstwirtschaftliche Arbeitsgeräte (leaflet with specific instructions for hitching agricultural or forestry equipment onto the machine according to German legislation)

Attachments for SKID STEER quickhitch

The machine manufacturer has not released any attachments for this quickhitch!

NOTICE

Damage to machine due to attachments that have not been released.

► If attachments that are not released are used, conformity (stability test) in accordance with the EC machine guideline or the EN 474-3 standard must be checked and documented by an authorized service centre.

Information

Refer to the following information sheets in section *Stability calculations for attachments from other manufacturers on page 5-100* for the stability test.

Information

Machine travel on public roads with a full bucket is prohibited in the Federal Republic of Germany!

Information

Observe the following for attachments that are not certified for use on public roads in the Federal Republic of Germany:

► Remove the attachments for transport on public roads.

► Load the attachment on a transport vehicle and transport it to the job site.

- If uncertified attachments are installed, or if parts of the quickhitch or attachment are subsequently modified or replaced, the operation license and the warranty become void.
- In addition to the Operator's Manual, observe and instruct the operator in all other generally applicable, legal and other mandatory regulations relevant to accident prevention and environmental protection.
- Please contact your dealer if you require more information on the quickhitch and the specific attachments.

Attachments for EURO quickhitch

The machine manufacturer has not released any attachments for this quickhitch!

NOTICE

Damage to machine due to attachments that have not been released.

► If attachments that are not released are used, conformity (stability test) in accordance with the EC machine guideline or the EN 474-3 standard must be checked and documented by an authorized service centre.

Information

Refer to the following information sheets in section *Stability calculations for attachments from other manufacturers on page 5-100* for the stability test.

Information

Machine travel on public roads with a full bucket is prohibited in the Federal Republic of Germany!

Information

Observe the following for attachments that are not certified for use on public roads in the Federal Republic of Germany:

► Remove the attachments for transport on public roads.

► Load the attachment on a transport vehicle and transport it to the job site.

- If uncertified attachments are installed, or if parts of the quickhitch or attachment are subsequently modified or replaced, the operation license and the warranty become void.
- In addition to the Operator's Manual, observe and instruct the operator in all other generally applicable, legal and other mandatory regulations relevant to accident prevention and environmental protection.
- Please contact your dealer if you require more information on the quickhitch and the specific attachments.

Attachments for Volvo quickhitch

NOTICE

Damage to the machine due to the use of attachments that have not been released.

- ► Use only attachments that are released for the existing quickhitch and that are fitted with a load diagram certified for the specific attachment.
- ► If other attachments are used, conformity (stability test) in accordance with the EC machine guideline or the EN 474-3 standard must be checked and documented by an authorized service centre.

Information

Refer to the following information sheets in section *Stability calculations for attachments from other manufacturers on page 5-100* for the stability test.

Information

Machine travel on public roads with a full bucket is prohibited in the Federal Republic of Germany!

Information

Observe the following for attachments that are not certified for use on public roads in the Federal Republic of Germany:

- ► Remove the attachments for transport on public roads.
- ► Load the attachment on a transport vehicle and transport it to the job site.

Information

Observe the footnotes in the table!

- If attachments that have not been released are installed, or if parts of the quickhitch or attachment are subsequently modified or replaced, the operation license and the warranty become void.
- In addition to the Operator's Manual, observe and instruct the operator in all other generally applicable, legal and other mandatory regulations relevant to accident prevention and environmental protection.
- Please contact your dealer if you require more information on the quickhitch and the specific attachments.

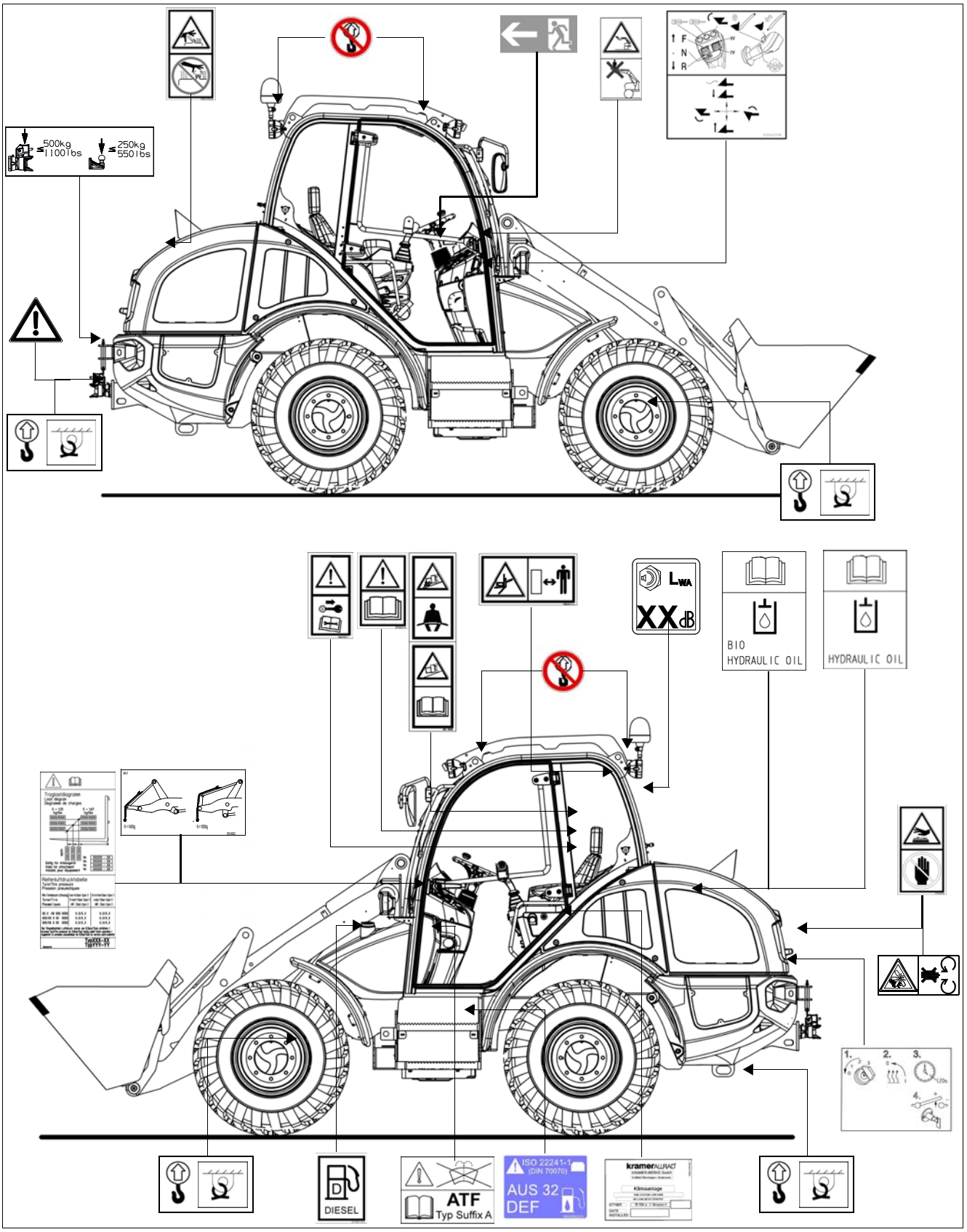
Overview of VOLVO attachments

Attachment	Machine model	Kramer order no.	Volvo order no.	Dimension mm (in)	Capacity[1] m^3 (ft^3)	Material density
Standard bucket[2]	352-03S 352-04S 352-04L	1000335672	–	2150 (84.64) with teeth	1,0 (35.3)	≤ p = 1.8 t/m³ (112 lb/ft³)
	352-03S 352-04S 352-04L	1000330459	–	2150 (84.64) without Z	1,0 (35.3)	≤ p = 1.8 t/m³ (112 lb/ft³)
Multipurpose bucket[2, 3]	352-03S 352-04S 352-04L	1000330680	–	2150 (84.64) with teeth	0,8 (28.25)	≤ p = 1.8 t/m³ (112 lb/ft³)
		1000330711	–	2150 (84.64) without Z	0,8 (28.25)	≤ p = 1.8 t/m³ (112 lb/ft³)
		1000306515	CL 11391144	1900 (74.80) with RZ	–	≤ p = 1.8 t/m³ (112 lb/ft³)
Pallet forks[3, 4]	352-03S 352-04S 352-04L	1000308375	Tines CL 2890381 + Mount CL 2812454	1200 (47.24) (fork arm length)	–	–

1. Heaped capacity
2. Not approved for machine travel on public roads (Germany) since the distance (including attachment) between the centre of the steering wheel and the front edge of the bucket is over 3500 mm. Get informed on and follow the legal regulations of your country.
3. See the Operator's Manual of the attachment for putting the attachment into operation and using it
4. Not certified for machine travel on public roads (Federal Republic of Germany). Observe and follow the legal regulations of your country.

3.4 Labels

Labels (overview)



Symbols

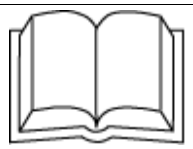


Fig. 3

The "Book" symbol on the signs and type labels indicates that the Operator's Manual contains more detailed information and explanations.

Type label

Fig. 4

The type label is located at the front right of the machine frame (on one side of the loader unit bulkhead).
The **CE** mark on the type label means that the machine meets the requirements of the Machine Directive 2006/42 EC within the European Community and that the conformity procedure has been performed.

Example: type label indications

1. Machine designation	Wheel loader
2. Serial no.	352 04 xxxx
3. Machine model	352
4. Output (kW)	55,4 (74,4)
5. Machine model/version	352-04S
6. Dead weight (kg)	–
7. Transport weight (kg)	–
8. Permissible maximum weight (kg)	7000 (15432.36 lbs.)
9. Maximum payload (kg)	–
10. Front axle weight rating (kg)	4480 (9876.71 lbs.)
11. Rear gross axle weight rating (kg)	4480 (9876.71 lbs.)
12. Check number of EC approval (only for machines with agricultural and forestry licence)	e1*2003/37*xxxx*xx
13. Year of construction	xxxx
14. Gross unbraked trailer weight rating[1] (kg)	750 (1653.47 lbs.)
15. Gross trailer weight rating overrun brake (kg)	–
16. Gross trailer weight rating (kg) overrun brake (1 axle)	3500 (7716.18 lbs.)
17. Gross trailer weight rating (kg) (hydraulically/pneumatically braked)	14000 (30864.72 lbs.)
20. Model year	xxxx

Other information *– see chapter 9 "Technical data" on page 9-1*

1. Optional ball hitch *– see chapter 9 "Trailer weight/drawbar load: trailer couplings (option)" on page 9-24*

Serial number

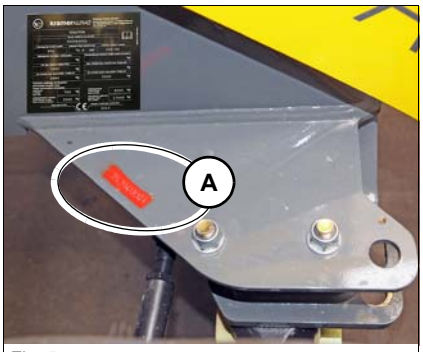


Fig. 5

Serial number

The serial number is stamped at the front on the machine frame **A**.

It is also located on the type label.

Cabin number

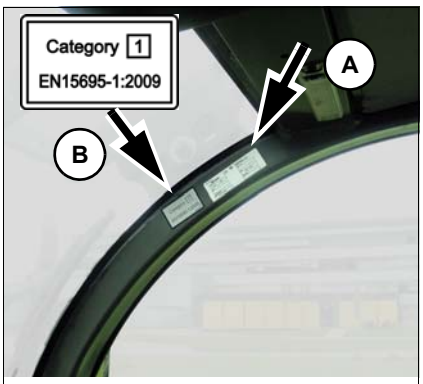


Fig. 6

Cabin number

The cabin type label (**A**) is located on the upper right in travel direction on the beam.

Information label (**B**) specifies that the cabin does not protect against substances that pose a risk to health and that therefore the machine is not authorized for work operation with sprays either.

EC cabin approval mark

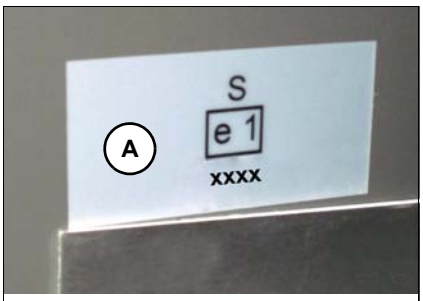


Fig. 7

EC cabin approval mark (example)

Identification of cabin for machines with agricultural or forestry registration for use in the European Community.

- e1 = EC approval mark.
- xxxx = approval number, also included in machine documents (National Type Approval [Germany] or Data Confirmation [Germany]).

Engine number

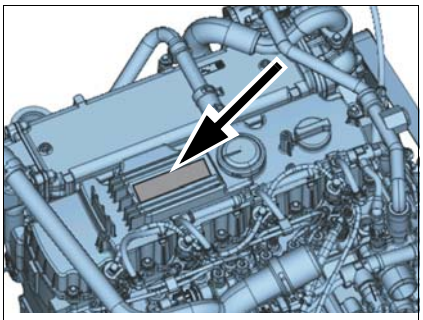


Fig. 8

The nameplate (arrow) is located on the valve cover (engine) and on the side on the crankcase housing.

Exhaust gas catalytic converter

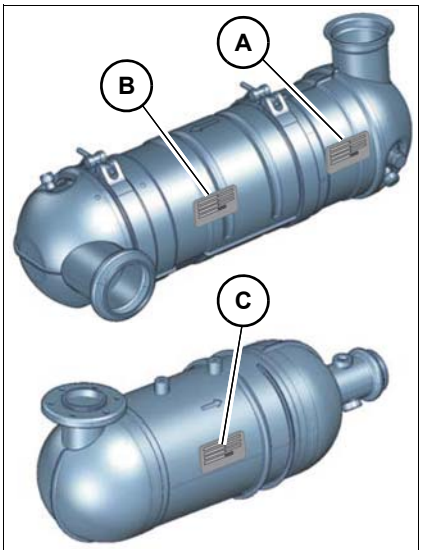


Fig. 9

A Nameplate: Diesel oxidation catalytic converter (DOC)

B Nameplate: Diesel particulate filter (DPF) (optional)

C Nameplate: SCR catalytic converter
(SCR = selective catalytic reduction) (optional)

Variable displacement pump number

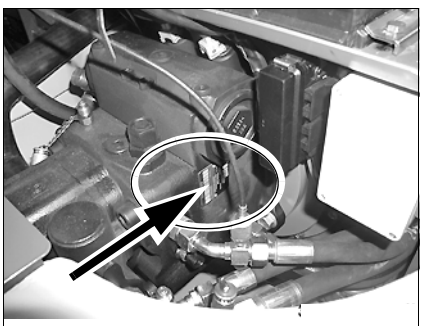


Fig. 10

The type label (arrow) is located on the housing of the variable displacement pump (drive, next to where the pump is installed on the diesel engine).

Variable displacement motor number (20 kph/12.43 mph)

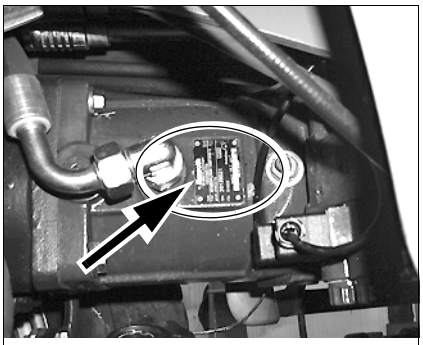


Fig. 11

The type label (arrow) is located on the variable displacement motor (rear axle drive), on the right in travel direction.

High-speed gearbox number (option 30 or 40 kph/18.64 or 24.85 mph)

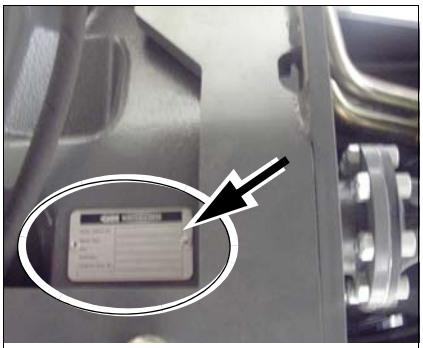


Fig. 12

The type label (arrow) is located on the gearbox housing.

Rear axle number

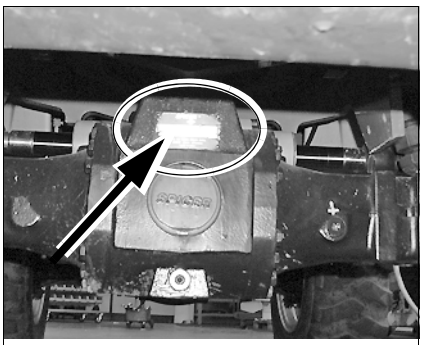


Fig. 13

The type label (arrow) is located on the upper side of the differential housing, at the rear.

Front axle number

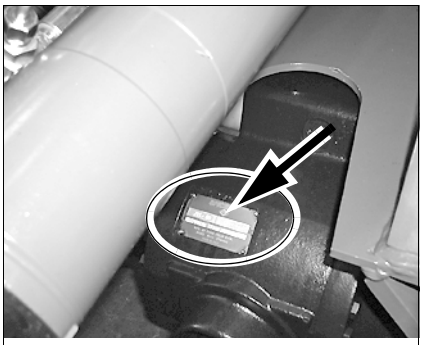


Fig. 14

The type label (arrow) is located on the upper side of the differential housing, at the front.

Warning labels

WARNING

Accident hazard due to damaged or missing warning and information labels!

Causes serious injury or death.

► Immediately replace damaged or missing warning and information labels by new ones.

► In particular this applies to information labels referring to hazards!

Fig. 15

Warning label: Cabin eye hooks!

The eye hooks on the cabin are for removing the cabin only and may **not** be used for crane-lifting the machine. Other information *– see "Crane-lifting the machine" on page 6-6*.

Fixed above on the cabin (4x).

Fig. 16

Warning label: General indication of danger!

Caution! All persons must stay clear of the danger zone of the machine.

Located at the front left and right of the loader unit, and at the rear of machine.

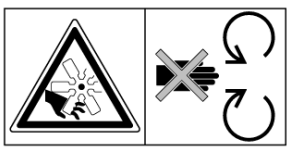


Fig. 17

Warning label: Caution, rotating parts!

Caution! Do not touch any turning parts!

Perform inspections and maintenance only at diesel engine standstill!

Located near the engine cooling (V-belt protection) and near the handle on the engine cover.

Fig. 18

Read and understand warning label of Operator's Manual

Caution! Read and understand the operator's manual before starting up, servicing or repairing the machine!

Located on the pillar on the right inside the cabin.

Fig. 19

Warning label: Remove the starting key!

Caution! Remove the starting key before performing inspection and maintenance on the machine.

- Read the service manual before performing maintenance.
- Have repair work performed only by trained technical personnel.

Located on the pillar on the right inside the cabin.

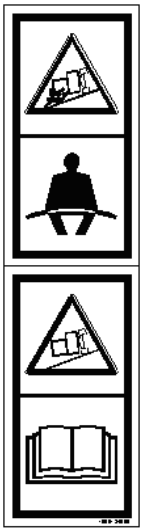


Fig. 20

Warning label: Seat belt and machine stability

- Operate the machine only from the operator seat.
- Fasten your seat belt before operating the machine.
- Ensure machine stability.
- Read and understand the Operator's Manual.

Located on the pillar on the right inside the cabin.

Fig. 21

Warning label: No transport of persons!

Warning! Do not raise or transport persons on the machine, in the bucket or on the pallet forks.

Located inside the cabin, on inside of front window.

Fig. 22

Warning label: No transport of persons!

Warning! Do not transport accompanying persons in the cabin.

Located on the pillar on the right inside the cabin.

Fig. 23

Warning label: Reservoir under pressure, burn hazard!

Caution! Do not open. The radiator is hot and under pressure.

- Open the radiator only after the coolant has cooled down.
- Open the cover carefully to the first stop notch to allow the pressure to escape.
- Wear protective gloves and clothing.

Fixed in the engine compartment on the radiator.

Fig. 24

Warning label: Burn hazard!

Caution! Do not touch.

- Wear protective gloves and clothing during maintenance work.

Located on the left on the rear wall of the engine compartment, near the exhaust muffler, and near the handle on the engine cover.

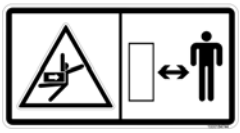


Fig. 25

Swivelling range warning label

Warning! Injury hazard!

Stay clear of the machine's swivelling range during operation!

Located inside the cabin, above the rear window.

Information labels

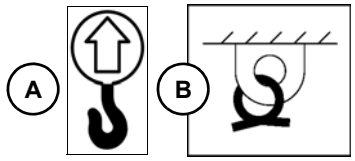


Fig. 26

Tie-down point labels for loading and tying down the machine!

Eye hooks for tying down the machine **B** during transport, and eye hooks **A** for loading the machine

– see chapter 6 "Loading the machine on a transport vehicle" on page 6-4 and *Crane-lifting the machine on page 6-6*.

Located on left and right of machine frame above the front axle attachment and at the rear under the machine.

Fig. 27

Information label: Maximum design-specific speed

Design-specific max. machine speed 20 kph standard (30/40 kph option). Only for use in the European Community.

Located at the rear of the machine and on the left/right of the counterweight.

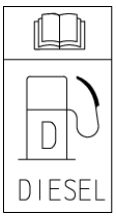


Fig. 28

Information label: Fuel filler opening!

Use only the diesel fuels indicated.

- DIN EN 590 (EU) / ASTM D975-94 (USA)
- Do not use diesel fuel with additives.

If other fuels are used, warranty rights shall not apply in case of diesel engine damage (guarantee)!

Located near the filler inlet of the fuel tank (left side of machine).

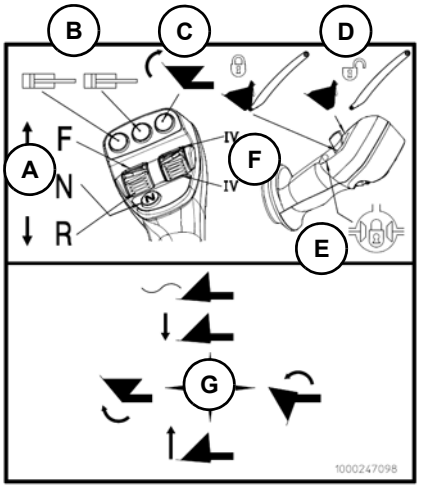


Fig. 29

Label: control lever (joystick) operation

A Travel direction: (F) forward/(R) reverse and (N) neutral position
B Additional control circuit with additional functions (option)
C Automatic bucket repositioning (option) or front socket power supply
D Operation: Locking/unlocking the attachment fitted on the quickhitch facility
E Differential lock
F Operation of 4th control circuit (option)
G Loader unit wiring diagram operation: raise/lower and tilt in/out (optional floating position)

Description of loader unit operation

– see chapter 5 "Operating hydraulics" on page 5-35.

Located on the right on the side window, next to the control lever (joystick).

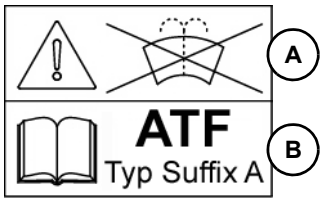


Fig. 30

Brake fluid label

A = Caution! Do not add any water!

B = Use only **ATF** brake fluids for adding brake fluid
– *see chapter 7 “Checking/adding brake fluid” on page 7-62*.

Located on the trim next to the brake-fluid reservoir (cabin access on the left).

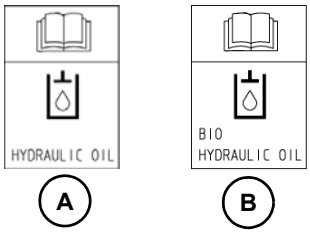


Fig. 31

Information label: Filler opening for hydraulic oil

A Hydraulic oil

B Biodegradable hydraulic oil

Other data – *see chapter 7 “Hydraulic system” on page 7-43*.

Located on the rear wall of the engine compartment, on the left near the filler inlet (hydraulic oil tank).

Fig. 32

Noise level label

Noise levels produced by the machine.

LWa = sound power level

Other data – *see chapter 9 “Noise emissions” on page 9-18*.

Affixed on the rear window.

Fig. 33

Information label: Emergency exit from cabin

Indicates the emergency exit in case of an emergency
– *see chapter 4 “Emergency exit from the cabin” on page 4-7*.

Located on the door handle on the right.

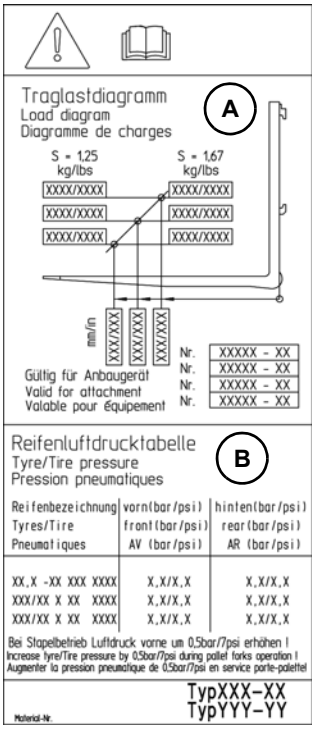


Fig. 34

Load diagram notice sign (A)!

Load diagram with maximum payload indications for pallet forks applications – *see chapter 9 “Payload/lift capacity/stability” on page 9-20*.

Information

The load diagram (on the left on the front window) is only valid for applications with the released pallet forks noted on the notice sign.

The load diagram also applies to released buckets if the specified capacities and material densities are observed.

Pay attention to the specific load diagrams of other attachments used or created
– *see chapter 5 “Fitting attachments from other manufacturers (option)” on page 5-99*!

Tire pressure table notice sign (B)!

List of certified types of tires with mandatory tire inflation pressures.

Located inside the cabin, on left side of front window.

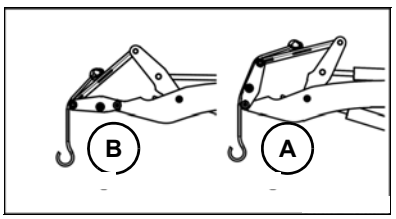


Fig. 35

Information label: Load hook diagram (option)

Example: maximum load-bearing capacity
– *see chapter 9 “Payload with load hook on tilt lever” on page 9-23*.

A Extended loader unit and quickhitch tilted in.
- ➥ Max N => 2400 kg (model 352-04S)
- ➥ Max N => 2600 kg (model 352-04S)

B Extended loader unit and quickhitch.
- ➥ Max N => 1800 kg (model 352-03S)
- ➥ Max N => 1900 kg (model 352-04S)

Located inside the cabin, on left side of front window.

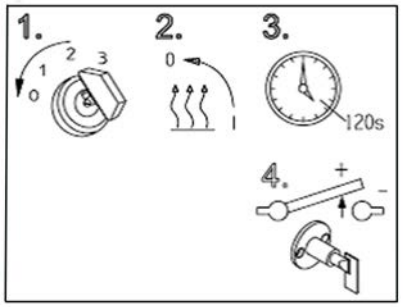


Fig. 36

Battery master switch notice sign (optional)!

Interrupting the electrical circuit early can cause damage to the diesel engine (electronic injection) and auxiliary heater (option).

➥ Never turn the battery master switch out of the notch with the engine running.

➥ After stopping the engine, wait at least 120 seconds before actuating the battery master switch
– see chapter 4 "Battery master switch (option)" on page 4-18.

Fixed in the engine compartment.

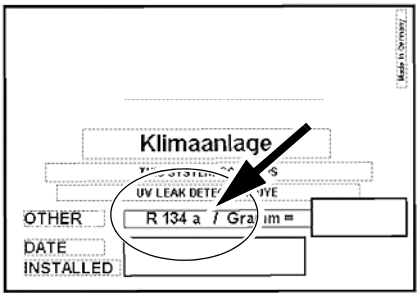


Fig. 37

Information label for air conditioning system refill (option)

Use only the refrigerants (see arrow) indicated on the label for refilling the air conditioning system.

Located inside the cabin.

Fig. 38

Notice sign for filling with urea solution (optional)!

Only the urea solutions specified on the notice sign may be used for filling.

- **AUS 32** – **A**queous **U**rea **S**olution (EU)
- **DEF** – **D**iesel **E**xhaust **F**luid (USA and North America)

Fixed on the fixed, cabin entry left.

4 Putting into operation

4.1 Cabin/control stand

Important information on the cabin

Fig. 39

- According to EN 15695-1:2009, the machine cabin does not protect against substances that pose a risk to health and is therefore not authorized for spraying applications. Only for use in the European Community. Get informed on and follow the legal regulations of your country.
- Only put the machine into operation if all cabin windows are free of dirt, snow and ice.
- In forestry applications, the standard cabin does not offer enough protection against falling trees or branches, or objects penetrating into the cabin. Therefore, the machine has not been released for forestry applications.
- A cabin damaged (deformed) in an accident may not be repaired but must be replaced by an authorized service center.
- Welding, removing or drilling through elements of the cabin is prohibited since this work modifies the cabin. Therefore it does not correspond to the certification any longer.

Information

For the operator's safety, the vehicle can optionally be outfitted with a seat contact switch. In this case:

- The diesel engine will not start unless the operator is seated on the seat.
- The drive switches off after 5 seconds if the load on the operator seat is reduced when driving the machine.

EC cabin approval mark (agriculture and forestry certification option)

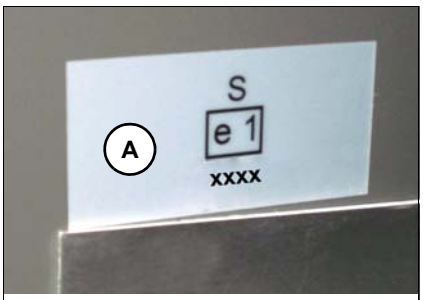


Fig. 40

Machines with agricultural or forestry certification for use in the European Community have an EC approval number **A** in accordance with the 2009/75 EC Directives.

➥ e1 = EC approval mark.

► xxxx = approval number, also included in machine documents.

Safety instructions regarding accessing and leaving the cabin

CAUTION

Falling hazard when entering or exiting!

Entering or exiting incorrectly can cause injury.

- ► Keep the mandatory climbing aids clean.
- ► Use the mandatory climbing aids for entering and exiting the machine.
- ► Face the machine as you enter and leave it.

Fig. 41

Information

Cabin access on the left = main access or main exit!

Use the cabin access on the right in an emergency only
(see the emergency exit label)!
Secure the control lever (joystick) and fold back the control lever base before leaving the cabin by the right door!

Opening and closing the cabin door (left/right)

CAUTION

Crushing hazard due to unlocked cabin door!

The door can cause crushing when it is being closed.

- ► Lock the door or secure it in the door arrester before moving the machine.

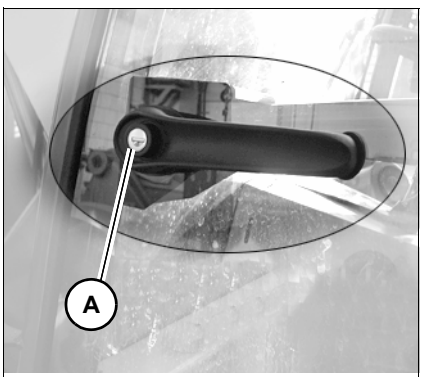


Fig. 42

Opening the door from outside

1. Unlock the door with the ignition key (turn to the right).
2. Press door button **A**.

Closing the door from outside

1. Lock the door with the ignition key (turn to the left).

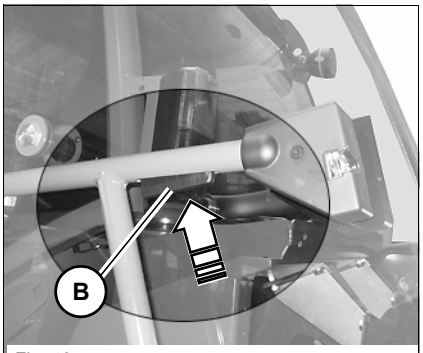


Fig. 43

Opening the door from inside

1. Push handle **B** up.

Information

The machine has a one-key system. All the locks (cabin, ignition lock, engine cover, fuel tank and tool kit) are opened and locked with the key of the machine.

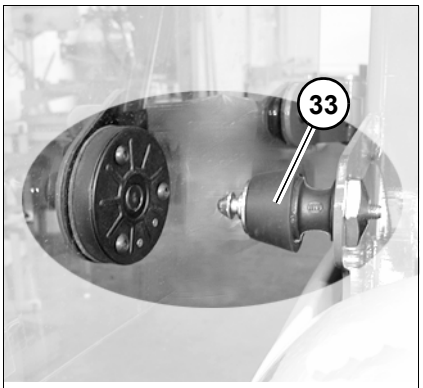


Fig. 44

Securing the door in the open position

1. Open the door completely and let it lock into place in arrester **33**

Information

Lubricate the door arrester regularly!

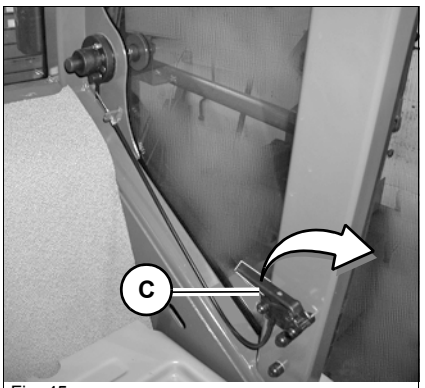


Fig. 45

Releasing the door out of the arrester

1. Press arrester lever **C** forward.
   ➥ The door is released from the lock by spring action.
2. Close the door.

Opening the right door to a gap

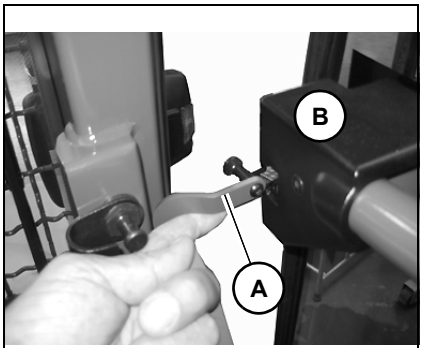


Fig. 46

The door on the right can be opened to a gap and secured with the arrester to improve cabin ventilation.

1. Safely engage lever **A** in door lock **B**

Folding back the control lever base

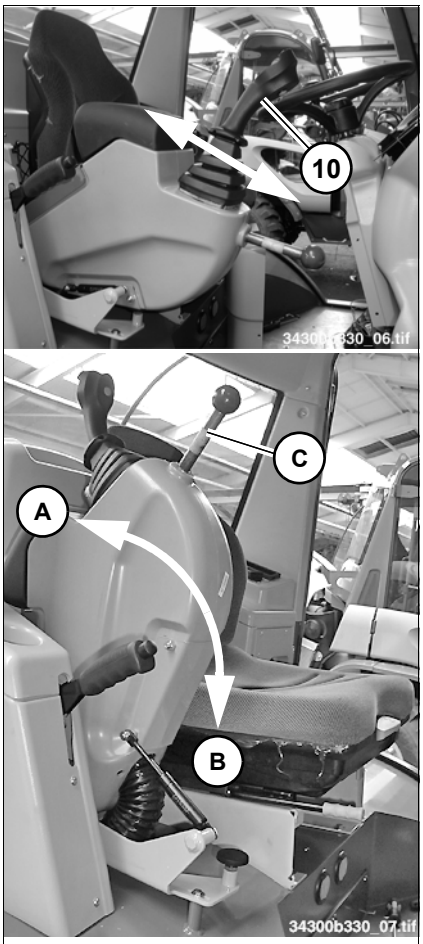


Fig. 47: Control lever base

Enter and leave the cabin only by the left door as a rule. Use the access on the right in an emergency only!

WARNING

Danger of accident if the control lever base is folded down too early!

May lead to serious injury or death due to uncontrolled movement of the vehicle or the loader unit.

- ► Stop the machine.
- ► Lower the loader unit to the ground.
- ► Apply the parking brake.
- ► Stop the engine and remove the starting key.
- ► Move control lever **10** (joystick) back and forth several times to release the pressure
- ► Secure the control lever (joystick) .

NOTICE

The control lever base is damaged if the load on it is too heavy.

- ► Do not use handle **C** to ease your entrance into the cabin.

1. Fully raise the control lever base to position **A** with handle **C**
   ➥ The gas strut keeps the control lever base in the top position.
2. Fold the control lever base down to position **B** after entering or leaving the cabin.
   ➥ The gas strut keeps the control lever base in the lower position.

MIrror adjustment on the left

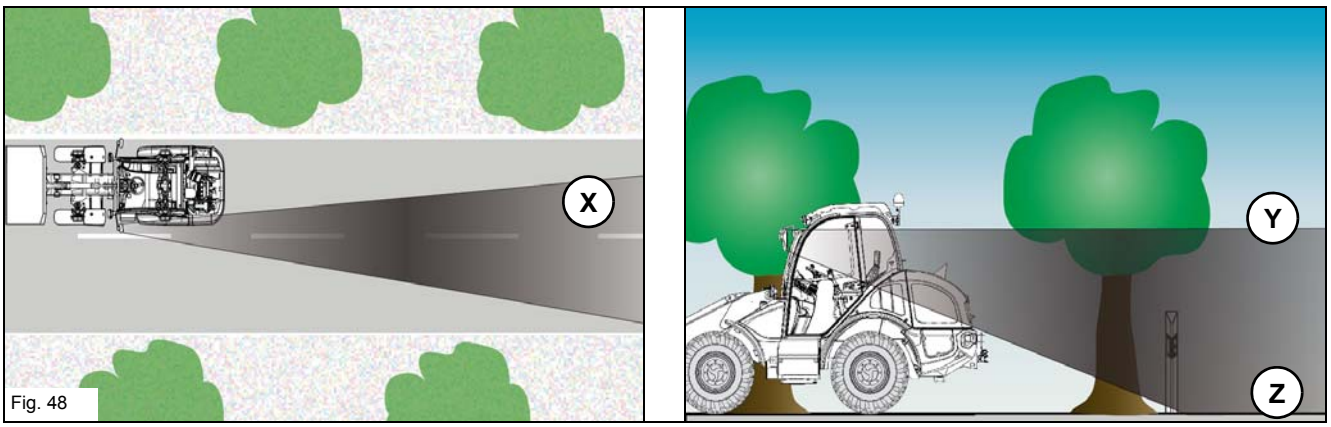


Fig. 48

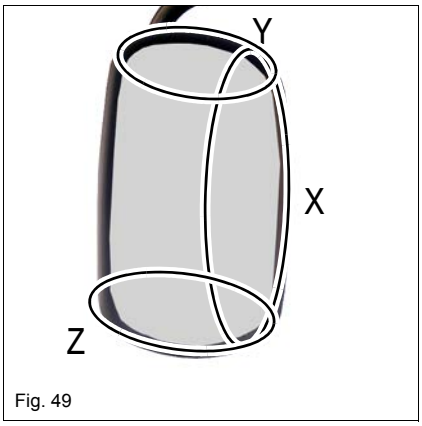


Fig. 49

1. Turn the mirror on the **left** outward with the long side.
   When making preliminary adjustments, ensure that the mirror bracket is turned far enough to the front (about 45°) to avoid touching the door window.
2. Adjust the **left** rearview mirror:
   - The outer edge of the machine must be visible on the inside **X** of the mirror.
   - The horizon must be visible at the upper edge **Y**.
   - At the lower edge **Z**, the visible area of the road must be as close as possible to the machine.

Mirror adjustment on the right

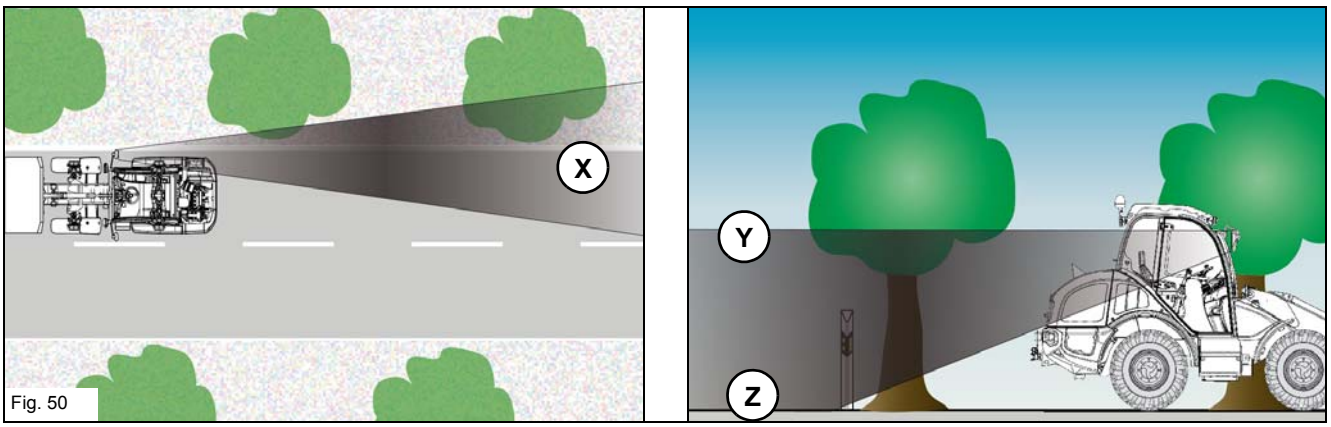


Fig. 50

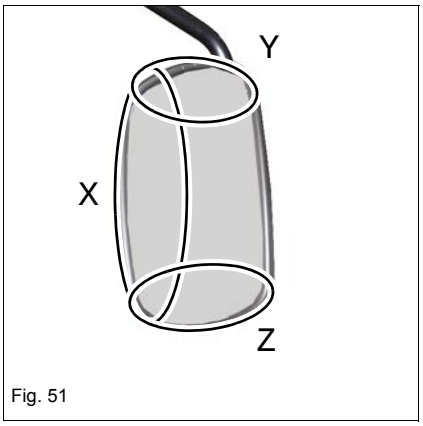


Fig. 51

1. Turn the mirror on the **right** outward with the long side.
   When making preliminary adjustments, ensure that the mirror bracket is turned far enough to the front (about 45°) to avoid touching the door window.
2. Adjust the rearview mirror on the **right**:
   - The outer edge of the machine must be visible on the inside **X** of the mirror.
   - The horizon must be visible at the upper edge **Y**.
   - At the lower edge **Z** of the mirror, the visible area of the road must be as close as possible to the machine.

Emergency exit from the cabin

Information on emergency exit

Fig. 52

Information

Cabin access on the left = main access or main exit!

Use the cabin access on the right in an emergency only.
(see the emergency exit label)!
Secure the control lever (joystick) and fold back the control lever base before leaving the cabin by the right door
– *see “Folding back the control lever base” on page 4-4*!

Machines certified for agriculture and forestry (option) are equipped with emergency hammers.

In an emergency, a window can be smashed with the emergency hammer and used as an emergency exit.

The emergency hammer is located to the right of the parking brake.

Using the emergency exit

Fig. 53

CAUTION

Smashing a window pane sends glass splinters flying around – injury hazard!

- ► Protect face and eyes before smashing a windowpane.
- ► If possible, ask for help before smashing a windowpane.

1. Stop the diesel engine.
2. Switch off all electric consumers and remove the ignition key.
3. If possible, ask for help.
4. Smash the window with the emergency hammer and carefully exit the cabin.

Information

Before putting the machine back into operation, put the emergency hammer back in place and seal it!

Have the damaged window replaced by an authorized service centre!

Operator seat

WARNING

Accident hazard when adjusting the operator seat during machine travel!

Can cause serious injury or death.

- ► Adjust the operator's seat only at machine standstill.
- ► Lock the seat adjustment lever safely into place.

CAUTION

Damage to health can result from an incorrectly adjusted or malfunctioning operator seat!

Can cause injury to spinal column!

- ► Adjust the operator's seat to the operator’s weight before putting the machine into operation or when changing operators.
- ► In order to avoid injury, do not store any objects in the suspension travel range of the operator seat.
- ► Do not modify the operator seat (for example by retrofitting parts other than original).
- ► Contact an authorized service center immediately if the seat does not function as usual (for example the seat suspension).

Information

For the operator's safety, the vehicle can optionally be outfitted with a seat contact switch. In this case:

- ► The diesel engine will not start unless the operator is seated on the seat.
- ► The drive switches off after 5 seconds if the load on the operator seat is reduced when driving the machine.

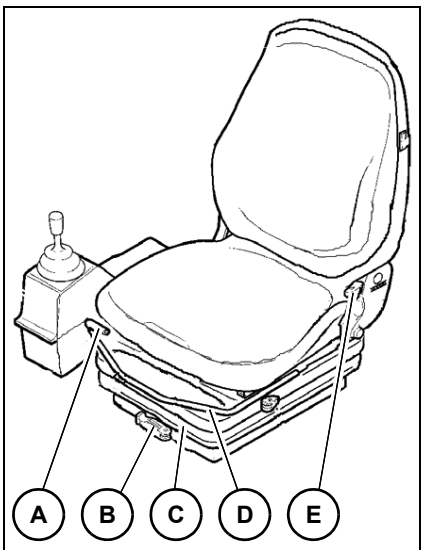


Fig. 54

Seat adjustment (overview)

The operator seat can be set to the following positions:

A Horizontal adjustment without control lever base
B Weight adjustment
C Weight indicator
D Horizontal adjustment with control lever base
E Backrest adjustment

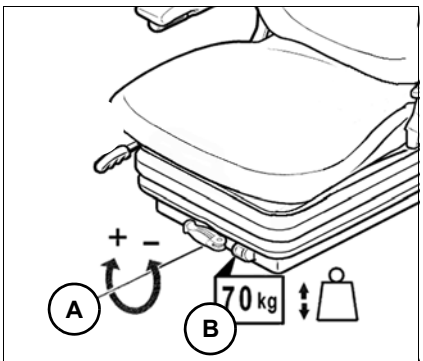


Fig. 55

Weight adjustment

1. Sit down on the operator seat.
2. Adjust the weight.

Use lever **A** to adjust the seat suspension to the operator's weight.
The weight indicator **B** shows the set operator weight [kg].

Weight	Adjustment
Higher operator weight	Turn handle **A** clockwise until reaching the weight in indicator **B** (10 kg/22 lb per notch)
Lower operator weight	Turn handle **A** anticlockwise until reaching the weight in indicator **B** (10 kg/22 lb per notch)

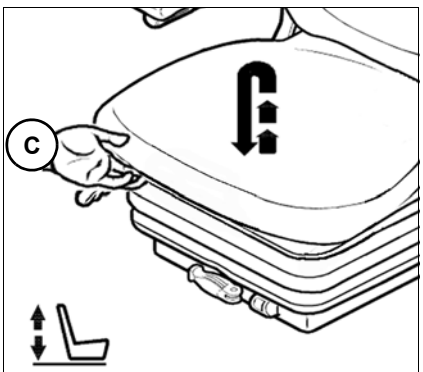


Fig. 56

Height adjustment

1. Raise or lower the seat as required until it engages with an audible click.

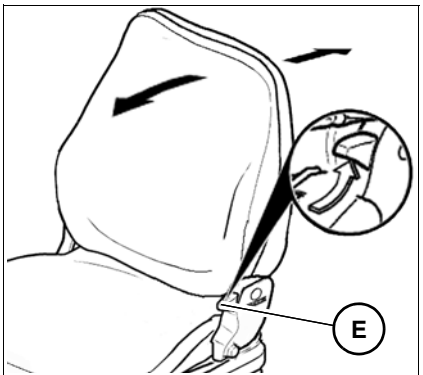


Fig. 57

Backrest adjustment

1. Sit down on the operator seat.
2. Pull lever **E** upward and at the same time, lean back to push the backrest into the required position.
3. Allow lever **E** to engage.

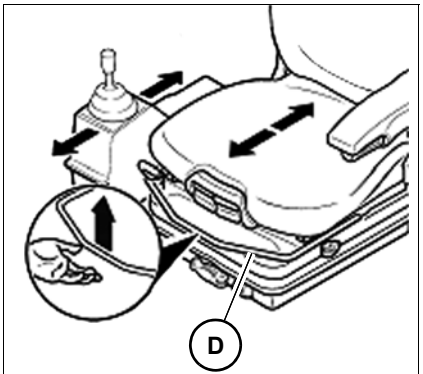


Fig. 58

Horizontal adjustment with control lever base

1. Sit down on the operator seat.
2. Pull lever **D** up and at the same time, move the operator seat forward or backward.
3. Allow lever **D** to engage in the required position

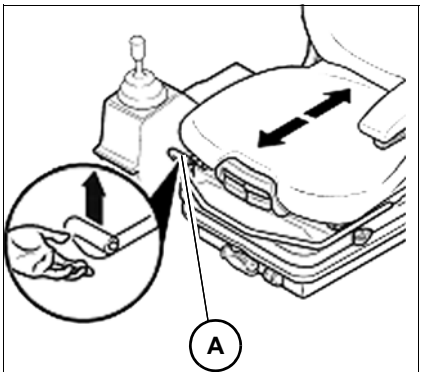


Fig. 59

Horizontal adjustment without control lever base

1. Sit down on the operator seat.
2. Pull lever **A** up and at the same time, move the operator seat forward or backward.
3. Allow lever **A** to engage in the required position.

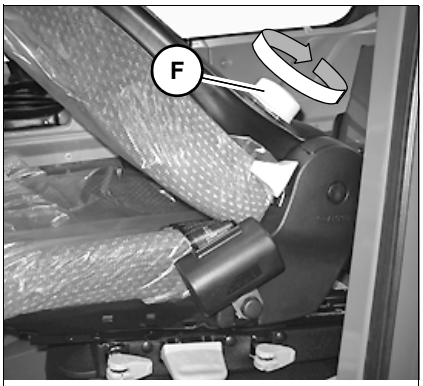


Fig. 60

Lumbar support adjustment (option)

Turn hand wheel **F** to the left or right to adjust the height and the intensity of the arch in the backrest padding.

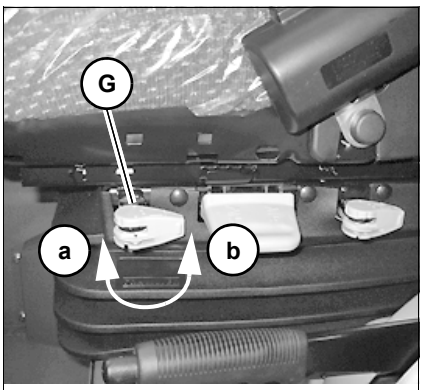


Fig. 61

Adjustment of horizontal suspension (option)

Switching on the horizontal suspension with lever **G** may be recommendable under certain conditions (for example driving with a trailer).

This enables the operator seat to dampen shocks in travel direction.

- Position **a** = horizontal suspension **ON**
- Position **b** = horizontal suspension **OFF**

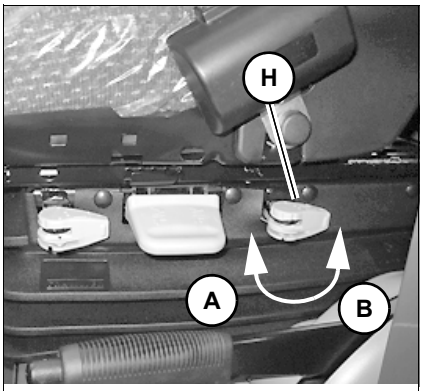


Fig. 62

Adjustable seat suspension damper (option)

The operator can adjust the seat suspension to his own requirements and to different work conditions.

Four levels ranging from **soft** to **hard** are possible.

- Lever **H** in position **A = soft**
- Lever **H** in position **B = hard**

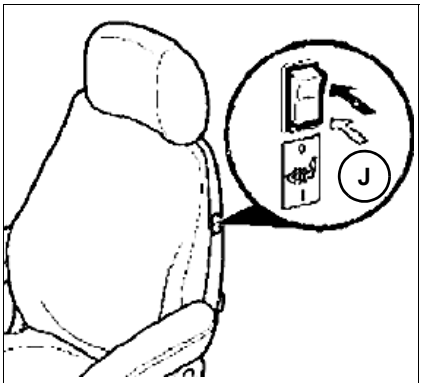


Fig. 63

Heated seat (option)

The seat heating is switched on or off with switch **J**.

Operator seat with air suspension (option)

Before putting the machine into operation, check the switches on the operator seat for correct function.

CAUTION

Danger of accident in the event of defective air-sprung driver's seat!

Can cause injury.

► Do not put a machine into operation with a malfunctioning air-sprung driver's seat.

► Have the operator's seat repaired by an authorized service center.

Fig. 64

The air-suspension seat height can be adjusted continuously.

There are two settings for the automatic weight adjustment. The second setting allows for an individual height adjustment.

- Pull or press lever **K**
  - ➥ Seat height changes.
  - ➥ Upon reaching the upper or lower limit, the height is automatically adjusted to ensure a minimum spring travel.

NOTICE

Do not run the air compressor for more than 1 minute to avoid damage to it!

Fire extinguisher (option)

Fig. 65

The fire extinguisher is **not** included in the machine's standard equipment (option).

Subsequent installation of the fire extinguisher must be performed by an authorized service centre.

- It is installed on the right on the seat pan, below the control lever base.
- Operate the fire extinguisher according to the instructions printed on the fire extinguisher.

Information

In order to ensure the full serviceability of the fire extinguisher:

► Have the fire extinguisher checked at regular intervals and refilled, see inspection tag.

► Remove the fire extinguisher from the cabin only in an emergency.

► After the fire extinguisher has been used: have it filled by an authorized service center or replace it with a new one.

Seat belt (lap belt)

WARNING

Injury hazard if the seat belt is not fastened correctly or not at all!

Fastening the seat belt incorrectly, or not at all, can cause serious injury or death.

- ► Fasten the seat belt before machine operation!
- ► Do not fasten a twisted seat belt!
- ► Seat belt must run over the hips – not over the stomach – and must always be applied tightly!
- ► Do not place the seat belt over hard, edged or fragile items in your clothes!

WARNING

Accident hazard due to damaged or dirty seat belt!

A damaged or dirty seat belt can cause serious injury or death.

- ► Keep the seat belt and buckle clean.
- ► Check the seat belt and buckle for damage.
- ► Have a damaged seat belt and buckle replaced by an authorized service centre.
- ► Have the seat belt immediately replaced after every accident and the load-bearing capacity of the fastening points and seat fixtures checked by a Wacker Neuson service center.

WARNING

Accident hazard when adjusting the seat belt during machine operation!

Adjusting the seat belt during machine operation can cause serious injury or death.

- ► Adjust the seat belt before putting the machine into operation.
- ► Ensure that the buckle is inserted (pull test).

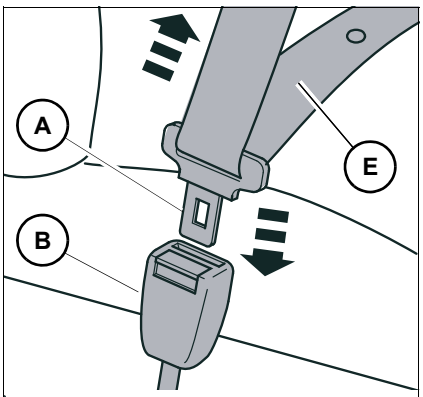


Fig. 66

Fastening the seat belt

1. Sit down on the operator seat.
2. Hold seat belt **E** at buckle latch **A** and run it steadily over the hips to buckle **B**.
3. Insert buckle latch **A** into buckle **B** until it engages audibly ***(pull test).***
4. Tighten the seat belt by pulling at its end.
   ➥ The seat belt must not be twisted and must run tightly over the hips!

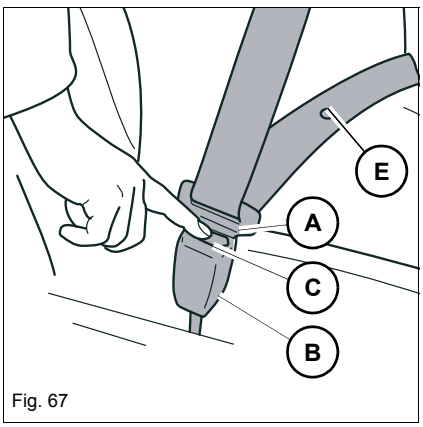


Fig. 67

Unfastening the seat belt

1. Hold seat belt **E**.
2. Press red button **C** on buckle **B**.
   ➥ Latch **A** is released from buckle **B.**
3. Slowly return the seat belt to the retractor.

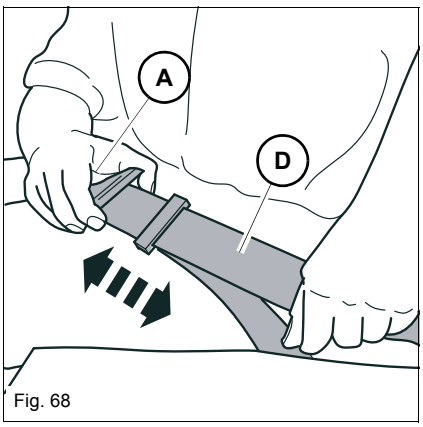


Fig. 68

Longer/shorter seat belt adjustment

1. Hold buckle latch **A** at a right angle to the seat belt and pull the seat belt to the required length.
2. To shorten the lap belt, just pull the free end **D** of the belt.

Information

When pulled slowly, the automatic seat belt offers full freedom of movement. It locks however during abrupt braking.
The automatic seat belt may also lock when passing through potholes or uneven terrain.

Engine cover lock

CAUTION

Injury hazard due to hot and moving engine parts!

Hot and moving engine parts can cause injury.

- ► Do not open the engine cover if the engine is running.
- ► Let the engine cool down.
- ► Wear protective equipment.

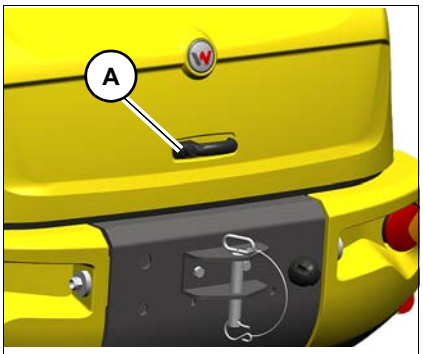


Fig. 69

Opening the engine cover:

1. Stop the engine and remove the starting key.
2. Unlock lock **A** with the ignition key.
3. Press lock **A**.
   ➥ The engine cover is raised with a gas strut.

Closing the engine cover:

1. Firmly press down the engine cover until lock **A** engages with an audible click.
2. Lock the engine cover with the ignition key.

Battery master switch (option)

The entire electric system is disconnected from the battery with the battery main switch. This prevents an unauthorized engine start.

The battery master switch **B** is located in the engine compartment on the right next to the engine oil filter.

NOTICE

Interrupting the electrical circuit early can cause damage to the diesel engine (electronic injection) and auxiliary heater (option).

- ► Never turn the battery master switch out of the notch with the engine running.
- ► After stopping the engine, wait at least 120 seconds and then turn the battery main switch from the notched position!

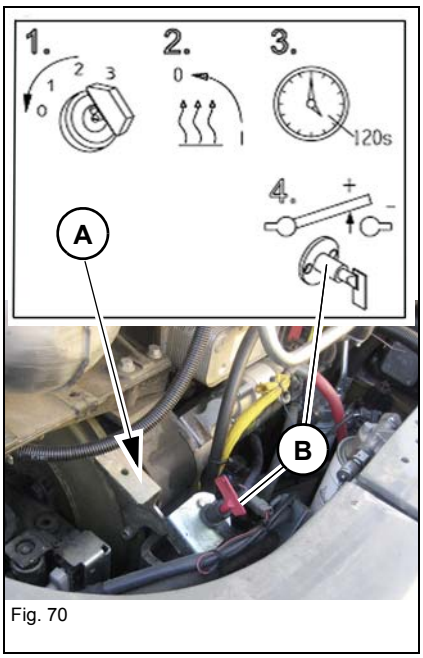


Fig. 70

Switch off the battery master switch

1. Stop the diesel engine.
2. Allow the engine to cool. To do this, wait at least 120 seconds - see the notice sign **A,** attached to the bracket of the battery main switch.
3. Turn key **B** out of the notched position and remove it.
   ➥ The entire electrical system is out of operation.

Switch on the battery master switch

1. Insert the key **B** in the battery master switch and turn it to the notched position.
   ➥ The entire electrical system is in operation.

Information

An external auxiliary heater (option) cannot be operated if the battery master switch is removed.

Key-based immobilizer (option)

The drive interlock is integrated in the ignition lock and can only be disabled with the blue ignition keys!

Scope of delivery:

- Immobilizer installed in the machine
- 2 x blue ignition keys (coded)
- 1 x red master key (for coding blue keys)

Coding the ignition keys

New personal keys are coded with the master key (red). This is why it must be carefully stored outside the machine. The master key is only used for coding new keys, and cannot be used for disabling the drive interlock.

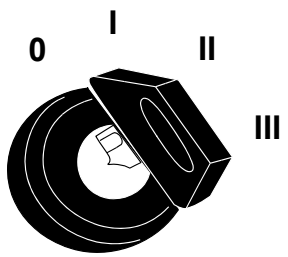


Fig. 71

1. Switch on the side marker lights
   – see chapter 5 “Parking lights/low beam” on page 5-25.
2. Insert the master key in the ignition lock and turn it to position (2).
3. Turn and remove the master key from position (0) within 5 seconds.
4. Insert the key to be coded (blue) into the ignition lock, turn it to position (2) and leave it in this position for at least 1 second.
   ➥ The key is registered as a valid key.
5. Remove the key.
   ➥ Step 4 can now be repeated for other keys to be coded.
   ➥ Coding can be performed for a maximum 10 keys.
   ➥ Coding is automatically stopped if no other key is detected within 15 seconds.

Information

In order not to give any incorrect information to the electronics of the drive interlock, the master key (red) has to be stored outside the machine after coding new keys (not to be attached to the key chain of the key to be coded).

Information

The immobilizer has only one master key!

► The drive interlock must be replaced by an authorized service center if the master key (red) is lost.

Enabling the immobilizer

1. Apply the parking brake – *see chapter 5 “Parking brake” on page 5-16*.
2. Stop the engine – *see “Stopping the engine” on page 4-60*.
3. Remove the starting key (blue).
   ➥ The immobilizer is enabled in 30 seconds.

Information

The drive interlock remains disabled if the ignition key (blue) is **not** removed from the ignition lock!

Disabling the immobilizer

- Insert the ignition key (blue) into the ignition lock.
  ➥ The immobilizer is disabled after 5 seconds.
- Start the engine – *see “Starting the engine” on page 4-58*.

Deleting coded keys

Deleting coded keys (blue) is necessary whenever a key is lost.

1. Switch on the side marker lights
   – *see chapter 5 “Parking lights/low beam” on page 5-25*.
2. Insert the master key (red) into the ignition lock, turn it to position (2) and leave it in this position for at least 20 seconds.
   ➥ All coded keys (blue) are deleted and can be re-coded
   – *see “Coding the ignition keys” on page 4-19*.

Information

The code of the master key (red) is retained.

Safety functions

- The immobilizer remains enabled for 15 minutes and does not accept any valid keys if more than 5 keys with different invalid codes are inserted and turned in the ignition lock within 1 minute.
- This function avoids ‘finding’ the correct key by chance by trying different keys.
- Valid keys are accepted only after 15 minutes and after the position (0) of the ignition lock has been detected. This avoids testing keys without actuating the mechanical ignition lock, for example by moving the ignition lock to position (2) by force.
- Interruptions of the supply line or other control lines do not disable the immobilizer or delete data (for example data codes).
- All important data is saved in a non-volatile memory.

Immobilizer with code input (option)

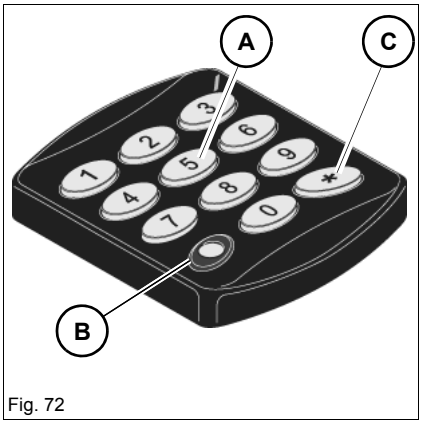


Fig. 72

Keypad for entering codes (overview)

The immobilizer is enabled or disabled with “personal” codes entered via the keypad. Two codes are available:

- The existing unchangeable six-digit main code for disabling the immobilizer, for entering a personal code or for changing the personal code.
- The four, five or six-digit personal code is used for disabling the immobilizer and is entered by the operator.

Information

We recommend using the personal code for disabling the system.
Keep the main code in a safe place.

NOTICE

The immobilizer can be damaged by heat and humidity.

► Protect the keypad and the control unit from heat and humidity.

Keypad (overview)	
A	10 numeric keys for entering the codes
B	LED (red indicator light)
C	(*) key for confirming the code that has been entered

- The keypad emits a sound to indicate operations.
  Example: a signal sounds to confirm a key has been pressed.
- The keypad illuminates whenever one of the keys is pressed.
- The keypad flashes to indicate specific system statuses.

Entering/changing the personal code

1. Disabe the drive interlock . To do this: enter the main code (6 digits) and confirm it with the (*) touch button.
2. Turn the ignition key to position 1.
   ➥ The LED illuminates for 2 seconds.
3. Enter the 4, 5 or 6-digit new personal code and confirm with the (*) key within 20 seconds after the LED has gone out.
   ➥ The LED flashes briefly.
4. Enter the new personal code again and confirm it with the (*) key.
   ➥ LED flashes 2x briefly. Then the LED lights for 2 seconds.
5. Turn the ignition key to the ZERO position and remove it as soon as the LED goes out.

➥ The new personal code is now set and can be used for disabling the immobilizer.

Information

The personal code must be entered correctly twice consecutively otherwise an error is indicated by means of a single flashing of the LED:

- Codes consisting of 3 and less, or of more than 6 digits are ignored by the system.
- Simple codes (with identical or consecutive digits, for example 1, 2, 3, 4) are rejected by the system with four short acoustic signals.
- Entering a new personal codes replaces the previous code. A code can be changed any time if the main code is known.

Enabling the immobilizer

1. Stop the engine.
2. Remove the starting key.
   ➥ The immobilizer is automatically enabled.
   ➥ The LED flashes.

Disabling the immobilizer

1. Enter the personal code or the main code (6 digits) and confirm with the (*) key.
   ➥ 2 long acoustic signals and long LED flashing.
   ➥ LED OFF: immobilizer is disabled.
   ➥ Diesel engine can be started.

If a wrong code has been entered:

   ➥ 4 short acoustic signals, flashing LED = wrong code.
   ➥ Diesel engine cannot be started.

2. Re-enter the code.
3. Turn the ignition key and start the engine before the LED flashes again (30 seconds).

Information

The keypad is blocked for 5 minutes and no codes can be entered if the wrong code is entered four times consecutively.

- Enter the code after 5 minutes.
- The keyboard does not light up for the duration of the lock; It lights up briefly every 4 seconds and an acoustic signal sounds.
- Press the (*) key after every code.
- The LED illuminates briefly when turning the ignition key to the engine start position.

Information

If power supply is interrupted with the immobilizer enabled, short acoustic signals sound when the keypad is switched on.
In this case, wait until the acoustic signals are no longer given. The immobilizer can then be disabled with the personal or main code.

Putting the immobilizer out of operation

We recommend putting the immobilizer out of operation, for example if the machine has to stay in a service centre or if the machine does not require any protection. This avoids having to communicate the code.

1. Disable the system by entering the personal or main code and by confirming with the (*) key.
2. Turn the ignition key to position “1”.
   ➥ The LED illuminates for 2 seconds.
3. As soon as the LED goes out, press the (*) key for about 2 seconds until a short acoustic signal, followed by two further signals, sounds.
   ➥ The LED now flashes very slowly, and the keypad is disabled.
4. Turn the ignition key to the zero position and remove it.
   ➥ The engine can be started without entering the code. The system is out of service even if electric power is interrupted.

Information

If the system is out of operation, the LED flashes slowly even if the ignition key is in position 1.
Entering the personal or main code does not have the effect of putting the system back into operation again (the acoustic signals for confirmation are still given). See the following procedure (“Putting the immobilizer back into operation again”) to leave the out-of-operation status again.

Putting the immobilizer back into operation again

1. Turn the ignition key to position (0).
2. Press the (*) key 2 seconds until two short acoustic signals sound.
3. The system is now re-activated; The code has to be entered again to start the engine.

Hydraulic oil preheating (option)

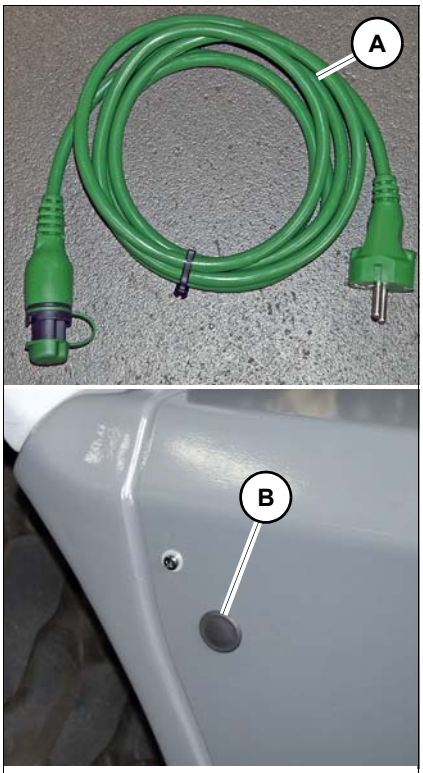


Fig. 73

The hydraulic oil preheating is used as a cold-starting aid at temperatures below −5 °C (23 °F).

The hydraulic oil preheater reduces pollutant emissions during the warm-up phase and saves fuel at the same time.

WARNING

Danger due to electric tension!

Damaged cables and voltage sources can cause serious injury or death.

► In Germany, cable **A** and the voltage source must be regularly checked by an electrician according to the VDE 0701 standard. Observe and follow the legal regulations of your country.

Information on putting into operation

Heating elements warm up the hydraulic oil in the hydraulic oil reservoir.

The hydraulic oil circuit can only be thoroughly warmed up if the preheating is connected over a longer period of time.

The vehicle plug receptacle **B** (230 V or 110 V) for the heater is attached in the cover (maintenance cover) on the left rear of the vehicle.

The special cable **A** for the mains plug is included in the standard package of the option.

Start the preheating

1. Park the machine near a socket (230 or 110 V).
2. First connect cable **A** supplied with the kit to vehicle plug receptacle **B,** then to the mains plug receptacle.

Switch off the preheating

1. Before starting the diesel engine, first remove special cable **A** from the mains plug receptacle, then remove it from the machine plug receptacle.
2. Close machine outlet **B** with a protective cap.

Fuel preheater (option)

The fuel preheater prevents paraffin crystals forming, which otherwise clog the fuel filter and the fuel system at low temperatures.

At temperatures below 10°C (50°F), a temperature switch automatically switches on the fuel preheater when ignition lock is switched on.

The heating element in the fuel line (between the fuel tank and the prefilter) is energized by the machine's electrical system.

Notes:

4.2 Overview of control elements

Inside the cabin

Description of control elements

This chapter describes the controls, and contains information on the function and the handling of the indicator lights and controls in the cabin.

The pages stated in the overview table refer to operation of the control units.

You can unfold the pages for a better overview.

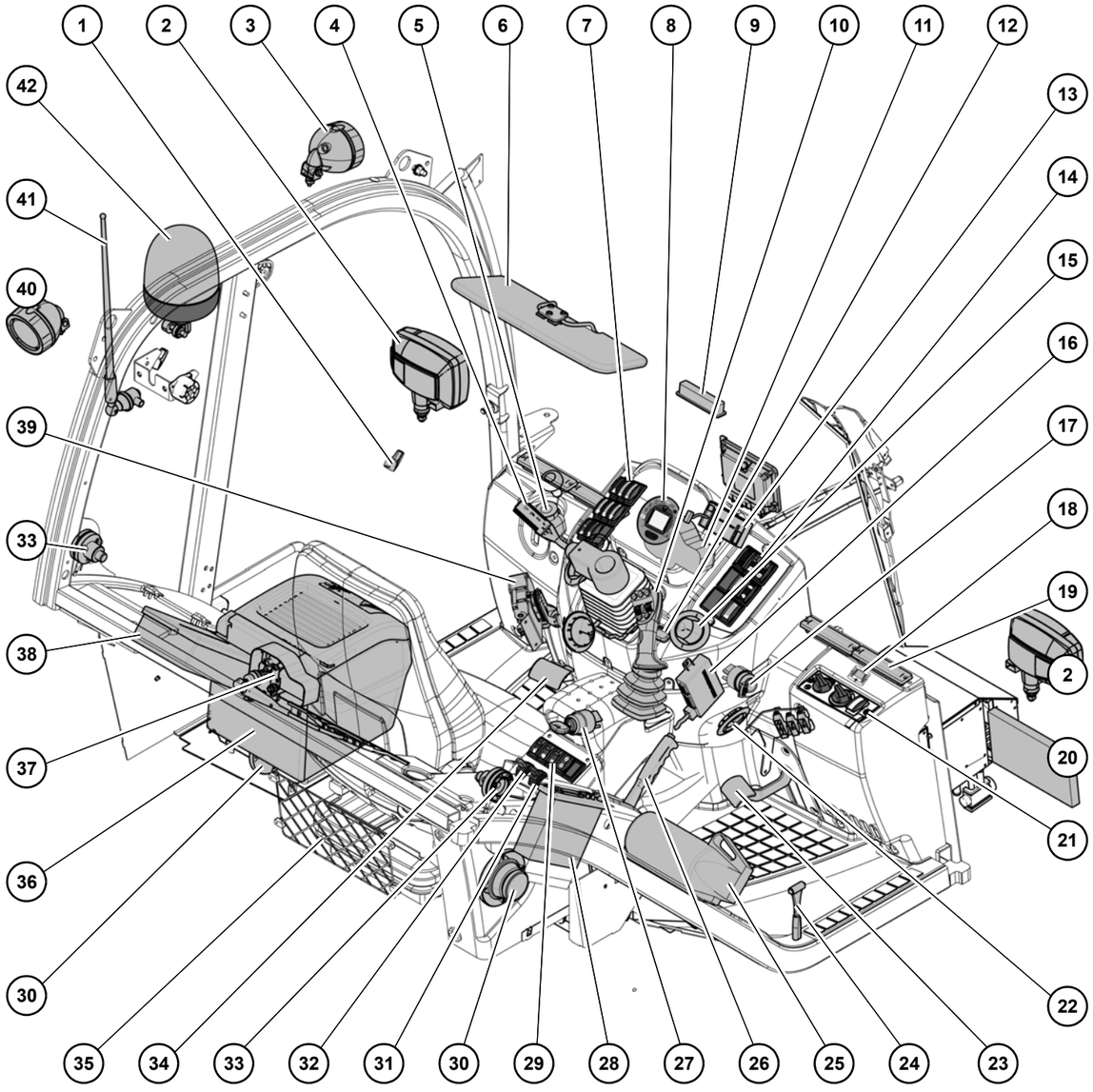


Fig. 74

Inside the cabin

Inside of cabin (overview)		For more information see page
1	Hook	
2	Headlights (left/right)	*5-25*
3	Front working lights (option)	*5-27*
4	Multifunctional lever – turn indicators, wipers, horn	*5-26*, *5-28*, *5-29*, *5-30*
5	Brake fluid reservoir	*7-62*
6	Sun visor	
7	Left control console; Relay and fuses under the envelope	*7-54*, *9-12*
8	Indicating instrument	
9	Interior light	*5-28*
10	Control lever (joystick)	*5-36*
11	Front window wiper motor	
12	Steering column adjustment lever	*5-1*
13	Steering electronics	
14	Switch console right; Relay and fuses under the envelope	*7-54*, *9-12*
15	Air vent – cabin (front left/right)	*5-32*
16	Drive interlock (optional)	*4-19*, *4-22*
17	12 V socket	
18	Indicator – auxiliary heater (option)	*5-131*
19	Air vents – front window (left/right)	*5-32*
20	Fresh air filter for heating	*5-32*
21	Switch console – fresh air, heating (air conditioning option)	*5-32*
22	Air vents – leg room (left/right)	*5-32*
23	Accelerator pedal	*5-9*
24	Emergency exit hammer (only for machines with agricultural or forestry certification)	*4-7*
25	Fire extinguisher (option)	*4-14*
26	Parking brake lever	*5-16*
27	Preheating start switch	*4-58*
28	Radio (option)	
29	Switch panel in armrest	
30	Loudspeakers (left/right) (option)	
31	Control lever (orange) – manual throttle (option)	*5-10*
32	Control lever (blue) – low-speed control (option)	*5-125*
33	Left/right door arrester	*4-2*
34	Brake/inching pedal	*5-14*
35	Storage net for Operator’s Manual	
36	Storage compartment/tool kit or cool box (option)	
37	Rear window wiper motor	*5-30*
38	Fixture – first-aid kit	
39	Bracket with cabin electronics disconnect	
40	Rear working light	*5-27*
41	Aerial (option)	
42	Rotating beacon (option)	*5-128*

Instrument panel with operator's controls

Instrument panel with operator's controls

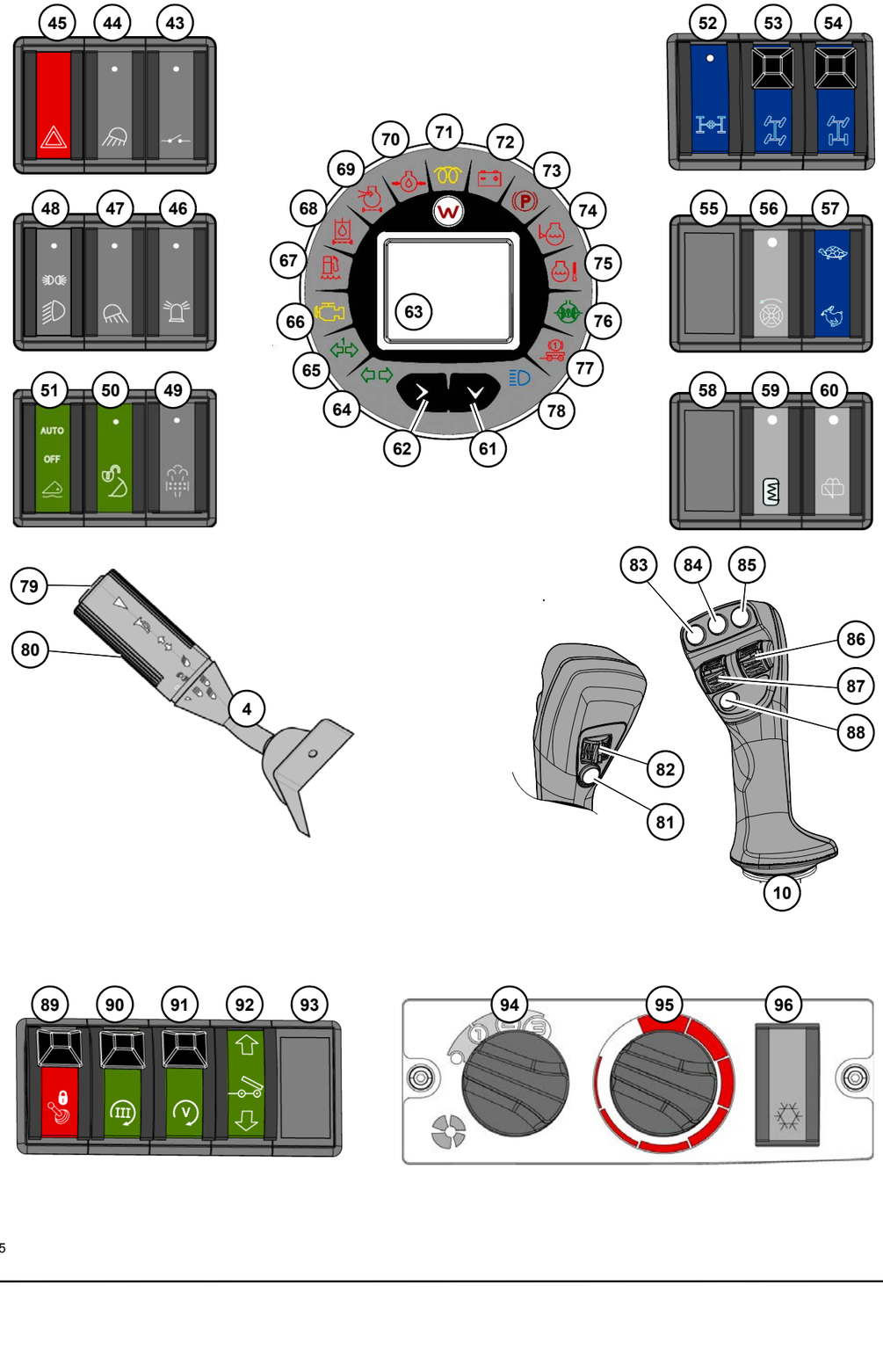


Fig. 75

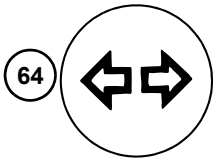
Instrument panel with control elements

Switch console on the left	For more information see page
43 Push button or switch (grey) – front socket (option)	*5-54*
44 Switch (grey) – front working light (option)	*5-27*
45 Switch (red) – hazard warning system	*5-29*
46 Switch (grey) – rotating beacon (option)	*5-128*
47 Switch (grey) – rear working light	*5-27*
48 Switch (grey) – lights	*5-25*
49 Push button – diesel particulate filter (option)	*7-86*
50 Push button (green) for unlocking the quickhitch lock	*5-41*
51 Switch (green) – load stabilizer (option)	*5-132*
Switch console on the right	**For more information see page**
52 Push button (grey) – steering synchronization	*5-3*
53 Switch with lock (grey) – diagonal steering (crab steering option)	*5-7*
54 Toggle switch with lock (blue) – all-wheel and front wheel steering	*5-5*, *5-6*
55 Not assigned	
56 Push button (grey) – reversing fan (option)	*5-133*
57 Switch (blue) – speed range selection	*5-18*
58 Not assigned	
59 Push button (grey) – rear window heating (option) or switch – mirror heating (option)	*5-129*
60 Switch (grey) – rear wiper	*5-30*
Indicating instrument	**For more information see page**
61 Push button for menu in digital display (level 1)	*4-37*
62 Push button for menu in digital display (level 2)	*4-37*
63 Digital display	*4-37*
64 Indicator light (green) – left/right turn indicators	*5-28*
65 Indicator light (green) – right/left turn indicator for rear attachments	*5-28*
66 Indicator light (yellow) – error of engine control unit or cabin controller	*4-37*
67 Indicator light (red) – fuel system water separator	*7-27*
68 Indicator light (red) – hydraulic oil filter	*7-44*
69 Indicator light (yellow) – air filter	*7-40*
70 Indicator light (red) – engine oil pressure	*7-31*
71 Indicator light (yellow) – cold starter	*4-58*
72 Indicator light (red) – alternator charge function	*4-58*, *7-52*
73 Indicator light (red) – parking brake	*5-16*
74 Indicator light (yellow) – coolant level	*7-36*
75 Indicator light (red) – diesel engine temperature	*4-58*, *7-34*
76 Indicator light (green) – differential lock	*5-24*
77 Indicator light (red) – compressed-air trailer brake (option)	*5-119*
78 Indicator light (blue) – high beam	*5-26*

Multifunctional lever turn indicators, wipers, horn	For more information see page
79 Push button – horn	5-29
80 Rotary switch and push button – front wiper, washer pump	5-30
Control lever (joystick)	**For more information see page**
81 Push button – differential lock	5-24
82 Switch – unlock/lock 3rd control circuit	5-40
83 Push button – additional control circuit with additional functions (option)	5-44
84 Push button – additional control circuit with additional functions (option)	5-44
85 Front socket push button (option) or bucket repositioning (option)	5-54, 5-107
86 Switch (scroll wheel) – additional control circuit (4th control circuit proportional controls option)	5-50
87 Switch – forward/reverse travel direction	5-20, 5-21
88 Push button – travel direction in neutral	5-22
Switch console (armrest)	**For more information see page**
89 Switch with lock (red) – lock for operating hydraulics/road travel	4-54
90 Switch with lock (green) – continuous operation of 3rd control circuit (option)	5-40
91 Switch (green) – additional front/rear control circuit (option)	5-44
92 Touch button (green) – hydraulic tipper for raising/lowering (optional)	5-48
93 Not assigned	
Heating switch console (optional air conditioning)	**For more information see page**
94 Rotary switch – heater fan	5-32
95 Rotary switch – heating temperature	5-32
96 Switch (grey) – air conditioning (option)	5-32

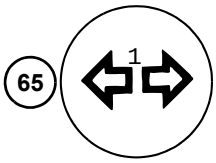
4.3 Overview of indicator lights

Indicator lights on indicating instrument



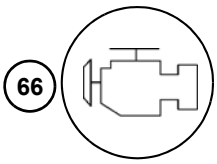
Indicator light (green) – left/right turn indicators

Flashes intermittently when the direction indicators are used
– see “Turn indicators” on page 5-28.



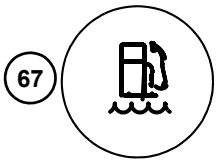
Indicator light (green) – right/left turn indicator light on rear attachment

Flashes intermittently when the turn indicators are used and a front or rear attachment is connected electrically.



Indicator light (yellow) – control unit/controller

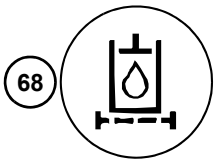
Illuminates if an error comes from the engine controller or the cabin controller
– see “Error memory” on page 4-44 and
“Malfunctions of the electrical system” on page 8-4



Indicator light (red) – fuel system water separator (option)

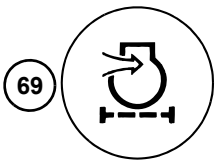
Illuminates if there is too much water in the water separator of the fuel prefilter:

Drain water – see “Fuel system” on page 7-27.



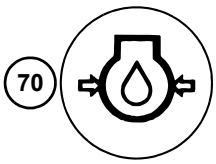
Indicator light (red) – dirt in hydraulic oil filter

Illuminates if the resistance of the oil flow in the return filter is too high
– see “Monitoring the hydraulic oil and the return filter” on page 7-44.



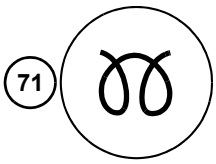
Indicator light (yellow) – air filter

Illuminates if the air filter is dirty
– see “Air filter” on page 7-40.



Indicator light (red) – engine oil pressure

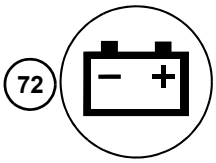
Illuminates if the engine oil pressure is too low
– see “Engine lubrication system” on page 7-31.



Indicator light (yellow) – preheating

Illuminates when the key in preheating start switch is in position 1.

A sheathed-element glow plug preheats the intake air of the diesel engine during this time and is switched off once the preheating time is over
– see “Starting the engine” on page 4-58.



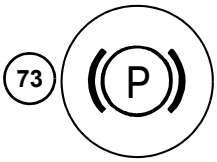
Indicator light (red) – alternator charge function

Illuminates if the ignition is switched on, but goes out as soon as the engine runs.

The V-belt is malfunctioning or there is an error in the charging circuit of the alternator if the indicator light illuminates with the engine running.

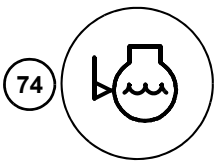
➥ The battery is no longer charged.

➥ The water pump does not turn any more
– see "V-belt/toothed belt" on page 7-42.



Indicator light (red) – parking brake

Illuminates when the parking brake is applied.



Indicator light (yellow) – coolant level

Illuminates if the coolant level in the radiator is too low
– see "Cooling system" on page 7-34.

Indicator light (red) – coolant temperature

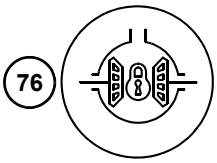
Illuminates if the maximum permissible coolant temperature is reached.

Information

The coolant temperature should be between 80 °C (176°F) and 105 °C (221°F).

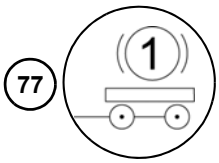
► The max. permissible temperature is 110 °C (230 °F).

► An alarm sounds if the temperature is 115°C (239°F) or higher
– see "Cooling system" on page 7-34.



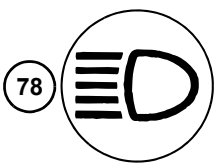
Indicator light (green) – differential lock

Illuminates if the differential lock is enabled
– see "Differential lock" on page 5-24.



Indicator light (red) – trailer brake (option)

Illuminates if the pressure in the compressed-air braking system for trailer operation drops below 5 bar (72.52 psi)
– see chapter 5 "Compressed-air braking system of trailer (option)" on page 5-119.



Indicator light (blue) – high beam

Illuminates if high beam is switched on, or during headlight flashing
– see "Parking lights/low beam" on page 5-25.

Control lamp check

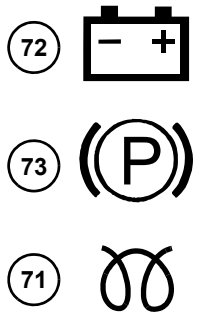


Fig. 76

When ignition is switched on, all indicator lights on the indicating instrument illuminate briefly for a check and then go out after a few seconds.

Information

Indicator lights **72** and **73** remain lit when ignition is turned on!
At cold outside temperatures, indicator light **71** (preheating) remains lit for a few seconds.

Information

For your own safety, and in order to prevent consequential damage to the machine, have malfunctioning indicator lights immediately checked or replaced by an authorized service center!

Digital display on indicating instrument

The display instrument is equipped with a warning sound display as well as a digital display **63**. The digital display provides information on active functions, current operating states, service information, machine status and error codes.

WARNING

Accident hazard when operating the digital display during machine travel!

Can cause serious injury or death.

► Stop the machine before operating the digital display.

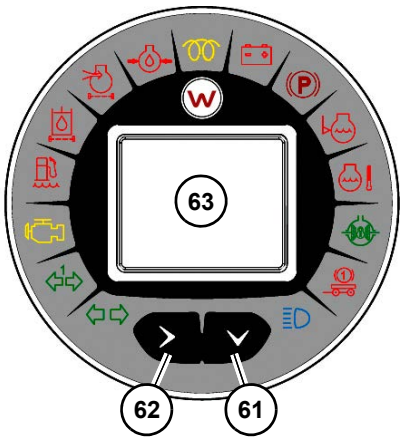


Fig. 77

Operation of digital display

The following table gives an overview of the menu structure of the digital display.

Push button **61** takes you through the indications of the 1st level.

Push button **62** takes you to the 2nd level.

Example:

Proceed as follows in order to leave the **Main indication 1** and to go to the **Service indication**:

1. Press the **61** touch button once.
   ➥ Main indication 1 appears.
2. Press the **62** touch button once.
   ➥ The service indication appears.

1st level	2nd level
Main indication 1	Service indication
Main indication 2	–
Machine status indication HMI	–
Machine status indication VCU	–
Machine status indication ECU	• Ash = ash load, Soot = soot load • DEF = urea capacity • ∅ l/h = fuel consumption
Error memory	–
Digital display settings	–

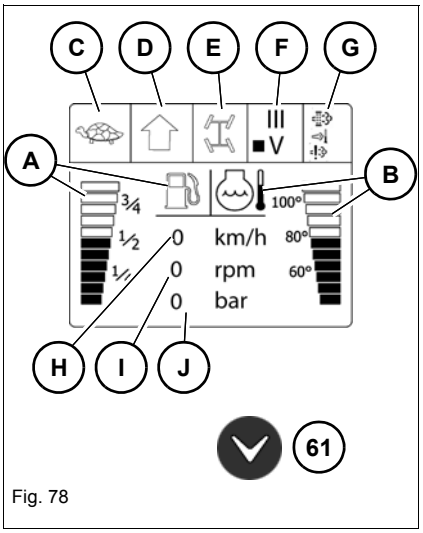
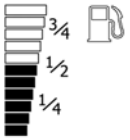
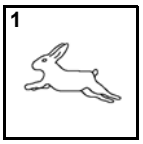
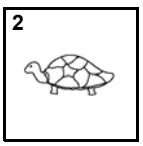
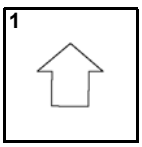
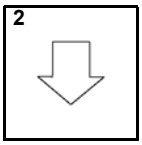
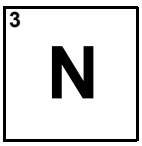


Fig. 78

Main indication 1

To access the contents of main display 1, press touch button **61** repeatedly.

Indication		Meaning
A		**Indication – fuel level/spare fuel** Indicates the fuel level detected by a resistance-based sensor in the tank. If the level is down to spare, the tank symbol starts flashing and an acoustic warning sounds every 10 seconds.
B		**Indication – coolant temperature** Indicates the engine coolant temperature detected by a sensor. When the maximum coolant temperature allowed is reached, control lamp **75** on the indicating instrument illuminates and an acoustic warning sounds *– see chapter 7 “Cooling system” on page 7-34*.
C		**Indicator display – high speed range (hare)** Illuminates if high speed is enabled with switch **57** *– see chapter 5 “Overview of speed ranges” on page 5-18*.
		**Indicator display – work speed range (turtle)** Illuminates if work speed is enabled with switch **57** *– see chapter 5 “Overview of speed ranges” on page 5-18*.
D		**Indicator display – forward travel direction** Illuminates if forward machine travel is enabled *– see chapter 5 “Selecting a travel direction and starting machine travel” on page 5-20*.
		**Indicator display – reverse travel direction** Illuminates if reverse machine travel is enabled *– see chapter 5 “Selecting a travel direction and starting machine travel” on page 5-20*.
		**Indicator display – neutral travel direction** Illuminates if the travel direction is disabled *– see chapter 5 “Selecting a travel direction and starting machine travel” on page 5-20*.

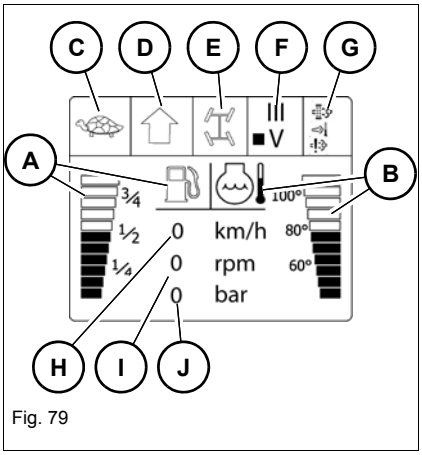


Fig. 79

E	1	**Indicator display – steering synchronization** Continuously flashes during the synchronization process and appears permanently if the parallel alignment of the wheels on both axles has occurred *– see chapter 5 "Synchronising the steering system" on page 5-3*.
	2	**Indicator display – front axle steering** Illuminates if front axle steering is enabled *– see chapter 5 "Front axle steering" on page 5-6*.
	3	**Indicator display – 4 wheel steering** Illuminates if 4 wheel steering is enabled *– see chapter 5 "4 wheel steering" on page 5-5*.
	4	**Indicator display – diagonal (crab steering) (option)** Illuminates if diagonal steering is enabled *– see chapter 5 "Diagonal steering (crab steering option)" on page 5-7*.
F	1	**Indicator display – 3rd control circuit in jog mode** Appears if the 3rd control circuit is enabled in jog mode *– see chapter 5 "3rd control circuit" on page 5-40*.
	2	**Indicator display – continuous operation of 3rd control circuit (option)** Appears if the 3rd control circuit is enabled in continuous operation *– see chapter 5 "Putting an attachment into continuous operation" on page 5-43*.
	3	**Indicator display – additional control circuit in jog mode (option)** Appears if the additional control circuit is enabled in jog mode *– see chapter 5 "Additional front/rear control circuit (option)" on page 5-44*.
	4	**Indicator display – additional control circuit in continuous mode (option)** Appears if the additional control circuit is enabled in continuous operation *– see chapter 5 "Additional front/rear control circuit (option)" on page 5-44*.
	5	**Indicator display – lock for operating hydraulics/ road travel** Appears if the lock for operating hydraulics/road travel is enabled with switch **89**. ➥ The complete operating hydraulics is switched off *– see "Securing the control lever (joystick)/switching off the operating hydraulics" on page 4-54*.

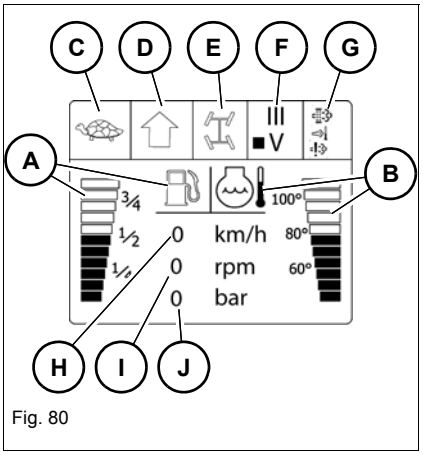
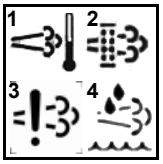


Fig. 80

G		**Indicator display – DPF (diesel particulate filter) and fill level of urea solution** *– see chapter 7 “Exhaust gas treatment” on page 7-73*. • Symbol **1 lights up** continuously: Regeneration of the DPF is in operation. • Symbol **2 flashes:** put regeneration of the DPF into operation manually • Symbol **3 lights up** continuously: load state of the DPF is too high. ➥ Diesel engine output is reduced. ➥ Contact an authorized service centre. • Symbol **4** lights up: fill level of the urea is below 15%. ➥ Top off urea immediately *– see chapter 7 “Fluids and lubricants” on page 7-12*.
H	...km/h	**Indicator display – travel speed**
I	...rpm	**Indicator display – diesel engine speed**
J	...bar	**Indicator display – compressed-air braking system**

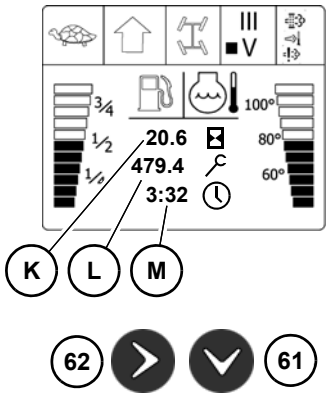


Fig. 81

Service indication

In order to access the contents of the service indication, press touch button **61** until the main indication 1 appears. Then press the touch button **62** again.

Indication	Meaning
K	**Hour meter** Number of operating hours since delivery of machine.
L	**Maintenance calculator** Indicates the remaining working hours up to the next maintenance interval. If less than 30 working hours remain until the next maintenance interval, the maintenance symbol appears briefly in the main menu instead of the tank and temperature symbol when the diesel engine is started. The hours until the next maintenance interval (100 or 500 hours of operation) are displayed in the following chronological order: • 100 hours of operation (perform maintenance) • 400 operating hours • 500 operating hours • Then every other 500 operating hours Maintenance intervals to be performed *– see chapter 7 “Maintenance overview” on page 7-3.* The maintenance indication can be reset only by an authorized service centre. Resetting does not affect the display of the next interval.
M	**Time**

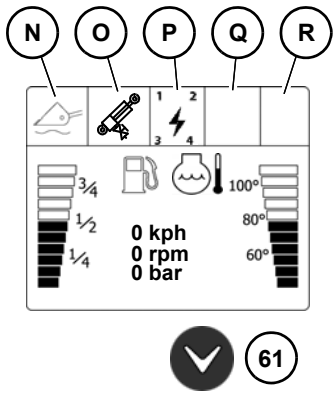
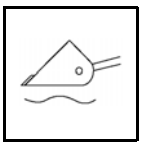
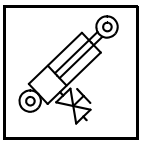
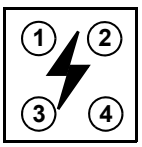


Fig. 82

Main indication 2

To access the contents of main display 2, press touch button **61** repeatedly.

Indication		Meaning
N		**Indicator display – loader unit load stabilizer** Appears if the load stabilizer is enabled *– see chapter 5 "Load stabilizer for loader unit (option)" on page 5-132*.
O		**Indicator display – hose burst valve** Appears if the hose burst valve is deactivated *– see chapter 5 "Load stabilizer for loader unit (option)" on page 5-132*.
P		**Indicator display – front socket** Appears if electrical circuit 1, 2, 3 or 4 of the front socket is enabled *– see chapter 5 "7-pole front socket (option)" on page 5-54*.
Q		**Not assigned**
R		**Not assigned**

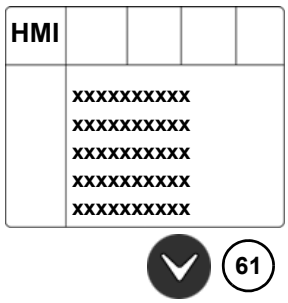


Fig. 83

Machine status indication on indicating instrument (HMI)

In order to access the “**HMI**” status indication, press the touch button **61** repeatedly.

➥ Contains indications (data) on the indicating instrument.

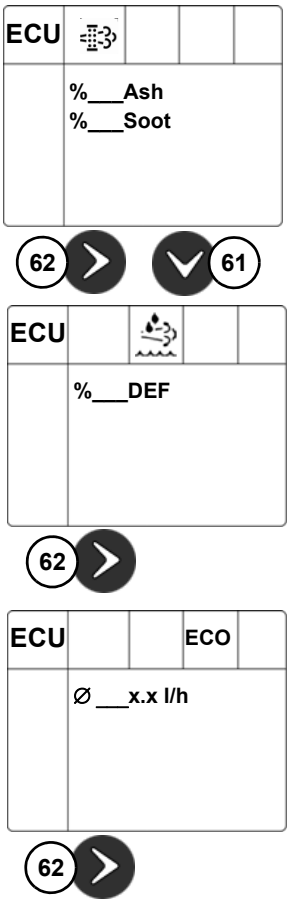


Fig. 84

Machine status indication on engine control unit (ECU)

- In order to call the “**ECU**” status indication, press push button **61** repeatedly.
- To access the display of the axle and soot load of the diesel particulate filter, press the touch button **62**
  – see chapter 7 “Exhaust gas treatment” on page 7-73.
- To access the display of the fill level of the urea solution, press touch button **62** repeatedly *– see chapter 7 “Monitoring of the SCR catalytic converter: Fill level of urea solution” on page 7-80*.
- To access the display of the fuel consumption, press touch button **62** repeatedly.

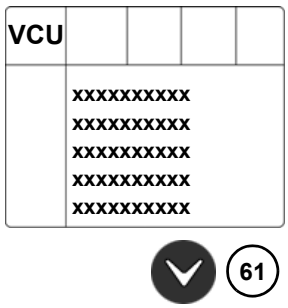


Fig. 85

Machine status indication on cabin controller (VCU)

In order to access the “**VCU**” status display, press the touch button **61** repeatedly.

➥ Contains indications (data) on the cabin controller.

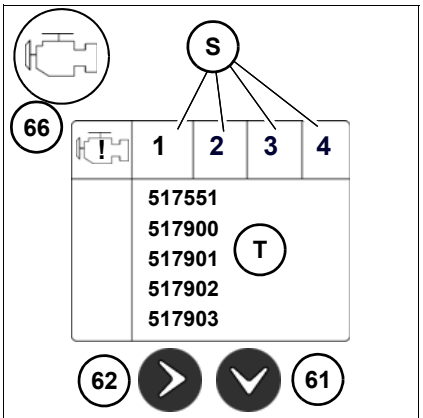


Fig. 86

Error memory

- If the machine electronics detects an error, an acoustic warning sounds and the error is briefly displayed in the main indication instead of the tank and temperature symbol.
- The error is also saved and can be viewed in the error memory until the next restart.
- The error memory can receive up to 20 different error codes (4 pages X with a maximum 5 error codes).

If the control lamp **66** lights up, we recommend first determining the cause of the disorder. Read the error memory for this purpose.

1. Press the touch button **61** again to access the error memory.
2. Press the touch button **62** to switch to the next page of the error memory.

Information

Errors for the work and drive hydraulics **66** are also shown via the control lamp.

- Further information *– see chapter 8 “Malfunctions of the electrical system” on page 8-4*.

Indication		Meaning
S	**1 – 4**	Pages 1 – 4 for issuing error codes.
T	**517551** **517900** **517901** **517902** **517903**	6-digit error codes. Breakdown *– see chapter 8 “Malfunctions of the electrical system” on page 8-4*.
		No error code.

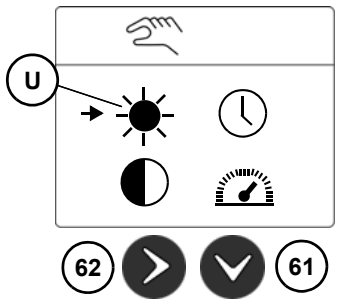


Fig. 87

Digital display settings – adjusting brightness

1. Press touch button **61** repeatedly until the settings display appear.
2. Press touch button **62** until symbol **U** is selected.

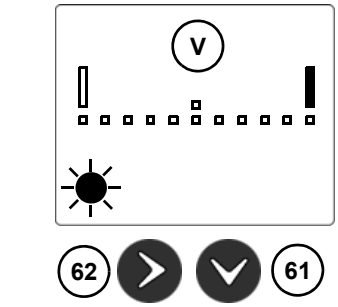


Fig. 88

3. Press push button **61**.
   ➥ Indication **V** appears.
4. Press touch button **62** repeatedly until you have the required brightness.
5. Press touch button **61** to leave the display **V**.

Digital display settings – adjusting contrast

1. Press touch button **61** repeatedly until the settings display appear.
2. Press push button **62** until symbol **W** is selected.

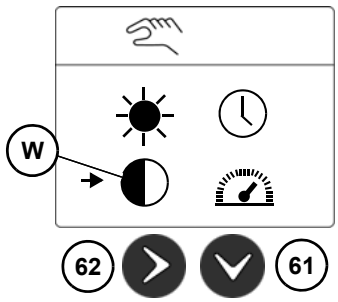


Fig. 89

3. Press push button **61**.
   ➥ Indication **X** appears.
4. Press touch button **62** repeatedly until you have the required contrast.
5. Press push button **61** to leave indication **X**.

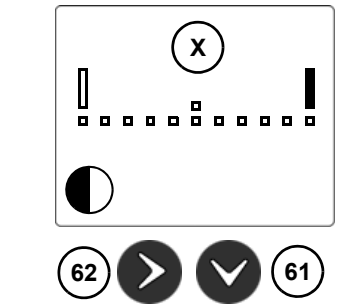


Fig. 90

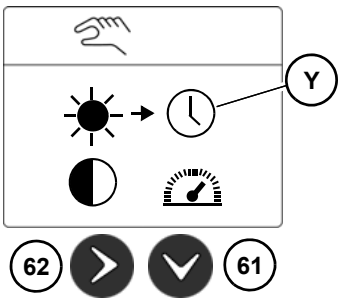


Fig. 91

Digital display settings – adjusting time

1. Press touch button **61** repeatedly until the settings display appear.
2. Press push button **62** until symbol **Y** is selected.

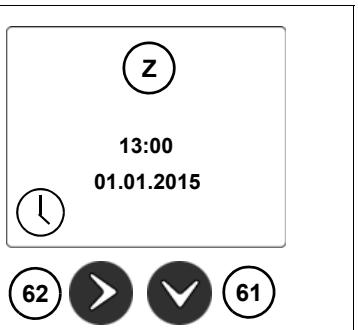


Fig. 92

3. Press push button **61**.
   ➥ Indication **Z** appears. The year flashes.
4. Press touch button **62** repeatedly until you have the required year.
5. Press touch button **61** to confirm the input.
6. Repeat steps 3 to 5 for the month, day, hours and minutes.

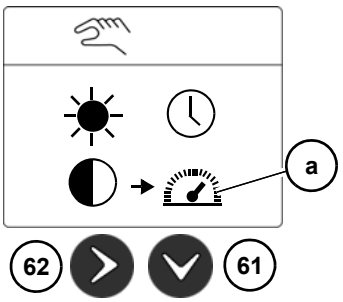


Fig. 93

Digital display settings – adjusting mph or kph.

1. Press touch button **61** repeatedly until the settings display appear.
2. Press push button **62** until symbol **a** is selected.

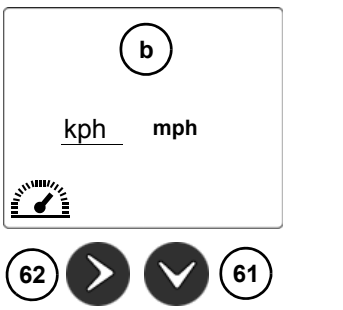


Fig. 94

3. Press push button **61**.
   ➥ Indication **b** appears.
4. Press touch button **62** repeatedly until the desired setting is chosen.
5. Press touch button **61** to confirm the input.
6. Press the touch button **61** to leave the display **b**.

Acoustic warnings

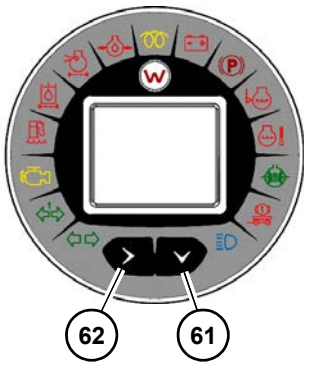


Fig. 95

Machine electronics buzzer

Errors in the machine electronics are indicated by error codes in the information display of the indicating instrument and by acoustic warnings of different lengths.

Permanent acoustic warnings sound until they are confirmed.

- Short acoustic warnings are automatically confirmed.
  ➥ The error is saved.
- Confirm a permanent acoustic warning by pressing the touch button **61** or **62** .
  ➥ The error is saved.

NOTICE

Failure to pay attention to the warnings can cause damage to the machine.

► Errors with permanent acoustic warnings are displayed every time the engine starts until they are read out and repaired by an authorized service center.

- **Permanent** acoustic warning: engine oil pressure below 2 bar. This permanent warning sounds when the diesel engine is started, until the engine oil pressure reaches 2 bar *– see chapter 7 “Checking the engine oil level” on page 7-32*.
- **Permanent** acoustic warning: coolant temperature of diesel engine over 120 °C *– see chapter 7 “Checking the coolant level” on page 7-36*.
- **Permanent** acoustic warning: low beam switched on and starter disengaged *– see chapter 5 “Parking lights/low beam” on page 5-25*.
- **Short** acoustic warning: soot load of diesel particulate filter at 125% and continues rising to 143% *– see chapter 7 “Monitoring of the diesel particulate filter (DPF) (optional)” on page 7-78*.
- **Permanent** acoustic warning: soot load of diesel particulate filter over 214% *– see chapter 7 “Monitoring of the diesel particulate filter (DPF) (optional)” on page 7-78*.
- **Continuous** acoustic warning: fill level of urea solution in the tank is too low *– see chapter 7 “Refueling with urea solution” on page 7-88*.

Backup warning system (option)

The signal transmitter generates an acoustic signal when shifting into reverse *– see chapter 5 “Backup warning system (option)” on page 5-130*.

4.4 Preparatory work

Important information before putting the machine into operation

CAUTION

Falling hazard when entering or exiting!

Entering or exiting incorrectly can cause injury.

► Keep the mandatory climbing aids clean.
► Use the mandatory climbing aids for entering and exiting the machine.
► Face the machine as you enter and leave it.
► Have damaged climbing aids replaced.

Requirements and information for the operating personnel

- The operating personnel (operator) must have read and understood this Operator's Manual before putting the machine into operation.
- The machine may only be put into operation by **authorized personnel that has been instructed**.
- The machine may only be put into operation when the operator is seated.
- Never get on a moving machine. Never jump off the machine.
- Before leaving the machine, lower the loader unit to the ground, stop the diesel engine and apply the parking brake (hand brake).
- Carrying or transporting accompanying persons in the cabin and/or on the machine is prohibited.
- Tell persons to leave the danger zone.
- Use the machine only in technically perfect condition in accordance with its designated use and the instructions set forth in the operation license, the Data Confirmation (Germany) and in the Operator's Manual, and only if you are fully aware of the risks involved in operating the machine.
- Always observe the warning and information labels, and the load diagrams, and take appropriate action.
- Immediately replace (or have replaced) damaged or illegible warning and information labels with new ones.
- Check the rearview mirrors on the left and right for damage, and adjust them
  – see "MIrror adjustment on the left" on page 4-5 and *"Mirror adjustment on the right" on page 4-6*.
  ➥ Have damaged rearview mirrors immediately replaced.
- Observe the checklists in the following tables and take appropriate action *– see "Check lists" on page 4-49*.

Running-in period

The vehicle is equipped with an automatic thermal overload protection for motor oil and for driving and work hydraulics oil. The thermal overload protection prevents the vehicle being put into operation in a cold state with a high speed of the diesel engine.

- At temperatures below −10°C (14°F), the maximum diesel engine speed is automatically limited to 1500 rpm.
- At temperatures between −10°C (14°F) and 10°C (50°F), the diesel engine idling speed is slightly increased until it reaches 10°C (50°F).
- At temperatures over 10 °C (50 °F), the diesel engine can run without any restriction.

Handle the machine carefully during its first **100 operating hours**.

- Do not put a cold diesel engine under load.
- Avoid loading the diesel engine at idling speed.
- Do not run the diesel engine at high speed for extended periods.
- Increase the load gradually while varying the diesel engine speed.
- Full travel speed (machine dynamics) is reached as soon as the temperature of the drive reaches 20 – 30°C (68 – 86°F).
- Strictly observe maintenance schedules and perform (or have performed) the specified maintenance
  – see chapter 7 “Maintenance overview” on page 7-3.

NOTICE

If the oil temperature of the drive hydraulics is over 105°C (221 °F), the travel speed (travel dynamics) is automatically reduced by 50% until the oil temperature is below 105°C (221 °F) in order to avoid damage to the drive hydraulics.

► Have the cause for the high oil temperature checked or repaired by an authorized service centre under all circumsances.

Check lists

These checklists are not intended to be exhaustive. They are only intended to help you to fulfill your obligation to exercise due care.

The checking and monitoring work listed below is described in greater detail in the following chapters of the Operator’s Manual.

If questions are answered with NO, first rectify the cause of the malfunction before starting or continuing work.

Starting checklist

Designation		X
1	Enough fuel in the tank?	
2	Engine oil level OK?	
3	Coolant level OK?	
4	Oil level in hydraulic reservoir OK?	
5	Water level in washer reservoir OK?	
6	V-belt condition and tension OK?	
7	Loader unit lubricated?	
8	Brake system (including parking brake) OK?	
9	Brake fluid level (ATF) OK?	
10	Tire condition and inflation pressure OK?	
11	Wheel nuts safely tightened (especially after a wheel change)?	
12	Pedal area clean?	
13	Lights, signals, indicators, warning lights and indicator lights OK?	
14	Windows, mirrors, lights and steps clean?	
15	Attachment on the loader unit safely locked?	
16	Engine cover safely locked?	
17	Especially after cleaning, maintenance or repair work: Rags, tools and other loose objects removed?	
18	Approved warning triangle, hazard warning light, warning vest and first aid kit in the machine?	
19	Seat position and mirrors correctly adjusted?	
20	Seat belt fastened?	
21	All additional control circuits disabled?	
22	Battery master switch switched on?	

Operation checklist

Designation		X
1	Indicator light for engine oil pressure and alternator gone out?	
2	Braking effect sufficient?	
3	Temperature gauge for engine coolant in normal range?	
4	Steering system working properly?	
5	Anyone in the danger zone of the machine?	
6	Attachment locked in quickhitch?	
During machine travel on public roads, particular attention should be paid to the following points:		
7	Bucket and attachments in transport position?	
8	Transport locks installed?	
9	Joystick for lift and tilt hydraulics of the loader unit locked?	
10	Front-edge protection fitted to bucket?	
11	Compliance with requirements of machine documentation (Data Confirmation [Germany]/National Type Approval [Germany])?	

“Parking” checklist

Designation		X
1	Attachments on the loader unit lowered to the ground?	
2	All additional control circuits disabled?	
3	Parking brake applied?	
4	Diesel engine stopped?	
5	Vehicle cab locked; particularly if the vehicle cannot be supervised?	
Parking on public roads:		
6	Machine appropriately secured?	
Parking on slopes:		
7	Machine additionally secured with chocks under the wheels to prevent it from rolling away?	

Instructions for machine travel on public roads

- Carrying or transporting **accompanying persons** in the cabin or on the telehandler is prohibited.
- The machine is subject to the applicable national legal regulations (**StVZO** German road traffic regulations, for example) and to the provisions laid down in the **General Certification for Vehicles (Germany)**, the **data confirmation (Germany)** or the **machine certification papers**.
- Only the attachments are authorized for use on public roads that are specified in the General Certification for Vehicles (Germany), in the data confirmation (Germany), the license certificate (Germany) and that are described in this operator's manual
  – see chapter 3 "Use of attachments on the machine" on page 3-11.
- Remove inadmissible attachments
  – see chapter 3 "Use of attachments on the machine" on page 3-11.
- Machine travel on public roads with a loaded attachment is prohibited.
- If the machine is certified as a self-propelled work machine:
  With a trailer hitched, the machine **must not transport any material**.
  Only machine attachments may be transported on a trailer.
- Bear in mind the mandatory national regulations for accident prevention of the employers' liability insurance associations.
- Observe and follow the legal regulations of your country.

CAUTION

Danger of accident if mirrors are adjusted incorrectly or not at all!

Can cause injury.

► Adjust the rearview mirrors ensuring good visibility to the rear (left, right and rear of machine).

► Replace or have a malfunctioning rear-view mirror replaced by a new one.

Preparing machine travel on public roads

- Remove **attachments that are not authorized** for travel on public roads *– see chapter 3 “Use of attachments on the machine” on page 3-11*.
- Empty the attachment completely and secure it *– see chapter 5 “Pick up the attachment” on page 5-58*.
- Set the loader unit to transport position (ground clearance about 250 mm/9.84 in) *– see chapter 5 “Machine travel on public roads with a bucket” on page 5-75*.
- Set the steering column to the front position *– see chapter 5 “Steering column height and angle adjustment” on page 5-1*.
- Install the protection on the leading edge of the bucket.
- Fold up and secure the fork arms of the pallet forks.
- Switch off the working lights during machine travel on public roads *– see chapter 5 “Working lights” on page 5-27*.
- High-speed version (30 or 40 km/h/18.64 or 24.85 mph): switch the steering system to front axle steering *– see chapter 5 “Front axle steering” on page 5-6*.
- Switch on the load stabilizer (option) *– see chapter 5 “Load stabilizer for loader unit (option)” on page 5-132*.
- Secure joystick (loader unit) and the 3rd control circuit of the loader unit *– see chapter 5 “3rd control circuit” on page 5-40*.
- Check all signalling and light systems for correct function.
- Remove the protective screens for the front window and/or the main lights (options) *– see chapter 5 “Protective screens for front window and/or main lights (option)” on page 5-129*.
- Lock the cabin door and the hinged window.
- When using a trailer, ensure that the trailer is safely locked in the tow hitch and that the loads are safely tied down on the trailer.
- Adjust the correct seat position *– see “Operator seat” on page 4-8.*
- Fasten the seat belt *– see “Engine cover lock” on page 4-17*.
- Check and if necessary adjust the rearview mirrors *– see “MIrror adjustment on the left” on page 4-5* and *“Mirror adjustment on the right” on page 4-6*.

Securing the control lever (joystick)/switching off the operating hydraulics

WARNING

Accident hazard due to unintentional loader unit operation!

Can cause injury or death.

► Always lock the joystick before performing machine travel on public roads and before leaving the machine.

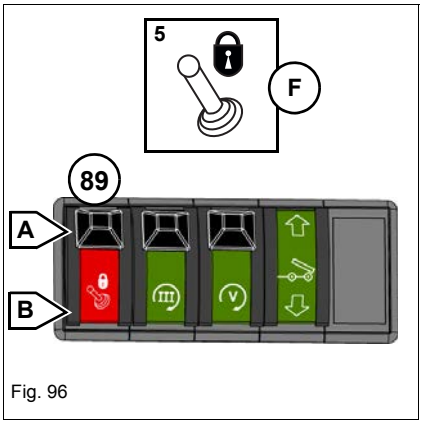


Fig. 96

The toggle switch **89** (lock for operating hydraulics/road travel) is located on the switch console (armrest).

Securing the control lever (joystick)/switching off the operating hydraulics

1. Slide the lock in switch **89** downward and press the switch to position **B** at the same time.
   - ➥ Symbol **F/5** appears in the digital display.
   - ➥ Control lever (joystick) **10** is out of operation.
   - ➥ The complete operating hydraulics is switched off .

Unlocking the control lever (joystick)/switching on the operating hydraulics

1. Slide the lock in switch **89** downward and press the switch to position **A** at the same time.
   - ➥ Symbol **F/5** goes out in the digital display.
   - ➥ Control lever (joystick) **10** is unlocked.
   - ➥ The complete operating hydraulics is operational.

Functional check of all control elements

- *– see chapter 5 “Checking the steering system” on page 5-2*
- *– see chapter 5 “Brake/inching pedal” on page 5-14*
- *– see chapter 5 “Lights/signalling system” on page 5-25*
- *– see chapter 5 “Operating hydraulics” on page 5-35*

Transport position of bucket

Information

Remove buckets/attachments that are not certified for transportation on public roads, and move or transport them with a suitable means of transportation *– see chapter 3 “Use of attachments on the machine” on page 3-11*.

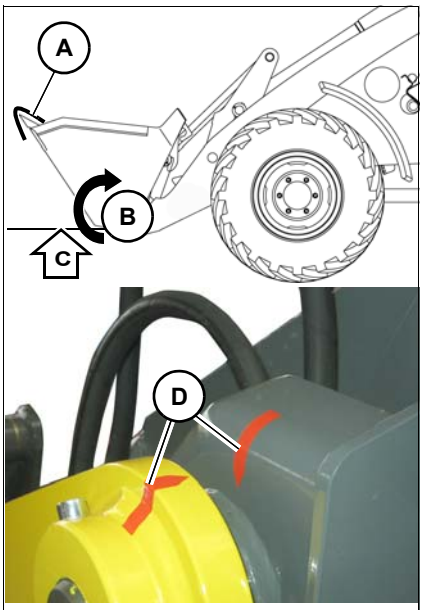


Fig. 97

Loader unit operation *– see chapter 5 “Operating hydraulics” on page 5-35*:

1. Empty and tilt back the bucket **B**.
2. Raise the loader unit until both red marks **D** on the lift frame and the bulkhead are aligned.
   ➥ Ground clearance **C** about 250 mm (9.84 in).
3. Cover the blade or teeth of the bucket across their entire width with the tooth guard **A** provided.
4. Secure the joystick *– see “Securing the control lever (joystick)/ switching off the operating hydraulics” on page 4-54*.

4.5 Starting and stopping the engine

Preparing to start the engine

- Go throught the “Starting” checklist *– see “Starting checklist” on page 4-50*.
- Switch on the battery master switch *– see “Battery master switch (option)” on page 4-18*.
- Sit down on the operator seat.
- Apply the parking brake.
  ➥ The motor will not start unless the parking brake is applied.
- Adjust your seating position *– see “Operator seat” on page 4-8*.
  ➥ All controls must be within easy reach.
  ➥ You must be able to move the brake and accelerator pedals to their limit positions!
- Go throught the “Starting” checklist *– see “Starting checklist” on page 4-50*.
- Adjust the rearview mirrors *– see “MIrror adjustment on the left” on page 4-5* and *“Mirror adjustment on the right” on page 4-6*.
- Fasten your seat belt.
- Disable the immobilizer (option)
  – see “Key-based immobilizer (option)” on page 4-19 or *“Immobilizer with code input (option)” on page 4-22*.
- Check whether all additional control circuits are switched off
  – see chapter 5 “Additional front/rear control circuit (option)” on page 5-44.
- Set the manual throttle (option) to idling speed
  – see chapter 5 “Manual throttle (option)” on page 5-10.
- Set the low-speed control (option) to the zero position
  – see chapter 5 “Low-speed control with regulated travel speed (option)” on page 5-125.
- Move joystick (loader unit) to neutral
  – see chapter 5 “Selecting a travel direction and starting machine travel” on page 5-20.

Information

For the operator's safety, the vehicle can optionally be outfitted with a seat contact switch. In this case:

► The diesel engine will not start unless the operator is seated on the seat.

► The drive switches off after 5 seconds if the load on the operator seat is reduced when driving the machine.

Important information on avoiding engine damage

NOTICE

Do not use additional starting aids (for example injection with start pilot).

NOTICE

In order to avoid damage to the starter, do **not** start the engine again immediately after stopping it!

► Wait at least 10 seconds before starting again.

Information

The vehicle is equipped with an automatic thermal overload protection for motor oil and for driving and work hydraulics oil. The thermal overload protection prevents the vehicle being put into operation in a cold state with a high speed of the diesel engine.

- At temperatures below -10 °C (14 °F) , the maximum diesel engine speed is automatically limited to 1500 rpm.
- At temperatures between -10 °C (14 °F) and +10 °C (50 °F), the diesel engine idling speed is slightly increased until it reaches 10 °C (50 °F).
- At temperatures over 10 °C (50 °F), the diesel engine can run without any restriction.

Information

At outside temperatures below −10°C (14°F), we recommend retrofitting the machine with a fuel and/or engine and hydraulic oil preheater (option)!

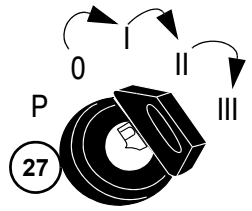
Information

The starter cannot be actuated if the engine is already running (start repeat interlock).

If the diesel engine does not start, interrupt the start attempt after a max. 10 seconds so that the battery can recover.

► Repeat the start attempt only after about 1 minute.

Starting the engine



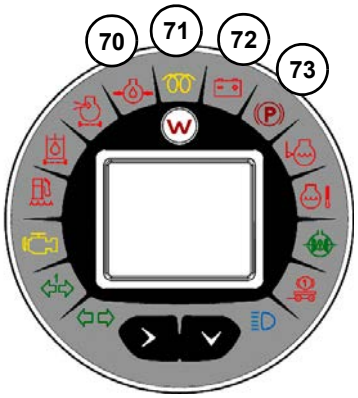


Fig. 98

Start the engine as follows

The preheating start switch **27** is located below the armrest.

1. Ensure that the parking brake (hand brake) is applied.
2. Turn the ignition key to position **I**.
   ➥ Indicator light check:
   all indicator lights illuminate briefly.

The following warning and indicator lights remain illuminated:

- Control lamp **73** (parking brake applied)
- Control lamp **70** (motor oil)
- Control lamp **72** (generator charge function).
- Control lamp **71** (preheating); in cold outdoor temperatures until the preheating temperature is achieved.

3. If the control lamp **71** goes out, turn the ignition switch key via the position **II** in the position **III** and hold until the diesel engine runs.
4. Release the starting key.
5. Slowly increase engine speed.
6. Actuate the operating hydraulics and travelling drive only after all indicator lights have gone out.

NOTICE

If one of the indicator lights **70** or **72** does not go out, stop the engine immediately and have the cause checked by an authorized service centre! Have a malfunctioning indicating instrument immediately replaced.

Information

If the engine starts too early (indicator light **71** still illuminates), an error message appears in the digital display.

► Switch off ignition and repeat the start procedure.

Information

If the engine does not start after 30 seconds:

► Turn the ignition key back to position **0**.

► Wait at least one minute before starting again.

Information

The engine cannot be started by tow starting the machine, as there is no driving connection between the engine and the gearbox (for example a cardan shaft)! (Hydrostatic drive.)

Jump-starting the engine

Safety instructions regarding external starting aids

NOTICE

Damage to electrical system due to short circuit when starting the machine with an external starting aid.

- ► Ensure that there is no contact among the vehicles.
- ► Do not jump-start the machine if the battery is malfunctioning or frozen.
- ► Do not connect two batteries in series.
- ► Use only batteries with the same voltage for jump-starting.
- ► Use only tested and certified battery jumper cables with insulated terminal clamps and a sufficient cable cross-section.
- ► Route the battery jumper cables so that they cannot catch on rotating engine parts.

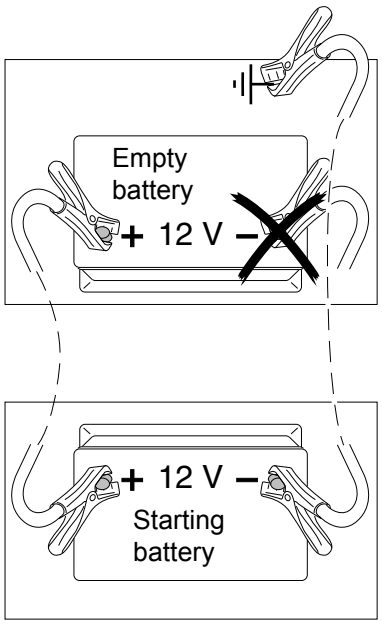


Fig. 99

Perform the starting aid as follows:

1. Drive the jump-starting vehicle close enough to the machine so that the battery jumper cables can reach to connect the two batteries.
2. Let the engine of the jump-starting vehicle run.
3. First connect one end of the red cable to the **+ *terminal*** of the empty battery, then connect the other end to the **+ *terminal*** of the starting battery.
4. Connect one end of the black cable to the **– *terminal*** of the starting battery, then the other end (**–**) to a metal component firmly screwed on the engine block or to the engine block itself.
   - ➥ Do not connect it to the negative terminal of the empty battery, as otherwise explosive gas possibly emerging from the battery can ignite if sparks are formed!
5. Start the engine of the machine with the empty battery.

Once the engine has started:

1. With the engine running, disconnect both battery jumper cables in the reverse order (first the **– *terminal***, then the **+ *terminal***).
   - ➥ This prevents sparking at the battery terminals!

Avoiding low-load engine operation

NOTICE

The running performance of the engine can be negatively affected if it runs at high speed and at less than 20% of the load!
Effects:

- Operating temperature is not reached
- Increased lube oil consumption
- Lube oil in exhaust system, and therefore dirt in the engine
- Blue smoke in exhaust

► Run the engine in regular operation at loads of over 20 %.

Stopping the engine

NOTICE

To avoid overheating damage after shutting off the engine, do not turn it off from full load operation!

► Let the engine run at idling speed for about 3 minutes so that the temperature can stabilize, and then stop the engine.

NOTICE

In order to avoid damage to the starter, do **not** start the engine again immediately after stopping it!

► Stop the engine.

► Wait at least 10 seconds before starting again.

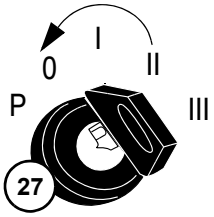


Fig. 100

1. Lower the loader unit fully.
2. Apply the parking brake.
3. Let the engine run at idling speed for about 3 minutes.
4. Turn the ignition key (preheating start switch **27**) to position “**0**” and remove it.

5 Operation

5.1 Steering system

Steering column height and angle adjustment

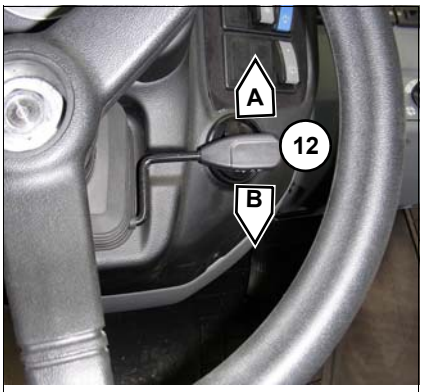


Fig. 101

WARNING

Accident hazard due to adjustment of steering column during machine travel!

Can cause serious injury or death.

► Adjust the steering column only at machine standstill.

1. Stop the wheel loader and the engine.
2. Apply the parking brake.
3. Sit down on the seat and adjust the height and the inclination of the steering column to your size (see table).

Function	Operation
Height adjustment	Pull lever **12** upward to position **A** and pull or push the steering column to the correct position and release the lever.
Angle adjustment	Push lever **12** downward to position **B** and adjust the correct position of the steering column and release the lever.

Checking the steering system

WARNING

Accident hazard due to leaking steering system not working correctly!

Can cause serious injury or death.

► Have a steering system that leaks or does not work correctly immediately repaired by an authorized service center.

1. Turn the steering wheel to the left and right with the engine running and at walking speed. As you do so, check whether the wheels turn in the same way as the steering wheel.

Information

The steering system is only operational when the engine is running! However the machine can still be steered if the diesel engine or the pump drive breaks down – **emergency steering feature!**
Turning the steering wheel requires greater effort! Take this into account especially when towing the machine!

► Adapt the towing speed to the modified steering behaviour! (Walking speed).

Synchronising the steering system

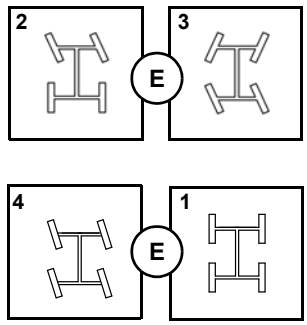


Fig. 102

Due to internal leakage in the steering hydraulics, the front and rear axle wheels of the machine no longer follow the same track during straight-ahead machine travel after extended operation. The steering system must be synchronized from time to time.

Synchronization during machine restart and steering-mode change

WARNING

Accident hazard when synchronising the steering system during machine travel!

Can cause serious injury or death.

► Synchronise the steering system only at a standstill or at walking speed.

Information

Synchronization of the steering is only possible at "tortoise" speed!

During synchronization, the “Hare” speed range can be selected with switch **57**. However, the speed only becomes active when synchronization is complete!

1. Start the diesel engine and select a new steering mode as required.
   ➥ The symbol for the selected steering mode **E/2, E/3** or **E/4** and symbol for synchronization **E/1** flash alternating.
2. Turn the steering wheel to the left and right several times.
   ➥ The synchronization is over as soon as both steering cylinders (front and rear axle) have reached or passed through the straight-ahead position and the symbol for synchronization **E/1** lights up continuously in the digital display. After a short time, the symbol for synchronization **E/1** and the symbol of the chosen steering mode **E/2, E/3** or **E/4** lights up continuously.

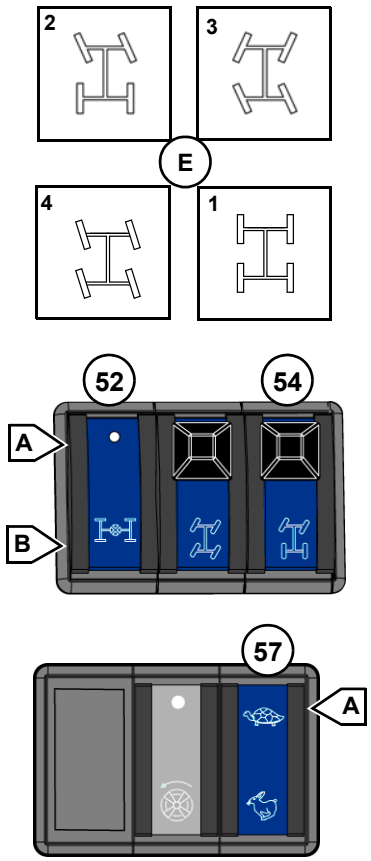


Fig. 103

Synchronization during work operation

WARNING

Accident hazard when synchronising the steering system during machine travel!

Can cause serious injury or death.

► Synchronize the steering system only at walking speed.

Information

If the machine is equipped with the front axle steering option, switch over to all-wheel steering to synchronize the steering system – *see “4 wheel steering” on page 5-5*.

1. Activate all-wheel steering. To do this: slide the lock in toggle switch **54** downward and press the toggle switch to position **A**.
2. Select the “Turtle” speed range. To do this, push the toggle switch **57** into position **A**.
   ➥ The symbol of the chosen steering mode **E/2, E/3** or **E/4** and the symbol for synchronization **E/1** appear alternately.
3. At walking speed, press the touch button **52** (synchronization) briefly in position **B**.
4. Synchronize the steering system. Turn the steering wheel to the left and right several times to do so.
   ➥ The synchronization is over as soon as both steering cylinders (front and rear axle) have reached or passed through the straight-ahead position and the symbol for synchronization **E/1** lights up continuously in the digital display.
5. Select the required steering mode.
6. Perform a functional check of the steering system.

4 wheel steering

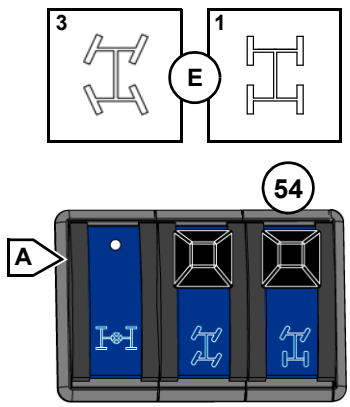


Fig. 104

4 wheel steering is used for fast loading operations in confined spaces where only small turning circles are possible.

WARNING

Danger of accident when changing steering mode during machine travel!

Can cause serious injury or death.

► Change the steering mode only at a standstill or at walking speed.

Enabling 4 wheel steering

1. Stop the machine or slow it down with the brakes to walking speed.
2. Set the steering to straight ahead.
3. Slide the lock in switch **54** downward and press the switch to position **A** at the same time.

If the symbols **E/1** und **E/3** appear alternately in the digital display:

4. Turn the steering wheel to the left and/or right until the wheels of the front and rear axles have reached or passed through the straight-ahead position from both directions.
   ➥ Symbol **E/3** appears permanently in the digital display.
   ➥ 4 wheel steering is in operation.

Information

If the machine is equipped with the "high speed option," switching over to all-wheel steering automatically reduces the speed to 20 km/h (12.43 mph)!

Front axle steering

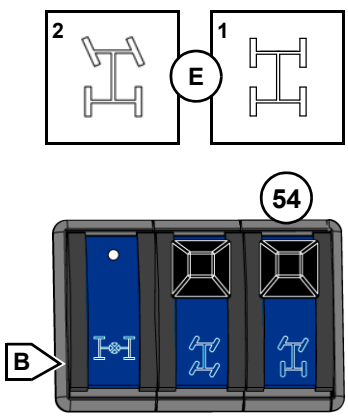


Fig. 105

Front axle steering is used for fast transport and road travel.

Front axle steering has to be selected for trailer operation or high-speed machine travel (30 or 40 kph/18.64 or 24.85 mph) on public roads.

WARNING

Danger of accident when changing steering mode during machine travel!

Can cause serious injury or death.

► Change the steering mode only at a standstill or at walking speed.

Enabling front axle steering

1. Stop the machine or slow it down with the brakes to walking speed.
2. Set the steering to straight ahead.
3. Slide the lock in switch **54** downward and press the switch to position **B** at the same time.

If the symbols **E/1** und **E/2** appear alternately in the digital display:

4. Turn the steering wheel to the left and/or right until the wheels of the front and rear axles have reached or passed through the straight-ahead position from both directions.
   ➥ Symbol **E/2** appears permanently in the digital display.
   ➥ Front axle steering is in operation.

Diagonal steering (crab steering option)

Use diagonal steering (crab steering) only for moving away laterally, for example from a wall, or for **briefly** repositioning the machine laterally.

WARNING

Accident hazard during machine travel on public roads with diagonal steering (crab steering)!

Can cause serious injury or death.

► Before performing machine travel on public roads, change over to front axle steering mode!

WARNING

Accident hazard due to use of manual throttle with diagonal steering (crab steering)!

Can cause serious injury or death.

► Do not use the manual throttle if diagonal steering (crab steering) is enabled.

WARNING

Danger of accident when changing steering mode during machine travel!

Can cause serious injury or death.

► Change the steering mode only at a standstill or at walking speed.

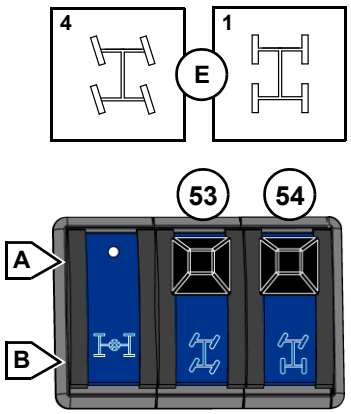


Fig. 106

Changing over from 4 wheel steering to diagonal steering

1. Stop the machine.
2. Select all-wheel steering. To do this: slide the lock in switch **54** downward and press the switch to position **A**.
3. Slide the lock on switch **53** downward and press the switch to position **B**.

If the symbols **E/1** und **E/4** appear alternately in the digital display:

4. Turn the steering wheel to the left and/or right until the wheels of the front and rear axles have reached or passed through the straight-ahead position from both directions.
   - ➥ Symbol **E/4** appears permanently in the digital display.
   - ➥ Diagonal steering is in operation.

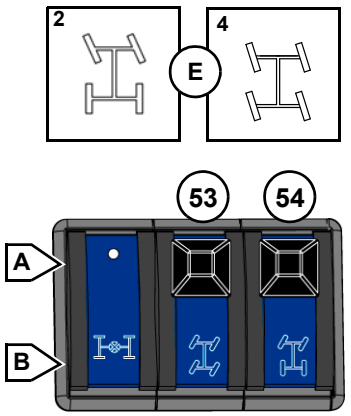


Fig. 107

Changing over from front axle steering to diagonal steering

Information

Diagonal steering cannot be selected directly from front axle steering!

If diagonal steering is nevertheless selected with the toggle switch **53** with front axle steering enabled, the machine gently brakes to 10 km/h and stays in front axle steering. In addition, a buzzer sounds and the symbols **E/2** and **E/4** flash in the digital display.

1. In order to change over to diagonal steering, slide the lock in switch **54** downward and press the switch to position **A**.
2. Turn the steering wheel to the left and/or right until the wheels of the front and rear axles have reached or passed through the straight-ahead position from both directions.
   - ➥ Symbol **E/4** appears permanently in the digital display.
   - ➥ Diagonal steering is in operation.

5.2 Accelerator actuation

Accelerator pedal

WARNING

Accident hazard due to blocked or dirty accelerator pedal!

Can cause serious injury or death.

► Keep the accelerator pedal clean and remove all objects in the area of the pedal.

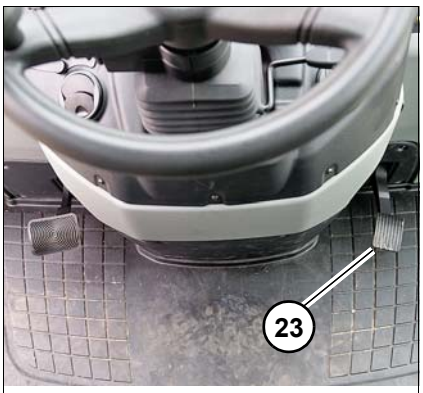


Fig. 108

Accelerator pedal **23** is located on the right in the machine.

Engine and machine speed is continuously adjusted with the accelerator pedal.

Maximum speed depends on the speed range set
– see “Overview of speed ranges” on page 5-18!

Manual throttle (option)

Using this function, a certain speed of the diesel engine can be set and saved. The speed is usually specified by the required speed for the attachment.

The manual throttle function guarantees a continuous supply of hydraulic oil when operating hydraulic attachments.

The manual throttle function can be combined with the low-speed control option.

WARNING

Accident hazard during machine travel on public roads with manual throttle!

Can cause serious injury or death.

► Before performing machine travel on public roads, disable the manual throttle.

WARNING

Accident hazard due to unexpected handling!

Can cause serious injury or death.

► Do **not** use the manual throttle if diagonal steering (crab steering) is enabled!

► Disable the manual throttle before changing over to diagonal steering.

WARNING

Accident hazard due to unexpected handling when changing operators with the manual throttle enabled!

Can cause serious injury or death.

► Before changing operators, stop the diesel engine and switch off ignition.

➥ This disables the manual throttle and deletes the engine speed saved.

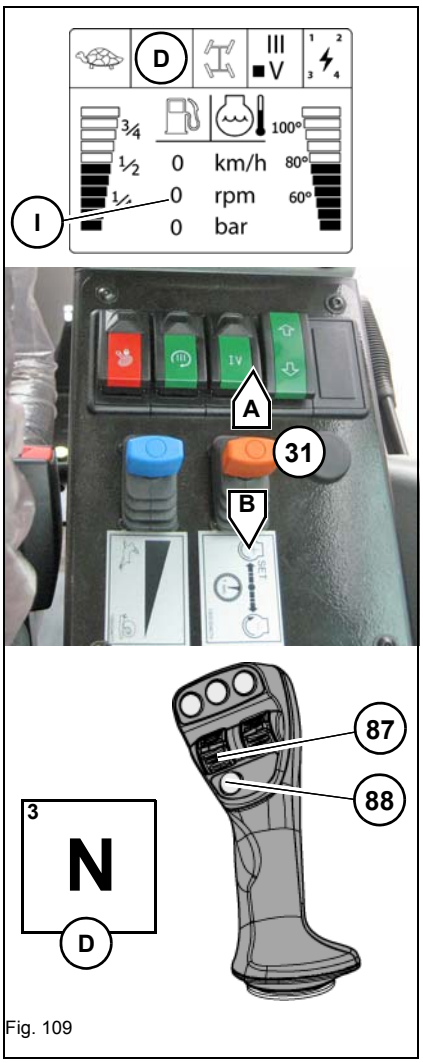


Fig. 109

Setting engine speed/enabling manual throttle

WARNING

Danger of accident due to fast acceleration of the machine!

Can cause serious injury or death.

► When starting with the activated manual throttle, make sure that no people or objects are in the danger area.

➥ If the manual throttle has been activated and then a travel direction is chosen with the rocker switch in the joystick, the vehicle accelerates according to the saved speed.

Information

In the "hare" speed, the saved engine speed is deleted after the manual throttle function is disabled and **cannot** be retrieved again.

Information

Engine speed can be increased with the accelerator pedal as required. If the accelerator pedal is not pressed any more, the engine speed is reset to the value last saved.

1. Select the speed and the desired steering mode.
2. Set the travel direction to neutral. Press touch button **88** on the joystick to do this.
   ➥ Symbol **D/3** appears in the digital display.
3. Select the required engine speed with the accelerator pedal.
   ➥ The current engine speed **I** appears in the digital display.
4. Press manual throttle regulator **31** forward **A** for at least 3 seconds.
   ➥ The engine speed is saved.
5. Adapt the engine speed as required by (repeatedly) tapping the manual-throttle regulator **31**:
   ➥ forward **A** – speed is increased
   ➥ Backward **B** – engine speed is reduced
6. Select the travel direction with switch **87** on joystick.
   ➥ The machine accelerates according to the preselected engine speed.

Specific features of manual throttle in “turtle” speed

WARNING

Danger of accident due to fast acceleration of the machine!

Can cause serious injury or death.

► When starting with the activated manual throttle, make sure that no people or objects are in the danger area.

➥ Engine speed is not changed if the machine is braked, with manual throttle enabled, by means of brake/inching pedal . In other words, as soon as the brake-inch pedal is released, the machine accelerates back to the saved speed.

- If push button **88** (neutral travel direction) is pressed with the manual throttle enabled, the manual throttle function is interrupted and the machine is evenly braked. The saved engine speed can be retrieved *– see “Access the saved engine speed (only for speed "turtle“)” on page 5-13*.

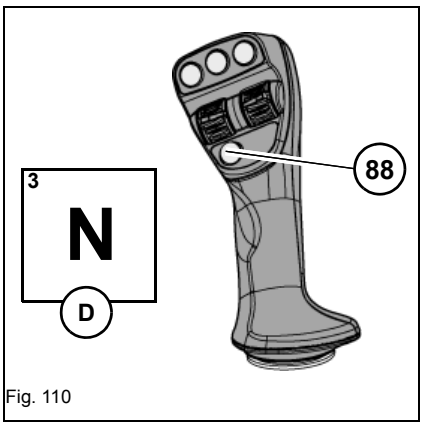


Fig. 110

Disabling manual throttle in the “Turtle” speed range

1. Press push button **88** on the joystick (neutral travel direction).
   ➥ Symbol **D/3** appears in the digital display.
   ➥ The manual throttle is disabled.
   ➥ The speed of the diesel engine falls to the lower idling speed.
   ➥ The **saved speed remains pre**served.

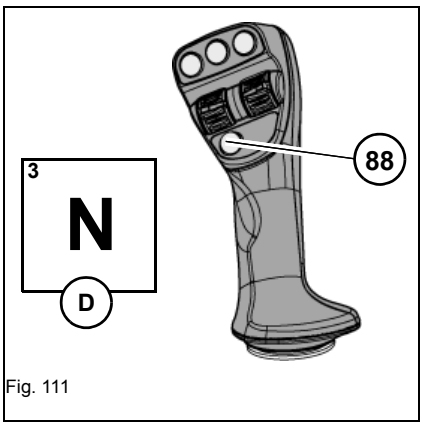


Fig. 111

Disabling manual throttle in the “Hare” speed range

1. Press the brake/inching pedal or push button **88** on the joystick (neutral travel direction).
   ➥ Symbol **D/3** appears in the digital display.
   ➥ The manual throttle is disabled.
   ➥ The speed of the diesel engine falls to the lower idling speed.
   ➥ The **saved speed is deleted**.

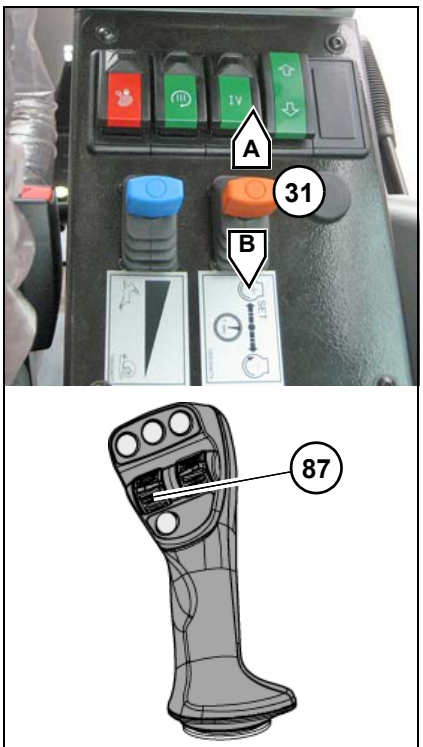


Fig. 112

Access the saved engine speed (only for speed "turtle“)

WARNING

Danger of accident due to fast acceleration of the machine!

Can cause serious injury or death.

► If the manual throttle is still activated, consider the saved speed and the resulting vehicle behavior before actuating the travel direction touch button.

1. Briefly tap manual-throttle regulator **31** forward or backward.
   ➥ The diesel engine increases the speed to the saved value.
2. Select the travel direction with switch **87** on joystick.
   ➥ The machine accelerates according to the set engine speed.

Information

If the travel direction is chosen, the control will **not** increase the speed of the control to the saved value before the diesel engine speed is reactivated.

Information

Switching off the ignition disables the manual throttle and at the same time deletes the engine speed saved.

5.3 Brake

Brake/inching pedal

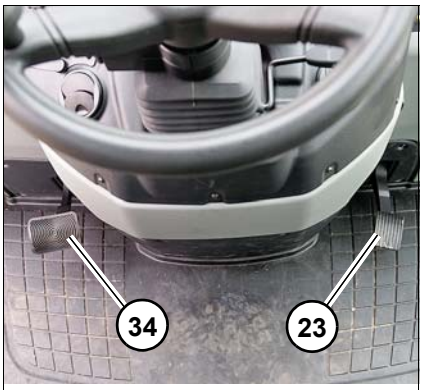


Fig. 113

Important information on brake/inching pedal actuation

Brake/inching pedal **34** is located on the left in the machine. The brake/inching pedal is used for two functions:

- **Inching** – engine speed does not change, however travel speed is reduced to increase the output of the operating hydraulics.
- **Brakes**

DANGER

Accident hazard due to blocked or dirty pedal!

Can cause serious injury or death.

► Keep the brake/inching pedal clean and remove all objects in the area of the pedal.

Braking with the brake/inching pedal (service brake)

WARNING

Accident hazard when moving down a slope too fast!

Can cause serious injury or death. Excessive engine speed can cause damage to the travelling drive or diesel engine.

► Select the next lower speed range before performing downhill machine travel.

► Reduce engine speed: remove your foot from the accelerator pedal.

► Reduce your travel speed with the brake/inching pedal (intermittent braking).

1. Check in the rear-view mirror that no one will be hampered.
2. Release accelerator pedal **23** completely.
3. Press down brake/inching pedal **34** with force with your left foot.

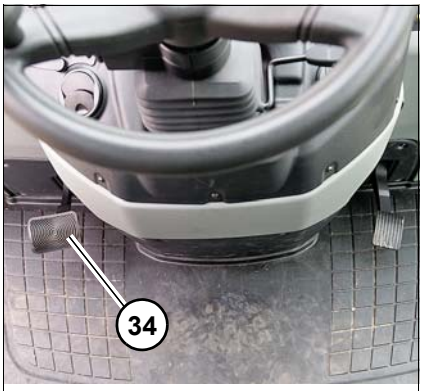


Fig. 114

Performing a brake test

1. After looking in the rear-view mirror and at low speed, press down the brake/inching pedal **34** and check the braking effect.
   ➥ A deceleration must be felt in the brake-inch pedal after half the pedal travel, and the brake lights must light up.

Inching with the brake/inching pedal

1. Press the brake/inching pedal **34** down slightly.
   ➥ Slightly press the pedal in the inch range. The pedal can be used like a car's clutch.
   ➥ The drive's output is reduced and the engine power is now available for the operating hydraulics.
   ➥ This makes it possible to raise the loader unit more quickly.

Information

The brake lights do not illuminate in the inching range.

Parking brake

Information on the parking brake

The parking brake is located to the right of the control lever base.

A starting interlock prevents the machine from starting even with the parking brake slightly applied.

Information

Selection of travel direction is not possible unless parking brake is completely released.
Applying the parking brake automatically cancels the selection of the forward/reverse travel direction (drive) and switches the drive to neutral.

Applying the parking brake

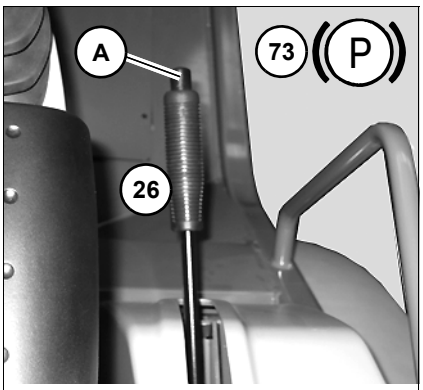


Fig. 115

CAUTION

Applying the parking brake during machine travel abruptly brakes the machine!

Can cause injury.

- ► Apply the parking brake only at machine standstill.
- ► In travel operation use only the brake/inching pedal as a brake.
- ► Use the parking brake as a secondary brake only in an emergency (if the service brake breaks down).

1. Lift the lever **26** up.
   - ➥ Indicator light **73** on the indicating instrument illuminates.
   - ➥ The engine can be started.
   - ➥ Selection of forward/reverse travel direction (drive) is automatically cancelled and neutral activated.
2. Secure the machine with wheel chocks.

Release the parking brake

1. Pull lever **26** up slightly.
2. Press button **A**.
3. Move lever **26** down as far as it will go.
   - ➥ Indicator light **73** on the indicating instrument goes out.

5.4 Travel operation

Important information before putting the machine into operation

WARNING

Accident hazard due to persons in the danger zone!

Serious injury or death can be caused by not staying clear of the danger zone of the machine.

- ► Ensure that no one is in the danger zone.
- ► Stop all work movements immediately if persons enter the danger zone.
- ► Seal off the danger zone with barriers.

NOTICE

If the oil temperature of the drive hydraulics is too high >105°C (>221°F), the travel speed (machine travel dynamics) is automatically reduced by 50% until the oil temperature is below 105°C (221°F) in order to avoid damage to the drive hydraulics.

- ► Have the cause for the high oil temperature checked or repaired by an authorized service centre under all circumsances.

Information

For the operator's safety, the vehicle can optionally be outfitted with a seat contact switch. In this case:

- ► The diesel engine will not start unless the operator is seated on the seat.
- ► The drive switches off after 5 seconds if the load on the operator seat is reduced when driving the machine.

Overview of speed ranges

The machine has two speed ranges (see table).

The possible speed ranges depend on the steering mode selected.

Before changing the speed range, select the required steering mode:
– *see "Front axle steering" on page 5-6*, *4 wheel steering on page 5-5* and *Diagonal steering (crab steering option) on page 5-7*.

Speed range	Travel speed	Recommended
	0 – 7 kph (0 – 4.35 mph) possible with all steering modes!	Used for work involving short loading cycles; in other words, a rapid succession of loading and unloading operations, for example onto a truck, and for work requiring precise speed adjustment, for example rotary broom applications
	0 – 20 km/h (0 – 12.43 mph) (series) only possible for front axle steering; 0 – 30 km/h (0 – 18.64 mph) (option) 0 – 40 km/h (0 – 24.85 mph) (option)	For long-haul travel

Information

For machines with high-speed gearbox (option), the following conditions must be fulfilled so that the machine can reach maximum speed:

- Level asphalted ground conditions
- Empty standard bucket, no trailer operation
- Travel drive temperature of about 20 – 30°C (68 – 86°F) reached.

Changing speed range

WARNING

Accident hazard during downhill travel!

Serious injury or death can be caused by travelling too fast. Excessive engine speed can cause damage to the travelling drive or diesel engine.

- ► Select the next lower speed range “Turtle” before performing downhill machine travel.
- ► Reduce engine speed: remove your foot from the accelerator pedal.
- ► Reduce your travel speed with the brake/inching pedal (intermittent braking).

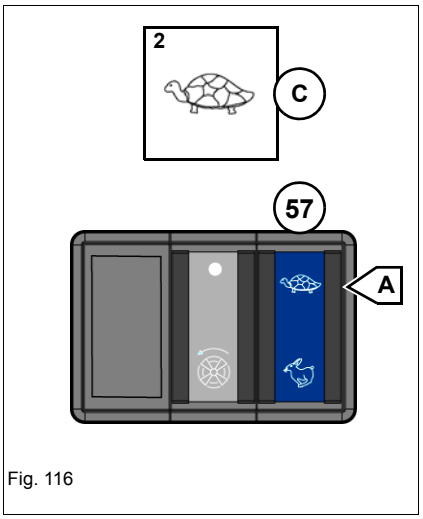


Fig. 116

Reducing travel speed

1. Set the required steering mode.
2. Press switch **57** to position **A** (“Turtle”).
   - ➥ Symbol **C/2** appears in the digital display.
   - ➥ If symbol **C/2** flashes, the speed is too high for the selected speed.
3. Brake the machine with the brake/inching pedal.
   - ➥ If the speed has been reduced according to the selected speed, the symbol **C/2** appears continuously in the digital display.

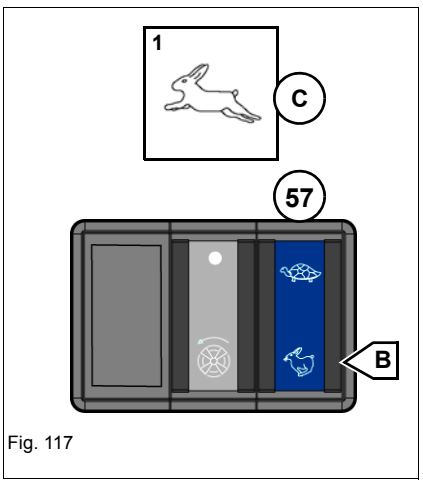


Fig. 117

Increasing speed

1. Set the required steering mode.
2. Press switch **57** to position **B** (“Hare”).
   - ➥ Symbol **C/1** appears in the digital display.

Information

The 40 kph speed range (Hare) is active only if front axle steering is switched on – *see “Front axle steering” on page 5-6*

Selecting a travel direction and starting machine travel

WARNING

Injury hazard to persons in the danger zone!

Persons in the danger zone can be overlooked and seriously injured or killed during backward machine travel.

- ► Adjust the existing visual aids (for example the rearview mirrors) correctly.
- ► Work particularly carefully when reversing the machine.
- ► Interrupt work immediately if persons enter the danger zone.

CAUTION

Accident hazard when changing the travel direction on public roads!

Can cause injury.

- ► Do not change the travel direction during machine travel, otherwise the machine moves in the opposite direction immediately.
- ► Only select the other travel direction when the machine is at a standstill.

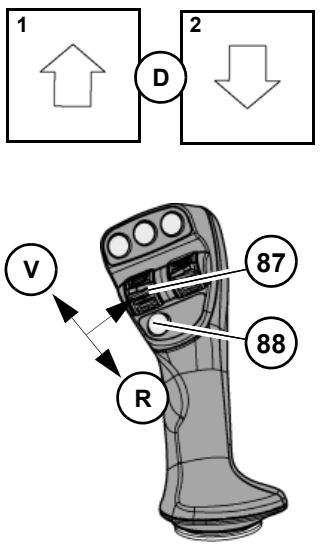


Fig. 118

1. Brake the machine with the service brake.
2. Select the travel direction with switch **87** on joystick.
   - **F** = forward – symbol **D/1** appears in the digital display.
   - **R** = reverse – symbol **D/2** appears in the digital display.
3. Press accelerator pedal slowly.
   ➥ Machine travel starts.
4. Test the brakes at low speed.

Information

If the selection of the travel direction is not accepted (no function), this means that push button **88** (travelling drive – neutral position) has been pressed unintentionally!

- ► Select the travel direction again.

Reversing operation (changing travel direction)

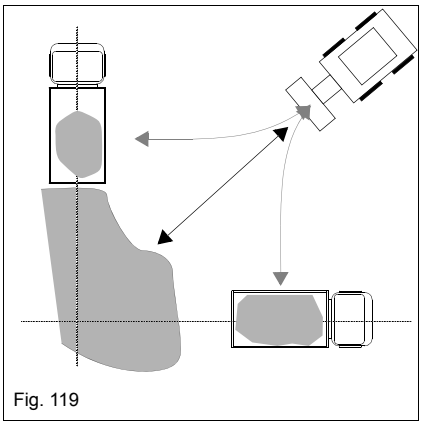


Fig. 119

Reversing operation (change of travel directon without stopping) is only allowed in a secured job site for fast loading at low travel speed and lift heights.

WARNING

Injury hazard to persons in the danger zone!

Persons in the danger zone are possibly not seen and can be injured during backward machine travel.

- ► Adjust the existing visual aids (for example the rearview mirrors) correctly.
- ► Work particularly carefully when reversing the machine.
- ► Interrupt work immediately if persons enter the danger zone.

Information

In the “Hare” speed range, changing direction during machine travel is only possible below 14 kph (8.7 mph) and is only allowed in a secured job site (for fast loading at low travel speed with a lowered loader unit).

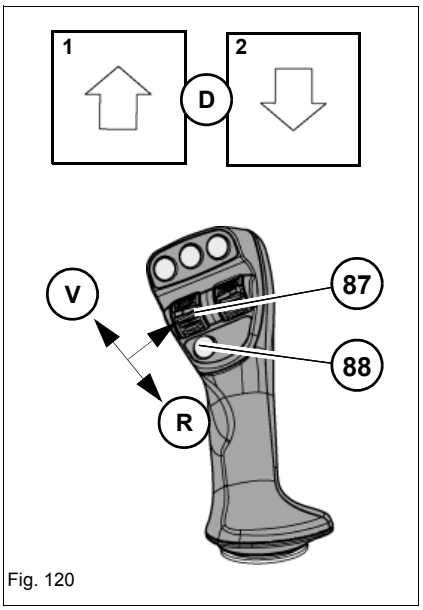


Fig. 120

1. Reduce the travel speed to below 14 kph (8.7 mph).
2. Select the travel direction with switch **87** on joystick.
   - **F** = forward – symbol **D/1** appears in the digital display.
   - **R** = reverse – symbol **D/2** appears in the digital display.

Information

If the selection of the travel direction is not accepted (no function), this means that the travel speed is higher than 14 kph (8.7 mph) or that push button **88** (travelling drive – neutral position) has been pressed unintentionally!

- ► Brake the machine.
- ► Select the travel direction again.

Neutral position, stopping the machine

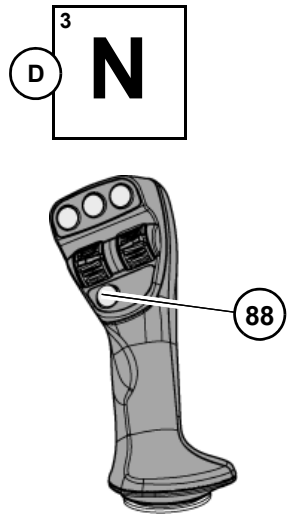


Fig. 121

Variant 1

1. Reduce the travel speed 0 – 20 kph (0 – 12 mph).
2. Press touch button **88** on the joystick.
   ➥ Symbol **D/3** appears in the digital display.
3. Brake the machine to a standstill with the service brake.
4. Apply the parking brake *– see “Parking brake” on page 5-16*.

Variant 2

1. Reduce the engine speed. Remove your foot from the accelerator pedal.
2. Stop the machine with the service brake.
3. Switch the travel direction to neutral position with push button **88**.
   ➥ Symbol **D/3** appears in the digital display.
4. Apply the parking brake *– see “Parking brake” on page 5-16*.

Parking the machine

WARNING

Danger of accident when parking the machine on a gradient!

Serious injury or death can be caused by the machine rolling away.

- ► Apply the parking brake.
- ► In addition to the parking brake, secure the machine by placing chocks (option) under the downhill sides of the wheels.

NOTICE

Engine damage by stopping the engine after full load.

- ► Let the engine run at idling speed for about 3 minutes so that the temperature can stabilize, and then stop it.

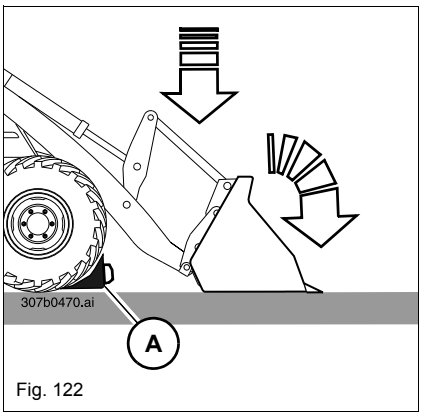


Fig. 122

1. Apply the parking brake *– see "Parking brake" on page 5-16*.
2. Switch off all additional control circuits *– see "Additional front/rear control circuit (option)" on page 5-44*.
3. Lower the loader unit completely and set the bucket horizontally with the ground. Operation *– see "Control lever (joystick) overview" on page 5-36*.
4. Stop the engine and remove the starting key.
   ➥ The immobilizer (option) is enabled.
5. Close and lock the door and the windows.
6. Remove the key from the battery master switch *– see chapter 4 "Battery master switch (option)" on page 4-18*.
7. Close the engine cover.

Additionally on slopes:

8. Take additional measures to secure the machine by placing chocks **A** under the downhill sides of the wheels.
   ➥ The wheel chock is located on the left on the frame in front of the cabin.

5.5 Differential lock

The 100% front and rear axle differential lock neutralizes the compensating effect of the differential, in other words, traction acts evenly on both wheels of the front and rear axles.

NOTICE

In order to avoid damage to the differential:

- ► Switch on the differential lock only if you expect a wheel to spin, when working on slopes or on slippery ground, for example.
- ► Switch on the differential lock only at machine standstill.
- ► Switch off the differential lock when cornering.

Switching on the differential lock

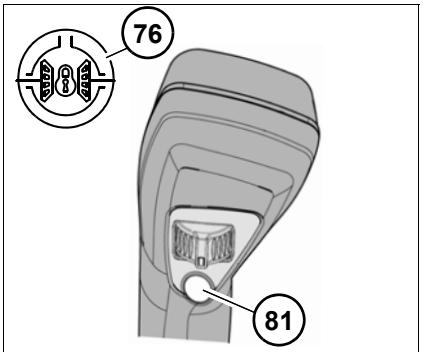


Fig. 123

WARNING

Accident hazard! The driving and steering behaviour changes considerably if the differential lock is enabled!

- ► Use the differential lock only at low speed and when traveling straight ahead.

In order to avoid damage to the differential lock when switching it on, the differential lock can only be enabled by pressing the push button **81** on the joystick **and** the brake-inch pedal!

1. Stop the machine.
2. Press and hold push button **81** on the joystick.
3. Press the brake/inching pedal (2 – 3 seconds) until indicator light **76** on the indicating instrument illuminates.
   - ➥ The differential lock is enabled.
4. Carefully start machine travel and then stop the machine with push button **81** pressed.

Switching off the differential lock

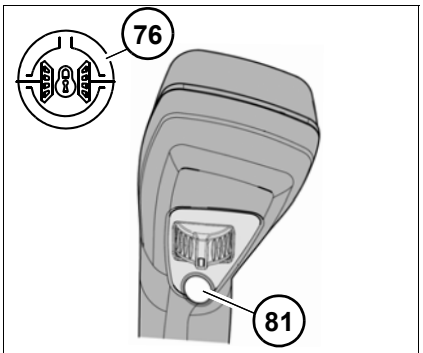


Fig. 124

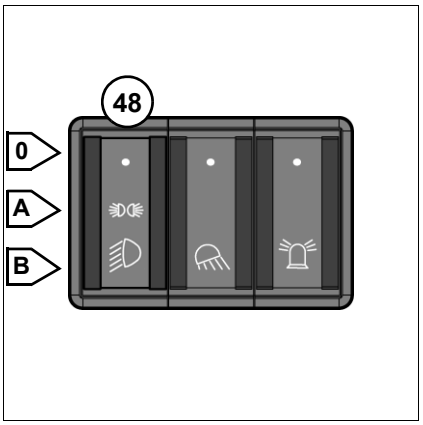
1. Reduce travel speed and engine speed.
2. Release push button **81** on the joystick.
   - ➥ Indicator light **76** on the indicating instrument goes out, the differential lock is disabled.

Information

Depending on the load on the power train, the differential lock can still be active for a short time even after releasing the push button. The differential lock is disabled only after the control light **76** goes out!

5.6 Lights/signalling system

Parking lights/low beam



The machine lights toggle switch is located on the rear switch panel to the right of the operator's seat.

Side marker light operation		Function
ON	Press switch **48** to position **A**.	➥ The indicator light in the switch illuminates.
OFF	Press switch **48** to position **0**.	➥ Indicator light in switch goes out.

Low beam operation		Function
ON	Press switch **48** to position **B**.	➥ The indicator light in the switch illuminates.
OFF	Press switch **48** to position **0**.	➥ Indicator light in switch goes out.

Information

The side marker lights stay lit if ignition is switched off while low beam is still switched on!

High beam/headlight flasher

WARNING

Accident hazard due to blinded motorists!

During machine travel on public roads, the activated high beam or flashing headlights can blind other motorists. This can cause serious injury or death.

► Switch off high beam or the headlight flasher in time during machine travel on public roads.

► Observe the national regulations.

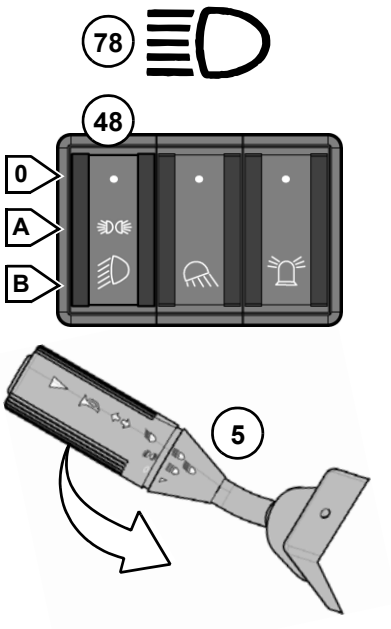


Fig. 126

High beam and the headlight flasher are operated with multifunctional lever **5**. The multifunctional lever is located on the left of the steering wheel.

High beam operation		Function
ON	1. Press switch **48** to position **B**. 2. Pull the multifunction lever **5** toward the steering wheel and release it.	➥ High beam and control lamp **78** light up.
OFF	Pull the multifunction lever **5** again toward the steering wheel and release it.	➥ The high beam and control lamp **78** go out.

Headlight flasher operation		Function
ON	Pull the multifunction lever **5** at short intervals toward the steering wheel.	➥ High beam and control lamp **78** light up.

Working lights

The machine is equipped with the following working lights in different versions to ensure optimal light conditions of the job site:

- Rear right working light (standard)
- Front and/or rear left working lights (option)

The switches are located on the switch console on the left beside the steering wheel.

WARNING

Accident hazard due to blinded motorists!

During machine travel on public roads, the activated work lights can blind other motorists. This can cause serious injury or death.

► Always switch off the working lights during machine travel on public roads.

► When operating the machine, only switch on the working lights when no one can be blinded by them.

► Pay attention to national regulations on construction site lighting.

Information

The working lights stay lit after switching off ignition. This puts a heavy load on the battery.

► Switch off the working lights if you do not need them.

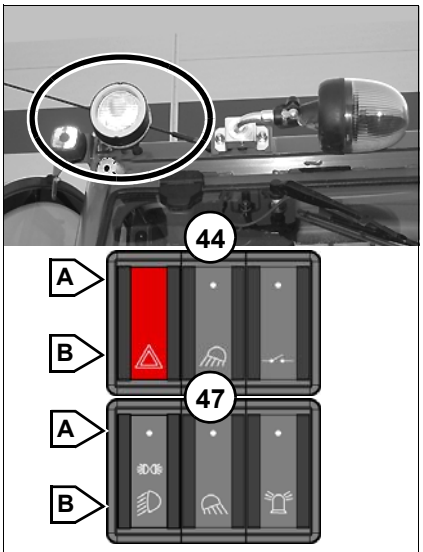


Fig. 127

Working lights operation		Function
ON	Press the toggle switch **44 (front)** and/or toggle switch **47 (rear)** to position **B**.	➥ The indicator light in the switch illuminates.
OFF	Press switch **44 (front)** and/or switch **47 (rear)** to position **A**.	➥ Indicator light in switch goes out.

Interior light

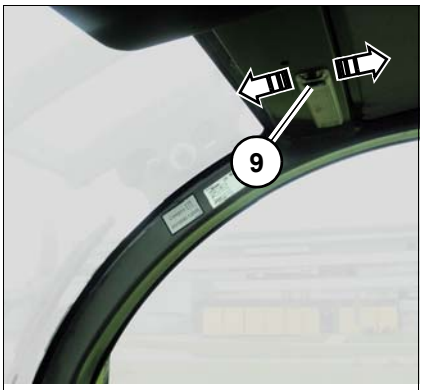


Fig. 128

The interior light is located at the upper right on the cabin roof and is adjusted with the switch **9**.

Switch position	Interior light function
Front	Illumination via door contact switch
Center	Light OFF
Rear	LIght permanently ON

Turn indicators

NOTICE

The turn indicator system is not in order if indicator light **64** and/or **65** flashes about twice as fast as normally!

► Have the turn indicator system repaired.

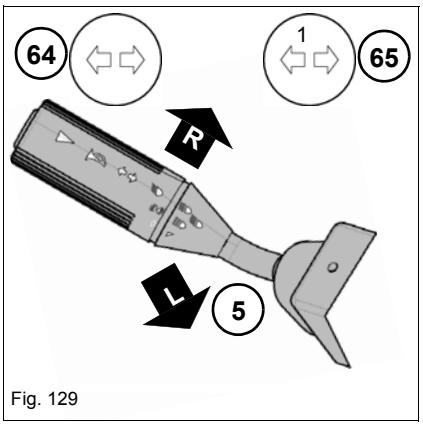


Fig. 129

Operating the turn indicators		Function
Right	Push multifunctional lever **5** forward **R**.	➥ Indicator light **64** flashes. ➥ Indicator light **65** flashes during trailer operation.
Left	Pull multifunctional lever **5** to the rear **L**.	

Hazard warning system

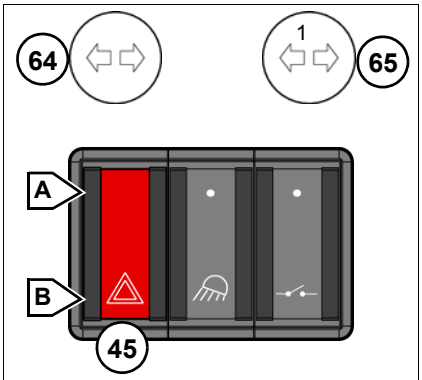


Fig. 130

The hazard warning switch is located on the switch console on the left beside the steering wheel.

Hazard warning system operation		Function
ON	Switch **45** in position **B** Press.	➥ The indicator light in the switch and indicator light **64** both flash. ➥ Indicator light **65** flashes, too, during trailer operation.
OFF	Switch **45** in position **A** Press.	➥ The indicator light in the switch and indicator lights **64 and 65** go out.

Horn

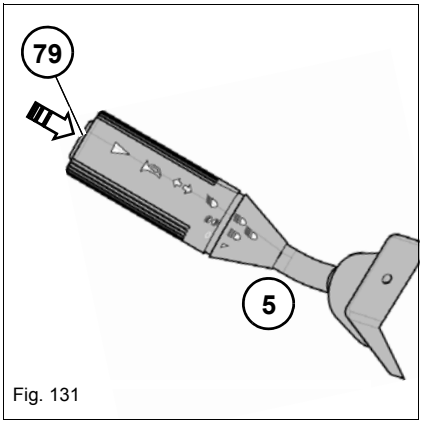


Fig. 131

Operating the horn		Function
ON	Press push button **79**.	➥ The horn sounds.

5.7 Wiper/wash system

Front wiper operation

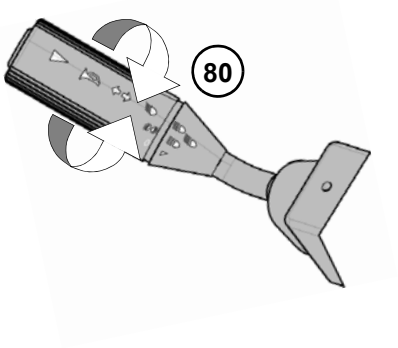


Fig. 132

Front wiper		Function
ON	Turn the rotary switch **80** on the multifunction lever to the **1st** position.	➥ Intermittent wipe.
ON	Turn the rotary switch **80** on the multifunction lever to the **2nd** position.	➥ Continuous wiping.
OFF	Turn rotary switch **80** fully back.	➥ Window wipers return to starting position.

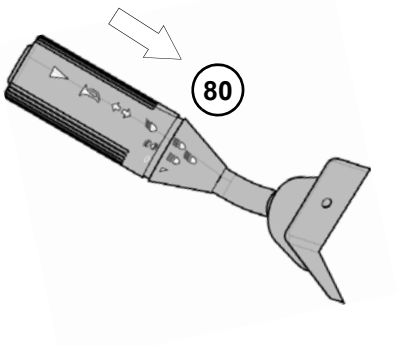


Fig. 133

Wash water (front/rear window)		Function
ON	Press and hold rotary switch **80** toward the steering column.	➥ Washer fluid is sprayed at the front and rear. ➥ The front wiper wipes 3 times.
OFF	Release rotary switch **80**.	➥ Front wiper returns to base position.

Rear wiper operation

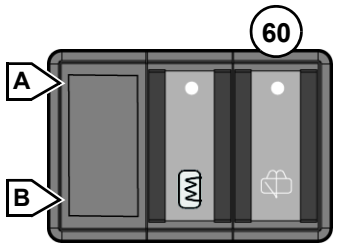


Fig. 134

The push button for the rear wiper is located on the switch console on the right beside the steering wheel.

Rear wiper		Function
ON	Press switch **60** to position **B**.	➥ Rear wiper is on.
OFF	Press switch **60** to position **A**.	➥ Rear wiper returns to base position.

Rear window washer pump		Function
ON	Press and hold switch **60** beyond position **B** (push button function).	➥ Washer nozzle in operation. ➥ Wiper wipes 3 times.

Information

Topping off the window washer fluid *– see chapter 7 “Washer system reservoir” on page 7-59*

5.8 Heating, ventilation and air conditioning system (option)

Heating and ventilation

The air is directed to the front window, the leg room area and the cabin by means of two nozzles each – *see chapter 4 “Inside the cabin” on page 4-30*.

Each nozzle can be directed and/or closed.

2 operating modes can be selected:

- Ventilation, fresh air
- Heating

Rotary switches **94** and **95** for adjusting the heating and ventilation are located on the switch console on the right (near the cabin door).

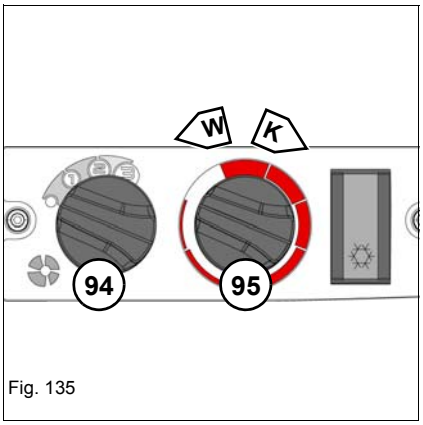


Fig. 135

Ventilation, fresh air

1. Adjust the fan speed with rotary switch **94** (positions **1 – 3**).
2. Turn rotary switch **95** to the limit to position **K** (cold).

Heating

1. Adjust the fan speed with rotary switch **94** (positions **1 – 3**).
2. Adjust the temperature with rotary switch **95**:
   K = cold
   W = warm

Air conditioning (option)

Information on putting the air conditioning into operation

For cooling and heating, the air conditioning system supplies dehumidified and purified air to the cabin.

In order to achieve best air conditioning results:

- Before putting into operation, ventilate the cabin thoroughly.
- Close the windows and doors.
- Set the fan to maximum output first, and then adjust it to your needs.
- In order to prevent condensation water from forming on the condensor, switch off the air conditioning system in due time before the end of work.

NOTICE

Observe the following points in order to avoid malfunctions, loss of refrigerant and drying-out of the seals:

► Run the air conditioning system at least once a month (always leave it switched on it if possible).

► Clean the heat exchanger (condenser) regularly.
Daily in dusty or dirty work conditions
– see chapter 7 “Air conditioning (option)” on page 7-56.

► Check the V-belt for cracks and correct tension
– see chapter 7 “Checking the V-belt (compressed-air brake option)” on page 7-42.

► Have the air conditioning checked at least once a year by an authorized service centre.

► The air conditioning system must only be repaired, serviced and filled with a refrigerant by trained personnel and an authorized service centre.

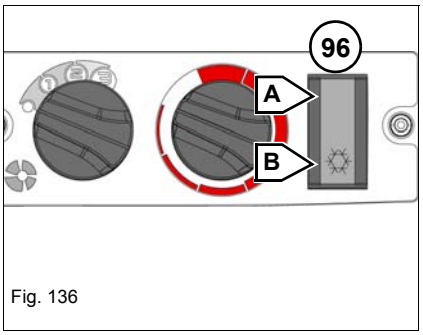


Fig. 136

Air conditioning operation

Switch **96** is located on the switch console on the right (near the cabin door).

Air conditioning operation		Function
ON	Press switch **96** to position **B**.	➥ Indicator light in switch illuminates. ➥ Air conditioning system in operation.
OFF	Press switch **96** to position **A**.	➥ Air conditioning system OFF.

Information

The air conditioning system allows you to select the same operating modes as with the heating and ventilation system!

The heating output is then restricted when the air conditioning system is in use!

5.9 Operating hydraulics

Important safety instructions on loader unit operation

WARNING

Danger of accident due to uncontrolled movements of the joystick!

Uncontrolled movements of the joystick can cause serious injury or death.

- ► Operate the machine only from the operator seat.
- ► Work calmly and carefully.
- ► Avoid fast and sudden movements of the joystick.
- ► Always lower the loader unit to the ground during work interruptions or when finishing work.
- ► Secure the joystick before performing machine travel on public roads.
- ► Secure the joystick before leaving the machine.

WARNING

Crushing hazard due to tipping over of machine!

A tipping machine can cause serious injury or death.

- ► Lower the loader unit to transport position before starting machine travel.
- ► Adapt the travel speed to the prevailing conditions.
- ► Adapt the travel speed to the material loaded.
- ► Pay attention to persons and obstacles.
- ► Reduce travel speed before performing downhill machine travel.
- ► Always fasten your seat belt.
- ► Ensure that no parts of the body protrude outside the machine.
- ► Carefully steer the machine if the loader unit is raised.
- ► Do not exceed the permissible payloads.

Information

With the "seat contact switch" option, the vehicle can only be put into operation from the operator’s seat.

If the operator’s seat is left, the diesel engine automatically switches off after about 5 seconds for safety reasons.

Control lever (joystick) overview

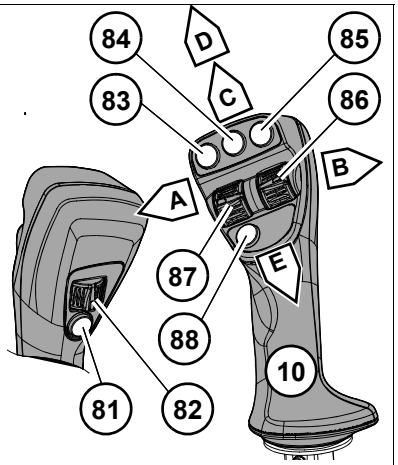


Fig. 137

Operation		Function
A	To the left	Tilt in the attachment.
B	To the right	Empty attachment.
C	Forward	Lower the loader unit.
D	Fully forward (2nd position)	Lowers the loader unit to float position (option)
E	Backward	Raise the loader unit.
81	Push button	Enable the differential lock *– see "Differential lock" on page 5-24*
82	Switch	3rd control circuit for locking/unlocking the quickhitch facility.
83 / 84	Push button	Additional control circuit with additional functions (option)
85	Push button	Front plug receptacle push button (option) or automatic bucket return (option)
86	Switch	Additional control circuit (4th control circuit proportional control, option)
87	Switch	Travel direction (forward/reverse) *– see "Selecting a travel direction and starting machine travel" on page 5-20*
88	Push button	Disabling the travel direction (neutral position) *– see "Neutral position, stopping the machine" on page 5-22*

Information

The operating hydraulics only works if the diesel engine runs and the joystick lock is disabled.

As an option the control valve can be fitted with a float position. This is beneficial when working with a rotary broom or snowploughs, or for grading bulk material in reverse.

Information

For safety reasons, the loader unit cannot be lowered with the hose burst valve (option) if the diesel engine is stopped and the ignition is switched off!

Hydraulic control circuits/plug couplings (overview)

The following control circuits and hydraulic connections are available on the machine depending on equipment.

See following pages for instructions on how to operate the separate control circuits and hydraulic connections.

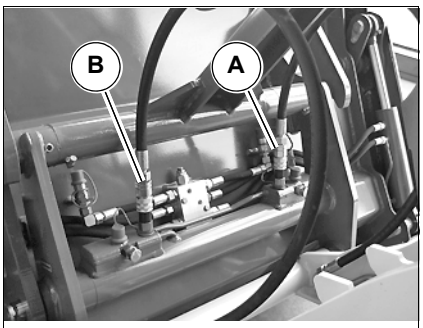


Fig. 138

KRAMER quickhitch plug couplings (standard)

Control circuits	Hydraulic connections	For operation, see page
3rd control circuit	A + B	*5-40*
Continuous operation of 3rd control circuit (option)		

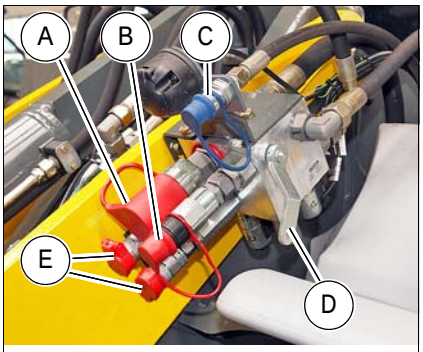


Fig. 139

Plug couplings for front additional control circuit

Control circuits	Hydraulic connections	For operation, see page
Front plug coupling (return without pressure)	A	*5-44*
Front plug coupling (pressure)	B	
Plug coupling (leak oil line)	C	
Changeover tap for front or rear plug couplings **B**	D	
Front plug coupling for additional functions	E	*5-47*

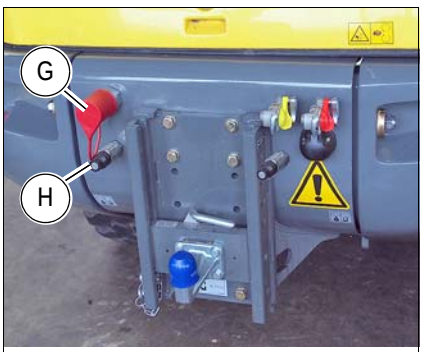


Fig. 140

Plug couplings for rear additional control circuit (option)

Control circuits	Hydraulic connections	For operation, see page
Rear plug coupling (return without pressure to reservoir)	G	*5-48*
Rear plug coupling (single-action)	H	

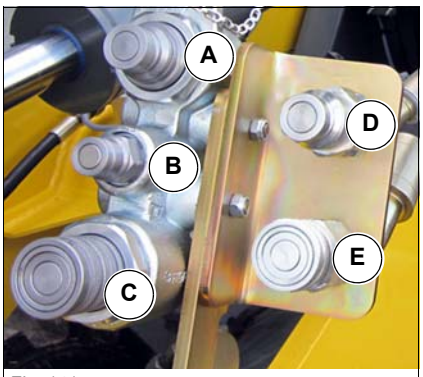


Fig. 141

Plug couplings of 3rd control circuit (FASTER block) and additional control circuit laterally on loader unit (option)

Information

This option (FASTER block) is only possible in connection with the SKID STEER quickhitch!

Control circuits:	Hydraulic connections:	For operation, see page:
Plug coupling (3rd control circuit, permanent operation, return without pressure)	**A**	*5-52*
Plug coupling (leak oil line)	**B**	–
Plug coupling (3rd control circuit, permanent operation – pressure)	**C**	*5-52*
Plug coupling (additional control circuit, return without pressure)	**D**	*5-53*
Plug coupling (additional control circuit – pressure)	**E**	

Important information on connecting and operating the hydraulic control circuits

WARNING

Connecting the flexible lines incorrectly results in incorrect operation and/or uncontrolled movements of the attachment!

Failure to observe this can cause serious injury or death.

- ► Ensure that the flexible lines of the attachment are correctly connected to the machine.
- ► Follow the instructions in the Operator's Manual of the attachment manufacturer.
- ► Check the response direction of the control elements before using the attachment.

NOTICE

In order to avoid leaks on the plug couplings and dirt in the hydraulic oil:

- ► carefully clean the plug couplings and flexible lines before connecting them.
- ► Stop the diesel engine before connecting the flexible lines.

NOTICE

Damage hazard to the machine and/or the attachment!

- ► Check the flow rate of the attachment before putting it into operation.
- ► Observe the operator's manual of the attachment.
- ► When removing the attachment, always ensure that all hydraulic lines are disconnected.

Information

The hydraulic system of the machine is still pressurized even when the engine is not running. The plug couplings can be released, however they cannot be re-attached because the pressure in the hydraulic lines has not been released.

- ► Release the pressure in the sections of the system and pressure lines that are to be opened before installing and removing an attachment *– see "Releasing the pressure at the plug couplings" on page 5-66*.

Information

Operation of attachments at the front and rear coupling connections at the same time is not possible! Remove an attachment that is not used!

3rd control circuit

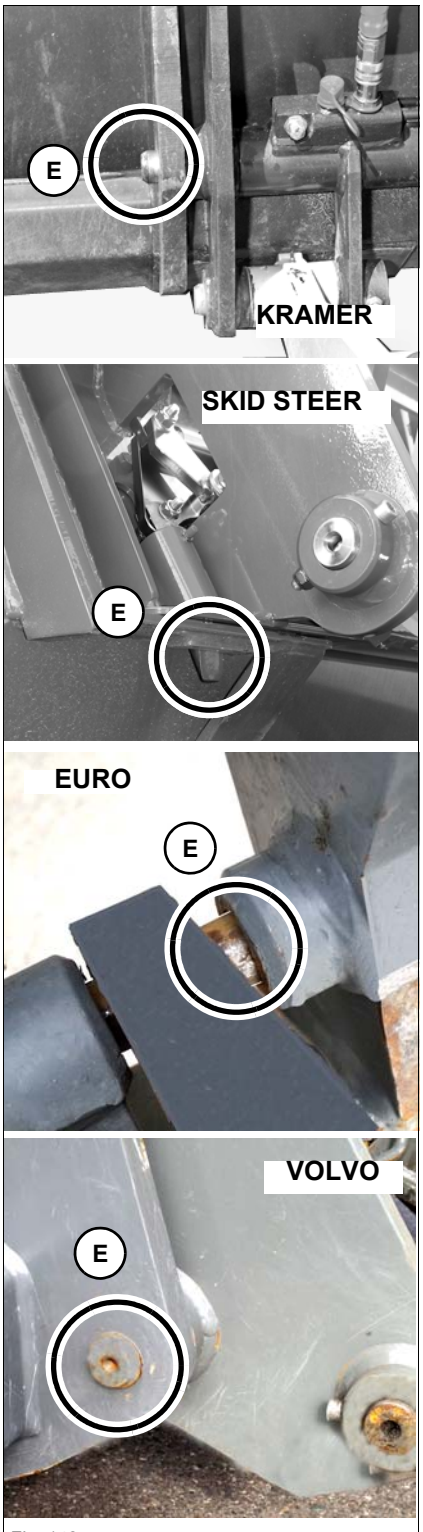


Fig. 142

Notes about lock

WARNING

Accident hazard due to unlocked attachment!

The attachment can come off unexpectedly and cause serious injury or death.

► Ensure that the attachment is visibly locked on either side with lock pins **E**.

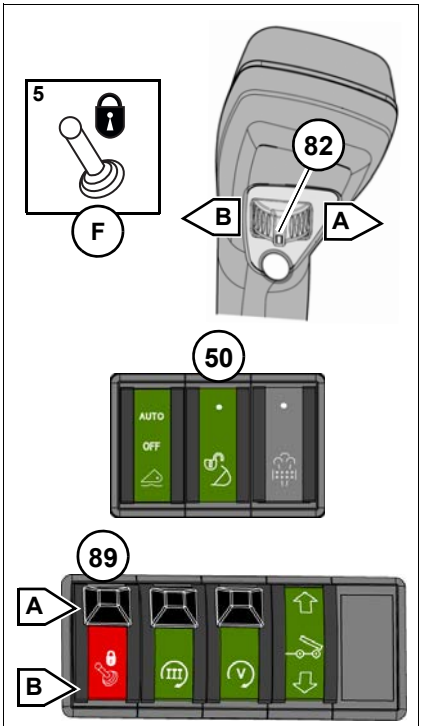


Fig. 143

Locking the attachment

1. Press the rocker switch **82** on the joystick to the left.
   ➥ The attachment is locked in the quickhitch.
2. When driving on roads, activate the lock for operation of the work hydraulics. To do this: slide the lock in rocker switch **89** downward and press the rocker switch to position **B**.
   ➥ Symbol **F/5** appears in the digital display.
   ➥ Work hydraulic functions are locked.

Unlocking an attachment

The attachment locked onto the quickhitch is secured against unintentional operation of switch **82** on the joystick. The attachment unlocking can only be done by two-hand operation while also pressing the touch button **50**.

Information

In order to avoid damage to the attachment lock, follow the order for performing unlocking.

1. If the road travel lock for work hydraulics is activated, see the symbol **F/5** in the digital display and disable this. To do this: slide the lock in switch **89** downward and press the switch to position **A**.
   ➥ Symbol **F/5** disappears from the digital display.
2. Unlock the attachment. Press and hold the touch button **50** to do so.
3. Press the rocker switch **82** on the joystick to the right **B** at the same time until the lock pins fully come out of the center bores of the attachment.
4. Release switch **82** on the joystick.
5. Release push button **50**.

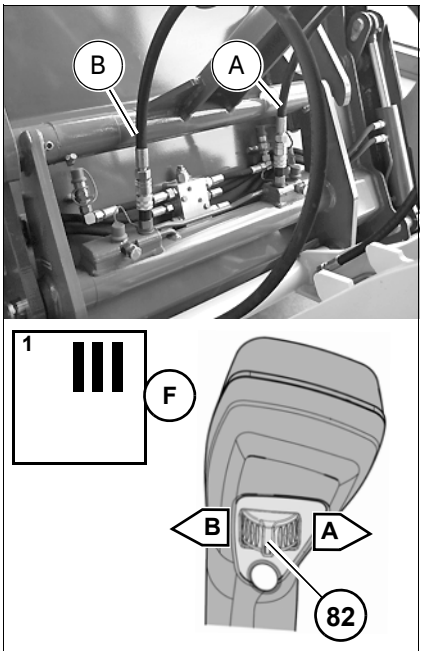


Fig. 144

Putting a hydraulic attachment into operation

A hydraulic attachment (for example a multipurpose bucket) can be operated with the 3rd control circuit.

To do this, the hose pipes **A** + **B** are connected between the attachment and the quickhitch facility.

Operation is performed with the rocker switch **82** on the joystick.

WARNING

Connecting the flexible lines incorrectly results in incorrect operation and/or uncontrolled movements of the attachment!

Failure to observe this can cause serious injury or death.

- ► Ensure that the flexible lines of the attachment are correctly connected to the machine.
- ► Follow the instructions in the Operator's Manual of the attachment manufacturer.
- ► Check the response direction of the control elements before using the attachment.

1. Pick up the attachment and safely lock it
   – see "Pick up the attachment" on page 5-58,
   – see "Locking the attachment" on page 5-41.
2. Release the pressure at the plug couplings
   – see "Releasing the pressure at the plug couplings" on page 5-66.
3. Connect the hydraulic connection to the 3rd control circuit
   – see "Connecting hydraulic lines to the 3rd control circuit" on page 5-69.

Operating an attachment	Function
Slide switch **82** to the left **A** (as seen in the travel direction).	➥ Symbol **F/1** appears in the digital display. ➥ Pressure is applied to plug coupling **B** on the left. ➥ The attachment is actuated proportionally (multipurpose bucket is opened, for example).
Slide switch **82** to the right **B** (as seen in the travel direction).	➥ Symbol **F/1** appears in the digital display. ➥ Pressure is applied to plug coupling **A** on the right. ➥ The attachment is actuated proportionally, e.g. power grab bucket is closed).

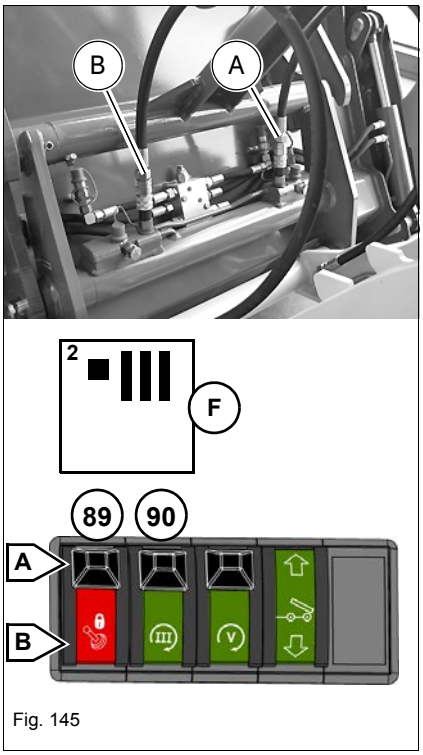


Fig. 145

Putting an attachment into continuous operation

Continuous operation is used for movements/procedures over a long period of time or operation of hydraulic motors (for example a rotary broom) or for operation of attachments with an integrated control valve adjusted to maximum oil flow, with an unpressurized return.

1. Pick up the attachment and safely lock it
   – *see "Pick up the attachment" on page 5-58*,
   – *see "Locking the attachment" on page 5-41*.
2. Lower the loader unit and apply the parking brake.
3. Stop the engine, but do **not** switch off ignition.
4. Release the pressure at the plug couplings
   – *see "Releasing the pressure at the plug couplings" on page 5-66*.
5. Switch off the starter and remove the starting key.
6. Connect hose pipes **A** and **B** between the attachment and the quickhitch facility.
7. Start the diesel engine.

Switching on continuous operation	
1. Disable the lock for the work hydraulics/road travel. To do this: slide the lock in toggle switch **89** downward and press the toggle switch to position **A**.	➥ Symbol **F/2** appears in the digital display. ➥ Continuous operation is enabled.
2. Slide the lock in switch **90** downward and press the switch to position **B**.	➥ Oil pressure builds.

Information

Restart lock in continuous operation!

Continuous operation is automatically disabled for safety reasons when the diesel engine is restarted!

When restarting the vehicle, the continuous operation must be reactivated!

Information

In order to avoid loss of output, switch off continuous operation if it is no longer required.

Additional front/rear control circuit (option)

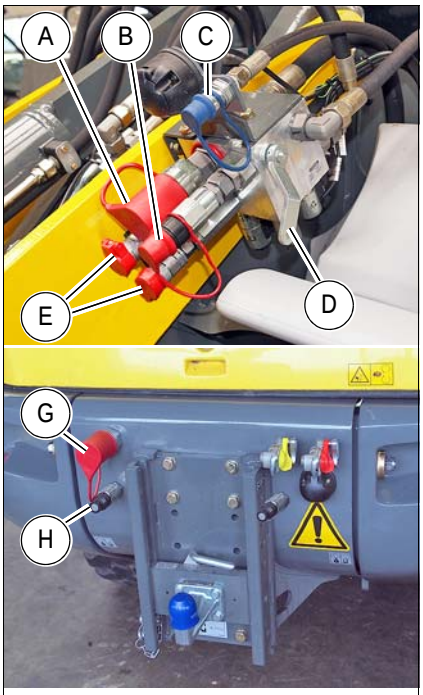


Fig. 146

The front additional control circuits 38 l/min (10 gal/min) or 115 l/min (30.4 gal/min) are provided for the operation of hydraulic attachments, for example a sweeper or snow blower with additional “Swiveling ejection” function.

The rear additional control circuit 38 l/min (10 gal/min) is for hydraulic attachments, for example salt spreaders or tipping trailers.

The front or rear additional control circuits are selected with changeover tap **D**. Simultaneous operation is not possible.

Hydraulic connections on front distributing block (loader unit) and at rear of machine.	
A	Front plug coupling (return without pressure)
B	Front plug coupling (pressure)
C	Plug coupling (leak oil line)
D	Changeover tap for connections **B** (front) or **H** (rear)
E	Front plug coupling (for additional functions)
G	Rear plug coupling (return without pressure)
H	Rear plug coupling (single-action pressure)

Important information on the front/rear additional control circuits

WARNING

Connecting the flexible lines incorrectly results in incorrect operation and/or uncontrolled movements of the attachment!

Failure to observe this can cause serious injury or death.

- ► Ensure that the hose pipes are connected correctly.
- ► Follow the instructions in the Operator's Manual of the attachment manufacturer.
- ► Check the response direction of the control elements before using the attachment.

NOTICE

In order to avoid leaks on the plug couplings and dirt in the hydraulic oil:

- ► carefully clean the plug couplings and flexible lines before connecting them.

NOTICE

Damage hazard to the machine and/or the attachment!

- ► Check the flow rate of the attachment before putting it into operation.
- ► Refer to the Operator's Manual of the attachment.
- ► When removing the attachment, always ensure that all hydraulic lines are disconnected.

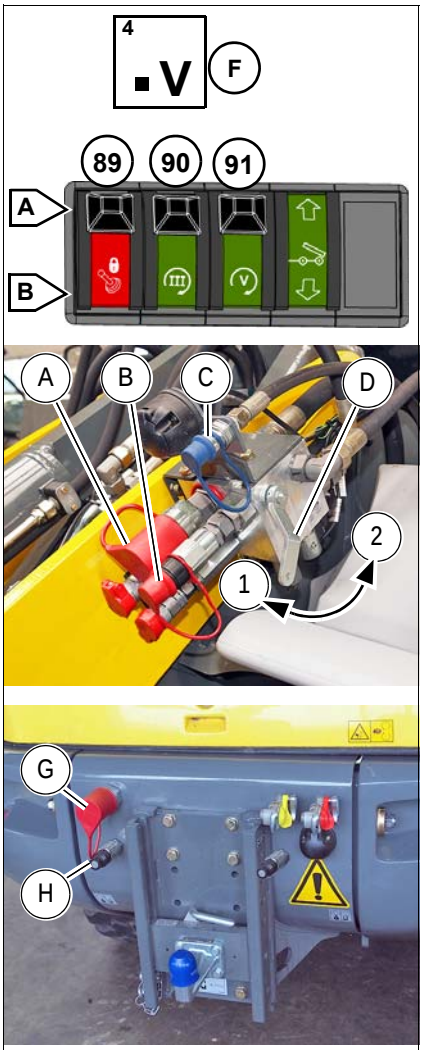


Fig. 147

Putting the front/rear additional control circuit into permanent operation

Before connecting the flexible line to the machine:

- Pick up the attachment and safely lock it
  – see "Pick up the attachment" on page 5-58,
  – see "Locking the attachment" on page 5-41.
- Lower the loader unit and apply the parking brake.
- Stop the engine, but do **not** switch off ignition.
- Release the pressure at the plug couplings
  – see "Releasing the pressure at the plug couplings" on page 5-66.
- Switch off the starter and remove the starting key.

Additional front/rear control circuits (38 l/min – 10.04 gal/min)	
1. Connect the hose pipes of the attachment to the coupling connections **A + B at the front** or **G + H at the rear**. 2. Turn changeover tap **D** to position **1 (front)** or **2 (rear)**. 3. Slide the lock in switch **89** downward and press the switch to position **A**. 4. Slide the lock in switch **91** downward and press the switch to position **B**.	➥ Control display **F/4** appears. ➥ Pressure is applied to coupling connections **B (front)** or **H (rear)**. ➥ No pressure is applied to coupling connections **A (front)** or **G (rear)**.
Additional front control circuit (115 l/min – 30.38 gal/min)	
1. Connect the hose pipes of the attachment to coupling connections **A + B (front)** on the distributing block. 2. Turn changeover tap **D** to position **1 (front)**. 3. Slide the lock in switch **89** downward and press the switch to position **A**. 4. Slide the lock in switch **90** downward and press the switch to position **B**. 5. Slide the lock in switch **91** downward and press the switch to position **B**.	➥ Control display **F/4** appears. ➥ Pressure is applied to coupling connection **B (front)** . ➥ Coupling connection **A** for return.

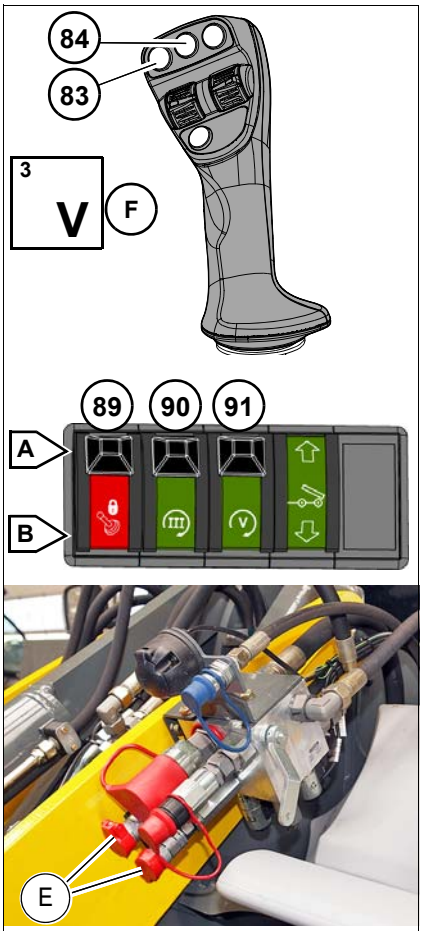


Fig. 148

Additional functions for the auxiliary control circuit in front during tipping operation

Additional functions of additional front control circuit (115 l/min – 30.38 gal/min)	
1. Connect the hose pipes of the attachment to the coupling connections **E** and **F**. 2. Slide the lock in switch **89** downward and press the switch to position **A**. 3. Slide the lock in switch **90** downward and press the switch to position **B**. 4. Slide the lock in switch **91** downward and press the switch to position **B**.	➥ Control display **F/3** appears. ➥ The additional control circuit is enabled.
5. Press and hold the touch button **83** or **84** on the joystick.	➥ Pressure is applied to coupling connections **E** depending on push button operation.

Additional control circuit for a tipping trailer (option)

Only tipping trailers with single-action tilt rams can be operated with this option.

Important information on the additional control circuit for tipping trailers

WARNING

Connecting the flexible lines incorrectly results in incorrect operation and/or uncontrolled movements of the attachment!

Failure to observe this can cause serious injury or death.

- ► Ensure that the flexible lines of the attachment are correctly connected to the machine.
- ► Follow the instructions in the Operator's Manual of the attachment manufacturer.
- ► Check the response direction of the control elements before using the attachment.

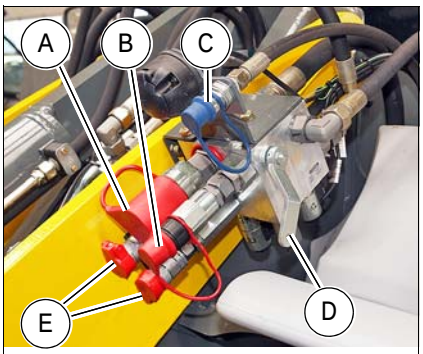


Fig. 149

WARNING

Accident hazard!

No attachments must be connected to the flat connector plugs "Additional front control circuit" **(A, B, C, E)** before putting the tipping trailer into operation!

- ► Uncouple the attachments.
- ► Close the plug couplings with protective caps.

NOTICE

In order to avoid leaks on the flat connector plugs and dirt in the hydraulic oil:

- ► carefully clean the plug couplings and flexible lines before connecting them.

NOTICE

Damage hazard to the machine and/or the attachment!

- ► Check the flow rate of the attachment before putting it into operation.
- ► Observe the operator's manual of the attachment.
- ► When removing the attachment, always ensure that all hydraulic lines are disconnected.

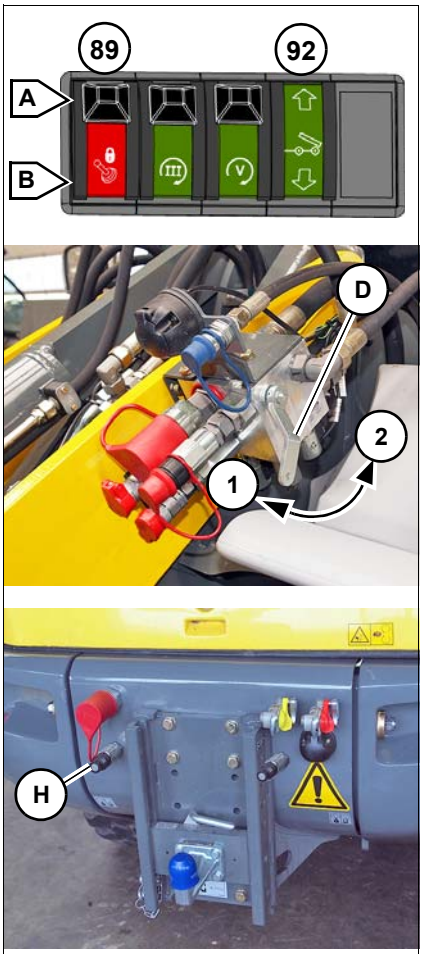


Fig. 150

Putting the additional control circuit for tipping trailers into operation

1. Lower the loader unit and apply the parking brake.
2. Stop the engine, but do **not** switch off ignition.
3. Release the pressure at the plug couplings
   – see "Releasing the pressure at the plug couplings" on page 5-66.
4. Switch off the starter and remove the starting key.
5. Connect the hose pipe of the tipper to coupling connection **H**.
6. Turn changeover tap **D** to position **2 (rear)**.
7. Start the diesel engine.
8. Slide the lock in switch **89** downward and press the switch to position **A**.
   ➥ The additional control circuit for the tipping trailer is activated.
9. Lower the tipping trailer: press push button **92** to position **B**.
10. Raise the tipping trailer: press push button **92** to position **A**.

Putting the additional control circuit for tipping trailers out of operation

1. Stop the engine, but do **not** switch off ignition.
2. Release the pressure at the plug couplings
   – see "Releasing the pressure at the plug couplings" on page 5-66.
3. Switch off the starter and remove the starting key.
4. Connect the hose pipe of the tipper to coupling connection **H**.

Additional control circuit of proportional controls (option)

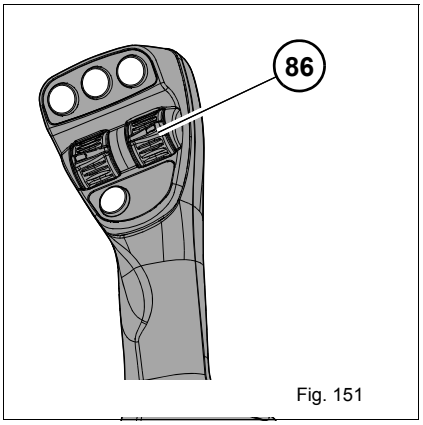


Fig. 151

Plug couplings with hydraulic hoses are installed on the loader unit of the wheel loader for the operation of hydraulic attachments with additional hydraulic functions (for example high-tilt bucket with clamp).

The additional control circuit is operated electronically (proportional controls) by means of scroll wheel **86** on the joystick and a solenoid valve on the controller.

Important information on the additional control circuit (proportional controls)

WARNING

Connecting the flexible lines incorrectly results in incorrect operation and/or uncontrolled movements of the attachment!

Failure to observe this can cause serious injury or death.

- ► Ensure that the hose pipes are connected correctly.
- ► Follow the instructions in the Operator's Manual of the attachment manufacturer.
- ► Check the response direction of the control elements before using the attachment.

NOTICE

In order to avoid leaks on the plug couplings and dirt in the hydraulic oil,

- ► carefully clean the plug couplings and flexible lines before connecting them.

NOTICE

Damage hazard to the machine and/or the attachment!

- ► Check the flow rate of the attachment before putting it into operation.
- ► Flow rate indications and consumer pressure on the plug couplings of the machine *– see chapter 9 "Usable consumer pressure at additional control circuit (option)" on page 9-11*.

Information

Always operate attachments with only one hydraulic circuit on the plug couplings of the 3rd control circuit.

Putting the additional control circuit (proportional controls) into operation

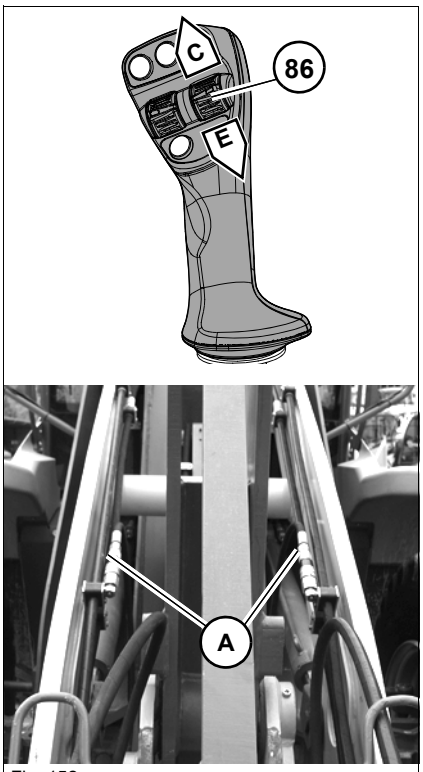


Fig. 152

WARNING

Connecting the flexible lines incorrectly results in incorrect operation and/or uncontrolled movements of the attachment!

Failure to observe this can cause serious injury or death.

- ► Ensure that the flexible lines of the attachment are correctly connected to the machine.
- ► Follow the instructions in the Operator's Manual of the attachment manufacturer.
- ► Check the response direction of the control elements before using the attachment.

1. Lower the loader unit and apply the parking brake.
2. Stop the engine, but do **not** switch off ignition.
3. Release the pressure at the plug couplings. Press and hold the rocker switch **86** in positions **C** and **E** for about 5 seconds each.
   ➥ Pressure in hydraulic lines is released.
4. Switch off the starter and remove the starting key.
5. Remove the flat connector plugs **A** from the dummy sockets and insert them in the flat connector plugs on the attachment.
6. Start the engine.
7. Operate the additional control circuit (proportional controls) with the scroll wheel **86** on the joystick.

Continuous operation of 3rd control circuit for SKID STEER attachments (option)

Continuous operation is used for movements/procedures over a long period of time or operation of hydraulic motors (for example a rotary broom) or for operation of attachments with an integrated control valve adjusted to maximum **oil quantity of 38 l/min (10 gal/min)** with an unpressurized return.

NOTICE

Damage hazard to the machine and/or the attachment!

- ► Check the flow rate of the attachment before putting it into operation.
- ► Flow rate indications and consumer pressure on the plug couplings of the machine – *see chapter 9 "Usable consumer pressure at 3rd control circuit / proportional controls (3rd control circuit)" on page 9-11*.
- ► Also refer to the Operator's Manual of the attachment for the required oil quantities.

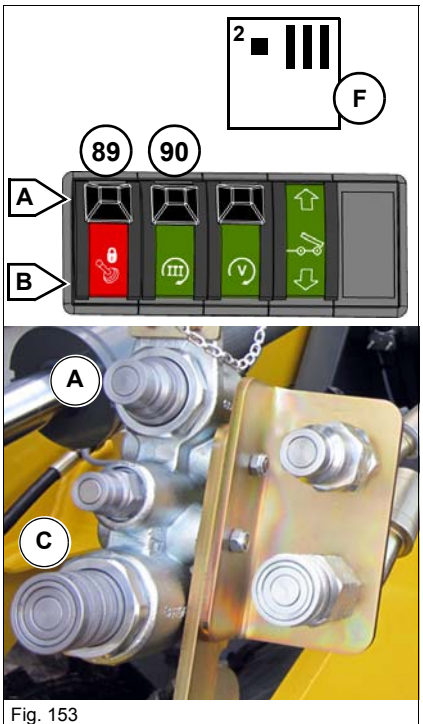


Fig. 153

Putting into continuous operation with an oil volume of 38 l/min (10 gal/min)	
1. Connect the hose pipes of the attachment to the flat connector plugs **A + C** of the distributing block. 2. Slide the lock in switch **89** downward and press the switch to position **A**. 3. Slide the lock in switch **90** downward and press the switch to position **B**.	➥ Control display **F/2** appears. ➥ Pressure is applied to coupling connection **C**. ➥ Coupling connection **A** for return.
Stopping continuous operation	
1. Switch off continuous operation of the 3rd control circuit. To do this, push the toggle switch **90** into position **A** . 2. Disable the 3rd control circuit. To do this, slide the lock in the toggle switch **89** downward and press into position **B** .	➥ Flat connector plugs **A + C** are out of operation.

Information

For safety reasons, the diesel engine cannot be restarted with continuous operation switched on (start interlock).

- ► Before starting the diesel engine, switch off continuous operation of the 3rd control circuit first.

Operation of the additional control circuit – SKID STEER attachments (option)

Using the additional control circuit in continuous operation

The additional control circuit is used for the operation of hydraulic attachments, for example a sweeper or a snow blower with an additional "swiveling ejector" function.

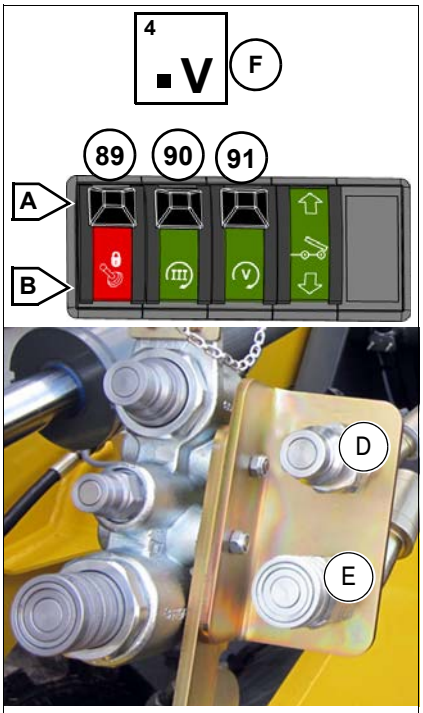


Fig. 154

Putting the additional control circuit (115 l/min or 30.38 gal/min) into continuous operation	
1. Connect the flexible lines of the attachment to the plug couplings **D + E**. 2. Slide the lock in switch **89** downward and press the switch to position **A**. 3. Slide the lock in switch **90** downward and press the switch to position **B**. 4. Slide the lock in switch **91** downward and press the switch to position **B**.	➥ Control display **F/4** appears. ➥ Pressure is applied to coupling connection **E**. ➥ Coupling connection **D** for return.
Putting the additional control circuit out of operation	
1. Press the toggle switch **91** into position **A**. 2. Press the toggle switch **90** into position **A**. 3. Disable the 3rd control circuit. To do this, slide the toggle switch **89** downward and press into position **A**	➥ Flat connector plugs **D + E** are out of operation.

Information

For safety reasons, the diesel engine cannot be started again (after it has been stopped) if continuous operation is switched on (start interlock)!

► Before restarting the diesel engine, switch off continuous operation of the auxiliary control circuit.

Information

Operation of auxiliary functions, for example electro-hydraulic control valves in the attachments, is possible with the front plug receptacle *– see "7-pole front socket (option)" on page 5-54*.

7-pole front socket (option)

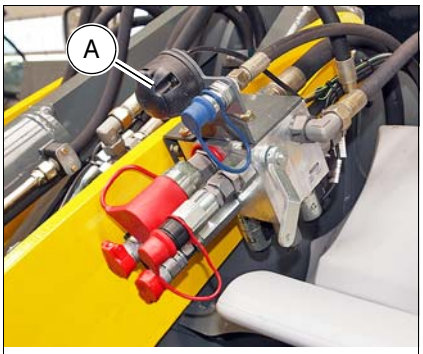


Fig. 155

Important information about putting the machine into operation

The machine is equipped with an optional 7-pole socket **A** (at the front left on the loader unit) for electrical attachments.

The front socket option is available in two variants:

- With one electrical circuit if the machine is equipped with the “Bucket repositioning” option.
- With two electrical circuits if the “Bucket repositioning” option is not installed.

NOTICE

In order to avoid faulty operation and/or damage to the attachment, before taking the attachment into service, the assignment of the individual circuits in the electric plug connection of the attachment must be checked for the assignment and operation of the 7-pole plug receptacle.

► Have troubleshooting only performed by an authorized service center.

► The assignment of the circuits (pin) in the 7-pole plug receptacle is listed in the wiring diagram (see system manual of the vehicle).

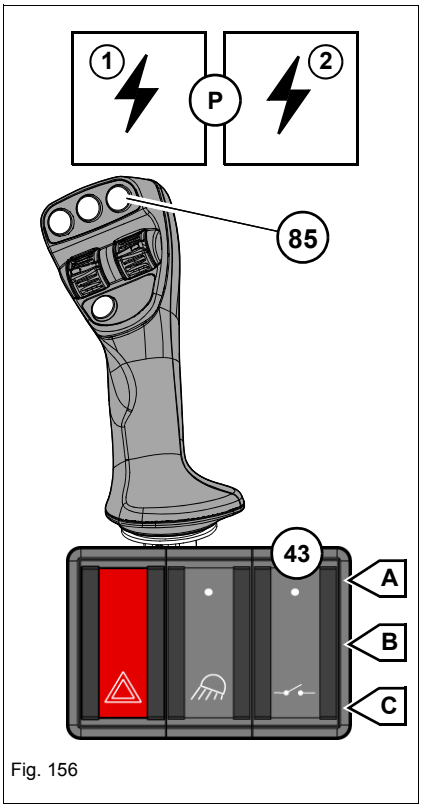


Fig. 156

Operation of the 7-pole plug receptacle

The power supply can be set to push-button or continuous operation, or switched off, with the toggle switch **43** in the switch console.

Changeover between both electrical circuits is possible with the touch button **85** on the joystick (for electrical attachments with two different electrical functions).

Operation		Function
Push-button operation	Press switch **43** to position **B**.	➥ Symbol **P/2** appears in the digital display. ➥ Electrical circuit 2 is enabled.
	Press and hold the touch button **85** .	➥ Symbol **P/1** appears in the digital display. ➥ Electrical circuit 1 is enabled.
OFF	Press switch **43** to position **A**.	➥ The power supply is switched off.
Operation		**Function**
Continuous operation	Press switch **43** to position **C**.	➥ Symbol **P/2** appears in the digital display. ➥ Electrical circuit 2 is enabled.
	Press the touch button **85** to change over to electrical circuit 1 or 2.	➥ Symbols **P/2** or **P/1** appear in the digital display.
OFF	Press switch **43** to position **A**.	➥ The power supply is switched off.

14-pole front socket (option)

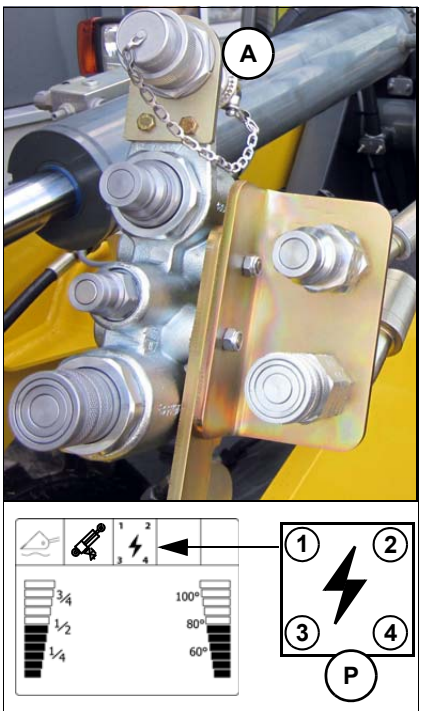


Fig. 157

Important information about putting the machine into operation

Three electrical circuits for activating electro-hydraulic control valves, and an additional electrical circuit for switching electrical functions on or off can be operated with the 14-pole front plug receptacle **A**.

NOTICE

In order to avoid faulty operation and/or damage to the attachment, before taking the attachment into service, the assignment of the individual circuits in the electric plug connection of the attachment must be checked for the assignment and operation of the 7-pole plug receptacle.

- ► Have troubleshooting only performed by an authorized service center.
- ► The assignment of the circuits (pin) in the 14-pole plug receptacle are listed in the wiring diagram (see system manual of the vehicle).

Information

The first 3 electrical circuits can only be operated separately. The circuit is then shown in the digital display through the corresponding symbol **P1, 2 or 3**.
The 4th electrical circuit symbol **P/4** can be operated in addition to the other three electrical circuits.

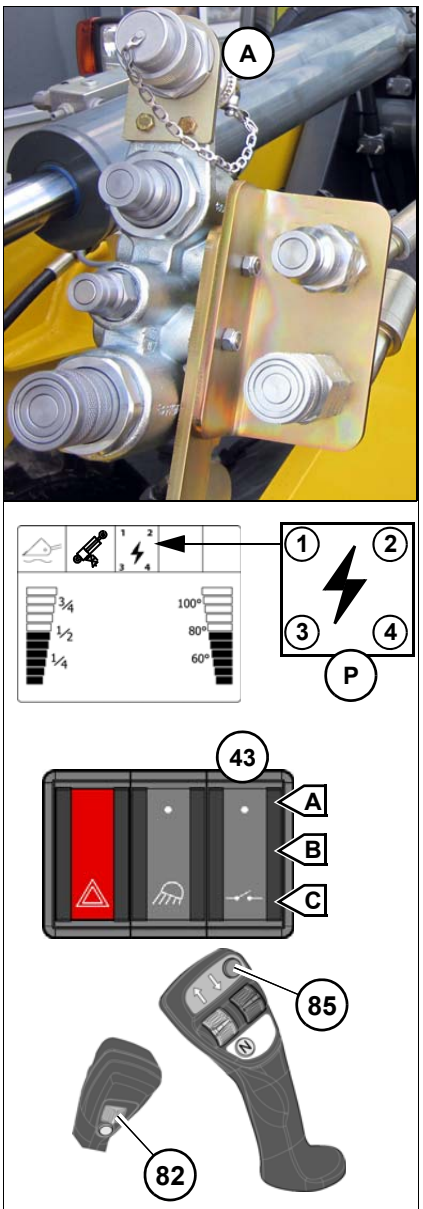


Fig. 158

Operation of the 14-pole plug receptacle (A)

- The selection and activation of the first 3 control circuits **P/1, 2 or 3** occurs via the toggle switch and touch button **43**.
- The selected electrical circuit is operated via the toggle switch **82** on the joystick.
- The operation of the 4th control circuit **P/4** occurs with the touch button **85** on the joystick and can be used in parallel to the other control circuits.

Operation of electrical circuit 1, 2 or 3	**Function**
1. Establish the electric connections to the attachment.	➥ Plug – plug receptacle
2. Put switch **43** in the middle position **B**.	➥ The LED in the switch illuminates. ➥ Operation of the 3rd hydraulic control circuit is disabled.
3. Select electrical circuit. To do so, press the touch button **43** briefly in position **C** until the required electrical circuit is indicated in digital display with the symbol **P/1, 2 or 3**.	➥ The selected electrical circuit is activated.
4. Press and hold switch **82** on the joystick to the left **or** right.	➥ Operation of active electrical circuit (for example for controlling different electro-hydraulic control valves).
Operation of electrical circuit 4	**Function**
5. Press the touch button **85** on the joystick briefly **ON.**	➥ Continuous operation for electrical functions (e.g. electric water pump on sweeper). ➥ Symbol **P/4** lights up in the digital display.
6. Briefly press touch button **85** repeatedly: **OFF.**	➥ Symbol **P/ 4** goes out in the digital display. ➥ Continuous operation for electrical functions is disabled.
Disabling all electrical circuits	**Function**
1. Press push button **43** to position **A**.	➥ All electrical circuits are disabled. ➥ Operation of the 3rd hydraulic control circuit is enabled.

5.10 Attachments

Pick up the attachment

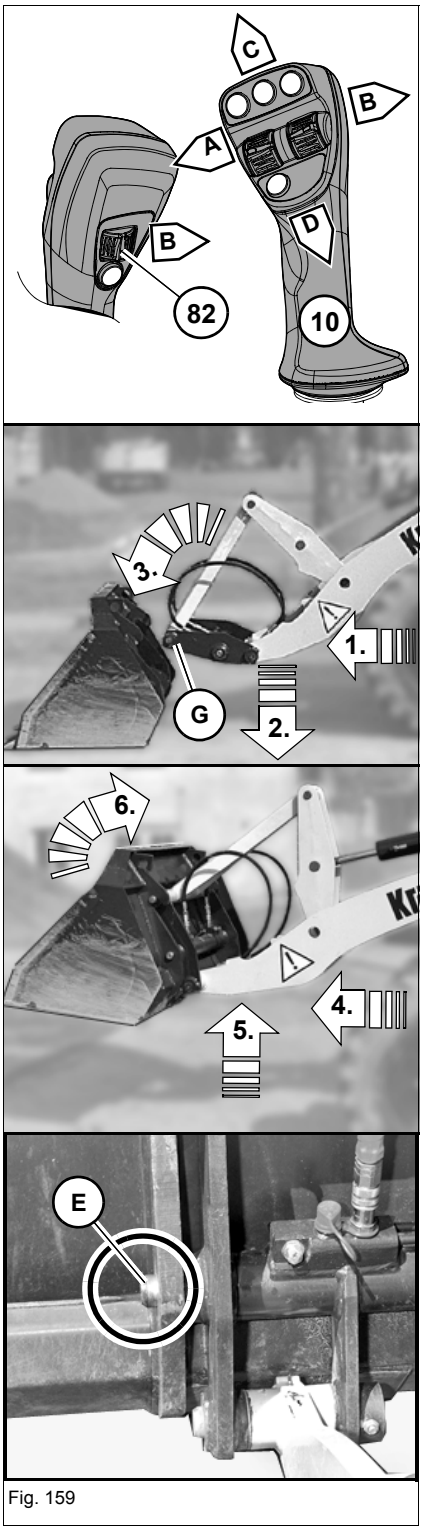


Fig. 159

Fitting an attachment onto a Kramer quickhitch

WARNING

Accident hazard due to incorrect locking of attachment!

Can cause serious injury or death.

- ► Check the lock pins and center bores of the attachment regularly for damage.
- ► Have damaged parts immediately replaced by an authorized service centre.
- ► Only lock and unlock empty attachments without any load.
- ► Ensure that the attachment is visibly locked on either side with lock pins **E**.

1. Approach the machine to the attachment.
2. Lower the loader unit. To do this: push the joystick forward **C.**
3. Tilt the quickhitch facility forward. To do this, press the joystick to the right **B.**
4. Drive the machine forward until the supports **G** of the quickhitch facility are directly beneath the catch hooks of the attachment.
5. s Raise the loader unit until the quickhitch facility engages in the lifting points of the attachment. To do this, pull the joystick downward **D.**
6. Tilt in the quickhitch completely. To do this, press the joystick to the left **A.**
7. Lock the attachment. Press the rocker switch **82** on the joystick to the left *– see “Locking the attachment” on page 5-41*.

Information

The attachment is secured against unintentional unlocking. It can only be unlocked from the quickhitch by means of the two-hand controls *– see “Unlocking an attachment” on page 5-41*.

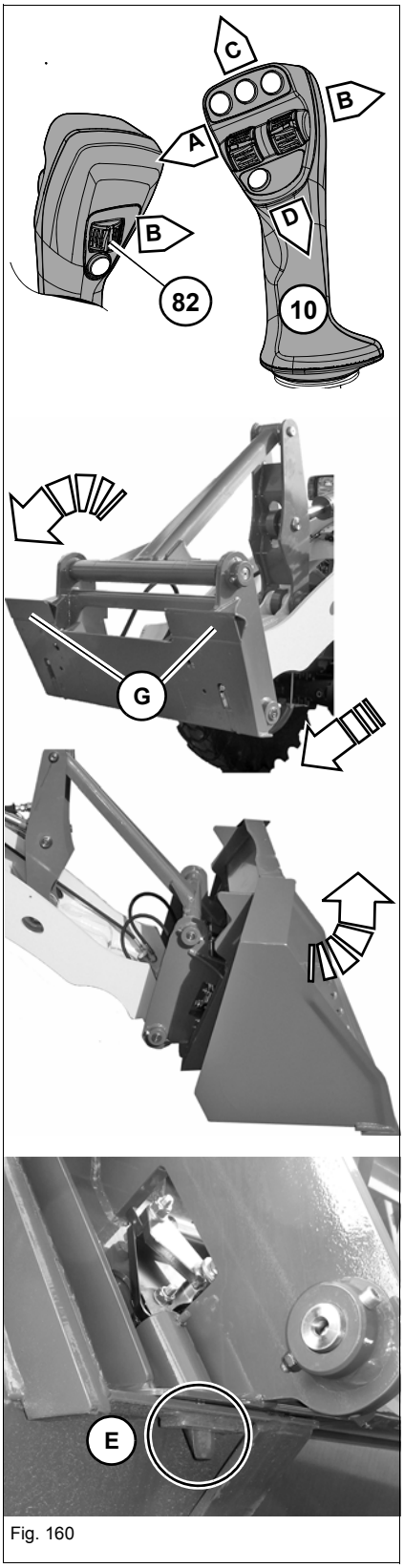


Fig. 160

Fitting an attachment onto a SKID STEER quickhitch

WARNING

Accident hazard due to incorrect locking of attachment!

Can cause serious injury or death.

- ► Check the lock pins and center bores of the attachment regularly for damage.
- ► Have damaged parts immediately replaced by an authorized service centre.
- ► Only lock and unlock empty attachments without any load.
- ► Ensure that the attachment is visibly locked on either side with lock pins **E**.

1. Approach the machine to the attachment.
2. Lower the loader unit. To do this: push the joystick forward **C.**
3. Tilt the quickhitch facility forward. To do this, press the joystick to the right **B.**
4. Drive the machine forward until the supports **G** of the quickhitch facility are directly beneath the catch hooks of the attachment.
5. s Raise the loader unit until the quickhitch facility engages in the lifting points of the attachment. To do this, pull the joystick downward **D.**
6. Tilt in the quickhitch completely. To do this, press the joystick to the left **A.**
7. Lock the attachment. Press the rocker switch **82** on the joystick to the left *– see “Locking the attachment” on page 5-41*.

Information

The attachment is secured against unintentional unlocking.
It can only be unlocked from the quickhitch by means of the two-hand controls *– see “Unlocking an attachment” on page 5-41*.

Fitting an attachment onto a EURO quickhitch facility

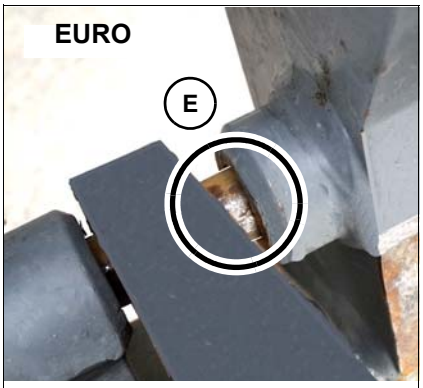


Fig. 161

WARNING

Accident hazard due to incorrect locking of attachment!

Can cause serious injury or death.

- ► Check the lock pins and center bores of the attachment regularly for damage.
- ► Have damaged parts immediately replaced by an authorized service centre.
- ► Only lock and unlock empty attachments without any load.
- ► Ensure that the attachment is visibly locked on either side with lock pins **E**.

Information

The attachment occurs in the same way as with the VOLVO quickhitch facility *– see “Fitting an attachment onto a VOLVO quickhitch facility” on page 5-61*.

Information

The attachment is secured against unintentional unlocking. It can only be unlocked from the quickhitch by means of the two-hand controls *– see “Unlocking an attachment” on page 5-41*.

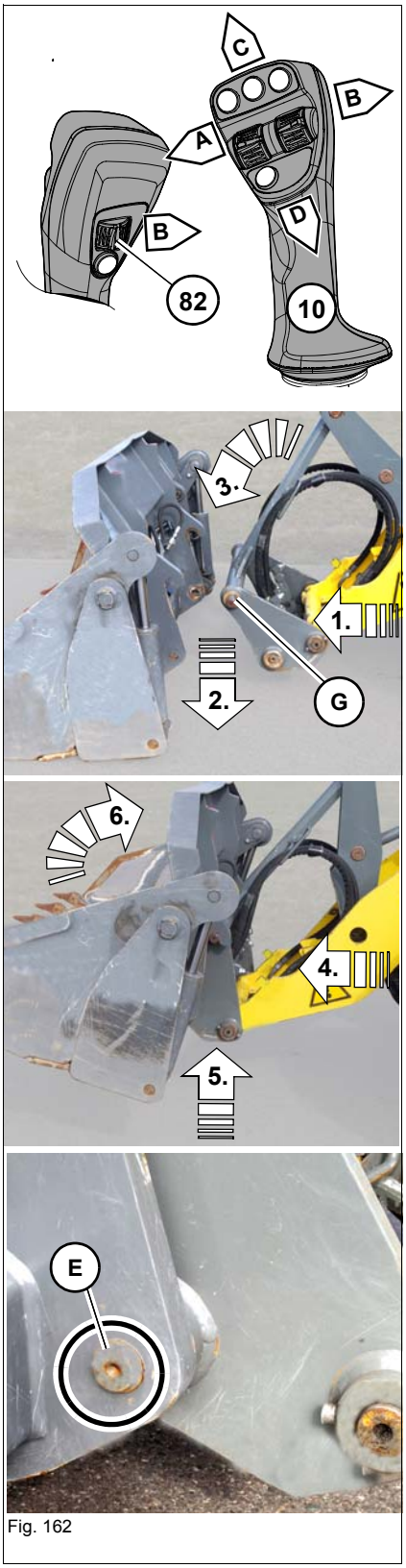


Fig. 162

Fitting an attachment onto a VOLVO quickhitch facility

WARNING

Accident hazard due to incorrect locking of attachment!

Can cause serious injury or death.

- ► Check the lock pins and center bores of the attachment regularly for damage.
- ► Have damaged parts immediately replaced by an authorized service centre.
- ► Only lock and unlock empty attachments without any load.
- ► Ensure that the attachment is visibly locked on either side with lock pins **E**.

1. Approach the machine to the attachment.
2. Lower the loader unit. To do this: push the joystick forward **C.**
3. Tilt the quickhitch facility forward. To do this, press the joystick to the right **B.**
4. Drive the machine forward until the supports **G** of the quickhitch facility are directly beneath the catch hooks of the attachment.
5. s Raise the loader unit until the quickhitch facility engages in the lifting points of the attachment. To do this, pull the joystick downward **D.**
6. Tilt in the quickhitch completely. To do this, press the joystick to the left **A.**
7. Lock the attachment. Press the rocker switch **82** on the joystick to the left *– see “Locking the attachment” on page 5-41*.

Information

The attachment is secured against unintentional unlocking. It can only be unlocked from the quickhitch by means of the two-hand controls *– see “Unlocking an attachment” on page 5-41*.

Lower the attachment

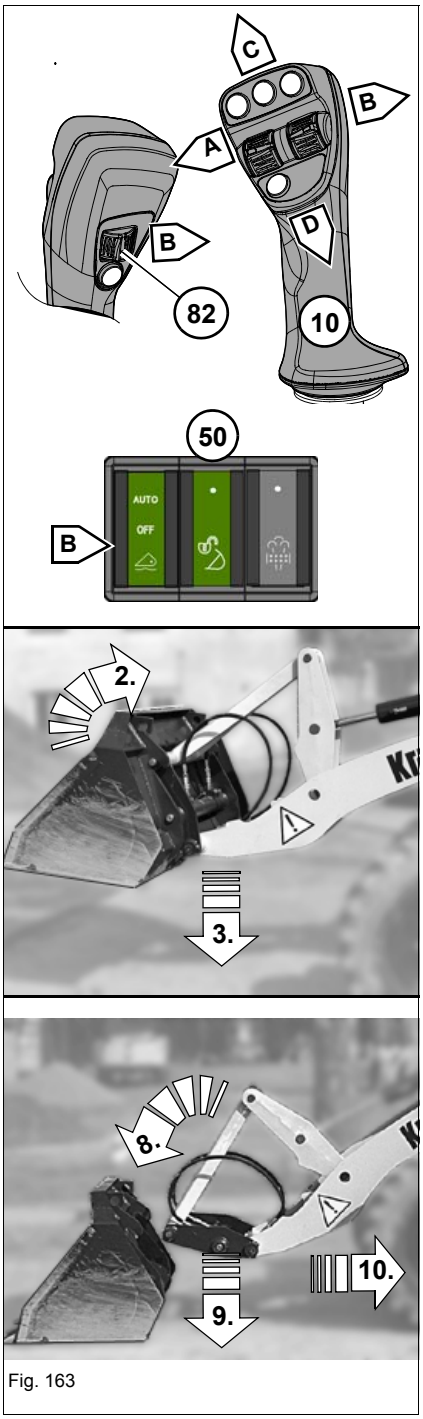


Fig. 163

Removing an attachment from a Kramer quickhitch

The locked attachment is secured against unintentional actuation of switch **82**. It can only be unlocked from the quickhitch by means of the two-hand controls.

WARNING

The attachment can tip over after lowering it to the ground!

Can cause serious injury or death.

► Uncouple all flexible lines from the attachment.

► Lower the attachment on level ground and ensure it cannot tip over.

1. Empty the attachment and drive it to the drop-off position.
2. Set the attachment parallel to the ground. To do this, press the joystick to the left **A.**
3. Lower the loader unit until the attachment is about 5 – 10 cm (2 – 3.9 in) above the ground. To do this, push the joystick forward **C.**

NOTICE

In order to avoid damage to the attachment lock, follow the order of unlocking.

4. Unlock the attachment. To do this, press and hold the touch button **50** in the position **B**.
5. Press the rocker switch **82** on the joystick to the right at the same time until the lock pins fully come out of the center bores of the attachment.
6. Release switch **82** on the joystick.
7. Release push button **50**.
8. Slightly tilt the attachment forward. To do this, press the joystick to the right **B.**
9. Lower the loader unit. To do this: push the joystick forward **C** until the attachment is on the ground without risk of falling over.
10. Reverse the machine away from the attachment.

Information

If the attachment is placed in direct sunlight after having been taken off, the oil in the hydraulic cylinders will warm up. This leads to a pressure increase in the hydraulic cylinders that will make it difficult to attach the hydraulic lines to the hydraulic connections.

► Set down the attachment out of the sun.

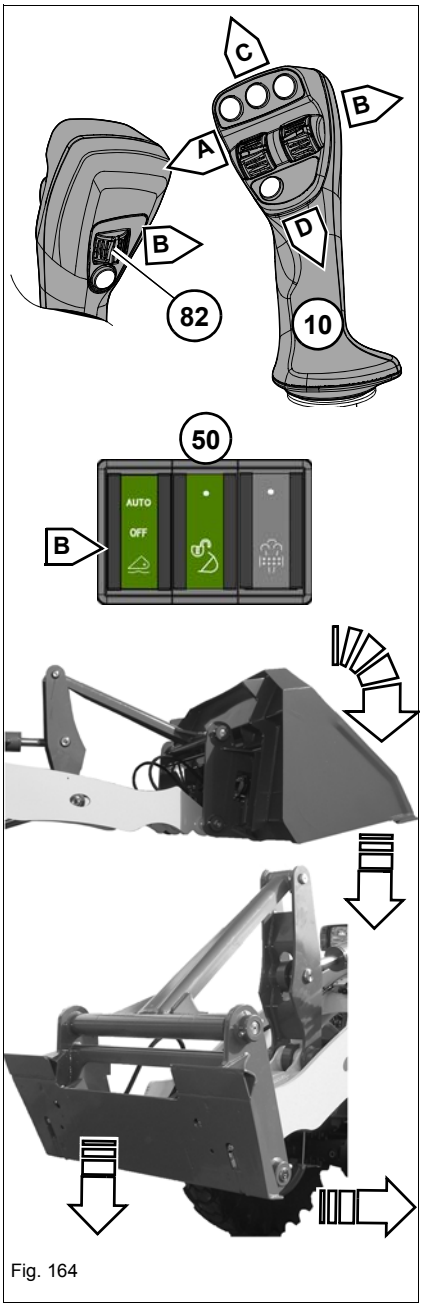


Fig. 164

Removing an attachment from a SKID STEER quickhitch

The locked attachment is secured against unintentional actuation of switch **82**. It can only be unlocked from the quickhitch by means of the two-hand controls.

WARNING

The attachment can tip over after lowering it to the ground!

Can cause serious injury or death.

► Uncouple all flexible lines from the attachment.

► Lower the attachment on level ground and ensure it cannot tip over.

1. Empty the attachment and drive it to the drop-off position.
2. Set the attachment parallel to the ground. To do this, press the joystick to the left **A.**
3. Lower the loader unit until the attachment is about 5 – 10 cm (2 – 3.9 in) above the ground. To do this, push the joystick forward **C.**

NOTICE

In order to avoid damage to the attachment lock, follow the order of unlocking.

4. Unlock the attachment. To do this, press and hold the touch button **50** in the position **B**.
5. Press the rocker switch **82** on the joystick to the right at the same time until the lock pins fully come out of the center bores of the attachment.
6. Release switch **82** on the joystick.
7. Release push button **50**.
8. Slightly tilt the attachment forward. To do this, press the joystick to the right **B.**
9. Lower the loader unit. To do this: push the joystick forward **C** until the attachment is on the ground without risk of falling over.
10. Reverse the machine away from the attachment.

Information

If the attachment is placed in direct sunlight after having been taken off, the oil in the hydraulic cylinders will warm up. This leads to a pressure increase in the hydraulic cylinders that will make it difficult to attach the hydraulic lines to the hydraulic connections.

► Set down the attachment out of the sun.

Removing an attachment from a EURO quickhitch facility

The locked attachment is secured against unintentional actuation of switch **82**. It can only be unlocked from the quickhitch by means of the two-hand controls.

WARNING

The attachment can tip over after lowering it to the ground!

Can cause serious injury or death.

► Uncouple all flexible lines from the attachment.

► Lower the attachment on level ground and ensure it cannot tip over.

Information

The setting down occurs in the same way as with the VOLVO quickhitch facility *– see "Removing an attachment from a VOLVO quickhitch facility" on page 5-65*.

Information

If the attachment is placed in direct sunlight after having been taken off, the oil in the hydraulic cylinders will warm up. This leads to a pressure increase in the hydraulic cylinders that will make it difficult to attach the hydraulic lines to the hydraulic connections.

► Set down the attachment out of the sun.

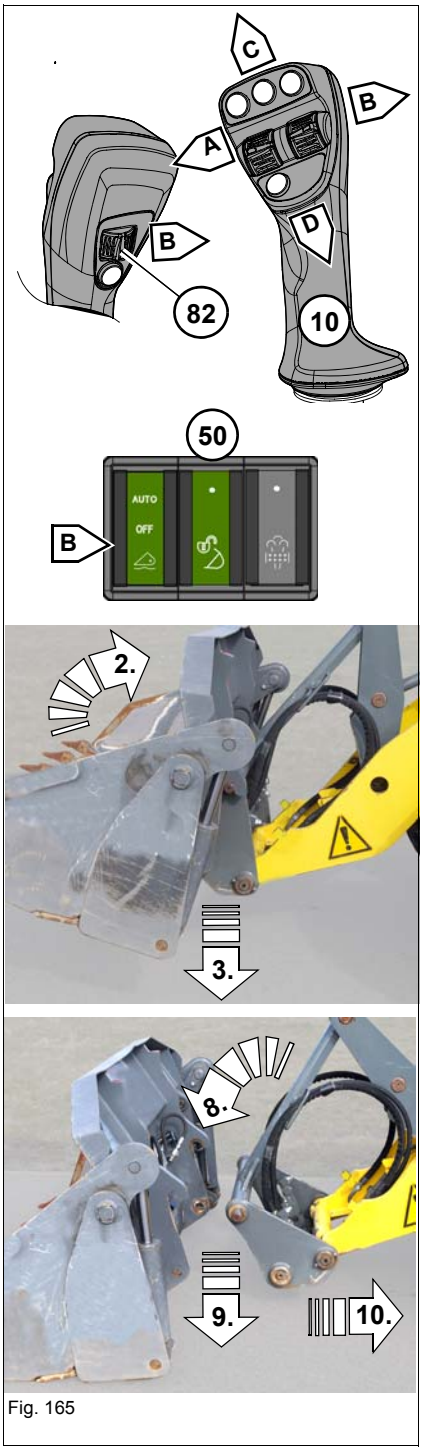


Fig. 165

Removing an attachment from a VOLVO quickhitch facility

The locked attachment is secured against unintentional actuation of switch **82**. It can only be unlocked from the quickhitch by means of the two-hand controls.

WARNING

The attachment can tip over after lowering it to the ground!

Can cause serious injury or death.

► Uncouple all flexible lines from the attachment.

► Lower the attachment on level ground and ensure it cannot tip over.

1. Empty the attachment and drive it to the drop-off position.
2. Set the attachment parallel to the ground. To do this, press the joystick to the left **A.**
3. Lower the loader unit until the attachment is about 5 – 10 cm (2 – 3.9 in) above the ground. To do this, push the joystick forward **C.**

NOTICE

In order to avoid damage to the attachment lock, follow the order of unlocking.

4. Unlock the attachment. To do this, press and hold the touch button **50** in the position **B**.
5. Press the rocker switch **82** on the joystick to the right at the same time until the lock pins fully come out of the center bores of the attachment.
6. Release switch **82** on the joystick.
7. Release push button **50**.
8. Slightly tilt the attachment forward. To do this, press the joystick to the right **B.**
9. Lower the loader unit. To do this: push the joystick forward **C** until the attachment is on the ground without risk of falling over.
10. Reverse the machine away from the attachment.

Information

If the attachment is placed in direct sunlight after having been taken off, the oil in the hydraulic cylinders will warm up. This leads to a pressure increase in the hydraulic cylinders that will make it difficult to attach the hydraulic lines to the hydraulic connections.

► Set down the attachment out of the sun.

Releasing the pressure at the plug couplings

The hydraulic system of the machine is still pressurized even when the engine is not running! The hydraulic plug couplings can be released, however they cannot be re-attached because the pressure in the hydraulic lines has not been released.

Release the pressure in the system sections before installing or removing an attachment! There are two possibilities for this:

- **Standard:** Via the rocker switch **82** on the joystick,
- **Option:** Via the touch button **E** on the inside of the loader unit.

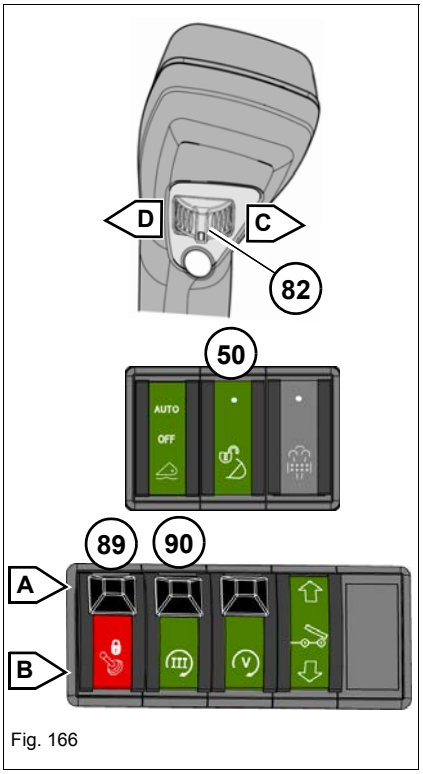


Fig. 166

3rd control circuit – releasing the pressure with the rocker switch on the joystick (standard)

1. Apply the parking brake.
2. If the "work hydraulics" lock for long-haul travel is activated, slide the lock in the toggle switch **89** downward and press the toggle switch into the position **A**.
3. Stop the diesel engine, but do not switch off ignition.
4. Press and hold push button **50**.
5. At the same time, press and hold the rocker switch **82** on the joystick in the position **C** and **D** for about 5 seconds each.
   ➥ Pressure in hydraulic lines is released.
6. The plug couplings can now be changed over
   – see “Hydraulic control circuits/plug couplings (overview)” on page 5-37.

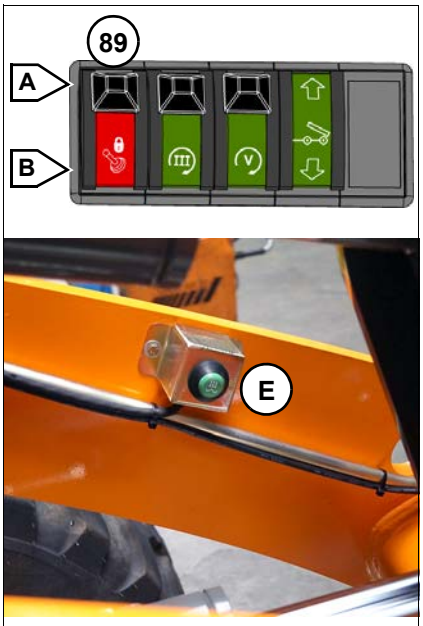


Fig. 167

3rd control circuit – release pressure with touch button E on the loader unit (optional)

With this option, the pressure release of the "3rd control circuit" can occur directly on the quickhitch facility with the touch button **E** left on the inside of the loader unit with the engine running.

1. Lower the loader unit.
2. Apply the parking brake.
3. If the "work hydraulics" lock for long-haul travel is activated, slide the lock in the toggle switch **89** downward and press the toggle switch into the position **A**.
4. Press the touch button **E** and keep it pressed for about 5 seconds.
   ➥ The pressure in flexible lines is released.
5. Change over the plug couplings *– see "Hydraulic control circuits/plug couplings (overview)" on page 5-37*.

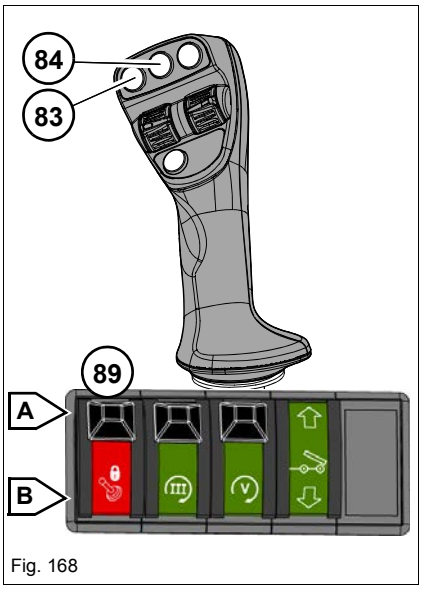


Fig. 168

Additional function of additional control circuit – releasing the pressure

1. Apply the parking brake.
2. If the "work hydraulics" lock for long-haul travel is activated, slide the lock in the toggle switch **89** downward and press the toggle switch into the position **A**.
3. Stop the diesel engine, but do not switch off ignition.
4. Press and hold push buttons **83** and **84** for about 5 seconds.
   ➥ Pressure in hydraulic lines is released.
5. Change over the plug couplings *– see "Additional front/rear control circuit (option)" on page 5-44*.

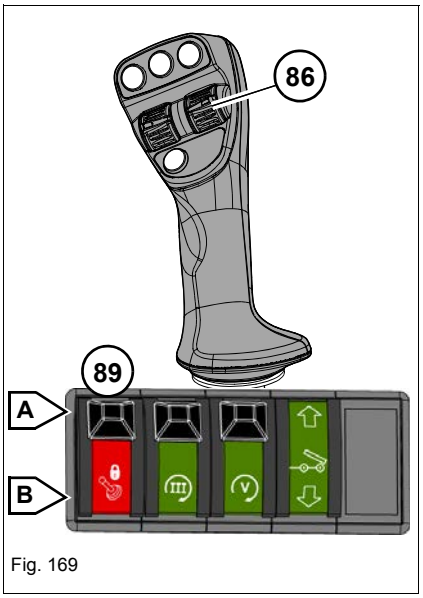


Fig. 169

Releasing the pressure in the additional control circuit (proportional controls)

1. Apply the parking brake.
2. If the "work hydraulics" lock for long-haul travel is activated, slide the lock in the toggle switch **89** downward and press the toggle switch into the position **A**.
3. Stop the diesel engine, but do not switch off ignition.
4. Press and hold the rocker switch **86** on the joystick to the front and rear for about 5 seconds in either position.
   ➥ Pressure in hydraulic lines is released.
5. Change over the plug couplings
   – see “Additional control circuit of proportional controls (option)” on page 5-50.

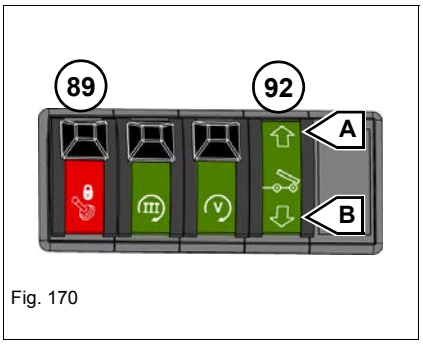


Fig. 170

Tipping trailer – releasing the pressure

1. Apply the parking brake.
2. If the "work hydraulics" lock for long-haul travel is activated, slide the lock in the toggle switch **89** downward and press the toggle switch into the position **A**.
3. Stop the diesel engine, but do not switch off ignition.
4. Press and hold the touch button **92** in position **A** and **B** for about 5 seconds each.
   ➥ Pressure in hydraulic lines is released.
5. Change over the plug couplings *– see “Additional control circuit for a tipping trailer (option)” on page 5-48*.

Connecting hydraulic lines to the 3rd control circuit

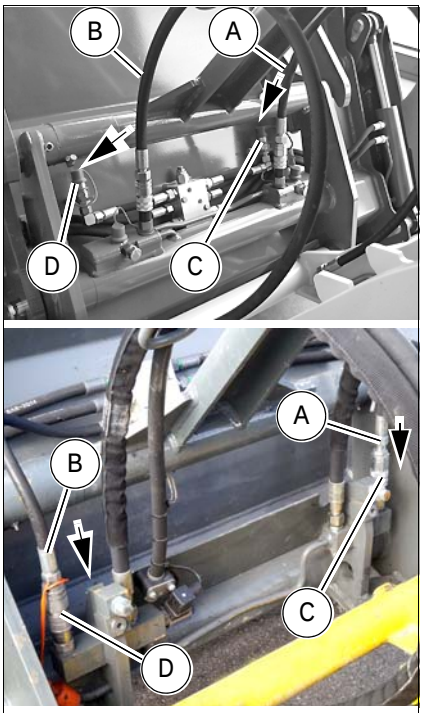


Fig. 171

A hydraulic attachment (for example a multipurpose bucket) can be operated with the 3rd control circuit. For this purpose, the hose pipes **A** + **B** are connected to the flat connector plugs.

WARNING

Connecting the flexible lines incorrectly results in incorrect operation and/or uncontrolled movements of the attachment!

Failure to observe this can cause serious injury or death.

- ► Ensure that the hose pipes are connected correctly (**NICHT** crosswise).
- ► Follow the instructions in the Operator's Manual of the attachment manufacturer!
- ► Check the response direction of the control elements before using the attachment.

1. Pick up the attachment and safely lock it
   – see "Pick up the attachment" on page 5-58,
   – see "Locking the attachment" on page 5-41.
2. Lower the loader unit.
3. Apply the parking brake.
4. Stop the engine, but do **not** switch off ignition.
5. Release the pressure in the hydraulic lines
   – see "Releasing the pressure at the plug couplings" on page 5-66.
6. Switch off the starter and remove the starting key.
7. Remove screwed nose caps.
8. Clean the flat connector plugs **C** and **D** on the attachment (Kramer) or on the quickhitch facility.
9. Remove hose pipes **A** and **B** from the flat connector plugs on the quickhitch facility (Kramer) or the attachment and connect to the flat connector plugs **C** and **D**.
   - ➥ Flexible line **A** to plug coupling **C**
   - ➥ Flexible line **B** to plug coupling **D**
10. Start the diesel engine.
11. Check the attachment for correct operation
    – see "Putting a hydraulic attachment into operation" on page 5-42.

Removing hydraulic lines from the 3rd control circuit

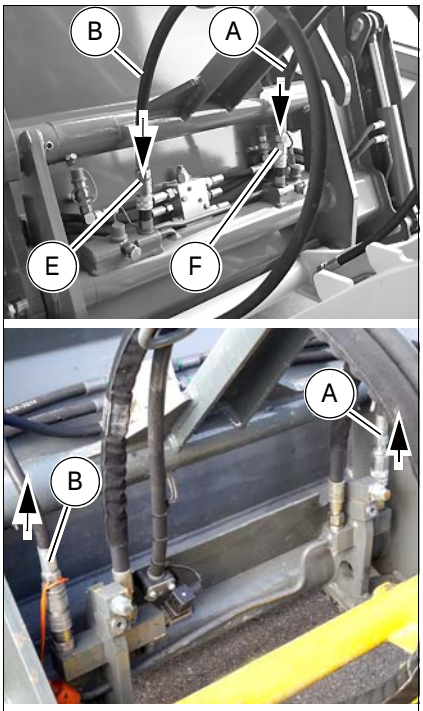


Fig. 172

WARNING

The attachment can tip over after lowering it to the ground!

Can cause serious injury or death.

► Uncouple all flexible lines from the attachment.

► Lower the attachment to the ground and ensure it cannot tip over.

1. Empty and tilt in the attachment completely.
2. Stop the engine, but do **not** switch off ignition.
3. Apply the parking brake.
4. Release the pressure in the hydraulic lines of the 3rd control circuit *– see "Releasing the pressure at the plug couplings" on page 5-66*.
5. Clean the flat connector plugs **E** and **F** on the quickhitch facility (Kramer) or on the attachment.
6. Remove the hose pipes **A** and **B** from the flat connector plugs on the attachment (Kramer) or on the quickhitch facility and connect to the open flat connector plugs.
   ➥ Flexible line **A** to plug coupling **F**
   ➥ Flexible line **B** to plug coupling **E**
7. Close the open flat connector plugs with the attached screwed nose caps.
8. Start the engine and lower the attachment to the ground *– see "Lower the attachment" on page 5-62*.

Standard bucket

Field of application of standard bucket

- The standard bucket is mainly used for digging earth, and for loosening, picking up, transporting and loading loose or solid materials.
- Machine travel on public roads with a full bucket is prohibited in Germany
  – *see "Instructions for machine travel on public roads" on page 4-52*,
  – *see "Preparing machine travel on public roads" on page 4-53*.
- Observe and follow the legal regulations of your country.
- In addition, observe the applicable national regulations relevant to accident prevention, for example the UVV regulations for accident prevention of the German social insurance against occupational accidents.

WARNING

Danger of accident due to installing lifting gear on the attachment without proper authorization!

Can cause serious injury or death.

► The attachment is not certified for lifting gear applications.

► Hitching hooks, eyelets or other lifting gear onto the attachment is prohibited as well.

Information

The load diagram (on the left on the front window) is valid only for applications with the released pallet forks and corresponding tyre size and pressure.

The load diagram also applies to attachments released by Kramer if the specified capacities and material densities are observed
– *see chapter 3 "Use of attachments on the machine" on page 3-11*

Pay attention to the specific load diagrams of other attachments used
– *see "Fitting attachments from other manufacturers (option)" on page 5-99*!

Information

Installing and removing the attachment is described in the following sections:

– *see "Pick up the attachment" on page 5-58*,

– *see "Lower the attachment" on page 5-62*.

Work operation with attachment – *see "Work operation" on page 5-74*.

Multipurpose bucket

Field of application of multipurpose bucket

- The multipurpose bucket is mainly used for digging earth, and for loosening, picking up, transporting, loading and pushing loose or solid materials.
- Machine travel on public roads with a full bucket is prohibited in Germany
  – see “Instructions for machine travel on public roads” on page 4-52,
  – see “Preparing machine travel on public roads” on page 4-53.
- Observe and follow the legal regulations of your country.
- In addition, observe the applicable national regulations relevant to accident prevention, for example the UVV regulations for accident prevention of the German social insurance against occupational accidents.

WARNING

Danger of accident due to installing lifting gear on the attachment without proper authorization!

Can cause serious injury or death.

► The attachment is not certified for lifting gear applications.

► Hitching hooks, eyelets or other lifting gear onto the attachment is prohibited as well.

Information

The load diagram (on the left on the front window) is valid only for applications with the released pallet forks and corresponding tyre size and pressure.

The load diagram also applies to attachments released by Kramer if the specified capacities and material densities are observed
– see chapter 3 “Use of attachments on the machine” on page 3-11

Pay attention to the specific load diagrams of other attachments used
– see “Fitting attachments from other manufacturers (option)” on page 5-99!

Information

Installing and removing the attachment is described in the following sections:

– see “Pick up the attachment” on page 5-58,

– see “Lower the attachment” on page 5-62.

Work operation with attachment – see “Work operation” on page 5-74.

Pallet forks

Fields of application of pallet forks

- The pallet forks are mainly used for picking up, transporting and loading palletized material, pallets and other stacked material.
- Pallet forks with fixed fork arms are not certified for machine travel on public roads in Germany.
- Pallet forks with foldable fork arms are authorized for transport on public roads. The fork arms must be raised
  – see "Instructions for machine travel on public roads" on page 4-52,
  – see "Preparing machine travel on public roads" on page 4-53.
- Observe and follow the legal regulations of your country.
- In addition, observe the applicable national regulations relevant to accident prevention, for example the UVV regulations for accident prevention of the German social insurance against occupational accidents.

Information

The load diagram (on the left on the front window) is valid only for applications with the released pallet forks and corresponding tyre size and pressure.

The load diagram also applies to attachments released by Kramer if the specified capacities and material densities are observed
– see chapter 3 "Use of attachments on the machine" on page 3-11

Pay attention to the specific load diagrams of other attachments used
– see "Fitting attachments from other manufacturers (option)" on page 5-99!

Information

Installing and removing the attachment is described in the following sections:

– see "Pick up the attachment" on page 5-58,

– see "Lower the attachment" on page 5-62.

Work operation with attachment *– see "Work operation" on page 5-74*.

5.11 Work operation

Hose burst valve (option)

Important safety instructions

The hose burst valve prevents the loader unit from being lowered or tilted out without being braked, in the event of a bursting hose or pipe!

If a hose bursts, the lift or tilt rams are blocked and cannot be operated.

WARNING

Accident hazard when lowering the loader unit in an emergency!

Can cause serious injury or death!

- ► Secure the danger zone.
- ► Do not try to repair the machine under a raised load.
- ► Perform emergency lowering with extreme care.

In the event of a bursting hose or pipe on the loader unit

1. Stop the machine immediately.
2. Apply the parking brake.
3. Stop the engine and remove the starting key.
4. Secure the danger zone.
5. Perform emergency lowering if this is possible without any danger *– see "Emergency lowering of loader unit in case of diesel engine breakdown" on page 5-104*.
6. Have a burst hose or pipe and the hose burst valve immediately repaired by an authorized service centre.

Environment

Collect the hydraulic oil as it drains with a suitable container (**if this can be done without any danger**) and dispose of it in an environmentally friendly manner.

Machine travel on public roads with a bucket

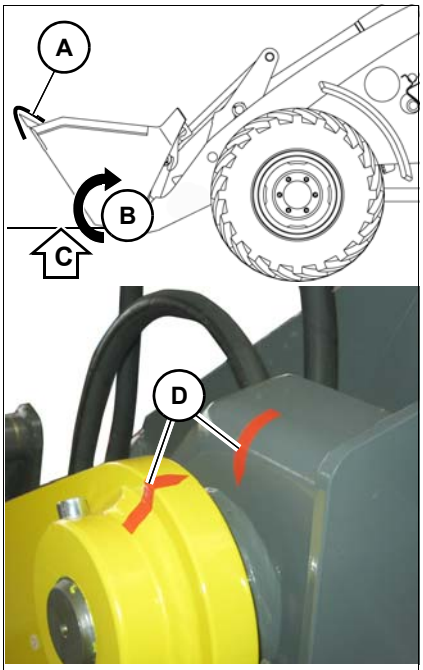


Fig. 173

Information

During machine travel on public roads, equip the machine only with attachments that are certified for this machine
– *see chapter 3 “Use of attachments on the machine” on page 3-11*.

Information

Machine travel on public roads **is prohibited** if the distance between the front edge of the bucket (transport position) and the centre of the steering wheel is over **3500 mm**. The special measures stated in “Merkblätter für Anbaugeräte” (leaflet with specific instructions for attachments) §30 clauses 10/11/12 StVZO (German traffic regulations) must be observed in addition.

Information

Machine travel on public roads with a full standard bucket is prohibited in Germany!
Observe the legal regulations of your country.

Preparing machine travel on public roads (wheel loader 352-03 S)

1. Empty and dump in the bucket **B**.
2. Raise the loader unit until red marks **D** on the lift frame and the bulkhead are aligned.
   ➥ Ground clearance **C** about 250 mm (9.84 in).
3. Lock the steering column in the front position
   – *see “Steering column height and angle adjustment” on page 5-1*.
4. Cover the blade or teeth of the bucket across their entire width with the tooth guard **A** provided.
5. Secure the joystick (loader unit) – *see “Securing the control lever (joystick)/switching off the operating hydraulics” on page 4-54*.

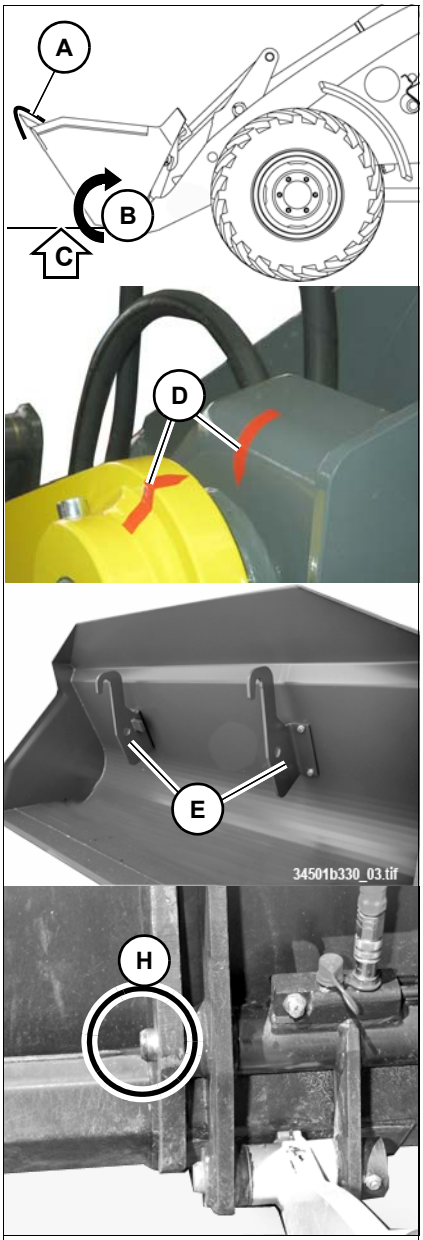


Fig. 174

Preparing machine travel on public roads (wheel loader 352-04 S/L)

1. Empty the bucket, lower it to the ground and remove it from the quickhitch facility
   – see “Lower the attachment” on page 5-62,
   – see “Unlocking an attachment” on page 5-41.
2. Install transport hooks **E** on the inside of the bucket.
3. Pick up and safely lock the bucket on transport hooks **E**
   – see “Pick up the attachment” on page 5-58,
   – see “Locking the attachment” on page 5-41.
4. Ensure that the bucket is visibly locked on either side with lock pins **H**.

NOTICE

Risk of damage to property due to squeezing or jamming the bucket against the front wheels.

---

5. Align the bucket base parallel to the ground, remove the bucket teeth if necessary.
6. Raise the loader unit to transport position.
   ➥ Ground clearance **C** about 250 mm (9.84 in).
7. Secure the joystick *– see “Securing the control lever (joystick)/ switching off the operating hydraulics” on page 4-54*.

Safety instructions regarding work with a standard bucket

WARNING

The machine risks tipping over if sinks or falls into a pit!

Can cause serious injury or death.

- ► Never drive up to the edge of a pit from outside.
- ► Never undermine the foundations of walls.

WARNING

Risk of death due to electric high-voltage cables, underground cables, gas and water pipes!

Can cause serious injury or death.

- ► Get in touch with the energy supplier before starting work.

WARNING

Crushing hazard due to tipping over of machine!

A tipping machine can cause serious injury or death.

- ► Lower the loader unit to transport position before starting machine travel.
- ► Adapt the travel speed to the prevailing conditions.
- ► Pay attention to persons and obstacles.
- ► Always fasten your seat belt.
- ► Ensure that no parts of the body protrude outside the machine.
- ► Carefully steer the machine if the loader unit is raised.
- ► Do not exceed approved payloads (Refer to the load diagram affixed on the front window or on the left on the front trim in the cabin).
- ► Do not exceed the certified values for capacity and material density.
- ► Do not perform any jerky movements with the joystick.

WARNING

Accident hazard if machine is not parked safely!

Can cause serious injury or death.

- ► Before leaving the machine, lower the bucket to the ground, stop the diesel engine, switch off ignition and remove the key.

Transporting with a full bucket

WARNING

Danger of accident due to falling material, and tipping hazard during transportation of loads with a raised loader unit!

Can cause serious injury.

- ► Do not transport loads with a raised loader unit.
- ► Raise a full bucket only at the tilt-out position, and only when the machine is at a standstill.
- ► Lower the loader unit to transport position and tilt in the bucket completely.
- ► Do not perform any U-turns on steep slopes.
- ► Ensure good visibility of the material you want to pick up and of the work and travel range.
- ► Whenever possible, perform machine travel in reverse when transporting material on a steep slope.
- ► In case of bulky loads:
  – Secure the load
  – Fit a protection to the rear of the bucket
  – Install a protective screen (option) on the cabin
  – Use attachments with hydraulic grabs (option)

Information

Machine travel on public roads with a full bucket is prohibited in Germany!

Observe the legal regulations of your country.

Working with the standard bucket

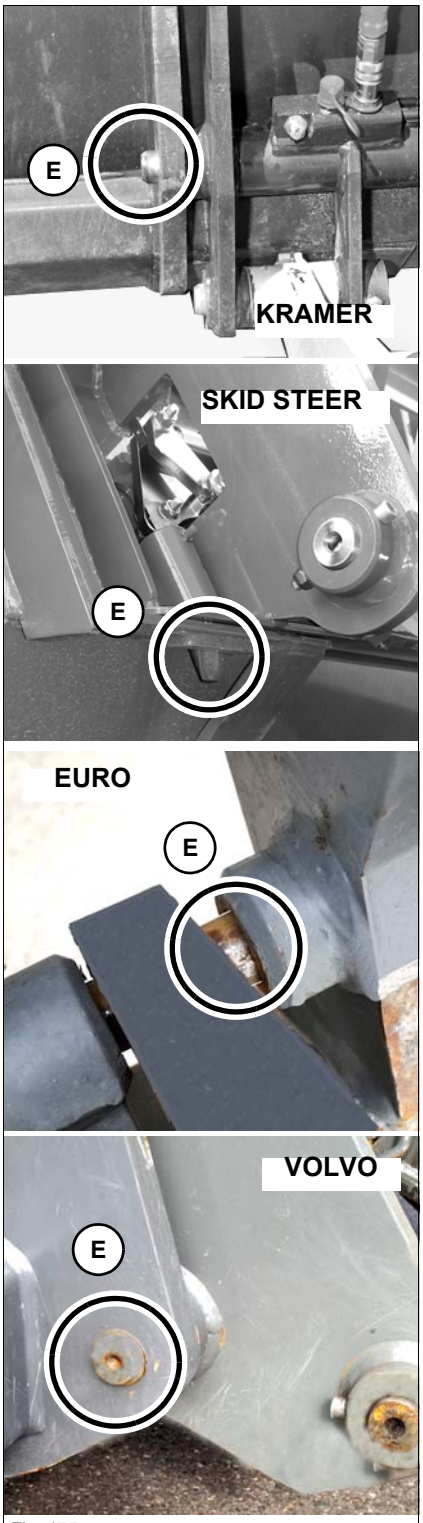


Fig. 175

WARNING

Accident hazard due to unlocked attachment!

The attachment can come off unexpectedly and cause serious injury or death.

► Ensure that the attachment is visibly locked on either side with lock pins **E**.

Information

Observe the safety instructions before working with the machine, and take appropriate action if necessary – *see chapter 2 “Attachment operation” on page 2-11*.

Observe the certified values for capacity and material density for the released attachments – *see “Use of attachments on the machine” on page 3-11*.

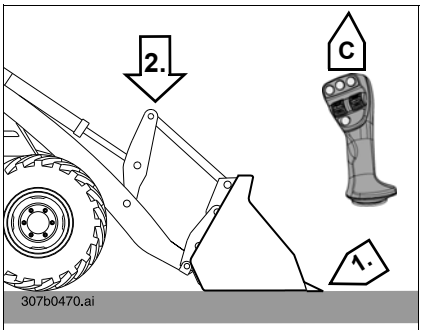


Fig. 176

Loading loose material

1. Align the blade parallel with the ground.
2. Lower the loader unit to the ground. To do this, push the joystick forward **C**.

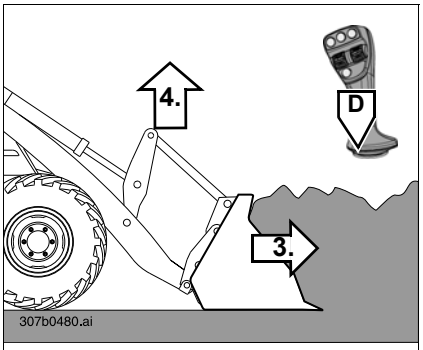


Fig. 177

3. Travel forward into the material.

When the diesel engine speed is reduced due to too much material:

4. Raise the loader unit a little. To do this, pull the joystick backward **D**.

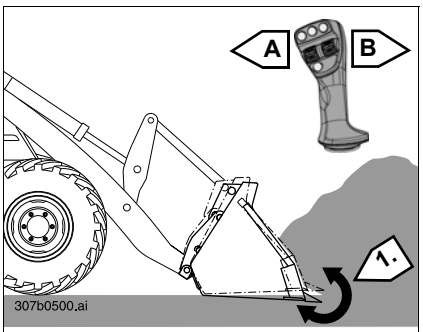


Fig. 178

Loading if the material is hard to penetrate

Load as for loading loose material, but in addition:

1. Slightly tilt the bucket in and out. To do this, move the joystick to the left **A** and right **B**.

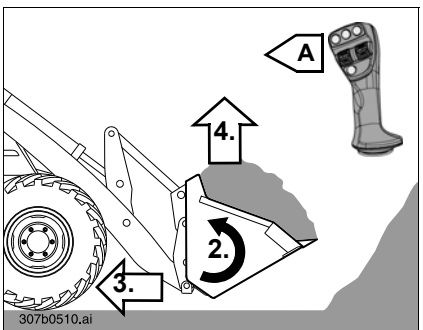


Fig. 179

When the bucket is full:

2. Tilt in the bucket. To do this, press the joystick to the left **A**.
3. Reverse out of the material.
4. Raise the bucket to transport position.

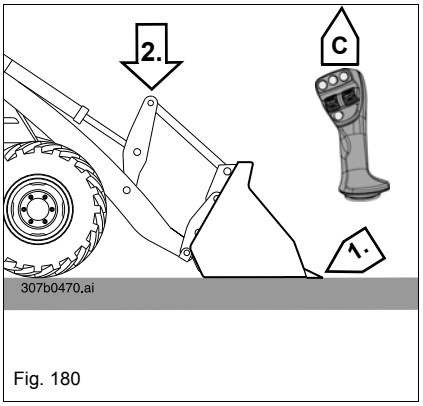


Fig. 180

Removing material/digging in soft soil

1. Align the blade parallel with the ground.
2. Lower the loader unit to the ground. To do this, push the joystick forward **C**.

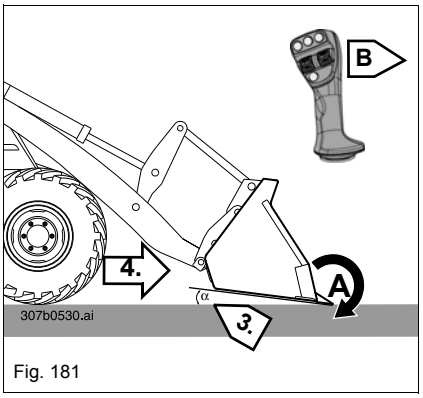


Fig. 181

3. Setting the digging angle. To do this, press the joystick to the right **B**.
4. Travel forward.

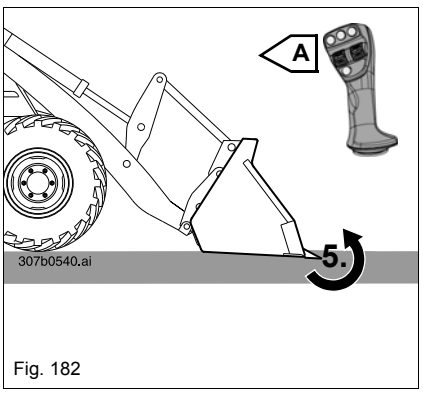


Fig. 182

Once the bucket has penetrated the soil:

5. Set the digging angle slightly flatter. To do this, push the joystick to the left **A** so that the layer being removed is as even as possible and so that the wheel spin is reduced.
6. Proceed as for loading loose material.

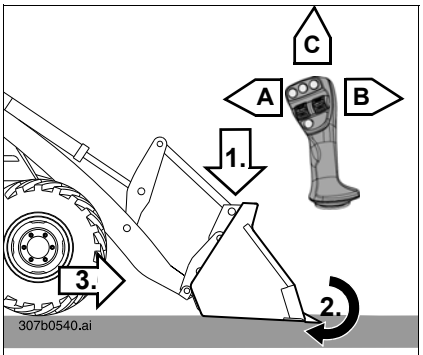


Fig. 183

Removing material/digging in hard soil

1. Place the bucket horizontally on the ground. To do this, push the joystick forward **C**.
2. Set a slightly flatter digging angle than for digging in soft soil. To do this, press the joystick to the left **A**.
3. Drive forward and push the bucket down slightly. To do this, push the joystick forward slightly **C**.

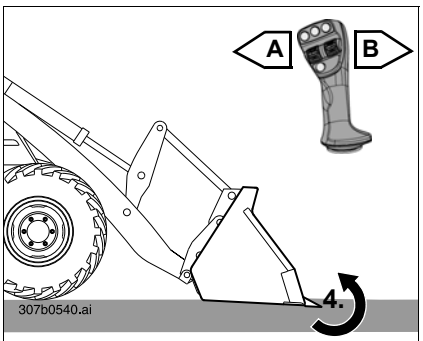


Fig. 184

Once the bucket has penetrated the soil:

4. Set the digging angle slightly flatter. To do this, push the joystick to the left **A** so that the layer being removed is as even as possible and so that the wheel spin is reduced.
5. Move the joystick to the left **A** and right **B** to loosen the material.
6. Proceed as for loading material hard to penetrate.

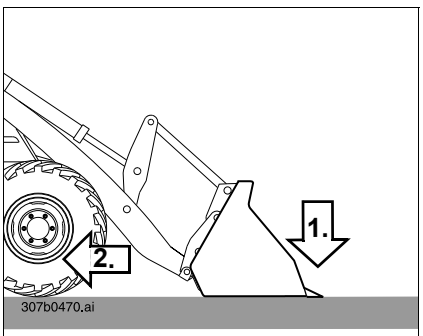


Fig. 185

Grading

1. Lower the loader unit horizontally to the ground.
2. Reverse across the surface to be graded.

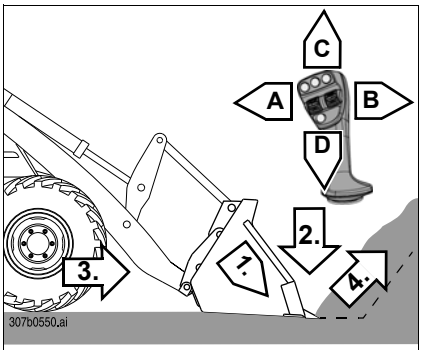


Fig. 186

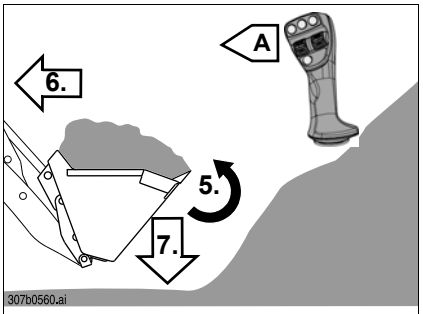


Fig. 187

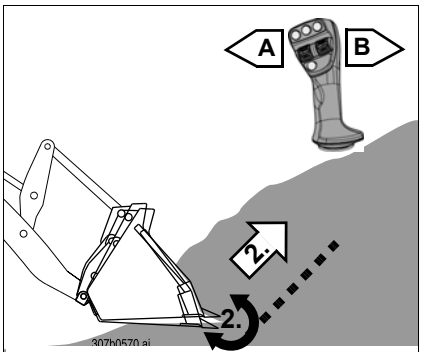


Fig. 188

Loading heaped material (non-compacted material)

1. Align the blade parallel with the ground. To do this, move the joystick to the left **A** or right **B**.
2. Place the bucket horizontally on the ground. To do this, push the joystick forward **C**.
3. Travel forward.

After penetrating the heaped material:

4. Raise the loader unit evenly. To do this, pull the joystick backward **D**.
5. Tilt in the bucket. To do this, press the joystick to the left **A**.
6. Reverse out of the material.
7. Lower the loader unit to transport position.

Loading heaped material (compacted material)

1. Proceed as for non-compacted material.
2. Slightly tilt the bucket in and out when raising the loader unit in the excavated material. To do this, move the joystick to the left **A** and right **B** alternating.
   ➥ The material is loosened.

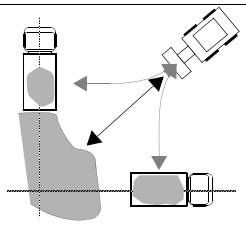


Fig. 189

Loading vehicles

1. If possible, the truck and the working direction of the machine should form an angle of 45°.
2. Only raise the full bucket to the tilt-out height when the vehicle travels in a straight line toward the truck.

Information

If possible, load material with the wind behind you to keep the dust away from your eyes, air filters and fans.

Freeing the machine

Proceed as follows if the machine should get stuck when picking up material:

1. Tilt out the bucket until the blade is vertical above the ground.
2. Lower the loader unit all the way.
3. Gradually tilt in the bucket.
   ➥ The machine is pushed backward.
4. Reverse slowly.
5. Repeat this procedure until the wheels reach firm ground.
6. Reverse the machine away.

Working with the multipurpose bucket

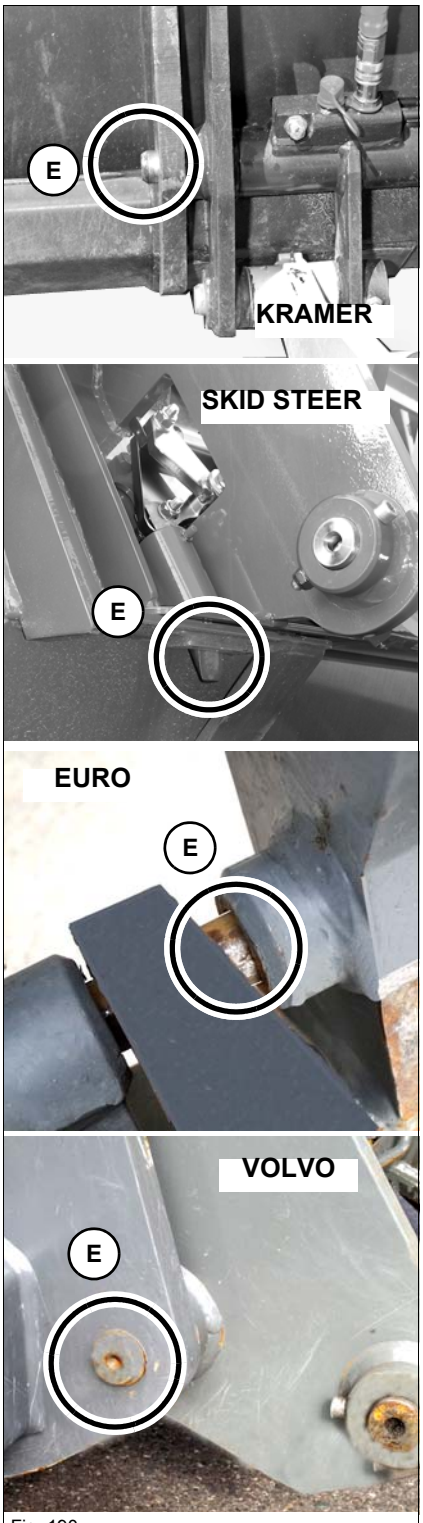


Fig. 190

WARNING

Accident hazard due to unlocked attachment!

The attachment can come off unexpectedly and cause serious injury or death.

► Ensure that the attachment is visibly locked on either side with lock pins **E**.

Information

Observe the safety instructions before working with the machine, and take appropriate action if necessary – *see chapter 2 “Attachment operation” on page 2-11*.

Observe the certified values for capacity and material density for the released attachments – *see “Use of attachments on the machine” on page 3-11*.

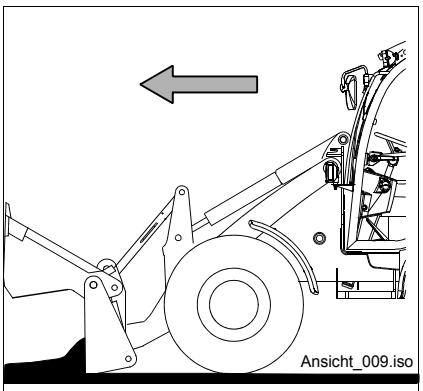


Fig. 191

Grading

1. Fold up the front half of the bucket.
2. Set the depth of the layer you want to remove with the lift hydraulics.
3. Set the angle of the rear cutting edge.
4. Grade the surface performing forward machine travel.

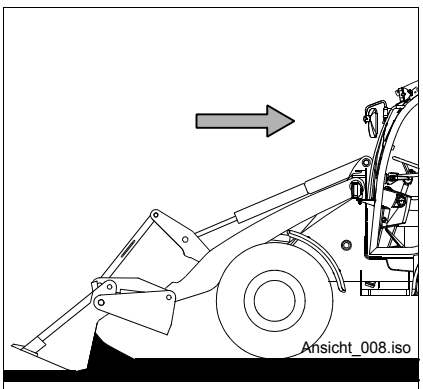


Fig. 192

Drawing material backward

1. Tilt out the multipurpose bucket.
2. Raise the bucket with the lift hydraulics.
3. Fold up the front half of the bucket.
4. Lower the multipurpose bucket to the ground.
5. Set the angle of the bucket.
6. Draw the material driving backward on the surface.

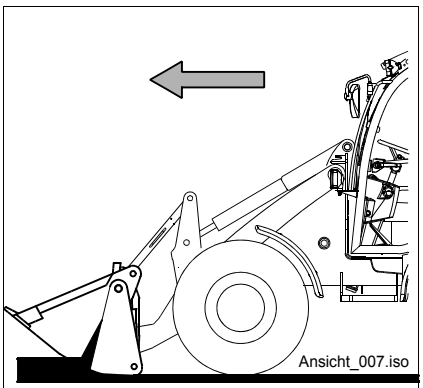


Fig. 193

Removing and spreading material in thin layers

Removing material in thin layers:

1. Set a flat digging angle.
2. Fold up the front half of the bucket by about 10 to 15 cm (3.9 to 5.9 in).
3. Move off the machine.
   - ➥ The material rolls into the bucket and is picked up at the same time.
   - ➥ This position allows for grass turf, for example, to be stripped down to a thickness of about 8 cm (3.1in.).

Spreading material in thin layers:

1. Set the rear cutting edge parallel to the ground.
2. Fold up the front half of the bucket until the required quantity of material is emptied onto the ground.
3. Move off the machine.
4. Lower the multipurpose bucket to the ground.
   - ➥ The rear cutting edge grades the material as it is emptied by opening the front half of the bucket. This position allows to spread material without performing machine travel on the lower layer.

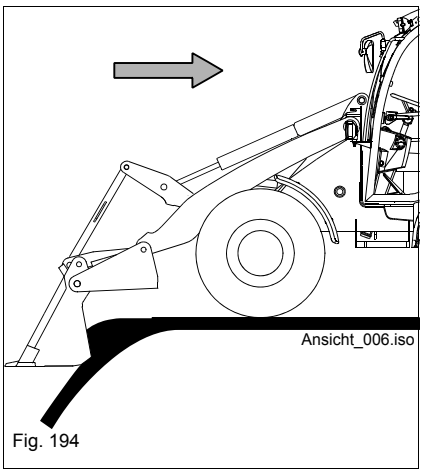


Fig. 194

Pulling out material from slopes

Information
This position allows to pull material out of slopes or roadside ditches with maximum safety and to spread it as required.

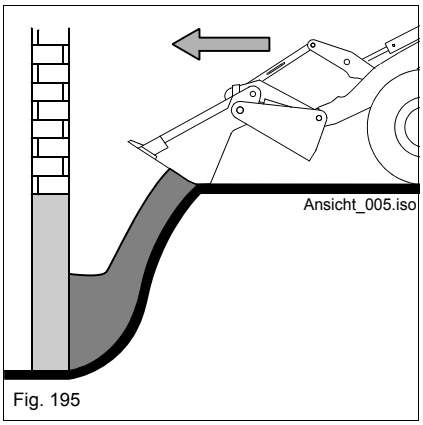


Fig. 195

Moving material with longer reach

Information
This position allows to move material without damaging slopes or structures.

➥ Backfilling with maximum safety and without damaging slopes.

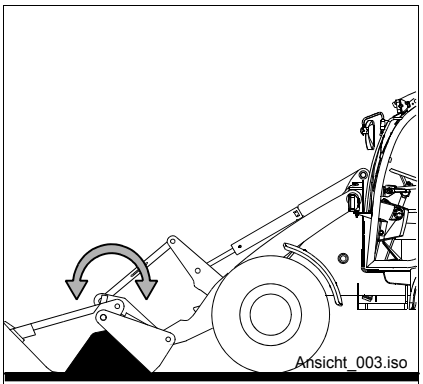


Fig. 196

Picking up remaining material

1. Fold up the front half of the bucket (multipurpose bucket).
2. Tilt out the bucket.
3. Lower the bucket to the ground. Ensure that both bucket halves touch the ground.
4. Close and tilt in the multipurpose bucket at the same time.
5. Raise the bucket with the lift hydraulics.

Information
Both bucket halves must touch the ground so that all the material is picked up.

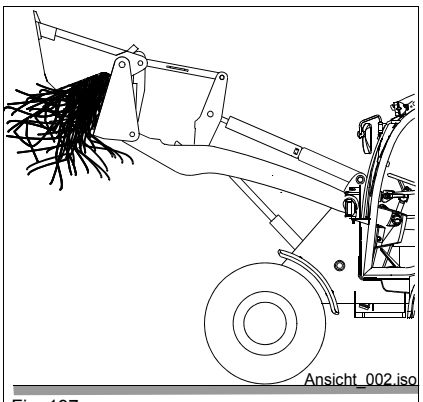


Fig. 197

Grabbing bulky material

- The multipurpose bucket allows to grab building timber, reinforcement bars, packaging bands, wire, etc. This ensures safe loading and transport.

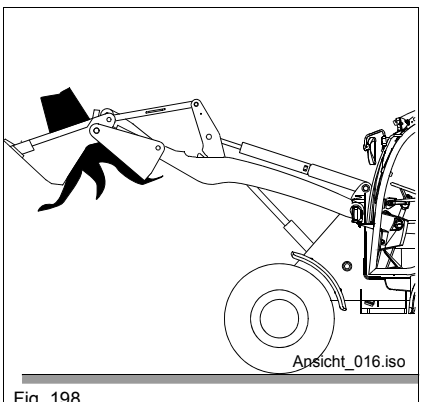


Fig. 198

- The multipurpose bucket allows to grab large objects. This ensures safe loading and transport.

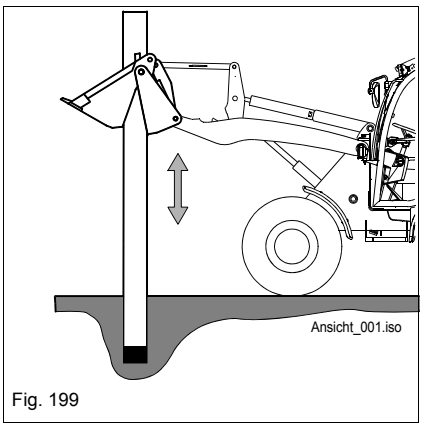


Fig. 199

Pulling out and setting posts

1. Open the power grab bucket and lower it over the post. Close the bucket to grip the post firmly.
2. Loosen the post with careful up-and-down movements.

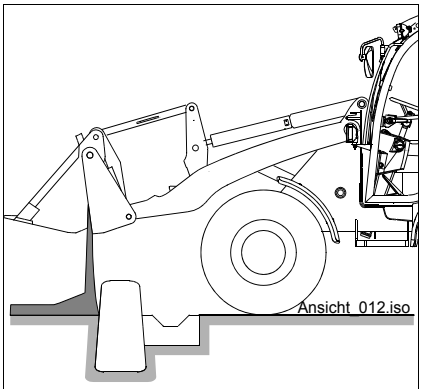


Fig. 200

Backfilling round gravel and precise unloading

- Precise dosing and placement of pourable material.

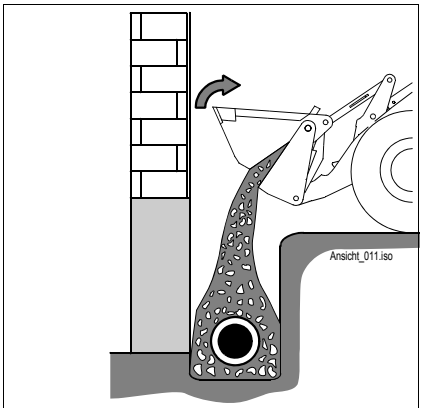


Fig. 201

Advantage of working method:

- Teeth move back from the wall as the bucket opens.

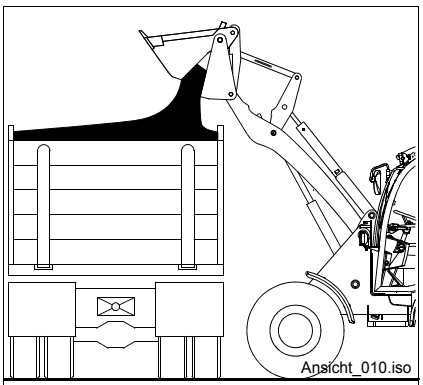


Fig. 202

Unloading from the bottom of the bucket for increased tilt-out heights

Advantage of working method:

- Tilt-out height can be increased by at least 55 cm (21.6 in) (depending on bucket size), as compared to tilting out with a standard bucket.

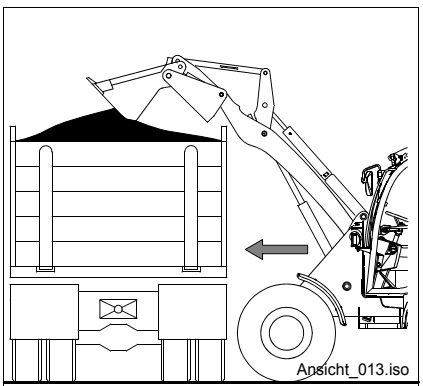


Fig. 203

- Material can be pushed with the open multipurpose bucket.

Working with the pallet forks

Important safety instructions for working with the pallet forks

WARNING

Accident hazard due to pallet fork arms!

Pallet fork arms can cause serious injury or death during machine travel on public roads.

- ► Remove the pallet forks and transport them separately.
- ► If the machine is equipped with pallet forks with foldable fork arms, fold them up and secure them.
- ► Do not transport the pallet forks in a bucket.
- ► Never use bent, cracked or otherwise damaged fork arms/pallet forks!
- ► Before starting work, ensure that the fork arms on the fork frame are safely locked!

WARNING

Accident hazard due to incorrect use of attachment!

Failure to observe this can cause serious injury or death.

- ► Transporting persons is prohibited.
- ► Stay clear of suspended loads!
- ► The attachment is not certified for lifting gear applications.
- ► Do not fasten any hooks, eyelets or other lifting gear on the attachment.

WARNING

Crushing hazard due to tipping over of machine!

Can cause serious injury or death.

- ► Lower the loader unit to transport position before starting machine travel.
- ► Adapt the travel speed to the prevailing conditions.
- ► Pay attention to persons and obstacles.
- ► Ensure that no parts of the body protrude outside the machine.
- ► Carefully steer the machine if the loader unit is raised.
- ► Do not exceed approved payloads (Refer to the load diagram affixed on the front window or on the left on the front trim in the cabin).
- ► Do not perform any jerky movements with the joystick.

Important safety instructions for machine travel on public roads with the pallet forks

In Germany, machine travel on public roads with the pallet forks fitted is **prohibited**!

Do not transport the pallet forks in a bucket fitted onto the machine!

- Remove the pallet forks and transport them with a suitable means of transport (trailer) during machine travel on public roads.

Get informed on and follow the legal regulations of your country.

Important information on picking up loads

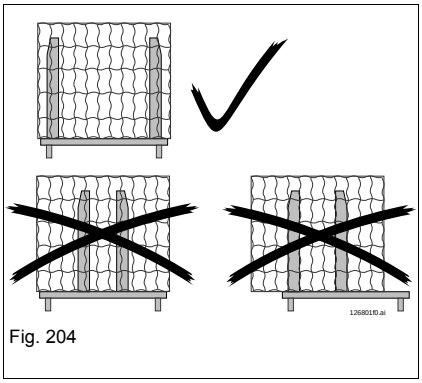


Fig. 204

- Approach the material as closely as possible!
- Always approach the material with the machine wheels in straight-ahead position!
- Always load on firm and level ground with sufficient load-bearing capacity only!
- Never raise a load with only one fork arm!
- Move the fork arms all the way through under the pallets, as far as they will go, so that the load is picked up the nearest possible to the fork frame!
- Move under the load with the straight fork arms as far apart as possible and at an equal distance from the left and right side of the load!

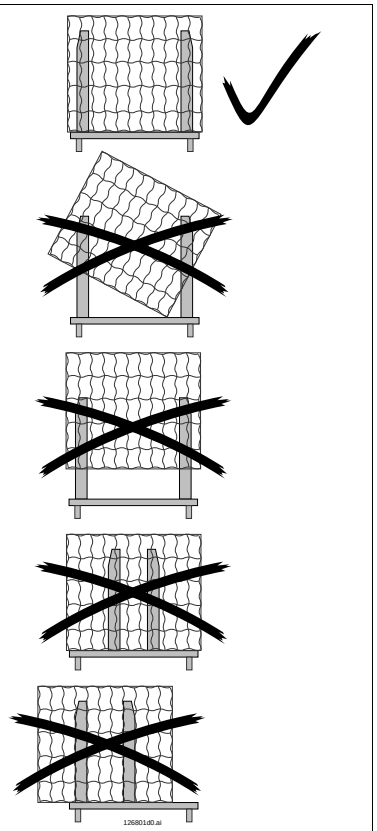


Fig. 205

Important information on load transport

- Always tilt in the attachment a little (toward the machine) for transport!
- Always transport the load close to the ground!
- Always adapt the transport speed to the load you are transporting and to the ground conditions!
- Never leave the machine with the load raised!
- Secure the 3rd control circuit on the machine
  – see “Securing the control lever (joystick)/switching off the operating hydraulics” on page 4-54
- On slopes, the load must be on the uphill side of the machine/ attachment. Drive the machine backward on sloping terrain to prevent the load from falling off and the machine from tilting forward when braking.
- When transporting large bulk loads perform backward machine travel for improved visibility.
- Observe the load-bearing capacity of bridges, basement ceilings, vaults, etc., before moving the machine on them!
- Bear in mind the clearances of underpasses, tunnels, gates, etc. before machine travel through or under them!

Important information on setting down loads

- Loads must only be set down on a suitable base with sufficient stability and load-bearing capacity.
- Do not stack or set down in higher places loads which are not properly packaged or which have shifted, or load units with damaged pallets/ stacking containers.
- Set down loads only in places where they will stand safely without tilting, falling down or sliding! Affix appropriate marks to loads which have been set down, especially in the area of public and private traffic!
- Observe the load-bearing capacity of the set-down area (for example truck platforms, storage area in high-bay warehouses, etc.).
- Load the loading area of vehicles or trailers evenly and distribute the load evenly on the axles.
- Stack loads only up to the authorized maximum pallet height.
- Do not set down loads too near to slopes, construction pits, etc.
- Do not set down loads in transit or escape routes, and not in front of safety facilities or works equipment which must be accessible at any time.

Brief instructions for fork arms

The following brief instructions are based on the “Guidelines for testing and repairing fork arms” (© by VETTER Umformtechnik GmbH):

- Use fork arms only according to their designated use.
- Do not exceed the load centre and the load-bearing capacity.
- Keep the fork arms clean at all times.
- Load both fork arms evenly.
- Do not use standard fork arms as reverse forks.
- Do not push, pull or shove the fork arms, or move them in at a slanting angle (risk of damaging them due to lateral forces).
- Do not pull off loads, or allow them to fall onto the fork arms.
- Tie down loads, if necessary, to avoid loosing them.
- Do not raise with the tilt ram (tilt device).
- Bear in mind the limits of application for the fork lift, and its Operator’s Manuals.
- Perform frequent visual checks.
- Have regular checks performed according to the Operator’s Manual and the legal regulations of your country.
- Do not modify the fork arms, or attach any additional device.
- Only the manufacturer is authorized to perform repair work on the fork arms.
- No transport of persons on the fork arms.
- Transporting flammable, liquid material is prohibited.
- Observe the legal regulations of your country during machine travel on public roads.
- The operating company/operator must check at regular intervals:
  - Lock: functional check
  - Hooks: visual check for cracks and deformations
  - Bend: visual check for indents, nicks and cracks
  - Bend and blade: do not use any longer if worn over 10 %
  - Blade and tip: check for deformations
- In case of damage or if you are unsure:
  ➥ Immediately stop using the fork arms!

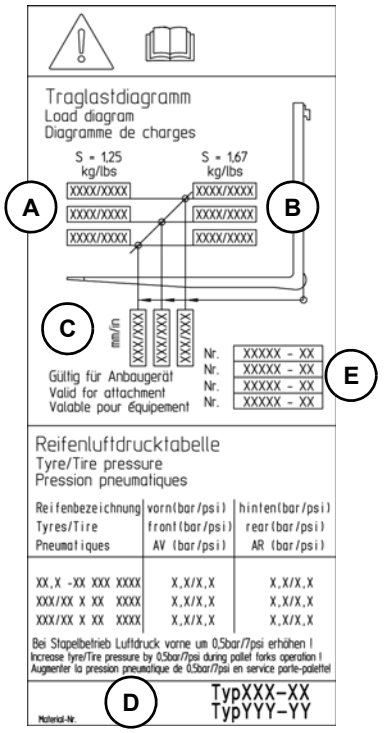


Fig. 206

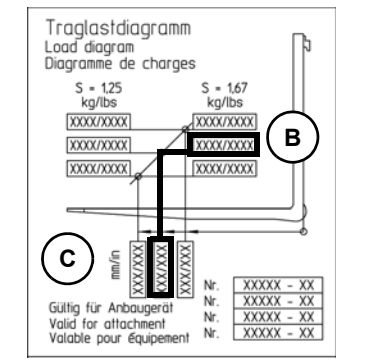


Fig. 207

Load diagram for pallet forks

The load diagram (on the left on the front window) is only valid for applications with the released pallet forks **E** and corresponding tire size.

The load diagram also applies to released buckets if the specified capacities and material densities are observed
– see chapter 3 “Use of attachments on the machine” on page 3-11.

Pay attention to the specific load diagrams of other attachments used
– see “Fitting attachments from other manufacturers (option)” on page 5-99!

WARNING

Tipping hazard of machine due to failure to pay attention to the load diagram!

Can cause serious injury or death.

► Observe the load diagram, and take appropriate action if necessary.

- Line **D** in the load diagram specifies the machine certified for a specific attachment.
- Do not exceed the maximum loads stated, otherwise machine stability is no longer ensured.
- Column **A** shows the maximum loads for applications on level ground (stability s = 1.25)
- Column **B** shows the maximum loads for off-road applications (stability s = 1.67).
- The maximum load is a function of the distance (load distance) **C** between the load centre and the fork frame (lower row of numbers). Take this into account also when using fork arm extensions!
- The load depends on the machine’s attachments
– see chapter 9 “Payload/lift capacity/stability” on page 9-20.

Example:

- At a load distance **C** of 600 mm (23.62 in), the maximum load **B** for off-road applications is 1170 kg (2580 lbs)!

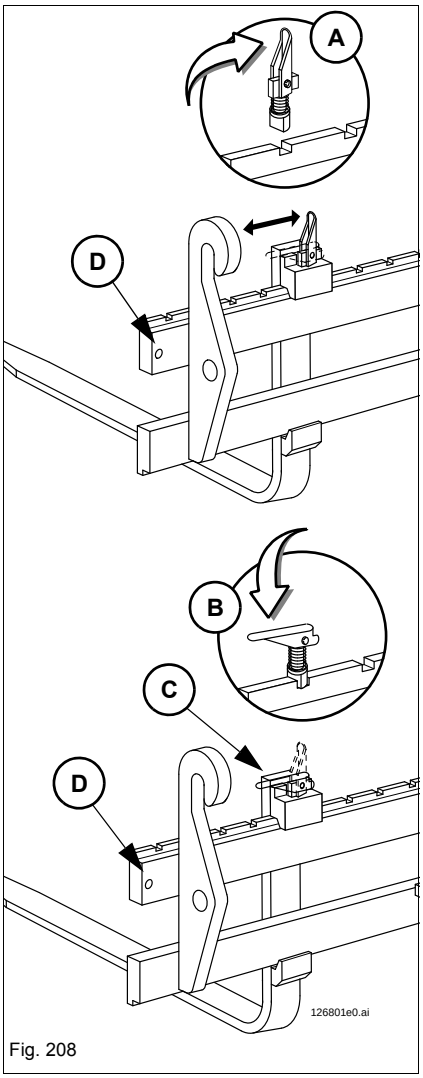


Fig. 208

Adjusting the fork arms of the pallet forks

WARNING

Accident hazard if the fork arms are not correctly locked on the fork frame!

The fork arms can come off and cause serious injury or death.

- ► Check before working whether locking levers **A** on both fork arms are folded down and safely engaged in the fork frame!
- ► Adjust the fork arms centrally with regard to the fork frame.
- ► Check whether safety screws **D** on either side on the upper slide rail of the fork frame are not damaged and whether they are firmly screwed.

CAUTION

Crushing hazard when shifting the fork arms!

Fingers and hands can be crushed between the fork frame and fork arms.

- ► Do not touch the sliding surface of the fork frame when shifting the fork arms.
- ► Wear protective gloves.

1. Set the locking lever to the vertical position (pos. **A**).
2. Slide the fork arms to the required distance until the locking pin engages in a slot on the fork frame.
3. Fold down the locking lever (pos. **B**).
   - ➥ The upper edge of the locking lever must be flush with the edge **C**.
   - ➥ Also refer to the Operator's Manual of the pallet forks.

Picking up material with the pallet forks

WARNING

Tipping hazard of machine due to failure to pay attention to the load diagram!

Can cause serious injury or death.

► Pay attention to the load diagram in the cabin.

Information

Switch off the load stabilizer (optional) to allow for an exact pick-up of the load.

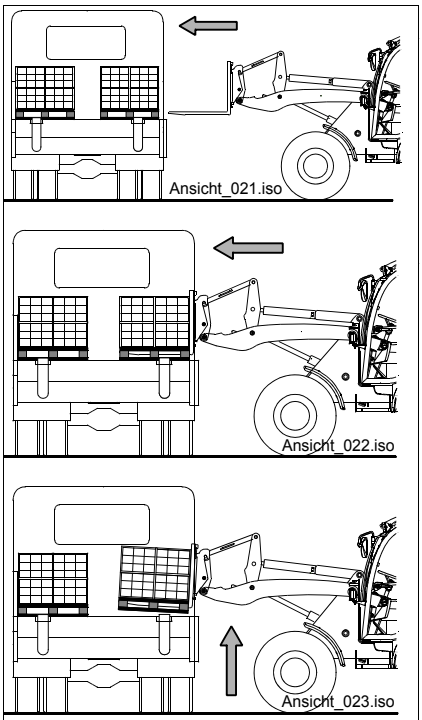


Fig. 209

1. Move the machine up to the load so that the pallet forks or the fork arms are at a right angle to the load.
   ➥ The fork arms must be the furthest possible apart, and at an equal distance from the left and right side of the load.
2. Drive the vehicle forward. Move the fork arms as far as possible underneath the pallet until the material touches the fork frame.
3. Raise the load carefully and tilt it in slightly

Safety instructions on transporting material

WARNING

The load can tip backward if it is not secured and if the loader unit is raised!

Can cause serious injury or death.

- ► Do not transport loads with a raised loader unit.
- ► Always tilt in the attachment a little toward the machine, carry it as close as possible to the ground and bear in mind the required ground clearance!
- ► After picking up the load, lower the loader unit to transport position and tilt the pallet forks.
- ► Unload material only at machine standstill and do not tilt back the pallet forks to the limit.
- ► Secure a bulky load before transporting it.
- ► Fit the rear of the pallet forks with a protection.
- ► Install a protective screen (option) onto the cabin.
- ► Use attachments with hydraulic grabs (option).
- ► Ensure good visibility of the material you want to pick up and of the work and travel range.

WARNING

The machine can tip over during machine travel or manoeuvres on slopes with a load on the pallet forks!

Can cause serious injury or death.

- ► Lower the loader unit to transport position.
- ► If possible, travel in reverse with a load on the pallet forks.

WARNING

The machine can tip over and the load can fall down in conditions of strong wind and poor visibility with a raised loader unit and fully loaded pallet forks!

Can cause serious injury or death.

- ► Avoid high storage positions for material that should not be exposed to wind.
- ► Stop fork lift work in conditions of strong wind and poor visibility.

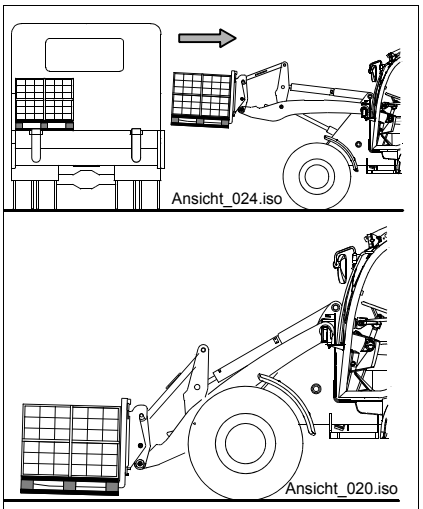


Fig. 210

Transporting material

- Move the load only when it is safely placed on the fork arms.
- Start, turn and stop smoothly.
- Concentrate on your work, avoid distractions.
- When moving and transporting loads, always tilt it slightly back toward the machine and raise or lower it to transport position (bear in mind the ground clearance).
- Always perform machine travel slowly in off-road applications, to avoid strong swinging movements of the load.
- On slopes, the load must be on the uphill side of the machine/attachment.
- Drive the machine backward on sloping terrain to prevent the load from falling off and the machine from tilting forward when braking.
- When transporting large bulk loads, perform backward machine travel for improved visibility.

Fitting attachments from other manufacturers (option)

Quickhitches for attachments from other manufacturers

- The following quickhitch facilities can be purchased from your dealer and installed by an authorized service center:
  - Quickhitch for SKID STEER attachments
  - Quickhitch for EURO attachments
  - Quickhitch for VOLVO attachments
- **Important!**
  Only approved attachments with an approved load diagram may be used with the quickhitch facility
  – see "Use of attachments on the machine" on page 3-11.
- If other attachments are used, conformity (stability test) in accordance with the EC machine guideline or the EN 474-3 standard must be checked and documented by an authorized service centre.
  In the case of non-EU countries, follow and apply the national regulations of these countries.
- Refer to the following information sheets *on page 5-100 "Stability calculations for attachments from other manufacturers"* for the stability test.
- Warranty and the operation license become void if non-approved attachments are installed, or if parts of the quickhitch facility or attachment (with a prescribed condition or quality, or the operation of which can put persons at risk) are subsequently modified or replaced.
- In addition to the Operator's Manual, observe and instruct the operator in all other generally applicable, legal and other mandatory regulations relevant to accident prevention and environmental protection.

Important information on fitting attachments from other manufacturers

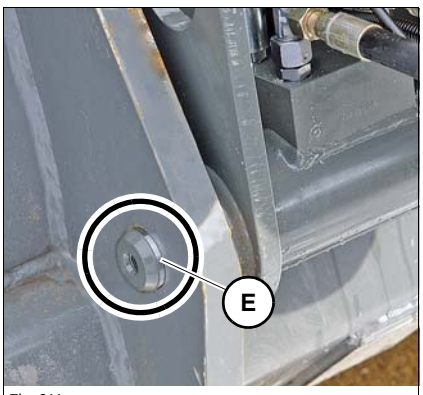


Fig. 211:

WARNING

Accident hazard if the attachments are not locked!

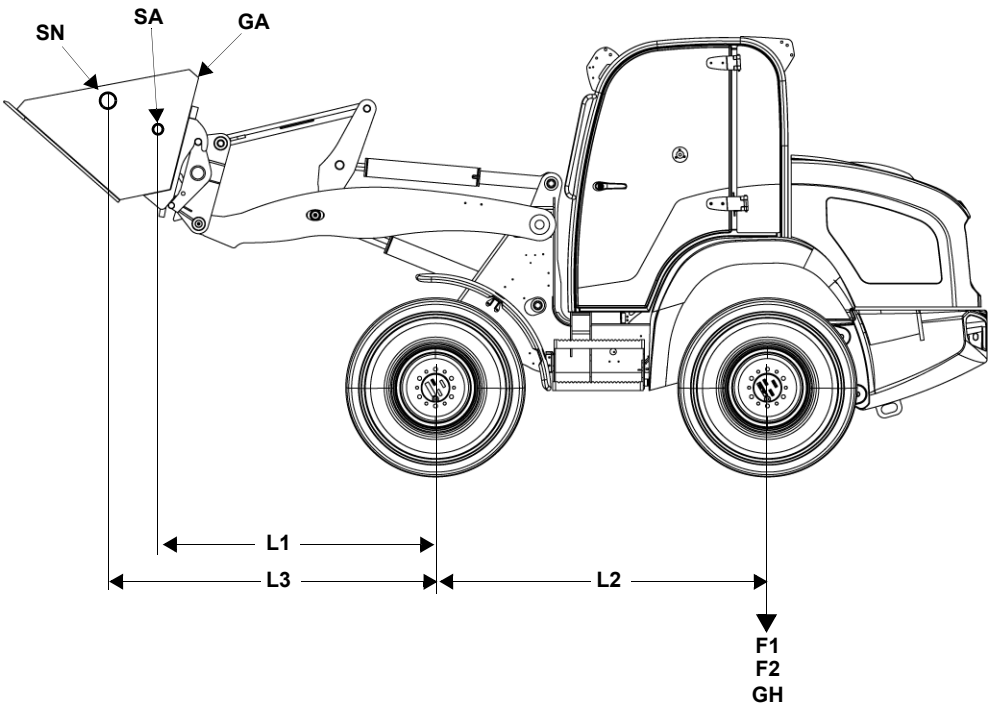
Can cause serious injury or death.

► Check whether lock pins **E are visible on either side** in the mounting bores of the attachment.

Information

Before connecting the hydraulics of the attachment from another manufacturer to the 3rd control circuit, ensure that the pressure in the quickhitch facility is released *– see "Releasing the pressure at the plug couplings" on page 5-66*!

Overview with bucket according to ISO 14397-1



Overview with pallet forks according to ISO 14397-1

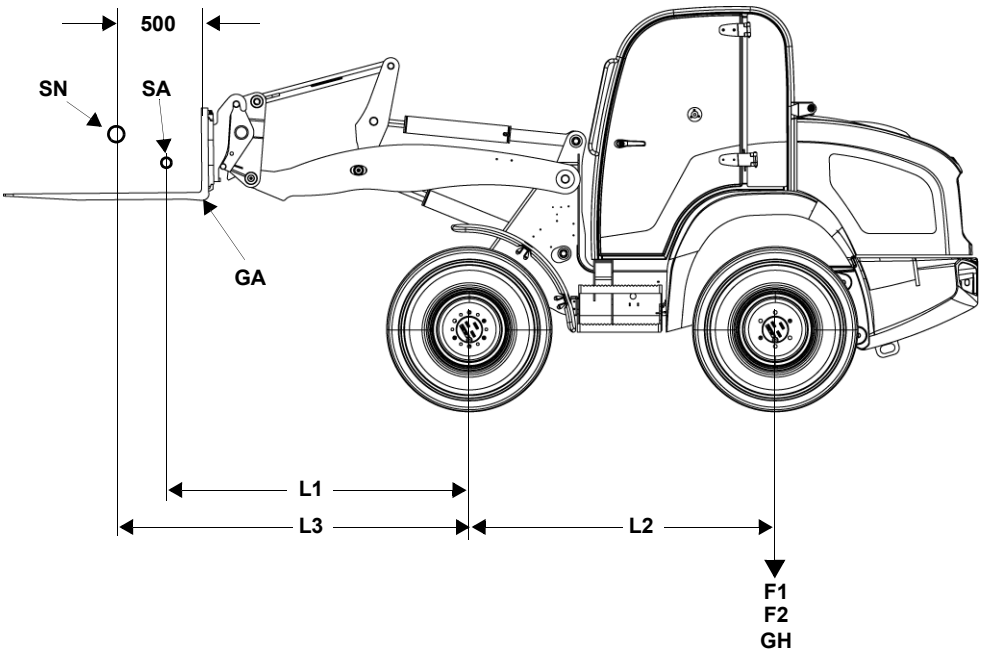


Fig. 212

Table for values that have been determined

Enter the values that have been determined in the column "**Entry**".

Designation		Measure/determine	Entry	
GN	Maximum authorized payload	**Enter the calculated values in the load diagram**– *see "Calculation formula for stability (load diagram)" on page 5-102*.		kg (lb.)
SN	Position of load centre: pallet forks	**Values entered in load diagram according to ISO 14397-1.**	500 (19.7) 600 (23.6) 700 (27.5)	mm (in.)
SN	Position of the load centre: bucket or other attachments			mm (in.)
S	Stability factor	Refer to table *Required safety factors (S) on page 5-102* for the values.		–
L1	Distance: between centre of front axle and centre of gravity of attachment	Measure		mm (in.)
L2	Axle base: between centre of front axle and centre of rear axle			mm (in.)
L3	Distance: between load centre (payload) and centre of front axle			mm (in.)
GH	Load on rear axle (without load on loader unit)	Calculated		kg (lb.)
F1	Measured load on rear axle (without attachment, with extended loader unit)	Determined on scales without attachment.		kg (lb.)
F2	Load reduction on rear axle due to installed pallet forks/attachment	Calculated, or measured if scales and an attachment are available.		kg (lb.)
GA	Weight of pallet forks/attachment	Ask attachment manufacturer.		kg (lb.)
SA	Centre of gravity of pallet forks/ attachment			–
p_{max}	Material density of load	Calculated: depends on material picked up with the bucket.		t/m³ (lb./ft³)
V	Bucket capacity (ISO 7546)	Ask attachment manufacturer.		m³ (ft³)
M	Payload mass	Calculated.		kg (lb.)

Required safety factors (S)

Pallet forks	DIN EN 474-3	
Rough terrain	60%	S = 0.6
Firm and level ground	80%	S = 0.8

Bucket	ISO 17397-1	
–	0.5	S = 0.5

Calculation formula for stability (load diagram)

$$F2 = \frac{GA \times L1}{L2}$$

$$GH = F1 - F2$$

$$GN = S \times \frac{GH \times L2}{L3}$$

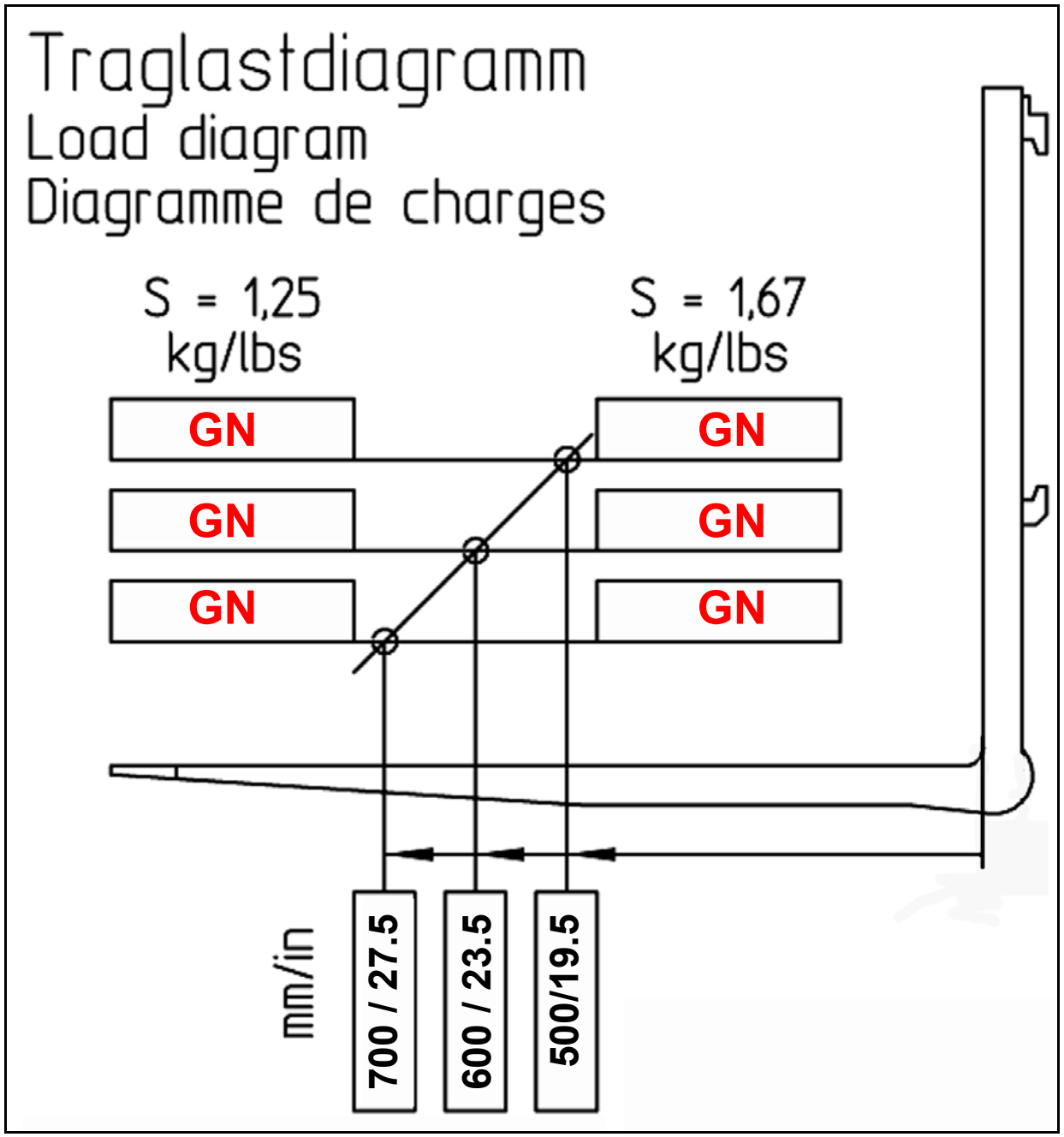
$$p_{max} = \frac{GN}{V}$$

Load diagram (sample)

Enter the calculated values “**GN**” in the load diagram.

Information

Affix the completed load diagram in the cabin in a position that is easily visible for the user/operator.



5.12 Emergency lowering

Emergency lowering of loader unit in case of diesel engine breakdown

Lowering the loader unit in an emergency is only possible if the ignition is switched on!

With the hose burst valves option, the touch button **50** must also be operated for the emergency lowering.

WARNING

Imminent accident hazard when lowering the loader unit in an emergency!

Can cause serious injury or death!

- ► Secure the danger zone.
- ► Do not try to repair the machine under a raised load.
- ► Immediately ask a service center for assistance.

Fig. 213

Emergency lowering

1. Ensure that no one is in the danger zone of the machine.
2. Apply the parking brake.
3. Engage the starter.
4. Disable the road-travel lock for the joystick if it is enabled *– see chapter 4 “Securing the control lever (joystick)/switching off the operating hydraulics” on page 4-54*.
5. With the "hose burst valves" option, press and hold the touch button **50** in the position **B**.
6. Slowly push joystick forward **C** until the loader unit is fully lowered.
7. Switch off the starter and remove the starting key.
8. Have the machine immediately repaired by an authorized service centre.

5.13 Options

Load hook (option)

Shaft rings, containers, pipes, etc., can be transported with a load hook and suitable lifting gear (belts, cables, chains).

WARNING

Injury hazard when working with a load hook!

Observe the following precautionary measures in order to avoid a danger of accident!

- ► Read and observe the section *Lifting gear applications on page 2-9* in the safety instructions chapter.
- ► Bear in mind the load diagram on the front window.
- ► Move loads only on firm and level ground.
- ► Wear protective gloves.
- ► Ensure that the ratchet safely engages in the hook as you hook up the lifting gear (belts, cables, chains).
- ► Do not use damaged lifting gear.
- ► Never place the lifting gear over sharp edges.
- ► Adapt your speed to the load as you move it near to the ground.
- ► Persons guiding the load must stay in visual contact with the machine operator.
- ► Do not transport loads on public roads.

Load hook on loader unit tilt rod

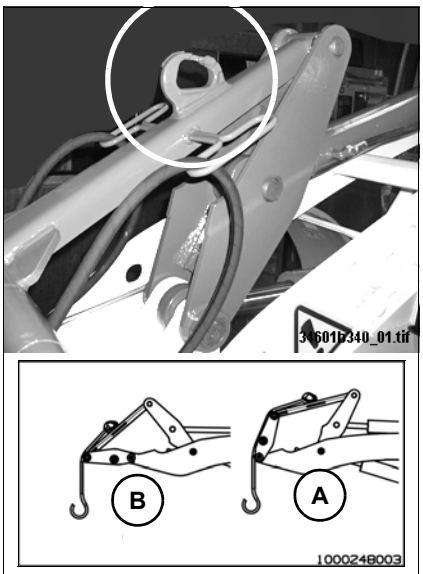


Fig. 214

NOTICE

Damage hazard to the lifting attachments and vehicle.

- ► Remove the attachment (bucket, pallet forks, etc.) from the quickhitch.
- ► Safely hitch the lifting gear (belts, cables, chains, etc.) on the load hook above the quickhitch.
- ► Never place the lifting gear over sharp edges.

1. Hitch the lifting attachment in the mounts (lugs, straps) provided for transporting the load.
2. Carefully raise the load and transport it near the ground.
   ➥ Do not exceed the load capacity, see load diagram **A** attached in the cabin (front window) and *Payload with load hook on tilt lever on page 9-23* in this operator's manual.

Load hook on forks arms of pallet forks

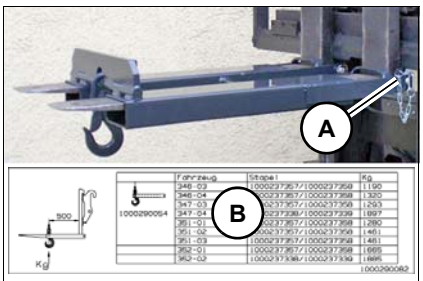


Fig. 215

WARNING

Injury hazard when working with a load hook!

Observe the following precautionary measures in order to avoid a danger of accident!

- ► Do not tilt the pallet forks in or out as you raise a load.
- ► Bear in mind the load diagram on the front window.

1. Set the fork arms of the pallet forks horizontally.
2. Put the load hook on the fork arms of the pallet forks.
3. Secure the load hook with safety pin **A**.
4. Carefully raise the load with lifting gear (belts, cables, chains, etc.) and transport it close to the ground.
5. Do not exceed the load capacity, see load diagram **B** in the cabin (front window).

Bucket repositioning (option)

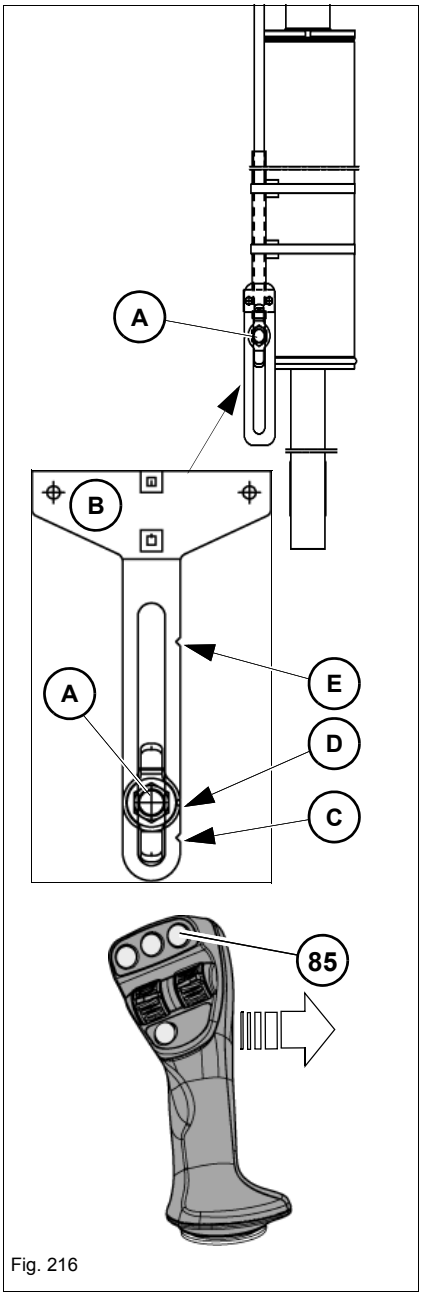


Fig. 216

The bucket repositioning function can be used for performing cyclical work (for example for loading trucks) efficiently and with minimum impact to the material: by pressing a button, the attachment is automatically positioned from the tilt-out position to the preset work position (for example a horizontal bucket base).

However, the efficiency of the bucket repositioning is ensured only if the attachment and the position of sensor **A** on the tilt ram are adjusted to each other.

This adjustment is performed easily by means of the marks (notches) on bracket **B** (see assignment of notch to attachment in table below)

Information

Before putting the automatic bucket repositioning into operation, switch off the tilt ram lock (option)!

Adjusting the sensor

1. Pick up and lock the attachment in the quickhitch *– see "Pick up the attachment" on page 5-58*.
2. Set the attachment to the base position (for example bucket base aligned horizontally with the ground).
3. Loosen the wing nut on sensor **A** (sensor bracket on tilt ram).
4. Slide the sensor to the respective mark (notch) on bracket **B**.
5. Tighten the wing nut.

Notch	Attachments
A	Side swing bucket
B	Bucket (normal material)
	Bucket (lightweight material)
	Multipurpose bucket
C	Pallet forks

Enabling the bucket repositioning

1. Press touch button **85** on the joystick.
2. The attachment is automatically tilted in to the position that has been set.
3. Lower the loader unit to load position.

Disabling the automatic bucket repositioning.

1. Press control lever to the right (empty shovel).

Tilt ram lock (option)

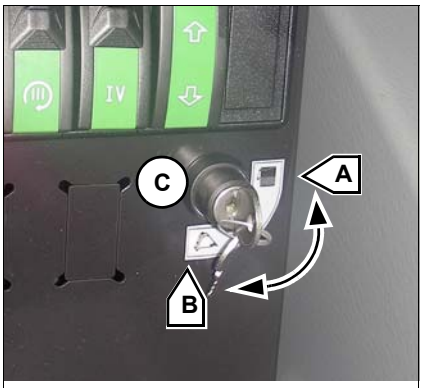


Fig. 217

This option is used for securing the tipping cylinder if it should not be operated (for example when setting down material on high piles).

Information

A work platform may **not** be mounted.

The tilt-ram lock is enabled with key-operated switch **C** in the switch console under the armrest.

Switching on the tilt ram lock

1. Set the loader unit to transport position.
2. Set the tilt ram and the material to the required position.
3. Turn key-operated switch **C** to position **A**.
   ➥ The tilt ram is locked and can no longer be operated in the position to which it has been adjusted.
4. Set down the load.

Switching off the tilt-ram lock

1. Turn key-operated switch **C** to position **B**.
   ➥ Tilt ram is unlocked.

Automatic trailer coupling (option)

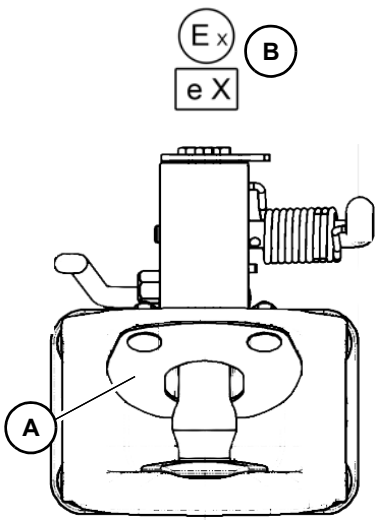


Fig. 218

Information

Only trailer couplings with EC acceptance or EC control marks are certified for use on public roads in Germany (StVZO German road traffic regulations).
Refer to and follow the National Type Approval (Germany) or the Data Confirmation (Germany) for information on other requirements!
Get informed on and follow the legal regulations of your country!

The automatic ball hitch is used for tractor vehicles according to § 43 clause 4 of the StVZO (German road traffic regulations) in the Federal Republic of Germany.

- Follow the regulations of the employer's liability insurance associations of your country when coupling or uncoupling a trailer.
- The attachments (trailer) and the ball hitch use are listed in the National Type Approval (Germany) or the Data Confirmation (Germany).
- Bear in mind the trailer and drawbar loads *– see chapter 9 "Trailer weight/drawbar load: trailer couplings (option)" on page 9-24*.
- Have a damaged or malfunctioning trailer coupling immediately repaired or replaced by an authorized service centre.

In order to ensure the required swivel angle when coupled, use the trailer coupling only in connection with lugs in compliance with DIN 11026, DIN 74053 (ISO 1102) or DIN 74054 (ISO 8755).

➥ See the nameplate **B** on the ball hitch and trailer draw-bar.

If the trailer coupling is equipped with a stabilizing feature **A** (hold-down device), only lugs in compliance with DIN 74054 (ISO 8755) are allowed.

Important information on the automatic ball hitch

WARNING

Accident hazard if the load on the front axle is too low!

Can cause serious injury or death.

- ► Install and safely lock attachments (for example buckets) on the loader unit that are certified for public roads.
- ► Cover the blade or teeth of the bucket across their entire width with the protection provided.

WARNING

Accident hazard due to a damaged trailer coupling!

Can cause injury.

- ► Check the ball hitch for damage before using it.
- ► Have a damaged or malfunctioning ball hitch immediately repaired or replaced by an authorized service center.

NOTICE

Before performing downhill machine travel, select the “Turtle” speed range and use the service brake to support the braking effect of the drive. This avoids damage to the drive and/or the diesel engine due to excessive speed! This applies to trailer operation in particular!

- ► Reduce the speed to less than 15 kph (9.32 mph) with the service brake.
- ► Select 1st speed “Turtle”.
- ► Support the drive’s braking effect with the brake/inching pedal by pressing it down with force beyond the inching range (intermittent braking).

Information

When equipped with a high speed gearbox (option), the wheel loader reaches maximum speed only on a level and asphalted surface, without a trailer and with an empty standard bucket!

Hitching a trailer

CAUTION

Accident hazard due to coupling pin snapping down!

Can cause injury.

► Do not touch the coupling pin with your hands.

WARNING

Danger of accident during reverse machine travel!

Can cause serious injury or death.

► Ensure that nobody is between the machine and the trailer.

► Have another person guide you if necessary.

CAUTION

Accident hazard due to unlocked coupling pin!

Can cause injury.

► After coupling a trailer, check whether the coupling pin is engaged in the lug.

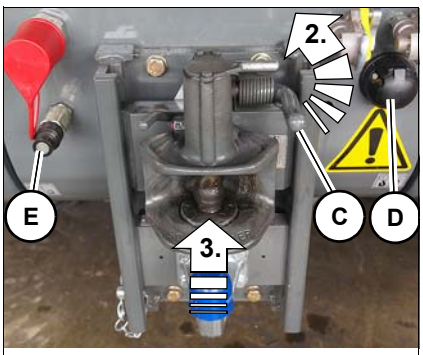


Fig. 219

1. Before hitching a trailer, adjust the height of the trailer coupling to the height of the trailer drawbar *– see "Adjusting the height-adjustable ball hitch (option)" on page 5-118*.
2. Open the ball hitch. To do this, press the lever **C** upward until the coupling pin audibly engages in the open position.
3. Reverse the tractor vehicle slowly until the lug engages in the tow hitch with an audible click.
   ➥ The trailer is locked in the tow hitch as the lug touches the release trigger of the coupling pin.
4. Stop the engine.
5. Apply parking brake.
6. Visually inspect the lock state.
7. Establish the electric **D** and hydraulic **E** connections between the trailer and the machine.
8. Release the trailer brake.
   ➥ Refer to the Operator's Manual of the trailer.
9. Remove the wheel chocks from the wheels of the trailer and safely store them on the trailer.

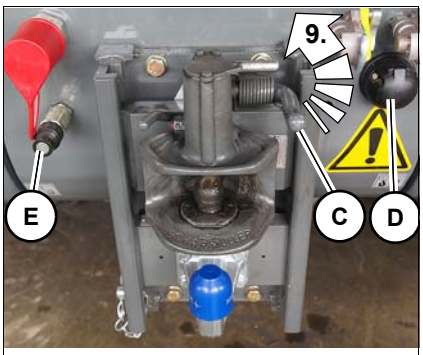


Fig. 220

Unhitching the trailer

NOTICE

In order to avoid dirt accumulation in the ball hitch lugs, close them again after uncoupling the trailer!

► Press lever **F** down until the coupling pin engages in the ball hitch.

1. Park the machine and the trailer on level ground.
2. Apply parking brake.
3. Stop the engine.
4. Switch off the starter and remove the starting key.
5. Secure the trailer with wheel chocks.
6. Apply the trailer parking brake.
7. Disconnect the electric **D** and hydraulic **E** connections between the machine and the trailer.
8. Close the flat connector plugs on the machine and the trailer with the protective caps provided.
9. Disconnect trailer. To do this, push lever **C** of the ball hitch upward until the coupling pin locks into place.

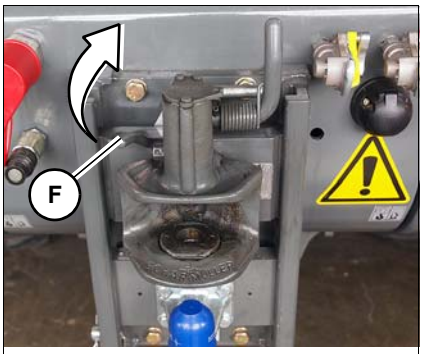


Fig. 221

Closing the coupling by hand (for example for a tow cable)

CAUTION

Accident hazard due to coupling pin snapping down!

Can cause injury.

► Do not touch the coupling pin with your hands.

1. Carefully press lever **F** down until the coupling pin engages in the ball hitch.

Ball hitch ø 50 mm (option)

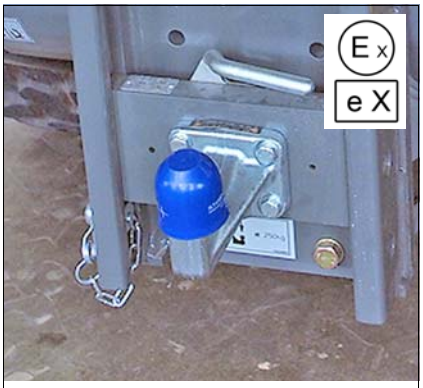


Fig. 222

Information

Only trailer couplings with EC acceptance or EC control marks are certified for use on public roads in Germany (StVZO German road traffic regulations).
Refer to and follow the National Type Approval (Germany) or the Data Confirmation (Germany) for information on other requirements!
Get informed on and follow the legal regulations of your country!

The ball hitch coupling is used for tractor vehicles and self-propelled work machines according to § 43 clause 4 of the StVZO (German road traffic regulations) in the Federal Republic of Germany.

- Only trailers may be towed that are equipped with ball traction couplings. Any other use is prohibited.
- Do not hitch trailers with positive steering.
- Follow the regulations of the employer's liability insurance associations of your country when coupling or uncoupling a trailer.
- The attachments (trailer) and the ball hitch use are listed in the National Type Approval (Germany) or the Data Confirmation (Germany).
- Bear in mind the trailer and drawbar loads *– see chapter 9 "Trailer weight/drawbar load: trailer couplings (option)" on page 9-24*.
- Keep the ball clean and apply a thin coat of grease. However, do not apply any grease to the ball when using a stabilization system, such as Westfalia "SSK".
- Check all fastening screws of the towing gear regularly or have them retightened by an authorized service centre to the specified tightening torque.
- Adapt the height of the drawbar if necessary.

Important information about the ball hitch

WARNING

Accident hazard if the load on the front axle is too low!

Can cause serious injury or death.

- ► Install and safely lock attachments (for example buckets) on the loader unit that are certified for public roads.
- ► Cover the blade or teeth of the bucket across their entire width with the protection provided.

WARNING

Accident hazard due to a damaged trailer coupling!

Can cause injury.

- ► Check the ball hitch for damage before using it.
- ► Ensure a minimum diameter of 49.0 mm (1.93 in) at any point of the ball.
- ► Have a damaged or malfunctioning ball hitch immediately repaired or replaced by an authorized service center.

NOTICE

Before performing downhill machine travel, select the “Turtle” speed range and use the service brake to support the braking effect of the drive. This avoids damage to the drive and/or the diesel engine due to excessive speed! This applies to trailer operation in particular!

- ► Reduce the speed to less than 15 kph (9.32 mph) with the service brake.
- ► Select 1st speed “Turtle”.
- ► Support the drive’s braking effect with the brake/inching pedal by pressing it down with force beyond the inching range (intermittent braking).

Information

When equipped with a high speed gearbox (option), the wheel loader reaches maximum speed only on a level asphalted surface without a trailer and under normal load (attachment)!

Piton ball hitch (option)

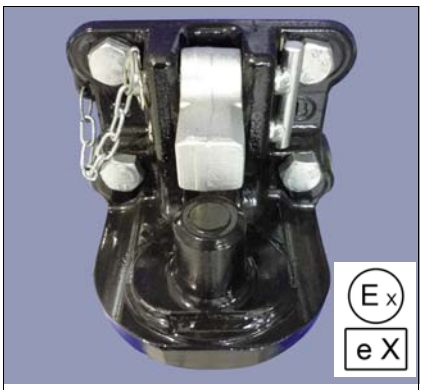


Fig. 223

Information

Only trailer couplings with EC acceptance or EC control marks are certified for use on public roads in Germany (StVZO German road traffic regulations).
Refer to and follow the National Type Approval (Germany) or the Data Confirmation (Germany) for information on other requirements!
Get informed on and follow the legal regulations of your country!

The Piton ball hitch is used for tractor vehicles according to § 43 clause 4 of the StVZO (German road traffic regulations) in the Federal Republic of Germany.

- Follow the regulations of the employer's liability insurance associations of your country when coupling or uncoupling a trailer.
- The attachments (trailer) and the ball hitch use are listed in the National Type Approval (Germany) or the Data Confirmation (Germany).
- Bear in mind the trailer and drawbar loads *– see chapter 9 "Trailer weight/drawbar load: trailer couplings (option)" on page 9-24*.
- Have a damaged or malfunctioning trailer coupling immediately repaired or replaced by an authorized service centre.
- Do not hitch trailers with positive steering.

Important information about the Piton ball hitch

WARNING

Accident hazard if the load on the front axle is too low!

Can cause serious injury or death.

- ► Install and safely lock attachments (for example buckets) on the loader unit that are certified for public roads.
- ► Cover the blade or teeth of the bucket across their entire width with the protection provided.

WARNING

Accident hazard due to a damaged trailer coupling!

Can cause injury.

- ► Check the ball hitch for damage before using it.
- ► Have a damaged or malfunctioning ball hitch immediately repaired or replaced by an authorized service center.
- ► The towing pin must have a maximum wear of 2 mm (0.08 in).

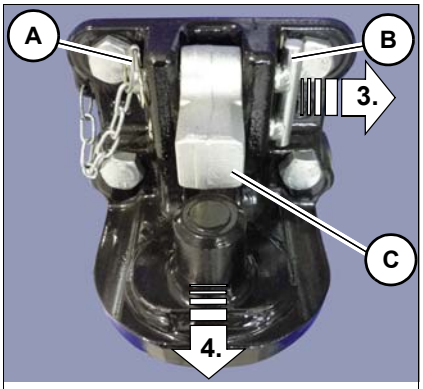
NOTICE

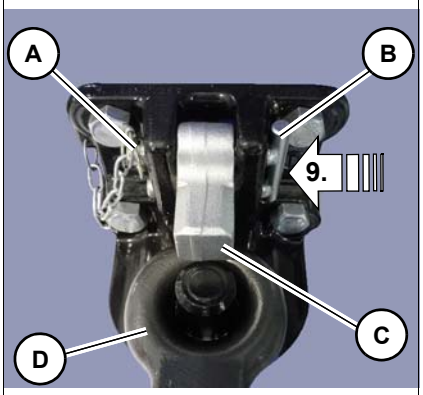
Before performing downhill machine travel, select the “Turtle” speed range and use the service brake to support the braking effect of the drive. This avoids damage to the drive and/or the diesel engine due to excessive speed! This applies to trailer operation in particular!

- ► Reduce the speed to less than 15 kph (9.32 mph) with the service brake.
- ► Select 1st speed “Turtle”.
- ► Support the drive’s braking effect with the brake/inching pedal by pressing it down with force beyond the inching range (intermittent braking).

Information

When equipped with a high speed gearbox (option), the wheel loader reaches maximum speed only on a level asphalted surface without a trailer and under normal load (attachment)!





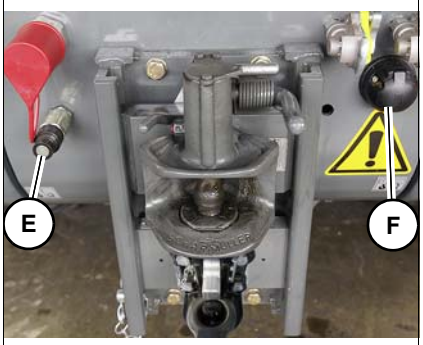


Fig. 224

Hitching a trailer

WARNING

Danger of accident during reverse machine travel.

Can cause serious injury or death.

- ► Ensure that nobody is between the machine and the trailer.
- ► Have another person guide you if necessary.

CAUTION

Accident hazard due to unlocked coupling pin!

Can cause injury.

- ► After coupling a trailer, always check whether the lug is safely seated on the towing pin and whether the hold-down device is safely locked.

1. Adapt the height of the drawbar to the height of the trailer coupling.
2. Pull spring plug **A** out of lock pin **B**.
3. Hold push-down plate **C** and remove lock pin **B** in the direction of the arrow.
4. Reverse the machine slowly until the lug is above the towing pin.
5. Stop the engine.
6. Apply parking brake.
7. Lower the drawbar prop and fold it to transport position.
8. Ensure that lug **D** is safely seated on the towing pin.
9. Position the hold-down device **C** so that the hold-down device is securely seated on the towing pin.
10. Use lock pins **B** (longer bolts on top).
11. Secure lock pin **B** with spring plug **A**.
12. Establish the electric **F** and hydraulic **E** connections between the trailer and the machine.
13. Release the trailer brake.
    - ➥ Refer to the Operator's Manual of the trailer.
14. Remove the wheel chocks from the wheels of the trailer and safely store them on the trailer.

Adjusting the height-adjustable ball hitch (option)

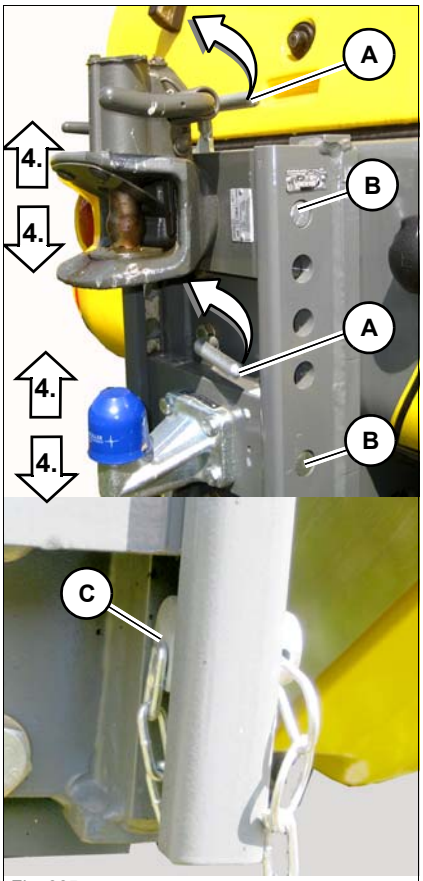


Fig. 225

Before hitching a trailer, the height of the ball hitch can be adjusted to the height of the trailer drawbar with the height adjustable ball hitch.

CAUTION

Injury hazard due to falling ball hitch!

If no locating pin is pre-adjusted, the ball hitch can fall on limbs when adjusting it.

► The locating pin **A** must be pre-adjusted before adjusting the ball hitch.

► Never remove the locating pin **A**.

WARNING

Danger of accident due incorrectly locked ball hitch!

The ball hitch can come out of the lock on the adjusting plate.

► Ensure that the lock pins on the left and right are visible and engaged flush in holes **C** of the adjusting plate.

1. Put the trailer drawbar in a horizontal position.
2. Insert lock pin **C** in the required position.
3. Pull lever **A** upward.
4. Slide the ball hitch upward or downward until it is at the same height as the trailer lug (at the middle of the tow hitch).
5. Release lever A.
   ➥ Lock pins **B** must engage on either side.

Information

In connection with a hydraulic or pneumatic trailer brake, the ball hitch has to be set in the lowest position. If the machine is equipped with an automatic ball hitch, the drawbar lug must rest on the base of the jaw.

Information

The height-adjustable ball hitch can be completely removed if necessary. To do this, remove locating pin **C**, unlock the ball hitch with lever **A** and take it out downward.

Compressed-air braking system of trailer (option)

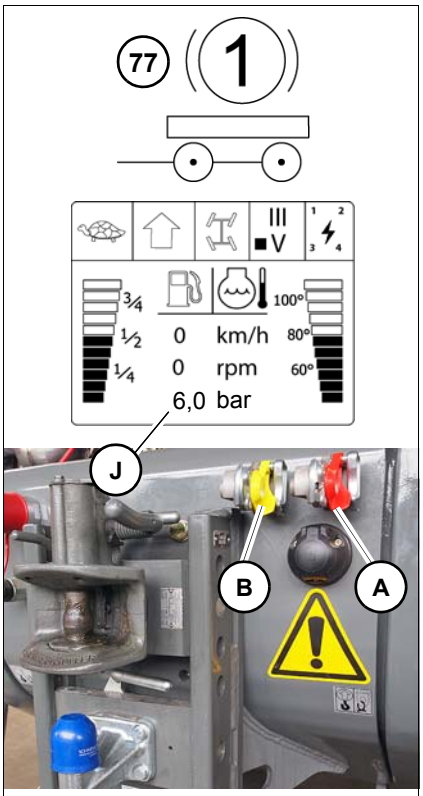


Fig. 226

Important safety instructions regarding the compressed-air braking system

- If indicator light **77** illuminates, the air pressure in the compressed-air braking system is too low. Start machine travel with a trailer hitched only if the digital display **J** reads a pressure of over 5.0 bar (73 psi).
- For machine travel without a trailer, the covers of the compressed-air couplings on the tractor vehicle must be closed.
- The compressed-air couplings on the supply lines of the trailer must be closed as well, or inserted in the dummy coupling heads.
- Before attaching the trailer, ensure that the sealing rings of the compressed-air couplings are clean and that they are not damaged.
- Pay attention to the compressed-air ports when connecting the supply lines.
  - Dual-circuit brake system **A** = red (tank), **B** = yellow (brake)
- Coupling and uncoupling compressed-air hoses (dual-circuit braking system). Pay attention to the correct chronological order when connecting and removing the supply lines
  – see “Coupling compressed-air hoses (dual-circuit braking system)” on page 5-120
  – see “Uncoupling compressed-air hoses (dual-circuit braking system)” on page 5-120
- Before moving off, set the lever of the trailer brake-power controller to the corresponding position (empty, half empty, full load).
- Trailers allowed to travel over 25 km/h (16 mph) must undergo specific inspections as required by StVZO (German road traffic regulations), §29, appendix VII.
  Get informed on and follow the legal regulations of your country
- Do not exceed the permissible maximum weight of the trailer.
- The maximum travel speed of the tractor/trailer combination is always the maximum speed of the slowest trailer.
- Check the drive belt on the compressed-air compressor at regular intervals for correct tension and damage.

NOTICE

Have repair and adjustment work on the braking system performed by an authorized service centre only!

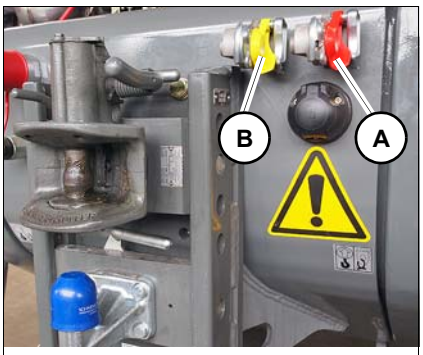


Fig. 227

Coupling compressed-air hoses (dual-circuit braking system)

1. After locking the trailer onto the ball hitch: First couple the compressed-air hose onto the yellow compressed-air coupling **B**, then the compressed-air hose onto the red compressed-air coupling **A**
2. On the trailer: open the lever of the trailer brake-power controller.

Uncoupling compressed-air hoses (dual-circuit braking system)

WARNING

Danger of accident due to trailer rolling away!

Can cause serious injury or death.

► Follow the chronological order described for uncoupling the pressure hoses!

1. Stop the machine.
2. Apply the parking brake.
3. Stop the engine and remove the starting key.
4. On the trailer: set the lever of the trailer brake-power controller to the corresponding position (empty, half empty, full load).
5. Uncouple the compressed-air hose on the red compressed-air coupling **A** (reservoir), then the compressed-air hose on the yellow compressed-air coupling **B** (brake).
6. Couple the compressed-air hoses on the brackets on the trailer.

Checking the compressed-air supply

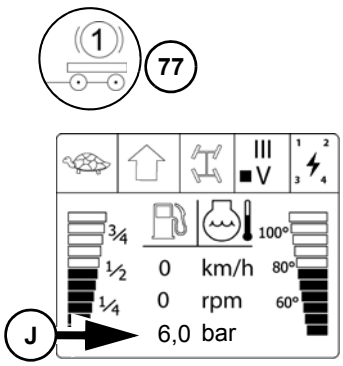


Fig. 228

WARNING

Danger of accident due to low air pressure!

The compressed-air braking system does not have enough braking effect at an air pressure below 5 bar (73 psi). Can cause serious injury or death.

► Before starting machine travel with a trailer hitched, the system pressure must read **at least 6 bar (87 psi)** in the digital display **J**.

► Indicator light **77** must have gone out.

► Stop the machine immediately if the air pressure drops below 5 bar (73 psi) during machine travel.

► Have the cause for the pressure loss immediately repaired by an authorized service center.

1. Let the diesel engine run at machine standstill until the compressed-air braking system is filled. **Specified value: 6 – 8 bar (87 – 116 psi)**
2. Perform a brake test.

Machine travel with the compressed-air braking system of the trailer

WARNING

Performing machine travel too fast can cause serious accidents! The trailer brake can overheat on longer downhill stretches with the brake-inch pedal pressed only halfway through!

Can cause serious injury or death.

- ► Reduce the travel speed early enough before turning or downhill machine travel (pump brakes). Press the brake-inch pedal **34** as far as it will go to brake the machine.
- ► Take your foot off the accelerator pedal to reduce the engine speed.
- ► Select the “Turtle” speed range.

When the machine is braked with brake/inching pedal **34**, air pressure is applied to the compressed-air braking system of the trailer to brake it.

Applying the parking brake also applies it to the compressed-air braking system of the trailer.

If the travel speed is reduced with the brake-inch pedal **34**, a pressure of about 2 bar (29 psi) is applied to the compressed-air braking system of the trailer after about 20% of the pedal travel. This “advance action” slightly brakes the trailer, and the tractor-trailer combination is held in a taut line.

NOTICE

The trailer brake can overheat on longer downhill stretches with the brake-inch pedal pressed only halfway through!

- ► Press the brake-inch pedal as far as it will go to brake the machine.

Hydraulic trailer brake (option)

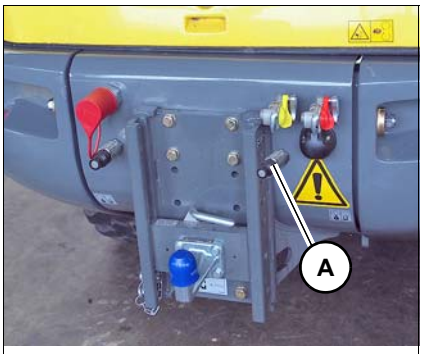


Fig. 229

Important safety instructions regarding the hydraulic trailer brake

- Plug coupling **A** for the hydraulic trailer brake is installed at the rear of the machine.
- The hydraulic trailer brake is operated with the machine's service brake!

NOTICE

The parking brake has **no** effect on the hydraulic trailer brake!

NOTICE

Only trailers with hydraulic brakes may be used that are certified for a braking pressure of a maximum 150 bar (2176 psi) at full braking!

Information

The hydraulic trailer brake is certified for public roads in Germany (StVZO German road traffic regulations) provided the brake system is adapted to the tractor!
The maximum road travel speed is limited to 25 kph (16 mph) in Germany (according to German traffic regulations).

► Refer to the National Type Approval (Germany), the Data Confirmation (Germany) or the licence certificate (Germany) for the applicable provisions!

► Get informed on and follow the legal regulations of your country, or have any country-specific final acceptance performed!

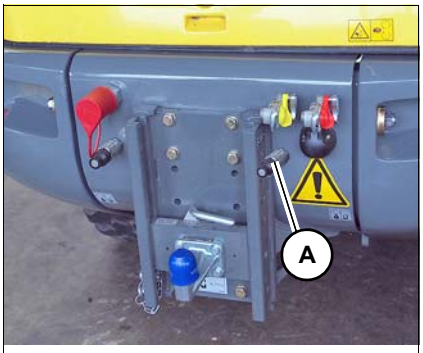


Fig. 230

Coupling a trailer brake hose

NOTICE

Clean the plug coupling carefully before connecting the flexible line of the trailer in order to ensure correct functioning and sealing!

► Inspections and maintenance on the hydraulic brake may be performed only by trained personnel or an authorized service centre.

1. Attach trailer to the ball hitch *– see “Hitching a trailer” on page 5-111*.
2. Clean the brake hose and plug coupling **A**.
3. Couple the brake hose onto plug coupling **A**.
4. Establish the electric and hydraulic connections between the trailer and the tractor vehicle.
5. Remove the wheel chocks from the wheels of the trailer and safely store them on the trailer.
6. Release the trailer brake.
   ➥ Refer to the Operator’s Manual of the trailer.

Performing machine travel with the hydraulic trailer brake

WARNING

Performing machine travel too fast can cause serious accidents! The trailer brake can overheat on longer downhill stretches with the brake-inch pedal pressed only halfway through!

Can cause serious injury or death.

- ► Reduce the travel speed before turning or downhill machine travel. Press the brake-inch pedal **34** in short intervals as far as it will go to brake the machine (pump the brakes).
- ► Take your foot off the accelerator pedal to reduce the engine speed.
- ► Select the “Turtle” speed range.

When the machine is braked with brake/inching pedal **34**, oil pressure is applied to the hydraulic braking system of the trailer to brake it.

The parking brake has no effect on the trailer braking system.

If the travel speed is reduced with brake-inch pedal **34**, oil pressure is applied to the trailer braking system after about 20% of the pedal travel. This “advance action” slightly brakes the trailer, and the tractor-trailer combination is held in a taut line.

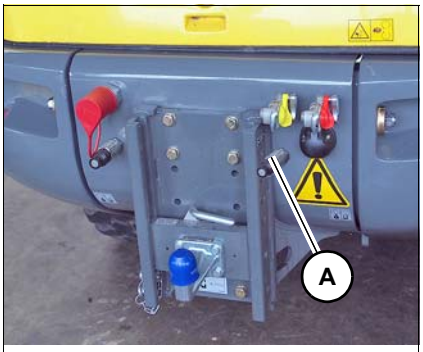


Fig. 231

Uncoupling the trailer brake hose

1. Park the machine and the trailer on level ground.
2. Apply parking brake.
3. Stop the engine.
4. Switch off the starter and remove the starting key.
5. Secure the trailer with wheel chocks.
6. Apply the trailer parking brake.
7. Disconnect the electric and hydraulic connections from the tractor vehicle to the trailer.
8. Close the flat connector plugs on the machine and the trailer with the protective caps provided.
9. Unhitch the trailer *– see “Unhitching the trailer” on page 5-112*.

Low-speed control with regulated travel speed (option)

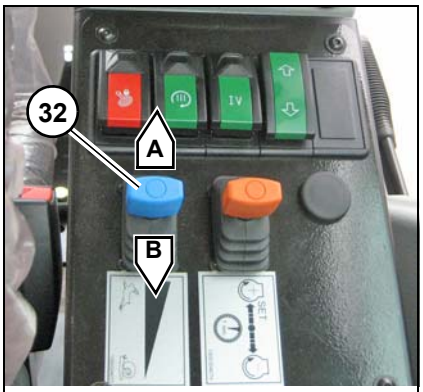


Fig. 232

Important information on the low-speed control with regulated travel speed (CSD = Control Speed Drive)

Using this function, an even driving speed can be achieved. The selected driving speed is largely self-contained of the driving resistance.

When operating hydraulically activated attachments (e.g. sweepers or ground mills), the function of the low-speed control ensures an even driving speed or starting from a standstill with a high engine speed.

With the sliding control, **32** the driving speed can be variably set regardless of the engine speed.

WARNING

Danger of accident due to fast acceleration of the machine!

Can cause serious injury or death.

► If a high speed is still pre-set via the manual throttle function, consider the saved speed and the resulting vehicle behavior before actuating the travel direction touch button.

Information

Operate low-speed control only in conjunction with the manual throttle option *– see “Manual throttle (option)” on page 5-10*.

Information

Operation of low-speed control is only possible from an engine speed of about 1100 rpm and in the ”Turtle” speed range
– see “Changing speed range” on page 5-19!

The low speed control is not effective in the "hare" speed.

Information

In order to achieve the maximum speed in the "Turtle" speed in normal application, the slide control **32** must be pushed forward to the detent (**A**).

If the slide control **32** is in position **B**, the vehicle will not drive.

Operation of low-speed control

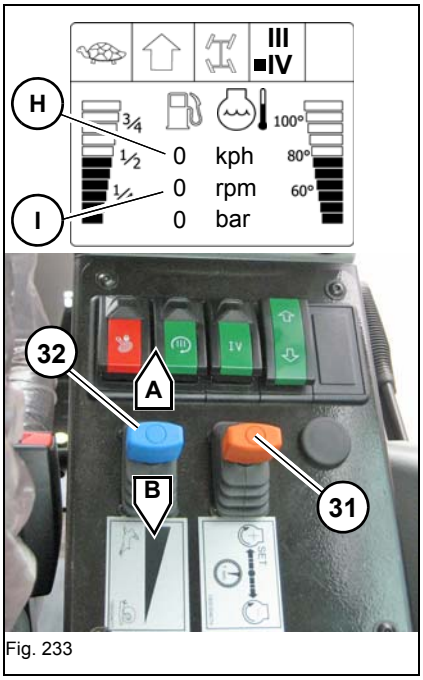


Fig. 233

Operation	Lever position	Result
Select the “Turtle” speed range.	*– see “Changing speed range” on page 5-19*.	
Activate the low-speed control function.	1. Pull the slide control **32** all the way to the rear **(B)**.	➥ Driving speed = 20 km/h (0 mph).
	2. Set the engine speed via the manual throttle controller **31** to the speed required for the attachment *– see “Manual throttle (option)” on page 5-10*.	➥ The speed **I** is shown in the display (rpm).
	3. Select a travel direction.	➥ Driving speed = 20 kph (0 mph).
Select the driving speed.	Push the slide control **32** forward **A** until the desired speed is achieved.	➥ The speed **H** is shown in the display (km/h). ➥ The speed is largely self-contained of the driving resistance.

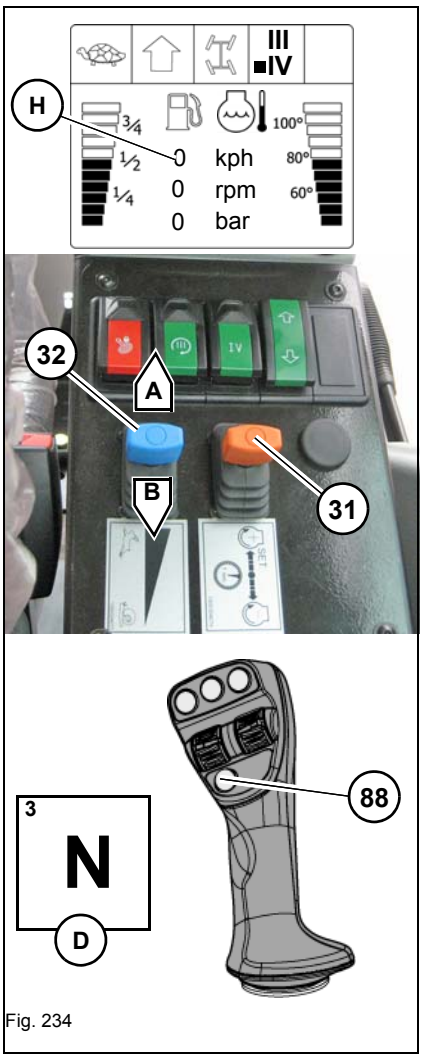


Fig. 234

Operation	Lever position	Result
Disabling the low-speed control.	1. Push the slide control **32** all the way to the rear **B**.	➥ The speed **H** is reduced to 0 km/h (0 mph). The engine speed saved via the manual throttle is preserved.
	2. Once the work operation is completed, press the touch button **88** "Neutral travel direction."	➥ The speed of the diesel engine falls to the lower idling speed. The manual throttle is disabled *– see "Disabling manual throttle in the "Turtle" speed range" on page 5-12*. ➥ Symbol **D/3** appears in the digital display.
	3. Push the slide control **32** all the way forward **A** for normal work operation.	➥ The speed is regulated via the accelerator pedal.

Information

For safety reasons, the low-speed control is also disabled when:

- the engine is restarted or
- the speed "Hare" is chosen.

If the low-speed control was disabled, the function must be reactivated and set.

Rotating beacon (option)

Information

If the vehicle is approved for travel on public roads in the Federal Republic of Germany, the rotating beacon must be folded up when driving on public roads, as otherwise the registration number cannot be read!

Information

In Germany, switching on the rotating beacon during machine travel on public roads is prohibited!

Exceptions are possible:

- ► when the work area of the vehicle is located in the traffic area of the street,
- ► when the vehicle represents an obstacle for normal traffic flow when in work application,
- ► when the vehicle is approved with official plates,
- ► when the vehicle has a safety label in the front and rear according to DIN 30710 (optional).

Observe the legal regulations of your country.

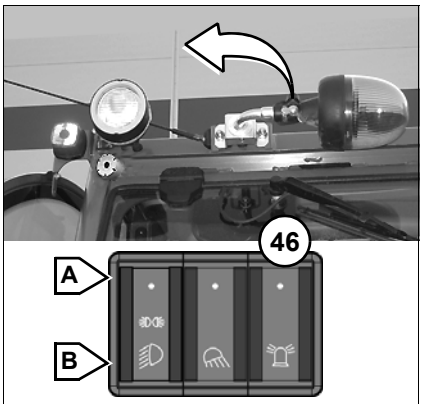


Fig. 235

The rotating beacon is operated with the toggle switch **46** in the switching console to the left of the steering wheel.

Rotating beacon operation		Function
ON	Press switch **46** to position **A**.	➥ The indicator light in the switch illuminates.
OFF	Press switch **46** to position **B**.	➥ Indicator light in switch goes out.

Information

Fold up and lock the rotating beacon before using it. In order to avoid possible damage, lower and lock the rotating beacon after using it.

Rear window heating (option)

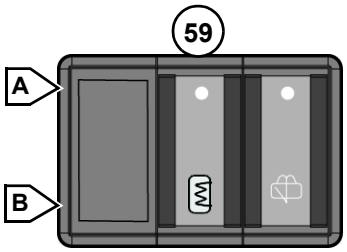


Fig. 236

The touch button of the rear window heating is located on the switch console on the left beside the steering wheel.

Rear window heating (option)		Function
ON	Press push button **59** to position **B**.	• Indicator light in switch illuminates. • Rear window heating is in operation.
OFF	Press push button **59** to position **A**.	• Rear window heating out of operation.

NOTICE

In order to avoid damage, the rear window heating is automatically switched off after about 5 minutes (time-lag relay).

Protective screens for front window and/or main lights (option)

Removing the protective screens for machine travel on public roads

The wheel loader can be fitted with protective screens on the front window and/or the main lights as a protection against falling material.

Information

The protective screens may be used only for work operation and must be removed during machine travel on public roads!

► See also the machine documentation and the Data Confirmation (Germany).

Backup warning system (option)

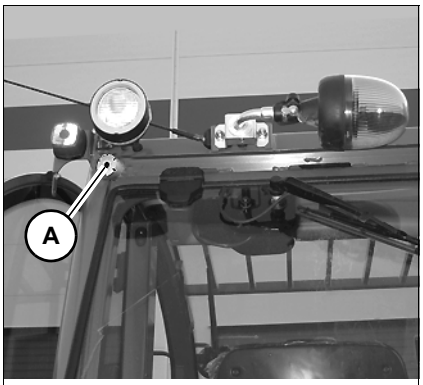


Fig. 237

The backup warning system consists of signal transmitter **A** fitted at the rear top left of the cabin.

Signal transmitter **A** generates an acoustic signal when shifting into reverse.

The volume at a distance of 1 m (1.09 yards) is about 103 dB (A) at a frequency of 2800 Hz.

WARNING

Injury hazard to persons in the danger zone!

Persons in the danger zone are possibly not seen and can be injured during backward machine travel.

- ► Do not rely on the backup warning system.
- ► Adjust the existing visual aids (for example the rearview mirrors) correctly.
- ► Work particularly carefully when reversing the machine.
- ► Interrupt work immediately if persons enter the danger zone.

Auxiliary heater (option)(Opt)

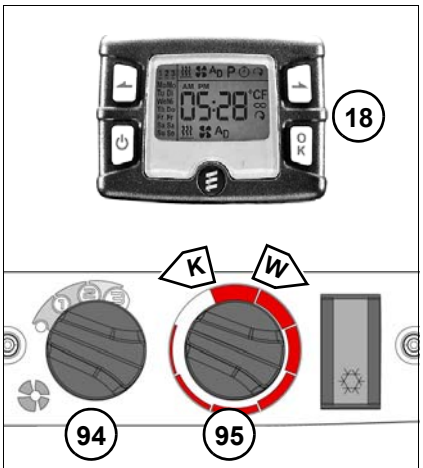


Fig. 238

The control element **18** of the auxiliary heating is located to the right above the switching console (near the cabin door).

At engine standstill, the auxiliary heater warms up the coolant that flows through the cabin heating to warm up the cabin.

Double advantage: warm cabin and preheated engine!

The heaters (engine heating and auxiliary heater) can be used independently of each other.

WARNING

Explosion hazard during operation of the auxiliary heater near flammable vapours or dust!

Can cause serious injury and death.

► Switch off the auxiliary heater before refueling the machine

WARNING

Poisoning and suffocation hazard during operation of auxiliary heater in enclosed areas!

Can cause serious damage to health or death.

► Do not put the auxiliary heater into operation in enclosed areas.

NOTICE

The auxiliary heater can be damaged by a loss of voltage.

► After switching it off, the auxiliary heater still runs for about 2 minutes to cool down.

► Switch off the battery master switch only if the auxiliary heater does not run any more.

Operating/programming the auxiliary heater

1. Adjust the fan speed with rotary switch **94**: positions **1 – 3**
2. Adjust the temperature with rotary switch **95**: **K** = cold/**W** = warm
3. Set the auxiliary heater timer.

Information

Refer to the operator's manual of the auxiliary heater supplied with the machine for operating and programming the timer!

Load stabilizer for loader unit (option)

For **minor** work as well as driving off-road or on public roads **without** a load, the load stabilizer attenuates the movements of the loader unit and thereby prevents the vehicle from shaking. This increases drive comfort and safety.

WARNING

Danger of accident due to pitching movements of the machine during machine travel on public roads!

Can cause serious injury or death.

- ► Always switch on the load stabilizer during machine travel on public roads.
- ► Lower the loader unit to transport position.

Information

In order not to restrict the functions of the load stabilizer, do not tilt in the tilt ram to the limit, or briefly release the hydraulic pressure in the tilt ram after tilting in the bucket.

Information

The loader unit yields easily with the load stabilizer switched on (continuous operation), making it difficult to perform any precise lifting movements.

- ► Switch off the load stabilizer during work operation.

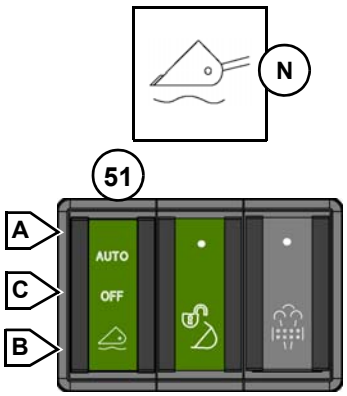


Fig. 239

Operating the load stabilizer

The load stabilizer can be used in automatic and continuous mode.

- The load stabilizer in **automatic operation** is suitable for longer trips off-road as well as on public roads or for minor work off-road. It is switched on and off by means of a driving speed control.
  - ➥ Driving speed over 15 kph (9.3 mph) => **ON**
  - ➥ Driving speed below 15 kph (9.3 mph) => **OFF**
- The load stabilizer in **continuous operation** is suitable for longer trips off-road as well as on public roads.
- **Switch off the load stabilizer for heavier duty loading work.**

Switch **51** for load stabilizer operation (option) is located on the switch console on the left beside the steering wheel.

Load stabilizer operation		Function
AUTO	Press switch **51** to position **A**.	➥ Load stabilizer in automatic mode. ➥ Symbol **N** appears in the digital display during machine travel over 15 km/h (9.3 mph), and disappears during machine travel below 15 km/h (9.3 mph).
OFF	Press toggle switch **51** to middle position **C**.	➥ Load stabilizer out of operation. ➥ Symbol **N** disappears from the digital display.
ON	Press switch **51** to position **B**.	➥ Load stabilizer in continuous operation. ➥ Symbol **N** appears in the digital display.

Information

Depending on the load, the loader unit can rise or go down slightly as you switch on the load stabilizer!

Reversing fan (option)

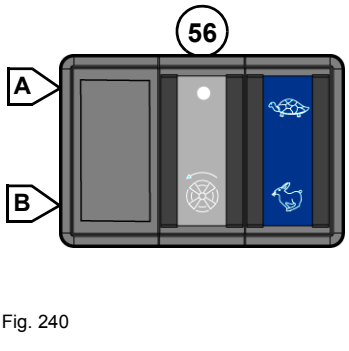


Fig. 240

Pressing the touch button **56** reverses the direction of rotation of the fan and cleans the radiator and maintains the temperature of the engine and hydraulic oil radiator at an optimal level.

Push button (**56**) for automatic cleaning is located on the switch console on the right.

Clean the radiator – *see chapter 7 “Cleaning the radiator with the reversing fan (option)” on page 7-39*.

5.14 Putting out of operation/back into operation

Putting out of operation

WARNING

Accident hazard if machine tips over or rolls away after parking it!

Can cause serious injury or death.

► Stop the machine on firm, level, and horizontal ground.

► Secure the machine accordingly (chocks, for example).

NOTICE

In order to avoid engine damage, allow the diesel engine to run for a while after operation under full load, so that the temperature can stabilize!

1. Lower the loader unit completely and set the bucket horizontally with the ground – *see "Working with the standard bucket" on page 5-79*.
2. Set the drive to neutral – *see "Selecting a travel direction and starting machine travel" on page 5-20*.
3. Stop the engine and remove the starting key.
   ➥ The immobilizer (option) is enabled.
4. Apply the parking brake – *see "Parking brake" on page 5-16*.
5. Close and securely lock the windows and the door as you leave the cabin.
6. Close and lock the cabin door as you leave the cabin.
7. Remove the key from the battery master switch
   – *see chapter 4 "Battery master switch (option)" on page 4-18*.
8. Lock the engine cover securely.
9. Take additional measures to secure the machine by placing chocks under the downhill sides of the wheels.

Putting out of operation for a longer period of time

1. If possible, retract the piston rods of the hydraulic cylinder to protect them against damage. If this is not possible, apply grease to the piston rods
2. and to the bare parts of the hydraulic cylinders that are not paint-coated.
3. **Before putting the machine into operation**, clean the piston rods, however not with a grease solvent or a high-pressure cleaner.
   ➥ The scraper bar is not water resistant. Water can therefore penetrate the guide bushings. This leads to rust formation and therefore damage to the piston rod.

Preserving the diesel engine

- Preserving inside
- Preserving outside

Information

Preserving work may be performed by an authorized service centre only!

5.15 Permanently putting out of operation

Information on decommissioning

If the machine is no longer used according to its designated use, ensure that it is put out of operation and disposed of according to applicable regulations.

Preparing disposal

- Follow all applicable safety regulations regarding machine decommissioning!
- Ensure that the machine cannot be operated between decommissioning and disposal!
- Ensure that there is no leakage of environmentally hazardous consumables, and that the machine presents no other dangers at its storage place!
- Ensure that the loader unit is fully lowered and that the bucket is placed horizontally on the ground! Install all protective devices!
- Ensure that the parking brake is used for parking the machine safely and for preventing it from rolling away and that the machine is secured in addition by placing chocks under the downhill sides of the wheels!
- Secure the machine against unauthorized use! Safely lock all openings (doors, windows, engine cover) of the machine!
- Repair leaks on the diesel engine, tanks and/or hydraulic systems and gearbox systems!
- Remove the battery!
- Store the machine in a place that is secured against access by unauthorized persons!

Environment

Avoid environmental damage!
Do not allow the oil and oily wastes to get into the ground or stretches of water! Dispose of different materials and consumables separately and in an environmentally friendly manner!

Disposal

Further recycling of the loader must be made in accordance with state-of-the-art standards applicable at the time of recycling, and in compliance with the safety regulations regarding accident prevention!

- All parts must be disposed of in the correct waste disposal sites for the different materials.
- Separate the material as you recycle parts!
- Ensure environmentally compatible disposal of consumables as well!

6 Transport

6.1 Towing the machine

Information on towing

WARNING

Accident hazard due to towing!

Can cause serious injury or death.

- ► The machine may only be towed using suitable towing equipment (towing bar or cable) in connection with suitable towing gear, such as a towing coupling, hooks and eyes!
- ► Ensure that no one is between the vehicles during towing.
- ► The max. towing distance is 300 m (328 yards).
- ► The max. towing speed is walking speed (5 kph/3.1 mph).
- ► Have a recovery service or an authorized service centre tow the machine away if necessary.

WARNING

Accident hazard when pulling trailer loads!

Pulling trailer loads can cause accidents, and serious injury or death.

- ► Do not use the towing gear to tow trailer loads.

Disabling the variable displacement pump

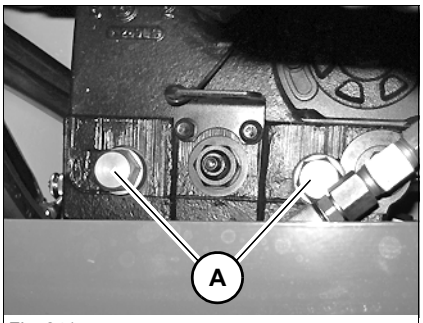


Fig. 241

NOTICE

The high pressure valves must be opened before towing in order to avoid damage (high pressure) to the variable displacement pump when towing away the machine.

Disabling the variable displacement pump (neutral position)

1. Apply the parking brake.
2. Stop the engine and remove the starting key.
3. Unscrew both high-pressure relief valves **A** on the variable displacement pump about 2 revolutions (wrench size 22 mm – 0.87 in).

Towing the machine

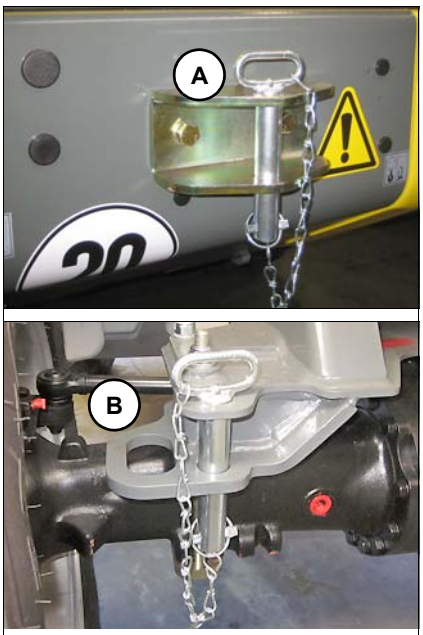


Fig. 242

Tow away the machine as follows:

Information

The towing devices at the vehicle rear **A** and on the frame at the front **B** is only certified for towing the machine. They are not certified as a trailer coupling, for fitting attachments or for raising, loading and tying down the machine.

1. Put the towing vehicle (with sufficient traction force and a safe braking system) in the towing position.
2. Attach suitable towing equipment (towing bar) to the towing facilities **A** or **B** (eyelets) on the machine.
   ➥ Bear in mind the machine's dimensions and weights.
3. Tow the machine out of the danger zone at walking speed.
   ➥ If possible, run the diesel engine at idling speed when towing.

Once towing is over

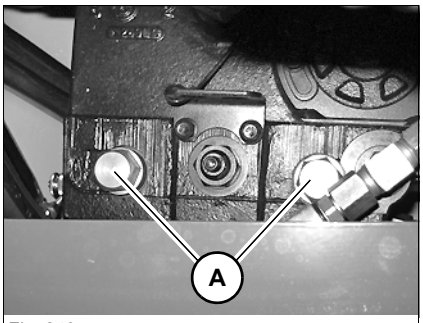


Fig. 243

Reset the variable displacement pump to drive operation once towing the machine is over!

1. Secure the machine with wheel chocks.
2. Remove the towing gear.
3. Screw in both high-pressure valves **A** on the variable displacement pump and tighten them to 70 Nm (wrench size 22 mm – 0.87 in).
4. In case of diesel engine and/or hydraulic drive breakdown, have an authorized service centre perform repair work.

6.2 Loading the machine

Loading the machine on a transport vehicle

Safety instructions regarding loading

- The transport vehicle must be of appropriate size – refer to chapter *Technical data on page 9-1* for the dimensions and weights of the machine to be loaded.
- Remove mud, snow or ice from the loading area and from the tires of the machine to be loaded.
- Secure the transport vehicle against unintentional movement.
- When positioning the machine on the platform, ensure that the center of gravity of the load is as low as possible and in the longitudinal center line of the transport vehicle if possible (load distribution plan).
- Do not exceed the permissible maximum weight and the gross axle weight rating of the transport vehicle.
- Ensure that the load does not fall short of the minimum axle load of the steering axle of the transport vehicle, otherwise the steering behaviour of the vehicle is seriously affected.
- Place partial loads so as to ensure an even load on all axles of the transport vehicle.
- Store or secure the load (machine) with suitable auxiliary means so that it cannot slip, slide, roll, tip over or fall, or cause the vehicle to tip over under usual transport conditions.
  - ➥ Usual transportation conditions are conditions in the which the brakes are slammed on, evasive maneuvers are performed with the vehicle or in which uneven roadways are traveled on.
  - ➥ Auxiliary means are, for example, anti-slip bases and linings, load-securing straps and chains, clamping beams, protective paddings, nets, edge protectors and many others.
- Always use the existing tie-down points when using belts and chains *– see chapter 3 “Machine overview” on page 3-1*.
- Use only tested ropes, belts, hooks and Shackles (lockable brackets with screws or socket pins) for tying down!

NOTICE

When loading and driving on ramps, the diesel engine can be damaged if the engine oil level is too low.

► Before loading, check the oil level in the diesel engine.

► The oil level must be visible at the MAX mark of the oil dipstick.

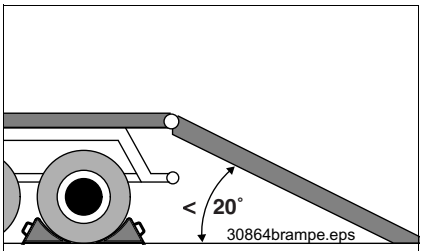


Fig. 244

Loading and tying down the machine

1. Secure the transport vehicle with chocks to prevent it from rolling.
2. Place the access ramps at the smallest possible angle.
   ➥ Do not exceed an **angle of 20°**.
   ➥ Use access ramps with an antiskid surface only.
3. Ensure that the loading area is clear and access to it is not obstructed, for example by superstructures.
4. Ensure that the access ramps and the wheels of the machine are free of oil, grease and ice.
5. Check the oil level of the diesel engine.
   ➥ The oil level must be visible at the MAX mark of the oil dipstick.
6. Start the machine.
7. Raise the loader unit enough so that it will not touch the access ramps.
8. Carefully drive the machine onto the middle of the transport vehicle.
9. Set the drive to neutral
   – see chapter 5 “Neutral position, stopping the machine” on page 5-22.
10. Lower the loader unit to the loading area.
11. Stop the engine.
12. Apply the parking brake *– see chapter 5 “Parking brake” on page 5-16*.
13. Remove the starting key.
14. Do not allow anyone to stay in the cabin, lock the door and the engine cover.
15. Ensure that the permissible maximum height of the transport vehicle is not exceeded.

Crane-lifting the machine

Safety instructions regarding crane-lifting

In order to avoid injury or accident hazard, bear in mind the following information when loading the machine!

- Ensure that **no one is in the machine to be loaded**!
- Seal off the danger zone.
- The crane and the lifting gear must have suitable dimensions.
- Take into account the machine's overall weight *– see chapter 9 "Weight" on page 9-19*.
- Use only tested ropes, belts, hooks and Shackles (lockable brackets with screws or socket pins) for tying down!
- In the USA, only use lifting gear tested and certified by the Occupational Safety and Health Administration (OSHA).
- The slinging points on the machine are marked with symbols *– see "Crane-lifting the machine" on page 6-6*.
- Have loads fastened and crane operators only instructed by experienced persons.
- The person guiding the crane operator must be within sight or sound of him.
- The crane operator must observe all movements of the load and the lifting gear! Secure the machine against unintentional movement!
- The crane operator may move a load only after making sure that the load is safely fastened and nobody is within the danger zone, or after receiving a signal from the persons attaching or securing loads.
- The load must not be fastened by winding the lifting rope or lifting chain around it!
- Bear in mind the load distribution (centre of gravity) when fastening the lifting gear.
- Load the machine only with the standard bucket empty and in transport position!
- Stay clear of suspended loads!
- Follow the safety instructions in this Operator's Manual on page *2-1* under all circumstances!

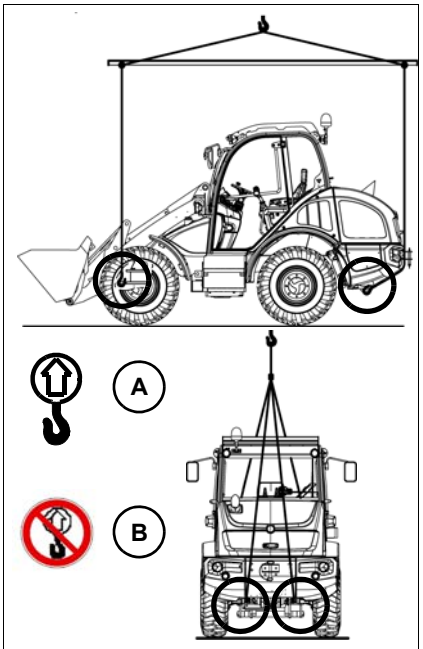


Fig. 245

Perform crane-lifting as follows:

1. Install and safely lock the standard bucket
   – see chapter 5 “Pick up the attachment” on page 5-58.
2. Set the drive to neutral
   – see chapter 5 “Neutral position, stopping the machine” on page 5-22.
3. Stop the engine and remove the starting key.
4. Apply the parking brake
   – see chapter 5 “Parking brake” on page 5-16.
5. Lock the cabin and the engine cover.
6. Fasten sufficiently sized lifting gear to the 4 slinging points (symbol **A** on the frame) of the vehicle.
7. Carefully raise the machine with the crane.

NOTICE

The slinging points**B** on the cabin may only be provided for the disassembly of the cabin and may **not** be used for loading the vehicle.

6.3 Transporting the machine

Safety instructions regarding transport

- Adapt the travel speed of the transport vehicle to the load, the road and traffic conditions and to the driving characteristics.
- The transport vehicle must be of sufficient size
  – *see chapter 2 “Transportation” on page 2-14*.
  See chapter “Technical data, Weights” on page *9-19* for the dimensions and weights of the vehicle to be loaded.
- Ensure that the authorized maximum height of the transport vehicle is not exceeded.
- Remove any mud, snow or ice from the tires so that the machine can be safely driven onto the ramps.
- When positioning the load on the platform of the transport vehicle, ensure that the center of gravity of the load is as low as possible and in the longitudinal center line of the vehicle if possible (load distribution plan).
- Do not exceed the gross weight rating and the gross axle weight rating of the transport vehicle when loading and transporting.
- Ensure that the load does not fall short of the minimum axle load of the steering axle of the transport vehicle. Failure to meet the minimum rated capacity will cause a hazardous loss of steering control.
- Place partial loads so as to ensure an even load on all axles of the transport vehicle.
- Store or secure the load with suitable auxiliary means so that it cannot slip, slide, roll, tip over or fall, or cause the vehicle to tip over under usual transport conditions.
  - ➥ Usual transportation conditions are conditions in the which the brakes are slammed on, evasive maneuvers are performed with the vehicle or in which uneven roadways are traveled on.
  - ➥ Auxiliary means are, for example, anti-slip bases and linings, load-securing straps and chains, clamping beams, protective paddings, nets, edge protectors and many others.
- Always use the existing tie-down points of the machine when using belts and chains – *see “Tying down the machine” on page 6-9*.
- When you tie down the machine with belts, do not place and tighten them in sharp-edged eyelets

---

NOTICE

When loading and driving on ramps, the diesel engine can be damaged if the engine oil level is too low.

► Before loading, check the oil level in the diesel engine.

► The oil level must be visible at the MAX mark of the oil dipstick.

Tying down the machine

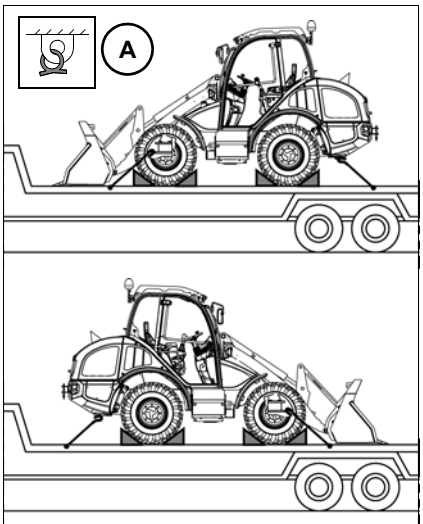


Fig. 246

Tie down as follows

1. Secure all tyres of the machine with chocks in front of and behind each wheel.
2. Firmly tie down the machine at the eye hooks – see symbol **A** on the front and rear machine frame *– see chapter 3 “Machine overview” on page 3-1* – with ratchet straps or chains of sufficient size onto the platform.
   - ➥ Do not place cables, belts, etc. over sharp-edged objects.
   - ➥ Use only tested ropes, belts, hooks, shackles (with screw and socket pins with lockable frames) for tying down the machine.
3. Before transporting the machine through heavy rain, close the outlets of the exhaust silencer with a simple cap or suitable adhesive tape.
4. Ensure that the operator of the transport vehicle knows the overall height, width and weight (including the loaded machine) before driving off, and the legal transport regulations of the country or countries in which transport will take place!

Notes:

7 Maintenance

7.1 Information on maintenance

Responsibilities and prerequisites

- Operational readiness and the service life of the machine are heavily dependent on maintenance and care.
- **The "daily maintenance" and "work every 20 hours of operation" indicated in the maintenance schedule have to be performed by a specially trained operator.**
- Have the following maintenance performed by an authorized service center otherwise warranty claims will not be acknowledged:
  - Delivery inspection,
  - Oil and filter replacement every 500 o/h,
  - 1st inspection at 100 o/h,
  - Every 500 o/h,
  - 1500 o/h (once a year)
- The manufacturer shall not be liable for damage or personal injury caused by failure to observe instructions!
- Please contact your dealer if you require more information on maintenance and service work.
- Insist on using original spare parts for repairs.
  The machine's permits, certifications, registrations, etc., may be withdrawn if machine parts/components with a prescribed condition or quality, or machine parts/components that can put persons at risk during operation, are subsequently modified or exchanged.

Important safety instructions regarding maintenance

CAUTION

Injury hazard due to maintenance!

Injury hazard!

► Apply the parking brake.

► Stop the engine and remove the starting key.

► Observe the danger indications and safety instructions during maintenance.

► Always park the machine on firm and level ground and secure it to prevent it from rolling away.

► Secure the raised loader unit against unintentional lowering.

► Remove the key of the battery master switch if the machine is equipped with this option.

► Follow the maintenance and safety instructions given in the Operator's Manuals of the attachments.

Safety prop for loader unit (option)

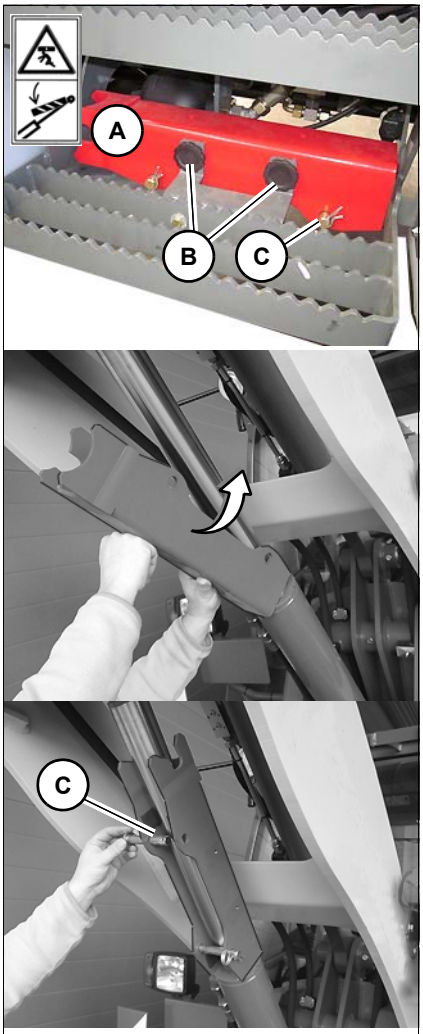


Fig. 247

WARNING

Danger of crushing during maintenance work on a raised loader unit that is not secured!

Can cause serious injury or death.

► Lower the loader unit to the ground during maintenance.

► If the machine is equipped with a safety support **A** (option), install it on the extended lift cylinder and secure it with a locating pin **C**.

Installing the safety prop onto the lift cylinder

The safety support is located on the machine frame (e.g. on the left at the access).

1. Park the machine on firm and level ground.
2. Empty and tilt in the attachment (bucket).
3. Raise the loader unit.
4. Apply the parking brake.
5. Stop the engine and remove the starting key.
6. Remove fastening screws **B** and the safety prop.
7. Remove lock pin **C** from the safety prop.
8. Slide safety prop **A** from below over the piston rod of the extended lift cylinder and turn it 180°.
9. Install lock pin **C** and secure it with a safety pin.
10. Carefully lower the loader unit (without pressure) onto the safety prop.

NOTICE

Install the safety support as shown in *Fig. 247* in order to avoid damage to the piston rod and the safety support!

► Opening showing downward!

Information

Before putting the machine into operation, remove the safety support from the lift cylinder and fasten it in the pre-determined storage place!

7.2 Maintenance overview

Maintenance plan

Important information on the maintenance plan

Have the maintenance work "delivery inspection" and the inspections "**A**" 1st inspection at 100 hours of operation, "**B**" every 500 hours of operation and "**C**" every 1500 hours of operation (annually) performed by an authorized service center to have warranty claims recognized.

For service and maintenance on the attachment, please refer to the operation and maintenance manual of the attachment manufacturer as well.

Oil and filter changes[1] (⇄)	Service centre	User/operator		Service centre		
	Delivery inspection	Every 10 o/h (once a day)	Every 20 o/h	"A" 1st Inspection at 100 o/h	"B" 2nd Inspection then every 500 o/h	"C" every 1500 o/h once a year
Motor oil [2, 3]					●	●
Motor oil filter					●	●
Fuel filter					●	●
Fuel pre-filter					●	●
Urea filter[4, 5] (on the pump)					●	
Air cleaner[4] (urea tank)				●	●	●
Filling screen[4] (urea tank)					●	●
Air filter insert [6]					●	●
Air cleaner cartridge – safety cartridge[7]						●
Gearbox oil in rear axle gearbox[8]					●	●
Gearbox oil in differential (front and rear axles)				●		●
Gearbox oil in left and right-hand planetary drives (front and rear axles)				●		●
Hydraulic oil						●
Return filter air cleaner (filter) element at hydraulic oil tank				●		●
Hydraulic oil tank cleaner[7]						●
Heater fine dust filter[7] (cabin interior)					●	●

1. Have the 1st inspection at 100 hours of operation and the 2nd inspection at 500 hours of operation performed by an authorized service center otherwise warranty claims will not be acknowledged
2. Have maintenance performed by an authorized service centre (acknowledgement of warranty claims).
3. **Important!** Before changing the oil, a manual regeneration of the exhaust after-treatment system (DOC and SCR catalytic converter) must be performed for DEUTZ engines with EU exhaust emission level IV (EPA tier4f) – *see "Manual regeneration" on page 7-84*. Then reset the maintenance counter in the DEUTZ engine controller.
4. The urea system is only installed in DEUTZ engines with EU exhaust emission level IV (EPA tier 4f) with exhaust after-treatment system (DOC and SCR catalytic converter).
5. At the latest after 2 years.
6. Replace air cleaner (filter) element at least once a year or every 1500 hours of operation.
7. Depending on the work operation and accumulation of dust as well as for applications in acidic environments, change the filter more often.
8. Every 500 hours of operation, change oil after taking into service for the first time and afterwards, every 1500 hours of operation.

Inspection work[1] (👁) :	Service centre	User/operator		Service centre		
	Delivery inspection	Every 10 o/h (once a day)	Every 20 o/h	"A" 1st Inspection at 100 o/h	"B" 2nd Inspection then every 500 o/h	"C" every 1500 o/h once a year
Engine oil: check the fill level.	●	●		●	●	●
Hydraulic oil: check the fill level	●	●		●	●	●
Check the hydraulic oil tank for condensation water.[2]					●	●
Clean the suction filter of the hydraulic system (suction filter insert on hydraulic tank).						●
Check coolant fill level[3, 4]	●	●		●	●	●
Clean the coolant level sensor.					●	●
Check gear oil fill level in front and rear axle differential.	●			●	●	●
Check gear oil fill level in the gearbox.	●			●	●	●
Check gear oil fill level in front and rear axle, check the left and right fill level.	●			●	●	●
Check the brake fluid (ATF) fill level, top off (or have topped off) if necessary.[3, 5]	●	●		●	●	●
Drive system: check and if necessary correct the variable displacement motor of the variable displacement motor by means of the test report.[6]				●		●
Check water/oil cooler for contamination and clean it if necessary.[7]		●		●	●	●
Check the intercooler (diesel engine) for contamination, clean if necessary.[7]		●		●	●	●
Check the heater box (air conditioning option) for contamination, clean it if necessary.[7]		●		●	●	●
Clean dust valve (air cleaner housing).	●	●		●	●	●
Check all pressure accumulators, correct the pressure level if necessary.[8]					●	●
Check the area around the pedals. Clean them and apply grease or oil if necessary.		●		●	●	●
Check the locks/door arrester. Clean them and apply grease or oil if necessary.		●		●	●	●
Check condition and pre-tension of V-ribbed belt[9] (water pump and generator), re-tension or replace it if necessary	●				●	●
Check condition and pretension of V-belt (compressed-air trailer brake), have it retightened or replaced if necessary.	●	●		●	●	●
Check condition and pretension of V-belt (air conditioning), have it retightened or replaced if necessary.	●				●	●
Fuel pre-filter: drain the water.					●	●

Inspection work[1] (👁) :	Service centre	User/operator		Service centre		
	Delivery inspection	Every 10 o/h (once a day)	Every 20 o/h	"A" 1st Inspection at 100 o/h	"B" 2nd Inspection then every 500 o/h	"C" every 1500 o/h once a year
Check the diesel particulate filter (optional) for ash load, replace if necessary.[10]				Every 3,000 hours of operation●		
Check battery charge condition; and charge if necessary.[11]	●				●	●
Heater: Clean the fine-dust filter (replace every 500 hours of operation)			●	●	●	●
Check and set the pressure (control piston M3 on the high-speed gear) (optional).[12]				●		
Check the brake pads on the service brake and parking brake and adjust or renew as required Replace if necessary.[13]				●	●	●
Perform tire check (damage, inflation pressure, tread depth).	●		●	●	●	●
Electrical system: check electric and ground connections, chafing on wiring harnesses, battery terminals.	●		●	●	●	●
Compressed-air brake (option): check for leaks (sound of escaping air) and damage.			●	●	●	●
Check condition of ball hitches (option). Replace them if necessary.[13]			●	●	●	●
Aggressive media (option): check anti-corrosion protection and renew it if necessary.			●	●	●	●
Warning and notice signs: check for damage, readability.	●	●		●	●	●
Check condition of paint coating.	●			●	●	●

1. Have the 1st inspection at 100 hours of operation and the 2nd inspection at 500 hours of operation performed by an authorized service center otherwise warranty claims will not be acknowledged
2. When using bio oil in particular, check for condensation water (oil probe) and replace the hydraulic oil if necessary.
3. Replace every 2 years.
4. Clean the cooling system with clean water before refilling the cooling system.
5. Do not mix the brake fluid with other brake fluids for safety reasons. Use only **ATF** brake fluids.
6. For the test report, refer to the system manual of machine model 352-03/352-04.
7. Clean radiator more frequently depending on operation and dust conditions, in particular if the machine is used for mowing and mulching applications.
8. Have the pressure accumulators checked only by an authorised service centre (acknowledgement of warranty claims).
9. Must be replaced every 3000 o/h by an authorized service centre.
10. After checking or replacing the diesel particulate filter, reset the requirement in the digital display to zero.
11. Make a note of the date the battery is charged.
12. The pressure at the control piston M3 must be set to 115/-2 bar by an authorized service center every 100 hours of operation.
13. Safety part! Have maintenance and repairs performed only by an authorised service centre

Lubrication[1,2,3] () (Note: lubricate more frequently when in heavy-duty operation!)	Service centre	User/operator		Service centre		
	Delivery inspection	Maintenance work (daily)	Every 20 o/h	"A" 1st Inspection at 100 o/h	"B" 2nd Inspection then every 500 o/h	"C" every 1500 o/h once a year
Hinges, joints (for example door arresters)			●	●	●	●
Rear axle oscillating bearing	●		●	●	●	●
Front and rear axle planetary drive bearings (left and right)	●		●	●	●	●
Trailer coupling – joint (option)	●		●	●	●	●
Loader unit – *see "Lubricating the loader unit" on page 7-26*						
Lift chassis bearing	●	●		●	●	●
Tilt rod bearing	●	●		●	●	●
Rocker arm bearing	●	●		●	●	●
Lift cylinder bearing	●	●		●	●	●
Tilt cylinder bearing	●	●		●	●	●
Quickhitch: bearing on lift frame	●	●		●	●	●

1. Observe the manufacturer's indications for lubrication of the attachment!
2. Have the 1st inspection at 100 hours of operation and the 2nd inspection at 500 hours of operation performed by an authorized service center otherwise warranty claims will not be acknowledged
3. More frequently when the machine is used for extremely heavy work. The "Central lubrication system" option is recommended in this case.

Functional check[1] ( ):	Service centre	User/operator		Service centre		
	Delivery inspection	Maintenance work (daily)	Every 20 o/h	"A" 1st Inspection at 100 o/h	"B" 2nd Inspection then every 500 o/h	"C" every 1500 o/h once a year
Service and parking brake[2]	●	●		●	●	●
Steering system[2]: steering column adjustment, synchronous position of wheels	●	●		●	●	●
Electrical system – lights, indicator lights, signalling system, washer system	●	●		●	●	●
Heating, air conditioning (option)	●	●		●	●	●
Trailer couplings[2] (option)	●	●		●	●	●
Drive interlock (option)	●	●		●	●	●
Seat adjustment, seat belt	●	●		●	●	●
Electrohydraulic lock – joystick and 3rd control circuit (road travel)	●	●		●	●	●
Loader unit load stabiliser (option)	●	●		●	●	●
Front and rear additional control circuit (option)	●	●		●	●	●

1. Have the 1st inspection at 100 hours of operation and the 2nd inspection at 500 hours of operation performed by an authorized service center otherwise warranty claims will not be acknowledged
2. Safety part! Have maintenance and repairs performed only by an authorised service centre

Leakage check[1]	Service centre	User/operator		Service centre		
	Delivery inspection	Maintenance work (daily)	Every 20 o/h	"A" 1st Inspection at 100 o/h	"B" 2nd Inspection then every 500 o/h	"C" every 1500 o/h once a year
Air intake line[2] (air filter – engine)	●	●		●	●	●
Engine lubrication (engine – filter)	●	●		●	●	●
Fuel lines[3]	●	●		●	●	●
Urea tank, urea lines (optional)	●	●		●	●	●
Cooling system (engine – hydraulic oil)	●	●		●	●	●
Steering system[4] (hose pipes and steering cylinders)	●	●		●	●	●
Hydraulic system/loader unit (flexible lines[5] and rams)	●	●		●	●	●
Rapid action couplings (auxiliary control circuits, 3rd control circuit, tipping trailer connection((option)	●	●		●	●	●
Braking system[4] (flexible lines and cylinders)	●	●		●	●	●
Compressed-air brake (option)	●	●		●	●	●
Air conditioning system (option) (hose pipes, capacitor, dehumidifier)	●	●		●	●	●

1. Have the 1st inspection at 100 hours of operation and the 2nd inspection at 500 hours of operation performed by an authorized service center otherwise warranty claims will not be acknowledged
2. In order to avoid engine damage, have air intake lines with cracking and chafe marks immediately replaced by an authorized service center.
3. Replace flexible fuel leak oil lines (synthetic material) every 2 years.
4. Safety part! Have maintenance and repairs performed only by an authorized service center.
5. Replace flexible lines every 6 years (DIN 20066 part 5).

Check bolts and nuts[1] for tightness, retighten them if necessary:	Service centre	User/operator		Service centre		
	Delivery inspection	Maintenance work (daily)	Every 20 o/h	"A" 1st Inspection at 100 o/h	"B" 2nd Inspection then every 500 o/h	"C" every 1500 o/h once a year
Engine and engine bearing	●			●	●	●
Exhaust system	●			●	●	●
Steering system[2]	●			●	●	●
Hydraulic system	●			●	●	●
Loader unit (pin locking)	●			●	●	●
Axle mounting, axle suspension	●			●	●	●
Counterweight (attachment)	●			●	●	●
Fastening screws of cardan shafts	●			●	●	●
Cabin fastening screws	●			●	●	●
Wheel nuts	●			●	●	●
Trailer couplings (option)	●			●	●	●

1. Have the 1st inspection at 100 hours of operation and the 2nd inspection at 500 hours of operation performed by an authorized service center otherwise warranty claims will not be acknowledged
2. Safety part! Have maintenance and repairs performed only by an authorized service center.

Service indication

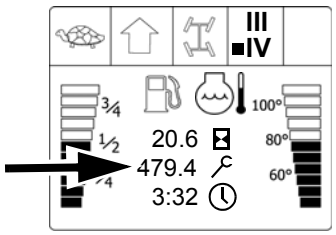


Fig. 248

The maintenance intervals are indicated by the service indication in the digital display.

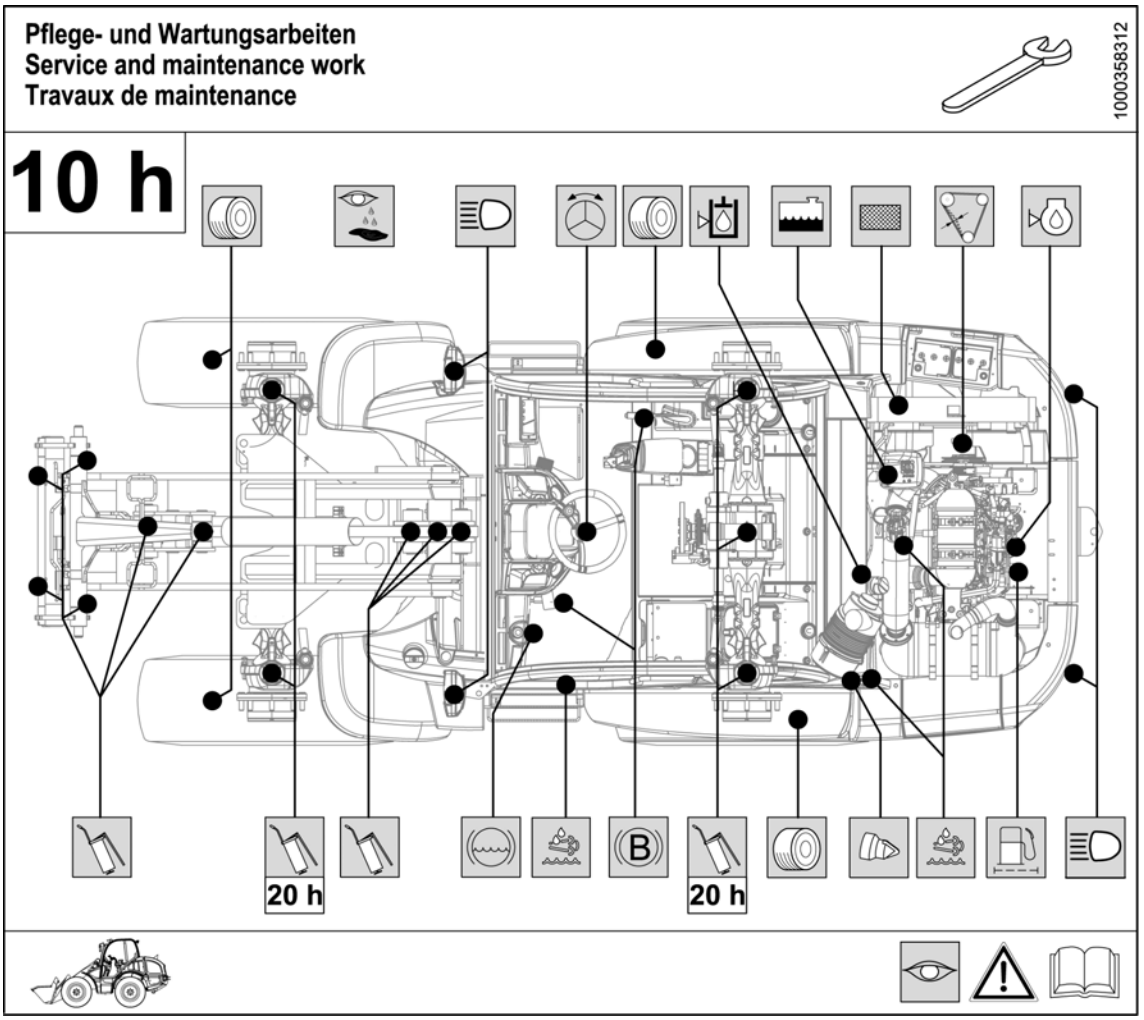
Description – *see chapter 4 "Overview of control elements" on page 4-29*.

Information

Maintenance intervals – *see "Maintenance plan" on page 7-3*.

Maintenance label

Located inside the cabin on the rear window



Explanation of symbols on the maintenance label

Affixed on the cabin

Symbol	Explanation
	Before starting maintenance, follow the safety instructions in the Operator's Manual!
	Before starting maintenance, read the "Maintenance" chapter in the Operator's Manual!
	Perform a functional check of the light system!
	Check tires for damage, inflation pressure and tread depth!
	Perform a functional check and synchronise the steering system!
	Perform a functional check of the braking system!
	Check hydraulic oil level. Add oil if necessary!
	Check engine oil level. Add oil if necessary!
	Check the brake fluid. Add fluid if necessary!
	Check the coolant. Add coolant if necessary!
	Compress the dust valve.
	Check radiator for engine coolant and hydraulic oil for dirt. Clean if necessary!
	Check condition and initial tension of V-belt. Retension or replace it if necessary!
	Leakage check: Check for tightness, leaks and chafing: pipes, flexible lines and threaded fittings. Rectify if necessary!
	Leakage check: Check the fuel/water separator. Drain water if necessary!
	Lubrication service: Lubricate the assemblies concerned!
	Leakage check: Urea system, urea lines (optional)!

7.3 Fluids and lubricants

Overview of lubricants

Component/application	Capacities [1]	Fluid/lubricant[2]	SAE grade Specification	Season/ temperature
Diesel engine	About 10.5 l (2.77 gal)	Engine oil[3] with oil filter	EUROLUB Supermax SAE 10W-40	Year-round
Engine cooling	Water 12 l (3.17 gal) Antifreeze 11 l (2.91 gal)	Antifreeze[4, 5, 6]	Water 55 % + HAVOLINE XLC or DEUTZ cooling system protective agent 45 %	Year-round −35 °C (−31 °F)
Fuel system, fuel tank[7]	About 120 l (31.70 gal)	Diesel fuel[8, 9]	DIN EN 590 (EU) ASTM D975-94 (USA)	Year-round −40 °C (−40 °F)
Urea tank[10]	About 10 l (2.6 gal)	Urea solution	AUS 32 (EU) DEF (USA	Year-round -11°C (12°F)
20 kph gearbox	0.8 l (0.21 gal)	Gearbox oil[11]	SAE 90 LS (Eurolub Gear LS 80W-90 GL5)	Year-round
30 kph gearbox (option)	4.5 l (1,188 gal)			
40 kph gearbox (option)				
Front or rear axle differentials[12]	4.0 l (1.05 gal)			
Planetary drives front or rear axle[12]	0.9 l (0.23 gal)			
Braking system	0,5 L	Brake fluid[13]	ATF Suffix A	Year-round
Hydraulic oil reservoir	About 64 l[14] (16.90 gal)	Hydraulic oil[15]	HVLPD 32[16]	30 °C (−22 °F)
			HVLPD 46 (HYD0530)	Year-round
		Biodegradable oil	AVILUB Syntofluid 46	
			PANOLIN HLP Synth 46	
Grease zerk fittings on the loader, axes, suspension fixtures	As required	Multipurpose grease	Lithium-saponified brand-name grease MPG-A	Year-round
Installation of pins, shafts[17]	As required	Special grease	Fuchs "gleitmo" 800	Year-round
Battery terminals	As required	Acid-proof grease	SP-B	Year-round

Continued on next page!

Component/application	Capacities [1]	Fluid/lubricant[2]	SAE grade Specification	Season/ temperature
Air conditioning (option)[18]	About 0.85 kg (1.87 lbs.)	Refrigerant[19]	R 134a/DIN 9860	Year-round
Washer system	Water 1.0 l (0.26 gal) Antifreeze 2.0 l (0.52 gal)	Cleaning agent[5]	Water 33% + antifreeze 67%	Year-round −20 °C (−4 °F)
Aggressive media (option)[20]	As required	Anticorrosion protection	ELASKON 2000 ML, ELASKON UBS light, ELASKON Aero 46 special, ELASKON Multi 80	Year-round

1. The capacities indicated are approximate values; the oil level check alone is relevant for the correct oil level.
2. Bear in mind the safety data sheet during maintenance.
3. Specification: CJ-4, ACAE E4/E6/E7/E9. Also see: *www.deutz.com/file/...de.0/flyer_betriebsstoffe_de.pdf.*
4. In order to avoid engine damage and loss of warranty, use only antifreeze released according to DEUTZ DQC CA-14, CB-14, CC-14. For other released antifreeze products, see: *www.deutz.com/file/...de.0/flyer_betriebsstoffe_de.pdf.*
5. Compound table *– see chapter 9 "Coolant" on page 9-18* or the manufacturer's information on the packaging.
6. The antifreeze must be replaced every 2 years by an authorized service center.
7. The entire fuel system may be emptied, and the fuel tank may be cleaned only by an authorized service center.
8. In order to avoid engine damage and loss of a possible warranty, do not add any additives to the diesel fuel!
9. If fuels are used that do not comply with the standards in the table, warranty rights shall not apply in case of diesel engine damage.
10. To avoid damage and loss of any warranty on the exhaust after-treatment system, only the urea solutions released according to ISO 22241-1 (DIN 70070) may be used.
    Only an authorized service center may empty or clean the urea container.
11. Specifications: MIL-L-2105B; API - GL5
12. Capacity for each axle or planetary drive
13. In order to avoid a failure of the braking system, do not mix this brake fluid (**ATF**) with other brake fluids
14. Complete refill of the hydraulic system about 103 l (27.22 gal)
15. DIN 51 524
16. Used in Scandinavian countries only
17. Before assembly: lubricate the bolts, shafts and bearing with Fuchs "gleitmo" 800. After assembly: lubricate the shafts and bolts via grease fittings.
18. Maintenance work may only be performed by technically trained personnel.
19. Bear in mind the safety data sheet during maintenance.
20. Have the sealing checked and repaired at least once a year by ELASKON – see the ELASKON servicing pass supplied with the machine.

Diesel fuel specification

Information

The machine is equipped with a diesel engine with low exhaust emissions. Diesel engines may be operated only with sulfur-free diesel fuel so that they comply with emissions legislation.

CAUTION

Health hazard due to diesel fuel!

Diesel fuel and fuel vapors are harmful to health!

- ► Avoid contact with the skin, eyes and mouth.
- ► Seek medical attention immediately in case of accidents with diesel fuel.
- ► Wear protective gloves during maintenance work and refueling of the machine.

NOTICE

In order to avoid damage to the diesel engine, use only the diesel fuels specified in the table!

- ► If other fuels are used, warranty rights shall not apply in case of damage (warranty)!
- ► When adding additives to the diesel fuel, only use the ones authorized by Deutz.
- ► Operation with RME/PME fuel (biodiesel) or vegetable oils is prohibited!
- ► Please contact your distributor if you require more information on fuel.

fuel specification	Cetane number	Use (°C/°F)
DIN EN 590 (EU) ASTM D975-94 (USA)	Min. 49	Up to −44 °C (−47.2 °F) outside temperatures

Specification of the SCR reducing agent

A highly pure 32.5% urea solution is used as a SCR reducing agent. This is known as DEF or AUS 32.

More information about the urea solution
– see “Urea solution” on page 7-87.

Safety instructions

CAUTION

Health hazard from SCR reducing agent!

SCR reducing agent and its vapors are harmful to health!

- ► Avoid contact with the skin, eyes and mouth.
- ► Seek medical attention immediately in case of accidents with SCR reducing agents.
- ► Wear protective equipment.

Environment

Collect the escaping SCR reducing agents with suitable containers and dispose of it in an environmentally friendly manner!

Identification

DEF or AUS 32

Normative specification

Standards	valid in
DIN 70070	Germany
ISO 22241-1	World-wide
ASTM D7821	USA

Coolant

Only use the coolant additives specified in table "Overview of lubricants" – see page 7-12.

Environment

Dispose of throwaway containers according to national regulations.

Important information on operation with biodegradable oils

- Use only the tested and approved biodegradable hydraulic fluids – see “Fluids and lubricants” on page 7-12. Always contact the manufacturer for the use of products other than those that have been recommended. In addition, ask the oil supplier for a written declaration of guarantee. This guarantee is applicable to damage occurring on the hydraulic components that can be proved to be due to the hydraulic fluid.
- If biodegradable oil is topped off, only use biodegradable oil of the same variety. In order to avoid misunderstandings, a label providing clear information is located on the hydraulic oil reservoir (next to the filler inlet) regarding the type of oil currently used! Replace missing labels!
  The joint use of two different biodegradable oils can affect the quality of one of the oil types. Therefore, make sure the remaining amount of initial hydraulic fluid in the hydraulic system does not exceed 8 % when changing biodegradable oil (manufacturer indications).
- Do not add mineral oil. The content of mineral oil should not exceed 2% by weight in order to avoid foaming problems and to ensure biodegradability of the biodegrable oil.
- For operation with biodegradable oils, the same oil and filter replacement intervals apply as to mineral oils
  – see “Maintenance plan” on page 7-3.
- The condensate in the hydraulic oil tank has to be drained by an authorised specialist workshop every 500 hours of operation; and in any case before the cold season starts.
  The water content must not exceed 0.1 % by weight.
- The instructions in this Operator’s Manual concerning environmental protection are also valid for the use of biodegradable oil.
- If additional hydraulic attachments are installed or operated, use the same type of biodegradable oil for these attachments to avoid mixtures in the hydraulic system.

Information

Subsequent change from mineral oil to biodegradable oil must be performed by an authorised service centre or by a dealer.

7.4 Maintenance accesses

Engine cover

CAUTION

Injury hazard due to hot and moving engine parts!

Hot and moving engine parts can cause injury.

- ► Do not open the engine cover if the engine is running.
- ► Let the engine cool down.
- ► Wear protective equipment.

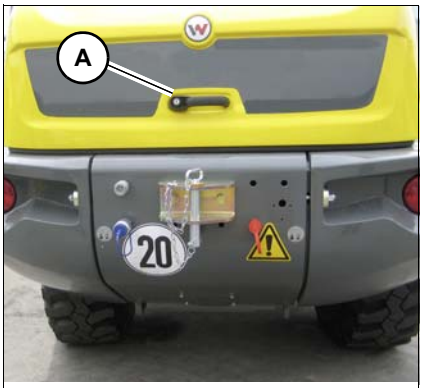


Fig. 249

Opening the engine cover:

1. Stop the engine and remove the starting key.
2. Unlock lock **A** with the ignition key.
3. Press lock **A**.
   ➥ The engine cover is raised with a gas strut.

Closing the engine cover:

1. Firmly press down the engine cover until lock **A** engages with an audible click.
2. Lock the engine cover with the ignition key.

Lower engine vat

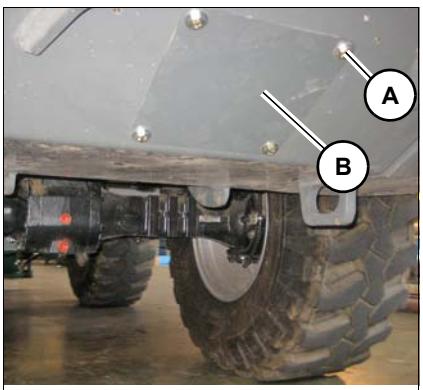


Fig. 250

Opening the cover

CAUTION

Injury hazard due to falling cover!

Can cause bruises and injury on head and face.

- ► Hold the cover when you remove the last screw.

1. Stop the engine and remove the starting key.
2. Unscrew screws **A**.
3. Remove cover **B**.

Closing the cover

4. Close cover **B** again with screws **A**.

7.5 Cleaning and maintenance

Important information on cleaning and maintenance

The wrong choice of cleaning equipment and agents can impair the operating safety of the machine on the one hand, and on the other put the health of the persons in charge of cleaning the machine at risk. Therefore always observe the following instructions.

NOTICE

Damage to machine due to cleaning work.

- ► Pay attention to the lower side in particular when cleaning the machine. Do not allow dirt to collect on the engine or gearbox.
- ► Ensure that the spaces between the radiator fins are clean and not blocked.
- ► Do not damage the radiator fins when cleaning with a high-pressure cleaner.
- ► Always cover the intake opening of the air filter before cleaning the engine.
- ► Do not point the water jet of the high-pressure cleaner at the seals of the piston rods of the hydraulic cylinders.
- ► Do not clean electrical components (instrument panel, fuses, alternator, compact connectors, control levers, etc.) with a high-pressure cleaner.

Information

Machines with anticorrosion protection (“aggressive media”) must be cleaned separately – *see “Machine preservation” on page 7-89*!

Environment

In order to avoid damage to the environment, clean the machine only in wash bays and places provided to this effect.

Cleaning with washing solvents

- Ensure sufficient room ventilation.
- Wear suitable protective clothing.
- Do not use flammable liquids, such as gasoline or diesel.

Cleaning with compressed air

- Work carefully.
- Wear safety glasses and protective clothing.
- Do not aim the compressed air at the skin or at other people.
- Do not use compressed air for cleaning your clothing.

Cleaning with a high-pressure cleaner or steam jet

- Electrical components and damping material must be covered and **not** directly exposed to the water jet.
- Cover the vent filter on the hydraulic oil reservoir and the filler caps for fuel, hydraulic oil, etc.
- Cover the piston rods of the hydraulic cylinders (the scraper is not watertight, and water in the guide bushing causes corrosion and damage to the piston rod).
- Cover electric parts, such as fuses, the alternator, the starter, the turn indicator and light switches, the relays, etc.
- Cover the controls and seals.
- Cover the air-intake filter, etc.

Cleaning with flammable anticorrosion protection

- Ensure sufficient room ventilation.
- Do not use unprotected lights or open flames.
- Do not smoke.

Cleaning inside the cabin

NOTICE

Never use high-pressure cleaners, steam jets or high-pressure water to clean inside the cabin.

► Water under high pressure can penetrate into the electrical system and cause short circuits.

► Seals may be damaged and operator's controls may be disabled!

The following aids are recommended for cleaning:

- Broom
- Vacuum cleaner
- Damp cloth
- Bristle brush
- Water with mild soap solution

Cleaning the seat belt (lap belt)

CAUTION

Injury hazard! Dirty or malfunctioning automatic safety belts can prevent them from rolling up properly and impair the operator's safety!

Can cause injury.

► Clean the seat belt with water and a mild soap solution.

► Only wind the seat belt when it is dry!

► Have a malfunctioning belt immediately replaced by an authorized service centre.

- Clean the seat belt (which remains fitted in the machine) with a mild soap solution only.
- Do not use chemical agents since they destroy the fabric.

Cleaning the pedals

WARNING

Danger of accident due to contamination or malfunction of the pedals!

Can cause serious injury or death.

- ► Keep the floor under the pedals clean.
- ► Do not place any objects in the leg room.
- ► Clean the pedal plates.

1. Park the machine on firm and level ground.
2. Apply the parking brake.
3. Stop the engine, but leave the starter switched on.
4. Lower the loader unit and the attachment to the ground without applying any pressure to it.
5. Switch off the starter and remove the starting key.
6. Thoroughly clean the pedals and the leg room.

Cleaning the exterior of the machine

NOTICE

Damage to machine due to cleaning work.

- ► Pay attention to the lower side in particular when cleaning the machine. Do not allow dirt to collect on the engine or gearbox.
- ► Do not damage the radiator fins when cleaning with a high-pressure cleaner.
- ► Always cover the intake connection of the air filter before washing the engine.
- ► Do not point the water jet of the high-pressure cleaner at the seals of hydraulic cylinders.
- ► Do not clean electrical components (instrument panel, alternator, compact connectors, control levers, etc.) with a high-pressure cleaner.

NOTICE

Damage due to rusting on paint finish, joints, screwed connections, etc.

- ► Thoroughly clean the machine with water after performing machine travel on saline ground or roads and going to a different site!

The following aids are recommended for cleaning:

- High-pressure cleaner
- Steam jet

Cleaning the engine and the engine compartment

CAUTION

Injury hazard due to hot and moving engine parts!

Hot and moving engine parts can cause injury.

► Do not open the engine cover if the engine is running.

► Let the engine cool down.

► Wear protective clothes.

NOTICE

When cleaning the engine with a water or steam jet, the humidity penetrating the electronics causes it to fail and leads to engine damage!

► The engine must be cold.

► Do not point the water jet directly at any of the electric sensors such as temperature and oil pressure switches or control valves.

► Protect all electric parts, such as the alternator, connectors, relays, etc. from humidity.

► If the water jet is unintentionally pointed at electrical components, dry them with compressed air and apply contact spray to them

The following aids are recommended for cleaning:

- High-pressure cleaner
- Steam jet

Checking threaded fittings

- Check all threaded fittings regularly, even if they are not listed in the maintenance plans.
- Immediately tighten loose connections.
  See chapter "*Technical data*" for the tightening moments.

Checking pivots and hinges

- Lubricate all mechanical pivot points on the machine (for example door hinges, joints) and fittings (for example door arresters) regularly, even if they are not listed in the lubrication plan.
- Check the accelerator and brake-inch pedals for contamination, clean them if necessary, apply spray oil to the joints.

7.6 Lubrication work

Lubricating the rear axle oscillation-type bearing

Information
Maintenance intervals – *see "Maintenance plan" on page 7-3*.
Lubricant – *see "Fluids and lubricants" on page 7-12*.

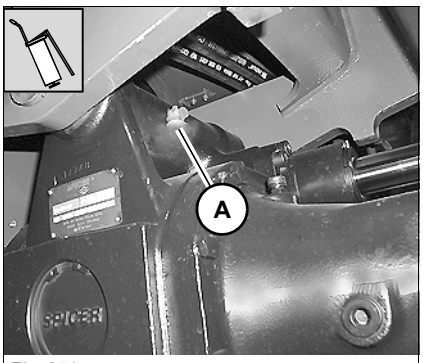


Fig. 251

1. Park the machine on level ground.
2. Apply the parking brake.
3. Secure the machine with a wheel chock.
4. Only raise the loader unit until all zerk fittings can be accessed without any risk.
5. Stop the engine and remove the starting key.
6. Switch off the battery master switch (option).
7. Lubricate grease zerk **A** of the oscillation-type bearing.

Information
A "remote lubrication" of the oscillating axle bearing is available. The zerk fitting on the oscillating axle bearing is connected to a zerk fitting mounted to the frame via a hose pipe.

Lubricating the planetary drive bearing (front and rear axles)

Information
Maintenance intervals – *see "Maintenance plan" on page 7-3*.
Lubricant – *see "Fluids and lubricants" on page 7-12*.

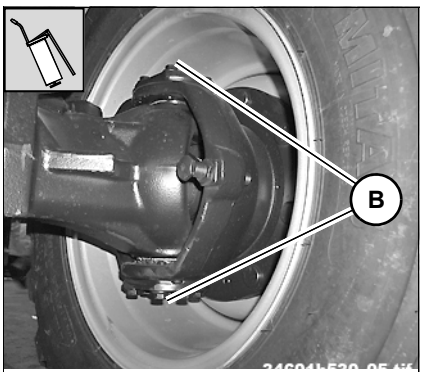


Fig. 252

1. Park the machine on level ground.
2. Apply the parking brake.
3. Secure the machine with a wheel chock.
4. Only raise the loader unit until all zerk fittings can be accessed without any risk.
5. Turn the steering wheel for better access.
6. Stop the engine and remove the starting key.
7. Switch off the battery master switch (option).
8. Lubricate zerk fittings **B** (2 x on each planetary drive bearing).

Lubricating the door arrester

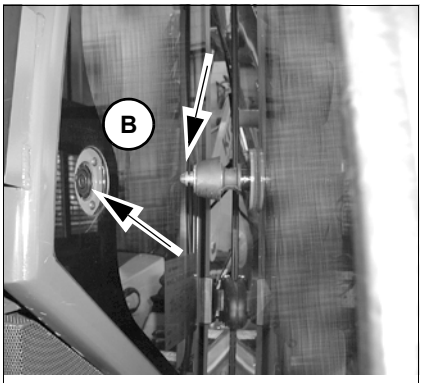


Fig. 253

Information
Maintenance intervals – *see “Maintenance plan” on page 7-3*.
Lubricant – *see “Fluids and lubricants” on page 7-12*.

- Apply a thin coat of grease to door arrester **B**.

Lubricating the loader unit

Information

Maintenance intervals – see “Maintenance plan” on page 7-3.
Lubricant – see “Fluids and lubricants” on page 7-12.

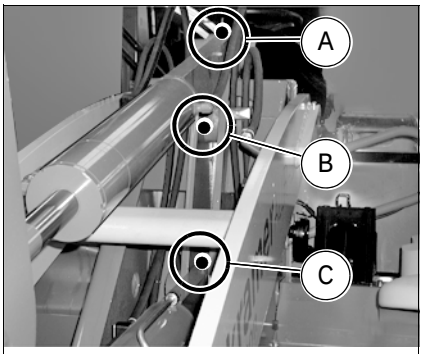


Fig. 254

Loader unit lubrication points (overview):

A Lubricate the grease zerk of the tilt cylinder bearing on the frame every 10 operating hours. Lubricate more frequently when in heavy-duty operation.

B Lubricate the grease zerk of the loader unit bearing every 10 operating hours. Lubricate more frequently when in heavy-duty operation.

C Lubricate the grease nipple on the lift ram bearing on the frame every 10 operating hours.

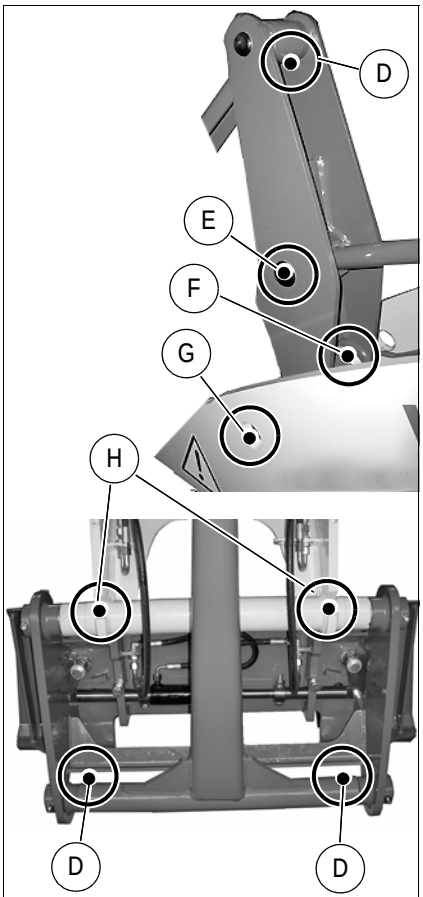


Fig. 255

D Lubricate the grease zerk of the tilt rod bearing every 10 operating hours. Lubricate more frequently when in heavy-duty operation.

E Lubricate the grease zerk of the tilt ram bearing every 10 operating hours.

F Lubricate the grease zerk of the lift ram bearing every 10 operating hours. Lubricate more frequently when in heavy-duty operation.

G Lubricate the grease zerks of the tilt lever bearing every 10 operating hours. Lubricate more frequently when in heavy-duty operation.

H Lubricate the grease zerks of the quickhitch bearing every 10 operating hours. Lubricate more frequently when in heavy-duty operation.

Lubricate the loader unit as follows

1. Set the quickhitch to a horizontal position.
2. Only raise the loader unit until all grease zerks can be accessed without any risk.
3. Stop the engine.
4. Apply the parking brake.
5. Switch off the starter and remove the starting key.
6. Apply grease to the lubrication points with a grease gun.

7.7 Fuel system

Important safety instructions for refueling

CAUTION

Fire hazard due to diesel fuel!

Diesel fuel gives off flammable vapours and can cause injury.

- ► Do not smoke.
- ► Avoid fire and open flames.
- ► Do not refuel in closed rooms.
- ► Do not add gasoline.

CAUTION

Health hazard due to diesel fuel!

Diesel fuel and fuel vapours are harmful to health and can cause injury!

- ► Avoid contact with the skin, eyes and mouth.
- ► Seek medical attention immediately in case of accidents with diesel fuel.
- ► Wear protective gloves when refuelling the machine.

NOTICE

Damage to machine due to diesel fuel.

- ► The entire fuel system may be emptied, and the fuel tank may be cleaned only by an authorized service center.
- ► Perform maintenance on the fuel system in accordance with the intervals specified in this Operator's Manual.
- ► Use only clean and high-quality diesel fuel.
- ► Do not add gasoline.
- ► After working on the fuel system, clean the engine and the engine mountings of any adhering fuel.
- ► Use a fine filter in the fueling line of the diesel fuel.

Environment

Use a suitable container to collect the fuel as it drains and dispose of it in an environmentally friendly manner! In order to lower the risk of fire, keep the vehicle clean and wipe away any spilled fuel immediately!

Stationary fuel pumps

NOTICE

In order to avoid damage in the fuel system, only refuel from stationary fuel pumps.

► Fuel from barrels or cans is usually contaminated and causes increased engine wear.

► Contaminated fuel leads to malfunctions in the fuel system and reduced effectiveness of the fuel filters.

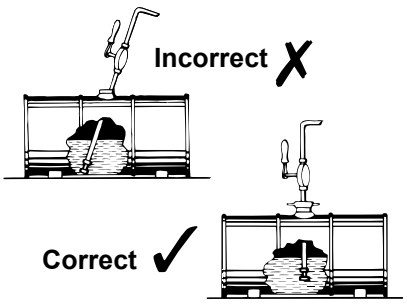


Fig. 256

If refueling from barrels cannot be avoided, note the following points:

- Barrels must neither be rolled nor tilted before refuelling.
- Protect the suction pipe of the barrel pump with a fine-mesh strainer.
- Immerse the suction pipe of the barrel pump down to a max. 15 cm (5.9 in) above the bottom of the barrel.
- Only fill the tank using refueling aids (funnels or filler pipes) with an integral microfilter.
- Keep all refuelling containers clean at all times.

Refueling

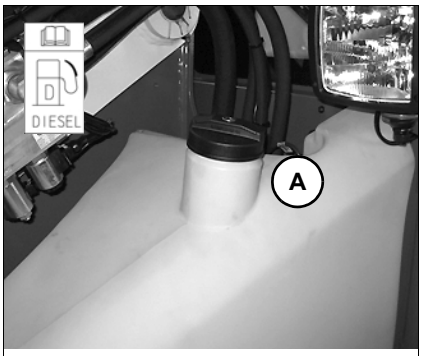


Fig. 257

Filler inlet **A** of the fuel tank is located on the left side of the machine.

WARNING

Fire and explosion hazard due to flammable vapors!

Can cause serious injury or death.

- ► Ensure that there are no open flames or sources of sparks near the machine.
- ► Do not smoke.

WARNING

Fire and suffocation hazard due to refueling in closed rooms!

Can cause serious damage to health or death.

- ► Do not refuel in closed rooms.

1. Park the machine on level ground.
2. Lower the loader unit to the ground.
3. Apply the parking brake.
4. Stop the diesel engine and remove the starting key.
5. Clean the area around filler cap **A** before opening the fuel cap.
6. Open the filler cap **A** and refuel the fuel tank via the filling screen.

Information

Technical data and fill capacities *– see "Diesel fuel specification" on page 7-14* and *Fluids and lubricants on page 7-12*.

Query the fuel consumption
– see chapter 4 "Machine status indication on engine control unit (ECU)" on page 4-43.

Environment

In order to avoid environmental damage, the emptying of the entire fuel system as well as the cleaning of the fuel tank is only to be done by an authorized service center.

Bleeding the fuel system

If the fuel tank has been run empty, or after having performed maintenance on the fuel system (for example filter replacement, water separator cleaned, etc.), the fuel system bleeds itself automatically when starting the engine.

Checking/cleaning the additional fuel filter (water separator, option)

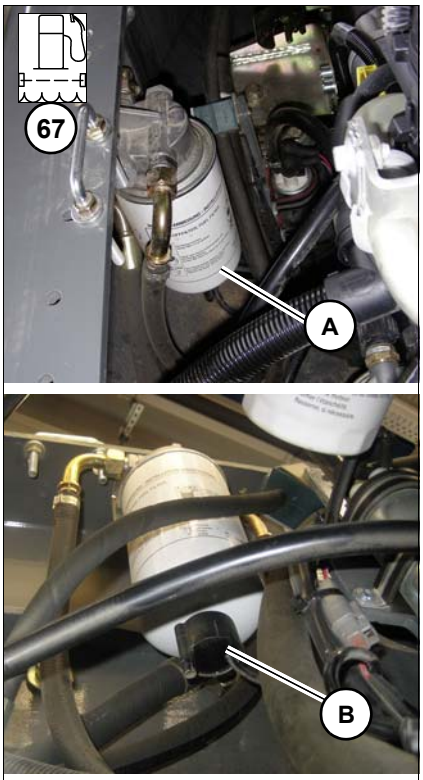


Fig. 258

Drain the condensation water in the fuel prefilter at the latest if indicator light **67** on the instrument panel illuminates.

Drain water more frequently at temperatures around or below 0 °C/32 °F, otherwise problems can arise even if winter diesel is used.

CAUTION

Injury hazard due to rotating parts!

Rotating parts in the engine compartment can cause serious injury.

- ► Stop the engine before opening the engine cover.
- ► Switch off the starter and remove the starting key.
- ► Switch off the battery master switch (option).
- ► Apply the parking brake.

1. Lower the loader unit to the ground.
2. Stop the engine and remove the starting key.
3. Apply the parking brake.
4. Open the engine cover.
5. Remove the servicing lid below on the engine vat if necessary – *see “Lower engine vat” on page 7-17*.
6. Place a container to collect the fuel.
7. Open drain cock **B** on the additional fuel filter and drain the condensation water.
8. Close drain faucet **B**.
9. Start the engine and check the additional fuel filter for leaks.

Information

Maintenance intervals – *see “Maintenance plan” on page 7-3*.
Specifications and fill quantities – *see “Fluids and lubricants” on page 7-12*.

Have the additional fuel filter **A** (cartridge) replaced by an authorized service centre every 500 o/h.

Environment

Use a suitable container to collect the fuel as it drains off and dispose of it in an environmentally friendly manner!

7.8 Engine lubrication system

Important safety instructions regarding the engine lubrication system

CAUTION

Injury hazard due to hot and moving engine parts!

Hot and moving engine parts can cause injury.

- ► Do not open the engine cover if the engine is running.
- ► Let the engine cool down.
- ► Wear protective equipment.

CAUTION

Burn hazard due to hot engine oil!

Splashes of hot oil can cause burns to the skin.

- ► Let the engine cool down.
- ► Wear protective clothes.

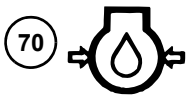


Fig. 259

NOTICE

Loss of output and engine damage due to wrong engine-oil level, and wrong or used engine oil.

- ► Observe the intervals for engine-oil and filter replacement.
- ► If indicator light **70** on the indicating instrument illuminates, check the engine-oil level immediately.
- ► Check the engine-oil level regularly and add oil if necessary.
- ► If the engine oil is used (black), have the oil immediately changed by an authorised service centre.
- ► Observe the specifications and fill quantities.

- Follow the safety instructions and country-specific regulations when handling lube oil!
- Dispose of drained oil correctly. Do not allow used oil to seep into the ground!
- Perform a test run every time work has been performed!
- Check for leaks and correct lube oil pressure, and then check the lube oil level in the diesel engine!

Checking the engine oil level

CAUTION

Injury hazard due to hot and moving engine parts!

Hot and moving engine parts can cause injury.

► Do not open the engine cover if the engine is running.

► Let the engine cool down.

► Wear protective clothes.

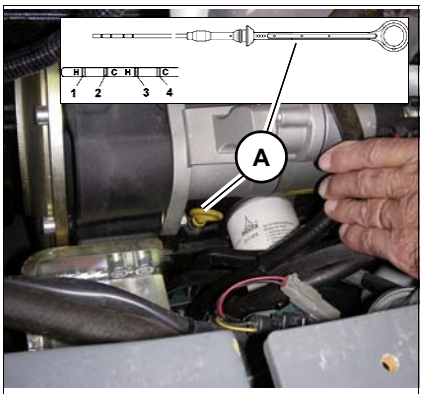


Fig. 260

1. Park the machine on level ground.
2. Stop the engine and remove the starting key.
3. Apply the parking brake.
4. Open the engine cover.
5. Pull out oil level dipstick **A** and wipe it with a lint-free cloth.
6. Push oil level dipstick in to the detent and pull it out again
7. Read off the oil level.
   ➥ 1st notch = MIN mark
   ➥ 2nd notch = MAX mark
8. Add oil if the oil level is near the MIN mark – *see “Adding engine oil” on page 7-33*.

Reading example: oil level dipstick with 2 notches

- 1st notch = MIN mark
- 2nd notch = MAX mark

Reading example: oil level dipstick with 4 notches

- Cold engine – 1st notch = MIN mark, 3rd notch = MAX mark
- Warm engine – 2nd notch = MIN mark, 4th notch = MAX mark

Information

Maintenance intervals – *see “Maintenance plan” on page 7-3*.
Specifications and fill quantities – *see “Fluids and lubricants” on page 7-12*.

Adding engine oil

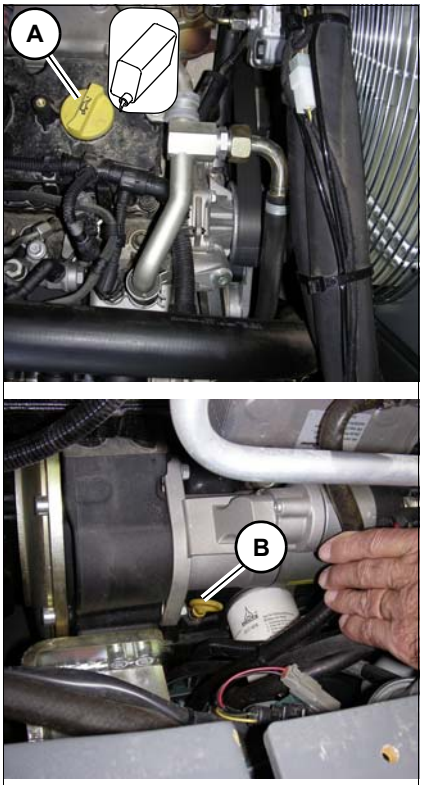


Fig. 261

NOTICE

Loss of output and engine damage due to wrong engine-oil level, and wrong or used engine oil.

- ► The oil level must not drop below the "Min." mark on the oil level dipstick.
- ► The oil level must not rise above the "Max." mark on the oil level dipstick.
- ► Observe the intervals for engine-oil and filter replacement.
- ► Observe the specifications and fill quantities.

1. Park the machine on level ground.
2. Stop the engine and remove the starting key.
3. Apply the parking brake.
4. Open the engine cover.
5. Clean the area around oil filler cap **A** with a lint-free cloth.
6. Open the sealing push-in cap **A**.
7. Pull out oil level dipstick **B** and wipe it with a lint-free cloth.
8. Add engine oil.
9. Wait a moment until all the oil has run into the oil sump.
10. Check the oil level with oil level dipstick **B** *– see "Checking the engine oil level" on page 7-32*.
11. Add oil if necessary and check the oil level again.
12. Close filler cap **A**.
13. Completely remove all oil spills from the engine.

Environment

Use a suitable container to collect the engine oil as it drains and dispose of it in an environmentally friendly manner!

Information

Maintenance intervals *– see "Maintenance plan" on page 7-3*.
Specifications and fill quantities *– see "Fluids and lubricants" on page 7-12*.

7.9 Cooling system

Safety instructions regarding the cooling system

Fig. 262

The combined water and oil radiator is located in the engine compartment. It cools the diesel engine coolant, and the hydraulic oil of the drive and operating hydraulics.

WARNING

Caustic injury hazard! Risk of swallowing antifreeze when handling it!

Can cause serious injury or death.

- ► Seek medical attention immediately if antifreeze has been swallowed.
- ► Keep antifreeze out of reach of children.

CAUTION

Burn hazard due to hot coolant!

Hot coolant can cause burns to the skin.

- ► Do not open the coolant reservoir if the engine is hot or if the cooling system is under pressure.
- ► Let the engine cool down.
- ► Wear protective clothes.

NOTICE

In order to avoid possible damage to the cooling system, have the coolant drained (every 2 years) and the radiator cleaned only by an authorised service centre.

Information on inspection and cleaning work on the cooling system

Fig. 263

Dirt on the radiator fins reduces the radiator's cooling capacity!
To avoid this:

- Clean the outside of the radiator at regular intervals. Refer to the maintenance plans for the cleaning intervals.
- In dusty or dirty work conditions, clean more frequently than indicated in the maintenance plans.
- An insufficient coolant level reduces the cooling capacity as well and can cause engine damage! Therefore:
  - Check the coolant level once a day.
- If the coolant has to be topped off frequently, have the cooling system checked by an authorized service center for leaks!
- Never add cold water/coolant if the engine is warm!
- Perform an engine test run after filling the coolant. Then check the coolant level again when the engine is off.
- Add enough antifreeze to the coolant.
- Use brand-name antifreeze agents since they already contain anticorrosion protection – *see "Fluids and lubricants" on page 7-12*.

NOTICE

In order to avoid sludge in the cooling system that damages the engine, do not use radiator cleaning compounds if an antifreeze agent has been added to the coolant.

Environment

Use a suitable container to collect the coolant as it drains and dispose of it in an environmentally friendly manner!

Checking the coolant level

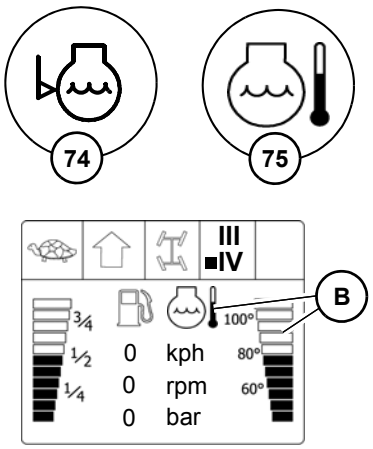


Fig. 264

Temperature indicator **B** (with acoustic warning) in the digital display on the indicating instrument monitors the cooling system.

The coolant temperature should be between 80 and 105°C (176 and 221°F). If the engine coolant temperature rises above 110°C (230°F), the control lamp **75** illuminates and a warning sounds.

If the coolant level drops below minimum, indicator light **74** illuminates and a warning sounds.

NOTICE

Risk of engine damage due to overheating.

- ► Let the engine run at idling speed for a short time until the control lamp **75** and the buzzer go out.
- ► Stop the engine and check the coolant level.
- ► Clean the radiator fins.

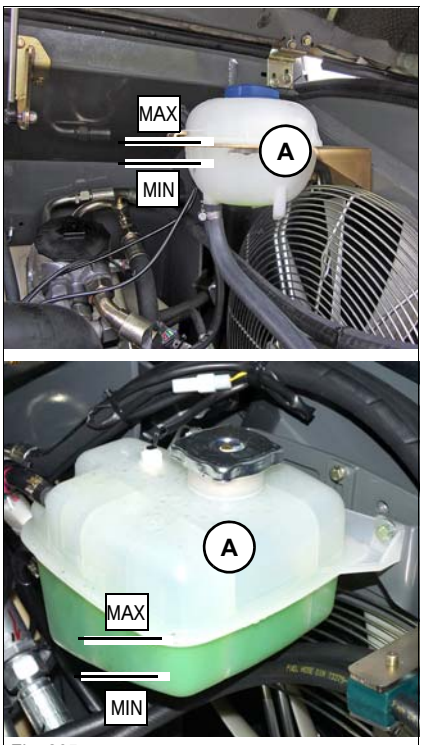


Fig. 265

1. Park the machine on level ground.
2. Lower the loader unit.
3. Stop the engine and remove the starting key.
4. Apply the parking brake.
5. Open the engine cover.
6. Check the coolant level in the transparent reservoir **A**.
7. If the coolant level is below the “MIN” mark, add coolant up to the “MAX” mark – *see “Adding coolant” on page 7-37*.

Information

Maintenance intervals – *see “Maintenance plan” on page 7-3*.
Specifications and fill quantities – *see “Fluids and lubricants” on page 7-12*.

Check the coolant level before starting the engine.
Check the antifreeze at temperatures below 4 °C (39 °F).

Information

Check the antifreeze with suitable testing equipment (antifreeze tester) before the winter – *see “Fluids and lubricants” on page 7-12*.

Adding coolant

CAUTION

Burn hazard due to hot coolant!

Hot coolant can cause burns to the skin.

- ► Do not open the coolant reservoir if the engine is hot or if the cooling system is under pressure.
- ► Allow the engine to cool down at least 10 minutes.
- ► Wear protective clothes.
- ► Use climbing aid (e.g. steps).

Information

Maintenance intervals – *see "Maintenance plan" on page 7-3*.
Specifications and fill quantities – *see "Fluids and lubricants" on page 7-12*.

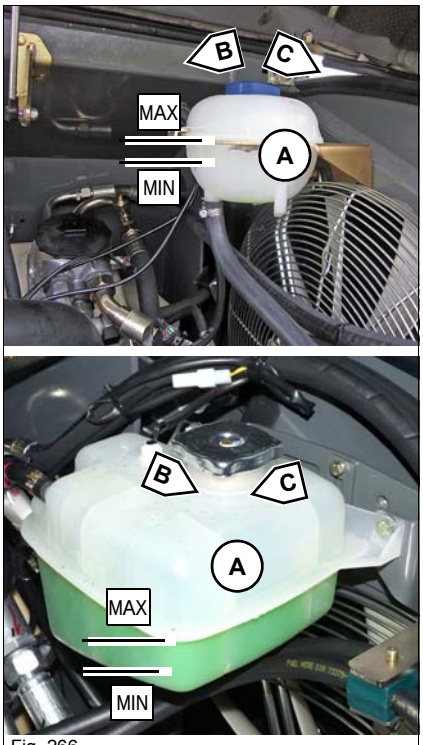


Fig. 266

Preparations

1. Park the machine on level ground.
2. Lower the loader unit completely.
3. Apply the parking brake.
4. Stop the engine and remove the starting key.
5. Allow the engine/cooling system to cool down.

Adding coolant

1. Open the engine cover.
2. Turn the cover of the coolant reservoir **A** toward **B** up to the first notch.
3. Release the pressure.
4. Open the cover completely.
5. Add coolant up to the "MAX" mark. Use brand-name antifreeze agents since they already contain anticorrosion agents.
6. Close the cover (toward **C**).

Leakage check

1. Open the heating circuit fully – *see chapter 5 "Heating, ventilation and air conditioning system (option)" on page 5-32*.
2. Start the engine and let it warm up for about 5 – 10 minutes.
3. Stop the engine and check the coolant level again.
   ➥ The coolant level in the reservoir must be between **MIN** and **MAX**.
4. If necessary, add coolant and repeat the procedure until reaching the correct coolant level.
5. Check the cooling system and the heating circuit for leaks.
   ➥ Have leaks immediately repaired by an authorized service centre.

Cleaning the radiator on the outside

CAUTION

Burn hazard during maintenance on a hot engine and radiator!

Non-observance can cause serious burns.

- ► Wear protective gloves and eye protection.
- ► Let the radiator cool down at least 10 minutes after stopping the diesel engine.

NOTICE

Dirt on the radiator fins reduces the radiator's heat dissipation capacity and can cause damage to the engine and the hydraulic system!

- ► Check and clean the outside of the radiator once a day.
- ► Clean the radiator more frequently in dusty or dirty work conditions.
- ► Do not clean in closed premises.

Information

Observe the maintenance intervals – *see "Maintenance plan" on page 7-3*.

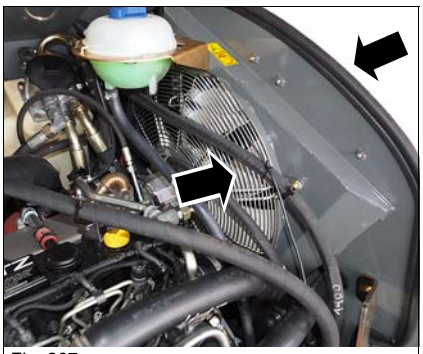


Fig. 267

1. Park the machine on level ground.
2. Lower the loader unit fully.
3. Apply the parking brake.
4. Stop the engine and remove the starting key
5. Let the engine cool down.
6. Open the engine cover.
7. Clean the radiator fins by blowing compressed air from either side of the radiator.
8. Remove dirt in the intake area of the radiator.
9. Check the firm position of the brush seal on the fan cowl. Have a sticky or worn brush seal replaced by an authorized service centre.

Information

In order to ensure the radiator's cooling capacity, do not damage the radiator fins as you clean them with a compressed-air gun!

Cleaning the radiator with the reversing fan (option)

The machine can be equipped with the optional reversing cooling fan.

Pressing push button **56** (on the right on the instrument panel) reverses the fan's direction of rotation and cleans the radiator.

NOTICE

Dirt on the radiator fins reduces the radiator's heat dissipation capacity and can cause damage to the engine and the hydraulic system!

- ► Check and clean the radiator once a day.
- ► Clean the radiator more frequently in dusty or dirty work conditions.
- ► Do not clean in closed premises.

NOTICE

Dirt on the radiator fins reduces the radiator's heat dissipation capacity and can cause damage to the engine and the hydraulic system!

- ► Check and clean the radiator **once a day**.
- ► Clean the radiator more frequently in dusty or dirty work conditions.
- ► Do not clean in closed premises.

Information

The radiator can be cleaned with the reversing fan during machine operation, but not in full load operation and only with the diesel engine running!

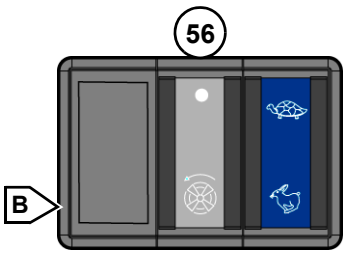


Fig. 268

Cleaning with the reversing fan

1. Briefly press the touch button **56** to position **B** with a running engine.
   - ➥ The fan rotates the other way round with a certain delay.
   - ➥ The fan is in cleaning mode and dirt is removed from the radiator.
   - ➥ This can be seen by the dust blown out from the intake screen on the engine hood.
   - ➥ The fan automatically switches back to normal cooling mode after about 1 minute.

Information

When working in especially dusty environments, clean the radiator repeatedly and more frequently!

7.10 Air filter

Important information on cleaning the air filter

Fig. 269

CAUTION

Injury hazard due to hot and moving engine parts!

Hot and moving engine parts can cause injury.

- ► Do not open the engine cover if the engine is running.
- ► Let the engine cool down.
- ► Wear protective clothes.

NOTICE

In order to avoid damage to the engine due to dirty intake air, bear in mind the following:

- ► Replace the filter elements if the control lamp **69** on the instrument panel lights up.
- ► Do not reuse damaged filter cartridges.
- ► Do not clean the filter cartridges with compressed air or a brush.
- ► Ensure cleanliness inside the air-filter housing during filter cartridge replacement!
- ► Do not operate the engine without the filter cartridges.

Cleaning the dust valve

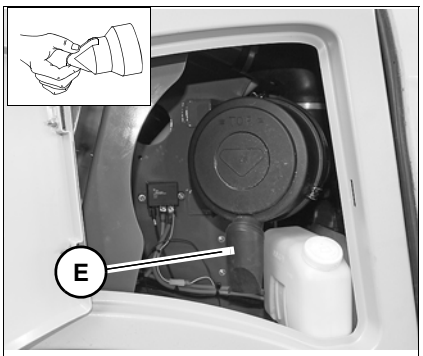


Fig. 270

1. Apply the parking brake.
2. Stop the engine and remove the starting key.
3. Remove the key from the battery master switch (option) *– see chapter 4 “Battery master switch (option)” on page 4-18*.
4. Open the engine cover.
5. Squeeze the discharge slot of dust valve **E**.
   ➥ Squeezing the discharge slot removes hardened dust.
6. Clean the discharge slot.

Information

Observe the maintenance intervals *– see “Maintenance plan” on page 7-3*.

Replacing the air-filter cartridge

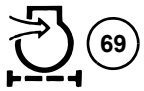


Fig. 271

The control lamp **69** on the indicating instrument monitors the air-filter cartridge. Replace filter cartridge **C** if this indicator light illuminates at the latest.

Safety cartridge **D** must be replaced in addition every third air-filter replacement.

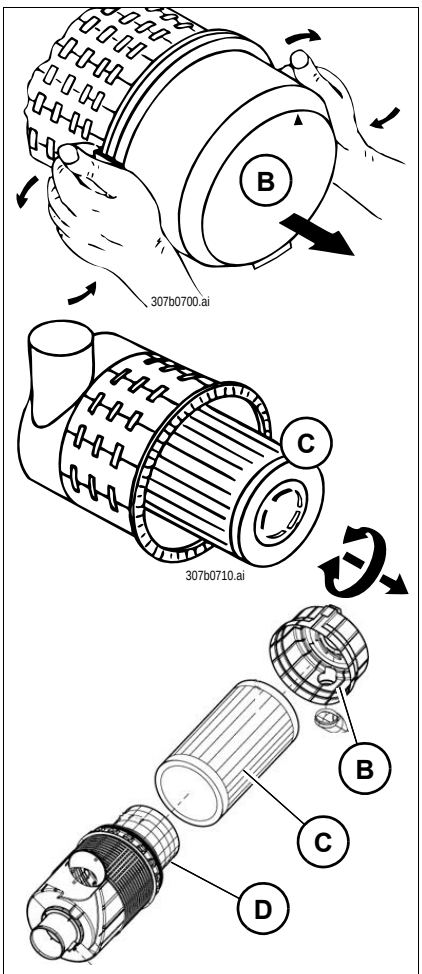


Fig. 272

NOTICE

In order to avoid damage to the engine due to dirty intake air, bear in mind the following:

- ► Do not clean the filter cartridges with compressed air or a brush.
- ► Replace the filter cartridges when the indicator light illuminates.
- ► Never reuse a damaged filter cartridge.
- ► Ensure cleanliness inside the air-filter housing during filter cartridge replacement!
- ► Do not operate the engine without the filter cartridges.

Information

Observe the maintenance intervals – *see "Maintenance plan" on page 7-3*.

Replacing the filter element and safety cartridge

1. Apply the parking brake.
2. Stop the engine and remove the starting key.
3. Open the engine cover.
4. Fold the bow hooks to the outside, off the seam of the filter housing.
5. Remove housing cover **B**.
6. Carefully remove filter cartridge **C** with slightly turning movements.
7. In addition, every 3rd time the filter is replaced, carefully remove the safety cartridge **D** with slight turning movements.
8. Remove all dirt (dust) inside the filter housing and the cover before installing the new filter.
9. Insert a new safety cartridge **D** into the filter housing.
10. Insert a new filter cartridge **C** into the filter housing.
11. Safely hitch and close the bow hooks into the notch of the filter housing.

7.11 V-belt/toothed belt

Checking the V-belt (compressed-air brake option)

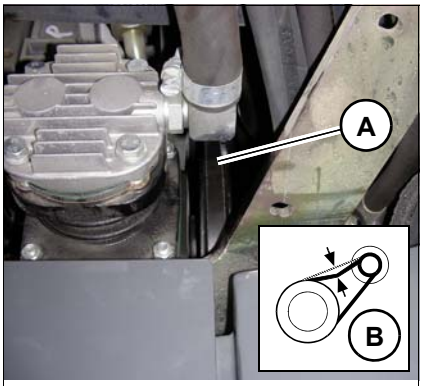


Fig. 273

Check the V-belt once a day or every 10 operating hours and if necessary, have it retightened by an authorised service centre.

Retension new V-belts after about 15 minutes of running time.

CAUTION

Injury hazard due to rotating parts!

Rotating parts can cause serious injury.

- ► Stop the engine before opening the engine cover.
- ► Only check the V-belt and flat belt when the engine is stopped.

NOTICE

A cracked and stretched V-belt causes engine damage!

- ► Have a damaged V-belt replaced by an authorized service center.
- ► Have the V-belt replaced by an authorized service centre every 2 years at the latest.

1. Park the machine on level ground.
2. Lower the loader unit fully.
3. Apply the parking brake.
4. Stop the engine and remove the starting key.
5. Remove the key from the battery master switch (option) *– see chapter 4 “Battery master switch (option)” on page 4-18*.
6. Open the engine cover.
7. Remove protective cover **A**.
8. Carefully inspect the V-belt **B** for damage.
   ➥ Have the V-belt replaced by an authorized service center.
9. Press with your thumb to check whether the V-belts can be deflected between the V-belt pulleys by no more than **about 10 mm (0.4 in)**.
   ➥ Have the V-belts re-tightened by an authorized service center if necessary.

Information

Observe the maintenance intervals *– see “Maintenance plan” on page 7-3*.

7.12 Hydraulic system

Important information on the hydraulic system

CAUTION

Burn hazard due to hot hydraulic oil!

Hot hydraulic oil can cause burns to the skin.

- ► Release the residual pressure in the hydraulic system.
- ► Let the engine cool down.
- ► Wear protective equipment.

NOTICE

Contaminated hydraulic oil, lack of oil or wrong hydraulic oil poses a risk of serious damage to the hydraulic system!

- ► Take care to avoid dirt when working!
- ► Always add hydraulic oil using the filling screen!
- ► Only use authorized oils of the same type *– see "Overview of lubricants" on page 7-12*.
- ► Always add hydraulic oil in time using the filling screen *– see "Adding hydraulic oil" on page 7-46*.
- ► If the hydraulic system is filled with biodegradable oil, then only use biodegradable oil of the same type for adding oil – observe the sticker on the hydraulic oil reservoir.
- ► Have the hydraulic oil only changed by an authorised service centre.
- ► Immediately contact an authorised service centre if the filter insert is contaminated with metal chippings, otherwise follow-on damage can result.

Observe the following before starting maintenance

- Lower the loader unit to the ground.
- Lower all hydraulically controlled attachments to the ground.
- Stop the engine and remove the starting key.
- Switch off the battery master switch (option).
- Use the parking brake to park the machine safely and to prevent it rolling away.
- Release the pressure in the hydraulic system.
- Wear protective clothes.
- Collect drained hydraulic oil and biodegradable oil in a suitable container, and dispose of it in an environmentally friendly manner.

Monitoring the hydraulic oil and the return filter

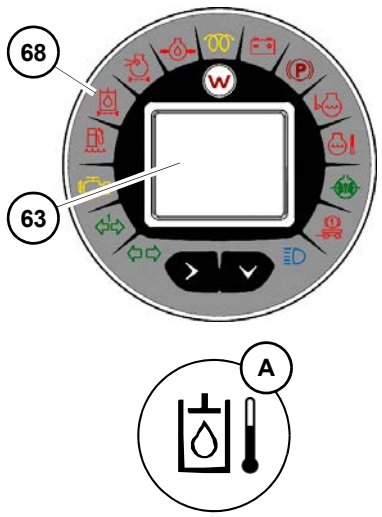


Fig. 274

indicator light **68** on the indicating instrument monitors the return filter (dirt).

An error code is stored if the hydraulic oil temperature is too high. The stored error code may be accessed via the digital display – *see chapter 4 "Error memory" on page 4-44*.

NOTICE

The control lamp **68** on the indicating instrument lights up if the oil-flow resistance in the return filter is too high.

► The filter element is dirty and must be replaced by an authorized service centre.

NOTICE

If symbol **A** appears in the digital display of the indicating instrument, the operating temperature of the hydraulic oil is too high.

► Check the hydraulic oil level (not enough oil in the reservoir).

► The filter element or the hydraulic oil is dirty and must be replaced by an authorized service centre.

NOTICE

If the oil temperature of the drive hydraulics is over 105°C (221°F), the travel speed (travel dynamics) is automatically reduced by 50% until the oil temperature is below 105°C (221°F) in order to avoid damage to the drive hydraulics.

► Have the cause for the high oil temperature checked or repaired by an authorized service centre under all circumsances.

Information

In cold weather indicator light **68** can illuminate immediately when the engine is started. This is caused by increased oil viscosity. In this case, regulate the engine speed so that control lamp does not light up.

► Bear in mind the instructions concerning warmup – *see chapter 4 "Running-in period" on page 4-49*.

Checking the hydraulic oil level

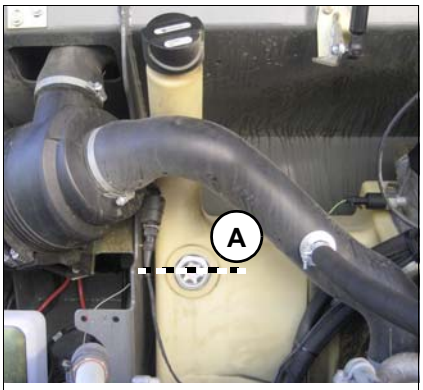


Fig. 275

The oil level sight glass is located on the hydraulic oil reservoir on the left in the engine compartment.

CAUTION

Burn hazard due to hot hydraulic oil!

Hot hydraulic oil can cause burns to the skin.

- ► Release the residual pressure in the hydraulic system.
- ► Let the engine cool down.
- ► Wear protective equipment.

NOTICE

Damage to hydraulic system due to a low hydraulic oil level.

- ► The hydraulic-oil level must be visible in the oil level sight glass (slightly over the middle).
- ► Check or have the hydraulic system checked for leaks.
- ► Have leaks repaired by an authorized service centre.

1. Park the machine on level ground.
2. Retract all hydraulic cylinders.
3. Apply the parking brake.
4. Stop the engine and remove the starting key.
5. Clean oil level sight glass **A** and check the oil level.
   - ➥ If the oil level is visible in the lower half of the oil level sight glass: oil level is OK.
   - ➥ If the oil level is no longer visible in the lower half of the oil level sight glass: **not enough oil!**
6. Add hydraulic oil *– see “Adding hydraulic oil” on page 7-46*.

Information

Observe the maintenance intervals *– see “Maintenance plan” on page 7-3*.
Specifications and fill quantities *– see “Fluids and lubricants” on page 7-12*.

Adding hydraulic oil

Important information

CAUTION

Burn hazard due to hot hydraulic oil!

Hot hydraulic oil can cause burns to the skin.

- ► Release the residual pressure in the hydraulic system.
- ► Let the engine cool down.
- ► Wear protective equipment.

NOTICE

Damage to hydraulic system due to incorrect or dirty hydraulic oil.

- ► Cloudy oil means that water or air is in the hydraulic system. This can cause damage to the hydraulic oil pump. Have an authorized service center perform a check of the hydraulic system if necessary. Do not use the machine unless the problem has been rectified.
- ► Do not add hydraulic oil unless the diesel engine is stopped.
- ► Add oil with a screen to avoid dirt.
- ► If the hydraulic system is filled with biodegradable oil, then use only biodegradable oil of the same type for filling up – observe the sticker on the hydraulic oil reservoir.

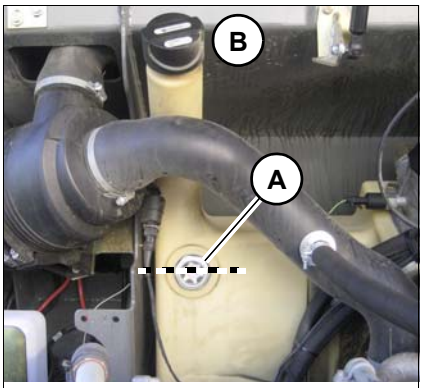


Fig. 276

Adding hydraulic oil

1. Check the hydraulic oil level
   – see “Checking the hydraulic oil level” on page 7-45
2. Clean the area around the filler and breather filter **B**.
3. Place a container under the hydraulic oil reservoir to collect the oil.
4. Open breather filter **B** by hand.
5. Top off hydraulic oil with the filter insert in place.
6. Check the hydraulic oil level on oil level sight glass **A**.
7. Add if necessary and check again.
8. Firmly close breather filter **B** by hand.

Environment

Excess hydraulic oil is released via the breather filter during loader unit operation.

► Drain the oil into a suitable collecting container until the oil level can be seen in the oil level glass **A**.

Information

Maintenance intervals – see “Maintenance plan” on page 7-3.
Specifications and fill quantities – see “Fluids and lubricants” on page 7-12.

Checking the hydraulic system for leaks

Safety instructions regarding pressure line checks

CAUTION

Burn and injury hazard if hot hydraulic oil escapes under high pressure!

Hydraulic oil escaping under high pressure can catch fire, damage property, penetrate the skin, and cause serious burns.

- ► Do not operate the machine with leaking or damaged hydraulic system components.
- ► Never search for leaks with your bare hands, wear protective gloves and clothes.
- ► Wear safety glasses to protect the eyes. If oil contacts the eye flush immediately with clean water and seek medical treatment.
- ► Seek immediate medical attention if oil penetrates the skin. Oil can cause serious infections.
- ► Retighten leaking threaded fittings and hose connections only when the hydraulic system is not under pressure. In other words, release the pressure before working on pressurised lines.
- ► Never weld or solder damaged or leaking pressure lines and hardware. Have damaged parts replaced with new ones by a qualified and authorized service center.
- ► Do not check for leaks with an open flame due to explosive fire risk from vaporised oil mist.

Checking hydraulic hoses for damage and ageing

Important information for the owner of the machine

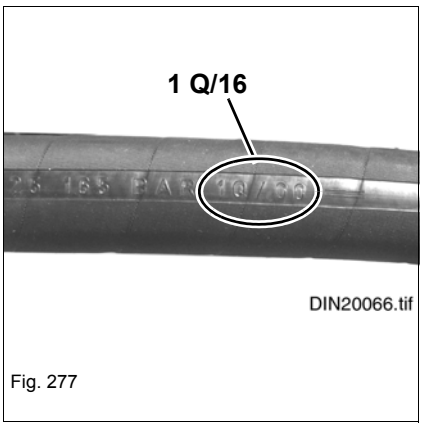


Fig. 277

Information

Observe the maintenance intervals – *see "Maintenance plan" on page 7-3*.

The entrepreneur/owner of the machine must ensure that flexible lines are replaced in appropriate intervals, even if no safety-relevant malfunctions can been detected on the flexible line.

- Have hose pipes checked by an authorized service center at least once a year to ensure a safe working condition.
- Leaking and damaged pressure lines must be immediately repaired or replaced by an authorized service centre.
- Have hydraulic hoses replaced by an authorized service center every 6 years from the date of manufacture, even if they do not seem to be damaged.
- The date of manufacture (month or quarter and year) is indicated on the flexible line.
  Reading example: The indication "**1 Q/16**" means manufactured in the 1st quarter of 2016.

Information

In the Federal Republic of Germany, reference is made in this connection to the "Safety regulations for hydraulic lines" issued by the Central Office for Accident Prevention and Occupational Medicine. Reference is also made to DIN 20066, part 5.

7.13 Electrical system

Qualification of maintenance personnel

Replacement and repair work on the electrical system may be performed only by an authorised service centre!

Checks and service work, as well as the replacement of light bulbs, fuses and the battery, must be performed by a specifically trained operator.

Safety instructions regarding the battery

WARNING

Injury hazard due to malfunctioning batteries!

Batteries give off explosive gases that can cause deflagrations if ignited, and therefore injury or death.

- ► Do not smoke, avoid fire and open flames.
- ► Do not place any tools on the battery.
- ► Wear protective clothes.

CAUTION

Accident hazard due to sparks during jump-starting!

Can cause serious injury.

- ► Use only 12 V power sources. Higher voltages will damage the electrical components.
- ► When connecting the battery leads, ensure that the poles +/− are not inverted, otherwise sensitive electrical components will be damaged.
- ► Do not interrupt electrical circuits at the battery terminals.
- ► Do not place tools or other conductive articles on the battery – risk of short circuit.

CAUTION

Injury hazard due to battery acid!

Battery acid can cause serious burns in case of skin contact.

- ► Avoid contact of the battery acid with the skin, eyes and mouth.
- ► In case of contact with battery acid, immediately rinse the affected parts of the body with plenty of clear water and seek medical attention.
- ► Wear protective clothes.

Checking/replacing the battery

The battery is located in the engine compartment, on the right (in travel direction) beside the radiator.

It is low in maintenance and no fluid needs to be refilled under normal operating conditions. However, have it checked according to the maintenance schedule to ensure that the fluid level is between the MIN and MAX marks.

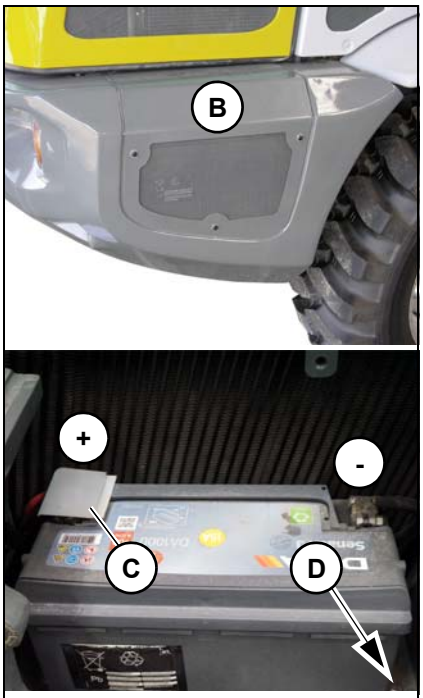


Fig. 278

NOTICE

In order to avoid damage to the machine electronics, only use batteries of the specified capacity!
If the battery is low, charge it with a tested and automatically controlled battery charger.

NOTICE

In order to avoid a short circuit due to the wrong chronological order when connecting or disconnecting the battery cables:

- ► First disconnect the negative terminal, and then the positive terminal.
- ► When connecting: First the positive terminal, and then the negative terminal.

1. Park the machine on level ground.
2. Lower the loader unit.
3. Apply the parking brake.
4. Stop the engine and remove the starting key.
5. Open the engine cover.
6. Remove the key with the "battery master switch" if the machine is equipped with this option
   – see chapter 4 “Battery master switch (option)” on page 4-18.
7. Remove the cover **B** on the right counterweight.
8. Remove the cover **C** on the positive terminal (**+**) large clamp.
9. Remove the battery cables :
   - ➥ First at the negative terminal (**-**) small clamp,
   - ➥ then at the positive terminal (**+**) large clamp.
10. Remove the battery fixture **D**.
11. Replace the battery with a new one.
    - ➥ Use battery with prescribed capacity
      – see chapter 9 “Electric units/light bulbs” on page 9-12.
12. Attach the battery fixture **D**.
13. Install the battery cables :
    - ➥ first on the positive terminal (**+**) large clamp,
    - ➥ then at the negative terminal (**-**) (small clamp).
14. Attach the cover **C** to the positive terminal.
15. Switch this on again with the "battery main switch" option.

Inspection and maintenance on the electrical system at regular intervals

CAUTION

Fire hazard! Blown fuses indicate overloading or short circuits of an electrical component.

Can cause injury.

► Have the electrical system checked by an authorised service centre before inserting new fuses.

► In order to avoid damage to the electrical system, use only fuses of the specified load capacity (amperage).

Information

Observe the maintenance intervals – *see "Maintenance plan" on page 7-3*.

Daily checks before operating the machine

- Is the light system OK?
- Is the signalling and warning system OK?

Weekly check

- Electric fuses: only replace malfunctioning fuses with fuses with the specified amperage.
- Battery charge condition and condition of battery terminals.
- Check the electric lines for tightness and chafing and have them repaired by an authorized service centre **if necessary**.

Checking the alternator

- Only test run the engine with the battery connected.
- When connecting the battery, ensure that the poles (+/–) are not inverted.
- Always disconnect the battery before performing welding work or connecting a quick battery charger.
- Have malfunctioning charge indicator lights immediately replaced.

Checking/replacing relays and fuses in the main fuse box


Fig. 279

The main fuse box with the power relays and preheating-time control unit is located on the left behind the cabin, behind the maintenance flap (near the air filter).

1. Lower the loader unit.
2. Apply the parking brake.
3. Stop the engine and remove the starting key.
4. Remove the key from the battery master switch (option) or disconnect the negative lead (−) from the battery .
5. Open the maintenance flap

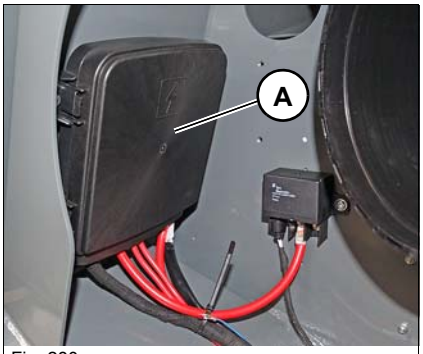


Fig. 280

6. Remove cover **A** from the fuse box.

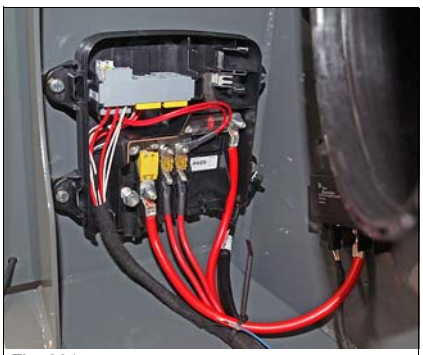


Fig. 281

7. Replace the malfunctioning fuses or relays.

➥ Main fuse and relay descriptions and output indications *– see chapter 9 “Main fuse box with relays” on page 9-12*.

8. Check the electrical system for correct function.

Checking/replacing relays and fuses on the board

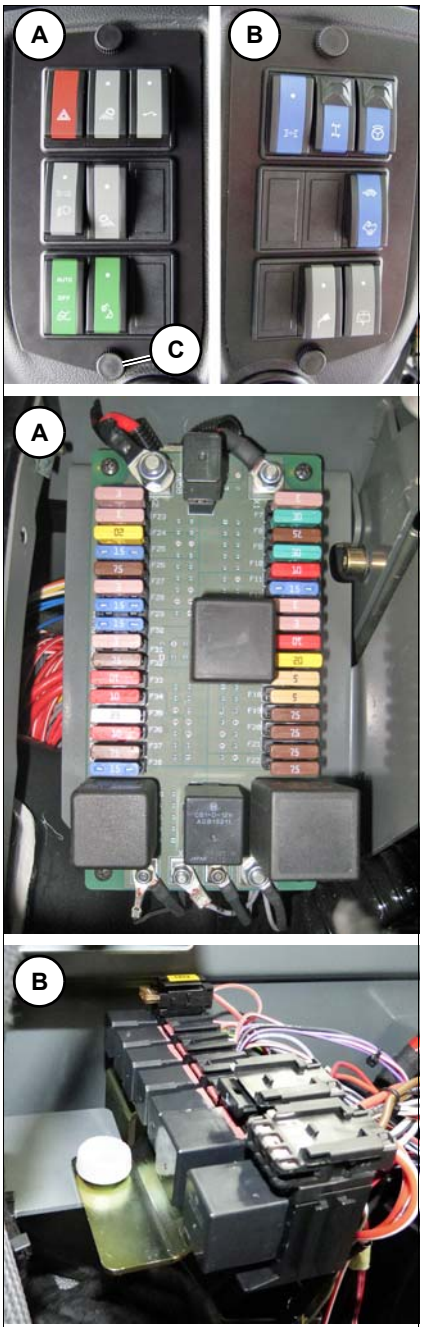


Fig. 282

The relays and fuses are located behind the switch console on the left **A** and right **B** in the cabin.

NOTICE

Blown fuses indicate overloading, short circuits or wiring harness damage.

- ► Have the electrical system checked before installing new fuses!
- ► Only use fuses with the specified load capacity (amperage).

1. Park the machine on level ground.
2. Lower the loader unit.
3. Apply the parking brake.
4. Stop the engine and remove the starting key.
5. Remove knurled thumb screws **C** from the switch panel.
6. Replace the malfunctioning fuse or relay.
7. Fuse and relay descriptions and output indications
   – see chapter 9 “Fuse assignments (pos. A)” on page 9-13 and *Switching relay assignment on page 9-15*.

7.14 Heating, ventilation and air conditioning system

Cleaning/replacing the dust filter of the cabin ventilation


Fig. 283

The dust filter is located behind the maintenance flap on the outside right of the cabin.

CAUTION

Health hazard due to incorrectly installed or damaged dust filter!

Can cause health damage to respiratory tracts.

- ► Replace damaged or very dirty dust filters with a new one!
- ► Clean the dust filter every 20 hours of operation, however replace it every 500 hours of operation at the latest.
- ► The machine may not be used in an environment requiring protection against aerosols and vapours!

1. Remove screws (2x) on the maintenance cover and remove the maintenance cover.
2. Pull out the dust filter and check for damage.
3. Knock the filter element on a plate on either side, or blow compressed air from the inside to the outside to clean the filter, or wash it with water and allow to dry.
4. Replace the dust filter if necessary:
   - Replace the dust filter every 500 hours of operation.
   - Replace or clean the filter more frequently if the machine is used in severe dust conditions.
5. Clean the inside of the air cleaner (filter) housing.
6. Insert the dust filter.
7. Install the servicing lid with 2 screws and tighten it to 1.5 Nm.

Information

In order to ensure the cleanest possible air inside the cabin, ensure the correct position of the dust filter.

Information

Observe the maintenance intervals – *see “Maintenance plan” on page 7-3*.

Air conditioning (option)

Responsibilities and prerequisites

- Functional and visual checks must be performed by the operator/user.
- All maintenance and repair work may only be performed by the trained personnel of an authorized service centre.

Important safety instructions regarding the air conditioning system

CAUTION

Injury hazard due to rotating parts!

Rotating parts can cause serious injury.

► Stop the engine before opening the engine cover.
► Switch off the starter and remove the starting key.
► Switch off the battery master switch (option).
► Apply the parking brake.
► Let the engine cool down.

CAUTION

Injury hazard due to damaged hoses and lines!

Escaping refrigerant can cause serious injury.

► Do not open tubes, hoses or other components.
► Avoid all contact with the refrigerant.

CAUTION

Injury hazard during inspection work! There are sharp-edged fins on the condensor and the heat exchanger. Furthermore, pipes and hoses containing coolant may be hot!

Failure to observe this can cause injury.

► Wear protective clothing (working gloves, safety glasses).
► Do not perform maintenance unless the heating and air conditioning systems are switched off.

Daily visual check by user (operator)

CAUTION

Injury hazard due to hot and moving engine parts!

Hot and moving engine parts can cause injury.

► Do not open the engine cover if the engine is running.
► Let the engine cool down.
► Wear protective clothes.

1. Apply the parking brake.
2. - Switch off the engine and remove the ignition switch key.
3. Remove the key from the battery master switch (option).
4. Check the heating and coolant lines for damage.
5. Check hoses for damage, leaks and chafing points.
6. Check the electric connections for correct condition and tightness.

The air conditioning system must be checked and serviced twice a year by trained personnel in an authorized service centre!

- For the first fill, see the air conditioning label inside the engine compartment on the air duct plate of the radiator.

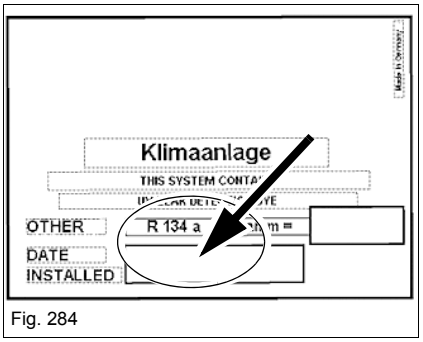


Fig. 284

Information

Use only the refrigerants indicated on the label for refilling the air conditioning system (see arrow).

NOTICE

To ensure the correct function of the air conditioning, perform inspections and maintenance at regular intervals.

► Perform a visual check of the air conditioning system once a day.
► Check and clean the heat exchanger once a day.
► Have the air conditioning system checked twice a year by trained personnel in an authorized service centre.
► Have the dehumidifier replaced every 2 years by an authorized service centre.

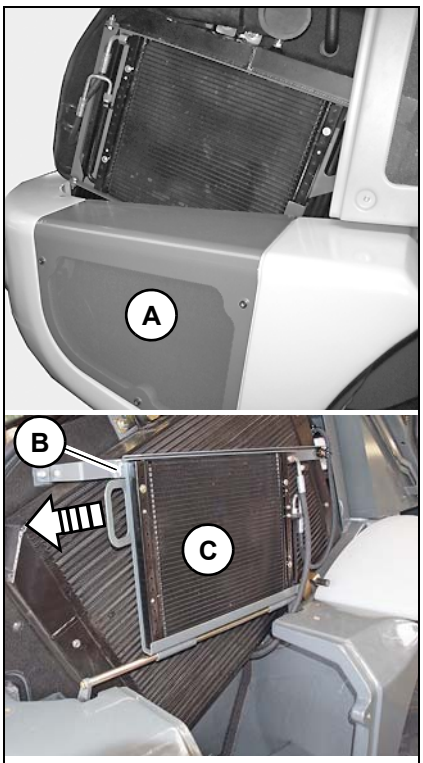


Fig. 285

Cleaning the heat exchanger (condenser)

Check and clean the heat exchanger once a day in order to ensure the correct function of the air conditioning. During mowing and mulching operation, clean the heat exchanger and the protective screen more frequently because of the increased dust (plant particles).

CAUTION

Injury hazard due to hot and moving engine parts!

Hot and moving engine parts can cause injury.

- ► Do not open the engine cover if the engine is running.
- ► Let the engine cool down.
- ► Wear protective equipment.

NOTICE

Damage to the heat exchanger due to cleaning.

- ► Do not use high-pressure cleaners or compressed air.

1. Apply the parking brake.
2. Stop the engine and remove the starting key.
3. Remove battery cover **A** from the counterweight.
4. Remove screws **B** and pull heat exchanger **C** backward, or lower it.
5. Clean the heat exchanger with a water jet.
6. Clean the air intake area.
7. Bring the heater box **C** in the initial position and attach screws **B**.
8. Install intake screen **A** onto the counterweight.

7.15 Washer system

Washer system reservoir

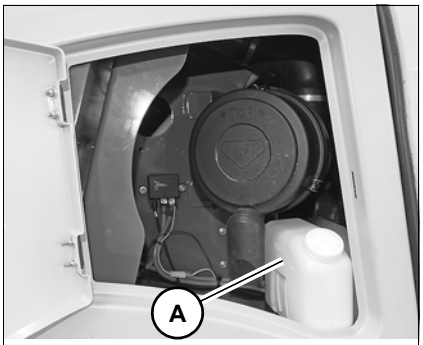


Fig. 286

Reservoir **A** is located on the left behind the cabin, behind the maintenance flap.

Information

Add only clean tap water!

Add a suitable cleaning agent if required
– *see "Overview of lubricants" on page 7-12*.

At temperatures around or below the freezing point:

- ► Add antifreeze for washer systems to the water.
- ► Refer to the antifreeze instructions for further information on concentrations.

Information

Maintenance intervals – *see "Maintenance plan" on page 7-3*.
Specifications and fill quantities – *see "Fluids and lubricants" on page 7-12*.

7.16 Axles/travelling drive

Maintenance on axles/drive

NOTICE

If the oil temperature of the drive hydraulics is over 105°C (221 °F), the travel speed (travel dynamics) is automatically reduced by 50% until the oil temperature is below 105°C (221 °F) in order to avoid damage to the drive hydraulics.

► Have the cause for the high oil temperature checked or repaired by an authorized service centre under all circumsances.

Information

Maintenance work on the axles and drive may only be performed by an authorized service center for reasons of safety and to ensure warranty and liability claims.

Observe the maintenance intervals – *see "Maintenance plan" on page 7-3*.
Specifications and fill quantities – *see "Fluids and lubricants" on page 7-12*.

7.17 Braking system

Important safety instructions regarding the braking system

WARNING

Accident hazard due to malfunctioning brake lines or hoses!

Can cause serious injury or death.

► Damaged brake lines or hoses must immediately be replaced by an authorized service centre.

Information

Brakes are crucial to safety. Incorrect maintenance can cause brake failure.
Maintenance work on the axles and drive may only be performed by an authorized service center for reasons of safety and to ensure warranty and liability claims.
An exception to this is the following work that must be performed by the operator:

► Daily check of the brake lines.

► Daily check of the level in the brake fluid reservoir
– see “Checking/adding brake fluid” on page 7-62.

Information

Observe the maintenance intervals *– see “Maintenance plan” on page 7-3*.
Specifications and fill quantities *– see “Fluids and lubricants” on page 7-12*.

Checking/adding brake fluid

The brake fluid reservoir is located at the front left in the cabin (near the brake/inching pedal).

WARNING

Danger of accident due to poor quality of brake fluid or non-permitted low brake fluid level!

Failure to observe this can cause serious injury or death.

- ► Check the brake fluid in the reservoir **once a day** before starting machine travel.
- ► Top off brake fluid up to the "MAX" mark of the sight glass.
- ► If the braking system loses too much brake fluid, have the braking system checked by an authorised service centre.
- ► The brake fluid must comply with the specification **(ATF)** *– see "Fluids and lubricants" on page 7-12*.
- ► The brake fluid must be replaced every 2 years by an authorized service centre.

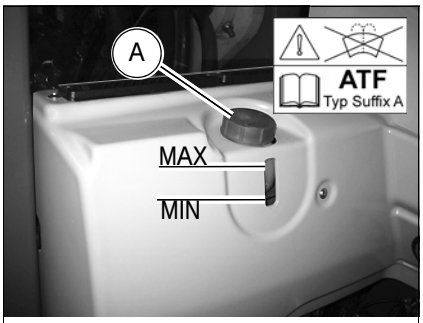


Fig. 287

If the fluid level is in the MIN range of the sight glass:

1. Clean the area around the opening with a clean cloth.
2. Open reservoir cover **A**.
3. Add brake fluid up to the **MAX** range on the sight glass.
   ➥ Use only ATF brake fluid *– see "Fluids and lubricants" on page 7-12*.
4. Close reservoir cover **A**.
5. Immediately wipe away brake fluid spills.

7.18 Tyres

Important information on the tyres

WARNING

Accident hazard due to use of tires other than certified!

Can cause serious injury or death.

- ► Install only certified tires/wheels (see “Technical data – tires”).
- ► Have wheels changed by an authorised service centre if possible.

Information

Have maintenance on the tyres and rims only performed by the trained personnel of an authorized service centre.

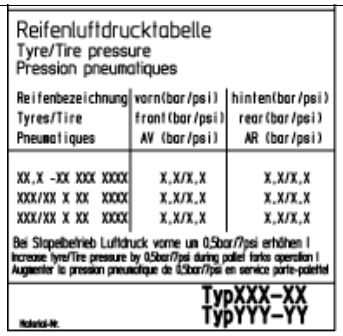
WARNING

Risk of tyres bursting during inflation!

Can cause serious injury or death.

- ► Wear gloves and safety glasses.
- ► Check the tires and rims for damage before inflating the tires.
- ► Stay clear of the tyres when checking the inflation pressure and/or inflating the tyres.
- ► Observe the mandatory tire inflation pressure (see label on front window).

Checking the tyres


Reifenluftdrucktabelle
Tyre/Tire pressure
Pression pneumatiques

Reifenbezeichnung Tyres/Tire Pneumatiques	vorn(bar/psi) front(bar/psi) AV (bar/psi)	hinten(bar/psi) rear(bar/psi) AR (bar/psi)
XX.X -XX XXX XXXX	X,X/X,X	X,X/X,X
XXX/XX X XX XXXX	X,X/X,X	X,X/X,X
XXX/XX X XX XXXX	X,X/X,X	X,X/X,X

Bei Stapelbetrieb Luftdruck vorne um 0,5bar/7psi erhöhen !
Increase tyre/Tire pressure by 0,5bar/7psi during pallet forks operation !
Augmenter la pression pneumatique de 0,5bar/7psi en service porte-palettes

TypXXX-XX
TypYYY-YY

Fig. 288

Information

Observe the maintenance intervals – *see “Maintenance plan” on page 7-3*.

Regular checks for damage and of the tire pressure increase operational safety and the service life of the tires, and reduce the machine’s downtimes.

1. Check the tire pressure with a measuring instrument.
   ➥ Refer to the label on the front window or
   – *see chapter 9 “Tyres” on page 9-7* in this Operator’s Manual.
2. Check the tires and the rims – also on the inside – for cracks, ageing and tread thickness.
3. Remove foreign bodies from the tire tread.
4. Remove traces of oil and grease from the tires.
5. Check the wheel nuts for correct seating and retighten them if necessary
   – *see chapter 9 “Tightening torques” on page 9-17*.

Installing/removing wheels

Important safety instructions

WARNING

Crushing hazard when raising the machine!

Can cause serious injury or death.

- ► Park the machine on level and firm ground.
- ► Seal off the job site and ensure constant supervision of the machine.
- ► Use only inspected and authorised lifting devices with the required lift load for lifting.
- ► Use trestles to secure and stabilise the machine, not the jack.
- ► Do not start the engine if the machine is jacked up or raised on trestles.
- ► Have wheels changed by an authorized service center if possible.

WARNING

Accident hazard due to wrong tires!

Can cause serious injury or death.

- ► Use only tires that have been certified for the machine.

WARNING

Accident hazard due to loose wheel nuts!

Can cause serious injury or death.

- ► Check the wheel nuts for tightness after every wheel or tire change.

NOTICE

The threads on the wheel bolts can be damaged when fitting the heavy wheels.

- ► Use suitable auxiliary assembly tools, such as lifting devices or protective sheaths for the wheel bolts.

Removing the wheels

1. Park the machine on level and firm ground.
2. Lower the loader unit to the ground.
3. Apply the parking brake.
4. Stop the engine and remove the starting key.
5. Prevent the machine from rolling away (wheel chocks).
6. Loosen the wheel nuts a little of the wheel you want to remove.
7. Raise the machine only until the wheel can be moved freely.
8. Put a trestle under the axle tube ensuring stability.
9. Lower the machine onto the trestle.
10. Completely remove the wheel nuts.
11. Remove the wheel.

Mounting the wheels

1. Clean the flange surfaces of the wheels and axles.
2. Place the covering sleeves onto the wheel bolts.
3. Place the wheel onto the wheel bolts with a suitable means.
4. Remove the covering sleeves.
5. Fit all the wheel nuts and tighten them part-way.
6. Lower the raised axle.
7. Tighten the wheel nuts to the specified tightening torque
   – see chapter 9 “Tightening torques” on page 9-17.

Information

Retighten the wheel nuts after 10 operating hours to the specified torque.

7.19 Maintenance of attachments

Correct maintenance and service is absolutely necessary for smooth and continuous operation, and for an increased service life of the attachments.

Please observe the lubrication, maintenance and care instructions in the respective operator's manuals of the attachments!

7.20 Maintenance of options

Automatic trailer coupling (option)

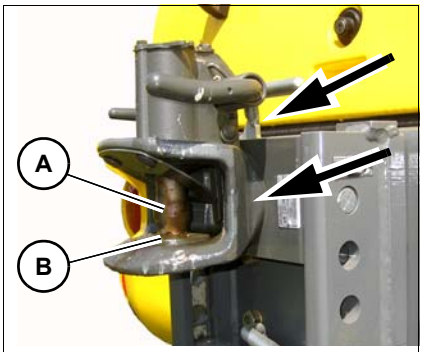


Fig. 289

Cleaning and lubricating the trailer coupling

NOTICE

In order to ensure the full functionality of the ball hitch, close the coupling pin in the ball hitch before cleaning with high-pressure cleaning equipment!

Information

Maintenance intervals – *see "Maintenance plan" on page 7-3*.
Grease – *see "Fluids and lubricants" on page 7-12*.

1. Close the trailer coupling.
2. After cleaning, lubricate the coupling pin **A**, the bearing support **B** and the drawbar eye with tough water-proof grease.
3. Apply tough water-proof grease to the lower bearing of the coupling jaw.
4. Apply grease to the grease zerk on the joint.
5. Lubricate all moving parts of the height adjustment.

Check the ball hitch for wear

WARNING

Injury hazard due to worn out or broken coupling components.

A worn coupling pin, too much play in the bearing, or a worn base ring can lead to serious injury or death.

► Check the ball hitch once a day for wear and play.

► Apply grease to the base ring.

► Only have repair work on the ball hitch or a replacement of the ball hitch performed by an authorized service center.

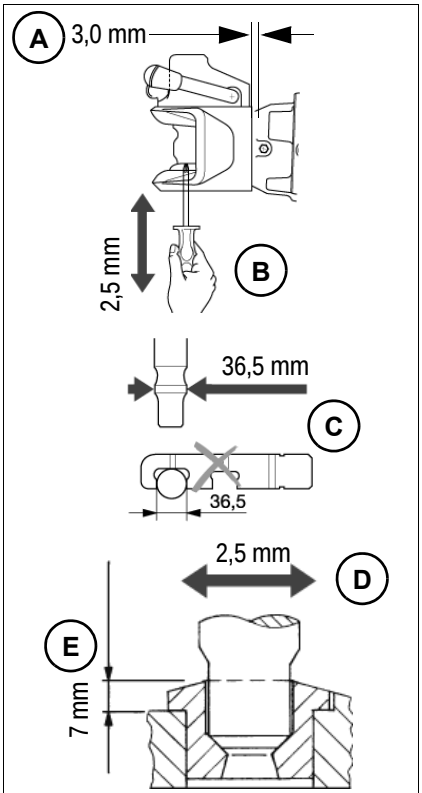


Fig. 290:

1. Check the bearing and **longitudinal play A** of the coupling head:
- Move the uncoupled coupling head with force in travel direction.
2. Check the **height-wise play** of the coupling head:
- Open the coupling.
- Move the coupling head up and down with a suitable tool (mounting lever).
  ➥ Play **A** in the centre axis of the coupling head = **max. 3 mm (0.12 in)**
3. Check the coupling pin – **wear**:
- Measure wear by means of a slide gage on the thickest section of the coupling pin **C**.
  ➥ Diameter **C** may **not drop below 36.5 mm (1.44 in)**.
  ➥ Height-wise play **B max. 2.5 mm (0.1 in)**.
4. Check bearing support – **bolt play** and **strength**:
  ➥ Bolt play **D** in the bearing support **max. 2.5 mm (0.1 in)**
  ➥ Thickness **E** of base ring **min. 7 mm (0.28 in)**

Ball trailer coupling (option)

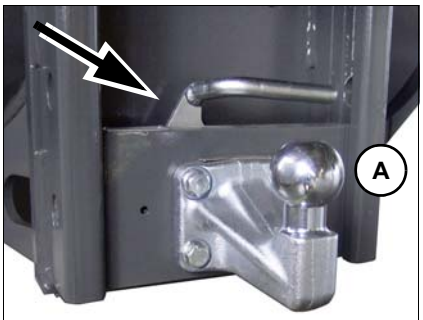


Fig. 291

Cleaning and lubricating the trailer coupling

Information

Maintenance intervals – *see “Maintenance plan” on page 7-3*.
Grease – *see “Fluids and lubricants” on page 7-12*.

1. After cleaning, apply tough water-proof grease to trailer ball **A** and the trailer cap.
2. Lubricate all moving parts of the height adjustment.

Piton ball hitch (option)

Fig. 292

Cleaning and lubricating the trailer coupling

Information

Maintenance intervals – *see “Maintenance plan” on page 7-3*.
Specifications and fill quantities – *see “Fluids and lubricants” on page 7-12*.

1. After cleaning, apply tough water-proof grease to the contact surface at the coupling point.
2. Lubricate all moving parts of the height adjustment.

Central lubrication system (option)

Function description

The "central lubrication system" outfitting allows you to lubricate all lubrication points of the machine in one single step.

Information

Maintenance intervals – *see "Maintenance plan" on page 7-3*.
Lubricant – *see "Fluids and lubricants" on page 7-12*.

- When the ignition is switched on, the LED **B** lights up for 1.5 seconds and shows the functional readiness of the control (switch-on check). The LED stays lit during the entire lubrication procedure.
- The integrated electronic control unit has a data memory for saving the times that have been set or that have elapsed. The time is taken and saved if the starter is switched off during lubrication or during a break. The remaining lubrication time or break time is read from the memory upon switching the starter on again, and lubrication is resumed where it was interrupted.

Time control

- Break and lubrication times can be set with the time-dependent control of the central lubrication system. Break times are the periods between two lubrication times.

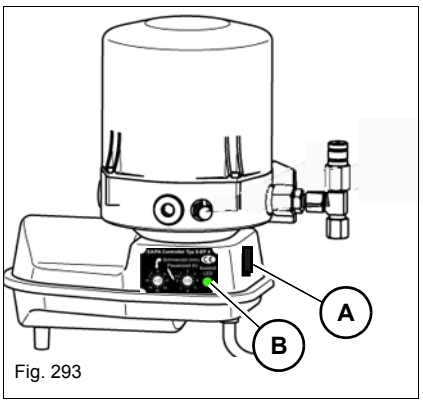


Fig. 293

Information

Pressing touch button **A** on the side of the pump starts intermediate lubrication at any given time if the starter is switched on. The intermediate lubrication is also used as a functional check.
After pressing the touch button, the pump immediately starts with a lubrication cycle. The lubrication or break time that has elapsed so far or that has been saved is reset and starts over again.
A lubrication system malfunction can also be reset by pressing the intermediate lubrication switch, and the pump restarts lubrication.

Repair work

Repair work on the central lubrication system may only be performed by authorized service centers!

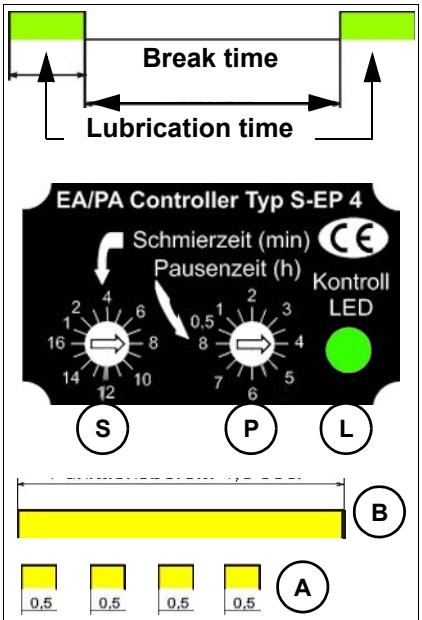


Fig. 294

Setting the lubrication and break times

Break times and lubrication times are set with the notched switches **S and P** in the sight window of the controls.

1. Remove the red frame on the protective motor housing of the pump with a flat screwdriver to set the time.
2. Loosen the four cross-slotted screws and remove the transparent cover.
3. Set the break time **P** and the lubrication time **S** with a flat screwdriver.
4. Install the transparent cover (window) once the settings are performed.

Lubrication times (S)

- 1 to 16 min. (16 notches each up to 1 min.)
- 2 to 32 min. (16 notches each up to 2 min.)

Break time (P)

- 0.5 to 8 h (16 notches, 0.5 h each)

LED (L)

- **(B)** lubrication system in operation
- **(A)** lubrication in progress: 0.5 seconds LED ON/0.5 seconds LED OFF

NOTICE

Close the sealing push-in cap of the controls correctly in order to avoid malfunctions due to the penetration of water in the controls of the lubrication system!

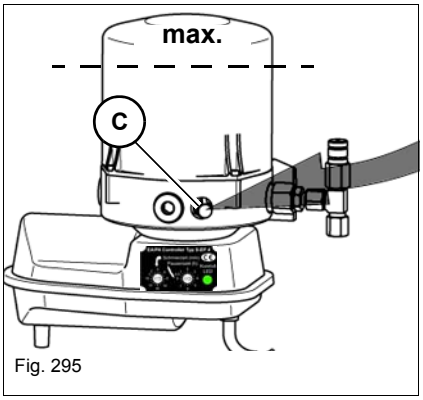


Fig. 295

Filling the central lubrication system

The lubrication system can be filled via the zerk fitting **C** or a fill coupling with a manual or pneumatic grease press.

NOTICE

Only fill up to the maximum level in order to ensure the ventilation of the central lubrication system.

7.21 Exhaust gas treatment

Exhaust after-treatment systems, exhaust emission level III B

Fig. 296

Depending on the country-specific approval, various exhaust after-treatment systems can be installed in the vehicles.

In the EU member states, the US, Canada and Switzerland:

A Diesel oxidation catalytic converter (DOC)/DEUTZ-Motor TCD 2.9

B Diesel oxidation catalytic converter (DOC) / DEUTZ-Motor TCD 3.6

➥ Description and function *– see "Diesel oxidation catalytic converter (DOC)" on page 7-75*.

C Diesel oxidation catalytic converter (DOC) combined with option diesel particulate filter (DPF)/DEUTZ engine TCD 2.9

➥ Description and function *– see "Diesel oxidation catalytic converter (DOC) with diesel particulate filter (DPF) (option)" on page 7-76*.

In the non-EU member states:

- Exhaust muffler (standard)

Exhaust after-treatment systems, exhaust emission level IV, tier 4f

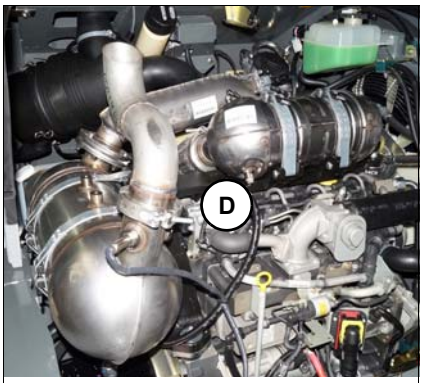


Fig. 297

Depending on the country-specific approval, various exhaust after-treatment systems can be installed in the vehicles.

e.g. in the EU member states, the US, Canada and Switzerland:

D Diesel oxidation catalytic converter (DOC) with SCR catalytic converter (SCR = selective catalytic reduction) with urea solution/ DEUTZ engine TCD 3.6.

➥ Description and function – *see “Diesel oxidation catalytic converter (DOC) with SCR catalytic converter (option)” on page 7-77*.

e.g. in the non-EU member states:

- Exhaust muffler (standard)

Description and function

Fig. 298

Diesel oxidation catalytic converter (DOC)

This exhaust after-treatment system is a closed system consisting of the diesel oxidation catalytic converter **A/B** (DOC).

The diesel oxidation catalyst has a catalyzing surface, through which harmful substances in the exhaust fumes are converted into non-harmful substances. In the process, carbon monoxides and unburned hydrocarbons are brought to react with oxygen and converted into carbon dioxide and water. In addition, the nitrogen monoxides are converted into nitrogen dioxides.

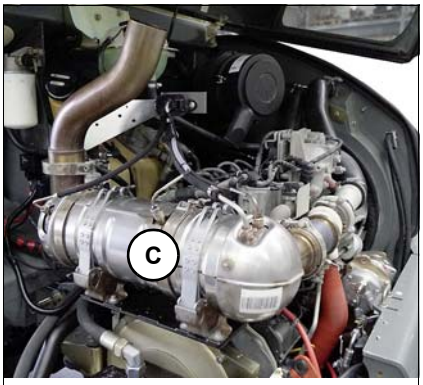


Fig. 299

Diesel oxidation catalytic converter (DOC) with diesel particulate filter (DPF) (option)

The exhaust after-treatment **C** is a closed system consisting of the diesel oxidation catalytic converter (DOC) with the diesel particulate filter (DPF) option.

The soot produced when combusting diesel fuel is collected in the diesel particulate filter.

The filter is automatically regenerated during engine operation as the soot load increases. This means that the soot is burned in the diesel particulate filter.

The combustion (regeneration) of the soot is a continuous process that automatically starts as soon the conditions required for it (soot load and exhaust-gas temperature) are fulfilled.

The loading of the diesel particulate filter is electronically monitored.

If automatic regeneration should not be possible for different reasons, the system indicates (by means of symbols and warning lights in the digital display) that manual regeneration is necessary
– see "Monitoring of the diesel particulate filter (DPF) (optional)" on page 7-78 and *Manual regeneration on page 7-84*.

Ash is also collected during the combustion of soot, however it is not eliminated by regeneration.

This results in shorter regeneration intervals, which ultimately requires the replacement of the diesel particulate filter during maintenance.

Information

The ash and soot load may appear in % in the digital display by means of a query.

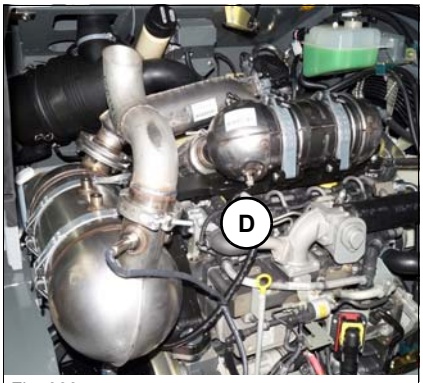


Fig. 300

Diesel oxidation catalytic converter (DOC) with SCR catalytic converter (option)

This exhaust after-treatment **D** is a closed system consisting of the diesel oxidation catalytic converter (DOC) and the SCR catalytic converter (SCR = selective catalytic reduction) with urea solution.

The diesel oxidation catalyst has a catalyzing surface, through which harmful substances in the exhaust fumes are converted into non-harmful substances. In the process, carbon monoxides and unburned hydrocarbons are brought to react with oxygen and converted into carbon dioxide and water. In addition, the nitrogen monoxides are converted into nitrogen dioxides.

Temperatures of > 250°C (> 482°F) are necessary for a high efficiency.

A urea solution injected into the SCR catalytic converter reacts with the NOx emissions contained in the exhaust fumes and reduces these to nitrogen (N2) and water (H2O).

The control of the urea injection amount occurs via the engine electronics.

If regeneration should not be possible for different reasons, the system indicates (by means of symbols and warning lights on the display) that manual regeneration is necessary
– see "Monitoring of the exhaust after-treatment" on page 7-78.

If the manual regeneration is not carried out, the engine controller activates the specified engine protection functions
– see "Monitoring of the exhaust after-treatment" on page 7-78.

➥ 1 level: Torque reduction of the diesel engine
➥ 2 level: Torque reduction + engine speed limitation

Information

Every manual regeneration dilutes the motor oil to a small degree with fuel.

➥ The number of manual regenerations is therefore monitored.
➥ Therefore, before an oil change, always perform a manual regeneration of the exhaust after-treatment system *– see "Manual regeneration" on page 7-84*. Then reset the maintenance counter in the DEUTZ engine controller.

Information

The SCR catalytic converter reacts to the faulty operation of the exhaust after-treatment system with various warning notices.

Errors are:

► Fill level of the urea solution too low (below 15%)
► Reduced degree of efficiency of the SCR catalytic converter
► Quality of the urea solution
► System error of the SCR catalytic converter
► Crystallization in the SCR catalytic converter

Monitoring of the exhaust after-treatment

Monitoring of the diesel particulate filter (DPF) (optional)

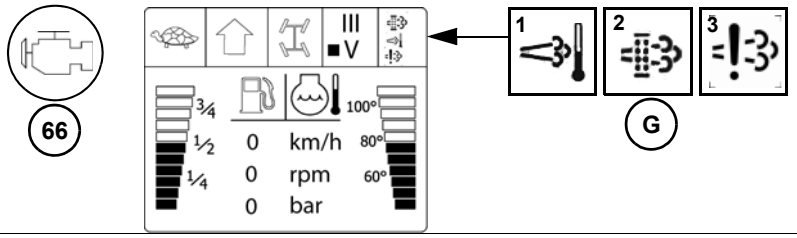


Fig. 301

Symbol in field G	Function	Result
• No symbol appears in the field **G** of the digital display.		**Normal operating conditions** • The soot load is in the permissible range.
1	• Symbol **G/1** illuminates permanently.	**Increased soot load** • Automatic regeneration in operation. • Machine operation can be continued. • Diesel engine operated with increased speed.
2	• Symbol **G/2** flashes.	**Caution! The soot load is in the high range** • Automatic regeneration is no longer possible. • Perform manual regeneration on the next occasion *– see "Manual regeneration" on page 7-84*.
2 66	• Symbol **G/2** flashes. • Warning light **66** lights up. • **A short** acoustic warning sounds.	**Caution! Critical soot load** • Diesel engine goes into protective functions and performance is reduced by 30%. • Perform manual regeneration immediately *– see "Manual regeneration" on page 7-84*.
3 66	• Symbol **G/3** flashes. • Warning light **66** lights up. • **A continuous** acoustic warning sounds.	**Caution! Soot load too high** • Diesel engine goes into protective functions and performance is reduced by 30%. • Diesel engine speed is limited to 1200 rpm. • Manual regeneration is no longer possible. • The diesel particulate filter has to be replaced by an authorized service center *– see "Cleaning/replacing the diesel particulate filter (option)" on page 7-86*.

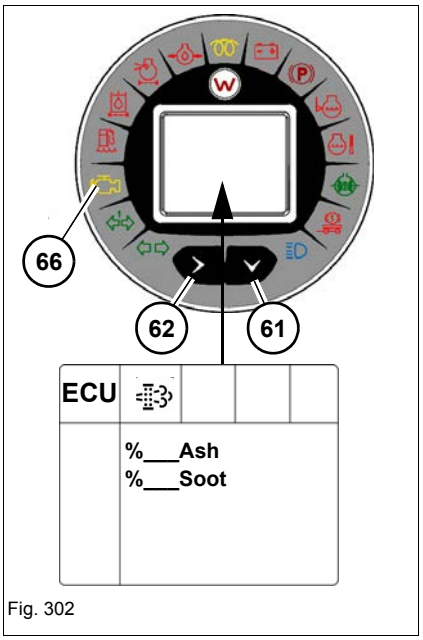


Fig. 302

Status check of ash and soot load

1. Press touch button **61** in the display repeatedly until the symbol "**ECU**" appears in the digital display.
2. Press touch button **62** in the display repeatedly until the symbol " " appears in the digital display.
   - ➥ **Ash** = ash load in %
   - ➥ **Soot** = soot load in %
3. At an **ash load of 105%**, due maintenance is indicated by warning light **66**, an acoustic warning and a corresponding CAN message in the digital display.

Information

At an ash load of 100 %, have an authorized service center replace the diesel particulate filter.

- ► Repair and maintenance work on the diesel particulate filter may be performed only by authorized service centres and trained personnel.
- ► In the DEUTZ exchange program, dirty diesel particulate filters can be returned and replaced with a clean filter.

Monitoring of the SCR catalytic converter: Fill level of urea solution

The warning messages are issued at a fill level of the urea tank below 15%.

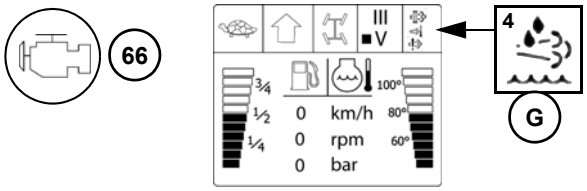


Fig. 303

Symbol in field G	Message	Result
• In the field **G** of the digital display, no symbol appears, no warning light lights up and no acoustic signal sounds.		**Normal operating conditions** • The exhaust after-treatment is working in the permissible range.
4	• Symbol **G/4** appears continuously.	**Caution!** • Fill level of the urea is below 15%. ➥ Top off urea as soon as possible *– see "Refueling with urea solution" on page 7-88*.
	• Symbol **G/4**flashes.	**Caution!** • Fill level of the urea is below 10%. ➥ Top off urea.
4 66	• Symbol **G/4**flashes (0.5 Hz). • Warning light **66** lights up continuously. • An acoustic **signal** sounds.	**Caution!** • The fill level of the urea is below 5%. ➥ Top off urea immediately.
4 66	• Symbol **G/4**flashes (1 Hz). • Warning light **66** lights up continuously. • An acoustic **signal** sounds.	**Caution! Critical condition** • Fill level below 5% for longer than 10 minutes. • Diesel engine goes into protective functions and performance is reduced by 30%. ➥ Top off urea immediately.
4 66	• Symbol **G/4**flashes (2 Hz). • Warning light **66** flashes. • An acoustic **signal** sounds.	**Caution! Critical condition** • Fill level below 5% for longer than 15 minutes. • Diesel engine goes into protective functions and performance is reduced by 30%. ➥ Top off urea immediately.
4 66	• Symbol **G/4**flashes (2 Hz). • Warning light **66** flashes. • An acoustic **signal** sounds.	**Caution! Extremely critical condition** • Fill level below 5% for longer than 20 minutes. • Diesel engine goes into protective functions and performance is reduced by 30%. • The speed of the diesel engine is limited. (1200 rpm). ➥ Top off urea immediately.

Monitoring of SCR catalytic converter: degree of efficiency

If the efficiency level is excessively low despite successful refilling, warnings and/or warning lights will appear **66** on the digital display.

Warnings also occur due to the use of an incorrect urea solution.

➥ If a manipulated element or the use of an incorrect reducing agent is detected, the diesel engine performance is reduced. The performance reduction occurs gradually and depends on the engine output.

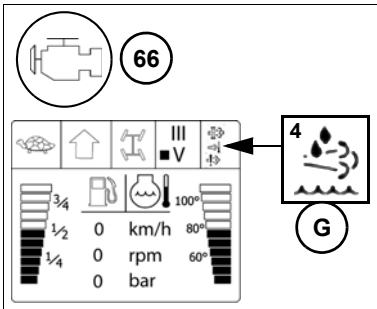
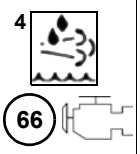
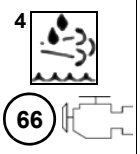


Fig. 304

Symbol in field G	Message	Result
• No symbol appears in the field **G** of the digital display. • Warning light**66** does not light up. • No acoustic **signal.**		**Normal operating conditions** • The exhaust after-treatment is in the permissible range.
	• Symbol **G/4** appears continuously. • Warning light**66** lights up continuously. • An acoustic **signal** sounds.	**Caution! Critical condition** • The diesel engine goes into protective functions and performance is reduced by 30%. ➥ Contact an authorized service centre.
	• Symbol **G/4** appears continuously. • Warning light **66** flashes. • An acoustic **signal** sounds.	**Caution! Extremely critical condition** • Diesel engine goes into protective functions and performance is reduced by 30%. • The speed of the diesel engine is limited. (1200 rpm). ➥ Contact an authorized service centre.

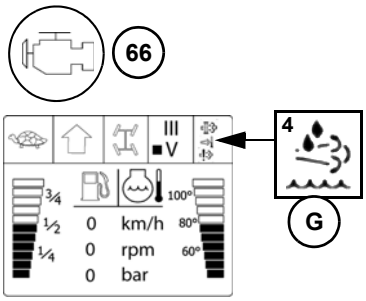
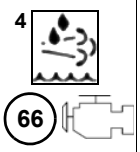
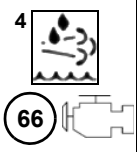


Fig. 305

Monitoring the SCR catalytic converter: system error

System errors may be errors of individual SCR components, such as the implausible value of a NOx or temperature sensor.

➥ The diesel engine performance is reduced in the event of an impairment of the urea injection due to a system error.

Symbol in field G	System error message	Result
• No symbol appears in the field **G** of the digital display. • Warning light**66** does not light up. • No acoustic **signal.**		**Normal operating conditions** • The exhaust after-treatment is in the permissible range.
	• Symbol **G/4** appears continuously. • Warning light **66 flashes.** • An acoustic **signal** sounds.	• Machine operation can be continued. ➥ Seek an authorized service center as soon as possible.
	• Symbol **G/4** appears continuously. • Warning light **66** flashes. • An acoustic **signal** sounds.	**Caution! Critical condition** • Diesel engine goes into protective functions and performance is reduced by 30%. • The speed of the diesel engine is limited. (1200 rpm). ➥ Contact an authorized service centre.

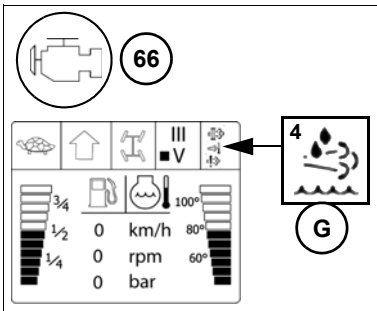


Fig. 306

Monitoring the SCR catalytic converter: crystallization

Crystallization occurs when the utilization of the engine is too low or has too short of operating times.

Symbol in field G	Crystallization message	Result
• No symbol appears in the field **G** of the digital display. • Warning light **66** does not light up. • No acoustic **signal.**		**Normal operating conditions** • The exhaust after-treatment is in the permissible range.
4	• Symbol **G/4** flashes.	• Machine operation can be continued. ➥ Perform manual regeneration.
4 66	• Symbol **G/4** flashes. • Warning light **66** lights up continuously. • An acoustic **signal** sounds.	**Caution! Critical condition** • The diesel engine goes into protective functions and performance is reduced by 30%. ➥ Contact an authorized service centre.
4 66	• Symbol **G/4** flashes quickly. • Warning light **66** flashes. • An acoustic **signal** sounds.	**Caution! Critical condition** • Diesel engine goes into protective functions and performance is reduced by 30%. • The speed of the diesel engine is limited. (1200 rpm). ➥ Contact an authorized service centre.

Manual regeneration

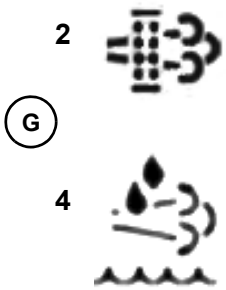


Fig. 307

Important information about the manual regeneration

If the symbol **G/2** or the symbol **G/4** flashes, the exhaust after-treatment must be manually regenerated.

Information

The symbol **G/4** only appears if a diesel particulate filter (optional) is installed in the vehicle.

Information

Important! Before changing the oil, a manual regeneration of the exhaust after-treatment system (DOC and SCR catalytic converter) must be performed for DEUTZ engines with EU exhaust emission level IV (EPA tier4f) .Then the maintenance counter must be reset in the DEUTZ engine controller.

WARNING

The parts of the exhaust after-treatment become very hot. There is a risk of fire and explosion!

Failure to observe this can cause serious injury.

- ► When stopping the machine while the engine is running, ensure that there is no flammable or combustible material in the immediate vicinity of the exhaust opening (for example paper, dry grass, straw, wood, wood ceilings, oil, fuel, etc.).
- ► Do not touch the area of the exhaust outlet since regeneration (combustion of soot) creates temperatures of about 650 °C (1202 °F)!
- ► Perform manual regeneration only outdoors, **not** in enclosed premises.

Information

The manual regeneration of the exhaust after-treatment system can only be performed if the following points are met:

- ► Park the machine on firm, non-flammable ground.
- ► The machine must not be moved during regeneration. (The time required for regeneration is about 30 minutes.)
- ► Engine coolant temperature must be at least 75°C (167°F).
- ► Hand brake applied.
- ► Work hydraulics locked.

Information

If these conditions are not fulfilled, regeneration cannot be performed or is interrupted, and must be performed again.

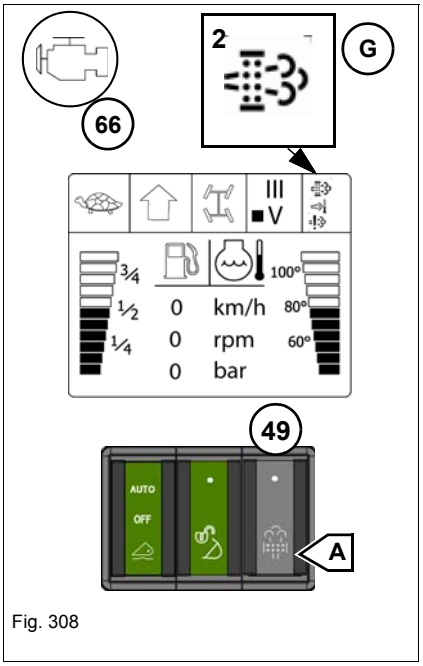


Fig. 308

Manually regenerate the exhaust after-treatment system

1. Run the diesel engine warm (coolant temperature at least 75 °C (167 °F)).
2. Park the machine on firm, non-flammable ground.
3. Lower the loader unit to the ground.
4. Apply the parking brake.
5. Do **not** stop the diesel engine, but let it run at idling speed.
6. Disable the lock for the operating hydraulics/road travel
   – see chapter 5 "3rd control circuit" on page 5-40.
7. Start regeneration. To do this: press push button **49** to position **A**.
   - ➥ Regeneration is in operation.
   - ➥ Engine speed is automatically increased.
   - ➥ The time required for regeneration is about 30 minutes.
8. Regeneration has finished successfully if:
   - ➥ the idling speed of the diesel engine reduces,
   - ➥ the symbol **G/2** in the digital display as well as the warning light **66** goes out.

Information

If the regeneration is interrupted for any reason (symbol **G/2** flashes, warning light **66** lights up**,** acoustic warning **ON),** then the entire regeneration must be repeated as described above.

If the regeneration is interrupted again, have the exhaust after-treatment system checked or replaced by an authorized service center.

Cleaning/replacing the diesel particulate filter (option)

During its entire service life, the diesel particulate filter also collects ash that is not removed by regeneration.

This ash load over time leads to reduced regeneration intervals, which then makes the replacement of the diesel particulate filter necessary as part of maintenance.

The diesel particulate filter may only be cleaned or replaced by an authorized service center.

NOTICE

Danger of engine damage within very short time under maximum load condition!

► Immediately park the vehicle and switch off the diesel engine.

► Contact an authorized service center.

Urea solution

Important information about the urea solution

CAUTION

Health risk from urea solutions!

Urea solutions and their vapors are harmful to health! Incorrect handling can cause injuries.

- ► Avoid contact with the skin, eyes and mouth.
- ► Ensure good ventilation.
- ► Ensure cleanliness.
- ► Wear protective equipment.
- ► Seek medical attention immediately in case of accidents with urea solutions.

Urea is a highly pure, watery 32.5% solution that is use as a NOx reducing agent for SCR exhaust fume after-treatment (SCR = selective catalytic reduction) of motor vehicles with diesel engines.

- The product must correspond to DIN 70070, ISO 22241-1 or ATSTM D 7821.
- The service life of urea solutions without a loss of quality is influenced by the storage conditions.
  The urea solution crystallizes (freezes) at -11°C (12.2°F) and over +35°C (95°F) a hydrolysis reaction sets in. This means a slow decomposition into ammonia and carbon dioxide begins.
- Avoid direct sunlight on unprotected storage containers.
- Containers with a urea content may not be stored for more than one year.
- Urea solution freezes from -11°C (12.2°F) ambient temperature.
  For ambient temperatures below -11°C (12.2°F), a preheating of the SCR system is therefore necessary.
- The urea solution should remain in the tank for a maximum of 4 months. This is to be documented.
- Empty and clean the urea tank when at a standstill.

Refueling with urea solution

NOTICE

Destruction of the exhaust after-treatment system by filling the urea tank with other media (e.g. diesel).

- ► Only fill the urea tank with urea solutions (SCR reducing agents).
- ► If the urea tank is incorrectly filled, have it emptied and cleaned by an authorized service center.
- ► If other media has made its way into the lines or the conveying module, this must be replaced by an authorized service center.

Environment

Collect the escaping urea solution with suitable containers and dispose of it in an environmentally friendly manner!

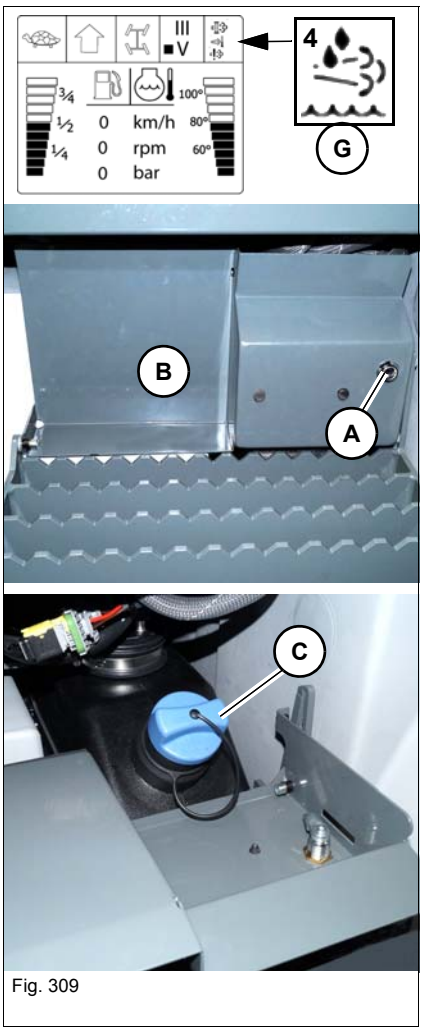


Fig. 309

If the fill level of the urea solution falls below 15%, the symbol **G/4** appears in the digital display.

➥ Top off urea.

The filler neck is located in the entry on the left side of the machine.

1. Lower the loader unit fully.
2. Apply the parking brake.
3. Stop the engine and remove the starting key.
4. Clean the area around the filler opening.
5. Unlock the lock **A** with the ignition switch key.
6. Fold down the cover **B**.
7. Open filler cap **C**.
8. Fill with urea solution.
   ➥ Comply with the quality and specification
   – see “Specification of the SCR reducing agent” on page 7-15.
9. Close filler cap **C**.
10. Fold down the cover **B** and lock with the lock **A**.

7.22 Machine preservation

Anticorrosion protection (option)

The machine can be specially protected against corrosion for work in aggressive media (for example, in a saline environment).

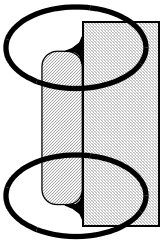
However, this anticorrosion protection is affected by external factors, for example dirt, cleaning, etc. This is why it only has ongoing effect if checked at regular intervals and renewed or reapplied as required.

If no anticorrosion protection is applied to the machine, for example for work in a saline environment, we recommend retrofitting your machine with this option by a sales partner.

The following anticorrosion protection is used:

Designation:	Elaskon 2000 ML, Elaskon UBS light Elaskon Aero 46 spezial, Elaskon Multi 80
Manufacturer:	ELASKON Sachsen GmbH & Co. KG, Dresden (Germany)

Components coated with anticorrosive wax

Component	Remarks
All electric plug connections, ground contacts and crimp connections	**Before applying the wax:** • Apply contact spray to contact surfaces and connect the plug-and-socket connections again. • Apply a particularly thick anticorrosion layer to the connecting parts of the fuel level transmitter.
All parts of the machine, for example Axles, gearbox, trim panels, servicing lids, loader unit, quickhitch	**Except:** • Piston rods (chromium coating) • Cabin, cabin bearings • Engine cover, engine mounting • Air filter • Counterweight • Fastening surfaces for installing parts on chassis • Radiator and insulating mat • Mudguards, rubber and plastic parts • Light elements
Flange surfaces 	**for example axles, diesel engine and cabin bearing:** • Seal gaps with anti-corrosion wax after assembly.

Measures for maintaining anticorrosive protection

WARNING

Special hazards during anticorrosion protection!

Can cause serious injury or death.

- ► When handling chemical substances of any kind, such as solvents, wax, etc., observe the specific product-related safety regulations (safety data sheet)!
- ► Ensure sufficient room ventilation!
- ► Do not use unprotected lights or open flames!
- ► Do not smoke!
- ► Corrosion on electric connections or components can cause hazardous operating malfunctions.
- ► Perform work on the electrical system only with the battery disconnected and the diesel engine stopped!

Information

Maintenance intervals – *see “Maintenance plan” on page 7-3*.

Cleaning

NOTICE

Contrary to the information in section "*Cleaning and maintenance on page 7-18*," do not clean the vehicle with bristle brushes or with steam cleaners or high pressure washers!

- ► If cleaning the machine with these means cannot be avoided, check the wax coating very carefully and have it renewed or reapplied as required.
- ► If you replace elements, check whether they are classified as in the table "*Components coated with anticorrosive wax on page 7-89*" and whether they are subject to special treatment before assembly.
- ► Have the sealing checked and repaired at least once a year by ELASKON – see the Elaskon servicing pass supplied with the machine.

- If the machine is used in corrosive environment over a longer period of time, remove the floor mat in the cabin. This will avoid a collection of corrosive moisture.
- Thoroughly clean machines that are put out of operation over a longer period of time.
- Clean the machine at least once a week. In particular, remove corrosive deposits (such as salt crusts) as fast as possible.
- Clean the machine with cold running water preferably.

Applying the anticorrosion protection

Bear in mind the following instructions as you apply the anticorrosion protection:

- Carefully cover all fastening surfaces and elements to which the anticorrosive protection may not be applied
  – see “Components coated with anticorrosive wax” on page 7-89.
- Apply Elaskon products with a brush or commercially available spray equipment.
- The protective Elaskon coating can be removed with an Elaskon cleanser if necessary.
- Spots are difficult to remove from clothing.
- Affix a “Wet paint!” or a similar sign to newly coated machines.

Treatment of oxidised surfaces

If in spite of all precautionary measures some components should be affected by corrosion (oxidized), treat the oxidized area follows:

Electric connections

- Remove the remaining protective wax at the oxidized area with an Elaskon cleanser.
- Treat the affected areas with an oxide cleanser, for example with Elaskon Multi 80.
- Apply Elaskon Multi 80 to the contact surfaces of the plug-and-socket connection.
- Establish the connection.
- Apply/spray the anticorrosion protection onto the electric connection from all sides.

Sheet-metal parts

- Remove the remaining protective wax at the oxidized area with an Elaskon cleanser.
- Remove all remaining corrosion and paint coating from the affected area down to the bare material, otherwise the protective coating will not adhere properly.
- Clean the affected area with a cleaning solvent, and apply a 2-component prime coating and then a 2-component paint coating to it.
- Then preserve the area with the anticorrosion protection.

8 Malfunctions

8.1 Diesel engine malfunctions

Information

For error identification, see also *Digital display of error codes on page 8-4* and *Overview error codes of diesel engine electronics on page 8-5*.

Errors may be rectified and repairs may be performed only by an authorized service centre.

Diesel engine malfunctions	Possible causes	Remedy/avoidance	See
Engine does not start or is not easy to start	Parking brake not applied	Apply the parking brake.	*5-16*
	3rd control circuit is switched on	Lock the 3rd control circuit.	*4-54*
	Wrong SAE grade of engine lubrication oil	Contact an authorized service centre.	*7-14*
	Fuel grade does not comply with specifications	Observe fuel specification when adding fuel.	*7-14*
	Insufficient fuel supply	Contact an authorized service centre.	–
	Malfunctioning or empty battery	Replace the battery with a new one.	*7-51*
	Seat contact switch (optional) issues no release.	Sit down on the operator seat.	
	Auxiliary control circuit is switched on	Switch off auxiliary control circuit.	*5-44*
	Loose or oxidized cable connections in starter circuit	Contact an authorized service centre.	–
	Malfunctioning starter, or pinion does not engage		–
	Wrong valve clearance		–
	Malfunctioning fuel injector		–
Engine starts, but does not run smoothly or faultless	Fuel grade does not comply with specifications	Observe fuel specification when adding fuel.	*7-14*
	Wrong valve clearance	Contact an authorized service centre.	–
	Injection line leaks		–
	Malfunctioning fuel injector		–
Engine does not run on all cylinders	Injection line leaks		–
	Insufficient fuel supply		–
	Malfunctioning fuel injector		–

Diesel engine malfunctions	Possible causes	Remedy/avoidance	See
Engine overheats. Temperature warning system responds	Oil level too low	Add engine oil, observe the engine oil specification.	*7-31*
	Oil level too high	Contact an authorized service centre.	–
	Dirty air filter	Replace the air filter.	*7-40*
	Malfunctioning air filter maintenance switch or gauge	Contact an authorized service centre.	–
	Dirty oil/water radiator fins	Clean the radiator.	*7-34*
	Malfunctioning fan, torn or loose V-belt	Retension the V-belt Contact an authorized service centre.	*7-42*
	Malfunctioning fuel injector		–
Insufficient engine power	Oil level too high	Contact an authorized service centre.	–
	Fuel grade does not comply with specifications	Observe fuel specification when adding fuel.	*7-27*
	Dirty air filter	Replace the air filter.	*7-40*
	Malfunctioning air filter maintenance switch or gauge	Contact an authorized service centre.	–
	Wrong valve clearance		–
	Injection line leaks		–
	Malfunctioning fuel injector		–
	Malfunctioning diesel particulate filter		–
	Soot load of diesel particulate filter is too high	Regenerate the diesel particulate filter.	*7-73*
Insufficient or no engine oil pressure	Oil level too low	Add engine oil, observe the engine oil specification.	*7-31*
	Engine inclination too high	Move machine out of inclination.	–
	Wrong SAE grade of engine lubrication oil	Contact an authorized service centre. Observe engine oil specification.	*7-12*
Engine oil consumption too high	Oil level too high	Contact an authorized service centre.	–
	Malfunctioning piston rings		–
	Engine inclination too high	Move machine out of inclination.	–
	Low-load operation of engine	Avoid too long engine idle times.	–

Diesel engine malfunctions		Possible causes	Remedy/avoidance	See
Engine smoke	Blue	Oil level too high	Contact an authorized service centre.	–
		Engine inclination too high	Move machine out of inclination.	–
	White	Engine starting temperature too low	Contact an authorized service centre.	–
		Fuel grade does not comply with specifications	Observe fuel specification when adding fuel.	*7-27*
		Wrong valve clearance	Contact an authorized service centre.	–
		Malfunctioning fuel injector		–
	Black	Dirty air filter	Clean, replace air filter.	*7-40*
		Malfunctioning air filter maintenance switch or gauge	Contact an authorized service centre.	–
		Wrong valve clearance		–
		Malfunctioning fuel injector		–
		Leaking charge-air line		–
		Malfunctioning injector		–
Regeneration light flashes		Soot load of diesel particulate filter is too high	Regenerate the diesel particulate filter.	*7-73*

8.2 Malfunctions of the traveling drive

Important information

Repairs on the drive system may only be performed by an authorized service center – *see "Error code overview – Electronics of work hydraulics" on page 8-10* and in the maintenance chapter the section *Axles/travelling drive on page 7-60*.

8.3 Malfunctions of the hydraulic system

Important information

Repairs on the hydraulic system may only be performed by an authorized service center – *see "Error code overview – Electronics of work hydraulics" on page 8-10* and in the maintenance chapter the section *Hydraulic system on page 7-43*.

8.4 Malfunctions of the electrical system

Important information

Repairs on the electrical system may only be performed by an authorized service centre.

Digital display of error codes

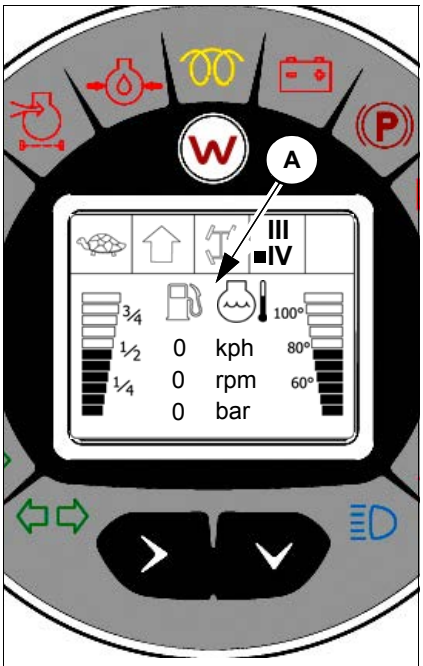


Fig. 310

An error code is issued if a machine component is malfunctioning.

The error codes are displayed in the main indication of the digital display instead of the tank and temperature symbol **A**.

Cause for error code:

- Open wiring, interruption
- Overvoltage, undervoltage
- Grounding contact error
- Malfunctioning component
- Over/under permissible values (temperature, pressure, speed, etc.)
- Sensor error due to dirt

If an error code is displayed:

1. Lower the load into the transport position.
2. If possible, drive the machine out of the danger zone.
3. Stop the engine.
4. Switch off the starter.
5. Restart the engine.

If the acoustic warning sounds again:

6. Make a note of the error code of the display.
7. Determine cause of error.
8. Rectify the error or inform a service centre of the error code.

Overview error codes of diesel engine electronics

Information
Errors may be rectified and repairs may be performed only by an authorized service centre.

Overview of error codes of diesel engine electronics

Error code	Diesel engine electronics	Possible causes	Remedy
100	Engine oil pressure	Engine oil pressure in inadmissible range	**Caution! Critical error!** 1. Stop the engine immediately. 2. Get in touch with an authorized service centre and have the error rectified.
105	Charge-air temperature	Charge-air temperature in inadmissible range	
110	Error, coolant temperature	Sensor error coolant temperature; Signal range exceeded or fallen below	
111	Coolant level	Coolant level too low	
175	Engine oil temperature	Engine oil temperatur too high, or below minimum value Sensor engine oil temperature; Implausible signal	
190	Engine speed	Engine speed above permissible range	
	Camshaft/crankshaft speed	Implausible value from camshaft/ crankshaft speed sensor	
523009	Common Rail System	Error detected on pressure relief valve	
132	Intake air/temperature sensor	Implausible value from intake-air volume/temperature sensor	**Non-critical error!** 1. The machine can continue to be operated if no functions are affected. 2. Have error rectified by an authorized service centre when the opportunity arises.
172		Intake air temperature sensor; Implausible signal	
168	Battery voltage	Battery/on-board voltage in inadmissible range	
523982			
524025			

Overview of error codes of diesel engine electronics			
Error code	**Diesel engine electronics**	**Possible causes**	**Remedy**
1180	Exhaust-gas temperature	Exhaust-gas temperature above permissible range	**Non-critical error!** 1. The machine can continue to be operated if no functions are affected. 2. Have error rectified by an authorized service centre when the opportunity arises.
3248	Exhaust-gas temperature	Exhaust-gas temperature **after** the diesel particulate filter (DPF) – Above maximum value – Under minimum value – Regeneration cut-off – Warning	
4765	Exhaust-gas temperature	Above or under the exhaust-gas temperature **before** the silencer	
4766	Exhaust-gas temperature	Above or under the exhaust-gas temperature **after** the silencer	
4768	Exhaust-gas temperature	Sensor error of exhaust gas temperature **before** (DOC); Signal range **exceeded or fallen below**	
4769	Exhaust-gas temperature	Sensor error of exhaust gas temperature **after** (DOC); Signal range **exceeded or fallen below**	
524024	Exhaust-gas temperature	Regeneration temperature of catalytic converter outside permissible range	
3711	Diesel particulate filter (DPF) regeneration	Not able to regenerate diesel particulate filter successfully	
524025			
3251	Differential pressure of diesel particulate filter (DPF)	Differential pressure at diesel particulate filter in inadmissible range	
3253	Differential pressure of diesel particulate filter (DPF)	Sensor error differential pressure (DPF); Signal range exceeded or fallen below	
3254		Sensor differential pressure DPF; Implausible signal	
523920	Exhaust gas back pressure at diesel particulate filter (DPF)	Exhaust-gas back pressure at burner: – Above maximum value – Below minimum value – Regeneration cut-off	
		Sensor error at burner exhaust-gas back pressure: – Beyond signal range – Under signal range	

Overview of error codes of diesel engine electronics			
Error code	**Diesel engine electronics**	**Possible causes**	**Remedy**
523913	Preheating system	Error detected on preheating system	**Non-critical error!** 1. The machine can continue to be operated if no functions are affected. 2. Have error rectified by an authorized service centre when the opportunity arises or on the occasion of the next maintenance interval at the latest.
523914			
102	Charge-air pressure too high	Charge-air pressure in inadmissible range	
651	Injector error cylinder 1	Error detected on cylinder 1 injector	
523929			
523946			
523895			
652	Injector error cylinder 2	Error detected on cylinder 2 injector	
523896			
523930			
523947			
653	Injector error cylinder 3	Error detected on cylinder 3 injector	
523897			
523931			
523948			
654	Injector error cylinder 4	Error detected on cylinder 4 injector	
523898			
523932			
523949			
2797	Injector error cylinder bank 1	Error detected on one or more injectors	
2798			
523350			
523352		Injector cylinder bank 2; Short circuit	
523998			
523354	Injector control	Error detected on injector control	
523999			
108	Ambient air pressure	Implausible value from ambient air pressure sensor	
109			

Overview of error codes of diesel engine electronics			
Error code	**Diesel engine electronics**	**Possible causes**	**Remedy**
97	Fuel monitoring	Implausible value from water separator	**Non-critical error!** 1. The machine can continue to be operated if no functions are affected. 2. Have error rectified by an authorized service centre when the opportunity arises or on the occasion of the next maintenance interval at the latest.
524057			
94	Fuel initial pressure	Fuel initial pressure in inadmissible range	
174	Fuel temperature outside permissible range	Fuel temperature in inadmissible range	
523615	Common Rail System	An error was detected at the metering unit	
523612	Internal software error of control units	Internal software error detected on control unit	
523612		Internal software error EMR; Injection cut off	
523612		Internal software error (electronic, measurement and control systems)	
102	Charge-air pressure	Implausible value from charge-air sensor	
51	EGR system	Error detected on EGR system	
52		Error detected on EGR system	
411		Differential pressure Venturi unit (EGR); maximum value exceeded	
412		Error detected on EGR system	
2659			
523960			
524030			
524031			
524033			
91	Accelerator pedal	Implausible signal from drive pedal	
1079	Sensor voltage	Sensor voltage in inadmissible range	
1080			
523601			
677	Starter relay error	Error detected on starter relay	

Overview of error codes of diesel engine electronics			
Error code	**Diesel engine electronics**	**Possible causes**	**Remedy**
172	Intake-air temperature error	Charge-air temperature in inadmissible range	**Non-critical error!** 1. The machine can continue to be operated if no functions are affected. 2. Have error rectified by an authorized service centre when the opportunity arises or on the occasion of the next maintenance interval at the latest.
1188	Wastegate system error	Error detected on Wastegate system	
1136	ECU temperature outside permissible range	ECU temperature: – Above maximum value – Below minimum value	
523550	Starter switch	Starter switch actuated too long	
524018	DPF regeneration	DPF does not regenerate, diesel engine output is reduced	
524022			
524023			
29	Manual throttle	Manual throttle signal range exceeded; Battery short circuit	
107	Air filter differential pressure	Differential pressure too high/ warning threshold reached/system reaction triggered	
171	Ambient-air temperature	Sensor error; Signal range **exceeded or fallen below**	
676	Cold-starting aid relay	Malfunctioning relay/open wiring	
729		Open wiring/power output element overtemperature	
1176	Pressure sensor before exhaust gas turbocharger	Sensor error; Signal range **exceeded/fallen below**	
3699	EAT system	Error in exhaust-gas treatment/ maximum standstill time reached; Change the oil	
524062	EAT system	Suppression switch/release switch not available	

Error code overview – Electronics of work hydraulics

Information
Errors may be rectified and repairs may be performed only by an authorized service centre.

Overview of error codes for work hydraulics		
Error code	**Possible causes**	**Remedy**
517551	Control unit flash – flash memory	**Critical error** Stop the machine immediately and have the error rectified by an authorized service centre.
	Application – machine configuration (object initialization failed)	
517900	Control unit, internal	
517901		
517902	Control unit communication, internal	
517903	Control unit power supply	
517904	Control unit environmental data – application timeout	
517905	VCU power supply too high	
517908	Internal control unit memory	
517909		
517910		
517911		
517912		
517913		
518987	Telescope scroll wheel error/4th control circuit in the joystick	
519358	Differential lock – solenoid valve (differential lock)	
519360	Solenoid valve 3rd control circuit continuous function error	
519361	Error solenoid valve 4th control circuit/raise tipping trailer	
519369	Load stabilizer – load stabilizer solenoid valve	
519370		
519371	Hose burst valve disabling – solenoid valve (hose burst valve)	

Overview of error codes for work hydraulics		
Error code	**Possible causes**	**Remedy**
519372	Solenoid valve (retract telescopic boom) error	**Critical error** Stop the machine immediately and have the error rectified by an authorized service centre.
519373	Solenoid valve (extend telescopic boom) error	
519374	Hydraulic quickhitch – solenoid valve (quickhitch unlocking)	
519375	Tilt cylinder lock solenoid valve	
519376		
519378	Float position – solenoid valve (float position)	
519377	Automatic bucket return – solenoid valve of automatic bucket return Y028	
519379	Touch button/scroll wheel error in joystick	
519382	Additional function 1 – solenoid valve (additional function 1)	
519383	Additional function 2 – solenoid valve (additional function 2)	
519384	Fan control – proportional valve (fan control)	
519386	Fan control – solenoid valve (reversing fan)	
519393	Raise/lower tipping trailer – solenoid valve error (raise tipping trailer)	
519394	Raise/lower tipping trailer – solenoid valve (lower tipping trailer)	
519398	Trailer braking system – solenoid valve (compressed-air parking brake)	
519461	Trailer braking system – proportional valve (hydraulic trailer brake)	
519463	Trailer braking system – solenoid valve (hydraulic trailer brake)	
519910	Travelling drive – accelerator pedal signal 2	
519911	Travelling drive – accelerator pedal signal 1	
521995	Travelling drive – configuration error/error in application software of travel function	
522195	Configuration error / error in application software of telescopic boom	
522282	Error quickhitch lock/unlock control circuit III – configuration error/error in application software of control circuit III	
522283	Configuration error / error in application software of 4th control circuit	

Overview of error codes for work hydraulics		
Error code	**Possible causes**	**Remedy**
517005	VCU: Controller temperature too low	**Non-critical error** Machine can continue to be operated. Have error rectified by an authorized service centre when the opportunity arises.
517006	Hydraulic oil temperature sensor error	
517008	Error can. receipt CCVS1 message	
517009	Error can. receipt EEC1 message	
517030	Error can. receipt IC1 – intake air temperature sensor	
517056	Error can. receipt IC1 - intake air temperature sensor	
517906	Power supply	
517907	CAN BUS	
518960	Release switch – parking brake	
518974	Differential lock – differential lock push button	
518979	Quickhitch lock/unlock control circuit III – push button/scroll wheel	
518980		
518982	Highflow 2 (continuous function of control circuit III) – switch (continuous function of control circuit III)	
518983	Error can. receipt of selected travel direction	
518984	Travelling drive – RWD scroll wheel	
518988	Scroll wheel error of telescope/4th control circuit	
518989	Hydraulic quickhitch – release switch (quichhitch unlocking)	
518993	Load stabilizer – load stabilizer switch	
518994	Logic error of lifting arm when lowering	
518996	Tilt ram lock – tilt-ram lock switch	
519005	Highflow 1 (control circuit IV/raise tipping trailer) – switch (control circuit IV)	
519007	Water separator error	
519015	Travelling drive – neutral push button	
519016	Front socket/bucket repositioning – push button (front socket/ bucket repositioning)	
519019	Raise/lower tipping trailer – switch (raise/lower tipping trailer)	
519034	Release switch – switch (control circuit III/lock for long-haul travel)	
519046	Travelling drive – manual throttle (joystick signal 1 S097)	
519050	Additional function 2 – switch (additional function 2)	
519051	Plunger switch (front/rear additional control circuit) – plunger switch (front ball-type cock)	
519053	Operator-presence switch error	
519066	Additional function 1 – push button (additional function 1)	

Overview of error codes for work hydraulics		
Error code	**Possible causes**	**Remedy**
519303	14-pole front plug receptacle error	**Non-critical error** Machine can continue to be operated. Have error rectified by an authorized service centre when the opportunity arises.
519351	Error can. receipt AUX – XID 0x41 drive mode	
519360	Highflow 2 (continuous function of control circuit III) – solenoid valve (continuous function of control circuit III)	
519361	Highflow 1 (control circuit IV/raise tipping trailer) – solenoid valve error (control circuit IV/raise tipping trailer)	
519442	Release switch – solenoid valve (boom interlock)	
519902	Error can. receipt of inch pedal position	
519940	Manual throttle joystick signal 2 S097 error	
521910	Accelerator pedal signal 2 error	
521911	Accelerator pedal signal 1 error	

8.5 Malfunctions in the air conditioning system (option)

Information

Repairing, filling up and emptying the air conditioning system may be performed only by an authorized service centre!

Malfunctions in the air conditioning system (option)			
Malfunctions	**Possible causes**	**Remedy**	**See page**
Fan does not run	Malfunctioning or loose fuse	Replace fuses	*7-50*
	Interrupted line	Contact an authorized service centre	–
	Malfunctioning fan motor		–
	Malfunctioning fan switch		–
Fan cannot be switched off	Short circuit in cable or fan switch		–
Reduced fan output	Dirty contacts		–
	Very dirty heat exchanger	Clean the heat exchanger	*7-55*
Insufficient heating output or none at all	Flow temperature too low	Contact an authorized service centre	–
	Malfunctioning thermostat		–
	Dirty heat exchanger fins	Clean the heat exchanger	*7-55*
Loss of refrigerant on equipment	Loose hose connection	Contact an authorized service centre	–
	Damaged hose		–
	Damaged heat exchanger		–
Compressor does not run	Interruption in solenoid coil of compressor		–
	V-belt pulley does not turn even though magnetic clutch is applied		–
	Compressor clutch slips		–
	Malfunctioning controls		–
	Torn V-belt		–
	Loose V-belt	Retension the V-belt	*7-42*

Malfunctions in the air conditioning system (option)			
Malfunctions	**Possible causes**	**Remedy**	**See page**
Condensor overflow	Expansion valve is stuck in open position	Contact an authorized service centre	–
Iced-up evaporator	Thermostat sensor in wrong position		–
	Malfunctioning expansion valve or thermostat		–
Clogged condensor	Dirty radiator fins	Clean the condensor	*7-55*
Loss of refrigerant	Interruption of refrigerant line	Contact an authorized service centre	–
	System leak		–
Insufficient refrigerating output	Clogged fan duct		–
	Refrigerant level too low		–
	Humidity in system		–
System cools with interruptions	Line interruption, insufficient ground connections or loose contacts in solenoid coil of compressor	Contact an authorized service centre	–
	Malfunctioning fan motor		–
Very loud system	Loose or excessively worn V-belt		*7-42*
	Loose compressor bracket or worn inside parts of the compressor		–
	Excessive wear of fan motor		–
	System overfill		–
	Not enough refrigerant in the system		–

9 Technical data

9.1 Model and trade names

The machine is identified by two designations.

- **“Model designation”**
  Stamped on the type label in square 5.
- **“Trade name” –** affixed outside on the machine.

Letters **S** or **L** in the model designation identify the loader unit version:

- **S** = standard loader unit
- **L** = higher loader unit

Model designation	Trade name
352-03S	8105
352-04S	8115
352-04L	8115L

9.2 Engine

Vehicle model 352-03S / 352-04S / 352-04L	20 kph (standard)	30 kph or 40 kph (option)	
Exhaust-emission level[1]	**EU level IIIB**		**EU level IV EPA tier 4f**
Product	Deutz diesel engine		
Type	TCD 2.9	TCD 3.6	TCD 3.6
Design	In line		
Number of cylinders	4		
Displacement	2925 cm³ (178.5 in³)	3621 cm³ (221 in³)	
Nominal bore and stroke	92 x 110 mm (3.62 x 4.33 in)	98 x 120 mm (3.86 x 4.72 in)	
Compression ratio	1:17,8	1:17,2	
Output (kW) at 2300 rpm (according to ISO 14396)	55.4 kW (74.3 hp)	74.4 kW (99.7 hp)	
Max. torque at 1600 rpm	300 Nm (221.3 ft. lbs.)	410 Nm (302.4 ft. lbs)	
Idling speed	About 900 – 950 rpm		
Min. specific fuel consumption	210 g/kWh (7.4 oz/kWh)	214 g/kWh (7.5 oz/kWh)	
fuel injection system	Common rail direct injection		
Firing order	1 – 3 – 4 – 2		
Starting aid	Sheathed-element glow plug		
Control valve	EMR4 (EDC17 - CV52)		
Charging	Exhaust turbocharger with charge air cooling		
Exhaust-gas treatment	Diesel oxidation catalytic converter (DOC) with optional diesel particulate filter (DPF)	Diesel oxidation catalytic converter (DOC)	Diesel oxidation catalytic converter (DOC) with SCR catalytic converter
Max. inclined position (engine no longer supplied with oil)	30° in all directions **Caution! Tilting limit of the machine 20° laterally!**		

1. The exhaust emissions correspond to the standards 97/68 EC and the following guidelines

Hydraulic fan - oil/water cooling

Unit	Data
Hydraulic pump	Gear pump
Displacement	14 cm^3/rev (0.85 in³/rev)
Fan motor (capacity)	11 cm³/rev (0.67 in³/rev) Max. 180 bar (2610.7 psi)

9.3 Travelling drive/axles

Variable displacement pump

Machine	20 km/h	20 km/h (optional)[1] 30 km/h or 40 km/h (optional)
Design	Automotive, infinitely variable hydrostatic axial-piston gearbox	
Displacement	60 cm³/rev (3.66 in³/rev)	69 cm³/rev (4.21 in³/rev)
Max. operating pressure **Model 352-03S**	430 bar (6,236.6 psi)	480 bar (6,961.8 psi)
Max. operating pressure **Model 352-04S/L**	480 bar (6961.8 psi)	

1. Vehicle with high speed option (ICVD)

Boost pump

Machine	20 km/h	20 km/h (optional)[1] 30 km/h (optional) 40 km/h (optional)
Design	Internal gear pump	
Displacement	14 cm^3/rev (0.85 in³/rev)	17 cm^3/rev (1.04 in³/rev)
Charging/boost pressure	About 33 bar (478.6 psi) at maximum diesel engine speed	
Control	Speed-sensitive, electro-hydraulic feed volume adjustment	
Travel direction	Electro-hydraulic control	
Inching	Electrical via proportional regulator	

1. Vehicle with high speed option (ICVD)

Variable displacement motor

Machine	20 km/h	20 km/h (optional)[1] 30 km/h or 40 km/h (optional)
Design	Axial piston motor (swash plate design)	
Capacity	110 cm³/rev (6.71 in³/rev)	233 cm³/rev(14.22 in³/rev)
Travel speed[2] (forward and reverse)	**1st speed range:** 0 – 7 kph (0 – 4.35 mph) **2nd speed range:** 0 – 20 kph (0 – 12.43 mph)	**1st speed range:** 0 – 7 kph (0 – 4.35 mph) **2nd speed range:** 0 – 30/40 kph (0 – 18.64/24.85 mph)
Pushing power (tires 16/70-20)	**352-03S:** 51 kN (11.465 lbf) **352-04S/L:** 57 kN (12.814 lbf)	**352-03S:** 52 kN (11.690 lbf) **352-04S/L:** 55 kN (12.364 lbf)
Pushing power (tyres 405/70-24)	**352-03S:** 47 kN (10.566 lbf) **352-04S/L:** 53 kN (11.915 lbf)	**352-03S:** 48 kN (10.791 lbf) **352-04S/L:** 51 kN (11.465 lbf)

1. Vehicle with high speed option (ICVD)
2. The maximum speed is reached when the drive has a minimum temperature of 20–30 °C (68 °F–86 °F), on level, asphalted ground, without a trailer and with an empty bucket.

Front axle

Front axle	
Design	Planetary steering and drive axle, rigid screw connection with frame
Differential lock	100 % differential
King-pin inclination	0°
Camber	0°
Steering angle	max. 40°
Toe-in	0 mm (0 in)
Distance over hubs	1530 mm (60.23 in)

Rear axle

Rear axle	
Design	Oscillating planetary steering and drive axle
Differential lock	100 % differential
King-pin inclination	0°
Camber	0°
Total oscillation angle[1]	± 11°
Steering angle	max. 40°
Toe-in	0 mm (0 in)
Distance over hubs	1530 mm (60.23 in)

1. 352-03 S with tires 16/70-20
   352-04 S/L with tires 405/70-24

9.4 Brakes

Service brake

Service brake	
Design	Foot-operated hydrostatic disc brake
Location	Front axle input shaft (also the rear axle for machines equipped with optional 30/40 kph (18.6/24.8 mph) high speed)
Brake fluid	Special hydraulic fluid based on basic mineral oil (ATF) – *see chapter 7 “Fluids and lubricants” on page 7-12*

Parking brake

Parking brake	
Design	Manual, mechanical disc brake
Location	Front axle drive shaft

9.5 Tyres

Tyres for wheel loader model 352-03S

Tyre size[1]	Tire pressure		Wheel rims	
	Front bar (psi)	Rear bar (psi)	Size	Wheel offset mm (in)
14.5-20 139D 12PR MPT-04 TBL[2]	2,75 (39.9)	2,25 (32.6)	11x20	20 (0.787)
14.5-20 139D 12PR MPT-04 TBL ag.[3]				
380/75 R20 XMCL 148B				
375/75 R20 XZSL 143B				
365/80 R20 152K MPT81 TL				
405/70 R20 EM 143B/ 155A2 SPT9			13 x 20	
425/75 R20 XZSL 167A2/155B				
405/70 R20 141E MPT 70E TL				
425/75R20 MPT 148G AC70G TL				
405/70-20 150B PG75 RCL				
405/70-20 149B A323				
400/70 R20 149A8/149B A550				
400/70 R20 149A8/B BIBLOAD				
16/70-20 148D 14PR MPT-04TBL[4]				
405/70-24 152B A323			13x24	0 (0)
405/70 R24 146B/158A2 EM-01				
420/65 R24 146D-65 TRI2 Nokian[5]				

1. Increase front tyre pressure by 0.5 bar (7.15 psi) during pallet forks operation.
2. Snow chains are released only for these tyres.
3. Tires are foam-filled; not approved for machine travel on public roads
4. Standard tires
5. Since they do not have scraping depth, only for customer-specific applications.

Tyres for wheel loader model 352-04S/352-04L

Tyre size[1]	Tire pressure		Wheel rims	
	Front bar (psi)	Rear bar (psi)	Size	Wheel offset mm (in)
425/75 R20 XZSL 167A2/155B	2,75 (39.9)	2,75 (39.9)	13 x 20	20 (0.787)
425/75R20 MPT 148G AC70G TL				
405/70-20 150B PG75 RCL				
405/70-20 149B A323				
405/70-20 149B A323 ag.[2]				
16/70-20 148D 14PR MPT-04TBL				
400/70 R20 149A8/149B A550[3]				
400/70 R20 149A8/B BIBLOAD[3]				
405/70-24 151D MPT-04 14PR[4]			13x24	0 (0)
405/70-24 152B A323				
405/70 R24EM 146B/ 158A2 SPT9 TL				
405/70 R24 146B/158A2 EM-01				
420/65 R24 146D-65 TRI2 Nokian				

1. Increase front tire pressure by 0.5 bar (7.15 psi) during pallet forks operation!
2. Tires are foam-filled; not approved for machine travel on public roads
3. Snow chains are possible only for these tires. When using snow chains, the steering angle must be limited by an authorized service center.
4. Standard tires

9.6 Steering system

Steering system	
Design	Hydrostatic 4 wheel steering with emergency steering features
Types of steering systems	All-wheel steering, front axle steering, diagonal steering (crab steering optional)
Assemblies	Hydraulic pump, priority valve, servostat with safety valves, 1 steering ram per axle, changeover valve for steering mode “Front axle, diagonal and 4 wheel steering”
Displacement (servostat)	80/125 cm³/rev (4.89/7.62 in³/rev) per steering wheel revolution
Displacement (gear pump)	38 cm^3/rev (2.32 in³/rev)
Max. steering pressure	190 bar (2,755.7 psi)

9.7 Work hydraulics

Hydraulic pump

Hydraulic pump	
Hydraulic pump	Gear pump
Displacement	38 cm^3/rev (2.32 in^3/rev)
	84 l/min (22.2 gal/min)
Location	Variable displacement pump (drive)
Hydraulic pump with auxiliary output pump (option)	
Displacement	38 cm^3/rev (2.32 in^3/rev) + 17 cm^3/rev (1.04 in^3/rev)
	84 l/min (22.2 gal/min) + 45 l/min (11.89 gal/min)
Location	Variable displacement pump (drive)

Hydr. Pilot control

Charge pump at variable displacement pump	20 km/h	20 km/h (opt.)[1] 30 km/h or 40 km/h (opt.)
Displacement	14 cm^3/rev (0.85 in^3/rev)	17 cm^3/rev (1.04 in^3/rev)
Charging/boost pressure	About 33 bar (478.6 psi) at maximum diesel engine speed	

1. Vehicle with high speed option (ICVD)

Pilot control unit

Designation	
Control lever (joystick)	Universal lever – operation of lift and tilt rams, change of direction, 3rd control circuit and differential lock
Lock against unintentional operation (for long-haul travel and transport)	Push button + solenoid valve for 3rd control circuit unlocking. Switch – lock for operating hydraulics/road travel

Control valve

Control valve	
Design	3-fold pilot-control (standard)
Max. operating pressure[1]	240 bar (3481 psi)

1. Measured at hydraulic pump

Lift and tilt cylinder speed

Designation		352-03S	352-04S	352-04L
Gear pump 38 cm^3/rev (2.32 in^3/rev)		about time (sec.)[1]		
Lift cylinder	Raise	5,2	6,2	6,4
	Lower	3,8	4,8	4,9
Tilt cylinder	Tilt in	2.5	2.3	2.3
	Tilt out	2,8	2,9	2,9

1. At 2400 rpm (engine speed) without any load

Usable consumer pressure at 3rd control circuit / proportional controls (3rd control circuit)

Designation		
Gear pump 38 cm^3/rev (2.32 in^3/rev)	Function	Rpm / l/min / bar (rpm / gal/min / psi)
Front 3rd control circuit (return without pressure)	Electric control (solenoid valve) via 3rd control circuit. Push button operation on joystick (3rd control circuit).	2300 / 75 / 165 (2300 / 19.81 / 2,393.1)
Front 3rd control circuit (double action)		2300 / 75 / 155 (2300 / 19.81 / 2,248.1)

Usable consumer pressure at additional control circuit (option)

Designation		
Gear pump 38 cm^3/rev (2.32 in^3/rev) with ancillary drive pump 17 cm^3/rev (1.04 in^3/rev)	Function	Rpm / l/min / bar (rpm / gal/min / psi)
Front additional control circuit installed outside on loader unit	Electric control (solenoid valve) via 3rd control circuit	2290 / 115 / 170 (2290 / 30.38 / 2,465.6)
Rear additional control circuit installed with external return		2300 / 35 / 190 (2300 / 9.25 / 2,755.7)

9.8 Electrical system

Electric units/light bulbs

Designation	Power
Alternator	14V 120A
Starter	12V 3.2 kW (4.3 hp)
Battery	12V 100Ah
Light bulb – high beam (left/right)	12 V 55 W/H3
Light bulb – low beam (left/right)	12 V 55 W/H7
Light bulb – side marker light (left/right)	12 V 4 W
Light bulb – front and rear turn indicators (left/right)	12V 21W
Light bulb – brake/rear lights (left/right)	12 V 21/5 W
Light bulb – working light	12 V 55 W/H3
Light bulb – rotating beacon	12 V 55 W/H1
Light bulb – interior light	12V 10W

Main fuse box with relays

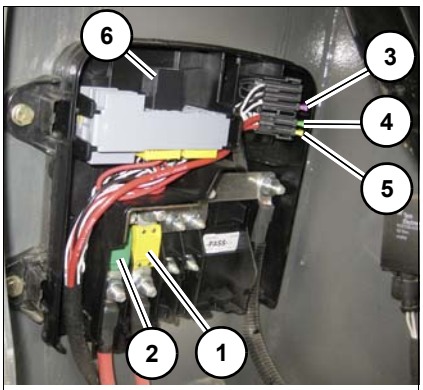


Fig. 311

The main fuse box is located in the engine compartment (rear wall left) or behind the maintenance flap on the left side of the vehicle (near the air cleaner).

Pos.	BKM	Rated current (A)	Protected circuit
1	F001	100	Main fuse (cabin supply)
2	F002	125	Preheating system (engine)
3	F004	20	Starter
4	F005	30	Main fuse (cabin supply)
5	F006	3	Exhaust gas recirculation (diesel particulate filter)

Pos.	Relay no.	Protected circuit
6	K088	Fuel pump relay

Fuse assignments (pos. A)

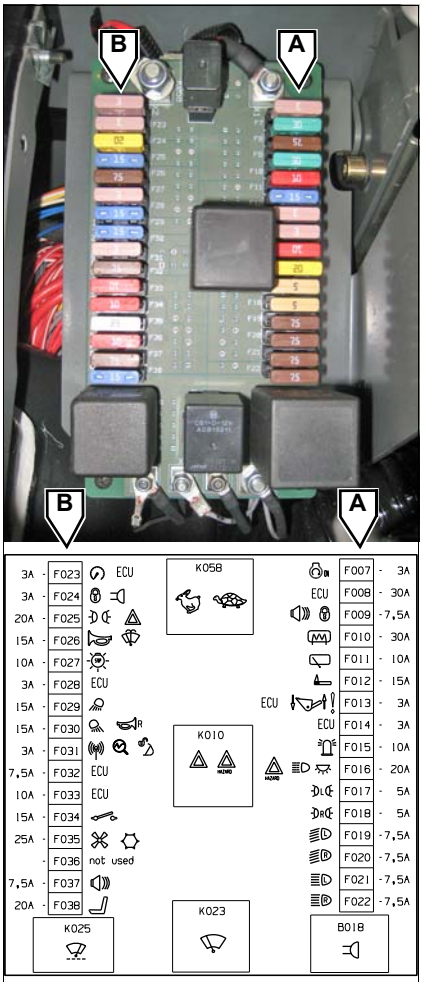


Fig. 312

Fuses in rear switching console in instrument panel, front left			
Pos.	**BKM**	**Rated current (A)**	**Protected circuit**
A	F007	3	Starting key
	F008	30	Cabin controller
	F009	7,5	Radio and immobiliser
	F010	30	Window heating
	F011	10	Rear wiper
	F012	15	12 V power outlet
	F013	3	Cabin controller / overload warning
	F014	3	Cabin controller
	F015	10	Rotating beacon
	F016	20	Hazard warning light / Flash light / Interior light
	F017	5	Left parking light / searchlight
	F018	5	Right parking light / searchlight
	F019	7,5	Low beam (left)
	F020	7,5	Low beam (right)
	F021	7,5	High beam (left)
	F022	7,5	High beam (right)

Fuse assignments (pos. B)

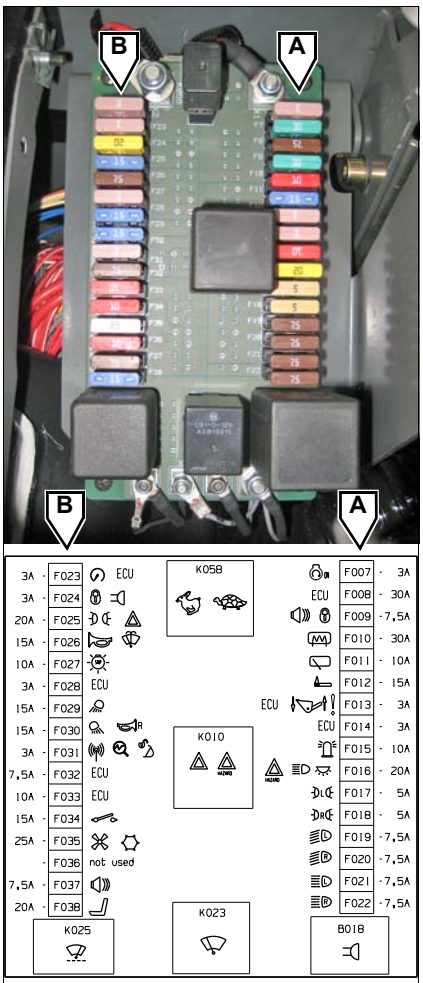


Fig. 313

Fuses in rear switching console in instrument panel, front left			
Pos.	**BKM**	**Rated current (A)**	**Protected circuit**
B	F023	3	Instrument panel / cabin controller
	F024	3	Buzzer / searchlight / immobiliser
	F025	20	Parking light / flasher
	F026	15	Horn / front wiper
	F027	10	Brake lights
	F028	3	Cabin controller
	F029	15	Front working lights
	F030	15	Rear working light / reversing warning system
	F031	3	Coupling signal / telematic power supply / diagnostic power supply / quickhitch lock
	F032	7,5	Steering electronics
	F033	10	Drive controller
	F034	15	Front power outlet
	F035	25	Heating / air conditioning
	F036	–	empty
	F037	7,5	Radio
	F038	20	Operator seat

Fuses behind control panel on the right

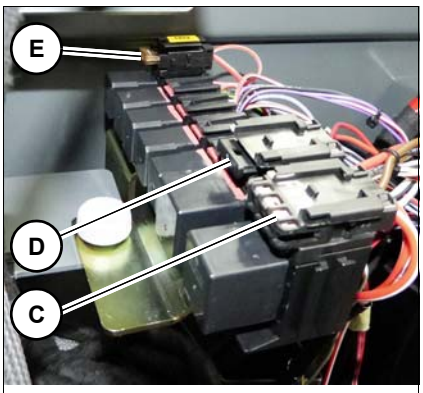


Fig. 314

Pos.	BKM	Rated current (A)	Protected circuit
C	F050	3	Powerflow plus
D	F040	1	Telematic
E	F053	5	Tilt sensor

Switching relay assignment

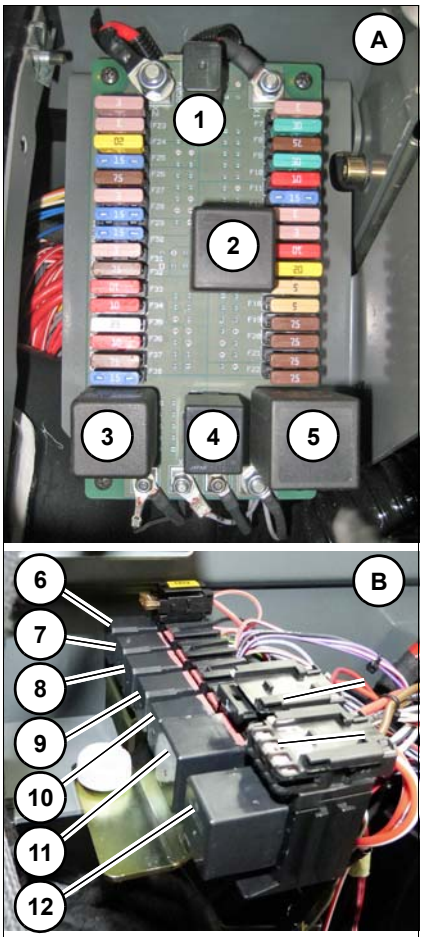


Fig. 315

The relays are located behind the switch console on the left **A** and right **B**, and in the engine compartment beside the main fuse box **C**.

Pos.	BKM	Protected circuit
1	K058	1st/2nd speed switching relay
2	K010	Turn indicator relay
3	K025	Intermittent-wipe switching relay
4	K023	Switching relay for wiper
5	B018	Buzzer
6	K124	Tilt sensor
7	K030	Brake lights switching relay
8	K003	Reversing switching relay (reversing alarm)
9	K016	Front power outlet switching relay
10	K106	Start interlock
11	K033	Rear window heating high current relay
12	K107	Powerflow plus switching relay
13	K005	Preheating high current relay (70 A)

Switching relay – 14-pole plug receptacle (optional)

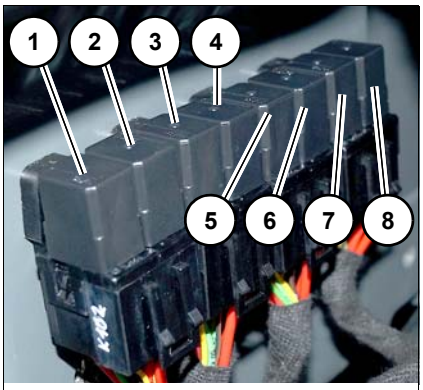


Fig. 316

The relays are located on the left rear wall in the engine compartment.

Pos.	Switching relay no.	Protected circuit
1	K102	Step-by-step relay switch power (J)
2	K016	Front plug receptacle switching relay (K)
3	K100	Switching relay control circuit DOWN (F)
4	K101	Switching relay control circuit UP (E)
5	K097	Switching relay control circuit RIGHT (C)
6	K098	Switching relay control circuit LEFT (D)
7	K095	Switching relay control circuit REVERSE (G)
8	K096	Switching relay control circuit FORWARD (H)

9.9 Tightening torques

General tightening torques

Screw dimensions	Tightening torques[1]		
	8.8	10.9	12.9
M4	3 Nm (2.2 ft.lbs.)	4 Nm (2.9 ft.lbs.)	5 Nm (3.7 ft.lbs.)
M5	5.5 Nm (4.1 ft.lbs.)	8 Nm (5.9 ft.lbs.)	10 Nm (7.4 ft.lbs.)
M6	10 Nm (7.4 ft.lbs.)	14 Nm (10.3 ft.lbs.)	16 Nm (11.8 ft.lbs.)
M8	23 Nm (17 ft.lbs.)	34 Nm (25.1 ft.lbs.)	40 Nm (29.5 ft.lbs.)
M10	46 Nm (33.9 ft.lbs.)	67 Nm (49.4 ft.lbs.)	79 Nm (58.2 ft.lbs.)
M12	79 Nm (58.2 ft.lbs.)	115 Nm (84.8 ft.lbs.)	135 Nm (99.5 ft.lbs.)
M14	125 Nm (92.1 ft.lbs.)	185 Nm (136 ft.lbs.)	220 Nm (162 ft.lbs.)
M16	195 Nm (144 ft.lbs.)	290 Nm (214 ft.lbs.)	340 Nm (251 ft.lbs.)
M18	280 Nm (206 ft.lbs.)	400 Nm (295 ft.lbs.)	470 Nm (346 ft.lbs.)
M20	395 Nm (291 ft.lbs.)	560 Nm (413 ft.lbs.)	660 Nm (486 ft.lbs.)
M22	540 Nm (398 ft.lbs.)	760 Nm (560 ft.lbs.)	890 Nm (656 ft.lbs.)
M24	680 Nm (501 ft.lbs.)	970 Nm (715 ft.lbs.)	1150 Nm (848 ft.lbs.)
M27	1000 Nm (737 ft.lbs.)	1450 Nm (1069 ft.lbs.)	1700 Nm (1253 ft.lbs.)
M30	1350 Nm (995 ft.lbs.)	1950 Nm (1437 ft.lbs.)	2300 Nm (1695 ft. lbs.)

1. These values are valid for screws with untreated, non-lubricated surfaces.

Specific tightening torques

Designation	Tightening torque
Wheel nut	390 ±10 Nm (287±7 ft.lbs.)

9.10 Coolant

Outside temperature	Water[1]	Antifreeze[2]
Up to °C (°F)	% by volume	% by volume
-22 (-7.6)	65	35
-28 (-18.4)	60	40
- 35 (-31)	**55**	**45**
- 41 (-41.8)	50	50

1. Water quality at 20 °C = 6.5 – 8.5 ph/total hardness 3 – 20 °dGH
(do not use salt, lake, river, brackish or industrial water)
2. In order to avoid engine damage and possible loss of warranty, use only the coolant “DEUTZ cooling system protective agent” or as an alternative, an antifreeze released in compliance with DEUTZ DQC CA-14, CB-14, CC-14 – *see chapter 7 “Fluids and lubricants” on page 7-12*.

9.11 Noise emissions

Noise levels

Sound power level	Engine	dB(A)	
Measured value	TCD 2.9	100,4	
	TCD 3.6	100,8	
Guaranteed value	TCD 2.9	101	
	TCD 3.6	102 level IIIb	101 level IV
Operator-perceived noise level (cabin)		77	

Information

The measurement occurs according to directives 2000/14 EC, ISO 6395 and EN ISO 3744!

9.12 Vibration

Vibration[1, 2]	
Overall vibration value for upper extremities of the body	< 2.5 $\frac{m}{s^2}$
Maximum effective value of weighted acceleration for body	< 0.5 $\frac{m}{s^2}$

1. Instruct or inform the operator of danger arising from vibrations.
2. Uncertainty of measurement of the vibration measurement according to DIN EN 474-1:2014-03 and EN 12096:1997

9.13 Weight

Weights	352-03S	352-04S 352-04L
Operating weight[1, 2]	5550 kg (12235 lb)	6050 kg (13337 lb)
Permissible maximum weight	7,000 kg (15,432 lb)	
Gross axle weight rating[3] in front	4480 kg (9876.5 lb)	
Gross axle weight rating[3] in rear		
Gross axle weight rating[4] in front	4,480 kg (9,876.5 lb)	5000 kg (11023 lb)
Gross axle weight rating[4] in rear		

1. With standard bucket, operator and full diesel tank. Depends on the selected outfitting, the curb weight may deviate from this specification.
2. The operating weight varies depending on equipment and options
3. For ABE approval
4. For EC tractor license (LoF)

9.14 Payload/lift capacity/stability

Payload with bucket (KRAMER quickhitch)

Payload[1]	352-03S	352-04S / 352-04L
Bucket capacity[2]: **m³ (ft³)**	0,85 / 1,0 (30.0 / 35.31	0,91 / 1,15 (31.8 / 40.61)
Tipping load: **kg (lb)**[3]	3600 / 4100 (7936.6 / 9039.0)	4140 / 4250 (9083.0 / 9369.6)
Payload: **kg (lb)**	2050 (4519.5)	2225 (4905.3)
Breakaway force: Lift cylinder **kN (lbf)**[4]	37,4 / 41,1 (8407.8 / 9239.6)	41,4 / 41,7 (9307.0 / 9374.5)
Breakaway force Tipping cylinder **kN (lbf)**	40,0 (8992.4)	41,8 (9397.0)
Scraping depth **mm (in)**	60 (2.36)	85 (3.34)

1. Version 352-03 S with standard bucket 1000233659
   Version 352-04 S/L with standard bucket 1000154387
2. Capacity struck according to ISO 7546/capacity heaped
3. Required/actual tilt load
4. Breakout force (kN): mechanical/hydraulic

Payload with bucket (VOLVO quickhitch)

Payload[1]	352-03S	352-04S / 352-04L
Bucket capacity[2] **m³ (ft³)**	1,0 (35.31)	1,0 (35.31)
Tipping load: **kg (lb)**[3]	3600 / 3775 (7936.6 / 8322.4)	3600 / 3842 (7936.6 / 8470.1)
Payload: **kg (lb)**	1,900 kg (4,188.8 lb)	1900 kg (4188.8 lb)
Breakaway force Lift cylinder **kN (lbf)**[4]	35,2 / 40,6 (7913.2 / 9127.2)	40,3 / 40,3 (9059.8 / 9059.8)
Breakaway force Tipping cylinder **kN (lbf)**	34 kN (7,643.5 lbf)	37.7 kN (8475.3 lbf)
Scraping depth **mm (in)**	20 mm (0.78 in)	81 mm (3.2 in)

1. With standard bucket 1000335672
2. Heaped capacity
3. Required/actual tilt load
4. Breakout force (kN): mechanical/hydraulic

Payload with pallet forks (KRAMER quickhitch)

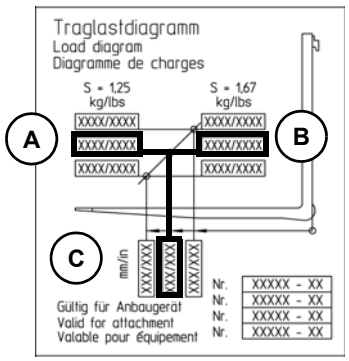


Fig. 317

Payload[1] (500 mm (19.68 in) load distance)	352-03S	352-04S / 352-04L
Payload (A) **safety factor 1.25**	2500 kg (5511.6 lb)	2900 kg (6393.4 lb)
Payload (B) **safety factor 1.67**	1850 kg (4078.6 lb)	2170 kg (4784.0 lb)
Movable payload[2] Transport position: **Safety factor 1.25**	3100 kg (6834.3 lb)	3500 kg (7716.2 lb)
Movable payload[2] Transport position: **Safety factor 1.67**	2300 kg (5070.6 lb)	2600 kg (5732.0 lb)

1. Loader unit in horizontal position
2. The movable payload is only authorized in transport position of the loader unit, and is not specified in the load diagram. The values may be limited by the permissible load-bearing capacity of the pallet forks/fork arms.

Payload with pallet forks (VOLVO quickhitch)

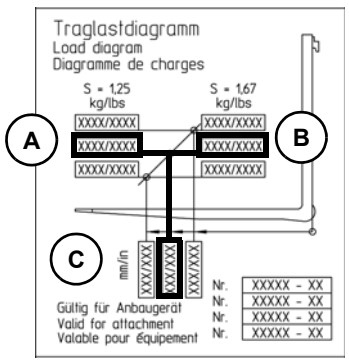


Fig. 318

Payload[1] (500 mm (19.68 in) load distance)	352-03S	352-04S / 352-04L
Payload (A) **safety factor 1.25**	2500 kg (5511.6 lb)	2550 kg (5621.8 lb)
Payload (B) **safety factor 1.67**	1,850 kg (4,078.6 lb)	1900 kg (4188.8 lb)
Movable payload[2] Transport position: **Safety factor 1.25**	3100 kg (6834.3 lb)	3100 kg (6834.3 lb)
Movable payload[2] Transport position **Safety factor 1.67**	2300 kg (5070.6 lb)	2300 kg (5070.6 lb)

1. Version 352-03 S with pallet forks 1000308375
2. The movable payload is only authorized in transport position of the loader unit, and is not specified in the load diagram. The values may be limited by the permissible load-bearing capacity of the pallet forks / fork arms.

Payload with pallet forks (SKID STEER quickhitch)

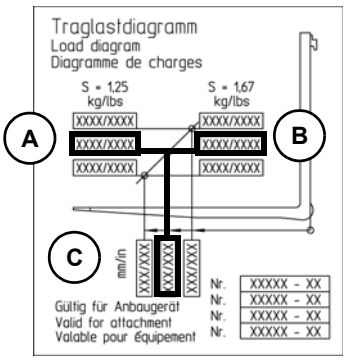


Fig. 319

Payload (500 mm (19.68 in) load distance)	352-04S / 352-04L
Payload (A) **safety factor 1.25**	2500 kg (5511.6 lb)
Payload (B) **safety factor 1.67**	1850 kg (4078.6 lb)
Movable payload[1] Transport position: **Safety factor 1.25**	3250 kg (7164.9 lb)
Movable payload[1] Transport position: **Safety factor 1.67**	2400 kg (5291.0 lb)

1. The movable payload is only authorized in transport position of the loader unit, and is not specified in the load diagram. The values may be limited by the permissible load-bearing capacity of the pallet forks / fork arms.

Payload with load hook on tilt lever

KRAMER quickhitch

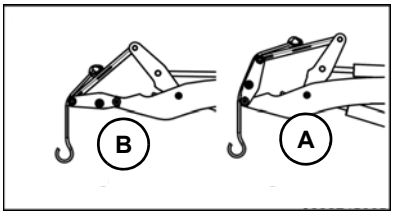


Fig. 320

Payload[1]	352-03S	352-04S / 352-04L
A = payload with extended loader unit and quickhitch tilted in	2400 kg (5291.1 lb)	2600 kg (5511.6 lb)
B = payload with extended loader unit and quickhitch	1800 kg (3968.3 lb)	1900 kg (4078.6 lb)

1. Payloads apply *with* lifting gear (chains, cables, towing gear)

VOLVO quickhitch

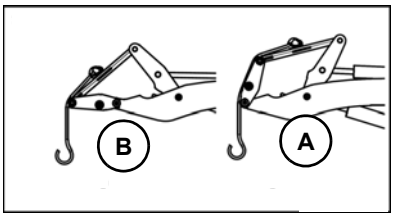


Fig. 321

Payload[1]	352-03S	352-04S / 352-04L
A = payload with extended loader unit and quickhitch tilted in	2350 kg (5180.9 lb)	2400 kg (5291.1 lb)
B = payload with extended loader unit and quickhitch	2000 kg (4409.3 lb)	2,200 (4,850.2 lb)

1. Payloads apply *with* lifting gear (chains, cables, towing gear)

Payload with pallet forks (foldable fork arms) (KRAMER quickhitch) (option)

500 mm load distance	352-03S	352-04S / 352-04L
Payload with **safety factor 1.25**	2500 kg (5511.6 lb)	2800 kg (6180 lb)
Payload with **safety factor 1.67**	1850 kg (4078.6 lb)	2100 kg (4630 lb)
Transport position: movable payload, safety factor 1.25	3100 kg (6834.3 lb)	3400 kg (7495.7 lb)
Transport position: movable payload, safety factor 1.67	2300 kg (5070.6 lb)	2500 kg (5511.6 lb)

Trailer weight/drawbar load: trailer couplings (option)

Information

The trailer weights/drawbar loads with an approval as a "self-propelled work machine" can be found in the ABE (General Certification for Vehicles) or the data confirmation.

Agricultural and forestry tractors Directive 2003/37 EC	Gross trailer weight rating[1]	Gross drawbar load rating
Trailer without brakes	750 kg (1653.4 lb)	500 kg[2] (1102.2 lb)
Trailer with brakes (1 axle overrun or hydraulically braked)[3]	3500 kg (7716.0 lb)	
Trailer with brakes (all axles are overrun or hydraulically braked)[4, 5]	8000 kg (17636.6 lb)	
Trailer with pneumatic (compressed air) or hydraulic brakes[4, 5]	11,250 kg (24,802 lb)[6] 14,000 kg (30,864.2 lb)[7]	
Ball[8]	3500 kg (7716.0 lb)	250 kg (551.1 lb)
For the control mark, refer to the machine documentation and the type label on the trailer coupling		
Towing gear	Only certified for towing the machine Not certified for trailer operation	

1. Bucket certified for travel on public roads must be fitted during trailer operation. D-value of ball hitch ≥ 45.8
2. In consideration of the axle loads and the overall weight of the wheel loader (see EC Certificate of Conformity)
3. Trailer approved up to 25 km/h.
4. Trailer approved up to 40 km/h.
5. Only attach height adjustable ball hitch in the lowest position. Do not attach the ball hitch in the position of the towing device.
6. For approval as "self-propelled work machine" (ABE).
7. For approval as "towing vehicle" (LoF approval)
8. See also indications on type label. Only in connection with height-adjustable drawbar.

9.15 Dimensions

DIN/EN – American measures

Volume	
1 l	2.1 pts (pints)
1 l	1.06 qts (quarts)
1 l	0.26 gals (gallons)
1 cm³	0.0611 cu. in. (cubic inch)
Length indications	
1 mm	0.03937 in (inches)
1 m (metre)	3.281 feet
1 m (metre)	1.0936 yards
1 km (kilometer)	0.622 mile
1 mile	1,607 km (kilometer)
Mass (weights)	
1 kp/cm² (kilopond/cm²)	2.2 lbs
1 kg (kilogram)	2.205 lbs (pounds)
1 g (gram)	0.035 oz (ounces)
Torques	
1 Nm (Newton metre)	0.737 ft/lbs (foot-pounds)
Pressure	
1 bar	14.50 psi
Force/output	
1 hp (horsepower) 0.735 kW (kilowatts)	0.985 hp (horsepower)

Dimensions with KRAMER bucket (model 352-03S)

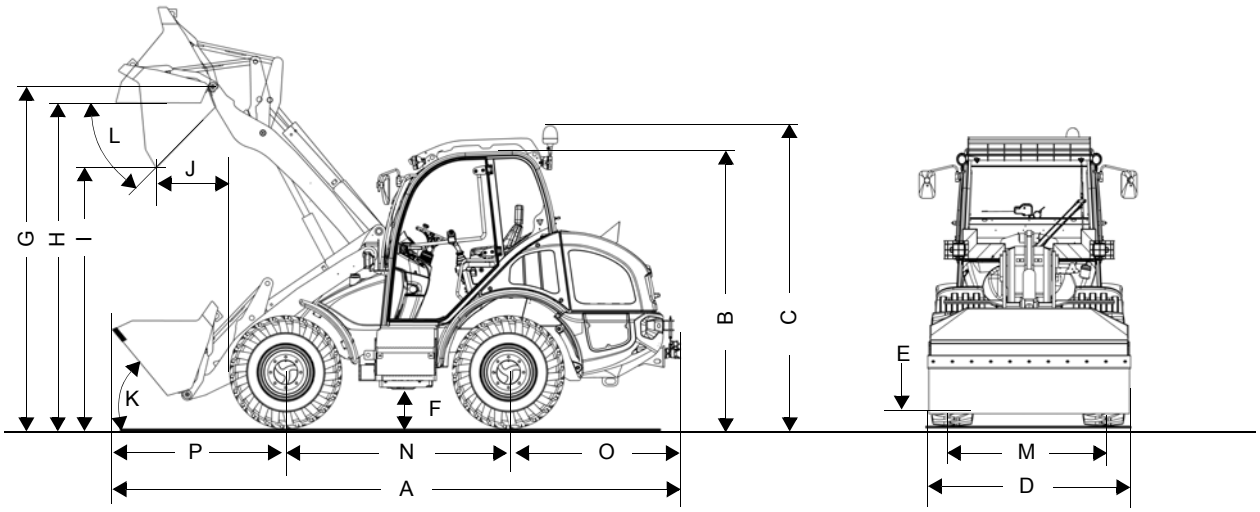


Fig. 322

Dimension		Model 352-03S
A	Overall length[1]	5710 mm (224.80 in)
B	Overall height[2, 3]	2640 mm (103.94 in)
C	Overall height with rotating beacon[2]	2870 mm (112.99 in)
D	Overall width without bucket [2, 4]	1920 mm (75.59 in)
D	Overall width with bucket[1]	2050 mm (80.71 in)
E	Ground clearance in transport position of loader unit	200 mm (7.87 in)
F	Ground clearance[2] below gearbox	350 mm (13.78 in)
G	Pin height[2]	3360 mm (132.29 in)
H	Load-over height[2]	3150 mm (124.02 in)
I	Tilt-out height[2]	2550 mm (100.39 in)
J	Tilt reach[2]	660 mm (25.98 in)
K	Tilt-in angle	48°
L	Tilt-out angle	45,5°
M	Front/rear track width[2, 5]	1490 mm (58.66 in)
N	Wheelbase (front/rear axles)	2150 mm (84.64 in)
O	Wheelbase (rear axle/rear of machine)	1620 mm (63.78 in)
P	Wheel base[1] (front axle - bucket)	1940 mm (76.38 in)
–	Turning radius[2, 6]	2950 mm (116.14 in)

1. With standard bucket1000233659
2. with tires 16/70-20
3. 2750 mm with protective FOPS screen (option)
4. With outside mirrors folded in
5. Wheel offset = 20
6. Measured at outer edge of wheel

Dimensions with VOLVO bucket (model 352-03S)

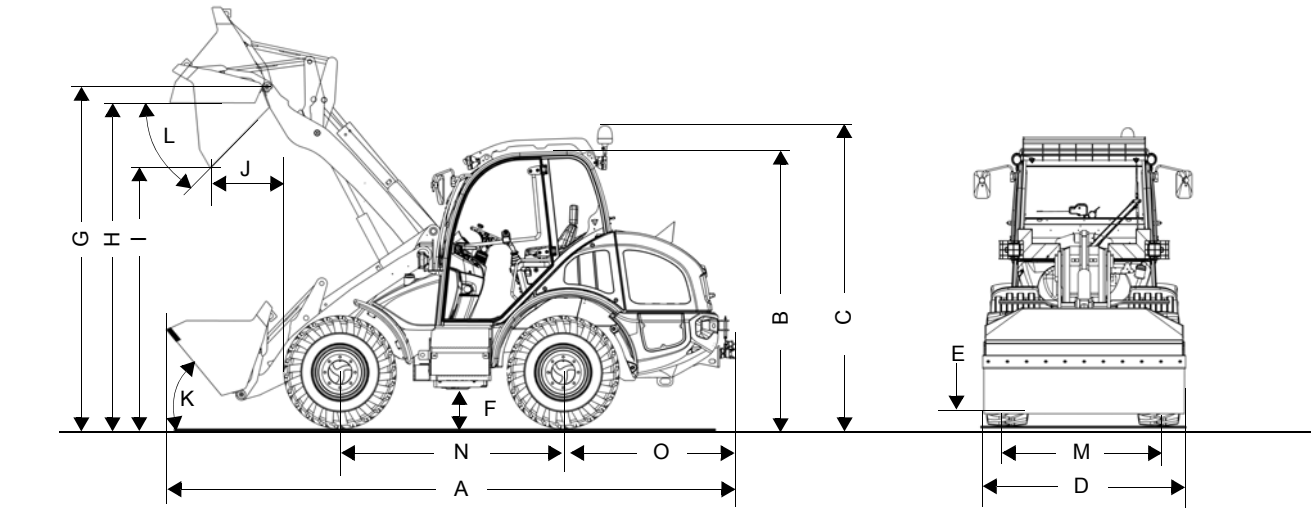


Fig. 323

Dimension		Model 352-03S
A	Overall length[1]	5710 mm (224.80 in)
B	Overall height[2, 3]	2640 mm (103.94 in)
C	Overall height with rotating beacon[2]	2870 mm (112.99 in)
D	Overall width without bucket [2, 4]	1920 mm (75.59 in)
D	Overall width with bucket[1]	2050 mm (80.71 in)
E	Ground clearance in transport position of loader unit	200 mm (7.87 in)
F	Ground clearance[2] below gearbox	350 mm (13.78 in)
G	Pin height[2]	3360 mm (132.29 in)
H	Load-over height[2]	3160 mm (124.41 in)
I	Tilt-out height[2]	2570 mm (101.18 in)
J	Tilt reach[2]	750 mm (29.53 in)
K	Tilt-in angle	50°
L	Tilt-out angle	45°
M	Front/rear track width[2, 5]	1490 mm (58.66 in)
N	Wheelbase (front/rear axles)	2150 mm (84.64 in)
O	Wheelbase (rear axle/rear of machine)	1620 mm (63.78 in)
–	Turning radius[2, 6]	2950 mm (116.14 in)

1. With standard bucket1000335672
2. with tires 16/70-20
3. 2750 mm with protective FOPS screen (option)
4. With outside mirrors folded in
5. Wheel offset = 20
6. Measured at outer edge of wheel

Dimensions with KRAMER bucket (model 352-04S/352-04L)

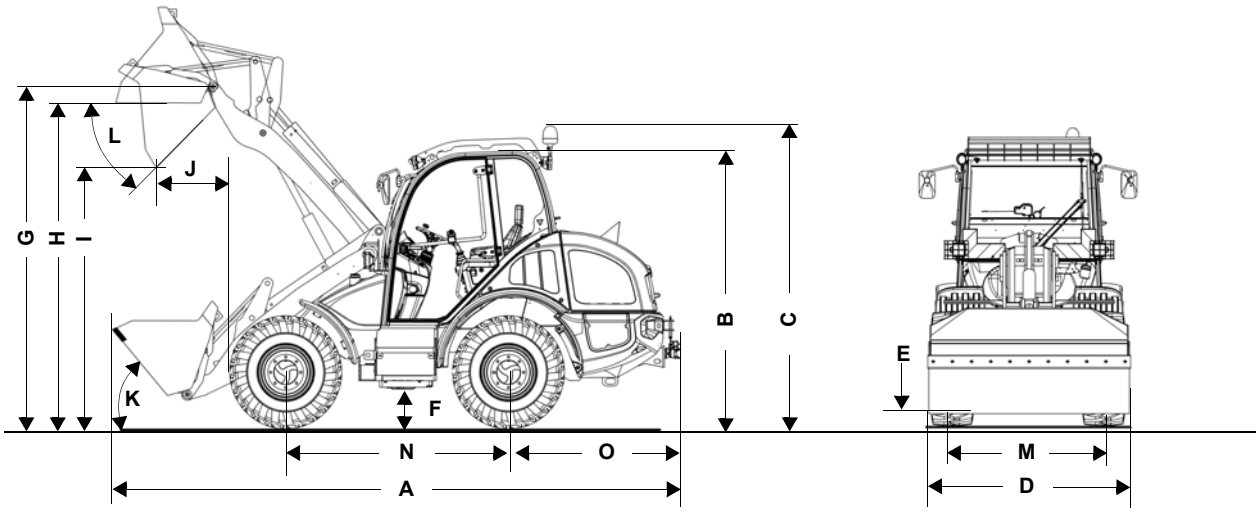


Fig. 324

Dimension		Model 352-04S	Model 352-04L
A	Overall length[1]	5800 mm (228,346 in)	5800 mm (228,346 in)
B	Overall height[2, 3]	2680 mm (105,512 in)	2680 mm (105,512 in)
C	Overall height with rotating beacon[2]	2910 mm (114,567 in)	2910 mm (114,567 in)
D	Overall width without bucket [2, 4]	1970 mm (77,559 in)	1970 mm (77,559 in)
D	Overall width with bucket[1]	2150 mm (84,646 in)	2150 mm (84,646 in)
E	Ground clearance in transport position of loader unit	200 mm (7,874 in)	200 mm (7,874 in)
F	Ground clearance under gearbox[2]	390 mm (15,354 in)	390 mm (15,354 in)
G	Pin height[2]	3450 mm (135.83 in)	3640 mm (143,307 in)
H	Load-over height[2]	3200 mm (125,984 in)	3430 mm (135,039 in)
I	Tilt-out height[2]	2650 mm (104,331 in)	2970 mm (116,929 in)
J	Tilt reach[2]	660 mm (29,528 in)	490 mm (19,291 in)
K	Tilt-in angle	50°	50°
L	Tilt-out angle	45°	35°
M	Front/rear track width[2, 5]	1490 mm (58.66 in)	1490 mm (58.66 in)
N	Wheelbase (front/rear axles)	2150 mm (84,646 in)	2150 mm (84,646 in)
O	Wheelbase (rear axle/rear of machine)	1620 mm (63,780 in)	1620 mm (63,780 in)
P	Wheelbase (front axle – bucket)	2030 mm (79.92 in)	2030 mm (79.92 in)
–	Turning radius[2, 6]	3000 mm (118.11 in)	3000 mm (118.11 in)

1. With standard bucket1000154387
2. With tyres 405/70-24 MPT-04
3. 2790 mm with protective FOPS screen (option)
4. With outside mirrors folded in
5. Wheel offset = 20
6. Measured above the bucket at the outer edge of the wheels

Dimensions with VOLVO bucket (model 352-04S/352-04L)

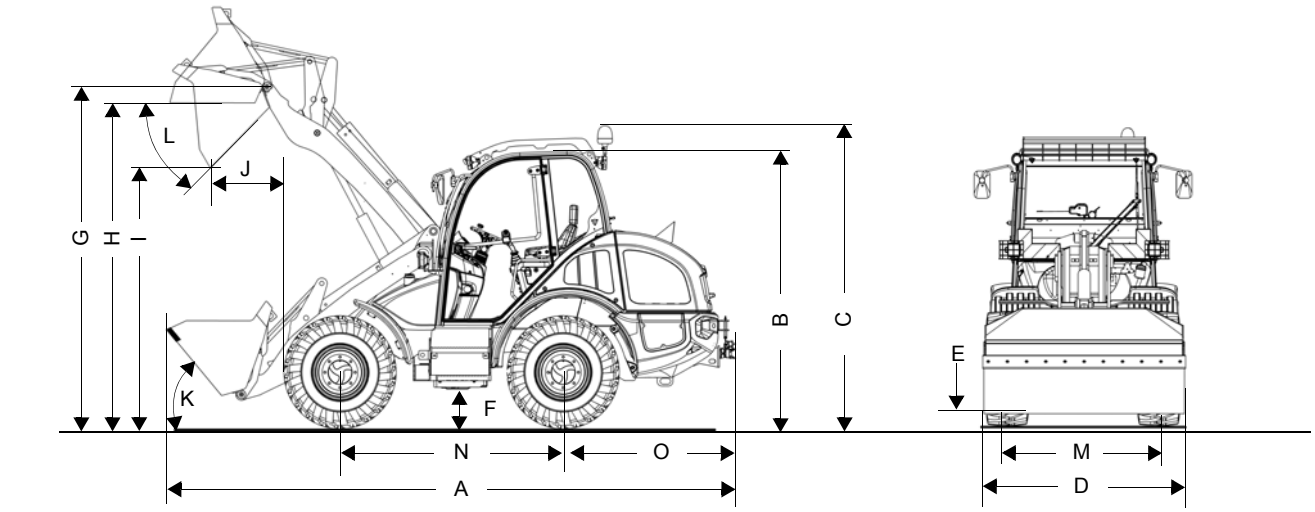


Fig. 325

Dimension		Model 352-04S	Model 352-04L
A	Overall length[1]	5790 mm (227.95 in)	5790 mm (227.95 in)
B	Overall height[2, 3]	2680 mm (105.51 in)	2680 mm (105.51 in)
C	Overall height with rotating beacon[2]	2910 mm (114.56 in)	2910 mm (114.56 in)
D	Overall width without bucket [2, 4]	1970 mm (77.55 in)	1970 mm (77.55 in)
D	Overall width with bucket[1]	2150 mm (84.64 in)	2150 mm (84.64 in)
E	Ground clearance in transport position of loader unit	200 mm (7.87 in)	200 mm (7.87 in)
F	Ground clearance under gearbox[2]	390 mm (15.35 in)	390 mm (15.35 in)
G	Pin height[2]	3450 mm (135.83 in)	3640 mm (143.30 in)
H	Load-over height[2]	3220 mm (126.77 in)	3470 mm (136.62 in)
I	Tilt-out height[2]	2650 mm (104.33 in)	3020 mm (118.90 in)
J	Tilt reach[2]	830 mm (32.67 in)	600 mm (23.62 in)
K	Tilt-in angle	43°	43°
L	Tilt-out angle	40°	40°
M	Front/rear track width[2, 5]	1490 mm (58.66 in)	1490 mm (58.66 in)
N	Wheelbase (front/rear axles)	2150 mm (84.64 in)	2150 mm (84.64 in)
O	Wheelbase (rear axle/rear of machine)	1620 mm (63.78 in)	1620 mm (63.78 in)
P	Wheelbase (front axle – bucket)	2030 mm (79.92 in)	2030 mm (79.92 in)
–	Turning radius[2, 6]	3000 mm (118.10 in)	3000 mm (118.10 in)

1. With standard bucket1000335672
2. With tyres 405/70-24 MPT-04
3. 2790 mm with protective FOPS screen (option)
4. With outside mirrors folded in
5. Wheel offset = 20
6. Measured above the bucket at the outer edge of the wheels

Dimensions with KRAMER pallet forks

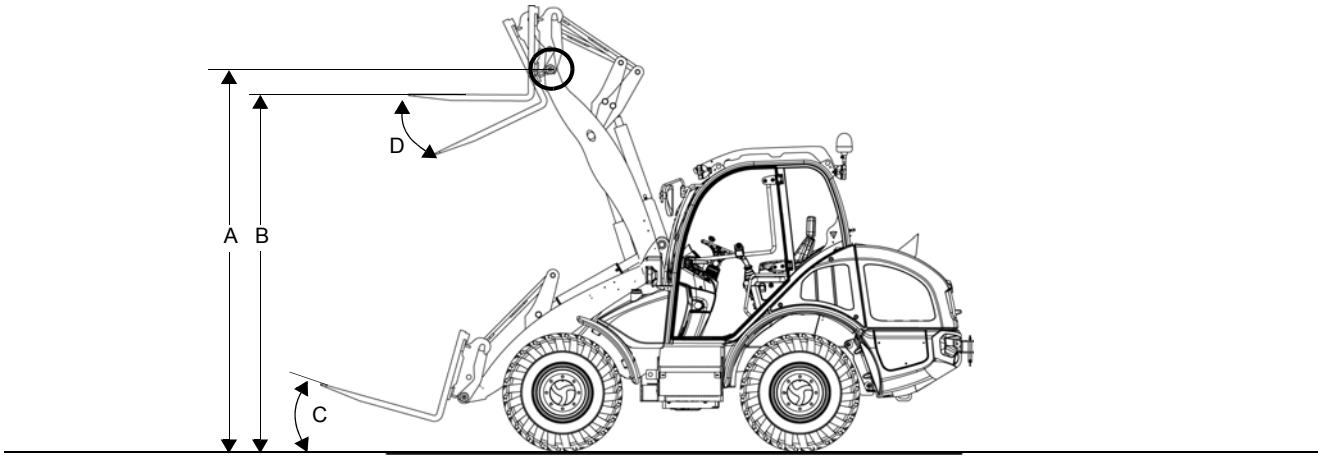


Fig. 326

Dimension		Model 352-03S	Model 352-04S	Model 352-04L
A	Pin height	3,360 mm (132.29 in)[1]	3450 mm (135.827 in)[2]	3,640 mm (143.307 in)[2]
B	Pallet height	3,145 mm (123.82 in)[1]	3,200 mm (125.984 in)[2]	3390 mm (133.465 in)[2]
C	Tilt-in angle in transport position	15°	17°	
D	Tilt-out angle	85°		71°

1. with tires 16/70-20
2. With tyres 405/70-24

Other information – *see "Dimensions with KRAMER bucket (model 352-03S)" on page 9-26*.

Dimensions with VOLVO pallet forks

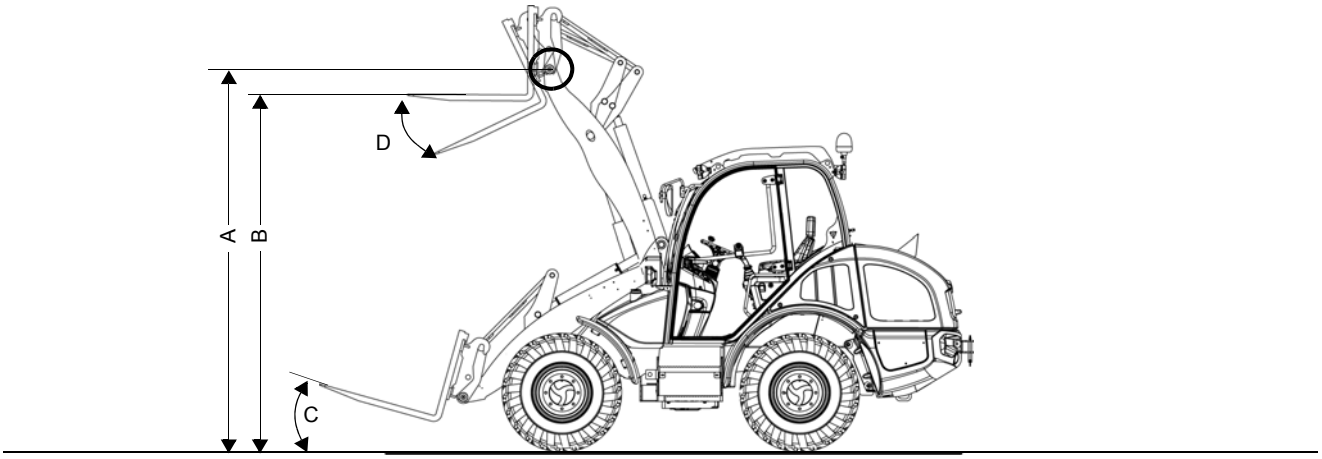


Fig. 327

Dimension		Model 352-03S	Model 352-04S	Model 352-04L
A	Pin height	3360 mm (132.29 in)[1]	3450 mm (135.827 in)[2]	3640 mm (143,307 in)[2]
B	Pallet height	3165 mm (124.61 in)[1]	3,360 mm (132.283 in)[2]	3,615 mm (142.323 in)[2]
C	Tilt-in angle in transport position	23°	14°	
D	Tilt-out angle	75°	65°	

1. with tires 16/70-20
2. With tyres 405/70-24

Other information – *see "Dimensions with VOLVO bucket (model 352-03S)" on page 9-27*.

Notes:

Index

KRAMER-WERKE GmbH keep abreast of the latest technical developments and constantly improve their products. For this reason, we may from time to time need to make changes to figures and descriptions in this documentation that do not reflect products that have already been delivered and that will not be implemented on these machines.

Technical data, dimensions and weights are only given as an indication. Responsibility for errors or omissions not accepted.

Kramer-Werke GmbH

Wacker-Neuson-Str. 1

D-88630 Pfullendorf
Germany

KRAMER

Kramer-Werke GmbH
Wacker-Neuson-Str. 1
D-88630 Pfullendorf

Phone 0080090209020
E-mail info@kramer.de
www.kramer.de

Order no. 1000328043
Language [en]