WACKER NEUSON

Operator’s manual

Telehandlers

TH627

This Operator's Manual includes the AEM Safety J anual RTF-0907

Machine model	**418-12**
Version	**1.0**
Document number	**1000390678**
Language	**[us]**

AEM MEMBER

1000390678

Legend	
Original Operator's Manual	**x**
Translation of original Operator's Manual	–
Version	1.0
Date	06/2018
Document	BA 418-12 *

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 vehicles.

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.

Exclusively built for Wacker Neuson.

Kramer-Werke GmbH

Wacker-Neuson-Str. 1

D-88630 Pfullendorf

Phone: +49 (0) 7552 9288-0
E-mail: info@kramer.de
www.kramer.de

Table of contents

EC / EU Declaration of Conformity

according to directive 2006/42/EC, EU official register L157 from June 09, 2006
according to directive 2000/14/EC, EU official register L162 from 7/3/2000
according to directive 2014/30/EU, EU official register L96 from March 29, 2014

Manufacturer

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

Product description

Designation	Telehandlers
Type	418
Variant	418-12
Trade name	TH627
Serial number	WNK41812xxxxx _ _ _ _
Output in kW	55.4
Measured sound power level dB(A)	103
Guaranteed sound power level dB(A)	104

We hereby declare that the abovementioned product meets all relevant clauses of the harmonization laws listed.

The manufacturer bears sole responsibility for issuing this compliance statement.

Compliance assessment procedure used

The compliance assessment procedure in accordance with Schedule VIII to EC directive 2000/14 was employed to determine the environmentally polluting noise emissions for use of the machines in question in the open air.

Notified body involved in procedure

DGUV Test Prüf- und Zertifizierungsstelle [DGUV testing and certification center] (EU identification number: 0515, Building Trade Department)
Landsberger Straße 309, D-80687 Munich

Applicable harmonized standards

EN 13309:2010, EN 1459-1:2017, EN 1459-5:2015

Other applicable standards and technical regulations

ISO/TR 25398:2006

Authorized representative for the compilation of technical documentation

Kramer-Werke GmbH, Wacker Neuson Straße 1, D-88630 Pfullendorf

Pfullendorf, the _ _ . _ _ . _ _ _ _

M. Arndt
Head of product development
Kramer-Werke GmbH

Original declaration of conformity

Declaration of manufacturer

Owing to the exhaust emission values, this vehicle is not licensed for use inside the European Union (EU).

Manufacturer

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

Product description

Designation	Telehandlers
Type	418
Variant	418-12
Trade name	TH627
Serial number	WNK41812xxxxx _ _ _ _
Output in kW (Exhaust fume values do not correspond to the EU standards for low-emission engines)	55.4

The following standards and/or technical specifications have been used for the proper application of the requirements regarding safety and health stated in the EC Directives:

2006/42/EC, 2000/14/EC, 2014/30/EU, EN 13309:2010, EN 1459-1:2017, EN 1459-5:2015

Authorized representative for the compilation of technical documentation

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

Pfullendorf, the _ _ . _ _ . _ _ _ _

M. Arndt
Head of product development
Kramer-Werke GmbH

1 Preface

1.1 Operator’s manual

Important information about 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 performing machine travel or operation for the first 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 personnel that have 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.

The basis for this in the Federal Republic of Germany is the "DGUV principle 308-009." Get informed on and follow the legal regulations of your country.

recommend repeating the training sessions 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, the operator must observe 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, operators must familiarize themselves 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 about this Operator’s Manual

- The Operator’s Manual and 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.
- Our distributors are always available to you for other questions about the vehicle and about 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 signs and 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
e.g. (50 in)	Indications in brackets (...) are US units of measurement

Explanation of abbreviations

Abbreviation	Explanation
(opt)	Option
Fig.	Figure
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
o/h	Operating hours
resp.	respectively
approx.	approximately (about, circa)
DGUV	German Social Accident Insurance
DIN	German Institute for Norming
DOC	"Diesel oxidation catalytic converter“ (exhaust after-treatment system)
Doc.	Document
DPF	"Diesel particulate filter" (exhaust aftertreatment)
EBE	Authorization for stand-alone operation
ECS	“Emission Control System” (exhaust-gas treatment system)
ECU	“Electronic Control System Unit” (electronic control unit for monitoring and operating electronic components)
EC	European Community
EGR	“Exhaust Gas Recirculation” (exhaust gas recirculation system for combustion gases - emission reduction)
EN	European Norm
etc.	et cetera (from Latin), and so forth
EU	European Union
poss.	possibly
FOPS	Falling Object Protective Structure
FeV	Driver's license ordinance
FZV	Vehicle Admission Ordinance
if nec.	if necessary
ISO	International Organization for Norming
LED	Light Emitter Diode (light diode)
Trucks	Trucks
LoF	Agriculture and forestry

Abbreviation	Explanation
LWA	Sound power level
max./MAX.	maximum
min./MIN.	minimal, at least
MVCU	Multi Variable Control Unit, control unit
No.	Number
o.s.	or similar
OK	okay, alright
Cars	Cars
ROPS	Roll Over Protective Structure
RZ	Ripper tooth
SAE	Society of Automotive Engineers, viscosity class for motor oil
SCR catalytic converter	"Selective Catalytic Reduction" (exhaust aftertreatment system)
StVZO	German road traffic regulations
SW	Quickhitch (loader unit)
etc.	et cetera
VDE	Association of Electrical Engineers, Electronic and Information Technology
e.g.	for example
cyl.	Cylinder

1.2 Warranty and liability

Notice on 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 of this operator's manual are to be observed.

Information about 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! In particular those specified in the maintenance chapter "*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 Behavioral measures and safety instructions

Prerequisites for operation

- The vehicle 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 vehicle. Immediately replace a damaged or illegible Operator's Manual and any supplements to it.
- The vehicle 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 vehicle.
  - If a damage or malfunction occurs during operation, put the vehicle 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 vehicle 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 from the 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 vehicle.
- 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 vehicle or vehicle 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 vehicle 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 vehicle may only be operated by authorized and safety-conscious persons who are fully aware of the risks involved in operating the vehicle.
- The operator and owner are obligated to operate the vehicle only in a safe and working condition.
- All persons working on or with the vehicle 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 vehicle.
- Be familiar with the emergency exit of the machine.

Preparatory measures for the operator

- Before starting, check the vehicle whether it can be driven and operated safely.
- Increased caution may be required if the driver has long hair or wears 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 vehicle 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 vehicle 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's 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 vehicle 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 vehicle are not sufficient for performing work safely, ensure additional lighting of the job site.
- There is an increased risk of fire from hot machine parts and exhaust gases.

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 vehicle operation immediately if persons do not stay clear of the danger zone.

Carrying passengers

- Carrying passengers with the vehicle 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 vehicle 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 vehicle for visible damage and defects.
- In case of damage and/or unusual behavior, put the vehicle 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 vehicle only with the seat belt fastened and only from the place provided for this.
- Put the vehicle 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 vehicle 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 vehicle 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 vehicle and never jump off the vehicle.

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 vehicle is in compliance with the national regulations.
- In order not to blind other motorists, using the existing work lights during vehicle 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).
- When transferring the machine on public roads, the attachment must be brought into transport position and emptied if necessary.
- The mounted attachment must be equipped with the mandatory lighting and protective devices.
- Take measures against unintentional operation of the operating hydraulics.
- If the vehicle 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 vehicle

- 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 vehicle 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 vehicle.
  - 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 vehicle and its work equipment are not being moved.
- Danger zones must not overlap with the work zones of other vehicles.

Lifting gear applications

- The vehicle 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 vehicle 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 vehicle 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.
- The machine requires a front ballast for 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 vehicle and the trailer when hitching a trailer.
- Hitch the trailer onto the vehicle correctly.
- Ensure that all equipment works correctly (for example, the brakes, lights).
- Before starting vehicle travel, ensure that nobody is between the vehicle and the trailer.
- If the vehicle has no EC 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 ?e device (for example a shatter protection).
- All other attachments require the vehicle 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.

Operating

- Carrying persons on/in an attachment is prohibited.
- Installing a work platform is prohibited.
  - Exception: The vehicle 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's 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 vehicle 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 vehicle and the equipment when picking up or lowering an attachment to the ground.

2.8 Towing, loading and transporting

Towing

- 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.
- Do not use the recovery device to tow the vehicle.
- 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 vehicle.
- Observe the national regulations (for example the light regulations) when towing on public roads/sites.

Towing

- Seal off the danger zone.
- Ensure that no one is near the sling or towing cable. The safety distance is equal to 1.5 times the length of the towing equipment.
- Have a recovery service or an authorized service center tow the vehicle away.
- 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.
- Do not use the towing gear to recover the vehicle.
- Check the recovering equipment for damage before recovering.
- Only attach the sling to approved recovering equipment.
- Have damaged or malfunctioning recovery equipment immediately repaired by an authorized service center.
- Use only sling gear or tow cables certified by a test/certification body, observe the inspection intervals.
- Tow away only in accordance with this Operator's Manual to avoid damage to the vehicle.

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 vehicle against unintentional movement.
- Raise the vehicle only after it is safely attached and the person attaching the vehicle 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 vehicle when loading the vehicle.
- 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 vehicle only in accordance with this Operator's Manual to avoid damage to the vehicle.
- 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 vehicle during transportation.
- Observe the national regulations (for example, “Merkheft Erdbaumaschinen”, 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 vehicle and the engine must be stopped during maintenance.
- Once maintenance is over, correctly install safety equipment again that has been removed.
- Wait for the vehicle 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 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 vehicle components before starting work.
- Apply special care when working on the fuel system due to the increased fire hazard.

Preparatory measures

- Attach a warning sign to the operator's controls (e.g. "Vehicle is being maintained. Do not start").
- Before performing assembly work on the vehicle, 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 vehicle 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 vehicle/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 vehicle 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 from the handholds, footholds, handrails).
- Disconnect the negative terminal of the battery before working on the electrical system.

Modifications and spare parts

- Do not modify the vehicle 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

Tires

- 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 screw connections 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 vehicle 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, 12V).

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). Don't 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).
  - Operate the machine only on appropriately ventilated areas.
- The respective safety instructions must be observed then using the vehicle in areas where there may be explosion hazards.
- 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 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 use flammable detergents.
- Keep the area around the exhaust system free of flammable materials.
- There is an increased risk of fire from hot machine parts and exhaust gases.
  - Stop and park the vehicle only in safe areas.
- If the vehicle is equipped with a fire extinguisher, have it installed in its specific location.
- Keep the vehicle 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 vehicle 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 vehicle 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.

Cleaning

- Risk of injury 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 from the 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

Outer overall view (part 1)

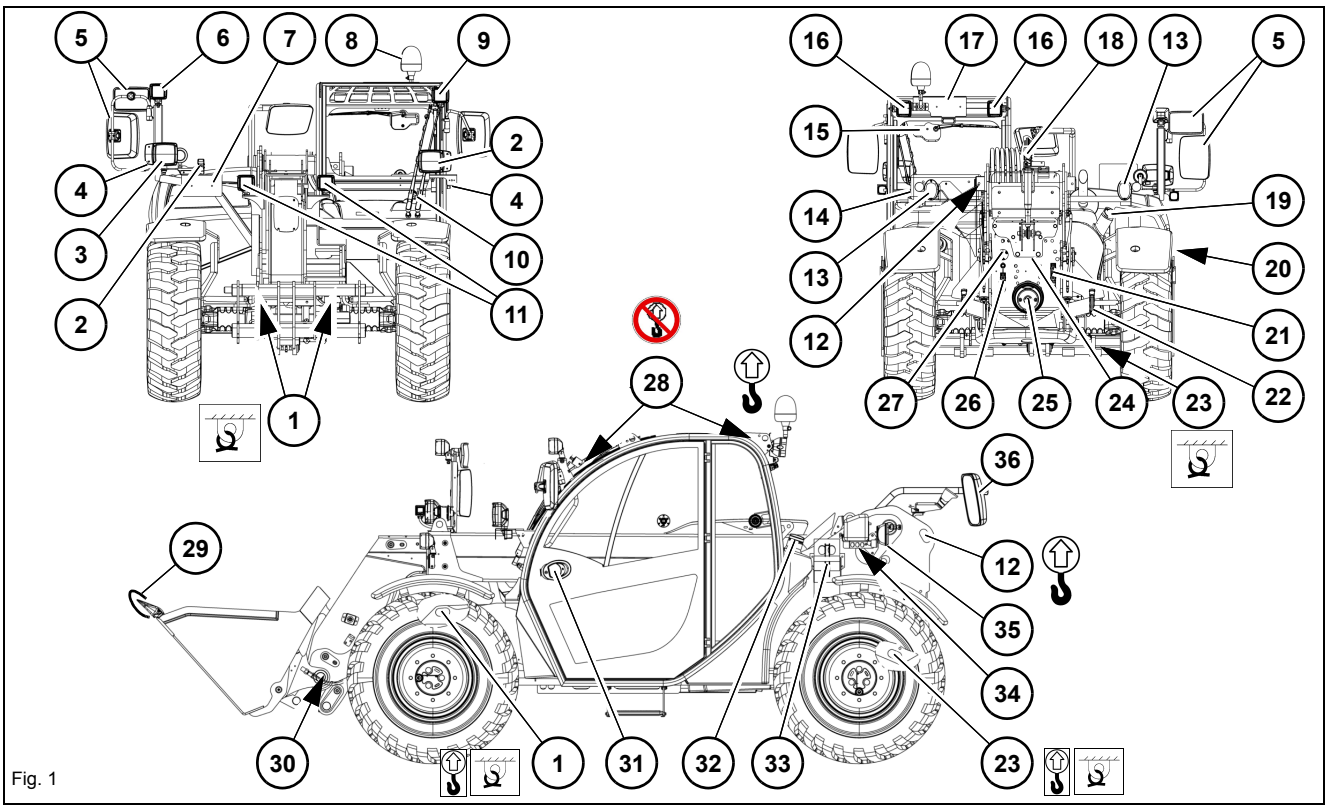


Fig. 1

Designation	
1	Front hooks for loading/tying down the machine (left/right)
2	Front camera (optional)
3	Headlight with turn indicator
4	Additional marker lights left / right (optional)
5	Rear mirror left/right with additional mirror
6	Front right working light (option)
7	Front numberplate fixture (option)
8	Rotating beacon (option)
9	Front left work light
10	Front wiper
11	Boom working lights (option)
12	Rear loading lug (left/right)
13	Turn indicator/brake/rear light
14	Fuel tank filler inlet
15	Rear wiper
16	Left rear series work light (right optional)
17	Number plate bracket (optional)
18	Rear camera (optional)
19	Hydraulic oil tank filler inlet

Outer overall view (part 2)

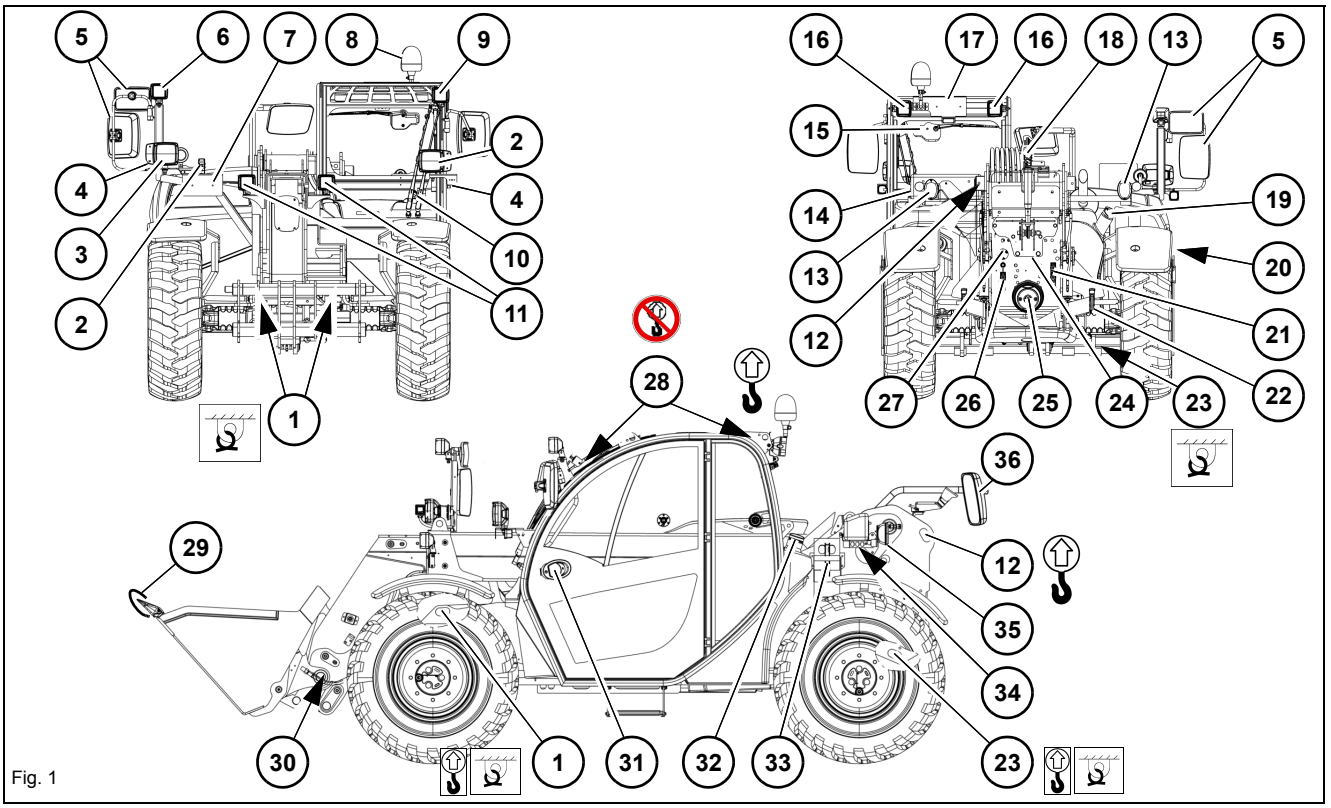


Fig. 1

Designation	
20	Engine cover lock
21	Flat connector plugs – auxiliary control circuit (optional)
22	Three-point rear receptacle (optional)
23	Rear hooks for tying down the machine (left/right on the frame)
24	Towing device or ball hitch (optional) or automatic ball hitch (optional)
25	PTO drive (optional)
26	Connections – Hydraulically activated trailer brake (optional)
27	Socket – trailer lights (option)
28	Eye hook[1] for installing/removing the cabin
29	Front-edge protection
30	Hydraulic connections 3rd control circuit (additional control circuit as an option)
31	Door lock
32	Fuel cap
33	Wheel chock
34	Touch button – Operation of the three-point receptacle and PTO (optional)
35	Tool kit (option)
36	Mirror for ball hitch (optional)

1. Eyehooks 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.

- **“Type designation”** => Stamped on the type label – *see "Vehicle" on page 3-36*.
- **“Trade name**” => affixed outside on the vehicle

Telehandler model	Trade name
418-12	TH627

3.2 Brief description of machine

Main components of the machine

- Sturdy steel sheet frame; Rubber-mounted engine
- ROPS/FOPS tested cabin (roll-over/falling object protection)
  - ROPS is the abbreviation for the English concept "Roll Over Protective Structure"
  - FOPS is the abbreviation for the English concept "Falling Object Protective Structure"
- Water-cooled, four-cylinder turbocharged diesel engine, exhaust emissions according to EC standard 97/68 EC
- Automotive drive, progressive hydrostatic axial-piston gearbox
  - Maximum speed 20 km/h (12.4 mph) series
  - Maximum speed 30 km/h (18.6 mph) (option)
- Hydraulic power steering with emergency steering features
- Front and rear planetary steering axles, rigid front axle, rear axle with oscillation
- Service brake (brake disc on rear axle drive shaft – brake effect on front axle via cardan shaft)
- Parking brake (brake disc on rear axle drive shaft)
- Loader unit (one-fold telescopic boom)

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 “Telematics” option.

Hydrostatic drive with inching

The diesel engine permanently drives a hydraulic pump (variable displacement pump), the oil flow of which is sent to a hydraulic motor flanged on the transfer gearbox. The output of the hydraulic motor is passed on via the transfer case (flanged to the front axle) further via the universal joint shaft connection to the rear axle so that a permanent all-wheel drive exists.

Work hydraulics and 4 wheel steering

A gear pump (flanged on the variable displacement pump of the drive) supplies the work hydraulics and, via a priority valve, also the hydrostatic steering.

The oil flow of the pump depends on the diesel engine speed.

When the machine is in operation, the entire diesel engine output can be transmitted to the gear pump for the work 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 loader unit by pressing the accelerator pedal and the brake/inching pedal at the same time.

Cooling system

There is a combined water-hydraulic oil cooler, intercooler and fuel cooler in the engine compartment.

The hydraulic oil temperature as well as the cooling temperature of the diesel engine are indicated via the control lamps in the display instrument (dashboard).

3.3 Information and regulations on use

General information on the machine

Due to the variety of the attachments that can be used, the vehicle is a flexible and powerful helper in the construction, agricultural and recycling industries.

According to the road traffic licensing regulation (StVZO) of the Federal Republic of Germany, the vehicle is a **self-propelled work machine** – also see the General Certification for Vehicles (Germany) or the Data Confirmation (Germany).

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

Information

For safety reasons, the vehicle is equipped with a start-up lock in all EU member states and in Australia.

The vehicle can only be operated if the operator has sat down on the operator's seat.

If the operator seat is left at a standstill or with the hand brake released, a continuous acoustic warning will sound.

If the operator's seat is left during the drive, the drive system goes into a neutral position when driving below 7 km/h (4.3 mph). At higher travel speeds, a continuous warning signal sounds.

Safe machine operation

The safety of the operator, as well as the safety of others, depends to a great extent on how the vehicle 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 7-20*.

Information

Repairs, maintenance or modifications may only be performed 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 vehicle is a self-propelled working machine **in the Federal Republic of Germany.**

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

NOTICE

In order to avoid damage to the vehicle, only the attachments listed in the following table are permitted to be attached
– see "Use of attachments" on page 3-13.

It is to be noted that not **all** of the attachments specified are permitted for driving in public traffic in the Federal Republic of Germany.

The "set-up conditions" (permitted attachments) as well as the corresponding requirements can be found in the **ABE (general operating permit) or the data confirmation** for vehicles with permission as a "self-propelled work machine" in Germany *– see "Use of attachments" on page 3-13*!

Attachments without a General Certification for Vehicles (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!

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.
- 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.
- Machine modifications without proper authority.
- Fastening/installation of additional equipment that has not been certified/released
- Use of non-original spare parts.
- Use for spraying applications.
- Use for forestry applications.
- Use as a carrier machine for equipment that has not been certified/ released by the manufacturer.
- Use in stretches of water or flood areas.
  ➥ Fording depth max. 300 mm (11.8 in)
- Raising and transporting persons.
- Installation and operation of work platforms.
- Raising heavy loads (overload).
- Machine operation although the machine operator is not on the operator seat.

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.

Permissible temperature range during normal operation

The permissible temperature range for a vehicle maintained according to the maintenance manual is -15°C to +40°C (+5°F to +104°F) in normal application with short-term max. power 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.

Driving license

The vehicle may only be driven by persons who are trained in how to operate it, have proven their driving and load-handling abilities to the operating company or its representative and have been expressly assigned by the company to do the driving.

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

In the Germany, in accordance with **the driving permission ordinance (FeV) § 6**, one of the following driving licenses is required for driving the machine.

- **Driving license category L**
  - Self-propelled work machines up to 25 kph
  - Agricultural or forestry tractors up to 40 kph (with trailer 25 kph)
- **Driving license category C**
  - Motor vehicles with over 3500 kg gross weight rating (with trailers up to 750 kg)
- **Driving license category C1**
  - Motor vehicles between 3500 and 7500 kg gross weight rating (with trailers up to 750 kg)
- **Driving license category CE**
  - Motor vehicles with over 3500 kg gross weight rating (with trailers over 750 kg)
- **Driving license category T**
  - 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.

Identification

§ 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 km/h** 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

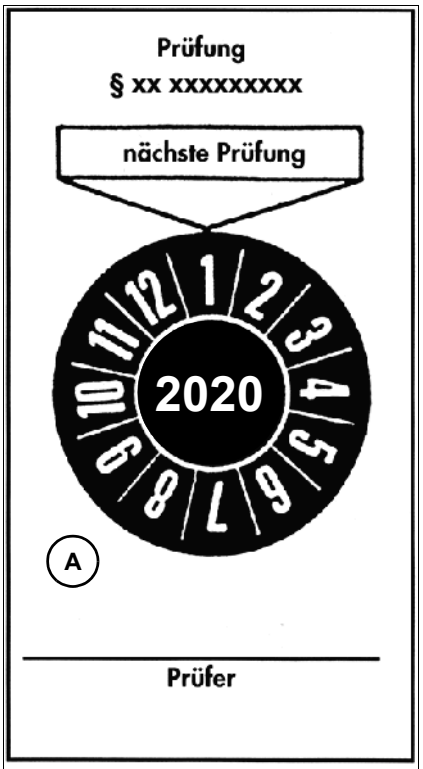


Fig. 2

When operating the machines, the national safety regulations must be followed as well, for example in Germany, the regulations for accident prevention “Deutsche Prüfstelle für Land- und Forsttechnik” (German Test- and Certification-Center for Agriculture and Forest Engineering – DPLF) and the Accident Prevention Regulations on “vehicles” (DGUV [German Statutory Accident Insurance] 70 § 57 clause 1).

In Germany, legislation, supplemented by the technical rules for operational safety (TRBS) 1201 and the accident prevention regulations (DGUV regulation 1), requires all machine operators to have all machines and equipment inspected regularly (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.
- As evidence of the inspection, affix an inspection label on the machine for evidence (see example on the left).
  The inspection tag can be acquired from the relevant inspection authorities.

Bear in mind 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).

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

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

On-board documents

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

- German ABE (Allgemeine Betriebserlaubnis = general operating license) or data confirmation
- Driving license
- Test report according to DGUV regulation 70 section 57 clause 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, the following outfitting is to be supplied and provided by the operator according to the road traffic regulations **§53 StVZO**:

- 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.

Warning identification of machine on public roads (option)

According to § 52 clause 4.1 of StVZO German road traffic regulations, from 01.10.1998 onward 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.

Use of attachments

- The following quickhitch facilities can be installed on the vehicle:
  - KRAMER quick coupler systems,
  - WEIDEMANN quick coupler system,
  - EURO quick coupler system,
  - SKID STEER quickhitch facility,
  - MANITOU quickhitch facility,
  - MATBRO quickhitch facility.
- How the vehicle is used depends on the attachments available.
- The respective approved attachments for the quick coupler systems with the corresponding requirements can be found in the following tables. See page *3-14* – *3-22*.
- Also refer to the National Type Approval (Germany) or the Data Confirmation (Germany) for fitting certified attachments and for the specific requirements.
- When fitting attachments that are not listed in the National Type Approval (Germany), the Data Confirmation (Germany) or the registration documents, get in touch with a dealer for authorization (warranty claims)! The EBE (individual operating permit) from the competent national authorities is then required for this purpose.
- **Warranty rights shall not apply if uncertified attachments or attachments from other manufacturers are installed.**
- Machine travel on public roads with a full bucket is prohibited.
- With a mounted attachment, the possible line-of-sight impairment must also be observed *– see "Field of vision during road travel" on page 4-6* and *“Field of vision during work operation” on page 4-7*.

Information

The application of attachments that are not listed for the corresponding quickhitch system must be tested and documented for compliance (stability inspection) according to the EC machine directive or the standard EN 1459 by an authorized specialized workshop in the EU member states (load-bearing capacity diagram)
– see chapter 5 " Fitting attachments from other manufacturers (option)" on page 5-78.

In the case of non-EU countries, follow and apply the national regulations of these countries.

Information

This Operator’s Manual only describes how to install, use and remove the standard bucket, multipurpose bucket and pallet forks *– see "Receive attachments on the quickhitch facility" on page 5-66*.

For the description of the function and application of other attachments, refer to the operator’s manuals of these attachments.

Attachments for Kramer quickhitch facility

Important information on the quickhitch facility and attachments

NOTICE

Damage to machine due to use of uncertified attachments!

- ► Use only attachments that are certified for the existing quickhitch system and that are fitted with a load diagram certified for the specific attachment.
- ► If uncertified attachments are installed, or if parts of the quickhitch facility 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.

Information

The use of attachments that are not listed for the corresponding quick-hitch systems must be tested and documented for compliance (stability inspection) according to the EC machine directive or the standard EN 1459 by an authorized specialized workshop in the EU member states (load-bearing capacity diagram) *– see chapter 5 " Fitting attachments from other manufacturers (option)" on page 5-78*.

In the case of non-EU countries, follow and apply the national regulations of these countries.

Information

For trips on public roads in the Federal Republic of Germany, only the attachments that are described in the following table on page *3-15* are permitted.

Attachments that are not approved must be removed and transported to the site of application with a suitable transport vehicle.
Furthermore, the line-of-sight impairment must be taken into consideration with a mounted attachment *– see "Field of vision during road travel" on page 4-6* and *"Field of vision during work operation" on page 4-7*.

Overview:
Attachments on KRAMER quickhitch facility

Approved attachments for machine travel on public roads (Federal Republic of Germany)					
Attachment[1, 2, 3]	**Type no.**	**Width mm (in)**	**Capacity[4] m³ (ft³)**	**Use**	**Bulk material density t/m³ (lb/ft³)**
Standard bucket – normal material	1000334051	2000 (78.7) (with teeth)	0.7 / 0.85 (24.7 / 30.0)	Loosening, picking up, transporting and loading of loose or solid material	≤ = 1.8 (≤ p = 112)
	1000249195[5] 1000286459[5]	2000 (78.7) (without teeth)			
Standard bucket – lightweight material	1000249242[5]	2150 (84.6) (without teeth)	1.0/1.2 (35.3/42.3)	Picking up, transporting and loading lightweight material	≤ = 1.3 (≤ p = 81)
	1000279623	1500 (59.0) (without teeth)	– / 1.0 (– / 35.3)		
Standard bucket – super-lightweight material[5, 6]	1000249307	2300 (90.5) (without teeth)	1.5/1.8 (52.9/63.5)	Picking up, transporting and loading grain	≤ = 0.7 (≤ p = 43.7)
	100368262				

1. Pay attention to the safe load indicator during work operation and take appropriate action.
2. Attachments are **only** permitted for the KRAMER quickhitch facility.
3. Machine travel on public roads is only certified if a front-edge protection is installed over the entire width of the bucket!
4. Capacity struck according to ISO 7546/capacity heaped.
5. With screwed-on bucket blade.
6. Only permitted for public traffic in conjunction with additional reflectors fixed to the vehicle on the left and right and in the rear on the tail lights.

Non-approved attachments for machine travel on public roads (Federal Republic of Germany)					
Attachment[1, 2, 3]	**Type no.**	**Width mm (in)**	**Capacity[4] m³ (ft³)**	**Use**	**Bulk material density t/m³ (lb/ft³)**
Bulky goods bucket with hydraulic clamp[5, 6]	1000255001	2000 (78.7) (with teeth)	– / 1.0 (– / 35.3)	Picking up and transporting silage or recycling material	≤ = 1.8 (≤ p = 112)
Pallet forks[5, 6]	1000247817[7]	1200 (47.2)	Load diagram	Picking up and transporting pallets	–
	1000363244	1200 (47.2)	Load diagram		–
Fork tines extension[8]	1000338756	1600 (63.0)	–		–
Load hook[6, 9]	1000291582	700 (27.5)	Load diagram	Picking up and transporting loads with lifting gear (cables, chains, belts)	–

Round and square bale grapple[6]	1000295315	800 – 1800 (31.5 – 70.8)	–	Picking up and transporting silage, straw and hay bales	–
Bale grapple V40[6]	1000375485		–		–
Bale grapple W500[6]	1000375486	800 – 1200 (31.5 – 47.2)	–		–
Silage bucket with grab[6,10]	1000295643	2000 (78.7)	–		–
Manure forks[6]	1000292240	1900 (74.8)	–		–
Bale spike[6] With 3 tines	1000373757	Fork tine length: 1100 (39.3) Width: 1200 (47.2)	–		–
Large bale spear[6], Folding	1000374315	Fork tine length: 1100 (39.3) Width: 1600 (47.2)	–		–
Silage cutting clamps[6]	1000308359	1780 (70.0)	–	Cutting, picking up and transporting silage, straw and manure	–
Gate opener [6, 11]	1000278984	–	–	Opening and closing specially equipped up-and-over doors	–

1. Pay attention to the safe load indicator during work operation and take appropriate action.
2. Attachments are **only** permitted for the KRAMER quickhitch facility.
3. Machine travel on public roads is only certified if a front-edge protection is installed over the entire width of the bucket.
4. Capacity struck according to ISO 7546/capacity heaped.
5. Use only with the load-bearing capacity diagram provided for this attachment.
6. See the Operator's Manual of the attachment for putting the attachment into operation and using it.
7. Due to the line-of-sight restriction, this pallet fork may only be used with the elevated cabin.
8. Use only with the load-bearing diagram of the pallet forks. Only for fork tines 100 x 42 mm (3.9 x 1.7 in).
9. Use only with the load-bearing capacity diagram.
10. Cannot be used for the mechanical KRAMER quickhitch facility.
11. For safety reasons and to avoid material damage, the door opener is only permitted for opening overhead gates that are approved accordingly. Other activities are prohibited with this attachment.

For more information on attachments, see:
Merkblatt für Anbaugeräte (leaflet with specific instructions for attachments) §30 Abs. 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).

Overview:
Attachments on KRAMER quickhitch facility / Australia

Attachment[1, 2]	Type no.	Width mm (in)	Capacity[3] m³ (ft³)	Use	Bulk material density t/m³ (lb/ft³)
Standard bucket – normal material[4]	1000334051	2000 (78.7) (with teeth)	0.7 / 0.85 (24.7 / 30.0)	Loosening, picking up, transporting and loading of loose or solid material	≤ = 1.8 (≤ p = 112)
	1000249195[5]	2000 (78.7) (without teeth)			
Pallet fork[6,7,8]	1000247817[9]	1200 (47.2)	Load diagram	Picking up and transporting pallets	–
	1000363244	1200 (47.2)	Load diagram		–

1. Pay attention to the safe load indicator during work operation and take appropriate action.
2. Attachments are **only** permitted for the KRAMER quickhitch facility.
3. Capacity struck according to ISO 7546/capacity heaped.
4. Machine travel on public roads is only certified if a front-edge protection is installed over the entire width of the bucket!
5. With screwed-on bucket blade.
6. Not approved for machine travel on public roads.
7. Only with attachment-specific load diagram
8. See the Operator's Manual of the attachment for putting the attachment into operation and using it
9. Due to the line-of-sight restriction, this pallet fork may only be used with the elevated cabin.

For more information on attachments, see:
Merkblatt für Anbaugeräte (leaflet with specific instructions for attachments) §30 Abs. 10/11/12 StVZO (Federal Republic of Germany).

Attachments for WEIDEMANN quickhitch facility

Important information on the quickhitch facility and attachments

The machine manufacturer currently has only released the attachments listed on page *3-19* for this quickhitch facility!

NOTICE

Avoid damage to the machine due to the use of uncertified attachments:

- ► Use only attachments that are certified for the existing quickhitch system and that are fitted with a load diagram certified for the specific attachment.
- ► If uncertified attachments are installed, or if parts of the quickhitch facility 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.

Information

The use of attachments that are not listed for the corresponding quick-hitch systems must be tested and documented for compliance (stability inspection) according to the EC machine directive or the standard EN 1459 by an authorized specialized workshop in the EU member states (load-bearing capacity diagram) *– see chapter 5 " Fitting attachments from other manufacturers (option)" on page 5-78*.

In the case of non-EU countries, follow and apply the national regulations of these countries.

Information

For trips on public roads in the Federal Republic of Germany, only the attachments that are described in the following table on page *3-19* are permitted.

Attachments that are not approved for use in public traffic must be removed and transported to the site of application with a suitable transport vehicle.
Furthermore, the possible line-of-sight impairment must be taken into consideration with a mounted attachment *– see "Field of vision during road travel" on page 4-6* and *"Field of vision during work operation" on page 4-7*.

Overview:
Attachments on WEIDEMANN quickhitch facility

Attachment[1, 2, 3]	Type no.	Width mm (in)	Capacity[4] m³ (ft³)	Use	Bulk material density t/m³ (lb/ft³)
Approved attachments for machine travel on public roads (Federal Republic of Germany)					
Standard bucket – normal material	1000252677	2100 (82.6) (with teeth)	0.87 (30.7)	Loosening, picking up, transporting and loading of loose or solid material	≤ = 1.8 (≤ p = 112)
Bucket – Lightweight material	1000253157	2000 (78.7) (without teeth)	1.44 (50.8)	Picking up, transporting and loading lightweight material	≤ = 1.13 (≤ p = 70.5)
	1000253108[5]	2200 (86.6) (without teeth)	1.58 (55.8)		≤ = 1.0 (≤ p = 62.4)
Non-approved attachments for machine travel on public roads (Federal Republic of Germany)					
Pallet forks[6, 7]	1000363308	1200 (47.2)	Load diagram	Picking up and transporting pallets	–
Bucket – super-lightweight material	1000252432	2500 (98.4) (without teeth)	1.80 (63.5)	Picking up, transporting and loading grain	≤ = 0.8 (≤ p = 49.9)

1. Pay attention to the safe load indicator during work operation and take appropriate action.
2. Attachments are **only** permitted for the WEIDEMANN quickhitch facility.
3. Machine travel on public roads is only certified if a front-edge protection is installed over the entire width of the bucket!
4. Heaped capacity.
5. Certified for machine travel on public roads only if the machine is fitted with additional reflectors on the left/right and on the rear lights.
6. Application only with attachment-specific load diagram.
7. See the Operator's Manual of the attachment for putting the attachment into operation and using it

For more information on attachments, see:
Merkblatt für Anbaugeräte (leaflet with specific instructions for attachments) §30 Abs. 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 EURO quickhitch facility (optional)

Important information on the quickhitch facility and attachments

The machine manufacturer currently has only released the attachments listed on page *3-21* for this quickhitch facility!

NOTICE

Damage to machine due to use of uncertified attachments!

- ► Use only attachments that are certified for the existing quickhitch system and that are fitted with a load diagram certified for the specific attachment.
- ► If uncertified attachments are installed, or if parts of the quickhitch facility 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.

Information

The use of attachments that are not listed for the corresponding quick-hitch systems must be tested and documented for compliance (stability inspection) according to the EC machine directive or the standard EN 1459 by an authorized specialized workshop in the EU member states (load-bearing capacity diagram) *– see chapter 5 " Fitting attachments from other manufacturers (option)" on page 5-78*.

In the case of non-EU countries, follow and apply the national regulations of these countries.

Information

The attachments described in the following table on page *3-21* are not approved for travel on public roads in the Federal Republic of Germany.

Attachments must be removed and transported to the site of application with a suitable transport vehicle.
Furthermore, the possible line-of-sight impairment must be taken into consideration with a mounted attachment *– see "Field of vision during road travel" on page 4-6* and *"Field of vision during work operation" on page 4-7*.

Overview:
Attachments to EURO quickhitch facility

Attachment[1, 2]	Type no.	Width mm (in)	Load	Use
Non-approved attachments for machine travel on public roads (Federal Republic of Germany)				
Pallet forks[3, 4]	1000363305	1200 (47.2)	Load diagram	Picking up and transporting pallets

1. Pay attention to the safe load indicator during work operation and take appropriate action.
2. Attachments are **only** permitted for the EURO quickhitch facility.
3. Application only with attachment-specific load diagram.
4. See the Operator's Manual of the attachment for putting the attachment into operation and using it

For more information on attachments, see:

Attachments for SKID STEER quickhitch facility (optional)

Important information on the quickhitch facility and attachments

The machine manufacturer currently has only released the attachments listed on page *3-23* for this quickhitch facility!

NOTICE

Damage to machine due to use of uncertified attachments!

- ► Use only attachments that are certified for the existing quickhitch system and that are fitted with a load diagram certified for the specific attachment.
- ► If uncertified attachments are installed, or if parts of the quickhitch facility 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.

Information

The use of attachments that are not listed for the corresponding quick-hitch systems must be tested and documented for compliance (stability inspection) according to the EC machine directive or the standard EN 1459 by an authorized specialized workshop in the EU member states (load-bearing capacity diagram) *– see chapter 5 " Fitting attachments from other manufacturers (option)" on page 5-78*.

In the case of non-EU countries, follow and apply the national regulations of these countries.

Information

The attachments described in the following table on page *3-23* are not approved for travel on public roads in the Federal Republic of Germany.

Attachments must be removed and transported to the site of application with a suitable transport vehicle.
Furthermore, the possible line-of-sight impairment must be taken into consideration with a mounted attachment *– see "Field of vision during road travel" on page 4-6* and *"Field of vision during work operation" on page 4-7*.

Overview:
Attachments to SKID STEER quickhitch facility

Attachment [1, 2, 3, 4]	Type no.	Width mm (in)	Capacity[5] m³ (ft³)	Use
Non-approved attachments for machine travel on public roads (Federal Republic of Germany)				
Pallet forks	1000349116	1200 (47.2)	Load diagram	Picking up and transporting pallets
Non-approved attachments for vehicle travel on public roads (only available in the US)				
Pallet forks	1000360255 5100024531	–	Load diagram	Picking up and transporting pallets
	1000360819 5100018703			
	1000360820 5100018704			
	1000360831 5100018705			
Bucket	1000360253 5200023772			Loosening, picking up, transporting and loading of loose or solid material
	1000360251 5200003427			
	1000360254 5200016975			
	1000360252 5200015856			

1. Pay attention to the safe load indicator during work operation and take appropriate action.
2. Attachments are **only** permitted for the SKID STEER quickhitch facility.
3. Application only with attachment-specific load diagram.
4. See the Operator's Manual of the attachment for putting the attachment into operation and using it
5. Heaped capacity.

Attachments for MANITOU and MATBRO quickhitch facilities (optional)

Important information on the quickhitch facility and attachments

The machine manufacturer has **not released** any attachments for these quickhitch facilities!

Your distributor is available to you if you require more information on the associated attachments.

NOTICE

Damage to machine due to use of uncertified attachments!

- ► Use only attachments that are certified for the existing quickhitch system and that are fitted with a load diagram certified for the specific attachment.
- ► If uncertified attachments are installed, or if parts of the quickhitch facility 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.

Information

The use of attachments that are not listed for the corresponding quick-hitch systems must be tested and documented for compliance (stability inspection) according to the EC machine directive or the standard EN 1459 by an authorized specialized workshop in the EU member states (load-bearing capacity diagram) *– see chapter 5 " Fitting attachments from other manufacturers (option)" on page 5-78*.

In the case of non-EU countries, follow and apply the national regulations of these countries.

Attachments for three-point mount (optional)

Important information about attachments

The vehicle manufacturer currently has **not released** any attachments for the three-point mount (optional)!

Your distributor is available to you if you require more information on the attachments.

NOTICE

Damage to machine due to use of uncertified attachments!

- ► If uncertified attachments are installed, or if parts of the 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 sales partner if you have more questions about the attachments.

Information

Attachments on public roads in the Federal Republic of Germany:

In the case of an approval as a "self-driving machine," only attachments may be carried along if they are registered in the General Certification for Vehicles (Germany). See page *3-13*.
No attachments are registered for the three-point mount. 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!

Registration in the machine documentation is not required for vehicles with "LoF [agricultural and forestry] approval" as a tractor machine.
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!

The operator of the machine always has the sole responsibility for this.

Also get informed on and follow the legal regulations of your country.

3.4 Labels

Overview: Signage (Europe)

Left side of machine

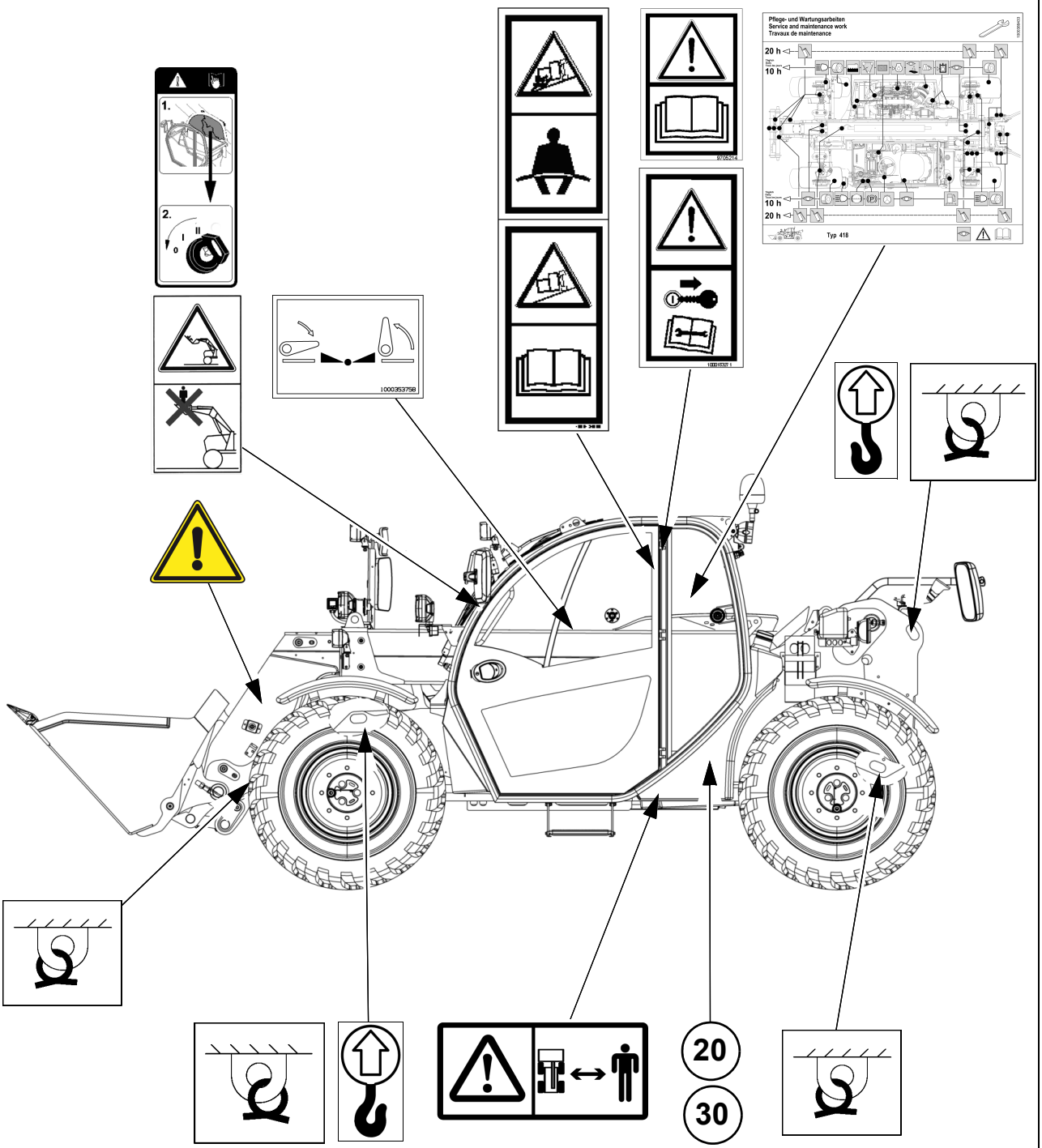


Fig. 3

Right side of machine

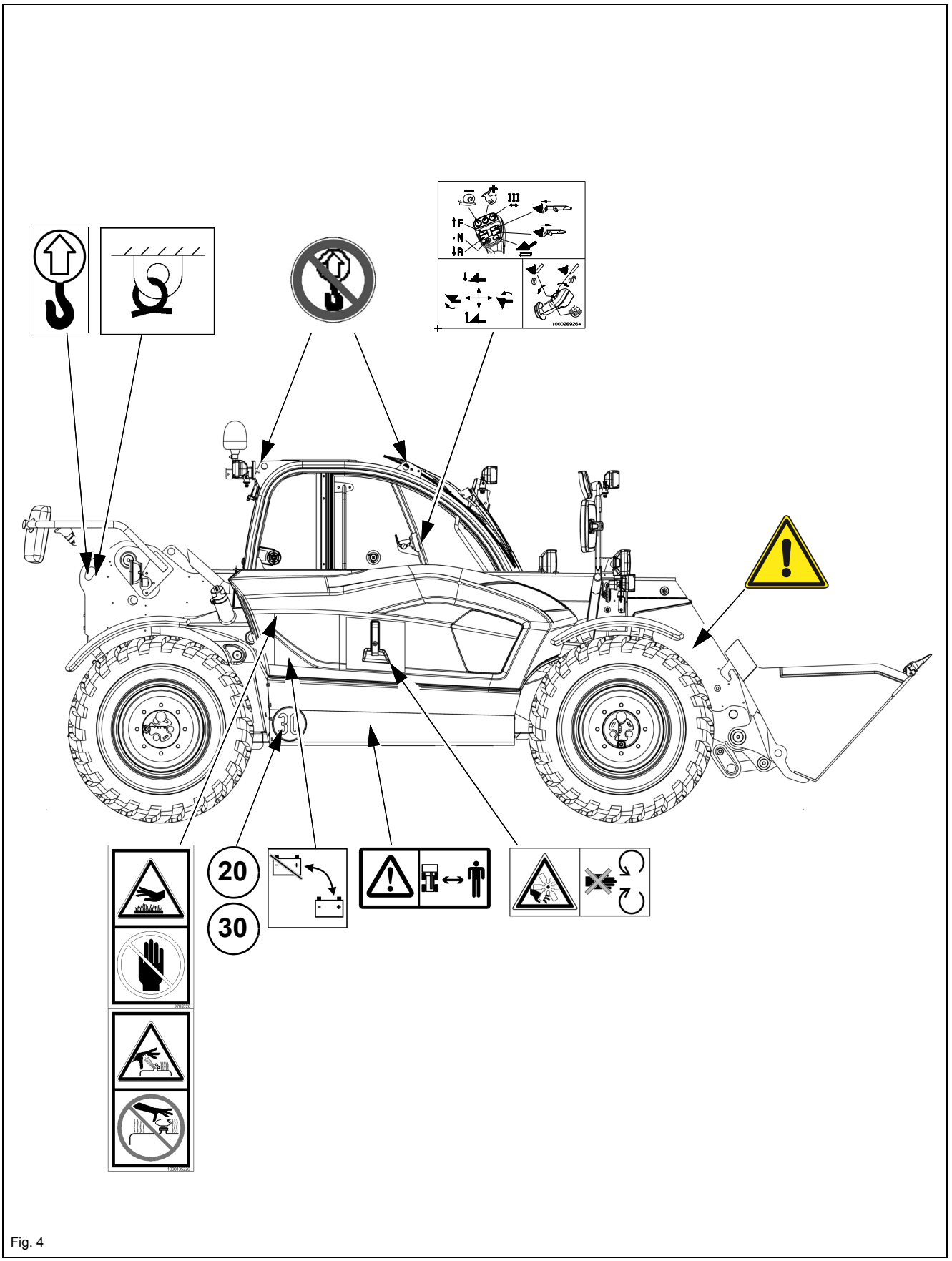


Fig. 4

Front of machine

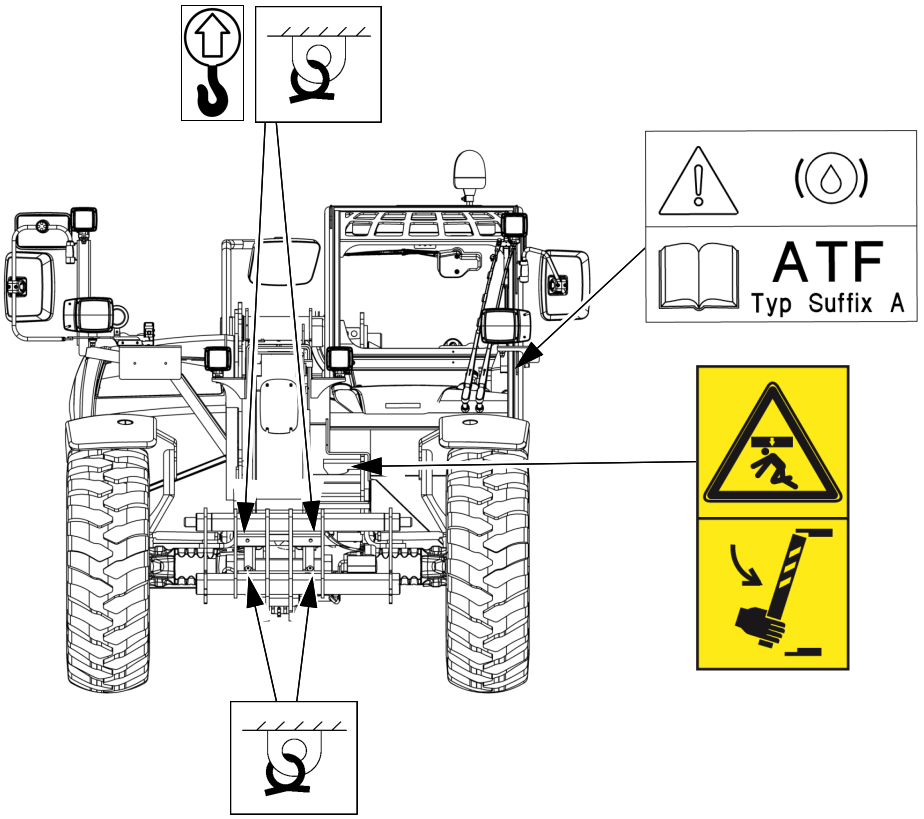


Fig. 5

Rear of machine

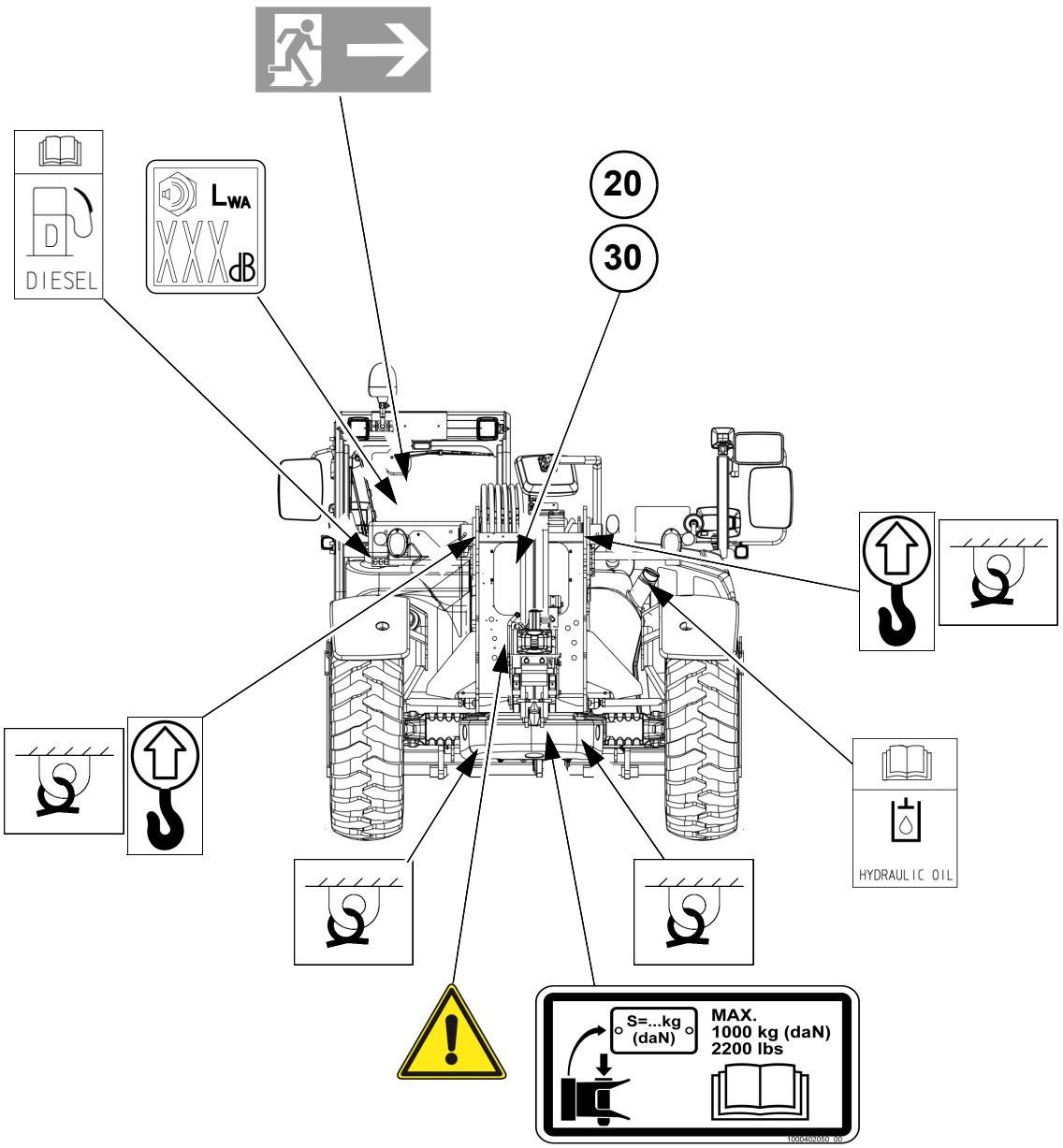


Fig. 6

Overview: Signage (USA / Australia)

Outside left of the vehicle

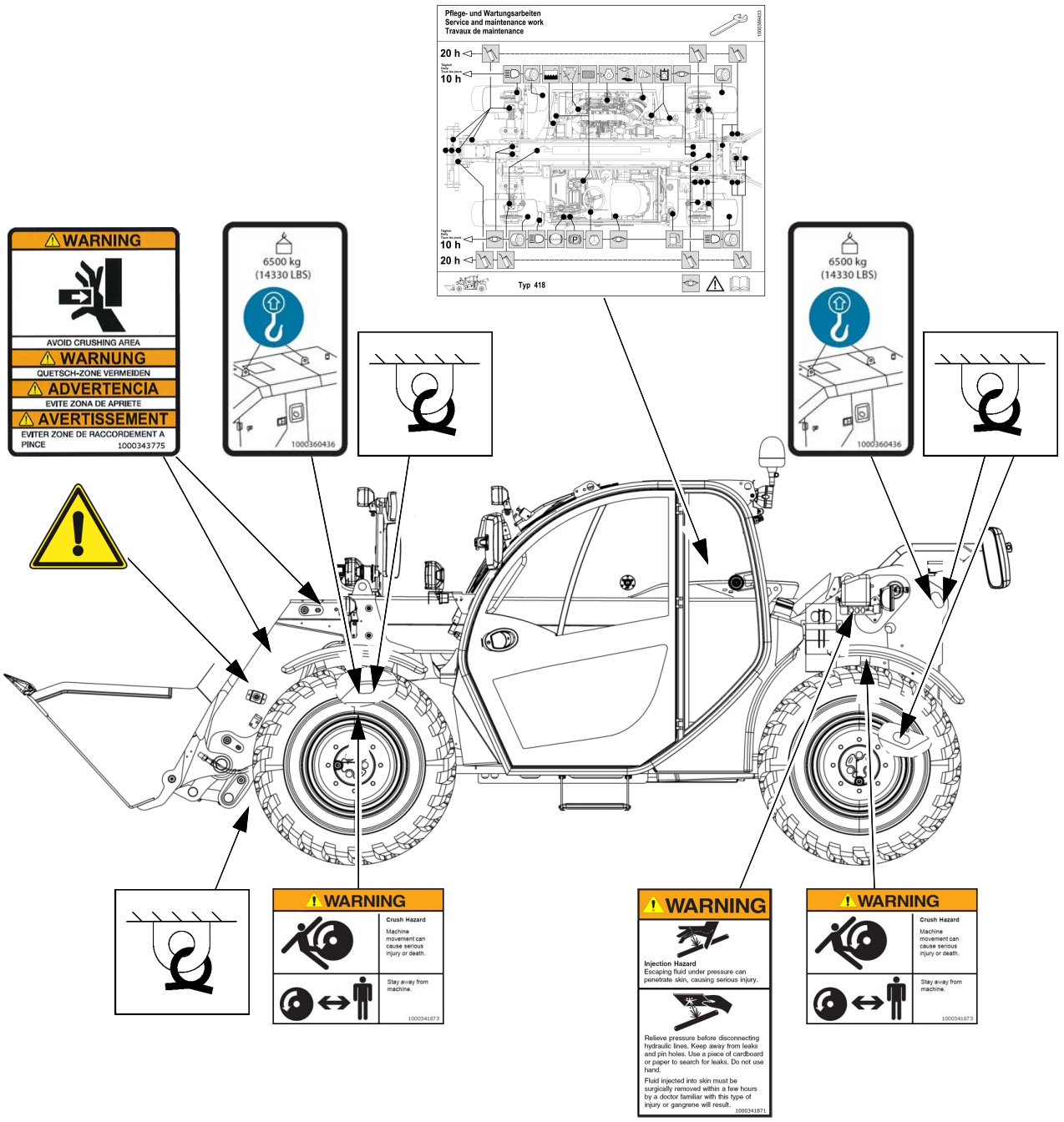


Fig. 7

Outside right of the vehicle

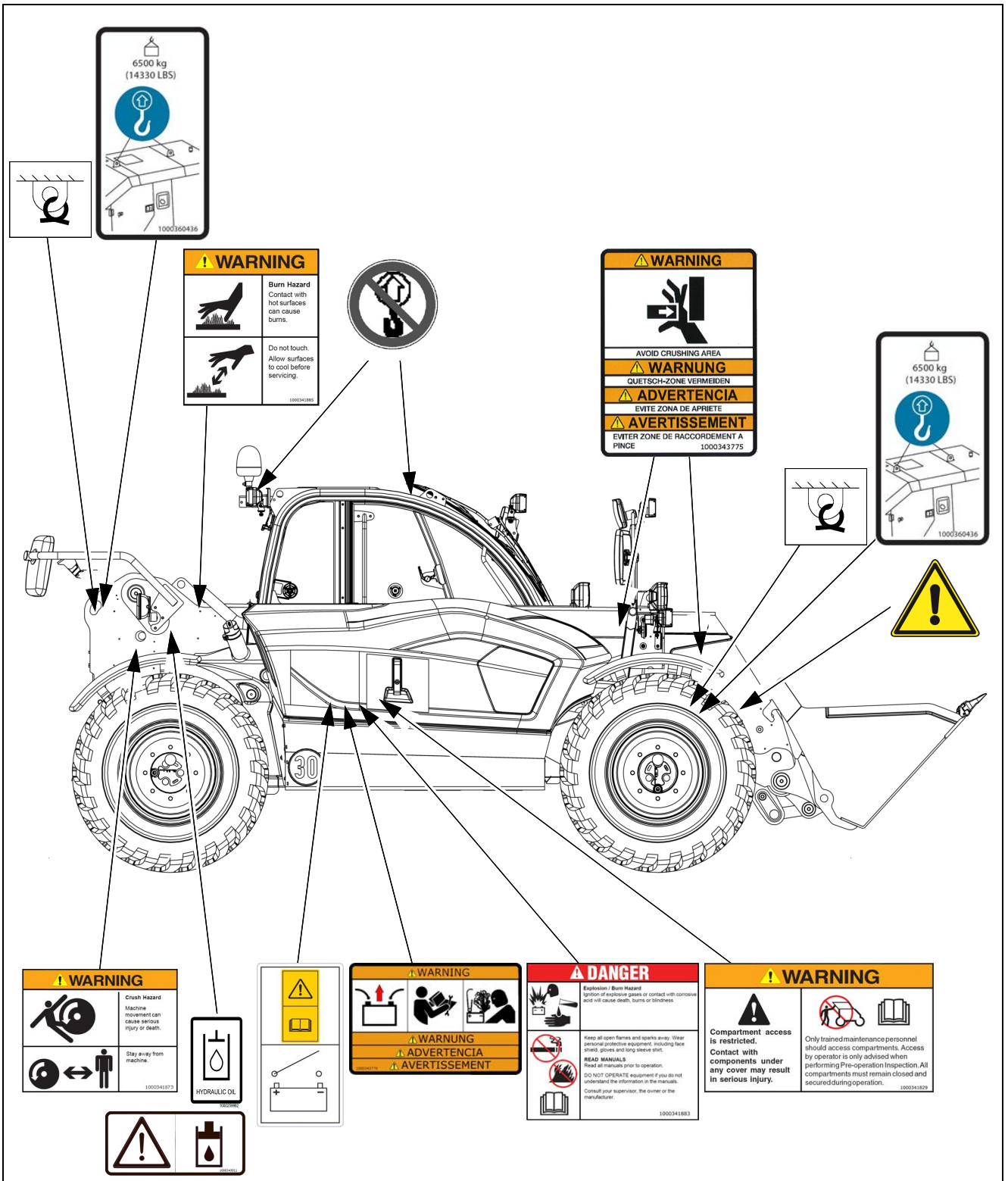


Fig. 8

Inside the cabin

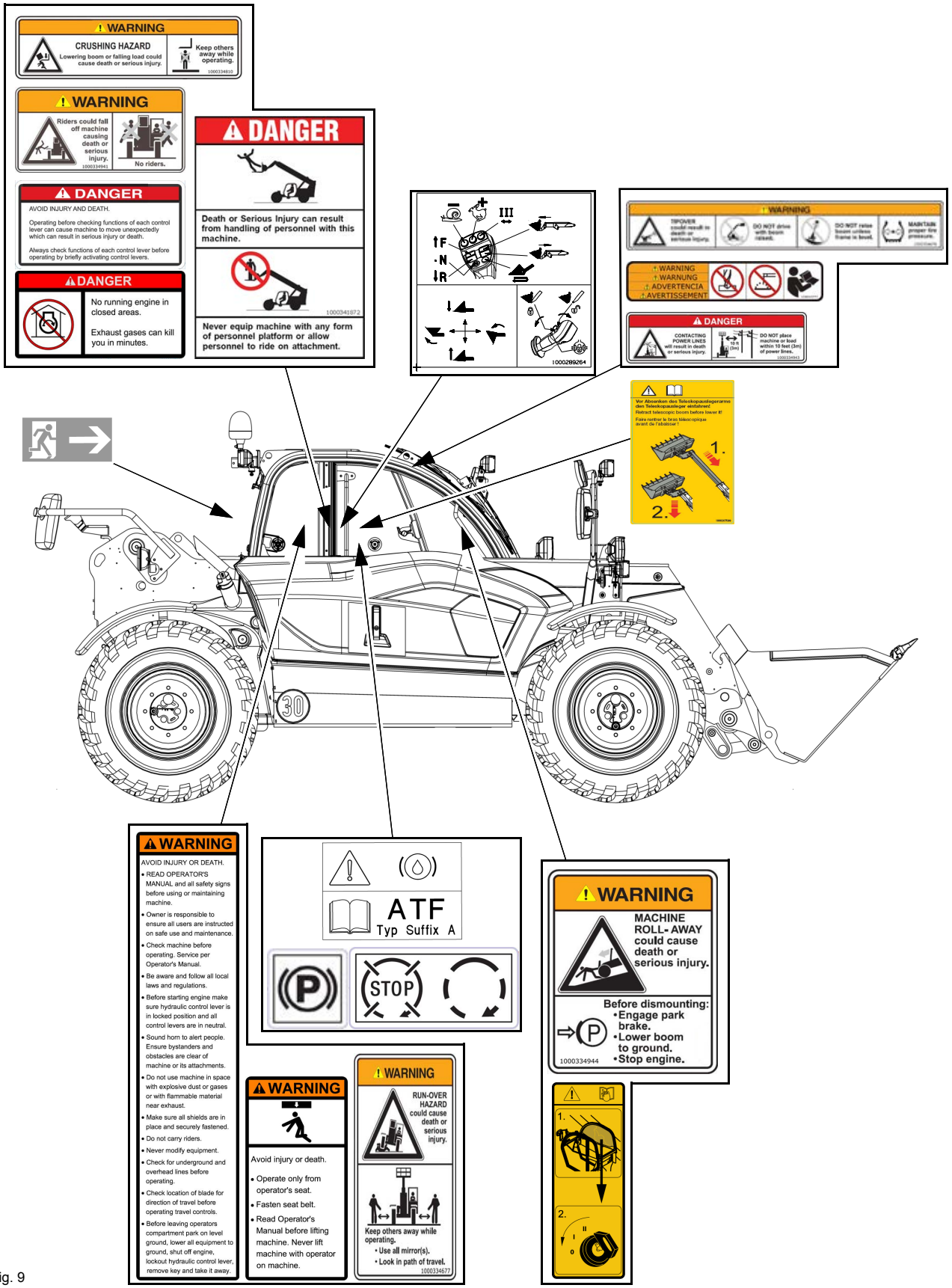


Fig. 9

Engine compartment interior

Fig. 10

Outside front of the vehicle

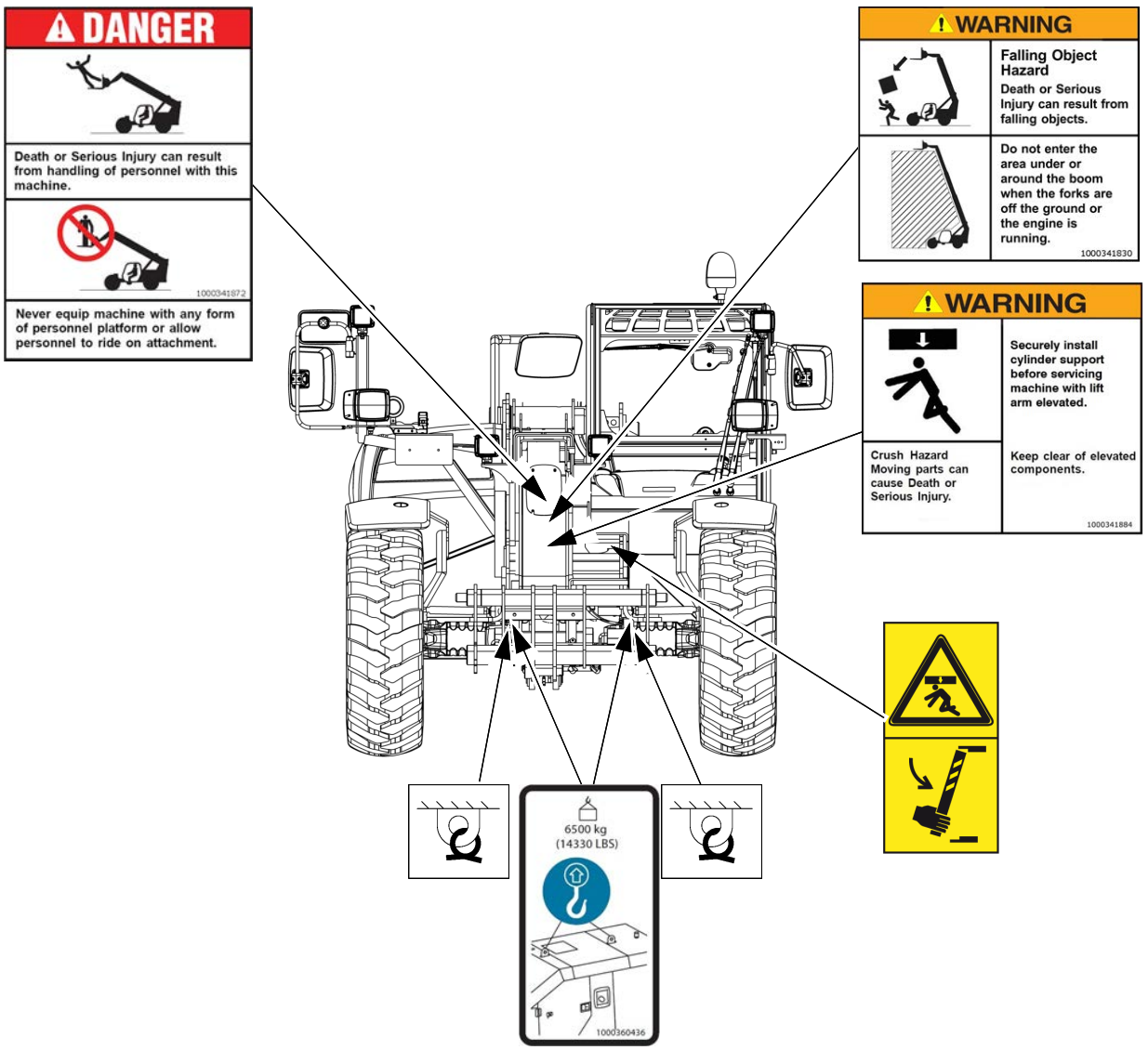


Fig. 11

Outside rear of the vehicle

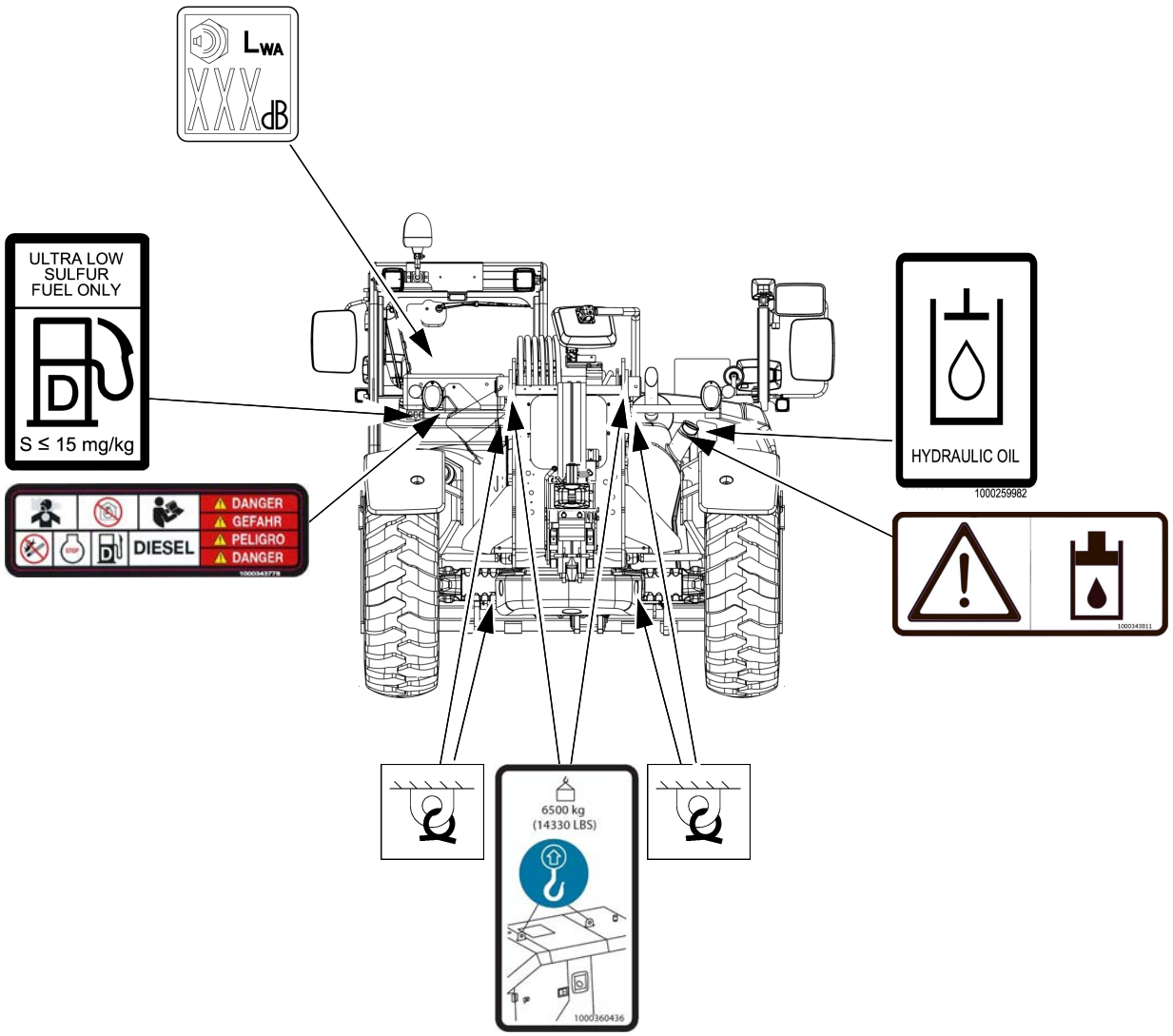


Fig. 12

Type labels

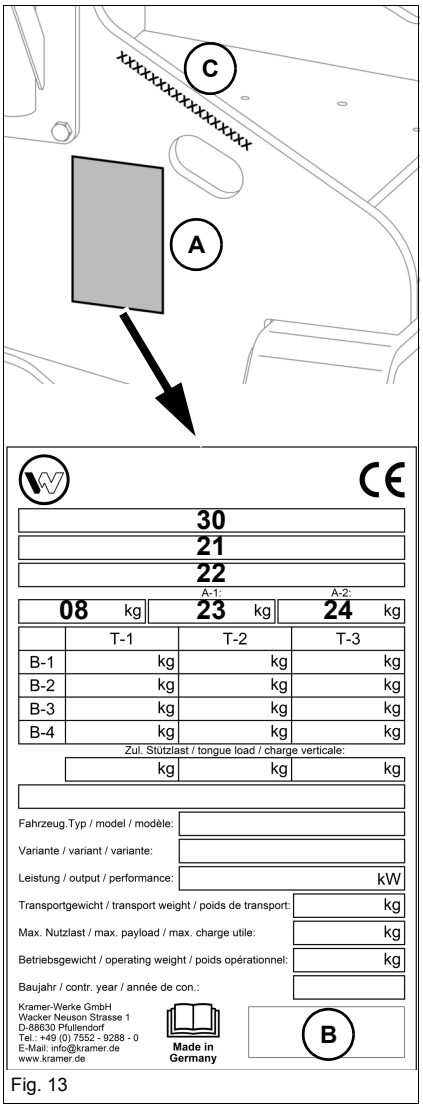


Fig. 13

Vehicle

The type label **A** is attached to the front right on the vehicle frame.

The **CE** mark on the type label means that the vehicle meets the requirements of the Machinery Directive 2006/42 EC within the European Community and that the conformity procedure has been performed.

The vehicle can also be identified via the bar code **B** shown on the type label and via the stamped identification number **C** in the vehicle frame *– see "Identification number (serial number)" on page 3-38*.

Example for reading: standard maker's plate (part 1)

Item	Description	Entry
30	Vehicle category[1]	T1a
21	EU type approval number[1]	
22	Identification number (machine chassis number)	*WNK41812xxxxx0015*
08	Maximum permissible weight (kg)	7500 kg (16,534.7 lb)
23	Front axle weight rating (kg)	4480 kg (9876.7 lb)
24	Rear gross axle weight rating (kg)	4480 kg (9876.7 lb)
B-1	Gross unbraked trailer weight rating	
	T-1 drawbar trailer (kg)	
	T-2 rigid drawbar trailer (kg)	
	T-3 trailer central axle (kg)	
B-2	Gross braked trailer weight rating	
	T-1 drawbar trailer (kg)	
	T-2 rigid drawbar trailer (kg)	
	T-3 trailer central axle (kg)	
B-3	Permissible trailer weight (hydraulically braked)	
	T-1 drawbar trailer (kg)	
	T-2 rigid drawbar trailer (kg)	
	T-3 trailer central axle (kg)	
B-4	Permissible trailer weight (pneumatically braked)	
	T-1 drawbar trailer (kg)	
	T-2 rigid drawbar trailer (kg)	
	T-3 trailer central axle (kg)	

1. Only for EU tractor approval

Example for reading: standard maker's plate (part 2)

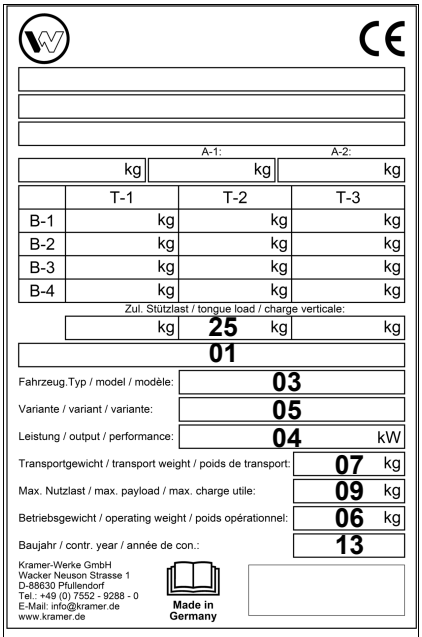


Fig. 14

Item	Description	Entry
25	Permissible drawbar load[1]	
01	Machine designation	TELESCOPIC LOADER or TRACTOR
03	Machine model	418
05	Variant	418-12
04	Output (kW)	55.4 kW (74 hp)
07	Transport weight (kg)	
09	Maximum payload (kg)	
06	Gross operating weight (kg)	
13	Year of construction	2018

1. Under consideration and observance of the permissible gross axle weight ratings as well as the permissible gross weight rating.

Information

The identification number (serial number) shown in line 22 is an example serial number

– see "Identification number (serial number)" on page 3-38.

Reading example: Italy type label

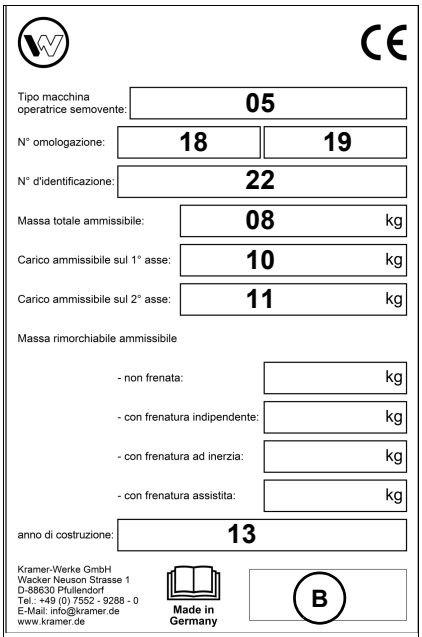


Fig. 15

Item	Description	Entry
05	Machine model/loading system version	418-12
18	Approval number/version	LL/Pxxxxx
19	Sequential order number	xxxxx
22	Identification number (machine chassis number)	*WNK41812xxxxx0015*
08	Maximum permissible weight (kg)	
10	Front axle weight rating (kg)	
11	Rear gross axle weight rating (kg)	
13	Year of construction	2018

Information

The identification number (serial number) shown in line 22 is an example

– see "Identification number (serial number)" on page 3-38.

Identification number (serial number)

The identification number **A** is stamped on the front right in the vehicle frame. It is also located on the type label.

The identification number (serial number) shown is just an example.

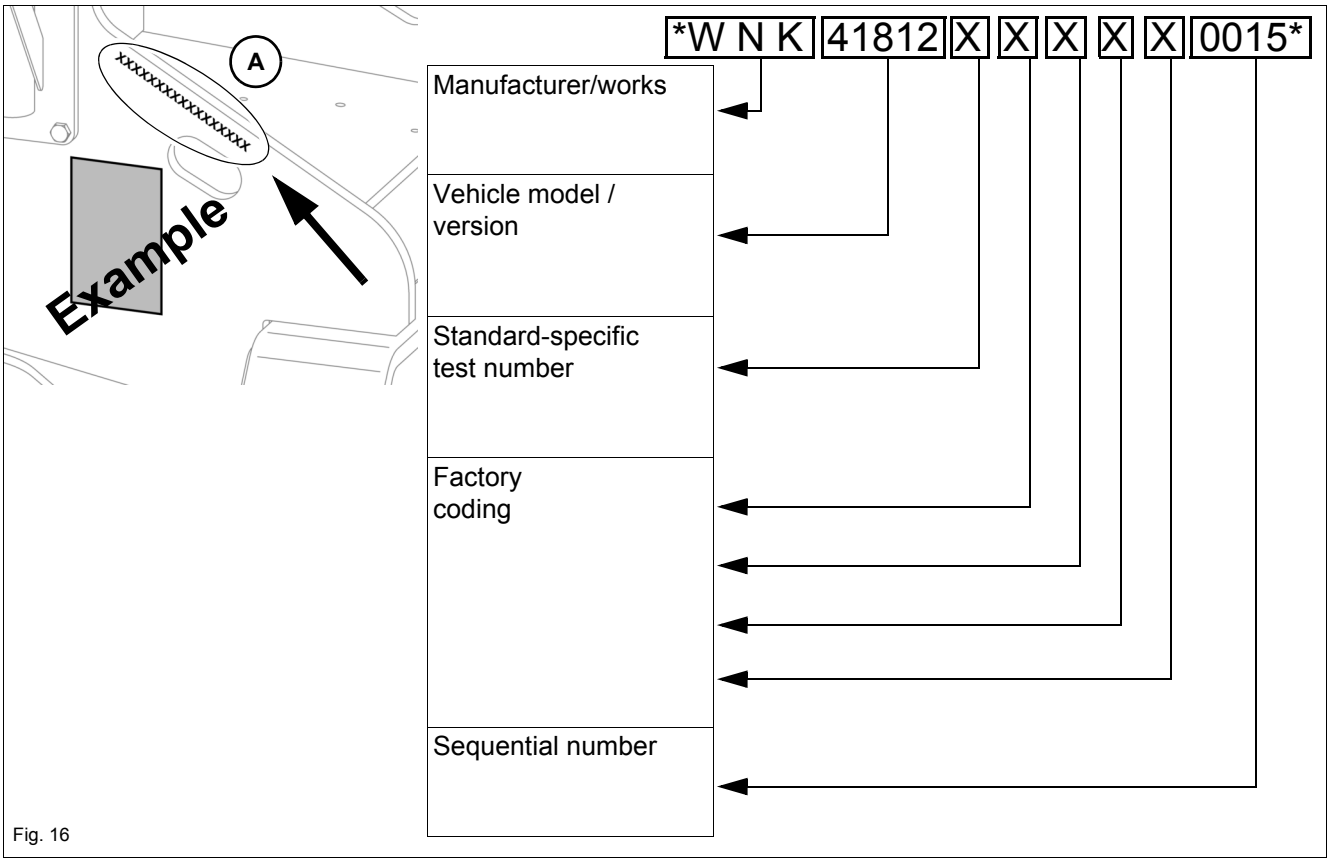


Fig. 16

Fig. 17

Cabin number

The nameplate (arrow) is located in the cabin at the bottom left on the B-bar.

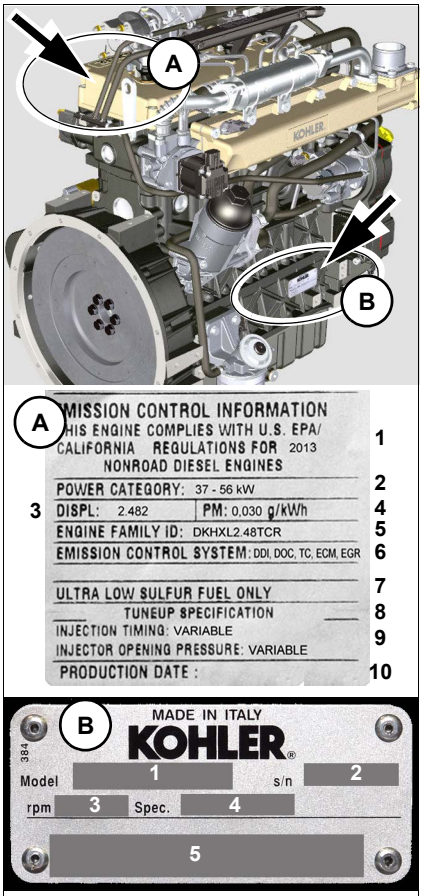


Fig. 18

Engine number

The engine number is fixed to the nameplate on the valve cover – engine (arrow) and on the side of the engine block (arrow).

Reading example: Information on the nameplate (A)

1. Reference year for compliance with standards
2. Output kW (hp)
3. Displacement of the engine (L)
4. Entry of particulate emission (g/kWh)
5. Serial number (engine family)
6. Emission Control System = ECS
7. Fuel with low sulfur content
8. Specification of the fuel injection timing (*PPMS)
9. Pressure opening injection valve (bar)
10. Date of manufacture

Reading example: Information on the nameplate (B)

1. Engine model
2. Serial number
3. Max. rpm per minute
4. Motor design
5. Approval data and "CE" guidelines

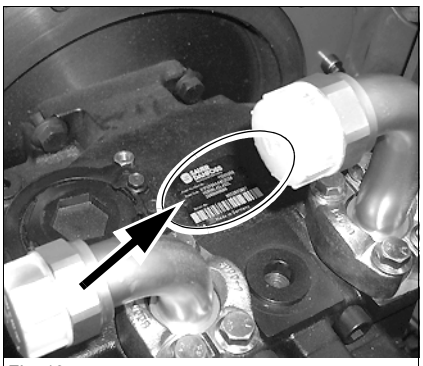


Fig. 19

Number of the drive variable displacement pump

The type label (arrow) is located on the variable displacement pump housing (flanged on the diesel engine).

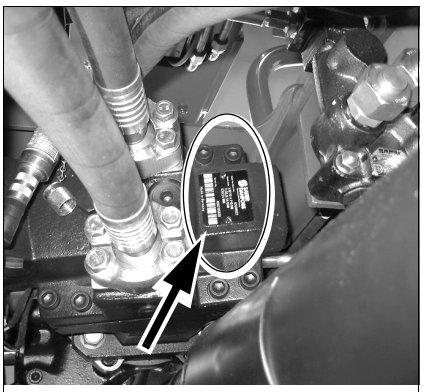


Fig. 20

Variable displacement motor number

Seen on lower side of machine.

The type label (arrow) is located on the variable displacement motor housing (flanged on the transfer gearbox).

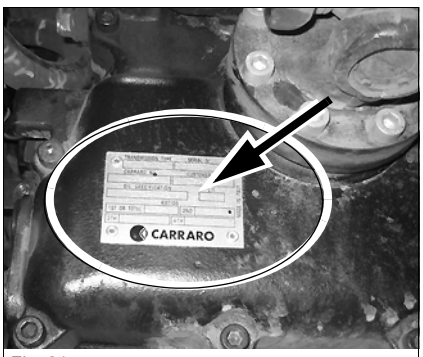


Fig. 21

Transmission number

Seen on lower side of machine

The type label (arrow) is located on the gearbox housing, flanged on the front axle.

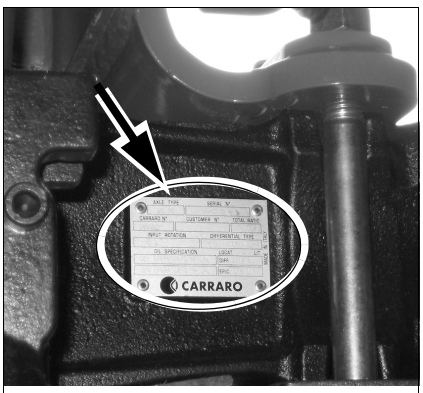


Fig. 22

Front and rear axle numbers

Seen on lower side of machine

The type label (arrow) is located on the axle carrier.

➥ Rear axle, on the left in travel direction

➥ Front axle, on the right in travel direction

Symbols

Fig. 23

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

Description of warning and notice signs (Europe)

WARNING

Injury hazard due to missing or damaged labels!

A missing, incomplete or poor indication of danger can cause serious injury or death.

- ► Never remove warning and information labels.
- ► Immediately replace damaged warning and notice signs with new ones.

Fig. 24

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.

Located on the cabin roof (4x).

Fig. 25

Warning label: General indication of danger

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

Located at front left and right of vehicle frame, and at rear of machine.

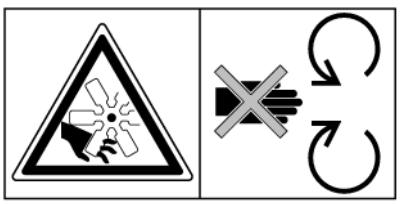


Fig. 26

Warning label: Shearing hazard

Caution! Do not touch any turning parts!

Perform inspections and maintenance only at diesel engine standstill!

Located in the area of the engine cooling (V-belt guard).

Fig. 27

Warning label: loader unit lift cylinder prop

Caution! Install the prop before performing maintenance on the loader unit!

Located on the prop.

Fig. 28

Warning label: Read the operator's manual

Caution! Read and understand this operator's manual before commissioning the vehicle and before servicing or repairing it.

Located on the pillar on the right inside the cabin.

Fig. 29

Warning label: Remove the ignition key

Caution! Remove ignition key before performing inspections and maintenance on the machine.

- Read the service manual before performing maintenance.
- Repair work may be performed by an authorized workshop only.

Located on the pillar on the right inside the cabin.

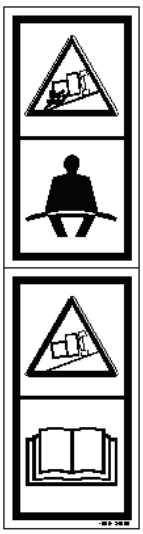


Fig. 30

Warning label: Seat belt and vehicle 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. 31

Warning label: No transport of persons

Warning! Lifting or transporting persons on the machine, in the bucket or on the pallet forks is prohibited.

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

Fig. 32

Warning label: risk of scalding

Caution! Do not touch.

- Wear protective gloves and clothing during maintenance

Located next to the exhaust silencer.

Fig. 33

Warning label: Reservoir under pressure, burn hazard

Caution! Do not open, 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

Located in the engine compartment next to the radiator (coolant)

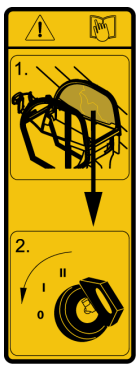


Fig. 34

Warning label: Danger in case of broken window on the right

In order to avoid a crushing or accident hazard, stop the machine immediately if the window on the right is broken!

1. Stop the engine and remove the starting key.
2. Apply the parking brake.
3. Have the side window replaced by an authorized service center.

Located in the cabin near the ignition lock.

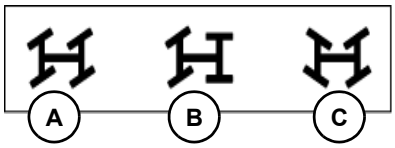


Fig. 35

Notice sign: Steering mode

A Diagonal steering
B Front axle steering
C 4 wheel steering

Located next to the steering mode joystick.

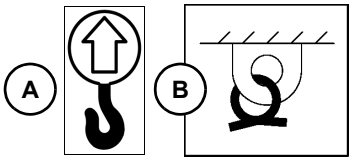


Fig. 36

Label: slinging points for loading and tying down the machine

A Slinging points for crane-lifting
B Slinging points for tying down the machine for transport

Fixed left and right on the vehicle frame in front and the rear.

Fig. 37

Notice sign: Maximum machine speed label

20 km/h (12.4 mph) standard / 30 km/h (18.6 mph) high speed (option).

Fixed on the rear, rear window and left / right on the vehicle side.

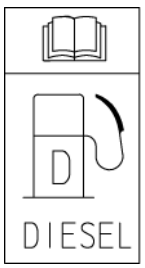


Fig. 38

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)!

Fixed behind the cabin on the left near the filler neck of the fuel tank.

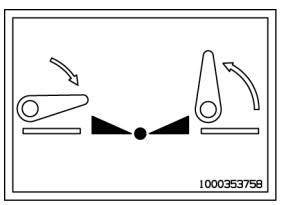


Fig. 39

Notice sign: the operator's controls of the joystick three-point suspension (optional)

Operation *– see chapter 5 " Three-point mount - power lift (optional)" on page 5-143*

Fixed on the right on the joystick console.

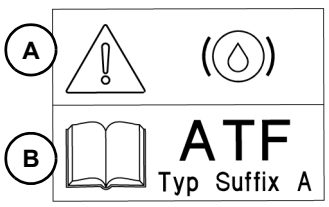


Fig. 40

Brake fluid label

The label contains important information concerning the brake fluid *– see chapter 7 " Overview of lubricants" on page 7-13*.

A = Caution! Do not add any water!

B = only **ATF Suffix A brake fluids** may be used.

Attached near the brake fluid reservoir.

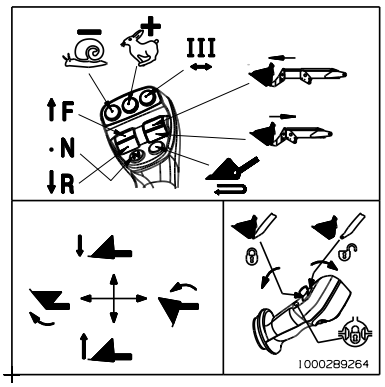


Fig. 41

Label: control elements joystick design A

Operation – *see chapter 5 " Joystick (joystick)" on page 5-42*

Located on the right on the side window.

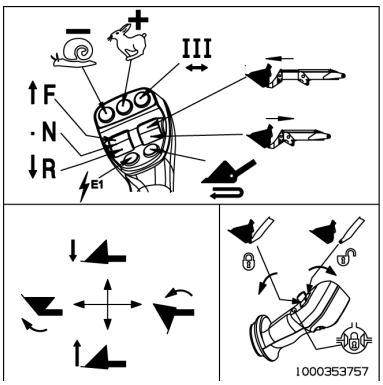


Fig. 42

Label: control elements joystick design B

Operation – *see chapter 5 " Joystick (joystick)" on page 5-42*

Located on the right on the side window.

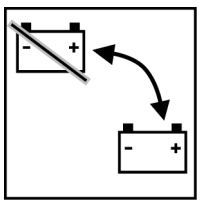


Fig. 43

Battery master switch label

In order to avoid a malfunction in the electronic engine control, the battery main switch may not be immediately unscrewed from the ratchet mechanism after shutting off the engine!

Fixed in the engine compartment near the battery main switch – *see chapter 4 " Battery master switch" on page 4-22*.

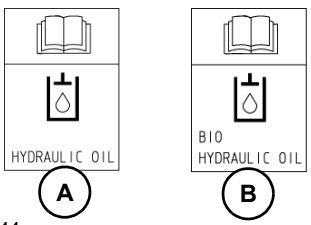


Fig. 44

Information label: Filler opening for hydraulic oil

A Hydraulic oil

B Biodegradable hydraulic oil

Located next to the filler opening (hydraulic oil reservoir)

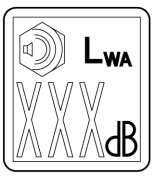


Fig. 45

Noise level label

Noise levels produced by the machine.

LWa = sound power level

Other information – *see chapter 9 " Noise emissions" on page 9-15*

Located on the rear window.

Fig. 46

Information label: Emergency exit

Indicates the emergency exit in case of an emergency!

Located on the rear window.

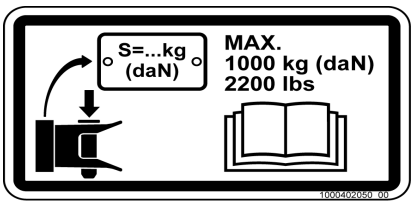


Fig. 47

Label: drawbar load (option)

Indicates the maximum drawbar load of 1000 kg (2204.6 lb.) of the vehicle!

Drawbar load of the ball hitch *– see chapter 9 " Trailer weight" on page 9-17*.

Fixed on the vehicle rear next to the ball hitch.

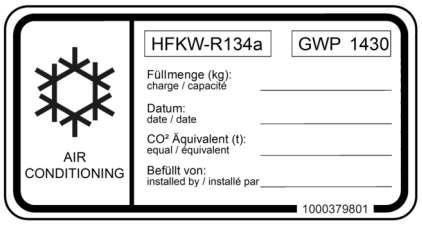


Fig. 48

Notice sign for air-conditioning system refill (option)

Use only the refrigerants for refilling the air-conditioning that are indicated on the label.

Located inside the cabin.

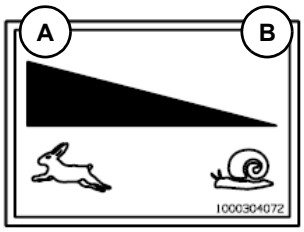


Fig. 49

Label: low-speed control (option)

A = maximum speed

B = standstill

Fixed near the joystick, right in the cabin *– see chapter 5 " Low-speed control (option)" on page 5-19*.

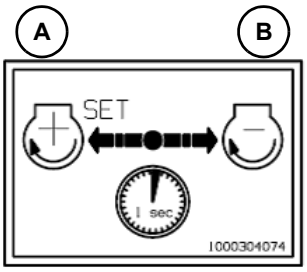


Fig. 50

Label: manual throttle (option)

A = Increase the engine speed

B = Reduce the engine speed

Fixed near the joystick, right in the cabin *– see chapter 5 " Manual throttle (option)" on page 5-8*.

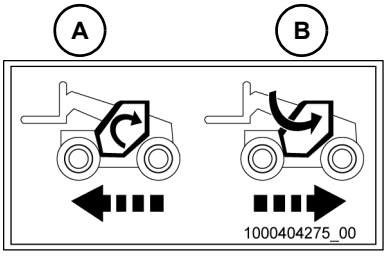


Fig. 51

Label: Fresh air/recirculated air circuit (for air-conditioning system option)

A = Recirculated air mode

B = Fresh air mode

Attached to the upper right of the accelerator pedal *– see chapter 5 " Fresh air/recirculated air circuit (for air-conditioning system option)" on page 5-36*

Description of warning and notice signs (USA / Australia)

Fig. 52

Hazardous sign: Explosive gases

Ignition of explosive gases or contact with corrosive acid will cause death, burns or blindness.

- ► Keep sparks and unprotected lights away.
- ► Wear protective equipment, including face shield, gloves and long sleeve shirt.
- ► Read the operator's manual.
- ► Do not operate the vehicle if you do not understand the information in the manuals.
- ► Consult your supervisor, the owner or the manufacturer.

Affixed: near the hood latch outside.

Fig. 53

Hazardous sign: Carrying passengers

Death or serious Injury can result from handling of personnel with this machine.

- ► Lifting or transporting persons on the machine, in the bucket or on the pallet forks is prohibited.
- ► No personal platforms, regardless of the type, may be attached to the vehicle.

Affixed: front on the loader unit and in the cabin on the right side window

Fig. 54

Hazardous sign: diesel fuel

Danger of suffocation from exhaust fumes of the diesel fuel in poorly ventilated spaces.

- ► Ensure good ventilation in rooms, stables, warehouses, etc.
- ► Stop the engine when the machine is not use.

Risk of scaling from diesel fuel vapors resulting during refueling. These vapors are easily flammable.

- ► Refuel only outdoors if possible.
- ► Avoid unprotected light (flames) and sparks when refueling.
- ► Using mobile phones can cause sparks that can be enough to ignite fuel vapors.

Affixed: to the diesel tank.

Fig. 55

Danger sign: joystick functions

Danger of injury when taking the vehicle into service without checking the functions of the individual joysticks previously. This may lead to sudden vehicle movements as well as severe injuries or death.

► Before taking the vehicle into service, always check the functions of the individual joysticks with a brief actuation.

Affixed in the cabin on the window on the right.

Fig. 56

Danger sign: running engine

► No running engine in closed areas.

► Exhaust gas can kill you in minutes.

Affixed in the cabin on the window on the right.

Fig. 57

Danger sign: Electrical open wires

Contacting power lines will result in death or serious injury.

► Do not place machine or load within 10 feet (3 m) of power lines.

Affixed: in the cabin on top.

Fig. 58

Warning sign: danger of crushing

Body parts may be crushed or cut off in the area between the inner tube and outer tube on the loader unit and in the area of the support of attachments.

- ► Immediately stop all work movements as soon as a person enters these areas.
- ► Seal off the job site so that unauthorized persons cannot enter these areas.

Affixed on the inner and outer tube of the loader unit (2x left; 2x right).

Fig. 59

Warning label: vehicle moving

Crushing hazard! Uncontrolled machine movements can cause serious injury or death.

- ► Immediately stop all work movements as soon as a person enters these areas.

Affixed near the wheels (4x).

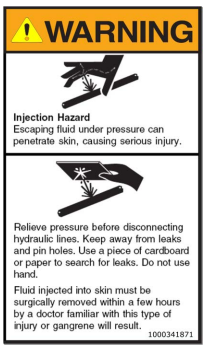


Fig. 60

Warning label: High pressure in the hydraulic lines

Hydraulic oil escaping under pressure can penetrate the skin and cause serious injuries.

- ► Relieve pressure before disconnecting hydraulic lines. Keep your distance from leaks.
- ► Do not search for leaks with your hand.
- ► Liquid penetrating into the skin must be treated by a doctor within a few hours (risk of gangrene).

Affixed at the rear left and right on the vehicle rear.

Fig. 61

Warning label: Burn hazard! Hot surfaces

Contact with hot surfaces can cause burns.

- ► Do not touch.
- ► Allow the surfaces to cool down before performing maintenance.

Affixed: on the right rear of the vehicle (near the exhaust muffler) and in the engine compartment on the air filter.

Fig. 62

Warning sign: Vapors of battery acid and danger of explosion

The battery is filled with diluted sulfuric acid (battery acid) and may form highly corrosive acidic vapors when opening the sealing push-in cap.

Battery acid can cause serious burns.

- ► Wear protective clothing when working with batteries.
- ► Immediately remove soiled, wet clothes.
- ► Always seek medical attention in case of accidents with battery acid.
- ► Rinse the affected area with plenty of water after contact with the skin.
- ► In case of contact with the eyes, rinse the affected eye several minutes with plenty of water.
- ► If swallowed, drink plenty of water. Do not induce vomiting.

WARNING: danger of explosion!

The battery acid reacts with the surrounding metals and produces hydrogen. There is a **danger of explosion**!

- ► Keep metal objects away from the battery terminals.
- ► Attach protective cover to the positive terminal of the battery
- ► Install and remove, jump-start and perform maintenance on the battery only in well-ventilated premises or outdoors.
- ► Avoid unprotected light (flames) and sparks.

Affixed: near the hood latch outside.

Fig. 63

Warning label: Opened elements

Danger of injury from restricted access to engine compartment, storage compartments and contact with components under a cover.

- ► Only trained maintenance personnel should access compartments.
- ► Access by operator is only advised when performing pre-operation Inspection.
- ► All compartments must remain closed and secured during operation.

Affixed: near the hood latch outside.

Fig. 64

Warning sign: contact with hydraulic oil

Damaging to health! Hydraulic oil can be harmful to health. Contact with the skin and eyes can cause irritations. Swallowing can cause intoxication. It does not cause irreversible damage.

- ► Wear protective clothing when handling hydraulic oil.
- ► Always seek medical attention in case of accidents with hydraulic oil.
- ► Rinse the affected area with plenty of water after contact with the skin.
- ► In case of contact with the eyes, rinse the affected eye with plenty of water.
- ► If swallowed, do not induce vomiting and give plenty of water to drink.

Caution! The hydraulic oil in the hydraulic oil tank can be very hot.

Burn hazard!

- ► Wear protective clothing when handling hydraulic oil.
- ► Allow the hydraulic oil to cool down.
- ► Do not open the hydraulic oil reservoir immediately after stopping the engine.

Affixed: near the filler neck of the hydraulic oil tank on the right.

Fig. 65

Warning label: General indication of danger

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

Located at front left and right of vehicle frame, and at rear of machine.

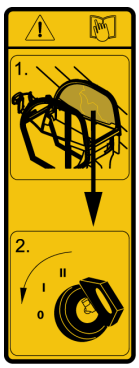


Fig. 66

Warning label: Danger in case of broken window on the right

In order to avoid danger of crushing or accidents, stop the machine immediately if the right-hand window is broken!

1. Stop the engine and remove the starting key.
2. Apply the parking brake.
3. Have the side window replaced by an authorized service center.

Located in the cabin near the ignition lock.

Fig. 67

Warning label: loader unit lift cylinder prop

Caution! Install the prop before performing maintenance work on the loader unit *– see chapter 7 " Safety prop for telescopic boom" on page 7-3*!

Affixed on the safety prop in the vehicle frame on the front.

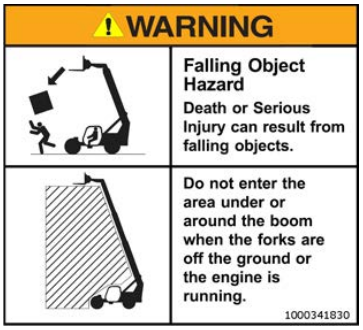


Fig. 68

Warning sign: Falling objects

Falling objects can cause serious injury or death.

► All persons must stay clear of the danger zone of the telehandler.

► Immediately stop work if people enter the danger area

Affixed: on the loader unit.

Fig. 69

Warning sign: with raised loads

Crushing hazard! Moving parts can cause serious injury or death.

► Securely install cylinder support before servicing machine with lift arm elevated.

► Keep away from elevated components.

Affixed: on the loader unit

Fig. 70

Warning sign: Suspended loads

Crushing hazard! Lowering the loader unit or a falling load could cause death or serious injuries.

► All persons must stay clear of the danger zone of the telehandler.

► Immediately stop work if people enter the danger area

► Keep other persons away during operation.

Affixed in the cabin on the window on the right.

Fig. 71

Warning sign: Electric current

Danger from high voltage, which can cause serious injury or death.

► Read and understand the Operator's Manual.

► Be careful when working with a pre-heating system and the power supply.

Affixed: in the engine compartment on the air filter

Fig. 72

Warning sign: Accompanying persons

Accompanying persons (riders) could fall off machine

causing death or serious injury.

► Lifting or transporting persons on the machine, in the bucket or on the pallet forks is prohibited.

Affixed in the cabin on the window on the right.

Fig. 73

Warning sign: Lowering the loader unit

If the loader unit is lowered with the telescopic arm extended in manual mode, the safe workload may be exceeded. This can cause the machine to tip forward!

► Retract the telescopic boom first and then lower it.

► Observe the overload warning display.

Affixed in the cabin on the window on the right.

Fig. 74

Warning sign: Do not modify the machine

The cabin complies with the requirements of the category 1 roll-over protective structure/FOPS control procedures. The cabin only offers a protective function if the machine has not been modified, changed, transformed or converted.

There is a crushing and accident hazard.

► No welding, drilling, bending on the protective ROPS/FOPS structure

► A damaged protective structure must be checked and maintained by an authorized service center for its protective function.

Affixed: in the cabin on top.

Fig. 75

Warning sign: Safe operation of the vehicle

If the vehicle is not operated correctly, this may lead to the vehicle tipping over and to serious injuries or death.

► Do not move loads with a raised loader unit and extended leveling jack.

► Only lift loads on solid horizontal ground.

► Maintain proper tire pressure.

Affixed: in the cabin on top.

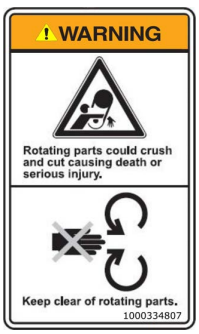


Fig. 76

Warning sign: Rotating parts

Rotating parts could crush and cut causing death or serious injury.

► Keep away from rotating parts.

Affixed: in the engine compartment on the air filter

Fig. 77

Warning sign: Apply the hand brake

A machine rolling away under its own weight can cause serious injury or death.

Before leaving the machine:

► Apply the parking brake.

► Lower the loader unit to the ground.

► Stop the engine and remove the starting key.

Affixed: on the pillar on the front right of the cabin

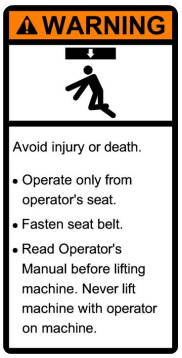


Fig. 78

Warning sign: Operate the machine only from the operator's seat

In order to avoid injury or death:

► Operate the machine only from the operator seat.

► Fasten your seat belt.

► Read the Operator’s Manual before lifting the machine.

Affixed: on the central pillar on the right in the cabin

Fig. 79

Warning sign: Keep a minimum safety distance

Rollover hazard can cause serious injury or death.

► All persons must stay clear of the danger zone of the telehandler.

► Immediately stop work if people enter the danger area

► Keep other persons away during operation.

► Use all rearview mirrors.

Affixed: on the central pillar on the right in the cabin.

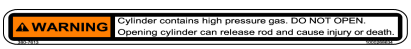


Fig. 80

Warning sign: Gas compression spring under pressure

WARNING! Cylinder contains high pressure gas.

► Do not open.

► Opening cylinder can release rod and cause injury or death.

Affixed: in the engine compartment on the air filter

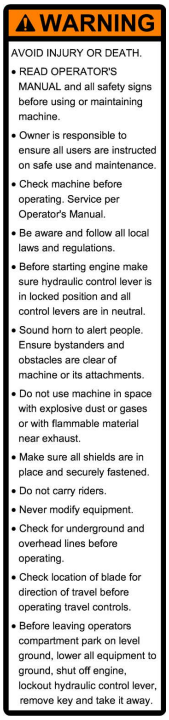


Fig. 81

Warning sign: Read and observe the operator's manual

In order to avoid injury or death:

1. Read Operator's Manual and all safety signs before using or maintaining machine.
2. Owner is responsible to ensure all users are instructed on safe use and maintenance.
3. Check machine before operating. Service per Operator's Manual.
4. Be aware and follow all local laws and regulations.
5. Before starting engine, ensure that the work hydraulics is in a locked position and all joysticks are in the neutral position.
6. Sound horn to alert people.
7. Ensure bystanders and obstacles are clear of machine or its attachments.
8. Do not use machine in space with explosive dust or gases or with flammable material near exhaust.
9. Make sure all shields are in place and securely fastened.
10. Do not convey any people.
11. Never modify equipment.
12. Check for underground and overhead lines before taking the vehicle into service.
13. Check the position of the attachment for travel direction before operating the drive system.
14. Before leaving cabin, park the vehicle on level ground, lower all equipment to ground, shut off engine, lock the work hydraulics, remove the key.

Affixed: on the central pillar on the right in the cabin.

Fig. 82

Warning sign: Opening the sealing push-in cap of the coolant reservoir

► **Burn hazard!** Never loosen or open reservoir cap when fluid is hot and under pressure.

► Always allow to cool before opening.

Affixed: in the engine compartment on the air filter

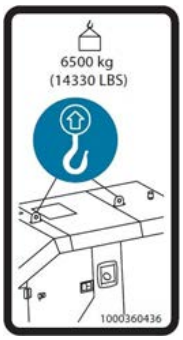


Fig. 83

Notice sign: lifting eyes

These labels identify the lifting eyes with which the machine can be safely lifted and loaded by crane without any damage.

► Take into account the vehicle's gross weight rating – *see chapter 9 " Weight" on page 9-16*.

► Each load hook used for lifting the machine must be designed for at least 1/4 of the operating weight.

Affixed 2x on the vehicle rear and 2x at the vehicle front

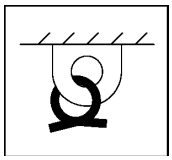


Fig. 84

Notice sign: slinging points for tying down the machine

Slinging points for tying down the machine for transport

Fixed left and right on the vehicle frame in front and the rear.

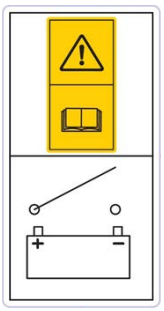


Fig. 85

Notice sign: Battery isolator switch

The battery isolator switch disconnects the entire power supply from the battery, such as:

- In case of an accident with the machine, the battery can be disconnected immediately (emergency-stop switch).
- For the protection of the maintenance personnel during maintenance (protection against unintentional machine start).
- As an immobilizer when parking the machine overnight (anti-theft protection).

In order to avoid a malfunction in the electronic engine control, the battery main switch may not be immediately unscrewed from the ratchet mechanism after shutting off the engine!

Fixed in the engine compartment near the battery main switch *– see chapter 4 " Battery master switch" on page 4-22*.

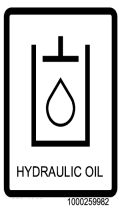


Fig. 86

Information label: Filler opening for hydraulic oil

Add only hydraulic oil complying with the specifications in chapter *– see chapter 7 " Overview of lubricants" on page 7-13*.

The hydraulic oil level is shown in the oil sight glass *– see chapter 7 " Check the hydraulic oil level" on page 7-56*.

Affixed: near the filler neck of the hydraulic oil tank on the right.

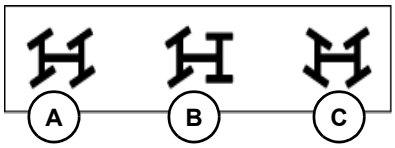


Fig. 87

Notice sign: changing the steering mode

A Diagonal steering
B Front axle steering
C 4 wheel steering

Located next to the steering mode joystick.

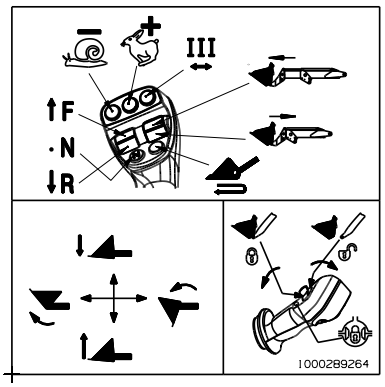


Fig. 88

Label: control elements design A

Operation – *see chapter 5 " Joystick (joystick)" on page 5-42*

Located on the right on the side window.

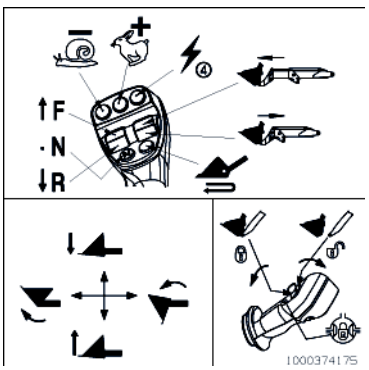


Fig. 89

Label: control elements joystick design USA

Operation – *see chapter 5 " Joystick (joystick)" on page 5-42*

Located on the right on the side window.

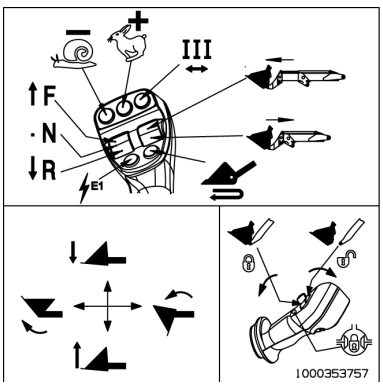


Fig. 90

Label: control elements design B

Operation – *see chapter 5 " Joystick (joystick)" on page 5-42*

Located on the right on the side window.

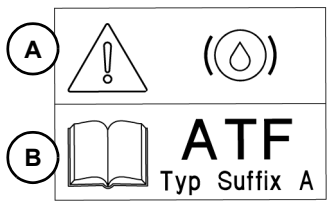


Fig. 91

Brake fluid label

The label contains important information concerning the brake fluid *– see chapter 7 " Overview of lubricants" on page 7-13*.

A = Caution! Do not add any water!

B = only **ATF Suffix A brake fluids** may be used.

Attached near the brake fluid reservoir.

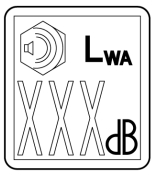


Fig. 92

Noise level label

Noise levels produced by the machine.

LWa = sound power level

Other information *– see chapter 9 " Noise emissions" on page 9-15*

Located on the rear window.

Fig. 93

Notice sign: low sulfur content of the diesel fuel

The label indicates that the machine may only be refueled with diesel fuel with a sulfur content of 15 mg/kg (US UNITS) or less.

Affixed near the filler neck of the fuel tank.

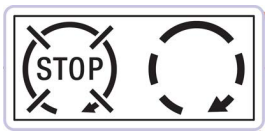


Fig. 94

Notice sign: Shut off the engine

The engine is started by turning the starting key to the right. The engine stops if the ignition switch key is turned to the left with the engine running *– see chapter 4 " Starting the engine" on page 4-60*.

Affixed in the cabin on the ignition lock.

Fig. 95

Notice sign: Apply the hand brake

A starting interlock prevents the machine from starting with the parking brake applied.
When the parking brake is engaged, the travel direction selection (drive system forwards / reverse operation) is automatically canceled and put into the neutral position *– see chapter 5 " Parking brake (hand brake)" on page 5-12*

Affixed in the cabin to the left near the hand brake lever.

Fig. 96

Notice sign: Emergency exit!

Indicates the emergency exit in case of an emergency!

Located on the rear window.

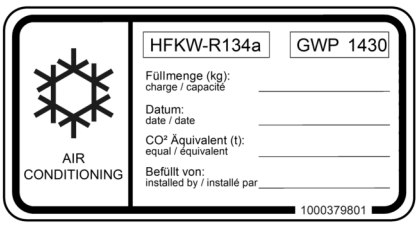


Fig. 97

Notice sign 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.

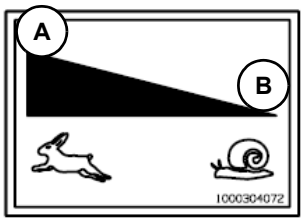


Fig. 98

Label: low-speed control (option)

A = maximum speed

B = standstill

Fixed near the joystick, right in the cabin *– see chapter 5 " Low-speed control (option)" on page 5-19*.

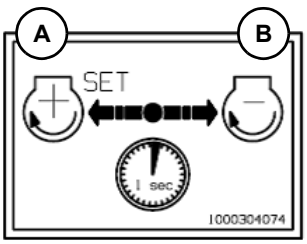


Fig. 99

Label: manual throttle (option)

A = Increase the engine speed

B = Reduce the engine speed

Fixed near the joystick, right in the cabin *– see chapter 5 " Manual throttle (option)" on page 5-8*.

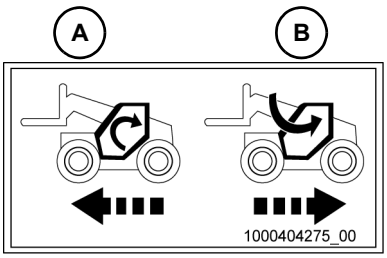


Fig. 100

Label: Fresh air/recirculated air circuit (for air-conditioning system option)

A = Recirculated air mode

B = Fresh air mode

Attached to the upper right of the accelerator pedal *– see chapter 5 " Fresh air/recirculated air circuit (for air-conditioning system option)" on page 5-36*

Load diagram

WARNING

Accident hazard due to damaged or missing information labels!

Can cause serious injury or death.

- ► Immediately replace damaged or missing labels with new ones.
- ► This particularly applies to information labels referring to hazards (e.g. load diagrams)!

Information

Informational labels are available from their sales partner via the spare parts service.

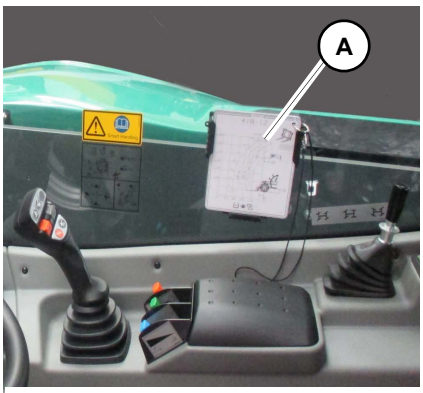


Fig. 101

The load-bearing diagrams**A** are located in the holder on the right at the side window.

Depending on the vehicle orientation, the folding panels consist of, for example:

- Tire pressure table
- Load diagram for pallet forks
- Load bearing diagram for crane jib

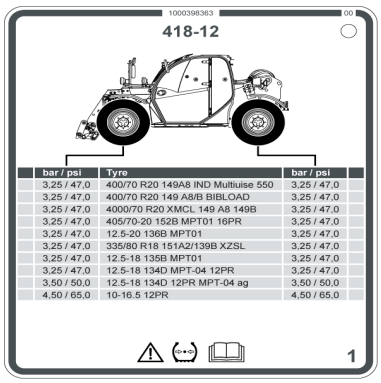


Fig. 102

Tire pressure table diagram (example)

The sign includes a list of approved tire types with the respective prescribed tire air pressure *– see chapter 9 " Tires" on page 9-4*.

Attached to the right on the side window.

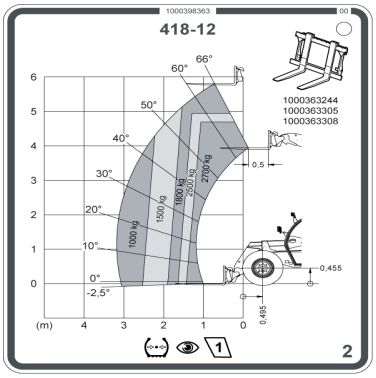


Fig. 103

Load-bearing diagram (example)

The load-bearing diagram specifies the maximum payloads for the pallet fork and the crane jib.

Attached to the right on the side window.

Information

The load diagram is valid only for applications with the released attachments and corresponding tire sizes.
Pay attention to the specific load diagrams of other attachments used
– see chapter 5 " Fitting attachments from other manufacturers (option)" on page 5-78.

CALIFORNIA Proposition 65 Warning

WARNING
The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

WARNING
Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

WARNING
Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- ► Always start and operate the engine in a well-ventilated area.
- ► If in an enclosed area, vent the exhaust to the outside.
- ► Do not modify or tamper with the exhaust system.
- ► Do not idle the engine except as necessary.

For more information go to www.P65warning.ca.gov/diesel.

WARNING
Cancer and Reproductive Harm -
www.P65Warnings.ca.gov.

WARNING
Batteries, battery posts, terminals and related accessories contain lead and lead compounds, and other chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. WASH HANDS AFTER HANDLING.

4 Putting into operation

4.1 Cabin/control stand

Important information on the cabin

WARNING

Danger of accident from impaired line-of-sight with an attached protective grating on the front windscreen!

Failure to observe this can cause serious injury or death.

► Remove the protective grating (optional) before driving on public roads.

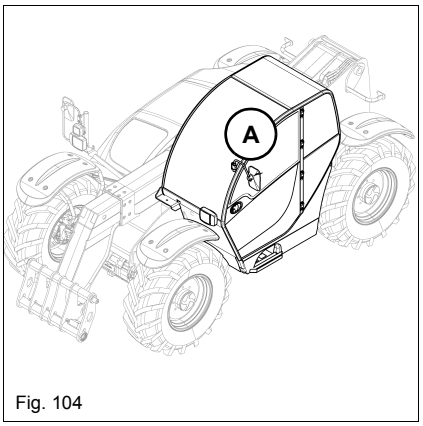


Fig. 104

- The cabin (**A**) offers no protection from health-hazardous substances.
- Keep the climbing aids (handles, footholds) free from dirt, snow and ice.
- As a standard, the cabin does not offer sufficient protection against falling trees and branches or objects protruding into the cabin during forestry work.
  Therefore, the machine is not approved for forestry applications.
- A cabin damaged (deformed) in an accident may not be repaired but must be replaced by an authorized service center.
- It is prohibited to drill through elements of the cabin or to weld or separate elements of the cabin as this work changes the cabin and it therefore no longer complies with the officially approved model roll-over protective structure / FOPS.
- Attaching an additional protective grating (optional) to the front windscreen impairs the operator's view and must be removed before driving on public roads.

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 vehicle as you enter and leave it.

► Have damaged climbing aids replaced.

Locking/unlocking the door and the side window

CAUTION

Crushing hazard due to incorrectly locked door!

The doors can cause crushing when closing.

- ► Always lock the cabin doors.
- ► Use the handholds for closing.

Information

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

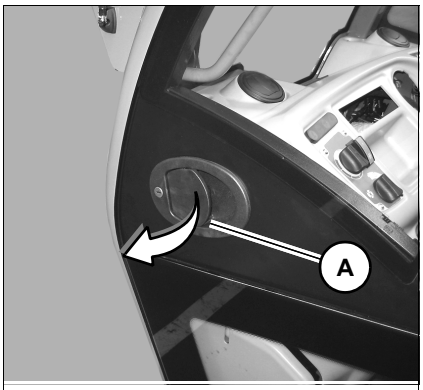


Fig. 105

Opening the cabin from the outside

1. Pull handle **A** outward.

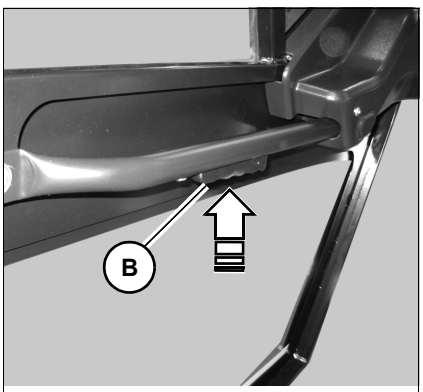


Fig. 106

Opening the cabin from the inside

1. Pull handle **B** up.

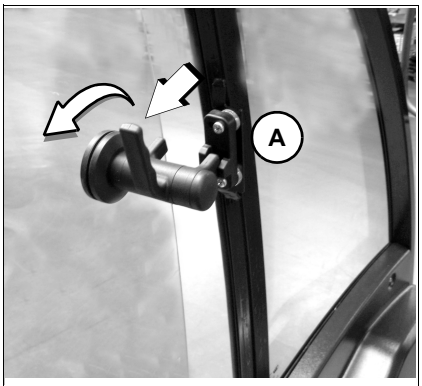
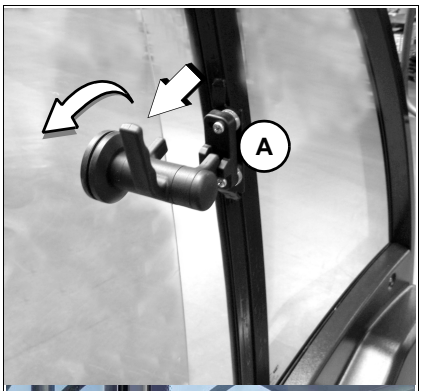


Fig. 107

Opening the side window in the driver's door for ventilation

1. Turn the lever from lock position **A** to the notch for the hinged position.



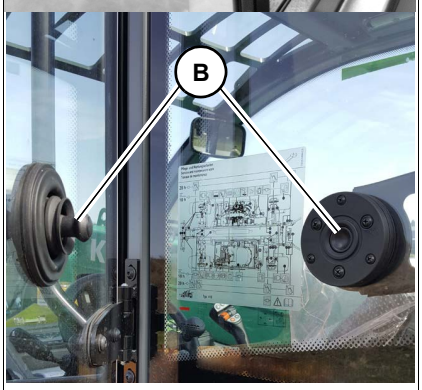


Fig. 108

Open the side window in the driver's door completely

1. Turn the lever to the rear from the locked position **A**.
2. Fold the side window completely to the outside and lock into place in arrester **B**.

Information

Lubricate arrester **B** at regular intervals!

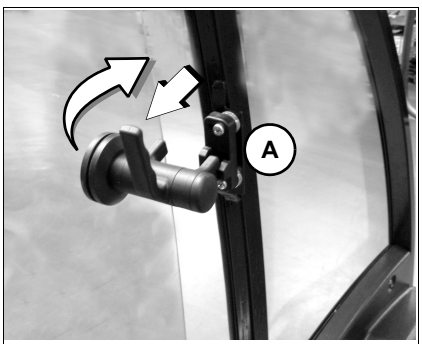


Fig. 109

Lock the side window in the driver's door

1. Loosen the lever from the locked position**A**.
2. Close the side window completely and turn the lever to the locked position **A**.

Opening/closing the rear window

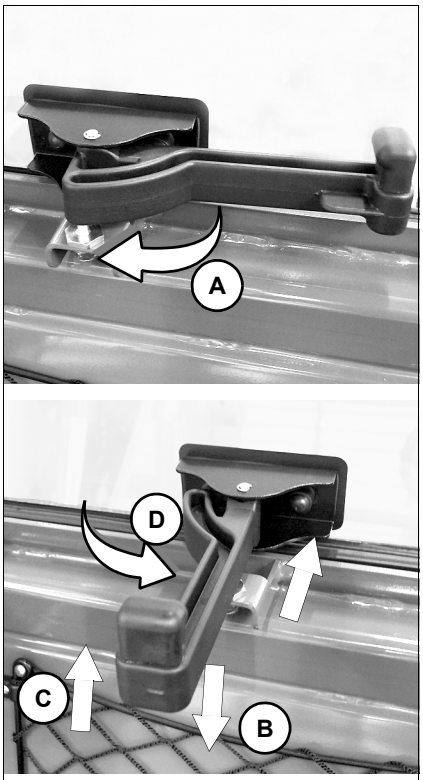


Fig. 110

CAUTION

Crushing hazard due to unlocked cabin window!

Unlocked cabin windows may cause injuries from crushing hands and fingers.

- ► Always lock the cabin window.
- ► Use the handholds for closing.

Opening and setting the rear window to a gap

1. Turn the lever out of the lock in the arrow of the direction **A**.
2. Set the window to a gap and audibly snap the lock lever into place in the catch in the lever end (arrow **B**).

Closing the rear window

1. Pull the lever out of the locked position (arrow **C**).
2. Close the rear window and lock with the lever in the direction of the arrow **D**.

Rear window emergency exit

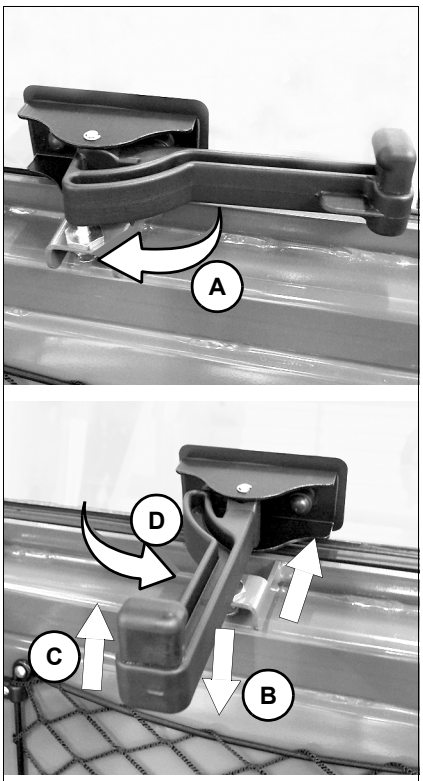


Fig. 111

In case of an emergency, the rear window can be used for exiting from the cabin if the door can no longer be used.

Exit the cabin in an emergency as follows:

1. Stop the diesel engine.
2. Switch off all electric consumers and remove the ignition key.
3. If possible, ask for help.
4. Unlock the rear window with the lock lever in the arrow of the direction **A**.
5. Remove the end of lever (arrow **C**) completely from the guide.
6. Opening the rear window:
7. Before restarting the vehicle, lift the lever out of the locked position (arrow **C**).
8. Close the rear window and lock with the lever in the direction of the arrow **D**.

Safety instruction – side window (right)

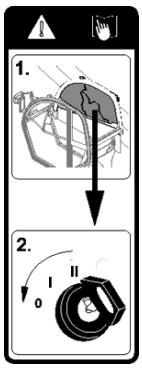


Fig. 112

The window on the right (cabin) is a safety element and must be immediately replaced with a new one by an authorized workshop, even if it is only slightly damaged.

WARNING

Danger of crushing from lifting and lowering the loader unit in the event of a defective right side window!

Failure to observe this can cause serious injury or death.

► If the vehicle is damaged, do not operate it or immediately bring it to a standstill during operation!

1. Immediately bring the vehicle to a standstill if the side window is damaged!
2. Keep a safe distance to the loader unit as you lower it to the ground carefully *– see chapter 5 " Raise / lower the loader unit, extend and retract the telescopic boom" on page 5-43*.
3. Apply the parking brake.
4. Shut off the diesel engine and remove the starting key.
5. Have the side window replaced by an authorized service center.

Field of vision during road travel

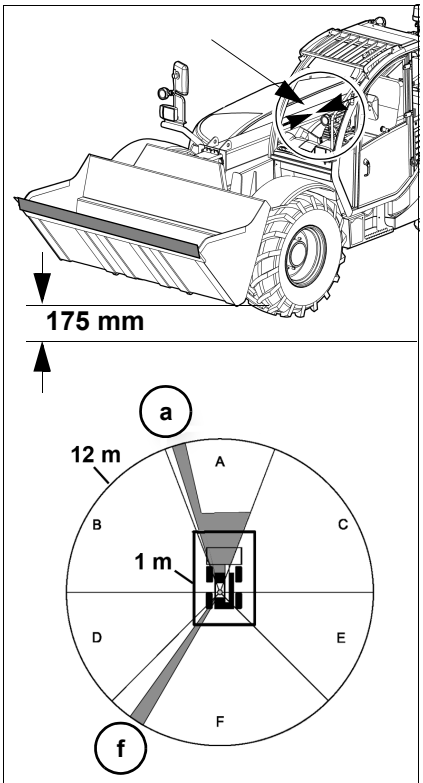


Fig. 113

Note the line-of-sight impairment with a bucket

The line-of-sight describes the visible area that the operator can see from the operator's seat, also with the help of mirrors and a camera (optional) – *see chapter 5 " Front and/or rear camera system (option)" on page 5-153*.

WARNING

Danger of accident from restricted line of sight when driving on public roads!

Failure to observe this can cause serious injury or death.

- ► Only use approved attachments during road travel
- ► Empty the loader bucket and lower it to the transport position about 175 mm (6.8 in).
- ► Check the line of sight and adjust the mirrors.
- ► If the line of sight cannot be ensured, load the attachment on the transport vehicle and transport to the site of use.

Information

The field of vision has been determined according to ISO 5006.

- The adjacent graphic describes the existing restrictions in line of sight within the radius of 12 m (4724.4 in) with the retracted telescopic boom, with the bucket in the transport position 175 mm (6.9 in).
- The gray highlighted area in sector **A** as well as in sector **F** show the lines-of-sight of the operator **not** visible with the loader unit in the transport position.
  - **a**) Line-of-sight restriction of the A-column in the front left of the cabin
  - **f**) Line-of-sight restriction of the C-column in the rear left of the cabin
- In sector **A,** no line-of-sight restriction may exist outside of the radius of 12 meters (4724.4 in).

Information

Due to the line-of-sight restrictions, only the *"Attachments for Kramer quickhitch facility" on page 3-14* in the table are permitted for use on public roads.

- ► Remove uncertified attachments, load them on a transport vehicle and transport them to the work site.

Field of vision during work operation

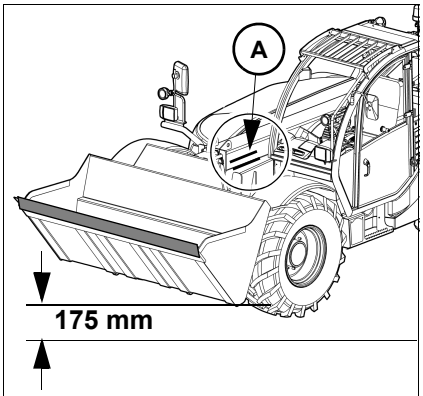


Fig. 114

Important safety instructions for the line-of-sight restriction

WARNING

Accident hazard due to restricted field of vision!

Failure to observe this can cause serious injury or death.

- ► Before starting work, check the line-of-sight and adjust the mirror so that the visible areas behind and to the sides of the vehicle come as close to the vehicle as possible.
- ► Additional equipment or attachments must not be installed if they impair visibility.
- ► Remove obstacles within the job site.
- ► Do not move material with a raised loader unit.
- ► Only move loaded goods in the transport position **A**.
- ► If the line-of-sight cannot be safely adjusted with the mirrors, the operator must take appropriate measures (optional camera, flagman). The operator of the machine always has the sole responsibility for this.

WARNING

Accident hazard due to persons in the danger zone!

Persons entering the danger zone of the machine or who are already in it can be injured by work movements.

- ► Always ensure that nobody is in the danger zone.
- ► Seal off the danger zone.
- ► Stop all work movements immediately if persons enter the danger zone.

- Before starting the vehicle, adjust the visual aids *– see "Mirror adjustment" on page 4-10* and *“Line-of-sight with camera (optional)” on page 4-14*.

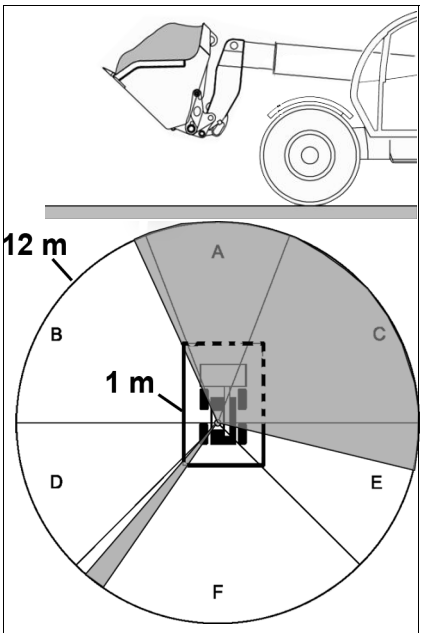


Fig. 115

Restricted line of sight with the bucket in work operation

The line-of-sight describes the visible area that the operator can see from the operator's seat, also with the help of mirrors.

CAUTION

Risks of visual impairments mainly occur during reverse operation, when the loader unit is raised as well as from the bucket with load.

- The adjacent graphic describes the existing restrictions in line of sight within the radius of 12 m (4724.4 in) with the retracted telescopic boom, and attached bucket **with a raised loader unit**.
- The gray area in the sector **B / A / C / E** as well as in the sector **F** show the lines of sight **not** visible to the operator with the loader unit raised.

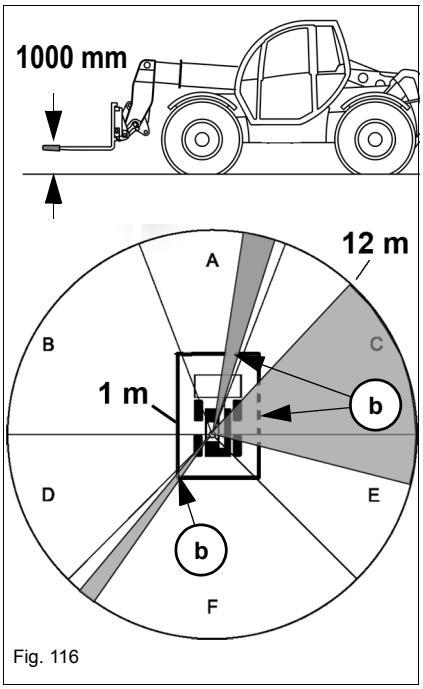


Fig. 116

Line-of-sight restriction in stacking mode to 1 meter's height

Information

The field of vision was determined according to ISO 5006 (road travel) and DIN EN 15830:2012 (work operation).

- The adjacent graphic describes the existing line-of-sight restrictions within the radius of 12 meters (4724.4 in) with a retracted telescopic boom and mounted pallet forks with a loader unit without goods raised **about 1 meter** (39.3 in).
- The gray highlighted areas in sector **A, C and E** as well as in sector **F** show the lines-of-sight of the operator that are **not** visible.
- **b)** The dotted lines show the line-of-sight restrictions in 1 m (39.3 in) spacing at 1.5 m (59.0 in) height around the vehicle.

Line-of-sight restriction in stacking mode to 0.5 meter's height

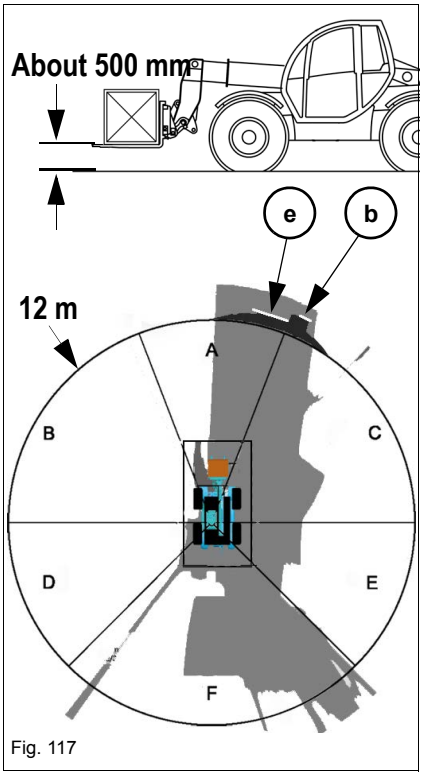


Fig. 117

Information

The line-of-sight was determined according to DIN EN 15830:2012 (work operation) with a test load according to standards and the cabin (series).

The adjacent graphic describes the existing line-of-sight restrictions according to DIN EN 15830:2012 within the radius of 12 meters (4724.4 in) with a retracted telescopic boom and mounted pallet forks **with a loader unit** with goods raised about 0.5 meters **(19.7 in)**.

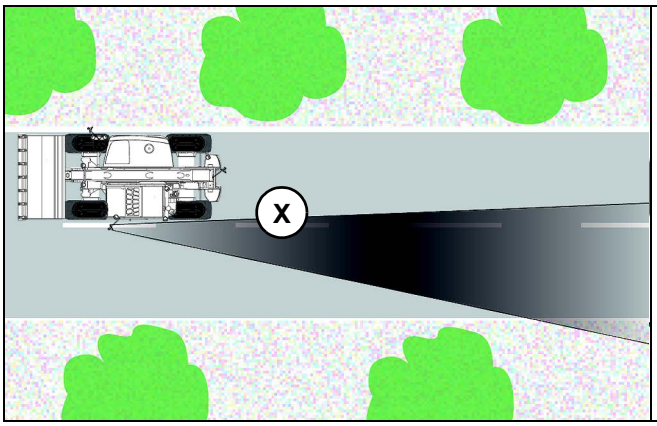
- The gray highlighted areas in sector **A, C and E** as well as in sector **F** show the lines-of-sight of the operator that are **not** visible.
- **b)** In the sector **C** outside of the radius of 12 m (4724.4 in) line-of-sight restriction:
  - at the height of 590 mm (23.2 in)
  - at the width of 398 mm (15.6 in)
- **e)** In the sector **A** outside of the radius of 12 m (4724.4 in) line-of-sight restriction:
  - at the height of 370 mm (14.5 in)
  - at the width of 1423 mm (56.0 in)

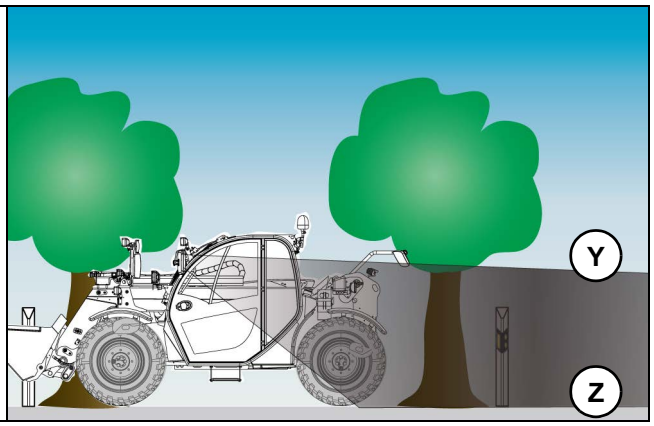
Mirror adjustment

Fig. 118

Adjusting the mirror on the left

1. Turn the mirror on the **left** upward with the long side.
   When making preliminary adjustments, ensure that the mirror bracket is turned far enough to the front (about 90°) to avoid touching the door window.





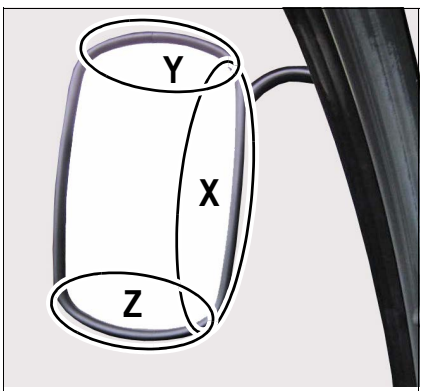


Fig. 120

2. Adjust the **left** rearview mirror:
   - The outer edge of the vehicle must be visible in the mirror area **X**.
   - The horizon must be visible in the **Y** mirror section.
   - In the **Z** section, the visible area of the road must be as close as possible to the machine.

Information

When adjusting, make sure that the mirror holder is turned far enough forward (about 90°) in order to prevent a collision with the cabin door.

Adjusting the mirror on the right

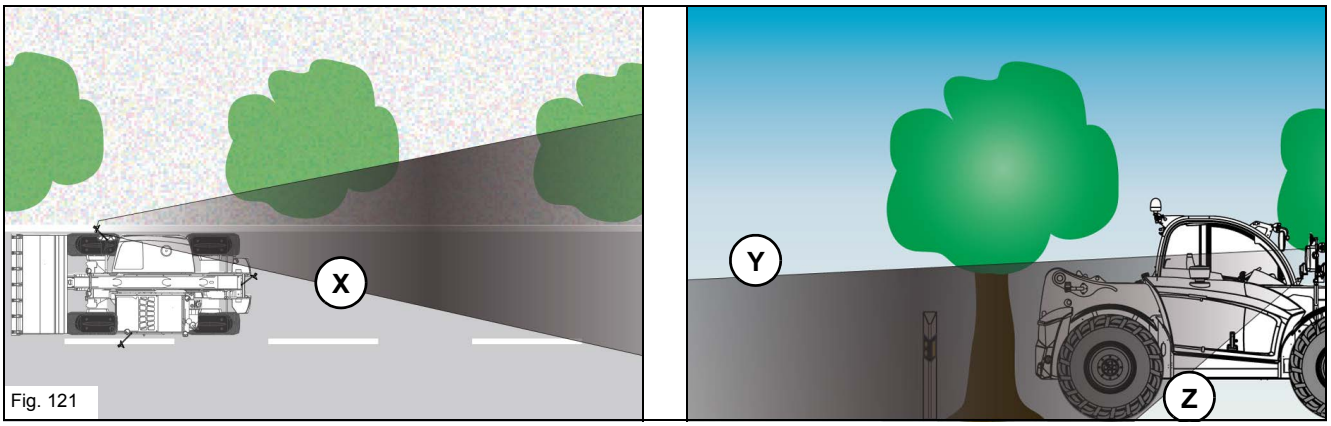


Fig. 121

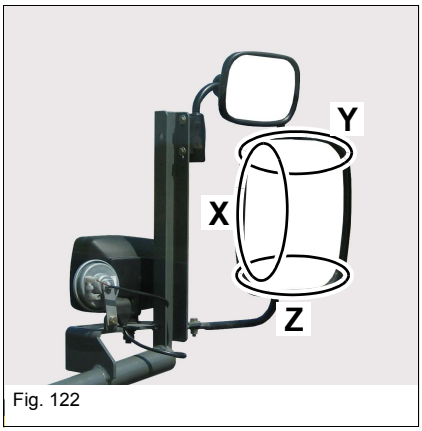


Fig. 122

1. Lower the loader unit to the transport position.
2. Adjust the rearview mirror on the **right**:
   - The outer edge of the vehicle must be visible in the mirror area **X**.
   - The horizon must be visible in the **Y** mirror section.
   - The visible area of the road must reach as close to the vehicle as possible in the mirror area **Z**.

Adjusting the additional mirror on the right

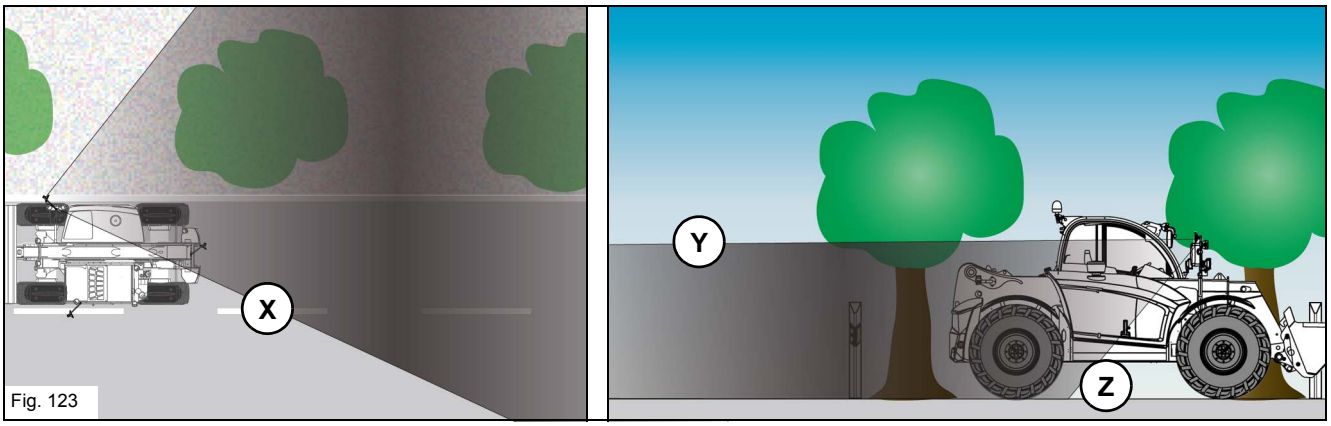


Fig. 123

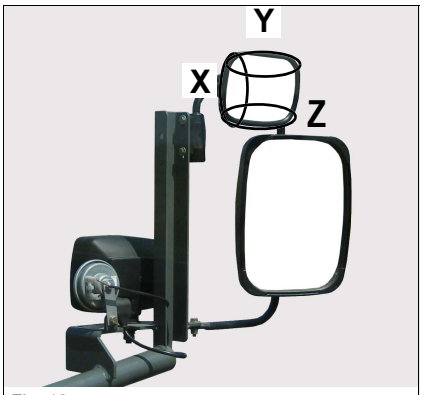


Fig. 124

1. Adjust the additional mirror on the **right**:
   - In the mirror area **X,** the hydraulic hoses behind the loader unit must be visible.
   - The horizon must be visible in the **Y** mirror section.
   - In the mirror area **Z,** the entire right rear wheel must be visible.

Adjusting the rear mirrors (option)

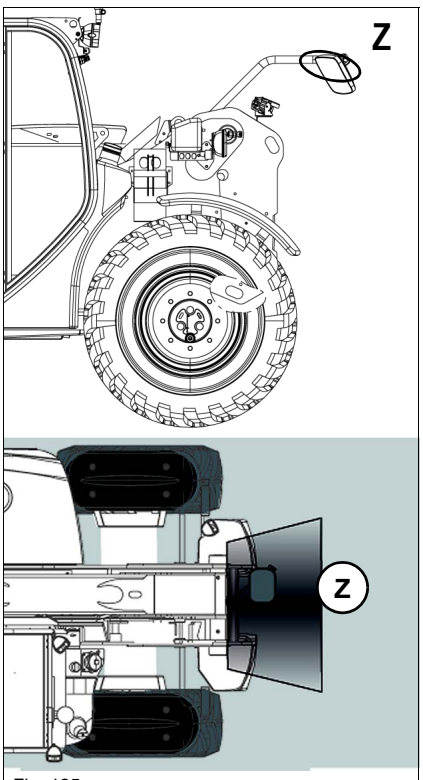


Fig. 125

Information

The rear-view mirror in the rear is required in conjunction with a ball hitch (optional) and must be used when coupling and decoupling.

1. Bring the rear-view mirror **in the rear** (optional) into position so that the rear of the vehicle with the ball hitch can be fully seen in the mirror area **Z**.

Fig. 126

Adjusting the rearview mirrors (option)

Adjust the rearview mirror so that you can see as much of the traffic behind the vehicle as possible and as little of your own interior as possible.

Line-of-sight with camera (optional)

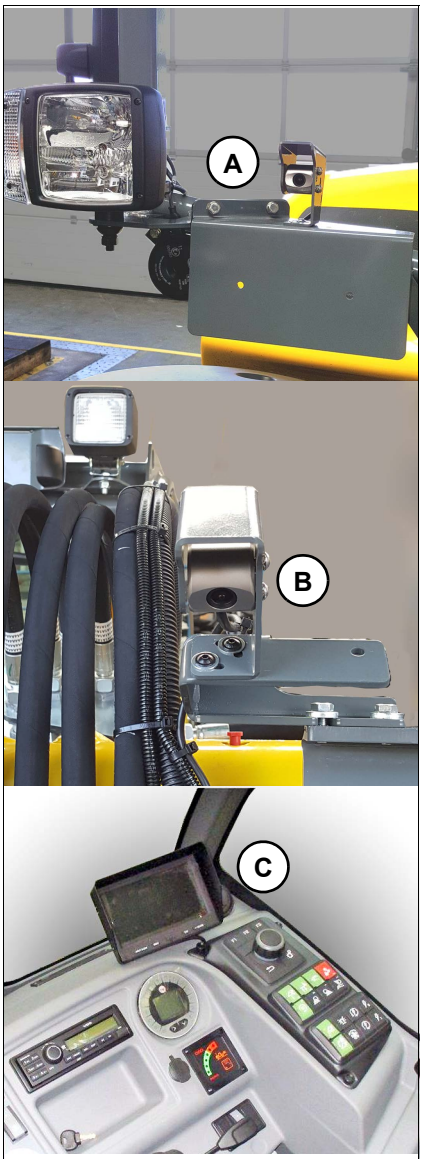


Fig. 127

The video system is provided for monitoring non-visible or poorly visible areas on the vehicle.

A Camera (fastened to the right mirror holder front and/or

B camera on the vehicle rear.

C Color monitor in the cabin

Information

For more information about the operation and adjustment of the camera, see *5-153*, for maintenance see page *7-82*, for technical data see page *9-12*.

Camera line-of-sight on the mirror holder in the front right

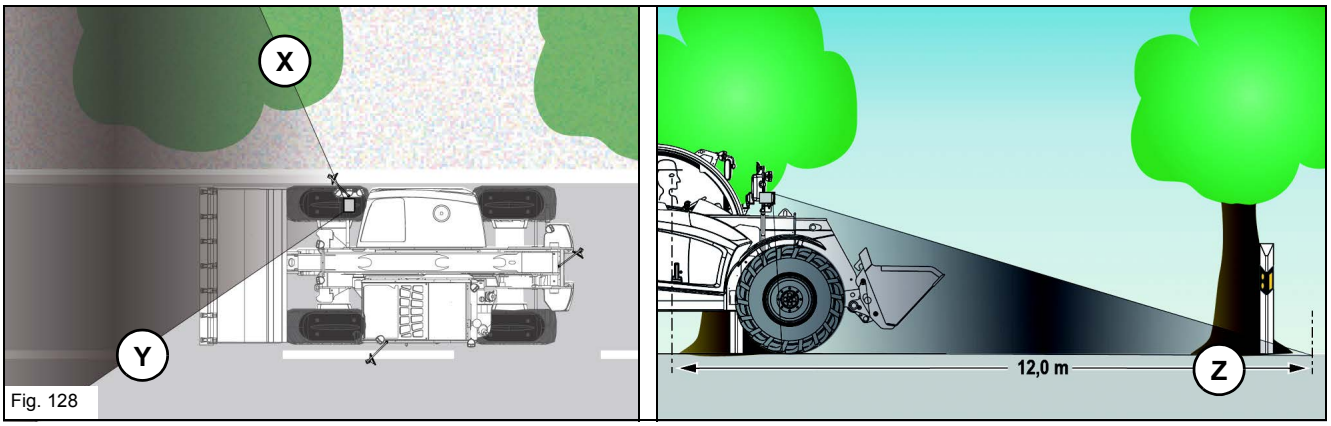


Fig. 128

1. Adjust the visible range of the camera so that the described areas can be seen on the monitor:
   - The area **Y** up to the area **X** next to the right front wheel.
   - The area forward **Z** (at least 12 m (4724.4 in) or beyond).

Camera line-of-sight on the vehicle rear

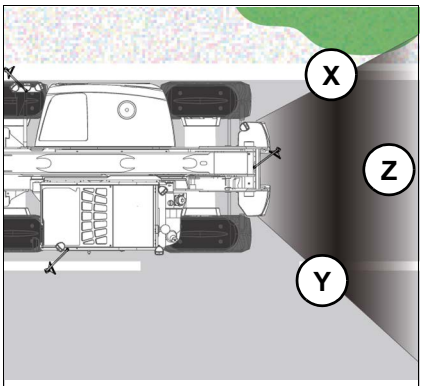


Fig. 129

1. Adjust the visible range of the camera so that the following areas can be seen on the screen:
   - Right outside **X,** the area behind the right rear wheel.
   - Left outside **Y,** the area behind the left rear wheel.
   - To the rear **Z,** the area up to the rear of the vehicle.

Seat adjustment

WARNING

Accident hazard when adjusting the operator seat during machine travel!

Failure to observe this can cause serious injury or death.

► Only adjust the operator seat at machine standstill.

► Ensure that the levers for seat adjustment are safely engaged

CAUTION

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

Can cause injury to spinal column!

► Adjust the operator 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.

- Modifying the operator seat (by using spare parts other than original, for example) can cause the approval given for the operator seat to be void. Functions that are important for safety can be affected.
- If the seat functions do not work as usual (seat suspension, for example), contact a service center immediately for repair.

Information

For safety reasons, the vehicle is equipped with a start-up lock in all EU member states and in Australia. The vehicle can only be operated if the operator has sat down on the operator's seat.

If the operator seat is left at a standstill or with the hand brake released, a continuous acoustic warning will sound.

If the operator's seat is left during the drive, the drive system goes into a neutral position when driving below 7 km/h (4.3 mph). At higher travel speeds, a continuous warning signal sounds.

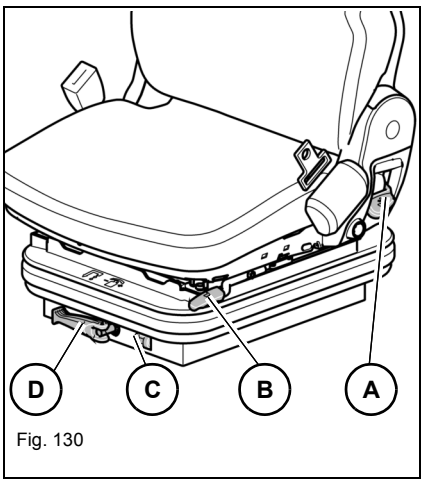


Fig. 130

Seat adjustment (overview)

The operator seat can be set to the following positions:

A Backrest adjustment
B Horizontal adjustment
C Weight indicator
D Weight adjustment

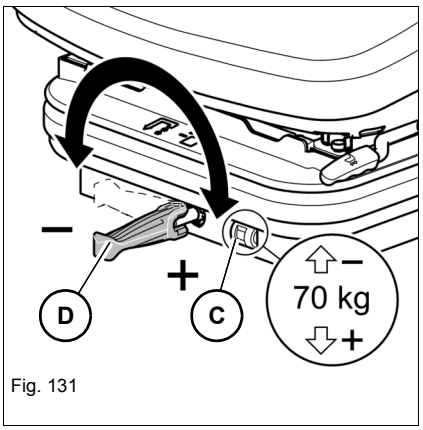


Fig. 131

Adjusting to a higher weight:

1. Sit down on the operator seat.
2. Turn the lever **D** clockwise and read the weight on the display **C**.

Adjusting to a lower weight:

3. Turn lever **D** counterclockwise
4. Read the weight on the display **C**.

Information

The weight indicator **C** shows the set operator weight [kg].

Fig. 132

Backrest adjustment

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

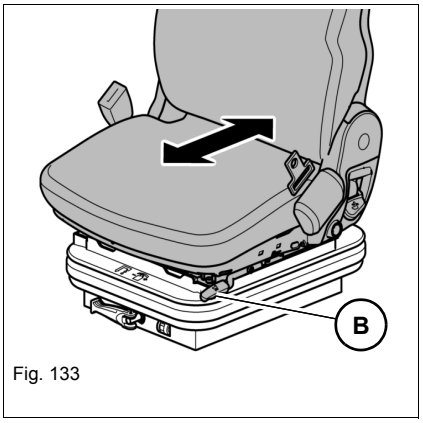


Fig. 133

Horizontal adjustment

1. Sit down on the operator seat.
2. Pull lever **B** upward and at the same time, move the operator seat forward or backward
3. Let the lever **B** engage as soon as the joystick can be easily reached.

Air-suspension seat (option)

Before starting the vehicle, the switch located in the seat is to be checked for its functionality.

CAUTION

Accident hazard in case of malfunctioning air-suspension seat!

Failure to observe this can cause injuries.

► Do not put a machine into operation with a malfunctioning air-suspension seat.

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

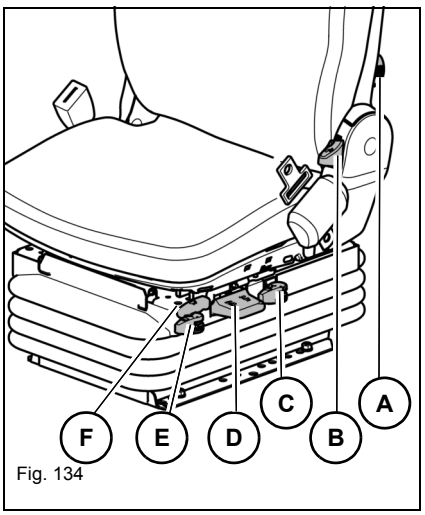


Fig. 134

Air sprung seat adjustment (overview)

The operator seat can be set to the following positions:

A Lumbar support
B Backrest adjustment (for description, see page *4-17*)
C Suspension of the operator seat
D Weight and height adjustment
E Horizontal suspension
F Longitudinal adjustment (for a description, see page *4-17*)

Fig. 135

The weight and height setting is variably adjusted with the air assistance of an air compressor.

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

- Pull or press lever **D**.
  ➥ Seat height changes.
  ➥ If the upper or lower stop of the seat position is reached, an automatic height adjustment occurs in order to allow for a minimum spring stroke.

NOTICE

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

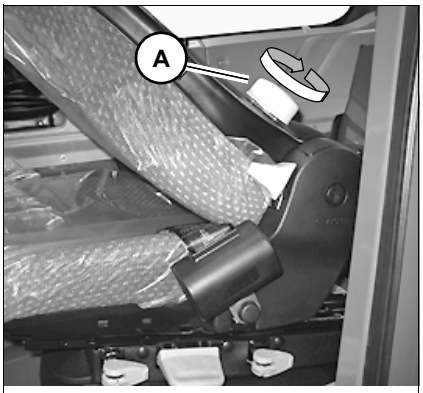


Fig. 136

Lumbar support adjustment (option)

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

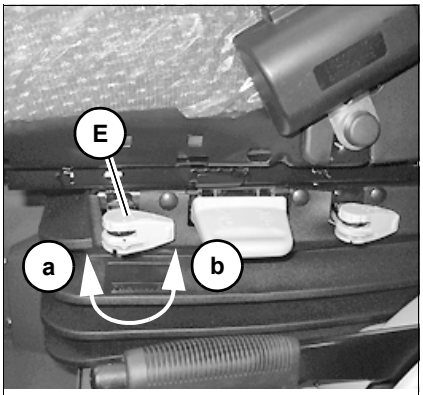


Fig. 137

Adjustment of horizontal suspension (option)

Switching on the horizontal suspension with control lever **E** 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**

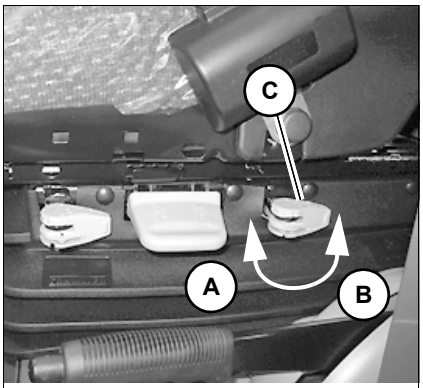


Fig. 138

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

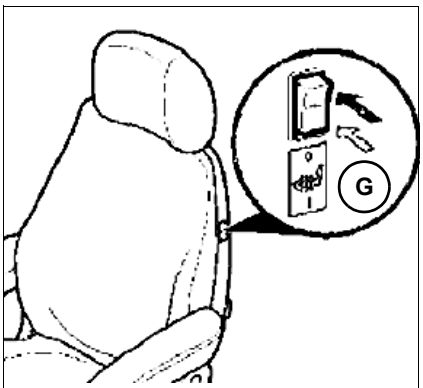


Fig. 139

Heated seat (option)

The heated seat is switched on with switch **G**.

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 center.
- ► 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).

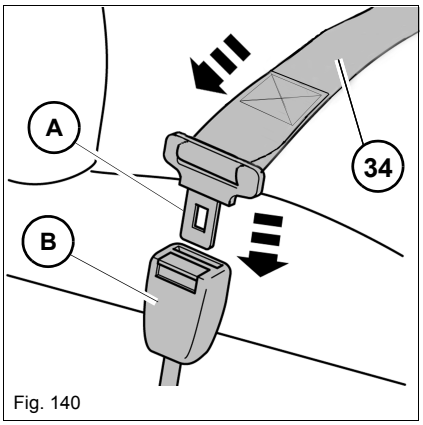


Fig. 140

Fastening the seat belt

1. Sit down on the operator seat.
2. Hold seat belt **34** at buckle latch **A** and run it steadily over the hips to buckle **B**.
3. Insert the buckle latch **A** into the buckle **B** until it audibly engages ***(pull test).***
   ➥ The seat belt must not be twisted and must run tightly over the hips!

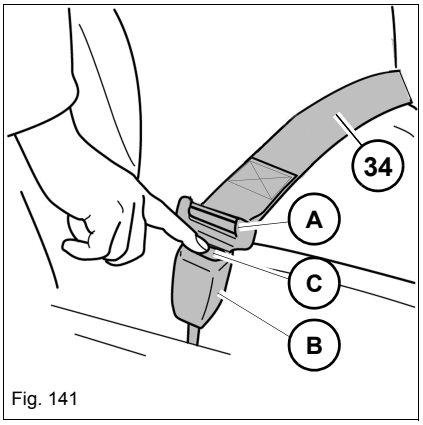


Fig. 141

Unfastening the seat belt

1. Hold the seat belt **34**.
2. Press red button **C** on buckle **B**.
   ➥ Latch **A** is released from buckle **B.**
3. Slowly return the seat belt to the retractor.

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.

Battery master switch

The battery master switch separates the entire electrical system from the battery and ensures protection against unauthorized engine start.

The main battery switch is located on the left in the engine compartment.

NOTICE

In order to avoid damage to the electronic elements from malfunction, do not immediately unscrew the main battery switch from the ratchet mechanism after shutting off the engine!

► Note the chronological order (see the notice sign **B**)!

NOTICE

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

► In order to avoid damage to the auxiliary heating (optional), first disconnect the power circuit with the battery main switch once the after-running of the heater has ended.

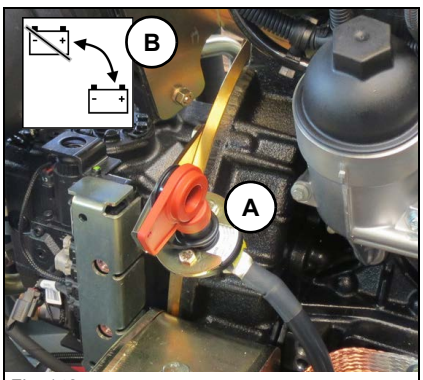


Fig. 142

Switch off the battery master switch

1. First, stop the diesel engine with the ignition key.
2. Wait at least 30 seconds.
3. Then turn the key **A** to the left and pull out.
   ➥ See the notice sign **B**
   ➥ The entire electrical system is out of operation.

Switch on the battery master switch

1. Insert the key in the battery master switch and turn it to the notched position.
   ➥ The entire electrical system is in operation.
2. Start the diesel engine.

Fire extinguisher (option)

Fig. 143

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

If a fire extinguisher is retrofitted according to DIN-EN 3, then this must be performed by an authorized service center.

- 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.

► Only remove the fire extinguisher from the cab 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.

Key-based drive interlock (option)

The immobilizer 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 keys (coded)
- 1 x red master key (for coding a blue key)

Coding (“training”) new ignition switch keys

New personal keys are coded with the master key (red). This is why it must be carefully stored outside the machine.

Information

The immobilizer has only one master key!

► The immobilizer must be replaced by an authorized service center if the master key is lost.

- The master key is only used for coding new keys, and cannot be used for disabling the immobilizer.
- Switch on the machine lights (side marker lights) before coding a new key (blue).
  - Switch on the machine lights *– see chapter 5 " Parking lights/low beam" on page 5-23*.
- Coding is performed by inserting the master key in the ignition lock and by turning it to position (1) for a maximum 5 seconds. After the master key has been returned to position (0) and removed, you have 15 seconds for inserting a key that requires coding. It must be inserted in the ignition lock and turned to position (1) in order to be registered as a valid key.
- Coding is automatically stopped if no key requiring coding is detected within 15 seconds.
- To code ("train") new keys (blue), these can be inserted in the ignition lock one after the other.
- The individual keys (blue) must stay in the position 1 of the ignition lock for at least 1 second.
- Coding can be performed for a maximum 10 keys.

Information

So as not to give the electronics of the drive interlock any false information, the master key (red) must be stored outside of the vehicle after the coding of the blue key. (Do not attach the master key to the key chain of the coded key).

Enabling (locking) the immobilizer

1. Apply the parking brake
   – see "Parking brake (hand brake)" on page 5-12.
2. Stop the engine
3. Remove the ignition switch key (blue) from the ignition lock.
   ➥ Immobilizer will be enabled in 30 seconds.

Information

If the ignition switch key (blue) is **not** removed, then the drive interlock remains unlocked!

Disabling (releasing) the immobilizer

1. Insert the ignition switch key (blue) into the ignition lock
   ➥ The system is enabled 5 seconds after the ignition key is inserted in the ignition lock.
2. Start the engine *– see "Starting the engine" on page 4-60*.
   ➥ The immobilizer is disabled as long as the engine runs.

Deleting coded keys

Deleting coded keys is necessary whenever a coded key is lost:

- All coded keys are deleted during deletion.
- After deletion has been performed, all existing keys can be recoded.

1. Switch on the side marker lights.
2. For the deletion process, insert the master key (red) into the ignition lock and turn to position 1
3. Keep the master key inserted in this position for at least 20 seconds.
   ➥ The coding for the blue keys is deleted
4. New key *– see "Coding (“training”) new ignition switch keys" on page 4-24*.

Information

The master key code is not deleted during deletion.

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 starter, for example by moving the starter to position 1 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.

Hydraulic oil and coolant preheating (option)

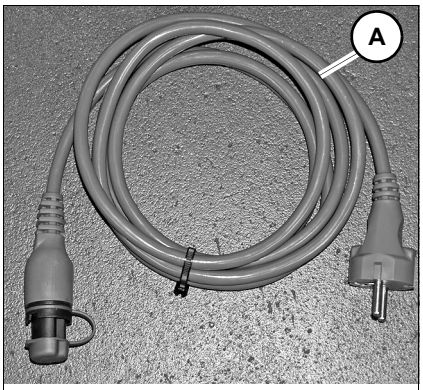


Fig. 144

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.

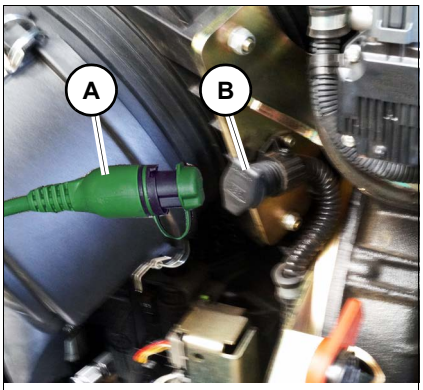


Fig. 145

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 located on the bracket of the air filter.

The special cable **A** for the mains plug receptacle 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 the power cable **A** that is part of the standard package with the vehicle plug receptacle **B** and then with the mains plug receptacle **C**.

Switch off the preheating

1. Before starting the diesel engine, first remove special cable **A** from the mains outlet, then remove it from the machine outlet.
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 at low temperatures.

The fuel preheater is automatically activated when ignition is switched on.

Information

A heating element in the fuel line between the tank and the fuel pre-filter is automatically switched on by a temperature sensor at temperatures below +10°C.

4.2 Overview of control elements

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 the operation of the corresponding control elements.

You can unfold the pages for a better overview.

Inside of cabin (overview)

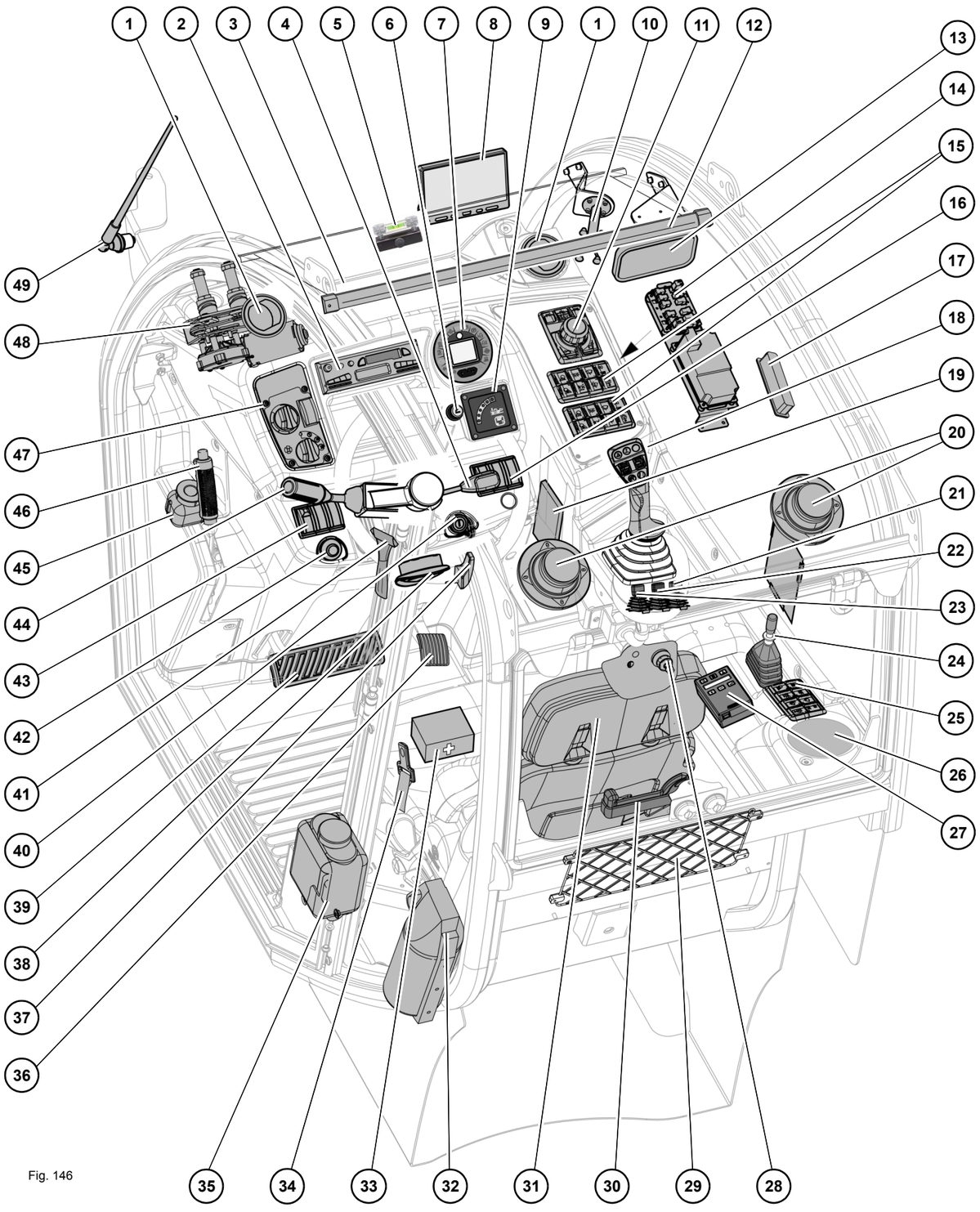


Fig. 146

Inside of cabin (overview)

Overview of control elements in cabin		Page
1	Air vents – side windows left/right	5-34
2	Radio (option)	
3	Front window air vents	5-34
4	Adjustment of the steering column (optional)	5-1
5	Frame leveling bubble	
6	Plug receptacle 12 V (single-pole)	
7	Indicating instrument – indicator lights	4-32
8	Screen for camera (optional)	5-153
9	Safe load indicator	5-39
10	Phone holder (optional)	5-166
11	Jog dial / oil volume adjustment (optional)	4-32
12	Roller sun-visor	
13	Rearview mirror (optional)	4-13
14	Central electrical system (relay, fuse box, etc.)	7-66, 9-8
15	Control panel (keypad) – Standard / options	4-32
16	Switch panel	4-32
17	Interior light	5-28
18	Joystick – drive, work hydraulics	4-56, 5-15, 5-22, 5-42, 5-54, 5-58, 5-66
19	Fresh air filter – cabin	7-68
20	Loudspeakers (option)	
21	Joystick (orange) – manual throttle (option)	5-8
22	Joystick (green) Proportional – Three-point receptacle lift / lower (optional)	5-143
23	Joystick (blue) – low-speed control (option)	5-19
24	Joystick – Reversing valve for choosing the types of steering	5-2
25	Control panel (keypad) – Auxiliary control circuits (optional)	4-32
26	Drink holder	
27	Control element for diesel particulate filter (optional)	7-83
28	Rear wiper	5-32
29	Storage net for Operator’s Manual	
30	Rear window lock	4-4
31	Operator seat	4-16
32	Fire extinguisher (optional)	4-23
33	First aid kit (optional) in the storage compartment under the operator’s seat	
34	Seat belt (operator seat)	4-20
35	Water container – windscreen washer	5-33, 7-72
36	Drive pedal (accelerator pedal)	5-7

Overview of control elements in cabin		Page
37	Clothes hook	
38	Leg room air vents	*5-34*
39	Brake-inching pedal	*5-10*
40	Start switch (ignition lock)	*4-60*
41	Emergency hammer (optional)	*4-4*
42	Hazard warning system (red)	*5-29*
43	Left-hand side switch panel	*4-32*
44	Multifunction lever – Indicator, high beam / low beam, windscreen wiper, horn	*5-23*, *5-32*
45	Brake fluid reservoir	*7-75*
46	Parking brake	*5-12*
47	Switch console – heating, ventilation	*5-34*
48	Front wiper	*5-32*
49	Radio aerial (option)	

Overview: indicating instruments, switch consoles, joysticks

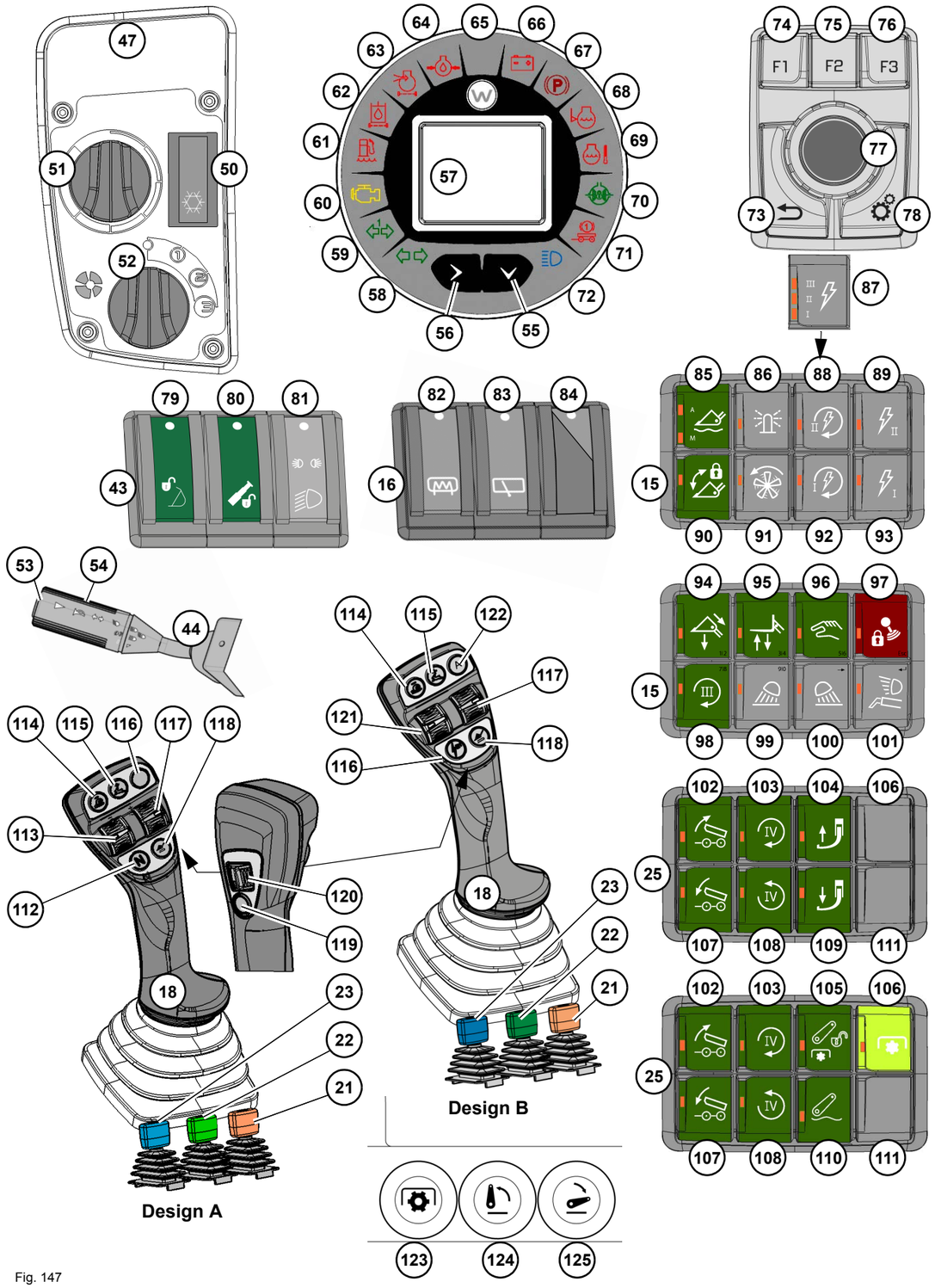


Fig. 147

Overview: indicating instruments, switch consoles, joysticks

Switch console 47 (heater, ventilation on left of steering wheel)	page
50 Rocker switch (gray) – air conditioning (option)	5-35
51 Rotary switch – heating temperature	5-34
52 Rotary switch – heater fan (heating, ventilation)	5-34
Multifunctional lever	**page**
53 Horn push button	5-29
54 Driving direction lever (indicator)	5-28
Rotary switch – Front windscreen wiper, washing water pump	5-32
Indicating instrument	**Page**
55 Touch button – Menu query in the digital display (level 1)	4-36
56 Touch button – Menu query in the digital display (level 2)	4-36
57 Digital display (display)	4-36
58 Right/left turn indicator light (green)	4-34, 5-28
59 Indicator light (green) – right/left turn indicators for rear attachments	4-34, 5-28
60 Indicator light (yellow) – Error of diesel engine electronics, control unit/controller	4-34
61 Warning light (red) – fuel system water separator	4-34, 7-35
62 Warning light (red) – Hydraulic oil filter	4-34, 7-54
63 Warning light (red) – air filter	4-34, 7-49
64 Warning light (red) – engine oil pressure	4-35, 7-39
65 Not assigned	
66 Warning light (red) – alternator charge function	4-35, 7-52
67 Warning light (red) – parking brake	4-35, 5-12, 7-74
68 Warning light (red) – Coolant level	4-35, 7-44
69 Warning light (red) – Temperature of the diesel engine	4-35, 7-42
70 Indicator light (green) – differential lock	4-35, 5-22
71 Not assigned!	
72 Indicator light (blue) – high beam	4-35, 5-24
Oil volume adjustment (optional)	**page**
73 Touch button – Menu selection back	5-112
74 Touch button – Menu selection 3rd control circuit lock / unlock	5-112
75 Touch button – Menu selection 3rd control circuit continuous operation	5-112
76 Touch button – Menu selection auxiliary control circuit dual-acting continuous operation (vehicle rear)	5-112
77 Adjusting wheel – Oil volume setting	5-112
78 Touch button – Main menu	5-112
Switch panel 43 (left steering wheel side)	**page**
79 Toggle switch (green) – Unlock quick-hitch lock and emergency lowering	5-54, 5-110
80 Touch button (green) – Overload display for manual operation	5-49
81 Switch (gray) – machine lights (side marker lights, low beam)	5-23
Switch panel 16 (right steering wheel side)	**page**
82 Push button (gray) – heated rear window (option)	5-34
83 Switch (gray) – rear wiper	5-32
84 Not assigned	

4.3 Overview of indicator lights

Indicator light check

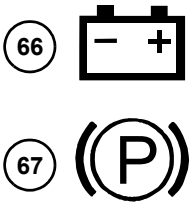


Fig. 148

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

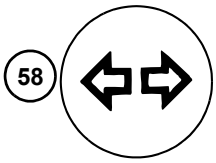
Information

Indicator lights **66** and **67** remain lit when ignition is turned on!

Information

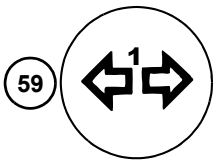
For your own safety and in order to avoid consequential damage to the machine, have malfunctioning indicator lights immediately checked or replaced by an authorized service center!

Indicator lights on indicating instrument



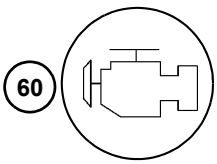
Indicator light (green) – right/left turn indicator

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



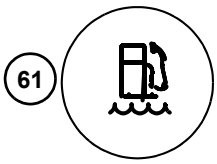
Indicator light (green) – right/left turn indicators on rear attachment

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



Indicator light (yellow) – control unit/controller

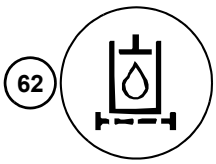
Illuminates if an error comes from the engine controller or the cabin controller *– see chapter 8 " Overview of error codes of diesel engine electronics" on page 8-7* and *“Overview of error codes of drive electronics” on page 8-13*.



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

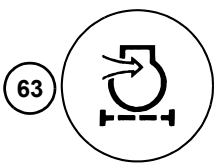
Illuminates if there is too much water in the water separator of the fuel pre-filter:

Drain water *– see "Fuel system" on page 7-35*.



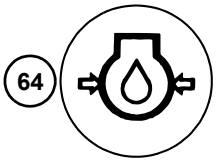
Indicator light (red) – dirt in hydraulic oil filter

Illuminates if the resistance of the oil flow in the return filter is too high *– see "Monitoring the hydraulic oil filter" on page 7-55*.



Indicator light (yellow) – air filter

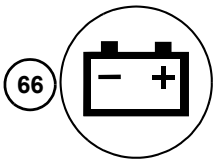
Illuminates if the air filter is dirty*– see "Air filter" on page 7-49*.



Indicator light (red) – engine oil pressure

Illuminates if the engine oil pressure is too low and / or there is a low oil level

– see "Engine lubrication system" on page 7-39.

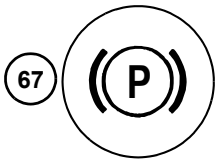


Indicator light (red) – alternator charge function

Illuminates when the starter is turned on and goes out as soon as the engine runs.

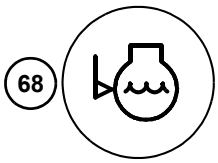
The V-belt is malfunctioning or there is an error in the charging circuit of the alternator if the indicator light illuminates with the engine running.

➥ The battery is no longer being charged.*– see "V-belt/toothed belt" on page 7-52*.



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 7-42.

Indicator light (red) – coolant temperature

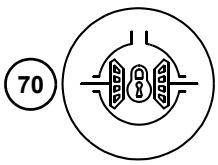
Illuminates if the maximum permissible coolant temperature is exceeded.

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).

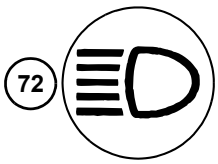
► An alarm sounds if the temperature is 115 °C (239 °F) or higher *– see "Cooling system" on page 7-42*



Indicator light (green) – differential lock (option)

Illuminates if the differential lock is enabled

– see "Differential lock" on page 5-21.



Indicator light (blue) – high beam

Illuminates if high beam is switched on, or during headlight flashing.

– see "Parking lights/low beam" on page 5-23

Indicating instrument with digital display

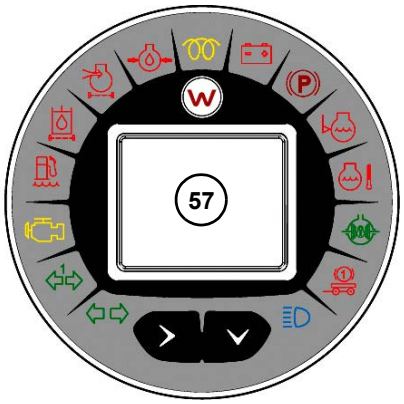


Fig. 149

Description

Digital display **57** on the indicating instrument provides information on active functions, current operating states, service information, machine status and error codes.

Two levels are allocated to the display instrument in the digital display **57**.

Modes of operation of the digital display – see page *4-37*.

1st level	See page	2nd level	See page
Main indication 1	*4-38*	Service indication	*4-42*
Main indication 2	*4-43*	–	–
Machine status indication HMI	*4-44*	–	–
Machine status indication VCU	*4-44*	–	–
Machine status display ECU [1] (ash load)	*4-44*	–	–
Error memory	*4-45*	–	–
Digital display settings	*4-46*	–	–

1. Ash loading of the diesel particulate filter, see operator's manual of the company BAUMOT

Modes of operation of the digital display

WARNING

Accident hazard when operating the digital display during machine travel!

Failure to observe this can cause serious injury or death.

Stop the vehicle, then perform operation and adjustment work on the digital display.

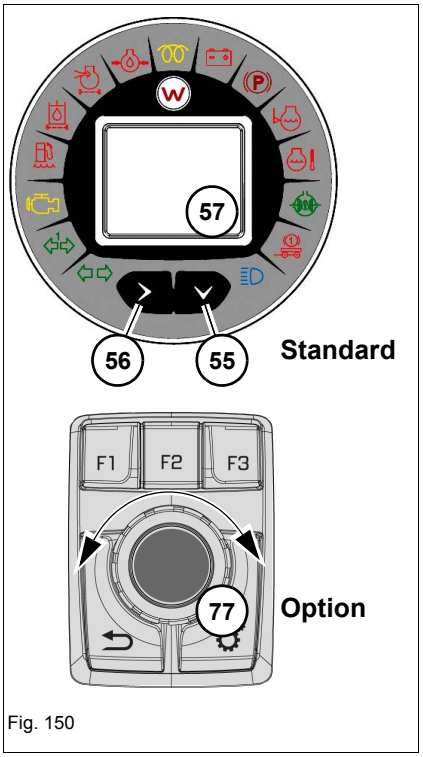


Fig. 150

Operation of the digital display (series)

- Change to the pages of the 1st level by **pressing** the touch button **55** ❯ *– see "Symbols in the main display 1" on page 4-38*
- Change to the pages of the 2nd level by **pressing** the touch button **56** ❯ *– see "Symbols in the main display 2" on page 4-43*

Operation of the digital display with the control element (jog dial) (optional)

- Change to the pages of the 1st level by **turning** the adjusting wheel **77** to the right or left
- Change to the pages of the 2nd level by **pressing** the adjusting wheel **77** then **turning** the adjusting wheel*– see chapter 5 " Oil volume setting with control element (jog dial) (optional)" on page 5-112*.

Example of operation:

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

1. Press **55** the touch button once briefly or turn the adjusting wheel **77 (optional)** to the right or left.
   ➥ The main display 1 appears in the 1st level.
2. Then press the **56** touch button or the adjusting **77** wheel.
   ➥ Service display appears in the 2nd level.

Information

If a function is selected that is not available to the vehicle, the **"no-function"** symbol will appear in place of the tank and temperature symbol for 4 seconds..

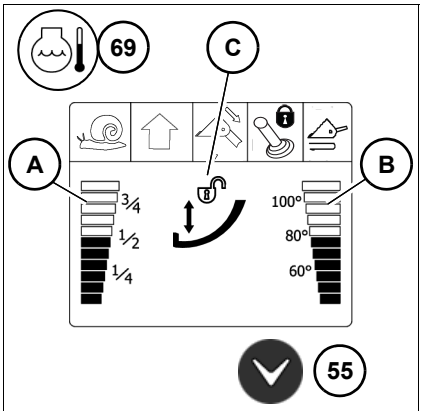


Fig. 151

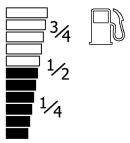
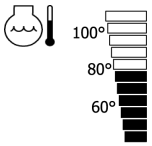
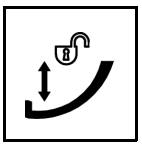
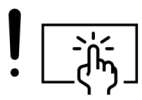
Symbols in the main display 1

To call the contents of main indication 1, press push button **55** repeatedly.

Information

Several symbols may be present in one display field, which are then accessible in succession, e.g. display field **D**.

- ► Symbol 1 travel speed increase/reduction "snail“
- ► Symbol 2 travel speed increase/reduction "turtle“
- ► Symbol 3 travel speed increase/reduction "rabbit“

	Indication	Meaning	Page
A		**Display – Fuel tank fill level** Indicates the fill level in the fuel 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 coolant temperature of the radiator. Once the maximum permissible coolant temperature is reached, the control lamp illuminates **69** in the display instrument and a warning also sounds.	*7-42*
C		**Symbol - Auto-hitch coupling (optional)** Appears if the lock of the auto-hitch coupling **is not secured.**	*5-130*
		**Symbol - error code display / severe error** Appears if the drive electronics has detected an error. ➥ Symbol is shown for about 4 seconds.	*5-130*
		**Symbol - error code display / critical error** Appears if the drive electronics has detected a critical error. ➥ The symbol is shown until the display has been acknowledged by pressing the button **55** or **56** on the indicating instrument or on the jog dial (optional) **11**.	*5-130*

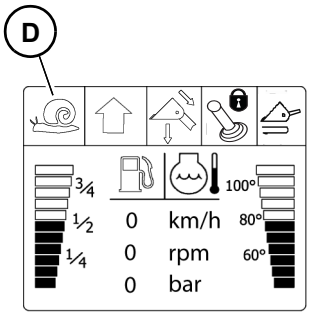
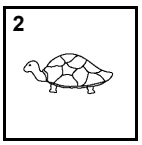
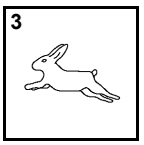


Fig. 152

Indication		Meaning	Page
D	1 	**Symbol – "snail" speed** **crawler gear 0 – 7 km/h (0 - 4.3 mph)** Appears if the operation was activated.	*5-16* *5-130*
	2 	**Symbol – "turtle" speed** **Operation 0 – 15 km/h (0 - 9.3 mph)** Appears if the operation was activated	*5-16*
	3 	**Symbol – "Hare" speed** **Operation 0 – 20 km/h (0 – 12.4 mph)** **High speed 0 – 30 km/h (0 – 18.6 mph) (optional)** Appears if the operation was activated	*5-16*

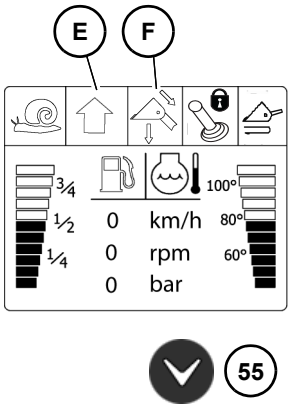


Fig. 153

Additional symbols in the main display 1

Indication		Meaning	Page
E	1	**Symbol – Forwards travel direction** Appears when the forwards travel direction is activated	5-15
	2	**Symbol – Reverse travel direction** Appears when the reverse travel direction is activated	5-15
	3 N	**Symbol – Neutral travel direction** Appears when the travel direction is deactivated	5-15
F	1	**Symbol Overload limit – Bucket mode** Appears if the bucket mode was activated	5-47
	2	**Symbol overload limit – stacking mode** Appears if the stacking mode was activated	5-48
	3	**Symbol Overload limit – Manual mode** Appears if the manual mode was activated	5-49

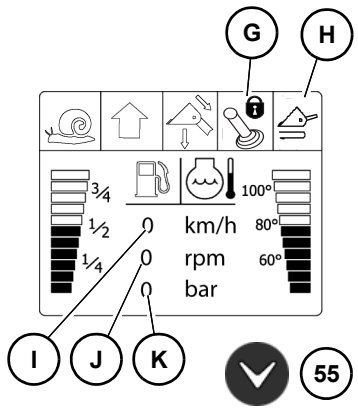


Fig. 154

Additional symbols in the main display 1

Indication		Meaning	Page
G	1	**Symbol – Work hydraulics lock** Appears if the lock of the work hydraulics for road travel has been activated with the touch button **97**. ➥ The entire work hydraulics is shut down	*4-56*
	2 III	**Symbol – 3rd control circuit** Appears if the 3rd control circuit is activated in inching operation	*5-54*
	3 III	**Symbol – 3rd control circuit in continuous operation (optional)** Appears if the 3rd control circuit is activated in continuous operation	*5-59* *5-115*
	4 IV	**Symbol – auxiliary control circuit (optional)** Appears if the auxiliary control circuit is activated	*5-138*
	5	**Symbol – PTO drive (optional)** Appears if the PTO drive is activated	*5-150*
	6	**Symbol – Floating position of the three-point receptacle (optional)** Appears if the three-point receptacle is in the floating position	*5-143*
H	1	**Symbol – Bucket return (optional)** Appears when the bucket return is activated	*5-140*
I	**kph**	**Symbol – travel speed display**	–
J	**rpm**	**Symbol – RPM of the diesel engine**	–
K	**bar**	**Not assigned**	–

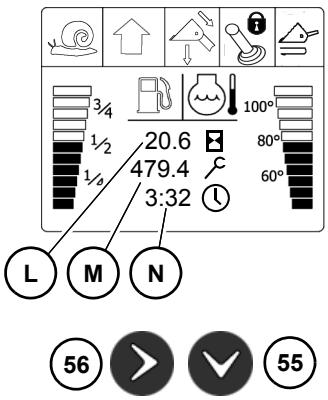


Fig. 155

Service indication

1. Select the service display. To do so, press the touch button 1x **55** (main display 1), then press the touch button **56** 1x.

Indication		Meaning	Page
L	**20.6**	**Hour meter** Indicates the operating hours since the delivery of the vehicle.	–
M	**479.4**	**Maintenance calculator** Indicates the remaining working hours up to the next maintenance interval. If the next maintenance interval is less than 30 working hours away, the warning symbol will be displayed in the main menu for 4 seconds (wrench) 10 seconds after the diesel engine starts. The hours up to the next maintenance interval are displayed in the following order: • 100 hours of operation (1st maintenance interval) • 400 hours of operation (no maintenance interval) • 500 hours of operation (2nd maintenance interval) • and every other 500 operating hours The maintenance indication can be reset only by an authorized service center. Resetting does not affect the display of the next interval.	*7-4*
N	**3:32**	**Time** Indicates the current time	*4-47*

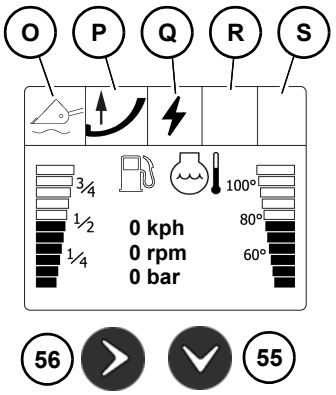
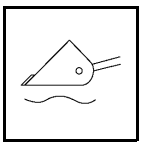
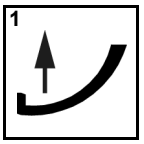
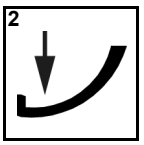
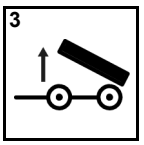
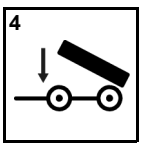
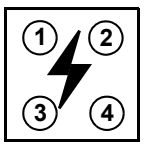


Fig. 156

Symbols in the main display 2

1. Menu change from the main display 1 to the main display 2. To do this, press the touch button **56** 1x.
2. Perform the interconnection of the menu in the main display 2 with the **55** touch button.

Indication		Meaning	Page
O		**Symbol – Load stabilizer of the loader unit** Appears if the load stabilizer is enabled	*5-121*
P		**Symbol - Auto-hitch coupling (optional)** Appears if the auto hitch coupling **is locked**	*5-130*
		**Symbol - Auto-hitch coupling (optional)** Appears if the auto hitch coupling **is unlocked**	*5-130*
		**Symbol – Raise the tipper (optional)** Appears if the tipper is raised	*5-135*
		**Symbol – Lower the tipper (optional)** Appears if the tipper is lowered	*5-135*
Q		**Symbol – Front socket (optional)** Appears if one of the 4 circuits has been activated via the front socket. ➥ Circuits 3 and 4 are not occupied	*5-61*
R	–	Not assigned	–
S	–	Not assigned	–

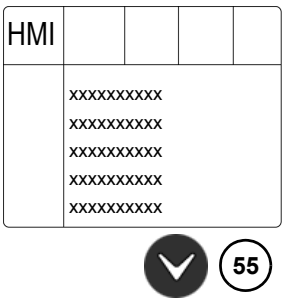


Fig. 157

Machine status indication on indicating instrument (HMI)

- In order to call the machine status indication (indicating instrument), press push button **55** repeatedly.
  ➥ Contains information (data) for the indicating instrument

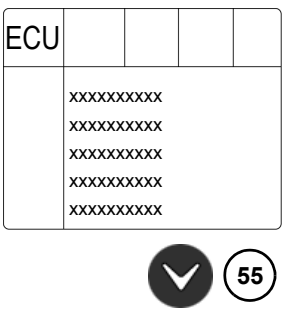


Fig. 158

Machine status indication on engine control unit (ECU)

- Not assigned

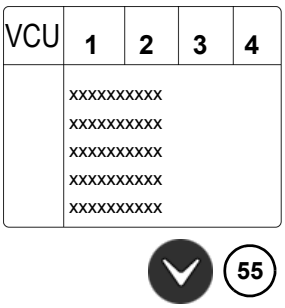


Fig. 159

Machine status indication on cabin controller (VCU)

- In order to call the machine status indication for the cabin controller, press push button **55** repeatedly.
  ➥ Contains information (data) for the cabin controller

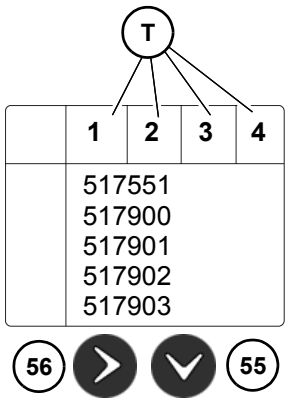


Fig. 160

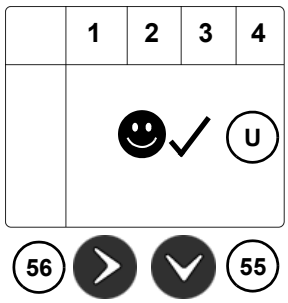


Fig. 161

Error memory

- In order to call the error memory, press push button **55** repeatedly.
- If the machine electronics detects an error, an acoustic warning sounds and the error is briefly displayed in the main indication.
- 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).
- Pressing push button **56** takes you to the next page of the error memory.
- Further information *– see chapter 8 " Malfunctions of the electrical system" on page 8-5*

Indication		Meaning	Page
T	**1 – 4**	6-digit error codes.	*8-5*
U		No error code.	–

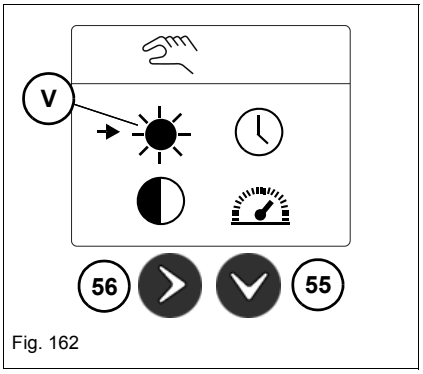


Fig. 162

Digital display settings – adjusting brightness

1. Press push button **55** repeatedly until the display settings appear.
2. Press touch button **56** until the symbol **V** is selected.

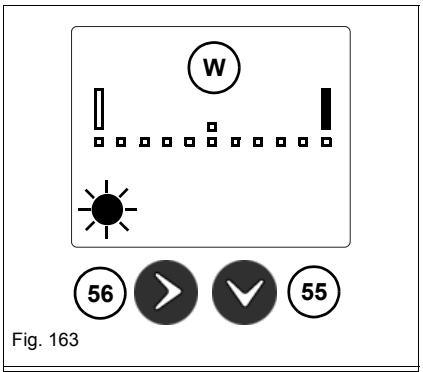


Fig. 163

3. Press button **55**
   ➥ Display **W** appears.
4. Press push button **56** repeatedly until you have the required brightness.
5. Press touch button **55** in order to leave the display **W**.

Digital display settings – adjusting contrast

1. Press push button **55** repeatedly until the display settings appear.
2. Press touch button **56** until the symbol **X** is selected.

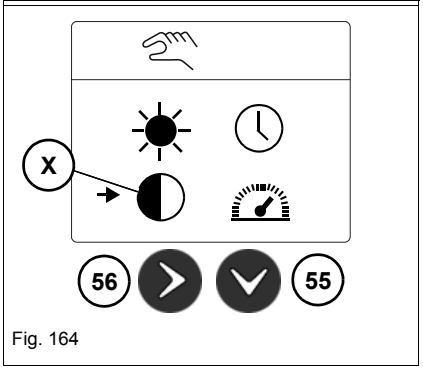


Fig. 164

3. Press button **55**
   ➥ Display **Y** appears.
4. Press push button **56** repeatedly until you have the required contrast.
5. Press the touch button **55** in order to leave the display **Y**.

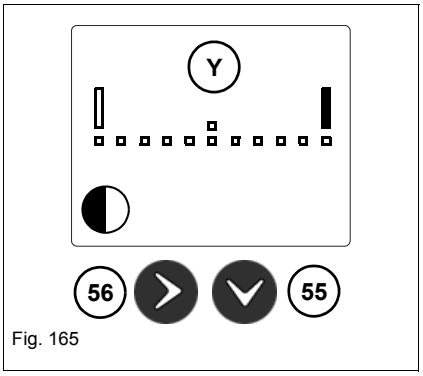


Fig. 165

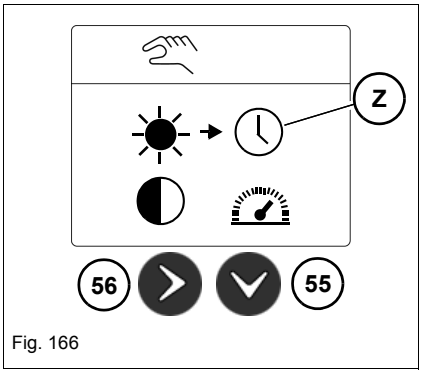


Fig. 166

Digital display settings – adjusting time

1. Press push button **55** repeatedly until the display settings appear.
2. Press the touch button **56** until the symbol **Z** is selected.

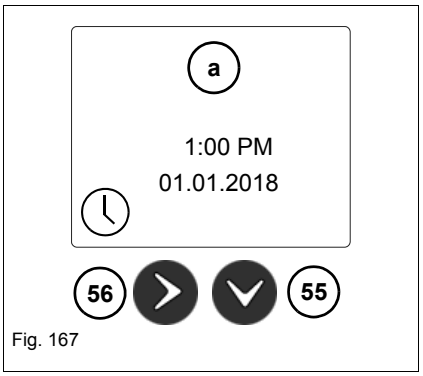


Fig. 167

3. Press button **55**
   ➥ The display **a** appears. The year flashes.
4. Press push button **56** repeatedly until the required year appears, and press push button **55**.
5. Repeat step 3 for the month, day, hours and minutes.

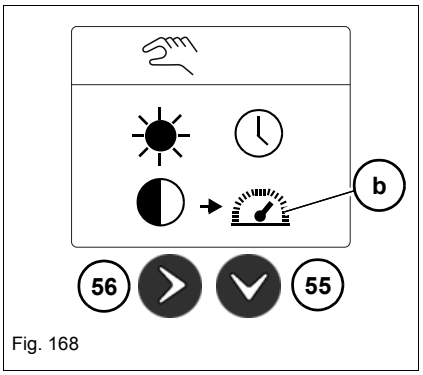


Fig. 168

Digital display settings – adjusting mph or kph.

1. Press push button **55** repeatedly until the display settings appear.
2. Press the touch button **56** until the symbol **b** is selected.

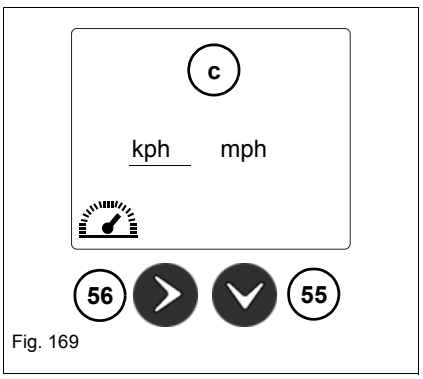


Fig. 169

3. Press button **55**
   ➥ The display **c** appears.
4. Press push button **56** repeatedly until the required setting is selected, and press push button **55**.
5. Repeat step 3 for the month, day, hours and minutes.
6. Press the touch button **55** in order to leave the display **c**.

Acoustic warnings

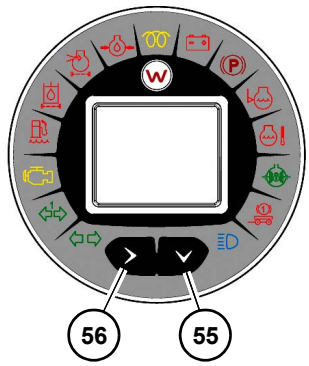


Fig. 170

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.

Continuous warning sounds remain until they are confirmed or reset.

- Short acoustic warnings are automatically confirmed.
  ➥ The error is saved.
- Continuous warning sound, confirmation by pressing the touch button **55** or **56**.
  ➥ The error is saved.

NOTICE

Ignoring the warning messages can lead to damage to the diesel engine as well as damage to the driving and / or work hydraulics.

► 10 seconds after restarting the diesel engine, errors with a continuous warning sound will always be displayed for 4 second until reset or repaired by an authorized workshop.

Continuous warning sounds are, for example:

➥ If the engine oil pressure falls below 2 bar – *see "Checking the engine oil level" on page 7-40*,
➥ If the engine oil pressure has reached 2 bar (28.4 psi) when starting the diesel engine.
➥ If the coolant temperature of the diesel engine rises above 120°C (248° F) – *see "Checking the coolant level" on page 7-44*.
➥ With a switched on low beam and switched off ignition – *see "Parking lights/low beam" on page 5-23*.
➥ If the operator's seat is left at over 7 km/h (4.3 mph) driving speed.

Reversing warning system

The signal transmitter generates an acoustic signal when shifting into reverse – *see "Backup warning system" on page 5-31*.

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 vehicle as you enter and leave it.
- ► Have damaged climbing aids replaced.

Information

For safety reasons, the vehicle is equipped with a start-up lock in all EU member states and in Australia.

The vehicle can only be operated if the operator has sat down on the operator's seat.

If the operator seat is left at a standstill or with the hand brake released, a continuous acoustic warning will sound.

If the operator's seat is left during the drive, the drive system goes into a neutral position when driving below 7 km/h (4.3 mph). At higher travel speeds, a continuous warning signal sounds.

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 vehicle may only be taken **into service** 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.
- Carrying or transporting accompanying persons in the cabin and/or on the machine is prohibited.
- Tell persons to leave the danger zone.
- The machine may only be used 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 by persons who are fully aware of the risks involved in operating the machine.
- Always observe the warning and information labels, and the load diagrams.
- Immediately replace (or have replaced) damaged or illegible warning and information labels with new ones.
- Adjust the rearview mirrors on the left and right.
- Observe the checklists in the following tables and take appropriate action – *see "Check lists" on page 4-52*.

Running-in period

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

- Do not put a cold diesel engine under load.
  - Let the diesel engine run at idling speed for about 3 minutes, then slowly increase the engine speed.
- 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 – 50 °C (68 – 122 °F).
- Strictly observe maintenance schedules and perform (or have performed) the specified maintenance *– see chapter 7 " Maintenance overview" on page 7-4*.

NOTICE

In order to achieve the maximum speed for vehicles with a high-speed transmission (optional), the axles and gearbox must at least been run in for 10 operating hours as well as have generally achieved a drive system temperature of about 50°C (122°F).

Furthermore, maximum speed is only reached on level, asphalted ground, with an empty bucket and without a trailer!

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 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	After cleaning, maintenance or repair work: Rags, tools and other loose objects removed?	
18	Approved warning triangle, warning light 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?	
7	Safe load indicator checked and OK?	
During machine travel on public roads, particular attention should be paid to the following points:		
8	Telescopic boom completely retracted?	
9	Bucket and attachments in transport position?	
10	Transport locks installed?	
11	Work hydraulics locked?	
12	Front-edge protection fitted to bucket?	
13	Compliance with requirements of machine documentation (Data Confirmation [Germany]/National Type Approval [Germany])?	

“Parking” checklist

“Parking” checklist		X
1	Attachments on the telescopic boom 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 (for example **StVZO** German road traffic regulations) and to the provisions laid down in the **National Type Approval (Germany)**, the **Data Confirmation (Germany)** or the **machine certification papers**.
- Only the attachments are authorized for use on public roads that are described in the National Type Approval (Germany), in the Data Confirmation (Germany), the license certificate (Germany) and in this Operator's Manual *– see "Use of attachments" on page 3-13*.
- Remove attachments that are not approved *– see "Use of attachments" on page 3-13*.
- Machine travel on public roads with loaded attachments 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 attachments from this vehicle are allowed on the trailer.
- Bear in mind the mandatory national regulations for accident prevention of the employers' liability insurance associations.
- Get informed on and follow the legal provisions, laws and standards of your country.

CAUTION

Danger of accident if the rear-view mirror is not properly adjusted!

Can cause injury.

► Adjust the rear-view mirror so that the view to the rear (vehicle side and rear) is securely visible.

Preparing machine travel on public roads

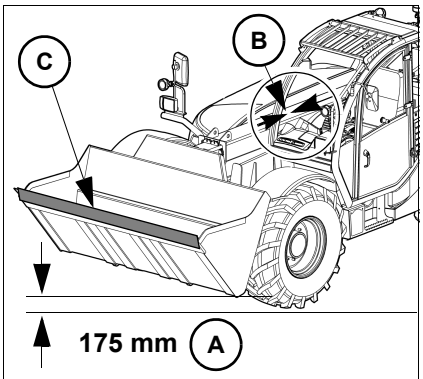


Fig. 171

- Remove attachments **that are not authorized for travel** on public roads– *see "Use of attachments" on page 3-13*.
- Bring the three-point mount (optional) into the transport position *– see "Three-point mount - power lift (optional)" on page 5-143*
- Completely retract the telescopic boom and tilt in the quickhitch facility..
- Raise the loader unit to transport height **A** about 175 mm (6.9 in).
  - ➥ Also see the red marking **B** on the telescopic arm and side window of the cabin.
- Install front-edge protection **C** on the cutting edge of the empty bucket.
- When driving with a standard bucket on public roads, bring the steering column into the forward-most position *– see "Steering column height and tilt adjustment (option)" on page 5-1*.
- Switch off the working lights during machine travel on public roads *– see chapter 5 " Working lights (standard/option)" on page 5-25*.
- With the high speed version (30 km/h / 18.64 mph), switch-over the steering system to the front axle steering *– see chapter 5 " Synchronizing the steering system" on page 5-2*.
- Switch on the load stabilizer (opt) *– see chapter 5 " Load stabilizer for loader unit (option)" on page 5-121*.
- Secure the work hydraulics *– see "Secure the control lever (joystick)/ lock the work hydraulics" on page 4-56*.
- Check all signaling and light systems for correct function.
- Remove the protective screens for the front window and/or the main lights (options).
- Lock the cabin door and the hinged window *– see "Locking/unlocking the door and the side window" on page 4-2*.
- When using a trailer, ensure that the trailer is safely locked in the coupling jaw and that the loads are safely tied down on the trailer.
- Adjust the correct seat position *– see "Seat adjustment" on page 4-16*
- Check the rearview mirror and adjust if necessary *– see "Field of vision during road travel" on page 4-6*.
- Fasten your seat belt *– see "Seat belt (lap belt)" on page 4-20*.

Secure the control lever (joystick)/lock the work hydraulics

The work hydraulics lock is activated or disabled with the touch button **97** in the keypad on the front right.

WARNING

Accident hazard due to unintentional loader unit operation!

Ignoring this can cause injury or death.

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

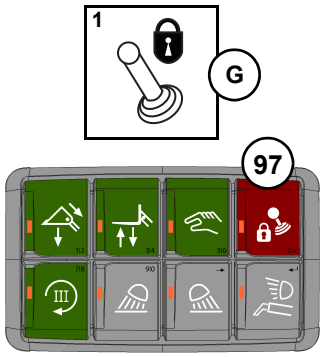


Fig. 172

Activate the lock of the work hydraulics (locking)

1. Press push button **97** briefly
   - ➥ Symbol **G/1** appears in the digital display
   - ➥ The following are locked: raising and lowering the loader unit, 3rd control circuit
   - ➥ The following options are locked: all auxiliary control circuits, three-point receptacle, drive PTO, auto hitch

Disable the lock of the work hydraulics (opening)

1. Press the touch button **97** again
   - ➥ Symbol **G** disappears in the digital display.
   - ➥ The work hydraulics are fully ready for operation.

Functional check of all control elements

- *– see "Checking the steering system" on page 5-2*
- *– see "Brake/inching pedal (service brake)" on page 5-10*
- *– see "Lights/signaling system" on page 5-23*
- *– see "Work hydraulics" on page 5-37*

Transport position of bucket

Machine travel on public roads

Attachments that are not permitted for driving on public roads must be removed and transported to the site of application by suitable transport means – *see "Use of attachments" on page 3-13*.

Information

German road traffic regulations prohibit driving on public roads if the distance between the front edge of the bucket and the center of the steering wheel is over 3500 mm (1378 in) in transport position.

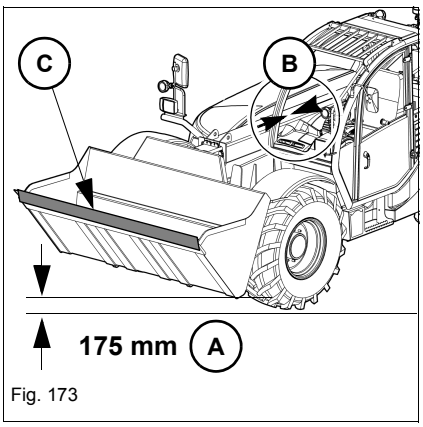


Fig. 173

Loader unit operation – *see "Work hydraulics" on page 5-37*.

1. Empty the attachment completely.
2. Retract the telescopic boom completely and tilt in the quickhitch facility, **but not fully to the limit**.
3. Raise the loader unit until the two red labels **B** on the telescopic arm and side window are congruent.
   ➥ Ground clearance **A** about 175 mm (6.9 in).
4. Cover the cutting edge or ripper teeth of the bucket with the provided protective device **C** across the entire width.
5. Switch on the load stabilizer – *see chapter 5 " Load stabilizer for loader unit (option)" on page 5-121*
6. Secure the control lever (joystick) – *see "Secure the control lever (joystick)/lock the work hydraulics" on page 4-56*.

Transport on construction sites

Loader unit operation – *see "Work hydraulics" on page 5-37*.

1. Tilt the bucket to the rear**.**
2. Raise the loader unit until the two red labels **B** on the telescopic arm and side window are congruent.
   ➥ Ground clearance **A** about 175 mm (6.9 in).

4.5 Starting and stopping the engine

Preparing to start the engine

Information

For safety reasons, the vehicle is equipped with a start-up lock in all EU member states and in Australia.

The vehicle can only be operated if the operator has sat down on the operator's seat.

If the operator seat is left at a standstill or with the hand brake released, a continuous acoustic warning will sound.

If the operator's seat is left during the drive, the drive system goes into a neutral position when driving below 7 km/h (4.3 mph). At higher travel speeds, a continuous warning signal sounds.

- Go through the "Starting the vehicle" checklist – *see "Starting checklist" on page 4-52*.
- Switch on the battery master switch – *see "Battery master switch" on page 4-22*.
- Apply the parking brake!
  - ➥ The motor will not start unless the parking brake is applied.
- Adjust your seating position – *see "Seat adjustment" on page 4-16*.
  - ➥ All controls must be within easy reach.
  - ➥ You must be able to move the brake and accelerator pedals to their limit positions!
- Adjust the mirrors.
- Fasten your seat belt.
- Check whether all additional control circuits are switched off – *see "Hydraulic control circuits/plug couplings (overview)" on page 5-51*.
- Disable the drive interlock (optional) – *see "Key-based drive interlock (option)" on page 4-24*
- Set the manual throttle (option) to idling speed – *see chapter 5 " Setting engine speed/enabling manual throttle" on page 5-8*.
- Set the low-speed control to the zero position – *see chapter 5 " Low-speed control (option)" on page 5-19*

Important information on avoiding engine damage

NOTICE

In order to avoid engine damage:

- ► After starting the diesel engine, do not accelerate into full speed operation from a cold state.
- ► Let the diesel engine run at idling speed for about 3 minutes, then slowly increase the engine speed.
- ► During the first 100 service hours of work operation, do not perform the work application with full engine output!
- ► Do not use additional starting aids (for example injection with start pilot).

NOTICE

In order to avoid starter motor damage:

- ► Do **not** start the engine again immediately after stopping it. Wait at least 15 seconds before restarting!
- ► If the diesel engine does not start, interrupt the start attempt after a max. 15 seconds to avoid damage to the starter and so that the battery can recover.
- ► Repeat the start attempt after about 1 minute.

Information

The engine cannot be started from towing the vehicle, since there is no friction connection between the engine and the gearbox (e.g. universal joint shaft)! (Hydrostatic drive.)

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).

Starting the engine

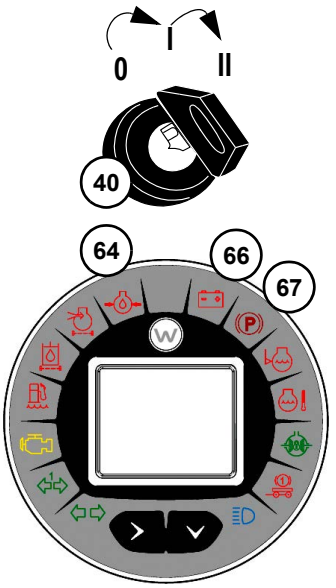


Fig. 174

Start the engine as follows

Caution! Pay attention to the safety instructions regarding internal combustion engines
– see chapter 2 " Safety instructions regarding internal combustion engines" on page 2-19.

The starting switch **40** is located on the dashboard to the right next to the steering wheel.

Information

The diesel engine has no pre-glow device!

1. Apply the parking brake.
2. Turn the starting key to position **I**.
   ➥ Indicator light check:
   all indicator lights illuminate briefly.
   ➥ The following warning lights remain on:
   - Control lamp **67** (parking brake activated).
   - Control lamp **66** (generator charge function).
3. Turn the starting key to position **II** and hold it until the engine runs.
4. Release the starting key.
5. Slowly increase engine speed.
6. Actuate the operating hydraulics and traveling drive only after all indicator lights have gone out.

NOTICE

If one of the control lamps **64 / 66** does not go out, immediately shut off the engine and have the reason checked by an authorized workshop! Have a malfunctioning indicating instrument immediately replaced.

► Also refer to *“Diesel engine malfunctions” on page 8-1*

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.

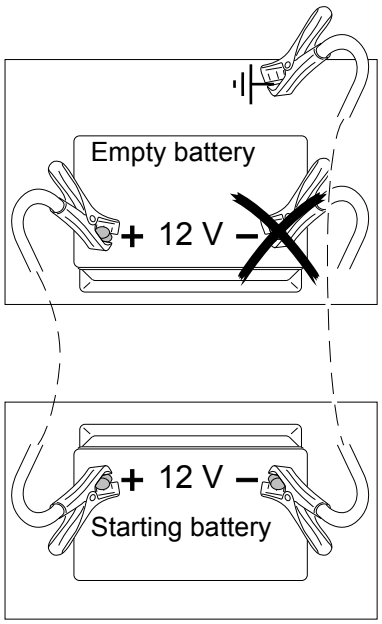


Fig. 175

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 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 running the engine under low-load conditions

NOTICE

The running behavior of the engine may be impaired if it is operated at higher RPMs and at less than 20% 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 %.

NOTICE

In order to avoid engine damage when starting, it automatically takes in gas time-delayed in a cold state.

► Allow the engine to idle for about 3 minutes.

Stopping the engine

NOTICE

In order to avoid engine damage due to overheating: Before stopping the engine after operation under full load, let it run about 3 minutes at idling speed so that the temperature can stabilize, then stop the engine.

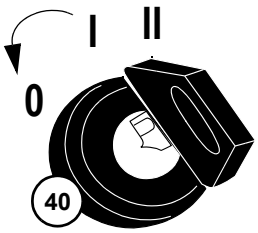


Fig. 176

NOTICE

In order to avoid starter motor damage, do **not** immediately restart the engine after shutting it down!

► Before restarting, wait at least 15 seconds and then restart the engine.

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 switch key (starting switch **40**) into position "**0**“ and pull out.

5 Operation

5.1 Steering system

Steering column height and tilt adjustment (option)

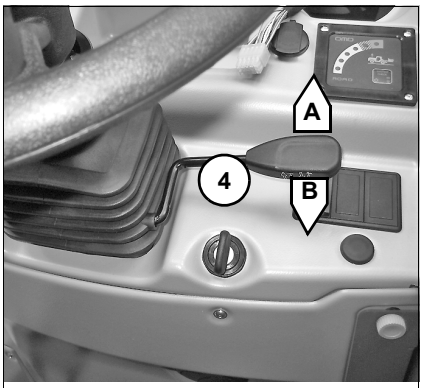


Fig. 177

The steering column height and angle can be set to the operator's individual size.

WARNING

Accident hazard when adjusting the steering column during machine operation!

Adjusting the steering column during machine operation can cause serious injury or death.

- ► Adjust the steering column before putting the machine into operation.
- ► Ensure that the steering column levers are locked into place.

Function	Operation
Height adjustment	1. Pull the lever **4** upwards **A** and pull or push the steering column into the right position. 2. Release the lever **4**. ➥ Steering column is locked.
Angle adjustment	1. Press lever **4** downward **B** and tilt the steering column to the correct position. 2. Release the lever **4**. ➥ Steering column is locked.

Checking the steering system

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 behavior! (Walking speed)

- 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.

Synchronizing the steering system

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 work operation.

The steering system must be synchronized from time to time.

WARNING

Accident hazard when synchronizing the steering system during machine travel!

Failure to observe this can cause serious injury or death.

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

Synchronizing with 4 wheel steering (standard)

1. Select a speed *– see "Travel speed increase/reduction/driving speed" on page 5-16*.
2. Select the travel direction with the switch on the joystick *– see "Select the travel direction, start, stop" on page 5-15*.
3. At low driving speed, turn the steering wheel to the **left or right** as far as it will go and try turning it even further in the end position against the pressure for a few seconds.
4. Quickly turn steering system **back** in into the straight-ahead position.
   ➥ Perform a test run to check that the front and rear wheels run in the same track.

Information

Have the steering system checked by an authorized service center if this does not synchronize the wheels.

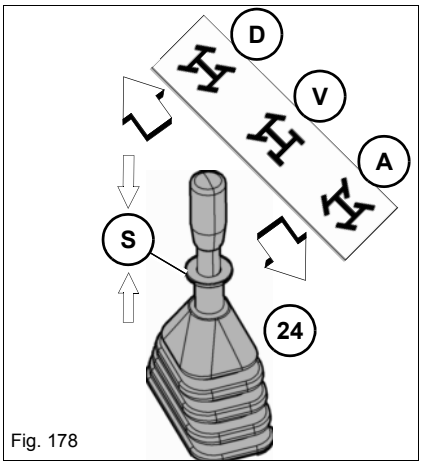


Fig. 178

Synchronize the front axle and diagonal steering

Information

Steering synchronization is only possible in the “4 wheel” steering mode!

1. Pull lock **S** on lever **24** out of the detent.
2. Pull lever **24** backward to position (**A = 4 wheel steering**).
3. Release lock **S**.
4. Check whether lever **24** is locked into place.

Information

Retainer **S** is pre-tensioned with a spring. Lock **S** automatically locks into place when it is released in lever position **A**!

The latching must be checked. If not functioning correctly, have this repaired by an authorized specialized workshop.

5. Select a speed *– see "Travel speed increase/reduction/driving speed" on page 5-16*.
6. Select the travel direction with the switch on the joystick *– see "Select the travel direction, start, stop" on page 5-15*.
7. At low driving speed, turn the steering wheel to the **left or right** as far as it will go and try turning it even further in the end position against the pressure for a few seconds.
8. Turn the steering wheel **rapidly** back to straight-ahead position.
9. Select the steering mode and perform a test run to check that the wheels on the front and rear axles run in the same track.

Information

Have the steering system checked by an authorized service center if this does not synchronize the wheels.

Front axle steering

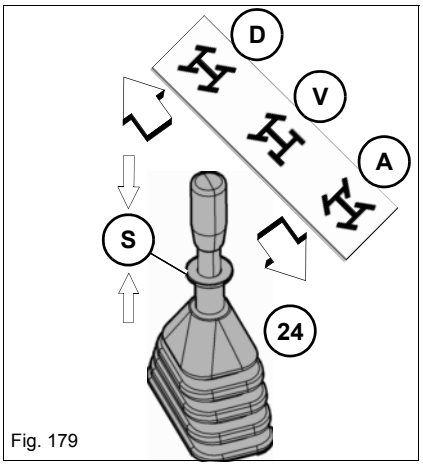


Fig. 179

When front axle steering is selected, only the front steering axle is steered. Front axle steering is used for fast transport and road travel.

WARNING

Risk of accidents when changing steering mode during machine travel!

Failure to observe this can cause serious injury or death.

- ► Only change the steering type at a standstill.
- ► The snapping into place of the retainer **S** must be checked. If not functioning correctly, have this repaired by an authorized specialized workshop.
- ► See the National Type Approval (Germany) or the Data Confirmation (Germany).

Changeover to front axle steering

Information

Only change to the front drum steering if the wheels of the front and rear axles are in the straight-ahead position. To do this, first select the "all-wheel" type of steering and synchronize the wheels in the straight ahead position
– see "4 wheel steering" on page 5-5.

1. Stop the vehicle.
2. Bring the wheels of the front and rear axle into the straight ahead position.
3. Pull lock ***S*** on lever **24** out of the detent.
4. Pull or push the lever **24** into the middle position **(V = front axle steering)**.
5. Release lock **S**.
6. Check whether lever **24** is locked into place.

4 wheel steering

When 4 wheel steering is selected (wheels run in the same track), both steering axles have the same steering angle, but in the opposite direction. 4-wheel steering is used for fast loading operations in confined spaces where only small turning circles are possible.

WARNING

Changing over from front axle to 4-wheel steering at high speed (high-speed option) causes accident hazard!

Failure to observe this can cause serious injury or death.

- ► Only change the steering type at a standstill.
- ► The snapping into place of the retainer **S** must be checked. If not functioning correctly, have this repaired by an authorized specialized workshop.

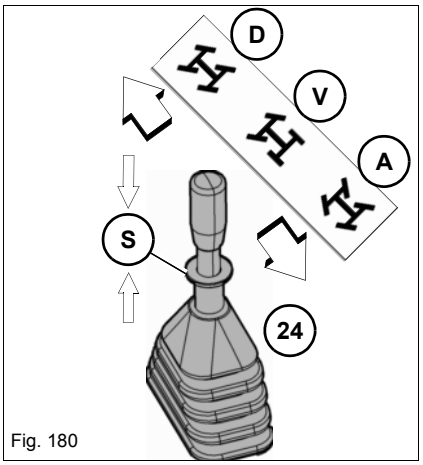


Fig. 180

Changing over to 4 wheel steering

Information

Only change to the all-wheel steering if the wheels of the front and rear axles are in the straight-ahead position. To do this, first select the "front drum steering" type of steering and synchronize the wheels in the straight ahead position – *see "Front axle steering" on page 5-4*.

1. Stop the vehicle.
2. Bring the wheels of the front and rear axle into the straight ahead position.
3. Pull lock **S** on lever **24** out of the detent.
4. Pull lever **24** backward to position (**A = 4 wheel steering**).
5. Release lock **S**.
6. Check whether lever **24** is locked into place.

Diagonal steering (crab steering)

When diagonal steering is selected, both steering axles are steered in the same direction. Diagonal steering (also called crab steering) is used for maneuvering in confined spaces where forward/reverse and sideways machine travel is required at the same time.

Diagonal steering is only permitted during work operation on short driving distances.

WARNING

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

Failure to observe this can cause serious injury or death.

- ► Only change the steering type at a standstill.
- ► The snapping into place of the retainer **S** must be checked. If not functioning correctly, have this repaired by an authorized specialized workshop.
- ► Before machine travel on public roads, changeover to front axle steering mode!

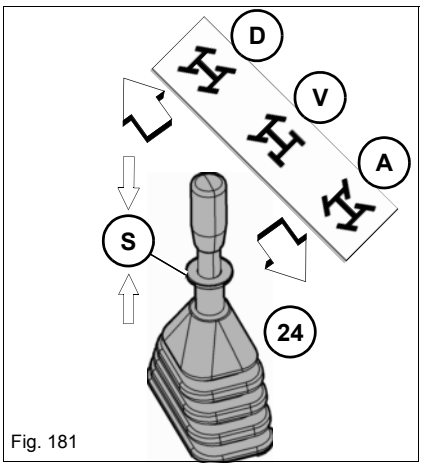


Fig. 181

Changing over to diagonal steering

Information

Only change to the diagonal steering if the wheels of the front and rear axles are in the straight-ahead position. To do this, first select the "all-wheel" type of steering and synchronize the wheels in the straight-ahead position
– see "4 wheel steering" on page 5-5.

1. Stop the vehicle.
2. Bring the wheels of the front and rear axle into the straight ahead position.
3. Pull lock **S** on lever **24** out of the detent.
4. Pull lever **24** forward to position (**D = diagonal steering**).
5. Release lock **S**.
6. Check whether lever **24** is locked into place.

5.2 Accelerator actuation

Accelerator pedal

Fig. 182

Important information on accelerator pedal operation

Engine and machine speed is continuously adjusted with accelerator pedal **36**.

Dirt accumulation and objects in the area of the accelerator pedal can result in malfunctions.

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

Information

Maximum speed depends on the speed range selected.

– see "Travel speed increase/reduction/driving speed" on page 5-16

Manual throttle (option)

Manual throttle function

This option is particularly useful for the operation of hydraulically operated attachments in order to ensure a uniform hydraulic oil supply.

It can also be equipped with the "low-speed control function" option for optimization.

WARNING

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

Failure to observe this can cause serious injury or death.

- ► Use the manual throttle for work operation only!
- ► Before performing machine travel on public roads, disable the manual throttle.

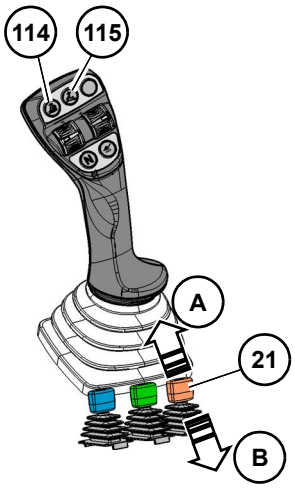


Fig. 183

Setting engine speed/enabling manual throttle

1. Once the engine has been started, pre-select the desired engine speed with the gas pedal (foot pedal).
2. Press manual throttle **21** forward (**A**) at least 3 seconds.
   ➥ The selected engine speed is saved.
3. **Increase the engine speed.** To do so, tilt the manual throttle regulator **21** briefly forward (**A**) until the desired engine speed is achieved.
   ➥ The engine speed is gradually raised by about 80 rpm.
4. **Reduce the engine speed.** To do so, tilt the manual throttle regulator **21** briefly backwards (**A**) until the desired engine speed is reduced.
   ➥ The engine speed is gradually reset (100 rpm).

Information

If necessary, the engine speed can be raised with the foot pedal. If the raised engine speed is no longer needed, the engine speed falls back to the last saved value.

In a neutral setting or travel direction change, the saved rpm is saved in the travel speed increase/reduction "snail and turtle".

Upon actuation of the brake-inch pedal, the saved engine speed is disabled in the "rabbit" travel speed increase/reduction. In the "snail and turtle" travel speed increase/reduction, however, it is saved.

The saved rpm is deleted when the diesel engine is shut off.

When changing between the travel speed increases/reductions of "snail, turtle or rabbit" (buttons **114, 115**), the manual throttle is completely disabled.

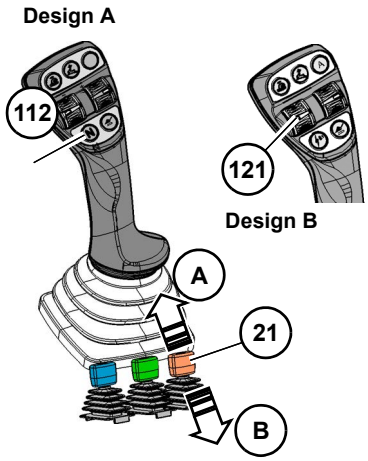


Fig. 184

Disabling the manual throttle

1. With the joystick design A: press the button **112**/**N** (neutral).
2. With the joystick design B: Bring the switch **121** into the central position.
   - ➥ The manual throttle and travel direction are disabled
   - ➥ The last saved speed remains preserved

Information

The saved rpm is deleted when the diesel engine is shut off.

5.3 Brake

Brake/inching pedal (service brake)

Important information on brake/inching pedal actuation

WARNING

Performing machine travel too fast can cause serious accidents!

Failure to observe this can cause serious injury or death.

► Before turning or downhill machine travel, reduce the travel speed with the brake/inching pedal (intermittent braking).

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

► Select the next lower speed .

Fig. 185

Brake/inching pedal **39** is located on the left in the machine!

Dirt accumulation and objects in the area of the brake/inching pedal can result in brake malfunctions.

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

Careful when stopping on slopes.

Press brake/inching pedal **39** down with force until the brake effect is felt.

Inching with the brake/inching pedal

- Press the brake/inching pedal **39 down** slightly
  - In the inching range (pedal pressed lightly), 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 work hydraulics.
  - This makes it possible to raise the loader unit more quickly.

Information

The brake lights do **not** illuminate in the inching range!

► For the brake lights to illuminate, press the brake/inching pedal down with force.

Braking with the brake/inching pedal

WARNING

Performing machine travel too fast can cause serious accidents!

Failure to observe this can cause serious injury or death.

► Before turning or downhill machine travel, reduce the travel speed with the brake/inching pedal (intermittent braking).

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

► Select the next lower speed  .

Fig. 186

- Check before moving off:
  - A firm resistance must be felt after half the pedal travel.
  - After looking in the rearview mirror and at low speed, press down the brake/inching pedal **39** and check the braking effect.

Parking brake (hand brake)

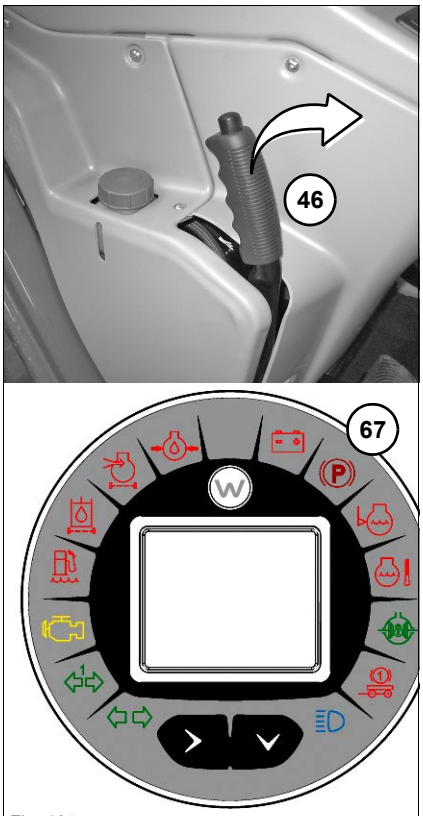


Fig. 187

Information on the parking brake

The parking brake **46** is located at the front left in the cabin.

NOTICE

A starting interlock prevents the machine from starting with the parking brake applied.
When the parking brake is engaged, the travel direction selection (drive system forwards / reverse operation) is automatically canceled and put into the neutral position!

Applying the parking brake

CAUTION

Danger of accident from control of the parking brake while driving. The machine is braked abruptly! No brake lights

The control of the parking brake may only be used in emergency situations with a failed service brake! Can cause injury.

- ► The brake lights are not activated when controlling the parking brake
- ► In normal operation use only the brake/inching pedal as a service brake.

1. Pull parking brake lever **46** backward in the direction of the arrow.
   - ➥ The control light **67** on the indicating instrument illuminates.
   - ➥ Selection of forward/reverse travel direction (drive) is automatically canceled and the neutral position is activated.
   - ➥ The engine can be started now.

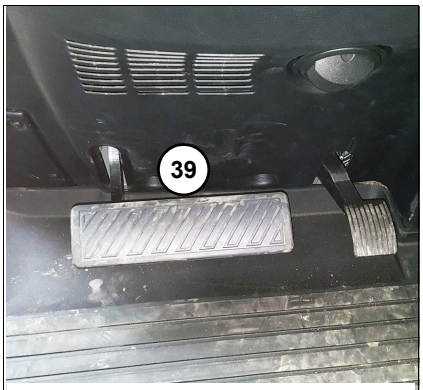
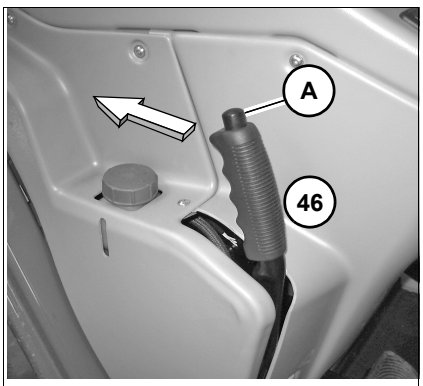


Fig. 188



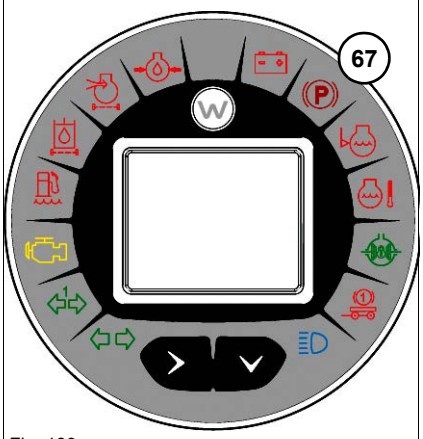


Fig. 189

Release the parking brake

The parking brake cannot be released unless the following conditions are fulfilled:

1. The operator must sit on the operator's seat.
2. Press down the brake/inching pedal **39**.
3. Press button **A** and guide the parking brake **46** forward to the detent.
   ➥ Indicator light **67** on the indicating instrument extinguishes.
   ➥ The machine is ready for travel operation.
4. After the parking brake has been released, actuate the gas pedal in a metered manner and carefully release the brake pedal (harmonious start).
   ➥ When starting on a hill, ensure that the vehicle does not roll back.

5.4 Machine travel operation

Important notes about the drive system

WARNING

Accident hazard due to persons in the danger zone!

People who are in the danger zone of the vehicle or who suddenly enter it may be injured or killed by the work motions of the vehicle.

- ► Correctly adjust the rear-view mirror, possibly using visual aids, e.g. camera (optional)
- ► Work particularly carefully when reversing the machine.
- ► Interrupt work immediately if persons enter the danger zone.

WARNING

Danger of accident when changing the travel direction at high travel speeds!

Failure to observe this can cause serious injury or death.

Reduce the driving speed of the vehicle to below 3 km/h (1.8 mph) and then perform the travel direction change.

Information

For safety reasons, the vehicle is equipped with a start-up lock in all EU member states, Switzerland and in Australia. The vehicle can only be operated if the operator has sat down on the operator's seat.

If the operator seat is left at a standstill or with the hand brake released, a continuous acoustic warning will sound.

If the operator's seat is left during the drive, the drive system goes into a neutral position when driving below 7 km/h (4.3 mph). At higher travel speeds, a continuous warning signal sounds.

Select the travel direction, start, stop

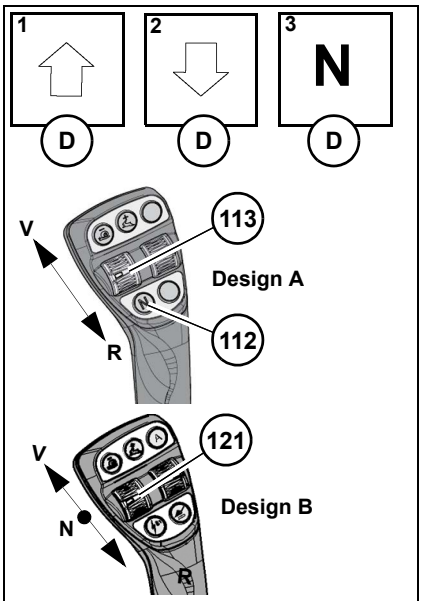


Fig. 190

Selecting a travel direction and starting machine travel

1. Select a speed – *see chapter 5 " Travel speed increase/reduction/ driving speed" on page 5-16*
2. Press down the brake/inching pedal with force.
3. Release the parking brake.
4. Select the travel direction with the rocker switch **113 or 121** push forward or backward on the joystick.
   - ➥ **V** = forwards - Symbol **D/1** appears in the digital display
   - ➥ **V** = reverse operation - Symbol **D/2** appears in the digital display
5. Slowly release the brake-inch pedal and actuate the gas pedal.
6. Test the brakes at low speed.

Information

If the travel direction selection is not accepted (no function), the button **112/N** was accidentally pressed when operating the travel direction selection (only possible with the KRAMER joystick) or the hand brake is not yet activated.

Information

The travel direction change (forwards / reverse operation) can be performed from any travel speed increase/reduction, but for safety reasons is first activated once the travel speed has been reduced to 3 km/h.

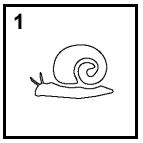
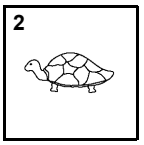
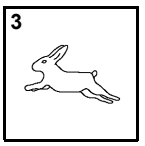
Stopping the machine

1. Reduce engine speed. To do this: remove your foot from the accelerator pedal.
2. Stop the machine with the service brake.
3. Select the travel direction with the button **112** or switch the rocker switch into the **121** neutral position.
   - ➥ Symbol **D/3** appears in the digital display.
4. Apply the parking brake.

Travel speed increase/reduction/driving speed

Overview of the travel speed increases/reductions

The vehicle has three travel speed increases/reductions.

Item	Symbol	Travel speed increase/reduction / travel speed	Recommended in application
D		1st travel speed increase/reduction: • 0 – 7 km/h (0– 4.3 mph)	For work requiring precise speed adjustment
		2nd speed: • 0 – 15 km/h (0 – 9.3 mph)	When working with short load cycles, i.e. with a fast sequence of material pick-up and dumping (e.g. loading on a lorry)
		3rd travel speed increase/reduction: • 0 – 20 km/h (0 – 12.4 mph) 0 – 30 km/h (0 – 18.6 mph) (Opt)	For long distances

Information

In order to avoid damage to the driving hydraulics, the drive system was set by the plant so that the full **driving dynamics** first can be achieved at a drive system temperature of about 20 – 30° Celsius (68 – 86°F)!

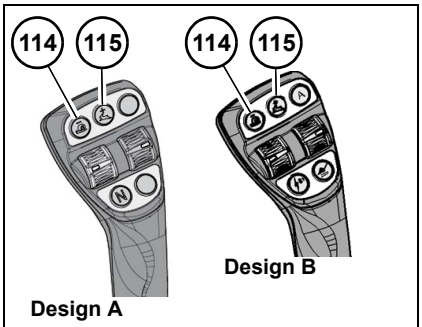


Fig. 191

Selecting a speed range

After the travel direction selection, select – *see "Select the travel direction, start, stop" on page 5-15* the travel speed increase/reduction/driving speed.

1. Increase the travel speed. To do this, actuate the button **115 (+)**.
   ➥ Symbol **D/2** or **D/3** appears in the digital display.
2. Reduce the travel speed. To do this, actuate the button **114 (-)**.
   ➥ Symbol **D/2** or **D/1** appears in the digital display.

Information

After restarting, the last selected travel speed increase/reduction is preserved (saved).

Exception! Before restarting the engine, if the travel speed increase/reduction "rabbit" and the steering type "diagonal steering" were selected, then the travel speed increase/reduction switches to "turtle" when restarting the engine for safety reasons.

Parking the machine

WARNING

Accident hazard if the machine is parked on slopes without any wheel chocks!

Failure to observe this can cause serious injury or death.

- ► Secure the vehicle from rolling away with the parking brake (hand brake).
- ► In addition to the parking brake, secure the machine by placing chocks under the downhill sides of the wheels.

NOTICE

In order to avoid engine damage, idle the engine for about 3 minutes to balance the temperature and then shut it off.

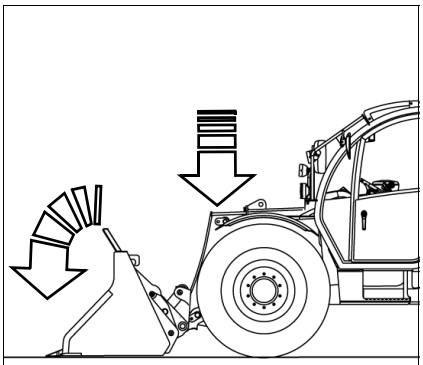


Fig. 192

1. Apply the parking brake *– see chapter 5 " Parking brake (hand brake)" on page 5-12*.
2. Switch off all additional control circuits.
3. Lower the telescopic boom completely and set the bucket horizontally with the ground *– see "Raise / lower the loader unit, extend and retract the telescopic boom" on page 5-43*.
4. Switch off the engine. To do this, turn the ignition switch key in the position "**0**“ and remove the ignition switch key.
   ➥ The immobilizer (opt) is enabled.
5. Close and safely lock the door and the windows.
6. Close the engine cover.
7. Remove the key from the battery master switch *– see "Battery master switch" on page 4-22*.

Additionally on slopes:

8. Take additional measures to secure the machine by placing chocks **A** under the downhill sides of the wheels.

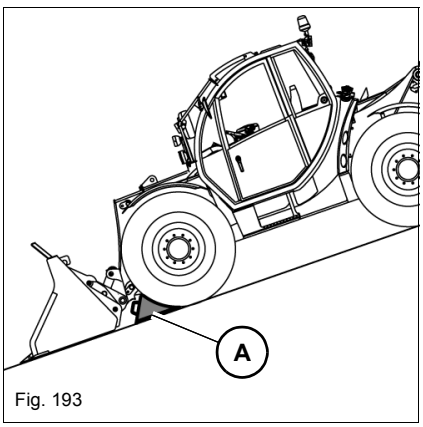


Fig. 193

Information

Wheel chock **A** is located at the left on the frame behind the cabin.

The wheel chock must always be on board the machine if it is registered as a self-propelled work machine.

Low-speed control (option)

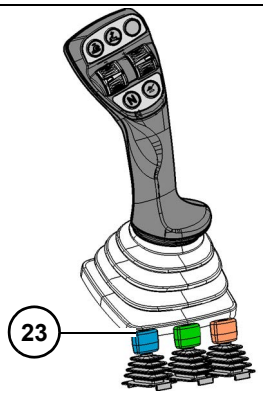


Fig. 194

Important information on the low-speed control with regulated travel speed (CSD = Constant Speed Drive)

This option is particularly useful for the operation of hydraulically operated attachments (e.g. rotary sweeper, rotary tiller) in order to ensure a uniform travel speed.

It can also be equipped with the "manual throttle" option for optimization.

The desired travel speed is variably set with the slide control **23** and automatically maintained self-contained of the engine speed – *see "Activate the low-speed control function" on page 5-20*.

Information

The operation of the low-speed control is only possible in the "snail" speed and from an engine speed of about 1100 rpm
– see "Travel speed increase/reduction/driving speed" on page 5-16!

Information

For safety reasons, the low-speed control function is disabled and set to zero:
- when the diesel engine is restarted,
- when changing the travel speed to "rabbit,"
- when changing to the neutral position of the travel speed increase/ reduction.

When restarting, the low-speed control function must be reactivated and set to the desired travel speed.

Information

In order to achieve the maximum travel speed of the travel speed increase/reduction in normal work application, the low-speed control function must be disabled *– see "Disabling the low-speed control" on page 5-20*.

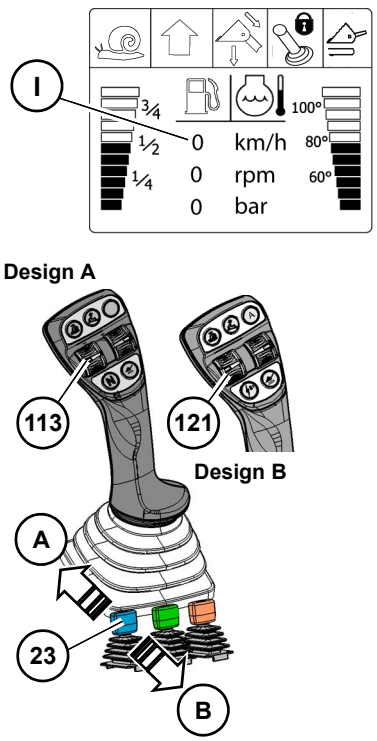


Fig. 195

Activate the low-speed control function

1. Select the “Turtle” speed – *see chapter 5 " Travel speed increase/ reduction/driving speed" on page 5-16*
2. Press down the brake/inching pedal with force.
3. Release the parking brake.
4. Activate the low-speed control function. To do so, slide the slide **23** controller all the way forward or backward (**A or B**).
   ➥ Low-speed control is enabled.
5. Set the desired driving speed. To do so, slide the slide controller **23** all the way forward or backward
   ➥ The travel speed (km/h) will be shown in the display **I** of the digital display.
6. Select the travel direction with the rocker switch **113 or 121** push forward or backward on the joystick.
7. Slowly release the brake-inch pedal and actuate the gas pedal.
   ➥ The set travel speed will be maintained self-contained of the engine speed

Disabling the low-speed control

1. Disable the low-speed control function. To do so, slide the slide controller **23** all the way forward (**A**).
   ➥ Low-speed control function is disabled
   ➥ The maximum travel speed of the travel speed increases/ decreases is again available.

5.5 Differential lock

Important information on the differential lock

The 100 % front axle differential lock neutralizes the compensating effect of the differential. In other words, traction is distributed evenly to both front wheels.

WARNING

Accident hazard! Machine travel on public roads with enabled differential lock!

Failure to observe this can cause serious injury or death.

- ► Switch off the differential lock during machine travel on public roads.
- ► Use the differential lock only for off-road applications, at low speed and during straight-ahead machine travel!

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 off the differential lock when cornering.

Switch the differential lock on / off

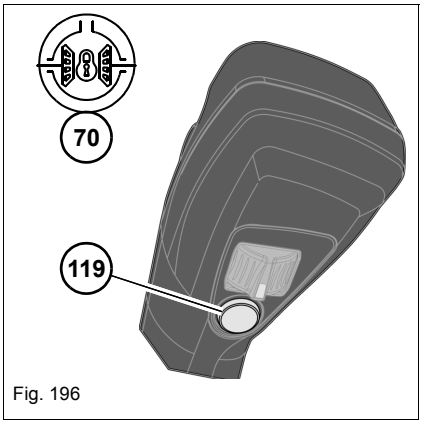


Fig. 196

Information

In order to avoid damage when switching on the differential lock, the differential lock can only be operated in combination with the button **119** (rear side of joystick) and the simultaneous depression of the brake-inch pedal!

Switching on the differential lock

1. Stop the machine.
2. Briefly depress the brake-inch pedal (3-4 seconds).
3. Press and hold tip switch **119** on the joystick
   - ➥ Indicator light **70** on the indicator illuminates.
   - ➥ The differential lock is enabled.
4. Carefully move off the vehicle with push button **119** pressed.

Switching off the differential lock

1. First reduce travel speed and engine speed.
2. Release button **119** on the joystick.
   - ➥ Indicator light **70** on the instrument panel goes out, the differential lock is disabled.

Information

Depending on the load of the drive train, the differential lock may also be active for a short time after releasing the touch button.

The differential lock is disabled only after indicator light **70** goes out!

5.6 Lights/signaling system

Parking lights/low beam

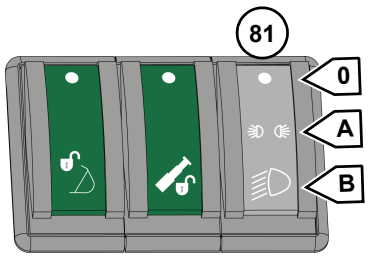


Fig. 197

The switch panel for the machine lights is located on the left on the instrument panel.

The parking light and low beam are controlled via the 2-level toggle switch **81**

Parking light operation		Function
ON	Press switch **81** to middle position **A**.	➥ The LED in the switch illuminates. ➥ Parking light ON
OFF	Press switch **81** to position **0**.	➥ The LED in the switch goes out ➥ Parking light OFF

Low beam operation		Function
ON	Press switch **81** to position **B**.	➥ The LED in the switch illuminates ➥ Low beam ON
OFF	Press switch **81** to position **0**.	➥ The LED in the switch goes out ➥ Low beam OFF

Information

If the ignition is switched off with the low beam switched on, only the parking lights remain on and a warning sound becomes active!

High beam/headlight flasher

WARNING

Accident hazard due to blinded motorists!

For trips on public roads, other motorists may be blinded by switched on high beams or headlamp flashing. If not observed, this may lead to serious injury or death.

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

► Observe the national regulations.

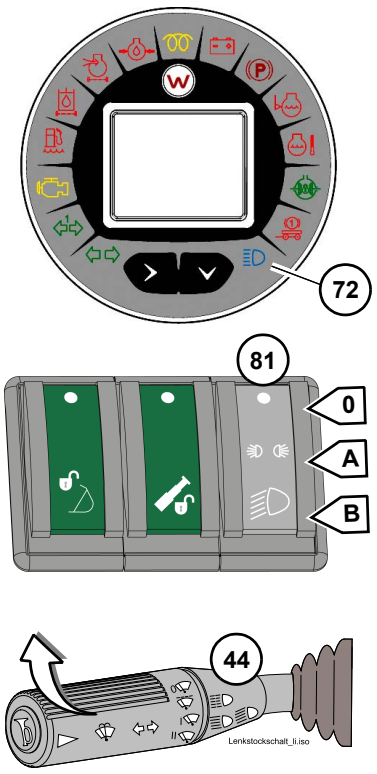


Fig. 198

The high beam and headlamp flashing are switched on and off via the multifunction lever **44**.

High beam operation		Function
ON	1. Press the rocker switch **81** into position **B**. 2. Pull the multifunction lever **44** toward the steering wheel and release.	➥ High beam and indicator light **72** illuminate
OFF	3. Pull the multifunction lever **44** toward the steering wheel again and release.	➥ High beam and indicator light **72** go out
Headlight flasher operation		**Function**
ON	Press the multifunction lever **44** toward the steering wheel briefly.	➥ High beam and indicator light **72** illuminate

Working lights (standard/option)

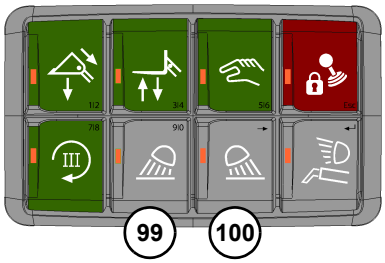


Fig. 199

The machine is equipped with several working lights in different versions to ensure optimal light conditions of the work area.

The operation (button **99/100**) of the work lights is located in the control panel to the right of the operator's seat.

- 1 work light on the left rear of the cabin roof (standard)
- 1 work light on the right rear of the cabin roof (optional)
- 2 working light for telescopic boom (option)
- 1 work light on the left front of the cabin roof (standard)
- 1 work light on the right front of the mirror holder (optional)

WARNING

Accident hazard due to blinded motorists!

For trips on public roads, other motorists may be blinded by switched on work lights. If not observed, this may lead to serious injury or death.

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

► 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 work lights before shutting off the diesel engine.

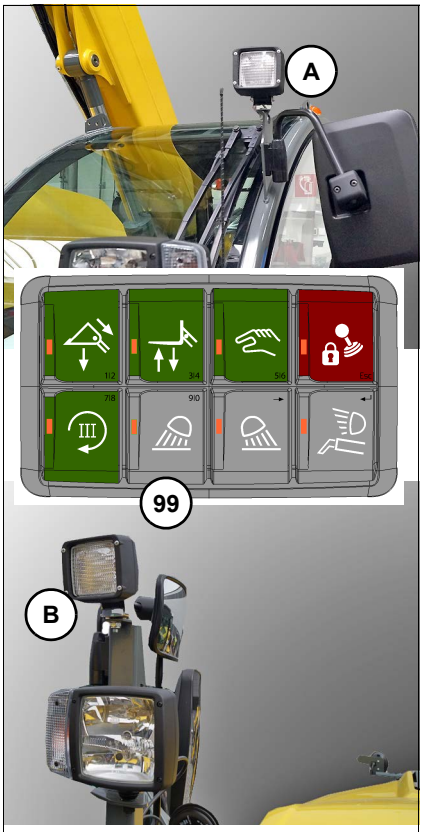


Fig. 200

Front working lights

- 1 work light **A** on the left front of the cabin roof (standard)
- 1 work light **B** on the right front of the mirror holder (optional)

Information

The work light in the front right (optional) and the standard work light on the front left are simultaneously operated with the button **99**.

Operation of front working lights		Function
ON	Press the touch button briefly **99**	➥ The LED in the push button illuminates. ➥ The working lights are switched on
OFF	Press the touch **99** button again briefly	➥ The LED in the push button goes out. ➥ The working lights go out

Fig. 201

Work light on the telescopic arm (optional)

- 2 working light for telescopic boom (option)

Front telescopic boom working lights (option)		Function
ON	Press push button **101** briefly	➥ The LED in the push button illuminates. ➥ The working lights are switched on
OFF	Press the touch **101** button again briefly	➥ The LED in the push button goes out. ➥ The working lights go out

Fig. 202

Rear working light

- 1 work light on the left rear of the cabin roof (standard)
- 1 work light on the right rear of the cabin roof (optional)

Information

The work light in the rear right (optional) and the standard work light on the rear left are simultaneously operated with the button **100**.

Operating the rear working lights		Function
ON	Press push button **100** briefly	➥ The LED in the push button illuminates. ➥ The working lights are switched on
OFF	Press the touch **100** button again briefly	➥ The LED in the push button goes out. ➥ The working lights go out

Interior light

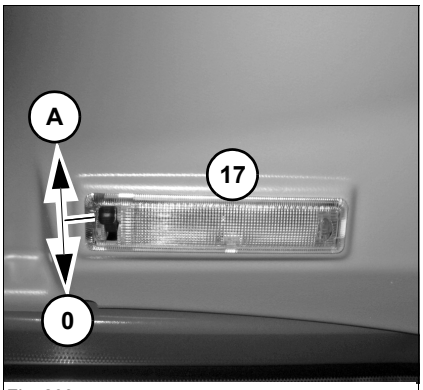


Fig. 203

The interior light is located at the upper right on the cabin roof and is adjusted with switch **17**.

Interior light operation		Function
A	Switch upward	➥ Interior light **ON** (continuous operation)
0	Switch downward	➥ Interior light **OFF**

Turn indicators

NOTICE

If the control lamp **58** of the travel direction display is flashing about twice as quickly as normally, then the indicator system is not functioning properly!

► Have the turn indicator system repaired.

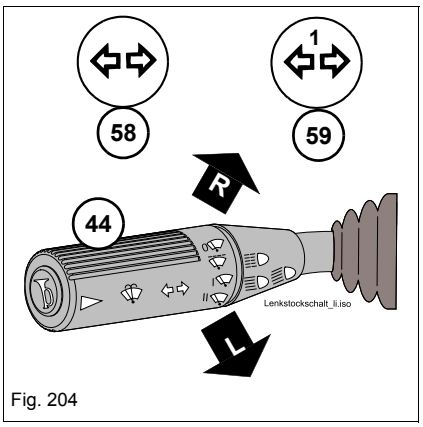


Fig. 204

Operating the turn indicators		Function
Right	Press the lever **44** in the direction **R**.	➥ Indicator light **58** flashes. ➥ The control light **59** flashes in addition during trailer operation.
Left	Pull the lever **44** in the direction **L**	➥ Indicator light **58** flashes. ➥ The control light **59** flashes in addition during trailer operation.

Hazard warning system

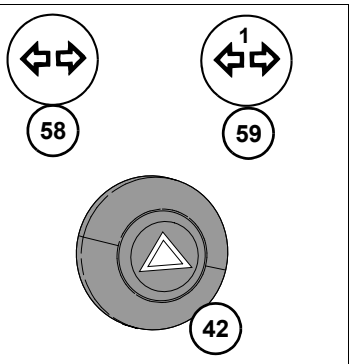


Fig. 205

The hazard warning system switch is located on the left on the instrument panel.

Hazard warning system operation		Function
ON	Press hazard warning system switch **42**	➥ The indicator light in the switch and indicator light **58** flash. ➥ Indicator light **59** flashes, too, during trailer operation (option)
OFF	Press hazard warning system switch **42** again	➥ Control lamp in the circuit breaker and the control lamp **58 and 59** go out.

Signal horn (horn)

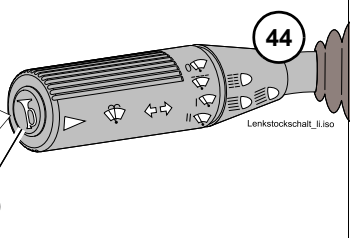


Fig. 206

Operating the horn		Function
ON	Press push button **53** briefly inward	➥ The horn sounds

Rotating beacon (option)

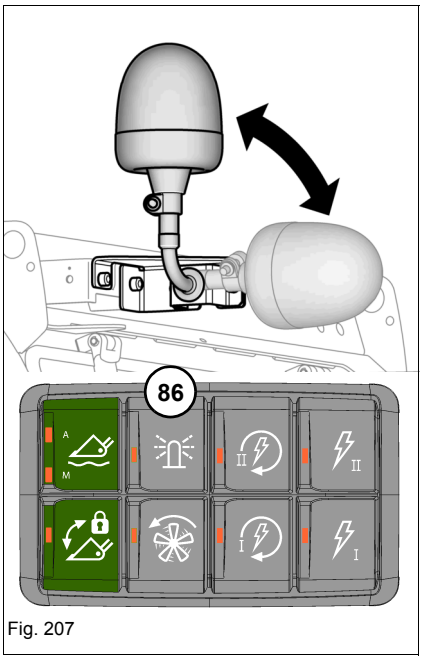


Fig. 207

The operation (touch button) is located in the switch console on the right on the dashboard.

Hazard warning system operation		Function
Fold up and lock the rotating beacon		
ON	Press push button **86** briefly	➥ The LED in the push button illuminates. ➥ Rotating beacon on
OFF	Press the touch **86** button again briefly	➥ The LED in the push button goes out. ➥ Rotating beacon OFF

Information

In Germany, switching on the rotating beacon during machine travel on public roads is prohibited!

Exceptions are permitted:

- ► 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 operation,
- ► when the vehicle has a safety label in the front and rear according to DIN 30710 (optional),
- ► when the vehicle is approved with official plates.

Observe the legal regulations of your country.

NOTICE

In order to avoid damage to the rotating beacon in work operation, fold this down and lock it when not in use.

Backup warning system

WARNING

Risk of injury 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.

The reverse warning system consists of a signal transmitter **A**, which is fitted at the rear of the vehicle.

The signal transmitter generates an acoustic signal when shifting into reverse.

The volume at a distance of 1 m (39.3 in) is about 103 dB (A) at a frequency of 2800 Hz.

Information

The signal transmitted can be programmed to emit a continuous sound at service by request.

Information

According to EN 1459, the reverse warning system is required for vehicles that are approved for road traffic.

According to the standard, a signal must sound when starting the reversing movement.

5.7 Window wiper - / wash system

Washer system operation

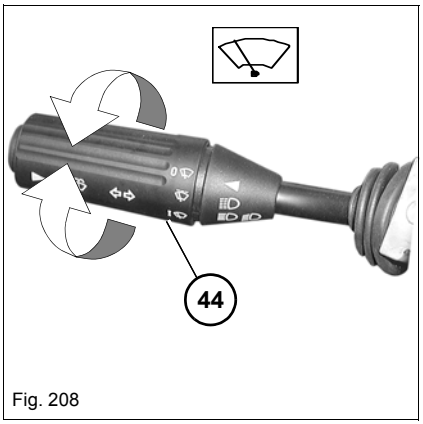


Fig. 208

Front wiper		Function
ON	Turn rotary switch **44** on the lever to the **1st** position	➥ Intermittent wipe
ON	Turn rotary switch **44** on the lever to the **2nd** position	➥ Continuous wiping
OFF	Turn rotary switch **44** on the lever completely back	➥ Wipers return to base position

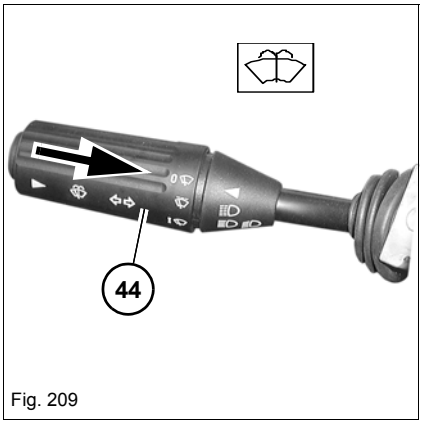


Fig. 209

Washer pump[1] (front and rear windows)		Function
ON	Press and hold rotary switch **44** toward the steering column	➥ Washer nozzle in operation ➥ The front wiper wipes 3 times
OFF	Release rotary switch **44**	➥ Washer nozzle off ➥ Front wiper off

1. The rear window is sprayed when operating the washing fluid pump

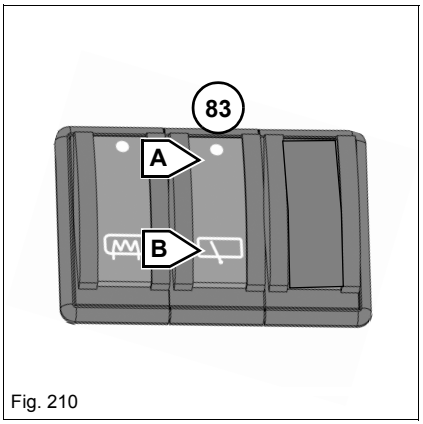


Fig. 210

Rear wiper (rear window)		Function
ON	Press button **83** to position **B**	Rear wiper functioning
OFF	Release the button **83** in the position **A**	Rear wiper returns to base position

Washer system reservoir

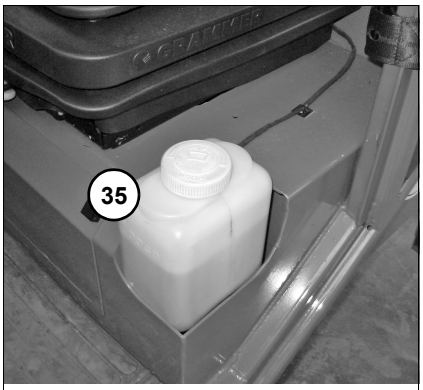


Fig. 211

Tank **35** is located in the cabin to the left of the seat.

Information

Add only clean tap water!

Add a suitable cleaning agent if necessary.

If there is a risk of freezing: use windscreen wiper fluid with antifreeze for windscreen wiping systems.
Refer to the antifreeze instructions for further information on concentrations.

5.8 Heating, ventilation and air conditioning system

Heating and ventilation

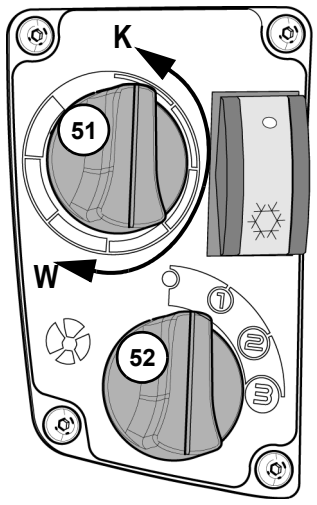


Fig. 212

The airflow is directed to the front window via two air vents, and to the legroom area via one air vent.

Each nozzle can be closed and directed separately.

The rotary switches **51** and **52** are located on the left on the instrument panel.

The machine heater can be set to 2 operating modes:

- Ventilation
- Heating

Ventilation

1. Turn the rotary switch **52** to position **1 – 3**.

Heating

1. Turn the rotary switch **52** to position **1 – 3**.
2. Set rotary switch **51** to the required temperature:
   K = cold/**W** = warm

Rear window heating (option)

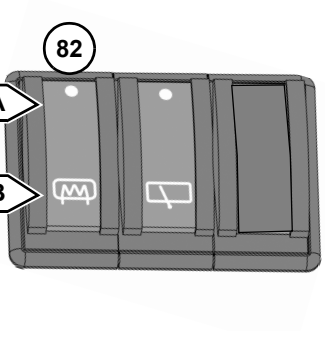


Fig. 213

The operation (switch) is located in the front right next to the steering wheel.

Rear window heating		Function
ON	Press switch **82** to position **B**.	➥ The indicator light in the switch illuminates. ➥ Heating is in operation.

Information

The rear window heating independently switches off once the temperature is reached (about 5 minutes)!

Air-conditioning system (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.

The following conditions have to be met to achieve best air-conditioning system 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 condenser, switch off the air conditioning system in due time before the end of work.
- Bring the fresh air/circulating air slide into recirculation mode.

NOTICE

The following is to be observed in order to avoid malfunctions, the loss of coolant as well as the drying out of gaskets.

► 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.

► Check the V-belt for cracks and correct tension.

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

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

Air conditioning operation

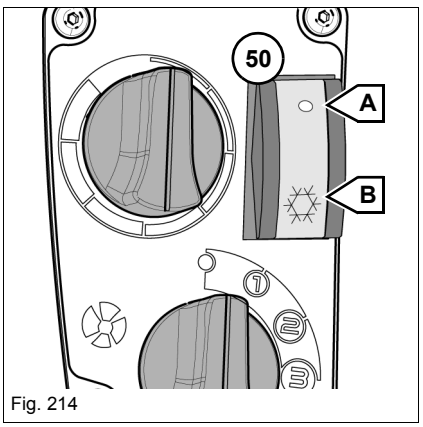


Fig. 214

The operation (toggle switch **50**) is located in the switch console (heater) on the left next to the steering wheel.

Air conditioning operation		Function
ON	Press the rocker switch **50** into position **B**.	➥ The LED in the switch illuminates ➥ Air conditioning system in operation
OFF	Press the rocker switch **50** into the 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 *– see "Heating and ventilation" on page 5-34*!

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

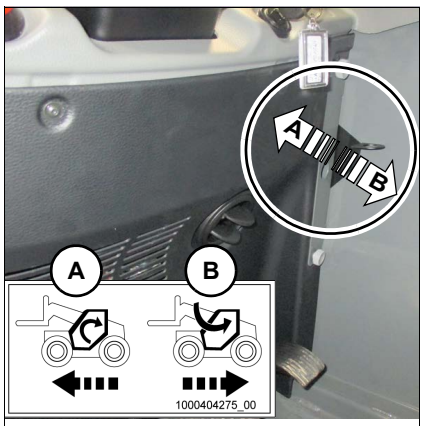


Fig. 215

Fresh air/recirculated air circuit (for air-conditioning system option)

The fresh air/recirculated air circuit is used to select between the supply of ambient air (fresh air) and the recirculation of the air in the vehicle (recirculated).

The fresh air/recirculated air circuit is located at the upper right of the accelerator pedal.

To change the air supply, put the slide in the desired position.

Operation	Function
Put the slide in position **A**.	➥ Recirculated air mode
Put the slide in position **B**.	➥ Fresh-air mode

Information

The switched on recirculated air system prevents the exchange of air.

- ➥ During prolonged operation of the air-conditioning system in recirculated air mode, **extremely dry** air can be created in the vehicle interior.
- ➥ During prolonged operation of the heater in recirculated air mode without an air-conditioning system, **extremely humid** air can be created in the vehicle interior.

Maximum cooling output

The maximum cooling output is reached if recirculated air mode **A** is set.

1. Open the doors/windows so that the heated air can escape quickly.
2. Switch on the air-conditioning system *– see "Air conditioning operation" on page 5-35*
3. Put the slide into recirculated air mode **A**.
4. Once the desired temperature is reached, put the slide into fresh air mode **B** or into the intermediate position.

5.9 Work hydraulics

Overload limit, overload display unit

Fig. 216

Important note about the overload warning display

During the work operation, luminous diodes in the safe load indicator **10** indicate the load of the loader unit with visual and audible signals and warn the operator of critical loads on the loader unit.

The safe load indicator is located at the upper front right.

WARNING

Danger of tipping over laterally, injury hazard!
The safe load indicator warns neither against a lateral load, nor against a sudden overload of the loader unit, nor does it warn against machine travel on ground with obstacles and holes!

Failure to observe stability can cause serious injury or death.

- ► The safe load indicator only monitors the telehandler's longitudinal stability.
- ► Lower the loader unit to transport position during machine travel.
- ► Do not travel or turn around on slopes.
- ► Slow cornering.

NOTICE

This signal can be affected by an extreme steering angle (steering wheel turned to the limit, for example) and/or lateral loads on the wheels of the rear axle!

- ► Before picking up or setting down a load, set the steering system (wheels) to the straight-ahead position.
- ► Take care not to touch any obstacles with the outside or inside of the wheels when picking up material.

NOTICE

If the rear axle continues to be relieved at a standstill despite the overload warning, a safety-critical state can arise. This can lead to the work functions of the loader unit and the telescopic boom being temporarily switched off.
In addition, an error model is shown in the display with SPN 519535, FMI 2.

- ► By pressing and holding the overload bypass button, this shutdown can be bypassed and the work hydraulics can be temporarily released in order to bring the machine into a safe state (e.g. through retraction) *– see "By-pass the overload limitation" on page 5-50*.

Information

Check the function of the safe load indicator regularly
– *see "Functional check of safe load indicator" on page 5-39*.

► Have a malfunctioning safe load indicator immediately repaired by an authorized service center.

Information

The overload display is set ex work and may only be readjusted and set by an authorized specialized workshop in the event of any repair work!

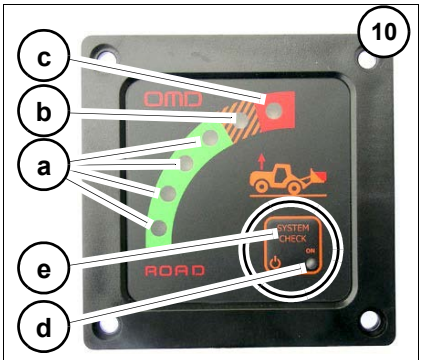


Fig. 217

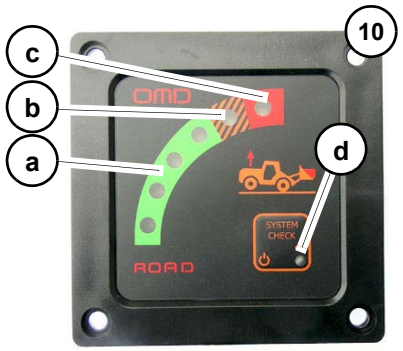


Fig. 218

Functional check of safe load indicator

The functional check can be performed at any time, even during operation.

- Press TEST push button **e**
  - ➥ The safe load indicator is OK if all LEDs (**a**, **b**, **c**) flash and an alarm sounds.
  - ➥ If one or more green LEDs and/or the orange or the red LEDs flash at the same time, and if the alarm sounds: **system error!**
  - ➥ Make a note of the flash code of the safe load indicator and give it to a service center.
  - ➥ The safe load indicator must be immediately checked and repaired by an authorized service center!

Function of the LED´s in the overload display

- Green LED **d** (readiness) illuminates.
  - ➥ The safe load indicator is in operation.
- Green LEDs **a** (1 – 4) illuminate.
  - ➥ **OK!** = the load is between **45** and **80%**.
- Green LEDs **a** (1 – 4) and the orange LED **b** flash, **work with extreme caution!** A load of **80 – 95%** is reached.
  - ➥ Reduce the load. To do this: retract the telescopic boom and carefully lower the load within the safety range (see load diagram).
- All LEDs **(a, b, c)** flash and an alarm sounds.
  - ➥ **Caution!** The vehicle can tip forward!
  - ➥ The load is too heavy.
  - ➥ If possible, **retract the telescopic boom immediately** until the load is between **45** and **80%**.
  - ➥ Carefully lower the load within the safe range (see load diagram).

Telescopic boom operation

Warning and safety instructions for the operation of the loader unit

WARNING

Accident hazard due to uncontrolled movements of the joystick!

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

- ► 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

Danger of crushing from lateral tipping over of the vehicle!

A tipping vehicle can cause serious injury or death.

- ► Lower the loader unit to transport position during machine travel.
- ► Adapt the travel speed to the prevailing conditions.
- ► Adapt the driving speed to the material loaded.
- ► Pay attention to persons and obstacles.
- ► Observe the load-bearing capacity of the vehicle. Do not exceed approved payloads
- ► Reduce the travel speed before descending.
- ► Always fasten your seat belt.
- ► Do not protrude any body parts out of the vehicle.

CAUTION

Accident hazard! Ignoring the overload display leads to the vehicle tipping forward!

Risk of injury!

- ► In the event of an overload, reduce the load until the signal sounds goes away and the red and yellow luminous diodes in the overload display disappear.
- ► Observe the safe load indicator and take appropriate measures.
- ► Observe the load diagram.

NOTICE

While working with the loader unit, no attachments may be attached to the three-point mount.
There is a risk of the warranty being lost in the event of damage from non-observance.

Important information about operating the loader unit

Information

For safety reasons, the vehicle is equipped with a start-up lock in all EU member states and in Australia. The vehicle can only be operated if the operator has sat down on the operator's seat.

The vehicle can only be operated if the operator has sat down on the operator's seat.

If the operator seat is left at a standstill or with the hand brake released, a continuous acoustic warning will sound.

If the operator's seat is left during the drive, the drive system goes into a neutral position when driving below 7 km/h (4.3 mph). At higher travel speeds, a continuous warning signal sounds.

Information

For safety reasons, the telescopic boom cannot be lowered with the diesel engine and the ignition switched off!

Joystick can only be operated if:

- the operator is seated on the seat,
- ignition is switched on,
- the diesel engine runs,
- the joystick lock is unlocked – *see "Secure the control lever (joystick)/ lock the work hydraulics" on page 4-56*.

Joystick (joystick)

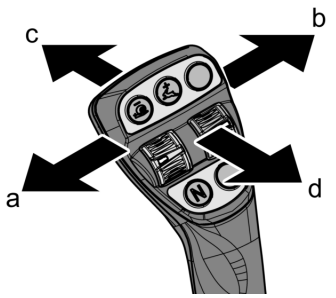


Fig. 219

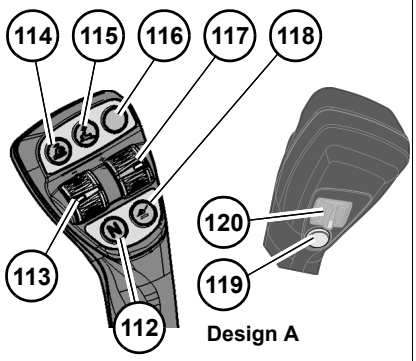


Fig. 220

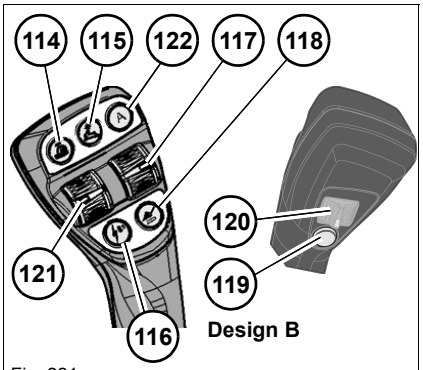


Fig. 221

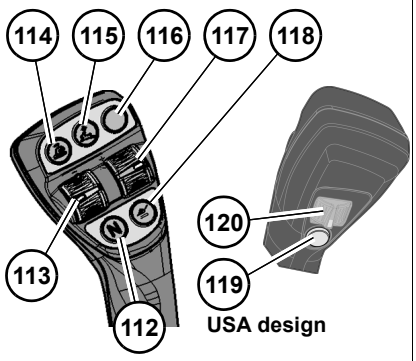


Fig. 222

Overview of the operator's controls in the joystick

Operation		Function
a	To the left	Tilts in the attachment
b	To the right	Tilts out the attachment
c	Forward	Lowers the telescopic boom
d	Backward	Raises the telescopic boom
112	Push button	Disable the travel direction neutral position), see page *5-15*
113	Switch	Forward/reverse travel direction, see page *5-15*
114	Touch button - "snail“	Reduce the travel speed increase/reduction, see page *5-16*
115	Touch button - "rabbit“	Select a higher speed range, see page *5-16*
116	Push button	Change-over of the 3rd control circuit to quick couplers (optional), see page *5-57* (design A)
		14-pole plug receptacle (optional), see page *5-63* (USA design)
117	Switch (scroll wheel for proportional controls)	Extend/retract the telescopic boom, see page *5-44*
118	Push button	Bucket repositioning (option)
119	Push button	Differential lock, see page *5-22*
120	Switch (scroll wheel for proportional controls)	3rd control circuit for locking/unlocking the quickhitch facility and for hydraulic attachment with hydraulic function, see page *5-54*
121	Push button	Travel direction forwards / reverse operation with neutral position, see page *5-15*
122	Push button	Not assigned

Raise / lower the loader unit, extend and retract the telescopic boom

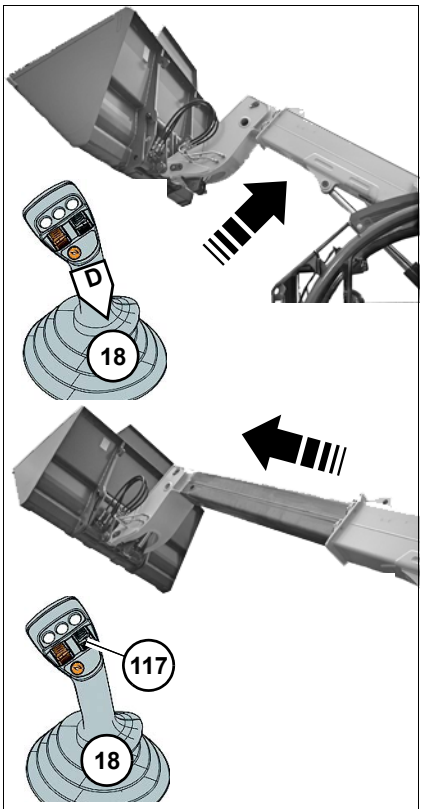


Fig. 223

CAUTION

Accident hazard! Ignoring the overload display leads to the vehicle tipping forward!

There is a risk of injury if ignored!

- ► In the event of an overload, reduce the load until the signal sounds goes away and the red and yellow luminous diodes in the overload display disappear.
- ► Observe the safe load indicator and take appropriate measures.
- ► Note the load values of the load-bearing capacity.

Raise the loader unit / extend the telescopic boom

1. Pre-select the mode **94** with the toggle switch – *see "Overload control in bucket mode" on page 5-47*, or *"Overload control in fork-lift mode" on page 5-48*,.
2. Raise the loader unit with the telescopic boom retracted to the required height. To do this: pull the joystick **18** backward **D.**
   - ➥ If it is tilted in, the bucket is moved parallel to its initial position as the loader unit is raised.
3. Extend the telescopic boom. To do so, press the rocker switch (potentiometer) **117** in the joystick **18** forward until the desired length of the telescopic boom is achieved.

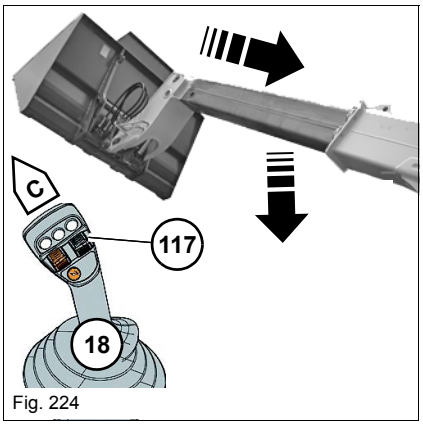


Fig. 224

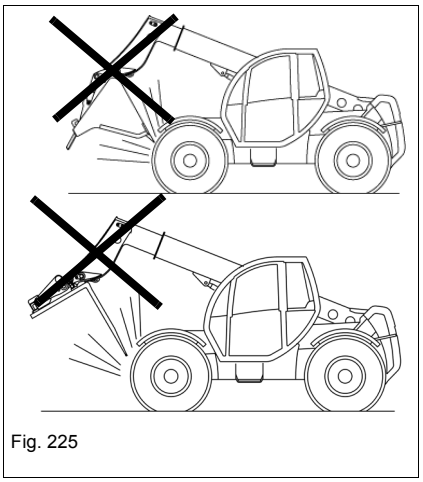


Fig. 225

Retracting the telescopic boom/lowering the loader unit

1. Retract the telescopic boom. To do this: press switch (potentiometer) **117** on the joystick **18** backward until the telescopic boom is fully retracted.
2. Lower the loader unit with the telescopic boom retracted. To do this: push joystick **18** forward **C**.

NOTICE

In order to avoid damage to the tires, do **not** lower the loader unit with the loader bucket or pallet forks fully tilted out!

► Tilt in the attachment first and then lower the loader unit.

“Smart Handling” overload control

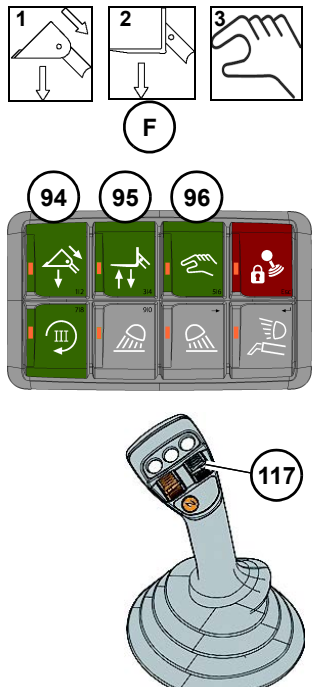


Fig. 226

Description / function

The "Smart Handling" overload limitation prevents the extended telescopic loader unit from entering into the overload range when lowering, thereby preventing the vehicle from tipping forward.

This ensures that the permissible operating range of the load-bearing capacity diagram is observed.

The overload control has 3 operating modes:

- Bucker operation: button **94** / symbol **F/1**
  – see "Overload control in bucket mode" on page 5-47.
- Stacking operation: button **95** / symbol **F/2**
  – see "Overload control in fork-lift mode" on page 5-48.
- Manual operation: button **95** / symbol **F/3**
  – see "Overload limitation in manual operation" on page 5-49.

In bucket mode

- Automatic reduced lowering speed depending on load and angle.
- Automatic boom retraction

In fork-lift mode

- Nearly vertical raising and lowering.
- Automatic reduced lowering speed depending on load and angle.
- Automatic retraction of the telescopic boom when lowering and automatic extension of the telescopic boom when lifting
- The telescopic boom can be overridden on the joystick when extending with the roller **117**.
  ➥ If the machine is put in the overload range by extending the telescopic boom with the scroll wheel, the overload control automatically switches off boom extension.

In manual operation

- All loader unit and boom movements can be performed.
- Automatic reduced lowering speed depending on load and angle. Lowering speed is reduced to standstill in doing so.
- Boom extension is switched off in case of overload.

Fig. 227

Checking the overload control before starting work

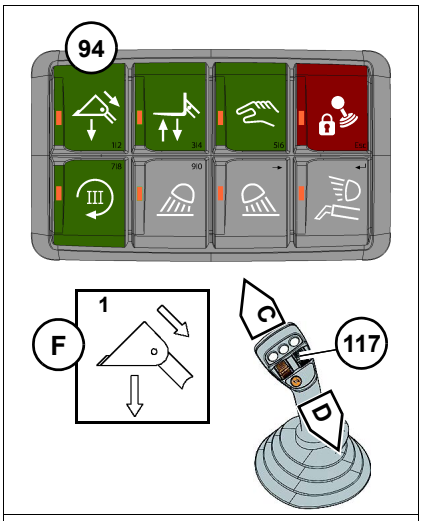
- Check the function of the safe load indicator (indicator lights) *– see "Functional check of safe load indicator" on page 5-39*!
- In bucket mode without load; check automatic retraction of boom *– see "Overload control in bucket mode" on page 5-47.*
- In fork-lift mode without load; check the automatic incline-dependent reduction of lowering speed of the loader *– see "Overload control in fork-lift mode" on page 5-48.*
- Check whether the front and rear slide and wear plates on the telescopic boom have the **minimum thickness.** If necessary, have them adjusted or replaced by an authorized service center *– see chapter 7 " Check the wear limits of the sliding plates regularly!" on page 7-31*!

NOTICE

The overload control is controlled by a sensor (on the rear axle) and an electric signal.
This signal can be affected by an extreme steering angle (steering wheel turned to the limit, for example) and/or lateral loads on the wheels of the rear axle!

► Before picking up a load, set the steering system (wheels) to the intermediate position and then pick up the load.

► Take care not to touch any obstacles with the outside of the wheels.



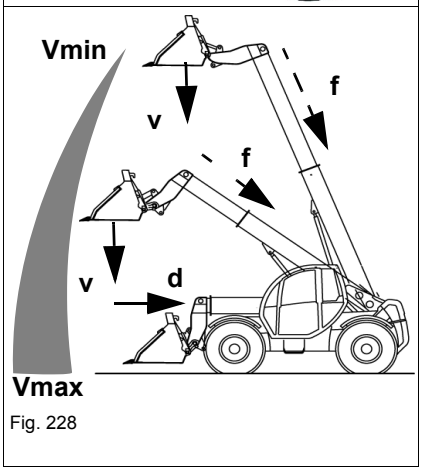


Fig. 228

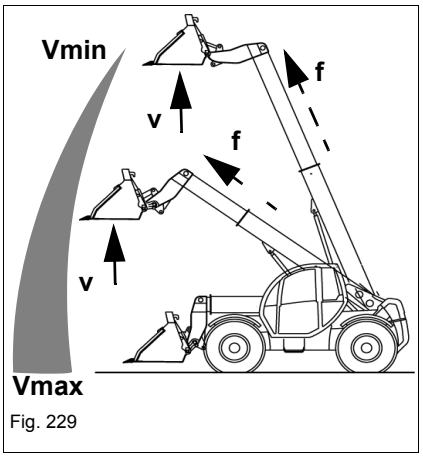


Fig. 229

Overload control in bucket mode

The overload limit is always active in the bucket mode and only monitors the longitudinal stability of the telehandler.

WARNING

Risk of injury if the stability is ignored!

The safe load indicator does not warn:
- of lateral loads of the vehicle,
- a sudden overload of the telescopic boom,
- when driving in difficult terrain,
- as well as of influences from abrupt braking and deceleration!

Failure to observe stability can cause serious injury or death.

- ► Only carry out transport trips with the loader unit lowered (transport position).
- ► Do not drive with raised or extended telescopic boom.
- ► Do not turn on inclines.
- ► Slow cornering.
- ► Drive at walking speed

1. Press push button **94**.
   - ➥ The LED in the touch button illuminates
   - ➥ Symbol **F/1** appears in the digital display.
2. Lower the loader unit. To do this, press the joystick forward **C**
   - ➥ Automatic reduced lowering speed depending on load and angle (**v**).
   - ➥ Automatic telescopic boom retraction **f**
   - ➥ The overload control is disabled when the telescopic boom is fully retracted (**d**).
3. Raise the loader unit. To do this: pull the joystick backward **D**.
   - ➥ Automatic telescopic boom extension **f**
   - ➥ Observe the safe load indicator, and take appropriate action if necessary.
4. Work with bucket – *see "Working with a standard bucket" on page 5-91*.

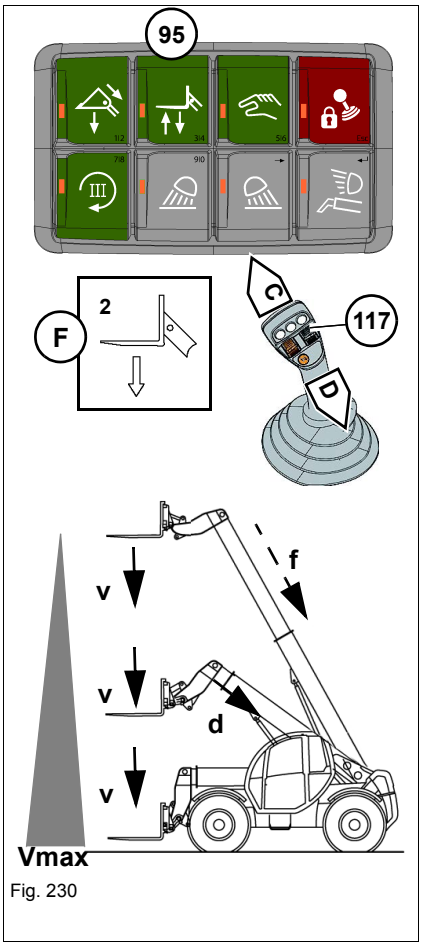


Fig. 230

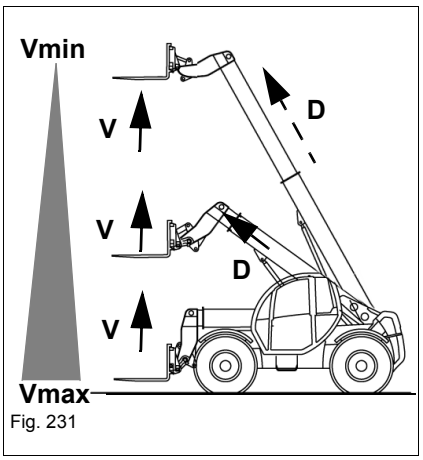


Fig. 231

Overload control in fork-lift mode

In stacking mode, the overload control is active in the background and only monitors the longitudinal stability of the telehandler.

WARNING

Risk of injury if the stability is ignored!

The safe load indicator does not warn:
- of lateral loads of the vehicle,
- a sudden overload of the telescopic boom,
- when driving in difficult terrain,
- as well as of influences from abrupt braking and deceleration!

Failure to observe stability can cause serious injury or death.

- ► Only carry out transport trips with the loader unit lowered (transport position).
- ► Do not drive with raised or extended telescopic boom.
- ► Do not turn on inclines.
- ► Slow cornering.
- ► Drive at walking speed

1. Press push button **95**.
   - ➥ The LED in the touch button illuminates
   - ➥ Symbol **F/2** appears in the display
2. Lower the loader unit. To do this, press the joystick forward **C**
   - ➥ Nearly vertical lowering. This means that the telescopic boom is automatically retracted when the loader unit is lowered (**f**).
   - ➥ The loader unit lowering speed (**V**) is reduced depending on load and angle. This means that in the upper range lowering speed is slow, and in the lower range lowering speed is faster.
3. Raise the loader unit. To do this, pull the joystick backward **D**.
   - ➥ Nearly vertical raising.
   - ➥ Loader unit raising speed (**V**) is automatically reduced depending on load and angle. This means that in the lower range raising speed is faster, and in the upper range raising speed is slower.
4. Carefully extend the telescopic boom. To do this, press the roller **117** forward in the joystick.
   - ➥ Observe the display unit (overload warning device) and then act – *see "Working with the pallet fork" on page 5-95*.

Information

The overload control can be bridged briefly for positioning heavy loads with precision (two-hand operation) – *see "Overload limitation in manual operation" on page 5-49*!

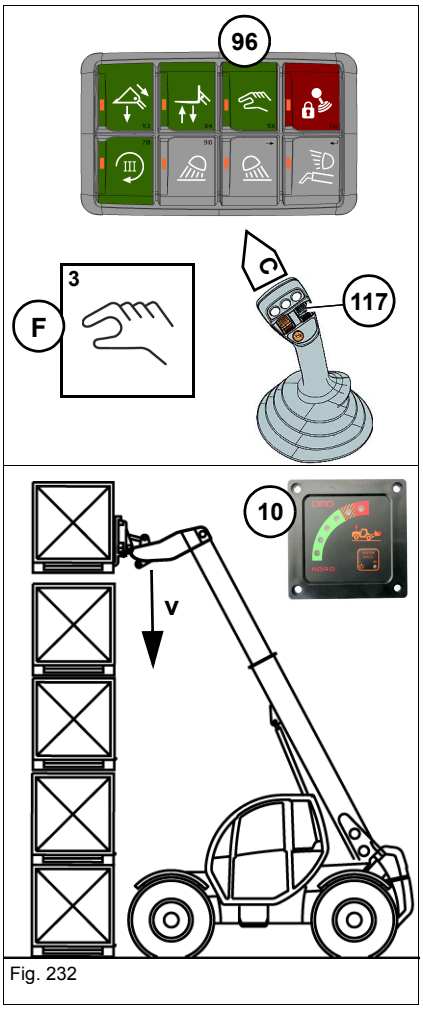


Fig. 232

Overload limitation in manual operation

In manual operation, the overload control is active in the background, but can be manually bridged briefly via two-hand operation.

WARNING

Risk of injury if the stability is ignored!

The safe load indicator does not warn:
- of lateral loads of the vehicle,
- a sudden overload of the telescopic boom,
- when driving in difficult terrain,
- as well as of influences from abrupt braking and deceleration!

Failure to observe stability can cause serious injury or death.

- ► Only carry out transport trips with the loader unit lowered (transport position).
- ► Do not drive with raised or extended telescopic boom.
- ► Do not turn on inclines.
- ► Slow cornering.
- ► Drive at walking speed

1. Press push button **96**.
   - ➥ The LED in the touch button illuminates
   - ➥ Symbol **F/3** appears in the display
2. Lowering the loader unit and extending the telescopic boom:
   - ➥ All loader unit and boom movements can be performed.
   - ➥ Loader unit lowering speed (**v**) automatically depends on load and angle. This means that in the upper range lowering speed is slow, and in the lower range lowering speed is faster.
   - ➥ Boom lowering or extension is interrupted if the maximum authorized payload is exceeded.

Information

The overload control can be bridged briefly for positioning heavy loads with precision (two-hand operation) *– see "Overload limitation in manual operation" on page 5-49*!

By-pass the overload limitation

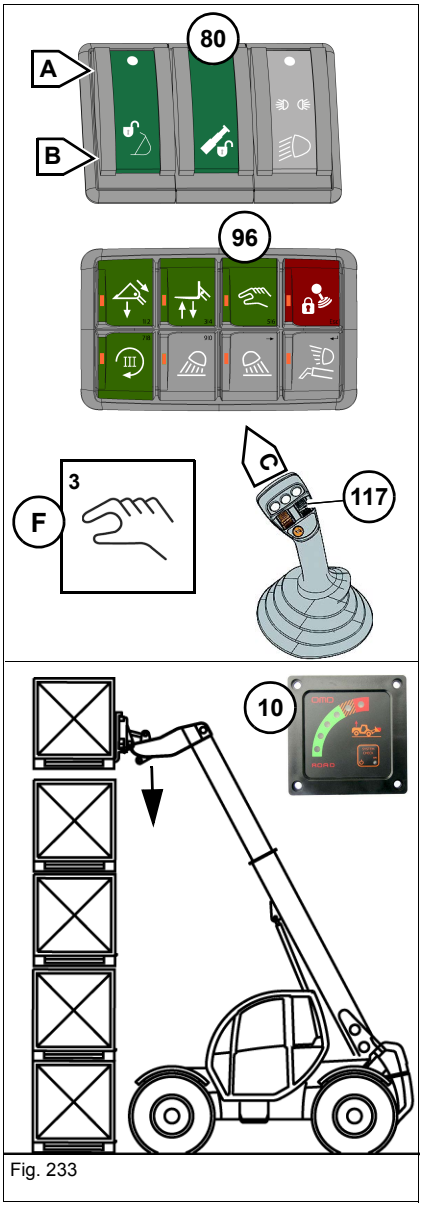


Fig. 233

CAUTION

Risk of injury! The machine can tip over to the front if the overload control is disabled!

Failure to observe this can cause serious injury.

- ► Disabling the overload control in the overload range is only allowed in exceptional cases in manual operation!
- ► Use the disabled overload control only briefly, for example for positioning heavy loads with precision or for setting down loads on high stacks or boxes smoothly and precisely.
- ► Set down the load only when the diesel engine is running at idling speed.
- ► Set down the load only when the machine is at a standstill.
- ► Do not perform any jerky movements with the joystick.
- ► Do not continue work with the overload control disabled.

Information

For safety reasons, the overload control can only be bridged **with both hands and is active for a maximum of 60 minutes.**

- ► After about 60 seconds, the bridging is automatically canceled!

Perform the manual operation as follows:

1. Stop the vehicle (standstill).
2. Press push button **96**.
   - ➥ The LED in the touch button illuminates
   - ➥ Symbol **F/3** appears in the digital display.
   - ➥ Overload control is in manual operation.
3. Press and hold button **80** in position **B**
4. Press the joystick carefully forward **C** simultaneously and set down the load in the safe area with a slight lowering movement and without retracting the telescopic boom (see figure).
   - ➥ Observe the overload warning device and take appropriate action.
5. Once the load is set down, release the **80** button.
   - ➥ The bridging of the overload control is manually canceled.
6. Carefully back up from the load and lower the loader unit.

Hydraulic control circuits/plug couplings (overview)

NOTICE

Damage to hydraulic system due to dirty plug couplings and coupling sockets!

- ► Remove the dirt and dust from the plug couplings and coupling sockets before connecting an attachment!
- ► Replace missing protective caps.

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

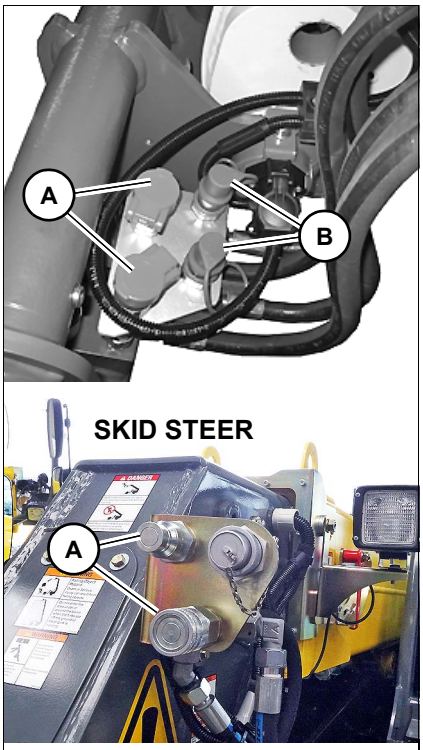


Fig. 234

3rd control circuit KRAMER, WEIDEMANN, EURO	Plug couplings	For operation, see page
3rd control circuit	A	*5-55* *5-114*
Continuous operation of 3rd control circuit (option)		*5-59* *5-115*
Switch-over of 3rd control circuit to flat connector plug **B** (optional)	B	*5-57* *5-115*
Switch-over of 3rd control circuit to flat connector plug **B** – continuous operation (optional)		*5-59* *5-115*
3rd control circuit SKID STEER (option)	A	*5-59* *5-115*

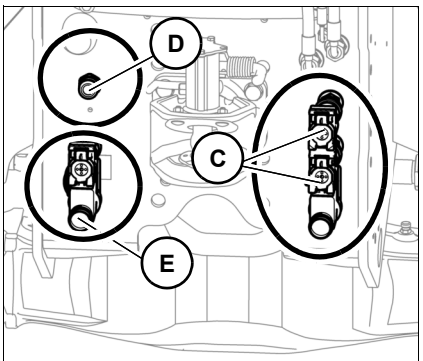


Fig. 235

Rear additional control circuit	Plug couplings	For operation, see page
Flat connector plugs – rear auxiliary control circuit (option)	C	*5-138* *5-117*
Hydraulic trailer brake (option)	D	*5-141*
Tipping trailer connection (option)	E	*5-135* *5-119*

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!

- ► When removing an attachment, always ensure that all hydraulic lines are removed.

Information

The hydraulic system of the vehicle 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 hydraulic lines that are to be opened before installing and removing an attachment! *– see "Pressure release of the flat connector plugs of the 3rd control circuit (standard)" on page 5-70*.

Information

Also observe the Operator's Manuals of the attachment manufacturers for installing and operating the attachments!

Important information on operation of the 3rd control circuit

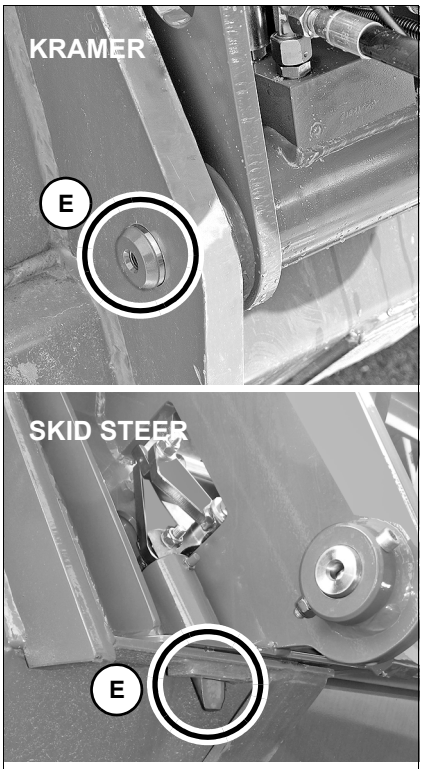


Fig. 236

With the 3rd control circuit, the attachment is hydraulically locked in the quick coupler system.

By changing over the hose pipes to attachments with hydraulically activated functions (e.g. power grab bucket), these may be operated via the 3rd control circuit – *see "Hydraulic connections: 3rd control circuit to the attachment" on page 5-72*.

The 3rd control circuit can also be operated in "continuous operation" – *see "Continuous operation of the 3rd control circuit (optional)" on page 5-59*.

WARNING

Accident hazard due to unlocked attachment on the quickhitch!

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

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

Operation of the lock – Attachments on quickhitch facility – *see "Receive attachments on the quickhitch facility" on page 5-66*.

Information

The 3rd control circuit can also be operated with the “oil volume adjustment“ option – *see "Oil volume setting with control element (jog dial) (optional)" on page 5-112*.

Refer to the specifications for the possible oil volumes – *see chapter 9 " Usable consumer pressure at the hydraulic flat connector plugs" on page 9-6*.

Unlocking/locking an attachment to the quickhitch facility

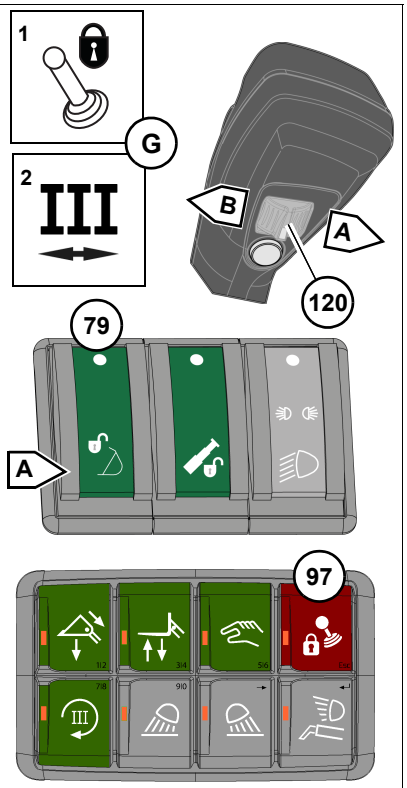


Fig. 237

Information

The attachment locked in the quickhitch facility is secured against unintentional unlocking for safety reasons.

The attachment can only be unlocked by pressing **79** push button and switch **120** on the joystick **with both hands** at the same time. The operator must be seated on the seat for this.

► The button **79** for unlocking is located in the switch console on the left beside the steering wheel.

NOTICE

In order to avoid damage to the attachment lock due to an attachment that is not fully unlocked, follow the order of unlocking.

Unlocking the attachment

1. Disable the road-travel lock of the work hydraulics if it is enabled. To do this: press the button **97**.
   ➥ Symbol **G/1** disappears in the display.
2. Unlock the attachment. To do so, press the touch button **79** down into position **A** and hold.
3. Press the rocker switch **120** to the **right (B)** (seen in the travel direction) at the same time until the lock bolts are driven fully out of the center bores of the attachment.
   ➥ Symbol **G/2** appears in the digital display
4. First release the switch **120** , then release the button **79**
   ➥ Symbol **G/2** goes out in the digital display

Locking the attachment

1. After picking up an attachment with the quick-hitch device, press rocker switch **120** on the joystick **to the left (A)** in the travel direction.
   ➥ The attachment is locked in the quickhitch.
2. Enable the road-travel lock during machine travel on public roads. To do this: press push button **97**.
   ➥ Symbol **G/1** appears in the digital display of the indicator.
   ➥ The LED in the push button illuminates.
   ➥ Switch **120** on the joystick is not functional.

3rd control circuit – hydraulic attachment

Important notes about safety / function

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.

- ► 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. 238

NOTICE

Damage to hydraulic system due to dirty plug couplings and coupling sockets!

- ► Remove the dirt and dust from the plug couplings and coupling sockets before connecting an attachment!
- ► Replace missing protective caps.

Information

The 3rd control circuit can also be operated with the "oil volume adjustment" option – *see "Oil volume setting with control element (jog dial) (optional)" on page 5-112*.

Refer to the specifications for the possible oil volumes – *see "Usable consumer pressure at the hydraulic flat connector plugs" on page 9-6*.

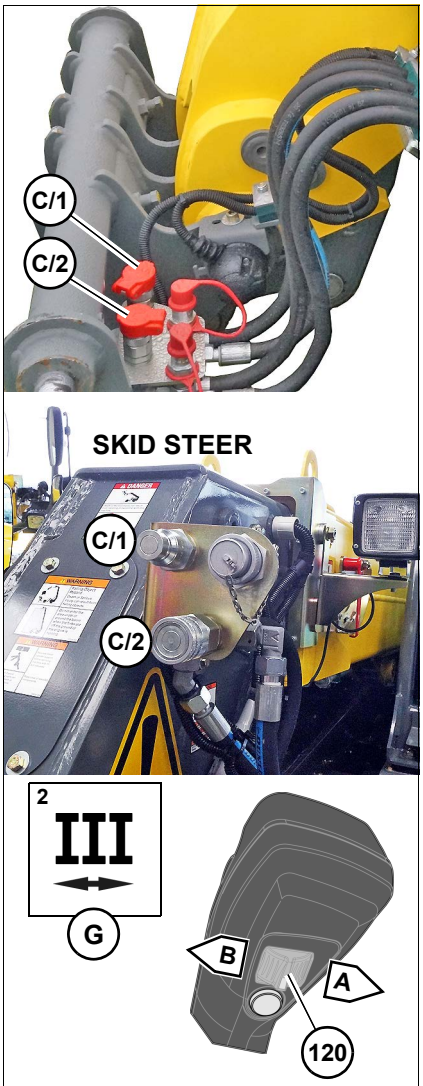


Fig. 239

Operation of 3rd control circuit

1. Mount the attachment to the quickhitch facility and securely lock – *see "Receive attachments on the quickhitch facility" on page 5-66*.
2. Release the pressure in the flat connector plugs **C** – *see "Pressure release of the flat connector plugs of the 3rd control circuit (standard)" on page 5-70* or *"Pressure release on the rapid action couplings of the 3rd control circuit (optional)" on page 5-71*
3. Couple the hose pipes of the attachment to flat connector plugs **C**.

Attachment operation	Function
Slide the rocker switch **120** proportionally to the left **A** (seen in the travel direction)	➥ Symbol **G/2** appears in the digital display of the indicator. ➥ The left flat connector plug **C/2** is pressurized. ➥ The attachment is actuated, for example close power grab bucket.
Slide the rocker switch **120** proportionally to the right **B** (seen in the travel direction)	➥ Symbol **G/2** appears in the digital display of the indicator. ➥ The right flat connector plug **C/1** is pressurized. ➥ The attachment is actuated, for example open power grab bucket.

3rd control circuit changeover valve for additional control circuit (option)

Fig. 240

With the reversing valve **A,** the 3rd control circuit can be switched over to the additional flat connector plugs **D/1 and D/2** on the quick change plate and this can then be used to operate attachments with additional hydraulically activated functions.

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.

- ► 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

Damage to hydraulic system due to dirty plug couplings and coupling sockets!

- ► Remove the dirt and dust from the flat connector plugs and coupling sockets before connecting an attachment!
- ► Replace missing protective caps.

Information

The auxiliary control circuit can also be operated with the "oil volume adjustment" option *– see "Oil volume setting with control element (jog dial) (optional)" on page 5-112*.

1. Pick up and safely lock the attachment with the quickhitch facility *– see "Receive attachments on the quickhitch facility" on page 5-66*.
2. Shut off the diesel engine and release pressure in the flat connector plugs **D**
   – see "Pressure release of the flat connector plugs of the 3rd control circuit (standard)" on page 5-70 or *"Pressure release on the rapid action couplings of the 3rd control circuit (optional)" on page 5-71*
3. Couple the hose pipes of the attachment to the flat connector plugs **D** of the quickhitch facility.
4. Operation of the auxiliary control circuit *– see "Switch on the reversing valve on flat connector plugs D" on page 5-58*

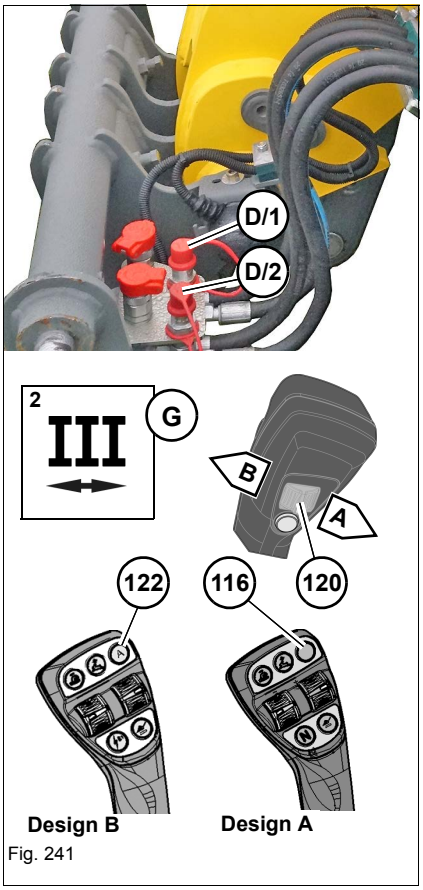


Fig. 241

Switch on the reversing valve on flat connector plugs D

1. Press the button **116** or **122**.
   ➥ Symbol **G/2** appears in the digital display.
   ➥ The 3rd control circuit is activated on flat connector plugs **D**
2. For the operation of the attachment, see table.

Attachment operation	Function
Slide switch **120** to the left **A** (as seen in the travel direction)	➥ The left flat connector plug **D/2** is pressurized, e.g. close power grab bucket.
Slide switch **120** to the right **B** (as seen in the travel direction)	➥ The right flat connector plug **D/1** is pressurized, e.g. open power grab bucket.

Information

See the Operator's Manuals of the attachment manufacturers for installing and operating the attachments.

Information

The flat connector plugs **D** can also be used in the continuous operation – *see "Continuous operation of the 3rd control circuit (optional)" on page 5-59*.

Continuous operation of the 3rd control circuit (optional)

Important notes about safety / function

Continuous operation is used for movements/procedures over a long period of time or operation of hydraulic motors (for example a rotary sweeper) or for operation of attachments with an integrated control valve adjusted to maximum discharge volume with an unpressurized reverse travel.

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.

- ► 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. 242

NOTICE

Damage to hydraulic system due to dirty plug couplings and coupling sockets!

- ► Remove the dirt and dust from the plug couplings and coupling sockets before connecting an attachment!
- ► Replace missing protective caps.

Information

The continuous operation 3rd control circuit can also be operated with the "oil volume adjustment" option *– see "Oil volume setting with control element (jog dial) (optional)" on page 5-112*.

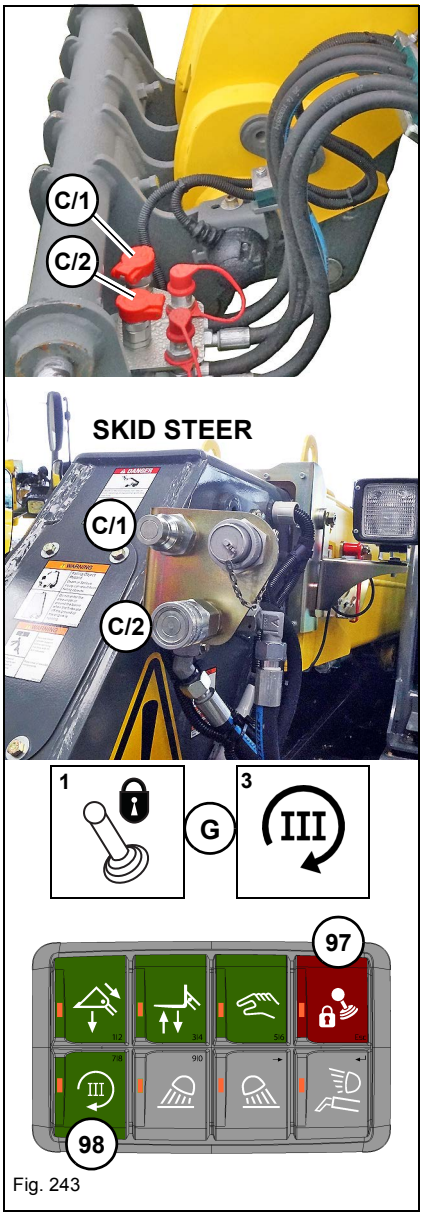


Fig. 243

Preparing attachments for continuous operation

1. Pick up the attachment and safely lock it – *see "Attach the bucket and lock" on page 5-66*.
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 "Pressure release of the flat connector plugs of the 3rd control circuit (standard)" on page 5-70*.
5. Switch off the starter and remove the starting key.
6. Couple the hose pipes of the attachment to the flat connector plugs **C/1 and C/2** – *see "Hydraulic connections: 3rd control circuit to the attachment" on page 5-72*.

Starting continuous operation

1. Start the diesel engine.
2. Disable the road-travel lock of the work hydraulics if it is enabled. To do this: press the button **97**.
   ➥ Symbol **G/1** disappears in the display.
3. Press the button **98** (about 1 sec.).
   ➥ The LED in the push button illuminates.
   ➥ Symbol **G/3** appears in the digital display.
   ➥ The oil pressure is being built up; continuous operation is running.

Switching off continuous operation

1. Press the button **98** briefly.
   ➥ The LED in the push button goes out.
   ➥ Symbol **G/3** disappears in the display.
   ➥ Continuous operation is disabled.

Information

For safety reasons, the **continuous operation is secured with a restart lock!**
If the ignition if switched off and back on, the continuous operation is automatically disabled and must be reactivated upon re-commissioning!

Information

In order to avoid excessively high hydraulic oil temperatures and performance losses of the diesel engine, switch off of the continuous operation if this is no longer necessary.

7-pole front socket (option)

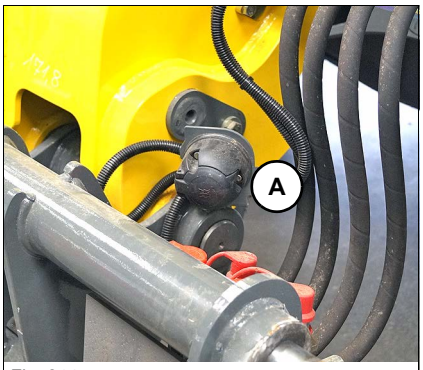


Fig. 244

To supply electrically operated attachments, a 7-pole plug receptacle **A** can optionally be fixed in the front left to the quick coupler system.

Two electric power supply versions can be operated with this plug receptacle.

- Power supply in push-button mode
- Power supply in jog mode (continuous operation).

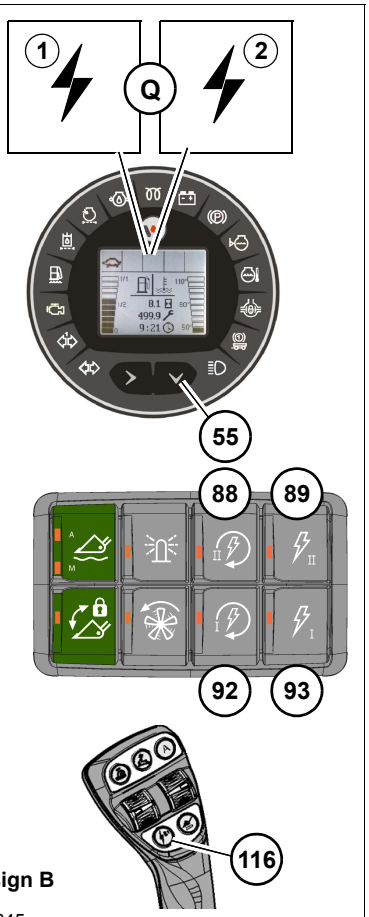
WARNING

Accident hazard by putting the front power outlet into operation with the power supply enabled!

Failure to observe this can cause serious injury or death.

► Before connecting the attachment electrically:
Switch off machine ignition, then establish the electric connection to the attachment.

1. Pick up and safely lock the attachment in the quickhitch facility – *see "Hydraulic connections: 3rd control circuit to the attachment" on page 5-72*.
2. Apply the parking brake.
3. Stop the diesel engine.
4. Switch off the ignition.
5. Establish the electric connection to the attachment.
6. Engage the starter.
7. Put the attachment into operation – *see "Front power outlet operation" on page 5-62*.



Design B

Fig. 245

Important information on the function of the front socket

The power circuits can be used in inching operation or continuous operation and only function with a switched on ignition.

A combination in inching or continuous operation is not possible!

It can be queried in the digital display what control circuit is activated. To do this, briefly press button **55** in the digital display:

➥ Symbol **Q/1 or 2** appears for a few seconds and shows the active control circuit.

Front power outlet operation

Information

The 1st control circuit in inching operation can be operated with the button **116** on the joystick as well as with the button **93** (keypad).

Operation in continuous operation	
Switch on the 1st control circuit , to do so press the button **93 or 116**.	➥ LED **Q/1** lights up. ➥ The electric power supply is enabled as long as touch button is pressed.
Switch on the 2nd control circuit To do so, press the button **89**.	➥ LED **Q/2** lights up ➥ The electric power supply is enabled as long as touch button is pressed.

Continuous operation	
Switch on the 1st control circuit To do so, hold down button **92** for about 2 seconds.	➥ LED **Q/1** lights up. ➥ The electric power supply is continuously activated.
Switch off the 1st control circuit. To do this, briefly hold button **92**.	➥ LED **Q/1** goes out and the electric power supply is disabled.
Switch on the 1st control circuit. To do so, hold down button **88** for about 2 seconds.	➥ LED **Q/2** lights up. ➥ The electric power supply is continuously activated.
Switch off the 2nd control circuit. To do this, briefly hold button **88**.	➥ LED **Q/2** goes out and the electric power supply is disabled.

14-pole front socket (option)

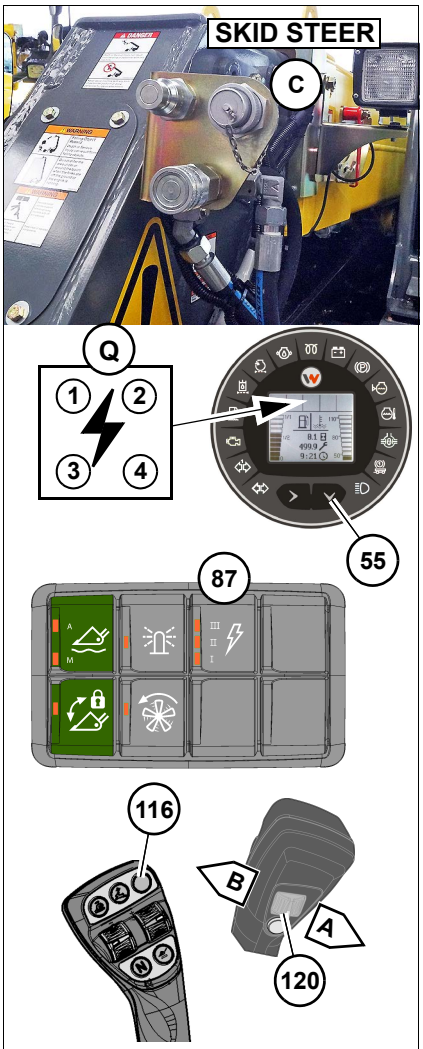


Fig. 246

This option is only possible in connection with a SKID STEER quickhitch facility.

Three power circuits for activating electro-hydraulic control valves, and an additional 4th power circuit for switching electrical functions can be operated with the 14-pole front plug receptacle **C**.

It can be queried in the digital display what control circuit is activated. To do this, briefly press button **55** in the digital display.

➥ The symbol **Q/1, 2, 3 or 4** appears for a few seconds and shows the active control circuit.

Information

The first 3 electrical circuits can only be operated separately, indicated by the corresponding symbols **Q** in the digital display.
The 4th electrical circuit can be operated in addition to the other three electrical circuits.

The control circuits are only ready for operation with activated work hydraulics for safety reasons *– see chapter 4 " Secure the control lever (joystick)/lock the work hydraulics" on page 4-56*.

- The selection and activation of the 3 electrical circuits occurs via the button **87**.
- The selected electrical circuit (1, 2 or 3) is operated with the rocker switch **120** on the joystick.
- The 4th electrical circuit is operated with push button **116** on the joystick.
- The operation of the individual electrical circuits *– see "Operation of 14-pole plug receptacle" on page 5-64*

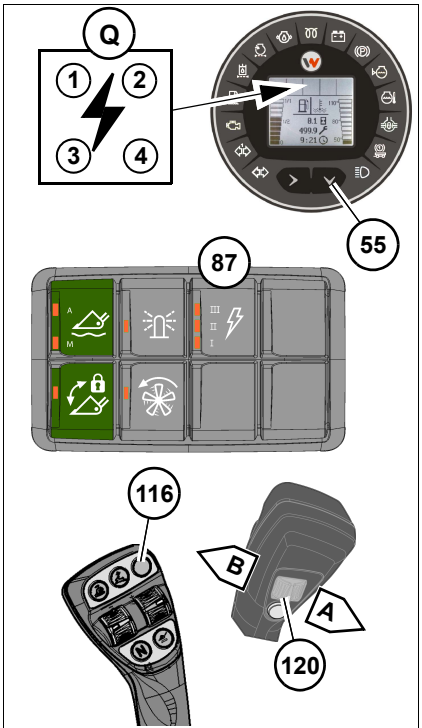


Fig. 247

Operation of 14-pole plug receptacle

Activation and operation of electrical circuit 1, 2, 3		Function
1	Activate the electrical circuits 1, 2 or 3. To do this, press the button **87**	➥ **The LED** in the touch button lights up for the activated electrical circuit
2	Operate the activated electrical circuit. To do this, press and hold the rocker switch **120** in position **A or B**	➥ Left or right-operating electrical circuit (for example control of different electro-hydraulic control valves) ➥ Symbol **Q** lights up with the active electrical circuit
Deactivation: electrical circuits 1, 2, 3		**Function**
1	Briefly press the button **87** again	➥ All electrical circuits are disabled. ➥ **LEDs** in the touch button are off ➥ The symbol **Q** in the display disappears
Operation of electrical circuit 4		**Function**
1	Press push button **116** on the joystick briefly **ON.**	➥ The symbol **Q/4** in the display lights up ➥ The electrical circuit **4** is active (e.g. electrical water pump on the sweeper)
2	Briefly press the touch button again **OFF.**	➥ The symbol **Q/4** disappears in the display ➥ The electrical circuit **4** is disabled

5.10 Attachments

Check the receptacle device of the attachment

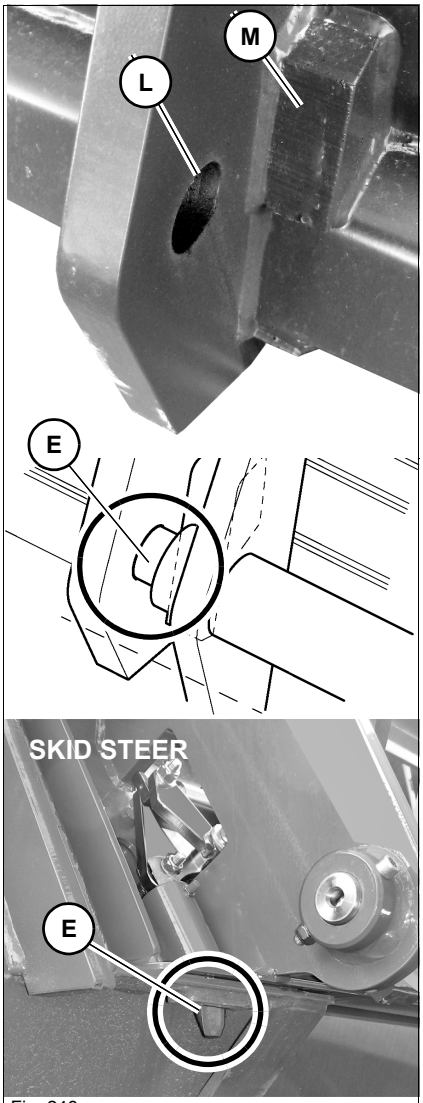


Fig. 248

NOTICE

Check the support of the attachment regularly to avoid damage to it!

► Only lock and unlock empty attachments without any load.

- Damage can occur if lock pin **E** is not aligned with mounting bore **L** of the attachment.
  - ➥ Limit stop **M** of the attachment is worn
  - ➥ the lock pin **E** is bent

Information

Have damage repaired by an authorized service center.

Receive attachments on the quickhitch facility

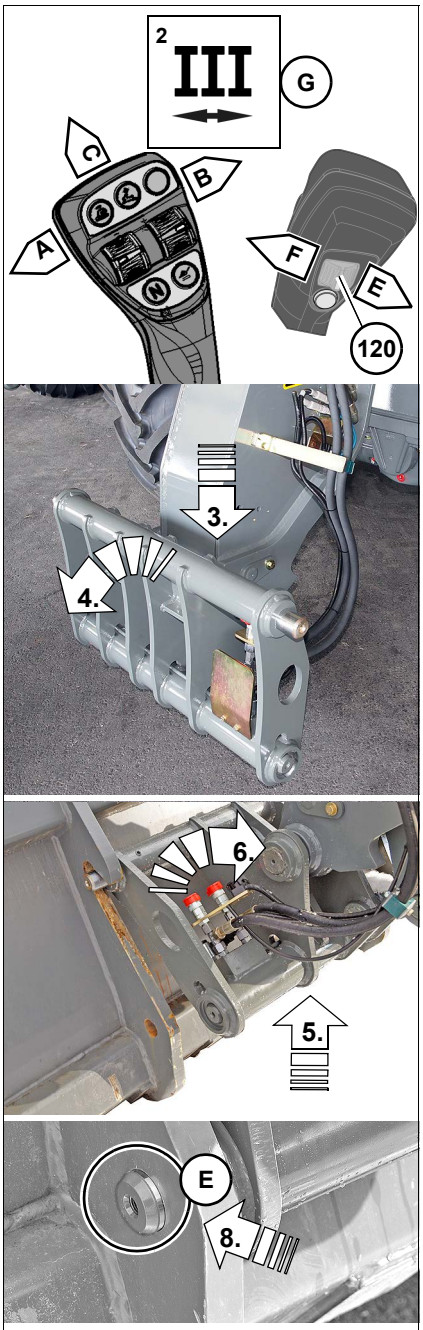


Fig. 249

Fitting an attachment onto a KRAMER quickhitch facility

WARNING

Accident hazard if the attachments are not locked!

Failure to observe this can cause serious injury or death.

► Check whether the lock pins **are visible on either side** in the mounting bores of the attachment.

Attach the bucket and lock

1. Unlock the 3rd control circuit – *see "Unlocking/locking an attachment to the quickhitch facility" on page 5-54*.
2. Drive the machine up to the attachment.
3. Lower the telescopic arm. To do this: push the joystick forward **C.**
4. Tip the quickhitch facility forward. To do this, press the joystick to the right **B.**
5. Raise the telescopic boom until the mount of the quickhitch engages in the mount of the attachment. To do this: pull the joystick backward **D.**
6. Tilt the quickhitch facility in completely. To do this, press the joystick to the left **A.**
7. Lock the attachment. To do this, press the rocker switch **120** in the joystick to the **left (E)** (seen in the travel direction).
   ➥ Symbol **G/2** appears in the digital display of the indicator.
   ➥ The lock pin engages in the mounting bores of the attachment and is automatically secured against unlocking.
8. Ensure that lock pin can be seen on either side of the attachment.

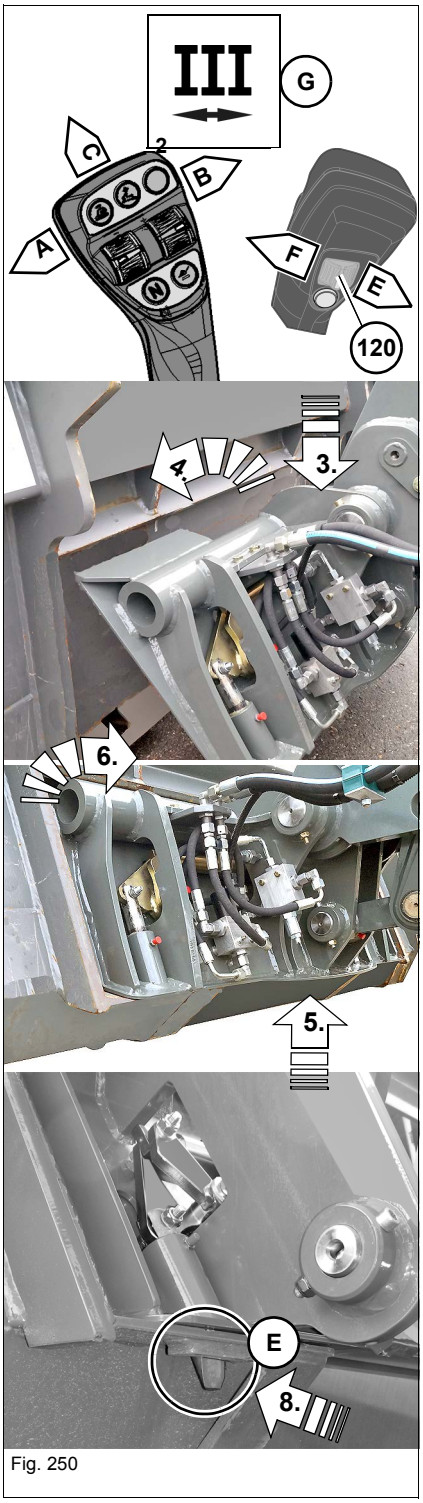


Fig. 250

Fitting an attachment onto a SKID STEER quickhitch facility

WARNING

Accident hazard if the attachments are not locked!

Failure to observe this can cause serious injury or death.

► Check whether the lock pins **are visible on either side** in the mounting bores of the attachment.

Attach the bucket and lock

1. Unlock the 3rd control circuit *– see "Unlocking/locking an attachment to the quickhitch facility" on page 5-54*.
2. Drive the machine up to the attachment.
3. Lower the telescopic arm. To do this: push the joystick forward **C.**
4. Tip the quickhitch facility forward. To do this, press the joystick to the right **B.**
5. Raise the telescopic boom until the mount of the quickhitch engages in the mount of the attachment. To do this: pull the joystick backward **D.**
6. Tilt the quickhitch facility in completely. To do this, press the joystick to the left **A.**
7. Lock the attachment. To do this, press the rocker switch **120** in the joystick to the **left (E)** (seen in the travel direction).
   ➥ Symbol **G/2** appears in the digital display of the indicator.
   ➥ The lock pin engages in the mounting bores of the attachment and is automatically secured against unlocking.
8. Ensure that lock pin can be seen on either side of the attachment.

Set down the attachments

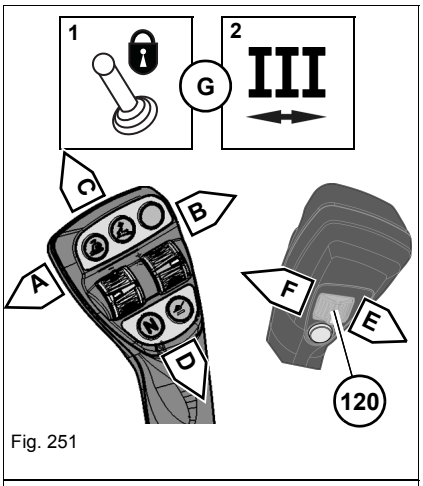


Fig. 251

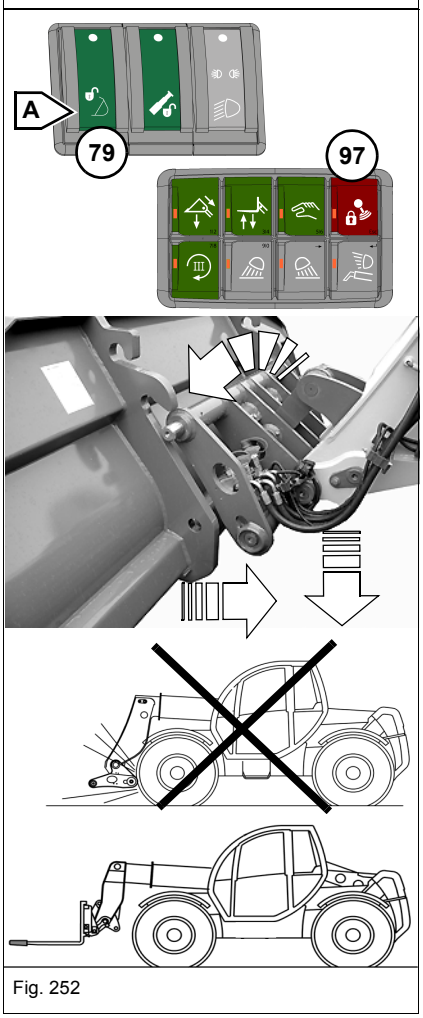


Fig. 252

Removing an attachment from a KRAMER quickhitch facility

CAUTION

The attachment can tip over after lowering it to the ground!

Can cause injury.

► Uncouple all flexible lines from the attachment.

► Lower the attachment to the ground and ensure it cannot tip over.

NOTICE

In order to avoid damage to the attachment lock due to an attachment that is not fully unlocked, follow the order of unlocking.

1. Drive the telehandler to the drop-off position.
2. Disable the road-travel lock of the work hydraulics if it is enabled. To do this: press the button **97** briefly.
   ➥ The LED in the push button goes out.
   ➥ Symbol **G/1** disappears in the display.
3. Lower the telescopic arm. To do this: push the joystick to position **C** until the attachment is about 5 – 10 cm (1.9 – 3.9 in) horizontal above the ground.
4. Unlock the attachment. To do so, push the touch button **79** into position **A** and hold it there.
5. At the same time (two-hand operation) press the rocker switch **120** in the joystick to the **right (F)** (seen in the travel direction) until the lock pin is driven entirely out of the center bores of the attachment.
   ➥ Symbol **G/2** appears in the digital display
6. First release the switch **120** , then release the button **79**
   ➥ Symbol **G/2** goes out in the digital display of the indicator.
7. Slightly tilt the quick coupler system forward. To do this, press the joystick in the position **B**.
8. Lower the telescopic arm fully. To do this, press the joystick into the position **C**.
9. Reverse the telehandler away from the attachment.

NOTICE

In order to avoid damage to the tires, do not move the machine with the quickhitch fully tilted out!

► Tilt in the quickhitch and lower the loader unit to transport position.

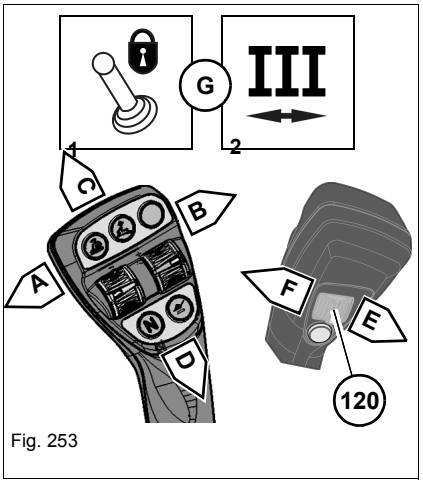


Fig. 253

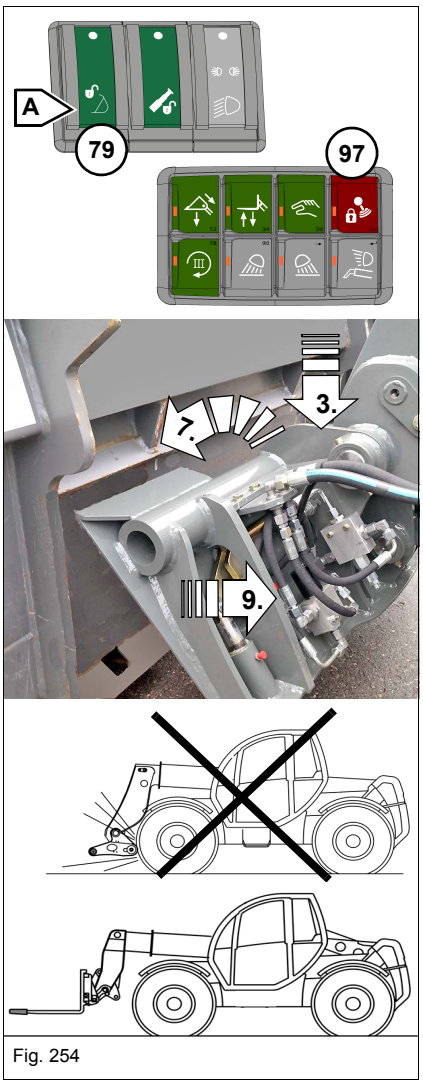


Fig. 254

Removing an attachment from a SKID STEER quickhitch facility

CAUTION

The attachment can tip over after lowering it to the ground!

Can cause injury.

► Uncouple all flexible lines from the attachment.

► Lower the attachment to the ground and ensure it cannot tip over.

NOTICE

In order to avoid damage to the attachment lock due to an attachment that is not fully unlocked, follow the order of unlocking.

1. Drive the telehandler to the drop-off position.
2. Disable the road-travel lock of the work hydraulics if it is enabled. To do this: press the button **97** briefly.
   ➥ The LED in the push button goes out.
   ➥ Symbol **G/1** disappears in the display.
3. Lower the telescopic arm. To do this: push the joystick to position **C** until the attachment is about 5 – 10 cm (1.9 – 3.9 in) horizontal above the ground.
4. Unlock the attachment. To do so, push the touch button **79** into position **A** and hold it there.
5. At the same time (two-hand operation) press the rocker switch **120** in the joystick to the **right (F)** (seen in the travel direction) until the lock pin is driven entirely out of the center bores of the attachment.
   ➥ Symbol **G/2** appears in the digital display
6. First release the switch **120** , then release the button **79**
   ➥ Symbol **G/2** goes out in the digital display of the indicator.
7. Slightly tilt the quick coupler system forward. To do this, press the joystick in the position **B**.
8. Lower the telescopic arm fully. To do this, press the joystick into the position **C**.
9. Reverse the telehandler away from the attachment.

NOTICE

In order to avoid damage to the tires, do not move the machine with the quickhitch fully tilted out!

► Tilt in the quickhitch and lower the loader unit to transport position.

Pressure release of the flat connector plugs of the 3rd control circuit (standard)

Information

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!

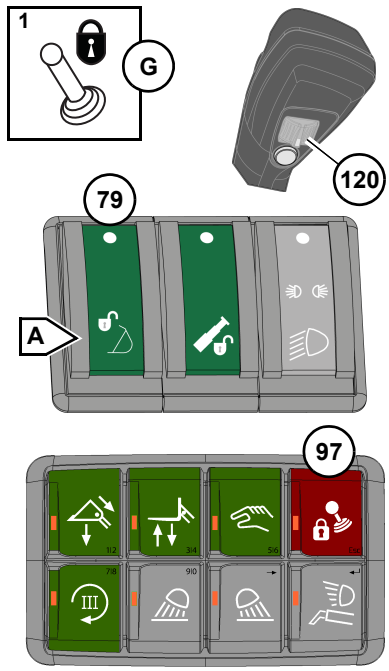


Fig. 255

Pressure release of the rocker switch 120 in the joystick

1. Disable the road-travel lock for the 3rd control circuit if it is activated. To do this: press the button **97**.
   ➥ The LED in the push button goes out.
   ➥ Symbol **G/1** disappears in the display.
2. Lower the loader unit and apply the parking brake *– see "Parking brake (hand brake)" on page 5-12*.
3. Shut off the diesel engine **but do not switch off ignition**.
4. Press and hold the rocker switch **120** on the joystick to the left and right for about 5 seconds in either position.
   ➥ Pressure in hydraulic lines is released.
5. Release switch **120** on the joystick.
6. Switch off the starter and remove the starting key.
7. Connect the hydraulic lines of the attachment onto the hydraulic connections of the quickhitch facility *– see "Hydraulic connections: 3rd control circuit to the attachment" on page 5-72*.

Pressure release on the rapid action couplings of the 3rd control circuit (optional)

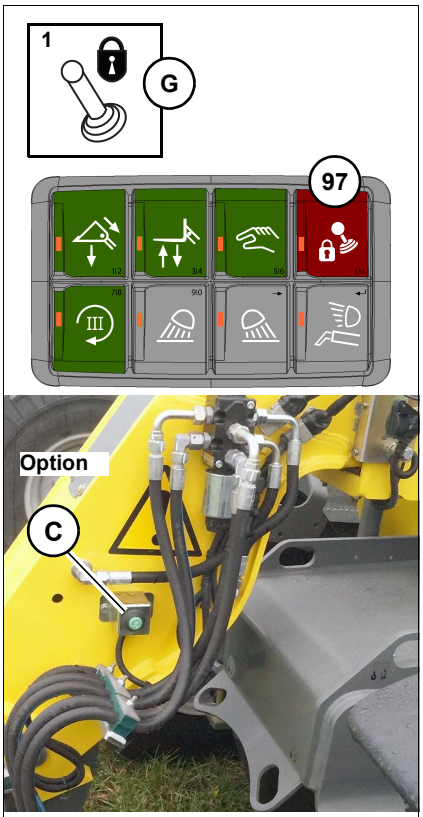


Fig. 256

Release the pressure with the touch button C on the loader unit (electro-hydraulic)

With this option, the pressure in the flat connector plugs of the quick coupler system can be lowered with the touch button when the engine is running **C** (laterally on the loader unit).

1. Disable the lock of the work hydraulics/road travel if it is activated. To do this, press the button **97** briefly.
   - ➥ Symbol **G/1** disappears in the display.
   - ➥ The LED in the push button goes out.
2. Lower the loader unit.
3. Apply the parking brake (hand brake) – *see "Parking brake (hand brake)" on page 5-12*.
4. Press and hold the button **C** about 5 seconds.
   - ➥ The pressure in the 3rd control circuit is released.
5. Change over the plug couplings.

Hydraulic connections: 3rd control circuit to the attachment

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.

- ► 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

Damage to hydraulic system due to dirty plug couplings and coupling sockets!

- ► Remove the dirt and dust from the plug couplings and coupling sockets before connecting an attachment!
- ► Replace missing protective caps.

NOTICE

Flexible lines can be damaged if they are not routed correctly!

- ► Do not route flexible lines crosswise.
- ► Watch out for crushing and shearing.

Information

If the attachment is placed in direct sunlight, the oil in the hydraulic rams is warmed up.

This creates pressure making it considerably difficult to attach the hydraulic lines to the hydraulic connections.

- ► Refer to the Operator's Manual of the attachment for an exact description of the hydraulic connections

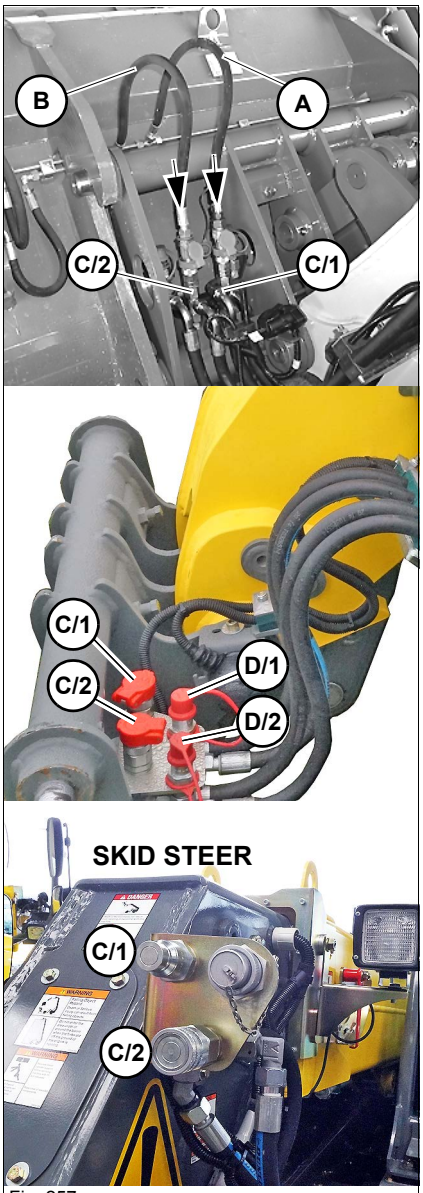


Fig. 257

Establishing the hydraulic connection to the attachment

1. Pick up the attachment and safely lock it – *see "Receive attachments on the quickhitch facility" on page 5-66*.
2. Apply the parking brake.
3. Stop the engine, but do **not** switch off ignition.
4. Release the pressure in the hydraulic lines – *see "Pressure release of the flat connector plugs of the 3rd control circuit (standard)" on page 5-70* or *“Pressure release on the rapid action couplings of the 3rd control circuit (optional)” on page 5-71*.
5. Switch off the starter and remove the starting key.
6. Clean the flat connector plugs.
7. Couple the hose pipes of the attachment to the flat connector plugs of the quick coupler system.
   - ➥ Hose pipe **A** to flat connector plug **C/1**
   - ➥ Hose pipe **B** to flat connector plug **C/2**.
8. Start the diesel engine.
9. Check the attachment for correct operation – *see "Important information on operation of the 3rd control circuit" on page 5-53*.

Disconnect the hydraulic connection from the attachment

WARNING

The attachment can tip over after lowering it to the ground!

Failure to observe this 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.

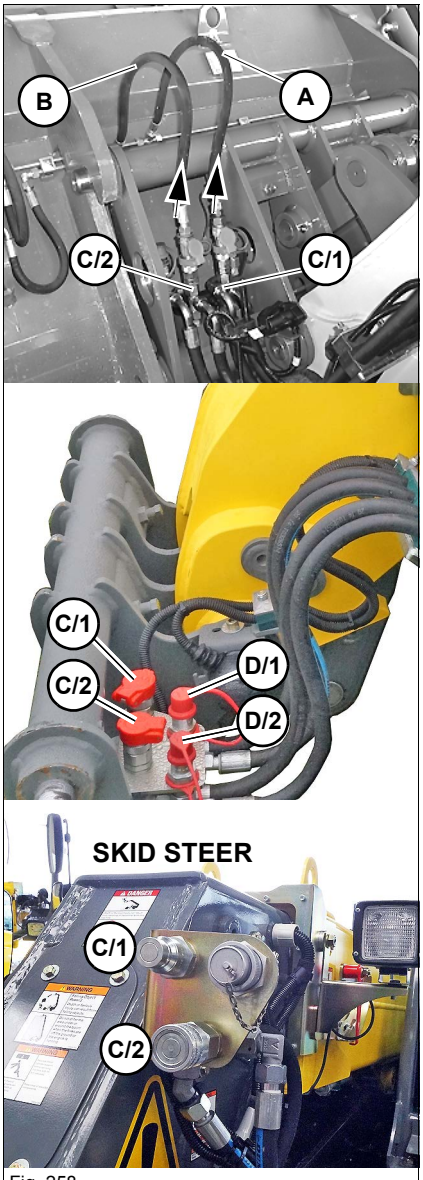


Fig. 258

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 "Pressure release of the flat connector plugs of the 3rd control circuit (standard)" on page 5-70* or *“Pressure release on the rapid action couplings of the 3rd control circuit (optional)” on page 5-71*.
5. Switch off the starter and remove the starting key.
6. Decouple the hose pipes **A** and **B** of the attachment (e.g. power grab bucket) on the flat connector plugs **C/1** and **C/2** and close with the screwed nose caps.
7. Start the engine and lower the attachment to the ground *– see "Set down the attachments" on page 5-68*.

Standard bucket

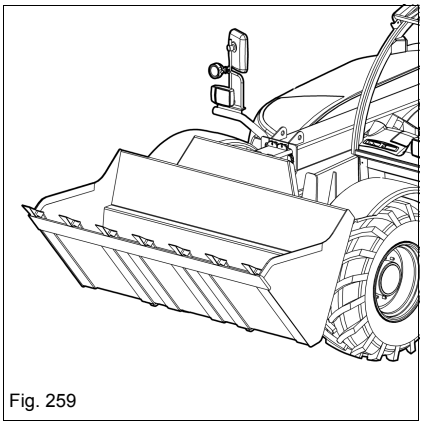


Fig. 259

Field of application and use of standard bucket

- The standard bucket is mainly used for digging earth, and for loosening, picking up, transporting and loading loose or solid material – see "Use of attachments" on page 3-13..
- Driving on public roads with a full bucket is not allowed according to the applicable national regulations (for example StVZO German road traffic regulations)!
- In addition, bear in mind the mandatory regulations relevant to accident prevention.

WARNING

Danger of accident due to machine overload when picking up or setting down loads due to disregard!

Failure to observe this can cause serious injury or death.

► Pay attention to the load diagram and the display of the overload control and take appropriate action if necessary.

► The load diagram is attached to the cabin.

Information

The load-bearing diagram is valid only for applications of the released stacker with the corresponding tire sizes.

The load diagram also applies to released attachments if the specified capacities and material densities are observed – see "Use of attachments" on page 3-13.

Pay attention to the specific load diagrams of other attachments used!

Pick up the standard bucket at the quickhitch facility – see "Check the receptacle device of the attachment" on page 5-65 and “Receive attachments on the quickhitch facility” on page 5-66.

Pallet forks

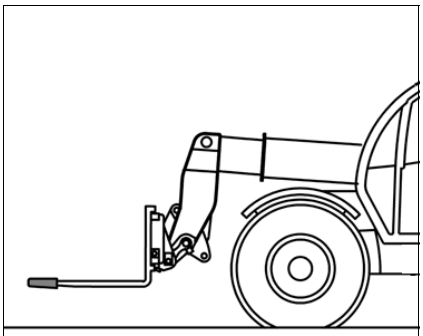


Fig. 260

Field of application and use of pallet forks

The pallet forks are mainly used for picking up, transporting and loading palletized material, pallets and other stacked material – *see "Use of attachments" on page 3-13*.

In addition, bear in mind the mandatory regulations relevant to accident prevention!

WARNING

Accident hazard from the pallet fork tines!

Pallet fork tines can cause serious injury or death during machine travel on public roads.

- ► Machine travel on public roads with pallet forks is prohibited!
- ► Remove the pallet forks before performing machine travel on public roads and transport them separately.
- ► Before leaving the machine, lower the pallet forks to the ground, stop the diesel engine, switch off ignition and remove the key.
- ► The pallet forks are not certified for applications with lifting gear! Do not hitch any hooks, eyelets, etc. either onto the pallet forks or fork tines as lifting gear!

WARNING

Danger of accident due to machine overload when picking up or setting down loads due to disregard!

Failure to observe this can cause serious injury or death.

- ► Pay attention to the load diagram and the display of the overload control and take appropriate action if necessary.
- ► The load diagram is attached to the cabin.

Information

The load diagram is valid only for applications with the released pallet forks and corresponding tire size
– *see "Use of attachments" on page 3-13*.

Pay attention to the specific load diagrams of other attachments used!

Picking up pallet forks with the quickhitch facility

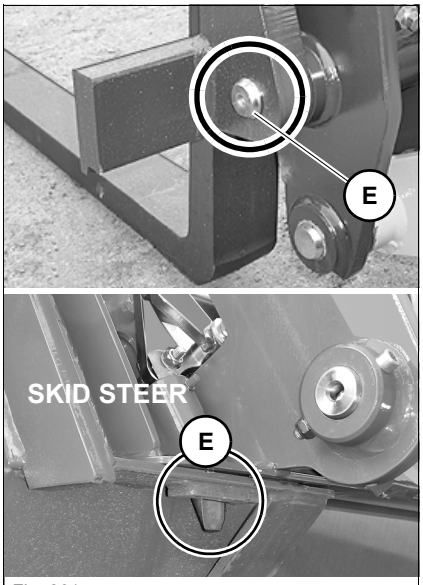


Fig. 261

WARNING

Accident hazard if the attachments are not locked!

Failure to observe this can cause serious injury or death.

► Check whether the lock pins **are visible on either side** in the mounting bores of the attachment.

Information

The pallet forks are picked up and installed on the quickhitch facility in the same way as the standard bucket

► *– see "Check the receptacle device of the attachment" on page 5-65.*

► *– see "Receive attachments on the quickhitch facility" on page 5-66.*

Removing the pallet forks from the quickhitch

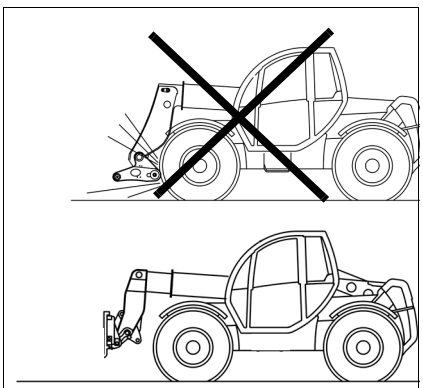


Fig. 262

NOTICE

In order to avoid damage to the tires, do not move the machine with the quickhitch fully tilted out!

► Tilt in the quickhitch and lower the loader unit to transport position.

Information

The pallet forks are removed from the quickhitch facility in the same way as the standard bucket

► *– see "Set down the attachments" on page 5-68.*

Fitting attachments from other manufacturers (option)

Quickhitch facilities for attachments from other manufacturers

The following quickhitch facilities can be purchased from your distributor and installed by an authorized service center.

Quickhitch facility for attachments

- with EURO quickcoupler
- with WEIDEMANN support
- with SKID STEER support
- with MATBRO support
- with MANITOU support

- **Important!**
  Only attachments may be used on quickhitch facilities from other manufacturers that are approved for this purpose and that have a load diagram approved for the attachment.
  - *– see chapter 3 " Attachments for WEIDEMANN quickhitch facility" on page 3-18*
  - *– see chapter 3 " Attachments for EURO quickhitch facility (optional)" on page 3-20*
  - *– see chapter 3 " Attachments for SKID STEER quickhitch facility (optional)" on page 3-22*
- If other attachments are used, conformity (stability test) in accordance with the EC machine directive or the EN 1459 and EN 474-3 standard must be checked and documented by an authorized service center.
- Warranty and the operation license become void if non-approved attachments are installed, or if parts of the quickhitch 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.
- See the following pages for the stability check.
- In the case of non-EU countries, follow and apply the national regulations of these countries.

Important information on fitting attachments from other manufacturers

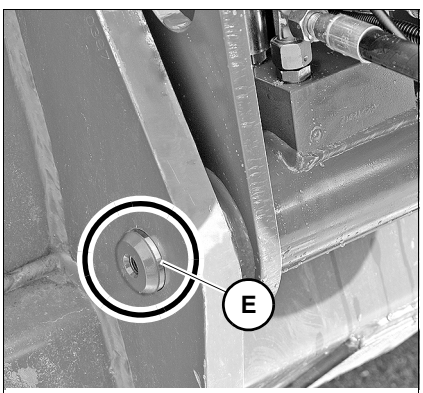


Fig. 263

WARNING

Accident hazard if the attachments are not locked!

Can cause serious injury or death.

► Check whether the lock pins **E on both sides are visible** in the mounting bores of the attachment.

Sample load-bearing capacity diagram with KRAMER pallet fork

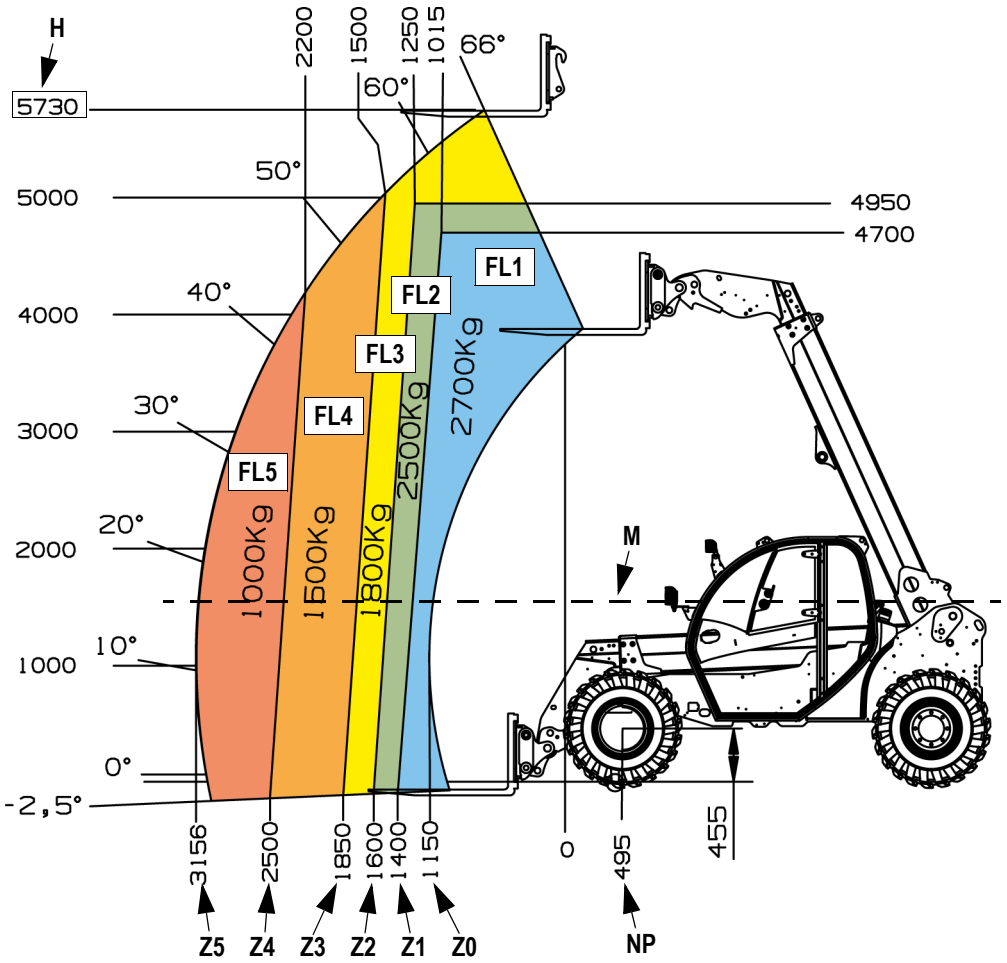


Fig. 264

Legend: load-bearing diagram with Kramer quick coupler system

Designation			Determine for attachments from other manufacturers
FL1 – FL5	Load on pallet forks	kg	Calculate and enter in load diagram
XL	Distance between payload and wheel	mm	Individual extension according to load diagram
FG	Pallet forks weight	kg	Ask manufacturer
X	Distance between pivotal point of pallet forks and axle center	mm	See calculation for quickhitch from other manufacturer
GG	Distance between center of gravity of pallet forks and pivotal point of attachment	mm	Ask manufacturer
SWE	Quickhitch weight	kg	See calculation for quickhitch from other manufacturer
SSWE	Distance between center of gravity of quickhitch and pivotal point of attachment	mm	See calculation for quickhitch from other manufacturer
NP	Wheel radius	mm	See KRAMER load diagram
∆ **Z....**	Differential range; extended boom to retracted boom	mm	Determine **Z0** and **Z5**, **Z1 to Z4** are fixed values
M	Moment at front axle, consisting of payload, quickhitch and pallet forks.	kg x m	–
H	Pallet height	mm	Determine and enter in new load diagram

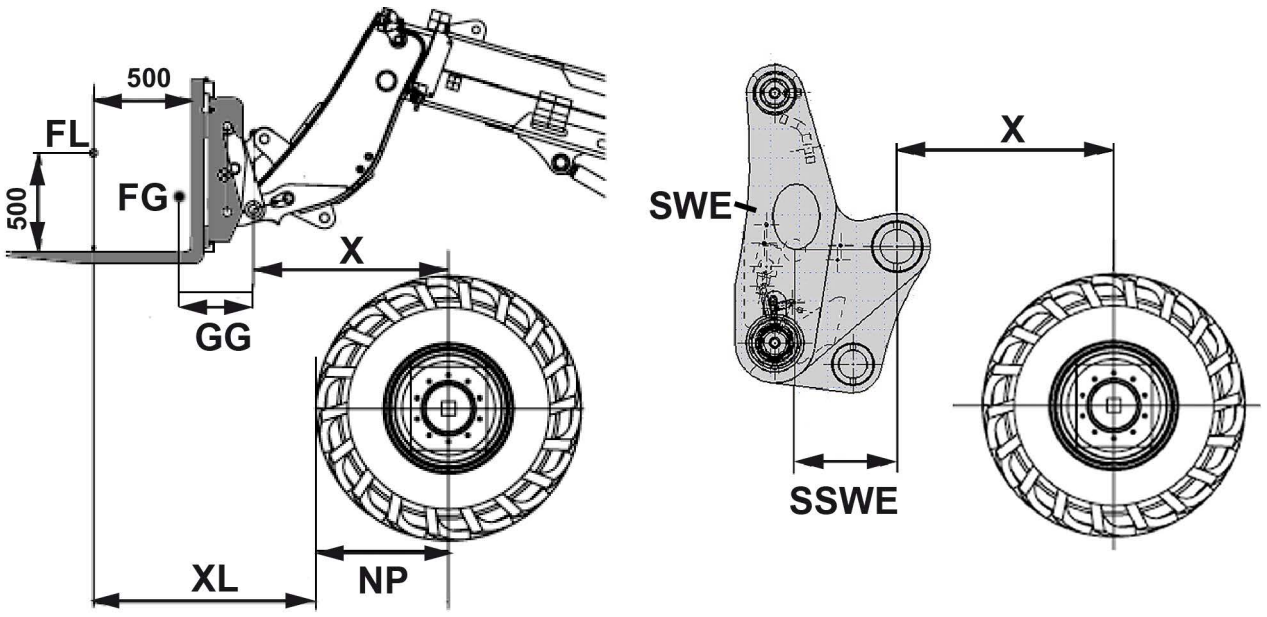


Fig. 265

Important information about the stability calculation

1. After installing quickhitches and pallet forks from other manufacturers, determine the load work area (outer curves of diagram) by means of the KRAMER load diagram.
2. Determine the load point (**FL)** on the pallet forks (500 mm x 500 mm (19.7 x 19.7 in)) *– see "Sample load-bearing capacity diagram with KRAMER pallet fork" on page 5-79*.
3. Determine dimension **Z0** (fully retracted telescopic boom) and dimension **Z5** (fully extended telescopic boom) for load point determined and enter it in the new load diagram on page *5-84*.
4. Calculate differential value (∆ **Z**) of payload areas (**Z1 – Z5**) and transfer it to the corresponding calculation formula in the quickhitch facility from another manufacturer.
   ➥ See graph on page *5-79*
   Z1 – **Z0** = differential value ∆ **Z...**
   Z2 – **Z0** = differential value ∆ **Z...**
   Z3 – **Z0** = differential value ∆ **Z...**
   Z4 – **Z0** = differential value ∆ **Z...**
   Z5 – **Z0** = differential value ∆ **Z...**
5. Determine the center of gravity of the pallet forks with regard to the pivotal point of the attachment **(GG)** and the weight of the pallet forks **(FG)** of the manufacturer and transfer them to the corresponding calculation formula for the quickhitch facility from another manufacturer.
6. Calculate the values **FL1 – FL5** with the formulas used for calculating stability (see page *5-82*) and enter them in the new load diagram on page *5-84*.
7. The pallet height **H** is modified by an attachment from another manufacturer.
   ➥ Enter the value that has been determined in the new load-bearing diagram on page *5-84*.

Calculation formula for stability (load diagram)

$$(FL_n) = \frac{M - SWE \times (SSWE + \Delta Z_n + X) - FG \times (GG + X + \Delta Z_n)}{XL + NP}$$

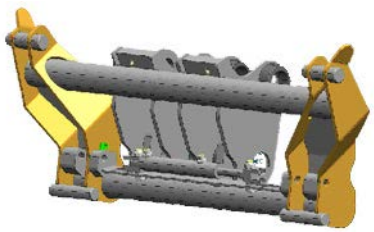


Fig. 266

Stability calculation with EURO quickhitch facility

Before calculating, determine the differential value (∆ **Z...**), as well as the weight of the pallet forks (**FG**) and the center of gravity for the pallet forks (**GG**) *– see "Important information about the stability calculation" on page 5-81*.

$$(FL_n) = \frac{M - SWE \times (SSWE + \Delta Z_n + X) - FG \times (GG + X + \Delta Z_n)}{XL + NP}$$

$$FL1 = \frac{5674 - 112 \times (0.157 + Z1 + 0.91) - FG \times (GG + 0.91 + Z1)}{1.9005}$$

$$FL2 = \frac{5870 - 112 \times (0.157 + Z2 + 0.91) - FG \times (GG + 0.91 + Z2)}{2.1005}$$

$$FL3 = \frac{4945 - 112 \times (0.157 + Z3 + 0.91) - FG \times (GG + 0.91 + Z3)}{2.350}$$

$$FL4 = \frac{5462 - 112 \times (0.157 + Z4 + 0.91) - FG \times (GG + 0.91 + Z4)}{3.005}$$

$$FL5 = \frac{4555 - 112 \times (0.157 + Z5 + 0.91) - FG \times (GG + 0.91 + Z5)}{3.656}$$

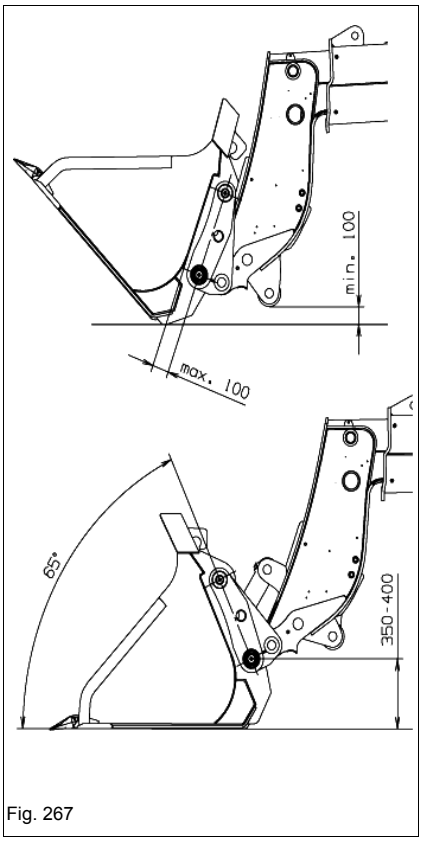


Fig. 267

Calculation of the stability of third party attachments (bucket)

Maximum authorized bucket payloads = pallet forks payloads – bucket weight.

- ➥ Bucket curb weight, see type label affixed on bucket.
- ➥ Pallet fork payload *– see "Template: Load-bearing diagram for pallet forks from other manufacturers" on page 5-84*.

Example: telescopic boom retracted

Payload 2700 kg (5952.3 lb.) - (see pallet forks load-bearing diagram) minus 600 kg (1322.7 lb.) bucket curb weight = 2100 kg (4629.6 lb.) actual payload in the bucket

Example: telescopic boom extended

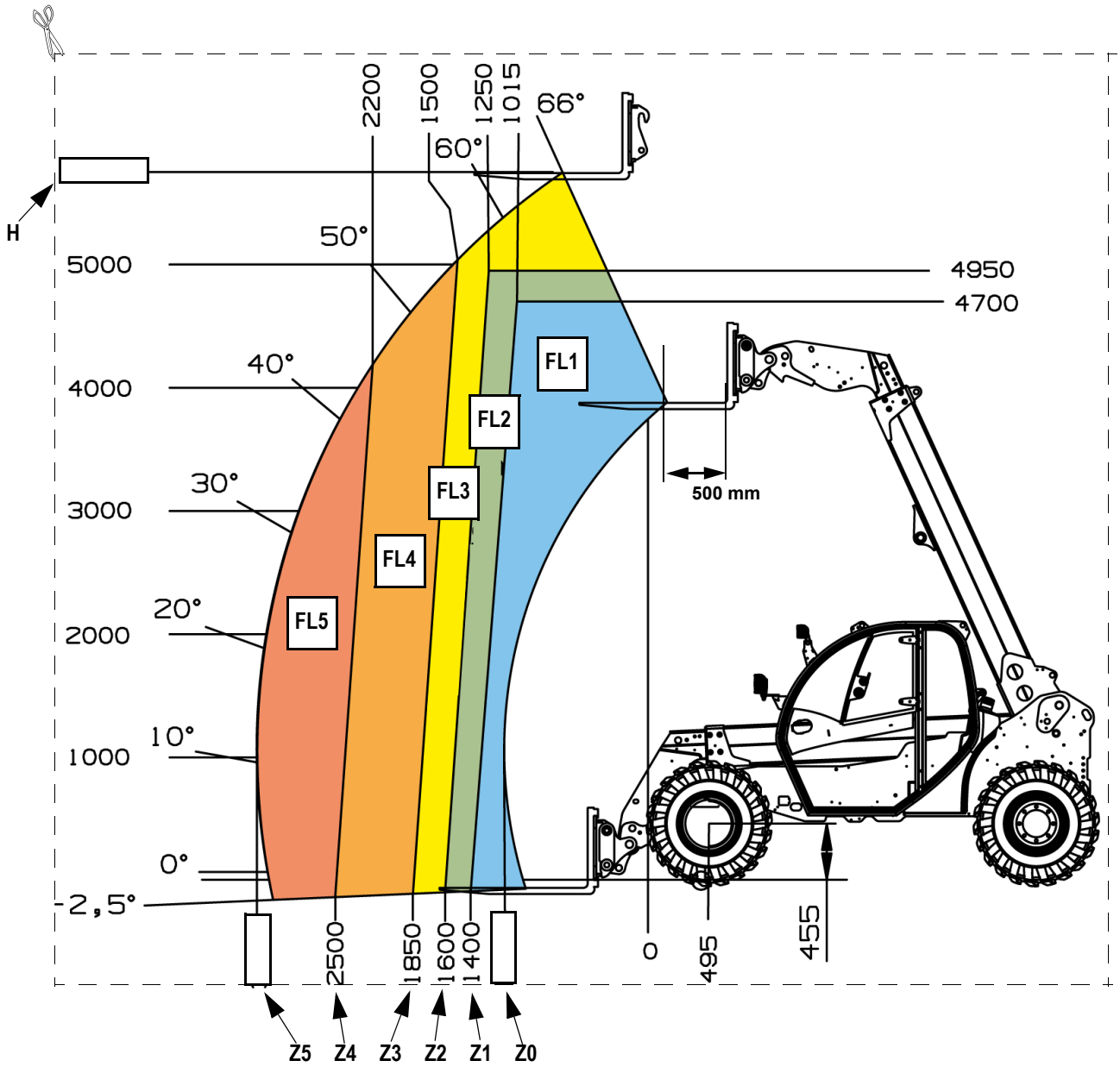
Payload 1000 kg (2204.5 lb.) - (see pallet forks load-bearing diagram) minus 600 kg (1322.7 lb.) bucket curb weight = 400 kg (881.8 lb.) actual payload in the bucket

Information

If the attachments do **not** correspond to the dimensions (length / width), to the bulk material density as well as the bearing loads of the approved attachments
– see chapter 3 " Use of attachments" on page 3-13, then an **EBE (individual operating license)** from the competent authorities is required!

Observe the legal regulations of your country.

Template: Load-bearing diagram for pallet forks from other manufacturers



Example: Test plan for third party attachments

Machine model: **Serial no.:** **Job no.:**		**Attachment type:** **Attachment no.:**	**Date:** **Tester:**
Stability		**Actual value**	**Remarks**
Wheelbase [mm]			
Front left wheel [N]			[N]
Front right wheel [N]		Front axle =	
Rear left wheel [N]			
Rear right wheel [N]		Rear axle =	
Technical data	**Specified**	**Actual value**	**Remarks**
Tilt-in angle (lower position)			
Tilt-out angle (upper position)			
Distance between center of gravity of payload and center of front axle [mm]			
Capacity as per type label [l]			
Gamma as per type label			
Weight of attachment [kg][1]			
Attachment functions			**Remarks**
Hitching the attachment onto the wheel loader			
Mechanically OK	Yes	No	
Hydraulically OK	Yes	No	
Electrically OK	Yes	No	
Mechanical stops (tilt out/tilt in) existing and functional			
OK	Yes	No	
Hose routing (length, damage, age)			
OK	Yes	No	
Nominal width of pressure line [mm]		10	
Nominal width of return line [mm]		10	
Pressures	**Specified**	**Actual value**	**Remarks**
At idling speed [bar]			Oil 50°C (122°F)
Under full load [bar]			Oil 50°C (122°F)
Permissible hydraulic pressures not exceeded at nominal load of boundary states [bar]			
Other remarks:			

1. With the three-point mount option, the max. permissible gross weight rating and the max. permissible rear axle load should not be exceeded. See *on page 9-16 "Weight"*.
Only under the prerequisite that at least 20% of the actually present gross weight rating is allotted to the front axle. Otherwise the vehicle is considered "incapable of steering!"
The front can additionally be ballasted in compliance with the aforementioned requirements.

5.11 Work operation

“Hose burst valve” safety feature

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!

WARNING

Accident hazard when lowering the loader unit in an emergency!

Failure to observe this 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.
- ► If oil escapes, inform the fire brigade or the authorities in charge of cleaning up the oil.

Information

Safety feature!

It is not possible to lower the telehandler system with a broken tube or hose **and** it can only be repaired by an authorized service center.

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!

- ► Inform the fire brigade or the authorities in charge of cleaning up the oil.

In the event of a bursting tube or pipe on the loader unit:

1. Apply the parking brake.
2. Stop the engine and switch off the ignition immediately.
3. If safely possible, carry out an emergency lowering *– see "Emergency lowering of the loader unit in case of diesel engine failure" on page 5-110*.
4. Secure the danger zone.
5. Have a burst hose or pipe, and the hose burst valve, immediately repaired by a qualified service center with trained personnel.

Machine travel on public roads with a bucket

Information

During machine travel on public roads, equip the machine only with attachments that are certified for this machine! (See **National Type Approval (Germany) or the Data Confirmation (Germany)**, and *"Use of attachments" on page 3-13* in this operator's manual!
German road traffic regulations **prohibit** driving on public roads if the distance between the front edge of the bucket and the center of the steering wheel is over **3500 mm** (137.8 in) in transport position.

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.

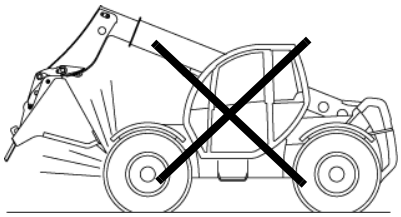


Fig. 268

Information

Machine travel on public roads with a full bucket is prohibited in Germany!

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

NOTICE

In order to avoid damage to the tires, do not move the machine with the bucket fully tilted out!

► Tilt in the quickhitch and lower the loader unit to transport position.

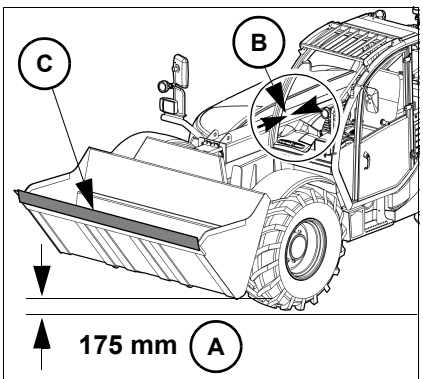


Fig. 269

1. Empty the bucket and curl it in.
2. Fully retract the telescopic boom.
3. Lift the telescopic arm into the transport position **about 175 mm (6.8 in)** until the red markings **B** are congruent on the telescopic arm and side window (cabin).
4. Cover the blade or teeth of the bucket across their entire width with the protection **C** provided.
5. Switch on the load stabilizer *– see "Load stabilizer for loader unit (option)" on page 5-121*.
6. For other precautions for road travel, see – *"Instructions for machine travel on public roads" on page 4-54* and *"Preparing machine travel on public roads" on page 4-55*.

Safety instructions regarding work operation with a bucket

WARNING

The machine risks tipping over if it caves in or sinks/falls into a pit!

Failure to observe this can cause serious injury or death.

► Never drive up to the edge of a pit from outside.

WARNING

Danger of collapsing walls and foundations!

Failure to observe this can cause serious injury or death.

► Never undermine the foundations of walls.

WARNING

Electric shock from overhead electric lines poses a death hazard!

Approaching overhead electric lines leads to arcing and may result in serious injury or death.

► To avoid danger, contact the energy supplier before working under overhead electric lines.

WARNING

Crushing hazard due to tipping over of machine!

A tipping vehicle can cause serious injury or death.

► Lower the loader unit to transport position during machine travel.
► Adapt the driving speed to the prevailing ground conditions.
► Adapt the driving speed to the material loaded.
► Note the tilting limit of the vehicle and do not exceed permitted payloads.
► Reduce the travel speed before driving downhill.
► Fasten your safety belt.
► Do not protrude any body parts out of the vehicle.
► Carefully steer the vehicle with the raised loader unit and reduce the travel speed (walking pace).

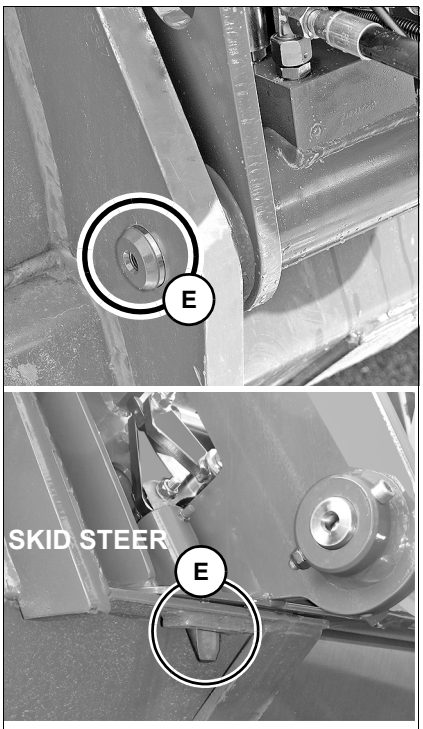


Fig. 270:

WARNING

Danger of accident if the attachments are not locked!

Failure to observe this can cause serious injury or death.

► Check whether the lock pins **E on both sides** are visible in the center bores of the attachment .

Information

Observe the safety instructions before loading operations and act accordingly!

► *– see "Designated use" on page 3-8*,

► *– see "Behavioral measures and safety instructions" on page 2-2* and *"Operation" on page 2-4*.

Information

Switch off the load stabilizer, as it will yield very easily, making it difficult to perform any precise lifting movements!

► *– see "Load stabilizer for loader unit (option)" on page 5-121*.

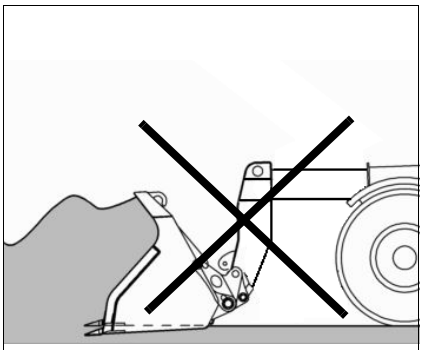


Fig. 271

NOTICE

In order to minimize the risk of damage to machine and environment, push and pull material only with the telescopic boom completely retracted!

► Fully retract the telescopic boom.

► Material may only be picked up with the bucket at slow speed (below 3 km/h (1.8 mph)) and performed with a fully retracted telescopic boom!

► At greater heights with an extended telescopic boom, drive into the material only if the speed is below 1 km/h (0.62 mph) and the material is mainly picked up with the work hydraulics!

► **Failure to observe the specified instructions can cause serious damage to the vehicle. Any warranty for such damage is generally refused by the manufacturer.**

Transporting with a full bucket

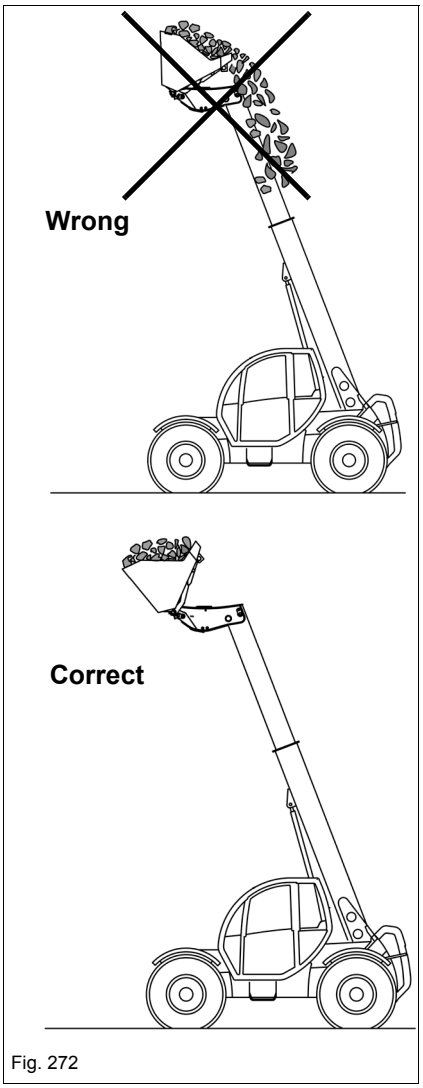


Fig. 272

If it is tilted in, the bucket is moved parallel to its initial position as the loader unit is raised.

WARNING

Danger of falling material when transporting loads with a raised and extended loader unit!

Failure to observe this can cause serious injury or death.

► Always tilt in the attachment slightly towards the machine and carry it as close as possible to the ground; bear in mind the required ground clearance!

WARNING

If the bucket is unintentionally tilted in to the limit in the raised position, material can fall over the rear of the bucket!

Failure to observe this can cause serious injury or death.

► Do not tilt in a raised bucket.

► 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)

WARNING

Danger of tipping over during machine travel or maneuvering on slopes with a full bucket!

Failure to observe this can cause serious injury or death.

► Lower the loader unit into the transport position and tilt in the bucket in!

► Ensure good visibility of the material you want to pick up and of the work and travel range.

► Observe the overload control display, and take appropriate action if necessary.

NOTICE

Dirt on the slide surfaces of the extended telescopic boom causes increased wear.

► Do not completely tilt in a full bucket if the telescopic boom is extended.

Working with a standard bucket

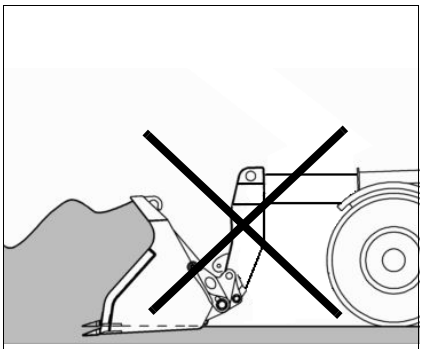


Fig. 273

NOTICE

In order to minimize the risk of damage to machine and environment, push and pull material only with the telescopic boom completely retracted!

- ► Fully retract the telescopic boom.
- ► Material may only be picked up with the bucket at slow speed (below 3 km/h (1.8 mph)) and only with a fully retracted telescopic boom!
- ► At greater heights with an extended telescopic boom, drive into the material if the speed is below 1 km/h (0.62 mph) and the material is mainly picked up with the work hydraulics!

Failure to observe the instructions specified above can cause serious damage to the machine. The manufacturer does not give any warranty for any such damage.

Machine travel with the bucket fully tilted out

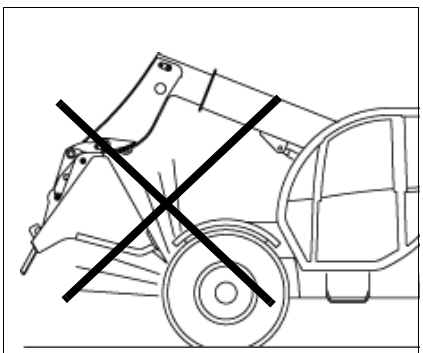


Fig. 274

NOTICE

In order to avoid damage to the tires, do not perform machine travel with the bucket fully tilted out!

- ► Tilt in the bucket and lower it to transport position

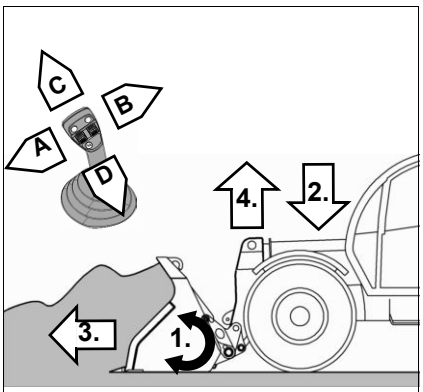


Fig. 275

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**.
3. Drive 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**.

Loading if the material is hard to penetrate

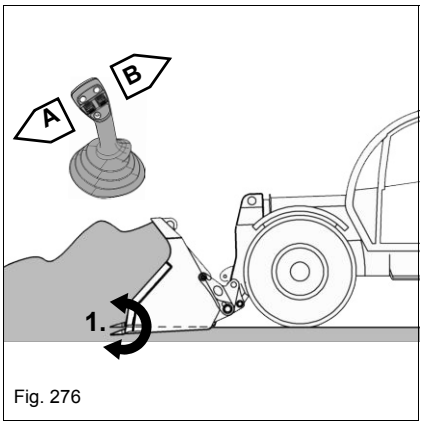


Fig. 276

Load as for loading loose material, but in addition:

1. Tilt the bucket in and out a little. To do this: move the joystick to the left **A** and right **B**.

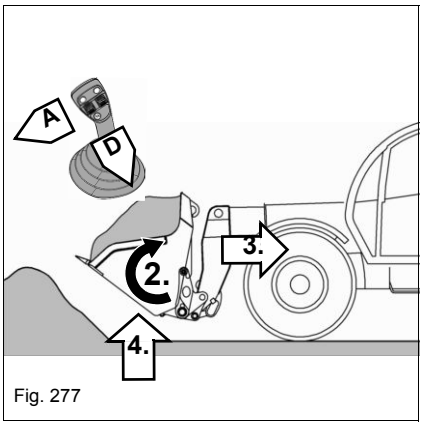


Fig. 277

When the bucket is full:

2. Tilt in the bucket. To do this: push the joystick to the left **A**.
3. Reverse out of the material.
4. Raise the bucket to transport position.

Removing material/digging in soft soil

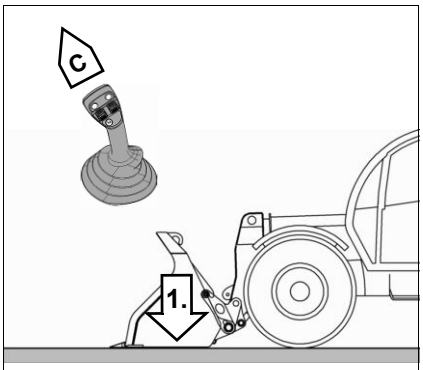


Fig. 278

1. Place the bucket horizontally on the ground. To do this: push the joystick forward **C**.

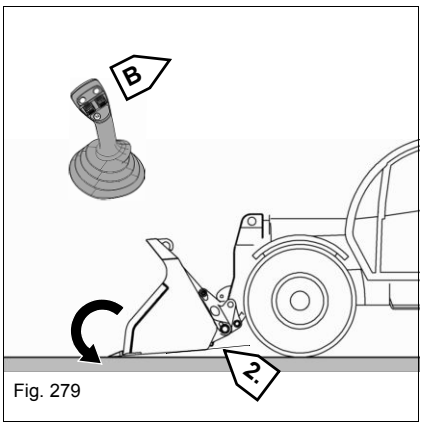


Fig. 279

2. Adjust the digging angle. To do this: push the joystick to the right **B**.

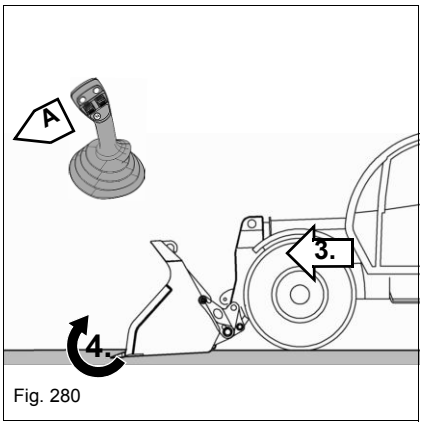


Fig. 280

3. Travel forward.

Once the bucket has penetrated the soil:

4. Set the digging angle a little 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. Proceed as for loading loose material.

Removing material/digging in hard soil

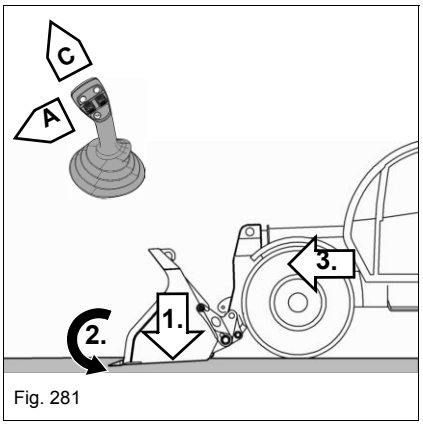


Fig. 281

1. Lower the bucket horizontally to the ground. To do this: push the joystick forward **C**.
2. Adjust the digging angle flatter than for digging in soft soil. To do this: push the joystick to the left **A**.
3. Drive forward and press the bucket downward a little as you do so. To do this: push the joystick forward **C** a little.

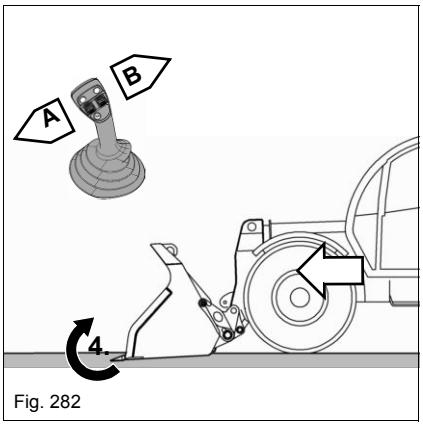


Fig. 282

Once the bucket has penetrated the soil:

4. Set the digging angle a little 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.

Grading

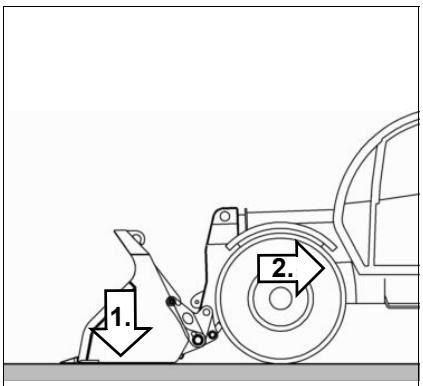


Fig. 283

1. Lower the loader unit horizontally to the ground.
2. Reverse across the surface to be graded.

Loading vehicles

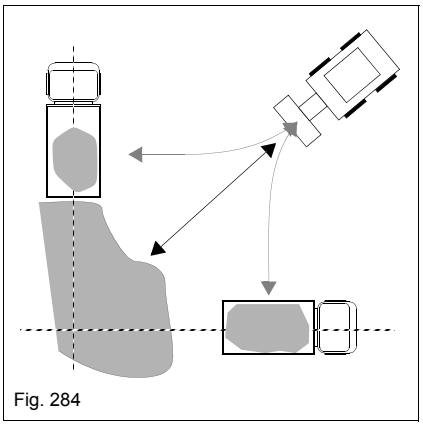


Fig. 284

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 you are performing machine travel in a straight line toward the truck.

If possible load material with the wind behind you to keep the dust away from your eyes, air filters and fans.

Working with the pallet fork

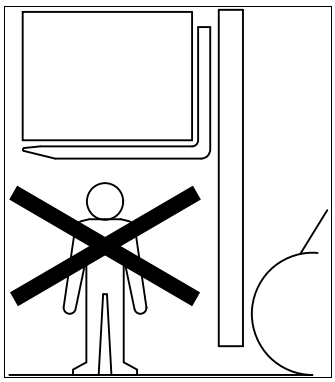


Fig. 285

Conduct and safety instructions

WARNING

Danger of accident from restricted line-of-sight!

Failure to observe this can cause serious injury or death.

► **Risks of visual impairments mainly occur during reverse operation, when the loader unit is raised as well as from the bucket with oversized goods.**

- Stay clear of suspended loads!
- Do not transport persons in the attachment.
- The pallet forks may not be used for applications with lifting gear!
- Follow the safety instructions in the Operator's Manual of the attachment!
- Before starting work, ensure that the fork tines on the fork frame are safely locked! Secure with locking lever against sliding sideways!
- Never use bent, cracked or otherwise damaged fork tines/pallet forks!
- Do not overload the attachment or the machine, observe the load diagram!
- Note the stability of the vehicle and never exceed the maximum load – *see "Overload limit, overload display unit" on page 5-37*!

Machine travel on public roads with the pallet forks

Machine travel on public roads with a mounted pallet fork is prohibited in the Federal Republic of Germany!

Do not transport the pallet forks in a loader 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.

  ➥ *– see chapter 3 " Approved attachments for machine travel on public roads (Federal Republic of Germany)" on page 3-15*

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

Pallet forks transport position

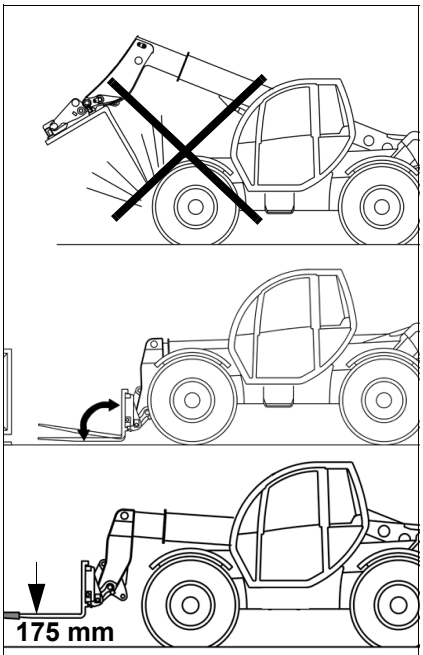


Fig. 286

NOTICE

In order to avoid damage to the tires, do not move the machine with the pallet forks fully tilted out!

► Tilt in the pallet forks and lower them to transport position.

1. Tilt in the quickhitch facility.
2. Lower the loader unit to transport position.
   ➥ The distance between the pallet forks and the ground is **about 175 mm (6.8 in).**

Use of fork tines

- Use fork tines only according to their designated use.
- Do not exceed the load center and lifting capacity. See the load-bearing diagram.
- Keep the fork tines clean at all times.
- Load both fork tines evenly.
- Do not use standard fork tines as reverse forks.
- Do not push, pull or shove the fork tines, 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 tines.
- Tie down loads, if necessary, to avoid losing them.
- 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 tines, or attach any additional device.
- Only the manufacturer is authorized to perform repair work on the fork tines.
- Transporting persons on the fork tines is prohibited.
- 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:
  - Locks, latches: check function.
  - Hook area of the fork tines: visual check for cracks and deformations.
  - Articulation area of the forks tines: visual check for indents, nicks and cracks.
  - Do not use fork tines if worn over 10%.
  - Check the fork tines for deformation.
- In case of damage or if you are unsure: immediately stop using the fork tines!

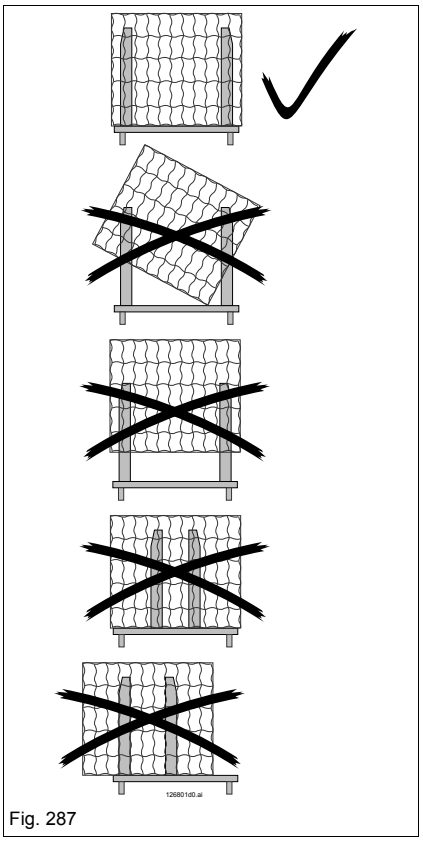


Fig. 287

Important information on picking up loads

- 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 tines 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 tines as far apart as possible and at an equal distance from the left and right side of the load!

Important information on load transport

WARNING

Danger of accident due to restricted line-of-sight during transport!

Failure to observe this can cause serious injury or death.

► Only use approved attachments

► Transport the cargo in the transport position about 175 mm (6.8 in).

► Check the line of sight and adjust the mirrors.

► If the line-of-sight cannot be ensured, use the camera option.

- Always tilt in the attachment a little (toward the machine) for transport!
- Always transport the load close to the ground!
- Bear in mind the overload warning device!
- Always adapt the transport speed to the load you are transporting and to the ground conditions!
- Never leave the machine with the load raised!
- Do not lower the loader unit from a high fork tine position with an extended telescopic boom – always retract the telescopic boom first!
- 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.).
- Evenly load the cargo areas of the truck or trailers and note the axle loads of the transport vehicle.
- 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.

Load diagram for pallet forks

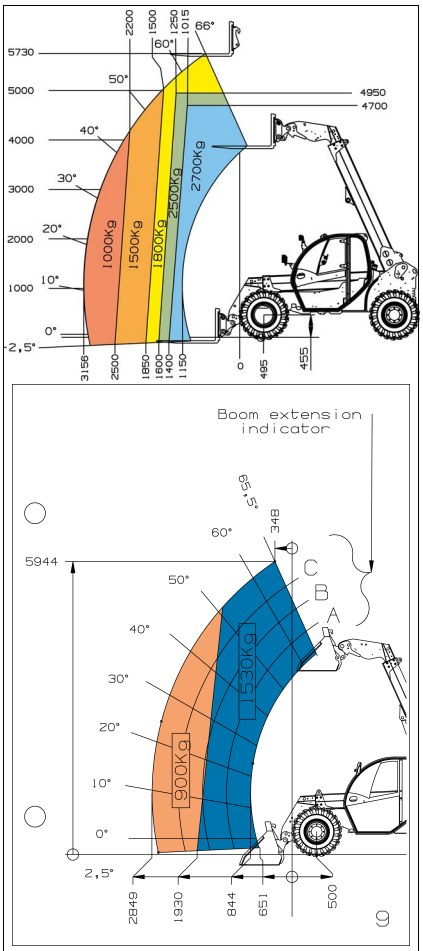


Fig. 288

Important information about the load-bearing diagrams

The load-bearing diagram fixed in the vehicle cabin applies exclusively for the released pallet fork. See tables for attachments on pages *3-14* to *3-22*!

Observe the load-bearing diagrams of other attachments (load hook, for example) used *– see "Work with a load hook" on page 5-108*!

WARNING

Danger of tipping over with the machine if the overload control and the load diagram are not observed!

Causes serious injury or death.

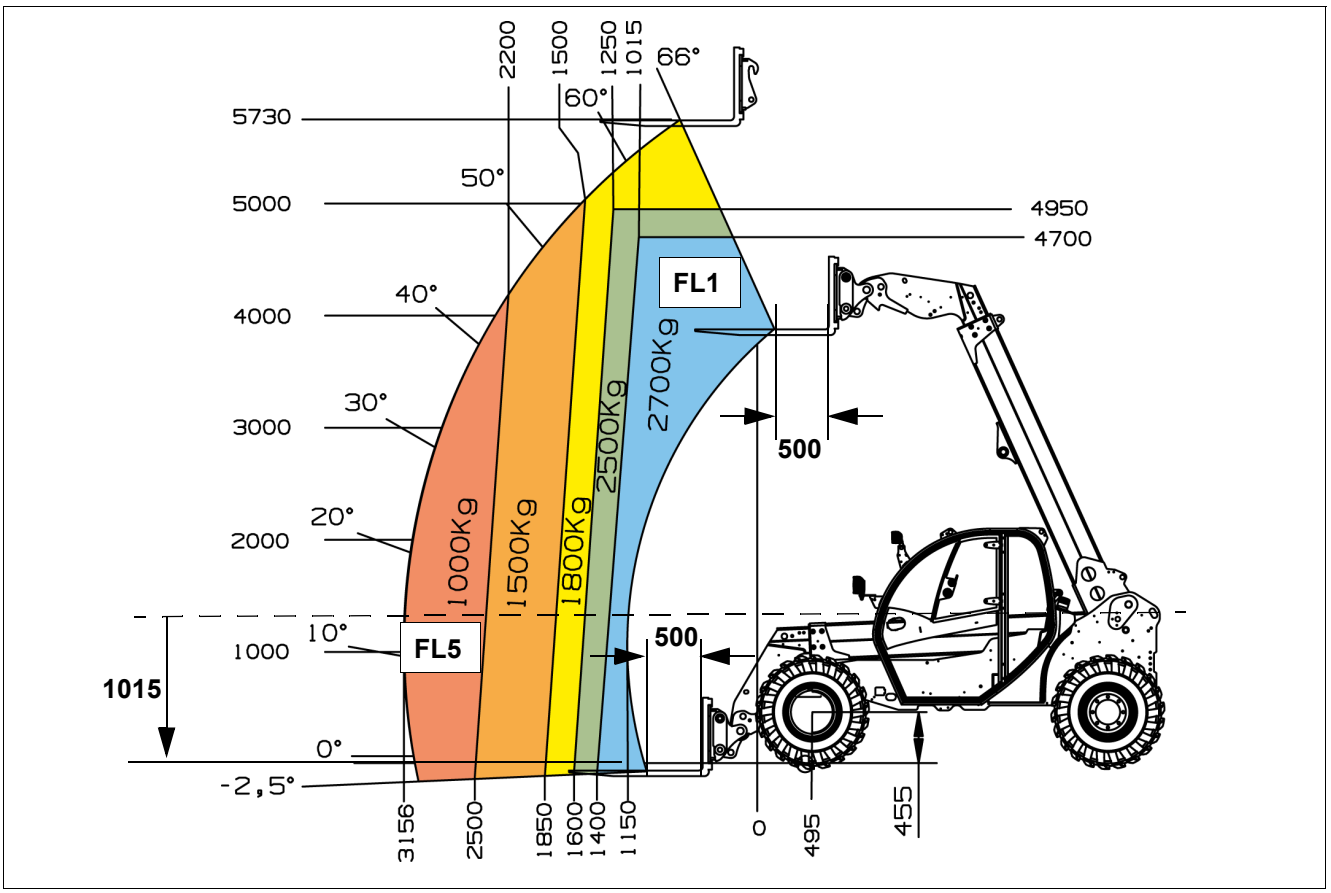
- ► Observe the safe load indicator and act accordingly.
- ► Pay attention to the load-bearing diagram in the cabin and act accordingly.
- ► The weight of the attachment plus the load may not exceed the information specified in the load-bearing diagram.

The payload and carrying load depends on how the vehicle is equipped e.g.:

- Dead weight of attachment
- Distance of load to middle of front wheels
- Lift height

Payloads and bearing loads *– see chapter 9 " Payload/lift capacity/ stability" on page 9-17*.

Reading example:
Load-bearing capacity diagram KRAMER, WEIDEMANN, EURO



Surface FL1 Telescopic arm retracted

- Center of gravity of the load on the fork frame 500 mm (19.6 in)
  ➥ **Maximum load lifting = 2700 kg (5952.3 lb.)**

Surface FL5 Telescopic arm extended and raised to 1015 mm (39.9 in)

- Center of gravity of the load on the fork frame 500 mm (19.6 in)
  ➥ **Maximum load lifting = 1000 kg (2204.5 lb.)**

Information

For the bearing capacity of the loader bucket, the dead weight of the bucket must be considered in the calculation of the load-bearing diagrams for the pallet forks *– see chapter 9 " Payload of the loader bucket" on page 9-18*.

For buckets on the SKID STEER quickhitch facility, their load-bearing diagrams must be considered and adhered to *– see chapter 9 " Load bearing tables – SKID STEER attachments USA" on page 9-22* or *– see chapter 9 " Load bearing tables – Attachments in Australia" on page 9-26*.

Reading example:
Load-bearing diagram for SKID STEER pallet fork and for Australia

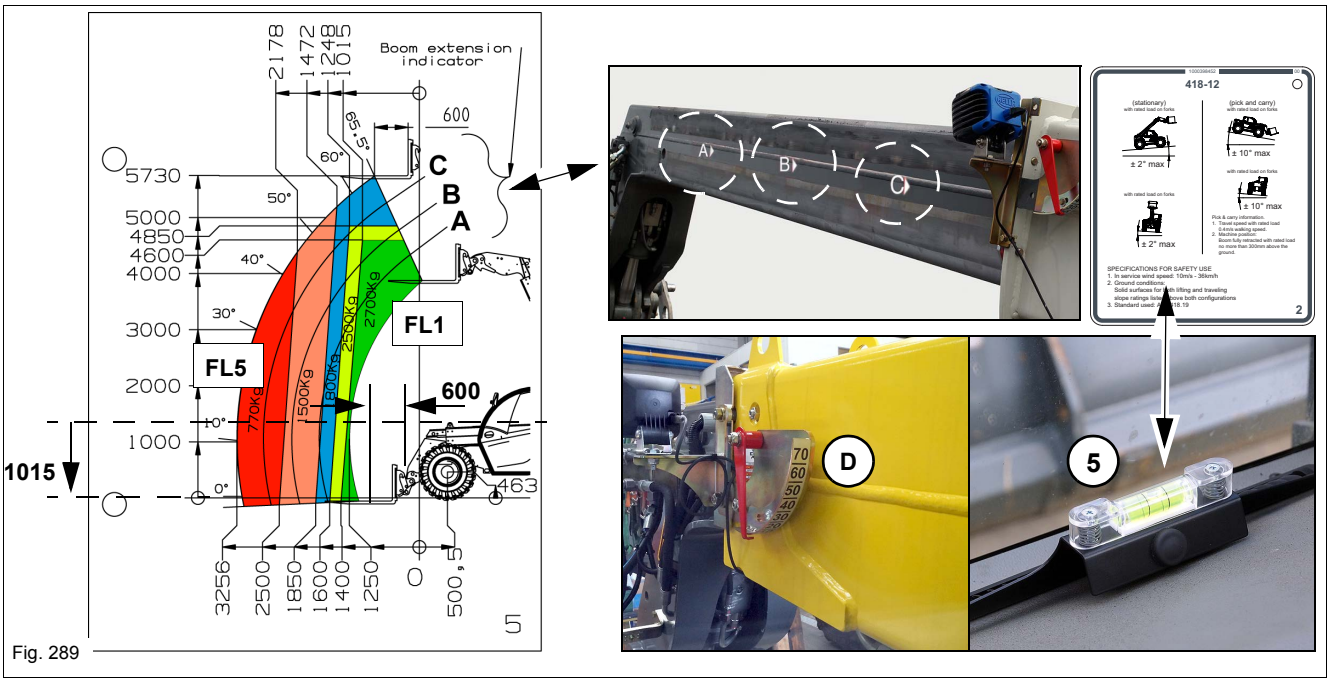


Fig. 289

Surface FL1 Telescopic arm retracted

- Center of gravity of the load on the fork frame 600 mm (23.6 in)
  ➥ **Maximum load lifting = 2500 kg (5500 lb.)**

Surface FL4 Telescopic arm extended and raised to 1015 mm (39.9 in)

- Center of gravity of the load on the fork frame 600 mm (23.6 in)
  ➥ **Maximum load lifting = 1000 kg (2200 lb.)**

Information

In work operation:

► note the markings **A**, **B**, **C** on the telescopic boom to the markings **A**, **B**, **C** on the load-bearing diagram and adhere to them.

► Note and adhere to the angle of inclination of the vehicle forward on the angle indicator **D**.

► Note and observe the safe load indicator
– see "Overload limit, overload display unit" on page 5-37.

Information

The bearing load with the loader bucket *– see chapter 9 " Load bearing tables – SKID STEER attachments USA" on page 9-22* or *– see chapter 9 " Load bearing tables – Attachments in Australia" on page 9-26*.

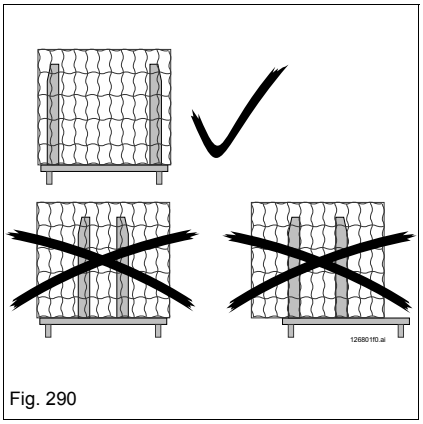


Fig. 290

Adjusting the fork tines of the pallet forks

WARNING

Accident hazard if the fork tines are not correctly locked on the fork frame!

The fork tines can come off and cause serious injury or death.

- ► Check before beginning work operation whether locking levers on both fork tines are folded down and safely engaged in the fork frame!
- ► Adjust the fork tines 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.

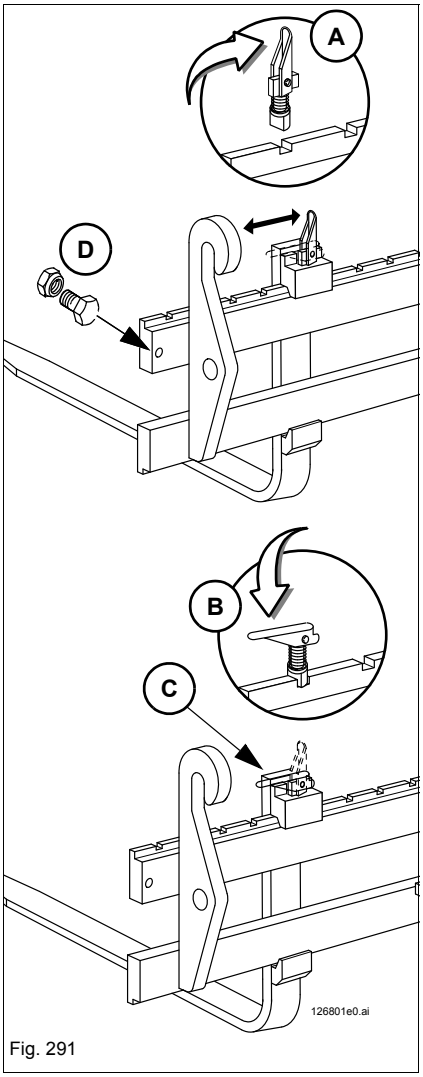


Fig. 291

CAUTION

Danger of crushing when shifting the fork tines!

Fingers and hands can be crushed and injured between the fork frame and fork tines.

- ► Do not touch the sliding surface of the fork frame when shifting the fork tines.
- ► Wear protective gloves.

1. Set the locking lever to the vertical position (position **A**).
2. Slide the fork tines to the required distance until the safety 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**.
   - ➥ Observe the operator's manual of the pallet fork.

Picking up material with the pallet forks

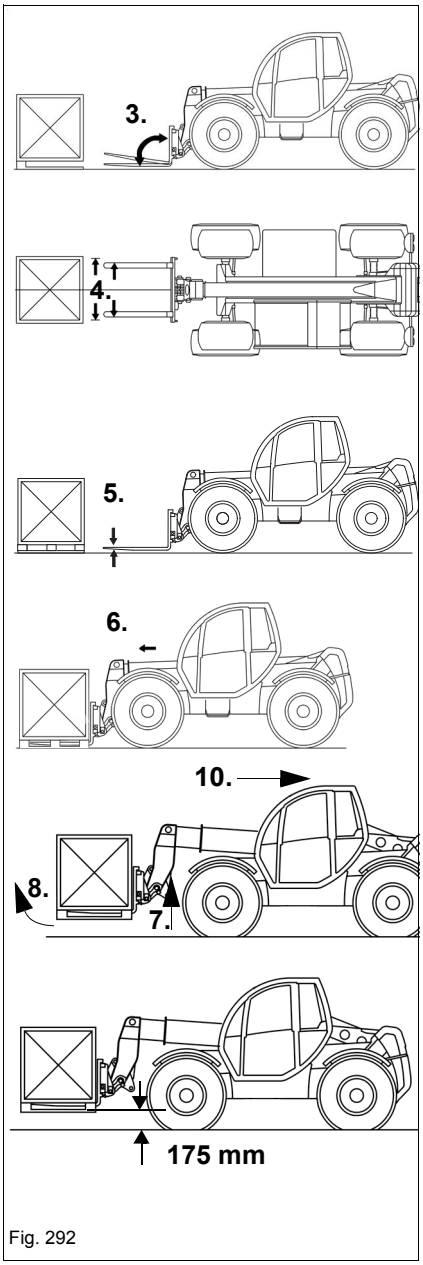


Fig. 292

WARNING

Danger of accident due to restricted line-of-sight during transport!

Failure to observe this can cause serious injury or death.

- ► Transport the cargo in the transport position about 175 mm (6.8 in).
- ► Check the line of sight and adjust the mirrors.
- ► If the line-of-sight cannot be ensured, use the camera option.

Information

The telescopic boom yields easily with the load stabilizer switched on, making it difficult to perform any precise lifting movements.

- ► Switch off the load stabilizer during pallet forks operation!

1. Switch off the load stabilizer before starting work *– see "Load stabilizer for loader unit (option)" on page 5-121*.
2. Fully retract the telescopic boom.
3. Stop the telehandler right before the load and align the fork tines parallel to the ground.
4. Adjust the distance of the fork tines with regard to the center line (dashed line).
5. Raise the loader unit until the pallet can be picked up easily.
6. Move carefully forward until the fork frame is in contact with the material.
7. Raise the loader unit and ensure that the limits of load diagram and overload warning device are not exceeded *– see "Function of the LED´s in the overload display" on page 5-39*!
8. Tilt the fork frame backward.
9. Ensure that the area behind the machine is clear.
10. Reverse the vehicle carefully until the loader unit can be lowered to the transport position.
    - ➥ Transport position about **175 mm (6.8 in)**

Transporting material

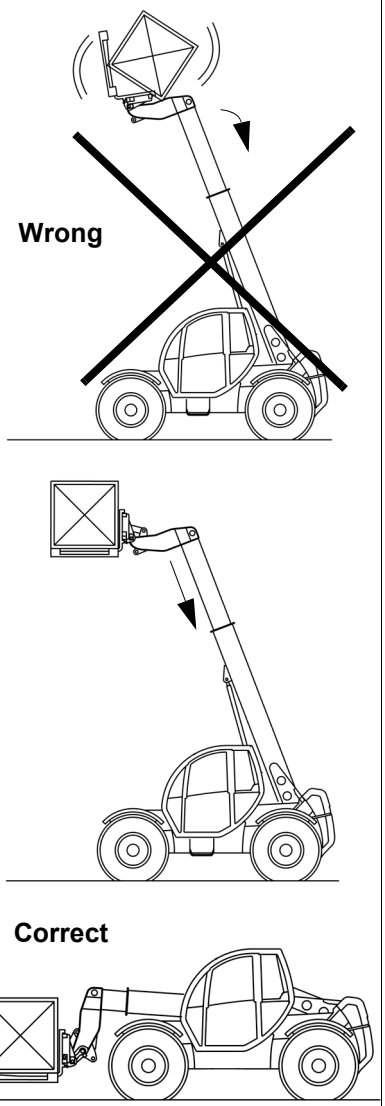


Fig. 293

WARNING

If the load is not secured, it can tip over to the back if the loader unit is raised and/or the telescopic boom extended!

Failure to observe this can cause serious injury or death.

- ► Do not transport loads with a raised loader unit.
- ► 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!
- ► Unload material only at machine standstill and do not tilt back the pallet forks to the limit.
- ► In case of a bulky load: secure the load.
- ► Fit the rear of the pallet forks with a protective device.
- ► 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 maneuvers on slopes with a load on the pallet forks!

Failure to observe this can cause serious injury or death.

- ► Lower the loader unit to the transport position.
- ► If possible, travel in reverse with a load on the pallet forks.

WARNING

The vehicle can tip over in conditions of strong wind and poor visibility with a raised loader unit and fully loaded pallet fork!

Failure to observe this can cause serious injury or death.

- ► Avoid high storage positions for material which should not be exposed to wind.
- ► Stop fork lift work in conditions of strong wind and poor visibility.

Setting down a load

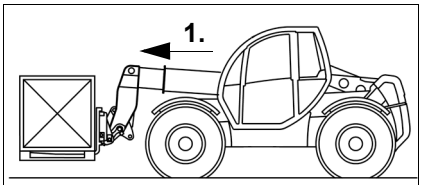


Fig. 294

1. Approach the storage position ensuring the material is in the middle of the stack.

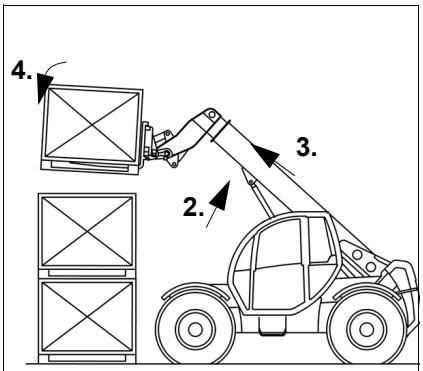


Fig. 295

2. Raise the loader unit.
3. Extend the telescopic boom carefully until the load is positioned precisely above the stack. As you do so, ensure that the preset limits of the load diagram and the safe load indicator are not exceeded – *see "Function of the LED´s in the overload display" on page 5-39*!
   In case of doubt or danger, stop stacking immediately!
4. Adjust the fork arms horizontally.

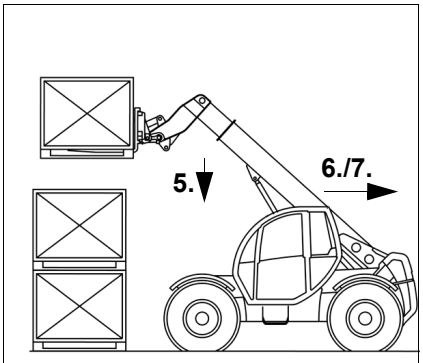


Fig. 296

5. **Slowly** lower the loader unit and ensure that the fork tines are no longer under load.
6. Ensure that the area behind the machine is clear.
7. Carefully reverse the machine from the stack.

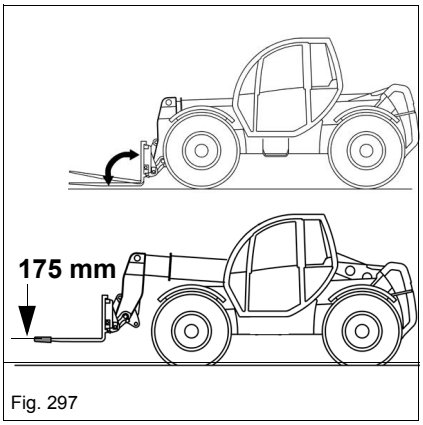


Fig. 297

8. Lower the telescopic arm in the transport position about 175 mm (6.8 in).
9. Tilt in the fork frame.

Working with a load hook (option)

Important safety instructions for working with a load hook

Shaft rings, bins, tubes, etc. can be repositioned and transported with the load hook and suitable lifting attachments (belts, ropes, chains).

- Before starting work, check whether the load stabilizer is switched off *– see "Load stabilizer for loader unit (option)" on page 5-121*.
- Bear in mind the notes in chapter 2 Safety instructions *“Lifting gear applications” on page 2-9*.
- Pick up and set down loads only on firm and level ground.
- Wear protective gloves.
- Ensure that the ratchet safely engages in the twisting hook as you hook up the lifting gear (belts, rope, chains).
- Use only tested and undamaged lifting gear.
- Before raising a load, observe the load diagram and the overload control display *– see "Overload limit, overload display unit" on page 5-37*
- Avoid a jerky movement of the load when lifting and setting down the load.
- Ensure that the load does not oscillate during transport. To do this:
  - Do not drive faster than 6 km/h (3.7 mph) with a load.
  - Transport the load close to the ground.
  - Bear in mind the wind conditions.
  - Do not move the loader unit and telescopic arm during transport.
- During transport, ensure that the load is never suspended.
- Persons guiding the load must stay in visual contact with the machine operator.
- Do not transport loads on public roads.

Fitting a load hook onto a KRAMER quickhitch facility

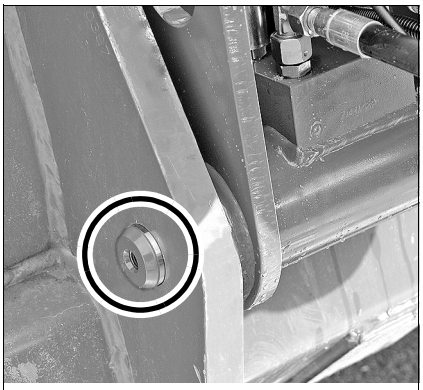


Fig. 298:

WARNING

Danger of accident if the attachments are not locked!

Failure to observe this can cause serious injury or death.

► Check whether the lock pins **are visible on either side** in the center bores of the attachment.

Information

The load hook is picked up and installed on the quick coupler system in the same way as the standard bucket – *see "Receive attachments on the quickhitch facility" on page 5-66*.

Work with a load hook

WARNING

Accident hazard due to persons in the danger zone!

Failure to observe this can cause serious injury or death.

- ► Always ensure that nobody is in the danger zone, in particular behind the machine.
- ► Seal off the danger zone.
- ► Stop all work movements immediately if persons enter the danger zone.
- ► Adjust the existing visual aids (for example the rearview mirrors) correctly.

WARNING

Accident hazard due to tipping over of vehicle!

Failure to observe this can cause serious injury or death.

- ► Extend the telescopic boom only if the machine is on firm and level ground.
- ► Pay attention to the safe load indicator. The safe load indicator only monitors the machine's longitudinal stability.
- ► First raise the loader unit fully, and then extend the telescopic arm.
- ► First retract the telescopic boom, then lower the loader unit.
- ► Do not travel or turn around on slopes with a raised or extended loader unit.
- ► Do not travel or turn the steering wheel quickly with a raised or extended loader unit.

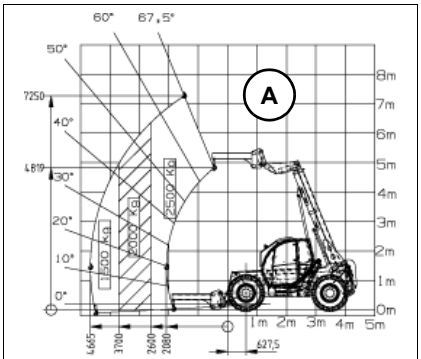


Fig. 299

1. Hitch the lifting gear in the mounts (lugs, straps) provided for transporting the load.
2. Carefully raise the load and transport it near the ground.
3. Do not exceed the load capacity.
   - ➥ See load-bearing diagram **A** located in the holder on the right at the side window. *– see chapter 9 " Load-bearing capacity tables – KRAMER, WEIDEMANN, EURO pallet forks" on page 9-19*,
   - ➥ Pay attention to the safe load indicator *– see ""Smart Handling" overload control" on page 5-45*
   - ➥ – also refer to the operator's manual of the attachment (load hook)

Removing the load hook from the quick coupler system

WARNING

The attachment can tip over after lowering it to the ground!

Failure to observe this can cause serious injury or death.

► Lower the attachment to the ground and ensure it cannot tip over.

Information

Setting down the load hook from the quickhitch facility takes place in the same manner as with the standard bucket.

► *– see "Set down the attachments" on page 5-68*.

Machine travel on public roads with the load hook

Information

Machine travel on public roads with an attached load hook is prohibited!

Do not transport a load hook in a bucket fitted onto the machine!

► Remove the load hook and transport it with a suitable means of transport (trailer) during machine travel on public roads!

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

5.12 Emergency lowering

Emergency lowering of the loader unit in case of diesel engine failure

The extended and/or raised loader unit can no longer be retracted and lowered in case of a technical malfunction and/or diesel engine breakdown!

WARNING

Danger of accident when lowering the loader unit in an emergency!

Failure to observe this can cause serious injury or death!

- ► Secure the danger zone.
- ► Secure the load before the emergency lowering.
- ► When lowering, note the overload warning device and stability of the vehicle.
- ► Do not try to repair the machine under a raised load.
- ► Have the vehicle only repaired by a Wacker Neuson service center after the emergency lowering.

Information

Safety feature!

The telescopic boom **cannot** be lowered with the ignition switched off and/or in case of diesel engine breakdown!

Emergency lowering can only be performed as follows – *see "Emergency lowering of the telescopic boom" on page 5-111*.

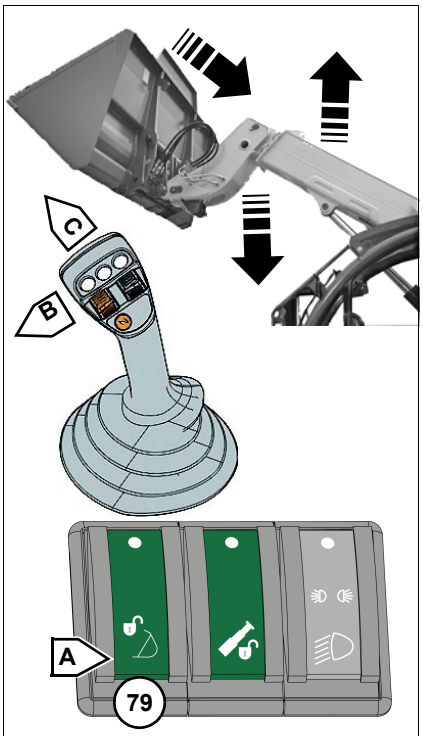


Fig. 300

Emergency lowering of the telescopic boom

1. Apply the parking brake.
2. If possible, secure the cargo.
3. Engage the starter.
4. Lower the telehandler system . To do this, press and hold the touch button **79** in the position **A while at the same time** (two-hand operation) press the joystick (to release the pressure of the tipping cylinder) slightly to the right **B** and then **slowly** forward **C** until the loader unit is lowered into the transport position.
   - ➥ Pay attention to the display of the overload control
   - ➥ If the loader unit reaches the overload range when being lowered, the overload control prevents further lowering.

If a hazard-free lowering is not possible:

5. Switch off ignition and remove the starting key
6. Leave and lock the machine.
7. Secure the danger zone.
8. Have the fault repaired by an authorized service center.

5.13 Options

Oil volume setting with control element (jog dial) (optional)

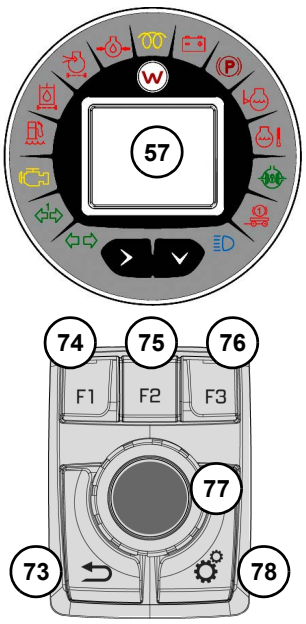


Fig. 301

Application and prerequisite

The hydraulic oil supply of the attachments can be individually adjusted with the oil volume setting.

The preset oil volume is displayed in percent (%) in the display **57** of the indicator after selecting the control circuit F1, F2 or F3.

If another oil volume is required, this can be set with the rotary switch**77** in the control element (jog dial)

– see "Overview of the hydraulic control systems that can be operated with the control element (jog dial):" on page 5-113.

The oil volume is adjusted in steps of 10%.

The oil volumes of the control circuits are pre-set ex works:

- 100% for the 3rd control circuit
- 50% for the auxiliary control circuit, dual-acting, and tipper connection

The oil volume setting requires the following conditions to be fulfilled:

- The operator has taken his operator's seat and the diesel engine is operating.

Information

The percentage setting of the oil volume may be done at any engine speed, but is only achieved at maximum engine speed.

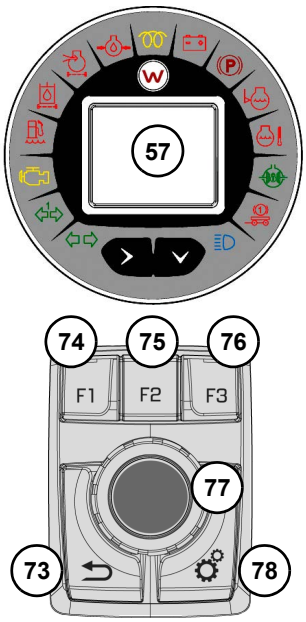


Fig. 302

Overview of the hydraulic control systems that can be operated with the control element (jog dial):

- With the button **74** (F1) – 3rd control circuit– *see "Oil volume setting online/offline: "lock or unlock" 3rd control circuit" on page 5-114*
- With the button **75** (F2) – 3rd control circuit in long-time application *– see "Activation of the oil volume setting of the 3rd control circuit "long-time application"" on page 5-115*
- With the button **76** (F3) – auxiliary control circuit, dual-acting (vehicle rear) *– see "Activation of the oil volume setting of the auxiliary control circuit" on page 5-117* or tipper connection (vehicle rear) *– see "Activation of the oil volume setting: control circuit for the "tipper"" on page 5-119*
- button **73** – Menu selection one level back
- button **78** – Menu selection back to the main menu

Information

The functions of the **F**-touch controls can be activated from any menu setting.

Information

For safety reasons, the oil volume setting is disabled when restarting the diesel engine and must be re-activated when reused, with the exception of the 3rd control circuit. This does not have to be activated and is available immediately.

► The previously set oil volume of the control circuits is preserved.

Oil volume setting online/offline:
"lock or unlock" 3rd control circuit

Information

When restarting the diesel engine, no activation of the oil volume must be performed when starting the 3rd control circuit.

The set oil volume (100% ex work) is available immediately after control or it can be re-set as described below.

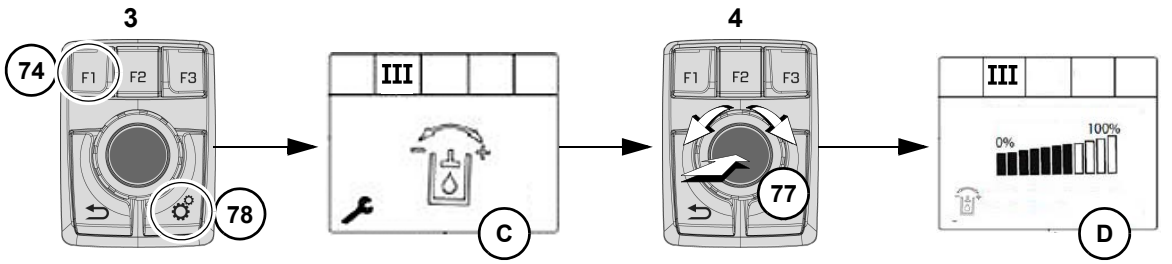


Fig. 303

1. Apply the parking brake.
2. Start the engine.
3. Set the oil volume. To do this, press button **74** (F1).
   ➥ The display **C** with symbol III appears
4. Confirm the displayed oil volume by pressing the rotary switch **77** or reset the oil volume by turning the rotary switch **77** to the left or right and then confirming by pressing it.
   ➥ The display **D** will show the set oil volume in percent, e.g. 80%.

Information

If the set oil volume is not confirmed immediately, an automatic confirmation occurs electronically after 10 seconds.

If the oil volume setting cannot be adjusted for some reason, use the button **78** to switch back to the main page of the display and start from the very beginning.

Activation of the oil volume setting of the 3rd control circuit "long-time application"

Information

For safety reasons, the oil volume setting is disabled when restarting the diesel engine and must be re-activated when re-used.

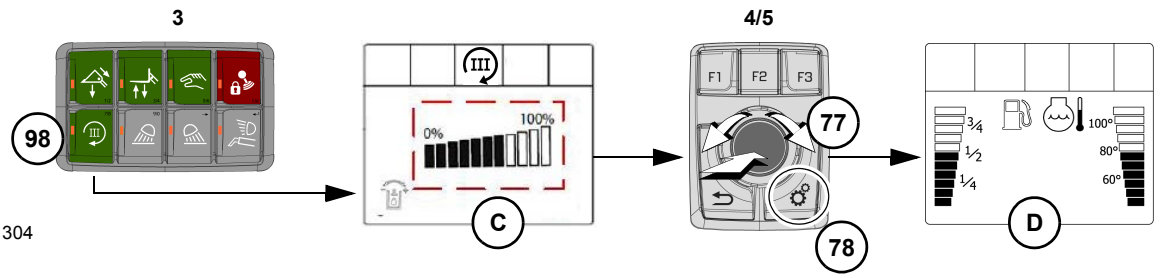


Fig. 304

1. Apply the parking brake.
2. Start the engine.
3. Switch on the "long-time application of the 3rd control circuit." To do this, briefly press the button **98**.
   - ➥ The LED in the touch button flashes
   - ➥ The display **C** with the symbol (III) appears and flashes.
4. Confirm the displayed oil volume by pressing the rotary switch **77** or reset the oil volume by turning the rotary switch **77** to the left or right and then confirming by pressing it.
   - ➥ LED illuminates continuously in the touch button
   - ➥ Activation was successful – Display **D** appears in the display unit
   - ➥ The set oil volume can be used for the attachment.

Information

If the set oil volume is not confirmed immediately, an automatic confirmation occurs electronically after 10 seconds.

If the oil volume setting is activated once, then the oil volume can be set "online" at any time when the diesel engine is running, i.e. with an active control circuit, as well as "offline" with an inactive control circuit– *see "Oil volume setting online/offline: 3rd control circuit "long-time application" during operation" on page 5-116*.

Oil volume setting online/offline: 3rd control circuit "long-time application" during operation

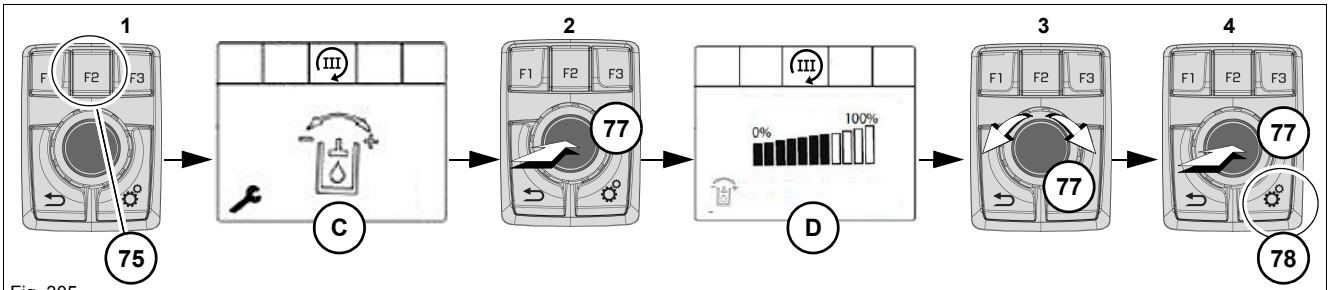


Fig. 305

1. Select the oil volume setting. To do this, press button **75** (F2).
   ➥ The display **C** appears in the display instrument.
2. Confirm the selection. To do this, press the rotary switch **77**.
   ➥ The display **D** appears in the display instrument.
3. Set the desired oil quantity. To do this, rotate the rotary switch **77** to the left or right.
   ➥ The display **D** will show the set oil volume in percent, e.g. 80%.
4. Confirm the oil volume. To do this, press the rotary switch **77**
   ➥ The desired oil volume is set and is saved even after restarting the diesel engine.

Information

If the set oil volume is not confirmed immediately, an automatic confirmation occurs electronically after 10 seconds.

If the oil volume setting cannot be adjusted for some reason, use the button **78** to switch back to the main page of the display and start from the very beginning.

Information

If the oil volume setting is activated once, then the oil volume can be set "online" at any time when the diesel engine is running, i.e. with an active control circuit, as well as "offline" with an inactive control circuit.

Activation of the oil volume setting of the auxiliary control circuit

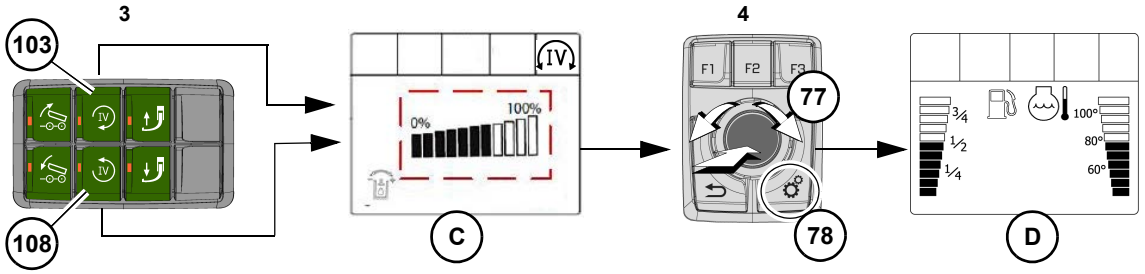


Fig. 306

1. Apply the parking brake.
2. Start the engine.
3. Switch on the "auxiliary control circuit." To do this, press the button **103** or **108** briefly.
   ➥ The display **C** with the symbol (IV) appears and flashes.
4. Confirm the displayed oil volume by pressing the rotary switch **77** or reset the oil volume by turning the rotary switch **77** to the left or right and then confirming by pressing it.
   ➥ LED illuminates continuously in the touch button
   ➥ Activation was successful – Display **D** appears in the display unit
   ➥ The set oil volume can be used for the attachment.

Information

If the set oil volume is not confirmed immediately, an automatic confirmation occurs electronically after 10 seconds.

If the oil volume setting is activated once, then the oil volume can be set "online" at any time when the diesel engine is running, i.e. with an active control circuit, as well as "offline" with an inactive control circuit– *see "Oil volume setting online/offline: 3rd control circuit "long-time application" during operation" on page 5-116*.

Oil volume setting online/offline: auxiliary control circuit

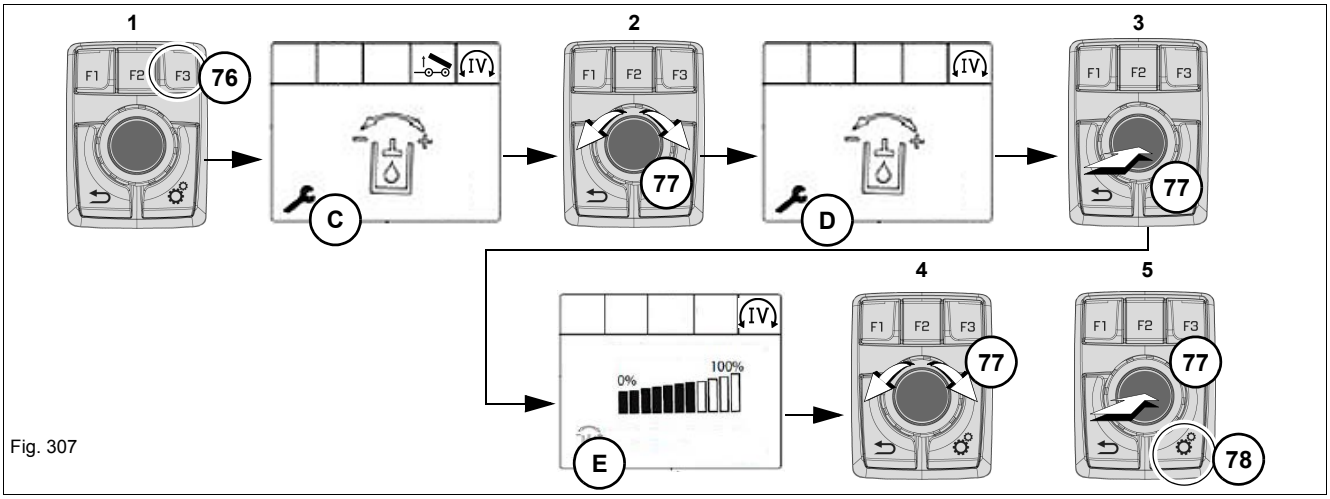


Fig. 307

1. Select the oil volume setting. To do this, press button **76** (F3).
   ➥ The display **C** with the symbols appears in the display instrument.
2. Select the **77** auxiliary control circuit with the rotary switch.
   ➥ The display **D** with the symbols appears in the display instrument.
3. Confirm the selection. To do this, press the rotary switch **77**.
   ➥ The display **E** appears in the display instrument.
4. Set the desired oil quantity. To do this, rotate the rotary switch **77** to the left or right.
   ➥ The display **D** will show the set oil volume in percent, e.g. 80%.
5. Confirm the oil volume. To do this, press the rotary switch **77** or an automatic confirmation occurs electronically after 10 seconds.
   ➥ The desired oil volume is set and also is saved until restarting the diesel engine.

Information

If the set oil volume is not confirmed immediately, an automatic confirmation occurs electronically after 10 seconds.

If the oil volume setting cannot be adjusted for some reason, use the button **78** to switch back to the main page of the display and start from the very beginning.

Information

If the oil volume setting is activated once, then the oil volume can be set "online" at any time when the diesel engine is running, i.e. with an active control circuit, as well as "offline" with an inactive control circuit.

Activation of the oil volume setting: control circuit for the "tipper"

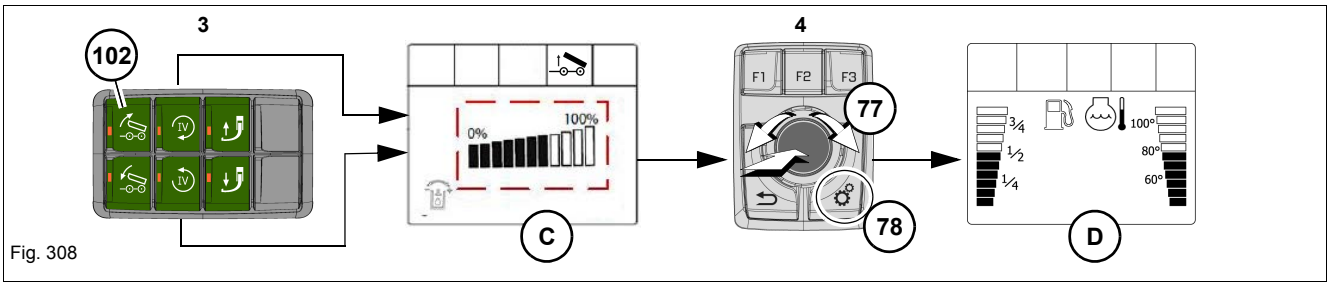


Fig. 308

1. Apply the parking brake.
2. Start the engine.
3. Switch on the "auxiliary control circuit." To do this: press the button **102** briefly.
   ➥ The display **C** with the symbol appears and flashes.
4. Confirm the displayed oil volume by pressing the rotary switch **77** or reset the oil volume by turning the rotary switch **77** to the left or right and then confirming by pressing it.
   ➥ LED illuminates continuously in the touch button
   ➥ Activation was successful – Display **D** appears in the display unit
   ➥ The set oil volume can be used for the attachment.

Information

If the set oil volume is not confirmed immediately, an automatic confirmation occurs electronically after 10 seconds.

If the oil volume setting is activated once, then the oil volume can be set "online" at any time when the diesel engine is running, i.e. with an active control circuit, as well as "offline" with an inactive control circuit– *see "Oil volume setting online/offline: 3rd control circuit "long-time application" during operation" on page 5-116*.

Oil volume setting online/offline: auxiliary control circuit of the "tipper"

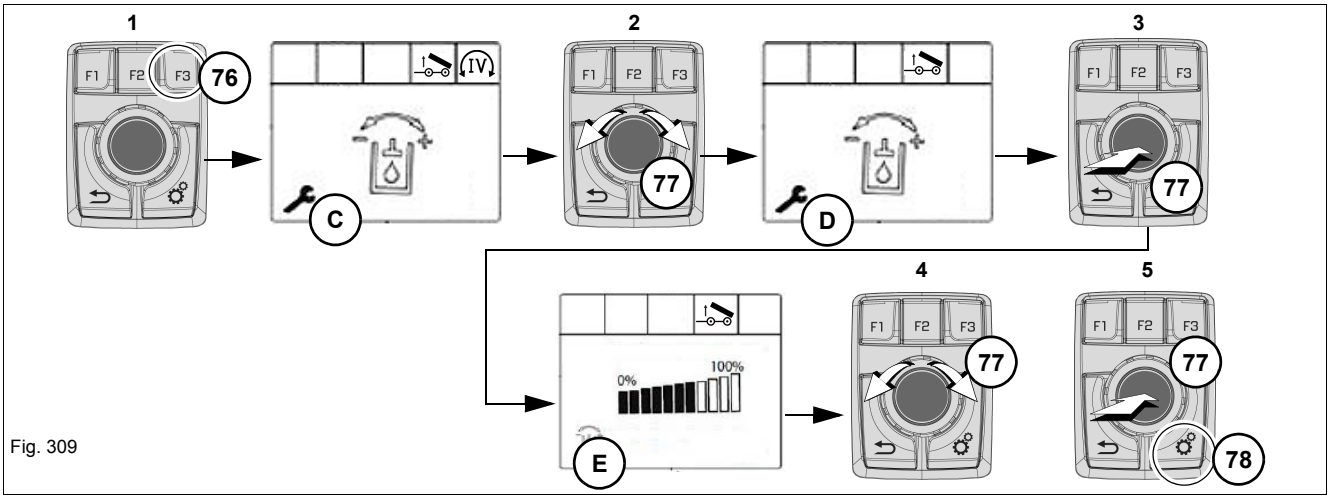


Fig. 309

1. Select the oil volume setting. To do this, press button **76** (F3).
   ➥ The display **C** with the symbols appears in the display instrument.
2. Select the **77** auxiliary control circuit for the "tipper" with the rotary switch.
   ➥ The display **D** with the symbols appears in the display instrument.
3. Confirm the selection. To do this, press the rotary switch **77**.
   ➥ The display **E** appears in the display instrument.
4. Set the desired oil quantity. To do this, rotate the rotary switch **77** to the left or right.
   ➥ The display **E** will show the set oil volume in percent, e.g. 85%.
5. Confirm the oil volume. To do this, press the rotary switch **77** or an automatic confirmation occurs electronically after 10 seconds.
   ➥ The desired oil volume is set and also is saved until restarting the diesel engine.

Information

If the set oil volume is not confirmed immediately, an automatic confirmation occurs electronically after 10 seconds.

If the oil volume setting cannot be adjusted for some reason, use the button **78** to switch back to the main page of the display and start from the very beginning.

Information

If the oil volume setting is activated once, then the oil volume can be set "online" at any time when the diesel engine is running, i.e. with an active control circuit, as well as "offline" with an inactive control circuit.

Load stabilizer for loader unit (option)

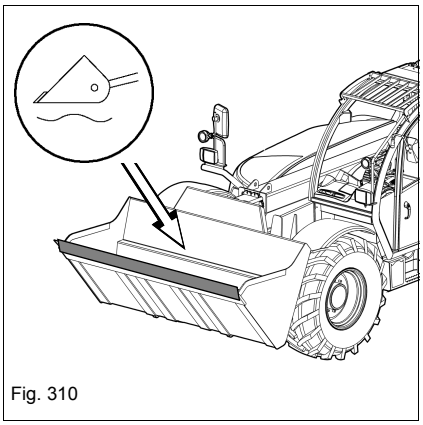


Fig. 310

Information on the load stabilizer function

The load stabilizer attenuates the movements of the loader unit while driving and thus prevents the vehicle from shaking.

The driving stability and drive comfort are thus improved.

It is therefore used for driving on public roads, for lighter work and for off-road transport.

Information

Always switch on the load stabilizer during machine travel on public roads! In order to ensure the full functionality of the load stabilizer, pay attention to the following:

- ► Retract the telescopic boom completely,
- ► Lower the loader unit to transport position,
- ► In order to avoid the tension between the tipping cylinder and loader unit, do not fully tilt in the loader bucket to the detent or briefly relieve the hydraulic pressure in the tipping cylinder after tilting in.

Information

The loader unit is very yielding in work mode with a load stabilizer switched on (long-time application), which makes a precise control of the lifting movements difficult.

- ► Switch off the load stabilizer during work operation.

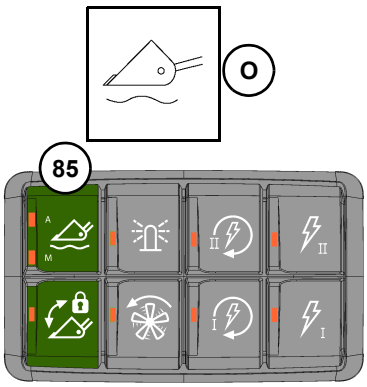


Fig. 311

Operating the load stabilizer

The operation of the load stabilizer (button **85**) is located in the control panel to the right of the operator's seat.

Load stabilizer operation		Function
Continuous operation ON	Briefly **85** press the touch button (1x)	➥ The LED (**M**) in the touch button illuminates when the load stabilizer is in long-time application. ➥ Symbol **O** appears in the digital display.
AUTO	Briefly **85** press the button (2x)	➥ LEDs in the touch button illuminate when the load stabilizer is in automatic operation. ➥ **Over 7 km/h** load stabilizer is in operation ➥ Symbol **O** appears in the digital display. ➥ **Below 6 km/h** and the load stabilizer is out of operation. ➥ Symbol **O** flashes in the digital display.
OFF	Again **85** briefly press the touch button (1x)	➥ Load stabilizer out of operation. ➥ Symbol **O** disappears from the digital display.

Information

Depending on the load, the loader unit can rise or go down slightly as you switch on the load stabilizer!

Tilt ram lock (option)

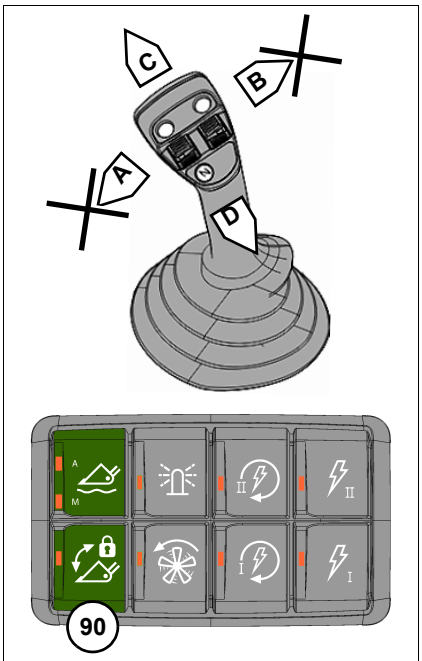


Fig. 312

The option is used for securing the tipping cylinder if it must not be operated, e.g. when setting down loaded goods on high piles.

When the tipping cylinder is locked, the functions of "fill shovel"**A** and "empty shovel **B**“ are locked.

Switching the tilt ram lock ON:

1. With the loader unit in transport position, with the joystick set the tipping cylinder and the material in the required position.
2. Press push button **90** briefly
   ➥ The tipping cylinder is locked in the set position.
3. Set down the load.

Switching the tilt ram lock OFF:

4. Press push button **90** briefly
   ➥ The tipping cylinder is unlocked and can be operated again to the full extent.

Automatic trailer coupling (option)

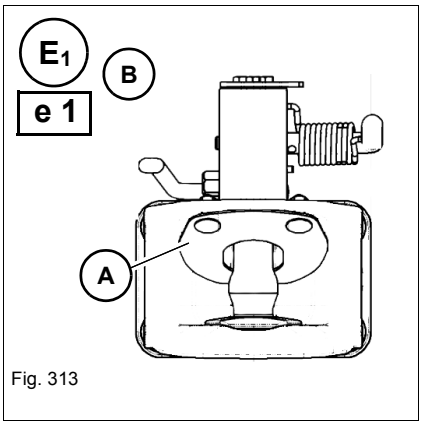


Fig. 313

Description and application

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 General Certification for Vehicle (Germany) or the Data Confirmation (Germany).
- Observe the trailer and drawbar loads – *see "Trailer weight" on page 9-17*.
- Adjust the line-of-sight to the ball hitch with the rear-view mirror – *see "Adjusting the rear mirrors (option)" on page 4-12*
- Have a damaged or malfunctioning trailer coupling immediately repaired or replaced by an authorized service center.

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 drawbar.

If the ball hitch is equipped with a stabilizing feature **A** (hold-down device), only lugs in compliance with DIN 74054 (ISO 8755) are allowed:

➥ See nameplate**B** on the ball hitch.

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 General Certification for Vehicles (Germany) or the Data Confirmation (Germany) for information on other requirements!

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

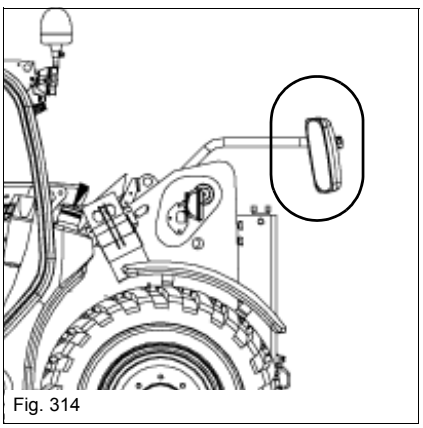


Fig. 314

Information

The rear-view mirror in the rear is mandatory in connection with a ball hitch and must be used when hitching and unhitching a trailer.

Important notes about the automatic ball hitch

WARNING

Accident hazard if the load on the front axle is too low!

Failure to observe this 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.

CAUTION

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.

Information

No goods may be transported with the machine and a trailer on public roads. Only the transport of machine attachments is allowed!

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

Information

When equipped with a high-speed gearbox (option), the machine reaches maximum speed only on a level and asphalted surface, without a trailer and with an empty standard bucket!

Opening an automatic ball hitch

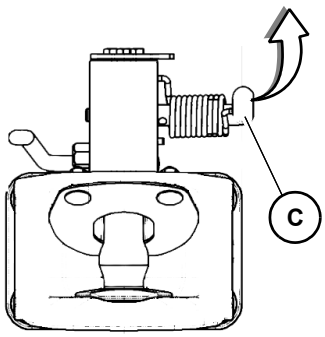


Fig. 315

CAUTION

Accident hazard due to coupling pin snapping down!

Can cause injury.

► Do not touch the coupling pin with your hands.

1. Press lever **C** upward until the coupling pin audibly engages in the open position.

Coupling a trailer

WARNING

There is a danger of accident when coupling a trailer!

Failure to observe this 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.

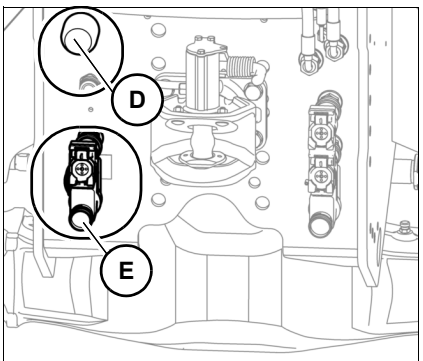


Fig. 316

1. Before hitching a trailer, adjust the height of the trailer drawbar to the height of the trailer coupling.
2. Reverse the tractor vehicle slowly until the lug engages in the coupling jaw with an audible click.
   ➥ The trailer is locked in the coupling jaw as the lug touches the release trigger.
3. Stop the engine
4. Apply parking brake.
5. Visibly check the lock status to the ball hitch.
6. Establish the electric **D** and hydraulic **E** connections between the trailer and the tractor vehicle.
7. Release the trailer brake.
   ➥ Refer to the Operator's Manual of the trailer.
8. Remove the wheel chocks from the wheels of the trailer and safely store them on the trailer.

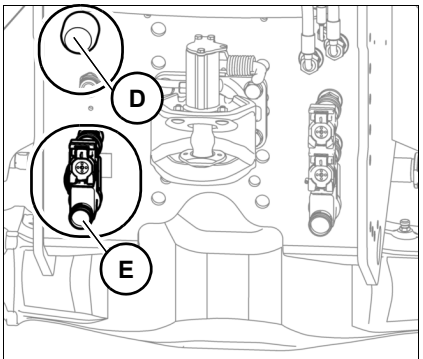


Fig. 317

Unhitching the trailer

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 from the tractor vehicle to the trailer.
8. Close the plug couplings on the machine and the trailer with the protective caps provided.

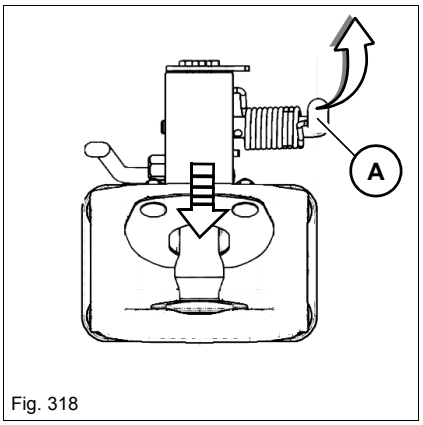


Fig. 318

9. Uncouple the trailer. To do this, push lever **A** of the ball hitch upward until the clutch bolt locks into place.

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 clutch bolt engages in the ball hitch.

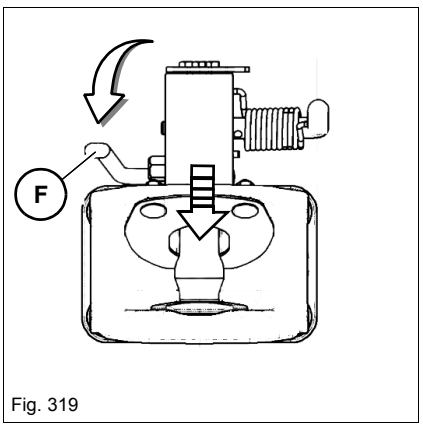


Fig. 319

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 with your hand until the coupling pin engages in the ball hitch.

Balltrailer coupling (option)

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.

WARNING

Accident hazard due to a damaged trailer coupling!

Failure to observe this can cause serious injury or death.

- ► Check the ball hitch for damage before using it.
- ► Ensure a minimum diameter of 49.5 mm at any point of the ball.
- ► Have a damaged or malfunctioning ball hitch immediately repaired or replaced by an authorized service center.

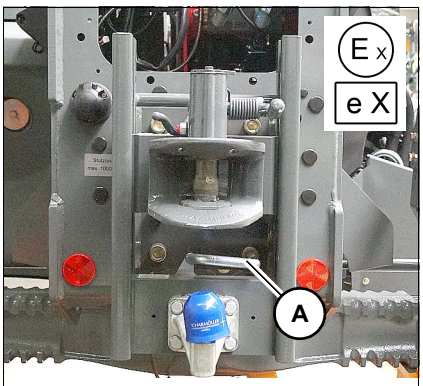


Fig. 320

- 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.
- **Note the trailer and support loads:** See the notice sign fixed near the ball hitch or in this operator's manual *"Trailer weight" on page 9-17*.
- 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 Westphalia "SSK".
- Check all fastening screws of the towing gear regularly or have them retightened by an authorized service center to the specified tightening torque.

Information

In the Federal Republic of Germany, only approved ball hitches with an EC approval or EC certification logo may be used. **Refer to and follow the General Certification for Vehicles (Germany) or the Data Confirmation (Germany) for information on other requirements!** Get informed on and follow the legal regulations of your country.

Information

The height-adjustable ball hitch can be completely removed if necessary. To do this: unlock the ball hitch with lever **A** and remove it from the adjustment plate with an upward movement.

Height-adjustable balltrailer coupling (option)

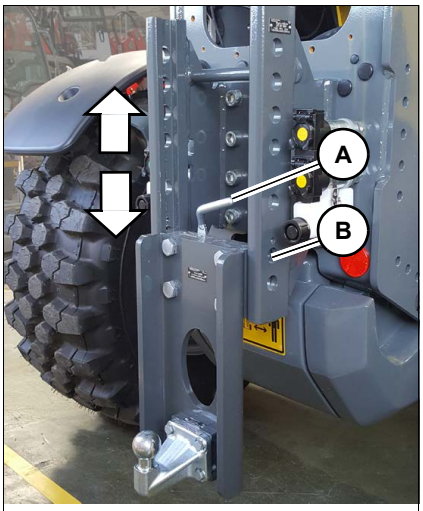


Fig. 321

Before hitching a trailer, the height of the trailer coupling can be adjusted to the height of the trailer drawbar with the height-adjustable trailer coupling.

WARNING

Accident hazard due incorrectly locked trailer coupling

The trailer coupling 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 **B** of the adjusting plate.

1. Put the trailer drawbar in a horizontal position.
2. Pull the lever **A** up.
3. Slide the trailer coupling upward or downward until it is at the same height as the trailer lug.
4. Release lever **A**.
   ➥ The lock pin **B** must lock into place securely on both sides.

Information

In connection with a hydraulic or pneumatic trailer brake, the trailer coupling has to be set in the lowest position.

Information

The height-adjustable trailer coupling can be completely removed if necessary. To do this: unlock the trailer coupling with lever **A** and remove it with a downward movement.

Ball hitch (option)

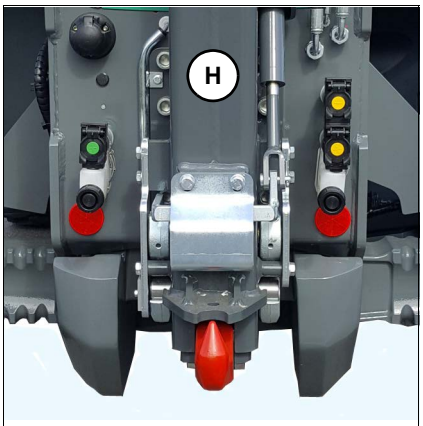


Fig. 322

Important notes about the ball hitch

The ball hitch**H** allows you to hitch a trailer equipped with a hitch lug onto the vehicle while remaining seated.

The operation of "open and lower" of the ball hitch can only be done with two hands – *see "Unlocking and lowering the ball hitch" on page 5-131*!

Information

Ball hitches with EC acceptance or EC certification logo are certified for use on public roads in Germany (StVZO German road traffic regulations). **Refer to and follow the General Certification for Vehicles (Germany) or the Data Confirmation (Germany) for information on other requirements!**

No goods may be transported with the machine and a trailer on public roads. Only the transport of machine attachments is allowed!
Get informed on and follow the legal regulations of your country!

The 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 General Certification for Vehicle (Germany) or the Data Confirmation (Germany).
- Observe the trailer and drawbar loads – *see "Trailer weight" on page 9-17*.
- Have a damaged or malfunctioning trailer coupling immediately repaired or replaced by an authorized service center.
- Do not hitch trailers with positive steering.
- Adjust the line-of-sight to the ball hitch with the rear-view mirror – *see "Adjusting the rear mirrors (option)" on page 4-12*
- Operation of the ball hitch – *see "Unlocking and lowering the ball hitch" on page 5-131*.

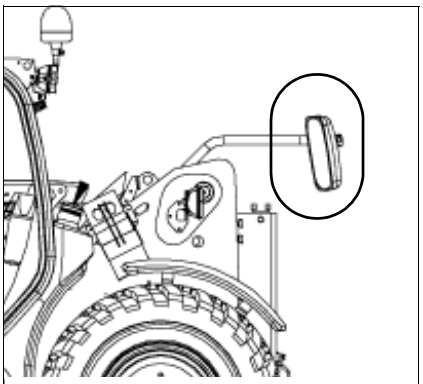


Fig. 323

Information

The rear-view mirror in the rear is mandatory in connection with a ball hitch and must be used when hitching and unhitching a trailer.

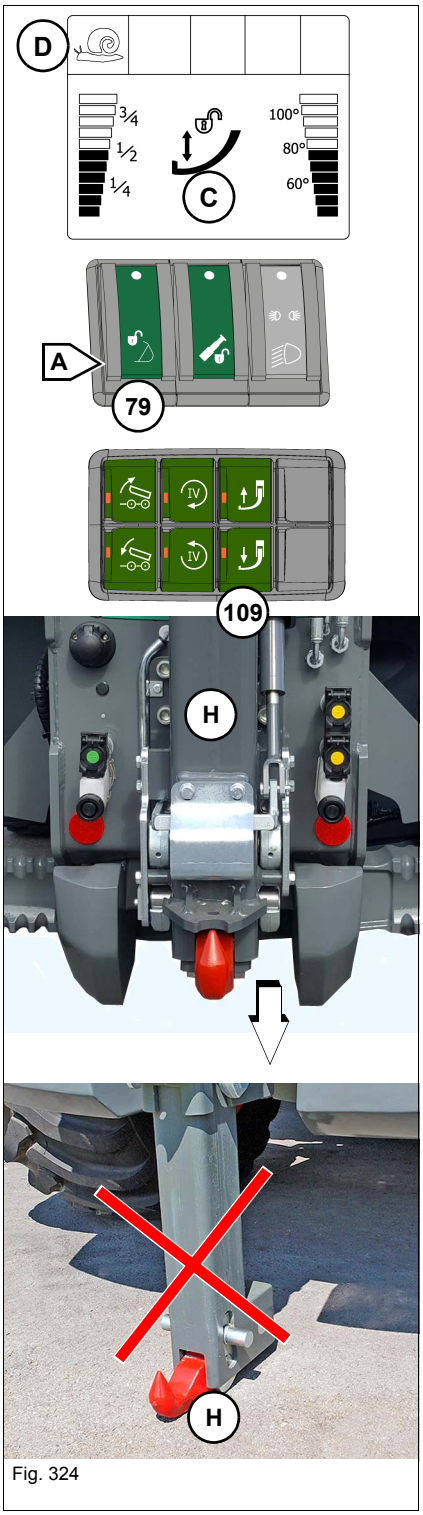


Fig. 324

Unlocking and lowering the ball hitch

The operation of the ball hitch can only be performed

- if the operator (driver) is seated on the operator's seat,
- the road lock of the work hydraulics is deactivated,
- and the travel speed is less than 7 km/h.

NOTICE

In order to avoid damage to the ball hitch:

► Adjust the line-of-sight to the ball hitch with the rear-view mirror *– see "Adjusting the rear mirrors (option)" on page 4-12*

► Do not lower the ball hitch too close to the ground, as otherwise the vehicle will be lifted in the rear, thus possibly resulting in damage from bending the ball hitch.

Information

For safety reasons, the ball hitch is locked against unwanted lowering of the towing pin and can only be unlocked through two-hand operation via the button **79** in the switch panel to the left in the dashboard and the button **109** in the control panel to the right of the operator's seat.

---

1. Open the ball hitch. To do this, press and hold the button **109** .
   ➥ The LED in the touch button illuminates
2. At the same time with the other hand, briefly press the button **79** until the towing pin has automatically unlocked.
   ➥ Symbol **D and C** flash in the digital display
3. Release the button **79**
4. Release **109** the button once the towing pin **H** has reached the trailer position.
5. Attach the trailer *– see "Couple the trailer onto the ball hitch" on page 5-132*

Couple the trailer onto the ball hitch

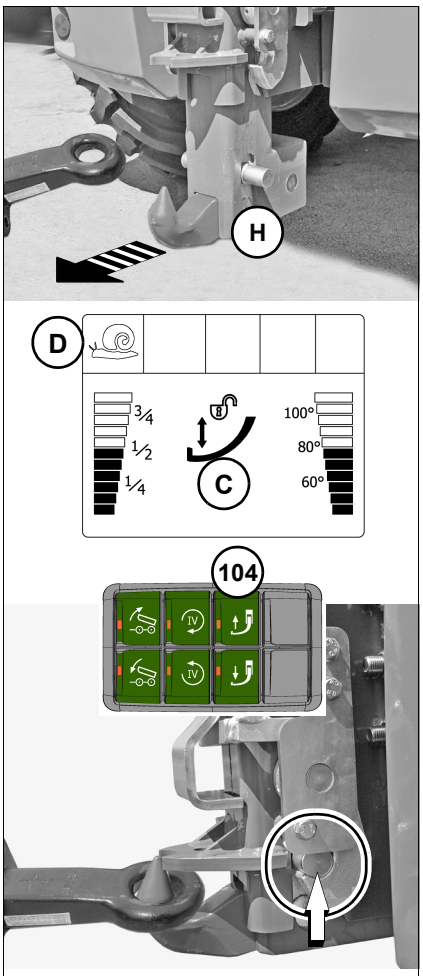


Fig. 325

WARNING

Risk of accidents due to incorrect hitching of the trailer!

Hitching a trailer incorrectly can result in loss of trailer and in serious accidents.

- ► Check the proper function of the safety lock once a day.
- ► Do not exceed the load values for the Autohitch coupling (see type label).
- ► Adjust the rearview mirror correctly to ensure visibility to the rear.
- ► Remove dirt from the towing pin.
- ► After you have coupled the trailer onto the telehandler, check whether the towing gear is safely locked.

1. Use the rear mirror view to carefully approach the trailer until the towing hook **H** appears below the lug of the ball hitch.
2. Close the ball hitch. To do this, press the touch button**104** and hold until the ball hitch **audibly** drives into pressure and automatically engages.
   - ➥ The LED in the push button illuminates.
   - ➥ Towing pin **H** moves upward to the final position (arrow **H**).
   - ➥ Symbol **D and C** flash in the digital display until the automatic safety locking device is completed.
3. Release the button after the automatic safeguarding has occurred **104**.
   - ➥ Symbol **D and C** disappear in the digital display
4. Secure the vehicle with the parking brake (hand brake).
5. Leave the cabin to check whether the trailer is safely locked in the ball hitch.
   - ➥ The bolt must be completely in the load hook – see circle with arrow.
6. Bring the center pole prop into the travel position.
7. Couple the hose pipes of the tipper and trailer brake
   – see "Tipping trailer connection (single-action, option)" on page 5-135
   /
   – see "Hydraulic trailer brake (option)" on page 5-141
8. Establish the electric connections to the trailer.
9. Store the wheel chocks.
10. Loosen the trailer brake.

Information

If the ball hitch is not secured – symbols **D and C** flash in the digital display – then driving can only occur in the snail mode max. 7 km/h (4.3 mph)!

Preparing to uncouple the trailer

WARNING

Danger of accident if the correct order for uncoupling the trailer is not followed!

Failure to observe this can cause serious injury or death.

► Follow the correct order under all circumstances as described in the following.

1. Park the machine and the trailer on level ground.
2. Apply the parking brake.
3. Stop the engine
4. Secure the trailer with the trailer parking brake and wheel chocks to prevent it from rolling away.
5. Put the support under the trailer center pole or fold it down if it is installed.
6. Disconnect the hose pipes – *see chapter 5 " Tipping trailer connection (single-action, option)" on page 5-135*.
7. Disconnect the cables of the trailer lights from the machine.

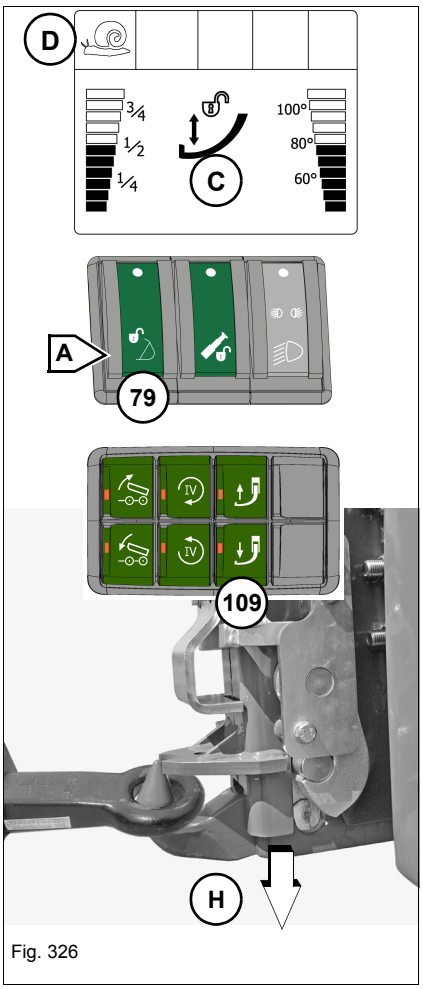


Fig. 326

Uncoupling the trailer from the ball hitch

NOTICE

In order to avoid damage to the ball hitch:

► Do not lower the ball hitch too close to the ground, as otherwise the vehicle will be lifted in the rear, thus possibly resulting in damage from bending the ball hitch.

1. Start the diesel engine.
2. Adjust the line-of-sight to the ball hitch with the rear-view mirror – *see "Adjusting the rear mirrors (option)" on page 4-12*
3. Open the ball hitch. To do this, press and hold the button **109** .
   ➥ The LED in the touch button illuminates
4. At the same time with the other hand, briefly press the button **79** until the towing pin has automatically unlocked.
   ➥ Symbol **D and C** flash in the digital display
5. Release the button **79**
6. Release the button **109** once the trailer position has been reached.
7. Looking in the mirror attached in the rear, carefully drive away from the trailer until the trailer hook **H** is free.

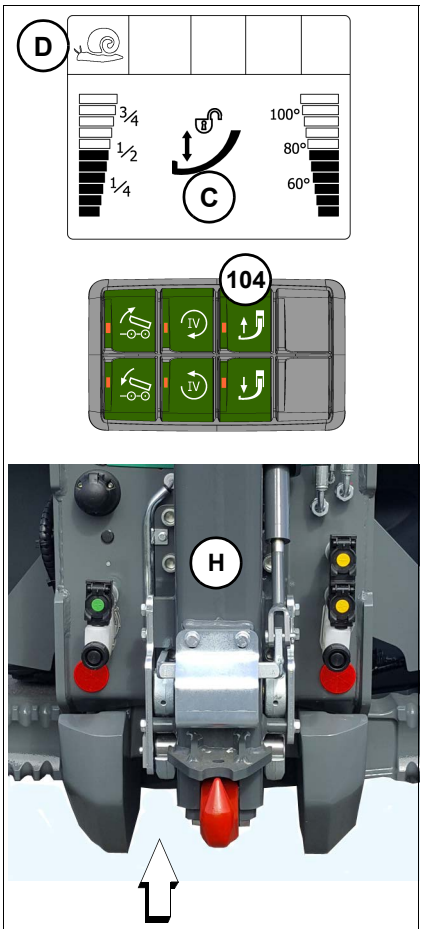


Fig. 327

Close the trailer coupling hitch

1. Close the ball hitch. To do this, press the touch button**104** and hold until the ball hitch **audibly** drives into pressure and automatically engages.
   - ➥ The LED in the push button illuminates.
   - ➥ Towing pin **H** moves upward to the final position (arrow **H**).
   - ➥ Symbol **D and C** flash in the digital display until the automatic safety locking device is completed.
2. Release the button after the automatic safeguarding has occurred **104**.
   - ➥ Symbol **D and C** disappear in the digital display

Information

If the ball hitch is not secured – symbols **D and C** flash in the digital display – then driving can only occur in the snail mode max. 7 km/h (4.3 mph)!

Tipping trailer connection (single-action, option)

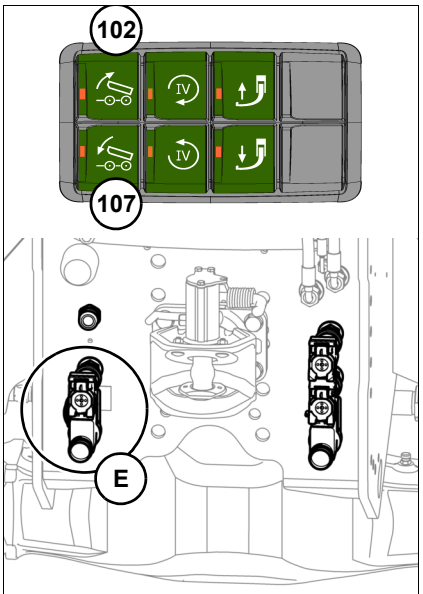


Fig. 328

Tipping trailers with single-action tipping cylinders can be operated using **E** a tipper connection.

The operation is performed via the button **102 and 107** in the switch console on the right – *see "Raise tipping trailer" on page 5-137*.

Important safety instructions for working with a tipper trailer

WARNING

Accident hazard due to persons in the danger zone!

Persons suddenly entering the danger zone of the vehicle with a trailer or who are already in it can be injured or killed by work movements of the trailer.

- ► Interrupt work immediately if persons enter the danger zone.
- ► Generously secure the danger zone.
- ► Work particularly carefully.

WARNING

Danger of tipping over the trailer when tipping the trailer load on unpaved or uneven ground conditions!

Failure to observe this can cause serious injury or death.

- ► Secure the unloading position against unauthorized persons
- ► Tip the loaded goods only on paved and even ground conditions.
- ► Start dumping out the loaded goods with a low rpm of the diesel engine and increase the rpm if necessary.
- ► Never drive with a raised platform
- ► Pay attention to and follow the instructions given in the Operator's Manual of the trailer.

Information

The tipper connection can also be operated with the "oil volume setting" option – *see "Oil volume setting with control element (jog dial) (optional)" on page 5-112*.

Refer to the specifications for the possible oil volumes – *see "Usable consumer pressure at the hydraulic flat connector plugs" on page 9-6*.

Couple the hosepipe of the trailer to flat connector plug (tipper connection)

NOTICE

Damage to hydraulic system due to dirty plug couplings and coupling sockets!

► Remove the dirt and dust from the plug couplings and coupling sockets before connecting an attachment!

► Replace missing protective caps.

---

1. Attach the trailer and safely lock it into place – *see "Automatic trailer coupling (option)" on page 5-124* or *“Ball hitch (option)” on page 5-130*
2. Stop the engine and remove the starting key.
3. Apply the parking brake.
4. Clean flat connector plug and the coupling plug.
5. Couple the hydraulic hose of the trailer to quick coupler **E** of the tipping trailer connection.

Raise tipping trailer

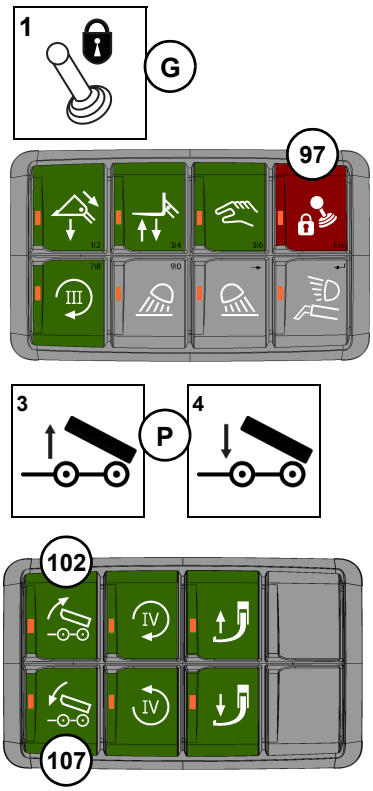


Fig. 329

WARNING

Danger of tipping over the trailer when tipping the trailer load on unpaved or uneven ground conditions!

Failure to observe this can cause serious injury or death.

- ► Secure the unloading position against unauthorized persons
- ► Tip the loaded goods only on paved and even ground conditions.
- ► Start dumping out the loaded goods with a low rpm of the diesel engine and increase the rpm if necessary.
- ► Never drive with a raised platform
- ► Pay attention to and follow the instructions given in the Operator's Manual of the trailer.

1. Apply the parking brake.
2. Start the diesel engine.
3. Disable the road-travel lock for the work hydraulics if it is activated. To do this: press the button **97**.
   - ➥ The symbol **G/1** disappears in the digital display.
   - ➥ The LED in the push button goes out.
4. Raise the tipper at a low rpm of the diesel engine (increase the rpm if necessary). To do this, press the button **102** and hold until the loading platform has reached the desired tilting angle.
   - ➥ The LED in the touch button illuminates during operation
   - ➥ Symbol **P/3** appears in the digital display.

Lower tipping trailer

5. Lower the loading platform. To do this, press the button **107** and hold until the loading platform is horizontal on the trailer.
   - ➥ The LED in the touch button illuminates during operation
   - ➥ Symbol **P/4** appears in the digital display
6. Manually lock the loading platform – see the operator's manual of the trailer

Additional rear hydraulic control circuit (double-action, option)

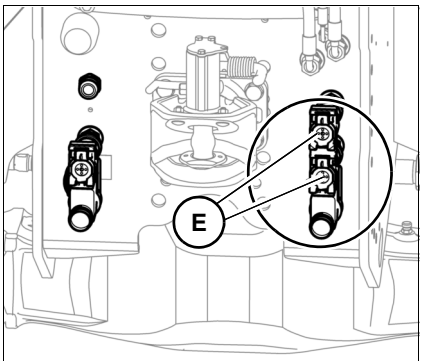


Fig. 330

Flat connector plugs: rear auxiliary control circuits

Flat connector plugs are installed on the rear of the machine for operating hydraulic attachments with additional hydraulic functions **E**.

Attachment and operation of the flat connector plugs in the rear *– see "Connect attachment to the rear flat connector plugs" on page 5-139* and *“Operation of the flat connector plugs in the rear” on page 5-139*

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.

- ► Note the operator's manual of the attachment manufacturer and act accordingly!
- ► Check the response direction of the control elements before using the attachment.

NOTICE

Damage to hydraulic system due to dirty plug couplings and coupling sockets!

- ► Remove the dirt and dust from the flat connector plugs before connecting the attachment!
- ► Replace missing protective caps.

Information

The hydraulically activated auxiliary control circuit can also be operated with the “oil volume setting“ option *– see "Oil volume setting with control element (jog dial) (optional)" on page 5-112*.

Refer to the specifications for the possible oil volumes *– see "Usable consumer pressure at the hydraulic flat connector plugs" on page 9-6*.

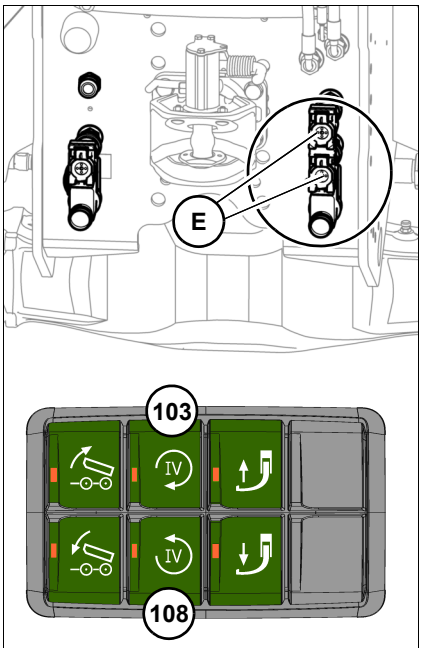


Fig. 331

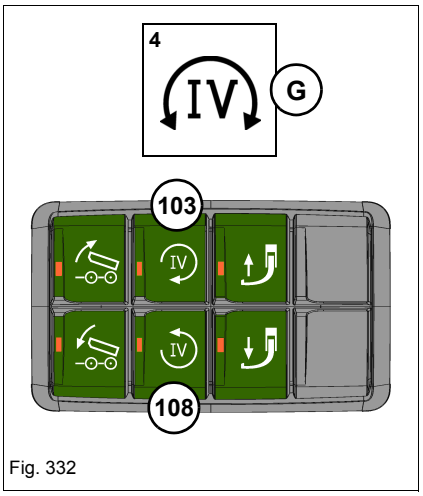


Fig. 332

Connect attachment to the rear flat connector plugs

1. Lower the loader unit and apply the parking brake.
2. Stop the engine, but do **not** switch off ignition.
3. Release the hydraulic pressure in the flat connector plugs. To do this, press the button **103** and button **108** in succession and hold each one down for about 8 seconds.
   ➥ Pressure in quick couplers is released.
4. Switch off the starter and remove the starting key.
5. Clean the flat connector plugs of dirt and dust.
6. Connect the hose pipes of the attachment to flat connector plugs **E** (rear side of the frame).
7. Commission flat connector plugs **E** *– see "Operation of the flat connector plugs in the rear" on page 5-139*.

Information

The hose pipes can be loosened from the flat connector plugs **E** but not re-attached if the pressure in the hydraulic lines is not depleted.

► Release the pressure in the system and the pressure lines when installing or removing an attachment.

Operation of the flat connector plugs in the rear

1. Apply the parking brake.
2. Start the diesel engine.
3. Switch on the auxiliary control circuits depending on the direction of rotation. To do this, briefly press the touch button **103** or **108** .
   ➥ The LED illuminates in the corresponding touch button.
   ➥ Symbol **G/4** appears in the digital display.
4. Switch off the auxiliary control circuits. To do this, briefly press the touch button**103** or **108** again.
   ➥ The LED in the touch button goes out.
   ➥ The symbol **G/4** goes out.

Information

Restart lock!

For safety reasons, the auxiliary control circuit is automatically deactivated by switching the ignition off and on again.

This has to be reactivated when re-starting the auxiliary control circuit!

Bucket repositioning (option)

With the automatic bucket return, cyclical work, such as loading a truck, can be performed rationally and in a manner that saves material.

This option makes it possible to save any tilt angle of the tilt ram and to apply it by pressing a push button (horizontal bucket position during work operation, for example).

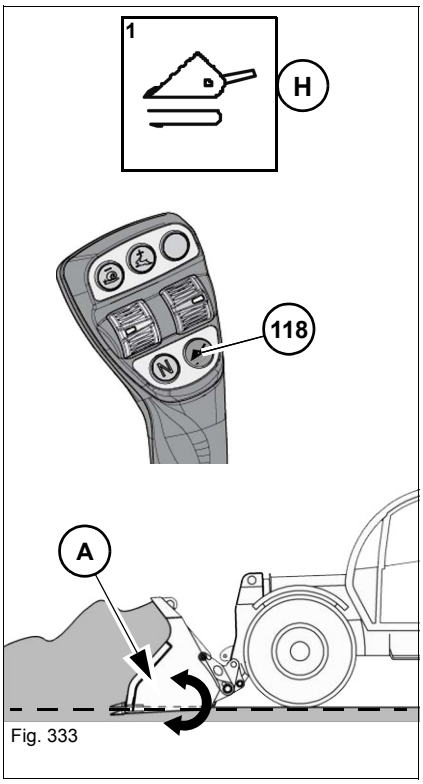


Fig. 333

Put the automatic bucket return into operation

Example for loading operation with bucket repositioning:

1. Lower the bucket with the joystick and align this horizontally with the ground
2. Save the selected alignment **A** (tilt angle) of the loader bucket. To do this, press and hold down the button **118** (joystick) **for 3 seconds**
   - ➥ The beep signal sounds and the symbol **H/1** appears in the digital display
   - ➥ The selected tilt angle **A** is saved.
3. Fill the bucket with the loaded material in forward travel. To do this, tilt the bucket in and lift it slightly at the same time.
4. Drive backwards and dump out the loaded material at the unloading point.
5. Pick up the new load material. To do this, lower the loader unit in the forward direction and briefly press the button**118**.
   - ➥ The bucket is automatically adjusted to the saved tilting angle **A**.
   - ➥ The symbol **H/1** appears in the digital display
6. Picking up a load

Information

The tilt angle remains permanently until the bucket is not manually tilted in or emptied.

- ► The automatic bucket return is disrupted with the tilt in or empty shovel of the loader bucket, but can be reactivated by pressing the button **118** again.
- ► The saved tilt angle can be accessed at the touch of a push button if necessary and can be overwritten at any time with a new tilt angle.
- ► With the ignition switched off or restart of the diesel engine, the saved tilt angle setting is deleted and must be reset again when starting the diesel engine and saved.

Hydraulic trailer brake (option)

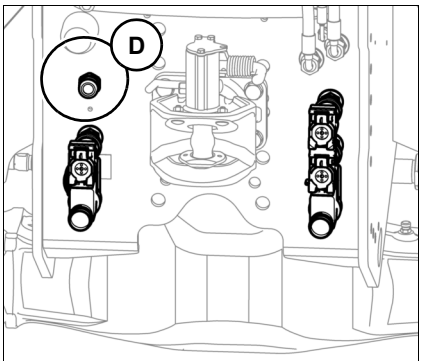


Fig. 334

Important safety instructions

- Flat connector plug **D** for the hydraulic trailer brake operation is installed at the rear of the machine (on the left in travel direction).
- The hydraulic trailer brake is operated with the machine's service brake!
- 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 (2133.4 psi) at full braking!

Information

The hydraulic trailer brake is certified for public roads in Germany (StVZO German road traffic regulations) provided it is adapted to the tractor!
The maximum road travel speed is limited to 25 km/h (15.5 mph) in Germany (according to German traffic regulations).

► Refer to the National Type Approval (Germany), the Data Confirmation (Germany) or the license 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!

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!

► Inspection and maintenance work on the hydraulic brake may be performed only by trained personnel or an authorized service center.

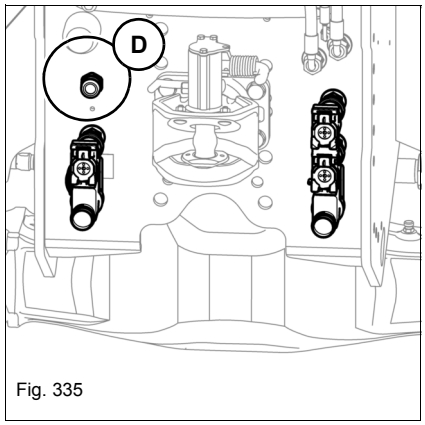


Fig. 335

1. Attach trailer to the ball hitch – *see "Coupling a trailer" on page 5-126*.
2. Clean the brake hose and quick coupler **D**.
3. Couple the brake hose onto quick coupler **D**.
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/inching pedal pressed only halfway through!

Failure to observe this can cause serious injury or death.

► Reduce the travel speed early enough before turning or downhill machine travel.

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

► Brake the vehicle by braking intermittently. To do this: briefly press the brake-inch pedal several times through the inch range.

► Select the next lower speed  .

When braking the vehicle with the brake/inching pedal **39** oil pressure is fed into the hydraulic trailer braking system and the trailer is braked.

The parking brake has no effect on the trailer braking system.

If the travel speed is reduced with brake-inch pedal **39**, 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.

Three-point mount - power lift (optional)

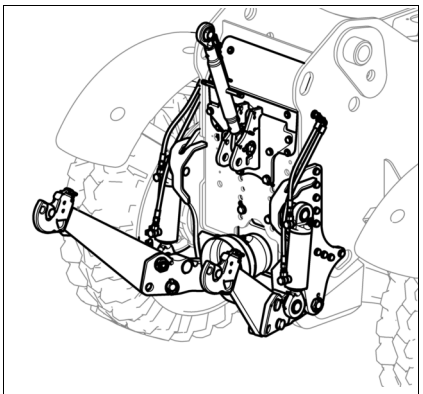


Fig. 336

Important safety instructions in work application

The three-point mount fixed to the rear of the vehicle is a work jig for lifting, lowering and pulling attachments with a three-point mounting.

WARNING

Risk of injury to persons in the danger zone!

Failure to observe this can cause serious injury or death.

► Immediately stop work if there are people in any of the work area of the vehicle, especially in the area of the three-point mount.

WARNING

Danger of accident in the event of improper coupling and unlocking attachments!

Failure to observe this can cause serious injury or death.

► Check the safety-locking device of the lower linkage for proper functioning.

► Comply with load-carrying capacities of the three-point mount (see nameplate).

► Only pick up attachments that are permitted for this three-point mount.

► Establish a view to the three-point mount through the fixed rear-view mirror.

► After picking up the attachment, check the locks on the lower linkage and upper linkage.

WARNING

Danger of accident in the event of damaged piston pin clips or missing piston pin clips!

Failure to observe this can cause serious injury or death.

► Check all piston pin clips (plug and/or linchpin)
– Replace damaged ones with new ones –

► Only use original plugs and/or linchpins
– No warranty claim is possible if not observed –

WARNING

Danger of accident from uncontrolled pivoting or oscillating of attachments!

Failure to observe this can cause serious injury or death.

► Ensure that no one is in the work area.

NOTICE

In order to avoid damage to the three-point mount as well as to the vehicle itself, bring the lower linkage into the transport position before driving on public roads.

Information

The operation of the three-point mount can only be performed if the operator (driver) is on the operator's seat.

Furthermore, after shutting off the engine the operation of the three-point mount is secured and must be released when restarting by pressing the button **105**.

Information

Attachments on public roads in the Federal Republic of Germany:

In the case of an approval as a "self-driving machine," only attachments may be carried along if they are registered in the General Certification for Vehicles (Germany). See page *3-13*.
No attachments are registered for the three-point mount. 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!

Registration in the machine documentation is not required for vehicles with "LoF [agricultural and forestry] approval" as a tractor machine.
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!

The operator of the machine always has the sole responsibility for this.

Also get informed on and follow the legal regulations of your country.

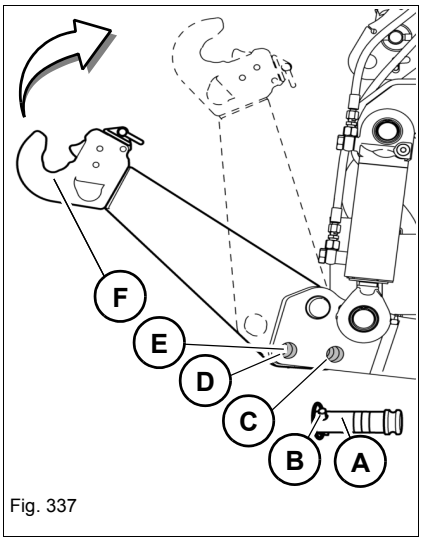


Fig. 337

Overview: Three-point mount of the lower linkage

The lower linkage of the three-point mount can be adjusted to different heights. To do this, insert the provided split pin into the corresponding opening.

A Pin for securing
B Split pin on the pin
C Fixed work position
D Moving work position
E The transport position if the three-point mount is no longer needed or when driving on public roads.
F Lower linkage hook for attachments

Adjust the lower linkage

1. Move the securing mechanism on the split pin **B** and pull out split pin **B**.
2. Raise the lower linkage by hand.
3. Pull out the pin **A** and bring the lower linkage into the desired position (**C, D,** or **E**).
4. Insert the pin **A** into the corresponding bore and secure with the split pint **B**.
5. Hook the attachment into the lower linkage hook.

Information

Adjust both lower linkages to the same lift height.

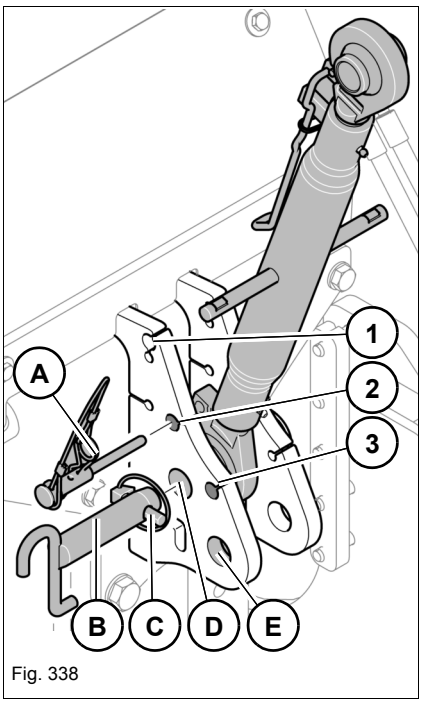


Fig. 338

Adjusting the upper linkage

1. Remove the lock pin **A**.
2. Move the securing mechanism on the split pin **C** and pull out split pin **C**.
3. Take out bolt **B**.
4. Bring the upper linkage into the desired position **D** or **E** and affix the split pin **C** so it cannot twist .
   ➥ In the position **E,** rotate the coupling jaw of the trailer coupling 90° to the right to avoid contact with the upper linkage.
5. If the upper linkage is attached to an attachment, secure the lock pin **A** in the position **1**.
6. if the upper linkage is not being used, always fold up the upper linkage and secure with a split pin **A**, pin **B** and split pin **C** in the position **2** or **3**.

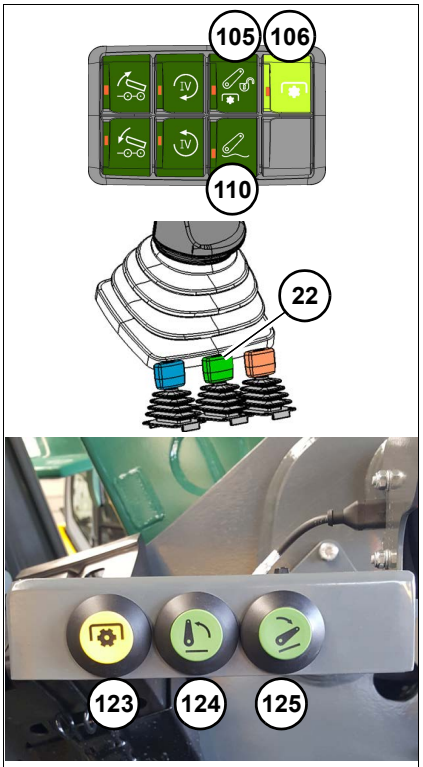


Fig. 339

Overview: Operation of the three-point mount and PTO

To avoid damage to the three-point mount as well as to the vehicle, do **not** exceed the max. permissible gross weight rating and the max. permissible rear axle load. See *on page 9-16 "Weight"*.Only under the prerequisite that at least 20% of the actually present gross weight rating is allotted to the front axle. Otherwise the vehicle is considered "incapable of steering!"
The front can additionally be ballasted in compliance with the aforementioned requirements.

Control element	Function	See page
Button **105**	Unlock the three-point mount as well as the PTO ➥ **Caution!** **For safety reasons, it is only possible to unlock if the operator is seated on the operator's seat**	
Button **106**	Power take-off drive	*5-151*
Button **110**	Floating position of the three-point mount	
Joystick**22**	Lift/lower the proportional control of the three-point mount	
Button **123** (vehicle rear left)	Power take-off drive	*5-152*
Button **124** (vehicle rear left)	Raise three-point mount	*5-149*
Button **125** (vehicle rear left)	Lower three-point mount	

Information

The operation of the rear button takes priority over the joystick **22** in the cabin. During simultaneous operation, the joystick **22** is put out of operation.
To reactivate the joystick, **22** first release the joystick **22** and then push to the rear or forward.

Operation of the three-point mount with joystick22 (cabin)

NOTICE

To avoid damage when picking up an attachment, adjust the line-of-sight to the three-point mount with the rear-view mirror
– see "Adjusting the rear mirrors (option)" on page 4-12!

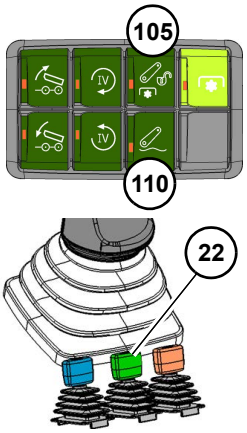


Fig. 340

1. Unlock the three-point mount. To do this, press the button **105**.
   ➥ The LED in the touch button illuminates
2. Lower the three-point mount. To do this, push the joystick to the front **22** (proportional control)
3. Drive the vehicle carefully up to the attachment while looking in the rear fixed mirror until the lower linkage hooks of the lower linkage are below the receiving pins of the attachment
4. Slightly lift the three-point mount. To do this, push the joystick to the rear **22** (proportional control)
   ➥ Only lift until the attachment is locked in the lower linkage
5. Attach the upper linkage to the attachment and secure the bolt with a plug or linchpin
6. Bring the attachment into the working position. To do this, push the joystick **22** to the rear and to the front
7. During transport, secure the three-point mount against unwanted operation. To do this, briefly press the button **105**
   ➥ The LED in the push button goes out.

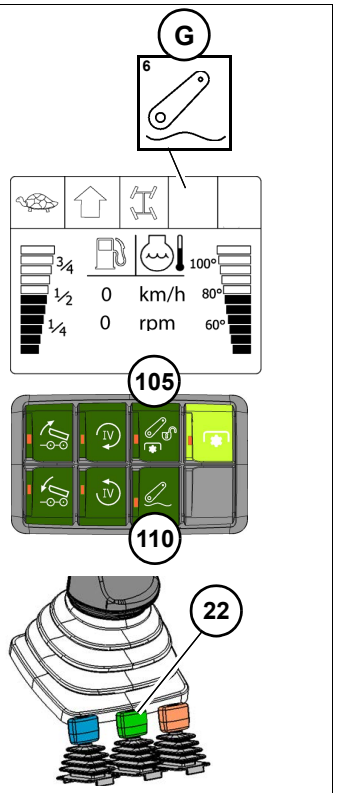


Fig. 341

Operation of the three-point mount in the floating position

1. Unlock the three-point mount. To do this, press the button **105**.
   ➥ The LED in the touch button illuminates
2. Commission the floating position. To do this, press the button **110** and hold for 2 seconds.
   ➥ The LED in the touch button illuminates
   ➥ Symbol **G/6** appears in the digital display
   ➥ The attachment slowly sinks to the ground
   ➥ The attachment is in the floating position
3. Decommission the floating position. To do this, press the button **110** again and hold for 2 seconds.
   ➥ The LED in the push button goes out
   ➥ Symbol **G/6** goes out in the digital display

Information

The enabled floating position is disabled with the operation of the joystick **22** and the LED in the button **110** flashes.
Pressing the joystick **22** once to lower can reactivate the floating position.

Operation of the three-point mount with the rear touch button (vehicle's rear)

The touch buttons for the operation of the three-point mount are located on the left rear of the vehicle.

WARNING

Danger of accident in the working area of the three-point mount!

Failure to observe this can cause serious injury or death.

- ► The operation of the three-point mount may only be done by authorized persons who are familiar with the vehicle and the attachment.
- ► The operation of the three-point mount may only be done at a secure distance.
- ► Do not stay between the vehicle and the attachment.
- ► When operating the rear touch button, ensure that no people are in the cabin or in the working area of the vehicle.

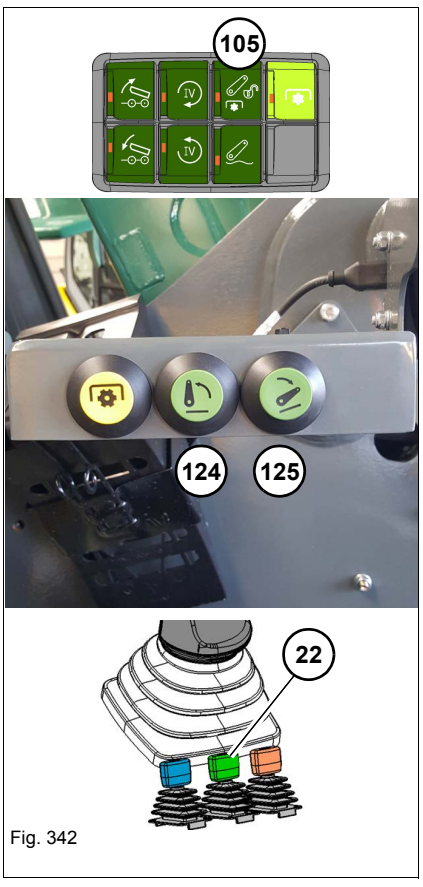


Fig. 342

1. Shut off the vehicle and apply the parking brake (hand brake)
2. Let the diesel engine idle at idling speed
3. Unlock the three-point mount. To do this, press the button **105**.
   ➥ The LED in the touch button illuminates
4. **Lower the attachment**. To do this, press and hold the button **124** until the attachment is set down on the ground
5. **Lift the attachment**. To do this, press and hold the button **125** until the attachment is at the desired height

Information

The operation of the rear button takes priority over the joystick **22** in the cabin. During simultaneous operation, the joystick **22** is put out of operation.
To reactivate the joystick, **22** first release the joystick **22** and then push to the rear or forward.

PTO (option)

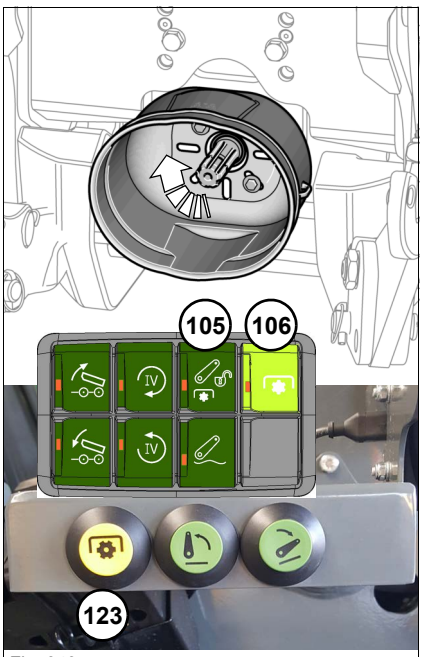


Fig. 343

Important safety instructions in work application

The PTO is located in the vehicle's rear and is driven via an oil engine. The PTO shaft rotates clockwise at 540 rpm at full diesel engine speed.

After being unlocked with the button, the PTO can be switched on or off **105** via the button **106** in the cabin in any driving area and with any diesel engine speed
– see "Preparation for the PTO drive" on page 5-151.

For stationary applications, the PTO shaft can also be operated via the button **123** at the vehicle rear (optional).

DANGER

Danger of accident due to falling parts!

Rotating parts grab pieces of clothing and limbs and lead to severe injuries or death.

- ► For PTO shaft operation, only use cardan shafts with working protective devices.
- ► Universal joint shafts without approved protective devices are prohibited.
- ► When attaching the universal joint shaft, ensure that the locating pin is securely locked into place in the PTO.
- ► Before any application, check that the universal joint shaft protection is properly secured with the fastening chain.
- ► Only operate the rear touch button when the engine is idling.

WARNING

Risk of injury to persons in the danger zone!

Failure to observe this can cause serious injury or death.

- ► Immediately stop work if there are people in any of the work area of the vehicle, especially in the area of the PTO.

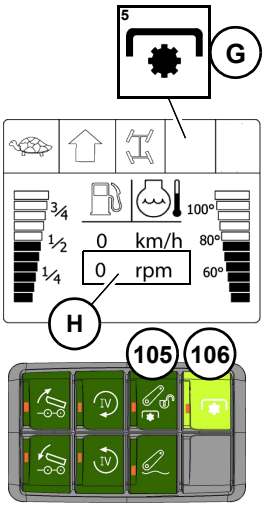


Fig. 344

Preparation for the PTO drive

1. After attaching the three-point mount, lower the attachment to the ground – *see "Operation of the three-point mount with joystick22 (cabin)" on page 5-147*.
2. Apply the parking brake.
3. Stop the diesel engine and remove the ignition key.
4. Attach the universal joint shaft of the attachment to the PTO.
   ➥ Ensure that the locating pin is securely locked into place in the PTO.
5. Attach the safety chain of the universal joint shaft protective device to a fixed point on the vehicle.

Switch the PTO on/off with touch buttons in the cabin

Information

The operation of the PTO shaft drive can only be done with the button **106** if the operator (driver) is on the operator's seat.

If the operator's seat is abandoned during the work operation, the PTO automatically shuts off after 7 seconds for safety reasons.

1. Switch on **the PTO**. To do this, start the diesel engine
2. Unlock the PTO drive with the button **105**
   ➥ Press push button.
   ➥ The LED in the touch button illuminates
   ➥ PTO drive is ready for operation
3. Start the PTO shaft. To do this, briefly press the button **106**
   ➥ The symbol **G/5** and PTO shaft speed **H** are shown in the digital display.
4. Switch off the PTO**.**To do this, briefly **106** press the button once
   ➥ The LED in the push button goes out
   ➥ Symbol **G/5** goes out in the digital display

Operation of the PTO shaft with the rear button (vehicle's rear)

WARNING

Danger of accident in the working area of the PTO!

Failure to observe this can cause serious injury or death.

- ► The operation of the PTO may only be done by authorized persons who are familiar with the vehicle and the attachment.
- ► The operation of the PTO may only be done at a secure distance.
- ► Do not stay between the vehicle and the attachment.
- ► When operating the rear touch button, ensure that no people are in the cabin or in the working area of the vehicle.

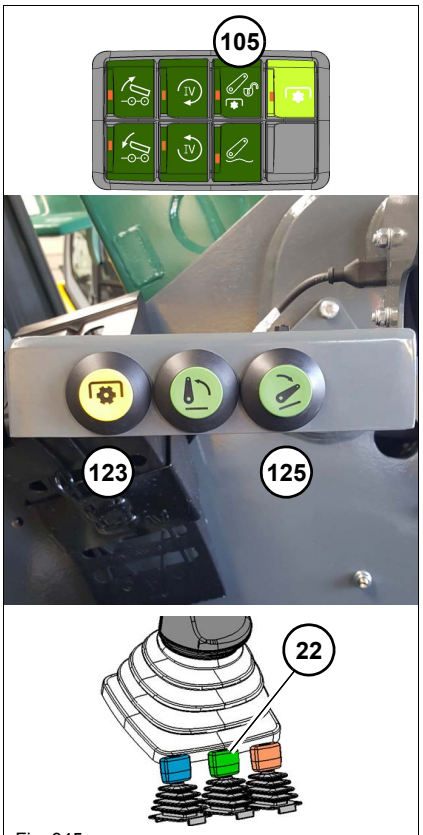


Fig. 345

1. Shut off the vehicle and apply the parking brake (hand brake)
2. Let the diesel engine idle at idling speed.
3. Unlock the PTO drive with the button **105**
4. Lower the attachment to the ground. To do this, press down the button **125** until the attachment is set down on the ground.
5. Put the PTO into operation,
   - ➥ Briefly press the button **123** (max. 5 sec.) = slight rotational movement
   - ➥ Press the button **123** (over 5 sec.) = continuous movement
   - ➥ Briefly press the button **123** again = PTO shaft is shut off

Information

The operation of the rear button takes priority over the joystick **22** in the cabin. During simultaneous operation, the joystick **22** is put out of operation.
To reactivate the joystick, **22** first release the joystick **22** and then push to the rear or forward.

Front and/or rear camera system (option)

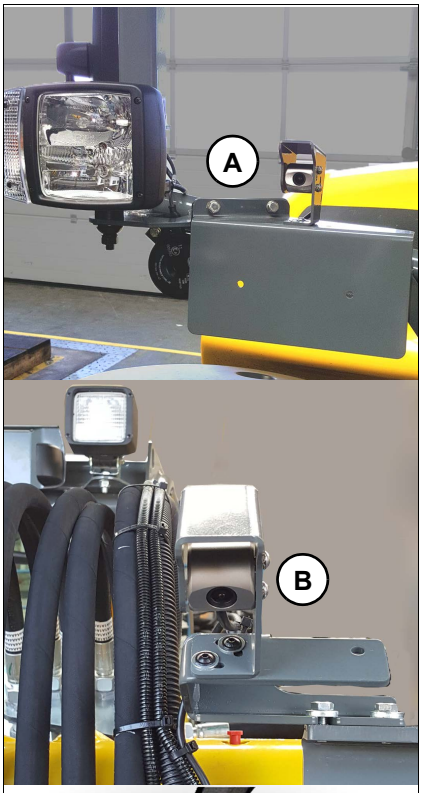


Fig. 346

Important information

The camera video system is provided for monitoring non-visible or poorly visible areas on the vehicle.

A Fastened to the right mirror holder front and/or

B to the rear of the vehicle.

C Color monitor in the cabin

Specifications – *see chapter 9 " Camera (option)" on page 9-12*

WARNING

Persons with pacemakers.

Negative effect on function due to high frequency.

► Before putting a transmitter or receiver unit into operation, contact the manufacturer of the pacemaker for information on possible negative effects on function.
Radiated power: see “Technical data”.

In case of damage to property or persons due to non-designated use of the video system, failure to observe the notes and information in this manual, incorrect installation, maintenance, servicing and repair work, or due to modifications of the unit without proper authority, then Kramer-Werke shall be dispensed from all liability for damages and from compensation for consequential damage. The system may only be used for the applications specified in the technical description and only in connection with the recommended or certified equipment. Safe and correct operation of the product requires correct transport, storage and installation, and careful operation and maintenance.

Installation overview

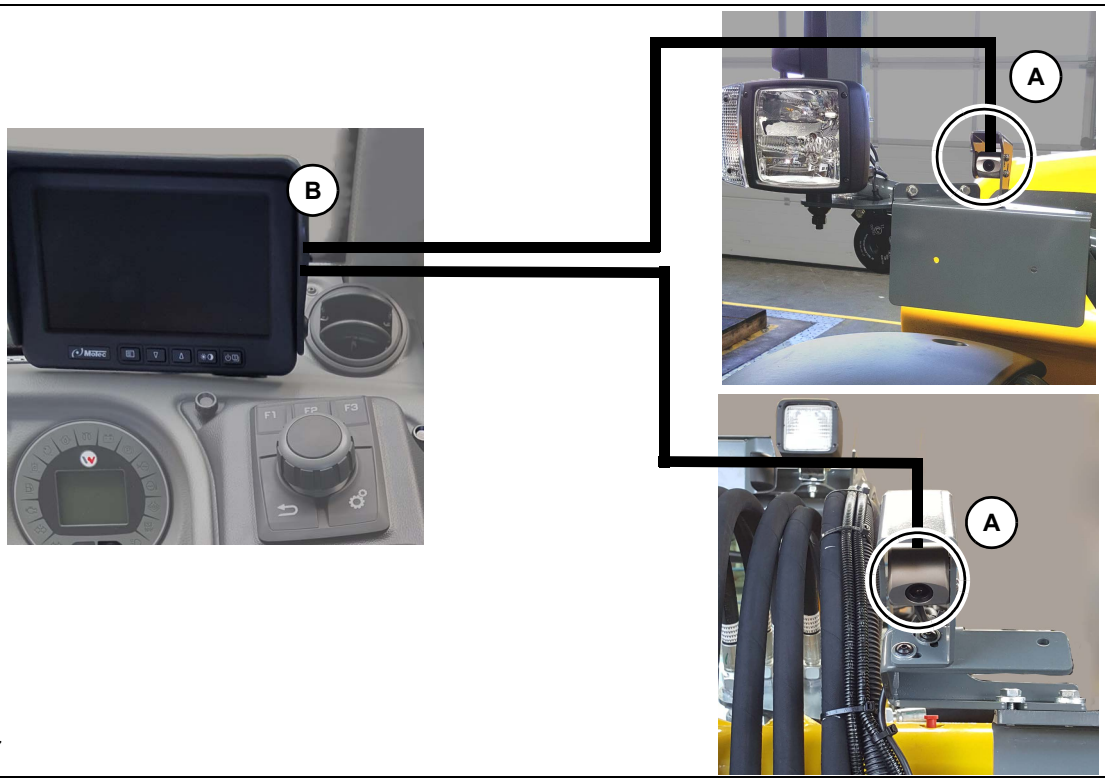
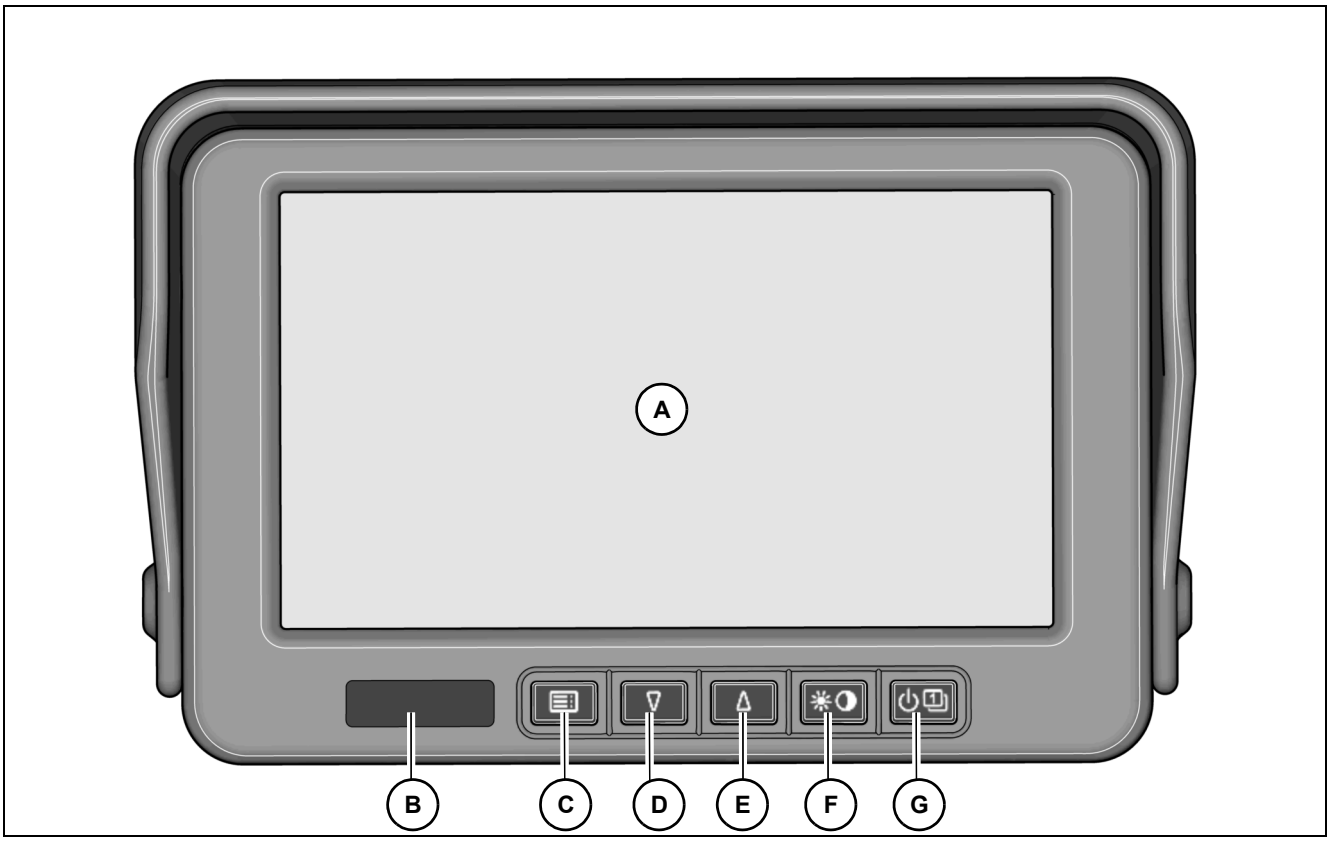


Fig. 347

Component		Description
Video system		The video system is a video transmission system for monitoring machine functions or supporting the operator during reverse travel.
A	Camera	The video signal of camera **A** is sent by cable to monitor **B**. The color camera is dust-sealed and protected against water. The camera is equipped with a dual front window for work in particularly dirty environments.
B	Screen	The camera image is shown on the monitor **B** as soon as the "reverse" travel direction is chosen. The monitor **B** makes it possible to show up to 2 cameras. Manually switch between the cameras. Screen brightness can be set automatically with the integrated light sensor. The screen is dust and spray-water protected.

Overview of the control elements of the front camera monitor



Symbol/designation		Function
A	Screen	Display of up to 2 camera images. Display of the screen menu and the selected settings.
B	Brightness sensor	Adjusts the brightness to the conditions if the automatic brightness control is selected.
C	Screen menu	Opens the screen menu. Confirms a selection.
D	Smaller	Moves the cursor down. Reduces the value.
E	Larger	Moves the cursor up. Increases the value.
F	Brightness	Switches the screen brightness to daytime or night time operation or automatic brightness control. The intensity of the lowering can be configured in the screen menu.
G	Power / Video	Lights up GREEN if the monitor is switched on. Flashes RED if there is an operational fault. Lights up RED if there is operating voltage present and the monitor is switched off.

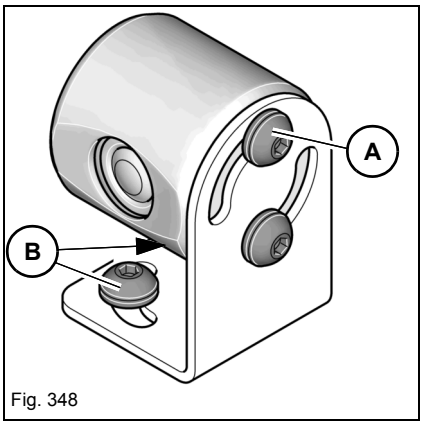


Fig. 348

Adjusting the camera

1. Adjust the position angle of the camera. To do this, release two hexagon socket bolts on the side **A** and on the base **B** of the retaining bracket. Wrench size 3 mm
2. Adjust the camera as required *– see chapter 4 " Line-of-sight with camera (optional)" on page 4-14*.
3. Re-tighten all hexagon socket bolts.

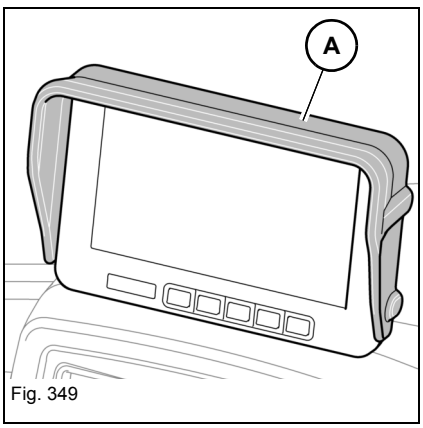


Fig. 349

Attach the sun-shield for the front camera monitor

The screen can be equipped with a sun shield **A** to protect it against sunlight.

1. Slide sun shield **A** on the monitor from the front.

Make the basic settings of the video system for the front camera

All settings can be made at any time.

During the initial commissioning or resetting to factory defaults, the user language must first be selected.

The following parameters can be chosen or selected via the main menu:

- Day brightness
- Night brightness
- Contrast
- Color
- Standard values
- Language
- Image mirroring
- Video system
- Trailer
- Indicator IN-2
- POC
- Close

The settings of the most important parameters for operation of the vehicle with a front camera are described in the following sections.

Information

If the main menu is accessed and no button is pressed for 10 seconds, the main menu is automatically closed.

Adjusting the display brightness for daytime

The setting serves to adjust the monitor to daylight. The contrast and color settings should be set to the value 10 beforehand.

Step	Push button	Activity
1		Switch on ignition and the video system if necessary.
2		Press the screen menu button. ➥ The screen menu will appear on the monitor. ➥ The "Day brightness" parameter is already marked.
3		Press the screen menu button. ➥ The setting is enabled.
4		Optimize the image value using the arrow keys.
5		Press the screen menu button again. ➥ The set value is saved. ➥ The setting is exited from.
6		Press the smaller button until the "close" line is selected.
7		Press the screen menu button. The screen menu is closed.

Adjusting the display brightness for night time

The setting serves to adjust the monitor to the lighting conditions at night.

Step	Push button	Activity
1		Switch on ignition and the video system if necessary.
2		Press the screen menu button. ➥ The screen menu will appear on the monitor.
3		Press the smaller button until the "night brightness" line is selected.
4		Press the screen menu button. ➥ The setting is enabled.
5		Optimize the image value using the arrow keys.
6		Press the screen menu button again. ➥ The set value is saved. ➥ The setting is exited from.
7		Press the smaller button until the "close" line is selected.
8		Press the screen menu button. The screen menu is closed.

Adjusting contrast

The setting serves to adjust the monitor to the lighting conditions during the day.

Step	Push button	Activity
1		Switch on ignition and the video system if necessary.
2		Press the screen menu button. ➥ The screen menu will appear on the monitor.
3		Press the smaller button until the "contrast" line is selected.
4		Press the screen menu button. ➥ The setting is enabled.
5		Optimize the image value using the arrow keys.
6		Press the screen menu button again. ➥ The set value is saved. ➥ The setting is exited from.
7		Press the smaller button until the "close" line is selected.
8		Press the screen menu button. The screen menu is closed.

Setting the color

The setting serves to adjust the monitor to the lighting conditions during the day.

Step	Push button	Activity
1		Switch on ignition and the video system if necessary.
2		Press the screen menu button. ➥ The screen menu will appear on the monitor.
3		Press the smaller button until the "color" line is selected.
4		Press the screen menu button. ➥ The setting is enabled.
5		Optimize the image value using the arrow keys.
6		Press the screen menu button again. ➥ The set value is saved. ➥ The setting is exited from.
7		Press the smaller button until the "close" line is selected.
8		Press the screen menu button. The screen menu is closed.

Restore the standard settings

The setting serves to reset the values for daytime brightness, night time brightness, contrast and color to the default values.

Step	Push button	Activity
1		Switch on ignition and the video system if necessary.
2		Press the screen menu button. ➥ The screen menu will appear on the monitor.
3		Press the smaller button until the "default values" line is selected.
4		Press the screen menu button. ➥ The settings are reset.
5		Press the smaller button until the "close" line is selected.
6		Press the screen menu button. The screen menu is closed.

Selecting a language

The screen menu can be shown in 8 different languages.

Step	Push button	Activity
1		Switch on ignition and the video system if necessary.
2		Press the screen menu button. ➥ The screen menu will appear on the monitor.
3		Press the smaller button until the "language" line is selected.
4		Press the screen menu button. ➥ The setting is enabled.
5		Select the desired language with the arrow keys.
6		Press the screen menu button again. ➥ The selected language is saved. ➥ The setting is exited from.
7		Press the smaller button until the "close" line is selected.
8		Press the screen menu button. The screen menu is closed.

Mirror the camera image

The monitor offers the option to horizontally or vertically mirror the signals of the connected camera.
Horizontally means: right and left are interchanged.
Vertically means: top and bottom are interchanged.

Step	Push button	Activity
1		Switch on ignition and the video system if necessary.
2		Press the screen menu button. ➥ The screen menu will appear on the monitor.
3		Press the smaller button until the "image mirroring" line is selected.
4		Press the screen menu button. ➥ The setting is enabled.
5		Select the desired image mirroring with the arrow keys.
6		Press the screen menu button again. ➥ The selected mirroring is saved. ➥ The setting is exited from.
7		Press the smaller button until the "close" line is selected.
8		Press the screen menu button. The screen menu is closed.

Select the video system

The monitor supports the PAL and NTSC systems.

If it is not known what system the installed camera uses, select the "auto" function.

Due to the format difference between PAL (4:3) and the monitor (16:9), the subject may not be shown in the right format under certain conditions. In addition, the image is compressed due to the compression of the 576 PAL image lines to the 480 LED- image lines. This effect can be significantly reduced by choosing PAL 480.

Information

With PAL 480, only the 480 lines lying in the middle of the image are shown. The lines outside of this zone are lost and are not shown on the monitor.

Step	Push button	Activity
1		Switch on ignition and the video system if necessary.
2		Press the screen menu button. ➥ The screen menu will appear on the monitor.
3		Press the smaller button until the "video system" line is selected.
4		Press the screen menu button. ➥ The setting is enabled.
5		Select the desired video system with the arrow keys.
6		Press the screen menu button again. ➥ The selected system is saved. ➥ The setting is exited from.
7		Press the smaller button until the "close" line is selected.
8		Press the screen menu button. The screen menu is closed.

Phone holder (optional)

General instructions

WARNING

Danger of accident when adjusting the cell phone holder or when operating the cell phone.

Failure to observe this can cause serious injury or death.

- ► Only adjust the cell phone holder when at a standstill.
- ► Only use the cell phone at a standstill and with the ignition off.

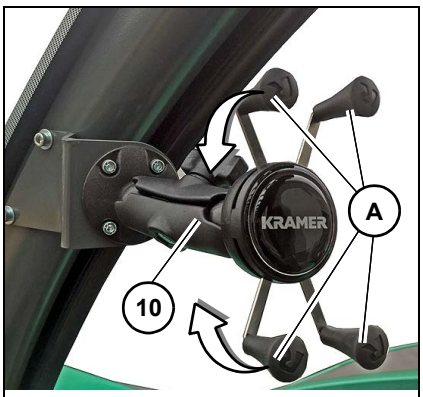


Fig. 350

Secure the cell phone

1. Push the tabs (**A**) of the cell phone holder (**10**) out with 2 fingers and hold.
2. Position the cell phone so that the tabs **A** do not press on the control buttons of the cell phone.
3. Press the tabs (**A**) against the cell phone.

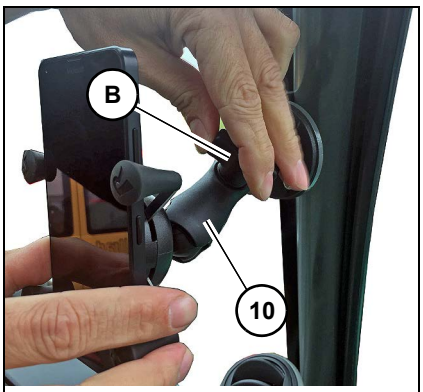


Fig. 351

Adjusting the cell phone holder

4. Loosen the toggle nut (**B**) on the cell phone holder (**10**).
5. Position the cell phone as desired.
6. Tighten the toggle nut (**B**).

5.14 Putting out of operation/back into operation

WARNING

Accident hazard if machine tips over or rolls away after parking it!

Failure to observe this can cause serious injury or death.

- ► Stop the machine on firm, level and horizontal ground.
- ► Secure the machine accordingly (for example with chocks).

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 "Telescopic boom operation" on page 5-40*.
2. Set the drive to a neutral position *– see "Select the travel direction, start, stop" on page 5-15*.
3. Stop the engine and remove the starting key.
   ➥ The immobilizer (opt) is enabled.
4. Apply the parking brake *– see "Parking brake (hand brake)" on page 5-12*.
5. Close and lock the windows and the door as you leave the cabin *– see chapter 4 " Locking/unlocking the door and the side window" on page 4-2*.
6. Lock the engine cover securely.
7. Remove the key from the battery master switch *– see "Battery master switch" on page 4-22*.
8. Take additional measures to secure the machine by placing chocks under the downhill sides of the wheels.

Putting the machine out of operation for longer time

1. If possible, retract the piston rods of the hydraulic rams to protect them against damage. If this is not possible, apply grease to the piston rods and to the bare parts of the hydraulic rams that are not paint-coated.
2. **Before commissioning,** clean the piston rods, however not with a grease solvent or a high-pressure cleaner.
   ➥ The scrapers are not water-tight, therefore water can penetrate into the guide bushing, and cause corrosion and damage to the piston rod.

Preserving the diesel engine

- Preserving inside
- Preserving outside

Information

Preserving work may be performed by an authorized service center 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 decommissioned or 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 hazards 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 all leaks on the diesel engine, reservoirs, gearbox and hydraulic system!
- 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 fluids and consumables!

6 Transport

6.1 Towing the machine

Information on towing

WARNING

Accident hazard due to towing!

Failure to observe this 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 facilities, such as a towing coupling, hooks and eyes.
- ► Ensure that no one is between the vehicles during towing.
- ► Max. 300 m (118.1 in) towing distance
- ► Max. towing speed is walking speed.
- ► Have a recovery service or an authorized service center tow the machine away if necessary.

Before towing the machine

Disabling the drive

NOTICE

The high-pressure valves (**A**) must be opened in order to avoid damage (high pressure) to the variable displacement pump when towing away the machine.

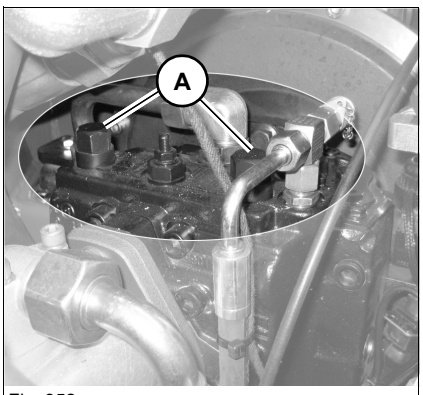


Fig. 352

Disabling the variable displacement pump (neutral position)

1. Apply the parking brake.
2. Stop the diesel engine.
3. Switch off the starter and remove the starting key.
4. Switch the variable displacement pump to towing operation. To do this: unscrew the high-pressure valves **A** 2 – 3 revolutions.

Front / rear towing device

Fig. 353

WARNING

Danger of accident from using the towing device for trailer operation!

Ignoring this may lead to severe injuries or death.

- ► The towing device is **not** approved for trailer operation.
- ► The towing jig is only approved for recovering the vehicle.
- ► Any other application is not permitted.

CAUTION

Accident hazard due to a damaged towing gear!

Failure to observe this can cause injuries.

- ► Check the towing gear for damage before using it.
- ► Have a damaged or malfunctioning towing gear immediately repaired or replaced by an authorized service center.

Towing the machine

Tow away the machine as follows

Observe the following order under all circumstances!

1. Put the towing vehicle (with sufficient traction force and a safe braking system) in the towing position.
2. Fasten suitable towing equipment (towing bar) on the towing gear (eyelets) of the machine.
   ➥ Bear in mind the machine's dimensions and weights.
3. Disable the variable displacement pump – *see "Disabling the drive" on page 6-1*.
4. Tow the machine out of the danger zone at walking speed.
   ➥ If possible, run the diesel engine at idling speed when towing the machine.

NOTICE

If the diesel engine fails, it takes great strength to control the steering system and brake!

► Towing section => max. 300 m (118.1 in) from the danger zone

► Max. towing speed is walking speed.

Once towing is over

5. Secure the machine with wheel chocks.
6. Switch the variable displacement pump back to machine travel operation
   – *see "Enabling the variable displacement pump" on page 6-3*!
7. Remove the towing gear.
8. Drive away the towing vehicle.

Once towing is over

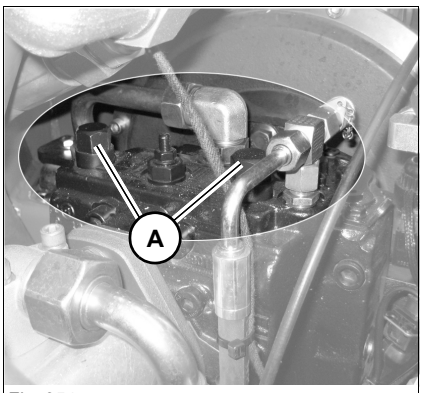


Fig. 354

Enabling the variable displacement pump

1. Screw in high-pressure valves **A** and tighten them to 85 Nm (62.7 ft. lbs.).
2. Check the drive for correct operation.

6.2 Towing the vehicle

Information on towing

WARNING

Accident hazard when towing away the machine!

Failure to observe this can cause serious injury or death.

- ► Only tow the vehicle with suitable towing equipment.
- ► Only attach the towing equipment at the provided towing devices.
- ► Ensure that no one is between the vehicles during towing.
- ► Have a recovery service or an authorized service center tow the vehicle away.

Towing equipment

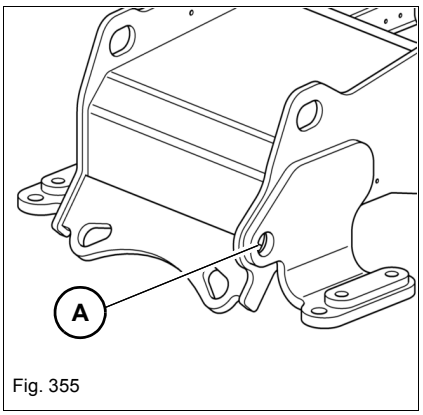


Fig. 355

High tractive forces are required to recover a hard-driven vehicle with a winch or a powerful towing vehicle.

Sturdy recovery equipment **A** is attached to the front on the frame for recovering the vehicle**.**

CAUTION

Danger of accident due to damaged recovering equipment!

Failure to observe this can cause injuries.

- ► Check the recovering equipment for damage before recovering.
- ► Have damaged or malfunctioning recovery equipment immediately repaired by an authorized service center.

WARNING

Danger of accident from recovering at the towing device!

Recovering the vehicle at with the towing gear can cause accidents, and serious injury or death.

- ► Do not use the towing gear to recover the vehicle.

1. Secure sufficiently sized and tested towing equipment to the towing devices **A** of the vehicle.
2. Carry out the preparations as for towing the vehicle *– see "Before towing the machine" on page 6-1*.
3. Carefully recover and tow the vehicle *– see "Towing the machine" on page 6-3*.

6.3 Loading the vehicle

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 behavior 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.

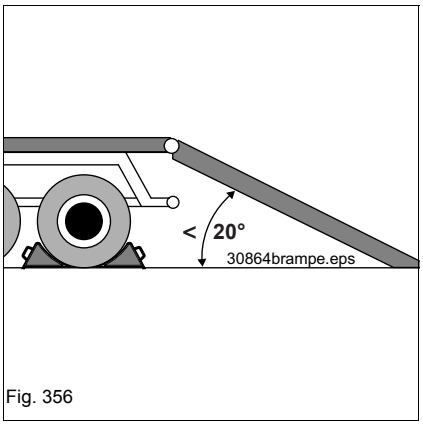


Fig. 356

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 anti-skid surface only.
3. Ensure that the loading area is clear and access to it is not obstructed, by superstructures for example.
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 vehicle.
7. Raise the telescopic boom enough so that it will not touch the access ramps.
8. Carefully drive the vehicle onto the middle of the transport vehicle.
9. Set the drive to a neutral position *– see chapter 5 " Select the travel direction, start, stop" on page 5-15*.
10. Lower the telescopic boom to the loading area.
11. Stop the engine
12. Apply the parking brake *– see chapter 5 " Parking brake (hand brake)" on page 5-12*.
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 overall height of the machine is not exceeded.

Crane-lifting

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 remains in the machine that is to be loaded**!
- Seal off the danger zone.
- The crane and the lifting gear must have suitable dimensions.
- Take into account the machine's gross weight rating *– see chapter 9 " Weight" on page 9-16*.
- Use only tested ropes, belts, hooks and Use shackles (lockable brackets with screws or socket pins)!
- The slinging points on the machine are marked with a symbol *– see "Crane-lifting" on page 6-7*.
- Have loads fastened and crane operators guided by experienced persons only!
- 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 only initiate a load movement once he has convinced himself that the load is securely attached and there are no people in the danger zone.
- The load must not be fastened by winding the lifting rope or lifting chain around it!
- Bear in mind the load distribution (center 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 under all circumstances!

Crane-lifting the machine

DANGER

Risk of injury from crashing vehicle or parts of the vehicle.

Falling objects can cause serious or fatal injuries.

► Use tested, intact lifting gear of sufficient dimensions.

► Check that the lifting gear is safely fastened.

► Ensure that nobody is under the raised machine.

NOTICE

The slinging points **B** on the cabin are for removing the cabin only and may **not** be used for crane-lifting the machine – *see chapter 3 " Machine overview" on page 3-1*.

NOTICE

Vehicle damage from the lifting gear!

Lifting gear can damage vehicle parts.

► Use tie-bars if necessary.

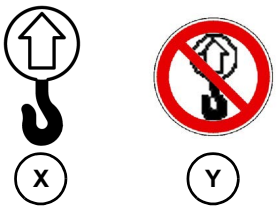


Fig. 357

1. Empty and tilt in the standard bucket, and lower it to transport position – *see chapter 5 " Machine travel on public roads with a bucket" on page 5-87*.
2. Set the drive to a neutral position – *see chapter 5 " Select the travel direction, start, stop" on page 5-15*.
3. Stop the engine and remove the starting key.
4. Apply parking brake – *see chapter 5 " Parking brake (hand brake)" on page 5-12*.
5. Lock the cabin and the engine hood – *see chapter 4 " Locking/ unlocking the door and the side window" on page 4-2*.
6. Fasten the vehicle at the 4 slinging points (symbol **X** on the frame) with lifting gear of sufficient size.

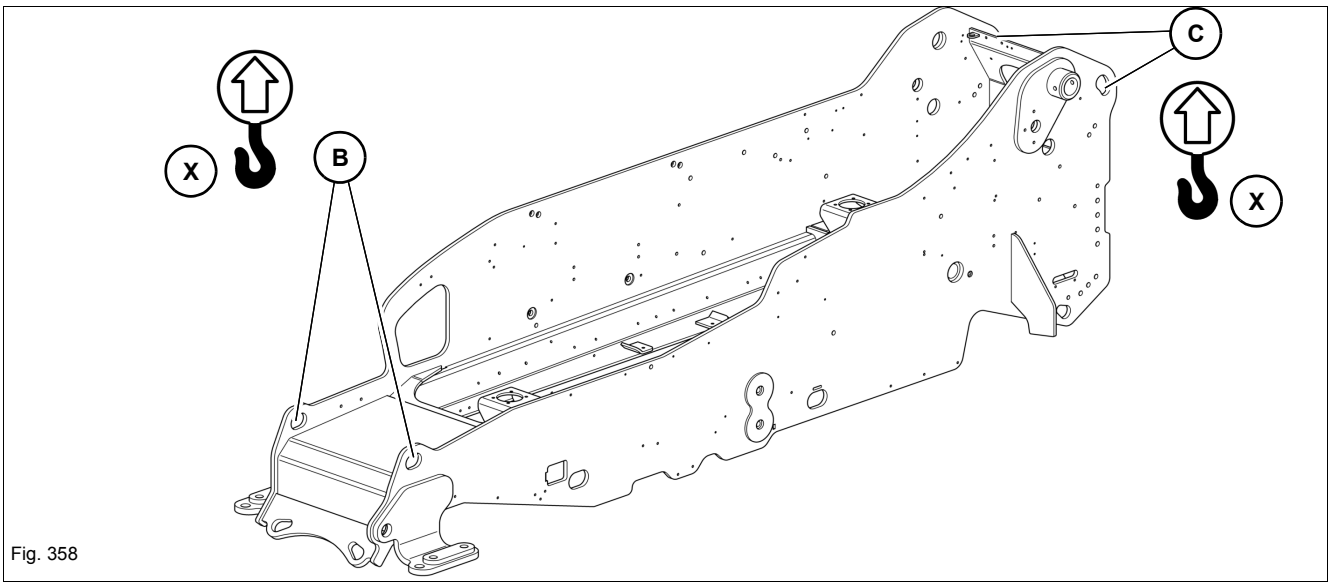


Fig. 358

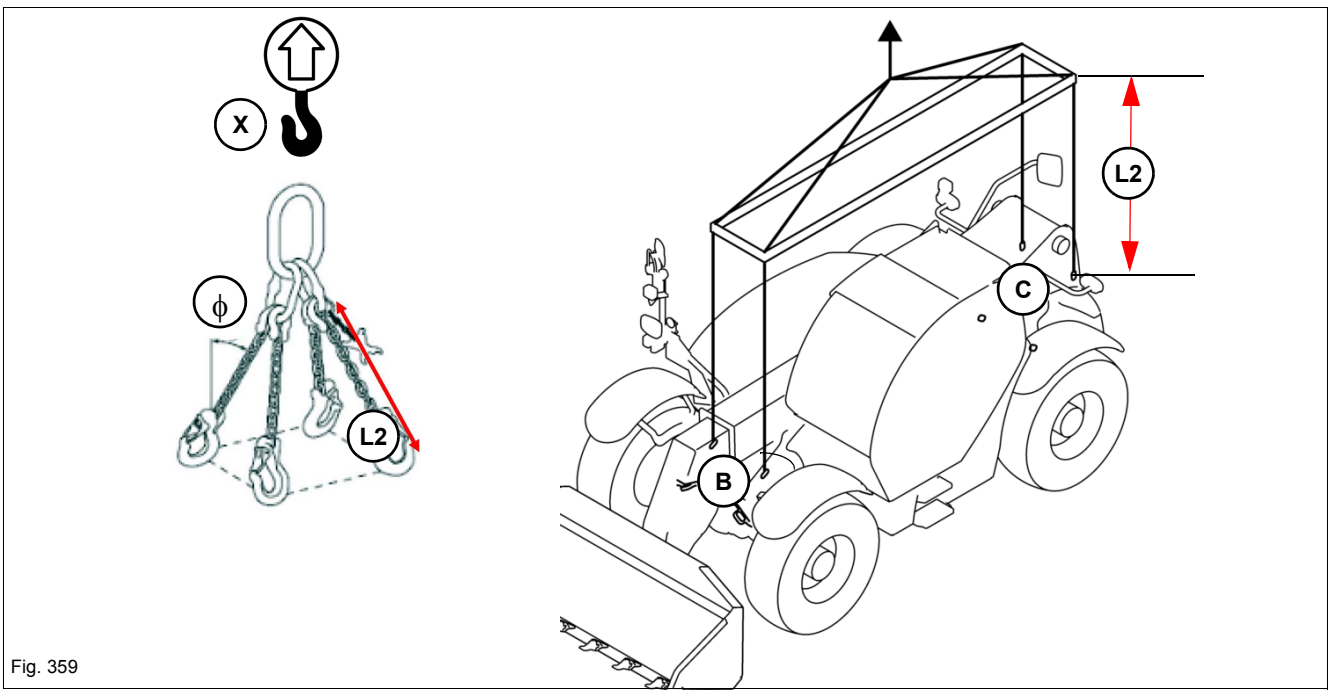


Fig. 359

	Point B	Point C	Remarks
Angle ϕ	10° ±5°	10° ±5°	
maximum lifting force	21 kN	17 kN	
Minimum length L2	2 m ±0.2 m	1.5 m ±0.2 m	When using a lifting beam, 3 m above ground

1. Secure sufficiently sized and tested lifting gear to the attachment points of the vehicle marked with the symbol **X**.
2. Raise the machine carefully with a crane, slowly position it over the unloading position and lower it carefully.

6.4 Transporting the vehicle

Safety instructions regarding transport

- Use only tested ropes, straps, hooks, shackles (with screw and socket pins with lockable frames) for tying down the vehicle!
- Do not use any tie-downs that are dirty, damaged or not of sufficient size.
- Do not place cables, belts, etc. over sharp-edged objects.
- Always use the existing tie-down points on the vehicle when using ratchet straps and chains – *see chapter 3 " Machine overview" on page 3-1*.
- In order to secure the machine on the platform, use only the fastening points provided for this purpose.
- Observe the national regulations on load securing.
- Depending on the load, adapt the travel speed of the transport vehicle to the road and traffic conditions and to the handling of the transport vehicle.
- Bear in mind the weather conditions (for example, ice, snow).

Tying down the machine

Tie-down points on machine

For tying down the vehicle, use only the attachment points identified with the corresponding labels **Z**.

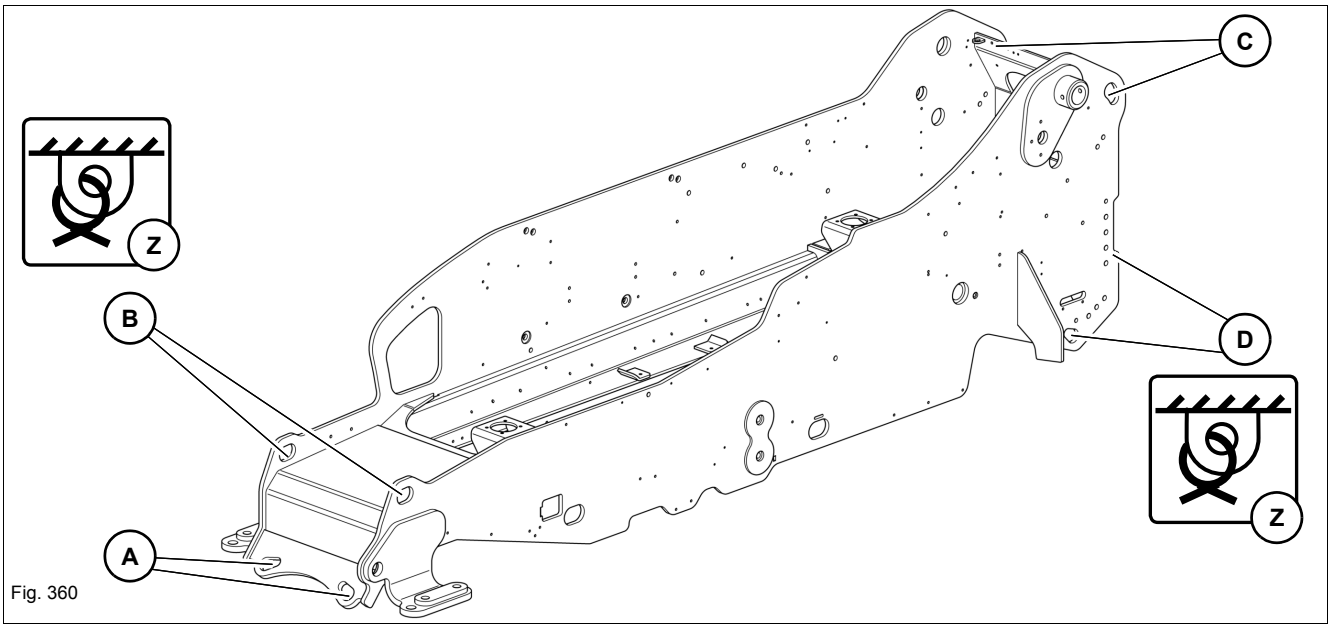


Fig. 360

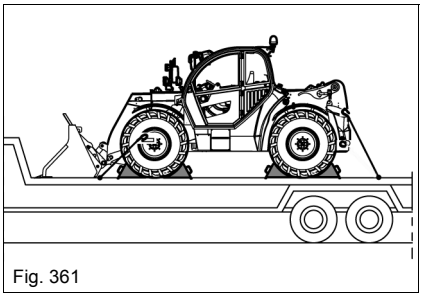


Fig. 361

Tying down the vehicle

1. Secure all tires of the machine with chocks in front of and behind each wheel.

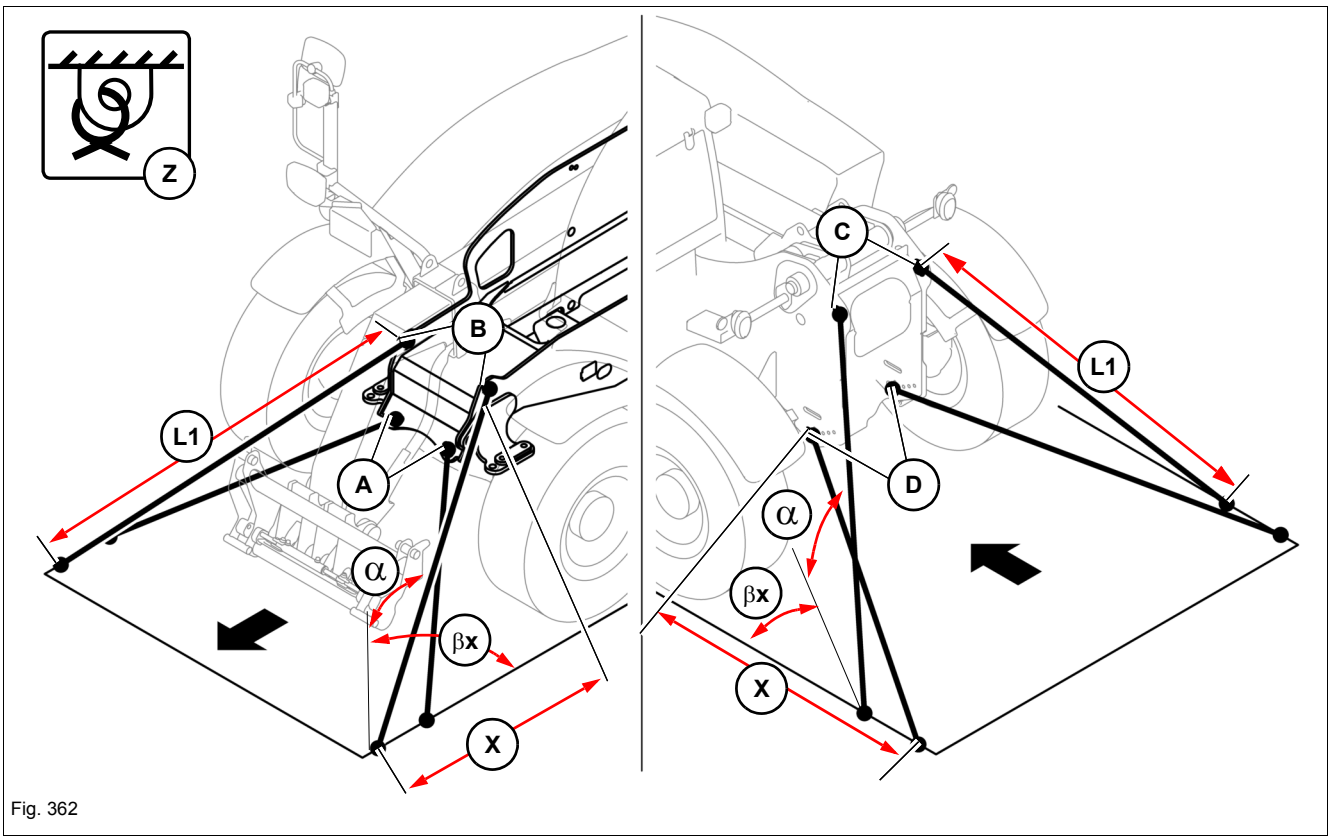


Fig. 362

	Point A	Point B	Point C	Point D	Remarks
Angle α	20° ±5°	30° ±5°	40° ±5°	15° ±5°	Angle between the loading area and fastening means
Angle βx	50° ±5°	35° ±5°	40° ±5°	30° ±5°	Angle between the longitudinal edge of the loading area and fastening means
Distance **X**	0.8 m ±0.2 m	1.2 m ±0.2 m	1 m ±0.2 m	1.6 m ±0.2 m	
Minimum length **L1**	1.5 m ±0.2 m	1.8 m ±0.2 m	2 m ±0.2 m	2 m ±0.2 m	Vehicle eye hook to the loading area eye hook
Maximum lashing force	35 kN	30 kN	35 kN	25 kN	

2. Securely anchor the vehicle to the eye hooks **point A, B, C** and **D** – see symbol **Z** on the vehicle frame – on the loading area with sufficiently sized ratchet straps or chains.

Information

The fastening means should run diagonally if possible.

3. If the vehicle is being transported longer distances or backwards in the rain, close the outlet opening of the muffler (diesel engine) with a simple cap or suitable adhesive tap so that no water can get into the exhaust system.

7 Maintenance

7.1 Information on maintenance

Responsibilities and prerequisites

- Operational readiness and the service life of the machine are heavily dependent on maintenance.
- **The care and maintenance "every 10 operating hours" (daily) as well as "every 20 hours of operation" indicated in the maintenance plan have to be performed by a specially trained operator / user.**
- **All other work listed in the maintenance plan (delivery inspection and inspections A, B and C) may only be carried out by an authorized service center in order to be recognized for warranty claims.**
  - ➥ The respective intervals for the inspection can be found in the service manual.
  - ➥ The maintenance and service personnel must have specialized knowledge about the maintenance and inspection work on the machine. The necessary expertise can be obtained at training sessions from KRAMER WERKE Service.
- The parts numbers of the plant materials and consumables required for the maintenance work as well as the numbers of the maintenance sets "A," "B," or "C" can be found in the spare parts list.
- The quantities and specification of the vehicle fluids and lubricants can be found in the table "Overview of vehicle fluids and lubricants" on page *7-13*.
- Perform maintenance and inspection work only with suitable protective equipment.
- 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 care and maintenance.

Safety instructions concerning maintenance work

CAUTION

Risk of injury from maintenance work!

Ignoring safety instructions can lead to injuries!

- ► Lock the service brake (hand brake)
- ► Stop the engine and remove the starting key.
- ► Observe the danger indications and safety instructions during maintenance.
- ► 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.

- Only perform maintenance and inspection work after having read and understood the Operator's Manual.
- Pay attention to the basic safety instructions and to all the warning labels affixed on the machine.
- The Operator's Manual describes the work to be performed.
  - However, the descriptions of the work processes provide the required information only to experienced personnel having appropriate knowledge.
- Always store the Operator's Manual in the place provided for it on the machine.

The work that is not specified in this Operator's Manual may only be performed by an authorized service center.

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!

Please contact your dealer if you require more information on maintenance.

Safety prop for telescopic boom

Fig. 363

Installing the safety prop onto the lift cylinder

WARNING

Crushing hazard! Assembly and maintenance on the raised telescopic boom not secured by a prop!

Causes serious injury or death.

► Install safety prop (supplied with the machine) onto the extended lift ram and secure it with pin (or a screw, see figure).

NOTICE

Install it as shown in the figures in order to avoid damage to the piston rod and the safety prop!

► The opening of the safety prop must face down!

The safety strut is located at the front left on the machine frame.

1. Remove the attachment (loader bucket)
2. Park the machine on firm and level ground
3. Apply the parking brake
4. Retract the telescopic boom and raise the loader unit so that the safety prop can be attached without danger.
5. Stop the engine and remove the starting key.
6. Remove the safety prop from the installation location. To do this, remove the plug fuse and unscrew the bolt **B** from the tapped bore.
7. Place the safety prop on the extended piston rod of the lift cylinder from below and turn via the piston rod.
   ➥ The opening of the safety prop must face down.
8. Lock the safety prop with bolt **A** and secure it with the safety pin (see figure).
9. Carefully lower the telescopic arm onto the safety prop using the emergency lowering **with the diesel engine** at a standstill
   – see "Emergency lowering of the loader unit in case of diesel engine failure" on page 5-110.
10. After maintenance work, remove the safety prop from the lift cylinder and attach at the predetermined installation location (front left in the vehicle frame)!

7.2 Maintenance overview

Maintenance plan

Important information on the maintenance plan

"**A**," "**B**" and "**C**" refer to the respective maintenance kits.

The respective intervals for the inspection can be found in the service manual.

For service and maintenance on the attachment, please refer to the operation and maintenance manual of the attachment manufacturer as well.

Work description[1] (o/h = operating hours)	**Service center**[2]	**User// operator**		**Service center**[2]		
Oil and filter change (⟳)	**Delivery inspection**	**every 10 hours of operation (daily)**	**Every 20 o/h**	**Inspection "A"**	**Inspection "B"**	**Inspection 'C"**
Engine oil					●	●
Engine oil filter					●	●
Replace the fuel filter, fuel pre-filter					●	●
Replace the air filter insert					●	●
Replace the safety cartridge of the air filter insert[3]						●
Replace the gearbox oil in front and rear axle differential				●		●
Gearbox oil in gearbox				●		●
Gearbox oil in front and rear axle planetary drives (left and right)				●		●
Replace the hydraulic oil					O[4]	O[4]
Replace the hydraulic oil filter insert (return)				●	O[5]	●
Replace the cabin breather filter[6]					●	●
Replace the hydraulic oil reservoir breather filter					O[5]	●
Replace the V-belt[7] of the water pump and alternator						●
Flat belt[7] : reversing cooling fan (reversible fan)						●
Replace the flexible fuel lines[7]						●

1. Have maintenance and repairs only performed by an authorized service center (acknowledgment of warranty claims)
2. The maintenance work described here may only be performed by an authorized workshop
3. When working in an acidic environment, replace the filter every 300 operating hours
4. Every 2 years or after 1500 hours of operation.
5. Filters are not included in maintenance package "B," but are required as part of an oil change (order separately!).
6. Depending on work operation and dust conditions, it may be necessary to replace air cleaner more frequently
7. Replace every 3 years if the machine is not used very often.

Legend:

O Depends on running output

● Depends on inspection

Work description[1] (o/h = operating hours)	Service center[2]	User// operator		Service center[2]		
Functional check, inspection work (👁):	Delivery inspection	every 10 hours of operation (daily)	Every 20 o/h	Inspection "A"	Inspection "B"	Inspection 'C"
Service and parking brake:						
Checking for correct function	●	●		●	●	●
Check the brake pads on the service brake and parking brake and adjust or renew as required .[3]				●	●	●
Check and top off the brake fluid (**ATF**) if necessary[4]	●	●		●	●	●
Accelerator and brake/inching pedals: check them for dirt, clean them if necessary, apply spray oil to the joints	●	●		●	●	●
Steering system:						
Check the steering column adjustment	●	●		●	●	●
Checking the steering synchronization of the tires	●	●		●	●	●
Electrical system:						
Check the lighting and electrical system	●	●		●	●	●
Battery: check charge condition					●	●
Check the wiper/wash system	●	●		●	●	●
Check the drive interlock (option)	●			●	●	●
Work hydraulics:						
Control lever (joystick): check lock for road travel	●	●		●	●	●
Hydraulic oil: check the level	●	●		●	●	●
Check the hydraulic tank for condensation water[5]					●	●
Cleaning the line filter (Filter insert LS-line control unit				●		●
Check the pressure accumulator, correct the pressure level if necessary[6]					●	●
Check overload limitation, overload display (loader unit) for setting and function	●			●	●	●
Axles and gearboxes:						
Check the gearbox oil level	●				●	●
Front/rear axle differential: check the oil levels	●				●	●
Front/rear axle planetary drives (left/right): check the oil levels	●				●	●

Work description[1] (o/h = operating hours)	Service center[2]	User// operator		Service center[2]		
Functional check, inspection work (👁):	Delivery inspection	every 10 hours of operation (daily)	Every 20 o/h	Inspection "A"	Inspection "B"	Inspection 'C"
Diesel engine:						
Engine oil: check the level	●	●		●	●	●
Fuel prefilter: drain the water		●		●	●	●
Coolant: check the level, top off coolant if necessary[7]		●		●	●	●
Water-oil cooler (engine hydraulic oil): Check for contamination, clean if necessary[8]		●		●	●	●
Air filter: clean the dust valve [9]		●		●	●	●
Check V-belt[10] : generator, water pump for wear and pretension, replace if necessary	●	●			●	●
Check the flat belt[11]: reversing cooling fan (reversible fan), for wear and pretension, replace if necessary	●	●			●	●
V-belt (air-conditioning system option): check, re-tension if necessary	●	●		●	●	●
Drive system (variable displacement pump, variable displacement motor):						
Check the drive system according to the inspection protocol, adjust if necessary				●	●	●
Cabin/chassis:						
Check the operator's seat, safety belt for wear, function and fastening	●	●		●	●	●
Check the seat contact switch	●	●		●	●	●
Check the locks/door arrester. Clean them and apply grease or oil if necessary		●		●	●	●
Clean the air cleaner (cabin interior)[12]			●	●	●	●
Check the heater, ventilation (cabin)			●	●	●	●
Check warning and notice signs to determine whether they are damaged or missing[13]	●	●		●	●	●

Work description[1] (o/h = operating hours)	Service center[2]	User// operator		Service center[2]		
Functional check, inspection work (👁):	Delivery inspection	every 10 hours of operation (daily)	Every 20 o/h	Inspection "A"	Inspection "B"	Inspection 'C"
Loader unit/tires:						
Slide plates and wear plates on telescopic boom: check, readjust and replace them if necessary[14]	●	●		●	●	●
Quick coupler system: Check the correct locking	●	●		●	●	●
Tires: damage, inflation pressure, tread depth	●	●		●	●	●
Options:						
Air-conditioning system (optional)[15]: Check function, top off if necessary, clean the capacitor			●	●	●	●
Load stabilizer (option): check the function	●	●		●	●	●
Load stabilizer (option): check the function	●	●		●	●	●
Ball hitches/Auto hitch (option): check function, damage, wear	●	●		●	●	●
Aggressive media (option): check corrosion protection, renew it if necessary			●	●	●	●

1. Have maintenance and repairs only performed by an authorized service center (acknowledgment of warranty claims)
2. The maintenance work described here may only be performed by an authorized workshop
3. Safety part! Have maintenance and repairs performed only by an authorized service center.
4. Do not mix the brake fluid with other brake fluids for safety reasons. Use only ATF brake fluids. Have the brake fluid replaced every 2 years by an authorized service center.
5. When using biodegradable oil in particular, check for condensation water (oil probe), replace the hydraulic oil if necessary.
6. Have the pressure accumulators checked only by an authorized service center (acknowledgment of warranty claims).
7. Have the coolant replaced every 2 years by an authorized service center. Rinse the cooling system with clean water before refilling it.
8. Depending on work operation and dust conditions, it can be necessary to clean the radiator more frequently.
9. Replace the filter insert as indicated by the maintenance display, and more frequently in an acidic environment.
10. Replace the V-belts every 3 years if the machine is not used very often.
11. The flat belt cannot be re-tensioned (self-tensioning). If very stretched and/or worn, this must be immediately replaced by an authorized service center.
12. Clean more frequently and replace as required when used in applications with increased dust development. Replace every 500 hours of operation.
13. Missing warning and safety signs must be replaced with new ones.
14. Have wear pads below the minimum thickness replaced by an authorized service center – see *Checking and adjusting the sliding plates on page 7-31*.
15. Dehumidifier must be replaced by an authorized service center every 2 years or after maintenance and repair work on the refrigerating circuit (repair).

Work description[1] (o/h = operating hours)	Service center[2]	User// operator		Service center[2]		
Lubrication[3] ():	Delivery inspection	every 10 hours of operation (daily)	Every 20 o/h	Inspection "A"	Inspection "B"	Inspection 'C"
Hinges, joints, fittings (door arresters, for example)			●	●	●	●
Rear axle oscillating bearing	●		●	●	●	●
Front/rear axle planetary drive bearings (left and right)	●		●	●	●	●
Ball hitch – swivel joint (optional) / Hitch (optional)	●		●	●	●	●
Lubricating the loader unit						
Telescopic boom slide plates	●		●	●	●	●
Compensating ram bearing	●		●	●	●	●
Telescopic ram bearing (push-out ram)	●		●	●	●	●
Telescopic arm support	●		●	●	●	●
Tilt lever bearing, tilt rod bearing	●		●	●	●	●
Lift ram bearing	●		●	●	●	●
Tilt ram bearing	●		●	●	●	●
Quickhitch facility: bearing on boom	●		●	●	●	●

1. Have maintenance and repairs only performed by an authorized service center (acknowledgment of warranty claims).
2. The maintenance work described here may only be performed by an authorized workshop
3. Lubricate attachment according to manufacturer's instructions!

Work description[1] (o/h = operating hours)	**Service center**[2]	**User// operator**		**Service center**[2]		
Check screws and nuts or screwed connections for tightness on the following subassemblies/elements. Retighten if necessary	**Delivery inspection**	**every 10 hours of operation (daily)**	**Every 20 o/h**	**Inspection "A"**	**Inspection "B"**	**Inspection 'C"**
Fastening screws of engine and engine suspension	●			●	●	●
Fastening screws of steering system	●			●	●	●
Fastening screws of hydraulic system	●			●	●	●
Fastening screws of loader unit (pin locking), quickhitch facility lock	●			●	●	●
Axle mounting, axle suspension	●			●	●	●
Mounting screws of universal joint shafts	●			●	●	●
Cabin mounting screws	●			●	●	●
Wheel nuts	●			●	●	●
Trailer couplings (option)	●			●	●	●
Electrical system: chafe marks on wiring harness, battery terminals, ground and cable connections	●		●	●	●	●

1. Have maintenance and repairs only performed by an authorized service center (acknowledgment of warranty claims).
2. The maintenance work described here may only be performed by an authorized workshop

Work description[1] (o/h = operating hours)	Service center[2]	User// operator		Service center[2]		
Leakage check ( ):	Delivery inspection	every 10 hours of operation (daily)	Every 20 o/h	Inspection "A"	Inspection "B"	Inspection "C"
Air intake line[3] (air filter – engine)	●	●		●	●	●
Coolant flexible lines[4]	●	●		●	●	●
Engine lubrication (engine – filter)	●	●		●	●	●
Fuel lines[4]	●	●		●	●	●
Cooling system (engine – hydraulic oil)	●	●		●	●	●
Steering system[5] (hose pipes[6] and steering cylinder)	●	●		●	●	●
Hydraulic system/controller, hose burst valves[5], hose pipes[6], cylinder	●	●		●	●	●
All additional control circuit rapid action couplings, 3rd control circuit, auto hitch, tipper connection (option)	●	●		●	●	●
Brake system[5]: hose pipes[6], brake fluid reservoir	●	●		●	●	●
Hydraulic brake system (optional)[5]: Hose pipes[6], flat connector plug	●	●		●	●	●
Air-conditioning system (optional): hose pipes[6], capacitor	●	●		●	●	●

1. Have maintenance and repairs only performed by an authorized service center (acknowledgment of warranty claims).
2. The maintenance work described here may only be performed by an authorized workshop
3. Have an authorized service center replace air intake lines and coolant flexible lines with cracks and chafings immediately, or every 3000 o/h.
4. Have flexible fuel lines or coolant hose pipes (synthetic material) replaced by an authorized service center every 3000 hours of operation.
5. Safety part! Have maintenance and repairs performed only by an authorized service center.
6. Have hydraulic flexible hose pipes replaced by an authorized service center every 6 years (DIN 20066 T5)

Service indication

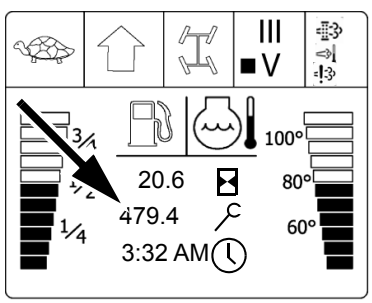


Fig. 364

The maintenance intervals are indicated by the service indication in the digital display.

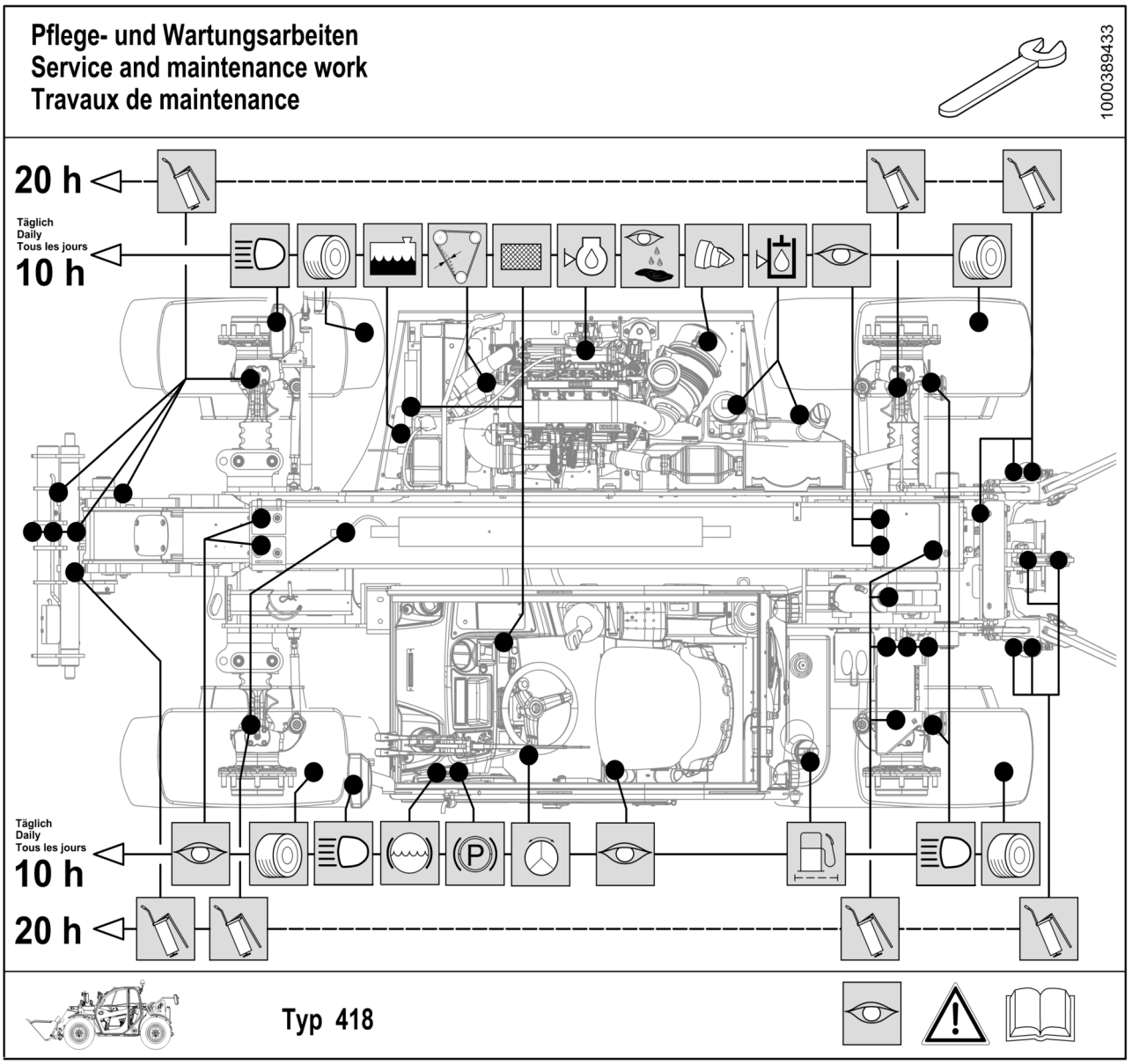
Description – see "Indicating instrument with digital display" on page 4-36.

Information

See the maintenance schedule for the maintenance intervals – see "Maintenance overview" on page 7-4.

Maintenance label

Affixed on front or side windows of the vehicle.



Information

Explanation of symbols on maintenance label: see next page.

Explanation of symbols on the maintenance label

Affixed to 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 synchronize 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!
	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 screw connections. Rectify if necessary!
	Visual check! Check wear parts and threaded fittings at regular intervals Retighten loose connections immediately and replace worn wear parts!
	Leakage check: Check the fuel/water separator. Drain water if necessary!
	Lubrication service! Lubricate the assemblies concerned!
	Check the coolant. Add coolant if necessary!
	Check the brake fluid. Add fluid if necessary!

7.3 Vehicle fluids and lubricants

Overview of lubricants

Component/ application	Capacities[1]	Fluid/lubricant[2]	SAE grade/specification/ manufacturer designation	Season/ temperature
Diesel engine	11.5 ltr. (3.0 gal)	Engine oil[3] with filter	EUROLUP CARGO LSP SUPER 10W/40	Year-round
			PLUS – 50 II 15W-30	-20°C (-4 °F) - +30°C (+86 °F)
			PLUS – 50 II 15W-40	-15°C (+5 °F) - +40°C(+104 °F)
Diesel engine cooling	Water 4.5 ltr. (1.19 gal) (55%) Antifreeze 3.5 ltr. (0.92 gal) (45%)	Antifreeze[4, 5, 6]	HAVOLINE XLC	Year-round -29°C (-20°F)
Gearbox	1.3 ltr. (0.34 gal)	Gearbox oil	SAE 85 W 90 / API CL5 SAE 90 LS (hypoid gear oil) EXTREME – GARD	Year-round
Front and rear axle differentials	each 6.0 ltr. (1.6 gal)		SAE 85 W 90 / API CL5 SAE 90 LS (hypoid gear oil) EXTREME – GARD LS 90	
Planetary drives left/right, front/rear axle	each 6.0 ltr. (1.6 gal)			
Fuel system, fuel tank	about 95 ltr. (25.1 gal)	Diesel fuel[7, 8]	DIN EN 590 (EU) ASTM D975-94 (USA)	Year-round -44 °C (-47 °F)
Braking system	0.5 ltr. (0.13 gal)	Brake fluid[9]	ATF Suffix A	Year-round
Hydraulic system, hydraulic oil reservoir	about 80 ltr.[10] (21.13 gal)	Hydraulic oil[11]	HVLPD 46 (HYD0530) HY – GARD Hydrau – Gard 46 Hydrau – Gard 46 Plus Hydrau – Gard 22 Arctic	Year-round
		Biodegradable oil[11]	AVIA Syntofluid 46	
			PANOLIN HLP Synth 46	
			BIO – HYDRAU – GARD 46	

Component/ application	Capacities[1]	Fluid/lubricant[2]	SAE grade/specification/ manufacturer designation	Season/ temperature
Grease nipples[12]	As required	Multi-purpose grease	Lithium-saponified brand-name grease MPG-A	Year-round
Pad tracks[13, 14], telescopic boom and inside of the telescopic boom tube	As required	Special grease	Optimoly paste TA or Fuchs STABYL TA	Year-round
Installation of pins, shafts[15]	As required	Special grease	Fuchs "gleitmo" 800	Year-round
Battery terminals	As required	Acid-proof grease	SP-B	Year-round
Washer system	Water 1.0 ltr. (0.26 gal) (45%) Antifreeze 2.0 ltr. (0.52 gal) (55%)	Antifreeze with cleansing agent[16]	Water + antifreeze	Year-round -20°C (4°F)
Aggressive media (opt)[17]	As required	Anti-corrosion protection	ELASKON 2000 ML, ELASKON UBS light ELASKON Aero 46 special, ELASKON Multi 80	Year-round
Air conditioning (option)[18]	950 g (2.09 lbs.)	Refrigerant	R 134a/DIN 9860	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: API CI-4.
4. Factory fill of antifreeze concentrate -60°C (-76°F). See *"Coolant" on page 9-15* and manufacturer indications on the packaging.
5. In order to avoid engine damage and possible loss of warranty, use only the released antifreeze
6. The antifreeze must be replaced every 2 years by an authorized service center
7. In order to avoid engine damage, use only the additives authorized by KOHLER
8. If fuels that do not comply with DIN EN or ASTM (USA) are used, warranty rights shall not apply in case of diesel engine damage
9. In order to avoid a failure of the braking system, do not mix this brake fluid (**ATF)** with other brake fluids
10. 130 ltr. (34.34 gal) in complete work hydraulics system
11. DIN 51 524 (ISO 6743/4)
12. Use special grease at temperatures below -15°C. Contact your sales partner for more information.
13. Lubricate the lower gliding surface of the extended telescopic boom and the gliding surface in the telescopic boom tube in the rear upper inside with a brush or roller – see *Lubricate the pad tracks on page 7-29*
14. **Caution!** If the telescopic boom is treated with the "smooth paint" finish, the pad tracks of the leveling jack as well as the inside of the telescopic boom tube may only be lubricated with the special grease "STABYL TA" – see *Post-treatment of the pad tracks with applied smooth paint (optional) on page 7-30*
15. Before assembly: lubricate the bolts, shafts and bearing with Fuchs "gleitmo" 800. After assembly: lubricate the shafts and bolts via zerk fittings.
16. See manufacturer's indications on the packaging and bear in mind the antifreeze compound table
17. Have the sealing checked and repaired at least once a year by ELASKON – see the ELASKON servicing pass supplied with the machine.
18. Maintenance on the air conditioning may only be performed by an authorized service center.

Diesel fuel specification

According to the legal exhaust-gas regulations, diesel engines equipped with exhaust-gas treatment systems must be operated with sulfur-free diesel fuel only.

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 equipment.

NOTICE

In order to avoid damage to the diesel engine and the exhaust-gas treatment system, use only those diesel fuels specified in the table!

- ► If other fuels are used, warranty rights shall not apply in case of damage (guarantee)!
- ► When adding additives to the diesel fuel, only use the ones authorized by the engine manufacturer.
- ► Operation with RME/PME fuel (biodiesel) or vegetable oils is prohibited!
- ► Please contact your dealer 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

Coolant

Only the listed coolant auxiliary substances listed on page *7-13 "Overview of lubricants"* may be used.

Environment

Dispose of throwaway containers according to national regulations.

Important notice on operation with biodegradable oils

- Use only the tested and approved biodegradable hydraulic fluids *– see "Vehicle fluids and lubricants" on page 7-13*. 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.
- Use only biodegradable oil of the same type for adding oil. 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!
  Mixing two different biodegradable oils can worsen the quality of one of the oil types. Therefore, ensure that 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.
- When running the machine with biodegradable oil, the same oil and filter replacement intervals are valid as for mineral oil – see maintenance plans in the appendix.
- The condensate in the hydraulic oil tank has to be drained by an authorized 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 authorized service center or by a dealer.

7.4 Maintenance accesses

Hood latch

CAUTION

Risk of injury 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.

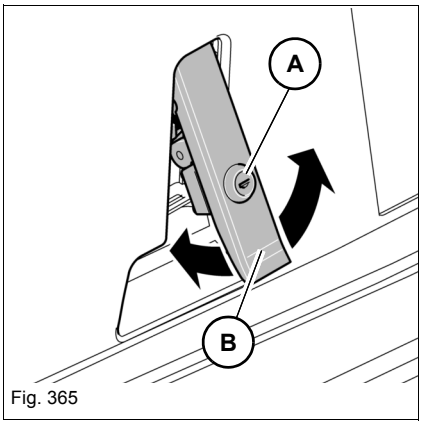


Fig. 365

Opening the engine cover

1. Stop the engine and remove the starting key.
2. Unlock the lock **A** with the starting key and at the same time pull the handle **B** up.
   ➥ The engine cover opens with the help of gas struts.
3. Remove the starting key.

Closing the engine cover:

1. Press the engine cover down firmly and press handle **B** toward the inside.
2. The engine cover is automatically locked and can only be opened again with the starting key.

Maintenance access on the vehicle

Remove/attach the maintenance cover

1. Stop the engine and remove the starting key.
2. Switch off the battery master switch (option)
3. Opening the engine cover
4. Remove screws **A**.
5. Remove the maintenance cover.
6. After maintenance: Install the removed maintenance cover again in the reverse chronological order.

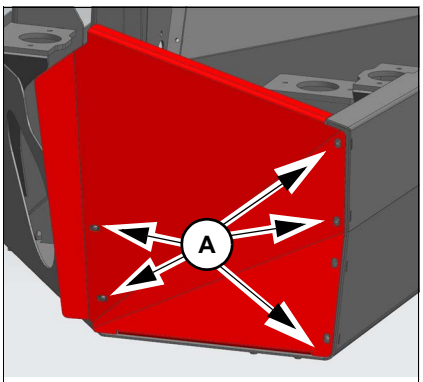


Fig. 366

Maintenance access (engine bay, rear)

Battery, line filter (control unit)

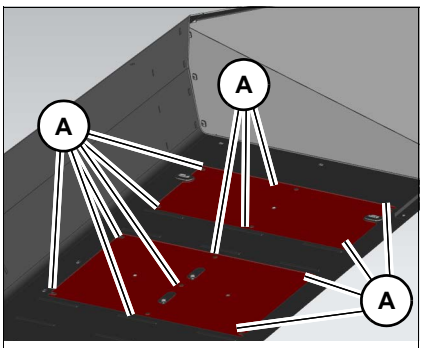


Fig. 367

Maintenance access (engine bay, bottom)

Drain motor oil, clean/replace fuel filter

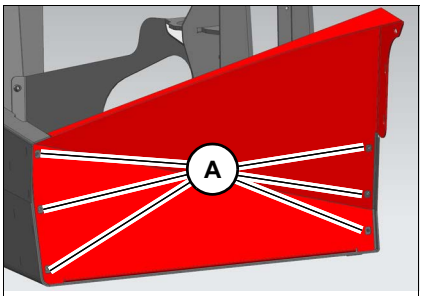


Fig. 368

Maintenance access (engine bay, front)

Clean the radiator

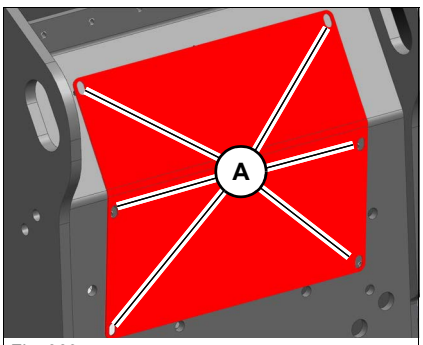


Fig. 369

Maintenance access (vehicle rear)

Check the sliding plates of the telescopic boom for wear and spray.

Access to the vehicle fuses

Fig. 370

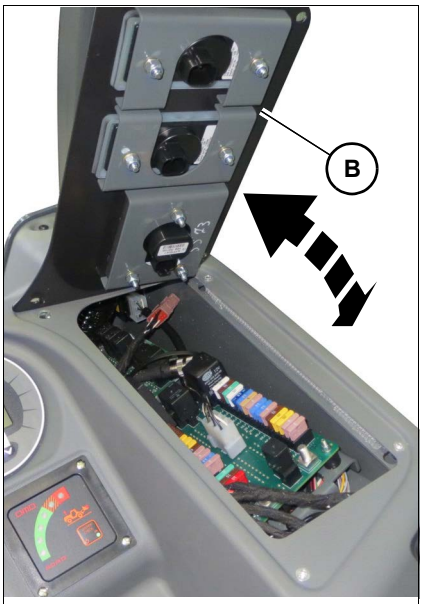


Fig. 371

NOTICE

Damage to the electrical system due to short circuit.

- ► Always disconnect the battery before performing work on the electrical system in which tools, spare parts, etc. can touch electrical components or contacts.
- ► Do not clean very sensitive electrical components with a high-pressure cleaner.

Opening/closing the switch console

1. Stop the engine and remove the starting key
2. Disable the electrical system with the main battery switch
3. Remove the screws **A** – *see "Relays, fuses on the printed circuit board" on page 7-66*
4. Remove the switch console **B**
   ➥ Access to the fuses and relay are clear
5. Close the switch console **B**
6. Attach the screws **A**
7. Activate the electrical system with the main battery switch

7.5 Cleaning and maintenance

Important notices on cleaning and maintenance work

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 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 sensitive electrical components (instrument panel, alternator, compact connectors, control levers, etc.) with a high-pressure cleaner.

Information

Machines with anticorrosion protection (“aggressive media”) must be cleaned separately!

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 any 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 jet.
- Cover the vent filter on the hydraulic oil reservoir and the filler caps for fuel, hydraulic oil, etc.
- Protect the following components from moisture:
  - Engine
  - Electrical components such as the alternator, oil pressure switches, wiring, electric/electronic components, etc.
  - Control devices and seals
  - Air intake filters, etc.

Cleaning with flammable anticorrosion agents and sprays

- 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.

► Damage seals and disable the controls!

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

Risk of injury! Dirty or malfunctioning automatic seat belts can affect and impair winding and the operator's safety!

Failure to observe this can cause injuries.

► Clean the seat belt with water and a mild soap solution.
Do not use chemical agents as they can destroy the fabric.

► Only wind the seat belt when it is dry!

► Have a malfunctioning belt immediately replaced by a qualified service center.

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 sensitive electrical components (instrument panel, alternator, compact connectors, control levers, etc.) with a high-pressure cleaner.

NOTICE

In order to avoid corrosion (paint finish, joints, threaded fittings, etc.), thoroughly clean the machine with water after operation on saline ground or roads and after driving the machine to a different site!

The following aids are recommended for cleaning:

- High-pressure cleaner
- Steam jet

Cleaning the engine and the engine compartment

CAUTION

Risk of injury 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

When cleaning the engine with a water or steam jet, humidity penetrating the electronics can cause them to fail and damage the engine!

- ► The engine must be cold.
- ► Do not point the water jet directly temperature and oil pressure switches, control devices may be exposed to direct jets of water.
- ► 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 screw connection

- All threaded fittings must be checked regularly, even if they are not listed in the maintenance plans.
- Retighten loose connections immediately. Refer to chapter “Technical data” for the tightening torques.

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/inching pedals for dirt, clean them if necessary, apply spray oil to the joints.

7.6 Lubrication work

Preparing lubrication

Information

Maintenance intervals – *see "Maintenance plan" on page 7-4*.
Lubricants – *see "Vehicle fluids and lubricants" on page 7-13*.

- Park the telehandler on level ground.
- Activate the parking brake and secure the vehicle additionally with wheel chocks.
- Only raise the loader unit until all grease zerks can be accessed without any risk.
- Stop the engine and remove the starting key.
- Switch off the battery master switch.

Lubricating the rear axle oscillation-type bearing

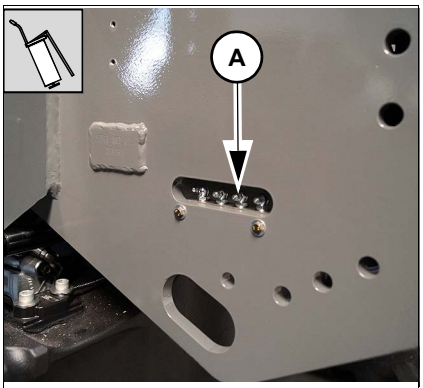


Fig. 372

Information

The machine has an oscillation-type rear axle.
The zerk fitting **A** (3rd from the front) is located on the rear left of the frame and is connected with the axle bearing by means of a hose pipe.

1. Removing the protection cap
2. Apply grease to grease nipple **A**.
3. Attach the protection cap

Lubricating the planetary drive bearing (front and rear axles)

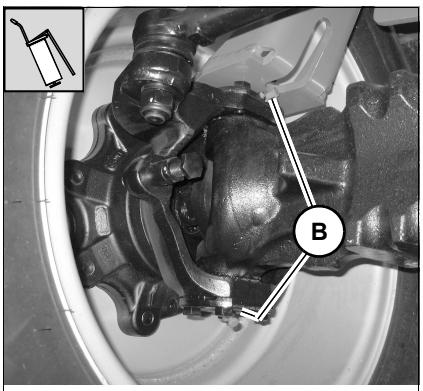


Fig. 373

1. Removing the protection cap
2. Lubricate grease nipple **B** (2 x) on each planetary drive bearing.
3. Attach the protection cap

Lubricate the driver doors and door arrester

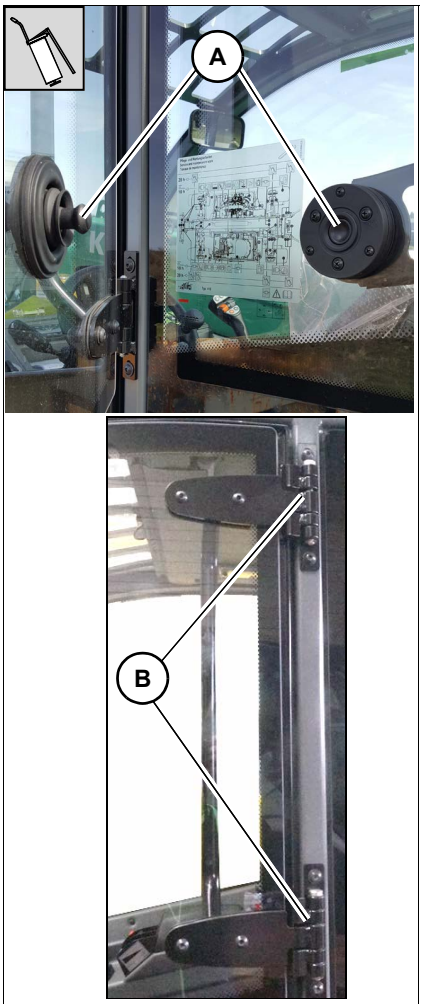


Fig. 374

Information

Maintenance intervals – *see "Maintenance plan" on page 7-4*.
Lubricants – *see "Vehicle fluids and lubricants" on page 7-13*.

- Lubricate door arrester **A**.
- Lightly lubricate the door hinge **B** with the oil can

Lubricate the telescopic arm

Overview of the loader unit lubrication points

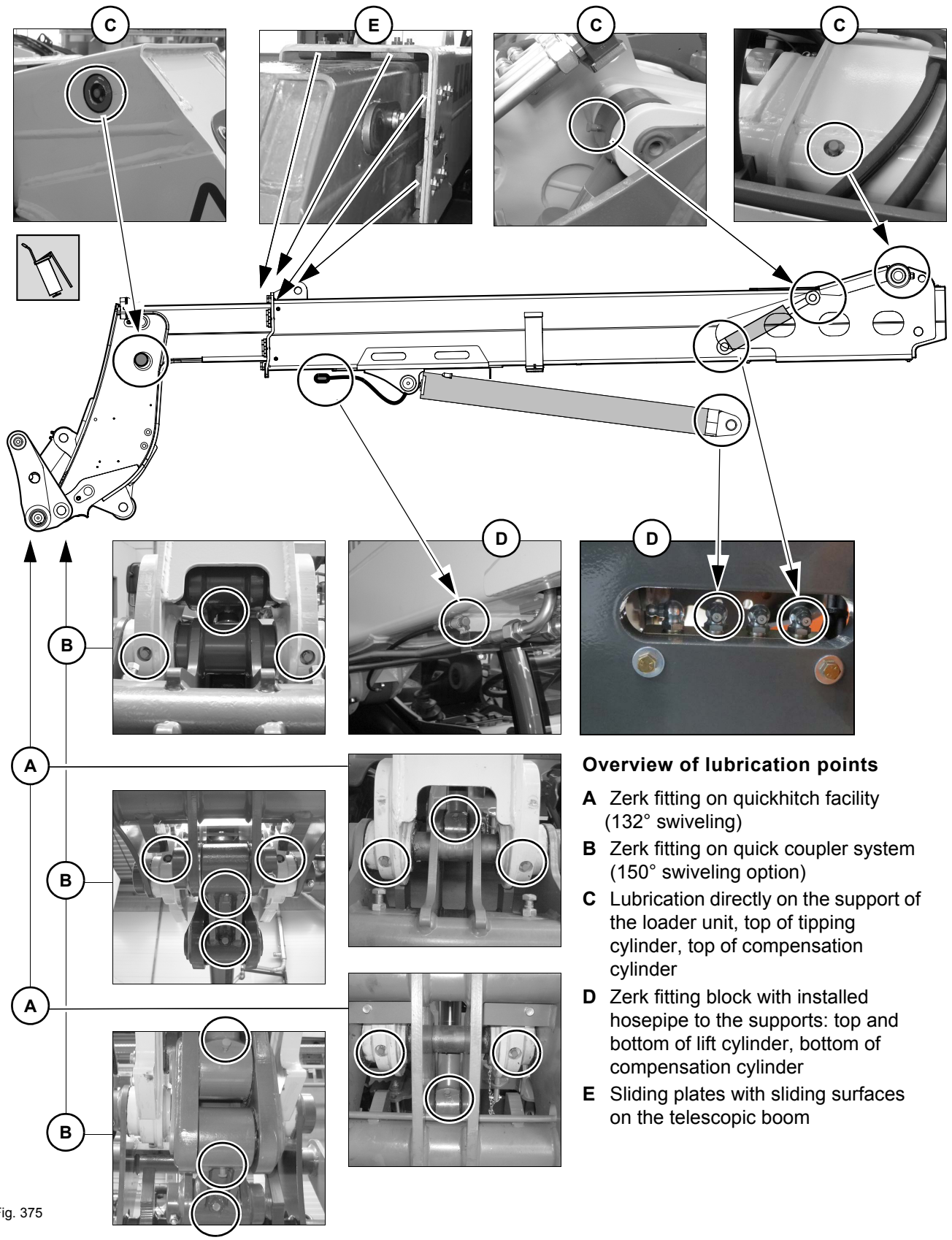


Fig. 375

Overview of lubrication points

- **A** Zerk fitting on quickhitch facility (132° swiveling)
- **B** Zerk fitting on quick coupler system (150° swiveling option)
- **C** Lubrication directly on the support of the loader unit, top of tipping cylinder, top of compensation cylinder
- **D** Zerk fitting block with installed hosepipe to the supports: top and bottom of lift cylinder, bottom of compensation cylinder
- **E** Sliding plates with sliding surfaces on the telescopic boom

Lubricate the telescopic boom as follows

Information

Maintenance intervals – *see "Maintenance plan" on page 7-4*.
Lubricants – *see "Vehicle fluids and lubricants" on page 7-13*.

1. Set the quickhitch facility 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 (manual hand brake).
5. Switch off the starter and remove the starting key.
6. Lubricate the lubrication points with a suitable tool.
7. Always lubricate the pad tracks regularly on the inside and outside telescopic boom sections with a suitable tool – *see "Lubricate the pad tracks" on page 7-29*.

Lubricate the pad tracks

NOTICE

Rust formation on the pad tracks leads to serious failures on the telescopic boom as well as the inner tube.

► After washing and drying the telescopic boom, the pad tracks must be lubricated with Optimoly paste TA or Fuchs STABYL TA.

NOTICE

With a horizontally placed loader unit with an extended telescopic boom, if the permissible load-bearing capacity (see load-bearing capacity field 5) can only be retracted jerkily or not at all, the pad tracks must be lubricated with Optimoly paste TA or Fuchs STABYL TA.

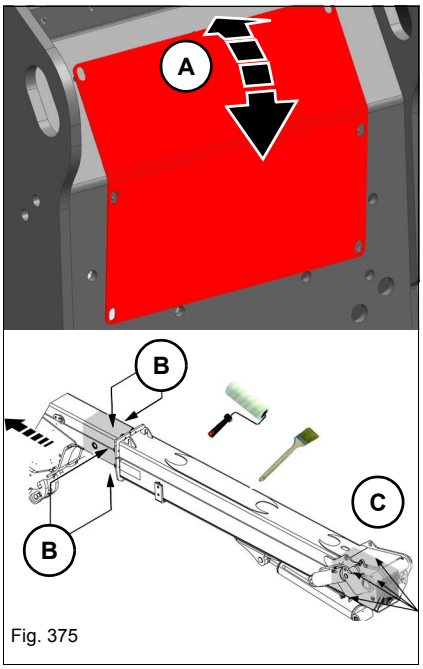


Fig. 375

Preparing the machine

1. Park the machine on level ground.
2. Apply the parking brake.
3. Raise the loader unit slightly so that the lubrication of the pad tracks can be performed without danger.
4. Extend the telescopic boom completely *– see chapter 5 " Telescopic boom operation" on page 5-40*
5. Stop the engine and remove the starting key.
6. Remove the cover **A** on the vehicle rear *– see "Maintenance access on the vehicle" on page 7-17*.l

Lubricate the pad tracks

1. With a brush or paint roller, lubricate the pad tracks **B** on the telescopic boom on the left side and right as well as top and bottom with Optimoly paste TA or Fuchs STABYL TA *– see "Overview of lubricants" on page 7-13*.
2. With a brush or paint roller, lubricate the pad tracks **C** of the telescopic boom tube on the **inside** left side, right as well as the top and bottom with Optimoly paste TA or Fuchs STABYL TA.
3. Retract and extend the telescopic boom several times.
4. Attach the cover **A** at the vehicle rear *– see "Maintenance access on the vehicle" on page 7-17*.

Post-treatment of the pad tracks with applied smooth paint (optional)

The pad tracks of the telescopic boom are treated with the "smooth paint" option.

In order to obtain an optimal mobility of the extension and retraction of the telescopic boom, the bottom side of the telescopic boom as well as the top inside of the telescope outer tube must be treated with special – *see "Overview of lubricants" on page 7-13* grease.

NOTICE

In order to avoid damage to the smooth surfaces from ridges and rust formation, the aftertreatment of the "smooth paint" is only to be carried out with a special grease **STABYL TA** .

► The aftertreatment must be carried out no later than **every 20 hours of operation** , but sooner if necessary.

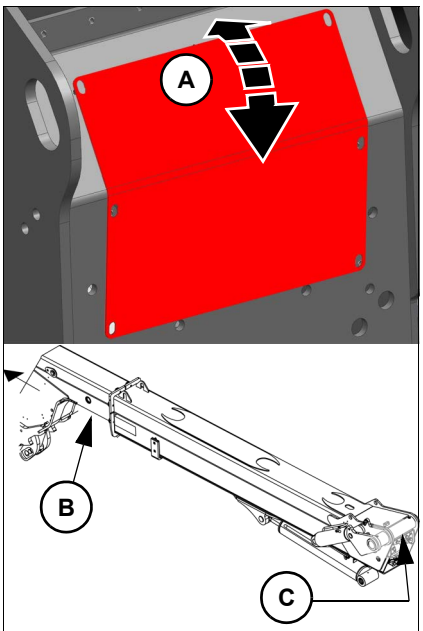


Fig. 376

Perform the post-treatment as follows:

1. Park the machine on level ground.
2. Apply the parking brake.
3. Raise the loader unit so that the curing can be performed without danger.
4. Extend the telescopic boom completely.
5. Stop the engine and remove the starting key.
6. Remove cover **A** at the vehicle rear.
7. Clean all smooth surfaces of the telescopic boom.
   - Do not use any high-pressure washers, but rather use water with soapsuds.
8. With a brush or paint roller, evenly lubricate the **lower pad track B** of the telescopic boom with special grease **STABYL TA**.
   - If there are signs of rust on the other pad tracks, lubricate these with the special grease as well.
9. With a brush or paint roller, evenly lubricate the **upper pad track** of the inside **C** of the telescopic boom tube with the special grease **STABYL TA**
10. Retract and extend the telescopic boom several times.
11. Attach cover **A** at the vehicle rear.

Checking and adjusting the sliding plates

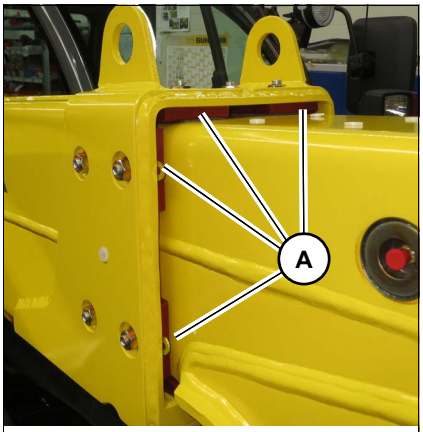


Fig. 377

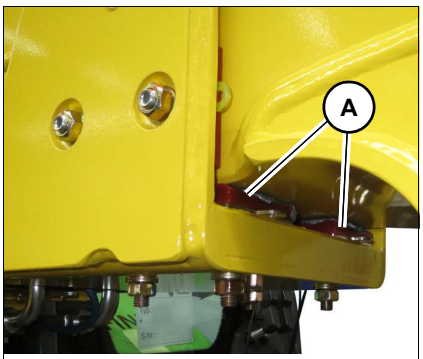
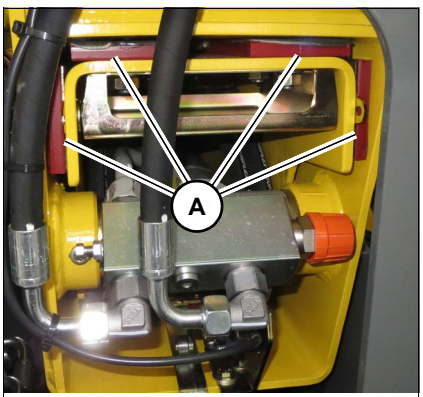


Fig. 378



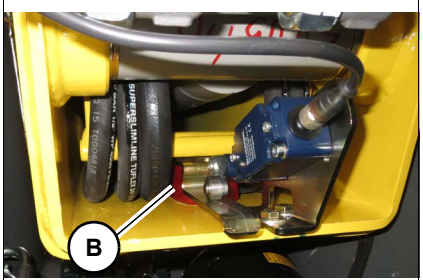


Fig. 379

The sliding plates are located between the inside and outside boom sections of the telescopic arm.

Information

Maintenance intervals – *see "Maintenance plan" on page 7-4*.

NOTICE

Check the wear limits of the sliding plates regularly!

Have the sliding plates readjusted with compensating panels if wear exceeds 1 mm (0.004 in).

Replace the wear pads if they are below the specified minimum thickness!

Have the sliding plates only readjusted or replaced by an authorized service center.

Caution! If the checking, adjusting and/or replacing of sliding plates is not performed, this may lead to severe damage (formation of furrows due to scoring) on the pad tracks, making a complete replacement of the telescopic boom necessary.

Pos.	Location	Slide plates in new condition	Slide plates minimum thickness
A	Front/rear top/side	13 mm (0.5 in)	**> 10.5 mm (0.55 in)**
B	Lower rear center	40 mm (1.57 in)	**> 35 mm (1.37 in)**

Information

Have the slide plates only readjusted or replaced by an authorized service center.

Lubricating with the central lubrication system (option)

Functional description of the central lubrication system

The central lubrication system allows you to lubricate all lubrication points of the telescopic loader in one single step.

Information

Maintenance intervals – *see "Maintenance plan" on page 7-4*.
Specifications and capacities – *see chapter 7 " Vehicle fluids and lubricants" on page 7-13*.

- When the ignition is switched on, the LED **B** illuminates for 1.5 seconds and shows the functional readiness of the control (switch-on check). It 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.

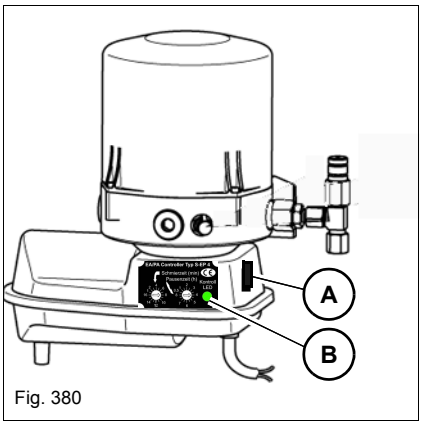


Fig. 380

Information

Pressing the push button **A** on the side of the pump starts intermediate lubrication at any time if the starter is switched on. This also serves as a functional check.
The pump then 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!

Lubricating with the central lubrication system (option)

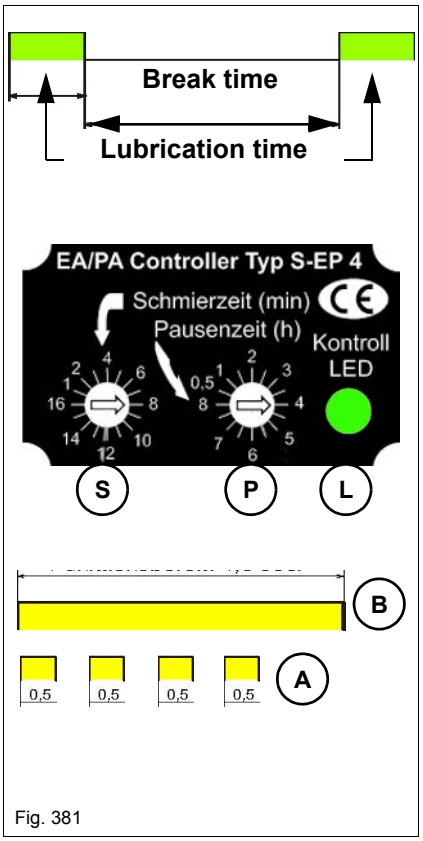


Fig. 381

Setting the lubrication and break times

Break times and lubrication times are set with the notched switches **S and P** in the 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 time (S)

- 1 to 16 min. (16 detents each 1 min.)
- 2 to 32 min. (16 detents each 2 min.)

Break time (P)

- 0.5 to 8 h (16 notches, 0.5 h each)

Yellow LED (L)

- **(B)** lubrication system in operation
- **(A)** lubrication in progress: 0.5 seconds LED ON/0.5 seconds LED OFF

NOTICE

Water can penetrate into the controls and cause lubrication system failure if the cover is not fitted and closed correctly!

Filling the central lubrication system (option)

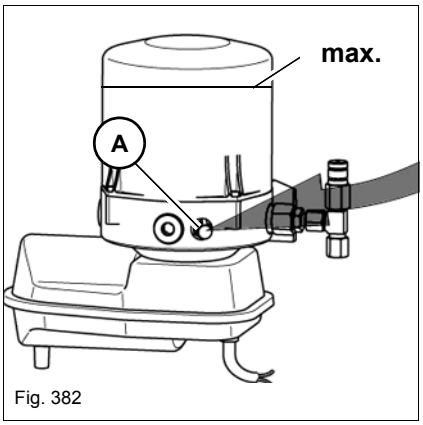


Fig. 382

The lubrication system is filled via conical grease nipple **A** or a fill coupling with a manual or pneumatic grease gun.

NOTICE

Damage to central lubrication system due to penetration of humidity to the controls.

► Always close the cover correctly, otherwise water can penetrate into the controls and destroy them.

NOTICE

Only fill up to the maximum level in order to ensure the ventilation of the central lubrication system.

Information

Maintenance intervals – *see "Maintenance plan" on page 7-4*.
Specifications and capacities – *see "Vehicle fluids and lubricants" on page 7-13*.

7.7 Fuel system

Important safety instructions for refueling

WARNING

Danger of burning from flammable of the diesel fuel vapors!

Failure to observe this can cause serious injury or death.

- ► Do not smoke, avoid fire and open flames.
- ► Immediately clean up spilled diesel fuel
- ► Gasoline mixtures are not permitted in the diesel fuel!

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 equipment.

NOTICE

Damage to the vehicle due to spilled diesel fuel.

- ► Use only clean and high-quality diesel fuel *– see "Diesel fuel specification" on page 7-15*.
- ► After working on the fuel system, clean the engine and the engine mountings of any adhering fuel.
- ► Use a fine filter to fill the tank.

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.

► Malfunctions in the fuel system and reduced effectiveness of the fuel filters.

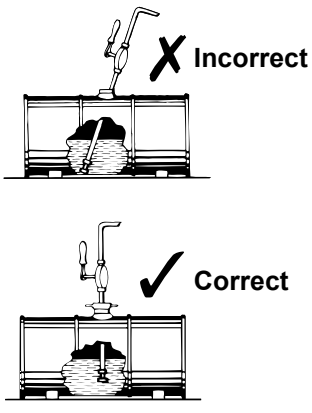


Fig. 383

If refueling from barrels cannot be avoided, note the following points:

- Barrels must neither be rolled nor tilted before refueling.
- 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 microfilmer.
- Keep all refueling containers clean at all times.

Refueling

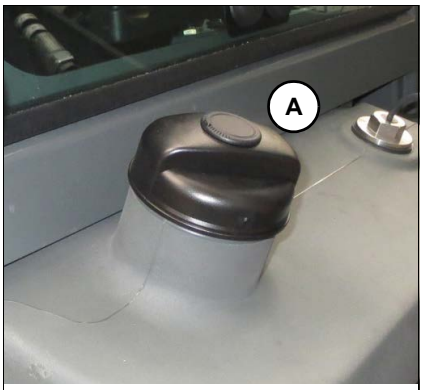


Fig. 384

Filler inlet **A** of the fuel tank is located on the left in travel direction, behind the cabin. (refer to the label affixed near the filler opening).

Refuel as follows:

1. Lower the loader unit to the ground.
2. Shut off the diesel engine and remove the starting key.
3. Clean the area around filler cap **A** before opening the filler cap.
4. Open the filler cap **A** and refuel the fuel tank via the filling screen.

Information

Specifications and capacities – *see "Vehicle fluids and lubricants" on page 7-13*.

Information

Fuel may be drained and the fuel tank may be cleaned only by an authorized service center!

Bleed the fuel system

Information

After the fuel tank has run empty or after maintenance work to the fuel system (e.g. filter change, cleaning the water separator, etc.) the fuel system is bled automatically via the electrical fuel delivery pump as soon as the diesel engine is started.

Fuel filter: drain the condensation water

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 main switch (option).
- ► Apply the parking brake.

Information

Maintenance intervals – *see "Maintenance plan" on page 7-4*.
Specifications and capacities – *see "Vehicle fluids and lubricants" on page 7-13*.

- ► Have the fuel filter changed only by an authorized service center according to the maintenance schedule.
- ► Drain the condensation water in the fuel pre-filter at the latest if indicator light **61** on the instrument panel illuminates.

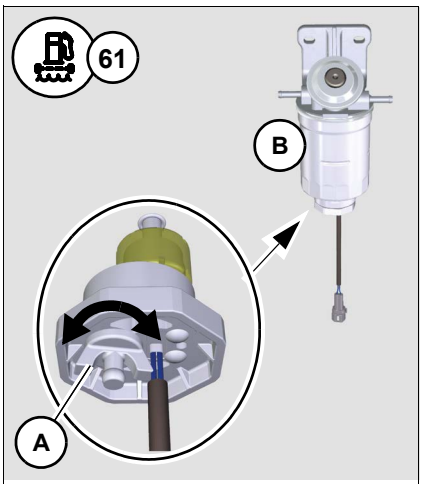


Fig. 385

Drain the condensation water as follows:

1. Lower the loader unit to the ground.
2. Shut off the diesel engine and remove the starting key.
3. Apply the parking brake.
4. Open the engine cover – *see "Opening the engine cover" on page 7-17*.
5. Remove the maintenance cover below the engine bay – *see "Maintenance access (engine bay, bottom)" on page 7-18*
6. Place a suitable container underneath to collect the oil.
7. Drain the condensation water. To do this, turn the drain cock**A** about one half-turn in the counter-clockwise direction.
8. Close the drain cock **A** as soon as the fuel starts to escape.
9. Start the diesel engine and check for leaks.
10. Attach the maintenance cover below the engine bay – *see "Maintenance access (engine bay, bottom)" on page 7-18*

Environment

Use a suitable container to collect the condensation water/fuel as it drains and dispose of it in an environmentally friendly manner!

7.8 Engine lubrication system

Important safety instructions regarding the engine lube oil system

Fig. 386

CAUTION

Risk of injury due to hot and moving engine parts!

Failure to observe this can cause injuries.

► 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!

Failure to observe this can cause injuries.

► Let the engine cool down.
► Wear protective equipment.

- Follow the safety instructions and country-specific regulations when handling lube oil!
- Dispose of drained lube 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

Risk of injury due to hot and moving engine parts!

Failure to observe this can cause injuries.

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

Information

Maintenance intervals – *see "Maintenance plan" on page 7-4*.
Specifications and capacities – *see "Vehicle fluids and lubricants" on page 7-13*.

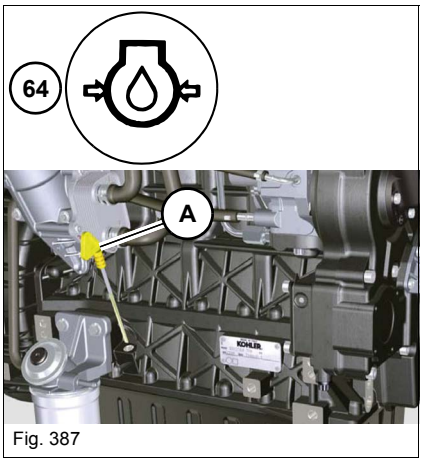


Fig. 387

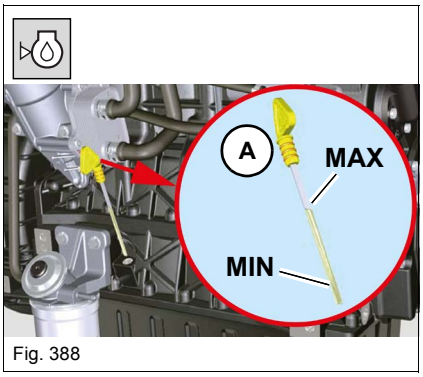


Fig. 388

The warning light **64** (with acoustic warning) on the indicating instrument monitors the engine oil pressure.

Checking the engine oil:

1. Park the machine on level ground and stop the engine.
2. Switch off the starter and remove the starting key.
3. Apply the parking brake.
4. Open the engine cover – *see "Opening the engine cover" on page 7-17*.
5. Pull out oil 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.
   - ➥ **MIN.**mark
   - ➥ **MAX.**mark
8. Top off the oil if the oil level is at the **MIN** mark – *see "Top off the engine oil" on page 7-41*.

Information

If the engine oil level is too low or if an oil change is overdue (black engine oil), **this can cause engine damage or loss of output!**

- ► Have the oil changed by an authorized service center.

Top off the engine oil

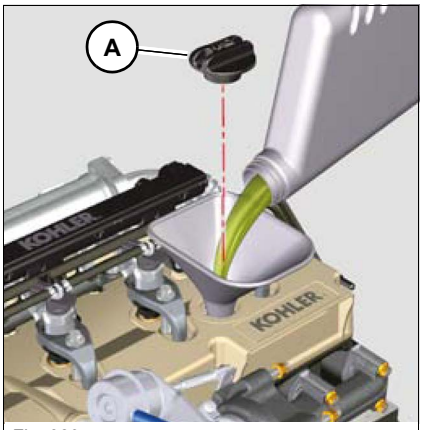


Fig. 389

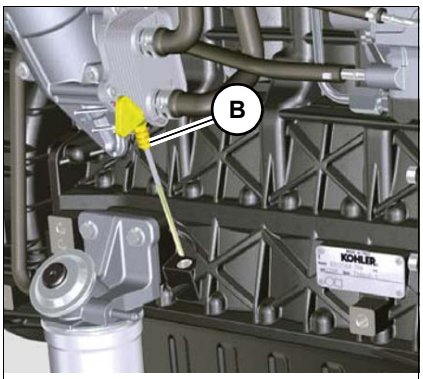


Fig. 390

NOTICE

Engine damage due to wrong motor oil level and/or wrong motor 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.
- ► Specifications and capacities *– see chapter 7 " Vehicle fluids and lubricants" on page 7-13*.
- ► Maintenance intervals *– see "Maintenance plan" on page 7-4*.

Environment

Use a suitable container to collect the engine oil as it drains and dispose of it in an environmentally friendly manner!

Adding engine oil:

1. Clean the area around sealing push-in cap **A** with a lint-free cloth and open the sealing push-in cap.
2. Pull out oil dipstick **B** and wipe it with a lint-free cloth.
3. Add engine oil.
4. Wait a moment until all the oil has run into the oil sump.
5. Check the oil level with oil dipstick **B**.
6. Add oil if necessary and check the oil level again *– see "Checking the engine oil level" on page 7-40*.
7. Close filler cap **A**.
8. Completely remove all oil spills from the engine.

Information

If the engine oil level is too low or if an oil change is overdue (black engine oil), **this can cause engine damage or loss of output!**

- ► Have the oil changed by an authorized service center.

7.9 Cooling system

Safety instructions regarding the cooling system

Fig. 391

The combined water, oil and charge air cooler is located in the engine compartment. It cools the diesel engine coolant, the hydraulic oil of the drive and operating hydraulics and the charge air.

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 equipment.

CAUTION

Caustic injury hazard! Risk of swallowing antifreeze when handling it!

Failure to observe this can cause serious injury or death

- ► Seek medical attention immediately if antifreeze has been swallowed.
- ► Keep antifreeze out of reach of children.

NOTICE

In order to avoid damage to the engine and the cooling system, have the coolant changed only performed by an authorized service center!

Information on inspection and cleaning work on the cooling system

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 must be replaced frequently, have the cooling system checked for leaks by an authorized service center!
- Never add cold water/coolant if the engine is warm!
- After filling the radiator, make a test run with the engine and check the coolant level again after stopping the engine.
- Add enough antifreeze to the coolant
- Use brand-name antifreeze agents since they already contain anticorrosion agents.

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.

NOTICE

In order to ensure the radiator's cooling capacity, do not damage the radiator fins as you clean them with a compressed-air gun!

► When blowing clear, ensure that excessively high air pressure does not occur.

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

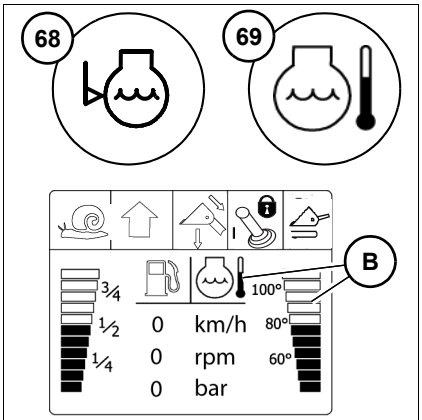


Fig. 392

The warning light **68** (with acoustic warning) on the indicating instrument monitors the coolant level in the compensation tank of the radiator.

➥ If the coolant level drops below minimum, indicator light **68** illuminates and a warning sounds.

The control lamp **69** and temperature display **B** with acoustic sound in the digital display monitor the coolant temperature.

➥ If the coolant temperature rises above 110°C (230°F), the warning light **69** illuminates and a warning sounds.

NOTICE

The coolant temperature should be between 80 and 105°C (221°F) (the maximum permissible cooling temperature is 110°C (230°F), see arrow).

► If the acoustic warning sounds (115°C (239°F)),

► let the engine run briefly at idling speed until the temperature drops back to 110°C (230°F) (acoustic warning no longer sounds),

► Stop the engine and check the coolant level.

► Check the cooling system and the heater for leaks (visual check).

► Clean the radiator fins.

Information

Maintenance intervals – *see "Maintenance plan" on page 7-4*.
Specifications and capacities – *see chapter 7 " Vehicle fluids and lubricants" on page 7-13*.

Check before starting the engine.
Check the antifreeze at temperatures below 4°C (39.2°F).

Fig. 393

Checking the coolant level:

1. Park the machine on level ground.
2. Lower the telescopic boom fully.
3. Apply the parking brake.
4. Stop the engine
5. Switch off the starter and remove the starting key.
6. Open the engine cover – *see "Opening the engine cover" on page 7-17*.
7. Check the coolant level at the sight glass **A**.
   ➥ If the coolant level is below the sight glass **A** top off the coolant up to the middle of the sight glass **A** – *see "Adding coolant" on page 7-45*

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.
- ► Let the engine cool down.
- ► Wear protective equipment.

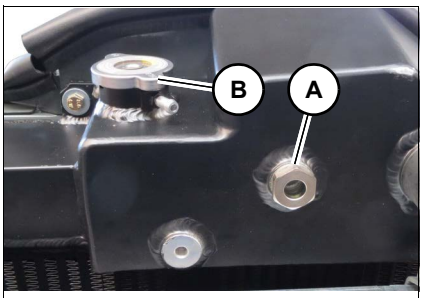


Fig. 394

Preparations

1. Park the machine on level ground.
2. Lower the telescopic boom fully.
3. Apply the parking brake.
4. Switch off the starter and remove the starting key.
5. Allow the engine/cooling system to cool down.

Adding coolant

1. Release the overpressure in the radiator. To do this: carefully unscrew filler cap **B** and release the pressure.
2. Open filler cap **B** fully.
3. Top off the coolant to the **middle of the sight glass A**.
4. Only use authorized coolants *– see chapter 7 " Vehicle fluids and lubricants" on page 7-13*.
5. Close filler cap **B**.

Leakage check

6. Start the diesel engine and let the engine run warm.
7. To do this, set the temperature controller of the heater to **MAX.** temperature.
   ➥ *– see chapter 5 " Heating and ventilation" on page 5-34*.
8. After reaching the full temperature, shut off the engine and pull out the key.
9. Check the cooling system and the heater for leaks (visual check).
   ➥ Have leaks immediately repaired by a qualified service center.
10. If necessary, add coolant and repeat the procedure until the coolant level remains constant.

Cleaning the radiator

CAUTION

Burn hazard during maintenance on a hot engine and radiator!

Failure to observe this can cause serious injury.

- ► Wear protective gloves and eye protection.
- ► Let the radiator cool down at least 10 minutes after stopping the diesel engine.

Information

Maintenance intervals – *see "Maintenance plan" on page 7-4*.

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.

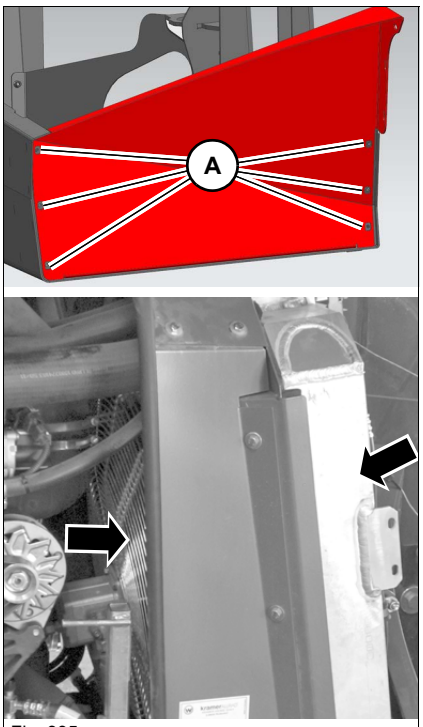


Fig. 395

Cleaning the radiator:

1. Park the telehandler on level ground.
2. Lower the telescopic boom fully.
3. Apply the parking brake.
4. Stop the engine and let it cool down.
5. Switch off the starter and remove the starting key.
6. Open the engine cover – *see "Opening the engine cover" on page 7-17*.
7. Remove the front maintenance cover **A** on the engine bay.
8. Clean the radiator fins by blowing compressed air from either side of the radiator.
9. Remove dirt in the intake area of the radiator.

NOTICE

In order to ensure the radiator's cooling capacity, do not damage the radiator fins as you clean them with a compressed-air gun!

10. Attach the front maintenance cover **A** on the engine bay.

Cleaning the radiator with the reversing fan (option)

Important safety instructions

The telehandler can be equipped with a reversing fan (option).

Pressing push button **91** (on the right on the control panel) reverses the fan's direction of rotation and cleans the radiator of dirt accumulation.

CAUTION

Respiratory irritation from dusty air!

Ignoring this can cause injury to the respiratory tracts.

- ► Do not perform the radiator cleaning with the reversing fan in enclosed areas.
- ► Ensure that nobody is in the area of the vehicle.

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.

Information

The blowing clear of the radiator can take place at a reasonable speed (1000–1200 rpm) of the diesel engine and during the work operation!

The radiator cleaning may not be done while driving on public roads.

Operation of the reversing fan – *see "Cleaning with the reversing fan" on page 7-48*

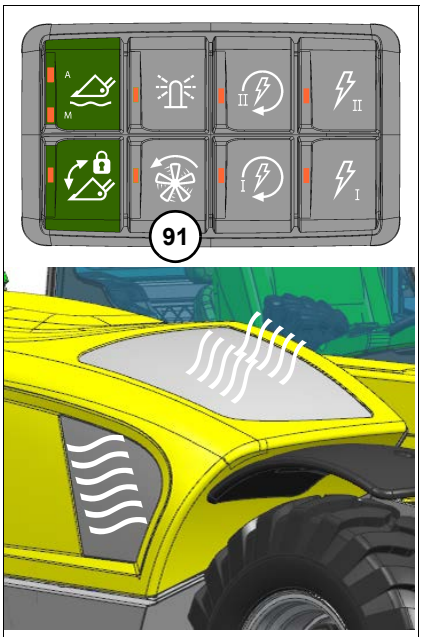


Fig. 396

Cleaning with the reversing fan

1. Place the machine on level ground
2. Lower the loader unit to the ground.
3. Apply the parking brake
4. Briefly press the touch button **91** with the engine running
5. Bring the speed of the diesel engine to about 1000–1200 rpm
   - ➥ 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 cover.
6. The fan automatically switches back to normal cooling mode after about 1 minute.
   - ➥ The cleaning is completed in reverse operation.

Information

When working in especially dusty environment, clean the radiator repeatedly and more frequently!

7.10 Air filter

Important information on cleaning the air filter

NOTICE

In order to avoid damage to the engine due to dirty intake air, bear in mind the following:

- ► Replace the air-filter elements as soon as this is displayed by the dirt indicator or the indicator light illuminates.
- ► Do not clean air-filter elements, replace them completely.
- ► Never reuse damaged air-filter elements.
- ► Do not clean the air-filter elements with compressed air or a brush.
- ► Ensure cleanliness in the entire filter area when replacing the air-filter elements!
- ► Do not operate the engine without the air-filter elements.

NOTICE

Filter elements are prematurely damaged during prolonged use in acidic air and must therefore be replaced frequently.

- ► This risk is present, for example, in acid production facilities, steel and aluminum mills, chemical plants and other nonferrous-metal plants.
- ► Maintenance intervals – *see "Maintenance plan" on page 7-4*.

Replacing the filter cartridge

NOTICE

In order to avoid damage to the engine due to dirty intake air, bear in mind the following:

- ► Do not clean the air-filter elements with compressed air or a brush.
- ► Replace the air-filter elements when the indicator light illuminates.
- ► Never reuse damaged air-filter elements.
- ► Ensure cleanliness in the entire filter area when replacing the air-filter elements!
- ► Do not operate the engine without the air-filter elements.

Replacing the filter cartridge and safety cartridge:

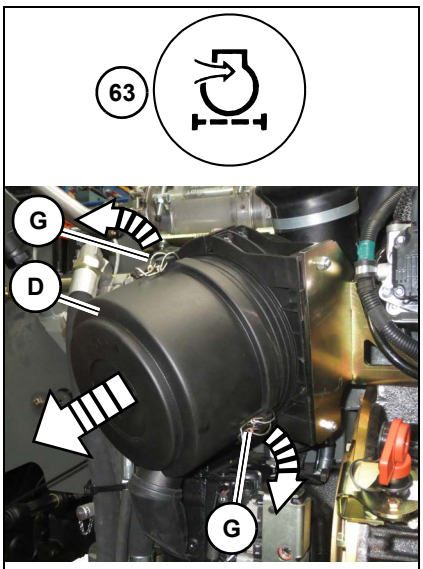


Fig. 397

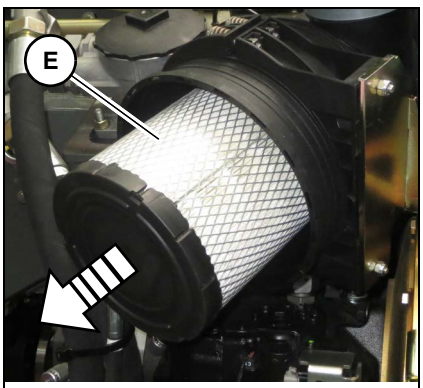


Fig. 398

Information

Maintenance intervals – *see "Maintenance plan" on page 7-4*.

There is a warning light **63** in the display instrument to monitor the filter element **E**. If this illuminates, immediately replace the air filter cartridge.

1. Stop the engine
2. Apply the parking brake.
3. Switch off the starter and remove the starting key.
4. Open the engine cover.
5. Pull lock **G** outward on housing cover **D**.
6. Remove housing cover **D**.

7. Carefully remove filter cartridge **E** with slightly turning movements.

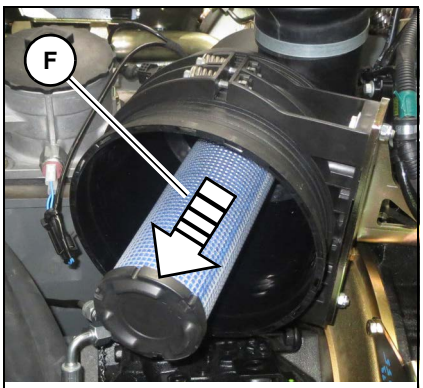


Fig. 399

8. In addition, every 3rd time the filter is replaced, carefully remove the safety cartridge **F** with slightly turning movements.

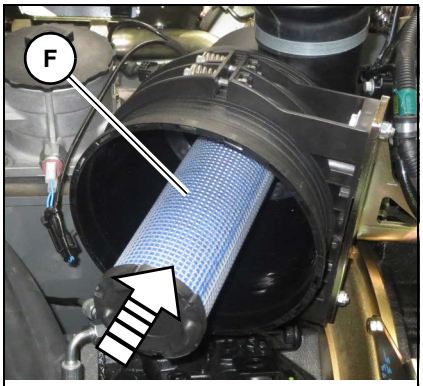


Fig. 400

9. Ensure that all the dirt (dust) inside the filter housing and the housing cover has been removed.
10. Insert a new safety cartridge **F** into the filter housing.

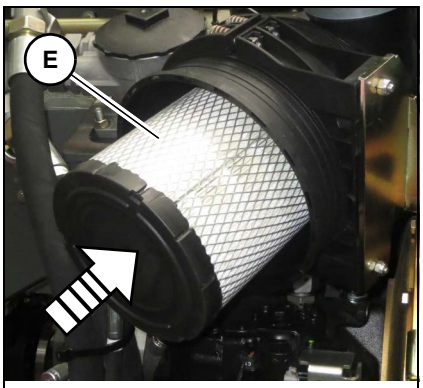


Fig. 401

11. Insert a new filter cartridge **E** into the filter housing.

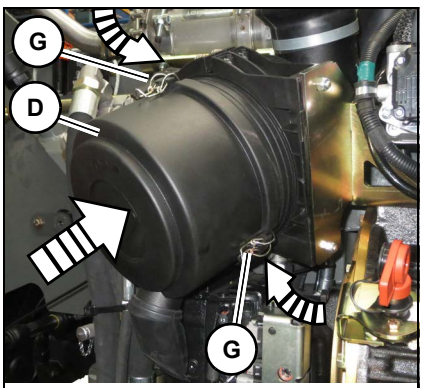


Fig. 402

12. Position the housing cover **D** (ensure that it is properly seated) and close lock **G**.

7.11 V-belt/toothed belt

Check the flat belt

CAUTION

Injury hazard due to rotating parts!

Rotating parts can cause serious injury.

- ► Stop the engine before opening the engine cover.
- ► Only check or retension 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 a qualified service center.
- ► Have the V-belt replaced by an authorized service center every 1500 hours of operation, but every 3 years at the latest.
- ► Maintenance intervals – *see "Maintenance plan" on page 7-4*.

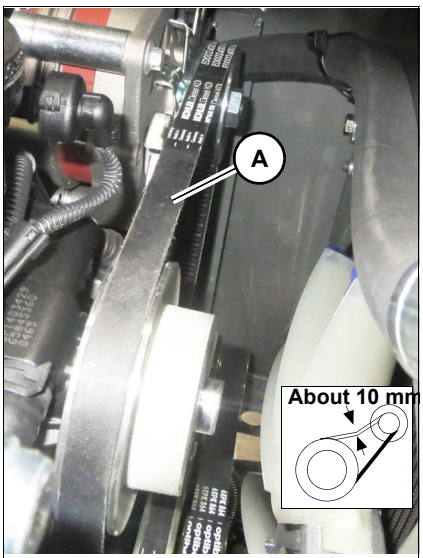


Fig. 403

Checking the V-belt (alternator/water pump):

1. Stop the engine
2. Apply the parking brake.
3. Switch off the starter and remove the starting key.
4. Open the engine cover.
5. Carefully inspect the V-belt for damage.
6. Press with your thumb to check whether the V-belt can be deflected between the pulleys by no more than **about 10 mm** (0.4 in).

Information

Only an authorized service center may re-tension the V-belt!

Check the flat belt (reversing fan, optional)

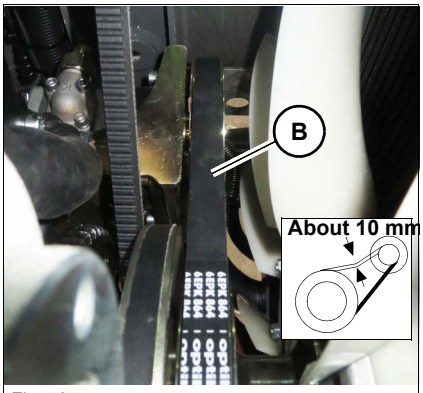


Fig. 404

NOTICE

The flat belt **B** is a self-tensioning belt and cannot be re-tensioned.

- ► Cracked and greatly stretched flat belts must be replaced by an authorized service center.
- ► Have the V-belt replaced by an authorized service center every 1500 hours of operation, but every 3 years at the latest.
- ► Observe the maintenance intervals – *see "Maintenance plan" on page 7-4*.

1. Stop the engine
2. Apply the parking brake.
3. Switch off the starter and remove the starting key.
4. Open the engine cover.
5. Carefully inspect V-belt **B** for damage.
6. Press with your thumb to check whether the flat belt **B** can be deflected between the pulleys by no more than **about 10 mm** (0.4 in).

7.12 Hydraulic system

Important information on the hydraulic system

Fig. 405

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.

- Release the pressure in all lines carrying hydraulic oil prior to any maintenance and repair work. To do this:
  - Lower all hydraulically controlled attachments to the ground, stop the engine and switch off the ignition.
  - Use the parking brake to park the machine safely and to prevent it rolling away.
  - After stopping the diesel engine, move all control levers of the hydraulic control valves several times to release the pressure.
  - Secure the lift ram of the raised telescopic boom with a prop to prevent unintentional lowering.
  - Wear protective clothes during maintenance.

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.

► Always add hydraulic oil before the level gets too low.

► 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 replaced by an authorized service center only.

Monitoring the hydraulic oil filter

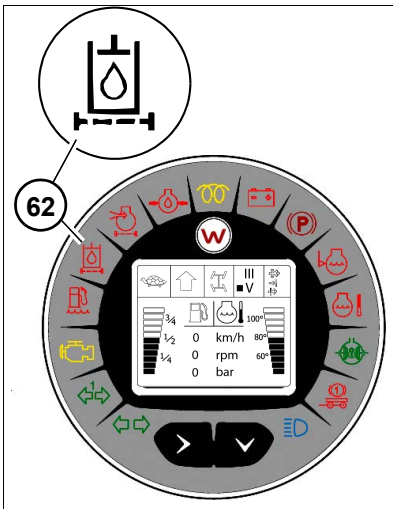


Fig. 406

The control lamp**62** on the indicating instrument monitors the dirt accumulation of the return filter.

NOTICE

Indicator light **62** on the indicating instrument illuminates if the resistance of the oil flow in the return filter is too high!

- ► The filter element is dirty and must be replaced.
- ► The filter element and the hydraulic oil may be replaced by an authorized service center only!

Information

In cold weather indicator light **62** can illuminate immediately when the engine is started. This is caused by increased oil viscosity. In this case regulate the engine speed so that indicator light **62** does not illuminate. Bear in mind the instructions concerning warmup *– see "Running-in period" on page 4-51*.

Hydraulic oil temperature monitoring

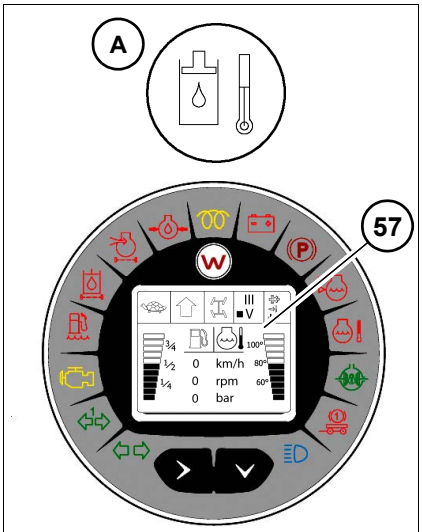


Fig. 407

The monitoring of the hydraulic oil temperature is located in the digital display **57.**

NOTICE

If the hydraulic oil temperature is too high, the symbol **57A** appears in the digital display!

- ► Check the hydraulic oil level and fill up missing oil *– see "Top off hydraulic oil" on page 7-57*.
- ► The filter element or the hydraulic oil is dirty and must be replaced by an authorized service center.
- ► The hydraulic oil cooler is dirty and must be cleaned *– see "Cleaning the radiator" on page 7-46*

Check the hydraulic oil level

The oil level glass is visible in the hydraulic oil tank (right of vehicle) outside the engine hood.

NOTICE

Damage to hydraulic system due to incorrect hydraulic oil level.

- ► The hydraulic oil level must never be higher or below the oil level sight glass.
- ► Any excess quantity of hydraulic oil in the tank escapes via the breather as soon as the temperature rises!

Information

Observe the maintenance intervals – *see "Maintenance plan" on page 7-4*.
Specifications and capacities – *see "Vehicle fluids and lubricants" on page 7-13*.

Fig. 408

Checking the hydraulic oil level:

1. Park the machine on level ground.
2. Retract all hydraulic cylinders.
3. Apply the parking brake.
4. Stop the engine and remove the key.
5. Clean the oil level glass **A**.
6. Check the oil level.
   - ➥ If the oil level is visible in the middle 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: **to little oil** immediately top off the hydraulic oil – *see "Top off hydraulic oil" on page 7-57*.

Top off hydraulic oil

NOTICE

Damage to hydraulic system due to incorrect or dirty hydraulic oil.

- ► If the oil is cloudy this means that either water or air has entered the system; this can damage the hydraulic oil pump. Contact an authorized service center to have the error rectified. Do not use the machine unless the problem has been rectified.
- ► Do not add hydraulic oil unless the diesel engine is stopped.
- ► Take care to avoid dirt when working.
- ► 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.

Information

Maintenance intervals *– see "Maintenance plan" on page 7-4*.
Specifications and capacities *– see chapter 7 " Vehicle fluids and lubricants" on page 7-13*.

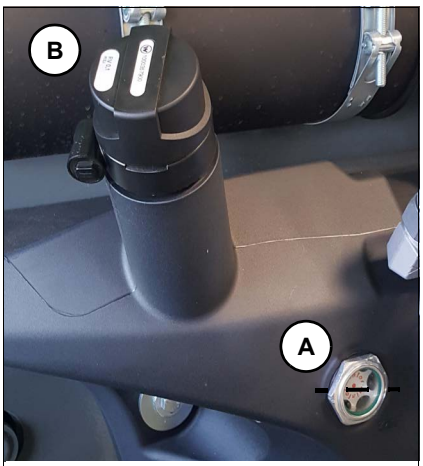


Fig. 409

Adding hydraulic oil:

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 the area around the filler and breather filter **B**.
6. Place a container under the hydraulic oil reservoir to collect the oil.
7. Unlock the breather filter **B** with a wrench and unscrew *– see chapter 7 " Opening and closing the hydraulic oil tank cover" on page 7-58*
8. Add hydraulic oil with the filter insert in place.
9. Check the hydraulic oil level in sight glass **A**.
10. Add if necessary and check again.
11. Screw on the breather filter **B** by hand and close with the wrench *– see chapter 7 " Opening and closing the hydraulic oil tank cover" on page 7-58*

Information

Excess hydraulic oil is released via the breather filter during loader unit operation.

- ► Drain the oil in a suitable container until the oil level is visible in the oil level sight glass.

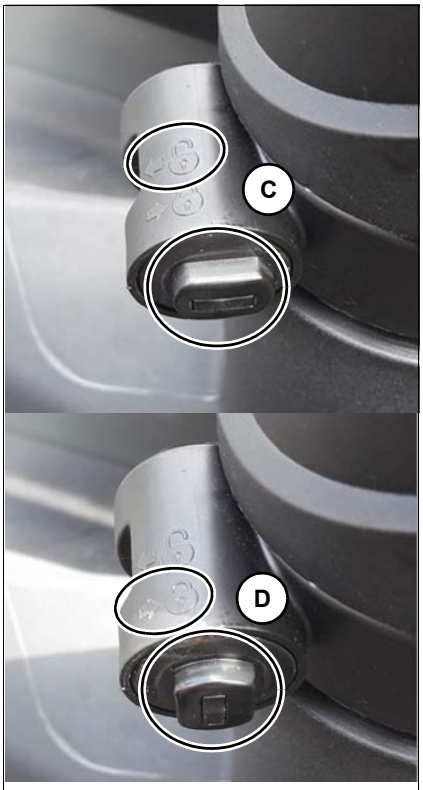


Fig. 410

Opening and closing the hydraulic oil tank cover

The closed cover of the hydraulic oil tank can be continuously rotated.

Operation	Function
Rotate the lock to position **C**.	➥ Lock is open.
Rotate the lock to position **D**.	➥ Lock is closed.

Opening:

1. Insert the starting key.
2. Turn the starting key slightly to the left until resistance is felt.
3. Turn the cover to the left until the starting key is turned into position **C**.
   ➥ The cover is unlocked.
4. Remove the starting key.
5. Unscrew the cover.

Closing:

1. Turn the cover to the right until it is firmly closed.
2. Insert the starting key.
3. Turn the starting key to the right into position **D**.
   ➥ The cover is locked.
4. Remove the starting key.

Hydraulic System – Checking pressure lines for leaks

Important safety instructions regarding pressure line checks

WARNING

Burn and injury hazard due to hot hydraulic oil escaping 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 emergency medical treatment.
- ► Seek immediate medical attention if oil penetrates the skin. Oil can cause serious infections.
- ► Never weld or solder defective or leaky pressure hoses.
- ► Re-tighten leaking screw connections and hose connections only when the hydraulic system is not under pressure. In other words, release the pressure before working on pressurized lines.
- ► Do not check for leaks with an open flame due to explosive fire risk from vaporized oil mist.

Information

Maintenance intervals *– see "Maintenance plan" on page 7-4*.

Hydraulic system – checking membrane accumulators

Important safety instructions for checking the membrane accumulators

WARNING

Risk of suffocation through uncontrolled release of large quantities of gas and risk of injury due to entrained components.

Failure to observe this can cause serious injury or death.

- ► Immediately put machine out of operation in case of leaking or damaged membrane accumulators.
- ► Never search for leaks with your bare hands.
- ► Have the membrane accumulator checked only by an authorized service center in accordance with the maintenance plan intervals.
- ► Never weld or solder defective or leaky membrane accumulators.
- ► Damaged membrane accumulators cannot be repaired and must be replaced by an authorized service center.

WARNING

Danger of explosions by filling the membrane accumulator with non-permitted gas!

Failure to observe this can cause serious injury or death.

- ► Have work on the membrane accumulator performed only by an authorized service center.

Information

Maintenance intervals – *see "Maintenance plan" on page 7-4*.

Checking the condition and age of hydraulic hoses

Important information for the owner of the machine:

The entrepreneur/owner of the machine must ensure that hose pipes are replaced in appropriate intervals, even if no safety-relevant malfunctions can been detected on the hose pipe.

Have flexible lines inspected by an expert (competent person) before the first commissioning, and then at least once a year for safe working condition.

Information

Observe the maintenance intervals – *see "Maintenance plan" on page 7-4*.

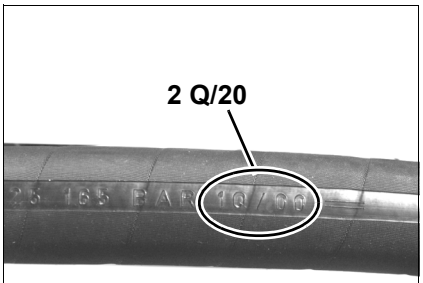


Fig. 411

- Leakages and damaged pressure lines must be immediately repaired or replaced by an authorized service center or after-sales personnel. This not only increases the operating safety of your machine but also helps to protect the environment.
- 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.

In this respect, we also recommend that you observe all the relevant safety regulations for hydraulic lines, as well as the safety regulations regarding accident prevention and occupational health and safety in your country. Also observe DIN 20066, part 5.

The date of manufacture (month or quarter and year) is indicated on the flexible line.

Example:

- The indication “**2 Q/20**” means manufactured in the 2nd quarter of 2020.

7.13 Electrical system

Qualification of maintenance personnel

Replacement and repair work on the electrical system may be performed only by trained technical personnel and/or authorized service centers!

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.

- ► Do not smoke, avoid fire and open flames.
- ► Do not place any tools on the battery.

WARNING

Risk of injury due to chemicals!

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 flush the affected parts of the body with plenty of clear water and seek medical attention at once.
- ► Wear protective equipment.

NOTICE

Charge a low battery with a regulated battery charger equipped with an automatic shutoff.

- ► Refer to the Operator's Manual of the battery charger.

Checking/replacing the battery

The battery is located in the engine bay near the rear wheel.

It is low in maintenance and no fluid needs to be refilled under normal operating conditions. However have it checked at regular intervals to ensure that the electrolyte level is between the MIN and MAX marks.

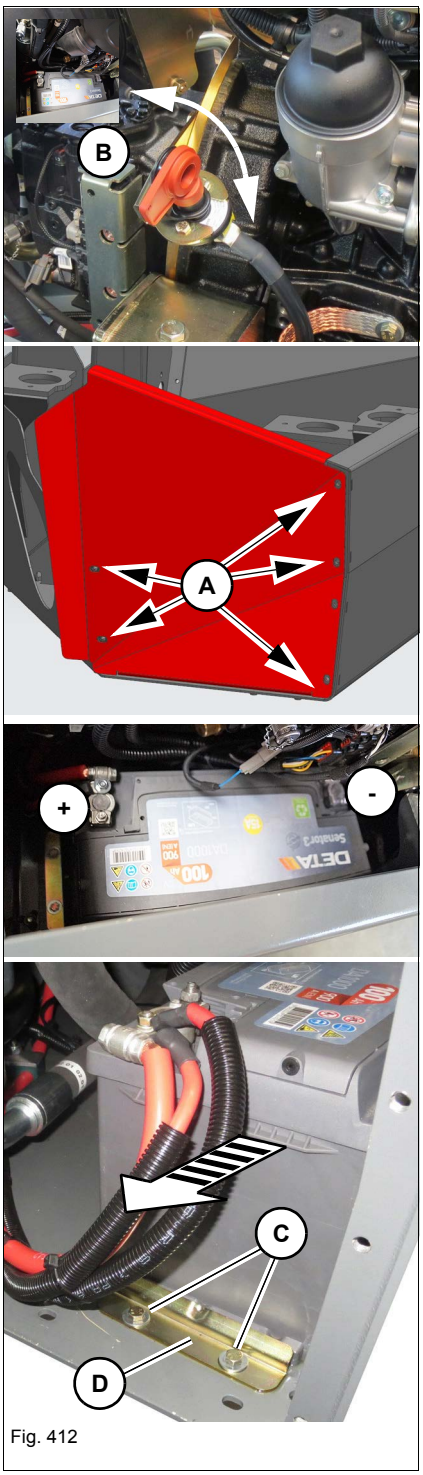


Fig. 412

Preparing battery replacement:

1. Park the machine on level ground.
2. Lower the loader unit.
3. Apply the parking brake.
4. Switch off the starter and remove the starting key.
5. Open the engine cover.
6. Turn the main battery switch **B** key to the left and pull out.
7. Remove the maintenance cover **A** in the rear on the engine bay.

NOTICE

Short circuit due to wrong order when disconnecting the battery cables from the battery.

► F**irst disconnect the negative terminal** (**-**), then the positive terminal (**+**).

Remove the battery:

1. First disconnect the black battery cable from the negative terminal (**−**).
2. Then remove the battery terminal cover on the red battery cable and disassemble the positive terminal (**+**).
3. Remove the screws **C** and remove the battery fastening **D** (SW10).
4. Pull out the battery in the direction of the rear wheel.

Installing the battery

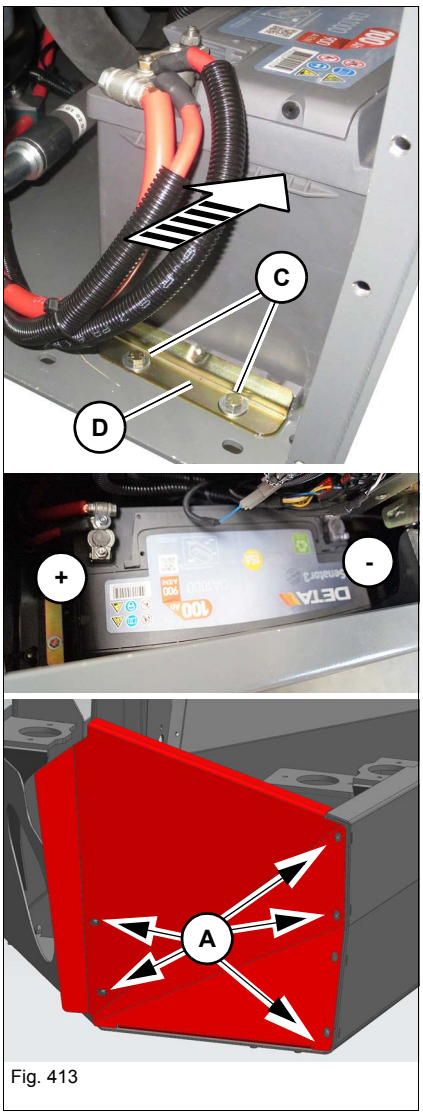


Fig. 413

NOTICE

In order to avoid damage to the vehicle electronics, only use batteries of the specified capacity!

NOTICE

Short circuit due to wrong order when connecting the battery cables to the battery.

► F**irst connect the negative terminal** (**-**), then the positive terminal (**+**).

1. Replace the battery with a new one.
2. Insert the battery into the engine bay from the direction of the rear wheel.
3. Attach the battery fastening **D** with screws **C**.
4. First attach the red battery cable to the positive terminal (**+**)
5. Attach the battery terminal cover to the red battery cable
6. Connect the black battery cable to the negative terminal (**-**).
7. Attach the maintenance cover **A** in the rear on the engine bay.

Regular checks and service work on the electrical system

Information

Maintenance intervals – *see "Maintenance plan" on page 7-4*.

Daily checks before operating the machine

- Is the light system OK?
- Is the signaling and warning system OK?

Weekly checks

- Electric fuses:
  Replace malfunctioning fuses by new ones with the specified load capacity (amperage) only.
  ➥ Blown fuses indicate overloading or short circuits. Therefore, the electrical system should be checked by a qualified technician before installing the new fuse.
- Electric and ground connections: When performing maintenance on the electrical system, pay particular attention to ensuring good contact in leads and fuses.
- Check the battery charge condition and the condition of the battery terminals.
- Check the electric lines for tightness and chafing and have them replaced by an **authorized service center 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.

Relays, fuses on the printed circuit board

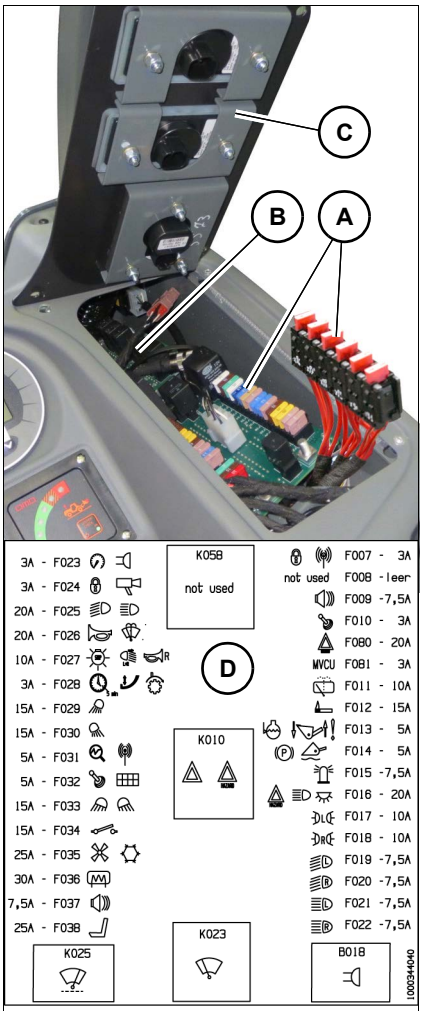


Fig. 414

The printed circuit board and plug console **A** with the fuses and the printed circuit board **B** with the relay are located under the switch console **C** on the right dashboard.

Fuse assignment – *see "Fuse assignment (A)" on page 9-8*, *"Fuse assignment (B)" on page 9-9* and *"Fuse assignment (C)" on page 9-10* or label **D** affixed to the cover **C**.

NOTICE

Blown fuses indicate overloading or short circuits. Therefore, the electrical system should be checked by an authorized workshop before installing the new fuse!

► Only use fuses with the specified current-carrying capacity (amperage) – see label **D**.

Checking/replacing fuses and switching relays:

1. Switch off the ignition and remove the black battery cable at the negative terminal (**-**) of the battery or switch off the main battery switch *– see "Checking/replacing the battery" on page 7-63*.
2. Lift the cover **C** *– see "Access to the vehicle fuses" on page 7-19*.
3. Remove malfunctioning fuses from the plug console and replace them with new ones – see label **D**.
4. Replace defective relays. To do this, the plug console of the fuses as well as the relay must be removed first.
5. Check the electrical system for correct function.

Main fuse box with switching relays

NOTICE

Blown fuses indicate overloading or short circuits. The electrical system must therefore be checked before installing the new fuse!

► Only use fuses with the specified load capacity (amperage).

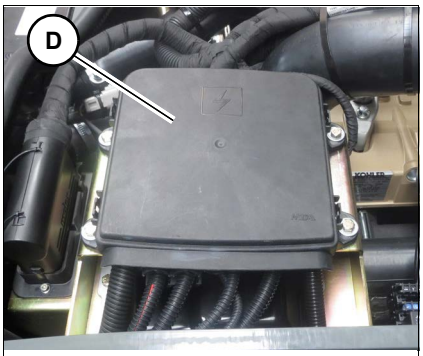


Fig. 415

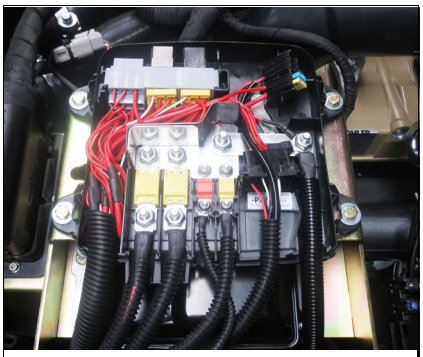


Fig. 416

Check/replace fuses and relays in the main fuse box:

The main fuse box is attached above the engine (near the radiator).

1. Lower the loader unit.
2. Apply the parking brake.
3. Switch off the ignition.
4. Open the engine cover.
5. Remove the key from the main battery switch **A** of disconnect the negative terminal (-) on the battery.
6. Remove the cover **D** on the fuse box.
7. Remove malfunctioning fuses or relays from the relay bracket and replace them with new ones. *– see "Main fuse box with relays in the engine compartment" on page 9-11*.
8. Install the fuse box cover A.
9. Check the electrical system for correct function.

7.14 Heating, ventilation and air conditioning

Important information on cabin ventilation

The cabin is equipped with a fine-dust filter.

CAUTION

Health hazard! Filter installed incorrectly or damaged!

Penetration of dust in cabin causing damage to health.

- ► In order to comply with the required safety measures regarding occupational safety and health, malfunctioning or dirty filters must be replaced by new ones!
- ► The machine may not be used in an environment requiring protection against aerosols and vapors!

Cleaning/replacing the fine-dust filter

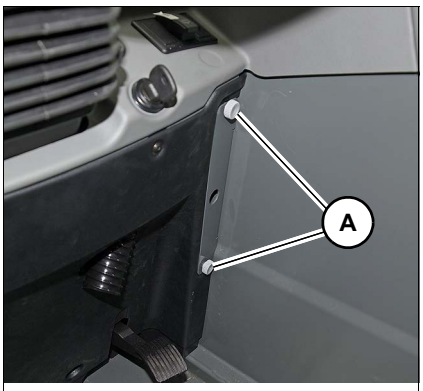


Fig. 417

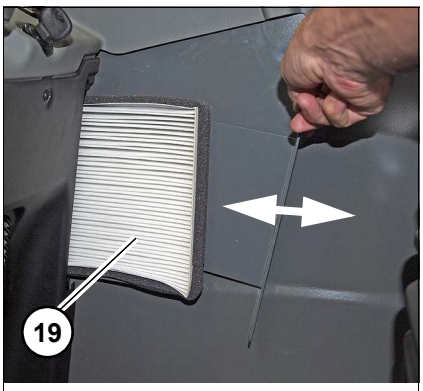


Fig. 418

Information

Maintenance intervals – *see "Maintenance plan" on page 7-4*.

1. The fine-dust filter access is located in the cabin on the right between the front and side trims.
2. Remove the knurled thumb screw **A**.
3. Pull out fine-dust filter **19** and check it for damage.
4. Knock the fine-dust filter on a plate on either side.
5. Blow compressed air from the inside to the outside to clean the filter, or wash it with water and dry it.
   - ➥ Replace the fine-dust filter.
   - ➥ Replace or clean the filter more frequently if the machine is used in severe dust conditions.
6. Clean the inside of the filter housing and insert the fine-dust filter.
   - ➥ Ensure that it is seated properly.
7. Attach the knurled thumbscrew **A**.

NOTICE

Ensure the correct position of the fine dust filter as you insert it.

Air conditioning (option)

Important notes about function and safety

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 center.

WARNING

Injury hazard due to damaged hoses!

Escaping refrigerant can cause serious injury or death.

- ► Do not open pipes, hoses or other components containing refrigerant.
- ► Avoid all contact with the refrigerant.
- ► Do not weld parts of the refrigerant circuit, or in the immediate vicinity of these parts.

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.
- ► Apply the parking brake.

CAUTION

Injury hazard during inspection work! The evaporator and heat exchanger have sharp-edged fins. Lines and hoses containing coolant can be hot!

Failure to observe this can cause injury.

- ► Wear protective equipment (protective gloves and safety glasses).
- ► Do not perform maintenance unless the heating and air conditioning systems are switched off.
- ► Observe the pertinent regulations relevant to accident prevention, other generally acknowledged regulations regarding safety and occupational medicine.

Daily visual check:

CAUTION

Risk of injury 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 gloves.

Information

Observe the maintenance intervals – *see "Maintenance plan" on page 7-4*.

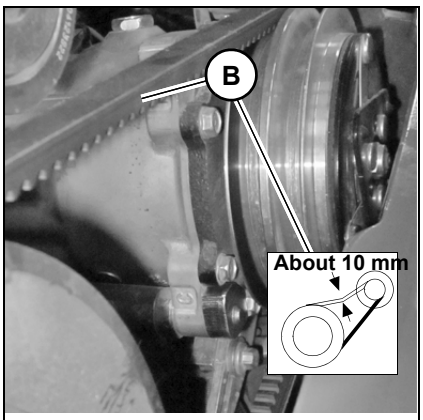


Fig. 419

1. Stop the engine.
2. Apply the parking brake.
3. Switch off the starter and remove the starting key.
4. Press with your thumb to check whether the V-belt **B** can be deflected between the pulleys by no more than **about 10 mm** (0.4 in).
5. Re-tension the V-belt **B** if necessary.
6. Check the hoses for tightness and chafing.
7. Check the electric connections for correct condition and tightness.
8. Have the coolant fill level checked by an authorized service center.

Re-tension the V-belt:

Information

The V-belt can be re-tensioned only by an authorized service center.

Cleaning the heat exchanger (condenser)

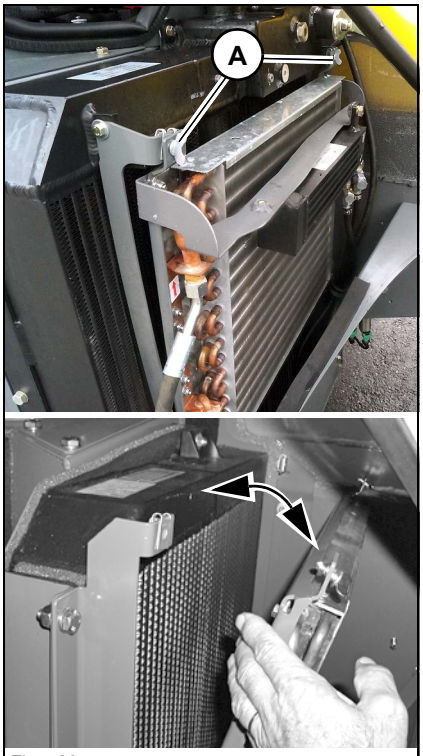


Fig. 420

CAUTION

Risk of injury 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.

Information

Observe the maintenance intervals – *see "Maintenance plan" on page 7-4*.

1. Place the vehicle on level ground. Lower the loader unit to the ground.
2. Switch off the diesel engine and remove the key.
3. Apply the parking brake.
4. Open the engine cover.
5. Loosen lock **A** on the capacitor and tilt it forward.
6. Clean the condenser with compressed air or by spraying water (do not use a high-pressure cleaner).
7. Tilt back the capacitor and safely lock it **A**in the bracket once cleaning is over.

Filling up the air conditioning system

The air-conditioning system must be checked and serviced twice a year in an authorized workshop!

For the first fill, see the air conditioning label on the side panel of the radiator.

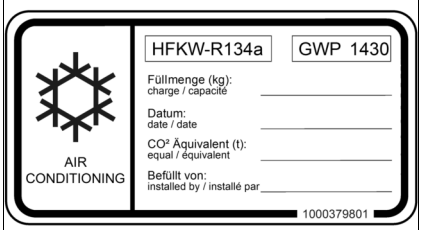


Fig. 421

Information

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

7.15 Washer system

Washer system reservoir

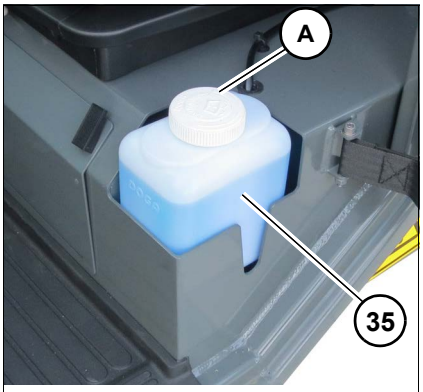


Fig. 422

The filler neck **A** of the reservoir **35** is located in the cabin to the left of the operator's seat.

Information

Add only clean tap water!

Add a suitable cleaning agent if necessary. In winter: 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 7-4*.
Specifications and capacities – *see chapter 7 " Vehicle fluids and lubricants" on page 7-13*.

7.16 Axles/drive

Maintenance on axles/drive

NOTICE

Maintenance on the axles and the drive may only be performed by an authorized service center.

Information

Maintenance intervals – *see "Maintenance plan" on page 7-4*.
Specifications and capacities – *see "Vehicle fluids and lubricants" on page 7-13*.

7.17 Braking system

Important safety instructions regarding the braking system

The brakes are a safety part of the first level; improper maintenance can cause the brakes to fail.

Have all repair work on the brakes only performed by the trained personnel of an authorized service center.

An exception to this is the following work which must be carried out by the driver/operator:

- Daily check of the level in the brake fluid reservoir – *see "Checking/adding brake fluid" on page 7-75*.
- Daily check of the brake lines

WARNING

Malfunctioning brake lines or hoses carry a risk of accidents!

Failure to observe this can cause serious injury or death.

► Damaged brake lines or hoses must immediately be replaced by an authorized service center.

Information

Maintenance intervals – *see "Maintenance plan" on page 7-4*.
Specifications and capacities – *see "Vehicle fluids and lubricants" on page 7-13*.

Checking/adding brake fluid

The brake-fluid reservoir is located on the left next to the parking brake.

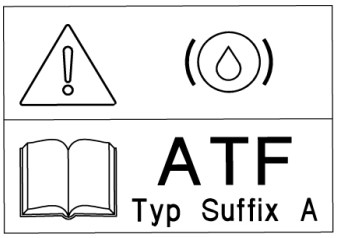


Fig. 423

WARNING

An incorrect brake fluid grade or an insufficient brake fluid level can impair the safety of the braking system.

Failure to observe this can cause serious injury or death.

- ► Check the brake fluid in the reservoir at regular intervals
- ► The brake fluid must comply with the SAE specification **(ATF).**
- ► In case of heavy brake fluid loss (**below MIN**), have the braking system immediately checked and repaired by an authorized service center.
- ► The brake fluid must be replaced **every 2 years** by an authorized service center.

Top off fluid if the level is below the **MIN** mark:

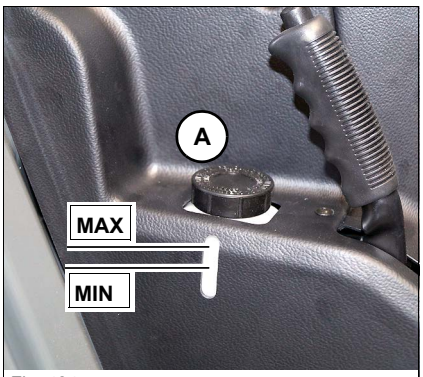


Fig. 424

1. Clean the area around the cover.
2. Open reservoir cover **A**.
3. Top off ATF brake fluid up to the mark **MAX**
   – see "Vehicle fluids and lubricants" on page 7-13.
4. Close the tank cover.
5. Check the braking system for leaks and correct function.

7.18 Tires

Important information on the tires

WARNING

Accident hazard if wheels are used that have not been released for the machine!

Can result in fatal or serious injury.

► Install only released tires/wheels.

► Have wheels changed by an authorized service center if necessary.

Information

Have maintenance on the tires and rims only performed by the trained personnel of an authorized service center.

Tire check

WARNING

Risk of tires bursting during inflation!

Risk of serious or fatal injury.

► Wear gloves and safety glasses.

► Check the tires and rims for damage before inflating the tires.

► Stay clear of the tires when checking the inflation pressure and/or inflating the tires.

► Observe the prescribed inflation pressure.

Information

Maintenance intervals – *see "Maintenance plan" on page 7-4*.

Work that must be performed by the operator/user:

- Check tire pressure.
- Check tires and rims for damage (cracks, aging, etc.) – also on the inside.
- Remove foreign bodies from the tire tread.
- Remove traces of oil and grease from the tires.
- Change the wheels.
- Check the wheel nuts for correct seating and retighten them if necessary.

Changing wheels

WARNING

Crushing hazard when raising the machine!

Can result in fatal or serious injury.

- ► Park the machine on level and sturdy ground.
- ► Use suitable lifting gear under all circumstances with a corresponding lift capacity.
- ► Use one or more trestles instead of a jack to stabilize the machine.
- ► Never start the engine if the machine is on trestles or if it is raised with a jack.

Removing the wheels

1. Park the machine on level and firm ground and prevent it from rolling away.
2. Lower the loader unit to the ground.
3. Apply the parking brake.
4. Stop the engine and switch off the ignition.
5. Loosen the wheel nuts a little of the wheel you want to remove.
6. Place a jack under the axle body, making sure it is standing firmly.
7. Only raise the corresponding axle side so that the wheel can be removed from the axle without lifting gear.
8. Secure the raised axle with a stable support frame.

NOTICE

The trestle must be positioned so as to avoid machine damage.

9. Completely remove the wheel nuts.
10. Remove the wheel.

Mounting wheels

WARNING

Crushing hazard when raising the machine!

Can result in fatal or serious injury.

- ► Park the machine on level and sturdy ground.
- ► Use suitable lifting gear under all circumstances with a corresponding lift capacity.
- ► Use one or more trestles instead of a jack to stabilize the machine.
- ► Never start the engine if the machine is on trestles or if it is raised with a jack.

NOTICE

The threads on the wheel bolts can be damaged when fitting the heavy wheels!

- ► Use suitable assembly tools, such as covering sleeves for the wheel bolts.
- ► Do not oil lug nuts and bolts.

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 lug nuts to the specified torque *– see "Tightening torques" on page 9-14*.

Information

Tighten the lug nuts first after one service hour with the prescribed torque and then after another 10 hours of operation with the prescribed torque *– see "Tightening torques" on page 9-14***.**

Information

When fitting a new tire size to the machine, have the software adapted by an authorized service center. The maximum speed of the machine is modified by the tire size.

7.19 Maintenance of attachments

Correct maintenance and servicing is absolutely necessary for smooth and continuous operation, and for an increased service life of the attachments.

Observe the lubrication and maintenance instructions in the Operator's Manuals of the attachments!

7.20 Maintenance of options

Automatic trailer coupling (option)

Cleaning and lubricating the trailer coupling

NOTICE

In order to ensure the full functionality of the ball hitch, close the clutch bolt in the ball hitch before cleaning with high-pressure cleaning equipment!

Information

Maintenance intervals – *see "Maintenance plan" on page 7-4*.
Specifications and capacities – *see chapter 7 " Vehicle fluids and lubricants" on page 7-13*.

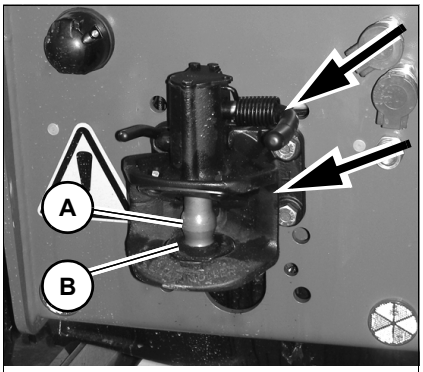


Fig. 425

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

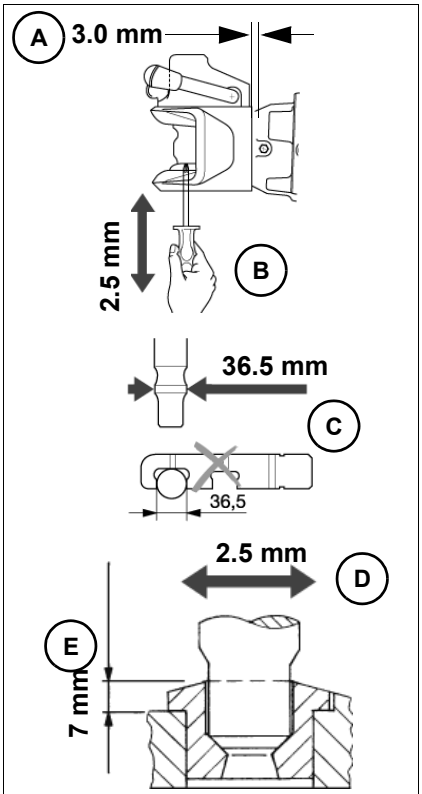


Fig. 426:

WARNING

Accident hazard in case of worn coupling pins, too much play in the bearing or a worn base ring!

Can cause injury.

- ► Check the ball hitch once a day for wear and play.
- ► Apply grease to the base ring.
- ► Have a malfunctioning ball hitch replaced by an authorized service center.

Check the bearing and **longitudinal play A** of the coupling head:

- Move the uncoupled coupling head with force in travel direction.

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 center axis of the coupling head = **max. 3 mm (0.12 in)**

Check coupling pin **C/D**:

- 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 B max. 2.5 mm (0.1 in)**.
- Check pin play **D** in the base ring and thickness **E** of the base ring.
  - ➥ Pin play **D max. 2.5 mm (0.1 in)**
  - ➥ Thickness of base ring **min. 7 mm (0.28 in)**

Ball hitch (option) maintenance

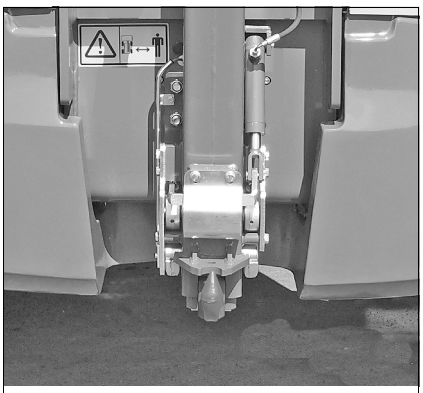


Fig. 427

Cleaning and lubricating the trailer coupling

Information

Maintenance intervals – *see "Maintenance plan" on page 7-4*.
Specifications and capacities – *see chapter 7 " Vehicle fluids and lubricants" on page 7-13*.

1. Lubricate all moving parts of the auto hitch.

7.21 Camera maintenance (optional)

NOTICE

Device damage when cleaning the monitor and camera with solvents!

► Never clean the screen and camera with solvents, cleaning agents or other chemical products.

► Use a soft, dry cloth or a soft brush for cleaning.

NOTICE

Cleaning with a high-pressure cleaner can damage the components or electronics.

► Ensure a minimum distance of at least 70 cm (27.5 in) between the high-pressure nozzle and the object to be cleaned.

► Do not point the jet directly at electronic components, plug-and-socket connections, seals or hoses.

Cleaning the screen

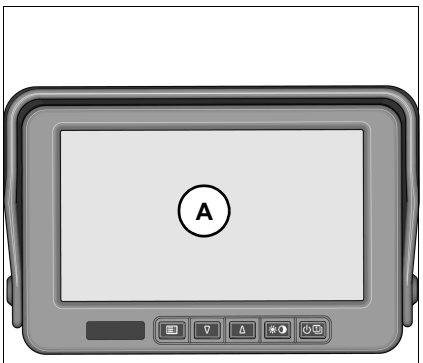


Fig. 428

1. Park the machine safely.
2. Carefully wipe the screen **A** with a soft, possibly moistened cloth.
3. Clean dust out of the ventilation slots of the monitor with with a soft brush.

Cleaning the camera

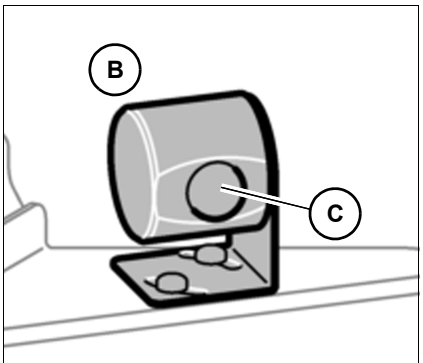


Fig. 429

An optimal image is achieved by checking the front glass of the camera regularly for cleanliness and by cleaning it if necessary.

1. Park the machine safely.
2. Free the camera **B** of dirt by using water.
   Add a commercially available cleaning agent to the water if necessary.
3. Dry the front window **C** of the camera with a soft cloth, or remove dust from it with a soft brush.

7.22 Exhaust gas cleaning system

Optional “diesel particulate filter” of the company BAUMOT available by request.

Address:

Company BAUMOT AG

Thurgauerstrasse 105

8152 Glattpark / Switzerland

Tel.: +41 (0) 44 954 80 70

Fax: +41 (0) 44 954 34 36

Email: info@baumo.ch

Internet: www.baumot.ch

Information

For the maintenance jobs of the diesel particulate filter (optional), see the separate installation, operation and maintenance manual of the company BAUMOT.

7.23 Machine preservation

Important notice on anti-corrosion protection

The machine is specially protected against corrosion for work in aggressive media (for example in a saline environment).

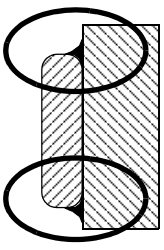
However, this anti-corrosion protection is affected by external factors, for example dirt, cleaning, etc. This is why it only has ongoing effect if checked at regular intervals and renewed or reapplied as required.

If no anticorrosion protection is applied to the machine, for example for work in a saline environment, we recommend retrofitting your machine with the “Aggressive Media” option by a sales partner.

The following anti-corrosive means has been used in the factory:

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 anti-corrosive wax

Component	Remarks
All electric plug-and-socket, grounding 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 anti-corrosion 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	**with the exception of:** • 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 an anti-corrosion protection after assembly

Measures for maintaining anti-corrosive protection

WARNING

Special hazards during anti-corrosion protection!

Failure to observe this 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 7-4*.
Specifications and capacities – *see chapter 7 " Vehicle fluids and lubricants" on page 7-13*.

Cleaning

NOTICE

Contrary to the instructions given in Chapter “General service work” in the Operator’s Manual of the machine, neither clean the machine with a bristle brush nor with a steam jet or a high-pressure cleaner!

► 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 components, check whether they are classified as in the table “Components coated with anti-corrosive wax” 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 to avoid the accumulation of corrosive humidity.
- 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.

Application of anti-corrosive layer

Bear in mind the following instructions as you apply the anti-corrosive protection:

- Carefully cover all fastening surfaces and components to which the anti-corrosion protection may not be applied
  – see chapter 7 " Components coated with anti-corrosive wax" on page 7-84!
- 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 oxidized 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.
- Apply an oxide solvent (for example ELASKON Multi 80) to the affected area.
- Treat the contact surfaces of the connection with for example ELASKON Multi 80.
- Establish the connection.
- Apply/spray the anti-corrosion protection onto the electric connection from all sides.

For sheet metal parts

- Remove the remaining protective wax at the oxidized area with an ELASKON cleanser.
- Make all affected areas "blank", i.e. 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 anti-corrosion protection.

8 Malfunctions

8.1 Diesel engine malfunctions

If an error exists, this is shown by error codes in the digital display of the indicating instrument and by acoustic warnings of different lengths.

Reading the error code – *see chapter 4 " Error memory" on page 4-45*, *"Acoustic warnings" on page 4-48* and *"Overview of error codes of diesel engine electronics" on page 8-7*.

Caution! Diesel engine repairs may only be performed by authorized service centers and trained personnel.

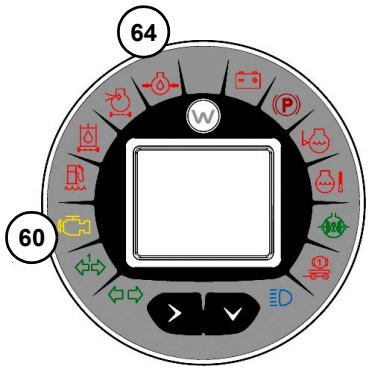


Fig. 430

NOTICE

In order to avoid engine damage, the following error descriptions must be immediately read by an authorized workshop and repaired.

- ► The red warning light **64** – engine oil pressure lights up
- ► The yellow control light **60** illuminates – The electronic control unit of the engine has detected a malfunction
- ► The engine speed suddenly rises and drops
- ► An unusual and/or sudden occurring noise is heard
- ► The color of the exhaust fumes is suddenly darker

Diesel engine malfunctions	Possible causes	Remedy/avoidance	See page
Yellow control lamp lights up	The electronic control unit of the engine has detected a malfunction	Contact an authorized service center	
Engine does not start	Sulfated battery terminals		
	Insufficient battery voltage	Contact an authorized service center	
	Lack of fuel	Refueling	*7-37*
	Frozen fuel	Contact an authorized service center	
	Clogged fuel filter		
	Air in fuel system		
	Clogged air filter	Clean/replace the filter	*7-50*
	Utility lines clogged	Contact an authorized service center	
	Blown fuse	Replace the fuse. Contact an authorized service center if this problem persists	*7-66*
	Intake or exhaust devices clogged	Contact an authorized service center	

Diesel engine malfunctions	Possible causes	Remedy/avoidance	See page
Engine only starts briefly	Unstable electric connections	Contact an authorized service center	
	Sulfated battery terminals		
	Clogged fuel filter	Contact an authorized service center	
	Fuel lines obstructed		
Fluctuating rpms when idling	Fuel lines obstructed		
Low rpms when idling	Fuel lines obstructed		
	Poor fuel quality		
Blue exhaust gases	Oil level in the tray too high	Contact an authorized service center	
	Clogged air filter	Replace the filter	*7-50*
Excessive Fuel consumption	Clogged air filter	Replace the filter	
	Oil level in the tray too high	Contact an authorized service center	
Reduced engine power	Clogged air filter	Replace the filter	*7-50*
	Fuel lines obstructed	Contact an authorized service center	
	Poor fuel quality		
	Oil level in the tray too high		
Engine stalls during acceleration	Clogged fuel filter		
Engine jerks during acceleration, engine overheats	Fuel lines obstructed		
	Lack of cooling liquid	Adding coolant	*7-44*
	Oil level in the tray too high	Contact an authorized service center	
	Radiator obstructed		

8.2 Malfunctions of the travel drive

If an error exists, this is shown by error codes in the digital display of the indicating instrument and by acoustic warnings.

Reading the error code – *see chapter 4 " Error memory" on page 4-45*, *“Acoustic warnings” on page 4-48* and *“Overview of error codes of drive electronics” on page 8-13*.

Caution! Drive system repairs may only be performed by authorized service centers and trained personnel.

Information

Basically, proceed as follows when the travel direction selection does not work:

- ► Press push button “Neutral position” on the joystick and select the travel direction again.
- ► If this does not start; start diesel engine again, and then select the travel direction again.
- ► If the malfunction persists, have the drive immediately checked or repaired by an authorized service center.
- ► For further possible causes, see table.

Malfunctions	Possible causes	Remedy	See
Travel direction selection does not work after new start	Parking brake applied – arrows on the joystick flash	Release the parking brake	*5-13*
	The touch button (neutral position of the drive system) was unintentionally actuated when the travel direction was selected	1 Start the diesel engine again 2 Release the parking brake 3 Select the travel direction again	*4-60* *5-13* *5-15*
	The travel direction was selected and at the same time, the accelerator pedal was pressed and the parking brake released	If the diesel engine runs at idling speed: 1 Release the parking brake 2 Selecting a travel direction 3 Press the accelerator pedal	*5-13* *5-15*
Maximum travel speed is not reached	The drive system temperature is below 20°C (68°F)	Heat up the drive system to over 20°C (68°F) operating temperature	–
Drive without full output	The drive electronics has detected an error and switches to “Limited Mode” (extremely limited drive output)	1 Stop the diesel engine 2 Disengage the starter 3 Put on parking brake 4 Start the diesel engine 5 Release the parking brake 6 Select the travel direction again 7 Check the drive output 8 If the problem persists, have the drive checked by an authorized service center	–

8.3 Disorders in the work hydraulics

Important information

Repairs on the hydraulic system may only be performed by an authorized service center.

Other remedial actions – *see "Overview of error codes of drive electronics" on page 8-13*, *“Error code - overload control display unit” on page 8-33* and in the maintenance chapter *“Hydraulic system” on page 7-54*.

Information

Failure to observe the order of the work steps and waiting times can cause error messages in the information display.

- ► Follow the order of the work steps under all circumstances when starting the engine.
- ► Observe the waiting times for starting the electronic control units.
- ► Interrupt the starting procedure if there are error messages in the information display. Switch off ignition and repeat the starting procedure by following the order and observing all waiting times.

8.4 Malfunctions of the electrical system

Important information

Information

Have malfunctions rectified and necessary repairs performed only by an authorized service center.

Other remedial actions in the chapter Maintenance *"Electrical system" on page 7-62*.

Digital display of error codes

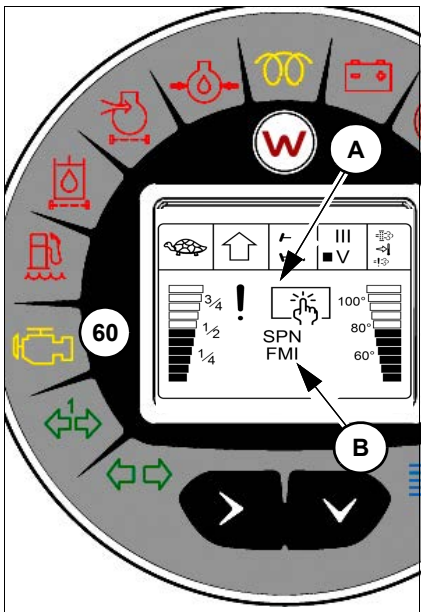


Fig. 431

Error codes **B** are issued if a machine component is malfunctioning. These are shown in the main display of the digital display **A**.

In the event of faults with the diesel engine electronics, the control light for the engine **60** also illuminates.

Cause for error code:

- Open wiring, interruption
- Overvoltage, undervoltage
- Grounding error
- Malfunctioning component
- Over/under permissible values (temperature, pressure, speed, etc.)
- Sensor error due to dirt

If an error code and/or audible warning is shown:

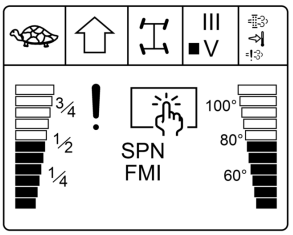
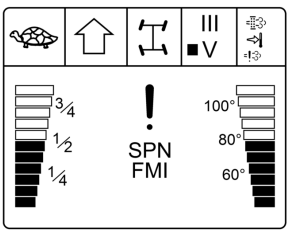
1. If possible, drive the vehicle out of the danger zone and shut it off.
2. Retract the telescopic boom and lower the loader unit,
3. Stop the engine and switch off the ignition.
4. Restart the engine.

If the error codes are issued again after the restart:

5. Have the error codes repaired by an authorized service center as soon as possible.

Error prioritization in the error code display

Three error categories are distinguished between in the system:

Status	Indication		Description	Effect
Red		Control light (only for error with engine electronics), notification in the display, short acoustic warning. Error code lists; See below on page *8-7* and page *8-13*.	**Critical error.** The symbol is shown until the display has been acknowledged by pressing the button **55** or **56** on the indicating instrument or on the jog dial (optional) **11**.	Restricted or no function. **Residual risk!**
Yellow		Control light (only for error with engine electronics), notification in the display, short acoustic warning. Error code lists; See below on page *8-10* and page *8-19*.	**Serious error.** Symbol is shown for about 4 seconds.	Restricted or no function. No residual risk.
White	None	None	Error detected. Error saved.	None

Overview of error codes of diesel engine electronics

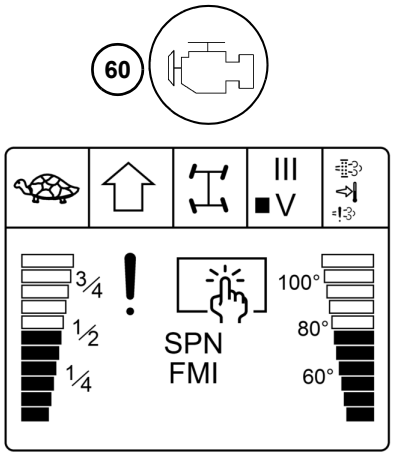


Fig. 432

Information

In the event of faults with the diesel engine electronics, the control light for the engine **60** also illuminates.

Critical error

NOTICE

A critical error can lead to severe damage to the vehicle. In order to avoid damage on the vehicle:

1. Retract the telescopic boom.
2. Lower the load into the transport position.
3. If possible, drive the machine out of the danger zone.
4. Stop the engine and switch off the ignition.
5. Restart the engine.

If the error is issued again:

6. Make a note of the error code of the display.
7. Stop the engine and remove the starting key.
8. Determine the cause of the error (see following table), contact specialized workshop and have the error rectified immediately.

SPN	FMI	Description of critical error for the diesel engine electronics
27	7	Error with exhaust return: Missing response of mechanical system or incorrect setting
28	3	ASC drive pedal sensor: signal range exceeded or short circuit to positive supply voltage
28	4	ASC drive pedal sensor: under signal range or short circuit against machine ground/sensor ground
28	20	ASC drive pedal sensor: signal value deviates up
28	21	ASC drive pedal sensor: signal value deviates down
29	3	Drive pedal sensor 2: signal range exceeded or short circuit to positive supply voltage
29	4	Drive pedal sensor 3: under signal range or short circuit against machine ground/sensor ground

SPN	FMI	Description of critical error for the diesel engine electronics
91	3	Drive pedal sensor 1: signal range exceeded or short circuit to positive supply voltage
91	4	Drive pedal sensor 2: under signal range or short circuit against machine ground/sensor ground
94	3	Fuel pressure sensor: Signal range exceeded or short circuit against positive supply voltage.
94	6	Fuel pressure sensor: Current too high or short circuit against machine ground
100	1	Oil pressure: Well below threshold
105	3	Air intake temperature: Signal range exceeded or short circuit against positive supply voltage.
105	4	Air intake temperature: Under signal range or short circuit against machine ground / sensor ground
107	2	Pressure difference sensor: Signal is faulty or irregular
110	0	Coolant temperature sensor: Threshold widely exceeded
156	2	Rail pressure error: Signal is faulty or irregular
156	14	Rail pressure error: Special error
157	0	Rail pressure error 1: Threshold widely exceeded
167	1	Injection valve: Well below threshold
167	31	Injection valve: Error condition met
168	3	Vehicle on-board voltage: signal range exceeded or short circuit to positive supply voltage
190	0	Engine speed: Threshold widely exceeded
190	2	Engine speed: Signal is faulty or irregular
190	9	Engine speed: Abnormal updating rate
430	3	Starter relay: Signal range exceeded or short circuit against positive supply voltage.
430	4	Starter relay: Under signal range or short circuit against machine ground / sensor ground
430	5	Starter relay: Current too low or open wiring
637	2	Camshaft position: Signal is faulty or irregular
637	8	Camshaft position: Abnormal frequency, pulse width or period

SPN	FMI	Description of critical error for the diesel engine electronics
1127	0	Turbocharger boost pressure: Threshold widely exceeded
1382	0	Fuel filter pressure error: Threshold widely exceeded
1393	2	Injection valve 1: Signal is faulty or irregular
1393	5	Injection valve 1: current too low or open wiring
1394	2	Injection valve 3: Signal is faulty or irregular
1394	5	Injection valve 3: current too low or open wiring
1395	2	Injection valve 4 (4 cylinder engine) Injection valve 2 (3 cylinder engine): Signal faulty or irregular
1395	5	Injection valve 4 (4 cylinder engine) Injection valve 2 (3 cylinder engine): Current too low or open wiring
1396	2	Injection valve 2 (4 cylinder engine): Signal is faulty or irregular
1396	5	Injection valve 2 (4 cylinder engine): current too low or open wiring
1397	3	Injection valve: Signal range exceeded or short circuit against positive supply voltage.
1397	4	Injection valve: Under signal range or short circuit against machine ground / sensor ground
1397	5	Injection valve: current too low or open wiring
1639	3	Fan speed: Signal range exceeded or short circuit against positive supply voltage.
1639	4	Fan speed: Under signal range or short circuit against machine ground / sensor ground
1639	5	Fan speed: current too low or open wiring
1639	6	Fan speed: Current too high or short circuit against machine ground
1639	31	Fan speed: Error condition met
2791	2	Exhaust return valve 1: Signal is faulty or irregular
2802	14	Data storage error: Special error
3349	2	TSC1 error: Signal is faulty or irregular
3349	9	TSC1 error: Abnormal update rate
3349	10	TSC1 error: abnormal change rate of the signal
3509	3	Sensor supply voltage 1: signal range exceeded or short circuit to positive supply voltage
3509	4	Sensor supply voltage 2: under signal range or short circuit against machine ground/sensor ground
3510	3	Sensor supply voltage 2: signal range exceeded or short circuit to positive supply voltage
3510	4	Sensor supply voltage 3: under signal range or short circuit against machine ground/sensor ground

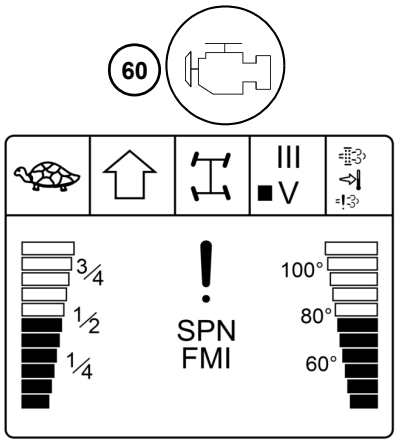


Fig. 433

Serious error

Information

In the event of faults with the diesel engine electronics, the control light for the engine **60** also illuminates.

NOTICE

A severe error can lead to damage to the vehicle. In order to avoid damage on the vehicle:

1. Retract the telescopic boom.
2. Lower the load into the transport position.
3. If possible, drive the machine out of the danger zone.
4. Stop the engine and switch off the ignition.
5. Restart the engine.

If the error is issued again:

6. Make a note of the error code of the display.
7. Stop the engine and remove the starting key.
8. Determine the cause of the error (see following table), contact specialized workshop and have the error rectified as soon as possible.

SPN	FMI	Description of severe error for the diesel engine electronics
96	3	Fuel level sensor: Signal range exceeded or short circuit against positive supply voltage.
96	4	Fuel level sensor: Under signal range or short circuit against machine ground / sensor ground
97	2	Water detected in the fuel: Signal faulty or irregular
102	2	Charge-air pressure sensor: Signal is faulty or irregular
102	3	Charge-air pressure sensor: Signal range exceeded or short circuit against positive supply voltage.
102	4	Charge-air pressure sensor: Under signal range or short circuit against machine ground / sensor ground
107	3	Pressure differential sensor: Signal range exceeded or short circuit against positive supply voltage.
107	4	Pressure differential sensor: Under signal range or short circuit against machine ground / sensor ground
108	3	Atmospheric pressure: Signal range exceeded or short circuit against positive supply voltage.
108	4	Atmospheric pressure: Under signal range or short circuit against machine ground / sensor ground

SPN	FMI	Description of severe error for the diesel engine electronics
110	2	Coolant temperature sensor: Signal is faulty or irregular
110	3	Coolant temperature sensor: Signal range exceeded or short circuit against positive supply voltage.
110	4	Coolant temperature sensor: Under signal range or short circuit against machine ground / sensor ground
157	1	Rail pressure sensor 1: Threshold widely fallen below
157	2	Rail pressure sensor 1: Signal is faulty or irregular
157	3	Rail pressure sensor 1: signal range exceeded or short circuit to positive supply voltage
157	4	Rail pressure sensor 1: under signal range or short circuit against machine ground/sensor ground
157	9	Rail pressure sensor 1: Abnormal update rate
157	14	Rail pressure sensor 1: Special error
157	15	Rail pressure error 1: Threshold slightly exceeded
157	16	Rail pressure error 1: Threshold exceeded
157	20	Rail pressure sensor 1: signal value deviates up
157	31	Rail pressure sensor 1: Error condition met
168	4	Vehicle on-board voltage: under signal range or short circuit against machine ground/sensor ground
174	3	Engine fuel temperature sensor: Signal range exceeded or short circuit against positive supply voltage.
174	4	Engine fuel temperature sensor: Under signal range or short circuit against machine ground / sensor ground
598	2	Coolant switch: Signal is faulty or irregular
604	2	Transmission neutral switch: Signal is faulty or irregular
626	3	Preheating relay: Signal range exceeded or short circuit against positive supply voltage.
626	4	Preheating relay: Under signal range or short circuit against machine ground / sensor ground

SPN	FMI	Description of severe error for the diesel engine electronics
1083	19	CAN 1: Faulty communication between components
1083	31	CAN 1: Error condition met
1084	19	CAN 2: Faulty communication between components
1127	1	Turbocharger boost pressure: Threshold widely fallen below
1349	2	Pump learning incomplete: Signal faulty or irregular
1382	16	Fuel filter pressure error: Threshold exceeded
1762	3	Hydraulic pressure sensor: Signal range exceeded or short circuit against positive supply voltage.
1762	4	Hydraulic pressure sensor: Under signal range or short circuit against machine ground / sensor ground
2791	3	Exhaust return valve 2: signal range exceeded or short circuit to positive supply voltage
2791	4	Exhaust return valve 3: under signal range or short circuit against machine ground/sensor ground
2791	7	Exhaust return valve 4: Missing response of mechanical system or incorrect setting
2791	13	Exhaust return valve 5: Calibration faulty / not executed
2791	14	Exhaust return valve 6: Special error
2791	31	Exhaust return valve 7: Error condition met
2802	9	Data storage error: Abnormal updating rate
2802	11	Data storage error: Error description cannot be identified
2802	12	Data storage error: Control error (controller)
2802	13	Data storage error: Calibration faulty / not executed
2802	31	Data storage error: Error condition met
4082	3	Fuel pump relay error: Signal range exceeded or short circuit against positive supply voltage.
4082	4	Fuel pump relay error: Under signal range or short circuit against machine ground / sensor ground

Overview of error codes of drive electronics

Information

Have malfunctions rectified and necessary repairs performed only by an authorized service center.

Critical error

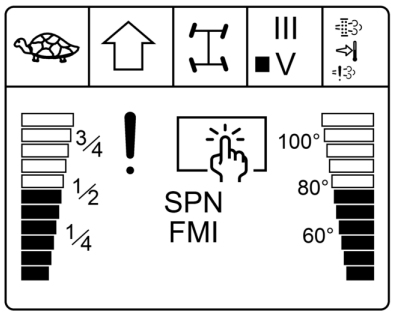


Fig. 434

NOTICE

A critical error can lead to severe damage to the vehicle. In order to avoid damage on the vehicle:

1. Retract the telescopic boom.
2. Lower the load into the transport position.
3. If possible, drive the machine out of the danger zone.
4. Stop the engine and switch off the ignition.
5. Restart the engine.

If the error is issued again:

6. Make a note of the error code of the display.
7. Stop the engine and remove the starting key.
8. Determine the cause of the error (see following table), contact specialized workshop and have the error rectified immediately.

SPN	FMI	Description of critical errors for the drive electronics
516403	12	Forward-reverse switch signal (CAN) is faulty, implausible or is outside of the valid range.
516404	12	Voltage level at signal input, control unit N001, connector CC2, PIN 1 and PIN 7 is outside the permissible range.
516406	12	The voltage level at signal input, control unit N001, plug PPU2, PIN 2 is outside the permissible range / the speed sensor for the hydraulic pump is outside of the valid range
516411	12	Current intensity level at control unit N001, plug PSC is outside the permissible range.
516420	12	Internal control unit monitoring is active. An error has been detected.

SPN	FMI	Description of critical errors for the drive electronics
516500	24	'D002: CAN- Bus joystick logic error
516699	02	P006: OMD- CRC error in the data flash
516699	12	P006: OMD- CRC error in the system flash
516699	13	P006: OMD- calibration faulty / not executed
516699	14	P006: OMD- control unit not found
516699	22	P006: OMD- error in the digital switching output
516699	24	P006: OMD- redundancy error of the sensor cells
516699	26	P006: OMD- sensor cell outside of the range
517104	02	B105: three-point potentiometer – both signals, incorrect or implausible data
517104	12	B105 three-point potentiometer - Internal error of the control unit
517104	26	B105 three-point potentiometer -both signals outside of the valid value range
517113	02	B028: angle sensor of the tilt cylinder – both signal - data incorrect or not plausible
517113	12	B028: tilt cylinder angle sensor - control error
517113	26	B028: tilt cylinder angle sensor for both signals - Signal outside of the valid range
517551	19	E60: system function monitoring, control unit flash memory – memory error – data reception with active error status
517551	24	AppInit: system function monitoring, control software object initialization – wrong machine configuration (object initialization failed) – logical error (software error)
517900	12	Control unit error
517901	12	Control unit error
517902	2	Control unit - HAST or PTC data faulty or not plausible
517903	2	System function monitoring, control unit, data faulty or not plausible
517903	27	System function monitoring, control unit, open wiring or short circuit to ground
517904	09	TIME: system function monitoring, control unit Central Processor Unit – timeout/abnormal clock rate
517904	16	UBAT: System function monitoring, monitoring control unit -Signal 1- Signal very low

SPN	FMI	Description of critical errors for the drive electronics
517908	12	System function monitoring, control unit indicating internal error
517909	12	System function monitoring, control unit indicating internal error
517910	12	System function monitoring, control unit indicating internal error
517911	12	System function monitoring, control unit indicating internal error
517912	12	System function monitoring, control unit indicating internal error
517913	12	System function monitoring, control unit indicating internal error
517914	12	System function monitoring, control unit indicating internal error
517915	12	System function monitoring, control unit indicating internal error
517916	12	System function monitoring, control unit indicating internal error
518905	02	P006: OMD - Deviation between CAN message and pin signal
518905	09	P006: OMD - Timeout while receiving CAN message
518905	19	P006: OMD - Data reception with active error status
519086	02	S137: position switch autohitch both signals – data incorrect or not plausible
519358	04	Y009: differential lock, lock changeover valve – short circuit against ground/low voltage
519358	12	Y009: differential lock, lock changeover valve – internal error of control unit
519358	28	Y009: Differential lock, lock changeover valve - Open wiring or short circuit to positive
519365	12	Y016: 3rd control circuit/quickhitch, lock proportional valve – internal error of control unit
519365	28	Y016: 3rd control circuit/quickhitch, lock proportional valve – open wiring/low current
519366	12	Y017: 3rd control circuit/quickhitch, unlock proportional valve – internal error of control unit
519366	28	Y017: 3rd control circuit/quickhitch, unlock proportional valve – open wiring/low current
519369	04	Y020: load stabilizer, activation changeover valve – short circuit against ground/low voltage
519369	12	Y020: load stabilizer, activation changeover valve – internal error of control unit
519369	28	Y020: Load stabilizer, activation changeover valve - open wiring or short circuit to positive

SPN	FMI	Description of critical errors for the drive electronics
519370	04	Y021: load stabilizer, activation changeover valve – short circuit against ground/low voltage
519370	12	Y021: load stabilizer, activation changeover valve – internal error of control unit
519370	28	Y021: Load stabilizer, activation changeover valve - open wiring or short circuit to positive
519372	02	Y023: telescope, retract proportional valve - Signal not plausible (overload case)
519372	12	Y023: Telescopic boom, retract proportional valve - internal control unit error
519372	28	Y023: Telescopic boom, retract proportional valve - open wiring or short circuit to positive
519373	12	Y024: Telescopic boom, extend proportional valve - internal control unit error
519373	28	Y024: Telescopic boom, extend proportional valve - open wiring or short circuit to positive
519374	04	Y025: quickhitch lock, lock-release changeover valve – short circuit against ground/low voltage
519374	12	Y025: quickhitch lock, lock-release changeover valve – internal error of control unit
519374	28	Y025: Quickhitch lock, lock release changeover valve - open wiring or short circuit to positive
519384	04	Y035: Fan solenoid valve - short circuit to ground / low voltage
519384	12	Y035: Fan solenoid valve - Control unit indicating internal error
519384	28	Y035: Fan solenoid valve - Open wiring or short circuit to positive
519386	04	Y037: Reversing fan solenoid valve - short circuit to ground / low voltage
519386	12	Y037: Reversing fan solenoid valve - Control unit indicating internal error
519386	28	Y037: Reversing fan solenoid valve - Open wiring or short circuit to positive
519393	12	Y044: Tipper solenoid valve / raise hitch – Control unit indicating internal error
519393	28	Y044: Tipper solenoid valve / raise hitch - Open wiring or current low
519394	12	Y045: Tipper solenoid valve / lower hitch – Control unit indicating internal error
519394	28	Y045: Tipper solenoid valve / lower hitch - Open wiring or current low
519395	12	Y046: Changeover valve of rear hydraulics - Control unit indicating internal error
519395	28	Y046: Changeover valve of rear hydraulics - Open wiring or short circuit to positive
519396	04	Y047: Unlock autohitch solenoid valve - short circuit to ground / low voltage
519396	12	Y047: Unlock autohitch solenoid valve – Control unit indicating internal error
519396	28	Y047: Unlock autohitch solenoid valve – Open wiring or short circuit to positive

SPN	FMI	Description of critical errors for the drive electronics
519400	04	Y051: Changeover valve for 3rd control circuit - short circuit to ground / low voltage
519400	12	Y051: Changeover valve of 3rd control circuit - Control unit indicating internal error
519400	28	Y051: changeover valve 3rd control circuit – open wiring/low current
519415	12	Y066: Raise boom solenoid valve – Control unit indicating internal error
519415	28	Y066: Raise boom solenoid valve - Open wiring or short circuit to positive
519416	12	Y067: Lower boom solenoid valve – Control unit indicating internal error
519416	28	Y067: Lower boom solenoid valve - Open wiring or short circuit to positive
519417	12	Y068: Tilt in solenoid valve - Control unit indicating internal error
519417	28	Y068: Tilt in solenoid valve - Open wiring or short circuit to positive
519418	12	Y069: Empty shovel solenoid valve - Control unit indicating internal error
519418	28	Y069: Empty shovel solenoid valve - Open wiring or short circuit to positive
519461	04	Y113: Hydraulic trailer brake solenoid valve - short circuit to ground / low voltage
519461	12	Y113: Hydraulic trailer brake solenoid valve – Control unit indicating internal error
519461	28	Y113: Hydraulic trailer brake solenoid valve - Open wiring or short circuit to positive
519464	04	Y116: Lower tipper solenoid valve - short circuit to ground / low voltage
519464	12	Y116: Lower tipper solenoid valve – Control unit indicating internal error
519464	28	Y116: Lower tipper solenoid valve / lower hitch - Open wiring or current low
519465	12	Y117: Raise three-point solenoid valve – Control unit indicating internal error
519465	28	Y117: Raise three-point solenoid valve - Open wiring or short circuit to positive
519466	12	Y118: Lower three-point solenoid valve – Control unit indicating internal error
519466	28	Y118: Lower three-point solenoid valve - Open wiring or short circuit to positive
519468	12	Y120: PTO shaft solenoid valve - Control unit indicating internal error
519468	28	Y120: PTO shaft solenoid valve - Open wiring or short circuit to positive

SPN	FMI	Description of critical errors for the drive electronics
519477	04	Y129 Rear hydraulics lowering mode solenoid valve: Under signal range or short circuit against vehicle ground/sensor ground
519477	12	Y129: Rear hydraulics lowering mode solenoid valve - Internal error of the control unit
519477	28	Y129: Rear hydraulics lowering mode solenoid valve - Open wiring or short circuit to positive
519850	02	K101: Front socket 7-pole switching relay chute UP- Signal faulty or irregular
519851	02	K102: Front socket 7-pole step-by-step relay button- Signal faulty or irregular
519911	02	R011: accelerator pedal potentiometer – both signals, data faulty or not plausible
519911	12	R011: accelerator pedal potentiometer both signals- Internal fault of the control unit
519911	26	R011: accelerator pedal potentiometer -both signals - outside of the valid value range
519912	02	R012 Potentiometer manual throttle both signals- Data faulty or not plausible
519912	12	R012 Potentiometer manual throttle both signals- Internal fault of the control unit
519912	26	R012 Potentiometer manual throttle signal 1: Outside of the valid value range
519923	02	R023: Angle sensor of the boom, both signals - Data incorrect or not plausible
519923	12	R023: Boom angle sensor - Control error
519923	26	R023: Boom angle sensor both signals - Signal outside of the valid range
521995	24	ASW: Driving function, control software, software function – logical error (software error)
522195	24	Application software: Telescopic boom, control software, software function - logical error (software error)
522282	24	ASW: 3rd control circuit/quickhitch, control software SW function – logical error (SW error)

Serious error

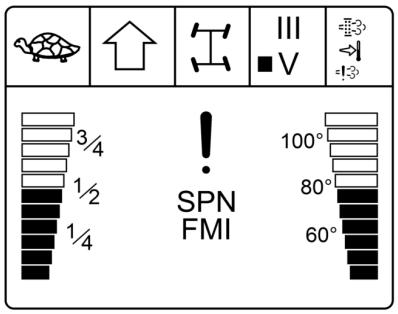


Fig. 435

NOTICE

A severe error can lead to damage to the vehicle. In order to avoid damage on the vehicle:

1. Retract the telescopic boom.
2. Lower the load into the transport position.
3. If possible, drive the machine out of the danger zone.
4. Stop the engine and switch off the ignition.
5. Restart the engine.

If the error is issued again:

6. Make a note of the error code of the display.
7. Stop the engine and remove the starting key.
8. Determine the cause of the error (see following table), contact specialized workshop and have the error rectified as soon as possible.

SPN	FMI	Description of severe errors for the drive electronics
516400	12	Voltage level at control unit N001, connector XE05, PIN 2 is outside the permissible range
516401	12	Sensor voltage at control unit N001, connector XE05, PIN 3 is above the permissible range
516405	12	Voltage level at signal input, control unit N001, connector XE05, PIN 10 and PIN 11 is outside the permissible range.
516408	12	Travel speed mode signal (CAN) is faulty, implausible or is outside of the valid range.
516409	12	Voltage level at signal input, control unit N001, connector CC1, PIN 5 is outside the permissible range.
516410	12	Voltage level at signal input, control unit N001, connector CC2, PIN 4 is outside the permissible range.

SPN	FMI	Description of severe errors for the drive electronics
516413	12	Current intensity level at control unit N001, connector CC2, PIN 3 is outside the permissible range.
516414	12	Current intensity level at control unit N001, connector CC2, PIN 9 is outside the permissible range.
516416	12	Current intensity level at control unit N001, connector CC2, PIN 8 is outside the permissible range.
516417	12	The internal control unit temperature at the control unit N001 is not within the valid range
516418	12	Accelerator pedal signal (CAN) outside of the valid range
516419	12	Voltage level at signal input, control unit N001, connector CC2, PIN 11 is outside the permissible range.
516421	12	Voltage level at signal input, control unit N001, connector PPU2, PIN 2 is outside the permissible range.
516491	02	0x03: H1- Pump
516500	08	D002: CAN bus joystick BJM- timeout/abnormal clock rate of the redundant signal
516500	09	D002: CAN bus joystick BJM - timeout / abnormal clock rate
516500	19	D002: CAN bus joystick BJM- data receipt with active error status
516501	08	D002: CAN bus joystick EJM - timeout/abnormal clock rate of the redundant signal
516501	09	D002: CAN bus joystick EJM - timeout / abnormal clock rate
516501	19	D002: CAN bus joystick EJM - data receipt with active error status

SPN	FMI	Description of severe errors for the drive electronics
516699	09	P006: OMD- control unit counter faulty
516699	15	P006: OMD- threshold slightly exceeded - Recalibration required
517005	09	B006: Sensor of the engine coolant temperature - timeout / abnormal clock rate
517005	19	B006: Sensor for the engine coolant temperature- Data reception with active error status
517008	02	B009: Driving functions, speed sensor - signal and CAN message data faulty or not plausible
517008	09	CCVS1 - B009: Driving functions, speed sensor, Can bus communication - timeout / abnormal clock rate
517008	19	CCVS1 - B009: Driving functions, speed sensor, Can bus communication - data reception with active error status
517009	09	B010: Operating mode, Can bus communication - timeout / abnormal clock rate
517009	19	B010: Operating mode, Can bus communication - data reception with active error status
517015	04	B016: Temperature sensor for fan controller - Short circuit to ground / low voltage
517015	12	B016: Temperature sensor for fan controller - Internal control unit error
517015	28	B016: Temperature sensor for fan controller - Open wiring or short circuit to positive
517027	03	B028: Tilt cylinder angle sensor signal 2- Short circuit to positive or voltage high
517027	13	B028: angle sensor of the tilt cylinder, both signals - Data incorrect or not carried out
517027	27	B028: Tilt cylinder angle sensor signal 2- Short circuit to ground or voltage low
517056	09	B057: Sensor of the intake air temperature - timeout / abnormal clock rate
517056	19	B057: Sensor for the intake air temperature- Data reception with active error status
517101	03	B102: load pressure sensor for three-point rear lifting unit – short circuit to positive/high voltage
517101	12	B102: load pressure sensor for three-point rear lifting unit - Internal control unit error
517101	26	B102: load pressure sensor for three-point rear lifting unit - Parameterization outside of the valid range

SPN	FMI	Description of severe errors for the drive electronics
517101	27	B102: load pressure sensor for three-point rear lifting unit - Open wiring or short circuit to ground
517103	08	B104: Speed sensor of the PTO shaft: PTO shaft blocked or incorrect rotational direction
517103	09	B104: Speed sensor - timeout / abnormal clock rate
517104	03	B105: Three-point potentiometer - Signal 1 short circuit to positive / high voltage
517104	27	B105: Three-point potentiometer - Signal 1 open wiring or short circuit to ground
517113	03	B028: Tilt cylinder angle sensor signal 1- Short circuit to positive or voltage high
517113	24	B028: Tilt cylinder angle sensor - Plausibility error of software (angle change without joystick deflection or both signals are faulty)
517113	27	B028: Tilt cylinder angle sensor signal 1- Open wiring or short circuit to ground
517114	03	B105: Three-point potentiometer - Signal 2 short circuit to positive / high voltage
517114	27	B105: Three-point potentiometer - Signal 2 open wiring or short circuit to ground
517905	16	TEMP: System function monitoring, monitoring control unit -Signal 2- Signal very low
517906	16	System function monitoring, Sensor for voltage supply, Signal very high
517906	18	System function monitoring, Sensor for voltage supply, Signal very low
517912	12	Control unit - Saving error, loading error
517914	12	Control unit - Saving error, loading error
517915	12	Control unit - Saving error, loading error

SPN	FMI	Description of severe errors for the drive electronics
518060	09	0xF1: CAN bus jog dial- timeout / abnormal clock rate
518061	07	N023: button F1, jog dial- mechanics not reacting / clamp activated
518062	07	N023: button F2, jog dial- mechanics not reacting / clamp activated
518063	07	N023: button F3, jog dial- mechanics not reacting / clamp activated
518064	07	N023: button 4 back, jog dial- mechanics not reacting / clamp activated
518065	07	N023: button 5 home, jog dial- mechanics not reacting / clamp activated
518066	07	N023: press rotary wheel, jog dial- mechanics not reacting / clamp activated
518067	07	N023: turn rotary wheel to the right, jog dial- mechanics not reacting / clamp activated
518068	07	N023: turn rotary wheel to the left, jog dial- mechanics not reacting / clamp activated
518079	08	CAN communication - abnormal frequency - pulse width or period faulty
518079	09	CAN communication - Timeout error
518079	10	CAN communication - abnormal change rate - counter error
518079	19	CAN communication - Reception data with set error status, message memory overflow
518079	24	CAN communication - logic SW error - faulty message
518080	08	CAN communication - abnormal frequency - pulse width or period faulty
518080	09	0x1E drive interlock - Timeout / abnormal clock rate
518080	10	CAN communication - abnormal change rate - counter error
518080	19	0x1E drive interlock - CAN data reception with active error status
518080	24	CAN communication - logic SW error - faulty message
518081	8	CAN communication - abnormal frequency - pulse width or period faulty

SPN	FMI	Description of severe errors for the drive electronics
518081	9	CAN communication - abnormal update rate - Timeout of cyclical messages
518081	10	CAN communication - abnormal change rate - counter error
518081	19	CAN communication - Reception data with set error status, message memory overflow
518081	24	CAN communication - logic SW error - faulty message
518082	19	CAN communication - Machine control MVCU, reception data with set error status, message memory overflow
518960	02	S011: release, parking brake changeover contact – both signals, incorrect or implausible data
518974	07	S025: Differential lock button - mechanics not reacting / clamp activated
518974	19	S025 Differential lock button - data reception with active error status
518976	3	S027: Front socket activation switch - Short circuit to positive signal 1 and 2
518976	7	S027: Front socket activation switch - Missing response of mechanical system signal 1
518976	26	S027: Front socket activation switch - Signal outside the valid range of signal 1 and 2
518976	27	S027: Front socket activation switch - Open control circuit or short circuit to ground signal 1 and 2
518976	31	S027: Front socket activation switch - Signal 2 faulty condition met
518980	02	S031: CAN joystick 3rd control circuit / quickhitch plate, lock/unlock scroll wheel (B/A) - Data incorrect or not plausible
518980	07	S031: CAN joystick 3rd control circuit / quickhitch plate, lock/unlock scroll wheel (B/A) - Mechanics not responding / clamp activated
518980	19	S031: CAN- Joystick 3rd control circuit/ quickhitch plate, lock/unlock scroll wheel (B/A) - data reception with active error status
518983	02	S034: Scroll wheel FNR joystick- Data faulty or not plausible
518983	07	S034: Scroll wheel FNR joystick - mechanics not reacting / clamp activated
518983	19	S034 Scroll wheel FNR joystick - Data reception with active error status

SPN	FMI	Description of severe errors for the drive electronics
518987	02	S038: Retract / extend telescopic boom- Data faulty or not plausible
518987	07	S038: Retract / extend telescopic boom scroll wheel - mechanics not reacting / clamp activated
518987	19	S038: Retract / extend telescopic boom scroll wheel -Data reception with active error status
518989	02	S040: Release switch quickhitch facility change-over contact both signals - Data faulty or not plausible
518989	03	S040: Release switch quickhitch facility change-over contact signal - Short circuit to positive / high voltage
518989	07	S040: Release switch quickhitch facility change-over contact both signals -Mechanics not reacting / clamp activated
519015	07	S066: Neutral switch joystick - mechanics not reacting / clamp activated
519015	19	S066 Neutral switch joystick - data reception with active error status
519016	07	S067: Front socket activation switch - Missing response of mechanical system or incorrect setting
519016	26	S067: Front socket step switching - Signal outside of the valid range
519016	31	S067: Front socket step switching- Signal - faulty condition met
519033	02	S084: Bridging the overload of the change-over contact both signals - Data faulty or not plausible
519033	03	S084: Bridging the overload of the change-over contact- Short circuit to positive / high voltage
519033	07	S084: Bridging the overload of the change-over contact both signals - Mechanics not reacting / clamp activated
519041	07	S092: Button for automatic bucket reverse on joystick - mechanics not reacting / clamp activated
519041	19	S092 Button for automatic bucket reverse on joystick - Data reception with active error status
519053	02	S104 Release, both signals for operator presence switch - Signal faulty or not plausible
519053	04	S104: Release, operator presence switch channel 1- Threshold fallen below
519053	26	S104: Release, operator presence switch – Outside the valid range
519053	28	S104: Release, operator presence switch channel 1 - Open wiring or short circuit to positive
519058	07	S109: Button for electric circuit 1 joystick Weidemann - Mechanics not reacting / clamp activated
519058	19	'S109: Button for electric circuit 1 joystick Weidemann- Data reception with active status
519059	07	S110: Button for changeover valve on joystick - mechanics not reacting / clamp activated

SPN	FMI	Description of severe errors for the drive electronics
519059	19	S110 Button for changeover valve on joystick - Data reception with active error status
519065	02	S116: End position switch of the telescopic boom change-over contact both signals - Data faulty or not plausible
519065	03	S116: End position switch of the telescopic boom change-over contact - Short circuit to positive / high voltage
519065	24	S116: End position switch of the telescopic boom change-over contact - Logic error
519072	03	S123: Belt contact switch - Short circuit to positive / voltage high
519072	26	S123: Belt contact switch – Outside the valid values range
519072	27	S123: Belt contact switch - Open wires or short circuit to ground
519084	07	S135: Snail button on joystick - mechanics not reacting / clamp activated
519084	19	S135 Snail button on joystick - data reception with active error status
519085	07	S136: Rabbit button on joystick - mechanics not reacting / clamp activated
519085	19	S136 Rabbit button on joystick - data reception with active error status
519109	03	S159: Rear lifting unit, rear button for raising – short circuit to positive/high voltage
519109	07	S159: Rear lifting unit, rear button for raising - mechanics not reacting / clamp activated
519109	26	S159: Rear lifting unit, rear button for raising - Outside the valid values range
519109	27	S159: Rear lifting unit, rear button for raising - Open wiring or short circuit to ground
519110	03	S160: Rear lifting unit, rear button for lowering – short circuit to positive/high voltage
519110	07	S160: Rear lifting unit, rear button for lowering - mechanics not reacting / clamp activated
519110	26	S160: Rear lifting unit, rear button for lowering - Outside the valid values range
519110	27	S160: Rear lifting unit, rear button for lowering - Open wiring or short circuit to ground

SPN	FMI	Description of severe errors for the drive electronics
519120	04	S172: Switch for the crab steering mode lever - Short circuit to ground / low voltage
519120	26	S172: Switch for the crab steering mode lever – Outside valid values range
519120	28	S172: Switch for the crab steering mode lever - Open wiring or short circuit to positive
519123	03	S175: PTO shaft rear button - Short circuit to positive / voltage high
519123	07	S175: PTO shaft rear button - Mechanics not reacting / clamp activated
519123	26	S175: PTO shaft rear button - Outside the valid values range
519123	27	S175: PTO shaft rear button - Open wires or short circuit to ground
519303	02	SA 0x22: Front socket 14-pole, control unit machine control MVCU – incorrect or implausible data
519303	07	0x22: Front socket, 14-pole, control unit machine control MVCU - mechanics not reacting / clamp activated
519303	09	SA 0x22: Front socket 14-pole, control unit machine control MVCU – Timeout / abnormal clock rate
519303	19	SA 0x22: Front socket 14-pole, control unit machine control MVCU – Data reception with active error status
519351	09	AUX - XID 0x42: gear switch, CAN bus communication - timeout / abnormal clock rate
519351	19	AUX - XID 0x42: gear switch, CAN bus communication - data reception with active error status
519358	03	Y009: differential lock, lock changeover valve – short circuit against positive/high voltage
519365	06	Y016: 3rd control circuit / quickhitch plate, lock proportional valve - Current too high or short circuit against machine ground
519365	26	Y016: 3rd control circuit / quickhitch plate , lock proportional valve - Outside valid values range
519366	06	Y016: 3rd control circuit / quickhitch plate, unlock proportional valve - Current too high or short circuit against machine ground
519366	26	Y016: 3rd control circuit / quickhitch plate , unlock proportional valve - Outside valid values range
519369	03	Y020: load stabilizer, changeover valve activation – short circuit to plus/high voltage

SPN	FMI	Description of severe errors for the drive electronics
519370	03	Y021: load stabilizer, changeover valve activation – short circuit to plus/high voltage
519372	06	Y023: Telescopic boom, retract proportional valve - short circuit to ground / high current
519372	26	Y023: Telescopic boom, retract proportional valve - Outside valid values range
519373	06	Y024: Telescopic boom, extend proportional valve - short circuit to ground / low voltage
519373	26	Y024: Telescopic boom, extend proportional valve - Outside valid values range
519374	03	Y025: Quickhitch lock, lock release changeover valve - open wiring or short circuit to positive
519384	03	Y035: Fan solenoid valve - short circuit to positive / high voltage
519386	03	Y037: Reversing fan solenoid valve - short circuit to positive / high voltage
519393	06	Y044- Tipper solenoid valve / raise hitch - Current too high or short circuit against machine ground
519393	26	Y044: Tipper solenoid valve / raise hitch – Outside the valid values range
519394	06	Y045- Tipper solenoid valve / lower hitch - Current too high or short circuit against machine ground
519394	26	Y045: Tipper solenoid valve / lower hitch – Outside the valid values range
519395	03	Y046: Changeover valve for rear hydraulics - short circuit to positive / high voltage
519395	06	Y046: Changeover valve for rear hydraulics - short circuit to ground / low voltage
519396	03	Y047: Unlock autohitch solenoid valve - short circuit to positive / high voltage
519400	03	Y051: Changeover valve for 3rd control circuit - short circuit to positive/high voltage
519415	06	Y066: Raise boom solenoid valve – short circuit against ground/high current
519415	26	Y066: Raise boom solenoid valve – Outside the valid values range
519416	06	Y067: Lower boom solenoid valve – short circuit against ground/high current
519416	26	Y067: Lower boom solenoid valve – Outside the valid values range
519417	06	Y068: Tilt in solenoid valve – short circuit against ground/high current
519417	26	Y068: Tilt in solenoid valve – Outside the valid values range
519418	06	Y069: Empty shovel solenoid valve – short circuit against ground/high current
519418	26	Y069: Empty shovel solenoid valve – Outside the valid values range

SPN	FMI	Description of severe errors for the drive electronics
519461	03	Y113: Hydraulic trailer brake solenoid valve - short circuit to positive / high voltage
519464	03	Y116: Lower tipper solenoid valve – short circuit to positive/high voltage
519465	06	Y117: Raise three-point solenoid valve – short circuit against ground/high current
519465	26	Y117: Raise three-point solenoid valve - Signal outside of the valid range
519466	06	Y118: Lower three-point solenoid valve – short circuit against ground/high current
519466	26	Y118: Lower three-point solenoid valve - Signal outside of the valid range
519468	06	Y120: PTO shaft solenoid valve – short circuit against ground/high current
519468	26	Y120: PTO shaft solenoid valve – Outside the valid values range
519477	03	Y129: Rear hydraulics lowering mode solenoid valve - short circuit to positive / high voltage
519765	3	K016: Front socket activation switch - Short circuit to positive
519765	4	K016: Front socket activation switch - Short circuit to ground
519844	3	K095: Front socket left-right (A-B) - Short circuit to positive

SPN	FMI	Description of severe errors for the drive electronics
519844	4	K095: Front socket left-right (A-B) - Short circuit to ground
519845	3	K096: Front socket left-right (A-B) - Short circuit to positive
519845	4	K096: Front socket left-right (A-B) - Short circuit to ground
519846	3	K097: Front socket left-right (A-B) - Short circuit to positive
519846	4	K097: Front socket left-right (A-B) - Short circuit to ground
519847	3	K098: Front socket left-right (A-B) - Short circuit to positive
519847	4	K098: Front socket left-right (A-B) - Short circuit to ground
519849	3	K100: Front socket left-right (A-B) - Short circuit to positive
519849	4	K100: Front socket left-right (A-B) - Short circuit to ground
519850	3	K101: Front socket left-right (A-B) - Short circuit to positive
519850	4	K101: Front socket left-right (A-B) - Short circuit to ground
519851	3	K102: Front socket step switch - Short circuit to positive
519851	4	K102: Front socket step switch - Short circuit to ground
519902	09	R002: Service brake, Can bus communication - timeout / abnormal clock rate
519902	19	R002: Service brake, Can bus communication - data reception with active error status
519911	03	R011: accelerator pedal potentiometer - Signal 1 short circuit to positive / high voltage
519911	27	R011: accelerator pedal potentiometer - Signal 1 open wiring or short circuit to ground
519912	03	R012: Potentiometer manual throttle signal 1- Short circuit to positive or voltage high
519912	27	R012: Potentiometer manual throttle signal 1 open wiring or short circuit to ground
519913	02	R013- Potentiometer fill / empty shovel: Faulty signal or implausible signal
519913	07	R013: Potentiometer fill / empty shovel - mechanics not reacting / clamp activated
519913	19	R013 Potentiometer fill / empty shovel - Data reception with active error status
519914	02	R014: Potentiometer raise/lower- Both signals faulty or not plausible
519914	07	R014: Potentiometer raise / lower - mechanics not reacting / clamp activated
519914	19	R014 Potentiometer raise / lower - Data reception with active error status

SPN	FMI	Description of severe errors for the drive electronics
519923	03	R023: Angle sensor for boom, signal 1- Short circuit to positive or voltage high
519923	13	R023: angle sensor of the boom, both signals - Data incorrect or not carried out
519923	24	R023: Boom angle sensor - Plausibility error for software
519923	27	R023: Boom angle sensor signal 1- Open wiring or short circuit to ground
519939	03	R011: accelerator pedal potentiometer - Signal 2 short circuit to positive / high voltage
519939	27	R011: accelerator pedal potentiometer - Signal 2 open wiring or short circuit to ground
519940	03	R012: Potentiometer manual throttle signal 2- Short circuit to positive or voltage high
519940	27	R012: Potentiometer manual throttle signal 2 open wiring or short circuit to ground
519948	03	R023: Angle sensor for boom, signal 2- Short circuit to positive or voltage high
519948	27	R023: Boom angle sensor signal 2- Short circuit to ground or voltage low
519951	09	0xC8: Operating mode, Can bus keypad- timeout / abnormal clock rate
519952	07	S033: 3rd control circuit, Keypad button - mechanics not reacting / clamp activated
519953	07	S125: lowering modes, keypad button - mechanics not reacting / clamp activated
519954	07	S017: Work lights, Keypad button - mechanics not reacting / clamp activated
519955	07	S125: lowering modes, keypad button - mechanics not reacting / clamp activated
519956	07	S016: Work lights, Keypad button - mechanics not reacting / clamp activated
519957	07	S125: lowering modes, keypad button - mechanics not reacting / clamp activated
519958	07	S060: Working lights for telescopic boom, keypad button - mechanics not reacting / clamp activated
519959	07	S085: Lock for long-haul travel, keypad button - mechanics not reacting / clamp activated

SPN	FMI	Description of severe errors for the drive electronics
520001	09	0xC9: Operating mode, Can bus keypad- timeout / abnormal clock rate
520002	07	S047: Tilt cylinder lock, keypad button - mechanics not reacting / clamp activated
520003	07	S044: Load stabilizer, keypad button - mechanics not reacting / clamp activated
520004	07	S064: Reversing fan, keypad button - mechanics not reacting / clamp activated
520005	07	S018: Rotating beacon, Keypad button - mechanics not reacting / clamp activated
520006	07	S179/S027: Front socket, keypad button - mechanics not reacting / clamp activated
520007	07	S180: Front socket, keypad button - mechanics not reacting / clamp activated
520008	07	S181: Front socket, keypad button - mechanics not reacting / clamp activated
520009	07	S182: Front socket, keypad button - mechanics not reacting / clamp activated
520051	09	0xCA: Operating mode, Can bus keypad- timeout / abnormal clock rate
520052	07	S070: Tipper, keypad button - mechanics not reacting / clamp activated
520053	07	S070: Tipper, keypad button - mechanics not reacting / clamp activated
520054	07	S069: Rear additional control circuit, keypad button - mechanics not reacting / clamp activated
520055	07	S069: Rear additional control circuit, keypad button - mechanics not reacting / clamp activated
520056	07	S131/S183: Three-point / autohitch, keypad button - mechanics not reacting / clamp activated
520057	07	S131/S184: Three-point / autohitch, keypad button - mechanics not reacting / clamp activated
520059	07	S143: PTO shaft, keypad button - mechanics not reacting / clamp activated

Error code - overload control display unit

Description and function of the overload display – *see chapter 5 " Overload limit, overload display unit" on page 5-37*

LED colors in the overload control display:

- ➥ LED 1 – 4 green
- ➥ LED 5 orange
- ➥ LED 6 red

Error code - overload control display unit

01	02	03	04	05	06	Error	Cause
	x		x	x	x	Time out	Internal, program flow does not react within the expected time
x			x	x	x	Digital output error	Digital output does not react as expected
			x	x	x	Redundancy	Difference of sensor current in cells A & B > 10 %
x	x			x	x	Control unit error	Control unit not found, no answer or incorrect answer
x				x	x	Internal communication error	internal communication disrupted
x	x	x	x		x	Calculation error	Internal, calculation beyond threshold value
				x	x	Beyond range	Sensor current too high, sensor short circuit
	x		x		x	Cannot be calibrated	System has not been calibrated
x		x			x	Boom angle supplies incorrect signal or none at all	See error display in diagnostic tool
x					x	Below range	Sensor current too low, sensor not connected
		x	x	x		End switch delivers incorrect signal	See error display in diagnostic tool Contact an authorized service center
x			x	x		Incorrect on-board voltage	
x		x		x		Boom angle not or incorrectly calibrated	
		x		x		Incorrect +5 V supply	
	x	x	x			Release switch provides incorrect signal	
		x	x			Limit switch not correct	
	x		x			Malfunctioning proportional valve	
	x	x				Release switch bypassed/pressed too long	

Information

The fault correction and calibration of the overload warning device may only be performed by an authorized service center.

8.5 Malfunctions in the air conditioning system (option)

Repairing, filling up and emptying the air conditioning system may be performed only by an authorized service center!

Malfunctions in the air conditioning system	Possible causes	Remedy	See page
Fan does not run	Malfunctioning or loose fuse	Replace fuses	7-62
	Interrupted line	Contact an authorized service center	–
	Malfunctioning fan motor		–
	Malfunctioning fan switch		–
Fan cannot be switched off	Short circuit in cable or fan switch		–
Reduced fan output	Dirty contacts		–
	Undersized electric lines		–
	Very dirty heat exchanger	Clean the heat exchanger	7-68
Insufficient heating output or none at all	Flow temperature too low	Contact an authorized service center	–
	Malfunctioning thermostat		–
	Dirty heat exchanger fins	Clean the heat exchanger	7-68
Loss of refrigerant on equipment	Loose hose connection	Contact an authorized service center	–
	Damaged hose		–
	Damaged heat exchanger		–
Compressor does not run	Interruption in solenoid coil of compressor		–
	Loose or torn V-belt		7-52
	V-belt pulley does not turn even though magnetic clutch is applied		–
	Compressor clutch slips		–
	Malfunctioning controls		–
Condenser overflow	Expansion valve is stuck in open position		–
Iced-up evaporator	Thermostat sensor in wrong position		–
	Malfunctioning expansion valve or thermostat		–
Clogged condenser	Dirty radiator fins	Clean the condenser	7-68

Malfunctions in the air conditioning system	Possible causes	Remedy	See page
Loss of refrigerant	Interruption of refrigerant line	Contact an authorized service center	–
	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 center	–
	Malfunctioning fan motor		–
Very loud system	Loose or excessively worn V-belt		*7-52*
	Loose compactor bracket or worn inside parts of the compactor		–
	Excessive wear of fan motor		–
	System overfill		–
	Not enough refrigerant in the system		–

Notes:

9 Technical data

9.1 Model and trade names

Telehandler model	Trade name
418-12	TH627

9.2 Engine

Diesel engine		
Product	KOHLER	
Engine designation	KDI 2504 TCR	
Design	Water-cooled 4 stroke diesel engine	
Exhaust-gas treatment	Muffler[1]	Diesel oxidation catalytic converter (DOC)
Exhaust emissions according to EC standard 97/68 EC	EU level III/B[1]	EU level III/B
Number of cylinders	4	
Displacement	2482 cm³ (151.4 in³)	
Bore and stroke	88 x 102 mm (3.46 x 4.01 in)	
Output (as per ISO 14396)	55.4 kW (74 hp) at 2600 rpm	
Max. torque (anticlockwise rotation)	300 Nm (221.2 ft.lbs.) at 1500 rpm	
Max. engine speed without load	about 2600 rpm	
Idling speed	about 950 rpm	
Min. specific fuel consumption	210 g/kWh (7.4 oz./kWh)	
fuel injection system	Common rail direct fuel injection	
Firing order	1-3-4-2	
Max. slanting position[2] (engine no longer supplied with lubricating oil)	25°/30 minutes max. in all directions. Observe the tilting limit of the machine (20° laterally)!	

1. The engine corresponds to the exhaust level III/A **without a** certificate and is therefore not valid in the EU member states, the USA, Canada, Switzerland and Australia.
2. Loader unit in transport position

9.3 Traveling drive/axles

Variable displacement pump

Variable displacement pump	
Design (Sauer-Danfoss)	Automotive, infinitely variable hydrostatic axial-piston gearbox
Displacement	0 – 45 cm³/rev (0 – 2.47 in³/rev)
Max. operating pressure	450^{+30} bar (6400.3 psi)
Starting speed	1250 – 1350 rpm 50 bar (711.1 psi)
Max. engine speed Engine droop	2600 rpm 300 – 350 bar (4267 – 4978 psi)
Boost pump	
Design	Gear pump
Displacement	12 cm³/rev(0.73 in³/rev)
Charging/boost pressure	30 bar (426.6 psi) at max. rpm
Control	Electronic
Travel direction	Electro-hydraulic control
Inching (brake/inching pedal)	Electric (potentiometer)

Variable displacement motor

Variable displacement motor	20 km/h (30 km/h option)
Design (Sauer-Danfoss)	Axial piston motor flanged onto transfer gearbox (front axle)
Capacity	110 cm³/rev (6.7 in³/rev)
Speeds (forward/reverse)	**1st speed:** 0 – 7 km/h (0 – 4.3 mph) **2nd speed:** 0 – 15 km/h (0 – 9.3 mph) **3rd speed series:** 0 – 20 km/h (0 – 12.4 mph) **3rd speed (option):** 0 – 30 km/h (0 – 18.6 mph)
Traction force[1]	44 kN (9891.5 lbf)

1. With tires 12.5-18

Front axle

Front axle with flanged transfer gearbox	
Design	Planetary steering and drive axle, rigid screw connection with frame
Differential lock	100 % differential
King-pin inclination	0°
Camber	0°
Steering angle	Max. 38°
Toe-in	0 mm
Track[1]	1600 – 1680 mm (62.9 – 66.1 in)

1. With standard tires

Rear axle

Rear axle	
Design	Planetary steering and drive axle, oscillating bearing on frame
Differential lock	None
King-pin inclination	0°
Camber	0°
Oscillation angle	±10°
Steering angle	Max. 38°
Toe-in	0 mm
Track[1]	1600 – 1680 mm (62.9 – 66.1 in)

1. With standard tires

9.4 Brakes

Service brake	
Design	Foot-operated hydraulic disc brake with braking effect on all wheels via gearbox – differential cardan shaft
Location	Drive shaft (rear axle)
Brake fluid	Special brake fluid on a mineral-oil basis **(ATF)** *– see chapter 7 " Overview of lubricants" on page 7-13*

Parking brake	
Design	Manual, mechanical disc brake on rear axle drive shaft

9.5 Tires

Tire size	Tire pressure	Wheel rims		
	Front/rear bar (psi)	Rim	Wheel offset mm (in)	Speed limitation km/h (mph)
340/80-18 (12.5-18) 135B MPT01	3.25 (47.0)	11x18	35 (1.37)	-
340/80-18 (12.5-18) 134D MPT-04 12PR[1]				
340/80-20 (12.5-20) 136B MPT01		11x20	58 (2.28)	
405/70-20 152B MPT01 16PR		13 x 20	50 (1.96)	
400/70 R20 IND Multi-use 550	3.5 (50.0)			
400/70 R20 149 A8/B BIBLOAD				
400/70 R20 XMCL 149 A8 149B				
12-16.5[1] / 140 A3 10PR SK-02	4.5 (65.0)	9.75 x 16.5	20 (0.78)	15 (9.32)
10-16.5[1] 12PR		16.5x8.25	5 (0.2)	-
33x12-20 156A5 BEEFY BABY SDS	-	20x7.5	35 (1.37)	25 (15.53)

1. Not approved for machine travel on public roads.

9.6 Steering system

Steering system	
Design	Hydrostatic 4 wheel steering with emergency steering features
Steering mode	All-wheel steering, front axle steering and diagonal steering (crab steering)
Assemblies	Gear pump, priority valve, servostat with safety valves, 1 steering cylinder per axle with end position synchronization in the cylinder, reversing valve for steering mode “Front axle, diagonal and all-wheel steering”
Max. pump pressure	260 bar (3770.9 psi)
Max. steering pressure[1]	175 bar (2538.1 psi)

1. Measured after the servostat

9.7 Work hydraulics

Hydraulic pump, control valve, hydraulic oil filter

Hydraulic pump, control valve, hydraulic oil filter	
Hydraulic pump	36 cm³/rev (2.19 in³/rev)
Design	Fixed displacement pump (gear pump)
Displacement	89 l/min (23.5 gal/min) at 2600 rpm
Location	On variable displacement pump drive
Hydraulic oil filter	Return filter
Control valve	4 or 5-times pilot controlled

Hydraulic cylinder protection

Hydraulic ram protection	
Max. service pressure[1]	260 bar (3770.9 psi)
Secondary protection of tilt ram:	
Rod side	280 bar (4061.0 psi)
Base side	280 bar (4061.0 psi)
Secondary protection of lift ram	
Base side	280 bar (4061.0 psi)
Secondary protection of push-out ram	
Rod side	280 bar (4061.0 psi)
Base side	200 bar (2900.7 psi)
Quickhitch ram (3rd control circuit) secondary protection:	
Max. operating pressure	280 bar (4061.0 psi)

1. Measured at control valve

Lift, tilt and push-out rams: velocity

With constant pump 36 cm³/rev (2.19 in³/rev)	
Ram/function[1]	**Time/seconds**
Lifting cylinder	
Raise	Approx. 6.6
Lower	Approx. 4.3
Tilt cylinder	
Tilt in	Approx. 2.8
Tilt out	Approx. 2.9
Push-out cylinder	
Retract	Approx. 3.5
Extend	Approx. 5.5

1. Measured with standard bucket and retracted telescopic boom

Usable consumer pressure at the hydraulic flat connector plugs

With constant pump 36 cm³/rev (2.19 in³/rev)		Approximate values		
Quick coupler	**Function**	**rpm**	**Liters/min (gal/min)**	**bar (psi)**
Quick coupler at front on quickhitch facility	3rd control circuit without pressureless return	1900 1500 950	58.1 (15.3) 44.4 (11.7) 32.5 (8.6)	170 (2465.6) 200 (2900.7) 220 (3190.8)
	3rd control circuit, dual-acting	1900 1400 950	58.1 (15.3) 41.0 (10.8) 32.5 (8.6)	160 (2320.6) 200 (2900.7) 220 (3190.8)
Flat connector plug at rear of machine (option)	Electric control connectable (solenoid valve) via 5-fold control device, dual acting	2100 1400 950	61.5 (16.2) 41.0 (10.8) 32.5 (8.6)	150 (2175.5) 200 (2900.7) 220 (3190.8)

Three-point mount with PTO shaft (optional)

Designation	
Lift capacity	2000 daN (4496.18 lbf) [1]
PTO shaft speed	540 rpm at 2600 rpm
PTO shaft output	18 kW (24.14 hp) at 2600 rpm and 215 bar system pressure

1. Considering the gross axle weight rating and the permissible gross weight rating of the telehandler, see *on page 9-16 "Weight"*.
Only under the prerequisite that at least 20% of the actually present gross weight rating is allotted to the front axle. Otherwise the vehicle is considered "incapable of steering!"
The front can additionally be ballasted in compliance with the aforementioned requirements.

9.8 Electrical system

Electric units / light bulbs

Designation	power
Alternator	14 V 80 A
Starter	12 V 2.0 kW (2.7 hp)
Battery	12 V/100 Ah
Light bulb – high beam (left/right)	12 V 55 W/H3
Light bulb – low beam (left/right)	12 V 55 W/H7
Light bulb – parking light (left/right)	12 V 4 W
Light bulb – front and rear turn indicators (left/right)	12 V 21 W
Light bulb – brake/rear lights (left/right)	12 V 21/5 W
Light bulb – working light[1]	12 V 55 W/H3
Light bulb – rotating beacon	12 V 55 W/H1
Light bulb – interior light	12 V 10 W

1. LED 12 V / 30W (optional)

Fuse assignment (A)

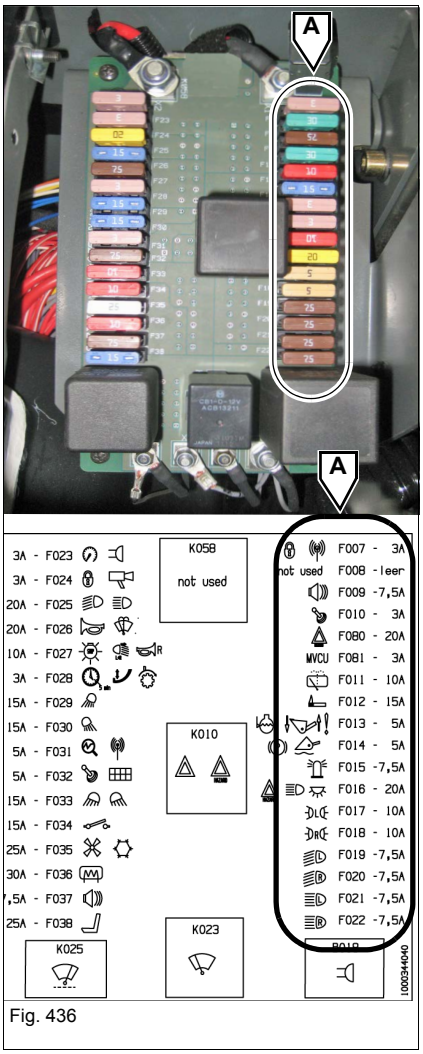


Fig. 436

The printed circuit board with the fuses is located under the cover in the switch console on the right on the instrument panel
– see chapter 7 " Relays, fuses on the printed circuit board" on page 7-66.

Item	No.	Rated current (A)	Protected circuit
A	F007	3	Drive interlock, telematics
	F008	–	Not assigned
	F009	7.5	Radio
	F010	3	Joystick
	F080	20	Hazard warning lights
	F081	3	High side signal controller
	F011	10	Rear window wiper
	F012	15	12 V power outlet
	F013	5	Overload warning device, coolant level
	F014	3	Parking brake, seat contact switch push button switch S045 load stabilizer, safety belt contact switch
	F015	7.5	Rotating beacon
	F016	20	Light switch S014 (terminal 30) warning light, light flasher, interior lights
	F017	10	Side light on left, number plate lights
	F018	10	Side light right, search light
	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 assignment (B)

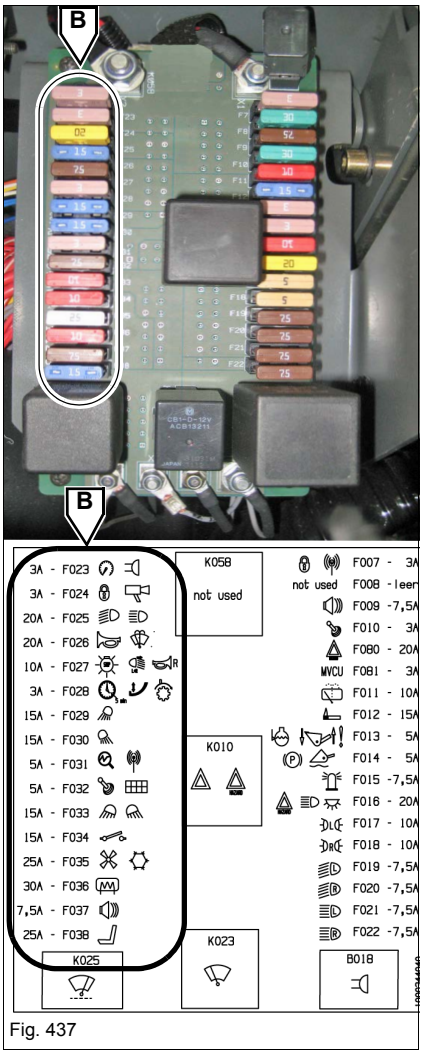


Fig. 437

The printed circuit board with the fuses is located under the switch console on the right on the instrument panel – *see chapter 7 " Relays, fuses on the printed circuit board" on page 7-66*.

Item	No.	Rated current (A)	Protected circuit
B	F023	3	Display instrument, buzzer, search lights
	F024	3	Drive interlock, camera
	F025	20	Light switch S014, S0 19 (terminal 15)
	F026	20	Front windshield wiper, front signal horn
	F027	10	Brake light, left/right reverse light, reversing alarm
	F028	3	Rear window heating: time-lag relay, S159, S160, Auto-Hitch S137, RPM sensor B104, sensor B102
	F029	15	Front working light
	F030	15	Rear working light
	F031	53	Coupling signal, telematics, diagnostics
	F032	5	Keypad, oil volume setting (jog dial), joystick for three-point mount, joystick for work hydraulics
	F033	15	Work light on telescopic boom
	F034	15	7 or 14-pole front plug receptacle
	F035	25	Heater, air-conditioning system (optional) compressor, fan
	F036	30	Window heating
	F037	7.5	Radio
	F038	25	Heated seat, lumbar support, compressor

Fuse assignment (C)

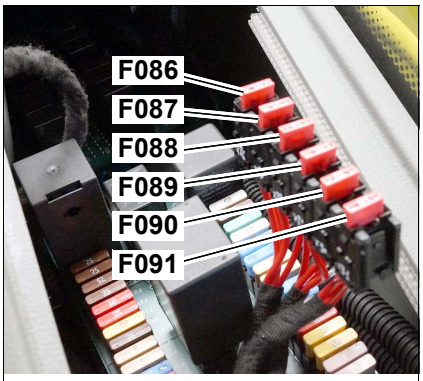


Fig. 438

The plug console with the fuses is located under the switch console on the right on the instrument panel *– see chapter 7 " Relays, fuses on the printed circuit board" on page 7-66*.

Item	No.	Rated current (A)	Protected circuit
C	F086	10	Input voltage of cabin controller
	F087	10	
	F088	10	
	F089	10	
	F090	10	
	F091	10	

Relay on the printed circuit board

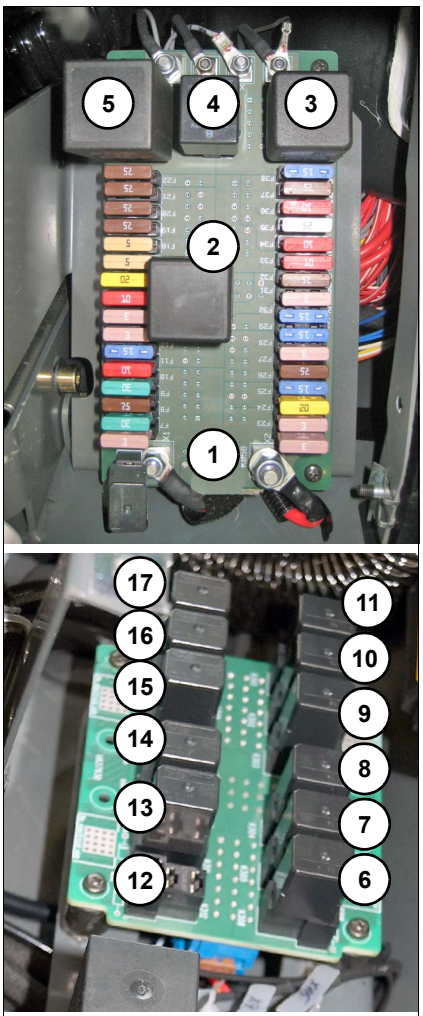


Fig. 439

The printed circuit board with the relays (shown from above) is located under the cover on the switch console on the right on the instrument panel *– see chapter 7 " Relays, fuses on the printed circuit board" on page 7-66*.

Item	Switching relays[1]	Protected circuit
1	K058	Not assigned
2	K010	Turn indicator relay
3	K025	Relay interval
4	K023	Relay for windshield wiper level 1
5	B018	Buzzer
6	K306 (K101)	Relay of 7-pole plug receptacle
7	K305 (K016)	Relay of 7-pole plug receptacle
8	K304 (K033)	Relay of windshield heating
9	K303 (K049)	Relay of work light on telescopic boom
10	K302 (K047)	Relay of rear work light for cabin
11	K301 (K048)	Relay of front work light for cabin
12	K312	Not assigned
13	K311 (K030)	Brake relay
14	K310 (K114)	Rotating beacon relay
15	K309 (K003)	Backup warning system relay
16	K308	No function
17	K307 (K102)	Relay of 7-pole plug receptacle

1. The switch relay designation in the parenthesis (..) refers to the circuit diagram

Main fuse box with relays in the engine compartment

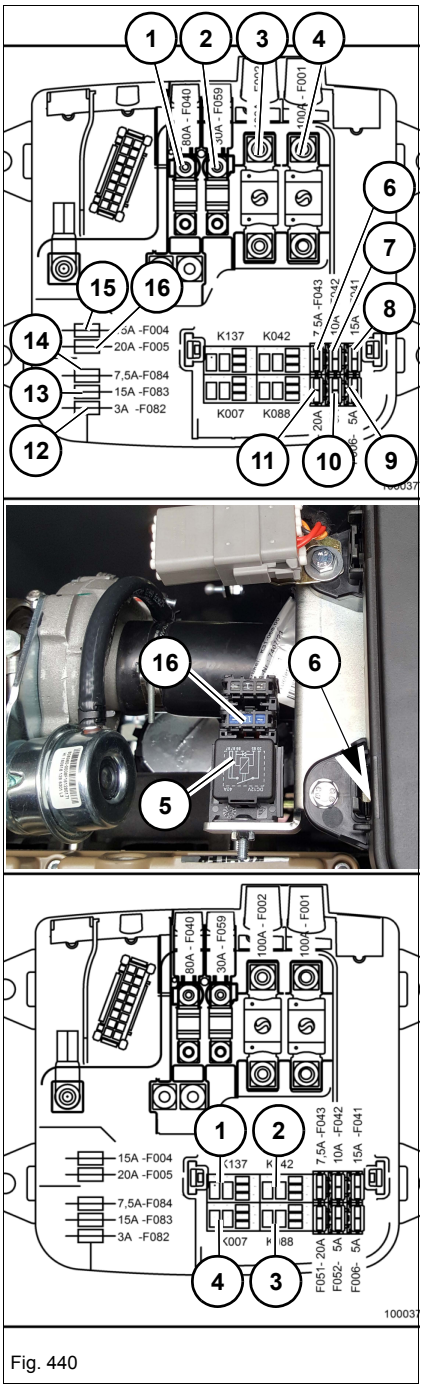


Fig. 440

The main fuse box is located in the engine compartment.

Fuses

Item	Fuse	Rated current (A)	Protected circuit
1	F040	80	Control valve N004
2	F059	30	14-pole plug receptacle
3	F002	100	Cabin terminal 30
4	F001	100	Cabin terminal 15
5	F043	7.5	Starter switch S001
6	F042	10	Control valve N004
7	F041	15	Traction electronics H1
8	F006	5	ECU terminal 30
9	F052	5	EGR (exhaust gas recirculation system)
10	F051	20	Starter relay
11	F082	3	Central lubrication system
12	F083	15	DPF kit terminal 30 (optional)
13	F084	7.5	Pressure relief of 3rd control circuit
14	F004	15	Fuel pump, DPF kit terminal 15 (optional)
15	F005	20	ECU engine controller
16	F045	15	Fuel preheater (option)

Relays

Item	Relays	Protected circuit
1	K137	DPF relay (option)
2	K042	Main relay ECU
3	K088	Fuel pump
4	K007	Relay starter
5	K031	Fuel preheater
6	K001	High current relay[1] (200 A)

1. The high current relay is attached below the main fuse box on the rear wall

Camera (option)

Screen

Designation	
Screen diagonal	7 ” (178 mm)
Resolution	800 x 480 pixels
Brightness	500 cd / m²
Image format	16 : 9 (wide screen)
Viewing angle	100° vertically, 120° horizontally
Display mode	normal / mirrored
Video inputs	3 pieces
Operating voltage	12 - 48 V direct current
Power consumption at 12 V	560 mA
Power consumption	26 W (max.)
Operating / storage temperature	-30 - 80 °C (-22 – 176° F)
Video signal	FBAS
Video system	PAL / NTSC
Brightness regulator	integrated CDS sensor, automatic / manual
Size (W x H x D)	210 mm x 128 mm x 83 mm (8.27 x 5.0 x 3.27 in)
Weight	470 g (1.04 lb), 620 g (1.37 lb) with light protection hood
Shock resistance	30 g (0.06 lb.)
Degree of protection	IP30, dust and spray-water protected

Camera

Designation	
Image sensor	CMOS 1/4”
Resolution	720 (r) x 576 (f)
Horizontal / vertical viewing angle	115° / 91°
Light sensitivity	< 1 lux
Video signal	FBAS
Video system	NTSC
Operating voltage	12 V direct current
Power consumption	max. 50 mA
Operating temperature	-35 - 75 °C (-31 – 167° F)
Storage temperature	-40 - 85 °C (-40 – 185° F)
Protective system	IP69K, Dust-proof and high-pressure cleaning suitable
Size (L x W x H)	33 mm x 38 mm x 52 mm (1.3 x 1.5 x 2 in)
Weight	about 80 g (0.18 lb)
Housing material	Aluminum
Shock resistance	30 g (0.06 lb.)

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	400 $^{\pm 20}$ Nm (295$^{\pm}$14 ft.lbs.)

9.10 Coolant

Outside temperature	Water[1]	Antifreeze[2]
Up to °C (°F)	% by volume	% by volume
4 (39)	99	–
-10 (14)	79	20
-20 (-4)	65	34
-25 (-13)	59	40
- 29 (-20)	**55**	**45**
- 42 (-43)	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. Antifreeze concentrate -60°C (-76°F) – *see "Vehicle fluids and lubricants" on page 7-13*.

9.11 Noise emissions

Outside noise level	
Sound power level	**dB (A)**
Measured value	103
Guaranteed value	104
Operator-perceived noise level	
Sound pressure level (LPA)	**dB (A)**
Measured as perceived by the operator in the cabin	80
Outside noise level	
Sound power level	**dB (A)**
Stationary	78
Moving	81

Information

This measurement occurs according to the guidelines 2000/14 EC, modified by the directive EC 2005/88 EC!

Operator-perceived noise level measured according to EN ISO 11201. Measurements performed on asphalted surface.

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	$< 0.5 \frac{m}{s^2}$ [3] $< 1.28 \frac{m}{s^2}$ [4]

1. Instruct or inform the operator of dangers arising from vibrations
2. Uncertainty of measurement of the vibration measurement according to DIN EN 474-1:2014-03 and EN 12096:1997
3. On flat and solid ground with corresponding driving
4. Application in extraction under harsh environmental conditions

9.13 Weight

Weights	
Curb weight[1]	min. 4200 kg (9259.4 lb.) max. 5000 kg (11,023.1 lb.)
Permissible maximum weight	7500 kg (16,534.7 lb.)
Front axle weight rating	4480 kg (9876.7 lb.)
Rear gross axle weight rating	4480 kg (9876.7 lb.)

1. The weight depends on the tires and the scope of options without the attachment with operator 80 kg (176.3 lb.) and a full diesel tank.

9.14 Payload/lift capacity/stability

Trailer weight

Optional ball hitch (see certification logo in machine documentation).

Permissible trailer load with automatic ball hitch	Self-propelled work machine
Trailer without brakes	750 kg (1653 lb.)
Trailer with brakes (1 braked axle)	3500 kg (7716 lb.)
Trailer with brakes (all axles braked)	8000 kg (17,636 lb.)
Trailer with hydraulic brakes	11,250 kg (24,801.5 lb.)
Max. authorized load of towing gear[1]	4000 kg (8818 lb.)

1. **Caution!** The towing device may only be used for recovering the vehicle.

Drawbar load

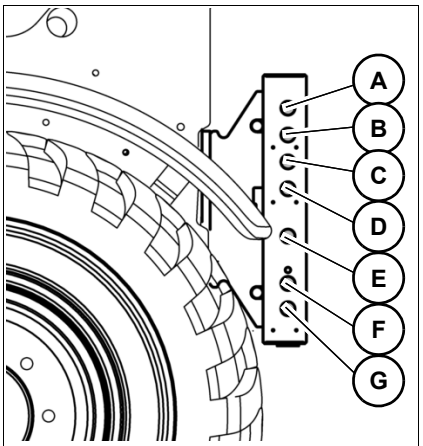


Fig. 441

With a height-adjustable trailer coupling, the drawbar load depends on the position and must be observed accordingly.

Trailer coupling model	Position	Drawbar load kg/lb
Height adjustable trailer coupling	**A**	750 /1653.5
	B	750 / 1653.5
	C	1000 / 2204.6
	D	1000 / 2204.6
	E	1250 / 2755.8
	F	1250 / 2755.8
	G	1250 / 2755.8
Height-adjustable ball coupling[1]	-	250 / 551.2
Rigid trailer coupling	-	1250 / 2755.8
Auto-Hitch	-	1250 / 2755.8

1. Weight regardless of position

Breakout force

Breakaway force/scraping depth	132° kinematics	150° kinematics
Lifting cylinder	28 kN (6294.6 lbf)	29 kN (6519.4 lbf)
Tilt cylinder	44 kN (9891.6 lbf)	32 kN (7193.8 lbf)
Scraping depth[1]	150 mm (5.9 in)	

1. With standard bucket and tires 12.5-18

Payload of the loader bucket

Maximum authorized bucket payloads = pallet forks payloads – bucket weight.

➥ Bucket curb weight, see type label affixed on bucket.

➥ Pallet fork payload *– see "Load-bearing capacity tables – KRAMER, WEIDEMANN, EURO pallet forks" on page 9-19*.

Calculation example for retracted telescopic boom

➥ Payload 2700 kg (5952.4 lb) (see pallet fork load diagram) - 600 kg (1322.7 lb)
bucket curb weight = 2100 kg (4629.7 lb) actual payload in the bucket.

Calculation example for extended telescopic boom

➥ Payload 1000 kg (2204.6 lb) (see pallet fork load diagram) - 600 kg (1322.7 lb)
bucket curb weight = 400 kg (881.8 lb) actual payload in the bucket.

Load-bearing capacity tables – KRAMER, WEIDEMANN, EURO pallet forks

KRAMER pallet forks

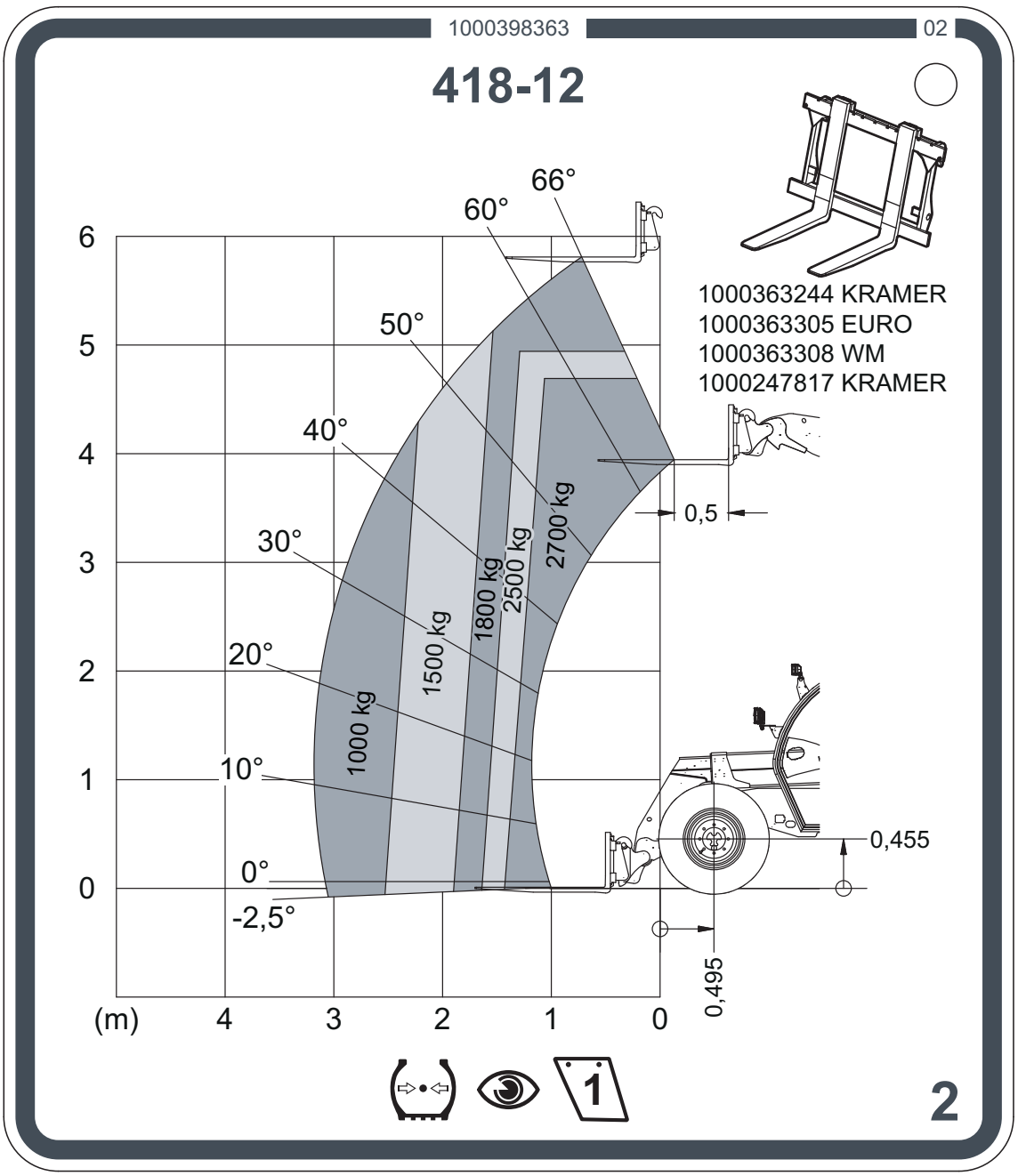
- Model no. 1000363244, load center 0.5 m (1.64 ft.)
- Model no. 1000247817, load center 0.5 m (1.64 ft.)

WEIDEMANN pallet forks

- Model no. 1000363308, load center 0.5 m (1.64 ft.)

EURO pallet forks

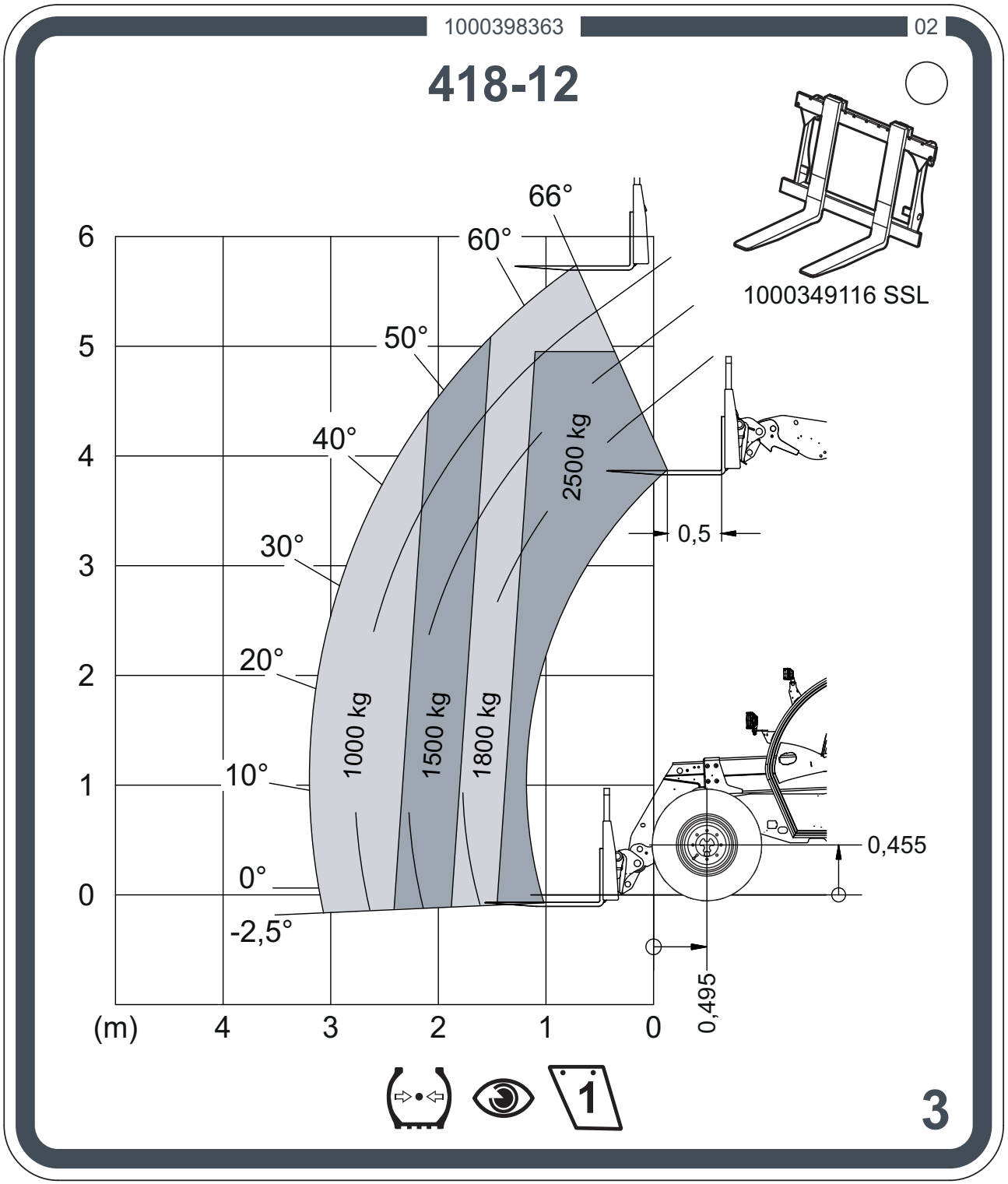
- Model no. 1000363305, load center 0.5 m (1.64 ft.)



Reading example: *– see chapter 5 " Reading example: Load-bearing capacity diagram KRAMER, WEIDEMANN, EURO" on page 5-100*.

SKID STEER pallet forks

- Model no. 1000349116, load center 0.5 m (1.64 ft.)

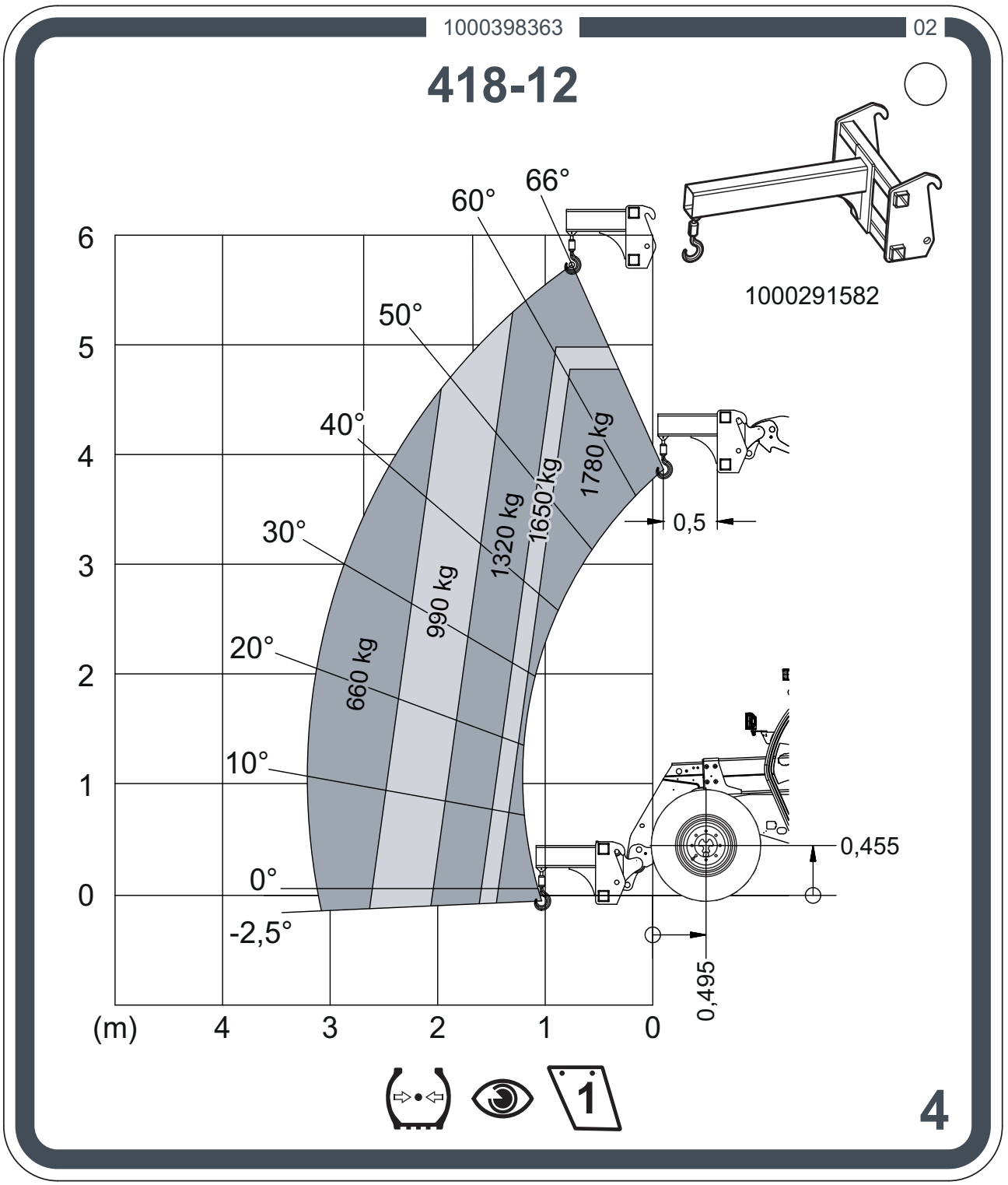


Reading example: load-bearing diagram – see page *5-100* and *5-108*.

Load-bearing tables load hook (optional)

Load hook (optional) for the KRAMER quickhitch facility

- **Load** model no. 1000291582,
  load center 0.5 m (1.64 ft)

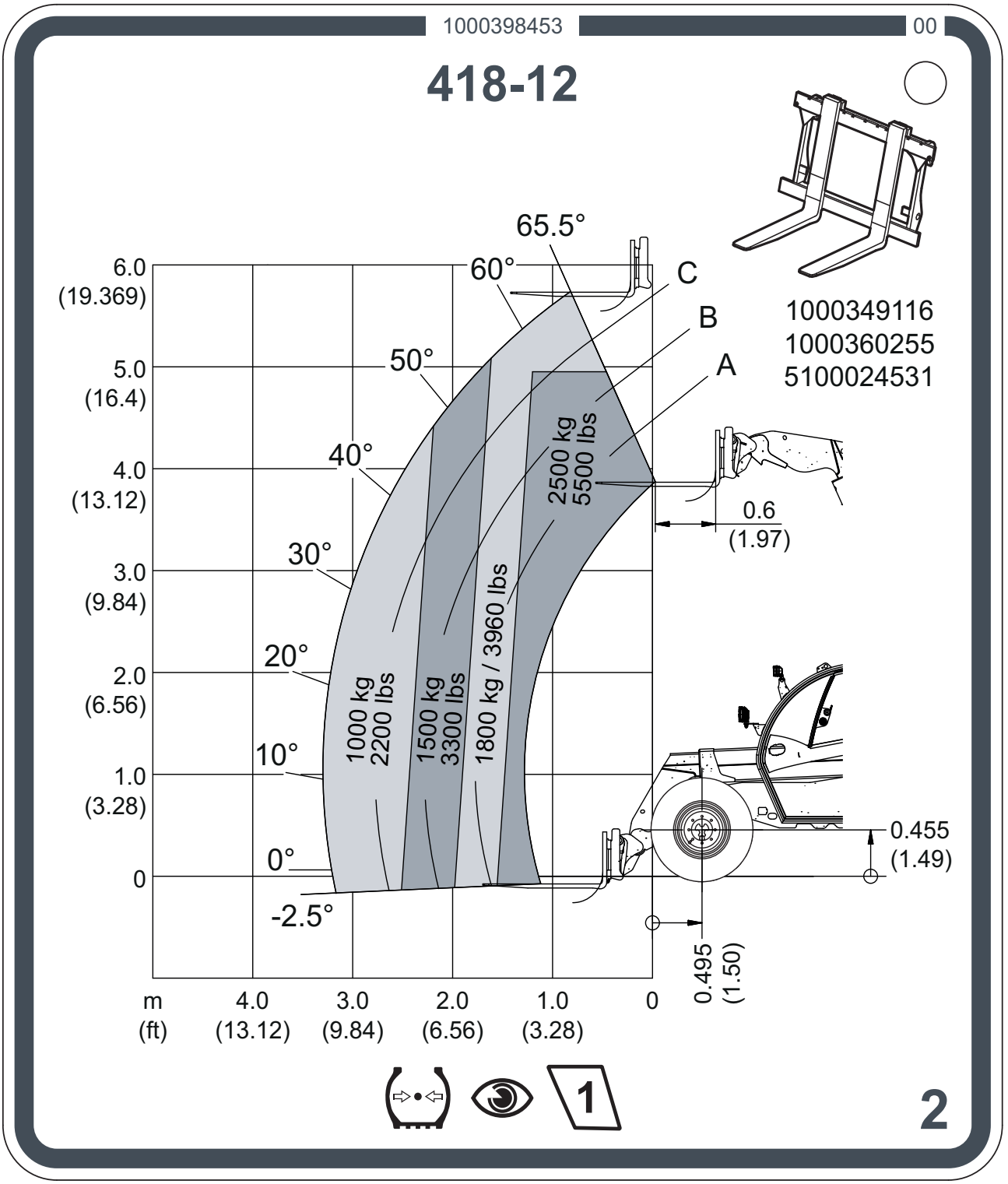


Reading example: load-bearing diagram – see page *5-100* and *5-108*.

Load bearing tables – SKID STEER attachments USA

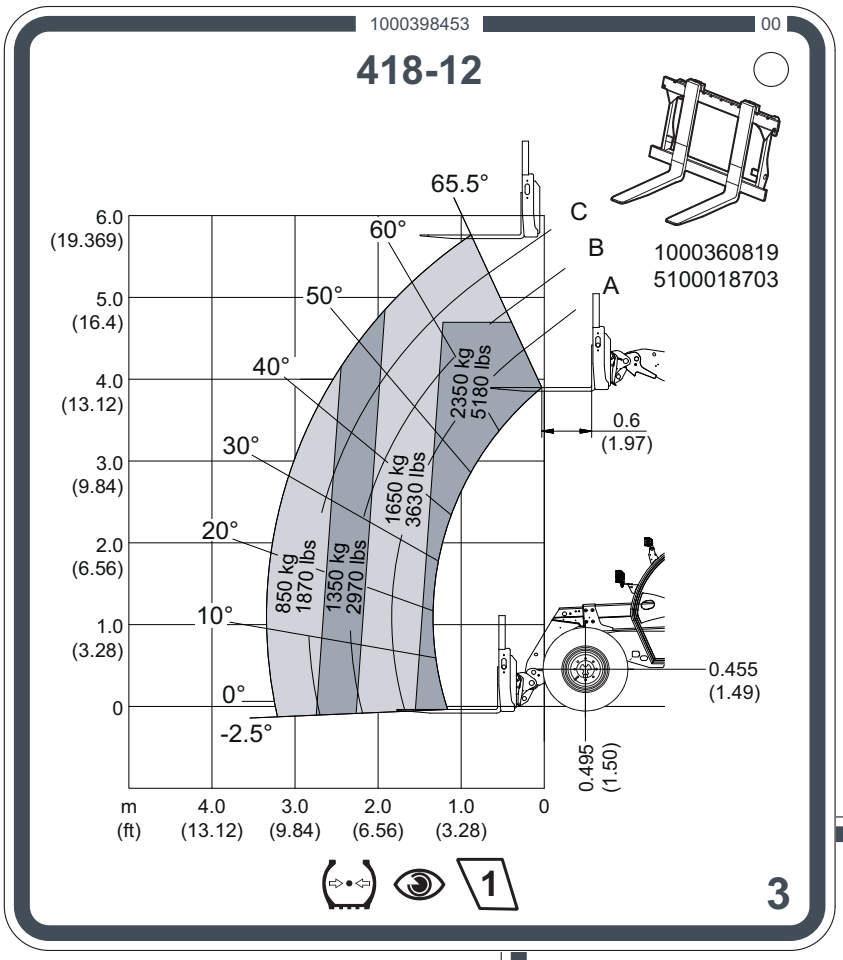
SKID STEER pallet forks

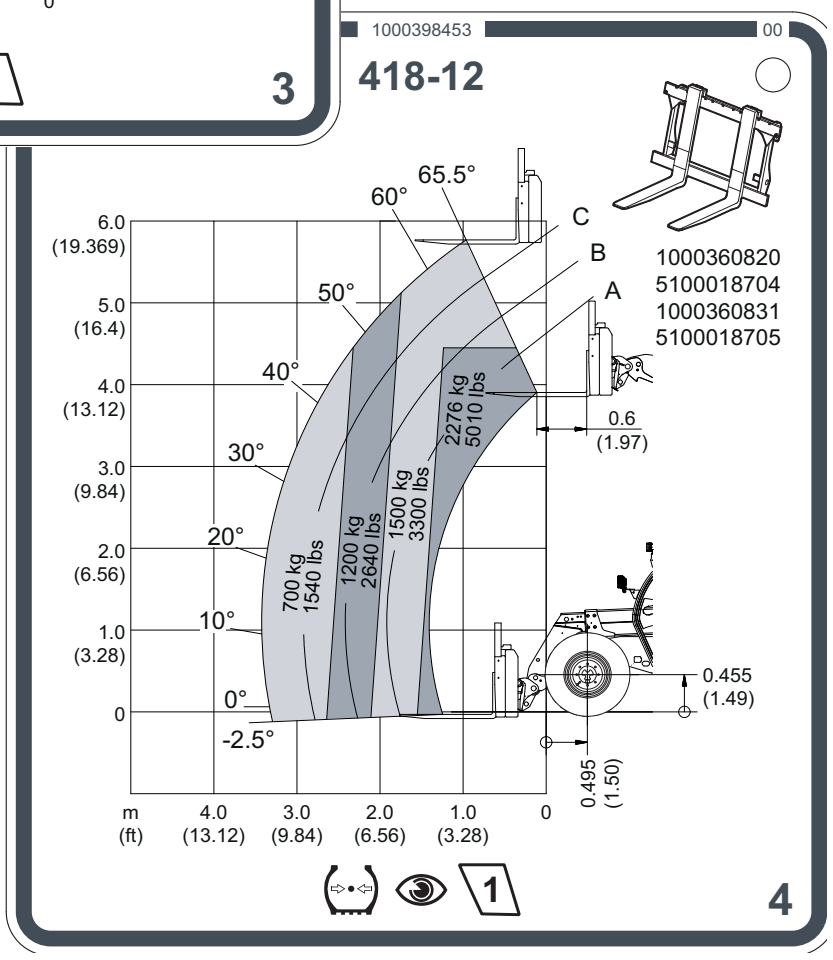
- Model no. 1000349116, load center 0.6 m (1.97 ft.)



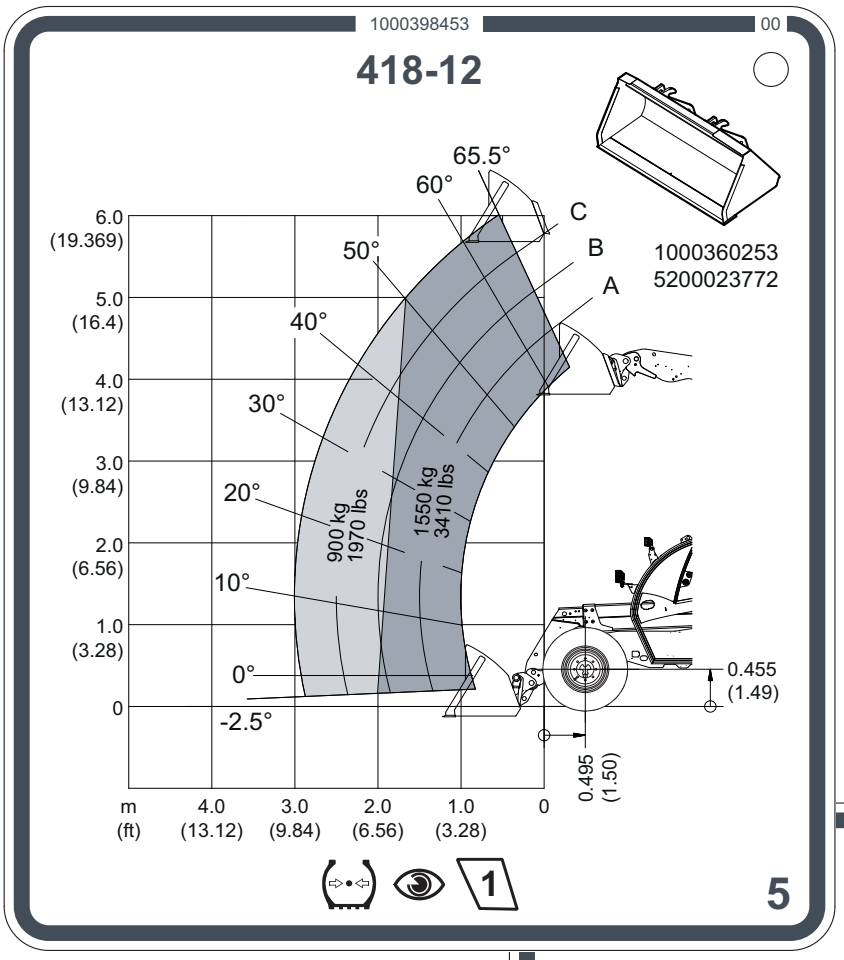
Reading example: load-bearing diagram – see page 5-100 and 5-108.

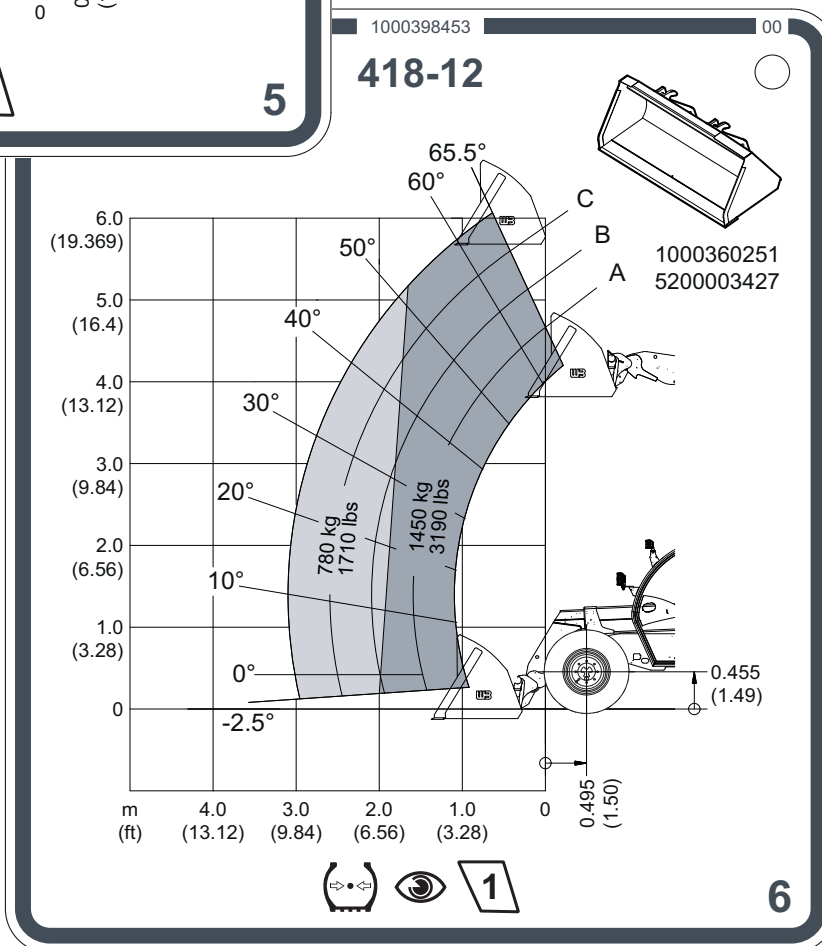
SKID STEER pallet fork (only available in USA)



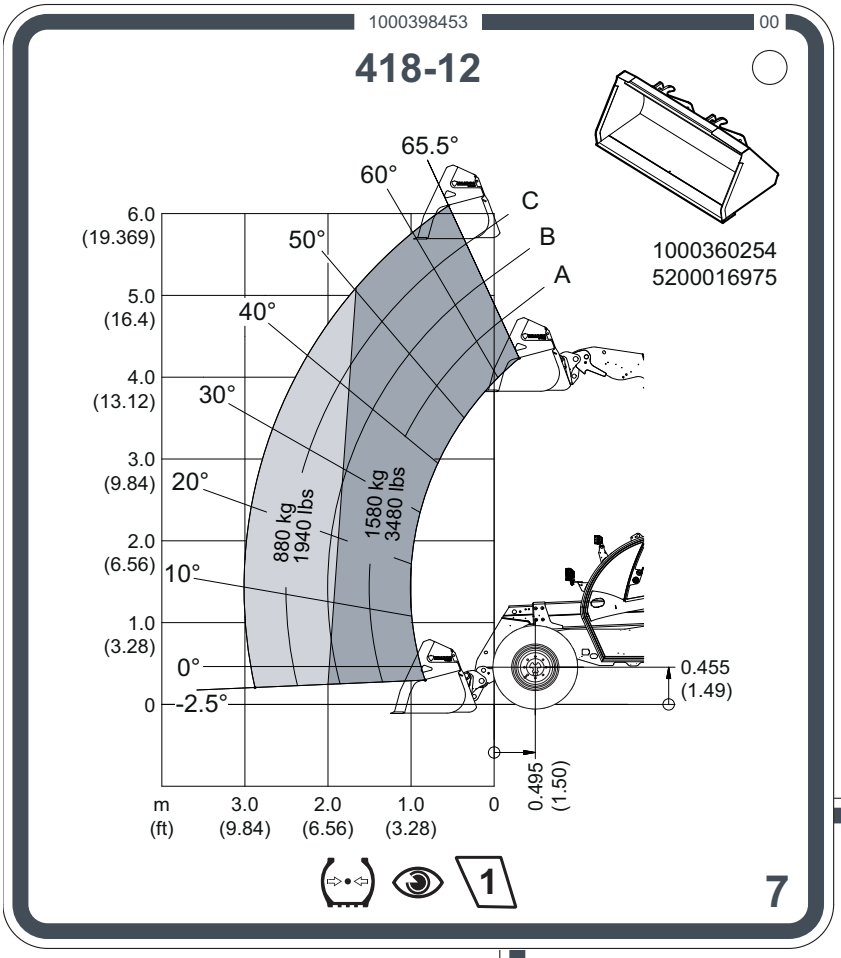


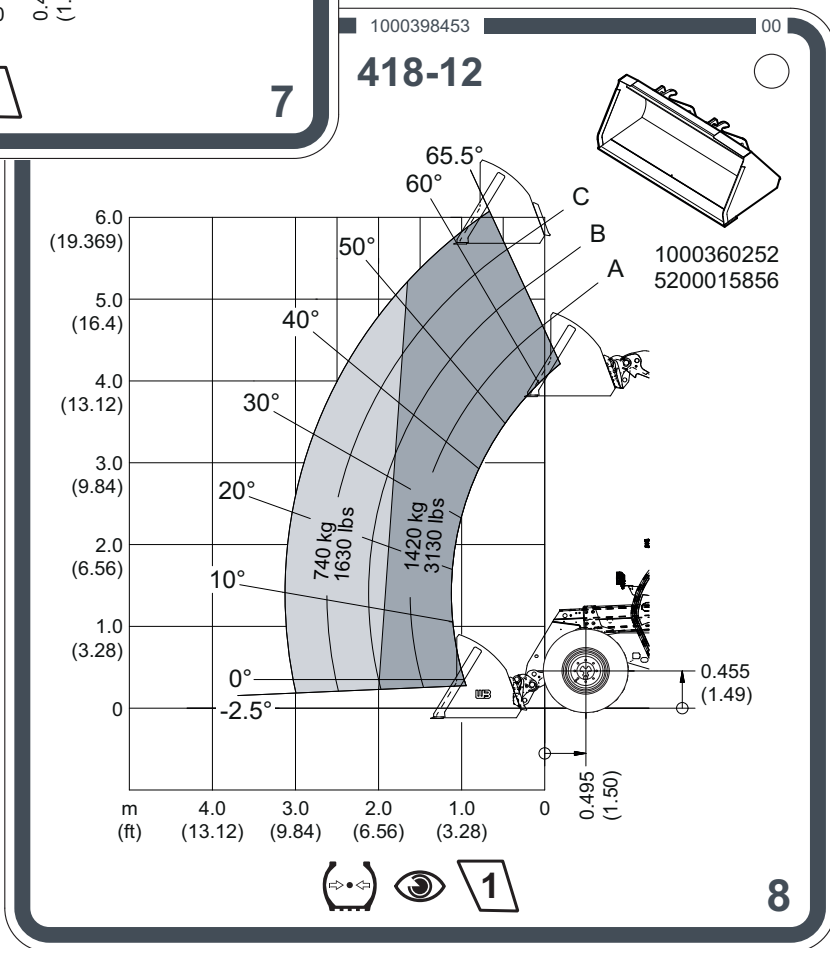
SKID STEER bucket (only available in USA)





SKID STEER bucket (only available in USA)

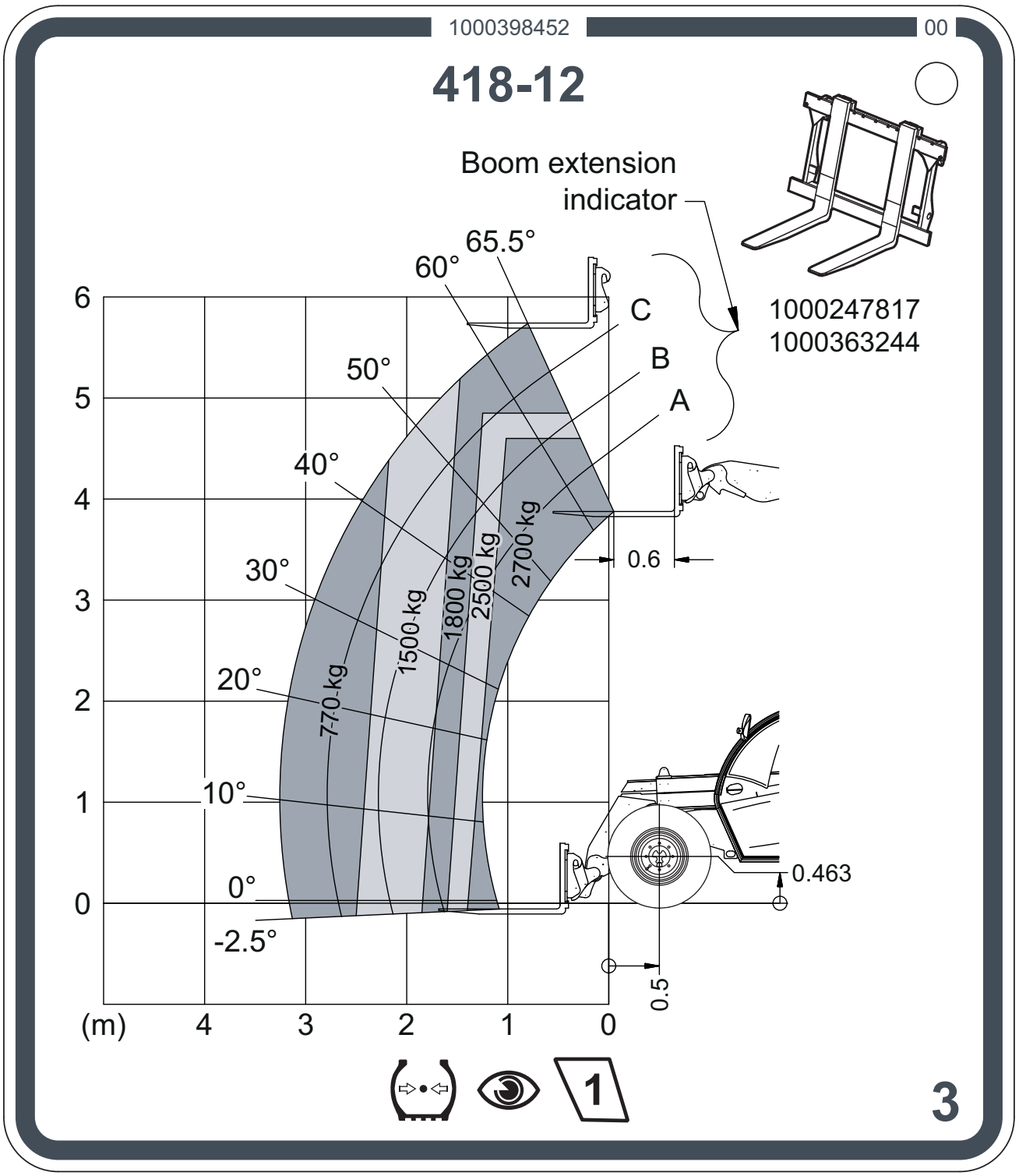




Load bearing tables – Attachments in Australia

KRAMER pallet fork Australia

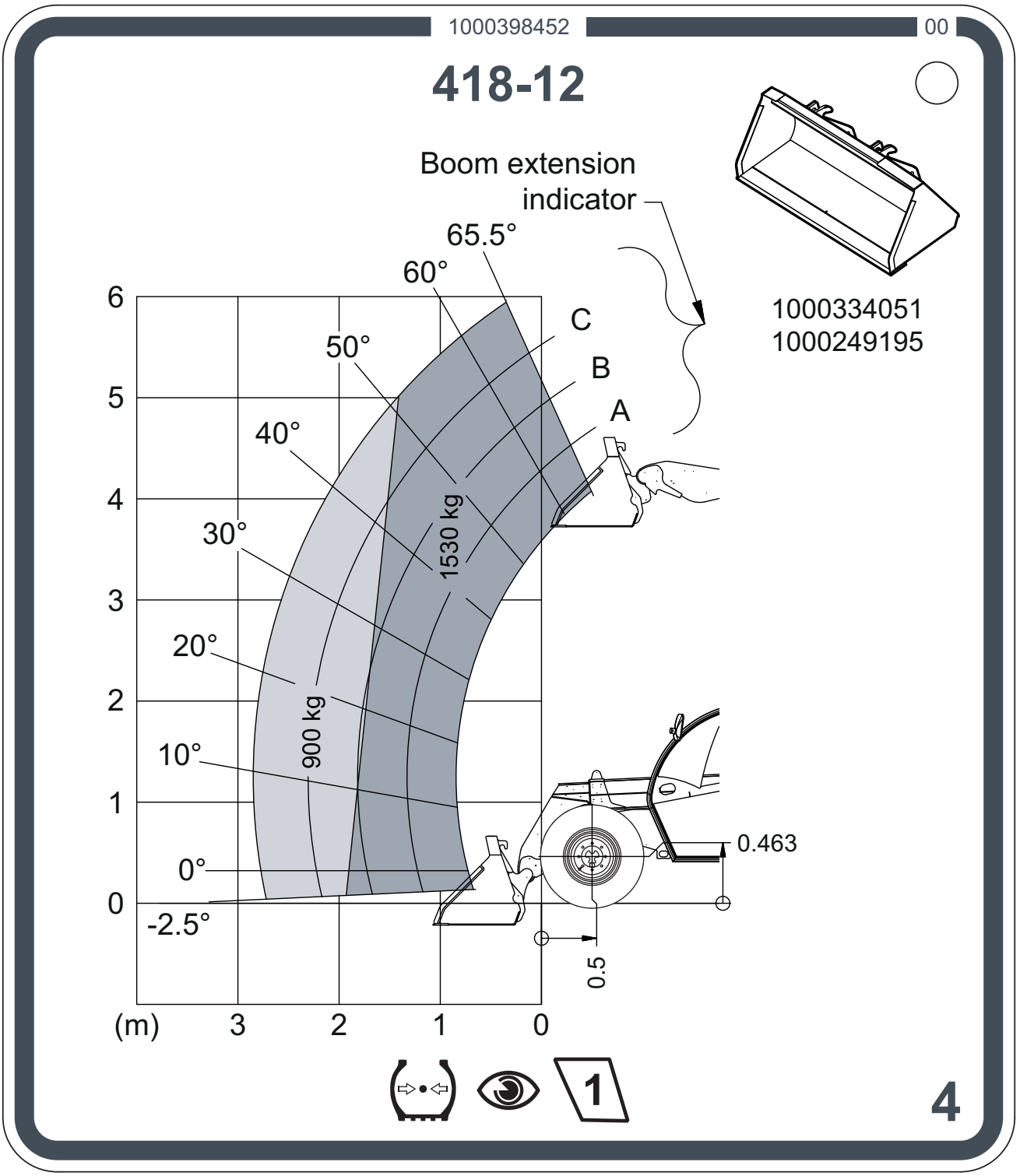
- Model no. 1000247817, load center 0.6 m (1.97 ft.)
- Model no. 1000363244, load center 0.6 m (1.97 ft.)



Reading example: *– see chapter 5 " Reading example: Load-bearing diagram for SKID STEER pallet fork and for Australia" on page 5-101*

KRAMER bucket Australia

- Model no. 1000334051, load center 0.6 m (1.97 ft.)
- Model no. 1000249195, load center 0.6 m (1.97 ft.)



Reading example: *– see chapter 5 " Reading example: Load-bearing diagram for SKID STEER pallet fork and for Australia" on page 5-101*

9.15 Dimensions

Important information about the dimensions

Dimensions shown as a function of the attachment are only valid with KRAMER quickhitch facility and attachments. For third-party attachments, these have to be individually adapted.

Dimensions with KRAMER bucket (part 1)

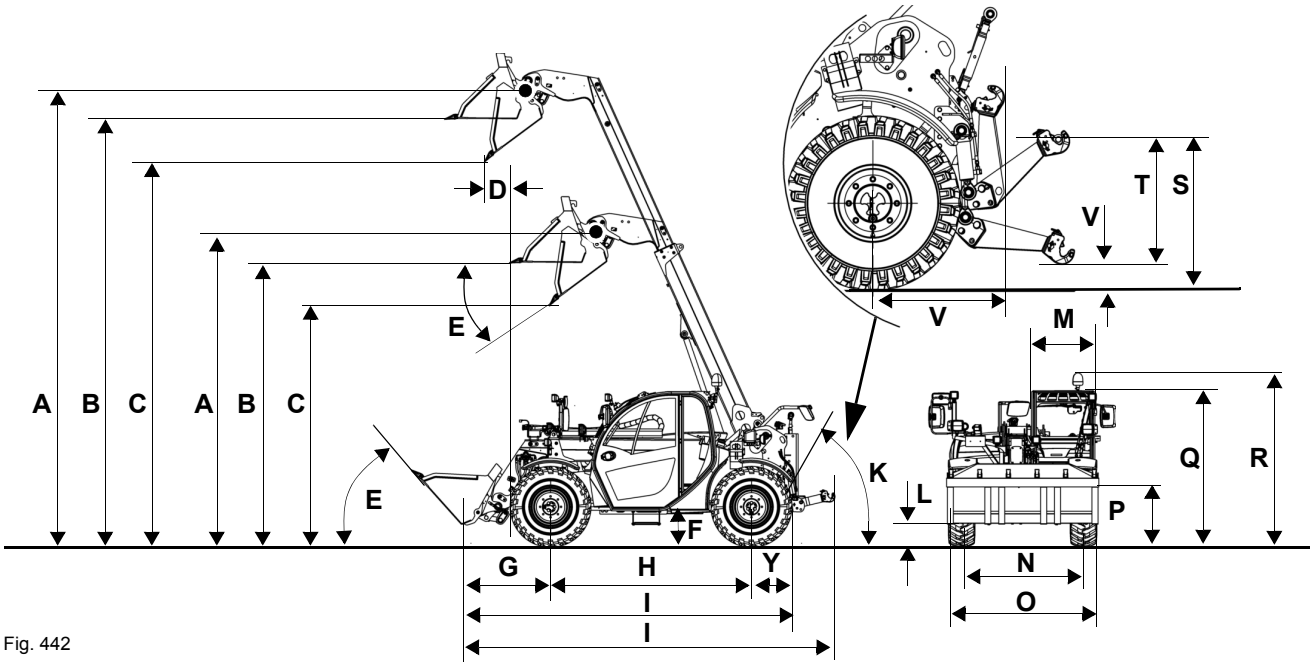


Fig. 442

Dimensions with bucket[1]		Retracted	Extended
A	Pivotal point of quickhitch facility[2]	4240 mm (166.9 in)	6080 mm (239.3 in)
B	Load-over height[2, 3]	3730 mm (146.8 in)	5600 mm (220.4 in)
C	Tilt-out height[2, 3]	3450 mm (135.8 in)	5280 mm (207.8 in)
D	Tilt reach[2, 3]	–	680 mm (26.7 in)
E	Tilt-in angle[3]/tilt-out angle **with 132° kinematics**	45°/22°	
E	Tilt-in angle[3]/tilt-out angle **with 150° kinematics**	45° / 40°	
F	Ground clearance underneath axle and gearbox[4]	300 mm (11.8 in)	
G	Middle of front wheels to front edge of quickhitch facility	1030 mm (40.5 in)	
H	Center wheelbase (front/rear axles)	2650 mm (104.3 in)	
I	Overall length[5] with quick coupler system without attachment, without ball hitch	4400 mm (173.2 in)	
	Total length with three-point mount (option)	4920 mm (193.7 in)	
Y	Middle of rear wheels to rear edge of ball hitch	730 mm (28.7 in)	
K	Departure angle[6]	76°	

1. Measured with KRAMER quickhitch facility and standard bucket
2. Measured with tires 12.5-18, with tires 12.5-20 + 30 mm (1.18 in) / 405/70-20 + 40 mm (1.5 in) / 12-16.5 - 70 mm (2.7 in) / 10-16.5 - 90 mm (3.5 in)
3. with standard bucket *1000334051*
4. Without guard for cardan shaft joint (option)
5. With ball hitch +70 mm (2.7 in) (Opt)
6. With ball hitch 51° (optional)

Dimensions with KRAMER bucket (part 2)

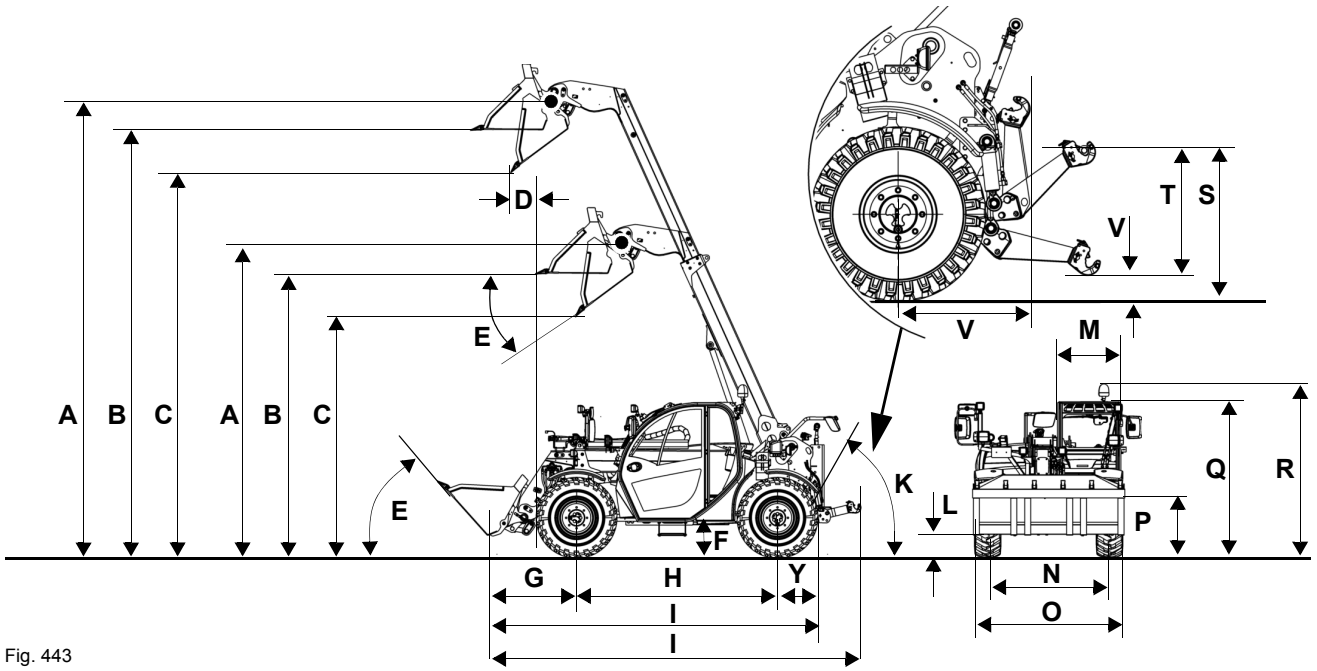


Fig. 443

Dimensions with bucket[1]		Retracted	Extended
L	Transport position of attachment	175 mm (6.8 in)	
M	Inside width of cabin	825 mm (32.4 in)	
N	Front/rear track width	about 1660 mm (65.3 in)	
O	Overall width without bucket[2]	1960 mm (77.1 in)	
P	Cabin floor access height[3]	480 mm (18.9 in)	
Q / R	Overall height[3, 4]	2105 mm (82.9 in)	
S	Maximum height of the lower linkage three-point mount (optional)[3]	819 mm (32.2 in)	
T	Stroke of the lower linkage three-point mount (optional)[3]	640 mm (25.2 in)	
V	Minimal height of the lower linkage three-point mount (optional)[3]	179 mm (7.05 in)	
V	Rear wheel middle to the three-point mount (optional) in the transport position	750 mm (29.5 in)	
–	Turning radius of outer edge of wheels[3]	3670 mm (144.4 in)	
–	Turning radius between walls[5]	4500 mm (177.1 in)	

1. Measured with KRAMER quickhitch facility and standard bucket
2. Measured with folded-in mirrors
3. With tires 12.5-18
4. With rotating beacon + 230 mm (9.0 in)
5. With standard bucket *1000334051*

Dimensions with KRAMER pallet forks

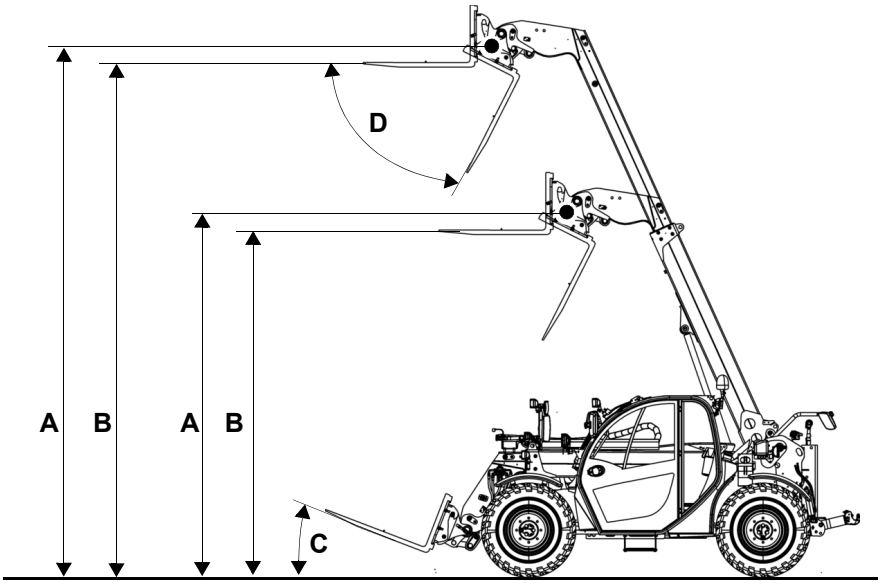


Fig. 444

Dimensions with pallet forks[1]		Retracted	Extended
A	Pivotal point of quickhitch facility[2]	4240 mm (166.9 in)	6080 mm (239.3 in)
B	Pallet height[2]	3900 mm (153.5 in)	5730 mm (225.5 in)
C	Tilt-in angle in transport position **with 132° kinematics**	21°	
C	Tilt-in angle in transport position **with 150° kinematics**		
D	Tilt-out angle **with 132° kinematics**	45°	
D	Tilt-out angle **with 150° kinematics**	63°	
–	Turning radius: with forks between walls	4500 mm (177.1 in)	

1. Measured with KRAMER quickhitch facility and pallet forks
2. Measured with tires 12.5-18, with tires 12.5-20 + 30 mm (1.18 in) / 405/70-20 + 40 mm (1.5 in) / 12-16.5 - 70 mm (2.7 in) / 10-16.5 - 90 mm (3.5 in)

➥ Other *"Dimensions" on page 9-28*.

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 vehicles.

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

Exclusively built for Wacker Neuson.

Kramer-Werke GmbH

Wacker-Neuson-Str. 1

D-88630 Pfullendorf
Germany

ROUGH TERRAIN FORKLIFT TRUCKS

www.aem.org

SAFETY MANUAL

FOR OPERATING AND MAINTENANCE PERSONNEL

Contents

Acknowledgment

We wish to acknowledge the contributions of the members of AEM's Rough Terrain Forklift Truck Council to the preparation of this Safety Manual.

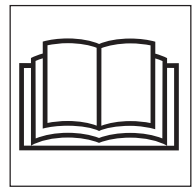
Revised 09/96, 03/03, 05/09

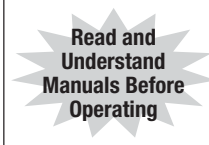
Foreword

This safety manual is intended to point out some of the basic safety situations that may be encountered during the normal operation and maintenance of a rough terrain forklift truck and to suggest possible ways of dealing with these conditions. This manual is **NOT** a substitute for the manufacturer's operator's manual(s).

Additional precautions may be necessary, or some instructions may not apply, depending on equipment, attachments and conditions at the worksite or in the service area. The manufacturer has no direct control over equipment application, operation, inspection or maintenance. Therefore, it is **YOUR** responsibility to use good safety practices in these areas.

The information provided in this manual supplements the specific information about the truck that is contained in the manufacturer's manual(s). Other information that may affect the safe operation of this equipment may be contained on safety signs or in insurance requirements, employer's safety and training programs, safety codes, local, state/provincial and federal laws, rules and regulations.





IMPORTANT! Before you operate the rough terrain forklift truck, make sure you have the manufacturer's manual(s). If the manufacturer's manuals are missing, obtain replacement manuals from your employer, equipment dealer or directly from the manufacturer. Keep this safety manual and the manufacturer's manual(s) with the machine at all times. Read and understand all manuals.

Safety videos are available from some manufacturers. Operators are encouraged to periodically review the safety video.

Safety Alerts

Symbol

This Safety Alert Symbol means: **"ATTENTION! STAY ALERT! YOUR SAFETY IS INVOLVED!"**

The Safety Alert Symbol identifies important safety messages on equipment, safety signs, in manuals or elsewhere. When you see this symbol, be alert to the possibility of death or personal injury. Follow instructions in the safety message.

Reasons Safety is Important to You:

— Accidents disable and kill.
— Accidents cost.
— Accidents can be avoided.

Signal Words

Signal words are distinctive words that will typically be found on safety signs on the machine and other worksite equipment. These words may also be found in this manual and the manufacturer's manuals. These words are intended to alert the operator to a hazard and the degree of severity of the hazard.

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

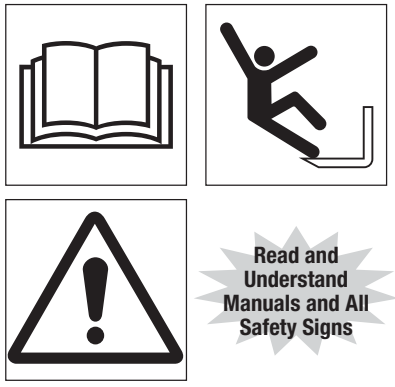
NOTICE indicates a property damage message.

A Word To The User/Operator

It is **YOUR** responsibility to read and understand the safety manual and the manufacturers' manuals before operating this rough terrain forklift truck. This safety manual takes you step by step through your working day.

It is important that you know and apply all applicable laws and rules including OSHA requirements for operator training and certification. **In the USA, OSHA Rule 29 CFR 1910.178(l) requires employers to train employees operating rough terrain forklift trucks.**

Graphics have been provided to help you understand the text.



Remember that **YOU** are the key to safety. Good safety practices not only protect you but also protect the people around you. Study this manual and the manufacturers' manuals for your specific machine. Make them a working part of your safety program. Keep in mind that this safety manual is written only for rough terrain forklift trucks.

Contact the manufacturer of your equipment to answer any questions about safe operation that remain after studying the manufacturers' manual(s) and this safety manual.

Practice all other usual and customary safe working precautions and above all:

REMEMBER — SAFETY IS UP TO YOU!

YOU CAN PREVENT SERIOUS INJURY OR DEATH CAUSED BY UNSAFE WORK PRACTICES!

The Rough Terrain Forklift Truck

"Rough Terrain Forklift Truck" is a generic term used to describe powered industrial forklift trucks, generally with pneumatic tires, intended for use on unimproved natural terrain as well as disturbed terrain construction sites. Machines designed primarily for earth-moving, even though their buckets or blades are replaced by forks, are not considered to be rough terrain forklift trucks.

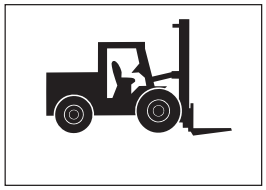
"Rough Terrain" does not mean that the truck can be safely operated on every conceivable type of terrain.

This manual covers two basic types of Rough Terrain Forklift Trucks.

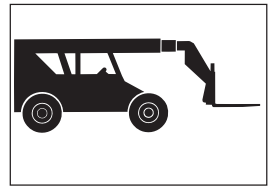
Vertical Mast Type.

Variable Reach Type.

IMPORTANT! This manual covers safe practices for rough terrain forklift trucks equipped with various types of forks. If your truck is equipped with other attachment devices, consult the manufacturer's operating and safety manual(s) pertaining to such equipment before proceeding. This manual does not cover truck-mounted type forklift trucks. Truck-mounted forklift trucks are covered in their specific safety manual.



Vertical Mast Type



Variable Reach Type

Follow A Safety Program

Protect Yourself

Wear personal protective clothing and Personal Protective Equipment (PPE) issued to you or called for by job conditions.

You may need:
— Hard hat
— Safety shoes
— Safety glasses, goggles or face shield
— Heavy duty gloves
— Hearing protection
— Reflective clothing
— Wet weather gear
— Respirator or filter mask

Wear whatever is needed—don't take chances.

WARNING! Prevent death or serious injury from entanglement. **Do not wear loose clothing or accessories. Stay away from all rotating components when the engine is running.** Contact, wrapping or entanglement with rotating or moving parts could result in death or serious injury.

Follow A Safety Program

Protect Yourself (continued)

To further your knowledge of safety practices and procedures, take advantage of available training programs.

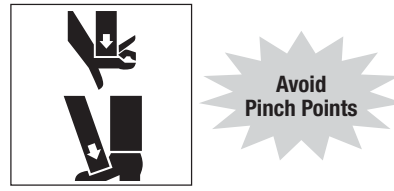
Never smoke while operating the machine. Never fill the fuel tank with the engine running or near an open flame. Make sure you have adequate visibility and adequate ventilation.

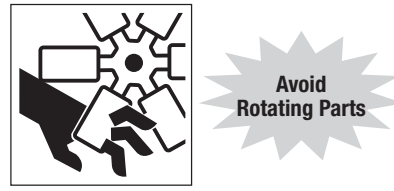
Know the pinch points and rotating parts on the truck—awareness on YOUR part can prevent accidents.

Never climb on the mast or boom or other areas of the rough terrain forklift truck. You may injure yourself or get pinned or wedged from a fall.

Never attempt to operate the controls except from the operator's seat. Improperly controlled functions could produce unexpected movement.

WARNING! Never leave the operator's seat without first safely shutting down the machine. A running, unattended rough terrain forklift truck could unexpectedly move or be operated by inexperienced personnel.





Follow A Safety Program

Be Alert!

Know where to get assistance. Know the location and how to use a first aid kit and fire extinguisher/fire suppression system.

Be Aware!

Take advantage of training programs offered.

Be Careful!

Human error is caused by many factors: carelessness, fatigue, overload, preoccupation, unfamiliarity of operator with the machine, drugs, and alcohol to name a few. Damage to the equipment can be fixed in a short period of time, but injury, or death, has a lasting effect.

For your safety and the safety of others, encourage your fellow workers to act safely.

WARNING! Drugs and alcohol affect an operator's alertness and coordination and the operator's ability to safely operate the equipment. **Never use drugs or alcohol while operating the equipment. Never knowingly allow anyone to operate equipment when their alertness or coordination is impaired.** An operator taking prescription or over-the-counter medication must consult a medical professional regarding any side effects of the medication that would hinder their ability to safely operate this equipment.

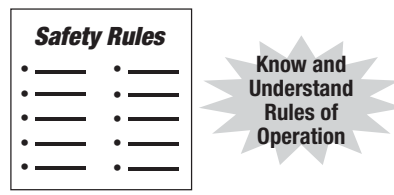
Follow A Safety Program

Know The Rules

Most employers have rules governing operation and maintenance of equipment. Before you start work at a new location, check with your supervisor or the safety coordinator. Ask about the rules you will be expected to obey.

The Occupational Safety and Health Administration (OSHA) enforces federal laws within the United States that apply to safety of operation, application and maintenance of equipment on a worksite. It is the employer's responsibility to comply with these laws. An OSHA representative may periodically inspect a worksite to see that these laws are being followed.

There may also be local or state/provincial laws or international regulations that apply to this equipment and its use, along with specific worksite or employer rules. It is important that you know and comply with all applicable laws and rules, including those requiring operator training and certification.

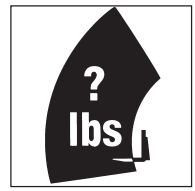


You must be a qualified and authorized operator for safe operation of your truck. You must clearly understand the written instructions supplied by the manufacturer, be trained—including actual operation of the truck—and know the safety rules and regulations for the worksite. It is a good safety practice to point out and explain safety signs and practices and ensure others understand the importance of following these instructions.

Follow A Safety Program

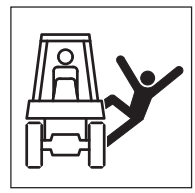
Know The Rules Of Operation

— Know the capacity and operating characteristics of the truck.
— Never modify or remove any part of the equipment.
— Inspect the machine and all attachments before each use as specified by the manufacturer and your employer.
— Always wear the seat belt/operator restraint while operating the truck.
— Make sure other machines and personnel are clear of the operating area before starting the engine.
— Never use attachments that are not approved by the manufacturer of the truck.
— Never lift or swing a load or attachment over anyone.
— Never suspend (free-rig) a load without written instructions and approval from the equipment manufacturer. Suspended loads are VERY DANGEROUS.
— Carry the load as low as possible. Look in the direction of travel.
— Follow traffic rules when traveling.
— Do not allow riders.
— Always lower the forks or attachment to the ground, set the parking brake, shut off the engine, cycle the control levers and remove the key before dismounting.

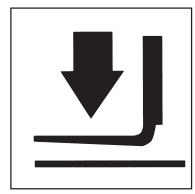


Know the Load Capacity

Buckle the Seat Belt



No Riders



Lower Forks to the Ground Before Dismounting

Follow A Safety Program

Know The Rules Of Operation (continued)

Before you start work at a new location, check with your supervisor or the safety coordinator. Ask about rules you may be expected to obey.

Make sure you know and understand:
— The rules covering traffic at the worksite.
— The meaning of all signs, flags and markings.
— Hand, flag, whistle, siren or bell signals.

When traveling on public roads or streets, obey all local traffic regulations appropriate to the use of this classification of equipment. Make sure dual brake pedals are locked together (if so equipped). Approach intersections with caution, observe speed and traffic control signs. Don't speed. Avoid panic stops and sharp turns.

When the rough terrain forklift truck is to be transported over the road, follow the manufacturer's detailed instructions for trailering or towing your machine.

Work Platforms

A rough terrain forklift truck is designed to lift and transport materials and must not be used to elevate personnel unless approved by the manufacturer for this use. Only work platforms approved by the rough terrain forklift truck manufacturer specifically designed to elevate personnel may be used for this purpose.

Refer to the rough terrain forklift truck manufacturer's instructions for proper procedures to follow for lifting personnel.

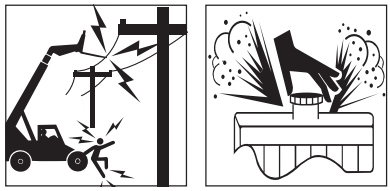
Obey Traffic Regulations

Use Only Approved Equipment for Lifting Personnel

Follow A Safety Program

Know The Equipment

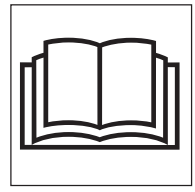
Read and understand the DANGER, WARNING, CAUTION and NOTICE safety signs and other informational signs on the equipment and in the manufacturers' operator's manual(s). Ask your supervisor to explain any information you do not understand. Failure to obey safety instructions could result in death or serious injury.



Make sure all the manufacturer's protective structures, guards, shields, screens and panels are in good repair, in place and securely fastened. Damaged, missing or weakened safety components can create a hazardous situation for you as the operator. **Never** remove or modify any safety components on a rough terrain forklift truck.

Know the following about the rough terrain forklift truck:

— How to operate all controls.
— The functions of all gauges, lights, dials, switches.
— The rated load capacity at different positions.
— Speed/gear ranges.
— Braking and steering characteristics.
— Turning radius and clearances.



Prepare For Safe Operation

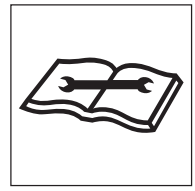
Check The Equipment

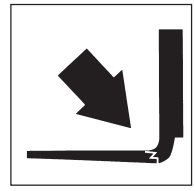
Before you begin your workday, take time to check the rough terrain forklift truck and the transport vehicle. Have all systems in good operational condition.

— Perform all maintenance procedures as outlined by the manufacturer.
— Check for broken, missing or damaged parts and loose or missing fasteners. Make any necessary repairs.
— Check that no safety switches have been bypassed and that no warning tags have been placed on the vehicle.
— Check operation of the back-up alarm.
— Check that safety signs, special instructions and operator's manuals are legible and stored in the proper location. Never operate without a legible load chart.
— Check forks for welds, cracks or misalignment. Replace the forks IN SETS when the condition of the fork(s) is questionable. Replace with factory approved forks ONLY.

WARNING! Do not use forks which have been repaired by welding.

— Check that the means to retain forks, if so equipped, are in place to prevent forks from changing position or coming off the carriage.



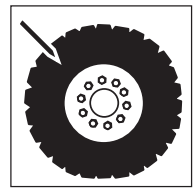


Prepare For Safe Operation

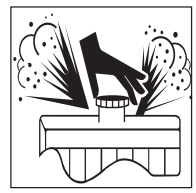
— Check tires for cuts, bulges, correct pressure and, where required, proper ballast.
— Check service and parking brakes for proper operation.
— Keep engine and radiator clean and free of dirt or flammable debris.
— Check engine oil and cooling system for proper levels. Add oil or coolant as required.
— Check the level of the hydraulic system. If necessary, fill to the required level with the proper type fluid.

WARNING! Diesel fuel or hydraulic fluid under pressure can penetrate the skin or eyes and cause serious injury, blindness or death. Fluid leaks under pressure may not be visible. **Use a piece of cardboard or wood to find leaks, not your hand. Wear a face shield or safety goggles for eye protection.** If fluid is injected into the skin, it must be removed within a few hours by medical personnel familiar with this type of injury. (See page 44, **Hydraulic System Hazards**.)

— Inspect hydraulic hoses and hose connections for wear or leaks. Repair or replace any damaged hoses or connections.



Check the Tires



Hot Fluid Under Pressure Can Cause Severe Burns

High Pressure Fluid Can Inject Into the Body

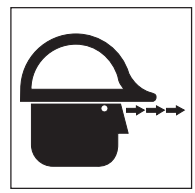
Wear Eye Protection

Prepare For Safe Operation

Check The Equipment (continued)

— Check condition and operation of the seat belt and its mounts.
— Keep steps, pedals and non-skid surfaces clean and free of grease, oil, dirt, snow or ice.
— Make sure all doors, guards or covers are in place and secured properly.
— Make sure work lights, mirrors and windows are kept clean. Check that lights, horn and window wipers operate properly. Make sure electrical connections are clean and free of damage.
— Remove or put away tools, lunch buckets, chains, hooks or any other loose object that could distract you while operating.
— Make sure mast sliding and/or all rolling members move freely.
— Make sure lifting and reach mechanisms move freely.

Avoid Falls – Clean Slippery Surfaces



Maintain Vision – Clean Up

Put Away Tools and Loose Items

Prepare For Safe Operation

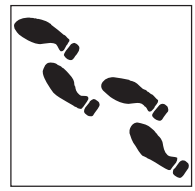
Know The Work Area

Before you operate the rough terrain forklift truck, learn as much as possible about the work area. Walk around the worksite and inspect the surface travel conditions. Locate and avoid:

- Holes
- Drop-offs
- Obstacles
- Excavations
- Standing water
- Deep mud
- Wet spots
- Soft soil
- Rough spots
- Slippery surfaces
- Oil spills
- Power lines and apparatus
- Gas lines or apparatus
- Other utilities
- Any conditions which could cause collision, loss of control or tipover
- Steep slopes

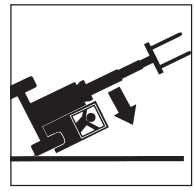
Correct unsafe conditions. Avoid operating in problem areas that cannot be corrected.

Check for weak spots when operating on docks, bridges, ramps or floors. Clear away trash and debris. Pick up anything that could puncture a tire. Know the truck's fully loaded ground pressure weight if required by conditions.



Walk Around the Worksite

Know Weight Limits



Check Conditions to Prevent Tipover

Prepare For Safe Operation

Know The Work Area (continued)

WARNING! Avoid possible injury. The weight of the machine may cause the ground, bridge deck, ramp or floor to give way causing loss of control, fall or tipover. **Know weight limits and stay clear of the edges of excavations or drop-offs.** Failure to know and observe weight limits and use caution could result in death or serious injury.

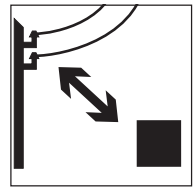
Plan travel routes for inside work in order to see and protect bystanders.

Check for overhead obstructions. Check the clearances of doorways, canopies and overheads. Know exactly how much clearance you have under power and telephone cables.

Maintain minimum safe distance from power lines and apparatus. If possible, have power to lines disconnected. If this is not possible, request a signal person to guide you while you work around power lines.

When working near power lines, always assume conductors are energized. A machine working near energized conductors must always be considered energized.

DANGER! Avoid electrocution or serious injury. **Do not allow the load or any part of machine to approach or contact energized power lines or apparatus.** Death or serious injury will result from contact or inadequate clearance to energized power lines or apparatus.



Do Not Approach Energized Power Lines

Stay Clear of Equipment Near Power Lines

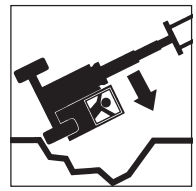
Prepare for Safe Operation

Plan Your Work

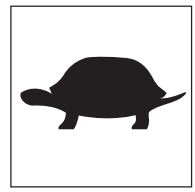
Before you operate, plan how and where you will travel, turn and pick up, lift and place loads.

Choose a smooth level route to prevent possible tipover or loss of load. If possible, avoid crossing:
— Ruts
— Ditches
— Curbs
— Exposed railroad tracks

When these conditions cannot be avoided, keep the load as low as possible and travel VERY SLOWLY and with EXTREME CAUTION.



Avoid Ruts and Ditches



Travel Slowly

Keep Loads Low When Traveling

Prepare For Safe Operation

Plan Your Work (continued)

Know where there are blind corner conditions on the worksite. Before turning a blind corner, stop, sound the horn and proceed slowly.

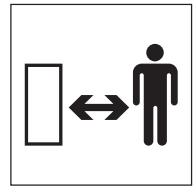
Always maintain a safe distance between your rough terrain forklift truck and other personnel, equipment and obstacles at the worksite.

Know the weights of all loads you may be expected to transport before attempting to lift them. Secure loose loads. Check that loads are properly banded or strapped together.

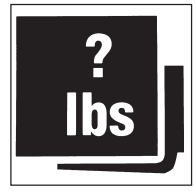
If you are placing a load in an area where visibility is a problem, use a signal person near the point where the load will be landed.

If you plan to suspend (free-rig) loads, obtain written instructions and approval from the equipment manufacturer. Suspended loads are very dangerous.

Obey Site Traffic Rules



Maintain a Safe Distance From Personnel and Equipment



Know Weight of Loads

Keep Sight of Load – Use Signalman

Prepare For Safe Operation

Know the rules for movement of people and machines on the worksite. Slow down and sound the horn, making sure that your approach has been acknowledged by those in your path. Stop the truck until your presence has been recognized or until the path is clear.

Operating in an area with public access requires that you create a “safety zone” for the operation of the machine. Mark your working “safety zone” using cones, barricades and warning tape. Make sure a trained signal person is available to warn people away from the working area. Be sure that all available warning devices are activated and working properly.

Ensure that adequate clearance is provided between both rear tail swing and front fork swing of the truck to avoid injury to personnel or damage to objects nearby.

Know where you will be expected to park the machine at the end of the work day, preferably in a level area out of traffic. (See page 38, **Machine Shutdown**.) Set the parking brake and lower the forks to the ground. If the machine is on a slope, block the wheels.

Remember:
— **Be Alert** – Know that conditions can change.
— **Use Common Sense** – Show that you are a responsible operator.
— **Be a Defensive Operator** – Prevent accidents before they happen.

Prepare For Safe Operation

Rules Of The Road

If the rough terrain forklift truck is to be driven or transported over the road, refer to the manufacturer’s operator’s manual for instruction.

Make sure clearance flags, lights and warning signs are in place and visible. When required, make sure the “Slow Moving Vehicle” emblem is visible to any vehicle approaching from the rear.

While traveling on public roads or streets, obey all local traffic regulations appropriate to machine use and local classification. Find out if you must use an escort vehicle or roading permit. Place the attachment in the transport position and secure all accessory equipment.

Don’t speed. Know stopping distances at a given speed. Always regulate travel speed accordingly. Avoid panic stops and sharp turns. If traffic backs up, pull over and allow other vehicles to pass.

Stop at all railroad crossings and look both ways before proceeding. Never park in traffic areas. If it is necessary to stop at night, pull off the road and set up lights or reflectors. When driving at night, use appropriate lights.

Always use hand signals or turn signals when turning. If you are going to transport a machine by truck or trailer, you must cover or remove the SMV emblem. Approach intersections with caution, observe speed and traffic control signs.

Use Caution When Fueling

IMPORTANT! Always use approved fuel containers and/or dispensing equipment.

Fuels are flammable, so observe these practices to reduce the possibility of a serious accident.
— Shut off engine and ignition during refueling.
— Keep sparks and open flames away from fuel.
— Do not smoke while refueling or when handling fuel containers.
— Do not cut or weld on or near fuel lines, tanks or containers.
— Do not overfill the tank or spill fuel. Clean up spilled fuel immediately.

Start Safely

Mount And Dismount Properly

When you enter or leave the rough terrain forklift truck:

— Maintain a three-point hand/foot contact with the machine. Three-point contact is defined as using one hand and two feet or two hands and one foot at any single time. Face the machine when either mounting or dismounting.

— Use handholds, handrails, ladders or steps (as provided).

— Never mount or enter the truck by passing under raised equipment unless the equipment or boom are supported by manufacturer approved support(s).

— Never use control levers or steering wheel as handholds.

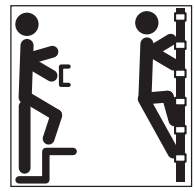
— Never step on foot controls when entering or leaving.

— Clean your boots and wipe your hands before mounting or dismounting.

— Never jump on or off the machine unless specifically instructed by an electrical contact emergency procedure.

— Never attempt to mount or dismount a moving machine.

— Never mount or dismount while carrying tools or objects that prevent three-point contact. Put parts or tools down. Maintaining proper contact, climb and then pick up the object. If necessary, rig a line and lift items.



Maintain Three-Point Contact – Face Machine

Start Safely

Start The Machine

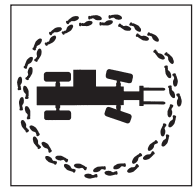
Look Out For Others

Before starting, walk completely around the truck operating area including the machine's tools and attachments. Make sure no one is under it, on it or close to it. Sound the horn and let other workers and bystanders know you are starting the engine. Don't start up until everyone is clear of the operating area.

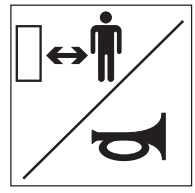
Starting The Engine

Do not start the engine or move any of the controls if there is a "DO NOT OPERATE" or similar warning tag attached to the start switch or controls. Check with your supervisor.

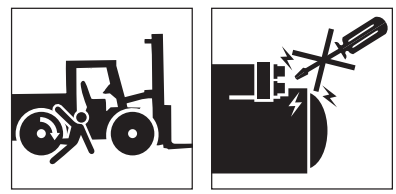
WARNING! Start the engine only from the manufacturer's recommended operating position. Never attempt to start the engine by shorting across starter terminals or reaching for the key from the ground or outside the cab. The machine may start in gear if neutral-start circuitry is bypassed. This could cause the machine to move suddenly and cause serious injury or death.



Walk-Around Inspection



Clear Bystanders and Sound Horn



Start Only From Operator's Position

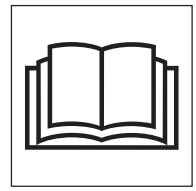
Start Safely

Know the exact starting procedures for this truck. See the manufacturer's manual(s) for starting procedures.

— Sit in the operator's seat and adjust the seat so you can operate all the controls properly.
— Close or secure the cab door if equipped.
— Fasten the seat belt.
— Familiarize yourself with warning devices, gauges and operating controls.
— Clear the area of all persons.
— Ensure the parking brake (if equipped) is engaged and put all controls including those for auxiliary equipment in the neutral/park position.
— Sound the horn.
— Start the truck according to either normal or cold starting procedures as instructed in the manufacturer's operator's manual.

If it is necessary to run the engine or operate the truck within an enclosed area, be positive there is adequate ventilation.

WARNING! Never operate any type of engine without proper ventilation—exhaust fumes can kill.



Know Starting Procedure, Read Manual

Sit in Operator's Seat, Fasten Seat Belt

Set Brakes, Place All Controls In Neutral

Start Safely

Starting Aids

Do not use ether/cold-start fluid if the engine is equipped with an intake manifold preheater.

Do not carry loose cans of starting fluid on the machine while operating.

If booster cables are used, follow the instructions in the manufacturer's manual(s). The operator must be in the operator's seat when boost starting the engine so that the machine will be under control when the engine starts. Boost starting is a two-person operation. A battery explosion or a run-away machine could result from improper starting procedures.

Never boost start a frozen battery. (See page 46, **Avoid Battery Explosion**.)

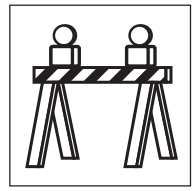
After Starting The Engine

Observe gauges, instruments, and warning lights to ensure that they are functioning and their readings are within the operating range.

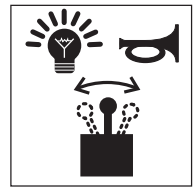
Run An Operating Check

Do not use a machine that is not in proper operating condition. It is the **operator's responsibility** to check the condition of all systems, and to run the check in a safe area.

WARNING! Prevent serious injury. **Do not allow anyone to stand within the operating work radius of the rough terrain forklift truck.** Contact with moving parts of the machine or attachments can cause serious crushing injury or death.



Clear Bystanders



Check Instruments and Controls

Start Safely

Test All Controls

Make sure the engine is operating correctly. Operate each machine control to check all functions.

Check to determine steering selection before testing travel and steering. See the machine manufacturer's manual. Check the travel warning for proper operation.

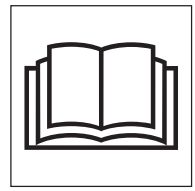
Operate the control(s) to ensure correct operation in forward, neutral, and reverse. Test the inching pedal, if equipped.

Check the parking and service brakes according to the manufacturer's manual(s). Test steering—right and left—while moving slowly.

WARNING! Prevent possible injury from loss of control. **Be certain you can control speed, direction, braking and boom motion, before operating the machine.**

Remember These Rules

— Stay in the operator's position, with the seat belt fastened.
— Understand the machine limitations. Be in control of the machine at all times.
— Assure yourself that the work area is clear of all personnel and other machines. Do not allow riders.
— If a condition that causes loss of control occurs, stop all machine motion as quickly as possible. Shut the machine down safely and remove the key. Place a **"DO NOT OPERATE"** tag on the machine controls and correct or report the problem immediately.



Read and Understand Manuals Before Operating

Use a "Do Not Operate" Tag

Operate Safely

Remember The Other Person

Never allow an untrained or unqualified person to operate this truck. Handled improperly, this machine could cause serious injury or death.

Do not allow anyone within the operating work radius of the rough terrain forklift truck.

WARNING! Prevent possible injury from fall or runover. The rough terrain forklift truck is a one-person machine. **NEVER PERMIT RIDERS.**

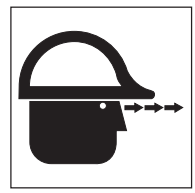
Always look around before you back up or move the load. If you can't see where you or the attachment are going, use a signal person.

Always look in the direction of travel.

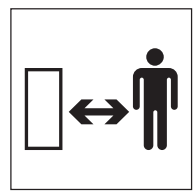
Stop the machine immediately if anyone approaches the machine.

Be sure that everyone is in the clear. Awareness on your part can prevent accidents.

Never Permit Riders



Look Before Moving the Machine or Boom



Clear Bystanders From Area

Operate Safely

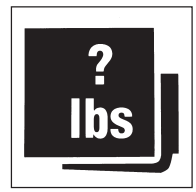
Lift The Load Safely

You, the operator, should know or be able to estimate the weight and load center of the load that you will be lifting. If you are unsure of the weight and load center of the load, check with your supervisor or with the supplier of the material.

Know the rated load capacities of the truck. Refer to the truck's capacity chart to determine the operating range in which you can safely lift, transport and place the load.

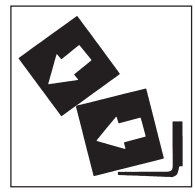
Know the manufacturer's procedure for use of stabilizers when lifting or placing a load.

Before picking up a load:
- Note the conditions of the terrain. Adjust the travel speed and reduce the amount of the load if the conditions would suggest an unstable path.
- Avoid lifting double-tiered loads, as they are difficult to control. Separate the load into two or more lifts.
- Make sure the load is clear of obstacles.
- NEVER suspend (free-rig) a load without written instructions and approval from the equipment manufacturer. Suspended loads are very dangerous.
- Adjust the spacing of the forks so they engage the pallet or load at its maximum width. Approach the load slowly and squarely with the fork tips straight and level. NEVER attempt to use just one fork to lift a load.
- NEVER operate the truck without a legible load chart.



Know the Weight of the Load

Know the Load Capacities



Avoid Doubled-Tiered Loads

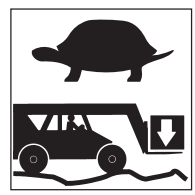
Operate Safely

Transporting The Load

After engaging the load and resting it against the backrest, tilt the load back to position the load for travel.

Lift the load only high enough to clear obstacles that may be in the path of the truck. Carrying the load as **low as possible** and **fully retracted** will:
- Ensure that you are operating within the maximum stability limits of the truck.
- Reduce the forward tipping effect of braking momentum.
- Reduce the chance of spilling the load or loss of control while traveling over rough terrain.
- Allow for better visibility over the load.
- Help to maintain control over steering.

Remember that smooth, controlled actions on your part are important to safe transport. To avoid tipover or toppling a load, apply these actions at all times:
- Decelerate or downshift with great care.
- Come to a gradual, complete stop before reversing direction.
- Operate steering and lift controls smoothly.
- DO NOT play games while operating—a rough terrain forklift truck is not a toy.



Always Travel Slowly, Keep Load Low

Avoid Jerks and Sudden Stops

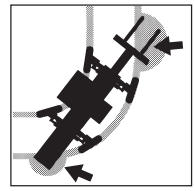
Operate Safely

Ensure that adequate clearance is provided between both rear tail swing and front fork swing of the truck to avoid injury to personnel or damage to objects nearby.

Traveling with the load in an elevated position is dangerous and can cause tipover. If you must travel with the load in an elevated position be sure to:
— Keep the load as low as possible.
— Travel with EXTREME CAUTION and at the SLOWEST possible speed.
— Keep the unit level at all times.
— Avoid sharp turns.
— Avoid sudden starts and stops.

Suspended loads are DANGEROUS as they can swing or sway and easily alter the truck's stability.

Be sure to:
— Obtain written instructions and approval from the equipment manufacturer.
— Keep the load as low as possible.
— Travel with EXTREME CAUTION and at the SLOWEST possible speed.
— Avoid sharp turns.
— Avoid sudden starts and stops.
— Use a tether or tagline to restrict load movement.



Provide Adequate Clearance for Fork and Tail Swing

Keep Loads Low When Traveling

Tether a Suspended Load

Operate Safely

Transporting The Load (continued)

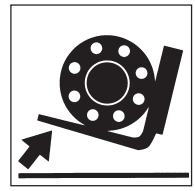
Use extra care when carrying drums, cylinders, reels or other round objects.

Loose, irregular shaped loads are more likely to fall off the forks if they are not handled properly.

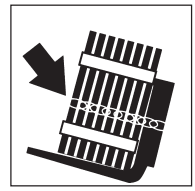
Be sure to:
— Keep the forks tilted back to hold the load.
— Secure loose loads to the carriage.
— Keep the unit level at all times.
— Avoid sharp turns.
— Avoid sudden starts and stops.

Watch clearances carefully when handling loads that are long, tall or wide. Load end-swing can be deceiving and could cause injury to personnel or damage to objects nearby.

Where the load will obstruct the operator's vision, it is recommended that the truck be operated in REVERSE, looking backwards in the direction of travel. Travel at a slower speed and get someone to direct you.



Keep Forks Tilted Back



Secure Loose Loads

Look Where You Are Traveling

Operate Safely

Driving on slopes or inclines can be dangerous and result in tipover or loss of load. Follow these rules to prevent injury or damage:

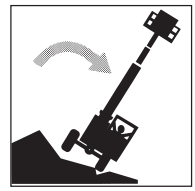
— Avoid excessively steep slopes or unstable surfaces. If you must drive on a slope, keep the load low and proceed with extreme caution. DO NOT drive ACROSS excessively steep slopes under any circumstances.

— Avoid turning on an incline or slope, if at all possible. If it is necessary, use extreme caution and make the turn as wide as possible.

— Ascend or descend inclines or slopes with the “heavy end” of the rough terrain forklift truck pointing up the slope.
NOTE: When the truck has NO LOAD, the rear of the machine is considered the “heavy end.” Travel with the FORKS POINTED DOWNHILL.
When the truck is CARRYING A LOAD, the front of the machine is considered the “heavy end.” Travel with the FORKS POINTED UPHILL.

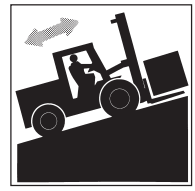
— Reduce travel speed and downshift to a lower gear to permit compression braking by the engine and aid in the application of the service brakes.

— NEVER depress the clutch or coast in neutral when going downhill.



Do Not Drive with Boom Up Across a Slope

Traveling with No Load, Forks Pointing Down Hill



Traveling With a Load, Forks Pointing Up Hill

Operate Safely

Lifting And Placing The Load

Now that the load has been transported to the location where it is to be placed, remember:

— Be sure the landing point can safely support the weight of the load.

— The chosen landing location should be level, both front to back and side to side.

— While lifting or lowering always make sure the path of the forks or load is clear of obstacles.

— Approach the landing location slowly with the load as low as possible.

— Drive as close as possible to the landing location.

— Avoid a sudden stop.

— Place the truck in neutral.

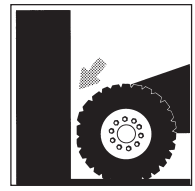
— Set the parking brake.

— Level the rough terrain forklift truck from side to side if the machine has this feature.

— If the truck is equipped with outriggers or stabilizers, lower them to stabilize the lift.

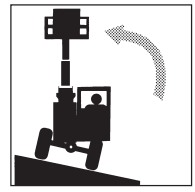
— Center the forks and carriage before lifting the load on machines equipped with side shift, side tilt or swing carriage features.

WARNING! Avoid tipover. If the rough terrain forklift truck cannot be leveled so the load is level before lifting, reposition the machine. The likelihood for tipover is greatly increased if the load is not level before lifting.



Drive as Close as Possible to Landing

Set the Parking Brake Before Lifting Load



Keep Loads Level

Operate Safely

Some important practices should be followed while lifting loads:

— Start lifting the load slowly and smoothly. Lift speeds can be increased once the load has started moving and appears to be stable.

WARNING! Avoid death or serious injury from loss of load or machine upset. **If the load leans or moves during the lift, immediately lower the load and adjust the load so it is stable during the lift.**

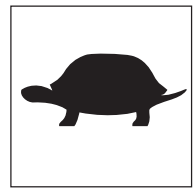
— When the load approaches a height that is higher than the landing point, the lift speed should be reduced.

WARNING! Avoid death or serious injury from loss of load or machine upset. **Do not allow the lift cylinders to hit the end of their stroke as the jolt may cause loss of the load or machine upset.**

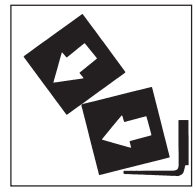
— Once above the landing point, the carriage can be tilted or lowered to place the load.

— Lower the load gently until the weight of the load is securely resting on the landing point and the forks are free to be retracted from under the load.

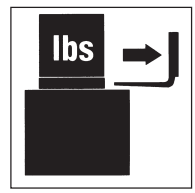
WARNING! Avoid death or serious injury from loss of load or machine upset. Before retracting the forks, check landing point for excessive bowing, cracking noises or other indications of overloading. **If there is any indication that the landing point cannot support the load, pick the load up and lower it to the ground.**



Start Slowly for Stable Lifts



Avoid Unstable Loads When Lifting



Place Loads Gently, Retract Forks Smoothly

Operate Safely

Lifting And Placing The Load (continued)

Before disengaging the forks from under the load, be aware of the following stability factors.

Factor 1.

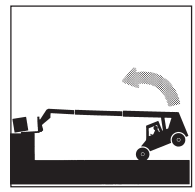
Always use the shortest boom length or mast extension possible. Use EXTREME CAUTION when working with a loaded boom or mast at its maximum extension or height. In this situation the rough terrain forklift truck's center of gravity is located at its most critical stability limits. Any adjustments made to tilt, shift or swing the load, can exceed the stability limits of the truck resulting in forward tipover.

Factor 2.

Use EXTREME CAUTION when releasing a load placed at a high elevation, especially if operating on an uphill grade. Removing the weight of the load immediately shifts the truck's center of gravity to the rear and increases the likelihood of a rearward tipover.

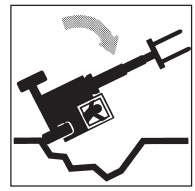
Factor 3.

Lower the mast or boom as soon as possible after placing a load. Traveling with an unloaded mast or boom that is elevated is DANGEROUS, as uneven terrain can cause dynamic tipover.



Use Caution with Full Boom Extension

Use Caution when Placing Loads



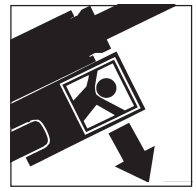
Avoid Traveling with Mast or Boom Elevated

Operate Safely

After disengaging from a load, proceed as follows:
— With the forks free from the weight of the load, the boom can be retracted or the truck can be backed away from under the load.
— Lower the carriage to the carry position above the ground.
— The truck can now be moved from the landing location to continue work.

WARNING! Avoid possible serious injury or death. **Do not attempt to jump from a tipping rough terrain forklift truck.**

If a rough terrain forklift truck ever becomes unstable and starts to tip over:
— Brace yourself.
— Stay with the machine.
— Keep the seat belt fastened.
— Hold on firmly and lean away from the point of impact.



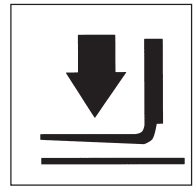
Brace Yourself in Tipover

Shut Down Safely

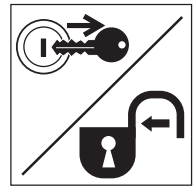
Machine Shutdown

Properly shutting down the rough terrain forklift truck can help prevent accidents from occurring when the machine is left unattended. Shut down the equipment following the specific procedures in the manufacturer's operator's manual. These procedures will normally include:
— Come to a full stop on a level surface.
— Set the parking brake.
— Lower the forks to the ground.
— Place the controls in neutral (or park).
— Idle the engine for gradual cooling.
— Shut the engine off.
— Cycle hydraulic controls to relieve any trapped pressure in the system.
— Remove the ignition key.
— Dismount from the truck using the proper handrails, handholds, ladders, or steps provided.
— Lock any anti-vandalism covers or guards if the machine is equipped with these features.
— If on a slope or incline, block the wheels.

Set Parking Brake



Lower Forks to the Ground



Shut Engine Off, Remove Key – Lock Covers or Guards

Block Wheels on Slopes and Inclines

Perform Maintenance Safely

Maintain The Equipment

Be sure to maintain equipment according to manufacturer's instructions. Regularly check the operation of the protective and safety devices.

Do not perform any work on a rough terrain forklift truck unless you are authorized and qualified to do so.

If you have been authorized to do maintenance, **read the operator's and service manuals**. Study the instructions; check the lubrication charts; examine all the instruction messages on the truck. Maintenance can be dangerous unless performed properly. Be sure you have the necessary skill, information, correct tools and equipment to do the job correctly.

IMPORTANT! Do not modify equipment or add components not approved by the manufacturer. Use parts, lubricants and service techniques recommended by the manufacturer.

Prepare Yourself

Wear personal protective clothing and Personal Protective Equipment (PPE) issued to you or called for by job conditions.

You may need:
— Hard hat
— Safety shoes
— Safety glasses, goggles or face shield
— Apron and heavy gloves
— Hearing protection
— Welding helmet or goggles
— Respirator or filter mask

Wear whatever is needed—don't take chances.

Keep hands—and clothing—away from all moving parts. Don't tempt fate with dangling ties, loose sleeves, rings, watches, or long hair.

Perform Maintenance Safely

Prepare Yourself (continued)

WARNING! Prevent death or serious injury from entanglement. **Do not wear loose clothing or accessories. Stay away from all rotating components when the engine is running.** Contact, wrapping or entanglement with rotating or moving parts could result in death or serious injury.

Wear a protective apron and protective gloves when working with corrosives. Wear gloves and safety shoes when handling wooden blocks or sharp-edged metal.

Always use safety glasses, goggles or a face shield. They provide eye protection from fluids under pressure, while grinding and servicing batteries. Protection is also needed from flying debris, liquids and loose material produced by equipment, tools and pressurized air/water.

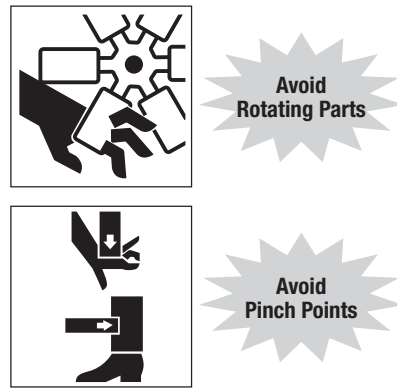
Wear a face shield when you disassemble spring-loaded components or work with battery acids. Wear a welding helmet or goggles with a shaded filter when you weld or cut with a torch.

Do not sand, grind, flame-cut, braze or weld without a NIOSH-approved respirator or appropriate ventilation.

If welding is required on this machine, refer to the manufacturer's manuals or consult your equipment dealer for proper procedures.

Keep pockets free of all objects that could fall out—and drop into machinery.

Handle tools and heavy parts sensibly—with regard for yourself and other persons. Lower items—don't drop them.



Perform Maintenance Safely

Prepare The Work Area

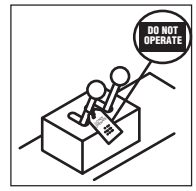
— Position the rough terrain forklift truck in a level area out of the way of other working equipment and follow safe shutdown procedures.
— Make sure there is adequate light, ventilation and clearance.
— Remove oil, grease or water to eliminate any slippery surfaces.
— Clean around the area to be serviced to minimize contamination.

Prepare The Machine

— Attach a “DO NOT OPERATE” warning tag to the control levers and remove the ignition key if the truck should not be started.
— Install approved support device(s) when working under or near raised equipment. Remove any attachment before raising the boom and before installing support device(s).

WARNING! Disconnecting or loosening any hydraulic tube, hose, fitting or component or a part failure can cause unsupported equipment to drop. **Do not go under equipment when raised unless supported by an approved support device(s).** Death or serious crushing injury could result from falling equipment.

— Remove only guards or covers that provide access to the area being serviced. Replace all guards and covers when work is complete.



Perform Maintenance Safely

Use Proper Ventilation

If it is necessary to run an engine in an enclosed area, remove the exhaust fumes from the area with an exhaust pipe extension.

WARNING! Prevent possible injury. **Never work on machinery with the engine running unless instructed by the manufacturer’s manuals for specific service.**

WARNING! Never operate any type of engine without proper ventilation—EXHAUST FUMES CAN KILL.

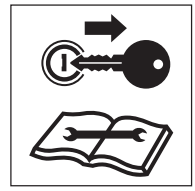
Use Jacks And Hoists Carefully

Safety stands or blocks must be located on a rigid part of the machine. Do not position stands under axles or wheel supports that may rotate.

If you must work beneath raised equipment, always use wood—**not concrete**—blocks, jack-stands or other rigid and stable supports. When using jacks or hoists always be sure they are adequately supported.

WARNING! Prevent possible crushing injury. **Never use concrete blocks for supports.** They can collapse under even light loads.

Make sure the hoists or jacks you use are in good repair. Never use jacks with cracked, bent, or twisted parts. Never use frayed, twisted or pinched cables. Never use bent or distorted hooks.



Perform Maintenance Safely

Common Maintenance Safety Practices

Fuel Hazards

IMPORTANT! Always use approved fuel containers and/or dispensing equipment.

Fuels are flammable, so observe these practices to reduce the possibility of a serious accident.

— Shut off engine and ignition during refueling.
— Keep sparks and open flames away from fuel.
— Do not smoke while refueling or when handling fuel containers.
— Do not cut or weld on or near fuel lines, tanks or containers.
— Do not overfill the tank or spill fuel. Clean up spilled fuel immediately.

Engine Coolant Hazards

Liquid cooling systems build up pressure as the engine gets hot, so **use extreme caution before** removing the radiator cap.

Be sure to:

— Stop the engine and wait for the system to cool.
— Wear protective clothing and safety glasses.
— Turn the radiator cap slowly to the first stop to allow the pressure to escape before removing the cap completely.

No Smoking and No Open Flames

Remove Radiator Cap Slowly

Perform Maintenance Safely

Hydraulic System Hazards

The hydraulic system is under pressure whenever the engine is operating and may hold pressure even after the engine is shut off. Cycle all hydraulic controls including the auxiliary hydraulic control after the engine is shut down. Relieve trapped pressure in the lines after the attachments are shut down and resting on the ground.

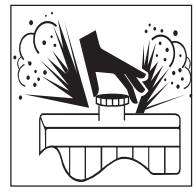
During inspection of the hydraulic system:

— Wait for fluid to cool before disconnecting the lines. Hot hydraulic fluid can cause SEVERE BURNS.
— **Do not** use your hand to check for leaks. Instead, use a piece of cardboard or paper to search for leaks.
— Wear appropriate eye protection. Hydraulic fluid can cause permanent eye injury.

WARNING! Hydraulic fluid under pressure can penetrate the skin or eyes and cause serious injury, blindness or death. Fluid leaks under pressure may not be visible. **Use a piece of cardboard or wood to find leaks, not your hand. Wear a face shield or safety goggles for eye protection.** If fluid is injected into the skin, it must be removed within a few hours by medical personnel familiar with this type of injury.

When venting or filling the hydraulic system, loosen the filler cap slowly and remove it gradually. If the system is equipped with an accumulator, see the manufacturer's manual for instructions.

Never reset any relief valve in the hydraulic system to a pressure higher than recommended by the manufacturer.



Hot Hydraulic Fluid Can Cause Severe Burns

High Pressure Fluid Can Inject Into the Body

Perform Maintenance Safely

Electrical System Hazards

Before working on the electrical system, disconnect the battery cable(s).

— Remove the battery negative (–) cable(s) first.
— When reconnecting the battery, connect the battery negative (–) cable(s) last.

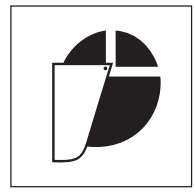
Avoid Injury

The liquid in batteries contains acid, which is a POISON and can cause SEVERE CHEMICAL BURNS.

— Wear a face shield to prevent contact with your eyes.
— Wear chemical-resistant gloves and clothing to keep electrolyte off your skin and regular clothing.

WARNING! Electrolyte will damage eyes or skin on contact. **Always wear a face shield to avoid electrolyte in eyes.** If electrolyte contacts eyes, flush immediately with clean water and get medical attention. **Wear rubber gloves and protective clothing to keep electrolyte off skin.** If electrolyte contacts exposed skin or clothing, wash off immediately with clean water.

If electrolyte is ingested, seek medical attention immediately. NEVER give fluids that would induce vomiting.



Perform Maintenance Safely

Avoid Explosion

WARNING! Avoid possible serious injury from explosion. Lead-acid batteries produce extremely explosive gases especially when being charged. **Keep arcs, sparks, flames and lighted tobacco away.**

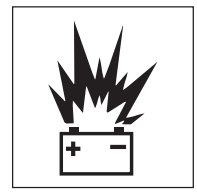
— **Do not** smoke near batteries.
— Keep arcs, sparks and open flames away from batteries.
— Provide adequate ventilation.

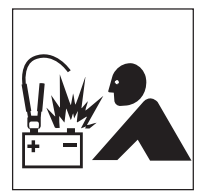
Never check the battery by placing a metal object across the battery posts—the resulting spark could cause an explosion.

WARNING! Avoid possible serious injury from battery explosion. **Do not charge a battery or boost start the engine if the battery is frozen.** Warm to 60°F (15,5°C) or the battery may explode and could cause serious injury.

Safety rules during battery boost starting:

— Follow the instructions for proper “battery boost starting” as specified in the manufacturer’s manual.
— Be sure the machines are not touching.
— Observe the polarity of the batteries and connections.
— Make the final cable connection to the engine or the furthest ground point away from the battery. Never make the final connection at the starter or discharged battery—sparks may ignite the explosive gases present at the battery.
— When disconnecting cables after jump starting, remove the cables in reverse order of connection (e.g., final connection first).





Perform Maintenance Safely

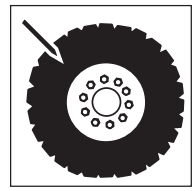
Tire And Wheel Maintenance

Check the tires and wheels daily because the stability of the rough terrain forklift truck can be dramatically affected by tire pressure or damage to tires or wheels.

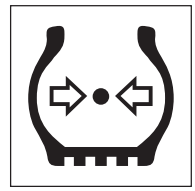
Check tires for:
— Correct pressure.
— Cuts and bulges.
— Nails or other punctures.
— Uneven or excessive wear.
— Condition of valve stems and caps.

Check wheels for:
— Damage to the rims.
— Missing or loose lug nuts or bolts.
— Misalignment.

All tire service should be performed by a qualified tire service center or by an authorized service person who has been properly trained in the procedures and use of safety equipment designed for tire servicing.



Check Tires and Wheels for Damage



Maintain Proper Tire Pressure

Perform Maintenance Safely

Tire And Wheel Maintenance (continued)

WARNING! The types of wheels and tires usually found on this equipment require special care when servicing to prevent death or serious injury.

Do not inflate the tires above the recommended pressure. Be sure to replace tire ballast if equipped. See manufacturer's specifications for ballast requirements.

Keep wheel lug nuts clean and tightened to manufacturer's recommendations.

A rise in tire pressure during operation is normal, and should NOT be reduced.

Never reinflate a tire that has been run flat or seriously underinflated without removing the tire from the wheel. Have the tire and wheel closely inspected for damage before remounting.

When adding air to a tire, do so from a distance. Use a long hose with self-attaching chuck. Always stand behind tread when adjusting tire pressure.

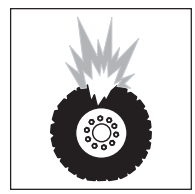
Do not inflate tires with flammable gases or from systems using an alcohol injector.

Never cut or weld on a wheel with an inflated tire mounted on it. This could cause explosive decompression.

Check that the tire size and wheel are correctly matched.

When replacing the tires, ensure the tires are of the appropriate rating specified by the manufacturer.

Tires should not be operated at speeds higher than their rated speed.



Avoid Tire Explosion

Perform Maintenance Safely

Complete Service And Repairs Before Machine Is Released

Tighten all bolts, fittings, and connections to torques specified by the manufacturer.

Install all guards, covers, and shields after servicing. Replace or repair any damaged parts. Refill and recharge pressure systems only with manufacturer approved or recommended fluids.

Start the engine and check for leaks. (See page 44, **Hydraulic System Hazards**.) Operate all controls to make sure the rough terrain forklift truck is functioning properly. Test the truck if necessary. After testing, shut down and check the work you performed. Are there any missing cotter pins, washers, locknuts, etc.? Recheck all fluid levels before releasing the loader for operation.

All parts should be inspected during repair and replaced if worn, cracked or damaged. Excessively worn or damaged parts can fail and cause injury or death.

Replace any damaged or illegible machine or safety signs.

Final Word To The User

You have just finished reading the AEM Rough Terrain Forklift Truck Safety Manual. It is impossible for this manual to cover every safety situation that you may encounter on a daily basis. Your knowledge of these safety precautions and your application to the basic rules of safety will help to build good judgment in all situations. Our objective is to help you develop, establish and maintain good safety habits to make operating a Rough Terrain Forklift Truck easier and safer for you.

This manual is another in a series on the safe operation of machinery published by AEM.
Many pictorials in this safety manual can be found and downloaded at http://pictorials.aem.org.
For additional publications visit our website at www.safetymaterials.org.

ASSOCIATION OF
EQUIPMENT MANUFACTURERS

e-mail safetymaterials@aem.org
www.aem.org

FORM RTF-0907
Printed in U.S.A.

Wacker Neuson SE
Preussenstr. 41
D-80809 Munich
Phone +49 89 35402-0
Fax +49 89 35402-390

Order no. 1000390678
Language [us]