KRAMER

Operator's Manual

Wheel loader

350 / 5035

Machine model	**348-01**
From serial no.	**348 01 0001**
Version	**2.0**
Document number	**1000303369**
Language	**[en]**

Documentation	Language	Order no.
Operator's Manual	[en]	1000303369
Service Booklet	de	1000159213
	en	1000159214
	fr	1000159215
Service manual	de	1000181835
	en	1000181836
	fr	1000181837
Spare parts catalogue, model 348-01	de/en/fr	1000172373

Legend	
Original Operator's Manual	**x**
Translation of original Operator's Manual	–
Edition	2.0
Date	11/2014
Document	BA 348-01 *

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 which do not reflect products that have already been delivered and that will not be implemented on these machines.
Technical data, dimensions and weights are only given as an indication. Responsibility for errors or omissions not accepted.
The cover features the machine with possible optional equipment.

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EC Declaration of Conformity

Manufacturer

Kramer-Werke GmbH
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D-88630 Pfullendorf

Product

Machine designation	Wheel loader
Type	348
Version	348-01
Trade name	350 / 5035
Serial number	348 01_ _ _ _
Output kW	23 (27 option)
Measured sound power level dB(A)	100
Guaranteed sound power level dB(A)	101

Conformity assessment procedure according to 2000/14EC, appendix VIII

The following inspection body was involved in the procedure:
Notified European body, identification number 0515
DGUV Test-, Prüf- und Zertifizierungsstelle
Fachbereich Bauwesen
Landsberger Str. 309
D-80687 München (Germany)

Directives and standards

We hereby declare that this product corresponds to the relevant regulations and requirements of the following EC Directives and standards:
2006/42/EC, 2000/14EC, 2004/108EC, 2003/37EC and 2009/144EC,
DIN EN ISO 12100: 2010, DIN EN 474-1 and 3, DIN EN ISO 3471,
DIN EN 13510, DIN EN ISO 3449

Responsible for documentation

Product Development
Kramer-Werke GmbH
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Pfullendorf, (date). _ _ . _ _ _ _

i. A.

Michael Arndt
Head of product development
Kramer-Werke GmbH

Notes:

1 Introduction

1.1 General information on the Operator's Manual

This Operator's Manual applies to the model 348-01 wheel loader

It is primarily designated for the machine operator and provides instructions on:

- use
- mode of operation
- safety instructions
- operation, set-up and maintenance of the machine.

Important. Carefully read and understand the Operator's Manual before starting up, servicing or repairing the machine.

Pay particular attention to the "Safety Instructions" given in chapter 2.

- The Operator's Manual and any supplements must always be at hand at the place of use of the machine, and must therefore be kept in the storage compartment or net behind the operator seat.
- 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.
- Also observe the Operator's Manuals of the attachments.

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We may from time to time need to make changes to figures and descriptions in this documentation which 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.

Please contact your dealer if you require more information on the machine or the Operator's Manual.

Explanation of warning symbols

This symbol identifies safety warnings. It is used for warning against potential personal risk or danger.

Therefore, pay particular attention to the safety information following this "Safety Instruction" symbol.

This symbol identifies danger for the machine. It is used for avoiding potential danger on the machine.

Explanations, abbreviations and symbols

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

Symbols	Explanation
•	Identification of general enumerations or lists of an activity
☞	Identification of activities to be performed
➥	Identification of results of an enumeration or lists of an activity
Abbreviations	**Explanation**
min.	minimum
max.	maximum
e.g.	for example
Fig.	Figure
o/h	Operating hours
Order no.	Order or part number
Opt	Option
incl.	including
LED	Diode

1.2 Notice on machine safety

Handling the machine

- Knowledge of the safety instructions and regulations is a prerequisite for the safe handling and correct operation of the machine
- All persons operating or working on this machine must observe this Operator's Manual, in particular the safety instructions
- The accident prevention rules and regulations that apply to the place of use of the machine must be followed
- The machine has been designed and built in accordance with state-of-the-art standards and the recognized safety regulations. Nevertheless, its use can carry a risk to life and limb of the user or of third parties, or cause damage to the machine or to other material property
- The machine may only be used according to its designated use and only in technically perfect and safe condition.
- Your own safety, as well as the safety of others, depends to a great extent on how the machine is moved and operated. Therefore careful and prudent working is the best way to avoid accidents
- Have malfunctions affecting safety rectified immediately

Warranty and liability

The "Conditions of Sales and Delivery" of our sales partners apply as a rule.

In case of personal injury or damage to property, warranty and liability claims are excluded if injury or damage is due to one or more of the following causes:

- Non-designated use of the machine
- Incorrect start, operation and maintenance (assembly work) of machine
- Operation of machine with safety and protective equipment that is malfunctioning, incorrectly installed or not in working order
- Failure to observe instructions in the Operator's Manual regarding putting into operation, operation and set-up, maintenance, transport and shut-down or storage of the machine
- Modifications on the machine without proper authority, for example modifications affecting the drive, output, engine speed
- Inadequate monitoring of machine parts crucial to safety and subject to wear
- Incorrect repair work

Maintenance, repair work, spare parts

In order to ensure the machine's operational safety, readiness and service life, maintenance must be performed regularly – *see chapter 5 "Notice on maintenance and servicing*" on page 5-1 and *Maintenance plan* on page 5-42.

Notice!

Repair work, maintenance or modifications may only be performed by specifically trained technical personnel or by a service centre.

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.

1.3 Brief description of the wheel loader

Models and trade names

Wheel loader model	Trade name
348-01	350 / 5035

Use

Due to a wide range of possible attachments, the machine is a versatile and powerful helper in the construction industry, in agriculture and in recycling operations.

- Possible applications – *see* "*Certified attachments*" on page 1-13.
- Retrofit the machine accordingly with specific safety equipment when using it as a lifting gear – *see chapter 2* "*Applications with lifting gear*" on page 2-8.

Machine licensing

According to German traffic regulations and the German agricultural and forestry tractors provision (optional registration), thewheel loader is a self-propelled work machine, tractor or equipment carrier.

The type of machine licensing is specified in the Data Confirmation and Licence Certificate of the machine.

During machine travel on public roads, the wheel loader must be equipped with lights (option) and a signalling system (option).

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

Permissible operating temperature range

Notice!

The operating temperature range for a machine serviced in compliance with the maintenance instructions is −15 to 40 °C during normal operation with short intervals of operation at maximum output.

Operating temperatures below −15 °C or above 40 °C 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.

Main components of wheel loader

- ROPS-tested cabin (standard) or canopy (option)
  – *see* *"Cabin number"* on page 1-15
  ➥ ROPS is the abbreviation for "Roll Over Protective Structure"
- Water-cooled Yanmar three-cylinder diesel engine
  ➥ 23 kW at 2600 rpm (27 kW option)
  ➥ Exhaust emissions according to EC standard 2004/26 EC
- Sturdy steel sheet frame;
  ➥ Rubber-mounted engine and cabin/control stand
- Hydrostatic drive with automatic drive control, inching valve
  ➥ 20 kph max. speed
- Hydraulic four-wheel power steering with emergency steering features
- Axle carrier with steered front and rear wheel motors
- Hydrostatic service brake (inching brake)
- Parking and auxiliary brake in front axle wheel motors
  ➥ Spring brake actuator braking system with electro-hydraulic actuation
  ➥ Differential lock (option)

Hydrostatic drive

The diesel engine permanently drives a hydraulic pump (variable displacement pump), whose oil flow is sent to the wheel motors flanged onto the front and rear axles.
This creates permanent 4 wheel drive.

Operating hydraulics and 4 wheel steering

The variable displacement pump also drives the flanged gear pump for the operating hydraulics and hydrostatic 4 wheel steering. The oil flow of this 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 operating hydraulics and steering. This is made possible by a so-called inching valve that responds as soon as the brake/inching pedal is used, reducing or cutting off power input of the drive. Therefore, engine output is fully available for the loader unit by pressing the accelerator pedal and the brake/inching pedal at the same time.

Cooling system

A combined oil/water radiator (for the diesel engine and the hydraulic oil) is located at the rear of the machine.

The indicator lights on the instrument panel of the machine indicate whether the engine and hydraulic oil temperatures are too high.

1.4 Machine overview

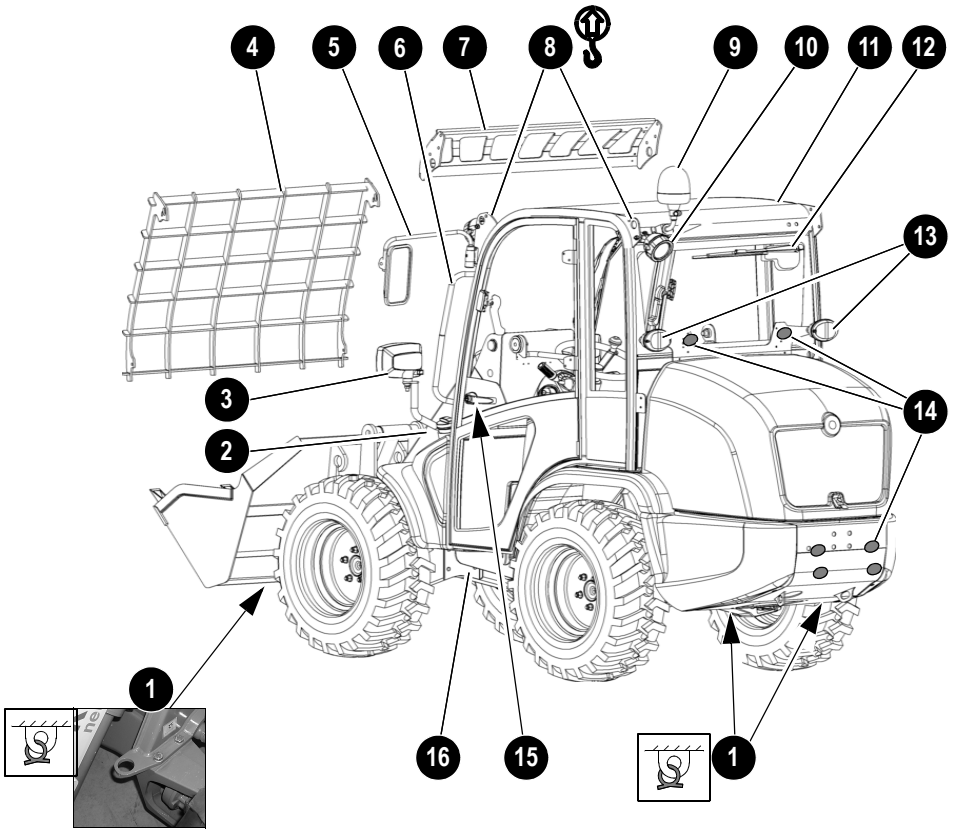


Fig. 1: Machine outside views

Pos.	Designation
1	Eye hooks (front/rear) for loading/tying down the machine
2	Loader unit (with lift and tilt rams)
3	Headlights with turn indicators (cabin option)
4	Screwed protective FOPS screen II (option)
5	Rearview mirror
6	Handhold
7	Screwed protective FOPS screen I[1]
8	Slinging points (lifting eye) (for loading the machine, installing/removing the cabin)
9	Rotating beacon (option)
10	Rear working light (standard), 2 x at front (option)
11	Cabin (option)

Pos.	Designation
12	Rear wiper (cabin option)
13	Brake/rear lights, turn indicators (option)
14	Reflectors (option)
15	Door handle
16	Access

1. The protective equipment must not be removed for safety reasons.

1.5 Legal regulations regarding wheel loader operation

Principal regulations for the operating personnel

- Read and understand the Operator's Manual before putting the machine into operation!
  ➥ Pay particular attention to the chapter on safety
- Be sure to observe the "Safety Instructions" labels on the wheel loader!
- Have damaged or illegible safety instructionss immediately replaced by new ones!
- Transporting accompanying persons in the cabin, on the wheel loader or in/on the attachments is prohibited!
- Driving or operating the wheel loader outside the operator's compartment is prohibited!
  ➥ Put the machine into operation only when seated
- Before leaving the operator seat, lower the loader unit completely, apply the parking brake, stop the diesel engine and remove the ignition key!
- The wheel loader may be used for applications with lifting gear if the appropriate safety equipment has been installed – *see chapter 2 "Applications with lifting gear"* on page 2-8
- As **a self-propelled work machine**, the wheel loader may **not be used for transport jobs on public roads**!

Notice!

When equipped with a canopy (option), the machine is fitted with an operator presence switch that prevents starting the engine if the operator is not seated on the seat.

The diesel engine is stopped after 3 – 4 seconds if the operator stands up from the seat with the engine running.

See also "Putting the machine into operation" on page *3-39*

Driving licence

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

German traffic regulations require one of the following driving licences for operating the wheel loader:

Driving licence category L (new, European Union)

- Self-propelled work machines up to 25 kph
- Agricultural or forestry tractors up to 32 kph (with trailer 25 kph)

Driving licence category C (new, European Union)

- Motor vehicles with over 3500 kg gross weight rating (with trailers up to 750 kg)

Driving licence category C1 (new, European Union)

- Motor vehicles between 3500 and 7500 kg gross weight rating (with trailers up to 750 kg)

Driving licence category CE (new, European Union)

- Motor vehicles with over 3500 kg gross weight rating (with trailers over 750 kg)

Driving licence category T (new, European Union)

- Self-propelled work machines for agriculture and forestry up to 40 kph
- Agricultural and forestry tractors up to 60 kph

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

Licence/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 kph** to affix their first name, surname and place of residence (company and registered office) in indelible print on the left side of their machines.

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

Machine inspections

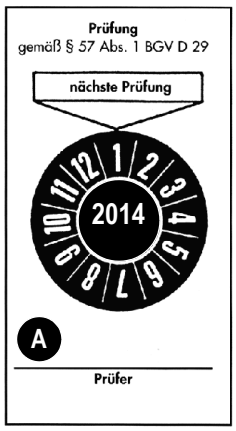


Fig. 2 : Example: inspection label

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” (DPLF German inspection and certification body for agriculture and forestry) and the accident prevention regulation “Fahrzeuge (vehicles)” (BGV D29 § 57 clause 1).

In Germany, legislation requires all machine operators to have all machines and equipment inspected regularly (BGV A1/BetrSichV §10).

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

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

☞ *Affix inspection label **A** for evidence (see example on the left)*

➥ The inspection tag can be acquired from the specific inspection authorities

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

This requirement is met, for example, if the results are documented in a test logbook, a test log file or in a test report; see also policy of German employers’ liability insurance association for construction engineering “Inspection of vehicles by experts” (BGG 916).

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

Documents

German traffic regulations require to have the following documentation on board, for example:

- National Type Approval (Germany) or Data Confirmation (Germany), Licence Certificate (Germany)
- Driving licence
- Test report according to BGV D29 § 57 clause 2 (safety and health regulations of German employer's liability insurance association)
- Operator's Manual and supplements

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

On-board equipment

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

- 1 warning triangle with design certification
- 1 warning light with design certification
- 1 first-aid kit in accordance with the legal regulations of your country
- 1 safety vest according to EN471

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

Machine warning identification (option)

From 01.10.1998 onward, § 52 clause 4.1 of StVZO German road traffic regulations requires wheel loaders that are used on public roads for the construction and maintenance of roads, and for the cleaning of roads or facilities, to be fitted with the red and white warning identification as per DIN 30710 in connection with a yellow rotating beacon (option).

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

1.6 Fields of application and using the wheel loader with an attachment

General notice on using the wheel loader

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

Refer to the National Type Approval (Germany), the Data Confirmation (Germany) or the following table for fitting certified attachments and for the specific requirements
– *see* "*Certified attachments*" on page 1-13!

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 your dealer for authorization (warranty claims)! In addition, a Separate Certification for Vehicles (Germany) made out by the appropriate national authorities is required!

Danger!

The wheel loader is not certified for forestry, spraying or lifting gear applications!
Using the machine in forestry can expose the operator and other persons to the following dangers:
– Danger of falling objects
– Falling tree trunks
– Penetration of objects into the cabin.

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

Fitting attachments onto the machine

This Operator's Manual only describes how to install and use the standard bucket, multipurpose bucket and pallet forks.

– *see* "*Equipping the machine with a standard bucket*" on page 3-73
– *see* "*Installing a multipurpose bucket and hydraulic attachments*" on page 3-84
– *see* "*Fitting pallet forks*" on page 3-96

Refer to the Operator's Manuals of the attachments for further information on installing and using other attachments.

Certified attachments

Description of attachment	Part no. (model)	Dimension	ISO 7546 capacity struck/heaped	Use
Standard bucket – normal material	1000168564 1000192715[1] 1000192716[1] 1000255991 1000168567 1000173086 1000168557 1000168558	1250 mm/with teeth 1250 mm/with teeth 1250 mm/without teeth 1250 mm/without teeth 1250 mm/without teeth 1250 mm/with teeth 1400 mm/with teeth 1400 mm/without teeth	0.25/0.3 m^3 0.23/0.28 m^3 0.23/0.28 m^3 0.25/0.3 m^3 0.25/0.3 m^3 - 0.26/0.31 m^3 0.26/0.31 m^3	Loosening, picking up, transporting and loading loose or solid material (material density ≤p = 1.8 t/m³)
Standard bucket – lightweight material	1000168567 1000173086	1250 mm/without teeth	0.25/0.3 m^3	Loosening, picking up, transporting and loading loose or solid material (material density ≤p = 1.3 t/m³)
Standard bucket – superlightweight material	1000173111 1000248884	1250 mm/without teeth 1400 mm/without teeth with screwed-on blade	0.39/0.53 m^3 0.41/0.48 m^3	Loosening, picking up, transporting and loading loose or solid material (material density ≤p = 0.9 t/m³)
Multipurpose bucket[2]	1000169131 1000169134 1000169689 1000169864	1250 mm/with teeth 1250 mm/without teeth 1400 mm/with teeth 1400 mm/without teeth	0.19/0.23 m^3 0.19/0.23 m^3 0.23/0.27 m^3 0.23/0.27 m^3	Grading, removing and scraping vegetation, for example; picking up and evenly spreading material; grabbing bulky material; loading trucks (material density ≤ p = 1.8 t/m³)
Side swing bucket[2, 3]	1000177352	1295 mm/without teeth	–	See standard bucket, however with benefits for filling and backfilling trenches and pits (material density ≤ p = 1.8 t/m³)
Pallet forks[2, 3, 4]	1000237352 1000237353	800 mm 1000 mm	–	Picking up and transporting pallets
Manure forks[3]	1000175644	1180 mm	–	Picking up and transporting silage, manure or recycling material (material density ≤ p = 1.0 t/m³)
Manure forks with grab[2, 3]	1000169990		–	
Rotary broom[2]	1000267612	1250 mm	–	Cleaning roads and facilities
Snow plough[2, 5]	1000142913	–	–	Winter service
Salt spreader[2, 6, 7]	1000180301	–	–	
Snow plough[2]	1000275550		–	
Adapter plate[8]	1000173381	–	–	For Weidemann attachments

1. SAE mount
2. See the Operator's Manual of the attachment for putting the attachment into operation and using it
3. Not authorized for use on public roads
4. Only in connection with the load diagram of the wheel loader
5. Only in connection with rotating beacon order no. 1000133985
6. Only in connection with additional control circuit and machine lights according to the legal regulations of your country
7. When using the machine without a snow plough: install a bucket and load a counterweight of a minimum 75 kg
8. – see "Using an attachment adapter with an attachment from another manufacturer" on page 3-107

See "Merkblatt für Anbaugeräte" (leaflet with specific instructions for attachments) §
30 clauses 10/11/12 of the StVZO German road traffic regulations for further information on installing attachments
Merkblatt für Winterdienstgeräte (leaflet with specific instructions for winter service equipment installed on machine according to German legislation)

1.7 Type labels and component numbers

Explanation of “Book” symbol

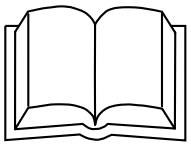


Fig. 3 : Explanation of “Book” symbol

The “Book” symbol on a (type) label means that the indications and explanations are described in further detail in this Operator’s Manual.

Serial number and type label

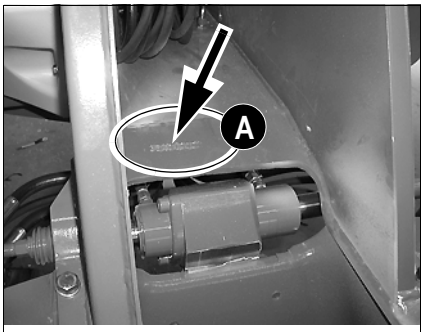


Fig. 4 : Location of serial number

The serial number is stamped on the machine frame **A** (next to the cabin attachment, on the right in travel direction). It is also located on the type label on the machine frame at the front right (on the side of the loader unit bulkhead).

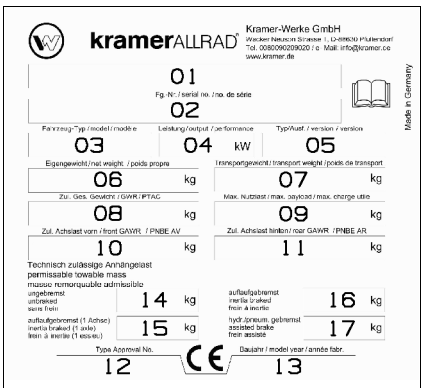


Fig. 5 : Type label

The type label is located on the machine frame, at the front right in travel direction (on one side of the loader unit bulkhead).

The **CE** mark on the type label means that the machine meets the requirements of the Machine Directive (2006/42 EC) and that the conformity procedure has been performed.

The **CE** mark is valid only in countries where the EU machine guideline (2006/42 EC) is applied!

For more data, see

Example: type label

1	Machine designation	Wheel loader (350)
2	Serial no.	348 01 1922
3	Machine model	348
4	Output (kW)	23
5	Machine model/version	348-01
6	Dead weight (kg)	–
7	Transport weight (kg)	–
8	Permissible maximum weight (kg)	2250
9	Maximum payload (kg)	–
10	Front gross axle weight rating (kg)	1550
11	Rear gross axle weight rating (kg)	1550
12	Gross unbraked trailer weight rating[1] (kg)	–
13	Gross braked trailer weight rating overrun brake (kg)	–
14	Gross braked trailer weight rating (kg) overrun brake (1 axle)	–
15	Gross trailer weight rating (kg) (compressed-air brake)	–
16	Check number of EC approval for machines with agricultural or forestry licence (option)	See National Type Approval (Germany), Data Confirmation (Germany) or registration documents
17	Year of construction	2013

1. The trailer coupling option is only for machines with agricultural or forestry registration (option)

Cabin number

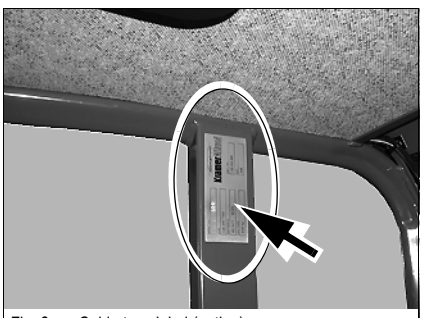


Fig. 6 : Cabin type label (option)

The type label (arrow) is located in the cabin, at the top right in travel direction.

Engine number

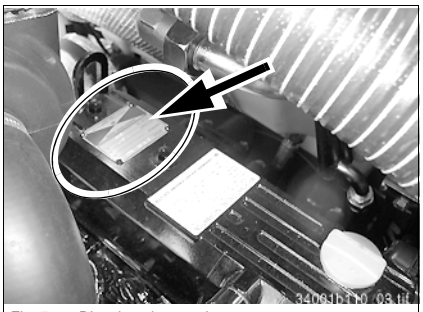


Fig. 7 : Diesel engine number

The type label (arrow) is located on the cylinder-head cover (engine).
Example:Yanmar 46557

Variable displacement pump number

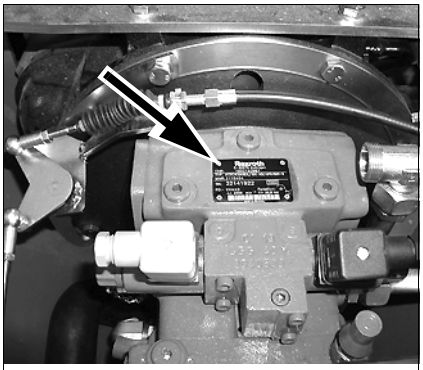


Fig. 8 : Variable displacement pump type label

The type label (arrow) is located on the hydraulic pump housing (next to where the pump is installed on the diesel engine)

Wheel motor number

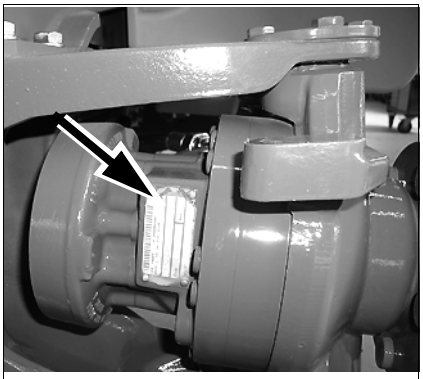


Fig. 9 : Wheel motor type labels

The type labels (arrow) are located direct on the wheel motors.

1.8 Labels and symbols

Labels on the outside of the machine

Fig. 10 : Eye hook label

Slinging point label (eye hooks) for loading the machine

Slinging points (lifting eyes) for loading the machine or for installing/removing the cabin – *see chapter 3 "Crane-lifting the machine"* on page 3-118.

Location

At the top of the cabin (4x)

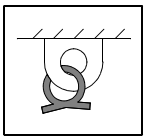


Fig. 11 : Label for points used for tying down the machine

Slinging point label for tying down the machine

The eye hooks are used for tying down the machine during loading and transport.

Other information – *see chapter 3 "Loading and transporting the machine on a transport vehicle"* on page 3-119

Location

On the left and right of the machine frame above the front axle attachment, and at the rear underneath the engine

Fig. 12 : Noise level label

Noise level label

Noise level produced by the machine.

L_{WA} = sound power level

Other information – *see chapter 6 "Noise levels"* on page 6-10

Location

On the rear window/on the control stand

Fig. 13 : Speed label

Label: maximum design-specific speed

Design-specific max. machine speed is 20 kph.

Location

At the rear and at the rear left/right of the machine

Fig. 14 : Danger label

Label: indication of danger.

This label alerts persons standing or working near the loader to an existing hazard within the area around the machine.

Location

Front left and right of machine frame, and at rear of machine.

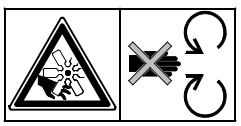


Fig. 15 : Prohibitory label

Label: do not open the engine cover

Do not open engine cover before engine is at a standstill!

Do not touch any turning parts!

Location

On the engine cover of the machine

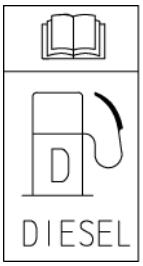


Fig. 16 : Label: fuel filler opening

Label: fuel filler opening.

Use only the diesel fuels indicated

- DIN EN 590 (EU)/ASTM D975-94 (USA)/EN 14214 (biodiesel)
- Do not use diesel fuel with additives

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

Location

Near the filler inlet of the fuel tank (left side of machine)

Fig. 17 : Prohibitive label: no transport of persons

Label: No transport of persons

Warning. Lifting or transporting persons on the wheel loader, and in or on the attachments is prohibited.

Location

On rear side of loader unit bulkhead

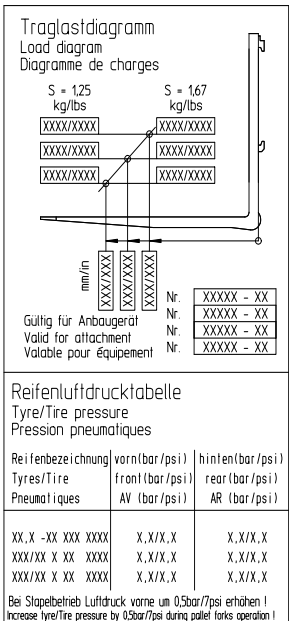


Fig. 18 : Load diagram and tyre pressure table

Load diagram for pallet forks with tyre pressure table

The framed numbers state the maximum authorized load on the fork arms for industrial and offroad applications. The maximum load varies according to the distance between the load centre and the rear end of the pallet forks.

Example:

➥ – *see chapter 3 "Load diagram for pallet forks"* on page 3-104

➥ – *see chapter 6 "Payload with pallet forks"* on page 6-12

Tyre pressure table

List of authorized types of tyres with prescribed inflation pressures

➥ – *see chapter 6 "Tyres"* on page 6-9

Location

On rear side of loader unit bulkhead

Notice!

The load diagram is valid only for applications with pallet forks. Observe the specific load diagrams of other attachments used, for example rotary crane jib!

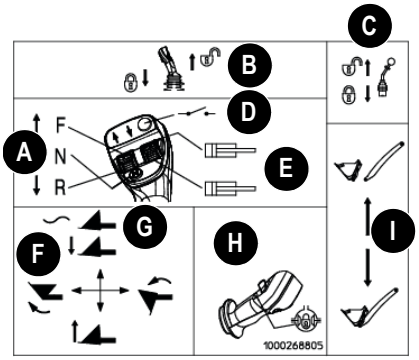


Fig. 19 : Label: control lever operation

Label for control lever operation of 3rd control circuit, mechanical locking

- **A** = travel direction: (**F**) forward/(**R**) reverse and (**N**) neutral position
- **B** = mechanical locking/unlocking of control lever (joystick)
- **C** = mechanical locking/unlocking of control lever (3rd control circuit for attachments)
- **D** = front socket (brief operation) (option)
- **E** = coupling plug of additional hydraulic control circuit (option)
- **F** = operation: raise, lower, tilt in/out loader unit
- **G** = operation: loader unit float position (option)
- **H** = operation: differential lock (option)
- **I** = operation: 3rd control circuit: unlocking and locking the attachments on the quickhitch and hydraulic control circuit for attachments

Location

On rear side of loader unit bulkhead

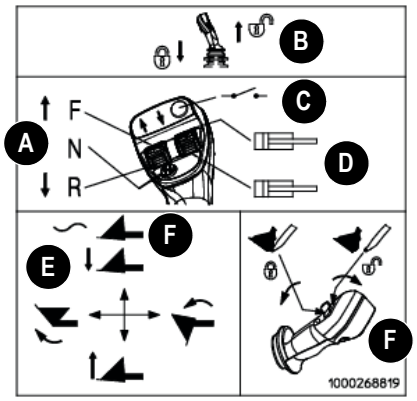


Fig. 20 : Label: control lever operation

Label for control lever operation and 3rd control circuit (option), electrical locking

- **A** = travel direction: (**F**) forward/(**R**) reverse and (**N**) neutral position
- **B** = mechanical locking/unlocking of control lever (joystick)
- **C** = front socket (brief operation) (option)
- **D** = coupling plug of additional hydraulic control circuit (option)
- **E** = operation: raise, lower, tilt in/out loader unit
- **F** = operation: loader unit float position (option)
- **G** = operation: 3rd control circuit: unlocking and locking the attachments on the quickhitch and hydraulic control circuit for attachments

Location

On rear side of loader unit bulkhead

Labels inside the cabin

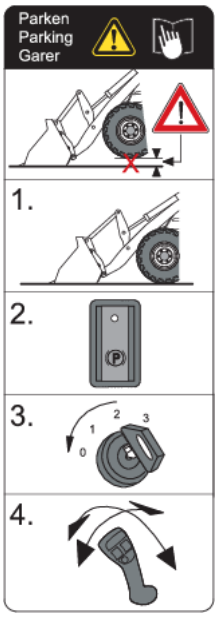


Fig. 21 : Machine stability label

Label: stopping/parking the machine

Caution!

The parking brake effect is applied electrically/hydraulically, via a brake valve, to the brake discs in the front wheel motors.
In order to prevent the machine from rolling away after parking it, do not raise the front axle or release the load on it by lowering the attachment!

1 Empty the bucket or pallet forks
2 Park the machine on firm and level ground (avoid slopes)
3 Align the bucket or pallet forks parallel to the ground and lower the loader unit to the ground without applying any pressure to it **(1)**
4 Apply the parking brake with the switch **(2)**
5 Switch off ignition and remove the ignition key **(3)**
6 Release the pressure in the lift and tilt rams.
To do this: move the control lever as far as it will go in all directions **(4)**
7 In addition to the parking brake, secure the machine **on slopes** by placing chocks under the wheels

Location

On the pillar on the right inside the cabin

Fig. 22 : Machine stability label

Machine stability label

Ensure machine stability.

- Read and understand the Operator's Manual

Location

On the pillar on the right inside the cabin

Fig. 23 : Operator's Manual label

Operator's Manual label

Caution. Read and understand the Operator's Manual before starting up, and befoe servicing or repairing the machine

Location

On the pillar on the right inside the cabin

Fig. 24 : Label: read and understand the service manual

Label: Remove the ignition key

Caution. Remove the ignition key before performing maintenance on the machine.

- Read and understand the service manual

Location

On the pillar on the right inside the cabin

Fig. 25 : Emergency exit label

Emergency exit label

– *see chapter 3 “Important safety instructions*” on page 3-13

Location

On the right-hand window inside the cabin

Labels in the engine compartment

Fig. 26 : Label: hot fluid (coolant)

Label: radiator under pressure, risk of burns!

Warning! The radiator is hot and under pressure.

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

Location

On the radiator in the engine compartment

Fig. 27 : Label: hot surface

Label: Burn hazard

Warning. Hot exhaust silencer. Do not touch.

- Let the engine cool down
- Wear protective gloves and clothing.

Location

On the left on the rear wall of the engine compartment (next to the exhaust silencer)

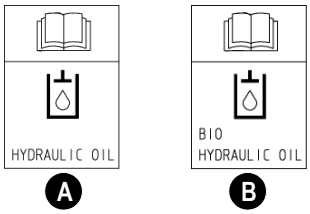


Fig. 28 : Label: filler opening for hydraulic oil

Label: filler opening for hydraulic oil

A = hydraulic oil

B = biodegradable hydraulic oil

– *see chapter 5 "Important information on the use of biodegradable oil"* on page 5-15

Location

On the hydraulic oil reservoir in the engine compartment (near the filler inlet)

Label for biodegradable lubricants (option)

Biodegradable lubricants (biodegradable oil) are used on the machine

➥ – *see chapter 5 "Important information on the use of biodegradable oil"* on page 5-15

2 Safety instructions

2.1 Identification of warnings and dangers

Important indications regarding the safety of the personnel and the machine are identified in this Operator's Manual with the following terms and symbols:

Danger!

Failure to observe the instructions identified by this symbol can cause personal injury or death for the operator or other persons.

☞ *Measures for avoiding danger to life and limb of the operator or other people*

Caution!

Failure to observe the instructions identified by this symbol can cause damage to the machine.

☞ *Measures for avoiding danger for the machine*

Notice!

This symbol identifies instructions for a more efficient and economical use of the machine.

Environment!

Failure to observe the instructions identified by this symbol can cause damage to the environment.
The environment is in danger if environmentally hazardous material (waste oil, for example) is not subject to proper use or disposal.

2.2 Designated use and exemption from liability

- **Carrying or transporting accompanying persons in the cabin or on the wheel loader is prohibited! Carrying or transporting persons in the attachments (bucket, pallet forks, for example) is prohibited!**
- **The machine may not be used for transport jobs on public roads!**
- **Using the machine with an overheated engine silencer and/or brake discs in areas posing a fire hazard** (hay or straw storage facilities, etc.) **is prohibited!**
- The machine is intended for:
  - moving earth, gravel, coarse gravel or ballast and rubble, and for applications with the attachments listed in chapter Introduction!
- Every other application is regarded as not designated for the use of the machine. The manufacturer will not be liable for damage resulting from use other than mentioned above. The user alone will bear the risk.
  Designated use also includes observing the instructions in the Operator's Manual and observing the conditions of maintenance and service!
- Observe the pertinent regulations relevant to accident prevention, other generally acknowledged regulations regarding safety and occupational medicine, as well as the regulations and standards relevant to motor vehicles and traffic which are valid in your country. Get informed on and follow the legal regulations of your country.
  The manufacturer shall not be liable for damage resulting from the failure to observe these regulations!
- The safety of the machine can be negatively affected by performing machine modifications without proper authority and by using spare parts, equipment, attachments and optional equipment which have not been checked and released by the manufacturer. The manufacturer will not be liable for damage resulting from this!
- The manufacturer shall not be liable for personal injury and/or damage to property caused by failure to observe the safety instructions and the Operator's Manual, and by the negligence of the duty to exercise due care when:
  - handling
  - operating
  - servicing and performing maintenance and
  - repairing the machine. This is also applicable in those cases in which special attention has not been drawn to the duty to exercise due care, in the safety instructions as well as in the operation and maintenance manuals (machine/engine).
- Read and understand the Operator's Manual before starting up, servicing or repairing the machine. Observe the safety instructions!
- In applications with lifting gear, the machine is used according to its designated use only if the mandatory Devices are installed and functional!

2.3 General conduct and safety instructions

Organizational measures

- The machine has been designed and built in accordance with state-of-the-art standards and the recognized safety regulations. Nevertheless, its use can carry a risk to life and limb of the user or of third parties, or cause damage to the machine and to other material property!
- The machine must only be used in technically perfect condition in accordance with its designated use and the instructions set forth in the Operator's Manual, and only by safety-conscious persons who are fully aware of the risks involved in operating the machine. Any malfunctions, especially those affecting safety, must therefore be rectified immediately!
  Basic rule:
  Before starting up the machine, inspect the machine for safety in work and road operation!
- Careful and prudent working is the best way to avoid accidents!
- The Operator's Manual must always be at hand at the place of use of the machine, and must therefore be kept in the storage compartment provided for in the cabin. Immediately complete or replace an incomplete or illegible Operator's Manual!
- 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.
  These mandatory regulations may also deal with handling hazardous substances, issuing and/or wearing personal protective equipment, or traffic regulations!
- With regard to specific operational features, for example those relevant to job organization, work sequences or the persons entrusted with the work, supplement the Operator's Manual by corresponding instructions, including those relevant to supervising and reporting duties!
- Persons entrusted with work on the machine must have read and understood the Operator's Manual and in particular, chapter "Safety Instructions" before beginning work. This applies especially to persons working only occasionally on the machine, for example set-up or maintenance!
- The user/owner must check – at least from time to time – whether the persons entrusted with operation or maintenance of the machine are working in compliance with the Operator's Manual and are aware of risks and safety factors!
- The user/owner commits himself to operate and keep the machine in a perfect condition, and, if necessary or required by law, to require the operating or servicing persons to wear protective clothing, etc.
- In the event of safety-relevant modifications or changes on the machine or of its behaviour, stop the machine immediately and report the malfunction to the competent authority/person.
  Safety-relevant damage or malfunctions of the machine must be rectified immediately!

- Never make any modifications, additions or conversions to the machine and its superstructures (for example cabin, loader unit, etc.), as well as to the attachments, which might affect safety without the approval of the manufacturer! This also applies to the installation and the adjustment of safety devices and valves, as well as to welding work on load-bearing elements!
- Spare parts must comply with the technical requirements specified by the manufacturer. Original spare parts can be relied to do so!
- Replace hydraulic hoses within stipulated and appropriate intervals even if no safety-relevant defects can been detected!
- Before working on or with the machine, remove jewellery, such as rings, wristwatches, bracelets, etc., and tie back long hair and do not wear loose-fitting garments, such as unbuttoned or unzipped jackets, ties or scarves.
  Injury can result from being caught up in the machinery or from rings catching on moving parts!
- Keep the machine clean. This reduces
  - Fire hazard, for example due to oil-soaked rags lying around
  - Risk of injury, for example due to dirt or debris on the footholds, and
  - Risk of accidents for example due to dirt or debris on the brake or accelerator pedal!
- Observe all safety, warning and information signs and labels on the machine!
- Adhere to prescribed intervals or those specified in the Operator's Manual for routine checks/inspections and maintenance!
- Tools and workshop equipment adapted to the task on hand are absolutely indispensable for performing service, inspection, maintenance or repair work!

Selection and qualification of personnel, basic responsibilities

- Any work on or with the machine must be performed by reliable personnel only.
  Do not let unauthorized persons drive or work with the machine! Observe statutory minimum age limits!
- Employ only trained or instructed personnel on the machine, and clearly and unequivocally define the individual responsibilities of the personnel for operation, set-up, maintenance and repair!
- Define the machine operator's responsibilities – also with regard to observing traffic regulations. Give the operator the authority to refuse instructions by third parties that are contrary to safety!
- Do not allow persons to be trained or instructed or persons taking part in a general training course to work on or with the machine without being permanently supervised by an experienced person!
- Work on the electrical system and equipment, on the chassis and the steering and braking systems must only be performed by technical personnel that has been specially trained for such work.
  Work on the hydraulic system of the machine must be performed only by personnel with special knowledge and experience in hydraulic systems!
- Seal off the danger zone should it not be possible to keep a safe distance.
- Stop machine operation if persons do not leave the danger zone in spite of warning!
  Keep out of the danger zone!
  Danger zone:
  The danger zone is the area in which persons are in danger due to the movements of the
  - machine
  - work equipment
  - other equipment or load!
  - This also includes the area affected by falling material, equipment or by parts that are thrown out.
  - The danger zone must be extended accordingly in the immediate vicinity of buildings, scaffolds or other elements of construction!

2.4 Safety instructions regarding operation

Normal operation

- Avoid any operational mode that might be prejudicial to safety!
- Before beginning work, familiarize yourself with the surroundings and circumstances of the work site. These are, for example, obstacles in the working and travelling area, the load-bearing capacity of the ground and any necessary barriers separating the work site from public roads!
- Take the necessary precautions to ensure that the machine is used only when in a safe and reliable state!
  Operate the machine only if all protective and safety-oriented devices, for example removable safety devices, soundproofing elements and exhausters, etc., are in place and fully functional!
- Check the machine at least once a day/per work shift for visible damage and defects. Report any changes (incl. changes in working behaviour) to the competent organization/person immediately! If necessary, stop the machine immediately and lock it!
- In the event of malfunctions, stop the machine immediately and lock it!
  Have any malfunctions rectified immediately!
- Start and operate the machine only from the operator seat!
- Before leaving the operator seat, apply the parking brake and stop the diesel engine!
- Perform start-up and shut-down procedures in accordance with the Operator's Manual, and observe the indicator lights!
- Before putting the machine/attachment into operation (start-up/moving), ensure that nobody is at risk by putting the machine/attachment into operation!
- Before driving with the machine, and also after interrupting work, check whether the brakes, the steering, signalling and light systems are functional!
- Before moving the machine always check whether the supplementary equipment and the attachments have been safely stowed away or attached!
- During machine travel on public roads, ways and places, observe the valid traffic regulations and, if necessary, ensure beforehand that the machine is in a condition perfectly compatible with these regulations!
- Always switch on the lights in conditions of poor visibility and after dark!
- **No raising, lowering or carrying persons in the work equipment/attachments!**
- **Installing a man basket or a working platform is prohibited!**
  (Always contact Kramer-Werke GmbH for installation!)
- When crossing underpasses, bridges and tunnels, or when passing under overhead lines always ensure that there is enough clearance!
- Always keep at a safe distance from the edges of building pits and slopes!
- When working in buildings or in enclosed areas, look out for:
  - Height of the ceiling/clearances
  - Width of entrances
  - Maximum load of ceilings and floors
  - Sufficient room ventilation – danger of poisoning!

- Avoid any operation that might be a risk to machine stability!
- During operation on slopes, drive or work uphill or downhill. If driving across a slope cannot be avoided, bear in mind the tilting limit of the machine!
  Always keep the attachments/work equipment close to the ground.
  This also applies to downhill machine travel.
  When travelling or working across a slope, the load must be on the uphill side of the machine!
- On sloping terrain always adapt the travel speed to the prevailing ground conditions!
  Never change to lower gear on a slope but always before reaching it!
- Before leaving the operator seat always secure the machine against unintentional movement and unauthorized use!
  Lower the work equipment/attachments to the ground
- Before starting work check whether:
  - all safety devices are properly installed and functional
  - and an approved warning triangle, hazard warning light and first aid kit are at hand!
- Before moving the machine or before taking up work:
  - Ensure that visibility is sufficient (do not forget rearview mirrors!)
  - Adjust correct seat position (you must be able to press the brake pedal as far as it will go).
    Never adjust the operator seat during machine travel or operation!
  - Fasten your seat belt
  - Inspect the immediate area (children!)
    On the job site the operator is responsible for third parties!
- Caution when handling fuel – increased risk of fire!
  Ensure that fuel does not come into contact with hot parts!
  Do not smoke during refuelling, and avoid fire and sparks. Stop the engine during refuelling and do not smoke!
- Never get on or off a moving machine! Never jump off the machine!
- Should the lights of the machine not be sufficient for performing work safely, provide additional lighting of the job site.
- Installed work lights must not be switched on for travel on public roads.
  They can be switched on in work operation if users of public roads are not dazzled!
- Hydrostatic 4 wheel steering takes time getting used to it. Therefore, adjust the travel speed to your abilities and the circumstances. Selection and change of steering mode at machine standstill only!

Applications with lifting gear

Definition:

Applications with lifting gear are understood as procedures involving raising, transporting and lowering loads with the help of slings and load-securing devices (ropes, chains, for example). In doing so, the help of persons is necessary for securing and detaching the load. This applies, for example, to raising and lowering pipes, shaft rings or containers!

- **The machine may be used for lifting gear applications only if a specific certification has been made out by the appropriate national authorities and if the prescribed safety devices are in place and functional.**
  These are for example:
  - Safe possibilities of slinging and securing lifting gear (load hook)
  - Load diagram
  - Protective devices!
- The load must be secured so as to prevent it from falling or slipping!
- Persons guiding the load or securing it must stay in visual contact with the machine operator!
- The machine operator must guide the load the nearest possible to the ground and avoid any oscillating or swinging movements!
- The machine may be moved with a raised load only if the path of the machine is as level as possible!
- The persons attaching or securing loads may approach the boom from the side only, and only after the machine operator has given his permission. The machine operator may give his permission only after the machine is at a standstill and the work attachment no longer moves!
- Do not use any lifting gear (ropes, chains) which is damaged or not of sufficient size. Always wear protective gloves when working with lifting gear!

Trailers and attachments

- Prior to driving on public roads remove all attachments which cannot be secured in compliance with the legal regulations of your country!
- Get informed on the legal regulations of your country which deal with the use and applications of trailers towed by the machine!
- Trailer operation with the towing gear of the machine is prohibited.
- Attachments and counterweights affect handling, as well as the steering and braking capability of the machine!
- Fit the attachments with the specially required devices only!
- Before uncoupling or coupling hydraulic lines (hydraulic quick couplers):
  - Stop the engine
  - Release the pressure in the hydraulic system. In order to do so, move the control levers of the hydraulic control units back and forth a couple of times!
- Coupling attachments requires special care!
- Secure the attachments against unintentional movement!
- Operate the machine only if all protective facilities have been installed and are functional, and if all brake, light and hydraulic connections have been connected!
- If optional equipment is installed, all additionally required light installations, indicator lights, etc., must be provided for and functional!
- Install the attachments only if the engine and the drive have been switched off!
- Especially when travelling or working with machines equipped with a quickhitch for the attachments, ensure that the attachment is safely locked in the quickhitch. The lock pin must be visible on either side of the bores on the attachment. Check before starting work!
- Prior to fitting attachments to the loader unit, secure the control lever of the hydraulic control unit against unintentional movement!
- Be careful when coupling attachments to the loader unit: risk of injury due to crushing and shearing. Ensure that nobody is between the machine and the attachment without securing the machine and the attachment against movement!

Transporting, towing, loading

- The machine must be towed, loaded and transported only in accordance with the Operator's Manual!
- For towing the machine observe the prescribed transport position, permissible speed and itinerary!
- Use only suitable means of transport and lifting gear of adequate capacity/payload!
- Safely secure the machine on means of transport! Use suitable slinging points and load-securing devices!
- The recommissioning procedure must be strictly in accordance with the Operator's Manual!

2.5 Safety instructions for maintenance

- Avoid any operational mode that might be prejudicial to safety!
- Observe the adjustment, maintenance and inspection activities and intervals set forth in the Operator's Manual, including information on the replacement of parts/partial equipment! These activities may be performed by technical personnel only!
- The machine may not be serviced, repaired or test-driven by unauthorized personnel!
- Brief operating personnel/operator before beginning special operations and maintenance! Appoint a person to supervise the activities!
- In any work concerning the operation, conversion or adjustment of the machine and its safety-oriented devices, or any work related to maintenance, inspection and repair, observe the start-up and shut-down procedures set forth in the Operator's Manual, and the information on maintenance.
- If required, secure the maintenance area appropriately!
- Prior to performing service, maintenance and repair work, attach a warning label, such as "Repair work – do not start machine!", to the ignition lock/steering wheel or to the control elements.
  Remove the ignition key!
- Perform service, maintenance and repair work only if
  - the machine is positioned on firm and level ground
  - the drive is in neutral
  - the parking brake is applied
  - all hydraulically movable attachments and working equipment have been lowered to the ground
  - the engine is stopped
  - the ignition key is removed and the
  - the machine has been secured against unintentional movement!
- Should maintenance or repair be inevitable with the engine running:
  - Only work in groups of two
  - Both persons must be authorized for the operation of the machine
  - One person must be seated on the operator seat and maintain visual contact with the other person
  - Observe the specific safety instructions in the work manual
  - Keep a safe distance from all rotating and moving parts, for example fan blades, V-belt drives, PTO shaft drives, fans, etc.!
- Prior to performing assembly work on the machine, ensure that no movable parts will roll away or start moving!
- To avoid the risk of accidents, parts and large assemblies being moved for replacement purposes must be carefully attached and secured to lifting gear.
  Use only suitable lifting gear and suspension systems in a technically perfect state with adequate load-bearing capacity!
  Stay clear of suspended loads!
- **The brake and steering systems are crucial to safety. Maintenance must be performed by trained personnel and an authorized service centre only!**

- Have loads fastened and crane operators guided by experienced persons only!
  The person guiding the operator must be within sight or sound of him!
- Always use specially designed or otherwise safety-oriented ladders and working platforms to perform overhead assembly work.
  Never use machine parts or attachments/superstructures as a climbing aid!
  Wear a safety harness when performing maintenance at greater heights!
  Keep all handholds, steps, handrails, platforms, landings and ladders free from dirt, snow and ice!
- Clean the machine, especially connections and threaded unions, of any traces of oil, fuel or preservatives before performing maintenance/repair work!
  Do not use aggressive detergents!
  Use lint-free cleaning rags!
- Before cleaning the machine with water, steam jet (high-pressure cleaner) or detergents, cover or tape up all openings which – for safety and functional reasons – must be protected against water, steam or detergent penetration. Special care must be taken with the electrical system!
- After cleaning, remove all covers and tapes applied for that purpose!
- After cleaning, examine all fuel, lubricant and hydraulic oil lines for leaks, chafe marks and damage!
  Rectify all defects without delay!
- Always tighten any threaded fittings that have been loosened during maintenance and repair!
- Any safety devices removed for set-up, maintenance or repair purposes must be refitted and checked immediately upon completion of the maintenance and repair work!
- Ensure that all consumables and replaced parts are disposed of safely and with minimum environmental impact!
- Do not use the work equipment as lifting platforms for persons!
- Before taking up work on machine parts dangerous for life and limb (bruising, cutting), always ensure safe blocking/support of these areas!
- Perform maintenance and repair work beneath a raised machine, work equipment/ attachments or additional equipment only if a safe and secure support has been provided for (the sole use of hydraulic rams, jacks, etc. does not sufficiently secure raised machines or equipment/attachments)!
- Avoid contact with hot parts, such as the engine block or the exhaust system during the operation of the machine and for some time afterward – risk of burns!
- Retainer pins can fly out or splinter when struck with force – risk of injury!
- Do not use starting fuel! This especially applies to those cases in which a heater plug (intake-air preheating) is used at the same time – danger of explosions!
- Apply special care when working on the fuel system – increased risk of fire!

2.6 Maintenance on protective ROPS and FOPS structures

Cabin, roll-over bar, protective screen

- Straightening and welding work on cabins, roll-over bars and protective screens are prohibited. These structures must be replaced by original spare parts from the manufacturer!
- Drilling holes or modifying protective ROPS/FOPS structures is prohibited!
- Driving or working with the wheel loader without installing the protective ROPS/FOPS structures correctly is prohibited!

2.7 Warning of special hazards

Electrical energy

- Use only original fuses with the specified current rating!
  Switch off the machine immediately and rectify the malfunction if trouble occurs in the electrical system!
- When working with the machine, maintain a safe distance from overhead electric lines! If work must be performed close to overhead lines, the equipment/attachments must be kept well away from them. Caution, danger! Get informed on the prescribed safety distances!
- If your machine comes into contact with a live wire
  - Do not leave the machine
  - Drive the machine out of the danger zone
  - Warn others against approaching and touching the machine
  - Have the live wire de-energized
  - Do not leave the machine until the line that has been touched or damaged has been safely de-energized!
- Work on the electrical system may only be performed by a technician with appropriate training, in accordance with the applicable electrical engineering rules!
- Inspect and check the electric equipment of the machine at regular intervals.
  Defects such as loose connections or scorched cables must be rectified immediately!
- Observe the operating voltage of the machine/attachments!
- Always remove the grounding strap from the battery when working on the electrical system or when performing welding work!
- Starting with battery jumper cables can be dangerous if performed improperly.
  Observe the safety instructions regarding the battery!

Gas, dust, steam, smoke

- Operate the machine only on adequately ventilated premises! Before starting internal combustion engines or operating fuel-operated heating systems on enclosed premises, ensure that there is sufficient ventilation!
  Observe the regulations in force at the respective site!
- Perform welding, flame-cutting and grinding work on the machine only if this has been expressly authorized. There can be a risk of explosion and fire, for example!
- Before performing welding, flame-cutting and grinding work, clean the machine and its surroundings from dust and other inflammable substances, and ensure that the premises are adequately ventilated – danger of explosions!

Hydraulic system

- Work on the hydraulic equipment of the machine must be performed only by persons having special knowledge and experience in hydraulic systems!
- Check all lines, hoses and threaded fittings regularly for leaks and obvious damage! Repair any damage and leaks immediately! Splashed oil can cause injury and fire!
- In accordance with the Operator's Manual/instructions for the respective assembly, release the pressure in all system sections and pressure lines (hydraulic system) to be opened before performing any implementing/repair work!
- Hydraulic and compressed-air lines must be laid and fitted properly. Ensure that no connections are interchanged. The fittings, lengths and quality of the hoses must comply with the technical requirements!

Noise

- During operation all sound baffles must be closed!
- Wear ear protectors if necessary!

Oil, grease and other chemical substances

- When handling oil, grease and other chemical substances (battery electrolyte – sulphuric acid, for example), observe the product-related safety regulations (safety data sheet)!
- Be careful when handling hot consumables – burn hazard!

Battery

- When handling the battery observe the specific safety instructions and regulations relevant to accident prevention. Batteries contain sulphuric acid – caustic!
- Especially when charging batteries, as well as during normal operation of batteries, an oxyhydrogen mixture is formed in the battery cells – danger of explosion!
- In the case of a frozen battery or of an insufficient electrolyte level, do not try start-up with a battery jumper cable. The battery can burst or explode!

Tyres

- Repair work on tyres and rims must be performed by technical personnel or by an authorized service centre only!
- Damaged tyres and/or wrong tyre pressure reduce the operational safety of the machine. Therefore perform regular checks of the tyres for
  - Prescribed tyre pressure and
  - Damage!
- Do not inflate tyres with inflammable gas – danger of explosion!
  Check the wheel nuts once a day for tightness. After changing wheels, retighten the wheel nuts after 10 operating hours!

Notes:

3 Operation

Cabin overview: see overleaf

3.1 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 table refer to the description of the controls.
A combination of digits, or a combination of digits and letters (for example 40/**18** or 40/**A**) used for identifying the control elements, means: fig. no. 40/control element no. 18 or position **A** in fig. no. 40

You can unfold pages (*3-2* and/or *3-4*) for a better overview.

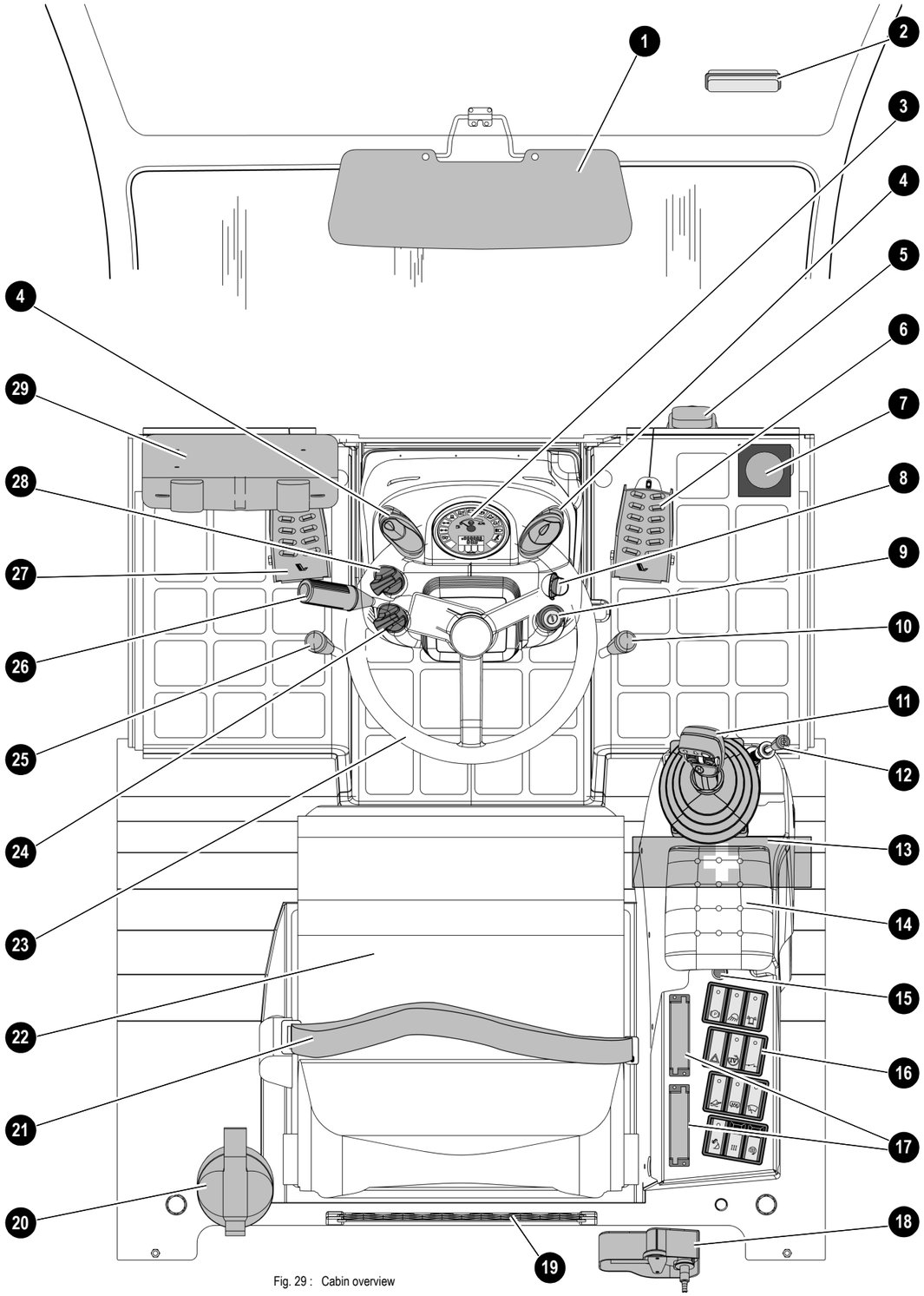


Fig. 29 : Cabin overview

3.2 Inside of cabin (overview)

Roof console(option)	For more information see page
1 Sun visor (option)[1]	
2 Interior light (option)[1]	
Cabin	**For more information see page**
3 Indicating instrument	*3-4*
4 Front window defroster vents (option)[1]	*3-62*
5 Front wiper motor (option)[1]	*3-62*
6 Accelerator pedal	*3-45*
7 Washer fluid reservoir (option)[1]	*3-62*
8 Horn push button	*3-59*
9 Preheating start switch (engine start)	*3-36*
10 Manual throttle (option)	*3-46*
11 Control lever (loader unit)	*3-42, 3-43, 3-64*
12 Control lever – 3rd control circuit (standard)	*3-42, 3-65*
13 Bracket (first-aid kit)[2]	
14 Armrest (option)	
15 1-pole socket (cigarette lighter)	
16 Switch panel	*3-4*
17 Fuse box	*6-7*
18 Rear wiper motor (option)[1]	*3-62*
19 Storage net for Operator's Manual (option)[1]	
20 Fire extinguisher (option)	*3-25*
21 Seat belt	*3-23*
22 Operator seat	*3-17*
23 Steering wheel	
24 Rotary switch for heating (warm/cold, option)[1]	*3-61*
25 Low-speed control (option)	*3-47*
26 Multifunctional lever (option)[3]	*3-59*
27 Service brake/inching pedal	*3-48*
28 Rotary switch for ventilation (option)[1]	*3-61*
29 Tool kit and document box[4]	*3-61*

1. Included in cabin option
2. Cabin option: installed on rear cabin wall on the left in travel direction
3. Included in machine lights option
4. Document box if equipped without cabin

Instrument panel overview: see overleaf

Instrument panel overview: see overleaf

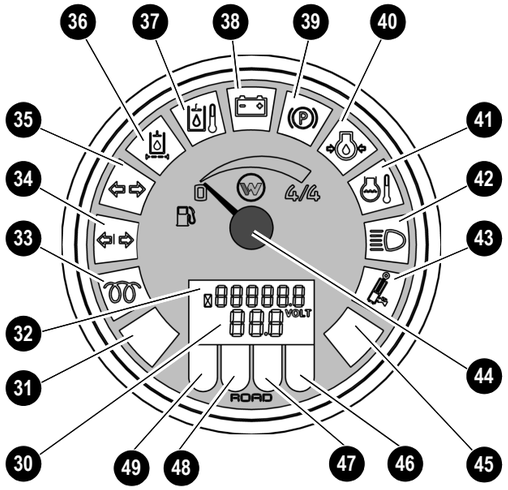


Fig. 30 : Indicating instrument overview

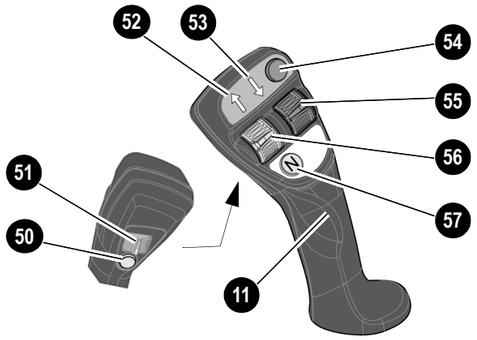


Fig. 32 : Control lever (joystick)

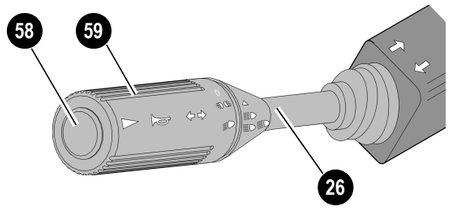


Fig. 31 : Multifunctional lever (option)

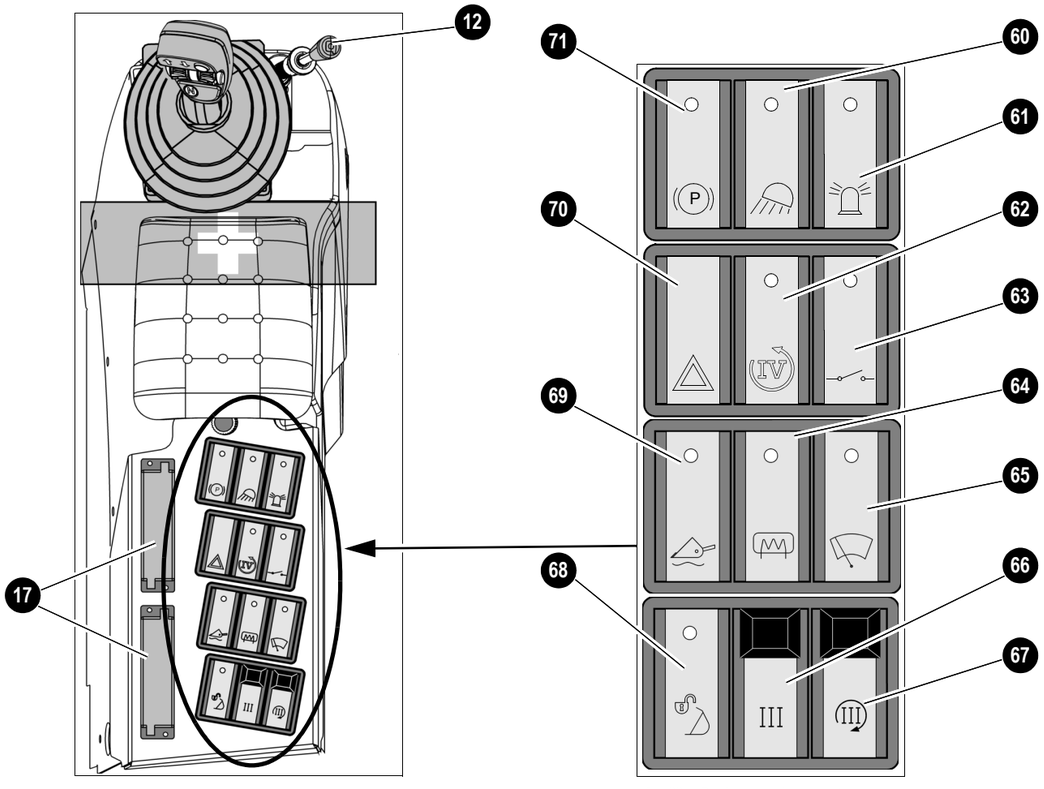


Fig. 33 : Right-hand switch panel (overview)

3.3 Instrument panel, multifunctional lever and drive lever (overview)

Indicating instrument	For more information see page
30 On-board voltage	
31 Not assigned	
32 Hour meter	
33 Indicator light (yellow) – preheating	*3-6*
34 Indicator light (green) – right/left turn indicator for rear attachments	*3-6*
35 Indicator light (green) – right/left turn indicators	*3-6*
36 Indicator light (red) – hydraulic oil filter	*3-6*, *5-16*
37 Indicator light (red) – hydraulic oil temperature	*3-7*, *5-14*
38 Indicator light (red) – alternator charge function	*3-7*, *3-36*
39 Indicator light (red) – parking brake	*3-7*, *3-50*
40 Indicator light (red) – engine oil pressure	*3-7*, *3-36*, *5-5*
41 Indicator light (red) – diesel engine temperature	*3-8*, *5-7*
42 Indicator light (blue) – high beam	*3-57*
43 Indicator light (yellow) – hose burst valve [1] (option)	*3-8*
44 Fuel level indicator	
45 Not assigned	
46 Not assigned	
47 Not assigned	
48 Not assigned	
49 Not assigned	

Control lever with 3rd control lever lock (option)	For more information see page
50 Push button – differential lock (option)	*3-56*
51 Switch – lock/unlock 3rd control circuit for quickhitch (option)	*3-67*
52 Indicator light (green) – forward travel direction	*3-51*
53 Indicator light (green) – reverse travel direction	*3-51*
54 Push button – front socket (brief operation) (option)	*3-55*
55 Switch – additional front control circuit (option)	*3-108*
56 Switch – travel direction selection (forward/reverse)	*3-51*
57 Push button – travel direction in neutral	*3-51*

Multifunctional lever (option)[2]	For more information see page
58 Horn push button	*3-59*
59 Rotary switch – lights, turn indicators	*3-57*, *3-59*, *3-62*

1. Hose burst valve is not functional with the load stabilizer switched on (indicator light illuminates)
2. Included in machine lights option

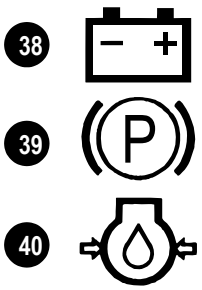
3.4 Overview: control console on the right

Control console on the right	For more information see page
60 Switch – working lights	3-58
61 Switch – rotating beacon (option)	3-62
62 Switch – additional front control circuit (option)	3-108
63 Switch – front socket (permanent operation) (option)	3-55
64 Switch – heated rear window (option)[1]	3-60
65 Switch – wiper (option)[1]	3-62
66 Switch with lock (green) – 3rd control circuit lock (option)	3-68
67 Switch with lock (green) – continuous operation of 3rd control circuit (option)	3-69
68 Push button (grey) – protection against unlocking attachments	3-67
69 Switch – load stabilizer (option)	3-53
70 Switch – hazard warning system (option)[1]	
71 Switch – parking brake	3-50

1. Included in cabin option

3.5 Functional description: indicator lights

Indicator light check



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

Caution!

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 centre!

Notice!

Indicator lights **38/39/40** remain lit when the ignition is turned on!

3.6 Indicator lights and warning lights: description

Indicator light (yellow) – preheating

Illuminates when the key in preheating start switch is in position **2**

The combustion air of the engine is preheated by glow plugs when the key is in this position

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

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

Indicator light (green) – right/left turn indicators

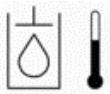
Flashes intermittently when operating the turn indicators

Indicator light (red) – hydraulic oil filter

Indicates inadmissibly high pressure in the hydraulic return line to the reservoir. In this case:

☞ *Have the hydraulic oil return filter checked and, if necessary, replaced by an authorized service centre*

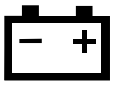
☞ *– see Monitoring the hydraulic oil and the return filter on page 5-14*

37 

Indicator light (red) – hydraulic oil temperature

Illuminates if the temperature in the hydraulic system is too high.

Check the hydraulic oil level (not enough oil in the reservoir)
– see chapter 5 "Checking the hydraulic oil" on page 5-16

38 

Indicator light (red) – alternator charge function

The indicator light illuminates when the ignition 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 charged.

39 

Indicator light (red) – parking brake

Illuminates when the parking brake is applied.

The electric driving interlock prevents starting the engine with the parking brake applied.

40 

Indicator light (red) – engine oil pressure

Illuminates if the engine oil pressure is too low. In this case:

☞ *Stop the machine*

☞ *Stop the engine immediately and check the oil level*
– see chapter 5 "Checking the engine oil level" on page 5-5

The indicator light illuminates when the ignition is turned on and goes out as soon as the engine runs.

41 

Indicator light (red) – diesel engine temperature indicator

Indicates the engine temperature detected by a sensor (coolant).

Caution!

Danger of engine breakdown if the indicator light illuminates with the engine running!

☞ *To cool down: let the engine run at idling speed briefly, then stop it*

☞ *Check the cooling system – see chapter 5 "Engine and hydraulics cooling system" on page 5-7*

42 

Indicator light (blue) – high beam

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

43 

Indicator light (yellow) – load stabilizer (option)

Caution! The hose burst valve is not active if the load stabilizer is switched on!

➥ Indicator light illuminates

☞ *– see Switching the load stabilizer ON and OFF on page 3-54*

☞ *– see Hose burst valve safety feature (option) on page 3-110*

3.7 Important notices before putting the machine into operation

Operating personnel

- The machine may be put into operation by instructed and authorized personnel only – *see chapter 1* “*Driving licence*” on page 1-9 and – *see chapter 2* “*Selection and qualification of personnel, basic responsibilities*” on page 2-5 of this Operator’s Manual.
- The operating personnel must have read and understood this Operator’s Manual before putting the machine into operation
- Only use the steps and handholds when entering and leaving the cabin
- Face the machine as you enter and leave it
- Never use the controls or movable lines and cables as handholds
- Keep the footholds and handholds clean to ensure a safe hold at all times; immediately remove dirt, such as oil, grease, earth, snow or ice
- The machine may only be put into operation when the operator is seated
- Fasten the seat belt (lap belt) before putting the machine into operation
- Never get on a moving machine. Never jump off the machine
- Before leaving the machine, lower the loader unit, stop the diesel engine, remove the ignition key and apply the parking brake
- Carrying or transporting accompanying persons in the cabin and/or on the machine is prohibited
- **The machine may be used only in technically perfect condition and only according to its designated use**
- **Always observe the warning and information labels, and the load diagrams (pallet forks, for example) affixed on the machine**
- **Immediately replace (or have replaced) damaged or illegible warning and information labels with new ones**
- Run through the checklists on the following pages
  - – *see chapter 3* “*Starting checklist*” *on page 3-11*
  - – *see chapter 3* “*Operation checklist*” *on page 3-12*
  - – *see chapter 3* ““*Parking*” *checklist*” *on page 3-12*

Running-in period

Handle the machine carefully during its first 100 operating hours.

- Do not put a cold diesel engine under load
- Let the diesel engine warm up at low engine speed (1/4 throttle) for about 30 seconds
- Avoid loading the diesel engine at idling speed, and do not run the diesel engine at high speed for extended periods
- Increase the load gradually while varying the diesel engine speed
- Strictly observe maintenance schedules and perform (or have performed) the specified maintenance – *see chapter 5 "Maintenance plan overview"* on page 5-42

Caution!

When performing cleaning and maintenance, do not run the wheel motors without load and at max. engine speed with the machine raised on props in order to avoid damage to the wheel motors!

3.8 Check lists

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

These checklists cannot claim to be exhaustive; they are merely intended as an aid for you in fulfilling your duties as a conscientious operator.

The checking and monitoring work listed below is described in greater detail in the following chapters.

If the answer to one of the following questions is NO, first rectify the cause of the fault before starting or continuing work.

Starting checklist

Check the following points before putting the machine into operation or starting the engine:

	Starting checklist	✔
1	Enough fuel in the tank? (➠ *5-3*)	
2	Engine oil level OK? (➠ *5-5*)	
3	Oil level in hydraulic reservoir OK? (➠ *5-16*)	
4	Water level in washer reservoir OK?	
5	V-belt condition and tension checked? (➠ *5-12*)	
6	Loader unit lubricated? (➠ *5-19*)	
7	Braking system (including parking brake) OK? (➠ *3-48*)	
8	Tyre condition and inflation pressure OK? (➠ *5-22*)	
9	Wheel nuts safely tightened (especially after a wheel change)? (➠ *6-11*)	
10	Lights, signals, indicators, warning lights and indicator lights OK? (➠ *3-59*)	
11	Windows, mirrors, lights and steps clean?	
12	Attachment on the loader unit safely locked? (➠ *3-73*)	
13	Engine cover safely locked? (➠ *3-25*)	
14	Especially after cleaning, maintenance or repair work: Rags, tools and other loose objects removed?	
15	Approved warning triangle, hazard warning light and first aid kit in the machine?	
16	Seat position and rearview mirrors correctly adjusted?	
17	Seat belt fastened? (➠ *3-23*)	

Operation checklist

After starting the engine and during operation, check and observe the following points:

Operation checklist		✔
1	Indicator lights for engine oil pressure and alternator gone out? (➠ *3-34*)	
2	Braking effect sufficient? (➠ *3-48*)	
3	Temperature gauge for engine coolant in normal range? (➠ *3-6*)	
4	Steering system working properly? (➠ *3-44*)	
5	Anyone dangerously close to the machine?	
7	3rd control circuit locked? (➠*3-73*)	
During machine travel on public roads, particular attention should be paid to the following points:		
9	Bucket and attachments in transport position? (➠ *3-41*)	
10	Transport locks installed? (➠ *3-41*)	
11	Control lever for lift and tilt hydraulics of the loader unit locked? (➠ *3-42*, *3-43*)	
12	Front-edge protection fitted to bucket? (➠ *3-41*)	

“Parking” checklist

Check and observe the following points when parking the machine:

“Parking” checklist		✔
1	Attachments on the loader unit lowered to the ground? (➠ *3-73*)	
2	Parking brake applied? (➠ *3-50*)	
3	Diesel engine stopped? (➠ *3-37*)	
4	Machine secured and/or cabin locked, especially if the machine cannot be supervised?	
When parking on public roads:		
5	Machine adequately secured? (➠ *3-50*, *3-52*)	
When parking on slopes:		
6	Machine additionally secured with chocks under the wheels to prevent it from rolling away? (➠ *3-52*)	

3.9 Cabin

Important safety instructions

Danger!

Risk of accidents! The cabin is not certified for forestry or spraying applications!
Using the machine in forestry can expose the operator and other persons to the following dangers:
– Danger of falling objects
– Falling tree trunks
– Penetration of objects into the cabin.

Danger!

Risk of injury!
In order to avoid risk of injury, remove dirt (oil, grease, earth, snow and ice) from handholds, footholds and shoes before accessing the machine.

☞ *Use only the machine footholds and handholds to access the cabin*

☞ *Face the machine as you enter and leave it*

Notice!

Cabin access on the left = main access and exit!
Use the window on the right only in an emergency
– *see Using the emergency exit* on page 3-16.

Locking/unlocking the door (left)

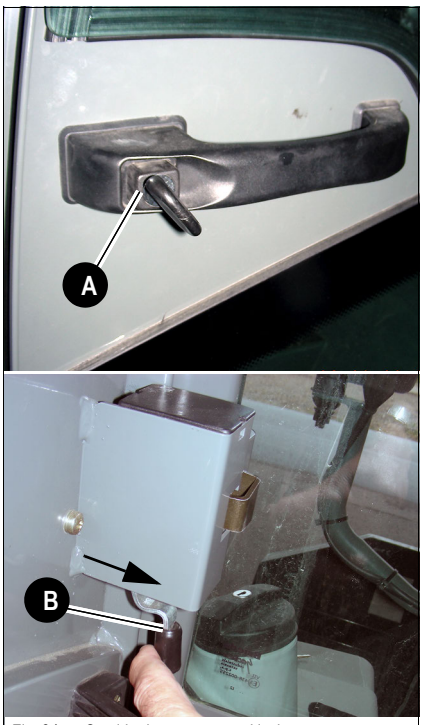


Fig. 34 : Outside door opener and lock

Danger!

In order to avoid crushing and injury, close the door when driving the machine!

☞ *Close the door completely before starting machine travel.*

Unlocking the door:

☞ *Unlock the door with the ignition key (turn to the left)*

Opening the door from the outside:

☞ *Press door button* **A**

Opening the door from the inside:

☞ *Press lever* **B** *in the direction of the arrow*

Locking the door:

☞ *Lock the door with the ignition key (turn to the right)*

Locking and unlocking the cabin window on the right/left

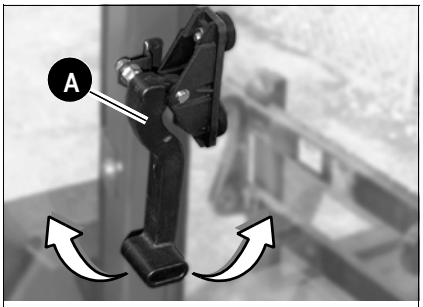


Fig. 35 : Locking/unlocking the side window

Danger!

In order to avoid crushing and injury, close the side window when driving the machine!

☞ *Ensure that the open side window is safely locked in the handle of the door opener*

☞ *Ensure that the open side window is engaged in the arrester*

☞ *Unlock the side window. To do this: turn lever* ***A*** *upward*

☞ *Lock the side window. To do this: turn lever* ***A*** *downward*

Opening the right/left-hand window to a gap

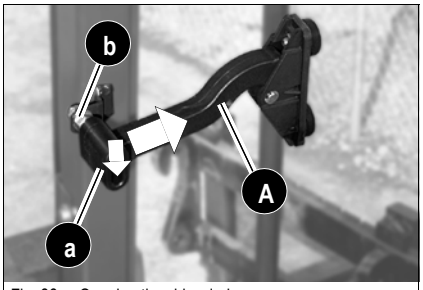


Fig. 36 : Opening the side window

Cabin ventilation can be improved by opening the side windows to a gap **during work operation** and securing them with lever **A**

☞ *Open the side window to a gap. To do this: turn lever* ***A*** *upward*

☞ *Push lever* ***A*** *horizontally to the outside*

☞ *Press the end of lever* ***a*** *downward in guide* ***b***

➥ The side window is secured with the door opener

Fully opening the side window

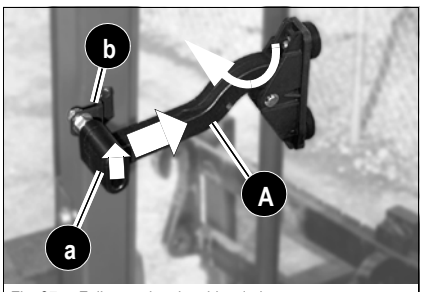


Fig. 37 : Fully opening the side window

☞ *Unlock the side window. To do this: turn lever **A** upward*

☞ *Open the side window completely. To do this: pull the end of lever **a** out of guide **b***

Locking and unlocking an open side window

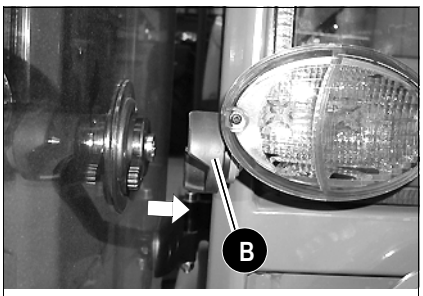


Fig. 38 : Locking the open side window

☞ *Open the side window completely and press it backward against arrester **B***

➥ The side window engages in the arrester and is locked

Notice!

Apply a thin coat of spray oil at regular intervals to ensure the correct function of arrester **B**.

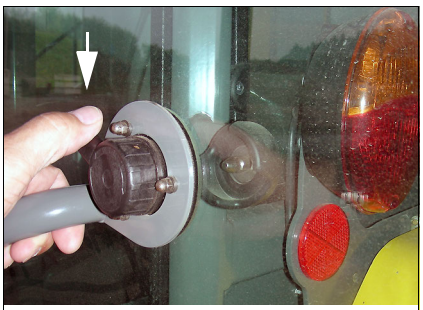


Fig. 39 : Unlocking the open side window

The side window can only be unlocked from the outside.

☞ *Push down the lever of the arrester*

➥ The side window is released from the lock by spring action

☞ *Close the side window and safely lock it with lever* **A**

– *see Locking and unlocking the cabin window on the right/left on page 3-14*

3.10 Side window emergency exit

Using the emergency exit

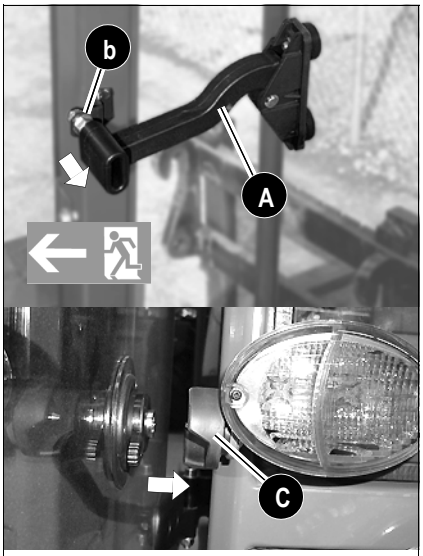


Fig. 40 : Side window emergency exit

In case of an emergency, the side window on the right can be used to exit the cabin if the door on the left can no longer be used.

Danger!

Risk of injury! The right side of the machine does not have footholds or handholds that ensure a safe exit.

☞ *Exit the cabin in an emergency as follows:*

- Stop the diesel engine immediately if possible
- Lock the control lever (joystick) and the 3rd control circuit
- Switch off all electric consumers
- Stop the engine and remove the ignition key
- Open the side window. To do this: raise the lever out of guide **b**
- Open the side window and press it into arrester **C**
- Carefully exit the cabin

➥ If possible, ask for help

3.11 Operator seat

Important information

Correct seat operation and adjustment increases drive comfort and avoids back problems. Therefore, adjust the seat to the operator's weight before putting the machine into operation and when changing operators!

- In order to avoid injury, do not store any objects in the suspension travel range of the operator seat.
- Do not modify the operator seat (for example by retrofitting spare parts **other than** original. Functions that are important for safety can be affected. In case of personal injury or damage to property, warranty and liability claims are excluded.
- If the seat functions do not work as usual (seat suspension, for example), have an authorized service centre perform repair work immediately.
- Failure to do this can result in health hazards and increased risk of accidents.

Notice!

Machines equipped with a canopy (option) are fitted with an operator presence switch that prevents starting the engine if the driver is not seated on the operator seat.

The diesel engine is stopped after 3 – 4 seconds if the operator stands up with the engine running.

See also "Putting the machine into operation" on page 3-39

Seat adjustment (overview)

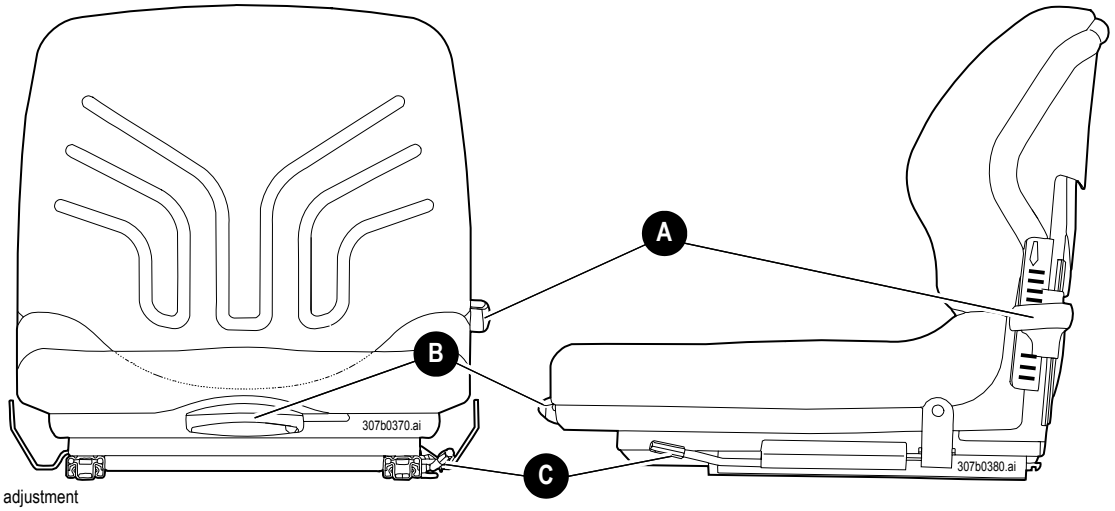


Fig. 41 : Seat adjustment

Danger!

In order to avoid risk of accidents, never adjust the operator seat during machine travel!

☞ *Adjust the operator seat before starting machine travel*

☞ *Ensure that the levers for seat adjustment are safely engaged*

The operator seat can be set to the following positions:

- **A =** weight adjustment with weight indication
- **B =** backrest adjustment (depending on version)
- **C =** horizontal adjustment

Weight adjustment

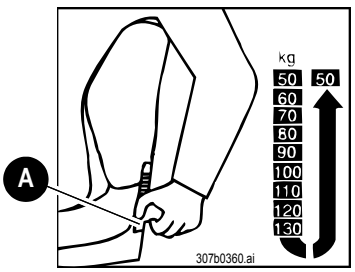


Fig. 42 : Weight adjustment

Adjusting to a higher weight:

☞ *Sit down on the operator seat*

☞ *Press handle **A** downward (10 kg per notch)*

Adjusting to a lower weight:

☞ *Press handle **A** against the lower limit*

➥ The weight adjustment automatically returns to the upper 50 kg position

☞ *Press handle **A** downward to the required position*

Horizontal adjustment

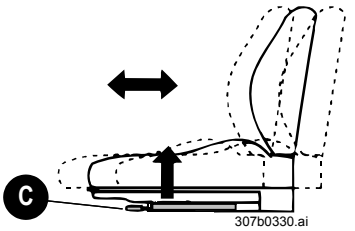


Fig. 43 : Horizontal seat adjustment

☞ *Sit down on the operator seat*

☞ *Pull lever **C** up and at the same time, move the operator seat forward or backward*

➥ Once the operator seat is adjusted, engage the lever in the required position. It must not be possible to move the operator seat to another position

Backrest adjustment

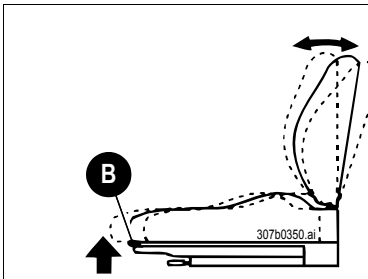


Fig. 44 : Backrest adjustment

☞ *Sit down on the operator seat*

☞ *Pull handle **B** up and at the same time, move the operator seat forward or backward, the backrest is set as follows:*

☞ *Operator seat moved forward*

➥ Flatter backrest inclination

☞ *Operator seat moved backward*

➥ Steeper backrest inclination

3.12 Operator seat with air suspension

Important information

Correct seat operation and adjustment increases drive comfort and avoids back problems. Therefore, adjust the seat to the operator's weight before putting the machine into operation and when changing operators!

- In order to avoid injury, do not store any objects in the suspension travel range of the operator seat
- Do not modify the operator seat (for example by retrofitting spare parts **other than** original. Functions that are important for safety can be affected. In case of personal injury or damage to property, warranty and liability claims are excluded
- If the seat functions do not work as usual (seat suspension, for example), contact an authorized service centre immediately for repair

Weight adjustment (air suspension)

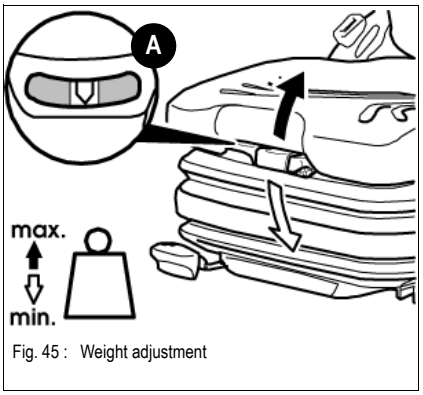


Fig. 45 : Weight adjustment

Caution!

In order to avoid damage to the compressor, do not make the compressor run more than 1 minute as you adjust the weight!

Sit down on the operator seat and adjust it to the specific weight by pulling or pressing the weight adjustment lever.

☞ *Adjust as follows:*

- Pull handle **A** up – high weight
- Press handle **A** down – low weight

➥ The operator seat is adjusted to the correct weight if the arrow is in the medium range of the window

➥ Within this visible range, the individual height can be adjusted up to the minimum suspension travel

➥ The minimum or maximum weight adjustment is indicated with the audible upper and lower limits

Horizontal adjustment (air suspension)

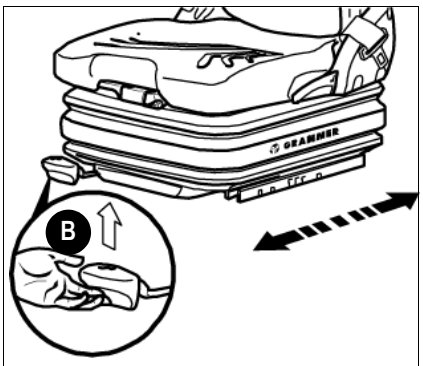


Fig. 46 : Horizontal adjustment

Horizontal adjustment is performed by actuating lock lever **B** upward.

☞ *Adjust as follows:*

- Sit down on the operator seat
- Pull lever **B** upward and at the same time, move the operator seat forward or backward

  ➥ Once the operator seat is adjusted, engage the lever in the required position. It must not be possible to move the operator seat to another position

Backrest adjustment (air suspension)

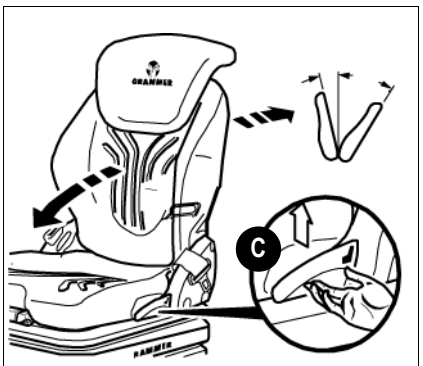


Fig. 47 : Backrest adjustment

☞ *Adjust the backrest as follows:*

- Sit down on the operator seat
- To release, pull handle **C** upward.

  ➥ The required position is adjusted by pressing against the backrest or releasing the pressure against it
- To lock, release handle **C**

Backrest extension (air suspension)

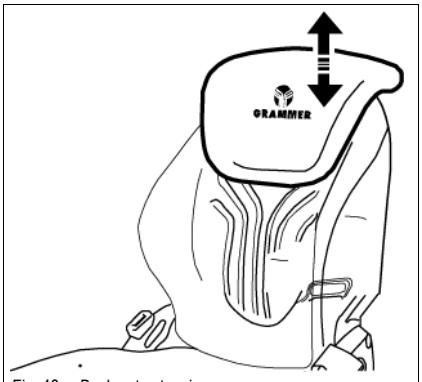


Fig. 48 : Backrest extension

☞ *Adjust the backrest extension as follows:*

- Pull or push the backrest extension beyond the notch
  - ➥ The backrest extension can be adjusted up to the limit
- To remove, pull the backrest extension upward sharply beyond the limit

Lumbar support (option)

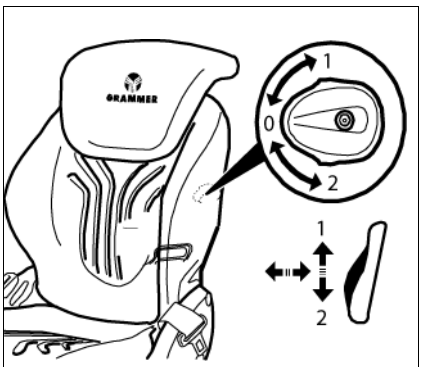


Fig. 49 : Head rest

☞ *Adjust the backrest curvature as follows:*

- Turn the handwheel upward to adjust the curvature in the upper part, and downward to adjust it in the lower part of the backrest cushioning
  - ➥ **0** = no curvature
  - ➥ **1** = maximum curvature in upper part
  - ➥ **2** = maximum curvature in lower part

Heated seat (option)

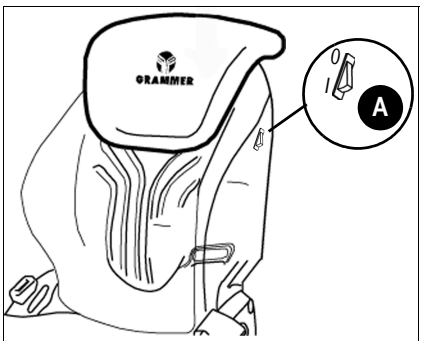


Fig. 50 : Heated seat

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

3.13 Seat belt (lap belt)

Notices on the seat belt

Fig. 51 : Seat belt label

Danger!

In order to avoid risk of accident and injury, fasten the seat belt (lap belt) during machine travel and operation!

☞ *Bear in mind the following when fastening the seat belt:*

- Do not twist the seat belt when you fasten it!
- 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 (tools, rulers, glasses, pen) carried inside your clothes!
- Never buckle up several persons!
- Check the condition of the seat belt regularly. Have damaged seat belts immediately replaced by an authorized service centre!
- Always keep the seat belt clean, as coarse dirt can impair proper functioning!
- There must be no foreign bodies in the buckle, otherwise the buckle latch cannot lock into place.

After an accident the belt strap is stretched and no longer serviceable.

☞ *Have the seat belt replaced by an authorized service centre.*

☞ *Have fastening points and seat fixture checked by an authorized service centre for bearing capacity!*

Fastening the seat belt

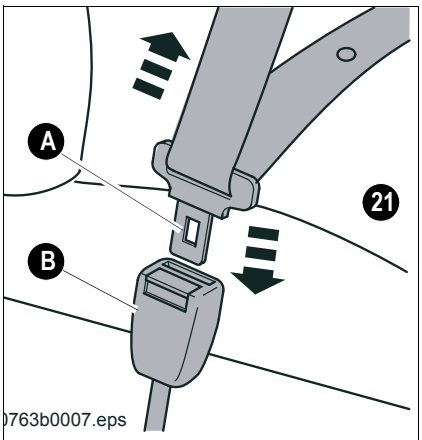


Fig. 52 : Fastening the seat belt

Fasten seat belt **21** as follows before starting machine travel:

☞ *Hold the belt at buckle latch **A** and run it slowly and steadily over the hips to buckle **B***

☞ *Insert buckle latch **A** into buckle **B** until it engages audibly **(pull test)***

☞ *Tighten the seat belt by pulling at its end*

➥ The seat belt must always be tightly in place over the hips!

Unfastening the seat belt

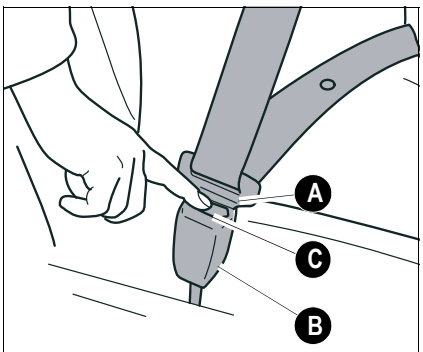


Fig. 53 : Unfastening the seat belt

Unfasten the seat belt as follows:

☞ *Hold the seat belt*

☞ *Press red button **C** on buckle **B***

➥ Latch **A** is released from buckle **B** by spring action

☞ *Slowly return the seat belt to the retractor (option)*

Longer/shorter seat belt adjustment

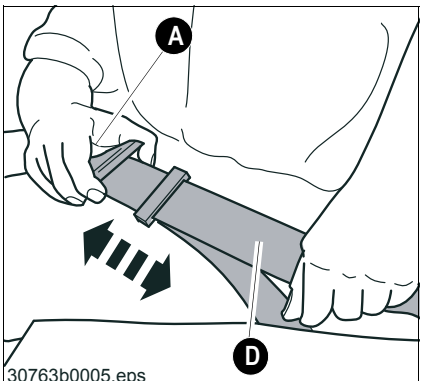


Fig. 54 : Longer/shorter seat belt adjustment

☞ *Lengthen the lap belt as follows:*

- Hold buckle latch **A** at a right angle to the seat belt and pull the seat belt to the required length

☞ *To shorten the lap belt, just pull the free end **D** of the belt*

Notice!

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.

3.14 Opening/closing the engine cover

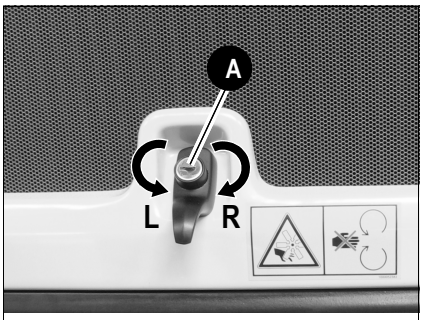


Fig. 55 : Engine cover lock

Danger!

Risk of injury. Risk of shearing due to rotating parts!

☞ *Stop the diesel engine before opening the engine cover*

☞ *Open the engine cover*

- Stop the diesel engine and remove the ignition key
- Press lock **A**
- Pull the engine cover upward

☞ *Close the engine cover*

- Firmly press down the engine cover until lock **A** engages with an audible click

☞ *Lock and unlock the engine cover*

Lock or unlock the engine cover with the ignition key of the preheating start switch.

3.15 Battery master switch (option)

The battery master switch is located in the engine compartment next to the battery

Interrupting power supply

☞ *Turn and remove the key of the battery master switch (notched position)*

Switching on power supply

☞ *Insert the key in the battery master switch*

☞ *Turn the key to the notched position*

3.16 Location of fire extinguisher (option)

Fire extinguisher operation

Fig. 56 : Fire extinguisher (option)

The 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 centre*

☞ *It is located on the rear cabin wall, to the left of the operator seat*

☞ *Fire extinguisher operation is described with the symbols on the fire extinguisher*

Caution!

The fire extinguisher must be refilled and sealed by authorized staff after it has been used.

3.17 Key-based drive interlock (option)

Key-based drive interlock: scope of delivery

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

Scope of delivery:

- Drive interlock installed in the machine
- 2 x blue keys (coded)
- 1 x red master key (for coding a blue key)

Coding (“training”) new ignition keys

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

Notice!

Important!
The new key (blue) cannot be coded unless the machine lights (side marker lights) are switched on.

☞ *Switch on the machine lights – see chapter 3 “Machine lights (option)” on page 3-57*

Caution!

Each drive interlock has only one master key!

☞ *The drive interlock must be replaced by an authorized service centre if the master key is lost.*

- The master key is only used for coding new keys, and cannot be used for disabling the drive interlock
- 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
- Several keys requiring coding can be inserted one after another in the ignition lock
- Each key must remain at least 1 second in position **1**
- Coding can be performed for a maximum 10 keys

Enabling (locking) the drive interlock

☞ *Apply the parking brake*

➥ *– see Parking brake* on page 3-50

☞ *Stop the engine*

☞ *Remove the ignition key (blue)*

➥ The drive interlock is enabled in 30 seconds

Caution!

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

Disabling (releasing) the drive interlock

Start and stop the engine exactly as described in *"Starting the engine"* on page 3-36.

☞ *The system is enabled 5 seconds after the ignition key is inserted in the ignition lock*

☞ *Start the engine – see Starting the engine on page 3-36*

➥ The drive interlock is disabled as long as the engine runs

Deleting coded keys

Deleting coded keys is necessary whenever a coded key is lost

Notice!

Important! A coded key cannot be deleted unless the machine lights (side marker lights) are switched on.

☞ *Switch on the machine lights – see chapter 3 "Machine lights (option)" on page 3-57*

- All coded keys are deleted during deletion
- After deletion has been performed, all existing keys can be recoded
- Deletion is performed by inserting the master key in the ignition lock and by turning it to position **1** for a minimum 20 seconds
- All coded keys are then deleted, and all existing keys can be recoded
- The master key code is not deleted during deletion

Safety functions

The drive interlock 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.
It is only available if the control valve relay is connected in addition with terminal 30.

The drive interlock remains enabled for 15 minutes and does not accept any valid keys if several invalid keys have been detected without having set the ignition lock to position **0**.

Valid keys are accepted only after 15 minutes and after the position **0** of the ignition lock has been detected. This avoids testing keys without actuating the mechanical ignition lock, for example by moving the ignition lock to position **1** by force.

Interruptions of the supply line or other control lines do not disable the drive interlock or delete data (data codes, for example). All important data is saved in a non-volatile memory.

3.18 Drive interlock with code input (option)

Keypad for entering codes (overview)

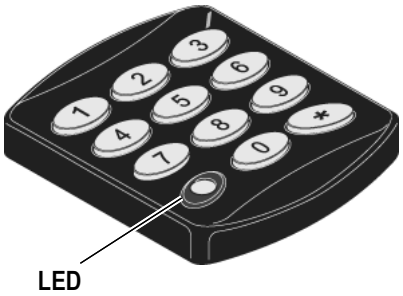


Fig. 57 : Drive interlock (code input option)

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

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

Caution!

We recommend using the personal code for disabling the system.

☞ *Keep the main code in a safe place.*

The keypad consists of:

- 10 numeric keys for entering the codes
- A (*) key for confirming the code that has been entered
- An LED (red indicator light)
- An internal acoustic signal for signalling specific procedures

  ➥ Example: a signal sounds to confirm a key has been pressed

The keypad illuminates:

- When pressing any key
- The keypad flashes to indicate specific system statuses

Entering/changing the personal code

In order to enter or change the personal code:

☞ *Disable the drive interlock by entering the main code (6 digits) and pressing the **(*)** key*

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

➥ The LED illuminates for 2 seconds

☞ *Enter the 4, 5 or 6-digit new personal code and confirm with the (*) key within 20 seconds after the LED has gone out*

☞ *Enter the new personal code again and confirm it with the **(*)** key after a short flashing of the LED*

➥ Confirmation: LED flashes twice briefly, then illuminates for 2 seconds

☞ *Turn the ignition key to the **0** position and remove it as soon as the LED goes out*

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

Caution!

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

☞ *Codes consisting of 3 and less, or of more than 6 digits are ignored by the system*

☞ *Simple codes (with identical or consecutive digits, for example 1, 2, 3, 4) are rejected by the system with four short acoustic signals*

☞ *Entering a new personal codes replaces the previous code. A code can be changed any time if the main code is known*

Enabling the drive interlock

☞ *Stop the engine and remove the ignition key*

➥ The drive interlock is automatically enabled

➥ Flashing LED (on the keypad)

Disabling the drive interlock

☞ *Enter the personal code or main code (6 digits).*

☞ *Press the **(*)** key.*

➥ Confirmation: 2 long acoustic signals and long LED flashing

➥ LED OFF = drive interlock is disabled

➥ Diesel engine can be started

If the diesel engine cannot be started: the wrong code has been entered

➥ Confirmation: 4 short acoustic signals, flashing LED = wrong code

➥ Re-enter the code

☞ *Turn the ignition key and start the engine before the LED flashes again (30 seconds)*

Caution!

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

☞ *Enter the code after 5 minutes*

- *The keypad does not illuminate as long as it is blocked. It illuminates briefly every 4 seconds and an acoustic signal sounds*

☞ *Press the **(*)** key after every code*

☞ *The LED illuminates briefly when turning the ignition key to position "Engine start"*

Putting the drive interlock out of operation

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

1 Disable the system by entering the personal or main code and by confirming with the **(*)** key

2 Turn the ignition key to position **1**

➥ The LED illuminates for 2 seconds

3 As soon as the LED goes out, press the **(*)** push button for about 2 seconds until a short acoustic signal, followed by two further signals, sounds

➥ The LED now flashes very slowly, and the keypad is disabled

4 Turn the ignition key to **0** and remove it

5 The engine can be started without entering the code. The system is out of service even if electric power is interrupted.

Caution!

If the system is out of operation, the LED flashes slowly even if the ignition key is in position **1**.

☞ *Entering the personal or main code does not have the effect of putting the system back into operation again (the acoustic signals for confirmation are still given). See the following procedure for putting back into operation again, to leave the out-of-operation status again*

Putting the drive interlock back into operation again

☞ *Press the* **(*)** *key for 2 seconds (ignition key in position* ***0****) until two short acoustic signals are given for confirmation*

➥ The system is enabled again. The code must be entered to start the engine.

Interruption of drive interlock power

If the drive interlock was **enabled** before electric power was interrupted, short acoustic signals are given upon switching on the keypad (similar to those that are given when entering the wrong code four times). In this case, wait until the acoustic signals are no longer given. Then disable the drive interlock with the personal or main code.

The LED still does not illuminate if the drive interlock was **disabled**. The engine can be started before the LED starts flashing again.

If the drive interlock was out of operation, this status remains unchanged and the LED flashes slowly.

Drive interlock maintenance

The drive interlock does not require any maintenance.

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

3.19 Oil and fuel preheater (option)

This equipment is for cold-starting at temperatures below −5 °C.

Oil preheater operation

The engine and hydraulic oil is heated by means of heating elements with a capacity of 750 W in the engine oil pan and in the hydraulic oil reservoir, according to the gravity principle (warm oil rises and is replaced by cold oil). The oil can only be thoroughly warmed up to operating temperature if the oil preheater is connected over a longer period of time – preferably over night.

Notice!

The oil preheater (option) reduces pollutant emissions during the warm-up phase by up to 60 % and saves fuel at the same time.

Fig. 58 : Machine socket

☞ *Connect the oil preheater as follows:*

- Park the machine near a 220 V (110 V) mains socket
- First connect the special cable to machine socket **A** (at the rear left), then connect the connector to a 220 (110) V mains socket

☞ *Before starting the engine:*

- Remove the plug from the mains socket
- Unplug special cable from machine socket **A**
- Close the engine cover

☞ *Start the engine*

Fuel preheater operation

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

A temperature switch automatically switches on a heating element in the fuel line between the tank and the fuel prefilter when ignition is switched on at temperatures below + 10 °C.

3.20 Putting the diesel engine into operation

Caution!

Risk of accidents. Risk of injury due to uncontrolled machine.

☞ *Sit down on the operator seat before putting the machine into operation*

☞ *Perform the following preparations*

Notice!

When equipped with a canopy (option), the machine is fitted with an operator presence switch that prevents starting the engine if the driver is not seated on the operator seat.

The diesel engine is stopped after 3 – 4 seconds if the operator stands up from the seat with the engine running.

Notices on preparing to start the engine

Notice!

The engine cannot be started unless the operator is seated on the operator seat (canopy) (option), the parking brake is applied and the drive interlock is disabled (option)

– *see Parking brake* on page 3-50
– *see Drive interlock with code input (option)* on page 3-29
– *see Key-based drive interlock (option)* on page 3-26

- If the engine does not start, interrupt the start attempt after a max. 10 seconds so that the battery can recover
- Repeat the start attempt only after about 1 minute
- The engine cannot be started by tow starting the machine, as there is no driving connection between the engine and the gearbox (for example cardan shaft) when the engine is stopped

Notice!

Starter actuation is automatically disabled if the engine is running (start repeat interlock).

Notice!

When the machine is used for extended periods at outside temperatures below 10 °C, we recommend retrofitting the machine with an engine preheater

– *see Oil and fuel preheater (option)* on page 3-33.

Preparing to start the engine

☞ *Run through the "Start-up" checklist 3-11*

☞ *Switch on the battery master switch – see Battery master switch (option) on page 3-25*

☞ *Sit down on the operator seat*

☞ *Apply the parking brake*
– see Parking brake on page 3-50

☞ *Adjust your seating position – see Operator seat on page 3-17*

➥ All controls must be within easy reach

➥ You must be able to move the brake and accelerator pedals to their limit positions

☞ *Adjust the rearview mirrors (you must be able to see the rear area of the machine)*

☞ *Fasten your seat belt – see Seat belt (lap belt) on page 3-23*

☞ *Disabling the drive interlock*
– see Disabling (releasing) the drive interlock on page 3-27

☞ *Set the manual throttle (option) to idling speed*
– see Manual throttle (option) on page 3-46

☞ *Set the low-speed control (option) to the zero position*
– see Low-speed control (option) on page 3-47

☞ *Set the control lever for the loader unit to neutral*
– see Selecting a travel direction and starting machine travel on page 3-51

Notices on starting the engine

Caution!

In order to avoid damage to the engine and the exhaust turbocharger due to insufficient lube oil supply:

☞ *Do **not** run the cold engine at full throttle when starting*

☞ *Let the engine warm up at low idling speed (1/4 throttle) for about 30 seconds*

☞ *When the engine runs smoothly, check whether indicator lights **38 and 40** have gone out*

☞ *Have a malfunctioning indicating instrument immediately replaced*

Caution!

In order to avoid damage to the starter, do not stop the engine and immediately start it again.

☞ *After stopping the engine, wait 10 seconds before starting it again.*

Notice!

When ignition is switched on, all indicator lights on the indicating instrument illuminate briefly. – **indicator light check!**

Starting the engine

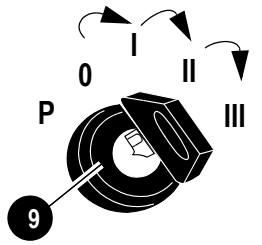


Fig. 59 : Preheating start switch

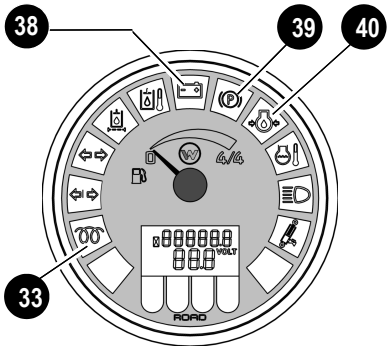


Fig. 60 : Indicating instrument indicator lights

Caution!

Ensure that the preparations for starting the engine have been made – *see Preparing to start the engine* on page 3-35.

Preheating start switch **9** is located on the right on the steering console.

☞ *Turn the ignition key (preheating start switch **9**) to position **1***

➥ All warning and indicator lights must illuminate briefly **(indicator light check!)**

➥ The following indicator lights must illuminate permanently

➥ Indicator light **38** for alternator charge function

➥ Indicator light **39** if the parking brake is applied

➥ Indicator light **40** for engine oil pressure

Notice!

Have a **malfunctioning** indicating instrument replaced by an authorized service centre.

☞ *Turn and hold the ignition key in position **2** (preheating)*

➥ Indicator light **33** (preheating) illuminates

Notice!

Preheating time depends on the outside temperature.

Reference values: Up to 0 °C (+32 °F) about 10 seconds
Up to −10 °C (+14 °F) about 30 seconds
Up to −20 °C (−4 °F) about 50 seconds

At very low temperatures, or if the battery is low, repeat the preheating procedure before turning the ignition key to position **3**.

☞ *Press the accelerator pedal through about 1/4 of its travel*

☞ *Turn the ignition key to position "**3**" at the same time and hold it until the engine runs*

☞ *Release the ignition key*

☞ *Check that the following indicator lights have gone out*

- Indicator light **40** (engine oil pressure)
- Indicator light **38** (alternator)
- Preheating indicator light **33**

Notice!

If the indicator lights indicated above do not go out, stop the engine immediately and have the reason checked by an authorized service centre!

- Have a malfunctioning indicating instrument immediately replaced

Avoiding running the engine under low-load conditions

Caution!

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

☞ *Effects:*

- *Operating temperature is not reached*
- *Increased lube oil consumption*
- *Lube oil in exhaust system*
- *Engine contamination*
- *Blue smoke in exhaust*

☞ *Always run the diesel engine in regular operation at loads of over 20 %*

Stopping the engine

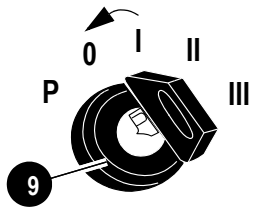


Fig. 61 : Stopping the engine

Caution!

In order to avoid heat accumulation and damage to the exhaust gas turbocharger, do not stop the engine from full throttle!

☞ *Let the engine run at idling speed for about 2 minutes and then stop it*

☞ *Apply the parking brake – see Parking brake on page 3-50*

☞ *Turn the ignition key (preheating start switch **9**) to position "**0**"*

☞ *Remove the ignition key*

Caution!

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

☞ *After stopping the engine, wait at least 10 seconds before starting it again*

3.21 Jump-starting the engine (external battery)

Safety instructions regarding external starting aids

Danger!

Risk of explosion due to jump-starting with a frozen battery

☞ *Immediately replace the frozen battery by a new one.*

Caution!

Risk of short circuit if the wheel loader and the vehicle giving the jump start have contact!

☞ *The battery jumper cable connected to the positive **+** terminal of the starting battery must never be brought into connection with electrically conductive vehicle parts.*

Caution!

Risk of short circuit and sparks!

☞ *The external power source must deliver **12 V**; higher supply voltages will damage the electrical system of the vehicles!*

☞ *Use only authorized battery jumper cables that conform to the safety requirements and that are in perfect condition!*

☞ *Route the battery jumper cables so they cannot catch on rotating components in the engine compartment!*

Providing external starting aid

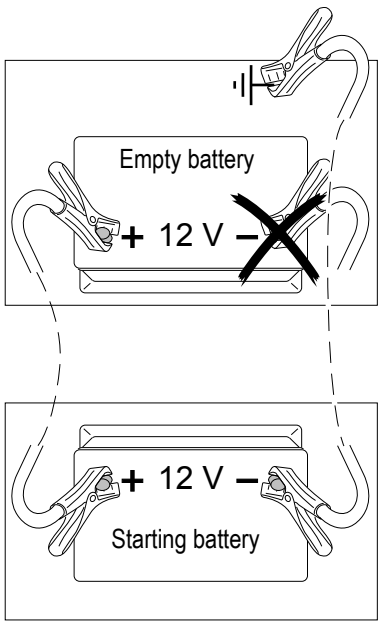


Fig. 62 : Starting aid with battery jumper cables

☞ *Drive the jump-starting vehicle close enough to the loader so that the jump leads can reach to connect the two batteries*

☞ *Let the engine of the jump-starting vehicle run*

☞ *First connect one end of the red cable (**+**) to the **+ terminal** of the discharged battery, then connect the other end to the **+** terminal of the starting battery*

☞ *Connect one end of the black cable (**–**) to the **– terminal** of the starting battery*

☞ *Connect the other end of the black cable (**–**) to a solid metal component fimly screwed on the engine block or onto 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!*

☞ *Start the diesel engine of the machine with the empty battery*

Once the engine has started:

☞ *With the engine running, disconnect both battery jumper cables in exactly the reverse order (first the **– terminal**, then the **+ terminal**). This prevents sparking near the battery!*

3.22 Preparatory work – putting the machine into operation

Notices on putting into operation

- Keep the pedal area clean
- Carrying or transporting **accompanying persons** in the cabin or on the machine is **prohibited**
- Driving or operating the wheel loader outside the operator's compartment is prohibited! Put the machine into operation only when seated
- Observe the applicable national regulations, for example **StVZO (German traffic regulations)**, the **National Type Approval (Germany)** or the **Data Confirmation (Germany)**
- Only the attachments are certified for use on public roads that are described in the **National Type Approval (Germany), in the Data Confirmation (Germany)** or in this Operator's Manual
  "Certified attachments" *on page 1-13* (the footnotes must be taken into account)
- In trailer operation the provisions laid down in the **National Type Approval (Germany)**, or the **Data Confirmation (Germany)** must be observed – also see *"Trailer couplings (option)"* *on page 3-111*
- **Bear in mind the trailer and drawbar loads** *– see chapter 6 "Trailer weight/drawbar load: trailer couplings (option)"* on page 6-13
- Adjust the correct seat position *– see Operator seat* on page 3-17
- Fasten your seat belt *– see Seat belt (lap belt)* on page 3-23
- Adjust the mirrors

Danger!

In order to avoid risk of accidents, adjust the rearview mirrors ensuring good visibility to the rear (rear part of machine)!

Danger!

Risk of accidents! The towing gear at the rear of the machine is **not** certified for trailer operation and may be used only for towing away the machine (without drawbar load)!

Caution!

When travelling downhill, the brake pedal (intermittent braking) must be used for supporting the braking effect of the drive. This avoids damage to the drive and the engine due to excessive speed. .

Preparing for driving on public roads

☞ *Prepare to start the engine as follows:*

- Remove attachments that are not authorized for transport on public roads – *see chapter 1 "Certified attachments"* on page 1-13
- Empty and tilt in the bucket as far as it will go
- Raise the loader unit to transport position (ground clearance **about 200 mm)**
- Install the protection on the leading edge of the bucket
- Adjust the correct seat position – *see Operator seat* on page 3-17
- Fasten your seat belt – *see Seat belt (lap belt)* on page 3-23
- Adjust the mirrors

Danger!

In order to avoid risk of accidents, adjust the rearview mirrors ensuring good visibility to the rear (rear part of machine)!

- Switch off the working lights during machine travel on public roads – *see Working lights* on page 3-58
- Switch on the load stabilizer – *see Load stabilizer (option)* on page 3-53
- Secure the control lever (joystick) and the 3rd control circuit of the loader unit – *see Lock for loader unit control lever and mechanical locking of 3rd control circuit (standard)* on page 3-42 or *"Lock for loader unit control lever and electrical lock for 3rd control circuit lever (option)" on page 3-43*
- Check all signalling and light systems for correct function – *see Machine lights (option)* on page 3-57 and *"Signalling system" on page 3-59*
- When using a trailer, ensure that the trailer is safely locked in the coupling jaw and that the loads are firmly tied down on the trailer – *see Trailer couplings (option)* on page 3-111

Notice!

Self-propelled work machines **may not transport goods** on public roads with a trailer. Only the transport of machine's own attachments is allowed! Also refer to the National Type Approval (Germany), the Data Confirmation (Germany) or the registration documents of the machine.

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

Functional check of all control elements

- – see *Checking the steering system* on page 3-44
- – see *Brake/inching pedal* on page 3-48
- – see *Parking brake* on page 3-50
- – see *Machine lights (option)* on page 3-57
- – see *Signalling system* on page 3-59
- – see *Operating and securing the 3rd control circuit (standard)* on page 3-65 or
  – see *Electrical operation and locking of 3rd control circuit (option)* on page 3-67
- – see *Washer system (option)* on page 3-62

Transport position of attachments on public roads

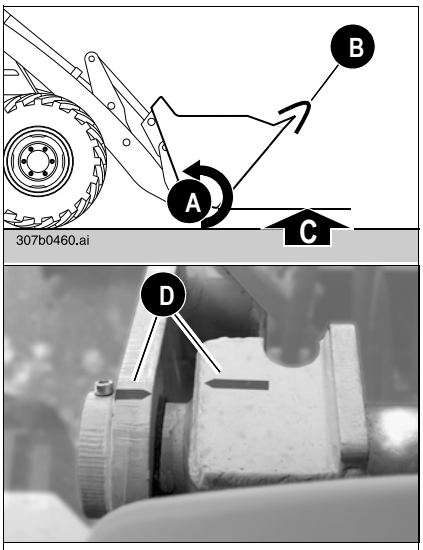


Fig. 63 : Transport position of attachment

☞ *Empty and tilt in the bucket **A***

☞ *Cover the blade or teeth of the bucket across their entire width with the tooth guard **B** provided*

☞ *Use a suitable means of transport to move or transport buckets/attachments that are not authorized for transport on public roads*

➥ *– see Fields of application and using the wheel loader with an attachment* on page 1-12

☞ *Raise the loader unit until both red marks **D** on the lift frame and the bulkhead are aligned*

Notice!

Ground clearance for transport **C** in connection with the standard bucket and standard tyres is **about 200 mm.**

☞ *Lock the control lever (loader unit) and the 3rd control circuit*
– see Lock for loader unit control lever and mechanical locking of 3rd control circuit (standard) on page 3-42
– see Lock for loader unit control lever and electrical lock for 3rd control circuit lever (option) on page 3-43

Lock for loader unit control lever and mechanical locking of 3rd control circuit (standard)

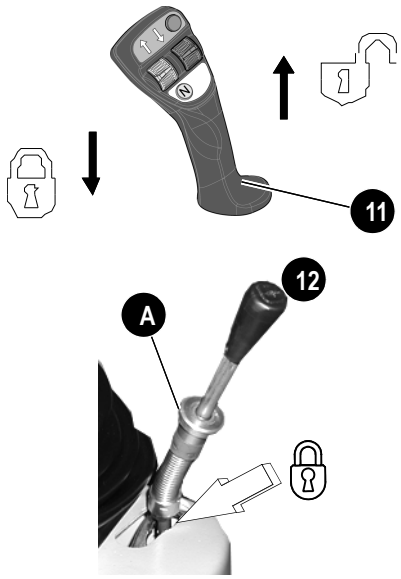


Fig. 64 : Lock for control levers

Danger!

Risk of accidents due to unlocked control levers!
In order to avoid risk of accidents during machine travel on public roads:

☞ *Lock control lever **11** (loader unit) against unintentional operation*

☞ *Lock control lever **12** (3rd control circuit/quickhitch) against unintentional operation*

☞ *After installing an attachment on the quickhitch, always secure the 3rd control circuit against unintentional operation*

Secure control lever **11** (loader unit) and control lever **12** (3rd control circuit for quickhitch) against unintentional actuation during machine travel on public roads.

☞ *Secure control lever **11** (loader unit)*

- Push control lever **11** down vertically in neutral position
  ➥ The control lever is locked in this position and can no longer be moved
  ➥ The loader unit is secured against unintentional operation

☞ *Secure control lever **12** (3rd control circuit)*

- Move control lever **12** to the centre position
- Press lock sleeve **A** on control lever **12** downward into the detent (see arrow)
  ➥ Control lever **12** is locked in this position
  ➥ The 3rd control circuit is secured against unintentional operation

Lock for loader unit control lever and electrical lock for 3rd control circuit lever (option)

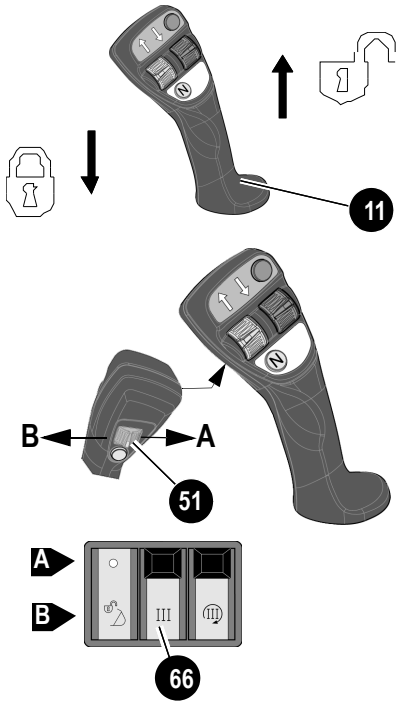


Fig. 65 : Locking the control levers/3rd control circuit (option)

The function of switch **51** on the control lever is described as seen in travel direction!

Danger!

Risk of accidents due to unlocked control lever!
In order to avoid risk of accidents during machine travel on public roads:

☞ *Lock control lever **11** (loader unit) against unintentional operation*

Danger!

Risk of accidents. When working with attachments without hydraulic functions, unintentionally actuating the switch **51** on the control lever (3rd control circuit) can unlock the attachment from the quickhitch!

☞ *Lock the 3rd control circuit when working with attachments without hydraulic functions*

☞ *Secure control lever **11** (loader unit)*

- Push control lever **11** down vertically in neutral position
  - ➥ The control lever is locked in this position and can no longer be moved
  - ➥ The loader unit is secured against unintentional operation

☞ *Lock the 3rd control circuit*

- Slide the lock in switch **66** downward and press switch to position **A**
  - ➥ The 3rd control circuit is disabled and secured against unintentional operation

3.23 Steering system

Caution!

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

☞ *Adapt the towing speed to the modified steering behaviour!*

☞ *Use a towing bar!*

➥ *– see Towing and transporting the machine* on page 3-114

Checking the steering system

Caution!

Risk of accidents due to steering system failure.
The steering system is a safety element and must always be checked for leaks and correct function before starting machine travel!

☞ *Check for leaks daily, however every 10 operating hours at the latest*

☞ *Check for correct function daily, however every 10 operating hours at the latest*

☞ *Functional check of steering system*

- With the engine running, turn the steering wheel to the left and right
- Check and if necessary, synchronize the track (synchronization) of the wheels of the front and rear axles *– see Wheel synchronization* on page 3-45

3.24 Wheel synchronization

The steering system has to be synchronized if the wheels on both axles do not run in the same track when travelling in a straight line!

Danger!

Risk of accidents! Do **not** synchronize the wheels when driving the machine, neither off-road nor on public roads!

☞ *Synchronize the steering system before putting the machine into operation*

☞ *At low travel speed, slowly turn the steering wheel to the **left and right** as far as it will go and try turning it even further in the end position for a few seconds (as for cornering)*

☞ *Turn the steering wheel rapidly back to straight-ahead position*

➥ The wheels of the front and rear axles must now run in the same tracks

Contact your dealer if this does not synchronize the wheels

3.25 Accelerator pedal

Speed control with the accelerator pedal

Accelerator pedal **6** controls the travel speed as follows:

Accelerator pedal	Function
• Press down	➥ Travel speed is increased
• Release slowly	➥ Travel speed is reduced
• Release fully	➥ Hydrostatic braking

Notice!

If the accelerator is completely released, the drive immediately brakes hydrostatically and the machine is braked to a stop!

3.26 Manual throttle (option)

Actuating the manual throttle

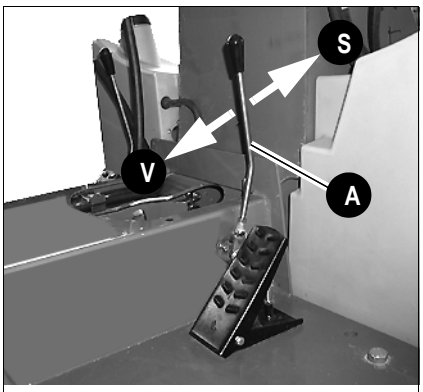


Fig. 66 : Manual throttle (option)

Manual throttle lever **A** is located at the right of the centre console.

Danger!

Risk of accidents! Travelling on public roads with the machine in a controlled manner is not possible with manual throttle lever **A**!

☞ *Use the manual throttle during work operation only!*

☞ *Before machine travel on public roads:*

- Move the manual throttle lever **A** to idling speed position **S**
- Set the engine speed with the accelerator pedal only

Danger!

Risk of accidents! The machine accelerates in an uncontrolled manner if the forward-reverse control is actuated at preselected engine speed!

☞ *Actuate the forward-reverse control only if the brake/inching pedal is pressed or if the manual throttle lever is in neutral position*

Danger!

Risk of accidents! In an emergency situation, immediately press the brake/inching pedal and push the manual throttle lever **A** backward to the limit **S**! Furthermore, reset the manual throttle lever **A** to the limit **S** before starting the diesel engine again!

Notice!

The manual throttle is especially useful for operating hydraulic attachments which need a continuous supply of hydraulic oil. Travel speed must be set with the brake/inching pedal or with the low-speed control (option).

Function

Permanent setting of diesel engine speed for work operation.

☞ *Preselect the engine speed as follows:*

- Press the brake/inching pedal to the inching range – *see Brake/inching pedal* on page 3-48
- Preselect the travel direction – *see Changing direction (forward/reverse)* on page 3-51
- Set the required engine speed with the manual throttle lever
  - ➥ **S** = idling speed (minimum engine speed)
  - ➥ **V** = full speed (maximum engine speed)
- Slowly release the brake/inching pedal

3.27 Low-speed control (option)

Setting the travel speed with the low-speed control

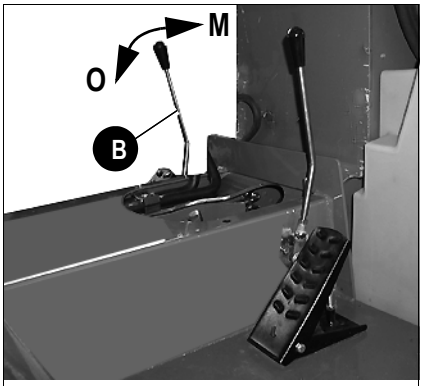


Fig. 67 : Low-speed control (option)

Control lever **B** of the low-speed control is located at the left of the centre console.

The travel speed can be set continuously and independently of the engine speed with control lever **B** of the low-speed control.

This function corresponds to inching with the brake/inching pedal.

This function is especially useful for operation of hydraulically driven attachments (rotary broom, rotary hoe, for example) in order to ensure continuous travel speed.

Danger!

Risk of death. Risk of accidents.
There is risk of death when leaving the machine with the low-speed control switched on at the same time.

☞ *Never leave the machine during machine operation!*

Danger!

In an **emergency situation**, immediately press the brake/inching pedal and push control lever **B** backward to the limit **O**!

Danger!

In order to avoid risk of accidents, push control lever **B** backward to the limit **O** before starting the diesel engine again!

☞ *Sit down on the operator seat*

☞ *Select the travel direction*
- *see Changing direction (forward/reverse) on page 3-51*
- *see Changing direction (forward/reverse) on page 3-51*

☞ *Set constant engine speed with the accelerator pedal or the manual throttle (option)*

☞ *Select the required travel speed with control lever **B***

➥ Limit **M** – maximum speed

➥ Limit **O** – machine is at a standstill

Notice!

When equipped with a canopy (option), the machine is fitted with an operator presence switch.

The diesel engine is stopped after 3 – 4 seconds if the operator stands up from the seat with the engine running.

3.28 Brake/inching pedal

Specific notices on brake/inching pedal operation

Brake/inching pedal **27** is located on the left in the machine.

Notice!

In order to achieve the best hydrostatic braking effect:

- Before operating the machine, let the diesel engine warm up at low idling speed (1/4 throttle) for about 30 seconds (operating temperature about 20 to 30 °C).

The wheel loader has a hydrostatic service brake for reasons of design (wheel motors).

The machine is braked by reducing the pressure on the accelerator pedal (hydrostatic braking effect of drive) and by pressing down the brake/inching pedal (additional activation of parking brake in front axle wheel motors).

The brake/inching pedal is used for two functions:

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

Danger!

Risk of accidents! Dirt and objects in the area of the brake/inching pedal cause the pedal to get stuck and result in brake malfunctions!

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

Danger!

Risk of accidents! The brake lights (option) at the rear of the machine do **not** illuminate

- when the parking brake is applied,
- when braking hydrostatically with the drive.

☞ *Press the brake/inching pedal down with force in order to brake the machine*

Danger!

Risk of accidents due to machine rolling away under its own weight. Therefore when stopping on slopes:

☞ *Press the brake/inching pedal down with force until the braking effect is felt*

Inching with the brake/inching pedal

☞ *Press the brake/inching pedal **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 operating hydraulics.

➥ This makes it possible to raise the loader unit more quickly.

Braking with the brake/inching pedal

Notice!

The machine has no brake lights in basic configuration.

- The brake lights are included in the machine lights option

☞ *Check the brakes as follows:*

- Check by looking back in the rearview mirror that no one is hindered by the brake manoeuvre.
- Press the brake/inching pedal down at slow speed and check the braking effect
  - ➥ A firm resistance must be in the brake/inching pedal felt after half the pedal travel
  - ➥ The brake lights (option) must illuminate

☞ *Brake the machine. To do this: release the accelerator pedal fully and press the brake/inching pedal down **with force***

➥ The machine is braked hydrostatically and the parking brake is applied

➥ The machine is braked to a stop

3.29 Parking brake

Notice on the parking brake

The machine is braked electrically/hydraulically with the parking brake by means of switch **71**, a brake valve and the brake discs in the front axle wheel motors.

Switch **71** is located on the switch console on the right.

Notice!

A starting interlock prevents the machine from starting with the parking brake applied. The drive is interrupted!

Notice!

The diesel engine cannot be started unless the brake is applied!

Applying the parking brake

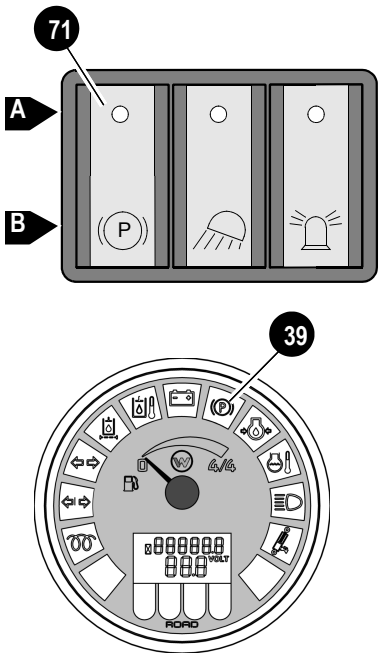


Fig. 68 : Parking brake

Danger!

During machine travel, apply the parking brake only in an emergency.
The brake lights (option) do not illuminate in this case!

☞ *In normal operation use only the brake/inching pedal as a service brake*

Applying the parking brake

☞ *Press switch **71** to position **B***

➥ Indicator light **39** on the indicating instrument illuminates

➥ The engine can be started

Notice!

Applying the parking brake during machine travel interrupts the drive, but the selection of the travel direction does not change.

- Before starting the diesel engine, set the travelling drive to neutral position in control lever **11** – *see Changing direction (forward/reverse)* on page 3-51

Releasing the parking brake

☞ *Press switch **71** to position **A***

➥ Indicator light **39** on the indicating instrument goes out

☞ *Secure the machine with chocks to prevent it from rolling*

3.30 Putting the machine into operation

Selecting a travel direction and starting machine travel

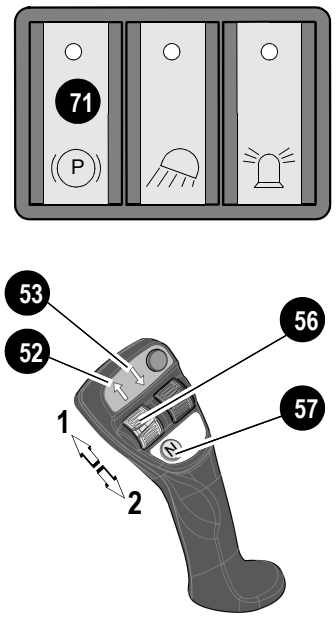


Fig. 69 : Selecting a travel direction

Notice!

The machine can be moved only after releasing the parking brake completely!

Select the travel direction after starting the diesel engine

☞ *Release the parking brake with switch **71** on the side console on the right*

☞ *Select the travel direction with the switch on control lever **56***

Function	Operation	Indicator light
Forward	☞ *Press switch **56** upward **1***	➥ Arrow **52** illuminates
Reverse	☞ *Press switch **56** downward **2***	➥ Arrow **53** illuminates
Neutral	☞ *Press push button **57***	➥ Arrows **52** and **52** go out

Driving the machine

☞ *Gradually press down the accelerator pedal*

➥ Machine moves off

☞ *Test the brakes at low speed*

Moving the wheel loader on slopes

☞ *Apply the parking brake with switch **71***

☞ *Select the travel direction with switch **56**on the control lever*

☞ *Increase diesel engine speed slightly and release the parking brake with switch **71***

Changing direction (forward/reverse)

Danger!

Risk of accidents! Changing direction (reversing operation) at high speed causes the machine to brake abruptly.

☞ *Reduce engine speed before changing direction*

☞ *Brake the machine to walking pace or to a standstill with the brake/inching pedal*

☞ *Reduce engine speed: remove your foot from the accelerator pedal*

☞ *Slow the machine to walking pace*

☞ *Select a new travel direction with switch **56** on the control lever*

3.31 Stopping/parking the machine

Danger!

Machines parked on slopes can roll away.

☞ *Use the parking brake to park the machine safely and to prevent it rolling away – see Parking brake on page 3-50!*

☞ *Additionally secure the machine by placing chocks under the downhill sides of the wheels!*

☞ *Reduce engine speed: remove your foot from the accelerator pedal*

☞ *Empty the bucket or pallet forks*

☞ *Park the machine on firm and level ground*

☞ *Stop the machine with the brake/inching pedal*

➥ *– see Braking with the brake/inching pedal* on page 3-49

☞ *Set the machine to neutral position with the forward-reverse control – see Selecting a travel direction and starting machine travel on page 3-51*

☞ *Apply the parking brake – see Parking brake on page 3-50*

☞ *Lower the loader unit. To do this:*

- Push the control lever forward out of neutral, and place the bucket on the ground so that the blade is flat with the ground
  – see Control lever (joystick) for lift and tilt rams on page 3-64

☞ *Release the pressure*

After operation at full power:

Caution!

Allow the engine to run on for a while so that the temperature can stabilize

☞ *Stop the engine. To do this: turn the ignition key to "**0**" and remove it*

☞ *Lock the doors after leaving the cabin*

☞ *Remove the key from the battery master switch (option)*

On slopes:

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

3.32 Load stabilizer (option)

Notices on the load stabilizer function

When travelling longer distances, off-road or on public roads, the load stabilizer dampens the movements of the loader unit and avoids pitching movements of the machine.
This increases drive comfort and safety.

Danger!

Risk of accidents! When travelling on public roads, the machine may become unstable if the load stabilizer is not switched on.

☞ *Always set switch **69** to position **B** during machine travel on public roads*

Caution!

If the machine is equipped with the **"Hose burst valve" option**, switching on the load stabilizer automatically disables the hose burst valve.
The loader unit is no longer secured against lowering caused by possible line damage ! – *see Hose burst valve safety feature (option)* on page 3-110

Notice!

In order not to impair the load stabilizer function in transport position of the loader unit, do not retract the tilt ram to the limit (pressure)!

- After setting the loader unit to transport position, tilt in the bucket as far as it will go, then tilt it out slightly again.
- Briefly reduce the pressure on the tilt ram limit

Switching the load stabilizer ON and OFF

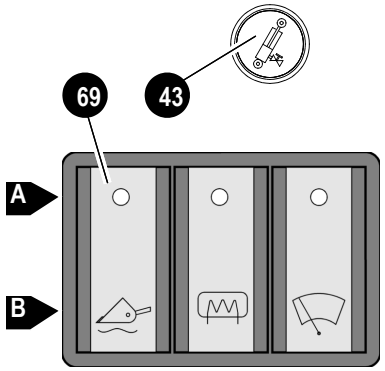


Fig. 70 : Switch for load stabilizer (option)

Switch **69** is located on the side console on the right.

Notice!

Switch on the load stabilizer only in transport position of the loader unit!

The loader unit yields easily with the load stabilizer switched on, making it difficult to perform any precise lifting movements.

- The lift capacity of the loader unit is only about 60 % of the rated force!
- Switch off the load stabilizer during pallet forks operation

Notice!

Depending on the load, the loader unit can rise or go down slightly as you switch on the load stabilizer!

Switching the load stabilizer on or off depends on the individual situation.

Function		Work operation
OFF	☞ *Press switch **69** to position **A*** ➥ Load stabilizer out of operation ➥ The hose burst valve (option) is switched on ➥ Indicator light **43** on the instrument panel illuminates (if the machine is equipped with a hose burst valve)	In general for heavy-duty work, for example picking up excavated material
ON	☞ *Press switch **69** to position **B*** ➥ Load stabilizer is switched on ➥ The hose burst valve (option) is switched off ➥ Indicator light **43** on the instrument panel goes out (if the machine is equipped with a hose burst valve)	For machine travel on public roads, for lighter work with the loader unit and for light off-road transport

3.33 Front/rear socket (option)

The machine can be equipped with the following sockets:

- 4-pole **front** socket (for example electric spray-water pump for rotary broom)
- 7-pole **front** and/or **rear** socket (light equipment according to German road traffic regulations)

Continuous operation of front socket

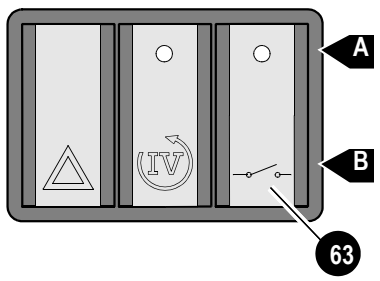


Fig. 71 : Front/rear socket switch

Power (**front** socket), for example for a spray-water pump for a rotary broom, is switched on or off permanently with switch **63** on the control console on the right.

Function		Work operation
ON	Press switch **63** to position **B**	➥ Power supply at the socket is switched on ➥ Indicator light in switch illuminates
OFF	Press switch **63** to position **A**	➥ Power supply is switched OFF ➥ Indicator light goes out

Brief operation of front socket

Fig. 72 : Front/rear socket switch

As long as push button **54** on control lever **11** is pressed, the power supply (**front** socket), for example a spray-water pump for a rotary broom, is switched on briefly.

3.34 Backup warning system (option)

Notice on the backup warning system

The backup warning system consists of a signal transmitter fitted at the rear of the wheel loader. The signal transmitter generates an acoustic signal when shifting into reverse. The acoustic level is about 103 dB (A) at a distance of 1 m and at a frequency of 2800 Hz.

Danger!

Risk of accidents when reversing carelessly

☞ *Do not rely on backup warning system **A** only!*

☞ *Ensure that nobody is within the danger zone of the machine when changing the travel direction.*

Notice!

In certain countries, a backup warning system is mandatory.

3.35 Differential lock (option)

Switching the differential lock ON or OFF

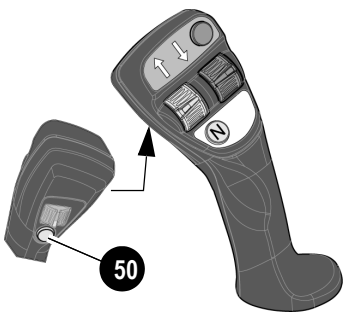


Fig. 73 : Differential lock (option)

Caution!

In order to avoid damage to the tyres:

☞ *Switch on the differential lock only if you expect a wheel to spin, for example when working on slopes or on slippery ground*

☞ *Switch off the differential lock when cornering*

The differential lock may be switched on during machine travel.

☞ *Press and hold push button **50** on the control lever*

➥ Hydraulic power is evenly distributed to all 4 wheel motors

☞ *Release push button **50** when cornering*

3.36 Machine lights (option)

Machine lights operation

The switch for the side marker lights, low and high beam switch is integrated in the turn indicator lever (multifunctional lever) on the left of the steering column.

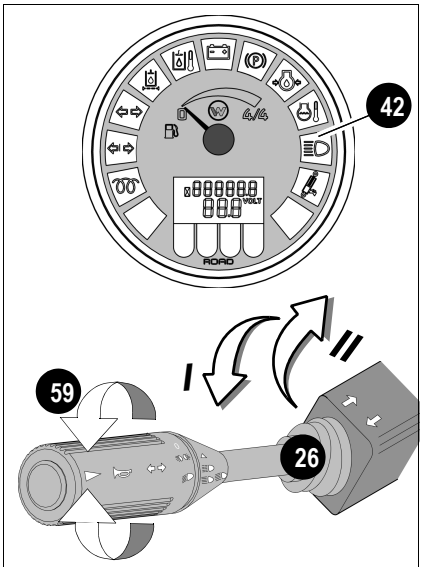


Fig. 74 : Light system

Side marker lights		
ON	☞ *Turn rotary switch **59** to the **1st notch***	➥ The side marker lights illuminate
OFF	☞ *Turn rotary switch **59** to the **0 notch***	➥ The side marker lights go out

Low beam		
ON	☞ *Turn rotary switch **59** to the **2nd notch***	➥ Low beam illuminates
OFF	☞ *Turn rotary switch **59** to the **0 notch***	➥ Low beam goes out

Notice!

Only the side marker lights stay lit if the ignition is switched off (with low beam switched on) – key in preheating start switch **9** in position **0**!

High beam		
ON	☞ *Turn rotary switch **59** to the **2nd notch***	➥ Indicator light **42** on the indicating instrument illuminates
	☞ *Press lever **26** upward to position **II***	➥ High beam illuminates
OFF	☞ *Press lever **26** downward to position **I***	➥ Indicator light **42** on the indicating instrument goes out
		➥ Low beam illuminates

Headlight flasher		
ON	☞ *Turn rotary switch **59** to the **2nd notch***	➥ Indicator light **42** on the indicating instrument illuminates
	☞ *Briefly pull lever **26** upward (beyond position **II**)*	➥ High beam illuminates briefly

3.37 Working lights

Working lights operation

Wheel loader with cabin (standard)

➥ 1 rear left working light

➥ Option at the front right and left

Wheel loader with canopy (option)

➥ 1 rear left working light

If several working lights are installed, all are switched on and off at the same time with switch **60**

Danger!

Risk of accidents! Switch off the working lights to avoid dazzling motorists on public roads!

☞ *Do not switch on the working lights during machine travel on public roads*

☞ *When operating the machine, only switch on the working lights when no one can be dazzled by them*

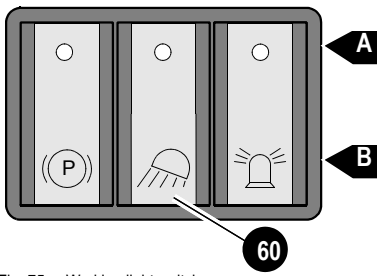


Fig. 75 : Working light switch

Front and/or rear working lights (option)		
ON	☞ *Press switch **60** to position **B***	➥ The indicator light in switch ***60*** illuminates
OFF	☞ *Press switch **60** to position **A***	➥ The indicator light in switch ***60*** goes out

3.38 Signalling system

Turn indicator operation (option)

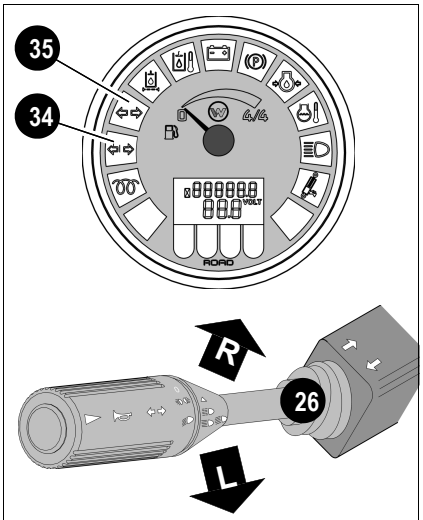


Fig. 76 : Turn indicators

Turn indicators (option)		
Right	☞ *Push lever **26** forward **R***	➥ Indicator light **35** flashes
Left	☞ *Pull lever **26** to the rear **L***	➥ Indicator light **35** flashes

Notice!

Indicator light **34** flashes during trailer operation.

Caution!

The turn indicator system is not in order if indicator light **35** flashes about twice as fast as normally!

☞ *Check the front and rear turn indicators immediately*

➥ Have the turn indicator system repaired if necessary

Horn operation

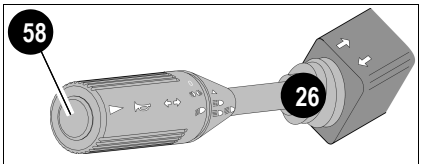


Fig. 77 : Horn

On wheel loaders without the machine lights option, the horn push button is installed on the right in the steering column trim

– *see Inside of cabin (overview)* on page 3-2

Horn

☞ *Sound the horn with push button **58** on multifunctional lever **26** (machine lights option)*

Hazard warning system operation

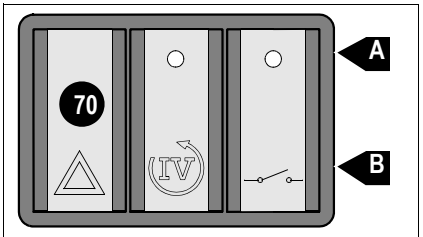


Fig. 78 : Hazard warning switch

The hazard warninig switch is located in the switch panel on the right on the instrument panel

Using the hazard warning system is prescribed during a breakdown and for towing.

Hazard warning system		
ON	☞ *Press the switch for hazard warning system **70** to the notched position **B***	➥ The indicator light in the switch and indicator lights **34** and **35** on the indicating instrument flash
OFF	☞ *Release switch **70** for the hazard warning system from the notched position **B** with slight pressure and press it to position **A***	➥ The indicator light in the switch and indicator lights **34** and **35** on the indicating instrument go out

3.39 Rotating beacon (option)

Rotating beacon operation

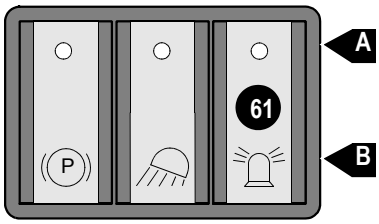


Fig. 79 : Rotating beacon switch

Notice!

In the Federal Republic of Germany, § 52 StVZO (German traffic regulations) requires you not to switch on the rotating beacon on public roads unless the road is within the machine's working range and the machine represents an obstruction to the normal flow of traffic when it is in work operation.
Get informed on and follow the legal regulations of your country.

Rotating beacon (option)		
ON	☞ *Press switch **61** to position **B***	➥ Indicator light in switch **61** illuminates
OFF	☞ *Press switch **61** to position **A***	➥ Indicator light in switch **61** goes out

3.40 Rear window heating (option)

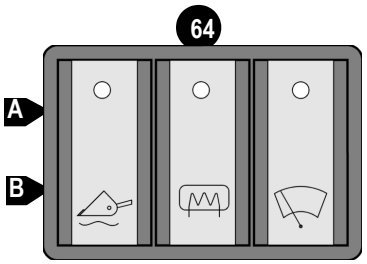


Fig. 80 : Rear window heating switch

The push button for the rear window heating is located on the control lever console on the right.

Rear window heating (option)		Function
ON	Press push button ***64*** to position **B**	Indicator light in switch illuminates Rear window heating in operation
OFF	Press push button ***64*** to position **A**	Rear window heating out of operation

Notice!

For safety reasons, the rear window heating is automatically switched off after about 5 minutes (time-lag relay)!

3.41 Cabin heating and ventilation

Operation of the heating and ventilation system

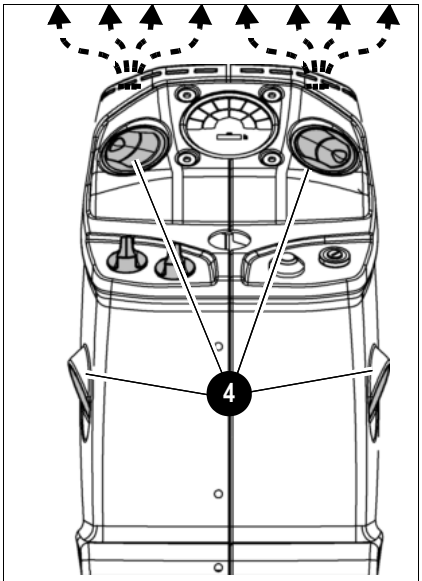


Fig. 81 : Air circulation in cabin

The heater can be set to 2 operating modes.

- Ventilation (fresh air)
- Heating

The air flows into the cabin via the front window nozzles and four defroster vents **4**.
Each nozzle can be closed and directed separately.

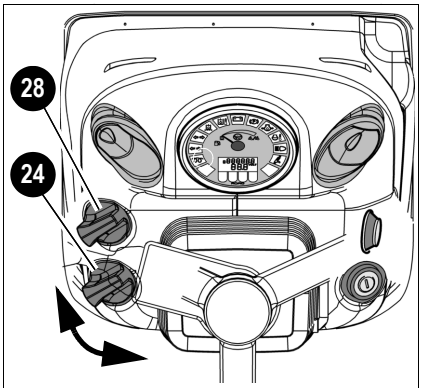


Fig. 82 : Heating adjustment

The rotary switches for ventilation and heating are located on the left on the centre console.

Ventilation (fresh air)		
1st speed	☞ *Turn rotary switch **28** to position **I***	➥ Fan runs in **1st speed**
2nd speed	☞ *Turn rotary switch **28** to position **II***	➥ Fan runs in **2nd speed**
OFF	☞ *Turn rotary switch **28** to position **0***	➥ Fan **OFF**

Heating	
☞ *Turn rotary switch **24** to the **left** (blue)*	**Cold**
☞ *Turn rotary switch **24** to the **right** (red)*	**Warm**

3.42 Washer system (option)

Front wiper operation

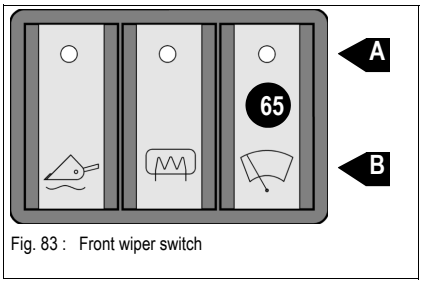


Fig. 83 : Front wiper switch

Notice!
This equipment is only available with a cabin.

Wiper switch **65** is located on the switch console on the right.

Front window wiper		
ON	☞ *Press switch **65** to position **B***	➥ Front wiper is on
OFF	☞ *Press switch **65** to position **A***	➥ Front wiper returns to base position

Front/rear washer pump operation

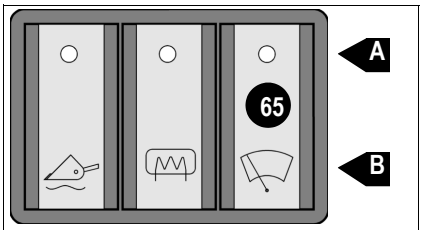


Fig. 84 : Washer pump switch

Notice!
This equipment is only available with a cabin.

Washer pump for front and rear window	
ON	☞ *Fully press and hold switch **65** in position **B***
OFF	☞ *Release switch **65***

Rear washer system operation

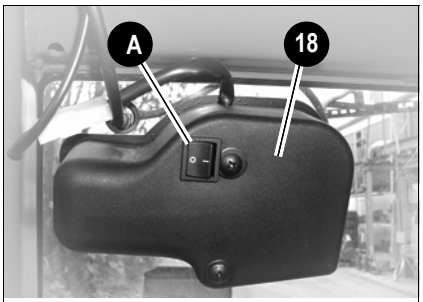


Fig. 85 : Rear wiper switch

Notice!
This equipment is only available with a cabin.

Switch **A** for the rear washer system is located on the wiper motor of the rear window.

Rear wiper		
ON	☞ *Press switch **A** on wiper motor **18** to position **1***	➥ Rear wiper is on
OFF	☞ *Press switch **A** on wiper motor **18** to position **0***	➥ Rear wiper returns to base position

Washer system reservoir

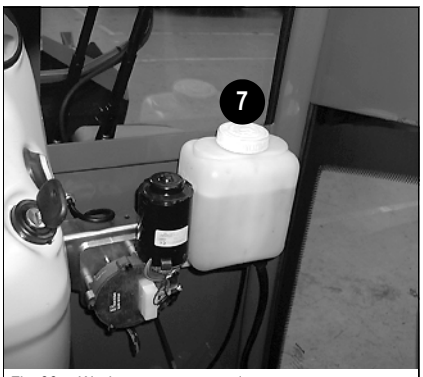


Fig. 86 : Washer system reservoir

Notice!
This equipment is only available with a cabin.

Reservoir filler inlet **7** is located in the cabin at the lower front right in the leg room area.

Notice!
Add only clean tap water!

Add a suitable cleaning agent if required.
In winter: add antifreeze for washer systems to the water.
Refer to the antifreeze instructions for further information on concentrations
– *see Fluids and lubricants* on page 5-39
– *see Coolant compound table* on page 6-10.

3.43 Loader unit control lever (overview)

Control lever (joystick) for lift and tilt rams

Danger!

Before leaving the operator seat, and during machine travel on public roads, lock control lever **11** (joystick) and control lever **12** (3rd control circuit) against unintentional actuation!

☞ *Lock control lever **11** (joystick) and control lever **12** (3rd control circuit)*

➥ *– see Transport position of attachments on public roads* on page 3-41

➥ *– see Lock for loader unit control lever and mechanical locking of 3rd control circuit (standard)* on page 3-42

➥ *– see Lock for loader unit control lever and electrical lock for 3rd control circuit lever (option)* on page 3-43

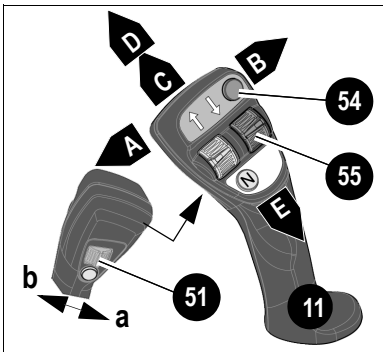


Fig. 87 : Joystick for loader unit

Operation		Function
A	To the left	Tilts in the attachment
B	To the right	Tilts out the attachment
C	Forward	Lowers the loader unit
D	Fully forward	Lowers the loader unit to float position (option)
E	Backward	Raises the loader unit
51	Switch (option)	Operation of quickhitch – unlock/lock and hydraulic functions of attachments
54	Push button (option)	Front socket (option)
55	Switch (option)	Additional control circuit (option)

Notice!

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

3.44 Operating and securing the 3rd control circuit (standard)

Operation of 3rd control circuit (standard)

Notice!

The attachment locked onto the quickhitch is secured against unintentional operation of the control lever (standard) or the push button on the joystick (3rd control circuit).

- The attachment can only be unlocked by pressing push button **68** in addition on the right on the switch console *(two-hand control)*.

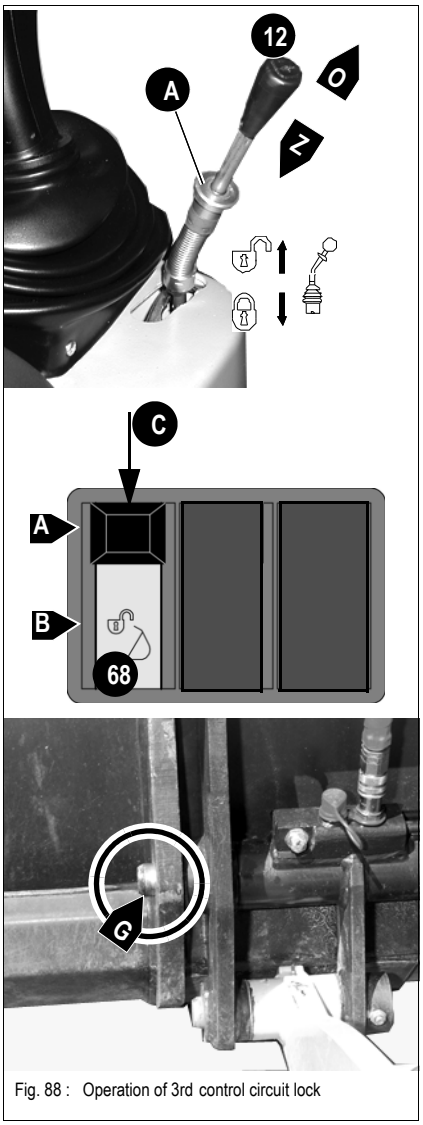


Fig. 88 : Operation of 3rd control circuit lock

Unlocking the 3rd control circuit lever	Result
Unlock control lever **12** . To do this: pull lock sleeve A upward until it engages in the groove in the control lever	• 3rd control circuit lever is **unlocked**
Unlocking an attachment from the quickhitch	**Result**
1. Slide the lock of push button **68** downward, and press and hold push button in position **B** 2. Press control lever **12** (3rd control circuit) to the front to position **O** at the same time (two-hand control) 3. Release push button **68**	• The attachment is **unlocked**
Locking an attachment on the quickhitch	**Result**
1. Fit an attachment onto the quickhitch – *see Equipping the machine with a standard bucket* on page 3-73 2. Pull control lever **12** backward **Z** 3. Lock control lever **12** . To do this: press lock sleeve **A** downward out of the groove in the control lever until the lock sleeve locks into place in the detent	• The attachment is locked • Lock pin **G** (see circle in figure) must be visible on either side of the mounting bores of the attachment • The unlocking mechanism is automatically secured against unintentional operation

Control lever for 3rd control circuit in continuous operation

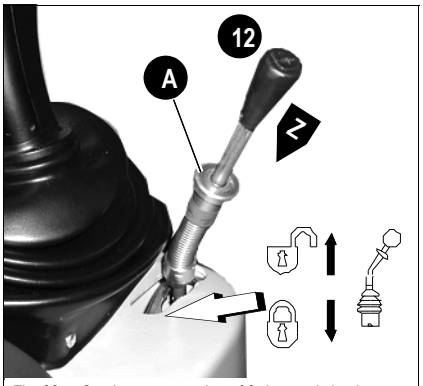


Fig. 89 : Continuous operation of 3rd control circuit

Notice!

Continuous operation of the 3rd control circuit is beneficial when using attachments with additional hydraulic functions, or when operating hydraulic motors (a rotary broom, for example) or attachments with separate control valves.

Continuous operation is performed with the control lever of the 3rd control circuit.

Caution!

In order to avoid damage, for example oil overheating due to the overpressure control in the oil circuit, perform continuous operation of the 3rd control circuit only with an attachment installed and connected with hydraulic hoses!

☞ *Pull and hold control lever **12 fully** backward **Z***

☞ *Move lock sleeve **A** in control lever **12** (3rd control circuit) downward to disengage it out of the groove and press it into the detent (arrow)*

➥ Continuous operation of the 3rd control circuit is switched on

3.45 Electrical operation and locking of 3rd control circuit (option)

Important safety instructions

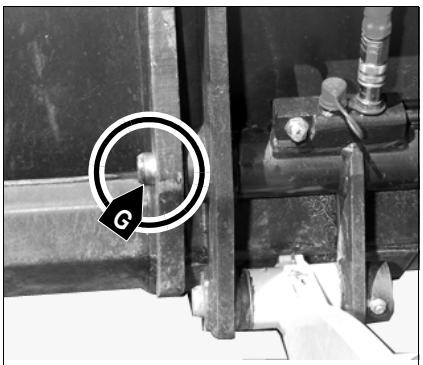


Fig. 90 : Locking the attachment

Danger!

Risk of accidents! When working with attachments **without hydraulic functions** (a bucket, for example), secure the 3rd control circuit against unintentional operation of the switch on the joystick
– *see Operation of 3rd control circuit (electrical, option)* on page 3-68!

Before starting work, also ensure that the attachment is safely locked onto the quickhitch!

☞ *Lock pin* **G** *must be visible on either side of the bores of the attachment*

☞ *Disable (secure) the 3rd control circuit before starting work*

Operation of 3rd control circuit (electrical, option)

Notice!

The function of switch ***51*** on the joystick is described as seen in travel direction.

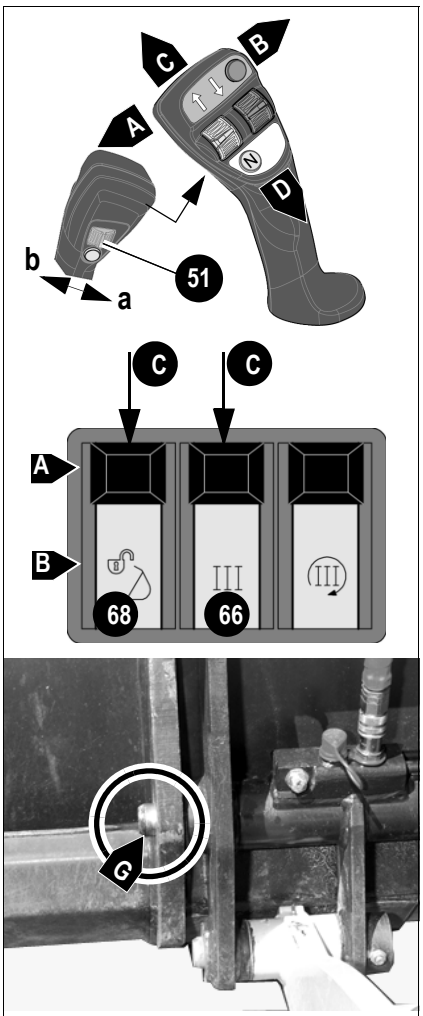


Fig. 91 : Operation of 3rd control circuit lock

Enabling the 3rd control circuit and the switch on the joystick	Result
1. Slide lock **C** on switch **66** downward and press the switch to position **B**	• The 3rd control circuit is **unlocked** and switch **51** on the joystick is functional
Unlocking an attachment from the quickhitch	**Result**
1. Slide lock **C** on push button **68** downward, and press and hold the switch in position **B** 2. Press switch **51** on the joystick to the right toward the window **b** at the same time (two-hand control) 3. Release push button **68**	• The attachment is unlocked
Locking an attachment on the quickhitch	**Result**
1. Fit an attachment onto the quickhitch 2. Press switch **51** on the joystick to the left to position **a** (operator seat)	• The attachment is locked • Lock pin **G** (see circle in figure) must be visible on either side of the mounting bores of the attachment
Disabling the 3rd control circuit (applies only to attachments without hydraulic functions)	**Result**
Slide lock **C** on switch **66** downward and press the switch to position **A**	• The 3rd control circuit is **locked** and switch **51** on the joystick is not functional

Operation of attachments with hydraulic functions

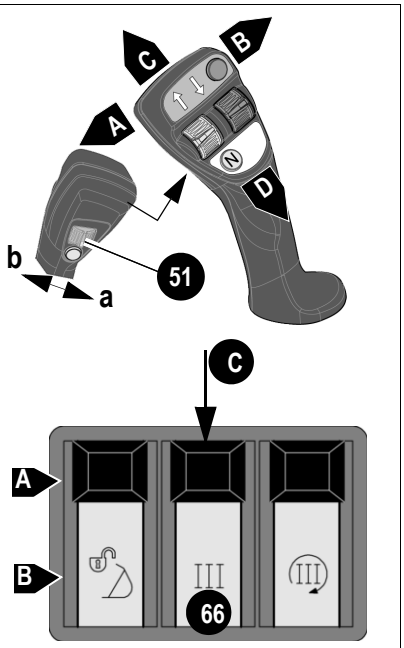


Fig. 92 : Operation of attachments with hydraulic functions

Operation of attachments with hydraulic functions	Result
Slide lock **C** on switch **66** downward and press the switch to position **B**	• 3rd control circuit is **unlocked** and
Press switch **51** on the joystick to the right toward the window **b**	• multipurpose bucket is **opened**, for example
Press switch **51** on the joystick to the left **a** (to the centre of the machine)	• multipurpose bucket is **closed**, for example

Continuous operation of 3rd control circuit and additional control circuit

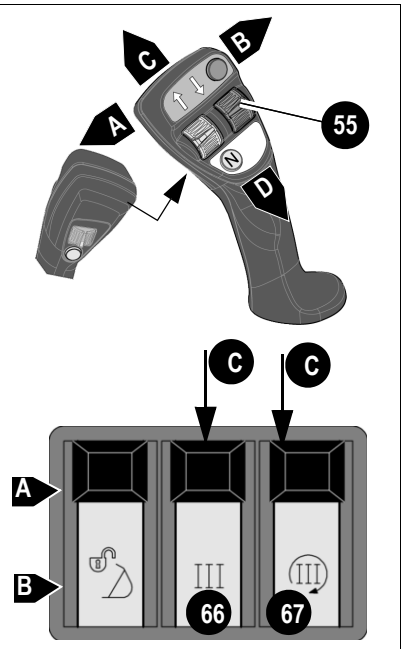


Fig. 93 : Continuous operation of 3rd control circuit

Continuous operation of the 3rd control circuit	Result
Slide lock **C** on switch **66** downward and press the switch to position **B**	• 3rd control circuit is **unlocked**
Slide lock **C** on switch **67** downward and press the switch to position **B**	• The 3rd control circuit is **in continuous operation**
Slide lock **C** on switch **67** downward and press the switch to position **A**	• Continuous operation is switched off

3.46 Attachments by other manufacturers on SKID STEER quickhitch (option)

Caution!

Only SKID STEER attachments can be installed on the quickhitch!

☞ *The attachments listed in "Fields of application and using the wheel loader with an attachment" on page 1-12* **cannot** be used here.

☞ ***When fitting attachments from other manufacturers** onto the quickhitches, the dimensions (length/width), the material density and the loads of these attachments must be in compliance with the **legal regulations of your country and the machine documentation**!*

- *If equipped with pallet forks = safety factor S 1.25/S 1.67*
- *If equipped with a bucket = safety factor S 2.0*
- *Refer to the load diagram affixed on the loader unit bulkhead*

A **Separate Certification for Vehicles (Germany)** issued by the specific authorities is necessary if the dimensions (length/width), material density and loads of the attachments are **not** in compliance with the requirements. **Get informed on and follow the legal regulations of your country.**

An EC declaration of conformity, and stability, load capacity and other tests according to DIN EN 474 must be performed for attachments used with the quickhitches indicated above.

Follow the safety regulations of your country regarding accident prevention during operation of machines and attachments.

In Germany, all machine operators are required to have all machines and equipment inspected regularly by a qualified person.

Inspections and necessary re-examinations of defects that have been detected must be documented in written form. The competent inspection authority may require the inspection report to be available at the place where the machine is used.

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

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

Notice!

Refer to the Operator's Manual of the attachment for installing and connecting the hydraulic hoses onto the quickhitch.

3.47 Emergency lowering of the loader unit with the engine stopped

Lowering or raising

The optional control lever is operated in the same way as the standard control lever.

Fig. 94 : Lowering/raising the loader unit

Danger!

Risk of accidents, injury and machine damage!
Never switch on the load stabilizer (option) if the hose burst valve (option) is enabled after a hose or pipe rupture!

☞ *Remove loads with a second machine if necessary.*

☞ *Contact an authorized service centre.*

Caution!

Emergency lowering is only possible if the load stabilizer (option) is switched on.

☞ *Switch on the load stabilizer for emergency lowering.*

☞ *Contact an authorized service centre if the machine is not equipped with a load stabilizer.*

☞ *Lower the loader unit as follows:*

- Ensure that no one is in the danger zone of the machine
- Apply the parking brake
- Slowly push the control lever forward (position **C**) until the loader unit is fully lowered
- Release control lever **11**
- Switch off ignition and remove the ignition key

☞ *Raise the loader unit as follows:*

- Fasten lifting gear (crane) onto the loader unit
- Pull and hold control lever **11** backward (position **E**)
- Raise the loader unit to transport position with the lifting gear
- Release control lever **11**

Notice!

In case of diesel engine breakdown, have an authorized service centre perform checks and repair work

Notice!

Ground clearance for transport in connection with the standard bucket and standard tyres is **about 200 mm.**

3.48 Pressure relief on the quick couplers and the quickhitch

Notice!

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

- Release the pressure in the sections of the system and hydraulic lines that are to be opened before starting setup or repair work, for example fitting/ removing an attachment!

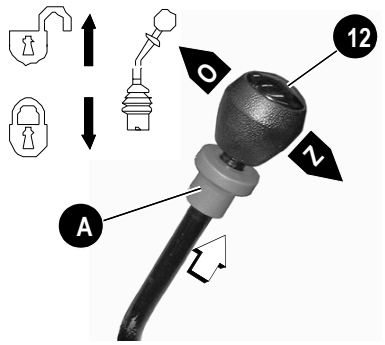


Fig. 95 : Mechanical pressure relief (standard)

☞ *Apply the parking brake*

☞ *Stop the engine but leave the ignition switched on*

☞ *Release the pressure (with the standard control lever)*

- Unlock control lever **12**. To to this: pull lock sleeve **A** on the control lever upward and let it lock into place in the groove
- Move control lever **12** back and forth several times ***O*/Z**

➥ Pressure in hydraulic lines is released

☞ *Switch off ignition and remove the ignition key*

☞ *Remove or connect the flexible lines to the quick couplers*
– see Installing a multipurpose bucket and hydraulic attachments on page 3-84

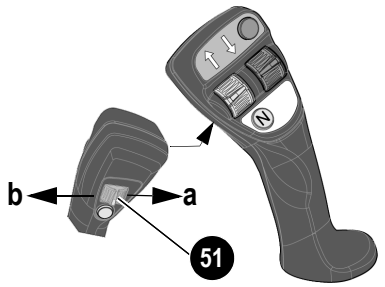


Fig. 96 : Electrical pressure relief (option)

☞ *Release the pressure (with* the switch on the control lever *[option])*

- Press and hold switch **51** on the joystick in each of positions **a** and **b** for about 5 – 8 seconds

➥ Pressure in hydraulic lines is released

☞ *Switch off ignition and remove the ignition key*

☞ *Remove or connect the flexible lines to the quick couplers*
– see Installing a multipurpose bucket and hydraulic attachments on page 3-84

3.49 Equipping the machine with a standard bucket

Field of application and use of bucket

The standard bucket is mainly used for digging earth, and for loosening, picking up, transporting and loading loose or solid materials.

In addition, bear in mind the mandatory regulations relevant to accident prevention.

Caution!

The bucket is **not** certified for applications with lifting gear!
Hitching hooks, eyelets or other lifting gear onto the bucket is prohibited as well!

Machine travel on public roads with a full bucket is prohibited according to StVZO (German road traffic regulations).

Use on public roads – *see Preparatory work – putting the machine into operation* on page 3-39

Checking the mounting bore of the attachment

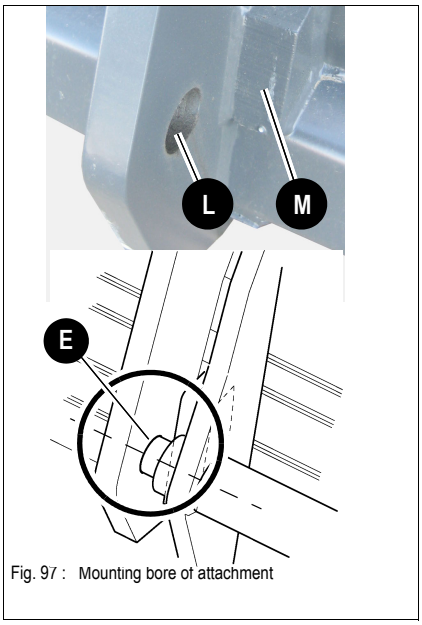


Fig. 97 : Mounting bore of attachment

Danger!

In order to avoid **risk of accidents and damage** on the quickhitch, check mounting bore **L** of the attachment regularly for damage!

- Lock pin **E** is not aligned with mounting bore **L** of the attachment.
  ➥ Have limit stop **M** of the attachment replaced by an authorized service centre if it is worn
- Bent lock pin **E**
  ➥ Have the lock pin replaced by an authorized service centre

Fitting a standard bucket onto the quickhitch

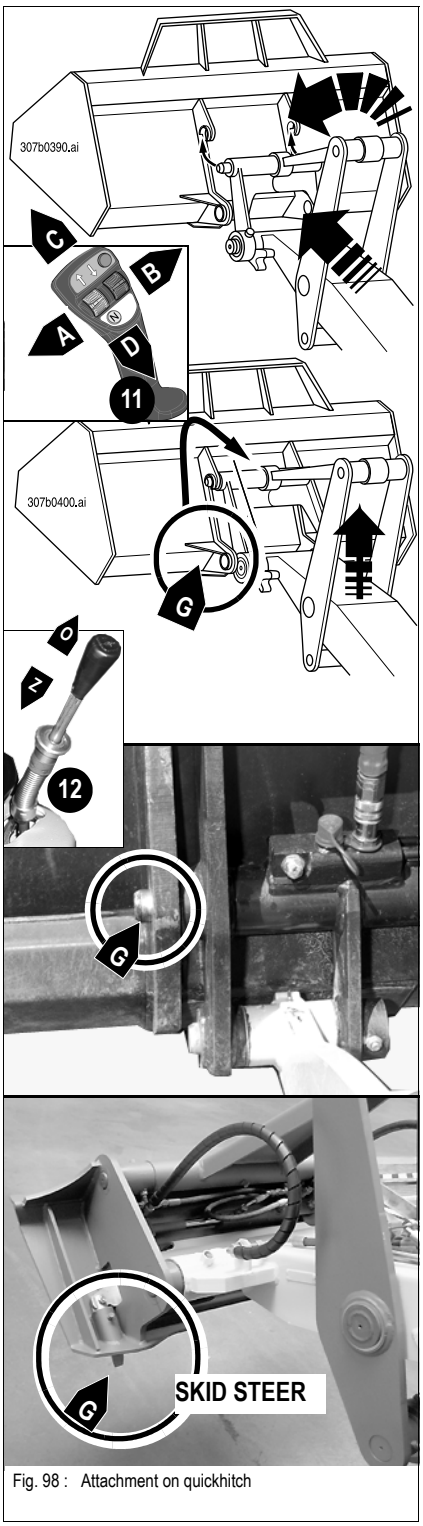


Fig. 98 : Attachment on quickhitch

Re-equipping the attachments is described below for the standard bucket. If you are fitting or removing attachments with their own hydraulic functions – multipurpose bucket or rotary broom, for example – you must follow the special information given in the Operator's Manual of the attachment.

Danger!

Before starting work, ensure that the attachment is safely locked onto the quickhitch by means of the lock ram.

☞ *You must be able to see lock pin **G** (circle) on either side in the mounting bores on the attachment*

Picking up a standard bucket

☞ *Approach the wheel loader to the attachment*

☞ *Lower the loader unit. To do this: push control lever **11** forward **C** and*

☞ *Tilt the quickhitch forward. To do this: push control lever **11** to the right **B***

☞ *Raise the loader unit until the quickhitch engages in the hooks of the attachment*

➥ Pull control lever ***11*** backward **D**

☞ *Tilt in the quickhitch completely*

➥ Push control lever ***11*** to the left **A**

Locking/securing a standard bucket

Secure the attachment with lock pins **G** of the quickhitch. To do this:

☞ *Pull control lever **12** backward **Z***

➥ Lock pin **G** engages in the mounting bores of the attachment

☞ *During machine travel on public roads, secure the control lever of the 3rd control circuit*

➥ *– see Operating and securing the 3rd control circuit (standard)* on page 3-65

Removing a standard bucket from the quickhitch

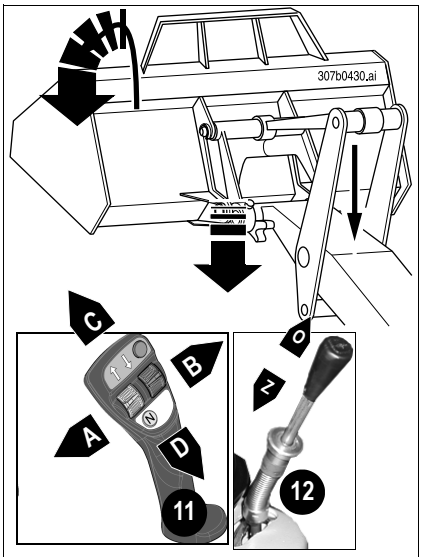


Fig. 99 : Lowering and tilting out the attachment

Danger!

Position the attachment so that it will stand safely and not tip over once it is unlocked from the quickhitch!

☞ *Drive the wheel loader with the attachment to the drop-off position*

☞ *Lower the loader unit. To do this: push control lever **11** to position **C**,*

➥ until the attachment is about 5 – 10 cm above the ground (horizontally)

☞ *Unlock the 3rd control circuit*

➥ *– see Operating and securing the 3rd control circuit (standard)* on page 3-65

➥ *– see Electrical operation and locking of 3rd control circuit (option)* on page 3-67

☞ *Unlock the attachment. To do this: push control lever **12** forward to position **O***

➥ The lock pin moves out of the mounting bores of the attachment

☞ *Lower the loader unit completely. To do this: push control lever **11** to position **C** and at the same time, tilt the quickhitch forward. To do this: push control lever **11** to position **B***

☞ *Reverse the wheel loader away from the attachment*

3.50 Working with the standard bucket

Safety instructions on work operation

Caution! Bear in mind the safety instructions given in chapter 2 before working with the machine!

- – see chapter 2 *"Designated use and exemption from liability"* on page 2-2
- – see chapter 2 *"General conduct and safety instructions"* on page 2-3
- – see chapter 2 *"Safety instructions regarding operation"* on page 2-6

- **Caution, risk of fatal injury!** When working with the machine, look out for high-voltage cables, underground cables, gas and water pipes!
- **Danger of collapse!** Never drive up to the edge of a pit from outside, never undermine the foundations of walls
- Bear in mind the mandatory regulations for accident prevention
- Secure the 3rd control circuit against unintentional operation
  – see *Fitting a standard bucket onto the quickhitch* on page 3-74
- Do not perform any jerky movements with the control lever (joystick)
- Set down and pick up loads carefully at low diesel engine speed
- When loading with the machine, switch off the load stabilizer (option), as it will yield very easily, making it difficult to perform any precise lifting movements
  – see *Load stabilizer (option)* on page 3-53
- **Caution!** Before leaving the machine, lower the bucket to the ground, stop the diesel engine, switch off ignition and remove the key

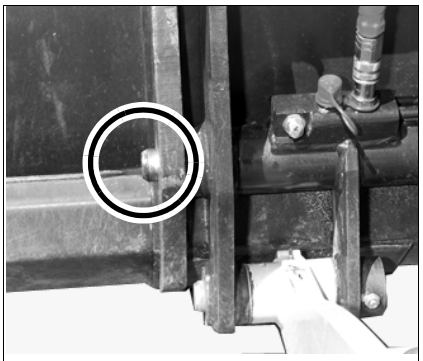


Fig. 100 : Locking the attachment

- In order to avoid risk of accidents, ensure that the attachment is safely locked onto the quickhitch by means of the lock ram before starting work

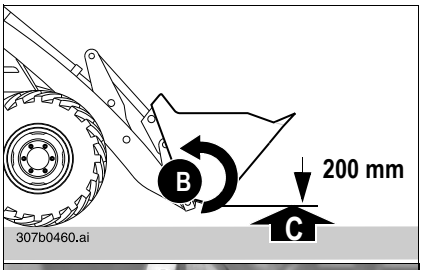
  ➥ You must be able to see the lock pins on either side of the mounting holes on the attachment

Caution!

In order to avoid damage to the tyres, do not move the machine with the bucket fully tilted out!

☞ *Tilt in the bucket and lower loader unit to transport position*

Travelling with a standard bucket during work operation



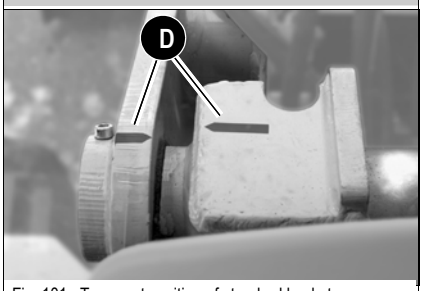


Fig. 101 : Transport position of standard bucket

Notice!

Machine travel on public roads with a full bucket is prohibited in Germany!

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

☞ *Tilt in the standard bucket to the limit* **A**

☞ *Raise the loader unit until both red marks* **D** *on the lift frame and the bulkhead are aligned (ground clearance* **C** *about 200 mm)*

☞ *Switch on the load stabilizer (option) – see Load stabilizer (option) on page 3-53*

Safety instructions regarding work with a full standard bucket

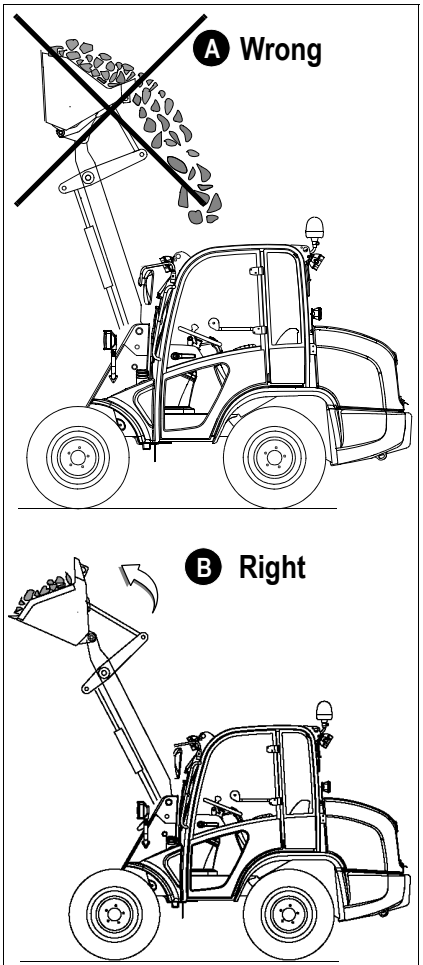


Fig. 102 : Safety instructions for transporting material

Danger!

Risk of accidents. Risk of injury. If it is tilted in in transport position, the standard bucket is moved parallel to its initial position as the loader unit is raised!
If the standard bucket is unintentionally tilted in to the limit in this position *Fig. 102*/***A***, material may fall over the rear of the bucket.

☞ ***Do not tilt in*** *a standard bucket filled with material in this position*

☞ *Slightly readjust the standard bucket if necessary (tilt out Fig. 102*/***B****)*

☞ *In case of a bulky load:*

- Secure the load and if necessary, fit the rear of the bucket with a protection
- Install a protective screen (option) onto the cabin
  – see chapter 1 "Machine overview" on page 1-7
- Use attachments with hydraulic grabs (option)
  – see chapter 1 "Certified attachments" on page 1-13

☞ *Ensure good visibility of the material you want to pick up and of the work and travel range*

☞ Raise a full bucket only at the tilt-out position, and only when the machine is at a standstill!

Danger!

Risk of tipping over. Risk of accidents. The wheel loader can tip over when turning or travelling on slopes with a full bucket.

☞ *Tilt in the standard bucket completely*

☞ *Set the loader unit to transport position – see Travelling with a standard bucket during work operation on page 3-77*

☞ *Travel in reverse when transporting a standard bucket loaded with material on a slope*

☞ Do not perform any U-turns on steep slopes!

Practical hints for digging

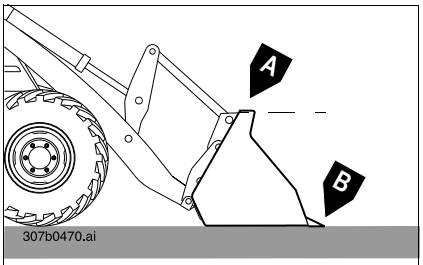


Fig. 103 : Tilt position of the bucket

- Exits from pits must be outside the digging line and as level as possible
- Dig by removing adjacent strips if possible
- Ensure that you can drive forward when travelling out of the digging area with a fully loaded bucket
- Whenever possible, travel in reverse when transporting a full bucket down a steep slope – *see* *Safety instructions regarding work with a full standard bucket* on page 3-78

Tilt position of the bucket

- The position of surface **A** on the upper edge of the bucket corresponds to the position of leading edge **B**

Caution!

If the bucket is very full, the material may fall over the rear of the bucket.

Loading loose material

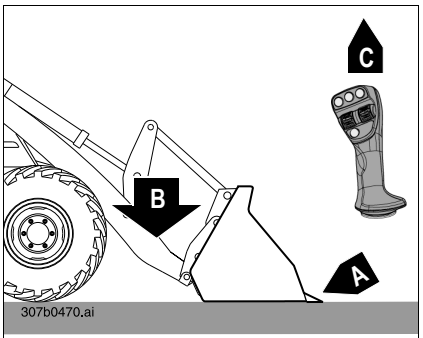


Fig. 104 : Horizontal lowering of the loader unit

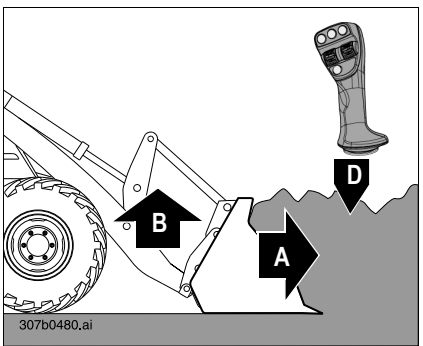


Fig. 105 : Driving into the material

☞ *Loading loose material*

- Align the blade parallel with the ground **A**
- Lower the loader unit to the ground **B**. To do this: push the control lever forward **C**

- Drive forward into the material **A**

When the engine speed is reduced due to too much material:

- Slightly raise the loader unit **B**. To do this: pull the control lever backward **D**

Caution!

In order to avoid damage to the machine or tyres, do **not** move the machine with the bucket fully tilted out

☞ *Tilt in the attachment to transport position*

Loading if the material is hard to penetrate

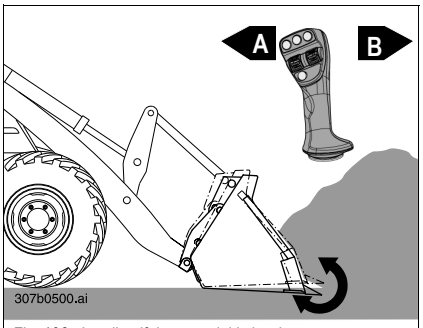


Fig. 106 : Loading if the material is hard to penetrate

☞ *Loading if the material is hard to penetrate*

- As for loading loose material, but in addition:
- Tilt the bucket in and out a little. To do this: move the control lever to the left and right **A and B**

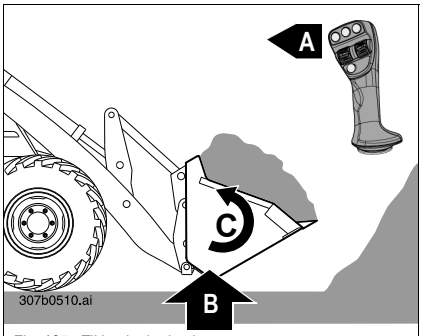


Fig. 107 : Tilting in the bucket

When the bucket is full:

- Tilt in the bucket **C**. To do this: push the control lever to the left **A**
- Reduce engine speed
- Reverse out of the material
- Raise the bucket to transport position **B**

Removing material/digging in soft soil

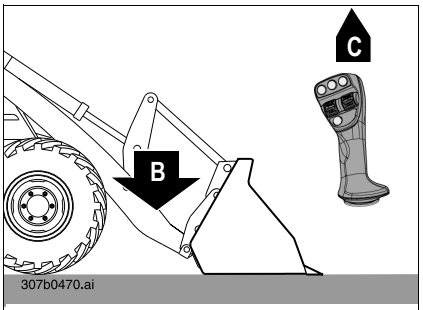


Fig. 108 : Lowering the loader unit to the ground

☞ *Remove and dig as follows:*

- Place the bucket horizontally on the ground **B**. To do this: push the control lever forward **C**

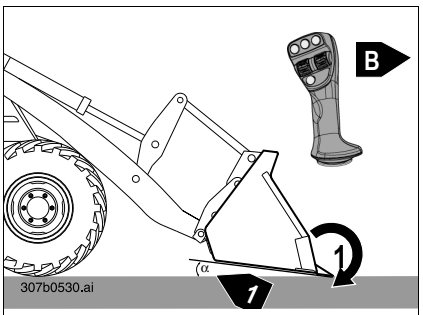


Fig. 109 : Adjusting the digging angle

- Adjust the digging angle **1**. To do this: push the control lever to the right **B**
- Drive forward

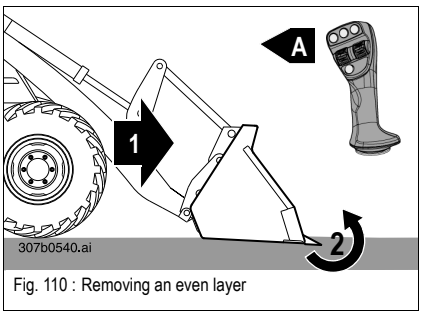


Fig. 110 : Removing an even layer

- Set the digging angle a little flatter **2**. To do this: push the control lever to the left **A**, so that the layer being removed is as even as possible and so that the wheel spin is reduced
- Proceed as for loading loose material

Removing material/digging in hard soil

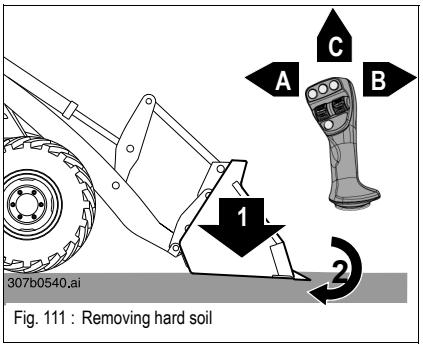


Fig. 111 : Removing hard soil

☞ *Remove and dig as follows:*

- Lower the bucket horizontally to the ground **1**. To do this: push the control lever forward **C**
- Adjust the digging angle flatter **1** than for digging in soft soil. To do this: push the control lever to the right **B**
- Travel forward and press the bucket downward a little as you do so. To do this: push the control lever forward **C** a little

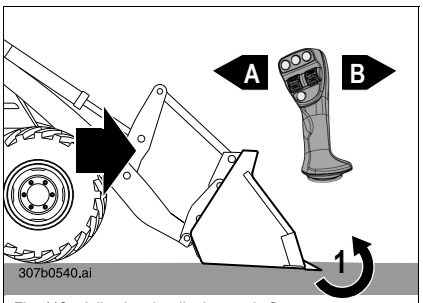


Fig. 112 : Adjusting the digging angle flatter

Once the bucket has penetrated the soil:

- Set the digging angle a little flatter **1**. To do this: push the control lever to the left **A**, so that the layer being removed is as even as possible and so that the wheel spin is reduced
- When the machine moves forward, move the control lever quickly to the left and right **A and B** to loosen the material
- Proceed as for loading material hard to penetrate

Grading

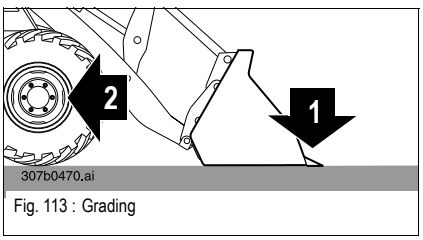


Fig. 113 : Grading

☞ *Grade as follows:*

- Lower the loader unit horizontally to the ground **1**
- Reverse across the surface to be graded **2**

Loading heaped material (non-compacted material)

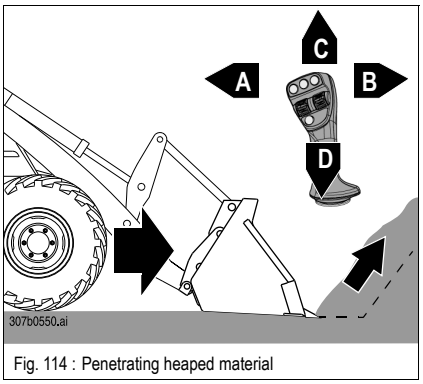


Fig. 114 : Penetrating heaped material

☞ *Proceed as follows:*

- Set the blade parallel to the ground. To do this: push the control lever to the left or right **A and B**
- Lower the loader unit horizontally to the ground. To do this: push the control lever forward **C**
- Drive forward
- After penetrating the heaped material:
- Raise the loader unit evenly. To do this: pull the control lever backward **D**

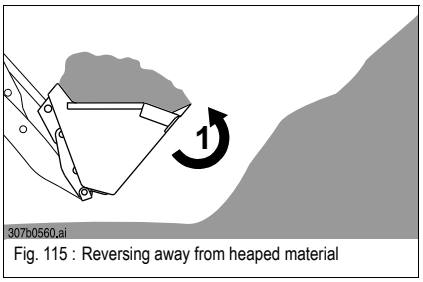


Fig. 115 : Reversing away from heaped material

- Tilt in the bucket. To do this: push the control lever to the left **A**
- Reverse out of the material
- Lower the loader unit to transport position

Loading heaped material (compacted material)

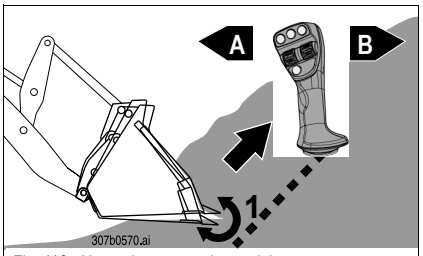


Fig. 116 : Heaped compacted material

☞ *Proceed as follows:*

- Proceed as for non-compacted material, however when raising the loader unit through the heaped material, tilt the bucket slightly in and out (**1**).
  To do this: move the control lever alternately to the left and right (**A and B**)
  ➥ The material is loosened

Practical hints for loading vehicles

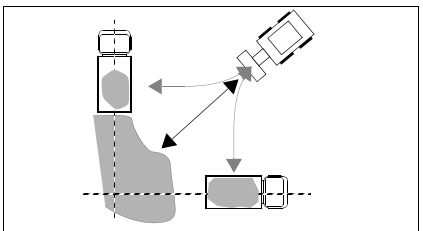


Fig. 117 : Loading vehicles.

- If possible, the truck and the working direction of the loader should form an angle of 45°
- Raise a full bucket only before the unloading position
- If possible load material with the wind behind you to keep the dust away from your eyes, air filters and fans

Freeing the machine

Proceed as follows if the machine should get stuck when picking up material:

- Tilt out the bucket until the blade is vertical above the ground
- Lower the loader unit all the way
- Gradually tilt in the bucket
- The machine is pushed backward
- Reverse slowly
- Repeat this procedure until the wheels reach firm ground
- Reverse the machine away

3.51 Installing a multipurpose bucket and hydraulic attachments

Fields of application for multipurpose bucket

- The multipurpose bucket is mainly used for earthwork, for grading, picking up, loosening, filling transporting and loading loose or solid materials.

Caution!

The multipurpose bucket is **not** certified for applications with lifting gear! Hitching hooks, eyelets or other lifting gear onto the multipurpose bucket is prohibited as well!

- **Machine travel on public roads with a full bucket is prohibited** according to StVZO (German road traffic regulations).
- **Use of attachments on public roads**
  – *see Putting the machine into operation* on page 3-51!

Installing a multipurpose bucket

Danger!

In order to avoid **risk of accidents and damage** on the quickhitch, check mounting bore **L** of the attachment regularly for damage
– *see Checking the mounting bore of the attachment* on page 3-73!

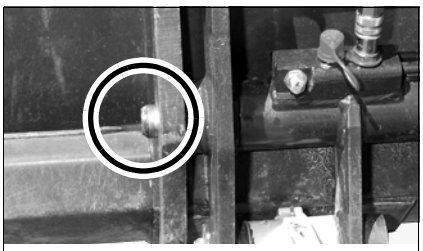


Fig. 118 : Checking the lock pins

Danger!

In order to avoid risk of accidents, ensure that the attachment is safely locked onto the quickhitch by means of the lock ram before starting work!

☞ *You must be able to see the lock pins on either side of the mounting holes on the attachment!*

☞ – *see Field of application and use of bucket on page 3-73*

Notice!

The multipurpose bucket is picked up and installed on the quickhitch in the same way as the standard bucket – *see Field of application and use of bucket* on page 3-73.

Connecting hydraulic lines to the wheel loader

Notice!

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

- Release the pressure on the hydraulic quick couplers before starting setup or repair work, for example fitting/removing an attachment!

Caution!

Clean the quick couplers carefully before connecting an attachment in order to ensure correct functioning and sealing!
Furthermore, the pressure in the quick couplers has to be released before they are connected – *see Pressure relief on the quick couplers and the quickhitch* on page 3-72.

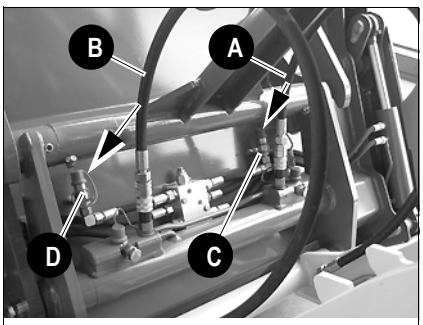


Fig. 119 : Connecting hydraulic lines

☞ *Connect the hydraulic lines as follows:*

- Stop the engine, but do not switch off the ignition
- Apply the parking brake
- Release the pressure in the hydraulic lines
  – *see Pressure relief on the quick couplers and the quickhitch* on page 3-72
- Clean the hydraulic connections on the multipurpose bucket and the quickhitch
- Remove flexible lines **A** and **B** from the quick couplers of the quickhitch and connect them onto the quick couplers of the multipurpose bucket
  - ➥ Flexible line **A** onto quick coupler **C** (to open the multipurpose bucket)
  - ➥ Flexible line **B** onto quick coupler **D** (to close the multipurpose bucket)
- Close the quick couplers on the quickhitch with protective caps

Caution!

Never connect the hydraulic lines crosswise, otherwise the attachment functions are inverted and the hydraulic lines are squeezed by tilting the attachment in and out.

☞ *Check the multipurpose bucket for correct function*

Checking the function of the multipurpose bucket

The function of switch **51** on the joystick is described as seen in travel direction!

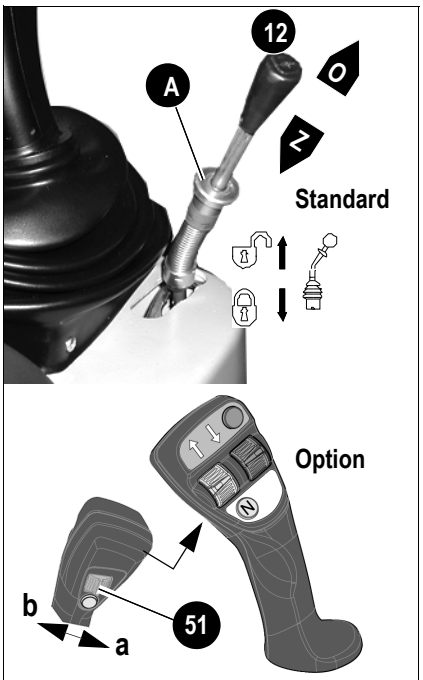


Fig. 120 : Multipurpose bucket function

Operation via 3rd control circuit	Result
Standard Push control lever **12** forward **O**	This applies pressure to the hydraulic line (blue) on the right and **opens** the multipurpose bucket
Option Press switch **51** on the control lever to the right **a**	
Standard Pull control lever **12** backward **Z**	This applies pressure to the hydraulic line (red) on the left and **closes** the multipurpose bucket
Option Press switch **51** on the control lever to the left **b**	

Notice!

If the attachment is placed in direct sunlight after having been taken off, the oil in the hydraulic rams will warm up. Pressure is created in the hydraulic rams, which makes it difficult to connect the flexible lines to the quick couplers.

- Set down the attachment out of the sun

Setting down the multipurpose bucket

Caution!

In order to avoid damage if the attachment tips over, place it on the ground ensuring stability!

Caution!

Clean the quick couplers carefully before connecting an attachment in order to ensure correct functioning and sealing!
Furthermore, the pressure in the quick couplers has to be released before they are connected – *see Pressure relief on the quick couplers and the quickhitch* on page 3-72.

Notice!

The attachment is removed from the quickhitch in the same way as the standard bucket – *see Removing a standard bucket from the quickhitch* on page 3-75

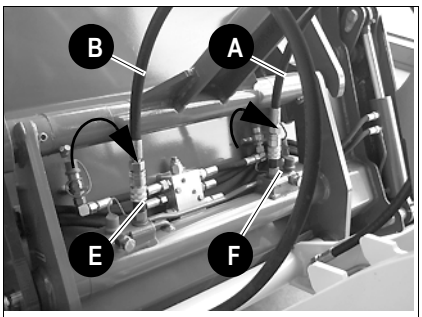


Fig. 121 : Removing the hydraulic lines

☞ *Set down the multipurpose bucket as follows:*

- Empty the multipurpose bucket and set it horizontally with the ground
- Stop the engine, but do ***not*** switch off ignition
- Apply the parking brake
- Release the pressure in the hydraulic lines of the 3rd control circuit – *see Pressure relief on the quick couplers and the quickhitch* on page 3-72
- Remove flexible lines **A** and **B** from the quick couplers of the multipurpose bucket and insert them into the quick couplers of the quickhitch
  - ➥ Flexible line **A** onto quick coupler **F**
  - ➥ Flexible line **B** onto quick coupler **E**
- Close the quick couplers on the multipurpose bucket with protective caps
- Start the engine and lower the multipurpose bucket to the ground

3.52 Working with the multipurpose bucket

Safety instructions on work operation

Caution! Bear in mind the safety instructions given in chapter 2 before working with the machine!

- – see chapter 2 *"Designated use and exemption from liability"* on page 2-2
- – see chapter 2 *"General conduct and safety instructions"* on page 2-3
- – see chapter 2 *"Safety instructions regarding operation"* on page 2-6
- **Caution, risk of fatal injury!** When working with the machine, look out for high-voltage cables, underground cables, gas and water pipes!
- **Danger of collapse!** Never drive up to the edge of a pit from outside, never undermine the foundations of walls
- Bear in mind the mandatory regulations for accident prevention
- Secure the 3rd control circuit against unintentional operation
  – see *Fitting a standard bucket onto the quickhitch* on page 3-74
- Do not perform any jerky movements with the control lever (joystick)
- Set down and pick up loads carefully at low diesel engine speed
- When loading with the machine, switch off the load stabilizer (option), as it will yield very easily, making it difficult to perform any precise lifting movements
  – see *Load stabilizer (option)* on page 3-53
- **Caution!** Before leaving the machine, lower the bucket to the ground, stop the diesel engine, switch off ignition and remove the key

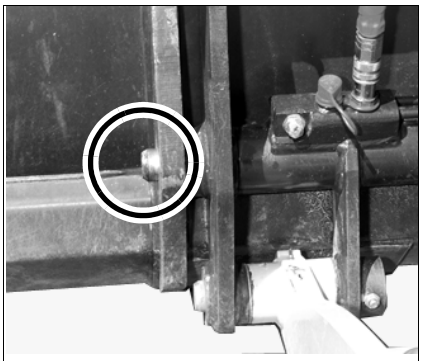
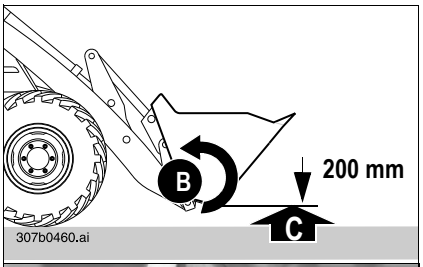


Fig. 122 : Locking the attachment

- In order to avoid risk of accidents, ensure that the attachment is safely locked onto the quickhitch by means of the lock ram before starting work

  ➥ You must be able to see the lock pins on either side of the mounting holes on the attachment

Travelling with a multipurpose bucket during work operation



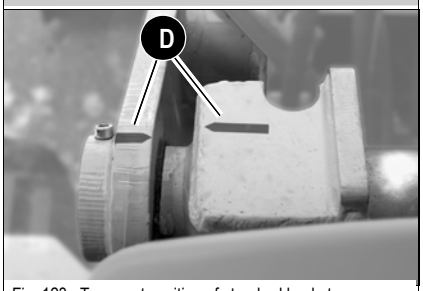


Fig. 123 : Transport position of standard bucket

Notice!

Machine travel on public roads with a full multipurpose bucket is prohibited in Germany!

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

☞ *Tilt in the multipurpose bucket to the limit* **A**

☞ *Raise the loader unit until both red marks* **D** *on the lift frame and the bulkhead are aligned (ground clearance* **C** *about 200 mm)*

➥ *Switch on the load stabilizer (option) – see Load stabilizer (option) on page 3-53*

Safety instructions regarding work with a full multipurpose bucket

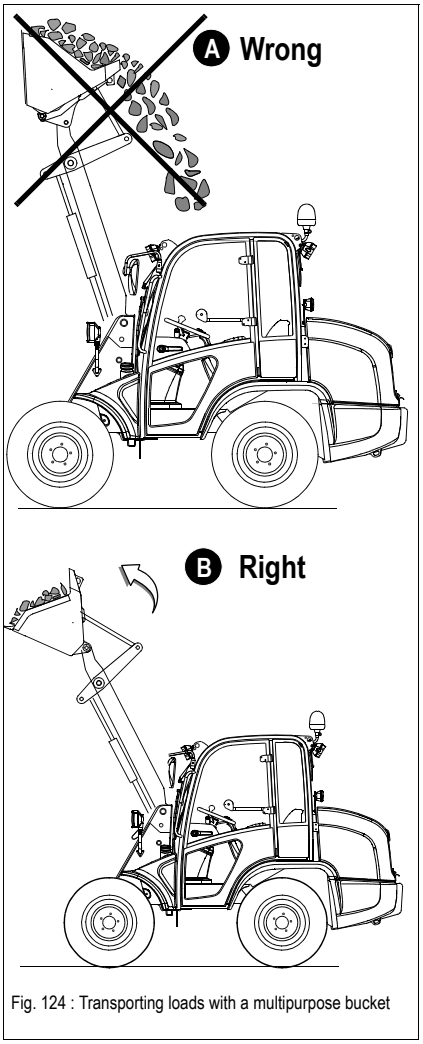


Fig. 124 : Transporting loads with a multipurpose bucket

Danger!

Do not transport loads with a raised loader unit!

When transporting loads, always tilt in the attachment a little toward the machine, carry it as close as possible to the ground and bear in mind the required ground clearance!

If it is tilted in in transport position, the multipurpose bucket is moved parallel to its initial position as the loader unit is raised!

If the multipurpose bucket is unintentionally tilted in to the limit in the raised position *Fig. 124**/A***, material may fall over the rear of the bucket.

☞ *Do **not tilt in** a bucket filled with material in this position*

☞ *Slightly readjust the multipurpose bucket if necessary (tilt out Fig. 124**/B**)*

☞ *In case of a bulky load:*

- Secure the load and if necessary, fit the rear of the bucket with a protection

☞ *Ensure good visibility of the material you want to pick up and of the work and travel range*

Danger!

In order to avoid **danger when travelling or manoeuvring on slopes** with a full bucket, tilt in the multipurpose bucket fully and set the loader unit to transport position!

☞ *Whenever possible, travel in reverse when transporting a bucket loaded with material on a steep slope*

Notice!

Machine travel on public roads with a full bucket is prohibited in Germany!

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

Practical hints for digging

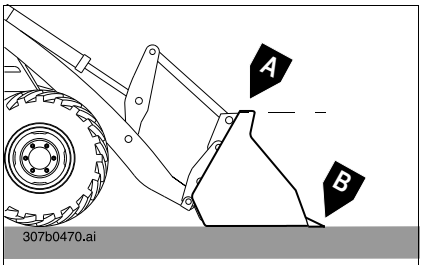


Fig. 125 : Tilt position of the bucket

- Exits from pits must be outside the digging line and as level as possible
- Dig by removing adjacent strips if possible
- Ensure that you can drive forward when travelling out of the digging area with a fully loaded bucket
- Whenever possible, travel in reverse when transporting a full bucket down a steep slope
  – *see Safety instructions regarding work with a full multipurpose bucket* on page 3-90

Tilt position of the bucket

- The position of surface **A** on the upper edge of the bucket corresponds to the position of leading edge **B**

Caution!

If the bucket is very full, the material may fall over the rear of the bucket.

Grading and scraping

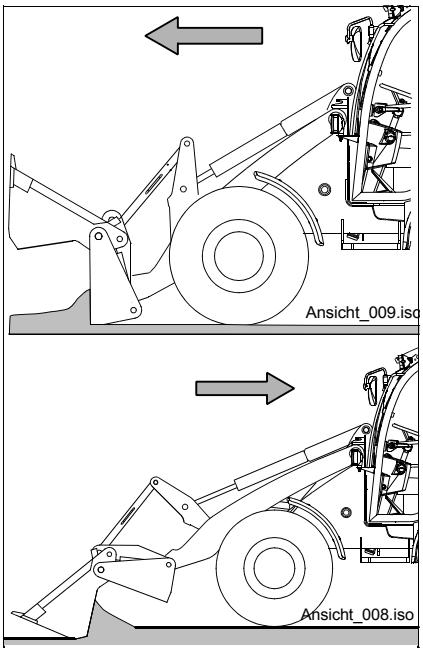


Fig. 126 : Grading work with a multipurpose bucket

Notice!

To operate the 3rd control circuit (open/close bucket)
– *see Lock for loader unit control lever and mechanical locking of 3rd control circuit (standard)* on page 3-42 or *"Lock for loader unit control lever and electrical lock for 3rd control circuit lever (option)*" on page 3-43

☞ *Grade as follows:*

- Fold up the front half of the bucket
- Set the depth of the layer you want to remove with the lift hydraulics
- Set the angle of the rear cutting edge

☞ *Drawing material backward*

- Tilt out the multipurpose bucket
- Raise the bucket with the lift hydraulics
- Fold up the front half of the bucket
- Lower the multipurpose bucket to the ground
- Set the angle of the bucket
- Surfaces are graded or scraped during reverse travel

Stripping in thin layers (scraper)

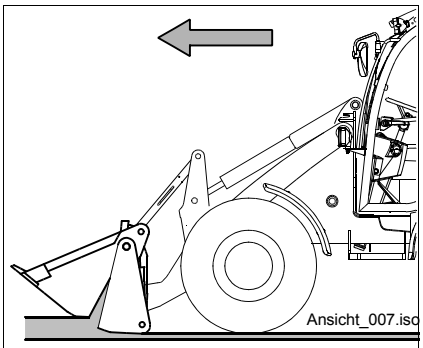


Fig. 127 : Removing material in thin layers with a multipurpose bucket

☞ *Remove material in thin layers as follows:*

- Set a flat digging angle
- Fold up the front half of the bucket by about 10 to 15 cm
- Start machine travel

➥ The material rolls into the bucket and is picked up at the same time

Notice!

This position allows to strip grass turf, for example, down to a thickness of about 8 cm.

Spreading material in thin layers

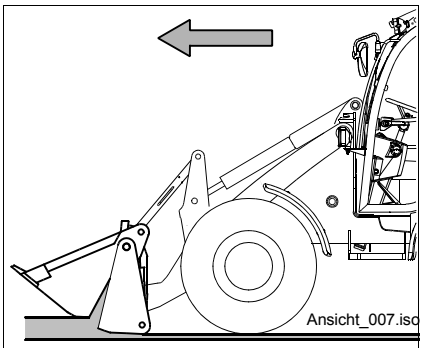


Fig. 128 : Spreading material with the multipurpose bucket

☞ *Spread material as follows:*

- Set the rear cutting edge parallel to the ground
- Fold up the front half of the bucket until the required quantity of material is emptied onto the ground
- Start machine travel
- Lower the multipurpose bucket to the ground

Notice!

The rear cutting edge grades the material as it is emptied by opening the front half of the bucket. The rear cutting edge grades the material as it is emptied by opening the front half of the bucket. This position allows to spread material without travelling on the lower layer with the machine (for example applying the first bituminous base, applying granulated material onto plastic coatings, etc.).

Pulling out material from slopes

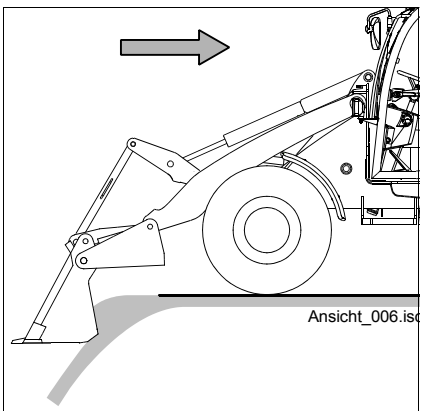


Fig. 129 : Pulling out material with a multipurpose bucket

Notice!

This position allows to pull material out of slopes or roadside ditches with maximum safety and to spread it as required.

Moving material with longer reach

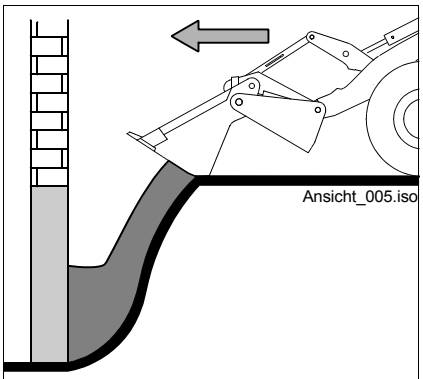


Fig. 130 : Filling in material with a multipurpose bucket

Notice!

Backfilling with maximum safety and without damaging slopes.

This position allows to move material without damaging slopes or structures.

Picking up remaining material completely

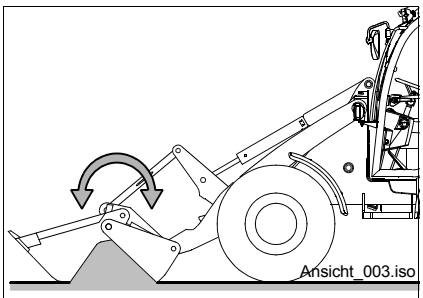


Fig. 131 : Picking up remaining material with the multipurpose bucket

Notice!

Both bucket halves must touch the ground so that all the material is picked up.

☞ *Pick up remaining material as follows:*

- Fold up the front half of the bucket (multipurpose bucket)
- Tilt out the bucket
- Lower the bucket to the ground. Ensure that both bucket halves touch the ground
- Close and tilt in the multipurpose bucket at the same time
- Raise the bucket with the lift hydraulics

Grabbing bulky material or large objects

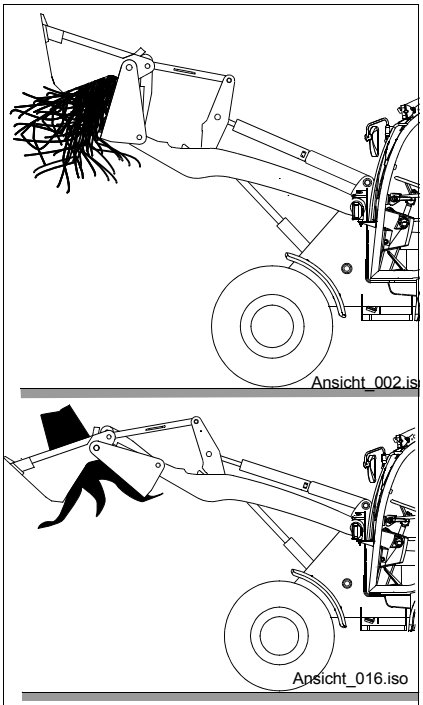


Fig. 132 : Bulky material or large objects

☞ *Grabbing bulky material*

- The multipurpose bucket allows to safely grab, pick up and transport building timber, reinforcement bars, packaging bands, wire, etc.
- The multipurpose bucket allows to safely grab, pick up and transport large objects

Pulling out and setting posts

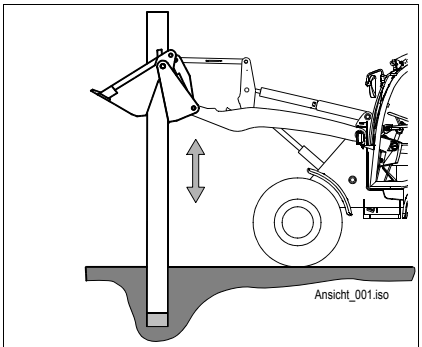


Fig. 133 : Moving posts with a multipurpose bucket

☞ *Pulling out or setting posts*

- Open the multipurpose bucket and lower it over the post. Close the bucket to grip the post firmly
- Loosen the post with careful up-and-down movements

Backfilling round gravel and precise unloading

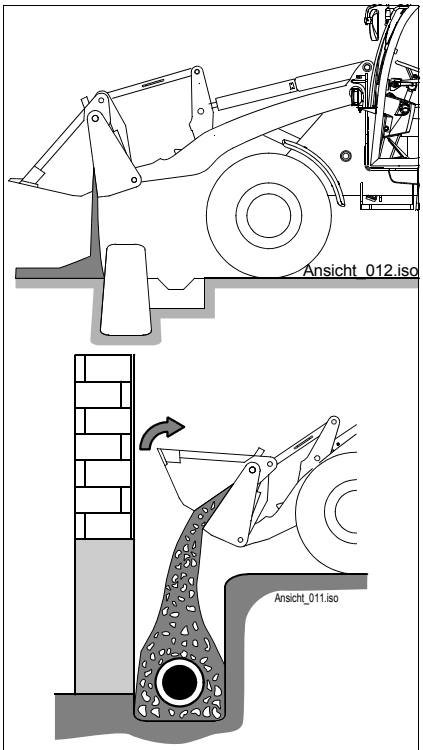


Fig. 134 : Backfilling and unloading material with a multipurpose bucket

- Precise dosing and placement of pourable material
- Bucket teeth move back from the wall as the bucket opens

Unloading from the bottom of the bucket for increased tilt-out heights

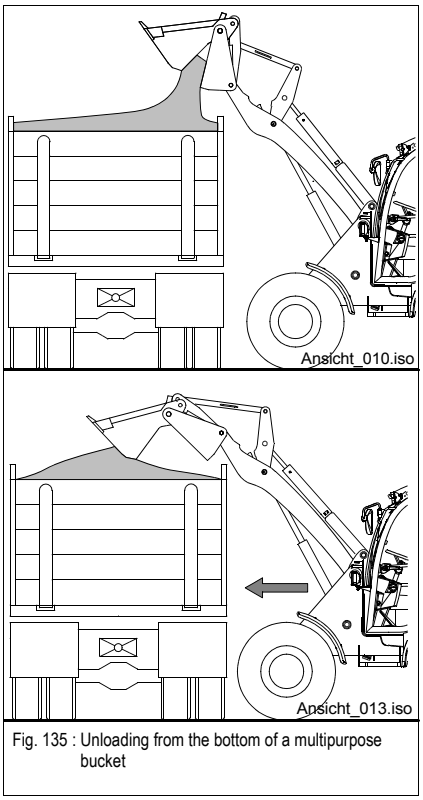


Fig. 135 : Unloading from the bottom of a multipurpose bucket

- Unloading from the bottom of the bucket for increased tilt-out heights
- Tilt-out height can be increased by at least 55 cm (depending on bucket size), as compared to tilting out normally with a standard bucket.

Notice!
Smaller tilt reach is compensated by pushing the material with the open multipurpose bucket as shown.

3.53 Fitting pallet forks

Fields of application for pallet forks

The pallet forks are mainly used for picking up, transporting and loading palletized material, pallets and other stacked material!

Transporting loads on pallet forks on public roads is prohibited!

In addition, bear in mind the mandatory regulations relevant to accident prevention!

Caution! Before leaving the machine, lower the pallet forks to the ground, stop the diesel engine, switch off ignition and remove the key

Caution!

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 arms as lifting gear!

Picking up pallet forks with the quickhitch

Danger!

In order to avoid **risk of accidents and damage** on the quickhitch, check mounting bore **L** of the attachment regularly for damage
– *see Checking the mounting bore of the attachment* on page 3-73!

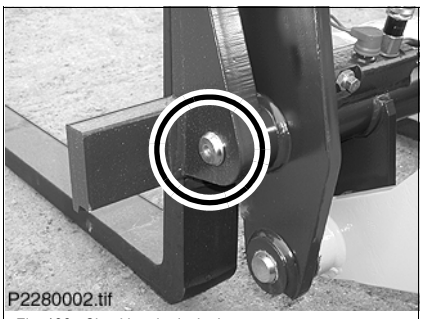


Fig. 136 : Checking the lock pins

The pallet forks are picked up and installed on the quickhitch in the same way as the bucket
– *see Fitting a standard bucket onto the quickhitch* on page 3-74.

Danger!

In order to avoid injury or risk of accidents, ensure that the attachment is safely locked onto the quickhitch by means of the lock ram before starting work!

☞ *You must be able to see the lock pins on either side of the mounting holes on the attachment!*

☞ *Secure the 3rd control circuit after installing*
– *see Operating and securing the 3rd control circuit (standard) on page 3-65* or
– *see Electrical operation and locking of 3rd control circuit (option) on page 3-67*

Machine travel on public roads with the pallet forks

Danger!

Risk of accidents! In order to ensure traffic safety, do **not** transport the pallet forks in a bucket installed on the machine!

Pallet forks with fixed fork arms are not certified for travelling on public roads.
They must be removed and transported with a suitable means of transport.
See also the **National Type Approval (Germany) (ABE)** or the **Data Confirmation (Germany)**of the machine.

Removing the pallet forks from the quickhitch

Danger!

Position the pallet forks so that they will stand safely and not tip over once they are unlocked from the quickhitch!

The pallet forks are lowered in the same way as the bucket
– *see Removing a standard bucket from the quickhitch* on page 3-75

Adjusting the fork arms

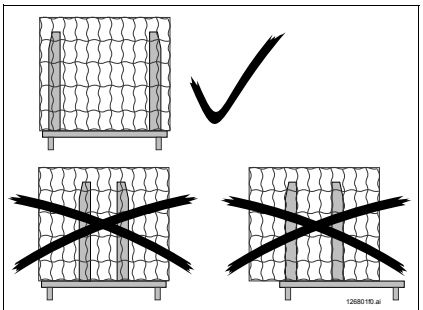


Fig. 137 : Foldable fork arms

Danger!

In order to prevent the fork armss from slipping or sliding sideways, the safety pins of the fork arms must be correctly locked in the notches on the fork frame.

☞ *Before using the pallet forks, check whether both locking levers **(a)** on the fork arms are folded down and engaged in the fork frame!*

☞ *Check whether securing screws* **D** *on either side on the upper slide rail of the fork frame are not damaged and whether they are firmly screwed on the slide rail*

When the fork arms are moved under the load, they must have the biggest possible spacing between them, or be introduced at the positions or in the fixtures provided for to this effect. The fork arms must always be evenly aligned with the fork frame.

To achieve this, the spacing of the fork arms can be adjusted as follows:

☞ *Set the locking lever to the vertical position **A***

➥ The fork arms can be moved on the fork frame

☞ *Slide the fork arms to the required distance until the safety pin engages in a slot on the fork frame*

☞ *Fold down the locking lever again, position **B***

➥ The upper edge of the locking lever must be flush with the edge **C**.

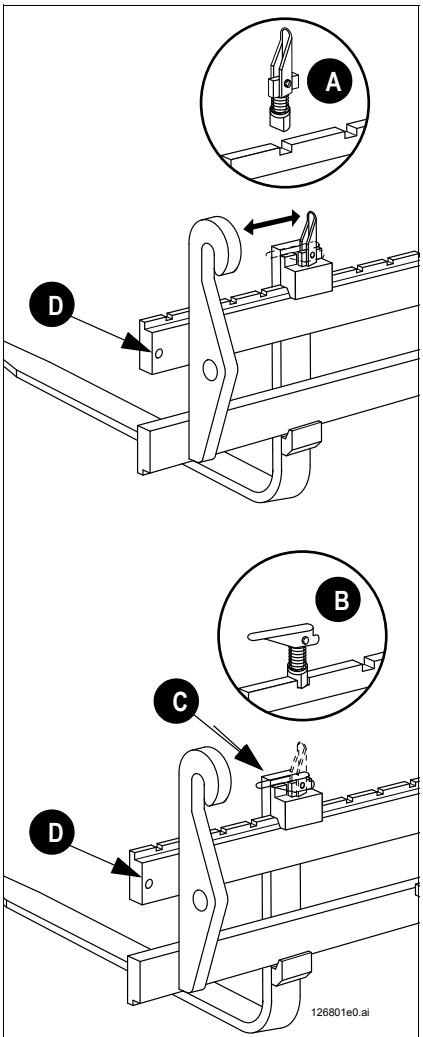


Fig. 138 : Adjusting the fork arms

3.54 Working with the pallet forks

General safety instructions regarding the pallet forks

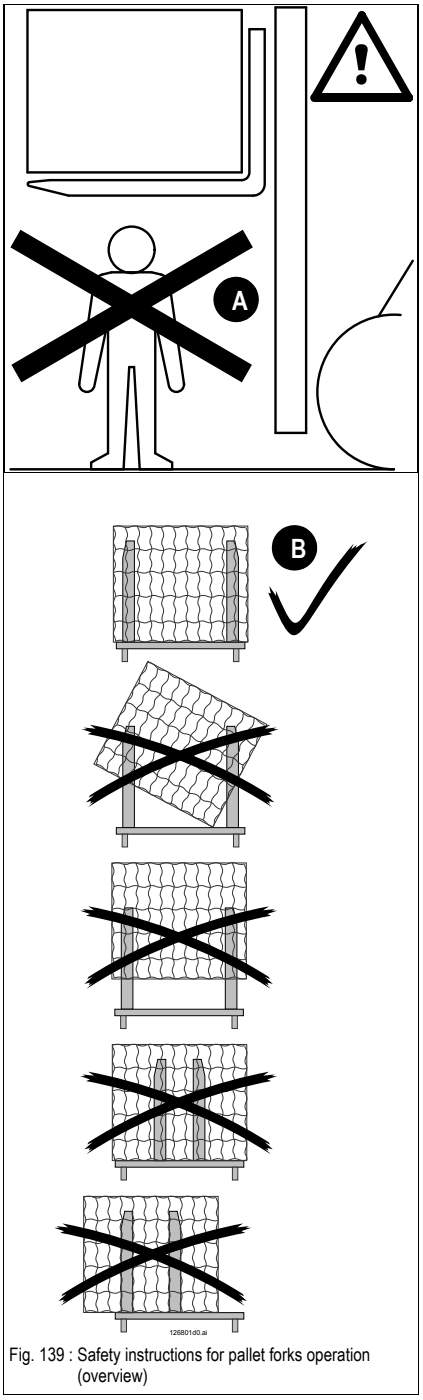


Fig. 139 : Safety instructions for pallet forks operation (overview)

Picking up loads

- Secure the 3rd control circuit against unintentional operation
  – *see chapter 3 "Operating and securing the 3rd control circuit (standard)"* on page 3-65
  – *see chapter 3 "Electrical operation and locking of 3rd control circuit (option)"* on page 3-67
- Stay clear of suspended loads **A**!
- 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 arms on the fork frame are safely locked! Secure with locking lever against sliding sideways!
- Never use bent, cracked or otherwise damaged fork arms/pallet forks!
- Do not overload the attachment or the machine, observe the load diagram
  – *see Load diagram for pallet forks* on page 3-104!
- Observe the stability of the vehicle!
- Never exceed the maximum load!
- Approach the material as closely as possible!
- Always approach the material with the machine wheels in straight-ahead position!
- Always load on firm and level ground with sufficient load-bearing capacity only!
- Never raise a load with only one fork arm!
- Move the fork arms all the way through under the pallets, as far as they will go, so that the load is picked up the nearest possible to the fork frame!
- Move under the load with the straight fork arms as far apart as possible and at an equal distance from the left and right side of the load **B**!

Never leave the machine with the load raised!

Transporting loads

- Always tilt in the attachment a little (toward the machine) for transport!
- Always transport the load close to the ground!
- Maintain a distance of a minimum 6 m (236.20 in) between the loader unit/load and overhead lines!
- Never operate the loader unit and the attachments at higher machine speed!
- Never leave the machine with the load raised!
- In order to avoid unlocking the pallet forks, secure the 3rd control circuit on the machine – *see Operating and securing the 3rd control circuit (standard)* on page 3-65 or
– *see Electrical operation and locking of 3rd control circuit (option)* on page 3-67
- 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 drive the machine backward 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!

Setting down loads

- Loads must only be set down on a suitable base with sufficient stability and load-bearing capacity
- Do not stack or set down in higher places loads which are not properly packaged or which have shifted, or load units with damaged pallets/stacking containers
- Set down loads only in places where they will stand safely without tilting, falling down or sliding! Affix appropriate marks to loads which have been set down, especially in the area of public and private traffic!
- Observe the load-bearing capacity of the set-down area (for example truck platforms, storage area in high-bay warehouses, etc.)
- Load the loading area of vehicles or trailers evenly and distribute the load evenly on the axles
- Stack loads only up to the authorized maximum pallet height
- Do not set down loads too near to slopes, construction pits, etc.
- Do not set down loads in transit or escape routes, and not in front of safety facilities or works equipment which must be accessible at any time

Specific safety instructions

- Always lock the control lever for the 3rd control circuit when working with the pallet forks
  ➥ – *see Lock for loader unit control lever and mechanical locking of 3rd control circuit (standard)* on page 3-42!
- Always follow the Load diagram for pallet forks. Never exceed maximum load!
- Follow the special instructions in the Operator's Manual of the pallet forks!
- 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 (for a fully loaded machine)!
- Never raise a load with only one fork arm!
- Maintain a distance of a minimum 6 m between the boom/load and overhead lines!
- Before starting work, ensure that the fork arms on the fork frame are safely locked!
- Never operate the boom and the attachments at higher machine speed!
- Never leave the machine with the load raised!
- Always transport the load close to the ground!

Brief instructions for fork arms

The following brief instructions are based on the “Guidelines for testing and repairing fork arms” (© by VETTER Umformtechnik GmbH):

- Use fork arms only according to their designated use
- Do not exceed the load centre and the load-bearing capacity
- Always keep fork arms clean
- Load both fork arms evenly
- Do not use standard fork arms as reverse forks
- Do not push, pull or shove the fork arms, or move them in at a slanting angle (risk of damaging them due to lateral forces)
- Do not pull off loads, or allow them to fall onto the fork arms
- Tie down loads, if necessary, to avoid loosing them
- Do not raise with the tilt ram (tilt device)
- Bear in mind the limits of application and the Operator’s Manuals
- Perform frequent visual checks
- Have regular checks performed according to the Operator’s Manual and the legal regulations of your country
- Do not modify the fork arms, or attach any additional device
- No transport of persons on the fork arms
- No transport of molten material
- Observe the legal regulations of your country during machine travel on public roads
- The operating company/operator must check at regular intervals:
  - Lock: functional check
  - Hooks: visual check for cracks and deformations
  - Bend: visual check for indents, nicks and cracks
  - Bend and blade: do not use any longer if worn over 10 %
  - Blade and tip: check for deformations
- **In case of damage or if you are unsure:**
  - Immediately stop using the fork arms!
  - Damaged fork arms must be replaced in pairs by an authorized service centre
- Only the manufacturer is authorized to perform repair work on the fork arms

Safety instructions regarding work with pallet forks

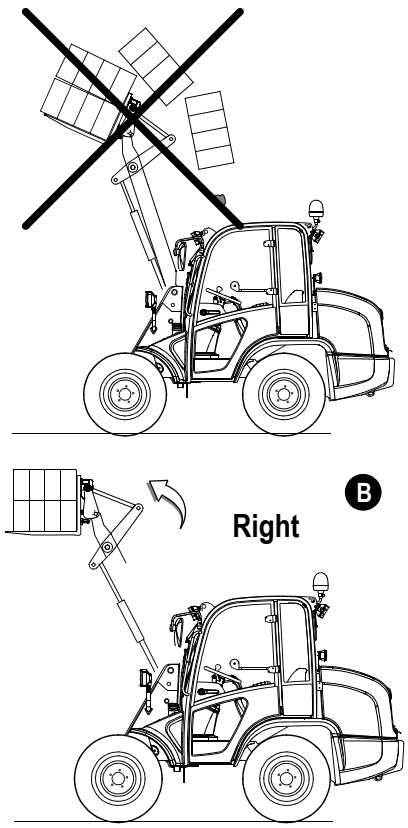


Fig. 140 : Transporting material with the pallet forks

Danger!

Do not transport loads with a raised loader unit!

When transporting loads, always tilt in the attachment a little toward the machine, carry it as close as possible to the ground and bear in mind the required ground clearance!

If they are tilted in in transport position, the pallet forks are moved parallel to their initial position as the loader unit is raised!

If the pallet forks are unintentionally tilted in to the limit in this position *Fig. 140**A***, material may fall over the rear of the forks.

☞ *Do **not tilt in** pallet forks loaded with material in this position*

☞ *Slightly readjust the pallet forks if necessary (tilt out Fig. 140**B**)*

☞ ***Loading large bales or less-than-carload freight piled on top of each other is prohibited if the machine is not equipped with a protective roof or cabin!***

☞ ***Do not load over the rear end of the pallet forks***

- Secure the load and if necessary, fit the rear of the pallet forks with a protection

☞ *Ensure good visibility of the material you want to pick up and of the work and travel range*

Danger!

In order to avoid tipping over when travelling or manoeuvring on slopes with full pallet forks, tilt them fully in and set them to transport position!

☞ *Whenever possible, travel in reverse when transporting pallet forks loaded with material on a steep slope*

Notice!

In Germany, transporting material on public roads with the pallet forks is prohibited!

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

Load diagram for pallet forks

Danger!

In order to avoid risk of accidents and damage to the machine, observe the load diagram under all circumstances during fork lift operation!
The load diagram is located at the rear of the loader unit bulkhead.

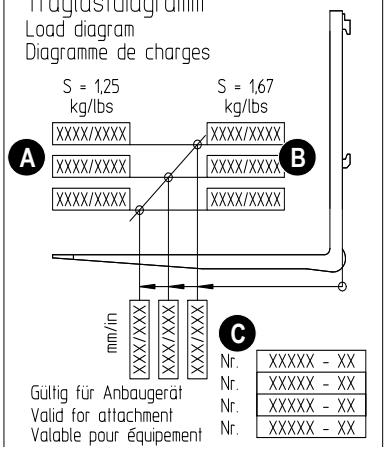


Fig. 141 : Load diagram

The framed row of numbers **A** on the left states the maximum load for applications on level ground (stability s = 1.25)

The framed row of numbers **B** on the right states the maximum load for off-road applications (stability s = 1.67).

The maximum load is a function of the distance (load distance) between the load centre and the fork frame **C** (lower row of figures). Take this into account also when using fork arm extensions!

Danger!

Do not exceed the maximum loads stated, otherwise machine stability is no longer ensured.

Example:

Off-road =>safety factor **S = 1.67** (framed row of figures on the right **B**)

Load distance = 400 mm (vertical centre line)

The maximum load **C** amounts to **xxxx**! (Intersection of the middle vertical line with the slanting line (load curve))

Picking up loads with the pallet forks

Caution!

If the machine is equipped with the “Hose burst valve” option, ensure that the load stabilizer (option) is switched off!
If the load stabilizer is switched on, the hose burst valve is disabled and offers no protection in the event of line damage. In other words, the loader unit can be lowered and an attachment tilted out

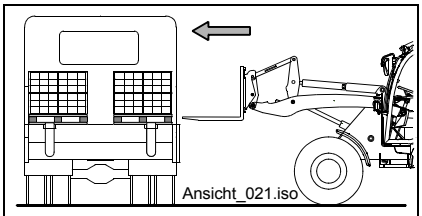


Fig. 142 : Position of fork arms with regard to load

☞ *Pick up loads as follows:*

- Move the machine up to the load so that the pallet forks or the fork arms are at a right angle to the load
  ➥ The fork arms must be the furthest possible apart, and at an equal distance from the left and right side of the load.

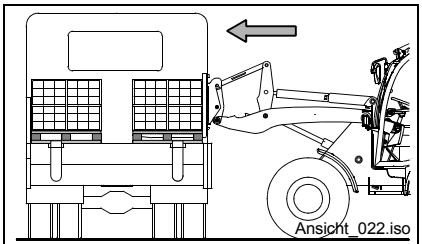


Fig. 143 : Picking up a load

- Drive the machine forward and move the fork arms as far as possible underneath the pallet until the material touches the fork frame

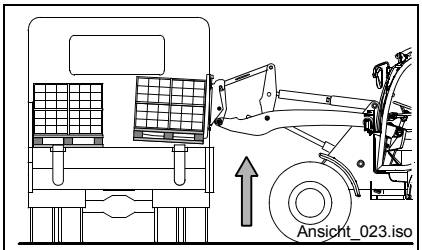


Fig. 144 : Raising the load

- Raise the load carefully and tilt it in slightly

Caution!

In order to avoid damage to the machine, no not exceed the machine’s output limit!
☞ *Observe the load diagram – see Load diagram for pallet forks on page 3-104!*

Transporting loads with the pallet forks

Danger!

Risk of accidents and injury!
When transporting loads with the pallet forks raised, the load can fall down or the machine can tilt!

☞ *After picking up the load, lower the loader unit to transport position and tilt in the pallet forks*

☞ *Raise the loader unit just before setting down the load*

☞ *Never raise the load over persons*

☞ *Never park the machine with the load raised*

☞ *Never leave the machine with the load raised*

☞ *Avoid any operation that might be a risk to machine stability*

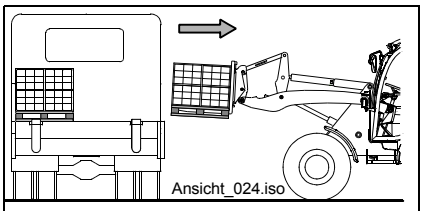


Fig. 145 : Transporting loads

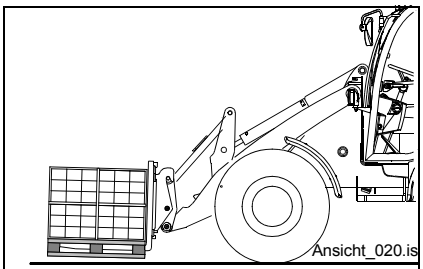


Fig. 146 : Setting down a load

☞ *Transport material as follows:*

- Move the load only when it is safely placed on the fork arms
- Raise the load and move the machine only if you have sufficient visibility
- Start, turn and stop smoothly
- Concentrate on your work, avoid distractions
- When moving and transporting loads, always tilt it slightly back toward the machine and raise or lower it to transport position (bear in mind the ground clearance)
- Always drive slowly in off-road applications, to avoid strong swinging movements of the load!
- On slopes, the load must be on the uphill side of the machine/attachment. Drive the machine backward on sloping terrain to prevent the load from falling off and the machine from tilting forward when braking
- When transporting large bulk loads drive the machine backward for improved visibility.

3.55 Working with an attachment adapter (option)

Installing and removing an attachment adapter

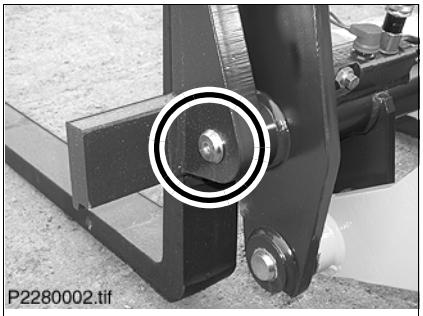


Fig. 147 : Checking the lock pins

Danger!

Before starting work, ensure that the attachment is safely locked onto the quickhitch by means of the lock ram.

☞ *You must be able to see the lock pins on either side of the mounting holes on the attachment!*

Install, connect the hydraulic hoses and remove the adapter from the quickhitch in the same way as a multipurpose bucket.

➥ *– see Installing a multipurpose bucket and hydraulic attachments* on page 3-84

Using an attachment adapter with an attachment from another manufacturer

Caution!

When fitting attachments from other manufacturers onto the attachment adapter, the dimensions (length/width), material density and loads of these attachments must be in compliance with the **National Type Approval** *or Data Confirmation (Germany) and must meet the requirements indicated on page 1-12 "Fields of application and using the wheel loader with an attachment"*!

☞ *Pallet forks = safety factor = S 1.25/S 1.67*
(see load diagram affixed on machine frame)

☞ *Buckets = safety factor = S 2.0*

If the attachments are **not** in compliance with the **National Type Approval**, a **Separate Certification for Vehicles (Germany)** made out by the competent authorities, is required.
Get informed on and follow the legal regulations of your country

3.56 Additional front/rear control circuit (option)

Overview of quick couplers 40 l/min (40 – 60 l/min)

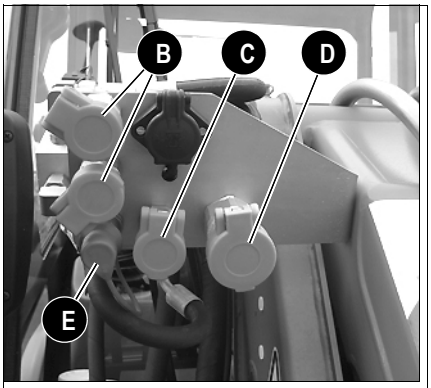


Fig. 148 : Quick couplers for additional control circuit (option)

Quick couplers are installed at the rear and/or front (loader unit) for operating attachments with additional hydraulic functions.

Possible options:

- Additional control circuit for front 60 l/min and rear 40 l/min quick couplers
- Additional control circuit for front 60 l/min quick couplers
- Additional control circuit for front/rear 40 l/min quick couplers

Overview of front/rear hydraulic connections (option)	
Connection	**Function**
B	Red quick coupler (front double-action pressure line)
C	Red quick coupler (front and rear single-action pressure line)
D	Blue quick coupler (front and rear unpressurized return to reservoir)
E	Red connector (leak oil line)

Caution!

Clean the quick couplers carefully before connecting an attachment in order to ensure correct functioning and sealing!
Operation of attachments **at the front and rear** quick couplers at the same time **is not possible**!

☞ *Use the quick couplers either at the front or rear*

Operation of additional control circuit

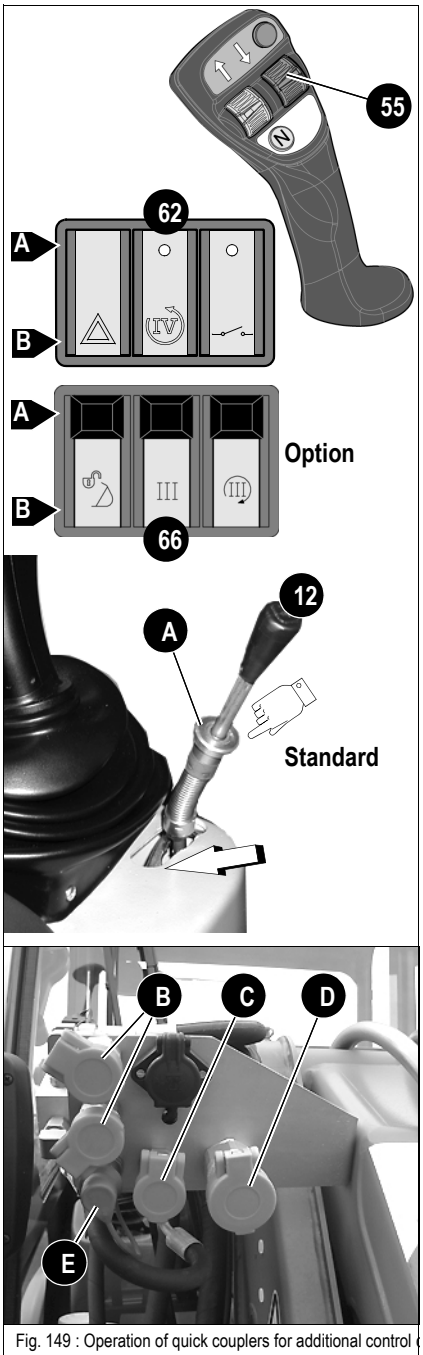


Fig. 149 : Operation of quick couplers for additional control circuit (option)

Additional control circuit 40 l/min (hydraulic pump 8 + 8 cm³/rev)

See the Operator's Manual of the attachment for information on using the quick couplers

☞ *Install the attachment in the quickhitch and connect it with quick couplers **B** at the front or with quick couplers **C** at the front or rear*

☞ *Press switch **62** to position **B***

☞ ***Standard** – pull control lever **12 fully** backward and lock it with lock sleeve **A** (press detent downward – continuous operation)*

☞ ***Option*** – slide lock **C** on switch **66** downward and press the switch to position **B**

➥ **Front or rear 40 l/min** additional control circuit **in operation**

Additional control circuit 60 l/min (hydraulic pump 16 + 8 cm^3/rev)

☞ *Install the attachment in the quickhitch and connect it with quick couplers **B** at the front or with quick couplers **C** at the rear or front*

➥ See the Operator's Manual of the attachment for information on using the quick couplers

☞ *Press switch **62** to position **A***

☞ ***Standard** – pull control lever **12 fully** backward and lock it with lock sleeve **A** (press detent downward – continuous operation)*

☞ ***Option*** – slide lock **C** on switch **66** downward and press the switch to position **B**

➥ **Front 60 l/min or rear 40 l/min** additional control circuit **in operation**

Additional function (for example rotating snow cutter ejector, etc.)

☞ *Press switch **55** on control lever 11 as required (up/down)*

➥ Additional function **(rotation to left/right) in operation**

3.57 Hose burst valve safety feature (option)

Important information on the hose burst valve

In the event of a bursting hose or pipe, the “Hose burst valve” safety feature prevents the loader unit from being lowered or tilted out in an uncontrolled manner.

Notice!

Switching on the load stabilizer automatically switches off the hose burst valve! Switch off the load stabilizer to ensure that the hose burst valve works correctly
– *see Load stabilizer (option)* on page 3-53

Danger!

The “Hose burst valve” safety feature is activated as soon as a hose or pipe bursts.

- ☞ *Secure the danger zone and stop the machine immediately*
- ☞ *Stop the engine*
- ☞ *If possible, carefully lower the loader unit to the transport position*
- ☞ *Apply the parking brake*
- ☞ *Remove the ignition key and lock the cabin*
- ☞ *Have damage to the hydraulic system and to the hose burst valve immediately repaired by an authorized service centre*

Environment!

Use a suitable container to collect the hydraulic oil as it drains and dispose of it in an environmentally friendly manner.

3.58 Trailer couplings (option)

Important information on trailer operation

The trailer coupling may only be used if the respective requirements regarding attachments (trailers) are complied with.
Refer to the **National Type Approval**, **Data Confirmation (Germany)** or registration certificate for these requirements.

Transporting material on public roads with a trailer is **prohibited**.
Only the transport of the machine's attachments is allowed.

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

In compliance with legal regulations, the operator must ensure that all safety features (locks) have been checked positively. Liability claims shall become invalid without these checks!

- Check whether the towing gear of the trailer is horizontally coupled onto the trailer coupling
- Perform maintenance on trailer couplings at regular intervals
  – see chapter 5 "Maintenance of the automatic trailer coupling (option)" on page 5-35
- Bear in mind the trailer weights and drawbar loads before coupling a trailer
  ➥ See the type label on the trailer coupling and *– see chapter 6 "Trailer weight/ drawbar load: trailer couplings (option)"* on page 6-13 in this Operator's Manual.
  ➥ The indications on the type label of the trailer coupling can be higher than the authoritative information in the machine documentation.

Danger!

In order to ensure traffic safety during trailer operation (load on the front axle), install an attachment on the loader unit of the machine that is certified for public roads!

☞ *Pick up and safely lock the bucket in the quickhitch*
– see Equipping the machine with a standard bucket on page 3-73

☞ *Cover the blade or teeth of the bucket across their entire width with the protection provided*

Caution!

Before driving downhill, use the brake pedal to support the braking effect of the drive (intermittent braking). This avoids damage to the drive and/or diesel engine due to excessive speed. This applies to trailer operation in particular!

Description of automatic trailer coupling

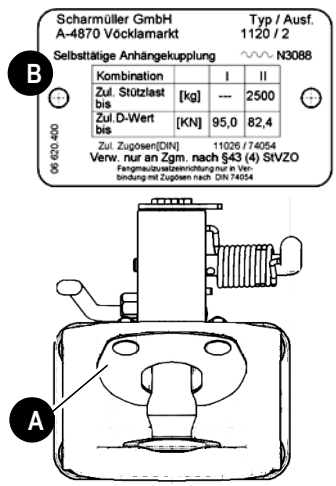


Fig. 150 : Trailer coupling (option) overview

- 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 type label **B** on the trailer coupling and the towing gear of the trailer
- If the trailer coupling is equipped with a stabilizing feature **A** (push-down plate), only lugs in compliance with DIN 74054 (ISO 8755) are allowed

  ➥ See type label **B** on the trailer coupling

Danger!

In order to avoid risk of accidents, always check whether the trailer coupling is correctly locked!

☞ *Ensure that no one is between the tractor vehicle and the trailer when coupling a trailer*

☞ *Keep your hands clear of the coupling jaw (risk of crushing!)*

☞ *Do not open or close the coupling jaw by force with parts or tools*

Coupling the trailer onto the machine

Fig. 151 : Opening the trailer coupling

☞ *Proceed as follows:*

- Park the machine in front of the trailer
- Apply the parking brake
- Stop the engine
- Press the lever fully upward **C**
- Align the coupling jaw horizontally
- Set the height of the trailer drawbar and the jockey wheel or of the towing gear to the middle of the coupling jaw
- Reverse the machine slowly until the trailer drawbar engages in the coupling jaw with an audible click

  ➥ The trailer drawbar is locked as soon as it touches the trigger in the coupling jaw
- Connect the supply lines (electrical system/hydraulics) to the machine

Uncoupling the trailer from the machine

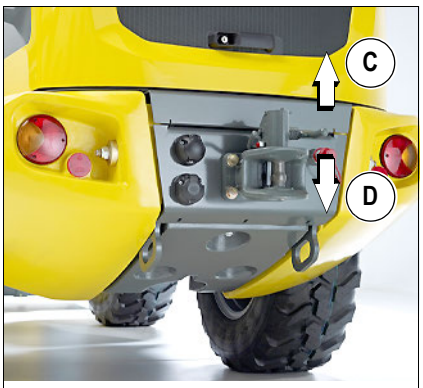


Fig. 152 : Opening/closing the trailer coupling

☞ *Proceed as follows:*

- Park the machine and the trailer on level ground
- Apply the parking brake
- Stop the engine
- Apply the parking brake
- Support the trailer with the jockey wheel (tandem axle) or the towing gear (trailer with 2 axles)
- Remove the supply lines (electrical system/hydraulics) from the trailer
- Press the lever (trailer coupling) fully upward into the detent **C**
- Move the machine away from the trailer

☞ *Closing the coupling by hand (for example when using a tow cable)*

- Briefly and carefully hit the lever with the ball of your thumb in the “CLOSE” **D** direction

Ball coupling (option)


Fig. 153 : Ball (option)

Description of ball coupling

Category: A 50-X

Type: 329 071

Maximum D value 17.5 kN

Maximum drawbar load 75 kg

Use:

- The towing gear is used for pulling trailers equipped with ball traction couplings. Any other use is prohibited
- Operation must be adapted to the road conditions
- Keep the ball clean and apply a thin coat of grease. However, do not apply any grease to the ball when using a stabilization system, such as Westfalia “SSK”
- If the ball diameter is 49.0 mm or less in a random point, do not use the towing gear any more for safety reasons and have it immediately replaced by an authorized service centre.
- Check all fastening screws of the towing gear or have them retightened by an authorized service centre to the specified tightening torque

3.59 Towing and transporting the machine

Safety instructions for towing away

If the diesel engine and/or the hydraulic drive breaks down, the machine can be towed out of the danger zone under the following conditions.

- Be aware of the risks towing implies and if necessary, have a recovery service or an authorized service centre tow away the machine
- The towing vehicle (tractor vehicle) must have enough tractive power and be fitted with a safe braking system!
- The machine may only be towed using suitable towing equipment (towing bar) in connection with suitable towing gear, such as a towing coupling, hooks and eyes!
- When towing with the front towing eye, ensure that the tyres do not touch the towing gear by limiting the steering angle, especially in curves!
- Ensure that no one is in the danger zone!
- The machine may be towed with a cable if the service brakes and steering are fully operational!
- If possible, run the diesel engine at idling speed when towing the machine

Danger!

Risk of accidents! After having released them, the brake discs in the front axle wheel motors must be enabled once towing is over!

Caution!

The parking brake discs in the front axle wheel motors are automatically enabled if the diesel engine or the hydraulic pump breaks down, and must be opened mechanically if the machine has to be towed away (spring brake actuator braking system)!

Caution!

In order to avoid damage to the hydrostatic drive (variable displacement pump) and the wheel motors, disable the high pressure lines on the valve block and the brake discs in the wheel motors before towing away the machine
– *see Getting ready for towing* on page 3-115!

☞ ***Tow the machine out of the danger zone only at walking pace and only over short distances (a maximum 300 metres)!***

Getting ready for towing

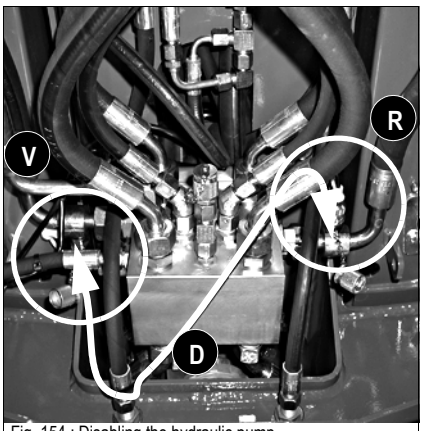


Fig. 154 : Disabling the hydraulic pump

Connecting the high pressure lines to the variable displacement pump of the travelling drive

☞ *Lower the loader unit to transport position*

☞ *Stop the engine*

☞ *Secure the machine to prevent it from rolling away (wheel chocks)*

☞ *Switch off ignition and remove the ignition key*

☞ *Connect the high pressure lines (forward/reverse) on the valve block test ports **F** and **R** with hose **D***

➥ The hose is included in the tool kit

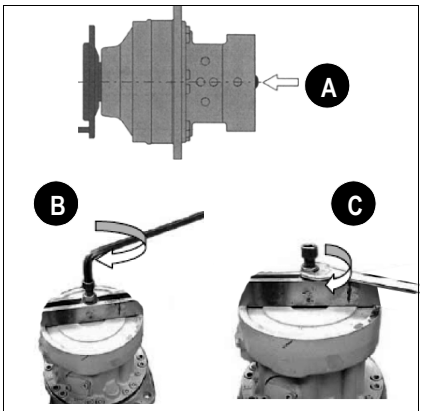


Fig. 155 : Disabling the parking brake

Releasing the wheel motor brake discs

☞ *Remove plastic plug **A** (front axle on left and right)*

☞ *Place 2 flat bars (160 x 50 x 15 mm) with bores (ø 12.5 mm) on the brake housing **B***

➥ Flat bars are included in the tool kit

☞ *Screw a hexagon head screw (M 12x40) and a washer into brake plate **C** about 2 – 3 revolutions*

➥ The spring brake actuator system is open

➥ The drive shaft must turn freely

Towing the machine

Danger!

In order to avoid risk of accidents, the towing vehicle must have enough tractive power and be fitted with a safe braking system.

☞ *Always use a towing bar for towing*

➥ Pay attention to the machine's dimensions and weights
– *see chapter 6 "Technical data"* on page 6-1.

➥ Eye hooks for towing the machine
– *see chapter 1 "Machine overview"* on page 1-7

☞ ***Tow the machine out of the danger zone only at walking pace and only over short distances (about 300 metres)!***

➥ If possible, run the diesel engine at idling speed.

➥ Caution! Turning the steering wheel requires greater effort if the diesel engine breaks down

Once towing is over

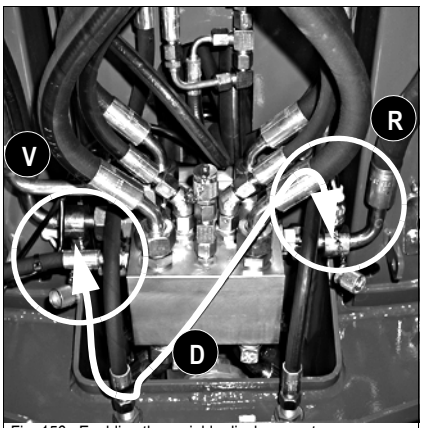


Fig. 156 : Enabling the variable displacement pump

Enabling the high pressure lines of the drive (variable displacement pump)

☞ *Stop the engine*

☞ *Secure the machine to prevent it from rolling away (wheel chocks)*

☞ *Switch off ignition and remove the ignition key*

☞ *Remove the hose on test ports **F** and **R** and close the test ports with screw plugs*

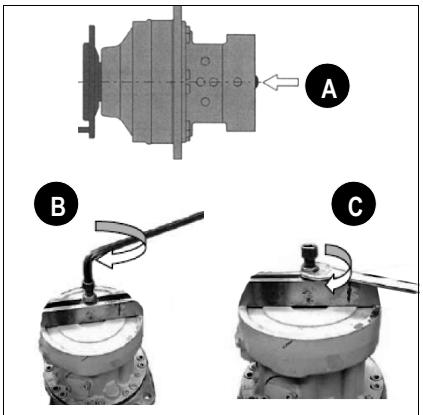


Fig. 157 : Enabling the parking brake

Enabling the wheel motor brake discs

☞ *Remove the flat bar and the set screw **B** + **C***

☞ *Close the threaded bore with a new plastic plug **A***

☞ *Check the service and parking brake for correct function*

☞ *Have a breakdown of the engine and/or drive repaired by an authorized service centre*

3.60 Crane-lifting the machine

Safety instructions regarding crane-lifting

In order to avoid injury or risk of accidents, observe the following instructions when loading the machine!

- Seal off the danger zone!
- The crane and the lifting gear must have suitable dimensions!
- Take into account the machine's overall weight – see page 6-9!
- Use only tested ropes, belts, hooks and shackles (lockable brackets with screws or socket pins) for fastening!
- 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 move a load only after making sure that the load is safely fastened and nobody is within the danger zone, or after receiving a signal from the persons attaching or securing loads.
- The load must not be fastened by winding the lifting rope or lifting chain around it!
- Bear in mind the load distribution (centre of gravity) when fastening the lifting gear
- Load the machine only with the standard bucket empty and in transport position!
- Ensure that ***no one is in or on the machine***!
- Stay clear of suspended loads!
- Bear in mind the safety instructions of this Operator's Manual on page 2-6 and the safety-specific legal regulations of your country under all circumstances!

Crane-lifting the machine

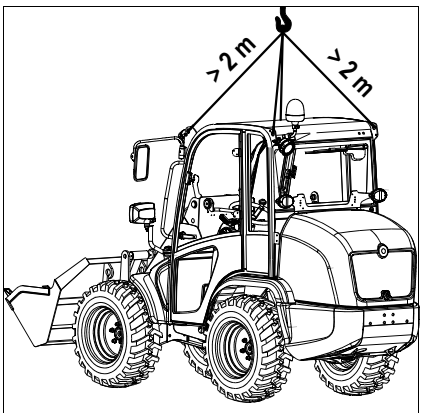


Fig. 158 : Crane handling with cabin

☞ *Handle the machine with a crane as follows:*

- Install and safely lock the standard bucket – *see Equipping the machine with a standard bucket* on page 3-73
- Set the drive to neutral – *see Putting the machine into operation* on page 3-51
- Apply the parking brake – *see Parking brake* on page 3-50
- Stop the engine and remove the ignition key
- Do not allow anyone to stay in the cabin, and close the doors and the engine cover
- Fasten the machine at the 4 slinging points provided to this effect with tested lifting gear (cables, belts, hooks, shackles) of sufficient size
- Carefully raise the machine with the crane

3.61 Loading and transporting the machine on a transport vehicle

Safety instructions regarding loading on a transport vehicle

- The transport vehicle must be of sufficient size
  - ➥ See the chapter on safety *"Transporting, towing, loading"* on page 2-9
  - ➥ See chapter "Technical data", *"Weights"* on page 6-9 for the machine's dimensions and weights!
- Ensure that the authorized maximum height of the transport vehicle is not exceeded
- Remove any mud, snow or ice from the tyres so that the machine can be safely driven onto the ramps
- Secure the machine against unintentional movement!
- When positioning the load on the platform, ensure that the centre of gravity of the load is as low as possible and in the longitudinal centre line of the vehicle if possible (load distribution plan).
- Do not exceed the gross weight rating and the gross axle weight rating of the transport vehicle when loading and transporting the machine.
- Ensure that the load does not fall short of the minimum axle load of the steering axle of the transport vehicle, otherwise the steering behaviour of the transport 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 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 transport conditions are conditions in the which the brakes are slammed on, evasive manoeuvres are performed with the vehicle or in which uneven roadways are driven on. Auxiliary means are for example anti-slip bases and linings, load-securing straps and chains, clamping beams, protective paddings, nets, edge protectors, etc.
- Depending on the load, adapt the travel speed to the road and traffic conditions and to the handling of the transport vehicle.
- When using belts and chains, always use the existing tie-down points (symbol **A**) *– see chapter 2 "Transporting, towing, loading"* on page 2-9.
- When you tie down the machine with belts, do not place and tighten them in sharp-edged eyelets

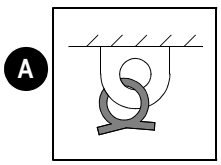


Fig. 159 : Label: eyelets for tying down the machine

Caution!

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*

Loading and tying down the machine

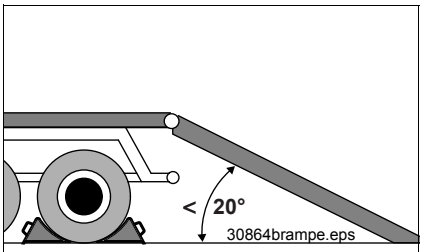


Fig. 160 : Access ramps

☞ ***Load*** *the machine as follows:*

- Secure the transport vehicle with chocks to prevent it from rolling
- Place the access ramps on the transport vehicle at the smallest possible angle – do not exceed an **angle of 20°**
- Use access ramps with an antiskid surface only
- Ensure that the loading area of the transport vehicle is clear and that access to it is not obstructed
- Ensure that the access ramps and the wheels of the machine are free of oil, grease and ice
- Check the oil level of the diesel engine of the machine you want to load – *see chapter 5 "Checking the engine oil level"* on page 5-5
- Start the diesel engine of the machine you want to load
- Raise the loader unit enough so that it will not touch the access ramps
- Carefully drive the machine onto the middle of the transport vehicle
- Set the drive of the wheel loader to neutral – *see chapter 3 "Putting the machine into operation"* on page 3-51
- Lower the loader unit (bucket) to the loading area of the transport vehicle
- Stop the diesel engine
- Firmly apply the parking brake – *see Parking brake* on page 3-50
- Remove the ignition key
- Do not allow anyone to stay in the cabin, and close the doors and the engine cover

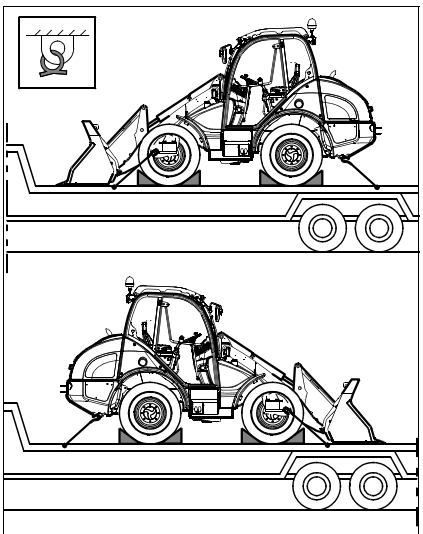


Fig. 161 : Tying down the machine

☞ ***Tie down*** *the machine as follows:*

- Firmly tie down the machine at the eye hooks (see figure) with ratchet straps or chains of sufficient size onto the platform.
  If possible, secure the wheels with additional chocks at the front, rear and at the sides
- Before transporting the machine over longer distances and in heavy rain: close the outlet of the exhaust silencer with a simple cap or suitable adhesive tape

☞ Ensure that the driver of the transport vehicle knows the overall height, width and weight of his vehicle (including the load) before starting machine travel, and that he observes the legal transport regulations of the country or countries in which transport will take place!

3.62 Putting the machine out of operation temporarily

Stopping/parking the machine

Danger!

Machines parked on slopes can roll away!

☞ *Use the parking brake to park the machine safely and to prevent it rolling away!*

➥ *– see Parking brake* on page 3-50

☞ *In addition to the parking brake, secure the machine by placing chocks under the downhill sides of the wheels!*

☞ *Stop the machine with the service brake*

☞ *Set the drive to neutral with push button (Fig. 32/**11**) on the joystick*

☞ *Apply the parking brake – see Parking brake on page 3-50*

☞ *Lower the loader unit completely and set the bucket horizontally with the ground*

➥ *– see Loader unit control lever (overview)* on page 3-64

Caution!

After operation under full load:

☞ *Allow the engine to run for a while so that the temperature can stabilize, then stop the engine*

☞ *Stop the engine and remove the ignition key*

➥ The drive interlock option is enabled

☞ *Close the windows and the door as you leave the cabin*

☞ *Close and lock the engine cover*

On slopes:

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

➥ The wheel chocks are stored on the machine frame behind the cabin

Putting the machine out of operation for longer time

☞ *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*

☞ **Before putting the machine into operation**, *do not clean the piston rods with a grease solvent or a high-pressure cleaner*

➥ The scraper is not water-tight

☞ *Water in the guide bushing causes corrosion and damage to the piston rod*

3.63 Putting the machine out of operation permanently

Notice on decommissioning

If the wheel loader is no longer used according to its designated use, ensure that it is decommissioned or taken out of service and disposed of according to applicable regulations.

Notice!
The final decommissioning of the machine must be performed by an authorized service centre or an approved recycling company!

Preparing disposal

- Follow all applicable safety regulations regarding decommissioning of the wheel loader!
- Ensure that the wheel loader cannot be operated between putting it out of operation and disposing of it!
- 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 standard 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 wheel loader against unauthorized use!
  Safely lock all openings(doors, windows, engine cover) of the machine!
- Repair all leaks on the engine, reservoirs, gearbox and hydraulic system!
- Park the wheel loader in a place that is secured against access by unauthorized persons!
- Remove the battery!

Disposal

Further recycling of the wheel loader must be made in accordance with state-of-the-art standards applicable at the time of recycling, and in compliance with the safety regulations regarding accident prevention!

- All parts must be disposed of in the correct waste disposal sites for the different materials.
- Separate the material as you recycle parts!
- Ensure environmentally compatible disposal of consumables as well!
  ➥ For example oil, grease, coolant, antifreeze, etc.

4 Troubleshooting

The information given in the following tables is provided for the fast and reliable detection of malfunctions and their appropriate repair.

Caution!

Repairs may be performed only by authorized service centres and trained personnel!

4.1 Engine malfunctions

Engine malfunctions	Possible causes	See page
Engine does not start or is not easy to start	Parking brake not applied	3-50
	Drive lever not in neutral	3-51
	Engine starting temperature too low	–
	Wrong SAE grade of engine lubrication oil	5-39
	Fuel grade does not comply with specifications	5-3
	Bleed the fuel system	5-4
	Malfunctioning or empty battery	5-27
	Loose or oxidized cable connections in starter circuit	–
	Malfunctioning starter, or pinion does not engage	–
	Wrong valve clearance	–
	Malfunctioning fuel injector	–
Engine starts, but does not run smoothly or faultless	Fuel grade does not comply with specifications	5-3
	Bleed the fuel system	5-4
	Wrong valve clearance	–
	Injection line leaks	–
	Malfunctioning fuel injector	–
Engine overheats. Temperature warning system responds	Oil level too low	5-6
	Oil level too high	5-5
	Dirty air filter	5-11
	Malfunctioning air filter maintenance switch or gauge	5-10
	Dirty oil radiator fins	5-7
	Malfunctioning fan, torn or loose V-belt	5-12
	Resistance in cooling system too high, flow capacity too low	–
	Malfunctioning fuel injector	–

Engine malfunctions		Possible causes	See page
Insufficient engine output		Oil level too high	5-5
		Fuel grade does not comply with specifications	5-3
		Bleed the fuel system	5-4
		Dirty air filter	5-11
		Malfunctioning air filter maintenance switch or gauge	5-10
		Wrong valve clearance	–
		Injection line leaks	–
		Malfunctioning fuel injector	–
Engine does not run on all cylinders		Injection line leaks	–
		Malfunctioning fuel injector	–
		Bleed the fuel system	5-4
Insufficient or no engine oil pressure		Oil level too low	5-6
		Engine inclination too high	–
		Wrong SAE grade of engine lubrication oil	5-39
Engine oil consumption too high		Oil level too high	5-5
		Engine inclination too high	–
Engine smoke	Blue	Oil level too high	5-5
		Engine inclination too high	–
	White	Engine starting temperature too low	–
		Fuel grade does not comply with specifications	5-3
		Wrong valve clearance	–
		Malfunctioning fuel injector	–
	Black	Dirty air filter	5-11
		Malfunctioning air filter maintenance switch or gauge	5-10
		Wrong valve clearance	–
		Malfunctioning fuel injector	–

5 Maintenance

5.1 Notice on maintenance and servicing

Maintenance personnel

Operational readiness and the service life of the wheel loader are heavily dependent on maintenance.

- **Daily and weekly servicing and maintenance must be performed by a specifically trained operator** – *see Maintenance plan* on page 5-42
- All other maintenance that is not described in this Operator's Manual must be performed only by the **trained and qualified personnel of an authorized service centre**
- The manufacturer shall not be liable for damage or personal injury caused by failure to observe the specific information and descriptions
- Please contact your dealer if you require more information on **maintenance**

Notice!

Refer to the maintenance plan for maintenance
– *see Maintenance plan* on page 5-42.

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

Important information on maintenance

- **Observe all risk indications and safety instructions given in this Operator's Manual.**
- Follow the maintenance and safety instructions given in the Operator's Manuals of the attachments.

Danger!

Risk of injury due to a hot or running engine.

☞ *Do not perform work on a hot and running diesel engine.*

☞ *Wear protective gloves and clothing*

Preparations before maintenance or repair

☞ *Park the machine on level ground*

☞ *Stop the engine, but leave the ignition switched on*

☞ *Lower the loader unit to the ground*

☞ *Apply the parking brake*

☞ *Switch off ignition and remove the ignition key*

☞ *Let the engine cool down*

☞ *Open the engine cover*

☞ *Switch off the battery master switch (option)*
– see Battery master switch (option) on page 3-25

Caution!

When performing cleaning and maintenance, do not run the wheel motors without load and at max. revs with the machine raised on props in order to avoid damage to the wheel motors!

Environment!

Use a suitable container to collect oil or fuel as it drains and dispose of it in an environmentally friendly manner.

5.2 Fuel system

Specific safety instructions regarding refuelling

- Extreme caution is essential when handling fuel – high risk of fire!
- Never perform work on the fuel system near open flames or sparks!
- Do not smoke when working on the fuel system or when refuelling!
- Before refuelling, stop the engine and remove the ignition key!
- Do not refuel in closed rooms!
- Wipe away fuel spills immediately!
- Keep the machine clean to reduce the risk of fire!

Diesel fuel specification

Caution!

Use only the diesel fuels listed in the table below!

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

☞ *Do not use diesel fuel with additives*

Specification	Cetane number	Use (°C)
DIN EN 590 (EU) ASTM D975-94 (USA)	Min. 49	Up to -44 °C outside temperature
EN 14214 (biodiesel)	Min. 51	Up to −20 °C outside temperature

Refuelling

Fig. 162 : Fuel filler inlet

The filler inlet of the fuel tank is located on the left-hand side of the machine in front of the access

Danger!

Fire and vapour inhalation hazard!

☞ *In order to avoid intoxication and fire hazards, do not refuel in enclosed areas!*

☞ *Never perform work on the fuel system near open flames or sparks*

Environment!

Use a suitable container to collect the fuel as it drains and dispose of it in an environmentally friendly manner!

Stationary fuel pumps

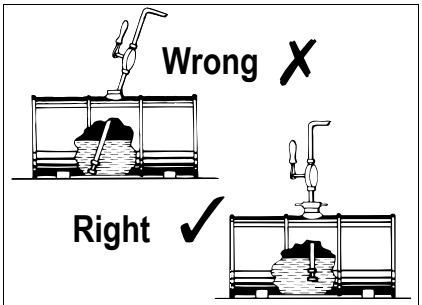


Fig. 163 : Refuelling from a barrel

General

Only refuel from stationary fuel pumps. Fuel from barrels or cans is usually dirty.

Even the smallest particles of dirt can cause

- Increased engine wear
- Malfunctions in the fuel system and
- Reduced effectiveness of the fuel filters

Refuelling from barrels

If refuelling from barrels cannot be avoided, note the following points:

- Barrels must neither be rolled nor tilted before refuelling
- Protect the suction pipe opening of the barrel pump with a fine-mesh screen
- Immerse it down to a max. 15 cm above the bottom of the barrel
- Only fill the tank using refuelling aids (funnels or filler pipes) with integral microfilter
- Keep all refuelling containers clean at all times

Bleeding the fuel system

Notice!

If the fuel tank has been run empty, or after having performed maintenance on the fuel system (filter replacement, water separator cleaned, etc.), the fuel system bleeds itself automatically when starting the engine!

Checking/cleaning the water separator

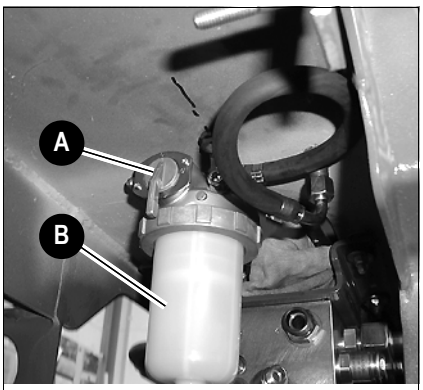


Fig. 164 : Bleeding the fuel system

The water separator is located at the front below the machine frame

Drain the condensation water every 50 o/h

☞ *Proceed as follows:*

- Stop the engine
- Apply the parking brake
- Switch off ignition and remove the ignition key
- Place a container to collect the fuel
- Remove the protective underbody panel (option)
- Close stop cock **A** on the water separator
- Remove sight glass **B**
- Drain the water and carefully clean the sight glass
- Check the sealing ring for damage and replace it if necessary
- Install sight glass **B**
- Open stop cock **A** on the water separator
- Start the diesel engine and check the water separator for leaks
- Install the protective underbody panel (option)

Environment!

Use a suitable container to collect the fuel as it drains and dispose of it in an environmentally friendly manner!

Have other repair work performed by an authorized service centre

5.3 Engine lubrication system

Checking the engine oil level

Danger!

Do not perform maintenance on a hot engine!

☞ *Wait at least 10 minutes after stopping the engine*

☞ *Wear safety glasses and protective clothing*

Notice!

Check the oil level every 10 operating hours or once a day.

Check before starting the engine.

After switching off a warm engine, wait at least 5 minutes before checking the oil level.

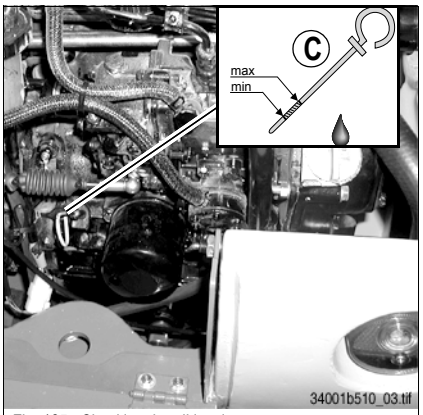


Fig. 165 : Checking the oil level

☞ *Park the machine on level ground*

☞ *Stop the engine*

☞ *Apply the parking brake*

☞ *Open the engine cover*

☞ *Pull out oil dipstick **C**, wipe it with a lint-free cloth, push it back in as far as possible into the oil level tube, then pull it back out and read off the oil level*

☞ *However if necessary, fill up the oil at the latest when the oil reaches the **MIN mark** on the oil dipstick **C** – see Adding engine oil on page 5-6*

Caution!

If the engine oil level is too low or if an oil change is overdue, this can cause **engine damage or loss of output!**

☞ *Observe the maintenance intervals – see Maintenance plan on page 5-42*

☞ ***Have the oil drained every 500 operating hours by an authorized service centre***

Adding engine oil

Caution!

Too much or incorrect engine oil can result in engine damage!

☞ *Do not add engine oil above the **MAX mark** of the oil dipstick*

☞ *Use only the specified engine oil – see Fluids and lubricants on page 5-39*

Environment!

Use a suitable container to collect the engine oil as it drains and dispose of it in an environmentally friendly manner!

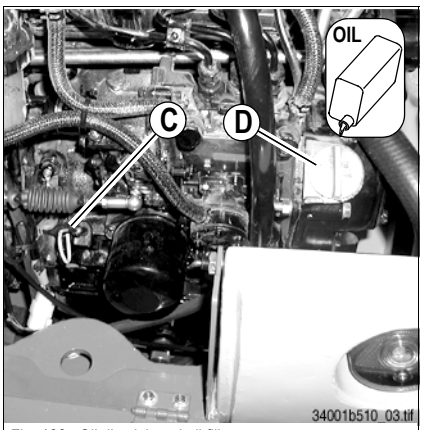


Fig. 166 : Oil dipstick and oil filler cap

☞ *Proceed as follows:*

- Clean the area around oil filler cap **D** with a lint-free cloth
- Open filler cap **D**
- Add engine oil
- Wait a moment until all the oil has run into the oil sump
- Check the oil level – *see Checking the engine oil level* on page 5-5
- Add oil if necessary and check the oil level again
- Close filler cap **D**
- Push oil dipstick **C** back in as far as possible
- Completely remove all oil spills from the engine

5.4 Engine and hydraulics cooling system

Specific information on cooling system maintenance

The combined oil/water radiator cools the diesel engine and the hydraulic oil of the drive and operating hydraulics.

The coolant reservoir is located at the rear on the radiator.

Danger!

Danger of poisoning and causticization! Risk of swallowing antifreeze when handling it!

☞ *Seek medical attention immediately if antifreeze has been swallowed*

☞ *Wear protective clothing and gloves*

☞ *Keep antifreeze out of reach of children*

General checks and cleaning work

Dirt on the radiator fins reduces the radiator's heat dissipation capacity! The following work must be performed to avoid this.

☞ *Clean the outside of the radiator at regular intervals. Refer to the maintenance plans in the appendix 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 heat dissipation capacity as well and can cause engine damage! Therefore:

☞ *Check the coolant level at regular intervals. Refer to the maintenance plans in the appendix for the intervals*

☞ *If coolant must be added frequently, check the cooling system for leaks and/or contact your dealer!*

☞ *Never add cold water/coolant if the engine is warm!*

☞ *After filling the coolant reservoir, make a test run with the engine and check the coolant level again after stopping the engine*

The use of the wrong coolant can destroy the engine and the radiator. Therefore:

☞ *Add enough antifreeze compound to the coolant – but never more than 50 %. If possible use brand-name antifreeze compounds with anticorrosion additives*

☞ *Bear in mind the coolant compound table on page* *5-39*

☞ *Do not use radiator cleaning compounds if an antifreeze compound has been added to the coolant – otherwise this causes sludge to form that can damage the engine*

Environment!

Use a suitable container to collect the coolant as it drains and dispose of it in an environmentally friendly manner!

Cleaning the radiator fins of the oil/water radiator

Danger!

Do not perform maintenance on a hot engine!

☞ *Wait at least 10 minutes after stopping the engine*

☞ *Wear safety glasses and protective clothing*

Caution!

Dirt on the radiator fins reduces the radiator's heat dissipation capacity. This can cause damage to the engine and the hydraulic system.

☞ *Check the radiator **once a day** for dirt and clean it if necessary*

☞ *Clean the radiator more frequently in dusty or dirty work conditions*

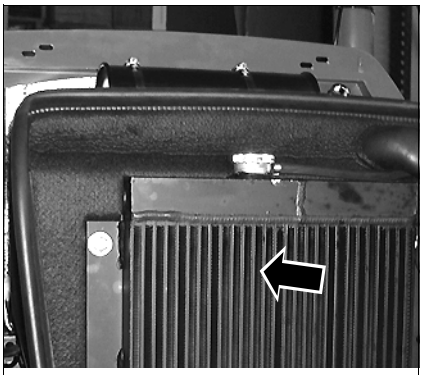


Fig. 167 : Cleaning the radiator

☞ *Proceed as follows:*

- Park the wheel loader on level ground
- Lower the loader unit fully
- Apply the parking brake with the switch on the instrument panel
- Stop the engine and let it cool down
- Switch off ignition and remove the ignition key
- Open the engine cover
- Clean the radiator fins by blowing compressed air from outside toward the engine side

Caution!

In order to ensure the radiator's optimal cooling capacity, do not damage the radiator fins as you clean them with a compressed-air gun!

Checking the coolant level/filling up coolant

Notice!
Check the coolant level every **10 operating hours** or once a day.
Check before starting the engine.

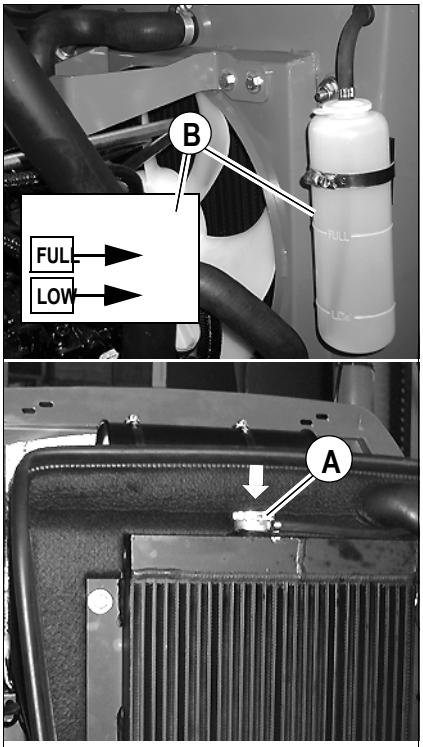


Fig. 168 : Coolant reservoir

Checking the coolant level

☞ *Park the machine on level ground*

☞ *Stop the engine and remove the ignition key*

☞ *Apply the parking brake with the switch on the instrument panel*

☞ *Open the engine cover*

☞ *Check the coolant level in the transparent coolant reservoir **B***

If the coolant level is below seam LOW of the reservoir:

☞ *Add coolant*

Adding coolant

Danger!

The cooling system is hot and under high pressure!

Never open the coolant reservoir or drain coolant if the engine is hot!

☞ *Wait at least 10 minutes after stopping the engine!*

☞ *Wear protective gloves and clothing*

☞ *Open filler cap **A** to the first notch and release the pressure*

☞ *Open filler cap **A** fully*

☞ *Add coolant up to the lower edge of the filler inlet (radiator)*

➥ Coolant – *see Fluids and lubricants* on page 5-39

☞ *Close filler cap **A***

☞ *Start the engine and let it warm up for about 5 — 10 minutes.*

☞ *Stop the engine and check the coolant level again*

➥ The coolant level must be between the **LOW and FULL** reservoir seams

☞ *If necessary, add coolant and repeat the procedure until the coolant level remains constant*

5.5 Air filter

Caution!

The filter cartridge will be damaged if it is washed or brushed out!
Bear in mind the following to avoid premature engine wear!

☞ *Replace dirty filter cartridges*

☞ *Never reuse a damaged filter cartridge*

☞ *Ensure cleanliness when replacing the filter cartridge!*

Checking the air filter for dirt

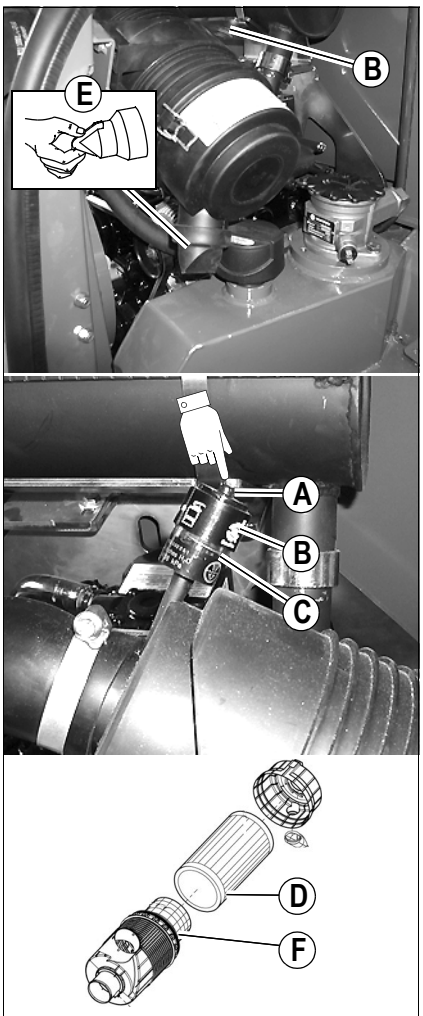


Fig. 169 : Air filter with safety cartridge

Maintenance display **B** on the filter housing monitors the filter cartridge.
The dust is removed by squeezing discharge slot **E** of the dust valve.

☞ *Proceed as follows:*

- Stop the engine and remove the ignition key
- Apply the parking brake with the switch on the instrument panel
- Squeeze the discharge slot of dust valve **E**
- Remove hardened dust by compressing the upper area of the valve
- Clean the discharge slot if necessary
- The filter cartridge **D** must be replaced if the **red** mark **C** in maintenance display **B** is visible
- At the latest after 1500 operating hours (however once every year)
- *– see Replacing the air filter cartridge* on page 5-11

Caution!

Filter cartridges degrade prematurely when in service in acidic air for longer periods of time. This risk is present for example in acid production facilities, steel and aluminium mills, chemical plants and other nonferrous-metal plants

☞ *Replace filter cartridge **D** and safety cartridge **F** at the latest after 500 operating hours!*

☞ *– see Replacing the air filter cartridge on page 5-11*

Notice!

For **applications in dusty environment**, the air filter is fitted with an extra safety cartridge **F**. Do not clean the safety cartridge – replace it every third time maintenance is performed on the filter!

Replacing the air filter cartridge

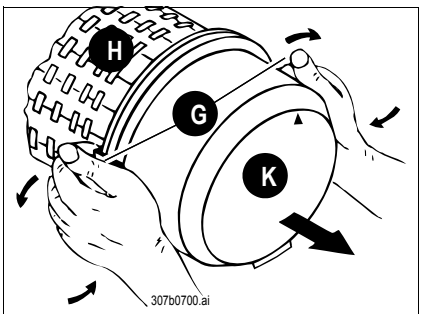


Fig. 170 : Removing the lower housing section

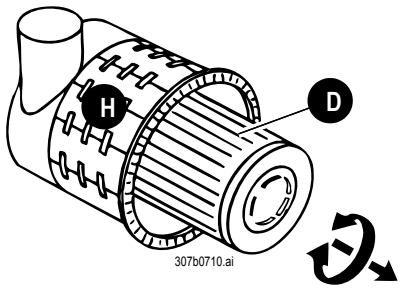


Fig. 171 : Removing the filter element

☞ *Proceed as follows:*

- Stop the engine
- Prevent the machine from rolling away and remove the ignition key – *see chapter 3* "*Parking brake*" on page 3-50
- Open the engine cover
- Fold both bow hooks **G** to the outside, off the notch of the upper housing section **H**
- Remove the lower housing section **K**
- Carefully remove filter cartridge **D** with slightly turning movements
- In addition, every 3rd time the filter is replaced, carefully remove the safety cartridge fig. 169/**F** with slightly turning movements

Caution!

Bear in mind the following to avoid premature engine wear!

☞ ***Ensure that** all contamination (dust) inside the upper and lower housing sections has been removed*

☞ *Carefully insert new safety cartridge 169/**F** into the upper housing section **H***

☞ *Carefully insert new filter cartridge **D** into the upper housing section **H***

☞ *Clean the dust valve fig. 169/**E***

☞ *Position lower housing section **K** (ensure that it is properly seated)*

☞ *Hitch and close both bow hooks **G** into the notch of the upper housing section **H***

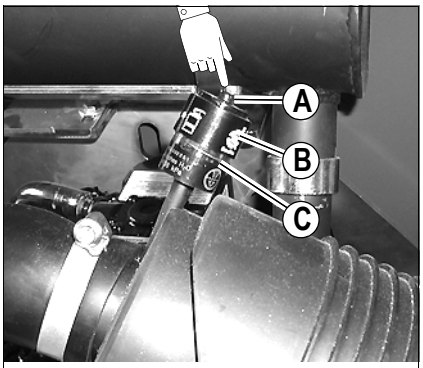


Fig. 172 : Air filter with maintenance display

After replacing the filter:

- Reset the red mark **C** in the inspection window of indicator **B**
- Press reset button **A**

5.6 V-belt

Danger!

Only check or retighten/replace the V-belt when the engine is stopped!

☞ *Stop the engine and remove the ignition key*

☞ *Remove the key from the battery master switch (option)*

Caution!

Cracked and stretched V-belts cause engine damage

☞ *Check the V-belt **once a day or every 10 operating hours**, and retighten it if necessary.*

☞ *Have the V-belt replaced by an authorized service centre every 2 years at the latest*

☞ *Retighten new V-belts after about 15 minutes of running time*

Checking the V-belt

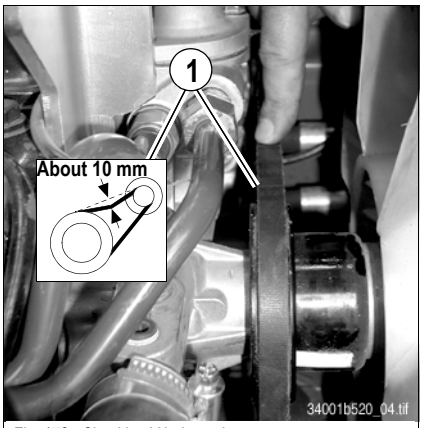


Fig. 173 : Checking V-belt tension

☞ *Stop the engine*

☞ *Prevent the machine from rolling away and remove the ignition key*

➥ *– see chapter 3 "Parking brake"* on page 3-50

☞ *Remove the V-belt guard*

☞ *Carefully inspect V-belt **1** for damage*

☞ *If the V-belt is damaged:*

➥ Have the V-belt replaced by authorized personnel

☞ *Press with your thumb to check whether the V-belt can be deflected between the pulleys by no more than **about 10 mm***

☞ *Retighten the V-belt if necessary*

Retightening the V-belt

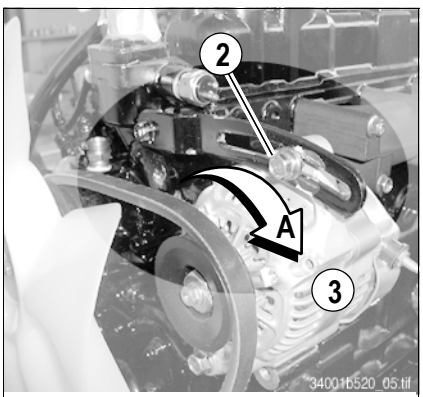


Fig. 174 : Retightening the V-belt

☞ *Slacken fastening screws **2** of alternator **3***

☞ *Use a suitable tool to push the alternator in the direction of arrow **A** until reaching the correct V-belt tension*

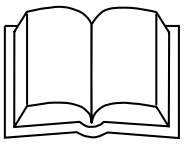
☞ *Keep the alternator in this position, and at the same time retighten fastening screws **2***

☞ *Start the engine*

☞ *Check V-belt tension after about 15 minutes*

5.7 Hydraulic system

Specific safety instructions regarding the hydraulic system



- 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
  - Move all control levers of the hydraulic control valves several times
- Use the parking brake to park the machine safely and to prevent it rolling away
- If the hydraulic oil in the sight glass is cloudy, this indicates that water or air has penetrated the hydraulic system. This can cause damage to the hydraulic pump!

  ☞ *Contact your dealer (service centre) immediately*

Danger!

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

☞ *Always consult a doctor immediately, even in case of minor wounds – otherwise serious infections could set in!*

Caution!

Contaminated hydraulic oil, lack of oil or wrong hydraulic oil – **danger of severe damage to the hydraulic system!**

☞ *Contact customer service if the hydraulic system filter is contaminated with metal chippings. Otherwise, follow-on damage can result!*

☞ *Always ensure cleanliness when handling hydraulic oil!*

☞ *Always add hydraulic oil using the filling screen*
– see Adding hydraulic oil on page 5-16.

☞ *Only use authorized oils of the same type*
– see Fluids and lubricants on page 5-39

☞ *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 filling up – observe the sticker on the hydraulic oil reservoir!*

Environment!

Collect drained hydraulic oil and biodegradable oil in a suitable container! Dispose of drained oil and used filters by an ecologically safe method. Always contact the relevant authorities or commercial establishments in charge of oil disposal before disposing of biodegradable oil.

Monitoring the hydraulic oil and the return filter

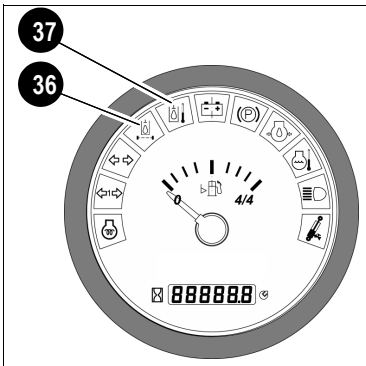


Fig. 175 : Hydraulic oil indicator lights

On the instrument panel, the red indicator light **36** monitors return pressure and the return filter, and indicator light **37** monitors oil temperature.

Caution!

Indicator light **36** on the indicating instrument illuminates if the resistance of the oil flow in the filter is too high

☞ *Replace the filter element*

☞ *Drain the hydraulic oil in case of increased contamination, however after 1500 operating hours at the latest or once a year*

If indicator light **37** (overheating) illuminates on the instrument panel:

☞ *Check the hydraulic oil level (not enough oil in the reservoir)*

☞ *Replace the filter element (highly contaminated filter)*

☞ *The filter element and the hydraulic oil may be replaced by an authorized service centre only!*

Notice!

Indicator light **36** on the indicating instrument can illuminate in cold weather immediately after starting the engine. This is caused by increased oil viscosity. In this case:

- Set engine speed so that indicator light ***36*** on the indicating instrument goes out
- Bear in mind the instructions concerning warmup – *see chapter 3 "Starting the engine"* on page 3-36

Important information on the use of biodegradable oil

- Use only the biodegradable hydraulic fluids that have been tested and approved by the manufacturer – *see Fluids and lubricants* on page 5-39
- Always contact the manufacturer for the use of other products which have not 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! The joint use of two different biodegradable oils can affect 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 % in order to avoid foaming problems and to ensure biological degradability
- 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
- Have the condensation water in the hydraulic oil reservoir drained by an authorized service centre every 500 operating hours, in any case before the cold season. 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
- **Subsequent change from mineral oil to biodegradable oil must be performed by an authorized service centre or by your dealer**

Checking the hydraulic oil

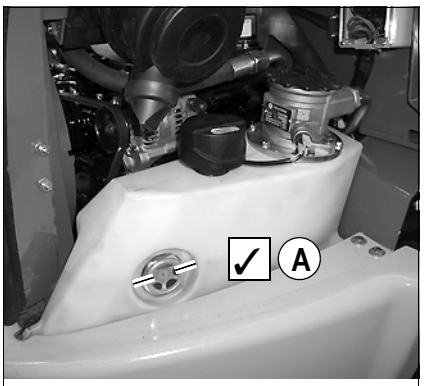


Fig. 176 : Oil level sight glass on the hydraulic oil reservoir

Notice!
Hot hydraulic oil expands, therefore check the oil only when cold

☞ *Park the machine on level ground*
☞ *Retract all hydraulic rams*
☞ *Secure the machine to prevent it from rolling away and stop the engine*
➥ *– see chapter 3 "Parking brake"* on page 3-50
☞ *Check the hydraulic oil level in sight glass* ***A***
☞ *If the oil level is visible in the lower half of the oil level sight glass*
➥ OK
☞ *If the oil level is no longer visible in the oil level sight glass (not enough oil)*
➥ Add hydraulic oil

Adding hydraulic oil

Notice!
Do not add hydraulic oil unless the engine is stopped. Otherwise, hydraulic oil will overflow at the filler opening on the hydraulic reservoir.

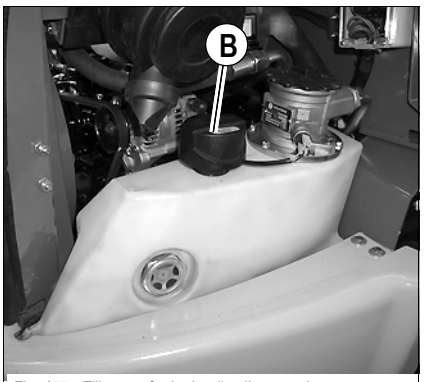


Fig. 177 : Filler cap for hydraulic oil reservoir

☞ *Proceed as follows:*

- Park the machine on level ground
- Retract all hydraulic rams
- Secure the machine against rolling away and stop the engine
  – see chapter 3 "Parking brake" on page 3-50
- Open the engine cover
- Clean the area around the filler and breather filter **B** with a cloth
- Place a container to collect the oil as it drains
- Open breather filter **B** by hand

With the filter insert in place

- Add hydraulic oil
- Check the hydraulic oil level in the oil level sight glass (fig. 176/**A**)
- Add if necessary and check again
- Firmly close breather filter **B** by hand

Notice!
Any excess quantity of hydraulic oil in the reservoir escapes via the breather as soon as the temperature rises!

- Drain the hydraulic oil if the oil level is no longer visible in the upper half of the oil level sight glass

5.8 Checking hydraulic pressure lines

Specific safety instructions regarding pressure line checks

Danger!

Caution when checking hydraulic lines, especially when searching for leaks.

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

☞ *Always consult a doctor immediately, even if the wound seems insignificant – otherwise serious infections could set in!*

☞ *Bear in mind the following instructions:*

- Retighten leaking threaded fittings and hose connections only when the system is not under pressure; in other words, release the pressure before working on pressurized lines!
- Never weld or solder damaged or leaking pressure lines and threaded fittings. Replace damaged parts with new ones!
- Never search for leaks with your bare hands, but wear protective gloves!
- Use paper or wood to check for minor leaks. Never use an unprotected light or open flame!
- Have damaged flexible lines replaced by authorized service centres only!

The entrepreneur/owner of the machine must ensure that flexible lines are replaced in appropriate intervals, even if no safety-relevant malfunctions can been detected on the flexible line.

Flexible lines must be inspected by an expert (competent person) before the first commissioning, and then at least once a year for safe working condition.

In this respect, we 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.

- Leaks and damaged pressure lines must be immediately repaired or replaced by an authorized service centre or after-sales personnel.
  This not only increases the operating safety of your machine but also helps to protect the environment
- Replace hydraulic hoses every 6 years from the date of manufacture, even if they do not seem to be damaged
- The date of manufacture (month or quarter and year) is indicated on the flexible line.

Example:

- The indication "**3 Q/13**" means manufactured in the 3rd quarter of 2013.

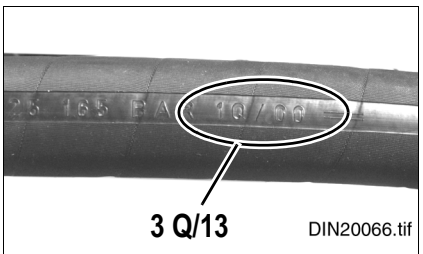


Fig. 178 : Oscillating axle bearing grease nipple

5.9 Lubrication work on the axles

Lubricate all lubrication points mentioned below with lithium-saponified brand-name grease
– *see Fluids and lubricants* on page 5-39

Lubricating the rear axle oscillation-type bearing

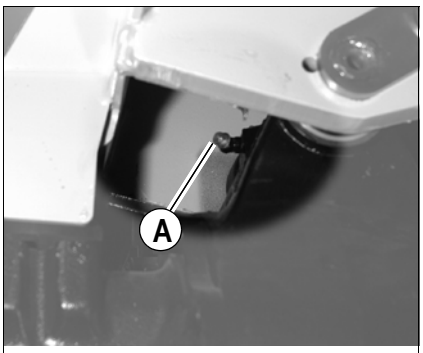


Fig. 179 : Oscillating axle bearing grease nipple

The machine has an oscillation-type rear axle. Grease the bearing at the latest after every **50 operating hours** or once a week. Lubricate more frequently when in heavy-duty operation (once a day)!

The grease nipple is located above the axle tube, on the left in travel direction.

☞ *Lubricate grease nipple **A** of the oscillation-type bearing*

Lubricating the wheel motor bearings (front/rear axles)

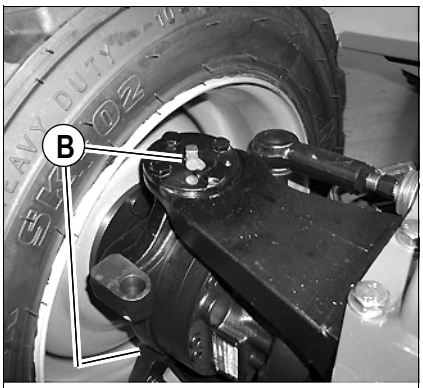


Fig. 180 : Wheel motor bearing grease nipples

☞ *Lubricate two grease nipples **B** (upper/lower bearings)* **every 50 operating hours** *or once a week. Lubricate more frequently when in heavy-duty operation (once a day)*

5.10 Lubrication work on the loader unit

Loader unit lubrication points

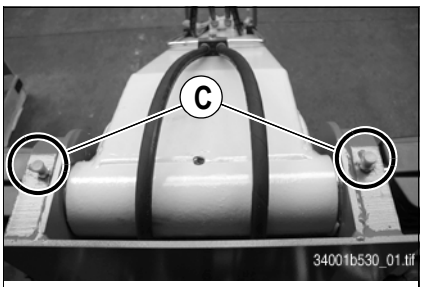


Fig. 181 : Upper lubrication points on loader unit

☞ *Lubricate grease nipples **C** (2 x) on the loader unit bearing* **every 50 operating hours** *(or once a week). Lubricate more frequently when in heavy-duty operation (once a day)*

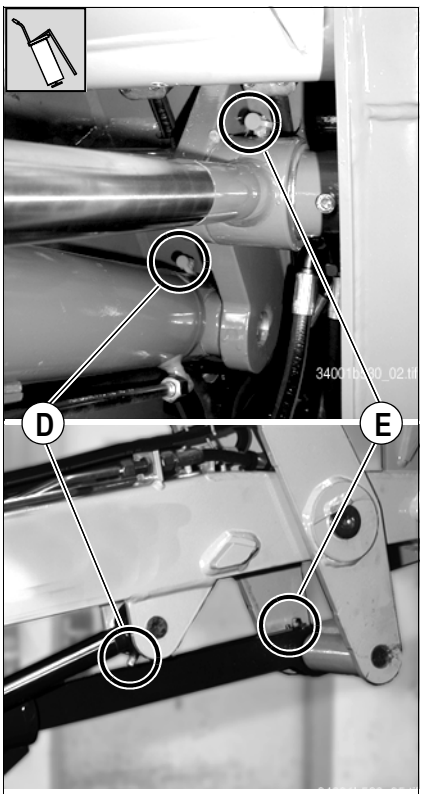


Fig. 182 : Lubrication points for lift and tilt ram bearings

☞ *Lubricate grease nipples **D** (2 x) on the lift ram bearing* **every 50 operating hours** *(or once a week). Lubricate more frequently when in heavy-duty operation (once a day)*

☞ *Lubricate grease nipples **E** (2 x) on the tilt ram bearing with grease* **every 50 operating hours** *(or once a week). Lubricate more frequently when in heavy-duty operation (once a day)*

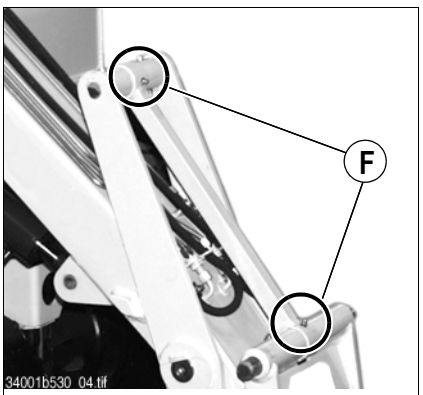


Fig. 183 : Lubrication points on tilt rod bearing

☞ *Lubricate grease nipples **F** (2 x) on the tilt rod bearing with grease* **every 50 operating hours** *(or once a week). Lubricate more frequently when in heavy-duty operation (once a day)*

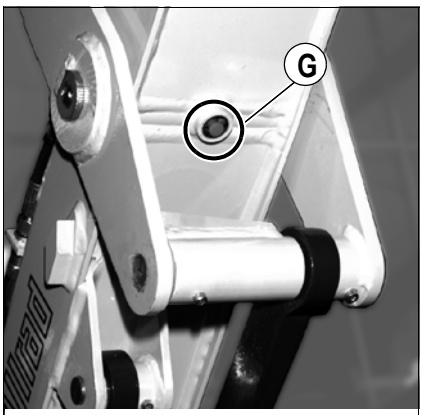


Fig. 184 : Tilt lever bearing lubrication point

☞ *Lubricate grease nipple **G** (1 x) on the tilt lever bearing* **every 50 operating hours** *(or once a week). Lubricate more frequently when in heavy-duty operation (once a day)*

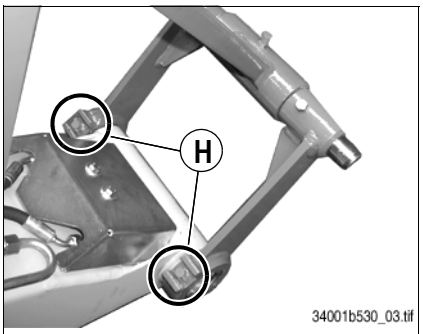


Fig. 185 : Lubrication points on quickhitch

☞ *Lubricate grease nipples **H** (2 x) on the quickhitch bearing* **every 50 operating hours** *(or once a week). Lubricate more frequently when in heavy-duty operation (once a day)*

5.11 Maintenance of the braking system

Specific safety instructions regarding the braking system

Danger!

Brakes are crucial to safety! Incorrect maintenance on the braking system can cause brake failure!

☞ **All maintenance and repair work on the brakes may only be performed by authorized service centres and trained personnel.**

General notice on the service brake

For reasons of design (wheel motors), the wheel loader has no service brake in terms of a brake circuit with brake shoes or discs.

The machine is braked with the service brake by reducing the pressure on the accelerator pedal (hydrostatic braking effect of the drive) and by pressing the brake/inching pedal.

Notice!

The service brake is maintenance-free.

General instructions regarding the parking brake

The machine is braked electrically/hydraulically with the parking brake by means of a switch, a brake valve and the brake discs in the front axle wheel motors.

Notice!

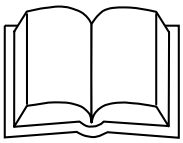
The parking brake is maintenance-free.

5.12 Tyres

Daily tyre checks

Danger!

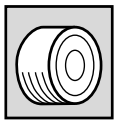
All repair work on tyres and rims may only be performed by authorized service centres.



Notice!

Regular inspections of the tyres

- Improve operating safety
- Increase the service life of the tyres
- Reduce machine downtimes
- Refer to the table in chapter “Technical data” for the approved tyre types and the correct tyre pressures. A tyre table sticker is also affixed on the loader unit bulkhead



☞ *Check tyre pressure*

➥ See label “Tyre pressure table” affixed on the loader unit bulkhead

☞ *Check tyres and rims for damage (cracks, ageing, etc.) – also on the inside*

☞ *Remove foreign bodies from the tyre tread*

☞ *Remove traces of oil and grease from the tyres*

Changing wheels

Danger!

Use only the wheels and tyres that have been released for this wheel loader.

☞ – see chapter 6 "Tyres" on page 6-9

☞ *Check the wheel nuts for tightness after every wheel or tyre change*

Caution!

The wheels are heavy and can damage the threads on the wheel studs if they are handled incorrectly!

☞ *Use suitable assembly tools, such as covering sleeves for the bolts, a jack, etc.*

Removing a wheel

☞ *Proceed as follows:*

- Park the machine on level and firm ground and prevent it from rolling away – see chapter 3 "Parking brake" on page 3-50
- Slightly loosen the wheel nuts of the wheel you want to remove
- Place a jack under the axle body, making sure it is standing firmly
- Raise the side of the axle from which you want to remove the wheel
- Check the machine is standing firmly
- Completely remove the wheel nuts
- Remove the wheel

Caution!

Do not run the wheel motors without load and at max. revs with the machine raised on props in order to avoid damage to the wheel motors!

Fitting a wheel

☞ *Proceed as follows:*

- Place the wheel onto the wheel bolts
- Tighten all wheel nuts part-way
- Lower the raised axle
- Tighten the wheel nuts to the specified tightening torque – see chapter 6 "Tightening torques" on page 6-11

5.13 Heating and ventilation system maintenance

Important notice on the heating and ventilation system

The heating system of the machine is equipped with a fine-dust filter.
The fresh air drawn in by the heater fan is cleaned by the fine-dust filter.

The volume of warm air flowing out of the air vents decreases as filter contamination increases: the fine-dust filter must be cleaned as required, however it must replaced **every 500 operating hours at the latest**!

Danger!

Health hazard! In order to comply with the required safety measures regarding occupational safety and health, malfunctioning or dirty fine-dust filters must be replaced by new ones!

Cleaning/replacing the fine-dust filter (up to date of construction 42/2013)

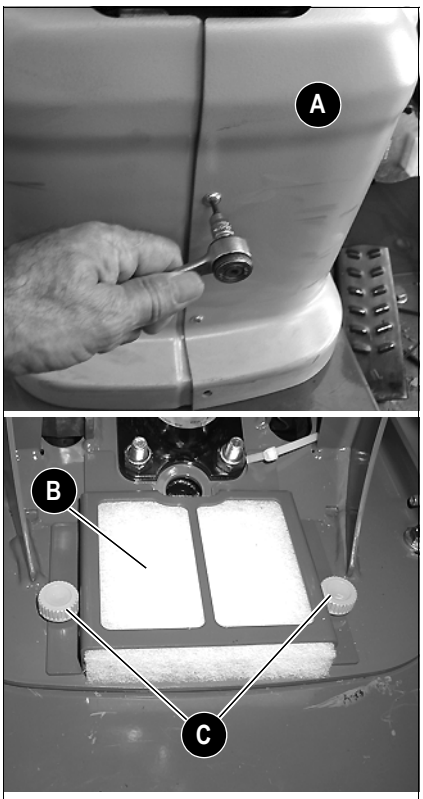


Fig. 186 : Fresh-air fine-dust filter

The fine-dust filter is located at the bottom behind the steering column trim.

Clean the filter as follows:

☞ *Remove the right-hand trim **A** (steering column)*

☞ *Remove the knurled screws and bracket **C** of the fine-dust filter*

☞ *Remove fine-dust filter **B** and check it for damage*

☞ *Knock the fine-dust filter on a plate on either side. If necessary, blow compressed air from the inside to the outside to clean the filter, or wash it with water and allow to dry*

➥ Replace the fine-dust filter every **500 o/h (service hours)** by a new one

➥ Replace the fine-dust filter more frequently if the machine is used in severe dust conditions

☞ *Clean the inside of the filter housing (with compressed air, wash it if necessary)*

☞ *Insert fine-dust filter **B** and install the bracket with knurled screws **C***

➥ Ensure that it is positioned properly

☞ *Install trim* **A**

Cleaning/replacing the fine-dust filter (from date of construction 43/2013)

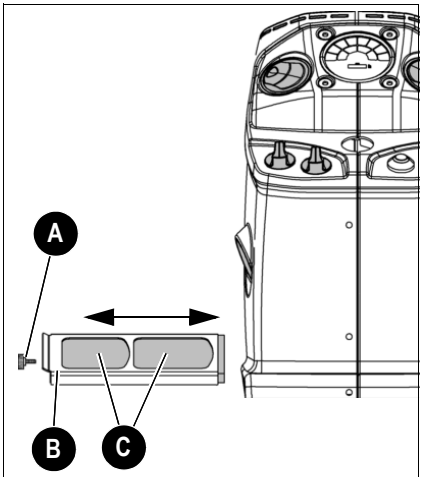


Fig. 187 : Fine-dust filter from 43/2013

The fine-dust filter is located in a drawer under the steering column.

Clean the filter as follows:

☞ *Remove knurled screws* **A**

☞ *Pull out drawer* ***B*** *with the fine-dust filter*

☞ *Remove fine-dust filter* ***C*** *and check it for damage*

☞ *Knock the fine-dust filter on a plate on either side. If necessary, blow compressed air from the inside to the outside to clean the filter, or wash it with water and allow to dry*

➥ Replace the fine-dust filter every **500 o/h (service hours)** by a new one

➥ Replace the fine-dust filter more frequently if the machine is used in severe dust conditions

☞ *Clean the inside of the filter housing (with compressed air, wash it if necessary)*

☞ *Insert the fine-dust filter in the drawer*

➥ Ensure that the fine-dust filter is positioned properly

☞ *Push in the drawer and secure it with knurled screw* ***A***

5.14 Maintenance of the electrical system

Important information

Maintenance and repair work on the electrical system (including the battery) may be performed only by trained personnel and/or authorized service centres!

Safety instructions regarding the electrical system and the battery

The battery contains sulphuric acid! This acid must not be allowed to come into contact with the skin, the eyes, clothing or the machine. When recharging or working near the battery, always wear safety glasses and protective clothing with long sleeves.

If acid is spilled:

- Thoroughly wash any part of the body touched by the acid immediately with plenty of water and seek medical attention at once
- Immediately rinse acid splashes in the eyes with clear water for several minutes! Then seek medical attention at once
- Immediately neutralize acid splashes on skin or clothing with an acid neutralizer or soap, and rinse with plenty of water
- Immediately seek medical attention if acid has been swallowed
- Thoroughly rinse all affected surfaces immediately with plenty of water

Battery maintenance – danger of explosion!

- Avoid open flames and sparks and do not smoke near open battery cells, otherwise gas can ignite
- When charging batteries, as well as during normal operation of batteries, an oxyhydrogen mixture is formed in the battery cells
- Disconnect the negative (**−**) battery terminal from the battery before starting repair work on the electrical system

Jump-starting

- Use only 12 V power sources. Higher voltages will damage the electrical components
- When connecting the battery leads, ensure that the poles (**+/−**) are not inverted, otherwise sensitive electrical components will be damaged
- Risk of sparking! Do not interrupt voltage-carrying circuits at the battery terminals
- Never place tools or other conductive objects on the battery – risk of short circuit!

Putting the machine out of operation

- Remove the battery, store it in a dry and frost-free place
- If the machine is put out of operation for extended periods, charge the battery every 2 months or use a battery charge maintainer
- Always charge the battery when storing it. The sulphation of the electrodes causes lasting damage! An empty battery must be recharged as soon as possible

Before putting the machine into operation

- Charge the battery and clean the terminals before installing it

Disposal of old battery

- For safe transport to a recycling point, put the protective cap on the positive terminal of the old battery and dispose of if properly

Checking/replacing the battery

The battery is low in maintenance and no fluid needs to be refilled under normal operating conditions.

However, have the electrolyte level in the battery checked at regular intervals.

The electrolyte level must be between the MIN and MAX marks.

Danger!

When charging batteries, as well as during normal operation of batteries, an oxyhydrogen mixture is formed in the battery cells with danger of explosions or causticization!

☞ *Therefore when recharging and/or working near the battery:*

- Always wear safety glasses and protective clothing with long sleeves
- Open the caps of the battery openings by half a revolution before recharging the battery
- Avoid open lights and sparks near the battery and do not smoke!
- Always disconnect the negative terminal (**–**) from the battery before starting repair work on the electrical system!
- Switch off the battery master switch (option) and remove the key

☞ *If acid is spilled:*

- Thoroughly rinse all affected surfaces immediately with plenty of water
- Thoroughly wash any part of the body touched by the acid immediately with plenty of water and seek medical attention at once in case of injury!

Replacing the battery

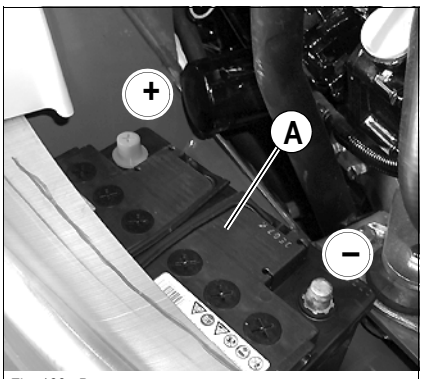


Fig. 188 : Battery

Battery A is located in the engine vat in front of the radiator.

☞ *Replace the battery as follows:*

- Lower the loader unit to the ground
- Apply the parking brake
- Switch off ignition and remove the ignition key
- Open the engine cover
- Remove the key from the battery master switch (option)
- *Remove the battery fixture*
- Remove the battery cover

Caution!

In order to avoid short circuits when disconnecting or connecting the battery leads, always bear in mind the order for disconnecting or connecting the leads under all circumstances!

Disconnecting the battery leads

- First disconnect the negative terminal (**–**) lead, then the positive terminal (**+**) lead
- Remove battery fixture **B**
- Replace the battery with a new one
- Install battery fixture **B**

Connecting the battery leads

- First connect the positive terminal (**+**) lead, then the negative terminal (**–**) lead
- Install the positive terminal (**+**) cover
- Install the battery cover
- Install fastening nut **A**

Inspections and maintenance on the electrical system at regular intervals

Daily checks and before operating the machine

- Is the light system OK?
- Is the signalling and warning system OK?
- Are the indicator lights and the gauges on the instrument panel in working order?

  ➥ Replace malfunctioning bulbs

Weekly checks

- Fuses: replace malfunctioning fuses (bear in mind the amperage)

  ➥ *– see Fuse assignment overview* on page 6-7

  ➥ Blown fuses indicate overloading or short circuits. Therefore, the electrical system should be checked by an authorized 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
- Battery charge condition

Checking/replacing relays and fuses

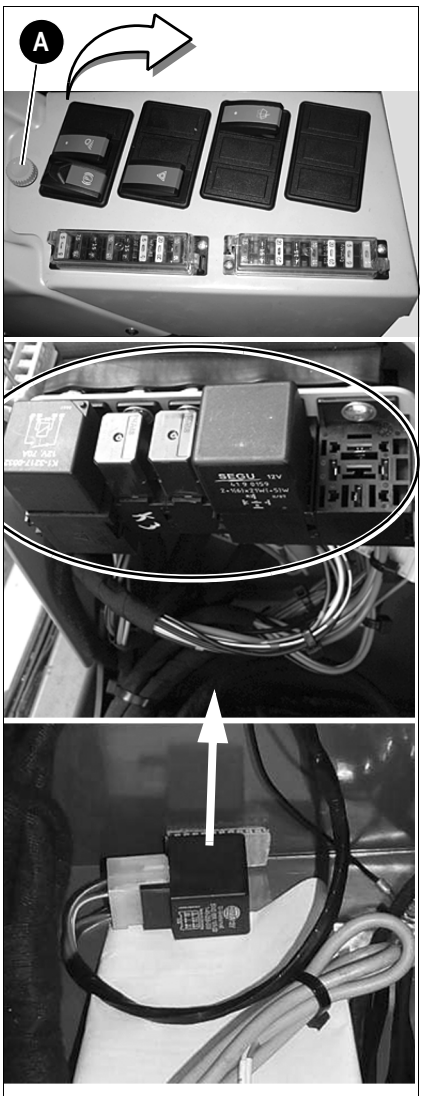


Fig. 189 : Fuse box, relay positions

The switching relays are located underneath the switch panel on the side console on the right.

Caution!

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)*
– see chapter 6 "Fuse assignment overview" on page 6-7

Checking/replacing switching relays

☞ *Switch off ignition and disconnect the battery leads*

☞ *Remove knurled screw **A***

☞ *Raise the side console to the rear*

☞ *Relay descriptions and output indications – see chapter 6 "Relays (overview)" on page 6-8*

Checking/replacing the main fuse box and the switching relays

Fig. 190 : Main fuse box in engine compartment

The main fuse box with the power relays and the preheating time control unit is located in the engine compartment on the right on the rear wall

☞ *Switch off ignition and disconnect the battery leads*

☞ *Remove the fuse box cover*

☞ *Main fuse and relay descriptions and output indications*
– see chapter 6 "Main fuse box with relays" on page 6-8

Caution!

Blown fuses indicate overloading or short circuits!

☞ *Have the electrical system checked by an* **authorized service centre** *before inserting new fuses!*

- In order to avoid damage to the electrical system, use only fuses and relays of the specified load capacity (amperage) *– see chapter 6 "Relays (overview)"* on page 6-8 and *"Main fuse box with relays" on page 6-8*

Checking the alternator

Follow the following notices under all circumstances:

- 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

Caution!

In order to avoid voltage damage on the alternator, always disconnect the battery leads from the battery terminals before performing welding work or connecting a quick battery charger!

5.15 Servicing and maintenance

Important safety instructions regarding cleaning 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 undermine the health of the persons in charge of cleaning the machine. Therefore always observe the following instructions.

Caution!

Machines with anticorrosion protection (“aggressive media”) must be cleaned separately!

☞ – *see Maintenance “Aggressive Media” (option) on page 5-36*

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 adequate room ventilation
- Wear suitable protective clothing
- Do not use flammable liquids, such as petrol 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 high-pressure cleaners

- 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.
- Cover the piston rods of the hydraulic rams (the scraper is not water-tight, and water in the guide bushing causes corrosion and damage to the piston rod)
- Cover electric parts, such as the alternator, the ignition lock, the turn indicator and light switches, the relays, etc.
- Cover the controls and seals
- Cover the air-intake filter, etc.

Cleaning with flammable anticorrosion agents and sprays

- Ensure adequate room ventilation
- Do not use unprotected lights or open flames
- Do not smoke!

Cleaning inside the cabin

Caution!

Do not 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, cause short circuits, damage seals and disable the controls (ignition lock)!*

We recommend using the following aids to clean the cabin:

- Broom
- Vacuum cleaner
- Damp cloth
- Bristle brush with water and mild soap solution

Cleaning the pedals

Danger!

Loss of machine control due to dirt or malfunction of the pedals

☞ *Keep the floor under the pedals clean*

☞ *Keep the hinges clean and in good operating condition*

☞ *Clean the pedals*

☞ *Apply spray oil to the pedal hinges if necessary*

Danger!

Risk of injury! Risk of accidents!
Secure the machine correctly before cleaning or servicing the pedals

☞ *Park the machine on firm and level ground*

☞ *Apply the parking brake*

☞ *Stop the engine, but leave the ignition switched on*

☞ *Lower the loader unit and the attachment to the ground without applying any pressure to it*

- *Place the attachment, for example a bucket, on the ground so that the edge applies slight pressure to the ground*

☞ *Switch off ignition and remove the ignition key*

Cleaning the door locks and arresters

☞ *Keep the door locks, arresters and hinges clean*

☞ *Apply spray oil to the hinges and joints if necessary*

Cleaning the seat belt

Danger!

Risk of injury! Dirty belts, in particular automatic seat belts, hinder winding and jeopardize the operator's safety!

☞ *Clean dirty belt straps and wind them only when they are dry!*

☞ *Have an authorized service centre replace a malfunctioning seat belt by a new one*

The following auxiliary means are recommended for cleaning:

- Mild soap solution. Clean the seat belt without removing it
- Do not use any chemical agents – the material can be destroyed!

Cleaning the exterior of the machine

Caution!

In order to avoid corrosion on the machine (paint finish, joints, threaded fittings, etc.), thoroughly clean the machine with water after driving on saline ground or roads and after driving the machine to a different site!

The following auxiliary means are recommended for cleaning:

- High-pressure cleaner or bristle brush with water and mild soap solution

Notice!

A machine with anticorrosion protection ("aggressive media") must be cleaned separately – *see chapter 5 "Maintenance "Aggressive Media" (option)*" on page 5-36!

Cleaning the engine compartment

Danger!

Caution, turning parts – risk of accidents! Do not clean when the engine is running!

☞ *Wait at least 10 minutes after stopping the engine*

☞ *Wear protective gloves and clothing during maintenance*

Caution!

The engine must be cold before cleaning it with a water or steam jet!

☞ *Do not point the jet directly at the electric sensors such as the oil pressure switch or the electronics on the hydraulic pump.*

- *The humidity penetrating any such sensors causes them to fail and leads to engine damage!*

The following auxiliary means are recommended for cleaning:

- High-pressure cleaner
- Steam jet

Checking threaded fittings

- Check all threaded fittings regularly, even if they are not listed in the maintenance plans.
- Retighten loose threaded fittings immediately. Refer to chapter “Technical data” for the tightening torques.

Checking pivots and hinges

All mechanical pivot points on the machine (door hinges, joints, for example) and fittings (door arresters, for example) must be lubricated regularly, even if they are not listed in the lubrication plan.

5.16 Maintenance and servicing of the 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 attachment!

5.17 Maintenance of the automatic trailer coupling (option)

Cleaning and lubricating the trailer coupling

Caution!

Ensure that the coupling pin is engaged in the trailer coupling before cleaning with high-pressure equipment!

☞ *Apply a little more grease to the coupling pin and the base ring once cleaning is over*

- Apply tough water-proof grease (EP3) to the coupling pin, the base ring and the drawbar eye after heavy use and before putting the coupling into operation
- Apply tough waterproof grease (EP3) to the lower bearing of the coupling jaw
- Apply grease to the grease nipple on the joint

Check the trailer coupling for wear

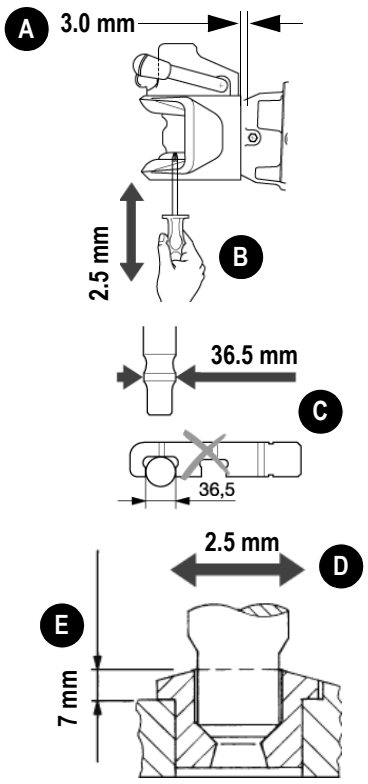


Fig. 191 : Rockinger trailer coupling

Danger!

Risk of accidents in case of a worn coupling pin, too much play in the bearing or a worn base ring!

☞ *Check the trailer coupling once a day for wear and play*

☞ *Apply grease to the base ring*

☞ *Have a malfunctioning trailer coupling replaced by a new one*

☞ *Checking the bearing and longitudinal play* **A** *of the coupling head*

- Move the uncoupled coupling head with force in travel direction

☞ *Checking the height-wise play of the coupling head*

- Open the coupling
- Move the coupling head up and down with a suitable tool (mounting lever)

➥ Play **A** in the centre axis of the coupling head = **max. 3 mm**

☞ *Checking the coupling pin* **C/D**

- Measure wear by means of a slide gauge on the thickest section of the coupling pin ***C***

➥ Diameter C may not drop below **36.5 mm**

➥ Height-wise play **B max. 2.5 mm**

- Check pin play **D** in the base ring and thickness ***E*** of the base ring

➥ Pin play **D max. 2.5 mm**

➥ Thickness **E** of base ring **min. 7 mm**

Caution!

Repair work on the trailer coupling must only be performed by an authorized service centre!

5.18 Maintenance “Aggressive Media” (option)

The machine is specially protected against corrosion for work in aggressive media (a saline environment, for example).

However, this anticorrosion protection is affected by external factors, for example dirt, cleaning, etc. This is why it only has ongoing effect if checked at regular intervals and renewed or reapplied as required.

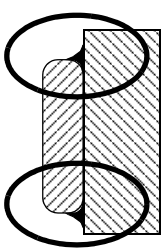
If no anticorrosion protection is applied to the machine, for example for work in a saline environment, we recommend retrofitting your machine with the “Aggressive Media” option by a sales partner.

Anticorrosion protection applied in the factory

The following anticorrosive wax has been used in the factory:

Designation:	ANTICORIT BW 366
Manufacturer:	FUCHS MINERALOELWERKE GMBH/Mannheim
Specification:	TI 8030-015/K 19/MIL-C-16 173 C-Grade 4

Components coated with anticorrosive 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 anticorrosion layer to the connecting parts of the fuel level transmitter
All machine parts such as axles, gearbox, trim panels, servicing lids, loader unit, quickhitch	**Except:** • Piston rods (chromium coating) • Cabin, cabin bearings • Engine cover, engine mounting • Air filter • Counterweight • Fastening surfaces for installing parts on frame • Radiator and insulating mats • Mudguards, rubber and plastic parts • Light elements
Flange surfaces 	**For example axles, engine and cabin bearing:** • Seal gaps with anticorrosion wax after assembly

Measures for maintaining anticorrosive protection

Safety instructions

- When handling chemical substances of any kind, such as solvents, wax, etc., observe the specific product-related safety regulations (safety data sheet)!
- When using volatile and easily flammable anticorrosive agents and solvents:
- Ensure adequate room ventilation!
- Do not use unprotected lights or open flames!
- Do not smoke!
- Corrosion on electric connections or components can cause dangerous operating malfunctions. Therefore check the electric functions of the machine with special care. Immediately put the machine out of operation if you detect any defects and have defects rectified immediately.
- Perform work on the electrical system only with the battery disconnected and the engine stopped!

Cleaning

- If the machine is used in corrosive environment over a longer period of time, we recommend removing the floor mat in the cabin to avoid collecting 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.

Caution!

Contrary to the instructions given in Chapter “General maintenance” in the Operator’s Manual, neither clean the machine with a bristle brush nor with a steam jet or a high-pressure cleaner. Otherwise the anticorrosive protection will be heavily affected.

☞ *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 *Components coated with anticorrosive wax* on page 5-36 and whether they are subject to special treatment before assembly.

Applying the protective anticorrosion coating

Bear in mind the following instructions as you apply the anticorrosive wax:

Caution!

Carefully cover all fastening surfaces and **elements to which the anticorrosive protection may not be applied** – *see Components coated with anticorrosive wax* on page 5-36

- ANTICORIT BW 366 can be applied with a brush, by means of immersion or with all commercially available spray guns.
- ANTICORIT BW 366 protective coating can be removed with petrol, RENOCLEAN E/K or FUCHS MULTICLEAN as required.
- ANTICORIT BW 366 spots are difficult to remove on 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), proceed as follows:

Electric connections

☞ *Remove the remaining protective wax in the oxidized area with petrol, RENOCLEAN E/K or FUCHS MULTICLEAN*

☞ *Treat the affected area with an oxide solvent, such as KONTAKT 60, and rinse it with KONTAKT WL, for example*

☞ *Treat the contact surfaces of the connection with KONTAKTSPRAY WD 40, for example*

☞ *Establish the connection*

☞ *Apply/spray anticorrosion wax onto the electric connection from all sides*

Sheet-metal parts

☞ *Remove the remaining protective wax in the oxidized area with petrol, RENOCLEAN E/K or FUCHS MULTICLEAN*

☞ *Remove all remaining corrosion and paint coating from the affected area down to the bare material, otherwise the paint 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 anticorrosion wax*

5.19 Fluids and lubricants

Component/application	Fluid/lubricant[1]	Specification	Season/ temperature	Capacities[2]
Diesel engine	Engine oil[3] with oil filter	10W-40; EO1040B[4]	Year-round	7.2 l
		5W-30[5]	+/− 30 °C	
Hydraulic system: hydraulic oil reservoir, drive hydraulics, wheel motors	Hydraulic oil[6]	HVLPD 46 (HYD0530[4])	Year-round	About 40 l
		HVLPD 32[5]	+/− 30 °C	
	Biodegradable oil	AVILUB Syntofluid 46	Year-round	
		PANOLIN HLP Synth 46		
Grease nipples loader unit/axles	Multipurpose grease	Lithium-saponified brand-name grease MPG-A[4]	Year-round	As required
Battery terminals	Acid-proof grease	SP-B[4]	Year-round	As required
Aggressive media (option)	Anticorrosion protection	Anticorit BW 366[7]	Year-round	As required
Installation[8] of pins, shafts	Special grease	Optimoly paste "TA"[9] White paste	Year-round	As required
Fuel system, fuel tank	Diesel fuel[10, 11]	DIN 51628/DIN EN 590 (EU) ASTM D975-94 (USA)	Year-round −40 °C	About 30 l
	Biodiesel[10, 11]	DIN EN 14214		
Engine cooling	Antifreeze[12, 13]	MS Frostschutz HAVOLINE XLC	Year-round −31 °C	About 4.2 l
Washer system (option)	Cleaning agent[14]	Water + antifreeze	Year-round −20 °C	About 1.5 l

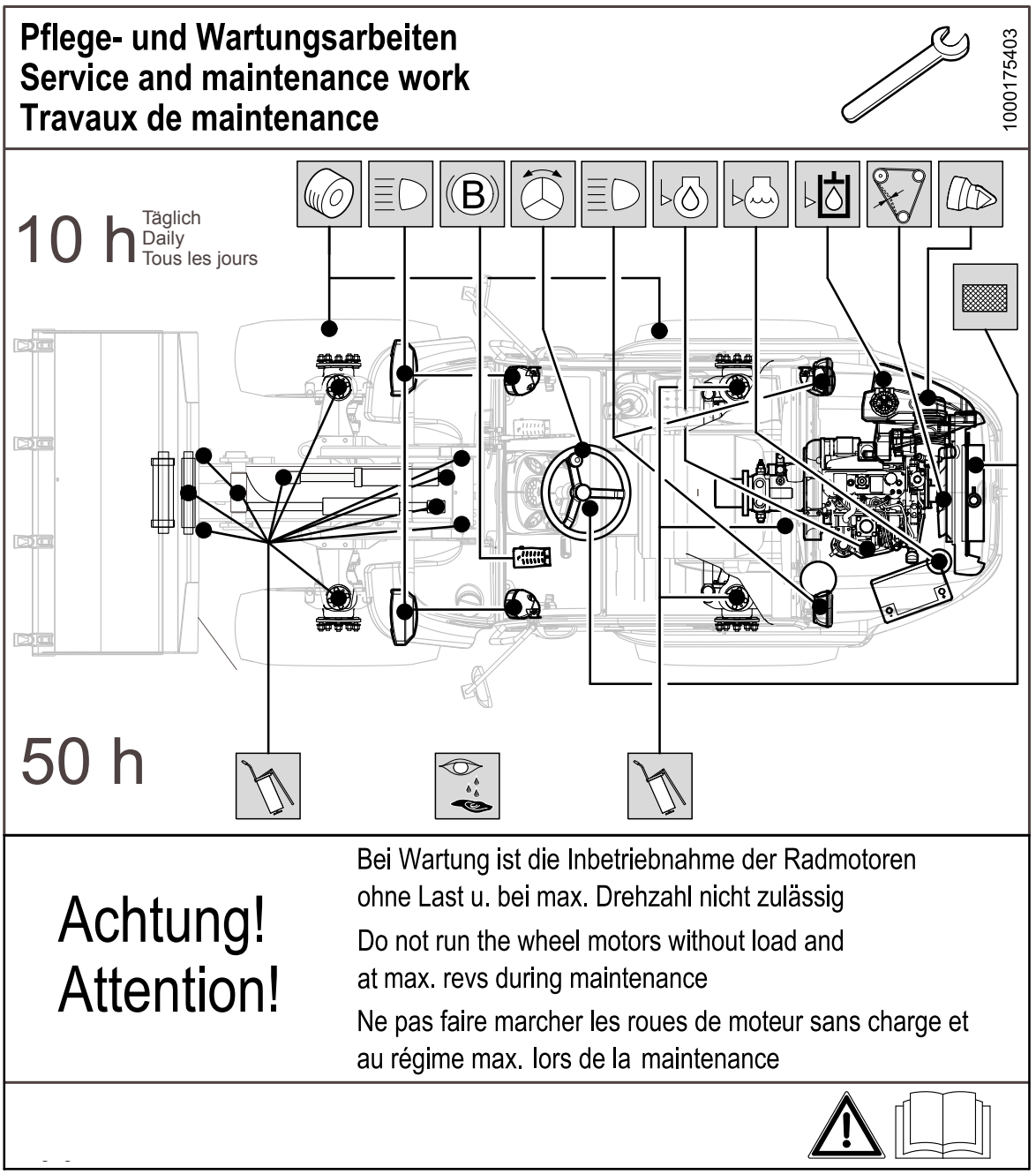
1. Bear in mind the safety data sheet of the engine/machine fluids
2. The capacities indicated are approximate values; the oil level check alone is relevant for the correct oil level
3. Specification: MIL-L-2104C; API CD/CE/CF4; CCMC-D4
4. Abbreviation for lubricants (Hauptverband der Deutschen Bauindustrie e. V. – German construction engineering association)
5. Used in Scandinavian countries only
6. DIN 51 524 (ISO 6743/4)
7. Specification: TI 8030-015/K 19/MIL-C-16 173 C-Grade 4
8. Notice! Pins (hard-chromium plated or coated with Molykote 3400A) are inserted in dry state. Lubricate via grease nipples once assembly is over
9. 250 gr tube, order no.: 1000030311
10. In order to avoid engine damage, do not add additives to the diesel fuel!
11. 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
12. Factory fill – antifreeze concentrate −60 °C
    Complete refill, see Coolant compound table on page 6-10 and manufacturer indications on the packaging
13. The coolant must be replaced every 2 years by an authorized service centre
14. See manufacturer's indications on the packaging and bear in mind the antifreeze compound table

5.20 Explanation of symbols on the maintenance label

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 tyres 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!
	Air filter, squeeze the dust valve
	Check radiator for engine coolant and hydraulic oil for dirt. Clean if necessary!
	Check condition and initial tension of V-belt. Retighten or replace if necessary!
	Leakage check: Check for tightness, leaks and chafing: pipes, flexible lines and threaded fittings. Rectify if necessary!
	Leakage check: Check the fuel/water separator. Drain water if necessary!
	Lubrication service: Lubricate the assemblies concerned!

5.21 Maintenance label

Affixed on the loader unit bulkhead



5.22 Maintenance plan

Important information on the maintenance plan

For servicing and maintenance on the attachment, please refer to the operation and maintenance manual of the attachment manufacturer as well.

Have maintenance, the Delivery Inspection, the 1st Inspection at 100 operating hours and the 2nd Inspection every 500 and 1500 operating hours (once a year) performed by an authorized service centre, otherwise warranty claims will not be acknowledged.

Maintenance plan overview

Work description[1]	Service centre	User/operator		Service centre		
	Delivery inspection	Maintenance (once a day)	Every 50 o/h	"A" 1st Inspection at 100 o/h[2]	"B" every 500 o/h[2]	"C" every 1500 o/h once a year
Oil and filter changes ( ) (check the oil levels after a test run):						
• Change the engine oil				●	●	●
• Replace the engine oil filter				●	●	●
• Replace fuel filter, fuel prefilter				●	●	●
• Replacing the fuel/water separator					●	●
• Replace the air filter insert [3, 4], replace the safety cartridge every 3rd time the air filter insert is replaced					●	●
• Replace the hydraulic oil [5]						●
• Replace the hydraulic oil filter insert				●		●
• Replace the hydraulic oil reservoir breather filter [4]						●
• Replace the fine-dust filter[6] of the heating and ventilation system					●	●
Inspection work ( ) :						
• Check engine oil level	●	●				
• Check hydraulic oil level	●	●		●	●	
• Check the engine coolant level[7] (also check the antifreeze at temperatures below 4 °C!)	●	●		●	●	●
• Check radiator for engine and hydraulic oil for contamination. Clean if necessary[8]		●	●	●	●	●
• When using biodegradable oil: drain the condensation water in the hydraulic oil reservoir[5]					●	●
• Clean dust valve on air filter housing[3]	●	●		●	●	●
• Check the pedals. Clean them and apply grease or oil if necessary		●		●	●	●
• Check the locks/door arrester. Clean them and apply grease or oil if necessary		●		●	●	●
• V-belt: check condition and pre-tension	●	●				
• V-belt: check condition and pre-tension. Retighten or replace if necessary	●			●	●	●

Work description[1]	Service centre	User/operator		Service centre		
	Delivery inspection	Maintenance (once a day)	Every 50 o/h	"A" 1st Inspection at 100 o/h[2]	"B" every 500 o/h[2]	"C" every 1500 o/h once a year
Other inspection work (👁) 🔧:						
• Check the fuel/water separator. Drain water if necessary			●	●		
• Check valve clearance (engine management). Set if necessary					●	●
• Check battery charge condition, charge the battery if necessary	●				●	●
• Heating: clean the fine-dust filter, replace it if necessary[6]			●		●	●
• Check and adjust the parking brake, replace if necessary				●	●	●
• Tyre check (damage, inflation pressure, tread depth)	●	●	●	●	●	●
• Aggressive media (option): check anticorrosion protection, renew if necessary		●		●	●	●
Check screws and nuts or threaded fittings for tightness on the following assemblies/components. Retighten if necessary						
• Engine and engine bearing				●	●	●
• Steering system, steering ram fastening				●	●	●
• Check the hydraulic system for leakage				●	●	●
• Loader unit (pin locking)				●	●	●
• Axle mounting, axle suspension				●	●	●
• Counterweight (attachment)				●	●	●
• Fastening screws of cabin or canopy (option)				●	●	●
• Wheel nuts	●			●	●	●
• Fastening screws of trailer coupling (option)	●			●	●	●
• Electrical system: check electric and ground connections, chafing on wiring harness, battery terminals	●			●	●	●
Lubrication service (🛢):[9]						
• Hinges, joints and fittings (for example door arresters)			●	●	●	●
• Rear axle oscillating bearing[10]	●		●	●	●	●
• Front/rear axle wheel motor bearings (8x)[10]	●		●	●	●	●
• Trailer coupling – joint (option)	●		●	●	●	●
• Loader unit – *see chapter 5 "Lubrication work on the loader unit" on page 5-19*						
• Lift frame bearing	●		●	●	●	●
• Quickhitch: bearing on lift frame	●		●	●	●	●
• Tilt rod bearing	●		●	●	●	●
• Tilt lever bearing	●		●	●	●	●
• Lift ram bearing	●		●	●	●	●
• Tilt ram bearing	●		●	●	●	●

Work description[1]	Service centre	User/operator		Service centre		
	Delivery inspection	Maintenance (once a day)	Every 50 o/h	"A" 1st Inspection at 100 o/h[2]	"B" every 500 o/h[2]	"C" every 1500 o/h once a year
Functional check (👁) 🔧:						
• Parking brake	●	●		●	●	●
• Steering system synchronous position of wheels	●	●		●	●	●
• Electrical system – lights, indicator lights, signalling system, washer system (option)	●	●		●	●	●
• Drive interlock (option)	●	●		●	●	●
• Operator seat, seat belt	●	●		●	●	●
• Operator presence switch (option)	●	●		●	●	●
• Locks: door, side windows, engine cover	●	●		●	●	●
• Lock: control lever (loader unit), 3rd control circuit lever	●	●		●	●	●
• Quickhitch lock	●	●		●	●	●
• Load stabilizer	●	●		●	●	●
• Front and rear additional control circuit (option)	●	●		●	●	●
• Trailer couplings[1] (option)	●	●		●	●	●
Leakage check (👁):						
Check for tightness, leaks and chafing: pipes, flexible lines and threaded fittings. Have them rectified if necessary.						
• Air intake line (air filter – diesel engine)	●	●		●	●	●
• Engine lubrication (diesel engine – filter)	●	●		●	●	●
• Fuel lines[11] fuel tank	●	●		●	●	●
• Cooling system (diesel engine – hydraulic oil)	●	●		●	●	●
• Steering system (flexible lines and rams)	●	●		●	●	●
• Hydraulic system (flexible lines[12] and rams)	●	●		●	●	●
• Quick couplers, additional control circuits, 3rd control circuit	●	●		●	●	●
• Drive – variable displacement pump, wheel motors, flexible lines[12] and changeover valves	●	●		●	●	●

1. Have repair work performed by an authorized service centre only
2. Have maintenance only performed by an authorized service centre (acknowledgement of warranty claims)
3. Replace filter insert as indicated by the indicator light on the air filter housing, however at least every 12 months or 1500 o/h.
4. When working in an acidic environment, replace the filter every 300 operating hours!
5. When using biodegradable oil: drain the condensation water in the hydraulic oil reservoir every 500 o/h, in any case before the cold season.
6. Depending on operation and dust conditions, it may be necessary to replace the fine-dust filter more frequently
7. Replace the engine coolant every other year!
8. Depending on operation and dust conditions, it can be necessary to clean the radiator more frequently.
9. Lubricate attachment according to manufacturer's instructions!
10. Lubricate more frequently when in heavy-duty operation (once a day)
11. Replace flexible fuel leak oil lines every 2 years
12. Replace flexible lines every 6 years (UVV, DIN 20066 part 5)

6 Technical data

6.1 Models and trade names (overview)

Wheel loader model	Trade name
348-01	350 / 5035

6.2 Frame

Sturdy steel sheet chassis, rubber-mounted engine

6.3 Engine

Wheel loader model 348-01		
Product	Yanmar diesel engine	
Type	3TNV 88	3TNV 84T (option)
Design	Water-cooled 4 stroke diesel engine	
Number of cylinders	3	
Displacement	1642 cm³	1496 cm³
Nominal bore and stroke	88 x 90 mm	84 x 90 mm
Output (kW) as per ISO	**23 kW** at 2600 rpm	**27 kW** at 2600 rpm
Max. torque	99 – 107 Nm at 1560 rpm	114 – 124 Nm at 1560 rpm
Max. engine speed without load	2810 rpm	
Idling speed	1100 rpm	800 rpm
Specific fuel consumption	271 g/kWh	261 g/kWh
Fuel injection system	Direct injection	
Firing order	1 – 3 – 2	
Starting aid	Glow plug (preheating time 10 – 15 seconds)	
Max. inclined position (engine no longer supplied with oil):	25° in all directions Observe the tilting limit (20° laterally) of the machine!	
Exhaust values according to	2004/26 EC	

6.4 Travelling drive

Variable displacement pump

Wheel loader model 348-01	
Design	Automotive infinitely variable hydrostatic drive
Displacement	0 – 45 cm³/rev
Max. operating pressure	380 bar
Starting speed	1300 $^{\pm 50}$ rpm at 50 bar HP
Control	Speed-sensitive, hydraulic displacement adjustment with pressure cutoff
Travel direction	Electro-hydraulic control
Inching	Inching valve via brake/inching pedal
Pushing power[1]	9.0 kN
Boost pump integrated in variable displacement pump	
Design	Internal gear pump
Displacement	11 cm³/rev
Charging/boost pressure	28 bar at 2600 rpm

1. Measured with 10-16.5 SK tyres

6.5 Front/rear axle

Front axle

Wheel loader model 348-01	
Design	Rigid screw connection of axle carrier onto frame
Differential lock (option)	Traction is evenly distributed hydraulically to all 4 wheel motors
King-pin inclination	7°
Camber	1°
Steering angle	38°
Toe-in	0 mm
Track width	940 mm[1]/1016 mm[2]/1046 mm[3]

1. With tyres 27x8.5-15/28x9.00-15
2. With tyres 10R 16.5/10-16.5
3. With tyres 315/55 R16

Rear axle

Wheel loader model 348-01	
Design	Oscillating axle carrier suspension on frame
Differential lock	None
King-pin inclination	7°
Camber	1°
Oscillation	± 7 °
Steering angle	38°
Toe-in	0 mm
Track width	940 mm[1]/1016 mm[2]/1046 mm[3]

1. With tyres 27x8.5-15/28x9.00-15
2. With tyres 10R 16.5/10-16.5
3. With tyres 315/55 R16

Wheel motors

Wheel loader model 348-01	
Design	2 steered wheel motors **with** hydraulic parking brake Front axle 2 steered wheel motors **without** hydraulic parking brake Rear axle
Wheel motor capacity	398 cm^3/rev

6.6 Brakes

Service brake

Wheel loader model 348-01	
Design	Hydrostatic braking
Effect	Brake/inching pedal: foot-operated hydrostatic braking via drive with additional activation of parking brake in wheel motors (front axle)

Parking brake

Wheel loader model 348-01	
Design	Hydraulic parking brake with electric control (instrument panel switch)
Location	In front axle wheel motors

6.7 Steering system

Wheel loader model 348-01	
Design	Hydrostatic 4 wheel steering with emergency steering features
Steering mode	4 wheel steering
Assemblies	Hydraulic pump, priority valve, servostat with safety valves, steering rams, self-synchronizing in final position
Displacement (servostat)	50 cm³/rev / steering wheel rotation
Steering pressure	175 bar
Hydraulic pump (gear pump) displacement	8 cm^3/rev

6.8 Operating hydraulics

Hydraulic pump, control valve, hydraulic oil reservoir

Wheel loader model 348-01	
Hydraulic pump	Gear pump
Displacement	8 cm^3/rev ≡ 20 l/min at 2600 rpm
Max. operating pressure[1]	240 bar
Control valve: Control lever (joystick) raise and lower, 3rd control circuit control lever	3-fold
Return suction filter	0.5 bar pre-tension
Hydraulic oil reservoir	About 40 l

1. Measured at control valve

Lift and tilt rams

Wheel loader model 348-01	
Hydraulic pump	8 cm^3/rev ≡ 20 l/min at 2600 rpm
Max. operating pressure[1]	240 bar
Tilt ram Secondary protection:	Rod side/base side/270 bar
Lift ram Secondary protection:	Rod side/anticavitation valve Base side/280 bar
Quickhitch ram Secondary protection:	None

1. Measured at control valve

Lift and tilt ram speed

Wheel loader model 348-01		
Hydraulic pump	8 cm^3/rev ≡ 20 l/min at 2600 rpm	
Lift ram	Raise	6.0 sec
	Lower	4.3 sec
Tilt ram	Tilt in	2.4 sec
	Tilt out	1.5 sec

Usable consumer pressure at 3rd control circuit

Wheel loader model 348-01		
Hydraulic pump	**Function**	**Rpm / l/min / bar**
Front 3rd control circuit quick couplers	3rd control circuit control valve	2600/**21**/175

Usable consumer pressure at additional control circuit (option)

Notice!

The specified flow rates are available at the front **or** rear quick couplers. Description of quick coupler connections – *see chapter 3 "Additional front/rear control circuit (option)"* on page 3-108

Wheel loader model 348-01		
Tandem hydraulic pump 8 + 8 cm/rev	**Function**	**Rpm/litres/bar**
Additional **rear** control circuit (rear)	Electric control (solenoid valve) via 3rd control circuit	2600/**40**/150
Front additional control circuit (on right of loader unit)		
Tandem hydraulic pump 16 + 8 cm/rev	**Function**	**Rpm/litres/bar**
Additional **rear** control circuit (rear)	Electrically operated solenoid valve with additional operation of 3rd control circuit lever (continuous operation)	2600/**40**/150
Front additional control circuit (on right of loader unit **with external return**)		2600/**55**/65 2600/**50**/110

6.9 Electrical system

Electric units

Designation	Power
Alternator	12 V 55 A
Starter	12 V 2.3 kW
Battery	12 V 72 Ah 570 A

Fuse assignment overview

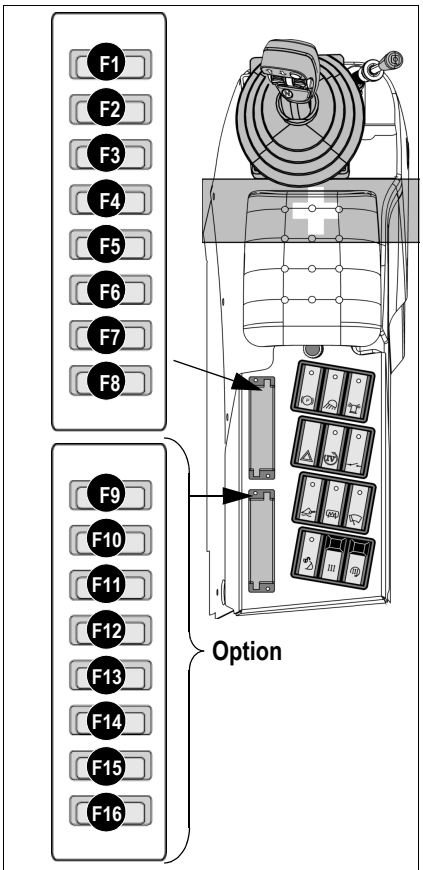


Fig. 192 : Fuse box

Fuse assignment without cabin, without machine lights

Fuse no.	Rated current (A)	Protected circuit
F1	5	Indicating instrument, cutoff solenoid, fuel pump, starting relay, time lag relay, cutoff solenoid switching relay, radio
F2	7.5	Forward/reverse driving, parking brake solenoid valve, control lever electronics, backup warning system
F3	15	Horn, front attachments
F4	10	Load stabilizer solenoid valve, additional control circuit solenoid valve (option), switch lights, hose burst valve OFF solenoid valve
F5	15	Additional functions, drive interlock
F6	5	Starting, preheating, high current relay, preheating indicator light
F7	20	Rotating beacon, front/rear working lights, switch lights, instrument lights
F8	10	1-pole socket (cigarette lighter)
Fuse assignment with cabin and machine lights (option)		
F9	7.5	Turn indicators with indicator light, turn indicator relay, brake lights, window heating time lag relay
F10	15	Front/rear wipers, washer pump, wiper switching relay
F11	20	Heating and ventilation fan
F12	15	Heated rear window
F13	10	Interior light, hazard warning system
F14	20	Left/right high beam, left/right low beam, high beam indicator light
F15	5	Left side marker and rear lights, switch lights, instrument lights, front socket, heated rear window, hazard warning system, front wiper
F16	3	Right side marker and rear lights, front socket

Main fuse box with relays

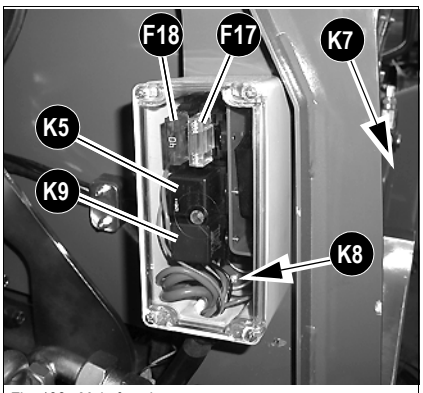


Fig. 193 : Main fuse box

The main fuse box with the power relays and the preheating time control unit is located in the engine compartment on the right on the rear wall

Fuse no.	Rated current (A)	Protected circuit
F17	80 A	Main fuse (machine)
F18	40 A	Preheating , starter, cutoff solenoid

Relay no.	Protected circuit
K5	Preheating
K7	Start high-current relay
K8	Time-lag relay
K9	Cutoff solenoid

Relays (overview)

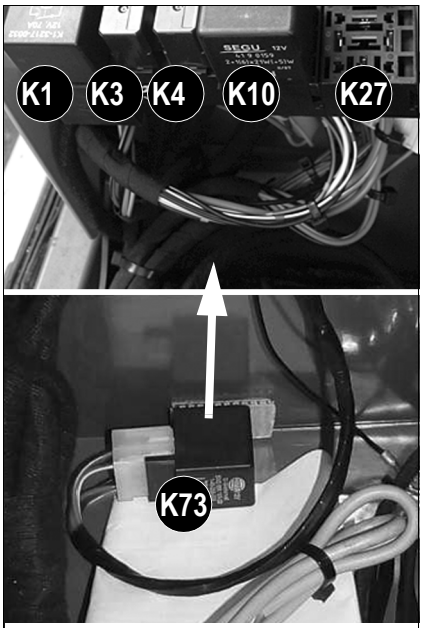


Fig. 194 : Relay positions

The relays are located underneath the switch panel on the side console on the right.

Switching relay no.	Protected circuit
K1	High-current relay
K3	Reverse driving switching relay
K4	Forward driving switching relay
K10	Switching relay – turn indicators
K27	Time lag relay for rear window heating of cabin (option)
K73	Switching relay for operator presence switch (option)

6.10 Tyres

Tyres

Tyre size	Tyre pressure		Wheel rims	
	Front	Rear	Wheel rim	Wheel offset
27x8.5-15 SK02 6PR TT	2.0[1]	2.0	7 x 15	18 mm
28x9.00-15 6PR AC30 TT CO 6PR				
27x10.5-15 120A 8PR SK-02			8LB x 15	0 mm
27x10.5-15 120A2 SK-02				
10 R 16.5 XZSL TL 128A5	1.5[1]	1.5	8.25 x 16.5	−20 mm
10-16.5 S-K02 8PR				
10.0/75-15.3 8PR TS05TL 106 A8			9.00 x 15	
315/55 R16 120K MPT81	2.0[1]	2.0	10LB x 16	−35 mm

1. Increase front tyre pressure by 0.5 bar during pallet forks operation!

6.11 Weights

Wheel loader model 348-01	
Kerb weight with cabin[1]	1790 kg
Kerb weight with canopy (option)	1620 kg
Permissible maximum weight	2250 kg
Front axle weight rating	1550 kg
Rear axle weight rating	
Max. authorized load for towing gear	Not applicable

1. With standard bucket, without driver, standard equipment and full fuel tank

6.12 Noise levels

Wheel loader model 348-01	
Measured value	100 dB
Guaranteed value	101 dB
Operator-perceived noise level (cabin)	82 dB
Operator-perceived noise level (ROPS bar)	84 dB

Notice!

Measurement of sound power level according to EC Directive 2000/14 EC.

Operator-perceived noise level measured according to EC Directives 84/532/EEC, 89/514/EEC and 95/27/EEC.

6.13 Vibrations, oscillation and acceleration value

Vibration[1]	
Overall vibration value for upper extremities of the body	< 2.5 $\frac{m}{s^2}$
Maximum effective value of weighted acceleration for body	< 0.5 $\frac{m}{s^2}$

1. Instruct or inform the operator of danger arising from vibrations

6.14 Coolant compound table

Outside temperature	Water[1]	Antifreeze
Up to °C	% by volume	% by volume
4	99	–
- 10	79	20
- 20	65	34
- 25	59	40
- 35	**55**	**45**
- 42	50	50

1. Water quality at 20 °C = 6.5 – 8.5 ph/overall hardness 3 – 20 °dGH

6.15 Tightening torques

General tightening torques

Screw dimensions	Tightening torques in Nm[1]		
	8.8	10.9	12.9
M4	3	4	5
M5	5.5	8	10
M6	10	14	16
M8	23	34	40
M10	46	67	79
M12	79	115	135
M14	125	185	220
M16	195	290	340
M18	280	400	470
M20	395	560	660
M22	540	760	890
M24	680	970	1150
M27	1000	1450	1700
M30	1350	1950	2300

1. These values are valid for screws with untreated, non-lubricated surfaces.

Specific tightening torques

Designation	Torque
Wheel nut	200 $^{\pm 10}$ Nm

6.16 Payloads

Loader unit with bucket

Wheel loader model 348-01	
Heaped bucket capacity as per ISO 7546[1]	0.35 m^3
Tilt load[2]	1250 kg
Payload[1, 2]	640 kg
Bucket width	1250 mm
Tilt-out height[3, 4]	2250 mm
Pin height[3, 4]	2790 mm
Tilt reach	165 mm
Scraping depth	−50 mm
Tilt-in angle	40°
Tilt-out angle	−45°
Breakout force **lift ram**	12.9 kN
Breakout force **tilt ram**	13.1 kN

1. With standard bucket 1000168564
2. Loader unit in horizontal position
3. With tyres 27x8.5-15
4. + 10 mm with 28x9.00-15 tyres/+ 30 mm with 315/55 R16 tyres / + 30 mm with 10R 16.5 tyres/+ 40 mm with 10-16.5 S-K02 tyres

Payload with pallet forks

Wheel loader model 348-01	
Pallet forks: loader unit in horizontal position: payload at 400 mm load distance	
Safety factor 1.25 **Safety factor 1.67**	750 kg 560 kg

Trailer weight/drawbar load: trailer couplings (option)

Agricultural and forestry tractors Directive 2003/37 EC	Gross trailer weight rating[1]	Gross drawbar load rating
Trailer without brakes	400 kg	75 kg
Trailer with brakes (one braked axle)	1750 kg	
Trailer with brakes (all axles braked)		
Ball[2]	1750 kg	75 kg
For the control mark, refer to the machine documentation and the type label on the trailer coupling		
Towing gear (not the trailer coupling)	Only certified for towing the machine	

1. Bucket certified for travel on public roads must be fitted during trailer operation
2. For further indications, see the type label – D-value of ball coupling ≥ 17.5
   Certification according to Directive 94/20/EC: no. e13 00-1176

6.17 Dimensions with bucket

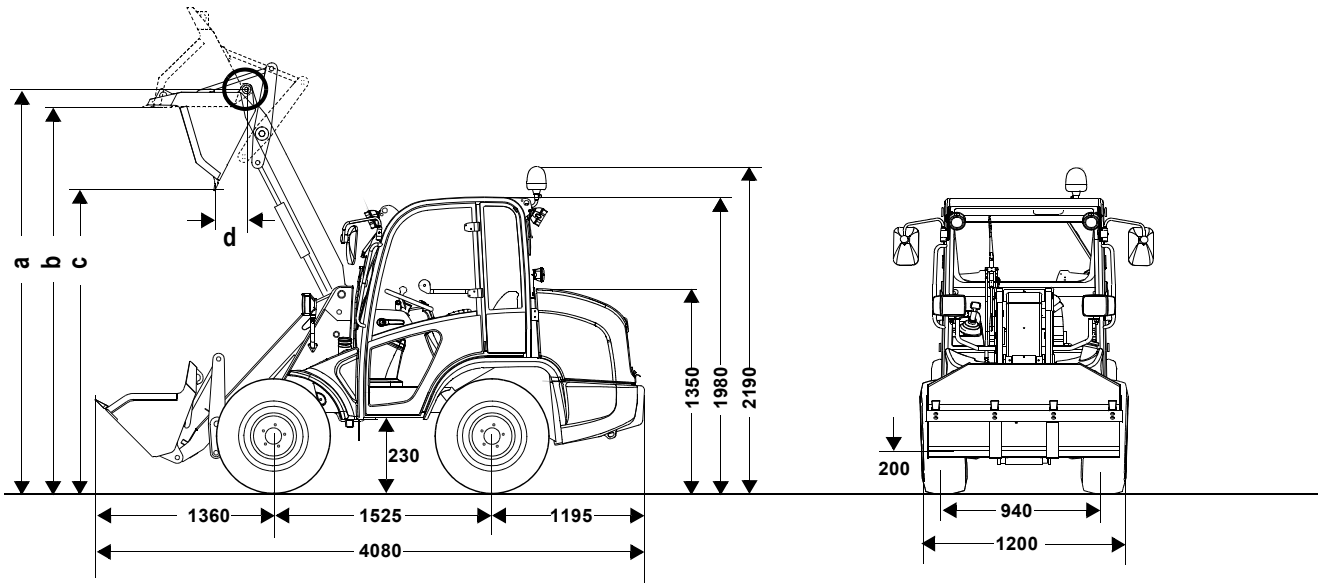


Fig. 195 : Machine dimensions with bucket

Wheel loader model 348-01		
–	Overall length[1, 2]	4080 mm
–	Overall width[1, 3, 4]	1200 mm[5]
–	Overall height with cabin[4, 6, 7]	1980 mm
–	Overall height, upper edge of engine cover[4, 7]	1350 mm
–	Ground clearance in transport position of loader unit	200 mm
–	Ground clearance[4] below axles (protective underbody panel)	230 mm
a	Pin height[4, 7]	2790 mm
b	Load-over height[4, 7]	2680 mm
c	Tilt-out height[4, 7]	2250 mm
d	Tilt reach[1]	165 mm
–	Front/rear track width	940 mm[4] 1016 mm[8] 1046 mm[9]
–	Wheelbase (front/rear axles)	1525 mm
–	Turning radius between kerbs[4] Between walls[1]	1950 mm[5] 2700 mm

1. With standard bucket order no. 1000168669
2. With towing eye hook on counterweight
3. With outside mirrors folded in
4. With tyres 27x8.5-15
5. + 180 mm with 315/55 R16 tyres/+ 100 mm with 10R 16.5 tyres
6. With rotating beacon + 210 mm
7. + 10 mm with 28x9.00-15 tyres/+ 30 mm with 315/55 R16 tyres/+ 30 mm with 10R 16.5 tyres/+ 40 mm with 10-16.5 S-K02 tyres
8. With tyres 10R 16.5/10-16.5 S-K02
9. With tyres 315/55 R16

6.18 Dimensions with pallet forks

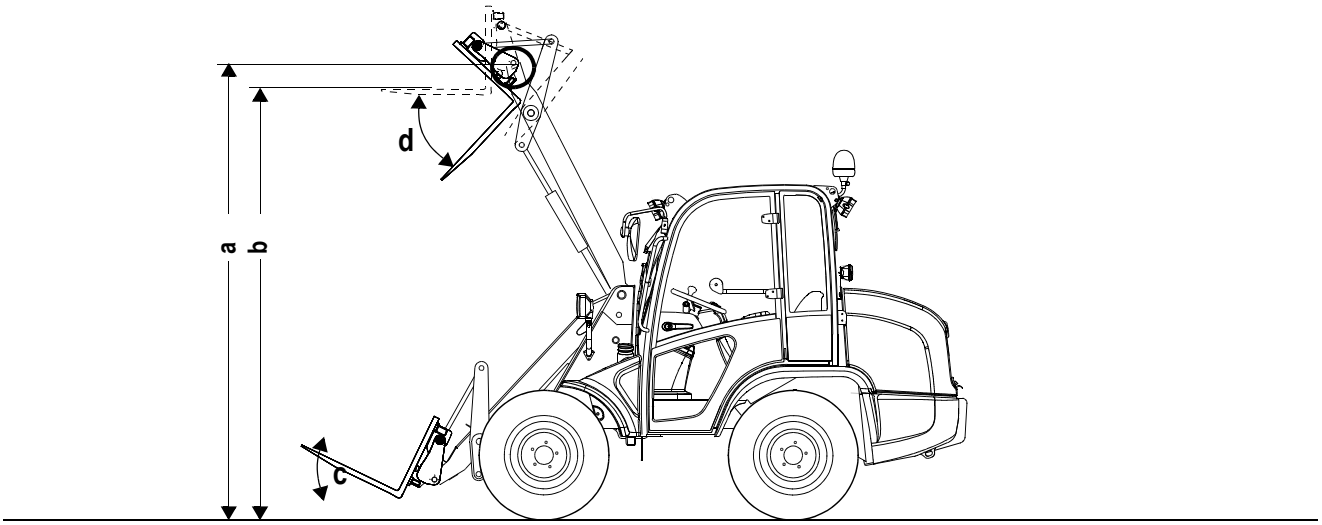


Fig. 196 : Machine dimensions with pallet forks

Wheel loader model 348-01		
a	Pin height[1, 2]	2790 mm
b	Pallet height[1, 2]	2680 mm
c	Tilt-in angle in transport position	17 °
d	Tilt-out angle	75°
–	Turning radius with pallet forks[3] (horizontal fork arms in transport position)	2950 mm

1. With tyres 27x8.5-15
2. + 10 mm with 28x9.00-15 tyres/+ 30 mm with 315/55 R16 tyres / + 30 mm with 10R 16.5 tyres/+ 40 mm with 10-16.5 S-K02 tyres
3. With pallet forks order no. 1000101816 (800 mm)

Notes:

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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 which 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.

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