

Operator's Manual

Wheel loaders

380 / 480 / 580



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

The cover features the machine with possible optional equipment.



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EC declaration of conformity (model 351-01)

Manufacturer

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

Product

Machine designation	351
Model/version	351-01 (380)
Serial number	351 01 _ _ _ _ _
Output kW	45
Measured sound power level dB(A)	100.3
Guaranteed sound power level dB(A)	101

Conformity assessment procedure

The following inspection body was involved in the procedure:
Fachausschüsse Bau und Tiefbau (Notified body number (EU): 0515)
Prüf- und Zertifizierungsstelle im BG-PRÜFZERT
Landsberger Str. 309
D-80687 München

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, 2004/108/EC, 2002/44/EC, 2003/10/EC, 2003/37/EC,
DIN EN ISO 12100-1 and 2, DIN EN 474-1 and 3, DIN EN 14121, DIN EN 3471,
DIN EN 13510, 2000/14 EC and EN ISO 3744: 1995, EN ISO 3746,
DIN EN ISO 3449

Responsible for documentation

Dipl.-Ing. Manfred Mack
KRAMER-WERKE GmbH
Wacker-Neuson-Str. 1
D-88630 Pfullendorf

Pfullendorf, (date)

i. A.

Dipl.-Ing. Manfred Mack
Head of Research & Development
KRAMER-WERKE GmbH



EC declaration of conformity (model 351-02)

Manufacturer

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

Product

Machine designation	351
Model/version	351-02 (480)
Serial number	351 02 _ _ _ _ _
Output kW	45 (58 optional)
Measured sound power level dB(A)	100.3
Guaranteed sound power level dB(A)	101

Conformity assessment procedure

The following inspection body was involved in the procedure:
Fachausschüsse Bau und Tiefbau (Notified body number (EU): 0515)
Prüf- und Zertifizierungsstelle im BG-PRÜFZERT
Landsberger Str. 309
D-80687 München

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, 2004/108/EC, 2002/44/EC, 2003/10/EC, 2003/37/EC,
DIN EN ISO 12100-1 and 2, DIN EN 474-1 and 3, DIN EN 14121, DIN EN 3471,
DIN EN 13510, 2000/14 EC and EN ISO 3744: 1995, EN ISO 3746,
DIN EN ISO 3449

Responsible for documentation

Dipl.-Ing. Manfred Mack
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Pfullendorf, (date)

i. A.

Dipl.-Ing. Manfred Mack
Head of Research & Development
KRAMER-WERKE GmbH



EC declaration of conformity (model 351-03)

Manufacturer

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

Product

Machine designation	351
Model/version	351-03 (580)
Serial number	351 03 _ _ _ _ _
Output kW	58
Measured sound power level dB(A)	100.3
Guaranteed sound power level dB(A)	101

Conformity assessment procedure

The following inspection body was involved in the procedure:
Fachausschüsse Bau und Tiefbau (Notified body number (EU): 0515)
Prüf- und Zertifizierungsstelle im BG-PRÜFZERT
Landsberger Str. 309
D-80687 München

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, 2004/108/EC, 2002/44/EC, 2003/10/EC, 2003/37/EC,
DIN EN ISO 12100-1 and 2, DIN EN 474-1 and 3, DIN EN 14121, DIN EN 3471,
DIN EN 13510, 2000/14 EC and EN ISO 3744: 1995, EN ISO 3746,
DIN EN ISO 3449

Responsible for documentation

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Pfullendorf, (date)

i. A.

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Head of Research & Development
KRAMER-WERKE GmbH





1 Introduction

1.1 General information on the Operator's Manual

This Operator's Manual applies to the wheel loaders model 351-01/351-02 and contains important information on how to work safely, correctly and economically with the machine. Therefore, it aims not only at new operators, but it also serves as a reference for experienced ones. It helps to avoid dangerous situations and reduce repair costs and down-times. Furthermore, the reliability and the service life of the machine will be increased by following the instructions in the Operator's Manual. This is why the **Operator's Manual must always be kept at hand in proper condition in the machine.**

The Operator's Manual is stored in the storage compartment on the backrest of the seat. Please contact your dealer if you require more information on the machine or the Operator's Manual.

Abbreviations/symbols

 This symbol requires you to carry out the activity described

 Subdivision within lists or an activity. Follow the steps in the recommended sequence

- This symbol stands for a list
 - Subdivision within lists or an activity.
- ➡ Description of the effects of an activity (result)

“Option” = optional equipment

Stated whenever controls or other components of the machine are installed as an option.



Driving direction in drawings or figures.

1.2 General information on machine safety

Your own safety, as well as the safety of others, depends to a great extent on how the machine is moved and operated. Therefore, carefully read and understand this Operator's Manual prior to the first drive. Also read chapter **“Safety instructions”** in order to be prepared for possible dangerous situations as it will be too late for it during operation. As a rule, keep the following in mind:

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

➡ – see chapter 2 “Selection and qualification of staff, basic responsibilities” on page 2-5

Operational safety and readiness of the machine do not only depend on your skill, but also on maintenance and servicing of the machine.

This is why regular maintenance and service work is absolutely necessary.

Extensive maintenance and repair work must always be carried out by an expert with appropriate training.

Insist on using original spare parts when carrying out maintenance and repair work. This ensures operational safety and readiness of your machine, and maintains its value.

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.



Introduction

1.3 Machine outside view

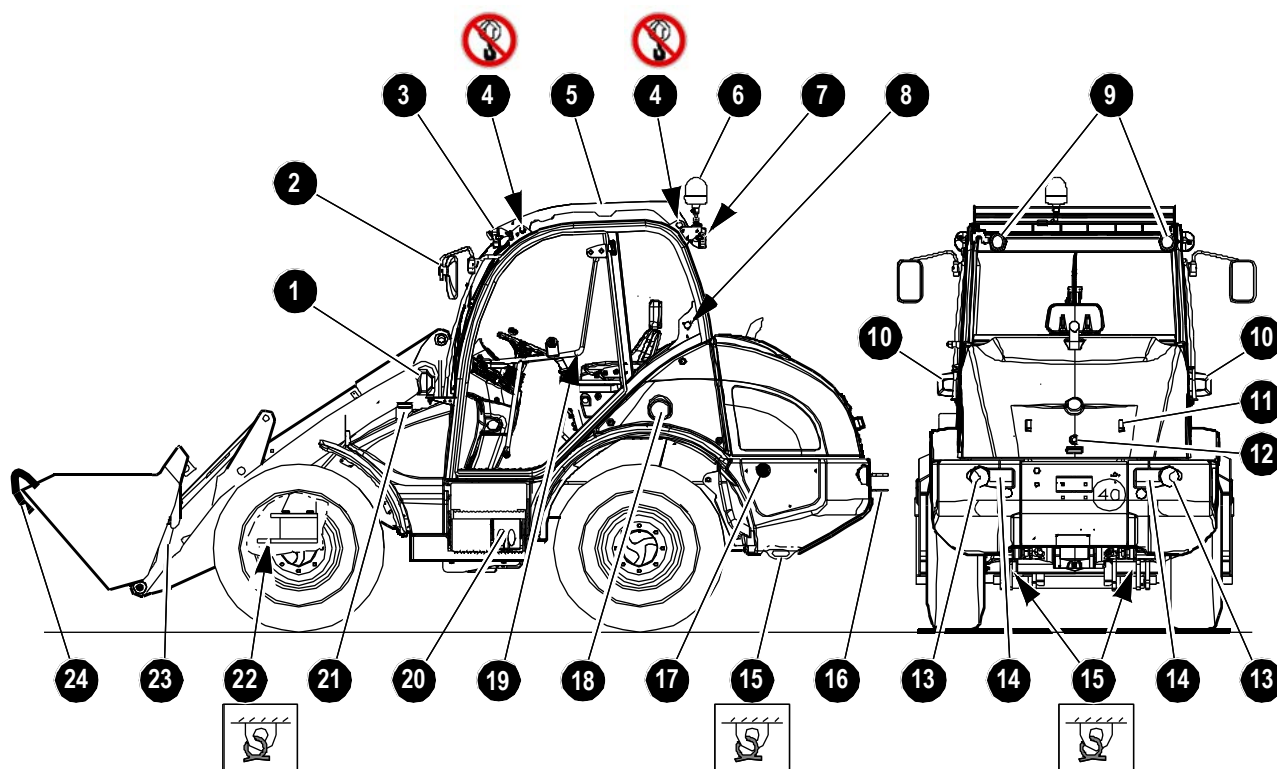


Fig. 1: Machine outside views

Pos.	Description
1	Headlight with turn indicator
2	Rearview mirror
3	Front working light
4	Eye hook ¹ (for removing the cab)
5	Protective FOPS screen (option)
6	Rotating beacon (option)
7	Backup warning system (option)
8	Door arrester
9	Rear working light
10	Clearance lights with reflectors (to the rear) (option)
11	Numberplate light (option)
12	Engine cover lock
13	Brake, rear and turn indicator lights

Pos.	Description
14	Reflectors
15	Rear hooks for loading/tying down the machine (left/right)
16	Towing facility
17	Socket (oil and fuel preheater option)
18	Additional fuel tank filler inlet (option)
19	Handle
20	Wheel chock
21	Fuel tank filler inlet
22	Front hooks for loading/tying down the machine (left/right)
23	Quickhitch for attachments
24	Front-edge protection

1. Eye hooks are for removing the cab only, and may not be used for crane handling the machine



1.4 Models and trade names: overview

Wheel loader model	Trade name
351-01	380
351-02	480
351-03	580

1.5 Brief description of the wheel loader

General information on the machine

According to German traffic regulations and the German agricultural and forestry tractors provision, the model 351-01/351-02/351-03 wheel loaders are self-propelled work machines, tractors or equipment carriers.

See also the wheel loader's "Data Confirmation" (Germany) and "Licence Certificate" (Germany).

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

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 Fields of application and using a wheel loader with an attachment](#) on page 1-5.

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](#) and ["Load hook \(option\)" on page 3-93](#).

Main components of wheel loader

- ROPS/FOPS tested cab (closed version)
- Water-cooled Deutz four-cylinder in-line engine, exhaust emissions according to EC standard 2004/26 EC
- Sturdy steel sheet frame; rubber-mounted engine
- Automotive drive, infinitely variable hydrostatic axial-piston gearbox; maximum speed 20 kph (35 or 40 kph options)
- Hydraulic four-wheel power steering with emergency steering features
- Front and rear planetary steering axles, rear axle with oscillation
- Service brake (brake disc on front axle drive shaft, and also on rear axle drive shaft for 30 – 40 kph machines)
- Parking brake (brake disc on front axle drive shaft)



Introduction

Hydrostatic drive

The diesel engine permanently drives a hydraulic pump (variable displacement pump), whose oil flow is sent to a hydraulic motor flanged on the gearbox. The force of the hydraulic motor is transmitted to the rear axle via the transfer gearbox. At the same time, the front axle is driven by the cardan shaft, ensuring permanent 4 wheel drive.

Work hydraulics and 4 wheel steering

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

When the machine is in operation, the entire diesel engine output can be transmitted to the gear pump for work hydraulics and steering. This is made possible by a so-called inching valve which responds as soon as the service brake 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 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 gauges and the telltales on the instrument panel of the machine ensure constant monitoring of the coolant temperature and level, and of the hydraulic oil temperature.

1.6 Wheel loader warranty

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

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



1.7 Fields of application and using a wheel loader with an attachment

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



Caution!

In order to avoid damage to the machine, only the attachments listed in the table have been authorised for installation on the machine.

Mounting attachments other than Kramer is only allowed if they correspond to the description in chapter "Operation", "[Equipping the machine with a standard bucket](#)" on page 3-66, "[Fitting a multipurpose bucket](#)" on page 3-75 and "[Fitting pallet forks](#)" on page 3-85.

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

The attachments complying with German road traffic regulations and the applicable provisions are listed in the **General Certification for Vehicles** (Germany) or the **data confirmation** (Germany)!

Attachments listed neither in the **General Certification for Vehicles** (Germany) nor in the **Data confirmation** (Germany) require a **Separate Certification for Vehicles** (Germany) made out by the competent authority!

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

Attachments with authorised material densities

Description of attachment	Wheel loader	Part no. (model)	Dimensions mm (in)	ISO 7546 capacity struck/heaped m³	Use
Standard bucket (normal material)	351-01	1000102344 ¹ 1000160648 ¹	1750 (68.90) with teeth 1750 (68.90) without teeth	0,55/0,65	Loosening, picking up, transporting and loading loose or solid material (material density ≤ p = 1.8 t/m³)
	351-02	1000096388	1850 (72.83) with teeth	0,65/0,75	
		1000137538 ¹	1850 (72.83) without teeth		
	351-03	1000110166 1000110167	1750 (68.90) with teeth 1750 (68.90) without teeth	0,55/0,65	
		1000154547	1950 (76.77) with teeth	0,75/0,85	
		1000245973 ¹	1950 (76.77) without teeth		
Standard bucket (lightweight material)	351-01	1000137538 ¹	1850 (72.83) without teeth	0,9/1,1	Picking up, transporting and loading very lightweight material (material density ≤ p = 1,3 t/m³)
	351-02	1000096393 ²	2050 (80.70) without teeth		
	351-03	1000096394 ^{1, 2}	2150 (84.64) without teeth	1,1/1,3	Picking up, transporting and loading lightweight material (material density ≤ p = 0,9 t/m³)
Standard bucket (super-lightweight material)	351-01	1000096394 ²			
	351-02	1000096397 ²			
	351-03	1000187889 ^{1, 2}	2300 (90.55) without teeth		



Introduction

Description of attachment	Wheel loader	Part no. (model)	Dimensions mm (in)	ISO 7546 capacity struck/heaped m³	Use
Multipurpose bucket ³	351-01	1000187786 1000187787	1750 (68.90) with teeth 1750 (68.90) without teeth	0,55/0,65	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)
	351-02	1000187296 1000187297	1850 (72.83) with teeth 1850 (72.83) without teeth	0,65/0,75	
	351-03	1000236118 1000236120	1950 (76.77) with teeth 1950 (76.77) without teeth	0,75/0,85	
Side swing bucket ³	351-01	1000175757	1744 (68.66) without teeth	0,45/0,55	Standard bucket, however with benefits for filling and backfilling material (material density ≤ p = 1,8 t/m³)
	351-02	1000176121	1844 (72.60) without teeth	0,6/0,7	
	351-03				
Verge grading bucket ^{3, 4}	351-03	1000111078	Without teeth	–	For stripping and picking up verge material
High-tilt bucket ^{3, 4}	351-01	1000156433 1000154475	1850 (72.83) without teeth	–	As standard bucket, however with a 80 – 100 cm higher dump height (material density ≤ p = 1,3 t/m³)
	351-02				
	351-03				
Heavy duty bucket with hydraulic clamp ^{3, 4}	351-01	1000111090	1850 (72.83)	0,6/0,7	Picking up and transporting e.g. bulky recycling material (material density ≤ p = 1,3 t/m³)
	351-02	1000111053	2050 (80.70)	–	
	351-03	1000100611	1850 (72.83)		
Heavy duty forks with hydraulic clamp (silage fork) ^{3, 4}	351-01 351-02	1000128262	1800 (70.86)	–	Picking up and transporting e.g. bulky and fibrous recycling material (e.g. grass, manure, brushwood; material density ≤ p = 1,3 t/m³)
Manure forks with grab ^{3, 4}	351-01 351-02	1000178474	1800 (70.86)	–	Picking up and transporting e.g. grass, manure, brushwood and straw
Pallet forks ^{3, 4}	351-01	1000237357 1000237358	1000 (39.37) 1200 (47.24)	–	Picking up and transporting pallets
	351-02				
	351-03				
Pallet forks with foldable fork arms ^{3, 5}	351-01 351-02 351-03	1000237336	1200 (47.24)	–	
Pallet forks (hydraulic lateral displacement) ^{3, 4}	351-01 351-02 351-03	1000247565	1200 (47.24)	–	
	351-03	1000182585	1500 (60.00)		
Pallet forks, floating fork arms ^{3, 4}	351-01 351-02	1000177240	1000 (39.37)	–	
	351-03	1000178334	1200 (47.24)		



Description of attachment	Wheel loader	Part no. (model)	Dimensions mm (in)	ISO 7546 capacity struck/heaped m³	Use
Material pusher ⁴	351-01 351-02 351-03	1000050660	3000 (118.11)	–	For moving loose bulk material
	351-03	1000100759	4000 (157.48)	–	
Tree replanter ⁴	351-01 351-02 351-03	1000100840	–	–	Digging and transporting nursery trees
Front scarifier ⁴	351-01 351-02 351-03	1000100841	–	–	Scarifying dense soil, loosening humus soil
Round bale clamp ^{3, 4}	351-01 351-02 351-03	1000177701	800 – 1800 (31.49 – 70.86)	–	Picking up and transporting silage, straw and hay bales
Rotary broom ^{3, 6}	351-01 351-02	1000139717	–		Sidewalk and street cleaning
Snow plough ^{3, 6, 7}	351-01 351-02	1000142915	–		Winter service

1. With screwed-on blade
2. When driving on public roads (Federal Republic of Germany), additional clearance lights (order no. 1000185392) with reflectors must be installed on the left and right of the cab. Get informed on and follow the legal regulations of your country.
3. See the Operator's Manual of the attachment for putting the attachment into operation and using it
4. Not authorised for use on public roads (Federal Republic of Germany)
5. Fork arms must be folded up when driving on public roads (Federal Republic of Germany)
6. Get informed on the legal regulations of your country which may require specific permits, certifications, registrations etc. for use on public roads!
7. Only in connection with rotating beacon order no. 1000133985

For more information on attachments, see:

Merkblatt für Anbaugeräte (leaflet with specific instructions for attachments) §30 Abs. 10/11/12 StVZO (Federal Republic of Germany)

Merkblatt für angehängte land- oder forstwirtschaftliche Arbeitsgeräte (leaflet with specific instructions for hitching agricultural or forestry equipment onto the machine according to German legislation)



1.8 Legal regulations regarding wheel loader operation

General safety instructions



Danger!

Transporting accompanying persons in the cab, on the wheel loader or in/on the attachments is not allowed!

Before leaving the seat, also apply the parking brake and stop the diesel engine!

Driving or operating the wheel loader outside the operator's compartment is not allowed!

 Put the wheel loader into service only when seated on the seat

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 driving the wheel loader:

Driving licence category L (new, European Union)

- Self-propelled work machines up to 25 kph
- Tractors and agricultural or forestry machinery 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
- Tractors and agricultural or forestry machinery 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 ein 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-hand side of their machines.

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



Machine inspections

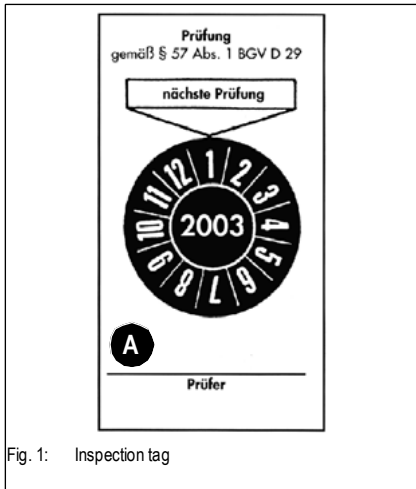


Fig. 1: Inspection tag

When operating the machines, the national safety regulations must be followed as well, for instance 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.

Inspections must be carried out 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 carried out, too.

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

🔑 *Fasten inspection tag A for evidence*

➡ The inspection tag can be acquired from the inspection authorities

Bear in mind that all work equipment is inspected, i.e. 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 instance, 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, e.g.:

- General Certification for Vehicles (Germany) or data confirmation (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

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 operator and to be fitted on the machine, for instance:

- 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

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

Machine warning identification (option)

From 01.10.1998 onwards, § 52 clause 4.1 of StVZO German road traffic regulations require 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 30 710 in connection with a yellow rotating beacon (option).

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



Introduction

1.9 Type labels and component numbers

Serial number

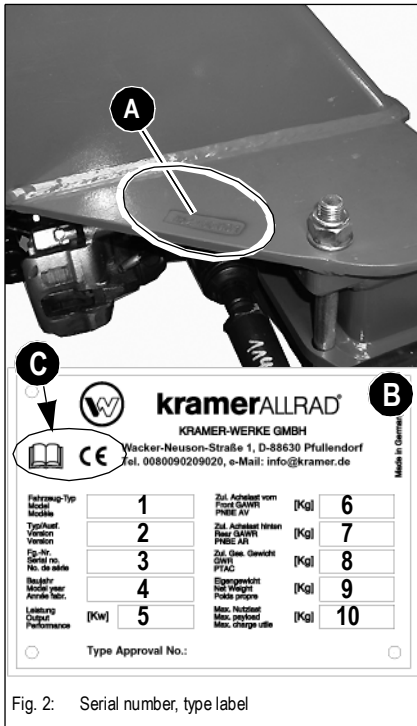


Fig. 2: Serial number, type label

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

The **CE** mark **C** 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 carried out.

Type label indications (example)

1	Machine model	351
2	Version	351-01
3	Serial no.	351 01 0055
4	Year of construction	2010
5	Output (kW)	45
6	Front gross axle weight rating (kg)	4000
7	Rear gross axle weight rating (kg)	4000
8	Gross weight rating (kg)	6500
9	Dead weight (kg)	–
10	Maximum payload (kg)	–

Other information – see [chapter 6](#) “Specifications” on page 6-1

Cab number

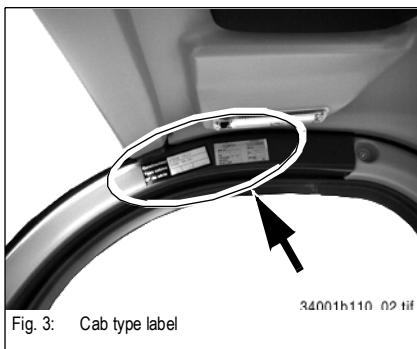


Fig. 3: Cab type label

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

Engine number

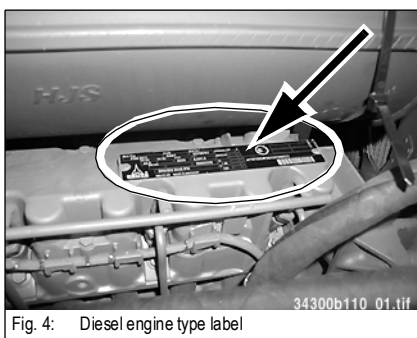


Fig. 4: Diesel engine type label

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

Example: Deutz D 2011 L04 W



Variable displacement pump number

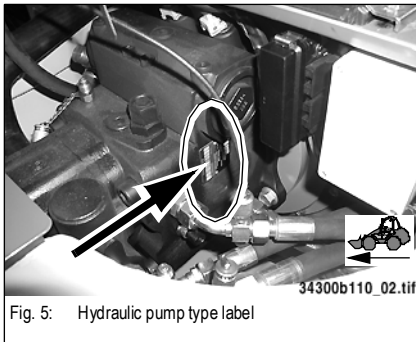


Fig. 5: Hydraulic pump type label

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

Variable displacement motor number

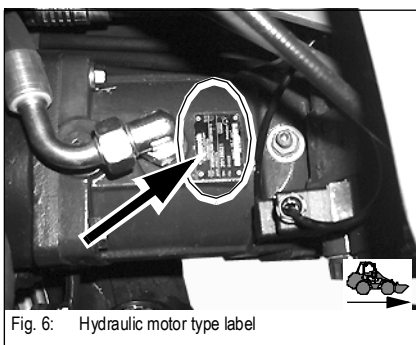


Fig. 6: Hydraulic motor type label

The type label (arrow) is located on the hydraulic motor, on the right in driving direction.

Rear axle number

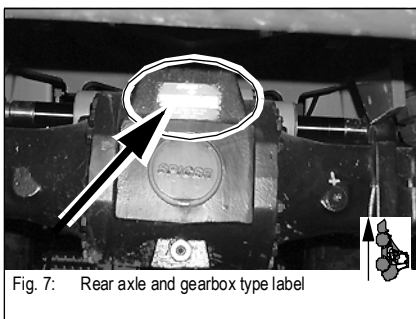


Fig. 7: Rear axle and gearbox type label

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

Front axle number

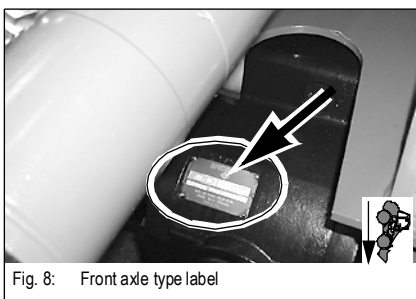


Fig. 8: Front axle type label

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



Introduction

1.10 Description of labels and symbols

Labels on the outside of the machine



Fig. 9: Cab eye hook label

Cab eye hook label

The eye hooks on the cab are for removing the cab only and may **not** be used for crane handling the machine – see [chapter 3](#) “Crane handling the machine” on page 3-59 for further details.

Location

Cab roof (4x).

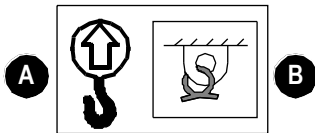


Fig. 10: Label for loading and tying down the machine

Label for loading and tying down the machine

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

➡ – see [chapter 3](#) “Crane handling the machine” on page 3-59

➡ – see [chapter 3](#) “Loading and transporting the machine on a transport vehicle” on page 3-60

Location

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

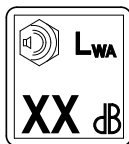


Fig. 11: Noise level label

Noise level label

Noise levels produced by the machine.

➡ L_{WA} = sound power level – see [chapter 6](#) “Noise levels” on page 6-12

Location

On the rear window.



Fig. 12: Speed label

Label: maximum design-specific speed

Design-specific max. machine speed 20 kph (30/40 kph option)

Location

At the rear of the machine and on the left/right of the counterweight.



Fig. 13: Danger label

Label: general indication of danger

This label warns persons standing or working near the machine of an existing danger within the area of increased danger around the machine.

Location

Front left and right of loader unit, and at rear of machine.

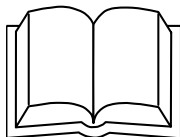


Fig. 14: Explanation of "Book" symbol

Explanation of "Book" symbol

The **"Book"** symbol on a label means that the indications are explained in further detail in the Operator's Manual.

Location

On labels.

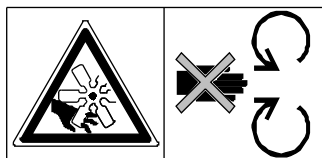


Fig. 15: Prohibitive label: turning parts

Label: Danger of shearing!

Caution! Do not touch any moving or turning parts!

Carry out inspections and maintenance work only at engine standstill!

Location

In the area of the engine cooling (V-belt guard)

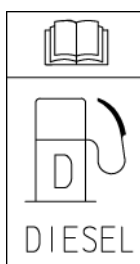


Fig. 16: Label: fuel filler opening

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-hand side of machine)



Introduction

Labels inside the cab

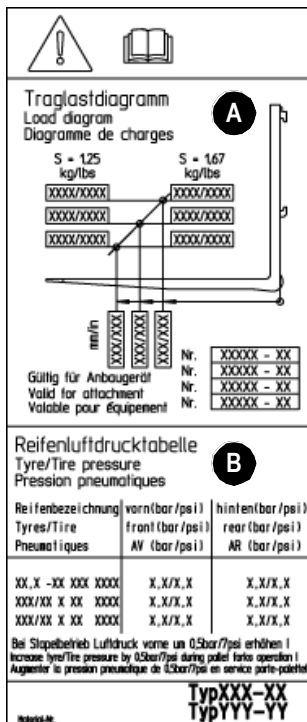


Fig. 17: Load diagram

Label: load diagram (A) for pallet forks and tyre pressure table

The framed weight indications state the maximum authorised 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 on how to read the load diagram – see chapter 3 “Load diagram for pallet forks” on page 3-89



Important!

The load diagram is valid only for applications with pallet forks!

- see Attachments with authorised material densities on page 1-5.

Observe the specific loads of other attachments used, e.g. rotary crane jib.

Label (B): tyre pressure table

List of authorised types of tyres with prescribed tyre inflation pressures.

– see chapter 6 “Tyres” on page 6-11

Location

Inside the cab, on left side of front window

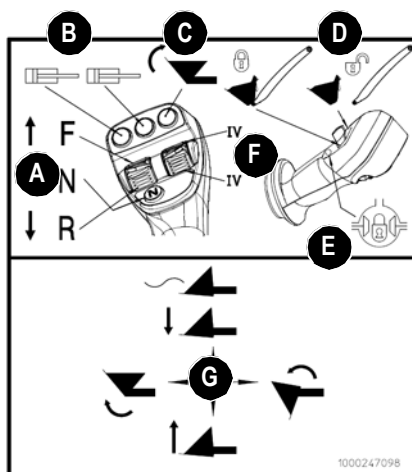


Fig. 18: Control lever label

Label: control lever (joystick) operation

- A = driving direction: (F) forwards (R) reverse and (N) neutral position
- B = additional control circuit with additional functions (option)
- C = automatic bucket repositioning (option) or front socket power supply
- D = locking/unlocking an attachment fitted on the quickhitch
- E = differential lock
- F = 4th control circuit (option)
- G = loader unit control pattern: raise/lower and dump in/out (optional float position)

Location

On the right-hand side window next to the control lever (joystick)

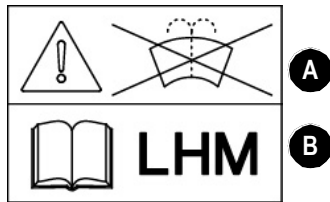


Fig. 19: Brake fluid label

Brake fluid label

A = Caution! Do not fill in any water!

B = Use only LHM brake fluids!

- – see chapter 5 "Maintenance of the brake system" on page 5-23
- – see chapter 5 "Fluids and lubricants" on page 5-43

Location

On the trim next to the brake-fluid tank (left-hand side cab access)



Fig. 20: Operator's Manual label

Operator's Manual label

Caution! Read and understand this Operator's Manual before putting the machine into operation, and before servicing or repairing it.

Location

On the right-hand side member inside the cab

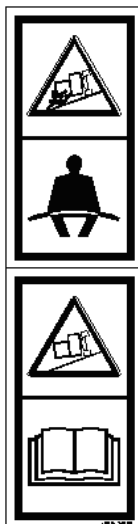


Fig. 21: Label: seat, fastening the seat belt

Label: seat belt and machine stability

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

Location

On the right-hand side member inside the cab



Fig. 22: Label: read and understand the service manual

Label: Remove the ignition key!

Caution! Remove the ignition key before working on the machine.

- Read and understand the service manual

Location

On the right-hand side member inside the cab



Introduction



Fig. 23: Prohibitive label: no transport of persons

Label: No transport of persons!

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

Location

Inside the cab, on right side of front window.



Fig. 24: Prohibitive label: no other persons allowed

Label: No other persons allowed in the cab!

Warning! Carrying or transporting accompanying persons in the cab or on the wheel loader is not allowed!

Location

In the cab (near the tool kit)

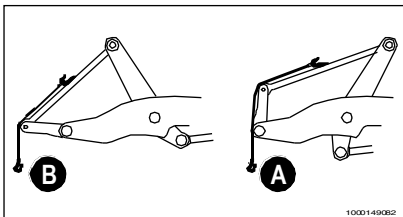


Fig. 25: Label: load hook diagram (option)

Label: load hook diagram (option)

Example: Maximum load capacity

- A Extended loader unit and quickhitch tilted in
➔ Max N => 2200 kg
- B Extended loader unit and quickhitch
➔ Max N => 1700 kg

Location

Inside the cab, on left side of front window

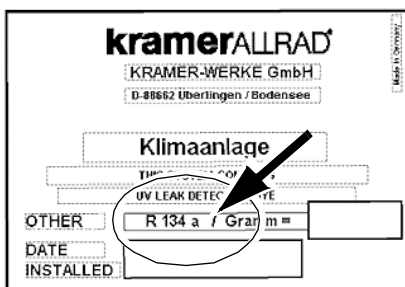


Fig. 26: Label for air conditioning system refill (option)

Label for air conditioning system refill (option)

Use only the refrigerants **R 134a** indicated on the label (see arrow) for refilling the air conditioning system.

Location

Inside the cab



Labels in the engine compartment



Fig. 27: Label: hot fluid (coolant)

Label: Container under pressure, danger of burns!

The container is hot and under pressure. Do not open the container as long as it is still hot.
Open the container only after the coolant has cooled down
Open the cover carefully and slowly to allow the pressure to escape.

Location

In the engine compartment next to the expansion tank (coolant)



Fig. 28: Label: hot surface

Label: Danger of burns!

Caution! Do not touch.

Location

On the rear wall of the engine compartment, on the left next to the exhaust silencer and the filler inlet (hydraulic oil tank).

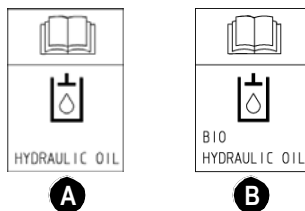


Fig. 29: Label: filler opening for hydraulic oil

Label: filler opening for hydraulic oil

A = hydraulic oil or B = biodegradable hydraulic oil

➡ – see [chapter 5](#) “Important information for the use of biodegradable oil” on page 5-17

Location

On the rear wall of the engine compartment, on the left next to the filler inlet (hydraulic oil tank)



Introduction

Notes:



2 Safety instructions

2.1 Identification of warnings and dangers

Important indications regarding the safety of the staff 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 result in 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 result in damage to the machine.

 *Measures for avoiding danger for the machine*



Important!

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 result in damage to the environment.

The environment is in danger if environmentally hazardous material (e.g. waste oil) is not subject to proper use or disposal.



2.2 Designated use and exemption from liability

- **Carrying or transporting accompanying persons in the cab or on the wheel loader is not allowed! Carrying or transporting persons in the attachments (e.g. bucket, pallet forks) is not allowed either!**
- **The machine may not be used for transport jobs on public roads!**
- **Fire hazard due to hot engine silencer** – the machine may not be used in areas posing a fire hazard (hay or straw storage facilities, etc.) !
- The machine is intended for:
 - moving earth, gravel, coarse gravel or ballast and rubble, and for applications with the attachments listed in chapter Introduction *“Fields of application and using a wheel loader with an attachment”* on page 1-5!
- 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 carrying out 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 carrying out maintenance work 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 prescribed devices are installed and functional!



2.3 General conduct and safety instructions

Organisational measures

- The machine has been designed and built in accordance with state-of-the-art standards and the recognised safety regulations. Nevertheless, its use can constitute 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. Immediately rectify any functional disorders, especially those affecting the safety of the attachment!

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 cab. 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 compulsory regulations may also deal with handling hazardous substances, issuing and/or wearing personal protective equipment, or traffic regulations!
- With regard to specific operational features, e.g. those relevant to job organisation, 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, e.g. 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 (e.g. cab, 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 have 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, e.g. due to oil-soaked rags lying around
 - Danger of injury, e.g. due to dirt or debris on the footholds, and
 - Danger of accident e.g. 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 work!
- Tools and workshop equipment adapted to the task on hand are absolutely indispensable for carrying out service, inspection, maintenance or repair work!



Selection and qualification of staff, basic responsibilities

- Any work on or with the machine must be carried out by reliable staff only. Do not let unauthorised persons drive or work with the machine! Observe statutory minimum age limits!
- Employ only trained or instructed staff on the machine, and clearly and unequivocally define the individual responsibilities of the staff 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 brake systems must be carried out only by technical staff which has been specially trained for such work.
Work on the hydraulic system of the machine must be carried out only by staff with special knowledge and experience in hydraulic systems!
- Seal off the danger area should it not be possible to keep a safe distance.
- Stop work if persons do not leave the danger area in spite of warning! Keep out of the danger area!

Danger area:

The danger area 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 which are thrown out.
- The danger area 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, familiarise yourself with the surroundings and circumstances of the work site. These are e.g. 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 make sure the machine is used only when in a safe and reliable state!
Operate the machine only if all protective and safety-oriented devices, e.g. 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 the machine's working behaviour) to the competent organisation/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 defects rectified immediately!
- Start and operate the machine from the seat only!
- Before leaving the seat, apply the parking brake and stop the diesel engine!
- Carry out start-up and shut-down procedures in accordance with the Operator's Manual, and observe the telltales!
- Before putting the machine/attachment into operation (start-up/moving), make sure 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!
- When driving on public roads, ways and places, observe the valid traffic regulations and, if necessary, make sure 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 make sure 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 driving downhill!
When driving or working across a slope, the load must be on the uphill side of the machine!
- On sloping terrain always adapt your drive speed to the prevailing ground conditions!
Never change to lower gear on a slope but always before reaching it!
- Before leaving the seat always secure the machine against unintentional movement and unauthorised 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:
 - Make sure 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 seat when driving or working!
- Fasten your seat belt
- Inspect the immediate area (children!)
In the work area the operator is responsible for third parties!
- Caution when handling fuel – increased danger of fire!
Make sure 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 carrying out work safely, provide additional lighting of the work area!
- 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 drive 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 (e.g. ropes, chains). 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 applications with lifting gear only if the prescribed safety devices are in place and functional.
These are e.g.:
 - Safe possibilities of slinging and securing lifting gear (load hook)
 - Load diagram!
- 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 sufficiently dimensioned. 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 device of the machine is not permitted!
- Attachments and counterweights affect handling, as well as the steering and brake 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, telltales etc., must be provided for and functional!
- Mount the attachments only if the engine and the drive have been switched off!
- Especially when driving or working with machines equipped with a quickhitch for the attachments, make sure 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: danger of personal injury due to crushing and shearing. Make sure 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, admissible 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 carried out by technical staff only!
- The machine may not be serviced, repaired or test-driven by unauthorised staff!
- Brief operating staff before beginning special operations and maintenance work!
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 work
- If required, secure the maintenance area appropriately!
- Prior to carrying out 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!
- Carry out service, maintenance and repair work only if the
 - machine is positioned on firm and level ground
 - lever for selecting the driving direction is in neutral
 - parking brake is applied
 - all hydraulically movable attachments and working equipment have been lowered to the ground
 - engine is stopped
 - ignition key is removed and 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 authorised for the operation of the machine
 - One person must be seated on the 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, e.g. fan blades, V-belt drives, PTO shaft drives, fans etc.!
- Prior to carrying out assembly work on the machine, make sure 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 work must be carried out by trained staff and an authorised workshop only!**



- Have loads fastened and crane operators instructed by experienced persons only!
The person giving the instructions to the operator must be within sight or sound of him!
- Always use specially designed or otherwise safety-oriented ladders and working platforms to carry out overhead assembly work.
Never use machine parts or attachments/superstructures as a climbing aid!
Wear a safety harness when carrying out maintenance work at greater heights!
Keep all handles, 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 carrying out 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 screwed connections 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!
- Make sure 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!
- Carry out 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 afterwards – danger of burns!
- Retainer pins can fly out or splinter when struck with force – danger of personal 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 danger of fire!



2.6 Maintenance work on protective ROPS and FOPS structures

Cab, roll-over bar, protective screen

- Straightening and welding work on cabs, 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

Electric 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 carried out 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 area
 - Warn others against approaching and touching the machine
 - Have the live wire de-energised
 - Do not leave the machine until the line that has been touched or damaged has been safely de-energised!
- Work on the electrical system may only be carried out 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 earthing strap from the battery when working on the electrical system or when carrying out welding work!
- Starting with a battery jump cable can be dangerous if carried out 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, make sure there is sufficient ventilation!
Observe the regulations in force at the respective site!
- Carry out welding, flame-cutting and grinding work on the machine only if this has been expressly authorised. There can be a risk of explosion and fire, for example!
- Before carrying out welding, flame-cutting and grinding work, clean the machine and its surroundings from dust and other inflammable substances, and make sure the premises are adequately ventilated – danger of explosions!



Hydraulics

- Work on the hydraulic equipment of the machine must be carried out only by persons having special knowledge and experience in hydraulic systems!
- Check all lines, hoses and screwed connections 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 carrying out any implementing/repair work!
- Hydraulic and compressed-air lines must be laid and fitted properly. Make sure 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 (e.g. battery electrolyte – sulphuric acid), observe the product-related safety regulations (safety data sheet)!
- Be careful when handling hot consumables – risk of burning or scalding!

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 jump cable. The battery can burst or explode!

Tyres

- Repair work on tyres and rims must be carried out by technical staff or by an authorised workshop only!
- Damaged tyres and/or wrong tyre pressure reduce the operational safety of the machine. Therefore carry out 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 service hours!



Notes:

3 Operation

3.1 Description of control elements

This chapter describes the controls, and contains information on the function and the handling of the telltales and controls in the cab.

The pages stated in the table refer to the description of the controls.

A combination of digits, or a combination of digits and letters (e.g. 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

Figures carry no numbers if they are placed to the left of the text.

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

The symbols used in the description have the following meanings:

- This symbol stands for a list
 - Subdivision within lists or an activity. Follow the steps in the recommended sequence

 This symbol requires you to carry out the activity described

➡ Description of the effects or results of an activity

n. s. = not shown

“Option” = optional equipment

Stated whenever controls or other components of the machine are installed as an option.

Cab overview: see overleaf

3.2 Cab overview

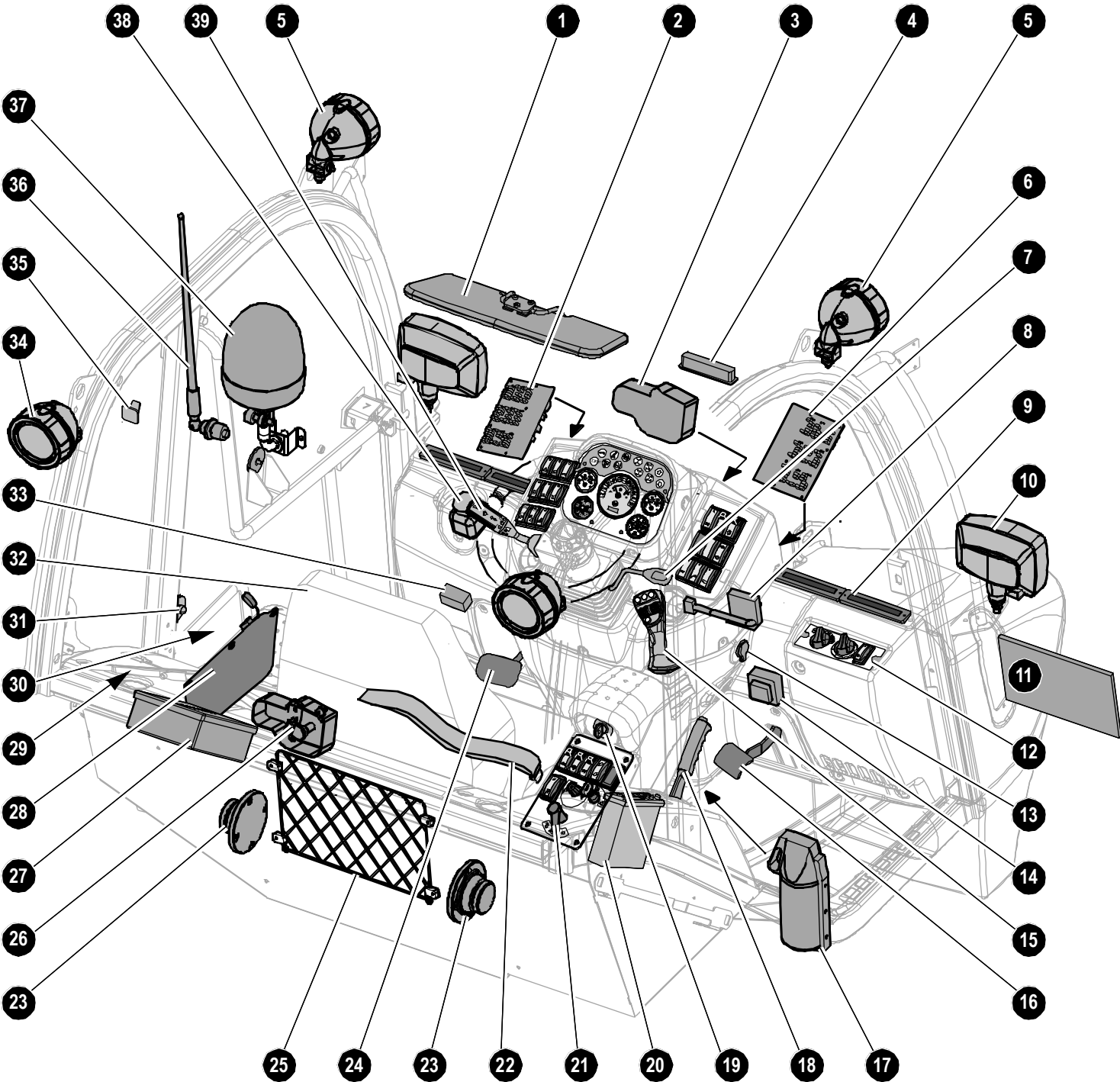


Fig. 30: Cab overview

Inside of cab (overview)		For more information see page
1	Sun visor	
2	Board – relays and fuses (left)	
3	Front window wiper motor	3-49
4	Interior light	3-44
5	Front working light	3-43
6	Board – relays and fuses (right)	
7	Steering column adjustment lever	3-30
8	Steering electronics	
9	Front window air vents (left/right)	3-46
10	Lights	3-43
11	Fresh air filter for heating	3-46
12	Instrument panel – fresh air, heating (air conditioning option)	3-46
13	12 V socket	
14	Proportional electronics control valve	
15	Control lever (joystick)	3-62
16	Accelerator pedal	3-34
17	Fire extinguisher (option)	3-14
18	Parking brake lever	3-36
19	Preheating start switch	3-16
20	Prepared installation for radio (option)	
21	Joystick lock (stop cock) for road travel	3-26
22	Seat belt	3-53
23	Loudspeakers (option)	
24	Brake/inching pedal	3-35
25	Storage net for Operator's Manual	
26	Rear window wiper motor	3-49
27	Fixture – first-aid kit	
28	Tank – washer system	3-49
29	Storage compartment	
30	Tool kit	
31	Left/right-hand side door arrester	3-13
32	Seat	3-50
33	Coolant level sensor amplifier	
34	Rear working light	3-43
35	Hook	
36	Aerial (option)	
37	Rotating beacon (option)	3-45
38	Brake fluid tank	
39	Multifunctional lever – turn indicators, wipers, horn	3-45

Instrument panel overview: see overleaf

Instrument panel overview: see overleaf

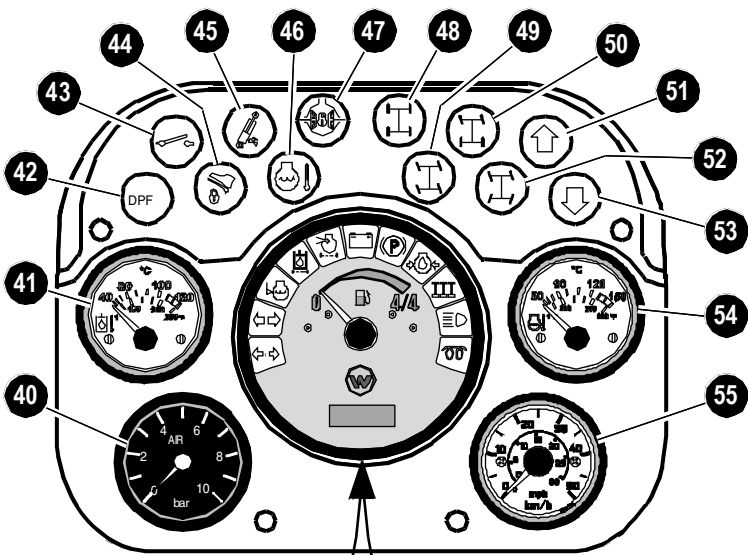


Fig. 33: Indicating instrument overview

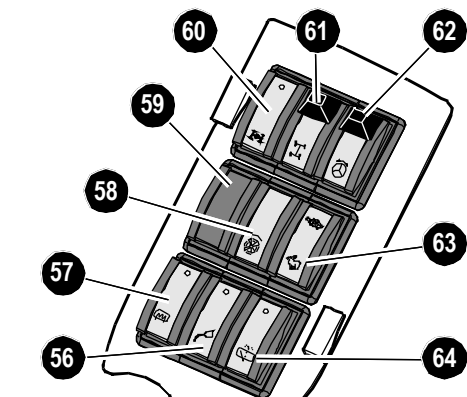


Fig. 31: Right-hand side switch panel

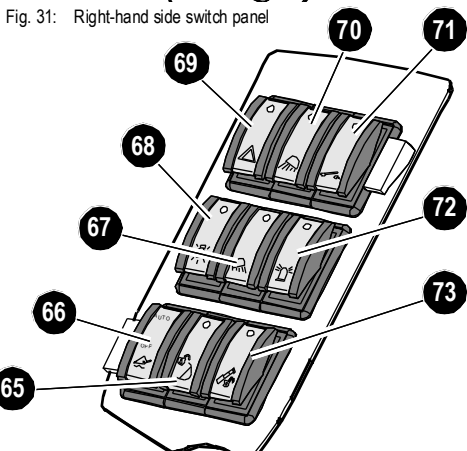


Fig. 32: Left-hand side switch panel

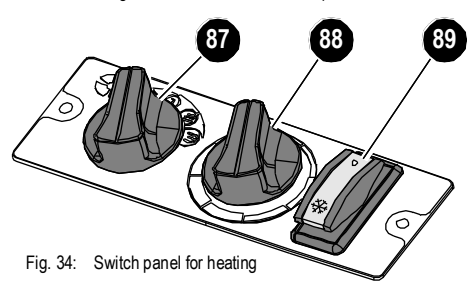


Fig. 34: Switch panel for heating

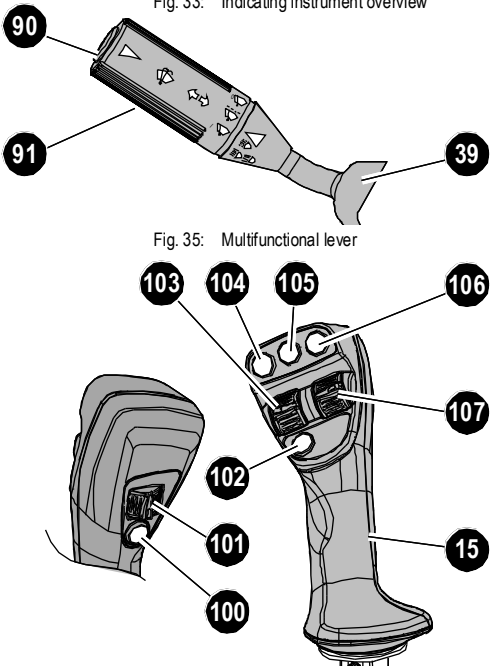


Fig. 35: Multifunctional lever

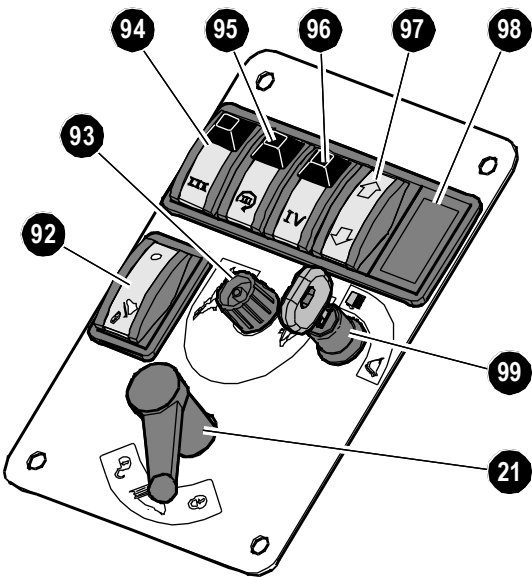


Fig. 36: Control lever (joystick)

Fig. 37: Right-hand side console (overview)

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

Indicating instrument console		For more information see page
40	Not assigned	
41	Hydraulic oil temperature gauge	5-16
42	Telltale (red/yellow/green) – diesel particle filter (option)	5-36
43	Telltale (green) – front socket (option)	3-42
44	Telltale (yellow) – accelerator pedal lock (option)	3-34
45	Hose burst valve, load stabiliser (option) telltale (yellow)	3-40, 3-98
46	Diesel engine temperature telltale (red)	5-5
47	Telltale (green) – not assigned	
48	Steering synchronisation telltale (red)	3-31
49	Telltale (green) – diagonal steering (crab steering option)	3-33
50	Telltale (green) – front axle steering	3-32
51	Forwards driving direction telltale (green)	3-38
52	4 wheel steering telltale (green)	3-32
53	Reverse driving direction telltale (green)	3-38
54	Diesel engine temperature gauge (115 °C ON with acoustic warning/110 °C OFF)	5-9
55	Speedometer (high speed option)	
Switch console on the right		For more information see page
56	Not assigned	
57	Switch (grey) – heated rear window, mirror heating (option)	
58	Not assigned (reversing fan option)	
59	Not assigned	
60	Tip switch (blue) – steering synchronisation	3-31
61	Switch (grey) – diagonal steering (crab steering option)	3-33
62	Switch with lock (blue) – 4 wheel/front axle steering	3-32
63	Speed range selection switch (blue)	3-37
64	Switch (grey) – rear wiper	3-49
Switch console on the left		For more information see page
65	Not assigned – quickhitch lock (option only for telescopic boom)	3-40
66	Switch (green) – load stabiliser (option)	3-43
67	Switch (grey) – rear working light	3-44
68	Lights switch (grey)	3-44
69	Hazard warning system switch (red)	3-45
70	Switch (grey) – front working light	3-44
71	Front socket (option) tip switch (grey)	3-42
72	Switch (grey) – rotating beacon (option)	3-45
73	Not assigned – overload cutoff and emergency lowering (option only for telescopic boom)	



Indicating instrument	For more information see page
74 Hour meter	
75 Right/left turn indicators telltale (green) for rear attachments	3-45
76 Right/left turn indicators telltale (green)	3-45
77 Coolant level telltale (red)	5-9
78 Hydraulic oil filter telltale (red)	5-16
79 Air filter telltale (yellow)	5-11
80 Alternator charge function telltale (red)	5-32
81 Parking brake telltale (red)	3-35
82 Engine oil pressure telltale (red)	5-5
83 Telltale (red) – 3rd control circuit, continuous operation	3-64
84 High beam telltale (blue)	3-44
85 Cold starter telltale (yellow)	3-16
86 Tank gauge (fuel)	
Heating switch console (optional air conditioning)	For more information see page
87 Rotary switch – heater fan	3-46
88 Rotary switch – heating temperature	3-46
89 Air conditioning (option) switch (grey)	3-48
Multifunction lever turn indicators, wipers, horn	For more information see page
90 Horn tip switch	3-45
91 Rotary switch and tip switch – front wiper, washer pump	3-45
Switch console (armrest)	For more information see page
92 Tip switch – accelerator pedal lock (option)	3-34
93 Crawler gear potentiometer/low-speed control (option)	3-39
94 Switch with lock (green) – 3rd control circuit lock	3-63
95 Switch with lock (green) – continuous operation of 3rd control circuit (option)	3-64
96 Switch (green) – front additional control circuit (option)	3-95
97 Switch (green) – rear additional control circuit (option)	3-95
98 Tip switch (green) – raise/lower hydraulic tipper (option only for trailer operation)	
99 Switch – tilt ram lock (option)	
Control lever (joystick)	For more information see page
100 Not assigned	
101 Switch – unlock/lock 3rd control circuit	3-63
102 Tip switch – driving direction in neutral	3-37
103 Switch – forwards/reverse driving direction	3-38
104 Tip switch – additional control circuit with additional functions (option)	3-95
105 Tip switch – additional control circuit with additional functions (option)	3-95
106 Front socket tip switch (option) or bucket repositioning (option)	3-42, 3-94
107 Switch (scroll wheel) – additional control circuit (4th control circuit proportional controls option)	3-97



3.4 Functional description: telltales

Telltale check

All telltales come on briefly for a check when the ignition is switched on.



Caution!

For your own safety and in order to avoid consequential damage to the machine, have defective telltales immediately checked or replaced by an authorised workshop!

Telltales and warning lights on the indicating instrument



Engine oil pressure telltale (red)

Comes on 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



Coolant level telltale (red)



Caution!

Danger of engine breakdown if the telltale comes on with the engine running!

- ☞ Stop engine immediately
- ☞ Check the coolant level – see chapter 5 “Checking the coolant level” on page 5-9



Alternator charge function telltale (red)

The telltale comes on when the ignition is turned on and goes out as soon as the engine runs.

The V-belt or the charging circuit of the alternator is faulty if the telltale comes on with the engine running. The battery is no longer charged.



Right/left turn indicators telltale (green)

Flashes intermittently when the turn indicators are used



Right/left turn indicators telltale (green) on rear attachment

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



High beam telltale (blue)

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



Parking brake telltale (red)

Comes on when the parking brake is applied.

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



Hydraulic oil filter telltale (red)

Indicates inadmissibly high pressure in the hydraulic reflux line to the tank. In this case:

➡ Have the hydraulic oil reflux filter checked and, if necessary, replaced by an authorised workshop



Air filter telltale (yellow)

➡ Indicates air filter contamination.



Telltale (red) – continuous operation of 3rd control circuit (hydraulics)

Comes on during operation of an attachment with its own hydraulic circuit (e.g. rotary broom with hydraulic motor).

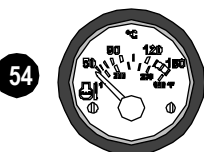


Telltale (yellow) – preheating time lag relay

Comes on when the key in preheating start switch is in position 1.

➡ A glow plug preheats the intake air of the diesel engine during this time.

Telltales and indicators on the instrument panel

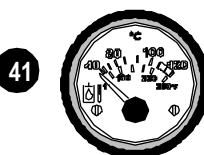


Temperature gauge with acoustic warning – engine (coolant)

Indicates the engine temperature detected by a sensor.

Engine temperature should be between 80 and 105 °C.

- Max. admissible temperature is 110 °C.
- The acoustic warning sounds from 115 °C
- – see chapter 5 “General instructions regarding cooling system maintenance” on page 5-7



Hydraulic oil temperature gauge

Indicates the hydraulic oil temperature detected by a sensor.

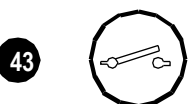
- – see chapter 5 “Monitoring the hydraulic oil and the reflux filter” on page 5-15



Telltale (red/yellow/green) – diesel particle filter (option)

The LED indicates the status in the exhaust gas particulate filter system.

➡ – see chapter 5 “Checking the electronic filter monitoring” on page 5-38



Telltale (green) – front socket (option)

The LED indicates whether electrically operated attachments are connected.



Telltale (yellow) – accelerator pedal lock (option)

Indicates that the accelerator pedal lock is switched on (manual throttle).



45



Telltale (yellow) – hose burst valve/load stabiliser (option)

Indicates that the load stabiliser is switched on, and that the hose burst valve is disabled.

➡ – see *Load stabiliser (option)* on page 3-40 and *“Hose burst valve” safety feature (option)* on page 3-98

46

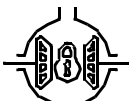


Telltale (red) – hydraulic oil temperature

Indicates that the temperature in the hydraulic system is too high.

➡ – see *chapter 5 “Monitoring the hydraulic oil and the reflux filter”* on page 5-15

47



Telltale (green) – differential lock

Indicates that the differential lock is switched on

48



Telltale (red) – steering synchronisation

Indicates that the wheels on both axles are aligned.

49



Telltale (green) – diagonal steering (crab steering option)

Indicates that diagonal steering is switched on

50



Telltale (green) – front axle steering (option)

Indicates that front axle steering is switched on

52



4 wheel steering telltale (green)

Indicates that 4 wheel steering is switched on

53



51



Telltale (green) – driving direction

Indicates forwards or reverse driving direction



3.5 Putting the wheel loader into service

Safety instructions regarding commissioning

- Only use the steps and handles when entering and leaving the cab
- Face the machine as you enter and leave it
- Never use the controls or movable lines and cables as handles
- Keep the footholds and the handles clean to ensure a safe hold at all times
 - Immediately remove dirt, such as oil, grease, earth, snow or ice
- Never get on or off a moving machine! Never jump off the machine
- Stop the diesel engine and apply the parking brake before leaving the wheel loader
- **Always observe the warning and information labels, and the load diagrams (e.g. pallet forks) of the loader unit**

Important information for the operating staff

- The operating staff (driver) must have read and understood this Operator's Manual before putting the machine into operation
- The machine may be put into operation by authorised staff only
 - ➡ – *see chapter 1 "Driving licence"* on page 1-8 and – *see chapter 2 "Selection and qualification of staff, basic responsibilities"* on page 2-5 of this Operator's Manual.
- **The machine may only be put into operation when the driver is seated**
- **Carrying or transporting accompanying persons in the cab or on the wheel loader is not allowed**
- The machine may only be used in technically perfect condition in accordance with its designated use and the instructions set forth in the General Certification for Vehicles (Germany), the data confirmation (Germany) and in the Operator's Manual, and only by persons who are fully aware of the risks involved in operating the machine
- Run through the checklists in the following tables

Running-in period of wheel loader

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

Observe the following recommendations during the running-in period.

- Do not overload the machine, but at the same time do not drive too cautiously either, as the machine will never reach its proper operating temperature
- Do not run the engine at high speed for extended periods
- Increase the load gradually while varying the engine speed
- Never let the engine run at idling speed for longer time – *see Starting the engine* on page 3-16
- Strictly observe maintenance schedules and carry out (or have carried out) the specified maintenance work – *see chapter 5 "Maintenance plan"* on page 5-47



3.6 Checklist

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 jobs listed below are described in greater detail in subsequent chapters of the Operator's Manual.

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 service or starting the engine:

No.	Starting checklist	✓
1	Enough fuel in the tank? (► 5-3)	
2	Engine oil level OK? (► 5-5)	
3	Oil level in hydraulic tank OK? (► 5-16)	
4	Water level in washer tank OK? (► 3-2)	
5	V-belt condition and tension checked? (► 5-13)	
6	Loader unit lubricated? (► 5-20)	
7	Brake system (including parking brake) OK? (► 3-35)	
8	Tyre condition and inflation pressure OK? (► 5-24, 6-11)	
9	Wheel nuts safely tightened (especially after a wheel change)? (► 6-13)	
10	Lights, signals, indicators, warning lights and telltales OK? (► 3-43, 3-45, 3-6)	
11	Windows, mirrors, lights and steps clean?	
12	Attachment on the loader unit safely locked? (► 3-63)	
13	Engine cover safely locked? (► 3-14)	
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? (► 3-50)	
17	Seat belt fastened? (► 3-53)	



Operation checklist

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

No.	Operation checklist	✓
1	Telltale for engine oil pressure and alternator gone out? (→ 3-16)	
2	Braking effect sufficient? (→ 3-35)	
3	Temperature gauge for engine coolant in normal range? (→ 3-6)	
4	Steering system working properly? (→ 3-26)	
5	Anyone dangerously close to the machine? (→ 2-6)	
6	3rd control circuit locked? (→ 3-63)	
When driving on public roads, particular attention should be paid to the following points:		
7	Bucket and attachments in transport position? (→ 3-26)	
8	Transport locks installed? (→ 3-26)	
9	Control lever for lift and tilt hydraulics of the loader unit locked with the stop cock? (→ 3-26)	
10	Front-edge protection fitted to bucket?	

Parking checklist

Check and observe the following points when parking the machine:

No.	Parking checklist	✓
1	Attachments on the loader unit lowered to the ground? (→ 3-67)	
2	Parking brake applied? (→ 3-36)	
3	Diesel engine stopped? (→ 3-17)	
4	Cab locked, especially if the machine cannot be supervised? (→ 3-12)	
When parking on public roads:		
5	Machine adequately secured? (→ 3-58)	
When parking on slopes:		
6	Machine additionally secured with chocks under the wheels to prevent it from rolling away? (→ 3-58)	



Operation

3.7 Cab

Safety instructions regarding cab entrance and exit

- Remove dirt (oil, grease, earth, snow and ice) from handles, footholds and shoes before entering the cab
- Use only the machine footholds, platforms and handles for entering the cab
- Face the machine as you enter and leave it



Danger!

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

- ☞ Lock the door or secure it in the door arrester before moving the machine
 - See [Locking/unlocking the door](#) on page 3-12 or [Securing an open door in the arrester](#) on page 3-13

Locking/unlocking the door



Fig. 38: Outside door opener and lock

- ☞ Opening the door from the outside:
 - Press door button **A**
- ☞ Locking the door:
 - Lock the door with the ignition key (turn to the right)
- ☞ Unlocking the door:
 - Unlock the door with the ignition key (turn to the left)

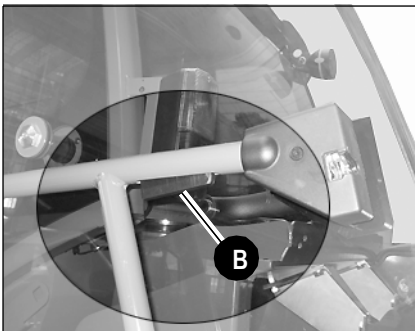


Fig. 39: Inside door opener

Opening the door from the inside:

- ☞ Pull handle **B** up



Important!

Enter and leave the cab only by the left door as a rule.

Secure the control lever (joystick) and fold back the control lever base when leaving the cab by the right-hand side door

- – see [Folding back the control lever base](#) on page 3-55!



Securing an open door in the arrester

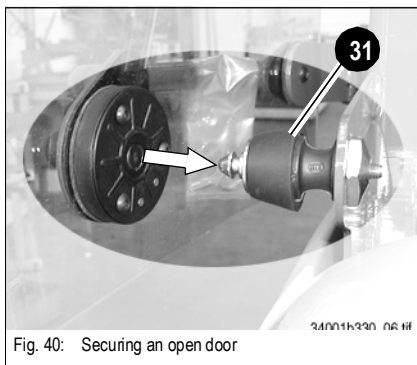


Fig. 40: Securing an open door

☞ Press the door against bracket **31** of the arrester until it engages with an audible click



Important!

Lubricate arrester **31** regularly!

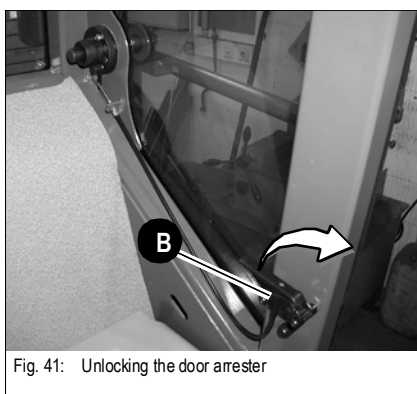


Fig. 41: Unlocking the door arrester

☞ Release the door out of the arrester:

- The door arrester is located on the left in the cab
- Press lever **B** of the arrester forwards
- ☞ The door is released from the lock by spring action
- Close the door

Opening the right-hand side door to a gap

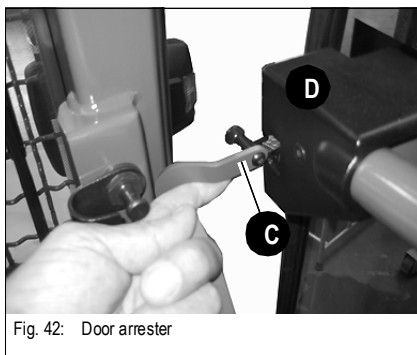


Fig. 42: Door arrester

The right-hand side door can be opened to a gap and secured with the arrester to improve cab ventilation.

☞ Safely engage lever **C** in door lock **D**



3.8 Engine cover lock

Opening/closing the engine cover

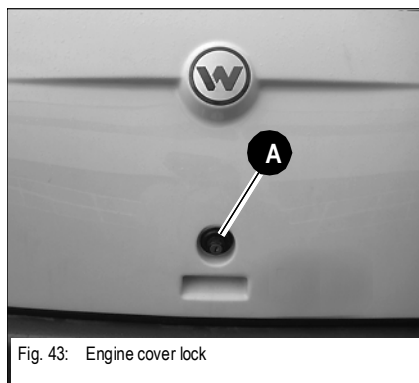


Fig. 43: Engine cover lock



Danger!

Caution, turning 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 upwards

☞ *Close the engine cover:*

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

☞ *Lock and unlock the engine cover:*

- Close the engine cover with the ignition key of the preheating start switch.

3.9 Protective screens for front window and/or main lights (option)

Removing the protective screens for driving on public roads

The wheel loader can be fitted with protective screens on the front window and/or the main headlights as a protection against falling material.



Caution!

The protective screens may be used only for work operation and must be removed when driving on public roads!

☞ *See also the machine documentation and the data confirmation (Germany)*

3.10 Fire extinguisher (option)

Fire extinguisher operation

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 carried out by an authorised workshop
- Located on the cab column, to the right of the seat (see fig.)
- Fire extinguisher operation is described with the symbols on the fire extinguisher



Caution!

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



3.11 Putting the diesel engine into operation

Preparing to start the engine



Danger!

The wheel loader may be put into service only if the operator is seated on the seat!

Operate the machine from the seat only

Prepare to start the engine as follows:

- Run through the “Start-up” checklist [3-10](#)
- Switch on the battery master switch
 - [see Battery master switch \(option\)](#) on page 3-18
- Adjust seat position and rearview mirrors – [see Seat](#) on page 3-50
- All controls must be within easy reach
- You must be able to move the brake and accelerator pedals to their limit positions
- Fasten your seat belt – [see Seat belt \(lap belt\)](#) on page 3-53
- Make sure the parking brake is applied – [see Parking brake](#) on page 3-36
- Make sure the control lever for the loader unit is in neutral position – [see Changing direction \(forwards/reverse\)](#) on page 3-38



Important!

The engine will not start unless:

- the parking brake is applied to the last notch
 - [see Parking brake](#) on page 3-36
- the drive interlock is disabled (option)
 - [see Drive interlock with code input \(option\)](#) on page 3-20
 - [see Key-based drive interlock \(option\)](#) on page 3-18
- The starter cannot be actuated if the engine is already running (start repeat interlock)
- Do not run the starter for more than 10 seconds
- Wait about 1 minute so the battery can recover before trying again
- The engine **cannot** be started by tow starting the machine, as there is no driving connection between the engine and the gearbox (e.g. cardan shaft) when the engine is stopped – [see Towing the machine](#) on page 3-56

When working at outside temperatures of less than -10 °C for extended periods, we recommend retrofitting the machine with an oil and fuel preheater (option).

- – [see Oil and fuel preheater \(option\)](#) on page 3-24



Starting the engine

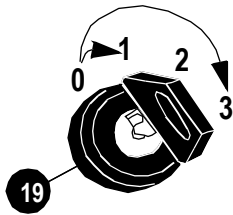


Fig. 44: Preheating start switch

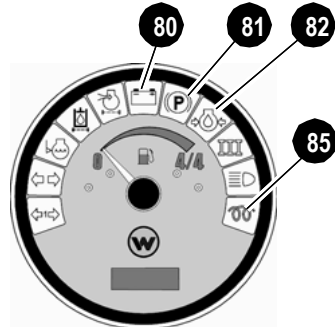


Fig. 45: Indicating instrument telltales

The ignition lock is located on the right-hand side control lever console.

- Apply the parking brake to the last notch
- Turn the ignition key (preheating start switch **19**) to position “1”
- The following telltales must come on

- Engine oil pressure telltale **82**
- Telltale **81** if the parking brake is applied
- Alternator charge function telltale **80**
- Automatic preheating telltale **85**, comes on for about 30 – 60 seconds at normal temperatures (up to 0°), and for about 60 – 90 seconds at low temperatures (below 0°)

- The intake air is preheated via a temperature-dependent time lag relay, and telltale **85** goes out once the temperature is reached

After telltale 85 (automatic preheating) has gone out:

- Start the engine as follows:

- Press the accelerator pedal through about 1/4 of its travel
- Turn the ignition key to position “3” and hold it in this position until the engine starts
- Release the ignition key
- Check that the following telltales have gone out:

- Engine oil pressure telltale **82**
- Alternator charge function telltale **80**
- Cold starter telltale **85**



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 (for about 30 seconds)
- Replace defective telltales immediately



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.
Operating temperature is not reached!

- *Effects: Increased lube oil consumption*
- *Lube oil in exhaust system*
- *Engine contamination*
- *Blue smoke in exhaust*

We recommend running the engine at loads of over 20 % during regular operation

Stopping the engine

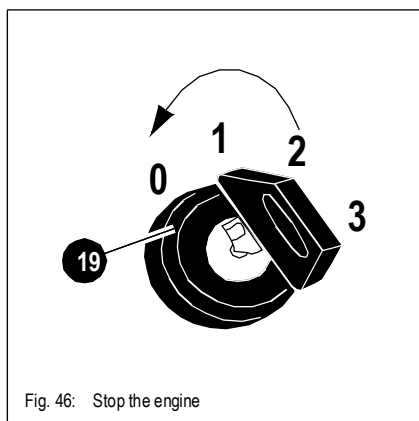


Fig. 46: Stop the engine



Caution!

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

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

☞ *Apply the parking brake to the last notch*

☞ *Turn the ignition key in the preheating start switch to "0" and remove it*



3.12 Battery master switch (option)

Battery master switch operation

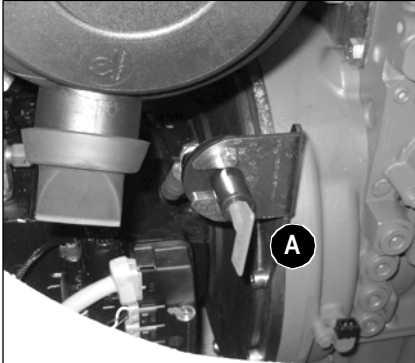


Fig. 47: Battery master switch

Battery master switch **A** is located in the engine compartment at the upper left above the variable displacement pump (drive)

☞ **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

3.13 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 training the blue keys)

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.



Caution!

Each drive interlock has only one master key!

☞ *The drive interlock must be replaced 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 carried out 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 carried out for a maximum 10 keys



Enabling (locking) the drive interlock

- 🔑 Apply the parking brake
 - ➡ – see [Parking brake](#) on page 3-36
- 🔑 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 on page 3-16 “*Starting the engine*”.
- 🔑 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 3-16
 - ➡ 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

- All coded keys are deleted during deletion
- After deletion has been carried out, all existing keys can be recoded
- Deletion is carried out 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, e.g. 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 (e.g. data codes). All important data is saved in a non-volatile memory.



3.14 Drive interlock with code input (option)

Keyboard for entering codes: overview

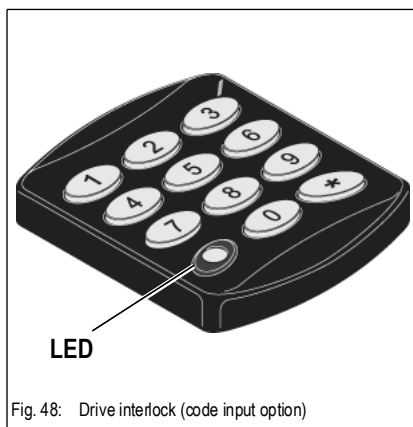


Fig. 48: Drive interlock (code input option)

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 driver



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 telltale)
- An internal acoustic signal for signalling specific procedures
➡ Example: a signal sounds to confirm a key has been pressed

The keypad comes on:

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



Entering/changing the personal code

In order to enter or modify the personal code, disable the drive interlock by entering the main code (6 digits) and pressing the (*) key

☞ Turn the ignition key to 1

☞ The LED comes on 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 comes on for 2 seconds

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

☞ The new personal code is now set and can be used for disabling the 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, e.g. 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)



Operation

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

The diesel engine will not start if a wrong code has been entered

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

➡ Re-enter the code

☞ Turn the ignition key and switch on 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 come on as long as it is blocked. It comes on briefly every 4 seconds and an acoustic signal sounds

☞ Press the (*) key after every code

☞ The LED comes on briefly when turning the ignition key to the engine start position

Putting the drive interlock out of operation

We recommend putting the drive interlock out of operation if the machine has to stay in a workshop, for instance, 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 the ON position
 - ➡ The LED comes on for 2 seconds
- 3 As soon as the LED goes out, press the (*) tip switch for about 2 seconds until a short acoustic signal, followed by two further signals, sounds
 - ➡ The LED now flashes very slowly, and the keypad is disabled
- 4 Turn the ignition key to the ZERO position and remove it
- 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 ("Putting the drive interlock 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 OFF) 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 come on 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



3.15 Oil and fuel preheater (option)

General information on the oil and fuel preheater

- Connect the oil and fuel preheater only to an earthed socket
- Check the connecting cable regularly for damage
- Replace a damaged cable by a new one immediately
- The heating element can be damaged:
 - if the oil and fuel preheater is connected to intermittent or pulsating voltage
 - if dirty or not enough coolant is used
 - if the cooling system is not bled
 - if a radiator repair compound is used

Oil preheater operation

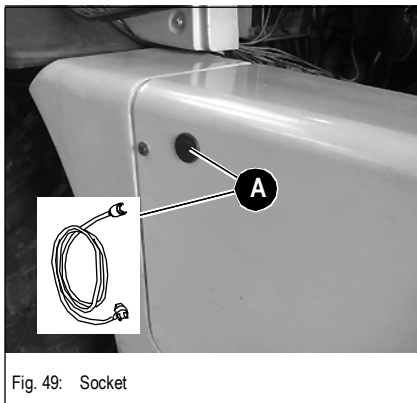


Fig. 49: Socket

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 tank, 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.

The machine socket is located at the rear right in the cover plate of the counterweight.

Put the oil preheater into operation

- Park the machine near a 220 V socket
- First connect the special cable with the machine socket, then insert the plug into the 220 V (110 V) socket

Before starting the engine:

- Remove the plug from the 220 V (110 V) socket
- Unplug the special cable from the machine socket
- Close the machine socket with a protective cap



Important!

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

Fuel preheater

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.



3.16 Jump-starting the engine (external battery)

Safety instructions regarding external starting aids



Caution!

The jump lead connected to the positive (+) terminal of the starting battery must never be brought into connection with electrically conductive vehicle parts – danger of short circuit!

- ⓘ The external power source must deliver **12 V**; higher supply voltages will damage the electrical system of the vehicles!
- ⓘ Use only authorised jump leads which conform to the safety requirements and which are in perfect condition!
- ⓘ Route the jump leads so they cannot catch on rotating components in the engine compartment!

Providing external starting aid

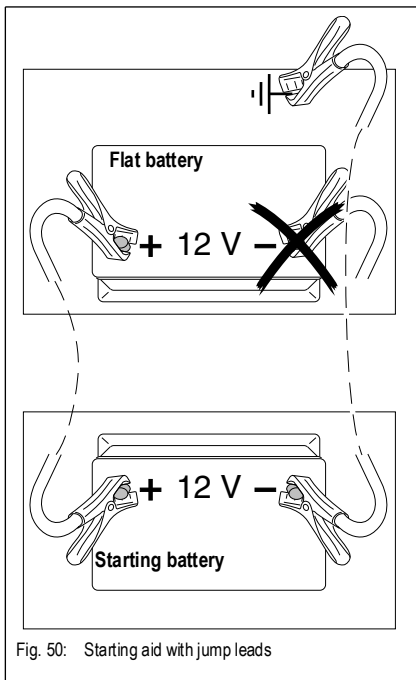


Fig. 50: Starting aid with jump leads

ⓘ Proceed as follows:

- Drive the jump-starting vehicle close enough to the wheel 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 jump lead (+) to the + terminal of the flat battery, then connect the other end to the + terminal of the starting battery
- Connect one end of the black jump lead (-) to the - terminal of the starting battery
- Connect the other end of the black jump lead (-) onto a solid metal component firmly mounted on the engine block or onto the engine block itself. Do not connect it to the negative terminal of the flat battery, as otherwise explosive gas emerging from the battery can ignite if sparks are formed!
- Start the engine of the machine with the flat battery

Once the engine has started:

- With the engine running, disconnect both jump leads in exactly the reverse order (first remove the - terminal, then the + terminal) – this prevents sparking in the vicinity of the battery!



3.17 Before moving off

Special instructions for driving on public roads

- Carrying or transporting **accompanying persons** in the cab or on the wheel loader is **not allowed**
- The machine is subject to the applicable national legal regulations (e.g. **StVZO** German road traffic regulations) and to the provisions laid down in the **General Certification for Vehicles (Germany)** or the **data confirmation (Germany)**.
- Only the attachments are authorised for use on public roads that are described in the **General Certification for Vehicles (Germany)**, in the **data confirmation (Germany)** or in this Operator's Manual – *see chapter 1 "Fields of application and using a wheel loader with an attachment"* on page 1-5 (the footnotes must be taken into account).
- Bear in mind the mandatory regulations for accident prevention
- For operation on public roads, bear in mind the provisions laid down in the machine documentation and in the data confirmation (Germany)

Preparing for driving on public roads

German road traffic regulations prohibit driving on public roads if the distance between the front edge of the bucket and the centre of the steering wheel is over 3500 mm in transport position! – *see chapter 1 "Fields of application and using a wheel loader with an attachment"* on page 1-5. See also the provisions laid down in the machine documentation and in the data confirmation (Germany)

🔧 Prepare to start the engine as follows:

- Empty and dump in the bucket as far as it will go
➡ – *see Working with a bucket* on page 3-69
- Raise the loader unit to transport position (ground clearance **about 250 mm**)
➡ – *see Bucket transport position* on page 3-27
- Mount the front-edge protection onto the leading edge of the bucket or onto the fork arms of the pallet forks
- If the machine is equipped with pallet forks with foldable fork arms (option), fold them up and secure them
- Switch off the working lights when driving on public roads
- High speed version (30/40 kph): switch the steering system to front axle steering
– *see Changing over to front axle steering (option)* on page 3-32
- Switch on the load stabiliser – *see Load stabiliser (option)* on page 3-40
- Secure the control lever (joystick) and the 3rd control circuit of the loader unit
– *see Locking the control lever (joystick) and the 3rd control circuit (attachments)* on page 3-29
- Remove the protective screens for the front window and/or the main lights (options)
– *see Protective screens for front window and/or main lights (option)* on page 3-14
- Adjust the seat position and the rearview mirrors
- Fasten your seat belt – *see Seat belt (lap belt)* on page 3-53

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



Bucket transport position

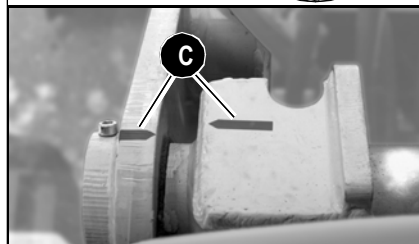
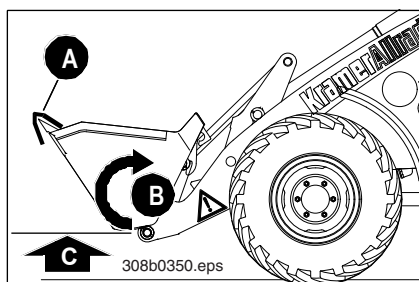


Fig. 51: Transport position



Important!

Loader unit operation

– see [Loader unit control lever \(overview\)](#) on page 3-62

➡ Set the bucket to transport position as follows:

- Empty and tilt back the bucket **B**
- Raise the loader unit so that both red marks **D** on the lift frame and the bulkhead are aligned
- ➡ Ground clearance **C** about 250 mm
- Cover the blade or teeth of the bucket across their entire width with the tooth guard **A** provided



Important!

Remove buckets/attachments that are not authorised for transport on public roads and use a suitable means of transport to move or transport them.

- – see [chapter 1](#) “Attachments with authorised material densities” on page 1-5

- Secure the control lever (joystick)

➡ – see [Locking the control lever \(joystick\) and the 3rd control circuit \(attachments\)](#) on page 3-29

Transport position of pallet forks



Important!

Only pallet forks with foldable fork arms are authorised for travel on public roads!

Remove pallet forks that are not authorised for transport on public roads and use a suitable means of transport to move or transport them.

- – see [chapter 1](#) “Attachments with authorised material densities” on page 1-5



Important!

Pallet forks operation – see [Fitting pallet forks](#) on page 3-85

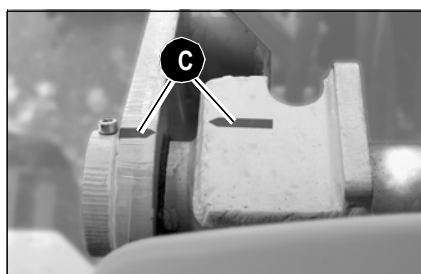


Fig. 52: Transport position of pallet forks

☞ Set the pallet forks to transport position as follows:

- Remove the load off the pallet forks
- Fold back and secure the fork arms
- Raise the loader unit so that both red marks **D** on the lift frame and the bulkhead are aligned
- ➡ Ground clearance **C** about 250 mm
- Cover the fork arms across their entire width with the protection **A** provided
- Secure the control lever (joystick)
- – see [Locking the control lever \(joystick\) and the 3rd control circuit \(attachments\)](#) on page 3-29



Locking the control lever (joystick) and the 3rd control circuit (attachments)

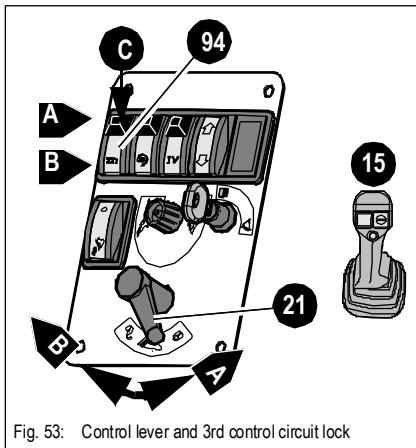


Fig. 53: Control lever and 3rd control circuit lock

Secure the control lever (joystick) and the 3rd control circuit (quickhitch) against unintentional actuation when driving on public roads.

➡ – see *Operating and securing the 3rd control circuit* on page 3-63

The stop cock for locking the control lever is located on the console of the control lever base (on the right in driving direction).

☞ **Lock the control lever:**

- Push stop cock **21** lever to the right **A**

➡ The hydraulic oil circuit to the control valve (joystick **15**) is interrupted

☞ **Unlock the control lever:**

- Push stop cock **21** lever to the left **B**

➡ The control valve (joystick **15**) is connected with the hydraulic oil circuit

☞ **Locking the 3rd control circuit:**

- Slide lock **C** on switch **94** in the direction of the arrow and press the switch to position **B** at the same time
- Release lock **C**

➡ The 3rd control circuit is completely secured against unlocking

Functional check of all control elements

- – see *Steering system* on page 3-30
- – see *Brake/inching pedal* on page 3-35
- – see *Machine lights* on page 3-43
- – see *Signalling system* on page 3-45
- – see *Washer system* on page 3-49
- – see *Seat* on page 3-50
- – see *Other controls* on page 3-55
- – see *Operating and securing the 3rd control circuit* on page 3-63



3.18 Steering system

Steering column height and angle adjustment (option)

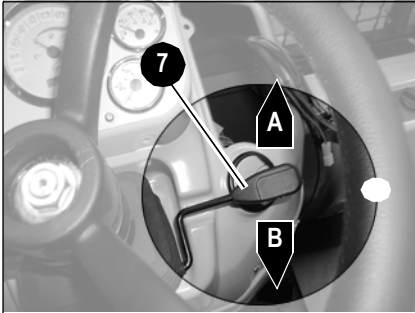


Fig. 54: Steering column adjustment



Danger!

In order to avoid danger of accidents, do **not** adjust the steering column when driving!

✎ *Adjust the steering column at machine standstill as follows:*

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

Function	Operation
Height adjustment	Pull lever 7 upwards to position A , pull or push the steering column to the correct position, and release the lever • The steering column is locked at the required height
Angle adjustment	Push lever 7 downwards to position B , adjust the correct inclination of the steering column, and release the lever • The steering column is locked at the required inclination

Checking the steering system

✎ *Functional check of steering system*

- With the engine running, turn the steering wheel to the left and right



Important!

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 towing speed to the altered steering behaviour!
- ➡ – see *Towing the machine* on page 3-56



3.19 Wheel synchronisation (front/rear axles)



Danger!

Do **not** synchronise the wheels when driving on public roads!

➡ Synchronise the steering system before driving on public roads

Synchronisation when starting the machine

Wheel synchronisation is automatically set by turning the steering wheel to the left and right when the engine is running.

Only the  speed range is active during synchronisation – telltale **48** on the instrument panel flashes.

The hare  speed range (switch **63/B**) can be selected but is not active until synchronisation is over.



Important!

Synchronisation is over as soon as both steering rams have passed through the straight-ahead position from both directions and telltale **48** on the instrument panel goes out.

Synchronisation during work operation

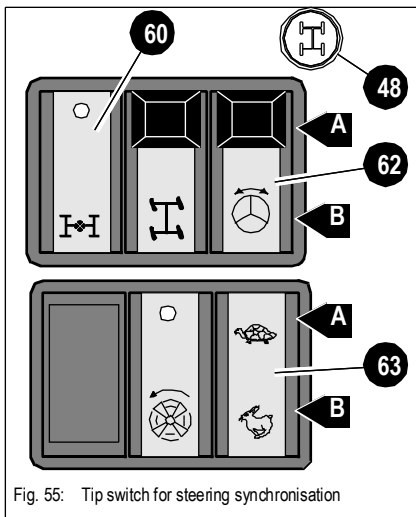


Fig. 55: Tip switch for steering synchronisation

The steering system must be synchronised if the wheels of the machine no longer follow the same track when driving straight-ahead on level ground.

The steering system is synchronised with tip switch **60** on the switch console on the right on the instrument panel.

➡ Proceed as follows:

- Press switch **62** to position **A**
➡ – see *Changing over to 4 wheel steering* on page 3-32
- Select the “Turtle”  speed range by pressing switch **63** to position **A**
- At walking speed, press tip switch **60** (synchronisation) to position **B** and turn the steering wheel to the left and right until telltale **48** goes out
➡ Steering synchronisation is over
- Carry out a functional check of the steering system



Important!

If the machine is equipped with the front axle steering option, switch over to 4 wheel steering before synchronising the steering system!



Operation

3.20 Changing steering mode

General safety information on changing steering mode



Danger!

In order to avoid danger of accidents, do **not** change steering mode when driving the machine on public roads!

Furthermore, do not change steering mode when driving at high speed!

➡ *Change steering mode before driving on roads and only a walking speed*

Changing over to front axle steering (option)

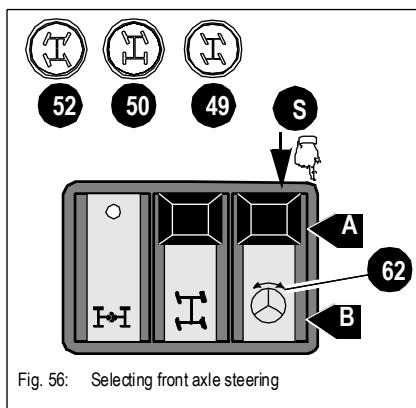


Fig. 56: Selecting front axle steering

➡ *Proceed as follows:*

- Slide lock **S** in switch **62** in the direction of the arrow and press the switch to position **A** at the same time
- Release lock **S**
- Turn the steering wheel to the left and/or right until the wheels of the front and rear axles have passed through the straight-ahead position from both directions

➡ Telltale **50** comes on and front axle steering is enabled

➡ Telltales **52** and **49** go out

Changing over to 4 wheel steering

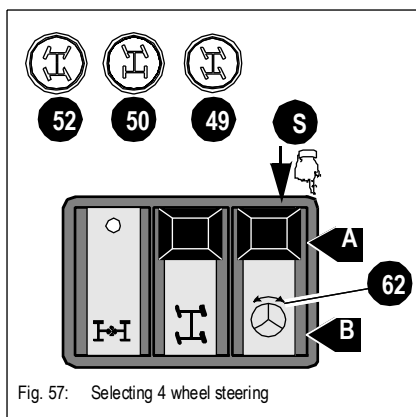


Fig. 57: Selecting 4 wheel steering



Important!

If the machine is equipped with the "High speed" option, changing over to 4 wheel steering automatically reduces speed to 20 kph!

➡ *Proceed as follows:*

- Slide lock **S** in switch **62** in the direction of the arrow and press the switch to position **B** at the same time
- Release lock **S**
- Turn the steering wheel to the left and/or right until the wheels of the front axle have passed through the straight-ahead position from both directions

➡ Telltale **52** comes on and 4 wheel steering is enabled

➡ Telltales **50** and **49** go out



Changing over to diagonal steering (crab steering option)

Use diagonal steering (crab steering) only for moving away laterally from a wall or for repositioning the wheel loader laterally.



Danger!

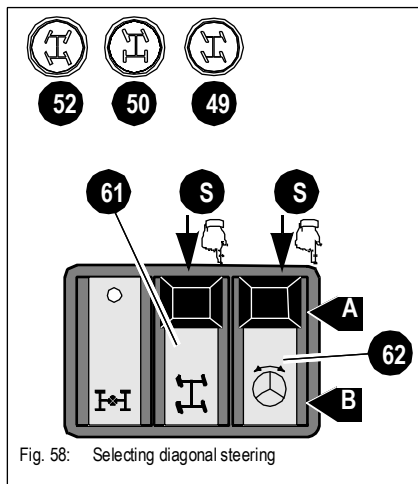
In order to avoid danger of accidents, do not drive over longer distances. Furthermore, driving on public roads with diagonal steering (crab steering) is not allowed!

➡ Change over to 4 wheel steering, or to front axle steering in the case of high speed mode!

➡ – see Changing over to 4 wheel steering on page 3-32

➡ – see Changing over to front axle steering (option) on page 3-32

➡ Change steering mode before driving on roads and only a walking speed



Important!

Changing to diagonal steering is only possible by enabling "4 wheel steering"!

➡ Proceed as follows:

- Slide lock **S** in switch **62** in the direction of the arrow and press the switch to position **A** at the same time
- Release lock **S**
- ➡ 4 wheel steering is switched on
- Slide lock **S** in switch **61** in the direction of the arrow and press the switch to position **B** at the same time
- Release lock **S**
- Turn the steering wheel to the left and/or right until the wheels of the front and rear axles have passed through the straight-ahead position from both directions

➡ Telltale **49** comes on and diagonal steering is enabled

➡ Telltales **50 and 52** go out

3.21 Accelerator pedal

Speed control with the accelerator pedal

☞ Accelerator pedal *Fig. 30/16* controls the drive speed as follows:

- Press the accelerator pedal down
- ➡ Drive speed is increased
- Release the accelerator pedal slowly
- ➡ Drive speed is reduced
- Release the accelerator pedal fully
- ➡ Hydrostatic braking



Important!

Maximum speed depends on the speed range selected.

- – see *Selecting a speed range* on page 3-37

3.22 Accelerator pedal lock – manual throttle (option)

Disabling/enabling the accelerator pedal lock

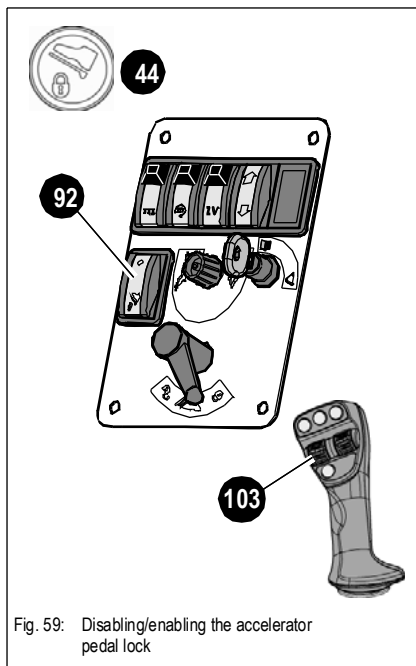


Fig. 59: Disabling/enabling the accelerator pedal lock

This option is especially useful for operation of hydraulic attachments in order to ensure a continuous hydraulic oil supply and/or drive speed.

The accelerator pedal lock is set by means of the accelerator pedal and tip switch **92** on the switch panel on the right on the control lever base.

Use the accelerator pedal lock only during work operation.



Danger!

Driving on public roads with the accelerator pedal lock (manual throttle) is not allowed!

☞ See also the machine documentation and the data confirmation (Germany)

☞ *Enabling the accelerator pedal lock:*

- Select and hold the required engine or drive speed with the accelerator pedal
- Press tip switch **92** in the switch panel (1 x) and telltale **44** comes on
- ➡ The required engine or drive speed is set

☞ *Disabling the accelerator pedal lock:*

- Press tip switch **92** in the switch panel (1 x), or switch **103** on the joystick (change of direction)
- ➡ The accelerator pedal lock is disabled and telltale **44** goes out



3.23 Brake/inching pedal

Specific information on brake/inching pedal actuation

- The brake/inching pedal is located on the left in the machine.
- Dirt accumulation and objects in the area of the brake/inching pedal can result in brake malfunctions.
- Keep the brake/inching pedal clean and remove all objects in the area of the pedal



Danger!

The brake lights at the rear of the machine **neither** come on when applying the parking brake, nor during inching.

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

Braking with the brake/inching pedal

- ☞ Before braking, check in the rearview mirror that no-one will be hindered
- ☞ Release the accelerator pedal fully and press the brake/inching pedal down **with force** beyond the inching range
 - ➔ The machine is braked to a standstill regardless of the position of the forwards-reverse control on the joystick

Caution when stopping on slopes:

- ☞ Press brake/inching pedal [Fig. 30/24](#) down with force until the braking effect is felt



Caution!

When driving downhill, use the brake pedal to support the braking effect of the drive. This avoids damage (excessive speed) to the drive and/or the diesel engine!

During trailer operation (option), also select the "Turtle" speed range **before driving downhill!**

- ☞ Reduce engine speed
- ☞ Reduce the speed to less than 11 kph with the service brake
- ☞ Select the "Turtle" speed range

- The brakes are supported by the hydraulic braking effect of the drive

Inching with the brake/inching pedal

- ☞ Press brake/inching pedal [Fig. 30/24](#) down **slightly** (inching range)
 - ➔ In the inching range (pedal pressed lightly), the pedal can be used like a car's clutch
 - ➔ The drive's output is reduced, making the engine power available to the work hydraulics
 - ➔ This makes it possible to raise the loader unit more quickly



3.24 Parking brake

General instructions regarding the parking brake

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

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



Important!

The driving direction can only be selected if the parking brake is completely released.

Applying the parking brake automatically cancels the selection of the forwards/reverse driving direction (drive) and switches the drive to neutral.

Applying the parking brake



Danger!

When driving the machine, apply the parking brake only in an emergency. The brake lights do not come on in this case!

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

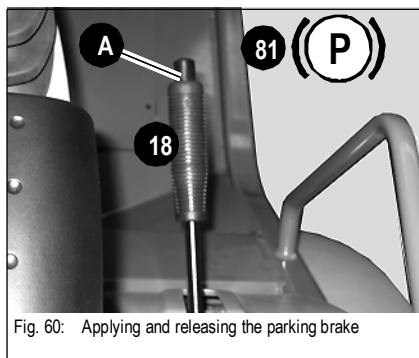


Fig. 60: Applying and releasing the parking brake

☞ Apply the parking brake

- Pull lever **18** up to **the last notch**
- ➔ Telltale **81** on the indicating instrument comes on
- ➔ The engine can be started
- ➔ Selection of forwards/reverse driving direction (drive) is automatically cancelled and neutral activated
- Secure the machine with wheel chocks – [see Stopping/parking the machine](#) on page 3-58

☞ Release the parking brake

- Pull lever **18** up slightly
- Press button **A**
- Move lever **18** down as far as it will go
- ➔ Telltale **81** on the indicating instrument goes out



3.25 Driving the machine

Selecting a speed range

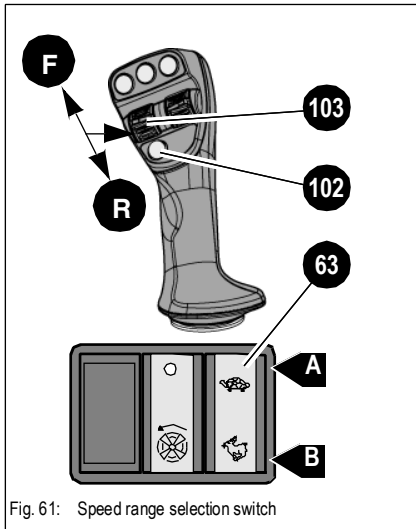


Fig. 61: Speed range selection switch

The machine has two speed ranges.

The switch for selecting the speed range is located on the switch console on the right-hand side of the instrument panel.

🐢 **Select the 1st speed range**

- Set driving direction to neutral with tip switch **102** on the joystick
- Press switch **63** to position **A**
- Select the driving direction (**F or R**) with switch (scroll wheel) **103**

🐰 **Select the 2nd speed range**

- Press switch **63** to position **B**
- Select the driving direction (**F or R**) with switch (scroll wheel) **103**
- Gradually press down the accelerator pedal
- ➡ Machine moves off
- Test the brakes at low speed

Speed range symbol	Speed range	Recommended
	1st speed range 0 – 7 kph	Used for work involving short loading cycles, i.e. a rapid succession of loading and unloading operations, e.g. onto a truck, and for work requiring precise speed adjustment, e.g. rotary broom applications.
	2nd speed range 0 – 20 kph 0 – 30/40 kph (option)	For long-haul travel



Operation

Changing direction (forwards/reverse)

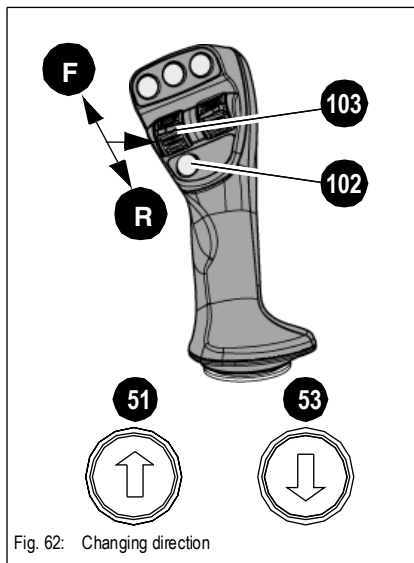


Fig. 62: Changing direction



Important!

For reasons of safety, changing direction (forwards/reverse) during machine travel is only possible if drive speed is reduced to less than 15 kph!

Select the driving direction

- Reduce engine speed: remove your foot from the accelerator pedal
- Slow down your drive speed to less than 15 kph
- Select the driving direction with switch **103**, or stop the machine with tip switch **102**
- Apply the parking brake at machine standstill

Driving direction	Operation	Telltale on instrument panel
Forwards	Press switch 103 on the control lever (joystick) forwards F	Telltale 51 comes on
Reverse	Press switch 103 on the control lever (joystick) backwards R	Telltale 53 comes on
Neutral	Press tip switch 102 on the control lever (joystick)	Telltale 51/53 goes out

3.26 Differential lock (self-locking differential)

Switching the differential lock ON and OFF

The differential lock neutralises the compensating effect of the differential, i.e. traction is distributed evenly to the front and rear wheels.

- Both the front and the rear axle of the machine are fitted with a **self-locking differential**
- The lock value is 45 % for each axle.



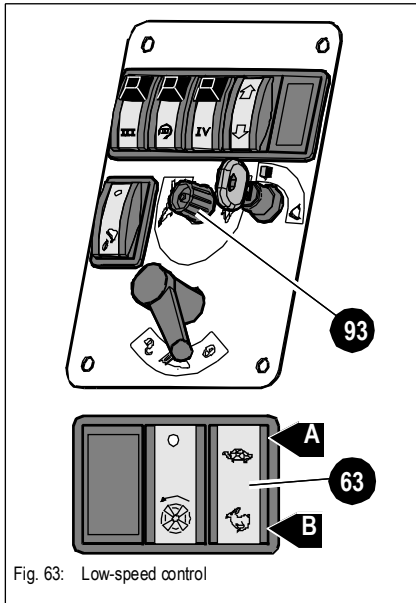
Important!

The differential is locked automatically and cannot be switched on or off!



3.27 Low-speed control (option)

Selecting the drive speed



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

Unregulated low-speed control

Drive speed is set with potentiometer **93** and maintained by means of the **manual** diesel engine speed setting (accelerator pedal).

Regulated low-speed control

(CSD – Constant Speed Drive printed on symbol)

Drive speed is set with potentiometer **93** and maintained by means of the **automatic** diesel engine speed setting.



Important!

Regulating drive speed with potentiometer (regulator) **93** is not possible unless the "Turtle"  speed range has been selected!

 Select the drive speed as follows:

- Press switch **63** to position **A** 
- Set the drive speed with potentiometer **93** (see table)

Speed range symbol	Drive speed	Recommended
	0 – 7 kph	Used for work involving short loading cycles, i.e. a rapid succession of loading and unloading operations, e.g. onto a truck, and for work requiring precise speed adjustment.



Important!

Once the low-speed control is no longer needed: set potentiometer **93** to "Hare"  so you can reach maximum speed in normal operation!



3.28 Load stabiliser (option)

General instructions regarding the load stabiliser function

The load stabiliser cushions and dampens the movements of the loader unit. It avoids unstable oscillating movements of the loader and increases drive comfort and safety!



Important!

Always switch on the load stabiliser when driving on public roads!

In order not to impair the load stabiliser 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, dump in the bucket as far as it will go, then dump it out slightly again
- Switch off the load stabiliser during pallet forks operation
- – see *Switching the load stabiliser ON and OFF* on page 3-41



Caution!

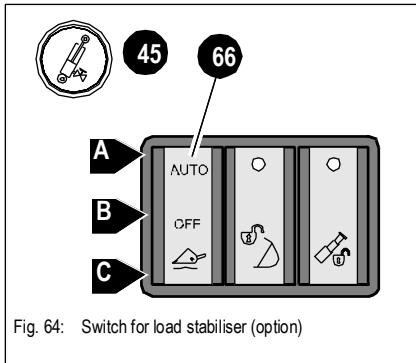
If the machine is equipped with the **“Hose burst valve”** option, switching on the load stabiliser automatically disables the hose burst valve, and the hydraulic lines and pipes are no longer protected against possible damage!

☞ – see *“Hose burst valve” safety feature (option)* on page 3-98

☞ Switch off the load stabiliser during pallet forks operation



Switching the load stabiliser ON and OFF



The switch is located on the left on the switch console of the instrument panel



Important!

Switch on the load stabiliser only in transport position!

In order not to impair the load stabiliser 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, dump in the bucket as far as it will go, then dump it out slightly again

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

- Switch off the load stabiliser during pallet forks operation

Function	Work operation
Auto (A) Switches the load stabiliser on automatically ➤ Press switch 66 to position A ➤ The load stabiliser is automatically switched on when driving faster than 15 kph ➤ Telltale 45 on the instrument panel comes on ➤ The hose burst valve (option) is disabled	For driving on public roads, for lighter work with the loader unit and for light off-road transport
OFF (B) Switches off the load stabiliser ➤ Press switch 66 to centre position B ➤ Telltale 45 on the instrument panel goes out ➤ The hose burst valve (option) is enabled	For heavy-duty work, e.g. picking up excavated material
ON (C) Load stabiliser in continuous operation ➤ Press switch 66 to position C ➤ Telltale 45 on the instrument panel comes on ➤ The hose burst valve (option) is disabled	For driving on public roads, for lighter work with the loader unit and for light off-road transport

3.29 Backup warning system (option)

Instructions regarding the backup warning system

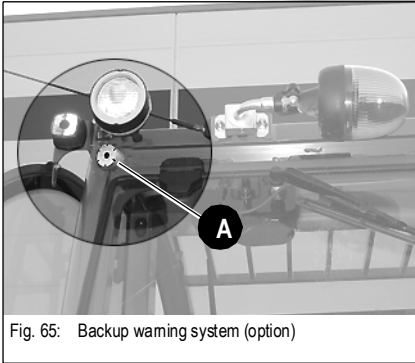


Fig. 65: Backup warning system (option)

The backup warning system consists of a signal transmitter fitted on the rear of the cab. 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!

Do not rely exclusively on the backup warning system when reversing with the machine!

 *Make sure nobody is within the danger area of the machine when changing the driving direction!*

3.30 Electric connection – front socket (option)

Putting the front socket into operation

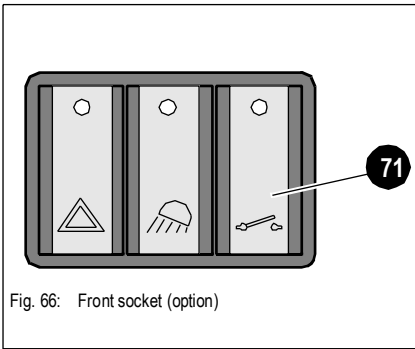


Fig. 66: Front socket (option)

The machine can be equipped with a 4 pole socket (at the front left on the loader unit). Tip switch **71** at the left on the switch console of the instrument panel switches the electric power supply on or off for electrically operated attachments such as a spray water pump for a rotary broom.

Power supply for front attachments (option)		Function
ON	Press tip switch 71 briefly (1 x)	Power supply at the socket is switched on
OFF	Press tip switch 71 briefly (1 x)	Power supply is switched OFF



3.31 Machine lights

Machine lights operation

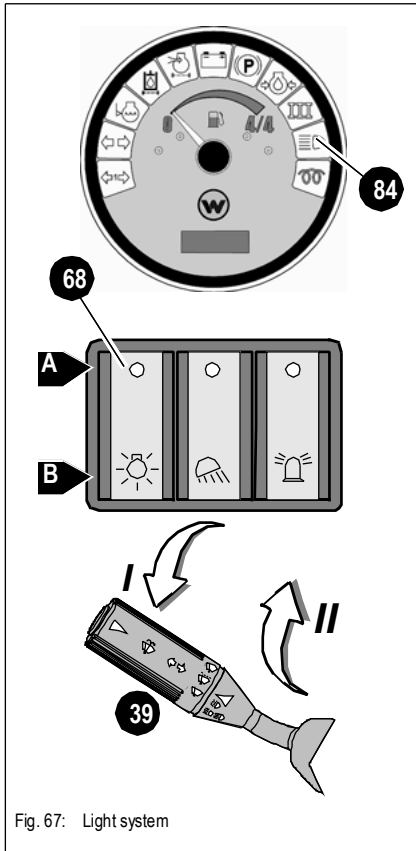


Fig. 67: Light system

The switch for the machine lights is located on the switch panel on the left-hand side of the instrument panel.

Side marker light operation		Function
ON	Press switch 68 to the 1st position B	Telltale in switch comes on
OFF	Press switch 68 down to position A	Telltale in switch goes out

Low beam operation		Function
ON	Press switch 68 to the 2nd position B and pull lever 28 to position II	Telltale in switch comes on
OFF	Press switch 68 down to position A	Telltale in switch goes out



Important!

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

High beam operation		Function
ON	Press switch 68 to the 2nd position B and push lever 39 to position I	Telltale (blue) 84 on the indicating instrument comes on
OFF	Pull lever 39 to position II	Telltale (blue) 84 on the indicating instrument goes out Low beam comes on

Headlight flasher operation		Function
ON	Briefly pull lever 39 fully up (beyond position II)	Telltale (blue) 84 on the indicating instrument comes on



Working lights operation

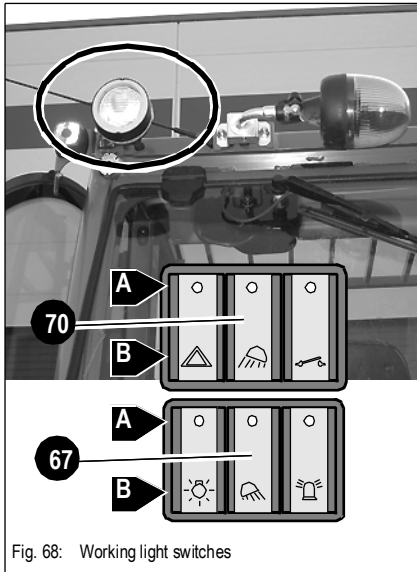


Fig. 68: Working light switches



Danger!

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

- ☞ Do not switch on the working lights when driving on public roads
- ☞ When operating the machine, only switch on the working lights when no-one can be dazzled by them

Function		Telltale
ON	Press switch 70 (front) and/or switch 67 (rear) to position B	Telltale in switch comes on
OFF	Press switch 70 (front) and/or switch 67 (rear) to position A	Telltale in switch goes out

Interior light operation

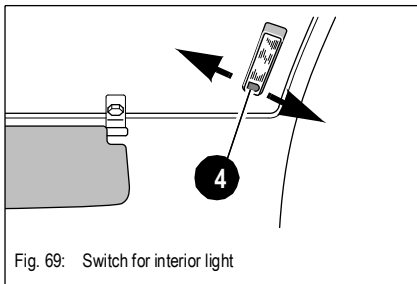


Fig. 69: Switch for interior light

Function	
ON	Press switch 4 to the left or right
OFF	Move switch 4 to centre position



3.32 Signalling system

Turn indicator operation

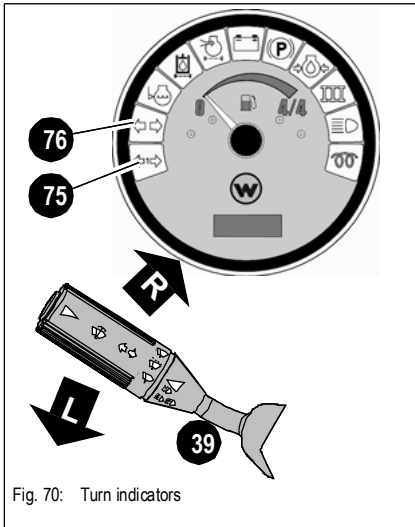


Fig. 70: Turn indicators

Function		Telltale
RIGHT	Push lever 39 forwards R	Telltale 76 flashes
LEFT	Pull lever 39 to the rear L	Telltale 76 flashes

→ Telltale **75** flashes during trailer operation.



Caution!

The turn indicator system is not in order if telltale **76** flashes about twice as fast as normally!

- Check the front and rear turn indicators, have the turn indicator system repaired if necessary

Hazard warning system operation

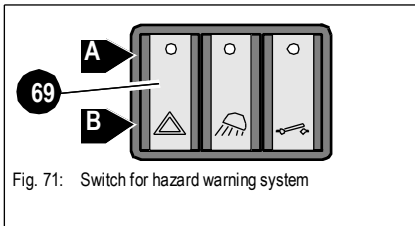


Fig. 71: Switch for hazard warning system

Function		Telltale
ON	Press hazard warning switch 69 to position B	The telltale in the switch and telltale 76 both flash
OFF	Press hazard warning switch 69 to position A	The telltale in the switch and telltale 76 both go out

3.33 Rotating beacon (option)

Rotating beacon operation

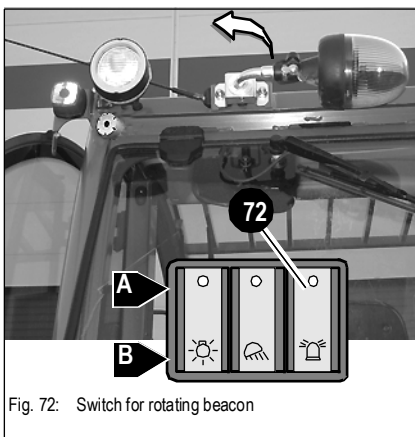


Fig. 72: Switch for rotating beacon

☞ Fold up and lock the rotating beacon

Function		Telltale
ON	Press switch 72 to position B	Telltale in switch comes on
OFF	Press switch 72 to position A	Telltale in switch goes out



Important!

Legal regulations of your country may require 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 the machine is in work operation. Furthermore, legal regulations may require your machine to have some type of warning identification (e.g. red and white warning stripes)!



Operation

3.34 Cab heating and ventilation

Heating and ventilation system operation

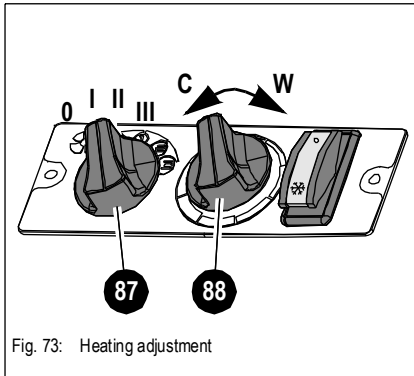


Fig. 73: Heating adjustment

The air is guided to the front window by the air vents on the left and right, to two leg room vents and to the rear window by two air vents.

➡ [see Cab overview](#) on page 3-2

Each nozzle can be closed and directed separately.

The machine heater can be set to 2 operating modes:

- Ventilation in fresh-air mode and heating

The rotary switches (heating/ventilation) are located on the switch console on the right (near the door)

☞ *Ventilation, fresh air*

- Turn fan switch **87** to positions **1 – 3**
- Temperature switch **88** in position **C** (cold)

☞ *Heating*

- Turn fan switch **87** to positions **1 – 3**
- Set the required temperature with temperature switch **88**

➡ **C** = cold (blue)

➡ **W** = warm (red)



3.35 Auxiliary heating (option)

Operating and setting the auxiliary heating

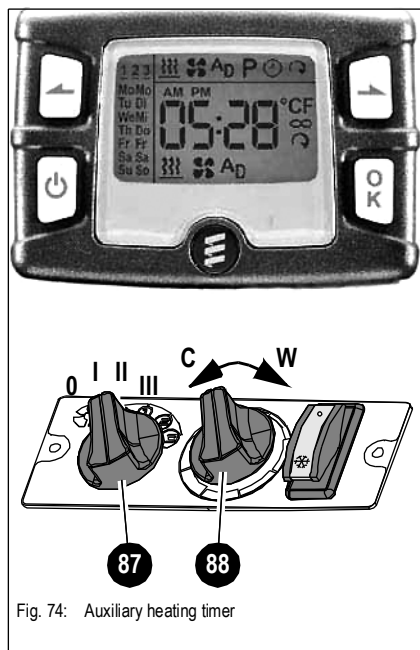


Fig. 74: Auxiliary heating timer

At engine standstill, the auxiliary heating warms up the coolant and the cab.



Important!

Double advantage: warm cab and preheated engine!

⚙️ *Adjust the vehicle heater as follows before setting (programming) the timer:*

- Turn fan switch **87** of the vehicle heater to positions **1 – 3**
- Set temperature switch **88** to the required temperature
- ➡ **W** = warm (red)
- Set the auxiliary heating timer

Refer to the Operator's Manual of the auxiliary heating supplied with the machine for operating and setting (programming) the timer.



Danger!

Danger of explosion near filling and service stations and places where inflammable vapours or dust may arise!

Danger of poisoning and suffocation when operating the auxiliary heating in enclosed areas!

- ⚙️ *Switch off the auxiliary heating when refuelling the machine*
- ⚙️ *Switch off the auxiliary heating in enclosed areas*



Operation

3.36 Heating/air conditioning system (option)

Heating/air conditioning operation

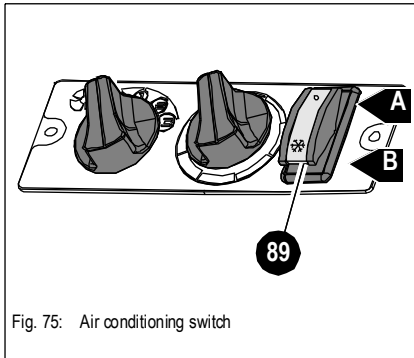


Fig. 75: Air conditioning switch

The heating/air conditioning system heats or cools the air in the cab.

The control elements for the heating/air conditioning system are located on the switch console on the right (near the door)



Important!

Close the door and the windows to achieve best air conditioning results.



Important!

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

- See *Heating* and *Ventilation, fresh air* on page 3-46

☞ Press switch **89** to position **B**

➔ Telltale in switch comes on

➔ Heating/air conditioning system in operation



Caution!

Carry out the following checks to avoid malfunctions and possible loss of refrigerant!

- ☞ *Run the air conditioning system once a month. This prevents the seals in the compressor from drying*
- ☞ *Check the V-belt tension at the compressor – see chapter 5 “Heating/air conditioning system (option): maintenance” on page 5-27*



Important!

Only trained staff and an authorised workshop may clean the heat exchanger and the evaporator, and repair, service and fill the air conditioning system with refrigerant!



3.37 Washer system

Washer system operation

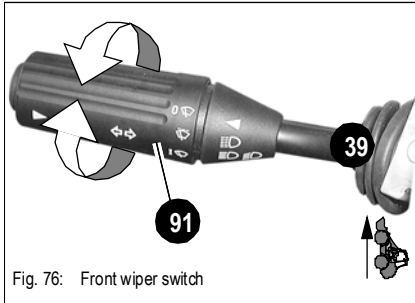


Fig. 76: Front wiper switch

Front window wiper 		Function
ON	Turn rotary switch 91 on the lever to the first position	Intermittent wipe
	Turn rotary switch 91 on the lever to the second position	Normal wipe
OFF	Turn rotary switch 91 on the lever fully back to 0	Wipers return to base position

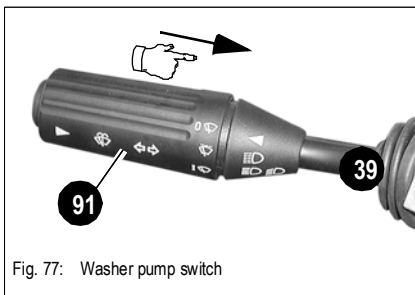


Fig. 77: Washer pump switch

Front window washer pump 		Function
ON	Slide and hold rotary switch 91 on lever 39 towards the steering column (see symbol on rotary switch)	
OFF	Release rotary switch 91	

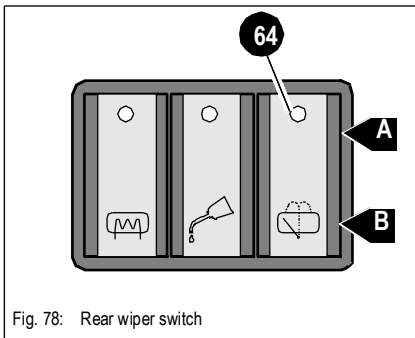


Fig. 78: Rear wiper switch

The rear wiper switch is located on the switch console on the right on the instrument panel.

Rear wiper 		Function
ON	Press switch 64 B down	Rear wiper is on
OFF	Press switch 64 A down	Rear wiper returns to base position

Rear window washer pump 		Function
ON	Press switch 64 B fully down (tip switch function)	

Tank for washer system



Fig. 79: Tank for washer system

Tank filler inlet **28** is located in the cab to the left of the seat

Important!

Fill with clean tap water only!
Add a suitable cleaning agent if required.
In winter: add antifreeze for washer systems to the water. Refer to the anti-freeze instructions for further information on concentrations.



Operation

3.38 Seat

Seat adjustment: overview

Always adjust the seat to your individual needs. This will help avoid or minimise physical disorders related to bad posture!



Danger!

Never change the seat position when driving or working!

- ☞ *Adjust the seat before moving the machine*
- ☞ *Make sure the levers for seat adjustment are safely engaged*

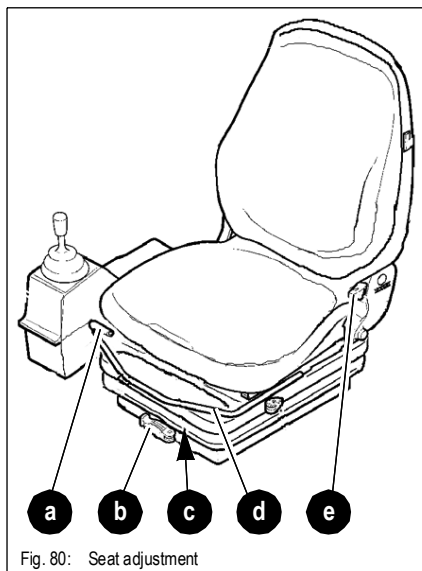


Fig. 80: Seat adjustment

The seat can be set to the following positions:

- **a** = horizontal adjustment without control lever base
- **b** = weight adjustment
- **c** = weight indication
- **d** = horizontal adjustment with control lever base
- **e** = backrest adjustment

Weight adjustment

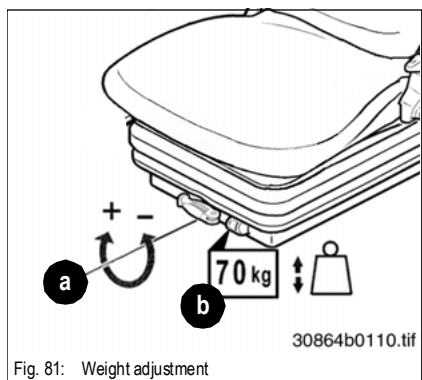


Fig. 81: Weight adjustment



Important!

Adjust the seat suspension correctly to ensure a high level of ride comfort, and to avoid or minimise physical disorders related to bad posture. Use lever **a** to adjust the seat suspension to the operator's weight. The weight indicator **b** shows the set operator weight [kg].

☞ *Set fan revs as follows:*

- Sit down on the seat

To adjust to a higher weight:

- Turn lever **a** clockwise
- ☞ Read the weight off indication **b**

To adjust to a lower weight:

- Turn lever **a** counterclockwise
- ☞ Read the weight off indication **b**



Height adjustment

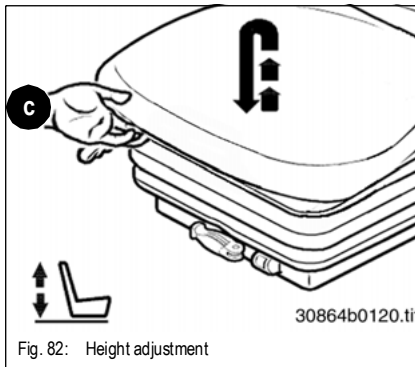


Fig. 82: Height adjustment

☞ Raise or lower seat as required until it engages with an audible click

Height adjustment (air-suspension seat, option)

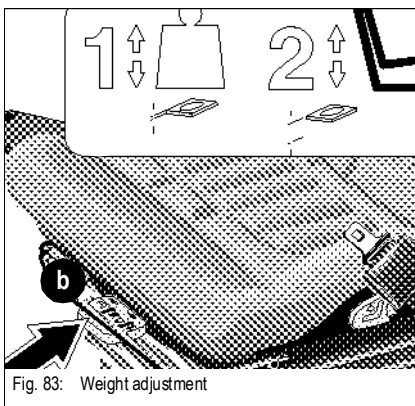


Fig. 83: Weight adjustment

The air-suspension seat height can be adjusted continuously

☞ Pull or press lever **b** (arrow)

➔ Seat height changes

➔ Upon reaching the upper or lower limit, the height is automatically adjusted to ensure a minimum spring travel



Caution!

In to avoid damage to the air compressor, do not run it for more than 1 minute !

Backrest adjustment

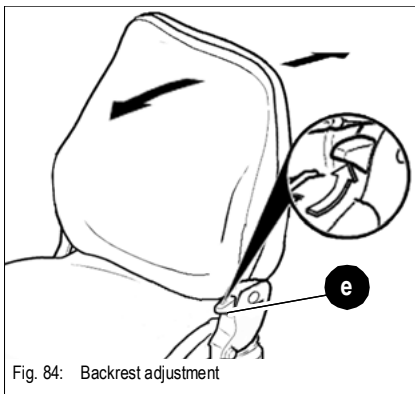


Fig. 84: Backrest adjustment

☞ Set fan revs as follows:

- Sit down on the seat
- Pull lever **e** up and at the same time
- Lean back to push the backrest into the required position
- Allow lever **e** to engage

Horizontal adjustment with control lever base

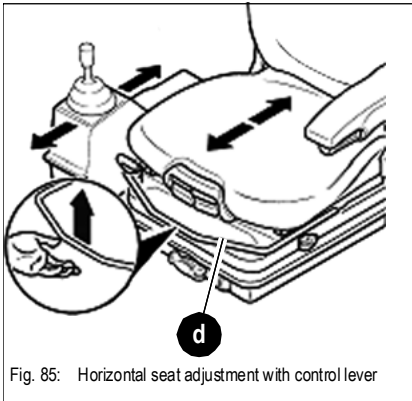


Fig. 85: Horizontal seat adjustment with control lever

☞ Set fan revs as follows:

- Sit down on the seat
- Pull lever **d** up and at the same time
- Move the seat forwards or backwards
- Allow lever **d** to engage in required position

Horizontal adjustment without control lever base

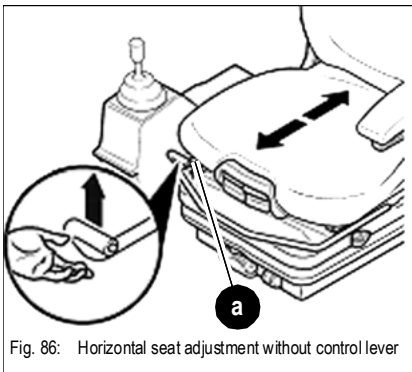


Fig. 86: Horizontal seat adjustment without control lever

☞ Set fan revs as follows:

- Sit down on the seat
- Pull lever **a** up and at the same time
- Move the seat forwards or backwards
- Allow lever **a** to engage in required position

3.39 Heated seat (option)

Heated seat operation

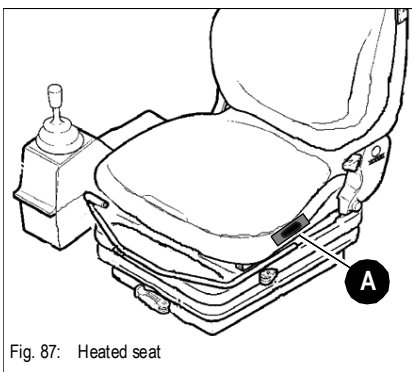


Fig. 87: Heated seat

The heated seat switch is located on the side of the seat cushion

☞ Operate as follows:

- Switch on ignition
 - Press heated seat switch **A**
- ➡ The temperature is automatically adjusted



3.40 Seat belt (lap belt)

Specific instructions regarding the seat belt



Fig. 88: Seat belt symbol



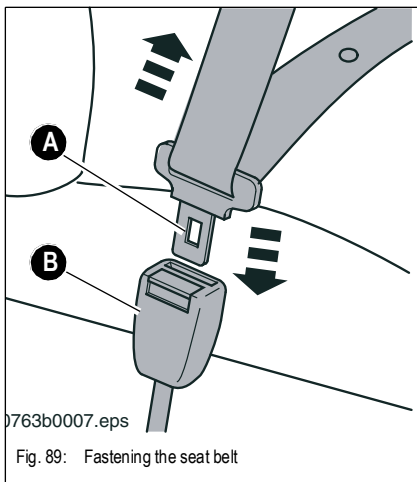
Danger!

In order to avoid injuries, fasten the seat belt (lap belt) when driving the wheel loader!

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

- The seat belt must not be twisted as 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, meter rule, 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 authorised workshop!
- Always keep the seat belt clean, as coarse dirt can impair proper functioning!
- After an accident the belt strap is stretched and must be replaced by a new one by an authorised workshop!

Fastening the seat belt



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Fig. 89: Fastening the seat belt

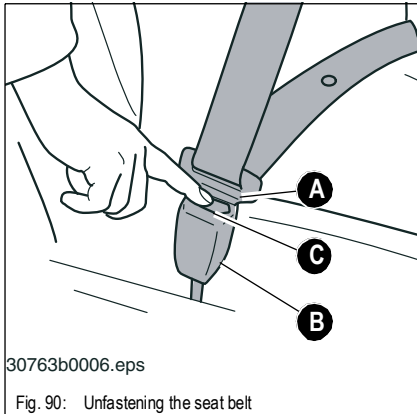
 *Fasten the seat belt as follows before moving off:*

- 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!



Operation

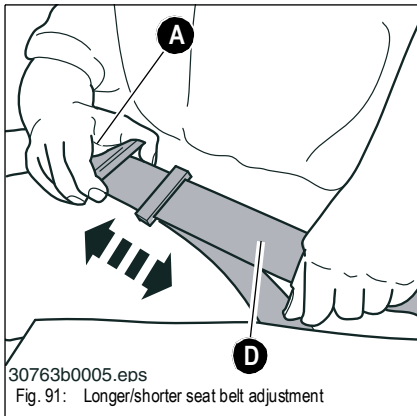
Unfastening the seat belt



☞ *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 lap 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



3.41 Other controls

Folding back the control lever base

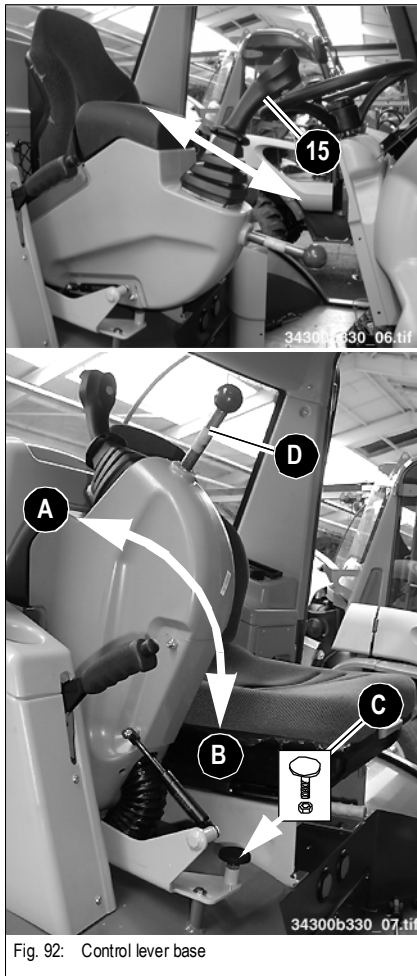


Fig. 92: Control lever base



Danger!

The door on the right can be used as entry and exit.

In order to avoid danger, the following conditions must be fulfilled before entering or leaving the cab:

- Stop the machine
- Lower the loader unit to the ground
- Apply the parking brake
- Stop the engine and remove the ignition key
- Move control lever **15** (joystick) back and forth several times to release the pressure
- Secure control lever **15** (joystick) – see *Locking the control lever (joystick) and the 3rd control circuit (attachments)* on page 3-29

*Fully raise the control lever base to position **A** with handle **D***

➔ The gas strut keeps the control lever base in the top position

*Fold the control lever base down to position **B** after entering or leaving the cab*

➔ The gas strut keeps the control lever base in the lower position



Caution!

*In order to avoid damage to the control lever base, do not use handle **D** on the control lever base as a support to ease your entrance or exit from the cab!*

Use the entrance handles in the cab



Important!

The height of the control lever base can be set with stop bolt **C**.



3.42 Towing 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 hazard zone under the following conditions.

- The towing vehicle (tractor vehicle) must have enough tractive power and be fitted with a safe brake system!
- The machine may only be towed using suitable towing equipment (towing bar) in connection with suitable towing facilities, such as a towing coupling, hooks and eyes!
- Make sure no-one is between the vehicles!
- 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

Getting ready for towing

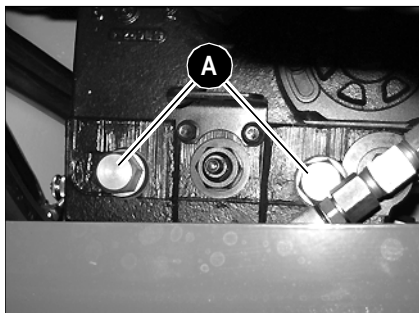


Fig. 93: Disabling the variable displacement pump

Disabling the variable displacement drive pump



Caution!

The hydrostatic power train can be damaged when towing the machine!

- ☞ *Tow the machine out of the hazard zone only with the high pressure relief valves open A*
 - ➡ **Towing speed => 8 kph max.**
 - **Distance => max. 300 m**

☞ *Switch over the high pressure relief valves A on the hydraulic pump to towing as follows:*

- Stop the diesel engine
- Switch off ignition and remove the ignition key
- Remove the protective caps (2 x) on the high pressure relief valves A
- Unscrew the high pressure relief valves 3 – 4 turns with an allen key
- [Towing the machine](#) on page 3-57



Caution!

Reset the variable displacement pump to drive operation once towing the machine is over!

- ☞ *– see [Once towing is over](#) on page 3-57*



Towing the machine



Danger!

In order to avoid danger of accidents, the towing vehicle must have enough tractive power and be fitted with a safe brake system.

☞ *Tow away only with a towing bar*

☞ See chapter [Specifications](#) on page 6-1 for the machine's dimensions and weights!

☞ *Overview of eye hooks for towing the machine – see chapter 1 “Machine outside view” on page 1-2*

☞ *If possible, run the engine at idling speed when towing the machine*

☞ Steering and braking requires greater effort if the diesel engine breaks down.

☞ **Towing speed => 8 kph max.**

☞ **Towing distance => 300 m max.**

Once towing is over

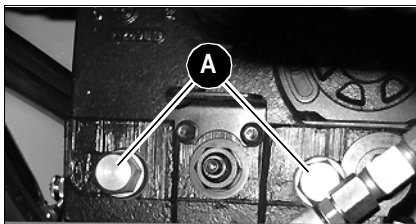


Fig. 94: Enabling the variable displacement pump

Enabling the variable displacement pump

☞ *Switch over the high pressure relief valves **A** on the hydraulic pump to drive operation as follows*

- Screw in the high pressure relief valves (**A**) by 3 – 4 turns and tighten them to 85 Nm
- Mount the protective cap
- Check the drive for correct operation



3.43 Decommissioning the machine 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 3-36](#)!
- ☞ Additionally secure the machine by placing chocks under the downhill sides of the wheels!
 - Wheel chocks are fastened at the access (right-hand side of cab)

☞ To decommission the machine temporarily, proceed as follows:

- Reduce engine speed: remove your foot from the accelerator pedal
- Stop the machine with service brake [Fig. 30/24](#)
- Move the machine to neutral with tip switch [Fig. 36/102](#) on the joystick
- Apply the parking brake permanently – see [Parking brake on page 3-36](#)
- Lower the loader unit. To do this: push control lever (joystick) [Fig. 30/15](#) forwards out of neutral
- Place the bucket on the ground so that the edge is flat with the ground. To do this: push the control lever to the left or right – see [Loader unit control lever \(overview\) on page 3-62](#).



Caution!

After engine operation under full load:

- ☞ Allow the engine to run on for a while so that the temperature can stabilise – see [Stopping the engine on page 3-17](#)

- Stop the engine and the ignition, and remove the key
- Close the windows and the door as you leave the cab
- Close and lock the engine cover

On slopes:

- Additionally secure the machine by placing chocks under the downhill sides of the wheels
- Wheel chocks are fastened at the access (right-hand side of cab)

Decommissioning the machine for a 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
- **Caution! Before putting the machine into operation**, clean the piston rods, however not with a grease solvent or a high-pressure cleaner
 - The scrapers are not water-tight, therefore water can penetrate into the guide bushing, and cause corrosion and damage to the piston rod



3.44 Crane handling the machine

Safety instructions regarding crane handling

- The crane and the lifting gear must have suitable dimensions
 ➔ Machine weight – [see chapter 6](#) “Specifications” on page 6-1
- Crane handling requires lifting gear with four ropes, chains, etc.
- Secure the machine against unintentional movement!



Danger!

Bear in mind the following instructions when crane handling the wheel loader!

- Make sure **no-one** is in the machine!
- Have loads fastened and crane operators instructed by experienced persons only! The person giving the instructions to the crane operator must be within sight or sound of him
- The slinging points (eyelets) that can be used for loading are marked with symbols **A**
- Make sure the crane and the lifting gear (cables, chains) have sufficient load-bearing capacity!
- Load the machine only with the standard bucket empty and in transport position!
- Stay clear of suspended loads!
- Fasten the lifting gear (cables, chains, belts) so as to make sure the wheel loader is horizontal when it is raised
- *It is essential that you follow the safety instructions [Applications with lifting gear](#) on page 2-8 and any other safety instructions relevant in your country!*

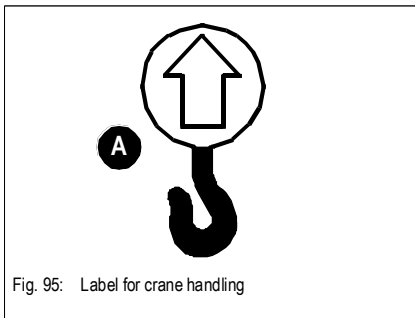


Fig. 95: Label for crane handling

Crane handling the machine

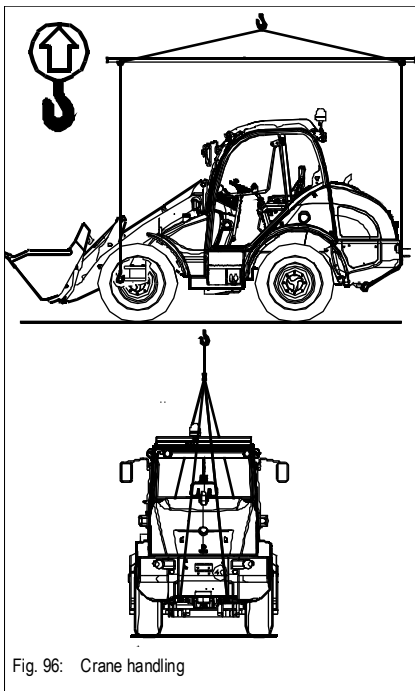


Fig. 96: Crane handling

Load the machine as follows

- Mount and safely lock the standard bucket – [see Equipping the machine with a standard bucket](#) on page 3-66
- Set the drive to neutral – [see Changing direction \(forwards/reverse\)](#) on page 3-38
- Apply the parking brake – [see Applying the parking brake](#) on page 3-36
- Stop the engine and remove the ignition key
- Do not allow anyone to stay in the cab, and close the doors and the engine cover
- Fasten the machine at the 4 points (eyelets) provided to this effect with sufficiently dimensioned lifting gear – [see chapter 1](#) “Machine outside view” on page 1-2
- Carefully raise the machine



Caution!

Do **not** use the slinging points (eye hooks) on the cab for loading the machine.



3.45 Loading and transporting the machine on a transport vehicle

Safety instructions regarding loading on a transport vehicle

- The transport vehicle must be of adequate size
 ➔ – see [chapter 2](#) “Transporting, towing, loading” on page 2-9
 ➔ See chapter Specifications, “Machine weights” on [page 6-12](#) for the machine's dimensions and weights!
- Make sure the authorised 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 wheel loader against unintentional movement!
- When placing the load on the platform, make sure the load is at the lowest possible position and that the centre of gravity of the load is in the centre line of the vehicle if possible (load distribution plan).
- Do not exceed the gross weight rating and the gross axle weight rating when loading and transporting the machine.
- Make sure the load does not fall short of the minimum axle load of the steering axle, otherwise the steering behaviour of the vehicle is seriously affected.
- Place partial loads so as to ensure an even load on all axles.
- 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 carried out with the vehicle or in which uneven roadways are driven on. Auxiliary means are e.g. anti-slip bases and linings, load-securing straps and chains, clamping beams, protective paddings, nets, edge protectors, etc.
- Depending on the load, adapt your drive 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 1](#) “Machine outside view” on page 1-2

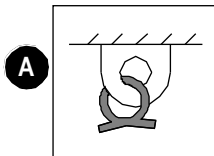


Fig. 97: Label: eyelets for tying down the machine



Caution!

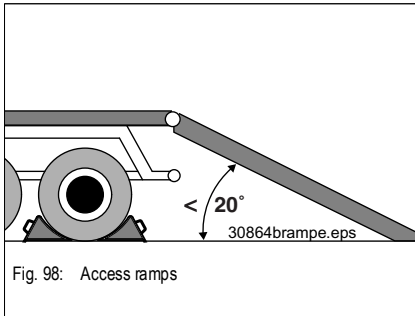
When loading and driving on ramps, the diesel engine can be damaged if the engine oil level is too low.

☞ Check the oil level of the diesel engine

- The oil level must be visible at the MAX mark of the oil dipstick



Loading and tying down the machine

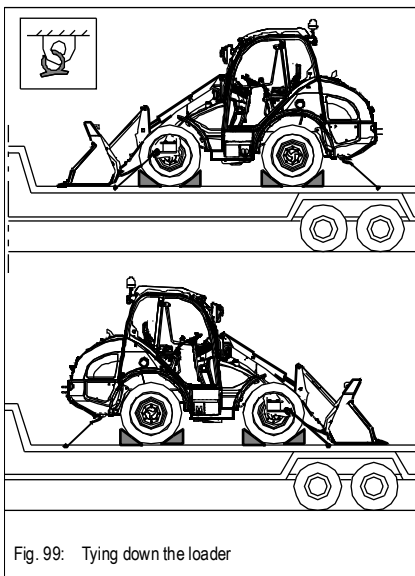


➤ Load as follows:

- Secure the transport vehicle with chocks to prevent it from rolling
- Place the access ramps at the smallest possible angle
- Do not exceed an **angle of 20°**
- Use access ramps with an antiskid surface only
- Make sure the loading area is clear and that access to it is not obstructed
- Make sure the access ramps and the wheels of the machine are free of oil, grease and ice
- Check the engine oil level – [see chapter 5 “Checking the engine oil level”](#) on page 5-5
- Start the engine of the machine
- 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 to neutral – [see Changing direction \(forwards/reverse\)](#) on page 3-38
- Lower the loader unit (bucket) to the loading area of the transport vehicle
- Stop the engine
- Apply the parking brake – [see Applying the parking brake](#) on page 3-36
- Remove the ignition key
- Do not allow anyone to stay in the cab, and close the doors and the engine cover

➤ Tie down the machine as follows:

- Firmly tie down the machine at the eye hooks – [see chapter 1 “Machine outside view”](#) on page 1-2 – with sufficiently dimensioned belts or chains onto the platform. If possible, secure the wheels with additional chocks at the front, rear and at the sides
- Before transporting the machine through heavy rain: close the outlet of the exhaust silencer with a simple cap or suitable adhesive tape
- Make sure the driver of the transport vehicle knows the overall height, width and weight of his vehicle (including the load) before moving off, and the legal transport regulations of the country or countries in which transport will take place!





3.46 Loader unit control lever (overview)

Control lever (joystick) for lift and tilt rams and 3rd control circuit



Danger!

Before leaving the seat, and when driving on public roads, lock the control lever (loader unit) and the 3rd control circuit against unintentional actuation!

☞ [Locking the control lever \(joystick\) and the 3rd control circuit \(attachments\)](#) on page 3-29

☞ – see [Operating and securing the 3rd control circuit](#) on page 3-63

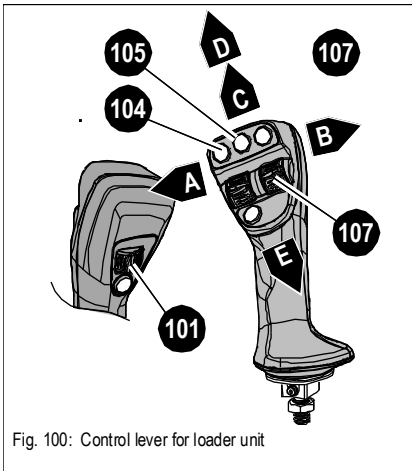


Fig. 100: Control lever for loader unit

Position	Operation	Function
A	To the left	Tilts in the attachment
B	To the right	Dumps out the attachment
C	Forwards	Lowers the loader unit
D	Fully forwards (2nd position)	Lowers the loader unit to float position (option)
E	Backwards	Raises the loader unit
101	Switch	Quickhitch – unlocking/locking/attachments – 3rd control circuit
104/105	Tip switch	Additional control circuit (option)
106	Tip switch	Front socket (option) or bucket repositioning (option)
107	Switch (scroll wheel)	Additional control circuit (proportional controls option)



Important!

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.



3.47 Operating and securing the 3rd control circuit

Locking and unlocking an attachment from the quickhitch



Danger!

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

☞ Secure the switch (3rd control circuit) with switch **94**!

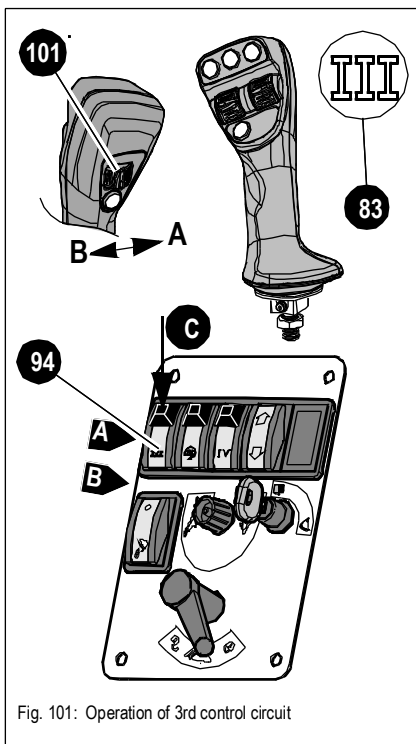


Fig. 101: Operation of 3rd control circuit

Unlocking the switch (3rd control circuit)	Result
Slide lock C on switch 94 downwards and at the same time press the switch to position B	Telltale 83 on the indicating instrument comes on The 3rd control circuit is unlocked and switch 101 on the joystick is functional
Unlocking the attachment from the quickhitch	Result
Press switch 101 on the control lever to the left to position A (towards the centre of the machine)	The attachment is unlocked
Locking the attachment in the quickhitch	Result
Press switch 101 on the control lever to the right to position B (towards the door on the right)	The attachment is locked
Locking the switch (3rd control circuit)	Result
Slide lock C on switch 94 downwards and at the same time press the switch to position A	Telltale 83 on the indicating instrument goes out The 3rd control circuit is locked and switch 101 on the joystick is not functional

Operation of hydraulic attachments

The function of switch **101** on the joystick is described as seen in driving direction!

Attachment operation	Result
Press switch 101 on the control lever to the left A	Pressurises the right-hand side blue hydraulic line and opens e.g. a multipurpose bucket
Press switch 101 on the control lever to the right B	Pressurises the left-hand side red hydraulic line and closes e.g. a multipurpose bucket



3.48 Continuous operation of the 3rd control circuit (option)

Continuous operation of the 3rd control circuit

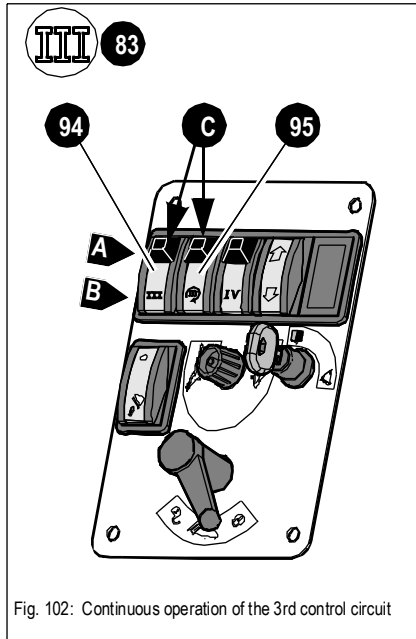


Fig. 102: Continuous operation of the 3rd control circuit

For hydraulic movements/procedures over a longer period of time or operation of hydraulic motors (e.g. rotary broom) or for operation of a hydraulic attachment with a control valve adjusted to maximum oil flow, with an unpressurised reflux.

Unlocking the 3rd control circuit	Result
Slide lock C on switch 94 downwards and at the same time press the switch to position B	Telltale 83 on the indicating instrument comes on 3rd control circuit is unlocked
Continuous operation of the 3rd control circuit	Result
Slide lock C on switch 95 downwards and at the same time press the switch to position B	The 3rd control circuit is in continuous operation
Slide lock C on switch 95 downwards and at the same time press the switch to position A	Continuous operation is switched off
Locking the 3rd control circuit	Result
Slide lock C on switch 94 downwards and at the same time press the switch to position A	Telltale 83 on the indicating instrument goes out 3rd control circuit is locked



Important!

Restart lock!

The 3rd control circuit is automatically locked when switching ignition off and on again! When resuming continuous operation, re-activate the 3rd control circuit with switch **94**!



3.49 Emergency lowering of loader unit in case of diesel engine breakdown

Lowering or raising



Fig. 103: Lowering the loader unit

☞ Lower the loader unit as follows:

- Make sure no-one is dangerously close to the machine
- Apply the parking brake
- Slowly push control lever **15** forwards **C** until the loader unit is fully lowered
- Return control lever **15** to neutral
- Switch off ignition and remove the ignition key

☞ Raise as follows:

- Fasten lifting gear (crane) onto the loader unit
- Pull and hold the control lever backwards
- Raise the loader unit to transport position with the lifting gear
- Release control lever **15**
- In case of diesel engine breakdown, have an authorised workshop carry out checks and repair work

3.50 Pressure relief on the quickhitch couplers

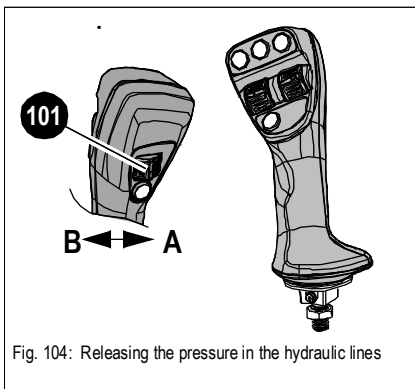


Fig. 104: Releasing the pressure in the hydraulic lines



Important!

The hydraulic system of the machine is still pressurised 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 as follows:

- Apply the parking brake – see [Parking brake](#) on page 3-36
- Unlock the 3rd control circuit – see [Operating and securing the 3rd control circuit](#) on page 3-63
- Stop the engine but leave the ignition switched on
- Press and hold switch **101** 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
- Quick couplers can be switched over – see “Re-equipping attachments” on page [3-66](#), [3-75](#) and [3-85](#)

3.51 Equipping the machine with a standard bucket

Fitting a standard bucket onto the quickhitch

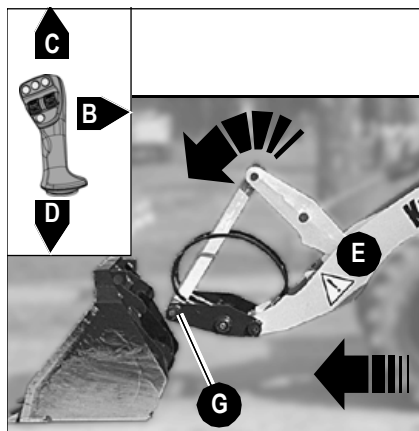


Fig. 105: Driving up to the attachment

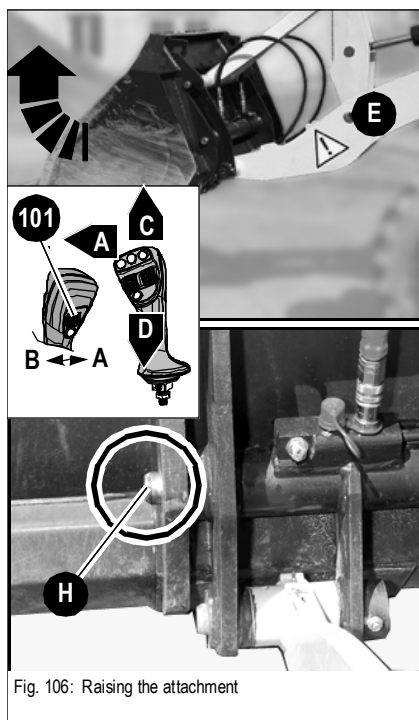


Fig. 106: Raising the attachment



Danger!

Before starting work, make sure 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 (left/right) in the mounting bores on the attachment

 Remove the bucket as follows:

- Approach the machine to the attachment
- Lower loader unit **E**. To do this: push the control lever forwards **C**
- Tilt the quickhitch forwards. To do this: push the control lever to the right **B**
- Drive the machine forwards until mounts **G** of the quickhitch are directly beneath the mounts of the attachment
- Raise loader unit **E** until pin shanks **G** engage in catch hooks **F** of the attachment. To do this: pull the control lever  backwards **D**
- Fully tilt in the quickhitch. To do this: push the control lever  to the left **A**
- Secure the attachment with catch bolts **H** of the quickhitch. To do this: push and hold switch **101** on the control lever to the right **B** until catch bolts **H** engage in the mounting bores of the attachment
- Make sure the attachment is visibly locked on either side with lock pins **H**
- Lock the 3rd control circuit – see *Operating and securing the 3rd control circuit* on page 3-63



Removing a standard bucket from the quickhitch

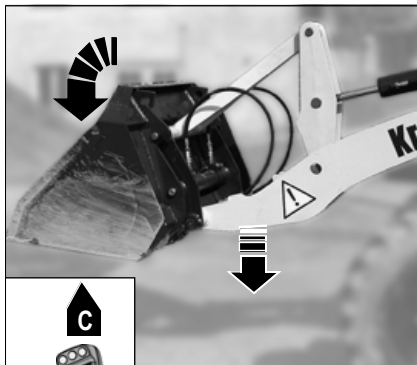


Fig. 107: Lowering and tilting in the attachment

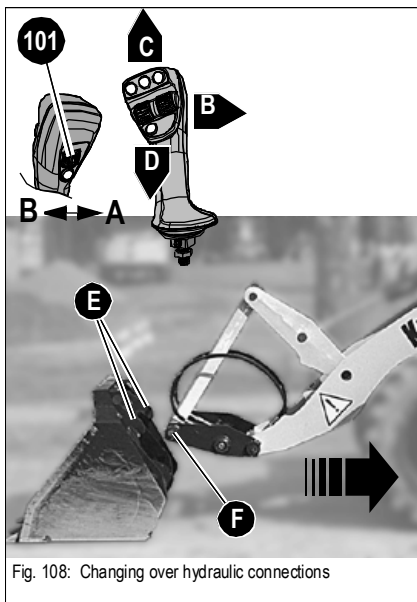


Fig. 108: Changing over hydraulic connections



Danger!

In order to prevent the attachment from tipping over, place it on the ground ensuring stability!

☞ *Position the attachment so that after unlocking it will stand safely and not tip over*

☞ Remove the bucket as follows:

- Drive the machine to the drop-off position with an empty attachment
- Tilt in the quickhitch. To do this: push the control lever to the left **A**
- Lower the loader unit until the attachment is about 5 – 10 cm above the ground. To do this: push the control lever forwards **C**
- Unlock the 3rd control circuit – see *Operating and securing the 3rd control circuit* on page 3-63
- Push and hold switch **101** on the control lever to the left **A** until the attachment is unlocked
- Tilt the quickhitch slightly forwards. To do this: push the control lever to the right **B**
- Lower the loader unit. To do this: push the control lever to the front **C** until the attachment is on the ground without risking falling over
- Reverse the machine away from the attachment



3.52 Driving on public roads with a standard bucket

Preparing road travel

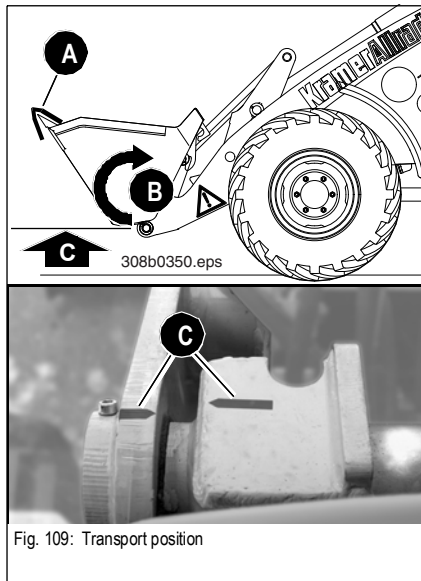


Fig. 109: Transport position

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

➔ – see [chapter 1](#) “Fields of application and using a wheel loader with an attachment” on page 1-5

☞ Preparing road travel

- Empty the bucket, dump it in, and lower the loader unit to transport position
- Cover the blade or teeth of the bucket across their entire width with the protection **A** provided – see *Special instructions for driving on public roads* on page 3-26
- Lock the control lever (joystick) and the 3rd control circuit

➔ – see *Locking the control lever (joystick) and the 3rd control circuit (attachments)* on page 3-29

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



Caution!

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

- ☞ Dump in the bucket and lower loader unit to transport position
- ☞ The distance between the bucket and the ground **B** is about **250 mm** with standard tyres



3.53 Working with a bucket

Fields of application for bucket

- The standard bucket is mainly used for digging earth, and for loosening, picking up, transporting and loading loose or solid materials.
- Get informed on the legal regulations of your country which may prohibit driving on public roads with a full bucket!
 ➡ – [see chapter 1](#) "Fields of application and using a wheel loader with an attachment" on page 1-5
- The machine and the attachment may be used for applications with lifting gear only if the prescribed safety devices are in place and functional.

Safety instructions for working with the bucket

- Never drive up to the edge of a pit from outside – **danger of cave-in!**
- Never undermine the foundations of walls – **danger of collapse!**
- Operation of the wheel loader by unauthorised staff is prohibited
- When working with the machine, look out for high-voltage cables, underground cables, gas and water pipes
- Get informed on the legal regulations of your country which may prohibit driving on public roads with a full bucket!
- Observe the footnotes and instructions in chapter 1 [Fields of application and using a wheel loader with an attachment](#) on page 1-5
- Bear in mind the mandatory regulations for accident prevention
- If the machine is equipped with a load stabiliser (option):
 - Switch off the load stabiliser before working with the machine – [see Load stabiliser \(option\)](#) on page 3-40
 - The loader unit yields very easily with the load stabiliser switched on, making it difficult to carry out any precise lifting movements



Danger!

Before starting work, make sure the attachment is safely locked onto the quick-hitch 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!*

👁️ – [see Fitting a standard bucket onto the quickhitch](#) on page 3-66



Safety instructions for transporting material in a full bucket



Danger!

In order to avoid danger of accidents, do not transport loads with a raised loader unit!

Always dump in the attachment a little towards the machine, carry it as close as possible to the ground and bear in mind the required ground clearance!

If it is dumped in, the bucket is moved parallel to its initial position as the loader unit is raised! If the bucket is unintentionally dumped in to the limit in the raised position, material can fall over the rear of the bucket!

☞ *In the raised position, **do not dump in** a loaded bucket **fully to the limit***

☞ *Slightly readjust (dump out) the bucket if necessary*

☞ *In case of a bulky load:*

- Secure the load and if necessary, fit the rear of the bucket with a protection
- Install a protective FOPS screen (option) onto the cab

☞ *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 driving or manoeuvring on slopes with a full bucket, dump in the bucket fully and set the loader unit to transport position!

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



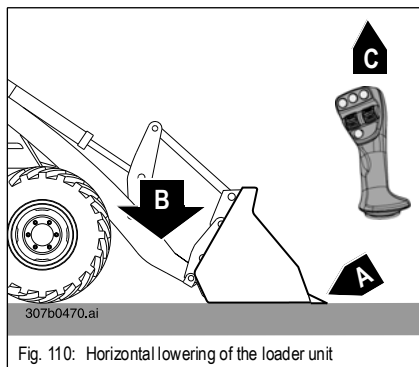
Important!

Driving on public roads with a full bucket is not allowed in Germany!

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



Loading loose material

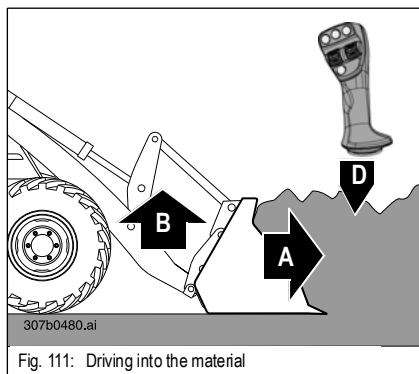


☞ Loading loose material

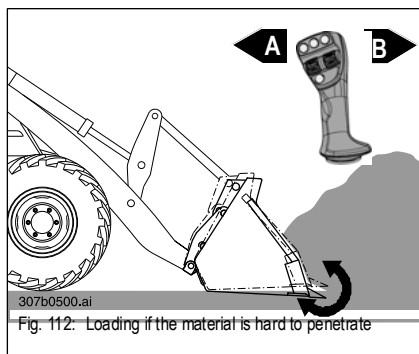
- Align the blade parallel with the ground **A**
- Lower the loader unit to the ground **B**. To do this: push the control lever forwards **C**
- Drive forwards into the material **A**

☞ When the engine speed decrease due to too much material:

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

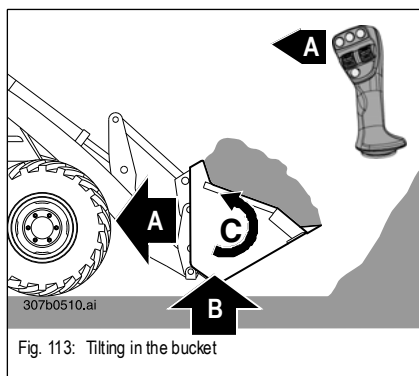


Loading if the material is hard to penetrate



☞ Loading if the material is hard to penetrate

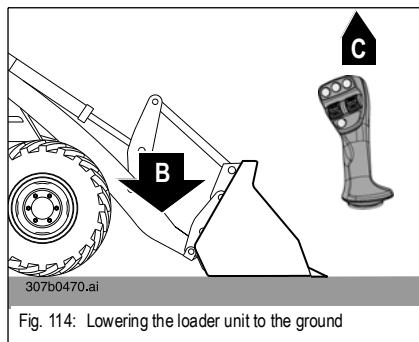
- As for loading loose material, but in addition:
- Tilt the bucket in and out a little. To do this: move the control lever to the left and right **A** and **B**



☞ Ending loading:

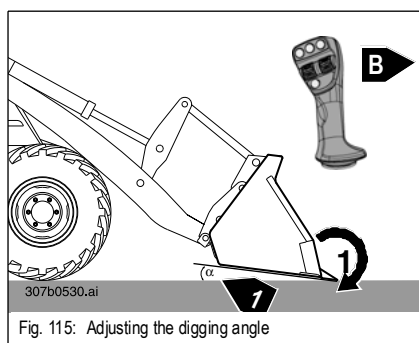
- Dump in the bucket **C**. To do this: push the control lever to the left **A**
- Reduce engine speed
- Reverse out of the material **A**
- Raise the bucket to transport position **B**

Removing material/digging in soft soil

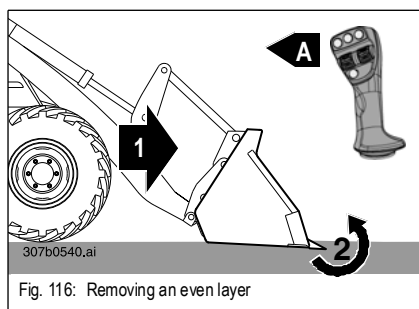


☛ Digging in soft soil

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



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

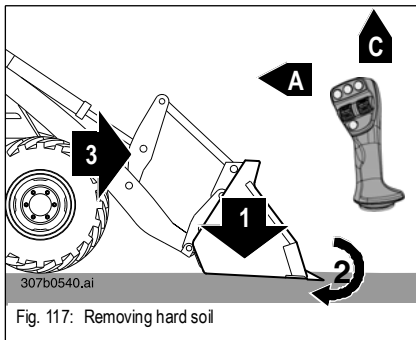


☛ Once the bucket has penetrated the soil:

- 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

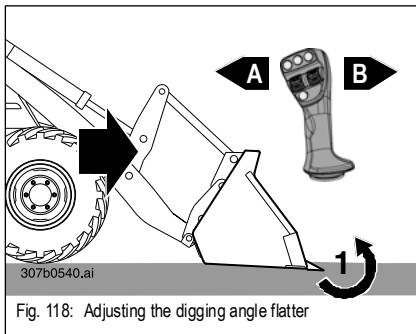


Removing material/digging in hard soil



Digging in hard soil

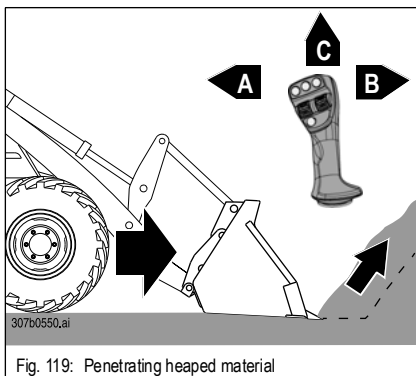
- Lower the bucket horizontally to the ground 1. To do this: push the control lever forwards **C**
- Adjust the digging angle flatter 2 than for digging in soft soil. To do this: push the control lever to the left **A**
- Drive the machine forwards 3 and
- Press the bucket downward a little. To do this: push the control lever forwards **C** a little



Once the bucket has penetrated the soil:

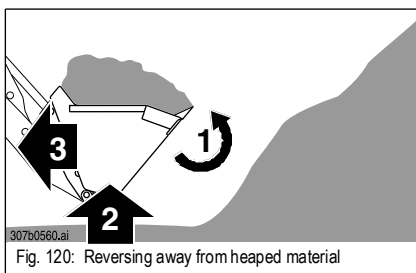
- Set the digging angle a little flatter 1. To do this: push the control lever to the left **A**, so that the layer being removed is as even as possible and so that the wheel spin is reduced
- Push control lever to the left **A**, or move it alternately to the left and right **A** and **B** to loosen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

Loading heaped material (non-compacted material)



Loading heaped material (non-compacted material)

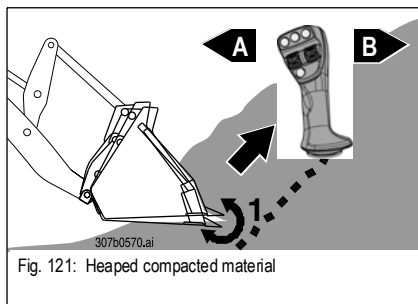
- Set the blade parallel to the ground. To do this: push the control lever to the left or right **A** and **B**
- Lower the loader unit horizontally to the ground. To do this: push the control lever forwards **C**
- Drive forwards
- After penetrating the heaped material:
- Smoothly raise the loader unit and
- Keep the bucket level



When the loader unit cannot be raised further:

- Tilt in the bucket 1
- Raise the loader unit 2
- Reverse out of the material 3
- Lower the loader unit to transport position

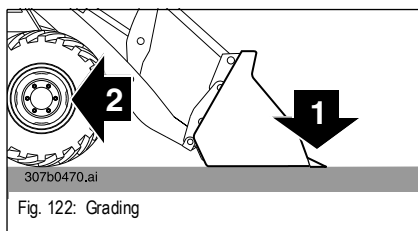
Loading heaped material (compacted material)



Loading heaped material (compacted material)

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

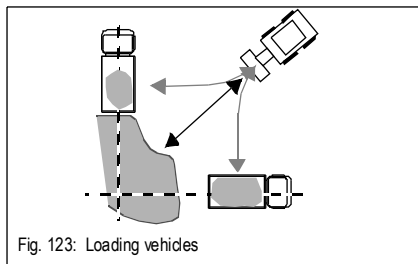
Grading



After having finished removing/loading the material:

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

Practical hints for loading vehicles



Practical hints for loading vehicles

- If possible, the truck and the working direction of the loader should form an angle of 45°
- Only raise the full bucket to the dump height when you are driving in a straight line towards the truck
- If possible dump with the wind behind you to keep the dust away from your eyes, air filters and fans!

Freeing the machine

Freeing the machine

- Dump 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 backwards
- Reverse slowly
- Repeat this procedure until the wheels reach firm ground
- Reverse the machine away



3.54 Fitting a multipurpose bucket

Picking up a multipurpose bucket with the quickhitch



Important!

The multipurpose bucket is picked up and mounted on the quickhitch in the same way as the standard bucket

- – see *Fitting a standard bucket onto the quickhitch* on page 3-66

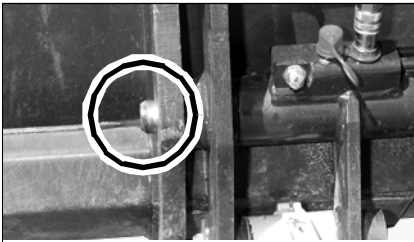


Fig. 124: Checking the lock pins



Danger!

Before starting work, make sure 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!

Hydraulic connections on the multipurpose bucket (overview)

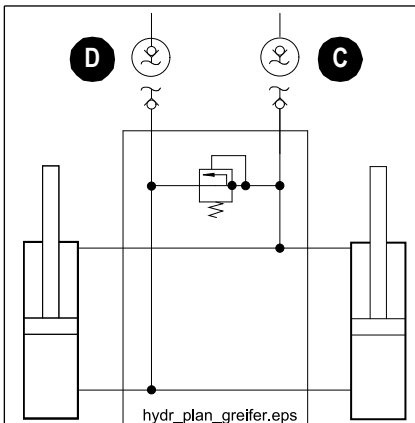


Fig. 125: Hydraulic connections on the multipurpose bucket

Hydraulic connection	Function
C Pressurised	Opens the multipurpose bucket
D Pressurised	Closes the multipurpose bucket



Connecting the hydraulic lines of a multipurpose bucket to the wheel loader



Important!

The hydraulic system of the machine is still pressurised 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 which are to be opened before starting setup or repair work, e.g. fitting/removing an attachment!

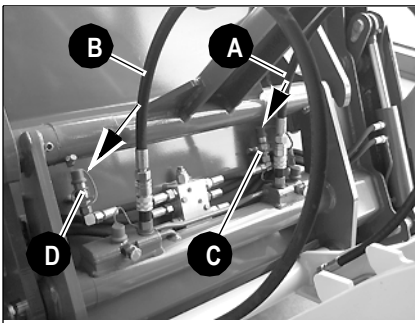


Fig. 126: Connecting the hydraulic lines onto a multipurpose bucket

Proceed as follows:

- Stop the engine
- Apply the parking brake
- Release the pressure in the hydraulic lines
- ➔ – see [Pressure relief on the quickhitch couplers](#) on page 3-65
- Clean the hydraulic connections on the multipurpose bucket
- 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**
- ➔ Flexible line **B** onto quick coupler **D**



Caution!

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

➔ Check the multipurpose bucket for correct function



Important!

If the attachment is placed in direct sunlight after having been taken off, the oil in the hydraulic rams will warm up. This leads to a pressure increase in the hydraulic rams that will make it difficult to attach the hydraulic lines to the hydraulic connections.



Removing the multipurpose bucket from the quickhitch



Danger!

In order to prevent the attachment from tipping over, place it on the ground ensuring stability!

☞ *Position the attachment so that after unlocking it will stand safely and not tip over*

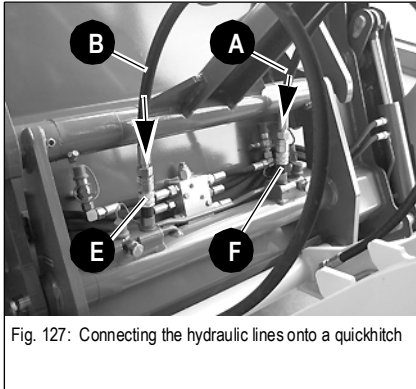


Fig. 127: Connecting the hydraulic lines onto a quickhitch



Important!

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 3-67

☞ **Remove 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 quickhitch couplers* on page 3-65
- 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



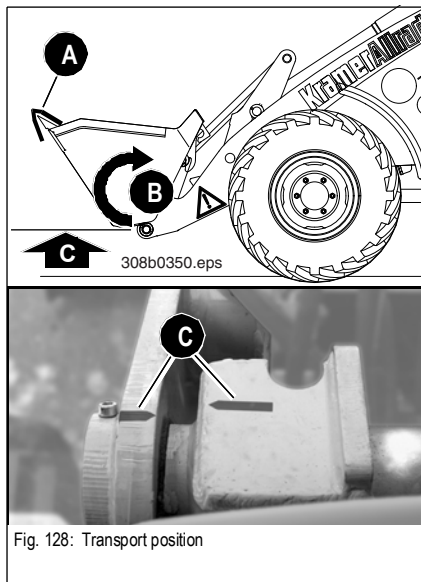
Caution!

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

☞ *Check the multipurpose bucket for correct function*

3.55 Driving on public roads with the multipurpose bucket

Preparing road travel



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

➡ – see chapter 1 “Fields of application and using a wheel loader with an attachment” on page 1-5

⚠ Preparing road travel

- Empty the bucket, dump it in, and lower the loader unit to transport position
- Cover the blade or teeth of the bucket across their entire width with the protection A provided – see *Special instructions for driving on public roads* on page 3-26
- Lock the control lever (joystick) and the 3rd control circuit

➡ – see *Locking the control lever (joystick) and the 3rd control circuit (attachments)* on page 3-29

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



Caution!

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

- ⚠ Dump in the bucket and lower loader unit to transport position
- ⚠ The distance between the bucket and the ground B is about **250 mm** with standard tyres



3.56 Working with the multipurpose bucket

Fields of application for multipurpose bucket

- The multipurpose bucket is mainly used for digging earth, and for loosening, pushing, picking up, transporting and loading loose or solid materials.
- Get informed on the legal regulations of your country which may prohibit driving on public roads with a full bucket!
 ➡ – see [chapter 1](#) "Fields of application and using a wheel loader with an attachment" on page 1-5
- The machine and the attachment may be used for applications with lifting gear only if the prescribed safety devices are in place and functional.

Safety instructions for working with the multipurpose bucket

- Never drive up to the edge of a pit from outside – **danger of cave-in!**
- Never undermine the foundations of walls – **danger of collapse!**
- Operation of the wheel loader by unauthorised staff is prohibited
- When working with the machine, look out for high-voltage cables, underground cables, gas and water pipes
- Get informed on the legal regulations of your country which may prohibit driving on public roads with a full bucket!
- Observe the footnotes and instructions in chapter 1 [Fields of application and using a wheel loader with an attachment](#) on page 1-5
- Bear in mind the mandatory regulations for accident prevention
- If the machine is equipped with a load stabiliser (option):
 - Switch off the load stabiliser before working with the machine – see [Load stabiliser \(option\)](#) on page 3-40
 - The loader unit yields very easily with the load stabiliser switched on, making it difficult to carry out any precise lifting movements



Danger!

Before starting work, make sure the attachment is safely locked onto the quick-hitch by means of the lock ram.

👁️ *You must be able to see the lock pins on either side (left/right) in the mounting bores on the attachment!*

👁️ – see [Picking up a multipurpose bucket with the quickhitch](#) on page 3-75



Safety instructions for transporting material in a full multipurpose bucket



Danger!

In order to avoid danger of accidents, do not transport loads with a raised loader unit!

Always dump in the multipurpose bucket a little towards the machine, carry it as close as possible to the ground and bear in mind the required ground clearance!

If it is dumped in, the multipurpose bucket is moved parallel to its initial position as the loader unit is raised! If the multipurpose bucket is unintentionally dumped in to the limit in the raised position, material can fall over the rear of the bucket!

☞ *In the raised position, **do not dump in** a loaded multipurpose bucket **to the limit***

☞ *Slightly readjust (dump out) the multipurpose bucket if necessary*

☞ *In case of a bulky load:*

- Secure the load and if necessary, fit the rear of the bucket with a protection
- Install a protective FOPS screen (option) onto the cab

☞ *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 driving or manoeuvring on slopes with a full multipurpose bucket, dump in the multipurpose bucket fully and set the loader unit to transport position!

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



Important!

Driving on public roads with a full multipurpose bucket is not allowed in Germany!

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



Grading and scraping

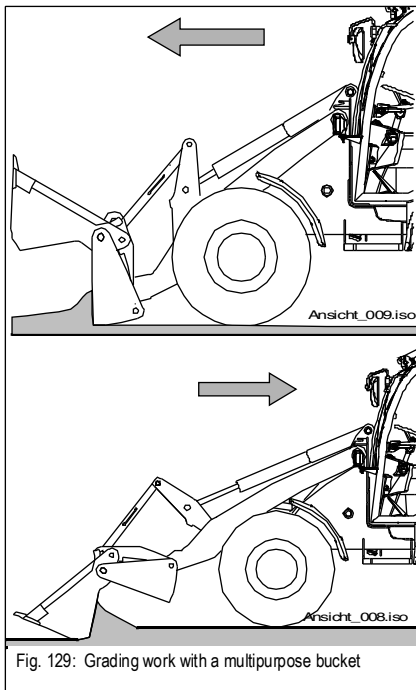


Fig. 129: Grading work with a multipurpose bucket

Grading

- 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 backwards

- Dump 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 when driving in reverse

Removing and spreading material in thin layers

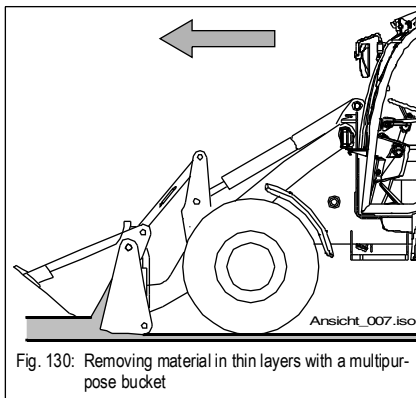


Fig. 130: Removing material in thin layers with a multipurpose bucket

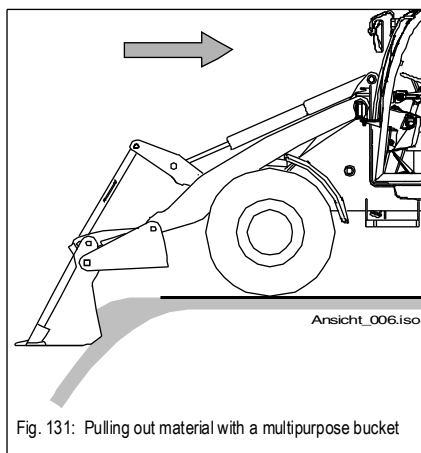
Removing material in thin layers

- Set a flat digging angle
- Fold up the front half of the bucket by about 10 to 15 cm
- Move off the machine
- ➔ The material rolls into the bucket and is picked up at the same time
- ➔ This position allows to strip e.g. grass turf down to a thickness of about 8 cm

Spreading material in thin layers

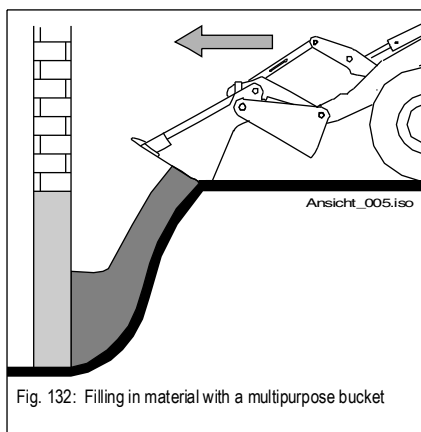
- Set the rear cutting edge parallel to the ground
- Fold up the front half of the bucket until the required quantity of material is emptied onto the ground
- Move off the machine
- Lower the multipurpose bucket to the ground
- ➔ The rear cutting edge grades the material as it is emptied by opening the front half of the bucket. This position allows to spread material without driving on the lower layer with the machine (e.g. applying the first bituminous base onto sensitive antifrost layers, applying granulated material onto plastic coatings)

Pulling out material from slopes



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

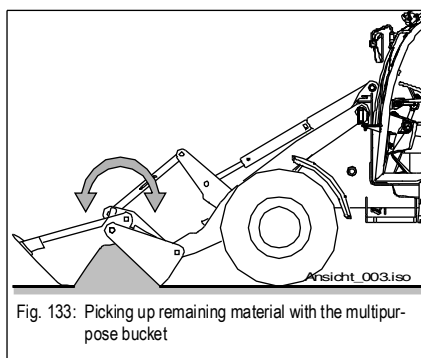
Moving material with longer reach



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

- Backfilling with maximum safety and without damaging slopes

Picking up remaining material completely



Important!

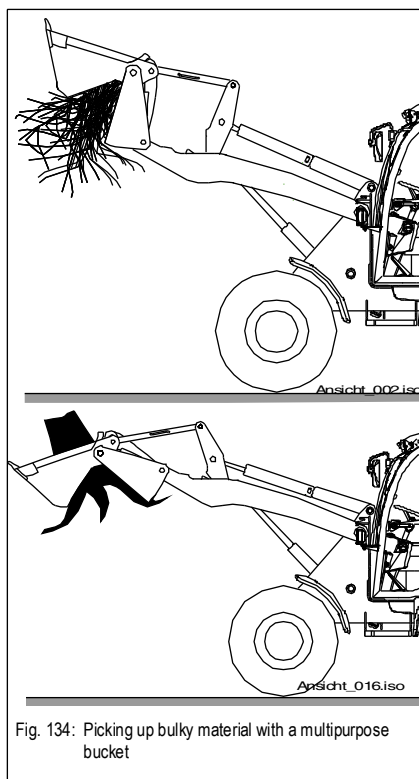
Both bucket halves must touch the ground so that all the material is picked up.

Picking up remaining material

- Fold up the front half of the bucket (multipurpose bucket)
- Dump out the bucket
- Lower the bucket to the ground. Make sure both bucket halves touch the ground
- Close and dump in the multipurpose bucket at the same time
- Raise the bucket with the lift hydraulics



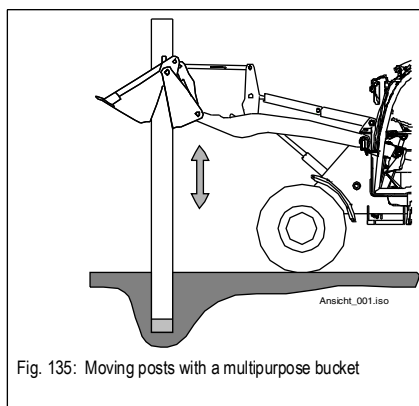
Grabbing bulky material



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

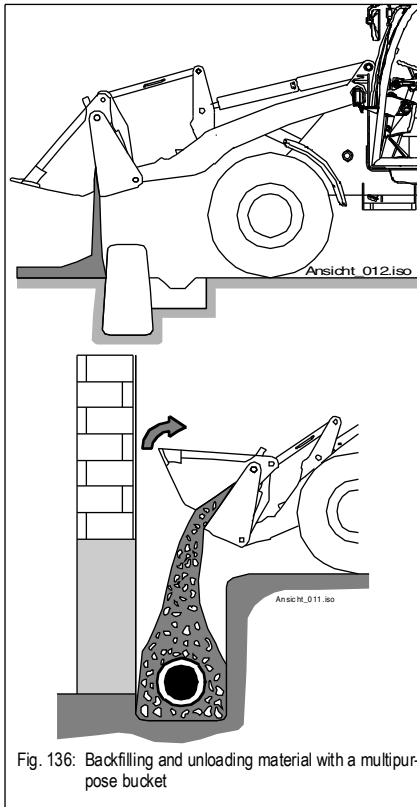
Pulling out and setting posts



Pulling out and 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

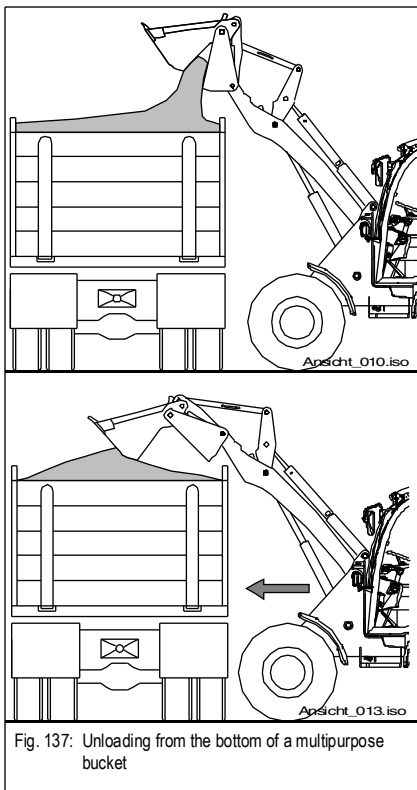
Backfilling round gravel and precise unloading



Backfilling round gravel

- 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 dump heights



Unloading from the bottom of the bucket for increased dump heights

- Increases the dump height by at least 55 cm (depending on bucket size), as compared to dumping with a standard bucket



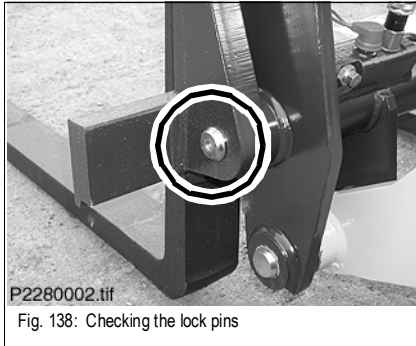
Important!

Smaller dump reach is compensated by pushing the material with the open multipurpose bucket as shown



3.57 Fitting pallet forks

Picking up pallet forks with the quickhitch



Important!

The pallet forks are picked up and mounted on the quickhitch in the same way as the standard bucket.

- – see *Fitting a standard bucket onto the quickhitch* on page 3-66



Danger!

Before starting work, make sure 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 (left/right) in the mounting bores on the attachment!

Removing the pallet forks from the quickhitch



Important!

The pallet forks are removed from the quickhitch in the same way as the standard bucket.

- If the machine is equipped with pallet forks with foldable fork arms, fold them down to the work position and secure them before they are removed
- – see *Removing a standard bucket from the quickhitch* on page 3-67

3.58 Driving on public roads with pallet forks

German road traffic regulations prohibit driving on public roads if the distance between the front edge of the forks and the centre of the steering wheel is over 3500 mm in transport position.

Only pallet forks with foldable fork arms are authorised for transport on public roads.

☞ – see *chapter 1 "Fields of application and using a wheel loader with an attachment"* on page 1-5

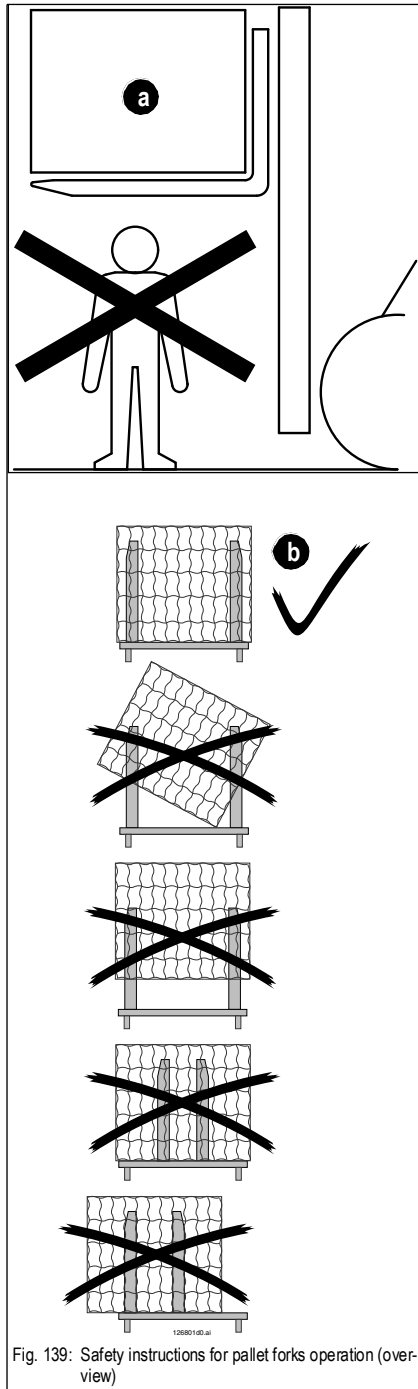
☞ If the machine is equipped with pallet forks with foldable fork arms (option), fold them back and secure them

☞ Lower the pallet forks to transport position – see *Bucket transport position* on page 3-27

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

3.59 Working with the pallet forks

General safety instructions regarding the pallet forks



- Follow the special instructions in the Operator's Manual of the attachment!
- 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 loader unit/load and overhead lines!
- Before starting work, make sure the fork arms on the fork frame are safely locked!
- Never operate the loader unit and the attachments at higher machine speed!
- Never leave the machine with the load raised!
- Always transport the load close to the ground!
- Make sure only authorised persons handle and work with the attachment
- Do not transport persons in the attachment
- Stay clear of suspended loads! (figure a)
- Never use the controls or movable lines and cables as handles
- Never use bent, cracked or otherwise damaged fork arms/pallet forks!
- Do not drive on public roads with an attachment fitted on the machine!
- 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!
- Lock the adjustable fork arms with the locking lever before moving the machine with loaded or unloaded pallet forks, to prevent the fork arms from moving (slipping, sliding) sideways!
- 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
- Always tilt in the attachment a little (towards the machine) for transport!
- Lower the bucket the nearest possible to the ground for transport. Observe minimum ground clearance!
- Drive slowly with a raised load, especially in off-road applications, to avoid strong swinging movements of the load!

Fig. 139: Safety instructions for pallet forks operation (overview)



- When driving or working across a slope, the load must be on the uphill side of the machine/attachment. Drive the machine backwards on sloping terrain to prevent the load from falling off and the machine from tilting forwards when braking
- When transporting large bulk loads drive the machine backwards 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 driving through or under them!
- Do not overload the attachment or the machine, observe the load diagram!
- Set down loads only in places where they will stand safely without tilting, falling down or sliding
- Observe the load-bearing capacity of the set-down area (e.g. 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 authorised maximum pallet height
- Do not set down loads too near to slopes, construction pits etc.
- Set down loads only in the areas provided for within the construction site. Affix appropriate marks to loads which have been set down, especially in the area of public and private traffic
- Do not set down loads in transit or escape routes, and not in front of safety facilities or works equipment which must be accessible at any time



Brief instructions for fork arms

The following brief instructions are based on the "Guidelines for testing and repairing fork arms" (© by VETTER Umformtechnik GmbH):

- Use fork arms only according to their designated use
- Do not exceed the load centre and the load-bearing capacity
- 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 (danger 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 loosening them
- Do not raise with the tilt ram (tilt device)
- Bear in mind the limits of application for the fork lift, and its Operator's Manuals
- Carry out frequent visual checks
- Have regular checks carried out according to the Operator's Manual and the legal regulations of your country
- Do not modify the fork arms, or attach any additional device
- Only the manufacturer is authorised to carry out repair work on the fork arms
- No transport of persons on the fork arms
- No transport of molten material
- Working on overhead lines is not allowed
- Observe the legal regulations of your country when driving on public roads
- The operator/driver 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!



Specific safety instructions for picking up loads with the pallet forks

- Always lock the control lever for the 3rd control circuit when working with the pallet forks – see *Operating and securing the 3rd control circuit* on page 3-63.
- 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 loader unit/load and overhead lines!
- Before starting work, make sure the fork arms on the fork frame are safely locked!
- Never operate the loader unit and the attachments at higher machine speed!
- Never leave the machine with the load raised!
- Always transport the load close to the ground!

Load diagram for pallet forks

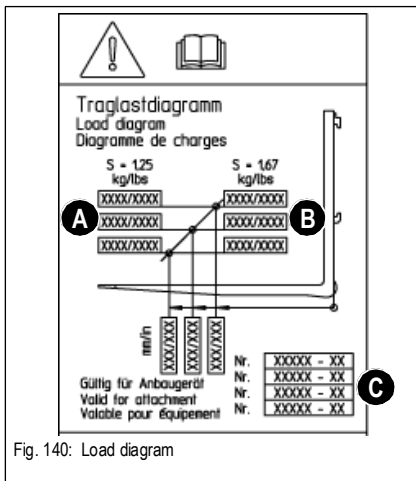


Fig. 140: Load diagram

The load diagram is located in the cab on the front window, values are calculated for the respective machine model (– see *chapter 1 “Attachments with authorised material densities”* on page 1-5).

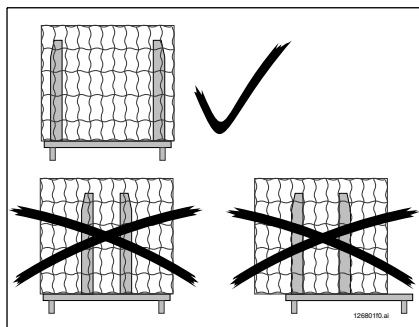
- Do not exceed the maximum loads stated, otherwise machine stability is no longer ensured.
- The framed row of numbers **A** on the left states the maximum load for applications on level ground (stability $s = 1.25$).
- The framed row of numbers **B** on the right states the maximum load for off-road applications (stability $s = 1.67$).
- The maximum load is a function of the distance (load distance) of the load centre to the fork frame **C** (lower row of figures).
- Take this into account also when using fork arm extensions!

Example:

- Safety factor for off-road applications **S = 1.67** (framed row of figures on the right **B**)
➔ Load distance = 600 mm (vertical centre line).
- The maximum load **C** amounts to **xxxx**! (Intersection of the middle vertical line with the slanting line)
- Pallet forks payloads – see *chapter 6 “Payloads”* on page 6-15



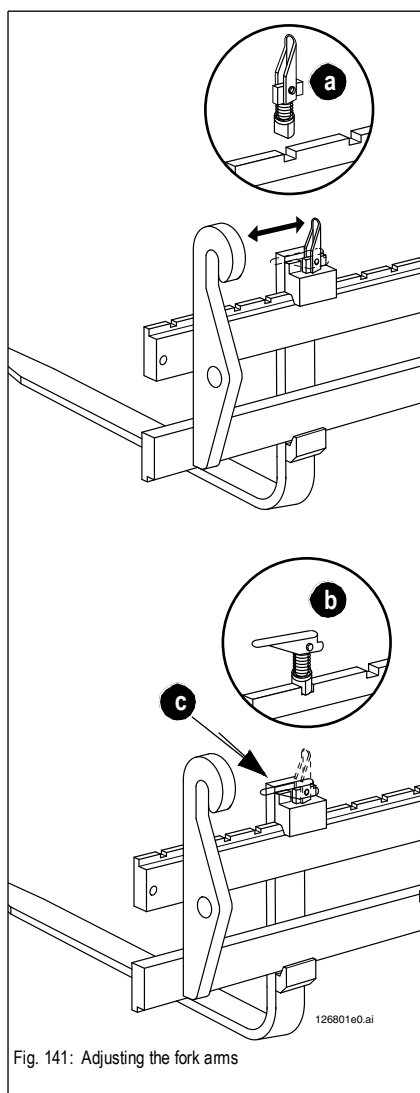
Adjusting the fork arms of the pallet forks



Danger!

In order to prevent the fork arms 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 safely engaged in the fork frame!*



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.

☞ **Adjust the fork arms 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. 141: Adjusting the fork arms



Fields of application for pallet forks

- The pallet forks are mainly used for picking up, transporting and loading palletised material and staple commodities.
- Get informed on the legal regulations of your country which may prohibit driving on public roads with loaded pallet forks!
 - ➔ – see chapter 1 “Fields of application and using a wheel loader with an attachment” on page 1-5
- The machine and the attachment may be used for applications with lifting gear only if the prescribed safety devices are in place and functional.

Picking up loads with the pallet forks



Caution!

If the machine is equipped with the “Hose burst valve” option, make sure the load stabiliser (option) is switched off!

➔ The hose burst valve is disabled if the load stabiliser is switched on

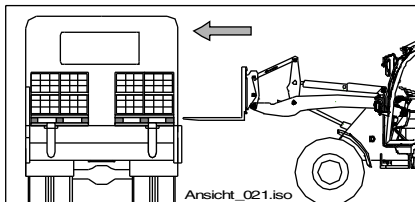


Fig. 142: Position of fork arms with regard to load

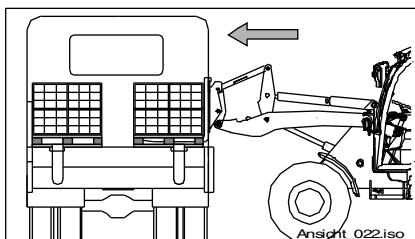


Fig. 143: Picking up the load

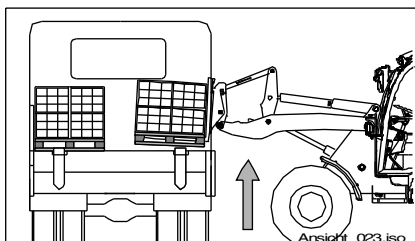


Fig. 144: Raising the load

➔ Pick up loads as follows:

- Move the wheel loader 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

- Drive the wheel loader forwards and move the fork arms as far as possible underneath the pallet.
 - ➔ The load must fit close to the fork frame

- Carefully raise the load and
- Slightly dump in the load



Caution!

Do not exceed the loader's output limit

➔ Observe the load diagram! Affixed at the rear of the loader unit bulkhead
– see Load diagram for pallet forks on page 3-89



Transporting loads with the pallet forks



Danger!

When transporting loads with the pallet forks raised, the load can fall down or the machine can tilt!

- ☞ *Dump in the pallet forks a little and lower them to transport position*
- ☞ *If necessary, raise the pallet forks just before setting down the load*
- ☞ *Never raise the load over persons*
- ☞ *Never park the machine with a raised load*
- ☞ *Avoid any operation that might be a risk to machine stability*

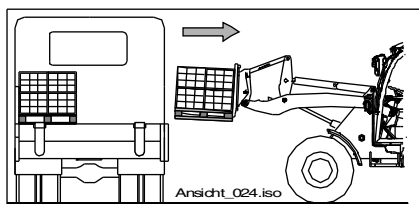


Fig. 145: Transporting loads

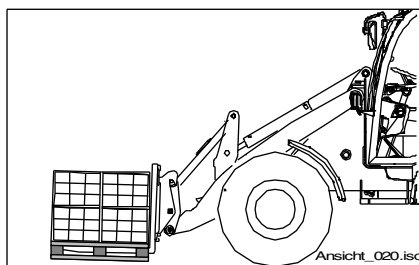


Fig. 146: Setting down the material

☞ **Transport loads as follows:**

- Move the load only when it is safely placed on the fork arms
- Move the machine only if you have sufficient visibility
- Start, turn and stop smoothly
- Concentrate on your work, avoid distractions
- Lower/raise loads to transport position before moving and transporting them (bear in mind the ground clearance)
- Always tilt in the pallet forks a little (towards the machine) for transport!
- Always drive slowly, especially in off-road applications, to avoid strong swinging movements of the load!
- When driving or working across a slope, the load must be on the uphill side of the machine/attachment. Drive the machine backwards on sloping terrain to prevent the load from falling off and the machine from tilting forwards when braking
- When transporting large bulk loads drive the machine backwards for improved visibility



3.60 Load hook (option)

Safety instructions regarding work with a load hook

Shaft rings, containers, pipes etc., can be transported with a load hook and suitable lifting gear (belts, cables, chains).



Danger!

Observe the following precautionary measures in order to avoid danger of accidents!

- Read and follow the instructions given in chapter "Safety Instructions, *Applications with lifting gear* on page 2-8"
- Bear in mind the load diagram on the front window
- Pick up and set down loads only on firm and level ground
- Make sure the ratchet safely engages in the hook as you hook up the lifting gear (belts, cables, chains)
- Do not use damaged lifting gear
- Adapt your speed to the load as you move it near to the ground
- Persons guiding the load must stay in visual contact with the machine operator
- Wear safety gloves
- Do not transport loads on public roads



Fig. 147: Load hook

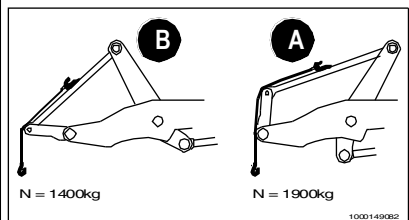


Fig. 147: Load diagram for load hook



Caution!

In order to avoid damage to the lifting gear and to the machine, remove the attachment (bucket, pallet forks etc.) from the quickhitch **under all circumstances!**

- ☞ Safely hook up the lifting gear (belts, cables, chains etc.) across the quickhitch in the load hook (see figure)
- ☞ Never place the lifting gear over sharp edges

☞ Pick up loads as follows:

- Hook up the lifting gear in the mounts (eyelets, shackles) provided for transporting the load
- Carefully raise the load and transport it near the ground
- ☞ Do not exceed the load capacity, see load diagram **A** in the cab (front window)

Example for reading the load hook diagram:

- **A** Extended loader unit and quickhitch tilted in
☞ Max N => 2200 kg
- **B** Extended loader unit and quickhitch
☞ Max N => 1700 kg



3.61 Working with the automatic bucket repositioning (option)

General information on automatic bucket repositioning

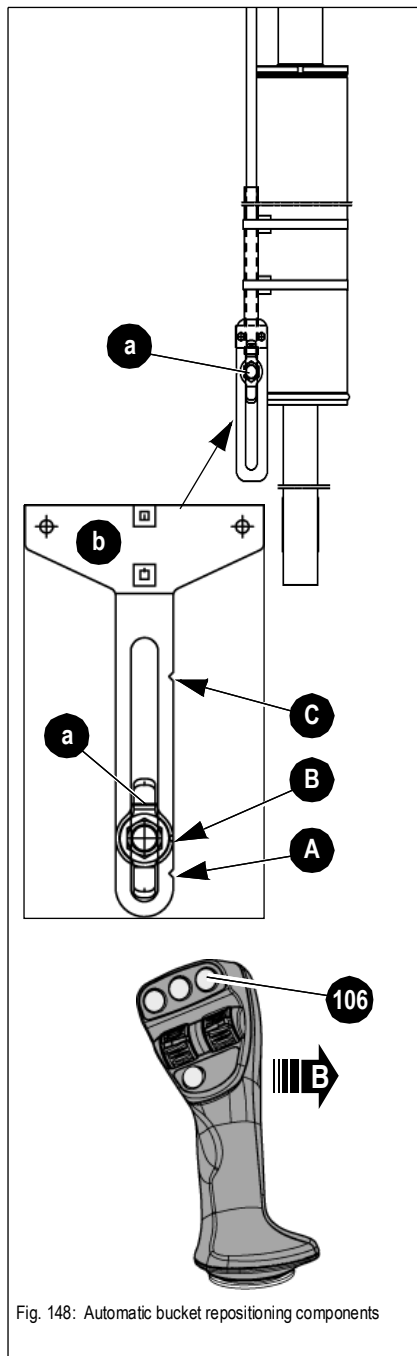


Fig. 148: Automatic bucket repositioning components

The bucket repositioning function can be used for carrying out cyclical work (e.g. loading trucks) efficiently and with minimum impact to the material: by pressing a button, the attachment is automatically positioned from the dump-out position to the preset work position (e.g. horizontal bucket base). However, the efficiency of the bucket repositioning is ensured only if the attachment and the position of sensor **a** on the tilt ram are adjusted to each other. This adjustment is carried out easily by means of the marks on bracket **b** for the buckets listed in the table.

Adjust the tilt ram sensor as follows:

- Pick up and lock the attachment in the quickhitch
– see *Locking and unlocking an attachment from the quickhitch* on page 3-63
- Set the bucket to the base position (e.g. bucket base aligned horizontally with the ground)
- Slacken the wing nut on sensor **a** (sensor bracket on tilt ram)
- Slide the sensor to the respective mark (notch) on bracket **b** and tighten the wing nut

Notch	Attachments
A	Side swing bucket
B	Normal material standard bucket
	Lightweight material standard bucket
	Multipurpose bucket
C	Pallet forks

Enabling the automatic bucket repositioning

- Press tip switch **106** on the control lever
- ➔ The attachment is automatically tilted in to the position that has been set
- Lower the loader unit to load position

Disabling the automatic bucket repositioning

- Press control lever **B** to the right (dump out)



3.62 Front/rear hydraulic additional control circuit (option)

Connections for additional control circuits (overview)

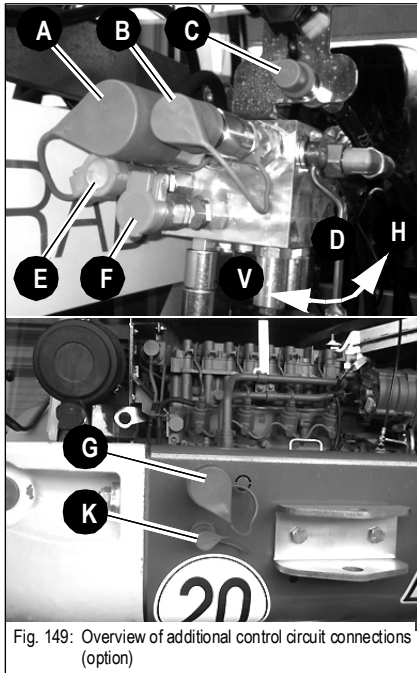


Fig. 149: Overview of additional control circuit connections (option)

For operation of hydraulic front attachments (e.g. rotary broom) or hydraulic rear attachments (e.g. salt sprayer, tipping trailer) or hydraulic attachments with additional functions (e.g. snow cutter with hydraulic swivelling ejector).

Quick coupler flow rates:

- ➔ – see Operation of front/rear additional control circuits on page 3-96
- ➔ – see chapter 6 “Usable consumer pressure at additional control circuit (option)” on page 6-7

Front/rear hydraulic connections

Connection	Function
A	Front quick coupler
B	Front quick coupler
C	Quick coupler (leak oil line)
D	Coupling connections changeover tap A + B (front) or G + K (rear)
E	Front quick coupler (additional function)
F	Front quick coupler (additional function)
G	Rear quick coupler
K	Rear quick coupler



Caution!

Clean the quick couplers before connecting the attachment in order to avoid damage to quick couplers and dirt in the hydraulic oil!



Important!

The hydraulic system of the machine is still under pressure 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 in the sections of the system and hydraulic lines which are to be opened before fitting or removing an attachment.
- See the Operator's Manuals of the attachment manufacturers for installing and operating the attachments!



Operation of front/rear additional control circuits

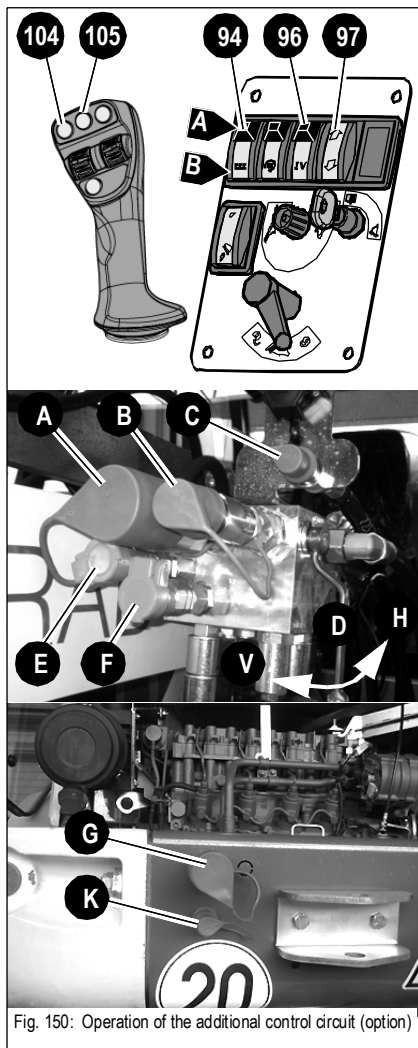


Fig. 150: Operation of the additional control circuit (option)

Operation of front/rear additional control circuit

Operation of front or rear additional control circuit (38 l)

Set changeover tap D to position V or H	The front or rear coupling connections are enabled
Slide the lock on switch 96 downwards and press the switch to position B	Pressure (38 l) is applied to coupling connections A + B (front) or G + K (rear)

Operation of front or rear additional control circuit (115 l)

Set changeover tap D to position V or H	The front or rear coupling connections are enabled
Slide the lock on switch 94 downwards and press the switch to position B Slide the lock on switch 96 downwards and press the switch to position B	Pressure (115 l) is applied to coupling connections A + B (front) or G + K (rear)

Operation of front additional control circuit (additional functions)

Slide the lock on switch 96 downwards and press the switch to position B	The additional control circuit is enabled
Press tip switch 104 on the control lever	Pressure is applied to coupling connection F
Press tip switch 105 on the control lever	Pressure is applied to coupling connection E

Operation of rear additional control circuit (tipping trailer connection)

Operation of rear additional control circuit (tipping trailer)

Set changeover tap D to position H	Rear tipping trailer connection G + K is enabled
Press switch 97 up or down	To raise the tipping trailer = tip switch position B To lower the tipping trailer = tip switch position A



Important!

No operation of attachments at the front and rear quick couplers at the same time!

- Uncouple the attachment if it is not used
- See the Operator's Manuals of the attachment manufacturers for installing and operating the attachments!



3.63 Additional control circuit (4th control circuit proportional controls option)

Operation of 4th control circuit

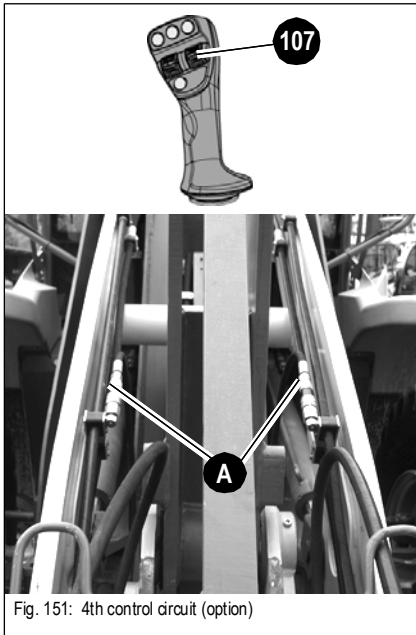


Fig. 151: 4th control circuit (option)

Quick couplers with hydraulic hoses are installed on the loader unit of the wheel loader for the operation of hydraulic attachments with additional hydraulic functions (e.g. high-tilt bucket with clamp).

The additional control circuit is operated electronically (proportional controls) by means of scroll wheel **107** on the control lever (joystick) and a solenoid valve on the control valve.



Caution!

Clean the quick couplers carefully before connecting an attachment in order to ensure proper function and sealing features!

Operation of 4th control circuit

- Pick up and safely lock the attachment in the quickhitch
– see *Fitting a standard bucket onto the quickhitch* on page 3-66



Danger!

Before starting work, make sure 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!

- Stop the engine but leave the ignition switched on
- Apply the parking brake
- Release the oil pressure in the 4th additional control circuit with scroll wheel **107** on the control lever
- Remove quick couplers **A** from the dummy sockets and insert them in the quick couplers on the attachment
- Start the engine
- Operate the 4th additional control circuit (proportional controls) with scroll wheel **107** on the control lever (joystick)



Important!

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



Operation

3.64 Tilt ram lock (option)

Switching the tilt ram lock ON and OFF

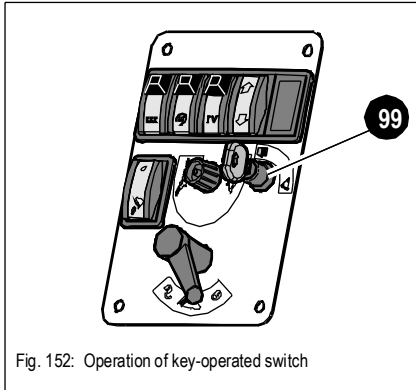


Fig. 152: Operation of key-operated switch

This option is used for securing the tilt ram if it is not supposed to be operated (e.g. when setting down material on high piles).

The key-operated switch is located on the switch console on the right (control lever console).

☞ Switching on the tilt ram lock

- With the loader unit in transport position, set the tilt ram and the material to the required position

- Turn the key-operated switch 99 to the symbol

➡ The tilt ram is locked and can no longer be operated in the position to which it has been adjusted

- Setting down the material

☞ Switching off the tilt ram lock

- Turn the key-operated switch 99 to the symbol

➡ Tilt ram is unlocked

3.65 “Hose burst valve” safety feature (option)

General information on the hose burst valve

The “Hose burst valve” safety feature prevents the loader unit from being lowered or dumped out without being braked, in the event of a bursting hose or pipe.



Caution!

Switching on the load stabiliser automatically switches off the hose burst valve!

- ☞ Switch off the load stabiliser to make sure the the hose burst valve works correctly!

- ☞ – see Load stabiliser (option) on page 3-40

Hose burst valve function

The “Hose burst valve” safety feature is activated as soon as a hose or a pipe bursts.

☞ Enable the hose burst valve as follows:

- Secure the danger area 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 cab
- Have damage to the hydraulic system and to the hose burst valve immediately checked and repaired by technical staff with appropriate training



3.66 Automatic trailer coupling (option)

General information on the trailer coupling

Using the automatic trailer coupling is allowed only if the machine has been authorised as a tractor in compliance with § 43 clause 4 of StVZO German road traffic regulations! Please refer to the **General Certification for Vehicles (Germany)/the data confirmation** or to the registration certificate for the specific requirements regarding attachments (trailers).



Danger!

Add extra weight to the loader unit during trailer operation!

☞ *Pick up and safely lock the bucket in the quickhitch – see Equipping the machine with a standard bucket on page 3-66*

Trailer weights/drawbar loads on the trailer coupling



Caution!

Bear in mind the trailer weights and drawbar loads before coupling a trailer!

☞ *– see chapter 6 “Trailer weight/drawbar load for automatic trailer coupling (option)” on page 6-16*

Trailer coupling operation

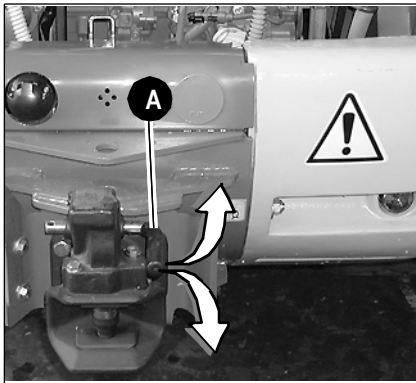


Fig. 153: Trailer coupling (option)



Danger!

In order to avoid danger of accidents, always check that the trailer is correctly and safely coupled onto the trailer coupling!

☞ *Keep your hands clear of the coupling jaw when checking (danger of crushing!)*

☞ Attaching a trailer

- In order to attach a trailer, press lever **A** upwards until it engages
- Check whether the coupling jaw is locked
- Set the height of the trailer drawbar to the middle of the coupling jaw
- Reverse the tractor vehicle slowly until the trailer drawbar engages with an audible click

➡ The trailer drawbar is locked as soon as it touches the trigger in the coupling jaw

☞ Closing the coupling by hand (e.g. for a tow cable)

- Briefly and carefully hit the pommel of lever **A** with the ball of your thumb in the “OPEN” direction



3.67 Final decommissioning of machine

General information on decommissioning

If the wheel loader is no longer used according to its designated use, make sure it is decommissioned or taken out of service and disposed of according to applicable regulations.

Preparing disposal

- Follow all applicable safety regulations regarding machine decommissioning!
- Make sure the machine cannot be operated between decommissioning and disposal!
- Make sure there is no leakage of environmentally hazardous consumables, and that the machine presents no other hazards at its storage place!
- Make sure the loader unit is fully lowered and that the bucket is placed horizontally on the ground! Mount all protective devices!
- Make sure the parking brake is used to park the machine safely and to prevent it rolling away and that the machine is secured in addition by placing chocks under the downhill sides of the wheels!
- Secure the machine against unauthorised use! Safely lock all openings (doors, windows, engine cover) of the machine!
- Repair all leaks on the engine, tanks, gearbox and hydraulic system!
- Remove the battery!
- Store the machine at a location that is secured against access by unauthorised persons!



Environment!

Avoid environmental damage!

Do not allow the oil and oily wastes to get into the ground or stretches of water!

Dispose of different materials and consumables separately and in an environmentally friendly manner!

Disposal

Further recycling of the machine 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 (depending on material) at appropriate sites!
- Separate the material as you recycle parts!
- Ensure environmentally compatible disposal of consumables as well!



4 Troubleshooting

The information given in this chapter is provided for maintenance staff, for fast and reliable detection of malfunctions and their appropriate repair.

Repairs must be carried out by authorised staff.

4.1 Engine trouble

Engine trouble	Possible causes	See page
Engine does not start or is not easy to start	Parking brake not applied	3-36
	Drive lever not in neutral	3-37
	Engine starting temperature too low	–
	Wrong SAE grade of engine lubrication oil	5-43
	Fuel grade does not comply with specifications	5-4
	Bleed the fuel system	5-4
	Defective or flat battery	5-31
	Loose or oxidised cable connections in starter circuit	–
	Defective starter, or pinion does not engage	–
	Wrong valve clearance	–
	Defective fuel injector	–
Engine starts, but does not run smoothly or faultless	Fuel grade does not comply with specifications	5-4
	Bleed the fuel system	5-4
	Wrong valve clearance	–
	Injection line leaks	–
	Defective fuel injector	–
Engine overheats. Temperature warning system responds	Oil level too low	5-5
	Oil level too high	5-5
	Dirty air filter	5-12
	Defective air filter maintenance switch or gauge	5-12
	Dirty oil radiator fins	–
	Defective fan, torn or loose V-belt	5-13
	Resistance in cooling system too high, flow capacity too low	–
	Defective fuel injector	–



Troubleshooting

Engine trouble		Possible causes	See page
Insufficient engine output		Oil level too high	5-5
		Fuel grade does not comply with specifications	5-4
		Bleed the fuel system	5-4
		Dirty air filter	5-12
		Defective air filter maintenance switch or gauge	5-12
		Wrong valve clearance	–
		Injection line leaks	–
		Defective fuel injector	–
Engine does not run on all cylinders		Injection line leaks	–
		Defective fuel injector	–
		Bleed the fuel system	5-4
Insufficient or no engine oil pressure		Oil level too low	5-5
		Engine inclination too high	–
		Wrong SAE grade of engine lubrication oil	5-43
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	5-4
		Wrong valve clearance	–
		Defective fuel injector	–
	Black	Dirty air filter	5-12
		Defective air filter maintenance switch or gauge	5-12
		Wrong valve clearance	–
		Defective fuel injector	–



4.2 Malfunctions in the air conditioning system (option)

**Caution!**

Only authorised workshops and trained staff may carry out repairs, and fill up and empty the air conditioning system!

Malfunctions (air conditioning)	Possible causes	See
Fan does not run	Defective or loose fuse	6-8
	Interrupted line	–
	Defective fan motor	–
	Defective fan switch	3-48
Fan cannot be switched off	Short circuit in cable or in fan switch	–
Reduced fan output	Dirty contacts	–
	Size of electric lines too small	–
	Heat exchanger extremely dirty	5-27
No or insufficient heating output	Flow temperature too low	–
	Defective thermostat	–
	Dirty filter	5-26
	Dirty heat exchanger fins	5-27
Loss of refrigerant on equipment	Loose hose connection	
	Damaged hose	
	Damaged heat exchanger	
Compressor does not run	Interruption in solenoid coil of compressor	5-28
	Loose or torn V-belt	
	V-belt pulley does not turn	
	Compressor clutch slips	
	Defective controls	
Evaporator overflow	Expansion valve is stuck in open position	
Iced-up evaporator	Thermostat sensor in wrong position	
	Defective expansion valve or thermostat	

Troubleshooting



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Malfunctions (air conditioning)	Possible causes	See
Clogged evaporator	Dirty radiator fins	5-28
Loss of refrigerant	Refrigerating-agent line interrupted	
	System leak	
Insufficient refrigerating output	Clogged fan duct	
	Level of refrigerant too low	
	Humidity in system	
System cools with interruptions	Line interruption, insufficient ground connections or loose contacts in solenoid coil of compressor	
	Defective fan motor	
Very loud system	Loose or excessively worn V-belt	
	Loud clutch	
	Loose condensor bracket or inside parts of compressor	
	Excessive wear of fan motor	
	System overfill	
	Not enough refrigerant in the system	



5 Maintenance

5.1 Important information on maintenance and service work

Important information for maintenance personnel

Operational readiness and the service life of your wheel loader are heavily dependent on maintenance.

Daily and weekly service and maintenance work must be carried out by a specifically trained driver – see Maintenance plan on page 5-47.

All other maintenance work must be carried out only by the trained and qualified staff of your sales partner or workshop.



Important!

Refer to the maintenance plan for the maintenance work.

- – see Maintenance plan on page 5-47

Before carrying out service and maintenance work, always make sure:

- that the machine is parked on level and firm ground and that it cannot roll away under its own weight.
- that the engine is stopped and the ignition key removed.
- that the cable on the negative terminal (-) of the battery is disconnected before starting welding or repair work on the electrical system!
- that the key is removed if the machine is equipped with the "Battery master switch" option.
- that the "Safety instructions for maintenance" on page 2-10" in this Operator's Manual are followed!
- that the maintenance and safety instructions in the Operator's Manuals of the attachments are observed.



Danger!

Do not carry out assembly and maintenance work if the loader unit is raised and **not** secured – danger of crushing and injury!

- ☞ *Secure the loader unit with an appropriate prop or support to prevent it from being lowered unintentionally*
- ☞ *Stop the engine and remove the ignition key*
- ☞ *Apply the parking brake*



5.2 Fuel system

Safety instructions for refuelling

- Extreme caution is essential when handling fuel – high risk of fire!
- Never carry out work on the fuel system in the vicinity of naked 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!



Environment!

Use a suitable container to collect the fuel as it drains and dispose of it in an environmentally friendly manner! Keep the machine clean to reduce the risk of fire and wipe away fuel spills immediately!

Diesel fuel specification



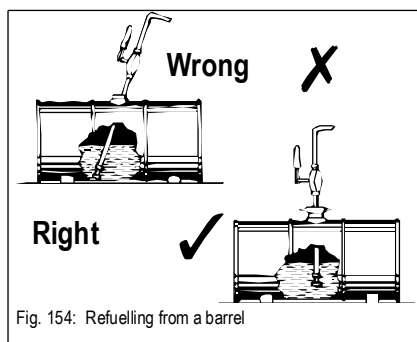
Caution!

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 51628/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

Stationary fuel pumps



General instructions

Only refuel from stationary fuel pumps. Fuel from barrels or cans is usually contaminated. 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 strainer
- Immerse it down to a max. 15 cm above the floor 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



Refuelling



Fig. 155: Main tank fuel filler inlet



Fig. 156: Additional tank fuel filler inlet



Danger!

In order to avoid intoxication and fire hazards, do not refuel in enclosed areas!

⚠ *Never carry out work on the fuel system in the vicinity of naked flames or sparks*

The fuel tank filler inlet is located on the left-hand side of the machine (left-hand side access to cab).

The machine can be equipped with an optional additional fuel tank (on the right-hand side access to the cab).



Important!

First fill up the main tank **A** and then the additional tank **B** as you refuel!

- Capacity = main tank about 85 l/additional tank about 60 l



Caution!

Do not park the machine on extreme slopes if the fuel tank is full to the brim!
The fuel can flow out of the tank if the cap is opened!

Checking/cleaning the additional fuel filter (water separator, option)

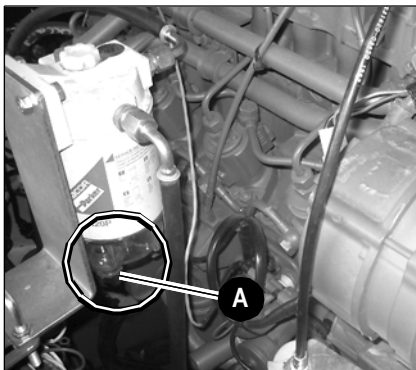


Fig. 157: Checking the additional fuel filter

The additional fuel filter is fastened on the the engine cover lock

Drain the condensation water every 50 s/h (service hours)

⚠ *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
- Open stop cock **A** on the additional fuel filter and drain the condensation water
- Close stop cock **A** on the additional fuel filter
- Start the diesel engine and check the additional fuel filter for leaks



Environment!

Use a suitable container to collect the fuel as it drains and dispose of it in an environmentally friendly manner!

Have further repair work carried out by an authorised workshop

Bleeding the fuel system

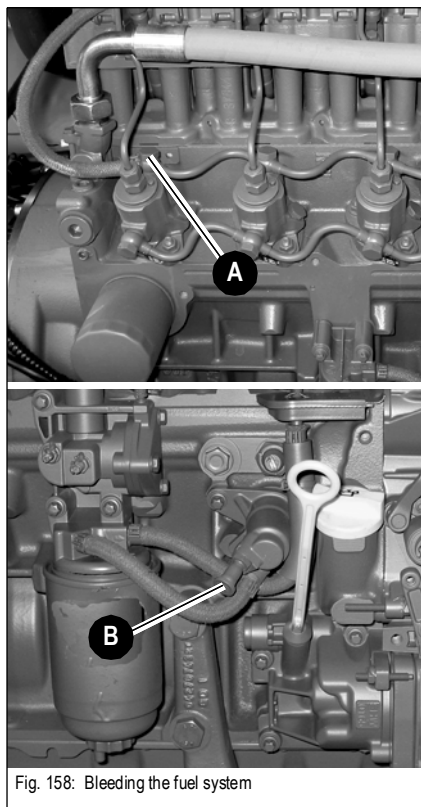


Fig. 158: Bleeding the fuel system



Danger!

If the fuel, as it drains, comes into contact with hot engine parts or the exhaust system, there is an increased fire hazard!

⚠ *Never bleed the fuel system if the engine is hot!*

Bleed the fuel system in the following cases:

- After removing and fitting the fuel filter, prefilter or the fuel lines back on again
- After running the fuel tank empty
- After running the engine again, after it has been out of operation for a longer period of time

⚠ *Bleed the fuel system as follows:*

- Place the container under the engine
- Fill the fuel tank
- Slacken bleed screw **A** on the injection pump by a few turns
- Press button **B** on the fuel pump with your hand (pumping movement) until the fuel comes out free of air from the slackened bleed screw
- Tighten bleed screw **A**
- Start the engine

If the engine runs smoothly for a while, and then stops; or if it does not run smoothly:

- Stop the engine
- Check once again if there is any air in the fuel system
- Bleed the fuel system again as described above

Have this checked by authorised staff if necessary



Environment!

Use a suitable container to collect the fuel as it drains and dispose of it in an environmentally friendly manner!



5.3 Engine lubrication system

Safety instructions regarding inspections and maintenance work on the engine



Danger!

Do not carry out maintenance work on a hot engine!

☞ Wait at least 10 minutes after stopping the engine

☞ Wear protective gloves and clothing during maintenance work



Important!

Check the oil level every 10 service 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.

Checking the engine oil level



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 5-47

☞ **Have the oil drained every 500 service hours by an authorised workshop**

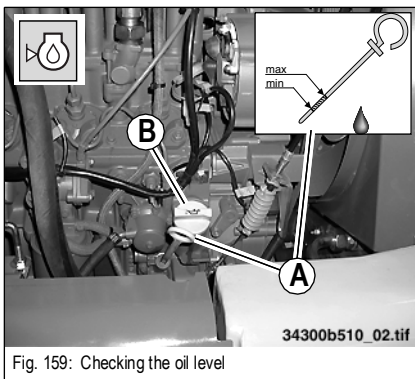


Fig. 159: Checking the oil level

☞ Check the engine oil as follows:

- Park the machine on level ground
- Stop the engine
- Apply the parking brake and open the engine cover
- Pull out oil dipstick **A** and wipe it with a lint-free cloth
- Push it in as far as possible, pull it back out again and read off the oil level
- Fill up the oil when the oil reaches the MIN mark on oil dipstick **A**



Filling up 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 **A**
- ☞ Use only the specified engine oil – see [Fluids and lubricants](#) on page 5-43



Environment!

Use a suitable container to collect the engine oil as it drains and dispose of it in an environmentally friendly manner!

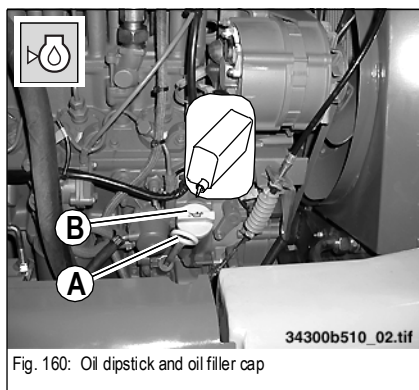


Fig. 160: Oil dipstick and oil filler cap

☞ Fill up the engine oil as follows:

- Clean the area around oil filler cap **B** with a lint-free cloth
- Open filler cap **B**
- Pull out oil dipstick **A** and wipe it with a lint-free cloth
- Fill in engine oil
- Wait a moment until all the oil has run into the oil sump
- Check the oil level with oil dipstick **A** – see [Checking the engine oil level](#) on page 5-5
- Fill up oil if necessary and check the oil level again
- Close filler cap **B** and completely remove all oil spills from the engine



5.4 Engine and hydraulics cooling system

General instructions regarding cooling system maintenance

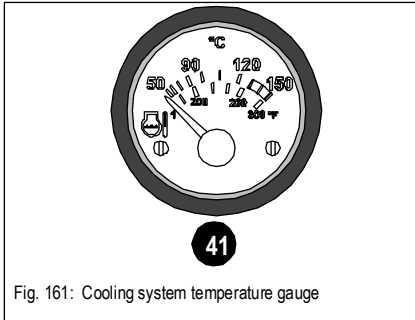


Fig. 161: Cooling system temperature gauge

The combined oil/water radiator cools the diesel engine and the hydraulic oil of the drive and work hydraulics.



Caution!

**Engine temperature should be between 80 and 105 °C.
Max. admissible engine temperature is 110 °C.**

- ☞ An alarm sounds if the engine temperature is 115 °C or higher
- ☞ To cool down: let the engine run at idling speed briefly, then switch it off
 - The alarm no longer sounds if the engine temperature is 110 °C or lower
- ☞ Check the cooling system



Danger!

Danger 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!

- Check the radiator once a day for dirt and clean it if necessary. Refer to the maintenance plan for the intervals
- In dusty or dirty work conditions, clean more frequently than indicated in the maintenance plan
- An insufficient coolant level reduces the heat dissipation capacity and can lead to engine damage!
- Check the coolant level at regular intervals. Refer to the maintenance plan for the intervals – [see chapter 5 "Maintenance plan"](#) on page 5-47
- If the coolant must be replaced frequently, have the cooling system checked for leaks by an authorised workshop!
- Never fill in cold water/coolant if the engine is warm!
- After filling the expansion tank, make a test run with the engine and check the coolant level again after stopping the engine
- Add enough antifreeze to the coolant.
- Use brand-name antifreeze compounds with anticorrosion additives – [see chapter 6 "Coolant compound table"](#) on page 6-13
- 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

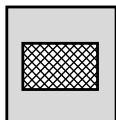


Environment!

Use a suitable container to collect the coolant as it drains and dispose of it in an environmentally friendly manner!



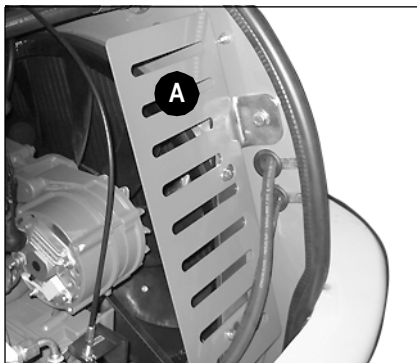
Cleaning the radiator fins of the oil/water radiator



Danger!

Danger of burns! Do not carry out maintenance work on a hot engine and hydraulic system!

- ☞ *Wait at least 10 minutes after stopping the engine*
- ☞ *Wear protective gloves and clothing during maintenance work*



Caution!

Dirt on the radiator fins reduces the radiator's heat dissipation capacity and 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*
- ☞ *Do not damage the radiator fins as you clean them with a compressed-air gun*

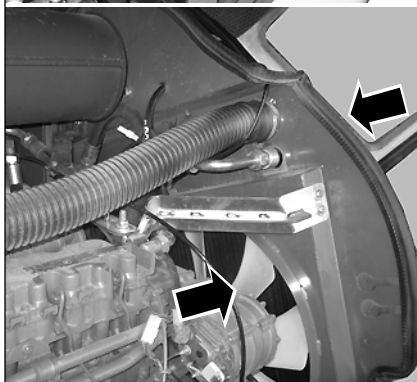


Fig. 162: Cleaning the radiator

☞ *Clean as follows:*

- Park the wheel loader on level ground
- Lower the loader unit fully
- Apply the parking brake
- Stop the engine and let it cool down
- Switch off ignition and remove the ignition key
- Open the engine cover
- Remove protective cover **A**
- Clean the radiator fins by blowing compressed air from either side of the radiator
- Remove dirt in the intake area of the radiator
- Install protective cover **A**

Fan bearing – Visco clutch

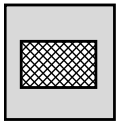


Caution!

In order to avoid damage to the Visco clutch, engine and radiator, have the fan bearing replaced **every 2500 service hours** by an authorised workshop!



Checking the coolant level



The coolant expansion tank is located outside on the radiator sheet-metal separation at the rear right.



Danger!

Danger of burns! Never open the coolant tank and never drain coolant if the warm engine is running since the cooling system is under high pressure!

- ☞ *Wait at least 10 minutes after stopping the engine!*
- ☞ *Wear protective gloves and clothing*
- ☞ *Always actuate the safety valve first on the filler cap of the expansion tank.*
To do this:
- ☞ *Open the cap to the first notch and release the pressure*



Important!

Check the coolant level every **10 service hours** or once a day. Check before starting the engine.

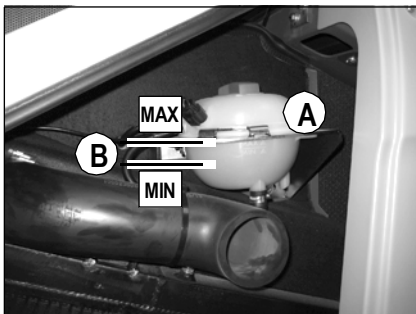


Fig. 163: Checking the coolant expansion tank

☞ *Check the coolant level as follows*

- Park the machine on level ground
- Lower the loader unit fully
- Apply the parking brake
- Stop the engine
- Switch off ignition and remove the ignition key
- Open the engine cover
- Check the coolant level in the expansion tank **A**

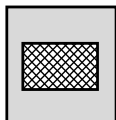
If the coolant level is below the **MIN** mark **B** of the expansion tank:

- Fill up coolant to the **MAX** mark **B**

☞ *Check the coolant quality (antifreeze) with suitable testing equipment (antifreeze tester) – see Fluids and lubricants on page 5-43 and – see Coolant compound table on page 6-13*



Filling up coolant

**Danger!**

Danger of burns! Never open the coolant tank and never drain coolant if the warm engine is running since the cooling system is under high pressure!

- ☞ *Wait at least 10 minutes after stopping the engine!*
- ☞ *Wear protective gloves and clothing*
- ☞ *Always actuate the safety valve first on the filler cap of the expansion tank.*
To do this:
 - ☞ *Open the cap to the first notch and release the pressure*

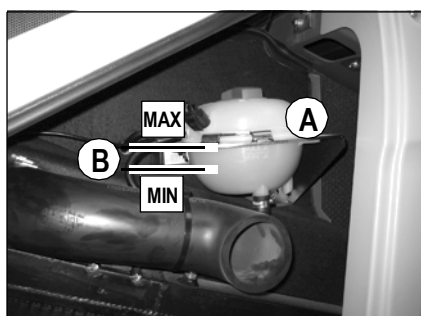


Fig. 164: Filling up coolant in the expansion tank

☞ *Fill up coolant as follows*

- Park the machine on level ground
- Lower the loader unit
- Apply the parking brake
- Switch off ignition and remove the ignition key
- Allow the engine/cooling system to cool down
- Release the overpressure in the coolant expansion tank. To do this: open cap **A** to the first notch and release the pressure
- Open filler cap **A** fully
- Fill up coolant to the **MAX** mark **B**
- ☞ Use brand-name antifreeze compounds with anticorrosion additives – see *Fluids and lubricants* on page 5-43
- Close filler cap **A**

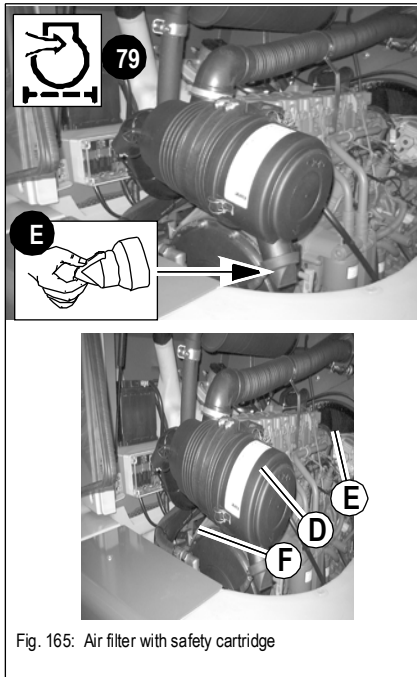
☞ *Check the coolant level*

- Open the heating circuit fully
- Start and warm up the engine
- Stop the engine
- Check the coolant level again
- ☞ If necessary, fill in coolant and repeat the procedure until reaching the correct coolant level
- Check the cooling system and the heating water circuit for leaks
- Have leaks immediately repaired by an authorised workshop



5.5 Air filter

Checking the air filter for dirt



Caution!

The filter housing is fitted with a discharge slot **E** for removing the dust. Bear in mind the following to avoid premature engine wear!

- ☞ Do not wash, brush or clean the filter cartridge with compressed air
- ☞ Replace the filter cartridge when the telltale comes on
- ☞ Never reuse a damaged filter cartridge
- ☞ Ensure cleanliness when replacing the filter cartridge!

For applications in dusty environment, the air filter is fitted with an extra safety cartridge **F** (standard).

- ☞ Do not clean the safety cartridge – replace it every third time maintenance is carried out on the filter!

☞ Checking the dust valve **E**

- Stop the engine
- Prevent the machine from rolling away and remove the ignition key – see chapter 3 “Stopping/parking the machine” on page 3-58
- 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

☞ Replace the air filter cartridge as soon as telltale **79** on the indicating instrument comes on – see Replacing the air filter cartridge on page 5-12

- At the latest after 1500 service hours (however once a year)



Caution!

Filter cartridges degrade prematurely when in service in acidic air for longer periods of time!

- ☞ Replace filter cartridge **D** and safety cartridge **F** at the latest after 500 service hours!
- ☞ – see Replacing the air filter cartridge on page 5-12



Replacing the air filter cartridge

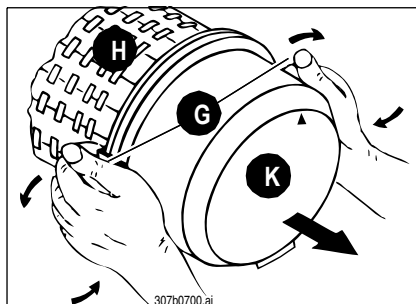


Fig. 166: Removing the lower housing section

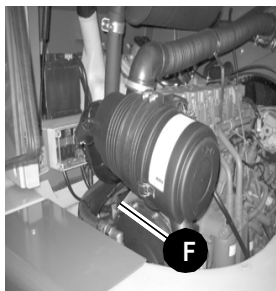
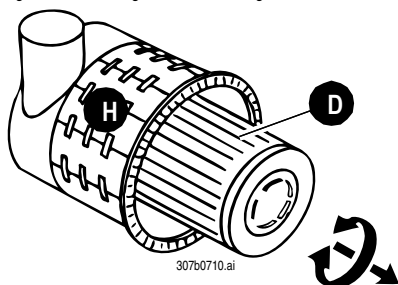


Fig. 167: Removing the filter element

Change the filter cartridge as follows:

- Stop the engine
- Prevent the machine from rolling away and remove the ignition key
– see chapter 3 “Stopping/parking the machine” on page 3-58
- 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 **F** with slightly turning movements



Caution!

Before inserting the new filter, make sure all dirt (dust) inside the upper and lower housing sections has been removed!

- Carefully insert new safety cartridge **F** into the upper housing section **H**
- Carefully insert new filter cartridge **D** into the upper housing section **H**
- Clean the dust valve fig. 165/E
- Position lower housing section **K** (make sure it is properly seated)
- Fold and close both bow hooks **G** on the notch of the upper housing section **H**



5.6 V-belt

Checking V-belt tension

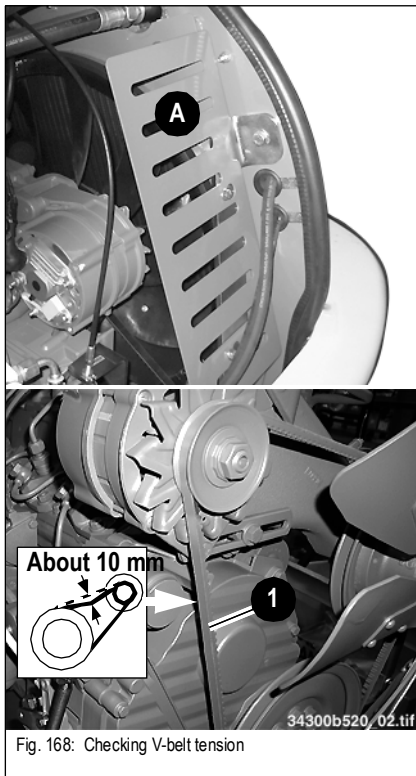


Fig. 168: Checking V-belt tension



Danger!

Caution, turning parts! Only check or retighten/replace the V-belt when the engine is stopped!

☞ *Stop the engine before carrying out inspection work in the engine compartment!*



Caution!

Cracked and stretched V-belts cause engine damage

☞ *Replace the V-belt every 2 years at the latest*

☞ *Have the V-belt replaced by an authorised workshop*

Check the V-belt once a day or every 10 service hours, and retighten if necessary! Retighten new V-belts after about 15 minutes of running time.

☞ *Check as follows:*

- Stop the engine
- Prevent the machine from rolling away and remove the ignition key
 - ☞ – *see chapter 3 “Stopping/parking the machine” on page 3-58*
- Remove protective cover **A**
- Carefully inspect V-belt **1** for damage
- If the V-belt is damaged:
 - ☞ Have the V-belt replaced by authorised staff
- 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
- Install protective cover **A**

Retightening the V-belt

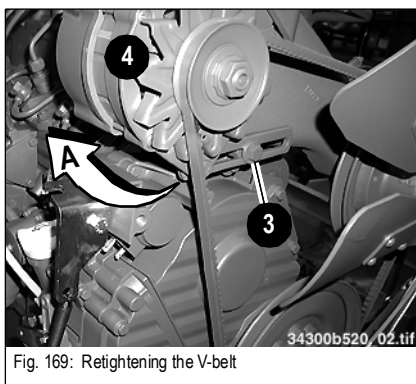


Fig. 169: Retightening the V-belt

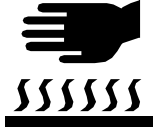
☞ *Retighten as follows:*

- Stop the engine
- Prevent the machine from rolling away and remove the ignition key
 - ☞ – *see chapter 3 “Stopping/parking the machine” on page 3-58*
- Remove protective cover **A** (see [Fig. 168](#))
- Slacken *fastening screws 3* of alternator **4**
- Use a suitable tool to push the alternator in the direction of arrow **A** until the correct V-belt tension is obtained (fig. 168)
- Keep the alternator in this position, and at the same time retighten fastening screws **3**
- Start the engine
- Check V-belt tension (fig. 168) after about 15 minutes
- Install protective cover **A** (see [Fig. 168](#))



5.7 Hydraulic system

Safety instructions regarding maintenance of the hydraulic system



Danger!

Danger of burns! Do not carry out maintenance work on a hot engine and hydraulic system!

- ☞ Wait at least 10 minutes after stopping the engine
- ☞ Wear protective gloves and clothing during maintenance work



Danger!

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

- ☞ Always consult a doctor immediately even if the wound seems insignificant – otherwise serious infections could set in!

- Release the pressure in all lines carrying hydraulic oil prior to any maintenance and repair work. To do this:
 - Lower all hydraulically controlled attachments to the ground
 - Stop the engine and apply the parking brake
 - Move all control levers of the hydraulic control valves several times
- Always fill in hydraulic oil using the filling screen! – see *Filling up hydraulic oil* on page 5-16
- Only use authorised oils of the same type – see *Fluids and lubricants* on page 5-43
- Always fill in 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 tank!
- Contact customer service if the hydraulic system filter is contaminated with metal chippings. Otherwise, follow-on damage can result!
- 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.



Caution!

If the hydraulic oil in the sight glass is cloudy, this indicates that water or air has penetrated the hydraulic system.

Contaminated hydraulic oil, lack of oil or wrong hydraulic oil – **danger of severe damage to the hydraulic system!**

- ☞ Have the hydraulic oil immediately replaced by an authorised workshop



Monitoring the hydraulic oil and the reflux filter

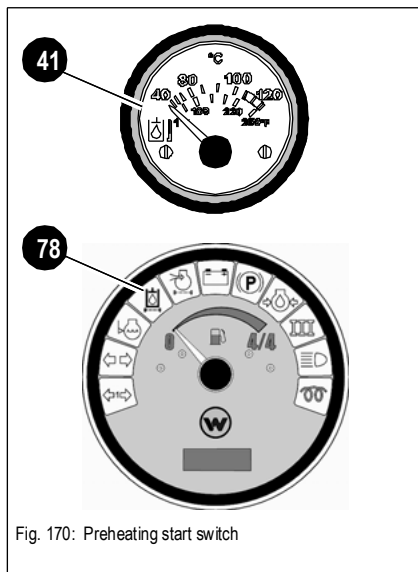


Fig. 170: Preheating start switch

On the indicating instrument, the red telltale **78** monitors the reflux pressure and the reflux filter, and gauge **41** monitors oil temperature.



Caution!

Telltale **78** on the indicating instrument comes on if the flow resistance in the reflux filter is too high!

- ☞ *The filter element is dirty and must be replaced*
- ☞ *Drain the hydraulic oil in case of increased contamination, however after 1500 s/h at the latest or once a year*
- ☞ *The filter element and the hydraulic oil may be replaced by an authorised workshop only!*

The operating temperature of the hydraulic oil is too high if the needle of gauge **41** is in the red range

- ☞ *Check the hydraulic oil level (not enough oil in the tank)*
- ☞ *Replace the filter element (highly contaminated filter)*



Important!

Telltale **78** on the indicating instrument can come on in cold weather immediately after starting the engine. This is caused by increased oil viscosity. In this case:

- Set engine speed so that the telltale goes out
- Bear in mind the instructions concerning warmup – see [chapter 3](#) “Starting the engine” on page 3-16



Checking the hydraulic oil level



Danger!

Danger of burns! Do not carry out maintenance work on a hot engine and hydraulic system!

- ☞ Wait at least 10 minutes after stopping the engine
- ☞ Wear protective gloves and clothing during maintenance work

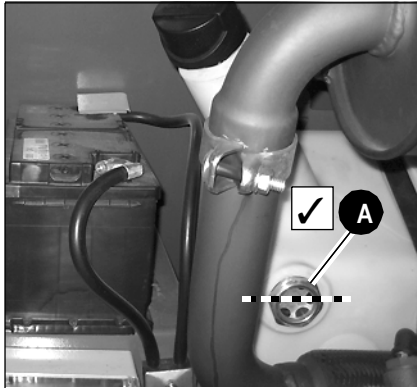


Fig. 171: Oil level sight glass on the hydraulic oil tank

☞ Proceed as follows:

- Park the machine on level ground
- Retract all hydraulic rams
- Stop the engine
- Apply the parking brake
- Open the engine cover
- 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 not visible in the oil level sight glass (not enough oil)

➔ Fill up the hydraulic oil



Caution!

Any excess quantity of hydraulic oil in the tank escapes via the breather as soon as the temperature rises!

If the oil level is no longer visible in the upper half of the oil level sight glass

☞ Drain the hydraulic oil

Filling up hydraulic oil

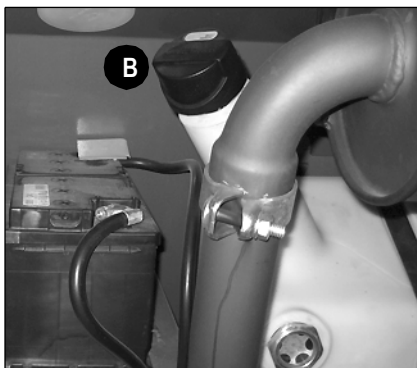


Fig. 172: Filler cap for hydraulic oil tank

Do not fill up the hydraulic oil unless the engine is stopped. Otherwise, hydraulic oil will run out of the filler opening on the hydraulic tank.

☞ Fill up as follows:

- Park the machine on level ground
- Retract all hydraulic rams
- Stop the engine
- Apply the parking brake
- 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

- Fill up the hydraulic oil
- Check the hydraulic oil level in the oil level sight glass (fig. 171/A)
- Fill up if necessary and check again
- Firmly close breather filter **B** by hand



Important information for the use of biodegradable oil

- Use only the biodegradable hydraulic fluids which have been tested and approved by Kramer-Werke GmbH – see *Fluids and lubricants* on page 5-43. Always contact Kramer-Werke GmbH 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, which can be proved to be due to the hydraulic fluid
- Use only biodegradable oil of the same type for filling up. In order to avoid misunderstandings, a label providing clear information is located on the hydraulic oil tank (next to the filler inlet) regarding the type of oil currently used! Replace missing labels! The joint use of two different biodegradable oils can affect the quality of one of the oil types. Therefore, make sure the remaining amount of initial hydraulic fluid in the hydraulic system does not exceed 8 % when changing biodegradable oil (manufacturer indications)
- Do not fill up with 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 tank drained by an authorised workshop every 500 service 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 mounted 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 carried out by an authorised workshop or by your dealer**

5.8 Checking hydraulic pressure lines

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 injuries.

☞ *Always consult a doctor immediately, even if the wound seems insignificant – otherwise serious infections could set in!*

☞ *Always observe the following instructions:*

- Retighten leaking screwed fittings and hose connections only when the system is not under pressure; i.e. release the pressure before working on pressurised lines!
- Never weld or solder damaged or leaking pressure lines and screw connections. Replace damaged parts with new ones!
- Never search for leaks with your bare hands, but wear protective gloves!
- Have damaged flexible lines replaced by authorised workshops only!

The entrepreneur/owner of the machine must ensure that flexible lines are replaced in appropriate intervals, even if no safety-relevant defects can be 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.

- Leakages and damaged pressure lines must be immediately repaired or replaced by an authorised workshop or after-sales staff.

This not only increases the operating safety of your machine but also helps to protect the environment

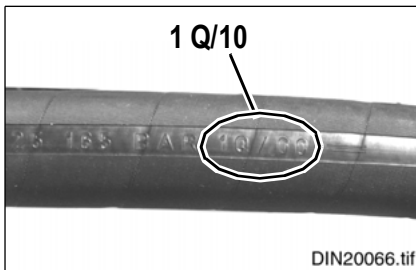
- Replace hydraulic hoses every 6 years from the date of manufacture, even if they do not seem to be damaged

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.

The date of manufacture (month or quarter and year) is indicated on the flexible line.

Example:

The indication “1 Q/10” means manufactured in the 1st quarter of 2010.





5.9 Lubrication work

General safety instructions regarding lubrication work

- Park the wheel loader on level ground and prevent it from rolling away by applying the parking brake and placing wheel chocks
- Raise the loader unit and secure it with the safety strut on the lift ram
- Stop the engine and remove the ignition key



Caution!

Lubricate all lubrication points mentioned below with lithium-saponified brand-name grease

🔧 – see *Fluids and lubricants* on page 5-43

Lubricating the rear axle oscillation-type bearing

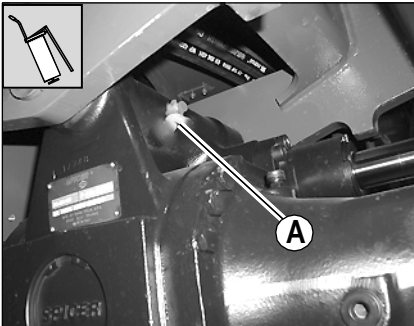


Fig. 173: Grease nipples for oscillation-type bearing



Important!

The machine has an oscillation-type rear axle. Lubricate the bearing every **20 service hours** at the latest.

🔧 Lubricate grease nipple **A** of the oscillation-type bearing

Lubricating the front and rear axle planetary drive bearings

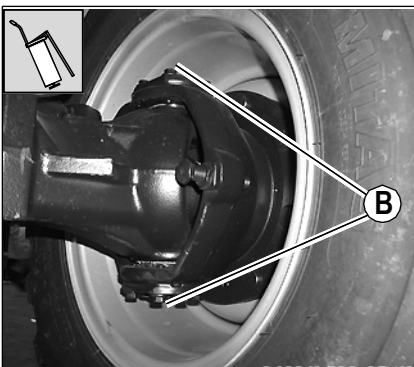


Fig. 174: Grease nipples on planetary drive bearings

🔧 Lubricate grease nipples **B** (2 x) on each **planetary drive bearing** every **20 service hours**

Lubricating the loader unit, lift, tilt and lock rams

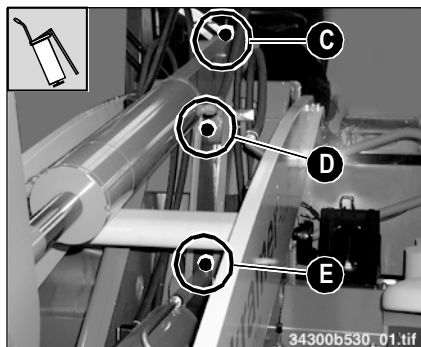


Fig. 175: Lubrication points on frame

☞ **Lubricate the following lubrication points on the loader unit of the machine:**

- Lubricate grease nipple **C** of the **tilt ram bearing on the frame every 10 service hours. Lubricate more frequently when in heavy-duty operation**
- Lubricate grease nipple **D** of the **loader unit bearing every 10 service hours. Lubricate more frequently when in heavy-duty operation**
- Lubricate grease nipple **E** on the **lift ram bearing on the frame every 20 service hours**

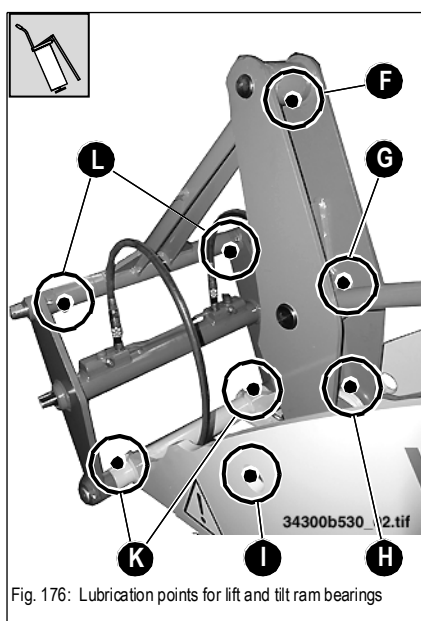


Fig. 176: Lubrication points for lift and tilt ram bearings

- Lubricate grease nipple **F** of the **tilt rod bearing every 10 service hours. Lubricate more frequently when in heavy-duty operation**
- Lubricate grease nipple **G** of the **tilt ram bearing every 20 service hours**
- **Lubricate grease nipple H of the lift ram bearing every 20 service hours. Lubricate more frequently when in heavy-duty operation**
- **Lubricate grease nipple I of the tilt lever bearing every 10 service hours. Lubricate more frequently when in heavy-duty operation**
- Lubricate grease nipples **K** of the **quickhitch bearing every 10 service hours. Lubricate more frequently when in heavy-duty operation**
- **Lubricate grease nipples L of the tilt lever bearing every 10 service hours. Lubricate more frequently when in heavy-duty operation**



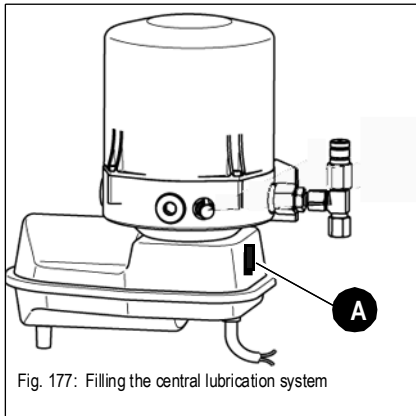
5.10 Lubricating with the central lubrication system (option)

General functional description of the central lubrication system

The central lubrication system allows you to lubricate all lubrication points of the wheel loader in one single step.

- The yellow LED comes on for 1.5 seconds upon switching on ignition to indicate functional readiness of the controls (switch-on check). It stays lit during the entire lubrication procedure.
- The integrated electronic control unit has a data memory for saving the times that have been set or that have elapsed. The time is taken and saved if ignition is switched off during lubrication or during a break. The remaining lubrication time or break time is read from the memory upon switching ignition on again, and lubrication is resumed where it was interrupted.

Time control



- Break and lubrication times can be set with the time-dependent control of the central lubrication system. Break times are the periods between two lubrication times.



Important!

Pressing the tip switch **A** on the side of the pump starts intermediate lubrication at any given time if ignition is switched on. This also serves as a functional check.

- The pump then immediately starts with a lubrication cycle. The lubrication or break time that has elapsed so far or that has been saved is reset and starts over again.
- A lubrication system malfunction can also be reset by pressing the intermediate lubrication switch, and the pump restarts lubrication.

Repair work

Repair work on the central lubrication system may be performed only by authorised workshops!



Setting the lubrication and break times

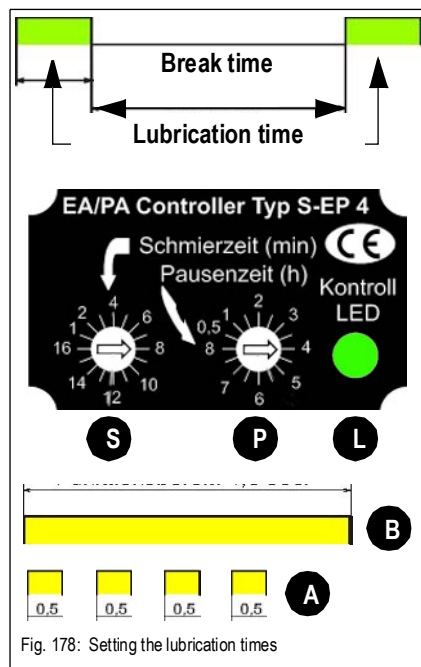


Fig. 178: Setting the lubrication times

Break times and lubrication times are set with the notched switches **S** and **P** in the window of the controls.

- ✎ Remove the red frame on the protective motor housing of the pump with a flat screwdriver to set the time
- ✎ Slacken the four cross-slotted screws and remove the transparent cover
- ✎ Set the break time **P** and the lubrication time **S** with a flat screwdriver

Lubrication times (S):

- ➔ 1 to 16 minutes (16 notches, 1 minute each)
- ➔ 2 to 32 minutes (16 notches, 2 minutes each)

Break time (P):

- ➔ 0.5 to 8 h (16 notches, 0.5 h each)

Yellow LED (L)

- ➔ (B) lubrication system in operation
- ➔ (A) lubrication under progress: 0.5 seconds LED ON/0.5 seconds LED OFF

- ✎ Install the transparent cover (window) once the settings are carried out



Caution!

Water can penetrate into the controls and damage them if the cover is not fitted and closed correctly!

Filling the central lubrication system

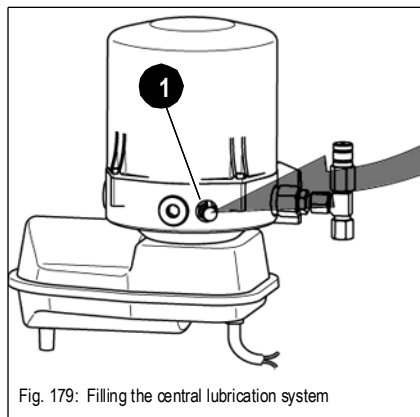


Fig. 179: Filling the central lubrication system

The lubrication system is filled via conical grease nipple **1** or a fill coupling with a manual or pneumatic grease gun.



Caution!

Use only commercially available greases up to NLGI-Kl. 2 to avoid damage to the lubrication system and the lubrication points!

- ✎ – see *Fluids and lubricants* on page 5-43



5.11 Maintenance of the brake system

Specific safety instructions regarding the brake system

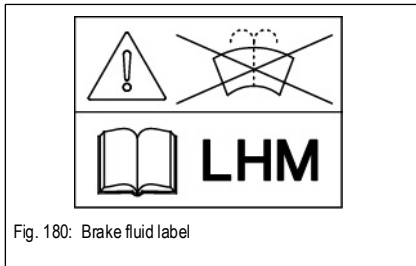


Fig. 180: Brake fluid label

Brakes are crucial to safety. Incorrect maintenance can cause brake failure. **Therefore all repair work on the brakes must be carried out by trained staff.**

An exception to this is the following work which must be carried out by the driver/operator:

- Daily check of the level in the brake fluid tank
- Daily check of the brake lines



Danger!

Defective brake lines or hoses carry a danger of accident!

☞ *Damaged brake lines or hoses must immediately be replaced by an authorised workshop*

Checking/filling up the brake fluid level

The brake fluid tank is located at the front left in the cab (next to the brake/inching pedal)

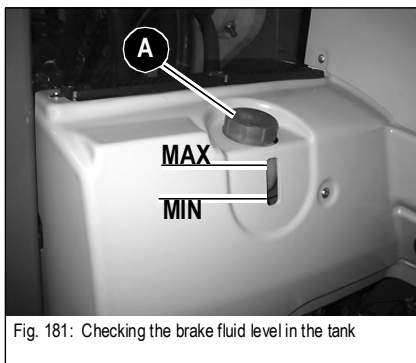


Fig. 181: Checking the brake fluid level in the tank



Danger!

An incorrect brake fluid grade or an insufficient brake fluid level can impair the safety of the brake system –

- ☞ *Check the brake fluid in the tank at regular intervals*
- ☞ *Fill up brake fluid up to the upper edge of the sight glass*
- ☞ *The brake fluid **must** comply with the SAE specification (LHM)*
 ➡ – see [Fluids and lubricants](#) on page 5-43
- ☞ *The brake fluid **must** be replaced every 2 years by an authorised workshop*
- ☞ *If the brake system loses too much brake fluid, have the brake system checked and repaired by an authorised workshop*

☞ *If the level is below the upper edge of the sight glass:*

- Clean the area around the opening with a clean cloth
- Open tank cover **A**
- Fill up brake fluid up to the upper edge of the sight glass **MAX**
- Close tank cover **A**



5.12 Tyres

Daily tyre checks



Danger!

All repair work on tyres and rims may only be carried out by authorised workshops.



Important!

Regular inspections of the tyres

- Improve operating safety
- Increase the service life of the tyres
- Reduce machine downtimes
- Refer to the table in chapter "Specifications" on page 6-11 for the authorised tyre types and the correct tyre pressures. Machines are also delivered ex works with a tyre table sticker on the front window or on the loader unit bulkhead.

Reifenluftdrucktabelle Tyre/Tire pressure Pression pneumatiques		
Reifenbezeichnung Tyres/Tire Pneumatiques	vorn(bar/psi) front (bar/psi) AV (bar/psi)	hinten(bar/psi) rear (bar/psi) AR (bar/psi)
XX,X -XX XXX XXXX	X,X/X,X	X,X/X,X
XXX/XX X XX XXXX	X,X/X,X	X,X/X,X
XXX/XX X XX XXXX	X,X/X,X	X,X/X,X

Bei Stopbetrieb Luftdruck vorne um 0,5bar/7psi erhöhen !
Increase tyre/tire pressure by 0,5bar/7psi during parked/stop operation !
Augmenter la pression pneumatique de 0,5bar/7psi en service arrêté/parké !

Modell-Nr. **TypXXX-XX**
TypYYY-YY

Fig. 182: Tyre table

- Check tyre pressure
- 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



Wheel change



Danger!

Use only the wheels and tyres that have been released for the machine.

🔧 – [see chapter 6](#) “Tyres” on page 6-11

🔧 Use suitable assembly tools, such as covering sleeves for the studs, a jack etc.

🔧 Check the wheel nuts for tightness after every wheel or tyre change

🔧 Remove the wheels as follows:

- Park the machine on level and firm ground and prevent it from rolling away – [see chapter 3](#) “Stopping/parking the machine” on page 3-58
- Loosen the wheel nuts a little of the wheel you want to remove
- Place a jack under the axle beam, 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

🔧 Mount the wheels as follows:

- Place the wheel onto the wheel studs
- Tighten all wheel nuts part-way
- Lower the raised axle
- Tighten the wheel nuts to the prescribed tightening torque

5.13 Heating and ventilation system maintenance

General instructions regarding the heating system

The heating system of the machine is equipped with a fine-dust filter. Clean the filter as required, **however replace it every 500 s/h at the latest.**



Danger!

In order to be able to comply with the required safety measures regarding occupational safety and health, defective or dirty fine-dust filters must be replaced by new ones!

Cleaning the dust filter of the heating system



Fig. 183: Replacing the dust filter of the heating system

The dust filter is located behind the maintenance flap on the outside right of the cab.

☞ *Clean the filter as follows:*

- Remove knurled screw (2x)
- Pull out the fine-dust filter and check it for damage
- *Knock the filter element on a plate on either side*
- Blow compressed air from the inside to the outside to clean the filter, or wash it with water and dry it
- ☞ Replace the fine-dust filter every **500 s/h** (service hours)
- ☞ Replace or clean the filter more frequently if the machine is used in severe dust conditions
- Clean the inside of the filter housing and insert the fine-dust filter (make sure it is seated properly)
- Mount knurled screw (2x)



5.14 Heating/air conditioning system (option): maintenance

General safety instructions regarding the air conditioning system

- Maintenance and repair work may be carried out by trained staff only.
- Careful when carrying out maintenance and repair work – sharp-edged fins on the condensor and the heat exchanger.
- Wear protective equipment (protective gloves and goggles) during maintenance and repair work.
- Do not carry out maintenance work unless the heating and air conditioning systems are switched off.
- Bear in mind the pertinent regulations relevant to accident prevention, other generally acknowledged regulations regarding safety and occupational medicine.



Danger!

Lines and hoses containing refrigerants and cooling fluids are under pressure and can be hot!

- ⚠ Avoid touching parts containing refrigerants
- ⚠ Switch off the air conditioning during checks and maintenance work
- ⚠ **Have repair work carried out by an authorised workshop with trained staff only**

Filling up the air conditioning system

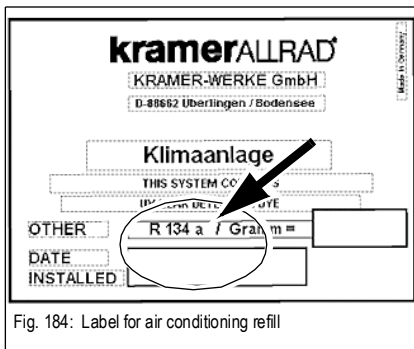


Fig. 184: Label for air conditioning refill

The air conditioning system must be checked and serviced **twice a year** by trained staff in an authorised workshop!

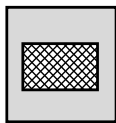
- For the first fill, see the air conditioning label inside the cab on the door



Important!

Use only the refrigerants indicated on the label for refilling the air conditioning system (R 134a, see arrow).

Daily functional and visual checks of the heating and air conditioning system



Danger!

Do not carry out inspection and maintenance work on a hot engine and heat exchanger!

- ☞ Wait at least 10 minutes after stopping the engine
- ☞ Wear protective gloves and clothing during maintenance work

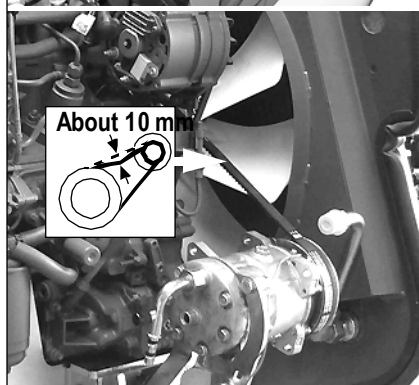
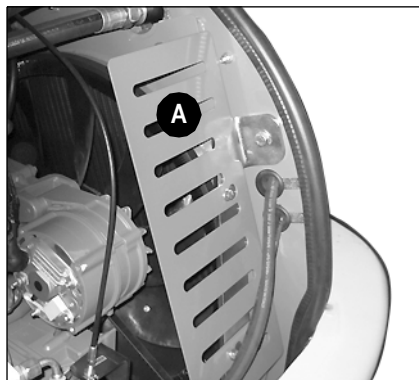


Fig. 185: Air conditioning V-belt

- ☞ The driver must carry out visual checks once a day
 - Check the heating and coolant lines for damage
 - Check the hoses for tightness, leaks and chafing
 - Check the electric connections for correct condition and tightness
 - Remove protective cover **A**
 - Check V-belt tension **C** and if necessary, retighten the V-belt
 - ➔ Press with your thumb to check whether the V-belt can be deflected between the pulleys by no more than **about 10 mm** (arrow)
 - ➔ Have a defective V-belt replaced by an authorised workshop
 - Install protective cover **A**



Cleaning the heat exchanger (condenser)

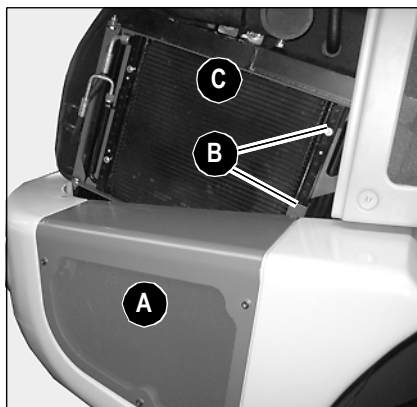


Fig. 186: Air conditioning: heat exchanger, dehumidifier

➡ Proceed as follows:

- Stop the engine
- Apply the parking brake
- Switch off ignition and remove the ignition key
- Remove intake screen **A** from the counterweight
- Remove fastening screws **B** from the heat exchanger and fold away heat exchanger **C**
- Clean the heat exchanger with a water jet (do not use a high-pressure cleaner or compressed air)



Caution!

Do not damage the fins as you clean the heat exchanger!

- Clean the air intake area
- Install intake screen **A** onto the counterweight
- Install heat exchanger **C** after cleaning



Caution!

Have the air conditioning system checked twice a year by trained staff in an authorised workshop!

Furthermore, replace dehumidifier **D** twice a year!

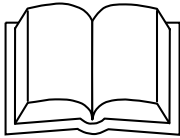
- The dehumidifier is located in the engine compartment under the engine cover lock

5.15 Electrical system

General instructions

Maintenance and repair work on the electrical system (including the battery) may be performed only by trained staff and/or authorised workshops!

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. Therefore when recharging or working near the battery, always wear goggles and protective clothing with long sleeves

If acid is spilt:

- 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 neutralise acid splashes on skin or clothing with an acid neutraliser 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 naked flames and sparks and do not smoke in the vicinity of 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
- Do not attempt to jump-start the machine if the battery is frozen or if the acid level is low. The battery can rupture or explode
- 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 electric components
- When connecting the battery leads, make sure the poles +/- are not inverted, otherwise sensitive electric components will be damaged
- Danger of sparking! Do not interrupt voltage-carrying circuits at the battery terminals
- Never place tools or other conductive articles on the battery – danger 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! A flat 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, place the protective cap on the positive terminal of the old battery and dispose of it 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 battery checked at regular intervals to make sure the electrolyte level is 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 causticisation!

☞ *Therefore when recharging and/or working near the battery:*

- Always wear goggles and protective clothing with long sleeves
- Open the caps of the battery openings by half a revolution before recharging the battery

☞ *If acid is spilt:*

- 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!
- Avoid naked lights and sparks in the vicinity of the battery and do not smoke!
- Always disconnect the negative terminal (-) from the battery before starting repair work on the electrical system!

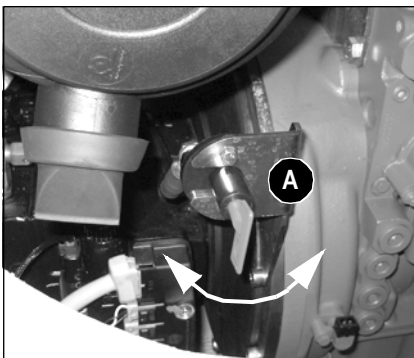


Fig. 187: Battery master switch

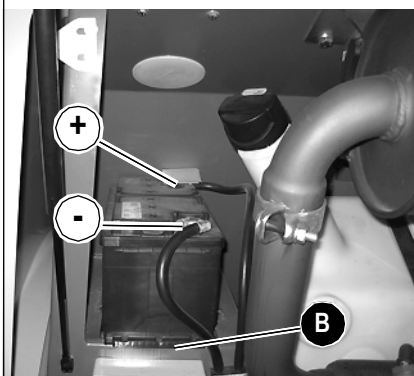


Fig. 188: Battery

The battery is located in the engine compartment, on the left next to the hydraulic oil tank.

☞ *Replace the battery as follows:*

- Apply the parking brake
- Switch off ignition and remove the ignition key
- Remove the key from battery master switch A (option)



Caution!

In order to avoid short circuits when disconnecting the battery leads, always bear in mind the order for removing the leads under all circumstances!

☞ **Disconnecting the leads:**

- *First remove the negative terminal (-) lead, then the positive terminal (+) lead*

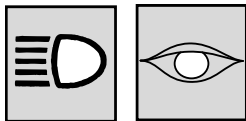
☞ **Mounting the leads:**

- *First fasten the positive terminal (+) lead, then the negative terminal (-) lead*

- Remove battery fixture B
- Replace the battery with a new one
- Install the battery leads (bear in mind the order required for installing the cables)
- Install the positive terminal (+) cover



Inspection and maintenance work on the electrical system at regular intervals



Daily checks before operating the machine

- – [see Maintenance plan](#) on page 5-47
- Is the light system OK?
- Is the signalling and warning system OK?
- Is the ignition lock in working order?

Weekly checks

- Electric fuses: if defective, use only the specified load capacity (amperage)
 - ➔ Blown fuses indicate overloading or short circuits. Therefore, the electrical system should be checked by an authorised technician before installing the new fuse
 - ➔ – [see chapter 6 "Fuses"](#) on page 6-8
- Electric and earth connections: When carrying out maintenance work on the electrical system, pay particular attention to ensuring good contact in leads and fuses
- Battery charge condition and condition of battery terminals
 - ➔ – [see Checking/replacing the battery](#) on page 5-31

Checking the alternator

Always observe the following instructions:

- Only test run the engine with the battery connected
- When connecting the battery, make sure the poles (+/-) are not inverted
- Always disconnect the battery before carrying out welding work or connecting a quick battery charger
- Replace defective charge telltales immediately



Checking/replacing fuses and relays

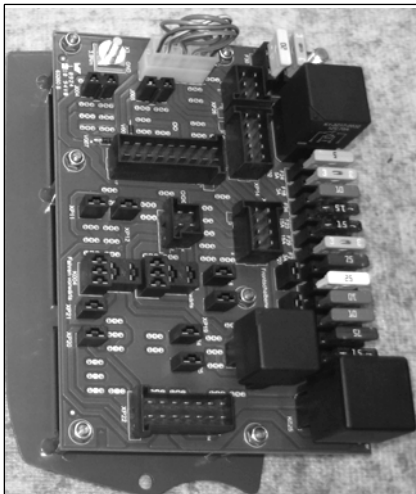


Fig. 189: Board with fuses and relays (right)

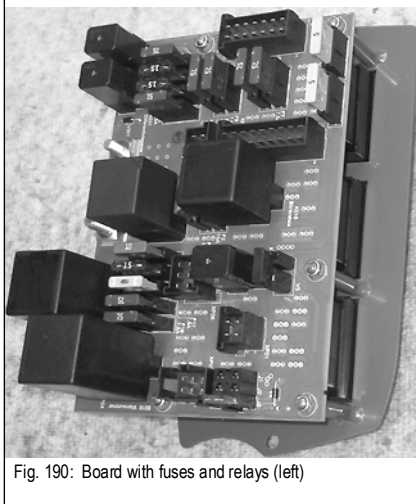


Fig. 190: Board with fuses and relays (left)

The fuses and switching relays are located on the board under the switch panel. Seen from below.

☞ Checking/replacing fuses or switching relays

- Switch off ignition and disconnect the battery leads
- Remove knurled screw **A** from the switch panel on the instrument panel
- Remove the switch panel from the trim
- Replace the defective fuse or relay

☞ Fuse and relay descriptions and output indications – see [chapter 6](#) “Fuses” on page 6-8



Caution!

Blown fuses or relays indicate overloading or short circuits. The electrical system must therefore be checked before installing the new fuse or relay!

☞ Use fuses and relays with the specified load capacity (amperage)

Checking/replacing fuses of the main fuse box

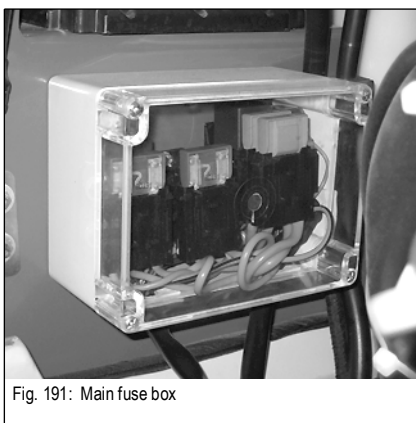


Fig. 191: Main fuse box

The main fuse box with the power relays and the preheating time control unit is located on the left in the engine compartment (near the hydraulic oil tank).

☞ Checking/replacing fuses

- Switch off ignition and remove the battery leads or switch off the battery master switch (option)
- Remove the fuse box cover

☞ Main fuse and relay descriptions and output indications – see [chapter 6](#) “Main fuse box with relays” on page 6-9



5.16 General cleaning and maintenance work

Safety instructions regarding general cleaning work

Cleaning the machine is divided into 3 separate areas:

- Inside the cab
- Exterior of the machine
- Engine compartment

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.

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 goggles and protective clothing
- Do not aim the compressed air at the skin or at other people
- Do not use compressed air for cleaning your clothing

Cleaning with a high-pressure cleaner or steam jet

- Electric components and damping material must be covered and not directly exposed to the jet
- Cover the vent filter on the hydraulic oil tank 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 volatile and flammable anticorrosion agents and sprays

- Ensure adequate room ventilation
- Do not use unprotected lights or naked flames
- Do not smoke!



Cleaning inside the cab



Caution!

Never use high-pressure cleaners, steam jets or high-pressure water to clean inside the cab.

 *Water under high pressure can penetrate into the electrical system, cause short circuits, damage seals and disable the controls!*

We recommend using the following aids to clean the cab:

- Broom
- Vacuum cleaner
- Damp cloth
- Bristle brush
- Water with mild soap solution

Cleaning the seat belt

- Clean the seat belt (which remains fitted in the machine) only with a mild soap solution; do not use chemical agents as they can destroy the fabric!

Cleaning the exterior of the machine

The following articles are generally suitable:

- High-pressure cleaner
- Steam jet



Cleaning the engine compartment



Danger!

Caution, turning parts! Do not carry out maintenance work on a hot engine!

- ☞ *Wait at least 10 minutes after stopping the engine*
- ☞ *Wear protective gloves and clothing during maintenance work*

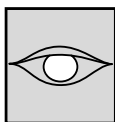


Caution!

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.*
 - *The humidity penetrating any such sensors causes them to fail and leads to engine damage!*

Checking screw connections



All screw connections must be checked regularly, even if they are not listed in the maintenance plans.

Tighten loose connections immediately. Refer to chapter "Specifications" for the tightening torques.

Checking pivots and hinges



All mechanical pivot points on the machine (e.g. door hinges, joints) and fittings (e.g. door arresters) must be lubricated regularly, even if they are not listed in the lubrication plan.

5.17 Maintenance of attachments and of the work equipment

Correct maintenance and service is absolutely necessary for smooth and continuous operation, and for an increased service life of the attachments. Observe the lubrication and maintenance instructions in the Operator's Manuals of the attachments!



5.18 Maintenance of the automatic trailer coupling (option)

Cleaning and lubricating the trailer coupling



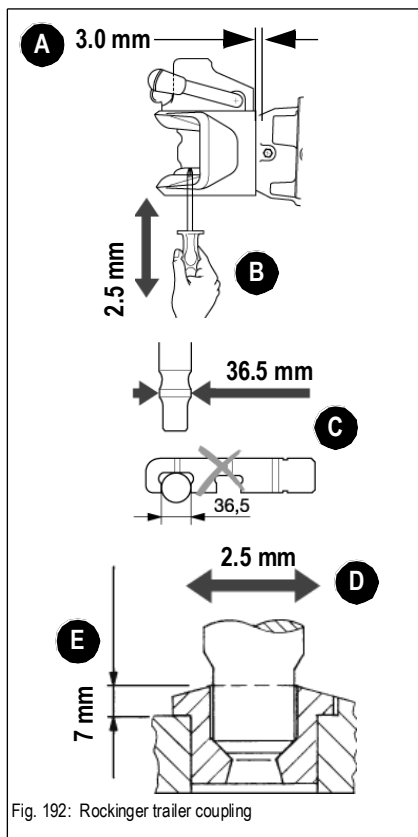
Caution!

Make sure 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 draw-bar 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



Danger!

Worn coupling pins, too much play in the bearing or a worn base ring carries a danger of accidents!

- ☞ Check the trailer coupling once a day for wear and play
- ☞ Apply grease to the base ring
- ☞ Have a defective 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 driving 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 be carried out by an authorised workshop only!



5.19 Maintenance: diesel particle filter (option)

Checking the electronic filter monitoring

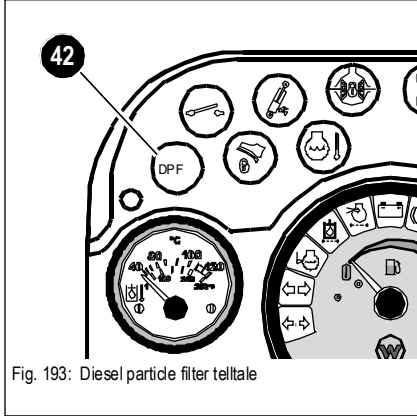


Fig. 193: Diesel particle filter telltale

The functional readiness or errors and malfunctions of the filter are indicated by the telltale 42 (DPF LED display) on the instrument panel and the acoustic warning indicator.

Errors are indicated by means of a flashing or continuously lit telltale 42 (see table).



Caution!

If the red LED display (DPF) comes on or flashes, correct the error or the cause before continuing to operate the machine!

Have troubleshooting carried out only by an authorised workshop!

The following alarms can be displayed:

LED colour	Alarm	Cause	Troubleshooting
Green	Filter OK and operational		
Yellow flashing	High counterpressure	Pre-alarm: dirty filter	Drive under full load (30 minutes). If this does not help: dirty filter: clean the filter (service technician)
Red flashing	High counterpressure, threshold value reached	Main alarm: very dirty filter	Drive under full load (30 minutes). If this does not help: dirty filter: clean the filter (service technician)
	Defective temperature sensor input	Sensor not plugged in or defective	Replace the sensor (service technician)
	Defective temperature sensor output	Sensor not plugged in or defective	Replace the sensor (service technician)
	Overdue service interval	Servicing must be carried out	Reset the service interval (service technician)
Red and warning sound	System error	Several possible causes	Service technician



5.20 Maintenance work “Aggressive Media” (option)

The machine is specially protected against corrosion for work in aggressive media (e.g. a saline environment).

However, this anticorrosion protection is affected by external factors e.g. dirt, cleaning etc. This is why it only has ongoing effect if checked at regular intervals and renewed or re-applied as required.

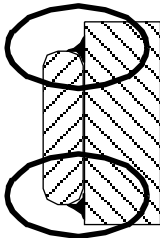
If no anticorrosion protection is applied to the machine, for instance for work in a saline environment, we recommend retrofitting your machine with the “Aggressive Media” option by a sales partner.

Anticorrosion protection applied in the factory

The following anticorrosive wax has been used in the factory:

Description:	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, earthing 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 layer) • Cab, cab bearings • Engine cover, engine mounting • Air filter • Counterweight • Fastening surfaces for mounting parts on frame • Radiator and insulating mats • Mudguards, rubber and plastic parts • Light elements
Flange surfaces 	E.g. axles, engine and cab 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 naked flames!
- Do not smoke!
- Corrosion on electric connections or components can lead to 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.
- Carry out 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 cab 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 work" in the Operator's Manual of the machine, neither clean the machine with a bristle brush nor with a steam jet or a high-pressure cleaner. 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 5-39 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 5-39

- 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 oxidised surfaces

If in spite of all precautionary measures some components should be affected by corrosion (oxidised), proceed as follows:

Electric connections

- ☞ Remove the remaining protective wax in the oxidised 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 e.g. KONTAKT WL
- ☞ Treat the contact surfaces of the connection with e.g. KONTAKTSPRAY WD 40
- ☞ Establish the connection
- ☞ Apply/spray anticorrosion wax onto the electric connection from all sides

Sheet-metal parts

- ☞ Remove the remaining protective wax in the oxidised 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



Notes:



5.21 Fluids and lubricants

Component/ application	Engine/machine fluid	SAE grade Specification	Season/temperature	Capacities ¹
Diesel engine	² Engine oil with oil filter	HD-C 10W-40; EO1040B ³	Year-round	About 10.5 l (2.77 gal)
		HD-C 15W-40; EO1540B ³		
Gearbox	Gearbox oil ⁴	85 W 90 API GL5 or SAE 90 LS (hypoid gear oil)	Year-round	0.8 l (0.21 gal)
Front and rear axle differentials				4.0 l (1.05 gal)
Planetary drives – left and right, front and rear axles				0.9 l (0.23 gal) each
Hydraulic oil tank	Hydraulic oil ⁵	HVLPD 46 (HYD0530)	Year-round	About 64 l ^{6, 7} (16.90 gal)
	Biodegradable oil	AVILUB Syntofluid 46		
		PANOLIN HLP Synth 46		
Grease nipples, loader unit/axles	Multipurpose grease	Lithium-saponified brand-name grease MPG-A ³	Year-round	As required
Battery terminals	Acid-proof grease	SP-B ³	Year-round	As required
Aggressive media (option)	Anticorrosion protection	Anticorit BW 366 ⁸	Year-round	As required
Mounting ⁹ of pins, shafts	Special grease	Optimoly paste "TA" ¹⁰ White-Paste	Year-round	As required
Fuel system, fuel tank ¹¹	Diesel fuel ^{12,13}	DIN 51628/DIN EN 590 (EU) ASTM D975-94 (USA)	Year-round -40 °C (-40 °F)	About 85 l (22.45 gal)
	Biodiesel ^{12, 13}	DIN EN 14214		
Brake system	Brake fluid ¹⁴	Agip LHM Super/Shell LHM	Year-round	–
Air conditioning (option) ¹⁵	Refrigerant ¹⁶	R 134a	Year-round	About 850 g (1.87 lbs.)
Engine cooling	Antifreeze ^{17, 18, 19}	MS Frostschutz HAVOLINE XLC	Year-round -31 °C (-23.8 °F)	Water 4.4 l (1.17 gal)
				Antifreeze 5.4 l (1.42 gal)
Washer system	Cleaning agent ¹⁸	Water + antifreeze	Year-round -20 °C (-4 °F)	Water (67 %) 1.3 l (0.34 gal) Antifreeze (33 %) 0.7 l (0.18 gal)

- The capacities indicated are approximative values; the oil level check alone is relevant for the correct oil level
- MIL-L-2104C; API CD/CE/CH4; CCMC-D4
- Abbreviation for lubricants (Hauptverband der Deutschen Bauindustrie e. V. – German construction engineering association)
- MIL-L-2105B; API-GL5
- DIN 51 524
- Complete refill of wheel loader about 103 l
- With oil change of high speed gearbox 40 kph (option) + 10 l
- TI 8030-015/K 19/MIL-C-16 173 C-Grade 4
- Important! Pins (hard-chromium plated or coated with Molykote 3400A) are inserted in dry state. Lubricate via grease nipples once assembly is over
- 250 gr tube, order no.: 1000030311
- With additional tank about 60 l (option)
- In order to avoid engine damage, do not add additives to the diesel fuel!
- If fuels are used that do not comply with the standards in the table, warranty rights shall not apply in case of diesel engine damage
- Standard: B 71 2710
- Maintenance work must be carried out by trained staff only
- Bear in mind the safety data sheet during maintenance work
- See [Coolant compound table on page 6-13](#)
- See manufacturer's indications on the packaging and bear in mind the antifreeze compound table
- Replace the coolant every 2 years!

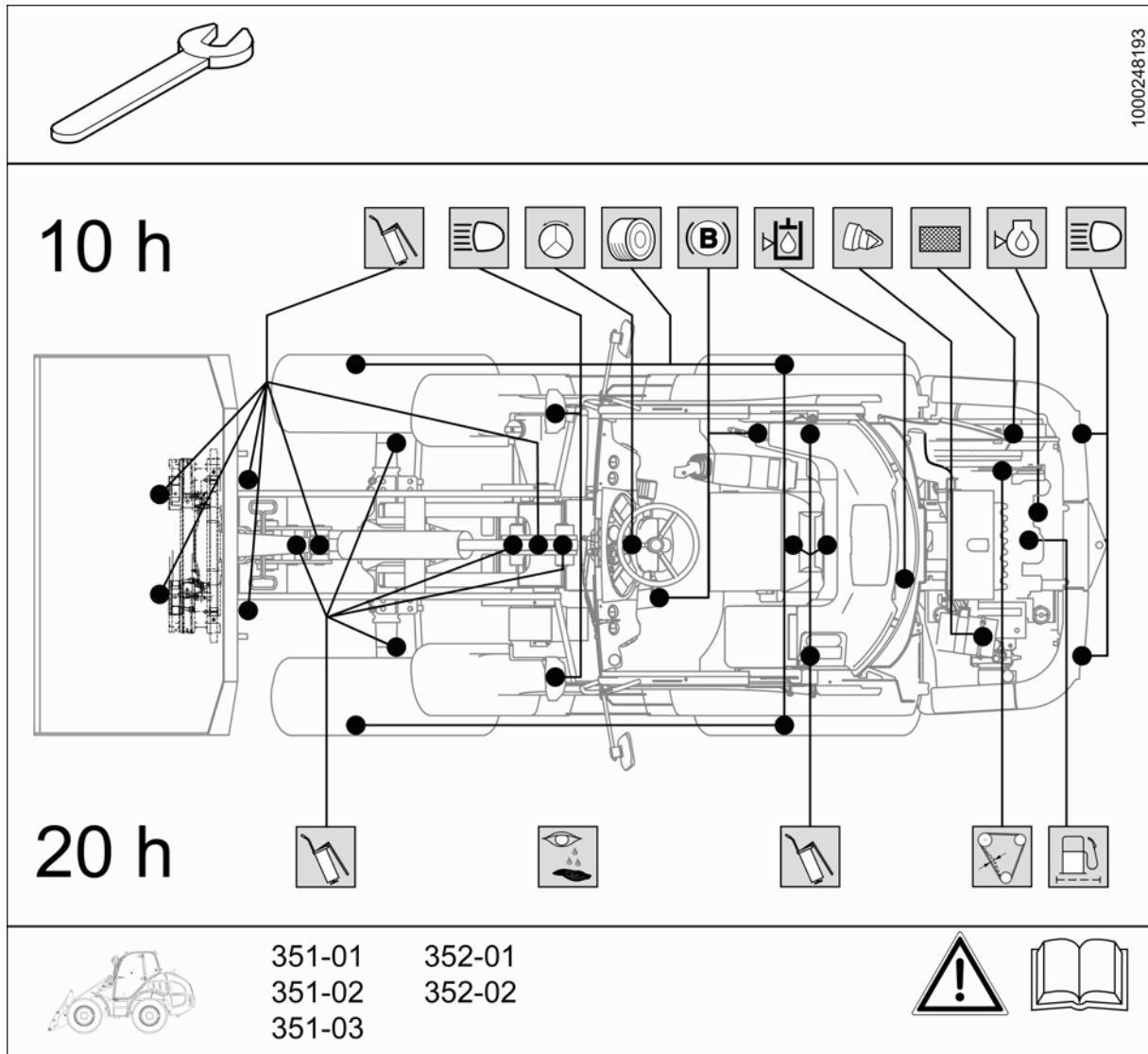
5.22 Explanation of symbols on the maintenance label

Symbol	Explanation
	Before starting maintenance work, follow the safety instructions in the Operator's Manual!
	Before starting maintenance work, read the "Maintenance" chapter in the Operator's Manual!
	Carry out a functional check of the light system!
	Check tyres for damage, pressure and tread depth!
	Carry out a functional check and synchronise the steering system!
	Carry out a functional check of the brake system!
	Check hydraulic oil level. Fill up if necessary!
	Check engine oil level. Fill up if necessary!
	Compress the dust valve
	Check radiator for engine coolant and hydraulic oil for contamination. 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 screw connections. Rectify if necessary!
	Leakage check: Check the fuel/water separator. Drain water if necessary!
	Lubrication service: Lubricate the assemblies concerned!



5.23 Maintenance label

Location: inside the cab on the rear window





Notes:



5.24 Maintenance plan

Work description

For service and maintenance work on the attachment, please refer to the operation and maintenance manual of the attachment manufacturer as well.

Oil and filter changes, fan bearing ():

Carry out the following oil and filter changes (check oil levels after test run):

	Work-shop	Operator/driver	Workshop
	Delivery inspection	Maintenance work (once a day)	“A” every 50 s/h “A” every 20 s/h “B” every 500 s/h ² 2nd inspection 1st inspection ¹ at 100 s/h “C” every 1500 s/h once a year
• Engine oil			●
• Engine oil filter			●
• Fuel filter, fuel prefilter			●
• Air filter insert ^{3,4} replace safety cartridge every 3rd time the air filter insert is replaced			●
• Gearbox oil in front and rear axle differentials and in rear axle gearbox			●
• Gearbox oil in front and rear axle planetary drives (left and right)			●
• Hydraulic oil ⁵			●
• Microfilter (line filter in drive)			●
• Hydraulic oil filter insert			●
• Hydraulic oil tank breather filter ⁴			●
• Heating: fine-dust filter ⁶			●
• Replace the fan bearing (Visco clutch)			●
			Every 2500 service hours

Inspection work ():

Check the following material. Refill if necessary:

• Engine oil	●	●	●	●			
• Hydraulic oil	●	●	●	●	●	●	●
• Engine coolant ⁷ (also check antifreeze in autumn/winter and at temperatures below 4 °C!)	●	●			●	●	●
• Gearbox oil in front and rear axle differentials and in rear axle gearbox	●				●	●	●
• Gearbox oil in front and rear axle planetary drives (left and right)	●				●	●	●
• Brake fluid ⁸	●	●	●	●	●	●	●
• Check radiator for engine and hydraulic oil for contamination. Clean if necessary ⁹		●	●	●	●	●	●



5.24 Maintenance plan

Work description

For service and maintenance work on the attachment, please refer to the operation and maintenance manual of the attachment manufacturer as well.

Other inspection work ():

	Work-shop	Operator/driver			Workshop		
	Delivery inspection	Maintenance work (once a day)	"A" every 20 s/h	"A" every 50 s/h	1st Inspection ¹ at 100 s/h	"B" every 500 s/h ² 2nd Inspection	"C" every 1500 s/h once a year
• When using biodegradable oil: drain the condensation water in the hydraulic oil tank ⁵						●	●
• Clean dust valve on air filter housing ³	●	●	●	●	●	●	●
• V-belt: check condition and pre-tension. Retighten or replace if necessary ¹⁰	●	●	●	●	●	●	●
• Check the fuel/water separator. Drain water if necessary			●	●	●	●	●
• Clean filter insert on fuel pump, replace if necessary			●	●	●	●	●
• Check valve clearance (engine management). Set if necessary					●		
• Battery: check charge condition						●	●
• Heating: clean the fine-dust filter			●	●	●		
• Check and set service and parking brake pads. Replace if necessary					●	●	●
• Tyre check (damage, air pressure, tread depth)	●	●	●	●	●	●	●
• Aggressive media (option): check anticorrosion protection, renew if necessary ¹¹		●			●	●	●
Check screws and nuts or screw connections for tightness on the following assemblies/components. Retighten if necessary							
• Engine and engine bearing					●	●	●
• Steering system					●	●	●
• Hydraulic system					●	●	●
• Loader unit (pin locking)					●	●	●
• Axle mounting, axle suspension					●	●	●
• Counterweight (attachment)					●	●	●
• Fastening screws of cardan shafts					●	●	●
• Fastening screws of cab					●	●	●
• Wheel nuts	●				●	●	●
• Electrical system: check electric and earth connections, chafing on wiring harness, battery terminals	●				●	●	●



5.24 Maintenance plan

Work description

For service and maintenance work on the attachment, please refer to the operation and maintenance manual of the attachment manufacturer as well.

Lubrication (): ¹² (Note: lubricate more frequently when in heavy-duty operation!)

	Work-shop	Operator/driver	Workshop
	Delivery inspection	Maintenance work (once a day)	“A” every 50 s/h “B” every 20 s/h “C” every 1500 s/h once a year
• Hinges, joints and fittings (e.g. door arresters)		•	•
• Rear axle oscillating bearing	•		•
• Front and rear axle planetary drive bearings (left and right)	•	•	•
• Loader unit – see <i>Lubricating the loader unit, lift, tilt and lock rams</i> on page 5-20			
• Lift frame bearing	•	•	•
• Tilt rod bearing	•	•	•
• Tilt lever bearing	•	•	•
• Lift ram bearing	•	•	•
• Tilt ram bearing	•	•	•
• Quickhitch: bearing on lift frame	•	•	•

Functional check ():

Check the function of the following assemblies/components. Rectify if necessary:

• Service and parking brake	•	•	•	•	•	•
• Steering system	•	•	•	•	•	•
• Lights and electrical system	•	•	•	•	•	•
• Air conditioning (option)	•	•	•	•	•	•

5.24 Maintenance plan

Work description

For service and maintenance work on the attachment, please refer to the operation and maintenance manual of the attachment manufacturer as well.

Leakage check ():

Check for tightness, leaks and chafing: pipes, flexible lines and screw connections of the following assemblies and components. Rectify if necessary:

	Work-shop Delivery inspection	Operator/driver			Workshop		
		Maintenance work (once a day)	"A" every 20 s/h	"A" every 50 s/h	1st Inspection ¹ at 100 s/h	"B" every 500 s/h ² 2nd Inspection	"C" every 1500 s/h once a year
• Air intake line (air filter – engine)	●	●	●	●	●	●	●
• Engine lubrication (engine – filter)	●	●	●	●	●	●	●
• Fuel lines ¹³	●	●	●	●	●	●	●
• Cooling system (engine – hydraulic oil)	●	●	●	●	●	●	●
• Steering system (flexible lines and steering rams)	●	●	●	●	●	●	●
• Hydraulic system/loader unit (flexible lines ¹⁴ and rams)	●	●	●	●	●	●	●
• Brake system (flexible lines and cylinders)	●	●	●	●	●	●	●
• Air conditioning system (option) – flexible lines, condenser, dehumidifier	●	●	●	●	●	●	●

1. Work to be carried out once after the first 100 s/h. This work must be carried out by an authorised workshop for warranty claims to be acknowledged.
2. Work after the first 500 s/h (2nd Inspection) must be carried out by an authorised workshop for warranty claims to be acknowledged
3. Replace filter insert as indicated by the telltale on the air filter housing, however at least every 12 months or 1500 s/h.
4. When working in an acidic environment, replace the filter every 300 s/h!
5. When using biodegradable oil: drain the condensation water in the hydraulic oil tank every 500 s/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. Replace every 2 years
9. Depending on operation and dust conditions, it can be necessary to clean the radiator more frequently
10. Replace the toothed belt every 3000 s/h or after 5 years at the latest (toothed belt must be replaced by authorised staff)
11. See maintenance instructions for aggressive media, order no. 1000108296
12. Lubricate attachment according to manufacturer's instructions!
13. Replace flexible fuel leak oil lines every 2 years
14. Replace flexible lines every 6 years (UVV, DIN 20066 part 5)



6 Specifications

6.1 Models and trade names: overview

Wheel loader model	Trade name
351-01	380
351-02	480
351-03	580

6.2 Frame

Sturdy steel sheet frame, rubber-mounted engine

6.3 Engine

Engine	Wheel loader models 351-01/351-02	Wheel loader models 351-02/351-03
Product	Deutz diesel engine	
Type	D 2011 LO4	TD 2011 LO4
Design	In line	
No. of cylinders	4	
Displacement	3620 cm ³	3619 cm ³
Bore and stroke	96 x 125 mm	96 x 125 mm
Compression ratio	1:19	1:18
Output (as per ISO 14396)	45 kW at 2300 rpm	58 kW at 2300 rpm
Max. torque	210 Nm at 1700 rpm	270 Nm at 1600 rpm
Minimum idling speed	900 rpm	
Specific minimum fuel consumption	230 g/kWh	255 g/kWh
Fuel injection system	Direct fuel injection	
Firing order	1-3-4-2	
Starting aid	Glow plug	
Max. inclined position (engine no longer supplied with oil):	30° in all directions Observe the tilting limit of the machine! (20° laterally)	
Oil pressure	3.0 – 4.5 bar at 2300 rpm	
Exhaust emissions according to EC standard	2004/26 EC	



Specifications

6.4 Drive

Variable displacement pump/boost pump

Variable displacement pump	Wheel loader models 351-01/351-02	Wheel loader model 351-03
Design	Automotive, infinitely variable hydrostatic axial-piston gear-box	
Displacement 20 kph	45 cm³/rev	60 cm³/rev
Displacement 30 kph/40 kph (option)	60 cm³/rev	
Max. operating pressure 20 kph	450 bar	
Max. operating pressure 30 kph/40 kph (option)	400 bar	450 bar
Starting engine speed	1150 – 1250 rpm at 50 bar HP	
Droop	2050 – 2250 rpm at 250 bar HP	
Boost pump		
Design	Internal gear pump	
Displacement	9 cm³/rev	12 cm³/rev
Charging/boost pressure	28 – 30 bar at 1500 rpm	
Control	Speed-sensitive, electrohydraulic feed volume adjustment	
Driving direction	Electrohydraulic control	
Inching	Electric via proportional control (potentiometer)	

Variable displacement motor

Variable displacement motor	Wheel loader model 351-01	Wheel loader models 351-02/351-03
Design	Axial piston motor (bent axis design)	
Capacity 20 kph	80 cm³/rev	
Capacity 30/40 kph (option)	233 cm³/rev	
Drive speed (forwards and reverse)	1st speed range: 0 – 7 kph 2nd speed range: 0 – 20 kph 0 – 30/40 kph (option)	
Pushing power 20 kph	42 kN ¹	40 kN ²
Pushing power 30/40 kph (option)	38 kN ¹	40 kN ²

1. 12.5-18 tyres
2. Tyres 12.5-20



6.5 Axles

Front axle

Wheel loader models 351-01/351-02/351-03

Design	Planetary steering and drive axle, rigid screw connection with frame
Differential lock	Self-locking differential 45 %
King-pin inclination	0°
Camber	0°
Steering angle	40°
Toe-in	0 mm
Track (distance over hubs)	1400 mm

Rear axle

Wheel loader models 351-01/351-02/351-03

Design	Oscillating planetary steering and drive axle
Differential lock	Self-locking differential 45 %
King-pin inclination	0°
Camber	0°
Total oscillation angle ¹	± 11°
Steering angle	40°
Toe-in	0 mm
Track (distance over hubs)	1400 mm

1. Tyres 12.5-18 (12.5-20)



Specifications

6.6 Brakes

Service brake

Wheel loader models 351-01 / 351-02 / 351-03

Design	Foot-operated hydraulic disc brake
Location	Front axle input shaft (also on rear axle if equipped with 30/40 kph high speed)
Brake fluid	Special hydraulic fluid based on basic mineral oil (LHM) – see chapter 5 “Fluids and lubricants” on page 5-43

Parking brake

Wheel loader models 351-01 / 351-02 / 351-03

Design	Manual mechanical disc brake
Location	Front axle drive shaft

6.7 Steering system

Steering system

Design	Hydrostatic 4 wheel steering with emergency steering features
Types of steering systems	4 wheel steering, optional front axle steering, optional diagonal steering (crab steering)
Assemblies	Hydraulic pump, priority valve, servostat with safety valves, 1 steering ram per axle with zero-position sensor on rear axle, changeover valve for steering mode “Front axle, diagonal and 4 wheel steering” If equipped with 30/40 kph high speed option: Switching over to wheel steering automatically switches over to 20 kph speed range! Front axle steering must be selected for higher speeds
Displacement (gear pump) wheel loader model 351-01	22.5 cm³/rev
Displacement (gear pump) wheel loader model 351-02/351-03	32 cm³/rev
Max. steering pressure ¹	190 bar

1. Measured before the steering unit



6.8 Work hydraulics

Hydraulic pump

Hydraulic pump	
Design	Gear pump
Displacement wheel loader model 351-01	22.5 cm³/rev
	50 l/min at 2300 rpm
Displacement wheel loader models 351-02/351-03	32 cm³/rev
	70 l/min at 2300 rpm
Location	Variable displacement pump (drive)
Control valve	3-fold pilot-control (standard)
Max. operating pressure ¹	240 bar

1. Measured at hydraulic pump

Hydraulic pilot control, pilot control unit

Boost pump (drive hydraulics variable displacement pump)	
Displacement wheel loader models 351-01/351-02	9 cm³/rev
Displacement wheel loader model 351-03	12 cm³/rev
Charging/boost pressure	28 – 30 bar at 2300 rpm
Pilot control unit	
Control lever (joystick)	Universal lever – operation of lift and tilt rams, change of direction, 3rd control circuit
Lock against unintentional operation (for long-haul travel and transport)	Stop cock in pilot-control line and switch for 3rd control circuit lock (electric)



Specifications

Hydraulic ram protection

Wheel loader models 351-01 / 351-02 / 351-03

Hydraulic pump	– see <i>Hydraulic pump</i> on page 6-5
Max. operating pressure	240 bar
Tilt ram Secondary pressure limiting	Rod side 270 bar Base side 100 bar
Lift ram Secondary pressure limiting	Rod side anticavitation valve Base side 270 bar
Quickhitch ram (3rd control circuit) Secondary pressure limiting	270 bar
Hydraulic filter	Suction reflux filter

Lift and tilt ram speed

Lift and tilt ram speed ¹		Wheel loader model 351-01	Wheel loader model 351-02	Wheel loader model 351-03
Hydraulic pump		22.5 cm³/rev	32 cm³/rev	
Lift ram	Raise	5.0 sec	6.0 sec	
	Lower	4.7 sec	4.0 sec	
Tilt ram	Dump in	2.5 sec	2.4 sec	
	Dump out	3.3 sec	2.4 sec	

1. At maximum engine speed without load

**Usable consumer pressure at additional control circuit (option)****Important!**

The specified flow rates are available at the front **or** rear quick couplers.

Description of quick coupler connections – [see chapter 3](#) “Front/rear hydraulic additional control circuit (option)” on page 3-95

Wheel loader		Model 351-01	Models 351-02/351-03
Hydraulic pump	Function	22.5 cm ³ /rev	32 cm ³ /rev
		Rpm/litres/bar	Rpm/litres/bar
Front 3rd control circuit (reflux without pressure) ¹	Electric control (solenoid valve) via 3rd control circuit	2300/45/175	2300/65/175
Front 3rd control circuit (double action) ¹	Tip switch operation in joystick	2300/45/155	2300/65/155
Hydraulic pump with auxiliary output pump		–	32 cm ³ /rev 17 cm ³ /rev
Additional control circuit with external reflux at front on outside of loader unit and/or at rear ¹	Electric control (solenoid valve) via 3rd control circuit	–	2300/90/180

1. Usable pressure at attachment



6.9 Electrical system

Electric units

Wheel loader models 352-01 / 352-02

Alternator	12 V 95 A
Starter	12 V 2.3 kW
Battery	12 V 88 Ah

Fuses

The fuses are installed on the board under the switch panel.

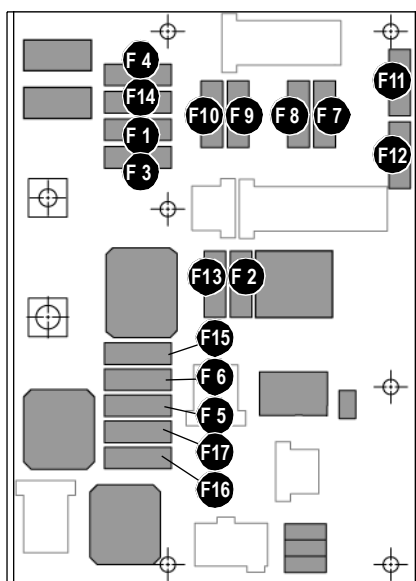


Fig. 194: Fuses on left-hand side board

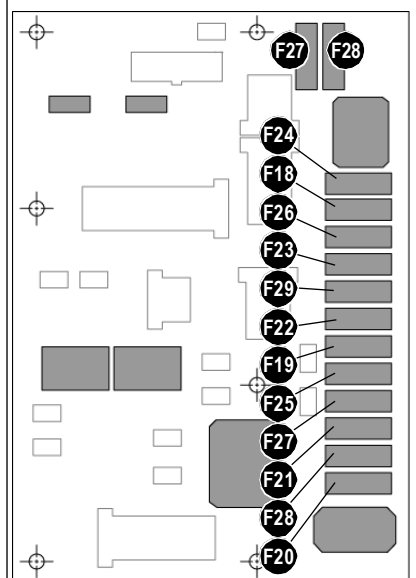


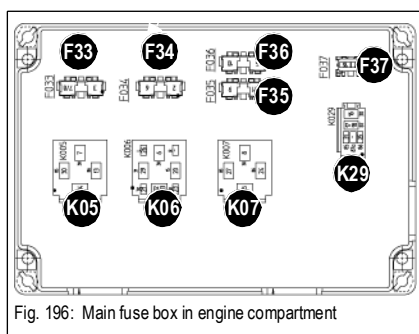
Fig. 195: Fuses on right-hand side board

No.	Rated current (A)	Symbol	Protected circuit
F1	15		Front socket
F2	15		High and low beam
F3	7.5		Brake lights
F4	7.5		Turn indicators
F5	3		Electronics: front socket
F6	15		Solenoid valves
F7	7.5		High beam (right)
F8	7.5		High beam (left)
F9	7.5		Low beam (right)
F10	7.5		Low beam (left)
F11	5		Parking light (right)
F12	5		Parking light (left)
F13	15		Front working light
F14	15		Rear working light
F15	10		Rotating beacon
F16	7.5		Hazard warning lamp
F17	7.5		Interior light (cab)
F18	3		Glow control unit, axle sensors
F19	7.5		Steering system
F20	15		Front wiper, horn
F21	10		Rear wiper



No.	Rated current (A)	Symbol	Protected circuit
F22	3		Instrument panel lights
F23	15	PWM	Proportional electronics
F24	5		Cutoff solenoid (diesel engine)
F25	25		Heating, air conditioning (option)
F26	10		Drive electronics – hydraulic pump
F27	10		Additional function solenoid valve
F28	7.5		Radio, float position, drive interlock (option)
F29	15		Central lubrication system, air-suspension seat, bucket repositioning (option)
F30	20		Socket (cigarette lighter), auxiliary heating
F31	3		High current relay, switching relay preheating and starting, telltale for preheating

Main fuse box with relays



The main fuse box is located in the engine compartment, on the left in driving direction

No.	Rated current (A)	Protected circuit
F33	50	Glow plug fuse
F34	50	Glow plug fuse
F35	60	Board fuse (right)
F36	60	Board fuse (left)
F37	10	Multiple quantity valve (engine)

Relay no.	Protected circuit
K 05	High current relay preheating
K 06	Preheating time control unit
K 07	Start high current relay
K 29	Multiple quantity valve mini switching relay (engine)

Relays

The relays are mounted on the left and right on the board under the switch panel.

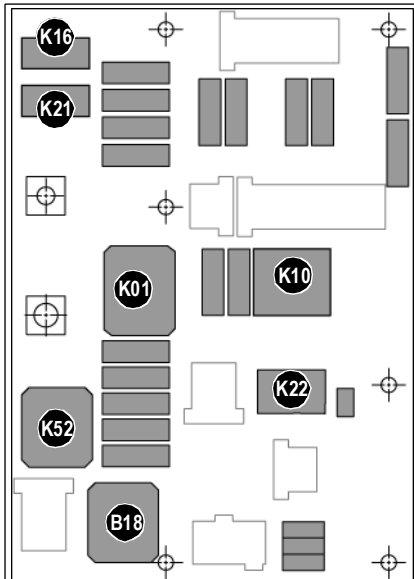


Fig. 197: Relays on board (left)

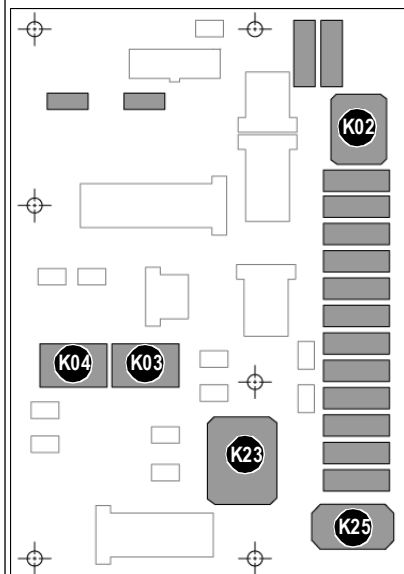


Fig. 198: Relays on board (right)

Switching relay no.	Protected circuit
K01	Power supply high current relay
K02	Power supply high current relay
K03	Reverse driving switching relay
K04	Forwards driving switching relay
K10	Turn indicator relay
K16	Front socket switching relay
K21	Differential lock switching relay
K22	Load stabiliser switching relay
K23	Front wiper switching relay (1st speed)
K25	Front wiper intermittent wipe relay
K52	Mini SPS switching relay/front socket
B18	Buzzer



6.10 Tyres

Tyres for wheel loader model 351-01

Tyre size	Tyre pressure ¹		Wheel rims	
	Front	Rear	Wheel rim	Wheel offset
12.5-18 MPT-04 TBL 10 PR	2.5	2.0	11 x 18	0 mm
365/70R18EM SPT9				
365/70 R18 EM-01 135 B				
335/80 R18 XZSL 151 A2				
340/80 R18 XMCL				
375/70R20 MPT 136G AC70			11 x 20	
12.5-18 MPT317 128G			11x18	-25 mm

1. Increase front tyre pressure by 0.5 bar during pallet forks operation!

Tyres for wheel loader models 351-02/351-03

Tyre size	Tyre pressure ¹		Wheel rims	
	Front	Rear	Wheel rim	Wheel offset
12.5-20 MPT 04 10 PR	2.5	2.0	11 x 20	-30 mm
12.5-20 MPT317 129G				0 mm
335/80 R20 SPT9 136B				
375/70 R20 MPT AC70G 132B				
335/80 R20 MPT81				
365/70 R18 EM SPT9 132B				
365/70 R18 EM-01 135 B	3.0	2.5	11 x 18	0 mm
405/70 R18 EM01 141B				
405/70 R18 EM SPT9				

1. Increase front tyre pressure by 0.5 bar during pallet forks operation!



6.11 Machine weights

Weight	Wheel loader model 351-01	Wheel loader model 351-02	Wheel loader model 351-03
Kerb weight ¹	4300 kg	4900 kg	4920 kg
Gross weight rating	6500 kg		
Front axle weight rating	4000 kg		
Rear axle weight rating			
Max. authorised load for towing facility	None		

1. With standard bucket, driver and full fuel tank

6.12 Noise levels

Sound power level wheel loader models 351-01 / 351-02 / 351-03	dB(A)
Measured value	100.3
Guaranteed value	101
Noise level in the cab	79



Important!

Measurement of sound power level according to Directives 2000/14 EC, ISO 6395: 1995 and EN ISO 3711: 1995.

6.13 Vibrations, oscillation and acceleration value

Vibration	
Overall vibration value for upper extremities of the body	$< 2.5 \frac{m}{s^2}$
Maximum effective value of weighted acceleration for body	$< 0.5 \frac{m}{s^2}$



6.14 Coolant compound table

Outside temperature	Water ¹	Antifreeze ²
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

2. See Fluids and lubricants on page 5-43

6.15 Tightening torques, conversion tables

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

Description	Tightening torque
Wheel nut	390 ^{±10} Nm



Specifications

Conversion table: DIN standard – USA standard

All indications made without engagement.

Volumes

1 litre = 2.1 pts (pints)

1 litre = 1.06 qts (quarts)

1 litre = 0.26 gals (gallons)

1 cm³ (cubic centimeter) = 0.0611 cu. in. (cubic inches)

Lengths

1 mm (millimetre) = 0.03937 in (inches)

1 m (metre) = 3.281 feet

1 m (metre) = 1.0936 yards

1 km (kilometre) = 0.622 miles

1 mile = 1.607 km (kilometres)

Masses (weights)

1 kg (kilogram) = 2.205 lbs. (pounds)

1 g (gram) = 0.035 oz (ounces)

Torques

1 Nm (Newton metre) = 0.737 ft./lbs. (foot-pounds)

Pressures

1 kp/cm² (kilopond/cm²) = 14.22 psi

1 bar = 14.29 psi

Force/output

1 hp (horse power) = 0.735 kW (kilowatt)

1 kW (kilowatt) = 1.36 hp (horse power)

1 hp (horse power) = 0.985 hp (horse power)



6.16 Payloads

Loader unit with bucket

Bucket ¹	Wheel loader model 351-01	Wheel loader model 351-02	Wheel loader model 351-03
Bucket capacity	0.75 m ³ according to ISO	0.85 m ³ according to ISO	0.95 m ³ according to ISO
Tipping load	3507 kg	3650 kg	3750 kg
Payload	1754 kg	1825 kg	1875 kg
Breakout force: lift ram	34 kN	43.8 kN	43.6 kN
Breakout force: tilt ram	31.8 kN	40.7 kN	39.4 kN
Scraping depth	50 mm ²	60 mm ³	60 mm ³

1. With a standard bucket
2. With tyres 12.5-18
3. With tyres 12.5-20

Loader unit with pallet forks

500 mm load distance	Wheel loader model 351-01	Wheel loader model 351-02	Wheel loader model 351-03
Payload, safety factor 1.25	2000 kg	2150 kg	2300 kg
Payload, safety factor 1.67	1500 kg	1600 kg	1700 kg
Transport position: movable payload, safety factor 1.25	2400 kg	2600 kg	2750 kg
Transport position: movable payload, safety factor 1.67	1800 kg	1950 kg	2060 kg
Lift height	2830 mm ¹	3000 mm ²	3000 mm ²

1. With tyres 12.5-18
2. With tyres 12.5-20

Specifications


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Loader unit with pallet forks (foldable fork arms option)

500 mm load distance	Wheel loader model 351-01	Wheel loader model 351-02	Wheel loader model 351-03
Payload, safety factor 1.25	2000 kg	2150 kg	2300 kg
Payload, safety factor 1.67	1500 kg	1600 kg	1700 kg
Transport position: movable payload, safety factor 1.25	2400 kg	2600 kg	2750 kg
Transport position: movable payload, safety factor 1.67	1800 kg	1950 kg	2060 kg
Lift height	2830 mm ¹	3000 mm ²	3000 mm ²

1. With tyres 12.5-18
2. With tyres 12.5-20

Loader unit with load hook (option)

Payload ¹	Wheel loader model 352-01	Wheel loader models 351-02/351-03
Payload with extended loader unit and quick-hitch tilted in	2000 kg	2200 kg
Payload with extended loader unit and quick-hitch	1500 kg	1700 kg

1. Payloads apply with lifting gear (chains, cables, suspension devices)

Trailer weight/drawbar load for automatic trailer coupling (option)

Gross trailer weight rating ¹	Tractors and agricultural or forestry machinery Directive 2003/37 EC	Gross drawbar load rating
Trailer without brakes	750 kg	500 kg ²
Trailer with brakes (1 braked axle)	3500 kg	
Trailer with brakes (all axles braked)	8000 kg	
Ball	–	250 kg

Control mark: see machine documentation

1. Bucket must be fitted during trailer operation
2. In consideration of the axle loads and the overall weight of the wheel loader (see EC Certificate of Conformity)



6.17 Wheel loader dimensions with bucket (model 351-01)

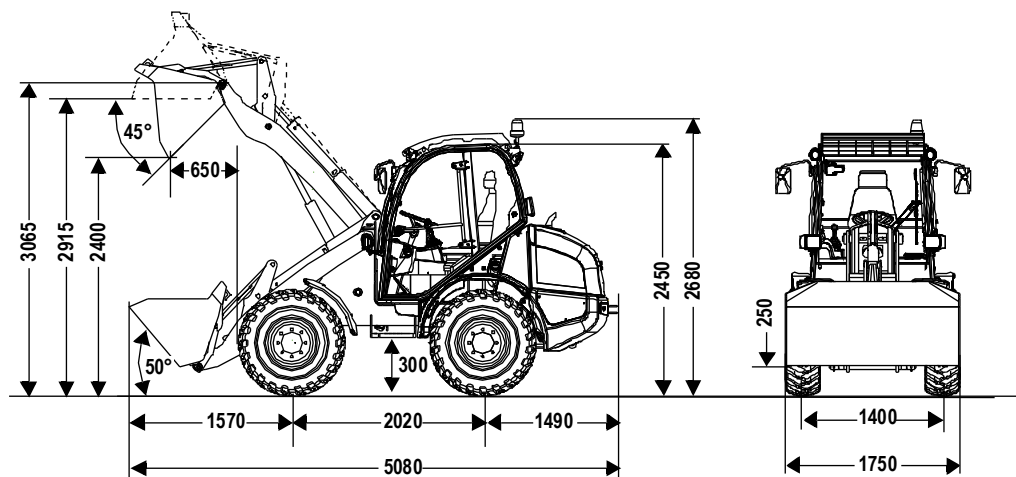


Fig. 199: Machine dimensions model 351-01

Dimensions	
Overall length ¹	5080 mm
Overall height ^{2, 3}	2450 mm
Overall height with rotating beacon ^{2, 4}	2680 mm
Overall width without bucket ^{2, 5}	1720 mm
Overall width with bucket ¹	1750 mm
Ground clearance in transport position of loader unit	250 mm
Ground clearance ² under gearbox	300 mm
Pin height	3065 mm
Load-over height	2915 mm
Dump height	2400 mm
Dump reach	650 mm
Dump-in angle	50°
Dump-out angle	45°
Front/rear track (distance over hubs)	1400 mm
Wheelbase (front/rear axles)	2020 mm
Turning radius ^{2, 6}	2900 mm

1. With standard bucket order no. 1000160648
2. With tyres 12.5-18
3. 2560 mm with protective FOPS screen (option)
4. 2800 mm with protective FOPS screen (option)
5. With outside mirrors folded in
6. Measured at outer edge of wheel



6.18 Wheel loader dimensions with bucket (model 351-02)

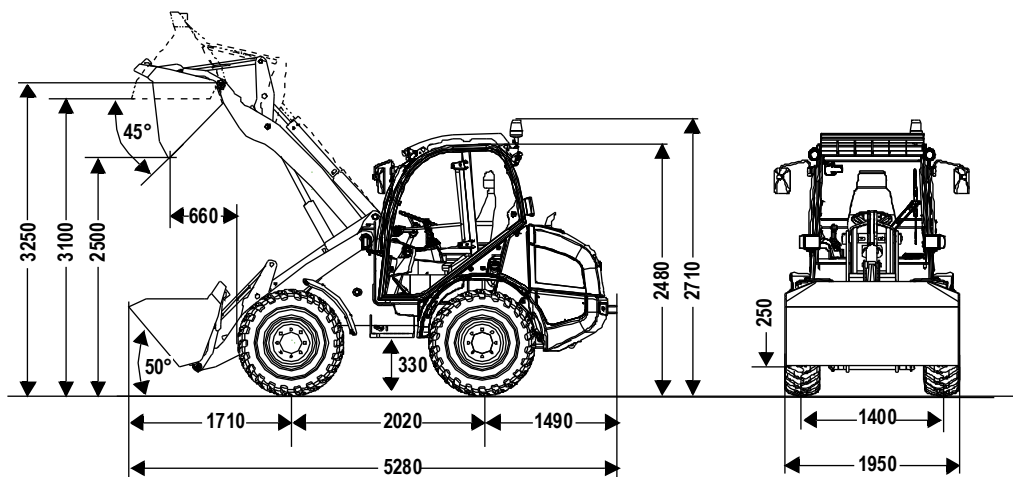


Fig. 200: Machine dimensions model 351-02

Dimensions	
Overall length ¹	5280 mm
Overall height ^{2, 3}	2480 mm
Overall height with rotating beacon ^{2, 4}	2710 mm
Overall width without bucket ^{2, 5}	1780 mm
Overall width with bucket ¹	1850 mm
Ground clearance in transport position of loader unit	250 mm
Ground clearance ² under gearbox	330 mm
Pin height	3250 mm
Load-over height	3100 mm
Dump height	2500 mm
Dump reach	660 mm
Dump-in angle	50°
Dump-out angle	45°
Front/rear track (distance over hubs)	1400 mm
Wheelbase (front/rear axles)	2020 mm
Turning radius ^{2, 6}	2900 mm

1. With standard bucket order no. 1000137538
2. With tyres 12.5-20
3. 2590 mm with protective FOPS screen (option)
4. 2830 mm with protective FOPS screen (option)
5. With outside mirrors folded in
6. Measured at outer edge of wheel



6.19 Wheel loader dimensions with bucket (model 351-03)

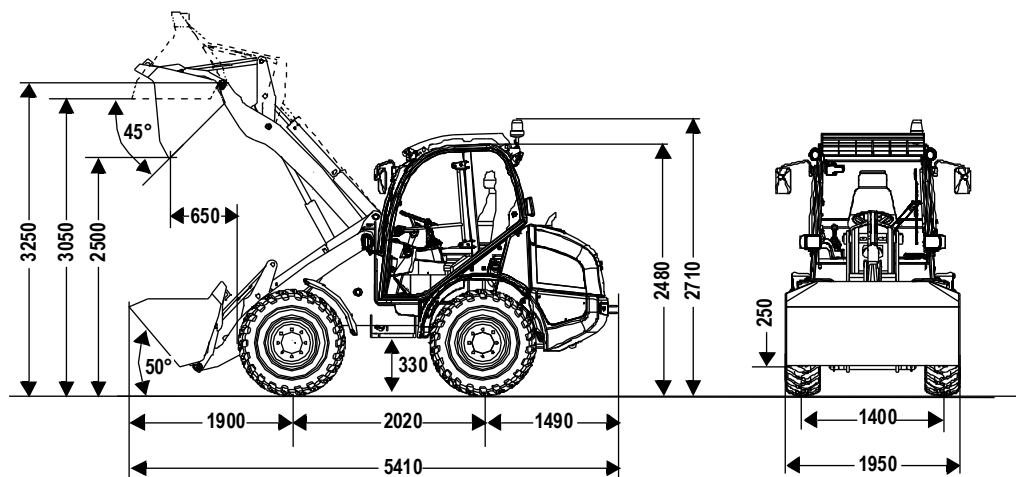


Fig. 201: Machine dimensions model 351-03

Dimensions	
Overall length ¹	5410 mm
Overall height ^{2, 3}	2480 mm
Overall height with rotating beacon ^{2, 4}	2710 mm
Overall width without bucket ^{2, 5}	1780 mm
Overall width with bucket ¹	1950 mm
Ground clearance in transport position of loader unit	250 mm
Ground clearance ² under gearbox	330 mm
Pin height	3250 mm
Load-over height	3050 mm
Dump height	2500 mm
Dump reach	650 mm
Dump-in angle	50°
Dump-out angle	45°
Front/rear track (distance over hubs)	1400 mm
Wheelbase (front/rear axles)	2020 mm
Turning radius ^{2, 6}	2900 mm

1. With standard bucket order no. 1000245973
2. With tyres 12.5-20
3. 2590 mm with protective FOPS screen (option)
4. 2830 mm with protective FOPS screen (option)
5. With outside mirrors folded in
6. Measured at outer edge of wheel



6.20 Wheel loader dimensions with pallet forks (models 351-01/351-02/351-03)

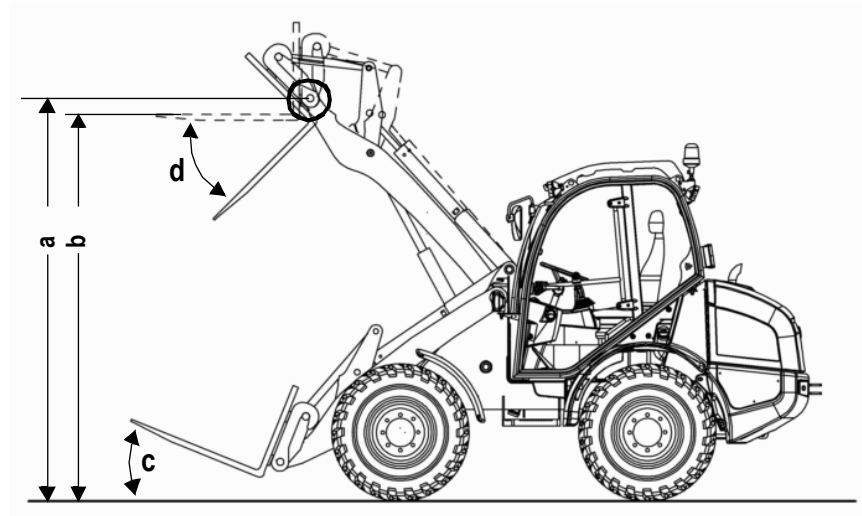


Fig. 202: Machine dimensions with pallet forks

Wheel loader model		351-01	351-02	351-03
a	Pin height	3065 ¹ mm	3250 ² mm	3250 ² mm
b	Pallet height	2800 ¹ mm	3000 ² mm	3000 ² mm
c	Dump-in angle in transport position	17°		
d	Dump-out angle	85°		

1. With tyres 12.5-18

2. With tyres 12.5-20

Other dimensions

➡ [see](#) Wheel loader dimensions with bucket (model 351-01) on page 6-17

➡ [see](#) Wheel loader dimensions with bucket (model 351-02) on page 6-18

➡ [see](#) Wheel loader dimensions with bucket (model 351-03) on page 6-19

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