1000184972 US	1.0
0908	

Wheel loaders

WL 180
WL 280

OPERATOR'S MANUAL

1 0 0 0 1 8 4 9 7 2

Documentation

Title	Order no.
Operator's Manual	1000184972 US

Legend

Edition	Issued
1.0	09/2008

The cover features the machine with possible optional equipment.

kramerALLRAD®

Kramer-Werke GmbH
Postfach 10 15 63
D-88 645 Überlingen
E-mail info@kramer.de
www.wackerneuson.com

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Table of contents

Index

1 Introduction

1.1 Important information on this Operator's Manual

This Operator's Manual 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 downtimes. 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 and the service booklet must always be kept at hand in the machine.**

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. The Operator's Manual will help to familiarize yourself more easily with the machine, thereby enabling you to use it more safely and efficiently.

Prior to the first drive, carefully read chapter **"Safety Instructions"** as well, in order to be prepared for possible dangerous situations, as it will be too late for it during operation.

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

Operational safety and readiness of the machine do not only depend on your skill, but also on maintenance and servicing of the machine. This is why regular maintenance and service work is absolutely necessary (see service booklet). Always have a technician with appropriate training or an authorized workshop perform the maintenance and repair work which are not included in this Operator's Manual. 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.

Store the Operator's Manual in the storage compartment behind the seat.

Abbreviations, marks, symbols

☞ *This symbol requires you to perform 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. Follow the steps in the recommended sequence

➥ Description of the effects or results of an activity

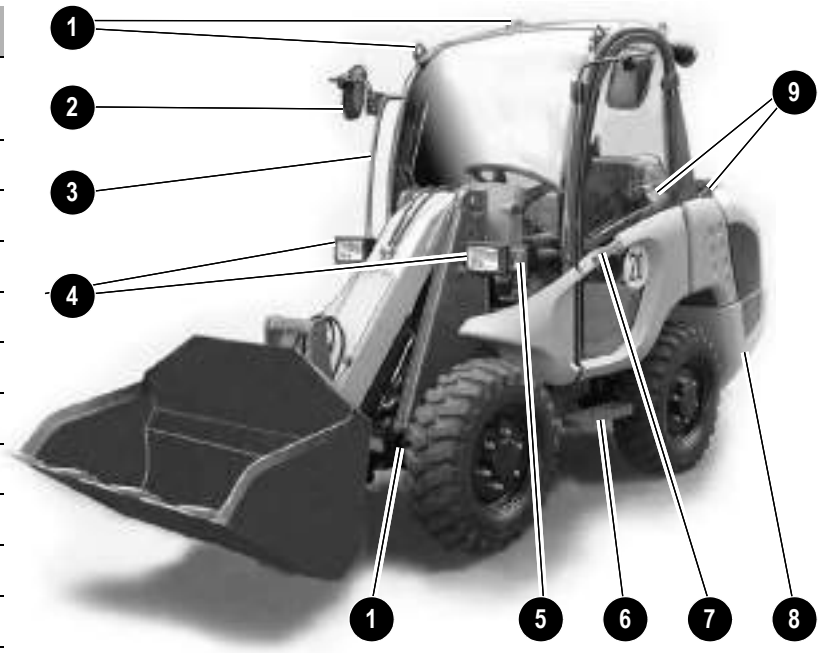
"Option" = optional equipment

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

 Driving direction in drawings or figures.

1.2 Overall view of WL180 machine

Pos.	Description
1	Eye hook for loading/strapping down the machine
2	Rearview mirror
3	Handle
4	Headlights
5	Turn indicator
6	Foothold
7	Door handle and lock
8	Speed label
9	Door holder
10	Reflectors
11	Turn indicator/brake/rear light



Pos.	Description
12	Socket for oil preheater (option)
13	Towing device/eye hook for loading/ strapping down the machine
14	Maintenance flap (model WL 180)
15	Hydraulic connections (option)
16	Engine cover lock
17	Working light
18	Rotating beacon (option)

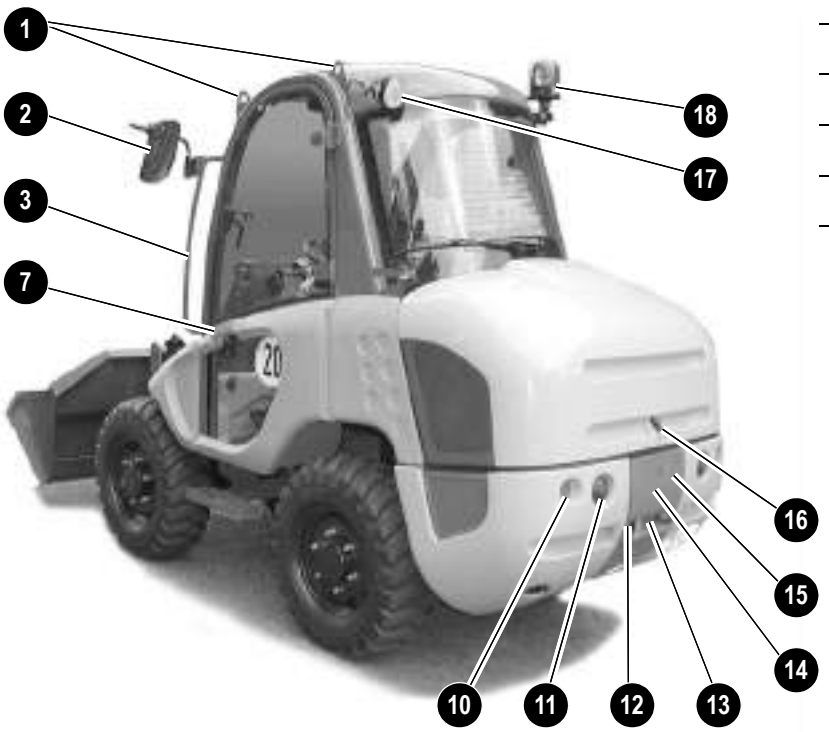
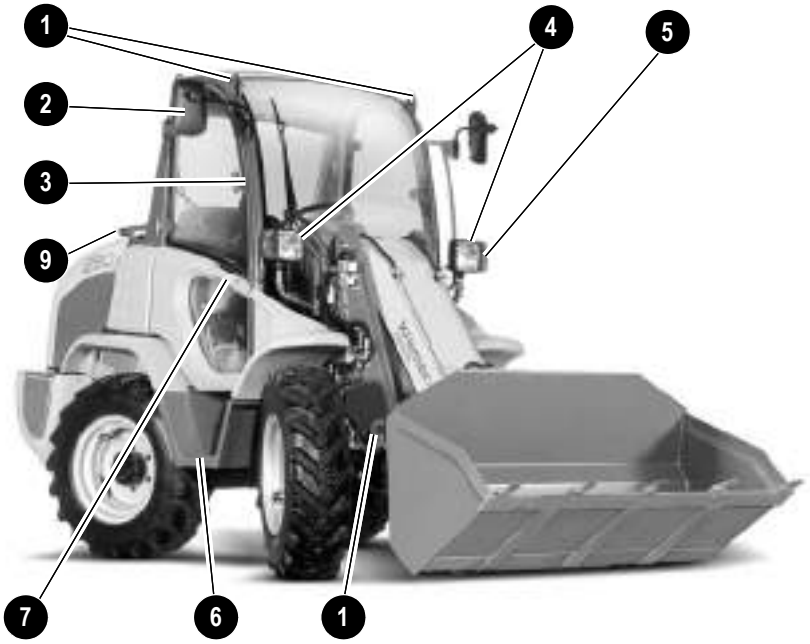
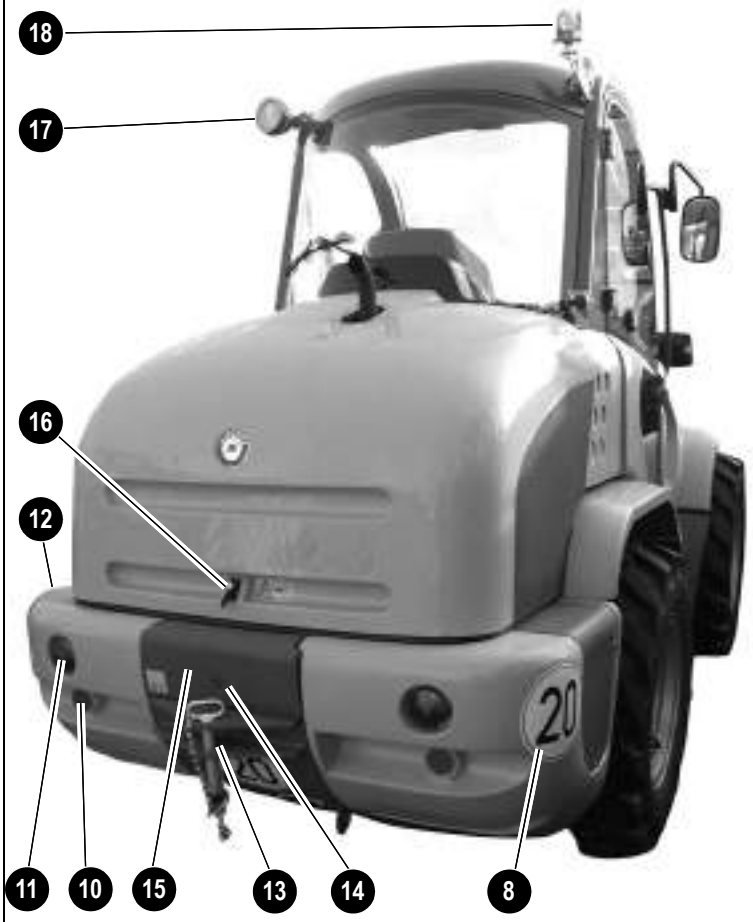


Fig. 1: Outside views of WL 180 machine

1.3 Overall view of WL 280 machine

Pos.	Description
1	Eye hook for removing the cab only (May not be used for crane-lifting the machine.)
2	Rearview mirror
3	Handle
4	Headlights
5	Turn indicator
6	Foothold
7	Door handle and lock
8	Speed label
9	Door holder
10	Reflectors





Pos.	Description
11	Turn indicator/brake/rear light
12	Socket for oil preheater (option)
13	Towing device/eye hook for loading/ strapping down the machine
14	Maintenance flap (model WL 280)
15	Hydraulic connections (option)
16	Engine cover lock
17	Working light
18	Rotating beacon (option)

Fig. 2: Outside views of WL 280 machine

1.4 Models and trade names: overview

Wheel loader model	Trade name
340-01	WL 180
341-02	WL 280

1.5 Brief description of the wheel loader

The wheel loader is a self-propelled work machine according to German traffic regulations. Get informed on and follow the legal regulations of your country.

This machine is a versatile and powerful helper for moving earth, gravel and debris on construction sites and elsewhere.

The wide range of attachments accounts for the numerous applications of the machine: as a fork lift, a snow plow, a spreader for grit, salt etc., a sweeper or a tree replanter.

See chapter *Fields of application, use of attachments on page 1-5* for further applications.
Retrofit the machine with appropriate safety features when using it in lifting gear operation (see section “Applications with lifting gear” in chapter Safety Instructions).

1.6 Main components of machine

- Roll Over Protection Structure (ROPS) tested closed cab (standard)
- ROPS tested open cab (option)
- ROPS bar
- Water-cooled three-cylinder Yanmar diesel engine, regulated to
  - ➥ Model WL 180: 23 kW (30.8hp.) at 2600 rpm
  - ➥ Model WL 280: 28 kW (37.5hp.) at 2400 rpm
  - ➥ Exhaust values according to EC standard 2004/26 EC (level III)
  - ➥ Rubber-mounted engine
- Sturdy steel sheet frame
- Hydrostatic drive with automatic drive control, inching valve
  - ➥ 20 kph (12.5mph) max. speed
- Hydraulic four-wheel power steering with emergency steering features
- Front and rear planetary axles, rear axle with oscillation
- Hydrostatic service brake (inching brake), mechanical disc-type parking brake

Hydrostatic drive

The diesel engine permanently drives a hydraulic pump, whose oil flow is sent to a hydraulic motor flanged on the rear axle. 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 hydrostatic 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 rpm 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 an 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 indicators on the instrument panel of the machine ensure constant monitoring of the engine and hydraulic oil temperature, as well as of the coolant temperature and level.

1.7 Fields of application, use of attachments

The attachments installed determine the intended use of this machine.

Note that not all attachments listed below comply with local traffic regulations. The attachments complying with local traffic regulations and the applicable provisions are listed in the **machine documentation**!

The authorities of your country may require specific permits, certifications, registrations etc. for the use of attachments not authorized or listed in the machine documentation!

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

Important

The attachments listed below are the only attachments approved for use with this wheel loader. To minimize the risk of equipment damage and unsafe operating characteristics:

- Do not use any unauthorized attachments.

Use: attachment

Possible equipment and authorized material densities.

Description of attachment	Wheel loader	Model	Use
Standard bucket - normal material	**WL 180**	1000101429 1000101430 1000181301 1000181302	Loosening, picking up, transporting and loading loose or solid material (material density ≤ p = 1.8 t/m³) (material density ≤ p = 112 lbs/ft³)
	WL 280	1000127391 1000127502 1000137539	
Standard bucket - lightweight material	**WL 180**	1000106695 1000114423	Picking up, transporting and loading very lightweight material (material density ≤ p= 1.3 t/m³) (material density ≤ p= 81 lbs/ft³)
	WL 280	1000126212 1000129385	
Standard bucket - superlightweight material[1]	**WL 280**	1000126213	Picking up, transporting and loading lightweight material (material density ≤ = 0.9 t/m³) (material density ≤ = 56 lbs/ft³)

Description of attachment	Wheel loader	Model	Use
Multipurpose bucket [2]	**WL 180**	1000146640 1000146682	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) (material density ≤ p = 112 lbs/ft³)
	WL 280	1000127844 1000127845	
Right-hand dump side swing bucket [2]	**WL 180**	1000111067	As standard bucket, with benefits for filling and backfilling material (material density ≤ p = 1.8 t/m³) (material density ≤ p = 112 lbs/ft³)
	WL 280	1000127503	
High-tilt bucket[1, 2]	**WL 280**	1000127504	As standard bucket, with a 80 - 100 cm higher dump height (material density ≤ p = 1.8 t/m³) (material density ≤ p = 112 lbs/ft³)
Pallet forks[1, 2, 3]	**WL 180**	1000101816 1000101787	Picking up and transporting pallets
	WL 280	1000101788 1000101817 1000173282 1000173456	
Salt sprayer[4, 5, 6]	**WL 180**	1000101226 1000116550	Winter service
	WL 280	1000116550	
Snow plow[5, 7]	**WL 180**	1000098736 1000142913	
	WL 280	1000142914	
Attachment adapter[1, 8]	**WL 280**	1000156685	Picking up attachments
Rotary broom[1, 8, 5]	**WL 180**	1000142911	Cleaning roads and facilities
	WL 280	1000142912	

1. Not authorized for use on public roads!
2. See the Operator's Manual of the attachment for taking the attachment into service and using it
3. Only in connection with load diagram for wheel loader WL 180 (order no. 0004354146), wheel loader WL 280 (order no. 1000125519)
4. Only in connection with 4th control circuit (order no. 0113600298) and electric connections for equipment according to German traffic regulations (order no. 0113300599)
5. Legal regulations of your country may require a separate certification
6. Bucket must contain a counterweight of 75 kg min. if machine is used without a snow plow
7. Only in connection with mounting kit (order no. 0114100299)
8. Attachments may be mounted only in connection with a conformity test

Get informed on the legal regulations of your country for further information on mounting attachments

1.8 EC declaration of conformity, model WL 180

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EC Declaration of Conformity

according to EC Directive 98/37/EC, 2000/14/EC

KRAMER-WERKE GmbH
Nussdorfer Str. 50
D-88662 Überlingen

declare, under their own responsibility, that the product

Name of product	KRAMER-Allrad Wheel Loader 180
Model	340
Version	340 01
Serial no.	340 01_ _ _ _
Machine output	23.5 kW (31.5 hp) at 2600 rpm

to which this declaration refers, corresponds to the pertinent fundamental requirements regarding safety and health of

EC Directive 98/37/EC,
EMC Directive 89/336/EC

and the requirements of further pertinent EC Directives and standards.

2000/14/EC appendix VIII	Sound power level	dBA
Fachausschuss Tiefbau Prüf- und Zertifizierungsstelle Landsberger Str. 309 D-80687 München	Measured	98.9
	Guaranteed	100

The following standards and/or technical specifications have been used for the proper application of the requirements regarding safety and health stated in the EC Directives:
EN 474-1, EN 474-3, ISO EN 12100-01 and 12100-2,
ISO 3471, EN 13510, EN ISO 3744, EN ISO 3746, ISO 3449

Überlingen, (date)

i. A.
Dipl.-Ing.
M. Mack
Head of Research & Development
KRAMER-WERKE GmbH

1.9 EC declaration of conformity, model WL 280

kramerALLRAD®

EC Declaration of Conformity

according to EC Directive 98/37/EC, 2000/14/EC

KRAMER-WERKE GmbH
Nussdorfer Str. 50
D-88662 Überlingen

declare, under their own responsibility, that the product

Name of product	KRAMER-Allrad Wheel Loader 280
Model	341
Version	341 02
Serial no.	341 02_ _ _ _
Machine output	28 kW (37.5 hp) at 2600 rpm

to which this declaration refers, corresponds to the pertinent fundamental requirements regarding safety and health of

EC Directive 98/37/EC,
EMC Directive 89/336/EC

and the requirements of further pertinent EC Directives and standards.

2000/14/EC appendix VIII	Sound power level	dBA
Fachausschuss Tiefbau Prüf- und Zertifizierungsstelle Landsberger Str. 309 D-80687 München	Measured	100.1
	Guaranteed	101

The following standards and/or technical specifications have been used for the proper application of the requirements regarding safety and health stated in the EC Directives:
EN 474-1, EN 474-3, ISO EN 12100-01 and 12100-2,
ISO 3471, EN 13510, EN ISO 3744, EN ISO 3746, ISO 3449

Überlingen, (date)

i. A.
Dipl.-Ing.
M. Mack
Head of Research & Development
KRAMER-WERKE GmbH

1.10 Type labels and component numbers

Serial number

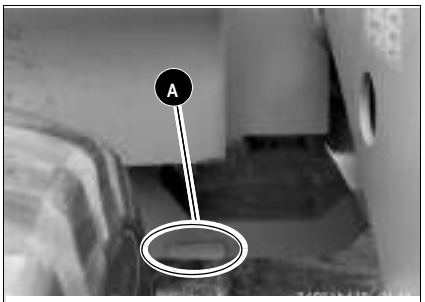


Fig. 3: Type label: location

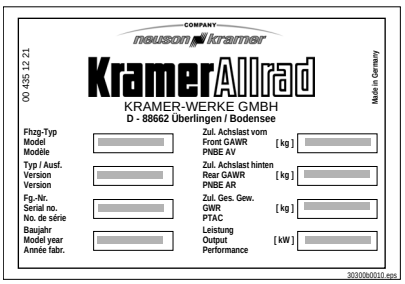


Fig. 4: Serial number

The serial number is stamped on the machine frame (fig. 3/**A**). It is also located on the type label (fig. 4).

The type label is located at the front right of the machine frame (on one side of the cab bulkhead).

Type label information

Example: model 340 01 (WL 180)

Machine model:	340
Version:	340 01
Serial no.:	340 01 0090
Model year:	2004
Front gross axle weight rating:	1600 kg (3527 lbs.)
Rear gross axle weight rating:	1600 kg (3527 lbs.)
Gross weight rating:	2300 kg (5071 lbs.)
Output:	23 kW (31.5 hp)

Other information - *see chapter 6 "Specifications"* on page 6-1

Cab certification number

Fig. 5: Cab type label

The cab certification number (arrow) is located in the cab, on the top right frame member.

Engine serial number

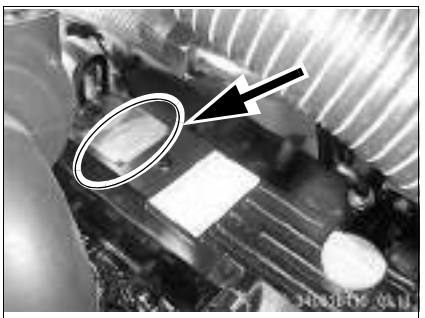


Fig. 6: Diesel engine number

The engine serial number (arrow) is located on the cylinder-head cover (engine).

Example: Yanmar 46557

Hydraulic pump serial number

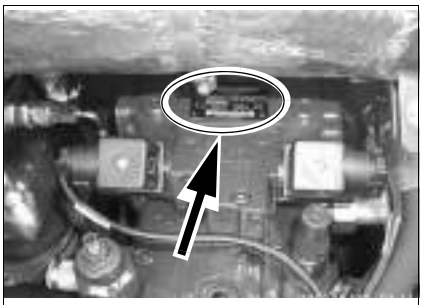


Fig. 7: Hydraulic pump type label

The serial number(arrow, Fig. 7) is located on the side of the hydraulic pump housing (next to where the pump is installed on the diesel engine, near the pump mounting flange of the engine.)

Example: 6204226

Hydraulic motor serial number

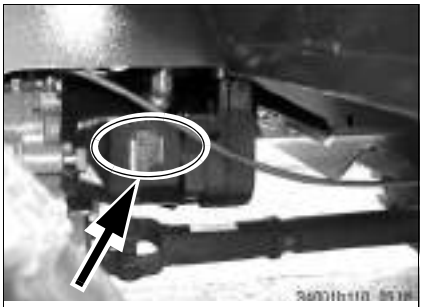


Fig. 8: Hydraulic motor type label

The serial number (arrow, Fig. 8) is located above the cardan shaft, on the right side of the hydraulic motor.

Example: 7657648

Rear axle serial number

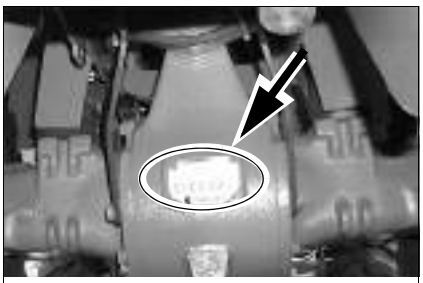


Fig. 9: Rear axle and gearbox type label

The serial number (arrow, Fig. 9) is located on the differential housing, at the rear.

Front axle serial number

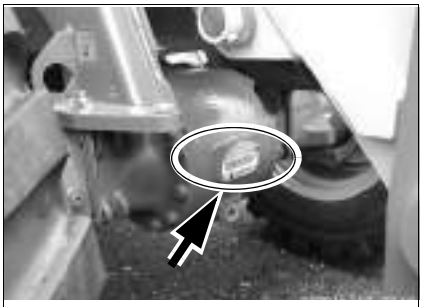
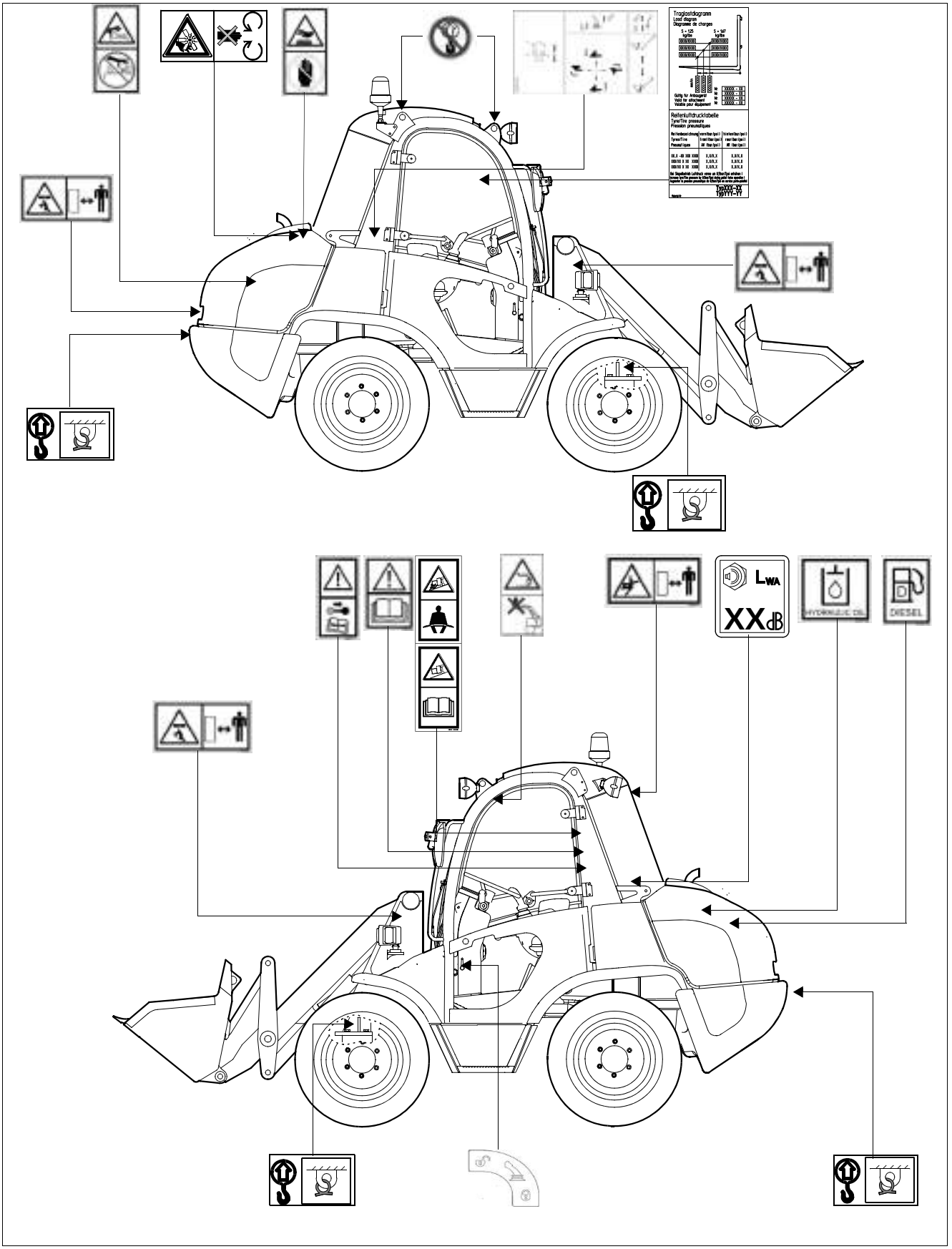


Fig. 10: Front axle type label

The serial number (arrow, Fig.10) is located on the differential housing, at the front.

1.11 Labels overview



1.12 Signs and symbols

Labels on the outside of the machine

Fig. 11: Lifting points

Label: cab eye hooks

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*" on page 3-46.

Location

Cab roof (4x)

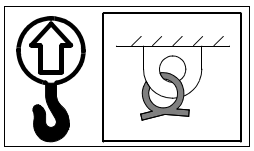


Fig. 12: Label for points used for strapping down the machine

Description

Tie-down points for strapping down the machine.

Tie-down points are for strapping down the machine during loading and transport - *see chapter 3 "Loading the machine*" on page 3-47 for further details.

Location

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

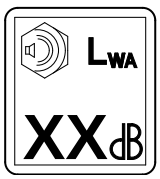


Fig. 13: Sound powerl label

Description

Sound power

➥ LWA = Noise levels produced by the machine, working with the engine at rated speed- *see chapter 6 "Noise levels*" on page 6-8 - *see chapter 6 "Noise levels*" on page 6-8

Location

On the rear window/on the control stand

Fig. 14: Safety alert symbol

Description

Safety alert symbol

This label alerts persons to possible safety hazards in the area where the symbol is located.

Location

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

Fig. 15: Keep distance

Description

Crushing hazard label. This label alerts persons standing or working near the machine of an existing safety hazard within the area around the machine. Keep clear of machine!

Location

On the loader unit on the left and right, and at the rear on the engine cover.

Fig. 16: CE mark

Description

The CE mark means that the machine meets the requirements of the Machine Directive and that the conformity procedure has been carried out. The machine meets all the health and safety requirements of the Machine Directive.

Location

On the rear window.

Labels inside the cab

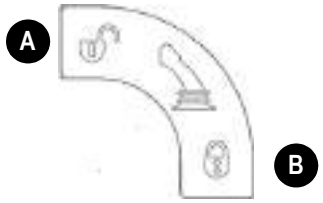


Fig. 17: Control lever lock label

Description

Locking the control lever (joystick) against unintentional operation

Label: locking the control lever (joystick) during road travel!

- **A** = lock open
- **B**= lock closed

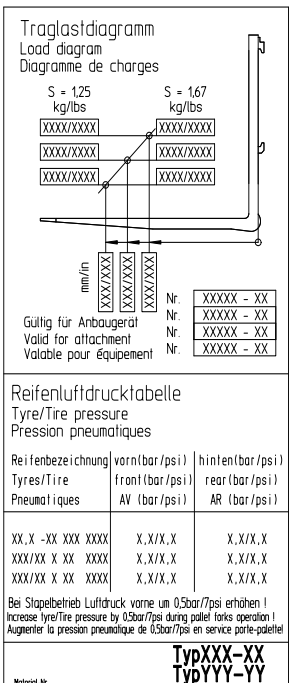


Fig. 18: Load diagram

Description (example)

...when using pallet forks with fork arms:
The framed numbers indicate the maximum authorized load on the fork arms for industrial and off-road applications respectively. The maximum load varies according to the distance from the load center.

Example:

- Off-road applications = safety factor S = 1.67
  ➥ Load distance to rear side of forks = 400 mm (15.7 in.)
- Industrial applications = safety factor S = 1.25
  ➥ Load distance to rear side of forks = 400 mm (15.7 in.)

Tire pressure table

...list of authorized tires with prescribed tire pressures

Location

On rear side of loader unit bulkhead

Important

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

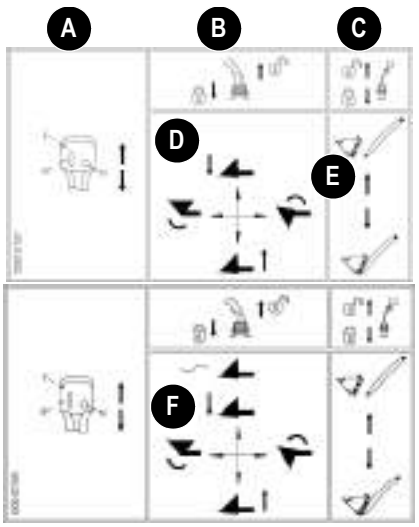


Fig. 19: Label: control lever operation (overview)

Description

Control lever elements (joystick)

- **A** = driving direction: (F) forwards/(R) reverse and (N) neutral position
- **B** = control lever (joystick) unlocked/locked for road travel
- **C** = control lever (3rd control circuit for attachments) unlocked/locked
- **D** = loader unit operation: raise, lower, dump in/out
- **E** = 3rd control circuit operation. Pick up/set down attachment
- **F** = loader unit operation: raise, lower with float position, dump in/out

Location

On rear side of loader unit bulkhead

Fig. 20: Label:Read Operator's Manual

Description

Attention!

Read and understand the Operator's Manual before starting, operating, adjusting, maintaining, or repairing the machine.

Location

Inside the cab on the right on the pillar

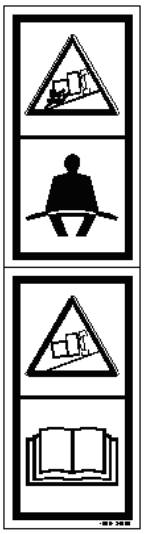


Fig. 21: Operator’s seat and fasten seat

Description

- Risk of being thrown from the machine. Operate the machine only from the operator's seat.
- Fasten seat belt when operating the machine.
- Operate within stability limits of machine to avoid tipping over.
- Read the Operator's Manual.- *see chapter 3 “Seat belt”* on page 3-41

Location

Inside the cab on the right on the pillar

Fig. 22: Read the Operator’s Manual

Description

Caution! Remove the starter key before working on the machine. Read the Service Manual.

Location

Inside the cab on the right-hand side pillar.

Fig. 23: Prohibiting sign: transport of persons

Description

Warning! No raising or transporting persons in the bucket or on the pallet forks.

Location:

In the cab over the front window.

.

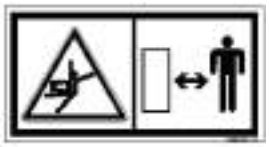


Fig. 24: Safety alert: safety distance to persons

Description

Collision hazard! Bystanders must stay clear of the machine when it is being operated.

Location:

In the cab at the rear above the rear window.

Engine compartment labels

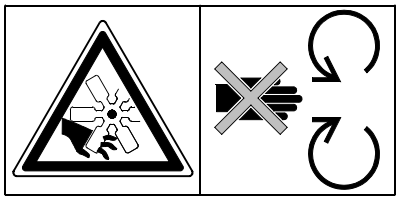


Fig. 25: Shearing hazard

Description

Shearing hazard! Do not touch any moving or turning parts!

Location

In the engine compartment between the cover hinges.

Fig. 26: Label: hot fluid (coolant))

Description

Burn hazard!

The tank is hot and under pressure.

Do not open the tank when it is hot.

Carefully and slowly open the cover only after the cooling fluid has cooled down, to allow the pressure to escape.

Location:

In the engine compartment on the right, on the cooler.

Fig. 27: Label: hot surface

Description

Burn hazard! Do not touch.

Location:

In the engine compartment compartment between the cover hinges, next to the muffler.

Fig. 28: Label: filler opening for hydraulic oil

Description

Filler opening for hydraulic oil.

Location:

In the engine compartment on the left next to the engine cover attachment

Fig. 29: Label: filler opening for fuel

Description

Filler opening for diesel fuel.

Location:

In the engine compartment on the left next to the engine cover attachment

Fig. 30: Label: biodegradable oil

Description

Biodegradable lubricants (biodegradable oil) are used on the machine

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

Location:

In the engine compartment on the left, on the filler inlet of the hydraulic oil tank.

2 Safety Information

2.1 Safety Symbols Found in this Manual

This is the safety alert symbol. It is used to alert you to potential personal hazards.

- Obey all safety messages that follow this symbol.

DANGER

indicates a hazardous situation which, if not avoided, will result in death or serious injury.

☞ *Obey all safety messages that follow this symbol to avoid injury or death.*

WARNING

indicates a hazardous situation which, if not avoided, could result in death or serious injury.

☞ *Obey all safety messages that follow this symbol to avoid possible injury or death.*

CAUTION

indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

☞ *Obey all safety messages that follow this symbol to avoid possible minor or moderate injury.*

NOTICE

Used without the safety alert symbol. NOTICE indicates a situation which, if not avoided, could result in property damage.

Note: *Contains additional information important to a procedure.*

Important

Identifies an instruction that, when followed, provides 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 endangered if environmentally hazardous material, such as waste oil, is not properly used or disposed of.

2.2 Designated Use

1 In accordance with its designated use, the machine may be used ONLY for moving earth, gravel, coarse gravel or ballast and rubble. It may also be used for working with the attachments approved in the - *see chapter 1 "Brief description of the wheel loader*" on page 1-4.

2 No other applications are designated for the use of the machine. Wacker Neuson will not be liable for damage resulting from use other than mentioned above. The user alone will bear the risk.

3 "Designated use" also includes observing the instructions set forth in this Operator's Manual and observing the maintenance schedule.

4 Machine safety 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 Wacker Neuson. Wacker Neuson will not be liable for damage resulting from unapproved parts or unauthorized modifications.

5 Wacker Neuson shall not be liable for personal injury and/or damage to property caused by failure to observe the safety instructions on labels and in this Operator's Manual, and by the negligence of the duty to exercise due care when:

- transporting the machine
- operating the machine
- servicing the machine and carrying out maintenance work
- repairing the machine

This is also applicable when special attention has not been drawn to the duty to exercise due care.

6 Read and understand this Operator's Manual before starting up, moving, operating, servicing, or repairing the machine. Observe all safety instructions.

7 The machine shall NOT be used for transport jobs on public roads!

2.3 General Conduct and Safety Instructions

Conditions for use

- The machine has been designed and built in accordance with state-of-the-art standards and recognized safety regulations. Nevertheless, its use can constitute a risk to the user or to third parties, or cause damage to the machine and to other property.
- Read and follow this Operator's Manual and other manuals that accompany the machine.
- The machine must only be used in accordance with its designated use and the instructions set forth in this Operator's Manual.
- The machine must only be used by qualified operators who are fully aware of the risks involved in operating the machine.
- Do not start, move, or operate a damaged or defective machine. Any mechanical dysfunctions, especially those affecting the safety of the machine, must be repaired immediately. Only qualified technicians shall determine how to move a damaged or defective machine to a safe place for diagnosis and repair.
- The user/owner commits himself to operate and keep the machine in serviceable condition and, if necessary or required by law, to require the operating or servicing persons to wear protective clothing and safety equipment.

User training and knowledge

- Always keep this Operator's Manual and other manuals that accompany the machine in their storage compartment provided in the operator station on the machine. Immediately replace an incomplete or illegible Operator's Manual.
- All persons working on or with the machine must read and understand the safety information in this Operator's Manual before beginning work. This applies especially to persons working only occasionally on the machine, such as performing set-up or maintenance tasks.
- Follow, and instruct the operator in, legal and other mandatory regulations relevant to accident prevention and environmental protection.These may include handling hazardous substances, issuing and/or wearing personal protective equipment, or obeying traffic regulations.
- The user/owner must regularly ensure that all persons entrusted with operation or maintenance of the machine are working in compliance with this Operator's Manual and are aware of the risks and safety factors of the machine.

Preparing for use

- Before starting up the machine, ALWAYS inspect the machine to make sure that it is ready for safe work and travel operation.
- Wear close-fitting work clothes that do not hinder movement. Tie back long hair and remove all jewelry (including rings).

Modifications and spare parts

- NEVER make any modifications, additions, or conversions to the machine and its superstructures (for example, cab), or the machine's attachments, without the approval of Wacker Neuson! Such modifications may affect safety and/or machine performance. This also applies to the installation and 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 Wacker Neuson. Contact your Wacker Neuson dealer for assistance.

2.4 Operator and Technician Qualifications and Basic Responsibilities

User/owner responsibility

- Only allow trained and experienced individuals to drive, maintain, or repair the machine. NEVER let unauthorized or underaged persons operate the machine.
- Clearly and unequivocally define the individual responsibilities of the operator and technician for operation, maintenance, and repair.
- Define the machine operator's responsibilities on the job site and for observing traffic rules. 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 by anyone other than an experienced person. Also, NEVER allow persons taking part in a general training course to work on or with the machine without being supervised by an experienced person.

Repair person qualifications

- Work on the electric system and equipment, on the chassis, and the steering and brake systems may be carried out only by skilled individuals who have been specially trained for such work.
- Work on the hydraulic system of the machine must be carried out only by a technician with special knowledge and experience in hydraulic equipment.

2.5 Safety Instructions Regarding Operation

Preparing for use

- Keep the machine clean. This reduces the risk of fire hazards (such as from combustible materials like rags), and reduces the risk of injury or operational accidents that can be caused by dirt build-up on the drive pedals or foot rests and steps.
- Observe all safety, warning, and informational signs and labels on the machine.
- Start and operate the machine from the seat only.
- The operator must sit in the seat, and fasten and adjust the seat belt before putting the machine into operation.
- Adjust the seat position before starting work so that you are able to press the brake pedal as far as it can go. Never change the seat position when driving or working!
- Make sure that all safety devices are properly installed and functional before starting work.
- Before putting the machine/attachment into operation (startup/moving), make sure that no one in the immediate vicinity will be at risk.

Startup and shutdown

- Perform startup and shutdown procedures according to this Operator's Manual.
- Observe all indicator lights.
- Do not use starting fluid (for example, ether) especially in those cases in which a heater plug (intake air pre-heating) is used at the same time.
- Make sure the brakes, steering, signaling, and light systems are functional before operating the machine, and also before restarting after an interruption of work.
- Before leaving the seat, always secure the machine against unintentional movement and unauthorized use.

Work area awareness

- Familiarize yourself with the surroundings and circumstances of the work site before beginning work. Be aware of:
  - obstacles in the working and traveling area
  - the soil weight-bearing capacity
  - any necessary barriers separating the work site from public roads
- Always keep at a safe distance from the edges of building pits and slopes.
- Look out for the following when working in buildings or in enclosed areas:
  - height of the ceiling/clearances
  - width of entrances
  - maximum load of ceilings and floors
  - sufficient room ventilation—danger of carbon monoxide poisoning!
- Observe the danger area. See “Danger area awareness”.
- Use the rearview mirror to stay aware of work area obstacles and personnel.
- Always switch on the work lights in conditions of poor visibility and after dark. However, make sure that users of public roads will not be temporarily blinded by the work lights.
- Provide additional lighting of the work area if the lights of the machine are not sufficient for carrying out work safely.

Danger area awareness

- The danger area is the area in which persons are in danger due to the movements of the machine, work equipment, additional equipment, or material.
- The danger area also includes the area affected by falling material, equipment, or construction debris. The danger area must be extended by 0.5 m (20 inches) in the immediate vicinity of buildings, scaffolds, or other elements of construction.
- Seal off the danger area if it is not possible to keep a safe distance. Stop work immediately if persons do not leave the danger area in spite of warnings!

Operating the machine

- Never operate the machine if you are standing on the ground.
- Operate the machine ONLY when you are seated and you have fastened your seat belt. Stop the engine before releasing the seat belt.
- During operation on slopes, drive or work uphill or downhill. If traveling 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 traveling downhill. When traveling or working across a slope, the load must be on the uphill side of the machine.
- On sloping terrain, adapt your travel speed to the prevailing ground conditions.
- Never get on or off a moving machine, and do not jump off the machine.
- Hydrostatic four wheel steering requires practice before a user becomes familiar with the control response. Therefore, adjust the travel speed to your abilities and the surroundings. Select and change the steering mode only when the machine is at a standstill.

Carrying passengers

- If a passenger accompanies the operator, he or she must sit on the designated passenger seat to the left of the operator's seat.
- Never install a man basket or a working platform to the machine.

Mechanical integrity

- Take the necessary precautions to make sure the machine is used only when in a safe and serviceable state.
- Operate the machine ONLY if all protective and safety-oriented devices (ROPS, removable safety devices, soundproofing elements, mufflers, etc.) are in place and fully functional.
- Check the machine before entering the cab for visible damage and defects. Report any changes, including changes in the machine's function and response, to your supervisor immediately!
- If the machine is functioning unpredictably, stop the machine immediately, lock it, and report the malfunction to a qualified technician or supervisor. Safety-relevant damage or malfunctions of the machine must be rectified immediately.

Traveling

- When traveling on or in public areas, observe all applicable regulations. Make sure beforehand that the machine is in compliance with these regulations.
- Installed work lights must NOT be used for travel.
- When crossing underpasses, gates, bridges and tunnels, or when passing under overhead lines, make sure the clearance height and width are sufficient to avoid contact.
- Empty the bucket before traveling on public roads.

2.6 Applications with Lifting Gear

General information

- Craning applications are procedures involving raising, transporting and lowering loads with the help of slings and load-securing devices (for example, ropes and chains). In doing so, the help of other persons is necessary to secure and detach the load. This applies, for example, to lifting 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.

Safety criteria

- When used for craning applications, the machine must meet the following criteria:
  - Proper equipment for slinging and securing the load
  - Proper lift capacity per tables in this Operator's Manual

Conditions for safe operation

- Secure the load to prevent it from falling or slipping. Install an OSHA-approved load hook after removing the bucket or other approved attachment to provide a secure attachment point for the lifting sling, chain, or cable.
- Have loads fastened, and crane operators instructed, by a qualified person competent in craning operation and standard hand signals. The person giving instructions to the operator must be within sight of the operator during load attachment and load disconnection.
- The load shall be kept as close to the surface as practical to accomplish the craning operation. The operator shall gently move the controls and machine to avoid swing or oscillating motion of the load. A tether line is recommended to dampen the tendency of the load to swing or oscillate during the craning operation.
- Machine travel with a raised load must be done very carefully on a level surface, moving very slowly to avoid sudden motion that can cause swinging or oscillating motion of the load.
- The person(s) attaching the load to the machine shall approach the boom only from the side, and only if the operator is in visual contact with them. No one shall approach the machine or attempt to attach the load until the machine has stopped and the operator has signaled for the attachment.

2.7 Trailers and Attachments

General information regarding attachments

- Prior to traveling remove all attachments which cannot be secured in compliance with the legal regulations of your locality.
- The machine operating characteristics including steering vary with different option attachments and counterweights. The operator shall be familiar with the variations and act accordingly.
- Use only approved attachments and connecting hardware.
- Attach and remove attachments carefully to avoid damage and potential injury.
- Confirm that the attachment has been properly and securely attached to the machine according to the instructions. Before using the attachment, the operator shall confirm that the attachment performs correctly in response to control actuation.
- Do not attach the attachment with the engine running and the machine moving.
- Trailer operation with the machine's towing device is not permitted!
- Before putting the machine/attachment into operation (startup/moving), make sure that no one in the immediate vicinity will be at risk.
- Before leaving the seat, always secure the machine against unintentional movement and unauthorized use. Lower the attachments to the ground.

Installation notes

- Couple and uncouple hydraulic hoses/lines (hydraulic quick couplers) only if the engine is stopped and the controls actuated to release the hydraulic pressure remaining in the circuit. Follow the operating instructions for releasing the pressure.
- Operate the machine only if all protective devices for the attachments have been installed and are functional, and if all brake, light, and hydraulic connections have been connected.
- If an optional attachment is installed, make sure that all lights and associated indicator lamps are installed and functional.
- The lock pin of the quick hitch attachment shall be visible at each end of the pin to confirm that the attachment is securely locked in place. The operator shall perform a check operation to confirm the latching integrity before operating at a production pace.
- Crushing and shearing hazard: Make sure that no one is between the attachment and the machine while coupling attachments to the loader unit. Secure the machine and attachments against unintentional movement.

2.8 Transport and Towing

Towing

The machine must be towed, loaded and transported according to the procedures described within this Operator's Manual. See section *3-45*.

Transporting

- The transporting vehicle must have sufficient load capacity and platform size to safely transport the machine. Refer to section 6 of this manual to determine the physical characteristics of the machine before loading and transporting.
- Use OSHA-approved straps, chains or cables to securely fasten the machine to the surface of the transport.
- Use the tie-down points provided on the load surface of the transport.
- Attach the tie-down devices to the machine at the designated tie-down points.
- Confirm that the machine tie-down procedures will prevent sideways, forward, rearward, and upward motion of the machine in the event the transport vehicle is involved in an incident or sudden avoidance maneuver.

2.9 Safety Guidelines for Maintenance

General maintenance notes

- Adhere to prescribed intervals or those specified in this Operator's Manual for routine checks/inspections and maintenance work.
- For inspection and maintenance work, ensure that all tools and workshop equipment are capable of performing the tasks prescribed. Do not use defective or broken tools. Use certified measuring devices that are routinely calibrated for accuracy (torque wrench, pressure gauge, ammeter, etc.).
- Replace hydraulic hoses within stipulated and appropriate intervals even if no safety-relevant defects have been detected.
- Make sure all consumables and replaced parts are disposed of safely and with minimum environmental impact.
- Always tighten any screws, electrical connections, or hose connections that may have become loose during maintenance.
- Upon completion of the maintenance and repair work, immediately refit and check any safety devices removed for set-up or maintenance purposes.

Personal safety measures

- Brief the technician and the operator before beginning maintenance or repair work. Appoint someone to supervise the activities.
- Always work in groups of two when diagnosing a machine problem requiring the engine to be running. Both persons must be trained on 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 maintenance section of this Operator's Manual.
- Always keep a safe distance from all rotating and moving parts, for example, fan blades, V-belt drives, PTO shaft drives, fans, etc.
- Before starting work on the machine, always ensure safe blocking/support.
- Apply special care when working on the fuel system due to the increased danger of fire.
- Engine and exhaust system become very hot during operation and require cool-down time after machine is shut off. Avoid contact with hot parts. Wait for the machine to cool before touching components.
- Retainer pins can fly out or splinter when struck with force. Avoid striking the pins during operation, repair, or maintenance.

Preparing for maintenance and repair work

- Prior to carrying out repair and maintenance work, always attach a warning label such as "Repair work—do not start machine!" to the control elements as a precautionary measure.
- Observe the startup and shutdown procedures set forth in this Operator's Manual. This applies to any work concerning the operation, conversion or adjustment of the machine and its safety-oriented devices, or any work related to inspection and maintenance.
- Prior to carrying out assembly work on the machine, stabilize the area under repair and use proper lifting and support devices to change parts weighing more than 9 kg (20 lbs.).
- Perform maintenance work ONLY if:
  - the machine is positioned on firm and level ground
  - the machine is secured against unintentional movement
  - all hydraulically movable attachments and working equipment have been lowered to the ground
  - the engine is stopped
  - the starting key has been removed
  - the pressure accumulator is discharged
- Perform maintenance work beneath a raised machine, attachments or additional equipment ONLY if a safe and secure support has been provided. The use of hydraulic rams or jacks as the sole method of support does NOT sufficiently secure raised machines or equipment/attachments!

Performing maintenance and repairs

- Observe the adjustment, maintenance and inspection activities and intervals set forth in this Operator's Manual, including information on the replacement of parts and subassemblies. These activities must be carried out only by qualified personnel.
- Disconnect the negative battery terminal when working on the electrical system.
- Do not allow the machine to be serviced, repaired, or test-driven by unauthorized personnel.
- Wear a safety harness when performing elevated maintenance work. Keep all handles, steps, handrails, platforms, landings, and ladders free from dirt, snow, and ice.
- Always use specially designed or otherwise safety-oriented ladders and working platforms to perform overhead assembly work. NEVER use machine parts or attachments/superstructures as a climbing aid!
- Do not use the work equipment as lifting platforms for persons.
- In accordance with this Operator's Manual and instructions for the respective assembly, release the pressure in all system sections and pressure lines (hydraulic system) before carrying out any maintenance work.
- Straightening and welding work on the ROPS is prohibited. ROPS components must be replaced with original Wacker Neuson parts.

2.10 Special Hazards

Battery

- In case of a frozen battery or of an insufficient electrolyte level, do not try starting the machine with battery jumper cables. The battery can burst or explode.
- Batteries contain caustic sulphuric acid. When handling the battery, observe the specific safety instructions and regulations relative to accident prevention.
- A volatile oxyhydrogen mixture forms in batteries during normal operation and especially when charging. Always wear gloves and eye protection when working with batteries.
- Starting the machine with a battery jumper cable can be dangerous if carried out improperly. Observe the safety instructions regarding the battery.

Tires

- Repair work on the tires must be carried out only by trained technical staff or by an authorized workshop.
- Damaged tires and incorrect tire pressure reduce the operational safety of the machine. Check the tires regularly for correct tire pressure and visible damage.
- Explosion hazard: Do not use flammable gases to inflate tires. Use only compressed air.
- Check the tightness of the wheel lug nuts regularly per the Maintenance Plan in this Operator's Manual.

Electric energy

- Use only original fuses with the specified current rating.
- In case of electrical system malfunctions, switch off the machine immediately, disconnect the battery (by using the battery master switch), and perform trouble-shooting procedures.
- 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 and attachments must be kept well away from them.
- If the machine comes into contact with a live wire:
  - Immediately drive the machine out of the danger area.
  - Warn others against approaching and touching the machine.
  - Do not leave the machine until the line that has been touched or damaged has been safely de-energized!
- Make sure that work on the electric system is carried out only by a technician with appropriate training, in accordance with applicable electrical engineering codes.
- Inspect and check the electrical equipment of the machine at regular intervals. Defects such as loose connections or scorched cables must be repaired immediately.
- Observe the operating voltage of the machine/attachments. The voltages must be compatible (12 volts) and confirm that an appropriate fuse or circuit breaker is incorporated in the system to prevent damage from malfunction or short circuit.
- Always remove the grounding strap from the battery when working on the electric system.

Hydraulics

- Check all lines, hoses, and threaded couplers and fittings regularly for leaks and obvious damage. Repair any damage and leaks immediately. Splashed oil can cause injury and fire!

Noise

- Close all doors and windows if practical.
- Wear ear protection. This is especially important when working in enclosed areas.

MSDS

- When handling oil, grease, and other chemical substances such as battery electrolyte or hydraulic fluid, observe the product-related safety regulations (Material Safety Data Sheet (MSDS)).

2.11 Safety Guidelines while using Internal Combustion Engines

WARNING

Internal combustion engines present special hazards during operation and fueling. Failure to follow the warnings and safety guidelines could result in severe injury or death.

☞ *Read and follow the warning instructions in the engine owner's manual and the safety guidelines below.*

Running the engine

When running the engine:

- Keep the area around exhaust pipe free of flammable materials.
- Check the fuel lines and the fuel tank for leaks and cracks before starting the engine. Do not run the machine if fuel leaks are present or the fuel lines are loose.

When running the engine:

- Engine exhaust CAN KILL YOU IN MINUTES. Engine exhaust contains carbon monoxide. This is a poison you cannot see or smell. Never run the machine indoors or in an enclosed area such as a deep trench unless adequate ventilation, through such items as exhaust fans or hoses, is provided.
- Do not smoke while operating the machine.
- Do not run the engine near open flames.
- Do not touch the engine or muffler while the engine is running or immediately after it has been turned off.
- Do not operate a machine when its fuel cap is loose or missing.
- Do not remove the radiator cap when the engine is running or hot. The radiator fluid is hot and under pressure, and may cause severe burns!

Fueling the engine

When fueling the engine:

- Clean up any spilled fuel immediately.
- Refill the fuel tank in a well-ventilated area.
- Replace the fuel tank cap after refueling.

When fueling the engine:

- Do not smoke.
- Do not refuel a hot or running engine.
- Do not refuel the engine near an open flame.

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 indicators 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.

Cab overview: see overleaf

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 perform 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.

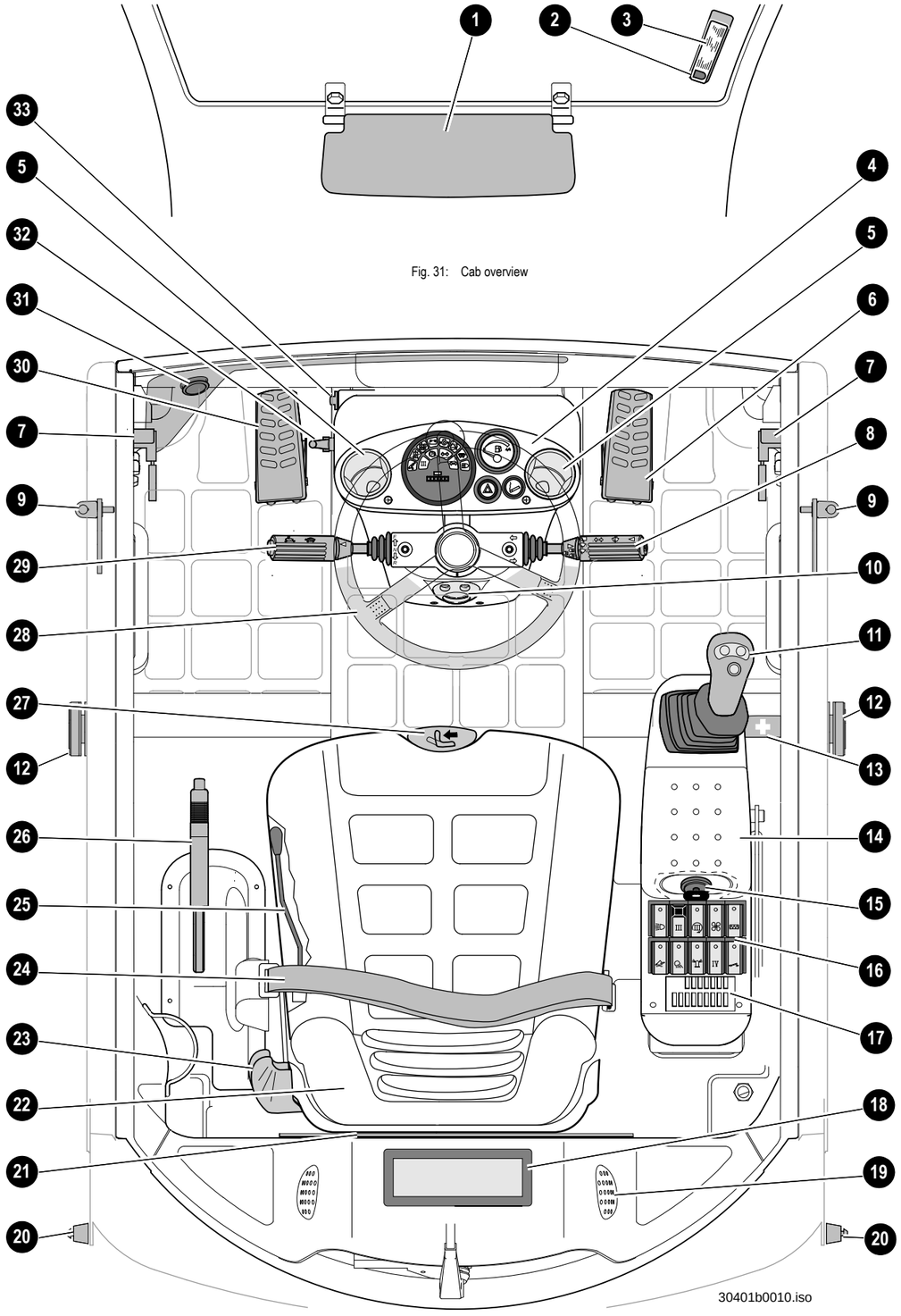


Fig. 31: Cab overview

3.2 Cab overview

Pos.	Description	For more information see page
	Roof console	
1	Sun visor	
2	Switch - interior lighting	*3-36*
3	Interior light	*3-36*
	Cab	
4	Instrument panel	*3-4*
5	Air vent - front window	*3-37*
6	Accelerator pedal	*3-25*
7	Door locks	*3-42*
8	Multifunctional lever	*3-34*, *3-36*, *3-38*
9	Opener - side windows	*3-42*
10	Leg room air vent	*3-37*
11	Control lever - loader unit	*3-49*
12	Holder - side windows	*3-13*
13	Fixture - first-aid kit	
14	Control lever base	*3-4*, *3-15*
15	Preheating start switch	*3-17*
16	Switch panel	*3-34*
17	Fuse box	*6-5*
18	Storage compartment/prepared radio installation (option)	
19	Prepared installation for loudspeakers (option)	
20	Bracket - side window holder	*3-42*
21	Storage net for Operator's Manual	
22	Seat	*3-39*
23	Weight adjustment lever	*3-39*
24	Seat belt	*3-41*
25	Lever - horizontal seat adjustment	*3-40*
26	Parking brake lever	*3-27*
27	Backrest adjustment lever	*3-40*
28	Hydrostatic steering	*3-24*
29	Drive lever	*3-28*, *3-29*
30	(Hydrostatic) service brake/inching pedal	*3-26*
31	Tank - washer system	*3-38*
32	Control lever lock **11** for road travel	*3-23*
33	Rotary switch - heating	*3-37*

Instrument panel overview: see overleaf

Instrument panel overview: see overleaf

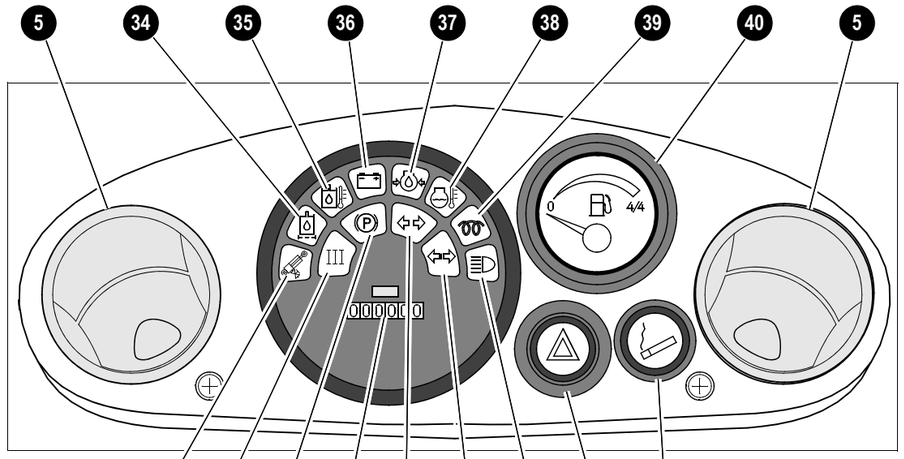


Fig. 32: Instrument panel (model WL 180): overview

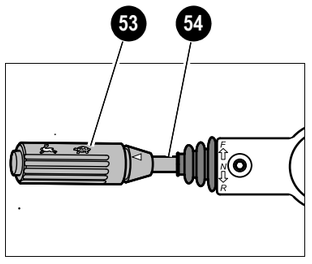


Fig. 33: Drive lever (model WL 180)

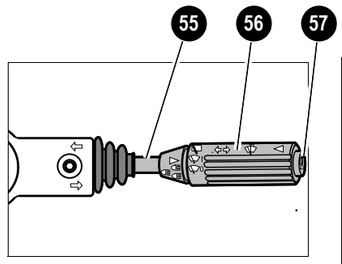


Fig. 34: Multifunctional lever

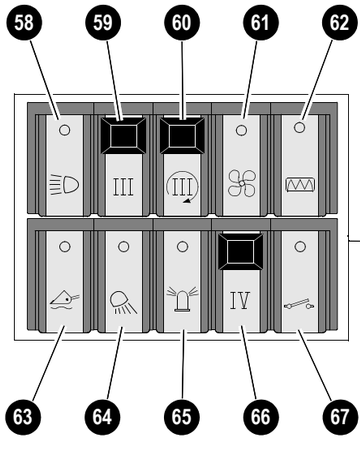


Fig. 35: Switch panel

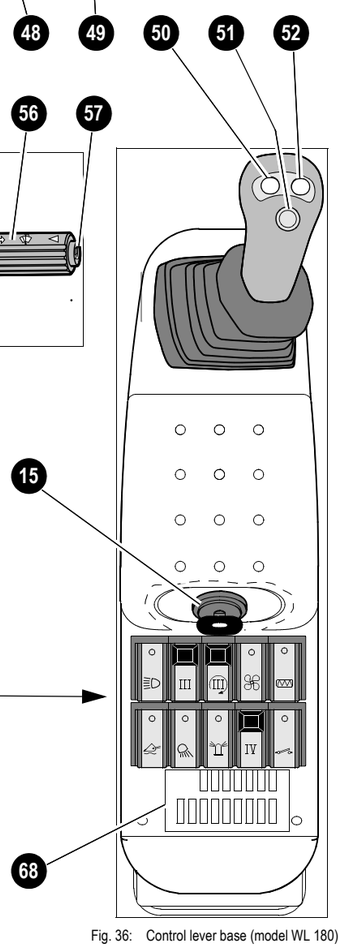


Fig. 36: Control lever base (model WL 180)

3.3 Instrument panel, multifunctional lever and drive lever: overview

Pos.	Description	For more information see page
	Instrument panel	
34	Indicator (red) - hydraulic oil filter	*5-15, 3-8*
35	Indicator (red) - hydraulic oil temperature	*5-15, 3-8*
36	Indicator (red) - alternator charge function	*3-7*
37	Indicator (red) - engine oil pressure	*3-7*
38	Indicator (red) - coolant temperature	*3-7*
39	Indicator (yellow) - cold starter	*3-7*
40	Fuel level indicator	
41	Indicator (yellow) - hose burst valve (option) not assigned for model WL 180	
42	Indicator (red) - 3rd control circuit	*3-50*
43	Parking brake indicator (red)	*3-8*
44	Hour meter	
45	Indicator (green) - right/left turn indicators	*3-7*
46	Indicator (green) - right/left turn indicator on rear attachment	*3-7*
47	Indicator (blue) - high beam	*3-7*
48	Hazard warning switch	*3-36*
49	Socket/cigarette lighter	
50	Tip switch - **unlock** 3rd control circuit (electric operation)	*3-50*
51	Not assigned	
52	Tip switch - **lock** 3rd control circuit (electric operation)	*3-50*
	Drive lever	
53	Rotary switch - speed range selection	*3-28*
54	Lever - selection of driving direction	*3-28*
	Multifunctional lever	
55	Lever - turn indicator, high beam, headlight flasher	*3-34, 3-36*
56	Rotary switch and tip switch - front/rear wiper, washer pump	*3-38*
57	Horn tip switch	
	Switch panel	
58	Lights switch	*3-34*
59	Switch with lock - 3rd control circuit	*3-50*
60	Switch with lock - 3rd control circuit (continuous operation)	*3-50*
61	Heater fan switch	*3-37*
62	Tip switch - rear window heating	*3-37*
63	Switch - load stabilizer (option) not assigned for model WL 180	
64	Switch - working light (option)	*3-35*
65	Switch - rotating beacon (option)	*3-35*
66	Switch with lock - additional control circuit (option)	*3-55*
67	Switch - front socket for electric attachments (option)	*3-53*
68	Label - fuse box assignment	*6-5*

Instrument panel overview: see overleaf (depending on serial number)

Instrument panel overview: see overleaf (depending on serial number)

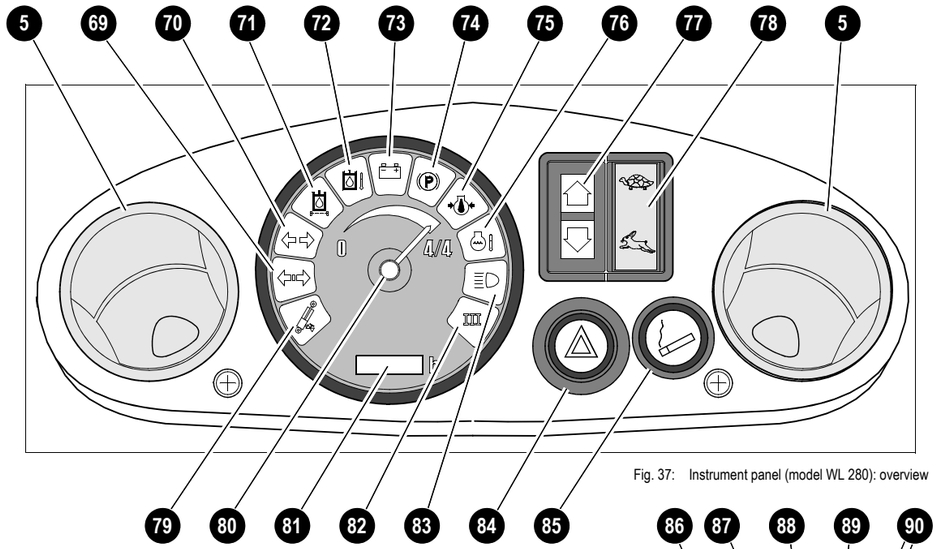


Fig. 37: Instrument panel (model WL 280): overview

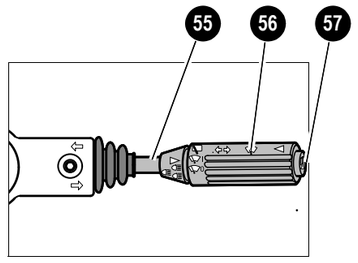


Fig. 38: Multifunctional lever

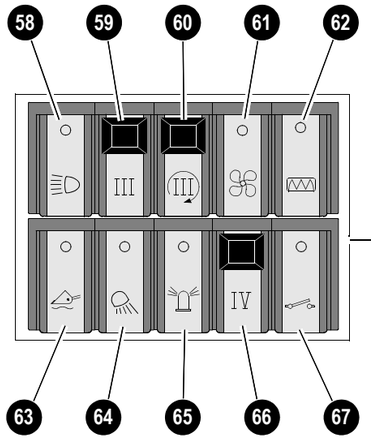


Fig. 39: Switch panel

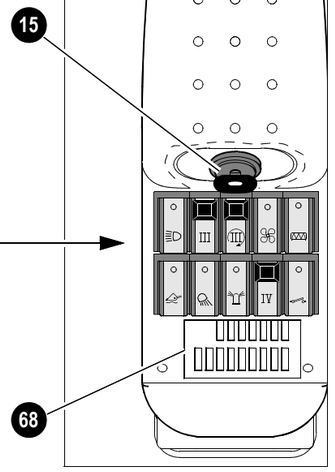


Fig. 40: Control lever base (model WL 280)

3.4 Instrument panel, multifunctional lever, drive lever: overview

Pos.	Description	For more information see page
	Instrument panel (model WL 280)	
69	Indicator (green) - right/left turn indicator on rear attachment	*3-7, 3-36*
70	Indicator (green) - right/left turn indicator	*3-7, 3-36*
71	Indicator (red) - hydraulic oil filter	*5-15, 3-8*
72	Indicator (red) - hydraulic oil temperature	*5-15, 3-8*
73	Indicator (red) - alternator charge function	*3-7, 3-17*
74	Indicator (red) - parking brake	*3-27*
75	Indicator (red) - engine oil pressure	*3-7*
76	Indicator (red) - coolant temperature	*3-7*
77	Indicator (green) - driving direction (forwards/reverse)	*3-29*
78	Switch - speed range selection (high/low)	*3-28*
79	Indicator (yellow) - hose burst valve (option)	*3-57*
80	Fuel level indicator	
81	Hour meter	
82	Indicator (yellow) - 3rd control circuit, continuous operation	*3-55*
83	Indicator (blue) - high beam	*3-7, 3-34*
84	Hazard warning switch	*3-36*
85	Socket/cigarette lighter	
	Control lever (model WL 280)	
86	Tip switch - neutral speed range	*3-29*
87	Switch - drive direction selection (forwards/reverse)	*3-29*
88	Momentary Contact Switch—activates left control auxiliary solenoid	*3-50*
89	Momentary Contact Switch—activates right control auxiliary solenoid	*3-50*
90	Not assigned	

3.5 Indicators and warning lights: description

Unfold pages *3-4* and *3-6* for a better overview!

Indicator (red) - engine oil pressure

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

☞ *Stop the machine*

☞ *Switch off the engine immediately and check the oil level*

➥ The indicator comes on when the starter switch is turned on and goes out as soon as the engine runs

Indicator (yellow) - preheating

Comes on when the key in starter switch is in position **2**.

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

Indicator (red) - coolant temperature

NOTICE

Overheated coolant will damage the machine. If the coolant temperature indicator comes on while the engine is running:

☞ *Stop engine immediately.*

☞ *Check and correct the coolant level.*

WARNING

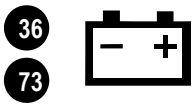
Burn hazard. The coolant in the system is hot under normal operating conditions and under about 1 bar (15 psi) pressure.

☞ *Never open the coolant tank or drain coolant if the engine is hot.*

☞ *Wait at least 15 minutes after stopping the engine.*

☞ *Wear protective glasses, gloves and clothing.*

☞ *Open the cap to the first notch and release the pressure.*



Indicator (red) - alternator charge function

The indicator comes on when the starter switch 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 indicator comes on with the engine running. The battery is no longer charged.

Indicator (green) - right/left turn indicators

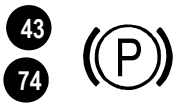
Flashes intermittently when the turn indicators are used

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

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

Indicator (blue) - high beam

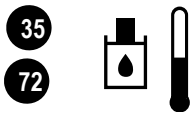
Comes on if high beam is switched on, or during headlight flashing.



Indicator (red) - parking brake

Comes on when the parking brake lever is applied.

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



Indicator (red) - hydraulic oil temperature

Comes on if hydraulic oil temperature exceeds 95 °C (203 °F).

NOTICE

Overheated hydraulic oil will damage the machine. If the hydraulic oil temperature indicator comes on while the engine is running:

☞ *Release the pressure on the work and drive hydraulics. To do this:*

☞ *Stop the machine and lower the loader attachment to the ground or a stable surface.*

☞ *Move the control lever of the loader unit to neutral.*

☞ *Move the drive lever to neutral.*

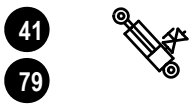
☞ *Run the engine at increased rpm until indicator* **34/71** *goes out.*

Indicator (red) - hydraulic oil filter

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

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

☞ *- see Monitoring the hydraulic oil return filter on page 5-15*



Indicator (yellow) - hose burst valve (option)

☞ *Indicates that the hose burst valve is switched on. This avoids lowering or dumping out the loader unit without any resistance.*

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

☞ *- see Load stabilizer for model WL 280 (option) on page 3-31*

☞ *- see "Hose burst valve" safety feature (option) on page 3-57*

3.6 Putting the machine into service for the first time

Safety instructions

- 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.

Important information

- Refer to the load diagrams for the pallet forks on the loader unit
- The machine may be put into service by authorized staff only – see *Operator and Technician Qualifications and Basic Responsibilities* on page 2-4 of this Operator's Manual.
- The operating staff must have read and understood this Operator's Manual before taking the machine into service.
- The machine may only be used in serviceable condition in accordance with its designated use and the instructions set forth in the Operator's Manual, and only by persons who are fully aware of the risks involved in operating the machine.
- Go through the “Start-up” checklist in the following chapter.

Running-in period

Handle the machine carefully during its first **100 hours of operation**.

The future performance and service life of the machine are heavily dependent on the observance of 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 rpm for extended periods.
- Increase the load gradually while varying the engine rpm.
- Strictly observe the maintenance plans in the maintenance section.

Check lists

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

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

The checking and monitoring jobs listed below are described in greater detail in subsequent chapters.

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

Start-up checklist

Check the following points before taking the machine into service or starting the engine:

No.	Question	✔
1	Enough fuel in the tank? (➠ *5-2*)	
2	Coolant level OK? (➠ *5-7*)	
3	Engine oil level OK? (➠ *5-5*)	
4	Oil level in hydraulic tank OK? (➠ *5-14*)	
5	Water level in washer tank OK? (➠ *3-38*)	
6	V-belt condition and tension checked? (➠ *5-12*)	
7	Loader unit lubricated? (➠ *5-18*)	
8	Brake system (including parking brake) OK? (➠ *3-24*)	
9	Tire condition and inflation pressure OK? (➠ *5-20*, *6-7*)	
10	Wheel nuts safely tightened (especially after a wheel change)? (➠ *5-20*, *6-9*)	
11	Lights, signals, indicators, warning lights and indicators OK? (➠ *3-34*, *3-36*, *3-7*)	
12	Windows, mirrors, lights and steps clean?	
13	Control lever base folded down? (➠ *3-15*)	
14	Attachment on the loader unit safely locked? (➠ *3-51*)	
15	Engine cover safely locked? (➠ *3-42*)	
16	Especially after cleaning, maintenance or repair work: Rags, tools and other loose objects removed?	
17	Approved warning triangle, hazard warning light and first aid kit in the machine?	
18	Seat position and rearview mirror correctly adjusted? (➠ *3-16*)	
19	Seat belt fastened? (➠ *3-41*)	

Operation checklist

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

No.	Question	✔
1	Indicators for engine oil pressure, coolant level and alternator gone out? (➠ *3-7*)	
2	Braking effect sufficient? (➠ *3-24*)	
3	Temperature indicator for engine coolant in normal range? (➠ *3-7*)	
4	Steering system working properly? (➠ *3-24*)	
5	Anyone dangerously close to the machine? (➠ *2-4*, *3-28*)	
When driving on public roads, particular attention should be paid to the following points:		
6	Bucket and attachments in transport position? (➠ *3-23*)	
7	Transport locks installed? (➠ *3-23*)	
8	Control lever for lift and tilt hydraulics of the loader unit locked with the lock? (➠ *3-23*)	
9	Tooth guard fitted to bucket? (➠ *3-23*)	

Parking checklist

Check and observe the following points when parking the machine:

No.	Question	✔
1	Attachments on the loader unit lowered to the ground? (➠ *3-30*, *3-49*)	
2	Parking brake applied? (➠ *3-27*)	
3	Cab locked, especially if the machine cannot be supervised? (➠ *3-42*)	
When parking on public roads:		
4	Machine adequately secured? (➠ *3-30*)	
When parking on slopes:		
5	Machine additionally secured with chocks under the wheels to prevent it from rolling away? (➠ *3-30*)	

3.7 Cab

Locking/unlocking the doors

Important

An unlatched door or window can swing free and crush or strike nearby objects or people.

- Close the doors before moving the machine.
- Lock the side window
  - see Locking / unlocking the windows on page 3-13

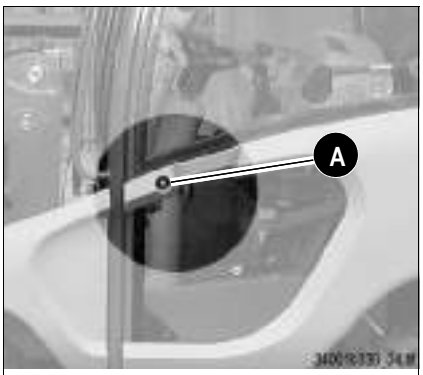


Fig. 41: Outside door opener and lock

Opening the door from the outside:

☞ *Press door lock* **A.**

Locking the door:

☞ *Turn the key in door lock* **A** *to the right.*

Unlocking the door:

- Turn the key in door lock **A** to the left.

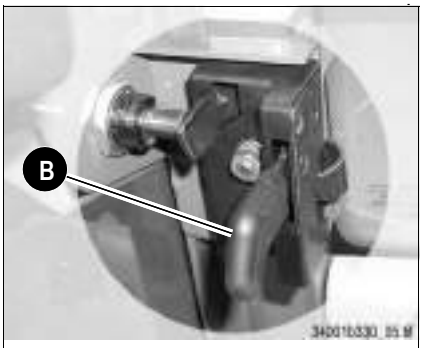


Fig. 42: Inside door opener left/right

Opening the door from the inside:

☞ *Pull lever* **B** *upwards on the inside door lock.*

Important

Enter and leave the cab only by the left door as rule.
- see Folding back the control lever base on page 3-15

Locking / unlocking the windows

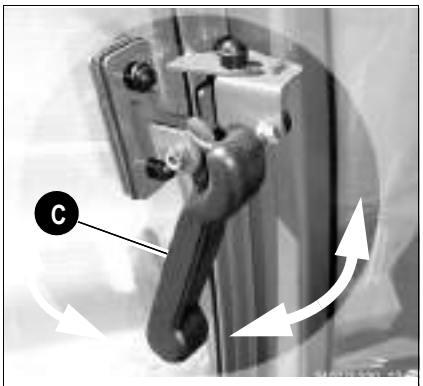


Fig. 43: Locking/unlocking the side windows

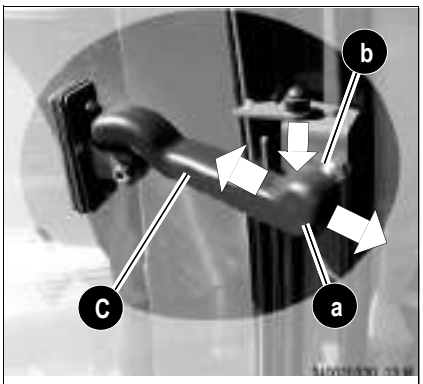


Fig. 44: Opening the side window

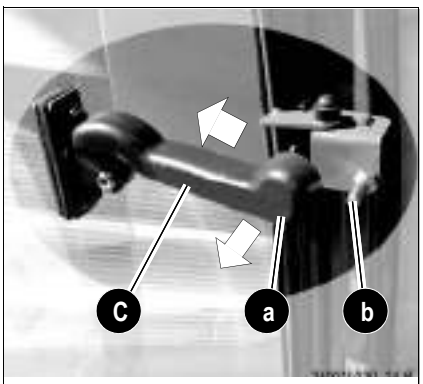


Fig. 45: Opening the side window

CAUTION

Personal injury hazard. An unlocked side window can swing free and strike nearby objects or people.

☞ *Make sure the side window is locked in the handle of the window opener.*

☞ *Make sure the open side window is engaged in the holder.*

☞ *Turn lever* **C** *down.*

➥ Window is locked.

☞ *Turn lever* **C** *up.*

➥ Window unlocked.

Opening the side window.

☞ *Turn lever* **C** *up.*

☞ *Slide lever* **C** *outwards horizontally.*

☞ *To fasten the window in its final position:*
Press the end of lever **a** *downwards in guide* **b**

Fully opening the side window.

☞ *Turn lever* **C** *up.*

☞ *Slide lever* **C** *outwards horizontallly.*

☞ *In order to fully open the window:*
pull the end of lever **a** *inside (to the driver) out of guide* **b.**

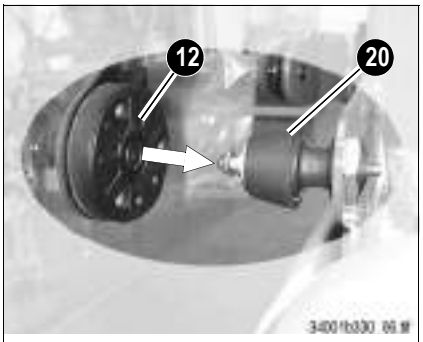


Fig. 46: Securing an open door

Securing open side windows:

☞ *Press the side window against bracket* **20** *of holder* **12** *until it engages with an audible click.*

Important

Lubricate holder **20** at regular intervals, at least every 500 service hours.

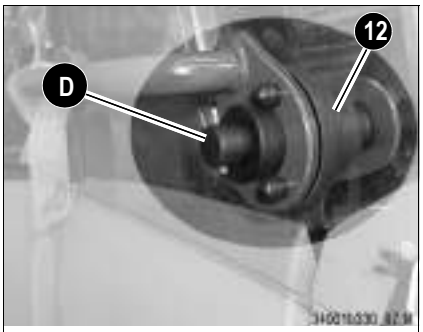


Fig. 47: Unlocking the door holder

Unlocking the side window:

☞ *Press button* **D** *of holder* **12** *and slightly pull the side window in doing so.*

3.8 Engine cover

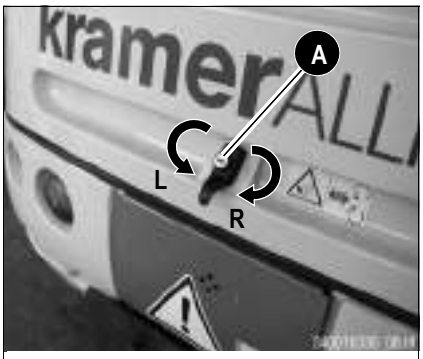


Fig. 48: Engine cover lock

Opening:

☞ *Press lock* **A.**

☞ *Pull the engine cover upwards.*

Closing:

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

Locking and unlocking:

Close the engine cover with the starter key of the preheating start switch.

☞ *Turn the starter key in lock* **A** *to the* **left** *(***L***).*

➥ Engine cover locked.

☞ *Turn the starter key in lock* **A** to the **right** *(***R***).*

➥ Engine cover unlocked.

3.9 Fire extinguisher (option)

Fig. 49: Fire extinguisher (option)

The fire extinguisher is not included in the machine's standard equipment.

☞ *IInstall a fire extinguisher rated by the appropriate regulatory agency in your locality. The extinguisher must be rated to suppress electrical and petroleum fed fires.*

☞ *Location:*

➥ Inside the cab, at the rear left (see figure).

3.10 Folding back the control lever base

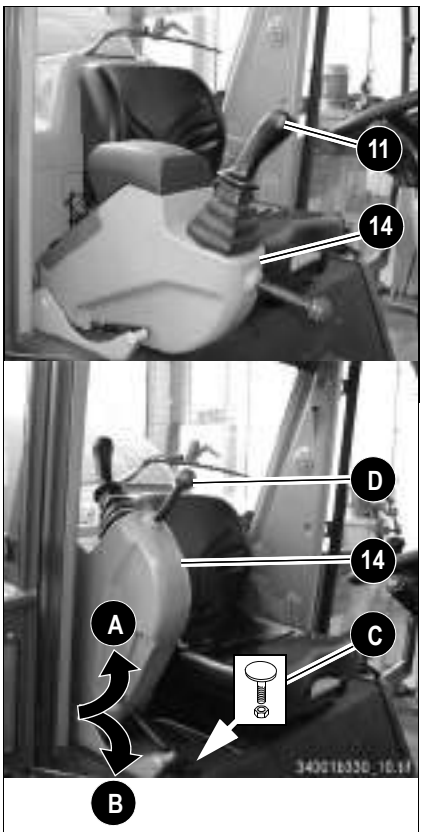


Fig. 50: Control lever base

CAUTION

Personal injury hazard. The cab door on the right can be used as entry and exit. However, you must first secure the machine against unintentional movement before entering or leaving the cab.

☞ *Follow the procedure below before entering or leaving the cab:*

- *Stop and secure the machine*
  - see Stopping and parking the machine on page 3-30
- *Lower the loader unit*
- *Apply the parking brake*
- *Switch off the engine*
- *Remove the starter key*
- *Move control lever* **11** *(joystick) back and forth several times*
  - see Lowering the loader unit with the engine switched off on page 3-51

☞ *Raise control lever base* **14** *with handle* **D** *to position* **A**

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

Important

Do not use handle D on the control lever base as a support to ease your entrance to the cab.

- Use the entrance handles in the cab.

☞ *Fold control lever base* **14** *down to position* **B** *once you are in the cab.*

➥ The gas strut keeps the control lever base in the lower position.

Important

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

3.11 Before starting the engine

General instructions on starting the engine

☞ *Run through the Check lists on page 3-10*

☞ *Adjust seat position and rearview mirror*

Important

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.*

☞ *Make sure that:*
- *Drive lever 31/***29** *(tip switch 40/***86***) is in neutral*
- *Parking brake 31/***26** *is applied*
- *The control lever base is folded down and*
- *Control lever 31/***11** *for operating the loader unit is in neutral.*

Important

Bear in mind the following:

- The engine will not start unless drive lever *31/***29** *(tip switch 40/***86***)* is in neutral and parking brake *31/***26** is applied.
- 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 gearbox when the engine is switched off.

NOTICE

The engine cannot be started by tow starting the machine. There is no traveling connection between the engine and the gearbox (e.g. cardan shaft) when the engine is switched off.

Important

When the machine is used for extended periods at outside temperatures of less than -10 °C (14 °F), we recommend retrofitting the machine with an engine oil
preheater (option) - *see Oil and fuel preheater (option)* on page 3-21.

Starting / turning off the engine

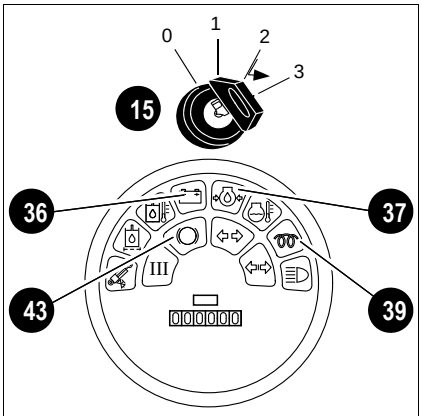


Fig. 51: Indicators (model WL 180)

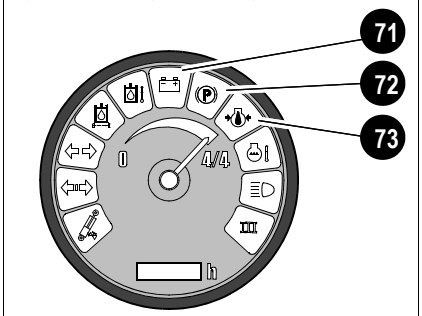


Fig. 52: Indicators (model WL 280)

Starting the engine

After you have completed the starting preparations in accordance with *Before starting the engine* on page 3-16 and *Disabling (releasing) the drive interlock* on page 3-20:

☞ *Insert the starter key into preheating start switch* **15.**

☞ *Turn the starter key to position "***1***".*

☞ *Check whether the following indicators come on:*

- Indicator **37 (73)** for engine oil pressure.
- Indicator **36 (71)** for the alternator charge function.
- Indicator **39** for the cold starter (model WL 180 only).
- Indicator **43 (72)** if the parking brake is applied.

☞ *Replace defective indicators immediately.*

☞ *Turn the starter key to position "***2***"and hold it in this position for about 5 seconds.*

➥ The intake air is preheated.

➥ Indicator 39 goes out *(model WL 180 only).*

☞ *Press accelerator pedal 31/***6** *through about a quarter of its travel.*

☞ *Turn the starter key to position "***3***" and hold it in this position until the engine starts.*

☞ *Release the starter key.*

Turning off the engine.

☞ *Turn the starter key to position "***0***".*

☞ *Set the drive to neutral*
- see Selecting the driving direction (model WL 180) on page 3-28
- see Selecting the driving direction (model WL 280) on page 3-29

Apply the parking brake - *see Parking brake* on page 3-27

NOTICE

In order to avoid damage to the engine and the exhaust turbocharger due to insufficient lube oil supply, operate the engine as follows as you start it:

☞ *Do* ***not*** *run the cold engine at high idle.*

☞ *Let the engine warm up at low idle (for about 30 seconds).*

☞ *Do* ***not*** *switch off the engine at high idle.*

☞ *Let the engine run at idling speed for about 2 minutes.*

☞ *Do not operate the machine with defective indicators.*

Starting the engine at low temperatures

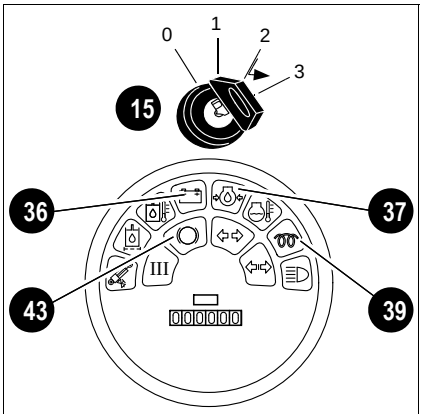


Fig. 51: Indicators (model WL 180)

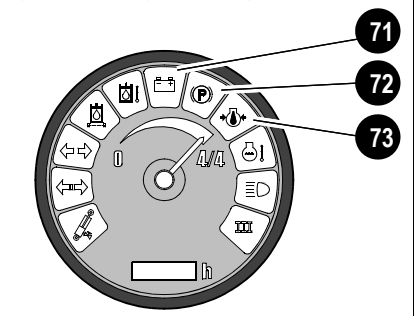


Fig. 52: Indicators (model WL 280)

☞ *Turn the starter key to position 2 and hold it in this position for* **about 15 - 20 seconds**

➥ The intake air is preheated.

➥ Indicator **39** goes out *(model WL 180 only).*

☞ *Press accelerator pedal 31/***6** *all the way down.*

☞ *Turn the starter key to position "***3***" and hold it in this position until the engine starts.*

☞ *Release the starter key.*

When the engine runs smoothly (increased engine speed):

☞ *Release accelerator pedal 31/***6**

Important

In general, a battery delivers less energy in cold conditions. Therefore, make sure the battery is always well charged.

When the engine has started ...

☞ *Check that the following indicators have gone out:*

- Indicator **36 (71)**
- Indicator **37 (73)**

☞ *Let the engine warm up.*

In winter:

☞ *Increase the engine speed slowly.*

☞ *Do not run the engine at full load until it has reached its operating temperature.*

3.12 Key-based drive interlock (option)

Key-based drive interlock: scope of delivery

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

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

Important

Each drive interlock has only one master key!

- The drive interlock must be replaced if the master key is lost

- The master 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 starter 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 starter 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 starter 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 3-27

☞ *Switch off the engine*

☞ *Remove the starter key (blue)*

➥ The drive interlock is enabled in 30 seconds

Important

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

Disabling (releasing) the drive interlock

Start and switch off the engine exactly as described on page 3-17 *"Starting / turning off the engine"*.

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

☞ *Start the engine - see Starting / turning off the engine on page 3-17.*

➥ 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 accomplished by inserting the master key in the starter 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

Security 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 starter 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 starter lock to position '0'. Valid keys are accepted only after 15 minutes and after the position '0' of the starter lock has been detected. This avoids testing keys without actuating the mechanical starter lock, e.g. by moving the starter 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.

3.13 Oil and fuel preheater (option)

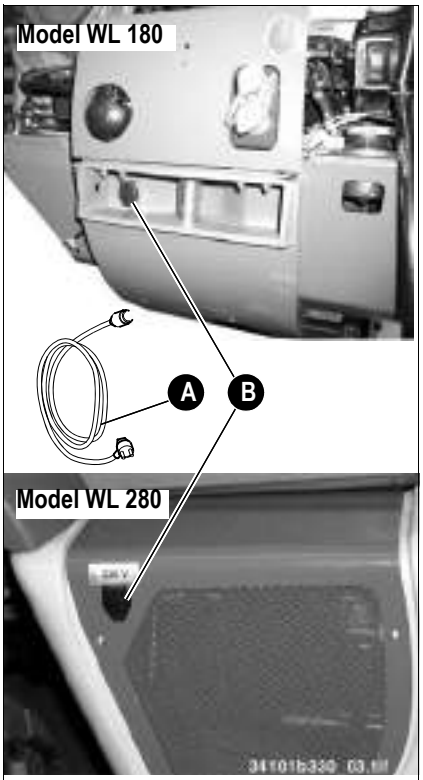


Fig. 51: Oil preheating (option)

This equipment is for cold-starting at temperatures below -5 °C (23°F).

Oil preheater (option)

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 service temperature if the oil preheater is connected over a longer period of time - preferably over night.

☞ *Connect the oil preheater as follows:*

- Park the machine near a 220 V socket.
- First connect special cable **A** with machine socket **B**, then
- Insert the plug into the 220 V socket.

☞ *Before starting the engine:*

- Remove the plug from the 220 V socket.
- Unplug special cable **A** from machine socket **B.**
- Close the engine cover.

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 (option)

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 engine is switched on at temperatures below + 10 °C (50°F).

3.14 Jump-starting the engine (supply battery)

Safety instructions

WARNING

Explosion hazard. A frozen battery may explode during a jump-starting operation.

☞ *Do not jump-start the engine if the battery is frozen.*

☞ *Dispose of the frozen battery in accordance with local environmental regulations.*

☞ *Replace the battery.*

WARNING

Possibility of equipment damage or injury from improper jump-starting.

☞ *Make sure the jumper cables are rated for 12V and the maximum CCA rating of the battery.*

☞ *The cable clamping ends shall be colored red for positive post connectors, and black for the negative post connectors.*

☞ *To avoid sparking, the excavator must not touch the jump-starting vehicle when connected with jumper cables.*

☞ *Use a 12V source, either in the form of another battery or a charger equipped for jump-starting. Using higher or lower voltage sources can damage the electrical system and potentially cause injury.*

☞ *To avoid short circuits, the jumper cable connected to the positive **+** terminal of the starting battery must never be brought into contact with electrically conductive vehicle parts.*

☞ *Route the jumper cables so they do not become entangled in rotating components in the engine compartment.*

Procedure

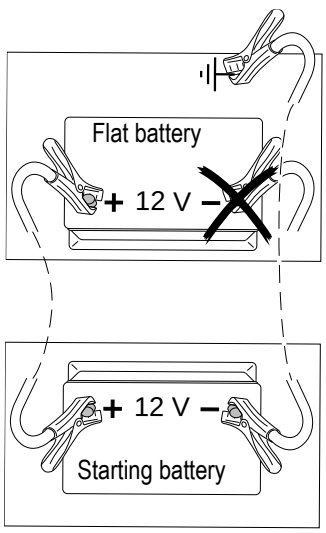


Fig. 52: Starting aid with jump leads

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

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

☞ *First connect one end of the red 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 fimly 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!*

3.15 Before operating

Special instructions for operating on public roads

The machine is subject to the

- Applicable legal regulations of your country
- Regulations specified in the operating license or in the machine documentation
- Only the equipment items (attachments) listed in the operating license or in the machine documentation are admissible for operating on public roads!
- Also observe the footnotes/instructions - *see chapter 1 "Use: attachment*" on page 1-5

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

☞ *Perform a functional check of:*
- *Brakes*
- *Steering*
- *Lights*

☞ *Empty the bucket (- see Control lever (joystick) of the loader unit on page 3-49)*

☞ *Tilt back the bucket* 53/**B**

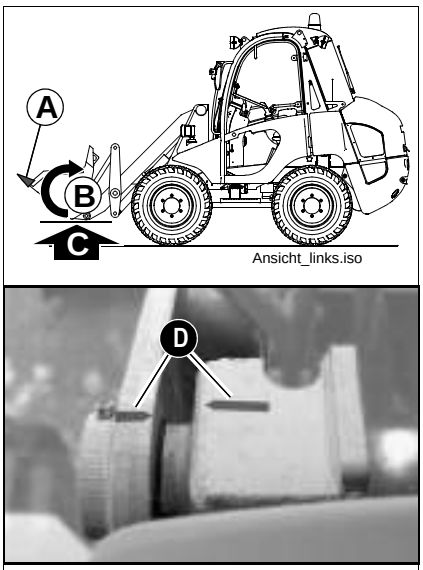


Fig. 53: Driving on public roads

WARNING

Personal injury hazard. Unprotected blades or teeth on the bucket can cut or crush.

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

☞ *Use a suitable means of transport to move or transport buckets/attachments which have not been authorized for transport on public roads. - see chapter 1 "Use: attachment" on page 1-5*

☞ *Raise the loader unit so that both red marks* 53/**D** *on the lift frame and the bulkhead are aligned.*

Important

Ground clearance for transport 53/**C** in connection with the standard bucket and standard tires is **about 200 mm (7.8 in.).**

Control lever lock (joystick)

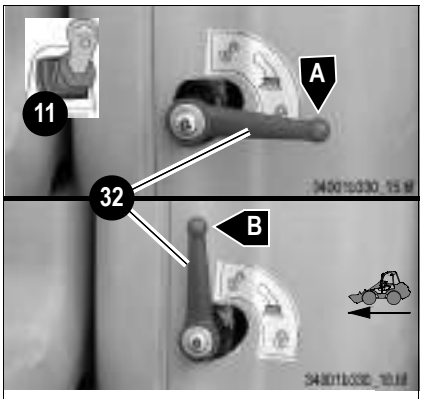


Fig. 54: Lock for driving on public roads

WARNING

Possible loss of machine control. Unsecured control lever 11 can be moved unintentionally, causing accidental machine movement.

☞ *Secure control lever* **11** *against unintentional actuation when driving on public roads.*

The stop cock for locking the control lever is on the lower left of the steering column near the brake pedal.

☞ *Secure control lever* **11** *(joystick) for the loader unit and the attachments against unintentional operation. To do this:*

Locking the stop cock:

☞ *Follow the instructions given in Before operating on page 3-23*

☞ *Push stop cock* **32** *lever* **A** *down.*

➥ The control valve is cut off from the hydraulic oil circuit.

Opening the stop cock:

☞ *Push stop cock* **32** *lever* **B** *up*

➥ The control valve is connected with the hydraulic oil circuit.

Checking the steering system

Functional check: move the steering wheel to the left and right

Important

Power steering is **only active** when the engine is running. The machine can still be steered if the diesel engine or the pump drive breaks down; however, steering will require more effort.

- Adapt towing speed to the altered steering characteristics.
- Use a towing bar.

Synchronous wheel position

Important

The machine has self-synchronizing axles. Carefully steering the front and rear wheels to their limits automatically synchronizes the steering system of the machine.

If you notice that the wheels on both axles do not run in the same track:

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

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

➥ Make sure the wheels on the front and rear axles run in the same track

☞ *Contact your Wacker Neuson dealer if this does not synchronize the wheels*

Accelerator pedal

Accelerator pedal 31/**6** controls the drive speed as follows:

- Press accelerator pedal 31/**6** down ➥ Drive speed is increased
- Release accelerator pedal 31/**6** slowly ➥ Drive speed is reduced
- Release accelerator pedal 31/**6** fully ➥ Hydrostatic braking

Important

Speed depends on the speed range selected with switch 34/**53**.

Checking the service brake

Important

Possibility of brake malfunction. Accumulated dirt in the area of the brake pedal can impair brake function.

☞ *Always keep brake/inching pedal* 31/**30** *clean!*

Important

The machine has no brake lights in basic version due to its specific design. (Brake lights are an optional feature.)

☞ *While operating the machine, frequently check the rearview mirror to verify that no one will be caught off guard by a braking maneuver.*

☞ *Check the brake action at low speed.*

- The machine is braked with the hydrostatic drive
  - see chapter 6 "Brakes" on page 6-3

Brake/inching pedal

Function

- To brake the machine irrespective of the setting of the drive lever and accelerator pedal.
- In the inching range of the brake pedal (pedal pressed lightly), the pedal can be used like a car's clutch. The drive system is no longer supplied with hydraulic oil which means the entire engine output is available to the work hydraulics. This allows especially to raise the loader unit more rapidly.

Braking

☞ *Press brake/inching pedal* 31/**30** *down with force.*

Inching

Press brake inching pedal 31/**30** *down slightly.*

Parking brake

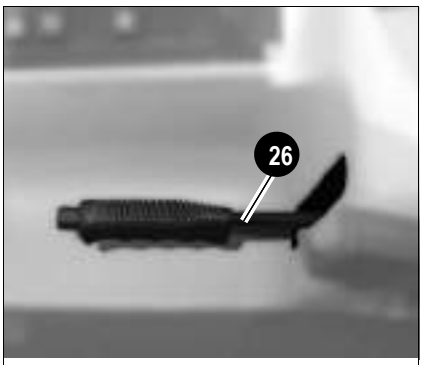


Fig. 55: Parking brake

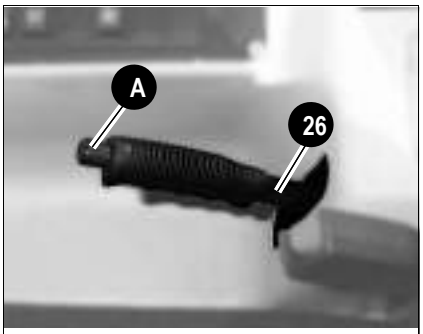


Fig. 56: Applying and releasing the parking brake

Important

A starting interlock prevents the machine from starting with the parking brake applied.
Selection of driving direction is not possible unless parking brake **26** is released. Applying the parking brake (model WL 180) automatically cancels the selection of forwards/reverse driving direction and activates neutral.

Function

- Prevents the machine from rolling away
- Emergency brake in case of service brake breakdown

WARNING

Collision hazard. While using the parking brake in an emergency, the machine will stop abruptly and the brake lights will not illuminate.

☞ *Use parking brake* **26** *instead of the service brake in an emergency only, i.e. in case of service brake breakdown*

☞ *In normal operation only use brake/inching pedal* 31/**30** *as a service brake*

Preventing the machine from rolling away

Important

Possibility of unexpected machine movement (Model WL 280). Applying the parking brake automatically cancels the selection of the forward/reverse driving direction and activates neutral.

- The preselected driving direction is enabled again as soon as the parking brake is released.
- Press tip switch 40/**86** in the joystick (neutral)
  - see Selecting the speed range (model WL 280) on page 3-29

☞ *Pull lever* **26** *up to the last notch.*

➥ Indicator 32/**43** (37/**74**) comes on.

Releasing the parking brake

☞ *Pull lever* **26** *up slightly.*

☞ *Press button* **A.**

Move lever **26** *all the way down.*

3.16 Moving off with the machine

Selecting the driving direction (model WL 180)

CAUTION

Possibility of unexpected machine movement. Changing direction at high speed and full throttle causes the machine to brake abruptly.

- *Slow the machine to walking pace before changing direction*

☞ *Select the driving direction with drive lever* 31/**29.**

☞ *Release parking brake* 31/**26.**

➥ Indicator 32/**43** goes out.

☞ *Gradually press down accelerator pedal* 31/**6.**

➥ Machine moves off.

☞ *Test the brakes at low speed.*

☞ *Reduce engine rpm: remove your foot from accelerator pedal* 31/**6.**

☞ *Slow the machine to walking pace.*

☞ *Select the new driving direction with lever* **54** *as follows:*

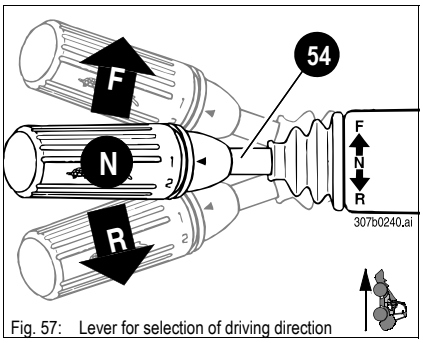


Fig. 57: Lever for selection of driving direction

Position	Lever	Effect
F	☞ *Push forwards*	➥ Forwards
N	☞ *In center position*	➥ Neutral
R	☞ *Pull back*	➥ Reverse

Selecting a speed range

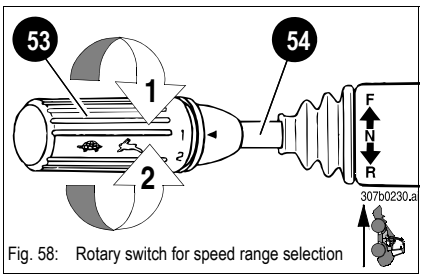


Fig. 58: Rotary switch for speed range selection

☞ *Stop the machine*

☞ *Move lever* **54** *to neutral* **N**

☞ *Select the speed range with rotary switch* **53** *as follows:*

Speed range	Rotary switch	Effect
1	☞ *Turn in direction of arrow* **1**	➥ Low work range (0 - 10 kph)
2	☞ *Turn in direction of arrow* **2**	➥ High drive range (0 - 19 kph)

Important

Speed range **1** is specially 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).

Selecting the driving direction (model WL 280)

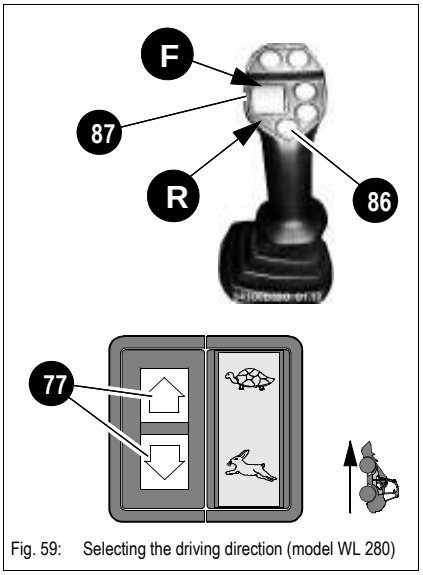


Fig. 59: Selecting the driving direction (model WL 280)

CAUTION

Possibility of unexpected machine movement. Changing direction at high speed and full throttle causes the machine to brake abruptly.

- Slow the machine to walking pace before changing direction

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

☞ *Slow the machine to walking pace*

☞ *Select the new driving direction with switch* **87** *as follows:*

Function	Operation	Effect
Forwards	☞ *Press switch* **87** *forwards* **F**	➥ Indicator **77** (front arrow) comes on
Reverse	☞ *Press switch* **87** *backwards* **R**	➥ Indicator **77** (rear arrow) comes on
Neutral	☞ *Press tip switch* **86**	➥ Indicator **77** goes out

Selecting the speed range (model WL 280)

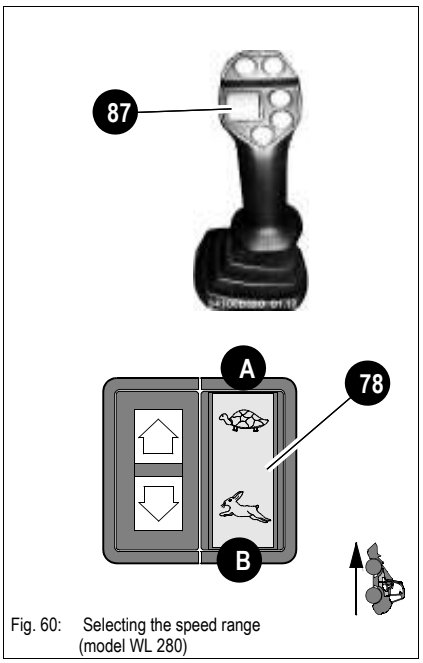


Fig. 60: Selecting the speed range (model WL 280)

The machine has **2 (A/B)** speed ranges. The speed range switch is located on the instrument panel.

☞ *Set driving direction to neutral with tip switch* **86** *on the joystick*

☞ *Select the required speed range with switch* **78**. *To do this:*

☞ *Press switch* **78**/**A**

➥ Speed range **A** is selected

☞ *Press switch* **78**/**B**

➥ Speed range **B** is selected

Speed range

Symbol	Description	Recommended
	Speed range **A** = 0 - 5.1 kph **A** = 0 - 3 mph	Specially 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.
	Speed range **B** = 0 - 20 kph **B** = 0 - 12 mph	For long-haul travel

3.17 Stopping and parking the machine

WARNING

Possibility of uncontrolled machine movement. Machines parked on slopes can roll away if not properly chocked and secured.

☞ *Use the parking brake to park the machine safely and to prevent it rolling away! - see Parking brake on page 3-27.*

☞ *Secure the machine by placing chocks under the downhill sides of the wheels.*

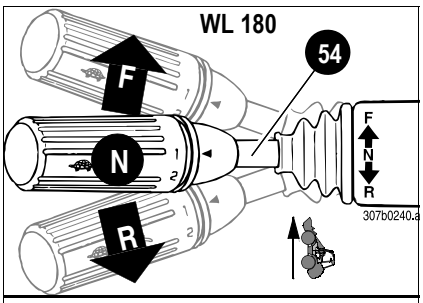


Fig. 61: Lever for selection of driving direction

Fig. 62: Tip switch for neutral position

Proceed as follows:

☞ *Reduce engine rpm: remove your foot from accelerator pedal* 31/**6.**

☞ *Stop the machine with service brake* 31/**30.**

☞ *Set the driving direction to neutral with lever* **54/N** *(or depending on the serial number, with tip switch* **86** *on joystick* **11***).*

☞ *Apply the parking brake. To do this: pull the lever all the way up to the last notch - see Parking brake on page 3-27.*

➥ Indicator 32/**43 (**40/**74)** in the instrument panel comes on.

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

- Push control lever **11** forwards out of neutral.
- Place the bucket on the ground so that the edge is flat with the ground. To do this: push control lever **11** to the left or right
  - see Control lever (joystick) of the loader unit on page 3-49.

After operation at full power:

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

☞ *Switch off the engine. To do this:*

- Turn the starter key to position "**0**".
- Remove the starter key.

☞ *Lock the doors after leaving the cab.*

On slopes:

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

3.18 Differential lock

Important

A differential lock neutralizes 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. The differential is locked automatically and cannot be switched on or off by the driver!

3.19 Load stabilizer for model WL 280 (option)

The load stabilizer cushions and dampens the movements of the loader unit. It avoids unstable oscillating movements of the loader.

WARNING

Tip over hazard. When traveling at higher speeds, the machine may become unstable if the load stabilizer is not switched on.

☞ *Always switch on the load stabilizer when traveling on public roads.*

☞ *Follow the procedure described in Before operating on page 3-23 when setting transport position!*

Switching the load stabilizer on or off depends on the individual situation. We recommend using the load stabilizer as follows:

Load stabilizer		
Switched off	**Switched on**	**Can be switched on**
• In general for heavy-duty work, e.g. picking up excavated material	• For driving on public roads	• For lighter work with the loader unit • For light off-road transport

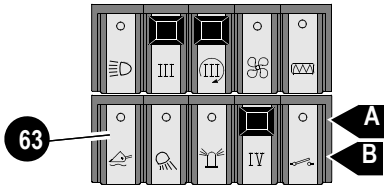


Fig. 61: Switch for load stabilizer (option)

Switched on

☞ *Press switch* **63** *below* **(A)**

➥ Indicator in switch comes **ON**

Switched off

☞ *Press switch* **63** *on top* **B**

➥ Indicator in switch goes **OUT**

Before working with the loader unit:

☞ *Switch off the load stabilizer*

Important

The loader unit yields very easily with the load stabilizer switched on, making it difficult to perform any precise lifting movements. The lifting capacity of the loader unit is only about 60 % of the rated force!

Important

Load stabilizer affects hose burst valve operation. Switching on the load stabilizer automatically switches off the hose burst valve (load holding control valve). In the event of a burst hose or pipe, this valve acts as a safety feature that prevents the loader unit from being lowered or dumped without being braked.

- Be aware that the hose burst valve is automatically switched off when the load stabilizer is switched on.
- *- see "Hose burst valve" safety feature (option)* on page 3-57

3.20 Backup warning system (option)

WARNING

Personal injury hazard. The backup warning system should not be relied upon exclusively to notify others when backing up the machine.

☞ *Make sure nobody is within the danger area of the machine when changing the traveling direction.*

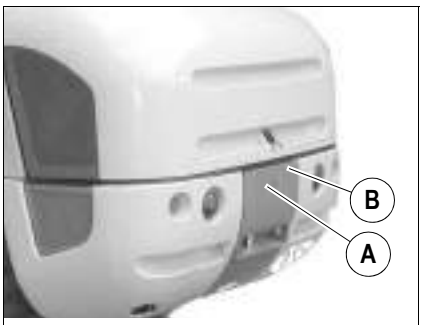


Fig. 62: Backup warning system (option)

Important

In certain countries, a backup warning system is mandatory.
The backup warning system consists of a signal transmitter **A** fitted to the inside of lid **B**. 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 (3.2 ft.) and at a frequency of 2800 Hz.

3.21 Low-speed control (option)

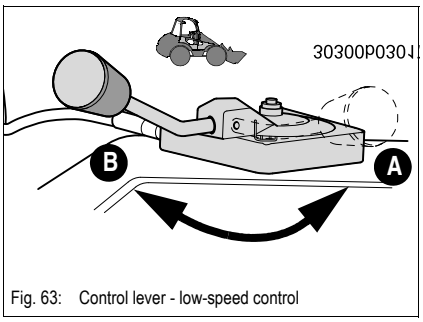


Fig. 63: Control lever - low-speed control

The control lever is located on the left on the control lever base.

➥ (between the driver's seat and the control lever base).

Function

Sets the machine's maximum speed independently of engine rpm.

Important

This function corresponds to inching with the brake/inching pedal, however maximum speed can be set with more precision.
Maximum speed depends on the speed range selected.

Position	Speed range
A	Maximum speed
B	Machine at a standstill

3.22 Manual throttle (option)

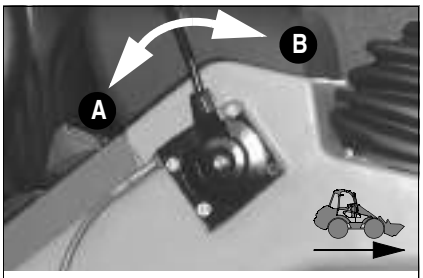


Fig. 64: Manual throttle lever

The manual throttle lever is located on the right side on the control lever base

WARNING

Possibility of unexpected machine movement. Do not actuate the manual throttle lever when traveling on public roads.

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

☞ *Before driving on public roads:*

- *Move the manual throttle lever to idling speed position.*
- *Set the engine rpm with the accelerator pedal.*

Function

Permanent setting of engine revs for work operation

Position	Engine revs
A	Idling speed = minimum rpm
B	Full throttle = maximum rpm

Important

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

3.23 Light system

Parking lights/low beam

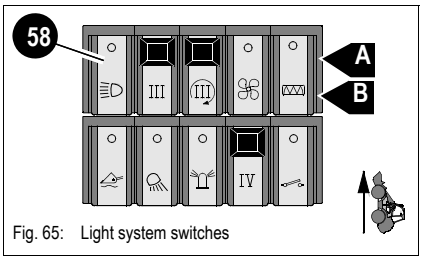


Fig. 65: Light system switches

The switch panel for the light system is located behind the control lever (joystick) in the control lever base.

Parking lights		
ON	☞ *Press switch* **58**/**B** *to the 1st position*	➥ Indicator in switch **58** comes on
OFF	☞ *Press switch* **58**/**A** *down*	➥ Indicator in switch **58** goes out

Low beam		
ON	☞ *Press switch* **58**/**B** *to the 2nd position*	➥ Indicator in switch **58** comes on
OFF	☞ *Press switch* **58**/**A** *down*	➥ Indicator in switch **58** goes out

Important

Only the side marker lights stay lit if the engine is switched off (with low beam switched on) - key in preheating/start switch 32/15 in position **0**!

High beam/headlight flasher

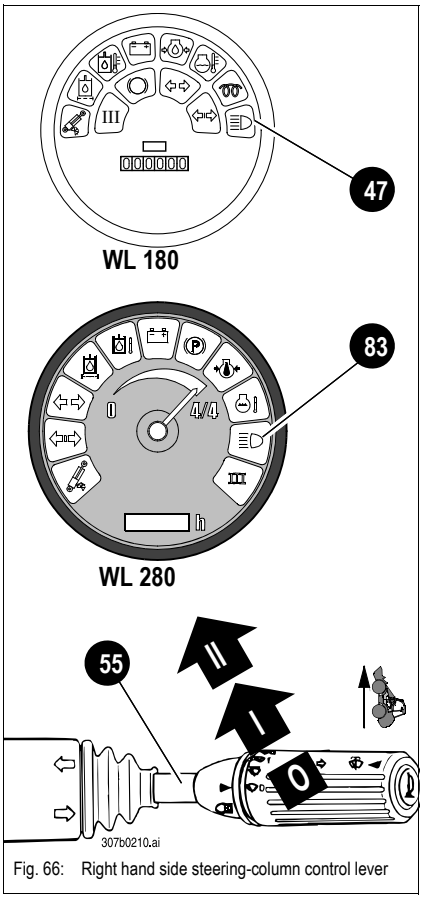


Fig. 66: Right hand side steering-column control lever

High beam		
ON	☞ *With low beam switched on, pull lever* ***55*** *to position* ***II*** *towards the steering wheel and release*	➥ Switching relay makes contact and high beam comes on ➥ Indicator **47 (83)** comes on
OFF	☞ *Pull lever* ***55*** *to position* **II** *towards the steering wheel and release*	➥ Switching relay breaks contact and low beam comes on ➥ Indicator **47 (83)** goes out

Headlight flasher		
ON	☞ *Pull lever* ***55*** *upwards to position* **I** *and hold*	➥ High beam and indicator **47 (83)** come on

3.24 Working light (option)

WARNING

Traffic accident hazard. The working lights can temporarily blind motorists on public roads.

☞ *Do not switch on the working lights when traveling on public roads.*

☞ *When operating the machine, only switch the working lights on when there is no possibility of blinding passing motorists.*

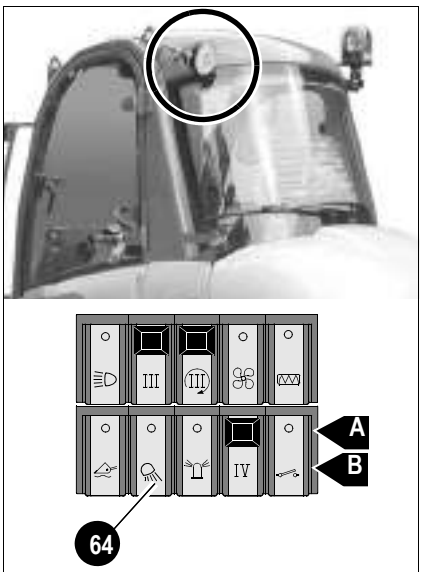


Fig. 67: Switch for working light

Front and/or rear working lights (option)		
ON	☞ *Press switch* **64**/**B** *down*	➥ Indicator in switch **64** comes on
OFF	☞ *Press switch* **64**/**A** *down*	➥ Indicator in switch **64** goes out

3.25 Rotating beacon (option)

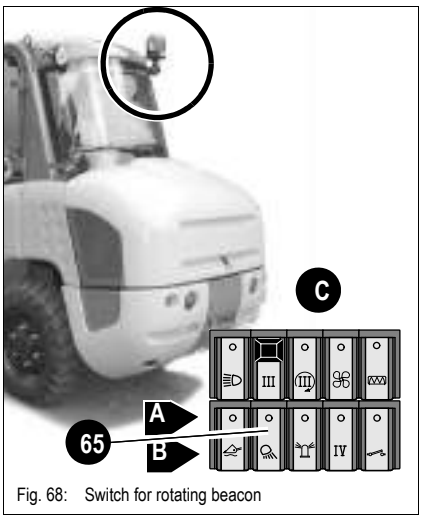


Fig. 68: Switch for rotating beacon

Rotating beacon		
ON	☞ *Press switch* **65**/**B**	➥ Indicator in switch **65** comes on
OFF	☞ *Press switch* **65**/**A**	➥ Indicator in switch **65** 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) **C**.
Get informed on and follow the legal regulations of your country.

3.26 Interior light

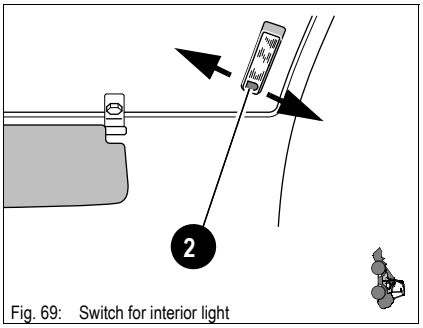


Fig. 69: Switch for interior light

Interior light	
ON	☞ *Press switch* **2** *to the left or right.*
OFF	☞ *Move switch* **2** *to center position.*

3.27 Signalling system

Hazard warning system

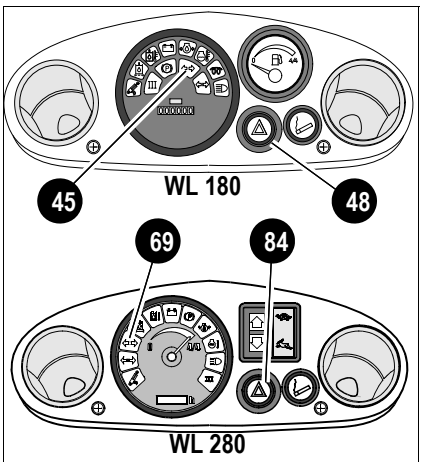


Fig. 70: Switch for hazard warning system

Hazard warning system		
ON	☞ *Press the switch for the hazard warning system* **48 (84)** *to the notched position.*	➥ The indicator in switch **48 (84)** flashes.
OFF	☞ *Release the switch for the hazard warning system* **48 (84)** *from the notched position by applying slight pressure.*	➥ The indicator in switch **48 (84)** goes out.

Turn indicators

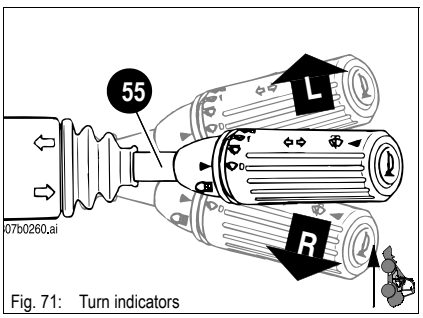


Fig. 71: Turn indicators

Turn indicators		
LEFT	☞ *Push lever* **55** *forwards* **L.**	➥ Indicator 60/**45 (69)** flashes.
RIGHT	☞ *Pull lever* **55** *to the rear* **R.**	➥ Indicator 60/**45 (69)** flashes.

NOTICE

If the indicator light 60/**45 (69)** flashes rapidly, this indicates that one of the turn signal lights is not illuminating.

☞ *With the turn signal activated, inspect both the front and rear turn signals to determine which is not working.*

☞ *Replace all burned-out bulbs.*

☞ *If bulb replacement fails to resolve the problem, contact your dealer to diagnose and repair the turn signal system malfunction.*

3.28 Cab heating and ventilation

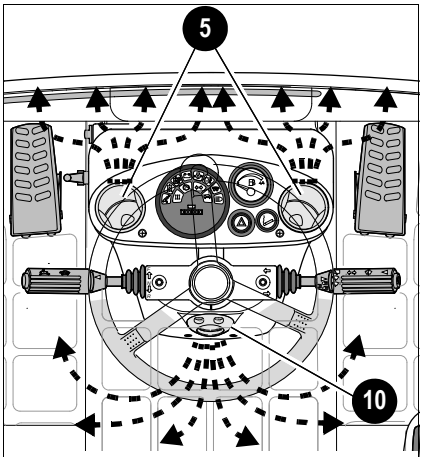


Fig. 72: Air circulation in the cab

Important

The machine heater can be set to 2 operating modes:

- Ventilation
- Heating

The air flow is directed to the front window via 2 defroster nozzles **5** and to the cab via footwell nozzle **10**.

Each nozzle can be closed and directed separately.

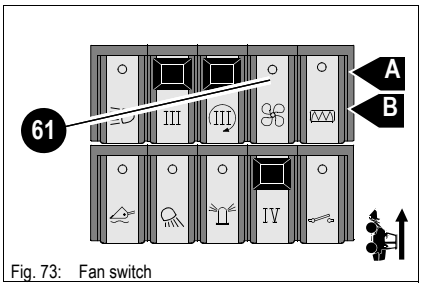


Fig. 73: Fan switch

Ventilation (fresh air)		
1st speed	☞ *Press switch* **61/A** *down one step*	➥ Fan runs in 1st speed
2nd speed	☞ *Press switch* **61/A** *down two steps*	➥ Fan runs in 2nd speed
OFF	☞ *Press switch* **61/A** *completely down*	➥ Fan OFF

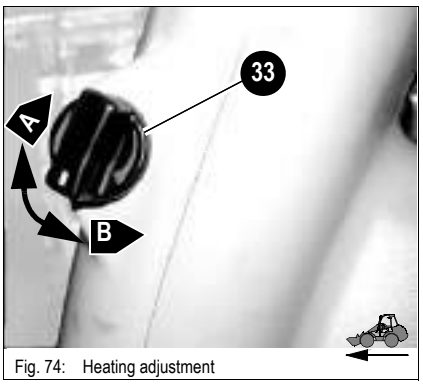


Fig. 74: Heating adjustment

Heating	
Colder	☞ *Turn rotary switch* **33** *to* **B**
Warmer	☞ *Turn rotary switch* **33** to **A**

3.29 Rear window heating

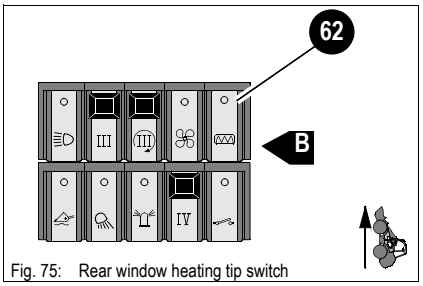


Fig. 75: Rear window heating tip switch

The rear window heating prevents the rear window from fogging.

☞ *Press switch (tip switch)* **62/B.**

➥ Indicator in switch **62** comes on.

- The rear window heating switches off automatically after about 5 minutes via a time lag relay.

➥ Indicator in switch **62** goes out.

Important

The rear window heating is only active if the engine is running.

3.30 Washer system

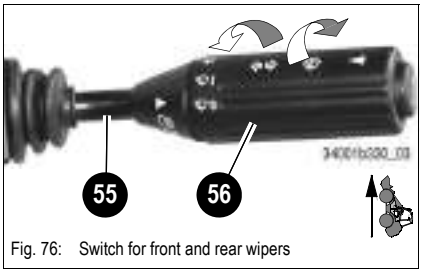


Fig. 76: Switch for front and rear wipers

Front and rear window wiper		
ON	☞ *Turn rotary switch **56** on lever **55** **to the first position***	➥ Front wiper is on
ON	☞ *Turn rotary switch **56** on lever **55** to the second position*	➥ Front and rear wipers are on
OFF	☞ *Turn rotary switch **56** on lever **55** fully back*	➥ Front and rear wipers return to initial position

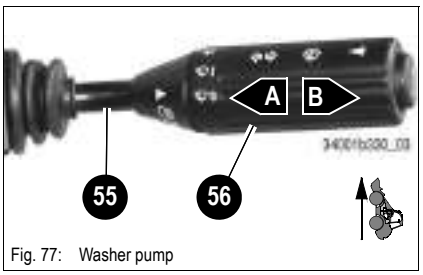


Fig. 77: Washer pump

Washer pump for front and rear window	
ON	☞ *Press rotary switch **56** on lever **55** to the left (**A**) and hold*
OFF	☞ *Release rotary switch **56** on lever **55** (**B**)*

Tank for washer system

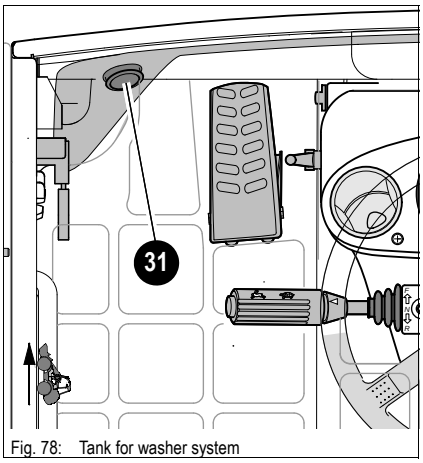


Fig. 78: Tank for washer system

The filler inlet for tank **31** is located at the lower left in the footwell, in driving direction.

Important

Fill the tank with a windshield washer solution for best results. This will provide a cleaning solvent as well as freeze protection in colder weather.

- Using water is not recommended. In colder weather, water will freeze and cause system damage and malfunctions.

3.31 Seat

Seat adjustment

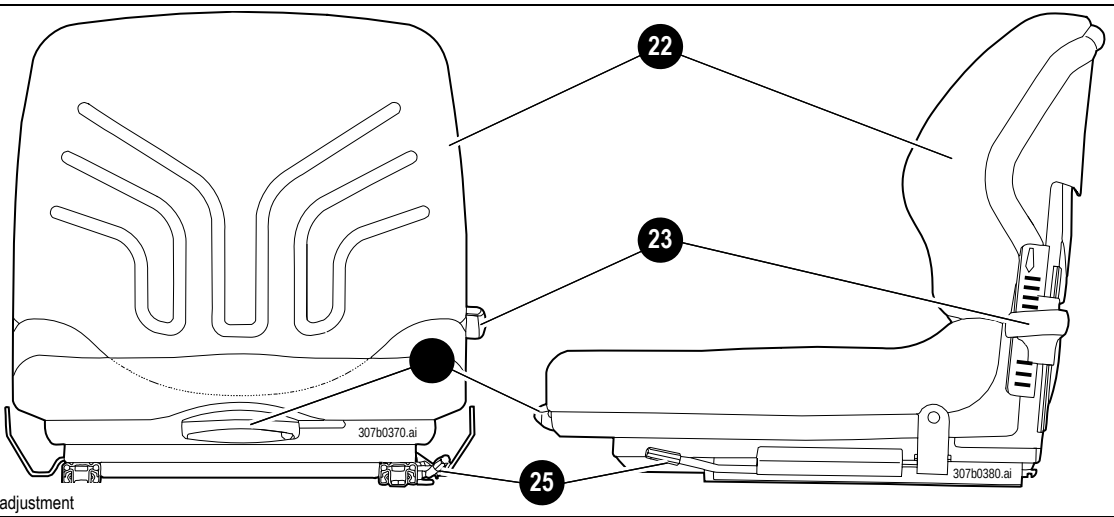


Fig. 79: Seat adjustment

CAUTION

Possible loss of machine control while adjusting the seat.

☞ *Do not adjust the seat position during machine operation or travel.*

☞ *Adjust the seat before operating the machine.*

☞ *After adjusting the seat, confirm that the seat is firmly latched in the desired position.*

☞ *Do not operate a machine with a malfunctioning or defective seat latch—repair or replace the latch before operating the machine.*

Weight adjustment

Important

Adjust the seat suspension correctly to ensure a high level of ride comfort. Use lever **23** to adjust the seat suspension to the operator's weight (9 possible ranges from 50 - 130 kg (110 - 348 lbs.)).

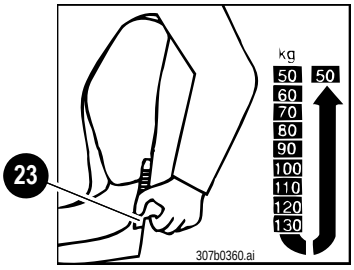


Fig. 80: Weight adjustment

☞ *Sit down on the seat*

To adjust to a higher weight:

☞ *Press lever* **23** *down (10 kg (22.5 lbs.) per notch).*

To adjust to a lower weight:

☞ *Press lever* **23** *down against the lower limit.*

➥ The weight adjustment automatically returns to the upper 50 kg (110 lbs.) position.

☞ *Press lever* **23** *down to the required position.*

Horizontal adjustment

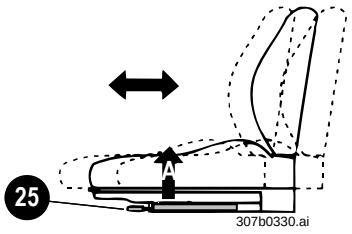


Fig. 81: Horizontal seat adjustment

☞ *Sit down on the seat.*

☞ *Pull lever* **25** *upwards* **A** *and at the same time.*

☞ *Move the seat forwards or backwards* **B.**

Backrest adjustment

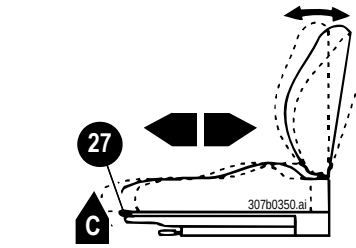


Fig. 82: Backrest adjustment

☞ *Sit down on the seat.*

☞ *Pull handle* **27** *up* **C** *- and at the same time.*

☞ *Move the seat forwards or backwards* **D**, *the backrest is set as follows* **E**:

• Seat moved forwards	➥ Flatter backrest inclination
• Seat moved backwards	➥ Steeper backrest inclination

3.32 Seat belt

WARNING

Personal injury hazard. The seat belt provides positive support in the operator seat during operation and travel and keeps the operator located within the comfort zone for control operation. The seat belt also reduces the risk of injury in the event a tipping incident occurs during use.

☞ *Always buckle up before operating or working with the machine.*

☞ *Do not twist the seat belt during fastening or use.*

☞ *Seat belt must run over the hips – not over the stomach – and must always be worn firmly fastened.*

☞ *Do not place the seat belt over hard, edged or fragile items (tools, steel rulers, glasses, pens) carried inside your clothes.*

☞ *Never buckle up 2 persons with one seat belt.*

☞ *Check seat belts each time the operator uses the machine. Have damaged parts immediately replaced by an authorized service center before using the machine.*

☞ *Always keep the seat belt and buckle clean, as dirt and debris can cause the buckle to malfunction and accelerate internal webbing abrasion in the belt.*

☞ *Seat belt buckle must not be obstructed by foreign bodies (paper or similar); otherwise the buckle latch cannot lock into place!*

WARNING

Personal injury hazard. The seat belt strap will be stretched after an accident and is no longer serviceable.The seat belt will NOT provide adequate protection in the future!

☞ *Replace the seat belt after an accident.*

☞ *Have fastening points and seat fixture examined for damage or failure. Repair or replace if damaged.*

The seat belt **24** is for the driver's safety during work on construction sites and during road travel.

Fastening the seat belt

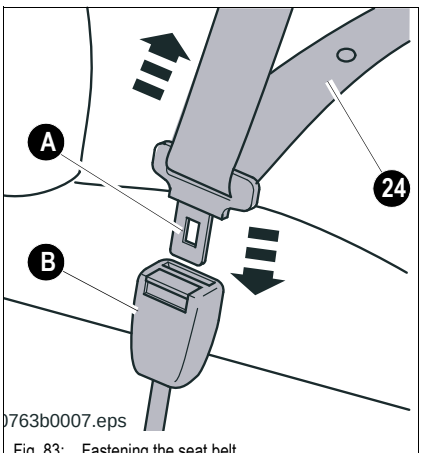


Fig. 83: Fastening the seat belt

Fasten seat belt **24** as follows before operating the machine.

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

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

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

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

Unfastening the seat belt:

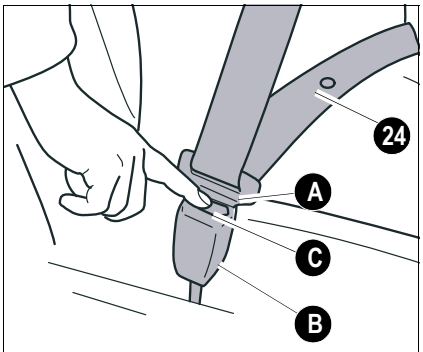


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Fig. 84: Unfastening the seat belt

Unfasten seat belt **24** 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:

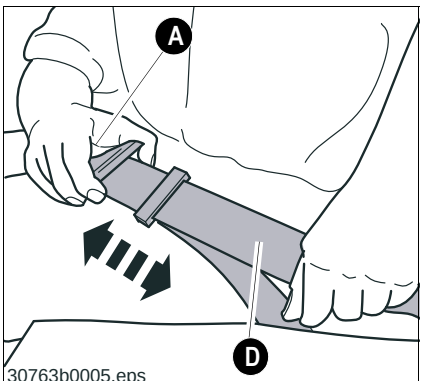

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Fig. 85: Longer/shorter seat belt adjustment

☞ *Lengthen the lap belt as follows:*

- Hold buckle latch **A** at a right angle to the seat belt and pull the seat belt to the required length - see *Fig. 85*

☞ *To shorten the lap belt, pull on the free end* **D** *of the belt - see Fig. 85*

Important

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

3.33 Other controls

Battery master switch (option)

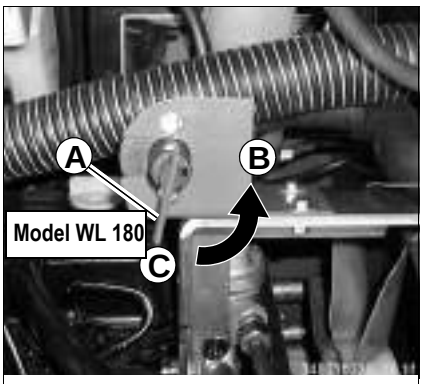


Fig. 86: Battery master switch (option)

Important

The machine can be fitted with a battery master switch (option). Power supply is interrupted with a key directly after the battery.

- Before working on the electric system.
- As an antitheft precaution.

Interrupting power supply:

☞ *Turn and remove key* **A** *of the battery master switch in position* **B.**

Switching on power supply:

☞ *Insert key* **A** *in the battery master switch.*

☞ *Turn the key down to the notched position* **C.**

3.34 Removing the cab for low clearance heights

General legislative information

Important

Operating the wheel loader with the cab removed may not be allowed depending on local road traffic regulations.

- Get informed on and follow your local legal regulations.

Removing the cab

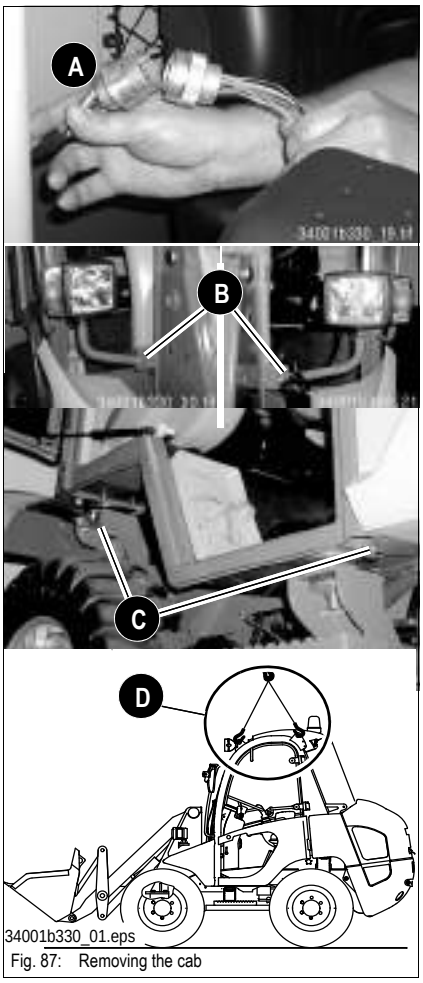


Fig. 87: Removing the cab

Machine height without cab - see dimensions on page *6-11*

WARNING

Crushing hazard. An improperly removed cab can slip or fall unexpectedly.

☞ *Make sure that the cab is removed correctly with a crane.*

☞ *Do not lift the cab with someone in the operator seat/station or on the machine.*

☞ *Secure the machine against unintentional movement.*

☞ *Persons responsible for attaching the lifting devices to the machine shall be experienced with crane operations and hand signals.The crane operator shall maintain sight of the personnel attaching, guiding, and unhooking the machine.*

☞ *Use OSHA-rated and approved lifting devices capable of lifting the cab. Refer to the general weight guidelines in the specification section of this manual.*

☞ *(- see chapter 2 "User/owner responsibility" on page 2-4) and follow all other relevant safety instructions of your country!*

☞ *Remove the cab as follows:*

- Place the machine on level ground.
- Switch off the engine.
- Remove the starter key.
- Lower the loader unit without pressure
  - see Lowering the loader unit with the engine switched off on page 3-51.
- Remove electric contact **A** (behind the operator's seat, on the right).
- Remove the fixtures for headlights **B** on the left and right of the machine frame.
- Unscrew hexagon head screws **C** for the attachment of the cab on the left and right.
- Carefully raise the cab at the 4 eye hooks **D** by means of a crane.
- Place the cab on level ground, ensuring stability.

Mounting the cab

☞ *Mount the cab in the reverse order of removal*

- Tightening moment for cab attachment: **195** Nm

3.35 ROPS bar (option)

Important safety instructions

WARNING

Crushing hazard. The operator will not be protected during a roll-over or tip-over incident, or from falling objects, if the ROPS bar is folded down.

☞ *Always raise and lock the ROPS bar before operating the machine.*

Lowering the ROPS bar

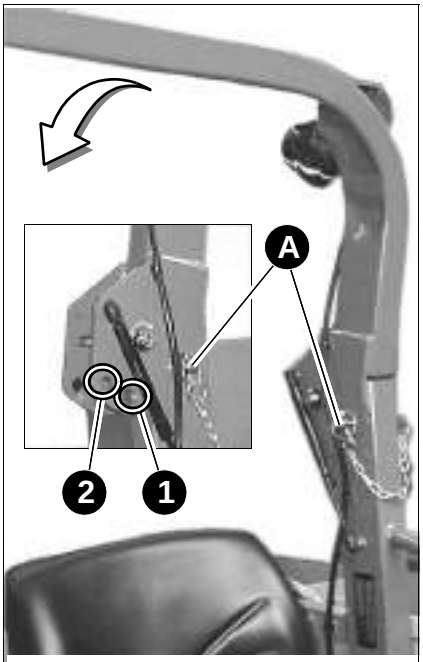


Fig. 88: Folding down the ROPS bar

When removing lock pins **A**

☞ *Hold the ROPS bar*

➥ A gas strut holds the ROPS bar in its position by applying slight pressure

☞ *Release and remove lock pins* **A** *on the left and right*

☞ *When lowering the ROPS, use:*

➥ Position **1** For opening the engine cover

➥ Position **2** For clearance height of **1745 mm (68.7 in.). (Model WL 180)**
For clearance height of **1785 mm (78.1 in.). (Model WL 280)**

☞ *Mount lock pin* **A** *in the required position and secure it with a hinged split pin*

3.36 Towing and transporting the machine

Safety instructions

- The machine may only be towed using suitable towing equipment (towing bar or cable) in connection with suitable towing accessories, such as a towing coupling, hooks and eyes!
- Move off slowly!
  Make sure no-one is dangerously close to the towing bar
- The machine may only be towed with a cable if the service brakes and steering are fully operational!

Towing

Important

Power steering is only active when the engine is running. The machine can still be steered if the diesel engine or the pump drive breaks down; however, steering will require more effort.

- Adapt towing speed to the altered steering characteristics.
- Use a towing bar.

NOTICE

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

☞ *Tow away the machine from the danger area only after you have switched over the HP pressure relief valves (see below).*

☞ *Switch off the engine.*

☞ *Do not tow the machine for more than 100 meters (328 ft.) and do not tow it faster than 3–4 kph (1–2 mph).*

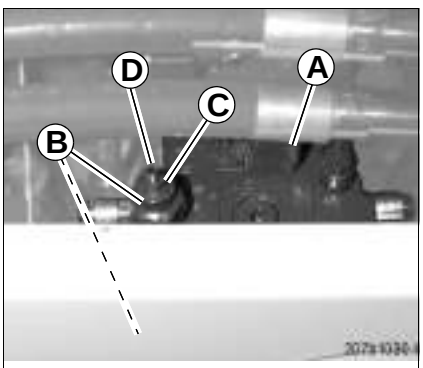


Fig. 89: Hydraulic pump when towing the machine

Tow away the machine as follows:

☞ *Move drive lever 31/**29** (tip switch 40/**86**) to neutral.*

☞ *Apply the parking brake (➠ page 3-27).*

☞ *Switch off the engine.*

☞ *Fit an adequately sized towing bar to the towing facilities.*

☞ *Switch over pressure relief valves **B** on hydraulic pump **A**. To do this:*

- Slacken hexagon locknuts **C** on both pressure relief valves **B.**
- Screw in hexagon socket screws **D** on both pressure relief valves **B** until they are flush with hexagon locknuts **C.**
- Secure hexagon socket screws **D** on both pressure relief valves **B** with locknuts **C.**

Proceed as follows before putting the machine back into service:

☞ *Reverse the changeover of the pressure relief valves before putting the machine back into service!*

- Unscrew hexagon socket screws **D** on both pressure relief valves **B** to the limit.
- Secure hexagon locknuts **C** on both pressure relief valves **B.**

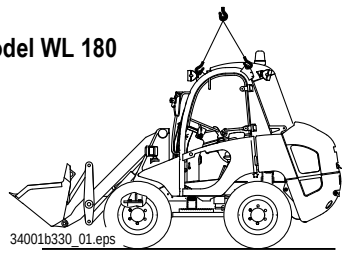
3.37 Lifting the machine

Safety instructions

- The crane and the lifting gear must have suitable dimensions - *see chapter 6 "Specifications*" on page 6-1
- The crane lifting the machine requires lifting gear of four equal lengths
- Secure the machine against unintentional movement!

Crane handling

Model WL 180



Model WL 280

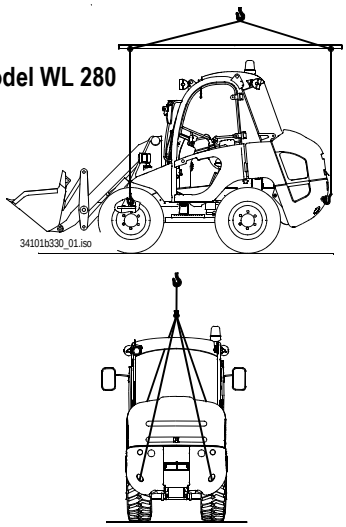


Fig. 90: Crane handling

WARNING

Crushing hazard.

☞ *Do not lift the machine with someone in the operator seat/station or on the machine.*

☞ *Secure the machine against unintentional movement.*

☞ *Persons responsible for attaching the lifting devices to the machine shall be experienced with crane operations and hand signals.The crane operator shall maintain sight of the personnel attaching, guiding, and unhooking the machine.*

☞ *Use OSHA-rated and approved lifting devices capable of lifting the machine, attachments, options and accumulated debris. Refer to the general weight guidelines in the specification section of this manual.*

☞ *Load the machine only with the standard bucket empty and in transport position— (- see chapter 1 "Fields of application, use of attachments" on page 1-5) and in transport position!*

☞ *The crane operator shall observe the lift zone and lift the machine when the area is clear of people.*

☞ *Stay clear of suspended loads.*

☞ *Do not attempt to lift the machine with any type of crane including wheel loaders unless the crane operator is qualified to lift loads in craning operations.*

☞ *Load the machine as follows:*

- Install and safely lock the standard bucket - see page *3-52*.
- Dump out the standard bucket.
- Set the drive to neutral - see page *3-28*.
- Tilt in the standard bucket and lower it to transport position - see page *3-23*.
- Switch off the engine.
- Apply the parking brake - see page *3-30*.
- Remove the starter key.
- Do not allow anyone to stay in the cab, and close the doors and the engine cover.

Model WL 180:

- Fasten the loader at the 4 slinging points provided to this effect - *see chapter 1 "Overall view of WL180 machine*" on page 1-2 - with sufficiently dimensioned lifting gear.

Model WL 280:

- Fasten the loader at the 3 slinging points provided to this effect - *see chapter 1 "Overall view of WL180 machine*" on page 1-2 - with sufficiently dimensioned lifting gear.

WARNING

Model WL 280: Personal injury and equipment damage hazard. Do not use the eye hooks on the cab for loading the machine.

☞ *Lift the machine by using only the designated lifting points*

- Carefully lift the machine.

3.38 Loading and transporting the machine

Safety instructions

- The transport vehicle must be of adequate size - see chapter *Specifications* for the dimensions and weights of the machine!
- Remove any mud, snow or ice from the tires so that the machine can be safely driven onto the ramps
- Secure the machine against unintentional movement!

Loading the machine

WARNING

Possibility of injury or equipment damage from improper loading and transporting.

☞ *Read the safety instructions at the beginning of this chapter.*

☞ *Follow any other local safety regulations regarding loading and transporting the machine.*

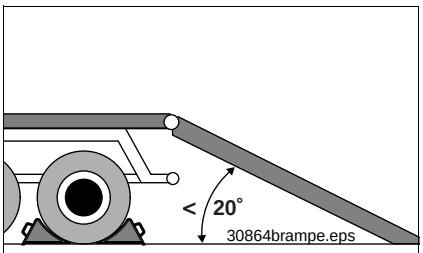
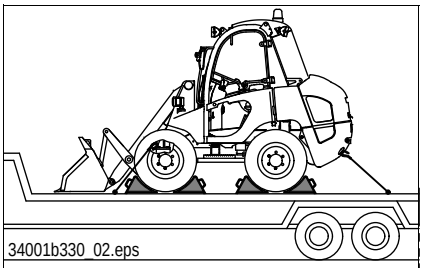


Fig. 91: Access ramps

☞ *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 access to it is not obstructed - e.g. by superstructures.
- Make sure the access ramps and the wheels of the machine are free of oil, grease and ice.
- Start the engine of the machine
- Raise the bucket enough so that it will not touch the access ramps.
- Carefully drive the loader onto the middle of the transport vehicle.
- Set the drive to neutral - *see Selecting the driving direction (model WL 180)* on page 3-28.
- Lower the bucket to the loading area.
- Switch off the engine.
- Apply the parking brake - *see Stopping and parking the machine* on page 3-30.
- Remove the starter key.
- Do not allow anyone to stay in the cab, and close the doors and the engine cover.



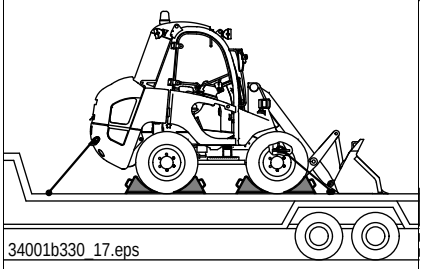


Fig. 92: Strapping down the loader

☞ *Strap down the machine as follows:*

- Make sure the authorized maximum height is not exceeded
- Secure all tires of the wheel loader with chocks in front of, behind and at the sides of each wheel
- Firmly strap down the machine at the eye hooks - *see chapter 1 "Overall view of WL180 machine*" on page 1-2 - with sufficiently dimensioned belts or chains onto the platform
- 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 loader) before moving off, and the legal transport regulations of the country or countries in which transport will take place!

3.39 Working with the machine

General safety instructions

- Never drive up to the edge of a pit from outside!
- Never undermine the foundations of walls!
- Operation of the machine by unauthorized staff is prohibited!
- When working with the machine, look out for high-voltage cables, underground cables, gas and water pipes!
- When using lifting gear such as pallet forks, comply with the load diagrams valid for this machine
- The hydraulic system of the machine is still pressurized even when the engine is not running! Depressurize 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 with hydraulic functions - see - *see Depressurizing the quick couplers on the loader unit* on page 3-51
- If your machine is equipped with a load stabilizer (option):

☞ Switch off the load stabilizer before working with the loader unit - otherwise the loader unit will yield very easily, making it difficult to perform any precise lifting movements. The lifting capacity of the loader unit is only about 60 % of the rated force

3.40 Control lever (joystick) of the loader unit

Control lever for lift and tilt ram hydraulics

CAUTION

Possible loss of machine control. Unsecured control lever **11** (joystick) can be moved unintentionally while traveling on roads, causing accidental machine movement.

☞ *Secure control lever 11 (joystick) before traveling.*

☞ *Lock the stop cock*
- see Control lever lock (joystick) on page 3-24

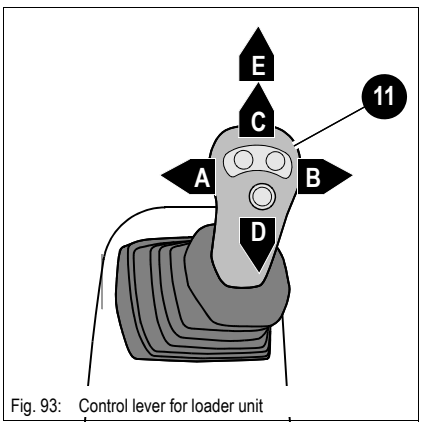


Fig. 93: Control lever for loader unit

Position	Lever 11	Function
A	☞ *To the left*	➥ Tilts in the attachment
B	☞ *To the right*	➥ Dumps out the attachment
C	☞ *Forwards*	➥ Lowers the loader unit
D	☞ *Backwards*	➥ Raises the loader unit
E	☞ *Fully forwards*	➥ Lowers loader unit to float position (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 snowplows and for grading in reverse.

To engage float position:

☞ *Push control lever* **11** *fully forwards to final position* **E.**

➥ Control lever stays in final position **E.**

Operation of 3rd control circuit

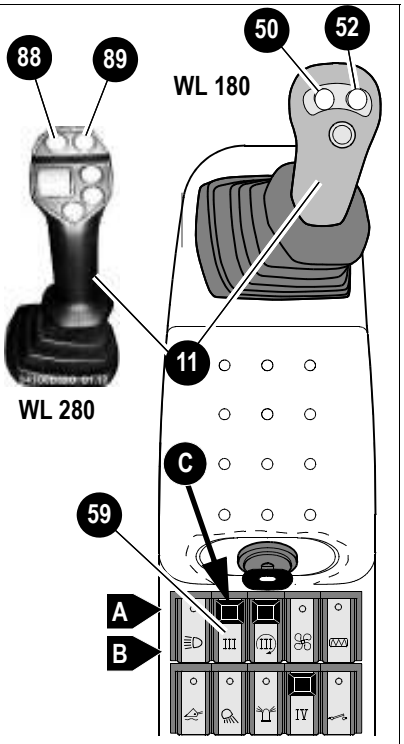


Fig. 94: Locking the 3rd control circuit

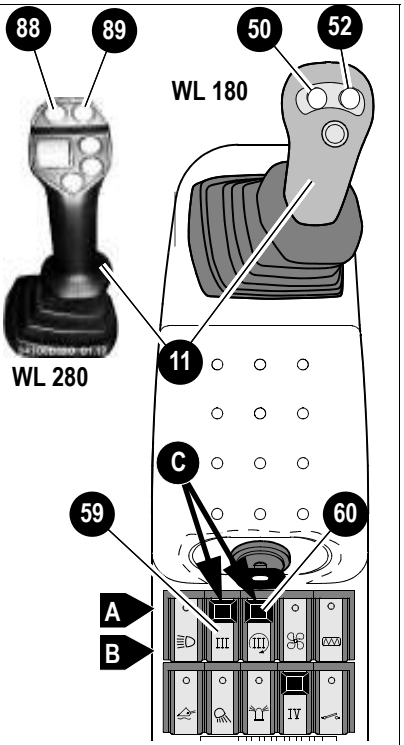


Fig. 95: Operation of 3rd control circuit

Important

Possibility of unexpected machine movement. Pressing momentary contact switch **50 (88)** on control lever **11** unlocks the quickhitch.

- Switch off switch **59** ! - see Locking the 3rd control circuit -

☞ *The 3rd control circuit is locked via switch* **59** *as follows:*

Locking the 3rd control circuit		Function
ON	☞ *Push lock* **C** *down and* ☞ *At the same time press switch* **59** *down to position* **B**	➥ Indicator in switch **59** comes on ➥ Momentary contact switch **50 (88)** and **52 (89)** are **ready for operation** ➥ Indicator **42 (82)** illuminates when Switch **59** is pressed down to position B (ON) to activate the 3rd control circuit.
OFF	☞ *Press switch* **59** *down to position* **A**	➥ Switch **59** is locked ➥ Indicator in switch **59** goes out ➥ Momentary contact switch **50 (88)** and **52 (89)** have **no function**

The 3rd control circuit is actuated as follows:

☞ *Via momentary contact switch* ***50 (88)*** *and* ***52 (89)*** *with switch* **59/B switched on***, and Indicator* **42 (82)** *on the instrument panel also on.*

Operation of 3rd control circuit	Function
Unlocking: Press momentary contact switch **50 (88)**	With the quickhitch connected: ➥ **Unlocks the** quickhitch With an attachment connected: ➥ Pressurizes the right-hand side hydraulic line (blue) (e.g. closes multipurpose bucket)
Locking: Press momentary contact switch **52 (89)**	With the quickhitch connected: ➥ **Locks the** quickhitch With an attachment connected: ➥ Pressurizes the left-hand side hydraulic line (red) (e.g. opens multipurpose bucket)
Continuous operation Push lock **C** down and At the same time press switch **60** down to position **B**	➥ Indicator in switch **60** comes on • Hydraulic movements/procedures over a longer period of time or operation of hydraulic motors • Operation of hydraulic equipment with a control valve adjusted to maximum oil flow, with an unpressurized return

Lowering the loader unit with the engine switched off

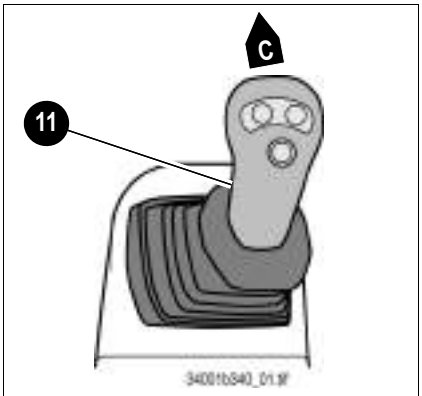


Fig. 96: Lowering the loader unit with the engine switched off

Lower the loader unit as follows:

☞ *Make sure no-one is dangerously close to the machine.*

☞ *Push and hold control lever* **11** *forwards (***C***).*

➥ Until the loader unit is completely lowered.

☞ *Return control lever* **11** *to neutral.*

Depressurizing the quick couplers on the loader unit

Important

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

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

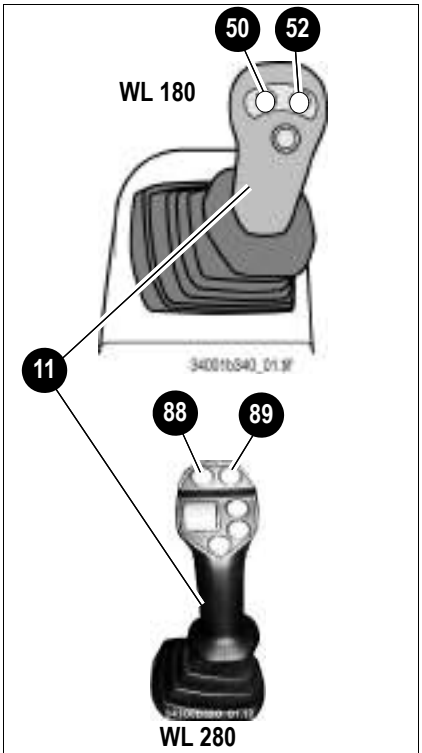


Fig. 97: Releasing pressure on the quickhitch

Release the pressure as follows:

☞ *Apply the parking brake - see Parking brake on page 3-27*

☞ *Switch off the engine.*

➥ Do not switch off the starting circuit.

☞ *Press and hold tip switches* **50 (88)** *and* **52 (89)** *on control lever* **11** *for about 5 - 8 seconds.*

➥ Pressure in hydraulic lines is released.

☞ *Switch off the engine and remove the starter key.*

☞ *Re-equip the loader unit.*

3.41 Exchanging an attachment on the loader unit

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

Fitting attachments onto the quickhitch

CAUTION

Personal injury hazard. An unlocked attachment can slip or fall unexpectedly.

☞ *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!*

Re-equip as follows:

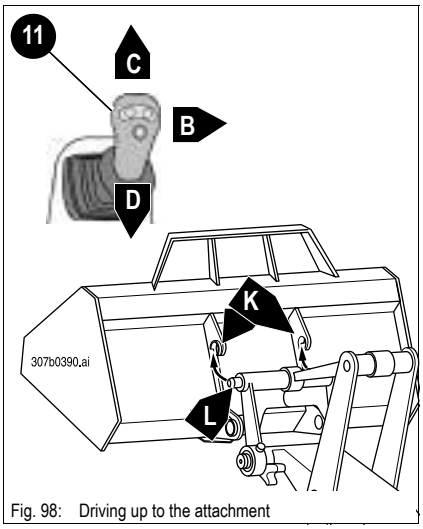


Fig. 98: Driving up to the attachment

☞ *Drive the machine up to the attachment.*

☞ **Tilt the quickhitch all the way forwards. To do this:**
Push control lever 11 *to the right* **B.**

☞ *Adjust the height of the pin shanks* **L** *of the quickhitch so that they are under the catch hooks of the attachment* **K**. *To do this:*

Lift frame	Control lever11
• Lower	☞ *Push forwards* **C**
• Raise	☞ *Pull backwards* **D**

☞ *Drive forwards until pin shanks* **L** *of the quickhitch are directly beneath the catch hooks of the attachment* **K.**

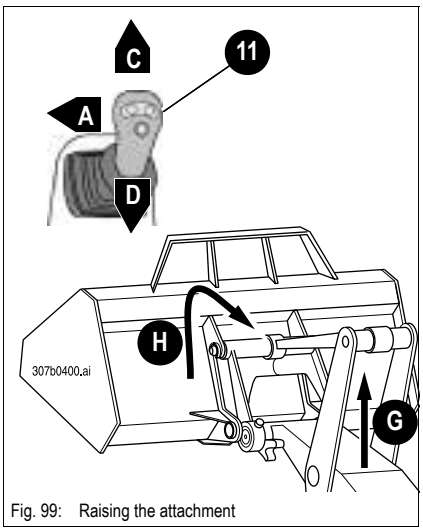


Fig. 99: Raising the attachment

☞ *Raise loader unit* **G**. *To do this:*
pull control lever **11** *backwards* **D** *and*

☞ **Tilt in quickhitch H. To do this:**
push control lever 11 t*o the left* **A.**

Locking attachments without hydraulic functions

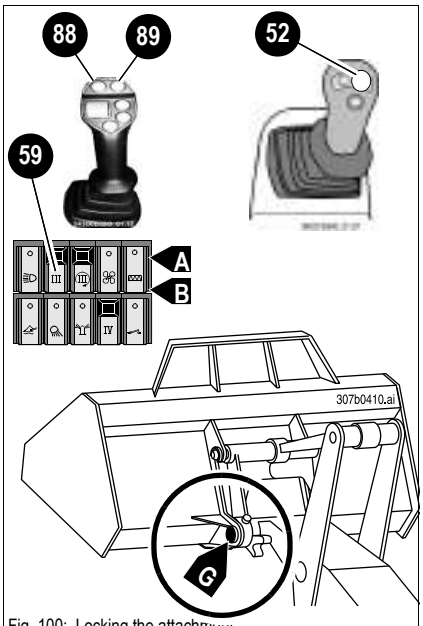


Fig. 100: Locking the attachment

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

☞ *Press tip switch* **52 (89)** *on control lever* **11**

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

➥ Make sure the attachment is safely locked with lock pins **G**

☞ *Release tip switch* **52 (89)** *on control lever* **11**

☞ *Lock the 3rd control circuit with switch* **59/A***:*
- see Locking the 3rd control circuit on page 3-50 **(OFF)**

CAUTION

Personal injury hazard. An unlocked attachment can slip or fall unexpectedly.

☞ *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.*

Locking: attachments with hydraulic functions

☞ *Switch off the engine.*

➥ Do not switch off the ignition.

☞ *Apply the parking brake.*

☞ *Unlock the 3rd control circuit with switch* **59/B***:*
- see Locking the 3rd control circuit on page 3-50 **(ON)**

☞ *Release the pressure in the 3rd control circuit.*

➥ *- see Depressurizing the quick couplers on the loader unit* on page 3-51.

☞ *Attach the hydraulic, and if used, electric connections for the attachment in accordance with its Operator's Manual.*

Connection of electric attachments (option)

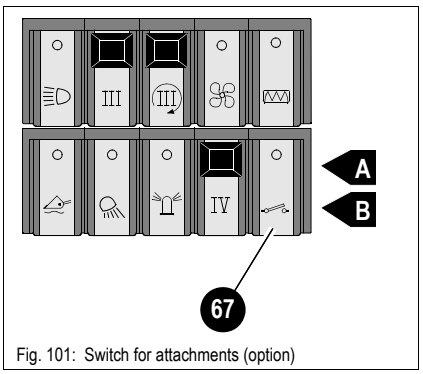


Fig. 101: Switch for attachments (option)

The machine can be fitted with a 4 pole front and/or rear socket. Switch **67** switches electric power supply on or off for electric attachments such as a spray water pump for a rotary broom.

Power supply for front attachments (option)		
ON	☞ *Press switch* **67** *down to position* **B**	➥ Power supply at the front socket is switched ON ➥ Indicator in switch comes on
OFF	☞ *Press switch* **67** *down to position* **A**	➥ Power supply is switched OFF ➥ Indicator goes out

Removing an attachment from the quickhitch

CAUTION

Personal injury hazard. Improperly removed attachments can fall over, crush, or cut.

☞ *Place the removed attachment on level ground so that it will not fall over.*

☞ *Position the attachment so that it will not tip or swing unexpectedly once it is unlocked.*

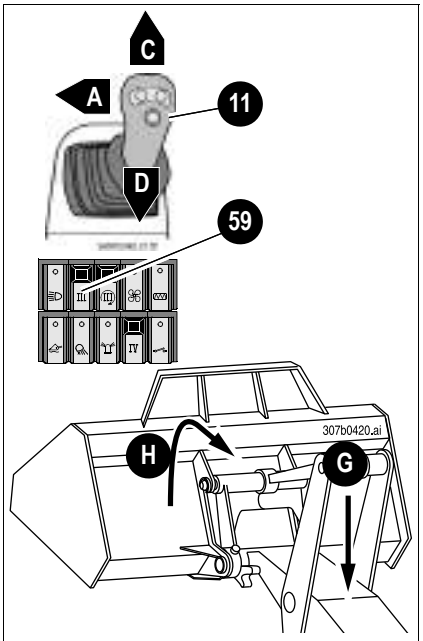


Fig. 102: Lowering and tilting in the attachment

Take the attachment off the quickhitch as follows:

☞ *Drive the machine with the empty attachment up to the drop-off position.*

☞ *Tilt in quickhitch* **H**. *To do this:*
push control lever **11** *to the left* **A.**

☞ **Lower loader unit G until the attachment is about** *5 - 10 cm (2–4 in.) above the ground.*
To do this: **push control lever 11** *forwards* **C.**

☞ *Unlock the 3rd control circuit with switch* **59***:*
- see Locking the 3rd control circuit on page 3-50 (ON).

Attachments with hydraulic functions:

☞ *Switch off the engine*

➥ Do not switch off the starter circuit.

☞ *Unlock the 3rd control circuit with switch* **59** *(ON):*
- see Locking the 3rd control circuit on page 3-50.

☞ *Depressurize the hydraulic lines*
- see Depressurizing the quick couplers on the loader unit on page 3-51

☞ **Changing round** *(on the lock ram): in accordance with the Operator's Manual of the attachment, hydraulic connections to the machine.*

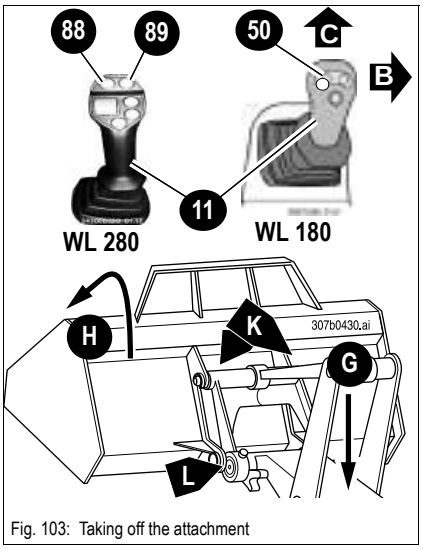


Fig. 103: Taking off the attachment

Open the lock on the quickhitch. To do this:

☞ *Press tip switch* **50 (88)** *on control lever* **11**

☞ **Slightly tilt the quickhitch forwards H. To do this:**
push control lever 11 *to the right* **B**

☞ **Lower loader unit G. To do this:**
push control lever 11 *forwards* **C.**

As soon as pin shanks **L** of the quickhitch are beneath the catch hooks of attachment **K**:

☞ *Reverse away from the attachment.*

3.42 Front/rear additional control circuit (option)

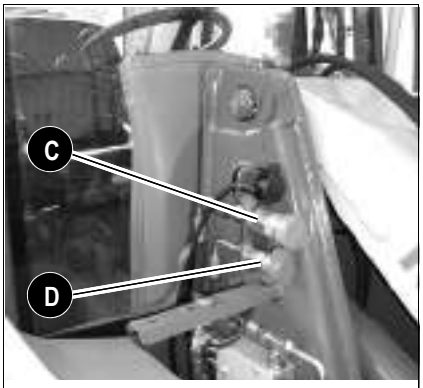


Fig. 104: Front hydraulic connections (WL 180, option)

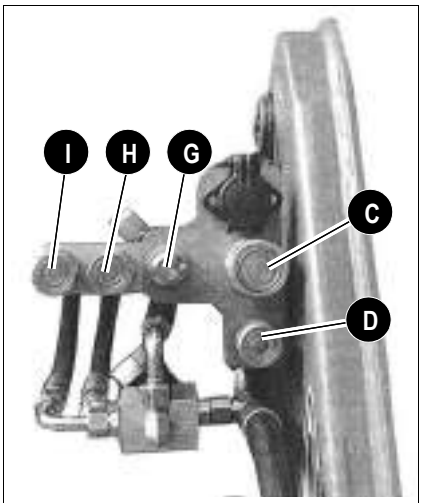


Fig. 105: Front hydraulic connections (WL 280, option)

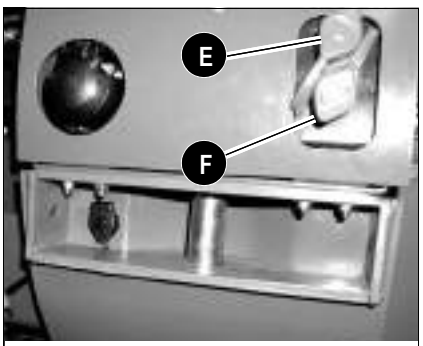


Fig. 106: Rear hydraulic connections (option)

Important

Possibility of unexpected machine movement. Pressing tip switch (fig. 107) 50 or 88 on control lever 11 unlocks the quickhitch.

- Press switch **59** (fig. 107) to position **A** to lock.
  - see Locking the 3rd control circuit on page 3-50 -

For operation of hydraulic front attachments (e.g. rotary broom) **or** hydraulic rear attachments (e.g. salt sprayer), the machine must be equipped with a 4th front/rear control circuit (option).

Important

The load is reduced if hydraulic attachments are connected at the front and rear at the same time.

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

Front/rear hydraulic connections (option)		
Connection	**Color**	**Function**
C	Blue	Unpressurized return to tank
D	Red	Pressure line
E	Red	Unpressurized return to tank
F	Red	Pressure line
G		Leak oil line
H		Pressure line for extra function (WL 280)
I		Pressure line for extra function (WL 280)

Operation of additional control circuit continuous operation

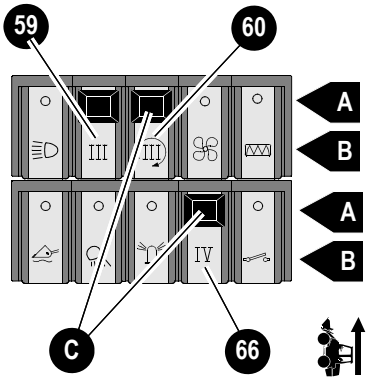


Fig. 107: Operation of additional control circuit

Operation:

☞ *With switches* **66**

➥ 52 l/min (front and rear connections) and

☞ *additionally with switch* **60**

➥ 75 l/min (front connection only): the additional control circuit is switched on or off with a solenoid valve.

Operation of front/rear additional control circuit (option)		
ON	☞ *Push lock* **C** *down and* ☞ *Press switch* **66** *down to position* **B**	➥ Front/rear 52 l/min additional control circuit is switched on ➥ Indicator comes on
ON	☞ *Push lock* **C** *down and* ☞ *Press switch* **60** *down to position* ***B***	➥ Front 75 l/min additional control circuit is switched on ➥ Indicator comes on
OFF	☞ *Press switch* **60/66** *to position* **A**	➥ The additional control circuit is switched off ➥ Indicator goes out

Specifications:

- see chapter 6 "Additional control circuit (option)" on page 6-4

Operation of extra function for additional control circuit (WL 280)

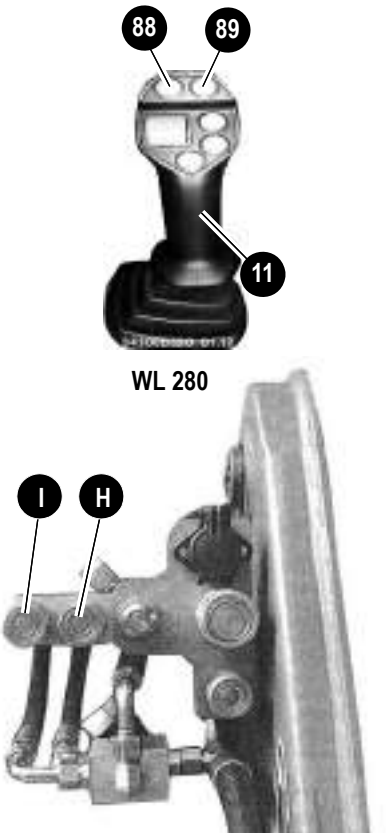


Fig. 108: Operation of extra function

Prerequisites:

☞ *Switch on the additional control circuit with switch* **60/66, see fig.** ***107***

Operation of extra function (option)		
ON	☞ *Press tip switch* **88/ 89**	➥ The extra function at the sockets **I/H** is enabled while pressing the tip switch
OFF	☞ *Release tip switch* **88/ 89**	➥ No extra function at the sockets **I/H**

3.43 ”Hose burst valve“ safety feature (option)

WARNING

Equipment damage and personal injury hazard. A burst hose or pipe will damage the machine and reduce operator control.

☞ *The “Hose burst valve” safety feature will activate as soon as a hose or a pipe bursts.*

☞ *Have damage to the hydraulic system and to the hose burst valve immediately repaired and checked by a qualified technician.*

Important

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

☞ *Switch off the load stabilizer to make sure the the hose burst valve works correctly.*

☞ *- see Load stabilizer for model WL 280 (option) on page 3-31*

Important

The safety feature “Hose burst valve” prevents the loader unit from being lowered or dumped out without being braked, in the event of a bursting hose or pipe - *see Applications with Lifting Gear* on page 2-7.

In the event of a burst hose, proceed as follows:

☞ *Stop the machine immediately*

☞ *If possible:*

- Carefully lower the loader unit to transport position
- Drive the machine out of the work area with the loader unit lowered

☞ *Apply the parking brake*

☞ *Switch off the engine*

☞ *Remove the starter key and lock the cab*

☞ *Secure the machine and the attachment*

Environment

Collect the spilled hydraulic oil in a suitable container.

☞ *Dispose of spilled hydraulic oil by an ecologically safe method*

☞ *Always contact the relevant authorities or commercial establishments in charge of oil disposal before disposing of biodegradable oil.*

☞ *Have the hose burst valve immediately repaired by an authorized workshop*

3.44 Working with the standard bucket

Fields of application of the standard bucket

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

➥ *- see Fields of application, use of attachments* on page 1-5

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)*- see chapter 2 "Applications with Lifting Gear*" on page 2-7
- Load diagram!

Safety instructions for working with the bucket

- Never drive up to the edge of a pit from outside.
- Never undermine the foundations of walls.
- Operation of the machine by unauthorized staff is prohibited!
- When working with the machine, look out for high-voltage cables, underground cables, gas and water pipes!
- When using lifting gear such as pallet forks, comply with the load diagrams valid for this machine
- Get informed on the legal regulations of your country which may prohibit driving on public roads with a full bucket!
- Also observe the footnotes/instructions *- see Fields of application, use of attachments* on page 1-5
- In addition, bear in mind the mandatory regulations relevant to accident prevention.
- If your machine is equipped with a load stabilizer (option)

WARNING

Personal injury hazard. An unlocked bucket can slip or fall unexpectedly.

☞ *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.*

☞ *- see Fitting attachments onto the quickhitch on page 3-52*

Recommendations for digging

- Exits from pits must be outside the digging line and as level as possible.
- Dig by removing adjacent strips if possible.
- Make sure you can drive forwards when driving out of the digging area with a fully loaded bucket.
- Whenever possible, drive in reverse when transporting a full bucket down a steep slope.

Tilt position of the bucket

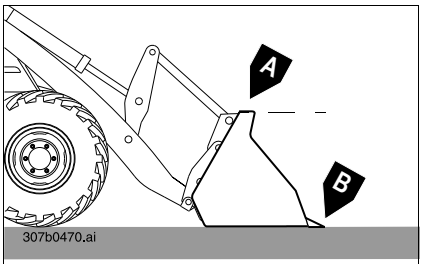


Fig. 109: Tilt position of the bucket

Important

Angle of mark **A** = angle of blade **B**

Transport position of the bucket

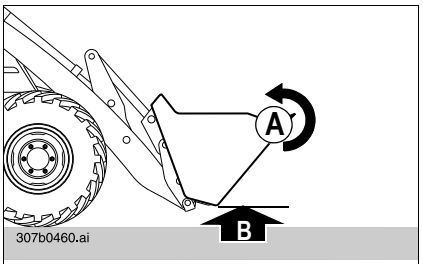


Fig. 110: Transport position of the bucket

Important

The bucket is in transport position if

- Bucket is tilted completely **A** and
- Marks on the loader unit and the machine frame are lined up **C**
- The distance of the bucket to the ground **B** is about **250 mm (10 in.)** with standard tires.

NOTICE

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

☞ *Lower the attachment to transport position and tilt it in*

Transporting with a full bucket

Fig. 111: Marks on loader unit and machine frame

WARNING

Tip-over hazard. Transporting full buckets in the raised position can cause the machine to tip while traveling across slopes or while cornering.

☞ *Travel with the empty or loaded bucket in the lowest practical position to keep the center of gravity low and avoid the risk of tipping the machines on slopes or while cornering.*

☞ *Tilt the bucket fully in*

☞ *Raise the loader unit to transport position*

Important

Local tax and safety regulations may prohibit the transport of material when driving on public roads.
Get informed on and follow the legal regulations of your locality.

Loading loose material

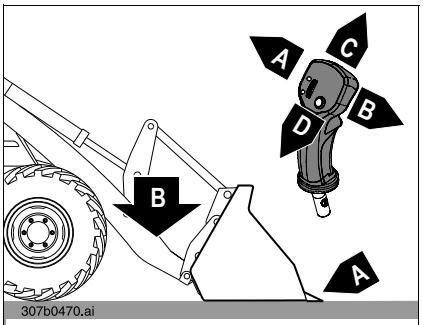


Fig. 112: Horizontal lowering of the loader unit

☞ *Align the blade parallel with the ground* **A**
- see Tilt position of the bucket on page 3-59

☞ *Lower the loader unit to the ground* **B**. *To do this:*
push the control lever forwards **C**

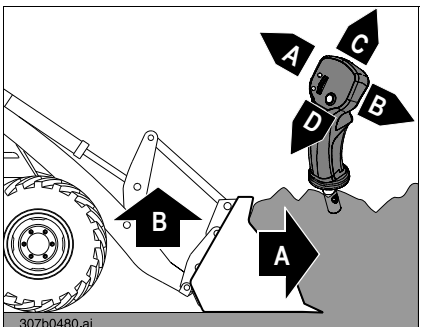


Fig. 113: Driving into the material

☞ *Drive forwards into the material* **A**

When the engine revs 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

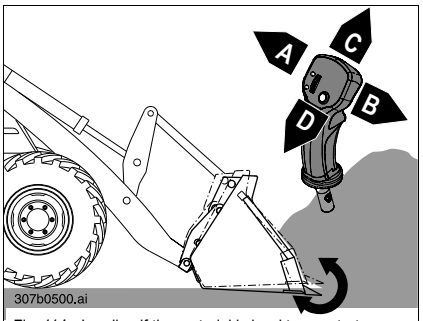


Fig. 114: Loading if the material is hard to penetrate

☞ *Proceed as for loading loose material, but in addition:*

☞ *Tilt the bucket in and out slightly. To do this: move the control lever to the left and right* ***A and B***

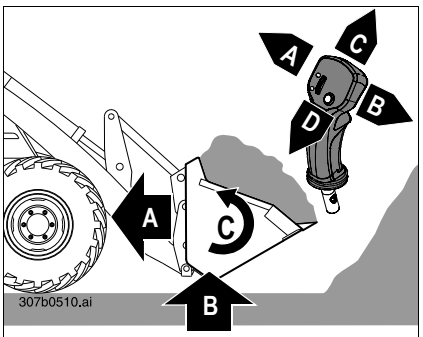


Fig. 115: Tilting in the bucket

Ending loading:

☞ *Tilt in the bucket* **C.** *To do this*:
push the control lever to the left A

☞ *Reduce engine rpm*

☞ *Reverse out of the material* **A**

☞ *Raise the bucket to transport position* **B**

Removing material/digging in soft soil

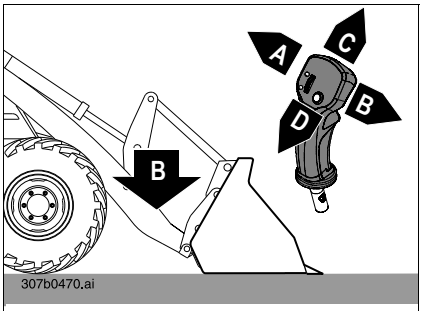


Fig. 116: Lowering the loader unit horizontal to the ground

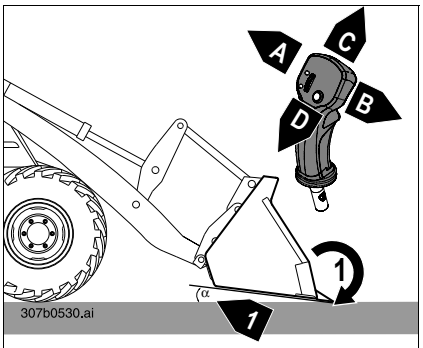


Fig. 117: Adjusting the digging angle

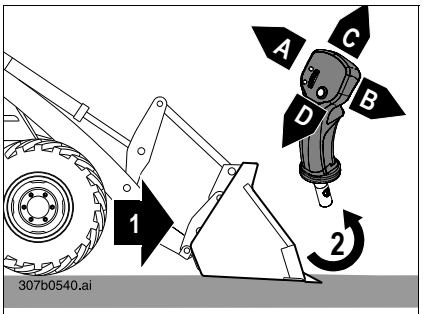


Fig. 118: Removing an even layer

WARNING

Collapse hazard. If foundations or walls are undermined, the foundation vertical wall can collapse.

☞ *Do not undermine foundations or walls.*

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

☞ *Adjust the digging angle* α **1**. *To do this push the control lever to the right* **B.**

☞ *Drive the machine forwards* **1.**

Once the bucket has penetrated the soil:

☞ *Adjust the digging angle* α *slightly flatter* **2**. *To do this: push the control lever to the left* **A**, *so that*

- Layer being removed is as even as possible and
- Wheel spin is reduced

☞ *Proceed as for loading loose material.*

Removing material/digging in hard soil

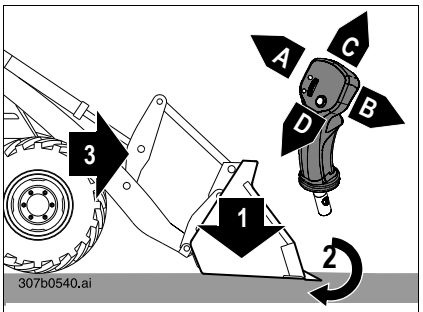


Fig. 119: Removing hard soil

☞ *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 slightly. To do this* **slightly push the control lever forwards C.**

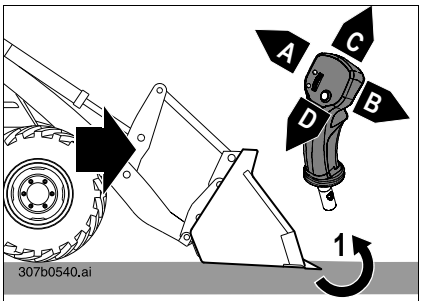


Fig. 120: Adjusting the digging angle flatter

Once the bucket has penetrated the soil:

☞ *Adjust the digging angle* α *slightly flatter* **1**. *To do this: push the control lever to the left* **A**, *so that*

- Layer being removed is as even as possible and
- 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)

WARNING

Collapse hazard. Digging under heaped material can cause it to collapse.

☞ *Do not undermine heaped material.*

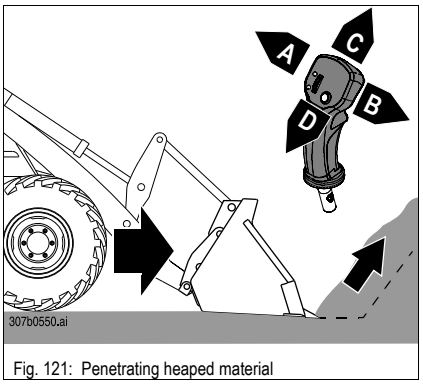


Fig. 121: Penetrating heaped material

☞ *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:

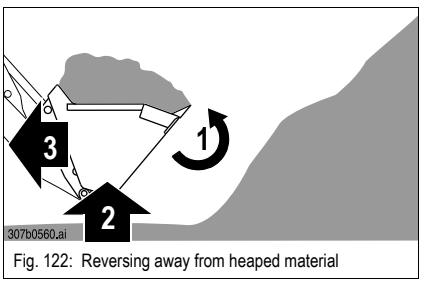


Fig. 122: Reversing away from heaped material

☞ *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)

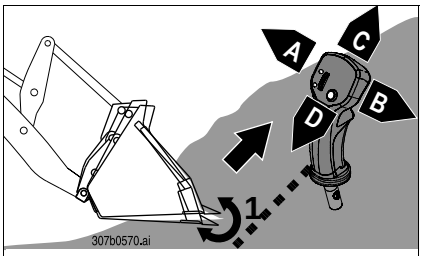


Fig. 123: Heaped compacted material

☞ *Proceed as for non-compacted material, however when raising the loader unit through the heaped material:*

☞ *Tilt the bucket slightly in and out (***1**). *To do this:*
*move the control lever alternately to the left and right (***A and B**).

➥ Material is loosened.

Grading

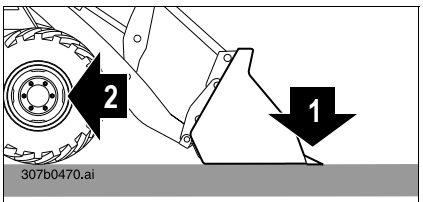


Fig. 124: Grading

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 recommendations for loading vehicles

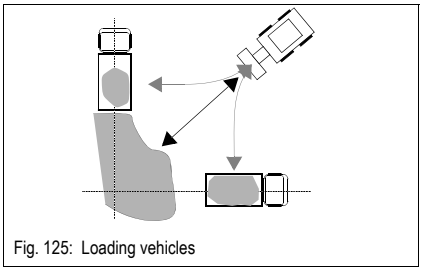


Fig. 125: Loading vehicles

When loading vehicles, we recommend taking the following into account:

- 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

If your machine gets stuck in the ground:

☞ *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.

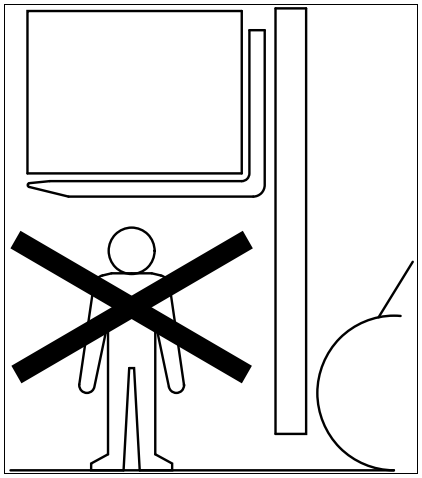
☞ *Operate the machine in reverse (slowly).*

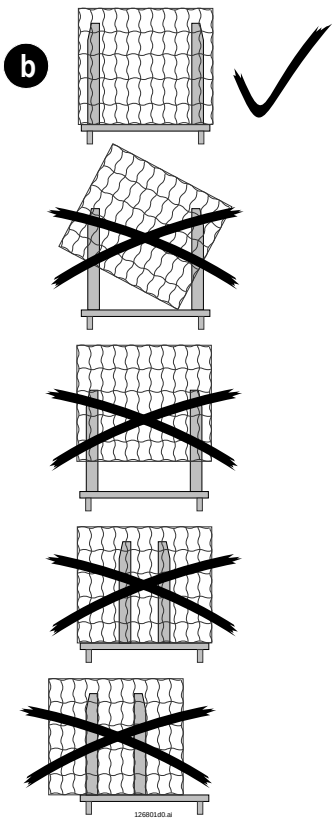
☞ *Repeat this procedure until the wheels reach firm ground.*

☞ *Once on firm ground, operate the machine in reverse away from the area.*

3.45 Working with the pallet forks

General safety instructions





- 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 (19.7 ft.) 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 (over 10 km/h (6 mph)!
- Never leave the machine with the load raised!
- Always transport the load close to the ground!
- Make sure only authorized persons handle and work with the attachment.
- Do not transport persons in the attachment.
- Crushing Hazard. Stay clear of suspended loads!
- 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 to 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.
- Always tilt the attachment slightly in (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!

- 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 authorized 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 center 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
- Strap down loads, if necessary, to avoid loosing them
- Do not raise with the tilt ram (tilt device)
- Bear in mind the limits of application for the fork lift, and its Operator's Manuals
- Perform frequent visual checks
- Have regular checks 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 authorized to perform repair work on the fork arms
- No transport of persons on the fork arms
- No transport of molten material
- No cable-laying work 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 Control lever lock (joystick)* on page 3-24
- Always follow the Pallet forks load diagram. 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 (39 in) 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!

Pallet forks load diagram

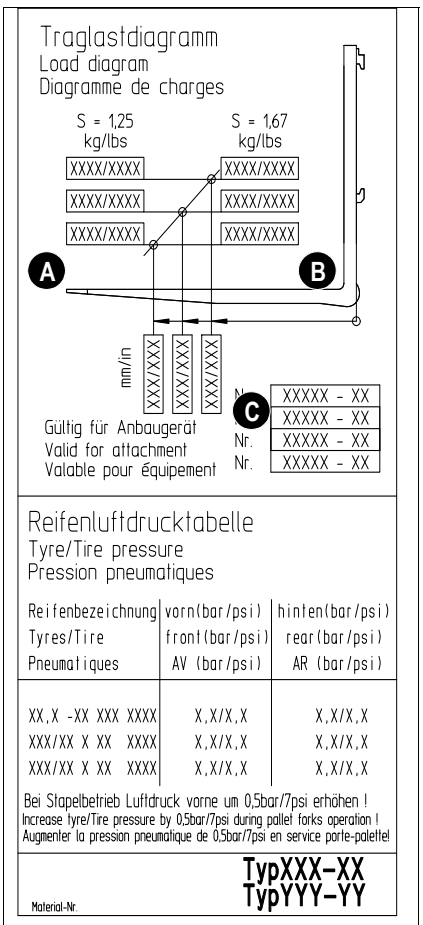


Fig. 126: Load diagram

The load diagram is located at the rear loader unit bulkhead, values are calculated for the respective machine model
(- *see chapter 1 "Use: attachment*" 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 center to the fork frame **C** (lower row of figures).

Take this into account also when using fork arm extensions!

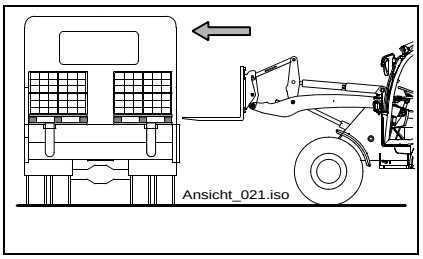
Example:

Off-road → safety factor **S = 1.67** (framed row of figures on the right **B**)

Load distance = 600 mm (23 in) (vertical center line).

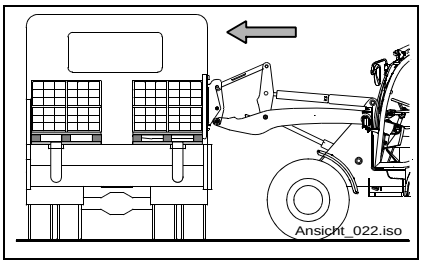
The maximum load **C** amounts to **xxxx**! (Intersection of the middle vertical line with the slanting line (load curve))

Picking up loads with the pallet forks



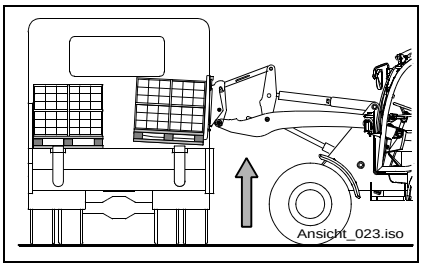
☞ *Move the wheel loader up to the load so that the pallet forks or the fork arms are at a right angle to the load.*

➥ The fork arms must be the furthest possible apart, and at an equal distance to 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*

☞ *Tilt in the load slightly backwards*

NOTICE

Do not exceed the loader's output limit.

☞ *Observe the load diagram. The diagram is affixed at the rear of the loader unit bulkhead*
- see Pallet forks load diagram on page 3-68

Transporting loads with the pallet forks

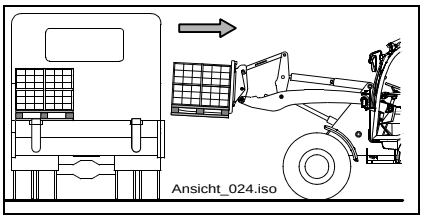
WARNING

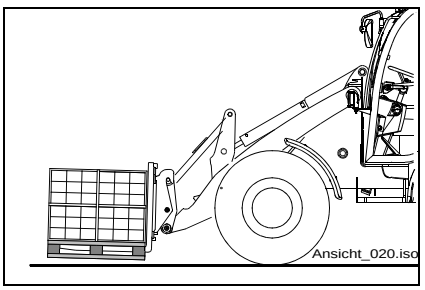
Tip-over hazard. When transporting loads with the pallet forks raised, the load can fall down or the machine can tilt.

☞ *Particularly when turning or traveling on slopes, make sure that the center of gravity is in the lowest possible position.*

☞ *To avoid accidents:*

- *Tilt the pallet forks slightly backwards.*
- *Lower the pallet forks to transport position and only raise them, if necessary, just before setting down the load.*
- *Do not raise the load over people.*
- *Do not park the machine with a raised load.*
- *Avoid any operation that might be a risk to machine stability.*





☞ *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 (ground clearance - see Transport position of the bucket on page 3-59).*
If necessary, increase ground clearance for off-road applications.

☞ *Always tilt the pallet forks slightly in (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.*

3.46 Fitting a multipurpose bucket

Attaching a multipurpose bucket to the quickhitch

☞ *Fit the multipurpose bucket*

➥ *- see Fitting attachments onto the quickhitch* on page 3-52

☞ *Make sure both lock pins of the lock ram are safely locked in the attachment!*

Fig. 127: Checking the lock pins

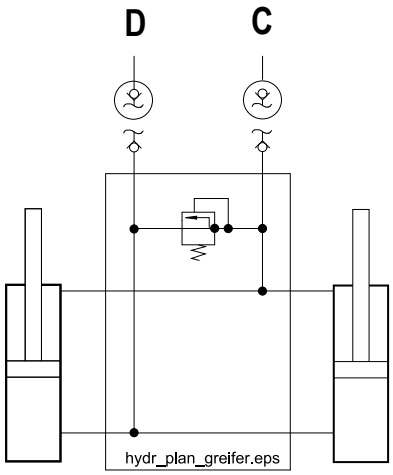
WARNING

Personal injury hazard. Unlocked quickhitch attachments can fall, crush, or cut.

☞ *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 bores on the attachment.*

☞ *Make sure the lock pins of the quickhitch are fully extended before coupling the hydraulic lines of the additional control circuit to the attachment.*

Hydraulic connections on the multipurpose bucket: overview



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

Connecting hydraulic lines to the machine

Important

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

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

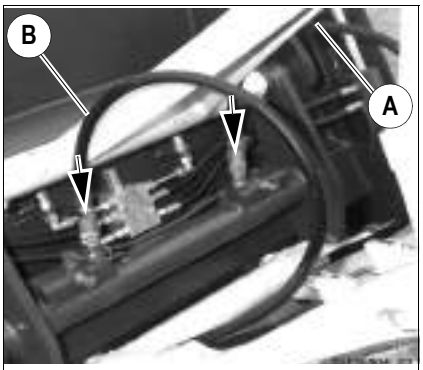


Fig. 128: Removing the hydraulic connection from the quick-hitch

☞ *Switch off the engine.*

☞ *Apply the parking brake.*

☞ *Release the pressure in the hydraulic lines.*

➥ *- see Depressurizing the quick couplers on the loader unit* on page 3-51.

☞ *Remove hydraulic lines* **A** *and* **B** *from the quickhitch.*

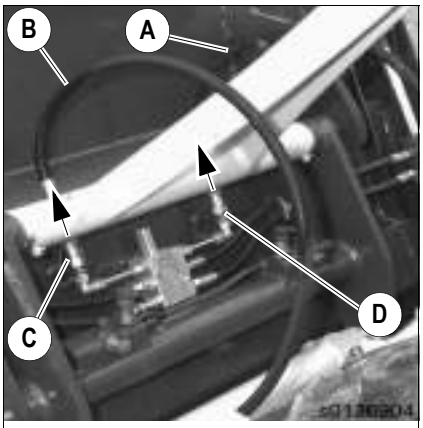


Fig. 129: Connecting hydraulic multipurpose bucket lines

☞ *Connect hydraulic lines* **A** *and* **B** *to the hydraulic connections* **C** *and* ***D*** *of the attachment.*

Important

Make sure the quick couplers are properly connected - never connect the hydraulic lines crosswise, otherwise the attachment functions are inverted and the hydraulic lines squeezed by dumping out and tilting in the attachment (- *see Working with the multipurpose bucket* on page 3-74).

☞ *Functional check:*

- Make sure the hydraulic lines cannot be squeezed within the entire moving range of the attachment

Removing the multipurpose bucket from the quickhitch

WARNING

Personal injury hazard. Improperly removed attachments can fall over, crush, or cut.

☞ *Place the removed attachment on level ground so that it will not fall over.*

☞ *Position the attachment so that it will not tip or swing unexpectedly once it is unlocked.*

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.
To avoid this problem, we recommend removing the attachment as follows:

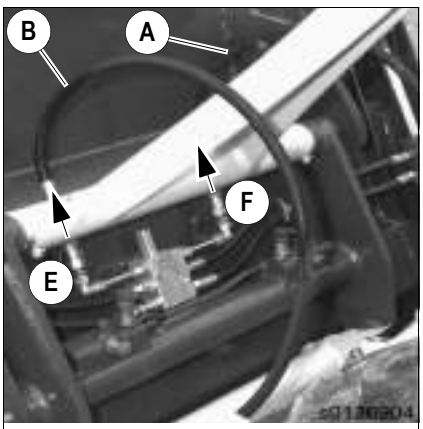


Fig. 130: Removing hydraulic multipurpose bucket connections

☞ *Tilt in the multipurpose bucket completely.*

☞ *Close the multipurpose bucket to a gap of about 20 cm (7.9 in.).*

☞ *Unlock the multipurpose bucket*

➥ *- see Hydraulic connections on the multipurpose bucket: overview* on page 3-71

☞ *Switch off the engine.*

☞ *Apply the parking brake.*

☞ *Release the pressure in the hydraulic lines.*

➥ *- see Depressurizing the quick couplers on the loader unit* on page 3-51.

➥ Multipurpose bucket closes without pressure

☞ *Remove hydraulic lines* **A** *and* **B** *from quick couplers* **E** *and* **F** *on the multipurpose bucket.*

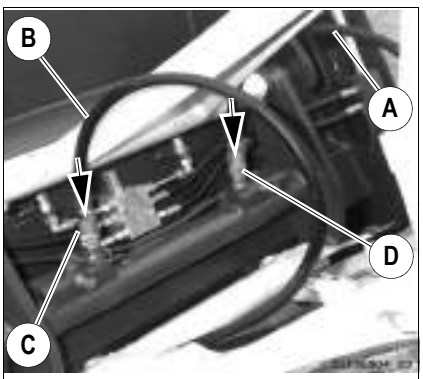


Fig. 131: Connecting hydraulic quickhitch lines

☞ *Connect hydraulic lines* **A** *and* **B** *onto quick couplers* **C** *and* **D** *of the quickhitch*

Important

Make sure the quick couplers are properly connected - never connect the hydraulic lines crosswise, otherwise the functions of the quickhitch ram are inverted.

After connecting the hydraulic ram of the quickhitch - as described above:

☞ *Slightly dump out the multipurpose bucket to a horizontal position.*

☞ *Set down the multipurpose bucket.*

➥ *- see Removing an attachment from the quickhitch* on page 3-54

3.47 Working with the multipurpose bucket

WARNING

Personal injury hazard. Unlocked quickhitch attachments can fall, crush, or cut.

☞ *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 bores on the attachment.*

☞ *- see Locking attachments without hydraulic functions on page 3-53*

NOTICE

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

☞ *Lower the attachment to transport position and tilt it in.*

Driving on public roads with the multipurpose bucket

Important

Some local regulations prohibit traveling on public roads if the distance between the front edge of the bucket and the center of the steering wheel is over 3500 mm (138 in.) in transport position. Get informed on and follow the legal regulations of your locality.

☞ *Empty the multipurpose bucket.*

☞ *Tilt in the multipurpose bucket (base position).*

☞ *Switch off the engine.*

☞ *Apply the parking brake.*

☞ *Release the pressure on the quick couplers.*

➥ *- see Depressurizing the quick couplers on the loader unit* on page 3-51

☞ *Uncouple the hydraulic lines from the multipurpose bucket and connect them to the quickhitch.*

➥ *- see Removing the multipurpose bucket from the quickhitch* on page 3-73

☞ *Hitch the multipurpose bucket in transport position.*

➥ *- see Special instructions for operating on public roads* on page 3-23

☞ *Mount removable parts on the machine (front-edge protection, light strip or additional clearance lights - if necessary, and if fitted on the machine depending on the legal regulations of your country).*

☞ *Secure the control lever (joystick).*

➥ *- see Control lever lock (joystick)* on page 3-24

Grading and scraping

WARNING

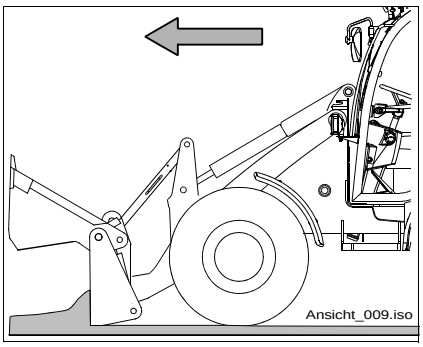
Tip-over hazard. Transporting full attachments in the raised position can cause the machine to tip while traveling across slopes or while cornering.

☞ *Travel with the attachment in the lowest practical position to keep the center of gravity low and avoid the risk of tipping the machines on slopes or while cornering.*

☞ *Tilt the attachment completely inward.*

☞ *Lower the attachment to transport position.*

Grading

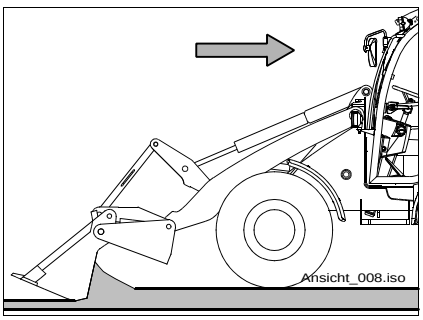


☞ *Fold up the front half of the bucket.*

☞ *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.*

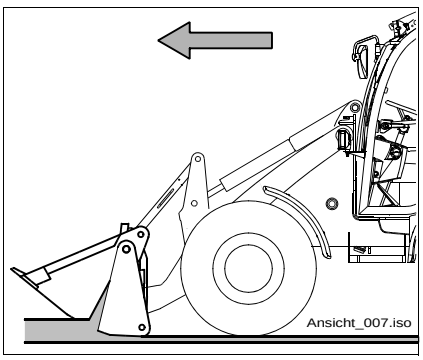
☞ *Fold up the front half of the bucket.*

☞ *Lower the multipurpose bucket to the ground.*

☞ *Set the angle of the bucket.*

☞ *Surfaces are graded or scraped when driving in reverse.*

Stripping in thin layers (scraper)



☞ *Set a flat digging angle*

☞ *Fold up the front half of the bucket by about 10 to 15 cm (4 to 6 in.)*

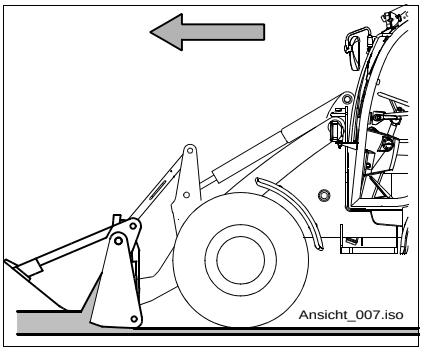
☞ *Move off the machine*

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

Important

This position allows to strip e.g. grass turf down to a thickness of about 8 cm (3.1 in.).

Spreading material in thin layers



☞ *Set the rear cutting edge parallel to the ground.*

☞ *Open the bucket until the required quantity of material is emptied onto the ground.*

☞ *Slowly, start driving (travel operation) the machine.*

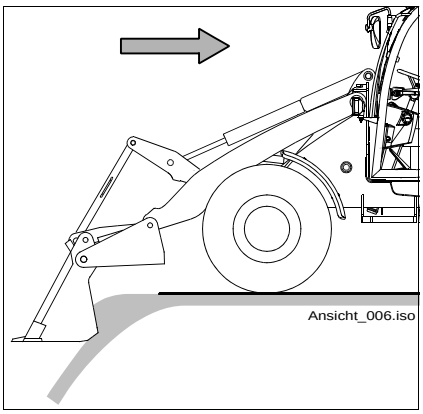
☞ *Lower the multipurpose bucket to the ground.*

➥ The rear cutting edge grades the material as it is emptied by opening the front half of the bucket.

Important

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).

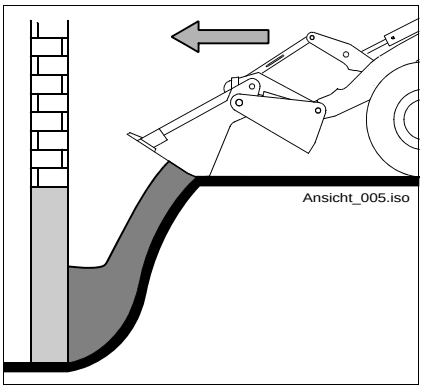
Pulling out material from slopes



Important

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

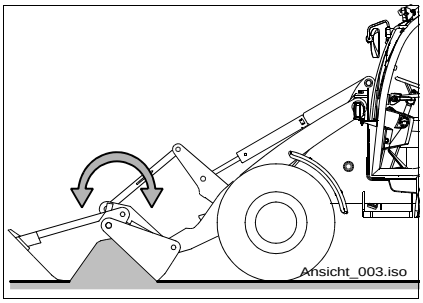


Important

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.

☞ *Open the front half of the bucket (multipurpose bucket).*

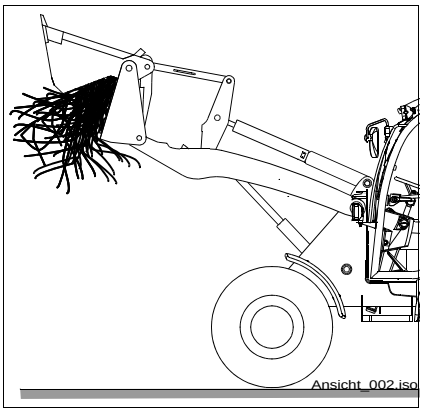
☞ *Dump out the bucket.*

☞ *Lower the bucket to the ground. Make sure both bucket halves touch the ground.*

☞ *Close and tilt in the multipurpose bucket at the same time.*

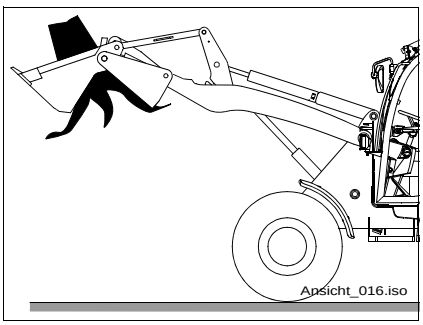
☞ *Raise the bucket with the lift hydraulics.*

Grabbing bulky material



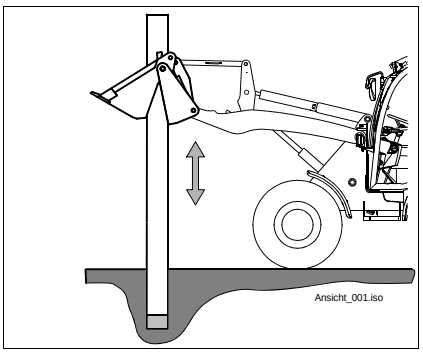
➥ The multipurpose bucket allows to safely grab, pick up and transport building timber, reinforcement bars, packaging bands, wire etc.

Grabbing large objects



➥ The multipurpose bucket allows to safely grab, pick up and transport large objects.

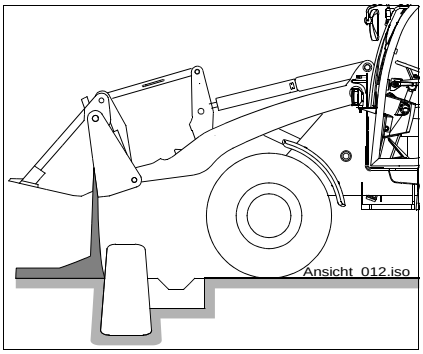
Pulling out and setting posts



☞ *Open the multipurpose bucket and lower it over the post. Close the bucket to grip the post firmly.*

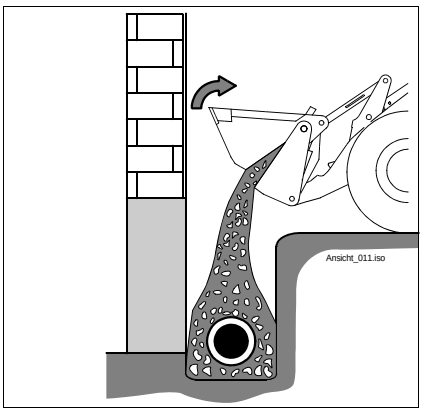
☞ *Loosen the post with careful up-and-down movements.*

Precise unloading



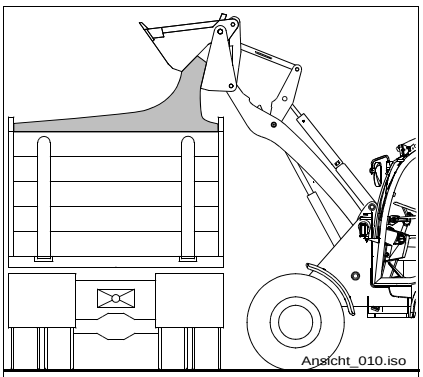
➥ Precise dosing and placement of pourable material.

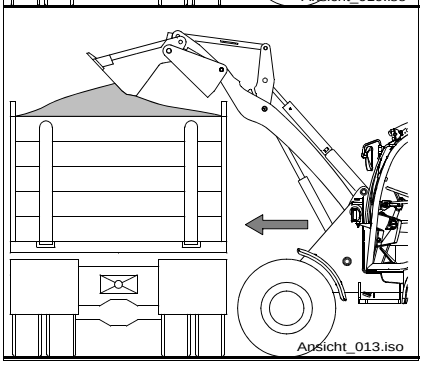
Backfilling round gravel into drainage ditches



➥ Bucket teeth move back from the wall as the bucket opens.

Unloading from the bottom of the bucket for increased dump heights





➥ Increases the dump height by at least 55 cm (21.6 in.) (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.

3.48 Working with an attachment adapter (option)

Use:

➥ *- see chapter 1 "Use: attachment*" on page 1-5

WARNING

Personal injury hazard. Unlocked quickhitch attachments can fall, crush, or cut.

☞ *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 bores on the attachment.*

☞ *Make sure the lock pins of the quickhitch are fully extended before coupling the hydraulic lines of the additional control circuit to the attachment.*

Mounting an attachment adapter onto the quickhitch

☞ *Install and connect the hydraulic hose with the quickhitch:*

➥ *- see Attaching a multipurpose bucket to the quickhitch* on page 3-71

☞ *Remove the attachment adapter.*

➥ *- see Removing an attachment from the quickhitch* on page 3-54

Mounting an attachment onto the attachment adapter

☞ *See the Operator's Manual of the attachment for mounting and connecting the hydraulic hoses to the attachment*

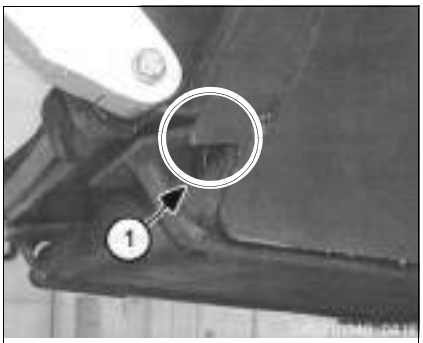


Fig. 132: Locking the attachment with the attachment adapter

WARNING

Personal injury hazard. Unlocked quickhitch attachments can fall, crush, or cut.

☞ *Before starting work, make sure the attachment is safely locked with the attachment adapter by means of lock pins 1 on the left and right. You must be able to see the lock pins on both sides of the mounting holes on the attachment adapter.*

☞ *Connect the hydraulic hoses.*

➥ *- see Fitting a multipurpose bucket* on page 3-71

➥ *- see Locking: attachments with hydraulic functions* on page 3-53

➥ **Notes:**

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 authorized staff.

4.1 Engine trouble

Problem	Possible causes	See
Engine does not start or is not easy to start	Steering-column control lever **29** not in neutral	*3-16*
	Engine starting temperature too low	
	Wrong SAE grade of engine lubrication oil	*5-35*
	Fuel grade does not comply with specifications	*5-35*
	Defective or flat battery	*5-25*
	Loose or oxidised cable connections in starter circuit	
	Defective starter, or pinion does not engage	
	Wrong valve tip clearance	
	Defective fuel injector	
Engine starts, but does not run smoothly or faultless	Fuel grade does not comply with specifications	*5-35*
	Wrong valve tip 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	*5-10*
	Defective air filter maintenance switch or gauge	*5-10*
	Dirty oil radiator fins	
	Defective fan, torn or loose V-belt	*5-12*
	Cooling air heats up	
	Resistance in cooling system too high, flow capacity too low	
	Defective fuel injector	
Insufficient engine output	Oil level too high	*5-5*
	Fuel grade does not comply with specifications	*5-35*
	Dirty air filter	*5-10*
	Defective air filter maintenance switch or gauge	*5-10*
	Wrong valve tip clearance	
	Injection line leaks	
	Defective fuel injector	
Engine does not run on all cylinders	Injection line leaks	
	Defective fuel injector	

Problem		Possible causes	See
Insufficient or no engine oil pressure		Oil level too low	*5-5*
		Engine inclination too high	
		Wrong SAE grade of engine lubrication oil	*5-35*
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	*5-35*
		Wrong valve clearance	
		Defective fuel injector	
	Black	Dirty air filter	*5-10*
		Defective air filter maintenance switch or gauge	*5-10*
		Wrong valve clearance	
		Defective fuel injector	

5 Maintenance

5.1 Important information on maintenance and service work

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

WARNING

Crushing hazard. An unsecured or improperly supported loader unit may drop unintentionally.

☞ *Do not perform assembly and maintenance work if the loader unit is raised and not secured.*

☞ *Secure the loader unit with an appropriate prop or support to prevent it from being lowered unintentionally.*

☞ *Follow the safety instructions provided in chapter 2 “SAFETY INSTRUCTIONS” of this Operator's Manual.*

☞ *Also follow the specific instructions provided in the Operator's Manuals of the attachments.*

NOTICE

Daily and weekly service and maintenance work must be carried out by a specifically trained operator. All other maintenance work must be carried out only by the trained and qualified staff of your KramerAllrad sales partner.

☞ *- see Maintenance plan (overview) on page 5-36*

5.2 Fuel system

General safety instructions for refueling

- Extreme caution is essential when handling fuel - high risk of fire!
- Never perform work on the fuel system in the vicinity of naked flames or sparks!
- Do not smoke when working on the fuel system or when refueling!
- Before refueling, switch off the engine and remove the starter 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

Use only high-grade fuels

Grade	Cetane number	Use
No. 2-D according to EN 590 (EU) No. 2-D ASTM975-94 (USA)	Min. 45	For normal outside temperatures
No. 1-D according to EN 590 (EU) No. 1-D ASTM975-94 (USA)		For outside temperatures below 4 °C (39°F)or for operation above 1500 m (4921 ft.) altitude

Stationary fuel pumps

General

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

Refueling from barrels

If refueling from barrels cannot be avoided, note the following points:

- Barrels must neither be rolled nor tilted before refueling.
- Protect the suction pipe opening of the barrel pump with a fine-mesh strainer.
- Immerse it down to a max. 15 cm (5.9 in.) above the floor of the barrel.
- Only fill the tank using refueling aids (funnels or filler pipes) with integral microfilter.
- Keep all refueling containers clean at all times.

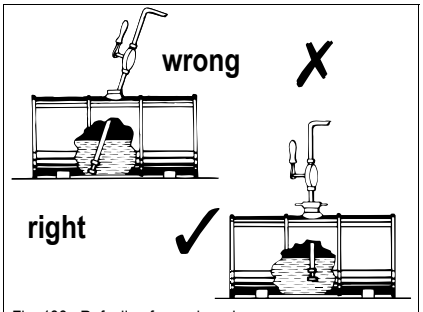


Fig. 133: Refueling from a barrel

Refueling

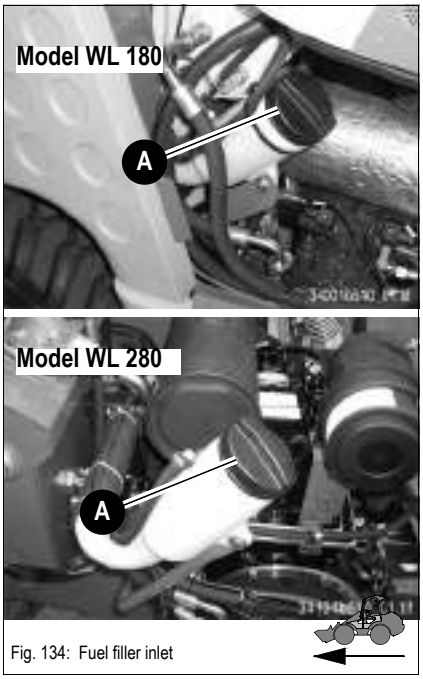


Fig. 134: Fuel filler inlet

Filler inlet **A** for the fuel tank is located under the engine cover, on the left in driving direction.

WARNING

Fire and fume inhalation hazards.

☞ *Do not refuel in closed rooms.*

☞ *Never perform maintenance or repair work on the fuel system in the vicinity of open flames or sparks.*

☞ *Never smoke when working on the fuel system or when refueling.*

☞ *Before refueling, stop the engine and remove the starter key.*

☞ *Wipe up any fuel spills immediately.*

☞ *Remove spilled fuel from the machine components and surfaces before use to reduce the risk of fire.*

Environment

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

Important

Do not run the fuel tank completely dry. Otherwise, air is drawn into the fuel system.

Bleeding the fuel system

Important

If the fuel tank has been run empty, or after having carried out maintenance work on the fuel system (filter replacement, water separator cleaned etc.), the fuel system bleeds itself automatically when starting the engine!

- It must not be bled manually.

Checking/cleaning the water separator

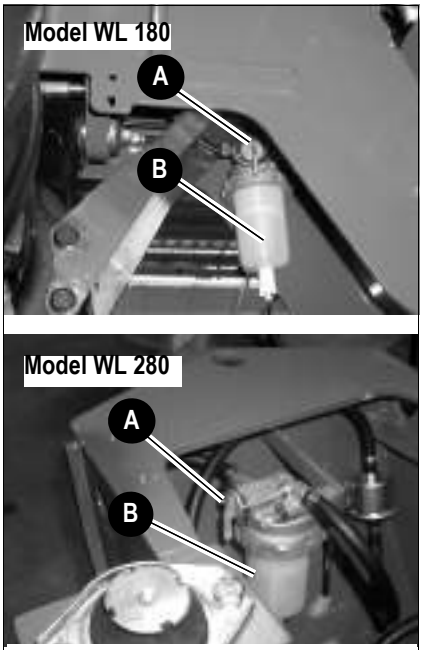


Fig. 135: Bleeding the fuel system

The water separator is located.

➥ at the rear right on the model WL 180 machine frame.

➥ at the rear in the engine vat on the model WL 280 machine frame.

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

- Switch off the engine.
- Apply the parking brake.
- Switch off the engine and remove the starter key.
- Place a container to collect the oil.
- Remove servicing lid (model WL 280 only).
- Close stop cock **A** on the water separator.
- Remove sight glass **B.**
- Drain the water and carefully clean the sight glass.
- Check the sealing ring for damage and replace it if necessary.
- Install sight glass **B.**
- Open stop cock **A** on the water separator.
- Start the diesel engine and check the water separator for leaks.
- Install servicing lid (model WL 280 only).

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 authorized workshop.

5.3 Engine lubrication system

CAUTION

Burn hazard. Engine and exhaust components become very hot during operation.

☞ *Wait at least 10 minutes after stopping the engine.*

☞ *Wear protective glasses, gloves, and clothing.*

Checking the oil level

Important

Check the oil level every 10 service hours or once a day.
We recommend checking it before starting the engine. After switching off a warm engine, wait at least 5 minutes before checking.

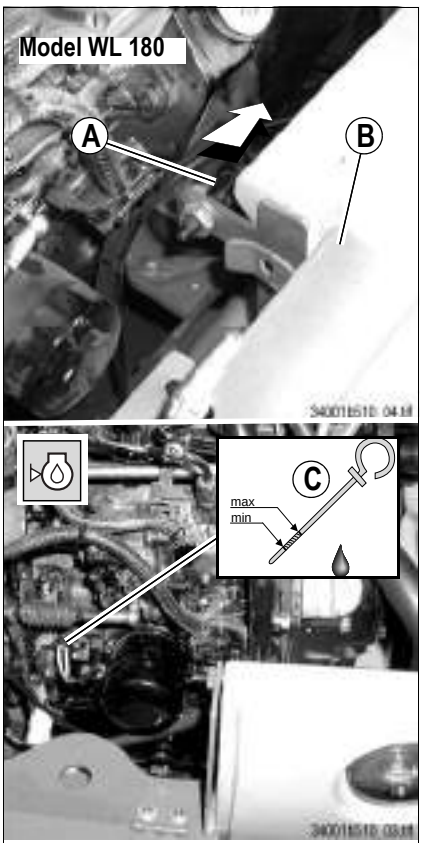


Fig. 136: Checking the oil level

Proceed as follows:

☞ *Park the machine on level ground.*

☞ *Switch off the engine! - see chapter 3 "Stopping and parking the machine" on page 3-30.*

☞ *Apply the parking brake.*

☞ *Open the engine cover.*

☞ **Model WL 180 only:** *Pull maintenance flap* **B** *and latch* **A** *to the right.*

☞ Fold back maintenance flap **B.**

☞ *Oil dipstick* **C:**

- Pull it out
- Wipe it with a lint-free cloth.
- Push it back in as far as possible.
- Withdraw it and read off the oil level.

☞ *However if necessary, fill up the oil at the latest when the oil reaches the MIN mark on dipstick* **C** *- see Filling up engine oil on page 5-6*

NOTICE

Possibility of equipment damage. If the engine oil level is too low or if an oil change is overdue, this can cause engine damage or loss of power.

☞ *Have the oil changed by an authorized service facility.*

☞ *Observe the maintenance intervals - see Maintenance plan (overview) on page 5-36*

☞ *Have the oil changed by an authorized service center.*

Filling up engine oil

NOTICE

Possibility of engine damage from too much oil or incorrect engine oil.

☞ *Do not add engine oil above the MAX mark of oil dipstick 136/C.*

☞ *Use only the specified engine oil .*

Environment

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

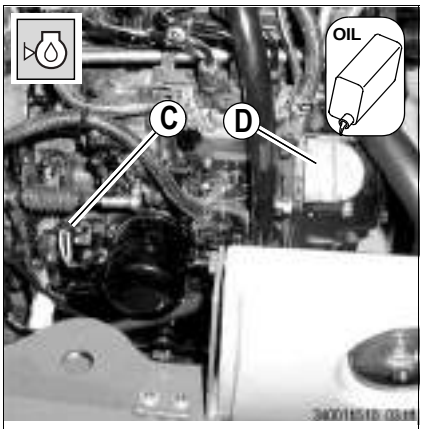


Fig. 137: Oil dipstick and oil filler cap

☞ *Proceed as follows:*

- Clean the area around oil filler cap **D** with a lint-free cloth.
- Open filler cap **D.**
- Raise oil dipstick **C** slightly to allow any trapped air to escape.
- Add engine oil.
- Wait a moment until all the oil has run into the oil sump.
- Check the oil level - *see Checking the oil level* on page 5-5.
- Add engine oil if necessary and check the oil level again.
- Close filler cap **D.**
- Push oil dipstick **C** back in as far as possible.
- Completely remove all oil spills from the engine.

5.4 Engine and hydraulics cooling system

The combined oil/water cooler is located in the engine compartment, on the right side of the engine. It cools the diesel engine, and the hydraulic oil of the drive and work hydraulics.

The expansion tank for the coolant is also located in the engine compartment on the right, in front of the battery.

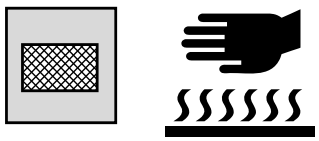
Checking / filling up coolant

- Dirt on the radiator fins reduces the radiator's heat dissipation capacity! To avoid this:
  - ☞ Clean the outside of the radiator at regular intervals. Refer to the maintenance plans in the appendix for the cleaning intervals
  - ☞ In dusty or dirty work conditions, clean more frequently than indicated in the maintenance plans
- An insufficient coolant level reduces the heat dissipation capacity as well and can lead to engine damage! Therefore:
  - ☞ Check the coolant level at regular intervals. Refer to the maintenance plans in the maintenance section for the intervals
  - ☞ If coolant must be added frequently, check the cooling system for leaks and/or contact your dealer!
  - ☞ 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 switching off the engine
- The use of the wrong coolant can destroy the engine and the radiator. Therefore:
  - ☞ Add enough antifreeze compound to the coolant - but never more than 50 %. If possible use brand-name antifreeze compounds with anticorrosion additives
  - ☞ Observe the coolant compound table in the *Coolant compound table* on page 6-9
  - ☞ Do not use radiator cleaning compounds if an antifreeze compound has been added to the coolant - otherwise this causes sludge to form, which 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: Specific safety instructions



WARNING

Burn hazard. The coolant in the system is hot under normal operating conditions and under about 1 bar (15 psi) pressure. Engine and exhaust components become very hot during operation.

☞ *Never open the coolant tank or drain coolant if the engine is hot.*

☞ *Wait at least 15 minutes after stopping the engine.*

☞ *Wear protective glasses, gloves and clothing.*

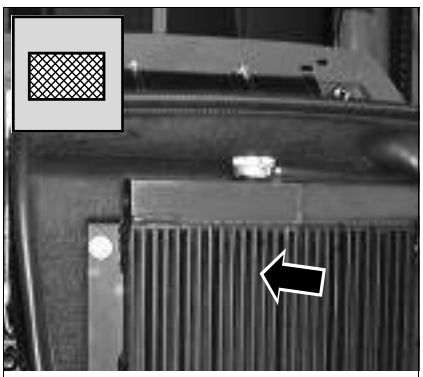


Fig. 138: Cleaning the radiator

☞ *Park the wheel loader on level ground.*

☞ *Lower the loader unit fully.*

☞ *Apply the parking brake.*

☞ *Switch off the engine and let it cool down.*

☞ *Move the starter key.*

☞ *Open the engine cover.*

☞ *Clean the radiator fins by blowing compressed air outwards from the engine side.*

NOTICE

Dirt on the radiator fins reduces the radiator's heat dissipation capacity and can cause damage to the engine and the hydraulic system.

☞ *In order to ensure the radiator's optimal cooling capacity, clean the radiator fins with a compressed air gun. Take care not to damage the fins while cleaning them.*

☞ *Check the radiator **once a day** for dirt and clean it if necessary.*

☞ *Clean the radiator more frequently in dusty or dirty work conditions.*

Checking/filling up the coolant level

Important

Check the coolant level every 10 service hours or once a day.
We recommend checking it before starting the engine.

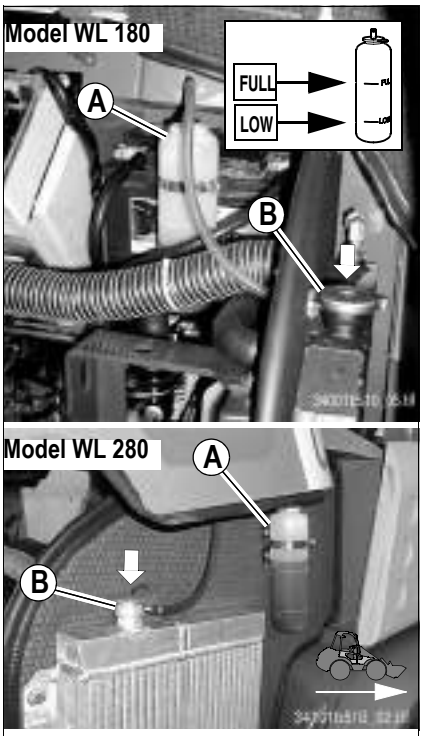


Fig. 139: Expansion tank for coolant

☞ *Proceed as follows:*

- Park the machine on level ground
- Switch off the engine! - *see chapter 3 "Stopping and parking the machine"* on page 3-30
- Apply the parking brake.
- Open the engine cover.
- Check the coolant level in the transparent expansion tank **A.**

If the coolant level is below seam LOW of the expansion tank:

☞ *Add coolant.*

WARNING

Burn hazard. The coolant in the system is hot under normal operating conditions and under about 1 bar (15 psi) pressure.

☞ *Never open the coolant tank or drain coolant if the engine is hot.*

☞ *Wait at least 15 minutes after stopping the engine.*

☞ *Wear protective glasses, gloves and clothing.*

☞ *Open filler cap* **B** *to the first notch and release the pressure.*

☞ *Reduce the overpressure in the radiator. To do this:*
Press filler cap **B** *down.*

☞ *Open the cap to the first notch and fully release the pressure.*

☞ *Open filler cap* **B.**

☞ *Fill in coolant up to the lower edge of the filler inlet (radiator)*

☞ *Close filler cap* **B.**

☞ *Start the engine and let it warm up for about 5 - 10 minutes.*

☞ *Switch off the engine and check the coolant level again.*

➥ The coolant level must be between the **LOW and FULL** tank seams

☞ *If necessary, fill up coolant and repeat the procedure until the coolant level remains constant.*

5.5 Air filter

NOTICE

The filter cartridge will be damaged if it is washed or brushed out! Bear in mind the following to avoid premature engine wear!

☞ *Do not clean the filter cartridge.*

☞ *Replace the filter cartridge when the indicator comes on.*

☞ *Never reuse a damaged filter cartridge.*

☞ *Ensure cleanliness when replacing the filter cartridge!*

Checking air filter contamination once a week

Maintenance display **B** on the filter housing monitors the filter cartridge.

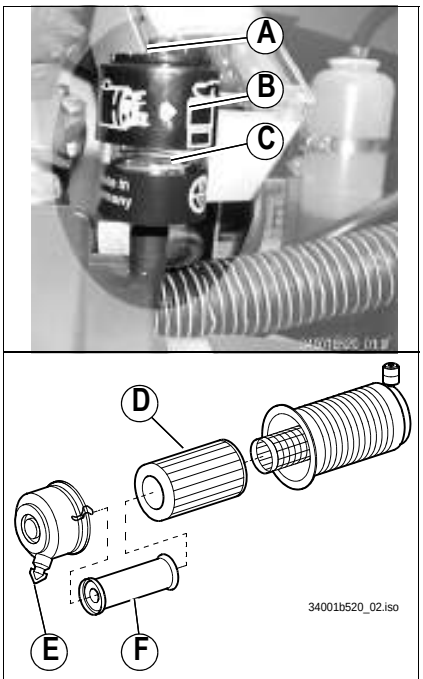


Fig. 140: Air filter with maintenance display

☞ *Filter cartridge* **D** *must be replaced:*

- If the **red** mark **C** in maintenance display **B** is visible
- At the latest after 1500 service hours (however once a year)

➥ *- see Replacing the filter cartridge* on page 5-11

Important

For **applications in especially dusty environment**, the air filter is fitted with an extra safety cartridge **F**. Do not clean the safety cartridge. Replace the safety cartridge every third time maintenance work is performed!

NOTICE

Filter cartridge degradation. Filter cartridges degrade prematurely in environments with acidic air, such as acid production facilities, steel and aluminum mills, chemical plants, and other non-ferrous metal plants.

☞ *Replace filter cartridge* **D** *and safety cartridge* **F** *at the latest after 500 service hours!*

☞ *- see Replacing the filter cartridge on page 5-11*

Functional check of the dust valve once a week

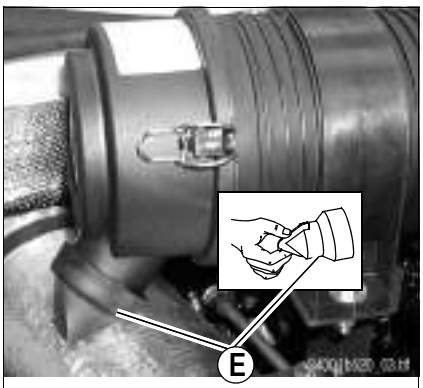


Fig. 141: Air filter - dust valve

☞ *Proceed as follows:*

- 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.*

Replacing the filter cartridge

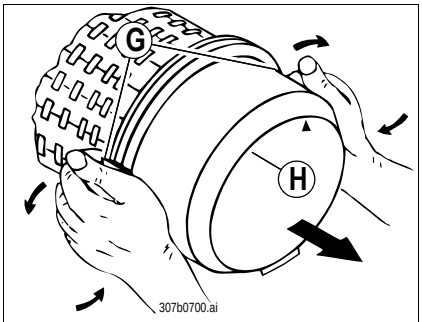


Fig. 142: Removing the lower housing section

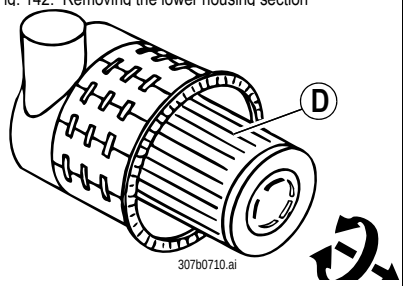


Fig. 143: Removing the filter element

☞ *Change filter cartridge* **D** *as follows:*

- Switch off the engine and remove the starter key.
- Prevent the machine from rolling away.
- *- see chapter 3 "Stopping and parking the machine*" on page 3-30
- Open the engine cover.
- Fold both bow clips **G** on lower housing section **H** to the outside.
- Remove lower housing section **H.**
- Carefully remove filter cartridge **D** with slightly turning movements.
- In addition, every 3rd time the filter is replaced, carefully remove the safety cartridge 140/**F** with slightly turning movements.

NOTICE

Keep in mind the following to avoid premature engine wear:

☞ Make sure *all contamination (dust) inside the upper and lower housing sections has been removed.*

☞ *Carefully insert new safety cartridge 140/***F** *into the upper housing section* **H.**

☞ *Carefully insert new filter cartridge* **D** *into the upper housing section* **H.**

☞ *Clean the dust valve fig. 140/***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.**

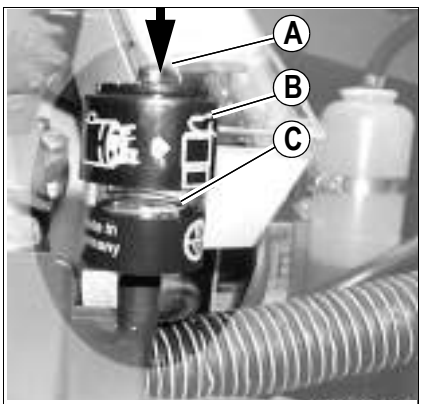


Fig. 144: Air filter with maintenance display

☞ *After replacing the filter:*

- Press reset button **A** to reset red mark **C** in maintenance display **B.**

5.6 Checking and retightening the V-belt

WARNING

Crushing, cutting, or burn hazards.

☞ *Stop the engine and permit a cool down time. Wait until the engine is comfortable to touch.*

☞ *Only check, retighten, or replace the V-belt when the engine is stopped.*

☞ *Disconnect the battery or the battery master switch before proceeding with work on the V-belt.*

NOTICE

Cracked and stretched V-belts cause engine damage.

☞ *Replace the V-belt at least every two years.*

☞ *Have the V-belt replaced by an authorized service facility.*

Checking the V-belt

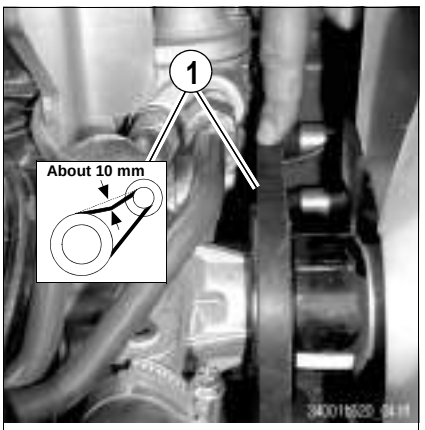


Fig. 145: Checking V-belt tension

☞ *Switch off the engine*

☞ *Prevent the machine from rolling away and remove the starter key*

➥ *- see chapter 3 "Stopping and parking the machine"* on page 3-30

☞ *Remove the V-belt cover (option).*

☞ *Carefully inspect V-belt **1** for damage.*

☞ *If the V-belt is damaged:*

➥ Have the V-belt replaced by authorized staff

☞ *Press with your thumb to check whether the V-belt can be deflected between the pulleys by no more than* **about 10 mm (4.7 in.).**

☞ *Retighten the V-belt if necessary.*

Retightening the V-belt

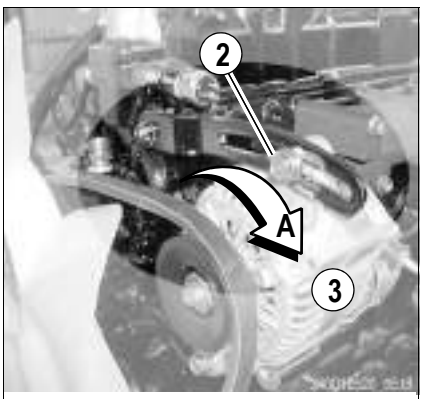


Fig. 146: Retightening the V-belt

☞ *Slacken fastening screws **2*** of alternator ***3***

☞ *Use a suitable tool to push the alternator in the direction of arrow **A** until the correct V-belt tension is obtained.*

☞ *Keep the alternator in this position, and at the same time retighten fastening screws **2***

☞ *Start the engine.*

☞ *Check V-belt tension after about 15 minutes.*

5.7 Hydraulic system

Specific safety instructions

- Release the pressure in all lines carrying hydraulic oil prior to any maintenance and repair work. To do this:
  - Lower all hydraulically controlled attachments to the ground.
  - Move all control levers of the hydraulic control valves several times.
- Apply the parking brake to prevent the machine from rolling away before you perform service and maintenance work.
- 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!
- If the hydraulic oil in the sight glass is cloudy, this indicates that water or air has penetrated the hydraulic system. This can cause damage to the hydraulic pump!

  ☞ Contact your WACKER NEUSON dealer immediately

NOTICE

Possible equipment damage. Contaminated hydraulic oil, lack of oil, or the wrong hydraulic oil can severely damage the hydraulic system. the hydraulic system!

☞ *Take care to avoid contamination when working!*

☞ *Always fill in hydraulic oil using the filling screen!*

☞ *Only use authorized oils of the same type - see chapter 5 “” on page 5-35*

☞ *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!*

Environment

Collect drained hydraulic oil and biodegradable oil in a suitable container! Dispose of drained oil and used filters by an ecologically safe method.
Always contact the relevant authorities or commercial establishments in charge of oil disposal before disposing of biodegradable oil.

Checking the hydraulic oil level

NOTICE

Check the oil level only if the hydraulic oil is cold and the engine stopped.

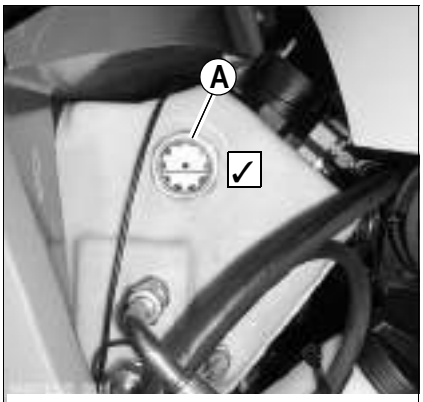


Fig. 147: Oil level sight glass on the hydraulic oil tank

☞ *Proceed as follows:*

- Park the machine on level ground.
- Retract all hydraulic rams.
- Switch off the engine.
- Apply the parking brake.
- Open the engine cover.
- Check the hydraulic oil level in sight glass **A.**

☞ *If the oil level is lower than in fig.* **A***:*

- Fill up the hydraulic oil.

Filling up hydraulic oil

NOTICE

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

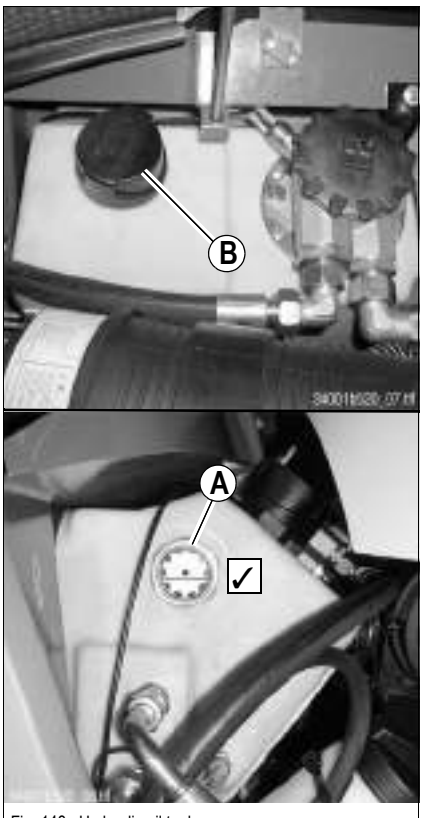


Fig. 148: Hydraulic oil tank

☞ *Fill up as follows:*

- Park the machine on level ground.
- Retract all hydraulic rams.
- Switch off the engine.
- Apply the parking brake.
- Open the engine cover.
- Clean the area around the filler and breather filter **B** with a cloth.
- Open breather filter **B** by hand.

With the filter insert in place:

- Fill up the hydraulic oil
- Check the hydraulic oil level on oil level sight glass **A.**
- Add hydraulic oil if necessary and check again.
- Firmly close breather filter **B** by hand.

Monitoring the hydraulic oil return filter

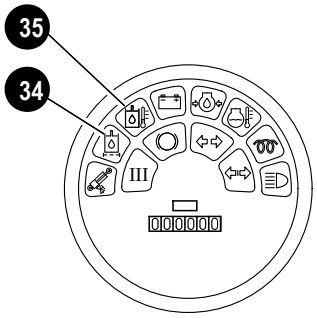


Fig. 149: Indicators (model WL 180)

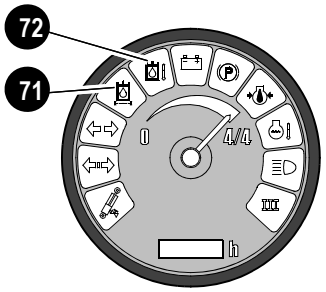


Fig. 149: Indicators (model WL 280)

On the instrument panel, the red indicator **34/71** monitors the return pressure and the return filter, and indicator **35/72** monitors oil temperature.

☞ **The filter element must be replaced by an authorized workshop:**

- If indicator **34/71** comes on.
- The return pressure in the filter is too high or,
- If indicator **35/72** comes on (hydraulic oil operating temperature is too high).
- At the latest after 1500 service hours (once a year).

Indicator **34/71** on the instrument panel can come on in cold weather immediately after starting the engine. This is caused by increased oil viscosity. In this case:

☞ *Set engine rpm so that indicator* **34/71** on the instrument panel goes out.

☞ *Bear in mind the instructions concerning warmup*
- see chapter 3 "Starting / turning off the engine" on page 3-17

Important information for the use of biodegradable oil

- Use only the biodegradable hydraulic fluids which have been tested and approved by WACKER NEUSON - *see chapter 5 ""* on page 5-35. Always contact your WACKER NEUSON dealer 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.
- Have the condensation water in the hydraulic oil tank drained by an authorized 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.

5.8 Checking hydraulic pressure lines

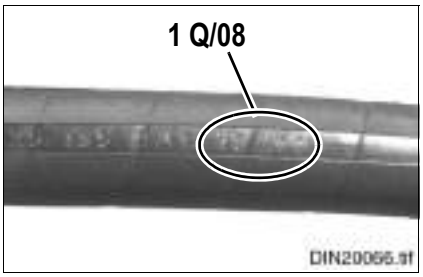
Specific safety instructions

WARNING

Pressurized hydraulic oil hazard. Hydraulic oil escaping under high pressure can catch fire, damage property, penetrate the skin and cause severe burns and injuries.

- ☞ *Do not operate the machine with leaking or damaged hydraulic system components.*
- ☞ *Use a piece of cardboard to diagnose the source of hydraulic leaks.*
- ☞ *Hydraulic oil can be hot and can cause serious burns if contact is made with skin. If contact occurs with hot oil, seek immediate medical attention and treatment for the burn.*
- ☞ *Wear safety glasses/goggles. If oil contacts the eye, flush immediately with clean water and seek emergency medical treatment.*
- ☞ *Seek immediate medical attention if oil penetrates the skin. Oil can cause serious infections.*

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/08**" means manufactured in the 1st quarter of 2008.

5.9 Lubrication work on the axles

Lubricate all lubrication points mentioned below with lithium-saponified brand-name grease - *see* on page 5-35

Lubricating the rear axle oscillation-type bearing

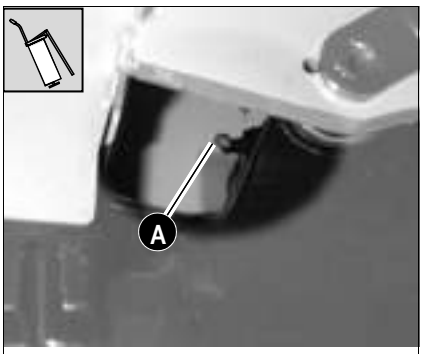


Fig. 150: Grease nipples for oscillation-type bearing

Important

The machine has an oscillation-type rear axle. Grease the bearing at the latest after every 50 service hours or once a week.
The grease nipple is located above the axle tube, on the left in driving direction.

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

Lubricating the planetary drive steering joint bearings

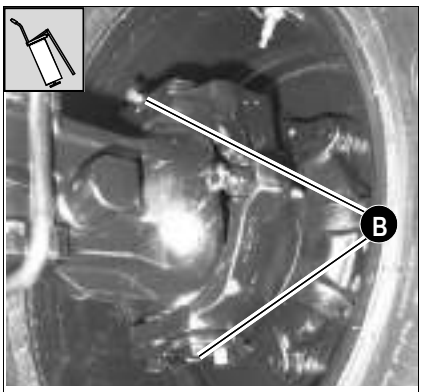


Fig. 151: Grease nipples on planetary drive bearings

☞ *Lubricate grease nipples* **B** *(2x) on each planetary drive steering joint bearing* **every 50 service hours** *or once a week*

5.10 Loader unit lubrication work

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

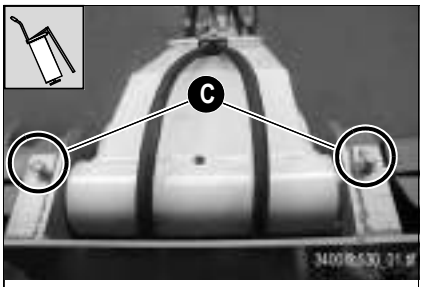


Fig. 152: Upper lubrication points on loader unit

☞ *Lubricate grease nipples* **C** *(2 x) on the loader unit bearing* **every 50 service hours** *(or once a week). Lubricate more frequently when in heavy-duty operation (once a day).*

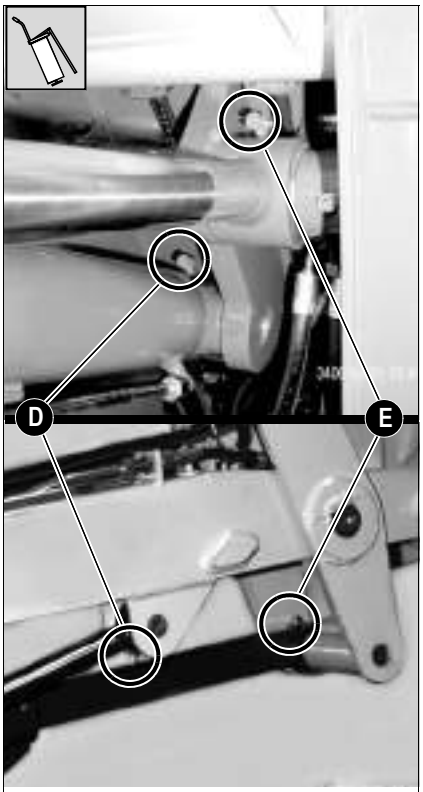


Fig. 153: Lubrication points for lift and tilt ram bearings

☞ *Lubricate grease nipples* **D** *(2 x) on the lift ram bearing* **every 50 service hours** *(or once a week). Lubricate more frequently when in heavy-duty operation (once a day).*

☞ *Lubricate grease nipples* **E** *(2 x) on the tilt ram bearing with grease* **every 50 service hours** *(or once a week). Lubricate more frequently when in heavy-duty operation (once a day).*

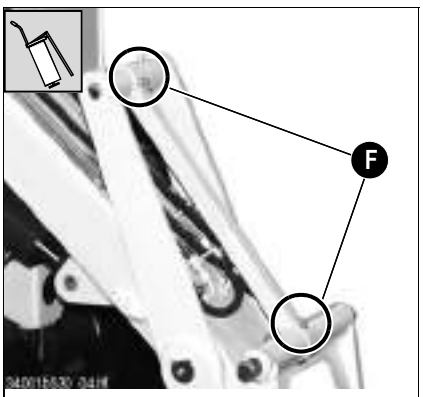


Fig. 154: Lubrication points on tilt rod bearing

☞ *Lubricate grease nipples* **F** *(2 x) on the tilt rod bearing with grease* **every 50 service hours** *(or once a week). Lubricate more frequently when in heavy-duty operation (once a day).*

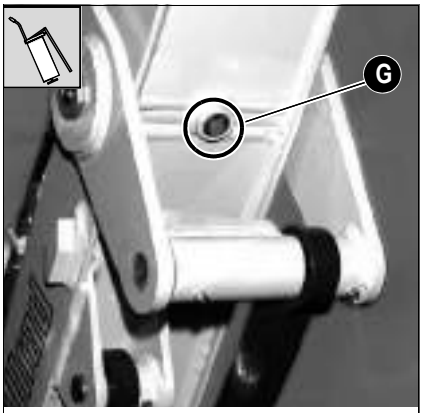


Fig. 155: Tilt lever bearing lubrication point

☞ *Lubricate grease nipple* **G** *(1 x) on the tilt lever bearing* **every 50 service hours** *(or once a week). Lubricate more frequently when in heavy-duty operation (once a day).*

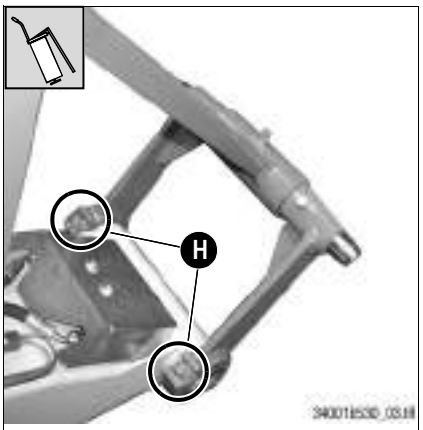


Fig. 156: Lubrication points on quickhitch

☞ *Lubricate grease nipples* **H** *(2 x) on the quickhitch bearing* **every 50 service hours** *(or once a week). Lubricate more frequently when in heavy-duty operation (once a day).*

5.11 Maintenance of attachments

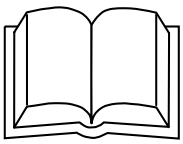
Important

Correct maintenance and service is absolutely necessary for smooth and continuous operation, and for an increased service life of the attachments. Please observe the lubrication and maintenance instructions in the Operator's Manuals of the attachments.

5.12 Tires

CAUTION

Personal injury hazard. Improperly repaired tires or rims can cause accidents.
☞ All repair work on tires and rims may only be performed by an authorized Wacker Neuson service center.

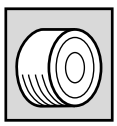


Important

Regular inspections of the tires

- Improve operating safety
- Increase the service life of the tires
- Reduce machine downtimes
- Refer to the table in chapter “Specifications” on page *6-7* for the authorized tire types and the correct tire pressures. Machines are also delivered ex works with a tire table sticker on the front window or on the loader unit bulkhead.

Daily tire checks



☞ *Perform the following maintenance work once a day:*

- Check tires for wear and measure tread depth.
- Check tire pressure.
- Check tires and rims for damage (cracks, ageing etc.) - also on the inside.
- Remove foreign bodies from the tire tread.
- Remove traces of oil and grease from the tires.

Wheel change

WARNING

Personal injury hazard. Using the wrong tires or wheels can increase the possibility of traffic accidents or work site accidents.

☞ *Use only wheels and tires authorized for your machine - see "Tires" on page 6-7*

☞ *Check the wheel nuts for tightness after every wheel or tire change*

NOTICE

The wheels are heavy and can damage the threads on the wheel studs if they are handled incorrectly!

☞ *Use suitable assembly tools, such as covering sleeves for the studs, a jack etc.*

Removing the wheels

☞ *Proceed as follows:*

- Park the machine on level and firm ground and prevent it from rolling away - *see chapter 3 "Stopping and parking the machine*" on page 3-30
- Slightly loosen the wheel nuts 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

Fitting the wheels

☞ *Proceed 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 - *see Specific tightening torques* on page 6-9

5.13 Electric system

Specific safety instructions

- 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.

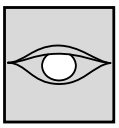
If acid is spilt:

☞ Thoroughly 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!

- Especially when charging batteries, as well as during normal operation of batteries, an oxyhydrogen mixture is formed in the battery cells - danger of explosion!
- 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!
- Avoid naked flames and sparks and do not smoke in the vicinity of open battery cells - otherwise the gas produced during normal battery operation can ignite!
- 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.
- Do not interrupt voltage-carrying circuits at the battery terminals because of the danger of sparking!
- Never place tools or other conductive articles on the battery - danger of short circuit!
- Disconnect the negative (**-**) battery terminal from the battery before starting repair work on the electric system.
- Dispose of used batteries properly.

Service and maintenance work at regular intervals



Before driving the machine

☞ *Check every time before driving the machine:*

- Is the light system OK?
- Is the signalling and warning system OK?

Every week

☞ *Check once a week:*

- Electric fuses - *see chapter 6 "Fuse no."* on page 6-5.
- Cable and earth connections.
- Charge condition of battery - *See Checking/replacing the battery* on page 5-25.
- Condition of battery terminals.

Cables, bulbs and fuses

Always observe the following instructions:

- Defective components of the electric system must always be replaced by an authorized expert. Bulbs and fuses may be changed by unqualified persons.
- When carrying out maintenance work on the electric system, pay particular attention to ensuring good contact in leads and fuses.
- Blown fuses indicate overloading or short circuits. The electric system must therefore be checked before installing the new fuse.
- Only use fuses with the specified load capacity (amperage) - *see chapter 6 "Fuse no."* on page 6-5.

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 indicators immediately
  - see chapter 3 "Indicator (red) - alternator charge function 3-7" on page 3-4.

Checking/replacing relays and fuses

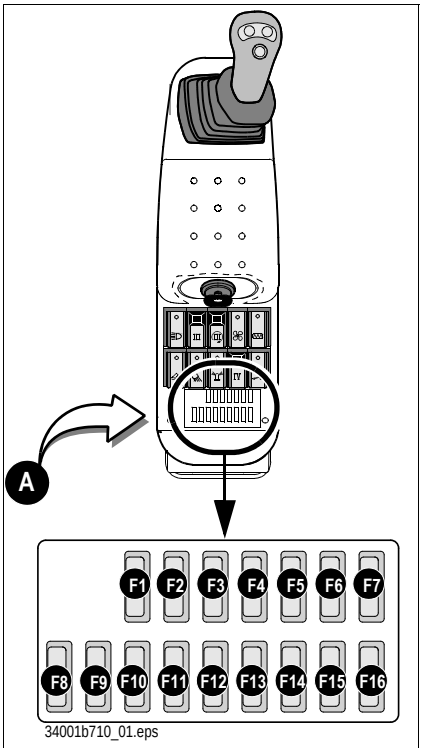


Fig. 157: Fuse box

Fig. 157: Relay slots

The fuse box is located at the rear of the control lever base.

Checking/replacing fuses

NOTICE

Blown fuses indicate overloading or short circuits. The electric system must therefore be checked before installing the new fuse!

☞ *Only use fuses with the specified load capacity (amperage) - see chapter 6 "Fuse box in control lever base" on page 6-5*

☞ *- see chapter 6 "Main fuse box with relays (engine TNV 88)" on page 6-6*

Checking/replacing switching relays.

The switching relays are located underneath the switch panel on the control lever base, on the board.

☞ *Switch off the engine and disconnect the battery leads.*

☞ *Remove fastening screws **A.***

☞ *Raise the side console to the rear.*

☞ *Relay descriptions and output indications*

➥ *- see chapter 6 "Relays (engine TNV 88)"* on page 6-6

Main fuse box

The main fuse box with the power relays and the preheating time control unit is located on the right in the engine compartment

Switch off the engine and disconnect the battery leads

☞ *Remove the fuse box cover*

☞ *Main fuse and relay descriptions and output indications - see chapter 6 “Main fuse box with relays (engine TNV 88)” on page 6-6*

Checking/replacing the battery

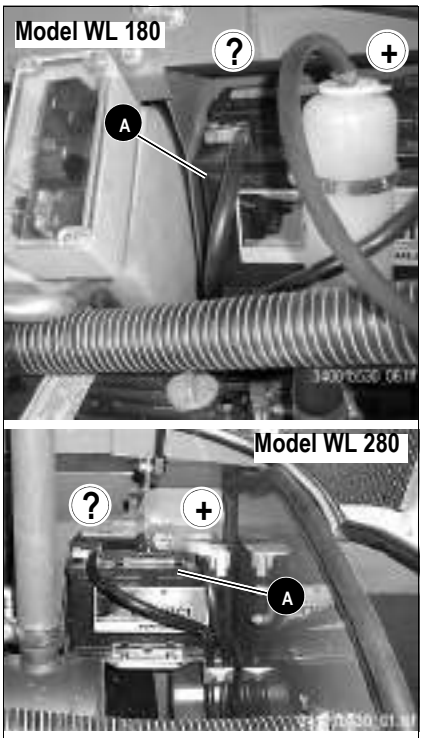


Fig. 159: Battery

Battery **A** is located in the engine compartment, on the right in driving direction. 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.

WARNING

Battery acid hazard. The battery contains highly caustic sulphuric acid. This acid must not be allowed to come into contact with the skin, the eyes, clothing, or the machine.

☞ *When recharging and/or working near the battery, always wear goggles and protective clothing with long sleeves.*

☞ *If acid is spilled, thoroughly rinse affected skin immediately with clean water and seek medical attention immediately.*

WARNING

Battery explosion hazard. Lead acid batteries can generate a potentially explosive hydrogen and oxygen mixture. Batteries can explode or rupture during jump starting, particularly if the electrolyte is low or has been frozen.

☞ *Avoid open flames and sparks in the vicinity of the battery. Do not smoke.*

☞ *Before jump starting, take the battery to the dealer for appraisal by a qualified technician.*

☞ *Replace a dead battery with a new one equivalent to the original.*

☞ *Always disconnect the negative terminal (–) from the battery before starting repair work on the electric system.*

Replacing the battery

☞ *Apply the parking brake.*

☞ *Switch off the engine and remove the starter key.*

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

☞ *Remove the battery lead from the negative terminal (-).*

☞ *Remove the battery lead from the positive terminal (+).*

☞ *Remove the cover (moulding) on the left.*

☞ *Remove the battery brackets from the base.*

☞ *Replace the battery with a new one.*

☞ *Install the battery in the reverse order.*

NOTICE

When installing the battery leads,

☞ *install the positive lead (+) first*

☞ *and then the negative lead (-)*

Important

The machine can be fitted with a battery master switch (option).
- see chapter 3 "Battery master switch (option)" on page 3-42

5.14 General maintenance work

Specific safety instructions

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.

NOTICE

Machines with anticorrosion protection (“aggressive media”) must be cleaned separately!

☞ *- see Maintenance work “Aggressive Media” (option) on page 5-30*

When using washing solvents

- Ensure adequate room ventilation.
- Wear suitable protective clothing.
- Do not use flammable liquids, such as fuel or diesel.

When using 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.

When using 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.
- Protect the following components from moisture:
  - Engine
  - Electric components such as the alternator etc.
  - Control devices and seals.
  - Air intake filters etc.

When using volatile and easily flammable anticorrosion agents and sprays

- Ensure adequate room ventilation.
- Do not use unprotected lights or naked flames.
- Do not smoke!

Cleaning inside the cab

NOTICE

Possibility of equipment damage. Water under high pressure can penetrate into the electric system, cause short circuits, damage seals, and disable the controls.
Do not use high-pressure cleaners, steam jets or high-pressure water to clean inside the cab.

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!

WARNING

Personal injury hazard. Dirt and water accumulating on the seat belt and in the winding mechanism may eventually deteriorate these components and impair winding.

☞ *Keep the seat belt and winding mechanism clean.*

☞ *Only wind the seat belt when it is dry.*

Cleaning the exterior of the machine

The following articles are generally suitable:

- High-pressure cleaner
- Steam jet

Cleaning the engine and the engine compartment

WARNING

Cutting, crushing, or burn hazards.

☞ *Stop the engine before cleaning.*

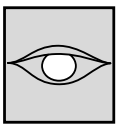
NOTICE

Possibility of sensor damage. Water or steam jet cleaners can penetrate sensitive electronic components, leading to sensor failure and possible engine damage.

☞ *Allow the machine to cool completely before cleaning the engine with a water or steam jet.*

☞ *Do not point the jet directly at electric sensors such as the oil pressure switch.*

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 holders) must be lubricated regularly, even if they are not listed in the lubrication plan.

5.15 Maintenance and service of the attachments

Important

Correct maintenance and service is absolutely necessary for smooth and continuous operation, and for an increased service life of the attachments. Please observe the lubrication and maintenance instructions in the Operator's Manuals of the attachments

5.16 Maintenance work “Aggressive Media” (option)

Your 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 reapplied as required.

If no anticorrosion protection is applied to your machine, for instance for work in a saline environment, we recommend retrofitting your machine with the “Aggressive Media” option by your sales partner.

Anticorrosion protection applied in the factory

The following anticorrosive wax has been used in the factory:

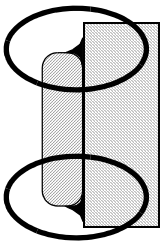
Designation: ANTICORIT BW 366 or U.S. Protect T

Manufacturer: FUCHS MINERALOELWERKE GmbH/Mannheim (Germany)

Complies with 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 parts of the machine, e.g. 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 take the machine out of service if you detect any defects and have defects rectified immediately.
- Perform work on the electric system only with the battery disconnected and the engine switched off!

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 taken out of service 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.

NOTICE

Possibility of anticorrosive protection breakdown. Wax coating can be damaged by aggressive cleaning procedures.

☞ *If cleaning the machine with a bristle brush, a steam jet, or a high-pressure cleaner, 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 5-30 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:

NOTICE

Carefully cover all fastening surfaces and **elements to which the anticorrosive protection may not be applied** - *see Components coated with anticorrosive wax* on page 5-30

- **ANTICORIT BW 366** or **U.S. Protect T** can be applied with a brush, by means of immersion or with all commercially available spray guns.
- **ANTICORIT BW 366** or **U.S. Protect T** protective coating can be removed with fuel, **RENOCLEAN E/K , FUCHS MULTICLEAN** or **Gunk® Purple Degreaser** as required.
- **ANTICORIT BW 366** or **U.S. Protect T** spots are difficult to remove on clothing.
- Affix a “Wet paint!” or a similar sign to newly coated machines.

Treatment of oxidized surfaces

If in spite of all precautionary measures some components should be affected by corrosion (oxidized), proceed as follows depending on the affected component:

Electric connections

☞ *Remove the remaining protective wax in the oxidised area with fuel,* **RENOCLEAN E/K , FUCHS MULTICLEAN** *or* **Gunk® Purple Degreaser**

☞ *Treat all affected parts with an oxide solvent, such as* **KONTAKT 60** *or* **Gunk® Electronic Cleaner**

☞ *Rinse the area with e.g.* **KONTAKT WL** *or* **CRC HF Contact Cleaner**

☞ *Treat the contact surfaces of the connection with e.g.* **KONTAKTSPRAY WD 40** *or* **Liquid Wrench® Super Lubricant**

☞ *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 fuel,* **RENOCLEAN E/K , FUCHS MULTICLEAN** or **Gunk® Purple Degreaser**.

☞ *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 part with a cleaning solvent*

☞ *Apply a 2-component prime coating to the affected area and then a 2-component paint coating*

☞ *Preserve the area with anticorrosion wax*

5.17 Fluids and lubricants

Component/ application	Engine/machine fluid	SAE grade Specification	Season/ temperature	Capacities[1]
Diesel engine	Engine oil[2]	SAE 10W; EO10[3]	Below -5°C (23°F)	7.2 l (1.90 gal) (model WL 180) 8.6 l (2.27 gal) (model WL 280)
		SAE 20W20; EO20[3]	-10°C to +10°C (14°F to 50°F)	
		SAE 30; EO30[3]	5°C to 30°C (41°F to 86°F)	
		HD-C 10W-40; EO1040B[3]	Year-round	
		HD-C 15W-40; EO1540B[3]		
Rear axle transfer gearbox	Gearbox oil[4]	80 W 90 API GL5 or SAE 90 LS (hypoid gear oil)	Year-round	0.3 l (0.08 gal)
Planetary drives - left and right, front and rear axle				0.6 l (0.16 gal) each (model WL 180) 0.5 l each (0.13 gal) (model WL 280)
Front and rear axle differentials				2.5 l (0.66 gal) each
Hydraulic oil tank	Engine oil[2]	SAE 5 W/30	Up to -25°C (-13°F)	About 40 l (10.57 gal) (model WL 180) About 65 l (17.17 gal) (model WL 280)
		SAE 5 W/40; EO 0540B[3]		
		SAE 10 W/40; EO 0540B[3]	Up to -15°C (5°F)	
		SAE 15 W/40; EO 1540B[3]	Up to -10°C (14°F)	
	Hydraulic oil[5]	HVLPD 46 (HYD0530[3]) (200 Hydraulic)	Year-round	
	Biodegradable oil	AVILUB Syntofluid 46		
		PANOLIN HLP Synth 46 (404 Biodegradeable Hydraulic 32/4)		
Grease nipples	Multipurpose grease	Lithium-saponified brand-name grease MPG-A[3] (Mobilgrease CM-P)	Year-round	As required
Battery terminals	Acid-proof grease	SP-B[3] (Mobilux EP2)	Year-round	As required
Mounting of pins, shafts etc.	Special grease	Optimoly paste "TA"[6] White paste	Year-round	As required
Fuel tank	Diesel fuel[7]	Grade no. 2-D	Over 4°C (39°F)	About 30 l (7.93 gal) (model WL 180) About 62 l (16.38 gal) (model WL 280)
		Grade no. 1-D	Below 4°C (39°F)	
Engine and hydraulic oil cooler	Coolant	Water + antifreeze; SP-C[3]	Year-round	About 4.2 l (1.11 gal) (model WL 180) About 5.3 l (1.40 gal) (model WL 280)
Washer system	Cleaning agent	Water + antifreeze		About 1.5 l (0.40 gal)

1. The capacities indicated are approximative values; the oil level check alone is relevant for the correct oil level
2. MIL-L-2104C; API CD/CE/CF4; CCMC-D4
3. Abbreviation for lubricants (Hauptverband der Deutschen Bauindustrie e. V. - German construction engineering association)
4. MIL-L-2105B; API-GL5
5. DIN 51 524
6. 250 gr tube, order no.: 0 00 441 32 10
7. DIN 51 601, min 45 cetane

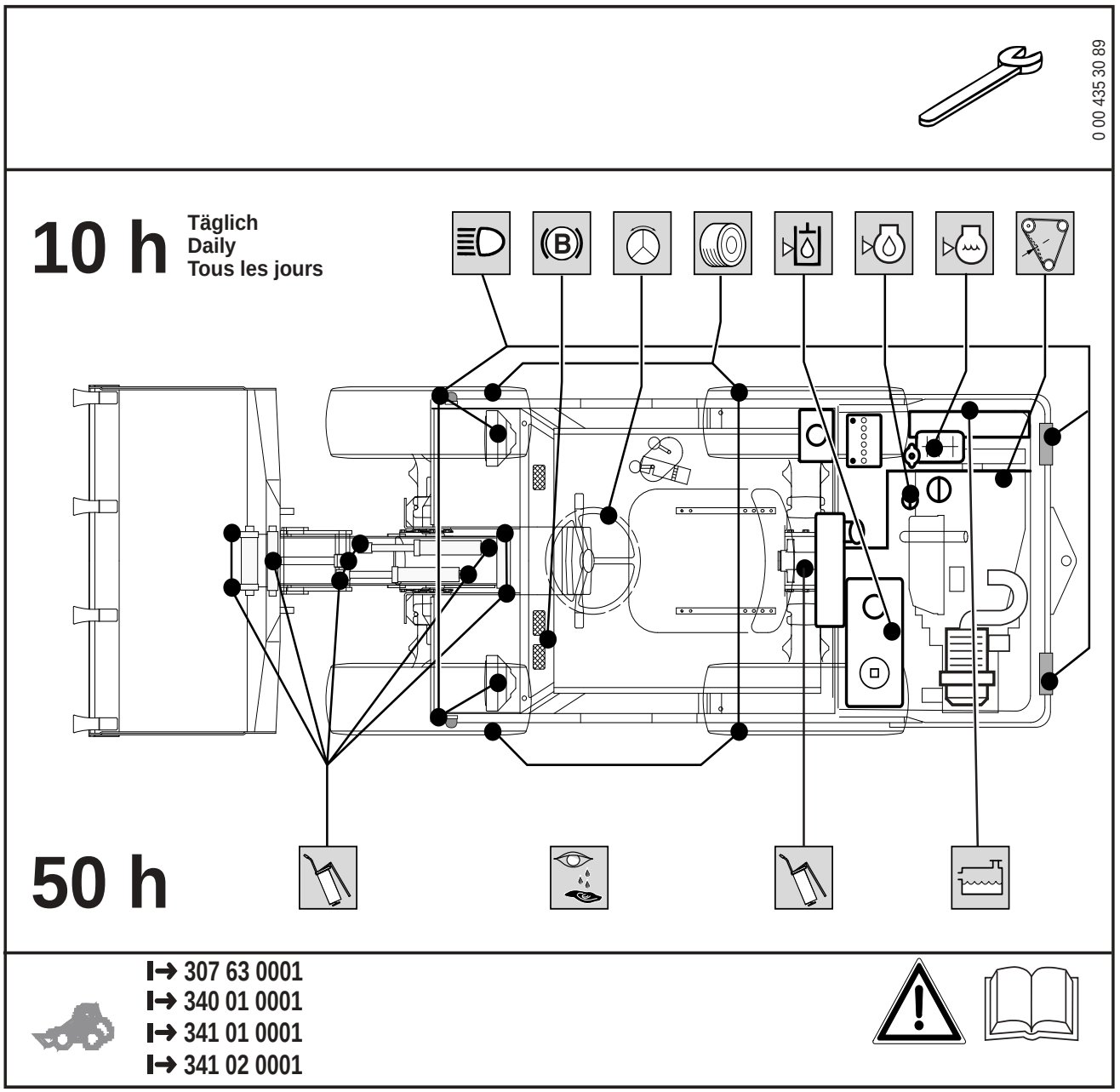
5.18 Maintenance label

Location: on inside of rear window

Explanation of symbols on the maintenance label

Symbol	Explanation
	Attention!
	Before starting maintenance work, read the “Maintenance” chapter in the Operator's Manual!
	Perform a functional check of the light system!
	Check tires for damage, pressure and tread depth!
	Perform a functional check and synchronize the steering system!
	Perform a functional check of the brake system!
	Check hydraulic oil level. Fill up if necessary!
	Check engine oil level. Fill up if necessary!
	Check coolant level. Fill up if necessary!
	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!
	Lubrication service: Lubricate the assemblies concerned!

Maintenance label



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5.19 Maintenance plan (overview)

Work description

For service and maintenance work on the attachment, please refer to the operation and maintenance manual of the attachment manufacturer as well.

	Maintenance plan/service hours (s/h)						
	Maintenance work (once a day)	Delivery inspection	"A" every 50 s/h once a week	1st Inspection[1] at 100 s/h	"B" every 500 s/h[2] 2nd Inspection	"C" every 1500 s/h once a year
Oil and filter changes ( ):						
Perform the following oil and filter changes (check oil levels after test run):						
• Engine oil				●	●	●
• Engine oil filter				●	●	●
• Fuel filter				●	●	●
• Fuel/water separator					●	●
• 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]						●
• Hydraulic oil filter insert				●		●
• Hydraulic oil tank breather filter [4]						●
• Heating: replace the dust filter					●	●
Inspection work ( ):						
Check the following material. Refill if necessary:						
• Engine oil	●	●	●			
• Engine coolant [6] (also check antifreeze in autumn/winter and at temperatures below 4 °C!)	●	●	●	●	●	●
• Hydraulic oil	●	●	●	●	●	●
• 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)		●			●	●
• Check radiator for engine and hydraulic oil for contamination. Clean if necessary[7]			●	●	●	●
• 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		●	●	●	●	●
• Check the fuel/water separator. Drain water if necessary[8]			●	●	●	●
• Check valve tip clearance (engine timing). Set if necessary					●	●

5.19 Maintenance plan (overview)

Work description

For service and maintenance work on the attachment, please refer to the operation and maintenance manual of the attachment manufacturer as well.

	Maintenance plan/service hours (s/h)					
	Maintenance work (once a day)	Delivery inspection	"A" every 50 s/h once a week	1st Inspection[1] at 100 s/h	"B" every 500 s/h[2] 2nd Inspection	"C" every 1500 s/h once a year
• Battery: check charge condition					●	●
• Heating: clean dust filter, replace every 1500 s/h if necessary[9]						●
• Check and set service and parking brake pads. Replace if necessary				●	●	●
• Tire check (damage, air pressure, tread depth)	●	●	●	●	●	●
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		●		●	●	●
Electric system: check electric and earth connections, chafing on wiring harness, battery terminals		●		●	●	●
Lubrication service ( ):[10]						
Lubricate the following assemblies/components:						
• Rear axle oscillating bearing		●	●	●	●	●
• Front and rear axle planetary drive bearings (left and right)		●	●	●	●	●
• Loader unit - *see Loader unit lubrication work* on page 5-18						
• Lift frame bearing		●	●	●	●	●
• Tilt rod bearing		●	●	●	●	●
• Tilt lever bearing		●	●	●	●	●
• Lift ram bearing		●	●	●	●	●
• Tilt ram bearing		●	●	●	●	●
• Quickhitch: bearing on lift frame		●	●	●	●	●
• Hinges, joints and fittings (e.g. door holder)			●	●	●	●

5.19 Maintenance plan (overview)

Work description

For service and maintenance work on the attachment, please refer to the operation and maintenance manual of the attachment manufacturer as well.

	Maintenance plan/service hours (s/h)					
	Maintenance work (once a day)	Delivery inspection	"A" every 50 s/h once a week	1st Inspection[1] at 100 s/h	"B" every 500 s/h[2] 2nd Inspection	"C" every 1500 s/h once a year
Functional check ( ):						
Check the function of the following assemblies/components. Rectify if necessary:						
• Service and parking brake	●	●	●	●	●	●
• Steering system	●	●	●	●	●	●
• Lights and electric system	●	●	●	●	●	●
Leakage check ( ):						
Check for tightness, leaks and chafing: pipes, flexible lines and screw connections of the following assemblies and components. Rectify if necessary:						
• Air intake line (air filter - engine)	●	●	●	●	●	●
• Engine lubrication (engine - filter)	●	●	●	●	●	●
• Fuel lines	●	●	●	●	●	●
• Cooling system (coolant and hydraulic oil)	●	●	●	●	●	●
• Steering system (flexible lines and rams)	●	●	●	●	●	●
• Hydraulic system/loader unit (flexible lines and rams) [11]	●	●	●	●	●	●

1. Work to be carried out once after the first 100 s/h. This work must be carried out by an authorized workshop for warranty claims to be acknowledged.
2. Work after the first 500 s/h (2nd Inspection) must be carried out by an authorized workshop for warranty claims to be acknowledged
3. Replace filter insert as indicated on the filter housing, however at least once a year or every 1500 service hours.
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. Replace the engine coolant every other year!
7. Depending on operation and dust conditions, it can be necessary to clean the radiator more frequently
8. Check every 50 s/h and drain the water
9. Depending on operation and dust conditions, it can be necessary to replace the dust filter more frequently
10. Lubricate attachment according to manufacturer's instructions!
11. Replace flexible lines every 6 years (UVV, DIN 20066 part 5)

6 Specifications

6.1 Frame

- Sturdy steel sheet frame, rubber-mounted engine

6.2 Engine

Engine	Model WL 180	Model WL 280
Product	Yanmar diesel engine	
Type	3TNV 88	4TNV 88
Design	Water-cooled 4 stroke diesel engine	
No. of cylinders	3	4
Displacement	1642 cm³ (100.32 in³)	2190 cm³ (133.80 in³)
Nominal bore and stroke	88 x 90 mm (3.46 x 3.54 in)	88 x 90 mm (3.46 x 3.54 in)
Output	23 kW at 2600 rpm	28 kW at 2400 rpm
Max. torque	99 - 107 Nm at 1560 rpm (72.96 - 78.85 ft.lbs. at 1560 rpm)	130 -142 Nm at 1440 rpm (95.81 - 104.654 ft.lbs. at 1440 rpm)
Max. engine speed without load	2810 +/- 25 rpm	2590 +/- 25 rpm
Idling speed	1100 +/- 25 rpm	1100 +/- 25 rpm
Specific fuel consumption	242 g/kWh (8,518 oz/kWh)	252 g/kWh (8,870 oz/kWh)
Fuel injection system	Direct injection	Direct injection
Firing order	1 - 3 - 2	1 - 3 - 4 - 2
Starting aid	Glow plug (preheating time 10 - 15 seconds)	
Max. inclined position (engine no longer supplied with oil):	30° in all directions Observe tilting limit (20° lateral) of the machine!	
Exhaust values according to	97/68 EC	

6.3 Power train

Variable displacement pump	Model WL 180	Model WL 280
Design	Infinitely adjustable axial pistons	
Displacement	0 - 28 cm³/rev (0 - 1.7108 in³/rev)	
Max. service pressure	350 bar (5001.5 PSI)	
Starting revs	1250 $^{+100}$ rpm	
Droop	2450 $^{+100}$ rpm	2250 $^{+100}$ rpm
Boost pump (integrated in variable displacement pump)		
Design	Gear	
Displacement	6.1 cm³/rev (0.37271 in³/rev)	8.4 cm³/rev (0.51324in³/rev)
Charging/boost pressure	30 bar (428.7 PSI)	
Driving direction	Electrohydraulic control (F - R on drive lever)	
Inching	Mechanical via brake/inching pedal	
Hydraulic motor		
Design	Axial piston motor	
Max. capacity	45 cm³/rev (2.7495 in³/rev)	55 cm³/rev (3.3605 in³/rev)
Speed range	0 - 20 kph (0 - 12.44 Miles/h), forwards and reverse driving	
Pushing power	12.5 kN (9212.5 ft.lbs.)	24.0 kN (17688 ft.lbs.)
Transfer gearbox		
Design	Single-stage	
Transmission ratio	1.8529	

6.4 Axles

Front axle (with 45 % self-locking differential)	Model WL 180	Model WL 280
Design	Rigid steering and drive axle	
King-pin inclination	7°	
Camber	1.5°	
Steering angle	38°	
Toe-in	0 mm (0 in)	
Track width	886[1]/902 mm (34.88[1]/35.51 in)	1193 mm[1] (46.97 in[1])
Rear axle (with 45 % self-locking differential)		
Design	Steering and drive axle, oscillating	
King-pin inclination	7°	
Oscillation	+/- 5°	+/- 7°
Camber	+/- 1.5°	
Steering angle	38°	
Toe-in	0 mm (0 in)	
Track width	886[1]/902 mm (34.88[1]/35.51 in)	1193 mm[1] (46.97 in[1])

1. Model WL 180 with tires 28 x 9.00-15
   Model WL 280 with tires 12.0-18

6.5 Brakes

Service brake	
Design	Hydrostatic
Location	Drive (rear axle transfer gearbox)
Effect	Foot-operated hydrostatic brake system, braking effect on all wheels via cardan shaft
Parking brake	
Design	Manual, mechanical disc brake
Location	Front axle gearbox input
Effect	On both axles via cardan shaft

6.6 Steering system

Steering system	**Model WL 180**	**Model WL 280**
Design	Hydrostatic 4 wheel steering with emergency steering features	
Steering mode	4 wheel steering	
Assemblies	Hydraulic pump, priority valve, servostat with safety valves, steering rams, self-synchronizing in final position	
Max. pressure of hydraulic lines	175 bar (2500 PSI)	
Hydraulic pump	Gear pump Displacement 8 cm³/rev (0.5 in³/rev)	Gear pump Displacement 22.5 cm³/rev (1.4 in³/rev)
Steering angle	2 x 38°	

6.7 Work hydraulics

Work hydraulics	**Model WL 180**	**Model WL 280**
Hydraulic pump displacement:	8 cm³/rev ≡ 20 l/min (0.5 in³/rev = 5.3 gal/min) at 2600 rpm	22.5 cm³/rev ≡ 52 l/min (1.4 in³/rev = 13.7 gal/min) at 2400 rpm
Control valve	3 sections	
Max. service pressure	$240^{\pm 5}$ bar ($3429.6^{\pm 71}$ PSI)	
Secondary protection tilt ram	Rod side 280 bar (4001 PSI) Base side 120 bar (1715 PSI)	
Secondary protection lift ram	Rod side: resuction Base side: 280 bar (4001 PSI)	Rod side: resuction Base side: 300 bar (4287 PSI)
Filter	Reflux suction filter (0.5 bar (7.145 PSI) initial stress)	
Hydraulic oil tank	40 l (10.5 gal)	65 l (17.2 gal)

6.8 Pilot control

Pilot control pump = boost pump of hydraulic pump	**Model WL 180**	**Model WL 280**
Displacement	6.1 cm³/rev (0.4 in³/rev)	8.4 cm³/rev (0.5 in³/rev)
Charging/boost pressure	30 bar (428.7 PSI) at 2400 rpm	
Pilot control unit		
Joystick	Four-way lever - control of lift and tilt rams Electric control of lock ram or attachments via tip switches	
Ball-type stop cock:	Lock against unintentional operation (for long-haul travel and transport)	

6.9 Additional control circuit (option)

Additional control circuit	**Model WL 180**	**Model WL 280**
Hydraulic pump Displacement: **front and rear** Max. service pressure	16 cm³/rev (1.0 in³/rev) 37 l/min (9.8 gal/min) at 2600 rpm 165 bar (2358 PSI)	22.5 cm³/rev (1.4 in³/rev) 52 l/min (13.7 gal/min) at 2400 rpm 240 bar (3430 PSI)
Hydraulic pump Displacement: **front only** Max. service pressure	-	32 cm³/rev (2.0 in³/rev) 65 l/min (17.2 gal/min) at 2400 rpm 150 bar (2144 PSI)
Front hydraulic connections Pressure line: Unpressurized reflux:	 1 x nw 12 (red) 1 x nw 15 (blue)	 1 x nw 16 (red) 1 x nw 20 (blue)
Rear hydraulic connections Pressure line: Unpressurized reflux:	 1 x nw 10 (red) 1 x nw 10 (red)	 1 x nw 12 (red) 1 x nw 16 (blue)
Extra function **Front** hydraulic connections		2 x nw 10
Leak port **Front** hydraulic connection		x nw 10

6.10 Electric system

Electric system	
Alternator	12 V 55 A
Starter	**12 V 1.4 kW** (model WL 280)
Battery	12 V 72 Ah
Socket	E.g. for cigarette lighter; 15 A max.

Fuse box in control lever base

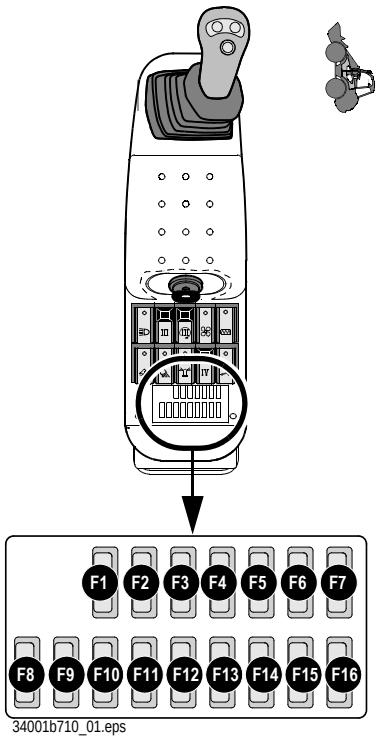

Fig. 160: Fuse box

Fuse no.	Rated current (A)	Protected circuit
F1	7.5 A	- High beam (left)
F2	7.5 A	- High beam (right)
F3	5 A	- Parking light (left)
F4	5 A	- Parking light (right)
F5	10 A	- Start
F6	25 A	- Additional lights
F7	25 A	- Lights
F8	7.5 A	- Low beam (left)
F9	7.5 A	- Low beam (right)
F10	5 A	- Relays, indicators, cutoff solenoid
F11	15 A	- Wiper
F12	15 A	- Valves
F13	7.5 A	- Driving
F14	30 A	- Fan, rear window heating
F15	7.5 A	- Turn indicators
F16	5 A	- Radio

Main fuse box with relays (engine TNV 88)

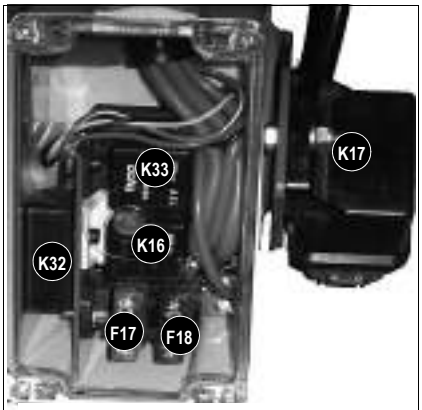

Fig. 161: Main fuse box in the engine compartment

Fuse no.	Rated current (A)	Protected circuit
F17	70 A	Main fuse
F18	40 A	Preheating/start fuse (starter)

Relay no.	Protected circuit
K 16	High current relay preheating
K 17	Start high current relay
K 32	Time lag relay for cutoff solenoid
K 33	High current relay cutoff solenoid

Relays (engine TNV 88)

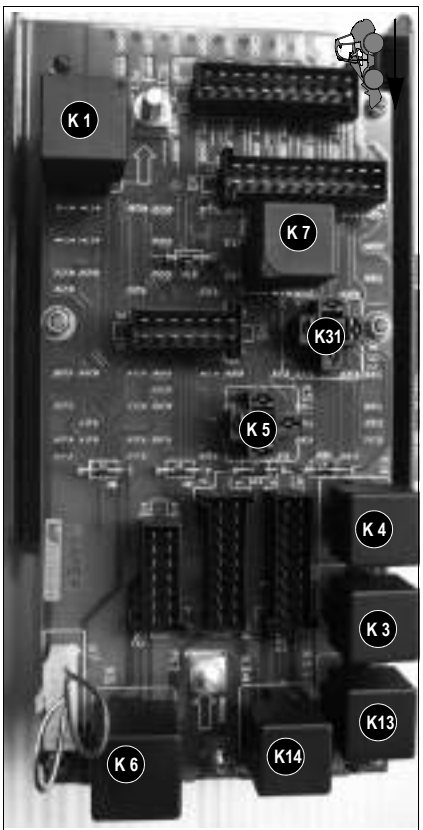

Fig. 162: Relays

The relays are installed in the control lever base under the switch panel (as seen from below the fuse board)

Switching relay no.	Rated current (A)	Protected circuit
K 1	70	High current relay - terminal 15
K 3	40/60	Solenoid valve - reverse driving
K 4	40/60	Solenoid valve - forwards driving
K 5	40/60	Front attachments
K 6	—	Turn indicator relay
K 7	40/60	Wipers
K 13	20/35	Unlock (quickhitch)
K 14	40/60	Lock (quickhitch)
K 31	—	Time-lag relay 5 min (rear window heating)

6.11 Tires for model WL 180

Tire size	Tire pressure		Wheel rims	
	Front	Rear	Wheel rim	Wheel offset
28x9.00-156PR AC30 TT CO	2.0[1] bar (28.58[1] PSI)	2.0 bar (28.58 PSI)	7 x 15	50 mm (2.0 in)
10-16.5 8PR SK-02 TBL	1.5[1] bar (21.44[1] PSI)	1.5 bar (21.44 PSI)	8.25x16.5	30 mm (1.2 in)
10 R 16.5 XZSL TL 128A5	1.5[1] bar (21.44[1] PSI)	1.5 bar (21.44 PSI)	8.25x16.5	50 mm (2.0 in)
315/55 R16 120K MPT81	2.0[1] bar (28.58[1] PSI)	2.0 bar (28.58 PSI)	11x16	50 mm (2.0 in)

1. Increase front tire pressure by 0.5 bar (7,15 PSI) during pallet forks operation!

6.12 Tires for model WL 280

Tire size	Tire pressure		Wheel rims	
	Front	Rear	Wheel rim	Wheel off-set
10.5-18 8PR MPT-02 TBL	2.5[1] bar (35.73[1] PSI)	2.5 bar (35.73 PSI)	9x18	-30 mm (-1.2 in)
12.0-18 T86 STAB.12PR TL	2.0[1] bar (28.58[1] PSI)	2.0 bar (28.58 PSI)		
12.0/75-18 12PR TR11 TBL	2.0[1] bar (28.58[1] PSI)	2.0 bar (28.58 PSI)		
12-16.5/10PR SK-02 TBL	1.5[1] bar (21.44[1] PSI)	1.5 bar (21.44 PSI)	16.5x9.75	
12.4-16 TT 08PR 116A8 [2]	3.0[1] bar (42.87[1] PSI)	2.5 bar (35.73 PSI)	11x16	
280/70 R18 114A8 AC70T	3.0[1] bar (42.87[1] PSI)	2.5 bar (35.73 PSI)	9x18	
325/70 R18 MPT AC70G TL	3.0[1] bar (42.87[1] PSI)	2.5 bar (35.73 PSI)		-69 mm (-2.7 in)
325/70 R18 MPT 70E	3.0[1] bar (42.87[1] PSI)	2.5 bar (35.73 PSI)		
340/65 R18 113A8 XM108	3.0[1] bar (42.87[1] PSI)	2.5 bar (35.73 PSI)		

1. Increase front tire pressure by 0.5 bar (7.15 PSI) during pallet forks operation!
2. Legal regulations of your country may require a separate certification

6.13 Weight indications for model WL 180

Weights[1]	Standard cab	Open cab
Dry weight	1860 kg (4100 lb)	1780 kg (3924 lb)
Front axle load	600 kg (1323 lb)	560 kg (1235 lb)
Rear axle load	1260 kg (2778 lb)	1220 kg (2690 lb)
Gross weight rating	2300 kg (5070 lb)	
Front axle weight rating	1600 kg (3527 lb)	
Rear axle weight rating	1600 kg (3527 lb)	
Max. authorized load for towing facility	2000 kg (4409 lb)	
Cab	248 kg (547 lb)	

1. With driver, standard bucket and full fuel tank

6.14 Weight indications for model WL 280

Weights[1]	Standard cab	Open cab
Dry weight	3300 kg (7275 lb)	3220 kg (7099 lb)
Front axle load	1070 kg (2359 lb)	1030 kg (2271 lb)
Rear axle load	2230 kg (4916 lb)	2190 kg (4828 lb)
Gross weight rating	3800 kg (8378 lb)	
Front axle weight rating	2750 kg (6063 lb)	
Rear axle weight rating	2750 kg (6063 lb)	
Max. authorized load for towing facility	2500 kg (5512 lb)	
Cab	248 kg (547 lb)	

1. With driver, standard bucket and full fuel tank

6.15 Noise levels

Sound power level	Model WL 180	Model WL 280
Measured value	98.9 dB (A)	100.1 dB (A)
Guaranteed value	100 dB (A)	101 dB (A)
Noise level in the cab (standard cab) (open cab and ROPS bar)	 79 dB (A) 82 dB (A)	 76 dB (A) 82 dB (A)

Important

Measurement of sound power level according to EC Directive 2000/14 EC. Noise level at the driver's ear measured according to EC Directives 84/532/EEC,
89/514/EEC and 95/27/EEC. Measurements carried out on asphalted surface.

6.16 Vibration

Vibration	
Effective acceleration value for the upper extremities of the body	< 2.5 $\frac{m}{s^2}$ (< 8.2 feet/s²)
Effective acceleration value for the body	< 0.5 $\frac{m}{s^2}$ (< 1.64 feet/s²)

6.17 Coolant compound table

Outside temperature	Coolant			
	Water	Anticorrosion agent		Antifreeze agent
Up to °C (°F)	% by volume	cm³/l (in³)	% by volume	% by volume
4 (39.2)	99	10 (0.611)	1	-
-10 (14)	79			20
-20 (-4)	65			34
-25 (-13)	59			40
-30 (-22)	55			44

6.18 Tightening torques

General tightening torques

Screw dimensions	Tightening torques in Nm[1] (ft.lbs.)		
	8.8	10.9	12.9
M4	3 Nm (2.2 ft.lbs.)	4 Nm (2.9 ft.lbs.)	5 Nm (3.7 ft.lbs.)
M5	5.5 Nm (4.1 ft.lbs.)	8 Nm (5.9 ft.lbs.)	10 Nm (7.4 ft.lbs.)
M6	10 Nm (7.4 ft.lbs.)	14 Nm (10.3 ft.lbs.)	16 Nm (11.8 ft.lbs.)
M8	23 Nm (17 ft.lbs.)	34 Nm (25 ft.lbs.)	40 Nm (29.5 ft.lbs.)
M10	46 Nm (33.9 ft.lbs.)	67 Nm (49.4 ft.lbs.)	79 Nm (58.2 ft.lbs.)
M12	79 Nm (58.2 ft.lbs.)	115 Nm (84.8 ft.lbs.)	135 Nm (99.5 ft.lbs.)
M14	125 Nm (92.1 ft.lbs.)	185 Nm (136 ft.lbs.)	220 Nm (162 ft.lbs.)
M16	195 Nm (144 ft.lbs.)	290 Nm (214 ft.lbs.)	340 Nm (250 ft.lbs.)
M18	280 Nm (206 ft.lbs.)	400 Nm (295 ft.lbs.)	470 Nm (346 ft.lbs.)
M20	395 Nm (291 ft.lbs.)	560 Nm (413 ft.lbs.)	660 Nm (486 ft.lbs.)
M22	540 Nm (398 ft.lbs.)	760 Nm (560 ft.lbs.)	890 Nm (656 ft.lbs.)
M24	680 Nm (501 ft.lbs.)	970 Nm (715 ft.lbs.)	1150 Nm (848 ft.lbs.)
M27	1000 Nm (737 ft.lbs.)	1450 Nm (1069 ft.lbs.)	1700 Nm (1253 ft.lbs.)
M30	1350 Nm (995 ft.lbs.)	1950 Nm (1437 ft.lbs.)	2300 Nm (1695 ft.lbs.)

1. These values are valid for screws with untreated, non-lubricated surfaces

Specific tightening torques

Description	Tightening torque
Wheel nut	300 $^{\pm 20}$ Nm (221.1$^{\pm 15}$ ft.lbs.)
Track-rod end (steering ram)	160 Nm (117.92 ft.lbs.)
Piston rod (steering ram/track rod)	250 Nm (184.25 ft.lbs.)

6.19 Loader unit

Loader unit with bucket [1, 2]	Model WL 180	Model WL 280
Bucket capacity	0.3 m³ (0.89 ft³) according to ISO	0.65 m³ (2.13 ft³) according to ISO
Tipping load	1200 kg (2646 lb)	2340 kg (5159 lb)
Payload	540 kg(1190 lb)	1170 kg (2579 lb)
Bucket width	1180 mm (46.46 in)	1650 mm (64.96 in)
Dump height	2075 mm (81.69 in)	2300 mm (90.55 in)
Pin height	2578 mm (101.5 in)	3020 mm (118.9 in)
Dump reach	600 mm (23.62 in)	250 mm (9.84 in)
Scraping depth	51 mm (2.0 in)	49 mm (1.93 in)
Dump-in angle	40°	45°
Dump-out angle	40°	40°
Breakout force (lift ram)	18.7 kN (13782 ft.lbs.)	28.0 kN (20636 ft.lbs.)
Breakout force (tilt ram)	15.1 kN (11129 ft.lbs.)	27.3 kN (20120 ft.lbs.)
Fork arms (payloads stated for 400 mm (15.75 in) load distance)		
Payload, safety factor 1.25 (standard cab)	780 kg (1720 lb)	1600 kg (3527 lb)
Payload, safety factor 1.25 (open cab option)	750 kg (1653 lb)	1550 kg (3417 lb)
Payload, safety factor 1.67 (standard cab)	580 kg (1278 lb)	1200 kg (2645 lb)
Payload, safety factor 1.67 (open cab option)	560 kg (1235 lb)	1150 kg (2535 lb)
Tipping load	975 kg (2150 lb)	2000 kg (4409 lb)
Lift height	2250 mm (88.58 in)	2670 mm (105.1 in)
Movable payload in transport position (**safety factor 1.25**)	950 kg (2094 lb)	1900 kg (4188 lb)

1. Model WL 180 with tires 28 x 9.00-15
   WL 280 with tires 10.5-18
2. Model WL 180 with standard bucket 1000101429
   Model WL 280 with standard bucket 1000123977

6.20 Dimensions model WL 180

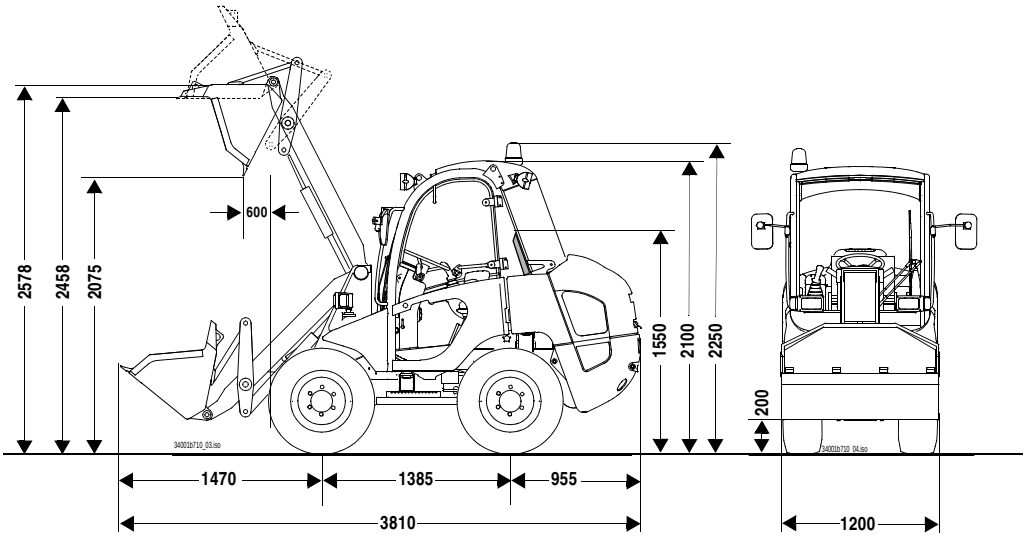

Fig. 163: Machine dimensions (model WL 180)

Dimensions Model WL 180	mm (in)
Overall length[1]	3810 (150.0)
Overall height [2, 3] without cab	1550 (61.0)
Overall height[2] with cab	2100 (82.68)
Overall height[2] with cab and protective FOPS screen[4] (option)	2160 (85.04)
Overall height[2] with cab and rotating beacon (option)	2250 (88.58)
Overall height[2] with ROPS bar (option)	2160 (85.04)
Overall height[2, 5] with ROPS bar folded down (option)	1745 (68.90)
Overall width without bucket[6]	1180 (46.46)
Overall width[1]	1200 (47.24)
Ground clearance in transport position of loader unit	200 (7.87)
Ground clearance[2] below rear axle gearbox	200 (7.87)
Track width, front/rear	904 (35.59)
Wheelbase	1385 (54.53)
Turning radius[7]	1940 (76.38)

1. With standard buckets 1000101429, 1000101430
2. With tires 28 x 9.00-15 (machine height increased by 30 mm with tires 10-16.5 and 315/55 R16)
3. Top edge of inside trim panel (behind seat)
4. According to ISO 3449 category I
5. Measured at upper edge of pivot
6. With outside mirrors folded in
7. Measured at outer edge of tires

6.21 Dimensions model WL 280

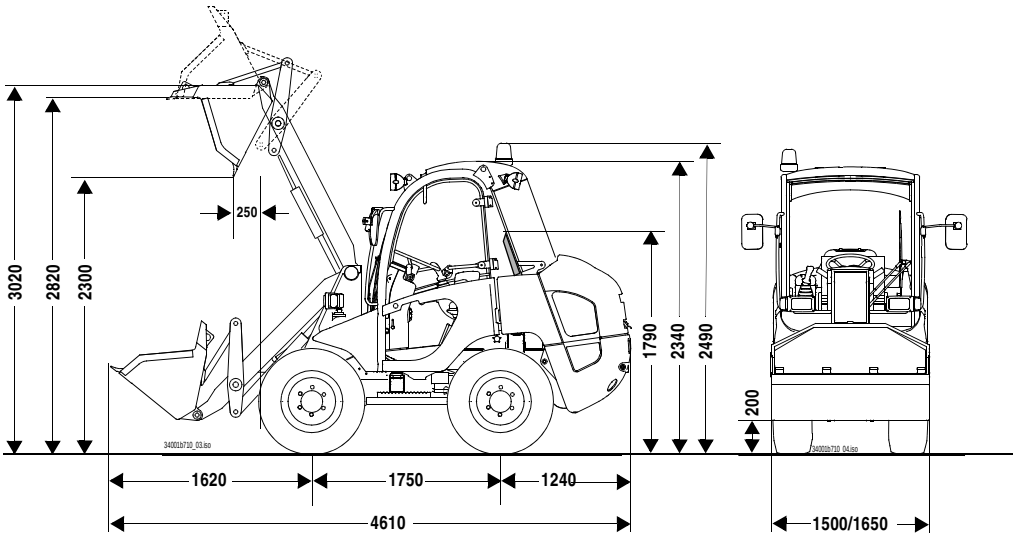

Fig. 164: Machine dimensions (model WL 280)

Dimensions Model WL 280	mm (in)
Overall length[1]	4610 (181.50)
Overall height [2, 3] without cab	1790 (70.47)
Overall height[2] with cab	2340 (90.13)
Overall height[2] with cab and protective FOPS screen[4] (option)	2400 (94.49)
Overall height[2] with cab and rotating beacon (option)	2490 (98.03)
Overall height[2] with ROPS bar (option)	2400 (94.49)
Overall height[2, 5] with ROPS bar folded down (option)	1985 (78.15)
Overall width without bucket[6]	1500 (59.06)
Overall width[1]	1650 (64.96)
Ground clearance in transport position of loader unit	200 (7.87)
Ground clearance[2] below rear axle gearbox	320 (12.60)
Track width, front/rear	1193 (46.97)
Wheelbase	1750 (68.90)
Turning radius[7]	2430 (95.67)

1. With standard bucket (spare part no. 1000124345)
2. With tires 10.5-18 (height indications 30 mm (1.18 in) lower with tires 12-16.5, height indications 40 mm (1.57 in) lower with tires 280/70 R18, height indications 20 mm (0.78 in) lower with tires 340/65 R18)
3. Top edge of inside trim panel (behind seat)
4. According to ISO 3449 category I
5. Measured at upper edge of pivot
6. With outside mirrors folded in
7. Measured at outer edge of tires

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

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

KRAMER-WERKE GmbH
Nussdorfer Str. 50
D-88662 Überlingen
Germany

Wacker Neuson Corporation
P. O. Box 9007
Menomonee Falls, WI 53052-9007
Telephone: (262) 255-0500
Fax: (262) 255-0550
Telephone: (800) 770-0957
www.wackerneuson.com

Kramer-Werke GmbH
Nussdorfer Str. 50
D-88662 Überlingen
Tel. +49 (0) 7551 802-0
Fax +49 (0) 7551 802-260
E-mail info@kramer.de
www.neusonkramer.com

Order no. 1000184972 US