WACKER NEUSON

Operator's Manual

Telehandler

TH955

Machine model	**416-16**
From serial no.	**416 16 0001**
Version	**2.0**
Doc. Number	**1000361101**
Language	**[en]**

2 Safety

2.1 Safety symbols and signal words

Explanation

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

DANGER

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

Consequences in case of non-observance.

► Avoidance of injury or death.

WARNING

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

Consequences in case of non-observance.

► Avoidance of injury or death.

CAUTION

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

Consequences in case of non-observance.

► Avoidance of injury.

NOTICE

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

► Avoidance of damage to property.

2.7 Attachment operation

Attachments

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

Operation

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

Removing and fitting attachments

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

Working near electric supply lines

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

Working near non-electric supply lines

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

Permissible temperature range during normal operation

The permissible temperature range for a machine serviced in compliance with the maintenance instructions is -15°C to +40°C (5°F to 107°F) during normal operation with short intervals of operation at maximum output.

Operating temperatures below -15°C or above +40°C (107°F) require special equipment and/or operating materials (fuel, engine and hydraulic oil).
Please contact your distributor if you require more information on operation in extreme temperature ranges

Driving licence

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

The buyer/operating company is responsible for the operators' training in safe working on and with the machine.

The basis for this in the Federal Republic of Germany is the "DGUV principle 308-009" [German inspection and certification body for agriculture and forestry].

§ 5 StVZO (German traffic regulations) requires the following driving licences for telehandler operation:

- Driving licence category **L** (European Union)
  - Self-propelled work machines **up to 25 kph**
  - Agricultural or forestry tractors **up to 40 kph** (with trailer 25 kph)
- Driving licence category **C** (European Union)
  - Motor vehicles over 3500 kg (with trailers up to 750 kg)
- Driving licence category **CE** (European Union)
  - Motor vehicles over 3500 kg (with trailers over 750 kg)
- Driving licence category **T** (European Union)
  - Self-propelled work machines for agriculture and forestry **up to 40 kph**
  - If certified as agricultural or forestry tractors **up to 60 kph**

Observe and follow the legal regulations of your country.

Identification

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

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

Observe and follow the legal regulations of your country.

Labels at rear of machine (overview)

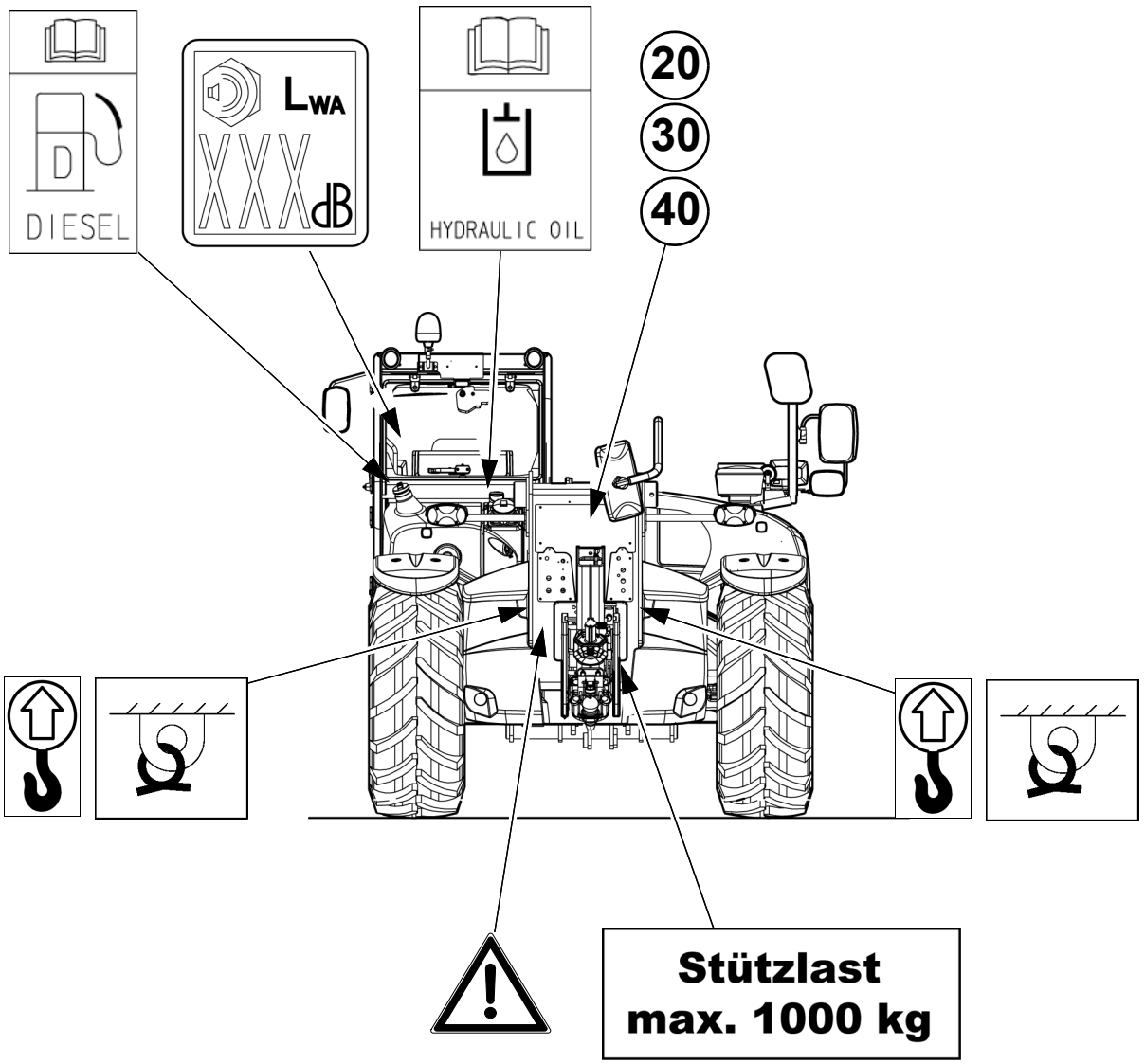


Fig. 5

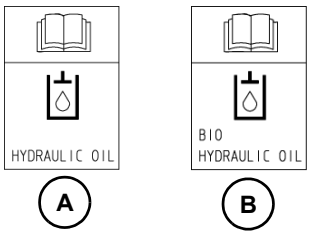


Fig. 38

Information label: Filler opening for hydraulic oil

A Hydraulic oil

B Biodegradable hydraulic oil

Located next to the filler opening (hydraulic oil reservoir).

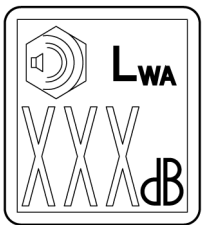


Fig. 39

Noise level label

Noise levels produced by the machine.

LWa = sound power level

Other information *– see chapter 9 "9.11 Noise emissions" on page 9-20*

Affixed on the rear window.

Fig. 40

Emergency exit label

Indicates the emergency exit in case of an emergency!

– see chapter 4 " Rear window emergency exit" on page 4-5

Affixed on the rear window.

Fig. 41

Label: drawbar load (option)

Specifies the maximum drawbar load of the ball hitch (1000 kg (2,204.5 lb)) *– see chapter 9 " Trailer weight/drawbar load" on page 9-22*

Located at rear of machine beside the trailer coupling.

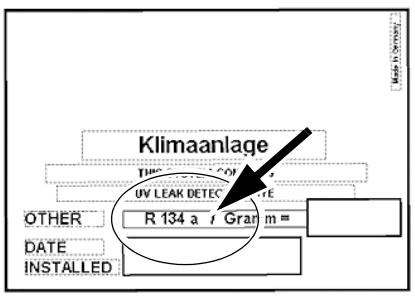


Fig. 42

Information label for air conditioning system refill (option)

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

Location: In the engine compartment on the air guide plate of the radiator (coolant).

Field of vision during work operation

Important safety instructions on field of vision during work operation

WARNING

Accident hazard due to restricted field of vision!

Failure to observe this can cause serious injury or death.

- ► Before taking the vehicle into service, check the line-of-sight and adjust the mirrors so that the visible area behind and beside the vehicle is seen as close as possible to the vehicle.
- ► Additional equipment or attachments must not be installed if they impair visibility.
- ► Remove obstacles within the job site.
- ► Do not move material with a raised loader unit.
- ► Move material only in transport position.
- ► If the field of vision cannot be safely adjusted with the mirrors, the operator must take appropriate measures (optional camera, person guiding the operator). The operator of the machine always has the sole responsibility for this.

WARNING

Accident hazard due to persons in the danger zone!

Failure to observe this can cause serious injury or death.

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

Before taking the vehicle into service, adjust the visual aids – *see "Mirror adjustment" on page 4-12*, or *Electric mirror adjustment (option) on page 4-16* and *Camera (option) on page 4-17*.

Rear window heating (option), mirror heating (option)

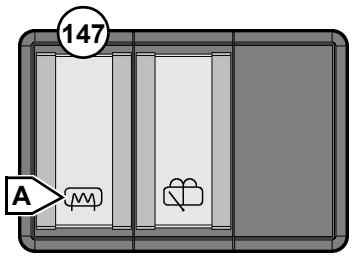


Fig. 73

The operating touch button is located on the switch console in the cabin roof

Operation of rear window and mirror heating		Function
ON	Press push button **147** to position **A**.	➥ The indicator light in the push button illuminates. ➥ Heating is in operation.

Information

The rear window and/or mirror heating is switched off automatically as soon as the correct temperature is reached!

Enabling the immobilizer

1. Apply the parking brake
   – see chapter 5 “ Parking brake” on page 5-13.
2. Stop the engine.
3. Remove the starting key (blue).
   ➥ The immobilizer is enabled in 30 seconds.

Information

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

Disabling the immobilizer

1. Insert the ignition key (blue) into the ignition switch key.
   ➥ The immobilizer is disabled after 5 seconds.
2. Start the engine *– see “Starting the engine” on page 4-64*.

Deleting coded keys

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

1. Switch on the side marker lights *– see chapter 5 “ Parking lights/low beam” on page 5-25*.
2. Insert the master key (blue) into the ignition switch key, turn it to position (1) and leave it in this position for at least 20 seconds.
   ➥ The coded keys are deleted (blue) and can be re-coded *– see “Coding the ignition key switch” on page 4-28*.

Information

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

Instrument panel with indicator lights (overview)	Page
89 Indicator light (yellow) – pressure monitoring	
90 Not assigned	
91 Indicator light (yellow) – oscillating-axle interlock (option)	*4-46*, *5-132*
92 Indicator light (green) – changeover valve for 3rd control circuit in operation (option)	*5-58*, *5-63*
93 Indicator light (green) – front socket (option)	*5-129*
94 Warning light (red) – hydraulic oil level (option)	*4-47*, *7-67*
95 Warning light (red) – hydraulic oil filter dirt	*4-47*, *7-67*
96 Indicator light (green) – trailer operation indicator light (option)	*4-47*
97 Indicator light (yellow) – differential lock	*4-47*
98 Indicator light (green) – turn indicator on the right/left	*4-47*
99 Warning light (red) – hydraulic oil temperature	*4-47*, *7-66*
100 Indicator light (green) – reverse machine travel	*4-47*
101 Indicator light (yellow) – coolant level	*4-48*, *7-53*
102 Indicator light (green) – forward machine travel	*4-48*
103 Indicator light (blue) – high beam	*4-48*

Instrument panel (left)	Page
104 Rotary switch – fan speed control for cabin heating	*5-36*
105 Switch (grey) – air conditioning (option)	*5-38*
106 Not assigned	
107 Not assigned	
108 Switch with lock (green) – continuous operation of 3rd control circuit (option)	*5-63*
109 Front socket switch (grey, option)	*5-129*
110 Switch with lock (green) – tilt ram lock (option)	*5-128*
111 Switch (green) – bucket, fork-lift and manual mode (overload control)	*5-47*, *5-48*, *5-49*
112 Not assigned	
113 Push button (green) – overload protection (boom)	*5-50*
114 Switch with lock (red) – joystick lock for road travel	*4-61*, *5-41*
115 Push button (green) – unlocking of quickhitch lock ram	*5-59*
116 Switch (3 positions) (green) – load stabilizer (option)	*5-98*
117 Hazard warning switch (red)	*5-31*
118 Switch (grey) – machine lights (road travel)	*5-25*
119 Touch button (grey) – diesel particulate filter regeneration (opt)	*7-97*
120 Rotary switch – heating controls for cabin heating	*5-36*

Control lever (joystick)	Page
121 Push button (grey) – speed range reduction	*5-16*
122 Push button (grey) – speed range increase	*5-16*
123 Push button (grey) – 3rd control circuit changeover valve (option)	*5-61*
124 Switch (scroll wheel, grey) – unlock/lock 3rd control circuit	*5-59*
125 Push button (grey) – differential lock	*5-24*
126 Push button (grey) – bucket repositioning (option)	*5-41*, *5-126*
127 Push button (orange) – travel direction neutral position	*5-20*
128 Switch (scroll wheel, grey) – extend/retract telescopic boom	*5-43*
129 Switch (scroll wheel, orange) – change of forward/reverse travel direction	*5-17*, *5-19*

Information display on the indicating instrument

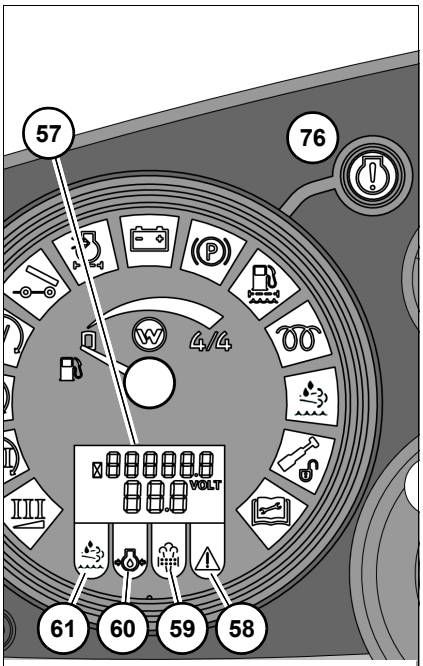
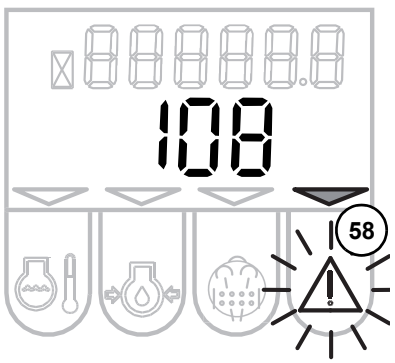


Fig. 99

Information display **57** on the indicating instrument monitors a range of operating states and values of the machine, and displays the current error codes.

The information display **57** has two lines and a warning-light section.

- The upper line displays the current operating hours of the machine.
- The lower line displays the current operating states and values of the machine.
- If a warning message is issued, another rotating beacon **61**, **60, 59** or **58** illuminates in addition.
  The separate current error codes and operating states can be selected with push button **76**.

Information display of upper line	Operating value	Unit	Remarks
	Operating hours	o/h	After switching on the ignition, the operating hours until the next service are displayed for a few seconds. Then the current operating hours are displayed. **Example:** 826.5 o/h Current operating hours since delivery of machine
	Error code	–	Shows the error code, such as error code 108 ➥ Warning light **58** illuminates ➥ Permanent acoustic warning **Possible causes:** • Malfunctioning hydraulic oil temperature sensor • Hydraulic oil temperature over 120°C (248°F) • Hydraulic oil temperature under -40°C (-40°F) ➥ Move to next message with touch button **76.** Further information *– see chapter 8 "Digital display of error codes" on page 8-7*.

Instructions for machine travel on public roads

- Carrying or transporting **accompanying persons** in the cabin or on the telehandler is prohibited.
- The machine is subject to the applicable national legal regulations (**StVZO** German road traffic regulations, for example) and to the provisions laid down in the **National Type Approval (Germany)**, the **Data Confirmation (Germany)** or the **machine certification papers**.
- Only the attachments that are specified in the National Type Approval (Germany), in the Data Confirmation (Germany), the certificate of approval (Germany) and that are described in this operator's manual are authorised for use on public roads– *see chapter 3 "Attachments certified for public roads in Germany" on page 3-12*.
- Remove inadmissible attachments – *see chapter 3 "Attachments not authorized for public roads in Germany" on page 3-13*.
- Machine travel on public roads with an attachment is prohibited if the distance between the front edge of the attachment and the centre of the steering wheel is **over 3500 mm** in transport position – *see chapter 3 "Overview of Attachments on KRAMER quickhitch facility" on page 3-12*.
- Machine travel on public roads with a loaded attachment is prohibited.
- If the machine is certified as a self-propelled work machine:
  With a trailer hitched, the machine **must not transport any material**.
  Only machine attachments may be transported on a trailer.
- Bear in mind the mandatory national regulations for accident prevention of the employers' liability insurance associations.
- Observe and follow the legal regulations of your country.

Normal load of exhaust gas after-treatment

The load in the diesel particulate filter depends on the load on the diesel engine and is indicated as follows.

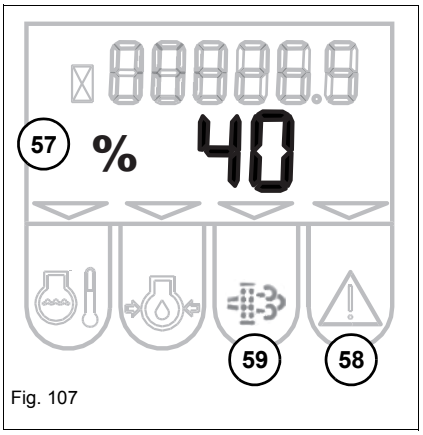


Fig. 107

Element	Signal	Remedy
Control lamp **59**	OFF	Normal operating state
Warning light **58** electronics error	OFF	
Buzzer	OFF	
Information display **57**	< 50%	

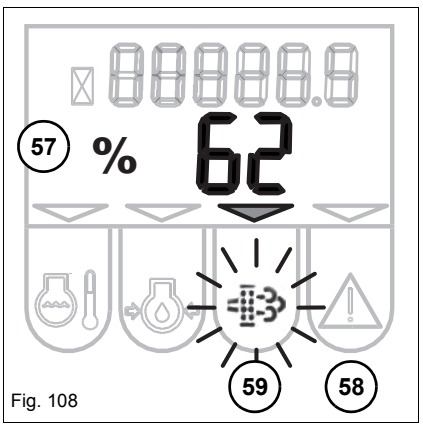


Fig. 108

Increase exhaust gas after-treatment load (only with diesel particle filters)

An increased load can be caused by:

- Long operation at idling speed, low-load operation.
- Many starts, short-distance operation.
- Low operating temperatures.

Element	Signal	Remedy
Indicator light**59**	**AN**	Increase the load, road travel at increased engine speed, for instance
Warning light **58** electronics error	**OFF**	
Buzzer	**1 x 3 sec**	
Information display **57** (only DPF)	**> 62 %**	

Diagonal steering (crab steering)

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

WARNING

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

Failure to observe this can cause serious injury or death.

► Before performing machine travel on public roads, switch-over to front wheel steering system – *see "Front axle steering" on page 5-5*.

Information

Diagonal steering is authorized only during work operation over short distances in the "Turtle" or "Snail" speed ranges.

Travel speed is automatically reduced during steering synchronisation to 7 km/h for safety reasons!

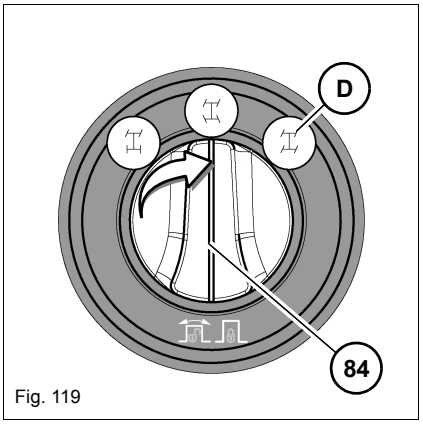


Fig. 119

Changing over to diagonal steering:

1. Brake the machine to walking speed.
2. Press rotary switch **84** and turn it to the right to position "Diagonal steering".
   ➥ Indicator light **D** flashes rapidly.
3. **Slowly** turn the steering wheel to the left and/or right until the wheels of the front and rear axles have passed through the straight-ahead position from both directions.
   ➥ Indicator light **D** for diagonal steering illuminates continuously.
   ➥ Diagonal steering is in operation.

Information

Do **not** stop the diesel engine with the wheels turned to the limit in diagonal steering mode.
When the machine starts again, this can cause tension in the steering system and malfunctions in the automatic steering synchronization.

► Set the wheels of the front and rear axles to the straight-ahead position before stopping the diesel engine.

Selecting a travel direction and starting machine travel

Important safety instructions on choosing the travel direction

WARNING

Accident hazard when changing travel direction during machine travel!

Changing the travel direction during machine travel can cause serious injury or death.

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

WARNING

Injury hazard to persons in the danger zone!

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

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

Working lights (standard/option)

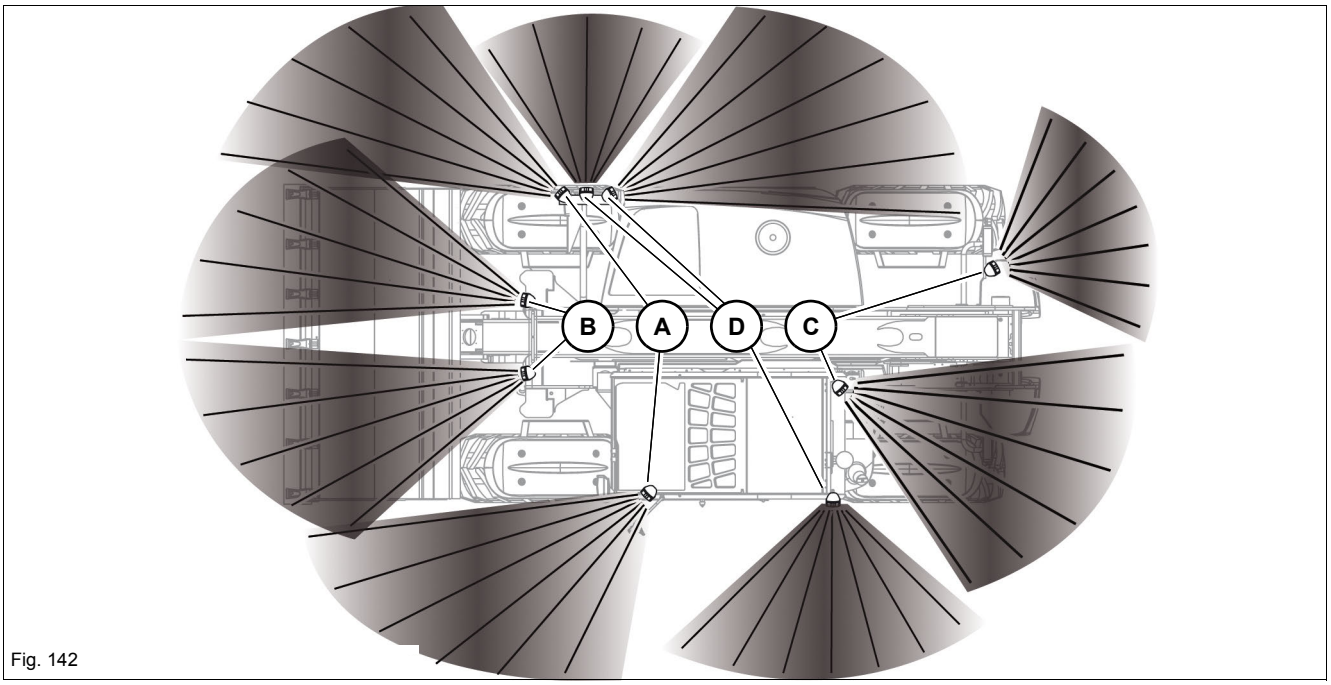


Fig. 142

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

The toggle switches are located on the switch panel on the upper right on the cabin roof.

WARNING

Accident hazard due to blinded motorists!

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

- ► Always switch off the working lights during machine travel on public roads.
- ► Pay attention to national regulations on construction site lighting.

Information

The working lights stay lit after switching off ignition.

This drains the battery of the machine.

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

Air conditioning (option)

Information on putting the air conditioning into operation

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

In order to achieve best air conditioning results:

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

NOTICE

In order to avoid functional errors and possible loss of the refrigerant:

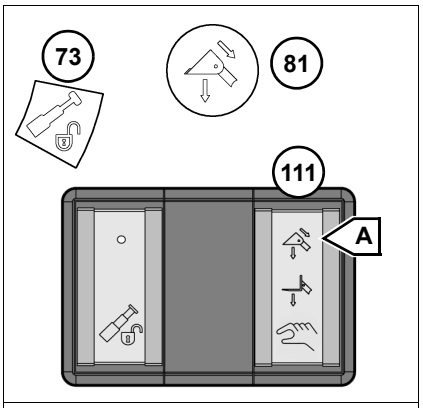
► Run the air conditioning system once a month. This prevents the seals in the compressor from drying and becoming brittle.

► Regularly check the V-belt for tension and cracks – *see chapter 7 " Air conditioning (option)" on page 7-80*.

► Clean a dirty condensor – *see chapter 7 " Air conditioning (option)" on page 7-80*.

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

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



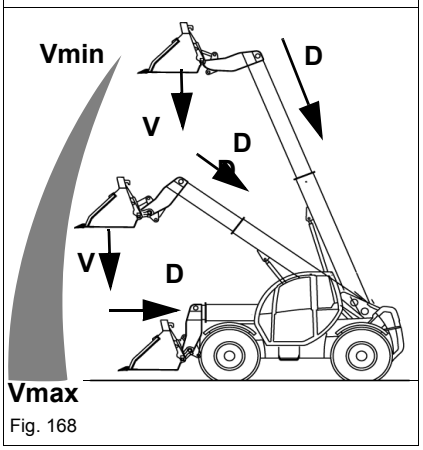


Fig. 168

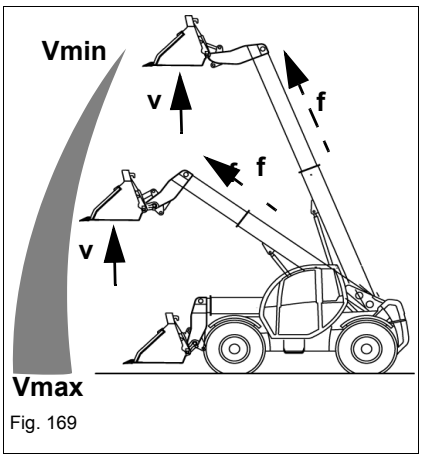


Fig. 169

Overload control in bucket mode

Overload control is always enabled in bucket mode.

WARNING

Risk of injury if the stability is ignored!

The overload display will not warn you about:
- vehicle side load,
- a sudden overload of the telescopic arm,
- when travelling on rough terrain,
- and in the event of any abrupt braking or delays!

Failure to observe stability can cause serious injury or death.

- ► Only perform transport trips with the loading system lowered (transport position).
- ► Do not drive with raised and extended telescopic loading system.
- ► Do not turn on gradients.
- ► Drive slowly round bends.
- ► Drive at a walking pace.

1. Press switch **111** to position **A**.
   - ➥ Indicator light **81** illuminates.
2. Lower the loader unit with the joystick.
   - ➥ Automatic reduced lowering speed depending on load and angle (**V**).
   - ➥ Automatic boom retraction
   - ➥ The overload control is disabled when the telescopic boom is fully retracted (**D**).
   - ➥ Indicator light **73** on the instrument panel illuminates.
3. Lift loading system with joystick (**v**).
   - ➥ Observe the safe load indicator, and take appropriate action if necessary.
4. Extend the telescopic arm, where appropriate (**f**).

Modifying and confirming the oil volume

Information

With regard to control circuits with touch button operation, keep the touch button pressed until the set oil volume is confirmed.

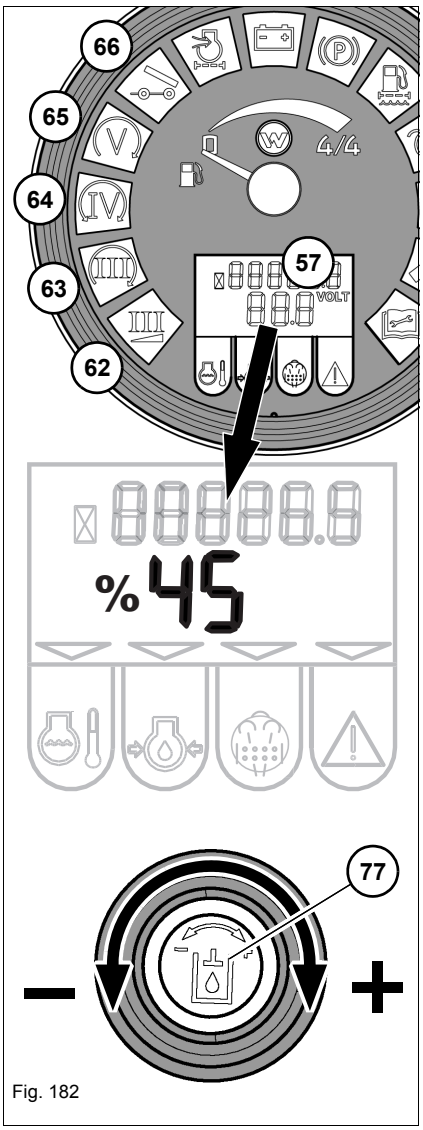


Fig. 182

1. Starts the engine
2. Activate the desired control circuits with the rocker switch or touch button.
   ➥ The indicator light of the selected control circuit **flashes** slowly.
3. Set the oil volume. To do this: turn rotary switch **77** to the left (−) or right (+) within 10 seconds until the required oil volume appears in digital display **57** in %.
   ➥ The oil volume is modified in steps of 5 %.
4. Save the chosen oil volume. To do this, press the rotary switch **77** **or** wait 10 seconds. The pre-adjusted oil volume of the active control circuit is then automatically saved.
   ➥ The indicator light of the selected control circuit illuminates continuously on the indicator**57**.
   ➥ The selected oil volume can be used for the attachment.

Installing an attachment on a quickhitch with a mechanical lock

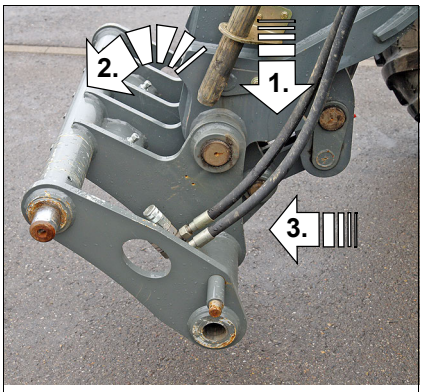


Fig. 196

Installing and locking the bucket mechanically

1. Lower the telescopic boom. To do this: push control lever **17** forward**.**
2. Tilt the quickhitch forward. To do this: push the control lever **17** to the right**.**
3. Approach the telehandler to the attachment.

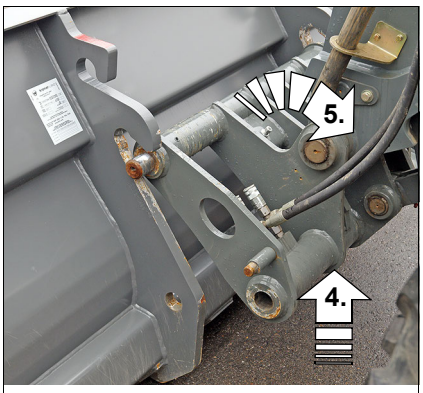


Fig. 197

4. Raise the telescopic boom until the mount of the quickhitch engages in the mount of the attachment. To do this: pull the control lever backward**.**
5. Tilt in the quickhitch fully. To do this: push the control lever **17** to the left**.**

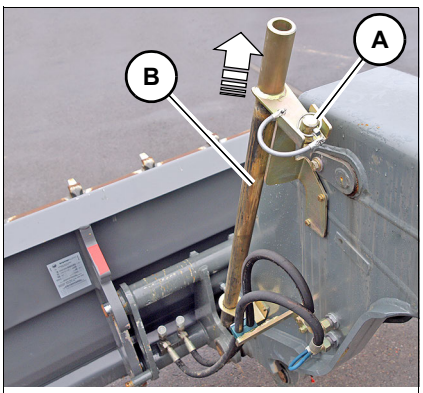


Fig. 198

Information

Lock pin **B** is located in the bracket on one side of the telescopic boom!

6. Release split pin **A** and pull out lock pin **B** from the bracket.

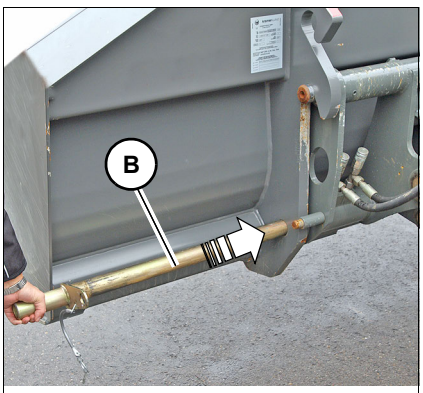


Fig. 199

7. Slide lock pin **B** through the mounting bores of the attachment and of the quickhitch frame as far as it will go.

Pallet forks

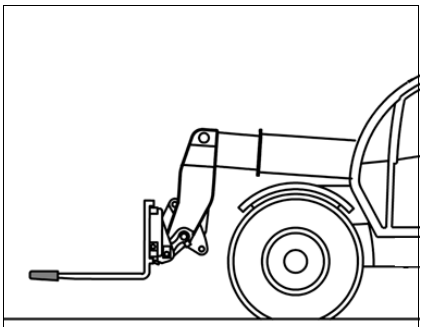


Fig. 213

Fields of application of pallet forks

The pallet forks are mainly used for picking up, transporting and loading palletized material, pallets and other stacked material!

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

WARNING

Accident hazard due to pallet fork arms!

Pallet fork arms can cause serious injury or death during machine travel on public roads.

- ► Machine travel on public roads with pallet forks is prohibited!
- ► Remove pallet fork arms before machine travel on public roads and transport them separately.
- ► Before leaving the machine, lower the pallet forks to the ground, stop the diesel engine, switch off ignition and remove the key.
- ► The pallet forks are not certified for applications with lifting gear! Do not hitch any hooks, eyelets, etc. either onto the pallet forks or fork arms as lifting gear!

WARNING

Accident hazard due to machine overload when picking up or setting down loads!

Failure to observe this can cause serious injury or death.

- ► Pay attention to the load diagram and the display of the overload control and take appropriate action if necessary.
- ► The load diagram is affixed on the side window.

Information

The fixed load-bearing capacity diagram applies exclusively for the application of the released pallet forks – see page *3-12*.

Pay attention to the specific load diagrams of other attachments used!

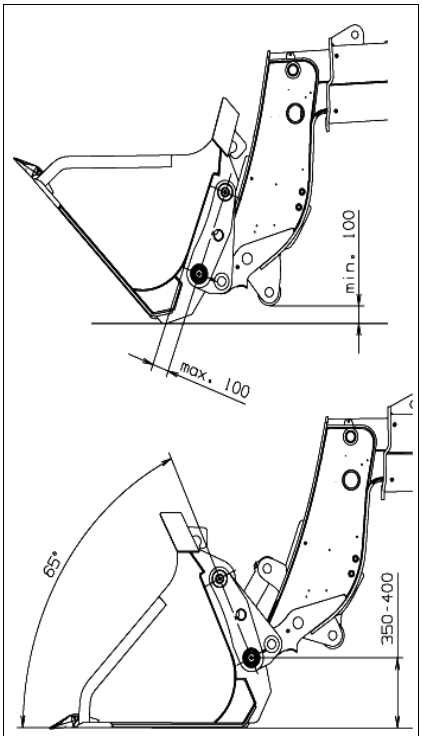


Fig. 222

Calculation of stability for attachments from other manufacturers (bucket)

Maximum authorised bucket payloads = pallet forks payloads – bucket weight.

- ➥ Bucket kerb weight, see type label affixed on bucket.
- ➥ Pallet forks payload *– see "Load diagram for pallet forks from other manufacturers (applies to machines with rigid front axle and oscillating rear axle)" on page 5-88*.

Example: telescopic boom retracted

Payload 4990 kg (11000.8 lb) (see pallet forks load diagram) –
600 kg(bucket dry weight) = 4390 kg (9678.1 lb) actual payload in bucket

Example: telescopic boom extended

Payload 2000 kg (4409.1 lb) (see pallet forks load diagram) –
600 kg(bucket dry weight) = 1400 kg (3086.4 lb) actual payload in bucket

Information

A **Separate Certification for Vehicles (Germany)** issued by the specific authorities is necessary if the dimensions (length/width), material density and loads of the authorized attachments
– see chapter 3 " Overview of Attachments on KRAMER quickhitch facility" on page 3-12 are **not** in compliance with the requirements!

Observe the legal regulations of your country.

Transporting with a full bucket

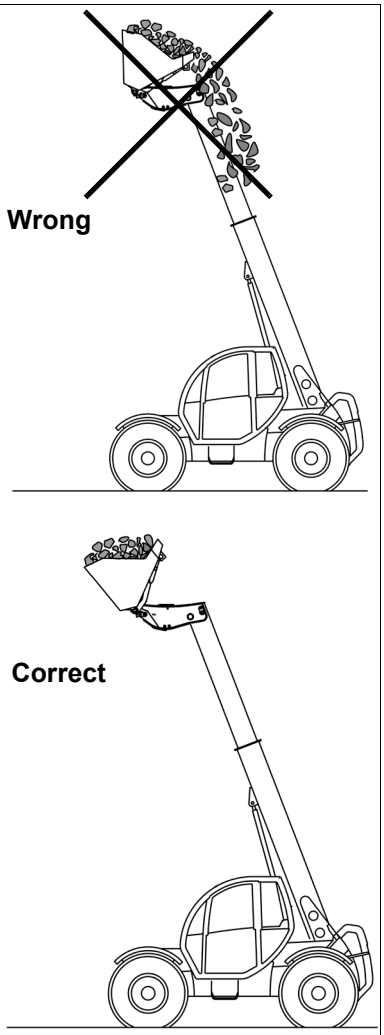


Fig. 226

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

WARNING

Danger of falling material when transporting loads with a raised and extended loader unit!

Failure to observe this can cause serious injury.

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

WARNING

If the bucket is unintentionally tilted in to the limit in the raised position, material can fall over the rear of the bucket!

Failure to observe this can cause serious injury.

► Do not tilt in a raised bucket.

► In case of bulky loads:
– Secure the load
– Fit a protection to the rear of the bucket
– Install a protective screen (option) on the cabin
– Use attachments with hydraulic grabs (option)

WARNING

Danger of tipping over during machine travel or manoeuvring on slopes with a full bucket!

Failure to observe this can cause serious injury or death.

► Lower the loader unit to transport position and tilt in the bucket completely.

► Ensure good visibility of the material you want to pick up and of the work and travel range.

► Observe the overload control display, and take appropriate action if necessary.

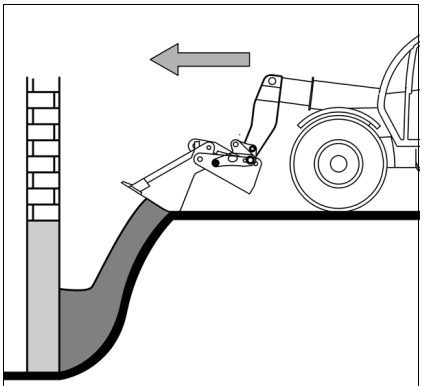


Fig. 247

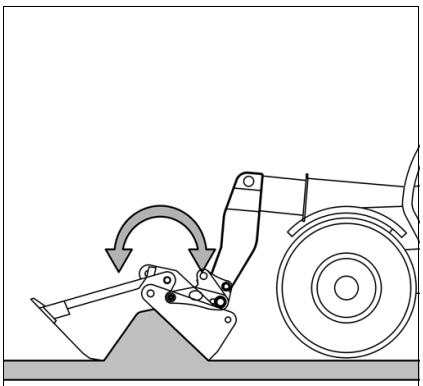


Fig. 248

Moving material with longer reach

Information

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

➥ Backfilling with maximum safety and without damaging slopes.

Picking up remaining material

1. Fully retract the telescopic boom.
2. Fold up the front half of the bucket (multipurpose bucket)
3. Tilt out the bucket
4. Lower the bucket to the ground. Ensure that both bucket halves touch the ground
5. Close and tilt in the multipurpose bucket at the same time
6. Raise the bucket with the lift hydraulics.

Information

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

Picking up material with the pallet forks

Information

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

► Switch off the load stabilizer in fork-lift mode!

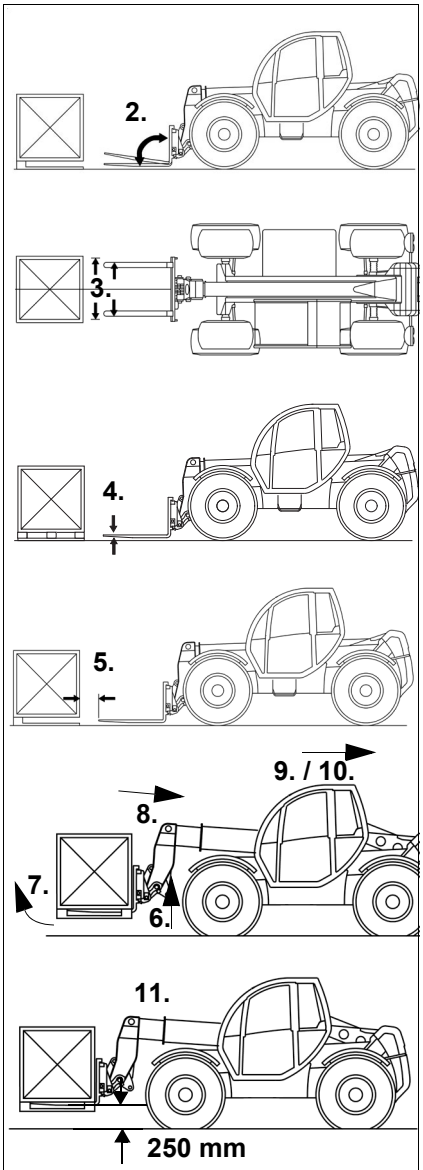


Fig. 262

1. Switch off the load stabilizer before working
   – see “Load stabilizer for loader unit (option)” on page 5-98.
2. Stop the telehandler right before the load and align the fork arms parallel to the ground.
3. Adjust the distance of the fork arms with regard to the centre line (dashed line).
4. Raise the loader unit until the pallet can be picked up easily.
5. Move carefully forward until the fork frame is in contact with the material.
6. Raise the loader unit and ensure that the limits of load diagram and safe load indicator are not exceeded!
   ➥ Ensure machine stability – see “Function of LEDs in safe load indicator” on page 5-40.
   ➥ In case of danger, lower the load immediately!
7. Tilt the fork frame backward.
8. Fully retract the telescopic boom.
9. Ensure that the area behind the telehandler is clear.
10. Reverse carefully until the loader unit can be lowered to transport position.
11. Transport the material in transport position.
    ➥ Transport height is about **250 mm (9.8 in)** above the ground.

Vibration function to load and unload the loader bucket (optional in preparation)

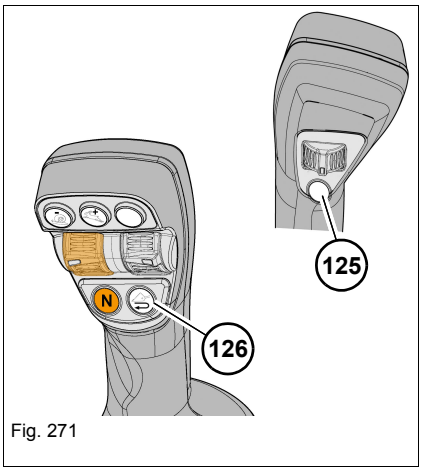


Fig. 271

The loader bucket can be loaded and emptied more easily with the vibration function (e.g. sticky earth).

This option is only available in combination with the “bucket repositioning” option.

NOTICE

To prevent any damage to the hydraulics, only use the vibration function briefly for loading or unloading the loader bucket.
This option cannot be used for other work (loss of warranty)!

Information

The vibration function is only possible in connection with the “automatic bucket return” and if the loader bucket is not tilted in or emptied at the detent.

Put the vibration function into operation as follows:

1. Picking up or tipping out a load
2. Press and hold touch button in the joystick **126** and hold touch button at the same time **125**
   ➥ Vibrating function is enabled
3. Release touch buttons **125 and 126**
4. Switch the shaking function on and off, for this, briefly press the touch button **125**
   ➥ Vibrating function is activated

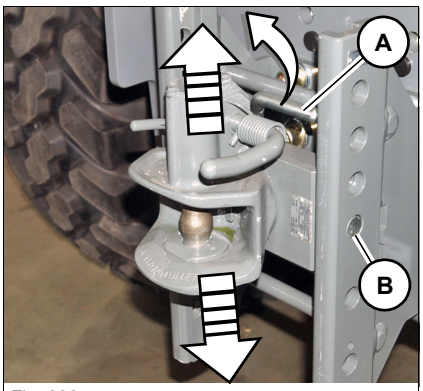


Fig. 286

Adjusting the height-adjustable trailer coupling (option)

Before hitching a trailer, adjust the height of the trailer coupling to the height of the trailer drawbar.

1. Put the trailer drawbar in a horizontal position.
2. Pull lever **A** upward.
3. Slide the trailer coupling upward or downward until it is at the same height as the trailer lug (at the middle of the coupling jaw).
4. Release lever A.
   ➥ Lock pins **B** must engage on either side.

Information

The height-adjustable trailer coupling can be completely removed if necessary. To do this: unlock the trailer coupling with lever **A** and remove it with an upward movement.

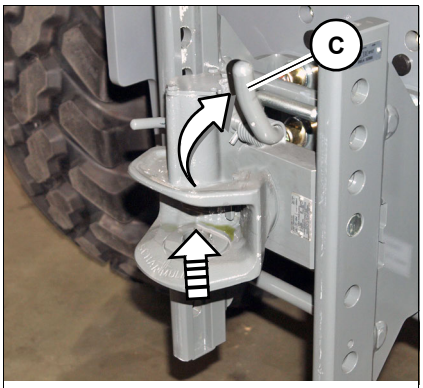


Fig. 287

Opening the automatic trailer coupling (option)

CAUTION

Accident hazard due to coupling pin snapping down!

Not observing this can lead to injuries!

► Do not touch the coupling pin with your hands.

1. Press lever **C** upward until the coupling pin audibly engages in the open position.

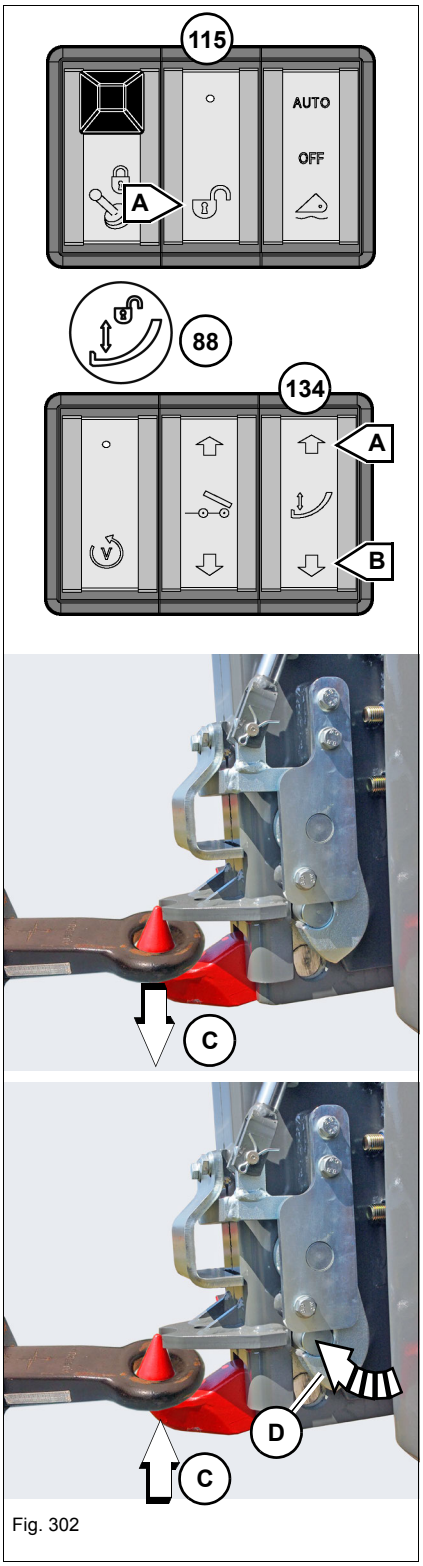


Fig. 302

Preparing to uncouple the trailer

1. Park the machine and the trailer on level ground.
2. Apply the parking brake.
3. Stop the engine.
4. Secure the trailer with the trailer brake and wheel chocks to prevent it from rolling away.
5. Put the support under the trailer draw-bar or fold down attached support.
6. Decouple all hydraulic hoses and compressed air hoses.
7. Disconnect the cables of the trailer lights from the machine.

Unhitching the trailer

NOTICE

To avoid damage to the ball hitch, do not lower the ball hitch too far to the ground as otherwise the vehicle will raise in the rear and therefore possibly cause damage from a bending of the ball hitch.

1. Start the diesel engine.
2. Adjust the line-of-sight to the ball hitch with the rear-view mirror *– see chapter 4 " Adjusting the rear mirror" on page 4-16*
3. Open the ball hitch. To do this, press and hold the touch button **134** in the position **B** with your right hand.
4. At the same time, press the touch button **115** in the position **A** briefly with your left hand until the towing pins have automatically disengaged.
   ➥ The warning light **88 lights up**.
5. Release the touch button **134** (right hand) once the uncoupling position has been reached.
6. When looking at the mirror attached at the rear, carefully drive away from the trailer until the trailer hook **C** is free.

Close the ball hitch

1. Close the ball hitch. To do this, press the touch button **134** in the position **A** and hold this until the ball hitch **audibly** encounters resistance and automatically locks.
   ➥ Towing hook **C** rises to the end position (arrow).
   ➥ Warning light **88** illuminates.
2. Release the touch button after the automatic safeguarding has occurred**134** .
   ➥ Warning light **88** goes out.

Information

The machine can only travel in snail mode (max. 7 km/h) if the Auto hitch trailer coupling is unlocked (warning light **88** illuminates)!

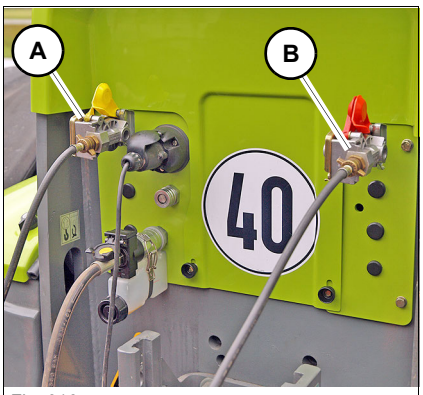


Fig. 316

Couple the compressed-air hoses

1. Hitch the trailer onto the trailer coupling, – see “Hitching a trailer” on page 5-138.
2. Clean the coupling heads on the pressure hoses and the machine.
3. First couple the pressure hose to the **yellow** coupling head **A**.
4. Then couple the pressure hose to the **red** coupling head **B**.
5. Establish the electric and hydraulic connections between the trailer and the tractor vehicle.
6. Remove the wheel chocks from the wheels of the trailer and safely store them on the trailer.
7. Release the trailer brake.
   ➥ Refer to the Operator’s Manual of the trailer.

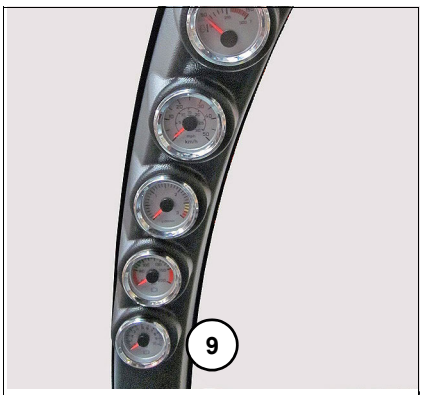


Fig. 317

Compressed-air gauge

CAUTION

There is a risk of an accident if the system pressure is below 5 bar (71.1 psi) during trailer operation!

Not observing this can lead to injuries!

► Before driving off with a coupled trailer, the pressure gauge **9** must show a system pressure of at least 5 bar (85.3 psi).

1. Let the diesel engine run at machine standstill until the compressed-air braking system is filled:
   ➥ Specified value: 6–8 bar (85.3–113.8 psi)
   ➥ Perform a brake test.

If the air pressure drops below 5 bar (71.1 psi) when travelling:

➥ Stop the machine immediately and have the pressure loss repaired – see “Compressed-air braking system (option)” on page 7-85.

Before putting the PROFI CAM / PROFI CAM PLUS into operation

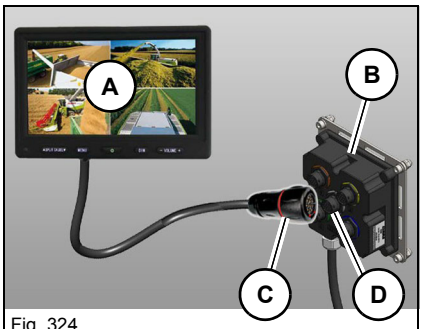


Fig. 324

Connecting the screen

Switch box (B) supplies the PROFI CAM screen (A) with power.The video signals are also transmitted from the cameras to the screen via the switch box.

1. Connect connector (3) of the screen to socket (4) in the middle of the switch box (2):
   ➥ Position the connector and the socket so that both guide cams and grooves are opposite.
2. Connect the connector and the bushing.
3. Turn the coupling ring on the connector 1/3 of a revolution to the right.

➥ The connection is established after an audible and perceptible click. The screen is operational.

Fig. 325

Installing the sun shield

The screen can be equipped with a sun shield (A) to protect it against sunlight.

1. Slide sun shield (A) on the screen from the front.

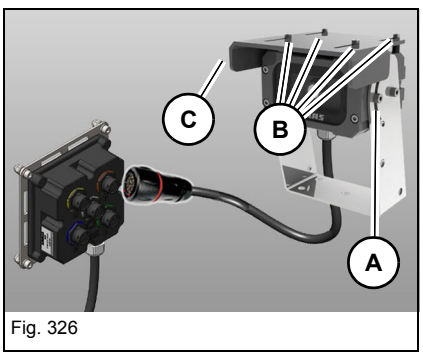


Fig. 326

Adjusting the camera

Adjust the position angle of the camera:

1. Loosen both hexagon socket bolts (A) on either side of the retaining bracket. Wrench size 3 mm
2. Adjust the camera as required.
3. Retighten the hexagon socket bolts (A).

Adjust the sun shield:

1. Loosen the 4 hexagon socket bolts (B) for fastening the sun shield (C). Wrench size 2.5 mm
2. Adjust the sun shield as required.
3. Retighten the hexagon socket bolts (B).

For more information on camera adjustment – *see “Camera (option)” on page 4-17*.

Putting the machine out of operation temporarily

1. If possible, retract the piston rods of the hydraulic rams to protect them against damage. If this is not possible, apply grease to the piston rods and to the bare parts of the hydraulic rams that are not paint-coated.
2. **Before putting the machine into operation**, clean the piston rods, however not with a grease solvent or a high-pressure cleaner.
   ➥ The scrapers are not water-tight, therefore water can penetrate into the guide bushing, and cause corrosion and damage to the piston rod.

Preserving the diesel engine

- Preserving inside
- Preserving outside

Information

Preserving work may be performed by an authorized service centre only!

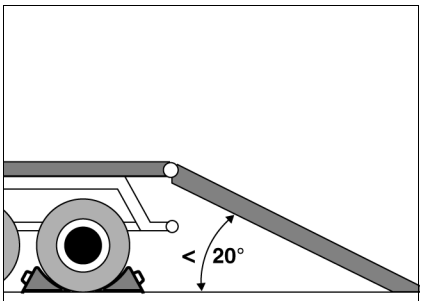


Fig. 338

Loading and tying down the machine

1. Secure the transport vehicle with chocks to prevent it from rolling.
2. Place the access ramps at the smallest possible angle.
   - ➥ Do not exceed an **angle of 20°**.
   - ➥ Use access ramps with an antiskid surface only.
3. Ensure that the loading area is clear and access to it is not obstructed, by superstructures for example.
4. Ensure that the access ramps and the wheels of the machine are free of oil, grease and ice.
5. Check the oil level of the diesel engine.
   - ➥ The oil level must be visible at the MAX mark of the oil dipstick.
6. Enabling the parking brake
7. Start the machine.
8. Raise the telescopic arm enough so that it does not touch the access ramps.
9. Release the parking brake
10. Carefully drive the machine onto the middle of the transport vehicle.
11. Set the drive to neutral *– see chapter 5 “Performing machine travel” on page 5-14*.
12. Lower the telescopic boom to the loading area.
13. Stop the engine.
14. Apply the parking brake *– see chapter 5 “Parking brake” on page 5-13*.
15. Remove the starting key.
16. Do not allow anyone to stay in the cabin, lock the door and the engine cover.
17. Ensure that the overall height of the machine is not exceeded.

Work description[1] (o/h = operating hours)	Service centre	User/operator		Service centre[2]		
Functional check, inspection work (👁)	**Delivery inspection**	**Every 10 o/h (daily)**	**Every 20 o/h**	**"A" 1st Inspection at 100 o/h**	**"B" every 500 o/h**	**"C" every 1500 o/h once a year**
Axles and gearboxes						
Check the gearbox oil level	●				●	●
Front/rear axle differential: check the oil levels	●				●	●
Front/rear axle planetary drives (left/right): check the oil levels	●				●	●
Diesel engine						
Engine oil: check the level	●	●		●	●	●
Fuel prefilter: drain the water		●		●	●	●
Coolant: check the level, add coolant if necessary[6]		●		●	●	●
Water/oil radiator (engine/hydraulic oil): check for dirt, clean if necessary[7]		●		●	●	●
Charge-air cooler: check for dirt accumulation, clean if necessary[7]		●		●	●	●
Charge-air cooler: drain the condensation water						●
Air filter: clean the dust valve [8, 9]		●		●	●	●
Check V-ribbed belt with tension pulley[10] (generator, fan) and have it replaced if necessary		●		●	●	●
Check the V-belt (air-conditioning system, compressed air-brake optional) and have re-tensioned if necessary[11]	●	●		●	●	●
Check valve clearance. Adjust if necessary						●
Check ash loading of diesel particle filter (option); renew where appropriate[12]				Every 3,000 o/h		
Cabin/undercarriage						
Operator seat, seat belt	●	●		●	●	●
Heater: Clean the recirculated air filter[13] (cabin interior) Clean the fine dust filter[13] (cabin exterior)		●		●	●	●
Warning and information labels: check for damage, loss	●	●		●	●	●
Condition of paint coating	●					

Specification of the SCR reducing agent (urea solution)

Important safety instructions

A highly pure, aqueous 32.5% urea solution is used as a reduction agent. This is known as DEF or AUS 32.

- Urea tanks – *see "SCR reducing agent/urea solution" on page 7-100*.

CAUTION

There is a risk to health with SCR reduction agent!

SCR reduction agent and its fumes are damaging to health!

► Avoid contact with the skin, eyes and mouth.

► Seek medical attention immediately in the event of accidents with SCR reduction agent.

► Wear protective equipment.

NOTICE

Destruction of the exhaust gas after-treatment system by filling the urea tank with other media (e.g. diesel).

► Only fill urea tank with SCR reduction agent.

► Empty and clean, in the event of incorrect filling of urea tank.

► If another medium than the SCR reduction agent reaches the utility lines or the transport module, these must be replaced.

Designation SCR reduction agent	Standard	Valid in
DEF or AUS 32	DIN 70070	Germany
	ISO 22241-1	world-wide
	ASTM D7821	USA

Environment

Collect the SCR reduction agent as it drains with a suitable container and dispose of it in an environmentally friendly manner!

7.6 Lubrication work

Preparing lubrication

Information

Maintenance intervals – *see "Maintenance plan" on page 7-4*.
Lubricants – *see chapter 7 "7.3 Fluids and lubricants" on page 7-14*.

- Park the telehandler on level ground.
- Apply the parking brake and secure the machine with additional wheel chocks.
- Only raise the loader unit until all grease zerks can be accessed without any risk.
- Stop the engine and remove the starting key.
- Remove the earthing strap on the battery isolator relay (battery).

Lubricating the rear axle oscillation-type bearing

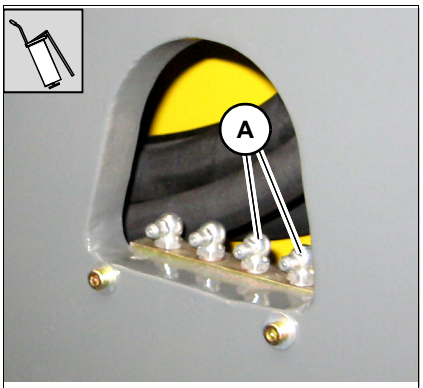


Fig. 346

Information

The machine has an oscillation-type rear axle.
Both grease nipples **A** are located on the rear left side of the frame and are routed to the axle bearing via hoses.

► Maintenance intervals – *see "Maintenance plan" on page 7-4*.
► Lubricants – *see chapter 7 "7.3 Fluids and lubricants" on page 7-14*.

- Lubricate grease nipples **A** (2 x).

Lubricating the front axle oscillation-type bearing

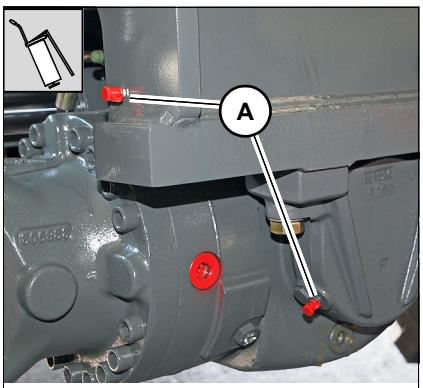


Fig. 347

Information

The machine has an oscillation-type front axle.
Both grease nipples **A** are located at the front right of the frame and are routed to the axle bearing via hoses.

► Maintenance intervals – *see "Maintenance plan" on page 7-4*.
► Lubricants – *see chapter 7 "7.3 Fluids and lubricants" on page 7-14*.

- Lubricate grease nipples **A** (2 x).

Filling the central lubrication system (option)

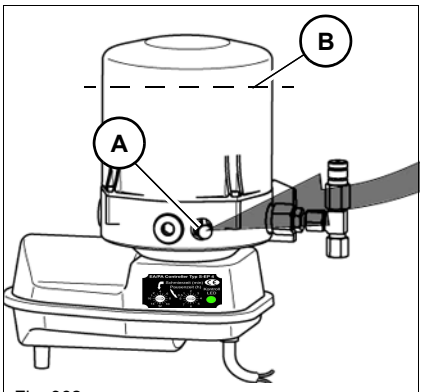


Fig. 362

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

Only fill up to the maximum fill level **B** in order to ensure the aeration of the central lubrication system.

NOTICE

Damage to central lubrication system due to penetration of humidity to the controls.

► Always close the cover correctly, otherwise water can penetrate into the controls and destroy them.

Information

Maintenance intervals – *see “Maintenance plan” on page 7-4*.
Specifications and fill quantities – *see chapter 7 “7.3 Fluids and lubricants” on page 7-14*.

Checking the engine oil level

CAUTION

Injury hazard due to hot and moving engine parts!

Hot and moving engine parts can cause injury.

- ► Do not open the engine cover if the engine is running.
- ► Stop the engine and let it cool down.
- ► Wear protective gloves.

NOTICE

If the engine oil level is too low or if an oil change is overdue (black engine oil), this can cause **engine damage or loss of output!**

- ► Have the oil changed by an authorized service centre.

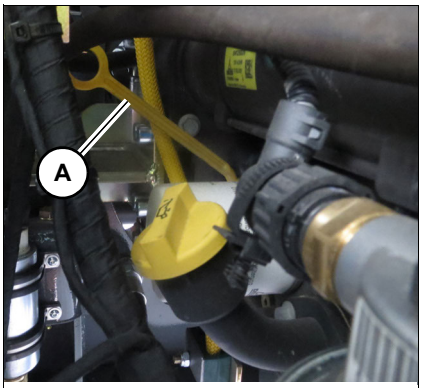


Fig. 369

Check the engine oil

1. Park the machine on level ground.
2. Apply the parking brake.
3. Stop the engine and remove the key.
4. Open the engine cover.
5. Pull out oil dipstick **A** and wipe it with a lint-free cloth.
6. Push in the oil dipstick as far as possible, pull it back out and read off the oil level.
7. Add oil if the oil level is near the MIN mark.

Example: oil dipstick with 2 notches

- ➥ 1st notch = MIN mark
- ➥ 2nd notch = MAX mark

Example: oil dipstick with 4 notches

- ➥ Cold engine – 1st notch = MIN mark, 3rd notch = MAX mark
- ➥ Warm engine – 2nd notch = MIN mark, 4th notch = MAX mark

Information

Maintenance intervals *– see "Maintenance plan" on page 7-4*.
Specifications and fill quantities *– see chapter 7 "7.3 Fluids and lubricants" on page 7-14*.

Cleaning the radiator

CAUTION

Burn hazard during maintenance on a hot engine and radiator!

Non-observance can cause serious injury.

- ► Wear protective gloves and eye protection.
- ► Let the radiator cool down at least 10 minutes after stopping the diesel engine.

NOTICE

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

- ► Check and clean the outside of the radiator once a day.
- ► Clean the radiator more frequently in dusty or dirty work conditions.
- ► Maintenance intervals – *see "Maintenance plan" on page 7-4*.

NOTICE

In order to ensure the radiator's cooling capacity, do not damage the radiator lamellas as you blow them clean with a compressed-air gun!

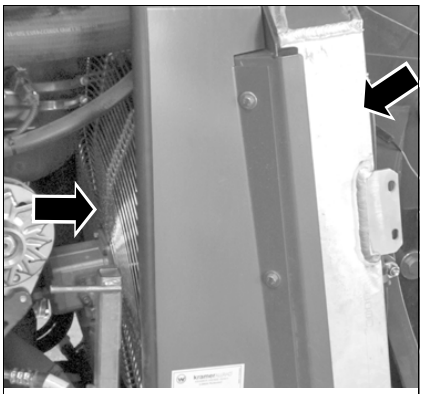


Fig. 377

Cleaning the radiator:

1. Park the telehandler on level ground.
2. Lower the telescopic boom fully.
3. Apply the parking brake.
4. Stop the engine and let it cool down.
5. Switch off the starter and remove the starting key.
6. Open the engine cover.
7. Clean the radiator fins by blowing compressed air from either side of the radiator.
8. Remove dirt in the intake area of the radiator.

Monitoring the hydraulic oil filter

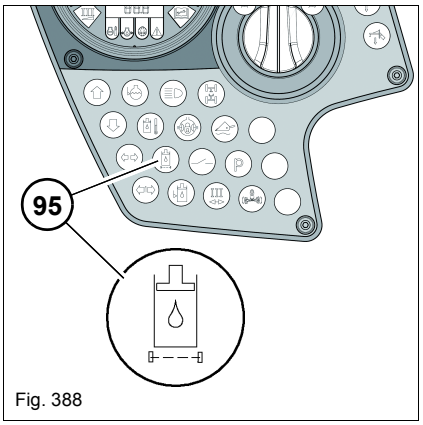


Fig. 388

The red indicator light **95** on the indicating instrument monitors the hydraulic oil filter.

NOTICE

Indicator light **95** on the indicating instrument illuminates if the resistance of the oil flow in the return filter is too high!

► The filter element is dirty and must be replaced by an authorised service centre!

Information

In cold weather indicator light **95** can illuminate immediately when the engine is started. This is caused by increased oil viscosity. In this case regulate the engine speed so that indicator light **95** does not illuminate. Bear in mind the instructions concerning warmup
– see chapter 4 " Running-in period" on page 4-56.

Hydraulic oil level monitoring (option)

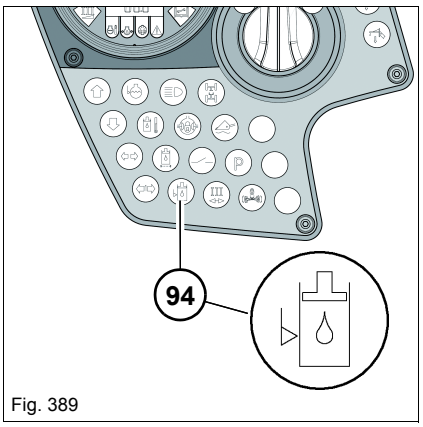


Fig. 389

The red indicator light **94** on the indicating instrument monitors the hydraulic oil level during machine operation.

NOTICE

If the consumed volume is too high (for example with a tipping trailer) or if the level in the hydraulic oil reservoir is too low, indicator light **A** illuminates (in the indicating instrument)!

► Hydraulic oil has to be added *– see "Adding hydraulic oil" on page 7-69*.

► Always check the hydraulic-oil level at the oil level sight glass in transport position *– see "Checking the hydraulic oil level" on page 7-68*.

► Have leaks repaired by an authorized service centre if necessary!

7.14 Heating, ventilation and air conditioning system

Important information on cabin ventilation

The cabin is equipped with a fine-dust filter and recirculated-air filter.

According to EN 15695-1:2009, this filter offers no protection from substances that are damaging to health and are therefore not approved for spray work.

Observe and follow the legal regulations of your country.

CAUTION

Risk to health if filter is not correctly mounted or is damaged!

Penetration of dust into the cabin that can cause damage to respiratory tracts.

- ► In order to comply with the required safety measures regarding occupational safety and health, malfunctioning or dirty filters must be replaced by new ones!
- ► The machine may not be used in an environment requiring protection against aerosols and vapours!

Removing the wheels

WARNING

Crushing hazard when raising the machine!

Failure to observe this can cause serious injury or death.

- ► Place the machine on firm and level ground.
- ► Only use suitable lifting gear that lifts the required lift load.
- ► Only use trestles instead of a jack to stabilise the machine.
- ► Never start the engine if the machine is on trestles or if it is raised with a jack.

1. Park the machine on level and firm ground and prevent it from rolling away.
2. Lower the loader unit to the ground.
3. Apply the parking brake.
4. Stop the engine and switch off the ignition.
5. Loosen the wheel nuts a little of the wheel you want to remove.
6. Place a jack under the axle body, making sure it is standing firmly.
7. Raise the side of the axle from which you want to remove the wheel.
8. Secure the raised axle with a suitable trestle.

NOTICE

The trestle must be positioned so as to avoid machine damage.

9. Completely remove the wheel nuts.
10. Remove the wheel with a suitable means.

Diesel oxidation catalytic converter (DOC) with SCR catalytic converter and diesel particulate filter (DPF)

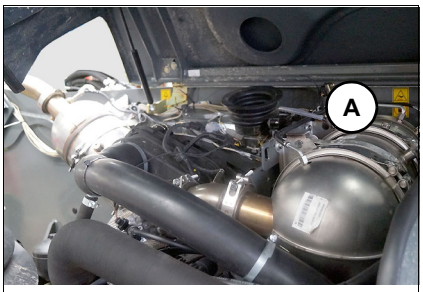


Fig. 415

Description / function

This exhaust gas after-treatment system **A** is a closed system, consisting of a diesel oxidation catalytic converter (DOC) and SCR catalytic converter and diesel particulate filter (DPF).

With the diesel particulate filter, the soot resulting in the combustion of diesel fuel is also collected in the diesel particulate filter.

With the increasing soot load, this is then automatically regenerated in the diesel particulate filter during machine operation.

Regeneration is a continuous process that automatically starts as soon the conditions required for it (soot load and exhaust-gas temperature) are fulfilled.

The load of the diesel particulate filter is electronically monitored.

If automatic regeneration should not be possible for different reasons, the system indicates (by means of warning lights in the display) that manual regeneration is necessary

The manual regeneration must then be carried out by the driver/operator *– see “Important information on manual regeneration” on page 7-98* and *Manually regenerating the exhaust after-treatment system on page 7-99*.

Ashes are also collected during the combustion of soot, however it is not eliminated by regeneration.

This results in shorter regeneration intervals requiring the replacement of the diesel particulate filter during maintenance.

Information

The ash and soot load appears in % in the digital display by means of a query.

8 Malfunctions

The information given in this chapter is provided for the fast and reliable detection of malfunctions.

8.1 Diesel engine malfunctions

Diesel engine repairs may only be performed by authorized service centres and trained personnel.

For other possible malfunctions of the diesel engine – *see "Overview error codes of diesel engine electronics" on page 8-15*.

Diesel engine malfunctions	Possible causes	Remedy/avoidance	See page
Engine does not start or is not easy to start	Empty fuel tank	Bleeding the fuel system	*7-45*
	Fuel intake line blocked	Contact an authorized service centre	
	Engine starting temperature too low		
	Cold starter		
	Wrong SAE viscosity grade of engine oil		
	Fuel grade does not comply with Operator's Manual		
	Malfunctioning or empty battery	Check the battery	*7-73*
	Loose or oxidized cable connections to starter	Contact an authorized service centre	
	Malfunctioning starter, or pinion does not engage		
	Dirty air filter/malfunctioning exhaust gas turbocharger	Checking/replacing	*7-61*
	Air in fuel system	Bleeding the fuel system	*7-16*
	Compression pressure too low	Contact an authorized service centre	
	Exhaust gas back pressure too high		
	Injection line leaks		
	High-pressure pump defective		
Engine will not start and the diagnosis lamp is flashing	Engine electronics prevent start		

Overview: error code – frame electronics			
Error code	**Cause/Impact**	**Troubleshooting**	**Category**
115	**Solenoid valve (extend telescopic boom)** Current level at control unit is in an inadmissible range ➥ “Extend boom” function malfunctioned	1. Check plug connections 2. Restart vehicle. **If the error cannot be rectified,** stop the vehicle immediately and have the error rectified by an authorised service centre.	**Critical error**
116	**Solenoid valve (retract telescopic boom)** Current level at control unit is in an inadmissible range ➥ “Retract boom” function malfunctioned		
117	**Solenoid valve (raise boom)** Current level at control unit is in an inadmissible range ➥ “Lift boom” function malfunctioned		
118	**Solenoid valve (lower boom)** Current level at control unit is in an inadmissible range ➥ “Lower boom” function malfunctioned		
119	**Solenoid valve (tilt in bucket)** Current level at control unit is in an inadmissible range ➥ “Tilt-in bucket” function not functioning		
120	**Solenoid valve (tilt out bucket)** Current level at control unit is in an inadmissible range ➥ “Tilt out bucket” function not functioning		
121	**Reversing fan switch** Signal inputs at control unit are in an inadmissible range ➥ Reversing fan not functioning	1. Check plug connections 2. Restart vehicle. **If the error cannot be rectified:** the vehicle can be operated again. Have error rectified by an authorized service centre when the opportunity arises.	**Non-critical error**

Overview of cabin electronics error codes

Overview: error code – cabin electronics			
Error code	**Cause/Impact**	**Troubleshooting**	**Category**
300	**Switch for lock for road travel** Voltage level at control unit is outside the permissible range ➥ All work hydraulic functions have malfunctioned	1. Check F021 fuses. 2. Check plug connections 3. Restart vehicle. **If the error cannot be rectified,** stop the vehicle immediately and have the error rectified by an authorised service centre.	**Critical error**
301	**Seat belt contact switch** Voltage level at control unit is outside the permissible range ➥ Charger not in operation	1. Check F023 fuses. 2. Check plug connections 3. Restart vehicle. **If the error cannot be rectified,** stop the vehicle immediately and have the error rectified by an authorised service centre.	
302	**Handbrake switch** Voltage level at control unit is outside the permissible range ➥ Error message is displayed	1. Check F013 fuses. 2. Check plug connections 3. Restart vehicle. **If the error cannot be rectified,** stop the vehicle immediately and have the error rectified by an authorised service centre.	
303	**Operator presence switch** Voltage level at control unit is outside the permissible range ➥ Engine is not starting ➥ All work hydraulic functions have malfunctioned	1. Check F023 fuses. 2. Check plug connections 3. Restart vehicle. **If the error cannot be rectified,** stop the vehicle immediately and have the error rectified by an authorised service centre.	

Overview of joystick error codes

Overview: error code – joystick			
Error code	**Cause/Impact**	**Troubleshooting**	**Category**
500 501	**Joystick** Sensor voltage at control unit is in an inadmissible range ➥ Joystick not functioning	1. Check F012 fuses. 2. Check plug connections 3. Restart vehicle. **If the error cannot be rectified,** stop the vehicle immediately and have the error rectified by an authorised service centre.	**Critical error**
502 503 504	**Joystick** Signal voltage (X-axis) at the control unit is in an inadmissible range or is implausible ➥ “Tilt bucket in/out “ function malfunctioned		
505 506 507	**Joystick** Signal voltage (Y-axis) at the control unit is in an inadmissible range or is implausible ➥ Raise/lower boom malfunctioned		
508	**Forward-reverse control (forward)** The sensor voltage at control unit is in an inadmissible range ➥ Driving direction selection malfunctioned		
509	**Forward-reverse control (reverse)** The sensor voltage at control unit is in an inadmissible range ➥ Driving direction selection malfunctioned		
510	**Joystick** The sensor voltage at control unit is in an inadmissible range ➥ Driving direction selection malfunctioned		

8.5 Malfunctions in the air conditioning system (option)

Only authorized service centres and trained personnel may perform repairs, and fill up and empty the air conditioning system!

Malfunctions in the air conditioning system	Possible causes	Remedy	See page
Fan does not run	Malfunctioning or loose fuse	Replace fuses Contact an authorized service centre	7-72
	Interrupted line	Contact an authorized service centre	–
	Malfunctioning fan motor		–
	Malfunctioning fan switch		–
Fan cannot be switched off	Short circuit in cable or fan switch		–
Reduced fan output	Dirty contacts		–
	Undersized electric lines		–
	Very dirty heat exchanger	Clean the heat exchanger	7-77
	Coolant volume incorrect	Contact an authorized service centre	–
Insufficient heating output or none at all	Flow temperature too low	Contact an authorized service centre	–
	Malfunctioning thermostat		–
	Dirty heat exchanger fins	Clean the heat exchanger	7-77
Loss of refrigerant on equipment	Loose hose connection	Contact an authorized service centre	–
	Damaged hose		–
	Damaged heat exchanger		–
Compressor does not run	Interruption in solenoid coil of compressor		–
	Loose or torn V-belt		7-64
	V-belt pulley does not turn even though magnetic clutch is applied		–
	Compressor clutch slips		–
	Malfunctioning controls		–

Lift, tilt and push-out rams: velocity

Designation	
Hydraulic pump	**Variable displacement pump 85 cm³/rev**
Lift ram[1]	
Raise	9.4 sec
Lower	6.9 sec
Tipping cylinder[1]	
Tilt in	3.4 sec
Tilt out	3.5 sec
Extension cylinder[1]	
Retract	6.9 sec
Extend	7.0 sec

1. When empty!
   Times can be longer under load for safety reasons!

Electro-hydraulic pilot control

Pilot control pump = boost pump of hydraulic pump	
Charging/boost pressure	30 bar (435.1 psi) at 2.300 rpm
Pilot control unit	
Control lever (joystick)	Four-way lever Lift and tilt ram operation Push-out ram via scroll wheel (potentiometer) Lock ram or attachment via potentiometer scroll wheel (electronic control)
Lock against unintentional operation (for long-haul travel and transport)	Switch joystick lock for road travel

9.9 Tightening torques

General tightening torques

Screw dimensions	Tightening torques[1]		
	8.8	10.9	12.9
M4	3 Nm (2.2 ft. lbs.)	4 Nm (2.9 ft. lbs.)	5 Nm (3.7 ft. lbs.)
M5	5.5 Nm (4.1 ft. lbs.)	8 Nm (5.9 ft. lbs.)	10 Nm (7.4 ft. lbs.)
M6	10 Nm (7.4 ft. lbs.)	14 Nm (10.3 ft. lbs.)	16 Nm (11.8 ft. lbs.)
M8	23 Nm (17 ft. lbs.)	34 Nm (25.1 ft. lbs.)	40 Nm (29.5 ft. lbs.)
M10	46 Nm (33.9 ft. lbs.)	67 Nm (49.4 ft. lbs.)	79 Nm (58.2 ft. lbs.)
M12	79 Nm (58.2 ft. lbs.)	115 Nm (84.8 ft. lbs.)	135 Nm (99.5 ft. lbs.)
M14	125 Nm (92.1 ft. lbs.)	185 Nm (136 ft. lbs.)	220 Nm (162 ft. lbs.)
M16	195 Nm (144 ft. lbs.)	290 Nm (214 ft.lbs.)	340 Nm (251 ft. lbs.)
M18	280 Nm (206 ft. lbs.)	400 Nm (295 ft. lbs.)	470 Nm (346 ft. lbs.)
M20	395 Nm (291 ft. lbs.)	560 Nm (413 ft. lbs.)	660 Nm (486 ft. lbs.)
M22	540 Nm (398 ft. lbs.)	760 Nm (560 ft. lbs.)	890 Nm (656 ft. lbs.)
M24	680 Nm (501 ft. lbs.)	970 Nm (715 ft. lbs.)	1150 Nm (848 ft. lbs.)
M27	1000 Nm (737 ft. lbs.)	1450 Nm (1069 ft.lbs.)	1700 Nm (1253 ft. lbs.)
M30	1350 Nm (995 ft. lbs.)	1950 Nm (1437 ft. lbs.)	2300 Nm (1695 ft. lbs.)

1. These values are valid for screws with untreated, non-lubricated surfaces.

Specific tightening torques

Designation	Tightening torque
Wheel nut	600 $^{\pm 20}$ Nm (442.5$^{\pm 14}$ ft. lbs.)

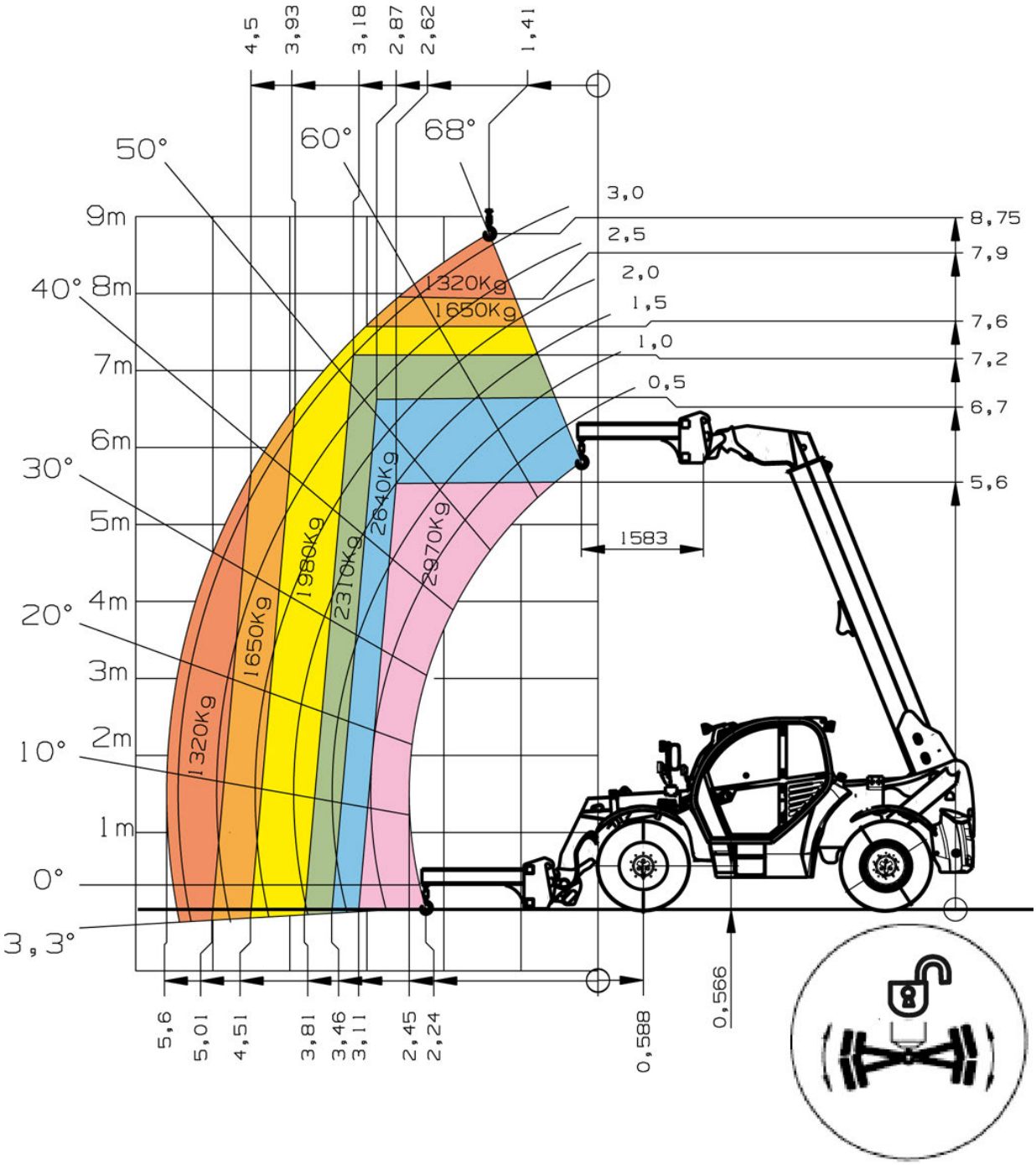
9.10 Coolant

Outside temperature	Water[1]	Antifreeze[2]
Up to °C	% by volume	% by volume
4 (39)	99	–
-10 (14)	79	20
-20 (-4)	65	34
-25 (-13)	59	40
-35 (-31)	**55**	**45**
-30 (-22)	50	50

1. Water quality at 20 °C = 6.5 – 8.5 ph/total hardness 3 – 20 °dGH
(do not use salt, lake, river, brackish or industrial water)
2. (Antifreeze concentrate -60°C (-76°F) – see *"Overview of lubricants" on page 7-14*

Load diagram valid for machines:

- **with oscillating rear axle (without oscillating-axle interlock, option) with rigid front axle (without frame levelling, option)**
- **With jib crane model no. 1000157237**



Example for load diagram – see page *5-115*.