Content

- [x] **Operating Instructions**
- [ ] **Maintenance Manual**
- [ ] **Additional documentation**

Condition of extradition:

Model:	821M (Mobile)
Driving engine:	Cummins QSB 4.5 C130
Equipment:	K11, KA 6,4m ST 4,8m
Undercarriage:	MP 21

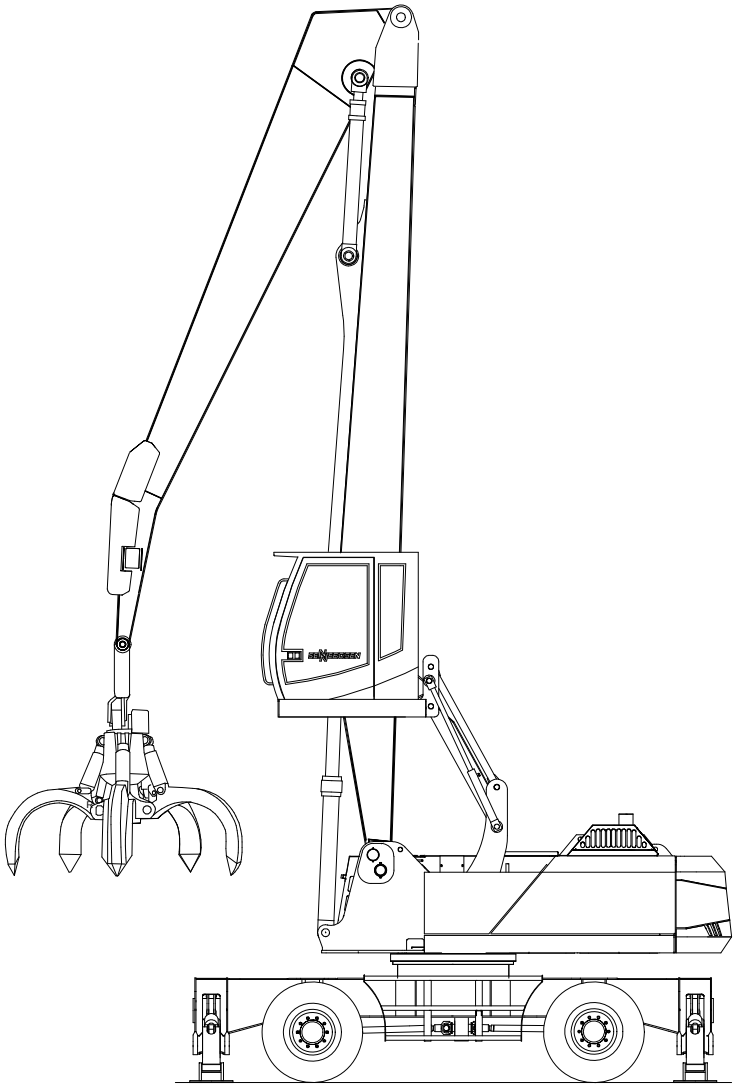
Machine number: **821.0.1281 us**

https://cranemanuals.com

https://cranemanuals.com

Operating instructions

821 M



CE

https://cranemanuals.com

Important notes on the manual

Read the manual, in particular Chapter 1 SAFETY thoroughly, before starting work with the machine.

Keep the manual in a safe place for future use.

WARNING!

- Only work with the machine once these manual have been read and completely understood.
- Observe safe working load tables in Section 3.2.
- Forbid unsafe operation or unsafe maintenance.
- Do not operate machine if a fault has been detected!
- Setting up, operation and maintenance of the machine is only permitted by trained personnel. The employer is responsible for the qualification and training of the personnel.
- These manual are an integral part of the machine. Always keep the manual in the cab.
  Recommended location to keep instructions: In the storage compartment behind the driver's seat.
  In the event of sale, disposal or loan, the manual must accompany the machine!
- Contact SENNEBOGEN immediately if there is anything in the manual that you do not understand!
  Your comments will help us to make the manual even more user friendly.
- Maintenance of the machine is described in separate instructions.

For reasons of clarity, the specified safety devices are not shown in some of the illustrations. Operation with safety devices removed is not permitted!

DANGER
Safety devices must be fitted when working with the machine.

Current when going to press

Ongoing development ensures the advanced technology and the high level of quality in our machines. This may result in deviations between these manual and your machine. Errors can also not be ruled out. Please understand that no legal claims can be derived from the specifications, illustrations and descriptions within these instructions.

https://cranemanuals.com

Illustration aids

These manual contain safety instructions that highlight dangerous working practices. These safety notes are indicated with a warning symbol and a keyword.

This warning symbol means: *Attention* - this concerns your safety and the safety of others.

The associated keyword signifies the degree of danger:

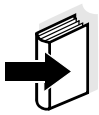
DANGER
Is used for great, directly threatening danger. If this danger is not averted, serious physical injuries or loss of life of persons will result.

WARNING
Is used for potentially dangerous situations. If this danger is not averted, serious physical injuries or loss of life of persons may result.

CAUTION
Is used for potentially dangerous situations. If this danger is not averted, physical injuries or serious material damage may result.

Notes which make the work easier or contribute to better understanding when operating the machine are displayed in the following way:

Note
Indicates notes which draw attention to peculiarities.



Note
Indicates cross references to other documents.

Handling instructions are shown in table form as follows:

1	Press switch (1).
2	Actuate control lever (2).
3	Unfasten pins (3).

- Listings are marked with bullet points.
  - Sub-points in listings or handling instructions are marked with dashes.

https://cranemanuals.com

Glossary of terms

Operator
The operator (owner of the company/company) is responsible for operating the machine in a correct manner, or for ensuring that the product is being used by suitable and instructed personnel.

Operating personnel
The operating personnel are the person/s authorized by the operator to use the product.

Trained technicians
Trained technicians are those authorized by the operator to fulfil certain obligations such as installation, fitting, repair and maintenance and troubleshooting.

- **Specialists**
  Specialists are those who, on the basis of specialist training, knowledge and experience with the product and in the full knowledge of the relevant standards, can appraise the work allocated to them and can recognize potential dangers and avoid them.
- **Instructed personnel**
  Instructed personnel are those who have received instruction in the tasks allocated to them and in the potential dangers of misuse and misbehavior, who have been taught about the necessary safety equipment, safety measures, relevant regulations, accident prevention guidelines and operating conditions and who have proved their abilities.
- **Experts**
  Experts are those who, on the basis of specialist training and experience have sufficient knowledge in the area of the product and are sufficiently aware of the relevant national occupational safety guidelines, accident prevention guidelines, regulations and generally recognized technical regulations (e.g. EEC-Guidelines, VDE-Regulations, VBG) as to be able to judge the operational safety of the machine.
- **Experts**
  Specialists are those who are authorized by the German technical monitoring organization TÜV or by their professional organization to check the machine. Authorization on the part of a professional organization must comply with the “Principles for authorizing specialists to check cranes” (ZH 1/518). It is linked to the issue of an identity number. This is to be entered by the specialist in the check report and/or check notice.
  Authorizations can be limited to parts of checks or to certain types of crane.

https://cranemanuals.com

Target group

The machine has been developed for demanding work.
Persons working on or with the machine must be trained or instructed for that purpose.

The operation and deployment may only be carried out by persons suitably instructed. Initial operation, maintenance, transportation and assembly/dismantling only by trained specialists.

Detailed information on the required prior knowledge and qualifications of the operator can be found in Chapter 1 SAFETY of these instructions.

https://cranemanuals.com

What documents go with the machine?

The following documents go with the machine:

- These manual
- The maintenance instructions
- Spare parts catalog
- Service checkbook.

Note
The complete scope of materials included with delivery is specified in the order confirmation.

How are the manual divided up?

The manual are divided into 10 chapters:

- 1: Safety
  You will find generally applicable safety instructions that must be universally observed in this section.
- 2: Overview
  Chapter 2 illustrates the main components of the machine.
- 3: Technical data
  You will find basic information about the machine in this section, forexample lifting capacities.
- 4: Starting operation
  This section provides information about starting operation on a daily basis.
- 5: Operation
  You will also find information on operating instruments and working operation.
- 6: Monitoring, care and cleaning
  Chapter 6 illustrates procedures used to ensure that the machine is suitable for use.
- 7: Transportation
  In Chapter 7 you will find the dimensions and weights of the machine.
- 8: What to do if ...
  Here you will find information on recognizing causes of malfunctions and introducing measures to eliminate faults.
- 9: Setting up
  Chapter 9 may contain information on optional work tools.
- 10: Appendix
  Here you will find an index and additional information, forexample on the warranty.

https://cranemanuals.com

Please contact us at

SENNEBOGEN Maschinenfabrik GmbH
Hebbelstrasse 30
D-94315 Straubing

Telephone: +49 9421 540-0

Internet: http://www.sennebogen.de

Fax Customer service: +49 9421 540279

Fax Spare parts storage: +49 9421 40811

Technical documentation:

E-mail: doku@sennebogen.de

Fax: +49 9421 540380

Note
The addresses of SENNEBOGEN sales and service partners are available on the Internet through our homepage.

CE symbol of conformity

The CE symbol indicates that basic safety requirements have been met. For more information, see the separate Declaration of conformity.

EuroTest

EuroTest is a voluntary type examination based on the EC machine regulation and the corresponding European standards.

Copyright

© Straubing 2008, SENNEBOGEN Maschinenfabrik GmbH
Reproduction, in whole or in part, only with written permission of SENNEBOGEN Maschinenfabrik GmbH, Straubing, Germany.
Printed in Germany.

https://cranemanuals.com

https://cranemanuals.com

https://cranemanuals.com

https://cranemanuals.com

https://cranemanuals.com

https://cranemanuals.com

1 Safety

1.1 General

The machine is built in accordance with the current state of the art. Nevertheless, there may be dangers during its use to persons, machine and other property, if

- the machine is not operated according to regulations.
- the machine is not operated by trained personnel or not maintained.
- the safety notes are not observed.
- the machine is found to be defective.
- the operating tools attached do not comply with the relevant safety regulations.
- the operating tools attached are found to be defective.

National and international regulations apply in addition to the safety information in these manual.

In the Federal Republic of Germany e.g:

- Winches, Lifting and pulling devices (VBG 8)
- Crane (BGV D6)
- Hoisting devices in lifting appliance operation (VBG 9a)
- EC Machinery guideline 98/37/EC
- EMC Guideline 89/336/EEC
- Electrical Machinery Equipment (EN 60204-1)
- Safety Requirements for Fluid Engineering Systems and their Components - Hydraulic (EN 982)
- Earth-Moving Machinery – Safety (EN 474-1/-5)
- Safety of Machinery (DIN EN 12100 -1 and DIN EN 12100-2)
- "Outdoor" Regulation 2000/14/EG

Note
If the national regulations deviate from our recommendations, the more stringent procedure should be followed.

https://cranemanuals.com

1.2 Correct use

The correct use of the machine concerns solely the hoisting, driving and transferring of loads.
Permitted work tools are:

- Grab
- Magnetic systems.

Specifications according to Chapter 3 TECHNICAL DATA. Observe the performance details of the machine.

Other or additional applications are considered as misuse and can endanger persons or machinery.

Work place:
The machine operator’s workplace is in the driver's cab of the machine.

Target group

The machine has been developed for demanding work.
Persons working on or with the machine must be trained or instructed for that purpose.

The operation and deployment may only be carried out by persons suitably instructed. Initial operation, maintenance, transportation and assembly/dismantling only by trained specialists.

1.3 Potential instances of misuse

- Exceeding admissible overall loads (see Section 3.2).
- Using non SENNEBOGEN parts.
- Use in inadmissible ambient conditions.
- Misuse by untrained and uninstructed personnel.
- Inadequate equipment for the application (e.g. protection of cab against falling objects with guard grill).
- Operating on insufficiently firm base.
- Neglect of necessary inspection and maintenance work.

https://cranemanuals.com

1.4 Misuse

Incorrect use (Misuse) applies in particular to:

- hoisting, driving and transporting of persons
- tilted pulling of loads
- dragging of loads
- pulling free of jammed loads
- Operation of the machine in an explosive environment.

WARNING
Misuse excludes all liability of the manufacturer! The risk is borne solely by the operator.

1.5 Residual hazards

The safety information in these manual are guidelines for the safe use of the machine by qualified machine operators. However, SENNEBOGEN cannot anticipate every situation in practice that may result in danger.
Therefore, the safety notes and warnings on the machine and in the manual cannot be all inclusive. The owner and machine operator still remain responsible for safety.

https://cranemanuals.com

1.6 Safety instructions

1.6.1 General

Danger area

The danger area is the area around the machine where persons may come into contact with:

- operational motions of the machine
- working equipment and its attachments
- swinging or falling loads
- falling working equipment.

DANGER
No persons must be within the danger area!

The machine operator must give warning signals in case of danger to persons. If the persons do not leave the danger area despite warning, work must be stopped.

To avoid becoming crushed by solid components, e.g. buildings, walls to be removed, scaffolding or other machinery, a sufficient safety distance (at least 500 mm) must be maintained.
If the safety distance cannot be maintained, then the area between the solid structure and the work area of the machine must be cordoned off.
If the machine operator has restricted driving and working vision, then he must be guided.

Gallery = Catwalk for operators

DANGER

Risk of falling!
A maximum of 200 kg (440 lbs) is permitted per segment of grid iron on the gallery (= operator catwalk). Overloading will lead to damaging the construction, the results of which can lead to personal injury.
Check the gallery for cracks and general damaged every 3 months and repair immediately if necessary.

https://cranemanuals.com

Personal protective equipment

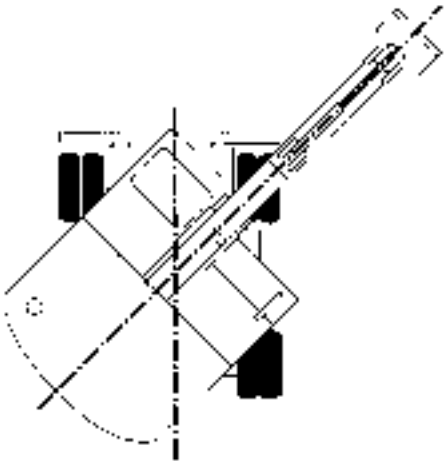
The operating personnel are obliged by national regulations to wear the necessary safety personal clothing while working on the machine (e.g. safety helmet, ear protection, protective gloves, and safety boots).

Problems

Report problems or damage immediately to a responsible person!
Prevent the machine from incorrect or erroneous use.
Repairs may only be performed by trained specialist personnel.

Stability

- Position machine on a firm, even surface.
- If necessary, stabilize ground.
- Caution at excavation edge, slopes, dips, etc.
- Position stabilizers also on a firm, even surface.
- with additional ballast:
  The machine must be supported when slewing the upper structure!
- Observe wind speeds!
- The lowest stability is when the working equipment lies across the direction of travel.
- The highest stability is achieved when the working equipment lies in a diagonal position.
  diagonally (see illustration below).



DANGER
Do not carry out any form of work which will affect the stability of the machine! Note the decreased stability during lateral swinging of load.

https://cranemanuals.com

Working near power lines

- Under supervision, clearly mark the lines in area of building site. Before starting work!
- Always assume that overhead lines are live.
- Guide the machine so that neither parts of the machine nor suspended loads extend into the danger area.
- Maintain a safe distance from overhead lines. If national regulations recommend no other values, adhere to the following minimum distances:

Nominal working voltage (volts)	Safety distance (meters)
up to 1000 V	1.00
above 1000 V up to 110 kV	3.00
above 220 kV up to 380 kV	4.00
above 220 kV up to 380 kV	5.00
not known	5.00

- Use a guide to monitor the safety distance.
- The insulation elements fitted to the machine, protective cages or proximity warning devices do not replace the listed minimum distances.
- In windy conditions, the overhead lines and the working equipment can swing and consequently decrease the distance.

Electricity transfer

In the case of high voltage contact, the following rules apply:

- Do not leave the driver's cab.
- Warn those outside from approaching or touching the machine.
- If possible, move all working equipment or the entire machine out of the danger area.
- Arrange switching off of power.
- Only leave the machine once the touched or damaged line is switched off.

DANGER
If the machine has to be vacated in the case of an emergency, e.g. danger of fire, do not touch the machine and the ground simultaneously. Jump off the machine with feet together.

https://cranemanuals.com

Qualification of personnel

The machine must only be operated and maintained by qualified personnel.

Excerpt from VBG 40

The independent operation or maintenance of earth moving machinery must only be carried out by persons who

- are 18 years or over,
- are physically and mentally suitable,
- are trained in the operation and maintenance of earth moving equipment and have confirmed their ability to do so to the employer and who
- can be expected to reliably carry out the appointed work.

They must be appointed by the employer for the operation and maintenance of earth moving equipment.

https://cranemanuals.com

1.6.2 Starting operation

WARNING

- Observe Chapter 1 SAFETY.
  Before operating, carry out checks according to Section 4.3 .
- Check that all safety devices of the machine are complete and correctly secured.
- Wear protective work clothing (safety helmet, eye protection), if working conditions necessitate.
- Take off jewelry and loose clothing.
- Secure loose items e.g. tools or other accessories.
- Agree on hand signals with guide.
- Obtain information on first aid and rescue facilities.
- Enter and exit machine only when stationary. Use the appropriate steps and ladders:
  - If necessary, clean steps and ladders before use
  - Do not hold any items when climbing up or down. Lift items of equipment onto machine using a rope or lifting gear.
  - Do not use operating elements in driver's cab as handholds.
- Ensure that no persons are within the danger area.
- Check safety devices of machine (brakes, signal and lighting devices).
- Check for correct function of operating elements and safety devices while driving slowly.

https://cranemanuals.com

1.6.3 Operation

WARNING

- Observe Chapter 1 SAFETY.
  Before operating, carry out checks according to Section 4.3 .
- Persons working on or with the machine must be trained or instructed for that purpose.
  The operation and deployment may only be carried out by persons suitably instructed.
- Proceed with utmost caution if you override the stick end limit.
- Ensure that no persons are within the danger area.
- Maintain safety distance to overhead lines.
- Only operate the machine from the driver's seat.
- Do not transport persons with the machine.
- Consider environment conditions, e.g. poor visibility, wind speeds, etc.
- Use the safe working load tables specifically for that machine.
- Observe performance details.
- Check that anchorage points have a sufficient safe working load.
- Observe guide signals as necessary.
- Position stick in direction of travel during long journeys.
- Before leaving the driver's cab:
  - Completely lower cab if necessary
  - Position the machine on firm base, if necessary set back from the edge of the excavation
  - Lower suspended loads
  - Secure working equipment
  - Pull safety lever to the rear
  - Chock wheels/running gear
  - Switch off engine
  - Lock cab, show warning lights if necessary.

https://cranemanuals.com

1.6.4 Maintenance

DANGER

Danger to life!
There is a risk of serious injury or even death to persons using the machine or in its vicinity if it moves suddenly or is started unintentionally. Observe the following:

- Place the machine on a firm base, if necessary set back from the edge of the excavation.
- Lower suspended loads and booms to the ground.
- Apply the brake.
- Switch off machine and secure against unauthorised re-starting.
- Use a chock to stop the machine from rolling away.

WARNING

- The tasks described may only be carried out by trained and instructed specialist personnel.
- Wear personal protection equipment (e. g. safety helmet, ear protection, protective gloves, safety boots).
- Observe accident-prevention and safety regulations.
- Lower suspended loads and boom to the ground.
- Pull left safety lever to the rear.
- Shut down the machine and secure against unauthorized re-starting before starting with any work.

- Place warning sign on operating elements.
- Smoking or handling open flame is forbidden.
- Use appropriate safe climbing aids or work platforms.
- Stay clear of rotating and moving parts.
- Relieve hydraulic system pressure before starting maintenance work (see Section 6.5.5).
- Dispose of hydraulic oil in accordance with regulations.
- Wear protective gloves when working on steel wire rope.
- Only use genuine SENNEBOGEN spare parts.
- Only use oils and lubricants specified in the lubricants table.
- Do not lift heavy components by hand. Use lifting gear.
- For pneumatic tires:
  When inflating tires, maintain sufficient safety distance and use a tire cage.
- Keep the cab clean and tidy.

https://cranemanuals.com

- Actuate optional battery disconnecting switch, if applicable, to interrupt the power supply.
- When working near batteries, these are to be covered with insulating material; do not lay tools on the batteries.
- Replace all safety devices on completion of work.
- Carry out a functional test to ensure correct operation.

DANGER

- Work on electrical equipment of the machine may only be carried out by an electrical specialist.
- Work on running gear, braking and steering systems may only be carried out by specifically trained specialists!
- Work on hydraulic systems may only be carried out by personnel with special knowledge and experience on hydraulics!

1.6.5 Transportation

WARNING

- In Germany:
  Loading and transportation work is only to be carried out by authorized specialist personnel in accordance with VBG 40, §48 and Federal Motor Vehicle Safety Standards (StVo) §22.
- Observe valid regulations for securing of loads.
  The respective transport operator is *always responsible for the transportation of machine and accessories*.
- When loading and transporting, secure the machine and its working equipment from unintended movement.
- Clean running gear of machine sufficiently from mud, snow and ice, so that ramps can be accessed without danger of sliding.
- Provide low loader access ramps with wooden planks.
- Check conditions of route before starting journey.
- Only transport machine on intended securing and lifting points.
- Ensure that the machine does not present any hazards to other road users.
- Wear personal protection equipment (e. g. safety helmet, protective gloves, safety boots).
- Report any damage that occurred during shipping to SENNEBOGEN customer service immediately.

https://cranemanuals.com

1.7 Responsibilities of the employer

WARNING
The employer is obliged to supply manual when working with hazardous machines or materials.

The necessary information is contained in

- EC guidelines on safety at work
- National laws on safety at work
- Accident prevention regulations and
- these manual.

Recurring inspections

Specialist testing, required for crane or backhoe operation

The machine must be thoroughly checked by a specialist.

- before initial operation and before putting the machine back into operation after significant modifications
- at least once yearly
- and in between according to operating conditions and conditions of use.

A specialist in this context is a person, who

- has extensive knowledge of this machine and the corresponding regulations and guidelines due to specialist training and
- through special instructions of Co. Sennebogen
- has obtained extensive knowledge of this machine and the corresponding regulations and guidelines through specialist training and can assess the safe working condition of the machine.

Specialist testing, only required for crane operation

The following cranes must be tested by a specialist at least every 4 years:

  – Fuel driven vehicle crane
  – Location changing fuel driven derrick crane
  – Vehicle attachment crane

The operator is responsible for having a specialist check carried out in the 13th year of operation and every year after that.

Faults that are determined in recurring inspections must be eliminated according to the safety-relevance and within a suitable time-frame.

https://cranemanuals.com

Personnel selection and qualifications

- Employ only trained and instructed personnel.
- Define responsibility for operation and maintenance.
- Observe the permitted minimum age.

DANGER

- Personnel under training or instruction must remain under constant supervision while working on the machine.
- Work on electrical equipment of the machine may only be carried out by an electrical specialist.
- Work on running gear, braking and steering systems may only be carried out by specifically trained specialists!
- Work on hydraulic systems may only be carried out by personnel with special knowledge and experience on hydraulics!

https://cranemanuals.com

Noise protection

The permanent sound pressure level of the machine, measured from the driver's seat with the driver's cab closed, is approximately 80 dB(A). The wearing of ear protection is therefore not absolute essential. The measurements are performed in accordance with EN ISO 11201.

This value of 85 dB(A) can however be exceeded due to environmental influence, e.g. through dropping or transporting material or on a building site together with other machines.
In these cases ear protection measures are strictly specified for the operating personnel.

The employer must ensure that appropriate ear protection is available and used by the operators.

Technical condition of the machine

The employer has an ongoing responsibility to monitor the overall technical condition (externally recognizable faults and damage as well as changes to operational behavior) of the machine.
Do *not operate machine* if a fault has been detected!
Observe mandatory time limits for routine checks.

Independent conversion and replacement part production

For safety reasons the machine may not be modified or altered in any way.
This applies also to the installation and use of safety devices and valves as well as welding on load carrying parts.

Genuine SENNEBOGEN replacement parts and accessories ensure the safety of personnel. Parts and fittings from other manufacturers are not tested by SENNEBOGEN and are not therefore approved. The use of other components can alter the machine's characteristics and present a safety hazard.

If other components are used, SENNEBOGEN will not be considered liable for any resulting consequences.

Impermissible operating practices

- The operating safety of the machine is only ensured if it is correctly used according to Section 1.2 of these manual.
- The performance details listed in Chapter 3 TECHNICAL DATA must be observed.
- If there is a danger of heavy items falling, the machine may only be used if the driver's space is covered by a protective roof (FOPS). The protective roof is optionally available from SENNEBOGEN.
- The machine is not suitable for towing a trailer.
  Due to the higher axle load, trailer operation is only permitted with heavy-duty multi-disc braked axles (optional).

https://cranemanuals.com

Special dangers

The operator of the machine must check whether special dangers are present while operating the machine, for example due to toxic gasses, features of the ground, etc. and must take appropriate measures to avoid or limit the dangers.

Overseas use

If the machine is used overseas, the following must be observed:

- Observe the safety regulations of the country where you are operating the machine.
- Ensure that the operators have the necessary qualifications for the intended work.
- Ensure that the contents of this manual have been read and completely understood. If necessary, ask SENNEBOGEN for a copy of this manual in the appropriate language.

Dangers on non-compliance with the safety notes

Non compliance with the safety notes is dangerous and can be hazardous to persons as well as to the environment and the machine.

Non compliance with the safety notes results in the loss of all claim for compensation.

Fire extinguisher and first aid box (optional)

The machine is provided with spaces for fire extinguisher (1) and first aid box (2). The employer is obliged to equip the machine with these items. If necessary, obtain fire extinguisher (1) and first aid box (2) from SENNEBOGEN.

1

2

Warranty conditions

The warranty conditions of SENNEBOGEN Maschinenfabrik GmbH are summarized in the warranty manual.

You will also find some important items in Section 10.7.

https://cranemanuals.com

1.8 Safety devices

DANGER

- Do not remove safety devices and covers.
- Always check that safety devices are complete and correctly secured before starting the machine.
- Replace all safety devices and covers correctly on completion of assembly or maintenance work.
- Exchange damaged safety devices for new ones.

Overload warning device

The overload warning device gives an acoustic and optical warning signal if the permitted safe working load is exceeded. Ensure that the overload warning device is activated when working with lifting gear (see Section 5.3.9). The danger of tipping over is not averted by the overload warning device!

DANGER
Tip over danger of machine!
Lower load immediately! Decrease load and decrease reach.

https://cranemanuals.com

1.9 Machine labeling

The machine is provided with special warning and notice labels.

- Do not remove the signs.
- Ensure that all labels are undamaged and legible.
- Clean labels with soap and water if necessary, not with fuel or solvents.
- Replace damaged, scratched or illegible signs with new ones.

Note
Labels are available from SENNEBOGEN (see spare parts catalog).

1.9.1 Identification plate

1	Machine type
2	Manufacturer’s No. (Facility No.)

https://cranemanuals.com

1.9.2 CE stamp of conformity

– affects machines that are operated within the EU/EEC.

These machines wear the CE identification. This means that these machines meet the respective safety stipulations of the EU machine regulations upon delivery. For changes that affect the safety of the machine and the respective consequences, those that make the changes are responsible and liable.

If the machine is used for purposes other than those intended or is used with machinery other than that indicated in these instructions, safety must be guaranteed in each case. Those performing the work are responsible and liable. In certain cases, another CE identification and the completion of a new EU declaration of conformity may be required.

CE Stamp

1.9.3 Euro-test identification

EuroTest is a voluntary Prototype test, which is based on the EC machine guidelines and the respective European standards.

https://cranemanuals.com

1.9.4 Warning and notice labels

Note

More information can be found in Kapitel 3 .

Explanations of the stickers used on the machine

Drilling- and welding work is only to be done by authorized SENNEBOGEN-Partner

(SE: 086489)

Function diagram for both control levers

(SE: 033809)

Maintain safety distance to overhead lines while working!

(SE: 027932)

Note pertaining to exiting in case of emergency, in case of danger, smash the rear windshield with the emergency hammer and then leave the cab carefully

(SE: 103007)

Danger of crushing in the vicinity of the raising cab (between the cab and the superstructure)

(SE: 103016)

Note regarding the storage location of the fire extinguisher

(SE: 103008)

https://cranemanuals.com

Secure the machine in these tie-down locations for transport
(SE: 031148)

Wear the optional safety belt when working with the machine

(SE: 103001)

Read and understand the maintenance instructions before starting with any cleaning-, service-, maintenance- or repair work

(SE: 061604)

Before starting operation with the machine, be sure to read the operating instructions and the additional technical information/additional documentation from any pre-suppliers.

(SE: 059928)

"Caution! Stay off!“

(SE: 086687)

Stepping on many parts of the superstructure is forbidden

(SE: 103003)

Starter batteries, filled with corrosive and poisonous acid.

Do not allow to drop and do not open with force

(SE: 103012)

https://cranemanuals.com

Symbol for the battery isolation switch
(SE: 032307)

Rear if the machine swings outward, keep a safety distance of at least 0.5 m

(SE: 062287)

Before performing any maintenance work, switch the engine off and remove the ignition key

(SE: 009245)

Note concerning the position of the button for emergency lowering of the cab

(in the cab)

(SE: 103030)

Note concerning the position of the lever for emergency lowering of the cab

(From of the superstructure),(SE: 103005)

Operating voltage of the on-board electrical system: 24 Volts

(SE: 032574)

Symbol for the slewing ring lubrication

(SE: 069756)

Note concerning the type of fuel used by the drive engine: DIESEL

No smoking and keep away from open flame when fueling the machine

(SE: 103002)

https://cranemanuals.com

Note referring to the hazard areas during machine operation

(SE: 103034)

The machine meets all essential safety requirements. Continuous sound levels outside the machine as well, e.g. 103dB

(SE: 062526)

Tie-down points (eyelets) for lifting the machine

(SE: 031149)

Magnet unit (optional): Shut the generator and the drive engine down and allow them to cool before starting any maintenance work!

The system operates under high power!

(SE: 103024)

Note concerning coolant specifications for the drive engine

Use this coolant only

for DEUTZ engines

(SE: 092872)

for Cummins engines

(SE: 103020)

Warning of hot surface or hot parts!

(SE: 103009)

https://cranemanuals.com

Belt drive, never reach into the area of the drive belts or pulleys!

(SE: 103022)

Note concerning the manufacturer and the specifications for hydraulic oil

(SE: 103033)

Note concerning the manufacturer and the specifications for gear oil

(SE: 103006)

Horn/Flashers

(SE: 019679)

Warning concerning the danger of injuries!

If leaks are present, hydraulic oil will escape under high pressure

(SE: 103011)

Wear personal safety equipment

(SE: 103013)

Fuse for ignition 40A

(SE: 103017)

https://cranemanuals.com

Warning of rotating components!

(SE: 103018)

Note indicating the position of the engine diagnostics plug-in connector

(SE: 103023)

Note indicating the position of the heater flange

(SE: 103025)

Warning concerning the danger of injuries!

Rotating fan baffles

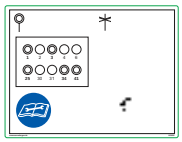
(SE: 103026)

Warning of the danger of amputation! (High pressure)

(SE: 103029)

Note about unlock button

(SE: 118805)

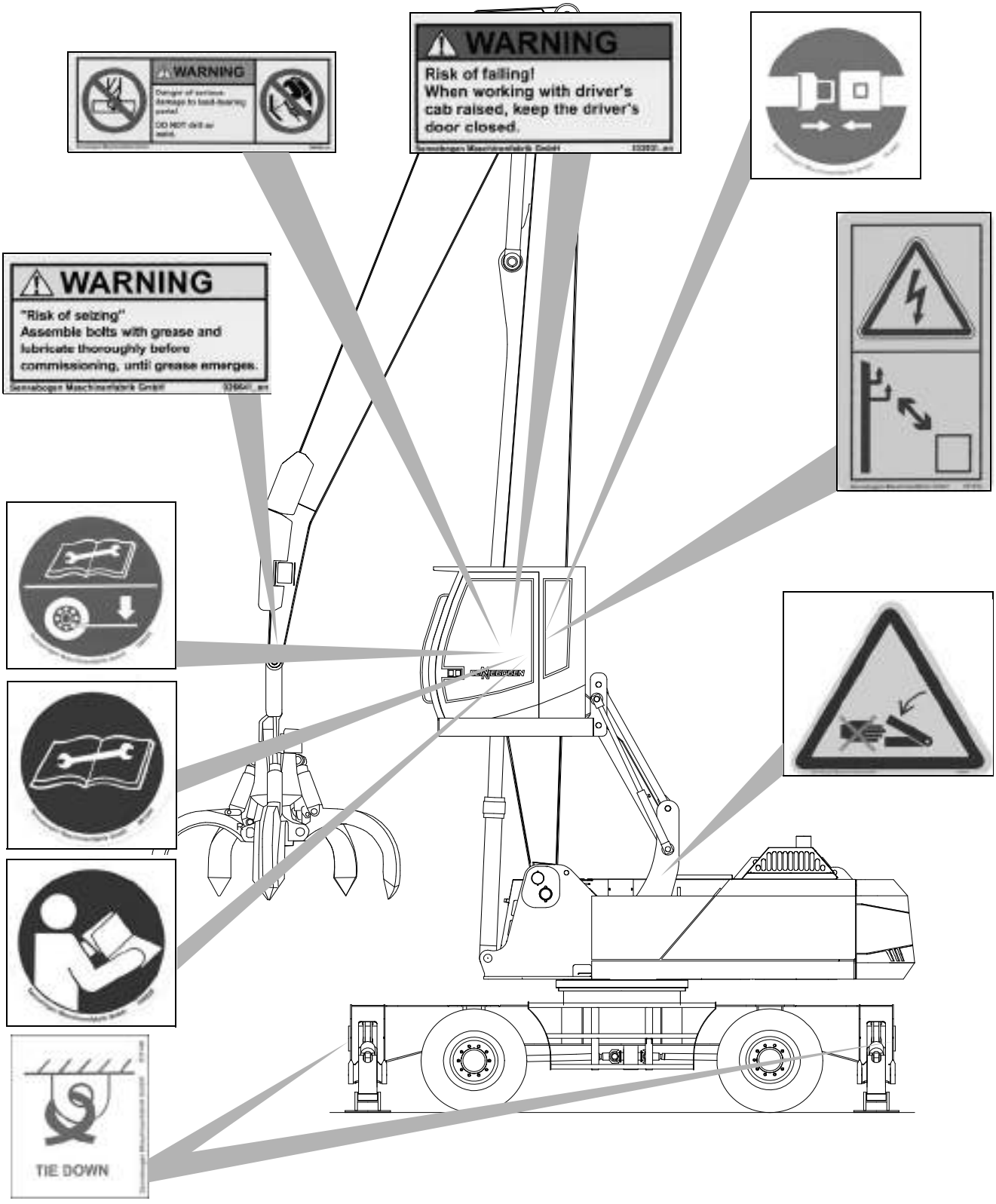


Note about measurement positions (hydraulics)

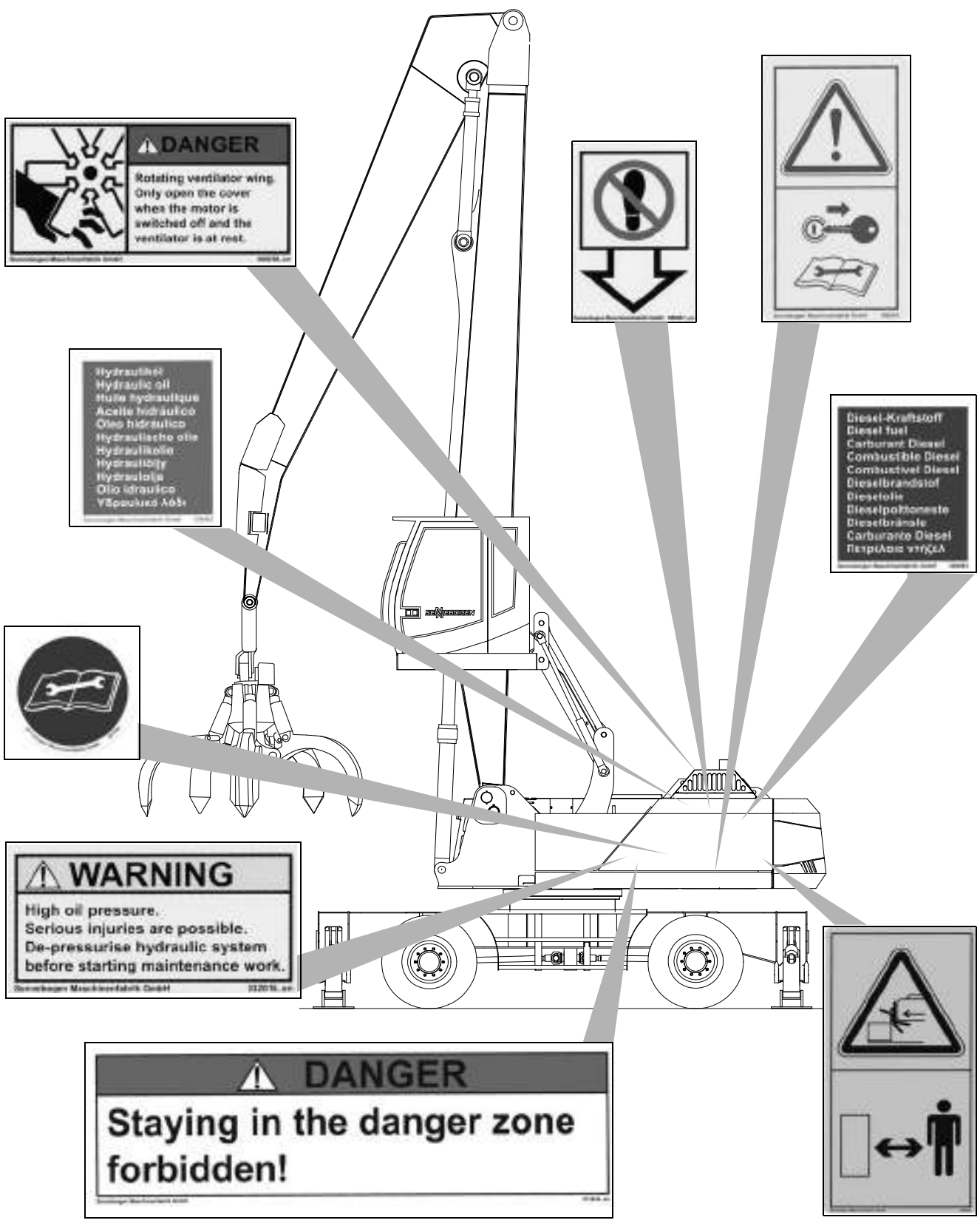
(SE: 103050)

1.9.5 Warning and notice labels

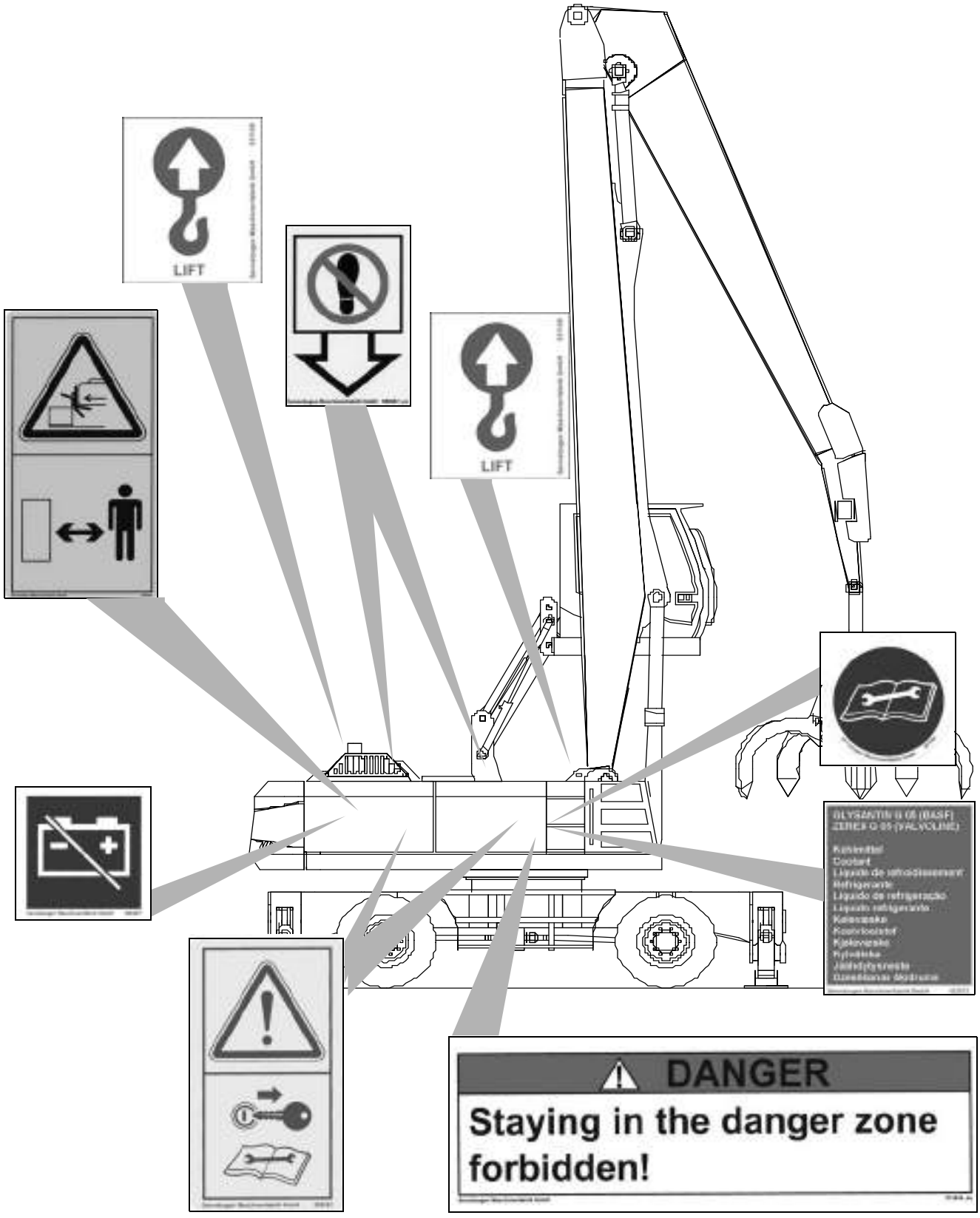
https://cranemanuals.com



https://cranemanuals.com



https://cranemanuals.com



https://cranemanuals.com

1.9.6 Disposal

Lubrication and consumables

CAUTION
Observe environment protection!
Handle and dispose of used items and materials correctly, especially

- when working on lubrication systems and devices and
- when working with solvents.

Extract from the *Disposal Guideline 75/439/EEC*:

- “It is prohibited to mix spent oil with other waste”.
- “Spent oils must not be mixed together”.
- “Used oil filters must be collected, kept, transported and disposed of separately from other waste”.

Notes

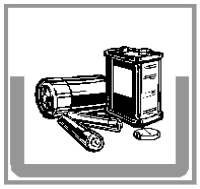
- Dispose of lubricants and other consumables at suitable collection points.
- National environmental conditions valid in the country of use also apply.

Batteries

When working with batteries, please observe safety instructions and protective measures.

Notes

- Do not dispose of batteries in household trash!
  Return defective batteries to a collection place for old batteries.
- National environmental conditions valid in the country of use also apply.



https://cranemanuals.com

1.10 Hand signals

Driver and signaler communicate with each other with the aid of the following hand signals when vision is restricted in the driving and work area.
The guide gives the necessary signals to ensure safe operation.

Safety instructions

Observe the safety notes before starting work.

CAUTION

- Only responsible persons may be employed as guides. They must receive the necessary training before starting their task.
- The guide must not be diverted from this task by other tasks.
- Observe notes of VBG 40, § 35 *Guides* as well as the details of DIN 33409 *Hand signals for guidance*.

	**Attention** Extend arm upwards with hand open
	**Stop** Extend both arms horizontally.

https://cranemanuals.com

	**Stop! Danger!** Alternately extend and fold in both arms horizontally
	**Drive off** Move upwards extended arm back and forth with hand open
	**Drive slowly forwards** Both arms bent and beckon forwards with palms of hands turned inwards.
	**Reverse slowly** Bend both arms and wave away with palms of hands turned outward.

https://cranemanuals.com

Turn right

Left thumb outwards.

Turn left

Right thumb outwards.

Turn upper structure to the right

Left thumb outwards to the left, rotate right index finger.

Turn upper structure to the left

Right thumb outwards to the right, rotate left index finger..

https://cranemanuals.com

	**Hoist equipment (load)** Right extended index finger points upwards, left hand moves up and down.
	**Lower equipment (load)** Right extended index finger points downwards, left hand moves up and down.
	**Increase reach** Both thumbs point outwards.
	**Decrease reach** Both thumbs point inwards.

https://cranemanuals.com

Open grab

Hold arm horizontal with half open hand to the side.

Close grab

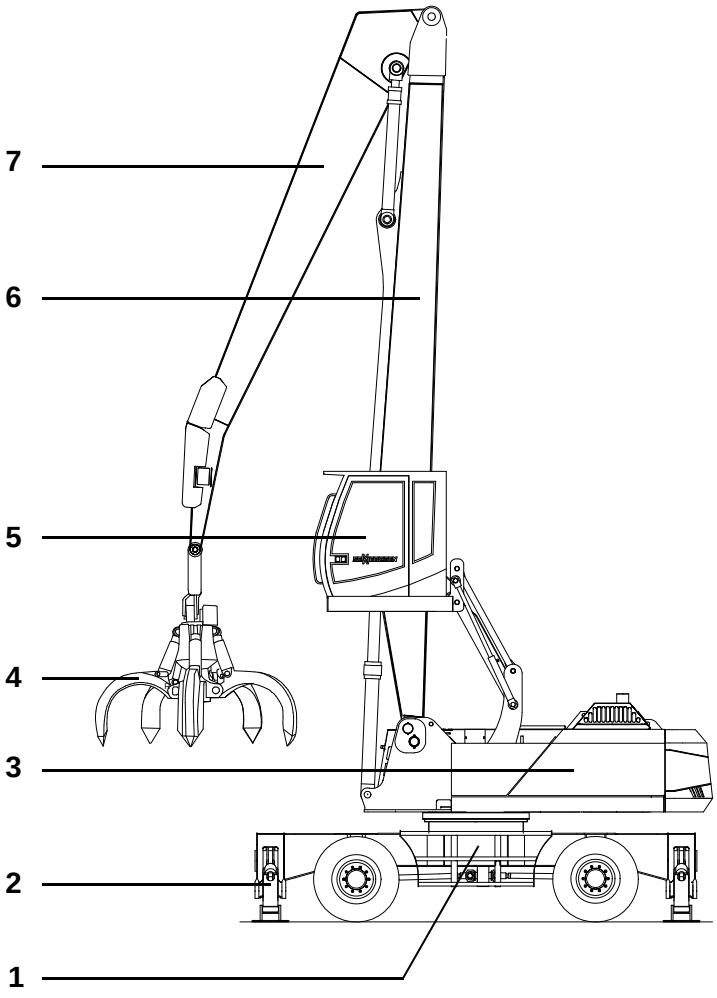
Hold arm horizontal with closed hand to the side.

https://cranemanuals.com

https://cranemanuals.com

2 Overview

2.1 Complete machine



1 Undercarriage

2 Outrigger

3 Upper structure

4 Work tools (example: grab)

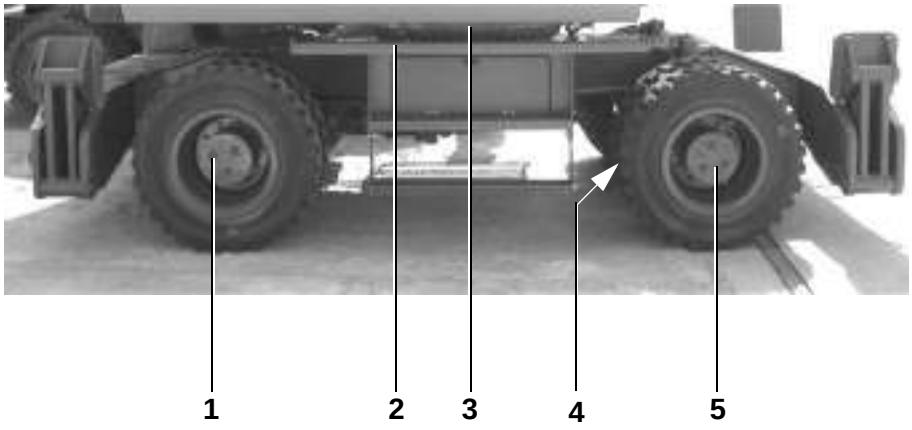
5 Operator's station/ Cab, hoistable

6 Compact boom

7 Grabbing stick

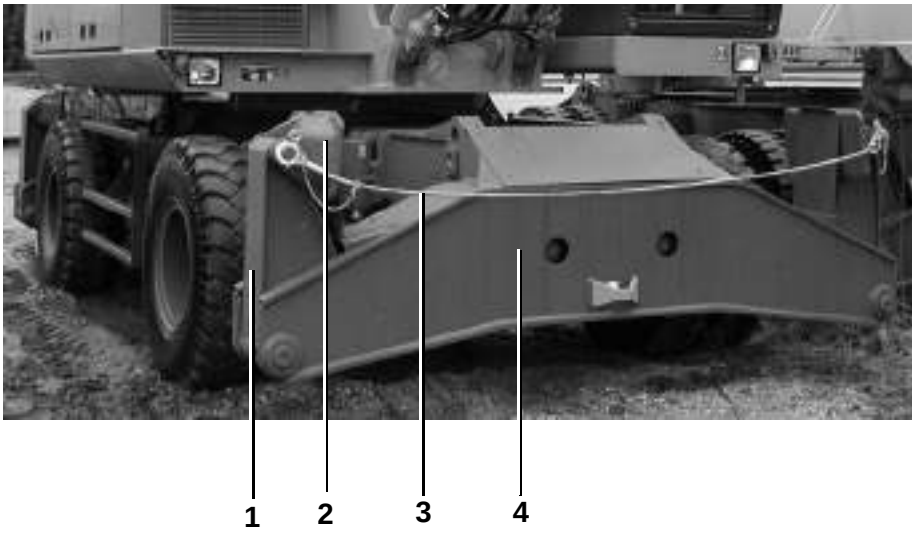
https://cranemanuals.com

2.2 Undercarriage



1 Rear axle
2 Access ladder
3 Slewing ring
4 Swing axle cylinder
5 Front axle (Swing axle)

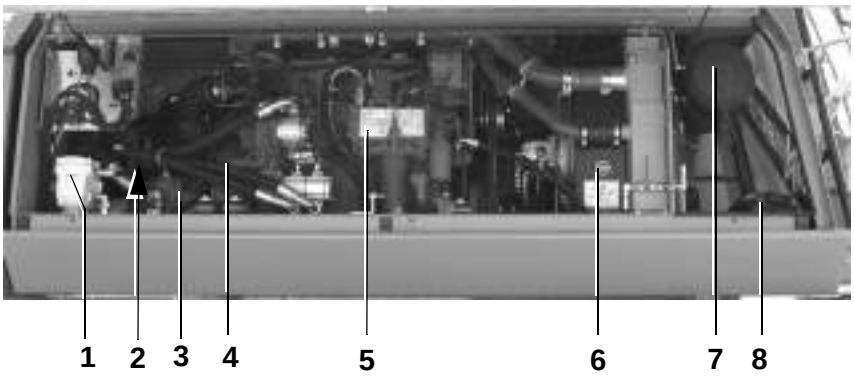
2.3 Outrigger (optional)



1 Stabilizer bracket
2 Outrigger pad
3 Safety rope
4 Outrigger housing

https://cranemanuals.com

2.4 Upper structure



Engine compartment:

1 Water separator (optional)

2 Hydraulic tank cutoff flap

3 Pump unit

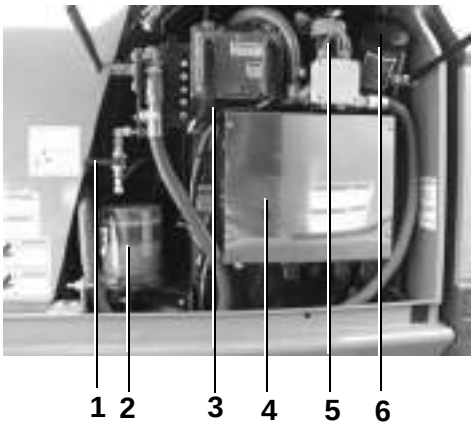
4 Gearbox

5 Drive engine

6 Combination cooler (water/ charging air)

7 Air filter

8 Batteries



Storage space:

1 Emergency lowering – cab

2 Central lubrication system (optional)

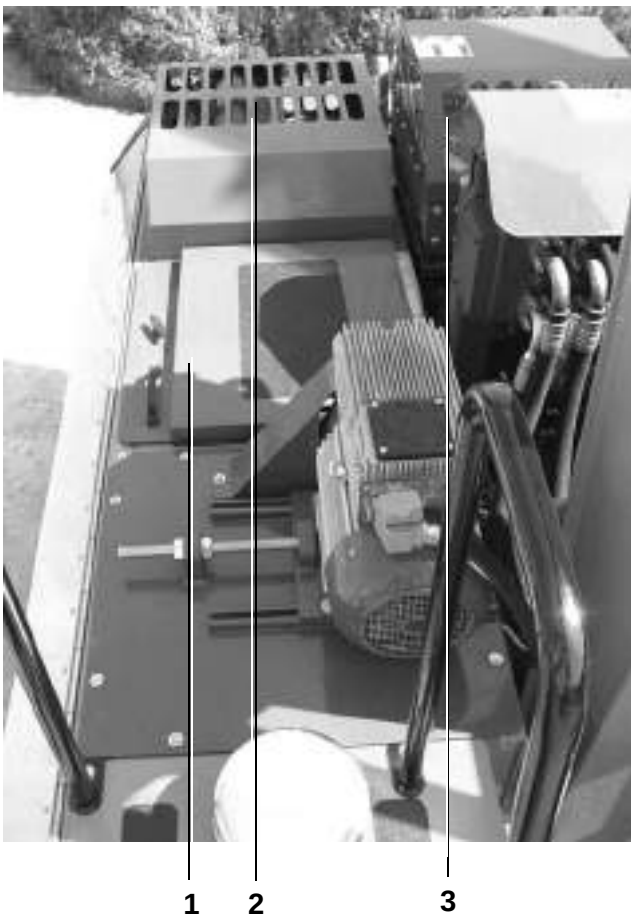
3 Fuel tank

4 Electric switch cabinet

5 Refueling pump (optional)

6 Fuel filler strainer – fuel tank

https://cranemanuals.com



View from above:

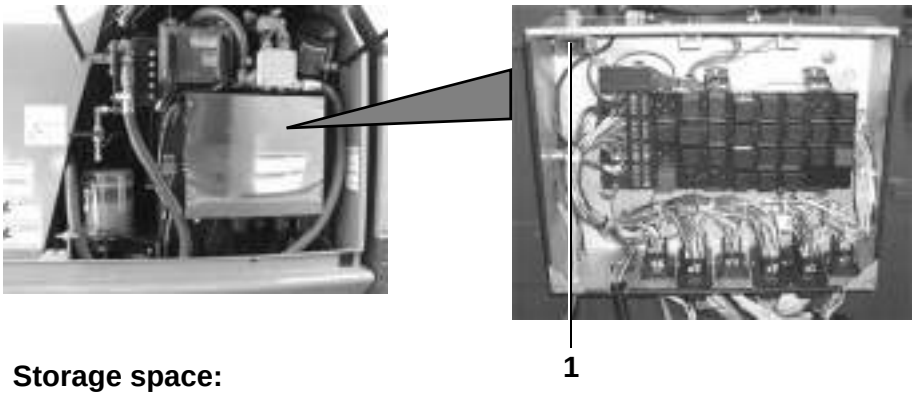
1 Service cover – drive engine

2 Exhaust silencer / Exhaust

3 Hydraulic oil cooler

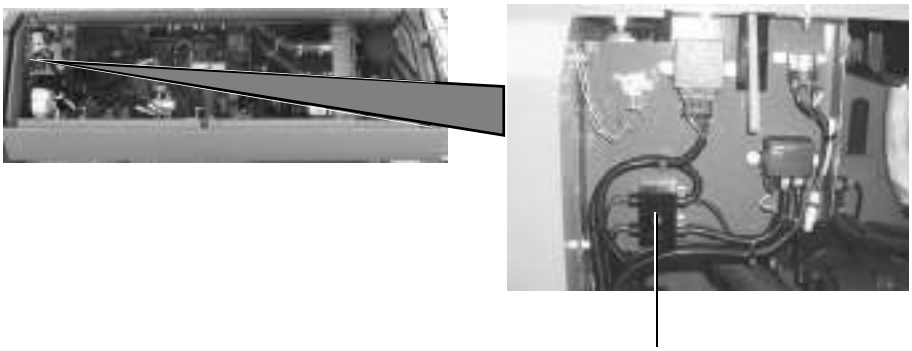
https://cranemanuals.com

2.5 Main fuse



Storage space:

1 Main fuse – central electrical system



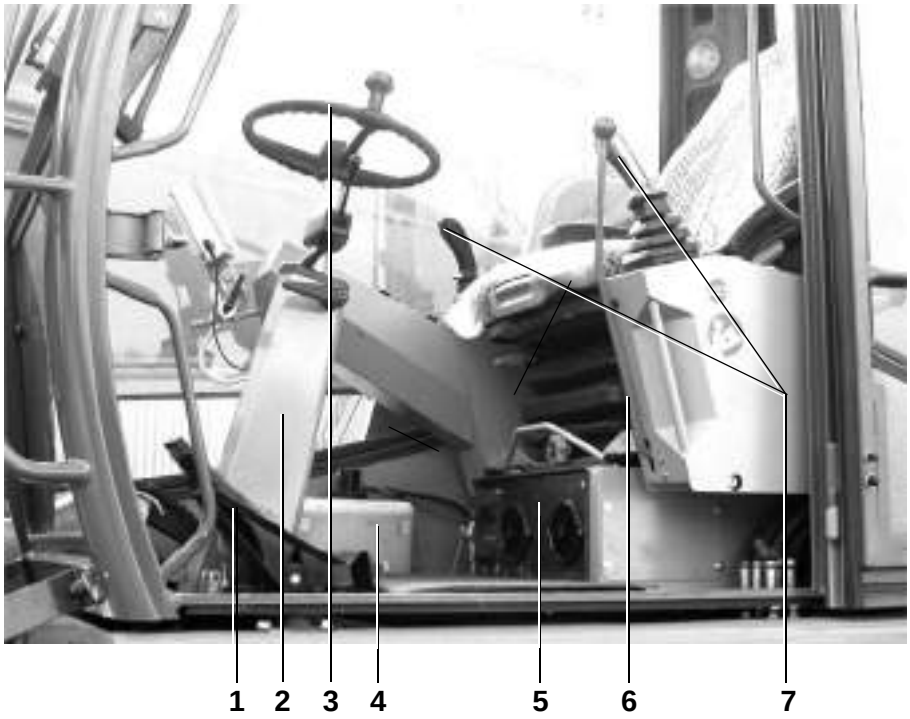
Engine compartment:

2 Fuse – preheat

3 Main fuse – electrical equipment

https://cranemanuals.com

2.6 Driver's cab



1 Pedals

2 Steering column

3 Steering wheel

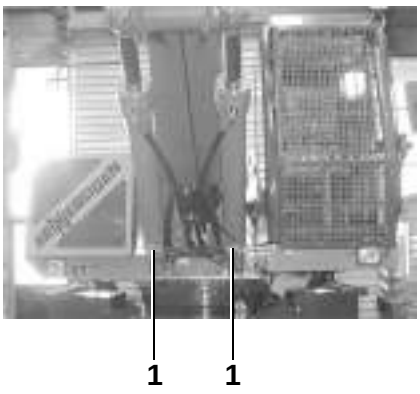
4 Container – cleaning water

5 Heating system/Air conditioning system (optional)

6 Safety lever

7 Control lever

2.7 Pipe fracture safety device (optional)



1 Pipe fracture safety device - hoist cylinder

2 Pipe fracture safety device - stick cylinder

https://cranemanuals.com

3 Technical data

Section 3.1 gives a list of the specifications of the basic machine.
Section 3.2 indicates the load ratings of the machine.

Note
Transportation dimensions and weights for the base machine can be found in Section 7.2. Special data on attachment systems can be found stickin the manual of the respective component.

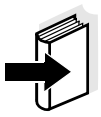
3.1 Base machine

Drive engine

	Cummins QSB4.5-C130
Output (in acc. with ISO 14396)	97 kW (132 HP) at rated speed of 2200 min $^{-1}$
Displacement	4500 cm^3
Cylinders	4

Permissible inclination of the engine:

left	**right**	**front**	**rear**
30°	30°	30°	30°



Note
If the inclination is excessive, the engine oil level may no longer be sufficient. If you require a greater angle, please contact SENNEBOGEN customer service in advance.

Further information on the drive engine is available in the manual of the engine manufacturer.

https://cranemanuals.com

Electrical system 24 V

Note
Ensure that the available output power of the alternator is not exceeded when installing additional current consumers (e.g. lights).

Driving speed

All terrain	5.4 km/h
Road travel	20 km/h

Hydraulic system Max. operating pressure 350 bar

Slewing drive

Slewing speed	0 - 8 rpms, continuously variable

Ambient temperature range - 20 °C ... +40 °C

Limitations during wind

Wind speed		
25 m/s	90 km/h	10 Beaufort

DANGER
Once the specified wind speed is reached, stop operating the machine immediately (lower load, lower stick). For a table on wind strengths and wind speeds, see Section 3.3.

Note
Machine operation is generally possible - without any attachments - at wind speeds of up to 25 m/second.
The decision concerning when operation is to be shut down is to be made by the machine operator and depends on the attachment being used.
Different attachments react differently to wind and may affect the stability of the machine. These are to be determined by the operator and the machine is to be shut down accordingly.

https://cranemanuals.com

3.2 Safe working loads

Notes

Load ratings

- are specified in tons (t) and equate to 75% of the static tilt load or 87% of the hydraulic lifting force according to ISO 10567.
- apply for a level and firm positioning of the machine and are apply for 360 degrees.
- apply to the machine when it is stabilized.

Deduct the weight of the hoisting accessories (hooks, hangers) from the load ratings. The values in brackets apply in the lengthwise direction with respect to the undercarriage.

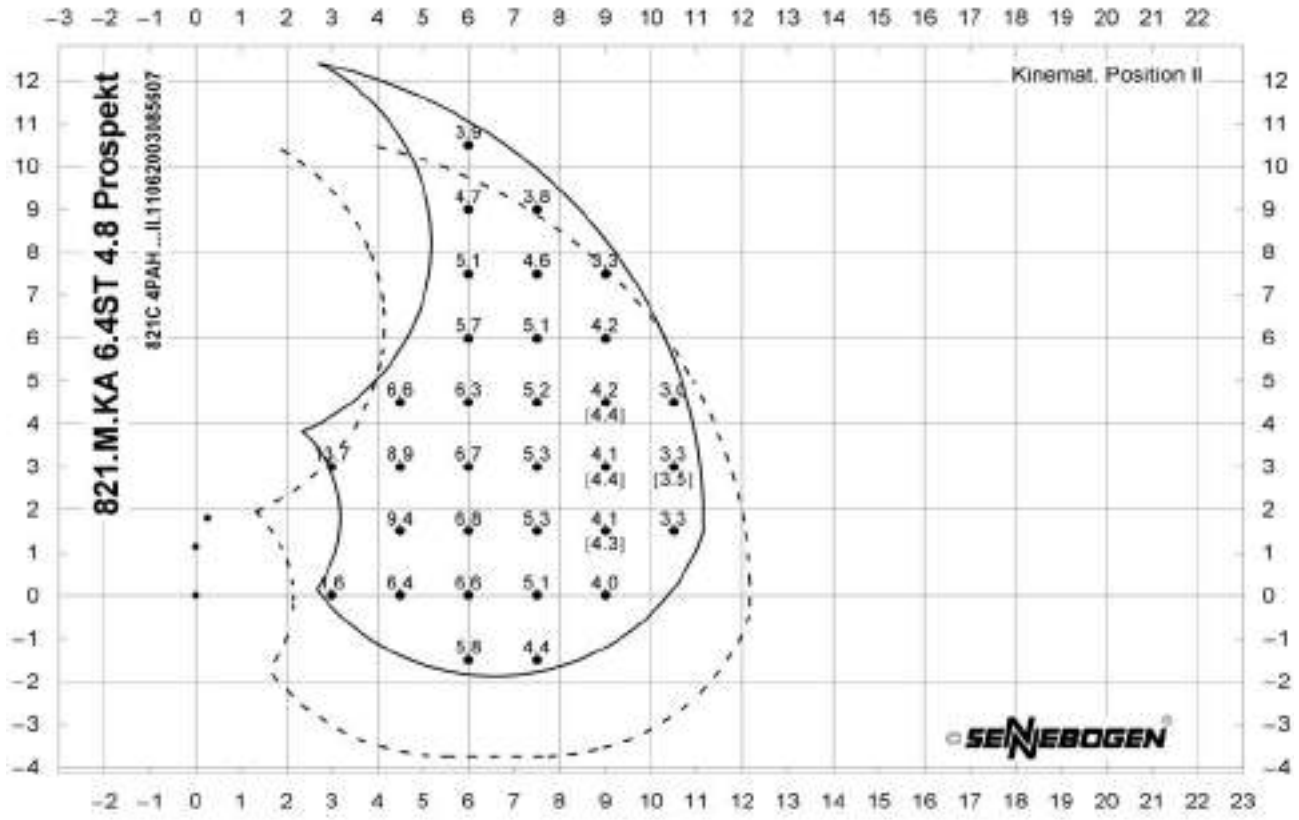
Adverse conditions

Limit or reduce load weights, to compensate for adverse conditions. Adverse conditions are e.g.

- soft or uneven ground
- slopes
- wind
- lateral loads
- swinging loads
- jerking or sudden stopping of load
- inexperience of operating personnel
- driving with load.

https://cranemanuals.com

Lifting capacity 3.2.1 Kin II, K11, compact boom 6,4 m and 4,8 m stick



Tabellenwerte in Tonnen [t] nach ISO 10567 (Stand: Mai 1993) – 75% statische Kipplast bzw. 87% hydraulische Hubkraft. Gültig für ebenen, festen Untergrund 360° schwenkbar. Klammerwerte gelten nur in Längsrichtung zum Unterwagen!

Lift capacities stated in metric tons based on ISO 10567 (May 1993) – 75% static tipping load e.g. 87% hydraulic lift capacity. Valid for firm and level supporting ground within 360°. Lift capacities in parentheses only valid longitudinal to undercarriage!

Remarques : Toutes les valeurs sont indiquées en tonnes (t) et comprennent 75% de la charge de basculement statique ou 87% de la force de levage hydraulique conformément à ISO 10567. Elles sont applicables avec stabilisateur et sur un sol plan et résistant, pivotement sur 360°. Les valeurs entre parenthèses [. . .] sont valables longitudinalement par rapport au châssis.

Observaciones: Todos los valores están especificados en toneladas (t) y constituyen el 75 % de la carga estática de volqueo, o el 87 % de la fuerza de elevación hidráulica conforme a ISO 10567. Rigen con apoyos y con posibilidad de giro en 360° sobre suelo firme y plano. Los valores entre corchetes [...] rigenen el sentido longitudinal para el conjunto inferior

https://cranemanuals.com

3.3 Appendix

Wind strength		**Wind speed**		**Effect**
Beaufort scale	Designation	m/s	km/h	Inland
0	Calm	0-0.2	1	Calm, smoke rises straight up
1	Light draft	0.3-1.5	1-5	Direction of wind is displayed by direction of smoke, but not by wind T
2	Light breeze	1.6-3.3	6-11	Wind is felt on face, leaves rustle, Wind T moves
3	Weak breeze	3.4-5.4	12-19	Leaves and thin twigs move, wind stretches a flag
4	Moderate breeze	5.5-7.9	20-28	Lifts dust and loose paper, moves twigs and thin branches
5	Fresh breeze	8.0-10.7	29-38	Small deciduous trees start to sway, breaker foam forms on lake surface
6	Strong wind	10.8-13.8	39-49	Strong branches are moving, whistling in power lines, umbrellas difficult to use
7	Stiff wind	13.9-17.1	50-61	Whole trees are moving
8	Stormy wind	17.2-20.7	62-74	Branches are broken off trees, walking outdoors is made very difficult
9	Storm	20.8-24.4	75-88	Slight damage to houses (chimney hoods and tiles are blown off)
10	Heavy storm	24.5-28.4	89-102	Uproots trees, considerable damage to houses
11	Hurricane type storm	28.5-32.6	103-117	Extensive storm damages (rarely in inland)
12	Hurricane	32.7-36.9	118-133	Severe devastation

https://cranemanuals.com

https://cranemanuals.com

4 Starting operation

4.1 Safety instructions

WARNING

- Observe Chapter 1 SAFETY.
  Before operating, carry out checks according to Section 4.3 .
- Check that all safety devices of the machine are complete and correctly secured.
- Wear protective work clothing (safety helmet, eye protection), if working conditions necessitate.
- Take off jewelry and loose clothing.
- Secure loose items e.g. tools or other accessories.
- Agree on hand signals with guide.
- Obtain information on first aid and rescue facilities.
- Enter and exit machine only when stationary. Use the appropriate steps and ladders:
  - If necessary, clean steps and ladders before use
  - Do not hold any items when climbing up or down. Lift items of equipment onto machine using a rope or lifting gear.
  - Do not use operating elements in driver's cab as handholds.
- Ensure that no persons are within the danger area.
- Check safety devices of machine (brakes, signal and lighting devices).
- Check for correct function of operating elements and safety devices while driving slowly.

https://cranemanuals.com

4.2 Initial operation

The initial operation of the machine is carried out by SENNEBOGEN or by a trained and authorized specialist.

If the machine is shut down for a prolonged period (> 6 months), contact SENNEBOGEN customer service immediately before starting operation again.

WARNING
Observe chapter 1 SAFETY.
Before operating, carry out checks according to Section 4.3 .

4.3 Checks before restarting daily operation

Safety instructions

Observe the safety information before starting with jobs work.

DANGER

- Familiarize yourself with the machine and equipment. Read these manual before starting operation, in particular chapter 1 SAFETY.
- Only carry out work for which you have been trained and which is within your scope of employment.

Checklist - visual and functional check

1	Are all protective covers and warning signs in place on the machine and undamaged?
2	Is the machine clean enough to ensure no danger areas exist due to dirt (danger of slipping, falling, poor visibility)?
3	Are the windows clean and free of ice and snow?
4	Is the stability of the machine ensured?
5	Is the undercarriage (tires, axles) intact?
6	Is the tire pressure correct?
7	Is the correct counterweight (ballast) fitted?
8	Are the boom components undamaged?
9	Is the stick end limit set correctly?
10	Is the lift limit set correctly?
11	Has any necessary maintenance work been carried out according to maintenance schedule?
12	Do the oil levels show sufficient capacities (hydraulic system, drive engine)?
13	Does the machine have sufficient fuel in the tank?

https://cranemanuals.com

14	Are the V-belts undamaged and tensioned?
15	Are all screw connections particularly on the elevating cab - intact and tight?
16	Are the operating and environmental conditions known?
17	Is the load weight known?
18	Is an experienced person available for signaling, if required?
19	Are machine and load securing device appropriate for the loads to be suspended? Observe Chapter 3 TECHNICAL DATA!
20	Are the side service access doors on the upper structure closed?
21	Are danger areas (overhead lines, ditches, etc.) marked and secured in the operating area?
22	Is the danger zone free of persons?
23	Are all safety devices (brakes, signal and lighting devices) working correctly?
24	Is the overload warning device activated?
25	If necessary, switch the optional battery isolation switch on or connect the battery pole (see Section 7.4).
26	Is the machine aligned horizontally?

DANGER
Report all irregularities to the person in charge before starting operation. Only operate machine after eliminating all faults.

https://cranemanuals.com

4.4 Switching on machine

Safety instructions

Observe the safety notes before starting machine.

DANGER

- Danger of injury!
  Keep maintenance hatches closed.
- Before starting the engine, ensure that no persons are within the danger area.
- Before starting the engine, ensure that the cut off flap on hydraulic tank (see Section 2.4) is open!
- The exhaust emission of diesel engines is damaging to health. Only run engine outdoors or in well ventilated areas.
- Do not start engine if a warning sign is present on the operating elements.
- Adjust driver's seat, steering column and mirror to the correct position.
- Fit restraint belt correctly.

4.4.1 Restraint belt (optional)

The machine is equipped with a lap belt. The belt complies with standards SAE J 386 (USA) and FMVSS 209 (EU).

WARNING

- Check belt for signs of wear before starting to operate the machine. Immediately exchange a damaged belt.
- Clean dirty belt using water.
- Do not twist the belt when fastening it.
- The belt must fit as far down as possible over the hips, not over the stomach.

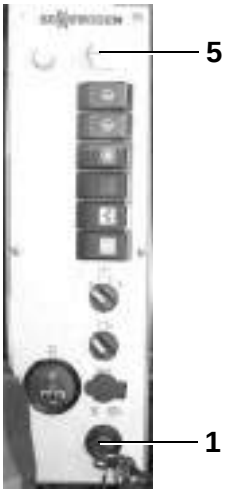
1	Push metal catch (1) into belt buckle (2). An audible click indicates that the belt has engaged.
2	To release belt, press red button (3) on belt buckle (2).

https://cranemanuals.com

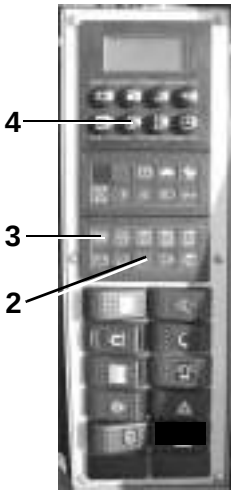
4.4.2 Starting engine

DANGER
Danger of toxic poisoning!
Only run the engine outdoors or in well ventilated areas. Inhaling exhaust gasses is hazardous to your health. It may lead to loss of consciousness and death.

CAUTION
Before starting the engine, ensure that the cut off flap on hydraulic tank (see Section 2.4) is open!



Control panel, rear right



Control panel, front right

1	Carry out checks according to Section 4.3.

Gefahr
Fire hazard!
Switching the ignition on and off too many times in succession (turning key to position 1) warms the heating flange. This can lead to a fire hazards on the motor and machine.
Never switch the ignition on and off over and over again (Turning key switch to "Position 1")!

2	Insert ignition key (1) in ignition lock and turn to the "1" position. – The indicator light (3) in the SDS lights up. – The indicator light for EMR (2) in the SDS lights up for 2 sec..

https://cranemanuals.com

3	Turn the ignition key (1) to the right to start the engine after the inicator light (3) in the SDS goes out . – The warning light for the selected speed lights up (*Travel fast* /*Travel slow*).
 4	Press on the key (4) in the SDS. – The engine speed is shown on the SDS display.
5	Adjust the desired engine speed with the rotary knob (5).

Note
Release the safety lever if necessary to enable the hydraulic function (see also Section 5.3.5 SAFETY LEVER).

https://cranemanuals.com

4.4.3 Bring machine up to operating temperature

Guidelines for warming up period

Ambient temperature	Warm up period	Max. engine speed
up to 0 °C	About 15 min.	Nominal speed - 250 rpms (Nominal speed, see Chapter 3.1)
0 °C ... -20 °C	About 30 min.	

Warm-up procedures

- Allow the engine to run at idle speed for 3 minutes after starting. Additional warm-up time can be required at temperatures under 0°C.
- Then incrase the rpm in steps up to the nominal speed of 250 rpm (no-load)
- If approx. 20°C water temperature has been achieved, put a load on the engine by carefully actuating hydraulic functions and continue to warm-up the machine.
- The machine can be loaded if the temperatures indicated below have been achieved.

Note
If the hydraulics are still slow to respond after the warm-up period, operate for a further 15 minutes at reduced speed.

The following temperatures should be displayed before operating the machine at full speed:

- Hydraulic oil: approx. 30°C
- Water: approx. 35 °C.

ATTENTION
Not warming up the engine and the machine can result in damage to the engine, hydraulic pump, hydraulic motor, hydraulic oil cooler and hydraulic tank.

Note
With optional equipment *change direction of fan* 0° or above:
Change the direction of the fan several times during the warming up phase. This thaws out the superfine filter (heating system in front of the cooler) with hot engine and blows out ice.

https://cranemanuals.com

4.4.4 Jump start

The machine is equipped with a 24 volt starting system. Make certain that the external power source has the same voltage.

CAUTION
If a power source with a higher voltage is used, this can cause extensive damage to the machine's electrical system.

1	If necessary use the optional battery isolator switch to disconnect from the power supply.
2	Remove battery cover where applicable.
3	Connect positive terminal (+) of power source with appropriate jumper cables.
4	Connect negative terminal (-) of power source with appropriate jumper cables.
5	If necessary activate the optional battery disconnect switch.
6	Start engine acc. to Section 4.4.2.
7	After the drive engine starts up: – Detach jumper cable of negative terminal (-). – Detach jumper cable of positive terminal (+).
8	Replace battery cover where applicable.

WARNING

- Danger of explosion!
  Avoid sparks forming due to fire, open light or smoking.
- Battery acid is corrosive.
  Avoid contact with skin, eyes or clothing. Rinse acid splashes and spills with clean water immediately. Consult a physician if appropriate.

When working on electrical system, adhere to current regulations and the accident prevention regulations.

https://cranemanuals.com

4.5 Turning off the machine

4.5.1 Shut down engine

Note
Switching off the driving engine without allowing a cooling down phase may cause heat storage and overheating of engine parts and especially the turbocharger. Allow the driving engine to cool down therefore before switching off:

- Lower engine speed to approx. 50 % of the rated speed (see Chapter 3).
- Allow machine to run for another approx. 5-10 minutes.

Non-observance may cause increased wear to the engine and cooling system.

1	Place the machine on a firm surface.
2	Lower suspended loads and lower stick if necessary.
3	Lower engine speed to approx. 50 % of the rated speed to prevent the engine and cooling system from being damaged.
4	Allow engine to run for a further approx. 5-10 minutes.
5	Turn ignition key to position "0" and remove.
6	If necessary pull back safety lever.
7	Secure the machine area (lights, warning triangle, etc.).

https://cranemanuals.com

4.6 Taking the machine out of service

Proceed as follows if the machine will be taken out of service for an extended period of time:

1	Turn off the machine as described in Section 4.5.
2	Clean the machine as described in Section 6.
3	Fill up consumables and lubricants. For filling quantities see Section 6.11.
4	Lubricate the machine as described in Section 6.10.
5	If necessary, switch the optional battery isolation switch off or disconnect the battery pole (see Section 7.4).
6	Preserve bare metal parts (for example piston rods in the hydraulic cylinders); see Section 6.5.2.
7	Select a storage location that is as dry and dust free as possible.

Note
On impermissible operating see Section 3.1.

https://cranemanuals.com

5 Operation

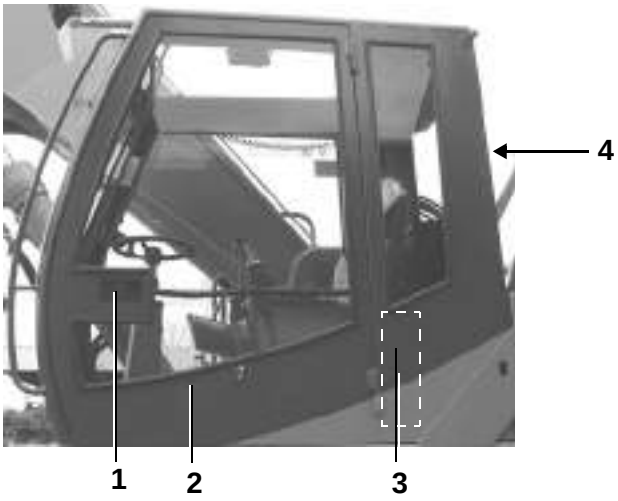
5.1 Safety instructions

DANGER

- Observe Chapter 1 SAFETY.
  Before operating, carry out checks according to Section 4.3 .
- Persons working on or with the machine must be trained or instructed for that purpose.
  The operation and deployment may only be carried out by persons suitably instructed.
- Proceed with utmost caution if you override the stick end limit.
- Ensure that no persons are within the danger area.
- Maintain safety distance to overhead lines.
- Only operate the machine from the driver's seat.
- Do not transport persons with the machine.
- Consider environment conditions, e.g. poor visibility, wind speeds, etc.
- Use the safe working load tables specifically for that machine.
- Observe performance details.
- Check that anchorage points have a sufficient safe working load.
- Observe guide signals as necessary.
- Position stick in direction of travel during long journeys.
- Before leaving the driver's cab:
  - Completely lower cab if necessary
  - Position the machine on firm base, if necessary set back from the edge of the excavation
  - Lower suspended loads
  - Secure working tools
  - Pull safety lever to the rear
  - Chock wheels/running gear
  - Switch off engine
  - Lock cab, show warning lights if necessary.

https://cranemanuals.com

5.2 Cab



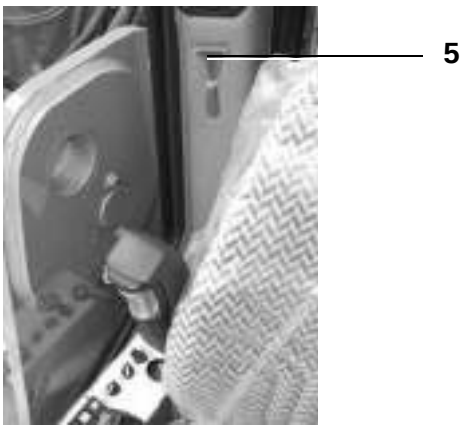
1 Door lock

2 Cab door

3 Release – door locking device

4 Emergency exit – rear window

Emergency exit



5 Hammer - emergency exit

In an emergency, you can exit via the rear window. Use the hammer to break the rear window.

https://cranemanuals.com

Driver's door

The driver's door can be latched in the open position on the side panel of the cab. Pressing the release (3) in the cab releases the catch again.

Front windshield

Opening the front windshield: tilt inwards or push upwards. Ensure that the wiper is sitting on the holder. Press the two upright bars inwards and push the screen to the position required. Ensure that the windshield latches in the desired position. Push the two upright bars back outwards.

Interior lighting

The cab is equipped with interior lighting.
Turning the lamp lens switches the lighting on and off.

Windshield washer system

The windshield wipers are operated by the switch on the right control panel. The reservoir for the windshield washer system cleaning fluid is located on the cab floor. Always fill the reservoir with anti freeze agent.

Driver's seat

Operation of the driver's seat is described in separate instructions. These instructions can be found in Section 10.3.

https://cranemanuals.com

5.2.1 Moving the cab (optional)

Safety instructions

DANGER
Danger of accident when cab is tilted!
Cab mounting, check bolts and screw fastenings daily!

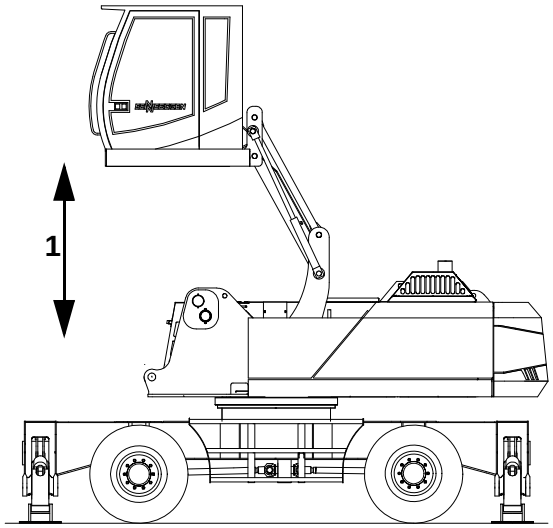
- Operate machine only when cab is lowered, cab is swung in and slew gear brake is off.
- Leave the cab only when lowered and swung in.
- Move the cab only when the undercarriage is stabilised.
- Keep driver doors closed.
- Fasten retaining belt according to Section 4.4.1 .
- Do not step on the step grid unless entering/exiting the cab, and only when the cab is fully lowered and swung in.

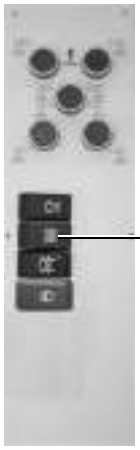
DANGER
Danger to life through shearing and crushing forces!
Ensure that no persons are within the danger area of the cab suspension. The danger area is in the area

- on and under the cab,
- on/under the mechanical cab supporting structure.

https://cranemanuals.com

Cabin travel





1 Raising/lowering the cab
Press the flip switch to the right: Raising the cab
Press the flip switch to the left: Lowering the cab.

Note
Do not elevate the cab to the uppermost/furthest forward limit setting (OT).
Stop the cab approx. 10 cm before the uppermost/furthest forward limit. This will provide optimum shock absorption conditions and pleasant working conditions inside the cab.

WARNING
Danger of injury due to uncontrolled rising of the cab!
After you have reached the lower limit position, hold down the switch for about 5 s more. This allows the integrated pressure accumulator to empty.

There is otherwise a danger of injury due to uncontrolled cab movement as the pressure accumulator empties.

https://cranemanuals.com

Dismantling/assembling the cab

DANGER
Danger to life from falling cab!

- The cab must be assembled/dismantled by trained and instructed technicians only!
- Always replace fixing bolts after a disassembly task. Do not use them again.
- Have bolts, bracing and fastening components checked by a trained specialist before using them again, or replace them if necessary.
- Only use genuine SENNEBOGEN spare parts.

https://cranemanuals.com

5.2.2 Emergency lowering

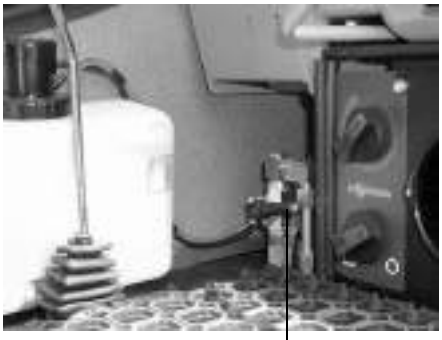
The machine is equipped with the following emergency lowering systems:

- Emergency lowering – cab (in the cab)
  Location: to the right next to the driver's seat/heater.
  Necessary e.g. in event of fault in drive system.
- Emergency lowering – cab (in storage space)
  Location: left hand storage space, on fuel tank.
  Necessary for situations in which the machine driver suffers health complaint which places him/her into a hazardous situation.
- Emergency lowering - boom
  Location: engine compartment, at the combination cooler
  Necessary e.g. in event of fault in drive system.

DANGER
Danger to life through shearing and crushing forces!
Ensure that no persons are within the danger area of the cab suspension. The danger area is in the area

- on and under the cab,
- on/under the mechanical cab supporting structure.

Emergency lowering - cab

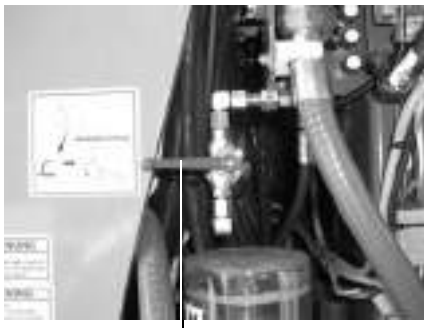


shown = cab lowering

1	Lower lever (1) (horizontal position). The cab lowers slowly.
2	Pull lever (1) back again after reaching the lower limit position.

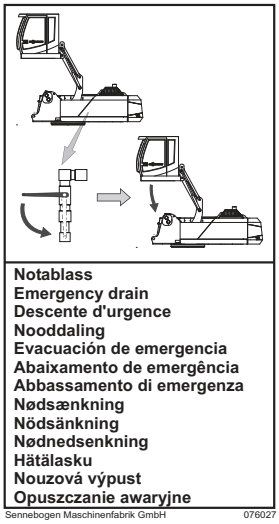
https://cranemanuals.com

Emergency lowering - cab (in storage compartment)



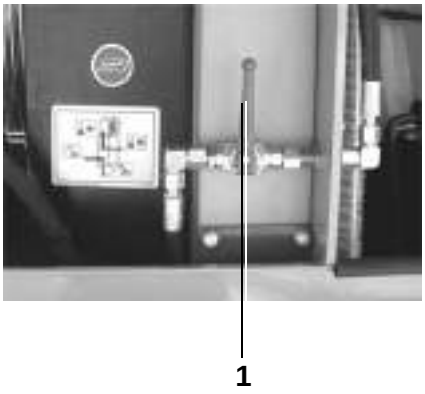
1

shown = cab up



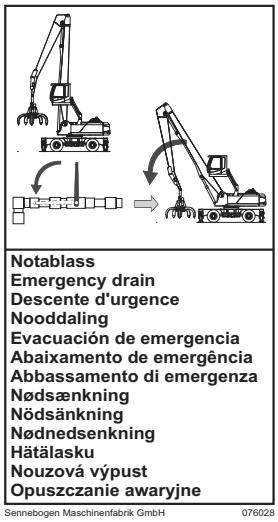
1	Lower lever (1) (horizontal position). The cab lowers slowly.
2	Pull lever (1) back again after reaching the lower limit position.

Emergency lower – boom



1

shown = Stick, top



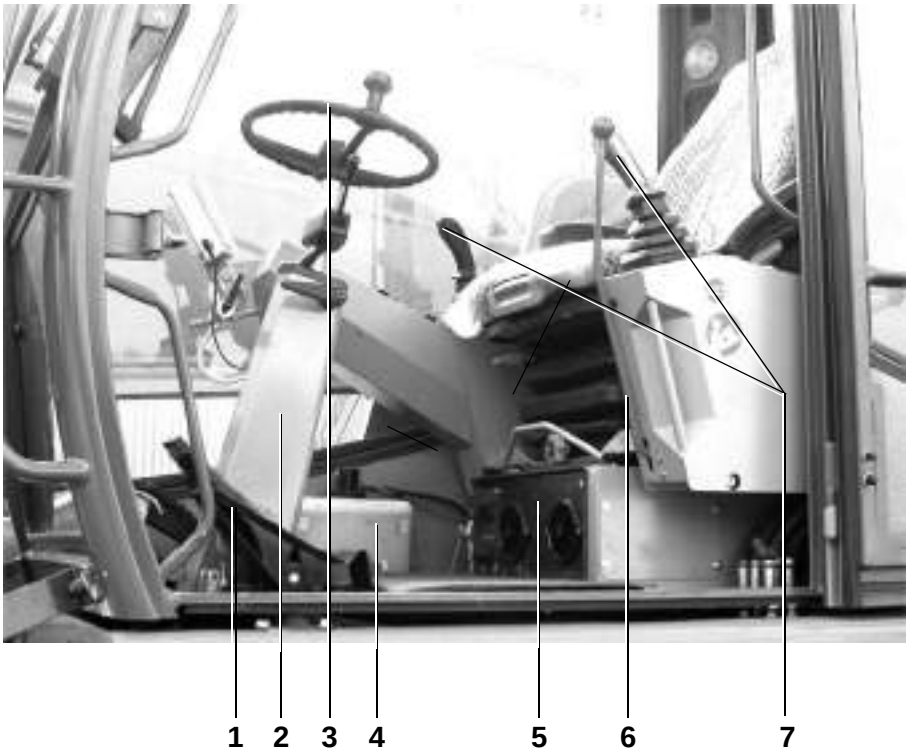
DANGER
Ensure that no persons are within the danger area of the compact stick.

1	Adjust emergency lowering lever (1) down vertically. The compact stick lowers.
2	Move the emergency lowering lever (1) back again.

https://cranemanuals.com

5.3 Operating elements

5.3.1 Overview



1 Pedals

2 Steering column

3 Steering wheel

4 Container - cleaning water

5 Heating system/Air conditioning system (optional)

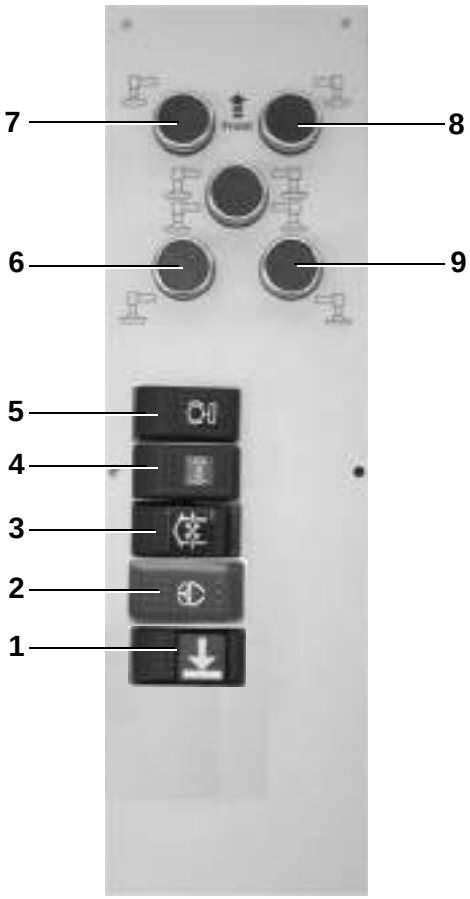
6 Safety lever

7 Control lever

DANGER
Accident risk through incorrect operation!
If the boom is positioned above the rear axle, the driving actions of the machine are reversed. Proceed with utmost caution when working over the rear axle or when needing to travel.

https://cranemanuals.com

5.3.2 Control panel, left hand



1 Lift limit ”Stick extend” OFF / ON (optional)

2 Grab-control

3 Changing the fan direction - combination cooler (optional)

4 Elevating/lowering the cab (optional)

5 Applying/releasing the slewing gear parking brake

6 Outrigger, rear left (optional)

7 Outrigger, front left (optional)

8 Outrigger, front right (optional)

9 Outrigger, rear right (optional)

https://cranemanuals.com

Optional lift limit

The *optional lift limit "Stick extend"* can be activated or deactivated by pressing the switch!

Grab-control

The pressure for *closing the grab* can be controled with *grab-control.*
This can be needed by using the work movements *closing the grab - swinging upper structure* or *closing the grab - stroke down/stroke up* simultaneous.

grab - control	Closing pressure for grab	Slewing speed - upper structure	Lifting speed - compact boom
activated	reduced pressure; The grab is closed - reduced pressure on the loading material.	fast	fast
deactivated	max. pressure; The grab is closed - max. pressure on the loading material.	slow	slow

Fan reversal – combination cooler

Fan reversal is used to clean the cooling fins of the combination cooler. To do this, press and hold down the button. After about 10 seconds the direction in which the fan is turning is reversed. Air and loose dust and dirt clinging to the cooling fins will be blown out.

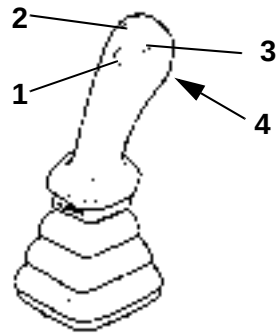
1	Hold the button for about 60 seconds.
2	Check the cooling finds on the combination cooler and change the direction of the fan again if necessary.

About 10 seconds after you let go of the switch, the direction in which the fan is turning changes again.

Note
To further clean the combination cooler, read supplementary documentation (see Section 10.4).

https://cranemanuals.com

5.3.3 Control lever, left



Pushbutton:

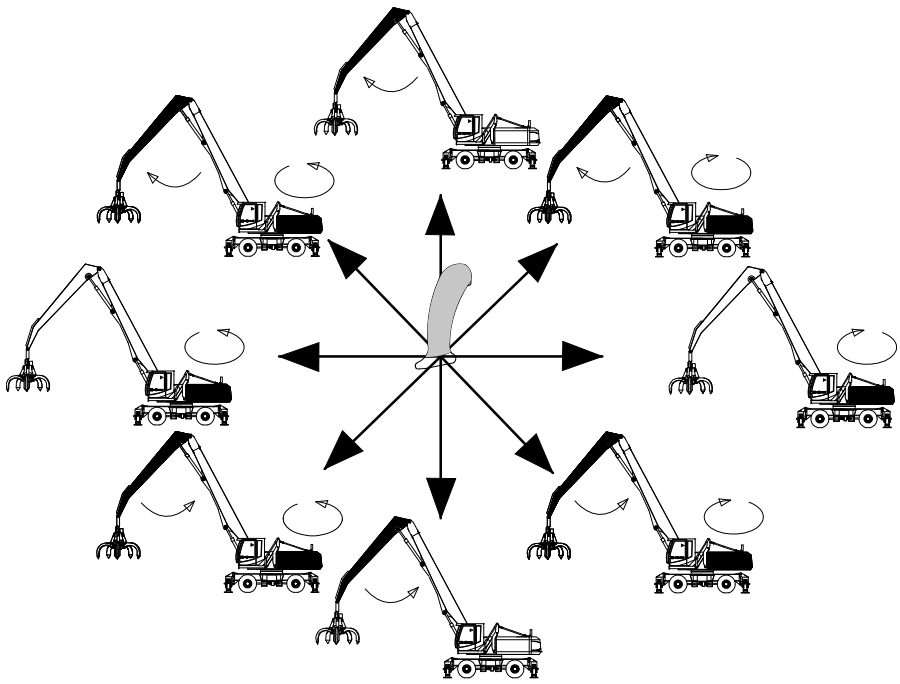
1 Unused

2 Grab, slew left

3 Grab, slew right

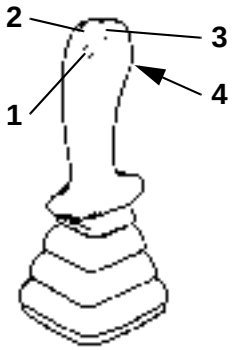
4 Safety limit shutdown
Bypassing ”Stick retract”

Movement directions:



https://cranemanuals.com

5.3.4 Control lever, right-hand



Pushbutton:

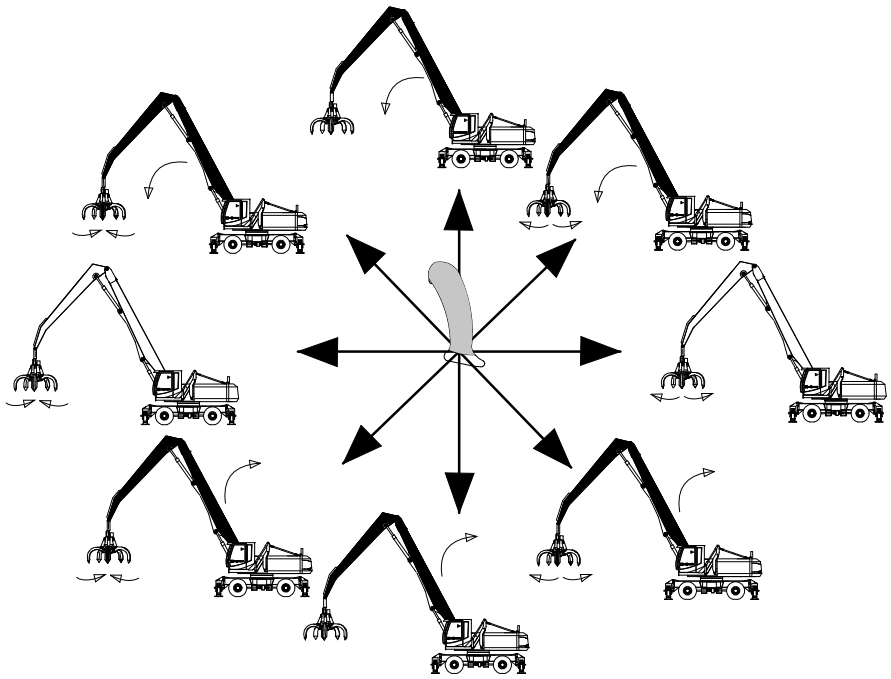
1 Unused

2 Unused

3 Unused

4 Horn

Movement directions:



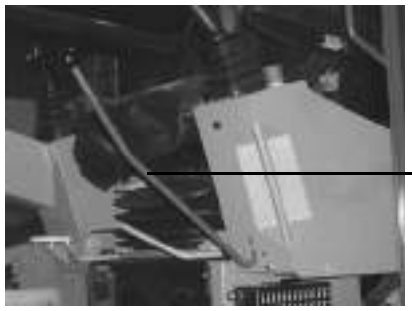
DANGER
Danger of death by bypassing the safety limit shutdown ”Stick retract”!
Attachments and load elements can penetrate the driver's cab.
Proceed with utmost caution.
Watch attachments and load constantly. Operation in this mode is at the sole responsibility of the machine operator.

Observe also the notes in Section 5.6.9.

https://cranemanuals.com

5.3.5 Safety lever

The safety lever (1) serves as a safety device.

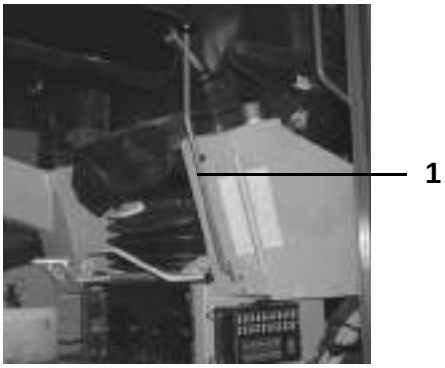


Shown = Safety lever released (pushed forward)

When safety lever is released (see illustration)

- all hydraulic functions are available.
- all work movements can be carried out.

Note
The slewing gear parking brake remains applied after release of the safety lever (pushed forwards). Release the swing bearing brake with the switch in the left-hand control panel (see Section 5.6.5).



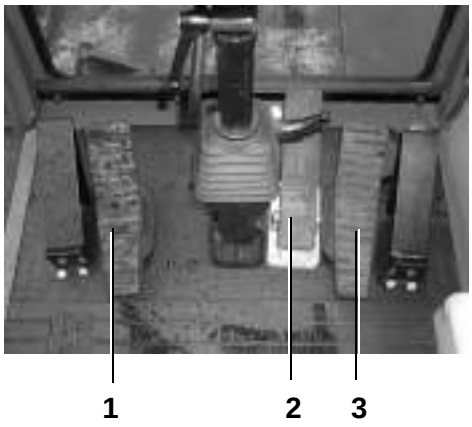
Shown = Safety lever actuated (pulled backward)

When safety lever is actuated

- all hydraulic functions are inoperative.
- the machine can be driven.

https://cranemanuals.com

5.3.6 Pedals



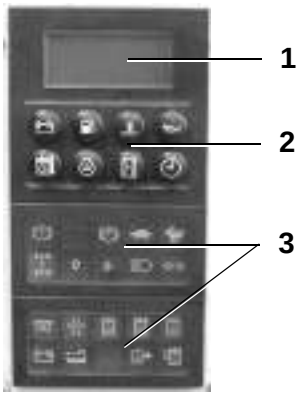
1 Claw support

2 Brake (with arrester) – travel action

3 Drive pedal

https://cranemanuals.com

5.3.7 SENNEBOGEN Diagnosis System (SDS)



1 Display

2 Button panel with LEDs

3 Indicator and warning lights

Additional information can be called up via the SDS, e.g. actual hydraulic oil temperature.

Note
Do not clean the SDS with alcohol or liquids containing solvents! These will corrode the plastic surface.

Note
All temperature details are displayed in °Celsius (°C).

Sensors on the machine monitor the actual operating conditions and transmit the measurement results to the SDS. The measurement results are evaluated in the SDS and are shown on the display when a key is pressed. The indicator and warning lamps are activated if irregularities occur on the machine.

Self test:
The SDS carries out a self test after the ignition is switched on. All segments of the display are activated, all LEDs illuminate. The sensors are checked. The SDS is subsequently operational.

If the SDS detects a fault this is shown on the display and via LED. Arrange for rectification of faults through SENNEBOGEN customer service.

Display (1) The 2-part display shows additional information, e.g. the time. Press a function key on the keypad (2) to call up and display the corresponding information.

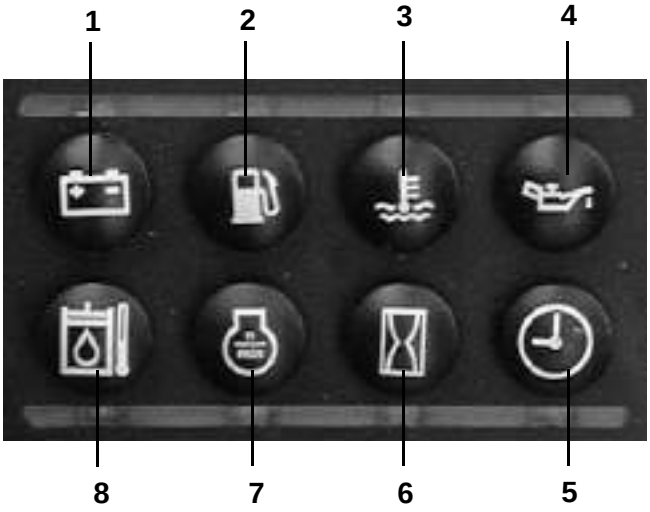
https://cranemanuals.com

Keypad with LEDs (2)

The keypad has 8 function keys. Information can be called up and shown on the display using these keys. A red LED is assigned to each key.

The LEDs illuminate when the corresponding key is pressed.

The LEDs flash if an impermissible value is reached, e.g. excessive engine temperature. The impermissible value flashes in the display, a buzzer sounds. Press the corresponding key to acknowledge the fault message. Eliminate the cause.



1 Battery charge
2 Fuel tank display
3 Coolant temperature
4 Oil pressure – drive engine
5 Time of day
6 Operating hours meter
7 RPM display – drive engine
8 Hydraulic oil temperature

Note
Temperatures below 20 °C (hydraulic oil) and/or below 30 °C (refrigerant) are not displayed.

https://cranemanuals.com

Setting the time:

1	Press keys (6) and (7) on keypad simultaneously for 5 seconds. The set clock time on the display will flash e.g. 16:52.
2	Press the following keys to change the time: (8) = Hour display - ten units (**1**6:52) (7) = Hour display - single units (1**6**:52) (6) = Minute display - ten units (16:**5**2) (5) = Minute display - single units (16:5**2**).
3	To accept the time, press keys (6) and (7) simultaneously until the display no longer flashes.

Resetting daily hours run meter:

1	Press key (6). The hours run meter function appears in the display. Release key (6).
2	Press key (6) ca. 3s. The hours run are reset to "zero".

Note
The hours run meter on the right control panel shows the total hours run of the machine. This meter cannot be reset.

https://cranemanuals.com

Error displays

LED flashes, buzzer sounds

Cause	Remedy
Hydraulic oil temperature too high (>84 °C)	– Allow engine to run without load until hydraulic oil has cooled.
Cooling fins on hydraulic oil cooler dirty	– Clean cooling fins on oil cooler.
Hydraulic oil level too low	– Check oil level acc. to maintenance instructions. – Top up hydraulic oil, if required.

Note
If the hydraulic oil temperature exceeds +94 °C, the temperature indicator in the display also flashes.

LED flashes, continuous tone sounds

Cause	Remedy
Insufficient fuel in tank	– Refuel machine acc. to Section 5.6.11.

LED flashes, buzzer sounds

Cause	Remedy
Engine overheating	– Run engine at idling speed.
Cooling fins on engine oil cooler dirty	– Clean cooling fins on oil cooler.
Fan drive loose or defective	– Secure fan drive, or replace if necessary.
Coolant level too low	– Top up refrigerant according to maintenance instructions.
Engine switched off without cooling phase.	– After operating, allow engine to run in low neutral for approx. 5-10 minutes before switching off.

Note
If the coolant temperature continues to rise, the temperature indicator in the display also flashes, a continuous tone sounds.

https://cranemanuals.com

LED flashes, buzzer sounds	**Cause**	**Remedy**
	Motor oil pressure too low (<1.3 bar)	– Shut down engine immediately. – Check engine oil level acc. to maintenance instructions. – Top up engine oil if necessary. – If occurrences repeat, Notify SENNEBOGEN customer service

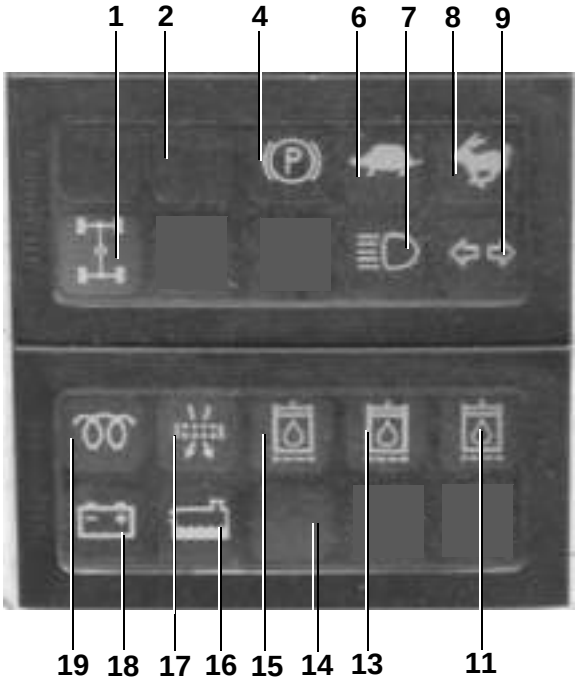
Note
If the oil pressure falls below 1.0 bar, the pressure indicator in the display also flashes, a continuous tone sounds.

https://cranemanuals.com

indicator and warning lights (3)

Indicator lamps inform about current operational conditions, e.g. *slewing gear parking brake applied*.

Warning lamps illuminate when immediate measures are required on the machine, e.g. *clean air filter*.



Indicator lamps:

1 Joy stick steering on/off (Optional)

6 Slow travel – off-road

7 Remote light

8 Fast travel – road travel

9 Direction indicator

14 Pilot light - EMR (electronic engine regulator)

19 Preheat

Warning lamps:

2 Overload warning

4 Parking brake – accumulator charge pressure

11 Filter change indicator – pilot filter

13 Filter change indicator – Hydro-Clean

15 Filter change indicator – return filter

16 Coolant level

17 Air filter - contamination display

18 Battery charge

https://cranemanuals.com

Warning lights - fault displays

Overload warning (2) lights up

Cause	Remedy
Overload	– Reduce load

(4) Illuminates, if engine is running

Cause	Remedy
Accumulator charge pressure too low	– Have system checked by hydraulics specialist.

(11) Illuminates, if pilot filter is blocked

Cause	Remedy
Pilot filter is blocked	– Check pilot filter, if necessary change acc. to maintenance instructions.

(13) Illuminates if hydro-clean superfine filter is blocked

Cause	Remedy
Hydro-clean superfine filter is blocked	– Check hydro-clean superfine filter, if necessary change acc. to maintenance instructions.

(15) Illuminates, if hydraulic return filter is blocked

Cause	Remedy
Return filter is blocked	– Check return filter, if necessary change acc. to maintenance instructions.

(16) lights up, warning tone sounds

Cause	Remedy
Coolant level too low	– Top up coolant.

https://cranemanuals.com

(17) lights up, warning tone sounds

Cause	Remedy
Air filter contaminated	– Clean filter acc. to maintenance instructions. – Exchange filter element if necessary.

(18) Illuminates, if lights up, warning tone sounds

Cause	Remedy
Battery charge too weak	– Check battery charge, recharge batteries or exchange if necessary. – Check battery connections, tighten terminals if necessary.

https://cranemanuals.com

Indicator lamps

(1) lights up when (optional) joy stick steering is activated.

(6) illuminates if travelling slowly.

(7) lights up when headlight lit.

(8) illuminates if travelling fast.

(9) lights up when flashing indicator is on.

https://cranemanuals.com

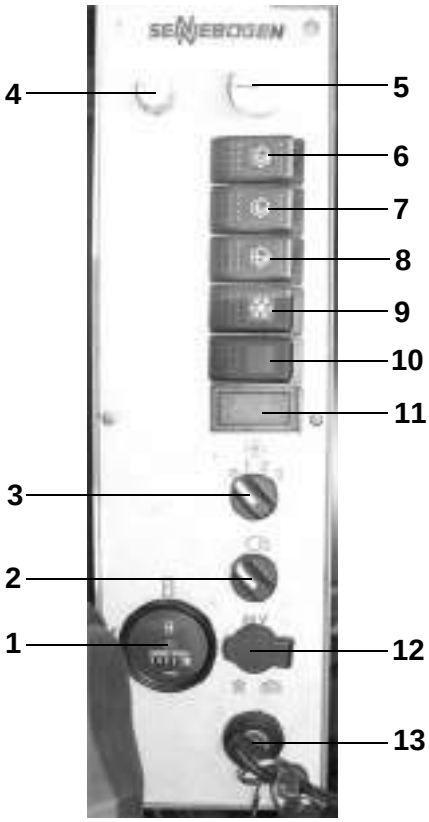
Pilot lamp (14) – EMR (electronic engine controller)

Light duration / type	EMR - fault
no light	– check EMR power supply – Notify SENNEBOGEN customer service
Lit for 2 sec, then goes out	– Self-check in order = normal operating status
lights up continuously	– slight EMR - fault Notify SENNEBOGEN customer service
flashes	– serious EMR - fault Notify SENNEBOGEN customer service

(19) lights up when preheating the drive motor.

https://cranemanuals.com

5.3.8 Control panel, right-hand, back



1 Operating hours meter

2 Light switch

3 Fan

4 Interval front windshield wiper

5 RPM adjustment

6 Frontwindshield wiper

7 Roof windshield wiper

8 Front windshield wiper lower (optional)

9 Heating/air-conditioning system (optional)

10 Central lubrication system (optional)

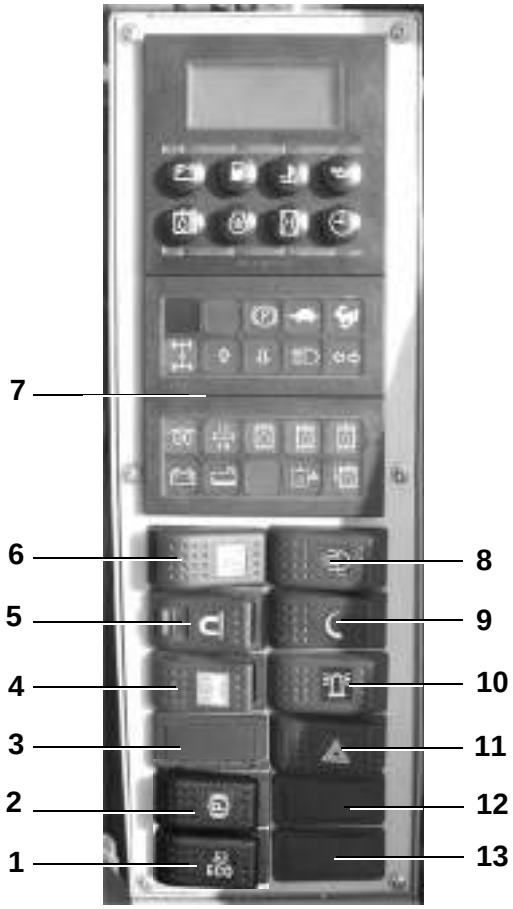
11 Unused

12 24-V plug socket

13 Ignition lock/engine start

https://cranemanuals.com

5.3.9 Control panel, front right



1 ECO-Switch

2 Parking brake

3 Unused

4 Full floating axle lock

5 Magnetic unit (optional)

6 Travel speed slow/fast

7 SENNEBOGEN Diagnosis System (SDS)

8 Work lighting (optional)

9 Automatic idling

10 Beacon light (optional)

11 Flashing warning lights

12 Unused

13 Unused

https://cranemanuals.com

ECO-Switch

When the *ECO-Switch* will be activated the nominal speed will be reduced for 8%.
The fuel consumption and the sound level will be reduced too.

Note
Deactivate *ECO-Switch* when workink with magnet system!

Full floating axle lock

The front axle has a floating mounting After releasing the lock (light on the switch lights up), travel surface unevenness can be compensated by the floating axle.

WARNING

- Tip over danger!
  Lock the floating axle when travelling with load.
- Unlock the floating axle when travelling on uneven terrain.

Note
The light on the switch lights up when the floating axle is released.
The light on the switch does not light up, when the floating axle is locked.

Automatic idling

The *automatic idle* control automatically decreases the rpm of the drive engine if no operating actions are carried out for several seconds. Once a control lever is actuated, the preset speed of the rpm adjustment is immediately restored.

https://cranemanuals.com

5.3.10 Central lubrication system (optional)

The central lubrication system automatically lubricates the running track. The lubrication cycle is preset in the factory.

Note
The preset lubricating cycle can be shortened. For more information see the manual of the manufacturer.

Shorter lubricating times are required,

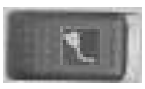
- in the tropics,
- when humidity is high,
- under very dusty and dirty conditions,
- if the temperature changes significantly,
- with a continuous swinging movement.

1 Lubricant container

2 Lubricating nipple – top off grease

Actuate running track lubrication manually

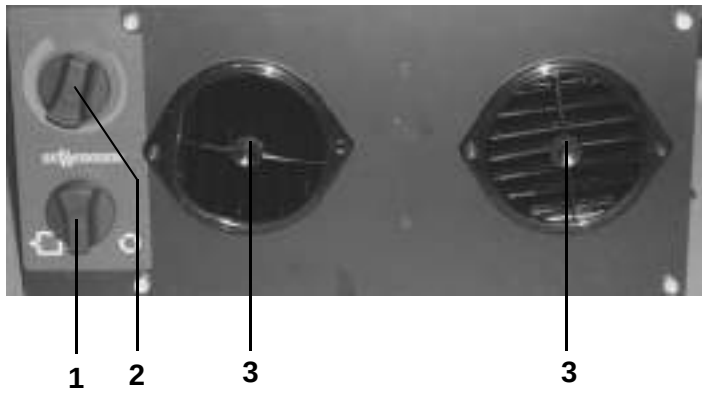
In addition to the preset lubrication cycle, lubrication can also be activated manually.

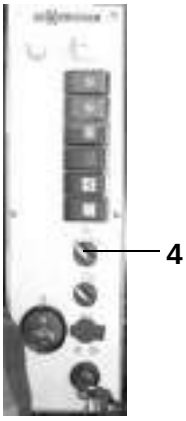


1	Move the switch on the control panel to the right:

https://cranemanuals.com

5.4 Heating





1 Outside air / circulating air selector knob

2 Temperature regulator

3 Blower nozzles

4 Blower switch, 3-phase (control panel, right-hand, back)

The heating can operate in outside air, recirculating air or blended air mode.

Outside air mode

When windows are misted, to dehumidify the cab.

Recirculating air mode

Faster warm up of cab and higher end temperature.
The air in the cab interior is recirculated, i.e. no fresh air is drawn in from outside. Do not leave this mode in operation for longer than 15 minutes, as the air quality in the cab will deteriorate significantly. Ensure that there is a sufficient outside air supply.

Mixed air mode (neutral position)

Normal operating mode.

https://cranemanuals.com

5.5 Special equipment

5.5.1 Air conditioner (optional)

WARNING

- Maintenance and repair work must only be carried out by trained specialist personnel.
- Do not reach inside the unit and do not insert any object.
- Only carry out maintenance work when the drive engine is switched off and the fan is disconnected.
- Danger of burning!
  Allow unit and components inside unit (heat exchanger, resistors) to fully cool down first.
- Avoid contact with refrigerant.
- Wear eye protection.
- Always use PAG oil for compressor. No ester-based oils.
- No fluorescing additives (tracer agent, sticks).

Note
Close windows and doors to guarantee adequate air conditioning.

The air conditioner regulates the temperature in relation to the outside temperature.

Air conditioning system switch on

1	Bring drive engine up to operating temperature.
2	Switch on blower on right control panel.
3	Open air inlet nozzle in the driver's seat console or on the front windshield to prevent the condenser from icing up.
4	Press switch for air conditioner on right control panel.
5	Regulate desired temperature via temperature control on heater unit.

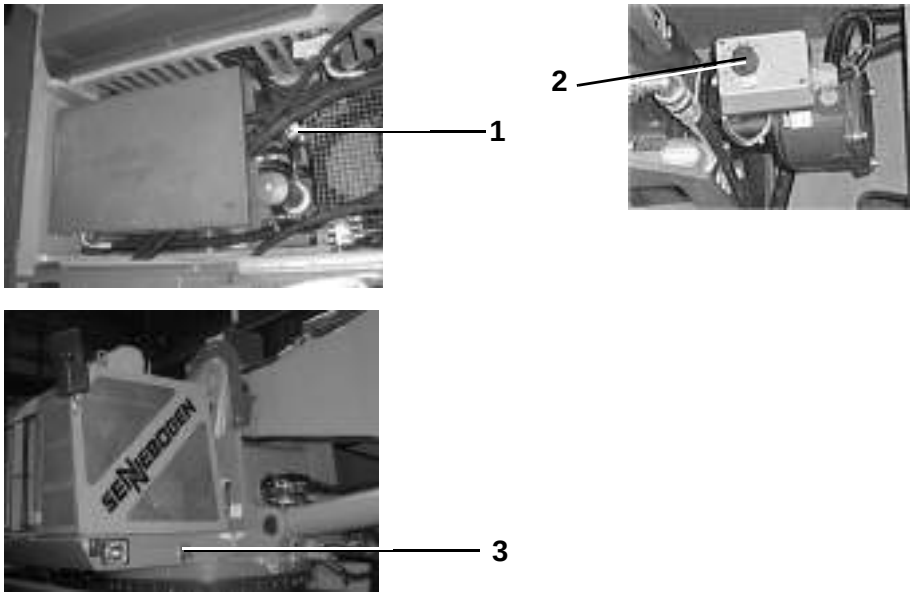
Note
Switch on air conditioner regularly. This will contribute considerably to the serviceability of the air conditioner.

Switch on air conditioning system once a month for at least 30 minutes at maximum fan rate, open windows and doors.

https://cranemanuals.com

5.5.2 Hydraulic oil heating system (option)

The Hydraulic oil heating system (1) is mounted on the hydraulic tank. Therefor the time of warming up of the hydraulic oil is shorter (Section 4.4.3).



For activating the hydraulic oil heating system, the socket (3) must be connected with the circuit (110 V).
Only the plug (3) but not the feeder cable is availabled by Sennebogen. The feeder cable and the plug´s must be connected by a qualified person.

You can choose the temperature with the regulator (2) on the thermostat (normal: 20°C).

When the oil has the right temperature the thermostat switches off.

Note
Fully retract all hydraulic cylinders. The hydraulic oil heating system will be more effective.

WARNING
Service and maintenance shall only be done by qualified persons.

https://cranemanuals.com

Note

Is the socket connected with the circuit, the

- hydraulic oil heating system is activated.
- coolant heating system is activated.
- heating system for the jar at the fuel filter is activated.

5.5.3 Coolant heating system

For activating the coolant heating system, the socket (3) must be connected with the circuit (110 V).
Only the plug (3) but not the feeder cable is availabled by Sennebogen. The feeder cable and the plug´s must be connected by a qualified person.

Note

Is the socket connected with the circuit, the

- hydraulic oil heating system is activated.
- coolant heating system is activated.
- heating system for the jar at the fuel filter is activated.

https://cranemanuals.com

5.5.4 Heating system for the jar - fuel filter

For activating the heating system for the jar at the fuel filter, the socket (3) must be connected with the circuit (110 V).
Only the plug (3) but not the feeder cable is availabled by Sennebogen. The feeder cable and the plug´s must be connected by a qualified person.

Note

Is the socket connected with the circuit, the

- hydraulic oil heating system is activated.
- coolant heating system is activated.
- heating system for the jar at the fuel filter is activated.

https://cranemanuals.com

5.6 Starting work

5.6.1 Safety instructions

DANGER

- Observe Chapter 1 SAFETY.
  Before operating, carry out checks according to Section 4.3 .
- Persons working on or with the machine must be trained or instructed for that purpose.
  The operation and deployment may only be carried out by persons suitably instructed.
- Proceed with utmost caution if you override the stick end limit.
- Ensure that no persons are within the danger area.
- Maintain safety distance to overhead lines.
- Only operate the machine from the driver's seat.
- Do not transport persons with the machine.
- Consider environment conditions, e.g. poor visibility, wind speeds, etc.
- Use the safe working load tables specifically for that machine.
- Observe performance details.
- Check that anchorage points have a sufficient safe working load.
- Observe guide signals as necessary.
- Position stick in direction of travel during long journeys.
- Before leaving the driver's cab:
  - Position the machine on firm base, if necessary set back from the edge of the excavation
  - Lower suspended loads
  - Secure working equipment
  - Pull safety lever to the rear
  - Chock wheels/running gear
  - Switch off engine
  - Lock the cab and secure the warning lights if necessary
  - Lock the floating axle.

https://cranemanuals.com

5.6.2 Towing

ATTENTION!
Use a steel cable with an appropriate strength rating when towing a defective machine. Do not use the holes in the shackles and eyes welded to the undercarriage for towing (these are intended solely for securing the machine during transport).

Note
An emergency actuating mechanism that permits emergency towing of the vehicle in the event of loss of control pressure or a faulty hydraulic motor is located on the power shift transmission.

CAUTION!

If the emergency actuating mechanism is not properly deactivated, the transmission will be damaged during normal operation. Because the transmission is not lubricated during towing, the following procedures must be observed:

- Towing speed: max. 10 km/h
- Distance towed: max. 5 km

For longer distances, the defective machine is to be transported using a suitable lowboy trailer.

ATTENTION!

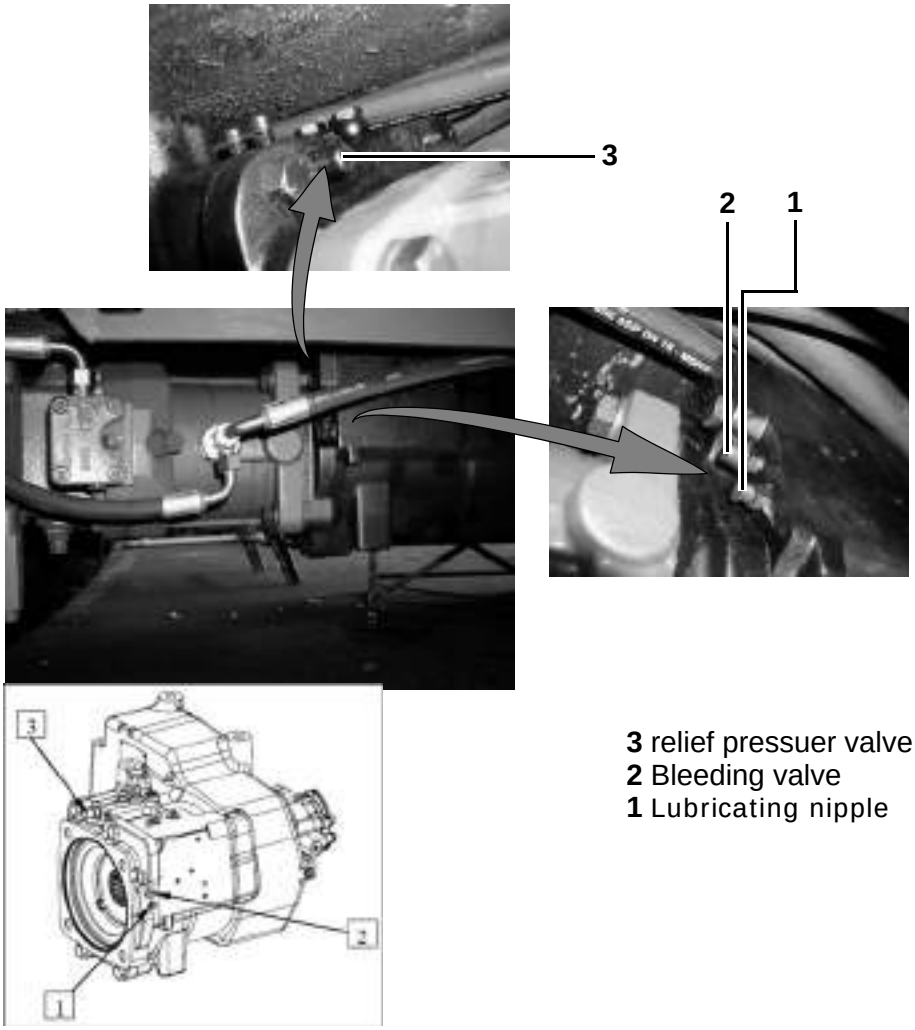
The parking brake does not function, if the emergency actuating mechanism has been activated.

No attempt to shift gears should be made, if the emergency actuating mechanism has been activated.

The grease nipple on the emergency actuating mechanism is not to be used for lubrication purposes.

https://cranemanuals.com

Overview of valves and nipples



3 relief pressuer valve
2 Bleeding valve
1 Lubricating nipple

WARNING

The grease nipple on the emergency actuating mechanism is not to be used for lubrication purposes. He serves exclusively to activate to the emergency activity. The gear can be destroyed!

Activating the emergency actuating mechanism

1	Shut off the engine.
2	Prevent the vehicle from rolling away.
3	Using a commercially available grease gun, pump grease into the grease nipple (**3**) until it appears again at the pressure relief valve (**1**) on the emergency actuating mechanism.

https://cranemanuals.com

Deactivating the emergency actuating mechanism

1	Open the bleed valve (**2**) on the emergency actuating mechanism.
2	Select on-road operation.
3	Apply the driving brake.
4	Close the bleed valve again.

https://cranemanuals.com

5.6.3 Driving the machine

DANGER
Accident risk through incorrect operation!
If the boom is positioned above the rear axle, the driving actions of the machine are reversed. Proceed with utmost caution when working over the rear axle or when needing to travel.

Driving with suspended load

Observe the following points when driving with suspended load:

- Tip-over danger!
  Keep loads as close as possible to the ground when moving.
- Always position stick lengthwise to the undercarriage.
- Only carry 50% of the permitted safe working load.
- Only drive on even ground with sufficient load bearing capacity.
- Lock swing axle.
- Reduce pendulum movements of load by sensitive driving.
- Negotiate corners with as wide a radius as possible.

Driving

1	Retract stabilizers if necessary.
2	Release parking brake.
3	Select off-road or road travel.
4	Release swing axle on right control panel if necessary.
5	Set driving speed using accelerator pedal and rpm adjustment on right control panel.
6	Slow the machine with the brake pedal.
7	Park machine acc. to Section 4.5.1.

Note
Avoid excessive heating of the hydraulic oil. Do not hold the steering at full lock longer than necessary.

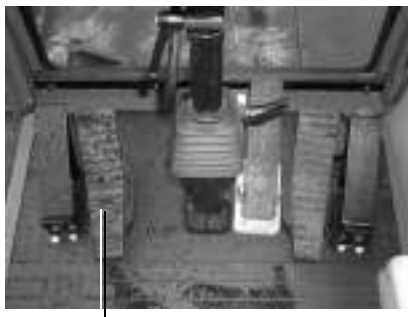
https://cranemanuals.com

5.6.4 Stabilizing machine

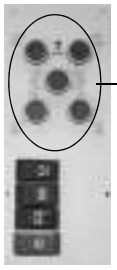
The machine is stabilized on uneven ground using the stabilizers. This increases the standing stability. When stabilized, the machine can lift greater loads (also see Section 3.2).

Extending outrigger

3



5



4

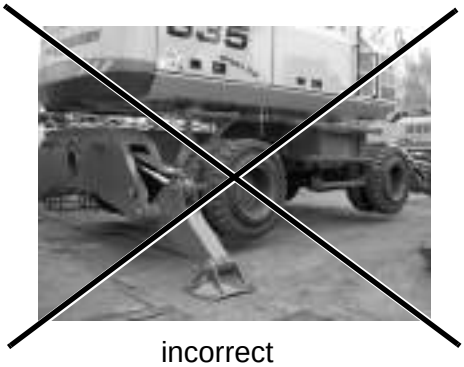
1	Start engine as described in Section 4.4.2.
2	Release the safety lever (see Section 5.3.5).
3	Lock the floating axle with the switch on the right of the control panel (the light on the switch does not light up).
4	Push down the drop arm (3). A warning signal sounds.

WARNING
Position stabilisers on a firm, even base.
Do not raise machine using the stabilisers. The tyres must always maintain ground contact.

https://cranemanuals.com

DANGER
Never extend the stabilisers completely (= to the stop). The weight will not be distributed evenly over the individual stabilisers this way, i.e. the maximum standing safety is not guaranteed.
If you have extended the stabilisers completely out to the stops (audible noise), always move them back in a bit.

correct



incorrect

5	Total actuation: – Push foot pedal (5) forwards until the outrigger is extended. Individual actuation (optional): – Press and hold corresponding push button on left (4) control panel. – Push foot pedal (5) forwards until the outrigger is extended.
6	Push up the drop arm (3) again. The warning signal stops.

Retracting outrigger

1	Start engine acc. to Section 4.4.2.

DANGER
Observe reduced safe working loads in unstabilized mode!

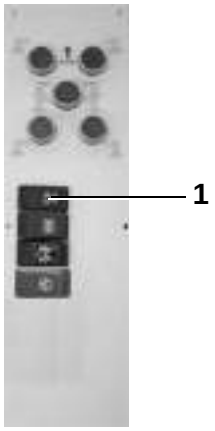
2	Push down the drop arm (3). A warning signal sounds.
3	Push foot pedal (5) back until the outrigger is retracted.
4	Push up the drop arm (3) again. The warning signal stops.

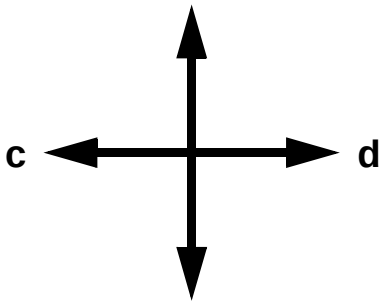
https://cranemanuals.com

5.6.5 Slewing upper structure

The upper structure is slewed using the *left* control lever.

DANGER
Danger of tipping with additional ballast!
The machine must be supported when slewing the upper structure!





1 Switch – slewing gear parking brake

Movement directions:

c Slew upper structure, left

d Slew upper structure, right

Slewing speed

The slewing speed is dependent on the:

- Speed of the drive engine
- Inclination of the left control lever.

DANGER
No persons, buildings or machines may be within the slewing range of the upper structure (danger area).

Swinging movement stop (braking)

1	Move control lever to neutral position (0-position). The upper structure is hydraulically braked. The slewing movement gradually stops.

Note
Counter actuation with the control lever increases the braking process.

https://cranemanuals.com

Slewing gear parking brake

The slew gear parking brake is not an operational brake for braking the upper structure. The brake serves exclusively as a parking and holding brake when the upper structure is at rest.

The upper structure must have stopped rotating completely before the slew gear brake is applied.

WARNING
If the swing bearing brake is used to stop the upper structure, serious damage will be caused to the brake and/or the slewing gear. This damage can be of the following nature:

- Diminished braking effect due to clutch plate damage
- Irreparable damage to the brake or other components
- Irreparable damage to the slewing gear

These types of damage fall outside the terms of warrantee of SENNEBOGEN Maschinenfabrik GmbH.

The machine operator is wholly liable for any damage or consequential damage resulting, for example, from diminished braking effect!

WARNING
Never rotate the upper structure when the slewing gear parking brake is applied.

Note
The slew gear brake is applied automatically as soon as

- The left control lever is in neutral for about 4 seconds
- the safety lever is pulled back
- the engine is switched off (e.g. emergency shut down, ignition key).

In adverse conditions it may take 30 seconds before the full braking effect is applied.

Activate the slew gear brake

Operate switch (1) to the ”left” on left hand control panel.
The slewing gear parking brake is engaged; the switch lights up.

Release slew gear brake

Operate switch (1) to the ”right” on left hand control panel.
When the swinging movement is activated with the left control lever, the automatic slewing gear parking brake is released and the light on the switch goes out.

https://cranemanuals.com

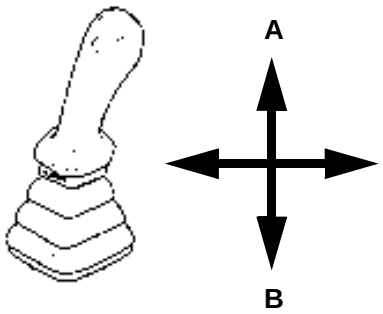
5.6.6 Lifting/lowering loads

Observe the following safety notes:

WARNING

- A suspended load is an accident risk!
  Always lower the load when work is interrupted.
  Never leave the driver's cab when a load is suspended.
- Activate overload warning device.
- Do not carry out any form of work which will affect the stability of the machine!
- Attachments (e.g. grab) and load elements can swing. Proceed with utmost caution.
- Observe danger area.

The load is lifted or lowered with the *left* control lever and/or with the *right* control lever.

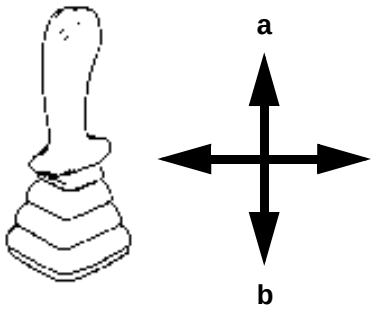


Control lever, left

Movement directions:

A Lift load (stick extend)

B Lower load (stick retract)



Right control lever

Movement directions:

a Lower load (stroke down)

b Lift load (stroke up)

Stick speed

The stick speed depends on the:

- Speed of the drive engine
- Inclination of the left control lever.

Hoisting speed

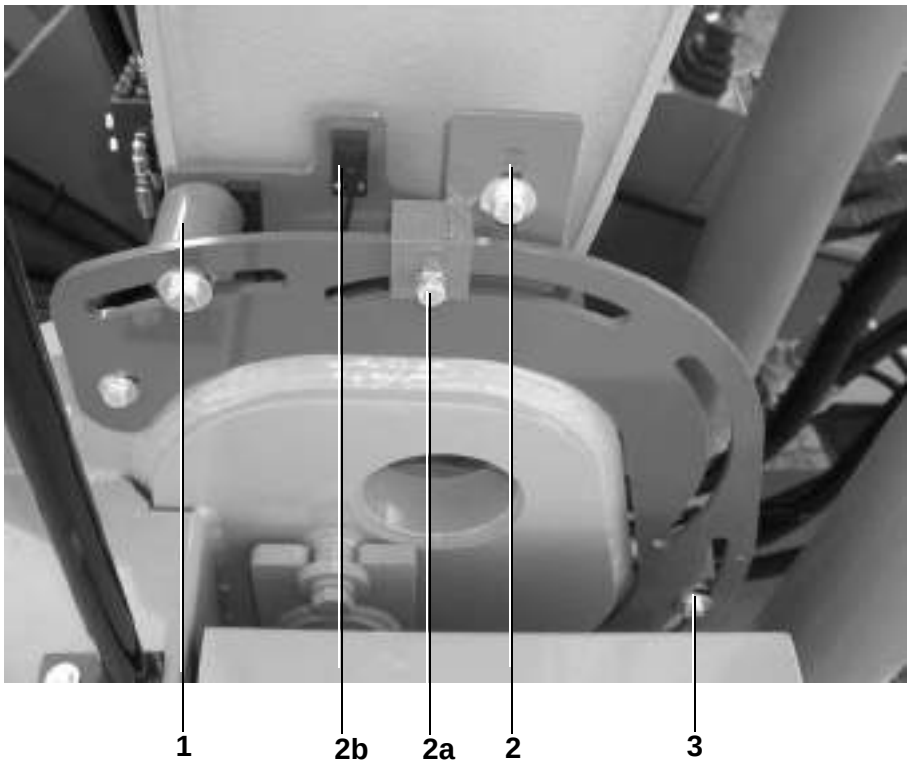
The hoisting speed is dependent on the:

- Speed of the drive engine
- Inclination of the right control lever.

https://cranemanuals.com

5.6.7 Limit shutdown - compact boom

The *limit shutdown compact boom* can be used to limit the ”Stroke up” movement of the compact boom.



1 Limit shutdown - stroke up

2 ”Stroke up” hoisting limit (optional)

2a Terminal screw

2b Sensor

3 Limit shutdown – stroke down

Limit shutdown

Limit shutdown prevents hydraulic cylinders from moving against the end stop.

DANGER
Under no circumstances should the setting for limit shutdown made in the factory (1, 3) be changed!
This setting may only be adjusted by SENNEBOGEN Customer Service or an authorized SENNEBOGEN service partner!

https://cranemanuals.com

The following types of damage may occur if the limit shutdown is changed independently:

- Wear on the cylinder bearing points and boom.
- Damage to hydraulic cylinders.
- Increased wear on the machine.

These types of damage fall outside the terms of warrantee of SENNEBOGEN Maschinenfabrik GmbH.

The machine operator is wholly liable for any such damage or consequential damage!

Hoisting limit (optional)

You can use the optional *hoisting limit* (2) to limit the ”stroke up” of the compact boom. This may be useful:

- near power lines (see Section 1.6.1)
- in buildings with limited height
- under bridges
- with other attachments supplied by SENNEBOGEN in some cases.

How to adjust the hoisting limit:

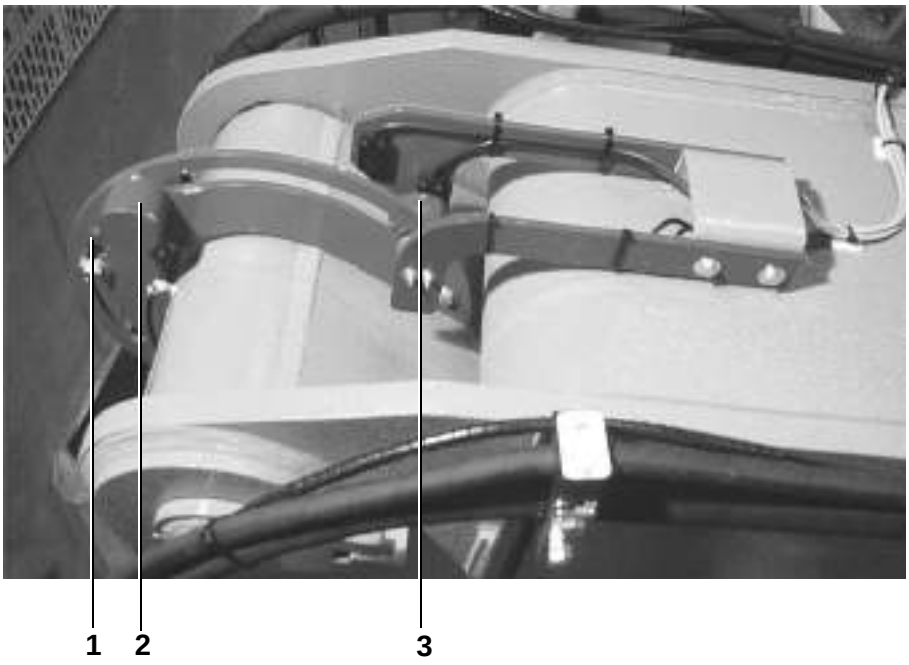
1	Carefully move the compact boom to just below the maximum height limit (maintain safety distance!).
2	Loosen the terminal screw (2a).
3	Move the hoisting limit (2) until the sensor (2b) responds (LED on the sensor goes out).
4	Tighten the terminal screw (2a).
5	Turn on the Flip switch *Lift limit* at the left of the control panel.
6	Carefully check the setting and repeat if necessary.

Note
The optional hoisting limiter (2) cannot be bypassed.

https://cranemanuals.com

5.6.8 Limit shutdown - grabbing stick

You can use the *limit shutdown grabbing stick* to limit the ”Stick extend” movement.



1 Limit shutdown – stick extend

2 ”Stick extend” hoisting limit (optional)

3 Safety limit shutdown ”Stick retract”

Limit shutdown

Limit shutdown prevents hydraulic cylinders from moving against the end stop.

DANGER
Under no circumstances should the setting for limit shutdown made in the factory (3) be changed!
This setting may only be adjusted by SENNEBOGEN Customer Service or an authorized SENNEBOGEN service partner!

https://cranemanuals.com

The following types of damage may occur if the limit shutdown is changed independently:

- Wear on the cylinder bearing points and boom.
- Damage to hydraulic cylinders.
- Increased wear on the machine.

These types of damage fall outside the terms of warranty of SENNEBOGEN Maschinenfabrik GmbH.

The machine operator is wholly liable for any such damage or consequential damage!

Hoisting limit (optional)

You can use optional *hoisting limit* (2) to limit the ”Stick extend” of the grabbing stick. This may be useful:

- near power lines (see Section 1.6.1)
- in buildings with limited height
- under bridges
- with other attachments supplied by SENNEBOGEN in some cases.

How to adjust the hoisting limit:

1	Carefully extend the grabbing stick to just below the maximum height limit (maintain safety distance!).
2	Loosen the terminal screw for the hoisting limit (2).
3	Move the hoisting limit (2) until the sensor responds (LED on the sensor goes out).
4	Tighten the terminal screw (2).
5	Turn on the Flip switch *Lift limit* at the left of the control panel.
6	Carefully check the setting and repeat if necessary.

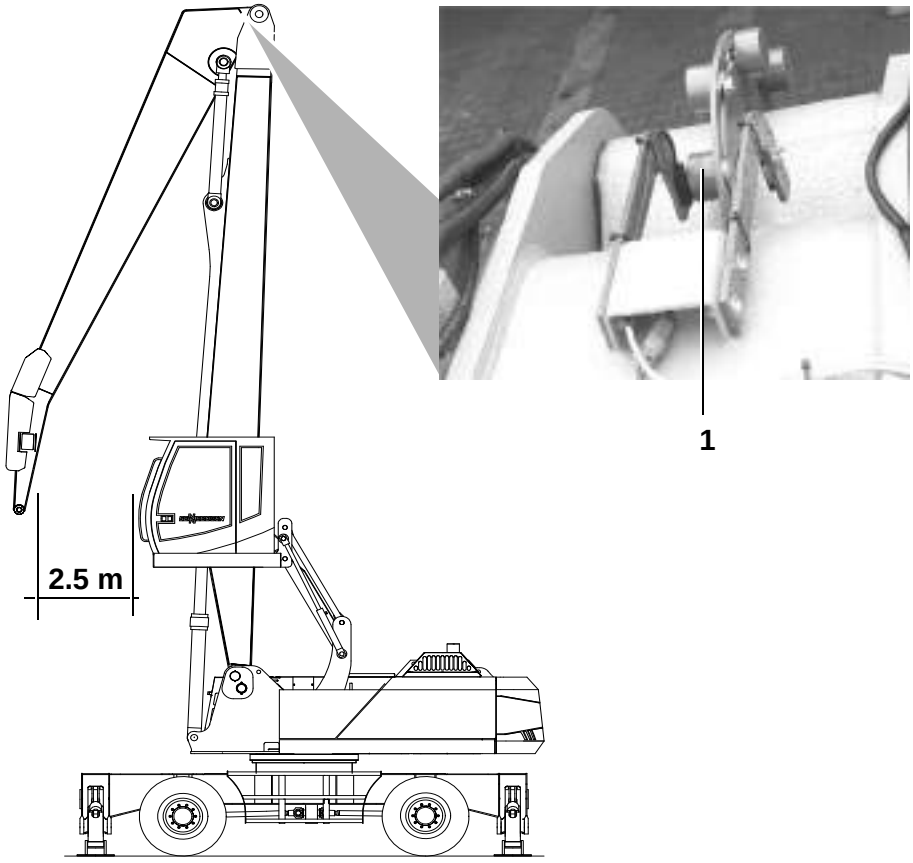
Note
The optional hoisting limiter (2) cannot be bypassed.

https://cranemanuals.com

Safety limit shutdown "Stick retract" adjust

The "Stick retract" safety limit shutdown is adjusted as follows in the factory:

- Stick retract: Stick (without attachment) about 2.5 m in front of lowered cab



DANGER

Danger of lethal injuries if the "Stick retract" (1) safety limit shutdown is incorrect!

Attachments and parts of the load can penetrate the driver's cab. The basic factory setting must always be adapted to the mounted attachment (for example a gripper). Operating with an incorrectly set stick retract safety shutdown (1) is at the sole responsibility of the machine operator.

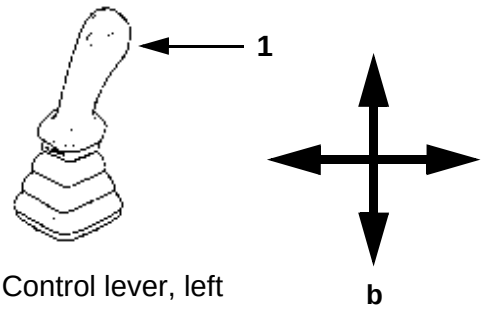
1	Completely lower driver's cab.
2	Carefully retract the stick with mounted attachment until the required safety clearance between the attachment and cab is reached. Take into consideration the pendulum swing of the attachment and load!

https://cranemanuals.com

3	Lower the boom.
4	Loosen the terminal screw for safety limit shutdown (1).
5	Move the safety limit shutdown (1) until the sensor responds (LED on the sensor goes out).
6	Tighten the terminal screw.
7	Check the setting and repeat if necessary.

5.6.9 Bypassing the ”Stick retract” safety limit shutdown

In exceptional circumstances it may be necessary to move the stick beyond the safety limit shutdown (bypassing the ”Stick retract” safety limit shutdown).



Control lever, left

DANGER
Danger of death by bypassing the safety limit shutdown ”Stick retract”!
Attachments and load elements can penetrate the driver's cab.
Proceed with utmost caution.
Watch attachments and load constantly. Operation in this mode is at the sole responsibility of the machine operator.

1	Press and hold pushbutton (1) on left-hand control lever.
2	Pull left control lever with extreme caution in direction ”b”. Ensure that the cab does not become damaged.

Note
The optional hoisting limiter (2) cannot be bypassed.

https://cranemanuals.com

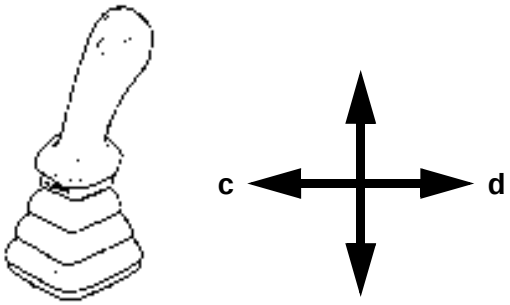
5.6.10 Grab operation

Observe the following safety notes:

WARNING

- A suspended load is an accident risk!
  Always lower the load when work is interrupted.
  Never leave the driver's cab when a load is suspended.
- Activate overload warning device.
- Do not carry out any form of work which will affect the stability of the machine!
- Attachments (e.g. grab) and load elements can swing. Proceed with utmost caution.
- Observe danger area.

The grab is opened/closed using the *right* control lever.



Movement directions:

c Close grab

d Open grab

Note

If joystick steering is activated the normal function of the control lever (grab open/close) is overridden.

https://cranemanuals.com

5.6.11 Refueling machine

The machine can be refueled in two ways:

- Manually
- Using a refueling pump

DANGER

- Fuel is damaging to health and lightly inflammable.
  Smoking and working near an open flame is strictly forbidden.
- Position the machine on a firm, even surface
- Only refuel when engine is shut down!
- Fuel must not ingress ground or waterways.
  Always ensure that fuel does not overflow when refueling.
- Before filling, the fluid level must be determined in the tank - the amount of fuel that the tank can taken on.
- When fuelling from the tank vehicle, the maximum tanking speed limit of 200 l/min (52 U.S.GPM) applies, as it could otherwise result in an overflow of the fuel.
- The filling procedure must be monitored at all times - no matter how the filling is done.

Note
Also observe the notes on the fuel system in the manual of the engine manufacturer.

Manually

1	Lower suspended loads and stick to the ground.
2	Shut down the engine.

3	Open left hand side door.

https://cranemanuals.com

4	Open cap (1) of filler neck.
5	Clean strainer.
6	Insert funnel in filler neck.
7	Carefully fill fuel through the funnel.
8	Reclose cover (1) and side doors.

Using a refueling pump

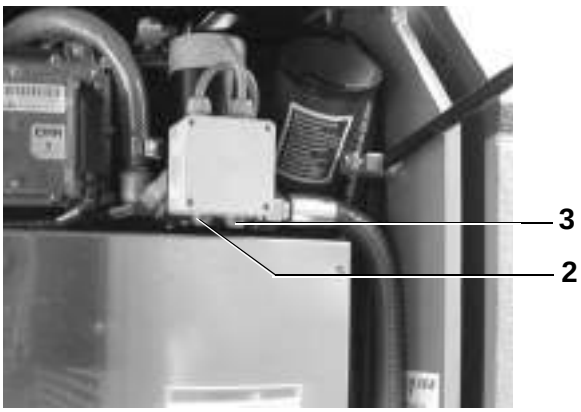
1	Lower suspended loads and stick to the ground.
2	Shut down engine.
3	Move key switch to the ”P” position.
4	Open service access doors.
5	Open cover (2) of filler strainer. This will allow air to escape from the fuel tank.

DANGER
If the cap (1) is not open, excess pressure can build up in the tank while it is being filled. The tank can become deformed or can burst and potentially cause damage to property or injure personnel. Spilled fuel also causes environmental damage.

6	Insert refueling hose (1) in the external fuel container.

Note
Danger of cavitation!
Ensure that the maximum suction head of 3 m is not exceeded.

https://cranemanuals.com



7	Switch on refueling pump with the green button (2). The tank is automatically filled.

CAUTION
Ensure that the pump does not run dry (> 30 s).
Switch off refueling pump with the red button (3) if necessary to prevent damage.

8	Monitor fuel level at inspection glass of fuel tank. Switch the pump off with the red button (3) as soon as the tank is full.
9	Remove refueling hose from the external fuel container and stow securely.
10	Re-close cover of filler strainer (2).
11	Re-close maintenance hatches.

Check the following points if the refueling pump does not start after ca. 5 seconds:

1	Is the battery charged?
2	Are all fuses in order?
3	Is the suction side free of leaks?
4	Is the maximum suction head of 3 m not exceeded?

https://cranemanuals.com

6 Monitoring, care and cleaning

WARNING
The work described below must be carried out by trained and instructed specialist personnel.

More extensive maintenance tasks are described in a separate manual.

DANGER

Danger to life!
There is a risk of serious injury or even death to persons using the machine or in its vicinity if it moves suddenly or is started unintentionally. Observe the following:

- Place the machine on a firm base, if necessary set back from the edge of the excavation.
- Lower suspended loads and booms to the ground.
- Apply the brake.
- Switch off machine and secure against unauthorised re-starting.
- Use a chock to stop the machine from rolling away.

https://cranemanuals.com

6.1 Safety notes

WARNING

- The tasks described may only be carried out by trained and instructed specialist personnel.
- Wear personal protection equipment (e. g. safety helmet, ear protection, protective gloves, safety boots).
- Observe accident-prevention and safety regulations.
- Lower suspended loads and boom to the ground.
- Pull left safety lever to the rear.
- Shut down the machine and secure against unauthorized restarting before starting with any work.

- Place warning sign on operating elements.
- Smoking or handling open flame is forbidden.
- Use appropriate safe climbing aids or work platforms.
- Stay clear of rotating and moving parts.
- Relieve hydraulic system pressure before starting maintenance work (see Section6.5.5).
- Dispose of hydraulic oil in accordance with regulations.
- Wear protective gloves when working on steel wire rope.
- Only use genuine SENNEBOGEN spare parts.
- Only use oils and lubricants specified in the lubricants table.
- Do not lift heavy components by hand. Use lifting gear.
- For pneumatic tires:
  When inflating tires, maintain sufficient safety distance and use a tire cage.
- Keep the cab clean and tidy.

- Actuate the optional battery disconnecting switch, if applicable, to interrupt the power supply.
- When working near batteries, these are to be covered with insulating material; do not lay tools on the batteries.
- Replace all safety devices on completion of work.
- Carry out a functional test to ensure correct operation.

https://cranemanuals.com

DANGER

- Work on electrical equipment of the machine may only be carried out by an electrical specialist.
- Work on running gear, braking and steering systems may only be carried out by specifically trained specialists!
- Work on hydraulic systems may only be carried out by personnel with special knowledge and experience on hydraulics!
- After maintenance or repair tasks are complete, always make a visual and functional check as described in Section4.3.

https://cranemanuals.com

6.2 General notes

6.2.1 Cleaning work

Notes

- Ensure that the cleaning agents used do not damage the seals and components of the machine.
- Do not use aggressive cleaning agents.
- It is especially important to clean the noise suppression mats with neutral cleaning agents!
- Only use lint free cleaning cloths.
- Only use dry, filtered compressed air up to max. 2 bar.
- On completion of cleaning work, carry out a visual and functional check of the machine acc. to Section4.3.

WARNING

Electrical and electronic components such as generators, switch cabinets etc. must not come into direct contact with the water jet!

Wet cleaning of these components is prohibited!

When wet cleaning the machine, always make sure that the water does not come into contact with electrical or electronic components.

Water ingress can otherwise damage or destroy the machine electronics. This can result in sudden, uncontrolled operating movements.

https://cranemanuals.com

6.2.2 Oils and lubricants

Only use oils and lubricants approved by SENNEBOGEN. These are listed in Section 10.8 LUBRICANTS TABLE. The ambient temperature range for operating the machine can be between - 20 °C and +40 °C. If the temperature at the site lies outside this range, discuss this with SENNEBOGEN customer service before starting operation.

WARNING
Mixing oils, lubrication or operational materials of different types is not permitted!
Filling or mixing oils, lubricants or any other operational fluids (e.g. hydraulic oil, transmission oil, motor oil, coolant, etc.) of different types can lead to chemical reaction damage to machine components. This damage can in turn result in severe damage to property and to personal injuries.

Use oils, lubricants and operational fluids that are approved by SENNEBOGEN only.

Only mix oils, lubricants and operational fluids that are of the same type or identical (same specifications) from one manufacturer!

Oil diagnosis

A regular oil diagnosis helps to avoid unnecessary costs. A series of tests determines:

- Condition of the oil
- Amount of worn metal in the sample
- Wear rate of components

Recommended for hydraulic system.

Further information is available from SENNEBOGEN customer service.

Biologically degradable oils and lubricants

The use is expressly specified, as leakage of mineral-based oils and lubricants presents a danger to the environment. The use of environmental friendly lubricants is particularly mandatory in water or nature conservation areas.

Only synthetic, ester based bio oils may be used.

WARNING
Switching to bio oils and bio lubricants is only permitted after the agreement and written confirmation of SENNEBOGEN customer service.

https://cranemanuals.com

6.2.3 Welding work

WARNING

- Welding work must only be carried out by an authorised and qualified welding specialist.
- It is forbidden to carry out drilling or welding on
  - boom sections
  - load-bearing frame parts
  - the engine
  - the hydraulic tank
  - the fuel tank
  - parts feeding fuel and oil
- Cover vulnerable components with fireproof material.

Preliminary work

Before starting with the welding work, carry out the following preliminary work.

1	If necessary use the optional battery isolator switch to disconnect from the power supply.
2	Disconnect battery.
3	Secure the ground clamp of the welding unit directly to the component to be welded.

https://cranemanuals.com

6.3 Check list

Safety instructions

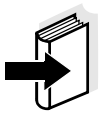
Observe the safety notes before starting work.

WARNING

- The work described below must be carried out by trained and instructed specialist personnel.
- Wear personal protection equipment (e. g. safety helmet, ear protection, protective gloves, safety boots).

Note

Shorter intervals may be necessary when operating in extreme conditions, e.g. high ambient temperatures.



Note

More extensive tasks are described in a separate maintenance manual.

Check list

Task	every 10 hrs run / daily	every 50 hrs run / weekly	Section
– Carry out visual and functional check according to manual.	☐	☐	4.3
– Cab – cab mounting: Check connecting and fastening components for damage (cracks, deformities, rust, etc.).	☐	☐	
– Check all fastenings (bolts, cotter pins, etc.) for tightness.	☐	☐	
– Pipe fracture safety device (optional): Visual check for damage and leak.	☐	☐	2.7
– Hydraulic cylinder: Visual check for damage and leak.	☐	☐	
– Check engine oil level. Observe intervals acc. to manual of engine manufacturer.	☐	☐	6.4.1
– Clean radiator.		☐	6.4.2
– Hydraulic system: Check oil level.	☐	☐	6.5.6

https://cranemanuals.com

Task	every 10 hrs run / daily	every 50 hrs run / weekly	Section
– Superfine filters: Check contamination indicator.	☐	☐	6.5.7
– Check and clean hydraulic oil cooler.		☐	6.5.8
– Check tire air pressure.		☐	6.6.2
– Tighten the wheel nuts.		☐	6.6.3
– Hub drive train: Check oil level.		☐	6.6.4
– Axle distribution gearbox: Check oil level.		☐	6.6.5
– Differential: Check oil level.		☐	6.6.6
– Lubricate the swiveling connection.	☐	☐	6.7
– Central lubrication system: Check to make certain it is filled.	☐	☐	6.7.1
– Slewing ring lubrication: Check the grease..	☐	☐	6.7.2
– Tighten slewing ring bolts.		☐	6.7.3
– Check cable connections of batteries and fuses.		☐	6.8
– Check heating filter.		☐	6.9
– Lubricate lubrication points.		☐	6.10

https://cranemanuals.com

6.4 Drive engine

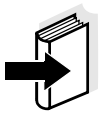
Safety instructions

Observe the safety notes before starting work.

CAUTION

- Only carry out maintenance or repair work with engine shut down and cooled.
- Secure machine against unauthorized restarting before starting with maintenance work.

- Waste oil must not enter into ground or waterways.
  Dispose of oil and oil filters in accordance with statutory regulations.
- Coolant must not ingress ground or waterways.
  Dispose of coolant in accordance with statutory regulations.
- After maintenance work on the engine, check that all safety devices have been fitted and all tools are removed from the engine.



Note

Also observe the notes and recommendations in the manual of the engine manufacturer.

https://cranemanuals.com

6.4.1 Checking the oil level

WARNING

- Danger of scalding!
  Proceed with utmost caution when draining hot oil.
- Waste oil must not ingress ground or waterways. Dispose of oil and oil filters in accordance with statutory regulations.

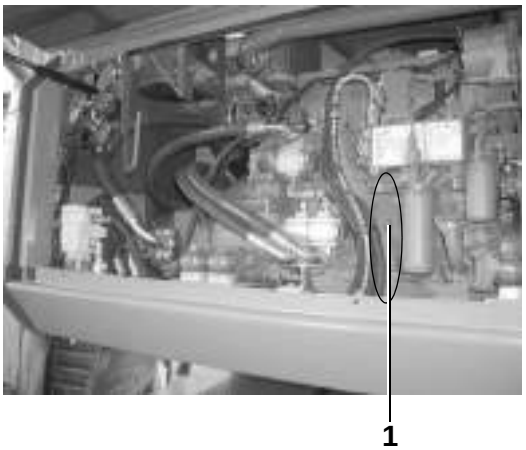
WARNING

Mixing oils, lubrication or operational materials of different types is not permitted!
Only mix oils, lubricants and operational fluids that are of the same type or identical (same specifications) from one manufacturer!

Note

Please also follow the guidelines and recommendations in the manual supplied by the engine manufacturer.

1	Position machine horizontally.
2	Run engine about min until the system is filled with oil.
3	Shut down drive engine.
4	Open front right maintenance hatch.



5	Pull out oil dipstick (1) and wipe off using a clean, fiber free cloth.

https://cranemanuals.com

6	Insert oil dipstick (1) as far as it will go and pull out again.
7	Checking the oil level: The oil level must lie between the lower marking (MIN) and the upper marking (MAX).
8	Top up engine oil if necessary.

https://cranemanuals.com

6.4.2 Cooler

Safety instructions

Observe the safety notes before starting work.

WARNING

- Danger of injury through rotating parts and through scalding!
  Only carry out maintenance work with drive engine shut down and cooled down cooling system.
- The coolant must not enter into the ground or waterways. Dispose of coolant in accordance with statutory regulations.

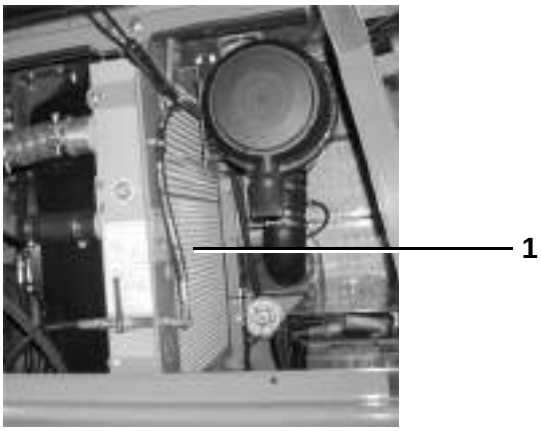
WARNING

Mixing oils, lubrication or operational materials of different types is not permitted!
Only mix oils, lubricants and operational fluids that are of the same type or identical (same specifications) from one manufacturer!

Coolant level indicator light

The coolant level is monitored by a sensor.
If the level falls below a certain point, a warning tone sounds. Top up coolant.

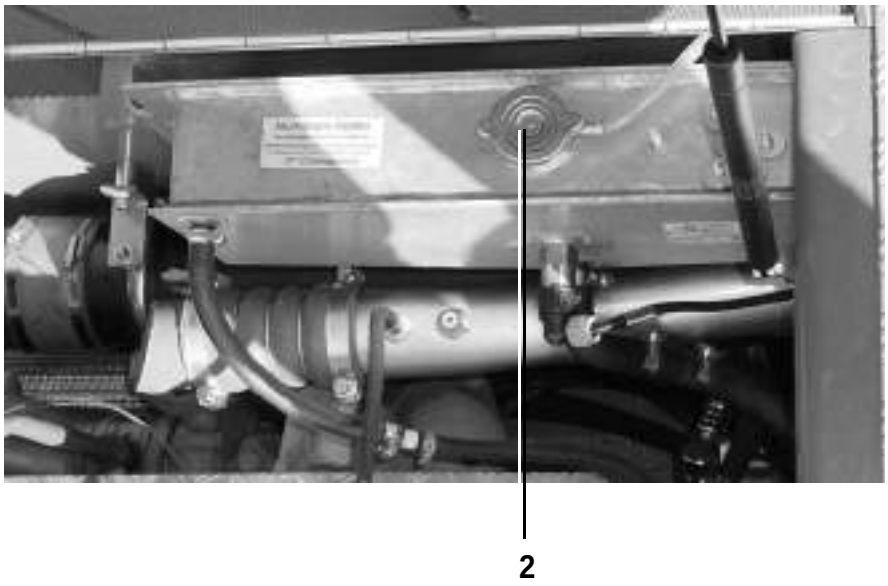
Cleaning radiator



1	Allow the drive engine and cooler (1) to cool down.
2	Open right maintenance hatch
3	Blow off lighter dust and dirt by using the fan reversal. For more information see Section5.3.2.
4	When there are heavy accumulations of dirt and dust, blow off cooling fins from the outlet side with dry, filtered compressed air (max. 2 bar). If contaminated with grease and oil, clean the cooling ribs with detergent.
5	Check radiator for leaks and damaged cooling fins.

https://cranemanuals.com

Checking the coolant level or antifreeze

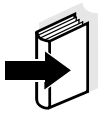


1	Allow drive engine and radiator to cool down.
2	Carefully open cap (2) of cooler equalization container in the engine compartment to allow the pressure to equalize.
3	Check antifreeze and coolant level, top up if necessary. The coolant must contain at least 50% antifreeze agent throughout the year.

Further information can be found in the separate maintenance instructions.

Coolant change intervals

SENNEBOGEN recommends changing the coolant every 2000 operating hours or max. 24 months. Whichever is first.



Note
Observe the instructions in the engine manufacturer’s instruction manual.

https://cranemanuals.com

6.5 Hydraulic system

6.5.1 Safety instructions

Observe the safety notes before starting work on hydraulic system.

DANGER

- Work on hydraulic systems may only be carried out by trained personnel with special knowledge and experience on hydraulics.
- Wear personal protection equipment (e.g. safety helmet, ear protection, protective gloves, safety boots).

- Warning of high oil pressure!
  The hydraulic system is subject to high pressure. Serious injuries can be caused by escaping hydraulic oil when loosening a hydraulic connection or when a leak occurs.
  Only carry out work on a depressurized hydraulic system!
- Relieve hydraulic system pressure before starting maintenance work (see Section6.5.5).
- The pilot control is equipped with a pressure accumulator, which remains under high pressure even after the engine is shut down. Therefore, depressurize the pressure accumulator.
- Danger of injury!
  Hydraulic oil escapes under high pressure when there are leaks. Hydraulic oil emerging under high pressure will penetrate the skin and cause severe injuries.
  Danger of infection. In the case of injury contact a physician immediately.
- Danger of injury from scalding
  The hydraulic oil can reach temperatures of 70°C and above. Only carry out maintenance work once the hydraulic oil system has cooled down.
- Danger of injury from rotating parts.
  Only carry out maintenance work when the engine is switched off, and then only if you are sure that the fan wheel has come to a stop and there is no risk of automatic start-up.
  Before starting up again, ensure that:
  - No items (e.g. tools) are in the vicinity of the fan wheels or could fall into this area as a result of vibrations, for example
  - The protective features have been fitted.

https://cranemanuals.com

6.5.2 Hydraulic cylinder

Pressure cylinders are subject to slight leakage. Remove excess leakage residue with a cloth. Dispose of oilsoaked cloth as hazardous waste.
The sliding surfaces of the piston rods are chromeplated. Heavier leakage indicates damaged sliding surfaces or defective seals.

Cleaning hydraulic cylinders:

- Do not use sharp edged tools, caustic fluids or abrasives.
- Clean the piston rods regularly with a steam cleaner. Do not point the steam jet directly at the seal components.
- Apply preservative to extended piston rods after cleaning. This protects the surface from the effects of environment and weather.

6.5.3 Screw connections

Check hydraulic screw connections and couplings regularly to make sure there are no leaks. Seal points of leakage and remove oil residue. Leaking hydraulic oil endangers the environment and presents a hazard due to danger of slipping.

Always seal opened screw connections immediately at both sides with plugs.

6.5.4 Hydraulic hose lines

Storage and service life

Even when used correctly at permissible loads, hoses and hose lines are subject to natural wear and tear. Their service life is therefore limited.

The operator is responsible for ensuring that hose lines are replaced at suitable intervals, even when there are no obvious defects to be seen in the hose line.

Hose lines must be replaced at least every six years, including a maximum of two years storage time, where applicable.

Check

Hose lines should be inspected by a specialist technician at least once a year to ensure that they are functioning correctly.

Remedy any defects discovered immediately.

https://cranemanuals.com

Defects

Replace hose lines in the following cases (see also DIN 20066):

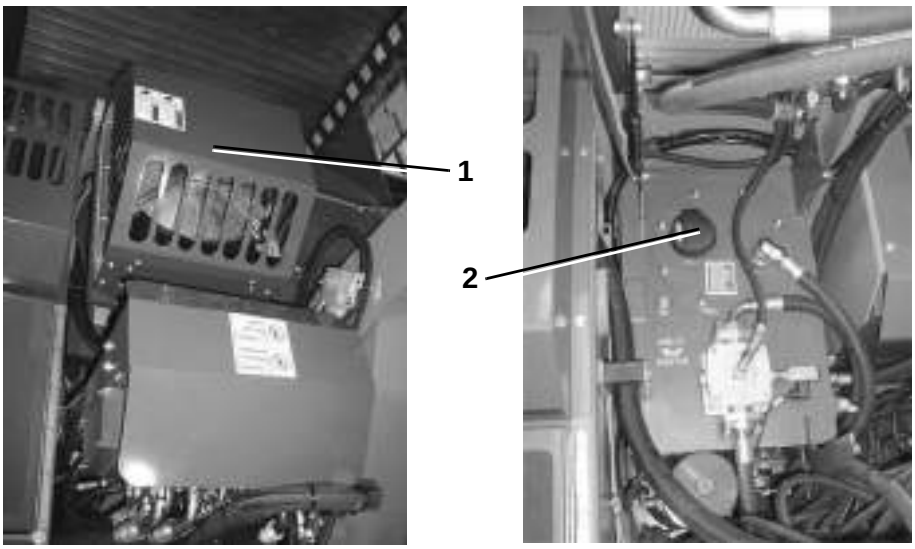
- Outer layer damaged as far as reinforcement (e.g. abrasion points, cuts, cracks);
- Outer layer brittle (cracks appearing in hose material);
- Deformation, which does not conform to the natural shape of the hose or hose line, both when under and not under pressure, or when bent (e.g. layer separation, bubbles forming);
- Leaks;
- Hose fittings damaged or deformed (sealing function affected);
- Hose has separated from fittings;
- Corrosion of fittings which reduces function and strength;
- Installation requirements ignored;
- Storage times and/or service life exceeded.

6.5.5 De-pressurizing hydraulic system

Depressurize the hydraulic system as follows:

1	Lower suspended loads and stick to the ground.
2	Shut down engine, move ignition key immediately back to the “1” position.
3	Move both control levers in the cab several times in all directions. This releases the pressure of the main hydraulics and the pressure in the pilot control pressure accumulator.
4	Pump the brake pedal several times. This releases the pressure in the pressure accumulator.
5	Open and close the parking brake. This releases the pressure in the pressure accumulator.
6	Activate the rotary selection switch for travel speed several times. This releases the pressure in the pressure accumulator.

https://cranemanuals.com



7	Fold up the covering (1).
8	Open screw cap (2) of hydraulic tank. This releases the residual pressure in the tank.

9	Connect the pressure gauge (maximum 600 bar) to all measurement connections.

Note
The pressure gauge must indicate 0 bar. If the pressure is not completely released, repeat points 2 to 6.

https://cranemanuals.com

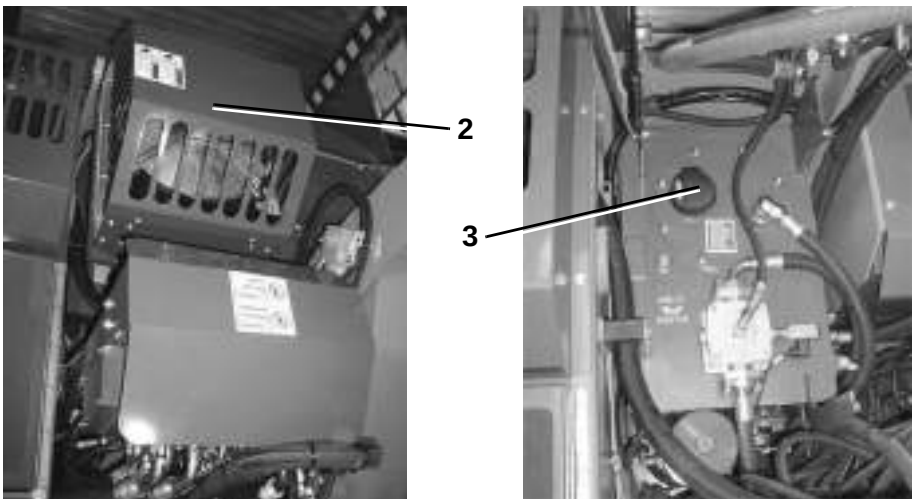
6.5.6 Checking oil level

WARNING
Mixing oils, lubrication or operational materials of different types is not permitted!
Only mix oils, lubricants and operational fluids that are of the same type or identical (same specifications) from one manufacturer!

1	Lower suspended loads and stick to the ground.
2	Position machine horizontally.
3	Fully retract all hydraulic cylinders.
4	Shut down drive engine.
5	Open right maintenance hatch.

6	Check oil level at the oil level indicator (1): The oil level must reach to the upper marking (MAX).

https://cranemanuals.com



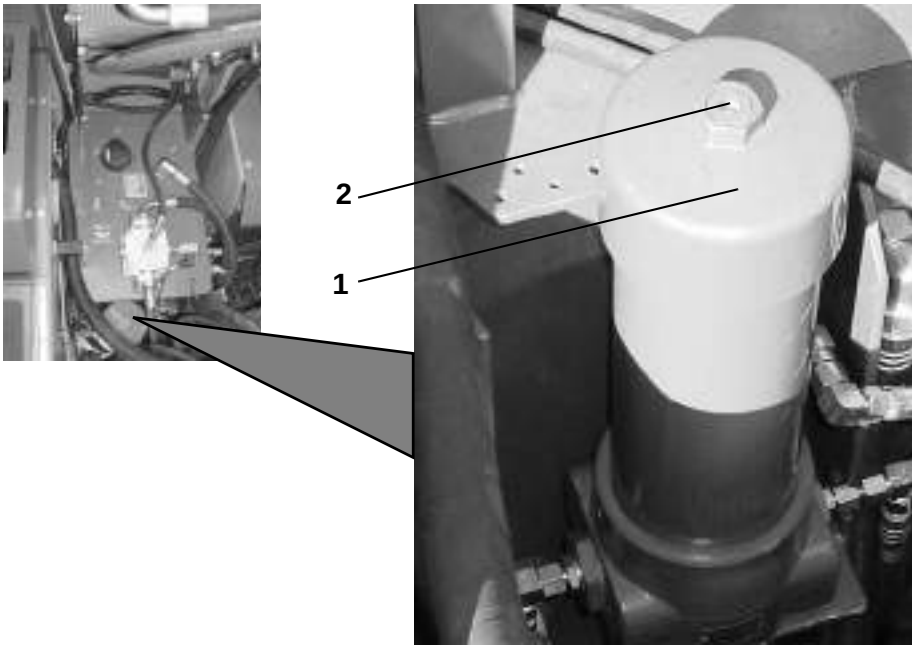
7	Top off hydraulic oil if necessary: – Fold up the covering (2). – Unscrew the screw cap (3) of the oil filler neck. – Top up hydraulic oil and recheck. – Retighten screw cap (3). – Fold the covering (2) back down.

https://cranemanuals.com

6.5.7 HydroClean – superfine filter system (optional)

Note
The dirt level of the HydroClean filter insert is monitored by the SDS. The filter insert must be changed when the corresponding warning light comes on.

Filter element change



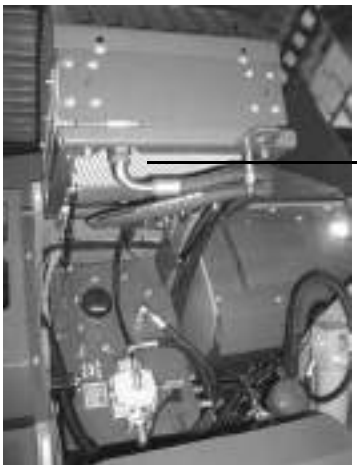
1	Depressurize hydraulic system acc. to Section6.5.5.
2	Unscrew the cover (1) with the built-in outer socket head screw.
3	Pull out filter element.
4	Dispose of filter element as hazardous waste.
5	Clean components, check seal and exchange if necessary.
6	Insert new filter element.
7	Screw the cover (1) back on.
8	Start the drive engine.
9	Unscrew the socket head screw (2) somewhat until the ventilation opening becomes free.
10	As soon as oil comes out, screw the socket head screw (2) closed again.
11	Turn off the drive engine and check for leaks.

https://cranemanuals.com

6.5.8 Checking and cleaning hydraulic oil cooler

WARNING
Danger of injury through rotating parts!
Only carry out maintenance tasks when the drive engine is switched off and the hydraulic system has cooled off.

1	Open the covering (1).



2	Blow out cooling fins (2) with dry, filtered compressed air (max. 2 bar). Take care not to damage cooling fins.
3	Remove grease and oil with detergent. Collect cleaning fluid and dispose of as hazardous waste.
4	Check cooler for leaks and bent or damaged cooling fins.

https://cranemanuals.com

6.6 Undercarriage

WARNING

- Danger of injury through rotating parts!
  Only carry out maintenance work with drive engine shut down.
- Oil must not ingress ground or waterways.
  Dispose of waste oil in accordance with statutory regulations.

6.6.1 Cleaning and lubricating

1	Position machine horizontally.
2	Shut down drive engine.
3	Clean tires and running gear using a steam cleaner.
4	Lightly grease guides and pins.
5	Lubricate all lubrication points (see Section).

6.6.2 Tire air pressure (pneumatic tires)

DANGER

When inflating tires, maintain sufficient safety distance and use a tire cage.

Tire size	**Air pressure**	
	bar	**psi**
10.00-20	7.5	108.78
12.00-20	9	130.53
12.00-24	10	145.04
395/85	8.5	123.28

https://cranemanuals.com

6.6.3 Tightening wheel nuts

Check all wheel nuts to make certain they are correctly seated and tight. The tightening torque is 650 Nm. Use a torque wrench.

6.6.4 Hub drive train

1 Oil filler screw

2 Oil drain screw

WARNING
Mixing oils, lubrication or operational materials of different types is not permitted!
Only mix oils, lubricants and operational fluids that are of the same type or identical (same specifications) from one manufacturer!

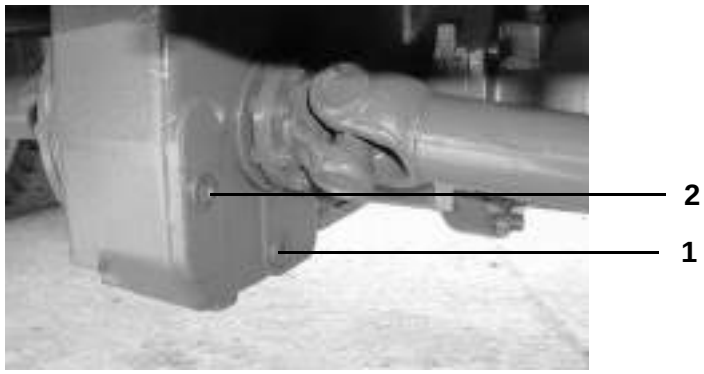
Checking oil level

1	Position machine horizontally.
2	Slew hub until the oil drain screw (2) is bottom (vertical position).
3	Shut down drive engine.
4	Screw out oil filler screw (1). The oil level must reach up to the lower edge of the oil filler screw, top up if necessary.

https://cranemanuals.com

5	Clean components, check seal and exchange if necessary.
6	Retighten oil filler screw (1).
7	Repeat the procedure on all remaining hubs.

6.6.5 Axle distribution gearbox



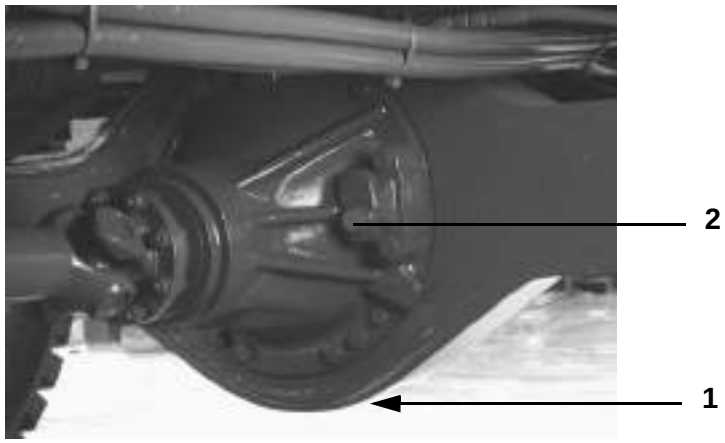
WARNING
Mixing oils, lubrication or operational materials of different types is not permitted!
Only mix oils, lubricants and operational fluids that are of the same type or identical (same specifications) from one manufacturer!

Checking oil level

1	Bring machine up to operating temperature.
2	Position machine horizontally.
3	Turn off the engine. Wait about 10 minutes for the oil to collect in the axle distribution gearbox.
4	Clean exterior of axle distribution gearbox using a cloth.
5	Screw out oil filler screw (2). The oil level must reach up to lower edge of filler opening, top up if necessary.
6	Clean components, check seal and exchange if necessary.
7	Re-tighten oil filler screw (2).

https://cranemanuals.com

6.6.6 Differential



WARNING
Mixing oils, lubrication or operational materials of different types is not permitted!
Only mix oils, lubricants and operational fluids that are of the same type or identical (same specifications) from one manufacturer!

Checking oil level

1	Bring machine up to operating temperature.
2	Position machine horizontally.
3	Turn off the engine. Wait about 10 minutes for the oil to collect in the differential.
4	Clean exterior of differential using a cloth.
5	Screw out oil filler screw (2). The oil level must reach up to lower edge of filler opening, top up if necessary.
6	Clean components, check seal and exchange if necessary.
7	Retighten oil filler screw (2).

https://cranemanuals.com

6.7 Swiveling connection

6.7.1 Central lubrication system

The central lubrication system automatically lubricates the running track of the swiveling connection. The lubrication cycle is preset in the factory.

Note
The preset lubricating cycle can be shortened. For more information, see the documentation on the CENTRAL LUBRICATION SYSTEM in Chapter 9 of the manual.

Shorter lubricating times are required,

- in the tropics,
- when humidity is high,
- under very dusty and dirty conditions,
- if the temperature changes significantly,
- with a continuous swinging movement.

1 Lubricant container

2 Lubricating nipple – top off grease

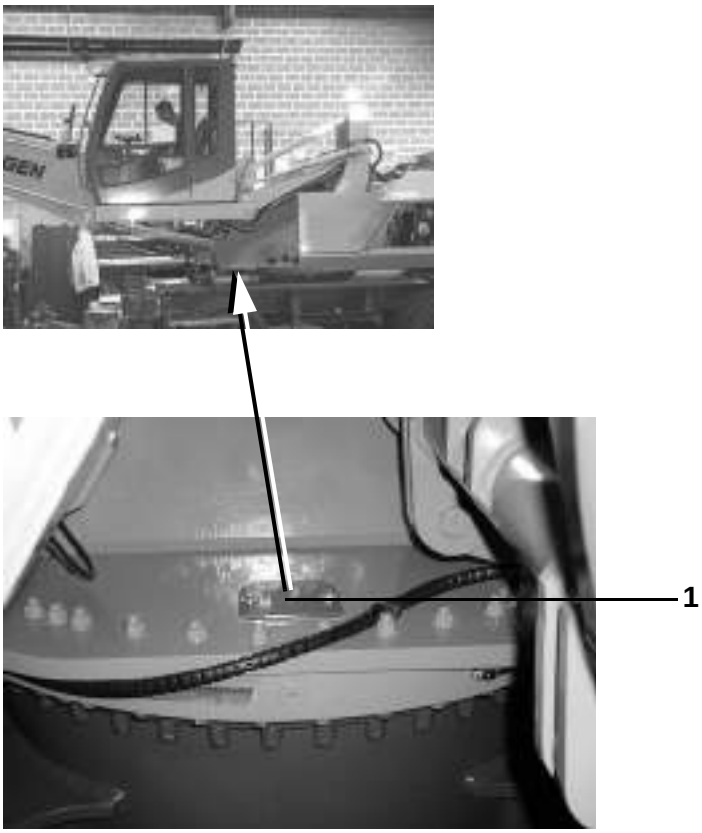
Actuate running track lubrication manually

In addition to the preset lubrication cycle, lubrication can also be activated manually.

1	Move the switch on the control panel to the right:

https://cranemanuals.com

6.7.2 Check the grease



WARNING
Mixing oils, lubrication or operational materials of different types is not permitted!
Only mix oils, lubricants and operational fluids that are of the same type or identical (same specifications) from one manufacturer!

1	Rotate the upper structure 360° counterclockwise starting from travel direction.
2	Rotate the upper structure further in counterclockwise direction until the boom is at right angles to the undercarriage (90° to travel direction.
3	Rotate the upper structure 90° in clockwise direction (boom is beeing set in driving direction):
4	Remove the cover (1).
5	You must see a „peak of grease“ (min. 0.8 inch (20mm)). Add more grease if necessary.
6	Refit the cover (1).

https://cranemanuals.com

6.7.3 Retighten the slewing ring screws

DANGER
Risk of fatality!
Defective slewing ring screws may cause the upper structure to tip over. It is therefore essential to observe maintenance intervals!

- Tighten slew ring bolts each week with torque wrench. Observe tightening torques according to Section6.12.
- Check or change slewing ring bolts every 5000 hrs run / every 5 years.

Note:
Testing must be performed by an expert from an independent specialist company / independent institute.
Unrestricted use of the slewing ring bolts must be proven by means of a certificate.

The slewing ring bolts must be changed otherwise.

Corroded or damaged bolts can shear and lead to the upper structure tipping over.

- Do not tighten corroded or damaged bolts, replace immediately with new bolts.
- Adhere without fail to the number and diameter of bolts.
- Only use genuine SENNEBOGEN spare parts!
- Contact SENNEBOGEN customer service if you have any further queries.

1	Shut down drive engine.
2	Retighten the slewing ring screws with a torque wrench using the cross.

https://cranemanuals.com

Note
The tension of the bolt tightened first is affected by the tensioning of the other bolts. It is therefore necessary to make at least two full turns. Bolts over M30 should preferably be tightened with a hydraulic socket wrench.

https://cranemanuals.com

6.8 Electrical system

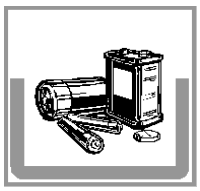
DANGER

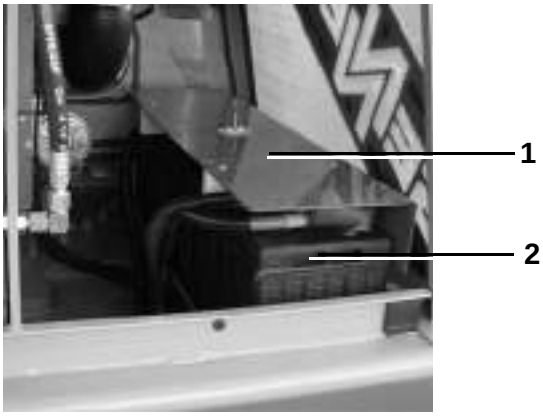
- Work on electrical system must be carried out by trained electrical technicians.

6.8.1 Batteries

DANGER

- Danger of explosion!
  Smoking and handling of open flame is forbidden. Avoid sparks in vicinity of the battery.
- Danger of acid burns!
  Wear eye protection and gloves.
  Do not tilt battery. Battery acid is caustic and must not come into contact with eyes or skin.
- Do not lay tools on the battery.
- Disconnect the batteries before starting welding work.
- Do not interchange battery connections.
- Dispose of old batteries as hazardous waste.





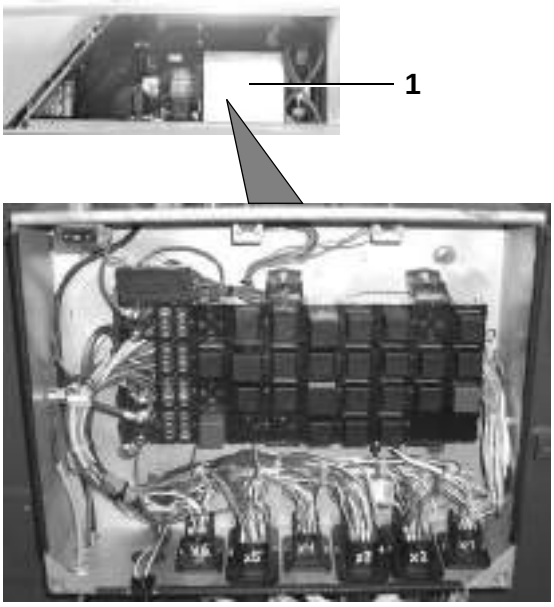
Check terminals and cable connections of batteries:

1	Open the right service access door.
2	Turn off the battery disconnecting switch if applicable.
3	Remove battery cover (1).
4	Clean terminals and cable connections of batteries (2). Check for tightness and preserve with terminal grease.
5	Replace battery cover.

https://cranemanuals.com

6.8.2 Fuses and relays

DANGER
Fire hazard!
Do not repair fuses and relays. Always insert new fuses with the same ampere value.



1	Shut down engine.
2	Open the left maintenance door.
3	Remove the cover of the fuse box (1).

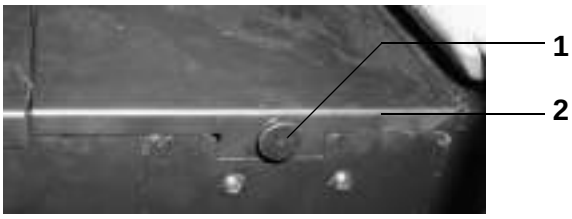
Note
You will find an overview of fuse and relay assignment in a table on the cover of the fuse box.

4	Replace defective fuse.
5	Check contacts, clean oxidized contacts.
6	Replace cover of fuse box (1).
7	Close the left maintenance door.

https://cranemanuals.com

6.9 Heating

Cleaning filter element



1	Screw out knurled screws (1) behind driver's seat.
2	Remove cover (2).

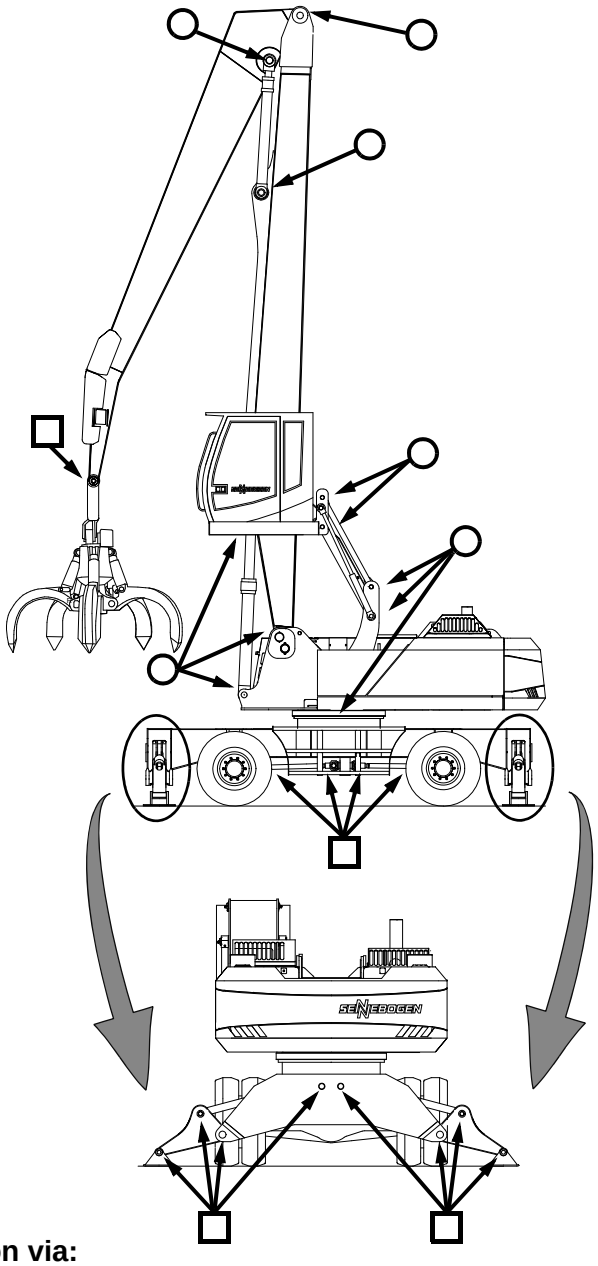
3	Remove filter element (3).
4	Beat out filter element or carefully blow out with compressed air.
5	Insert filter element. Ensure correct position. Clean air must exit in direction of travel.

https://cranemanuals.com

6.10 Lubricating the machine

Clean the lubricating nipple before lubricating. Remove extraneous grease.

Lubrication schedule



Lubrication via:

○ Central lubrication system (optional)
On the standard versions without optional central lubrication system, lubrication nipples are fitted at the lubrication points.

□ Lubrication nipple
The lubrication nipples are provided with a red protective cap.

https://cranemanuals.com

6.11 Capacities

The following values are guidelines. The level specified on the corresponding components is authoritative.

WARNING
Mixing oils, lubrication or operational materials of different types is not permitted!
Only mix oils, lubricants and operational fluids that are of the same type or identical (same specifications) from one manufacturer!

System	Capacity
Drive engine	see manufacturer's instructions
Fuel tank	About 300 l
Hydraulic tank	About 250 l
Hydraulic system, complete	About 320 l
Axle distribution gearbox	About 3.2 l
Differential	
● front	About 12.0 l
● rear	About 14.0 l
Hub drive train	
● front	About 2.0 l each
● rear	About 2.0 l each
Slewing ring lubrication	as required
Central lubrication system	as required
Lubrication points	as required

https://cranemanuals.com

6.12 Tightening torque for bolts

Note
For certain securing bolts on the undercarriage, values differing from those listed in this table may apply. Please observe notes in the respective sections.

Strength class 8.8

Coarse thread		Fine thread	
Bolt	Tightening torque M_A [Nm]	Bolt	Tightening torque M_A [Nm]
M4	2.7	M8x1	24
M5	5.4	M10x1	50
M6	9.3	M10x1.25	47
M8	23	M12x1.25	84
M10	45	M12x1.5	81
M12	77	M14x1.5	135
M14	125	M16x1.5	205
M16	190	M18x1.5	305
M18	275	M20x1.5	430
M20	385	M22x1.5	580
M22	530	M24x2	720
M24	660	M27x2	1050
M27	980	M30x2	1450
M30	1350		
M33	1850		
M36	2350		

https://cranemanuals.com

Strength class 10.9

Coarse thread		Fine thread	
Bolt	Tightening torque M_A [Nm]	Bolt	Tightening torque M_A [Nm]
M4	4.0	M8x1	36
M5	7.9	M10x1	73
M6	14	M10x1.25	69
M8	33	M12x1.25	125
M10	66	M12x1.5	120
M12	115	M14x1.5	195
M14	180	M16x1.5	300
M16	280	M18x1.5	435
M18	390	M20x1.5	610
M20	550	M22x1.5	830
M22	750	M24x2	1050
M24	950	M27x2	1500
M27	1400	M30x2	2100
M30	1900		
M33	2600		
M36	3300		

https://cranemanuals.com

Strength class 12.9

Coarse thread		Fine thread	
Bolt	Tightening torque M_A [Nm]	Bolt	Tightening torque M_A [Nm]
M4	4.7	M8x1	42
M5	9.2	M10x1	86
M6	16	M10x1.25	81
M8	39	M12x1.25	145
M10	77	M12x1.5	140
M12	135	M14x1.5	230
M14	210	M16x1.5	350
M16	330	M18x1.5	510
M18	455	M20x1.5	710
M20	640	M22x1.5	960
M22	880	M24x2	1200
M24	1100	M27x2	1750
M27	1650	M30x2	2450
M30	2200		
M33	3000		
M36	3900		

https://cranemanuals.com

https://cranemanuals.com

7 Transportation

Preliminary work

Transport the machine using a low loader. The following preliminary work is necessary:

- Select a suitable transport vehicle.
  Note dimensions and weight of the machine according to Section 7.2.
- Clean machine.
- Fold boom / stick into transportation position.
- Lock upper structure and undercarriage according to Section 7.3.
- Secure outrigger acc. to Section 5.6.4.
- If necessary, remove working tools.

7.1 Safety instructions

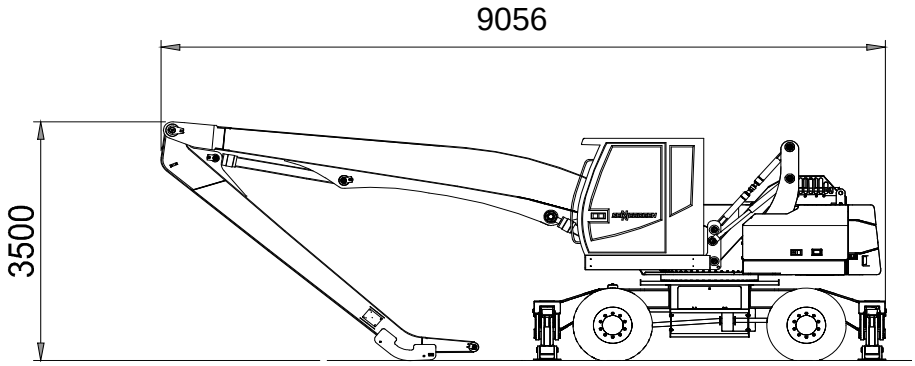
WARNING

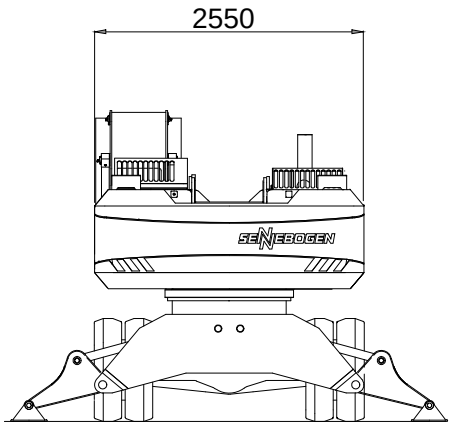
- In Germany:
  Loading and transportation work is only to be carried out by authorized specialist personnel in accordance with VBG 40, §48 and Federal Motor Vehicle Safety Standards (StVo) §22.
- Observe valid regulations for securing of loads.
  The respective transport operator is *always responsible for the transportation of machine and accessories*.
- When loading and transporting, secure the machine and its working equipment from unintended movement.
- Clean running gear of machine sufficiently from mud, snow and ice, so that ramps can be accessed without danger of sliding.
- Provide low loader access ramps with wooden planks.
- Check conditions of route before starting journey.
- Only transport machine on intended securing and lifting points.
- Ensure that the machine does not present any hazards to other road users.
- Wear personal protection equipment (e. g. safety helmet, protective gloves, safety boots).
- Report any damage that occurred during shipping to SENNEBOGEN customer service immediately.

https://cranemanuals.com

7.2 Dimensions and weights

7.2.1 Transportation dimensions





7.2.2 Weights

Note
The weight of the machine may deviate from these figures due to optional attachments.

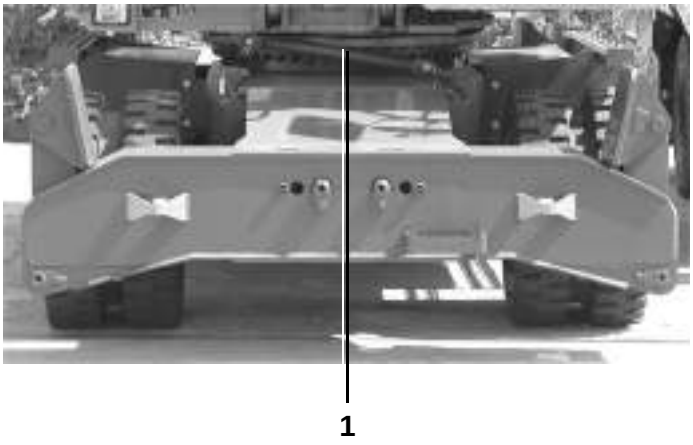
Machine	Weight	About 22 metric tons

with 104 kW (141 HP) diesel motor, 4-point outrigger, compact loading equipment.

https://cranemanuals.com

7.3 Lock upper structure

1	Move the upper structure to driving position.
2	Apply slewing gear parking brake.



3	Pin and secure the locking rod (1) on undercarriage and upper structure.

https://cranemanuals.com

7.4 Disconnect electrical system from battery

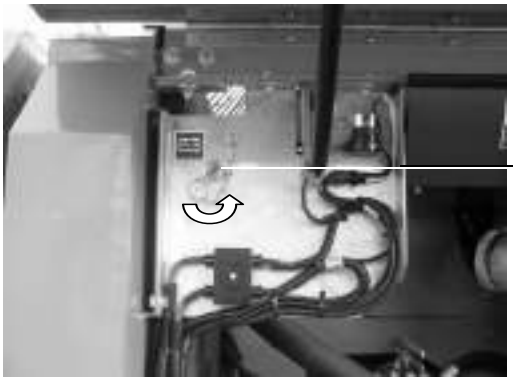
If the machine is idle for an extended period or for long transport distances, the electrical system must be isolated from the battery using the mechanical battery isolator switch (optional).

WARNING

Do not switch off mechanical battery isolator switch if:

- the engine is still running
- or other electrical consumers are still switched on.

Doing so may damage the electrical system and its controller.



1	Open service access doors.
2	Turn the battery isolation switch (1) to the left (counter-clockwise) and extract. The electrical system is now isolated from the battery.
3	Close service access doors.

Note

If no mechanical battery isolation switch exists, the battery poles must be disconnected. Properly install the battery protective caps again.

1	Open service access doors.
2	IMPORTANT! Prevent short circuits! Disconnecting: 1. Disconnect the negative pole 2. Disconnect the positive pole Connecting: 1. Connect the positive pole 2. Connect the negative pole
3	Close service access doors.

https://cranemanuals.com

7.5 Lift machine

Safety instructions

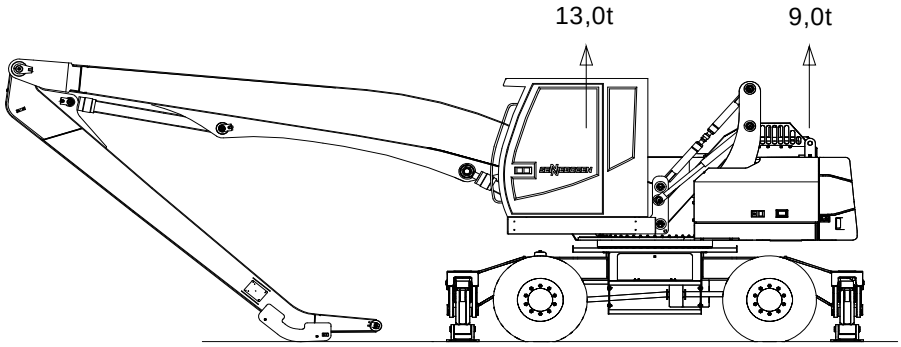
Observe the safety notes before starting work.

DANGER

- Sling machine only at the designated lifting points. The lifting points are marked green and have a green loading hook symbol.
- Ensure that the lifting equipment has a sufficient safe working load and a secure stability.

- The following are suitable as lifting equipment:
  - crane
  - telescopic crane
- Ensure that the slinging equipment has sufficient safe working load and is undamaged.
- The following are suitable slinging equipment:
  - chain suspensions
  - steel wire rope suspensions
  - round loops / sling devices
- Observe danger area!
  No persons must be beside, on or below the machine.

Procedure



1	Select a suitable hoisting crane and slinging equipment. Observe weight and center of gravity of the machine.
2	Secure slinging equipment to lifting points.
3	Hoist the machine carefully.

DANGER

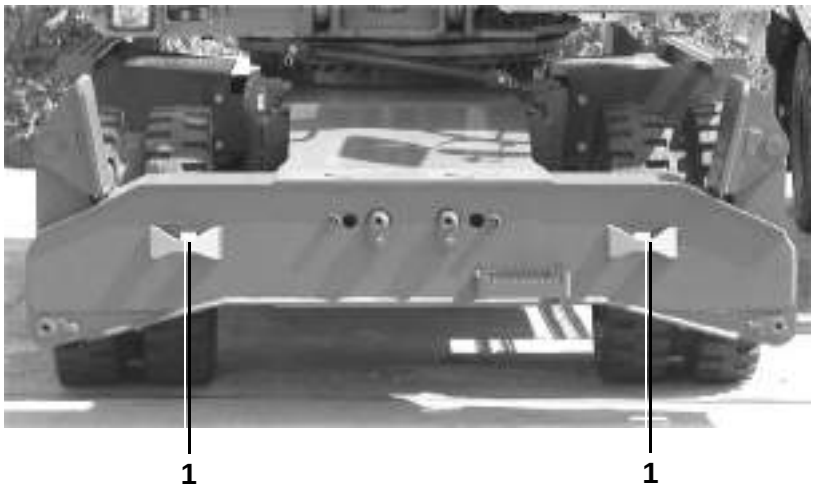
It is not permitted to remain below suspended load!

https://cranemanuals.com

7.6 Secure machine

CAUTION

- Secure machine at the designated tie-down points (1). Tiedown points are marked green and are located on the undercarriage.
- Ensure that the slinging equipment has sufficient safe working load and is undamaged.
- Ensure that the machine does not become damaged, if additional securing is necessary.
- The respective transport operator is *always responsible for the transportation of machine and accessories*.



https://cranemanuals.com

8 Troubleshooting

WARNING

- Observe Chapter 1 SAFETY.
- The personnel for maintenance, inspection and troubleshooting must have the appropriate qualifications for this work.
- For work not described in detail, please contact SENNEBOGEN customer service.

8.1 Drive engine

Engine does not start

Cause	Remedy
Battery power too low	– Check fluid level of batteries. – Recharge or replace battery. – Start machine using auxiliary battery.
Start interlock inactive	– Release accelerator pedal.
Fuel tank empty	– Refuel machine.

Engine performance drops

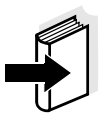
Cause	Remedy
Suction resistance too high	– Exchange filter element of water separator.

Machine does not drive

Cause	Remedy
Parking brake actuated	– Release parking brake.
Transmission defective	– Have fault rectified.

Oil or fuel leaks on engine

Cause	Remedy
Hose connections loose	– Tighten hose connections.
Hoses or seals damaged	– Exchange hoses or seals.



Note

Also observe the notes in the manual of the engine manufacturer.

https://cranemanuals.com

8.2 Hydraulic system

Oil leaks on hydraulic system

Cause	Remedy
Hose connections loose	– Tighten hose connections.
Hoses or seals damaged	– Exchange hoses or seals.

Hydraulic pump not working

Cause	Remedy
Fault in pump circuit	– Have fault inspected and rectified by hydraulic specialist.

No or faulty function of working equipment

Cause	Remedy
Hydraulic oil level too low	– Check hydraulic oil level. – Top up hydraulic oil, if required.
Leaks in Hydraulic system	– Check working cylinder, connections and hoses for leaks. – Have fault rectified by hydraulic specialist.
Fault in one of the working circuits	– Have fault rectified by hydraulic specialist.

Noises when moving a working cylinder

Cause	Remedy
Piston rod of cylinder without lubrication	– Have repair carried out by hydraulic specialist.

https://cranemanuals.com

No or low power in hydraulic system

Cause	Remedy
Hose connections loose	– Tighten hose connections.
Hoses or seals damaged	– Exchange hoses or seals.
Pressure relief valve opens too soon	– Have fault rectified by hydraulic specialist.
Hydraulic pump worn or defective	– Have pump exchanged by hydraulic specialist.

Noises in Hydraulic system

Cause	Remedy
Hydraulic pump takes in air	– Have fault rectified by hydraulic specialist.
Hydraulic pump delivers insufficient oil	– Check hydraulic oil level. – Top up hydraulic oil, if required.
Pressure relief valve chatters	– Have fault rectified by hydraulic specialist.

https://cranemanuals.com

8.3 Heating

No or insufficient heat output

Cause	Remedy
Water flow temperature too low	– Allow engine to warm up. – Replace thermostat (in air conditioning system).
Thermostat on vehicle defective	– Exchange vehicle thermostat.
Water valve does not open	– Check valve and valve actuation, if necessary replace. Note direction of flow.
Heat exchanger fins contaminated	– Clean heat exchanger.
Filter contaminated	– Clean filter, exchange if necessary.
No air flow	– see below.

No air flow

Cause	Remedy
Fuse defective	– Exchange fuse.
Power supply interrupted	– Check lines for loose contacts or open circuit.
Blower motor defective	– Have blower motor exchanged.
Blower switch defective	– Check switch, exchange if necessary.
Resistor defective	– Have resistor exchanged.

Heating cannot be switched off

Cause	Remedy
Bowden cable for water valve incorrectly adjusted	– Adjust Bowden cable.
Heating valve incorrectly fitted	– Check flow direction at valve, if necessary change supply and return line.
Actuation or Bowden cable defective	– Exchange actuation or Bowden cable.

https://cranemanuals.com

8.4 Tires and undercarriage

Oil leaks on differential, hubs or axle distribution gearbox

Cause	Remedy
Sealing plug loose	– Tighten sealing plug.
Seals damaged	– Exchange seals.

Oil leaks on slewing axle distribution gearbox

Cause	Remedy
Loose connections	– Tighten connections.

Rotary lead-through leaking

Cause	Remedy
Seals damaged	– Exchange seals.
Lines loose	– Tighten securing bolts.

Noises in slewing gear

Cause	Remedy
Insufficient lubrication on spur ring	– Lubricate spur ring according to lubrication plan.

8.5 Cab

Cab moves or swings strongly

Cause	Remedy
Cab mounting or cab fastening damaged	– Check all connection elements, bolts and pins of cab mounting and fastening for damage, cracks or deformation. – Have damaged components exchange immediately by trained and instructed specialist personnel.

https://cranemanuals.com

8.6 SDS - Fault displays

LED flashes, buzzer sounds

Cause	Remedy
Hydraulic oil temperature too high (>84 °C)	– Allow engine to run without load until hydraulic oil has cooled.
Cooling fins on hydraulic oil cooler dirty	– Clean cooling fins on oil cooler.
Hydraulic oil level too low	– Check oil level acc. to maintenance instructions. – Top up hydraulic oil, if required .

Note
If the hydraulic oil temperature exceeds +94 °C, the temperature indicator in the display also flashes.

LED flashes, continuous tone sounds

Cause	Remedy
Insufficient fuel in tank	– Refuel machine acc. to Section 5.6.11.

LED flashes, buzzer sounds

Cause	Remedy
Engine overheating	– Run engine at idling speed.
Cooling fins on engine oil cooler dirty	– Clean cooling fins on oil cooler.
Fan drive loose or defective	– Secure fan drive, or replace if necessary.
Coolant level too low	– Top up refrigerant according to maintenance instructions.
Engine switched off without cooling phase.	– After operating, allow engine to run in low neutral for approx. 5-10 minutes before switching off.

Note
If the coolant temperature continues to rise, the temperature indicator in the display also flashes, a continuous tone sounds.

https://cranemanuals.com

LED flashes, buzzer sounds

Cause	Remedy
Motor oil pressure too low (<1.3 bar)	– Shut down engine immediately. – Check engine oil level as described in the maintenance instructions. – Top off engine oil if necessary. – If occurrences repeat, contact SENNEBOGEN customer service.

Illuminates, warning tone sounds

Cause	Remedy
Air filter contaminated	– Clean filter as described in the maintenance instructions. – Exchange filter element if necessary.

Illuminates when engine is running

Cause	Remedy
Accumulator charge pressure too low	– Have system checked by hydraulics specialist.

Illuminates, warning tone sounds

Cause	Remedy
Coolant level too low	– Top off coolant.

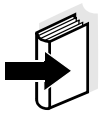
Illuminates when lights up, warning tone sounds

Cause	Remedy
Battery charge too weak	– Check battery charge, recharge batteries or exchange if necessary. – Check battery connections, tighten terminals if necessary.

https://cranemanuals.com

https://cranemanuals.com

9 Setting up



Note
The setup works to be carried out depend on the operating tools that have been selected. Please read operating manuals supplied by the respective operating tool manufacturers.

WARNING
There may be dangers during operation to persons, machine and other property, if

- the adjusted safety limit shutdown “Stick retract” is not adjusted to the work tools that are attached.
- the operating tools attached do not comply with the relevant safety regulations (see Section1.1).
- the work tools have not been approved by SENNEBOGEN.
- the operating tools attached are found to be defective.

The machine operator is wholly liable for any damage or consequential damage caused by tools!
This damage is excluded from the terms of the warranty issued by SENNEBOGEN Maschinenfabrik GmbH.

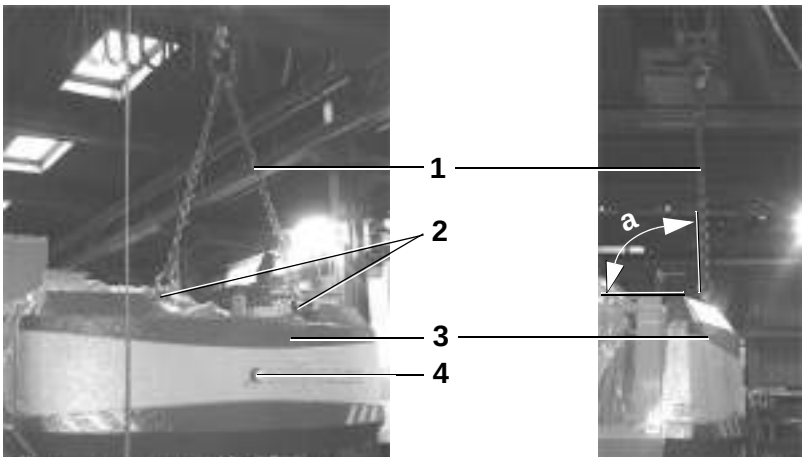
https://cranemanuals.com

9.1 Mounting/dismounting counterweight

The counterweight can be removed to transport the machine.

DANGER
Accident risk through tipping of machine!
The machine is not operational with counterweight removed.

9.1.1 Dismounting counterweight



1	Move superstructure to driving position. Lay equipment on the ground.
2	Secure appropriate load securing device (1) to auxiliary crane and to lifting points (2) on counterweight (3).

DANGER
Tip-over danger!
Angle “a” between the machine and the sling device (1) must always be <90°.
If the angle is greater the counterweight (3) may tip away from the machine.

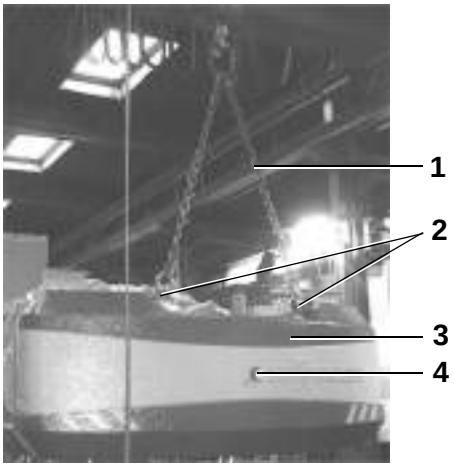
3	Slacken hexagon bolt (4).

DANGER
Do not walk under suspended loads.

4	Lift the counterweight (3) out of the way and deposit safely. Secure against overturning.

https://cranemanuals.com

9.1.2 Mounting counterweight



1	Secure appropriate load securing device (1) to auxiliary crane and to lifting points (2) on counterweight (3).

DANGER
Do not walk under suspended loads.

2	Hoist counterweight (3) onto machine using auxiliary crane.

WARNING
Secure the bolt (4) with “Loctite 270” each time you mount the counterweight!
Follow the instructions on the “Loctite” package!

3	Fasten counterweight (3) to the machine using hexagon bolt (4). Tighten bolt (4) with torque wrench to tightening torque 2350 Nm.
4	Remove sling device (1).

https://cranemanuals.com

https://cranemanuals.com

10 Appendix

10.1 List of abbreviations

TUR	Trade Union Regulations
Oh	Hours of operation
EMC	Electromagnetic compatibility
LED	LEDs
SDS	SENNEBOGEN Diagnosis System
FMVSS	Federal Motor Vehicle Safety Standards
UCTU	Underground Construction Trade Union
ACTU	Association of Commercial Trade Unions

https://cranemanuals.com

10.2 Index

10.3 Driver's seat

10.4 Cleaning the cooling system

10.5 Quick coupling

10.6 Installing large roller bearings, slewing gears and flange connections

10.7 Warranty conditions

10.8 Lubricants table

https://cranemanuals.com

https://cranemanuals.com

https://cranemanuals.com

https://cranemanuals.com

https://cranemanuals.com