# Instruction Manual

## Mobicone

### MCO 13

Please keep for future use!

## Product identification

| | |
|---|---|
| Model | Mobicone |
| Type | MCO 13 |
| Commission number | 4111001270 |
| Order number | K0420206 |
| Year of manufacture | 2013 |

## Customer registrations

Inventory no.

Location

## Manufacturer's address


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| | |
|---|---|
| Document number of the Instruction Manual:: | K0420206 |

## Purpose of the document

The purpose of this Instruction Manual is to provide information on all important issues relating to the technical design and safe operation of your machine.
Like us, you are also required to give close attention to this Instruction Manual prior to commissioning. This is necessary to operate your machine economically and to avoid damages and injuries. Unfortunately we cannot accept any liability for faults and damages that can be attributed to inadequate knowledge of the Instruction Manual.
In cases of doubt, please contact our in-house consultants or our branches and dealers both at home and abroad. We will be delighted to provide you with further assistance.

## Organisation of the Instruction Manual

The Instruction Manual is divided into chapters, which deal with the various types of machine application. This division will make it easy for you to find the desired information.

## Additional documents

In addition to this Instruction Manual, the original instruction manual must be used for certain vendor parts. We wish to expressly state at this point that this original Instruction Manual must be used with care. Although this Instruction Manual is designed for the relevant component, deviations in placement and functioning can occur as a result of installation in the system.

The following original documentation is provided:

| | |
|---|---|
| **Operating instructions for power unit** | **2x** |
| **Operating instructions for motor monitoring unit** | **2x** |
| **Circuit diagrams for electrical control system** | **2x** |
| **Functional description for electrical control system** | **2x** |
| **Operating instructions for magnetic belt separator (optional)** | **1x** |
| **Operating instructions for radio remote control (optional)** | **1x** |
| **Operating instructions for frequency converter (option)** | **2x** |
| **Operating instructions for cone crusher** | **2x** |
| **Operating instructions for auxiliary heating (option)** | **2x** |

# Table of Contents

# 1 Product description

## 1.1 Application and intended use

MOBICONE MCO 13, the mobile secondary crushing plant, is designed for sorting and crushing natural stone. Material is fed from a primary crusher with feed sizes of 0-300 mm.

Any further use, such as the crushing of rubble, contaminated materials, wood, scrap, coal, metal parts, etc., is contrary to the intended use of the machine.

The manufacturer does not accept responsibility for any resulting damage. The user alone bears the risk.

Included in the intended use:

- adherence to all instructions in the instruction manual and
- performance of inspection and maintenance work.

### 1.1.1 Intended use

The plant is state-of-the-art equipment and complies with the safety regulations applicable at the time of marketing and applicable to its intended use.

Design measures cannot avoid foreseeable misuse or residual dangers without restricting the specified range of functions.

The plant is built and designed

- for processing mineral materials with a feed size of 0-300 mm.
- for feeding from an upstream crusher plant.
- for crushing material.
- for screening different grain sizes using a classifying screen.
- for discharging different grain sizes via a belt conveyor onto waste tips or downstream plants for further processing.
- for clearing waste tips with a wheel loader, the size of which matches the plant power.

The plant is designed exclusively for commercial operation within enclosed areas such as building sites and quarries.

The plant must be operated by instructed operators in accordance with the specifications in the technical documentation.

All types of non-specified use, or all activities on the plant not described in this instruction manual, amount to misuse not covered by the statutory limits of liability of the manufacturer.

## 1.1.2 Non-specified use

In the case of non-specified use, or misuse of the plant, the warranty obligation of the manufacturer shall become null and void and responsibility shall be borne solely by the operating company.

Non-specified use includes:

- Conveying of persons.
- Climbing on the plant for purposes other than maintenance and repair.
- Operation with disassembled, defective or bypassed safety devices.
- Operation following incorrectly performed or neglected maintenance and repair work.
- Operation following failure to observe the maintenance intervals.
- Operation following neglected measurements and inspections for early detection of damage or wear.
- Feeding with lorries, dumpers or skip lorries or with excessively large or small digger shovels or buckets.
- Clearing the waste tip with an unsuitable device that leads to damage to the belt conveyors.
- Operation in unsuitable climatic conditions.
- Operation in a position other than horizontal.
- Operation following independent, unauthorised constructional modifications to the plant.

**The following are unsuitable for crushing in the crusher:**

- Material that exceeds the specified compressive resistance and dimensions. Material that is too large and hard results in material congestions, considerable wear and damage to the crusher.
- Unbreakable materials such as scrap metal. Even sporadic feeding of scrap metal, in particular hardened and solid steel parts, leads to damage and serious wear to the crusher, belt conveyors and other moving parts.
- All other materials not named in the section on intended use, such as wood, coal, scraps, rubbish, boulders of ore and other non-mineral materials.
- The following must not be fed into the crusher:
  - Hazardous and explosive substances.
  - Chemicals.
  - Solvents, oils and greases.
  - Asbestos-containing scraps, e.g. cement asbestos.
  - Pressurised vessels.

## 1.1.3 Residual risks

The residual risks were analysed and evaluated before the start of the design and planning phase of the plant.

The documentation makes reference to existing residual risks.

Existing residual risks can be avoided through the practical implementation and observance of the

following specifications:

- The special warning notices on the plant system.
- The general safety instructions in this instruction manual and in the safety manual.
- The special warning notices in this instruction manual.
- The instructions in the safety instructions.
- The instruction manual of the operating company.

Danger to life/risk of injury to persons can exist at the plant through, e.g.:

- Misuse.
- Incorrect handling.
- Transport.
- Missing safety devices.
- Defective or damaged components.
- Handling/operation by personnel without training or instruction.

The plant can cause dangers to the environment through, e.g.:

- Incorrect handling.
- Fluids and lubricants, etc.
- Noise and dust emission.

Material damage to the plant is possible through, e.g.:

- Incorrect handling.
- Nonobservance of operating and maintenance specifications.
- Unsuitable fluids and lubricants.

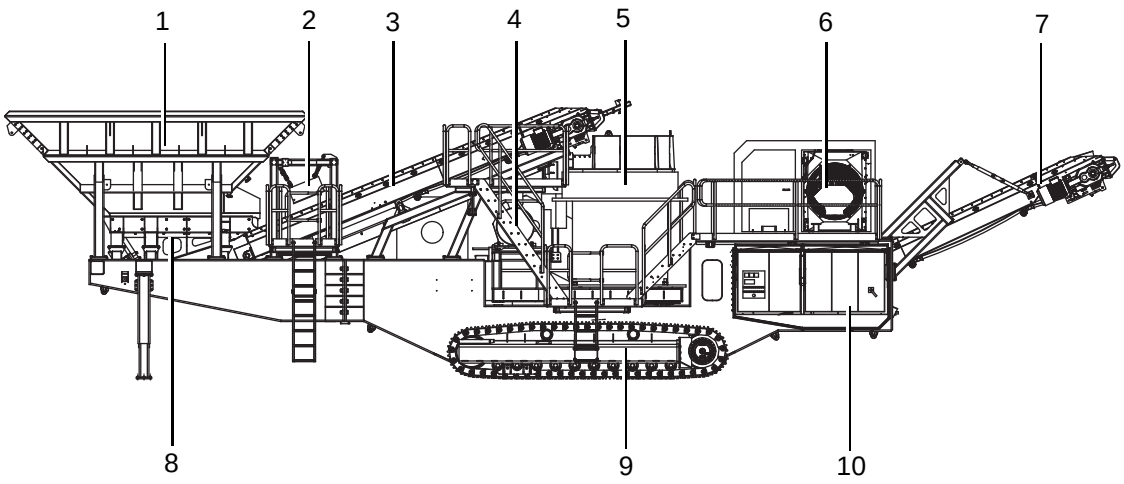
Material damage to further material assets in the operating area of the plant is possible through, e.g.:

- Incorrect handling.

Limitations to the performance and range of functions of the plant can result due to, e.g.:

- Incorrect handling.
- Incorrect maintenance or repair.
- Unsuitable fluids and lubricants.

## 1.2 Plant overview

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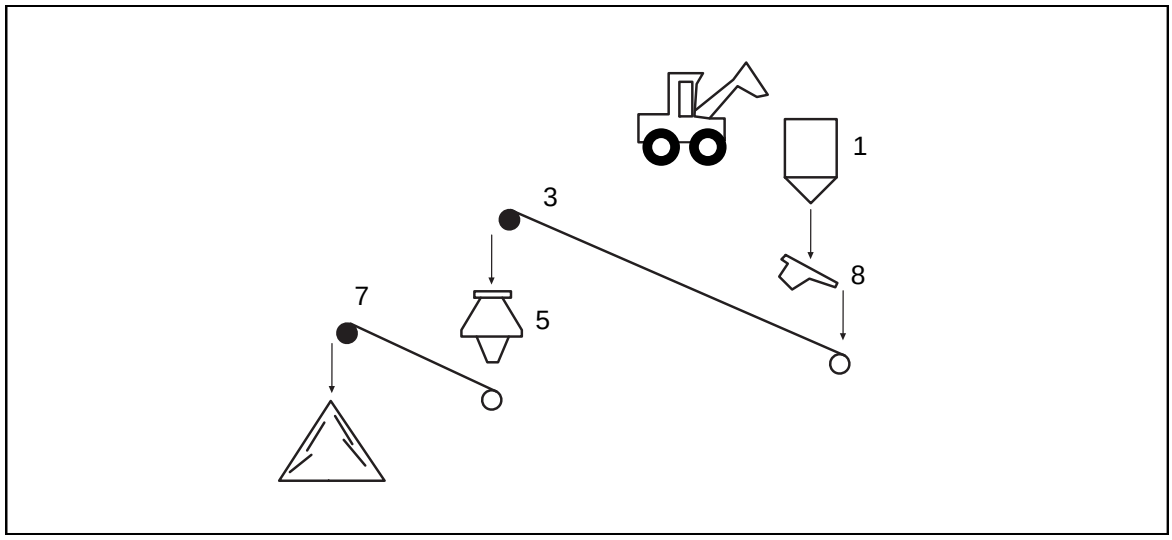
| | | | |
|---|---|---|---|
| **1** | **Feed hopper** | **6** | **Power supply unit** |
| **2** | **Permanent magnet (option)** | **7** | **Crusher discharge conveyor** |
| **3** | **Feeding conveyor** | **8** | **Feeder trough** |
| **4** | **Crusher drive** | **9** | **Crawler running gear** |
| **5** | **Cone crusher** | **10** | **Electrical system** |

**Flow chart**

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## 1.3 Precautionary measures

In the event of incorrect use of the plant, improper operation or faulty repairs, the plant itself or pro-d--ucts located nearby may be damaged or destroyed. Persons who are in the hazard area are liable to incur severe or fatal injuries.

Thus this instruction manual must be read thoroughly and it is imperative to observe the relevant safety instructions.

## 1.4 Conformity

The plant corresponds in its setup to valid EC Directives, as well as appropriate European standards. The development, manufacture and installation of the plant has been carried out with the utmost care.

## 1.5 Product designation

As the plant contains various individual machines, several type plates are used for the designation and these are found on the respective individual machines.

## 1.6 Technical details

All important technical details regarding the entire plant are given. These provide information on the performance and installation of the plant.

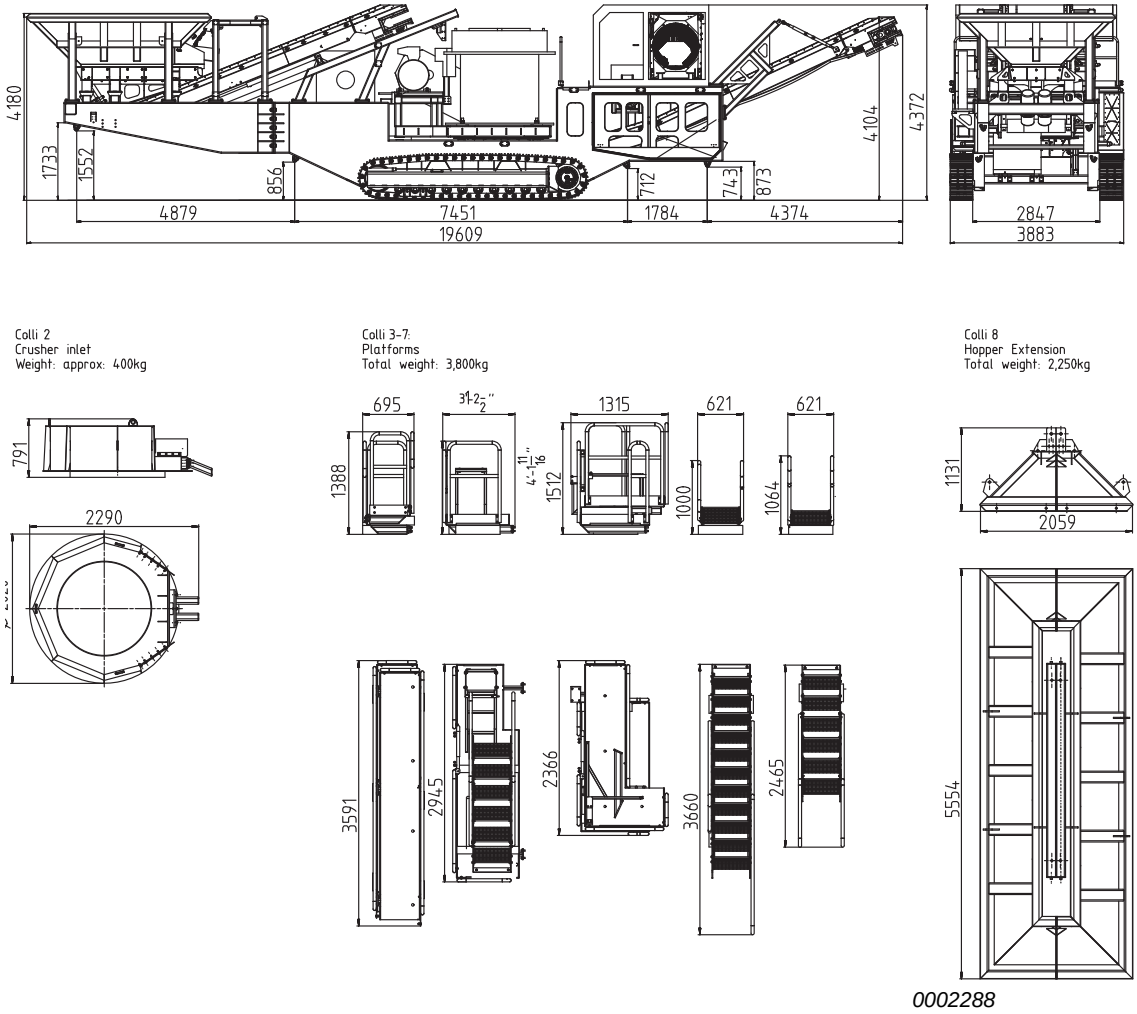
### 1.6.1 Mobicone plant

| | |
|---|---|
| Charged material | Natural stone |
| Feed size | depending on charged material up to 300 mm, profile |
| Feed capacity | up to 420 t/h depending on the charged material |
| Crushing capacity | with pre-crushed material<br>250-320 t/h with final grain size 0-60 mm<br>with 5-10% oversized product |
| Total weight | approx. 70.000 kg (without options) |
| Gradeability | Longitudinal: 12% (forwards / backwards) |
| | Transverse: 17% (lateral) |
| Driving speed | Natural stone |
| Ground pressure | |

## 1.6.2 Transport and erection area

### 1.6.2.1 Transport dimensions

All dimensions in millimetres

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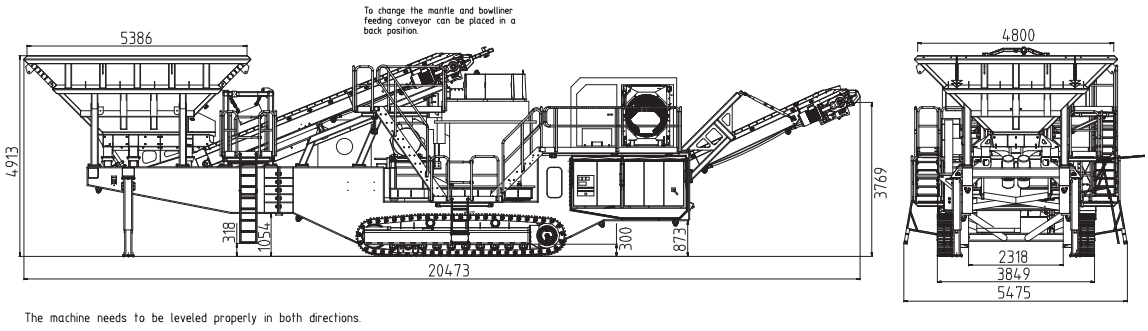
## 1.6.2.2 Erection area

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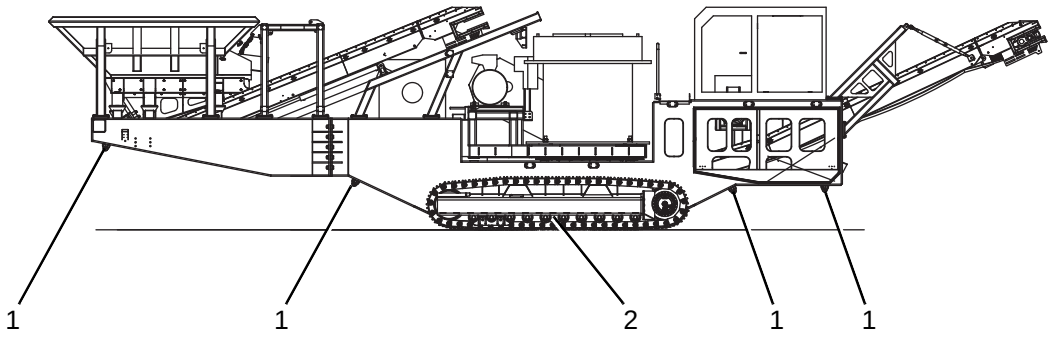
## 1.6.2.3 Lashing and tilting points

**⚠ WARNING!**

**Danger when loading the plant!**

**Incorrect or careless loading and lashing can result in personal injury and/or material damage.**

- **Take great care when loading and lashing.**
- **Observe general and locally applicable safety and accident prevention specifications.**
- **Only use the marked lashing points.**
- **Only apply load to the lashing points in the lashing equipment provided for this purpose.**

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*1 Lashing points*

*2 Tilting point*

**NOTE!**

**The position of the tilting point depends on the setup situation of the plant, e.g. hopper extension installed or disassembled.**

# 2 Safety regulations

## 2.1 General

Knowledge of the essential safety instructions and safety regulations is a basic prerequisite for the safe use and trouble-free operation of the machine.

The safety instructions in this section make up the general part. Extra instructions are given directly before the relevant operations.

- This instruction manual contains the most important information required to operate the ma---chine safely.
- The safety information must be observed by all persons who are working at the machine.

## 2.2 Symbol and notice explanation

In the instruction manual the following terms and symbols are used for hazards:

**⚠ DANGER!**

**This symbol means imminent danger.**

**Failure to comply with these instructions may lead to severe or fatal in---jury.**

**⚠ WARNING!**

**This symbol means possible danger.**

**Failure to comply with these instructions may lead to severe or fatal in---jury.**

**⚠ CAUTION!**

**This symbol means imminent danger.**

**Failure to comply with these instructions may lead to personal injury or material damage.**

**NOTE!**

**This symbol means possible danger.**

**Failure to comply with these instructions may lead to personal injury or material damage.**

**IMPORTANT!**

**Under this symbol, suggestions and tips for use and other particularly useful information is found.**

**These symbols and notices help you to optimally use all functions on the machine and make your work easier.**

## 2.3 Responsibility of the operator

- The operating company is obligated to only permit persons to work at the machine who

  **-** are aware of the essential regulations with regard to workplace safety and accident preven---tion and are familiar with the use of the machine.

  **-** have read and understood the safety section and the warning notices in this instruction man---ual and have confirmed so with their signature.
- The work is controlled at regular intervals to ensure that safety procedures are being followed.

## 2.4 Responsibilities of the personnel

All persons who are commissioned to work at the machine are obliged before beginning work

- to observe the basic regulations with regard to work safety and accident prevention,
- to read the safety section and the warning notices in the instruction manual and confirm their understanding of these with their signature,
- to obtain information about the operation before using the machine.

## 2.5 Organisational measures

- The necessary personal protective equipment must be provided by the operator.
- All existing safety devices must be checked regularly.

## 2.6 Informal safety measures

- The instruction manual must be **permanently retained at the site** of the machine. It must be easily accessible to the operators at all times.
- Supplementary to the instruction manual, the general and local regulations on accident pre---vention and environmental protection must be provided and adhered to.

- All safety instructions and hazard warnings must be kept at the machine and must be legible.
- With every change of owner or when the machine is on loan to other persons, the instruction manual must be handed over and its importance pointed out.

## 2.7 Training of personnel

All activities at the plant must only be carried out by authorised personnel.

The authorised personnel must:

- have reached the age of 18.
- be trained in first aid and be able to administer it.
- have read and understood the safety manual.
- be familiar with and know how to apply the accident prevent regulations and safety instructions for the plant.
- be trained and instructed on how to conduct themselves in the event of a fault.
- have the physical and mental ability to perform the tasks and activities at the plant for which they are responsible.
- be trained and instructed in the tasks and activities at the plant in their area of responsibility.
- have understood and be able to practically implement the technical documentation on the tasks and activities at the plant for which they are responsible.

Read the following before initial operation of the plant:

- the instruction manual.
- the safety manual.

The plant can only be operated and moved by persons who, in addition:

- have received instruction in operation and moving the plant.
- have provided the operating company with proof of their ability to perform the work.
- can be expected to reliably carry out the tasks assigned to them.
- They have to be appointed by the plant's owner to operate and move the plant.

## 2.8 Risks and dangers when using the machine

The machine is built using the best available technology and in accordance with the recognised safe---ty regulations. However, through its use danger to the life and well-being of the operator or third party may arise, as well as material damage.

- The machine is only to be used
  - for its intended purpose
  - and when it is in perfect condition with regard to safety.
- Faults which compromise safety must be eliminated immediately.

## 2.9 Maintenance and inspection, repairs

- All maintenance and repair work must be carried out when the **machine is disconnected from the power supply**.
  At the same time, the machine must be safeguarded against unintentional restart.
  - Lock switch cabinet
  - Turn off main switch
  - Remove ignition key from machine
  - Attach warning sign on the machine to warn against restart
- Compulsory maintenance and inspection work must be carried out in accordance with sched---ule.
- Operators must be informed before beginning maintenance and repair work.
- Disconnect all machines, upstream and downstream plant components and service mediums such as hydraulic oil and safeguard against unintentional startup.
- When replacing large components, carefully attach and secure them to hoisting devices.
- Check security of all screw connections.
- Doors and flaps of the machine must only be opened after moving parts are stationary.
- Once maintenance work is finished, check whether all safety devices are working properly.

## 2.10 Guard devices

- Safety devices must not be bridged or avoided.
- Before the machine is switched on, all safety devices must be properly attached and function---ing.
- Safety devices must only be removed
  - after the machine has shut down and
  - safeguarded against its unintentional restart.
- In the case of delivery of part components, the safety devices must be fitted by the operator in accordance with regulations.

## 2.11 Safety measures during normal operation

- Only operate the machine when all safety devices are fully functional.
- Before switching on the machine, ensure that nobody can be put at risk from starting up the machine.
- Inspect the machine at least once a day for noticeable external damage and check the opera---tion of safety devices.

## 2.12 Danger due to electrical power

- Work on the electrical system must only be carried out by qualified electricians.
- The electrical equipment of the machine must be checked regularly. Loose connections and damaged cables must be replaced immediately.
- The switch cabinet must be kept locked at all times. Access only permitted by authorised per---sonnel with key or appropriate tool.

- If work on live parts is necessary, then a second person must be present who can switch off the main switch in case of emergency.

## 2.13 Hazards resulting from hydraulic energy

- Only trained experts with special knowledge and experience in hydraulics may work on hydrau---lic devices.
- System sections and pressure lines that need to be opened must be depressurised before commencing repair work.
- Replace hydraulic-hose lines at appropriate intervals, even if no safety-relevant defects are de---tectable.

## 2.14 Particular dangers

**Risk of tipping due to subsidence or exceeding of the permissible drive inclination.**

Machine can crush persons located beneath it.

- ⇒ Only erect and move the machine on safe, solid ground.
- ⇒ Do not exceed permissible drive inclinations

**Risk of injury due to falling material.**

People can be killed or buried.

- ⇒ Do not stand within the discharge area of running belts.
- ⇒ Feed hopper area forbidden during loading.
- ⇒ Wear a safety helmet.

**Injuries due to reaching into the unbalance of the screening machine or into the conveyor belts.**

Limbs can be torn out.

- ⇒ Only execute maintenance work when the machine is stationary.
- ⇒ Never bypass safety devices.

**Injuries due to slipping on the polluted machine.**

Very serious fractures can result.

- ⇒ Keep machine and platforms clean.
- ⇒ Use stable ladders and the operator platform.

**Injuries due to reaching into or falling into the crusher.**

Risk of fatal injury!

- ⇒ Never eliminate blockages when the crusher is running.
- ⇒ Never climb on the vibrating conveyor chute during operation.
- ⇒ Never reach into the running crusher with bars.

**Eye injuries due to stone chips, dust, reinforcing steel.**

Permanent eye damage can result.

⇒ Wear safety goggles.

**Eye injuries and scalds due to squirting hydraulic oil.**

Can result in burns and blindness.

- ⇒ Always switch off and depressurise the hydraulics before performing maintenance and re---pair work
- ⇒ Replace defective hydraulic hoses immediately.

**Danger from touching electric lines.**

Can result in lethal electric shock.

- ⇒ Repairs to the electrical system must be performed by a skilled electrician.
- ⇒ Replace damaged cables immediately.
- ⇒ Keep switch cabinets closed.

**Injuries due to trapping between the machine and a shovel loader or excavator.**

Fatal crushing injuries can result.

- ⇒ Do not stand between the machine and the loading device.

## 2.15 Structural modifications to the machine

- No modifications, additions or conversions may be made to the machine without the manufac---turer’s permission. This also applies for welding work to structural components.
- All conversion measures require written confirmation from the manufacturer.
- Machine components that are not in perfect condition must be replaced immediately.
- Only use genuine Kleemann spare and wearing parts.

## 2.16 Cleaning the machine and disposal

- The materials and substances must be handled and disposed of appropriately, particularly when
  - Working on lubricating systems and lubricating devices and

- Cleaning with solvents.

## 2.17 Vibration emission

In automatic mode, the plant runs fully automatically without operating personnel. For this reason, there is no directly assigned workplace, which makes the vibration emission pressure level irrelevant.

During its operation, however, the plant is subject to stress from vibrations. Personnel authorised to enter the platforms only for maintenance and repair work are subject to stress through vibration.

However, observance of a few measures permits minimisation of the vibration emissions and the resulting danger:

- Do not remain on the platforms longer than necessary when performing maintenance and repair work.
- Do not walk on the vibratory screens, feeder trough and extractor channels until they have come to a complete standstill.

## 2.18 Noise emission

**Sound power level**

The sound power level of the plant is usually surpassed during crusher operation by the process noise.

**Emission sound pressure level**

In automatic mode, the plant runs fully automatically without operating personnel. For this reason, there is no directly assigned workplace, so that the emission sound pressure level is not directly relevant.

**⚠ WARNING!**

**Danger of hearing damage!**

**When working directly beside the plant or on its platforms, the permissible daily noise exposure level (LEX,8h) of 80 dB (A) is exceeded.**

- **Always wear your personal hearing protection when required.**

**⚠ WARNING!**

**Danger due to communication disturbance!**

**Noise development at the plant can interfere with communication between personnel and result in dangerous situations.**

- **Agree on unambiguous hand signals to avoid misunderstanding. Use radiotelephony where possible.**
- **Avoid the danger area during operation, maintenance, installation, removal and transport of the plant.**

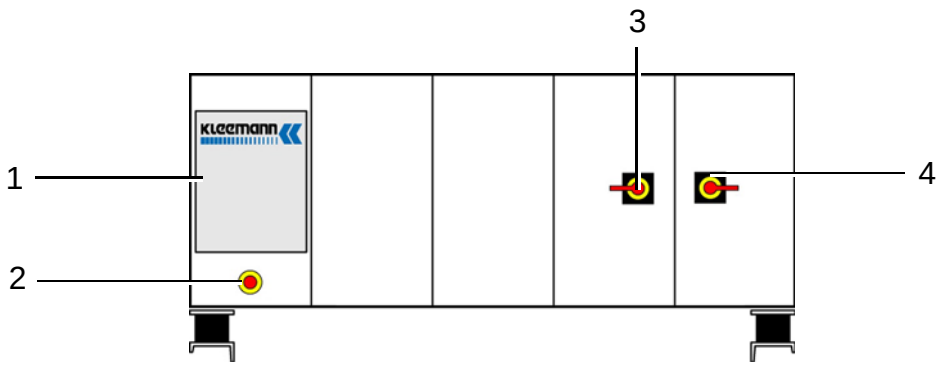
## 2.19 Warranty and liability

As a basic principle our "General Terms and Conditions of Sale and Delivery" apply. These are available to the operator no later than at conclusion of contract. Warranty and liability claims in the case of personal and material damage are ruled out if they are caused by one or more of the following:

- use of machine other than its intended purpose
- improper installation, startup, operation and maintenance of machine
- use of machine with defective safety devices or safety devices not fitted according to the rules or non-functional safety and protective devices
- non-use of original Kleemann replacement and wearing parts
- non-compliance with information in the operating manual with regard to transport, installation and removal, start-up, positioning and rigging, operation, maintenance and inspection, and repairs.
- structural changes made to machine without manufacturer's authorisation
- inadequate inspection of machine parts that are subject to wear and tear
- repairs carried out improperly
- catastrophes caused by impact of foreign material and Acts of God.

# 3 Operating and display elements

## 3.1 Switch cabinet

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| No. | Description | Function |
|---|---|---|
| 1 | Operator panel | Operates and monitors entire plant (see "Operator panel") |
| 2 | Emergency off | General emergency off (see "Emergency off") |
| 3 | Diesel generator main switch | Separates all loads from the diesel generator with exception of the excluded electric circuits (see "Excluded electric circuits"). Main switch can be locked using a padlock. |
| 4 | External power supply main switch (Option) | Separates all loads from the external power switch with exception of the excluded electric circuits (see "Excluded electric circuits"). Main switch can be locked using a padlock. |

**⚠ CAUTION!**

**Danger of material damage!**

**The electronics inside the switch cabinet may become damaged due to dust and dirt. The pressure relief system ensures that dust cannot enter when the plant is operating.**

- **Keep the switch cabinet closed during operation.**

## 3.2 External power supply

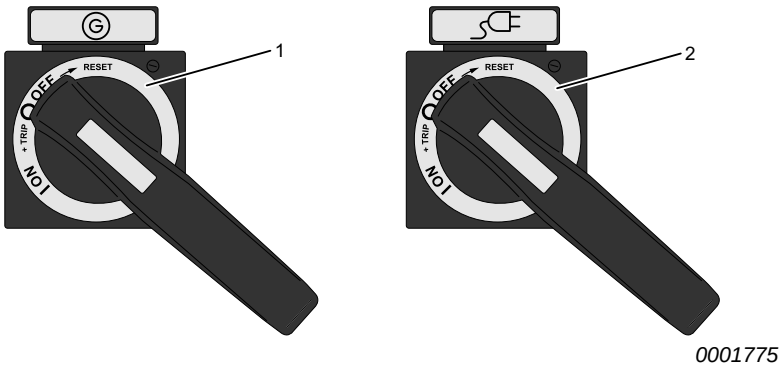
The two main switches of the diesel generator and the external power supply are on the switch cab-- inet below the power supply unit.

**⚠ CAUTION!**

**Danger of material damage!**

**The electronics inside the switch cabinet may become damaged due to dust and dirt.**

- **Always keep the switch cabinet closed during operation.**

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| No. | Description | Function |
|---|---|---|
| 1 | Diesel generator main switch | The plant is run with a diesel generator |
| 2 | Main switch for external power supply (Option) | The plant is run from an external power source |

Both main switches are interlocked reciprocally so that only one main switch can be switched on at

any one time.

- To switch over, first switch off one main switch and then switch on the other main switch.

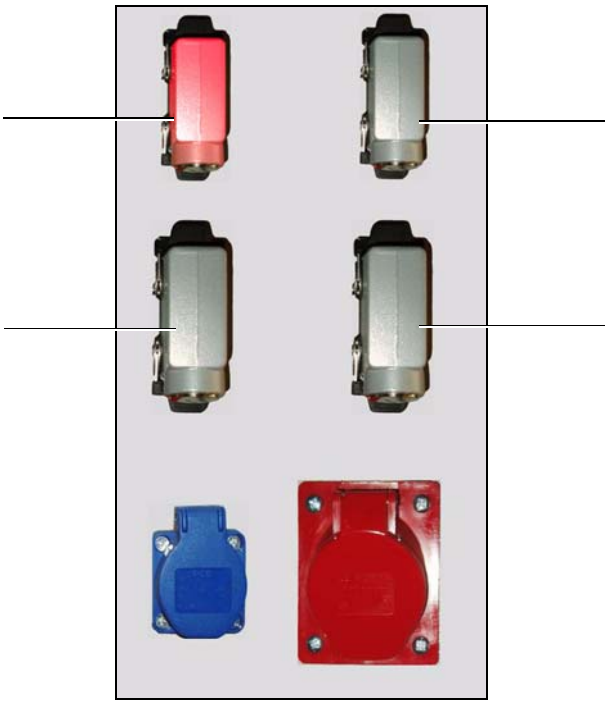
## 3.3 Socket outlets on the switch cabinet

**⚠ CAUTION!**

**Danger of material damage!**

**Danger of damage to contacts through improper handling.**

- **Remove dust and dirt from contacts before inserting connectors.**
- **Only insert connectors in socket outlets when de-energised.**
- **Keep socket outlets that are not in use closed.**



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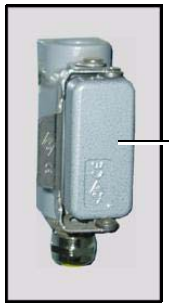


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| No. | Description | Function |
|---|---|---|
| 1 | Socket outlet | Connection for electrical locking device of a connected downstream machine (e.g. Mobiscreen). |
| 2 | Slot | Slot for unused connector at socket outlet 4 |
| 3 | Socket outlet | Transport mode / crushing mode |
| 4 | Socket outlet | Connection for electrical locking device of a connected upstream machine (e.g. Mobirex). |
| 5 | Socket outlet | Socket outlet for wired remote control |

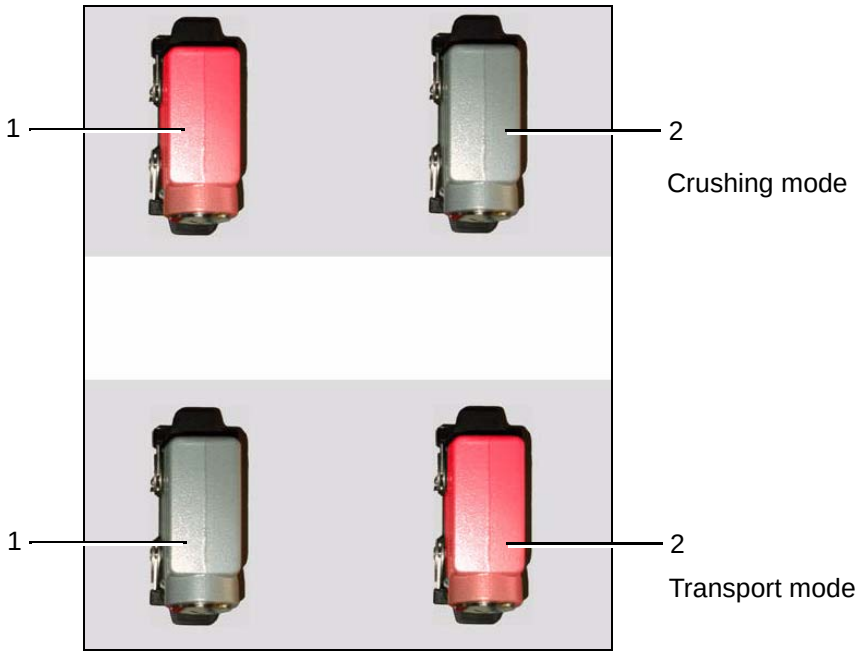
### 3.3.1 Reconnecting between transport mode and crushing mode

**⚠ DANGER!**

**Danger when machines are switched on!**

**In transport mode, the emergency switching off button below the operator panel and at the wired remote control are active; all other emergency switching off button and emergency-stop switches at the conveyors are deactivated!**

**Only use transport mode for transport and not for moving the plant on site.**




*1* *operating mode socket outlet*

*2* *dummy socket*

**NOTE!**

**The operating mode socket outlet is always the outermost socket outlet at the switch cabinet.**

**Transport mode**

- Insert transport plug (red) in the operating mode socket.
- Insert operating plug (grey) in dummy socket.

The plant can only be moved.

The emergency switching off buttons on the plant and the pull cords at the belt conveyors are deactivated. The emergency switching off button below the operator panel and at the wired remote controls is still active.

**Crushing mode**

- Insert operating plug (grey) in operating mode socket.
- Insert transport plug (red) in dummy socket.

The entire scope of functions of the plant are available.

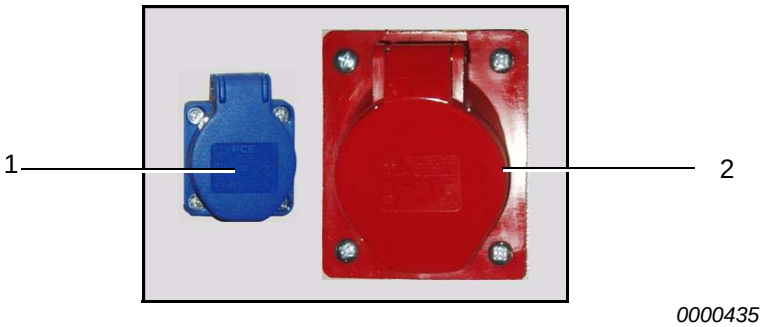
## 3.4 External circuits

**⚠ WARNING!**

**Electrical voltage!**

**Socket-outlets of external circuits are live even when the main switch is switched off!**

**To switch off the complete unit, press emergency-stop on switch cabinet.**

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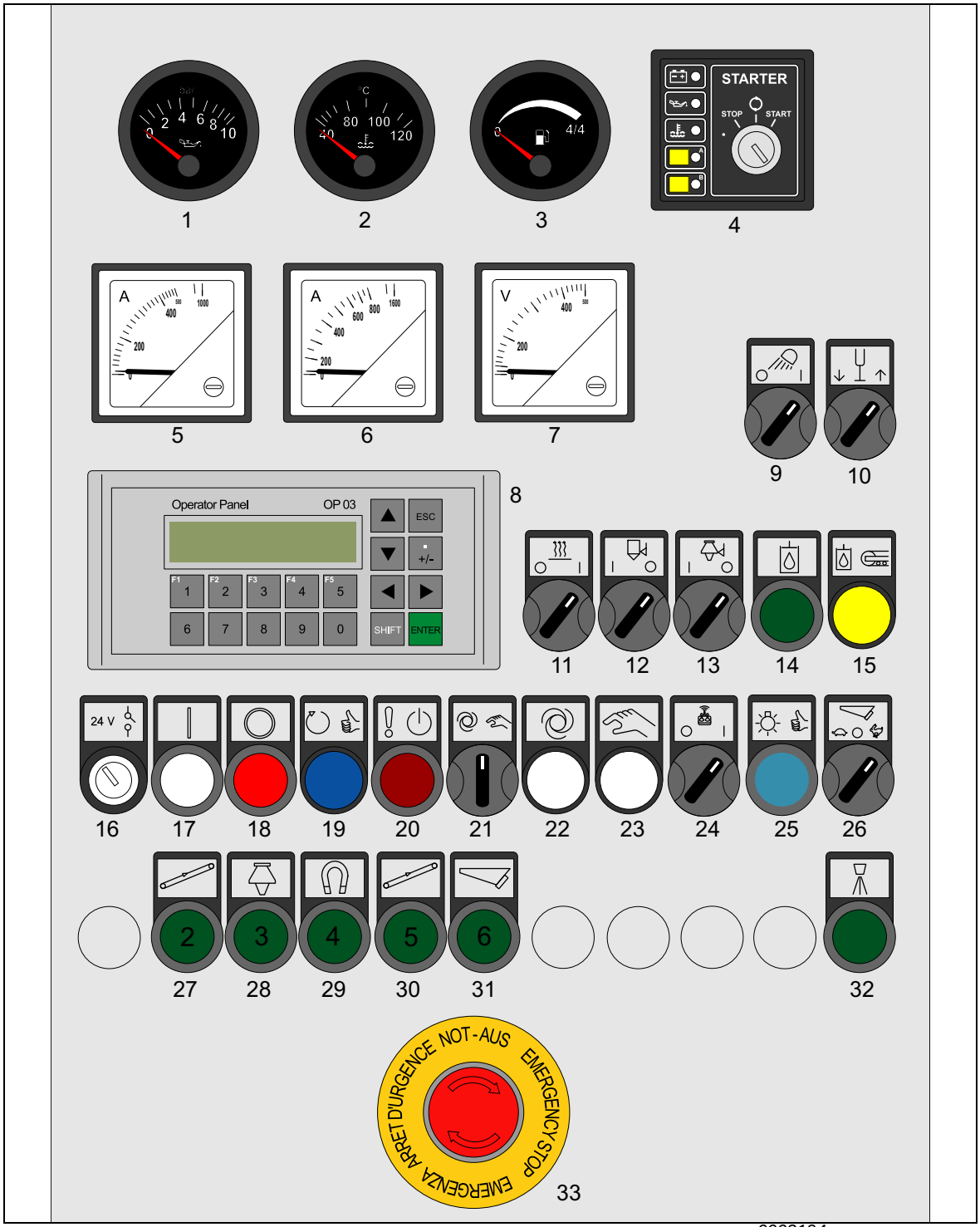
| No. | Designation | Function |
|---|---|---|
| 1 | Socket-outlet | Service socket-outlet (230V / 16A) |
| 2 | Socket-outlet | Service socket-outlet (400V / 32A) |

## 3.5 Operator panel

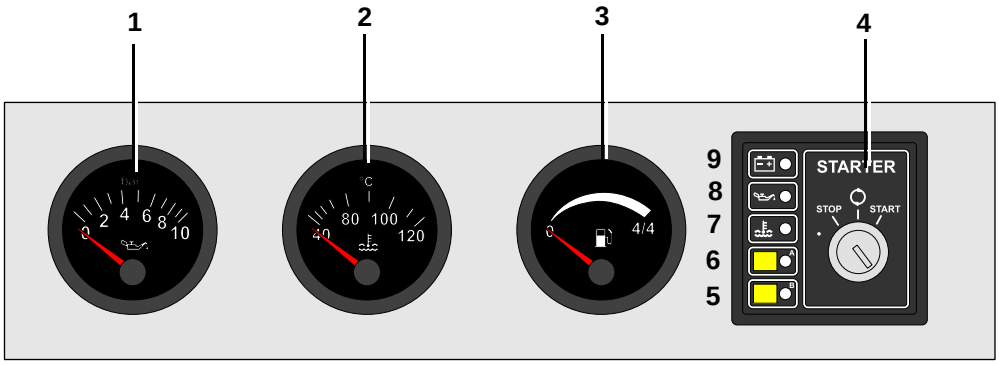



*0002194*

| No. | Designation | Function |
|---|---|---|
| 1 - 4 | Engine monitoring | See chapter 3.5.1 |
| 5 | Plant amperemeter | Displays current consumption of entire plant |
| 6 | Crusher amperemeter | Displays current consumption of crusher |
| 7 | Voltmeter | Displays voltage between the phases, which are preselected at phase switch |
| 8 | Operator terminal OP3 | See chapter 3.5.2 |
| 9 | Lighting | On/Off switch for lighting |
| 10 | Supports | Switch for retracting and extending supports |
| 11 | Winter operation | On/Off switch for heating and lubrication of cone crusher |
| 12 | Ultrasonic sensor for feeding | On/Off switch for ultrasonic sensor at feeding area |
| 13 | Crusher ultrasonic sensor | On/Off switch for ultrasonic sensor at crusher |
| 14 | Hydraulics | On/Off pushbutton for plant hydraulics |
| 15 | Drive system hydraulics | On/Off pushbutton for drive system hydraulics |
| 16 | Control voltage | On/off key switch for control voltage |
| 17 | Plant On | Pushbutton for switching on the plant |
| 19 | Plant Off | Pushbutton for switching off the plant |
| 20 | Start release | Lights up as soon as plant is ready to start |
| 21 | Acknowledge fault / emergency switching off | Pushbutton for acknowledging faults / emergency switching off |
| 22 | Automatic mode / manual mode | Selector switch to change between automatic and manual operating mode. In manual mode position, the sequential locking device of the machine is switched off |
| 23 | Automatic mode | Control lamp displays "Automatic mode" position of operating mode selector switch |
| 24 | Manual mode | Control lamp displays "Manual mode" position of operating mode selector switch |
| 25 | Radio remote control | On/Off switch for radio remote control |
| 26 | Lamp test | Checks the control lamps |
| 27 | Feeder trough +/- | Speed setting for feeder trough |
| 28 | Belt conveyor 2 | On/Off pushbutton for belt conveyor 2 |
| 29 | Crusher 3 | On/Off pushbutton for crusher 3 |
| 30 | Magnetic separator 4 | On/Off pushbutton for magnetic separator 4 |
| 31 | Belt conveyor 5 | On/Off pushbutton for belt conveyor 5 |
| 32 | Feeder trough 6 | On/Off pushbutton for feeder trough 6 |
| 33 | Water pump | On/Off pushbutton for water pump |
| 34 | Emergency off | See chapter 3.11 |

## 3.5.1 Engine monitoring

The engine monitoring system is a separate operator panel, which is integrated in the operator panel of the switch cabinet.

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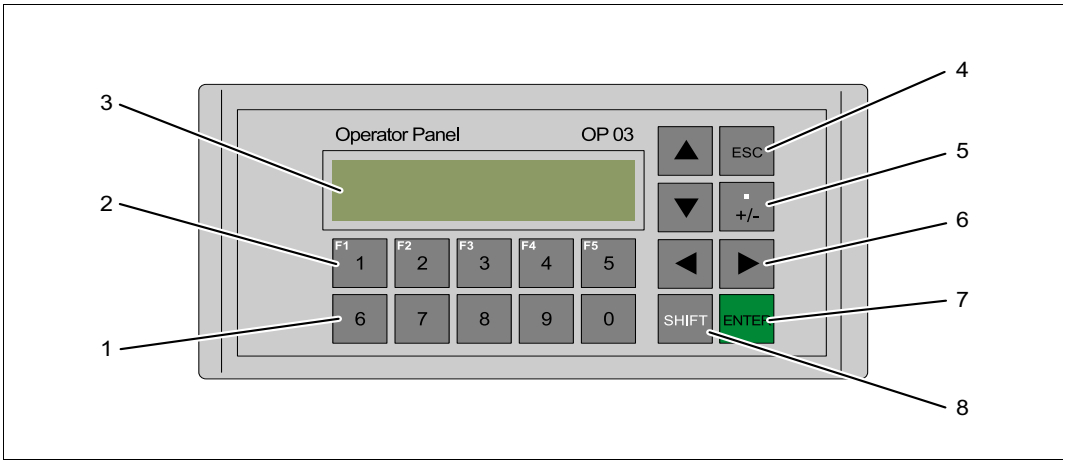
| No. | Description | Function |
|---|---|---|
| 1 | Oil pressure display | Displays oil pressure |
| 2 | Coolant temperature display | Displays coolant temperature |
| 3 | Fuel gauge | Displays amount of fuel |
| 4 | Key switch | Starts and stops the diesel generator |
| 5 | Control lamp B | Indicates a contaminated air filter<br>=>engine switches off automatically |
| 6 | Control lamp A | Indicates insufficient coolant<br>=>engine switches off automatically |
| 7 | Control lamp overtemperature | Indicates an excessive coolant temperature<br>=>engine switches off automatically |
| 8 | Control lamp for oil pressure | Indicates a drop in lube oil pressure below the permissible value.<br>=>engine switches off automatically |
| 9 | Control lamp - ignition | Lights up when ignition is switched on |

## 3.5.2 Operator panel OP3

### 3.5.2.1 Structure




*0001688*

*[1] Numerical keypad*

*[2] Function keys F1-F5*

*[3] LCD*

*[4] Abort key (ESCAPE key)*

*[5] Sign key*

*[6] Cursor keys*

*[7] Input key (ENTER key)*

*[8] Shift key (SHIFT)*

The OP3 operator panel displays messages from plant components and machines in the message level. All setting values can be read off in the value level. Service personnel can also change setting values if they have the corresponding password.

The OP3 operator panel has a membrane keyboard. The display can show two lines of text each with 20 characters.

0 to 9

**Numeric keys**

Input keys for numerical digits 0-9.

SHIFT + F1 1 to F5 5

**Function keys**

The numeric keys 1 to 5 are also function keys. Press the SHIFT key together with the function key F1 to call up Service mode. Function keys F2 to F5 have no value assignment.


**SHIFT key**

Shifts to the second function of keys with dual functions. To do this, the shift key is pressed at the same time as the relevant key, e.g.:

- Insert comma: press +.
- Call function: press + e.g.


**Sign key**

Changes sign from "Plus" to "Minus" and vice versa. Second function with pressed SHIFT key: insertion of a comma.


**ENTER key**

For switching into the value level. Entries are confirmed and completed with the input key.


**ESCAPE key**

Depending on the current operating and display situation, pressing the abort key (ES--CA-PE) has different effects:

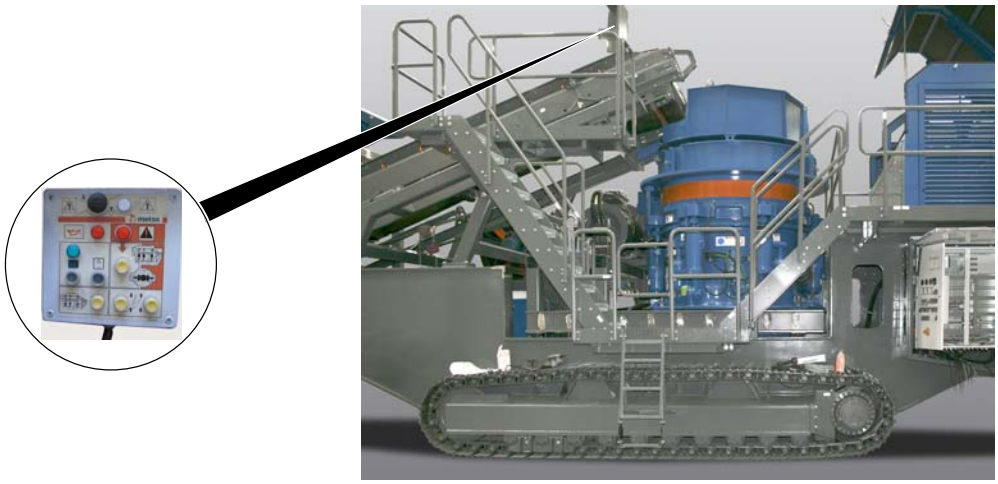
- Undo: field entries are undone, provided they have still not been confirmed with ENTER.
- Branch backward: from the value level back to the message level.
- Resetting when scrolling in messages: cancellation of scrolling in pending messages to reset the display to the currently pending message.
- Masking out a system message.

**Cursor keys**

Move cursor in the display. Depending on the operating and display situation, the cursor is moved to the left, right, upwards, downwards by characters, fields, entries or displays.

## 3.6 Local control

Local control can be used to control the cone crusher separately for maintenance and repair purposes.



0002318

**NOTE!**

**For a description of local control of the cone crusher, see separate operating instructions.**

## 3.7 Frequency converter

### 3.7.1 Frequency converter main switch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The main switch of the frequency converter is fitted in the switch cabinet. It can be accessed after

opening the switch cabinet door.

**⚠ CAUTION!**

**Danger of material damage!**

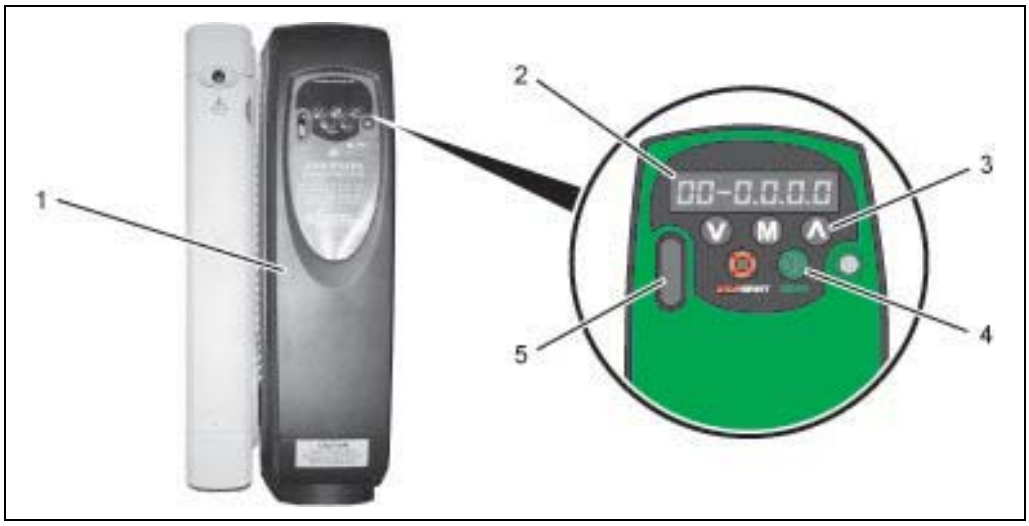
**Switching over the frequency converter main switch with the plant running can result in damage to the electrical system.**

- **Switch off plant components, diesel generator and the main switch of the plant.**
- **Only switch over the frequency converter main switch when the plant is not energised.**

The main switch has two switching positions:

- Switching position 1 = network operation: all consumers are supplied by the diesel generator at the rated frequency.
- Switching position 2 = frequency converter operation: the consumers connected to the frequency converter are controlled by the frequency converter.

## 3.7.2 Frequency converter operating unit




*0000001725*

*[1] Frequency converter housing*

*[2] Display*

*[3] Programming buttons*

*[4] Operating buttons*

*[5] Slot for Smartstick/Logicstick (option)*

The three-phase current frequency converter permits speed control of the vibration motors of the feeder trough.

The frequency converter is operated by the programming and operating buttons. The display is divid--ed into two display fields on the left and right. The left-hand display field shows the current parameter; the right-hand display shows the corresponding value.
The display can be viewed through a window in the switch cabinet door. The switch cabinet door must be opened to operate the operating unit.


**Mode button**

The mode button is used to change the operating unit mode. Three different modes can be selected:

- Status mode
  - Speed display
  - Load display
- Parameter display mode
- Parameter input mode

**Arrow keys**

The arrow keys are used to increase and reduce the speed of the vibration mo--tors. They are also used to select parameters and process their values.

**Start button**

Pressing the start button switches the frequency converter on.

**Stop button**

Pressing the stop button switches the frequency converter off.

### 3.7.2.1 Display windows

***Operating statuses (status mode)***

| Left display field | Status | Description |
|---|---|---|
|  | Converter ready | Converter is enabled and ready to start. |

| Left display field | Status | Description |
|---|---|---|
|  | Converter disa--bled | Converter is blocked due to missing enable or fault shutdown. |
|  | Fault shutdown of converter | The fault shutdown of the converter has been tripped. Fault shutdown code is displayed in the right-hand display field. |
|  | DC injection brak--ing | DC injection braking is active. |
|  | Network failure | Failure of the power network. |

**Speed displays**

| Left display field | Description |
|---|---|
|  | Drive output frequency in Hz. |
|  | Motor speed in rpm. |
|  | User-defined motor speed. |

**Load displays**

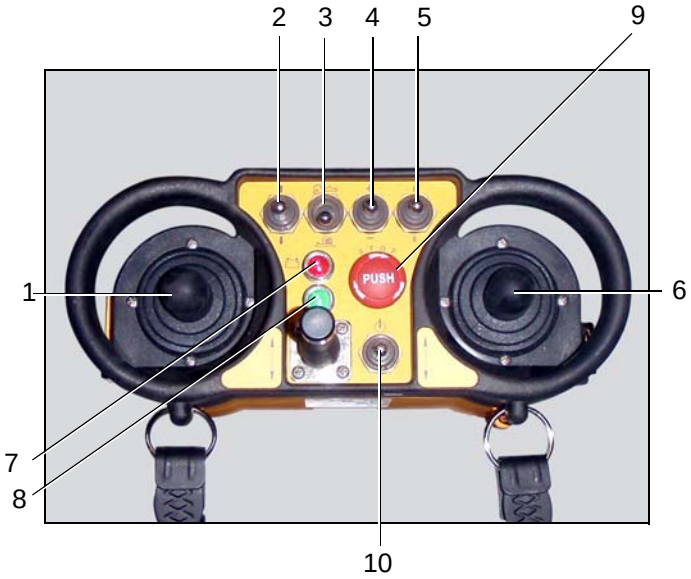
| Left display field | Description |
|---|---|
|  | Active load current as a % of motor rated current. |
|  | Converter output current per phase in A. |

## 3.8 Radio remote control

## DANGER!

**Risk of fatal injury due to bulky dimensions of the plant!**

- **Risk of fatal injury to persons during operation of the plant due to its bulky dimensions.**
- **Plant is only to be operated with the assistance of a reliable banksman.**
- **Keep constant eye contact with banksman during machine operation.**

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*000915*

| No. | Description |
|---|---|
| 1 | Left crawler control forwards/backwards |
| 2 | Has no function |
| 3 | Crawler control slow/fast |
| 4 | Feeder trough frequency control slow/fast |
| 5 | Feeder trough control on / off |
| 6 | Right crawler control forwards/backwards |
| 7 | Battery warning light LED |
| 8 | LED operation display |
| 9 | Unlocking emergency off |
| 10 | Has no function |
| 11 | Switch horn on / off (option) |
| 12 | Switch on radio remote control |

To operate the radio remote control, the "radio" monitoring switch on the switch cabinet must be set accordingly. The plant must also be manually switched on at the switch cabinet by radio remote con-trol.

**Activating the radio remote control**

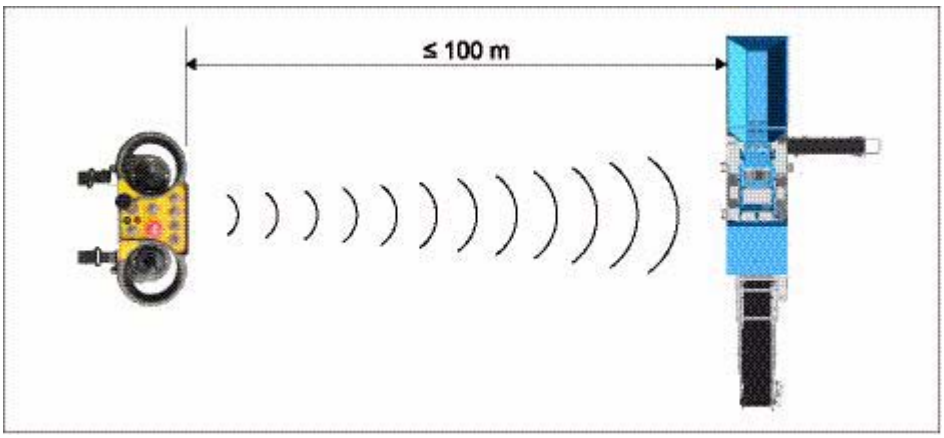
- Switch on radio remote control using rotary knob (12) on the side.
- Enable emergency off (9).
- Acknowledge emergency off at the operator panel.

**⚠ CAUTION!**

**Risk of damaging the receiver electronics!**

- **Before welding work is carried out on the plant, remove the control wire from the receiver electronics.**

## 3.8.1 Range of radio remote control

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The radio remote control permits operation and movement of the plant independently of the operator panel of the switch cabinet. The range of the radio remote control is approx. 100 m with visual contact between transmitter and receiver. The range can be smaller if there are obstacles between transmit-- ter and receiver.

The emergency-stop function of the radio remote control is tripped automatically by the following events:

- If the range of the transmitter is exceeded.
- Interruption of the radio signal, e.g. interference with transmitter or receiver.
- Removal of the battery from the radio remote control.
- Battery undervoltage.
- Manual actuation of the emergency stop at the radio remote control.

When the emergency-stop function is tripped, all plant drives with the exception of the diesel gener-- ator are switched off.

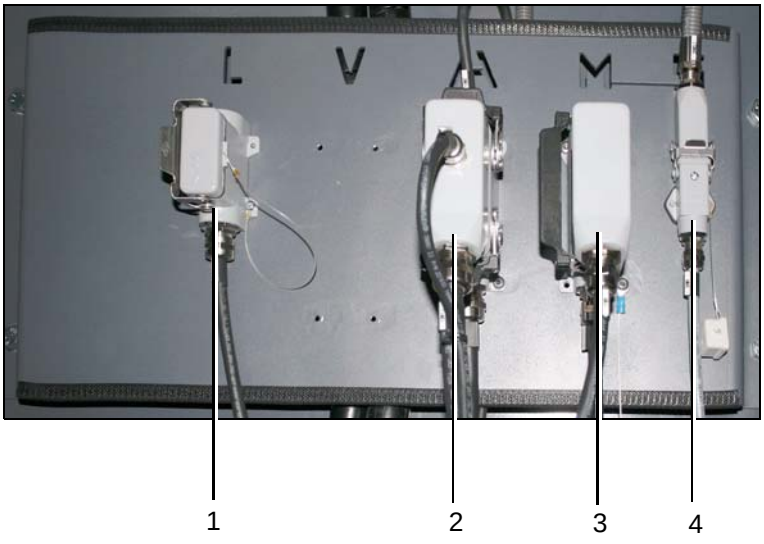
**NOTE!**

**Danger of material congestion**

**If the range of the radio remote control is exceeded, the emergency stop is tripped and material congestion in the plant can result.**

- **During plant operation, ensure that the range of the radio remote control is never exceeded.**
- **Never carry the radio remote control along in the wheel loader or digger and thus leave the range.**
- **Always ensure there is visual contact between transmitter and receiver.**
- **Store the radio remote control in the plant's switch cabinet when not in use.**

## 3.9 Socket outlets on the chassis

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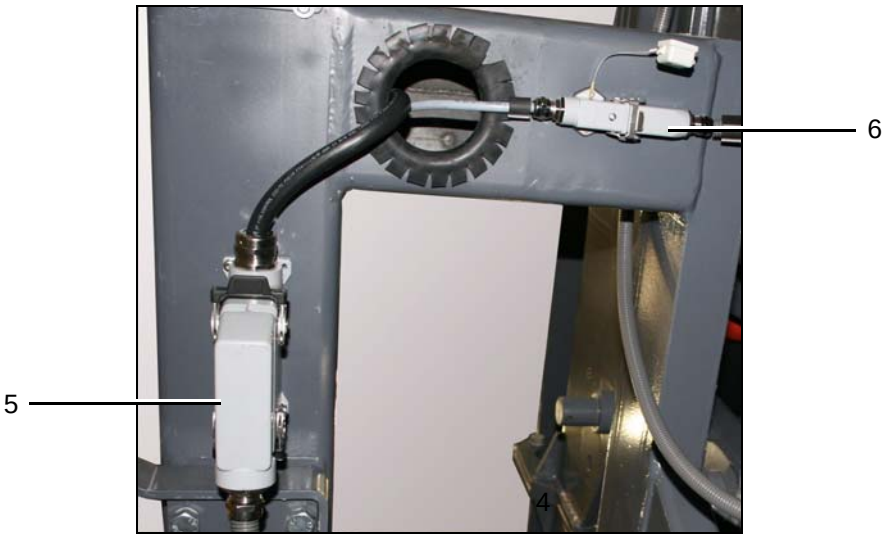


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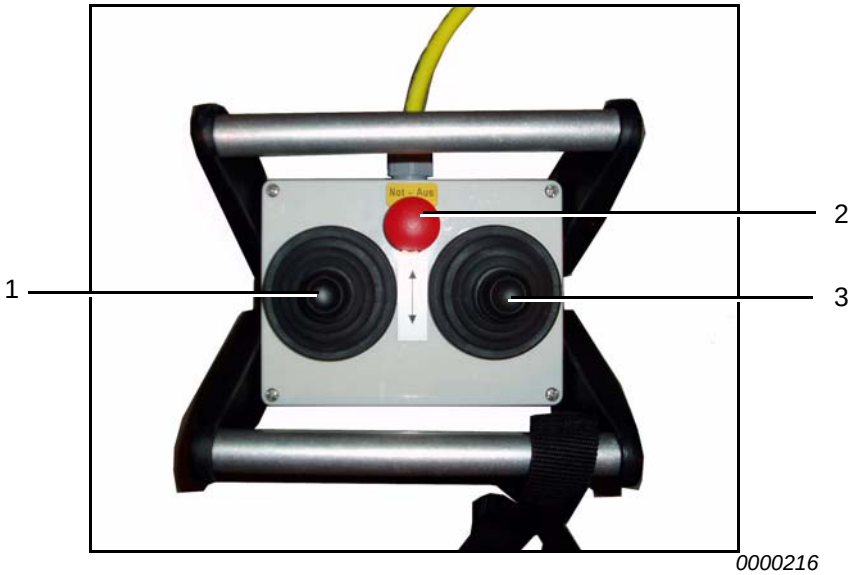
| No. | Description | Function |
|---|---|---|
| 1 | Socket outlet | Local control, cone crusher |
| 2 | Socket outlet | Drive for feeding conveyor |
| 3 | Socket outlet | Magnetic separator |
| 4 | Socket outlet | Crusher fill level monitoring |
| 5 | Socket outlet | Crusher discharge conveyor drive |
| 6 | Socket outlet | Feed hopper fill level monitoring |

## 3.10 Wired remote control




| No. | Description | Function |
|---|---|---|
| 1 | Left lever | Moves left chain forwards/backwards |
| 2 | Emergency off | Tripping an emergency-off signal |
| 3 | Right lever | Moves right chain forwards/backwards |

## 3.11 Emergency-stop

### 3.11.1 Emergency stop buttons

**⚠ WARNING!**

**The functioning of the emergency stop buttons must be checked daily.**

## ⚠ WARNING!

**Loads that are connected to the socket-outlets of exempt circuits and to socket-outlet 0X1 for follow-up machines are not switched off by the emergency-stop.**

**Injuries due to connected machines.**

**=>Switch off the diesel generator in emergencies!**

*0000226*

**Press emergency-stop in case of danger!**

All drives, except the crusher, are stopped immediately.

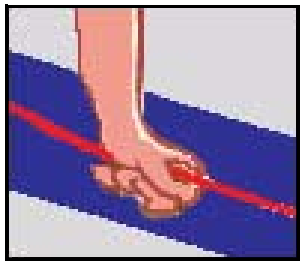
To stop the crusher immediately, press the **“Crusher” button** on the switch cabinet or the **emergency stop button on the switch cabinet.**

Pressing the emergency stop button on the switch cabinet stops the entire unit.

**Releasing the emergency stop button**

- turn clockwise
- and pull out

## 3.11.2 Emergency pull-wire



*0000225*

**Pull the emergency pull-wire in case of danger!**

All drives, except the crusher, are stopped immediately.

To stop the crusher immediately, press the **“Crusher” button** on the switch cabinet or the **emergency stop button on the switch cabinet.**

Pressing the emergency stop button on the switch cabinet stops the entire unit.

**Releasing the pull-wire switch**

- Return pull-wire switch lever to central position

or

- pull the button out

## 3.12 Valve block for feeding conveyor


*0002226*

| No. | Description | Function |
|---|---|---|
| 1 | Operating lever for feeding conveyor | Moving feeding conveyor forward/back |

## 3.13 Operating modes

**⚠ CAUTION!**

**Accidental activation of a machine in manual mode can cause personal injuries and/or material congestion.**

**For this reason, only use "Manual" mode in exceptional cases and with due care.**

There are two operating modes:

- Automatic mode
- Manual mode

The operating modes are switched over using a selector switch at the switch cabinet.

**Automatic mode:**
Normal operating mode

All machines are locked electrically and can only be switched on against the conveying direction. This prevents material congestion.

**Manual mode:**
Special operating mode for repair work and moving the plant.

The electric interlock is disabled. The individual machines can be switched on and off as desired.

# 4 Commissioning

## 4.1 Safety information

**⚠ WARNING!**

**Incorrect installation may lead to personal injury or damage to machine when starting up.**

- **Before switching on machine, ensure that**
  - **nobody is in hazard area,**
  - **the immediate shutdown of machine is guaranteed (emergency stop function).**
- **The machine may only be set up by persons with a sound knowledge of the machine.**
- **The operator (machinist) accepts full responsibility for the safety of persons who are in the hazard area of the machine.**

## 4.2 Installation

Before the system can be operated, it must be moved from the transport position to the work position. The activities described below must be performed for this purpose.

**⚠ WARNING!**

**Risk of injury and damage to property through incorrect use of hoisting machinery and lifting tackle.**

**If transporting by crane, always use suitable cargo gear. Check proper condition of chains, ropes etc. beforehand.**

**Standing under suspended loads is forbidden.**

**Personal protective gear, e.g. helmet, safety shoes, gloves etc. must be worn during system installation.**

**During installation and dismantling, chains or ropes must be attached to fixed components with slip-resistant fastenings. The mounting must be located in the centre of gravity.**

**Installation and dismantling must be carried out by skilled personnel.**

## 4.2.1 Erecting the machine

**⚠ CAUTION!**

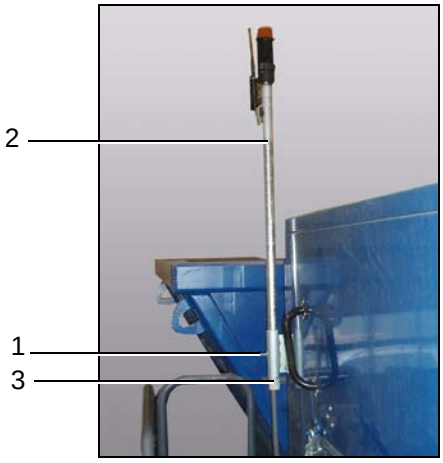
**Damage to property!**

**Risk of the machine tipping due to sinking on soft surface or unsuitable erection.**

- **Always erect the machine on a stable and solid surface**
- **Position the machine horizontally**
- **Machine must not rock**
- **The crusher must not rock on the chassis during operation**
- **The surface must be level (spread fine material over the ground and then level)**

If the machine or crusher rocks, reposition the machine and / or re-level the surface.

## 4.2.2 Extending the warning light

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- Remove fastening screw (1).
- Push the warning light (2) out from the stay tube (3) to the desired position.
- Secure position of the warning light using a fastening screw (1).

## 4.2.3 Earth the machine

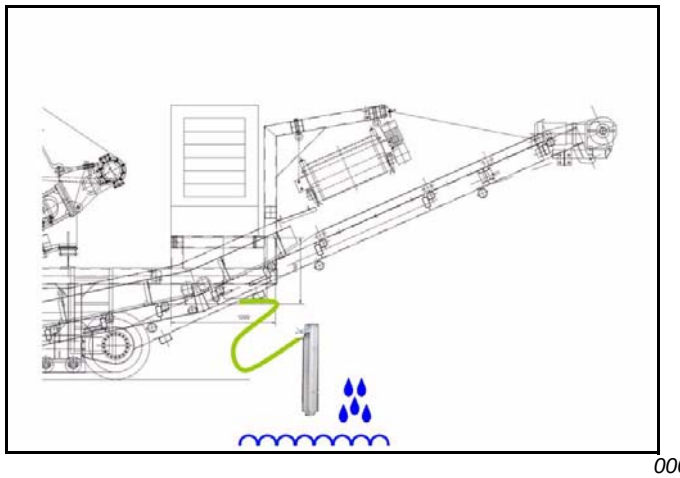
The machine must be earthed to ensure optimal connection of the protective earth conductor with the ground. This also prevents static charges due to the belts.

**⚠ WARNING!**

**There is a risk of electric shock from unearthed or incorrectly earthed systems!**

**After each new erection, the system must be professionally earthed and levelled in accordance with the applicable guidelines.**

**If the ground is dry, the soil around the earthing rod must be watered.**



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**Please note:**

- Earth stake must be firmly positioned and must not wobble.
- Remove the earth connection before moving the machine.
- Defective earth connections must be replaced immediately.

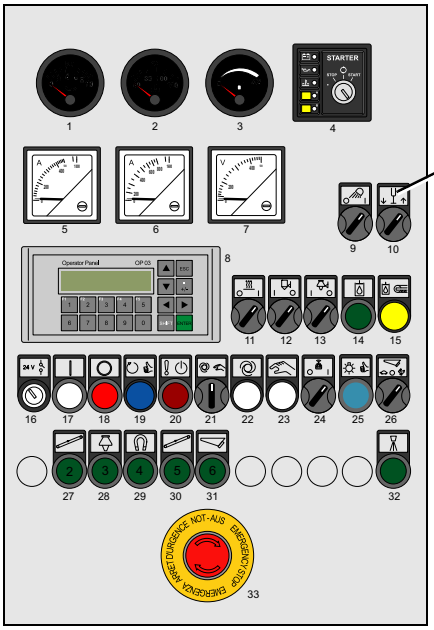
## 4.2.4 Extending the supports

**⚠ WARNING!**

**Risk of injury when supports are being extended or retracted!**

**The supports area is difficult to observe when supports are being extended or retracted.**

- **Ensure that there are no persons in the supports area.**

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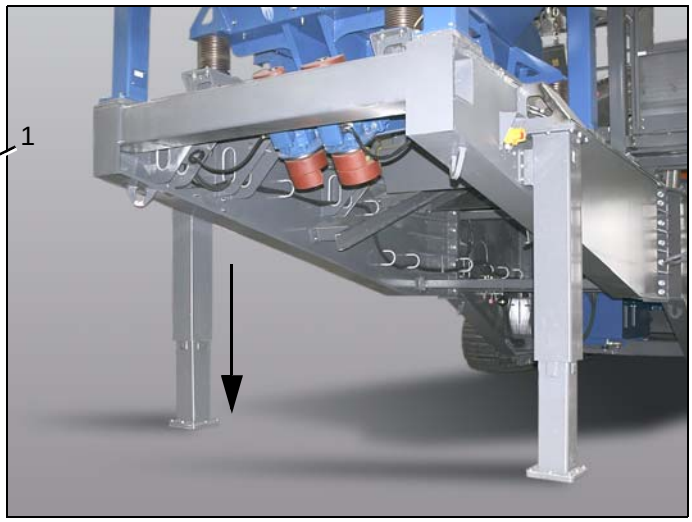


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- Start diesel generator and switch on the hydraulics.
- Actuate the rotary switch (1) to extend the supports.

**IMPORTANT!**

**The supports adjust themselves automatically.**

## 4.2.5 Installing platforms, steps and ladders

**⚠ WARNING!**

**Risk of injury!**

**Persons are at risk of injury and falling during mounting of the platforms.**

- **Use suitable lifting gear and tackle.**
- **Use secure climbing aids, e.g. ladders or lifting platforms.**
- **Take special care when mounting platforms and handrails.**


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**Mounting the platforms**

- Attach the platform (2) to suitable lifting gear and tackle and lift into the correct position on the chassis.
- Screw in fastening screws between the platform (2) and the chassis and secure with the corresponding tightening torque.

**Installing ladders**

- Lift ladder (5) to power supply unit platform.
- Screw in fastening screws between the ladder (5) and platform and secure with the corresponding tightening torque.

- Attach antifall guard (4) to handrail section and secure with spring pins.

**Installing access steps**

- Attach access steps (2) to suitable lifting gear and tackle and lift between the platforms.
- Screw in fastening screws between access steps and platforms and tighten to prescribed torque.

**Mounting handrail sections**

- Lift up handrail sections (3) using suitable lifting gear and tackle to platforms or access steps.
- Screw in all fastening screws between handrail sections (3) and platforms or access steps and secure with the corresponding tightening torque.

## 4.2.6 Mounting hopper extension (option)

**⚠ WARNING!**

**Risk of injury!**

**Persons are at risk of injury and falling during the mounting of the hopper extension.**

- **Use suitable lifting gear and lifting tackle.**
- **Use secure climbing aids, e.g. ladders or lifting platforms.**


*0002298*

- Clean contact surfaces on the feed hopper.
- Position the four walls of the hopper extension on a suitable base in relation to one another.
- Insert fastening screws (1) and tighten to corresponding tightening torque.
- Attach hopper extension to eyelets (2) using suitable lifting gear and lifting tackle and lift onto

feed hopper.

## 4.2.7 Mounting level sensor of feed hopper (option)

**⚠ WARNING!**

**Risk of injury!**

**Persons are at risk of injury and falling during mounting of the level sensor.**

- **Use suitable lifting gear and lifting tackle.**
- **Use secure climbing aids, e.g. ladders or lifting platforms.**

The fill level monitor at the feed hopper of the plant monitors the filling level in the feed hopper and switches off an upstream plant in the event of overfilling. When the feed hopper is free again, the upstream plant is switched on again.


*0002292*

- Screw fill level sensor (1) and bracket (2) onto discharge side of the feeding conveyor.
- Align fill level sensor (1).
- Insert the electrical connection for the level sensor (1) into the corresponding socket outlet on the chassis.

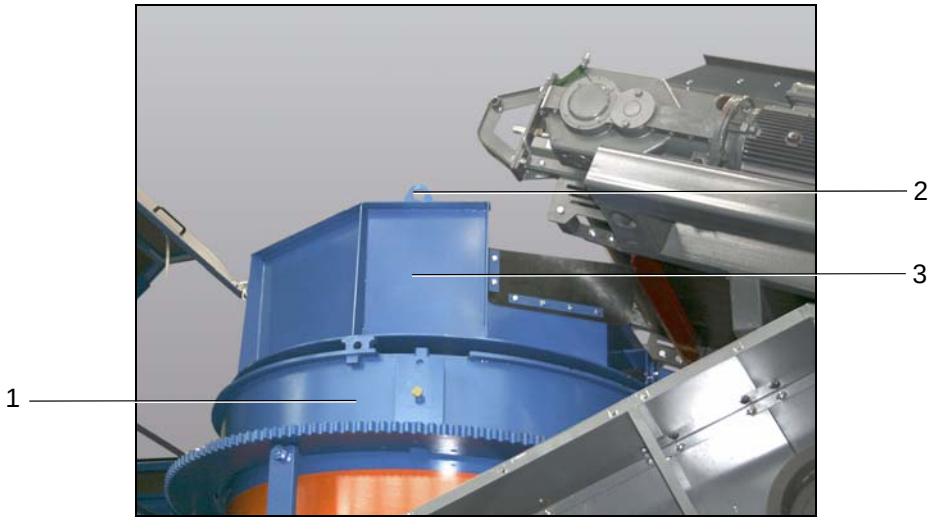
## 4.2.8 Mounting crusher inlet of cone crusher

**⚠ WARNING!**

**Risk of injury!**

**Persons are at risk of injury and falling during the assembly of the crusher inlet.**

- **Use suitable lifting gear and lifting tackle.**
- **Use secure climbing aids, e.g. ladders or lifting platforms.**

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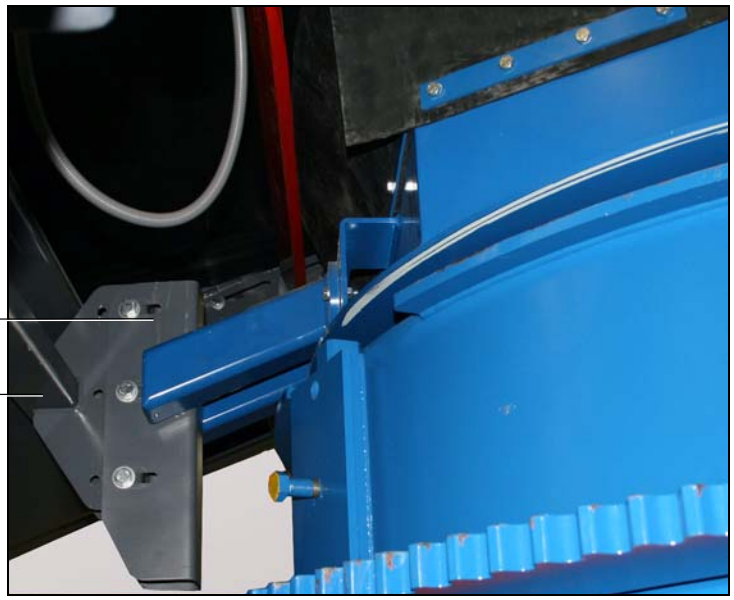
- Clean mounting surfaces of cone crusher (1).
- Attach crusher inlet (3) to the eyelets (2) using suitable lifting gear and lift over the cone crusher.
- Move crusher inlet (3) into correct position and lower onto cone crusher.




0002229

- Engage bracket for twist-lock (5) at frame of feeding conveyor (4).
- Bolt bracket for twist-lock (5) onto crusher inlet (3).

## 4.2.9 Mounting crusher level sensor (option)

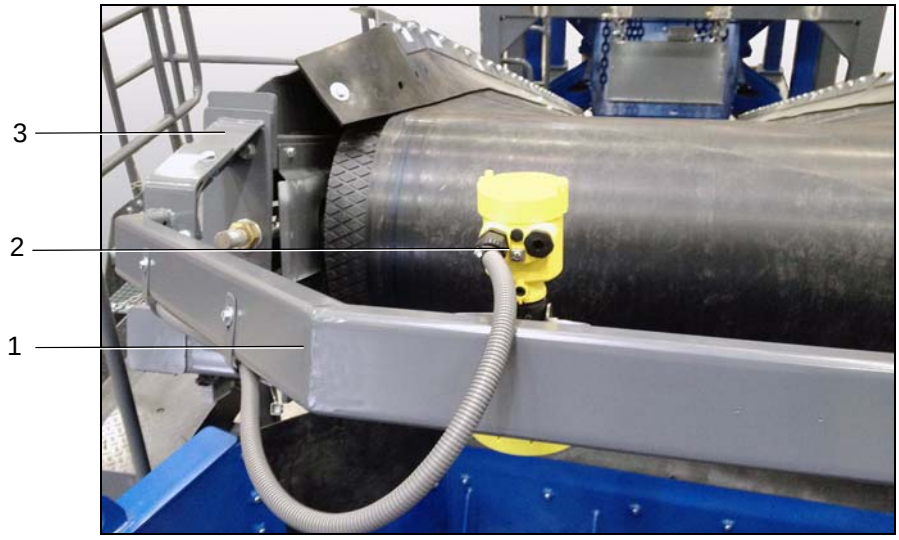
**⚠ WARNING!**

**Risk of injury!**

**Persons are at risk of injury and falling during mounting of the level sensor.**

- **Use suitable lifting gear and lifting tackle.**
- **Use secure climbing aids, e.g. ladders or lifting platforms.**

A fill level monitor at the crusher inlet monitors the fill level in the hopper of the cone crusher and, in the event of overfilling, switches off the feeder trough. When the hopper is free again, the feeder trough is switched on again.

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- Screw bracket (1) with fill level sensor onto bracket (3) of feeding conveyor.
- Align fill level sensor (2).
- Insert the electrical connection for the level sensor (2) into the corresponding socket outlet on the chassis.

### 4.2.10 Moving feeding conveyor to working position


*0002226*

- Remove transportation safety devices.
- Move feeding conveyor hydraulically (1) to working position.

## 4.3 Inspection

The following inspections and checks must be carried out after every transport and installation of the machine.

**⚠ CAUTION!**

**Danger due to foreign material in conveying devices!**

**Forgotten parts, e.g. tools or equipment, in conveyors may lead to disruptions and accidents.**

**=>After installation, check entire passage of material flow for foreign materials and remove them.**
**Main switch must be switched off during inspections.**

## 4.3.1 Checks with the machine stationary

**Oil levels:**
Diesel motor:

- Before checking the oil level, the motor must be stationary for at least 5 minutes.
- For approved oil grade, please see operating instructions for the diesel generator.

**Fuel level:**

- The fuel gauge on the switch cabinet indicates the fuel level
- Top up the fuel if required (see “Operation” chapter)

**Cooling water level:**

**⚠ WARNING!**

**Risk of scalding**

**Hot steam and water can escape when the cooling water tank is opened, causing scalds.**

**=>Open the cover of the expansion tank slowly, to allow the pressure to reduce.**

**⚠ WARNING!**

**Risk of poisoning**

**Anti-corrosion and antifreeze agents are toxic.**

**=>Do not ingest cooling water or bring it into contact with food.**

For prescribed coolant please see diesel generator operating instructions.

Please note:

- Only use ready-mixed coolant that is nitrite-free and approved by the manufacturer.
- When topping up larger quantities of coolant, never pour cold coolant into a warm motor, as this can cause cracks in the motor.

**V-belts:**

- Check the V-belts for:
  - Cracks
  - Twisting
  - Tension

**Spraying system level (option):**
The level of the spraying system must be checked to prevent dry running of the pump.

- Check the suction hose to ensure that water is present up to the level of the pump.
- If the water level is lower:
  - Fill up the water tank
  - Fill the suction line

**Transport belts:**

- Check transport belts for damage
- Eliminate any defects.

**Safety devices:**

- Check that protective covers and devices are present, are in proper condition and are firmly located.

**Damages:**

- Check the system for damages and soiling.
  - Repair any damage.
  - Eliminate soiling.

**Retighten loose screws:**
If you find any loose screw connections, tighten them immediately.

Tightening torques:

| Thread | M10 | M12 | M16 | M20 | M24 | M30 |
|---|---|---|---|---|---|---|
| Tightening torque [Nm] | 50 | 90 | 230 | 450 | 750 | 1450 |
| [lf-ft] | (37) | 66) | (170) | (332) | (553) | (1069) |

**Service openings:**
All service openings must be firmly closed.

This applies particularly for

- Doors and flaps on the crusher
- Service flap on the discharge belt conveyor
- Service flap on the large belt guard

## 4.3.2 Test run without material

When carrying out a test run without material, all machines are switched on in succession against the conveying direction. The correct functioning of each individual machine must be checked before swit-ching on the next machine.

If an error occurs, the system must be switched off immediately and the error eliminated.

**⚠ WARNING!**

**Risk of injury to persons in the system's danger area.**

**Persons who linger in the danger area during operation may be injured.**

**=>Before switching the system on, make sure that no persons are loca-t-ed in the system's danger areas.**

For information on the individual operating steps, please see the "Operation" chapter.

The performance of all test runs enables comprehensive checking of all important machine functions.

**NOTE!**

**All emergency stop buttons must be released, otherwise it will not be possible to start the system.**

**Test run 1:**

1. Set cone crusher local control to Automatic.
2. Select "Automatic" operating mode.
3. Switch the diesel generator on.
4. Switch on main switch.
5. Switch on control voltage.
   Wait for the OP3 controller to power up.
6. Switch off rotary switch for radio remote control.
7. Press "Acknowledge fault / emergency-off" pushbutton.
8. Press "Plant on" pushbutton.
   - Horn sounds for approx. 10 s
   - "Start release" lamp lights up.
9. Press "Plant on" pushbutton.
   - Drives 1 and 2 power up automatically.
   - Drive for crusher 3 flashes.
   - Crusher powers up.
   - "Crusher 3" lamp lights up if oil temperature and lubrication are correct.
10. Press "Plant on" pushbutton.
    - Horn sounds for approx. 10 s
    - "Start release" lamp lights up.
11. Press "Magnet 4" pushbutton.

- remaining drives power up automatically.

12. Check that the machines work in the correct manner.
13. Press emergency off on chassis.
14. Monitor the shutdown process.
    => All other machines stop immediately.
15. Unlock emergency off.
16. Switch off control voltage.
17. Switch off main switch.
18. Switch off generator.

### 4.3.3 "Repair" test run

**⚠ CAUTION!**

**The inadvertent switching on of a machine when in "Repair" mode can cause personal injuries and/or material jams.**

**Therefore, only employ "manual" operating mode in exceptional circumstances and with due care and attention.**

1. Set cone crusher local control to Automatic.
2. Select "Repair mode".
3. Switch the diesel generator on.
4. Switch on main switch.
5. Switch on control voltage.
   Wait for the OP3 controller to power up.
6. Switch off rotary switch for radio remote control.
7. Press "Acknowledge fault / emergency-off" pushbutton.
8. Press "Plant on" pushbutton.
   - Horn sounds for approx. 10 s.
   - "Start release" lamp lights up.

**NOTE!**

**Drives can only be activated while the start release lamp is lit.**

9. Drives can be switched on individually.
   The "Crusher 3" drive can only be connected if "Belt 2" is switched on.

# 5 Operation

## 5.1 Safety informations

**DANGER!**

**Failure to follow the safety instructions may lead to severe injuries and also material damage which is not covered under warranty.**

- Risk of fatal injury!
  When the plant is running, there is the risk of getting caught and crushed between machines which can lead to fatal injuries.
  Work on the machine and unblocking of material jams should only take place when the unit is switched off.
  - Wait for crusher runout.
  - Safeguard against restart of machine.
  - Attach warning sign.
- Risk of injury to persons in the hazard area of machine.
  Persons in the hazard area during operation of the machine may be injured.
  =>Before switching on the machine, ensure no persons are in hazard areas of machine.
- The operator (machinist) accepts full responsibility with regard to the safety of persons who are in the hazard area.
- Operation of machine only with personal protective equipment.
- All operating activities with the exception of "Move plant" must be carried out in "Automatic" mode.
- After completion of work and during breaks, machine must be switched off and switch cabinet (operator control panel) locked.
- Only persons familiar with the machine and those authorized to do so may operate the ma-chi-ne.
- If personnel or the machine are in danger, immediately actuate the nearest emergency-off switch.
- Switch cabinets and service doors must always be kept locked.

## 5.2 Switch-on

Switch-on involves two different consecutive stages. Switch-on of the generator and switch-on of the complete system. The system can only be switched on when the generator is running. Sometimes it may be necessary to operate the generator on its own for maintenance work.

## 5.2.1 Switching on generator

- Insert ignition key in key switch.
- Turn ignition key to "Start" and hold until the diesel engine fires.
- Release ignition key again.

## 5.2.2 Switching on the plant

**⚠ WARNING!**

**Risk of injury due to falling material!**

**Persons in hopper feeding area or discharge zones of belt conveyor are at risk of injury due to falling material.**

- **Do not stand in hopper feeding area or discharge area of belt conveyor.**
- **Wear a protective helmet.**

**NOTE!**

**All emergency-stop pushbuttons must be unlocked. Otherwise, the plant cannot be started.**

**Procedure**

1. Set cone crusher local control to Automatic.
2. Select "Automatic" operating mode.
3. Switch the diesel generator on.
4. Switch on main switch.
5. Switch on control voltage.
   Wait for the OP3 controller to power up.
6. Switch off rotary switch for radio remote control.
7. Press "Acknowledge fault / emergency-off" pushbutton.
8. Press "Plant on" pushbutton.
   - Horn sounds for approx. 10 s
   - "Start release" lamp lights up.
9. Press "Plant on" pushbutton.
   - Drives 1 and 2 power up automatically.
   - Drive for crusher 3 flashes.
   - Crusher powers up.
   - "Crusher 3" lamp lights up if oil temperature and lubrication are correct.
10. Press "Plant on" pushbutton.
    - Horn sounds for approx. 10 s

- "Start release" lamp lights up.

11. Press "Magnet 4" pushbutton.
    - remaining drives power up automatically.
12. Check that the machines work in the correct manner.

## 5.3 Switch-off

A distinction is also made between the system and the generator when switching off.

**IMPORTANT!**

**The crusher must be run idle before switching off. Otherwise material jams and blockages can result.**

### 5.3.1 Switching off the plant

- Run the crusher until empty.
- Press "Plant off" pushbutton.
  - Switches off all drives in conveying direction.
  - After-running of crusher: approx. 4 minutes.
- Switch off control voltage.
- Switch off plant using main switch.
- Switch diesel generator off.

### 5.3.2 Switching off generator

**IMPORTANT!**

**Engine should run for at least 4 minutes after shutdown without load**

**= Cool down function.**

- Turn key to left => stops engine.

## 5.4 Refueling

**⚠ WARNING!**

**Fire hazard!**

**Fuel can ignite during refueling.**

**=>Smoking and naked light are not permitted during refueling.**

## 5.5 Moving the system

The machine can be moved at any time, even with opened platforms and side discharge belt mounted.

**⚠ CAUTION!**

**Damage to property!**

**The cardan shaft of the screen drive and magnetic belt can be damaged.**

- **Before moving the system, fit transport safety devices to the magnetic belt and the screen frame**

**⚠ WARNING!**

**Obscured system!**

**Because of the obscured system, persons in the traversing range can be fatally injured.**

- **Always move the system with the help of a reliable marshaller**
- **Constant eye contact with the marshaller**

**⚠ CAUTION!**

**Damage to property!**

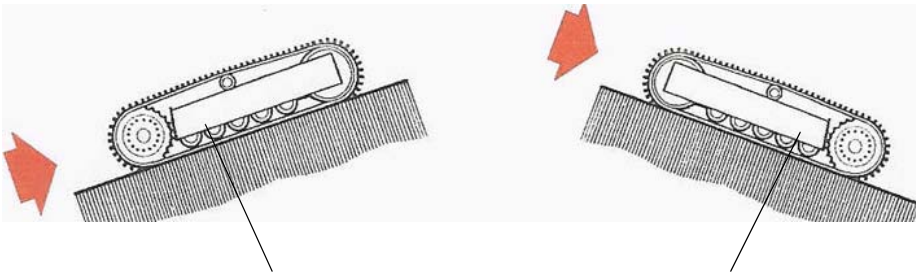
**Chains can rust or freeze solid and break.**

- **Move the system at least 10 m (33 ft) in each direction every day, in order to prevent seizing up**
- **Never drive the system if the chains are bogged down or frozen solid**

**Important note on traversing uphill and downhill gradients:**

**NOTE!**

**For drive operation and large uphill or downhill gradients, a minimum tank filling quantity of approx. 300 l (80 gal) is required to prevent the motor from stalling.**



Uphill gradients:
Drive at bottom

Downhill gradient:
Drive at bottom

## 5.5.1 Conditions

- Operate the conveyor belts until they are empty
- Detach earth connection
- Running gear must be clean (no dirt or stone between travelling wheels and track rollers)
  -> Risk of chain breakage
  -> Remove material caking
- Running gear must be free-running.
  Never drive the system if the chains are bogged down or frozen solid
- Chain must be tensioned

**NOTE!**

**Ensure adequate ground clearance of the system!**

- Travel way must be clear and free of obstacles
- Ground must be solid (note weight)
- Marshall must be appointed
- Drive uphill with the running wheel in front if possible, drive downhill with the drive wheel in front

## 5.5.2 Parking

- Park the machine on even, solid ground.
- If parking on a slope cannot be avoided, lock the chains firmly

## 5.5.3 Driving

**⚠ CAUTION!**

**Material damage!**

**The chain may slip from the drive wheel or sprocket when driving or tur-ning the plant.**

**The skipping of the chain reduces the service life of the chain and may lead to the malfunction of the gearbox and the hydraulic drive system.**

- **Chain must not skip from drive wheel. Only operate when chain is taut. Retension chain if necessary.**
- **Note the direction of movement when driving on slopes or inclines.**

**IMPORTANT!**

**Before driving, check whether the plant is being operated via the exter--nal power supply or the diesel generator.**

**If necessary, disconnect the external power supply and set the main switch to "Diesel generator".**

**Driving with wired remote control**

1. Release all emergency-off buttons at the plant.
2. Start diesel generator.
3. Switch on main switch.
4. Switch on control voltage.
5. Press the "Acknowledge emergency-off" pushbutton.
6. Press "Plant on" pushbutton.
   - Horn sounds for approx. 10 s.
   - Control lamp "Start release" lights up and the "Plant on" pushbutton flashes.
7. Set the rotary switch "Automatic mode/manual mode" to "Manual mode".
8. Press "Retract supports" pushbutton.
9. Press "Coupling" pushbutton.
10. Insert wired remote control into socket outlet in the switch cabinet housing.
11. Driving
    The crawlers are set in motion using the two levers of the drive control. The left lever is for

the left crawler, the right lever for the right crawler. The crawler always moves in the direc-- tion in which the lever is moved. The speed is proportional to the deflection of the levers.

**Driving with radio remote control**

1. Release all emergency-off buttons at the plant.
2. Rotary switch to "Radio on".
3. Start diesel generator.
4. Switch on main switch.
5. Switch on control voltage.
6. Press the "Acknowledge emergency-off" pushbutton.
7. Press "Plant on" pushbutton.
   - Horn sounds for approx. 10 s.
   - Control lamp "Start release" lights up and the "Plant on" pushbutton flashes.
8. Set the rotary switch "Automatic mode/manual mode" to "Manual mode".
9. Press "Retract supports" pushbutton.
10. Press "Coupling" pushbutton.
11. Switch on remote radio transmitter.
    - Activate rotary knob on the side.
    - Unlock emergency off.
12. Driving
    The crawlers are set in motion using the two levers of the radio control. The left lever is for the left crawler, the right lever for the right crawler. The crawler always moves in the direc-- tion in which the lever is moved. The speed is proportional to the deflection of the levers.

## 5.6 Crushing
## Important information for plant operator!

**DANGER!**

**Failure to follow the above-mentioned safety instructions may lead to se-- vere injuries and also material damage which is not covered under war-- ranty.**

- Risk of fatal injury by flying stones!
  During loading there is the risk of flying rocks in area of feed hopper.
  Ensure no persons are in the hazard area.
- Risk of fatal injury!
  There is a risk of fatal injury when eliminating material congestion in the crusher when it is run-- ning.
  - Never unblock material congestion using hands or other objects while the crusher is running.
  - Never climb into the feeder trough.
  - Never open service doors when the crusher is running.
- Risk of injury due to incorrect gap setting!

In the event of overload, gap settings lose their accuracy.
Standing in the area of the gap setting is prohibited.

- Destruction of drive system or control elements.
  Never run the crusher drive against a blocked crusher.
  Before starting the crusher, always check that the crushing chamber is empty. Empty the crus-hing chamber if there is material in it.
- Material congestion and blockages!
  In order to avoid material congestion, only load material in specified feed sizes.
- Risk of destruction of loading devices!
  Never use diggers or loading shovels to remove bridging (blockages) in area of material feed.
- Danger of destruction of the frequency converter!
  After the feeder trough is shut down following overload, NEVER cut in the trough prematurely via the operator panel or by radio remote control.
  The trough must only be cut in after complete standstill.
- Load feeder trough so a material bed constantly remains on trough floor. Constant loading of the trough when empty leads to deformations on the trough floor and to premature failure of the drive units.
- Material damage!
  Incorrect loading or setting of the feeder trough leads to continuous activation and deactivation of the trough. This faulty operation could lead to destruction of the frequency converter and / or vibration motors. Adjust the feeder trough and material quantity with frequency converter in such a way that the automatic shutoff is only actuated in extreme circumstances (maximum 10 times per hour allowed).

**NOTE!**

**Danger of material congestion**

**If the range of the radio remote control is exceeded, the emergency stop is tripped and material congestion in the plant can result.**

- **During plant operation, ensure that the range of the radio remote con-trol is never exceeded.**
- **Never carry the radio remote control along in the wheel loader or dig-ger and thus leave the range.**
- **Always ensure there is visual contact between transmitter and recei-ver.**
- **Store the radio remote control in the plant's switch cabinet when not in use.**

## 5.7 Operation of the cone crusher

**DANGER!**

**Risk of fatal injury!**

**Incorrect loading may lead to blockages or overfilling of the crusher! There is a risk of fatal injury in the case of improper clearance of jam-- ming.**

- **Never loosen obstructions with the crusher running.**
- **Only approach machine if charged material poses no hazard.**
- **Standing in the area of the crushing jaw during operation is strictly prohibited.**
- **Never insert rods or similar items into moving crusher.**

**WARNING!**

**Risk of injury due to swerving crusher upper section!**

**In the event of unfavourable material feeding or if material cannot be crushed, the crusher upper section swerves upwards. Unbreakable ma-- terial is ejected at the side between crusher upper section and base fra-me.**

- **Only approach machine if charged material poses no hazard.**
- **Standing in the area of the crushing jaw during operation is strictly prohibited.**

**CAUTION!**

**Damage to the cone crusher!**

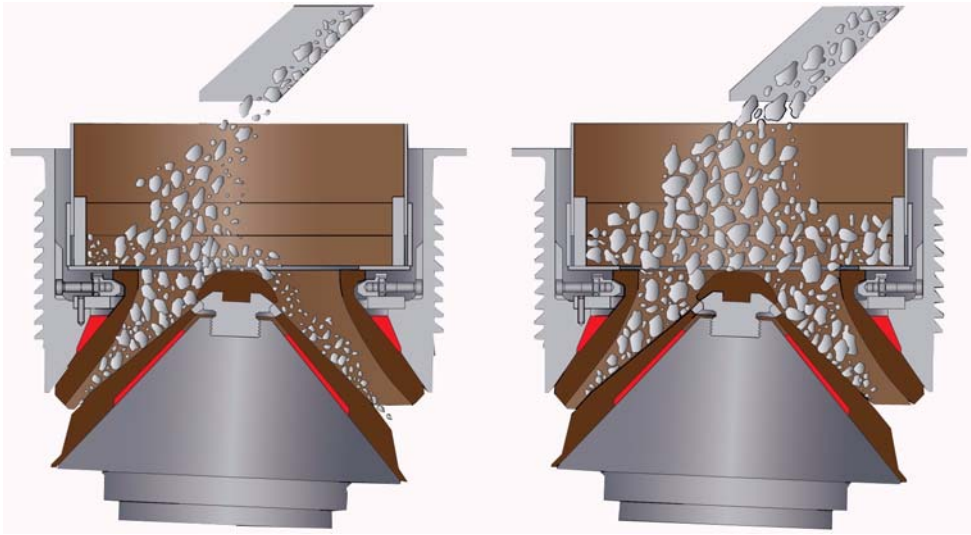
**If there is insufficient charged material and one-sided loading, the ad- jus-ting ring knocks against the base frame. Frequent impact of the ad- jus-ting ring leads to premature wear or destruction of the cone crusher.**

- **Ensure that charging of the crushing material is even and sufficient.**

The prerequisites for trouble-free operation and an optimal attainable performance of the machine are

- even filling of the cone crusher with crushing material.
- sufficient filling (cone crusher at full load).

- Homogeneous grain composition of the crushing material.
- Condition of the crushing material:
  - smaller than the crushing gap on the open side.
    (Oversized pieces lead to congestion and damage to the crusher).
  - where possible, without sticking/caking shares (e.g. clay).
  - less than 10% fines smaller than the gap width.
  - where possible, dry.



unfavourable charging: insufficient charged material, one-side filling, uneven grain distribution

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**NOTE!**

**For detailed instructions on cone crusher operation, please refer to separate instruction manual!**

## 5.8 Starting the crusher process

**⚠ WARNING!**

**Risk of injury!**

**Before starting the system, make sure that no persons in the vicinity can be put at risk. Warn all persons in the vicinity before starting up the system.**

**⚠ CAUTION!**

**Damage to the drive and control elements.**

**Never start the crusher drive when the crusher is jammed.**

**Before starting the crusher, always check that the crushing chamber is empty. If it contains material, empty it.**

1. Set cone crusher local control to Automatic.
2. Select "Automatic" operating mode.
3. Switch the diesel generator on.
4. Switch on main switch.
5. Switch on control voltage.
   Wait for the OP3 controller to power up.
6. Switch off rotary switch for radio remote control.
7. Press "Acknowledge fault / emergency-off" pushbutton.
8. Press "Plant on" pushbutton.
   - Horn sounds for approx. 10 s
   - "Start release" lamp lights up.
9. Press "Plant on" pushbutton.
   - Drives 1 and 2 power up automatically.
   - Drive for crusher 3 flashes.
   - Crusher powers up.
   - "Crusher 3" lamp lights up if oil temperature and lubrication are correct.
10. Press "Plant on" pushbutton.
    - Horn sounds for approx. 10 s
    - "Start release" lamp lights up.
11. Press "Magnet 4" pushbutton.
    - remaining drives power up automatically.
12. Check that the machines work in the correct manner.
13. Feed material.
14. Crush.

## 5.9 Operating the cone crusher

**NOTE!**

**To operate the cone crusher, please refer to separate instruction manual!**

### 5.9.1 Eliminating material congestion

**⚠ WARNING!**

**Danger due to material congestion!**

**Intervention in the running plant, in particular, in the running or coasting crusher, can result in serious or fatal injury.**

- **Eliminate material congestion when the plant is not running.**
- **Never climb on the vibrating conveyor troughs when they are running.**
- **Never open service doors and flaps when the plant is running.**
- **Allow the crusher to coast to a complete standstill.**
- **Switch off the plant, remove the key and secure against reactivation.**
- **Attach appropriate warning sign in a clearly visible area.**
- **Wear protective equipment.**
- **Observe the safety manual.**

**⚠ CAUTION!**

**Risk of destruction of loading devices!**

**Never use diggers or loading shovels to remove bridging (blockages) in area of material feed.**

After elimination of material congestion, the following final tasks must be carried out:

**⚠ CAUTION!**

**Destruction of the drive or control elements!**

- **Never run the crusher drive against a blocked crusher.**
- **Before starting the crusher, always check that the crushing chamber is empty. Empty the crushing chamber if there is material in it.**

- Remove all tools used from plant machines and components.
- Reinstall disassembled guard devices and components, ensuring they are correctly fitted.
- Ensure that there are no more persons in the hazard area.

## 5.9.2 Clearing stockpiles

The height and volume of the stockpiles must be monitored. The stockpile must not extend as far as the system. The distance between stockpile and conveyor belt must be at least 250 mm (0.82 ft.

If wheel loaders are used for clearing, take care not to damage the system.

## 5.9.3 Winter operation

**NOTE!**

**In the event of frost there is a risk of seals and scrapers freezing.**

**Before switching the system on, always check the free movement of scrapers and seals that come into contact with moving parts.**

**IMPORTANT!**

**Check antifreeze and cooling water in the motor.**

# 5.10 Water pump (option)

**⚠ CAUTION!**

**Danger of material damage!**

**Operation without water and operation with contaminated or frozen water destroys the water pump.**

- **Always ensure there is a sufficient water supply.**
- **Only use clean water that is not frozen.**
- **If there is a risk of frost, completely drain the water system.**


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**Suction mode**

When the water pump (1) is in suction mode (e.g. suction from water tank), the following items must be observed:

- The tank and the water must be clean.
- Suction line no more than 5 m (16 ft) in length.
- Fill water pump with water before bringing into operation.
- Water must only be supplied to the water pump via an on-site filter.

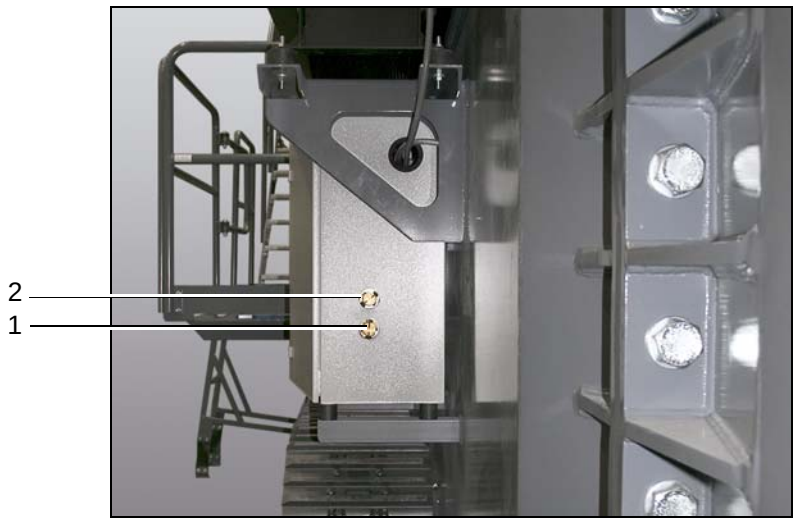
**Operating via existing water mains**
Maximum pressure of water mains: 4 bar (58 psi).

**Operation**

- Switch on crushing plant.
- Connect water pump (1) to 230 V socket outlet in water pump cabinet.
- Press "water pump" button.
- Open or close the corresponding shut-off cocks (2) of the supply lines to the spraying nozzles.
- Activate or deactivate water pump (1) with button on switch cabinet.
- Open or close supply line for spray system using corresponding shut-off cock (2).

## 5.10.1 Water connections

The multi-stage self-priming water pump is designed for suction mode. In flooded suction mode, the spraying nozzles are supplied directly with water.

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*[1 ] Connection for suction operation*

*[2 ] Connection for flooded suction*

- Connect the water supply line to the relevant connection.

## 5.11 Switch cabinet overpressure system


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The overpressure system (1) builds up overpressure in the switch cabinet. This prevents dust from penetrating the switch cabinet. The overpressure system only functions if there are no leaks.

- Keep the switch cabinet properly closed during operation.
- Regularly check air hoses for damage and replace them if necessary.
- Clean air filter at least once a week and more frequently if necessary.

# 6 Maintenance

## 6.1 Safety information

**⚠ WARNING!**

**Risk of fatal injury!**

**Only carry out repair work or maintenance work when machine is swit-ched off!**

- **Safeguard against unauthorised start-up of machine:**
- **Lock switch cabinet**
- **Switch off and lock main switch**
- **Attach warning sign on the machine to warn against restart**

**NOTE!**

**Those responsible must ensure that during maintenance work the ma--chine is inoperative and they must safeguard it against its unauthorised restart.**

**IMPORTANT!**

**Ensure that all work is carried out with the utmost cleanliness.**

All maintenance, repair and service work not described in this chapter must only be carried out by personnel trained by KLEEMANN GmbH. This includes repair work at the hydraulic and electrical system and on the diesel generator.

Throttle valves and pressure relief valves set by Kleemann GmbH may only be changed by personnel trained by Kleemann. It is prohibited to remove seals from safety valves.

Work on the crushing machine or hydraulics system must only be carried out when the machine has been switched off.

## 6.2 Maintenance schedule

| Maintenance work | First time | Interval time | Interval h | At least |
|---|---|---|---|---|
| **Cone crusher** | | | | |
| See separate instructions | | | | |
| | | | | |
| **Vibrating conveyor troughs** | | | | |
| Check terminal boxes for leaks | | | 100 h | |
| Check security of vibration motors | 50 h | | 500 h | |
| Check wear plates | | weekly | | |
| Lubricate vibration motors | see separate instruction manual | | | |
| | | | | |
| **Belt conveyor** | | | | |
| Check transport belts | | daily | | |
| Adjust rubber scraper | | as required | | |
| Adjust rubber seal | | as required | | |
| Oil change for belt drive | 500 h | | 2000 h | 1.5 years |
| Check sealing lips on plummer block | | weekly | | |
| | | | | |
| **Hydraulic system** | | | | |
| Check hydraulic lines for leaks and damage | 100 h | as required | | |
| Change return filter | 500 h | | 1000 h | |
| Change suction filter | 500 h | | 1000 h | |
| Hydraulics oil level check | | daily | | |
| Oil change or hydraulic oil analysis | 500 h | | 2000 h | |
| | | | | |
| **Crawler running gear** | | | | |
| Check oil level on planetary gears | | monthly | 200 h | |
| Oil change on planetary gears | 200 h | | 2000 h | yearly |
| Check chain tensioning | | as required | | |
| Check gearbox for leaks | | daily | | |
| Security of track rollers | | monthly | | |
| Security of track shoes | | monthly | | |
| | | | | |
| **Switch cabinet** | | | | |

| Maintenance work | First time | Interval time | Interval h | At least |
|---|---|---|---|---|
| Clean switch cabinet | | as required | | |
| Clamps and connection bolts | 50 h | as required | | |
| Reseal rubber seal at switch cabinet doors | | | | yearly |
| Check air/spring/rubber pressure | | 3 months | | |
| | | | | |
| **Switch cabinet overpressure system** | | | | |
| Check function / hoses | | daily | | |
| Clean air filter | | weekly | | |
| | | | | |
| **General** | | | | |
| Leak detection | | daily | | |
| Retighten screw connections | | as required | | |
| Replace defective lubricating nipples | | as required | | |
| Check hydraulic system for leaks | | daily | | |
| Check electric indicator lamps (if fitted) | | daily | | |
| Check emergency off | | daily | | |
| | | | | |
| **Diesel generator** | | | | |
| See separate instructions | | | | |
| | | | | |
| **Magnetic separator** | | | | |
| See separate instructions | | | | |

## 6.3 Fluids and lubricants

The fluids and lubricants tables contains a comparison of the respective products of the same spec-i-fications of different brands.

The order in which the brands are listed bears no relation to the quality of the products.

The listed brands are simply an abstract of the fluids and lubricants available on the market. During a future revision, this selection can be changed.

A complete presentation of the individual fluids and lubricants with all data and approvals, e.g. from combustion engine and gearbox manufacturers, is not possible for reasons of space.

The specification details take DIN and ISO standards, in particular, into consideration.

The fluids and lubricants table is designed to provide initial orientation for servicing KLEEMANN plants and machines. However, it does not replace the advice of a lubrication specialist or the recom--mendation of the engine and gearbox manufacturers.

For environmental protection reasons, it is absolutely necessary to dispose of used oil in accordance with the specifications after every service or oil change.

Fluids and lubricants for special application conditions are not included in this lubricant table.

**NOTE!**

**We shall only assume liability for our plants and machines if the listed fluids and lubricants, or their verifiable equivalents, have been used!**

## 6.3.1 Lubricants

### 6.3.1.1 Power supply unit/engine

The fluids and lubricants to be used are described in the manufacturer's documentation.

**Hydraulic oil supply**

| Operating material | Specifications | Brand | Product |
|---|---|---|---|
| Hydraulic oil -39 °C to +80 °C (-38 °F to +176 °F) | DIN 51524, ISO VG 32-68 | EMKA | Hydrostar HES |
| | | BP Biohyd | SE 46 |
| | | ESSO | Univis HEES 46 |
| | | Fuchs | Plantosyn 3268 |

| Operating material | Specifications | Brand | Product |
|---|---|---|---|
| Gear oil for pump splitter gear--box -35 °C to +60 °C<br>(-31 °F to +140 °F) | ISO VG 150 | EMKA | CLP HC 150 |
| | | AVIA | Syntogear PE 150 |
| | | CASTROL | Alphasyn T 150 |
| | | Fuchs | Renolin Unisyn CKC 150 |
| | | KLÜBER | Klübersynth GEM 4 150 N |
| | | MOBIL | Mobilgear SHC XMP 150 |
| | | SHELL | Omala HD 150 |

### 6.3.1.2 Cone crusher

**NOTE!**

**For lubrication of the cone crusher, please refer to separate instruction manual.**

### 6.3.1.3 Conveyor unit

| Operating material | Specifications | Brand | Product |
|---|---|---|---|
| Gear oil -35 °C to +60 °C<br>(-31 °F to +140 °F) | ISO VG 150 | EMKA | CLP HC 150 |
| | | AVIA | Syntogear PE 150 |
| | | CASTROL | Alphasyn T 150 |
| | | Fuchs | Renolin Unisyn CKC 150 |
| | | KLÜBER | Klübersynth GEM 4 150 N |
| | | MOBIL | Mobilgear SHC XMP 150 |
| | | SHELL | Omala HD 150 |
| Grease -30 °C to +130 °C<br>(-22 °F to +266 °F) | ISO NLGI 2 | EMKA | Lagerstar EP2 |
| | | BP | Energrease LS-2 |
| | | ESSO | Beacon EP 2 |
| | | Fuchs | Renolit F EP 2 |
| | | MOBIL | Mobilux EP 2 |
| | | SHELL | Alvania EP 2 |
| | | | |

### 6.3.1.4 Drive system

| Operating material | Specifications | Brand | Product |
|---|---|---|---|
| Gear oil for track drive<br>-57 °C to +90 °C<br>(-70 °F to +194 °F) | DIN 51517,<br>ISO VG 150 | EMKA | Renolin Unisyn CLP 150 |
| | | BP Enersyn | HTX 175 |
| | | Fuchs | Unisyn CLP 150 |
| | | MOBIL | SHC 629 |

| Operating material | Specifications | Brand | Product |
|---|---|---|---|
| Grease for chain tightener<br>-30 °C to +130 °C<br><br>(-22 °F to +266 °F) | ISO NLGI 2 | EMKA | Lagerstar EP2 |
| | | BP | Energrease LS-2 |
| | | ESSO | Beacon EP 2 |
| | | Fuchs | Renolit F EP 2 |
| | | MOBIL | Mobilux EP 2 |
| | | SHELL | Alvania EP 2 |
| | | | |

## 6.3.2 Lubricant table for hydraulic driving system / Auxiliary hydraulics

| **Fahrhydraulik / Zusatzhydraulik<br>Hydraulic driving system / Auxiliary hydraulics** | | |
|---|---|---|
| **Schmierstoff<br>Lubricant<br>Genre de lubricant** | **Öl / oil / huile** | **Fett / grease / graisse** |
| | | |
| **Umgebungstemperatur<br>Ambient temperature<br>Temperature ambiante** |  | |
| | **-5 ...+35 °C<br>23 °F ... +95 °F** | |
| **Hersteller / Manufacturer / Fabricant** | | |
| **Hydrostar HES<br>Synth. multigrade hydraulic oil** | **AFNOR NFE 46 HV HLP<br>VG 22-68** | **-** |
| **Fuchs** | **Plantosyn 3268 ECO** | |

We can only guarantee perfect operation of our machines if the lubricants specified above are used.
The order in which the mineral oil companies are listed bears no relation to the quality of the products.

## 6.3.3 Diesel Fuels

At low temperature, paraffin separations can cause obstruction in the fuel supply resulting in malfunc--

tions.

Below outside temperatures of 0 °C, use winter diesel fuel (up to -15 °C). In many cases, diesel fuel with additives with an application temperature of up to approx. -20 °C is offered.

At outside temperatures below 0 °C, the temperature properties of diesel fuel can be improved as a preventive measure by adding petroleum. A maximum of 20% can be added.

When refueling, the petroleum must be filled first so that it mixes with the diesel fuel.

**⚠ CAUTION!**

**Danger of engine damage**

**The addition of petroleum to diesel fuels (winter diesel fuel) already ad-apted to low outside temperatures can result in engine damage.**

- **Only add petroleum to summer diesel fuels.**
- **Do not add any other flow improvers or benzene.**

**Necessary properties of diesel fuel**

| Property | Requirement |
|---|---|
| Viscosity at 40 °C | 2.0 - 4.5 mm2/s (cSt) |
| Density at 15 °C | 0.82 - 0.86 kg/dm3 |
| Sulfur content (percent by weight) | maximum 0.3 % |
| Ignitability (cetane number) | at least 49 |
| Flash point | 56 °C |
| Complies with standard EN 590 | ASTM D 975 Grade No. 1-D and 2-D |

**IMPORTANT!**

**It is essential also to note and observe the specifications in the manuf-acturer's documentation.**

# 6.4 General maintenance work

## 6.4.1 Checking emergency-stop devices

### 6.4.1.1 Emergency-stop button and release cord

**⚠ WARNING!**

**Danger of material congestion**

**The immediate deactivation of all plant drives during the emergency stop can result in material congestion.**

- **Only actuate the emergency-stop button and release cord if the plant has run empty.**

- Run the plant completely empty.
- Switch on the plant in automatic mode. Actuate the emergency-stop button on the plant. All drives are shut down immediately. The crusher still runs on for approx. 60 seconds and then is also shut down. The diesel generator continues running.
- Release the emergency-stop button and repeat the procedure with all emergency-stop buttons and release cords on the plant.
- Check free accessibility of plant emergency-stop buttons and release cords.
- Check emergency-stop buttons of the radio remote control and wired remote control.
- If there is a malfunction, find the cause and eliminate it.

### 6.4.1.2 Emergency switching-off button

**⚠ WARNING!**

**The immediate deactivation of the diesel generator by the emergency switching-off button can cause material congestion.**

- **Only actuate the emergency switching-off button if the plant has run empty.**

- Run the plant completely empty.
- Switch on the plant in automatic mode.
- Actuate the emergency switching-off button on the switch cabinet.All drives, including the die--sel generator, are shut down immediately.
- Release the emergency switching-off button.
- If there is a malfunction, find the cause and eliminate it.

## 6.4.2 Retightening screw connections

If loose screw connections are identified during inspection and maintenance work or during the ma--chine's operation, they must be retightened immediately. See table for tightening torques.

In addition, after certain maintenance and repair work the respective screws must be retightened after a specific service life. The details can be found in the specifications.

| Screw 8.8 | M10 | M12 | M16 | M20 | M24 | M30 |
|---|---|---|---|---|---|---|
| **Torques Nm (lb ft)** | **51 Nm (38 lb ft)** | **87 Nm (65 lb ft)** | **214 Nm (158 lb ft)** | **430 Nm (318 lb ft)** | **743 Nm (548 lb ft)** | **1350 Nm (996 lb ft)** |

## 6.4.3 Check hydraulics for leaks

**DANGER!**

**Danger of serious physical injury!**

**Hydraulic fluid is under high pressure. When working on the hydraulic system, squirting hydraulic oil can result in very serious eye injuries or other injuries.**

- **Only tighten screw fittings and connections when the system is de--pressurised.**

- Regularly check all hydraulic lines, hydraulic cylinders, hydraulic pumps and oil tanks for oil loss and leaks.
- Tighten or replace leaky screw connections.
- Replace cracked or brittle hoses.
- Repair or replace leaky hydraulic components.
- Regularly free the oil tank vent of dirt and dust, in order to avoid obstruction.

## 6.4.4 Testing the electrical indicator lights

Testing the indicator lights is necessary to guarantee reliable verification of the machine’s operating state. Defective lamps can cause false assumptions, resulting in considerable danger.

## 6.4.5 Listening to bearing, checking its temperature

Unusual bearing noises or too high a temperature may indicate possible defect.

Checks must be carried out on both bearings at operating temperature of machine.

To recognise unusual bearing noises requires much experience due to high ambient noise level.

**⚠ CAUTION!**

**Danger of burns!**

**Bearings can heat up intensely. Physical contact with bearings may lead to burns.**

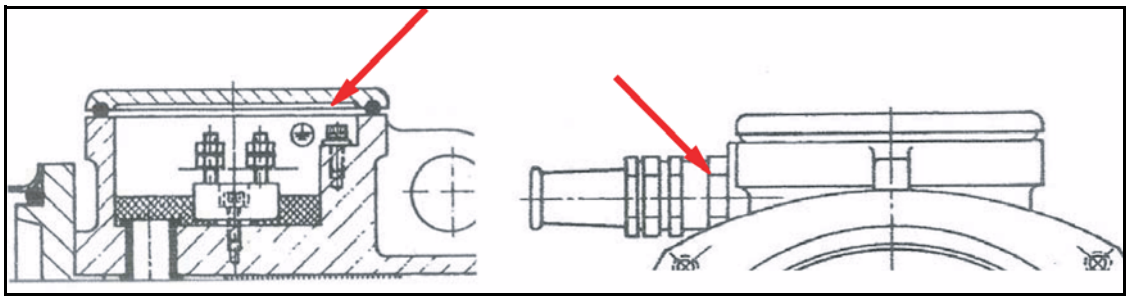
**NOTE!**

**It is possible that after lubrication bearings may heat up intensely. This has no negative effect on bearings.**
**Please note that the temperature of bearings drops again to roughly 50 °C (122 °F) no later than 8 hours afterwards.**
**If after this period the abnormally high bearing temperature has not dropped, there is probably a fault in the bearing.**

## 6.5 Vibrating conveyor chutes

### 6.5.1 Terminal box (electric motor)

Loose terminal box covers and cable entries can result in contact problems and short-circuits due to the penetration of water. Parts **must be regularly** checked for firm positioning and leaks.



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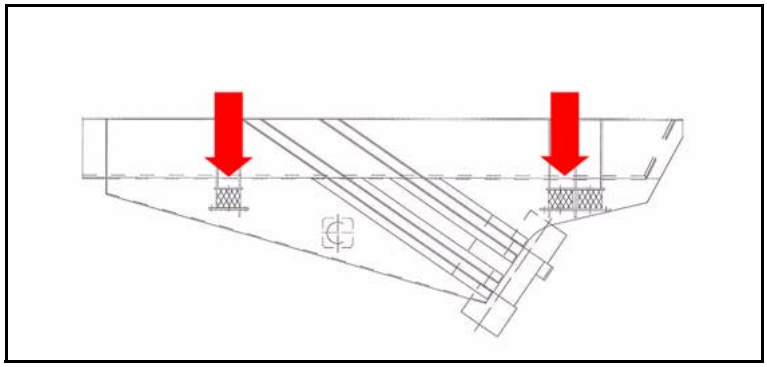
## 6.5.2 Checking the rubber buffers



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**⚠ WARNING!**

**Danger due to defective rubber buffers!**

**Check the rubber buffers for damage regularly.**

**Replace defective rubber buffers immediately.**

## 6.5.3 Checking security of vibration motors

**⚠ WARNING!**

**Risk of injury due to unprotected unbalance weights!**

**Contact with the uncovered unbalance weights of the vibration motors can result in serious or fatal injury.**

- **Only operate vibration motors with installed protective covers.**
- **During maintenance and repair work, secure plant components against activation.**

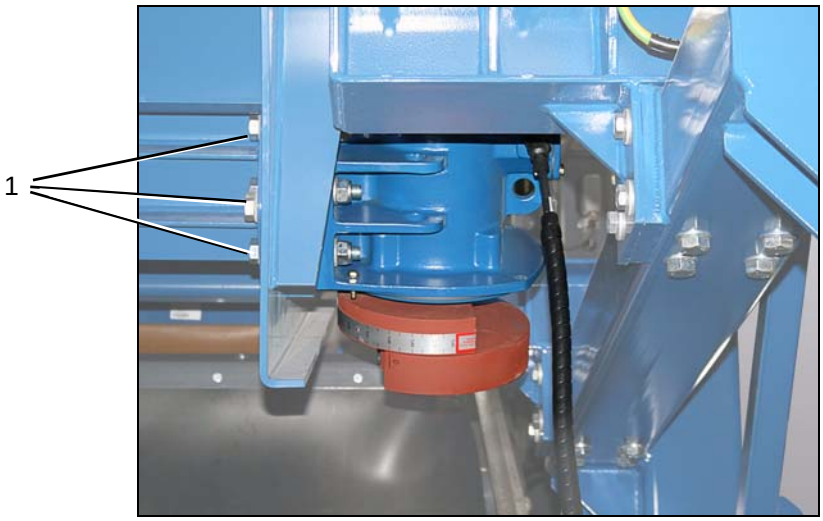
## ⚠ CAUTION!

**Risk of material damage from water ingress or dust!**

**Unguarded vibration motors could fail prematurely. Bearing damage and short circuits in the winding can be caused by water or dust.**

- **Only operate plant system with protective covers.**
- **Replace protective covers without delay if they are found to be defec-- tive.**

The fastening screws (1) of the vibration motors must be checked on a rotational basis because these screws are subject to high alternating loads and can therefore work loose. The transmission of vib-ra-tional forces is no longer guaranteed if screw connections are loosened and premature destruction of the vibration motors is likely.

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- Switch off the plant and safeguard against restart.
- Retighten all fastening screws [1] using a torque wrench.

| Thread | M10 | M12 | M16 | M20 | M24 | M30 |
|---|---|---|---|---|---|---|
| Tightening torque [Nm] | 50 | 90 | 230 | 450 | 750 | 1450 |
| [lbf ft] | (37) | (66) | (170) | (332) | (553) | (1069) |

### 6.5.4 Lubricate vibration motors

See instruction manual for "Vibration motors".

### 6.5.5 Wear lining

Regular inspections for fastening, abrasion and cleanliness.

Wear lining must be inspected weekly and replaced if worn.

**NOTE!**

**When new wear plates are installed, they should be retightened after ap-- prox. 1 day.**

## 6.6 Cone crusher maintenance

**NOTE!**

**For maintenance of the cone crusher, please refer to separate instruction manual!**

## 6.7 Tensioning V-belt

The V-belt tension is set by adjusting the clamping spindles. V-belts must not vibrate when the crus-h- er is idling. If vibrations occur, the belts must be loosened and then retensioned.

**Note**

**NOTE!**

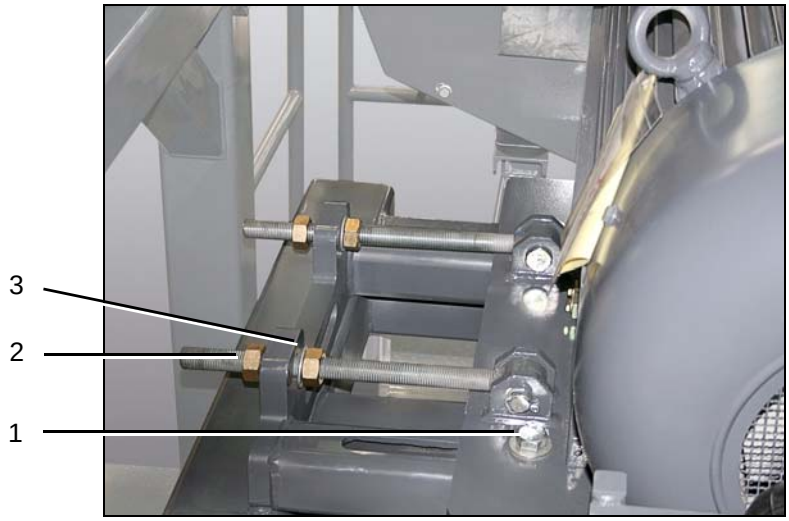
**A newly fitted V-belt must be retensioned after 50 operating hours due to elongation.**

- Avoid excessively loose belts.
  => belts can be ejected from the belt pulley.

- Similarly, avoid excessive belt tension.
  => increased bearing stress, increased belt wear.

**Tensioning**

- Switch off plant, wait until crushing coasting is complete.
- Lock main switch.

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- Release all four fastening screws (1) but do not remove them.
- Release opposed spindle (2).
- Turn clamping spindle (3) clockwise to tension the belt.
- Check belt tension.
- Tighten opposed spindle (2).
- Tighten fastening screws (1).

## 6.7.1 Checking the V-belts

**Checks**

- Check the V-belts for:
  - Cracks
  - Twisting (mainly on the large V-belt pulley)
  - Tension
- If a V-belt is twisted, return it to the correct position
- Replace worn V-belts (see chapter “Changing the V-belts”)
- If the V-belt is too loosely or too strongly tensioned, adjust the tension (see chapter “Tensioning the V-belts”)

# 6.8 Belt conveyor

## 6.8.1 Checking the conveyor belts

**⚠ WARNING!**

**Risk of being pulled in!**

**When performing visual inspections on the running conveyor belt, there is a danger of limbs being pulled in.**

- **Maintain safety distance**
- **Only perform adjustments when the belt is stationary**

- Run the belts and check for damage from a safe distance (visual inspection)

**Attention must be paid to the following defects**

- Edge damage
- Cover plate damage
- Fabric damage
- Detachment of endless connections
- Rubbing points
- Scoring
- Excessively strong or weak belt tensioning
  =>too weak: Belt will hang down between the carrier rollers
  =>too strong: Vibration of the bottom strand
- Slipping of the drive pulley
- Seized carrier rollers
- Worn carrier rollers
- Seized guide pulleys
- Unusual noises
- Skew running of the belt
- Trapped lumps of material
- Loose screw connections
- Contamination
- Jagged scrapers
- Worn sealing lips
- Seized scrapers (Storage)
- Off-centre conveyed material feed

- If you suspect damages or defects, stop the belt, lock the main switch and investigate the ex--

tent of the damage with the system stationary

- Eliminate any defects

## 6.8.2 Adjust rubber scraper

**DANGER!**

**Risk of fatal injury!**

**Only carry out repair work or maintenance work when machine is swit-ched off!**

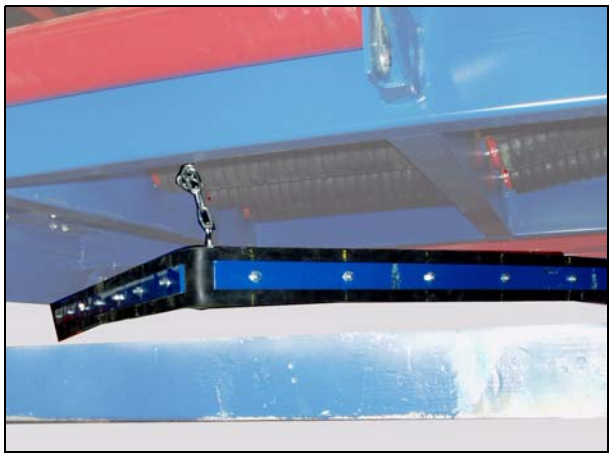
**Safeguard against unauthorised start-up of machine:**

- **Lock switch cabinet**
- **Switch off and lock main switch**
- **Attach warning sign on the machine to warn against restart**

**NOTE!**

**Those responsible must ensure that during maintenance work the ma--chine is inoperative and they must safeguard it against its unauthorised restart.**

**Wedge stripper**



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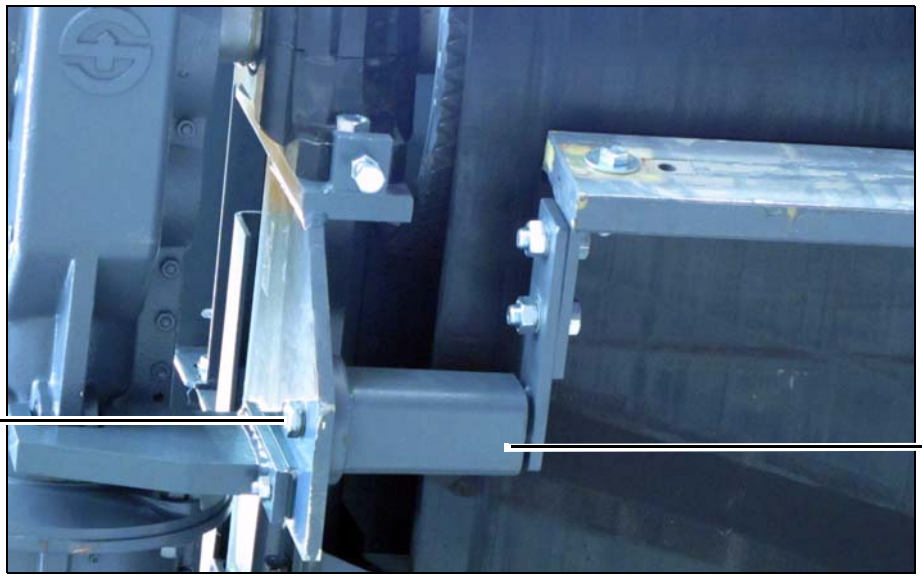
The wedge stripper on the inside of the belt adjusts itself automatically through its dead weight.

Regularly check the stripper lip for wear.

**Front scraper**

with clamping elements to guarantee contact pressure of scraper lip

**Adjusting front scraper**

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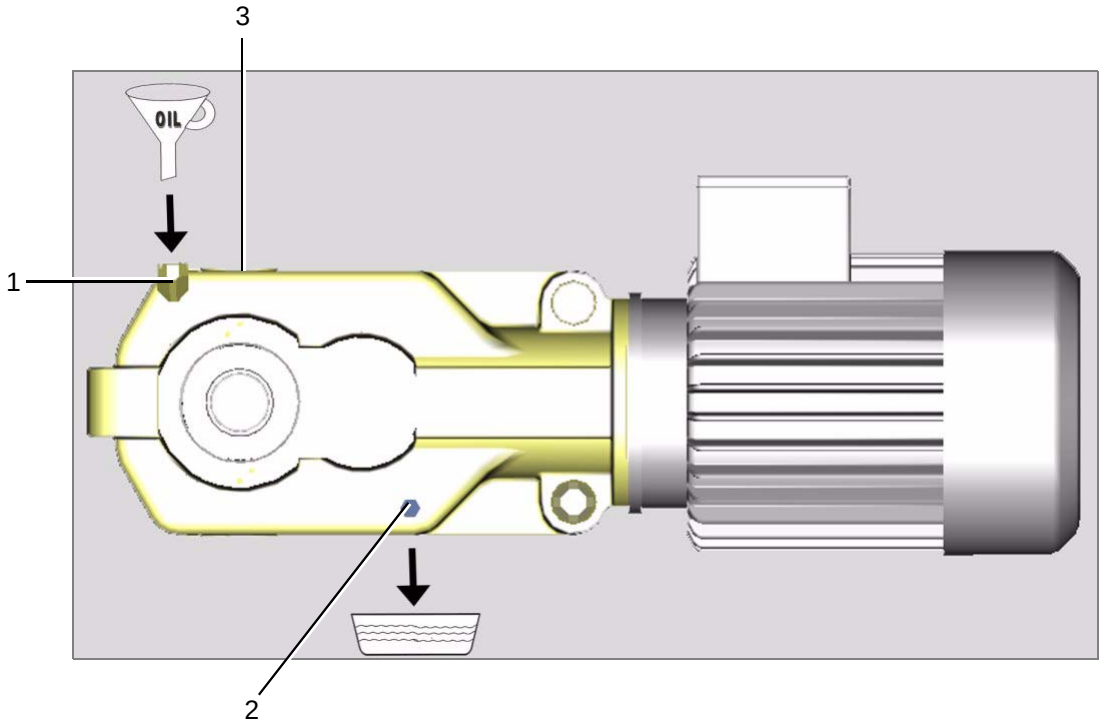
- Attach spanner to clamping element (1).
- Release mounting screw (2) of clamping element.
- Press on scraper by turning the clamping element with the spanner.
- Tighten mounting screw.
- Repeat the operation with the clamping element on the other side.

## 6.8.3 Belt drive oil service

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| No. | Designation |
|---|---|
| 1 | Bleed screw |
| 2 | Drain screw |
| 3 | Motor nameplate |

**Oil level check**

It is not normally possible to perform an oil level check, as the motors are installed at an angle and therefore the oil inspection holes are not congruent. If a large leak is detected in a gear motor, the oil quantity should be checked as follows:

- Clean the gear motor, paying particular attention to the bleed screw (1) and the oil drain-screw (2)
- Remove bleed screw
- Remove drain screw, drain oil and collect in a clean container
- Measure oil quantity. For correct oil quantity, see motor nameplate (3)
- Insert drain screw and tighten
- Top up oil and replace any shortfall

- Insert bleed screw and tighten
- Check transmission for leaks

**Change oil**

- Clean the gear motor, paying particular attention to the bleed screw (1) and the oil drain -screw (2)
- Remove bleed screw
- Remove drain screw, drain oil and collect in a clean container
- Insert drain screw and tighten
- Add new oil, for oil quantity see motor nameplate (3)
- Insert bleed screw and tighten
- Check transmission for leaks

### 6.8.4 Servicing magnetic separators

**DANGER!**

**Danger due to magnetic fields**

**Electric and permanent magnetic separators generate strong magnetic fields that present a risk to personnel.**

- **Persons with pacemakers and other medical-technical devices must stay well clear of magnetic separators.**
- **Keep a distance of at least 2 metres from magnetic separators.**
- **Observe the safety manual.**

**NOTE!**

**The maintenance and repair work on the magnetic separator is de-scri-bed in the manufacturer's documentation.**

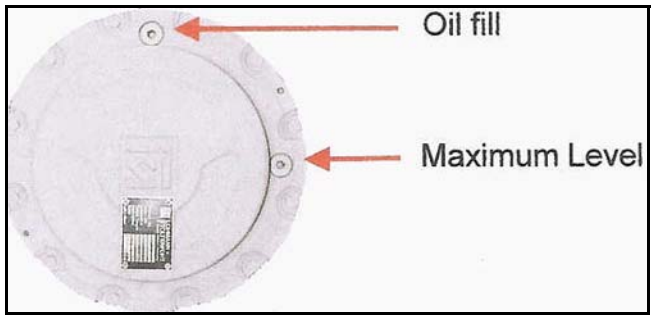
- **Carry out all maintenance and repair work based on the manufacturer's documentation.**
- **Observe the safety instructions in the manufacturer's documentation.**

## 6.9 Crawler-track chassis

### 6.9.1 Planetary gear oil service

- Position the machine so that the filling hole is at the top and the outlet is at the side (inspection plug)

Inscription is stamped into the housing

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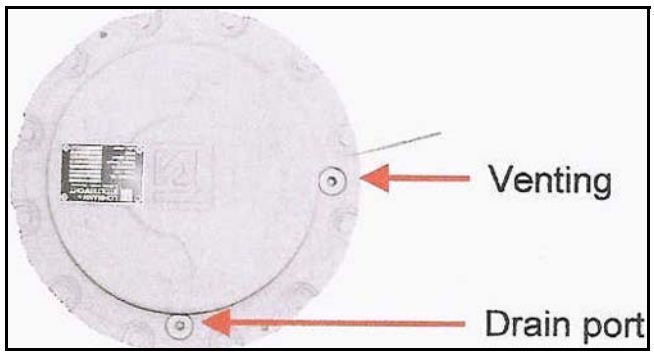
**Oil level check**

- Remove inspection plug

  **-** If no oil emerges,

  **-** use an Allen wrench to check how far below the inspection hole the oil level is (do not let the Allen wrench fall in).
- Top up oil if required

**Oil change**

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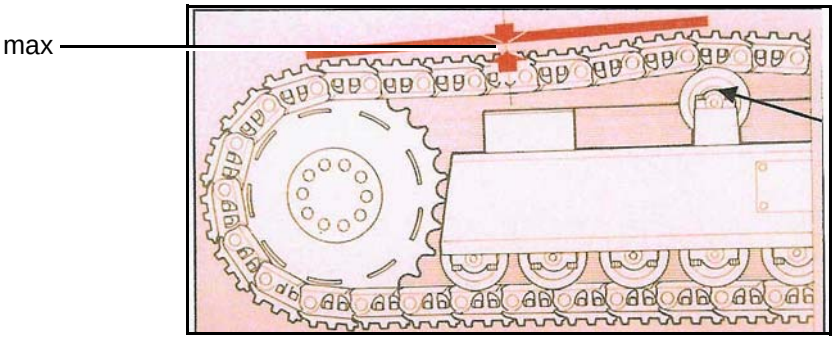
- Remove inspection and drain plugs
- Collect oil in suitable receptacle
- Fit drain plug
- Pour oil into the filling hole up to the height of the inspection plug
- Fit inspection plug

## 6.9.2 Chain tension

**Inspection**

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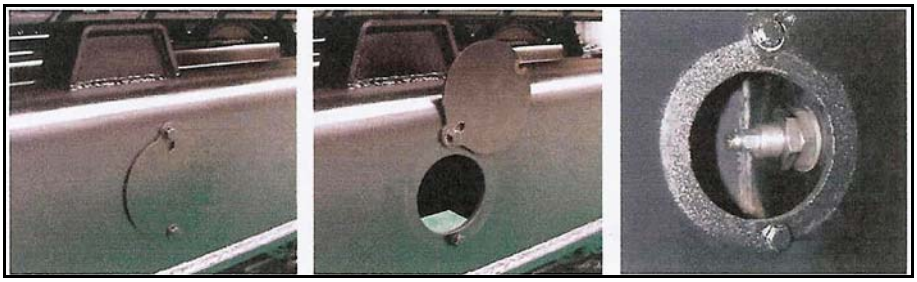
- Extend the chain on level ground
  Chain should be load-free if possible
- Check whether the upper section of the chain is clearly sagging
- If the chain is sagging more than 3 - 4 cm (1.2 in - 1.6 in) at the lowest point, it must be re-tensioned

**Tensioning the chain**



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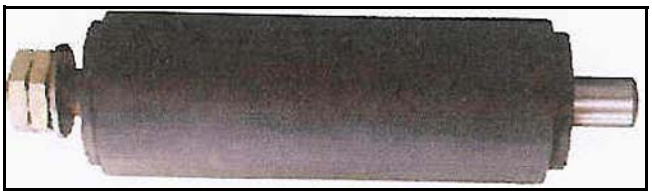
- Check chain for damage
- Unscrew chain tensioner cover
- Push on sliding coupling
- Tension chain by forcing in grease with a grease gun
  Check changes in chain tension during tensioning
  Ideally use an electric grease gun
- Remove sliding coupling
- Screw on chain tensioner cover

### 6.9.3 Chain tensioner



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**⚠ WARNING!**

**Risk of injury!**

**There is a very high risk of accident when carrying out repairs to the chain tensioner. Repairs must be carried out in a specialist workshop. Do not under any circumstances attempt to open the inner cylinder.**

### 6.9.4 Check transmission for leaks

The planetary gear and the hydraulic chain drives must be checked for leaks daily. If escaping oil is detected, the damage must be eliminated immediately.

### 6.9.5 Checking the fixing of the track rollers and baseplates

- Tap the screws to check the fixing of the track rollers
- If the screws move, tighten them immediately.
- Replace defective screws immediately

## 6.10 Hydraulic system

**Safety information**

**⚠ DANGER!**

**Danger of serious physical injury!**

**Hydraulic fluid is under high pressure. When working on the hydraulic system, squirting hydraulic oil can result in very serious eye injuries or other injuries.**

**Work on the hydraulic system must be carried out with the system de--pressurised.**

**In the event of injuries consult a doctor immediately, due to the risk of infection.**

1. Hydraulic system is under high pressure!
2. Use suitable aids for detecting leaks, due to risk of injury!
3. Before carrying out work on the hydraulic system, the system must be depressurised.
4. The motor must be switched off prior to carrying out work on the hydraulic system

**NOTE!**

**Ensure safe and environmentally sound disposal of lubricants and filters!**

## 6.10.1 Hydraulic filter

The hydraulic system is equipped with two suction filters, a return filter and a tank ventilation filter.

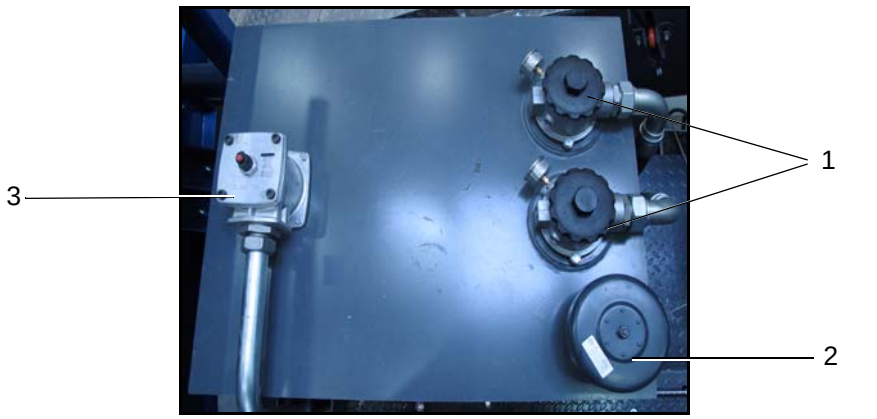
Change interval: first time 500 h
then 1000 h

**Note:**

- Always use the same kind of filter

**Changing filter:**

- Switch off machine
- Remove cover from filter housing
- Replace filter element
- Mount cover on filter housing
- Switch on the hydraulics
- Check filter for leaks

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| No. | Description |
|---|---|
| 1 | Suction filter |
| 2 | Ventilation filter |
| 3 | Return filter |

### 6.10.2 Hydraulic hose lines

Check hydraulic lines on a regular basis and replace if damaged or aged! The new lines must comply with the technical requirements of the device manufacturer!

**Recommended replacement intervals**

- normal requirements: at least every 6 years
- increased requirement (longer operating time, e.g. multi-shift operation, strong external influ-ences): at least every 2 years

**Recommended inspection intervals**

- normal requirements: 12 months
- increased requirement (longer operating time, e.g. multi-shift operation, strong external influ-ences): at least every 6 months

## 6.11 Electrical switch cabinet

We recommend that you carry out an occasional check to see that the terminal and connecting bolts in the switch cabinet are firmly located and tighten them if necessary.

The system must also be protected from dust. If there are large dust deposits in the cabinet, these should be removed by aspiration. The seals on the switch cabinet doors must be regularly checked and replaced annually.

**⚠ DANGER!**

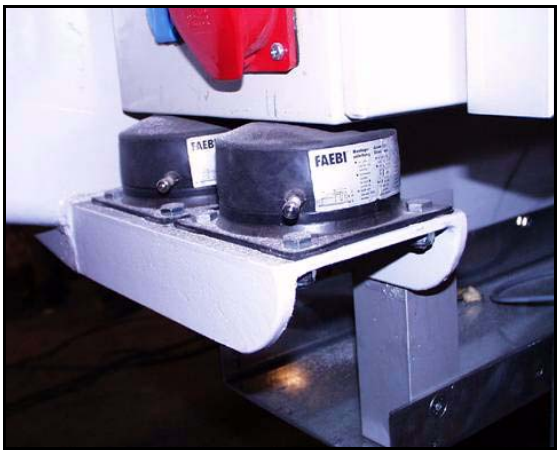
**Risk of fatal injury due to electric shock**

**In the event of contact with live parts, there is a risk of serious injuries due to electric shock!**

**Before carrying out work on electrical systems,**

- **disconnect them from the power supply**
- **protect them against re-starting**
- **ensure that they are disconnected from the power supply**
- **affix maintenance sign**

**Switch cabinet mounting**

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- Regularly check the rubber air-springs for damage and pressure.

| M no. | Type | Pressure | Diameter | Height | Use |
|---|---|---|---|---|---|
| M10015053 | FAEBI 100 | 5 bar (72.5 psi) | 118 mm (4.6 in) | 72 mm (2.8 in) | Double switch cabinet |
| M10015474 | FAEBI 50 | 3.5 bar (50.7 psi) | 80 mm (3.1 in) | 60 mm (2.3 in) | Single switch cabinet |

**NOTE!**

**Check height of rubber air springs every three months and add more air if required.**

# 7 Repair

## 7.1 Safety information

- Risk of fatal injury!
  Only carry out repair work or maintenance work when machine is turned off!
  Safeguard against unauthorised start-up of machine:
  - Lock switch cabinet
  - Switch off and lock main switch
  - Attach warning sign against restart.
- Those responsible must ensure that during maintenance work the machine is inoperative and they must safeguard it against its unauthorised restart.
- Retrofitting, welding and repair work to the machine may only be carried out by those commissioned by the manufacturer. When welding, the earth terminal must be located as close as possible to the weld. Otherwise this may lead to destruction of protective earthing system or bearings.
- If electrical or hydraulic components are replaced, then they must be adjusted in accordance with the details on type plate or wiring diagram.
- Conveyor belts and hopper walls must be supported as soon as work starts on valves, cylinders or hydraulic pipes.
- Throttle valves and pressure relief valves set by Kleemann may only be changed by personnel trained by Kleemann. It is forbidden to remove seals from safety valves.

**DANGER!**

**Failure to follow the above-mentioned safety instructions may lead to severe injuries and also material damage which is not covered under warranty.**

## 7.2 Repair work

The following repair work may be carried out by trained and qualified staff themselves. In the case of doubt, however, the manufacturer must be asked for more precise information.

## 7.3 Vibrating conveyor chutes

### 7.3.1 Replacing the vibration motor

If there is a defect in the vibration motors, it may be necessary to replace one or both motors. Only the same make and type of motor may be used.

## ⚠ WARNING!

**Risk of injury!**

**During test runs, there is a high risk of crushing and pulling in due to ro-- tating or vibrating motor parts. Limbs can be sheared off or torn out.**

**Always maintain a safe distance from the machine.**

## NOTE!

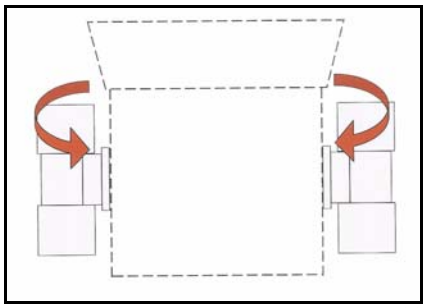
**The unbalance setting must be the same on both motors!**

## NOTE!

**After 10 h full operation, retighten the mounting screws of the vibration motor with the necessary torque.**

**Rotational directions of vibration motors**

Motors have different installation situations. The following illustrations show the prescribed rotational directions.



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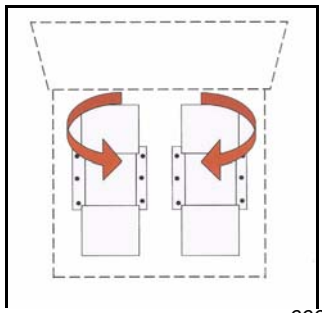

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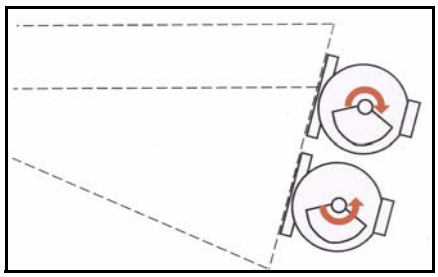

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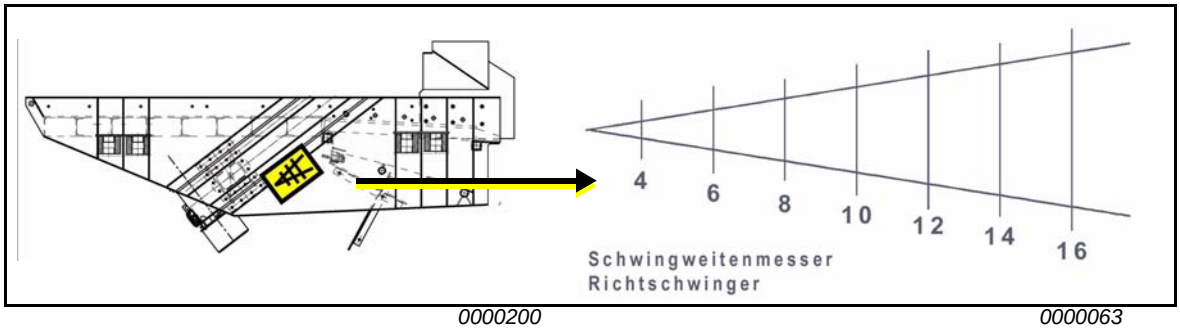
## 7.3.2 Measuring the stroke (Chute)

**⚠ CAUTION!**

**Risk of fatal injury and damage to property!**

**Incorrectly set unbalances can result in damage to the machine!**

- **All unbalances must have an identical setting**
- **All modifications and adjustments to the unbalances require prior consultation with the manufacturer.**

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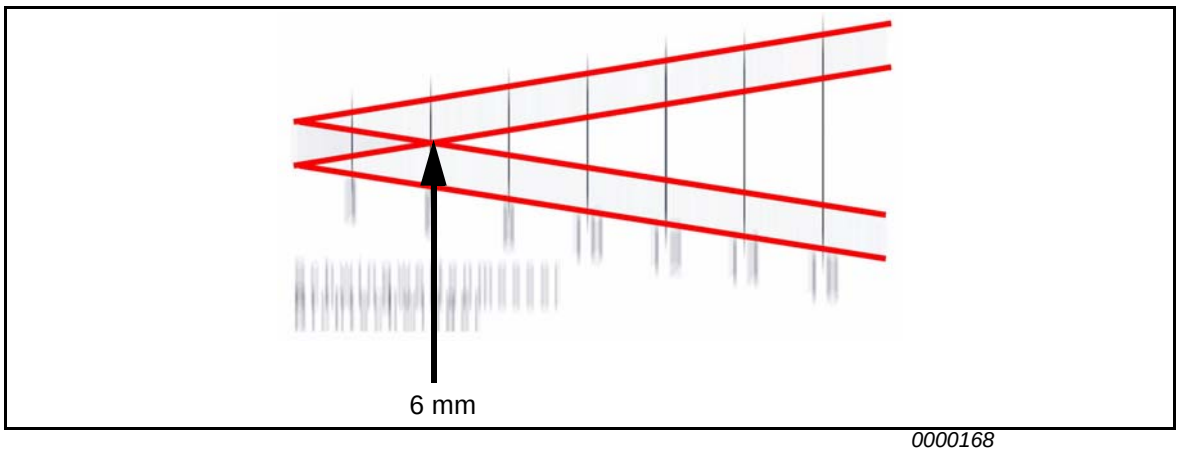
The stroke must be read off on the plate on the chute with the chute running.

- Switch chute on
- Read off stroke on the stroke meter

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Stroke results from the point of intersection of both straight lines The read-off value corresponds to the stroke in mm

## 7.3.3 Adjusting rocker width

**DANGER!**

**Danger due to open running unbalance weights!**

**Open running unbalance weights can catch and draw in personnel leading to serious or fatal injury.**

- **Only operate vibration motors with the guard devices firmly in place.**
- **Read off the rocker width only with the guard devices in position.**
- **Before starting repair work, switch off the plant, remove the key and secure against reactivation.**
- **Attach appropriate warning sign in a clearly visible area.**

**NOTE!**

**Those responsible must ensure that during maintenance work the machine is inoperative and they must safeguard it against its unauthorised restart.**

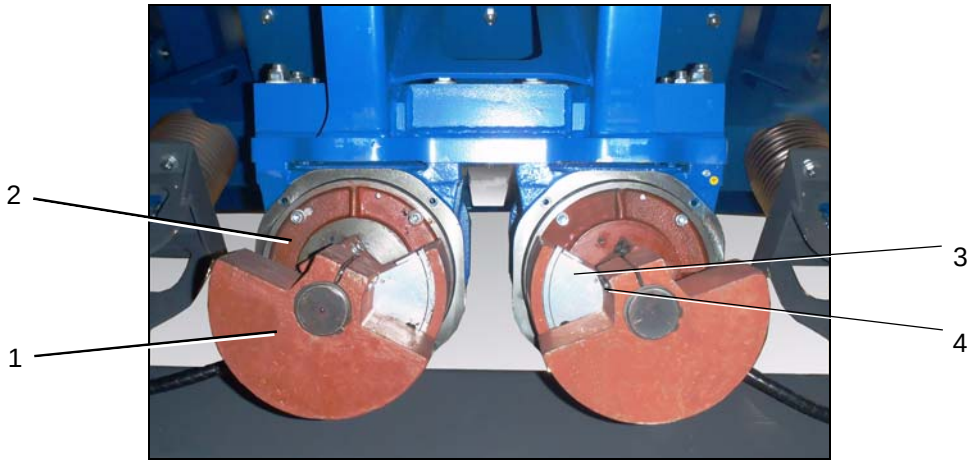
## ⚠ CAUTION!

**Danger of material damage!**

**Incorrectly adjusted unbalances may lead to destruction of machine!**

- **Repair work on vibration motors must be carried out by authorised and qualified personnel only.**
- **Ensure that all unbalance weights of a vibrating conveyor trough have exactly the same settings.**

The unbalance weights are set ex works to a certain percentage. This setting permits usage of the defined speed range via the frequency converter. Before adjusting to a higher percentage, in particular, please consult with the Customer Service of KLEEMANN GmbH.

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- Switch off plant components and the diesel generator.
- Remove all protective covers from vibration motors.
- Release clamping screws (4) on outer unbalance weights (1).
- Set the outer unbalance weights (1) so that the edge of the inner unbalance weight (2) is at the desired percentage on the scale (3). Set all outer unbalance weights (1) to the same percentage value.
- Tighten clamping screws (4) of outer unbalance weights (1) to specified tightening torque.
- Check the rocker width with the vibrating conveyor trough running and correct if necessary.
- Reinstall all protective covers on vibration motors. Ensure that the O-rings of the protective covers are correctly seated.

Every graduation of the scale (3) corresponds to one percent of the maximum centrifugal force of the unbalance weight.

**Setting feeder trough**

Maximum unbalance setting: 83% at 55 Hz

In case of failure of the frequency converter:70% at 60 Hz

**Tightening torques for clamping screws**

| Tightening torques in Nm | | | | | | |
|---|---|---|---|---|---|---|
| **M8** | **M10** | **M12** | **M14** | **M16** | **M20** | **M8** |
| 38 | 77 | 131 | 212 | 312 | 627 | 38 |

## 7.3.4 Changing wear lining


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As the hexagon sockets of the screws become eroded or clogged by material, the screw heads can be secured with weld points to prevent them turning. After removal of the nuts, the wear plates can be removed and the screws can be knocked out.

The wear plates are all bolted from the outside onto the chute trough.

- Unscrew nuts (1) of worn or damaged wear plates and remove wear plates.
- Insert new wear plates and screw in nuts (1) with locking rings.
- Tighten nuts (1) to specified tightening torque.

**Tightening torques of wear plates**

| Tightening torques in Nm | | | | | |
|---|---|---|---|---|---|
| **M10** | **M12** | **M16** | **M20** | **M24** | **M30** |
| 50 | 90 | 230 | 450 | 750 | 1450 |

## 7.4 Cone crusher

**NOTE!**

**To operate the cone crusher, please refer to separate instruction manual!**

## 7.5 Belt conveyor

### 7.5.1 Adjusting tension of conveyor belt

The conveyor belts are tensioned by means of tensioning spindles. Two spindles are installed per belt conveyor.

**⚠ WARNING!**

**Danger of being drawn in!**

**During all inspection and adjustment with a running belt there is a risk of being drawn in at the drive pulley and return rollers and at all support and return rollers. Loss of limbs may occur.**

- **Maintain sufficient safety distance when carrying out visual inspections.**
- **Only perform adjustments when the conveyor belt is stationary.**

**IMPORTANT!**

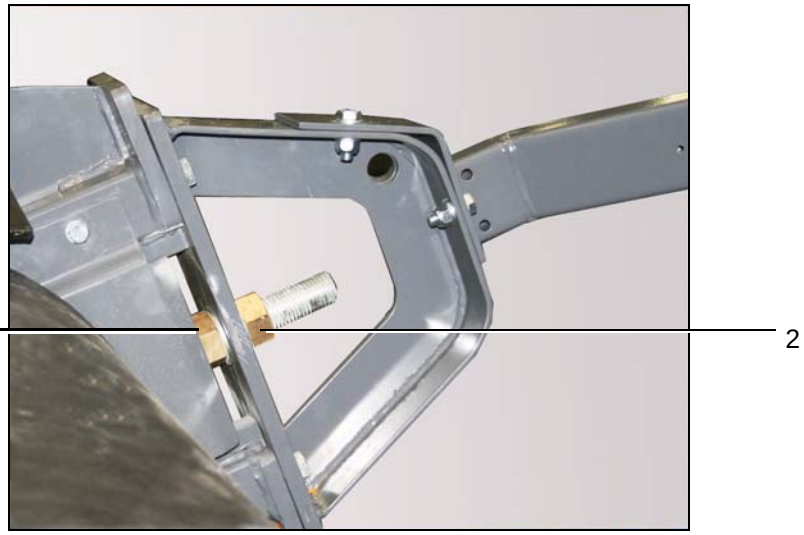
**Adjust both tensioning spindles alternately so that the drive pulley remains at right angles to the frame.**

**Otherwise conveyor belt run would be skewed.**

**NOTE!**

**Excessive or insufficient belt tension**

- **Too weak: increased sagging of conveyor belt between support rollers.**
- **Too strong: vibration of the bottom segment.**

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**Tensioning**

- Back off locknut (2) so that the tensioning path is free.
- Turn adjusting nut (1) until conveyor belt is tensioned.
- Remove locknut (2).

**Detensioning**

- Release locknut (2).
- Turn adjusting nut (1) until the conveyor belt reaches the desired tension release.
- Tighten locknut (2).

## 7.5.2 Changing conveyor belts

There are two basic options for changing the belt:

a. Have split belt joined on the machine by a vulcaniser.
b. Mount endless conveyor belt. With continuous belts, the conveyor belts must be removed

and partly disassembled.

## 7.5.3 Adjusting conveyor belt run

Check belt running with and without load and adjust if necessary.

**⚠ WARNING!**

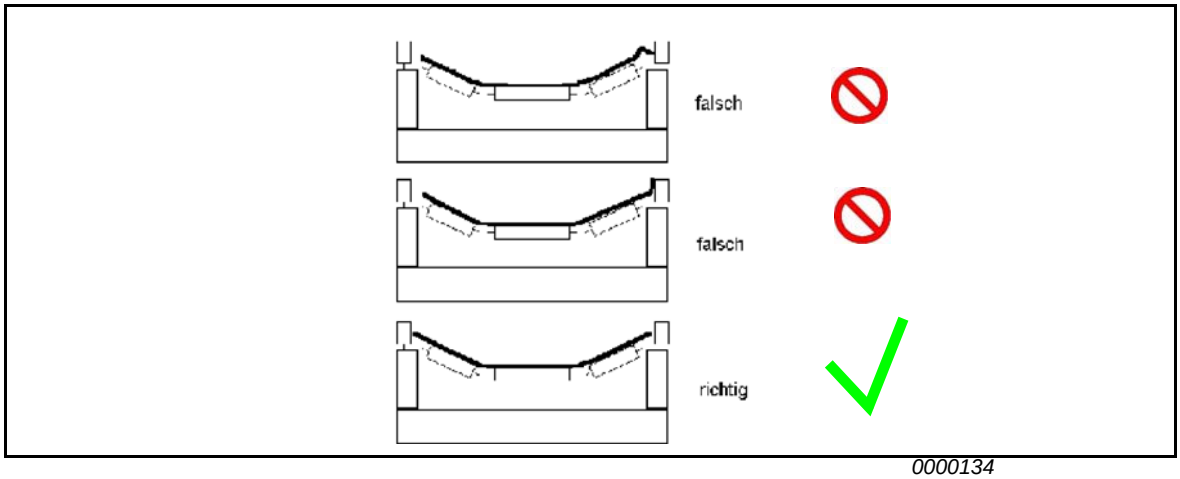
**Danger of being drawn in!**

**During all inspection and adjustment with a running conveyor belt there is a risk of being drawn in at the drive pulley and return rollers and at all support and return rollers. Loss of limbs may occur.**

- **Maintain sufficient safety distance when carrying out visual inspections.**
- **Only perform adjustments when the conveyor belt is stationary.**

**Check**

- Check directional stability with and without load and adjust if necessary.

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- The conveyor belt may lie against the lateral guidance rollers. The formation of folds and bulges must be prevented!

**Reasons for faulty conveyor belt run**

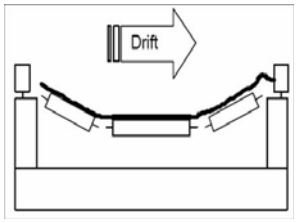
- Inadequate alignment of the drive pulley and/or return roller.
- Drums and rollers contaminated on one side.
- Eccentric feeding unit and guide of the conveyor belt.
- Scrapers placed in the material flow at an inclination that pass on the material via the side conveyor edge.
- Scraping of the conveyor belt on the conveyor belt frame or on jammed material pieces.

- Uneven power transmission over the conveyor belt width due to dampness.
- Incorrectly installed connection of the conveyor belt with kink in longitudinal direction.

**Adjusting conveyor belt run**

If the faulty conveyor belt run is caused by a reason other than those listed above, the belt run must be adjusted via the return rollers.

Example: Drift to the right

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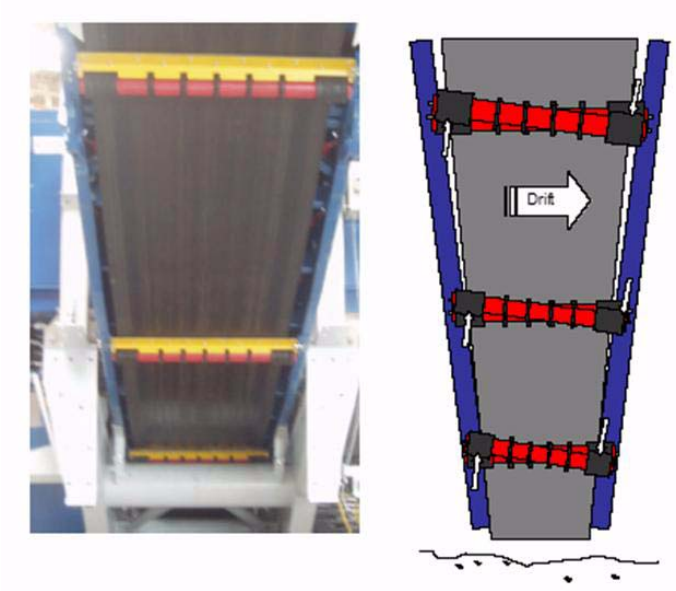


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At the point where the conveyor belt begins to drift, one or several return rollers can be adjusted.

- Exclude the above-mentioned reasons for faulty belt run.
- Tension the conveyor belt if necessary.
- Switch off plant components and the diesel generator.
- Release mount of return roller and turn slightly in the elongated holes.
- Tighten mount again.
- Switch on plant components and diesel generator and observe conveyor belt run with and with-

out charged material.

- Check setting as required.

**IMPORTANT!**

**Even a few millimetres in the setting range of the return rollers is sufficient to make a correction to the conveyor belt run. To check the conveyor belt run, the belt conveyor must run at least 2 minutes.**

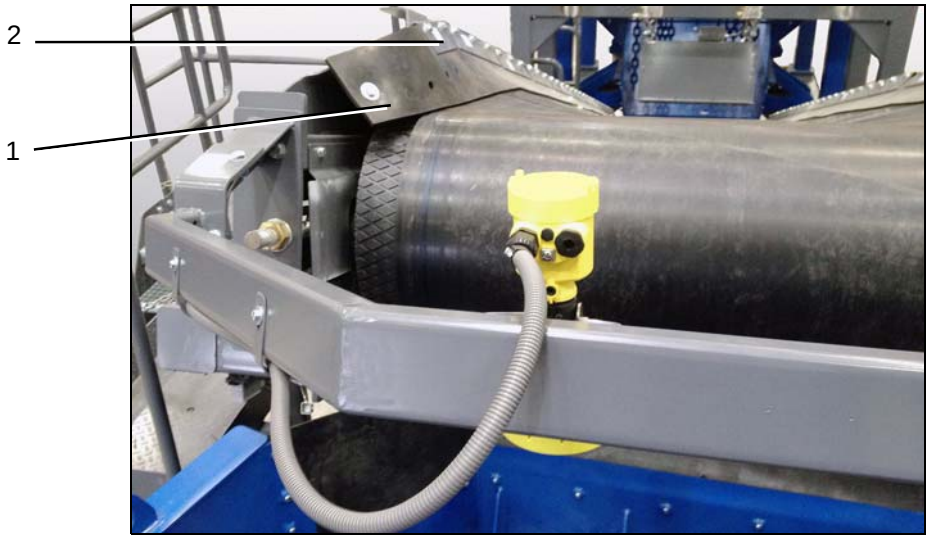
## 7.5.4 Changing guide rails

**⚠ WARNING!**

**Danger of being drawn in!**

**During all inspection and adjustment with a running belt there is a risk of being drawn in at the drive pulley and return rollers and at all support and return rollers. Loss of limbs may occur.**

- **Maintain sufficient safety distance when carrying out visual inspections.**
- **Only perform adjustments when the conveyor belt is stationary.**

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- Release all screws on the clamping plates (2) along the guide rails (1) but do not fully unscrew.

- Pull down guide rail (1) to remove.
- Push new guide rail under the clamping plates (2).
- Tighten screws back onto clamping plates (2).

# 8 Transportation

## 8.1 Transport between the places of use

If the plant must be driven on public roads, the necessary official permissions for special transport must be obtained. The pertinent regulations must be observed; these differ from country to country.

## 8.2 Safety information

**⚠ WARNING!**

**Risk of injury and material damage due to incorrect use of hoisting de---vices and lifting accessories.**

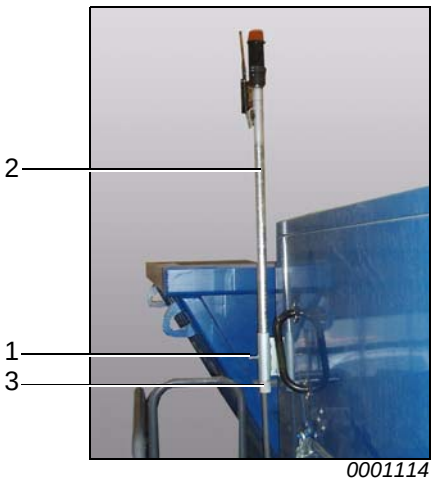
**Parts may be transported by crane only with suitable cargo gear. Check that chains, ropes etc. are in proper condition.**

- **It is forbidden to stand under hovering loads.**
- **Personal protective equipment, such as helmet, safety shoes, gloves etc. must be worn when installing machine.**
- **During installation/removal chains or ropes must be attached to fixed components so they do not slip. Attachment point must be at centre of gravity.**
- **Only qualified and competent personnel must carry out installation/re---moval work.**

**NOTE!**

- **Lifting eyes into which the load hooks can be fitted are provided at ma---chine for transport. Only hook machine to these lifting eyes.**
- **The lifting eyes are only suitable for the weight of the machine. Addi---tional loads added to the machine are not allowed to be lifted using these lifting eyes.**
- **In order to avoid endangering persons or damaging the machine, the machine must be transported with caution. In addition to the following information, the general and local regulations on safety and accident prevention must be observed.**
- **Machine may be transported by crane only with suitable cargo gear (in---spect ropes, chains etc and ensure they are in perfect condition).**
- **It is forbidden to stand under hovering loads.**
- **During transport the statistical load assumptions must be observed in order to avoid deformations and other damage.**

## 8.3 Retracting the warning light

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- Remove fastening screw (1).
- Insert warning light (2) into stay tube (3).
- Secure position of the warning light using a fastening screw (1).

## 8.4 Retracting the lighting pole


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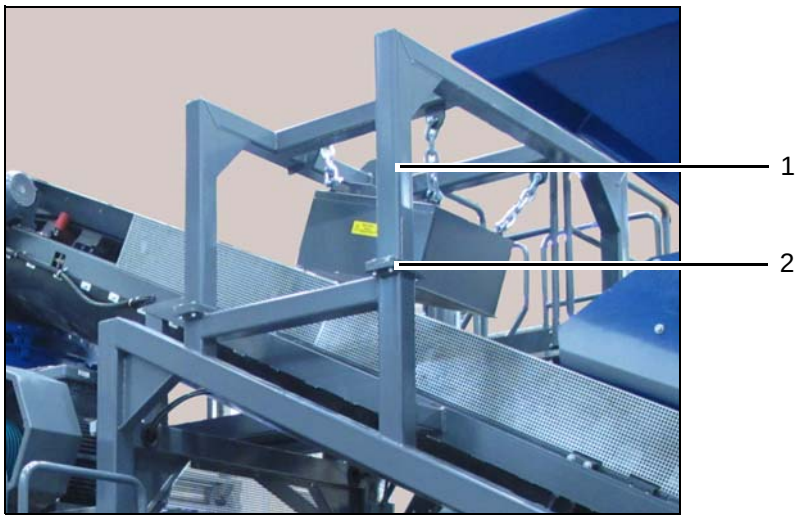
- Insert the electrical connection for the lighting mast (3) into the corresponding socket outlet on the chassis.
- Remove fastening screw (2).

- Push the lighting pole (3) with the halogen spotlight into the stay tube (1).

## 8.5 Disassembling magnetic separator

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- Unplug electrical connections.
- Attach magnetic separator with frame (1) to suitable lifting gear.
- Remove screws between mounting and frame.
- Lift the magnetic separator with frame (1) with lifting gear from discharge conveyor and set down carefully.

## 8.6 Disassembling fill level sensor (option)

**⚠ WARNING!**

**Risk of injury!**

**Persons are at risk of injury and falling during mounting of the level sensor.**

- **Use suitable lifting gear and lifting tackle.**
- **Use secure climbing aids, e.g. ladders or lifting platforms.**


*0002292*

- Disconnect fill level sensor connector.
- Secure mount (2) of fill level sensor.
- Release screw couplings on mount.
- Remove mount (2) and fill level sensor (1).

## 8.7 Disassembling hopper extension (option)

**⚠ WARNING!**

**Risk of injury!**

**Persons are at risk of injury and falling during the removal of the feed hopper.**

- **Use suitable lifting gear and lifting tackle.**
- **Use secure climbing aids, e.g. ladders or lifting platforms.**


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- Remove loose-lying stones from the feed hopper.
- Secure hopper extension with suitable lifting gear and tackle at lifting eyes (2).
- Lift down hopper extension and place on suitable base.
- Unscrew fastening screws between connecting points (1).

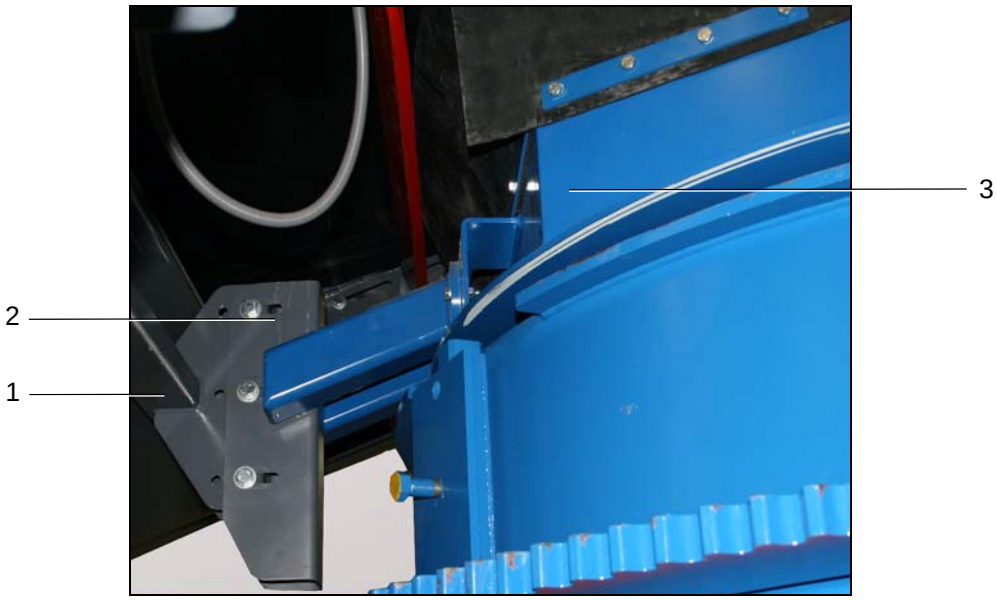
## 8.8 Disassembling crusher inlet of cone crusher

**⚠ WARNING!**

**Risk of injury!**

**Persons are at risk of injury and falling during the removal of the crusher inlet.**

- **Use suitable lifting gear and lifting tackle.**
- **Use secure climbing aids, e.g. ladders or lifting platforms.**

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- Remove any loose lying stones from the crusher inlet (3).
- Remove screws from twist-lock (2).
- Engage bracket for twist-lock (2) at frame (1) of feeding conveyor.


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- Attach crusher inlet (3) to suitable lifting gear at the eyelets (4).
- Attach crusher inlet (3) using suitable lifting gear at the eyelets (4) and lift from the cone crusher and set down carefully.

# 8.9 Disassembling platforms, steps and ladders

**⚠ WARNING!**

**Risk of falling!**

**Persons are at risk of falling during the removal of the platforms, rails and stairs.**

- **Use suitable lifting gear and tackle.**
- **Ensure that falling during removal is impossible.**


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**Removing handrail sections**

- Attach and secure handrail section (3) to suitable lifting gear.
- Remove fastening screws between handrail section (3) and platforms or access steps.
- Lift handrail section (3) down with lifting gear and set down carefully.

**Disassembling ladders**

- Remove spring pin between antifall guard (4) and handrail section and remove antifall guard (4).
- Unscrew fastening screws between the ladder (5) and the platform.
- Lift ladder (5) out of platform.

**Disassembling access steps**

- Attach and secure access steps (1) to suitable lifting gear.
- Unscrew fastening screws between access steps (1) and platform segments.
- Lift access steps (1) down with lifting gear and set down carefully.

**Removing the platforms**

- Attach and secure platform section (2) to suitable lifting gear.
- Unscrew fastening screws between the platform section (2) and the chassis.
- Remove platform section (2) from the chassis using lifting gear and carefully set down.

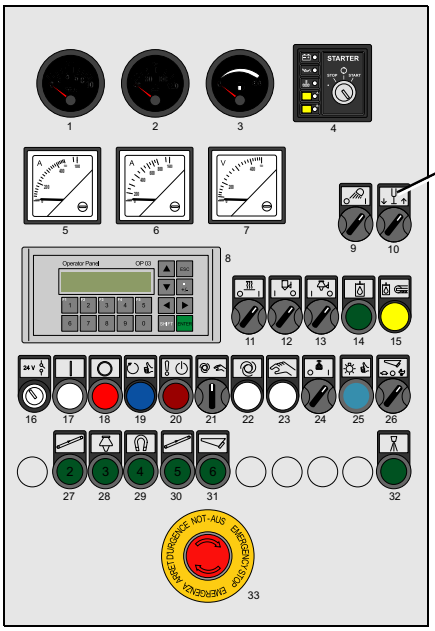
## 8.10 Retracting the supports

**⚠ WARNING!**

**Risk of injury when supports are being extended or retracted!**

**The supports area is difficult to observe when supports are being extended or retracted.**

- **Ensure that there are no persons in the supports area.**

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- Start diesel generator and switch on the hydraulics.
- Actuate the switch (1) to retract the supports.

## 8.11 Remove earth connection

- Pull the earth stake out of the ground
- Put the earth stake into the fixture

## 8.12 Power unit

- Close and secure all service doors

# 9 Storage

## Safety information

**NOTE!**

- **If possible the machine should be stored in closed rooms until final in---stallation.**
- **If the machine is stored outdoors it must be covered with tarpaulin cov---ers that are open at the bottom to allow run off of any condensation.**
- **Machine must be erected on suitable bases to protect against effect of rising damp.**
- **Electrical components must be stored in closed, dry and frost-protect---ed rooms.**
- **A transport and storage period of six months is generally considered as the period beyond which supplementary protective and preserva---tion measures must be provided.**

# 10 Disposal

The system must be correctly disposed of at the end of its life cycle.

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