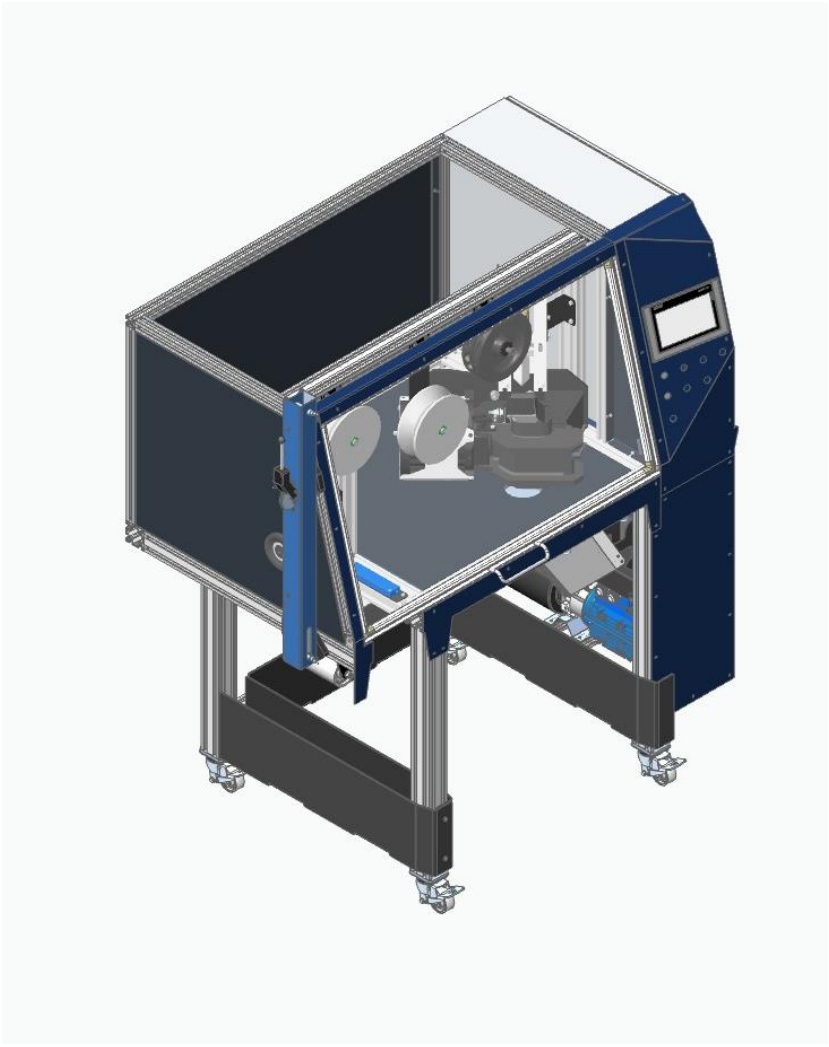
Original operating instructions

Automatic Chain Shears PKS300

customer: Pewag incorporated

Order No.: 1030004408

Order number: 1019439



Machine:	**Automatic Chain Shears PKS300**
Model name:	**ACC PKS300**
Series Numbers:	**See nameplate**
Order number:	**1030004408**
Year of construction:	**2024**
Date of creation / version	**02.12.24 / V1**
Inventar Number:	
Location:	
Company name:	**pewag engineering GmbH**
Street:	**Mariazeller Straße 143**
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Telephone, Fax	**05 05 011-0, 03862/24 9 32**

WARNING!

Always keep the operating instructions on the machine!

Always keep the instructions up to date!

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1 General

1.1 Introduction

HINT!

The descriptions, drawings, examples and photographs contained in the assembly and maintenance instructions refer to the equipment of the machine described here only as an example. In some cases, they may differ slightly from the real final state.

This assembly and maintenance manual creates the prerequisites for correct operation and maintenance of the machine.

The assembly and maintenance instructions contain information, warnings and tips that allow the machine to be operated correctly and rationally. This can create lasting reliability and the best conditions for use.

For proper operation of the machine, the operator must strictly follow and adhere to the assembly and maintenance instructions.

The assembly and maintenance instructions are part of the machine. Therefore, they keep you intact and safe throughout the life of the machine. The storage location must be known and accessible to all operators of the machine.

Obligation to inform all persons who may be in the area of effect of the plant.

Make sure that this chapter has been carefully read and understood by all persons who may be in the area of effect of the plant.

Your safety - as a machine operator or maintenance technician - is of paramount importance!

Situations, problems or malfunctions on the system can pose a safety risk if you are not aware of measures to avoid and avert the resulting hazards.

This Chapter

- determines the intended use of the system.
- contains generally valid safety instructions and safety regulations that must be observed in general.
- explains the meaning of symbols and pictograms used in this guide and in the signage of the facility.
- shows the arrangement of the safety and monitoring equipment on the plant.
- provides information about the required protective equipment and the requirements for operating and maintenance personnel.
- informs about hazards and residual risks that can also occur when the system is used as intended.

Specific, action- or situation-related safety instructions are listed for the corresponding steps in the following chapters of this manual.

State of the art

The system corresponds to the state of the art applicable at the time of delivery and is built in accordance with recognised safety regulations.

The standards taken into account for the construction are quoted in the declaration of conformity.

Nevertheless, the system can pose dangers if the safety instructions in this manual are not followed and implemented.

The included documentation is intended to enable you to use the system

- safely. Pay particular attention to the warnings about dangers.
- in all permissible applications.
- to be able to wait routinely.

1.1.1 Applicable documents

The instructions for this operating manual are extended with the following documents:

- Spare and wear parts list
- Further operating instructions for purchased components
- Circuit diagram E-technology
- Hydraulic plane
- Various safety data sheets

These documents can be found in the documentation provided.

1.1.2 Validity and Retention of Documentation

Keep these instructions carefully and in a place that makes sense and is easily accessible for the people involved (machine operators, maintenance personnel, ...).

Keep these instructions until the plant is decommissioned. Share these with subsequent owners. This document is an integral part of the Annex.

If the manual is lost, destroyed or in poor condition, request a copy from the manufacturer, stating the document number and the issue/revision.

1.2 Identification of the machine

The machine is designed for the automatic cutting or cutting of round and profile steel chains.

1.2.1 Components

The **Components** (Illustration 1-1) of the machine are:

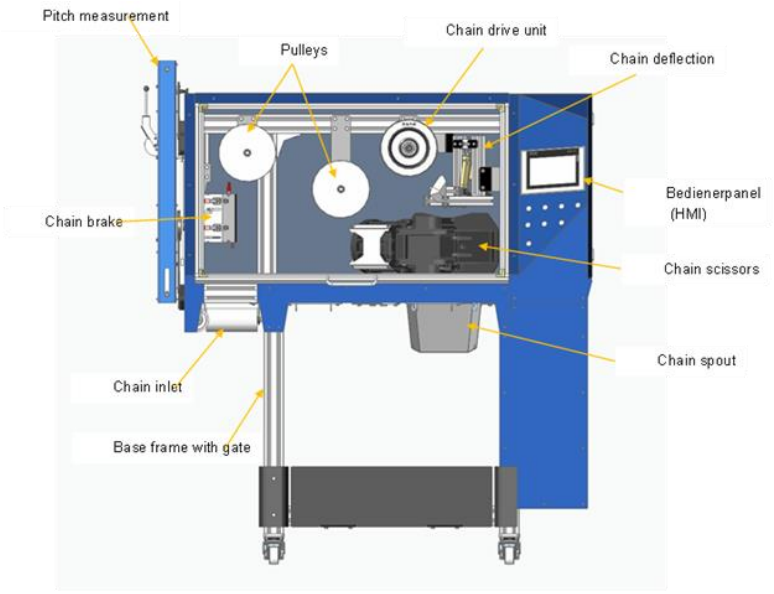


Illustration 1-1 Main components of the machine

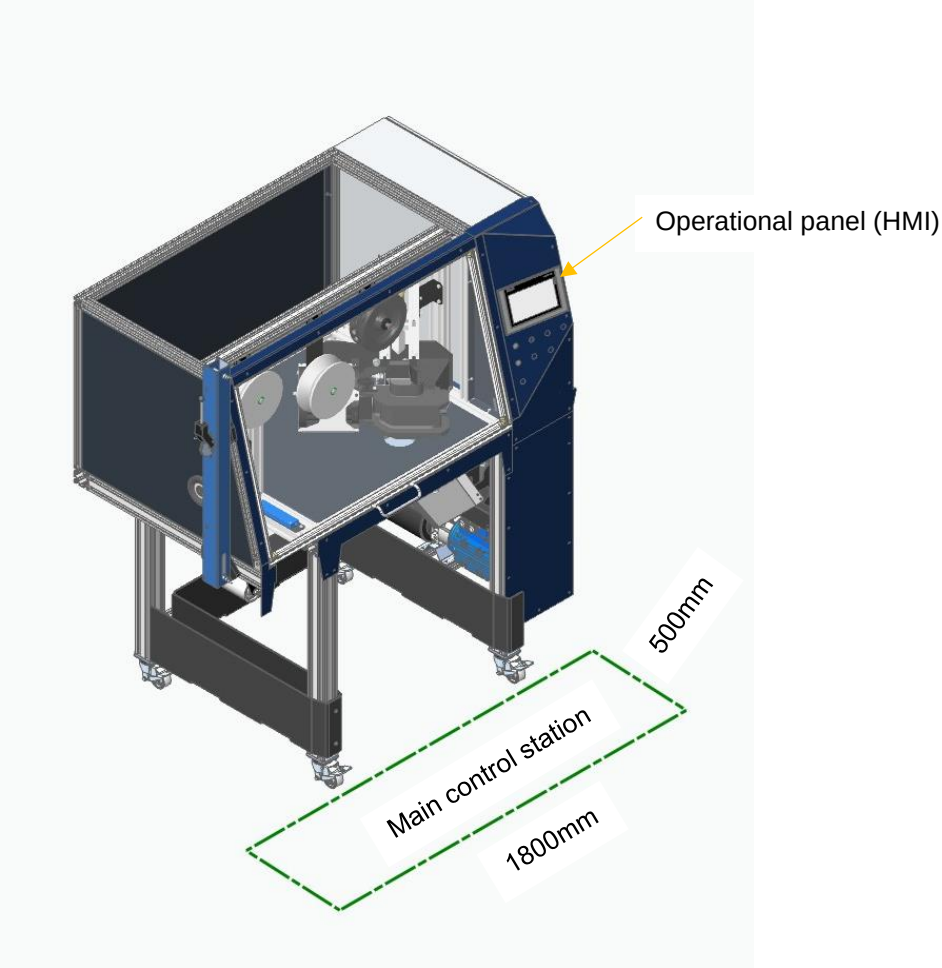
All work on the machine (installations, commissioning, operation, maintenance, troubleshooting and rectification, servicing) may only be carried out by trained and instructed specialist personnel.

The intended use also includes observing all instructions from the operating instructions and adhering to the inspection and maintenance intervals.

Information about the materials to be processed can be found in the *Chapter 3.6*.

1.2.2 Main operator stations on the machine

The main control station is located directly in front of the machine as shown in the following figure.



1.3 Symbols and Terms in this Owner's Manual

The following symbols are used in this operating manual:

Marking	Explanation
➢	Instructions for action step-by-step
→	Result of action steps
•	Listing without a fixed order

Abbreviations:

Abbreviation	Description
HMI	Human Machine Interface

1.4 Copyright

1.5 Warranty and liability

pewag engineering GmbH assumes no liability for damages if:

- the machine is used for tasks other than those intended.
- damage is caused by improper operation.
- damage caused by inadequate or improper maintenance.
- original spare parts not approved by pewag engineering GmbH are used.
- non-approved or non-compliant modifications and maintenance work (without prior consultation with pewag engineering GmbH).
- Damage is caused by documents that are not kept up to date.
- unsuitable equipment is used by the operator
- defective construction work,
- unsuitable building ground,
- Damage caused by chemical, electrochemical and electrical influences.

pewag engineering GmbH assumes no liability if:

- the machine is used for tasks other than those intended.
- damage is caused by improper operation.
- damage caused by inadequate or improper maintenance.
- original spare parts not approved by pewag engineering GmbH are used.
- non-approved or non-compliant modifications and maintenance work (without prior consultation with pewag engineering GmbH).

2 Safety

2.1 Presentation and structure of warnings and safety notices

The following terms and signs for hazards are used in the operating instructions:

DANGER!

This symbol means an imminent danger to the life and health of persons.

Failure to follow these instructions will result in serious adverse health effects, including life-threatening injuries.

WARNING!

This symbol means a possible imminent danger to the life and health of persons.

Failure to follow these instructions can result in serious adverse health effects, including life-threatening injuries.

CAUTION!

This symbol signifies a potentially dangerous situation.

Failure to follow these instructions can result in minor injuries or lead to damage to property.

HINT!

This symbol provides important information for the proper handling of the machine.

Failure to follow these instructions may cause malfunctions on the machine or in the surrounding area.

2.2 Intended use

HINT!

The intended use of the machine is a basic prerequisite for safe operation.

Any use that goes beyond the intended use or is otherwise considered misuse.

The intended use also includes:

- compliance with all safety regulations and information in these operating instructions.
- compliance with inspection and maintenance work by qualified and authorized personnel.
- the exclusive use of original parts.

the use of operating materials and auxiliary materials that have been approved by the manufacturer.

The purpose of the machine is the automatic cutting or cutting of round and profiled steel chains. Chain links with wire diameters or edge lengths between a minimum of 3 and a maximum of 16 mm can be separated. Furthermore, the maximum degree of hardness of the chains must be taken into account.

- Wire diameter or edge length less than 16mm → max. hardness G100
- Wire diameter or edge length 16mm → max. hardness G80

Adopted from operating instructions PKS300 as only two-leg cutting with automatic chain shears possible

2.2.1 Area of application and limits

Ambient conditions		
Operating air temperature	+5 to +35	°C
Air Temperature Storage	+5 to +40	°C
Relative humidity	non-condensing, 30 to 95	%
Site	Closed in a hall	
Height above sea level	Up to 1000	m
Vibration emission	Must not be present.	

This machine is intended for industrial use. This operating manual is intended for all users (operators) as well as for maintenance and repair specialists.

HINT!

Only operate or store the machine under the ambient conditions and ambient temperatures listed above.

During operation or storage, deviating from these conditions, damage to the machine can occur and unforeseeable dangers can arise.

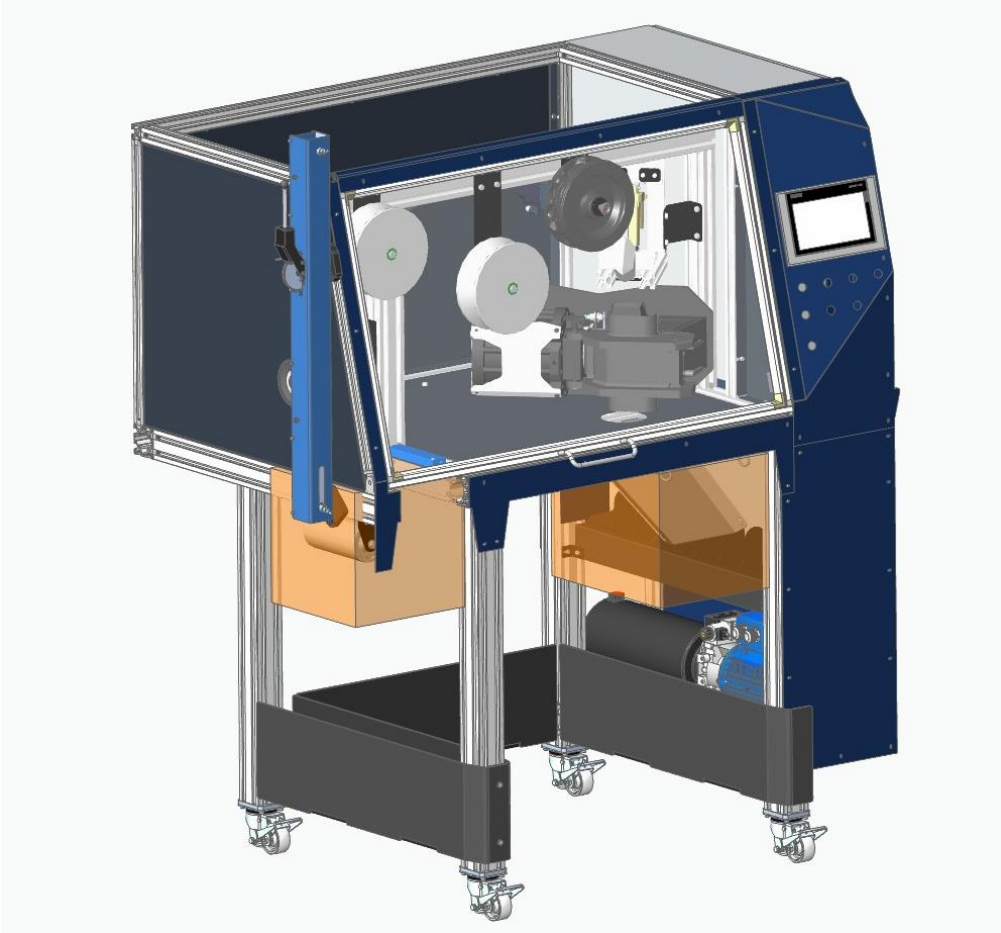
Use the machine only as intended and in perfect safety condition.

This is the only way to ensure the operational safety of the machine**.**

2.2.2 Safety-relevant environmental conditions

- Keep the danger zone (**Fehler! Verweisquelle konnte nicht gefunden werden.**) of persons.
- Observe the accident prevention regulations.
- Respect maintenance intervals.
- Keep the floor clean, dry and oil-free to minimise the risk of slipping.
- Only operate the machine if all protective devices and safety-related devices, e.g. emergency stop device, are present and functional.
- Check the machine at least once a week for externally recognizable damage and defects.
- Observe switch-on and switch-off processes as well as control indicators according to the installation and maintenance instructions
- In the event of malfunctions or unusual occurrences, stop the machine immediately. Inform the responsible supervisor and have any faults rectified immediately.
- Refrain from any operation that impairs the operational safety of the machine.
- Do not place objects in and on top of the machine.

The danger areas are located at the chain inlet and at the chain outlet. The following illustration shows a marking of the danger areas in orange.



2.2.3 Possible misuses

A different one than the one under *Chapter 2.2* specified or beyond this use is prohibited!

For damage caused by improper use:

- the operator bears sole responsibility.
- the manufacturer assumes no liability.

Any unintended use of the machine:

- may cause a danger to the life and limb of operators or third parties.
- can cause damage to the machine itself and other property.
- leads to the loss of warranty claims.

Possible incorrect applications for which the manufacturer assumes no liability:

- Any use that is not intended is considered misuse.
- Failure to comply with the operating instructions
- Operation of the machine without the intended protective device
- Maintenance or repair work on the machine that is not disconnected from the power source
- Recommissioning after maintenance/repair without protective measures
- Placing objects on the work surface
- Non-compliance with the permissible parameters for the processing of the respective material
- Installation of spare parts and use of accessories and equipment that are not approved by the manufacturer
- Machines modified or otherwise modified without the manufacturer's authorization
- Failure to comply with maintenance instructions
- Failure to observe signs of wear and damage
- Service work by untrained or unauthorized personnel
- Operating the machines even though the instructions for use are incomplete or not available in the local language
- Conscious or careless handling of the machines during operation
- Bridging or modifying the protective device
- All warning signs and notices must not be removed or covered. These must always be clearly visible and legible

2.3 User Qualification and Requirements

2.3.1 Operator's Responsibilities

The operator undertakes to only allow persons to work on the machine who:

- are familiar with the basic rules on occupational safety and accident prevention.
- are physically and mentally suitable.

- are not under the influence of alcohol, drugs or medication.
- have the appropriate competence and qualifications.
- are instructed in the work on the machine.
- have read and understood these operating instructions.

The requirements of the EC Directive on the Use of Work Equipment 2007/30/EC must be complied with.

The Operator or a person authorised by the Operator:

- secures the danger area of the machine against unauthorised access.
- instructs the operators.
- clearly defines the competencies and responsibilities of the operating and maintenance personnel for the machine.
- provides the operating and maintenance personnel with the necessary personal protective equipment.
- checks the safety-conscious work of the staff at regular intervals.
- is responsible for the perfect safety condition of the machine.
- immediately decommissions the machine if defects occur that could affect safety.
- carries out the nationally required inspections on the machine on time in addition to the inspections prescribed by pewag engineering GmbH.
- verifies the proper execution of the required and prescribed inspections and periodic inspections,
- ensures that the machine is serviced on time.
- ensures that information and warning signs attached to the machine are in perfectly recognizable condition and, if necessary, replaces missing or damaged signs.
- reports to the manufacturer any accident with the machine that results in serious injury or major damage to property.
- carries out the deployment planning for the machine carefully and conscientiously.
- takes fire safety precautions.
- provides suitable fire extinguishers at defined locations - easily accessible! -ready.
- creates an emergency plan.
- ensures that the foundation of the machine is designed according to the requirements for size, load capacity and stability. In addition, the foundation must comply with national and regional requirements such as water protection, etc.
- ensures that the machine is set up in accordance with the applicable standards and guidelines of the operating country.
- that during installation, particular attention is paid to ensuring that there is sufficient space between the machine and the environment, that all substances used and produced can be supplied and removed safely, and that sufficient space is available to the worker for the safe use of the machine/machine.
- that the control panel is always positioned in such a way that the operator has the danger areas in view.

2.3.2 Responsibilities of the staff

All persons entrusted with work on the machine undertake before commencing work:

- to comply with the basic regulations on occupational safety and accident prevention.
- read and observe the safety chapter and safety instructions in this operating manual.
- to equip themselves with the personal protective equipment necessary for the operation and to wear it during operation.
- check the machine for obvious defects before each start-up.
- to operate the machine only in accordance with its intended purpose and safely.
- to operate the machine only in normal operation with the specified technical values.
- report any modification to the machine that affects safety to the responsible supervisor or the operator.
- stop the operation of the machine immediately if safe operation is no longer possible.

2.4 Personal protective equipment

The operator is responsible for ensuring that the operating personnel wear the protective equipment listed here:

- Hearing protectors
- Safety shoes
- Gloves
- Goggles

To operate or repair the machine, wear tight-fitting protective clothing and personal protective equipment adapted to the respective activity.

You are responsible for

- wearing the necessary personal protective equipment,
- their regular cleaning and maintenance,
- the timely replacement of defective and unusable components of the protective equipment.

2.5 Safety and protection devices

The machine is equipped with the following safety devices. The implementation is carried out in a separate safety control system. In Illustration 2-1 you will find the safety devices pictorially.

List of safety devices

Safety devices (Illustration 2-1)

- Fixed guards (2, 4, 6, 7, 9)
- Interlocked separating guard
- Safety valve to relieve the control pressure circuit
- Tear-proof press fittings on all hydraulic hoses (not clear)
- Maximum pressure shutdowns as protection against mechanical and electrical overload (pressure relief valve?)

Safety relays

- The safety relays are used to interrupt the safety circuit in a safety-related manner. They meet the requirements of EN 60947-5-1 and EN 60204-1.
- The safety relays monitor the following inputs:
- Emergency stop button (12-21), when pressed the entire machine is stopped!
- Interlocking Guards (11)
- Safety switches of interlocked separating guards with interlocked separating guards (1, 21)
- Active optoelectronic protective device (3, 5, 8)

Designations or numbering and indication are generally unclear. Vote with HSC.

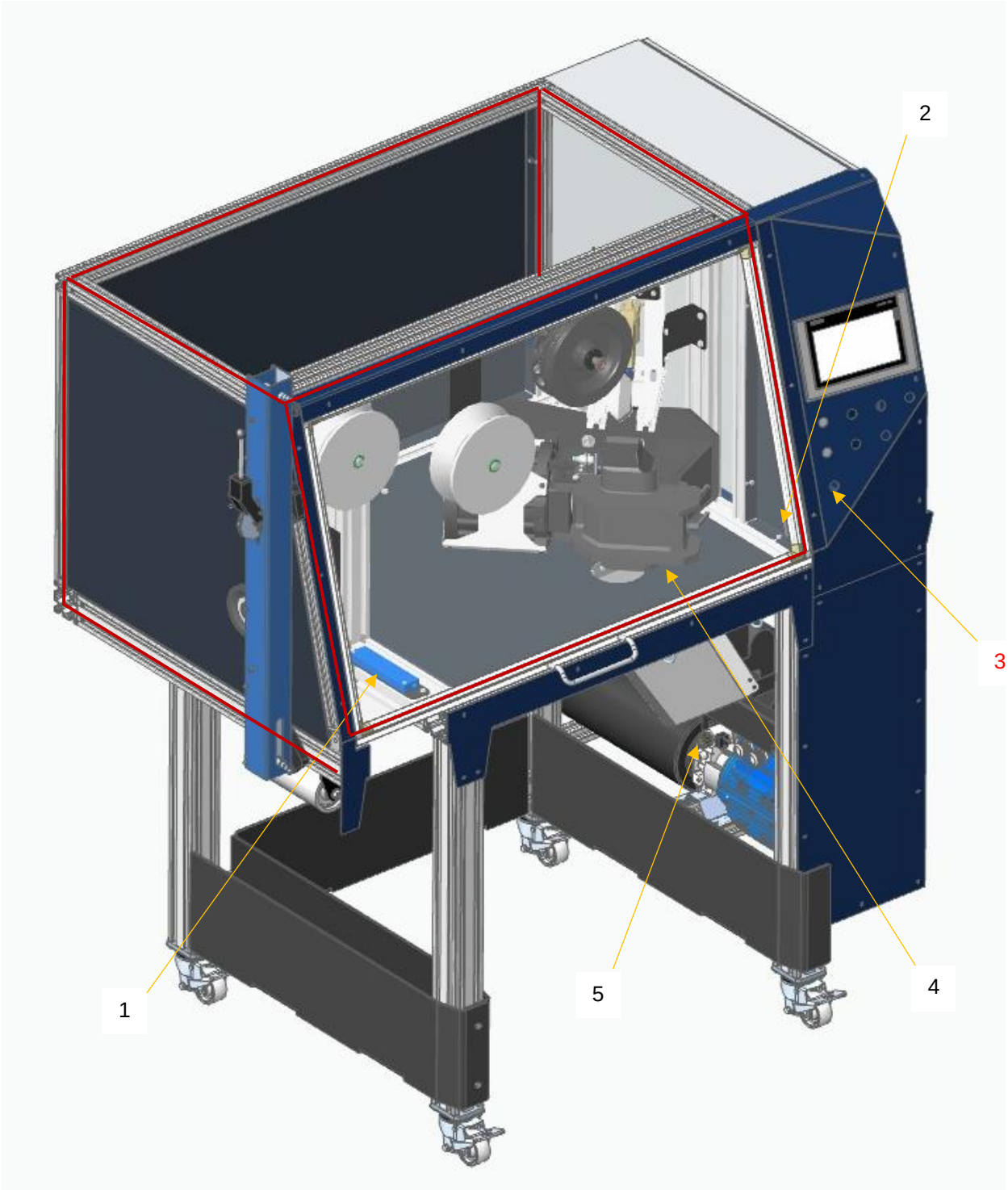


Illustration 2-1 Safety Layout

2.5.1 Attached safety markings

Warning signs are mounted on the machine to warn of residual risks that cannot be eliminated by design. In Illustration 2-1 the positions of these are shown:

Shield	Designation
	**Warning of dangerous electrical voltage!**
	**Warning of hand injuries!**
	**General warning sign!**
	**No touching!**
	**Access for unauthorized persons prohibited!**
	**No access for people with pacemakers!**
	**Reaching into it is prohibited!**
	**Entering the area prohibited!**
	**Use eye protection!**
	**Use foot protection!**
	**Use hand protection!**
	**Use head protection!**
	**Follow the instructions!** **Read the manual and operating instructions before use.** **Observe the safety instructions.**

Observe all warnings and safety instructions attached to the machine!

DANGER!

Danger to life due to improper installation of all warning, prohibition and information signs!

If they are not installed properly, possible hazards cannot be detected.

Replace damaged or unrecognizable signs.

The nameplate to identify the machine is located on the machine.

2.6 Conformity marking

Indicates conformity with valid EU directives that affect the product and which require CE marking.

The control cabinet is CE marked in accordance with Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014.

The machine is an (in)complete machine according to Directive 2006/45/EC of the European Parliament and Council of 17 May 2006.

The machine is supplied without protective fences and any safety devices. The operator is obliged to install further protective measures and to evaluate them by means of a risk assessment.

2.7 Basic safety instructions for operating the machine

The prerequisite for the safety-oriented handling and trouble-free operation of the machine is knowledge of the basic safety instructions and occupational health and safety regulations.

2.7.1 General safety instructions

DANGER!

There is a danger to life if you are in the danger zone!

Observe the following safety regulations:

- Do not stay under suspended or lifted loads (unloading or loading of the machine, etc.)!
- Make sure that there are no people in the machine or danger area of the machine.
- Wear appropriate protective clothing during the assembly, maintenance and operation of the machine.

Retaliatory action:

Wear safety goggles against eye injuries

Safety shoes with steel insole and treaded sole to prevent crushing and slipping

Wear protective gloves to protect against injuries caused by sharp-edged parts

Wearing head protection is mandatory for crane work!

DANGER!

Danger to life and serious damage to the machine due to unintentional starting or switching on!

Serious injuries or death can result in moving parts.

- Turn off the control voltage and remove the key.
- Turn off the main switch.
- Secure the machine from unauthorized access.

DANGER!

Danger to life from electrical, mechanical or hydraulic residual energy in the system!

After stopping the machine in an emergency, or after switching off the machine, there may still be electrical, mechanical and hydraulic residual energy in the system (pressure in cylinders, valves, pipes and pipes), which can lead to life-threatening injuries.

In addition to the countermeasures described in this installation and maintenance manual, take appropriate countermeasures on the upstream systems.

The operator must inform staff of these risks and the countermeasures to be taken.

DANGER!

Environmental hazard due to leaking hydraulic fluids and emulsions.

Leaking hydraulic fluids can cause environmental damage.

Ensure that the safety, health and environmental protection measures required in the oil manufacturer's safety data sheet are implemented.

DANGER!

Danger to life due to flammable hydraulic oil and lubricants!

In the area of the machine, hydraulic oil can ignite and cause a fire due to the process and activity.

Take fire safety precautions and place fire extinguishers within easy reach in the machine area!

WARNING!

Risk of cutting through components, due to sharp corners, edges and sharp-edged materials!

Hand injuries can occur due to sharp edges.

Wear protective gloves.

DANGER!

Risk of slipping and tripping due to dirt and objects lying around!

A fall can lead to head injuries.

Always keep the work area clean!

DANGER!

Danger to life due to lightning!

If the machine is placed outdoors, there is a risk of lightning striking the machine during a thunderstorm. This creates a danger to the lives of people who are in the immediate vicinity of the machine due to flashovers or dangerous step voltage!

During a thunderstorm, do not stay near the machine or larger metallic objects.

Never start the machine after a lightning strike. Have the machine checked by qualified personnel.

2.7.2 Operation of the machine

HINT!

The machine may only be operated by appropriately trained personnel and requires precise knowledge of these assembly and maintenance instructions.

HINT!

Setup and test operation may only be carried out by specially trained personnel. Maintenance may only be carried out by qualified personnel.

DANGER!

Danger to life due to injuries due to safety equipment that is not fully assembled and not functional!

Life-threatening injuries can occur due to moving parts.

Only operate the machine with the safety device fully attached and in working order, otherwise the operation must be stopped immediately until it has been properly installed.

DANGER!

Danger to life of persons who are in the danger zone of the machine during operation!

Life-threatening injuries can occur due to moving parts.

- Make sure there are no people in the machine's danger zone before turning on the machine.
- Entering the danger areas during machine operation is prohibited.
- Unprotected danger areas are **Fehler! Verweisquelle konnte nicht gefunden werden.** .
- Stop or shut down the machine immediately if a person enters or is in the hazardous area.

DANGER!

Danger to life due to defective machine components and malfunctions.

Life-threatening injuries can occur due to moving parts or electrical voltages, etc.

Do not continue to operate the machine in the event of defects or malfunctions.

Rectify defects and malfunctions that occur immediately or report them to pewag engineering GmbH.

HINT!

Machine damage due to air in the hydraulic system!

If air has entered the hydraulic system during maintenance work on the machine, the machine must not be operated.

Due to the high compression of the air in the hydraulic oil, burns occur in the oil, which destroys the cylinder seals and the hydraulic oil.

2.8 Safety during the transport of the machine

DANGER!

Danger to life due to falling parts during lifting and transport work!

Falling objects can lead to life-threatening injuries.

- These may only be carried out by trained and authorised specialists.
- Before use, check the load handling devices (chains, ropes, etc.) for damage. Replace damaged load handling devices.
- Check the lifting points (lifting points) for proper fastening. Read the operating instructions for the lifting points to be used. Only use designated lifting points with the appropriate load capacity.
- Lingering under a suspended load is prohibited.

DANGER!

Danger to life with moving parts during transport!

Moving parts can change the center of gravity during transport and lead to life-threatening injuries and machine damage.

Secure moving parts against unwanted changes in position.

Wear head protection.

2.9 Safety during maintenance work

2.9.1 Maintenance and troubleshooting

If several people are carrying out maintenance work on the machine at the same time:

- Designate a person responsible for security.

- Ensure coordinated and secure communication between the people involved!
- Before switching the machine back on, check that all persons are outside the danger zone of the machine.
- Switch off the machine before maintenance work and protect it from unintentional start-up.

All maintenance work on the machine may only be carried out when the unmanned machine is completely deactivated.

- Turn off the main switch and secure the main switch with a lock.
- Keep the key with you until the work is completed.
- Secure the entire machine area from unauthorized access.

DANGER!

Fire hazard due to welding, cutting and fire work!

Hot work can lead to a fire hazard.

Report welding, cutting and firing work on the machine to your safety officer and do not start the work until all safety precautions have been taken to prevent fires.

Welding work may only be carried out by trained welding specialists!

Observe the country-specific regulations and laws that affect welding work.

DANGER!

Danger to life due to residual pressure in the pneumatic and hydraulic system.

Life-threatening injuries can occur due to moving parts.

When working with the pneumatic and hydraulic system, make sure that it is depressurized. Bleed the pneumatic system.

2.9.2 Maintenance work on the hydraulic machine

DANGER!

Danger to life due to pressurized hydraulic oil!

Hydraulic oil spraying out under pressure can pierce parts of the body. Machine parts can perform unwanted movements, parts can jump off or bounce around.

- Maintenance work on the hydraulic machine may only be carried out by trained specialists with special knowledge of hydraulics.
- Wear the appropriate protective equipment for maintenance work - see *Chapter 2.4*
- Before starting work, relieve the pressure in the entire hydraulic system - see *Chapter 10.2*.
- Carry out important safety precautions before starting work - see *Chapter 2.7* .
- Check the system pressure at the appropriate measurement ports before opening. The control is carried out by means of a pressure gauge, the system must be pressureless (0 bar).
- Take protective measures against pressurized, sudden leakage of hydraulic oil.

DANGER!

Danger to life due to faulty hydraulic hoses and pipes!

Hydraulic oil spraying out under pressure can pierce parts of the body. Machine parts can perform unwanted movements, parts can jump off or bounce around.

Only check the machine for leaks when it is switched off.

Repair detected leaks with immediate professional action.

Immediately replace faulty hydraulic hoses and piping with genuine parts. Hydraulic hoses must not be repaired under any circumstances. When changing hydraulic hoses, only use tear-proof press fittings.

DANGER!

Risk of burns and scalding due to hot hydraulic oil and hot surfaces!

Burns can occur from touching hot liquids or surfaces.

Avoid any contact with the hot surfaces

HINT!

Have all hydraulic hoses checked annually by a qualified specialist.

The inspection intervals to be observed are regulated by regional laws and regulations, where applicable.

CAUTION!

Warning of leaking hydraulic oil!

Before servicing the entire hydraulic system, take precautions to prevent large quantities of oil or the entire contents of the hydraulic oil tank from leaking or to siphon off them - see *Chapter 10.2*.

Leaking hydraulic oil can pose a risk to people and the environment.

Bind spilled hydraulic oil immediately and remove it properly from the machine area and sidewalks!

HINT!

Always use hydraulic oil of the same type and specification.

Do not reintroduce spilled hydraulic oil into the hydraulic system.

Exception: After appropriate cleaning and control for impurities and oil quality by a laboratory.

Contamination in the hydraulic oil leads to malfunctions and damage to the machine.

Dispose of used hydraulic oil properly.

2.9.3 Maintenance work on the electric machine

Only skilled workers (electricians) are allowed to carry out maintenance and servicing.

DANGER!

Danger to life due to electric current!

An electric shock can lead to death.

It must be ensured that the machine is correctly grounded.

When working with the machine, observe the 5 safety rules of electrical engineering:

- Unlock
- secure against reconnection,
- determine the absence of voltage,
- grounding and short-circuiting,
- cover or fence off adjacent, energized parts.

2.10 Residual risks

Residual risks result from the risk assessment. Insert from it.

2.11 Environmental protection

Danger!

Environmental hazard due to leaking hydraulic fluids and emulsions.

Leaking fluids can lead to environmental hazards.

When handling hydraulic oil and other water-polluting substances, make sure that water-polluting liquids do not get into the wastewater or the soil.

- Eliminate leaks on the machine immediately.
- Neutralize spilled oil immediately with a binder.
- When disposing of the operating materials, observe the nationally applicable environmental protection regulations. If in doubt, clarify the appropriate disposal methods for the various operating materials with the responsible collection point.
- For draining operating fluids, only use sufficiently large containers that are leak-proof and resistant to oil, fuel or chemicals.
- Separate and dispose of all parts, as well as auxiliary and operating materials of the machine by type and in accordance with local regulations and guidelines.

Electrical and hydraulic parts, especially filter elements, are hazardous waste.

3 Overview and functional description of the machine

3.1 Overview of the complete machine

At the moment there are no real photos of the machine. Only one image from the CAD program can be inserted here.

3.2 Special safety instructions

- **Make sure that all operating instructions for the entire machine are placed on site. Take note of these.**
- **You must not dismantle, bridge or bypass safety-related components.**
- **Take special care when manually operating the machine with the mobile panel and operating the enabling button. Pneumatic functions in particular are operated at normal speed.**

3.3 Description

The desired length of the chain strand is entered by the operator via an operator panel. With the optional pitch measurement, the actual chain length can be measured over a certain number of links. This determines the actual chain pitch and compares it with the theoretical chain pitch. This means that any pitch error can be taken into account by the controller. A prerequisite for the proper compensation of the pitch error is that the actual pitch of the measured chain section is representative of the entire cut-to-length chain strand. The automatic chain feed conveys the chain strand from a container via the chain infeed into the machine. An adjustable chain brake prevents the retracted chain string from falling back when the drive unit is at a standstill and ensures uniform tension of the strand in the functional area of the pulleys. Once the desired length has been reached, a cut is made through the integrated chain scissors. Two knives are moved towards each other with the help of a hydraulic cylinder. The chain link positioned between them is squeezed by the blades and subsequently separated, which leads to a division of the chain strand. The separation force is a maximum of 30 tonnes. The cut strand falls over a chute in the chain outlet area into another container.

3.4 Features

- Compact design
- Simple and intuitive operation
- Pitch measurement (optional)
- Accurate limb counting via pocket wheel
- Simple and quick replacement of the pocket wheel by means of a central screw possible without the use of tools
- Ball detection in the chain infeed
- Complete enclosure of the chain cutting area
- Security gate
- Easy tool change
- Chain deflection for chains with wire diameter 13 and 16 mm
- Chain feed > 200 mm/s

3.5 Control and display elements

The machine is operated via the installed operating and display elements and are available in *Chapter 7* depicted and described.

3.6 Specifications

General data		
Dimensions of machine L x W x H	1868 x 1082 x 2082	Mm
Weight	615	medical history
Control cabinet L x W x H	760 x 300 x 760	Mm
Control cabinet weight	55	medical history
HMI L x W x H	274 x 30 x 190	Mm
Control Panel (HMI) Weight	3	medical history
Electric power supply		
Voltage	400	V
Rated current	10	A
Power frequency	50	Hz
Pre-fuse in the supply line	16	A
Cross-section of the supply line	5 x 2.5	mm²
Use of the neutral conductor: (yes / no)	YES	
Hydraulic		
Pressure	200	bar
Memory bubble	n.A	l
Oil	min. 15 / max. 70	°C
Oil Cooler Performance	n.A	Kw

Oil used	HLP	32, 46
Ambient conditions		
Operating air temperature	+5 to +35	°C
Air Temperature Storage	+5 to +35	°C
Relative humidity	Non-condensing, 30 to 95	%
Site	Closed in a hall	
Installation height (height above sea level)	1000	m
Foundation load	To be calculated	N/mm²
Vibration emission	Must not be present	
Acoustic pressure	Should still be measured	dB (A)
Performance data:		
Material to be processed	Round and profile steel chains	

4 Transport and storage

HINT!

Observe the safety regulations in *Chapter 2*, especially the references in *Chapter 2.8***.**

HINT!

Find out about the country-specific legislation and regulations before transporting! Choose the packaging accordingly.

4.1 General information about transport

HINT!

The machine may only be transported by technicians from pewag engineering GmbH or by trained and authorized specialists under the guidance of technicians from pewag engineering GmbH!

- During storage and transport, always comply with the environmental conditions that occur in the *Chapter 2.2* are indicated.
- Seal the packaging according to the state of delivery, if you have to open it, e.g. for inspection purposes.
- If possible, remove the packaging immediately before assembly.

DANGER!

Danger due to change of position of the components!

If not transported properly, the machine can lose its stability and thus overturn, fall down or change its position uncontrollably.

Make sure that there can be no change in position of the components.

DANGER!

Danger to life due to falling parts during lifting and transport work!

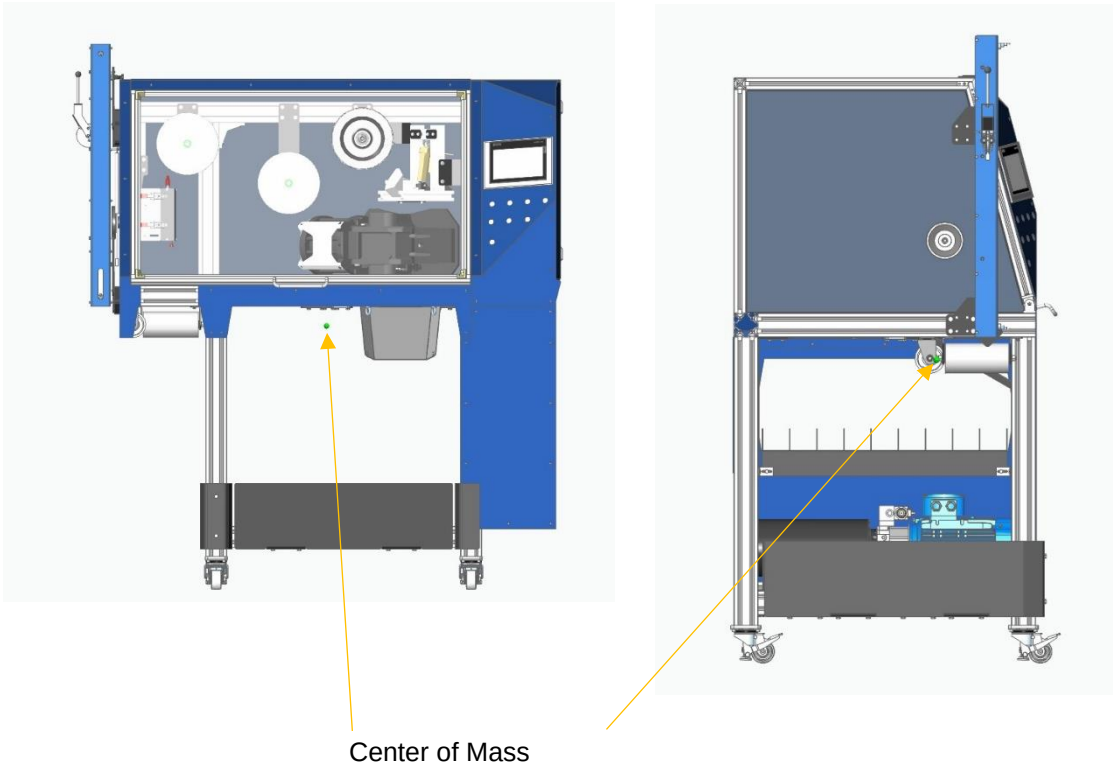
Falling objects can lead to life-threatening injuries.

- These may only be carried out by trained and authorised specialists.
- Before use, check the load handling devices (chains, ropes, etc.) for damage. Replace damaged load handling devices.
- Check the lifting points (lifting points) for proper fastening. Read the operating instructions for the lifting points to be used. Only use designated lifting points with the appropriate load capacity.
- Lingering under a suspended load is prohibited.

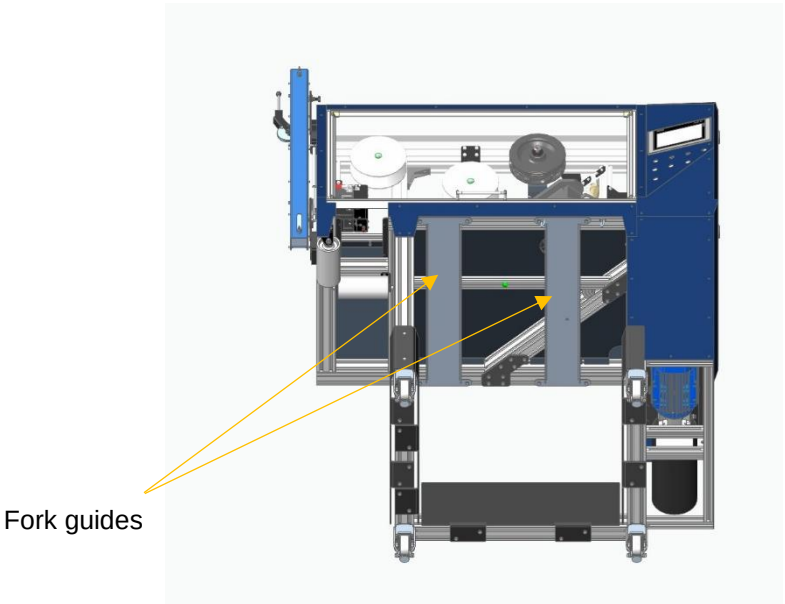
- Make sure you know the weight and position of the center of gravity.
- Place the machine on a suitable foundation / surface.
- Establish sufficient stability by means of additional suitable measures (e.g. by fastening or with the help of cranes) before removing any existing auxiliary structure.
- Use only the designated points or anchor points to attach or lift the product.
- The product must never be attached or lifted to the assembled components (pipes, hoses, control blocks, electric motors, accumulators, etc.).
- Note the maximum load capacity of the slings.
- Note the maximum load capacity of the industrial trucks.
- Make sure that no uninvolved persons are in the danger area.

4.2 Transport

The total weight of the machine is approximately 615 kg. Weight of the package cannot be defined yet, as packaging is not yet defined. The following image shows the center of mass (green dot in the figure) of the machine from two different views.



The machine may only be lifted and transported via the fork guides provided for this purpose by means of an appropriate industrial truck. Proper installation of the fork guides requires the disassembly of the chain chute at the chain outlet. The fork guides are shown and marked in the following figure.



4.3 Storage

HINT!

The machine may only be stored in dry, evenly tempered rooms. Outdoor storage is not permitted.

Comply with the environmental conditions specified in the *Chapter 2.2* are indicated.

Protect the product against moisture. This applies to transport and storage. For storage periods longer than 7 days, apply anti-corrosion agent to bare metal parts. Make sure that no valves, motors, sensors, electrical components, etc. are sprayed.

Protect the machine parts against dust.

Make sure that the machine is stable and stored in a tilt-proof manner.

5 Installation, assembly and installation

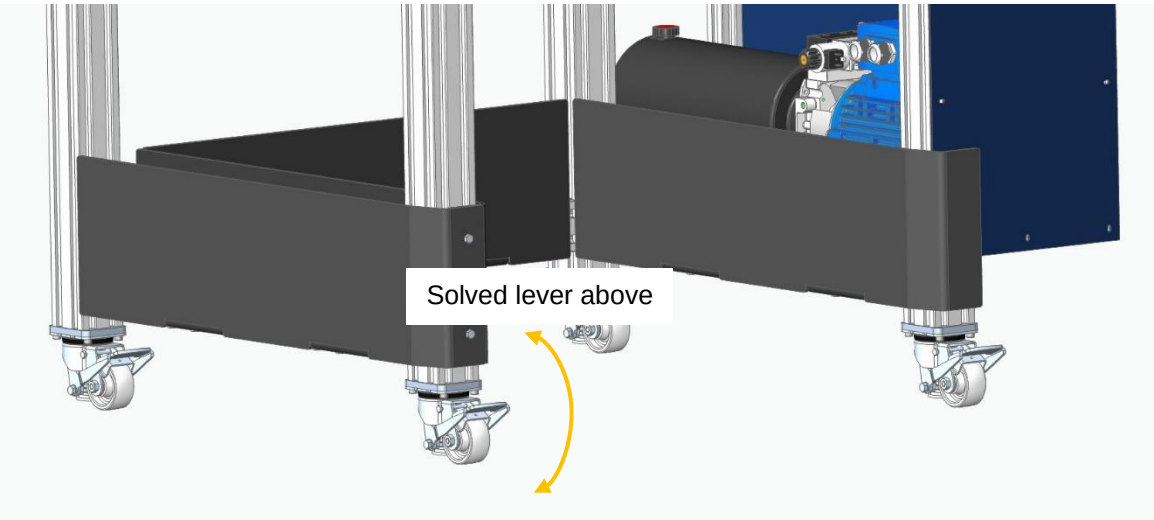
HINT!

Observe the safety regulations in *Chapter 2*.

HINT!

The erection, assembly and installation may only be carried out by technicians of pewag engineering GmbH or by trained and authorized personnel under the guidance of technicians of pewag engineering GmbH! (does that fit?)

The entire machine is built on four lockable lifting rollers. Changes of location over short distances within a business premises can thus be realized. The substrate must not be uneven or inclined and must have a sufficient load-bearing capacity. Once the lifting rollers are in the released state, the entire machine can be moved. If the lifting rollers are in the locked state, no movement of the machine can be realized. Operation is only permitted if all four lifting rollers are in a locked state. A representation of the lifting rollers can be found in the following figure.



Locked lever bottom

5.1 Site requirements

To do this, consider the environmental conditions *Chapter 2.2.1*.

HINT!

Only operate or store the machine under the ambient conditions and ambient temperatures listed above. During operation or storage, deviating from these conditions, damage to the machine can occur and unforeseeable dangers can arise.

Use the machine only as intended and in perfect safety condition.

This is the only way to ensure the operational safety of the machine.

6 Commissioning

6.1.1 Initial commissioning

HINT!

Observe the safety regulations in *Chapter 2*.

HINT!

Commissioning and programming may only be carried out by technicians from pewag engineering GmbH or by trained and authorized personnel under the guidance of technicians from pewag engineering GmbH! (does that fit?)

Perform the following activities before initial commissioning:

- Check the proper line-up
- Check fastening and connecting screws
- Check Hydraulic Hoses
- Check the proper power supply
- Check all electrical connections and contacts in the control cabinet and on the devices and tighten them if necessary
- Remove the corrosion guard and clean the machine
- Fill and check the auxiliary and operating materials
- Check the safety devices
- Turn on the machine
- Perform a test run

HINT!

In the first month after commissioning, shortened maintenance and inspection intervals apply. Carry out these in addition to normal maintenance work.

7 Service

7.1 General information on operation

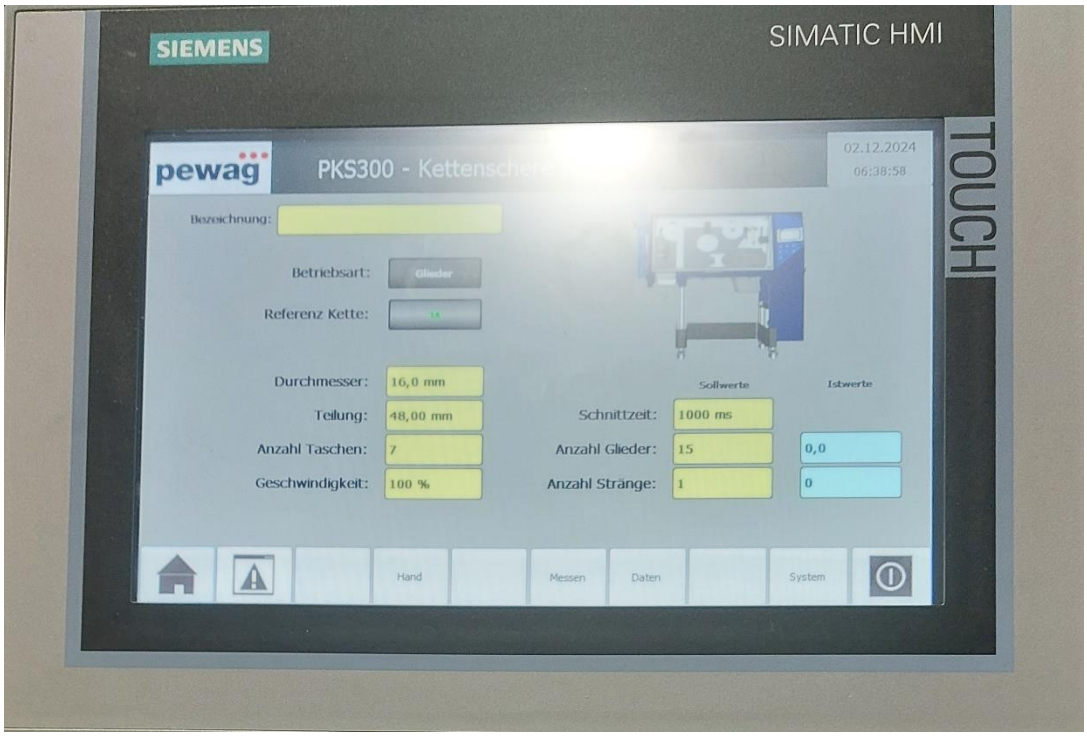
HINT!

Observe the safety regulations in *Chapter 2*.

HINT!

Pay particular attention to the safety instructions in *Chapter 2.7.2*.

7.2 Touch Panel – Visualization



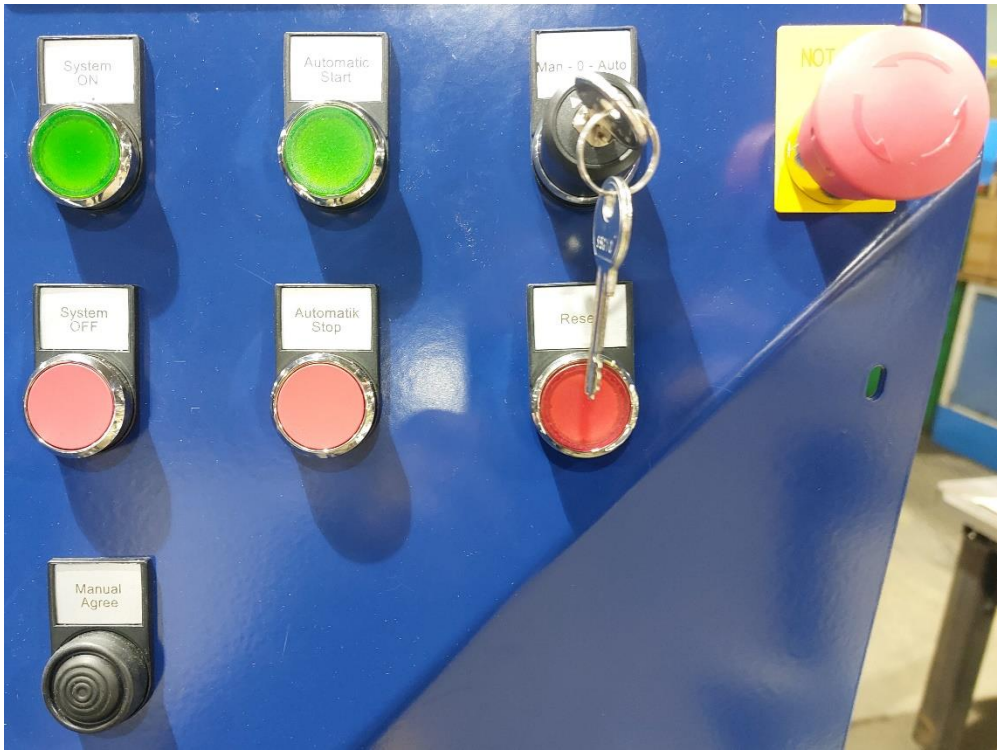
The following functions are implemented:

- Entering chain-specific setpoints
- Save, load and edit data sets
- Display of current actual values
- Display of error messages
- Button for manual operation

Switching to the individual images is done in each image via the buttons, which are arranged horizontally in the lower area.

Input fields are always displayed in yellow, output fields in blue.

7.3 Controls



System ON:

Switch on the entire system, when ON the green LED in the button lights up.

System OFF:

Switch off the entire system, button must be pressed for 2s.

Automatic Start;

Start of the automatic process, provided that all start conditions are met, the green LED in the button lights up when on.

Automatic Stopp:

Stopping an automatic process, but it can be started again at any time.

Mode switch:

One: Manual operation

0: No operating mode selected

Car: Automatic mode preselected

Reset:

Security and error acknowledge, in case of error red LED lights up in the button.

Enabling buttons:

This button must be operated together with the button of the desired movement in manual operation and open protection in order to perform the function.

Emergency stop:

When pressed, all functions are immediately shut down, after unlocking and pressing the reset button, the system is ready for operation again.

7.4 Signal tower

RED:

Active error is pending.

GREEN:

Automatic is started and active.

8 Normal

8.1 Safety instructions in normal operation

8.1.1 General safety regulations

HINT!

Pay particular attention to the safety instructions in *Chapter 2.7.2*.

8.1.2 Electricity and electronics

HINT!

- Make sure that there is always free access to the main counter.
- Control cabinet activities may only be carried out by qualified personnel and/or instructed personnel.

8.2 Turning on the machine

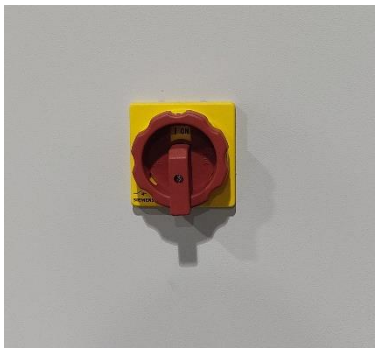
You can turn on the entire machine with the following components

The system is switched on with the main switch, which is installed in the control cabinet door. After switching on, it takes about 1 minute for the controller to boot up and be ready.

The next steps when switching on the system are:

- Press the red light-up button (reset) (emergency stop button must not be pressed)
- Press the green light-up button (System ON)

The system is now ready for operation and ready for use.

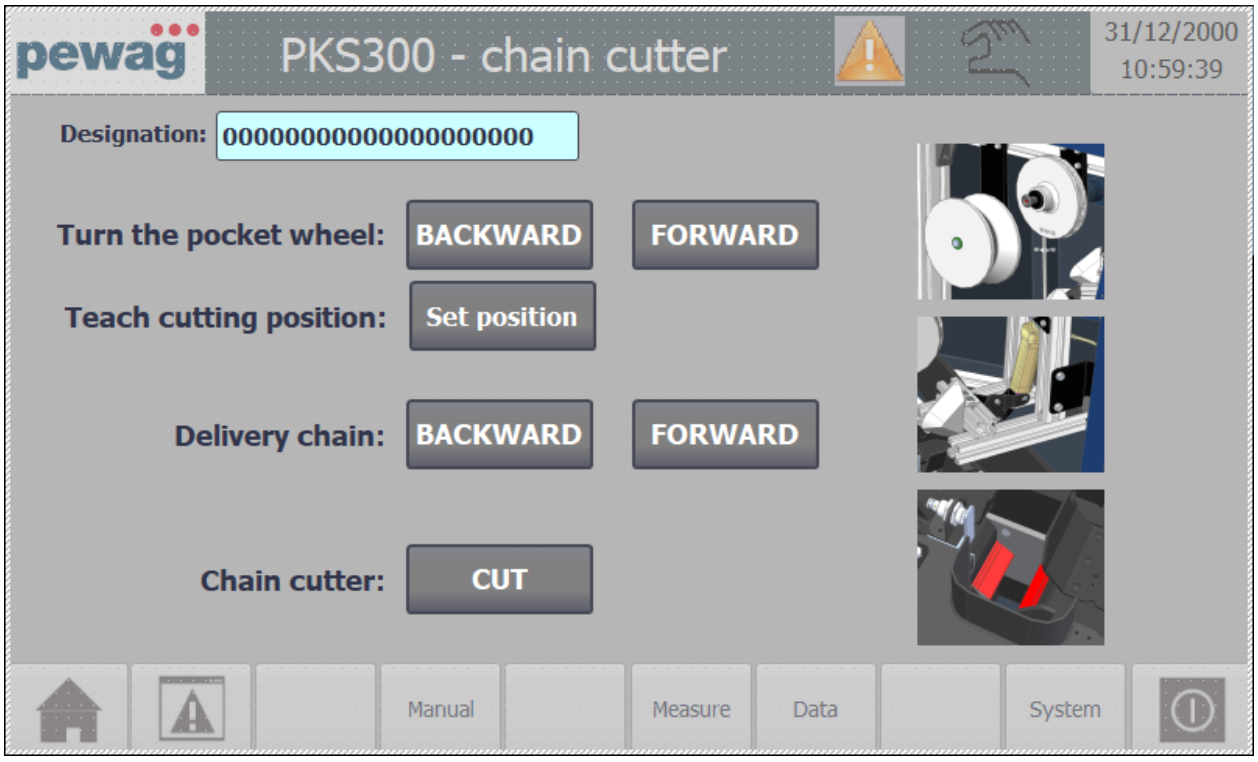


8.3 Modes

8.3.1 Manual operation

Manual operation is preselected with the key switch in the left position (MAN).

When the protection is closed, the function can now be executed with the corresponding button on the visualization, and when the protection is open, the enabling button must be pressed additionally.



Designation:

Display of the currently preselected parameter set

Turning the pocket wheel:

Forward and backward movement of the pocket wheel (chain transport)

Delivery chain:

Retracting and extending the chain from the scissors

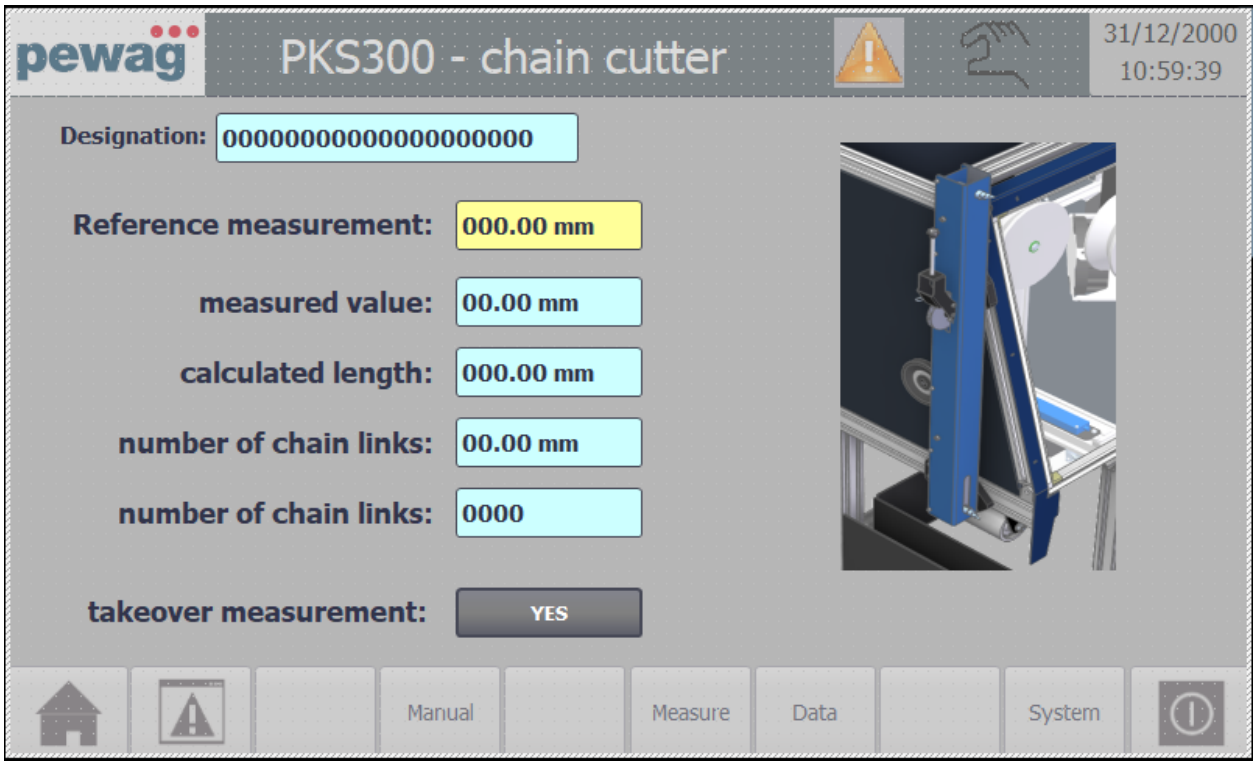
Kettenschere:

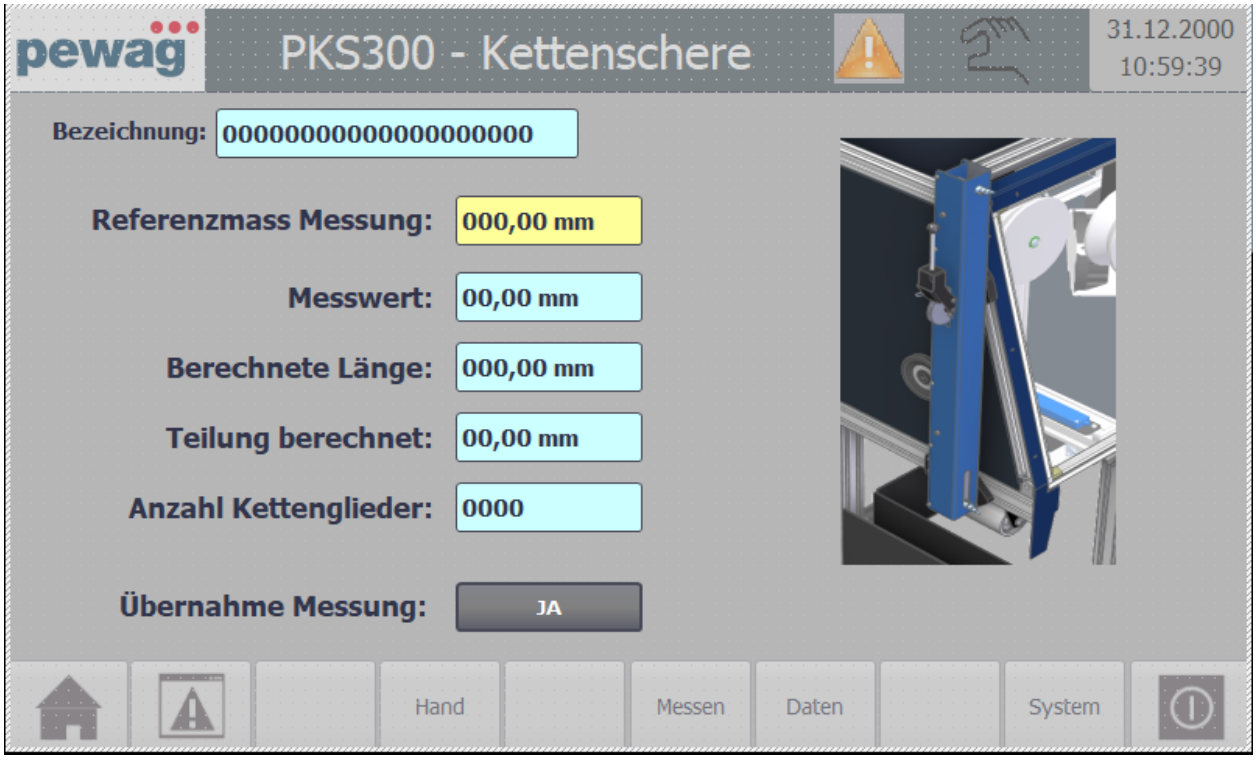
Move the chain shears forward (when pressed) and retract (after releasing the button)

8.3.2 Kette vermessen

This function must be performed in the 'Length' operating mode. For this purpose, the beginning of the chain is hooked onto the measuring arm and measured.

Based on the measurement result, the number of links for the required chain length for automatic operation is calculated.





Designation:

Display of the currently preselected parameter set

Reference measurement measurement:

For the length measurement, a reference dimension must be entered (this is done by pwe personnel), this measurement is the distance between the two suspension points of the chain in the lowest position.

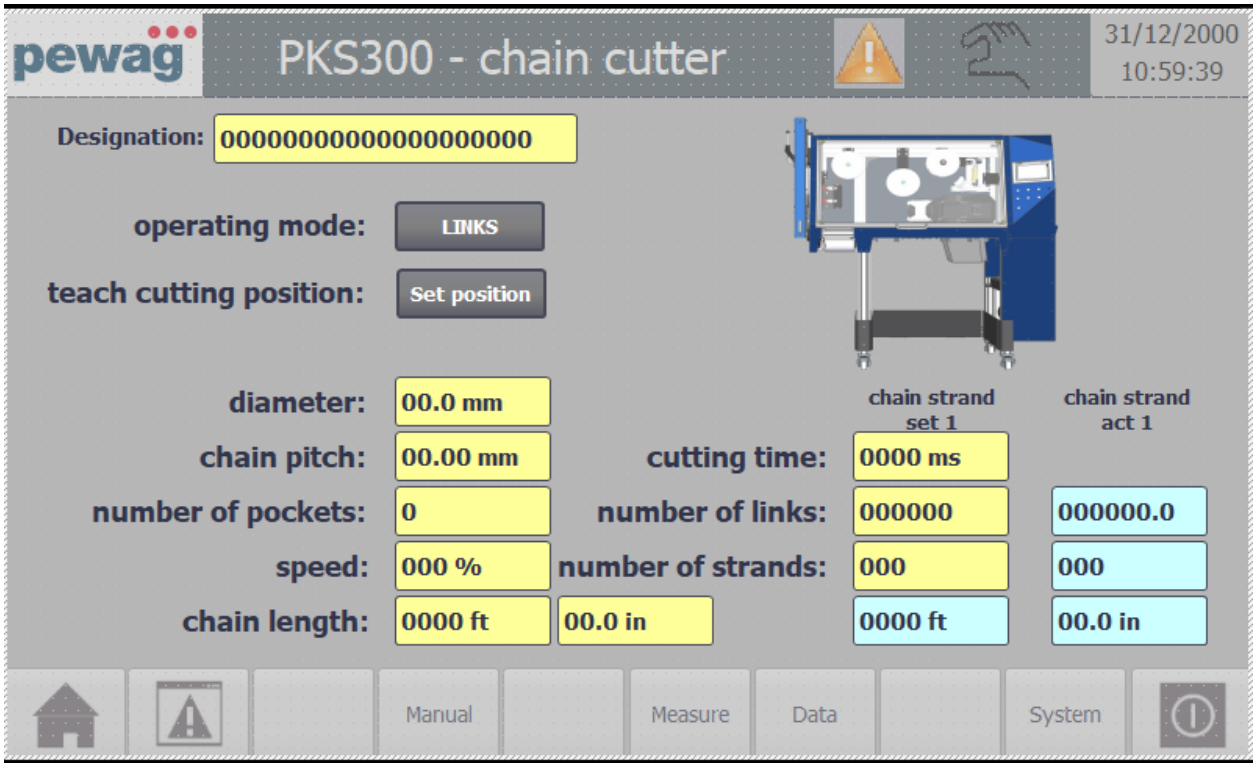
The following procedure must be followed when measuring the chain:

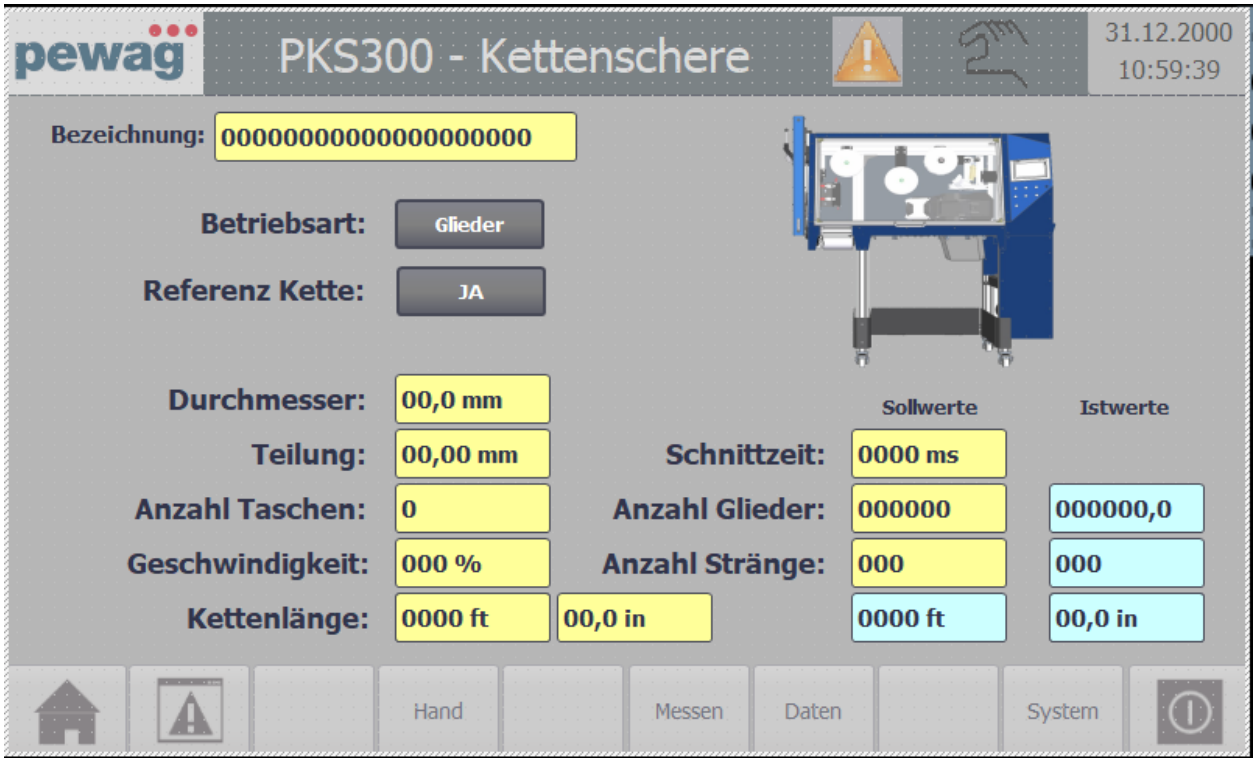
- Entering the diameter and pitch of the chain in the start screen
- Hook and align the chain on the measuring arm
- Press the 'Transfer Measurement' button

The display values 'measured value', 'calculated length', 'pitch calculated' and 'number of chain links' are the result of the measurement of the chain and are subsequently used to calculate the number of links in the 'length' operating mode.

8.3.3 Automatic

Automatic operation is possible in the AUTOMATIC mode, i.e. the key switch is in the right position.





Designation:

Enter the name of the chain type, or display the type if it was loaded from the recipe management.

Mode:

Preselection of the operating mode 'links' or 'length'.

If you select 'links', these are counted and when the desired links plus 1 are reached, the system is stopped and the chain is cut.

With the preselection 'Length', the number of links is calculated after measuring the chain and also when the desired links plus 1 are reached, the system is stopped and the chain is cut.

Reference Chain:

Referencing the chain is necessary so that the cutting position of the chain fits between the knives. To do this, position the chain by hand so that it fits exactly when cutting, i.e. the two adjacent chain links are not cut.

When the button is pressed, the display 'Number of links' switches to the value 0.0.

Input:

Diameter:

Diameter of the chain to be driven through the system.

Division:

Splitting the chain

Number of pockets:

Number of pockets on sprocket

Velocity:

Input of the transport speed (5...100%), where 100% is a speed of 360°/s.

Chain length:

Enter the desired length of the chain, with preselection operating mode 'length'.

If the language 'German' is selected, a metric input is made, if the area code is 'English' Imperial.

Cutting time:

Input of the time in ms for the advancing of the knife when cutting the chain.

Number of links

Input of the desired members when preselecting the operating mode 'Links'.

Number of strands:

Enter the number of strands that will be processed one after the other.

Output:

Number of links:

Number of chain links currently transported

Number of strands:

Currently processed number of chain strands

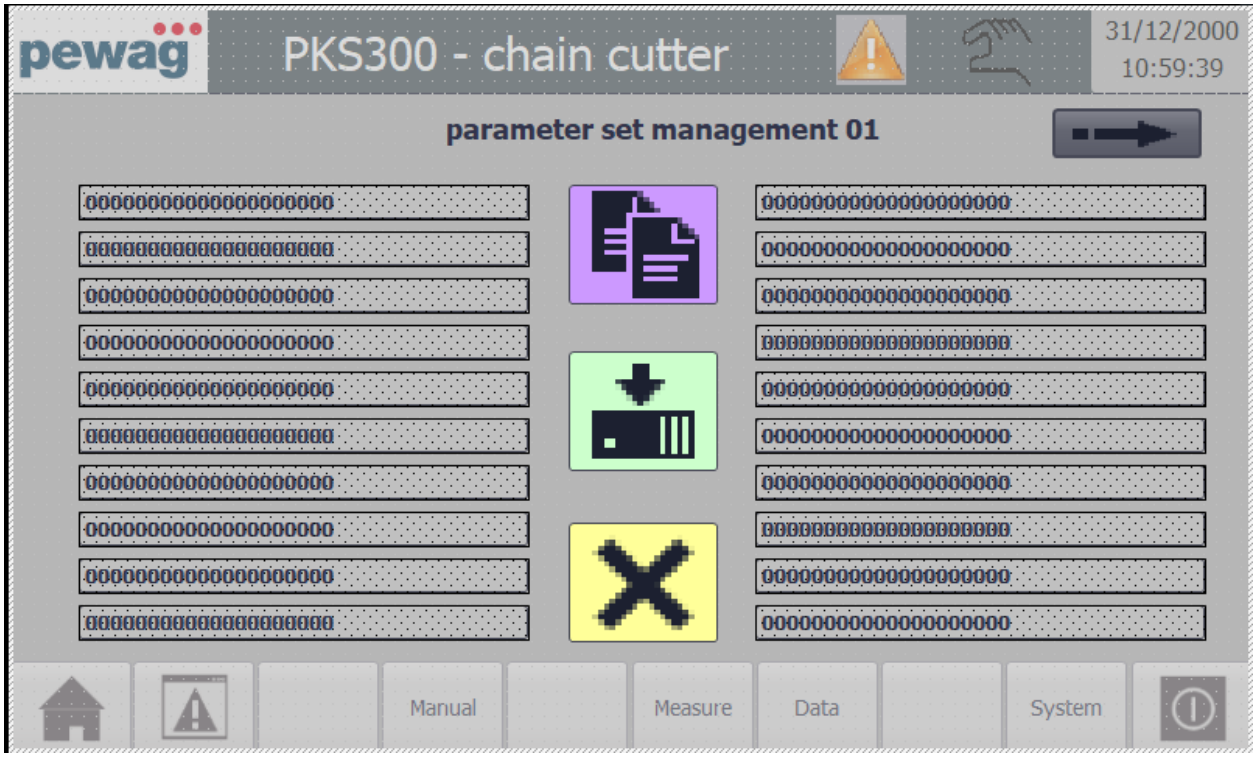
Chain length:

Currently transported chain length

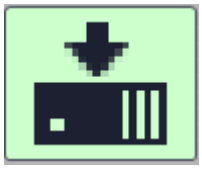
8.4 Recipe management

Chain-specific parameters can be stored in a database in the control system.

To save, load or delete records, the desired text field must be tapped (color changes). This data record is now accessed read or write.



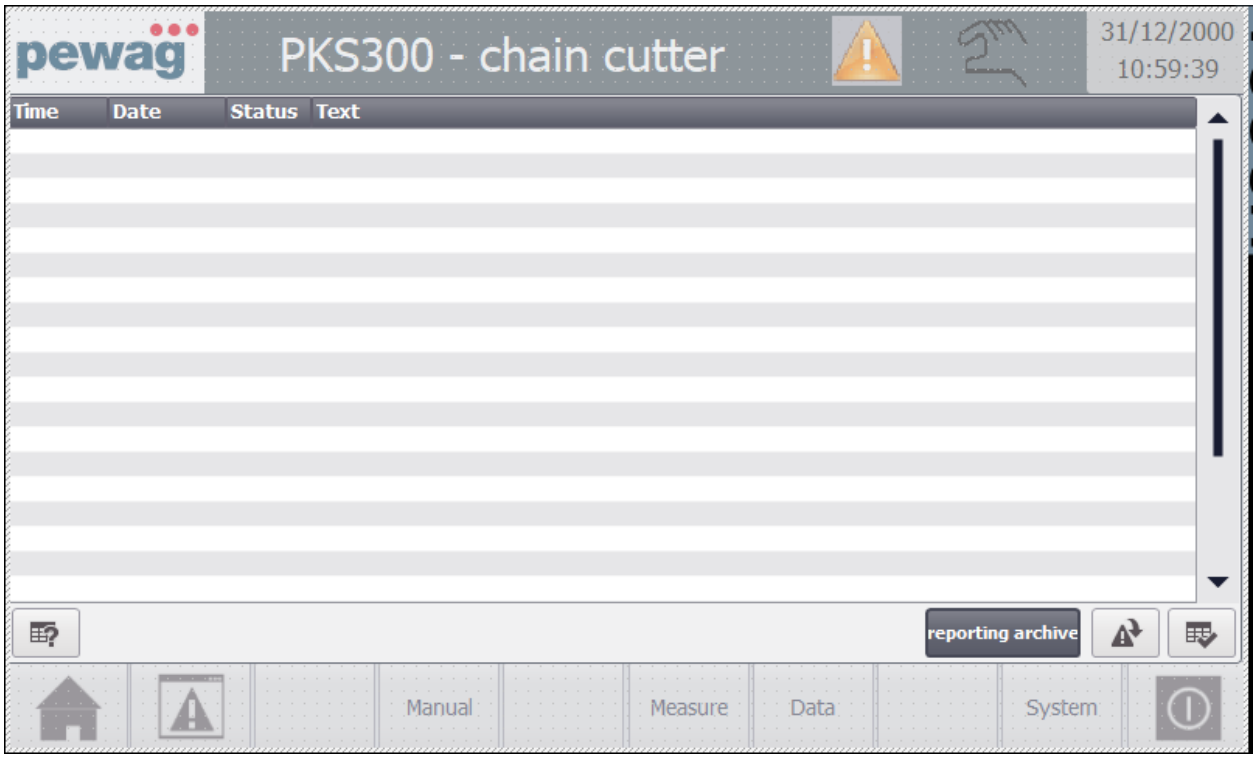
Save all values entered in the start screen. In addition, an additional query appears as to whether this is actually desired.

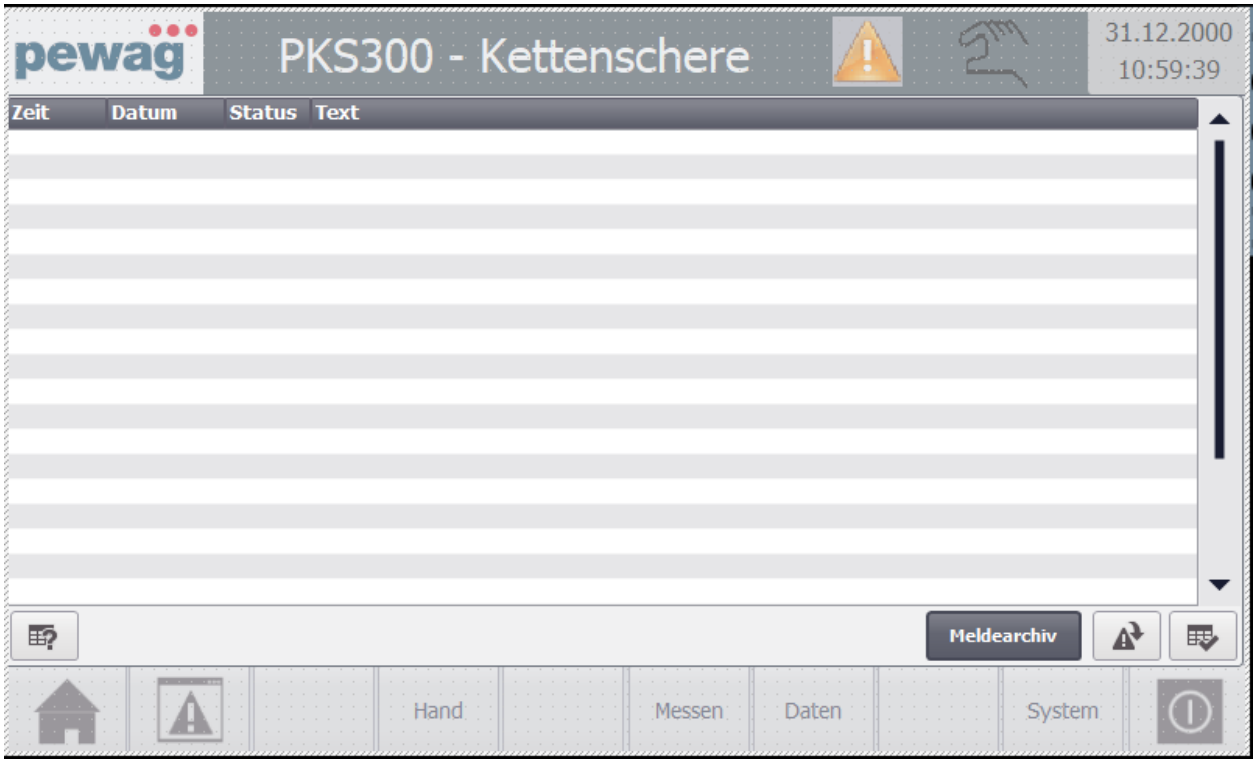


Transfer the parameters from the memory to the controller.

Deleting a parameter set in memory. In addition, an additional query appears as to whether this is actually desired.

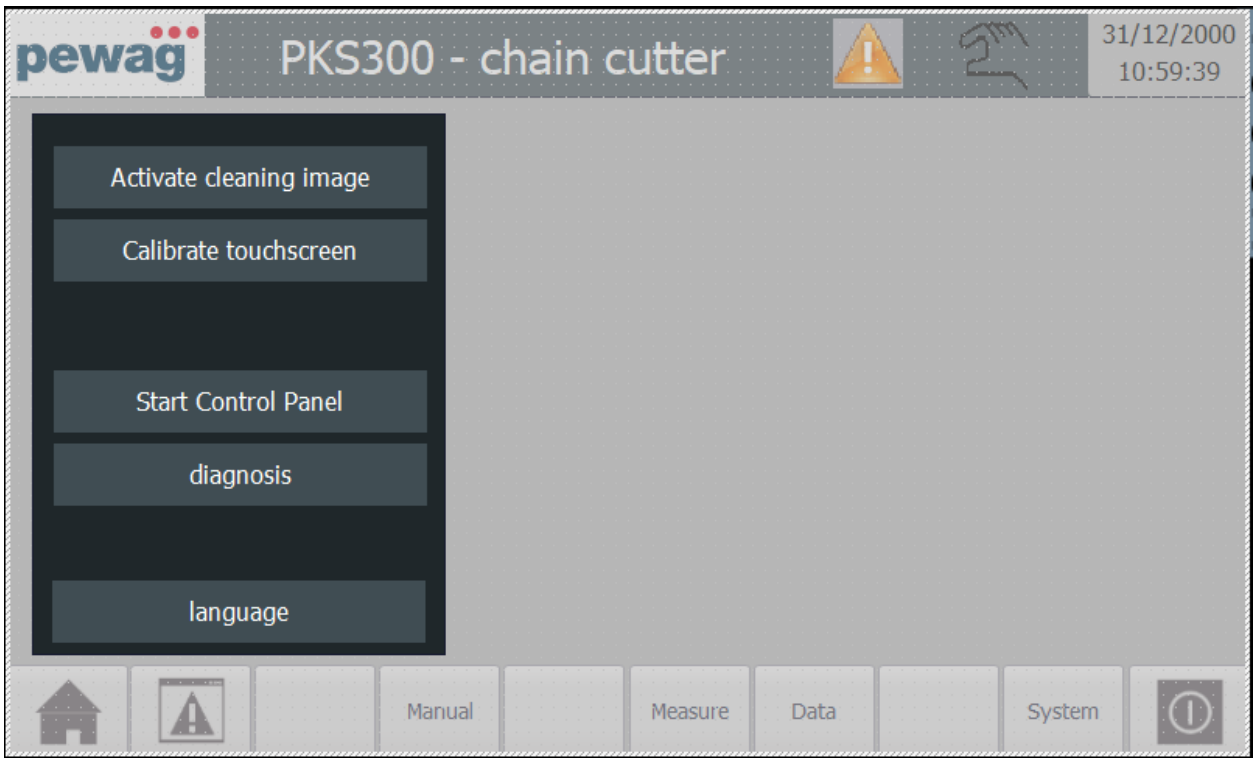
8.5 Error





Error messages are displayed here as text, with the button 'Reporting archive' you can branch to a separate page, where all error messages of the last weeks are stored and displayed.

8.6 Additional Features



Activate the plaster pattern:

The screen can be cleaned for 30s after pressing the button with a soft cloth, without detergent.

Calibrate touchscreen:

If the focus of the input fields no longer fits exactly, the touch can be recalibrated with this function. Simply follow the prompt.

Start Control Panel:

Password-protected function for the developer of the system (for troubleshooting)

Diagnosis:

Password-protected function for the developer of the system (for troubleshooting)

Language switching:

Switching between the operating language German and English.

8.7 Turning off the machine

You can switch off the entire machine with the following components

- Switch off the machine with the "Machine Off" button on the console
- For a longer standstill, the main switch can also be switched off.

9 Tool change

HINT!

Observe the safety regulations in *Chapter 2*.

DANGER!

Danger to life due to pressurized hydraulic oil!

Hydraulic oil spraying out under pressure can pierce parts of the body. Machine parts can perform unwanted movements, parts can jump off or bounce around.

- Maintenance work on the hydraulic machine may only be carried out by trained specialists with special knowledge of hydraulics.
- Wear the appropriate protective equipment for maintenance work - see *Chapter 2.4*
- Before starting work, relieve the pressure in the entire hydraulic system - see *Chapter 10.2*.
- Carry out important safety precautions before starting work - see *Chapter 2.7* .
- Check the system pressure at the appropriate measurement ports before opening. The control is carried out by means of a pressure gauge, the system must be pressureless (0 bar).
- Take protective measures against pressurized, sudden leakage of hydraulic oil.

It would be good to show the tool change using real pictures with the lid console. This may not be meaningful on the basis of 3D models alone.

10 Servicing, inspection and maintenance

HINT!

Observe the safety regulations in *Chapter 2*.

DANGER!

Danger of improper maintenance and maintenance work!

Injuries can occur due to moving parts, leaking hydraulic oil, etc.

Maintenance work may only be carried out by technicians from pewag engineering GmbH or by trained and authorised personnel.

Take important safety precautions before starting work - see *Chapter 2.*

Only after these precautions have been taken may you remove protective equipment or enter the danger areas.

HINT!

To maintain operational safety and to meet warranty claims, you must comply with the maintenance and service intervals and carry out the maintenance work properly.

An additional annual inspection and maintenance by pewag engineering GmbH is recommended.

Rectify any malfunctions that occur immediately or report them to pewag engineering GmbH.

DANGER!

Danger to life during maintenance work when the machine is switched on and due to unintentional starting!

Injuries may occur due to moving parts.

All maintenance work on the machine may only be carried out when the unmanned machine is completely deactivated.

- Turn off the control voltage and remove the key.
- Turn off the main switch and secure the main switch with a lock.
- Keep both keys with you until the work is completed.
- Secure the entire machine area from unauthorized access.

HINT!

Change the wearing parts in time to increase the service life of the machine.

If the wear parts are not changed in time, this can lead to increased pressure peaks and impacts in the machine, resulting in premature destruction of the machine components.

10.1 Important precautions before and during maintenance work

DANGER!

Danger to life due to pressurized hydraulic oil!

Hydraulic oil spraying out under pressure can pierce parts of the body. Machine parts can perform unwanted movements, parts can jump off or bounce around.

- Maintenance work on the hydraulic machine may only be carried out by trained specialists with special knowledge of hydraulics.
- Wear the appropriate protective equipment for maintenance work - see *Chapter 2.4*
- Before starting work, relieve the pressure in the entire hydraulic system - see *Chapter 10.2*.
- Carry out important safety precautions before starting work - see *Chapter 2.7* .
- Check the system pressure at the appropriate measurement ports before opening. The control is carried out by means of a pressure gauge, the system must be pressureless (0 bar).
- Take protective measures against pressurized, sudden leakage of hydraulic oil.

10.2 Unloading, venting and draining the hydraulic system

HINT!

Always use hydraulic oil of the same type and specification.

Do not reintroduce spilled hydraulic oil into the hydraulic system.

Exception: After appropriate cleaning and control for impurities and oil quality by a laboratory.

Contamination in the hydraulic oil leads to malfunctions and damage to the machine.

Dispose of used hydraulic oil properly.

The hydraulic system is under high pressure during and after operation, so special care must be taken when opening the system components.

Always switch off the machine and the main switch before starting work.

Secure the main switch against reconnection!

Take appropriate measures to reduce the system pressure to zero and check it at the appropriate measuring points. Take protective measures against pressurized, suddenly leaking hydraulic oil!

10.2.1 Hydraulic system pressure relief

To relieve pressure in the components, be sure to carry out the following steps:

- When working on the cylinders and piping, move the cylinders to the appropriate position before shutting down. The cylinder position depends on the work to be carried out.
- Turn off the main switch. Secure the main switch against restarting.
- Relieve the pressure in the pump lines. To do this, press the emergency actuations (manually) of the pressure relief valves several times until the pressure has been released.
- Press all valve emergency actuations on the corresponding manifolds several times until the pressure has been released.
- Check the system pressure at the appropriate measurement ports before opening. The system must be pressureless (0 bar).
- With some system components, a residual pressure of max. 4 bar is always included. When opening these components, provide protective measures against sudden leakage of hydraulic oil.
- Open components only a little and carefully until the pressure is released.

10.2.2 Ventilation and draining of the hydraulic system

- Ventilate using the aeration screw on the return filter or open the return filter cover and pull out the filter element. This means that the oil column breaks off through the air inlet and there is no suction effect.
- Connect existing butterfly valves to the respective pump suction lines. After completion of the work, be sure to open these butterfly valves again.
- First loosen the control pump suction line on the hydraulic oil tank so that the oil column tears off due to the air inlet and no suction effect can occur.

Draining the hydraulic oil

When working on the hydraulic system, empty the hydraulic oil and collect it in a suitable container.

- Either loosen the corresponding oil drain fittings until the system is emptied, or loosen the corresponding connection only slightly at first and let the hydraulic oil leak out before then completely disconnecting the connection.

10.3 Venting of the hydraulic system

HINT!

Mechanical breakdown!

If air has entered the hydraulic system during maintenance work on the machine, do not operate the machine.

Due to the high compression of the air in the hydraulic oil, burns occur in the oil, which destroys the cylinder seals and the hydraulic oil.

If air has entered the hydraulic system, the machine runs jerkily and must be vented.

To bleed, operate the machine at idle until all piston movements are smooth.

10.4 Precautions for the pneumatic system before maintenance and repair work

WARNING!

Warning of residual pressures in pneumatic components!

Injuries can occur due to moving parts.

Make the actuators depressurized.

Single-acting cylinders:

- Use a suitable holding device.

Suddenly relaxing feathers could lead to hazards.

Double-acting cylinders:

- Remove the check valves.

Suddenly relaxing air could lead to hazards.

Avoid damage to sealing surfaces and the piston rod at all costs.

When assembling the cylinders, please note:

- Ensure dirt and dust-free

Use only suitable grease for elements to be lubricated

10.5 Important activities during maintenance and repair work

- Clean sealing elements and sealing surfaces thoroughly before installation. Check them for damage. If necessary, replace the sealing elements or repair the sealing surfaces. Always lubricate sealing elements with a suitable lubricant before installation.
- Clean all components thoroughly before installation and oil or lubricate them accordingly. Specifically oil or lubricate components with exact fits before installation.
- Clean screws and fitting surfaces before assembly and lubricate them with release agent or lubricant for high temperatures and pressures.
- Tighten all fastening screws with a torque wrench or a torque-monitored force wrench, observing the torque values specified in the operating instructions or on the drawings.

HINT!

Contamination of the tool holder.

If no tools are inserted during maintenance, repair and conversion measures, the tool holder may become dirty.

Always insert tools before conversion, as well as maintenance and repair measures!

The machine or parts of the machine may only be started with the tool inserted.

10.6 Shorter inspection and maintenance intervals after commissioning

HINT!

In the first month after commissioning, shortened maintenance and inspection intervals apply. Carry out these in addition to normal maintenance work.

Component	Review	Measure / Observe Chapters	Interval
Connection, fastening and foundation screws	Tight fit or tightening torque		1 day after commissioning
Return filter, pressure filter	Check filter elements and magnetic rods, metal splinters and larger residues indicate imminent defects		1 week after commissioning
Hydraulic piping and hoses	Retighten fittings, flanges and hose fittings		1 week after commissioning
Hydraulic oil	Oil quality and impurities		1 month after commissioning
The Pneumatic Component	Contamination in the pneumatic system		1 month after commissioning
Central lubrication	Checking for damage or fault messages (via controller)		1 day after commissioning
Central lubrication	Lubrication tank level		1 day after commissioning
Central lubrication	Inspection of lubrication points		1 day after commissioning

10.7 Maintenance

10.7.1 Checking the oil level

You can recognize the oil level by the electric level indicators on the hydraulic oil tank.
These level indicators automatically switch off the machine if the limit values are not reached.

Maintenance interval - maintenance activity to be carried out

daily

- Check the level at the hydraulic oil tank level indicators.

10.7.2 Leak control

DANGER!

Danger to life due to faulty hydraulic hoses and pipes!

Hydraulic oil spraying out under pressure can pierce parts of the body. Machine parts can perform unwanted movements, parts can jump off or bounce around.

Only check the machine for leaks when it is switched off.

Repair detected leaks with immediate professional action.

Immediately replace faulty hydraulic hoses and piping with genuine parts. Hydraulic hoses must not be repaired under any circumstances.

HINT!

Have all hydraulic hoses checked annually by a qualified specialist.
The inspection intervals to be observed are regulated by regional laws and regulations, where applicable.

Maintenance interval - maintenance activity to be carried out

daily

- Check the level at the level indicators
- Check all hydraulic hoses for leaks and damage
- Check all piping and pipeline welds for leaks and damage
- Check hoses, fittings, pipe fittings and flanges and tighten them if necessary

at 3 Monate

- Retighten hoses, fittings, pipe fittings and flanges

annual

- For safety reasons, all hydraulic hoses of the machine must be checked annually by a qualified specialist

10.7.3 Maintenance of the pumps

The rolling bearings of the pumps are equipped with grease or oil lubrication for life.

Maintenance interval - maintenance activity to be carried out

weekly

- Check pumps for unusual running noises
- Check pumps for damage and leaks
- Check function

annual

- Controlling the capacity control of the pumps

See also manufacturer's operating instructions

10.7.4 Oil Water Cooler Maintenance

DANGER!

Risk of injury due to rotating parts!

Body parts can be pulled in by rotating parts.

Switch off the main switch when working on the machine. Secure the main switch against restarting.

Exception: Carry out bearing relubrication while the engine is running

Maintenance interval - maintenance activity to be carried out

weekly

- Check for unusual running noises
- Check for leaks
- Inspection of connectors and cables

depending on the company

- Clean the radiator housing, radiator elements and three-phase motor

See manufacturer's owner's manual

10.7.5 Hydraulic oil maintenance

HINT!

Always use hydraulic oil of the same type and specification.

Do not reintroduce spilled hydraulic oil into the hydraulic system.

Exception: After appropriate cleaning and control for impurities and oil quality by a laboratory.

Contamination in the hydraulic oil leads to malfunctions and damage to the machine.

Dispose of used hydraulic oil properly.

Filling is carried out through the manhole cover in the hydraulic oil tank.

Before each refilling or refilling, the entire hydraulic system must be thoroughly cleaned.

The impurities of the hydraulic oil must not exceed the oil purity classes 20 / 18 / 15 according to ISO 4406 or 9A / 8B / 8C according to SAE AS 4059 E.

Oil Specification:

HLP according to DIN 51524-2

Viscosity: ISO VG 46

Maintenance interval - maintenance activity to be carried out

1000 operating hours

- Laboratory testing of oil samples for impurities and oil quality

- Clean or replace hydraulic oil if necessary

10.7.6 Maintenance of the return filters

Return filters are equipped with an electrical contamination indicator and, if necessary, a magnetic rod.

Maintenance interval - maintenance activity to be carried out

depending on the company

- Replace filter element, indicated by electric contamination indicator

annual

- Renew filter element

10.7.7 Maintenance of pressure filters

Pressure filters are equipped with an electrical contamination indicator.

Maintenance interval - maintenance activity to be carried out

depending on the company

- Replace filter element, indicated by electric contamination indicator

annual

- Renew filter element

10.7.8 Maintenance of ventilation filters

Maintenance interval - maintenance activity to be carried out

annual

- Check and replace the filter element if necessary

10.7.9 Maintenance of hydraulic cylinders

Maintenance interval - maintenance activity to be carried out

annual

- Check cylinder seals for leaks
- Check scrapers and piston rods for damage
- Check cylinder bearings for dirt, cracks and backlash
- Check piston rod mounts for dirt, cracks and clearance

Recommended cylinder seal replacement intervals	
3-shift operation	every 2 years
2-shift operation	every 3 years
1-shift operation	every 4 years

10.7.10 Maintenance of pneumatic cylinders

HINT!

Frequent removal of the lubricating layer affects the service life.

Maintenance interval - maintenance activity to be carried out

annual

- Cleaning the piston rods with soft, non-fraying cloths
- Cleaning agents must always be gentle on materials

10.7.11 Maintenance of the central lubrication system

HINT!

Always use lubricant of the same type and specification.
Do not add used lubricants to the system.
Contamination in the lubricant leads to malfunctions and damage to the machine.
Dispose of used lubricants properly.

DANGER!

Danger to life due to pressurized central and spray lubrication system.

Lubricating medium that sprays out under pressure can pierce parts of the body.

Before working on the central and spray lubrication system, make sure that the system and the lines are not pressurized.

The lubricant level is monitored by means of an electric level control.

The pressure filter is equipped with an electrical contamination indicator.

Fill the lubricant reservoir with suitable lubricant cartridges to prevent contamination in the lubricant reservoir.

Maintenance interval - maintenance activity to be carried out

daily

- Check the level of the lubricant in the container and top it up if necessary
- Check for damage and leaks
- Check lubrication points for leaking lubricant

at 3 Monate

- Check electrical wiring and connections for damage and tightness
- Remove the line filter element (if available), check for damage, clean or replace if necessary
- Check the function of the pump elements

Note:

This check is necessary in the absence of a monitoring system of the conveying flow

depending on the company

- Replace filter elements, indicated by electrical or optical contamination indicator

annual

- Renew filter elements

For more information, see Operating Instructions - Appendix

10.7.12 Lubrication via grease fittings

HINT!

Always use lubricant of the same type and specification.

Do not add used lubricants to the system.

Contamination in the lubricant leads to malfunctions and damage to the machine.

Dispose of used lubricants properly.

Position of the grease fittings:

xy

weekly

Lubricate the machine via the grease fittings

10.8 Inspection and maintenance plans

10.8.1 Inspection and maintenance plan hydraulics

Component	Review	Measures / Chapters	Interval
Hydrauliköltank	Oil level	*10.7.1*	T
Hydraulic Pipelines	Leaks in pipes, welds and fittings	*10.7.2*	T
Hydraulic hoses	Leaks in hoses and fittings	*10.7.2*	T
Pump	Unusual running noises Leaks Function (pump test)	*10.7.3*	W
Oil Water Chiller	Unusual running noises Leaks Pollution Inspection of connectors and cables	*10.7.4*	W
Displays and Sensors	Damage Inspection of connectors and cables		W
Return filter	Filterelement	*10.7.6*	M
Pressure filter	Filterelement	*10.7.7*	M
Belüftungsfilter	Filterelement	*10.7.8*	3 M
Hydraulic oil	Oil quality and impurities	*10.7.5*	Kapitel beachten
Druckproportionalventil	Oil control		J
Hydraulic cylinder	Leaks Wiper, piston rod for damage Cylinder bearing for contamination, cracks and clearance Piston rod fastenings for contamination, cracks and clearance	*10.7.9*	W

T = daily, W = weekly, M = monthly, J = yearly

10.8.2 Pneumatics inspection and maintenance plan

Component	Review	Measures / Chapters	Interval
Cylinder	Cleaning of dirty piston rods	*10.7.10*	W

Component	Review	Measures / Chapters	Interval
Valves and other components	Checking and cleaning internal parts	*10.7.10*	J

T = daily, W = weekly, M = monthly, J = yearly

10.8.3 Inspection and maintenance plan mechanics and general maintenance of the machine

Component	Review	Measures / Chapters	Interval
Guards and covers	Proper assembly and function		T
Machine and hydraulic power unit	Checking for damage		T
Screw	Tighten		M
Accessible guides, bolts, bearings	Checking for wear, damage, backlash		W
Connection, fastening and foundation screws	Tight fit or tightening torques		M
Compressed air, oil, water	Media Loss Control		T
Pilotages	Integrity, tight fit		W

T = daily, W = weekly, M = monthly, J = yearly

10.8.4 Inspection and maintenance plan for central lubrication

Component	Review	Measures / Chapters	Interval
Central lubrication	Check for damage or fault message via control system	*10.7.11*	T
Central lubrication system	Lubricant tank level Damage Leaks Lubricant leakage at lubrication points	*10.7.11*	T
Lubrication tank	Check the level	*10.7.11*	T
Lubrication points	Check	*10.7.11*	W

T = daily, W = weekly, M = monthly, J = yearly

10.8.5 Lubrication inspection and maintenance plan

Component	Review	Measures / Chapters	Interval

	Lubrication of the **machine** via grease fittings	*10.7.12*	W
	Lubrication of the **machine** via grease fittings	*10.7.12*	W

T = daily, W = weekly, M = monthly, J = yearly

10.8.6 Inspection and maintenance plan Safety equipment

Component	Review	Measures / Chapters	Interval
All safety equipment	Completeness		T
EMERGENCY STOP	Press button		M
Devices	Interrupt the automatic key switch during preset		T
Lockable safety doors	Check the lock		W

T = daily, W = weekly, M = monthly, J = yearly

11 Cleaning

DANGER!

Danger to life due to the improperly secured machine components!

Injuries, such as crushing, can be caused by moving machine parts.

Carry out cleaning work without exception when the machine is completely empty and at a standstill and when the machine components are secured.

Switch off the main switch when working on the machine. Secure the main switch against restarting.

HINT!

Clean the machine regularly and thoroughly to ensure safety and proper functioning.

DANGER!

Danger to life due to electric shock!

An electric shock can lead to death.

Do not carry out cleaning work on electrical machines and machine parts with steam or water jets.

Component	Activity	Interval
Work area and walkways	Remove dirt, oil, grease, liquids, scrap material	T
Entire machine	Remove dirt, oil, grease, liquids	T
Oil drip pans	Remove dirt, oil, grease, liquids	T
Sensors	Clean	W
Drehstrommotore	Cleaning cooling fins with compressed air	M
Oil Water Cooler	Clean radiator housing, radiator elements, engine with compressed air	M
Displays	Clean	M
Lubrication	Remove dirt, grease	M

T = daily, W = weekly, M = monthly, J = yearly

12 Troubleshooting

HINT!

Observe the safety regulations - see *Chapter 2*.

HINT!

To maintain operational safety and to meet warranty claims, you must comply with the maintenance and service intervals and carry out the maintenance work properly.

An additional annual inspection and maintenance by pewag engineering GmbH is recommended.

Rectify any malfunctions that occur immediately or report them to pewag engineering GmbH.

12.1 Mechanical troubleshooting

In the event of mechanical malfunctions, please contact pewag engineering GmbH.

12.2 Electrical and electronic troubleshooting

All faults and warnings are displayed as text on the visualization in the console and on the mobile panel.

If the message is selected in the message window and the button is  pressed, a popup pops up with the exact error description and correction.

13 Decommissioning

Take shutdown measures if the machine is not used for more than one day.
Shutdown period - activity to be performed

Short-term 1-7 days

- Drive the machine completely empty
- move all cylinders of the machine to the rear end position, so that all piston rods are retracted.
- Switch off the machine and main switch, secure against re-switching
- Pressure relief of the hydraulic system and the central lubrication system
- Pressure relief of the pneumatic system
- Maintaining and cleaning the machine

Up to 3 months

Measures as under "Short-term 1 - 7 days", additionally

- Clean piston rods and treat them with corrosion protection
- carry out maintenance and servicing work before recommissioning
- Remove corrosion protection

Up to 12 months

measures as under "Up to 3 months", in addition to

- Before recommissioning, flush the hydraulic machines with fresh oil and fill them with new hydraulic oil.

Over 12 months

measures as under "Up to 12 months", in addition to

- Drain hydraulic oil and operating fluids

14 Recommissioning

After long-term storage, the same work must be carried out as for the initial commissioning.

15 Dismantling and disposal

HINT!

The dismantling of the machine may only be carried out by technicians of pewag engineering GmbH or by trained and authorized personnel under the guidance of technicians of pewag engineering GmbH!

The hydraulic system contains substances that are hazardous to water and may only be dismantled by technicians from pewag engineering GmbH or an approved company for hydraulics.

15.1 Dismantling

Perform the following steps before or during the disassembly of the machine:

- Move machine components to the appropriate dismantling position or to a safe position
- Switch off the machine and main switch, secure against re-switching
- Pressure relief of the hydraulic system and the central lubrication system
- Pressure relief of the pneumatic system
- Switch off the power supply line to the control cabinet, disconnect the supply line to the control cabinet
- Disconnect the power and control cables of the machine, roll them up and attach them securely to the machine parts
- Draining and dismantling pipelines and lubrication lines
- Emptying operating and auxiliary materials
- Divide the machine into appropriate units for removal - see *Chapter 4.1* the transport of the machine must be carried out by qualified personnel or specialist companies

15.2 Disposal

HINT!

Eliminate leaks on the machine immediately.

Neutralize spilled oil immediately with a binder.

When disposing of the operating materials, observe the nationally applicable environmental protection regulations. If in doubt, clarify the appropriate disposal methods for the various operating materials with the responsible collection point.

For draining operating fluids, only use sufficiently large containers that are leak-proof and resistant to oil, fuel or chemicals.

After proper disassembly, recycle the components:

- Metallic Materialreste scrap
- Recycling plastic elements

- Dispose of other components sorted according to material properties

HINT!

Electronic waste, electronic components, lubricants and auxiliary materials are subject to hazardous waste treatment and may only be disposed of by approved specialist companies.

16 Appendix

A. Recommended wear and spare parts

Digitally supplied with the technical documentation.

B. CE Declaration of Conformity Control Cabinet

C. Declaration of incorporation for incomplete machines

D. Operating instructions for the aforementioned documents

Component	Operating instructions

All other operating instructions, as well as the declarations of conformity, can be found in the supplied technical documentation.