PAAL®

A Kadant PAAL brand

Operating manual

Translation of the original operating manual

PACOMAT V-65 D BH 32.197

V3.6 - - 13.05.2025

1. General

1.1. Customer pointer

Dear customer,

This operating manual will familiarise you with the handling and operation of your machine.

The machine has been designed and built in accordance with the valid standards and guidelines, especially with the regulations of EU guideline Machines 2006/42/EG. The associated copy of the declaration is provided in the attachments.

This operating manual is an integral part of the machine. It is to be made available to the users during the entire service life of the machine. It must be ensured that all subsequent modifications are added to this operating manual as the case may be. It is to be passed on to future owners or users of the machine.

The maintenance documents and the instructions of the third-party manufacturers are available via download link.

Please study the documentation carefully. The manufacturer does not accept any guarantee or liability for damage caused by non-compliance with the instructions.

Our specialist staff is available to answer your questions or if problems arise. The contact data can be found in the chapter “Manufacturer and customer service” of this operating manual.

Please always quote the five-digit machine number stated on the name plate of the respective machine, here “32.197”, in your correspondence and during telephone calls.

Please hold the appropriate hydraulic drawings and electrical diagrams in readiness in the event of faults.

Kadant PAAL GmbH
Raiffeisenstraße 15 - 17
D-49124 Georgsmarienhütte

1.2. Information on the machine

Machine description:	Kanalballenpresse
Machine type:	PACOMAT V-65 D BH
Machine number:	32.197
Country of origin:	Germany
Year of manufacture:	2025

1.3. Information on the operating manual

Knowledge and observation of the basic safety instructions and safety regulations are the basic requirement for the safe handling and correct function of this machine.

This operating manual contains important instructions for the safe opeartion of the machine. It must always be available at the place of operation.

This operating manual, especially the safety instructions, are to be observed by all persons that work on the machine.

Beyond this, the accident prevention laws, rules and regulations applicable to the place of use are to be observed, applied and complied with.

The symbols employed in the operating manual have the following appearance with the following meaning:

Danger
Immediate threat of danger for life and limb
Dangerous situation for life and limb
Consequence: Death; serious injuries; injuries

Warning
Immediate dangerous situation
Consequence: Serious damage to the machine and machine components

Notice
Important situation
Compliance mandatory

Attach the attached "data sheet" in an easily visible position at the place of use of the machine.

1.4. Manufacturer and customer service

Please always state the machine type “PACOMAT V-65 D BH” and the machine number “32.197” when contacting customer service. You can reach our customer service at the following addresses:

(DE) Germany (manufacturer)

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Mr Craig Heley (Authorized person)
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D-49124 Georgsmarienhütte
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Spare parts service:

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🖷 +49 (0) 5401 / 488-150
✉ paal.kundendienst@kadant.com

Installation service:

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1.5. Scope of delivery

- Kanalballenpresse PACOMAT V-65 D BH
- Operating manual in printed form for the operating position
- Maintenance documents in printed form in the control cabinet
- Operating manuals and maintenance documents available as PDF files via download link.
- Data sheet laminated for attachment to the operating position 

1.6. Obligations, warranty and liability

1.6.1. Obligation of the operator

The operator is obliged to allow only staff to work on the machine

- who are familiar with the basics regulations for occupational health and safety and accident prevention
- who have been instructed on the handling of the machine and
- who have read and understood this operation manual (especially the safety chapter and the warnings) and confirmed this in writing.

Safety conscious working by staff will be verified and documented by the operator at regular intervals.

1.6.2. Obligation of the staff

All persons instructed to work on the machine is obliged before starting work

- To observe the basic regulations for occupational health and safety and accident prevention
- To read the safety chapter and the warnings in this operating manual, and to confirm in writing that he/she has understood these.

1.6.3. Warranty and liability

The contractually agreed sale and delivery condition apply. These are available to the operator at the latest since conclusion of the contract. Warranta and liability claims for personal injury and material damage are excluded if they are the result of one or more of the following causes:

- Unintended use of the machine
- Incorrect installation, commissioning, operation and maintenance of the machine
- Operation of the machine with defective or incomplete safety devices or or incorrectly mounted or non-functional safety and protection devices
- Non-compliance with instructions in this operating manual
- Unauthorised contructional changes to the machine, without consent by the manufacturer
- Inadequate monitoring of machine parts that are subject to wear
- Incorrectly performed repairs
- Catastrophic events caused by the influence of foreign bodies and force majeure.

The warranty excludes parts that are subject to normal wear and rear, e.g. seals, guides, rollers, bearings, cutters, springs, twister shafts, exchangeable sheet metal parts, pressure sensors, pilot valves, manometers, lamps, fuses, brake pads, batteries, accumulators, limit switches, push buttons, switches, sensor barriers, proximity switches, etc. or parts that are damaged due to incorrect maintenance and care or inappropriate use.

In the case of minor warranty events that require the exchange of smaller, simple construction and functional elements, which can be exchanged on site by customer staff without specialist knowledge, then the warranty is restricted to the free delivery of replacements for the defective parts.

1.6.4. Copyright

1.7. Nature of the material to be processed

Ensure that the type and quantity of material to be processed corresponds to the the machine capacity specified by Kadant PAAL, and is in accordance with the "Technical Data" and confirmation of order.

Prepare the material before loading it into the machine (e.g. by presorting the material to sort out parts that could cause a material blockage).

Warning
Especially rod shaped, compact materials must not be used. These lead to a onesided, punctual loading of the machine and can cause considerable damage to the machine.

Select a material loading speed that does not subject the machine to excessive loads.

Break up incorrectly bound or shaped bales before they are reloaded into the plant.

2. Intended use

The machine may be used only in locations that are protected from water, humidity and lightning strokes.
Pay attention to the machine dimensions during assembly and installation.
Pay attention to the foundation shapes and foundation loadings. Relevant information can be found in the chapter “Technical Data”.

The machine must only be used for the materials described in your contractual documents.

The following also belong to the intended use:

- Compliance with all instructions in the operating manual.
- Observation of the inspection and maintenance work, and
- The ban of all additions to, and enclosures on the machine.

Danger
Operation in environments at risk from explosion is forbidden.

Take measures to ensure that the employed material cannot cause explosion hazards.

Danger
You are not allowed to use the machine in a publicly accessible place.
Prevent unauthorised people from gaining access to the machine.

The machine is a channel baler press. It is designed exclusively to compress voluminous, cut or separable materials and is therefore also intended only for this purpose.

Caution
Note the foreseeable incorrect applications in the section “Foreseeable application”

2.1. Machine interfaces

Machine interfaces are a point at which a machine interacts with a further machine, or a human being with a machine.

2.1.1. Hopper

The machine operator must guarantee safe operation of the machine by means of appropriate safety measures if the machine is loaded using devices that are not included in the scope of delivery (e.g. belts, screw conveyors, pneumatic delivery devices, manual loaders, tipping devices). In all cases, a technical expert must establish operational readiness of the system:

2.1.1.1. Near the feeder unit

- Feeding must only be carried out unpressurised.
- Emergency stop
    a. Emergency stop devices must correspond with Stop Category 0 or 1 of the EN ISO 13850 standard; this leads to shorter stopping times.
    b. When you activate an emergency stop control device, the entire bale press, including the infeed and loading conveyors as well as the tipping device must stop to without causing any additional risks.
    c. The emergency stop control devices must be attached at locations that are easy to access:
        i. On each control station
        ii. On both sides at the start of the loading conveyor
        iii. At the unloading point of the loading conveyor and on both sides of it, assuming that both sides are accessible
        iv. With presses that are fed by hand, at the loading point
        v. With the feed shafts that are open at the top, a pull-wire that covers the three sides of the shaft
        vi. The emergency stop control devices must be installed along the conveyor so that a person can reach an emergency stop control device without having to move more than 10 m from any location.
    d. After activating the emergency stop device, the emergency stop system may only be acknowledged from the main control station.
- Key transfer system

    When you remove a key (key transfer system), the entire bale press, including the infeed and loading conveyors and the tipping device, must stop without causing any additional risks.
    Another method may be used to ensure that no more material is fed to the press after

a key has been removed. For instance using a bypass flap. In this case, the following applies:

i. The bypass flap must route the material safely past the press

ii. The control technology must safely monitor the bypass flap.

iii. The necessary performance level (PLr) “d” must be achieved.

When loading using conveyor belts

- The conveyor belts must correspond to the EN 620 standard.
- Additional emergency stop devices must be attached as described under “Feeding”. These devices must be activated by pull-wires that are located above and along the loading conveyor. It must be possible to activate these pull-wires at a distance of 2 m from the start and from the unloading point of the loading conveyor as well as between these points at least at every 3 m.
- If there is a danger of material dropping off, you must fit the conveyor with fixed separating guards along the entire bottom of the conveyor except at the location where excess material is allowed to fall to the floor. At this location, you must provide a vertical chute or housing to guide the excess material to the ground.
- You must fit the edges of the conveyor with guard rails that comply with the EN ISO 14122-3 standard or with other guards. Measured from the reference level, these guards must be at least 1100 mm high. You must clearly mark the open unprotected edges of the pit, which are necessary for loading material onto the conveyor, e.g. using yellow/black floor markings. These markings extend to the location at which the side cheek of the belt is 1100 mm high measured from the reference level.

When loading using tipping devices

- You must secure access to the moving parts of the tipping device using a key transfer system or by complying with the following points:

e. A control system without latching or a two-hand control device complying with PL_r “c” must be available;

f. The control position must be located at a safe distance in accordance with the EN ISO 13857 or EN ISO 13855 standards;

g. It must be ensured that there is a good view of the danger areas (mechanism of the tipping device, the raised containers and neighbouring areas) from the position in which you activate the controller;

h. The circumferential speed of the lifting device is a maximum of 0.5 m/s (measured using the largest container that may be lifted);

i. A visual and/or audible signal is issued for the entire time that the tipping device is in motion;

j. Access to the danger areas in which operating personnel does not have a good view must be secured by fixed or locking separating guards that have a key transfer system.

2.1.1.2. Near the feed shaft

You must never use steps, platforms or other climbing aids or make them available for use.

When loading using conveyor belts

- If servicing or emergency maintenance is being carried out on the feed shaft and the unloading point of the loading conveyor, you must provide an access platform that complies with ISO 14122 Part 1-4.
- You must secure all access to the feed shaft that is open at the top by means of a key transfer system with key removal.
- The outside surfaces of the feed shaft and the side walls of the conveyor belt must be smooth with no potential steps.

Loading using cranes, fork-lift trucks, mobile machines or tipping devices

- The feed shaft must be at least 1400 mm high above the highest point at which a person could stand (e.g. the top of the press chamber or a reinforcement rib or similar).

With manual loading

- The feed shaft must be at least 1400 mm high above the highest point at which a person could stand (e.g. the top of the press chamber or a reinforcement rib or similar). A dimension of 1200 mm to 1400 mm is allowed when using a feed chute to load material into the press, which prevents people from entering the danger area. The following requirements must be met:

  k. From the location of the control device that is used to start or restart the machine, the operating personnel must have a good view of the feed opening by means of a mirror or similar, for example;

2.1.2. Wire threading

Assuming that wire threading is not possible from ground level, you must only use optional climbing aids (ladders or steps) and working platform that are intended for this purpose. Machine parts must not be used as a climbing aid. If Kadant PAAL did not supply optional climbing aids, the owner must provide them. In this case, you must only use reliable and safe climbing aids.

2.1.2.1. Near the wire guide

Block the access to accessible draw-in positions near the wire guides by means of a barrier, such as a warning chain.

2.1.3. Bale discharge

The bales must be removed immediately after leaving the press channel. This must be ensured by a monitor with appropriate safety devices (e.g. light sensor barriers) or visually by staff members, since damage to operating equipment or building parts can result.

2.1.4. Machine installation

Installation on a level concrete floor that is impermeable to oil and is suitable for dowel pins is necessary for the safe functioning of the protection device and safety fences. In the case of an increased machine height or uneven floors, owners must ensure compliance with the necessary safety clearances by providing additional safety devices (e.g. safety fences with limit switch-secured doors). Machines with manual loading may only be loaded at ground level. Loading with the help of pedestals or from other raised positions is not permitted, since the permitted safety clearances will fall below the limit.

If it is possible to reach machine sections from a level other than the installation level (e.g. from fixed access points on the building side), you must completely protect these machine sections from access and tampering while complying with the DIN EN ISO 13857 and DIN EN 349 standards.

Any other use apart from this is considered to be inappropriate.
The manufacturer accepts no responsibility whatsoever for any damage resulting from this use.

2.2. Structural alterations

As a general principle, structural alterations to the machine are not permitted without previous written approval by thje manufacturer; this applies also to welding work on load-bearing parts.

Flawed machine parts must be exchanged or replaced immediately. Otherwise this can lead to greater damage or injuries.

Hydraulic components may be exchanged only as complete units and must not be dismantled.

Adjustments to hydraulic and electrical components that are not described in the operating manual must not be undertaken.

Lead seals must not be damaged or removed.

Safety switches must be neither shunted out nor removed, nor disabled in any other manner.

Only original spare parts or wearing parts may be used. It is not guaranteed that third party components are designed and manufactured appropriately for loading and safety requirements. The warranty and liability of the manufacturer become void after such use.

2.3. Residual risk

The machine is built according to the state of the art and the recognised technical safety rules. In spite of this, risks for life and limb of the user or third parties, or material damage to the machine or other material assets can arise from its use. These can be as follows:

- Slipping during maintenance or cleaning work or during normal operating processes, as well as in areas that cannot be climbed or entered. Pay attention to cleanliness at accessible positions of the machine and on platforms and walkways.
- Falling material in the loading area. Presence in these areas is to be avoided.
- Sudden wire fracture in the vicinity of the wire winder, wire guides and the bale stranding. This can result in personal injury and residence in these areas is therefore to be avoided. The wire must not be touched during machine operation.
- Bursting of hydraulic hoses. Presence in the vicinity of hydraulic hoses is to be avoided.
- Automatic movements of all components that are driven hydraulically. Even after the machine is switched off there may still be pressure left in the hydraulic system in individual cases. The expansion forces of the pressed material can lead to a pressure build-up in the hydraulic system. Ensure that there is enough space for movement. Do not hold any part of your body or any object on the transitions between the moving and fixed components.
- Automatic movement of the pressed material in and on the channel. There are expansion forces in the pressed material that can be released in an uncontrolled way. It is possible that pressed objects can jump out or jump forwards. You should keep out of the vicinity of the pressed material.

3. Safety instructions and regulations

3.1. Staff training

- Only sufficiently trained and instructed staff may work on the machine.
- The operating staff must have read and understood the operating manual.
- Safety and danger awareness of staff according to the operating manual should be reviewed monthly.
- The responsibilities of staff are to be defined clearly for installation, commissioning, operation, maintenance, set-up and repair.
- Instructed unskilled staff may work on the machine only under the supervision of experienced staff.
- Work on the machine is permitted only for persons older than 18 years.

3.2. Personal protection gear

When carrying out any work on the wire (if present), e.g. inserting the wire, removing wire residue, replacing coils, you must always wear protective goggles and gloves.

Usual protective clothing is to be worn at the installtion site. It is recommended that ear protection is worn. The necessary personal protection gear is to be provided by the operator.

3.3. Operating staff operating manual

- A copy of the operating manual must always be kept at the installation site of the machine and must be accessible to the operating staff at all times.
- In addition to the operating manual, the generally valid regulations for accident prevention and environmental protection are to be provided and complied with.
- All safety and hazard instructions are to be maintained at the machine in a legible state and to be renewed as necessary.

3.4. Organisation and cleanliness

- Pay attention to leaking fluids and the resulting slipping hazard.
- Pay attention to tidiness and cleanliness in the whole vicinity of the machine.

3.5. Safety and protective devices

- All protection devices must be mounted correctly and be functional before starting the machine.
- Protective devices may be removed only:
  - after shutdown and
  - after securing the machine against a restart (e.g. by locking the main switch).
- Safety switches must neither be shunted out, nor removed, nor disabled in any other manner.
- After delivery of partial components, the protective devices are to be mounted by the operator according to the regulations.
- All protective devices are to be remounted before recommissioning.
- The controller may be operated only by instructed staff.
- Program alterations in the software must be performed only by the manufacturer.

3.6. Safety instructions for operation

- Operate the machine only when all protective devices are present and fully functionable.
- Ensure before starting the machine that no one can be endangered by the machine start-up.
- Pay attention to the switching procedures for ON and OFF, signal lamps and warnings on the operator panel (if provided).
- Check the machine for externally visible damage and the functionality of the safety devices at least once per shift.
- Shut down the machine immediately if faults are present and let the faults be removed.
- The machine must be operated, maintained and repaired only by instructed persons.
- Follow the instructions and notices for maintenance and repair described in the chapter "Maintenance and repair".
- Switch the main switch to OFF during maintenance, fault finding and repair work, and secure it against unintentional reactivation.
- The plant may be released only when all maintenance ports and protective devices are correctly closed and screwed tight.
- Use the machine only for the intended purpose.
- Avoid foreseeable incorrect use.
- Entering the conveyor plant when the controller is switched ON is strictly forbidden. In the event that personal intervention in the upper loading area is necessary during the operation cycle, then this must be done only from a rigid platform.

- Never lock persons in the inerior of the machine or inside the safety areas.
- Do not touch the wire.

3.7. Safety during maintenance, repair and fault removal

Danger
Maintenance and repair work may only be carried out by instructed and qualified specialist staff.

Danger
Only trained and qualified specialists are allowed to remove any of the safety equipment.

Danger
Only trained and qualified specialists are allowedto open any of the safety equipment.

Danger
Also observe any and all safety information attached to or enclosed with third-party operating instructions.

- Secure the maintenance area with ample space.
- Execute the prescribed adjustment, maintenance and inspection work punctually.
- Inform the operating staff before starting maintenance and repair work.
- Switch the main switch to OFF, and secure it against unintentional reactivation. (E.g. by means of a padlock on the main switch).
- Fasten and secure larger components and modules carefully on hoisting gear.
- Authorise only experienced persons with the attachment of loads and instructing crane drivers. The guide must be visible to the crane driver or have verbal contact with him.
- Use only designated climbing aids and working platforms for installation work above body height. Machine parts must not be used as a climbing aid. Antifall guards are to be worn during work at greater heights.
- Keep all handholds, steps, railings, pedestals, platforms and ladders free from dirt, especially from oil. grease, snow and ice.

- Clean the machine, and here especially the connectors and threaded joints, at the start of maintenance/repair from oil, fuel or cleaning agents. Do not use aggressive detergents. Use only fibre-free rags.
- Before cleaning the machine using water or steam (high-pressure cleaning) or other cleaning agents, you must cover and/or mask all the openings into which water, steam or cleaning agents must not penetrate to ensure safe functioning. This applies in particular to bearings and electrical components such as electric motors, switching cabinets and terminal boxes. The coverings must be completely removed after completion of cleaning.
- Examinations for chafe marks and damage are to be made after cleaning hydraulic oil pipes and connectors. Remove identified defects immediately.
- The function of safety devices must be checked after completing maintenance work.
- Warning signs, instruction signs and signal colours are to be examined at regular intervals and renewed as required. (See chapter "Labelling of the machine")

3.8. Safety during cleaning and disposal

Materials and agents employed for cleaning are to be handled and disposed of correctly, especially:

- During work on lubrication systems and devices
- During cleaning with solvents

National and international environmental regulations are to be complied with.

3.9. Instructions for emergencies

- Always operate "emergency stop" in emergency situations.
- Visit a medical doctor after injuries caused by hydraulic fluids; there is an embolism risk due to the materials that enter the bloodstream.
- Extinguish burning oil with a CO2 extinguisher or powder extinguisher.
- Extinguish fire in the electrical controller only with CO2extinguishers.
- Rinse chemical burns with clean water and contact a medical doctor if necessary.
- When in doubt always contact the emergency doctor.

3.10. Dangers

3.10.1. Dangers caused by the material to be processed

Dangers caused by the material to be processed lie within the sole responsibility of the operator and his agents.

3.10.2. Dangers from baling wires

Danger caused by wire fracture, projecting wire ends and flying wire ends is present in the whole area of the wire:

- From the wire spools to its threading into the machine
- Near the press channel
- Near the finished bales.

Danger
Presence near the baling wires and the bale line is forbidden.
The wires must not be touched during machine operation.

3.10.3. Dangers from heat

There is a danger of burning from hot surfaces in the vicinity of:

- the electrical drives
- the hydraulic cylinders and lines
- the oil tank
- the switching cabinet
- near the finished bales

3.10.4. Danger from electrical energy

- Work on electrical systems must be performed solely by electrical craftsmen.
- The electricalö equipment in the machine is to be examined at regular intervals (see also national regulations for this). Defects, such as loose connections or damaged cable, must be corrected immediately.
- The control cabinet is to be kept locked at all times. Access is permitted only to authorised staff with a key.
- Use only original fuses! The electrical equipment can be destroyed by the use of fuses that are too large and danger exists for life and limb.
- Disconnect and connect plug connectors only in the de-energised state.
- If work is necessary on energised components, a second person is to be enrolled who can operate the main switch in emergencies. Cordon off the work zone with a red-white barrier and erect a warning sign. Use only electrically insulated tools.

3.10.5. Dangers from noise

- Please find information in the technical data regarding the noise level.
- It is recommended that ear protection is worn.
- Assess noise hazards by making bales from different materials and comply with the national regulations on reducing the risk of exposure to excessive noise.

The only installation methods to ensure reduced emitted noise are to set up all the system sections on level, pluggable concrete floor to avoid vibrations and noise.

The machine's noise emission values were determined in accordance with DIN EN 16252 Appendix A. DIN EN ISO 4871 was used as the basis for this.

3.10.6. Danger from hydraulic energy

- Only staff with special knowledge and experience in hydraulics may work on hydraulic devices.
- Remove the pressure from system sections and hydraulic pipes before starting repair work.
- Fluids discharged under high pressure can penetrate the skin and clothing, and cause serious injuries.
- Exchange hydraulic hoses at regular intervals in accordance with the manufacturer's instructions, even when safety relevant defects are not visible.

Danger
Presence near hydraulic hoses is forbidden.

3.10.7. Dangers from dust and vapours

Dust can be released, especially by dry material, during the loading and press process that can lead to damage to health, and to fire and explosion hazards. The operator must avoid the generation of such dusts. Suitable safety precautions must additionally be taken (personal protective clothing, smoking ban, etc.).

3.10.8. Dangers from falling objects

Danger from falling objects exists in the entire loading area.

3.10.9. Dangers from further emissions

- Further emissions must be expected, depending on the materials used.
- Fluids can leak from damp material. These must be collected and disposed of correctly.
- Vibrations can occur in the machine depending on, or independently from the material used.
- Dangers from non-ionising radiation do not originate from the machine.

3.11. Safety devices

The machine is equipped with the following safety devices:

- Emergency stop button
  - On each control station,
  - When loading using a conveyor belt, at the start of the loading conveyor (on both sides),
  - When loading using a conveyor belt, at the start of the unloading point of the loading conveyor (on both sides if accessible),
  - Near the press chamber,
  - At the ejection side of the press chamber (on both sides),
  - When loading by hand at the loading point,

- Key transfer system
  - At the press chamber doors,
  - At the inspection port at the side on the back of the press chamber,
  - On the protection doors in the tying unit (if present),
  - On the ladders of the platforms (if present),
  - On the platform's gangway barrier at the tying unit (if present),
  - On the doors in the boundary fence (if present),
  - On the door in the conveyor belt hopper (if present),
  - On the collecting trough at the back (if present),
  - On the cleaning port in the perforator (if present).

- Pull-wire emergency stop
  - When loading using a conveyor belt, along the loading conveyor with pull-wires,
  - With the feed shafts that are open at the top, a pull-wire that covers the three sides of the shaft.

- Emergency stop control device
  - along the conveyor belt at a maximum distance of 10 meters from each other. (on both sides if accessible; if present).

3.12. Transport

Warning
Transport work is to be performed only by qualified specialist staff.

3.12.1. Dimensions, weight, centre of gravity

Obtain the dimensions from the associated layout plan or dimension sheet (see chapter "Technical data").

Obtain the weight of the machine from chapter "Technical data".

Please contact the customer service for the position of the centre of gravity.

3.12.2. Instructions and protective measures for transport

The machine and loosely delivered machine parts and accessories are to be fastened correctly to the lorry and secured against shifting.

When transporting, there must be no bales in the press channel.

The press channel must be sufficiently secured for the transport of a press, using a transportation safety device against folding up (e.g. welded struts), horizontally and vertically.

The pressure plate must be in its backmost position.

You must empty the hydraulic oil into appropriate, permissible containers.

You must dismount additional equipment like the belt filling hopper, the perforator and the binding module.

3.12.3. Hoisting gear, transport lugs

Only approved hoisting gear may be used, such as:

- Shackle, e.g. to DIN 82101
- Sling chain, e.g. to DIN 5687 quality grade 8
- Sling ropes, e.g. to DIN 3088
- Textile hoisting gear, e.g. round sling to DIN 61360

When hoisting gear and transport lugs are used, care must be taken that the permitted loading of the elements may not be exceeded. The hoisting gear and transport lugs must furthermore be in a flawless state and must not show signs of damage. Also pay attention to the expiry date.

The correct position of the means of transport must be ensured during attachment to the machine. Straps and chains must not be twisted and must not intersect with each other.

Danger
There is danger of injury caused by
suddenly relaxed hoisting gear.

Danger
Only the attachment points marked on the machine
may be used. (See chapter "Labelling of the machine")

The generally valid regulations for the attachment of loads, and the use of loading devices and hoisting gear, are to be observed.

Please contact the customer service if questions arise concerning attachment of the machine.

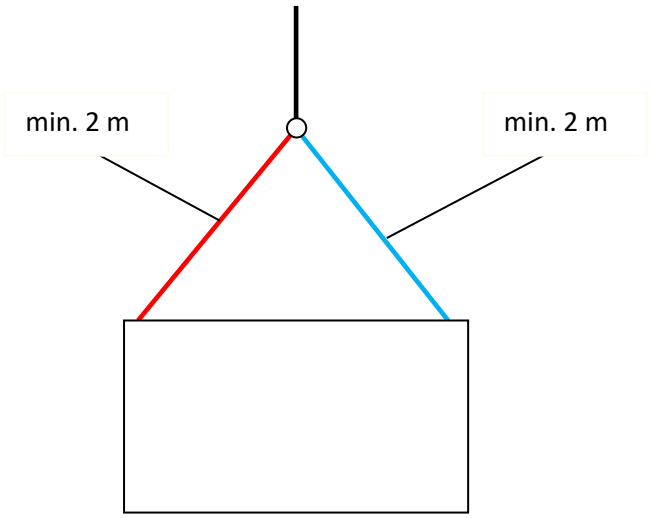
Unloading and installation using a forklift truck or crane is performed under the sole responsibility of the driver/crane driver, whose instructions must be followed.

3.12.4. Transport with the aid of a crane

The permitted loading of the crane must be taken into account during transport with the crane. Local safety regulations for the use of cranes continue to be valid.

The hoisting gear must be attached in such a manner that damage to the machine or its components is excluded.

Danger
Use chains and ropes with a minimum length of 2 m between the attachment point and the hoisting gear. (See following sketch)



3.12.5. Transport with tank steel castors

The machine can be conveyed bymeans of tank steel castors A sufficiently smooth surface with a satisfactory load-bearing capacity is necessary for this.

A tank steel castor with appropriate load capacity must be attached under each machine support point. The castors must be observed carefully for sliding and obstacles during the transport, in order to prevent slippage under the machine. Sharp edges in the transport area must be levelled using metal sheeting or other aids.

3.13. Transport damage, packing and storage

3.13.1. Inspection, transport damage

All parts must be inspected immediately at acceptance, and any established transport damage notified to the forwarding agent and the contracting party, and also recorded in the shipment documents.

The list of transport damage is to be confirmed by the driver. The correction of transport damage is not included in the manufacturer's warranty. The contracting party responsible for the transport is liable for this risk.

The delivered parts are to be unloaded correctly and be stored with protection against external sources of damage and climatic impacts.

3.13.2. Packing, insulation

Machine packing materials are to be disposed of correctly in an ecological manner and under consideration of valid environmenta protection regulations.

3.13.3. Storage location, storage duration, protection measures

The machine and the associated parts are to be stored correctly to protect against external damage and climatic impacts.

3.14. Installation and assembly instructions

Danger
Only specialist personnel authorized by Kadant PAAL are allowed to set up the machine.

The machine is delivered in a partially assembled state and must be assembled on site. The installation position must be load-bearing, firm and level to support the its weight. The permitted floor loading must be investigated. The machine or plant is to be erected in accordance with the assembly drawing, if provided. Attention is to be paid to providing sufficient space for access, safety and execution of maintenance work. See chapter "Technical data" for floor loading and assembly drawing).

All support points of all plant parts must stand on the floor firmly and free of distortion Any existing level differences must be compensated by appropriate means.

The machine parts are to be aligned carefully and to be boltes together at all attachment points free of tension. Finally, the machine is to be connected at all attachment points to the load-bearing floor with the provided heavy load anchors.

Attention must be made in the case of control cabinets that the cables are not strained, the doors close properly and the mains switch operates correctly.

Exposed cables are to be protected against damage by means of coverings.

If plant parts and associated switchgear can be caused by vehicles, then appropriate protection, e.g. fenders, is to be provided.

The same procedure is to be followed for separate oil tanks, and special attention must be paid to assembling the oil tanks horizontally.

Inspection platforms must be attached to the ground only using the provided heavy load anchors and must be attached correctly to the machine in accordance with the assembly drawing.

3.14.1. Reduction of noise and vibrations

Special measures to reduce noise and vibrations are not necessary.

3.14.2. Conditions for stability

Under normal circumstances and compliance with the floor loading capacity, the structural integrity of the machine will not be lost throughout its various life cycles, due to its weight and low centre of gravity.

3.15. Cleaning, lubrication

Removal of the corrosion protection is necessary only for machines from storage or in seaworthy packaging.

Also clean all polished machine parts, e.g. slinging parts, guides, using appropriate cleaning agents and tools.

Dispose of cleaning agents correctly.

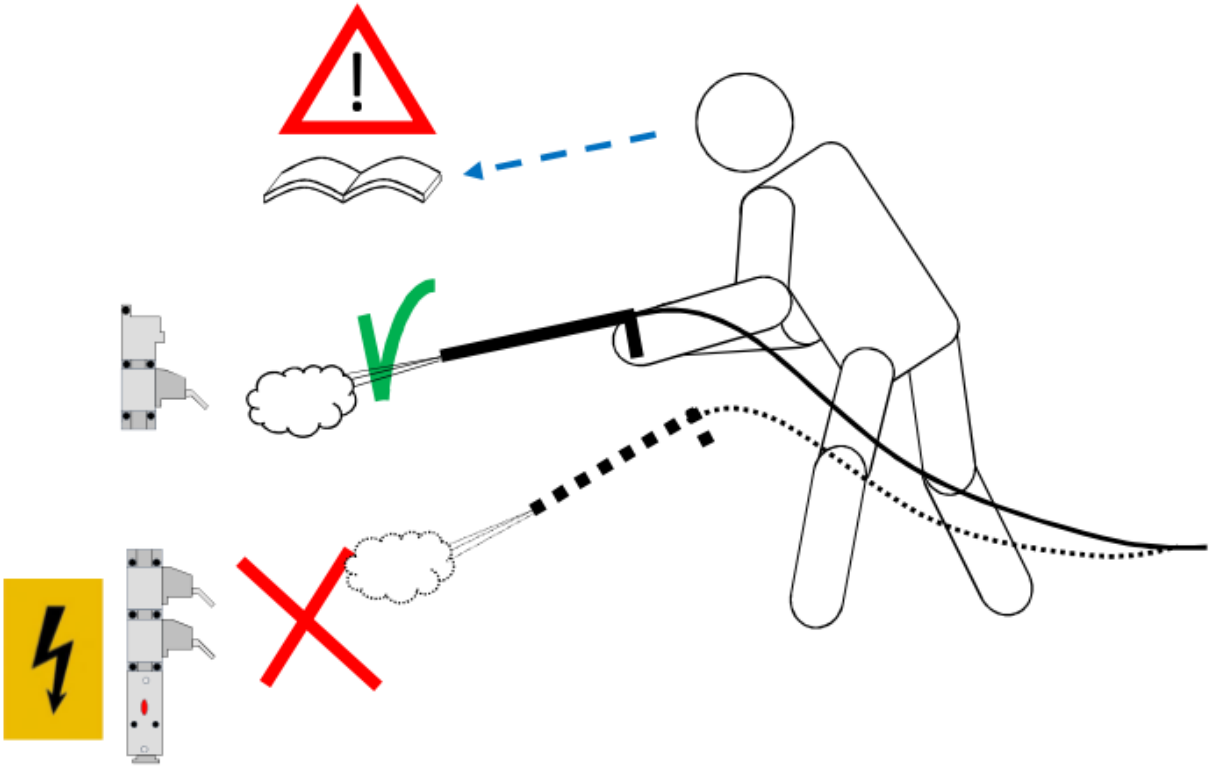
The machine is provided with basic lubrication by the manufacturer. Further lubrication is performed in accordance with the maintenance intervals.

3.15.1. Cleaning of the key transfer system

Key transfer units work best in a clean condition. Contamination can usually be removed easily with the help of compressed air or water. If cleaning agents are used, the units must be thoroughly rinsed with clean water after cleaning, especially in the case of aggressive cleaning agents such as phosphoric acid. Failure to do so may damage the units. In the case of stubborn contamination, the units can be cleaned with brake cleaner. Please observe the instructions of the brake cleaner manufacturer.
In the case of coarse contamination, such as partially hardened concrete, the mechanical units can be cleaned with a high-pressure cleaner.

Caution
The labelling fields of the modules and keys should not be damaged.
The high water pressure of a high-pressure cleaner can damage the seals on electrical units. Caution should therefore be exercised when using a high-pressure cleaner.

Lubrication may be necessary after this type of cleaning.



3.16. Make electrical connections

Danger
Work on electrical systems must be performed solely by electrical craftsmen.

Danger
Main connections to the local electrical power network may be made only by a locally approved electrical craftsman.

- Check the connection load values from chapter "Technical data".
- Connect the feeder to the feeder terminals at the main switch in the control cabinet.

  Check the phase rotation with a suitable measuring instrument. The phase rotation must be clockwise. If the phase rotation direction is incorrect it must be corrected by exchanging the feeder connections.
- It is absolutely necessary to check the direction of rotation of all motors after connection against the rotation direction arrows attached to the ventilation covers.

3.16.1. Connection of oil heater

Electronic devices and pumps function correctly only within certain temperature ranges. Heaters are fitted for certain applications in switchgear and oil tanks to maintain the minimum temperature.

The electrical supply to the heaters is not disconnected by the main switch in the control cabinet. Since these devices must continue to function also during pauses in operation, the supply voltage is tapped in front of the mains switch and controlled by an additional, separate main switch as required.

The switches are located inside the control cabinet.

Main switch

Main switch for heaters, lighting, controller

Warning
The mains voltage may be supplied to the oil tank heater only when the heating element is covered sufficiently with oil. Otherwise there is a danger of overheating.

3.16.2. Networking with third-party systems

When networking emergency-stop facilities of different control circuits or other external disconnections, you must take into account the special features of the press's operating sequence during the tying-off process. Do not switch off during the tying-off process.

Important
Switch the machine OFF only when the wire puller is in the home position, i.e. the wire pulling needles must not be located inside the press.

Important
It is possible to switch the machine OFF by manual intervention or emergency stop even if the wire catchers are not in the home position. In this case, ensure that you run the wire catchers back to the home position as quickly as possible. Otherwise they can be damaged by the pressure plate drawing back.

3.17. Labels/signs

The plant is provided with the following labels.
It is absolutely necessary to renew them if they become worn or contaminated:

	Ø=200 Access prohibited Part number: SD0081 (Attach to the hopper and the surfaces of the oil container if access is possible)
	Ø=200 Raised floor prohibited Part number: SD0143 (Attach to press hopper using chute if present)
	L=100 Warning of being buried under the material Part number: SD0156 (Attach to all the access doors of the feed shaft and the press chamber)
	L=100 Warning hand injury Part number: SD0082 (Attach in vicinity of chain drives)
	L=100 Warning crushing injury Part number: SD0083 (Attach to all maintenance doors)
	L=100 Warning of being caught or crushed Part number: SD0155 (Attach at several locations on the moving channel)

	Ø=100 Secure main switch against switch-on during maintenance work Part number: SD0078 (Attach to all maintenance doors)
	Ø=100 Observe instructions Part number: SD0079 (Attach to oil tanks and to cabinet)
	L=80 Rotation direction motor Part number: SD0084 (Attach to motors)
	2× L=35×40 (2 labels on one mounting) Oil level min. max. Part number: SD0085 (Attach to oil tank)
	L=100 Hoisting load Part number: SD0088 (Attach to hoist point)

4. Description of the machine

4.1. General

The machine is a very powerful and efficient bale press for recyclable, compressible materials. It allows highly compressed bales to be produced while guaranteeing maximum safety and quality.

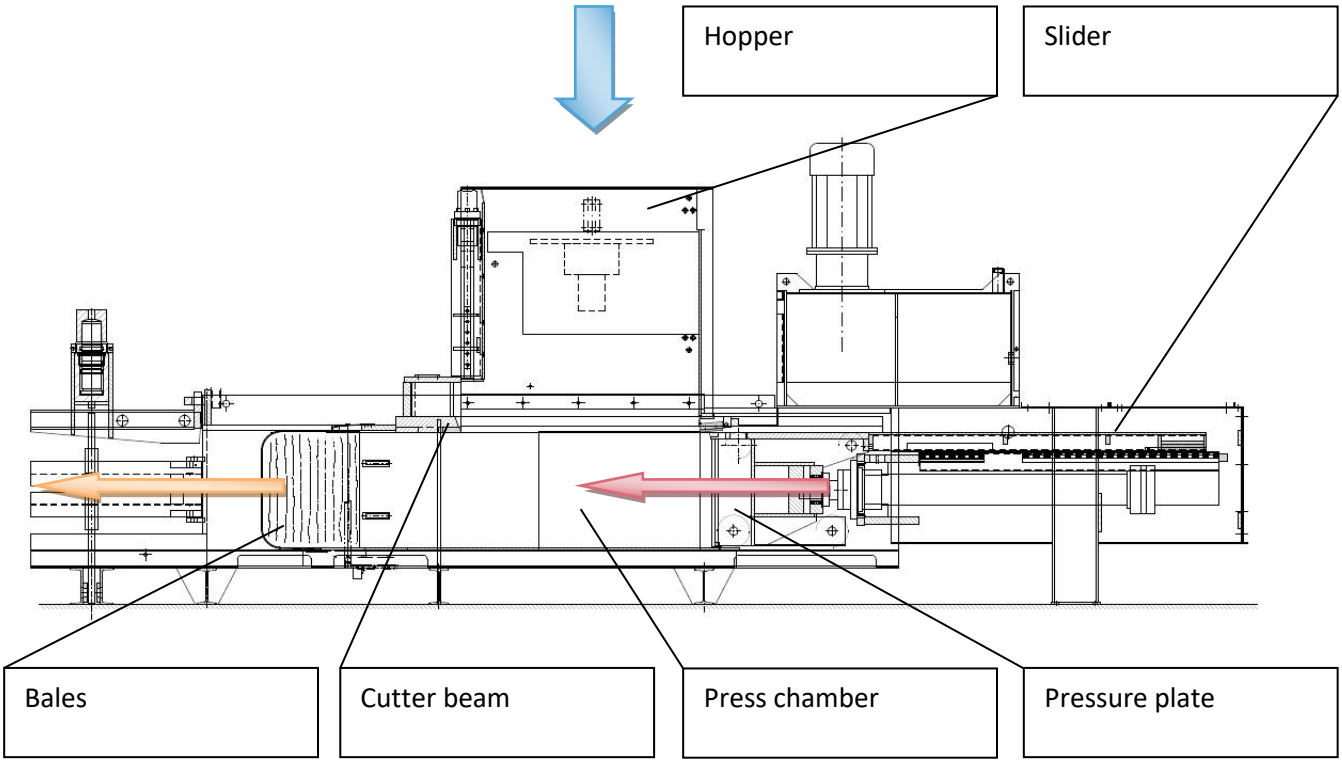
4.2. Fundamentals

4.2.1. Filling

The press is designed for fully automatic, continuous operation. The press material is fed by a separate loader and reaches the press chamber via the hopper.

4.2.2. Pressing process

The press material is pressed under high compaction in the press channel, whereby projecting press material in the hopper is sheared off at the cutting beam. A slider attached to the pressure plate which closes the hopper on its downward stroke prevents remaining press material falling behind the pressure plate, thereby allowing filling to continue during the pressing process.

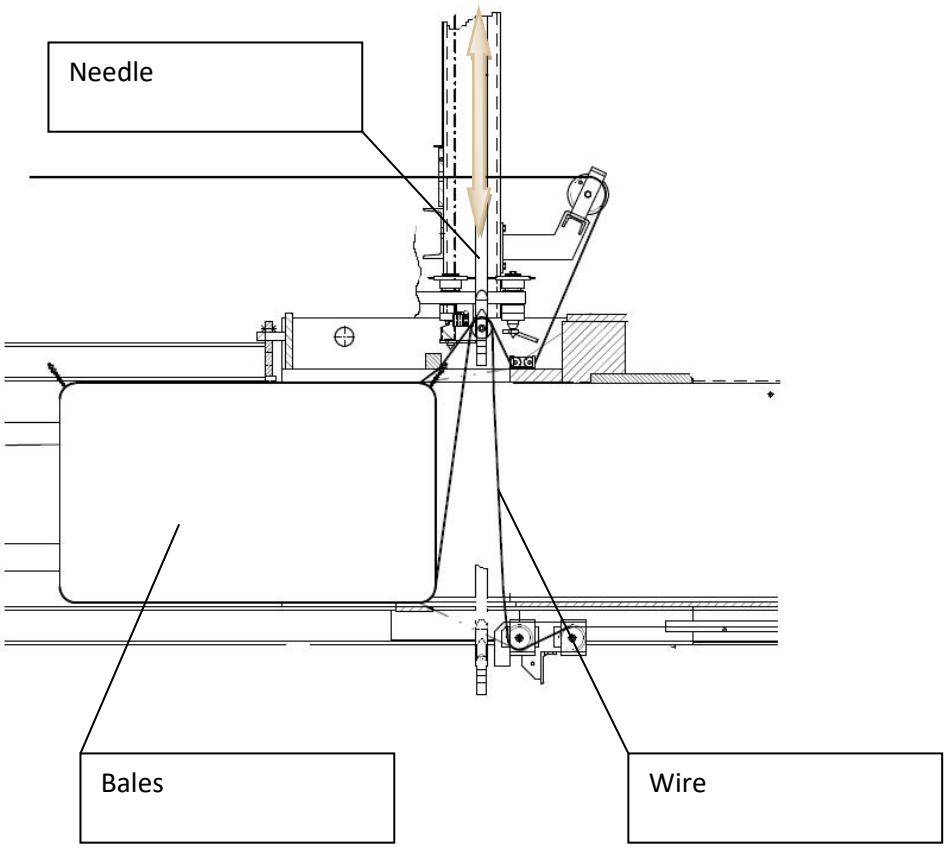


The pressure of the following bales secures the progressive feed motion and finally the discharge of the bale out of the press channel.

4.2.3. Tying process

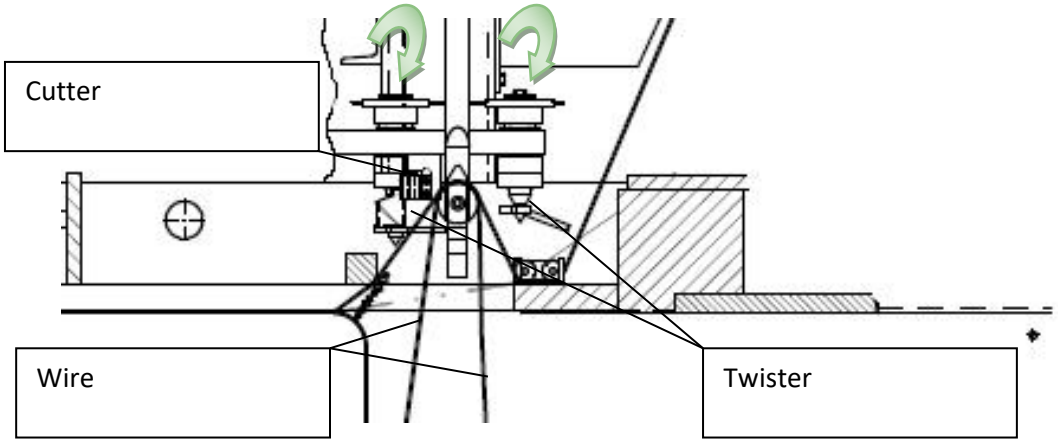
When the set bale length has been reached, it is tied fully automatically with binding wire unrolling from the storage roll. This normally happens so quickly that the continuous material feed is not interrupted by this process.

As soon as a bale is finished, the pressure plate is driven to its starting position, the binding position. A signal indicates that it has reached this position. The needles travel through openings in the pressure plate into the machine up to the end position. The needles now pull the opposite binding wire through the openings in the pressure plate, at the same time engage the front binding wires and travel to their home position.



4.2.4. Twisting process

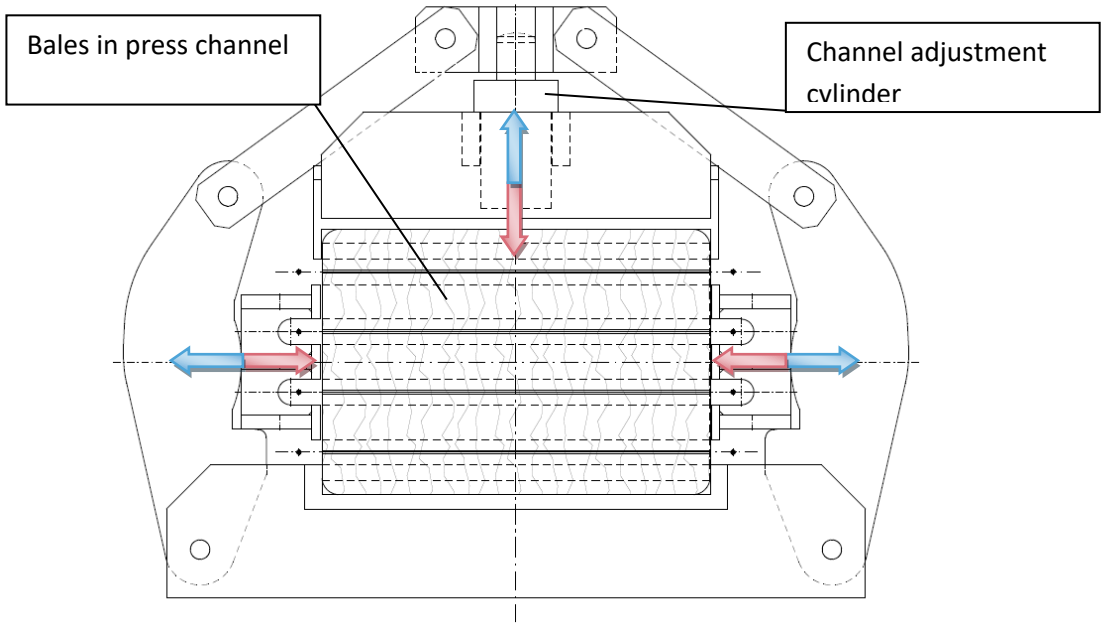
The twisting process follows the binding process. This twists the wire ends together. The wire is cut simultaneously with the twister advance by the cutter attached to the front twister hook. All wire ends are released during the subsequent return travel of the twister.



The pressure plate travels back when the twisting process is completed.

4.2.5. Channel adjustment system

The channel counterpressure is achieved by the conical extension of the press channel, which is controlled/the shape changed with the aid of a channel adjustment cylinder.
The further the channel is closed, the greater is the necessary force of pressure and the firmer the bales become.



Warning
The channel counterpressure is to be matched appropriately to the material to be pressed.

The pressure on the channel adjustment cylinder is built up by the controller corresponding to the required channel counterpressure before the pressing process starts. The pressing process starts with the forward motion of the press after reaching the minimum pressure.

The pressure also increases in the channel adjustment system during the pressing process. When the pressure at the main press cylinder has reached a certain set value, the channel adjustment valve opens to reduce the counterpressure for the main press cylinder.

4.3. Key transfer system

The machine is equipped with a key transfer system to secure the doors.

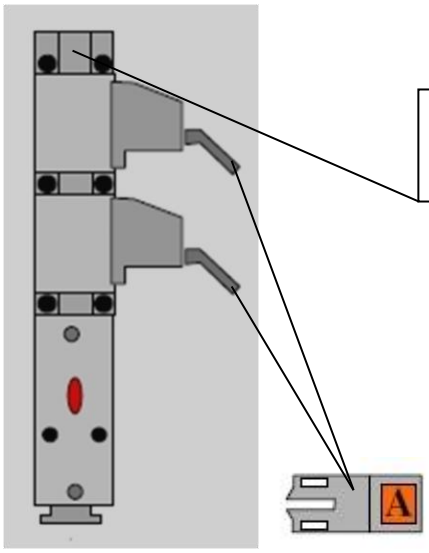
This system is based on a key transfer between an evaluation unit at the control cabinet and a lock that is fastened to the protection door to be opened. The protection doors protected in this manner can be opened only with one of these keys.

Note
Observe all the keys of the evaluation unit. It is not possible to operate the machine if only one key is missing in the evaluation unit.

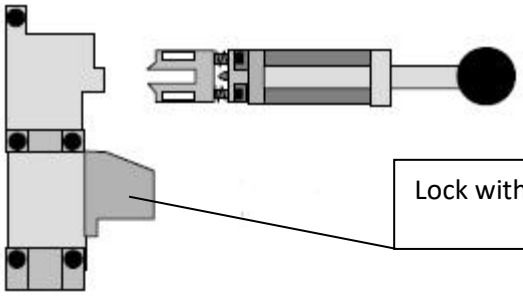
Note
Remove all the keys from the evaluation unit after terminating machine operation so that they cannot be removed by unauthorised persons.

Note
You can only remove the keys from the evaluation unit or insert them into it individually in a specific order. Remove the keys from bottom to top; insert them from top to bottom.

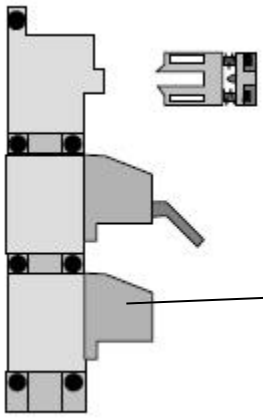
The key transfer system consists of the following components:



Evaluation unit with at least two locks and the associated keys on the control cabinet.



Lock with mechanical tumbler on the protection door.



Lock with mechanical tumbler on the protection door, through which entry is possible.

The keys for opening the protection doors are in the evaluation unit on the control cabinet. You have a choice of removing one or more keys one after the other to open protection doors at the same time.

4.3.1. Opening one protection door

- Withdraw one key from the evaluation unit at the control cabinet.
- Insert the key into the lock on the protection door.
- Open the door.

The key can now no longer be removed.

4.3.2. Closing one protection door

- Close the protection door completely.
- Pull out the key.
- Reinsert the key into the evaluation unit.

4.3.3. Open one protection door, through which entry is possible

- Withdraw one key from the evaluation unit.
- Insert the key into the lock on the protection door.
- Remove the second key located there.
- Leave the key you have just removed with the person entering.
- Open the door.

Danger
The removed key must under all circumstances be retained by the person entering the machine. This key protects the entering person against being locked in by other persons. It is only possible to lock the protection door again using this key and to commission the machine.

Do not allow anybody else to enter the machine.

4.3.4. Closing a protection door, through which entry is possible

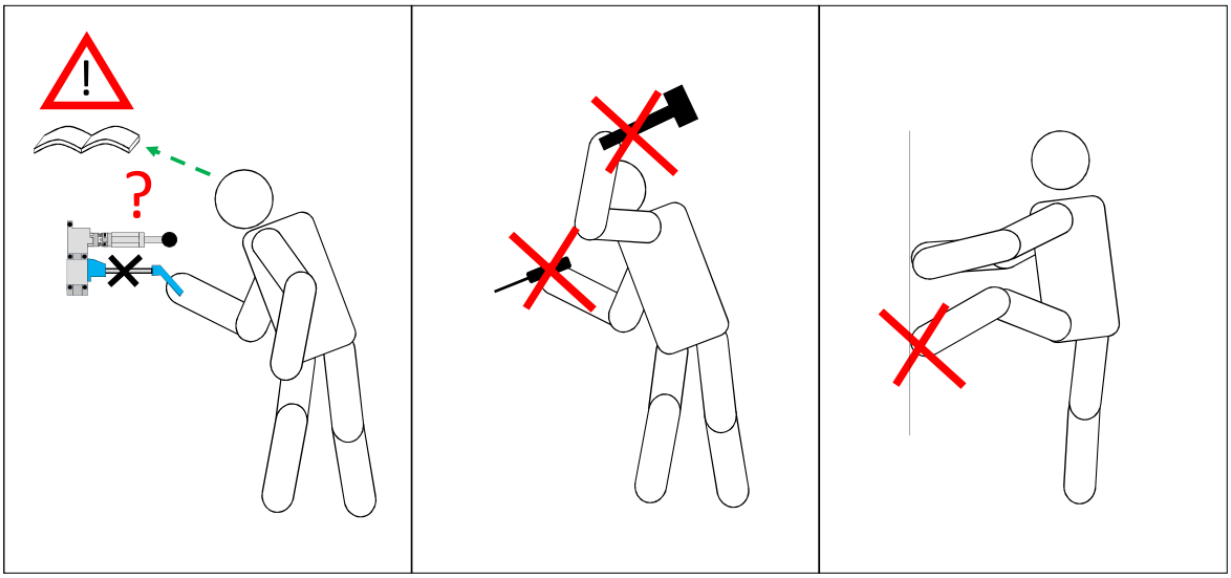
Danger
Make sure that nobody else has entered the machine.

- Close the protection door completely.
- Insert the key of the exiting person into the lock on the protection door.
- Remove the key located there.
- Reinsert the key into the evaluation unit.

4.3.5. Incorrect operation of the key transfer system

Check on the label and colour (from year of manufacture 2024) that you have the correct key for the lock you want to use. The keys only fit in the locks with the same designation and colour.

Do not use any tools or other aids.



5. Preparation for initial commissioning

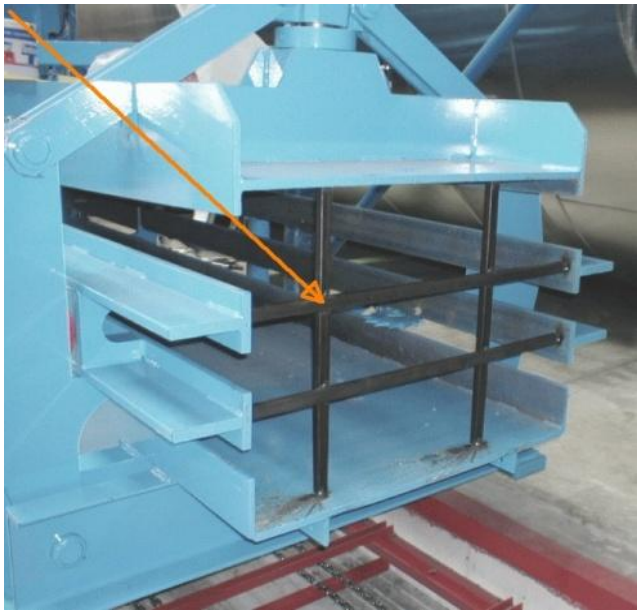
Danger
Only specialist personnel authorized by Kadant PAAL are allowed to carry out preparation for initial commissioning.

The measures described in the preceding chapters must have been performed and the instructions followed before the initial commissioning.

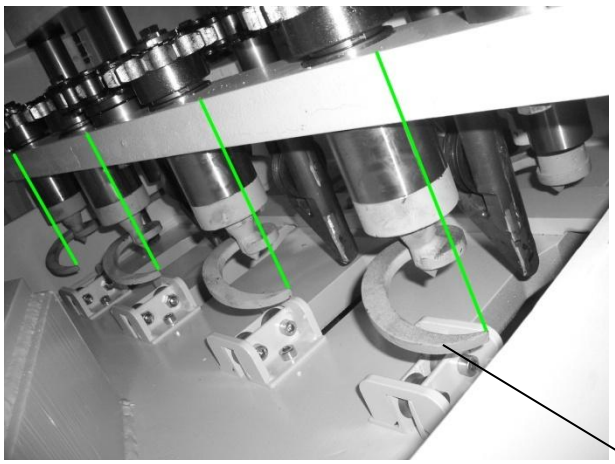
The activities listed below must be carried out before initial commissioning:

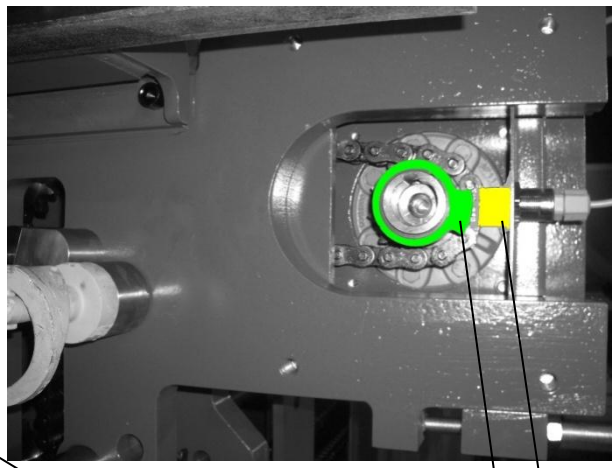
- All safety devices must be assembled and function correctly.
- Remove all unnecessary tools, especially hoisting gear, from the construction site and the machine.
- Check the direction of rotation of all drives against the rotation direction arrows attached to the ventilation covers.
- Fasten the enclosed data sheet at the control position.

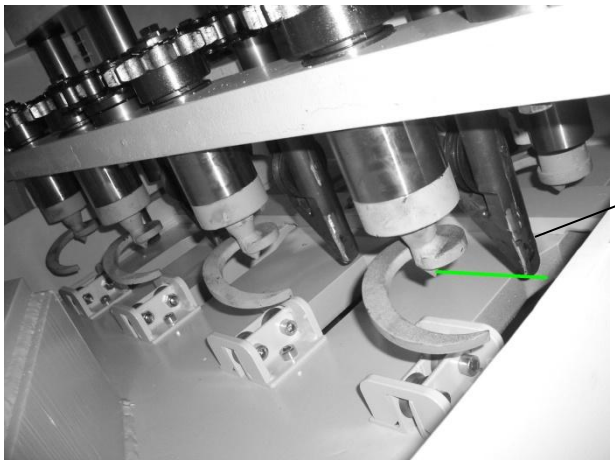
Danger
The transportation safety device in the press channel must not be removed completely so long as the channel is empty. There is danger of injury after the collapse of the channel top cover and the channel side walls.



- Check the hydraulic fluid and fill up with the necessary amount, if applicable. (See chapter "Topping up hydraulic oil")
- Check that all screw joints are tight, especially the hydraulic joints. Pay attention that the hoses do not rotate when tightening hydraulic connections.
- Check that the hoses are assembled without twisting.
- Bleed the hydraulic pumps and oil coolers and/or oil cooler pumps correctly.
- Place the wire spools in the provided compartments in the machine or in the separate wire unwinding devices.
- Check the positions of the twisters and needles. These must be located in the home position:







Twister

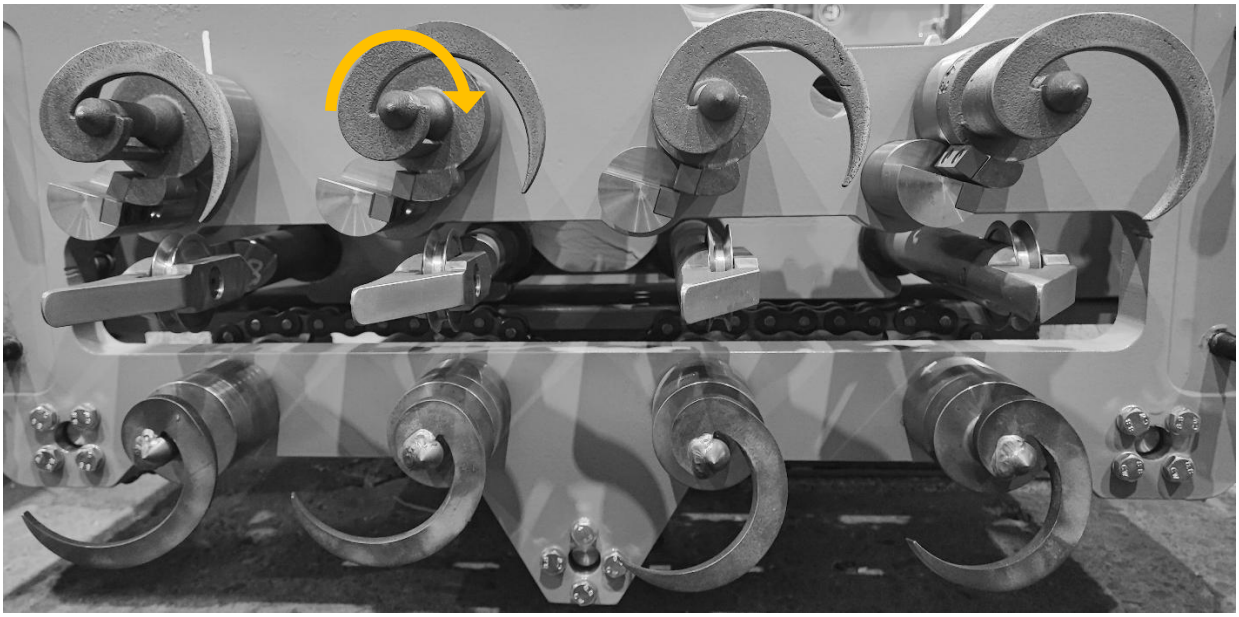
Needles

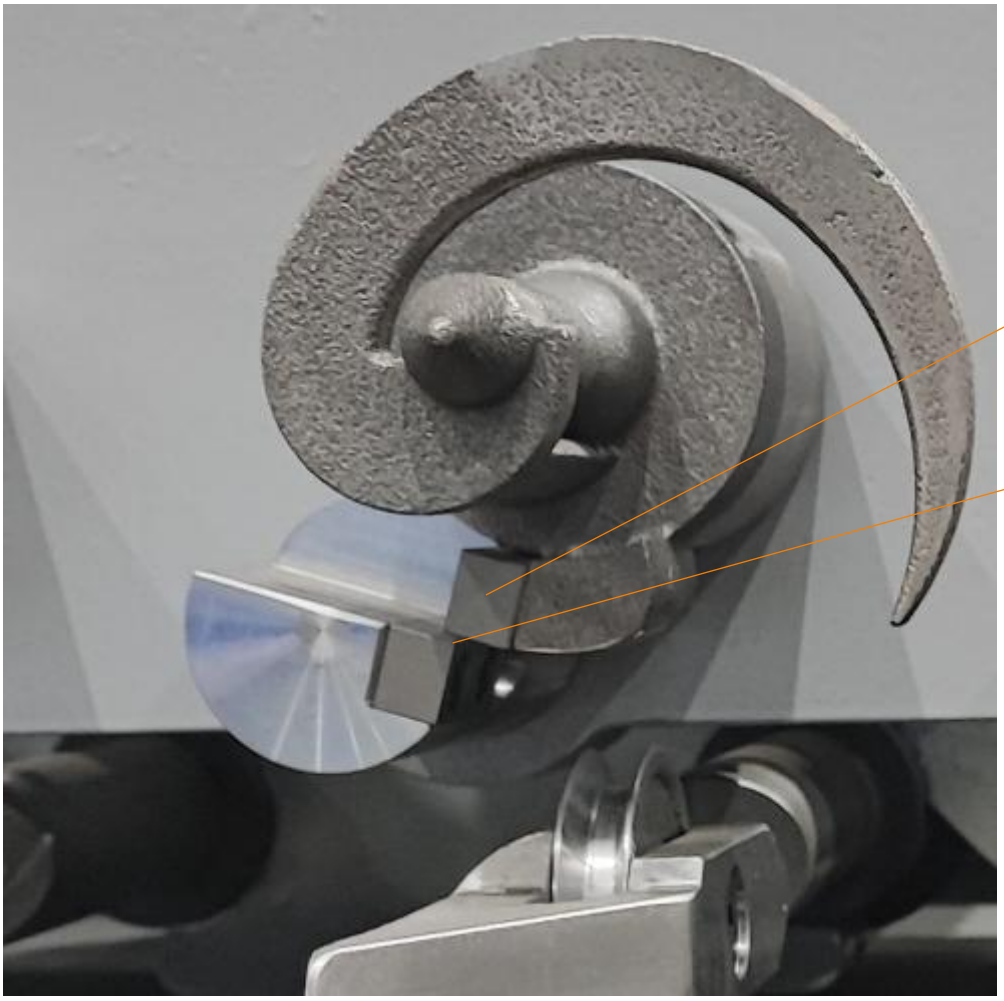
Home position of the drive

Sensor

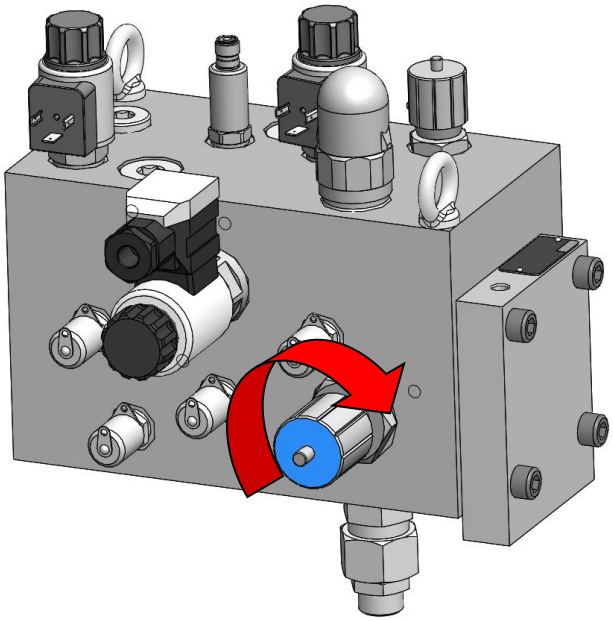
Note
Pay attention to the positions of the twister knives, if present. These must be positioned just behind the cutting edge in the forward direction of rotation.

Home position in the example of 4-wire tying:





- Close the shut-off valve for channel adjustment on the hydraulics unit that is marked here.



- Switch ON the main switch at the control cabinet.
- Start the controller in the control cabinet.
- Perform a lamp test.
- Drive through all machine functions (binding and pressure plate) several times in manual operation, as described in chapter "Operation".
- Switch OFF the machine

Danger
Switch OFF the machine and secure it against reactivation of the main switch.

- Draw the binding wire into the machine. (See chapter "Draw in binding wire")

5.1. Binding wire

Important
With automatic binding, use only soft-annealed and pre-greased binding wire according to DIN EN 10016-2, with a diameter of Ø2.8.....Ø3.4 mm.
The use of other binding wire can damage the mechanism.

Characteristics of binding wire:	***Value:***
Quality:	Acc. to DIN EN 10016-2
Strength:	320...450 N/mm²
Elongation:	Approx. 35...40 %
Wire diameter:	2.8...3.4 mm

5.2. Changing wire

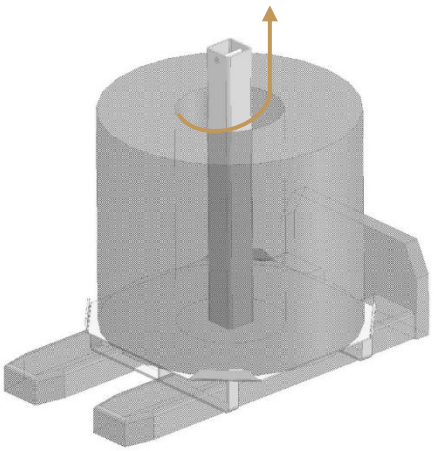
Note
If material is present in the press chamber which hinders insertion of the binding wire, then the pressure plate should be run to the front end position.

Danger
Before changing the binding wire, the machine must be switched OFF at the main switch as described in chapter “Switch OFF machine” and the main switch secured against switch ON.

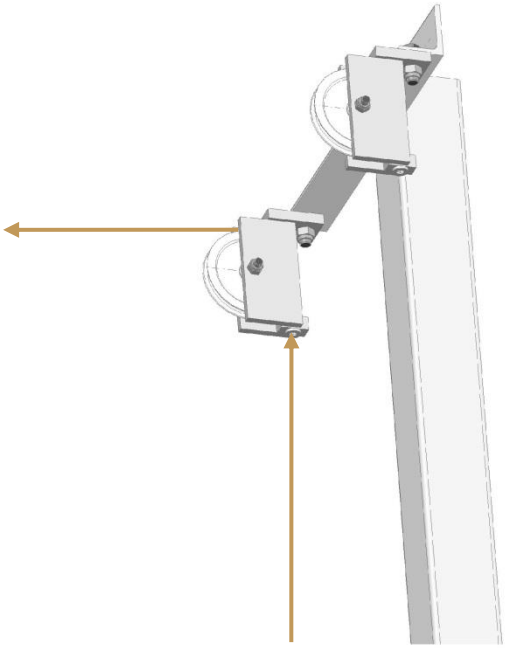
Danger
Always wear eye protection and protective gloves when carrying out any work on the wire. Be aware of how heavy the wire spools are and use appropriate lifting equipment.

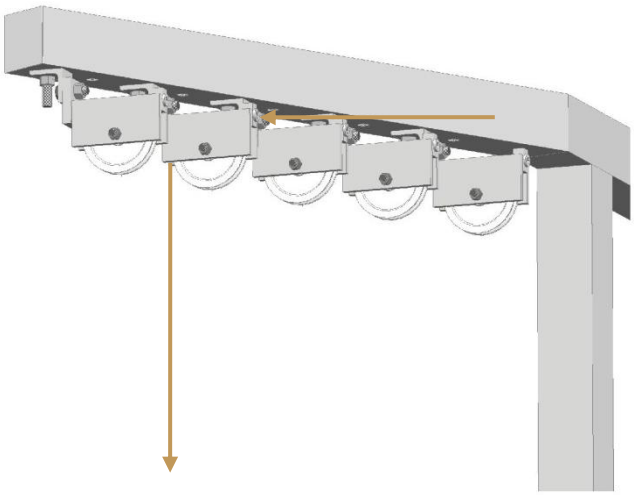
Danger
Watch out for your fingers when manually inserting small wire spools in the corresponding wire unwinder.

- Place the binding wire roll at the intended location.
- Pull the wire out of the inside of the binding wire roll:

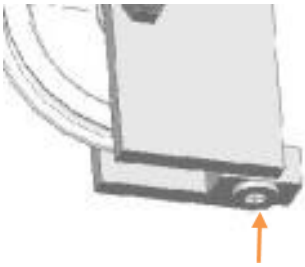


- Guide the wire across the intended deflection rollers:

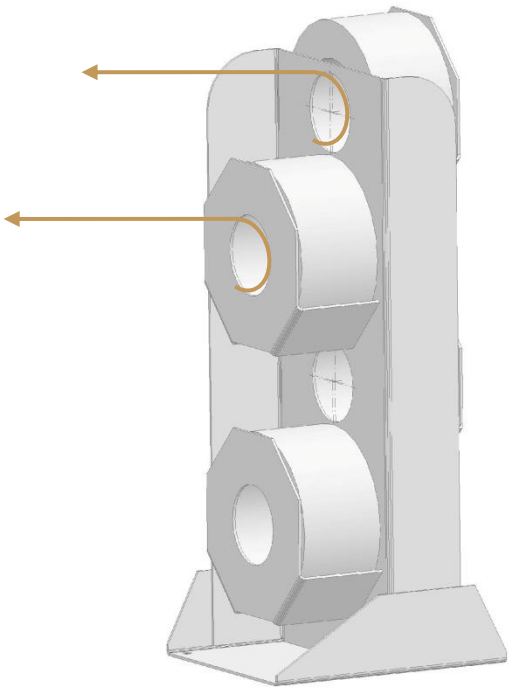


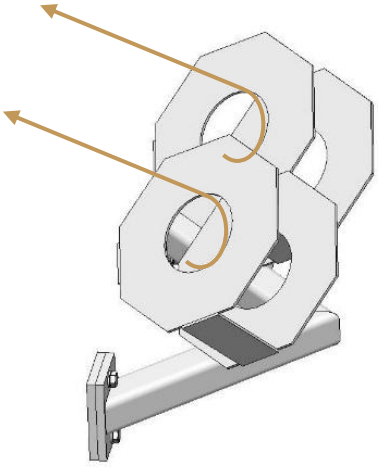


Always guide the wires through the bushings into the roller.



When using smaller wire unwinders, pull the wire out of the inside of the wire roll to the side:



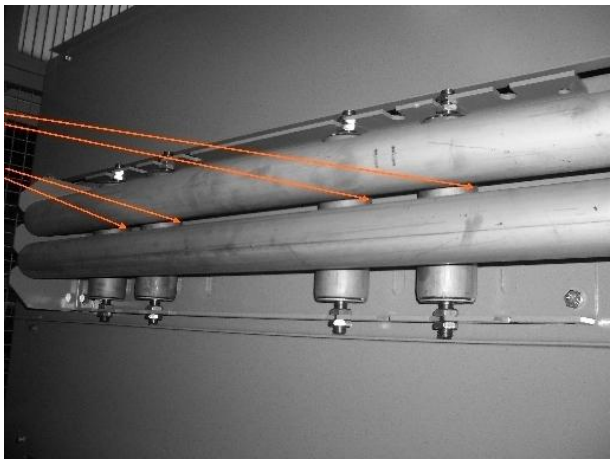


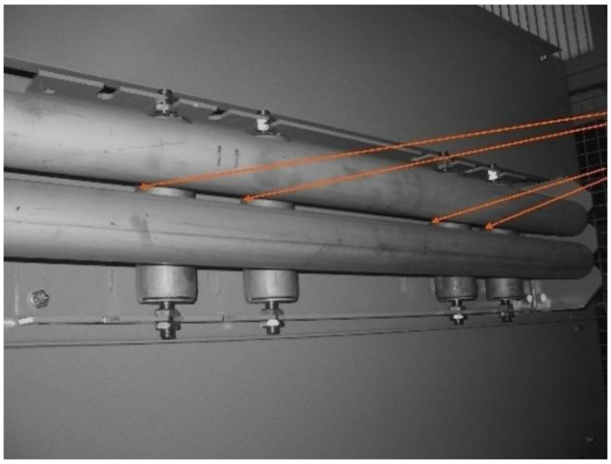
- Pull the wires into the press as described in the following section.

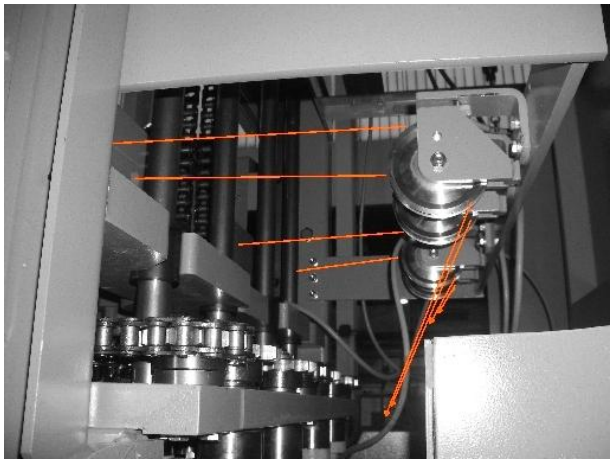
5.3. Draw in binding wire

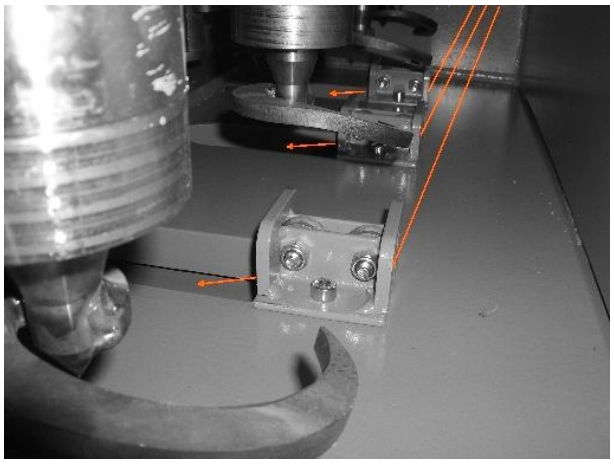
5.3.1. Vertical binding - top wire

The insertion into the press can be laterally inversed, depending on the wire insertion direction.





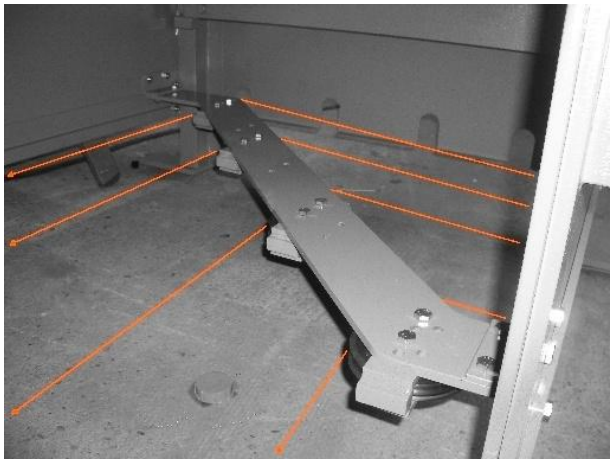




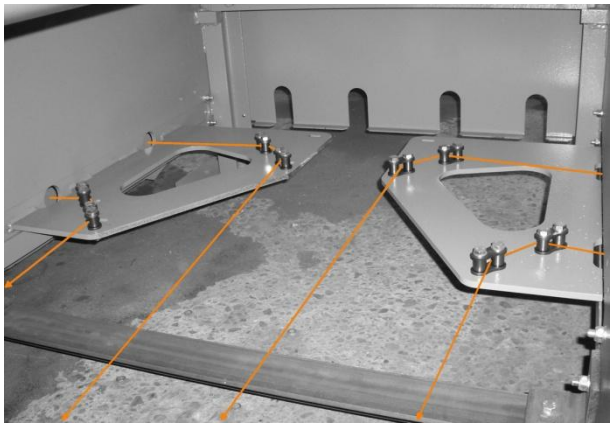
- Insert binding wire into the channel.

5.3.2. Vertical binding - bottom wire

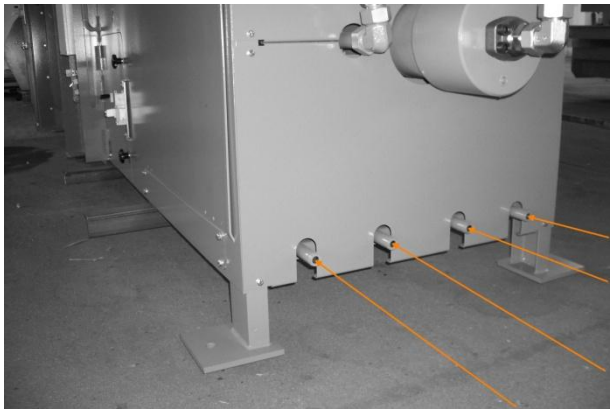
Depending on the positions of the wire coils, it is possible to carry out insertion from the left, the right, on both sides, or from the back. Insertion from the left-hand side (viewed in the direction of pressing):

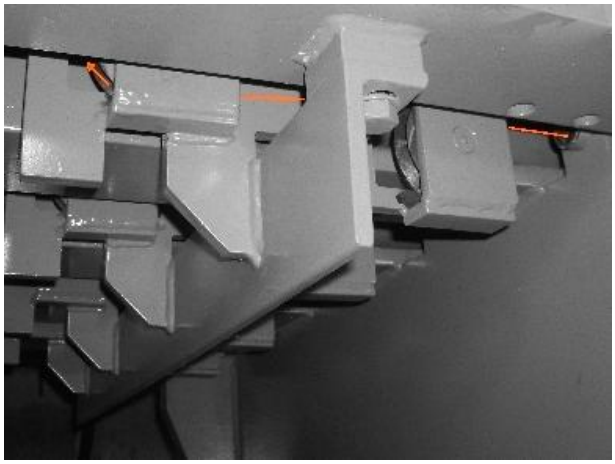


Insertion on both sides:



Insertion from the back:





- Insert binding wire into the channel
- Twist wire ends in the channel tightly with each other.

If the old wire end is still there, you can twist the start of the new wire onto the end of the old one. When doing this, ensure that the connection never passes the tying device.

Important
You must only make the connection of the new wire end to the old one behind the binding.

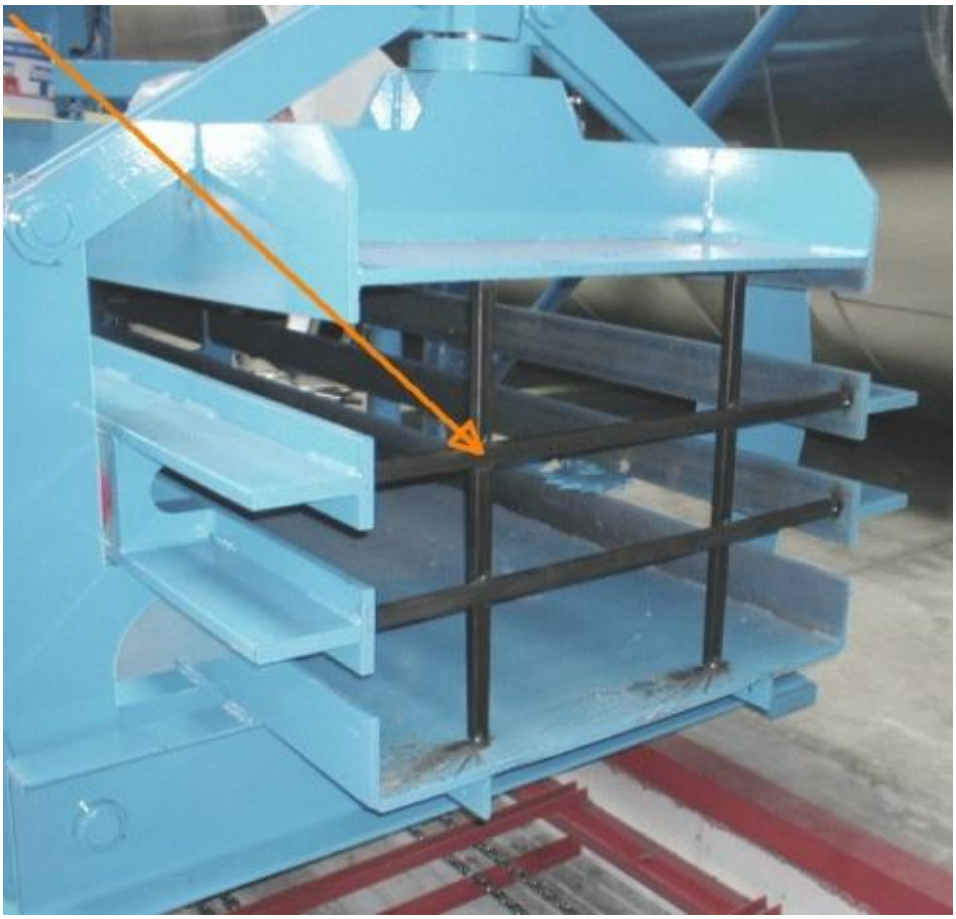
6. Initial commissioning

Danger
Only specialist personnel authorized by Kadant PAAL are allowed to carry out initial commissioning.

Important
Check the cylinder positions during the whole initial commissioning. If necessary, correct these by adjusting the initiators if available.

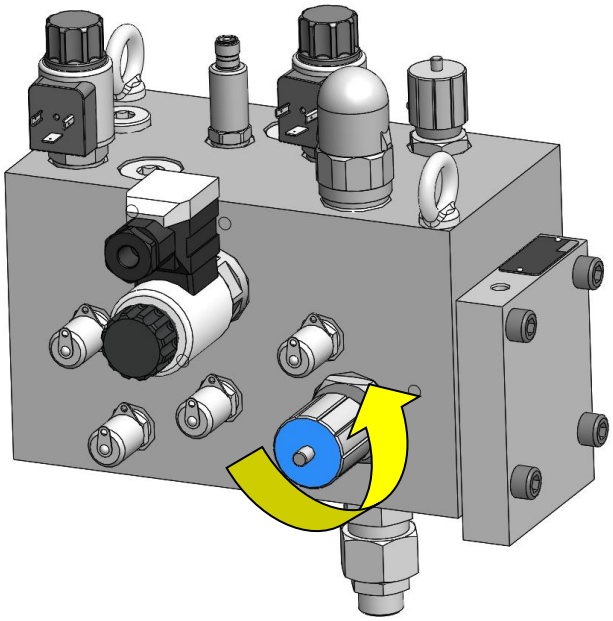
Danger
Lingering in front of the machine is life threatening and is strictly forbidden during initial commissioning.
Cordon off a large area in front of the press so that hazards caused by ejected parts are excluded.

Secure the transportation safety device shown in the following picture by a suitable method, so that it cannot be ejected after breaking loose. (The transportation safety device can consist of various profile sections.)



- Start the plant as described in chapter “Operation”. You are now in manual operation mode.
- Fill preferably compact material into the press chamber using the loader until the press chamber is full.
- Drive the pressure plate forwards in manual mode until the front end position is reached.
- Drive the pressure plate back to the rearmost fill position.
- Fill more material as described above and repeat the sequences until the press chamber is full and the transportation safety device breaks out at the end of the channel.

- Slowly and carefully open the shut-off valve for channel adjustment on the hydraulics unit that is marked here.



- Carry out a tying operation in manual mode as described in the Chapter entitled “Operation”.

Automatic operation can now be started.

It can happen at the start of the press process that the first bales do not correspond to your required firmness and density. This improves after several bales, as soon as the bales located at the front of the channel become more compressed.

Instruction
The parameters (formulas) must be selected in such a manner in the controller that flawless bales are produced. Examples for formulas can be found in chapter "Formulas".

- Switch the machine OFF as described in chapter "Machine shutdown".

Danger
Switch OFF the machine and secure it against restart at the main switch.

- Check all hydraulically screwed joints for leakages or escaping oil.

Note
A small amount of oil may appear on hydraulic cylinders in the area of the scraper. This is the residual oil film that has been scraped off the drawbar. This residual oil film that has been scraped off usually collects in the area of the scraper on the cylinder cover and, if not cleaned regularly by hand, can drip down and contaminate the area below the cylinder. This is not a defect and no sign of a leak.

- Check that all other screwed joints are tight after initial commissioning, in particular:
  - on the travelling slide,
  - on the connecting rod attachments on the pressure plate and on the stamper (if provided),
  - on the cutters and counter blades of the pressure plate,
  - on the ruffler disc (if provided),
  - on the running rails of the pressure plate,
  - on the cylinder flanges,
  - on the covering and connection points of the hydraulic block,
  - on the valves,
  - on the sensors.
- Check the oil level and oil temperature, and top up as required.
- Check that the tank ventilation filter and housing are in a proper state.
- Check that all protective devices are in a proper state.
- Check the wire unwinding device and wire guides. Shear points should not be present, which can cause grooves.

7. Work station/control position

Danger
Only instructed, competent staff may be deployed to operate the machine.

Danger
Pay attention to foreseeable incorrect applications in the chapter entitled “Foreseeable applications”

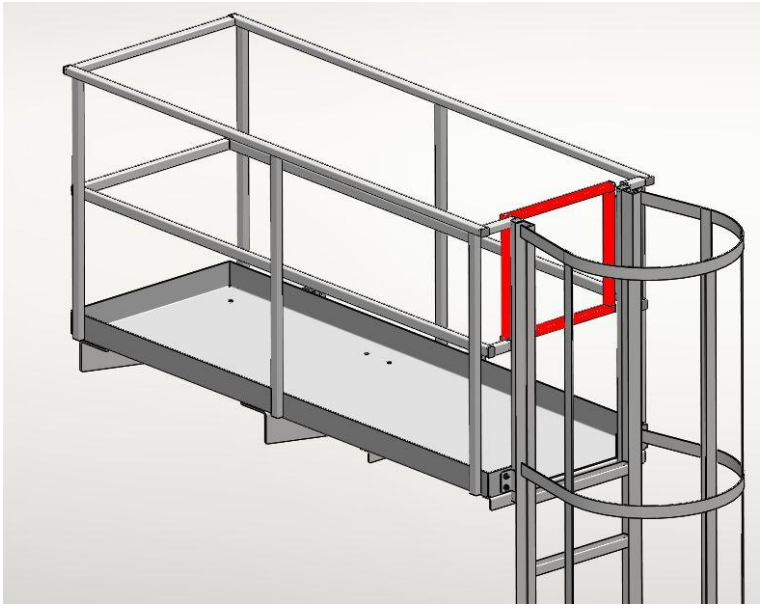
The machine functions fully automatically after switching ON the loader and the automatic controller. Sporadic work stations can become necessary for individual tasks:

- At the control console.
  The machine must be switched ON and controlled as needed at the control console or at the control cabinet in compliance with safety regulations.
- At different positions for fault removal.
  The causes of faults must be removed by the operating staff.
- At the material loading.
  The operating staff must pay attention to the loading of press material.
- At the end of the channel.
  The bales must be transported away as soon as they leave the press channel or the guiding area and this does not happen automatically.
- Near the press channel.
  Attention must be paid to sufficient binding wire reserves.

7.1. Inspection platforms and access points

- Keep to a headroom of at least 2.1 m along the inspection platform.
- Keep the inspection platform free from material, tools and other objects.
- Keep the inspection platform clean and free of grease.
- Do not carry any loads when climbing to the inspection platform.

Danger
Make sure that the gangway barrier closes automatically.
This must always be guaranteed.

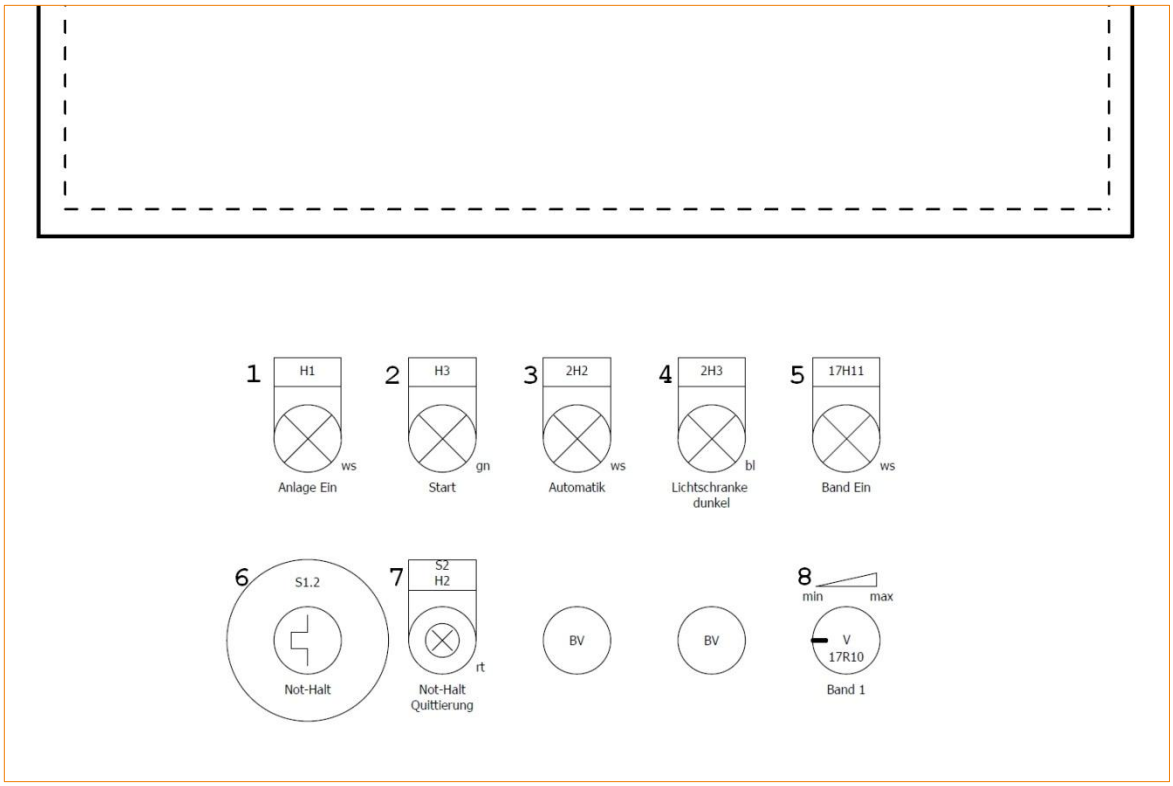


7.2. Push buttons and lamps

Some push buttons and lamps are provided as options on the control cabinet.

No:	Description:	Type:	Colour:	Indication, operation, function
1	Plant ON	Lamp	Clear	Main switch is switched ON
2	Start	Lamp	Green	Illuminated when plant running
3	Automatic	Lamp	Clear	Illuminated when automation operation activated
4	Light barrier dark	Lamp	Clear	Light barrier is interrupted
5	Belt ON	Lamp	Clear	Lights up when the loader is ON
6	EMERGENCY stop	Button	Red	Shutdown of the plant in hazardous situations Unblock with key
7	Acknowledge EMERGENCY stop	Button	Blue	Illuminated after interruption of the Emergency STOP chain. The button must be pressed after removing the interruption to release the machine.
8	Belt	Controller	Black	Set belt speed

Example of layout:

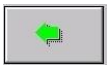


Please find the exact layout in the attached electrical diagram under "Layout of control elements".

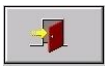
7.3. Touchpanel

The press is controlled using the touch panel. This also displays all information from the press. The illustrations here are intended as examples. Depending on how your machine is equipped, you will find different images on your panel.

Under some circumstance, you may be able to page back in the various menus or go straight back to the main screen.



Tap this pushbutton to go back to the previous screen.

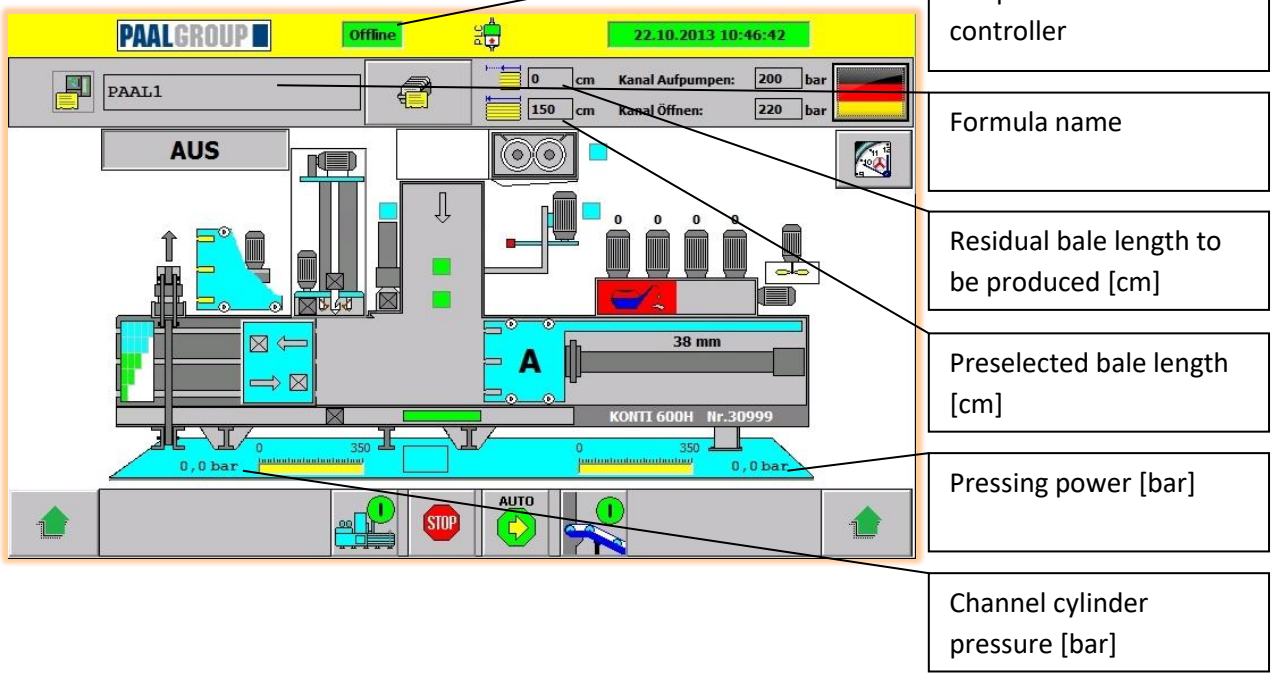


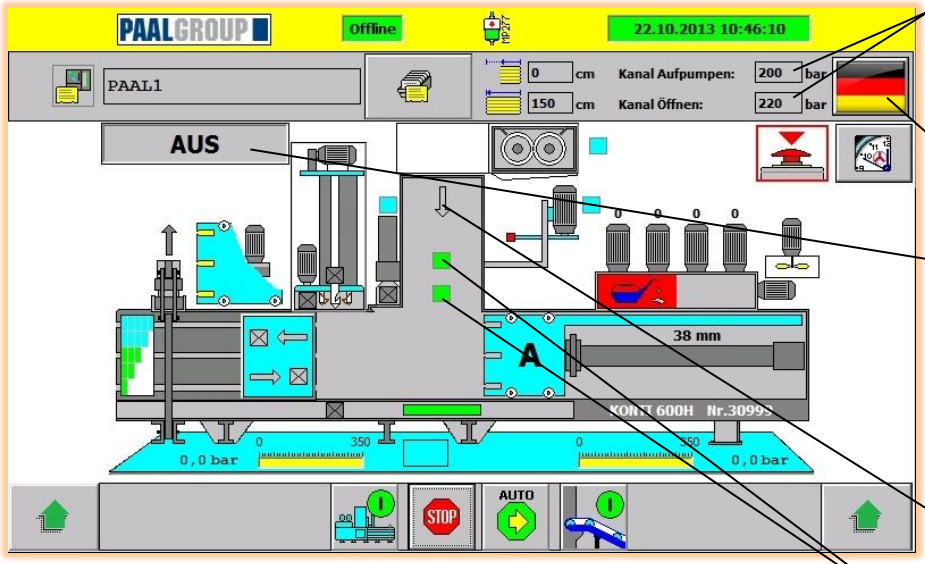
Tap this pushbutton to exit the respective menu.
Go back to the main screen.

7.3.1. Basic display

The basic display shows you the current states of the press. Depending on the equipment, the images show the corresponding symbols. The system shows in different colours the status conditions of the displayed drives, material feed, pressure plate and binding components as well as the status of the light barriers:

Green = Active
Blue = Inactive
Yellow = Moving
Red = Disturbance





Pressure settings of channel

Language of the panel

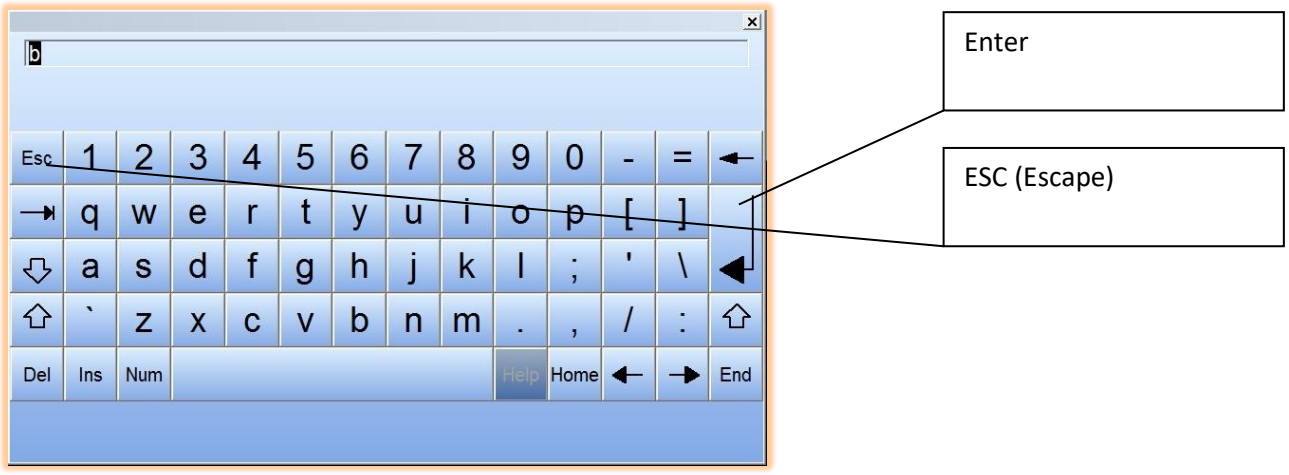
Status of the system:
- Off
- Manual mode
- Automatic mode
- Service mode

Status of the loading convevor

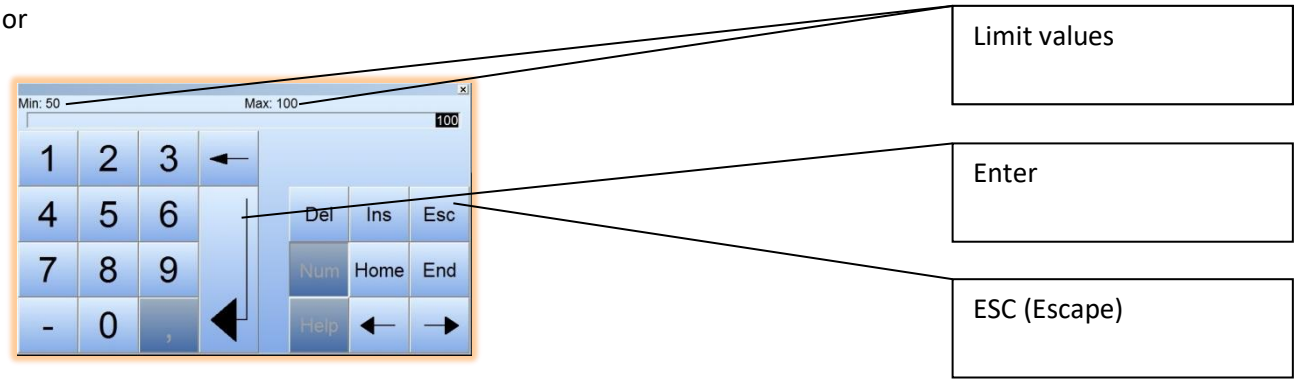
Status of light barriers

7.3.2. Using the keyboard

The system displays the respective keyboard after you tap the entry field that you want to fill in.
The keyboard is closed after completing the input with the confirmation using “Enter” or after abort with “ESC”.



or

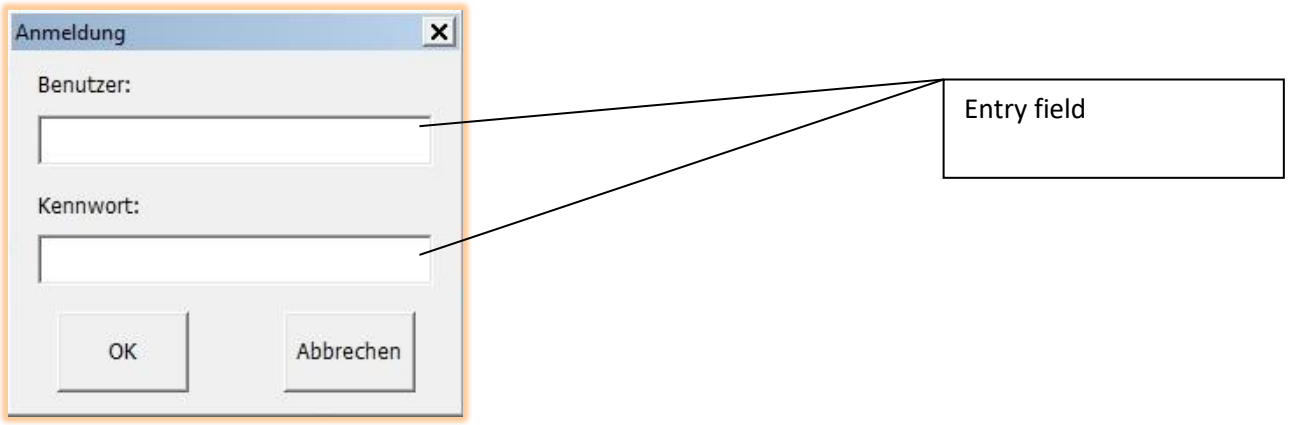


You may only be able to enter numeric values within specific limit values. If you enter numbers outside the limit values, the system issues an´ error message.

7.3.3. Entering the password

The password-protected area is for specially trained personnel only. This means that you should keep the password in a safe place.

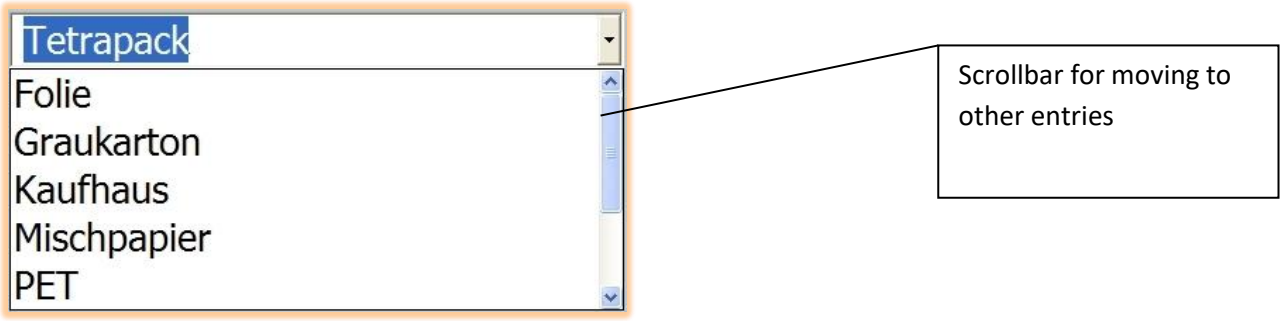
When requested, enter the user name “b” and the password. Confirm the entries with the “OK” button.



After confirmation, the system shows the previous screen again and the protected area is open.

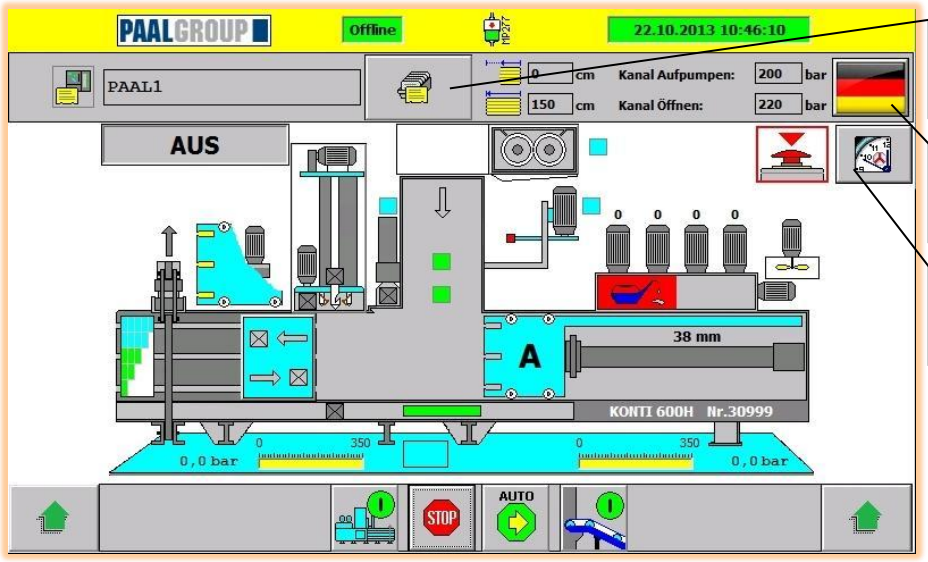
7.3.4. Using the selection menu

In selection menus, press the  pushbutton next to the text field. The system opens a selection of possible entries. Choose the entry you want by pressing it.



7.3.5. Direct settings and information

Using specific buttons, you can directly select a formula; pressing the button several times allows you to choose one of the saved languages or display the number of operating hours.



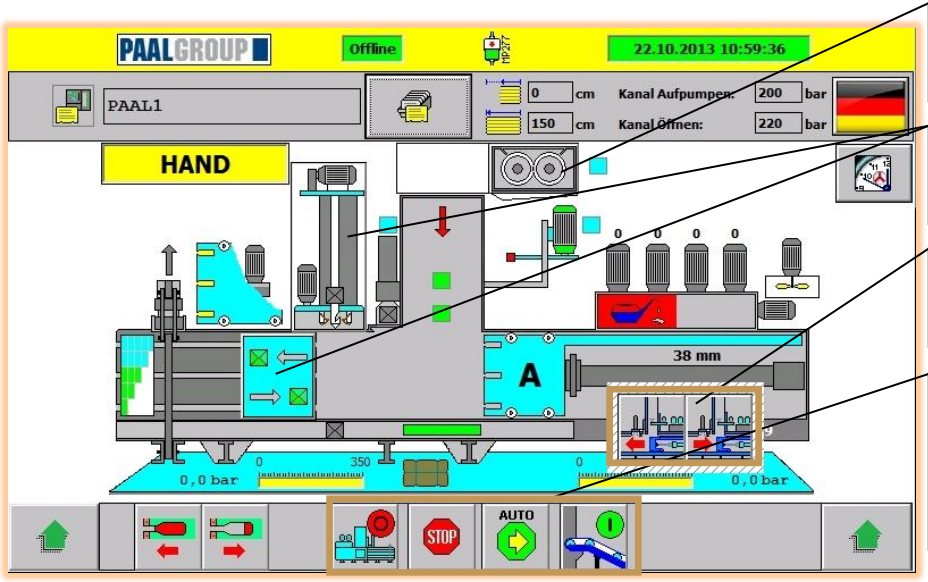
Direct formula selection

Direct language selection

Direct operating hour display

7.3.6. Press control

Depending on the equipment, you can press the displayed buttons by hand to control the press and the loading conveyor.



Manual operation of the perforator

Manual control of the binding

Manual control of the pressure plate

Plant ON/OFF
Automatic ON/OFF
Loading conveyor ON/OFF

7.3.7. Manual control in manual mode

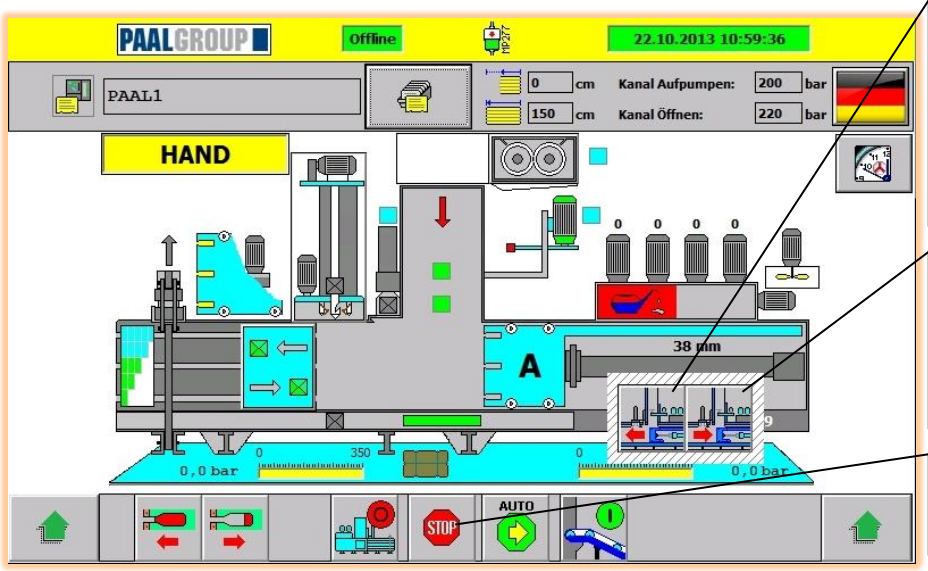
Manual control is only possible in manual mode. The machine is switched to manual mode when the  button is pressed.

You can enter manual mode from automatic mode by pressing the  button.

Follow the instructions in the chapter “Operating modes”.

7.3.7.1. Manual control of the pressure plate

You can only see the pushbuttons for manual movement of the pressure plate on the basic display in manual mode.



Pressure plate advance to pre-press position, with continued pressure up to the binding position

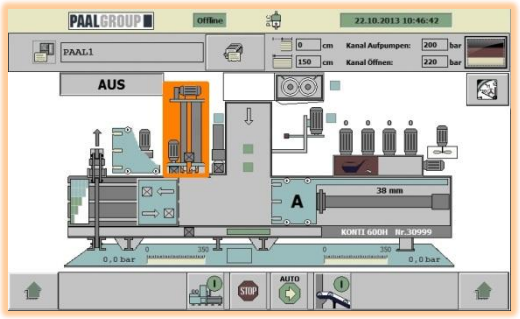
Pressure plate return to the rearmost end position

Stop the pressure plate motion

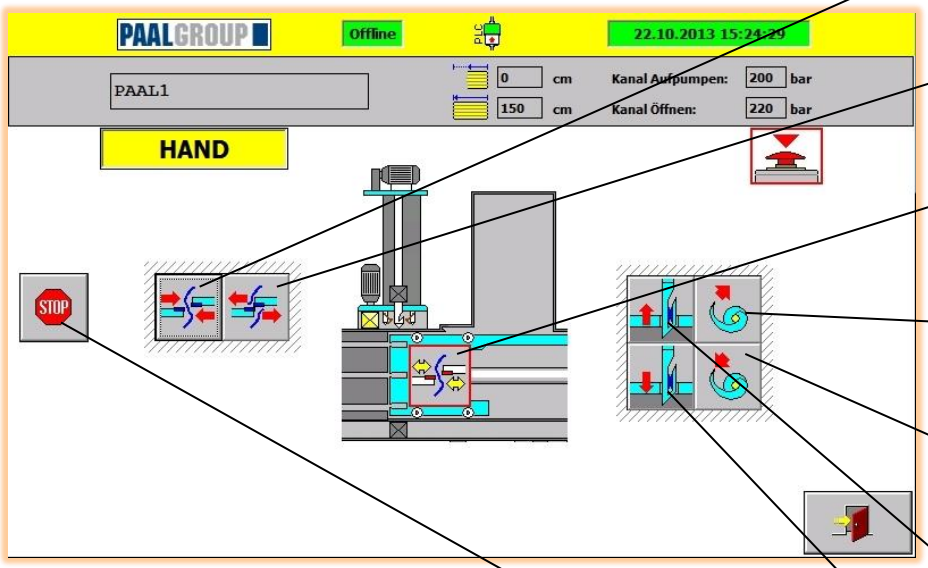
7.3.7.2. Manual control of the binding

7.3.7.2.1. Vertical binding (if present)

Press the highlighted location on the basic display:



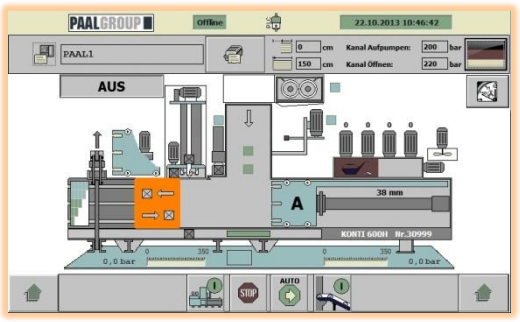
The system displays the following screen:



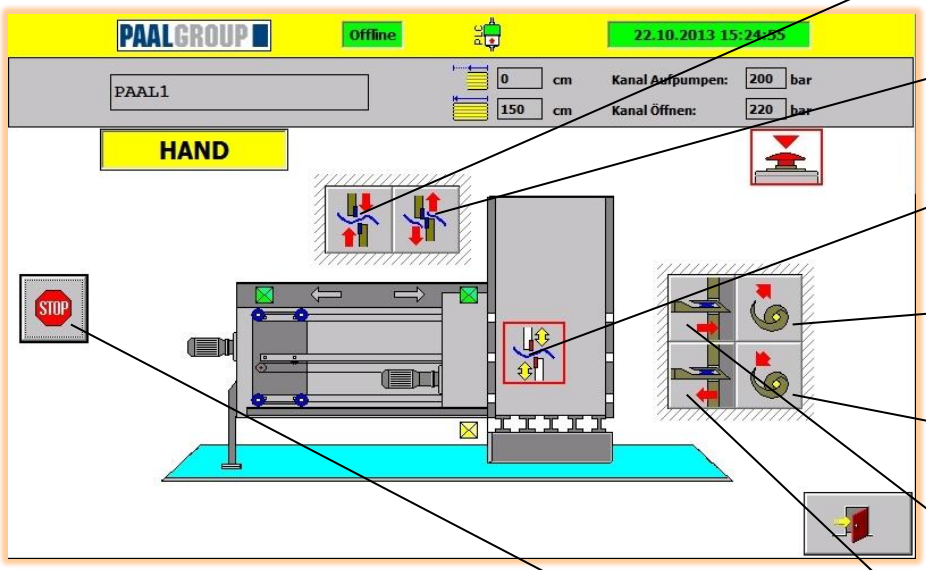
- Advance of wire cutting blade
- Return of wire cutting blade
- Actual position of blade
- Advance twister
- Return of twister
- Extend the wire pulling needles
- Withdraw the wire pulling needles
- Stop current motion

7.3.7.2.2. Horizontal binding (if present)

Press the highlighted location on the basic display:



The system displays the following screen:

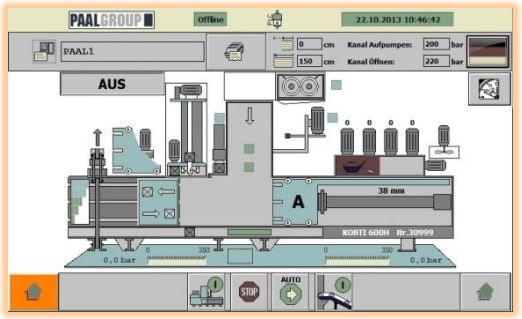


- Advance of wire cutting blade
- Return of wire cutting blade
- Actual position of blade
- Advance twister
- Return of twister
- Withdraw the wire pulling needles
- Extend the wire pulling needles
- Stop current motion

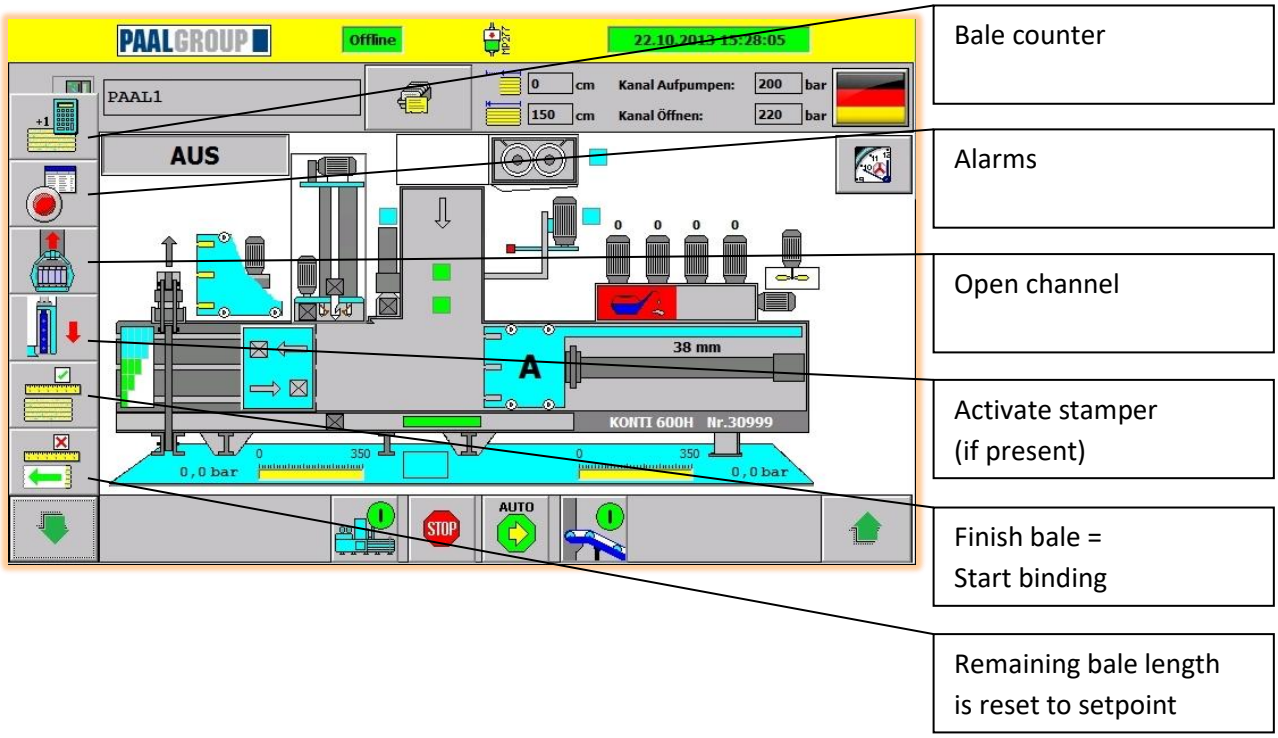
7.3.8. Other control and setting options

7.3.8.1. Overview of left button row

Press the highlighted location on the basic display:

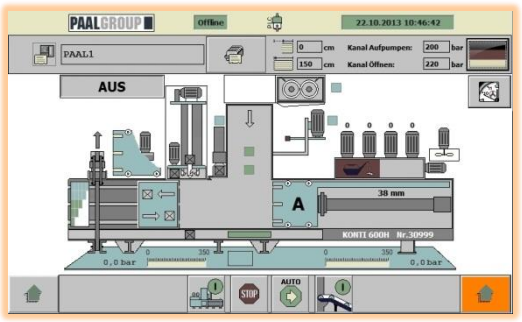


The system displays the following screen:

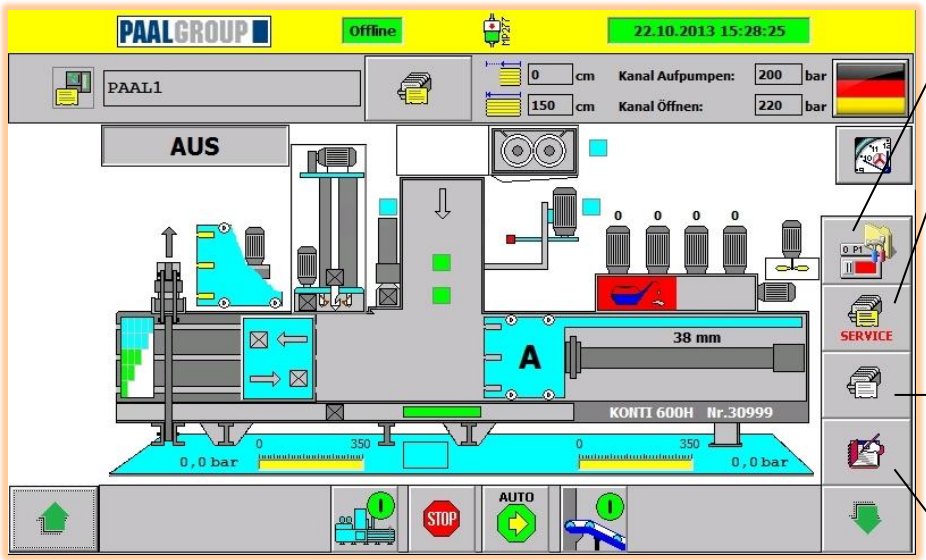


7.3.8.2. Overview of right button row

Press the highlighted location on the basic display:



The system displays the following screen:



Settings

Formula modification with immediate trans-mission to machine – “online” service mode

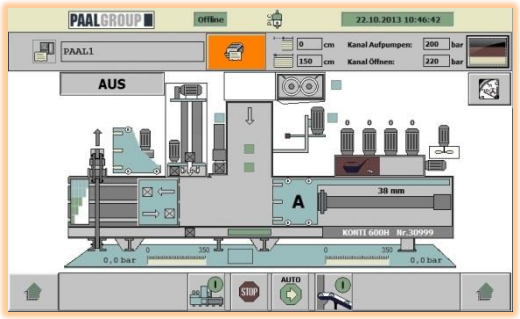
Formula selection “offline”

Formula administration and modification – “offline”

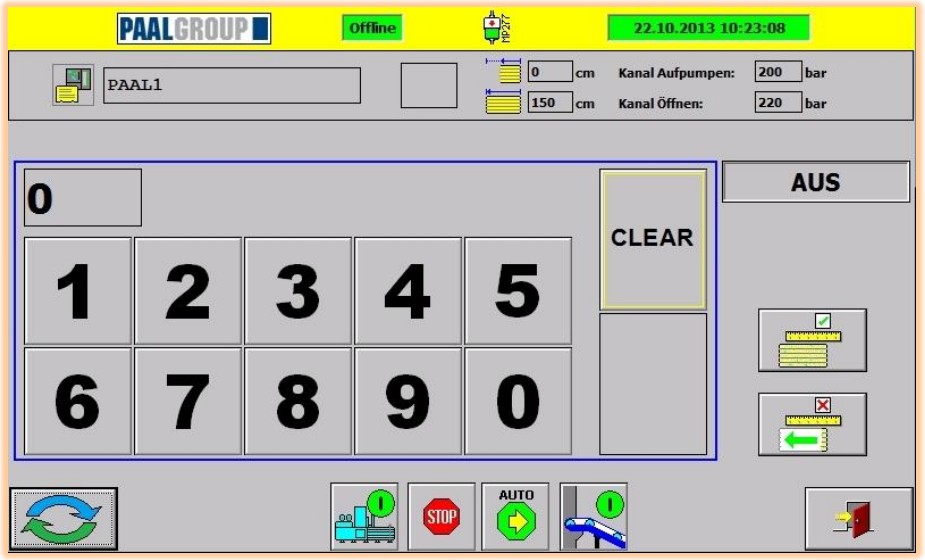
7.3.9. Formula selection

7.3.9.1. Direct formula selection (offline)

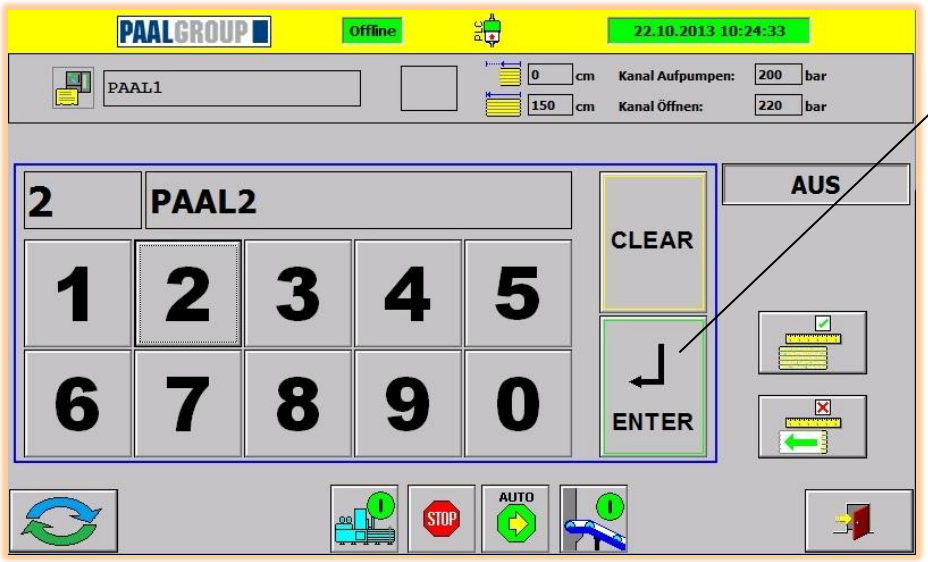
Press the highlighted location on the basic display:



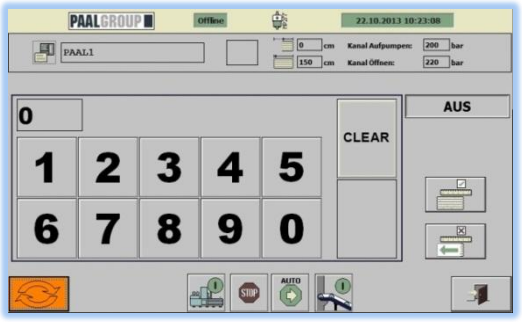
Select the required formula from the data set:



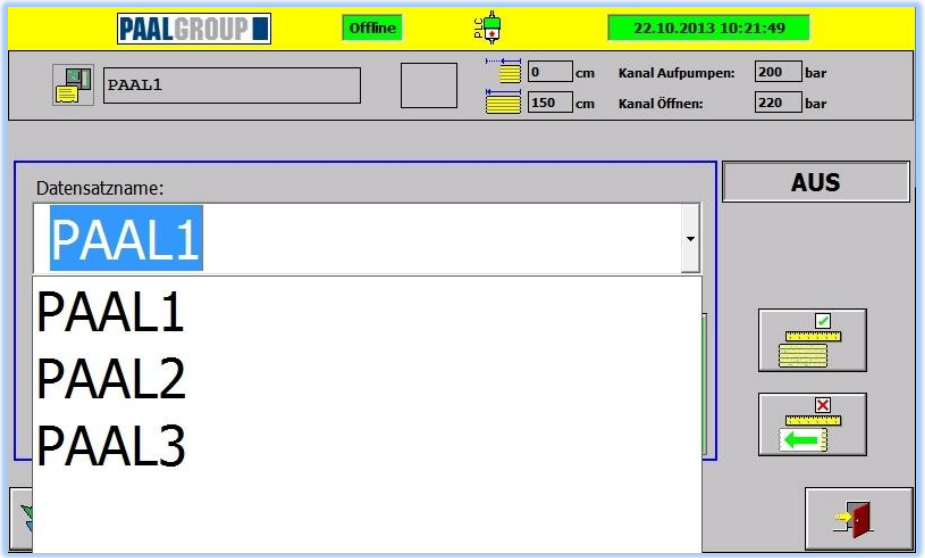
Transfer the selected formula to the controller to activate it:



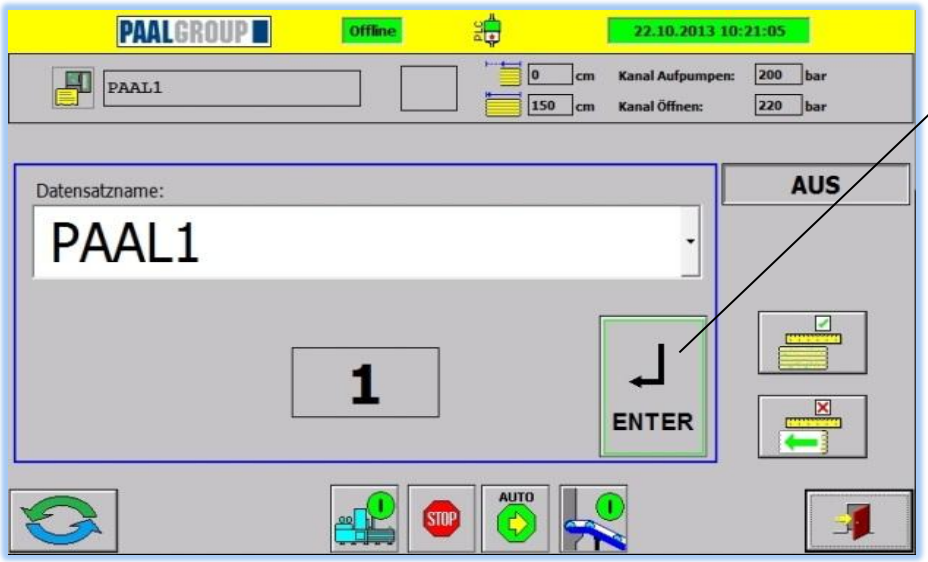
If you do not know the number of the formula, you can also choose one from a list. Press the highlighted location:



Select the required formula from the data set:



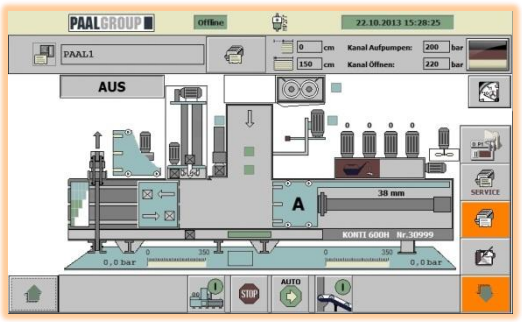
Transfer the selected formula to the controller to activate it:


PAALGROUP
Offline
22.10.2013 10:21:05
PAAL1
0 cm
150 cm
Kanal Aufpumpen:
200 bar
Kanal Öffnen:
220 bar
Datensatzname:
PAAL1
AUS
1
ENTER
STOP
AUTO

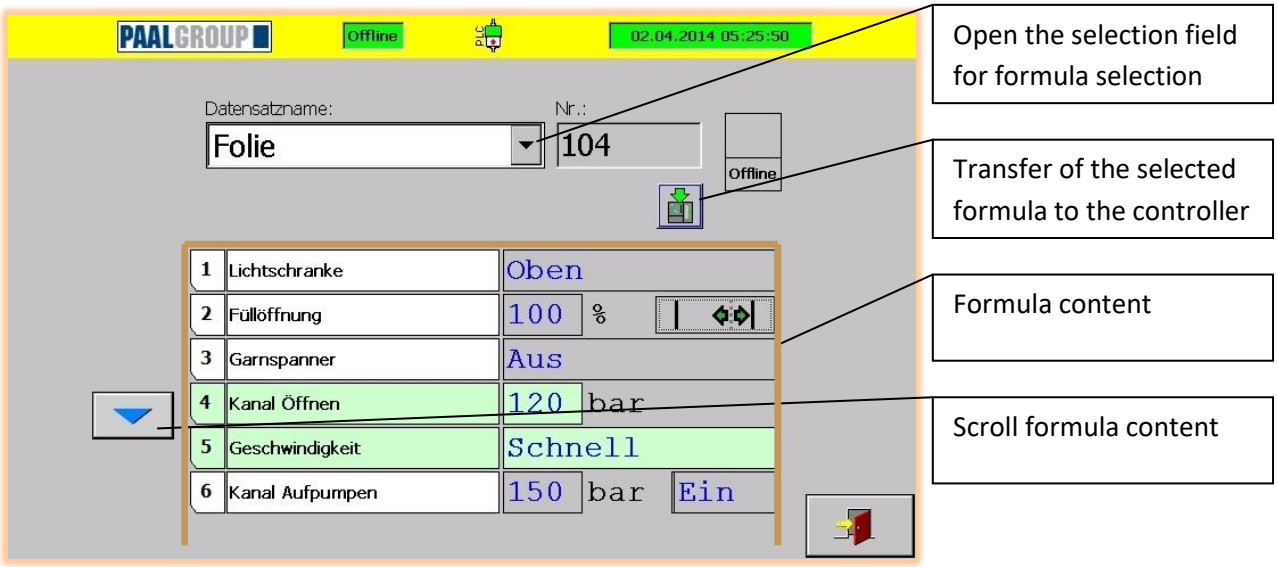
Transfer

7.3.9.2. *Formula selection with formula viewing*

Press the “Select formula” button in the right-hand row of buttons for formula selection:



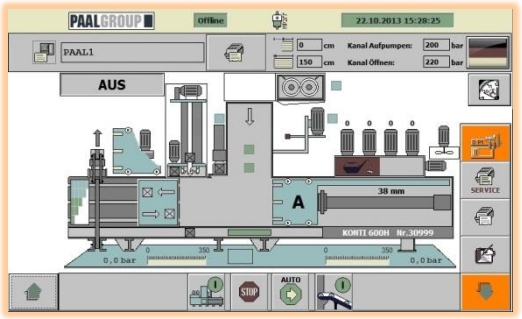
A saved formula can be selected, viewed and transmitted to the machine here:



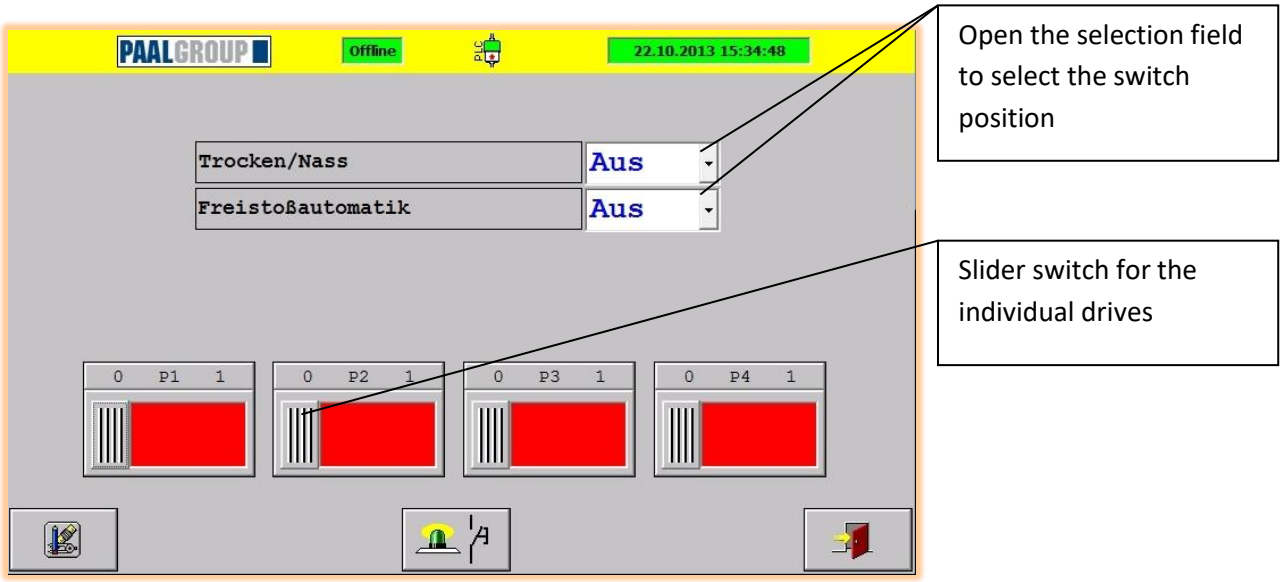
- Select the required formula from the data set.
- Inform yourself on the formula content.
- Scroll to the other positions.
- Press the button to transmit the formula.
- The formula is now active.

7.3.10. Settings

Switches must be operated in addition to formula selection.
Press the “Settings” button on the right-hand row of buttons:



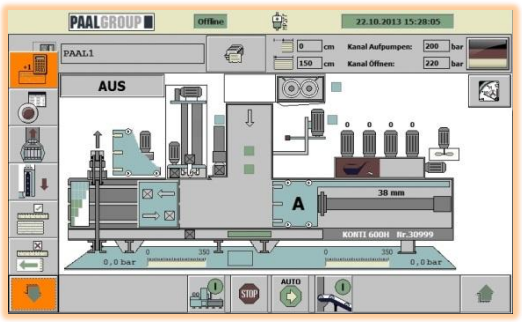
Switches corresponding to the machine equipment appear:



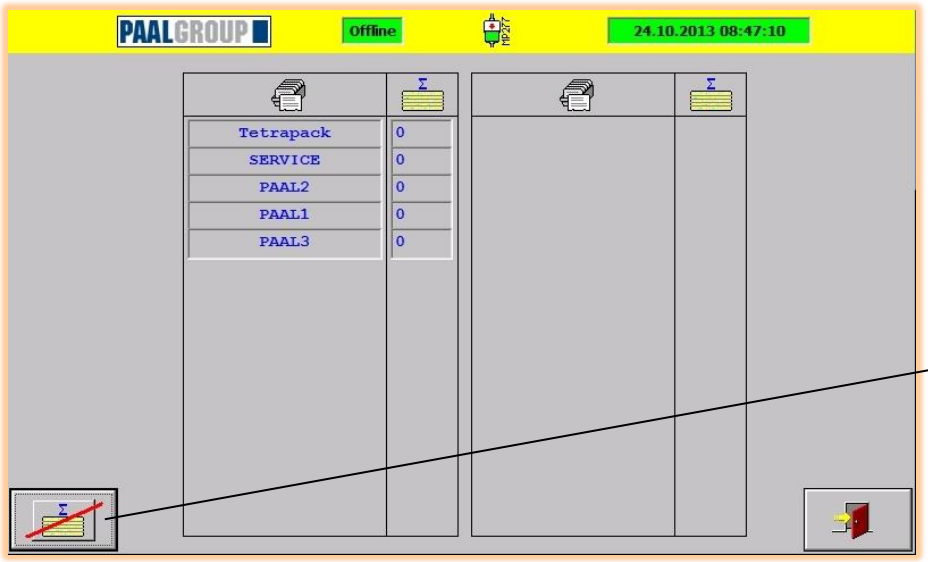
Additional units, e.g. ruffler or perforator, are not switched by means of the formula, but only monitored. If the switches for these units are not in the position specified in the formula, then an alarm is output.

7.3.11. Bale counter

Press the “Bale counter” button in the left-hand row to display the number of produced bales:

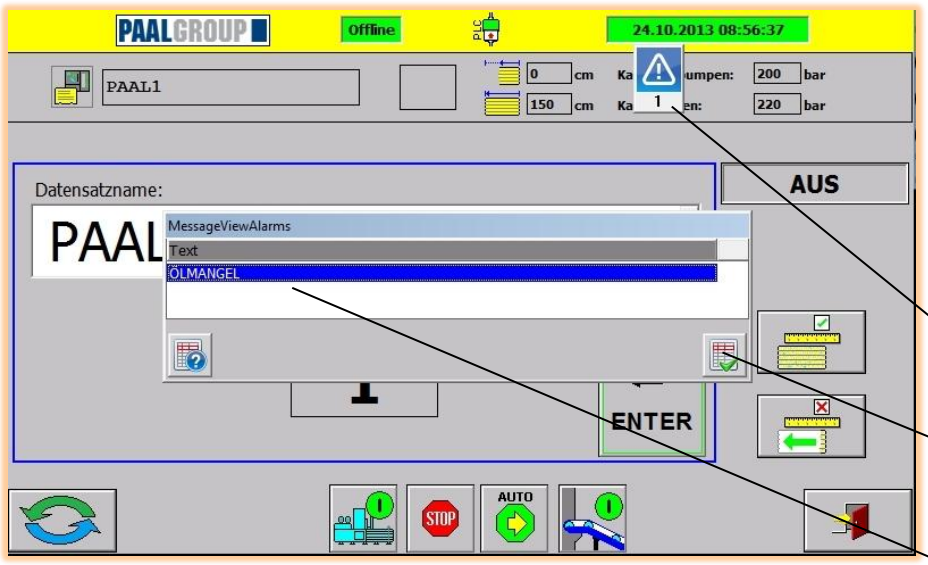


The number of produced bales is listed in a table.
A further line is added after a formula change.
A maximum of 30 formulas are displayed.



7.3.12. Faults

Occurring alarms are output immediately.

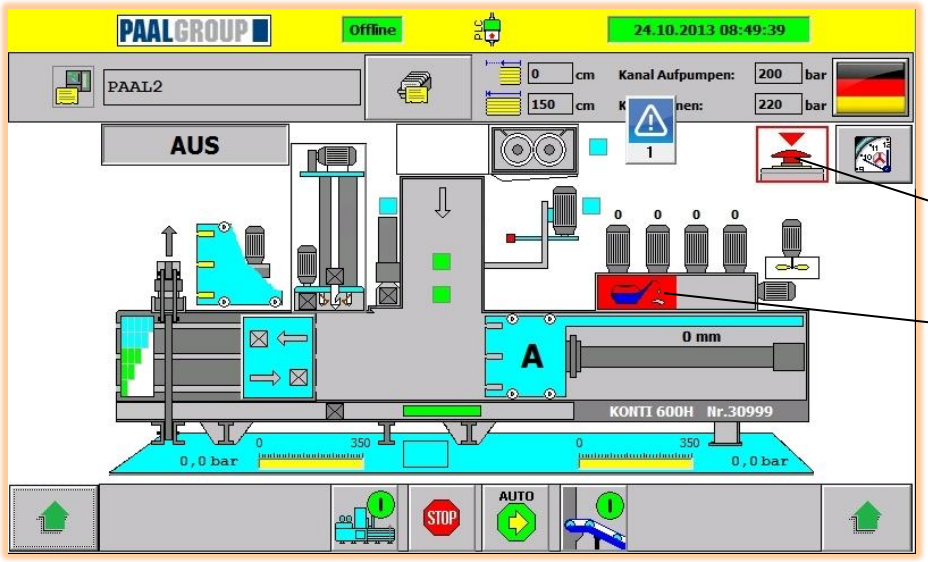


Number of faults

Acknowledge fault

Display of a Help text

The system also displays faults graphically (example):

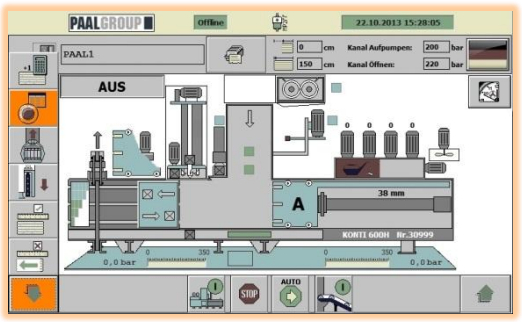


Emergency stop is activated

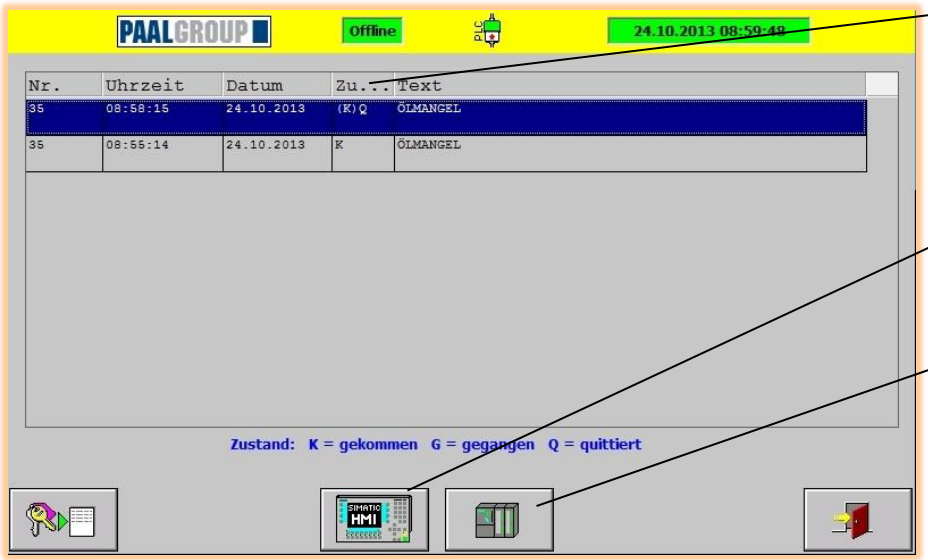
Fault in hydraulics

7.3.12.1. Alarm table

Press the “Fault” button in the left-hand row to display the alarm table:



The current faults are listed in the alarm table.



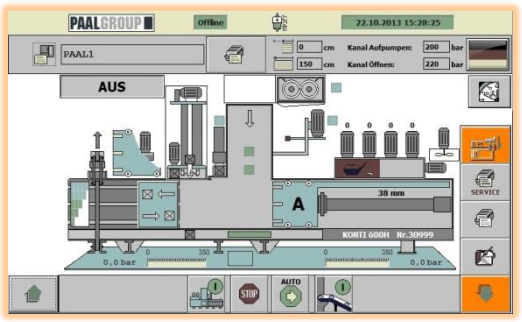
Fault status
K = detected
G = cleared
Q = acknowledged

Faults in the panel

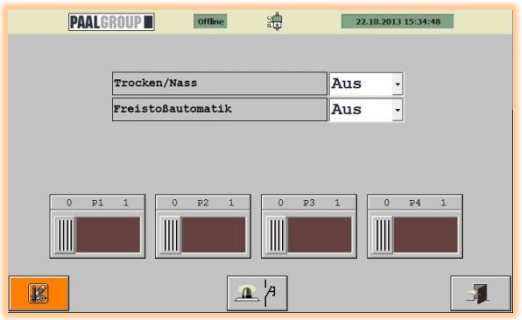
Faults in controller

7.3.12.2. Clearing alarms

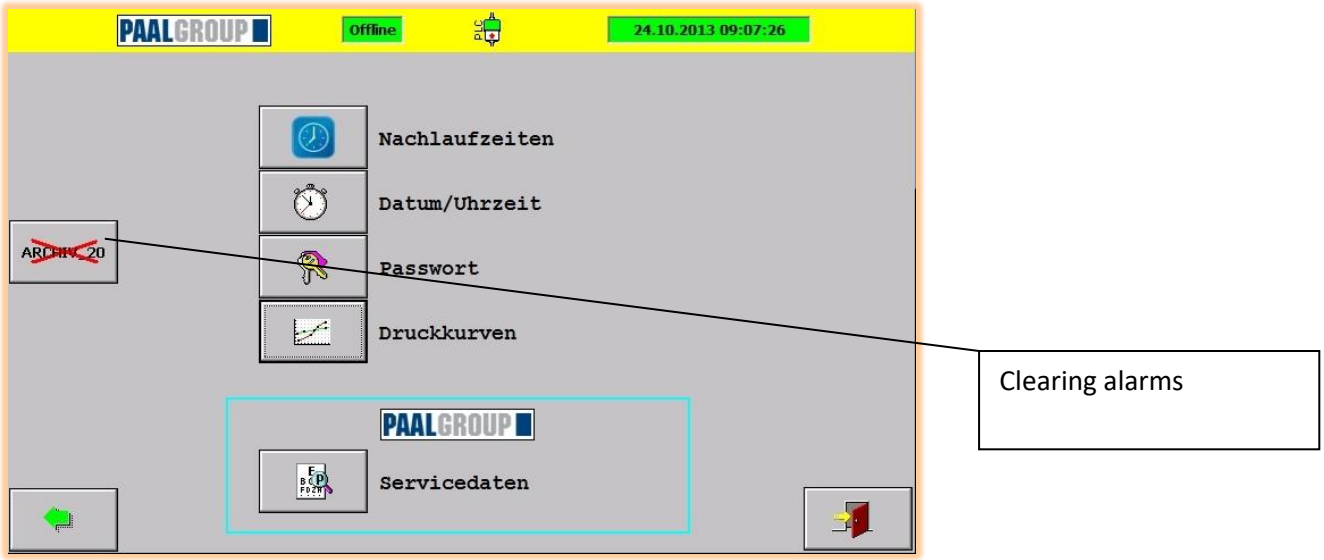
Press the “Settings” button on the right-hand row of buttons:



Press the button for further system settings:

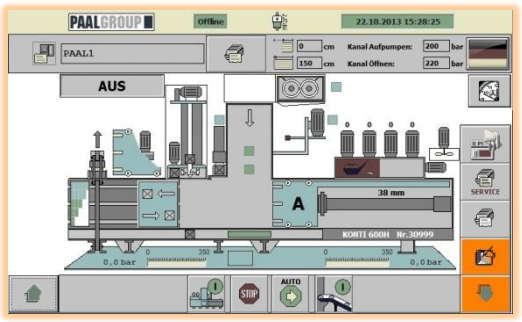


Pressing the button to clear alarms permanently deletes all the recorded alarms:

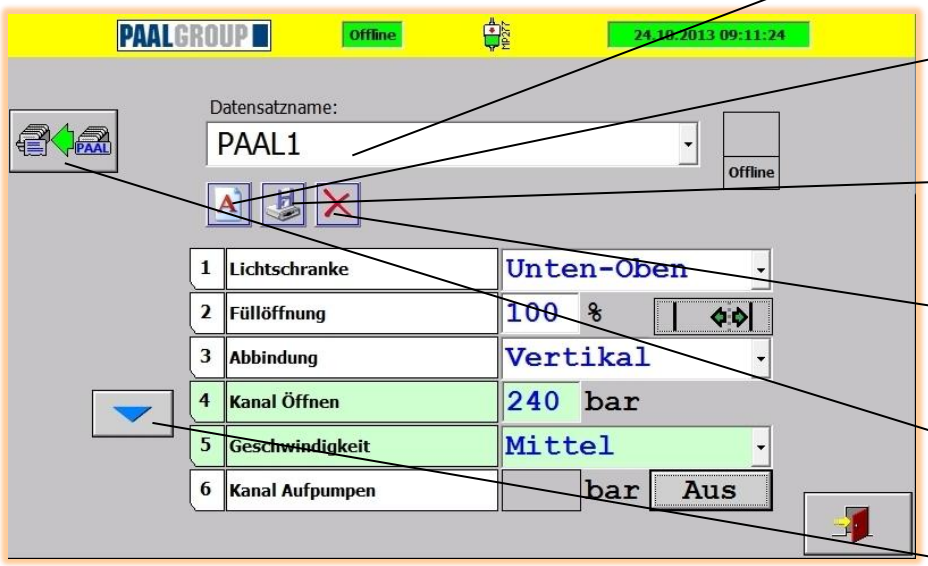


7.3.13. Formula administration

Press the “Formula admin” button in the right-hand row of buttons to administer the formulas.



You can import default formulas, change or delete existing formulas and generate new formulas.



Formula name

New formula

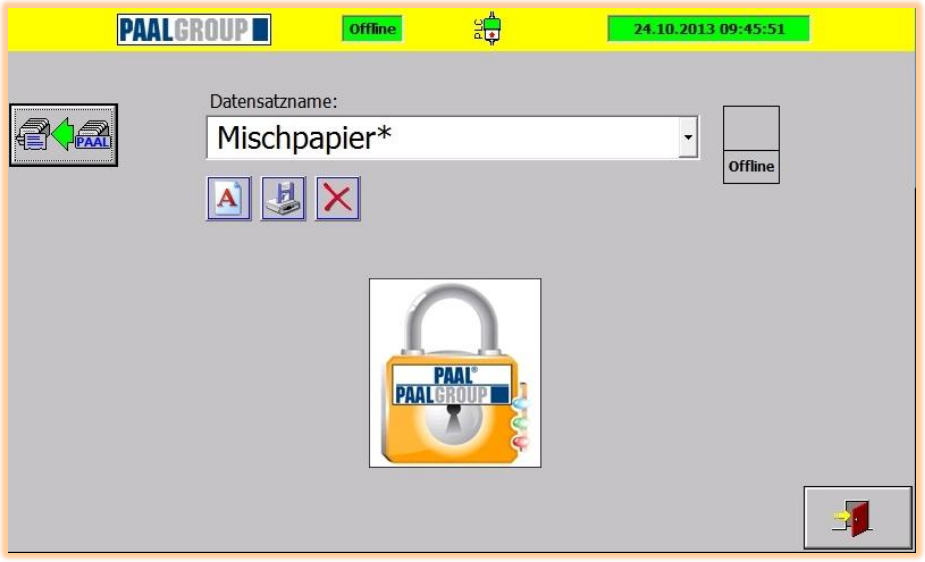
Save formula

Delete formula

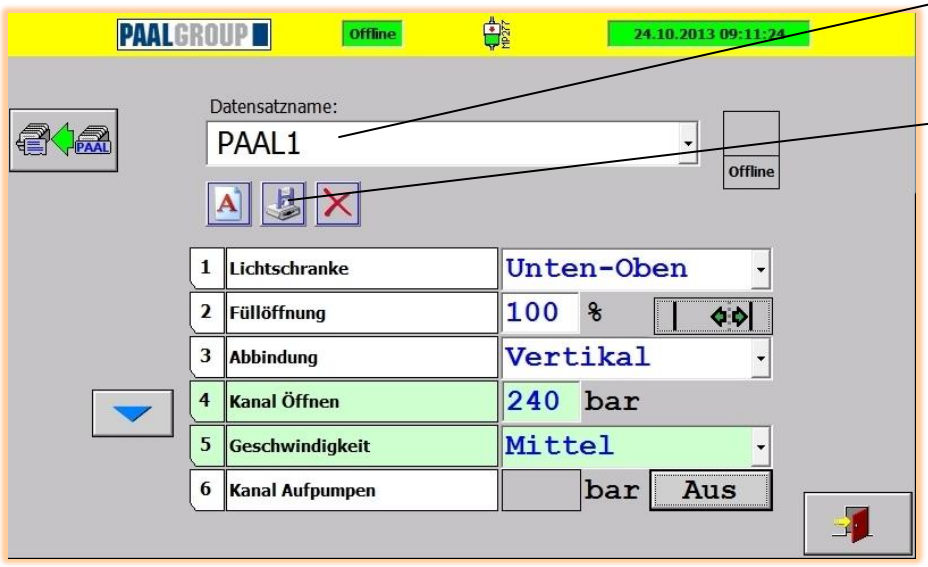
Import formulas

Scroll formula content

Formulas from Kadant PAAL cannot be changed. This is displayed in the following window:



You can however make copies and change the copies. Enter a new, unique formula name for each copy. Save the changes by pressing the “Save” button. The formula can now be edited. (See chapter “Change formula”).



7.3.13.1. *Import formulas*

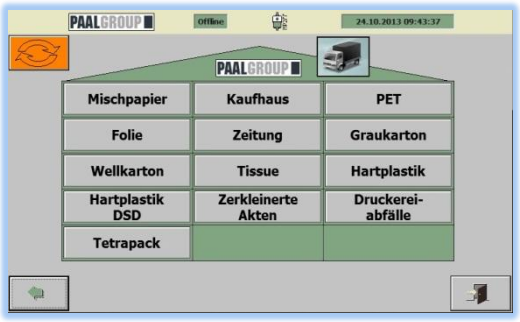
Press the “Import formulas” button to import prepared/default formulas:

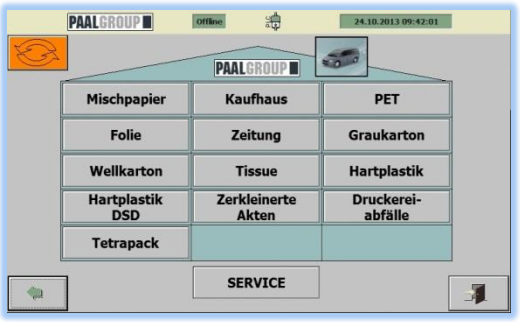
You can choose two levels:

Formulas for optimized bale weights

Formulas for bale production that is as fast as possible

Switch between the two levels using the following pushbutton:

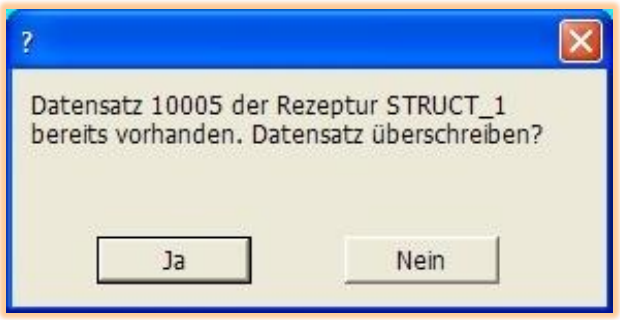




Select the required formula to be changed:

If formula names have an asterisk (*), the formulas are designed for particularly heavy bales.

If formulas with the same formula name are already present, you will be asked whether the data should be overwritten. Confirm appropriately with yes or no.

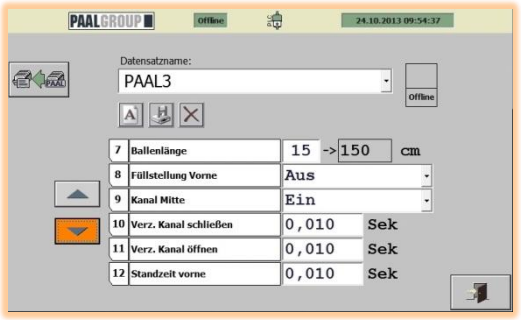


7.3.13.2. Change formula

Select the formula to be changed:

Edit the individual contents of the formula by clicking on the respective input fields and choosing the preset options or entering possible numeric values:

Scroll to further formula contents and perform the required changes:



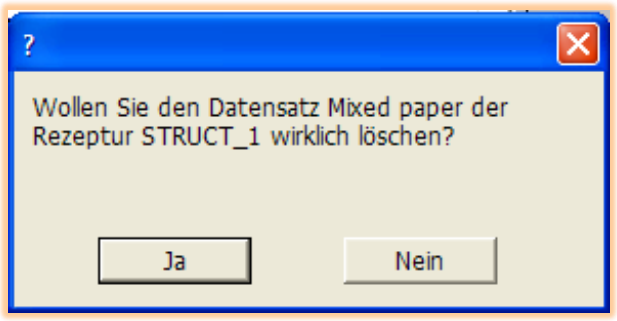
Save the changes by pressing the “Save” button:

7.3.13.3. *Delete formula*

Make sure that the formula you want to delete is not activated. Select the formula to be deleted:

Delete the formula by pressing the “Delete” button:

Confirm deletion.



7.3.13.4. Generate new formula

Press the “New” button:

Enter any formula name that has not previously been used:

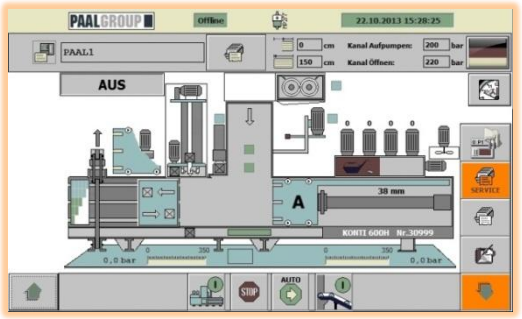
Fill out the formula as described in chapter “Change formula”.

All the fields that are highlighted in yellow are mandatory fields and must be filled out.

Save the changes by pressing the “Save” button:

7.3.14. Service/changing formulas online

Formula changes are possible online using the “Service” button. Each change will be transmitted immediately to the machine and the machine reacts accordingly.



Choose the appropriate formula:

You cannot change the formula if an online connection is active.

Activate the online connection by clicking on the following pushbutton:

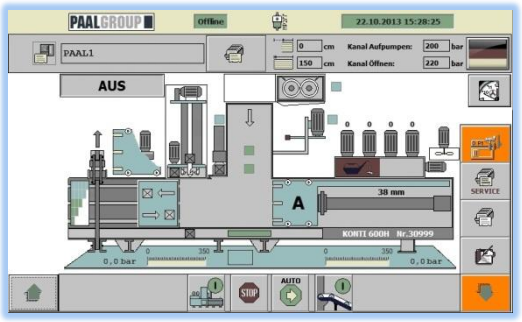
Change the individual formula settings as described in the chapter entitled “Change formula”.
The machine immediately records and implements each individual change to a recipe.

The settings are also saved automatically even when you leave the menu.

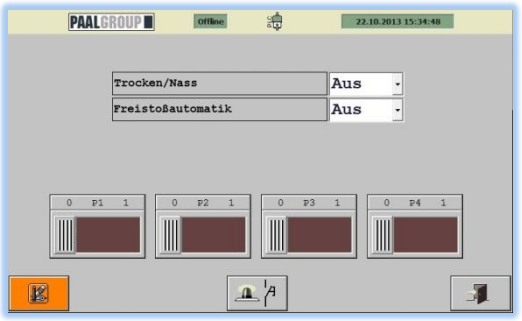
The online connection is maintained until you again open a menu for formula selection or open the formula administration menu.

7.3.15. Adjust follow-up times

You can set follow-up times for the individual drives and the loading conveyor. These times are for delaying switch-off according to specific signal status conditions that occur. Press the “Settings” button on the right-hand row of buttons:



Press the button for further system settings:

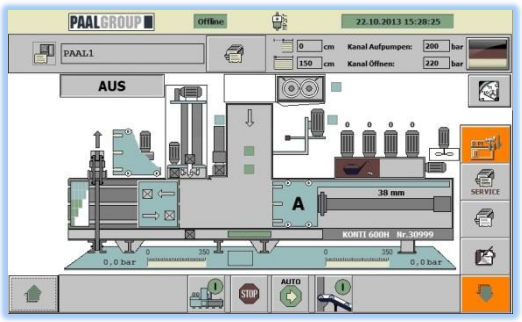


Press the button for follow-up times.

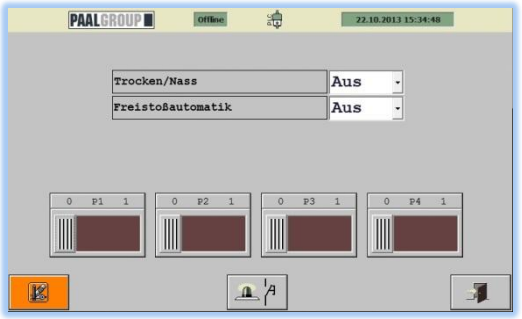
Edit the individual times by clicking on the respective input fields and entering the possible numeric values:

7.3.16. Setting the date and time

Press the “Settings” button on the right-hand row of buttons:



Press the button for further system settings:



Press the “Date/Time” button:

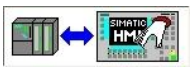
The system displays the following screen:

Only the time of the panel can be changed.
There are various options for transferring the time between the panel and the controller:

Change the synchronization type by pressing several times.

Automatic transfer of the time from the controller to the panel is active.

Automatic transfer of the time from the panel to the controller is active.



Automatic transfer is inactive.

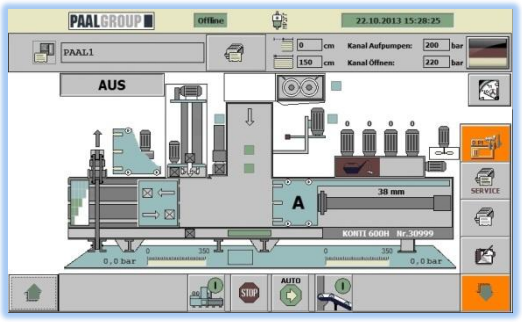
Press to transfer the time from the controller to the panel.

Press to transfer the time from the panel to the controller.

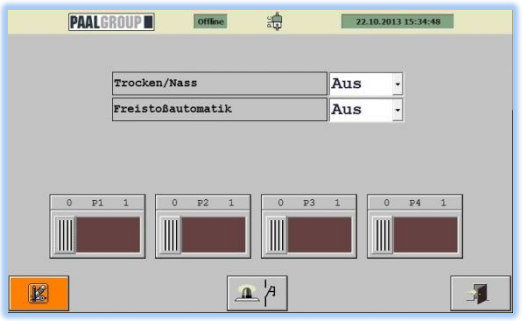
7.3.17. Changing the password and timeout

The timeout is the elapsed time after which the system automatically logs off users. It always starts with the last action you take on the panel.

Press the “Settings” button on the right-hand row of buttons:

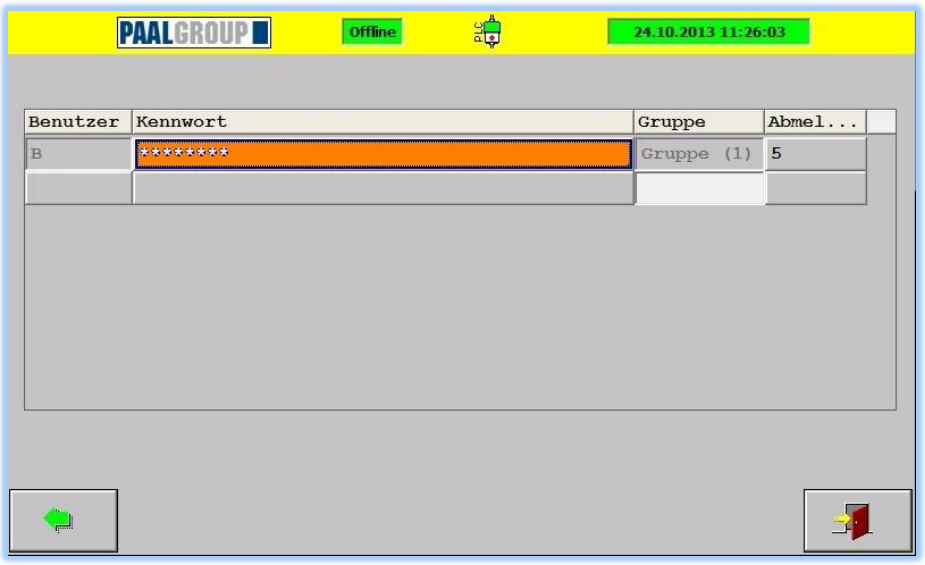


Press the button for further system settings:

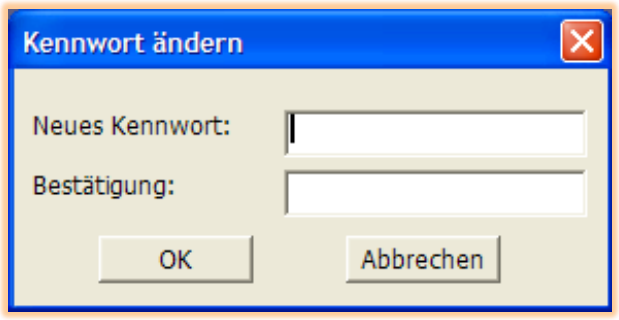


Press the “Password” button.

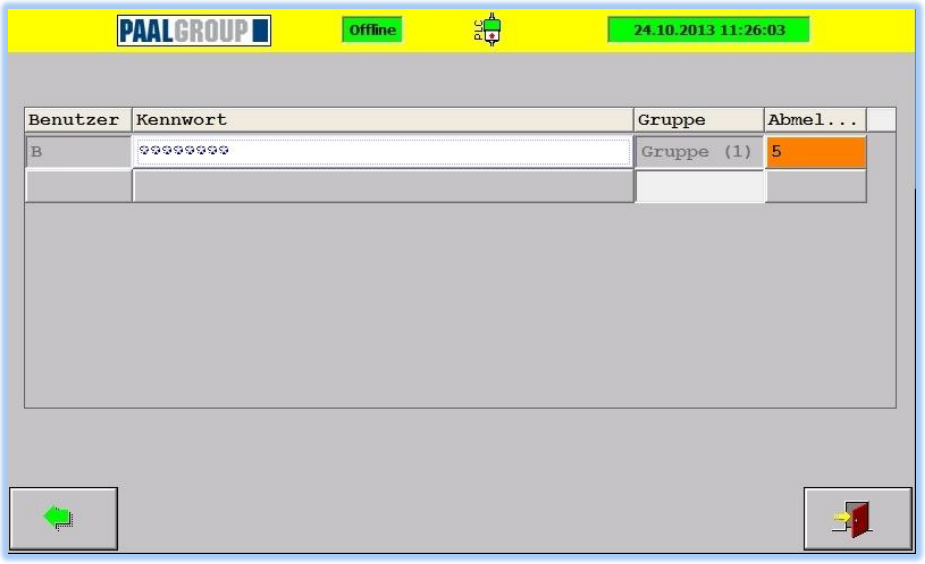
Double-click the highlighted button:



Enter the new password in the following window, in both lines, and confirm with “OK”:

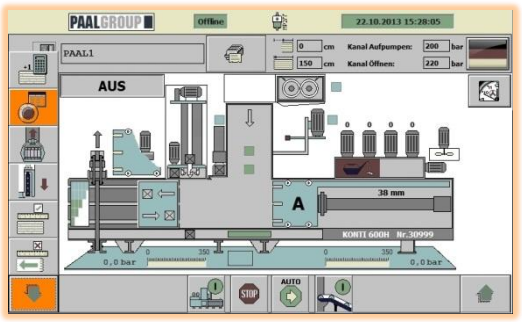


Double-click the highlighted button and then enter the desired timeout in minutes:

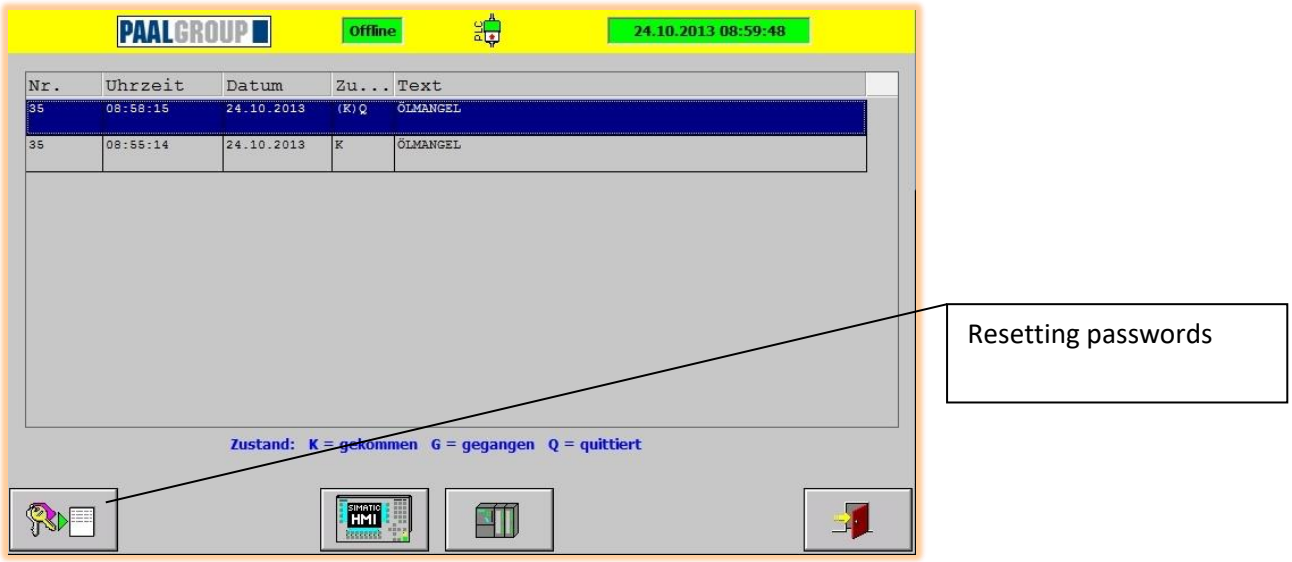


7.3.18. Resetting passwords

Press the “Disturbance” button on the left-hand row of buttons.

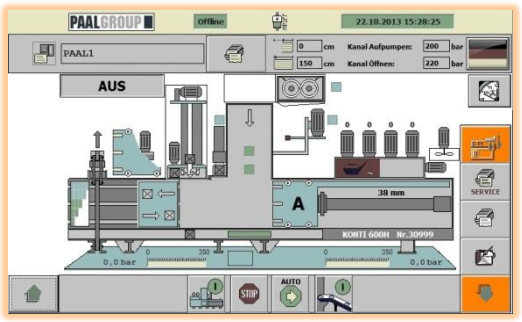


All the passwords are cleared and the factory-set password applies again. See also chapter “Entering the password”.

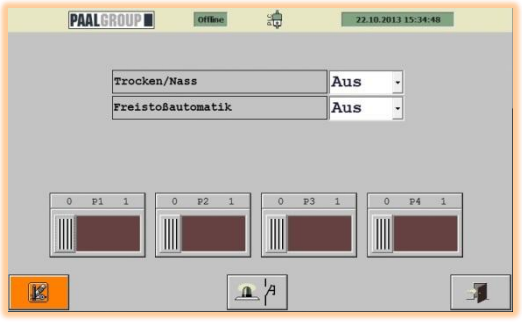


7.3.19. Display the pressure curve

Press the “Settings” button on the right-hand row of buttons:

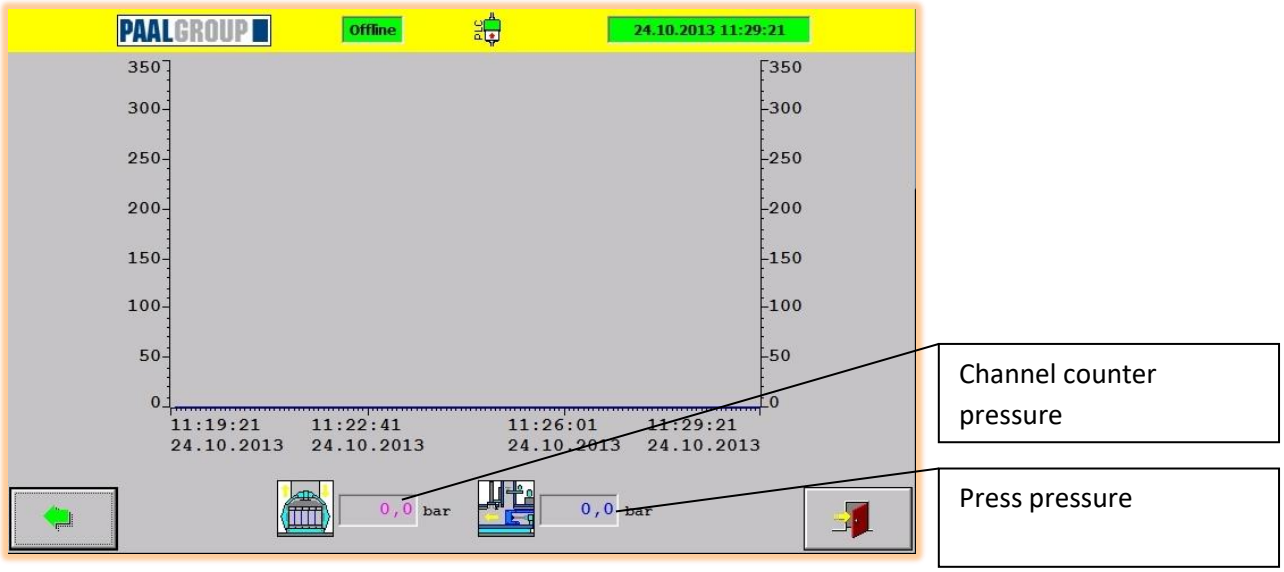


Press the button for further system settings:



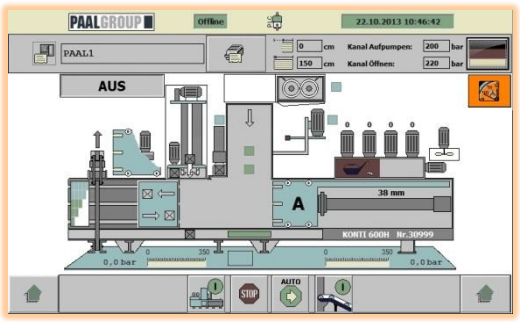
Press the “Pressure curves” button:

Here, the system displays the pressure curves of the channel adjustment and the pressure plate as a diagram and also shows the current pressures:

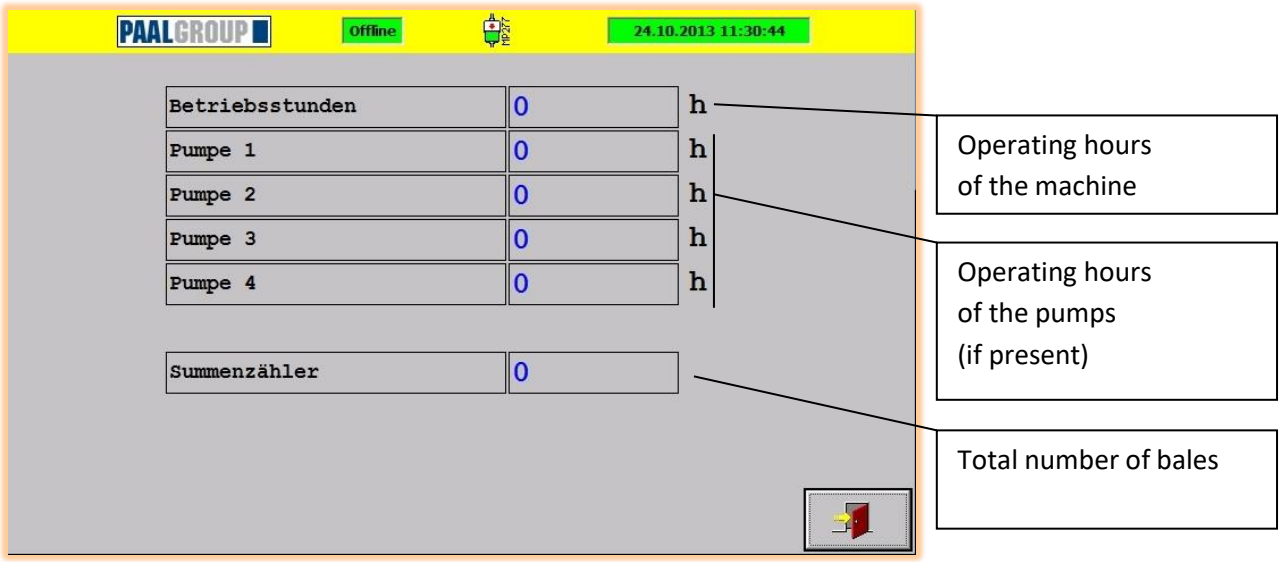


7.3.20. Display operating hours

Press the highlighted location on the basic display:



The system displays the total operating hours for each main pump and the press, as well as the total number of bales:

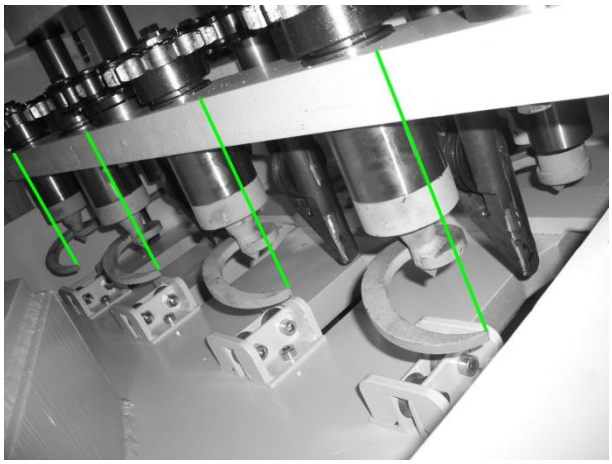


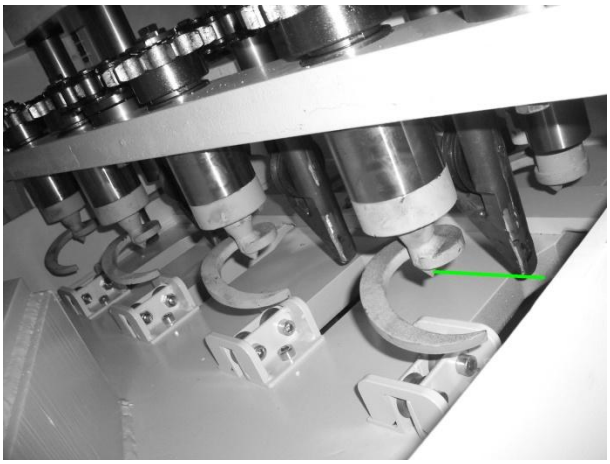
7.4. Switch ON machine

Danger
Before switching ON, it is absolutely necessary to check that no persons are present in the danger area (e.g. for maintenance or repair work).

The following tasks must be performed before switching the machine ON:

- Check that the binding wire is in the correct position after each step.
- Check the binding wire for quantity, damage or twisting.
- Check all binding wire pulleys and guiding elements. The guiding elements must not have signs of damage that could lead to damage to the binding wire. All rollers must also rotate freely. Stiff or damaged rollers are to be repaired or replaced.
- Check the positions of the twisters and needles. These must be located in the home position: If this is not the case, they must be driven to the home position manually after switching the machine ON. (See following pictures)





- Perform the 8-hour maintenance plan.
- Close all the doors and protection covers, the press chamber doors and the maintenance ports; lock them correctly.

After these preparations, the machine can be started as described in the following chapter.

Instruction
A warm-up phase is necessary when ambient temperature is below 15 °C. Drive the press plate backwards and forwards 5 to 6 times in manual mode. Pay attention that the heating main switch is not switched OFF also during operating shutdown periods.

If the heating was switched OFF during a shutdown period, it must be switched ON 24 hours before starting the machine.

- Switch ON main switch.
- Enter PIN code when requested.
- Press the "Start" button.
- Switch ON the pump.
- Select one of the modes described in the following chapter.
- Press the button "Conveyor ON" or start loading material.

7.5. Operating modes

The pressing process can begin after switching ON the machine. The following modes are available.

7.5.1. Manual mode

The machine is in manual mode after switch ON.

The most important press functions can be run individually and independently from each other in manual mode. This applies to both the binding process and also to the pressure plate movement.
The most important functions are protected against incorrect operation. (For example, returning of the pressure plate is only possible when the tying units are in the home position).

Important
Under all circumstances, drive the tying units back to the home position (see Chapter “Preparation for initial commissioning”) before exiting from manual mode. Run the pressure plate to the rearmost position.

7.5.2. Automatic mode

The press functions fully automatically in automatic mode, depending on the fill level in the hopper and the preselected bale length. Control is performed by light barriers in the hopper and the bale length counter.

The pressure plate moves backwards and forwards in automatic mode and presses the material into the press chamber. If the pre-set bale length is reached, the pressure plate moves into binding position and the binding process is carried out.

Binding can also be started prematurely in automatic mode by pressing the “Bale finished” button early to change materials, for example. After binding has been completed, the press process restarts.

Note
Automatic mode does not start if the tying units are not located in the home position, and the pressure plate is not located in the rearmost position.

7.6. Formulas

Warning
Defective recipes can cause deformed bales and operational faults of the press. The manufacturer is not liable for incorrectly set recipes and the resulting disturbances and damage to the press.

The bale quality is largely dependent upon the following factors:

- Composition of the material
- Light barrier control
- Filling position of the pressure plate
- Closing pressure of the press channel (channel counter pressure, pressure plate counter pressure)
- Opening speed of the press channel

7.6.1.1. Light barrier

Two light barriers,which detect the filling height of the material in the hopper, are mounted in the hopper to control the press movements and material loading. The selection of the filling level and the light barrier function is to be performed dependent on the composition (homogenity, density) of the press material and the loading speed.

7.6.1.1.1. "Bottom" setting

(For very compact and prepressed material)
The press is advanced when the lower light barrier is interrupted.
Material loading stops at the same time.

7.6.1.1.2. "Bottom top" setting

(For mixed paper, cardboard and corrugated carton waste, PET)
The press advances when the lower light barrier is interrupted.
The material loading is stopped by the upper ligt barrier.

7.6.1.1.3. "Top" setting

(For complete or large volume cartons or large-sized cardboard and corrugated carton waste, and lighter materials)
The press advances when the upper light barrier is interrupted. Material loading stops at the same time.

7.6.1.2. Fill opening

An opening in the press chamber that is limited by the position of the pressure plate. At “Large”, the press chamber is completely open; at “Small”, the pressure plate closes the rear half of the press chamber.

The more compact the press material is, the smaller the filled quantity should be. A large fill opening should be selected for loose, homogeneous press material, e.g. shavings, etc. A small filling chamber size should be selected for compact and difficult press material.

7.6.1.3. Tying

Appropriate settings are available depending on how the machine is equipped. Vertical, horizontal and cross-tying are possible.

7.6.1.4. Open channel

The upper limit value of pressing pressure at the main pressing cylinder. If this is exceeded, the system opens the channel.

7.6.1.5. Speed

The opening speed of the channel influences the firmness of the bales. The slower the channel opens, then the more forcefully the bale is retained in the press channel. The necessary press pressure increases, and the bales become firmer. Choose the appropriate speed from “Very slow”, “Slow”, “Medium”, “Fast” or “Very fast”.

If the opening speed is too slow, this reduces the throughput of produced bales.

If the opening speed is set too fast, then the bales will not be firm enough. Should the situation arise, the press material can be pushed through without force.

7.6.1.6. Pump up channel:

If you activate this function using the “ON/OFF” pushbutton, the pressing process does not start until the channel counter-pressure that is set here has been reached. The cycle time is extended and results in tighter bales.

If this function is deactivated, the system builds up the channel counter-pressure parallel to the system pressure during the pressing process. The cycle time is reduced and results in looser bales.

7.6.1.7. Bale length

Enter the desired bale length as a numeric value. This numeric value multiplied by ten is the selected bale length.

The bale length can change after binding is performed due to the bale expanding. To obtain exact bale lengths, you must change the bale length preselector in accordance with the material. Note that the bales are structured in layers whose thicknesses vary depending on the composition of the material. The bale length is composed of the number of strokes of the pressure plate times the actual layer thickness. This means that under some circumstances the desired bale length may differ. With

different materials, it may be necessary to correct the bale length preselection to achieve approximately the desired bale length.

7.6.1.8. "Front" filling position

The pressure plate remains stationary in the front position after each pressing process. The press material does not drop gradually into the press chamber, but rather onto the slider that closes the press chamber. On reaching a specific fill level in the hopper, the pressure plate moves backwards and the material drops quickly into the press chamber. This pre-compresses the material and the press chamber is filled in an optimum way. The pressure plate then moves forwards again and compresses the material into the press channel.

7.6.1.9. Middle channel

Activate this function if the machine is not running smoothly.

In the case of material with unfavourable friction properties, the bale strand may move jerkily (stick-slip effect). In this connection, the channel adjustment tries to maintain the optimum counter-pressure even though it is no longer possible. This function leads to regulation of the channel being limited. It saves energy and time and prevents high levels of wear on the machine.

7.6.1.10. Delay channel closing

The standstill time after closing the channel before pressing starts. The channel guarantees safe material retention. (The time from reaching the minimum pressure of channel adjustment)

7.6.1.11. Delay channel opening

The standstill time until the channel opens. (Time from reaching the channel opening pressure)

7.6.1.12. Stationary period at front

Standstill time of the pressure plate at the foremost position to give the material time to settle and to let the still compressed air to escape from the bales.

7.6.1.13. Stationary period at back

Standstill time of the pressure plate at the rearmost position to give the material in the press chamber time to slide downwards. This prevents empty strokes.

7.6.1.14. Pre-press position

Activate this function to keep dirt discharge low during pressing.

Deactivate the function to increase press performance. With some materials, dirt discharge can be higher.

7.6.1.15. Twister rotation

The wire can snap or the twisting unwinds itself during heavy loading of the bale tying. This is also dependent upon the diameter of the employed wire. The number of twister revolutions influences the tightness of the tying. Select:

Standard: …. 7 …. **8** …. 9 ….

Wire snaps: …. **7** …. 8 …. 9 ….

Wire unwinds itself: …. 7 …. 8 …. **9** ….

7.6.1.16. Cleaning stroke 0…3

For particular purity, it is possible to select up to three cleaning strokes. Before completing the last bale of a variety, the pressure plate runs to its backmost position and then back again depending on the selected quantity. Tying is carried out directly after the last cleaning stroke.

Activate the cleaning stroke shortly before changing materials to initiate finishing of the last bale. To do this, press the “Cleaning stroke” button below the panel.

If the selected bale length has been reached, the cleaning stroke starts automatically.

If the selected bale length has not been reached. press “Bale finished” on the panel: the cleaning stroke starts.

7.7. Operating instructions

7.7.1. Bale removal

Caution
The bales must be removed immediately after leaving the press channel.
Otherwise, damage to operational plant and/or building parts can result.

7.7.2. Acoustic signal

The acoustic signal (optional) indicates:

- Start-up of the system
- Press fault: Read off the fault display (see the chapter entitled “Faults”)

7.7.3. Separate binding/bale lengths on changing recipes

If residual quantities of press material are produced during pressing of bales, then they can either be added to the respective bales or pressed separately as residual bales. (“Varietal purity”). If you do not pay attention to the varietal purity of bales or if this is not necessary, the system produces a “mixed bale” on changing recipes.

- Varietal purity:
  In this connection, operators observe loading of the press. Shortly before changing the material, you must decide whether to create a normal long bale and a residual amount bale (350 mm) with the amount that is still present (using the “Bale finished” command). If this is not the case, an overlong bale must be created using “Reset counter” and then the “Bale finished” command. You can now change recipes. The new bale length is active with immediate effect. Only then is conveying of the new material allowed.
- Mixed bales:
  In this connection, operators observe loading of the press. As soon as new material gets into the press, the operator selects the recipe for the new material. The new recipe is active with immediate effect. If the started bale with the old material is shorter than 800 mm, the system presses new material until the minimum length of 800 mm is reached. The bale is bound. If the started bale with the old material is 800 mm or more, it is bound immediately. After this procedure, the bale length from the new recipe is active.

7.7.4. Pressing tough material

When pressing tough material (e.g. plastic foil), dry press material between the cutters at the cutting edge can heat up due to friction and block the pressure plate. This disturbance can be avoided by moistening the foil with water.

7.7.5. Rotating beacon

The rotating beacon (optional) signals:

- Press fault: Read fault display (see chapter "Fault")
- Needles not in home position

Warning
Do not switch OFF press, since needles can be damaged by pressure drop.

7.7.6. Binding wire

Attention must be paid to ensure sufficient reserves of binding wire during the press and tying processes.

7.8. Switching off the machine

- Stop filling.
- Wait until the remaining material has been pressed.
- Run the needles to their basic positions outside the press chamber.

- Run the pressure plate to its rearmost basic position.
- Switch off the press.

Danger
Switch OFF the machine and secure it against restart at the main switch.

Warning
The machine may be switched OFF only when the needles are in the home position. Otherwise there is a danger that the needles become damaged by the pressure plate drawing back.

7.9. Operation after emergency stop:

When "emergency stop" is activated or a monitored door or protective device is opened, this is indicated by the "Accept emergency stop" lamp. To accept the emergency stop:

- Remove all disturbances
- Press the "Accept emergency stop" button.

Danger
Before starting the machine, ensure that there is nobody present in the danger area.

If the "Accept emergency stop" is not cancelled after activation, then either a door or cover is open or a disturbance is still present in the emergency stop circuit.

Further information on the safety devices can be found in the chapter "Safety devices".

- Press the "Start" button to start running the machine again.
- Drive all units manually to their home position. (See chapter "Operating modes")
- Start the automatic controller.

Important
After an "emergency stop", all units must be run to their home positions in manual mode.

7.10. Remove material blockages

7.10.1. Near the press channel

- Stop material loading.
- Drive the pressure plate to the rearmost position in manual mode.
- Switch the machine OFF as described in chapter "Machine shutdown".

Danger
Switch OFF the machine and secure it against restart at the main switch.

Danger
Observe the information on automatic movements in the chapter entitled "Residual Hazards".

- Open the door of the press chamber.

Danger
Material is present in the press chamber, which can press against the door and fall out when the door is opened.

- Remove the material build-up at the cutter beam with hooks, bars or rakes.
- Close the doors.
- Start the press.

As far as possible, avoid material blockages by matching the press settings optimally to the press material. Activate the automatic stamper function (option) when required.

7.10.2. In the area of the hopper by bridging

- Press the “Pressure plate return” until the rearmost position is reached.
- Switch the machine OFF as described in the chapter entitled “Switching the machine off”.

Danger
Switch OFF the machine and secure it against restart at the main switch.

Danger
Observe the information on automatic movements in the chapter entitled “Residual Hazards”.

- Using hooks, bars or rakes, remove the material build-up in the hopper from above; however, only from a safe inspection platform or, if available, through the hopper door designed for this purpose. Do not climb into the hopper under any circumstances!
- Open the door of the press chamber.

Danger
Material is present in the press chamber, which can press against the door and fall out when the door is opened.

- Remove the material build-up at the cutter beam using hooks, bars or rakes.
- Close the doors.
- Start the press.

8. Foreseeable applications

Danger
The following foreseeable applications cause disturbances and can be a source of risk for life and limb of the user or third parties, or cause material damage to the machine or other material assets:

- Shunting out safety switches. Result: Risk for life and limb
- Removal or deactivation of other safety devices. Result: Risk for life and limb
- Removal of safety covers. Result: Risk for life and limb
- Using steps, platforms or other climbing aids that do not belong to the machine. Result: Risk for life and limb
- Using parts of the machine as climbing aids. Result: Risk for life and limb
- Feeding highly flammable materials. Result: Sudden flash flames, fire, danger of injury and death, damage to machine components
- Loading acidic materials. Result: Risk of injury from chemical burns (e.g. by squirting out during pressing), unknown chemical reactions
- Use of materials that are not listed in chapter “Intended purpose”. Result: Damage of machine parts
- Pneumatic delivery pressurized; as a result: Functional disturbances and damage to machine components
- Loading compact or already pressed material. Result: Material blockages in front of the cutting beam, unsatisfactory bale quality, damage to machine components
- Feeding abrasive materials, e.g. roofing felt, cement sacks. Result: High wear and high abrasion of the press chamber and channel walls and other machine components
- Feeding narrow plastics (e.g. starps for packaging). Result: Blockage of the pressure plate due to jamming and damage to machine components
- Feeding inhomogeneous materials, e.g. cardboard tubes, square timber, which lead to punctual loading of machine components. Result: Damage to machine components, e.g. channel side walls, pressure plate and press chamber doors
- Feeding non-compressible materials, e.g. solid scrap, concrete elements, rubble. Result: Damage and high wear of machine components
- Selection of wrong formula. Result: Bale quality not correct, bales possibly not suitable for stacking or stable stacking, with risk of tilting from the stack, wire fractures on bales
- Incorrect wire used, incorrect wire threading. Result: High wear to the twister and wire guides, uncontrolled wire fractures after production of bale

- Switch off the machine using "emergency stop". The pressure plate is in the backmost position, as a result: Risk to life and limb due to the pressure plate moving slowly and silently while there is access to the press chamber

9. Faults

9.1. General remarks on faults

Danger
Faults may be eliminated by trained and qualified specialist staff only.

Danger
Fault prevention or removal may only be carried out after the machine has been stopped safely.

Danger
Walking or standing on the conveyor is only permitted if the machine is switched OFF at the main switch and secured against restarting.

This operating instruction for fault recognition and removal is to be used after the occurrence of faults and alarms. Please contact customer service for faults that are not described here. (See chapter “Manufacturers and customer service”).

If needles or twisters must be returned to the home position, or movement sequences be tested after failure of the electricity supply, then this can be done by rotating the fan blades manually. The motor brake must be released beforehand.

Danger
Please always comply with the operating instructions provided by the manufacturer, which you received separately by electronic means (CD-ROM, download link, ...).

Danger
The motor covers may only be removed after switching OFF the main switch in the control cabinet and securing it against restart.

9.2. Structure of the alarms

All important movement sequences are monitored and the pressures in the hydraulic system measured during the operating sequence. Identified faults are indicated by an alarm on the display and/or by the rotating beacon or an alarm horn.

The alarm overlies the general image on the display until it is reset.

The alarm can be reset in several ways, depending on the type of error.

- Removal of the fault by the plant operator
- Automatically by the press controller
- By pressing the "ESC" button or the "Enter" button.

9.3. Alarms

No.	*Message*:*	*See chapter:*
35	LOW OIL LEVEL	Faults in hydraulics
36	MOTOR PROTECTION PUMP 1	Faults in controller
37	MOTOR PROTECTION PUMP 2	Faults in controller
38	MOTOR PROTECTION PUMP 3	Faults in controller
39	MOTOR PROTECTION COOLING PUMP	Faults in oil cooler; faults in controller
40	MOTOR PROTECTION COOLER	Faults in oil cooler; faults in controller
41	MOTOR PROTECTION CONVEYOR BELT	Faults in loader; faults in controller
42	MOTOR PROTECTION RUFFLER	Faults in the ruffler device; faults in controller
43	MOTOR PROTECTION TWISTER	Faults in the tying; faults in controller
44	MOTOR PROTECTION WIRE PULLER	Faults in the tying; faults in controller
45	PROTECTION SWITCH FOR 230V AC	Faults in controller
46	“PRESSING PRESSURE DEFECTIVE” PRESSURE SENSOR	Faults in controller
47	“CHANNEL PRESSURE DEFECTIVE” PRESSURE SENSOR	Faults in controller

48	PRESS LIMIT SWITCH “AT REAR”	Faults in controller
49	“MEDIUM FILLING POSITION” PRESS LIMIT SWITCH	Faults in controller
50	“SMALL FILLING POSITION” PRESS LIMIT SWITCH	Faults in controller
51	“STAMP POSITION” PRESS LIMIT SWITCH	Faults in controller
52	“CUTTING EDGE PASSED” PRESS LIMIT SWITCH	Faults in controller
53	“PRE-PRESSING” PRESS LIMIT SWITCH	Faults in controller
54	PRESS “FRONT 1” PRESS LIMIT SWITCH	Faults in controller
55	PRESS “FRONT 2” END POSITION PRESS LIMIT SWITCH	Faults in controller
56	WIRE PULLER “AT FRONT” LIMIT SWITCH	Faults in the tying; faults in controller
57	WIRE PULLER “AT BACK 1” LIMIT SWITCH	Faults in the tying; faults in controller
58	WIRE PULLER “AT BACK 2” LIMIT SWITCH	Faults in the tying; faults in controller
59	LIMIT SWITCH WIRE INSERTER	Faults in the tying; faults in controller
60	LIMIT SWITCH “STAMPER”	Faults in hydraulics
61	PUMP 1 – NO PRESSURISATION	Faults in hydraulics
62	PUMP 2 – NO PRESSURISATION	Faults in hydraulics
63	WIRE PULLER NOT IN END POSITION	Faults in the tying; faults in controller
64	CHANNEL PRESSURISED - NO PRESS ADVANCE	Pressure plate faults
65	PRESS “AT FRONT” - NO RETURN TRAVEL	Pressure plate faults
66	PRESS MOVEMENT TOO SLOW	Pressure plate faults
67	RUFFLER IN OPERATING POSITION NOT SWITCHED ON	Faults in controller
68	RUFFLER NOT IN AN END POSITION	Faults in controller
69	TWISTER NOT IN HOME POSITION	Faults in the tying; faults in controller
70	TYING SEQUENCE NOT FINISHED	Faults in the tying; faults in controller

71	WIRE INSERTER DOES NOT COME TO FINAL POSITION	Faults in the tying; faults in controller
72	PRESSING POWER > X BAR	Faults in controller
73	REPLACE FILTER	Faults in hydraulics
74	STAMPER IN UPWARD MOTION JAMMED	Faults in stamper; Faults in controller
75	STAMPER IN DOWNWARD MOTION NOT PRESSURISED	Faults in stamper; Faults in controller
76	RUFFLER LIMIT SWITCH IN IDLE POSITION	Faults in controller
77	RUFFLER LIMIT SWITCH IN MIDDLE POSITION	Faults in controller
78	RUFFLER LIMIT SWITCH IN OPERATING POSITION	Faults in controller
79	RUFFLER PLUG-IN UNIT MOTOR CONTACTOR	Faults in controller
80	THERMOSTAT OIL TEMPERATURE TOO HIGH	Faults in controller
81	LIGHT BARRIER OVERFILL FILLING HOPPER	Faults in controller
82	LIMIT SWITCH BALE TRANSVERSE TRANSPORTATION	Faults in controller
83	PUMP STROKE LIMITATION MOTOR CONTACTOR	Faults in controller
84	WIRE FRACTURE ALARM	Faults in tying
85	LIMIT SWITCH WIRE PULLER “AT BACK” (HORIZONTAL UNTYING)	Faults in the tying; faults in controller
86	MOTOR PROTECTION WIRE PULLER (HORIZONTAL UNTYING)	Faults in the tying; faults in controller
87	MOTOR PROTECTION TWISTER MOTOR (HORIZONTAL UNTYING)	Faults in the tying; faults in controller
88	MOTOR PROTECTION PRESSURE PLATE SLIT COVER	Faults in the pressure plate; faults in controller
89	LIMIT SWITCH PRESSURE PLATE SLIT COVER	Faults in the pressure plate; faults in controller
90	MOTOR PROTECTION PUMP 4	Faults in controller
91	RUFFLER NOT RETRACTED	Faults in controller
92	RUFFLER NOT EXTENDED	Faults in controller
93	PERFORATOR NOT RETRACTED	Faults in controller

94	PERFORATOR NOT EXTENDED	Faults in controller
95	PERFORATOR MOTOR CONTACTOR	Faults in controller
96		
97		
98		
99		

*= optional

9.4. Localisation of faults

The "actual state" during faults is to be determined by answering the following questions:

- How does the fault make itself noticeable?
- In which control state is the controller?
- Which contactors and relays are activated?
- Is the mains connection in order?
- Are all fuses in the control cabinet intact?
- Are all motor protection switches/circuit breakers switched ON?
- Is the control voltage present?
- Which indicator lamps are lit?
- Which function should the machine be performing now?
- Which input and output signals are displayed on the PLC modules?
- Which alarm is shown on the display?
- In which position are the components located, e.g. pressure plate, stamper, ruffler, perforator, tying, door?
- Is the pump moptor running?
- Which hydraulic valves are being activated at this moment?

9.5. Pressure plate faults

9.5.1. Pressure plate does not advance forwards

Possible causes:

- Pump is not running.
- Tying system not in home position.
- Stamper (optional) not at upper end position.
- Ruffler/perforator (optional) not at end position.
- Minimum pressure of the channel adjustment not present.
- Press stuck.
- Insufficient pump pressure.
- Valve for forward motion defective.

Remedies:

- Check pump indicator lamp.
- Move tying system to home position.
- Move stamper to home position.
- Move ruffler/perforator into home position.
- Switch OFF automatic controller and activate the "Press advance" button.
- Remove material blockage.
- Measure pump pressure.
- Test valve activation.

9.5.2. Pressure plate stops at the cutter edge

Possible causes:

- The press box has been overfilled.
- Channel adjustment does not open.
- Press pressure too low.
- Automatic stamper system not switched ON.
- Play between cutters and cutting edge too great.

Remedies:

- Reduce material feed; remove material blockage.

- Open shutoff valve channel adjustment.
- Check selector switch settings; measure pressures.
- Activate stamper.
- Notify customer service.

9.5.3. Pressure plate leaves the front end position

Possible causes:

- Gasket kit in press cylinder defective.
- Hydraulic components defective or worn out.

Remedies:

- Replace defective components.
- Notify customer service.

9.5.4. Pressure plate does not move back

Possible causes:

- Wire puller not in end position.
- Twister not in home position.
- Proximity switch "Press at rear" sends signal.

Remedies:

- Move wire puller to end position.
- Move twister to home position.
- Check proximity switch.

9.5.5. Press does not move back, pump runs against pressure

Possible causes:

- Valve is not switched.
- Pressure plate stuck mechanically.
- Press in forward motion.

Remedies:

- Check activation of the "Press return travel" valve.
- Remove dirt.
- Measure pressures.

9.5.6. Forward or return motion does not switch OFF

Possible causes:

- Proximity switches are defective
- Hydraulic valves sticking

Remedies:

- Switch OFF the automatic controller; this interrupts the movement
- Check signal output from proximity switch “Press at front/rear”.
- Check valves

9.5.7. Pressure plate moves continuously backwards and forwards

Possible causes:

- Light barrier controller not functioning correctly

Remedies:

- Clean light barrier transmitters and receivers
- Check cables and their connections
- Check warning diode and potentiometer at light barrier transducers in the control cabinet

9.6. Faults in channel adjustment

9.6.1. Channel counterpressure insufficient

Possible causes:

- Leakage in system, pressure not being held
- Shutoff valve of channel adjustment cylinder is not open
- Relief valve of the channel adjustment is not closed

Remedies:

- Measure pressure at the pump and the channel adjustment
- Seal leaking components or exchange

9.6.2. Channel adjustment system does not open.

Possible causes:

- Press pressure does not reach the minimum pressure that opens the channel
- "Open channel" valve does not switch
- Manual shutoff valve for the channel adjustment is closed
- Flow control valve set incorrectly

Remedies:

- Test function using "Open channel" button (only possible in forward direction)
- Measure pressure in press cylinder on the piston side
- Open manual shutoff valve for the channel adjustment
- Open shutoff valve (at cylinder)
- Re-adjust flow control valve

9.6.3. Channel adjustment system does not hold pressure

Possible causes:

- Bleed valve is open or defective
- Shutoff valve leaks
- Overpressure valve on adjustment cylinder is set too low or defective
- Control valve has too large leakage
- Adjustment cylinder gasket leaking

Remedies:

- Close bleed valve
- Establish leaking devices or gaskets.

9.6.4. Channel adjustment system does not release pressure

Possible causes:

- Pump pressure does not reach the value set at pressure sensor "Pressure on press cylinder"
- Pressure sensor "Pressure on press cylinder" defective
- "Open channel" valve does not switch

Remedies:

- First test "Open channel" using button
- Check activated inputs and outputs with associated control devices
- Check condition of light emitting diodes
- Measure pressure in press cylinder on the piston side

9.7. Faults in tying

9.7.1. Twister not in home position

Possible causes:

- Driving chain too loose
- Chain wheel worn out

Remedies:

- Tension driving chain, check chain wheels and chain

9.7.2. Binding wire knots unwind themselves

Possible causes:

- Wires are too thin
- Knots are become unwound during the twister return travel
- Helix too long

Remedies:

- Use thicker wires (See chapter "Draw in binding wire")
- Knots must release themselves from the twister hook chambers during twister return run, therefore grease or exchange twister
- Change pulley attachment to short distance

9.7.3. Binding wire on finished bale snaps

Possible causes:

- Wrong binding wire
- Bales are compressed too strongly or too long
- Foreign bodies in the pressure plate slits
- Jammed deflection pulleys
- Ground in wire guide
- Sharp-edged retainer
- Wires do not release themselves from the twister hook

Remedies:

- Use soft-annealed and pre-greased binding wire.
- Reduce channel counterpressure This reduces bale tightness.
- Select shorter bale length at the bale length counter.
- Clean grooves in the pressure plate.
- Loosen deflection pulleys for binding wire.
- Check all wire guiding parts for wear. Wire guiding parts should not have burrs or other sharp corners and edges.
- Grease twister hooks or replace.

9.7.4. Binding wires are not twisted

Possible causes:

- Wires are cut too early

Remedies:

- Check twister hook home position

9.7.5. Twister motor protection trips

Possible causes:

- Motor overloaded

- Wires do not unreel or are jammed in the deflection pulleys
- Needles blocked by trapping
- Wheels contaminated
- 2-phase motor operation
- Brake not released, because voltage missing or brake rusted tight

Remedies:

- Measure current on all 3 phases
- Check fuses and switchgear
- Twister not in home position
- If overloaded, check bearings, clean and grease
- Replace defective bearings
- Clean wire puller housing and running rails
- Check deflection rollers
- Check the “Front 1” press function (with horizontal tying)
- Check all fuses

9.7.6. Wire puller does not move into the press

Possible causes:

- Pressure plate not in position "Front 2"
- Twister not in home position
- Slit cover not open
- Needles trapped or blocked
- Limit value transducer "retracted" activated
- Switchgear or drive defective
- Brake not released

Remedies:

- Check tying grooves in pressure plate
- Check end position of slit cover
- Check function of proximity switch "retracted"
- Check which inputs and outputs are activated and whether the associated contactors operate

- Check fuses

9.7.7. Wire puller does not return

Possible causes:

- Wires do not unreel or are jammed in the deflection pulleys
- Needles blocked by trapping
- Limit value transducer "rear" activated
- Switchgear or drive defective
- Brake not released

Remedies:

- Check tying grooves in pressure plate
- Check function of proximity switch "rear"
- Check which inputs and outputs are activated and whether the associated contactors operate
- Check fuses

9.7.8. Wire puller moves continuously backwards and forwards

Possible causes:

- Wire puller does not reach rear position because the pressure plate draws back and thus the safety circuit for the prevention of jamming becomes effective
- Brake does not restrain wire puller

Remedies:

- Observe indicator lamp "Press at front"; if it cancels while the needles retract, then the problem is in the hydraulics
- Find reason for leakage

9.7.9. Wire puller motor protection trips

Possible causes:

- Wires do not unreel or are jammed in the deflection pulleys
- Needles blocked by trapping

- Wire puller rods or tying needles contaminated
- 2-phase motor operation
- Brake not released

Remedies:

- Wash and oil rods
- Check that wire unreeling device and deflection rollers are loose
- Check position of the proximity switch "Front 1"
- Check all three fuses
- Test brake function and brake rectifier

9.8. Faults in hydraulics

Universal measuring points are present at various locations. These measuring points are also labelled in the enclosed hydraulic drawings with "Mxx".

9.8.1. Overpressure present

(with axial piston pumps only, if present)

Possible causes:

- Pump defective (with axial piston pumps only, if present)

Remedies:

- Please contact customer service.

9.8.2. No pressure build-up

Possible causes:

- Switch valve not operated
- Switch valve defective
- Pump logic valve jammed
- Pressure tube or hose in tank leaking or defective
- Pump defective
- Internal leakage in hydraulic system

Remedies:

- Check activation of the valves
- Function test with manual emergency activation
- Direct pressure test on the pump pipe

9.8.3. Low oil level

Possible causes:

- Float switch defective, plug loose or cable defective
- Oil level too low

Remedies:

- Top up oil
- Check switch, attachment, cable connection, cable and connection terminals

9.8.4. Oil temperature too high

Possible causes:

- Pressure limiter set incorrectly
- Flow control valve set incorrectly
- Leakage in hydraulic system
- Defective gaskets or devices

Remedies:

- Please contact customer service.

9.9. Faults in the oil cooler

9.9.1. The motor protection for the cooler circulation pump tripped

Possible causes:

- Motor overload
- Filter blockage
- Excessive resistance in the oil circuit
- Cable defect

Remedies:

- Clean or replace filter
- Check bypass
- Check cable

9.9.2. Motor protection of cooler ventilator tripped

Possible causes:

- Motor overload

Remedies:

- If overloaded, check, wash out and grease the bearings. Replace defective bearings.

9.9.3. Cooler does not cool the oil

Possible causes:

- Cooling fins dirty

Remedies:

- Blow out the cooling fins

9.10. Faults in controller

9.10.1. Controller general

Signal lamps/alarms indicate the current state of the system and provide information, whether a switch is generating a signal or a motion is switched ON.

Light emitting diodes are provided in the control cubicle on time relays, light barrier signal transducers and at the inputs and outputs of the PLC. One can identify which signals are received here. The devices are labelled with the identifiers in the circuit diagrams.

One can recognise from the light emitting diodes on the electromagnetic valves in the hydraulics, whther a solenoid is being supplied with voltage.

The corelationships can be seen from the identifiers on the feed cables and the item numbers in the hydraulics diagrams.

9.10.2. General instructions for faults in the controller

The electrical circuit diagrams belong to the scope of delivery of the plant. These diagrams should always be available for fault removal. The devices and their functions can be determined from the identities of the feeder cables to the external devices (limit switches, pressure switches, electromagnetic valves, etc.) using the electrical circuit diagrams. The devices built into the control cabinet are labelled with the identifiers in the electrical circuit diagrams. The respective cable connections are to be checked during all faults in the electrical equipment. All terminal points should be tightened to exclude contact problems.

9.10.3. General motor protection trips

Possible causes:

- Motor overloaded by excessive power input
- Motor running on only 2 phases

Remedies:

- Measure current on all 3 phases to the affected motor
- If loading not equal: Check fuses, switchgear, cables, connections and motor windings

9.10.4. Sensors do not switch or are permanently activated

Possible causes:

- Operating distance too long
- Cable damaged or terminals loose
- Position switching vane dirty

Remedies:

- Check switch, mounting, cable connection, cable and connection terminals
- Tighten terminal strips
- Clean the position switching vane

9.10.5. Controller cannot be switched ON

Possible causes:

- Control voltage not present
- EMERGENCY STOP CHAIN interrupted

- PLC is switched OFF
- PLC changed to STOP mode.
- No program in memory

Remedies:

- Observe chapter "Switch ON machine"
- Check fuses and protection switches
- Check memory slot

9.10.6. Pump motor does not start up

Possible causes:

- EMERGENCY STOP not cancelled
- Machine is not started
- Selector switch pump 0 1 not switched ON, if present.
- Motor protection tripped
- Fuse defective
- Permitted oil temperature exceeded

Remedies:

- Pay attention of error signals
- Check fuses and protection switches
- Switch machine OFF and ON

9.10.7. Main pump fuses blow

Possible causes:

- Defective power controller

Remedies:

- Please contact customer service.

9.10.8. Main pump motor protection trips

Possible causes:

- Defective power controller
- Delivery flow shutdown not functioning correctly
- System pressure set too high

Remedies:

- Please contact customer service

9.10.9. Oil level monitor signals fault

Possible causes:

- Oil level too low
- Cable damaged or terminals loose

Remedies:

- Top up oil
- Check switch, mounting, cable connection, cable and connection terminals
- Tighten terminal strips

9.10.10. Oil temperature monitor signals overtemperature

Possible causes:

- Thermostat set incorrectly or defective
- Cable defect or terminals loose

Remedies:

- Check switch, mounting, cable connection, cable and connection terminals
- Tighten terminal strips

9.10.11. Light barrier not functioning

Possible causes:

- Transmitter or receiver contaminated or continuously covered

- Transmitter, receiver or amplifier defective

Remedies:

- Clean transmitter, receiver and openings
- Observe status diodes on amplifier
- Check transmitter and receiver
- Check switch, mounting, cable connection, cable and connection terminals
- Tighten terminal strips

9.11. Other faults

9.11.1. Rotating beacon gives signal

Possible causes:

- Tying process in progress
- A fault is present

Remedies:

- Wait for tying process to complete, rotating beacon then switches OFF automatically
- Read alarm on the display and correct fault

9.11.2. Bales rotate in channel

Possible causes:

- insufficient press chamber filling
- Incorrect preselection of light barriers
- Light barrier darkened or defective
- Incorrect position of light barriers
- Retainer not moveable or spring defective.

Remedies:

- Check setting preselection "Light barrier"
- Check and clean lighjt barrier
- Check retainer or replace spring

The preselector must be set in a manner that the filling chamber is always filled higher than the cutting edge with loosened material. The stamper should act only seldomly.

The filling chamber size determines the layer thickness per stroke and influences the compression.

The selection of light barriers determines the filling level and thus controls the loading in the upper area of the filling chamber.

Shapely, heavy and stackable bales are formed only when all settings are correct.

10. Maintenance and repair

10.1. General instructions for maintenance and repair

The regulations and instructions listed in the chapter “Safety instructions and regulations” must always be complied with.

Observe the information in the chapter entitled “Residual Hazards”

Danger
Maintenance and repair work may only be carried out by instructed and qualified specialist staff.

Danger
Only trained and qualified specialists are allowed to remove any of the safety equipment.

Danger
Maintenance after 1000/2000 operating hours must be performed exclusively by competent staff.

Danger
Only trained and qualified specialists are allowed to open any of the safety equipment.

Danger
Machine parts can move due to their own weight after loosening screws, brakes or chains. Take safety measures using supports.

Danger
All maintenance openings and protection devices must be closed and screwed down according to the regulations after completing work.

Danger
Before executing maintenance work, ensure that the main switch remains in the OFF position by locking the switch with a personal padlock or equivalent.

Danger
The main switch does not isolate the machine completely from the mains. Control voltages and supply voltages for heaters and lighting remain present in the machine. These can be isolated by switching OFF a further controller main switch.

Main switch for heaters, lighting, controller

An authorized and qualified person must carry out regular inspections in accordance with national regulations.

Carry out planned maintenance work and repairs in accordance with this operating and maintenance manual.

Ensure that components with a limited service life (e.g. components with fatigue limits such as hoses) are checked at regular intervals for signs of wear and safe serviceability.

Ensure that safety relevant defects are eliminated or registered for repair immediately. Stop the machine immediately, if obvious danger for operating staff or the machine exists, and ensure that the machine is not recommissioned before the defect has been removed.

Carry out maintenance work from the positions provided for it.

Caution

You must observe the maintenance intervals in the operating manuals of third-party manufacturers that have been made available to you in digital form. These maintenance intervals are not listed here.

Caution

After carrying out work on the hydraulic system, especially on the main press cylinder, the main press cylinder must be driven in and out at least five times without load so that any air present in the cylinder can escape from the cylinder cavity in order to prevent the risk of spontaneous (diesel) ignition.

Danger

Only use hoses suitable for the respective operating pressure in accordance with the hydraulic diagram.

The machine components are identified with group numbers in the hydraulic and electrical drawings. All control devices, connection cables and instructions that affect only one specific module are identified by this group number.

Danger
Use only spare parts that have been approved by the machine manufacturer.

The machine functions are interlocked by the controller against each other against incorrect operation. Incorrect operations at the control panel or at the control cabinet are therefore excluded, insofar as manipulations are not made to limit switches and manual interventions are not made in parts of the electrical or hydraulic controller.

A maintenance checklist is enclosed in this operating manual as a sample, and we request you to ensure that this is kept carefully by the authorised persons. Please produce copies to suit your needs.

We recommend that you arrange for a comprehensive revision be performed at intervals of 2000 operating hours or 12 months by specialist mechanics and specialists from Paal. This should not only determine the condition of the machine, but also preventive measures. The functions are monitored carefully with a review of the controllable electrical and hydraulic control elements.

Danger
After adjustment and repairs to safety relevant components, a specialist must inspect the plant before it is commissioned. (e.g. according to BetrSichV (Health and Safety at Work Regulations))

The machine must be inspected after every repair and after every modification. The scope of the inspection addresses the type and scope of repair or modification. Document the results of all executed tests.

Document inspection verification in accordance with your national regulations.

10.2. Instructions for sensor adjustment

The switches are adjusted in the factory for correct machine function and should not be changed as far as possible.

Warning
In the evnt of a necessary readjustment, care must be taken that they do not collide with any other components, both on the scanning side and also on the connection side. This can damage the switch and lead to machine malfunction.

Please contact customer service for the correct setting, since the switch settings are matched to the respective machine deployment.

10.3. 8-hour maintenance

- Perform a visual check and a function test of all emergency stop devices (emergency stop button, pull-wires and safety switch of the key transfer system on the control cabinet).
- Remove material and dust accumulations, and dirt behind the pressure plate
- Clean material adhering to the running surfaces of the pressure plate rollers. Clean and grease the rollers if water accumulates on the material.
- Remove material and dust accumulations in the area of the needle slits, on the press chamber door hinges and in the press filling area.
- Clean the twister and wire puller. If wire remains are present, it must be determined from where they originate.
- Clean the yarn deflector rollers on the opposite tying side and check for easy movement.

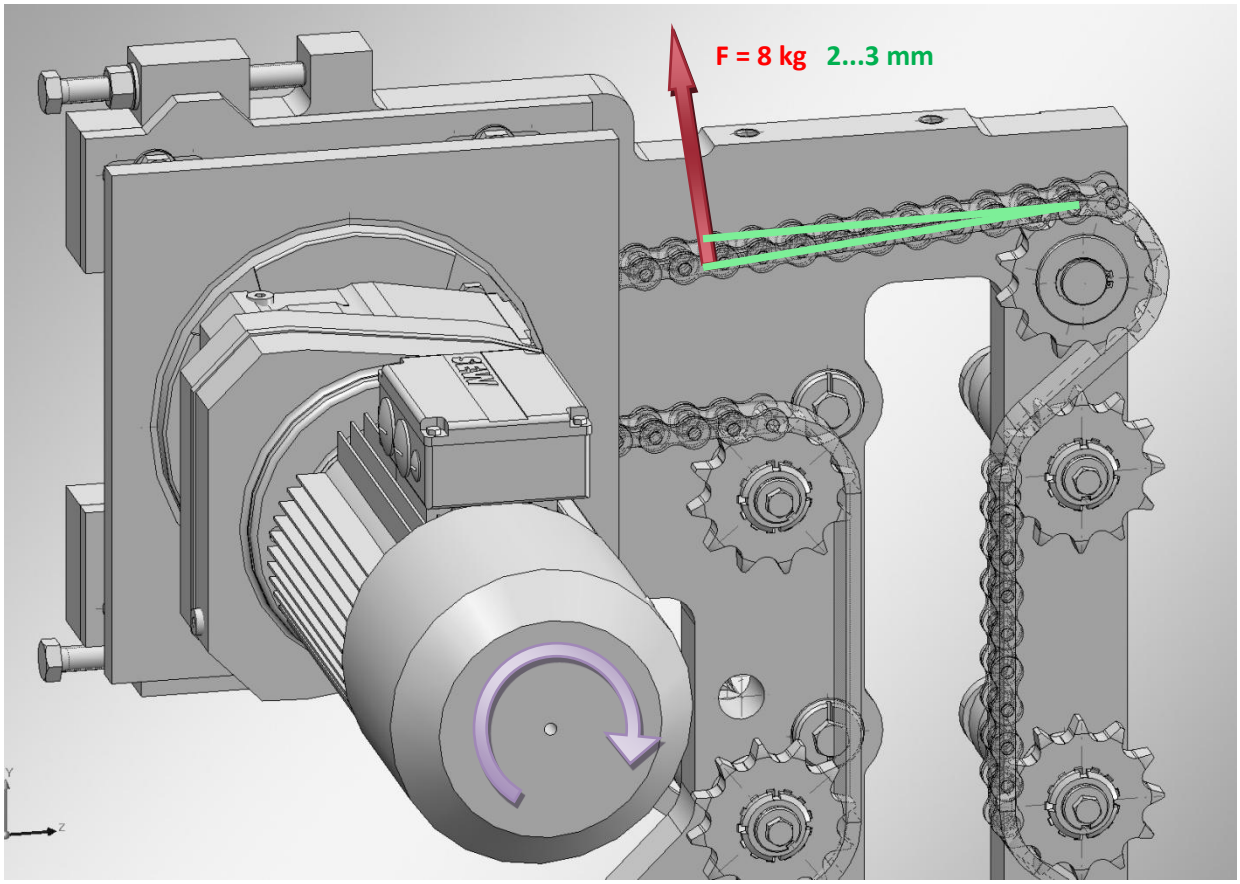
10.4. 48-hour maintenance

- Perform the 8-hour maintenance plan.
- Check all safety instructions and danger notices on the machine. Renew them if they become worn or contaminated.
- Check the oil level with cylinders retracted, top up oil as necessary.
- Check and clean the light barriers.
- Clean and grease the pressure plate rollers.
- Check the filter mats in the control cabinet for soiling, replace if necessary.
- Grease the bolts and guides in the channel adjustment.
- Clean the retainer fingers, grease and check free movement.
- Clean the area around the sensors above and below the associated slide.
- Oil the wire drums with spray oil; pay attention to national regulations regarding environmental protection.
- Check the position of the twister hooks.
- Grease the guides of the hydraulic wire cutter (if present).
- Check the wire deflection rollers for free movement, traces of wear and lateral play of max. 1.0 mm.
- Check the twister hooks and needles for play and wear.

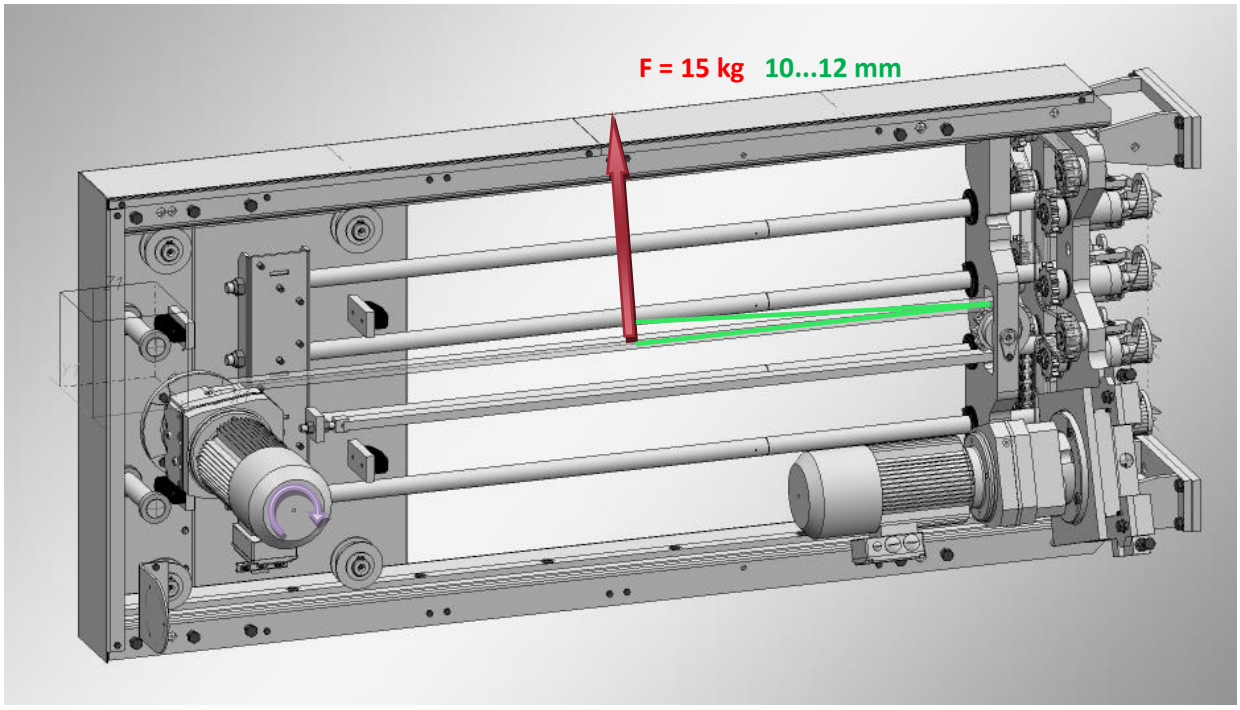
10.5. 192-hour maintenance

- Perform the 8-hour maintenance plan.
- Perform the 48-hour maintenance plan.
- Check the hydraulic control pipes and valves for leakage.
- Examine the hoses for porous, leaking and moist locations, also for bubbles on the external skin and for tight and non-turnable bonding of the screw connections.
- Perform a function test of all signal transmitters and devices.
- Check the tension of retainer finger spring.
- Check the switch clearance of limit switches/proximity switches. The distance to the switching surface must not exceed or fall short of the range 2 - 7 mm.
- Perform a lamp test and replace faulty lamps.
- Check the deflection wheel and its position from the wire puller and at the twister.
- Check the chain tension on twister. Remove the ventilator hood from the motor and turn the fan wheel, manually, the motor clockwise (blue arrow), in order to relieve the chain at the measuring point. The motor should be difficult to turn manually. The chain should move only

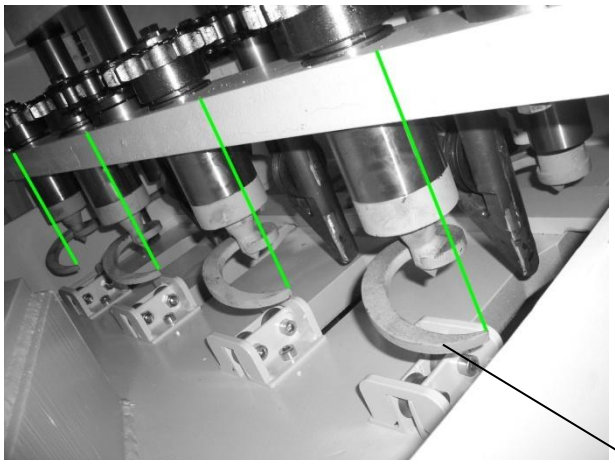
max. 2 to 3 mm sideways with a lateral tension of 8 kg, between the drive wheel and the subsequent, most distant wheel. (See following diagram)

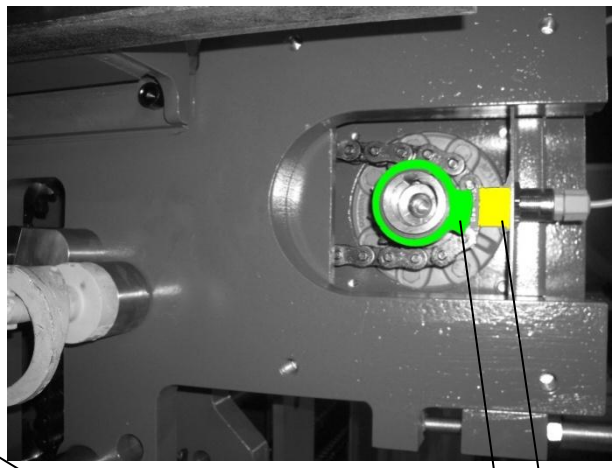


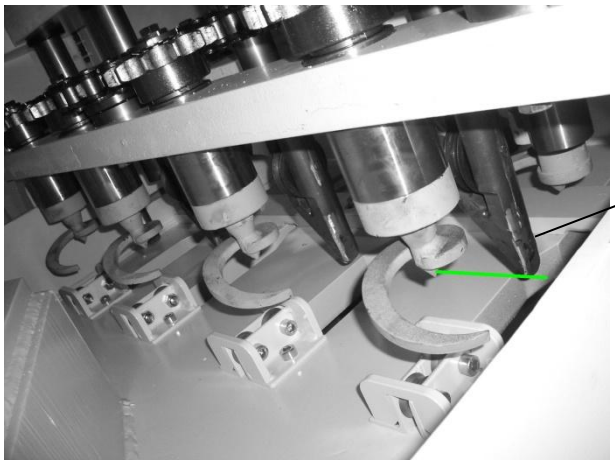
- Check the chain tension at the wire puller, as described above at the twister. The chain should move only max. 10 to 12 mm sideways with a lateral tension of 15 kg, between the drive wheel and the subsequent, most distant wheel. (See following diagram)



- Check the positions of the twisters and needles. These must be located in the home position:







Twister

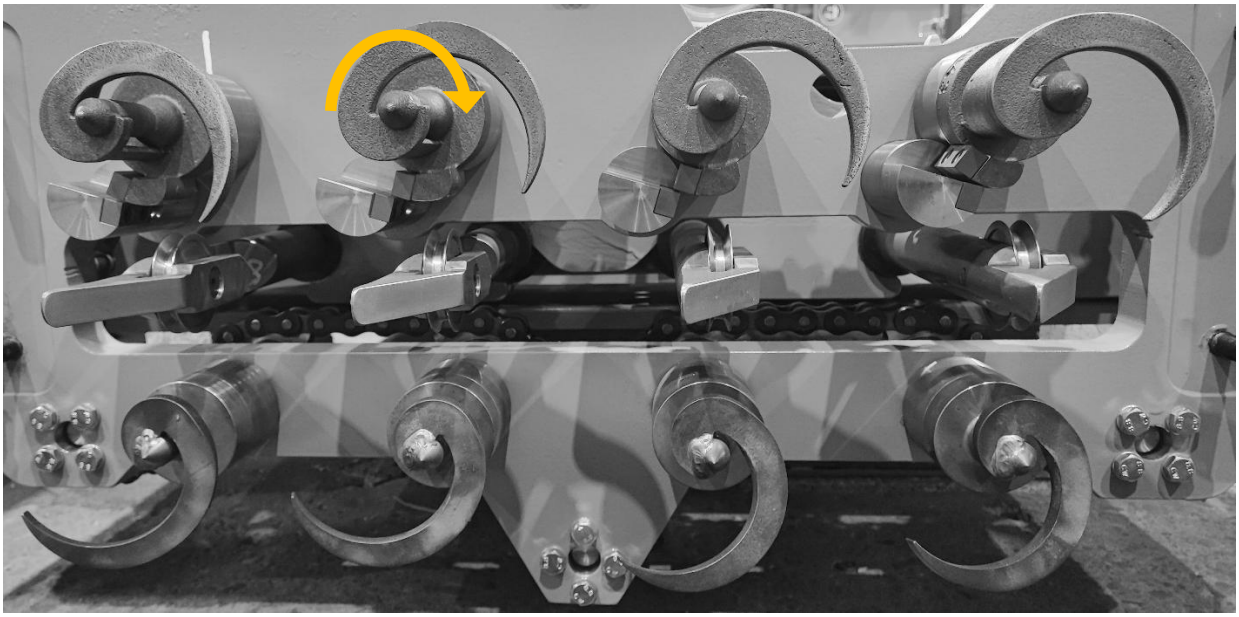
Needles

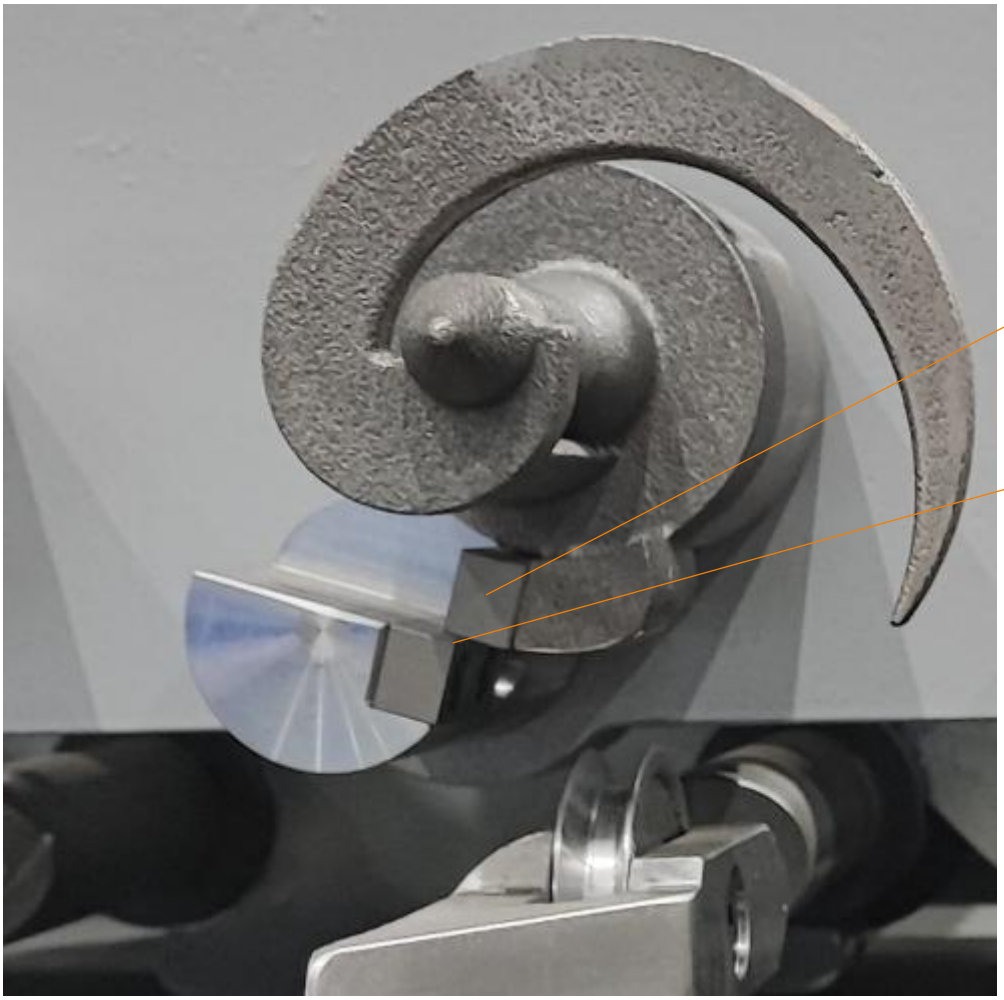
Home position of the drive

Sensor

Note
Pay attention to the positions of the twister knives, if present. These must be positioned just behind the cutting edge in the forward direction of rotation.

Home position in the example of 4-wire tying:

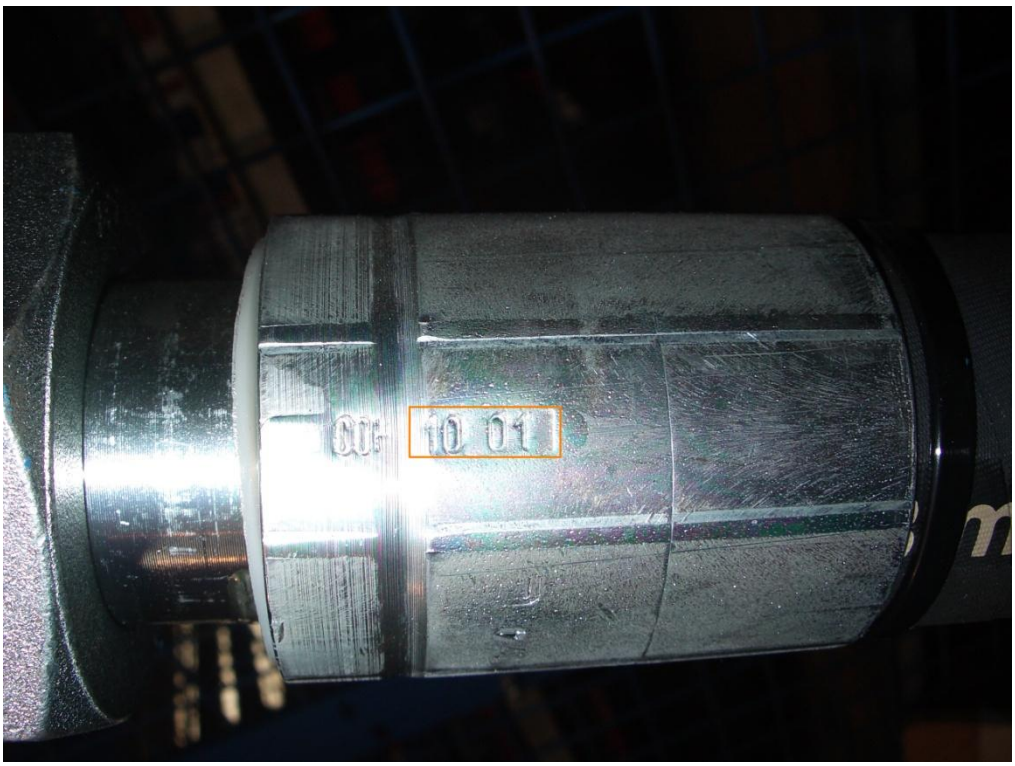




10.6. 1000-hour maintenance

Danger
Maintenance after 1000/2000 operating hours must be performed exclusively by competent staff.

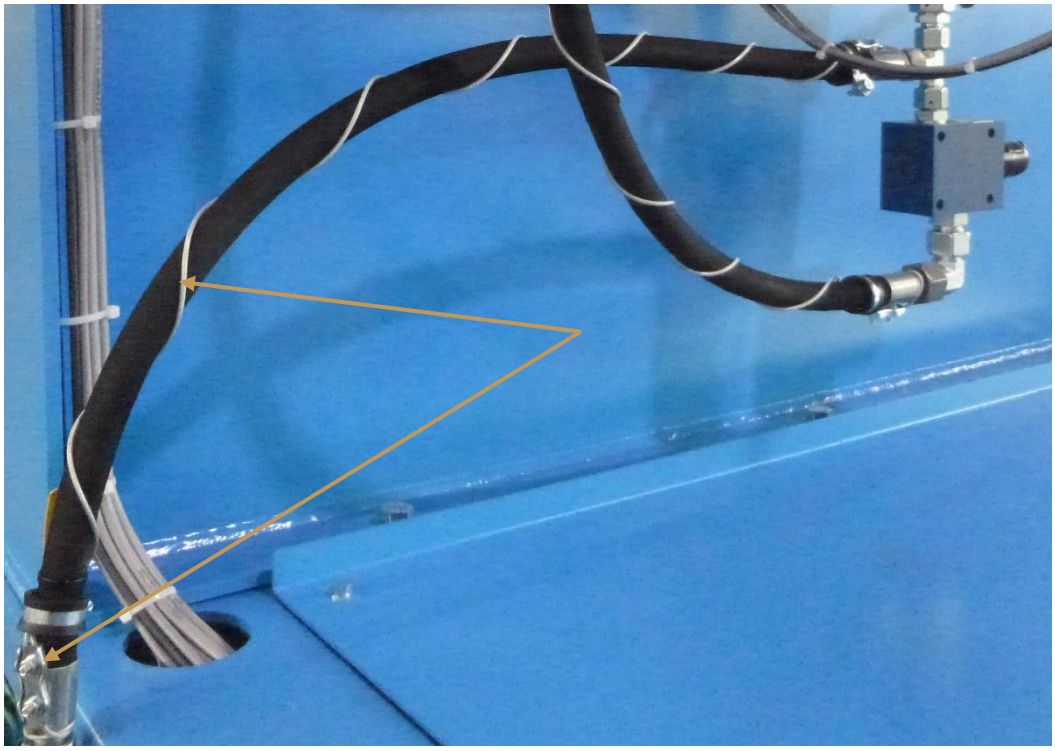
- Examine the gap between the pressure plate and floor (min. >0 mm, max 2 mm). The lower pressure plate rollers must be in contact.
  If the gap > 2 mm, then foreign matter is present under the pressure plate.
  If the dimension = 0 mm, then the pressure plate rollers no longer bear.
- Check that all screw connections on the machine including the floor are tight.
- Check the floor for damaged concrete around all the fastening screws.
- Check the twister knife for wear and replace if necessary.
- Examine all hydraulic cylinders for leaks and check all connecting rods for formation of grooves.
- Examine the condition of the hose lines and their connections. The hoses must not have cracks and the surface must not appear porous. Otherwise replace the hose lines immediately.
- Check the production date of the hose lines and comply with the replacement intervals of a maximum of six years. The last four digits show the year and month of manufacture, e.g. "10 01" for January 2010; this means that you must replace the hose lines by January 2016.



If the marking is missing or illegible, the marking on the hose takes precedence. In this case, check the production date of the hose lines and comply with the replacement intervals of a maximum of six years.

Example:
Production date 1st quarter 2008 + 6 years = Replacement date at the latest by 1st quarter 2014.
Examples of hose marking:

- Check the condition of all hose protection devices and replace them if damaged or corroded.



Hoses with the following designations have a retention system and therefore do not need a hose protection device:

HD520 HD525 HD725 HD732 HD740 HD750

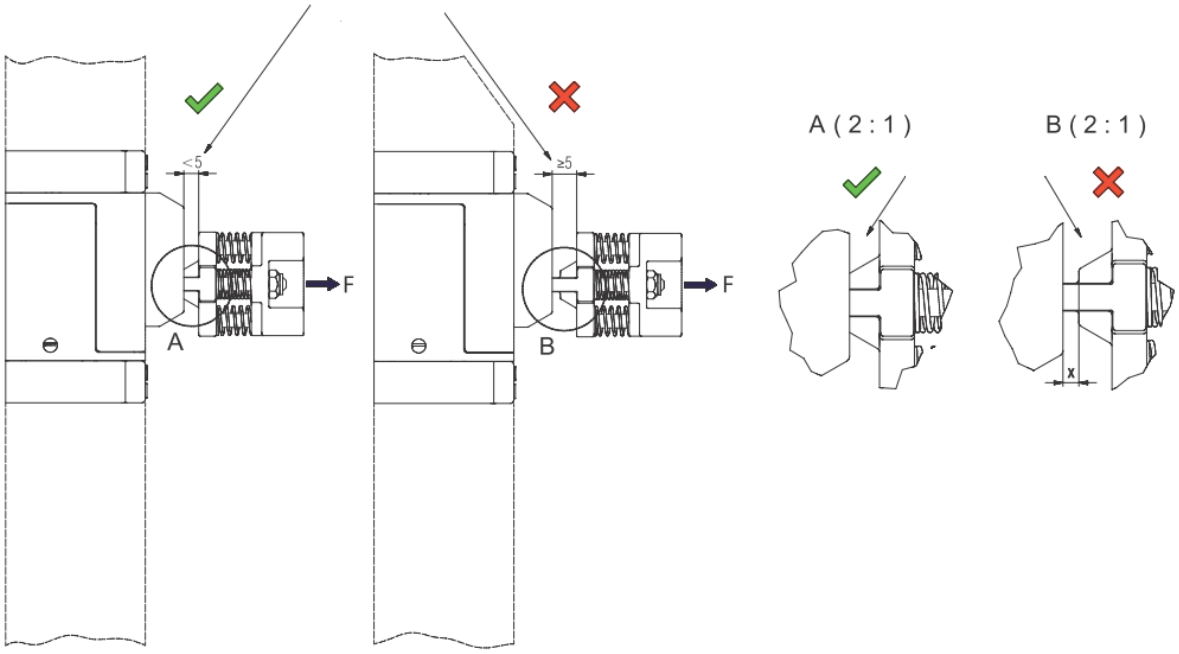
- Examine the fastening and function of limit switches/proximity switches.

- Check the rear switch OFF position of the cylinder and the switching speed of the hydraulic system. The pistons must not contact the cylinder floor.
- Test that all screw connections are tight, tighten as necessary.
- Check the rollers and guide rails for exact guidance.
- Examine the pressures at all measuring points in the hydraulic block in accordance with the hydraulic drawing.
- Check the play between the cutters at the pressure plate and the counter blades (max. 3 mm).
- Examine the gaps between the pressure plate and the side walls (each max. 3 mm).
- Grease the pressure plate door hinges and all pivot joints.

10.6.1. Key transfer system checks

Key transfer systems must be tested or checked before commissioning, after repairs and at regular intervals. These tests or checks should include the following tasks as a minimum:

1. Visual inspection of the units for cleanliness: Remove all contamination
2. Visual inspection of the fastenings: If necessary, tighten the screws
3. Visual inspection of the units for damage and wear: Function check
4. Check the maximum travel of 5 mm of all locking bolts.



5. Manual check to confirm that the units are easy to operate, lubrication may be necessary.

6. Function check using the key run plan: It must not be possible to remove the held keys and actuators. Coded keys cannot be inserted into locks with other codes. Check this using the test matrix below.

Danger
In the case of malfunctions, switch off the machine and secure it against restarting at the main switch. Remove system blockages or arrange for a repair.

	Key A	Key B	Key C	Perforator key
Control cabinet lock A	1	~~10~~	~~19~~	~~28~~
Control cabinet perforator	~~2~~	~~11~~	~~20~~	29
Press chamber doors lock A	3	~~12~~	~~21~~	~~30~~
Press chamber door lock B	~~4~~	13	~~22~~	~~31~~
Press chamber door lock C	~~5~~	~~14~~	23	~~32~~
Access doors lock A	6	~~15~~	~~24~~	~~33~~
Access doors lock B	~~7~~	16	~~25~~	~~34~~
Access doors lock C	~~8~~	~~17~~	26	~~35~~
Access opening perforator	~~9~~	~~18~~	~~27~~	36

The key can be inserted	
It is not possible to insert the key	~~

Insert each key into each lock one at a time by hand.

Check all 27 options (for the existing perforator 36).
If there are several access points, the number of options to be checked is increased by 3 (for the existing perforator 4). Fewer access points are also possible.

10.7. 2000-hour maintenance

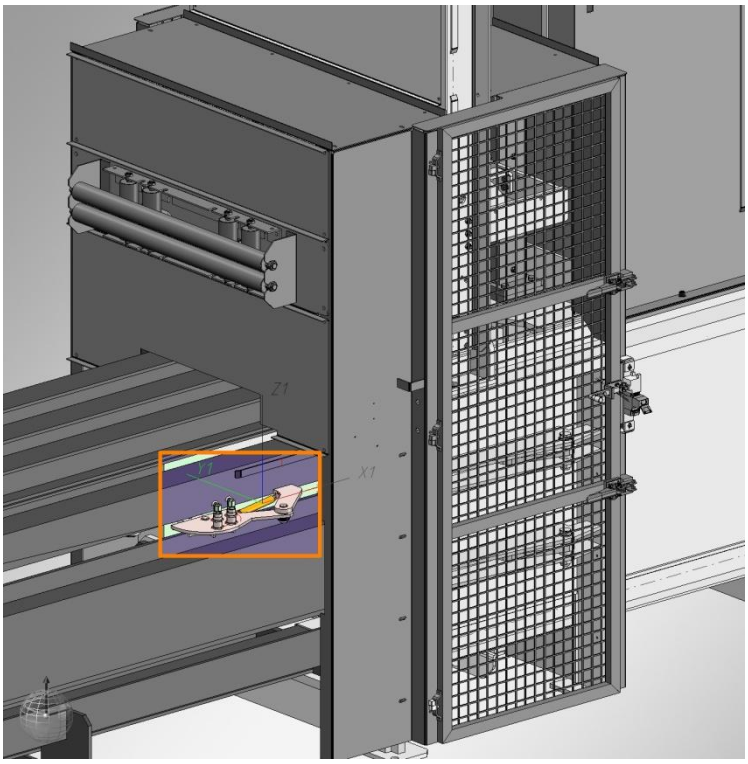
- Perform a visual check and a function test of all safety devices and systems, including the associated control devices.
- Check the electrical equipment.
- Replace the guide block and the associated slide.
- Perform the 1000 h maintenance plan.
- Have the oil checked and perform an oil change if necessary. (See chapter "Change hydraulic oil").

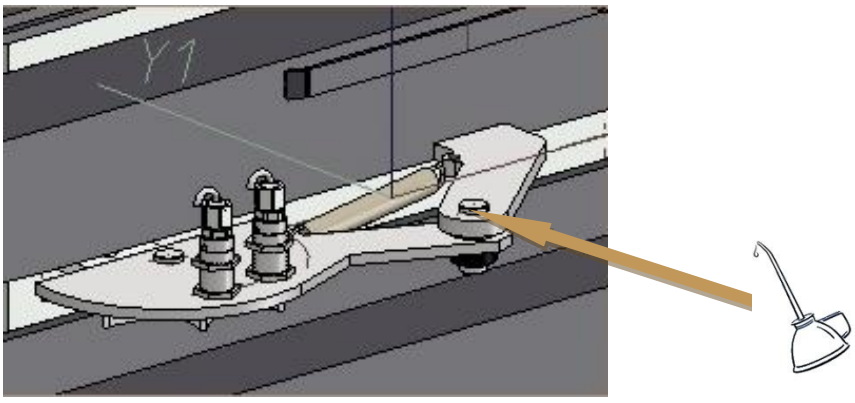
10.8. Lubrication

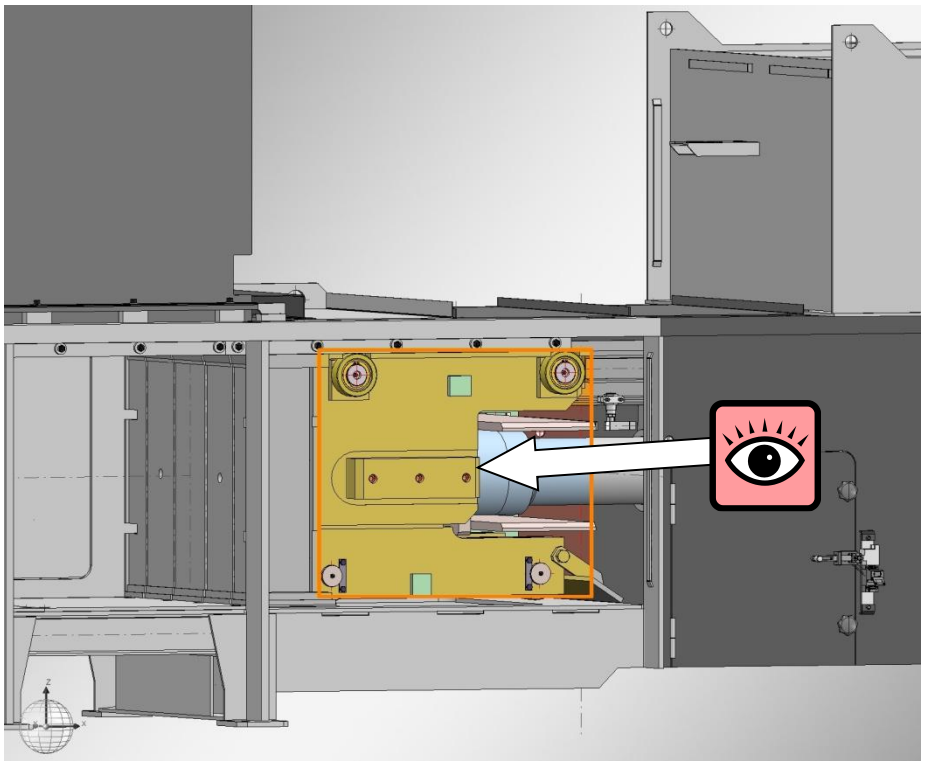
Careful and regular lubrication is necessary for fault-free operation of the machine and avoids expensive repairs.

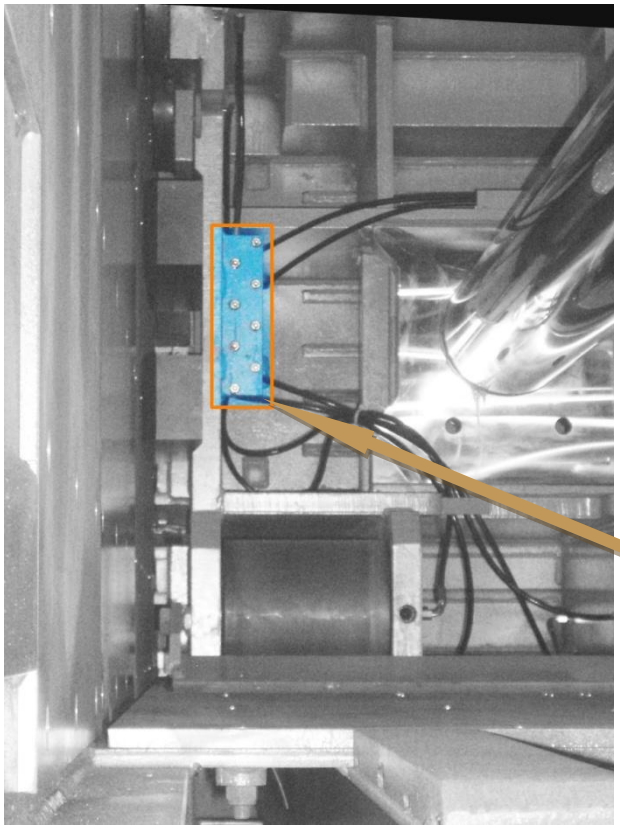
- Switch the machine OFF as described in chapter “Machine shutdown”.

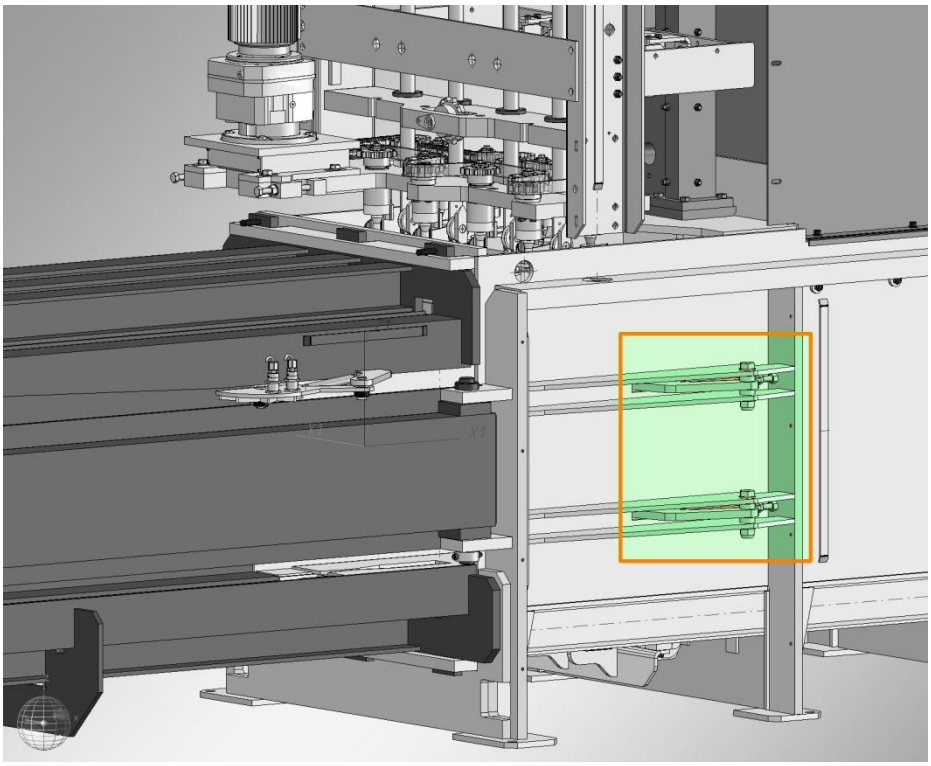
Danger
Switch OFF the machine and secure it against restart at the main switch.

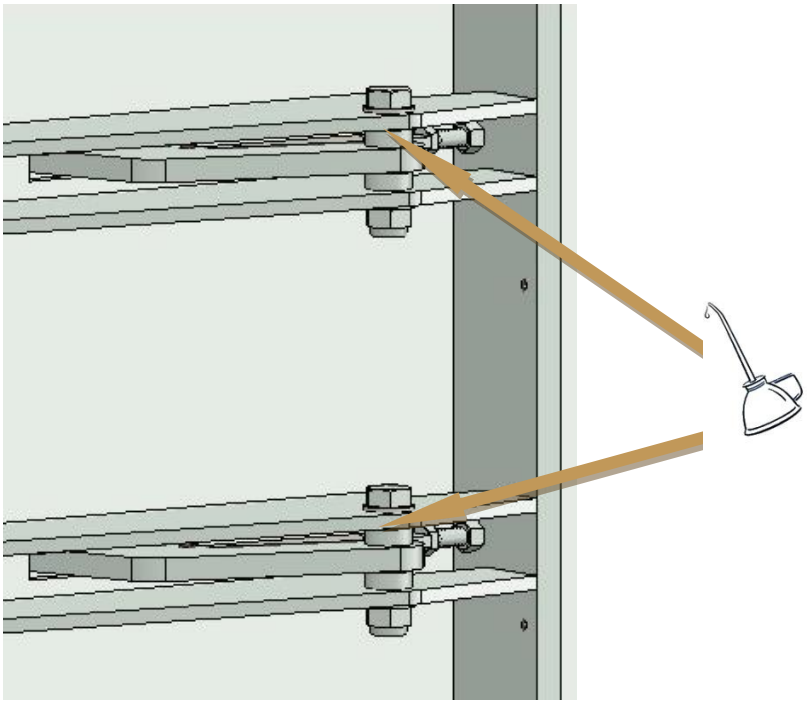

Z1
X1

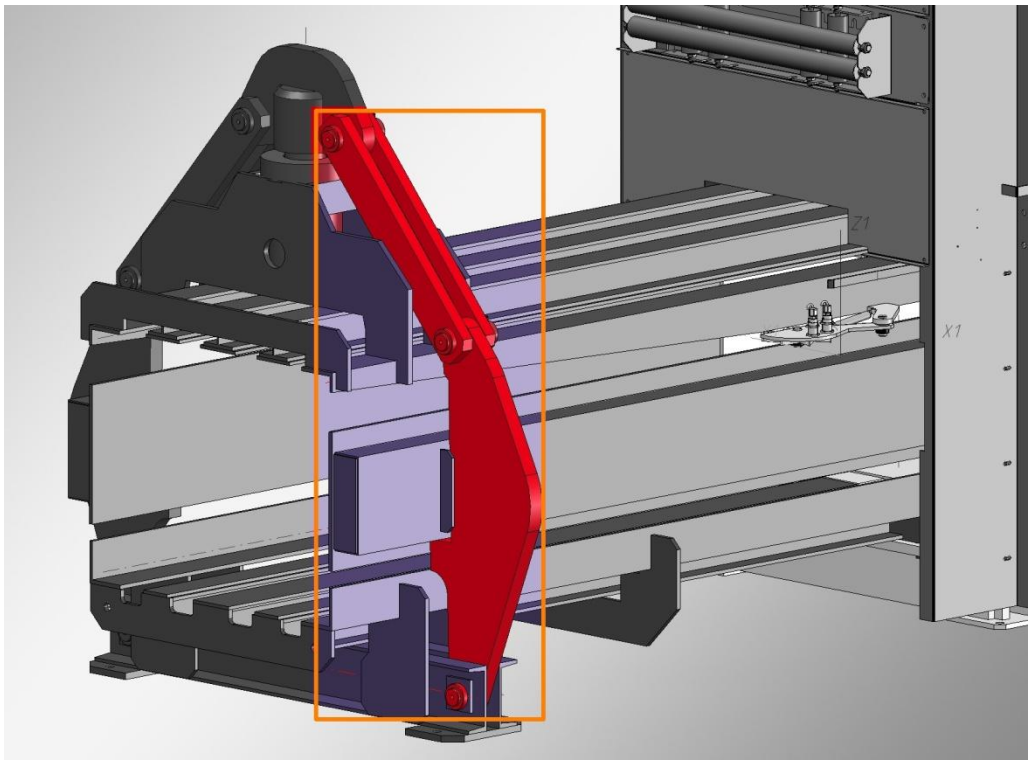

Y1

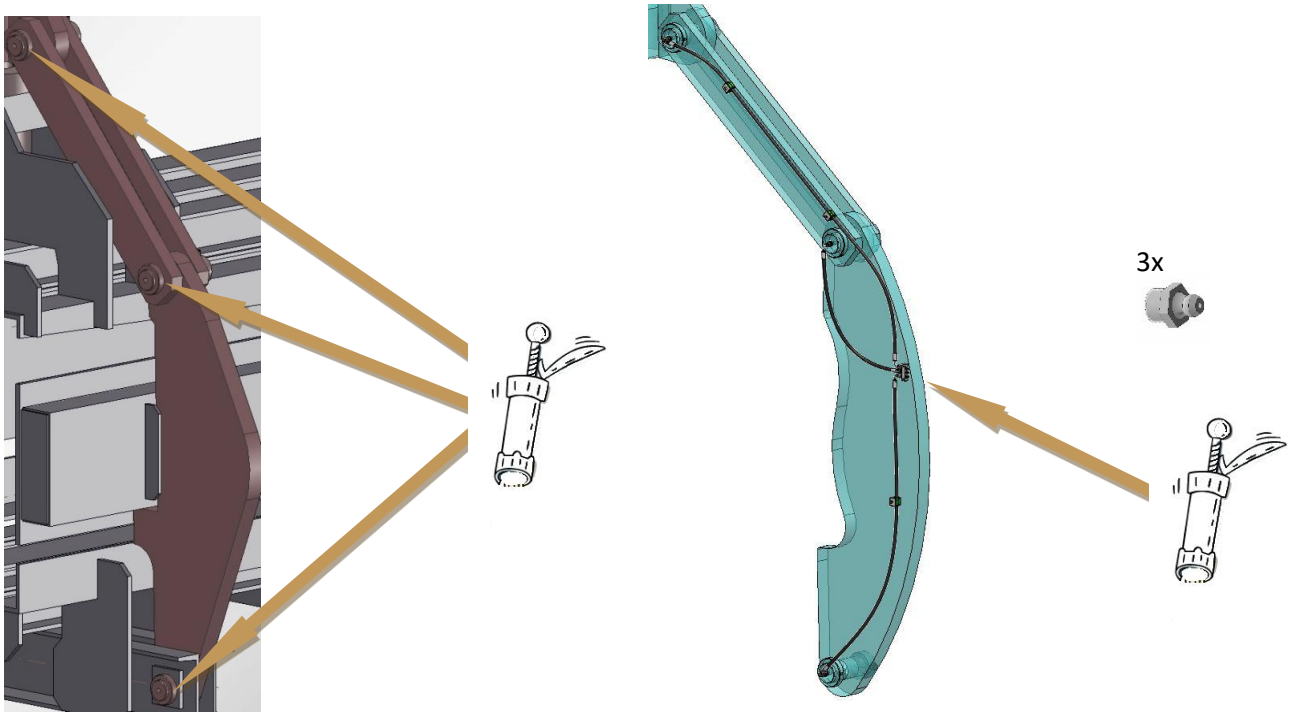



8x








3x

10.9. Greases

... or similar greases from other manufacturers.

Greasing position:	ARAL	EXXON	KLÜBER LUBRICATION	TOTAL	wintershall
Drip feed lubricator	Aral Degol BG 220	Mobilgear 600 XP 220	Klüberoil GEM 1-220 N	CARTER XEP 220	Wiolin 85 W-90
Roller and slide bearings, threads	Aral Aralub HL 2	Mobilux EP 2	Centoplex 2 EP	MULTIS EP 2	Wiolub LFP 2
Gear wheels in tying	Aral Sinit FZ 2	Mobilgear OGL 007	Grafloscon C-SG 500 Plus	COPAL OGL 0	Wiolub ZFZ

10.10. Lubrication of the key transfer system

Caution
Do not use grease for lubrication! If lubrication is required, please refer to the table for selecting the optimum lubricants under the chapter “Lubricants for the key transfer system”.

10.11. Lubricants for the key transfer system

Key transfer units do not normally need to be lubricated because of the design and materials. However, there may be special cases where additional lubrication makes sense. In these cases, it is necessary to adapt the lubricant system to the respective application.

Type of contamination:	Examples:	Adhering dirt:	Lubricant recommendation:	Comment:
Dry dust	Cement, fly ash, stone, lime	No	Graphite powder; graphite- or PTFE-based bonded coating	Do not use grease!
Sludge	Concrete, fly ash, hard water	Yes	Gear spray with MoS2 (molybdenum sulfide) and graphite, Molycote spray, penetrating oil	

Wet dust	Wood dust, chips	Yes	Graphite-, MoS2, (molybdenum sulfide) or PTFE-based bonded coating, possibly with penetrating oil	Do not use grease!
Adhering dust	Asphalt	Yes	Penetrating oil	Do not use graphite!
Acids and alkalis	Additives in cleaning agents such as lye, acid	No, corrosive	Lubricating oil or grease spray	
Rust film	Rust dust	No	EP-based fluid grease, anti-corrosion spray with additives	Use in the case of a rust film
Icing	Freezing rain	Yes	Silicone spray penetrating oil	Attach the cover

To prevent sluggishness or even jamming, lubrication should always be carried out in a clean condition. When using oils and greases, dirt can adhere, which can affect the function. In any case, we recommend that you use tests to determine the appropriate lubricant for your application. Please also note the viscosity of the lubricants and the influence of temperature. An excessively high viscosity can lead to faults.
A simple way to apply the respective lubricant is to use spray cans. They allow the relevant com

10.12. Hydraulic oils

Warning
Only the oil type in the hydraulic tank may be used for refilling. If hydraulic oil is included in delivery, the oil type is stated on the label on the hydraulic tank. If this is the case, the corresponding safety data sheet is enclosed with the hydraulic drawings.

Warning
If a different oil type or an oil type from a different manufacturer is used, the entire hydraulic system must be emptied first and the hydraulic oil manufacturer's instructions on the safety data sheet must be followed.

Warning
If oil of type “HLPD” is used to replace oil of type “HLP”, the entire hydraulic system must be emptied, cleaned and flushed.

Hydraulic oil must satisfy the following conditions:

Characteristics:	*Units:*	*Standard:*	*Value:*
Description in accordance with DIN 51502 / DIN EN ISO 6743	-	DIN 51502 / DIN EN ISO 6743	HLP / HM
Viscosity class	-	DIN 51519	68
Kinematic viscosity at 100°C	mm^2/s	DIN 51562-1	≥8.5
Aging stability Increase of the acid number after 1000 hours	mg KOH/g	DIN 51587	<2.0
Air release characteristics at 50°C	min	DIN ISO 9120	≤14
Mechanical test in the FZG gear test rig A/8,3/90	Scuffing load stage	DIN 51354-2	>10
Purity class	-	ISO 4406	20/18/15

The following oil types satisfy the above conditions:

HLP oils

ADDINOL	ARAL	bp	Castrol
Hydrauliköl HLP 68	Aral Vitam GF 68	Bartran 68	Hyspin AWS 68
		Energol HLP-HM 68	Paradene 68 AW
			Hyspin ZZ 68
			Tribol 943 AW-68

FUCHS	Q8 Oils		TOTAL
RENOLIN MR 20 VG 68	Haydn 68	Shell Tellus S2 M 68	AZOLLA ZS 68
RENOLIN B20 VG 68	Holst 68		

WIBO			
Wibohyd HLP 68 SX			

HLPD oils

FUCHS	MÉGUIN OILS OF GERMANY	Mobil	TOTAL
RENOLIN ZAF 68 DT	AF 68 HLPD	MOBIL DTE 10 Excel 68	AZOLLA DZF 68
RENOLIN ZAF 68 B			

WIBO			
Wibohyd 68 BRG 44			

10.13. Change hydraulic oil

Important
Retract all the hydraulic cylinders.

Danger
Switch the machine OFF before changing the oil
and secure it against restarting.

Important
Observe the information in the chapter entitled “Connecting the oil heater”.
Observe the information in the chapter entitled “Hydraulic oils”.

The machine is not provided with a drain screw; the hydraulic oil must be extracted by suction.

- Collect the oil in a sufficiently large container during suction. See “Technical data” for filling quantities. Remove contaminated oil completely and dispose of it correctly. Pay attention to national and international regulations.
- Check the tank interior for damage and contamination; if necessary have it cleaned by a specialist company.
- Fill the tank as described in the chapter entitled “Top up hydraulic oil”.

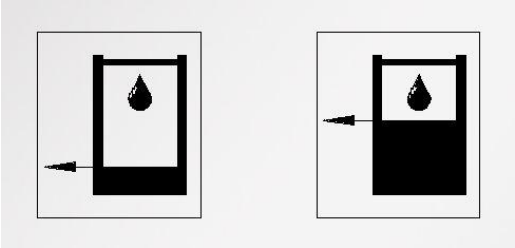
Danger
It is forbidden to enter the tank. The oil tank must be cleaned only by a specialist company.

10.14. Topping up hydraulic oil

Specifications for hydraulic oil are found in the chapter “Hydraulic oils”.

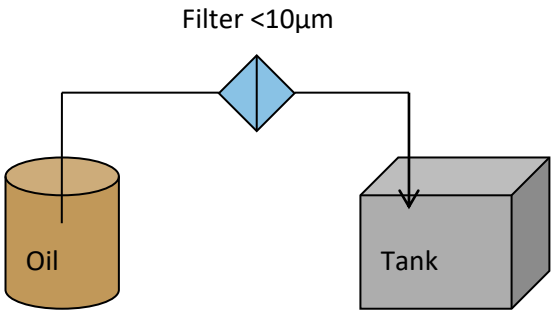
Important
Only measure the oil level when the main pressing cylinder is retracted.
You must never fill above the maximum permissible oil level.

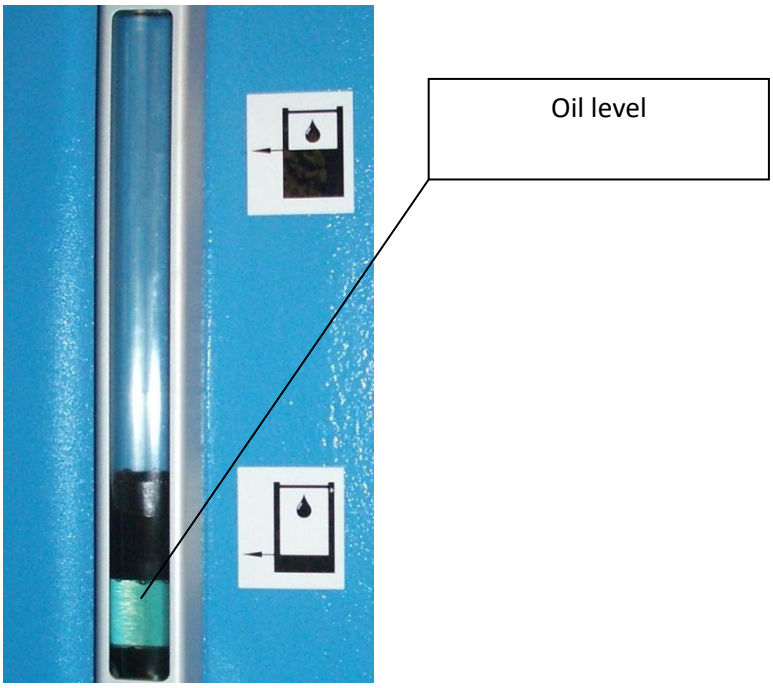
- The filling quantities for hydraulic oil are found in chapter “Technical data”.
- Open the air filter and remove the air filter insert.
- Fill the hydraulic oil through this opening to the maximum mark.



Minimum oil level Maximum oil level

Warning
Fill the machine only through a
filter unit with fineness grade <10 µm.





- Bleed the hydraulic pumps and the oil cooler using the measuring connections.

Danger
The bleeding must be performed
exclusively only by competent staff.

- The filling opening must be reclosed after filling the oil container. Ventilation through the air filter must continue to be guaranteed here.
- Remove oil residues and dispose of then correctly.
- Let the oil settle for 3 hours.

Warning
Machine start after initial oil filling or after
completed oil change not earlier than after 3 hours.

Warning
Before the machine starts being used for work, the main cylinder must be driven in and out at least 5 times without load. Any air present in the cylinder can escape from the cylinder cavity and the risk of a spontaneous (diesel) ignition is avoided.

10.15. Replacing the hydraulic air filter

The hydraulic air filters are not subject to regular maintenance.
Depending on the actual degree of contamination of the filters, the system displays the time for maintenance on the panel.

Danger
Switch the machine OFF and secure it against restarting before removing and changing the filter.

All the hydraulic filters (air and oil filters) must always be serviced by a specialist tradesman at the same time.

10.16. Spare part procurement

Correct and safe functionality is guaranteed only when origianl spare parts are employed.

Use the spare part service at www.kadantpaal.com under the menu "Service".

The contact data for customer service can be found in the chapter "Manufacturer and customer service".

Please state the machine number "32.197" engraved on the name plate. Please describe the fault and state the required spare parts with the number of units.

Please state the type of shipment and the delvery address, the contact person and your order number to speed up spare part delivery.

10.17. Repair work

Please contact customer service for the execution of repair work. You find the addresses in chapter "Manufacturer and customer service".

11. Decommissioning machine

Danger
Decommissioning the machine, dismounting and dismantling it must only be carried out by trained, qualified specialists.

- Drive the machine to its home position.
- Switch the machine OFF in accordance with chapter “Machine shutdown”.
- Switch OFF the electrical power supplies at the appropriate low voltage distribution system.
- Interrupt the electrical energy supply by disconnecting the feeder terminals at the main switch in the control cabinet by an electrical craftsman.
- Release the pressure fully in the hydraulic system.
- Suck the hydraulic oil out of the tank.

  Collect the oil in a sufficiently large container during suction. See "Technical data" for filling quantities. Remove contaminated oil completely and dispose of it correctly. Pay attention to national and international regulations.
- Clean oil residues from the tank interior.
- Dispose of oils and greases correctly.

11.1. Temporary decommissioning of the machine

Caution

For temporary decommissioning, it is imperative to press dry material beforehand. If wet press material remains in the channel, the bale may stick to the channel. When resuming press operation, extensive interference suppression measures will be required.

11.2. Remove/dismantle machine

Please contact customer service with regard to machine decommissioning and disposal (see chapter "Manufacturers and customer service")

11.3. Disposal

- Dispose of all machine components separately and correctly according to material.
- Dispose of hydraulic oil, neon lamps, batteries and electronic modules as hazardous waste.
- Always comply with national and internation disposal regulations.

12. Technical data

Description:	Kanalballenpresse
Type:	PACOMAT V-65 D BH
Serial number:	32.197
Year of manufacture:	2025

12.1. Performance data press

Press force:	65 t
Specific press force:	77 N/cm²
Volume output no-load operation:	505 m³/h
Volume output at 35 kg/m³:	237 m³/h
Drive power main pump:	37 kW
Delivery output mani pump:	260 l/min

12.2. Dimensions press

Length:	=> Erection plan / Dimensions sheet
Width:	=> Erection plan / Dimensions sheet
Height:	=> Erection plan / Dimensions sheet
Channel cross-section:	750x1100 mm x mm
Filling opening:	1600x1020 mm x mm

12.3. Hydraulics

System pressure:	315 bar
Hydraulic tank volume:	750 l

12.4. Electrical connection values

Nominal voltage:	3x 400 V
Nominal frequency:	50 Hz
Nominal power:	47 kW
Nominal current:	85 A
Primary fuse min.:	100 A
Primary fuse max:	160 A

12.5. Ground properties and loading

Instructions for properties of the subsoil and loading requirements are found in the floor loading drawing. Unspecified floor loading is below 50 N/cm².

12.6. Associated drawings and plans

Erection plan / Dimensions sheet:	A-30516 + B-50000/1
Floor loading plan:	A-30516
Electrical diagrams:	EL-...
Hydraulic diagrams:	80... / 00...

12.7. Paint surface

Colour:	RAL 5012

12.8. Ambient conditions

Max. ambient temperature in operation:	-10… 35 °C
Permissible ambient temperature in storage:	-10… 35 °C
Permissible humidity:	max. 80% rel. humidity
Weight:	13 t

Noise emission values:	*Without material*	*With material*
Sound power level L_w	99 dB(A)	101 dB(A)
Emission sound pressure level L_p measuring distance 1 m in accordance with standard	91 dB(A)	93 dB(A)
Emission sound pressure level L_p measuring distance 5 m	77 dB(A)	79 dB(A)
Measurement uncertainty in each case	1.5 dB	1.5 dB

The noise emission values can deviate depending on the environment, the set up location, the material feed and the used materials.

13. Glossary

Word:	Explanation:
Tying position	Position at which the tying process can be performed
Tying process	Tying a finished bale
Tying time	Time period for the tying process
Terminal connectors	Connection device to connect cable ends to a component
Discharge	Movement of the pressed material out of the press channel
Conveyor belt hopper	Hopper for loading the press chamber with a conveyor belt
Fill level monitor	Monitoring of the material height in the conveyor belt hopper using light barriers
Loader controller	Controller of the loading conveyor
BetrSichV	German Health and Safety at Work Regulations
Binding wire	Wire used for tying the finished bales
Wire unreeling device	Frame for support of wire reels
Wire inserter	Device for positioning the wire
Wire fracture monitor	Monitor of the wire feeder
Wire cutter	Device for cutting the wires
Wire puller	Module for pulling the binding wire into the tying system
Twister	Device for connecting the wire ends by twisting
Twister hook	Device for catching the wires
Twister cutter	Device for cutting the wires
Twister return	Backward rotation of the twister hooks to release the wire ends
Twister shaft	Shaft to drive the twister
Floor suitable for dowel pin	Rigid, load bearing floor for attaching machine parts to the floor using heavy load anchors

Word:	Explanation:
Grinding marks	Grooves caused by the wire
Feeder terminals	Terminal connectors
Stamper	Releases blockages of the pressure plate by pressing compacted material down at the upper cutter
Filling height	Height of material in the hopper
Filling position	Positions of the pressure plate for different press chamber sizes
Foundation loading	Compressive load on the floor by the machine
Foundation shape	Size and shape of the floor
Commission	Starting the machine
Channel adjustment	Device to move the channel side walls and the cover to clamp the bale stream
Rollers	Rollers of the pressure plate to ensure low-friction movement of the pressure plate
Oil leakage alarm device	Device for warning when oil tank leaks
Air separator capacity	The ability of the oil to dissipate the absorbed air
Ventilator blade	Element of the ventilator fan of a motor, attached to the motor shaft
Ventilator cover	Covering of the ventilator fan in the electrical motors
Dimensions sheet	Drawing showing the dimensions of the machine
Measuring connections	Connections for measuring pressure values
Measuring hose	Connection hose to the meter, to the connector at the measurement connection
Measuring points	Positions of the measuring connections
Needle slots	Slots for the needles to travel through
Needle slot cover	Device to close the slots
Oil heater	Device for maintaining a minimum oil temperature
Oil cooler	Device for cooling the hydraulic oil
Perforator	Component for making holes in PET bottles

Word:	Explanation:
Perforator device	Perforator with device for insertion and retraction
Press material	Material to be pressed into bales
Press chamber	The space into which the material to be pressed drops and passed through by the pressure plate
Pressure plate	Device for the active compression of the material to be pressed (plunger)
Pressure plate rollers	Rollers of the pressure plate to ensure low-friction movement of the pressure plate
Pressing process	Advance of the pressure plate to compress the material to be pressed ending with the return of the pressure plate to the original (home) position
Stretching tapes	Elastic material
System pressure	The actual hydraulic working pressure present in the machine
Drip feed lubricator	Component for the continuous lubrication of chains
Compressibility	Property for compression by means of mechanical pressure
Opposite side to tyer	Machine side opposite the tying device
Wire pulling needle	Component for penetration of the tying grooves and for catching the wire
Tying grooves	Openings in the pressure plate for the wire pulling needles
Tying slit	Tying grooves
Tying side	Machine side at which the tying device is located
Tying position	Position of the pressure plate during the tying process
Tying process	Penetration of the needles and catching, pulling, twisting and cutting of the wires
Ruffler	Component for swirling the material to be pressed
Ruffler drive	Motor to drive the ruffler disc
Ruffler device	Ruffler with device for insertion and retraction
Ruffler motor	Ruffler drive
Ruffler disc	Rotating disc for swirling action

Word:	Explanation:
Loading conveyor	Transport of the material towards the machine
Feed transporter	Machine to transport material towards the machine
Feed transport	Loading conveyor

14. Attachment

Maintenance table

Date:	*Maintenance interval:*	*Remarks, diagnosed faults:*	*Signature:*

EU Conformity Declaration

for a machine
in the context of EU Guideline Machines 2006/42/EC dated 17 May 2006, Attachment II A

We herewith declare that the machine described as follows

Description:	Kanalballenpresse
Type:	PACOMAT V-65 D BH
Machine number:	32.197
Year of manufacture:	2025

corresponds to all relevant regulations of EU Guideline 2006/42/EC.

We also declare the conformity with the following guidelines:

- 2014/30/EU (EMC guideline)

The following standard was applied:

- DIN EN 16252 (Horizontal baling presses)

This declaration loses its validity if the machine is converted or changed without our written approval. This declaration is expressly restricted up to the system limits, in accordance with the machine interfaces described in the operating manual.

Authorised to issue this declaration:	Authorised to compile technical documents:
Kadant PAAL GmbH Hubert Stricker (Authorised officer) Raiffeisenstrasse 15-17 49124 Georgsmarienhütte	Kadant PAAL GmbH Rainer Tegeder Raiffeisenstrasse 15-17 49124 Georgsmarienhütte

Georgsmarienhütte, 13.05.2025

Manufacturer / Authorised officer (Hubert Stricker)

This duplicate version reflects the contents of the original Declaration of Conformity in accordance with Directive 2006/42/EC, Attachment I, Point 1.7.4.2 mentioned above.
The manufacturer will retain the original for at least ten years as specified in Attachment II, Point 2 of the same Directive.

PAAL®

Observe (Do):	Avoid (Don't):
▪ Always pay attention to the detailed machine operating manual. ▪ Only ever enter the press area if you are wearing a person detection system, assuming that one is installed. ▪ Only ever operate the machine if you have been trained adequately and are authorised to do so. ▪ Check the functionality of all the safety equipment at the specified regular intervals. ▪ You must decommission the machine immediately and secure it from being recommissioned if you find any malfunctions of the safety equipment or other obvious defects that may negatively affect safety. ▪ Stop operation immediately if any defects occur during operation that are relevant to safety. ▪ You must report all faults immediately. ▪ Wear appropriate personal protective equipment at all times. ▪ Secured the machine against unauthorised use when it is not in operation. ▪ Always choose the appropriate formula ▪ Always choose the appropriate binding material ▪ Always switch the machine off as described in the operating instructions.	▪ Never step onto the infeed or loading conveyor during operation. ▪ Do not remove any covers or open any access doors. ▪ Do not disable any safety equipment or use it incorrectly. ▪ Do not bypass any safety switches. ▪ Do not remove or deactivate any safety equipment. ▪ Do not remove any safety covers. ▪ Do not use steps, platforms or other climbing aids that do not belong to the machine. ▪ Do not use any parts of the machine as climbing aids. ▪ Avoid using the wrong formula. ▪ Avoid using the wrong wires. ▪ Never use the "Emergency STOP" function to switch off the machine. Only in the case of an emergency. ▪ Avoid feeding the materials listed below to the machine: o Flammable materials o Materials containing acids o Materials that are not listed in the operating instructions under "Intended Use" o Abrasive materials (e.g. roofing felt, cement sacks) o Non-homogeneous materials (e.g. cardboard casings, squared timber) that can result in point loading o Narrow plastics (e.g. straps for packaging) o Compact materials (e.g. material that has already been pressed) o Compressed materials (e.g. bales, solid scrap, concrete elements, rubble) ▪ Do not load any materials under pneumatic pressure into the machine.