

Assembly instruction

KS Emulsifier

MACHINE NAME

FL225 DK Type 185

MACHINE TYPE

Machines 36044/45/46/47

Keep for future reference!

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1 Identification

Machine data

Manufacturer	KARL SCHNELL GmbH & Co. KG
Machine name	KS Emulsifier
Machine type	FL225 DK Type 185
Component or machine number	36070/71/72
KS Order number	AT011007
Customer	Nestle Purina Petcare Hartwell USA

Document

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2 User information

2.1 Purpose of the assembly instruction

The assembly instruction in hand

- provides important information for the installation into a complete machine;
- describes the working method, installation, operation, maintenance and disposal and
- gives important information for a safe and efficient handling of the machine.

The assembly instruction is addressed to mechanical engineers who incorporate this partly complete machine into a complete machine and place it on the market.

The contents of this assembly instruction which are relevant for the operator must be made accessible to the user in the operating manual by the manufacturer of the complete machine.

The assembly instruction is to be handed over together with the machine when changing the location or when there is a change in ownership.

2.2 Hints for using the assembly instruction

First read the user information. Make yourself familiar with the type of presentation in the operating manual.

When you set the machine, operate or want to repair it, read first the descriptions of the components and functions for the respective lifetime phase before reading the instructions. In this way, you can receive a good overview of the machine and will be able to better evaluate hazards and operations that are to be done.

Read the general safety information in any case. They are the prerequisite for an operation that meets safety requirements.

The manuals show you step-by-step how you reach your target. It is essential to follow all the instructions on the prerequisites and auxiliary aids as well as all warning and safety instructions. Maintain the order of the steps described.

2.3 Type of presentation

2.3.1 Action instructions

The actions steps to be carried out by the operating personnel are represented as an enumerated list. The system reactions of the respecting operating handling are marked by an arrow.

For example:

- 1 Operator control action step 1
- 2 Operator control action step 2
→ Reaction of the system to the operator control action 2

2.3.2 Safety information

Safety information

- warning of immediate or possible dangers;
- inform about measures to be taken for to avoid dangers;
- describe measures on risk minimisation;
- provide important information on how to behave to meet safety standards.

The safety information is marked by an icon and a signal word.




- The icon describes the kind of danger.
- The signal word describes the seriousness of the imminent danger.

Observe the safety information to avoid causing damage to yourself, to other persons, or to physical assets.











Signal words

DANGER	Direct danger for the life and limb of persons (severe injuries or death).
WARNING	Possible danger to the life and health of persons (severe injuries or death).
CAUTION	Possibly a dangerous situation. Slight injuries of persons or damage to properties are possible.
ATTENTION	Possibly a dangerous situation. Property damage is possible.

Symbols

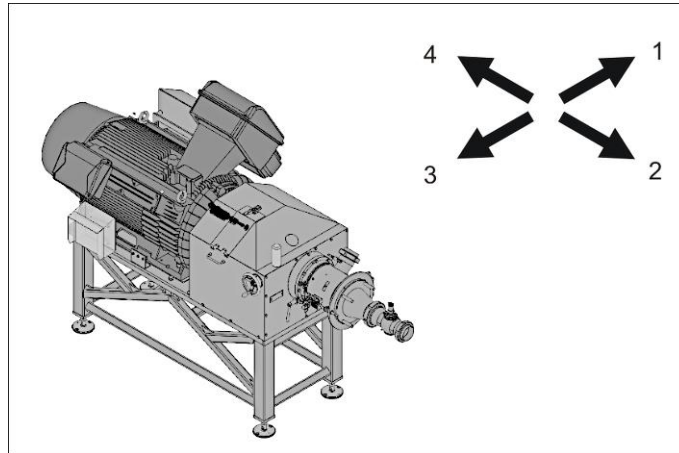
	Warning of immediate or possible dangers.
	Rule: Obligation to behave in a special way or to carry out an activity. Measures to be absolutely observed!
	Prohibition: Prohibits certain activities or behaviour patterns.

Danger symbols in warning instructions

	Danger through high electrical voltages. High electrical current-flows in the body and burns are possible. Comply with the precautions and safety rules.
	Danger through machines or components starting independently. Do not remove any protective devices or set them out of operation.
	Danger through load being raised. Danger of a person being crushed when lowering takes place. Danger of parts falling down. Keep well clear of the load being raised.
	Danger of fingers/hands being crushed. Do not remove any protective covers.
	Danger of the body being crushed. Do not remove any protective covers. Caution when transporting machines with installed undercarriage. Transportation only on a level underground.
	Danger of fingers/hands being cut. Do not remove any protective covers.
	Danger of hot surfaces. Burns are possible. Only touch components after the cooling-down time or with hand protection.
	Danger from noxious substances. Avoid physical contact. Observe the safety data sheet of the substances.
	Danger of slipping through spilled products or auxiliary materials. Lock the affected areas and clean the floor. Use adhesive agent if necessary.
	Danger of falling down. Take security measures. Use suitable climbing aids.

2.4 Locations in the operating manual

All direction indications and locations in this manual refer to the front of the machine.



Locations in the operating manual

- [1] right
- [2] front
- [3] left
- [4] rear

3 Description of the machine

3.1 Use as intended

The operational safety of the partly complete machine is ensured only

- after the installation into a complete machine;
- with intended use.

This partly complete machine only may be put into operation if it has been determined that the machine, into which this partly complete machine has been installed, corresponds to the legal regulations.

The partly complete machine is solely determined for the cutting of the specified products.

Improper handling can cause damage to persons or property. The machine must not be used in explosive surroundings.

For damage arising from any use not as intended

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

Machines with feeding device or inlet flange may be operated only in connection with the firmly mounted feeding device and closed inlet housing/cutting set housing.

Important: Machines with inlet pipe or hopper without protective grid may be operated only in connection with a closed and firmly mounted feeding device.


These measures must prohibit safely the access to driven components during all situations (observe operation, cleaning and maintenance!).

The system integrator or operator is responsible for the proper implementation of these safety measures.

The machine complies, in respect of the electromagnetic compatibility, with the requirements of the standards in the industrial sector. The machine is not suitable for use in living quarters and small companies in view of the interference emission.

3.1.1 Specification of the products to be processed

The machine is designed for the processing of

Products	<ul style="list-style-type: none"> • Meat, also frozen in blocks up to 20x20x20mm • Vegetables, fruits, herbs; • Sweets; • Cosmetic products.
Products that are not allowed 	<ul style="list-style-type: none"> • Inflammable substances • Explosive substances • Fibrous material (textiles) • Powdery substances
Permissible temperature range of the products to be processed	min -10 °C, max 50 °C
Maximum size of pieces	The size of pieces to be processed may not exceed 20x20x20 mm. Products with a temperature below -0°C must be fed pre-cut (no frozen meat blocks!) These limit values for the size of pieces are strongly dependent on the consistency of the product mass and the shape. It the event that you would like to process deviating products, contact the KARL SCHNELL service department beforehand.

3.1.2 Limits of the machine

The limits of the machine depend strongly on the product to be processed. The following indications are therefore only guide values.

Throughput quantity	approx. 15.000 kg/h
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3.1.3 Place of installation

The machine complies, in respect of the electromagnetic compatibility, with the requirements of the standards

- EN50081-2 emitted interference in the industrial sector
- EN50081-2 noise immunity in the industrial sector

The machine is not suitable for use in living quarters in view of the interference emission.

3.2 Technical Specifications

Main dimensions machine with undercarriage

Machine with 3-fold cutting set	Length: approx. 2670 mm. Width: approx. 1331 mm. Height: approx. 1478 mm
Inlet flange	Height: approx. 512 mm
Outlet	Height: approx. 630 mm

Main dimensions machine with running rail

Machine with 3-fold cutting set	Length: approx. 3436 mm. Width: approx. 1336 mm. Height: approx. 1437 mm
Inlet flange	Height: approx. 760 mm
Outlet	Height: approx. 923 mm

Weights

Version with undercarriage 200 kW	approx. 2600 kg
Version with running rail 200 kW	approx. 2700 kg

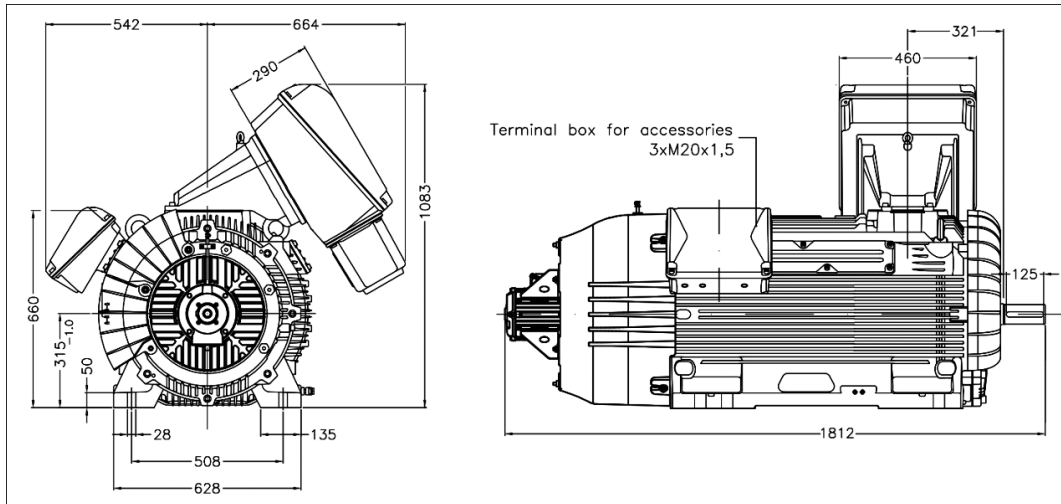
Knife motor

IMPORTANT! See also nameplates of the motors!

Manufacturer and type	WEG
Type and product identification	otor W50 315H/G WEG No.: OC50026885 Material: 14574625
Frame	W50 315H/G
Bearing type	6314-C3
Output power	200kW
Poles	2
Frequency	60 Hz
Rated voltage	4160 V
Rated current	34.2 A
Rated speed	3579 rpm
Rated torque	534 Nm
Class of protection	IP55
Air humidity bearing	max. 90% relative humidity without bedewing
Weight	aproxx. 1734 kg

Fan motor

Manufacturer and type	WEG
Type and product identification	3-Phase Motor W22 Material: 1045781539
Bearing type	6205-ZZ
Output power	2,2kW
Frequency	60 Hz
Rated voltage	240/480 V
Rated current	7,87/3,93 A



Electricity

Distribution voltage and power consumption	Dependent on the machine execution. See machine data sheet and type plate.
Control voltage	AC 230 V DC 24 V
On-time	relative On-time: 100%
Supply voltage knife motor	AC 4160 V / 60 Hz
Power consumption	Knife motor: approx. 200 kW Fan: 2,2 kW

Environmental conditions

Temperature operation	5 ... 45 ° C
Temperature bearing	5 ... 55 ° C
Air humidity operation	max. 90% relative humidity without bedewing
Air humidity bearing	max. 90% relative humidity without bedewing
Operation above sea level	max. 1000 m a.s.l.
Soil condition:	stable, level, horizontal

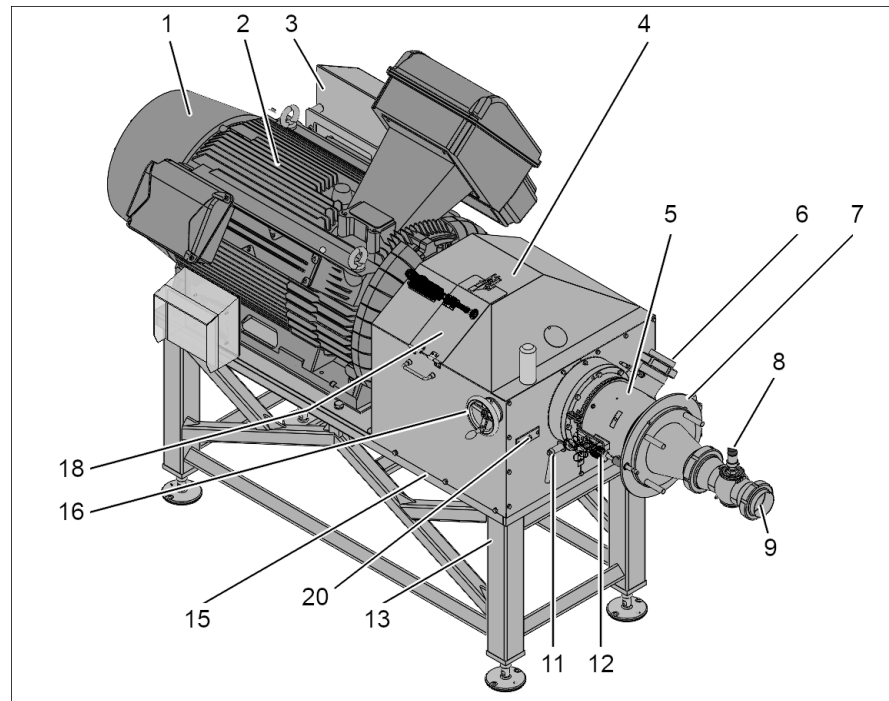
Emissions

EMC	In accordance with the EMC guideline and the valid EMC standards for the use in the industrial sector.
Noises	Emission value in respect of the workplace during rating: 78 dB (A). Measurement according to DIN EN ISO 3744 CI 2 Indication according to DIN 45 649 Part 1

Space requirement and supply connections

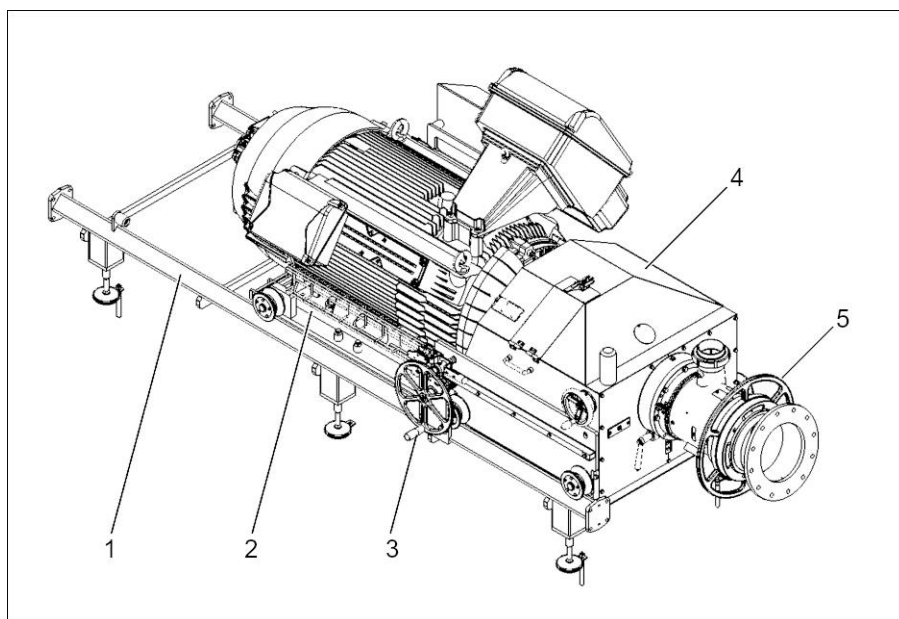
Space requirement	Length: at least 4000 mm. Width: at least 3000 mm. There must be the necessary free space around the machine for cleaning and maintenance work.
Connection for the power supply	The cable entry is screwed on the bottom side or on the rear side of the switch cabinet.

3.3 Elements of the machine



Elements of the machine

- [1] Separate fan knife motor
- [2] Knife motor
- [3] Terminal boxes or control cabinet (depending on model)
- [4] Cover
- [5] Cutting set housing with installed cutting set
- [6] Outlet
- [7] Infeed flange with cap nut
- [8] Pressure sensor (option)
- [9] Inlet
- [11] Clamping lever of knife readjustment unit
- [12] Safety switch at the cutting set housing
- [13] Undercarriage (individual design)
- [15] Base plate
- [16] Handwheel of knife readjustment unit
- [18] Maintenance flap (coupler and knife readjustment unit)
- [20] Lubricating nipple

Mobile version on running rail*Elements of the machine*

- [1] Running rail
- [2] Base plate
- [3] Hand wheel to move the emulsifier on the running rail
- [4] Cover
- [5] Threaded ring for connecting the machine to the feeding device

3.4 Safety and protection devices



⚠ WARNING

Operate system only if all protection and safety devices are complete and operable.

- Check the safety and protection devices regularly.

The machine is delivered as a partly complete machine. The control and the safety devices and safety functions are part of the superior complete machine. Please unconditionally observe the operating manual of the superior machine.

These measures are within the responsibility of that manufacturer who installs this partly complete machine into a complete machine.

3.5 Workstation of the personnel

The machine must be only operated by a single person. The workstation is in the front area of the machine, before or next to the feed hopper or inlet flange.

3.6 Type plate

The nameplate of the machine is mounted close to the main switch.

There you find important information

- about the machine,
- about the energy supply,
- about the manufacturer.

3.7 Symbols on the machine

Warning signs are mounted on the machine for to warn of residual risks which are not removable in construction. Observe the warnings and safety information

- attached to the machine,
- other identifications, such as rotational or transport directions.

	<p>Danger of electrical voltage! Work on the electrical system to be undertaken only by authorised electricians.</p>
	<p>Rotation direction of the knife motor. See plate at the cutting set housing.</p>

3.8 Description of the cutting sets

The machine can be adapted optimally with different cutting sets to the individual requirements.

Refer to the separate manuals of the cutting sets for the description and the instructions of the installation and removal of the cutting sets!

3.9 Operational controls

The machine is delivered as a partly complete machine. The control and the operating elements are mostly part of the superior complete machine. Please unconditionally observe the operating manual of the superior machine.

4 General safety information

4.1 Dangers in handling the machine

This partly complete machine only may be put into operation if it has been determined that the machine, into which this partly complete machine has been installed, corresponds to the legal regulations.

As long as the machine is not installed into a complete machine there are risks for those minimisation suitable measures have to be taken. These measures are within the responsibility of that manufacturer who installs this partly complete machine into a complete machine.

Dangers and nuisances may occur when using the machine

- for life and limb of the operator or third parties;
- for the machine itself;
- to other physical assets.

The basis for the proper integration of the partly complete machine and the safe handling as well as the trouble-free operation is a thorough knowledge of the safety and user information contained in this operating manual.

Serious injuries to people and damage to property are possible with

- improper installation and setting up,
- improper use,
- unauthorised removal of coverings or safety devices.

Transport, setting-up, installation

Transport and installation, connection of the supply lines, commissioning as well as maintenance- and repair work may be executed only by qualified specialist personnel who have had instruction specific to the machine.

Electrical dangers

For the proper and safe power supply and all safety measures to avoid dangers through electrical current, refer to the technical documentation of the superior machine.

Mechanical dangers

Electromotor-driven machine parts may catch or crush fingers and hands.

- **Do not operate the machine with disassembled protective devices.**
- **Do not reach into the running machine.**
- **Switch off main switch before all work in the working range of the machine.**

Operating manual

here are hazards on the machine which cannot be removed from the design side. Absolutely observe the safety information on the machine and in the operating manual.

This machine is supplied with installation instructions. The manufacturer of the superior, complete machine or system must integrate the relevant information into the operating manual of the superior, complete system.

Keep the operating manual always at the place of work of the machine! The operating manual must be readily available for the operator and maintenance personnel.

Electrical dangers

Live parts can be touched in control cabinets and terminal boxes. Highly dangerous electric shocks or burns are possible. Work on the electrical plant

- to be done only in the switched-off condition;
- through electro-technically trained specialists;
- according to the valid standards at the place of installation.

Please observe the general safety rules when working on electrical systems!

4.2 Measures in the case of emergency

Refer to the operating manual of the superior, complete machine!

4.3 Faulty protection and safety devices

Faulty or disassembled safety devices can result in dangerous situations.

If you detect missing or faulty safety devices, then

- switch off plant immediately;
- protect plant against restarting;
- disconnect electrical power supply if necessary.

4.4 Retrofits or modifications

Any supplementations or modifications on the machine are not permitted without the written approval of the manufacturer. If you are planning rebuilding, get in contact before with the manufacturer.

4.5 Spare and wear parts as well as auxiliary means

The use of spare and wear parts of other manufacturers can lead to hazards. Use only original parts or parts that are released by the manufacturer.

The manufacturer does not assume any liability for damages resulting from the use of spare and wear parts or auxiliary materials which are not released by the manufacturer.

5 Transport and storage

5.1 Safety information for the transport



WARNING

Raised loads can fall down and cause severe injuries to persons and damage to property.

Raise or transport machine and machine parts only with hoists which are suitable for the weight and the dimensions of the machine.

- Observe the indications in the specifications!
- Only put on ropes on the intended take-ups at the undercarriage. Other attachment points are not permitted.
- Never go under floating load!
- Keep a sufficiently safe distance away!
- Transport parts as closely as possible over the floor!
- Do not reach below the load when lowering!



WARNING

Transport, disassembly and assembly of the plant only by specially trained personnel.

5.2 Preparing for transportation

Notes on transportation:

- Only install machine on an even, stable ground.
- Observe the local valid regulations for working premises.
- Observe the technical data of the machine.

Procedure

- 1 If the machine has already been taken into operation, then put the machine out of operation before transporting it.
- 2 Check soil condition and load-bearing capacity of the ground at the intended location and on the entire haulage way.
- 3 Determine and mark exact location.
- 4 Determine haulage way and remove any possible obstacles.
- 5 Keep unauthorised persons away from the haulage way and location. Close areas if necessary.
- 6 Check the securing devices on the machine and attach them if necessary. See the description of the packing for this.

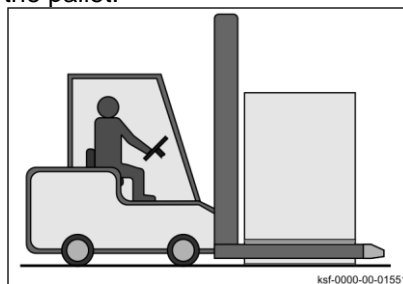
5.3 Transport in original packing

The machine will be delivered on a transport base or in a crate, and should be transported in this condition to the place of installation as close as possible.

The machine centre of gravity is marked on the packing. The machine is fastened with bolts on the floor in the original packing and/or fixed with tension straps. The machines may neither be dropped nor tilted by more than 10° from the horizontal. Appropriate comments are attached clearly and visible on the packing.

Procedure

- 1 Line up the forks of a suitable fork lift with the markings on the transport pallet.
- 2 Drive fork lift so far forwards that the forks project approx. 20 cm out of the pallet.



- 3 Raise machine carefully and only a little at a time.
- 4 Transport machine over the floor as closely as possible to the unpacking place.
- 5 Lower machine carefully and slowly. In doing so, do not reach under the machine.

5.4 Unpack machine

Procedure

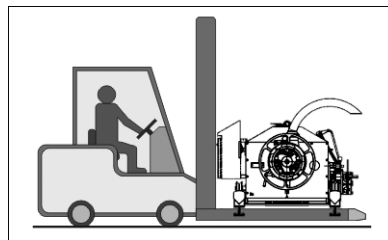
- 1 If available: Cut and remove protective plastic sheeting.
- 2 Open the crate with a nail iron.
- 3 The components of the machine are fastened with bolts on the pallet floor or fixed with tension straps. Remove the fastening bolts and carefully loosen the tension straps.
- 4 Lift small parts and accessories manually from the pallet.

5.5 Transport with a crane

Procedure

- 1 Loop rope for the crane transportation on the corners around the undercarriage. Do not use other suspension points. Make sure that the rope does not run over the additions and that it can not slip.
- 2 Raise machine carefully **very slowly** and only a little at a time. Take care with the compensation for the centre of gravity!
- 3 Transport machine over the floor as closely as possible to the place of installation.
- 4 Lower machine carefully and slowly.

5.6 Transport machine with a fork lift



Procedure

- 1 Put on forks of a suitable fork lift to the base frame. Important: The base frame must seat on the entire depth on the forks of the fork lift.
- 2 Raise machine carefully **very slowly** and only a little at a time. Take care with the compensation for the centre of gravity!
- 3 Transport machine over the floor as closely as possible to the place of installation.
- 4 Lower machine carefully and slowly.
- 5 Remove the transport locks and raise machine with a crane from the pallet.

6 Installation and commissioning

Observe when installing the machine to the adherence of the valid safety- and accident prevention rules on the installation location.

The safety of the operating and maintenance personnel must be ensured through the adherence to all valid regulations and standards.

Dewing

Before the operation the machine must be brought to the same temperature as in the operating room to avoid the creation of condensate. A possible dewing of the electronics through condensation can lead to the endangerment of persons through electric shock or to the destruction of the system components.

Store the machine before commissioning at least 5 hours dead in the provided operating room.

Aeration

Install the machine so that a sufficient aeration is ensured.

Influence of heat

Do not place the machine in the close proximity of heat sources or heat-producing consumers.

Electromagnetic compatibility

The machine complies, in respect of the electromagnetic compatibility, with the requirements of the standards in the industrial sector. Refer to Chapter **Technical Specifications**. The machine is not suitable for use in living quarters and small companies in view of the interference emission.

6.1 Installing machine



WARNING

An unprofessional installation of the machine can lead to

- serious damage to persons or
- damages on the machine and on parts of the superior plant.

The installation of the partly complete machine into a machine as well as the conceptual design and integration of the necessary measures for the safe operation may be done solely by technicians with respective subject-specific training.



CAUTION

Heavy machine parts can crush parts of the body.

Wear personal protective clothing for the installation.

- Gloves;
- protective shoes;
- safety shoes.

On the inlet of the machine (dependent upon the individual design) the access to driven components is possible without further measures. The machine must be integrated in such a way into a superior machine/plant that the access to the hazard area during the operation of the knife drive is prevented safely.

The safety-related parts and functions (see chapter 3.4) must be integrated professionally into the control of the superior machine/plant. The control of the machine must be designed and created according to the valid legal demands.

Prerequisites for a safe operation of the machine

- All machine feet [1] must be in a firm position on the floor.
- The machine must be positioned firmly in all directions.
- Access to driven components must be safely prevented during operation.

Procedure

- 1 Place the machine on its intended location. Take care that sufficient free space is around the machine.
- 2 Level machine feet horizontally by adjusting the machine feet.
- 3 Unscrew machine feet so far that the machine is positioned safely.
- 4 Set up and align the feeding device.
- 5 Connect the external feeding device.

6.2 Connecting the machine to the power supply

For incomplete machines without switchgear, see documentation of the entire system.



⚠ WARNING

High electrical voltages can cause life-threatening electrical current-flows in the body and burns.

The electrical connections are made

- according to the circuit diagram and the indications on the nameplate,
- according to the valid standards at the place of installation,
- to be done only by a qualified electrician.

Also with switched off main switch the appliance socket in the control cabinet is live!

Observe following points when connecting:

- The mains voltage must comply with the mains voltage on the nameplate. The nameplate is located at the rear of the machine.
- Operation of the machine only with clockwise rotating field.
- The machine must be connected only to mains with earthed centre (TT/TN).
- When operating with mains with compensation devices:
 - Compensation devices must be equipped inducted.
 - Ask the manufacturer of the compensation device for information.
- When operating with mains with earth-leakage circuit breaker:
 - use AC/DC sensitive earth-leakage circuit breaker,
 - dimensioning fault current at least 300 mA.
- Before the operation the machine must be brought to the same temperature as in the operating room to avoid the creation of condensate.
- Use only delay-action fuses supplied by the customer.
- Use larger wire-cross section for larger line lengths or with unfavourable voltage conditions.
- The cable entry points are located at the bottom side of the switch cabinet.

6.3 Electrical connection of knife motor



WARNING

Even when the motor is off, dangerous voltages may be present inside the terminal box used for the space heater supply or winding energization when the winding is used as heating element.

Motor capacitors will hold a charge even after the power has been cut off. Do not touch the capacitors and/or motor terminals, before discharging the capacitors completely.

After the motor connection has been completed, ensure that no tool or foreign body has been left inside the terminal box.

Take the required measures in order to ensure the degree of protection indicated on the motor nameplate:

- - unused cable inlet holes in the terminal boxes must be properly closed with blanking plugs;
- - components supplied loose (for example, terminal boxes mounted separately) must be properly closed and sealed.

The cable inlets used for power supply and control must be fitted with components (for example, cable-glands and conduits) that meet the applicable standards and regulations in each country.

If the motor is fitted with accessories, such as brakes and forced cooling systems, these devices must be connected to the power supply according to the information provided on their nameplates and with special care as indicated above.

All protection devices, including overcurrent protection, must be set according to the rated machine conditions.

These protection devices must protect the machine against short circuit, phase fault or locked rotor condition.

The motor protection devices must be set according to the applicable standards.

Check the direction of rotation of the motor shaft. If there is no limitation for the use of unidirectional fans, the shaft rotation direction can be changed by reversing any two of the phase connections. For single-phase motor, check the connection diagram indicated on the motor nameplate.

WARNING! Local Standards have priority on the definition of the connection standards.

To connect the motor to the power supply and to connect the cables to the motor, refer to the motor manual. Chapter 6 Installation.

6.4 Insulation resistance

We recommend measuring the winding insulation resistance at regular intervals to follow-up and evaluate its electrical operating conditions. If any reduction in the insulation resistance values are recorded, the storage conditions should be evaluated and corrected, where necessary.

Insulation resistance measurement

The insulation resistance must be measured

- in a safe environment.
- with a megohmmeter.
- in cold state of the machine and disconnected from the power supply.

It is recommended to insulate and test each phase separately. This procedure allows the comparison of the insulation resistance between each phase. During the test of one phase, the other phases must be grounded.

For measurement procedures and evaluation of measurement results, refer to the engine manual.

- **Chapter 5.4 INSULATION RESISTANCE**

6.5 Safety information on the commissioning



WARNING

Initial start-up of the machine to be done only by a specially instructed electrician if the machine has not been provided by the manufacturer with a power lead.



WARNING

Driven or heavy moveable components can cause damage to persons. Observe all safety information in the operating manual for the commissioning. Lock machine and commissioning area if necessary and turn away unauthorised persons.

Avoid contamination of the product and damage to the machine! Clean all parts coming into contact with foodstuffs before starting up the first time.

6.6 Before starting up the machine

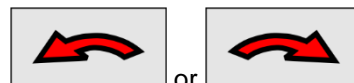
Procedure

- 1 Carry out visual inspection of the machine.
- 2 Clean entire machine.
- 3 Grease all lubrication points.
- 4 Mount pipe connection to the outlet.
- 5 Dismantle cutting set.

6.7 Rotation direction check

The machine is switched by the factory in such a way that the rotation direction of the motors is correct when the machine is connected to a power supply with clockwise rotating field. Nevertheless the rotation direction check should be carried out with the first start-up.

A rotation direction arrow is attached at the cutting set housing, showing the rotation direction of the knife motor.



Requirements

- The machine is ready for operation.
- Outlet housing is closed and locked.

Procedure

- 1 On machines with manual knife readjustment: Dismantle cutting set.
- 2 Start knife motor for a short time. Press push-button **ON** for this and immediately after starting-up the motor push-button **OFF**.
- 3 Check rotation direction. Look down from above into the hopper onto the knife shaft. The rotation direction must correspond with the rotation direction arrow on the cutting set housing.
- 4 If the rotation direction is faulty or the machine does not start (rotary field monitoring), then switch the power supply to neutral, change 2 phases of the electrical supply line and repeat check.

7 Preparing for operation

7.1 Open cutting set housing



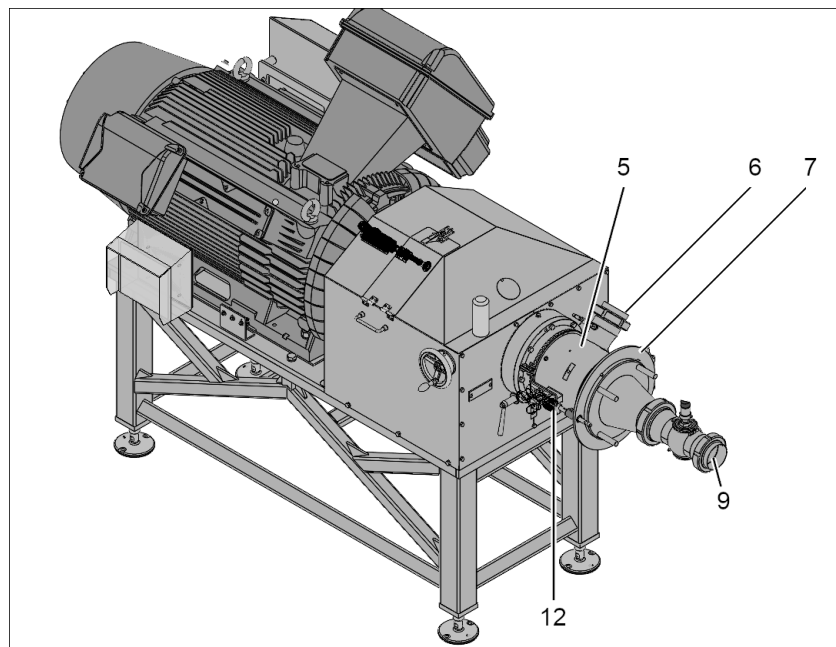
⚠ WARNING

A rotating cutting set can cause the severest of injuries and lead to material damage at the cutting set.

- Open cutting set housing only when the knife motor has come to a complete standstill.
- Never operate the machine with disassembled inlet housing.

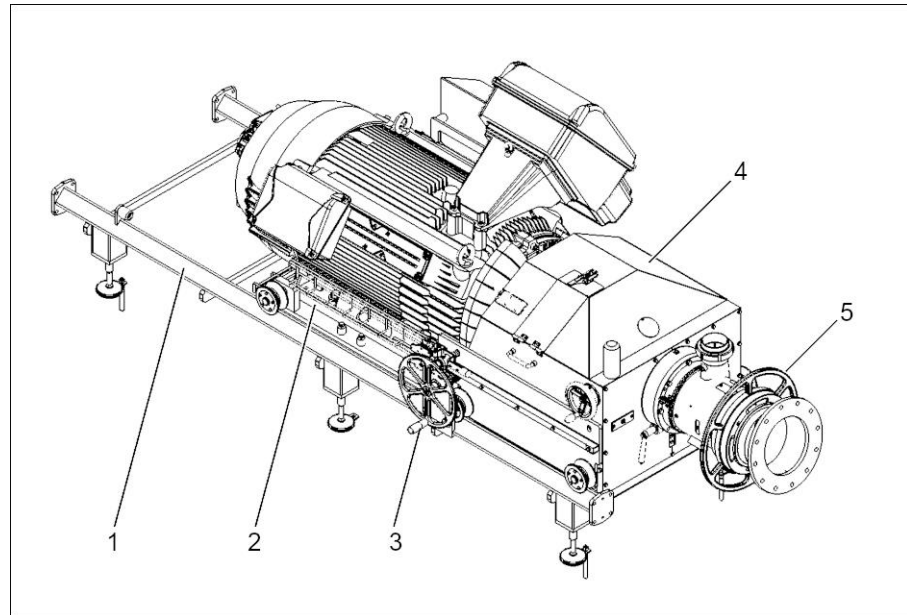
Residual risks exist on the partly complete machine in the area of the inlet opening and the cutting set which are not removable in construction or through safety measures. Within the scope of the assembly into a superior machine/plant suitable measures regarding the safety must be taken.

See also the operating instruction of the superior machine/plant for it.



Inlet housing with cap nut

- [5] Cutting set housing with installed cutting set
- [6] Outlet
- [7] Infeed flange with cap nut
- [9] Inlet
- [12] Locking with safety switch
Not included in delivery. Installed and integrated under the responsibility of the operator.



Mobile version on running rail

- [1] Running rail
- [2] Base plate
- [3] Hand wheel to move the emulsifier on the running rail
- [4] Cover
- [5] Threaded ring for connecting the machine to the feeding device

Procedure

- 1 Do not feed any further product for cutting.
- 2 Move knife readjustment to the rear end position (unlock). See the operating manual of the control of the plant for it.
- 3 Machine with undercarriage:
 - Unlock the inlet flange (safety switch) and pull the actuator out of the safety switch.
 - Switch off main switch of the plant.
 - Unscrew cap nut from the cutting set housing of the machine.
 Mobile machine with running rail:
 - Pull the actuator (black ball head on the running rail) of the safety switch forward.
 - The emulsifier is no longer locked in its position.
 - Switch off main switch of the plant.
 - Unscrew cap nut of the feeding device from the cutting set housing of the machine.
 - Move machine at the hand wheel to the left end position, until the locking bolt engages on the running rail.
 - The machine is fixed in the left end position.

7.2 Close cutting set housing

Procedure

- 1 Clean cutting set housing and install cutting set. Make sure that no product residues adhere to the male thread of the cutting set housing.
- 2 Rub the threads on the knife housing and cap nut slightly with food-grade grease.
- 3 Machine with undercarriage:
 - Screw cap nut to the cutting set housing of the machine and tighten it.
 - Push the actuator in the safety switch and switch the safety switch on.Mobile machine with running rail:
 - Move machine at the hand wheel to the feeding device.
 - Screw cap nut of the feeding device carefully to the cutting set housing of the machine and tighten it. The cutting set housing of the emulsifier and the feed screw must align exactly so that the cap nut can be screwed easily onto the cutting set housing without jamming.
 - Push the actuator in the safety switch and switch the safety switch on.→ The emulsifier is locked in its position.
- 4 Switch on the main switch of the plant.

7.3 Remove cutting set



CAUTION

The sharp insert blades on the knife head can cause cut injuries.

- Do not touch the knife head in the area of the insert blades.
- Wear protective gloves.

- Remove the cutting set when you
- put the machine into operation,
- check the rotation direction of the drive,
- clean the machine,
- carry out maintenance and repair work in the area of the cutting set.

Important! Always disassemble all cutting set parts as well as the retaining ring and the intermediate sleeve.

Requirements

- The cutting set housing is opened.
- Power supply of the machine is switched off.

Necessary auxiliary means:

- Hexagonal socket wrench with a wrench width of 27 mm.
- Assembly lever (plug).

Procedure

- 1 Open the cutting set housing. Remove the infeed flange.
- 1 Unscrew clamping nut [2] of the cutting set clockwise with a socket wrench (SW 27) [1].
- 2 Carefully remove the elements of the cutting set.
- 3 Clean the individual elements and put them in correct order into the setting device.

7.4 Pre-adjust cutting set

Cutting sets with 2 or 3 knife heads and hole plates must be pre-set before installation. Cutting sets with 1 knife head/hole plate need not to be preset.

A correctly adjusted cutting set decreases the wear and improves the product result. The presetting which is dependent on the cutting set type is described in the separate documentation for the cutting sets. It is imperative to observe the instruction for the cutting set which you use.

7.5 Installing the cutting set

The installation which is dependent on the cutting set type is described in the separate documentation for the cutting sets. It is imperative to observe the instruction for the cutting set which you use.

The principal procedure is described as follows.

Procedure

- 1 Switch off main switch and protect against restarting.
- 2 Check cutting set housing. Only install the cutting set into a cleaned cutting set housing.
- 3 Check cutting set. Cutting sets with 2 or 3 knife heads and hole plates must be preset.
- 4 Install cutting set. Refer to the documentation for the cutting sets.
- 5 Adjust knife contact-pressure in the machine.

7.6 Check torque

The cutting set's presetting and the shear cutting position are crucial for the cutting result. An incorrect adjustment can

- cause the damage of the cutting set,
- and/or influence negatively the product result.

Therefore, carry out the adjustment of the shear cutting position with the utmost care.

This check must occur after each installation of the cutting set and additionally according to request. The torque will change during the operation due to wear and contaminations.

The shear cutting position is checked with the help of a torque measurement.

On this setting the torque is measured with which the shaft of the knife motor can be rotated manually before starting the machine. After the machine starts, this torque is not any longer adjacent due to the grinding of the knife blade.

This function is supported by the control in case of machines with automatic knife readjustment (AMN).

Prerequisite

- The machine must have come to a standstill.
- The cutting set housing and the pipeline for the product feeding must be empty and cleaned.
- The cutting set must be installed.
- The cutting set housing must be firmly closed.

On machines with automatic knife readjustment:

- The compensation must be preset.
- The knife contact pressure must be preset.
- The function "automatic knife readjustment" must be activated.

Auxiliary tools

- Torque wrench

Adjust and use the torque wrench

Before each check of the knife contact-pressure: Check adjustment of the torque wrench and correct, if necessary.

Check the torque at the knife shaft to ensure that the insert blades rest upon the hole plate.

The torque wrench must be adjusted to the required nominal value before the adjustment of the contact-pressure.

- Setpoint: 15 Nm

The red push button must be tensioned to check the adjustment.

The torque must be checked in the rotation direction of the machine. The torque wrench must be used corresponding to this rotation direction. (Pointer moves with resistance in direction -0- i.e. in direction of the red push-button).

The knife motor shaft must be rotated slowly and sensibly with the torque wrench. A jerky rotation heavily distorts the result.

Check the torque at the drive shaft to ensure that the insert blades rest against the hole plate.

Procedure

- 1 Open the maintenance flap on the protective cover.
- 2 Put the torque wrench with the pin into a drill hole of the coupler and check the torque. Insert torque wrench in such a manner that the pointer moves with resistance to direction 0 of the scale.
- 3 To do this, turn the knife motor-shaft with the torque wrench to the rotation direction of the motor slowly and carefully. A jerky rotation heavily distorts the result.
The adjustment is concluded when the red push button jumps out onto the torque wrench when there is a slow and careful impact of force and the shaft of the knife motor starts to rotate at the same time.
 - The shear cutting position must be 35pprox.3535 if the torque wrench does not unlatch at all or unlatch immediately. Adjust compensation for it.
 - Decrease torque: Increase compensation
 - Increase torque, decrease compensation.
- 4 Check the torque once again if the settings have been corrected.

8 Operate machine



WARNING

Hazards are possible when handling the machine.

- Read and observe the general safety information!
- Set up machine properly before the productive operation.

8.1 Shear cutting and emulsification

Shear cutting

With this shear cutting position the knives touch the hole plate. The product to be processed heats up only a few using this cutting process. The possibilities for lowering the outlet temperature with this type of knife adjustment are exhausted with this type of cutting.

When processing rind, sinewy product and similar, it is useful to operate with shear cutting, so that the blades and hole plates cut themselves free and sharpen against each other.

The outlet temperature is decisively determined by the inlet temperature and the throughput rate.

- The warmer the inlet product, the warmer the outlet product.
- The colder the inlet product, the colder the outlet product.
- The lower the flowability of the product, the lower the throughput.
- The lower the throughput, the larger the temperature increase.

The shear cutting position has been set optimally by the adjustment of the knife contact-pressure.

The automatic knife readjustment is able to maintain an adjusted knife distance and to perform a “free cut” of the hole plates. This is necessary when strong sinewy products plug the hole plates when “operating with knife distance“. In this case the knife blades are then moved within a split second to the hole plates depending upon the set readjustment frequency. Hereby the blades and hole plates sharpen each other. During this time the outlet temperature modifies a little.

The cutting performance can be kept always at an optimum due to the wear offset of the knife blades with the automatic knife readjustment during the production. The knife readjustment can be readjusted up to 60 times per hour.

Emulsification

An emulsification of product that is suitable for this (albuminous products) is achieved by slightly lifting the adjusted knife heads from the hole plate.

Herewith the side effect results that the product throughput decreases and the temperature increase rises.

The measure of the throughput 36pprox.3636ion, and thus the temperature increase involved, is dependent upon:

- product quality,
- cutting set configuration (hole plate diameter, blade number of the knife heads, number of the knife heads),
- distance of the knife heads from the hole plates.

8.2 Adjust knife distance

If the insert blades are pressed too strongly to the hole plates, then hot cracks form and the hole plates can break.

- Do not move the knife heads too closely to the hole plates.
- Measure the torque on the drive shaft, if necessary.

Start behaviour

The start $37_{\text{prox.37}}$ is determined by the control. See the operating instruction of the superior machine/plant for it.

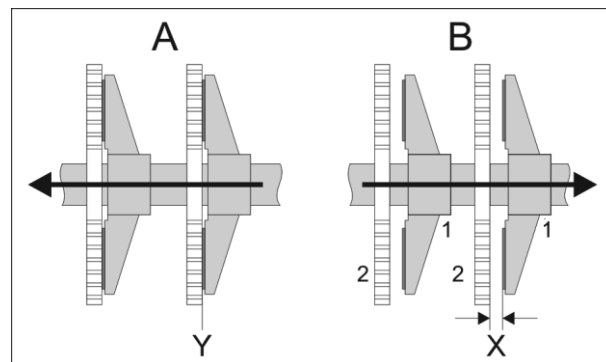
Running operation of the machine

Through the knife readjustment you can compensate the wear of the knife blades and hole plates. Without knife readjustment the

- distance of the knife blades would increase through the wear,
- shear cutting $37_{\text{prox.37}}$ would deteriorate extremely.

With the knife readjustment the knife shaft is pushed with the knife heads relatively to the stationary hole plates.

The readjustment occurs through the operating personnel via a handwheel or at machines with automatic knife readjustment (AMN) through a servo motor.



Knife distance; dependent on the position of the knife shaft

- [A] Knife shaft back, increase knife distance
- [B] Knife shaft forwards, decrease knife distance
- [1] Knife head
- [2] Hole plate
- [X] Knife distance (here > 0 mm)
- [Y] Knife distance = 0 mm (shear cutting position)

Following points can cause the correction of the adjustment:

- Increase of the outlet temperature through wear of the knife blades,
- plugging of the hole plates with sinews,
- strong wear of the cutting set.

An optimum shear cutting 38 approx. 38 reduces the increase of the product temperature during the processing.

With knife distance > 0 it results:

- a stronger increase of the outlet temperature,
- a lower wear in the cutting set.

With a knife distance of 0 mm (shear cutting) the knife contact-pressure may not be too high, otherwise the wear in the cutting set increases considerably.

Readjust knife distance during operation

The cutting set should not be readjusted too often, since too strong wear in the cutting set develops. If the outlet temperature is too high, then the inlet temperature of the product must be measured first and a colder product must be used if possible.

The knife distance can be modified if required during the production. The knife distance can be corrected via different controls optionally to the manual readjustment.

8.3 Switch machine on and off

8.3.1 Switch off machine in the emergency case

Press emergency stop button;

- Motors are switched off and can no longer be started,
- locking can be activated.

Unlock emergency stop button. Pull out the button cap for to do this.

- Motors can be switched on and started.
- locking can be activated.

8.3.2 Switch on machine

Requirements

- Operating voltage must lie adjacent.
- All safety devices must be brought into an operable state. (Close outlet housing and inlet grid locking).
- Rotation direction of the drive must correspond to the marking on the machine.
- Cutting set must be installed and adjusted,
- Feeding device and inlet flange must be closed and locked,
- Product must be fed in.

Procedure

- 1 Switch on main switch of the superior control.
- 2 Fill the cutting set somewhat with water on self-priming machines (this facilitates the suction of the product when it is viscous).
- 3 If an external feeding device is installed, then switch it on. Feed product.
- 4 Switch on knife motor.
→ The product will be cut and discharged at the outlet.
- 5 Make sure that the machine is not operated without product.

8.3.3 Switch off machine.

Procedure

- 1 Do not feed any new product for cutting. Wait until the feed hopper or the product supply is empty.
- 2 Switch off knife motor.
- 3 Switch off main switch.
- 4 Clean machine.

8.4 Readjust knife distance during operation

ATTENTION

Damage on the cutting set is possible through a wrongly adjusted knife distance! If the insert blades are pressed too strongly to the hole plates, then hot cracks form and the hole plates can break.

- Do not move the knife heads too closely to the hole plates.
- Measure the torque at the knife shaft, if necessary.

The cutting set should not be readjusted too often, since too strong wear in the cutting set develops. If the outlet temperature is too high, then the inlet temperature of the product must be measured first and a colder product must be used if possible.

The cutting set adjustment can be modified, if necessary, during the production. The running machine must not be switched off to do this.

The knife distance can be adjusted at the adjustment hand wheel:

Lift knife	turn the hand wheel clockwise for this.
Block knife	turn hand wheel anti-clockwise.

8.4.1 Decrease knife distance

Purpose:

- Lower outlet temperature of the product
- Improving cutting.

Procedure

- 1 Loosen the clamping lever for the adjustment hand wheel anti-clockwise.
- 2 Turn adjustment hand wheel **anti-clockwise** by approx.. 0.5 rotations.
→ Turning anti clockwise moves the knives closer to the hole plate.
- 3 Close the clamping lever clockwise.
→ After 40 approx.. 15 seconds a modification of the temperature takes place.
- 4 Repeat this process several times, if necessary. If there is no sufficient modification of the temperature despite several readjustments, then the product consistency and / or the temperature must be either checked or modified. Too frequent repetition of the readjustment greatly increases the wear on the cutting set.

8.4.2 Increase knife distance

Purpose:

- Increase outlet temperature of the product,
- improve emulsification,
- change cut.

Procedure

- 1 Loosen the clamping lever for the adjustment hand wheel anti-clockwise.
- 2 Turn adjustment hand wheel clockwise by approx.. 1.5 rotations.
→ By the larger adjustment the clearance in the mechanics of the knife adjustment becomes balanced. Turning clockwise moves the knives away from the hole plate.
- 3 Close the clamping lever clockwise.
→ After approx.. 15 seconds a modification of the temperature takes place.
- 4 Repeat this process several times, if necessary. If there is no sufficient modification of the temperature despite several readjustments, then the product consistency and / or the temperature of the fed product must be either checked or modified.

8.5 Feed machine

Before switching on the machine you must feed it with a suitable product. The product is collected and crushed by the cutting set after switching on the machine. Take care that there is always sufficient product in the cutting set to achieve an optimum suction.

On self-priming machines with hopper you can fill the cutting set somewhat with liquid (e.g. water) before feeding. You can obtain a better suction behaviour in this way.

Important! The capacity of the feeding must be larger than the capacity of the emulsifier so that the hopper will not be discharged during automatic operation.

9 Clean machine.



WARNING

High electrical voltages can cause life-threatening electrical current-flows in the body and burns.

Before cleaning the machine, take care of the following prework:

- switch off main switch,
 - close the doors of the control cabinets and terminal boxes;
- disconnect also additional or auxiliary circuits e.g. for the control cabinet or stand-by heaters.



WARNING

Cleaning agents and auxiliary materials can cause damage to health.

Wear personal protective-clothing such as a protective helmet, safety shoes, goggles and gloves while cleaning the machine.

Observe the safety data sheets of the cleaning agents!

Cleaning instructions

Observe the cleaning schedule with all cleaning work to be done!

- Clean the machine after the end of work, at least once a day.
- Use only detergents approved for the foodstuff sector.
- Only use detergents which do not abrade metal, rubber or plastics.
- Please consult the manufacturers of detergents.
- Clean the control unit only by hand with a damp cloth. Do not spray the control unit.

Lubricants in the product and spraying area

There exists generally in the product and spraying area the risk of contamination with lubricants of the product to be processed. Thus use only food-grade lubricants in these areas which fulfil the following requirements:

- approved and acceptable under food law;
- harmless to health;
- neutral in respect of taste and odour;
- internationally approved.

9.1 Pre-cleaning

Procedure

- 1 Do not feed in any new product.
- 2 Switch off knife motor directly before the machine would operate without product.
- 3 Position an adequate bin at the outlet pipe.
- 4 Lift knife somewhat from the hole plates. Loosen the clamping lever for the knife re-adjustment and turn the hand wheel approx. 3 rotations clockwise.
- 5 Fill water into a hopper or a feeding bin.
- 6 Start machine for a **short** time. Press push-button **On**. If the motor has started press the push-button **Off**. Do not let the machine run with full speed and always start only for a short time.
 - The water that is filled in is pressed with a high rate of flow through the machine and out of the outlet pipe. Here a strong jet appears, do not step into the jet area of the outlet pipe.
- 7 Repeat process several times if necessary.
- 8 Switch off knife motor. Leave main switch in position 1.
- 9 Disassemble outlet pipe.
- 10 Open inlet grid.
- 11 Open outlet housing.
- 12 Set main switch to position 0 and protect against unauthorised restarting.

9.2 Main cleaning



WARNING

Powered components can collect, catch in, crush or cut off body parts.

Before the actual work to clean the machine:

- Switch off main switch.
- Only open the protective devices if all engines have come to a stop.
- Empty the pipelines to a large extent before the disassembly.
- Wear personal protective-clothing such as safety shoes, goggles and gloves.

Observe the cleaning schedule with all cleaning work to be done!

Procedure

- 1 Remove cutting set, backup ring, intermediate sleeve.
- 2 Clean, disinfect and oil all parts. See the Cleaning schedule on this.
- 3 Pre-rinse the machine carefully (coarse cleaning).
- 4 Foam the machine from bottom to top (alkaline or acid cleaning).
- 5 Rinse the machine from top to bottom with hot water (60°C) (140° F) after the stipulated time for taking effect (intermediate rinsing). Check the rinse result.
- 6 Check machine for cleanliness. Check particularly critical points and problem areas. Clean again if necessary.
- 7 Disinfect the complete machine.
- 8 Rinse with drinking water after the stipulated time for taking effect.

9.3 Work to be done after the cleaning

Procedure

- 1 Dry machine.
- 2 After the cleaning, protect the dried machine against corrosion with food-grade oil.
- 3 Completely dry inside of cutting set housing and oil it with food-grade oil.
- 4 Completely dry cutting set parts and oil them with food-grade oil.
- 5 Grease thread on the front end of the knife shaft with food-grade grease.
- 6 Reinstall cutting set.

9.4 Cleaning schedule

Pre-rinse (coarse cleaning)

Cycle	Daily, additionally upon request
Procedure	Manual, mechanical
Cleaning agent	Water max. 60°C
Devices	Filler, scraper, low-pressure device
Note	Start immediately after end of production

Alkaline cleaning

Cycle	Daily
Procedure	Foam or manual, concentration and exposure time according to the indication of the manufacturer
Cleaning agent	Alkaline, chlorine free cleaner or foam cleaner (e. g. Ecolab P3-topax 19)
Devices	Low-pressure foaming device, brush, tub

Acid cleaning

Cycle	Upon request instead of the alkaline cleaning at least however 1x weekly.
Procedure	Foam or manual, concentration and exposure time according to the indication of the manufacturer
Cleaning agent	Acid, chlorine free cleaner or foam cleaner (e. g. Ecolab P3-topax 56)
Devices	Low-pressure foaming device, hand spray device, brush for removing adhering contaminants.

Intermediate rinsing

Cycle	After each cleaning
Cleaning agent	Drinking water
Procedure	Low-pressure up to 30 bar, temperature 60 °C
Devices	Low-pressure device, water-hose
Note	All small parts included

Check for cleanliness

Cycle	After each cleaning
Procedure	Visual

Rinse

Cycle	After each cleaning
Procedure	Low-pressure < 30 bar, temperature 50-60 °C
Cleaning agent	Drinking water
Devices	Low-pressure device, water-hose
Note	Entire system and small parts, from up to down.

Check

Cycle	After each cleaning
Procedure	Visual inspection, observe the problem areas, pH control if necessary.
Note	Entire system and small parts, from up to down.

Disinfect

Cycle	After each cleaning
Cleaning agent	Neutral disinfectant (e. G. Ecolab P3-topax 91)
Procedure	Spray, concentration and exposure time according to the indications of the manufacturer.
Devices	Low-pressure device, spray-gun
Note	Entire system and small parts. After conclusion of all the cleaning measures to be done in the room.

Rinse again

Cleaning agent	Drinking water
Procedure	Low-pressure <30 bar
Devices	Low-pressure device, water-hose
Note	Rinse process from top to bottom

Dry and servicing

Care products	Food-grade oil
Procedure	Spray and rub
Devices	Spray pistol, soft cloth

10 Maintenance

In this chapter maintenance work is described that can be performed by the customer itself. KARL SCHNELL offers in addition various training about this machine. Do not hesitate to contact the customer service of the manufacturer with any questions that may arise.

10.1 Maintenance

The subchapter "Maintenance" describes the measures for sustaining the operability condition of the machine. Perform regularly the described works for the preventive maintenance in the prescribed intervals.

10.2 Inspection and maintenance schedule



CAUTION

Danger for the operating personnel or damage to the machine is possible!

- If the machine has been taken out of operation for a longer period of time, then perform all inspection work.

Maintenance interval: 8 operating hours

- Check the safety devices.
- Emergency-stop device.
- Separative protection devices.
- Check sealing rings at the feeding device for damage.
- Check cutting set for wear and damage.
- Lubricate the shaft seal of the motor-knife. See the Lubrication schedule on this.

Maintenance interval: 40 operating hours

- Check locking of the outlet housing.

Maintenance interval: 160 operating hours

- Adjust knife contact-pressure in the machine.
- Lubricate shaft of the knife readjustment. See the Lubrication schedule on this.
- Lubricate bracket (outlet housing). See the Lubrication schedule on this.

Maintenance interval: 1000 operating hours

- Clean ventilation grid on the knife motor. Dependent according to the contamination also more often.

Maintenance interval: 3604 operating hours

- Lubricate motor bearing. See the Lubrication schedule on this.

Insulation resistance of motor

We recommend measuring the winding insulation resistance at regular intervals to follow-up and evaluate its electrical operating conditions. If any reduction in the insulation resistance values are recorded, the storage conditions should be evaluated and corrected, where necessary.

10.3 Check monitoring and locking



WARNING

Severe injuries due to fast rotating cutting set are possible.

The locking can be opened directly with the key switch without consideration of the slow-down time of the machine.

- Before starting work on the machine after switching off the locking wait until the knife motor comes to a complete standstill!
- Do not reach into the rotating drive shaft or the cutting set.

The following functions are locked during the operation of the machine (rotating knife motor):

- open coupling cover (if available)
- open the cutting set housing or inlet flange.

Switching on of the machine is locked with opened safety circuits.

The machine is delivered as a partly complete machine. The control and the safety devices and safety functions are part of the superior complete machine. Please unconditionally observe the operating manual of the superior machine.

These measures are within the responsibility of that manufacturer who installs this partly complete machine into a complete machine.

10.4 Lubrication

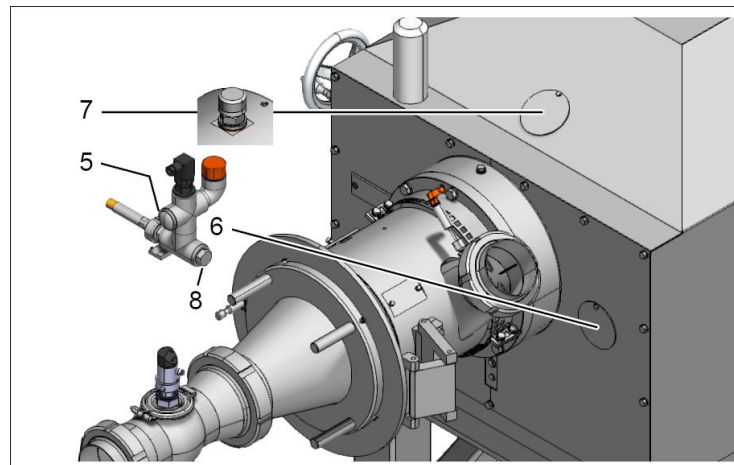
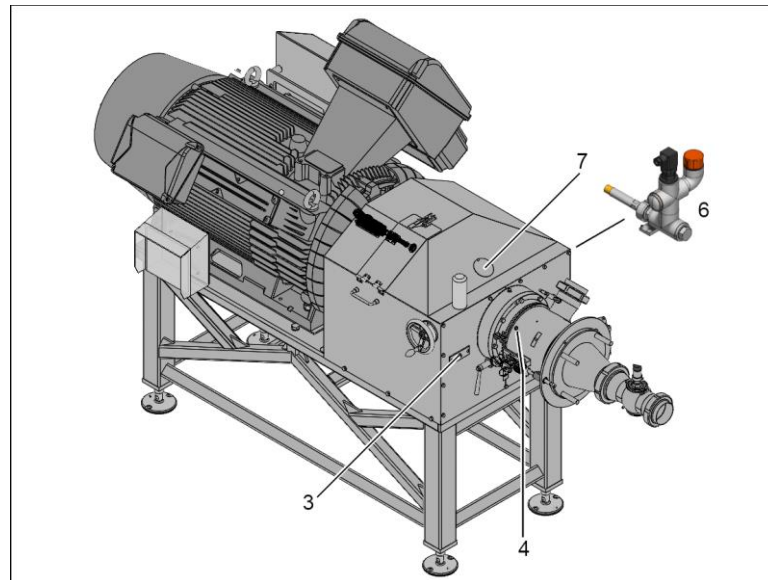
10.4.1 Lubrication points overview and lubrication notes



NOTICE

Excess grease causes bearing overheating, resulting in bearing failure.

- Only use the grease or oil types, amounts and lubrication intervals recommended for the bearings.



Lubrication points

- [3] Worm for knife adjustment
- [4] Knife shaft seal
- [5] Inspection glass
- [6] Bearing of knife shaft (oil bath lubrication)
- [7] Vent screw at the top of the bearing housing
- [8] Oil drain plug

Notes on oil bath lubrication

- Check the oil level in the bearing housing by means of the oil inspection glass.
- For filling with oil, remove the vent screw. To do this, remove the right front wall of the cover and unscrew the vent screw using a 24 mm wrench.
- Before filling with oil, make sure that the oil drain plug is locked.
- Check the oil level at the inspection glass during filling.

Lubrication of the knife motor

Proper lubrication plays a vital role in the motor performance. Only use the grease or oil types, amounts and lubrication intervals recommended for the bearings. This information is available on the motor nameplate and the lubrication procedures must be carried out according to the type of lubricant (oil or grease).

Excess grease causes bearing overheating, resulting in bearing failure.

The lubrication intervals specified in the lubrication plan consider an absolute temperature on the bearing of 85 °C, the motor running at rated speed, a motor mounted in horizontal position and greased with Mobil Polyrex EM grease. Any variation of the parameters listed above must be evaluated.

10.4.2 Lubrication plan

ATTENTION

Damage at the machine is possible.

When the machine has been taken out of operation for a longer period of time, then all bearing points must be greased before restarting.

A standard grease gun delivers 50 pprox.. 1.5g grease per stroke.

Knife shaft seal [4]

Lubricating interval:	8h and with each start of shift
Lubricant:	2g food-grade grease (edible grease) Cassida Grease RLS2

Worm for knife adjustment [3]

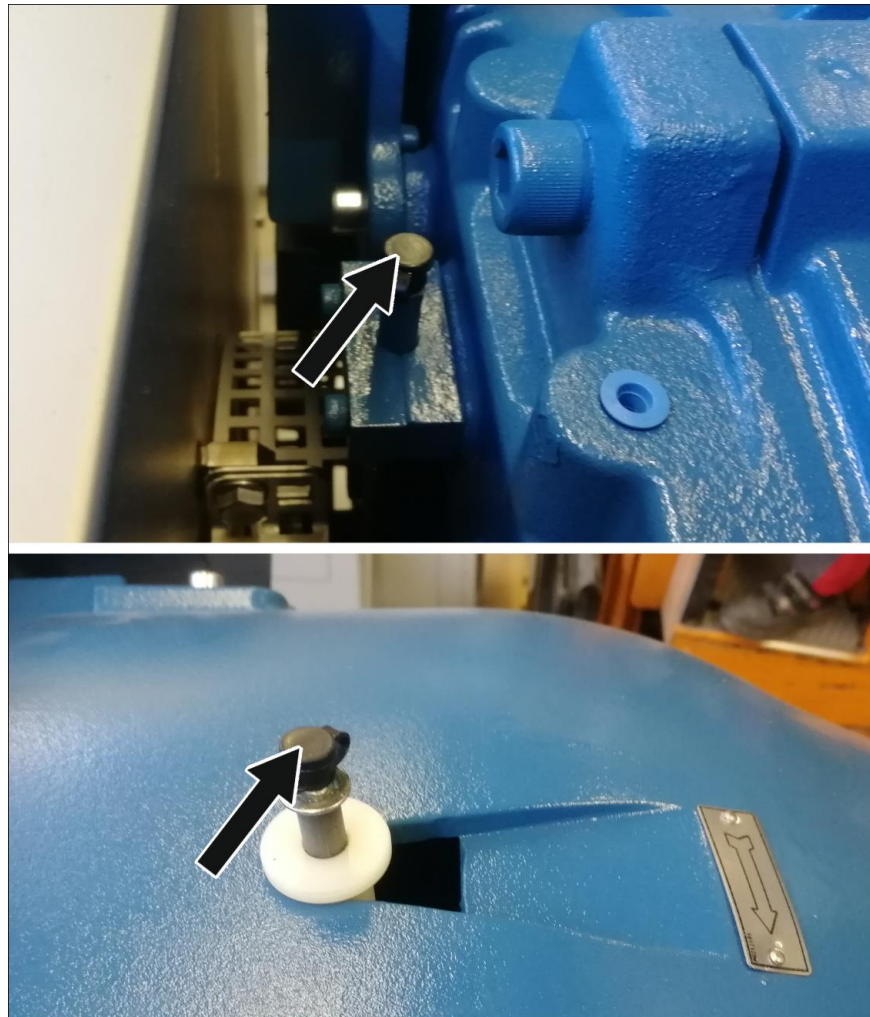
Lubricating interval:	160h
Lubricant:	2 g food-grade grease Cassida Grease RLS2

Bearing of knife shaft [6]

Oil level check	40 h
Oil change	1000 h
Lubricant:	Shell Vitrea 150

Knife motor bearings

Lubricating interval:	3604 operating hours
Lubricant:	27 g MOBIL POLYREX EM



To lubricate the bearings with the motor stopped, proceed as follows:

- Before lubricating, clean the grease nipple and immediate vicinity thoroughly;
- Lift grease inlet protection;
- Remove the grease outlet plug;
- Pump in approximately half of the total grease indicated on the motor nameplate and run the motor for about 1 (one) minute at rated speed;
- Switch-off the motor and pump in the remaining grease;
- Lower again the grease inlet protection and reinstall the grease outlet protection.

It is not recommended to mix different types of greases. In such a case, clean the bearings and lubrication channels before applying new grease.

10.5 Replace insert blades and regrind hole plates

The insert blades on the knife head must be replaced if:

- they project only approx. 0.5mm out of the knife head or
- they are damaged;

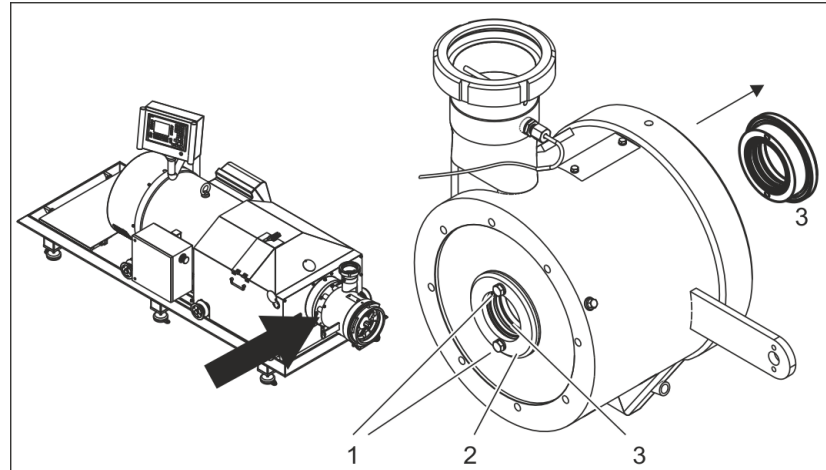
The insert blades on the cutting ring and cutting head must be replaced if they are

- damaged,
- blunt, and therefore the resulting product no longer meets the expectations.
- worn (gap between cutting ring and cutting head is too large) and thus too many coarse particles run through.

Refer to the separate documentation of the cutting sets when replacing the insert blades and grinding the hole plates.

10.6 Remove and check sealing housing

The shaft seal consists of a sealing bushing and a sealing housing with oil seals. The shaft seal seals the workspace in the knife housing against the environment. Check the seal regularly and renew damaged or worn parts. Disassemble the seal for this.



Remove sealing housing

- [1] Hexagonal screws for the sealing housing
- [2] Thrust disc
- [3] Sealing housing

Requirements

- The main switch must be switched off and protected against restarting.
- The knife housing must be opened.
- The cutting set must be removed.
- The installation space of the cutting set in the knife housing must be empty and cleaned.

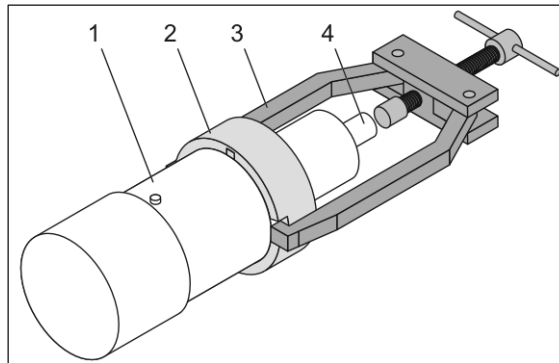
Auxiliary tools:

- Wrench 13 mm

Procedure

- 1 Loosen both hexagonal screws with the wrench on the rear side of the knife housing.
- 2 Pull sealing housing forwards out of the knife housing.
- 3 Clean the sealing housing thoroughly.
- 4 Check oil seals of the sealing housing. Replace oil seals with strong wear, foulings or damages. Refer to Chapter **Replace oil seals of the sealing housing**.

10.6.1 Remove / check sealing bushing



Sealing bushing on the knife shaft

- [1] Knife shaft
- [2] Sealing bushing
- [3] Bearing extractor
- [4] Stud screw

The sealing bushing has two oppositely lying square recesses which are used for extracting. These recesses can be stuffed through contamination, and have to be cleaned with a small angle screwdriver, if necessary.

The sealing bushing must be cleaned when there are firm deposits on the tread. The sealing bushing is worn and must be renewed when grooves and damage have occurred on the tread.

Requirements

- The sealing housing must be disassembled.
- The main switch must be switched off and protected against restarting.

Procedure

- 1 Clean sealing bushing thoroughly with a rag and some detergent in its installed state.
- 2 Check tread of the sealing bushing for ridges, grooves and deposits.
- 3 To clean or replace the sealing bushing, put the bearing extractor [3] in such a way onto the knife shaft [1] that the lugs of the both extracting arms engage into the recesses of the sealing bushing [2].
- 4 Put the tommy screw of the bearing extractor onto the stud bolt [4] and turn it so that the extractor cannot slide off.
- 5 Hold together both arms of the bearing extractor with one hand in such a way that they do not pull out from the grooves of the sealing bushing. Turn with the other hand the tommy screw clockwise, so that the sealing bushing pulls away from the shaft.
- 6 Clean the sealing bushing somewhat with fleece and detergent. If the sealing bushing is damaged, then it must be replaced.

10.6.2 Installing packing sleeve



CAUTION

Hot components can cause burns to fingers and hands.

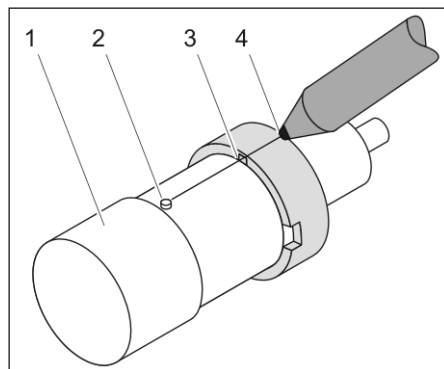
- Wear heat-resistant protective gloves when handling highly heated parts.
- Keep unauthorised persons away from the workplace.

Requirements

- The main switch must be switched off and protected against restarting.
- The installation space of the cutting set in the knife housing must be empty and cleaned.
- The packing sleeve and the sealing housing must be new, or cleaned, and repaired.

Auxiliary tools:

- Wrench 13 mm
- Heat-resistant gloves (up to 250 °C).
- Inductive heating device or heating plate or hot-air hairdryer.
- Food-grade grease



Sealing bushing on the knife shaft

- [1] Knife shaft
- [2] Pivots on the knife shaft
- [3] Cut-out on the sealing bushing
- [4] Marking for the alignment

The sealing bushing has 2 oppositely-lying square recesses as well as 90° offset to these recesses a half-round cut-out [3] in the internal diameter. The 2 square recesses are used to detach.

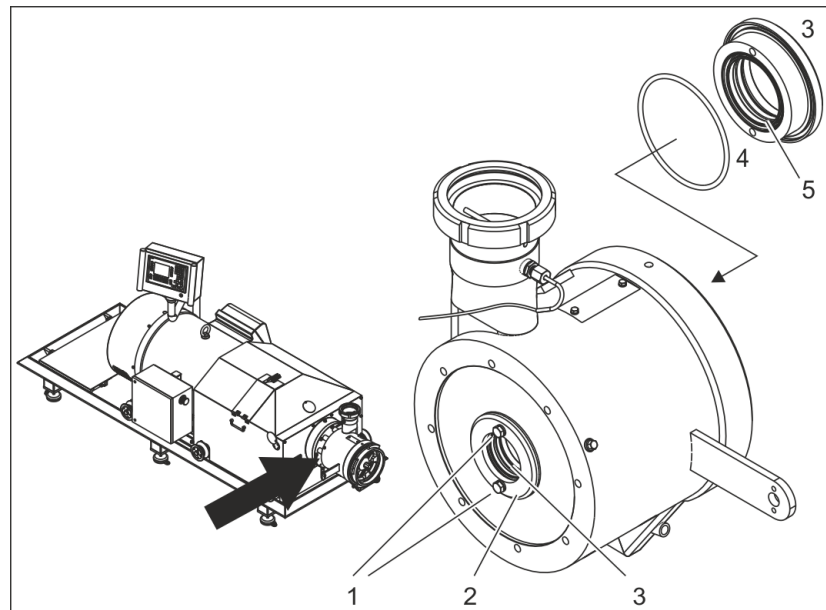
The half-round cut-out at the sealing bushing must take up the pivot [2] which is located at the collar of the knife shaft [1] (anti-twist protection).

Important: After the assembly the pivot of the knife shaft must be absolutely in the half-round cut-out of the sealing bushing.

Procedure

- 1** Clean the seating of the sealing bushing carefully at the collar of the knife shaft.
- 2** Mark the half-round cut-out on the external diameter of the sealing bushing for the torsion protection, so that the alignment to the pivot of the knife shaft can be kept.
- 3** Wear heat-resistant protective gloves.
- 4** Heat up sealing bushing to approx. 100 °C. Thereby the bushing expands and can be pushed easier onto the shaft. The sealing bushing must be pushed onto the shaft immediately after heating it up, so that it does not shrink prematurely and fit tight on the knife-motor shaft in the wrong position.
- 5** Take up hot sealing bushing carefully and push it onto the shaft so that the pivot [2] at the collar of the knife shaft engages into the cut-out [3] of the sealing bushing and the sealing bushing touches the collar of the knife shaft.
- 6** Check seat of the sealing bushing. The sealing bushing must fit firmly on the shaft after the cooling down.

10.6.3 Installing sealing housing



Installing sealing housing

- [1] Hexagonal screws for the sealing housing
- [2] Thrust disc
- [3] Sealing housing
- [4] O-ring at the sealing housing
- [5] Replace oil seals in the sealing housing

Requirements

- The main switch must be switched off and protected against restarting.
- The sealing bushing must be installed.
- The cutting set must be removed.
- The installation space of the cutting set in the knife housing must be empty and cleaned.

Auxiliary tools:

- Wrench 13 mm
- Food-grade grease

Procedure

- 1 Apply food-grade grease to the O-ring and insert it into the sealing seat at the sealing housing.
- 2 Apply food-grade grease to the sealing housing in the range of the O-ring and the shaft seals in the sealing housing. Fill the space between the both shaft seal rings completely with edible grease.
- 3 Insert the sealing housing from the front over the knife shaft into the knife housing. Make sure that the O-ring is seated correctly in the seat.
- 4 Fasten the sealing housing with the both hexagonal screws to the rear side of the knife housing.
- 5 Tighten the both screws with the wrench.

10.6.4 Replace oil seals of the sealing housing

The shaft seal seals the workspace in the knife housing against the environment. Check the seal regularly and renew damaged or worn parts.

Observe thereby that the new oil seals are forced in exactly in the same mounting orientation and position. With a wrong mounting orientation or position problems can arise when lubricating or sealing.

Requirements

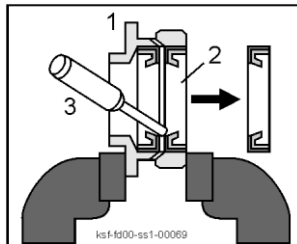
The sealing housing must be disassembled.

Auxiliary tools:

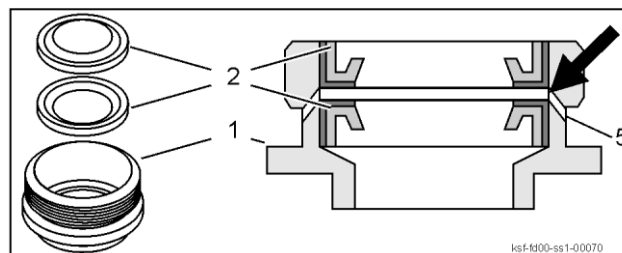
- Hammer
- Punch 8 mm
- Cleaning agent
- Vice
- Soft jaws
- Press or press fit device KS parts number 025254

Procedure

- 1 Clamp the sealing housing with soft jaws in such a way into the vice that the oil seals can be struck out.



- 2 Strike out oil seals [2] of the sealing housing [1] carefully with hammer and punch 8mm [3].
- 3 Clean the sealing housing thoroughly and grease inside with food-grade grease.
- 4 Place the sealing housing [1] in such a way that the thread side shows upwards.



- 5 Place first (lower) oil seal coplanar onto the sealing housing. Thereby the lip seal must show downwards.
- 6 Press fit oil seal ring with care vertically downwards up to the stop into the sealing housing. Do not jam the oil seal ring thereby.
- 7 Check if the lubricating drills [5] on the inner side of the sealing housing are free above the oil seal ring. If the drills are not free then continue to press fit the oil seal ring.
- 8 Place second (upper) oil seal ring coplanar onto the sealing housing. Thereby the lip seal must show upwards.

- 9 Press fit the oil seal ring with care vertically downwards until the upper edge is flush with the edge of the sealing housing. Do not jam the oil seal ring thereby.
- 10 Check if the lubricating drills [5] on the inner side of the sealing housing are free between the both oil seals. The position of the oil seals is correct if the drills are free.

If the drills aren't free then a

- **lubrication is not possible;**
- **then the upper oil seal ring must be removed again, replaced if necessary and pressed fit correctly.**

11 Shutting-down and disposal

11.1 Safety information for the shutting-down



WARNING

High electrical voltages can cause life-threatening electrical current-flows in the body and burns.

Work on the electrical plant

- according to the valid standards at the place of installation,
- to be done only by a qualified electrician,
- in the voltage-free state.

Also with switched off main switch the appliance socket in the switch cabinet is live!

11.2 Shut down machine temporarily

- 1 Discharge hopper or feed hopper and pipeline.
- 2 Switch off machine.
- 3 Protect machine against restarting.
- 4 Clean machine and rub in with food-grade oil.

11.3 Shut down machine finally

- 1 Discharge hopper or feed hopper and pipeline.
- 2 Switch off machine.
- 3 Switch off power supply and disconnect feeder at the feed-in point or disconnect plug.
- 4 Unroll feed cable and fasten securely on the machine.
- 5 Drain auxiliary products and dispose of professionally.
- 6 Dismantle cutting set.

11.4 Disposing of the machine

Check before the disposal that all energy supply lines are disconnected to the machine.

Inform about the local valid disposal regulations.

Accumulators, dry batteries, button cells, paints, lacquers, chemical substances (e.g. solvents, detergents etc.), glues, fluorescent tubes, energy-saving lamps, waste oil and oil filters are special waste!

People's health and the environment are exposed to the hazards of such parts and substances!

Separate the components of the machine according to its materials:

- Metals
- Plastics
- Composite materials
- Electrotechnical components
- Auxiliary products such as lubricants etc.

Please consult the manufacturer with all requests.

Procedure

- 1 Disassemble machine.
- 2 Separate the components purely by sort.
- 3 Dispose of all components according to the local valid regulations.