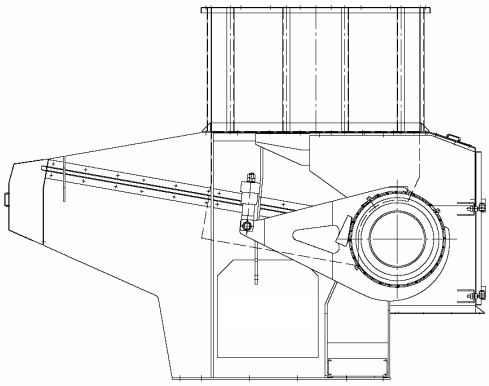
CE

Operation Manual

Shredder
SR 2000 MF ECO Drive



Order no.:	10271
Machine no.:	10271 010
Date:	2007-07-17
Year of construction:	2007

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systems 4 recycling

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Systems 4 Recycling Limited

1 Contents

2 CE Conformity

2.1 Prerequisites for CE-Compliant Operation

This machine can only be considered to be suitable for operation in accordance with the EC Declaration of Conformity if the following conditions are met:

Installation

- There is a fixed, mounted funnel with a minimum height of 600 mm. The minimum gap of surface that can be walked upon to the upper edge of the funnel is at least 1200 mm (safety distance).
- a fixed, mounted, and closed conveyor for removing the chips that accumulate at the ejection channel of the shredder or
  a outlet chute of min. 850 mm in length. (Impossible to reach into the outlet opening.)
- All protective devices and cover plates covering moving parts have been mounted!
  (Refer to the list in the Safety section of this operation manual.)
- Working platforms, ladders, steps, etc. to be used for fitting out and maintaining the plant must be mounted.
- Local control desks (operational controls) are to be attached so that dangerous areas of the machine can be recognised.
  (See the sketch in Positioning Local Control Desks in the Safety section.)

Feed

- All hydraulic connections, pipes, hoses, and joints have been checked by a specialist company to make sure they are leak-tight and undamaged.
  The specialist company must provide a test report.
- All pneumatic connections, pipes, hoses, and joints have been checked by a specialist company to make sure they are leak-tight and undamaged.
  The specialist company must provide a test report.
- All connections, pipes, hoses, and joints for the coolant supply have been checked by a specialist company to make sure they are leak-tight and undamaged.
  The specialist company must provide a test report.
- All electrical connections must be installed by qualified electricians.
  The specialist company must provide a test report.

- All electrical connections, lines, and circuits must be checked for damage by a specialist electrics company.
  The specialist company must provide a test report.
- Check locks with downstream and upstream systems!
  (see the commissioning "Locking Mechanism Tests" section.)
- A safety check has been carried out by a specialist electrics company in accordance with DIN EN 60204 / VDE 0113.
  The specialist company must provide a test report.

Safety equipment

- The machine cannot be switched on if the front door is open (see Safety Locks in the Safety section).
- The machine cannot be switched on if the funnel inspection door is open (see Safety Locks in the Safety section).

Functional tests

- Check that all functions listed in the Operational Controls section are functioning correctly.
- Direction of rotation and movement of drives:
- Rotor must rotate in the direction of the counter knife
- Direction of movement of hydraulic ram
  The hydraulic ram must travel away from the rotor when the Ram Back button is pressed.

The

EC Declaration of Conformity
in the sense of EC Machine Directive 98/37/EC

only takes effect if all conditions noted in the section

Prerequisites for CE-Compliant Operation

are met and if the entire operation manual has been read, understood, and observed as regards safety measures.

3 General

3.1 Note to the Operator

The operating instructions from this operation manual must be observed, because:

- Only with the knowledge of this operation manual can errors to the machine/plant be avoided and faultless operation be guaranteed.
- Systems 4 Recycling accepts no liability for damage and operational disruptions arising from the non-observation of this operation manual!

Nevertheless, should you encounter any difficulties, please turn to our Customer Service or Spare Parts department or one of our representative agents. They will be happy to help you (see Chapter "Spare Parts Holding and Customer Service").

3.2 Systems 4 Recycling - Quality Control

The machine/plant will be completely assembled and the individual parts operationally checked at the Systems 4 Recycling site.
The complete machine/plant will furthermore be subjected to Systems 4 Recycling quality control.

3.3 Usage as Stipulated

The machine/plant is exclusively provided for the following purpose:

- for the shredding of residue derived fuel
  (density 0,16 - 0,2 to/m³)

Any further usage is deemed not to be as stipulated.
Systems 4 Recycling is not liable for the damage incurred as a result, solely the user bears the risk for this.

- The machine/plant is constructed in accordance with the state of the art at the time and the acknowledged safety regulations at the time it is supplied and is operationally safe.
  Nevertheless, risk to life and limb of the user or third parties or effects on the machine and other investment goods can arise if it is not used expertly, by untrained personnel or not used as stipulated.
- Included under usage as stipulated is the observance of the operation manual and keeping to the inspection and maintenance conditions.

4 Safety

4.1 Symbols

4.1.1 Occupational Safety

Warning!

You will find this symbol next to all occupational safety instructions in this operation manual for which there is risk to life and/or limb. Observe these instructions and conduct yourself particularly carefully in these cases.
Forward all occupational safety instructions to other users as well. As well as the instructions in this operation manual, the generally valid safety and accident prevention regulations must be considered.

Caution - Equipment Damage!

This symbol is found in places in this operation manual which are to be specially noted so that the guidelines, regulations, instructions and the correct working procedures observed, and so damage and destruction of the machine and/or other parts of the plant are also prevented.

Note

This is where you will find information or notes.

4.2 Occupational Safety Instructions

4.2.1 Organisational Measures

- Always keep the operation manual available at the place where the machine/plant is being used!
- Staff entrusted with working on the machine must have read the operation manual, especially its Safety Instructions chapter, before starting work. While working it is too late.
  This is particularly applicable for those staff working only on fitting out and maintaining the machine, for example.
- All safety and risk instructions at/on the machine are to be kept in a readable condition in their entirety.

4.2.2 Selection and Qualification of Personnel; Fundamental Obligations

- Only use personnel who are trained or are being trained and who are at least 18 years old.
  Clearly establish the competence of personnel for operating, fitting out, maintaining, and repairing the plant.
- Ensure that only those staff entrusted for that purpose are working on the machine.
- Establish responsibility of machine operator - even with respect to traffic regulations - and enable him to reject any instructions from third parties that are contrary to safety.
- Only allow staff being trained, instructed or in the context of a general training course to work on the machine/plant under constant supervision of an experienced person.

4.3 Safety Instructions for Specific Operating Phases

4.3.1 Normal Operation

Warning - Risk of Injury.

During operation there is the risk of injury in the dangerous areas of the machine.
Local control desks (operational controls) are to be attached so that dangerous areas of the machine can be recognised.

Warning - Fire risk!

If reduced material is left standing for long periods in the machine/plant, the material may ignite.
For preventative fire protection, reduction machines and conveying plant must be run empty at the end of the shift or before standing idle for long periods.

- Always operate the machine/plant only in a perfect condition.
- At least once every shift, check the machine/plant for damage and defects that are externally detectable.
  Immediately report any changes made (including those of the operating behaviour) immediately to the competent post/person.
  Shut the machine down immediately, as appropriate, and secure against it being turned on again.
- In the case of functional faults, shut down the machine/plant immediately and secure.
  Immediately rectify any faults.
- All work on the machine/plant is in principle only to be carried out when the machine/plant has been stopped and when the main breaker is turned off and disconnected.
  Simply operating the emergency stop switch is not sufficient.
- Before switching on the machine/plant or putting it into operation, ensure that nobody may be at risk from the running machine/plant.
- Do not switch off or remove pneumatic extraction and ventilation equipment when the machine is running.

4.3.2 Special Work such as Upkeep Work, Rectifying Faults and Waste Disposal

- Do not make any alterations or extensions to or rebuild the machine/plant without the approval of Systems 4 Recycling. This also applies to the installation and adjustment of safety equipment and safety valves and for welding to load-bearing parts.
- Do not make any alteration to the electrical control system without the written authorisation of Systems 4 Recycling. This also applies to software from PLC control systems.
- Replace hydraulic hose pipes at the intervals indicated (see Maintenance Chapter "Maintenance and Inspection List"), even if no external defects can be detected.
- Keep to the adjustment, maintenance and inspection work and deadlines prescribed in the operation manual including information on replacing parts/fitting out parts.
  This work must only be carried out by specialist personnel.
- Inform operating staff before starting to carry out special work and upkeep work. Appoint supervisors.
- Secure an upkeep zone over a wide area.
- During maintenance or repairs, completely switch off machine/plant and secure against it be switched on again.
- Lock up the master control equipment and remove the key and/or switch off the main breaker. Emergency stop is not sufficient for this.
- Individual parts and larger assemblies are to be carefully affixed and secured by hoisting gear, so that they do not present any risk.
  Only use suitable and technically perfect hoisting gear and load-bearing resources with sufficient loading capacity.
  Do not remain or work under suspended loads.
- Only entrust experienced persons with the attachment of loads and instruction of crane operators.
  The instructor must remain in the field of view of the operator or stay in voice contact with him.
- For installation work above body height, use ascending aids or working platforms.
  Do not use machine parts as ascending aids.
  Use antifall guards for maintenance work at greater heights.

- Keep all handles, handrails, pedestals, platforms and ladders free from soiling, snow and ice.
- Using appropriate instructions and inspections, the operator must guarantee cleanliness and visibility of the workplace at the machine/plant.
- Clean the machine, and particularly in this case connections and screw joints, of oil, fuel or cleaning materials before starting maintenance/repairs.
  Do not use any aggressive cleaning materials.
  Use fibre-free cleaning cloths.
- Before cleaning the machine with water or other cleaning material, cover, seal, or glue up all holes so that no water / cleaning material may penetrate. This is for safety and/or functional reasons.
  At particular risk are electrical motors, switching cabinets, and all units.
  Cleaning with a steam jet-air ejector (pressure washer) is not permitted.
- After cleaning, remove the covers/adhesions completely.
- After cleaning, inspect all operational and auxiliary material pipes for leaks, loose connections, rub marks, and damage.
  Immediately rectify any defects established.
- Always tighten loosened screw connections when doing maintenance and upkeep work.
- If the removal of safety equipment when fitting out, maintaining and repairing is required, immediately after the maintenance and repair work has been carried out, the safety equipment is to be replaced and inspected.
- Before putting into operation after upkeep work, check whether all the protective devices have been attached.
- Ensure safe disposal of operating resources and aids, as well as replacement parts, that is not harmful to the environment.
- Doors and valves must only be opened after the machine/plant is stopped.
  Observe information signs.

4.4 Instructions on Particular Types of Risk

4.4.1 Electrical Energy

- Only use original fuses with the prescribed current rating.
  Turn off the machine/plant whenever the electrical energy supply is disrupted.
- Work on electrical plant or operating resources must only be done by a specialist electrician or by persons being instructed under the management and supervision of a specialist electrician, in accordance with the electrical engineering regulation.
- Machine and plant parts on which inspection, maintenance and repair work is to be carried out must be switched off and unpowered.
  First check that the switched-off parts are unpowered, then earth and short circuit. Insulate nearby parts that are powered.
- The electrical equipment of a machine/plant is to be inspected/checked regularly. Defects, such as loose connections and/or soldered cable, must be removed immediately.
- If work on powered is necessary, take on a second person, who would operate the emergency stop or main breaker with voltage disconnection in an emergency.
  Close off the working areas with a red-and-white safety chain and a warning sign.
  Only use tools which are electrically insulated.
- When working on high voltage assemblies after disconnecting the power, connect the supply cable to earth and short circuit the components, e.g. capacitors, with an earthing rod.

Warning – General Risks!

For all control systems which are equipped with a UPS (Uninterruptible Power Supply), as well as switching off the control system voltage, the mains switch located on the UPS must also be switched off.

4.4.2 Gas, dust, steam and smoke

- Only carry out welding, burning and grinding work on the plant if this is expressly authorised.
  Risk of fire and explosion.
- Before welding, burning and grinding, clean the machine/plant and the surrounding area of dust and flammable substances and ensure sufficient ventilation (risk of explosion).
  If present, remove the EPROM from the PLC.
- When working in tight spaces, observe any national regulations that exist.

4.4.3 Hydraulics, Pneumatics

- Work on hydraulic equipment must only be done by persons with special knowledge and experience in hydraulics.
- Regularly check all cables or pipework, hoses and screw connections for leaks and damage that can be detected externally. Rectify any damage immediately. Oil spraying out can lead to injuries and cause fires.
- Depressurise system sections and pressure pipes (hydraulics, compressed air) before starting repair work.

4.4.4 Oils, Greases and other Chemical Substances

- When handling oils, greases and other chemical substances, observe the safety regulations applicable to the product. Observe manufacturer's information.
- Take care when handling hot operating resources and aids (risk of burning and/or scalding).

4.5 Mobile Machines

- Only use permitted hoisting gear and load-bearing equipment with sufficient loading capacity in loading work.
- Determine expert instructors for the lifting process.
- Only lift machines expertly with hoisting gear in accordance with the information in the operation manual (load fastening points for load-bearing equipment etc.).
- Only use a suitable materials handling vehicle with sufficient loading capacity.
- Reliably secure load. Use suitable load fixing points.
- If available, before loading work, provide the machine with the equipment supplied for unintentional load changes. Attach relevant warning sign.
- Remove equipment properly before recommissioning.
- Carefully reattach and affix parts removed for materials handling purposes before recommissioning.
- Even for minor site change of the machine or plant, disconnect from any external energy supply.
  Before recommissioning, properly reconnect the machine to the mains.
- When recommissioning, only proceed in accordance with the operation manual.

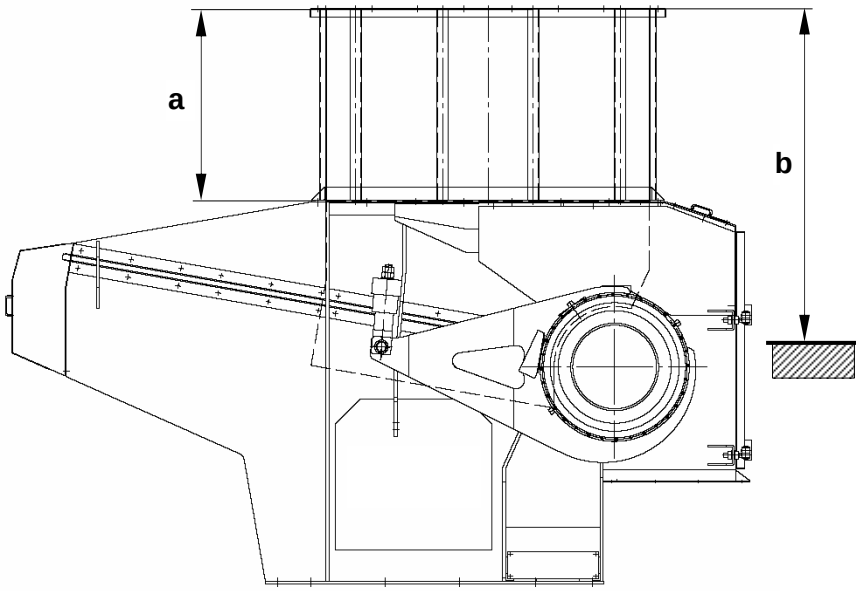
4.6 Safety distances

Warning – General Risks!

The machine must not be operated without a funnel

The machine must not be operated without a minimum gap of accessible area above the funnel of 1200 mm.

The required minimum gap must be maintained!

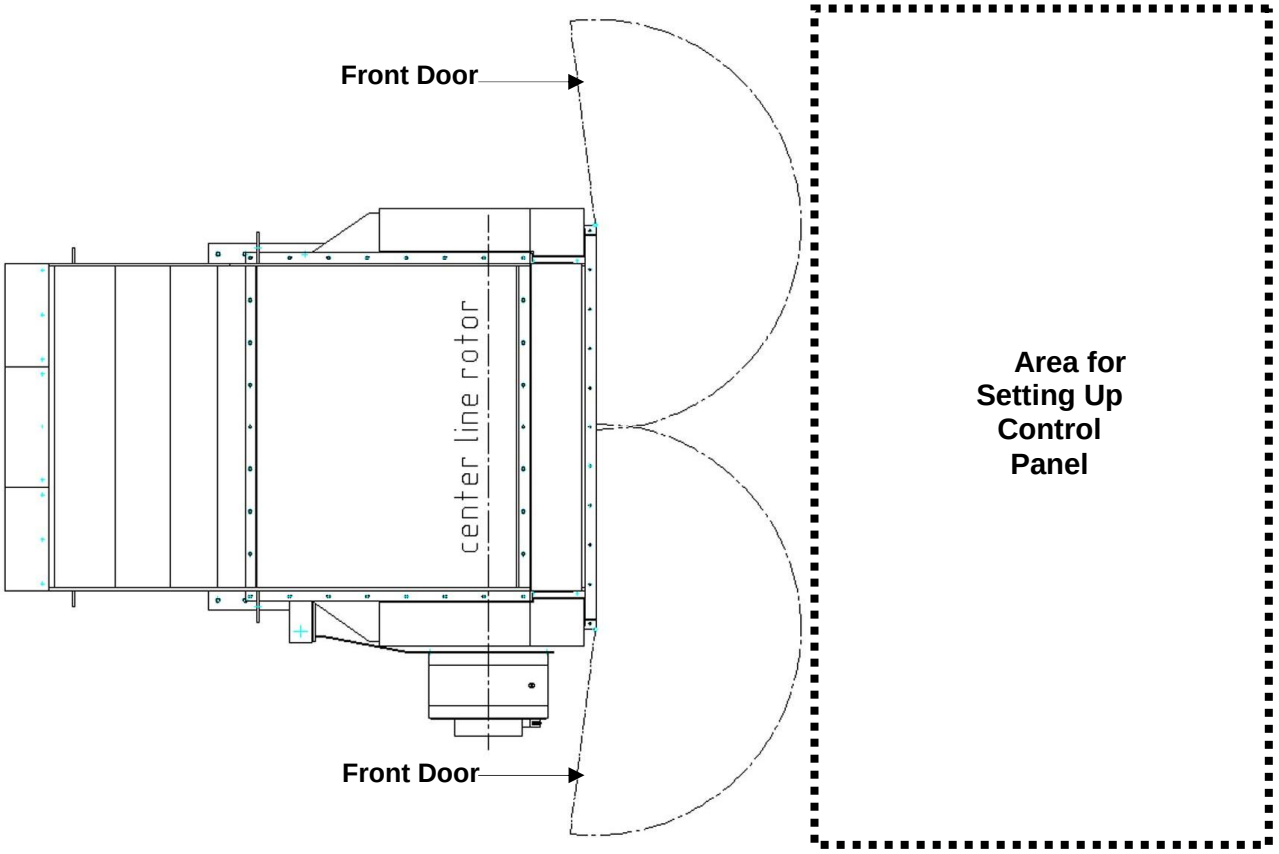


Details:	
a ≥ min. 600 mm	b ≥ min. 1200 mm

4.7 Positioning of the Operating Console

Warning – General Risks!

**During operating and when setting up and maintaining the plant, there is a risk of injury in the dangerous areas of the machine!
The operating console is to be installed in a defined, clearly indicated area as shown in the diagram below.
The dangerous areas must be visible from the operating console!**



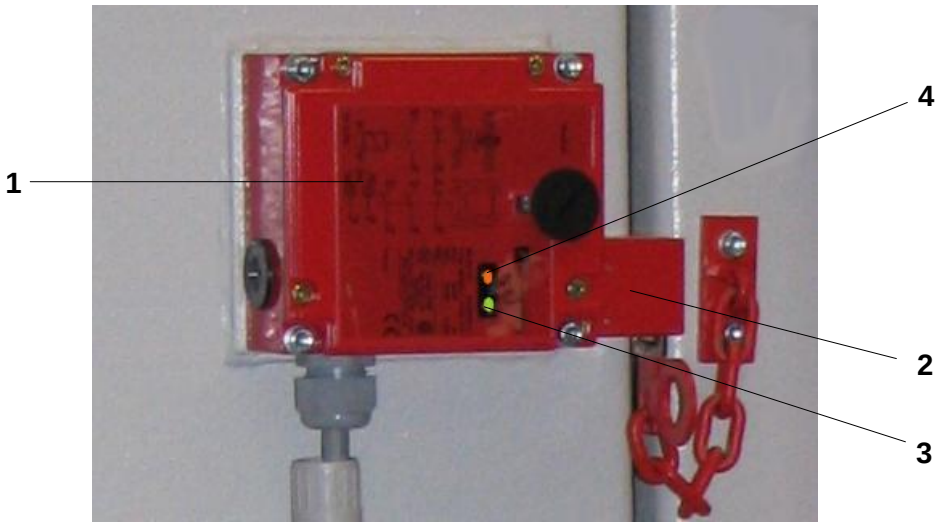
4.8 Safety Locks

Warning – General Risks!

Risk of falling - make sure you are in a stable position when working!

This machine has safety locks in the following places:

Funnel inspection door	☐
Machine housing front door	☒
Side maintenance doors	☐



Details:	
1 = Safety position switch	3 = Green LED
2 = Actuator	4 = Orange LED

For operation	Green LED = locked
For maintenance	Orange LED = released

Caution - Equipment Damage!

The actuator may only be operated from the safety position switch if the orange LED is lit.

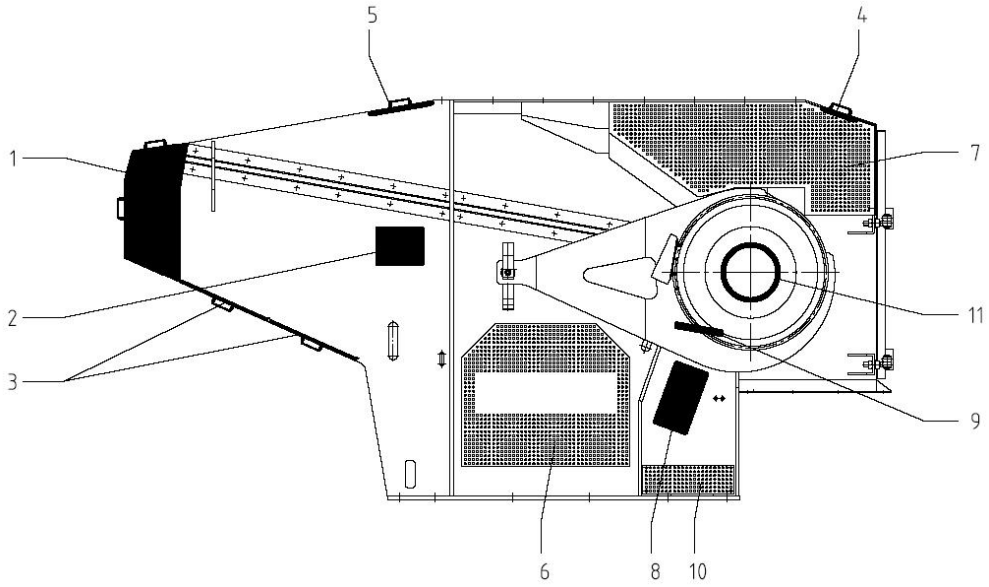
4.9 Protective Devices

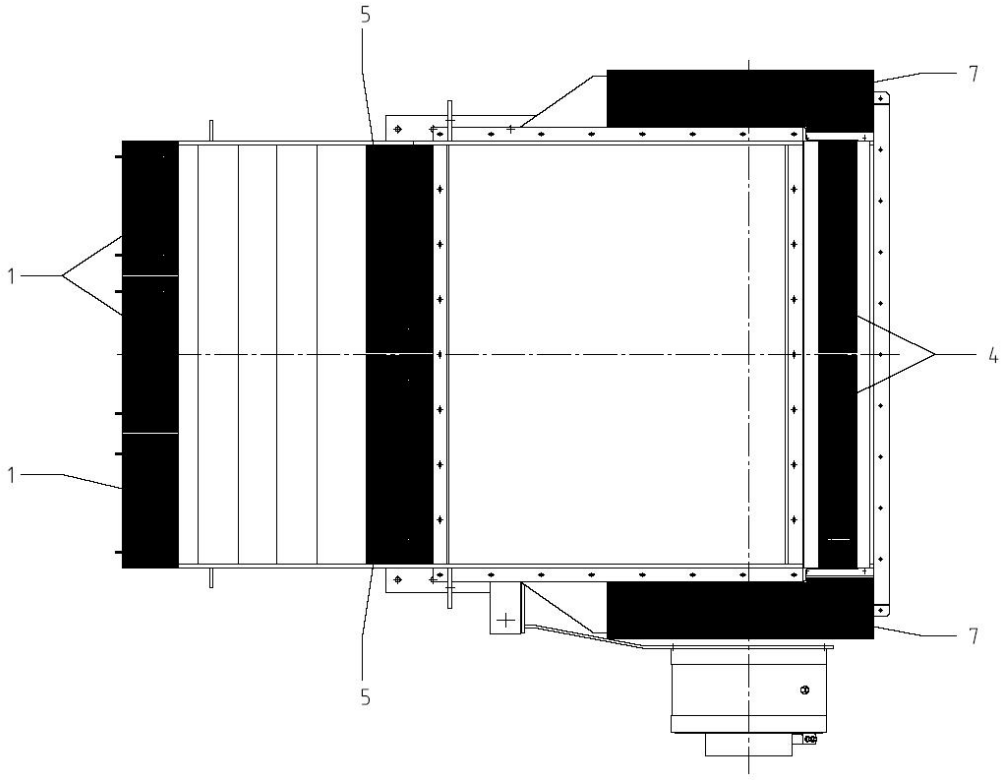
Warning – General Risks!

The machine/plant must not be operated under any circumstances without a protective device.

The machine/plant is currently fitted with all the required safety devices according to the current status of safety technology.

- Protective device(s):





Details:			
1 = 3	cover plates Hydraulic ram cylinder	6 = 2	cover plates Beneath bottom plate
2 = 2	cover sheets Ram seal	7 = 2	cover plates For screen cylinder
3 = 4	cover sheets Beneath hydraulic ram	8 = 2	cover sheets For counter knife bar stop support
4 = 2	cover sheets Beneath screen	9 = 2	cover sheets For counter knife bar stop
5 = 2	cover sheets Over rear wall sealing	10 = 2	cover sheets Beneath counter knife bar
11 = 1	cover plate Rotor shaft, motor		

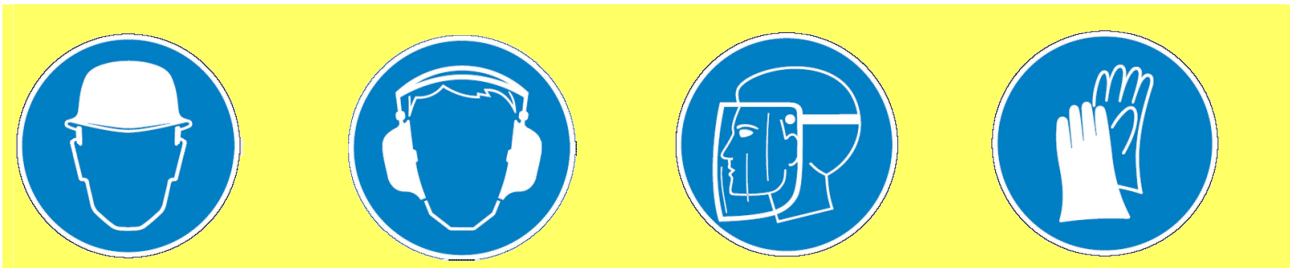
4.10 Residual Risks

There are residual risk from the machine/plant, if

- The machine/plant is operated without protective devices
- Repair work is undertaken without the required safety regulations
- For sub-floor fitting, no antifall guard is arranged
- Material parts knocking around or out
- Working procedures on the tools are effected from the funnel/hopper

4.11 Personal Protective Equipment

Personal protective equipment comprises complete head protection (head protection, ear protection and eyesight protection) and work protective gloves.



Head Protection, Ear Protection, Eyesight Protection and Work Protective Gloves

5 Technical Data

5.1 Machine Model Code

SR	2000	M	F	ECO Drive
Single rotor	Intake Width in mm	Intake Length 2000 mm	Lowerable counter knife bar	High torque motor

5.2 Machine/Plant Rating

5.2.1 Functional Data

- Rotor diameter (circle of flight): 640 mm
- Rotor length: 2000 mm
- Rotor speed: 0 - 220 rpm
- Number of reducing tools: 93

5.2.2 Dimensions and Weight

- Overall length: ca. 4615 mm
- Overall width: 3700 mm approx.
- Overall height: ca. 2375 mm
- Weight: 17000 kg approx.
- Dimensional drawing: 05000598

5.2.3 Main drive

- Type:	High torque motor
- Nominal motor power:	203 kW
- Nominal current of motor:	415 A
- Motor speed:	0 - 340 rpm
- Connection voltage:	400 V
- Mains frequency:	50 Hz
- Degree of protection:	IP 54
- Model:	B5

5.2.4 Hydraulic unit

- Motor power of ram:	P = 9,0 kW
- Operating pressure max. ram:	up to 150 bar
- Amount of hydraulic oil:	160 litres
- Type of hydraulic oil:	Shell TELLUS HLP 46

5.2.5 Connection for compressed air

- Compressed air connection:	min. 9 bar
- Oil-free compressed air; output power:	400 l / min. at 9 bar

5.3 Tightening Moment of the Screw, Except Fixing Screws for Reducing Tools and Counter Knife

Size	Property Class 8.8
M 8	23 Nm
M 10	50 Nm
M 12	85 Nm
M 14	125 Nm
M 16	210 Nm
M 20	395 Nm
M 24	680 Nm

5.3.1 Tightening Torques of Screw Connection of Reducing Tools

Size of the Reducing Tools	Thread	Property Class 10.9
60 x 60 mm	M18 / M20	300 Nm

5.3.2 Tightening Torques of Screw Connection for Counter Knife

Thread	Property Class 10.9
M 20	500 Nm

5.4 Electrical Connections

Note

Conductor cross sections must be designed in accordance with the relevant regulations of the structural circumstances.

Recommended conductor cross sections

Power supply to reducer - switch cabinet:

Driving Power [kW]	Supply Fuse Protection [A]	Minimum Recommended Conductor Cross Section of Supply [mm^2]
203	630	3 x 240 / 1 x 120
		4 x 2 x 120

Power supply from switch cabinet to the consumers:

Drive Power [kW]	Motor Fuse Protection in the Switch Cabinet [A]	from the Control Cabinet to the Motor [mm^2] screened
203	500	3 x 240 / 1 x 120
		4 x 2 x 120

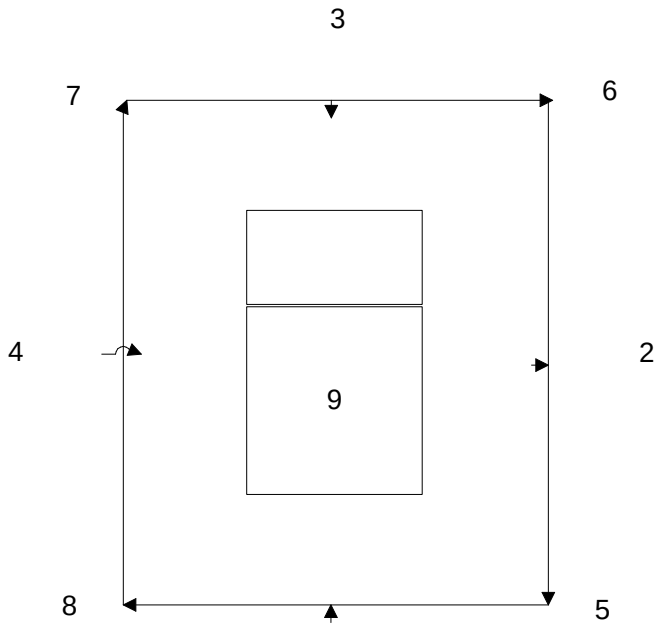
5.5 Noise Emission

Technology **05.07.2006**

Noise Measurement Log SR 2500 M NF ECO Drive, 203 kW, Screen 20 mm

Measurement on: 08.02.2006

Machines - Measuring Points



1 Apl.

Measurement Standard Applied	DIN EN ISO 3746
Measuring Equipment Used	Sound Level Meter No. 2 Comparison sound source No. 3 with sound power level 91 dB(A)
Measurement Method Used	
- Time value	slow
- Number of measurement points on the shell surface	9
- Distance from standard cuboid	1.00 metre
- Microphone level	1.50 metres
- Environmental corrections	through comparison sound source
- **Machine Dimensions (External Dimensions):**	Length: 4,900 mm Width: 4,100 mm Height: 2,600 mm
Noise Protection Measures	quiet-running torque drive
Machine Data	Reduction shaft Diameter 640 x 2500 mm length
Quantity of cuts	76 concave cutters, 60 x 60 mm
Rotor speed:	250 rpm

	Measurements in dBA	
	Measuring Point	**Measurements in Idling in dB(A)**
	1	80,9
	2	79,1
	3	80,6
	4	80,6
	5	76,0
	6	81,7
	7	82,4
	8	74,8
	9	78,6
	Average noise pressure level when idling	**79,41**
	Average noise power level when idling L_{wa}	**103,23**

Note

Values are applicable without correction according to the comparison sound source.

Note

The values which are given here are emission values and do not have to represent safe workplace values at the same time. As there is no correlation between emission readings and workplace readings, they cannot be reliably used to establish whether or not further precautions are required. Factors which may affect the current workplace reading include the duration of the action, the characteristics of the work room, other noise sources, the number of machines and other related effects. The reliable workplace readings may also vary from country to country. However, this information should enable the user to better assess the danger and risk.

6 Transporting

6.1 Dimensions and Weight (see Chapter "Technical Data")

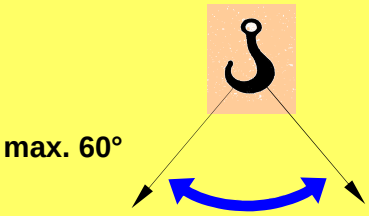
6.2 Instructions and Protective Measures for Transporting

Warning – Danger of Death!

Do not walk or stand under a suspended load!

Secure machine/plant for transporting on transport vehicle (e.g. lorry).

Only take up machine/plant at the marked load fastening points.



Caution - Equipment Damage!

Ensure that no components are damaged.

6.3 Hoisting Gear, Lifting Eye Bolts

- Only use tested and permitted hoisting gear.
  - Shackle, e.g. to DIN 82101
  - Chain slings, e.g. to DIN 5687 grade 8
  - Sling ropes, e.g. to DIN 3088
  - Textile hoisting gear, e.g. round slings to DIN 61360

Warning – General Risks.

When selecting hoisting gear, ensure sufficient loading force!

6.4 Check on Acceptance by the Receiver

When accepting the machine/plant, check for visible damage from transporting, particularly to

- moving parts
- electrical cables
- hydraulic lines
- pneumatic lines

6.5 Packings, Insulations

Dispose of packings and insulations expertly and in a way appropriate to the environment. National regulations are to be observed.

6.6 Report and Document Transport Damage

- Transport damage established must be held in the transport documents.
- The supplier responsible (normally the lorry driver) must confirm the damage established on the transport documents (by signature).
- Transport damage is to be reported to the manufacturer as quickly as possible.
- A photograph is to be taken of the transport damage for damage declaration or documentation.

6.7 Storage Location, Storage Period, Protective Measures

- All blank parts of the machine/plant are provided with corrosion protection prior to delivery.
- Store machine/plant in a dry, ventilated room.
- The machine/plant must be idle for a maximum of 3 months.
- When in interim storage, blank machine parts must be protected against corrosion, e.g. with Tectyl 506 or similar preservative.

  For transport by sea, you must consult with the manufacturer, in this case the machine/plant must be specially protected and packaged.

7 Installation

7.1 General Instructions

Warning - Risk of Injury.

Only take up machine/plant at the marked load fastening points.

Systems 4 Recycling urgently recommends that fitting work on the machine/plant is carried out by Systems 4 Recycling expert personnel. Systems 4 Recycling accepts no liability for damage as a result of non-expert work by third parties.

7.2 Installation Conditions

When installing, consider whether there is enough space for maintenance and upkeep.

Machines connected in series are to be arranged accordingly.

Check that the delivery is complete before fitting. All parts are to be unpacked expertly.

For fitting the machine/plant:

- In principle, only use labour with sufficient expertise and who have the necessary equipment.
- When installing the machine/plant outside, special arrangements are to be made and Systems 4 Recycling is to be consulted. Otherwise, the machine/plant is to be installed in roofed rooms. Damage from the effects of weathering, e.g. damp and ice, are excluded from the guarantee.
- The installation regulations of Systems 4 Recycling must be observed.
- The relevant technical regulations are to be kept to.
- Ensure that there is sufficient ventilation so that there is no build up of heat in the switch cabinet, drive and hydraulic drive area of the machine/plant. Ambient temperatures of over 30° Celsius could cause faults. In that case, ventilation equipment and/or cooling equipment is required.

Special measurements are required for ambient temperatures below 0°C.

At ambient temperatures of below – 10°C the machine/plant is only conditionally usable.
Special heating spirales etc. will be required – please contact the Systems 4 Recycling-Service Department for more information.

- Observe national laws and regulations of private and public inspection authorities.

7.3 Hoisting Gear

- Only use permitted hoisting gear and fixing materials.
- Never exceed the permitted load capacity.
- Only lift machine/plant or machine parts at the marked load fastening points.

Warning - Danger of Death!

Do not walk or stand under a suspended load!

7.4 Installation

Measures before Starting to Install

- Determining and establishing the axes
- Establishing height marks

The installation (erection) is to be effected according to the installation drawing (if necessary).

When installing, the working processes and instructions listed below are particularly to be observed:

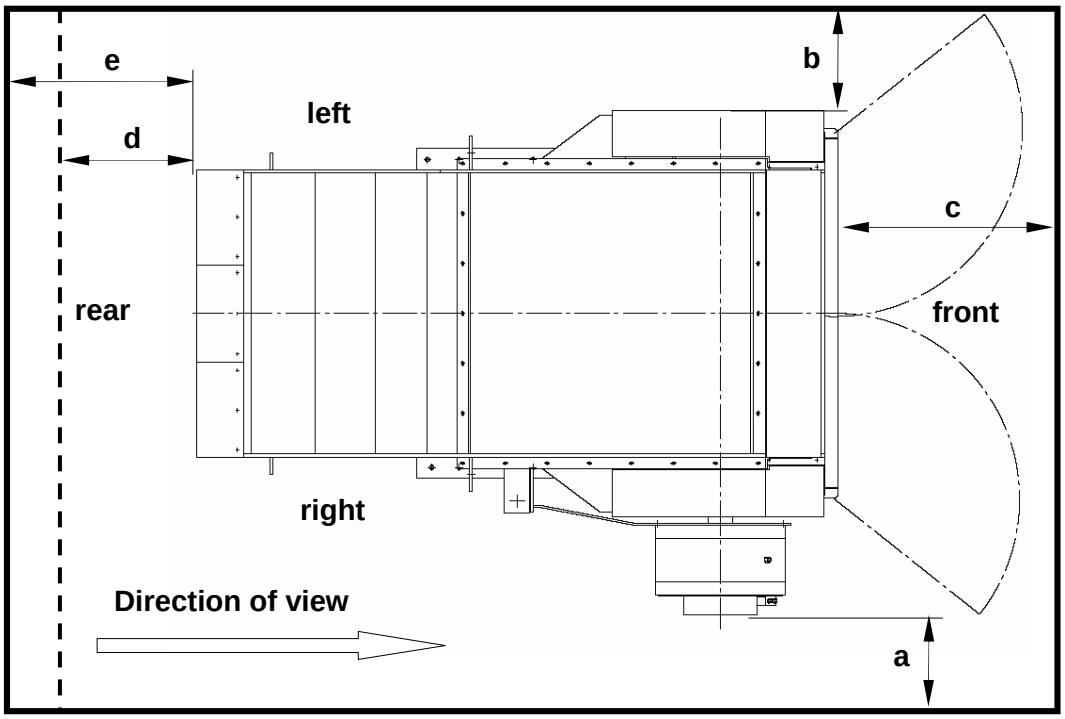
- Aligning the machine/plant with a spirit level.
- Level and sufficient loadable standing area/ fixing area.
- The machine/plant must not be tilted.

7.4.1 Fitting

The static and dynamic base load can be seen from the dimensional drawing (see Chapter "Technical Data - Dimensions and Weight").

Required minimum clearance during fitting:

Dimensions in mm!



a *	b *	c *	d	e
1000	1000	1600	1000	1600

* Required min. clearance for service work

d: Space required for removing the hydraulic cylinder

e: Space required for removing the hydraulic ram

Caution - Equipment Damage!

Funnel must be removable!

Place the machine/plant on the prepared support points (supports, foundations etc.) with a fork-lift truck or truck crane.
Align the machine/plant in accordance with the prescribed axes and holes for inserting and removing materials and anchor firmly.

Warning – General Risks!

Screw down the machine/plant to the floor with anchoring dowels. The safety instructions and fitting instructions of the dowel manufacturer are to be observed.

7.5 After Installation

After the installation it is to be observed that:

- All screw connections are to be checked so that they sit firmly
- Remove transport locks labelled
- Close doors, flaps and trim
- Attach the required protective device
- Leave space to work on machine/plant and free machines connected in series from foreign bodies (steel parts, tool left behind).
- Fill all lubrication points with grease
  (see Chapter "Upkeep, Lubrication Points")

If you have any further questions, please contact the installation department of Systems 4 Recycling, to prevent possible errors in assembly.

7.6 Electrical Plant

Warning - General Risks.

Machines with damaged electrical equipment must not be put into operation.

Local control desks (operational controls) are to be attached so that dangerous areas of the machine can be recognised.

For all control systems which are equipped with a UPS (Uninterruptible Power Supply), as well as switching off the control system voltage, the mains switch located on the UPS must also be switched off.

Caution - Equipment Damage

When cabling the control cabinet from the building, when introducing cables from below these are to be enclosed with Rittal bottom plates (+ microcellular rubber) so that the type of protection is maintained.

The switch cabinet must only be installed in ventilated, rooved rooms. It is to be protected from the effects of dust and the sun, however, in particular from damp.

A fused mains is to be laid to the switch cabinet, the cross-section of which must be sufficient to supply the motors. All cables are to be laid protected in pipes or cable conduits.

Check the proper electrical installation in accordance with the customer's and local regulations.

Check and adjust the protective devices (motor protection relay, earthing resistor etc.).

Electrical drives are to be kept free from the build up of dust. Cooling air must be supplied for unhindered access.

Note that fault-free operation is only guaranteed when the work mentioned below has been properly carried out.

- Arrange the terminal boxes in such a way that the cable entries are pointing downwards.
- Suitable metric screw connections are to be used for the supply, using reduction fittings as appropriate.

- Brush the threads of metric screw joints and blind stops with jointing compound and tighten well. Then brush over again.
  Also seal cable entries well.
- Clean sealing surfaces of terminal boxes and terminal box lid well before reinstallation.
  Seals must be glued in place on one side.
  Replace seals that have become brittle.
- When reinstalling after maintenance work etc., the end plate centres are also to be brushed with jointing compound.
- Corrosion protection consists of a multiple application. This must be renewed or improved regularly depending on external effects.

7.7 Removal

The machine/plant is removed for a site change (after it has finished being used) in the reverse order as for installation.

In so doing, the working safety instructions (see "Safety" chapter) are to be observed.

8 Commissioning

8.1 Instructions

Initial commissioning has a significant effect on the optimum working of the machine/plant.

Because of the number of influencing factors, we urgently recommend taking on Systems 4 Recycling expert personnel for commissioning. This must only not only be done for guarantee reasons, but at the same time:

- check the machine/plant
  (any damage in transit, installation errors),
- determine optimum performance,
- instruct the operating personnel,
- forward additional advice on how to operate the machine/plant, on maintenance and upkeep.

8.2 Before commissioning

The machine/plant is to be checked before commissioning:	Yes	No
• All transport fixings and transport locks are removed.	☐	☐
• All protective devices and cover plates are fitted.	☐	☐
• All fixing screws for the reducing tools are fastened tightly.	☐	☐
• All counter knife fixing screws are fastened tightly.	☐	☐
• The values for voltage and frequency on the type plates of motors, solenoids and other electrical devices match the values of the local power supply.	☐	☐
• The electrical cabling is properly laid and fused.	☐	☐
• The thermal relay settings correspond to the nominal current of the motor on the motor rating plate.	☐	☐
• All control parts (e.g. limit switches) working correctly.	☐	☐
• The coolant supply is connected:		
High torque motor	☐	☐
Frequency converter	☐	☐
Rotor cooling (optional)	☐	☐
• The tanks on the cooling equipment are to be filled with permitted coolant up to the MAX. marking.	☐	☐
• Is the frost protection of the coolant sufficient:		
down to -25°C	☐	☐
down to -35°C	☐	☐
• Oil filling of hydraulic unit.	☐	☐
• Nobody must be standing in the danger area of the machine/plant.	☐	☐

Note

For tightening torques of the screws see "Technical Data" chapter.

For oil levels see “Specifications“ chapter or “Appendix“.

8.3 During Commissioning

Warning – General Risks!

Faulty plant must not be put into operation.

Caution - Equipment Damage!

If the direction of rotation of the oil pump drive motor is wrong, the pump shall be quickly destroyed.

If the direction of rotation of the cooling equipment pump motor is wrong, the pump shall be quickly destroyed.
Dry running of the pump is absolutely to be avoided!

The following are to be checked when commissioning:	immediately	after an hour
Direction of rotation of the rotor (see arrows for the direction of rotation on the rotor bearing)	☐	
After starting the machine the hydraulic ram moves backwards for approx. 4 seconds, then changes direction and moves towards the rotor. At reverse operation see chapter “operation, item failure elimination".	☐	
Direction of hydraulicmotors (arrow of ventilator cover or oil pump)	☐	
Direction of rotation of the fan motor and pump of the cooling equpiment (see arrows for direction of rotation)	☐	
Check filling height in tanks of the cooling equipment. Do not exceed MAX. filling height! Do not go under MIN. filling height! Top up as required after putting into operation.		☐
Current consumption of the electric motors (see “Technical Data” chapter)	☐	
Observe temperatures of rotor bearings.		☐

If the reducer is in operation, it must be ensured that the machine housing is resting firmly on the ground.

8.4 Idle Operation and Locking Mechanism Test without Material

Caution - Equipment Damage!

The machine/plant must only be run in an empty working room.

8.4.1 Idle Operation Test

After the machine/plant has been successfully installed, the idle operation test is to be conducted. This includes the relevant starting of the machine/plant and its material feed and disposal groups (e.g. conveyor belts), in order to obtain proof of perfect functioning of the individual machine/plant components.

The idle operation test has been completed if all the required reworking, and that which has become necessary, has been finished and it is guaranteed that the units can be operated without further supervision for the duration of the locking mechanism tests.

Conducting the idle operation tests has the prerequisite that the drives in question are ready to be switched on after mechanical and electrical installation has been finished.

8.4.2 Locking Mechanism Tests

After the idle operation tests have been completed, there needs to be clearance from the locking mechanism tests before electrical and mechanical installation.

The customer's locking mechanism schedule is to be extended for the locking mechanism sequence with the relevant machine/plant component:

- Start of the material evacuation system
- Start of the machine/installation component
- Start of the material feeding system

Switching off is done in the reverse order.

Warning - Risk of Injury.

No mechanical reworking is allowed to be carried out during the locking mechanism test.

The locking mechanisms are there, firstly so that the individual units of the plant work alongside each other and then together with each other. If a drive fails, it must be ensured that the drives connected in series in the locking mechanism chain fail immediately or after the prescribed times.
It is absolutely necessary that all drives are correctly connected in terms of locking mechanisms and the control works properly.

All motors must run during the locking mechanism tests.

As far as possible, the locking mechanism tests are to be set to the true operating behaviour. A simulation of running drives with fuses or electrical inserts taken out should not be carried out in the interest of later commissioning.

8.5 Mechanical Test Running with Material

Only after completing the "Idle Operation and Locking Mechanism Tests" is the machine/plant loaded with material.

Warning – General Risks!

Nobody must stand in the danger area of the entire plant.

The procedures is as follows:

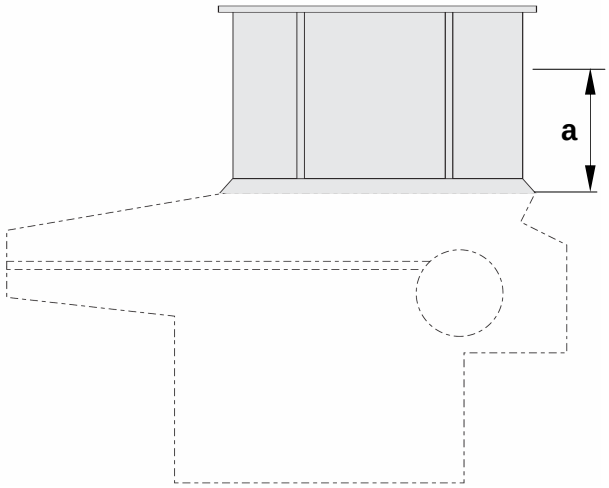
- Operate running warning switch (if required for safety) and wait for release before switching on the machine/plant
- Test locking mechanisms
- The following material evacuation devices must work
- Push Start-button
- If the machine/plant cannot start, see "Operation, Troubleshooting" chapter
- Start the material feeding devices

The following procedure has proven itself in practice:

- Beginn with a small amount of material and check the automatic operation
- Check temperatures of bearings
- Check current consumption of the electric motors
- Check for abnormal working noise
- Fill funnel

Note

The filling height depends on material.



Details:	
a = max. filling height 1 m	

For commissioning by a Systems 4 Recycling technician, a commissioning report is to be signed by the same.

No guarantee claim can be made for damage when in-house, non-expert commissioning is carried out.

The safety regulations are always to be observed when commissioning.

The machine/plant is to be checked directly after commissioning for faultless operation.

The machine/plant must not be operated if:

- Any function is not working properly
- Safety defects are present through the type of installation or through additional devices or machines.

9 Operation

9.1 Normal Operation

The normal switching on and operation of the machine/plant is not different from the procedure described in the "Commissioning" operation manual.

9.2 Stopping the Machine/Plant

Stopping is done in the following order:

- Switch off the material feeding device.
- Before a long stoppage, particularly in winter operation, run the machine/plant empty.
- Switch off group drive of the machine/plant.
- Switch off the material evacuation device after clearing out.

Note

For preventative fire protectionb the machine/plant, must be run empty at the end of the shift or before standing idle for long periods.

9.3 Conduct in Case of Disruptions

Depending on the following instructions, for the operation of the machine/plant, the local safety provisions are applicable in each case.

9.3.1 Safety Cut-Off

We recommend most urgently a lockable repair switch, which prevents unintentional switching on of the machine/plant during repairs or disruptions. Normally we refer to the relevant accident prevention regulations of the relevant employment insurance association.

9.4 Operational Safety

The drive motor must be protected from overload by an overload switch. All safety devices must be installed before operation. Alterations to the drives are only permitted after written consultation with Systems 4 Recycling.

Add-ons to the machine/plant, e.g. feeder funnel etc. are only permitted according to the information of Systems 4 Recycling.

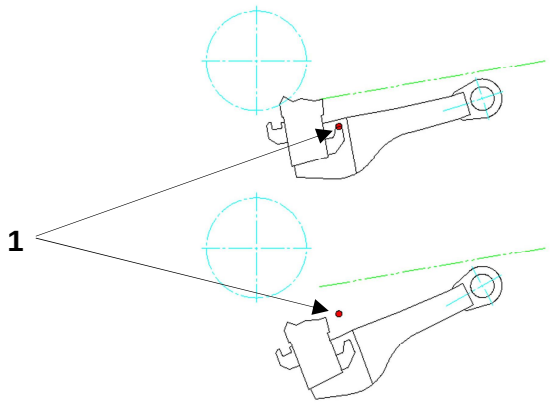
Caution - Equipment Damage!

The switch cabinet doors must remain closed except for maintenance work!

As required, the doors may only be opened if the switch cabinet has not been connected (main breaker set to zero) and the ambient air is free of dust and dirt. This also needs a waiting time until the swirled up dust has settled.

In order to reduce the risk of damage due to foreign bodies the counter knife bar is mounted on air springs.

In case of abnormal impact the counter knife will quickly move away from the rotor. This movement is detected by proximity switches which will immidiately stop the machine. This is indicated by a warning light on the control panel. (see chapter “Operation” Description of function of the Flexible Counter Knife Bar).



Details:	
1 = Proximity switch Torque switch	

Caution - Equipment Damage!

The surface in the area of the side wall/counter knife bar must be cleaned before raising into working position.

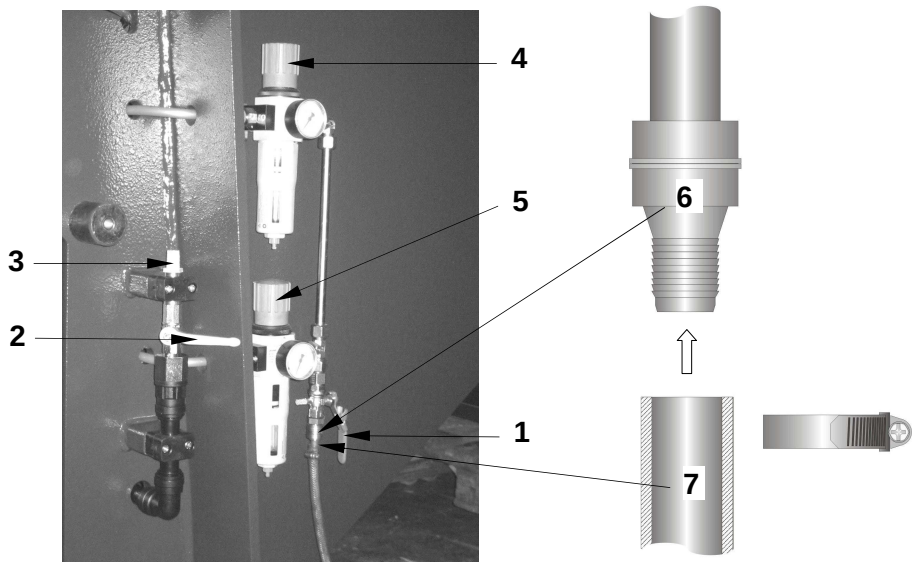
Switching the machine back on again without removal of the foreign body leads to series damage to the rotor, rotor shaft and counter knife.

9.4.1 Pneumatic protection in case of maintenance works

Warning – General Risks!

When removing foreign bodies and in maintenance works on the counter knife bar, changing the counter knife, changing the reducing ool and changing the screen, the compressed air system is to be depressurised.

- The illustrated presentation is shown in operating condition



Details:	
1 = Compressed Air Cut Off Cock	5 = Controller knob for counterknife pressure setting
2 = Shut-off valve aeration	6 = Rapid release coupling is supplied with machine
3 = Muffler	7 = ½“ Air Hose 56 cfm @ 10 bar, free of oil and water
4 = Control knob for screen pressure setting	

For making system without pressure, proceed as follows:

- Stop supply of compressed air by setting cut off cock in position 90° towards flow direction and protect with lock.
- Set cut off cock ventilation in parallel position in flow direction. (probably remaining pressure may escape through the muffler)

9.4.2 Pressure adjustment for screen and counter knife bar

The pressure is adjusted by a filter and regulating valve by each one regulating head. For this, pull up the regulating head and by turning to the right (-) reduce the corresponding pressure, respectively by turning to the left (+) increase the corresponding pressure.

Caution - Equipment Damage!

At too high a pressure, the knife may break.
The pressure is to be adapted to the material to be reduced.
(Guideline: 7-8 bar)

9.4.3 Description of function flexible counter-knife bar

The counter knife bar is mounted on strong air springs.

In case the rotor catches a foreign body - such as metal or rocks - the counter knife is pressed down against the springs.

The machine will automatically cut off in order to avoid further damage. The COLLISION light on the main control panel is energised.

Warning – Danger of Death!

Please note that dangerous movements and conditions are to be considered with the adjustment operation and appropriate measures are to be taken.

Nobody must stand in the danger area of the entire plant.

There is the possibility with open maintenance doors and open screen that the rotor can move.
Before undertaking maintenance work on the machine, ensure that the maintenance staff are not endangered by the remote operation of the "Rotor Forwards" or "Rotor Backward" key.

Take particular care when drive the rotors with open maintenance door, as there is the risk from the roller due to rotating knives and material may fall out of the reducing space.

Ensure that nobody is standing the feed area of the rotors.

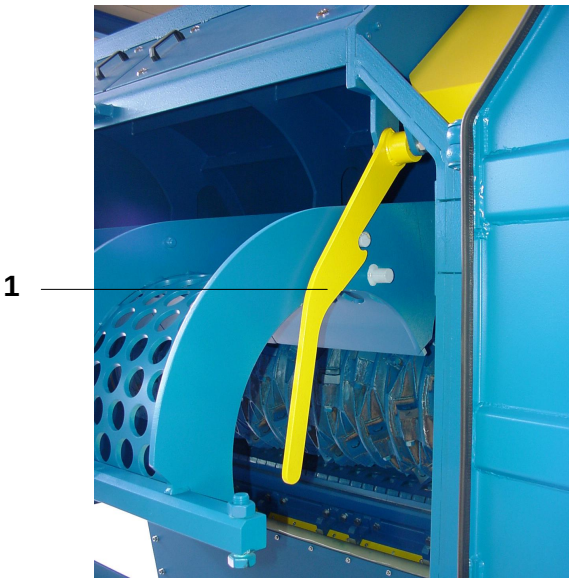
Caution - Equipment Damage!

Switching the machine back on again without removal of the foreign body leads to series damage to the rotor, rotor shaft and counter knife.

To remove foreign bodies, the following procedure is to be adhered to:

1. On the control desk, set the operating mode selector to "1 = Setup".
2. (Only for machine with bridge breaker
   set bridge breaker selector to "0 = Off".
3. Keep front doors closed.
4. (Only for machine with bridge breaker)
   Only run the bridge breaker out by operating the "bridge breaker forwards" key (in the reducing space).
5. Lower the counter knife bar by operating the "remove" key switch.
6. Put "Open front bonnet" key switch into the "1" position.
7. Operating mode selector to "0 = Stop".
   After 30 seconds, the front door is electrically unlocked and can be opened.
   Meaning of indicator LEDs on the solenoid switch:
   Orange = open
   Green = closed and locked
8. Set the operating mode selector to "1 = Setup".
   Run the screen unit up by operating the "screen up" key.
9. Ensure that the screen is locked. (see Chapter "Functional Description of Mechanical Screen Unit Locking")
10. Shut off the supply of compressed air.
    (Put the cut off cock lever 90° to the direction of flow)
    open emergency release.
    (Put lever in the direction of flow)
    Press "Emergency Stop"
11. The counter knife is now freely accessible. Remove any foreign bodies which are in the area between the rotor and counter knife. Reducing tools, counter knife and screen are to be checked for any damage.
    All studs and the area of the counter knife bar, and the clamping hook for the screen unit are to be cleaned.
12. Reopen the supply for the compressed air.
    (Put the cut off cock lever parallel to the direction of flow)
    and close emergency release.
    Release "Emergency Stop".
13. By operating the push button "screen off" release the safety hook, in order to conclude with screen dropping down when unlocking. (Loading of the safety hook as appropriate by compressed air loss of the unintentional running of the screen)
14. Unlock safety hook (1) by turning away from the screen unit. (see Chapter "Functional Description of Mechanical Screen Unit Lock")
    Run the screen unit by operating the "Screen Closed" push button in the working position.
15. Close and lock front doors.
16. Put "Open front bonnet" key switch into the "0" position.

17. Release counter knife key switch to "0".
    Put the counter knife bar by pressing the "Tighten" key into the working position.
    For safety reasons, this function is only possible if:
    - Screen unit is in working position
    - Front doors are closed
18. Quit fault by operating the reset push button on the switch cabinet.
19. The error message display "breakage securing" must now be off.
    Should the counter knife bar not be in the correct working position, the entire process from point 1) must be repeated.
20. The machine is now ready to be switched on again.



Details:	
1 = safety hook	

9.4.4 "Functional Description of Mechanical Screen Unit Locking"

Warning – Danger of Death!

Please note that dangerous movements and conditions are to be considered with the adjustment operation and appropriate measures are to be taken.

Nobody must stand in the danger area of the entire plant.

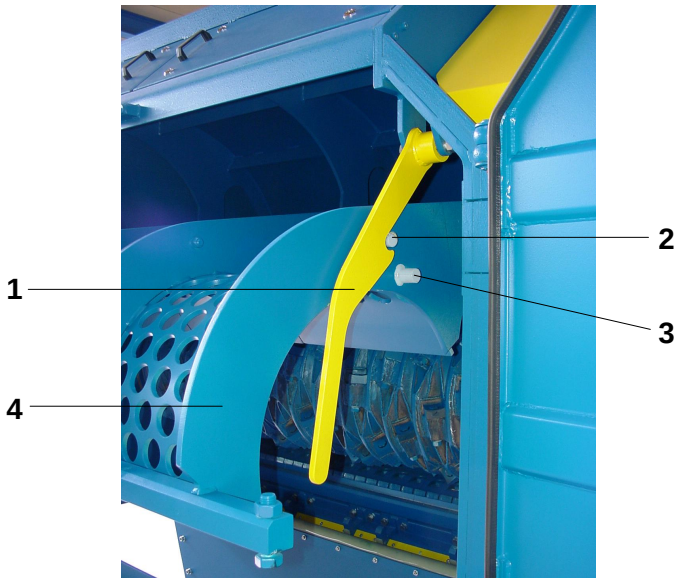
There is the possibility with open maintenance doors and open screen that the rotor can move.
Before undertaking maintenance work on the machine, ensure that the maintenance staff are not endangered by the remote operation of the "Rotor Forwards" or "Rotor Backward" key.

Take particular care when drive the rotors with open maintenance door, as there is the risk from the roller due to rotating knives and material may fall out of the reducing space.

Ensure that nobody is standing the feed area of the rotors.

Caution - Equipment Damage!

Switching the machine back on again without removal of the foreign body leads to series damage to the rotor, rotor shaft and counter knife.



Details:	
1 = Securing hook	3 = Long bolt
2 = Short bolt	4 = Screen unit

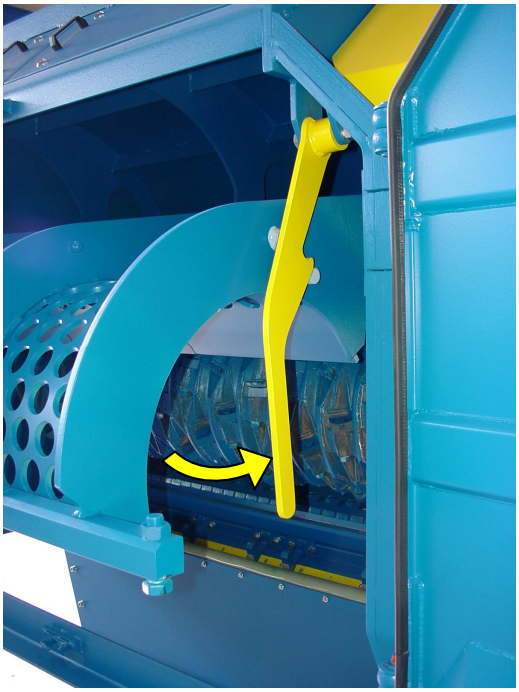
The screen unit lock is for securing the screen unit from dropping down by loss of compressed air or unintentional closing of the screen.

When opening the screen unit, the short bolt automatically locks in the securing hook.

Warning – Danger of Death!

When opening the screen unit, ensure that the securing hook meshes into the short bolt.

- To unlock the screen unit, the securing hook must be freely moveable upwards.
  If that is not the case, the screen unit must be driven shortly upwards over the control.
- Then push the securing hook in the direction of the side wall and against the long bolt so that the hook is lying on the short bolt. (see illustration below)



- The mechanical screen unit stop is now lifted and the screen unit can be closed via the control.

9.5 Operator controls

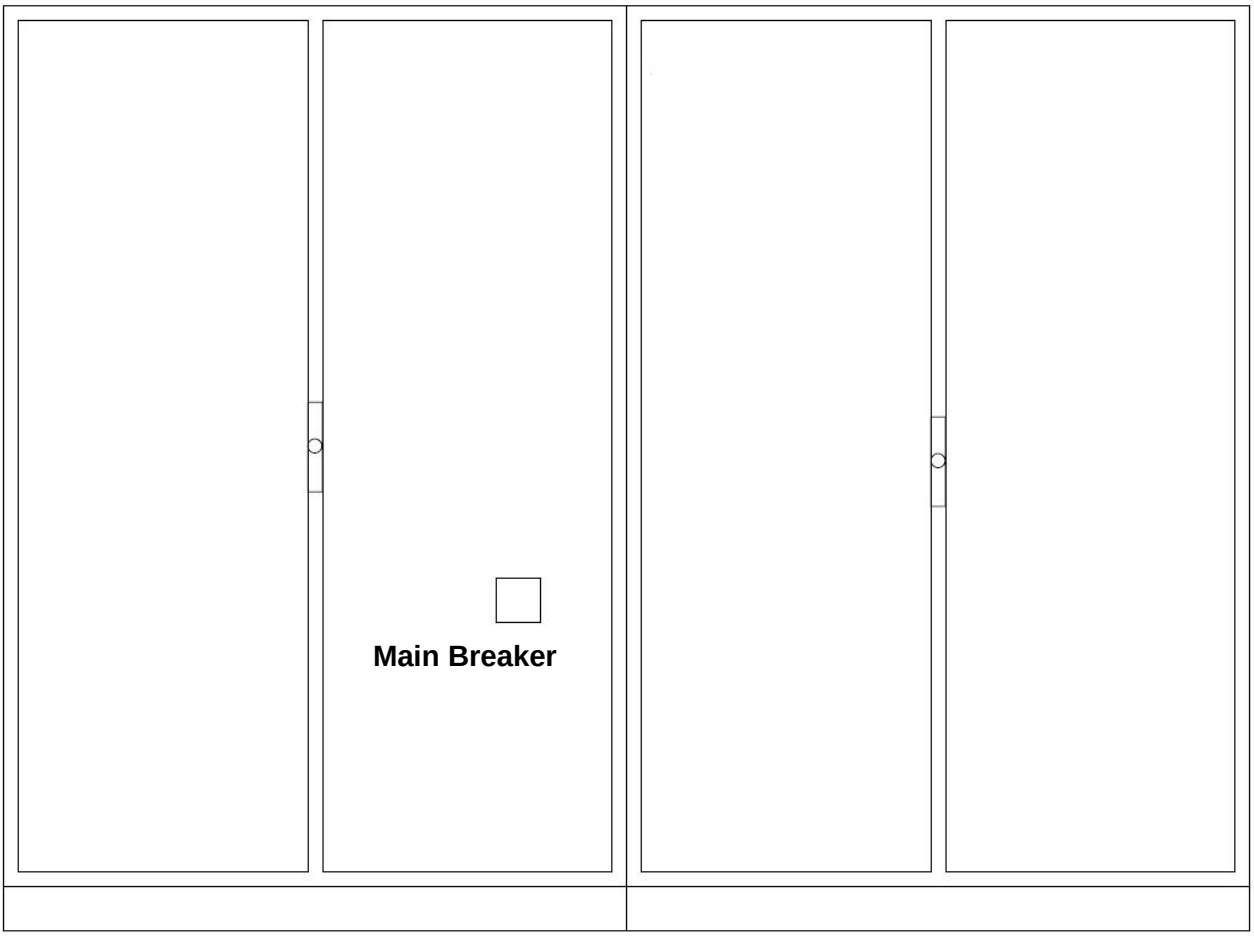
Warning – Danger of Death!

There is the possibility with open maintenance doors and open screen that the rotor can move.
Before undertaking maintenance work on the machine, ensure that the maintenance staff are not endangered by the remote operation of the "Rotor Forwards" or "Rotor Backward" key.

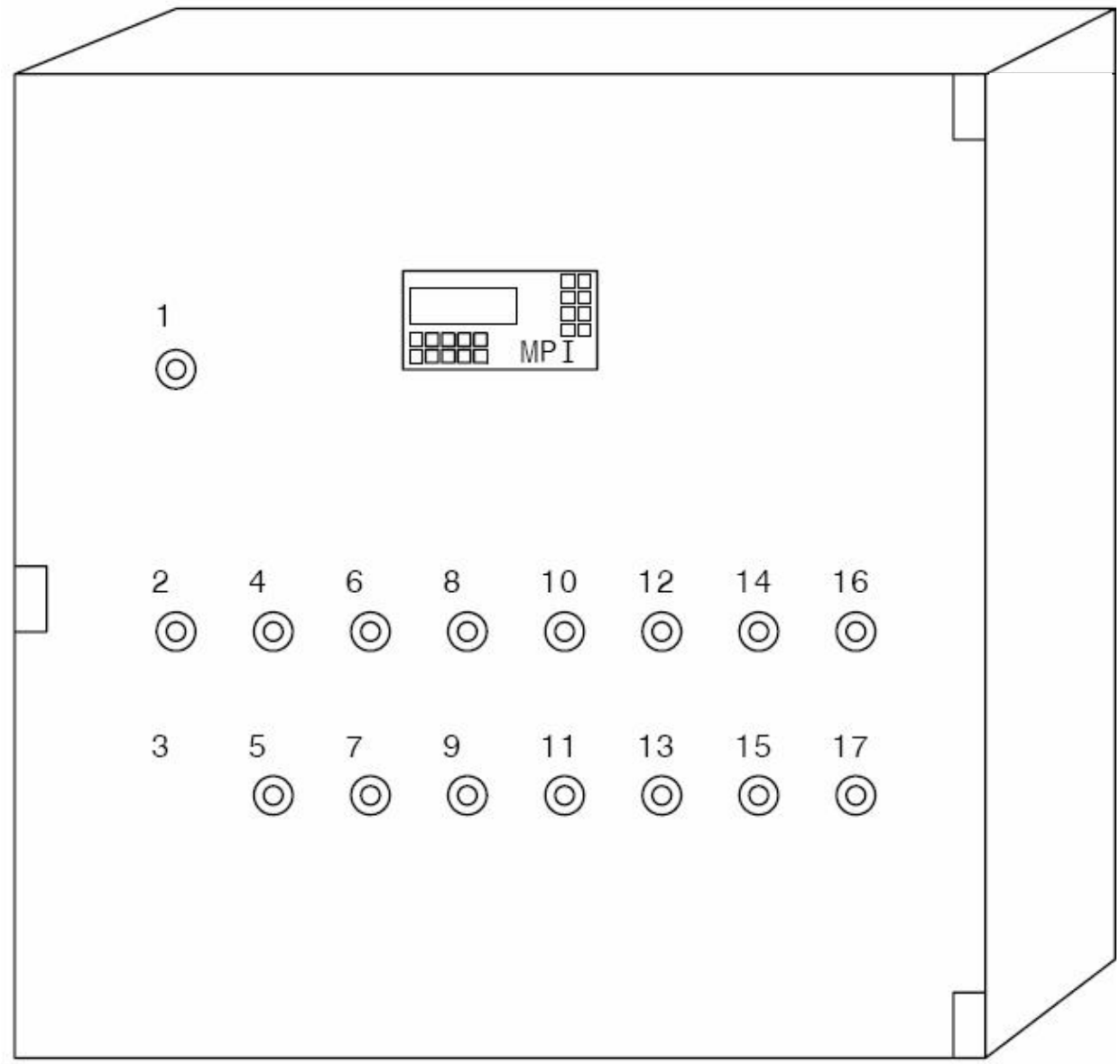
Take particular care when drive the rotors with open maintenance door, as there is the risk from the roller due to rotating knives and material may fall out of the reducing space.

Ensure that nobody is standing the feed area of the rotors.

9.5.1 Control cabinet



9.5.2 Operator panel



Operational Controls Label		Description
1	Emergency stop	Switches off the control voltage
2	Mode selector switch	
	0 = Off	Machine cannot be operated
	1 = Setup/maintenance	Setup and maintenance functions can be used
	2 = Manual	Machine can be started from the operating console
	3 = Automatic	Machine can be started by means of an external control
3		
4	Open hopper door	Open release for hopper door
5	Open front cover	"Open front cover" release
6	Machine On	Machine starts in manual operation
7	Machine Off	Machine is stopped
8	0 = Continuous operation	Runs without cut-off on idle operation
	1 = Automatic OFF	Automatically switches machine off on idle operation
9	Rotor forward	Tip operation if the operating mode selector is at "Setup"
	Rotor reverse	Tip operation if the operating mode selector is at "Setup"
10	Ram forward	Ram moves to rotor (setup operation)
11	Ram reverse	Ram moves away from rotor
12	Tighten counter knife bar	Counter knife bar is lifted (Selector must be on "setup" with front door open and lowered counter knife)
13	Loosen counter knife bar	Counter knife bar is lowered (Selector must be on "setup")
14	Screen open	Screen swivels open (Selector must be on "setup" with front door open and lowered counter knife)
15	Screen closed	Screen swivels shut (Selector must be on "setup" with front door open and lowered counter knife)
16	Reset	Removed error is reset
17	Lamp test	Checks the functionality of the signal lamps

For safety reasons and to avoid damage, certain functions cannot be used together in setup operation.

9.5.3 Siemens OP3: Functions on SR 2000 MF ECO Drive

Display

Function keyboard

Numeric

The OP 3 operator panel is for displaying and accessing faults that have occurred.

Error messages:

The current error message is shown in the display. If several error messages are on the display, then these can be browsed up / down with the arrow keys.
If there are no error messages to display, the OP switches back to the basic screen.

Procedure for Quitting from Error Messages:

- Read off error on OP3.
- Remedy error on the machine or system part.
- Quit error on the control cabinet or press "Reset" key.

As long as there is no fault, the OP always starts with the green screen when the machine is turned on. Otherwise the fault is displayed in plain text, e.g. "torque switch". After the fault has been removed and has been quit with the "quit fault" button, the OP automatically goes back to the green screen. From here, press the **"Enter"** key to reach the operating level where you find the following standard options, through which you can navigate with the arrow keys according to the on-screen instructions:

- Shift + F1 > Info
  - Systems 4 Recycling contact information
- Shift + F2 > Special
  - Up to eight special functions depending on customer's wishes

- Shift + F1 > Targets
  - Display targets for the machine functions
- Shift + F2 > Actual
  - Display actual values

Set targets:

Target:	Setup	Adjust the speed of the rotor in setup operation (in percent)
0...10%	5%	Enter a number between 1 and 10 and confirm with

Target: 0...100%	Manual 50%	Adjust the speed of the rotor in manual mode (in percent) Enter a number between 10 and 100 and confirm with

Target: 0...100%	Auto/Ext. 80%	Adjust the speed of the rotor in automatic mode (in percent) Enter a number between 10 and 100 and confirm with

Target: 0...100%	Reverse 50%	Adjust the speed of the rotor in reverse (in percent) Enter a number between 10 and 100 and confirm with

Target: 1 - 999 st.	Rev. meter 60	Reverse processes up to error message "reversed too often" Enter a number between 1 and 999 and confirm with

Target: window 1 - 3600 s	Rev. time 3600 s	Set time window for reverse meter Enter a number between 1 and 3600 and confirm with

Target: 1 - 3600 s	Autom. Off 300 s	Time for Autom. Off (WS. Autom. Off must be at 1) Enter a number between 1 and 3600 and confirm with

Target:	Converter	Set converter value, affects ram control
100 - 1000 A	1000 A	Enter a number between 100 and 1000 and confirm with ENTER
		
Target: current	Rated	Set motor rated current, affects ram control
50 - 500 A	290 A	Enter a number between 50 and 500 and confirm with ENTER
		
Target: time	Rev. window	Set time window for how long the rotor reverses
1 - 100 s	6.00 s	Enter a number between 1 and 100 and confirm with ENTER
		
Target: imp.	Rev. window	Adjust how many turns the rotor reverses
1 - 999 st.	2	Enter a number between 1 and 999 and confirm with ENTER
		

You can get back to the green screen at any time with 

9.5.4 Error message on OP3

Note

Error messages from OP3
see OP documentation and wiring diagram

9.5.5 Troubleshooting

Symptom	Cause	Action
The machine has strong vibrations	The machine is tilted	Align machine with spirit level
Abnormal noises in the reducer	Foreign bodies in the working area	Stop reducer, lower counter knife bar, clear up working space and remove foreign bodies (check the reducing tools and the counter knife)
Main drive reverses too often	Reducing tools are worn Counter knife is worn	Turn or replace reducing tools Replace counter knife
Rotor blocked	Foreign bodies in rotor area	Stop reducer, lower counter knife bar clear up working space and remove foreign bodies (check the reducing tools and the counter knife)
Bearing temperature too high > 80°C	Insufficient greasing or over-greased Dirt Bearing installation fault	Check greasing Replace seals, clean bearing and re-grease Check bearing assembly
Chip size too large	Diameter of screen holes too big Gap between reducing tool and counter knife too big (wear of reducing tools)	Replace screen for smaller screen size Turn or replace reducing tool Replace counter knife
ram lifts up in front position	guide rails worn	replace guide rails, clean out complete reducing area
material under the ram	seal at the front of ram is worn	replace plastic seal element
Ram remains in one end position, does not change direction	Setting of pressure switch incorrect Pressure switch defective Slots of guide rails are dirty	Check setting of pressure switch Replace pressure switch Clean slots of guide rails
Ram travels forwards but not backwards, or ram does not work	The field coil of the directional valve is faulty The pressure switch is faulty The valve connector is faulty	Change the field coil Change the pressure switch Change the valve connector

Symptom	Cause	Action
Ram remains in one end position, does not change direction	Setting of pressure switch incorrect	Check setting of pressure switch and pressure relief valve
Ram drives up to the front end position, then only even slightly back	The grooves for the guide rails are clogged with dirt Pressure switch set wrongly or faulty	Clean grooves of the guide rails Check pressure setting and correct setting accordingly or replace pressure switch

Note

Observe separate troubleshooting measures for plant components.
(See separate documentation in "Appendix" chapter.)

Other fault messages from machine and turn-key installations are indicated on the control panel in the form of text or alpha numeric displays. See wiring diagram for the PLC input/output configuration. These are grouped separately or documented in the following – depending on the extent of the information.

10 Maintenance

10.1 Maintenance and Inspection

10.1.1 Instructions

- For maintenance and inspection work, the "Safety" chapter is to be observed thoroughly.
- Operating faults which arise due to insufficient or improper maintenance could lead to very high repair costs and long stoppage periods of the machine/plant. Therefore, regular maintenance is indispensible.
- The operating safety and life of the machine/plant, as well as other factors, also depend on proper maintenance.
- The following table contains time, testing and maintenance instructions for normal use of the machine/plant.
- However, a complete overhaul must be undertaken every three years.
- Because of the various operating behaviours, it cannot basically be established how often an inspection for wear, inspection, maintenance and upkeep is required. A suitable inspection route is to be established under consideration of your operating behaviours.
- Our specialists are happy to be at your disposal for further advice.
- The plant is to be stopped and the power supply interrupted for all maintenance and repair work.
- Maintenance and installation work on electrical components must only be carried out, if the component is disconnected from the power supply.
- For welding work on or in the vicinity of the machine/plant, the earth terminal must be arranged in the immediate vicinity of the welding points, so that no currents can flow uncontrolled over the bearing.
  The EPROM is to be taken out of the PLC.
  Photo cells, particularly opticals, are to be covered.

Warning – General Risks!

If the repair switch is operated, then this must be secured permanently against switching on (padlock) for the period of the maintenance work.

Caution - Equipment Damage!

The repair switch must only be switched with the system/machine switched off, otherwise electronic components such as frequency converter may be damaged!

Warning – General Risks!

**Keep parts that you can walk on free of oil and grease.
Risk of sliding out.**

Substances harmful to the environment, such as oil, are to be collected and disposed of in an environmentally-friendly way. In so doing, the relevant laws for keeping ground and waterways clean are to be observed.

10.1.2 General advice hydraulic system

Valves and pressure regulating elements get adjusted as standard values corresponding to the indications stated in the hydraulic diagram.

The hydraulic systems are factory-filled with hydraulic oil of type SHELL TELLUS 46. The proper function has been approved during a test run in the factory under normal conditions.

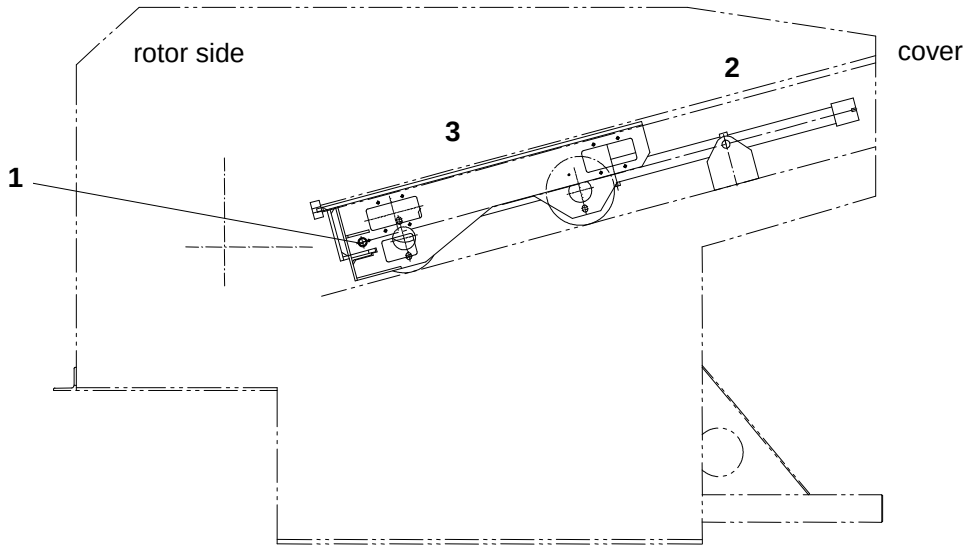
The use of oils with different viscosity may cause functional problems at the automatic operation of the machine. Modification of adjustment required in such case.

Check the oil level with the oil-level indicator – especially after the first operation at which all connected tubes and cylinders are oil-filled, so that all devices connected to the hydraulic system work properly.

Immediately fill up hydraulic oil before the level reaches the minimum mark (check if ram is in front end position).

Note

Only fill up when the ram is behind.



Details:	
1 = bolt hydraulic cylinder	3 = ram in front (rotor side)
2 = ram in rear end position (cover)	

Note

In case of repair:

The inside of the tank, the suction pipes and the filter must be absolut ely clean before filling the tank with new hydraulic oil.

Exchange dirty or milky oil immediately!

The oil gets milky if water has come into the tank or if pumps or suction pipes are leaking.

Find out the reason in any case.

Exchange oil every 2,000 operation hours but at least once per year.

Designations and types are listed in the aggregates parts list res. the equipment list.

10.1.3 Adjusting the Hydraulic System

The hydraulic system gets supplied ready for work. Re-adjustments, e.g. after repair, must only be effected by the qualified Systems 4 Recycling personnel.

10.1.4 Recommended Hydraulic Oil Type

Note

Systems 4 Recycling recommends the hydraulic oil Shell TELLUS HLP 46.

Under extreme conditions (very low or high ambient temperatures) it may be necessary to use hydraulic oils with different characteristics. Ask the **Systems 4 Recycling** service department.

10.1.5 Maintenance and Inspection List

Control Point and Maintenance Instructions	Description Sheet No.	Firstly after ... Operating hours	Regularly after ... Operating hours
All screws to be tight.			200
Remove all solvable covers and any material accumulations.			1000
Switch cabinets must not be blasted out with compressed air, but must be evacuated.			Every six months or weekly with high soiling
Check condition of the reducing tools, turn or exchange if required	Maintenance: Exchange of reducing tools		40
Test rotor contour using the template supplied in the toolbox, reinforce if required.	Upkeep: Rotor contour wear test		200
Condition of counter knife, exchange if necessary	Maintenance: Replacing counter knife	8	40
Check area under the hydraulic ram and remove waste material.			40
Hard Rubber Wheels - Visual inspection	Maintenance: Replacement of: Hard Rubber Wheels	40	200
Ram guidance - Visual inspection	Maintenance: Replacement of ram guidance		200
Ram front seal - Visual inspection	Maintenance: Replacement of seal elements on the ram		200
Sealing of back wall - Visual inspection	Maintenance: Replacement of plastic elements		200
With ambient temperatures less than 10°C the frost protection of the coolant is to be checked to be guaranteed down to –25°C or -35°C respectively.	Appendix: Cooling system documentation		
Check cooling system for seal - Visual inspection.		2	40

Control Point and Maintenance Instructions	Description Sheet No.	Firstly after ... Operating hours	Regularly after ... Operating hours
Check coolant level in the cooling equipment and top up as appropriate		2	40
Coolant change on cooling equipment			after 2 years
Screen Condition - Visual inspection	Maintenance: Replace screen		200
Check hydraulic screw connections for leakage - Visual inspection.	Maintenance: General advice hydraulic system	2	40
Check hydraulic fittings on cracks and leakage, corrosion and deformation and replace if necessary.		40	2.000 or at least after 6 years of operation
Check washers of hydraulic cylinders and replace if necessary.			2000
At least replace hydraulic hoses after.			12.000 or at least after 6 years of operation
Replace oil filter	Appendix: Hydraulics Documentation		2000 or ar least annually
Check oil level in hydraulic unit and fill up if necessary.	Maintenance: General advice hydraulic system	2	40
Oil change on hydraulic power unit	Technical Data: Hydraulic power unit		2000 or annually at the latest
Air spring cushions - Visual inspection.	Maintenance: Lowerable counter knife bar		200

Caution - Equipment Damage!

When using cooling equipment, ventilators, air conditioner etc. in the control cabinet , these (or filter mats) must be cleaned of dust / dirt.

Warning - Fire risk!

If the cooling devices, ventilators, air conditioners etc. are not sufficiently maintained, this leads to unpermitted heating in the control cabinet.

Note

Observe the separate maintenance and inspection instructions for plant components.
(See separate documentation in "Appendix" chapter.)

10.2 Lubricating and Checking the Bearings

Like other vital components, roller bearings must be checked and cleaned now and again.
The schedule for checks depends on the operating conditions.

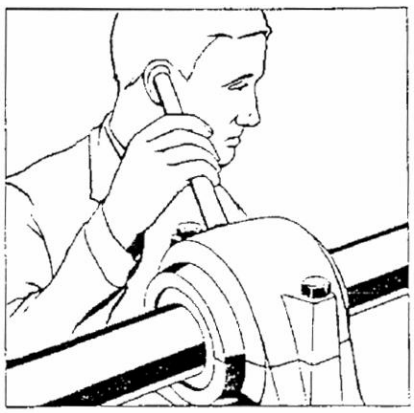
If the condition of the bearings can be assessed by listening to the running noise, measuring the temperature of the bearings or checking the lubrication, then it is usually sufficient to thoroughly check and clean the bearings (rings, separators and body) and all other parts of the bearings during a routine machine inspection or during repair work. However, if the bearings are subject to high stress, they must be checked more frequently.

- The machine/plant is provided with the appropriate quantities of grease for the site installation.
- Careful lubrication is required for a faultless operation of the machine/plant and prevents costly repairs. This particularly applies to the proper lubrication of all roller bearings.
- If lubrication is defective, the standing time of the roller bearing is insufficient and leads to failures.

10.2.1 Checking the Bearings

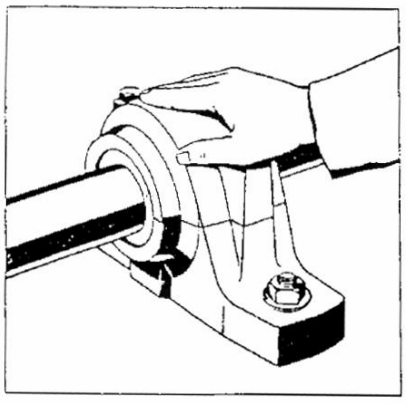
Noise check

Put your ear to a wooden rod, the tang of a screwdriver or a similar object, the other end of which is put as close as possible to the bearing on the housing. If everything is OK, a quiet whirring noise will be heard. On the other hand, damaged bearings cause a loud, often irregular rattling noise.



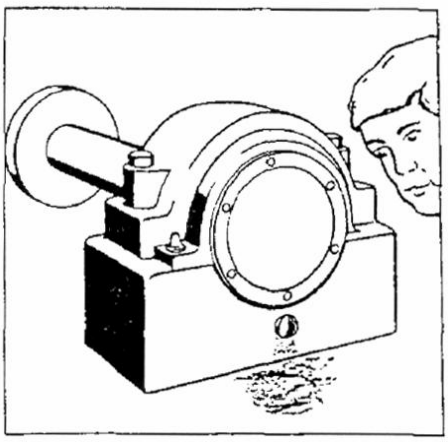
Temperature check

Check the temperature at the bearing position with a thermometer or very simply by laying a hand on the bearing housing. An unusually high temperature or a sudden rise in temperature under the same operating conditions is a sure sign that something is wrong. Reasons for this may be insufficient or excessive lubrication, contamination, overload, bearing damage, too little bearing ventilation, distortions, high friction in the seals or heat coming from outside. However, it is be noted that immediately after relubricating the bearing there is a certain temperature increase which is maintained for up to two days. This is unavoidable.



Visual inspection

Check the conditions of seals, screwed plugs, transition joints and similar, and establish whether lubricant is leaking and whether contamination including hot or corrosive liquids or gases might be able to penetrate the bearing point. Darkly coloured lubricant generally indicates contamination in the bearing. Any automatic lubrication systems present are also to be checked to make sure that they are functioning properly.



10.2.2 Lubricating Points

All lubricating points are to be lubricated with lithium-based grease with corrosion protection additive of penetration grade 3.

Systems 4 Recycling uses **TEXACO MULTIFAK EP 2**.

Naturally, this recommendation does not exclude the use of lubricants of other makes with the same properties.

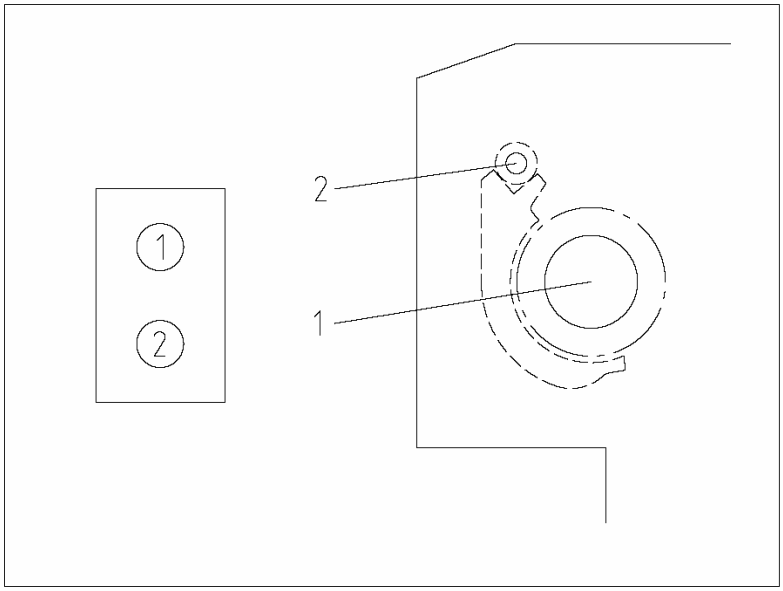
It is to be noted that when greasing, the grease is not too quickly pushed in, as otherwise the seals could be damaged.

Observe the following when lubricating with grease nipples:

- Clean the grease nipples before use
- Make sure that the grease is getting through

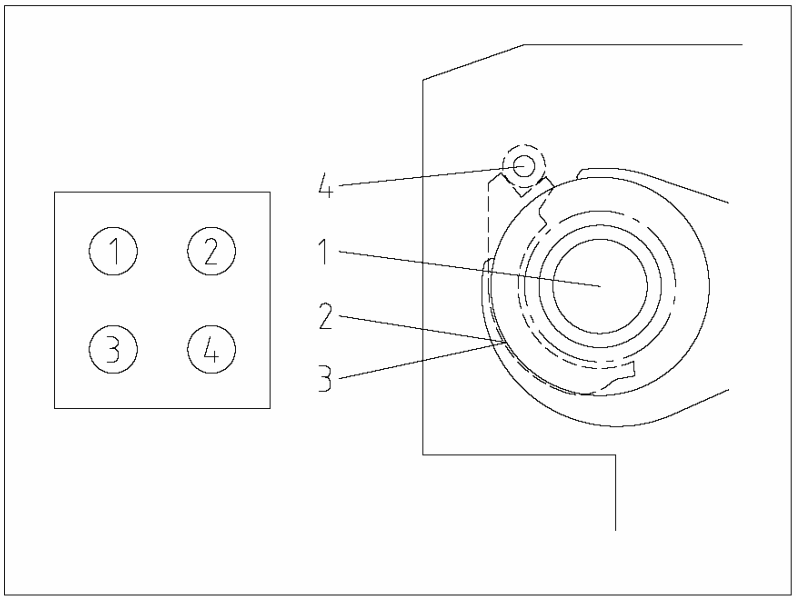
Lubricating points opposite to driving side

Pos. No.:	No of	Located at	Total filling amount grease (g)	Expected re-filling amount (g)	Re-grease (h)	Inspection intervals (h)
1	1	Rotor flanged bearing	1800	70	100	2000
2	1	Screen spherical plain bearings		20	200	2000

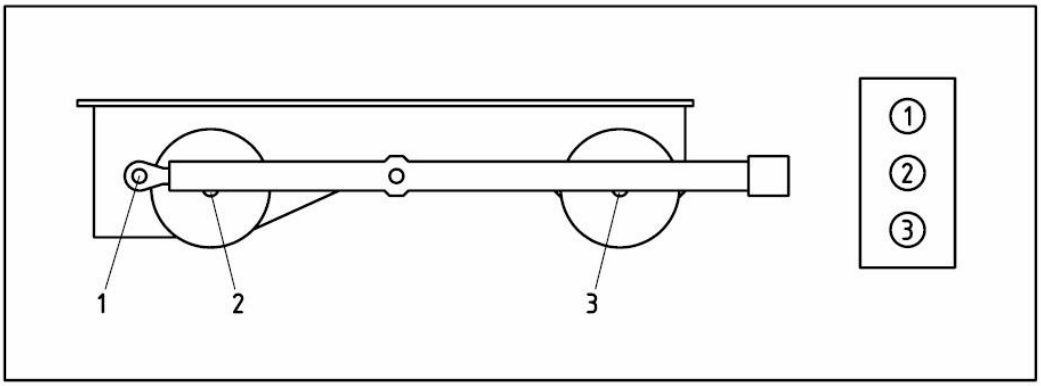


Lubricating points driving side

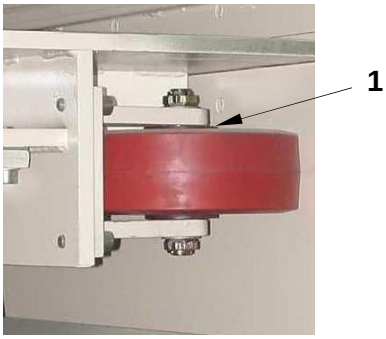
Pos. No.:	No of	Located at	Total filling amount grease (g)	Expected re-filling amount (g)	Re-grease (h)	Inspection intervals (h)
1	1	Rotor flanged bearing	1800	70	100	2000
2	1	High torque motor		100	1000	4000
3	1	High torque motor		100	1000	4000
4	1	Screen spherical plain bearings		20	200	2000

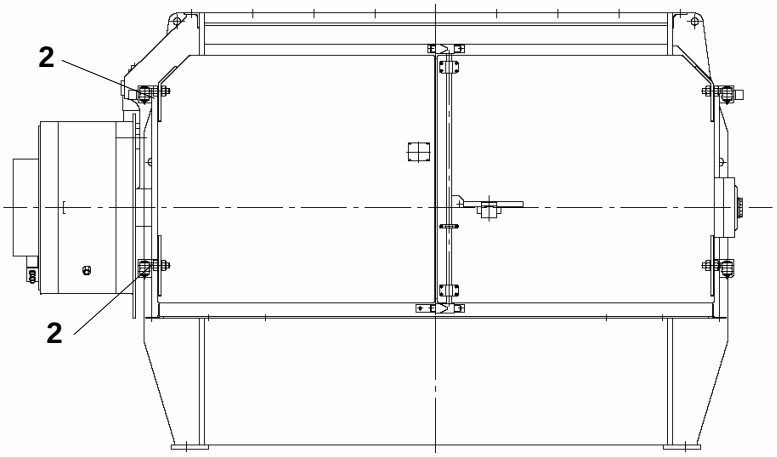


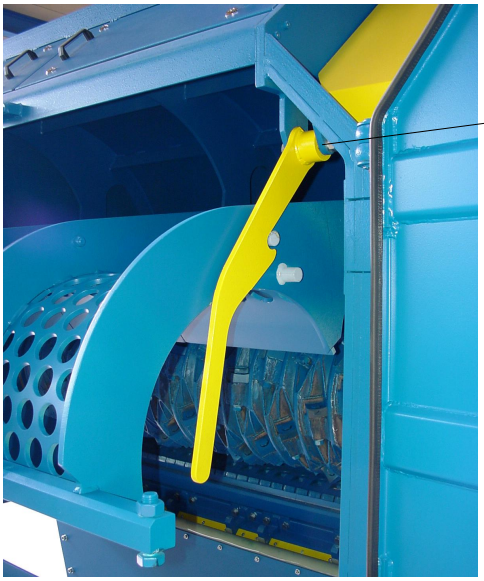
Pos. No.:	No of	Located at	Total filling amount grease (g)	Expected re-filling amount (g)	Re-grease (h)	Inspection intervals (h)
1	2	Hydraulic cylinder linkage eyes		20	200	2000
2	2	Front slide rollers	100	20	100	2000
3	2	Rear slide rollers	100	20	100	2000



Pos. No.:	No of	Located at	Total filling amount grease (g)	Expected re-filling amount (g)	Re-grease (h)	Inspection intervals (h)
1	4	Side slide rollers	100	20	500	2000
2	4	Front door steel pin bearing			100	2000
3	1	Safety hook bearing			as required	
4	1	Counter knife bar linkage eye		20	200	2000

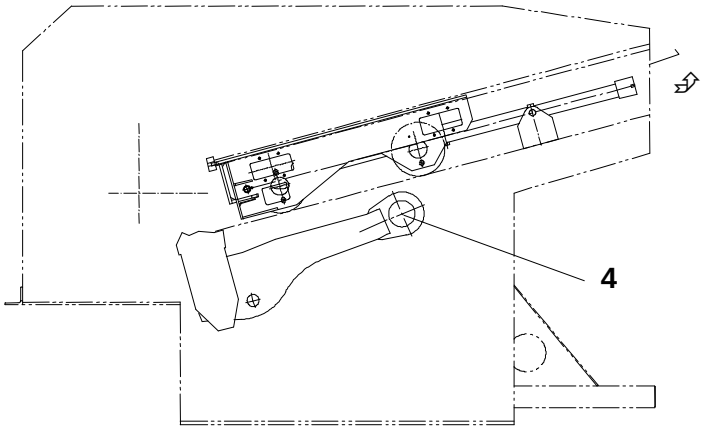






Note

The freedom of movement of the safety hook must always be guaranteed.



10.2.3 Lubricant Storage

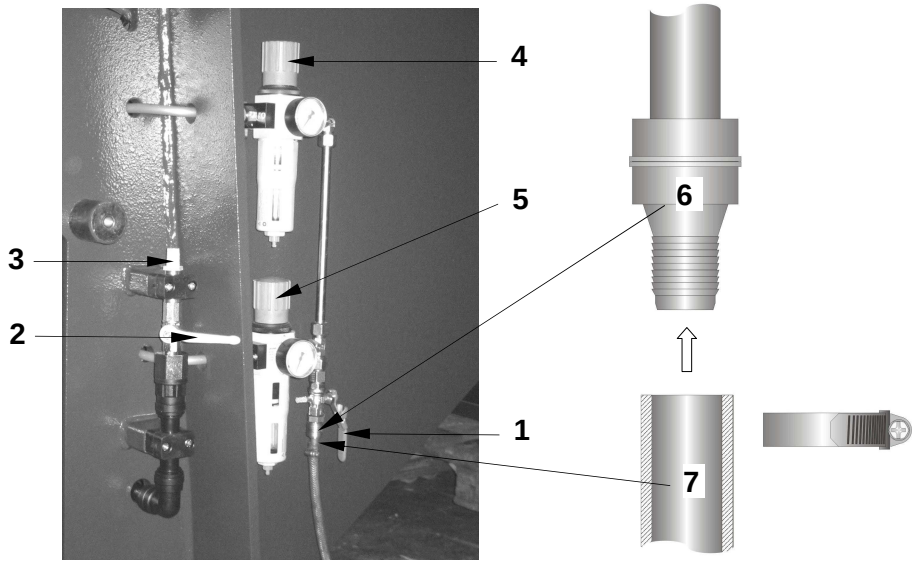
- Store oils and grease cool and dry in clean, closed containers.

10.2.4 Pneumatic protection in case of maintenance works

Warning – General Risks!

When removing foreign bodies and in maintenance works on the counter knife bar, changing the counter knife, changing the reducing ool and changing the screen, the compressed air system is to be depressurised.

- The illustrated presentation is shown in operating condition



Details:	
1 = Compressed Air Cut Off Cock	5 = Controller knob for counterknife pressure setting
2 = Shut-off valve aeration	6 = Rapid release coupling is supplied with machine
3 = Muffler	7 = ½“ Air Hose 56 cfm @ 10 bar, free of oil and water
4 = Control knob for screen pressure setting	

For making system without pressure, proceed as follows:

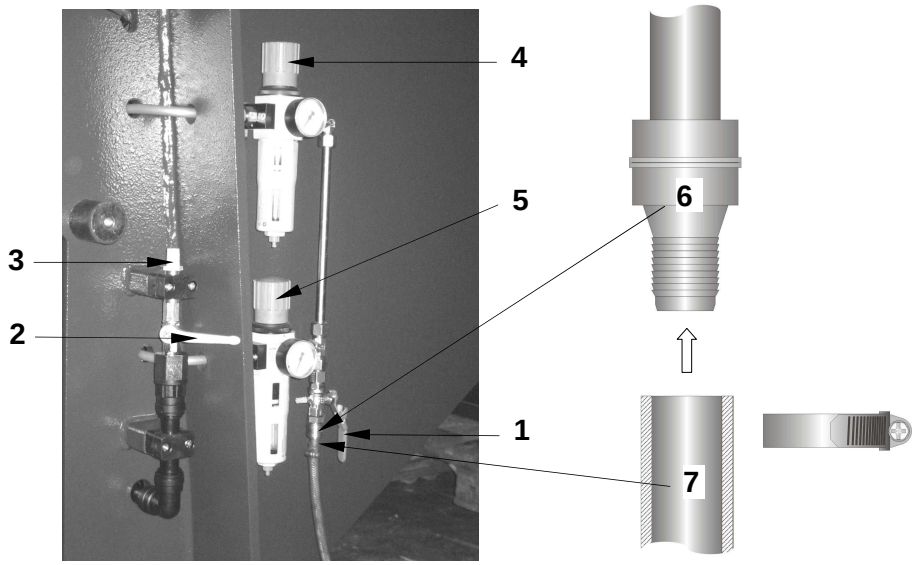
- Stop supply of compressed air by setting cut off cock in position 90° towards flow direction and protect with lock.
- Set cut off cock ventilation in parallel position in flow direction. (probably remaining pressure may escape through the muffler)

10.2.5 Pressure adjustment for screen and counter knife bar

The pressure is adjusted by a filter and regulating valve by each one regulating head. For this, pull up the regulating head and by turning to the right (-) reduce the corresponding pressure, respectively by turning to the left (+) increase the corresponding pressure.

Caution - Equipment Damage!

At too high a pressure, the knife may break.
The pressure is to be adapted to the material to be reduced.
(Guideline: 7-8 bar)



Details:	
1 = Compressed Air Cut Off Cock	5 = Controller knob for counterknife pressure setting
2 = Shut-off valve aeration	6 = Rapid release coupling is supplied with machine
3 = Muffler	7 = ½“ Air Hose 56 cfm @ 10 bar, free of oil and water
4 = Control knob for screen pressure setting	

10.3 Maintenance

10.3.1 Note

- Systems 4 Recycling recommends to employ the qualified Systems 4 Recycling service crew for repairs. Therefore, your maintenance personnel obtain the opportunity for intensive training.
- Only the maintenance work is described, which is done in the context of upkeep, or is needed for replacing worn parts.
- If for certain reasons, you need to replace parts yourself, the following instructions and the individual steps below are to be observed.
- To avoid unnecessary stoppage times, we recommend keeping a supply of spare or replacement parts.
  These parts are particularly marked in the spare parts in the "Spare Parts Holding and Customer Service" chapter.
- Only use original spare parts.
- Before beginning of any repair or maintenance work the machine/plant has to be protected against unintentional start.
  A lockable main power switch and a separate repair switch (if existing) enable this.
- The maintenance drawings are partially simplified.
- The tool supplied for upkeep of the machine is listed in the "Appendix" chapter.

10.3.2 Changing the Reducing Tools

Warning – Danger of Death!

The tools may only be changed from the extension funnel.
The machine must be run empty to do this.
Stop the machines/plants feeding the material and secure against switching on again by a safety lock.

Before starting maintenance work, stop machine/plant, disconnect power supply to open sections of the system and make pressure lines (hydraulics, compressed air, etc.) unpressurised and secure against switching on again.

Warning - Risk of Injury.

During this work, work gloves must be worn.

Warning - Fire risk!

Worn reducing tools lead to overheating of the rotor when reducing is taking place.
Risk of fire!

Caution - Equipment Damage!

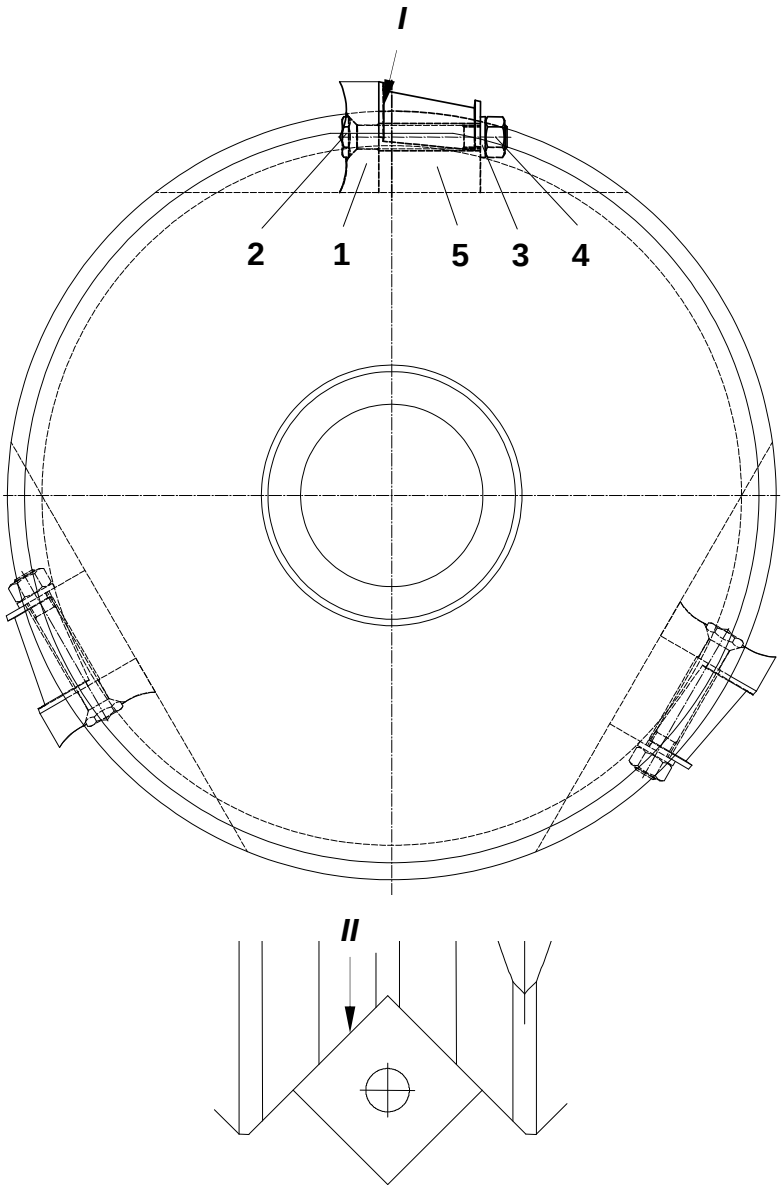
When installing and removing the reducing tools, no impact wrench may be used.

Note

The reducing tools must be changed at the very latest before the contours of the supporting surfaces of the knife holder are affected.

Worn reducing tools lead to deterioration in reducing performance.

The reducing tools, which are screwed to the rotor, can be used up to four times due to their favourable shape and can be easily replaced.



Details:	
1 = reducing tool	5 = tool holder
2 = taper-hexagon screw	I = base surface
3 = washer	II = rotor surface
4 = nut	

- Loosen nut - if necessary counter the conical hexagon bolt with the corresponding socket for wrenches.
  Remove nut and washer, take out conical hexagon bolt.

Caution - Equipment Damage!

Inspect reducing tools for fractures.
Torn or broken reducing tools must no longer be used.

- Clean the bearing surfaces of the reducing tools, the tool holders ***I*** and the rotor grooves ***II***.
- Check bearing surface on the knife holder for evenness.
  If the bearing surface is deformed (lumpy) or the surface is worn, the knife holder must be replaced, because otherwise the fastening screws come loose and damage may occur.
  (see "Instructions on Repairing (Reinforcing) Rotor Contour and Knife Holder")
  Knife holder deforms if larger foreign bodies get into the machine.
  Knife holders wear if the reducing tools are not turned or replaced in good time.
- Exchange reducing tools or turn them to 90°.
  The worn front side of the reducing tools must not be turned to the tool holder.
- Tighten nuts, by holding tapered hexagon screw against the socket insert.
  (For tightening torques of the screws see ("Technical Data" chapter.)

Caution - Equipment Damage!

Damaged screws for the reducing tools are to be replaced immediately.
When tightening the screws, ensure that the reducing tools are on the knife holder surfaces.

Only use hexagonal screws of property class 10.9.

Note

Worn parts are excluded from guarantee.

10.3.3 Rotor Contour Wear Testing

The wear testing of the rotor contour is done using the template supplied in the toolbox. This is put vertically between the pockets of the reducing tools on the rotor.

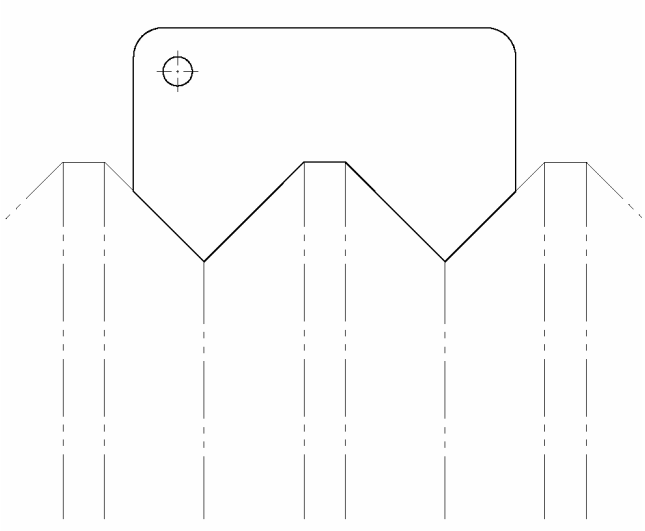


Illustration shows rotor in new condition.

The contour of the template is completely on the rotor contour.

(With reinforced rotors, the template has a bit of air, as the reinforcement is not completely smooth.)

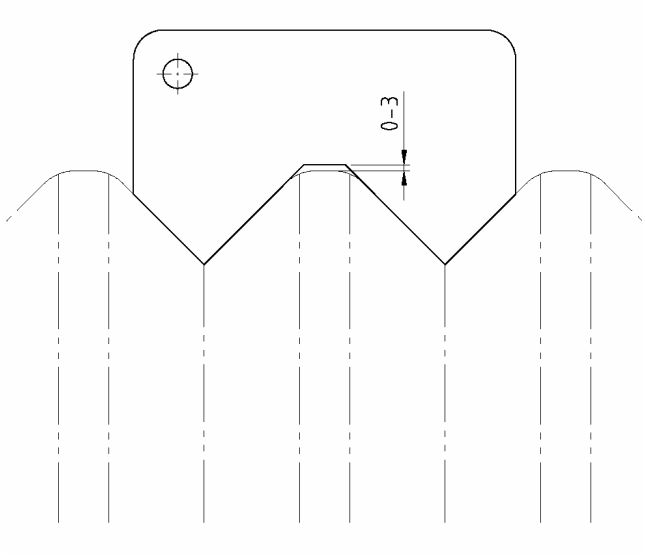


Illustration shows rotor in a slightly worn condition.

Contour of the template is removed no wider than 3 mm from the rotor contour.
A repair is not yet required.

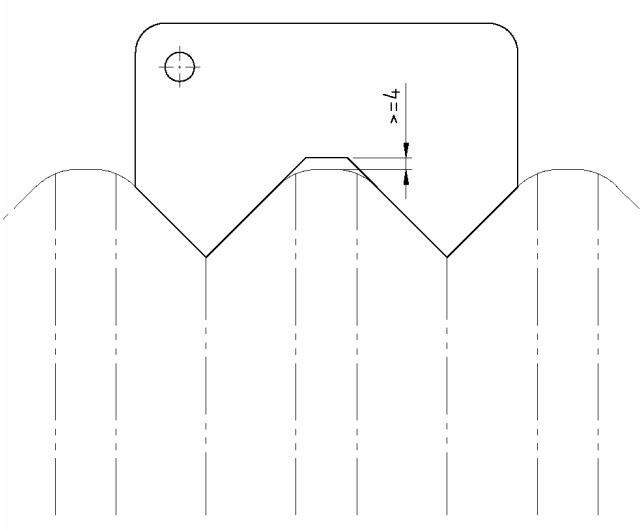


Illustration shows rotor in worn condition.

Contour of the template is removed at least 4 mm from the rotor contour.
The wear boundary is thus reached and the rotor contour must be repaired (reinforced), see "Reinforcing Rotor Contour"

10.3.4 Instructions on Repairing (Reinforcing) Rotor Contour and Knife Holder

Reinforcement of the rotor contour is required if the wear boundary according to "Rotor Contour Wear Testing" has been exceeded.

Caution - Equipment Damage!

If you have to weld on the rotor in the condition when installed, the earthing cable must be attached directly to the body of the rotor!

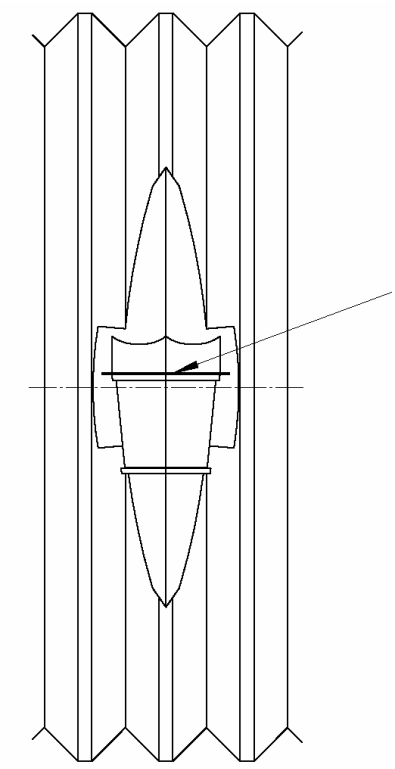
If you do not keep to this, it causes bearing damage and may also lead to damage to other machine and electrical parts.

Knife holder:

It must first be checked whether all knife holders are in perfect condition. To do this, the contact surfaces of the reducing tool must be even and must not worn on the side. (Only a protrusion of the cutting tip of the tool against the holder up to 3 mm is permitted.)

Caution - Equipment Damage!

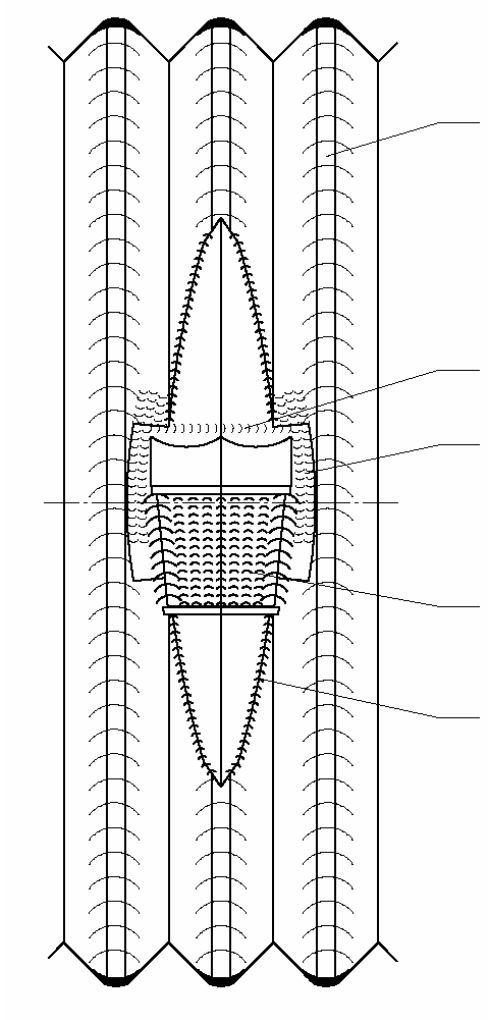
Deformed, worn or crowned knife holders must be replaced:



1. Score or mark the position of the knife holder in the pocket **before** removing along the holder.
2. Remove knife holder using cutoff wheel and weld on new holder as marked.

Note

If both points are not observed, there is the risk that the cutting clearance between the reducing tool and counter knife can no longer be correctly adjusted.



Reinforcement Sequence:

1. Knife holder
2. On the side next to the reducing tool and knife holder
3. Rotor vanes
4. Edges of rotor pockets
5. In front of concave cutter

10.3.5 Replace Counter Knife

Warning – Danger of Death!

The tools may only be aligned from the extension funnel.
The machine must be run empty to do this.
Stop the machines/plants feeding the material and secure against switching on again by a safety lock.

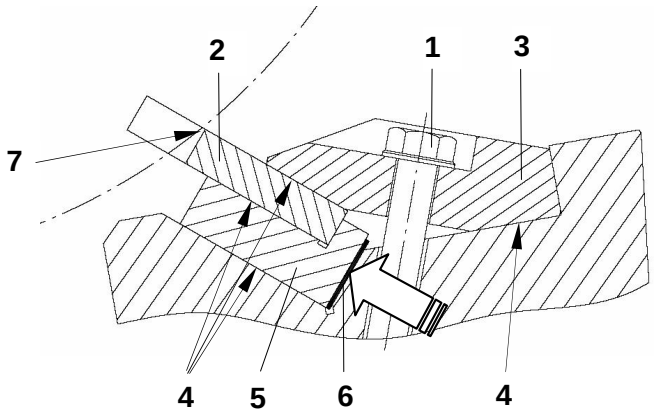
Before starting maintenance work, stop machine/plant, disconnect power supply to open sections of the system and make pressure lines (hydraulics, compressed air, etc.) unpressurised and secure against switching on again.

Warning - Risk of Injury.

During this work, work gloves must be worn.

Note

The counter knives must be changed at the very latest before the contours of the supporting surfaces of the counter knife bar are affected.
Worn counter knives lead to deterioration in reducing performance.



Details:	
1 = Hexagon screw	5 = Support
2 = Counter knife	6 = Spacer plate
3 = Clamping ledge	7 = Cutting gap
4 = Base surface	

- Loosen hexagon screw
- Remove clamping wedge
- Remove counter knife.
- Clean surface (support)and check with regard to damages
- Place new counter knife in position.
- By installation, respectively removal of spacer plates, a cutting cutting gap of 0,5 until max. 1.5 mm between cutting edge rotor tool and counter knife is to be adjusted.
  (Additional spacer plates are in the Systems 4 Recycling tool box.)
- Tighten hexagon screws (For tightening torques of the screws see "Technical Data" chapter).
  Damaged screws for affixing the counter knife are to be replaced immediately with screws of the same property class.
- After replacement of the counter knife turn rotor by hand with corresponding tool, in order to be sure, that no reducing tool knocks against the counter knife.

Note

Worn parts are excluded from guarantee.

10.3.6 Lowering counter knife bar

Warning – General Risks!

Before starting maintenance work, stop machine/plant, disconnect power supply to open sections of the system and make pressure lines (hydraulics, compressed air, etc.) unpressurised and secure against switching on again.

During this work, work gloves must be worn.

Risk of Injury!

Note

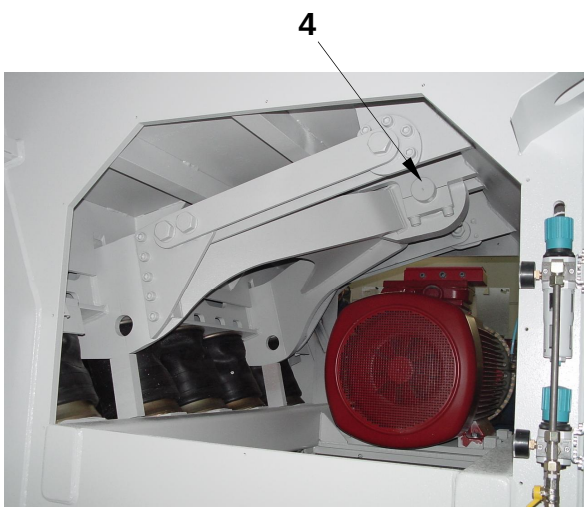
The damper plate must be replaced at the latest when on its upper side or underside, deep deformations of more than 0.5 mm occur.

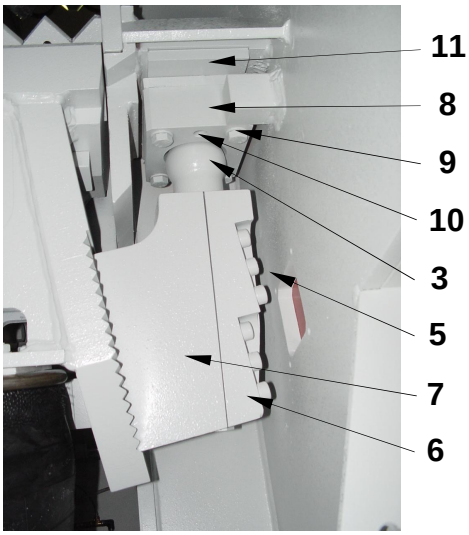
- To do this, lower the counter knife bar and loosen screws. The damper plate can then be removed.
- Insert new damping plate and fasten with screws.

Details:	
1 = plastic damper plates	2 = screws

Note

The ball stud must be replaced at the latest if visible wear phenomena can be detected.
Under certain preconditions it is also possible to adjust the height stop using the ball stud.





Details:	
3 = ball stud	8 = spherical cap
4 = fixing screws	9 = screws
5 = screws	10 = squeeze thread hole
6 = hexagon	11 = fixing plate
7 = holder	

- Re-adjustment: Loosen only front row of screws and adjust ball stud at hexagon by turning upwards or downwards.

- Replacement: Loosen both rows of screws and remove spherical cap together with the fixture. Now the ball stud can be turned out.

Note

The ball cup must be replaced at the latest when visible wear phenomena can be detected.

- For this, lower counter knife bar and loosen and remove screws. Squeeze off sperical cap by two screws M16 x 100 and the squeeze off thread holes from the holding plate (press fit!).

Caution - Equipment Damage!

The pretension pressure of the counter knife bar must be set when commissioning according to the material to be reduced and the sensitivity to disruptive material. A pretension that is set too high can lead to damage to the reducing tools and their fastenings.

10.3.7 Changing the Screen

Warning – General Risks!

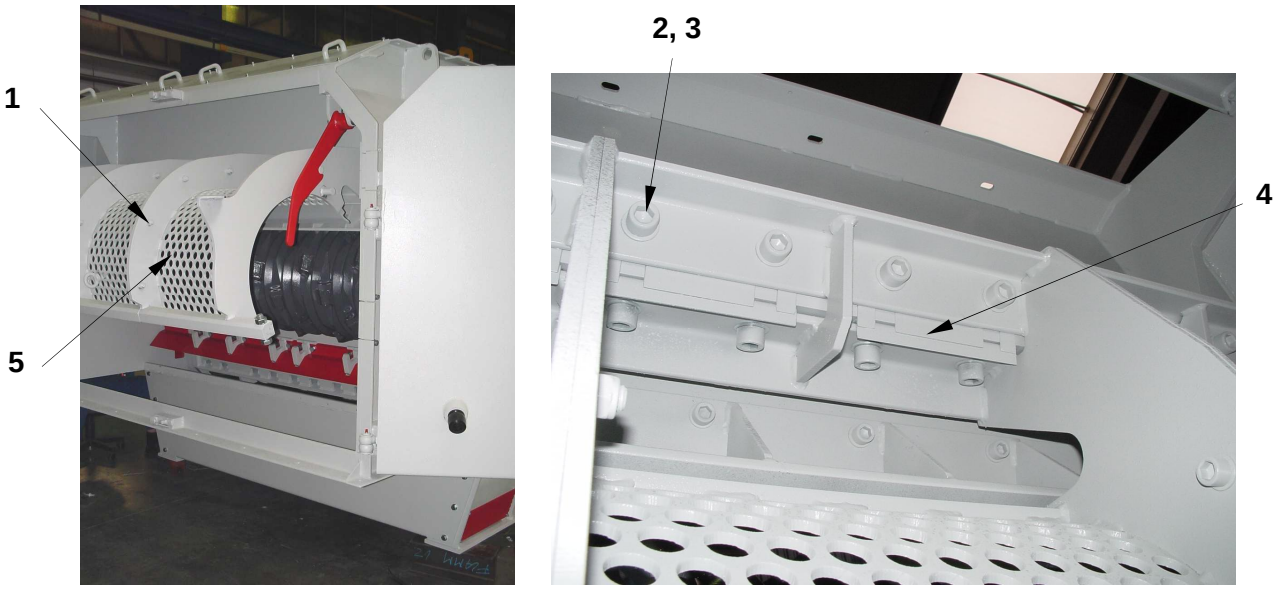
Before starting maintenance work, stop machine/plant, disconnect power supply to open sections of the system and make pressure lines (hydraulics, compressed air, etc.) unpressurised and secure against switching on again.

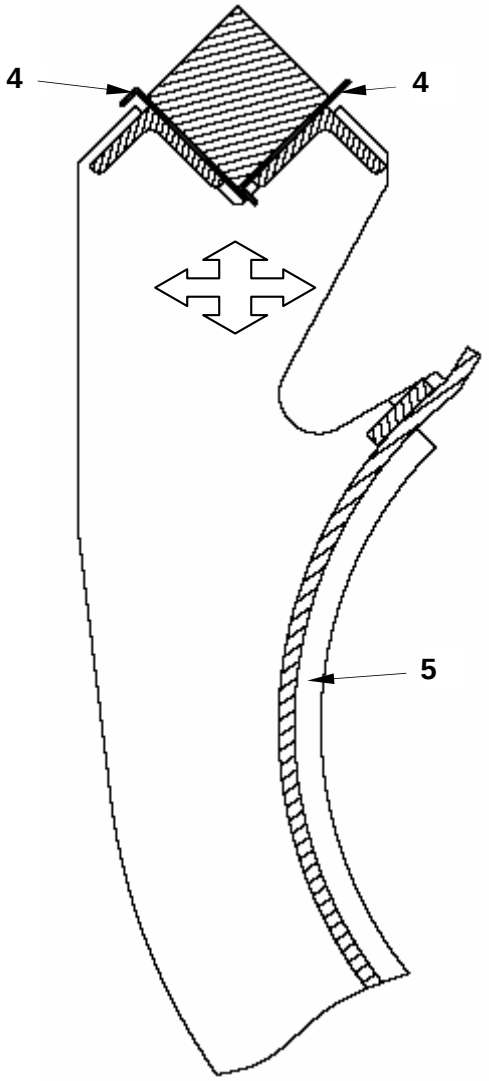
During this work, work gloves must be worn.

Risk of Injury!

Note

The screen units must be changed at the latest, if the ribs for screens are broken, the screen is deformed or if the gap between the tip of the reducing tool and screen is greater than 10 mm.





Details:	
1 = Screw connection	4 = Spacer
2 = Fixing screw	5 = Screen unit
3 = Washer	

- Set selector switch to 0 = off
- Open front hood
- Fasten screen to suitable hoisting gear
  (e.g. chain pulley or stacker)
- Loosen screwed connection of the screen units among each others.
- Undo fastening screws with washers
- Remove screen unit and clean hub

Installation is done accordingly in the reverse order.

- Adjust a distance of 1 upto 3 mm max. all around between top of the rotor tool and inner radius screen by installation respectively removal of spacer plates. (Additional spacer plates are in the Systems 4 Recycling tool box).

Note

Worn parts are excluded from guarantee.

10.3.8 Ram guides: Replacing of guide rollers

Warning – General Risks!

Before starting maintenance work, stop machine/plant, disconnect power supply to open sections of the system and make pressure lines (hydraulics, compressed air, etc.) unpressurised and secure against switching on again.

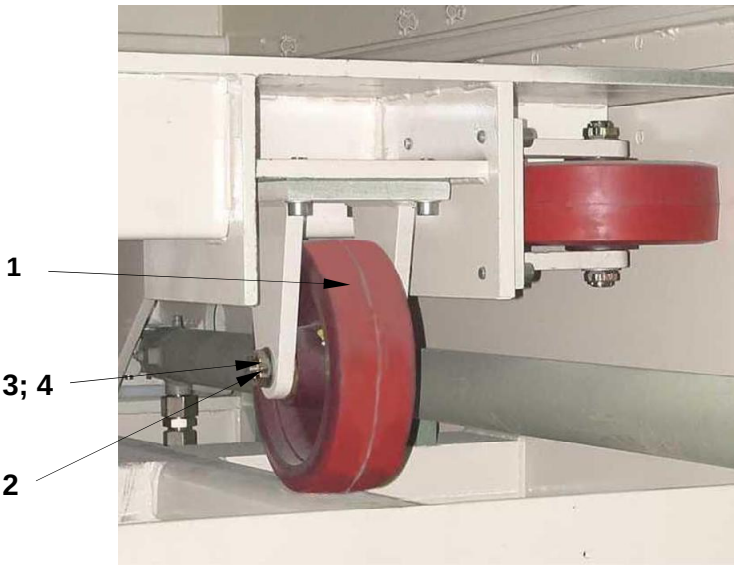
During this work, work gloves must be worn.

Risk of Injury!

Note

Every 200 h the screen guide and the rollers are to be checked. The rollers are to be replaced when the running surface or the bearings are damaged.

Due to fault rollers the screen tilts to blockages and the operation of the brass guide rails and the seal element (see following pages) is not longer guaranteed.



Details:	
1 = Roller	3 = Hexagonal nut
2 = Locking shim	4 = Axle

- Remove locking shim and unscrew hexagon nut.
- Take out roller with axle
- Remove axle
- Install new roller in reverse order
- Pay attention to sufficient lubrification of the rollers

Note

Worn parts are excluded from guarantee.

10.3.9 Replacing the Guide Rails (brass)

Warning – General Risks!

Before starting maintenance work, stop machine/plant, disconnect power supply to open sections of the system and make pressure lines (hydraulics, compressed air, etc.) unpressurised and secure against switching on again.

During this work, work gloves must be worn.

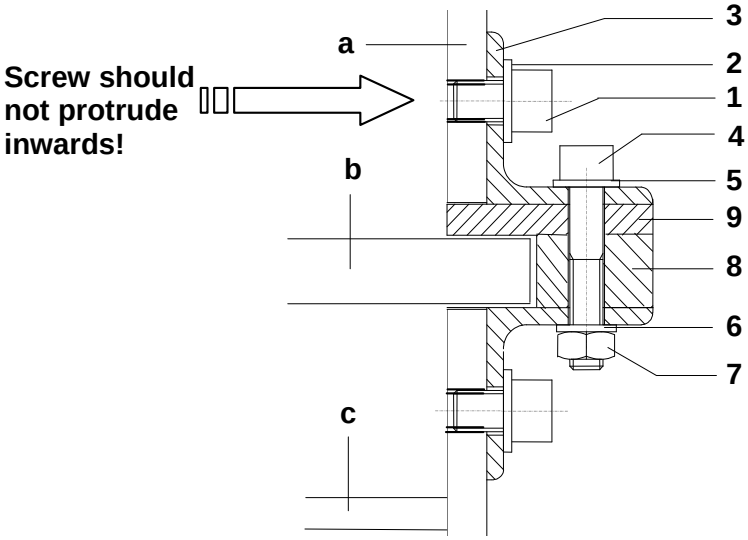
Risk of Injury!

Note

The guide rail is to be checked for wear every 200 h. Replace if required.

If the groove in the guide rail is badly worn, the ram tilts towards the deadlocks.

The operation of the seal element (see following pages) can no longer be guaranteed.



Details:	
1 = cylinder head screws	7 = hexagon nut
2 = washer	8 = flat steel
3 = upper angle	9 = guid rails (brass)
4 = cylinder head screws	a = machine side wall
5 = washer	b = ram
6 = washer	c = machine bottom plate

Replacing the brass rails (in pairs):

- Support the ram towards the machine bottom plate.
- Loosen cylinder screws with washers of upper angle
- Loosen hexagon nuts and remove cylinder head screws together with washers
- Remove brass guide rail and flat bar
- Insert new brass guide rail together with flat bar. Tighten angle with crews and washers.
- Line up brass guide rails and flat bar.
  (They must flush with the inner side of the machine side wall)
- Insert cylinder head screws with washers and hexagon nuts and tighten firmly.

Note

Worn parts are excluded from guarantee.

10.3.10 Replacing the Seals at the Ram Front

Warning – General Risks!

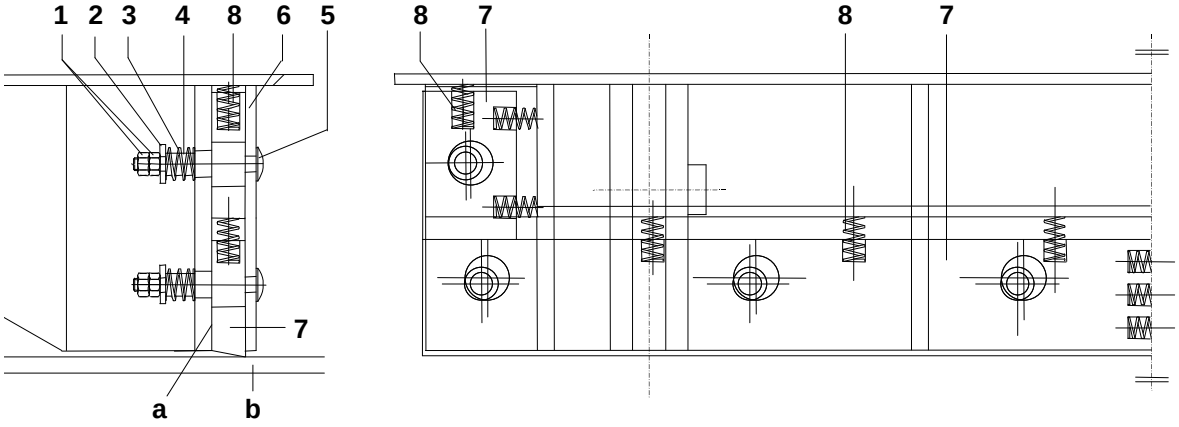
Before starting maintenance work, stop machine/plant, disconnect power supply to open sections of the system and make pressure lines (hydraulics, compressed air, etc.) unpressurised and secure against switching on again.

This maintenance work must only be carried out with work gloves and safety goggles (springs may jump off).

Risk of Injury!

Note

The seal element is to be replaced at the latest when it loses its wedge shape.



Details:	
1 = hexagon nut	6 = front plate
2 = washer	7 = seal element
3 = spring	8 = spring
4 = bushing	a = contact surface
5 = cup square bolt	b = machine bottom plate

- Loosen hexagon nuts.
- Remove washers, springs and bushings.
- Remove front plate carefully together with cup square bolt.

Warning - Risk of Injury.

Pressure springs can jump out!

- Take out seal element cautiously.
- Remove springs.
- Clean contact surfaces.

Installation is done accordingly in the reverse order.

Note

Worn parts are excluded from guarantee.

10.3.11 Replacing the Seal at the Back Wall

Warning – General Risks!

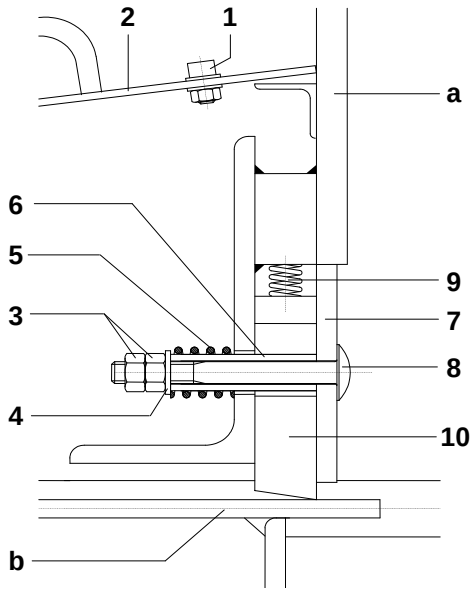
Before starting maintenance work, stop machine/plant, disconnect power supply to open sections of the system and make pressure lines (hydraulics, compressed air, etc.) unpressurised and secure against switching on again.

This maintenance work must only be carried out with work gloves and safety goggles (springs may jump off).

Risk of Injury!

Note

The seal element is to be replaced at the latest when it loses its wedge shape.



Details:	
1 = sash fastener	7 = clamping plate
2 = cover	8 = cup square bolt
3 = hexagon nut	9 = spring
4 = washer	10 = seal element
5 = spring	a = back wall
6 = bushing	b = ram

- Loosen sash fastener
- Remove cover.
- Loosen hexagon nuts.
- Remove washers, springs and bushings.
- Remove front plate carefully together with cup square bolt.

Warning - Risk of Injury.

Pressure springs can jump out!

- Take out seal element cautiously.
- Remove springs.
- Clean contact surfaces.

Installation is done accordingly in the reverse order.

Note

Worn parts are excluded from guarantee.

10.3.12 Repair Work on the Machine/Plant

For all repair work concerning the machine/plant (store change, drive change etc.) technical qualifications are required, consult with Systems 4 Recycling as appropriate.

11 Spare Parts Holding and Customer Service

11.1 Spare Parts Holding

A supply of the most important spare and replacement parts on the installation site is an important prerequisite for continuous functioning and operational readiness of the machine/plant.

Only use original spare parts.

We expressly make it clear that spare parts and accessories that are not from Systems 4 Recycling have also not been tested and released by Systems 4 Recycling. The installation and/or the user of such products can therefore under circumstances negatively affect the prescribed properties of the machine/plant in terms of design, and therefore affect the active and/or passive safety.
The liability and guarantee on the part of Systems 4 Recycling is excluded for damage which is incurred by the user of non-original spare parts and accessories.

Please note that there are often special manufacturing and supplier specification for own or external parts. We always supply you with spare parts to the latest state of the art and in accordance with the latest legal regulations.

For ordering spare parts, please use the following spare parts list.

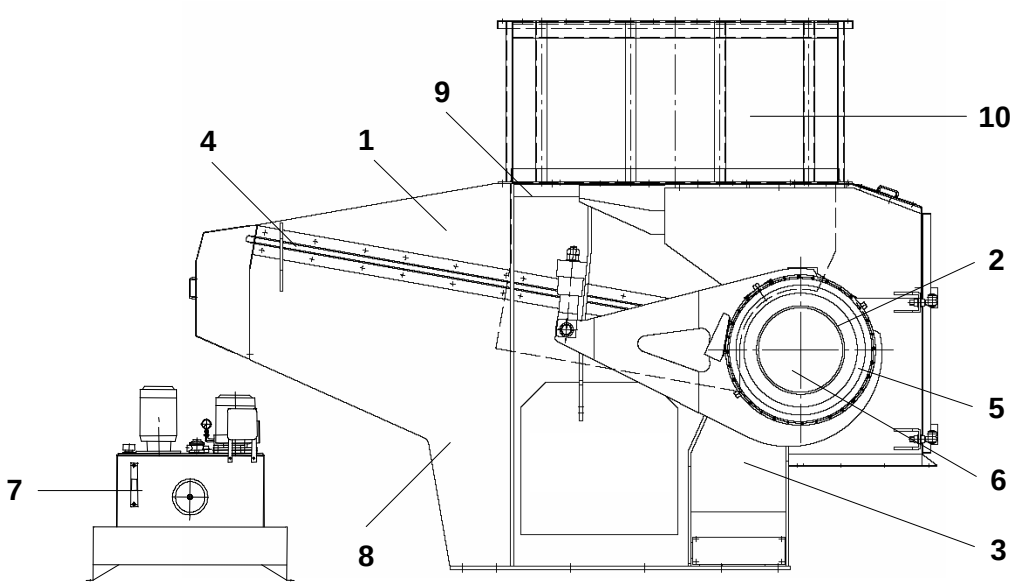
The following information is to be given for orders of spare parts:

- Order number
- Nomination
- Rating
- Assembly
- Machine number (commission number)
- Item number
- Quantity

11.2 Designation

Type Plate

11.3 Name of Components



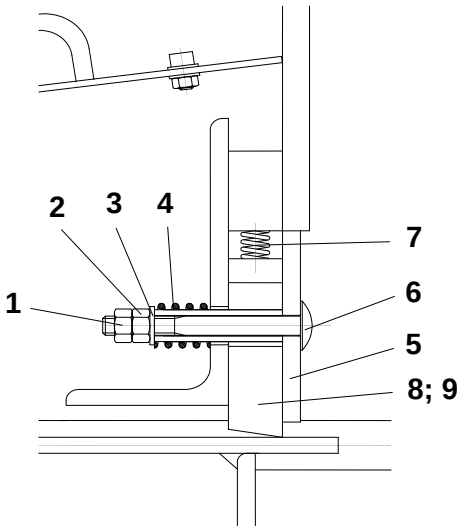
Details:	
1 = Machine stand	6 = Main drive
2 = Rotor	7 = Hydraulic power unit
3 = Lowerable counter knife bar	8 = Compressed air connection
4 = Swivellable screen	9 = Connection for coolant
5 = Ram	10 = Funnel

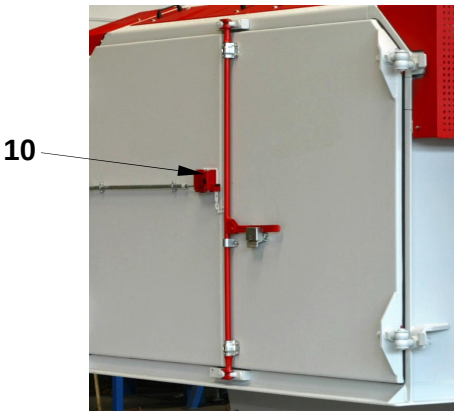
11.4 Spare and Replacement Parts List

Details:		
Replacement parts	=>	No label
Spare parts	=>	labelled with *

11.4.1 Machine body

Item	Quantity	Description
1	10	Hexagon nut, self-locking
2	10	Hexagon nut
3	10	Washer
4	10	Compression-tension spring (saucer head screw)
5	1	Clamping plate
6	10	Mushroom head screw
7	13	Compression tension spring
8	1	Seal element right *
9	1	Seal element left *
10	1	Safety switch

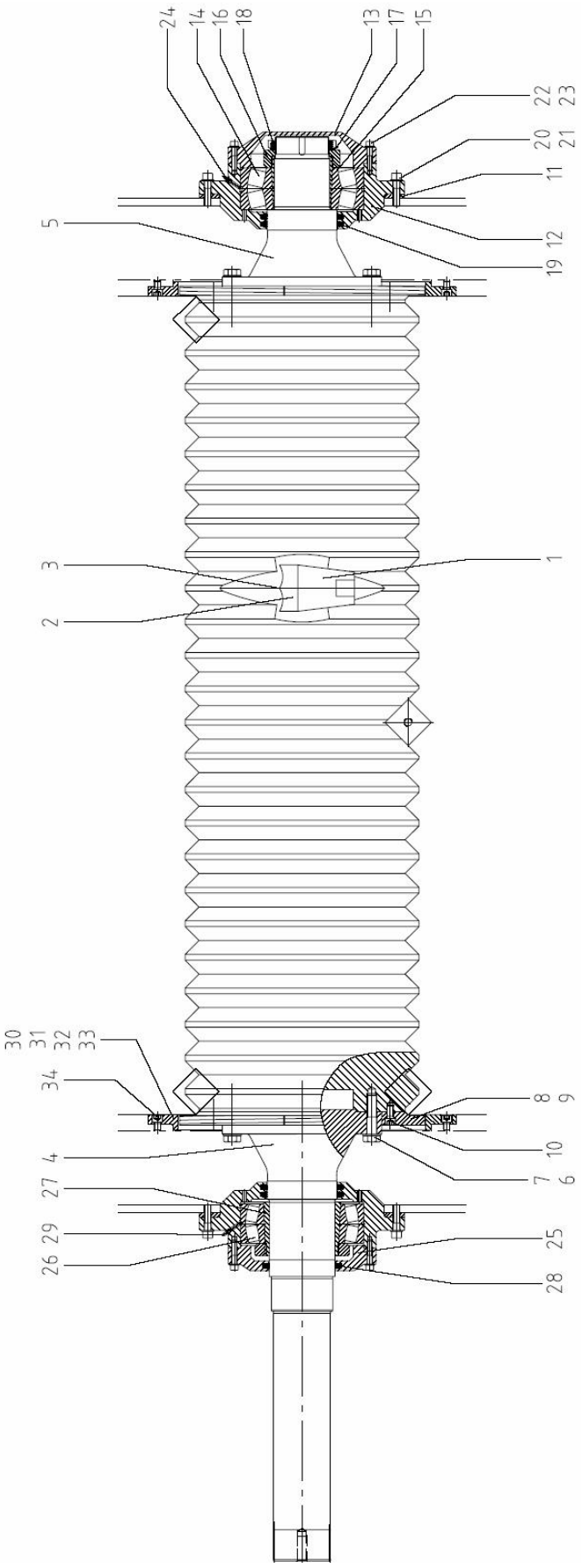




11.4.2 Rotor

Item	Quantity	Description
1	93	Knife holder *
2	93	Reducing tool *
3	93	Hexagon bolt with 90° taper
4	1	Rotor shaft (movable bearing)
5	1	Rotor shaft (fixed bearing)
6	40	Hexagon head cap screw
7	40	Washer
8	1	Wear ring (right)
9	1	Wear ring (left)
10	24	Cylinder screw
11	1	Spacer disk
12	1	Flanged bearing housing
13	1	Bearing cover closed
14	1	Spherical roller bearing
15	1	Withdrawal sleeve
16	1	Threaded sleeve
17	1	Retainer plate *
18	1	Lock nut *
19	4	Felt seal *
20	24	Cylinder screw
21	24	Washer
22	16	Cylinder screw
23	16	Washer
24	1	Grease nipple
25	1	Bearing cover open
26	1	Spherical roller bearing
27	1	Sleeve

Item	Quantity	Description
28	1	Felt seal Fl22 *
29	1	Grease line
30	1	Deflector, top right
31	1	Deflector, bottom right
32	1	Deflector, top left
33	1	Deflector, bottom left
34	18	Cylinder screw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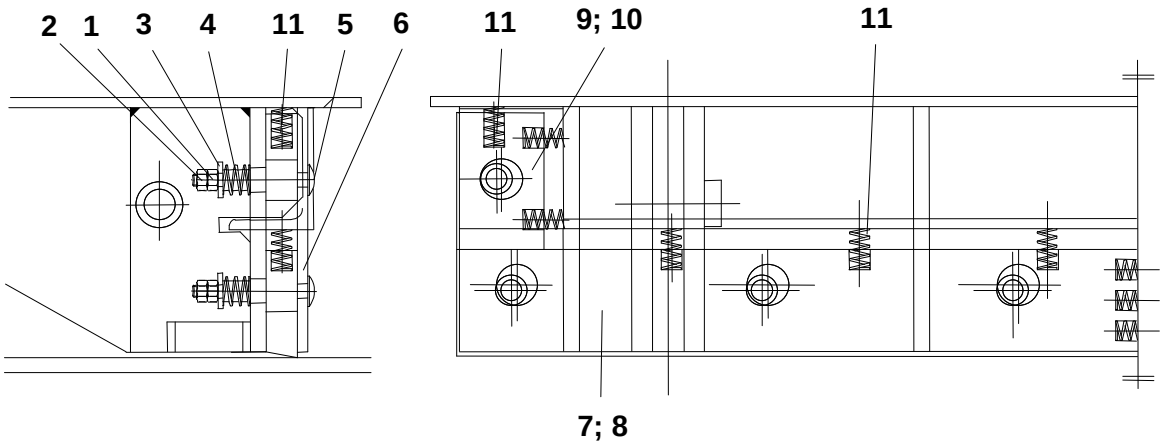
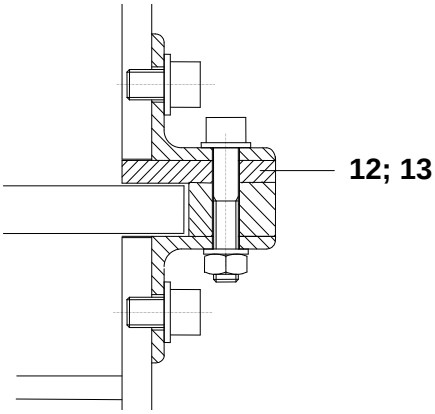
11.4.3 Ram

Item	Quantity	Description
1	12	Hexagon nut
2	12	Hexagon nut, self-locking
3	12	Washer
4	12	Compression-tension spring (saucer head screw)
5	12	Mushroom head screw
6	1	Clamping plate
7	1	Seal element left *
8	1	Seal element right *
9	1	Seal element left *
10	1	Seal element right *
11	15	Compression tension spring
12	4	Guide rail (rear, centre) *
13	2	Guide rail (front) *
14	4	Roller
15	4	Roller
16	2	Bolt
17	2	Cylinder screw
18	1	Proximity switch

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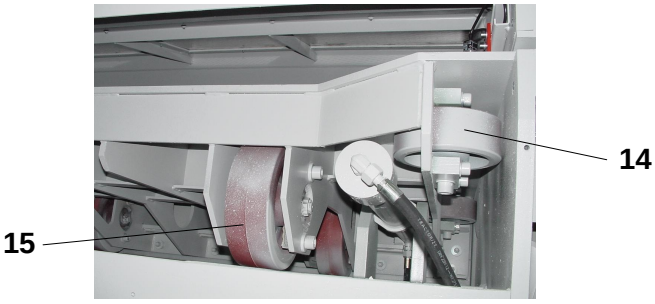
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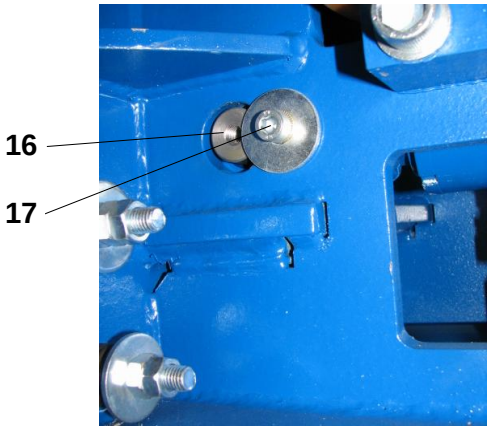
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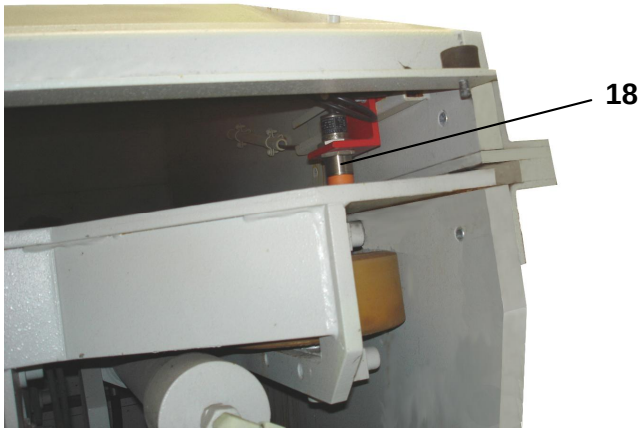
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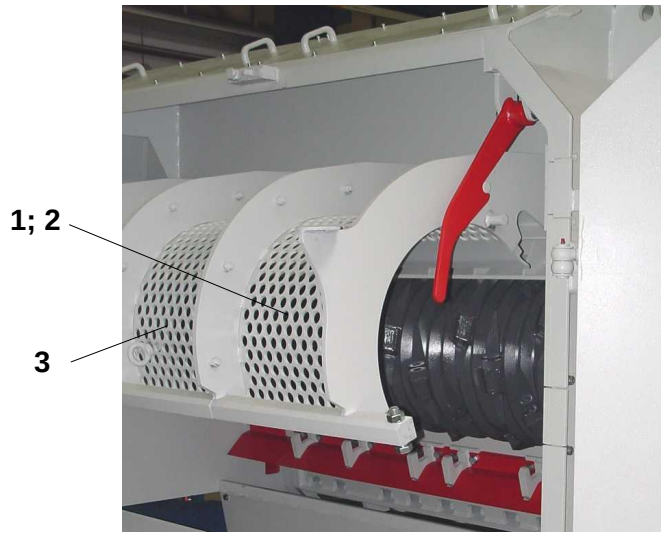
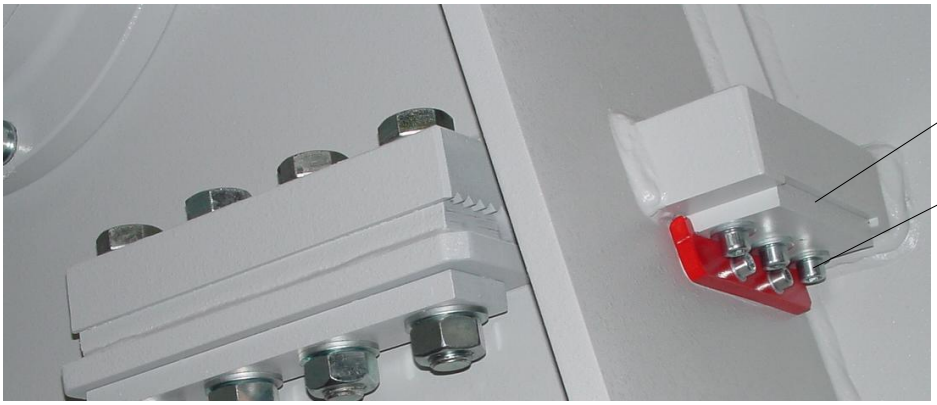
11.4.4 Swivellable Screen

Item	Quantity	Description
1	1	Screen unit (left) *
2	1	Screen unit (right) *
3	2	Screen unit (centre) *



11.4.5 Lowerable Counter Knife Bar

Item	Quantity	Description
1	6	Air bellows
2	20	Hexagon head cap screw
3	20	Hexagon nut
4	2	Air bellows
5	28	Cylinder screw
6	2	Ball
7	2	Ball seat
8	8	Hexagon head cap screw
9	2	Damping plate
10	6	Cylinder screw
11	6	Ultra bushing (stabiliser)
12	1	Eye joint
13	1	Eccentric shaft
14	6	Screen hook
15	24	Hexagon head cap screw
16	12	Shim
17	20	Hexagon bolt (counter knife) *
18	20	Disk (counter knife) *
19	1	Counter knife 5 - part *
20	3	Clamping wedge (centre) *
21	2	Clamping wedge (external) *
22	2	Fastening strip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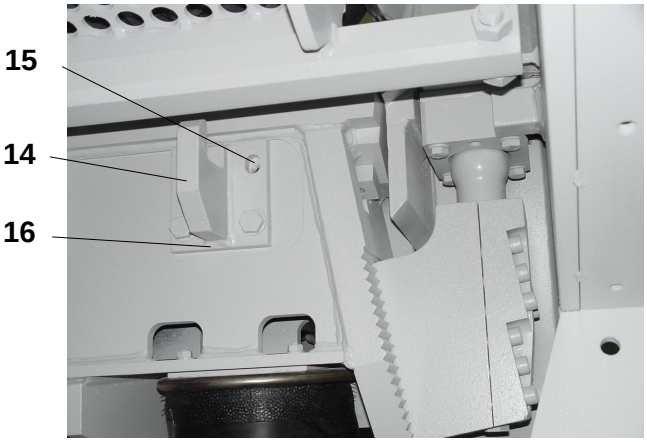
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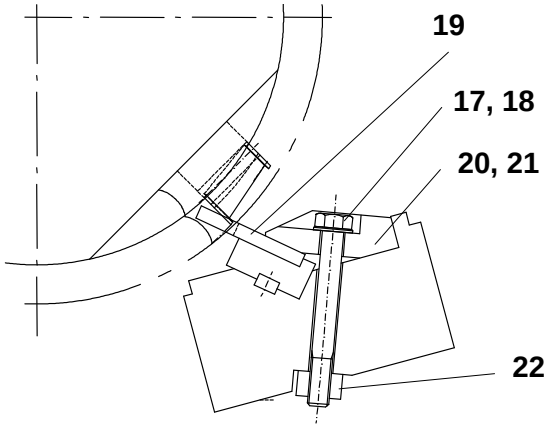
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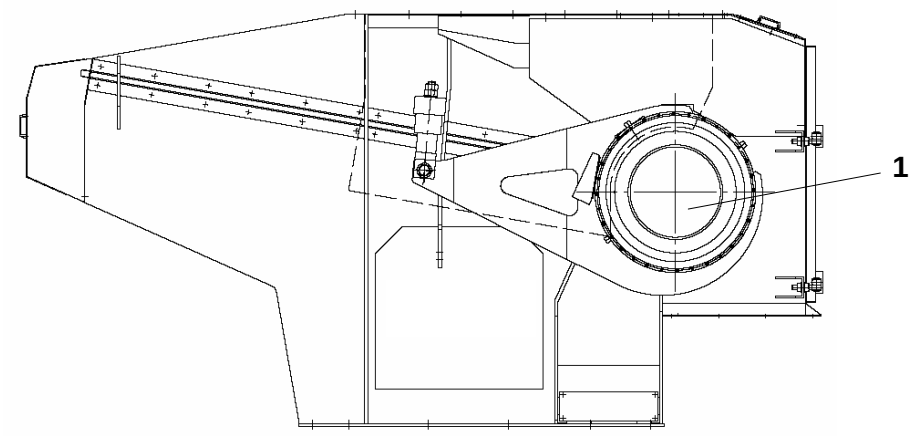
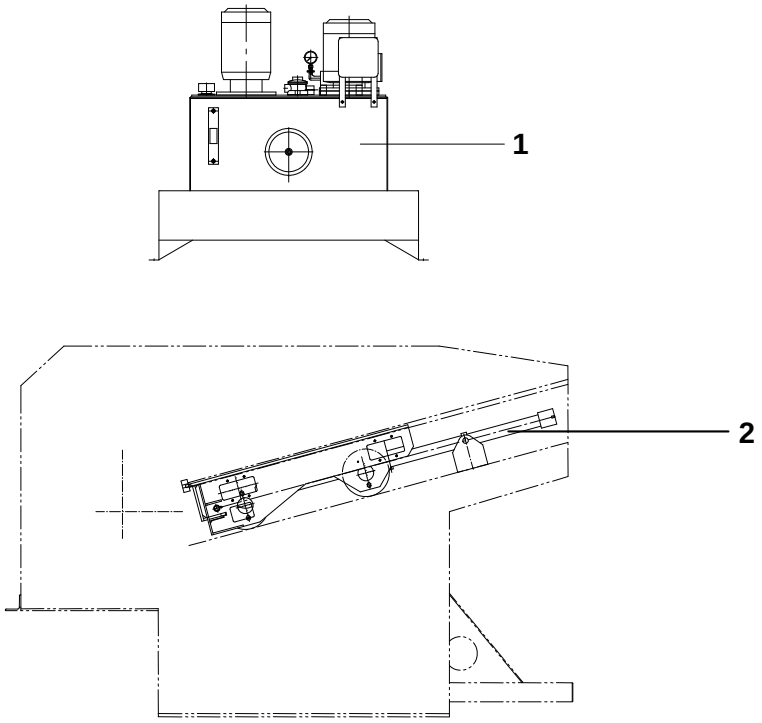
11.4.6 Main drive

Item	Quantity	Description
1	1	High torque motor



11.4.7 Hydraulic unit

Item	Quantity	Description
1	1	Hydraulic power unit
2	2	Hydraulic cylinder



11.5 Spare Parts and Customer Service Addresses

Systems 4 Recycling Limited
2 Adelaide House
Corbygate Business Park
Priors Haw Road
Corby
Northamptonshire
NN17 5JG

Telephone **+44 (0) 1536 206470**
Facsimile +44 (0) 1536 206471
info@s4r.co.uk

12 Appendix

12.1 Maintenance Tools and Accessories

Note

For undertaking maintenance work and making this maintenance work easier the following tools and accessories are supplied:

1 tool box

1 socket wrench - socket 3/4" 27 mm; hexagonal

1 socket wrench - socket 3/4" 30 mm; hexagonal

1 socket wrench - socket 3/4" 36 mm; hexagonal

1 ratchet 1/2"

1 extension 1/2"; 125 mm l.

1 socket wrench - insert 1/2" 17 mm; allen

1 socket wrench - insert 1/2" 19 mm; allen

1 socket wrench - insert 1/2" 19 mm; hexagonal

1 allen key set 4-19 mm

1 combination wrench set 8-22 mm

1 patented lidded can of original paint 1/2 l

1 torque wrench 140 - 700 Nm 3/4" with nut 19, IN19

1 tool for hexagon bolt with 90° taper

4 spacer sheet 0.5 x 350 x 35

4 spacer sheet 1 x 350 x 35

4 spacer sheet 2 x 350 x 35

4 spacer sheet 3 x 350 x 35

3 spacer sheet 0.5 x 400 x 35

3 spacer sheet 1 x 400 x 35

3 spacer sheet 2 x 400 x 35

3 spacer sheet 3 x 400 x 35

2 spacer sheet 0.5 x 450 x 35

2 spacer sheet 1 x 450 x 35

2 spacer sheet 2 x 450 x 35

2 spacer sheet 3 x 450 x 35

2 spacer sheet 0.5 x 500 x 35

2 spacer sheet 1 x 500 x 35

2 spacer sheet 2 x 500 x 35

2 spacer sheet 3 x 500 x 35

10 spacer sheet 1 x 200 x 130

10 spacer sheet 2 x 200 x 130

10 spacer sheet 3 x 200 x 130

6 spacers, 0.5 x 145 x 140 (screen hook - counter knife bar)

6 spacers, 1 x 145 x 140 (screen hook - counter knife bar)

6 spacers, 2 x 145 x 140 (screen hook - counter knife bar)

3 off tools for installation seal element counter knife bar

3 off. cylinder head screw M10 x 40

3 off. washer

2 tools for splaying the ball stud support

12.2 List of Separate Documentation

High torque motor documentation

Cooling system documentation

Frequency converter documentation

Documentation hydraulic

Documentation for electrical equipment (See inside control cabinet)

13 Index