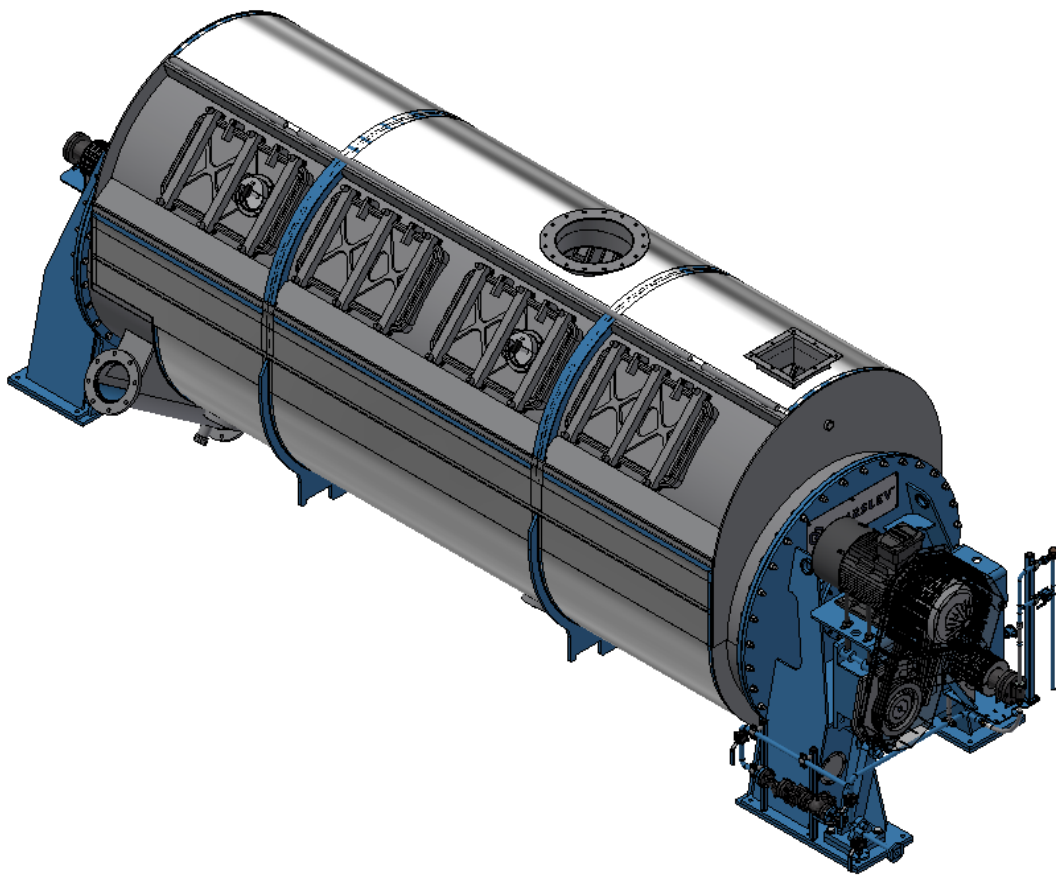




HAARSLEV™
Processing Technology

**Original Instruction Manual for
Condi Dryer type HCD60SS
Part No. 108-1306**



Preface

We kindly ask you to read the following instructions in order to avoid the problems that may otherwise occur due to insufficient knowledge of the Condi dryer and the way it is used.

However, please do not hesitate to contact Haarslev Industries A/S immediately if problems occur, if more information is needed or in case the Condi dryer has been damaged during the transport.

Furthermore, we would like to draw your attention to the fact that improvements of our machines are being made constantly, which is why there might be some deviations between the technical data of your machines and the information stated in this manual.

We hope that the enclosed documentation, which meets the necessary requirements and conditions for mounting, functioning and maintenance of the Condi dryer will prove to be helpful.

Quality

A neutral authority inspects all coil-dryers and a standard test is carried out before each shipment.

Design

Our machines are made in accordance with the international standards. Accordingly, designing considerations are carried out to make maintenance and cleaning easier.

Productions

At the construction of the plant only the very latest technology has been used. The methods as well as the calculations have been executed with due consideration to the rules and regulations prevailing in Europe.

Development

Veterinary authorities and meat technologists are always consulted when new developments and optimizing are made.



This safety and warning symbol states that the section in question contains important security rules and guide lines to the prevention of accidents.

Notification of Authorities

In most countries it is the duty of the customer to notify local authorities that a pressure vessel is being installed. Legislation varies between countries, but usually an inspection of the plant and pressure certificates by the local authorities is mandatory. Depending on local legislation the inspector may have the right to witness a hydrostatic pressure test of pressure vessels or inspect vessels internally.

It is common practice to come to an agreement with the local authorities at the initial inspection of the pressure vessels, on how often the plant shall be inspected and by whom.

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1. Technical Specifications

1.1 Technical Data

Manufacturer: Haarslev Industries A/S
Head office Bogensevej 85
5471 Sønderso, Denmark
Tel.: +45 63 83 11 00
Fax: +45 63 83 11 20

Type: Condi dryer type HCD60SS

Heating surface: 60 m²
Coil thickness: 5,54 mm

Length: 5084 mm
Width: 1876 mm
Height: 2791 mm

Shipping weight: 11000 kg
Max working weight: 18500 kg

Gear: Flender H3HH, A, St. 8
Gear ratio: i=90:1

Motor: Hoyer type IE3
Power: 22 kW
Motor speed: 1500 rpm
Voltage: 400 V
Frequency: 50 Hz

Transmission: V-belts

Coupling: Hydraulic coupling

Bearings: Spherical roller bearings type C3

Steam inlet: 1 1/2" rotary joint
Condensate outlet: 3/4" rotary joint

Direction of rotation of the rotor seen from the drive end: clockwise

Design pressure: 10 bar

Consumption:

Max. steam consumption: 700 kg/h @10bar / 450 kg/h @6bar

Name Plate SN7110



HAARSLEV™

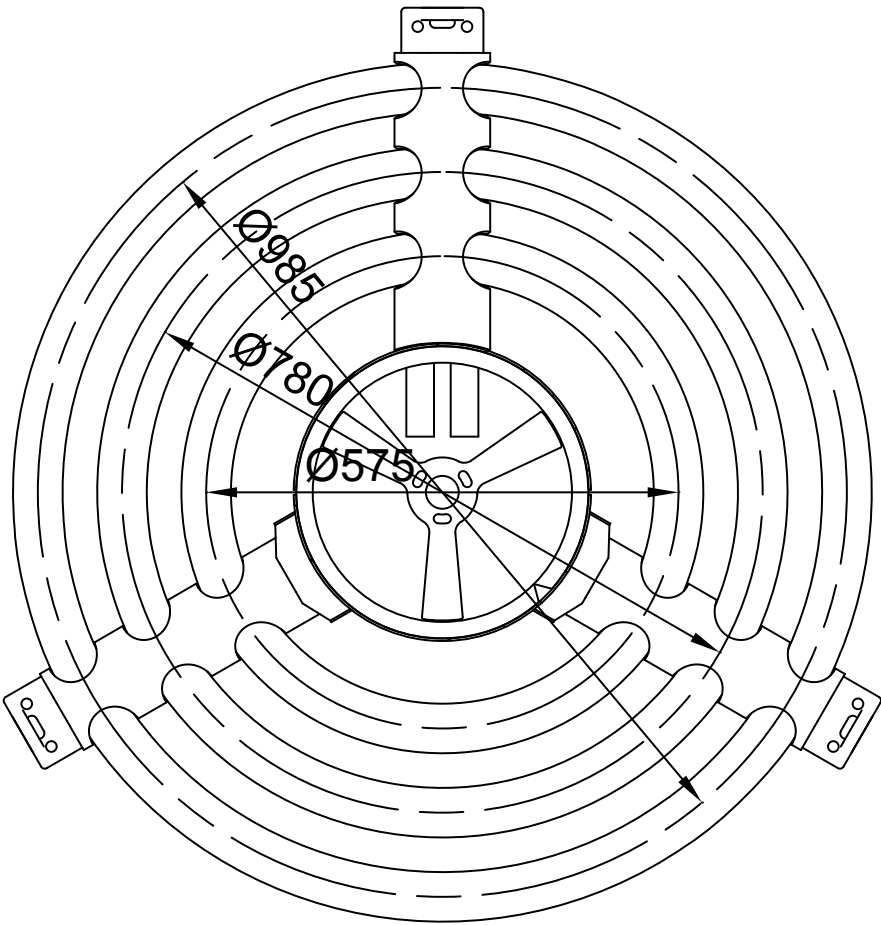
Haarslev Machinery (Xuzhou) Co Ltd
No 18 Miaoshan Road
Xuzhou City (221004) Jiangsu Province
The People's Republic of China



TYPE	: HCD 60SS	
SERIAL NUMBER	: 7110	
PRODUCTION NO.	: /	
MANUFACTURE YEAR	: 2019	
DESIGN CODE	: EN13445-2014	
NOTIFIED BODY NO.	: 0038	
VOLUME	V : 1300	L
ALLOW. PRESSURE MIN/MAX	PS : 0/10	BAR
ALLOW. TEMP. MIN/MAX	TS : 0/184	°C
TEST PRESSURE	PT : 20	BAR
FLUID GROUP / CATEGORY	: 2/IV	
MEDIUM	: STEAM	

1.2 Corrosion Allowance

General	Coil
2.0 mm	4.0 mm



1.3 Requirements to Condensate

The condensate must in principle have the same purity as distilled water. We refer to the enclosed international standards. The requirements are stated in the table below.

The basis for the requirements to the condensate is the following international standards:

Requirements to the condensate		
pH		9 < pH < 10
Carbonic acid, CO ₂	mg/kg	< 25
Chloride, Cl ⁻	mg/kg	< 0.05
Hardness, Ca ²⁺ & Mg ²⁺	mval/kg °dH	< 0.01 < 0.03
Iron, Fe	mg/kg	< 0.05
Copper, Cu	mg/kg	< 0.01
Conductivity, 25°C	µS/cm	< 20 *
Oxygen content	mg/kg	< 0.01
KMnO ₄ consumption	mg/kg	< 10
Oil	mg/kg	< 1

* Often < 10, but each plant has its own typical value.

2. Safety Instructions



Do not expose the equipment to any damage, strokes or the like as this may damage the equipment.



Before the electrical connection, check that the voltage and frequency are in accordance with the data plates of the motors.



Only qualified personnel should operate the equipment after having received exact instructions.



Make sure that there are no foreign parts (metal, etc.) in the equipment during operation.



Before the steam is supplied, it **MUST** be checked that all flange connections are mounted correctly with the packings and bolts/nuts tightened. All the steam pipes must be flushed and cleaned before supplying steam to the steam system.



The operating pressure and temperature for the equipment are indicated in chapter 1. Do not install the machine in lines with pressure / temperature higher than mentioned. Haarslev Industries A/S is not responsible for any damages and/or injuries of personnel which may arise from exceeding the design values. See the machine plate (name plate).



Never open inspection doors, nor filling / discharge doors during operation. For batch processing machines: Make sure that the discharge door is closed while feeding the machine with material.



The machine should be equipped with adequate protection against overpressure. Automatic safety valves must be installed according to the rules in force. No valves of any kind must be placed between the pressurised equipment and the safety valve.

The safety valve must be calibrated to “max. working pressure” of the equipment or lower. Find the max. working pressure on the name plate of the machine or on the depiction of the name plate in this manual.



Do not supply the rotor of the machine with steam, if the rotor is not rotating. Steam supply is only allowed for a short time before starting up the machine after a long standstill to avoid damaging the rotary joint.



Never change oil until the power to the motor / motors has been switched off and secured.



Never mix mineral oil and synthetic oil. Never mix different oil types, not even if they are of the same brand.



Never fill the machine with bones only.



When cleaning the outside, make sure not to clean electrical parts with a high pressure cleaner.



Use hearing protection if the noise level exceeds 80 dB(a).



The floor around the machine may be slippery due to oil/fat and should be cleaned regularly in order to avoid accidents.

Before any maintenance or repair works:



- Empty the equipment from material.
- Stop the systems for feeding / discharging the material.
- Switch off and secure the electric power to the motor (motors).
- Shut off the steam supply and secure it by inserting a blind flange into the flange connection at the steam supply.
- Release the pressure inside the machine / rotor / steam jacket.
- Let the equipment cool down to a temperature of 50 °C or below.
- Make sure that any pipes to / from external systems are closed and secured.



Follow all the local Health and Safety regulations for working in confined spaces.



Risk of poisonous gasses!

All confined spaces should be well ventilated. The air inside the confined space should be checked for atmospheric hazards. If such a test is not carried out, use air respiratory protection.



Never work alone.



Always use safety belt or lines when working above ground level.



Beware of hot surfaces. If maintenance works are to be carried out shortly after stopping the machine, wear protective clothing.



For the batch cooker: Regularly dismount and clean all the plugs, sockets and nipples of the front plate. Replace them if they are corroded.



For the machines equipped with load cells: Welding current may destroy load cells. If you have to weld near the machine, connect the ground on the piece you have to weld. Otherwise: Dismantle the load cells assembly and isolate the load cell.

Safety Regulations - Personnel

The responsible buyer/user must make sure that the personnel working with the machine (operator, cleaning staff, service personnel etc.) have the necessary background, are familiar with and have understood the instructions for use.

Only the persons, whose jobs require it, are allowed access to the machine.

Should it be necessary to provide access to the installation to persons who have no knowledge of its function (for instance in connection with repair, visitors or demonstration), suitable safety precautions are to be observed.

Safety Regulations - Operation

Always make sure that the machine is used in a safe manner, and that it is in a good mechanical condition.

The machine may only be used when all safety precautions have been observed, which means that guards, grids, covers and more are to be firmly bolted, etc. All safety prescriptions mentioned in the manual must be observed.

When in operation, it is not allowed to take any regulatory actions on the machine.

If used alone, it must be equipped with a main switch.

Safety Regulations - Cleaning, Maintenance and Repair

Only persons for whom it is part of their work may undertake cleaning, maintenance and repair. Cleaning, maintenance, and repair may **ONLY** be undertaken when the main switch is turned off, the power has been disconnected, the input of the raw material has been stopped, the steam supply has been closed and isolated, and the machine is cooled down. Follow all the Safety Instructions, described in this manual (Chapter 2).

Inside cleaning/maintenance:

It is very important that the operator is absolutely sure that the vapour vent valve is safely closed and isolated before entering inside of the machinery. Any local Health and Safety procedure for working in confined space **MUST** be followed (e.g. "Never work alone", etc).

Follow all the Safety Instructions, described in this manual (Chapter 2).

The manufacturer cannot be held responsible for possible incidents caused by leaking valves.

It is the responsibility of the buyer/user to ensure that the staff carrying out work such as cleaning, maintenance and repair is informed about the location of various switches on the installation.

Training and Instruction

In order for the personnel to protect themselves from machine and workplace hazards, each discipline - operators, cleaning and service personnel etc. - must receive instructions that suit their particular subject area.

Operators:

Instruction in the safe-operation of the system is required and the manual must be accessible at all times.

Cleaning and Service Personnel:

The necessary safe-instruction needed to carry out maintenance work, basic technical knowledge about the machine is required, and the manual must be accessible at all times.

3. Field of Application

The Condi dryer is designed for continuous drying of biological material.

The Condi dryer is not to be used for other materials than the instructed. Please, contact Haarslev Industries A/S should you need the Condi dryer for something else.



Make sure that there are no foreign parts (metal etc.) in the Condi dryer during operation.

3.1 Description

The Condi dryer is made as a cylindrical, horizontal bin, provided with a steam-heated agitator (spiral-type).

The dryer is delivered with stainless steel shell and dome. End plates are made from mild steel and covered with stainless steel on the inside. Necessary stiffening and bottom frame are made from mild steel.

The agitator is designed as a large number of rings, made from 2" steam pipes. The rings are connected to a heavy section center pipe. The agitator is steam heated via a mechanical steam box. The agitator is equipped with paddles to ensure constant flow through the dryer. In both ends there are placed bearing houses. On the rear shaft end, a hollow shaft gearbox is directly coupled.

3.2 Improper Use and Counter Indications

Condi dryer is designed for continuous drying of blood, feather or fish meal and other low fat products.

-  Never overfill the machine as this may cause defective operation, cause system failure and create danger to the user.
-  Never operate the machine if you are affected by alcohol and / or medicine, which may make you drowsy.
-  Do not introduce any element into the machine other than the ones for which it is destined. Please call our customer service in case of doubt.
-  Haarslev Industries will not be held responsible in case of inadequate use of the machine, which may cause bad functioning hereof and/or breakdowns of any type and importance.
-  The modification of any element of the machine is not permitted without previously consulting Haarslev Industries, who will not be responsible of the danger to which the user might be exposed in such case.
-  Improper use of the machine due to inadequate use of materials will result in total loss of the guarantee.

4. Transportation and Handling



The Condi dryer is not to be exposed to any damage, strokes or the like during transportation as this may result in a reduced operating capacity of the Condi dryer.

Packaging

The Condi dryer is delivered as one complete unit, pre-mounted and packed on a single transport unit. The drive unit, charging and vapour connections on the top of the stator are proper sealed with plastic.

The discharge connections in the bottom of the Condi dryer are sealed with plastic.

If the Condi dryer is supplied with domes for charging and vapour extraction, these will be shipped together with the Condi dryer on the same transport unit and proper sealed for transport or storage.

Lifting

When moving the Condi dryer, use lifting eyes.

Check that the lifting straps do not squeeze the shield, motor etc.

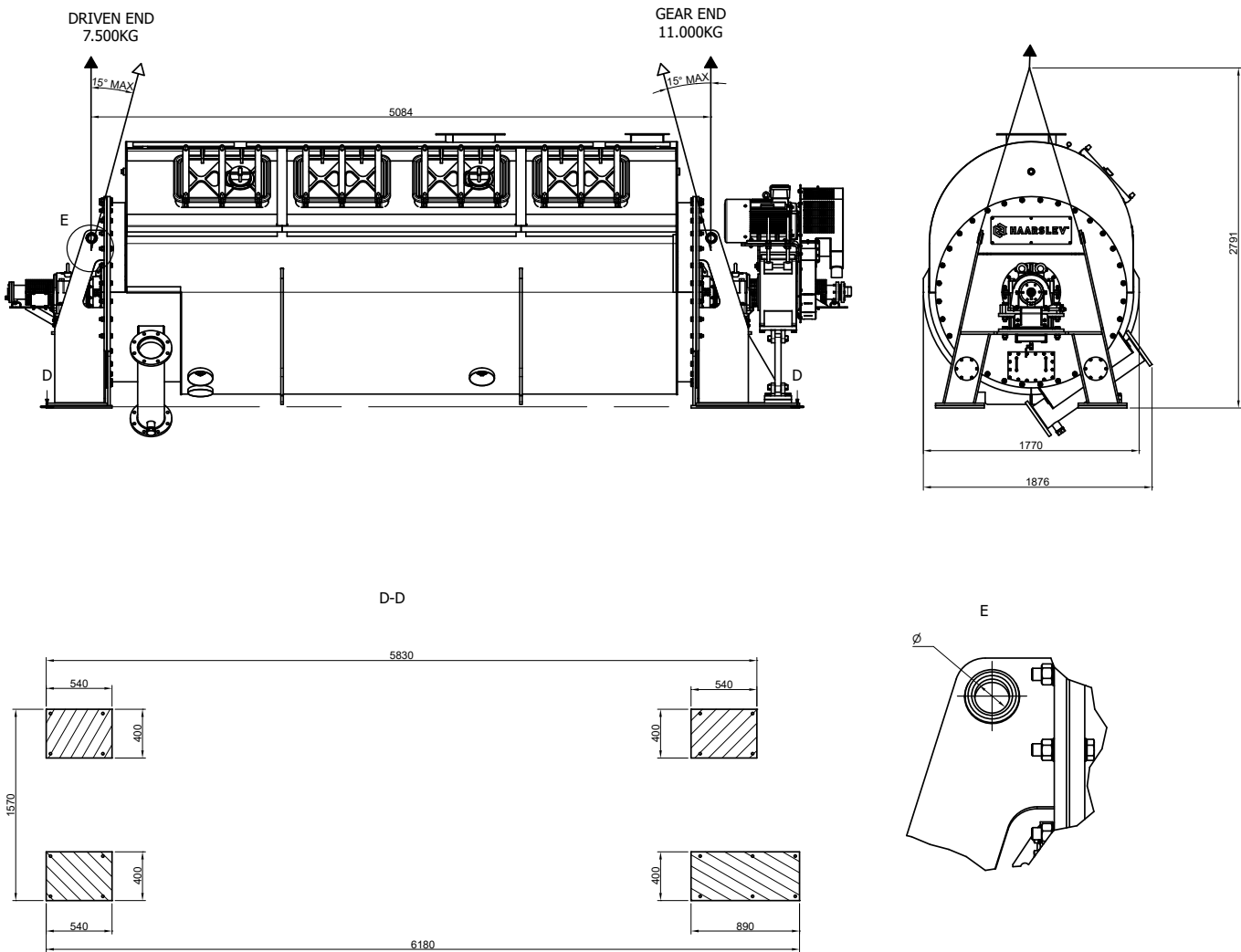
Do not lift by means of the shaft.

The Condi dryer has to be lifted as shown on the drawing.

Shipping weight: 11000 kg.

See drawings on the next page.

SHIPPING WEIGHT 11.000KG



5. Mounting and Connection



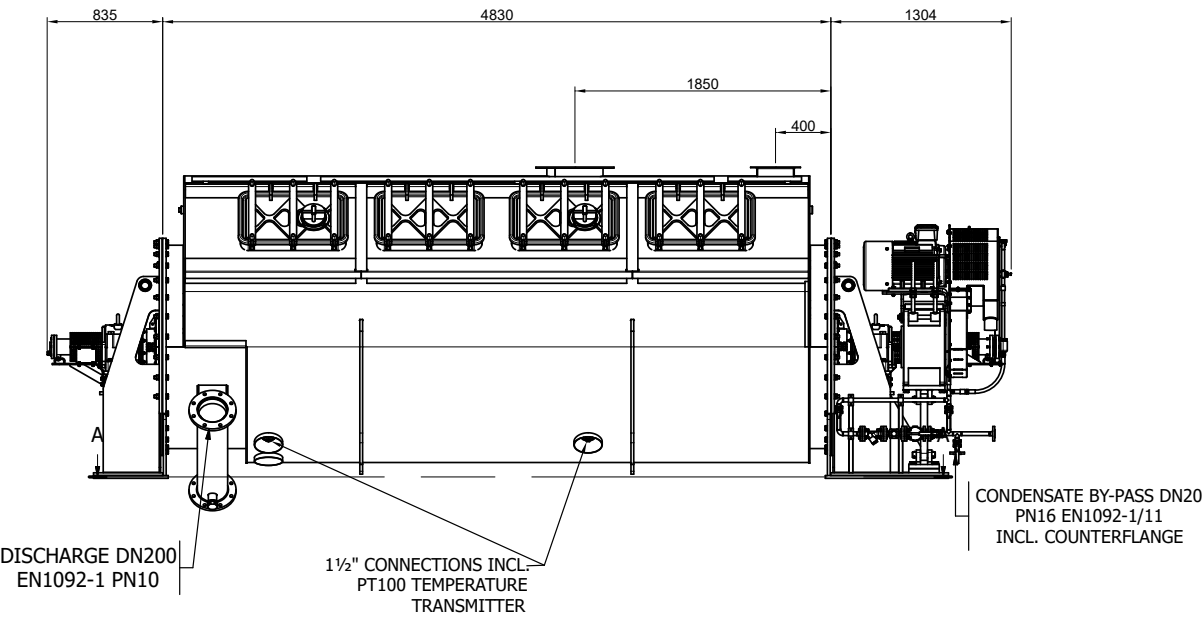
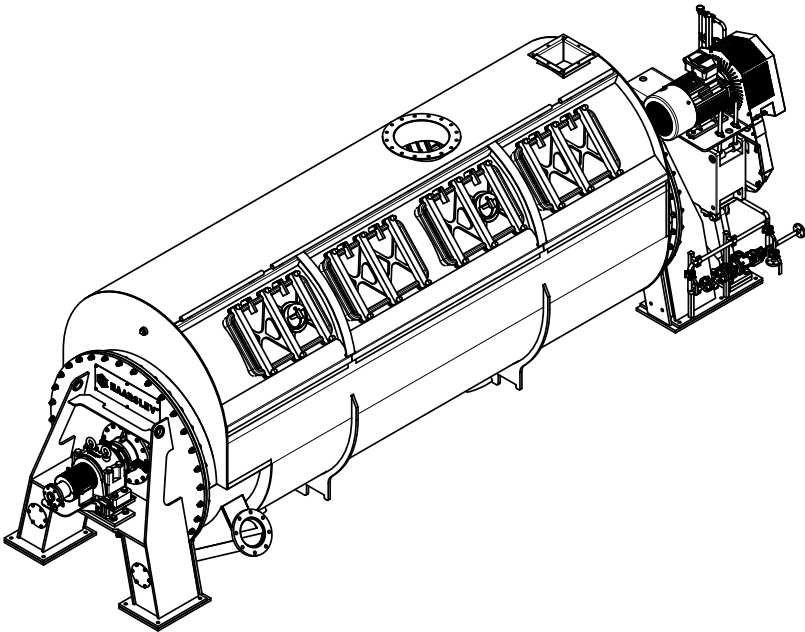
Safety precautions make it important that the instructions in this chapter are followed thoroughly.

On receipt of the Condi dryer check whether it was damaged in transit, especially that the gear, motor, grease nipples etc. have not been exposed to jolts or the like during transportation.

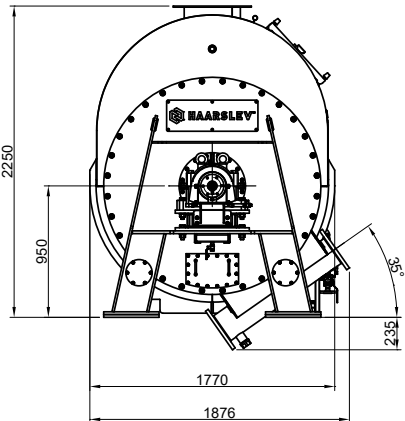
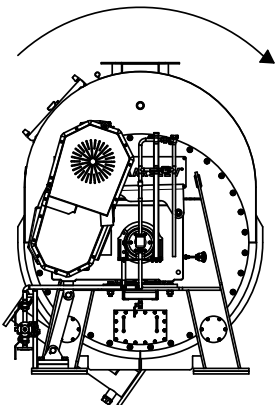
Make sure that there are no foreign parts (metal etc.) in the Condi dryer, and check that all shields are on and fastened.

5.1 Mounting

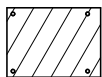
The gearbox is mounted directly on the agitator shaft and attached to the bottom frame with torque support. The foundation for the Condi dryer should be regular and horizontal and be able to bear the weight of a fully loaded Condi dryer. The Condi dryer must be fastened properly to the foundation. Before the mounting of valves the pipe arrangement to the dryer is to be cleaned thoroughly in order to secure that these are absolutely free of foreign bodies and impurities. It is important to make sure that there is enough space around the dryer for dismounting of the gear.



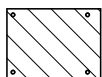
DIRECTION OF ROTATION (CW)



A-A

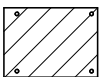


LOAD A

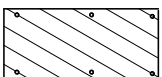


SHIPPING WEIGHT 11.000KG:
LOAD A: 5.000 KG LOAD B: 6.000 KG

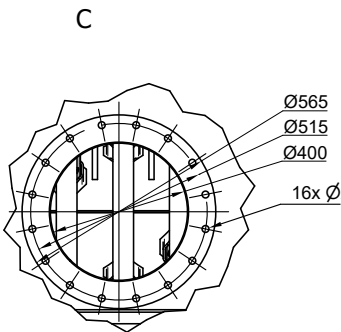
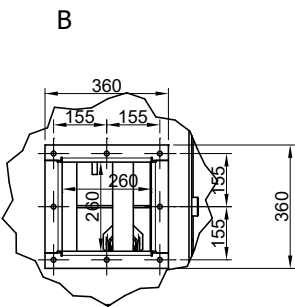
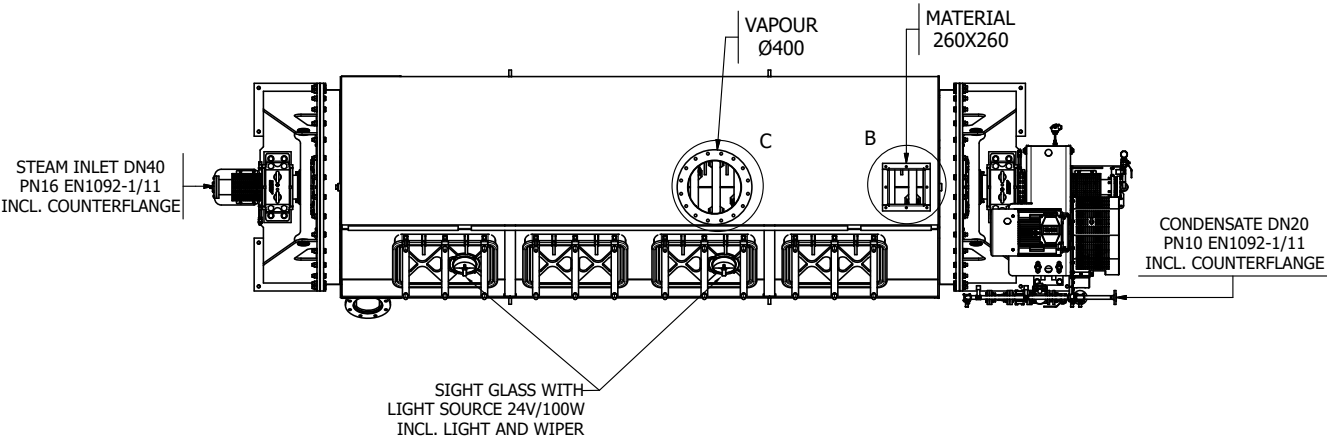
MAX. WORKING WEIGHT 18.500 KG:
LOAD A: 8.750 KG LOAD B: 9.750 KG



LOAD B

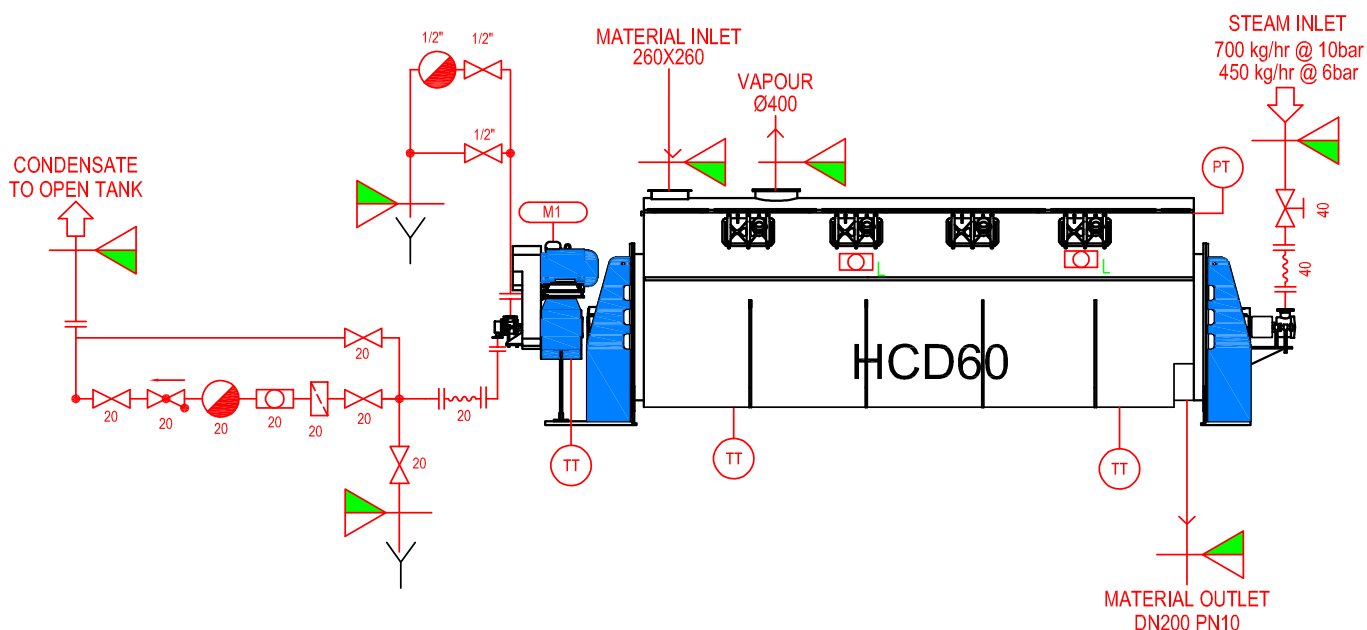


NOTE! Due to heat expansion, the Disc Drier expands with approx.
10mm in length direction when obtaining full working temperature.



5.3 Diagrams

PI-diagram



		SPECIFICATION	PRT. NUM.	BRAND
	GLOBE VALVE	DN40	3961-150SCJS-1.5	N/A
	FLEXIBLE HOSE	DN40	23085	N/A
	FLEXIBLE HOSE	3/4"	A12BM12BMT	N/A
	BALL VALVE	1/2"	391-2222-1/2	DVC
	BALL VALVE	3/4"	391-2222-3/4	DVC
	STRAINER	DN20	44.9632.007	SPIRAX
	CHECK VALVE	1/2"	SPI262420	SPIRAX
	AIR TRAP	1/2"	1234065	SPIRAX
	STEAM TRAP	DN20	44.4404.010	SPIRAX
	SIGHT GLASS	DN20	44.8806.009	SPIRAX
	PRESSURE TRANSMITTER	4-20mA +0,1/-0,1 bar	781057	VEGABAR
	PRESSURE INDICATOR	0-10bar	77101	SPIRAX
	TEMPERATURE TRANSMITTER	4-20mA 0-200°C	300000105572	BAUMER
	MAIN MOTOR	22 kW 400V/50Hz	IE3180L-4 B3	HOYER
	SIGHT GLASS W. LIGHT	24V/100W	32220	LUMISTAR

5.3 Connection

The biological material is fed into the Condi dryer through a system of screw conveyors according to the illustrations in the above PI-diagram.

The feed screw is connected to the material inlet of the Condi dryer.

The discharge screw conveyor is welded to the bottom of the stator in the opposite end of the Condi dryer.

A temperature transmitter mounted close to the product outlet end regulates the speed of the discharge screw, making it possible to control the temperature/dryness of the product before it is discharged from the Condi dryer (lower temperature slows down or eventually stops the discharge screw, and high temperature values speeds up the outlet screw).

The load cell system is connected to the controller of the feed screw, and via a PLC the correct level of material in the stator is controlled.

The steam jackets, if mounted, are connected to the main steam inlet.

The condensate is let out in the gear end via a condensate system to an open tank, from where it is returned to the boiler.



Before the steam is supplied it **MUST** be checked that all flange connections etc. are mounted correctly with the packing and bolts/nuts tightened.

Electrical connection

Motor: See 'chapter 1. Technical Specifications'.



Before the electrical connection: check that voltage and frequency are in accordance with the data plate of the motor.



All electrical installations must be made by a qualified electrician/technician and in compliance with local regulations.



An off switch for repairs should be installed.



The Condi dryer should be grounded according to local rules before connecting to an electrical system. The dryer is provided with an earthing terminal. A power cable with an earthing conductor should be used during the installation.

Direction of rotation of the rotor:

- Two persons should be present while checking the direction of rotation.
- The correct direction of rotation seen from the gear end: See 'chapter 1. Technical specifications'.
- The direction of rotation is being checked by giving a brief start/stop command to the motor.
- If the wires to the motor are mounted incorrectly, the rotor will rotate in the wrong direction.
- The two phase wires are to be exchanged.

5.4 Noise and Vibration

Measurements of Noise Level

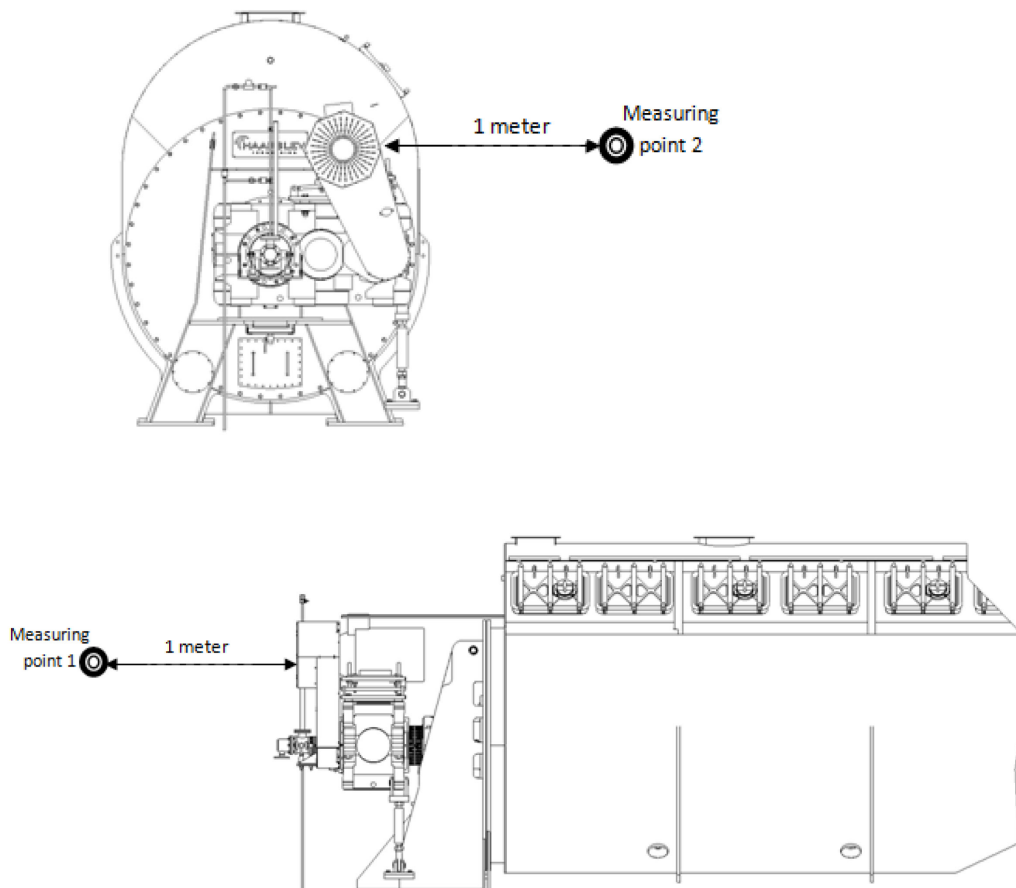
The measurements are made in two places both at a distance of 1 meter from the drive unit motor (see the drawing below).

The Condi dryer is running empty while the noise level is measured.

Haarslev Industries A/S recommends that employees working on or near the Condi dryer while it is running are provided with ear protection.

According to the Danish labor inspectorate order no. 63 of 6 February 2006 chapter 2 § 10: If noise levels exceed 80 dB, or peak values of pulses exceed 135 dB, the employee shall be equipped with ear protectors.

It is necessary to observe local regulations regarding noise limitations. If they have more severe demands, their observation is binding.



Vibration

The machinery is designed and constructed in such way that the vibrations produced by the machinery is reduced to the lowest possible level. This requires that the machinery is correctly installed as described in the section 'Installation and mounting'.

Before shipping all machines are tested for vibrations and assessed with reference to vibration data for similar machinery.

(Machinery Directive 2006/42 section 1.5.9).

5.5 Residual Dangers

DANGER OF INJURIES BY ROTATING ELEMENTS



Never remove V-belt cover before the power to the motor has been switched off and secured.

Dismount V-belts before any inspection, service or repair.

DANGER OF ELECTRIC SHOCK INJURIES



Never remove nor disassemble electrical components and / or wires while the machine is running and / or connected to the power grid.

Disconnect the machine from all power supplies and follow instructions for repair and maintenance.

BEWARE OF HOT SURFACES



Beware of hot surfaces on the outside of the stator and steam in / and outlets.

The machine must cool down to the temperature of 50° or below before any service or repair. Steam supply must be cut off and secured by inserting blind flanges in steam inlet flange connections.

BEWARE OF TOXIC GASSES



Toxic gasses may occur in the internal of the machinery during operation.

Use necessary protection and avoid opening inspection hatches when the machine is running.

DANGER OF SCALDING



The machine uses pressurised steam.

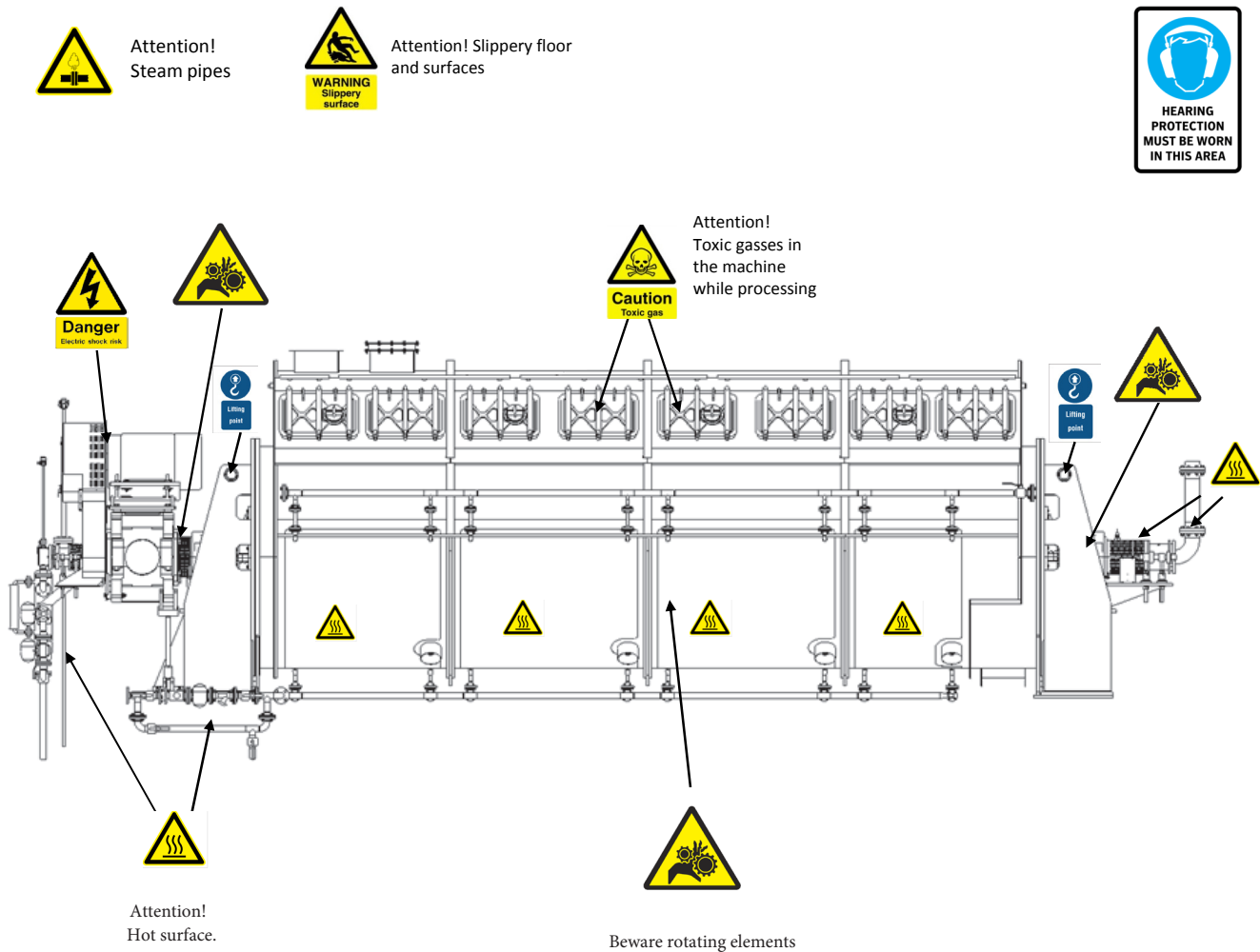
Beware of the risk of steam leaks. Take care and use necessary protective clothes when working near the machinery.

BEWARE OF SLIPPERY SURFACE



Area around the machine may be slippery.

Be careful while working near the machine. Use appropriate footwear.



5.6 Seismic movements

After any severe seismic movement, which might cause material and structural damage to the machine, it is necessary to estimate the damage of the machine, according to the details below:

Seismic movement of low intensity:

- The location where the machine is installed has not suffered great damage (for instance the building is not damaged).

Stop the machine and carry out a visual inspection of all its components to estimate damage.
Restart the machine after the inspection, if it has been satisfactory.

Seismic movement of moderate intensity:

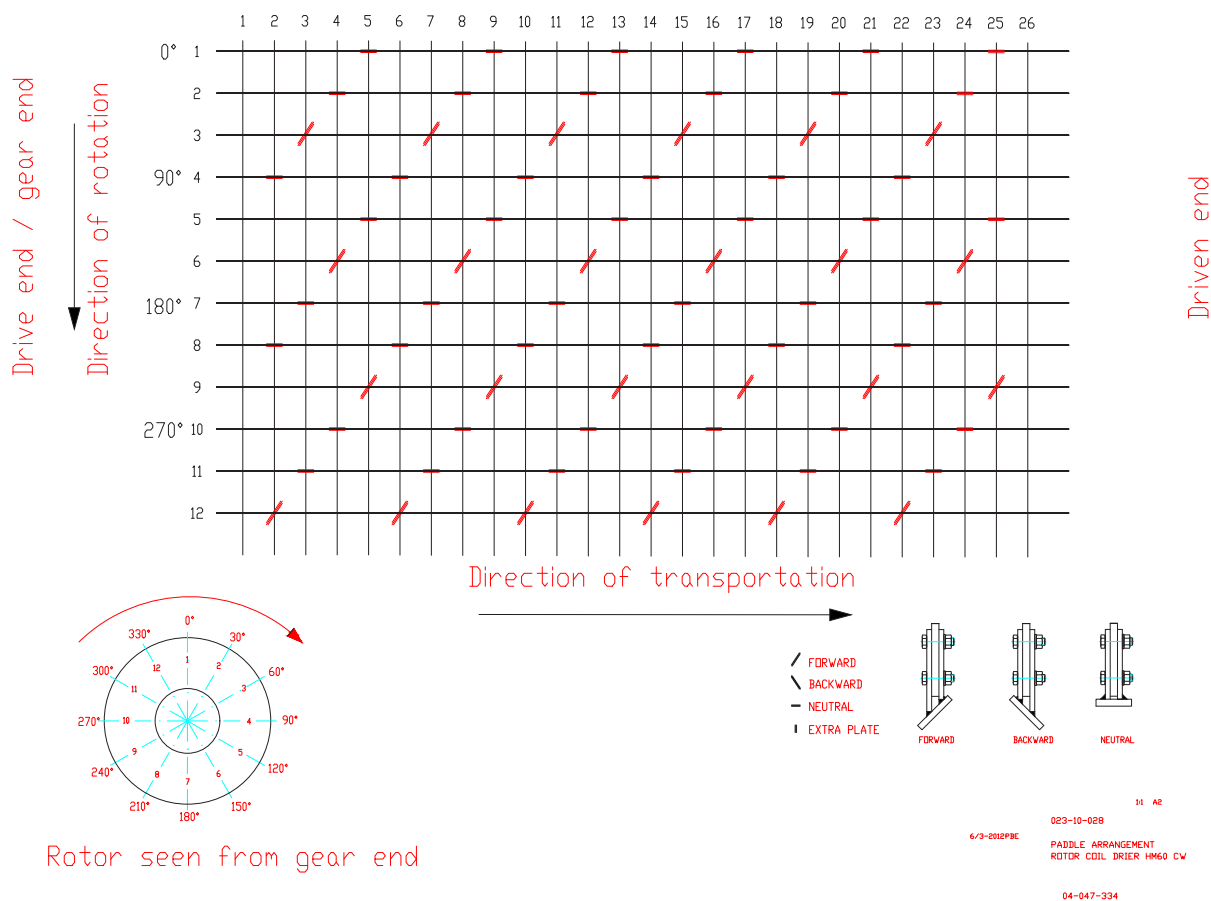
- The building and the machine have suffered some damage: Objects have fallen on the machine, structural damage, damage in peripheral equipment, etc.
Stop the machine, if it is still running (in case the electric power, or any other energy source, has not failed), provided this does not imply an added danger.

Carry out a comprehensive inspection of the machine. Repair the damaged elements.
If the structure of the machine has suffered severe damage, such as crushing, warping, deformations of the shell, and this is severe enough, take the machine out of service.

Seismic movement of maximum intensity:

- Severe material damage has taken place, such as collapse of the building.
Inspect the equipment when the physical conditions permit it.

5.7 Paddle Arrangement



6. Control and Operation



Do not open the inspection doors during operation.

6.1 Checklist Before Starting Up the Machine

Electric Installation:

1. Check the voltage and the frequency.
2. Check the fuse.
3. Check the electric connections on the motor.
4. Check the correct rotation of the rotor.
5. Check the timer for star delta start about 3-4 sec.

Mechanical installation:

1. Check all the pipe connections.
2. Check that all valves are working.
3. Clean the Condi dryer for extraneous matter inside and outside.
4. Check the oil level in the gear.
5. Check the inspection doors.
6. Check the V-belt drive.
7. Lubricate the bearings.

6.2 Operation

Charging:

Before charging the Condi dryer it should be checked that the inspection doors are closed. After that switch on the Condi dryer motor and the Condi dryer unit is ready for charging.



Do not supply the agitator of the Condi dryer with steam, as long as there is no rotation. This is only allowed shortly before the starting up of the machine after a long standstill.

Condensate:

The condensate must in principle have the same purity as distilled water. The requirements stated in the table are based on the international standards.

Requirements on the condensate		
PH		9 < pH < 10
Carbonic acid, CO ₂	mg/kg	< 25
Chloride, Cl ⁻	mg/kg	< 0.05
Hardness, Ca ²⁺ & Mg ²⁺	mval/kg °dH	< 0.01 < 0.03
Iron, Fe	mg/kg	< 0.05
Copper, Cu	mg/kg	< 0.01
Conductivity, 25°C	µS/cm	< 20 *
Oxygen content	mg/kg	< 0.01
KMnO ₄ consumption	mg/kg	< 10
Oil	mg/kg	< 1

* Often < 10, but each plant has its own typical value.

6.3 Emergency stop

According to “Directive EC 2006/42 – machinery” section. 1.2.4.3, no emergency stop will be fitted at the machine since this does not reduce the stopping time for rotating elements.

Due to the high inertia of the rotor in the Condi dryer and the high gearing ratio between the AC-motor and the rotor, the rotor will not stop immediately when pushing the emergency stop. Therefore, precautions have been taken in the design of the machine; it appears as a closed machine with no moving parts, which should minimize the risk involved in using the Condi dryer.

6.4 Long Standstill

Before a long standstill (more than 2 - 3 days), the Condi dryer should be emptied as much as possible from material.

When starting-up again:

1. Check the condition and the tension of V-belts.



It is recommended to have an extra set of V-belts in stock, as well as an extra melting plug and oil for the hydraulic coupling.

2. Supply steam to the rotor.
3. Start the motor of the Condi dryer. If the motor starts, and the rotor rotates, proceed with start-up as usual.

If the rotor does not rotate:

1. Open steam supply to the dryer and heat the material inside.
2. Try to start the motor again. Note that sufficient time must pass between the attempts to start the motor in order to avoid overheating.
3. If the machine does not start, adjust a star-delta timer to minimum and use direct start. If using soft start, put ramp up time to zero.

6.5 Long-term Storage

Before long-term storage of the machine, you should comply with the following points:

1. The plant must be kept at a constant temperature between 5-25°C.
2. All unpainted steel surfaces (not stainless steel surfaces) must be treated with Tectyl 506EH, to avoid corrosion.
3. We propose that the plant is cleaned for product and slurry, shortly after shutdown.
4. After conservation period, all gears and bearings must be filled with new oil.

The dryer must run for half an hour every month, to secure all inner parts of gears and bearings are lubricated sufficiently.

In general all unprotected steel surfaces (not stainless steel surfaces), must be treated with Tectyl 506EH, to avoid corrosion.

Gearbox unit shutdown/conservation - protection in accordance with the guide lines of gear manufacturer.

See documentation for gear unit.

Outer protection to be carried out by treating unprotected surfaces with Tectyl 506EH where applicable.

Main Bearings – long-term storage:

In order to avoid corrosion in bearing and bearing housing it is recommended to protect these components before storage, by lubricating the internal of the bearing housing and the bearing.

Procedure for corrosion protection:

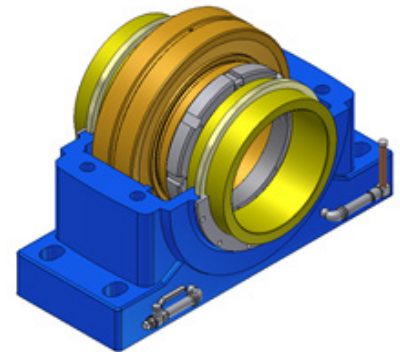
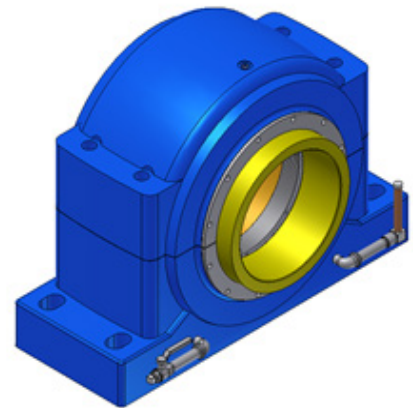
1. Drain the bearing housing completely for oil.
2. Dismount the top of the bearing housing.
3. Lubricate sufficiently all surfaces of the bearing/house/components with Castrol Tribol 1390/220.
4. Remount the top of the bearing house and fill up the bearing housing completely with Castrol Tribol 1390/220.
5. Leave the bearing housing for 15 minutes before draining the oil to normal oil level.
6. It is recommended to rotate the bearings for a half an hour every month.

Step 1-5 should be repeated every six month. If the bearing oil is contaminated with condense/water the bearing housing should be drained completely for oil, and the procedure should be repeated from step 1.

Recommended lubricants:

For corrosion protection/storage:
Castrol Tribol 1390/220 (PolyGlycole oil)

For normal operation: See Chapter 7.3 Routine Maintenance.



6.6 Withdrawal from Service and Disposal

Withdrawal from service, demounting and disposal should be done in such a way that no harm will occur to the personnel.

Materials for production have been chosen so that they are as little harmful as possible.

When demounting the Condi dryer:

- All connections to the power grid and steam supply must be disconnected.
- All fluids must be drained.
- Parts such as the AC-motor, gearbox, sensors, indicators etc. may be reused if no harm has happened to them.
- All electrical wiring and components must be removed.
- All raw materials such as steel components should be recycled.
- The foundation for the Condi dryer is reusable if no harm has happened to it.

All disposal and recycling must be carried out in an environmentally acceptable manner according to the local legislation and regulations!

7. Irregularities and Troubleshooting

7.1 Actions of Personnel in Case of a Malfunction, Critical Failure or Breakdown

In case of equipment's malfunction / failure:

- check the operating conditions and parameters by visual check and instruments' reading;
- inform the shift supervisor;
- identify the fault location and character;
- turn off the faulty equipment.



In case of personnel injury, provide immediate medical assistance according to working regulations; get medical help and inform the shift supervisor.

The Condi dryer should be stopped immediately by the personnel or by automatics in case of:

- safety valve failure;
- failure of automatic safety controls or alarm system or in case of a voltage drop in these systems;
- steam temperature and / or pressure have exceeded the limits and continue to increase;
- detection of defects in welding connections or steel structure (cracks, breaks, etc.);
- detection of defects in the dryer's components, which can endanger the personnel;
- steam temperature and / or pressure has come down under the limits.

Indicate the reason of emergency stop in the alarm history.

The Condi dryer may be started up only after the repair of a malfunction.

7.2 Limit State Criteria

The Condi dryer has reached its serviceability limit state, if it is no longer possible to operate it without a major repair.

The limit state criteria are: damages which lead to pressurization leakage or strength reduction: cracks, breaks of welding connections or in the metal structure, corrosion, permanent residual deformation, etc.

Local regulations on machine's safety establish rules and methods of evaluation of permissibility of operational defects. Compliance with these requirements is binding.

If a damage occurs to either of pressurized parts of the Condi dryer because of wear, residual deformation of steel structure, etc., the dryer must be stopped and inspected.



Before re-starting the dryer, eventual damages, cracks, etc., must be repaired and the pressurized parts must be inspected and approved by a certified organization.

7.3 Irregularities and Operation Stoppage

Fault	Possible causes	Remedy
Motor does not start.	No electric power.	Check fuse and supply.
	Wrong connection.	Check connection for motor and check control panel.
	Motor broke down.	Replace the motor.
Motor buzzes and gets hot.	Motor broke down.	Replace the motor.
	One phase broke down.	Check connection, fuse and contact in panel.
Noise from motor.	Bearing defect.	Replace the bearing.
	No grease in bearing.	Lubricate the bearing.
Agitator is not turning when the motor is running.	V-belt drive defect.	Tighten up or change V-belt.
	Gear box defect.	Repair or change gear box.
	Shaft on agitator is broken.	Welding of the shaft.
Agitator blocked.	Metal between agitator and inner shell.	Try to start in opposite direction. If it is not possible, open the inspection door and take out the material, find the metal and cut it out. NB: Remove the V-belt before entering the Condi dryer.
Abnormal noise from the Condi dryer.	Metal or similar inside the Condi dryer.	Be ready to stop the agitator.
	Bearing defect.	Change the bearing.
Processing time is longer than normally.	Steam trap blocked.	Clean the trap strainer in the steam trap.
	Steam trap defect.	Replace the steam trap.
	Steam trap wrongly adjusted.	Cleaning and adjusting.
	Steam valve on agitator closed.	Open steam valve.
	Condensate pipe on steam box broken or in wrong position.	Repair or replace condensate pipe.

8. Maintenance

The Condi dryer must be maintained to avoid a stop of production and major repairs.



Never clean, repair or change oil before the power to the motor has been switched off and secured.



An off switch for repairs must be installed.

After a few hours of operation:

- Tighten up nuts and bolts on the Condi dryer.
- Check the oil level of the gear. Refill if necessary.
- Check the tension of the V-belt. Tighten if necessary.
- Check the tension of the packing. Tighten if necessary.



Never mix mineral oil with synthetic oil. Never mix two different oil types, even of the same brand.

In order to obtain a satisfactory working, the steam traps require certain supervision, as they otherwise may be clogged up with various impurities. Especially when a new Condi dryer is started-up, the steam might at the beginning carry along some dirt and the like from the rotor. It is therefore advisable during this period to inspect the steam traps in order to avoid clogging up. Dismount the pipe connections and check whether passage is free. During daily operation there might be a certain lime deposit inside the steam traps and consequently the steam trap should be regularly inspected.

8.1 Manual Cleaning

The following precautions should be taken while performing maintenance and cleaning works on and around the Condi dryer:

-  Beware that the surroundings of the Condi dryer are often slippery.
-  When cleaning the outside of the Condi dryer with a high pressure cleaner, prevent the water from getting into the bearing houses, the electrical components and the sensors.
-  Never clean the Condi dryer before the power to the motor has been switched off and secured.
-  Follow all the safety procedures described in chapter "Safety Instructions".

Beware that normally it is not necessary to clean the Condi dryer inside.

-  If the dryer is to be cleaned inside, it must be emptied completely from processing material. The steam supply must be cut off and secured by inserting blind flanges in the flange connections of the inlet.
-  The vapour vent valve must be safely closed and isolated.
-  Follow all the local Health and Safety procedures for working in confined spaces.
-  Only qualified personnel should perform the inside cleaning of the Condi dryer.
-  Place a visible sign on the control panel or by the main circuit breaker stating:

ATTENTION!
DO NOT CONNECT
PERSONNEL CARRYING OUT MAINTENANCE WORK ON THE MACHINE

-  Remove V-belts from the electric motor, disconnect the dryer from the power grid and dis-connect the heating medium before entering the dryer.
-  Before opening the inspection doors, the dryer should have reached a temperature of 50°C or less.
-  Beware that the rotating parts contain inertia and therefore do not stop immediately.
-  When cleaning / servicing the Condi dryer inside, follow these precautions:
If it is not possible to clean the rotor without rotating it, make sure that no one is injured!
After cleaning / servicing inside: remount the inspection doors and reconnect the heating and electric system. Make sure that there are no foreign parts (tools, metal etc.) in the dryer before restarting it.

8.2 Routine Maintenance

Packing gland in front and rear end	Maintenance	Grease/oil type
Every day	Tighten if leaks. Change packings if necessary.	

Spindle pin for packing gland	Maintenance	Grease/oil type
Every week	Clean and lubricate with high-temperature grease.	Texaco Multifak EP2

Gear	Maintenance	Grease/oil type
Every day	Check oil temperature. Check for oil leaks. Check for unusual noise.	The type of gear oil depends on environment and temperature. Oil type and amount: see gear manual.
Every month	Check oil level. Refill if necessary.	
After 400 hours	First oil change.	
Every time the oil is changed	Change oil filter.	
After 10000 hours	Subsequent oil change (at least every 24 months).	

Bearings	Maintenance	Grease/oil type
Every week	Check oil level. Refill if necessary.	Tivela/Synlube 460WS
Every 6 months	Open bearing house and check bearing.	
Every 2-3 months	Haarslev Industries strongly recommends this time period for subsequent oil change. However it can be changed depending on the environment and working conditions.	
After 300-500 hours	First oil change.	

V-belts	Maintenance	Grease/oil type
Every week	Check tension. If necessary tighten them all. Check for wear. Replace all of them if necessary.	

Hydraulic coupling	Maintenance	Grease/oil type
Every week	Check for oil leaks. Refill if necessary.	See the manual for hydraulic coupling.
After 400 hours	First oil change.	
After 4000 hours	Change oil.	

Strainer	Maintenance	Grease/oil type
	Cleaning: First week: Every day Subsequent month: Every week Subsequently: Every 6 months	

Safety valve	Maintenance	Grease/oil type
Every month	To be opened by hand. If necessary clean valve.	

Motor	Maintenance	Grease/oil type
	Check and lubricate bearings. See motor manual.	Texaco Multifak EP2

Rotary joint for steam	Maintenance	Grease/oil type
	If steam leaks, check alignment or change carbon rings.	

Air trap	Maintenance	Grease/oil type
	By continuous steam leakage, clean or replace air trap.	

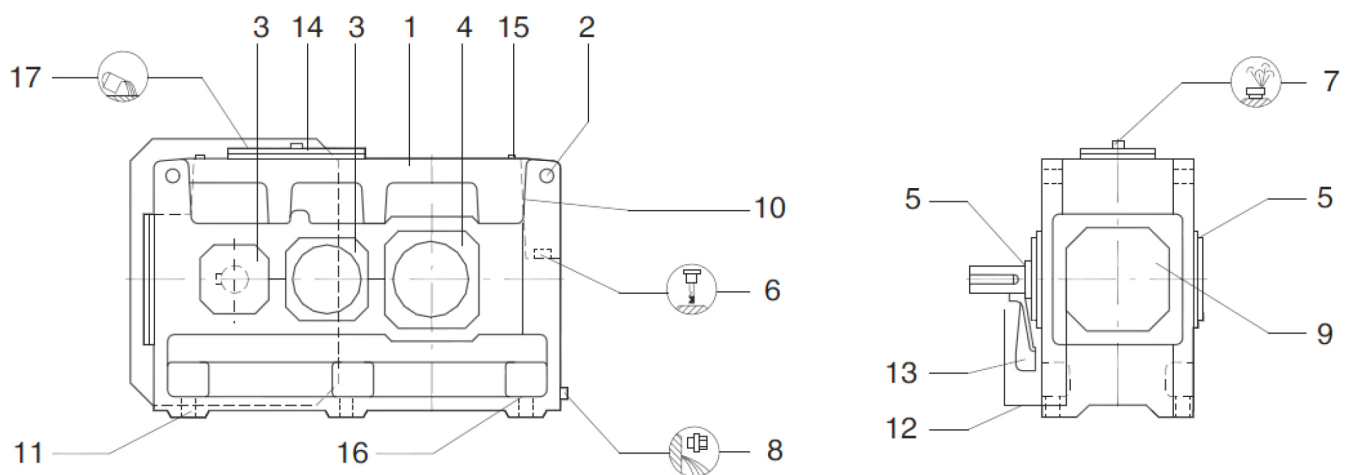
Wearing rings	Maintenance	Grease/oil type
	Check every time the packing is changed. Change if necessary.	

Paddles	Maintenance	Grease/oil type
1st month - every week Subsequently - every month	Check that the paddles bolts are intact and tightened.	

Siphon inspection nozzle	Maintenance	Grease/oil type
Every year	Change gaskets and bolts.	

8.3 Oil Change in Gear Box

For oil change in the gearbox Haarslev Industries A/S refers to the instruction manual from the gear manufacturer. The recommended service interval and the recommended oil can be found in section “Routine Maintenance” and in the Lubrication table.



Attn.: a model drawing, may vary slightly from your gear

- (6) – Oil dipstick
- (7) – Breather
- (17) – Oil inlet
- (8) – Oil drain

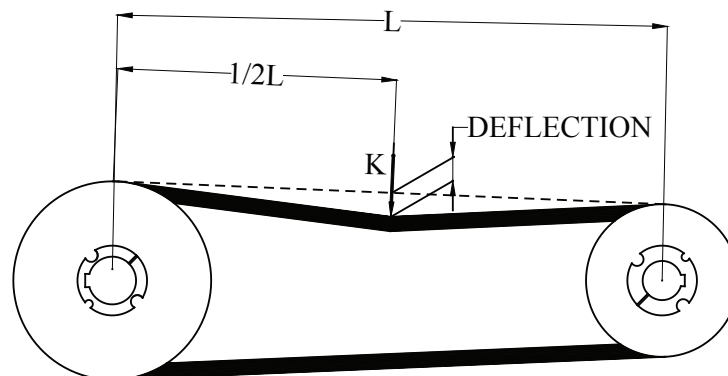


The gear box must be warm when changing oil, due to the viscosity of the oil.

8.4 Tightening of V-belts

-  Never replace/tighten V-belt before the power to the motor has been switched off and secured. Disconnecting and securing the control system shuts off the line in which the Condi dryer is part of.
-  Proper belt tension is vital to the operation of the drive and the life of the V-belt.
-  Do not overtighten the V-belts since there is a risk of damaging the bearings in the gear and motor.

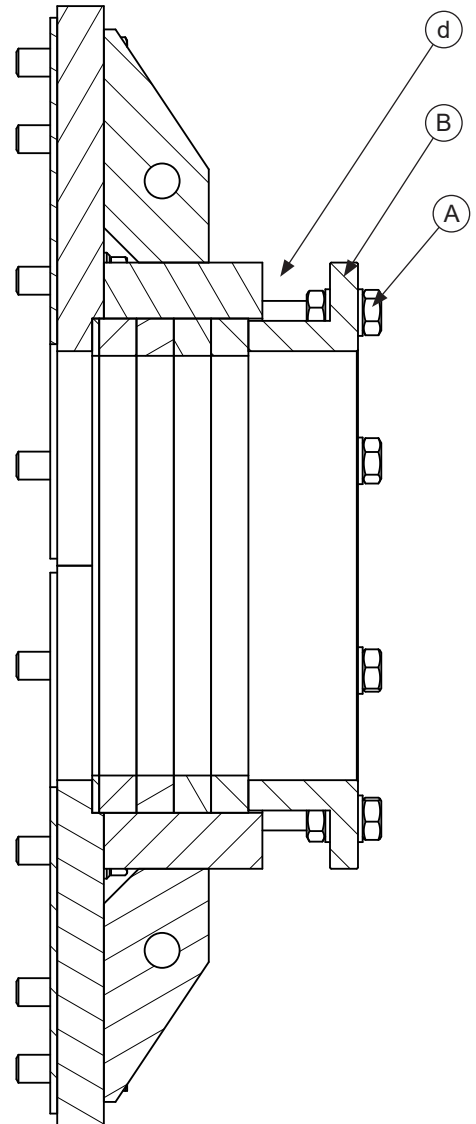
The V-belt tension is checked with a belt tension gauge.



L = Span (mm)	K = Deflection force (N)	K = Deflection force (N) New V-belt	Deflection (mm)
616	18	20	6

8.5 Tightening of Stuffing box

1. Make sure the packing gland (B) reaches into the outer ring.
2. Tighten the nuts (A) a little.
3. Measure the distance (d) between the packing gland and the stuffing box in four points. Adjust the nuts so, that the deviation is less than 1 mm.
4. Now tighten all the nuts about half a round at a time until it is sufficient.
5. After some hours in operation, check if the stuffing box is not leaking. Retighten if it is necessary.



9. Instructions for Repairs



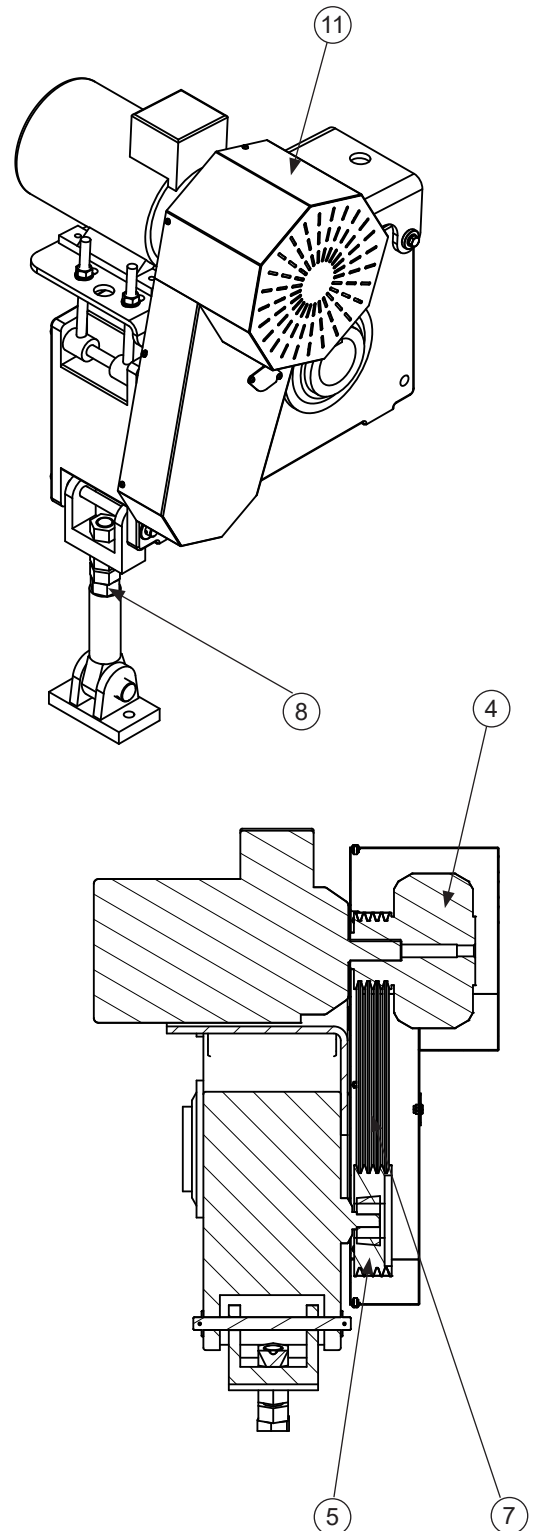
When replacing bearings, gear, motor and packing etc. make sure that the power to the motor is turned off and secured. The Condi dryer must cool down before any repairs, in order to avoid personal injuries.

9.1 Replacement of V-belts



Never replace/tighten V-belt before the power to the motor has been switched off and secured. Disconnecting and securing the control system shuts off the line in which the Condi dryer is part of.

1. Dismount the V-belt cover (11).
2. Dismount the V-belt (7) by loosening the belt tightener nut (8).
3. Dismount the V-belt from around the V-belt pulley (5) first and then from over the coupling (4).
4. Mount the new V-belt and tighten the nut (8) so that the V-belt are tight.
5. Mount the V-belt cover.
6. Check the V-belt again after a few days of operation in order to see if it is necessary to tighten them up.



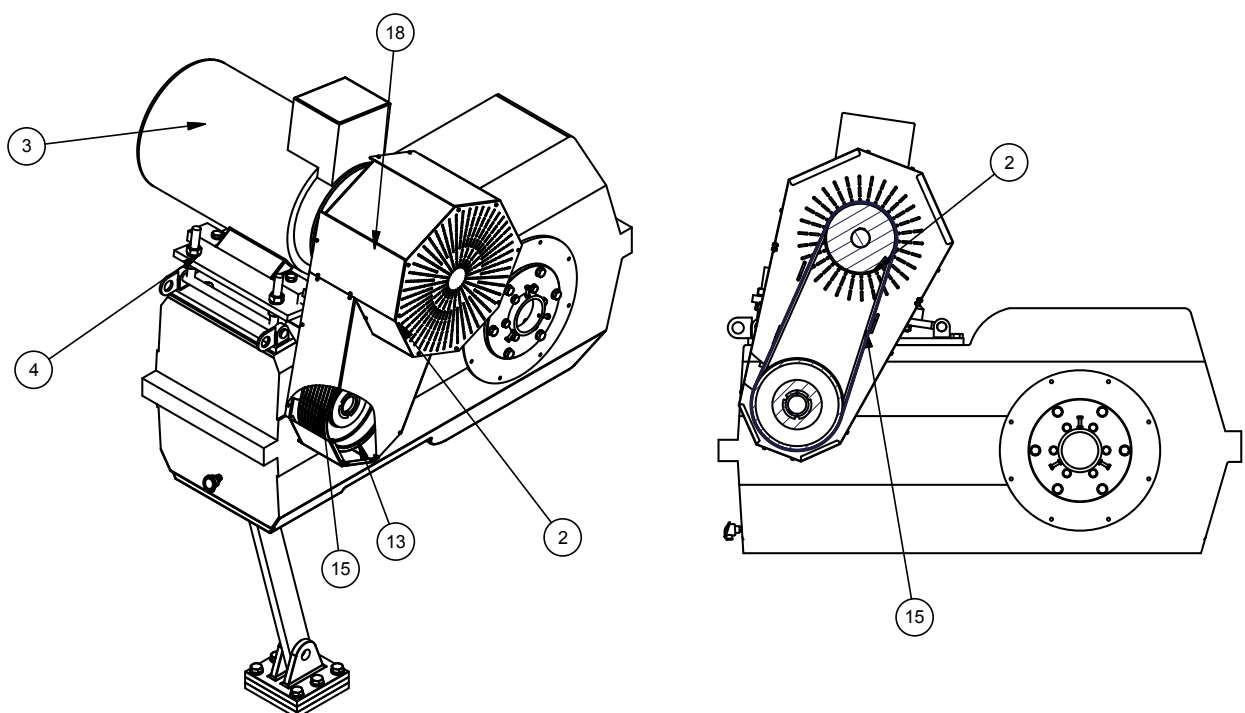
9.2 Replacement of Motor



Never replace the motor before the power to the motor has been switched off and secured.

1. Disconnect the power cable.
Dismount V-belt cover (18) and the V-belts (15) as described in chapter 8.1.
2. Insert the lifting device in the lifting eye of the motor (3). Please notice that the motor is heavy. Therefore it is not advisable to use other lifting points than the lifting eye of the motor.
3. Dismount the bolts, which attach the motor to the motor bracket (4).
4. Lift the motor and place it on a solid foundation.
5. Dismount the coupling (2) and mount it on the new motor. Check that voltage and frequency are in accordance with the data plate of the motor. See also the next page.
6. Lift the new motor in place and insert and tighten the bolts.
7. Mount the V-belts (15) as described in Chapter 8.1. Remove the lifting device and mount the V-belt cover.
8. Connect the power cables to the new motor. It must be done by a certified electrician.
9. Switch on the power to the motor. Check the direction of rotation as described in Chapter 5.2.
10. Check the V-belt tension after a few days of operation. Tighten if necessary.

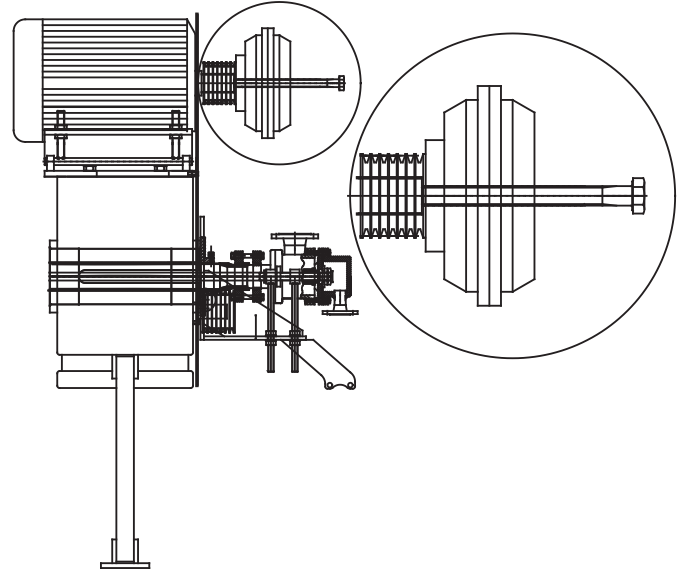
See also the drawings on the next page for dismounting of coupling.



9.3 Dismounting of Coupling

When dismounting the coupling use a M30 threaded bar (L=320) with a nut welded on it. Screw the bar into the coupling and press it off the motor shaft.

Lubricate the thread with heat resistant grease. Then loosen the taper lock. Dismount the V-belt pulley and the taperlock.

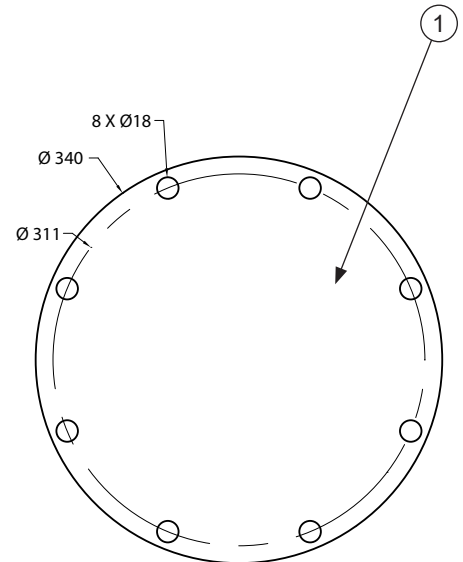


Attn.: model drawing, kan vary from your machine.

9.4 Dismounting of Gearbox

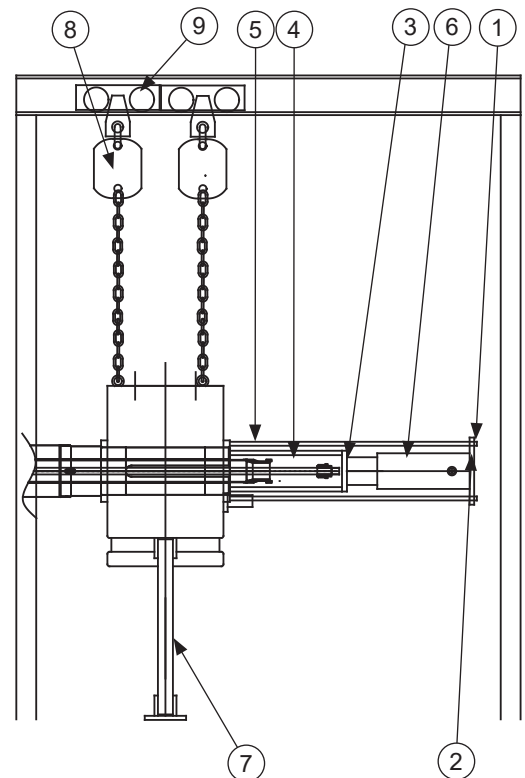
The following is used:

1. One flange (1). Thickness: 25 mm.
2. 8 x M16 nut (2) and 8x Ø16 washer.
3. One round plate (3) of Ø 255 ±5 and a thickness of 30 mm.
4. One pipe (4) with an outer diameter of Ø 245±5 and an inner diameter of Ø 205±5, a length of 600 mm. The pipe is used to press on the shaft in order to draw out the gear. Weld the round plate and the pipe together.
5. 8 threaded rods M16.
6. One pump and one oil piston.
7. 4 crane trolleys (9) of 3 tonnes.
8. 4 chain blocks of 1.6 - 2 tonnes.

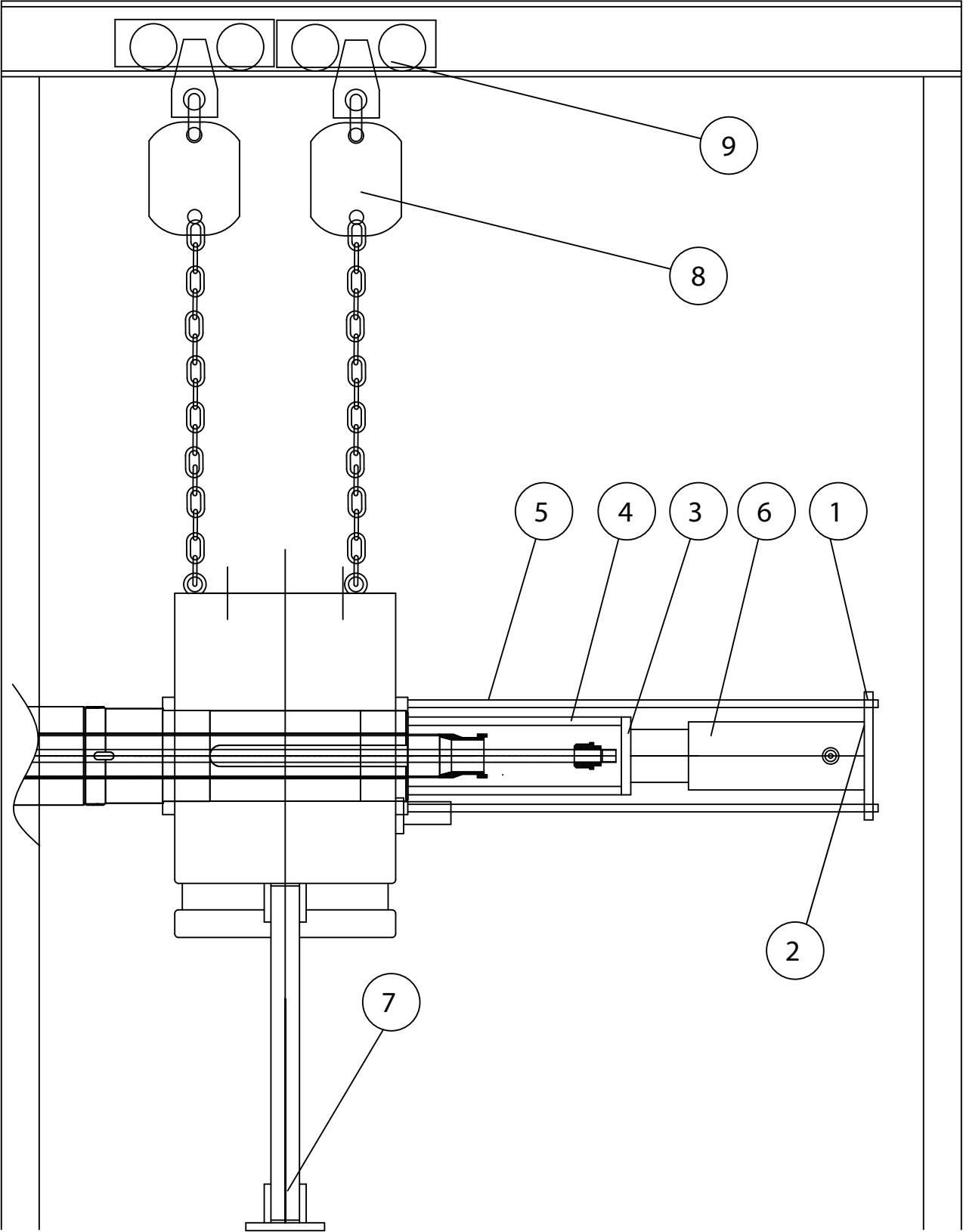


Instructions

1. Dismount the cable to the motor and secure the power.
2. Cut off the steam inlet valve and dismantle the condensate system at the gear end. Make sure that no water or steam can penetrate into the machine.
3. Dismount the rotary joint for steam.
4. Disconnect a cable to a temperature sensor (if installed). Dismount the sensor.
5. If the gear is equipped with a system of air or water cooling: disconnect water supply and all the cables to the cooler.
6. Mount the chain blocks (8) to the crane trolleys (9) and tighten the chains.
7. Dismount the end plate, which keeps the gear box in its right position.
8. Dismount the torque arm (7). Be careful it is heavy.
9. Mount the threaded rods (5).
10. Place the pipe (4).
11. Place the hydraulic piston (6) between the pipe (4) and the plate (1).
12. Mount nuts and washers and tighten them manually.
13. Place the pipe (4), place the piston in the centre of the pipe and tighten the nuts with a spanner.
14. Connect a hydraulic hose between the piston and the hydraulic pump.
15. Pull the gear out and off the shaft.



See also the drawing on the next page.

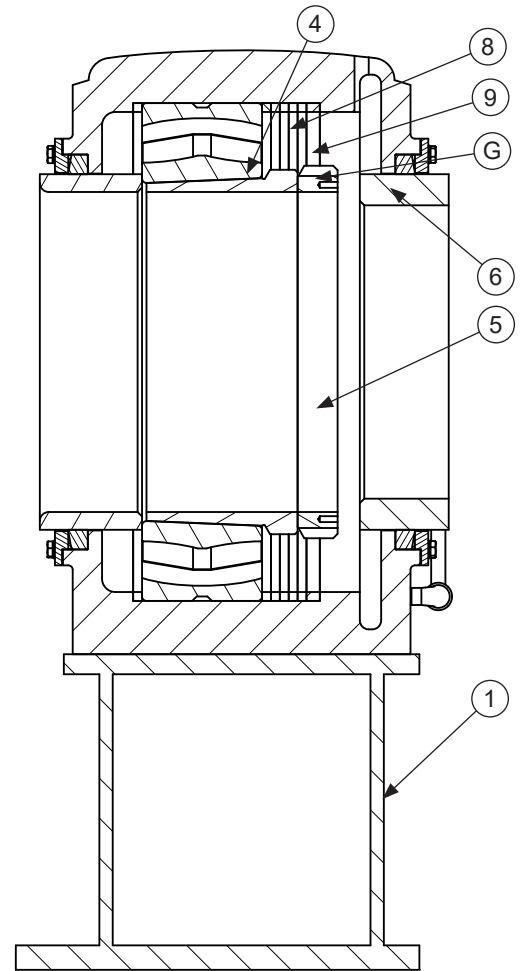


9.5 Replacement of Bearings in Drive End (Gear End)

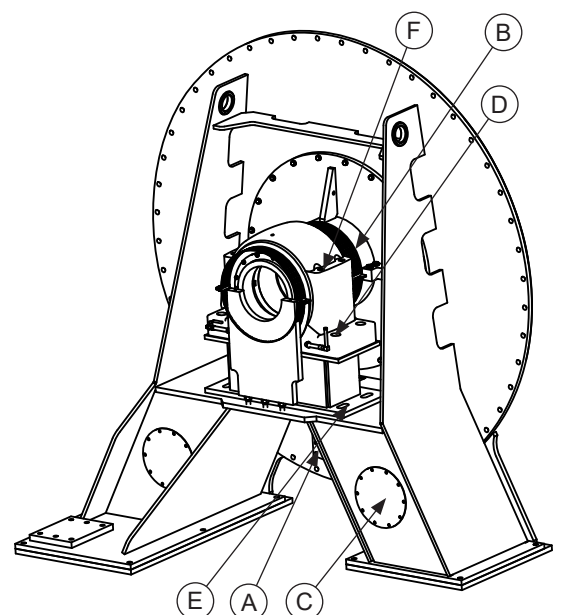


Before replacing of bearings the steam supply **MUST** be cut off and secured by inserting a blind flange in the flange connection on the steam entry. Make sure that the power to the motor is turned off and secured. The machine should be as empty as possible and cooled down.

1. Dismount the condensate system and the rotary joint for condensate.
2. Dismount cables from the motor.
3. Dismount the gear and the motor. See chapter 8.2.
4. Remove packing gland and pull packing out from the stuffing box.
5. Dismount the upper part of the stuffing box (B).
6. Dismount a hatch (A) in the bottom part of the end plate.
7. Remove cover (C) from machine legs.
8. Take dowel pins (if existing) out from the bottom part of the bearing house. Dismount bolts (D) between the bottom part and the bearing house's bracket (1).
9. Take dowel pins (if existing) between the bracket and the end plate foundation out and dismount bolts (E) between the bracket and the end plate foundation.
10. Place a jack under the center of one of the discs and place a 0.4" (10 mm) plate between the jack and the bottom part of the machine. Lift the rotor until the bearing house gets loose from the bracket.
11. Fasten the rotor so, that it cannot slide from side to side.
12. Take the bracket (1) out. Notice, that it is very heavy. .
13. Place slings in both sides of the bottom part of the bearing house and tighten it with help of a tackle. Dismount the bolts (F) in the bearing house and lift the upper part of the bearing house with help of a tackle. Dismount the distance rings (8+9).
14. Take the bottom part of the bearing house out.
15. Heat the distance ring (6) up and pull it out.
16. Dismount the locking bolt (G) in the shaft nut (5) and take the nut out.
17. Mount a hydraulic nut and pull the withdrawal sleeve (4) out. (See the detailed description of the dismounting of the bearing on the next pages).



Attn.: Model picture. Your model might vary slightly



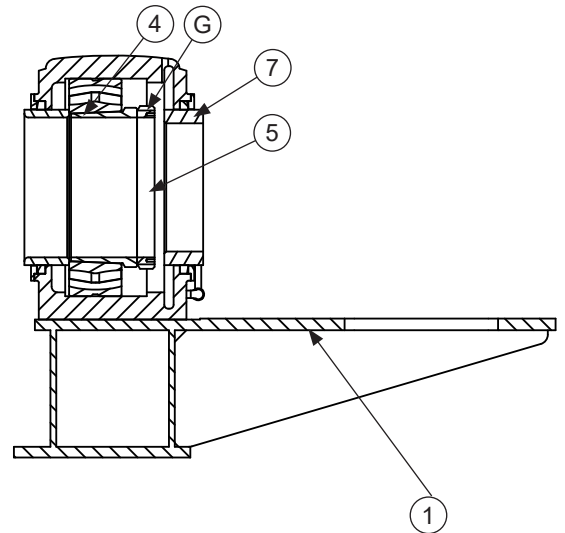
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9.6 Replacement of Bearings in Driven End

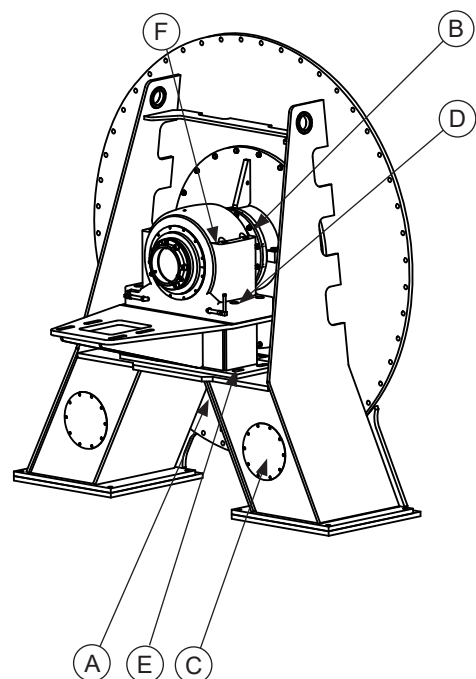


Before replacing of bearings the steam supply **MUST** be cut off and secured by inserting a blind flange in the flange connection on the steam entry. Make sure that the power to the motor is turned off and secured. The machine should be as empty as possible and cooled down.

1. Dismount the steam system and the rotary joint for steam.
2. Pull packing out from the stuffing box.
3. Dismount a hatch (A) in the bottom part of the end plate.
4. Dismount the upper part of the stuffing box (B).
5. Remove cover (C) from machine legs.
6. Take dowel pins (if existing) out from the bottom part of the bearing house. Dismount bolts (D) between the bottom part and the bearing house's bracket (1).
7. Take dowel pins (if existing) between the bracket and the end plate foundation out and dismount bolts (E) between the bracket and the end plate foundation.
8. Place a jack under the center of one of the discs and place a 0.4" (10 mm) plate between the jack and the bottom part of the machine. Lift the rotor until the bearing house gets loose from the bracket.
9. Fasten the rotor so, that it cannot slide from side to side.
10. Take the bracket (1) out. Notice, that it is very heavy.
11. Place slings in both sides of the bottom part of the bearing house and tighten it with help of a tackle. Dismount the bolts (F) in the bearing house and lift the upper part of the bearing house with help of a tackle.
12. Take the bottom part of the bearing house out.
13. Heat the distance ring (7) up and pull it out.
14. Dismount the locking bolt (G) in the shaft nut (5) and take the nut out.
15. Mount a hydraulic nut and pull the withdrawal sleeve (4) out. (See the detailed description of the dismounting of the bearing on the next pages).



Attn.: Model picture. Your model might vary slightly



Attn.: Model picture. Your model might vary slightly

9.7 Replacement of Spherical Roller Bearings



Before replacing of bearings the steam supply **MUST** be cut off and secured by inserting a blind flange in the flange connection on the steam entry. The Condi dryer must be emptied completely of the material and the pressure be reduced to 0. Make sure that the power to the motor is turned off and secured. Before replacement the Condi dryer should have reached a temperature of 50° C or less.

1. Dismount the Johnson rotary joint.
2. In the drive end dismount the V-belt, the gear (see Chapters 8.1 - 8.2) and the motor.

Spherical roller bearing 23134CCK/C3 **Dismounting**

Dismounting from withdrawal sleeve.
Hydraulic.



The mounting and dismounting of rolling bearings involve the handling of sometimes heavy weights, the use of tools and other devices, and in some cases the use of high pressure oil. In order to avoid accidents, injuries or damage to property please follow carefully the prescribed methods.

Precautions

Arrange for a clean working place.

An undamaged bearing should be remounted in the same shaft position and orientation. Mark each bearing's relative position, i.e. which section of the bearing is up, which side is in front etc.

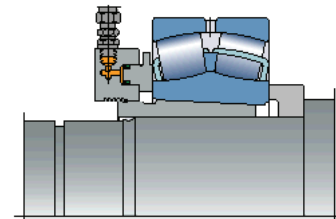
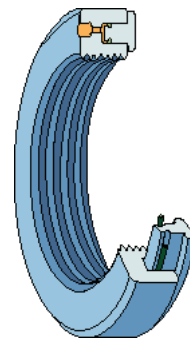
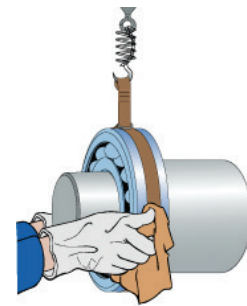
Make sure that shaft or housing is properly supported during dismounting.
Use lifting equipment to facilitate the handling of the bearing.

 Make sure that the lifting equipment is secure so that the bearing will not be dropped. Check that no-one is under the bearing.

Dismounting procedure

To push off the bearing use a hydraulic nut.

Screw the hydraulic nut on to the thread with the piston facing the bearing, and tighten it slightly until it abuts the inner ring.
Pump oil to the nut until the sleeve comes loose.



Mounting

Mounting on withdrawal sleeve.
Hydraulic mounting. Hydraulic nut.

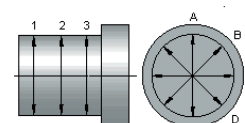
Precautions

Mount the bearing in a clean environment. Housings, shafts and other components of the bearing arrangement should be checked to see that they are clean.

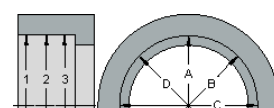
The bearings should be left in their original packages until immediately before mounting so that they do not become dirty.

The dimensional and form accuracy of all components which will be in contact with the bearing should be checked.

The diameter of cylindrical shaft seatings is usually checked using a micrometer at four positions in three planes.



The diameter of cylindrical housing seatings is usually checked using an internal gauge at four positions in three planes.



Mounting procedure

Wipe the preservative from the bore and outside diameter of the bearing.

If the bearing is to be grease lubricated and used at very high or very low temperatures, or if the grease is not compatible with the preservative, it is necessary to wash and carefully dry the bearing.

Wipe the preservative from the surfaces of the sleeve.

Lightly oil the bore of the bearing with a thin mineral oil. Place the bearing against the abutment on the shaft. Open the withdrawal sleeve by inserting a screwdriver or other suitable tool in the slit, slide it along the shaft and drive it in under the bearing ensuring firm contact.

To drive up the bearing use a hydraulic nut .

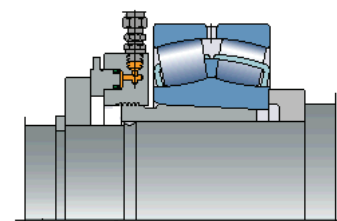
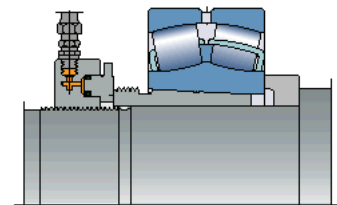
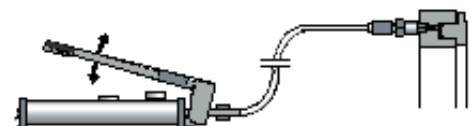
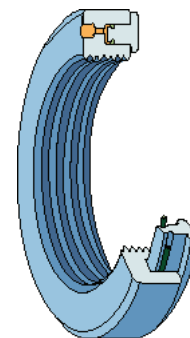
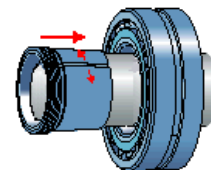
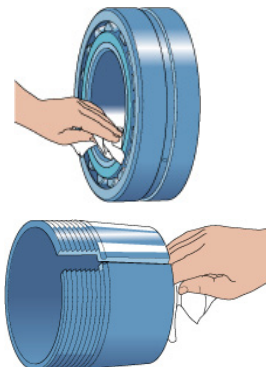
Use an oil pump.

Screw on the hydraulic nut with the piston facing the bearing.

If the sleeve thread is used, screw on the hydraulic nut with the piston facing away from the bearing. The nut must be supported at the piston side.

Tighten the nut by hand just enough to achieve proper contact between bearing, sleeve and shaft - do not tighten the nut any further.

Pump oil to the hydraulic nut until the bearing is driven up to the correct position. To determine the correct position see below.



Measuring the axial drive-up using shims

Use two shims each with the thickness of the required drive-up 1.3 mm to fit the bearing exactly. Screw a nut on the sleeve until it pinches the shims. Remove the shims and drive up the bearing on the sleeve with the hydraulic nut. Keep the nut on the sleeve in its position until it contacts the bearing. Remove the sleeve nut.

The drive-up value is valid for solid steel shafts only.

Measuring residual clearance using feeler gauges

The initial clearance before mounting must be measured and the clearance must also be measured as the bearing is driven up on to its seat until the prescribed clearance reduction has been achieved. The reduction in radial internal clearance should be minimum 0.08 mm and maximum 0.11 mm. The clearance should always be measured between the outer ring and an unloaded roller, either the uppermost

.... or the lowest one when the bearing is on the shaft.

Before measuring, the bearing should be rotated a few times to ensure that the rollers have assumed their correct position.

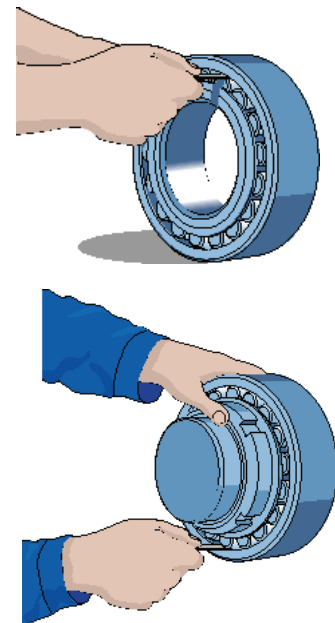
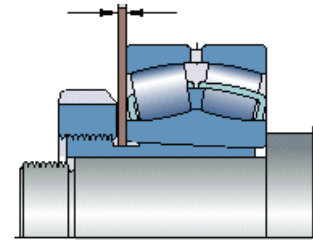
During the measurement, the roller at the measuring point should be lightly pressed against the guide ring between the two roller rows and the feeler gauge blade be inserted to the middle of the roller. The measured internal clearance must be the same for both rows of rollers.

The residual radial clearance should be minimum:

0.06 mm for Normal clearance bearing.

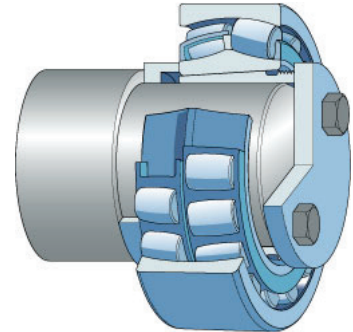
0.1 mm for C3 clearance bearing.

0.15 mm for C4 clearance bearing.



Release the pressure from the hydraulic nut and unscrew the nut. The bearing will not come loose. Attach the locking device for the bearing/sleeve assembly.

Lubricate the bearing.



9.8 Replacement of Rotary Joint for Condensate and Air



Never start with a dry rotary joint.

If the machine has been out of use for approx. a month or longer, the rotary joint should be dismantled and cleaned before start up. Make sure that all movable parts are moving freely.

The sealing surface in the rotary joint should be lubricated with water before starting up the machine.

Do as follows:

Open slightly the steam supply to the agitator before starting the dryer. The condensate thus created is sufficient lubrication for the sealing surface.

Mounting and dismounting



Before replacement of the rotary joint and carbon rings the steam supply must be cut off and secured by inserting a blind flange in the flange connection on the steam entry. Make sure the power to the motor is turned off and secured. Before the replacement the machine should cool down to at least 50 °C.

Mounting of the siphon pipe

Drawings 1, 3 at the next page

1. Mount the elbow (32) on the pipe (31), screw it on almost to the bottom of the threads.
2. Make sure, that when the guide (34) is turned upwards, the elbow (32) has to point exactly downwards. Now the elbow can be tack welded on the pipe (31).
3. Push the pipe (31) with the elbow (32) in through the shaft of the agitator.
4. Remove the cover (11, drawing 3) , that is placed on the agitator inside the dryer.
5. Screw the pipe (33) into the elbow (32) through the cover hole. Tighten thoroughly with the special tool for siphon pipe (delivered with the machine).

Mounting of the rotary joint

Drawing 4 at the next page

Before the mounting make sure to have all the necessary spare parts and gaskets.

The rotary joint for steam is mounted onto the shaft end of the agitator by means of a fixture consisting of 2 parts. These 2 parts are:

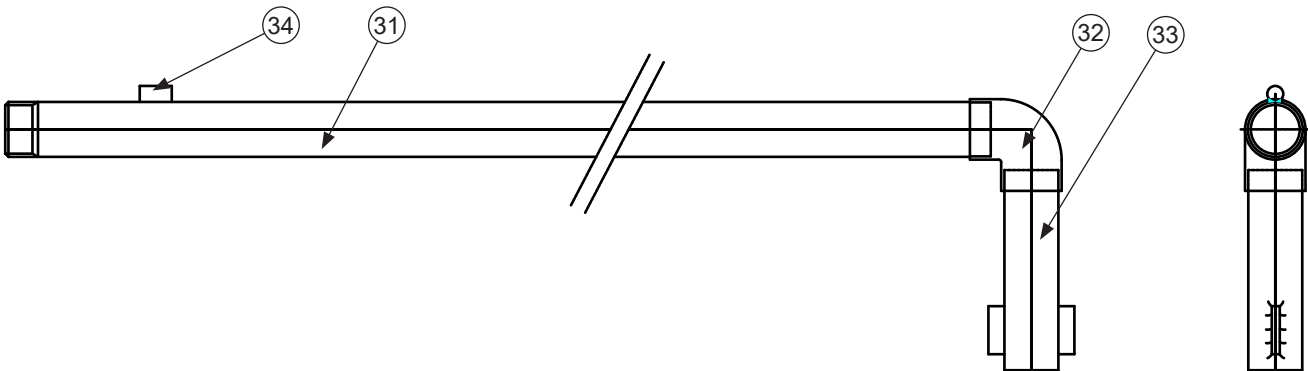
Q-nipple flange (pos. 4)

Conical divided ring (3)

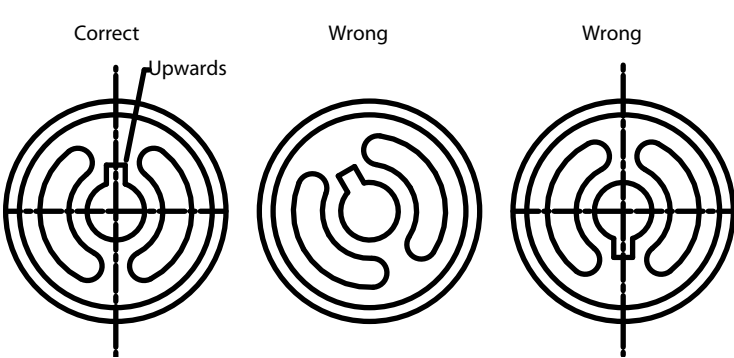
The Q-nipple flange (4) and the conical divided ring (3) are mounted together and fixed with the bolts (109). This fixture places the Q-nipple in its right position. (Remember always to install the copper gasket (8Q) in place).

1. Mount the siphon pipe as described above.
2. Pull the siphon pipe out through the steam rotary joint.
3. Mount the carbon sealing (6) and the spring into the body (1). Fix it with the plate (36).
4. Take the keyhole plate (35) and mark the top of it.
5. Screw the head (2) on the siphon pipe. Mount the head on the steam rotary joint without tightening the bolts. Remember to replace all the gaskets with new ones.
6. Turn the keyhole plate until it points correct (see drawing 2). Tighten the bolts.

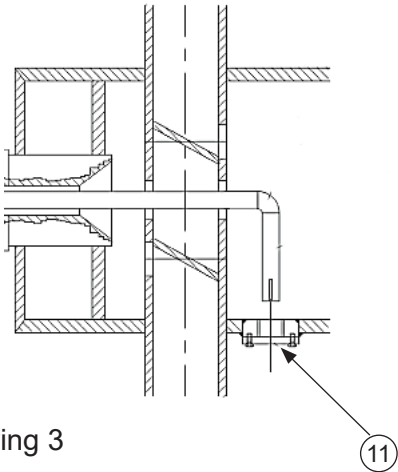
Dismounting is undertaken in the reverse order.



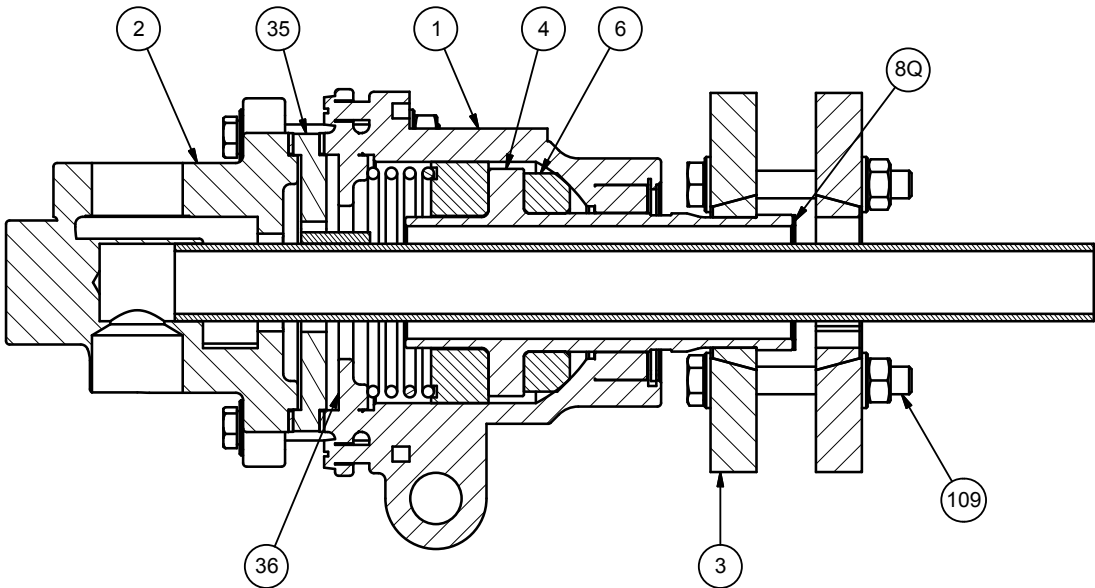
Drawing 1 - Siphon pipe



Drawing 2 - Keyhole plate



Drawing 3

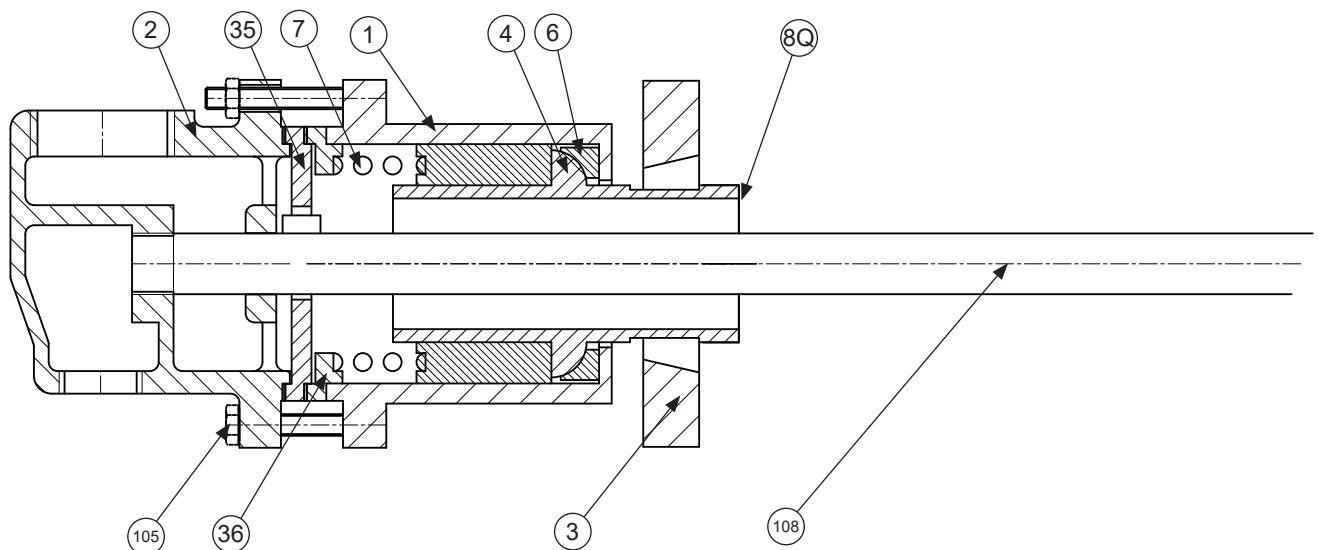


Drawing 4

9.8 Replacement of Carbon Ring

If the rotary joint is leaking, it can be necessary to clean it or to replace the carbon ring (6) and the Q-nipple (4).

1. Remove the bolts (105).
2. Screw the head (2) off the siphon pipe (108).
3. Remove the keyhole plate (35), plate (36) and the spring (7).
4. Remove the bolts that keep the rotary joint body in place, after that the body (1) can be removed.
5. Change the carbon seal ring (6).
6. Make sure that the moving parts move freely.
7. Mount all the parts in the reverse order.
8. Make sure all the gaskets are in place. Replace all the gaskets every time the rotary joint is opened.



9.9 Replacement of Rotary Joint for Steam



Before replacing of the rotary joint, the steam supply **MUST** be shut off and secured by inserting a blind flange in the flange connection on the steam entry. Make sure that the power to the motor is turned off and secured. Before replacement the machine should have reached a temperature of 50°C or less.

The rotary joint is mounted onto the shaft end of the agitator by means of a fixture consisting of 5 parts.

Siphon flexible link
2 Q-nipple flanges (9)
2 Conical divided rings

Dismounting of the rotary joint for steam

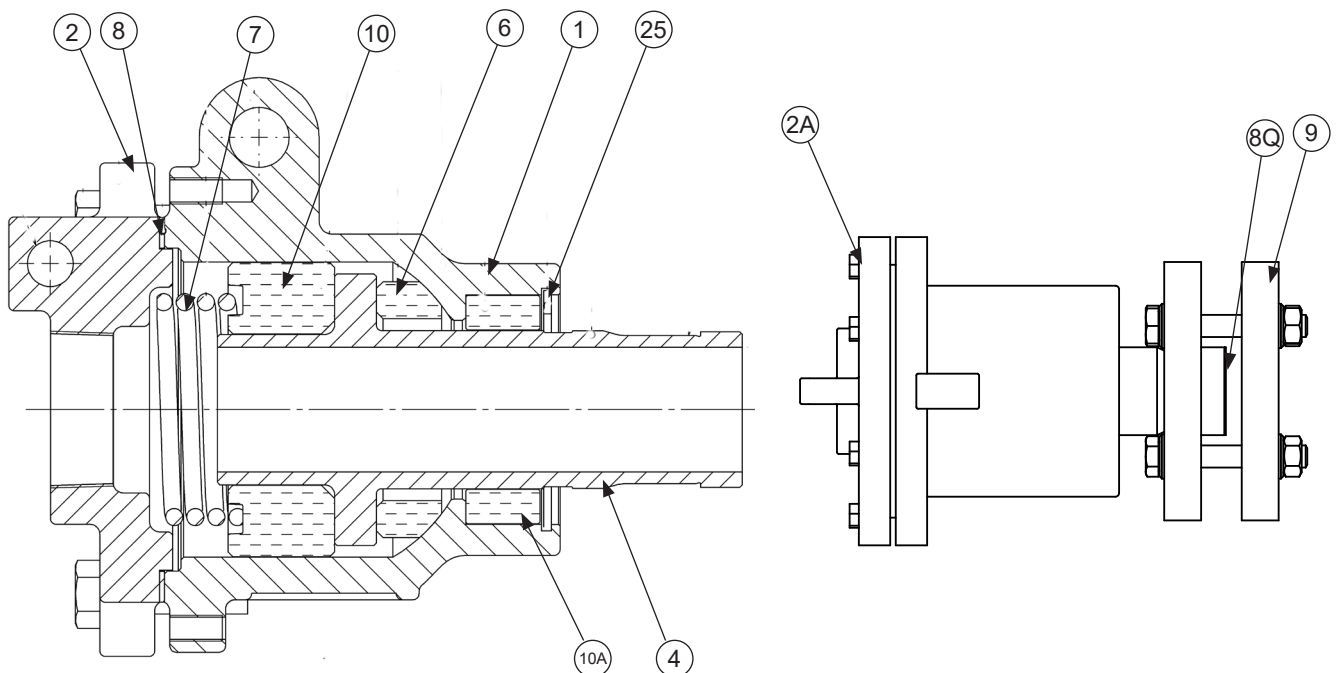
1. Dismount the bolts (2A), and then dismount the head (2).
2. Remove the packing (8).
3. Dismount the Q-nipple flanges (9). Dismount the copper gasket (8Q).
4. Dismount the rotary joint (1).

Mounting of the rotary joint for steam

The mounting is done in reverse order.

1. Screw the Q-nipple flange (9) and the conical divided ring together and mount them on the shaft end with the copper gasket (8Q) in place.
2. Press the divided conical rings on the shaft.
3. When the Q-nipple flanges (9) have been pulled over the conical divided ring, the inlet pipe is in the correct position.

It is important always to remember the gaskets.



9.10 Tightening/ Replacement of Packing

Part No. 012-22-033

Tighten Up The Packing

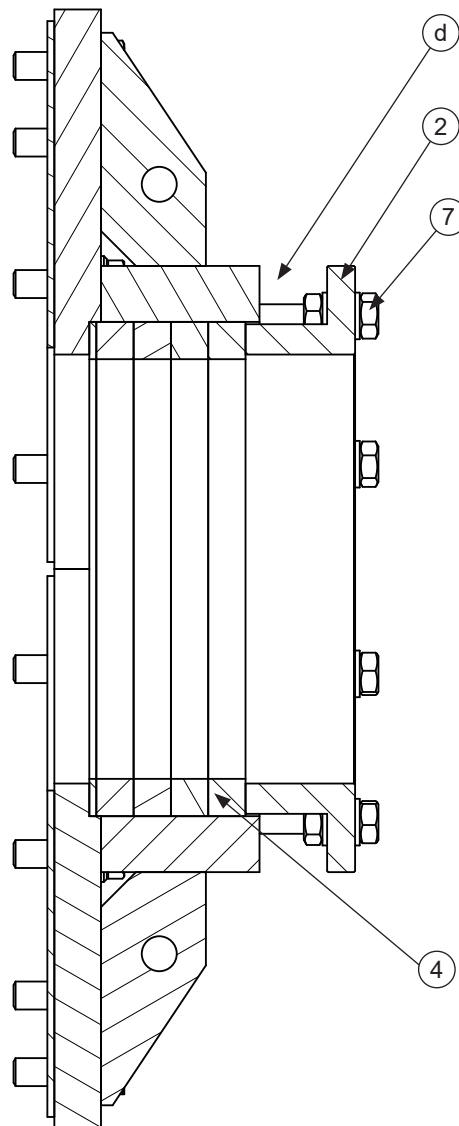
If the stuffing box is leaking, it is necessary to tighten the packing. If it is impossible to tighten it, replace all the packing rings.

1. Make sure the packing gland (2) reaches into the outer ring.
2. Tighten the nuts (7) a little.
3. Measure the distance (d) between the packing gland and the stuffing box in four points. Adjust the nuts so, that the deviation is less than 1 mm.
4. Now tighten all the nuts about half a round at a time until it is sufficient.
5. After some hours in operation, check if the stuffing box is leaking. Retighten if it is necessary.

Replacement of Packing

Replacement of packing in the drive end and/or driven end is carried out in the exact same way.

1. Loosen the nuts (7) on the packing gland so, that it can be pulled back.
2. The old packing (4) consists of 4 rings. Remove them and mount the new ones on the shaft.
3. Push the packing gland in its place and tighten the nuts. Turn each nut a couple of times alternately, until achieving the proper tightening of the packing.



9.11 Mounting of Screws for Axle Journal

1. Turn the screw without lock washer as far into the thread as possible. Do not over tighten the screw.
2. The distance between the head of the screw head and the flange must not exceed 3mm. Please, contact Haarslev Industries A/S when the distance exceeds 3mm.
3. The tightening torque values for the screws with lock washers are shown in Table 1 (see next page). The tightening takes place in four steps. The tightening torque applies to screws without surface treatment and with Molykote 1000 on thread and under the screw head (friction factor 0.1).

Do not reuse the screws.

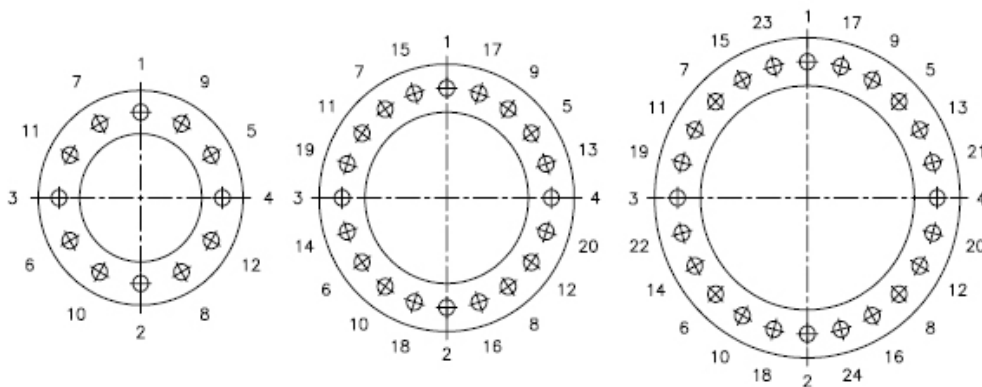


Table 1 Torque values (Nm)

Screw	Quality of material	1 st turn	2 nd turn	3 rd turn	4 th turn
M16	1.4462	70	110		
M20	1.4462	120	210		
M24	1.4462	200	300	360	
M30	1.4462	300	500	720	
M36	1.4462	600	1000	1260	
M39	1.4462	800	1300	1640	
M42	1.4462	1000	1500	2020	
M45	1.4462	1000	1800	2530	
M56	1.4462	1000	2300	3600	4900
M16	8.8	100	150		
M20	8.8	150	295		
M24	8.8	300	400	520	
M30	8.8	500	800	1020	
M36	8.8	800	1300	1780	
M39	8.8	800	1600	2330	
M42	8.8	1000	2000	2870	
M45	8.8	1000	2300	3600	
M56	8.8	1000	3000	5000	6970
M16	193 B7	100	170		
M20	193 B7	170	330		
M24	193 B7	200	400	570	
M30	193 B7	600	900	1150	
M36	193 B7	1000	1500	2010	
M39	193 B7	1000	1800	2615	
M42	193 B7	1000	2100	3230	
M45	193 B7	1000	2000	3000	4050
M56	193 B7	1000	3000	5500	7840

10. List of Spare Parts

Spare parts can be ordered from:

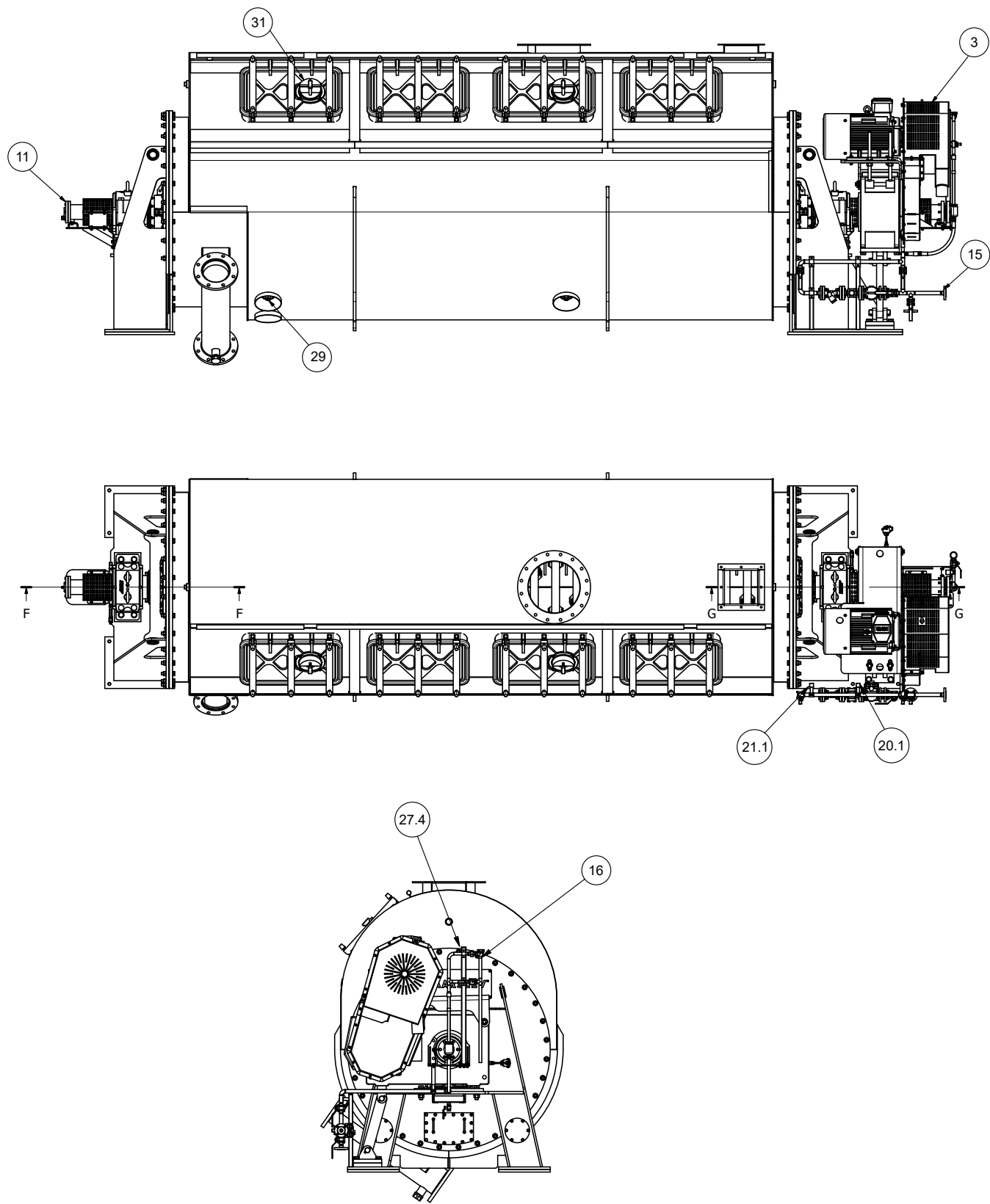
Haarslev Industries A/S
Bogensevej 85
5471 Sønderso, Denmark
Tel.: +45 63 83 11 00
Fax: +45 63 83 11 20

- | | |
|-------|---|
| 10.1 | Spare parts for the Condi dryer |
| 10.2 | Spare parts for the rotor |
| 10.3 | Spare parts for the drive unit |
| 10.4 | Spare parts for shaft, drive end |
| 10.5 | Spare parts for shaft, driven end |
| 10.6 | Spare parts for end cover, drive end |
| 10.7 | Spare parts for end cover, driven end |
| 10.8 | Spare parts for stuffing box |
| 10.9 | Spare parts for bearing housing |
| 10.10 | Spare parts for rotary joint for steam |
| 10.11 | Spare parts for rotary joint for condensate |
| 10.12 | Spare parts for condensate system |
| 10.13 | Spare parts for rotor deaeration system |
| 10.14 | Spare parts for one sight glass set |
| 10.15 | Spare parts for one paddle, type forward |
| 10.16 | Spare parts for one paddle, type neutral |

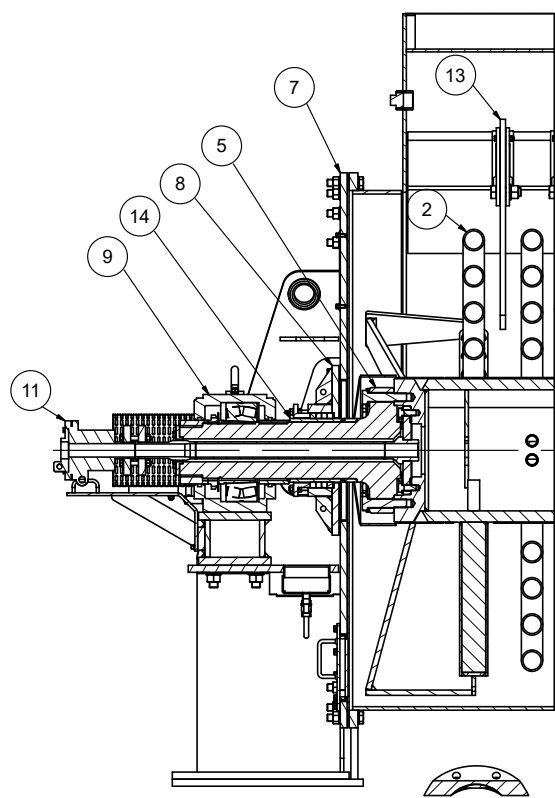
10.1 Spare Parts for the Condi dryer

Pos. No.	Description	Qty.	Part No.
2	Rotor	1	*22-0027-840
3	Drive unit	1	*300000147836
4	Shaft drive end	1	*023-19-129M
5	Shaft driven end	1	*023-19-130M
6	End cover drive end	1	*012-06-536
7	End cover driven end	1	*012-06-551
8	Stuffing box	2	*012-22-033
9	Bearing house	2	*004-22-091
11	Rotary joint for steam	1	*023-32-003
12	Rotary joint for condensate	1	*023-32-001
13	Scraper bar	25	012-40-038
14	Wear ring Ø180/Ø160 L=190	2	300000148264
15	Condensate system	1	*300000148444
16	Deaeration system	1	*023-20-016
20.1	Plastic cap for 30X30X2	1	DPF301020
21.1	Plastic cap for 30X30X2	1	DPF301020
27.4	Plastic plug for tube	1	DPE35102001
29	Gasket Ø68XØ50X3MM	2	16111
31	Sight glass with light	2	32604

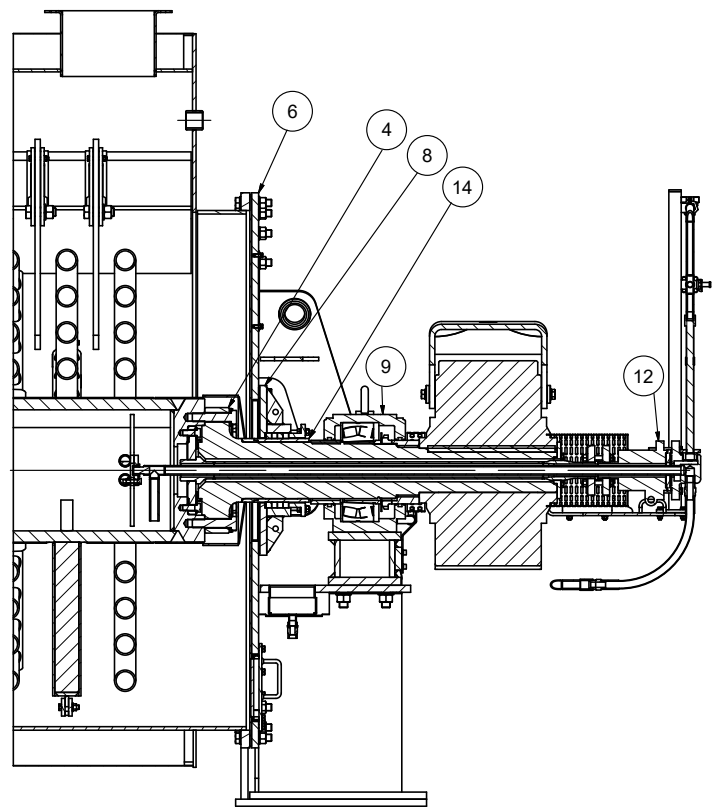
* See separate spare parts list
See the drawings on the next page



F-F



G-G

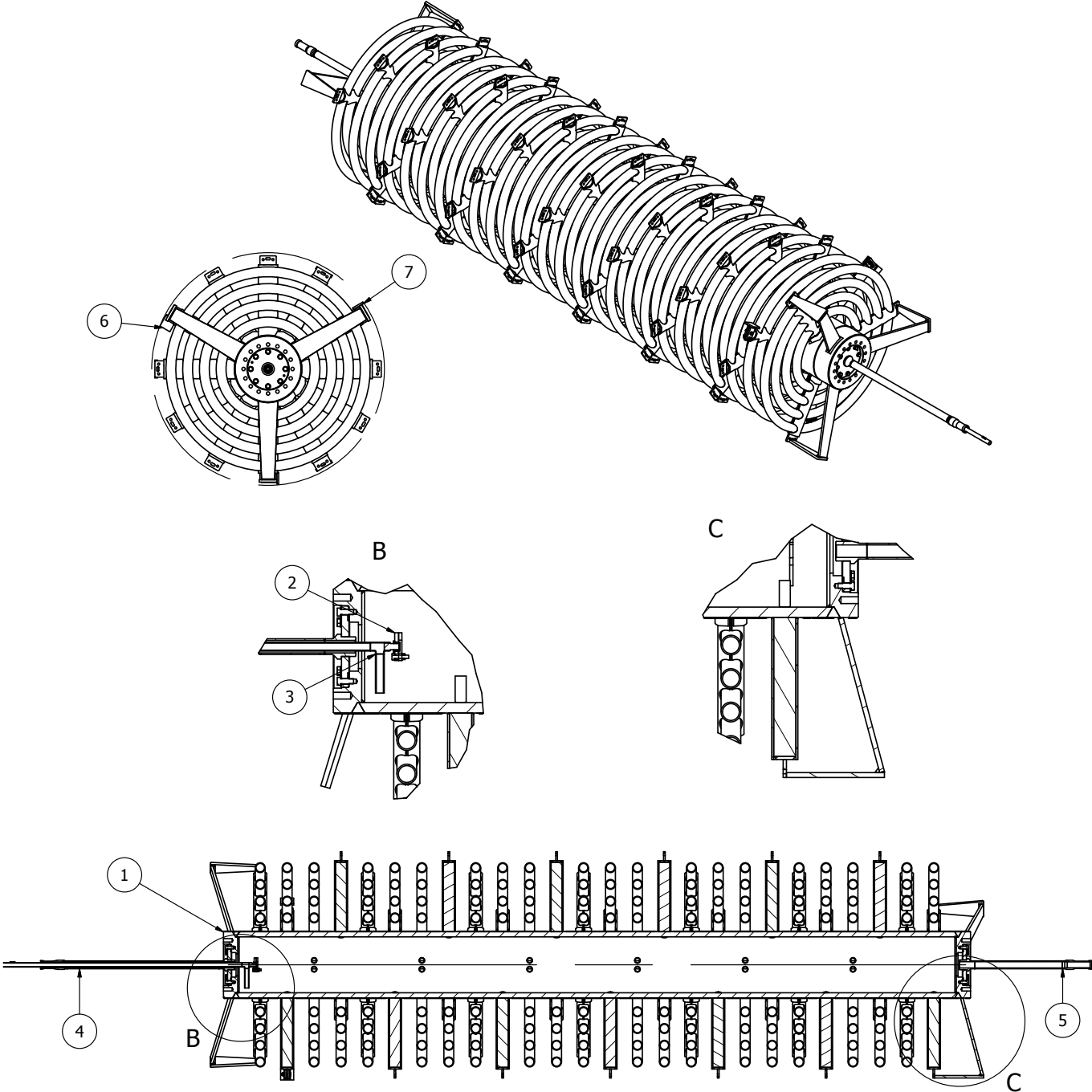


10.2 Spare parts for Rotor

Part no. 22-0027-840

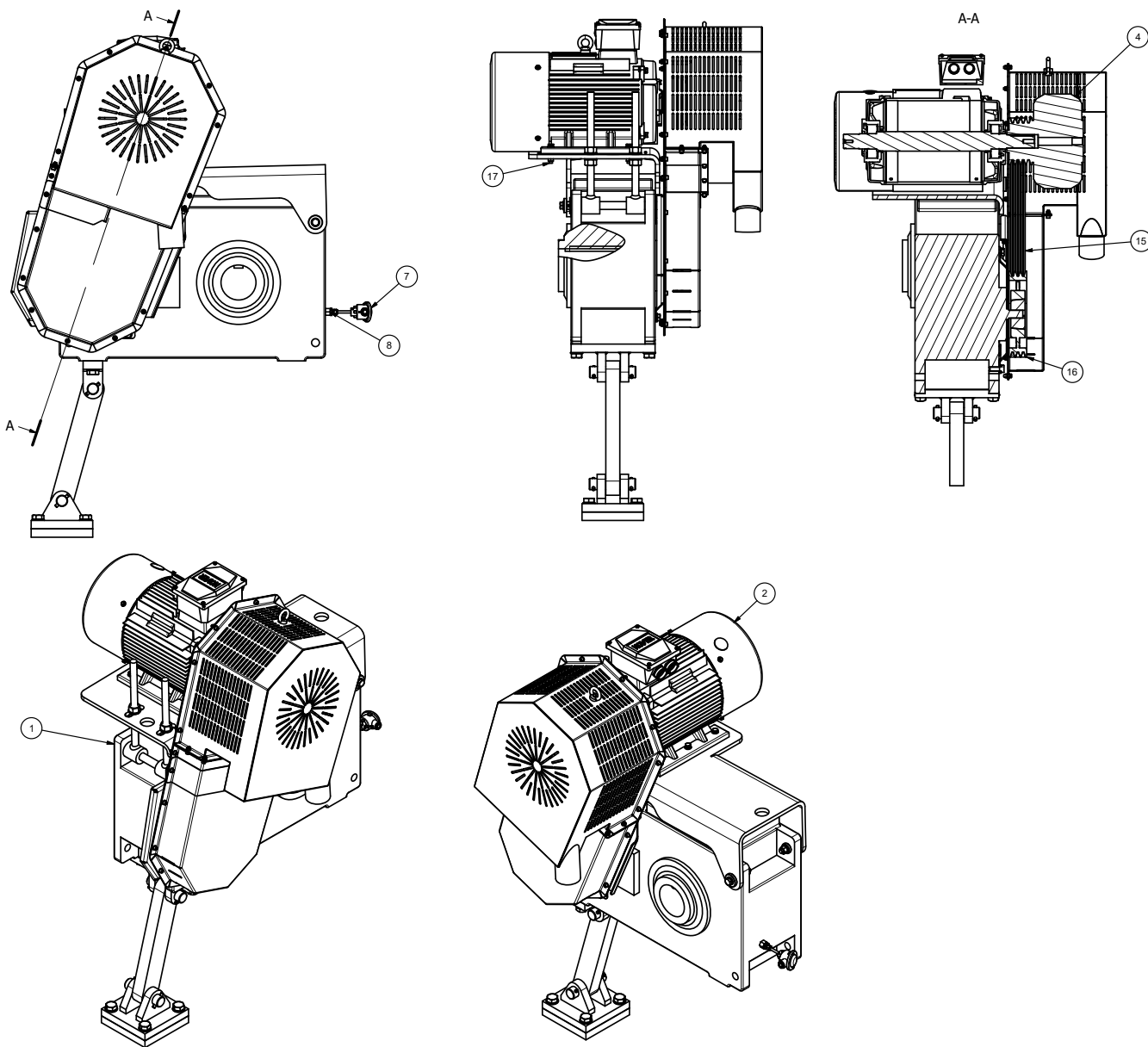
Pos. no.	Description	Qty.	Part no.
1	Rotor	1	023-10-029
2	Siphon pipe holder	1	030-39-036
3	Siphon pipe 3/4"	1	030-39-062
4	In/outlet 1.5"	1	22-0027-898
	Metaflex "C" SPG/304 Ø189 / Ø161 x 4.5 mm	1	16089
	Washer M16	8	409-16
	Bolt M16	8	5657 1640TÜV
5	In/outlet 1.5"	1	22-0027-897
	Metaflex "C" SPG/304 Ø189 / Ø161 x 4.5 mm	1	16089
	Washer M16	8	409-16
	Bolt M16	8	5657 1640TÜV
6	Paddle H=70 B=80, forward	26	012-26-018M
7	Paddle H=70 B=80, neutral	52	012-26-019M

See drawing on the next page.



10.3 Spare Parts for Drive Unit

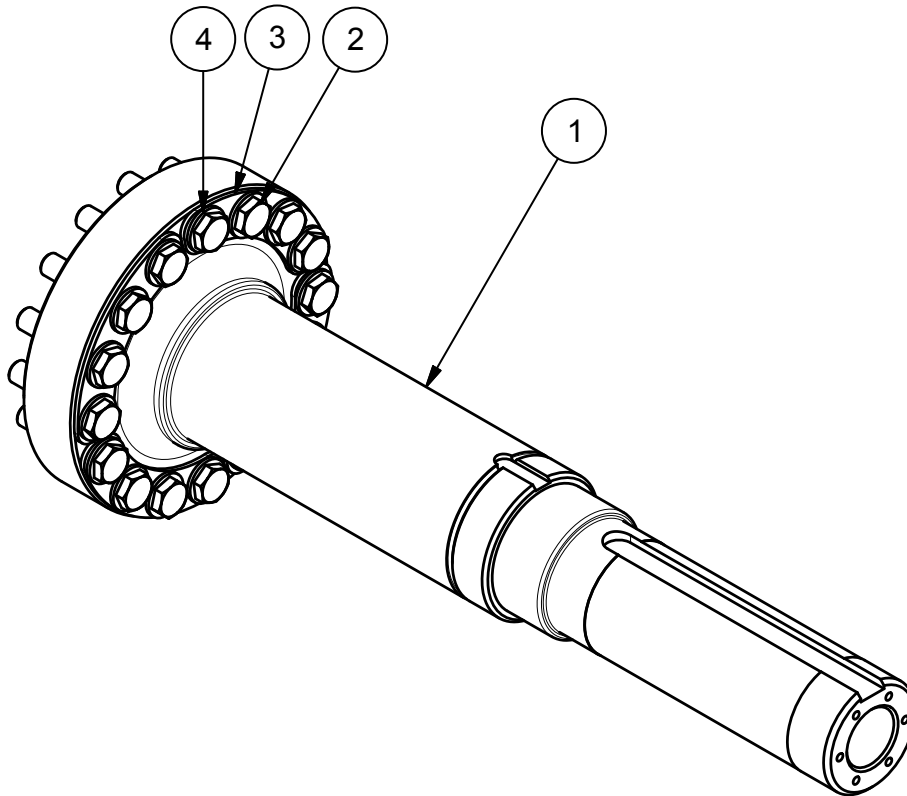
Part no. 300000147836



Pos. No.	Description	Qty.	Part No.
1	Flender gear Type H3HH, St. 8, l=90:1	1	007-05-793
2	Motor Hoyer type IE3, 22 kW, B3, 4 pol, 50 Hz, 400 V, 1500 RPM	1	22-0020-067
4	Rotofluid coupling Beta X 40P-160-48	1	300000109573
7	Temperature transmitter PT-100	1	300000105572
8	Thermo well	1	HX77070
15	V belt SPB 2060	3	300000147843
16	V belt pulley SPB Ø300/3 grooves	1	007-13-293
17	Taper bush 3020 Ø28	1	TAP3020-28

10.4 Spare Parts for the Shaft, Drive End

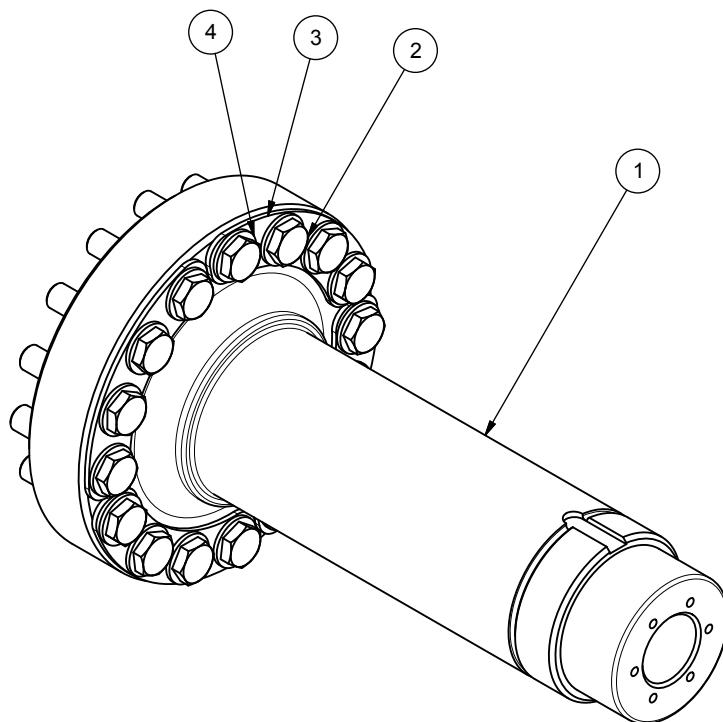
Part no. 023-19-129M



Pos. no.	Description	Qty.	Part no.
1	Shaft, drive end	1	023-19-129
2	Bolt M24 x 110	16	8853 24110TÛV
3	Lock plate for shaft	4	012-46-146
4	Lock washer M24	16	030-33-108

10.5 Spare Parts for Shaft, Driven End

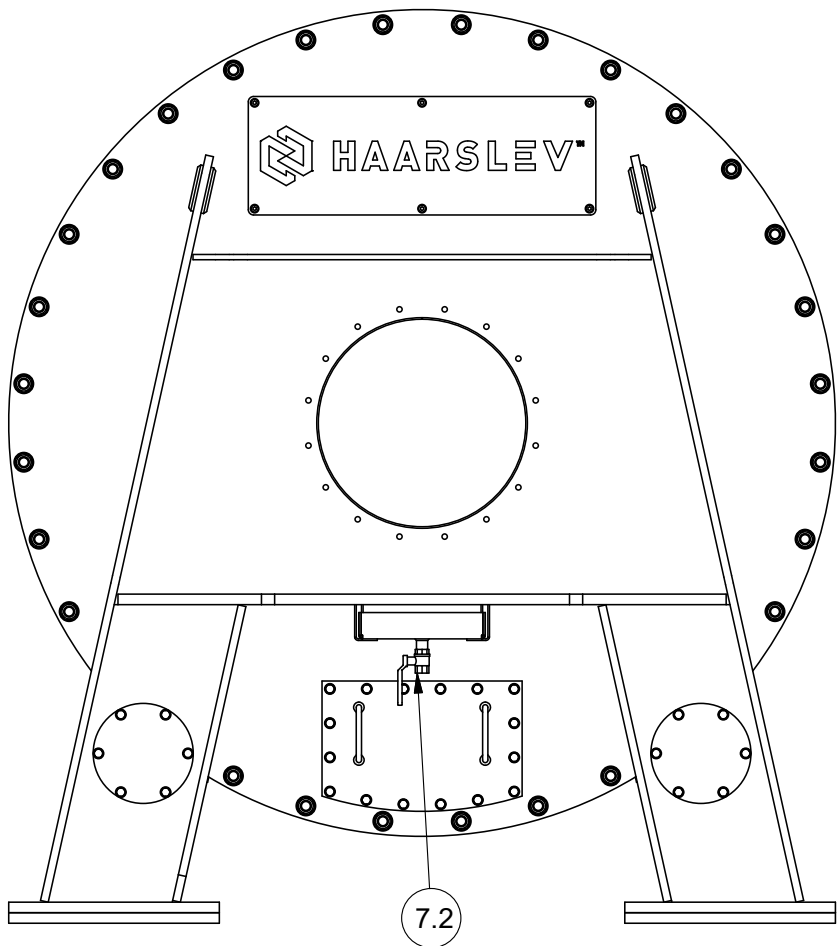
Part no. 023-19-130M



Pos. no.	Description	Qty.	Part no.
1	Shaft, driven end	1	023-19-130
2	Bolt M24 x 110	16	8853 24110TÛV
3	Lock plate for shaft	4	012-46-146
4	Lock washer M 24	16	030-33-108

10.6 Spare Parts for End Cover, Drive End

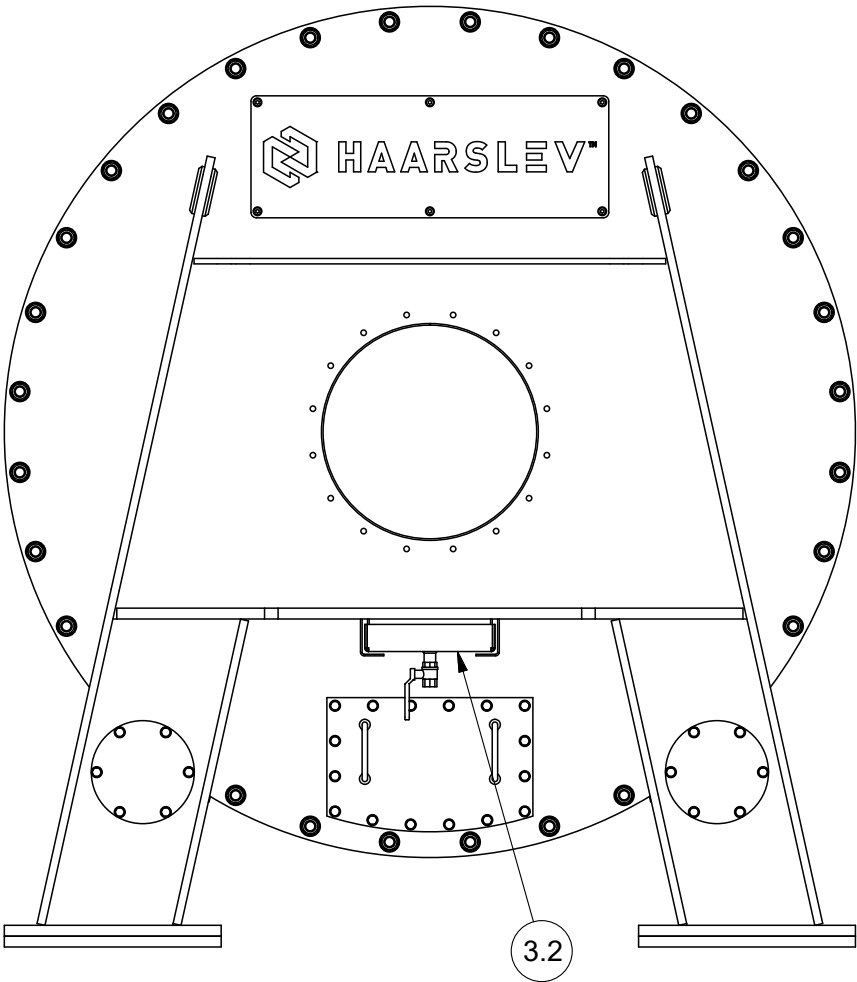
Part no. 012-06-536



Pos. No.	Description	Qty.	Part No.
7.2	Ball valve 1/2"	1	HX41.8117.004

10.7 Spare Parts for End Cover, Driven End

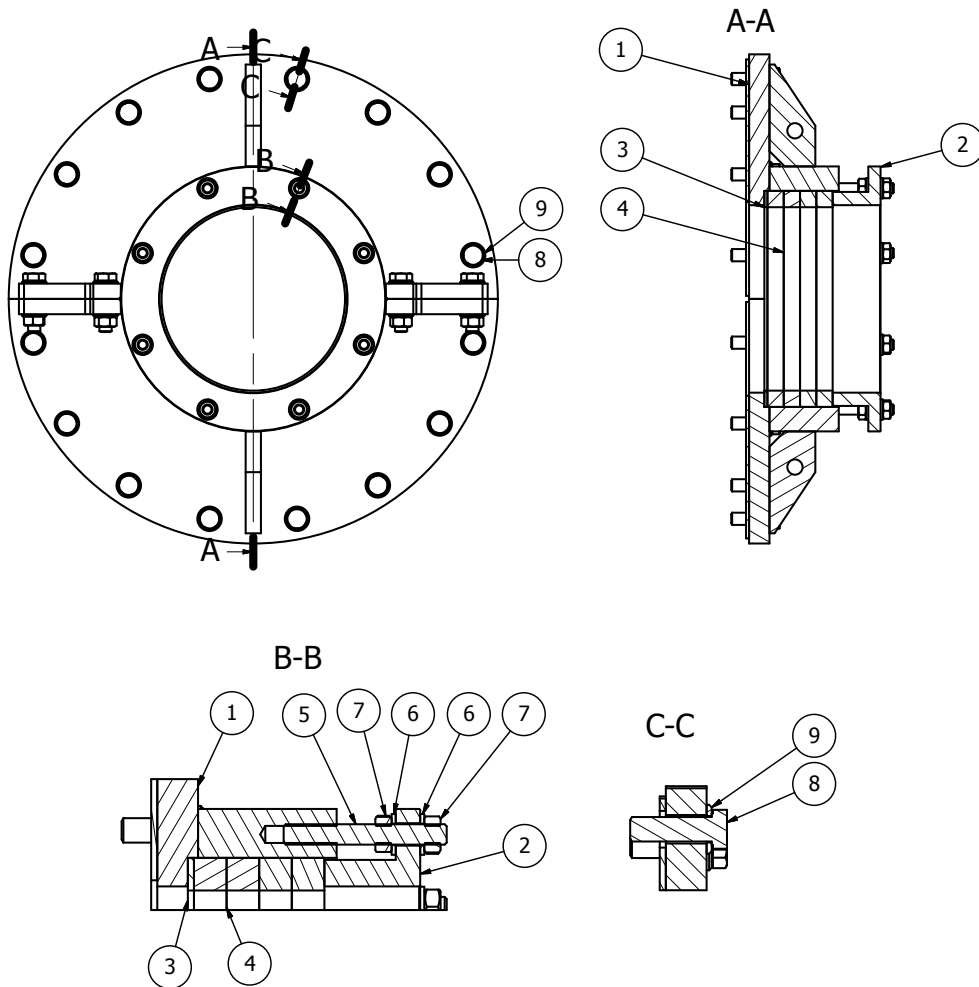
Part no. 012-06-551



Pos. No.	Description	Qty.	Part No.
3.2	Ball valve 1/2"	1	HX41.8117.004

10.8 Spare Parts for Stuffing box

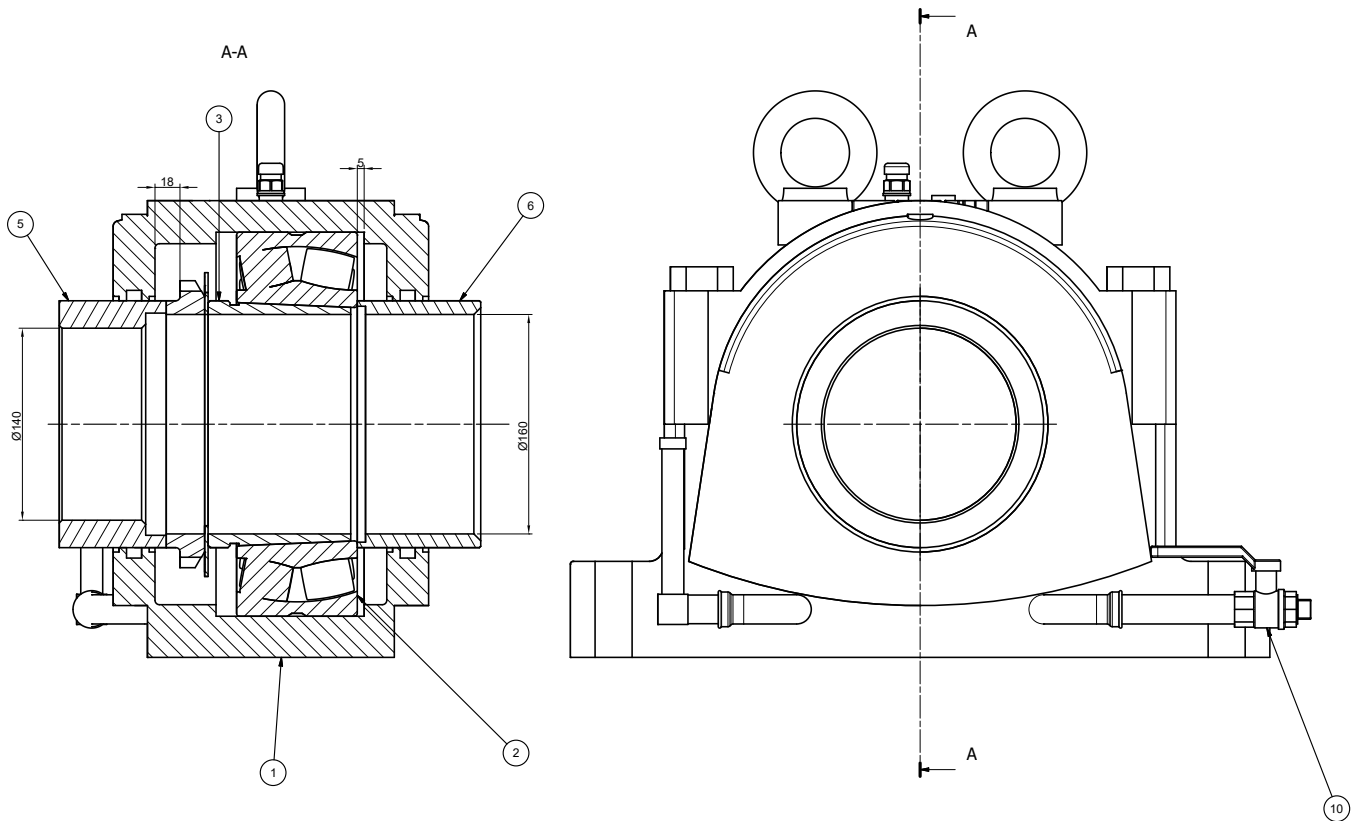
Part no. 012-22-033



Pos. no.	Description	Qty.	Part no.
1	Stuffing box house	1	012-22-030
2	Packing gland Ø 180	1	012-22-226
3	Teflon ring Ø 180 / Ø 212 x 3	1	TEF180/212
4	Packing Lubseal Ø 180 / Ø 212 x 16	4	LUB180/212QM
5	Threaded rod M10, L=80	8	004-28-179
6	Washer M10	16	407-10
7	Nut M10	16	0322 10
8	Set bolt M12 - 040	16	57 12040
9	Washer M12	16	407-12

10.9 Spare Parts for Bearing Housing

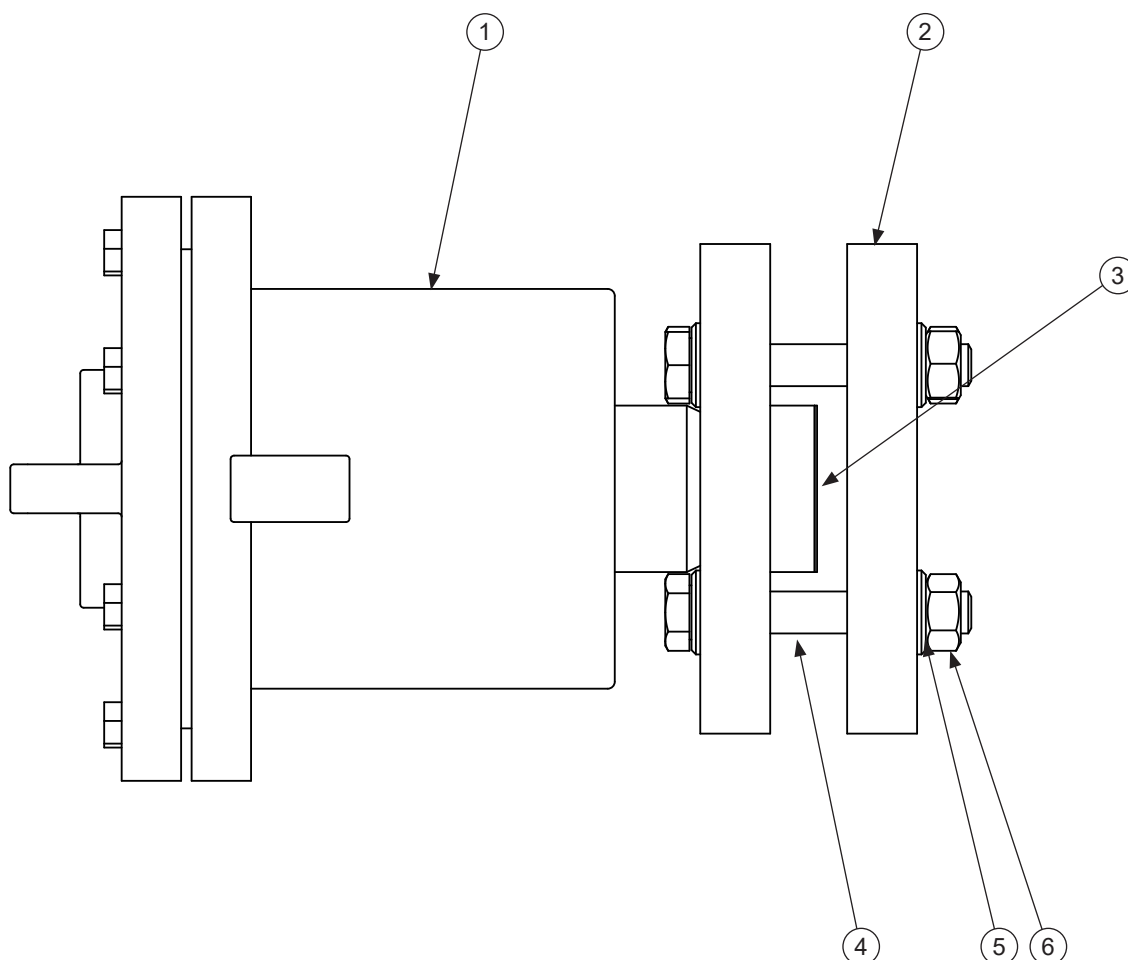
Part no. 004-22-091



Pos. No.	Description	Qty.	Part No.
1	Plummer block housing SD3134	1	SD3134
2	Spherical roller bearing	1	23134CK/C3
3	Withdrawal sleeve	1	AH3134
5	Distance ring	1	012-18-160
6	Distance ring	1	012-18-255
10	Ball valve 1/2"	1	HX41.8117.004
	Braided packing 12X14, 15M (not indicated on the drawing)	1	GPT1214

10.10 Spare Parts for Rotary Joint for Steam

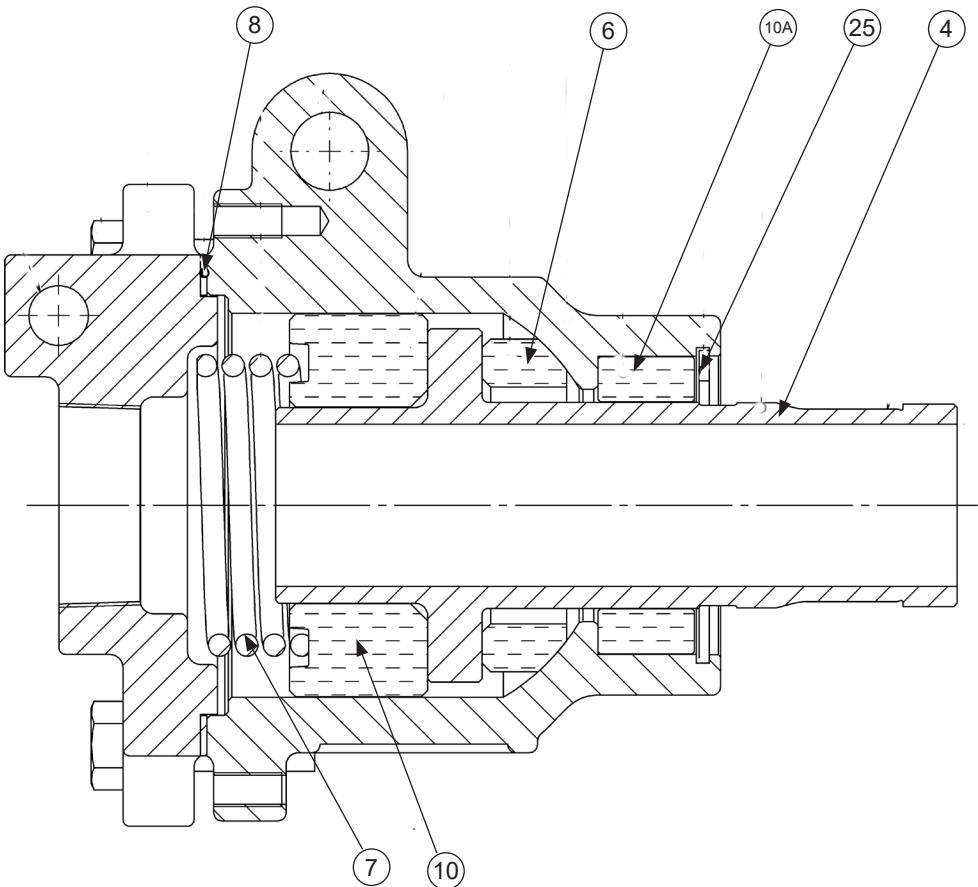
Part no. 023-32-003



Pos. No.	Description	Qty.	Part No.
1*	Rotary joint SXCQ3500	1	SXCQ3500
2	Q-nipple flange	2	3500-QA
3	Copper gasket	1	3500-8Q
4	Hex cap bolt M12-080	4	53 12080
5	Washer M12	8	407-12
6	Hex nut M12	4	0322 12

* See drawing and spare parts list for rotary joint, pos. 1, on the next page.

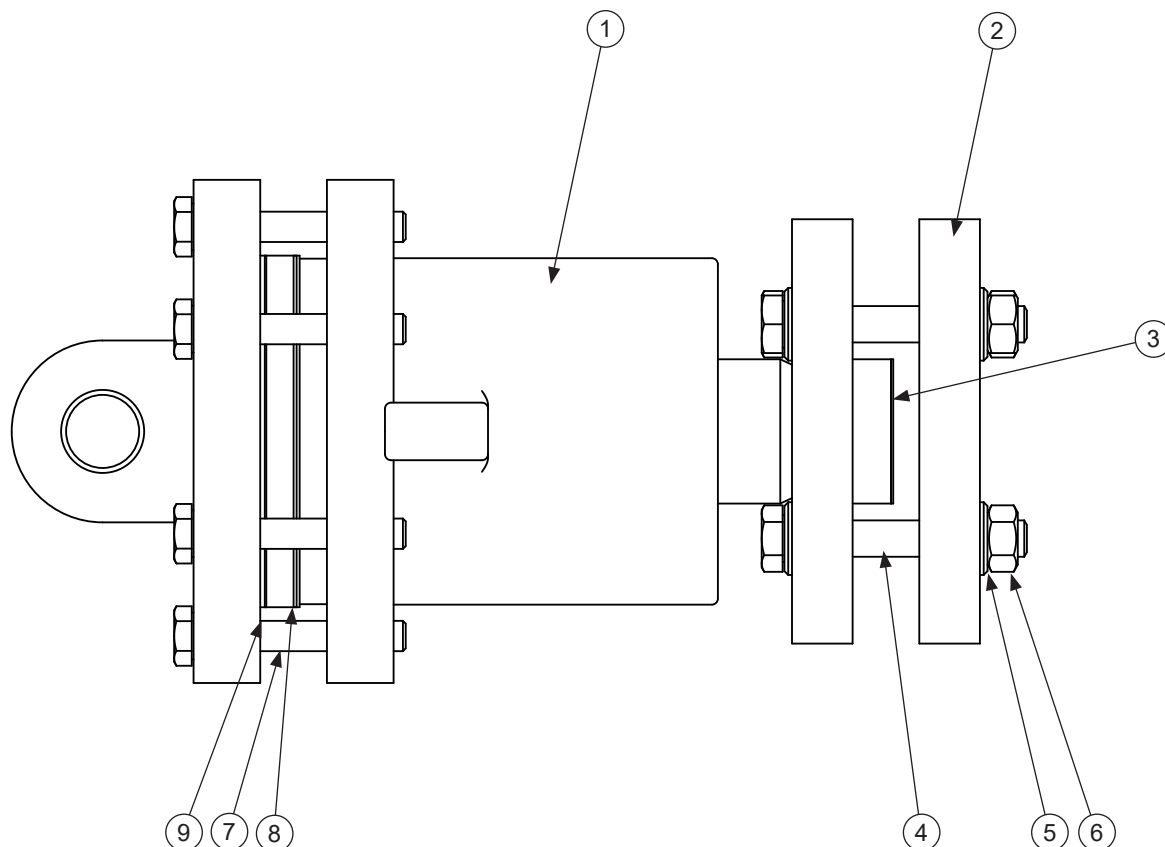
Spare Parts for Rotary Joint, type Johnson SXCQ3500



Pos. No.	Description	Qty.	Part No.
4	Q-Nipple	1	3500X-04
6	Seal ring	1	3500X-06
7	Spring	1	3500-7S
8	Gasket	1	3500-08
10	Guide	1	3500X-10
10A	Guide	1	3500X-10A
25	Retaining ring	1	3500X-25

10.11 Spare Parts for Rotary Joint for Condensate

Part no. 023-32-001

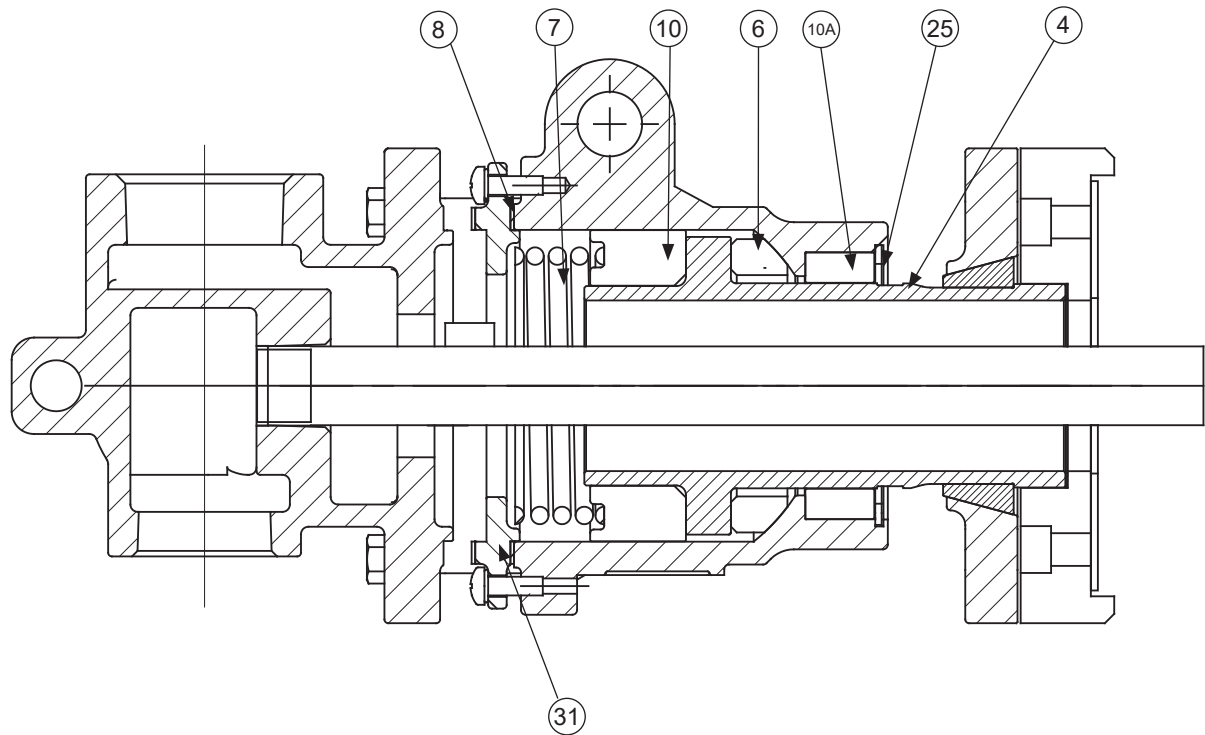


Pos. No.	Description	Qty.	Part No.
1*	Rotary joint, type Johnson SXPBQ3500	1	SXPBQ3500-1
2	Q-nipple flange	2	3500-QA
3	Copper packing	1	3500-8Q
4	Hex cap bolt M12-080	4	53 12080
5	Washer M12	8	407-12
6	Hex nut M12	4	0322 12
7	Bolt 7/16" UNC 8.8, L=87 mm	6	114-054-01
8	Flange for condensate	1	023-20-121
9	Packing Ø 116 / Ø 97	2	16050

* See spare parts list and drawing for rotary joint, pos. 1, on the next page.

Spare Parts for Rotary Joint, type Johnson SXPBQ3500

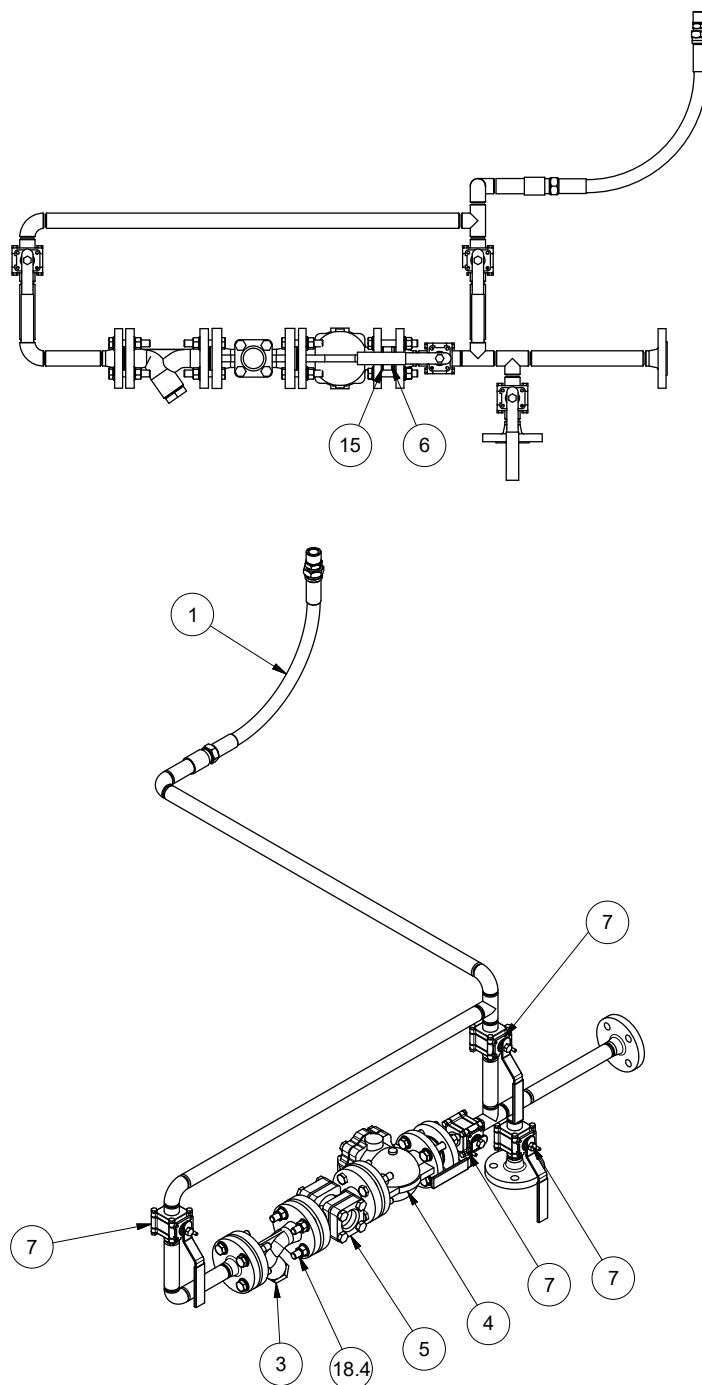
Part no. SXPBQ3500-1



Pos. No.	Description	Qty.	Part No.
4	Q-Nipple	1	3500X-04
6	Seal ring	1	3500X-06AI
7	Spring	1	3500-7S
8	Gasket	2	3500-08
10	Guide	1	3500X-10
10A	Guide	1	3500X-10A
25	Retaining ring	1	3500X-25
31	Assembly plate	1	-0596076

10.12 Spare Parts List for Condensate System

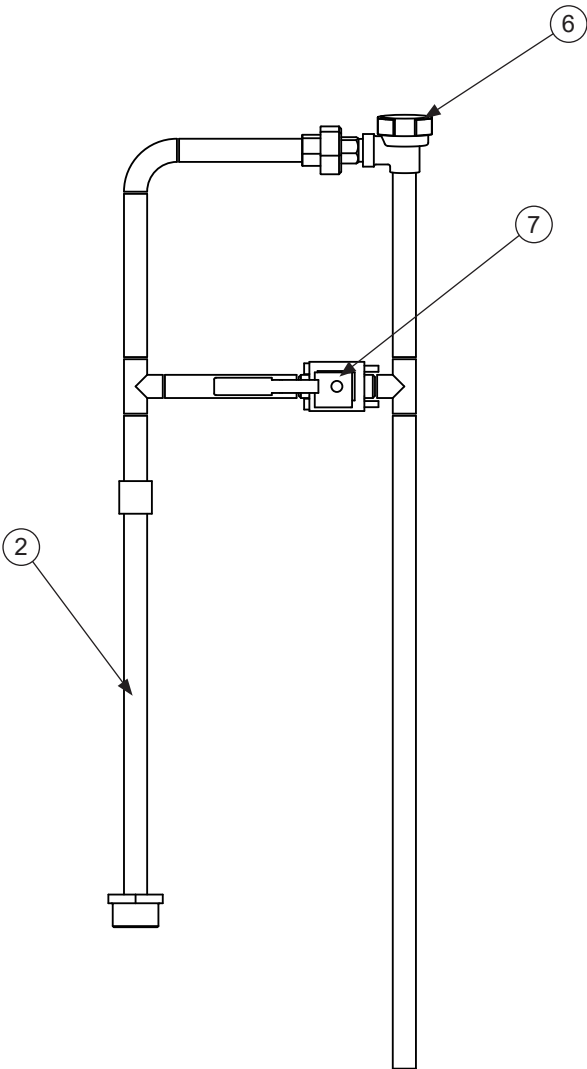
Part no. 300000148444



Pos. No.	Description	Qty.	Part No.
1	Flexible hose	1	HXA12BM12BMT
3	Strainer Fig33	1	44.9632.006
4	Steam trap FT14-10V	1	44.4404.006
5	Sight glass SG253	1	44.8806.006
6	Non return valve DCV3	1	SPI262420
7	Ball valve 3/4"	4	HX391-2222-3/4
15	Gasket DN20 PN100	2	00.0680.027
18.4	Gasket DN20 PN100	3	00.0680.027

10.13 Spare Parts for Rotor Deaeration System

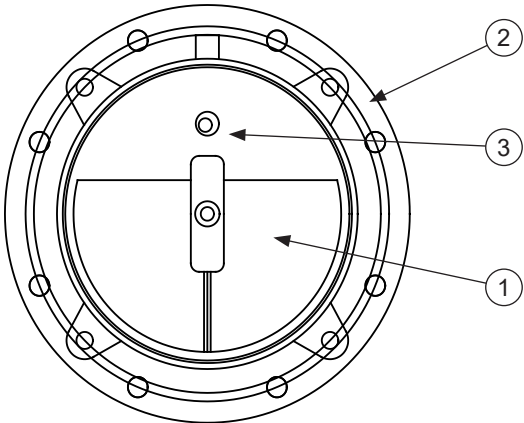
Part no. 023-20-016



Pos. No.	Description	Qty.	Part No.
2	Flexible hose 1/2" L=390	1	HXA08BM08BMT
6	Steam trap type BPT 13A	1	BPT13A
7	Ball valve 1/2"	1	HX391-2222-1/2

10.14 Spare Parts for One Sight Glass Set

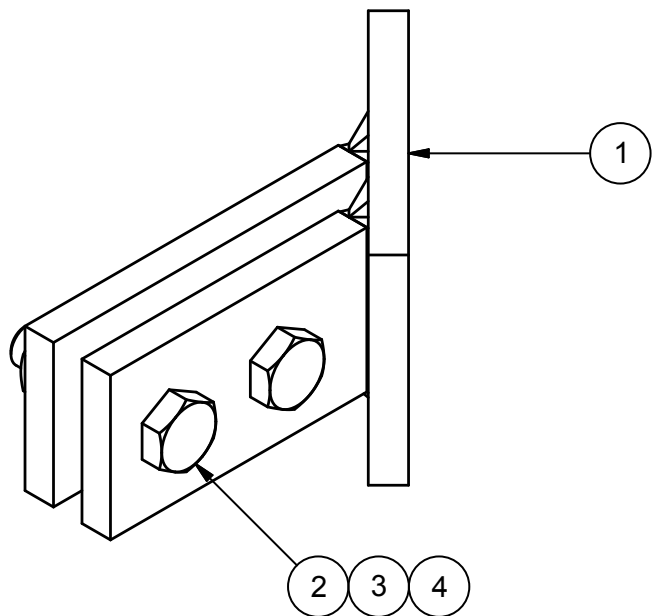
Part No. 32604



Pos. No.	Description	Qty.	Part No.
1	Sight glass with wiper SW1	1	32281
2	Packing	2	32282
3	Light source Lumistar 175	1	32220

10.15 Spare Parts for one Paddle, type Forward

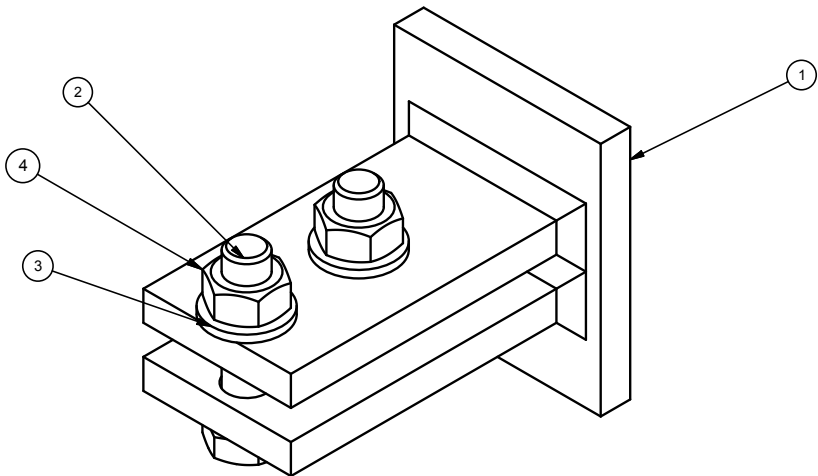
Part no. 012-26-018M



Pos. no.	Description	Qty.	Part no.
1	Paddle	1	012-26-018
2	Bolt M12 x 50	2	95 12050
3	Washer M12	2	409-12
4	Lock nut M12	2	007-97-859

10.16 Spare Parts for one Paddle, type Neutral

Part no. 012-26-019M



Pos. no.	Description	Qty.	Part no.
1	Paddle	1	012-26-019
2	Bolt M12 x 50	2	95 12050
3	Washer M12	2	409-12
4	Lock nut M12	2	007-97-859

EU CERTIFICATE OF CONFORMITY

This is to certify that Lloyd's Register Verification, a Notified Body under the terms of:
The Pressure Equipment Directive 2014/68/EU;
The Pressure Equipment (Safety) Regulations 2016, UK Statutory Instrument 2016 No. 1105, did
(in accordance with Module G of the Directive) undertake an EU Unit Verification on the stated
pressure equipment to ensure its conformity with the requirements of the Directive which apply
to it. The equipment identified below was shown to comply.

This certificate is issued to:

Applicant: **Haarslev Machinery (Xuzhou) Co., Ltd.**
No. 18, Miaoshan Road, Xuzhou City (221004),
Jiangsu Province, the People's Republic of China

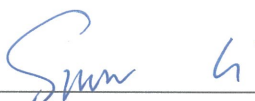
Product description: **Complete Rotor Coil Dryer HCD60SS**
Product type: **HCD60SS**
Design standard: **EN13445:2014**

The Pressure Equipment, Serial Number SN7110 has been designed, manufactured and tested in
accordance with the above standard.

The final inspection and proof test in accordance with the requirements of Section 3.2 of the
essential safety requirements was carried out on the above equipment, as verified by Inspection
and Test Certificate No. NTH1968030/1 issued by Lloyd's Register Industrial Technical Services
(Shanghai) Co., Ltd. on 08 April 2019.

The attached Schedule details the content of the Technical Documentation and Specified
Standards and shall form part of this certificate.

Certificate No: 0038/PED/SHA/NTH1968030/1
Date of Issue: 10 April 2019
Certificate Issue: 01
LRV Notified Body Number: 0038


Snow Li on behalf of Lloyd's Register Verification

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EU CERTIFICATE OF CONFORMITY (MODULE G)
Haarslev Machinery (Xuzhou) Co., Ltd.
Complete Rotor Coil Dryer HCD60SS
CERTIFICATE NO: 0038/PED/SHA/NTH1968030/1
SCHEDULE

Equipment data

Type: Complete Rotor Coiler Dryer HCD60SS

Maximum Design Pressure: 10 bar(g)

Volume: 1300 Liters

The undermentioned documents have been reviewed for compliance with the Pressure Equipment Directive 2014/68/EU and following Design Code(s): EN13445:2014

Technical File Contents

Title	Document Number	Revision / Date
Drawings	12-0053-160	0/ 2018.12.10
Design Calculations	DC-PED-EN-1812	0/ 2018.12.10
	DC-PED-EN-1812-FEA	0/ 2018.12.10
Hazard Checklist	HRA-PED-EN-1812	0/ 2018.11.15
Particular Material Appraisal	PMA-PED-1810-1	0/ 2018.10.12
	EN 10216-3 P355N	2018.12.10
	EN 10028-2 P265GH	2018.12.10
	EN 10216-5 1.4301	2018.12.10
NDE Reports	UT: 7110-1~2	2019.03.08
NDE Personnel Certification	17-UT2-08571(Mr. Yang Xuezhong UT)	2017.06.21
Hydrostatic Test Reports	HT7110-01	2019.03.08
Operational Manual	IOM-PED-EN-1812	0/ 2018.12.10
CE labelling	Copy of Nameplate	2019.03.08
Declaration of Conformity	DOC of 7110	2019.03.08

LRV Reports

Inspection certificate	NTH1968030/1	2019.04.08
Design Appraisal documents	SDAC/1890143 Issue No 0	2018.12.10

Schedule Issue: 01

Date of Schedule Issue: 10 April 2019

LRV Notified Body Number: 0038



 Snow Li on behalf of Lloyd's Register Verification

LUBRICATION TABLE

PROJECT: 75769

The indicated oil quantities are only approximations. It should therefore always be confirmed visually that the gear contains sufficient oil.
For further information please check gear manuals.

ITEM	PART NO.	DESCRIPTION	GEAR UNIT	FIRST OIL CHANGE	SUBSEQUENT OIL CHANGE INTERVALS						OIL TYPE	QUANTITY [L]
					2000 H	2500 H	5000 H	1 YEAR	10000 H	12000 H		
1H01A	108-1306	Condi dryer	Flender H3HH	400 Hours					X		Mineral oil VG460 Meropa (Omala)	40L