Erection Work, Operating and Maintenance Instructions

	Machine Code:	MODUSCREEN T4D
	Customer Name:	Dong Tien Paper,Vietnam
	Customer P.O. No:	
	Andritz Internal Order No:	
	Project WBS No:	D-14-815751-010-3151
	Andritz Material No:	132206555
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1 INTRODUCTION

This manual is part of the technical documentation of Andritz TC. It is intended as a supplement to the training provided, to supply the basic knowledge required for proper, safe and economical use of the equipment delivered by Andritz TC. Observing these instructions helps avoid hazards and reduce repair and downtime costs, as well as increasing the reliability and useful life of machines.

Translated from original instructions

1.1 User

Target group

This operating manual is intended for users with a knowledge of mechanical engineering and is for the exclusive use of the operator of the mill and his personnel.

Personnel entrusted with work on the machine must have read and understood these operating instructions and comply with them. This refers in particular to the following tasks:

- Handling, starting and stopping
- Troubleshooting
- Maintenance and upkeep
- Haulage
- Handling process materials, cleaning of machine and area around the machine

The following sections are especially important:

- the chapter on SAFETY
- the safety instructions contained in various other chapters

Supplementary instructions

The mill operator shall complete this manual by adding national regulations on safety at work, health protection and environmental protection.

Instructions on any special operational conditions concerning work organization, sequence of work/operations and the personnel assigned to the job shall also be added. This also includes instructions on supervising and reporting obligations.

Safe keeping

Keep the entire operating manual near the place where the machine is installed and within easy reach.

1.2 Standards and guidelines

The machine/plant has been built in accordance with state-of-the-art standards and the recognized safety rules. The equipment conforms with the equivalent appropriate standards.

1.3 How to use the manual

Pictograms The following pictograms are used in the manual:

WARNING

Warning signs are shown with an explanation of the type of the hazard. The meaning of the different graduations of hazards are described in the chapter on SAFETY.

Marks an instruction on handling of the machine or system.

Marks a useful information.

► Marks a cross-reference to other sections, figures and tables in brackets.

Examples:

(► Sec. 6.4, Start-up on page 6-3)

(► Fig. 9-2/**123.1**) with reference to an item after the slash (/)

(► Tab. 3-1, Construction weights on page 3-2)

► Safety, installation, operation and/or maintenance instructions on components not supplied by Andritz TC are contained in the descriptions of the components provided by subsuppliers.

Example:

See ► Instructions from subsuppliers.

Work steps (operations) Work steps are presented in tables. Work steps are numbered and must be carried out in the order specified.

Listings

Lists without numbering do not require operations to be carried out in a certain order.

Numbering of pages, tables and figures	Pages	Consecutive numbering of chapters	2-1
	Tables	Tab. + Consecutive numbering of chapters	Tab. 2-1
	Figures	Fig. + Consecutive numbering of chapters	Fig. 2-1
Abbreviations	Dwg.	Drawing	
	Fig.	Figure	
	Sec.	Section	
	Tab.	Table	
Illustrations and graphic charts	The illustrations and graphic charts show the basic design of the machine. This may not necessarily correspond exactly to the design supplied.		

1.4 Warranty and guarantee

Andritz TC's general terms of delivery and sale shall apply.

Guarantee and liability claims on Andritz TC shall become void if personal injury or material damage is caused by one or several of the following:

- Use of the machine/system for any purpose other than its designated use
- Non-conformity of erection work, start-up and handling of the machine/system
- Non-observance of the safety instructions in the manual
- Non-authorized structural changes to the machine/system
- Non-observance of the maintenance and upkeep instructions

In the event of a claim for repair under guarantee, Andritz TC reserves the right to assess the damage to the machine/system.

1.5 Copyright

2 SAFETY

2.1 General safety regulations

The chapter on safety contains general safety regulations which must be observed when working on the machine/plant.

In addition, the chapters in the operating manual contain further safety regulations. These are marked by warning signs.

Safety instructions on components not supplied by Andritz TC are contained in the descriptions of the components provided by sub-suppliers. The safety instructions supplement Andritz TC's operating instructions.

All safety instructions must be observed. Disregarding the safety instructions may cause a risk to life and limb, environmental pollution hazards and damage to property.

2.2 Danger and warning signs

The entire SAFETY chapter is of extreme importance and relevant to safety. The information in this chapter, therefore, is not marked with special danger symbols.

In the following chapters of this manual, warnings are marked by a pictogram. The following warning signs are used:

 **DANGER**	**This symbol indicates there may be a risk to life and limb.** Non-compliance with the warning signs may lead to serious health problems or even fatal injuries, and can cause extensive damage to property.

 **WARNING**	**This symbol points to an imminent health risk, as well as a risk of environmental pollution and of damage to property.** Non-compliance with the warning signs may cause moderate health problems and/or extensive environmental pollution and damage to property.

 **CAUTION**	**This symbol points to a dangerous situation.** Non-observance of these signs may cause environmental pollution and damage to property.

Further symbols and pictograms used are described in the chapter INTRODUCTION.

2.3 Designated use

The equipment should only be used according to the specifications forming part of the purchase order.

Using the machine/plant for other purposes is considered contrary to its designated use.

Any modifications to the scope of supply made without the agreement of Andritz TC are considered contrary to the designated use.

The term designated use shall also include adherence to the operating instructions, observance of the operating, inspection and maintenance conditions and of the regulations on cleaning and upkeep.

2.4 Forbidden ways of using

WARNING

Following ways of use are strictly forbidden

- Using too powerful motor
- Using too high process pressure
- Operating the ModuScreen filled with liquid and valves closed for a long period of time
- Loosen the guards during operation
- Operating the ModuScreen while the cover is loosened
- Starting the ModuScreen while air removal or emptying valve is open
- Performing service operations while the electric motor is connected to power supply

2.5 General remarks on machine/plant safety

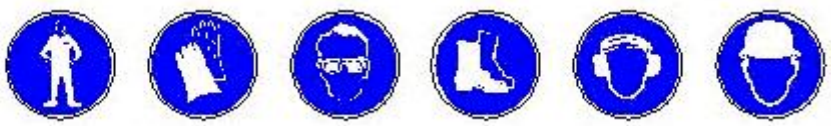
The machine/plant has been built in accordance with state-of-the-art standards and the recognized safety rules. Nevertheless, its use may constitute a risk to life and limb of the user or of third parties, or cause damage to the machine/plant and to other material property.

The machine/plant may only be operated when in perfect condition and with due consideration to safety and the risks involved. All protective devices and the emergency cut-out devices must be in place and fully functional.

Malfunctions and unforeseen changes to the machine/plant must be remedied immediately.

2.6 Personal protective apparel

General protective apparel



The following must always be worn when performing work on the machine/plant:

- Protective clothing to prevent the fiber pulp from coming into contact with the skin
- Gloves to prevent hand injuries
- Goggles to prevent eye injuries
- Safety shoes as protection against foot injuries
- The required personal ear protection to avoid hearing defects
- Standard hard hat as protection against head injuries

2.7 Safety at the machine installation site

- Adequate lighting must be provided (industrial lighting).
- The foundations must be sized to withstand the loads caused by the machine. Customer will be provided with a load plan.
- Area around machine and marked escapes to be kept free. Area around machine must be marked as danger zone.
- Make sure machine and surrounding area are kept clean. In particular, oil and grease on the floor and on machine elements may cause slipping. This is therefore a considerable source of injuries, as are tools.
- The floor around the machine must be provided with a non-slip finish.
- In order to prevent any falls from or damage to the machine, it is forbidden to climb onto machine elements or on the machine (except for the treading areas provided). Use ladders or similar equipment in accordance with recognised standards.
- Ramps, platforms and lifts must be used to avoid injury or excessive physical effort.

2.8 Safety during start-up

The person in charge of mounting the screen must ensure that there are no risks involved in the mounting. The supplier of the screen is only responsible for the assembly of the screen prior to delivery.

Especially when the electric motor is installed on site, it must be ensured that after installation of protective guards, the potentially dangerous gaps remaining in the screen are smaller than what standard EN 294 requires. The person in charge of mounting must take care of acquiring the necessary supplementary guards if the detachable guards supplied with the screen do not provide sufficient protection.

2.9 Safety during operation

The maximum feed pressure of the screen is shown in the dimensional drawing appended to the instructions.

Do not use the screen at a temperature higher than what the customer has notified while the order was being made. When the operating temperature exceeds 65°C (EN563), short-term surface contact may cause skin burn. Long-term contact may cause skin burn at temperatures below 65°C.

All original guards of the screen must be appropriately fastened while the screen is running, and the guards must not be removed during operation.

All maintenance of the screen and its drive motor is forbidden during operation, except:

- Lubrication of bearings.
- Adjusting sealing water flow and pressure (these are adjusted by valve(s) in the sealing water equipment).

While the drive motor of the screen is rotating, make sure that there is a continuous liquid flow through the screen (due to a risk of over-heating).

2.10 Safety during maintenance

Use appropriate hoisting equipment when lifting the screen, taking into account the design weight of the screen. The design weight and correct lifting methods are shown in the instructions.

If the cover of the screen needs to be opened during maintenance, flush the screen while the motor is still rotating.

Before maintenance, stop the drive motor and disconnect it from the electrical supply by means of a safety switch in accordance with relevant regulations.

Once the drive motor is stopped, close the valve of the sealing water line going to the shaft seal.

Before opening the cover of the screen:

- Make sure that the screen is depressurized
- Make sure that no liquid or stock can flow into the screen
- Drain the screen

DANGER

Do not take tools or lamps that operate with an electric voltage higher than 24V into the equipment.

The screen can be started after maintenance only after:

- The cover of the screen has been closed
- All original guards have been installed properly

The sealing water valve must be opened before starting the drive motor of the screen.

If there is reason to expect considerable wear, for example, on account of excessive sand content, measure the thickness of the screen material regularly. If significant wear occurs, contact the supplier to ensure safe operation.

With the exception of seals and belt transmission, both stainless and mild steel have been used as the materials of the screen. These can be recirculated after use.

2.11 Safety during disassembly

The person in charge of the disassembly of the screen shall make sure that no measures at the disassembly site cause a safety risk.

Before disassembling the screen:

- Make sure that the screen is disconnected from power supply.
- Make sure that the screen is not pressurized.
- Make sure that liquid or stock flow into the screen is prevented.
- Drain and flush the screen.

3 DELIVERY

3.1 Mode of delivery

The screen is normally delivered from our factory completely assembled with the belt drive and motor installed. In cases where the customer supplies and installs the motor, the belts and belt pulleys are delivered in a separate package. Before delivery, all the connections of the screen have been protected with cover plates or plugs.

CAUTION

Do not remove the cover plates or plugs until the piping installation requires it.

3.2 Packaging

For transportation by truck, the screen is attached to a transport pallet which allows loading and transferring with a forklift truck. For long distance shipment, the screen with its transport pallet are packed into a sturdy crate to prevent damage during transfers and lifting. The lifting points are marked on the shipping crate. Weights and dimensions are given in the shipping documents.

3.3 Receiving inspection

When the shipment has reached its destination, it is recommended that the screen and its enclosed parts be immediately inspected for potential damage which may have occurred during transportation.

If the delivery has included a separate spare parts shipment, verify the quality and quantity of the spare parts against the dispatch note to detect any potential shortcomings.

Immediately inform your contact person at Andritz TC about possible damages or missing parts so as to agree on further procedures and to determine possible compensation claims.

4 ERECTION

4.1 Erection site

The maximum working pressure of the closed pressure screen can be found from the dimensional drawing.

WARNING

The screen must not be used at higher pressures.

The screen can be located at various levels of the building.

Although there are no special requirements as to the operation and location of the screen, the following details should be taken into consideration at the planning stage to allow a trouble-free screening process:

CAUTION

The requirement of clean sealing water is 0.03 - 0.08 l/s (2 - 5 l/min), the pressure of the water led to the seal is recommended to be 100 kPa higher than the maximum inlet pressure of the screen; however, at least 300 kPa.

- The dilution liquid requirement according to the production, pressure 150 kPa higher than the inlet pressure of the screen.
- The location of regulating valves and magnetic flow meters and the straight pipe lengths required by them.
- Selection of feed pump head so that the pressure is high enough to transfer the accept and reject to the next stage of treatment, taking the normal pressure loss of approx. 0 - 50 kPa into account.
- The centralization of local instruments to a free space.

The dimensional drawing presents the external dimensions of the screen and the free space requirement above it.

4.2 Foundation

The foundation can be made of concrete (see the dimension dwg.). The quantity and location of the foundation screws are given in the foundation drawing/dimensional drawing.

The screen can be levelled using the adjustment screws in the foundation (6 pcs). The foundation's threaded bars and bolts included in the delivery should be used.

Welding must be performed in accordance with the welding instruction given in the dimensional drawing.

To allow after-tightening, there must not be any adjustment nuts in the foundation screws under the stand. When after-tightening, a nut under the stand will prevent the tightening of the base plate against the concrete surface!

4.3 Lifting equipment

There should be lifting equipment at the installation site to facilitate mounting and maintenance inspections. There must be sufficient space above the screen to lift the upper frame and other inner parts.

4.4 Installation of ModuScreen

Lift the screen from its transport pallet using the lifting lugs (► Fig. 4-1 Hoisting of ModuScreen, on page 4-12).

DANGER

Do not lift the screen by the motor or motor stand.

DANGER

While lifting the screen there must be extra support in the upper lifting lugs to prevent the falling of the screen.

For undisturbed operation and to prevent stress to the foundation screws of the screen during operation, the screen must be leveled during installation. This will also ensure the removal of all liquid from the screen during drainage.

Vibrations can be transmitted to the screen from the pump or other near-by equipment as well as through the piping. The screen must therefore be carefully and securely fastened to the foundation.

DANGER

Check the tightening of the foundation screws before the screen is taken into use.

Size	Weight with motor* [kg]	Weight without motor [kg]
T4D	3 625 – 3 900 (625 – 900)	3 000
*) weight of standard motor in brackets		

Tab. 4-1 Construction weights

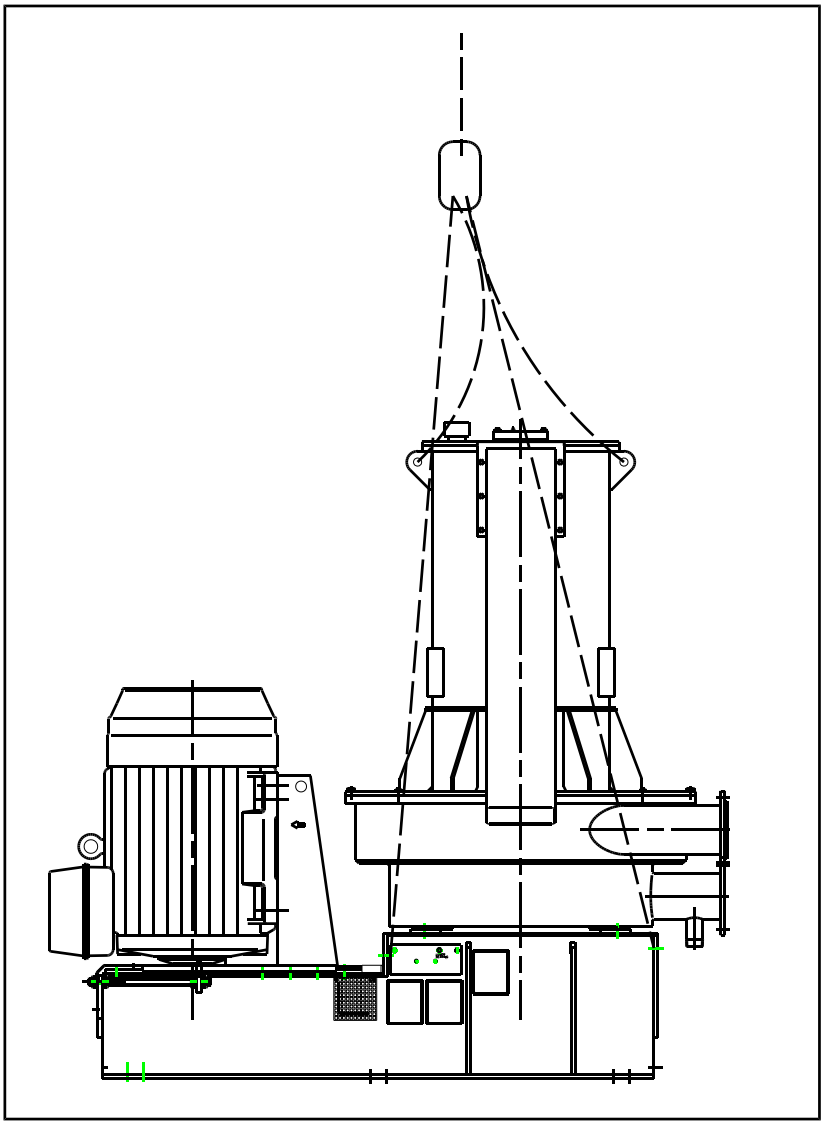


Fig. 4-1 Hoisting of ModuScreen

4.5 Installation of the electric motor

The electric motor must be installed at the installation site in case it is provided by the customer.

Installation of the drive parts is explained in (► Sec. 8.7 Motor and power transmission, on page 8-45).

4.6 Power transmission

The power transmission of the screen is arranged through V-belts.

Move the motor stand in order to tighten the belt(s) (► Fig. 4-2 Moving of the motor in order to tension the belt(s), on page 4-15).

4.7 Tensioning of V-belts

DANGER

Always disconnect the motor from the power supply in accordance with regulations before dismounting the belt guards and inspecting and servicing the transmission! Remount the belt guards before reconnecting the motor to the power supply.

The high power transmission ability of the belts cannot be utilized unless the belts are correctly tensioned. Make sure that the belts are correctly tensioned in the following way:

Measure the perpendicular bending force F (► Fig. 4-3 Measuring of the belt tension, on page 4-16), which leads to a belt tension in accordance with the following table.

Size	Deflection [mm]
T4D	10

Tab. 4-2 Belt deflection

Compare the measured force with the table below.

Belt profile	Diameter of smaller pulley [mm]	Bending force F [N]
SPB/5V	160 – 200 212 – 280 300 – 400	29 – 44 36 – 50 38 – 58
SPC	250 – 355 375 – 560	51 – 75 60 – 90

Tab. 4-3 Belt bending force

If the measured bending force falls between the given values, the tension is suitable. If the force is below the lower value, the belts are too slack. A new belt drive should be tensioned to the higher measured force value because the belts stretch during the run-in period.

After the first 30 minutes or at the latest after the first day of operation, check the belts and tension the slack which has been created during the run-in period back to the recommended range.

After this adjustment, the belts will not slacken during normal operation and only need little further adjustment.

CAUTION

Do not tension the belts above the recommended range.

WARNING

After installing and tensioning the belts, make sure that all guards are installed before starting.

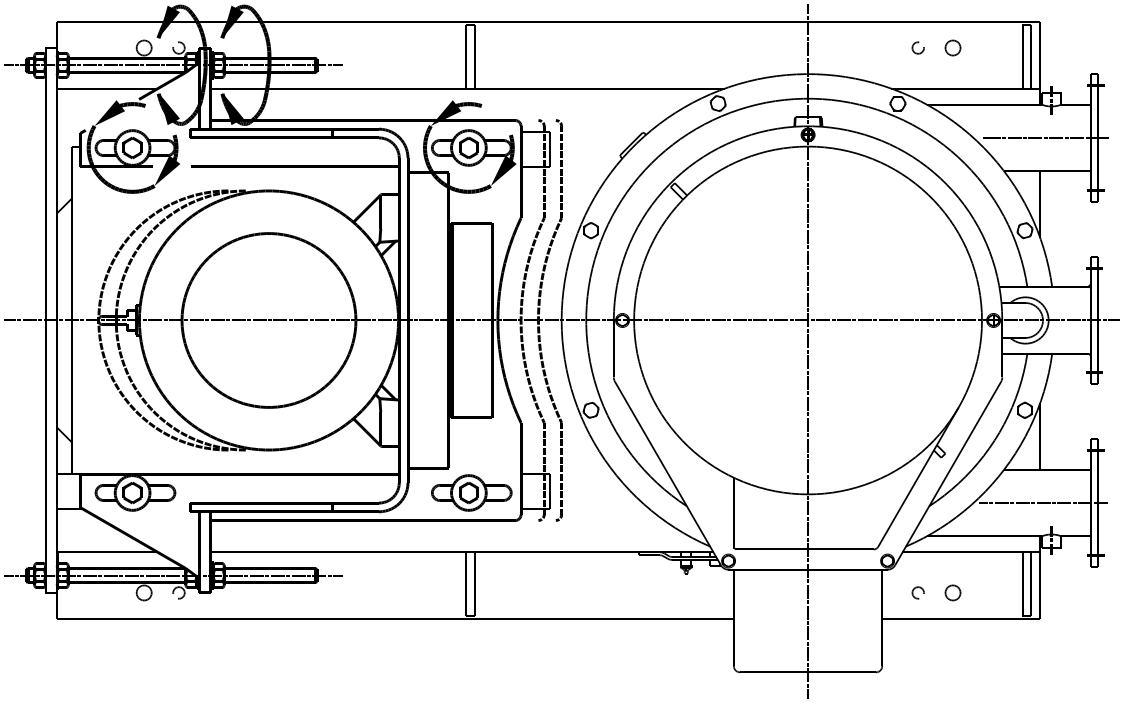


Fig. 4-2 Moving of the motor in order to tension the belt(s)

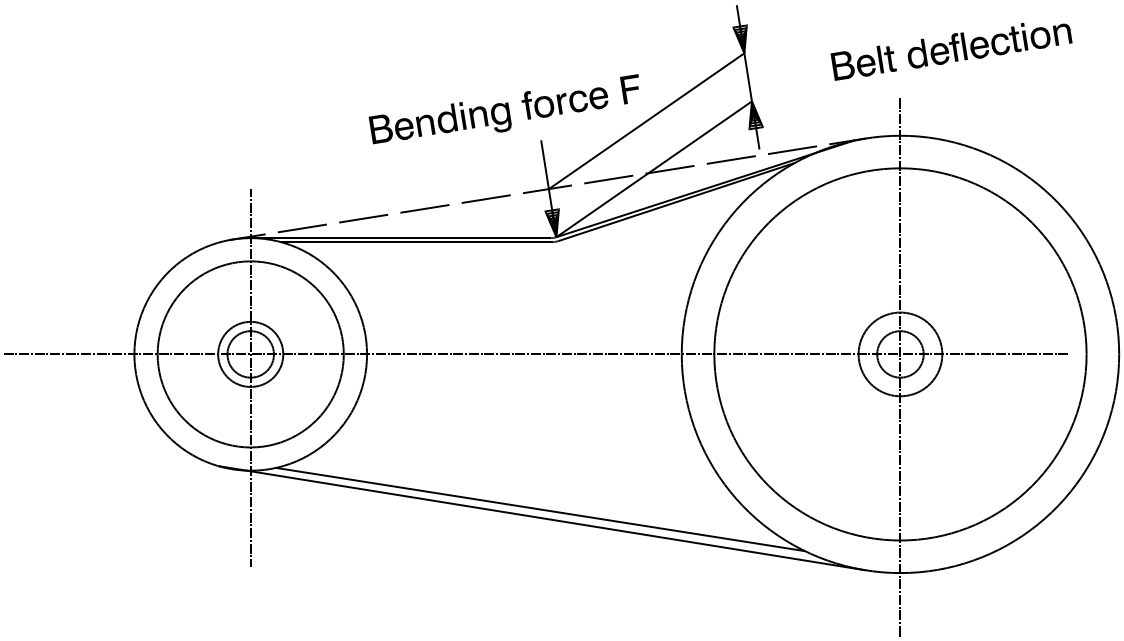


Fig. 4-3 Measuring of the belt tension

4.8 Sealing water equipment

Fasten the sealing water measuring and adjusting equipment with bracket – which have been detached for transportation – into place on the stand. Use the screws which are included in the delivery for this purpose.

Fasten the sealing water hoses to the sealing water equipment.

CAUTION

Do not start the screen without sealing water.

5 PIPING AND VALVE INSTALLATION

5.1 General instructions for installation

There should be a high density type AhlCleaner equipped with a junk trap installed in the feed line of the ModuScreen T.

The pipe connections for the screen are shown in the dimensional drawing. The piping and other connections must be installed according to approved drawings, in which the special requirements set by the regulating valves as well as consistency and flow measurements have been taken into consideration.

When engineering and installing stock pipes in particular, make sure that air pockets cannot be formed in the pipes.

Connecting the screen

Preconditions

- Pipe work is completed.

Step	Action
1	Flush the inside of the piping to remove welding and other residues. The cleaning should be carried out before the pipes are fastened to the screen.
2	After cleaning, remove the cover plates and plugs protecting the connections of the screen.
3	Fasten the connections to the pipes.

Tab. 5-1 Connecting the screen

5.2 Feed piping

The feed piping of a single screen is simple and the valve installed to the feed pipe is a mere shut-off valve. The valve must be suitable for reject lines containing heavily contaminated pulp; e.g. full bore ball valve. During normal operating conditions, throttling is not used except when reducing pressure on the inlet side.

In a parallel installation of two or more units, individual throttling is avoided by making the feed pipe of each separate unit tapered or stepped in order to even out the flow velocity of stock.

5.3 Accept piping

5.3.1 Atmospheric top part

The upper accept of the screen is in atmospheric pressure. It does not require any valves, nor pressure nor flow measurement. If there is a valve in the pipeline it must be of on/off type.

The screen must be elevated so that the upper accept can freely flow down in a descending pipe.

The upper accept is usually led to the pulper.

5.3.2 Pressurized bottom part

The lower accept line must be equipped with a control valve.

5.4 Reject piping

The pressurized lower part can be intermittently purged from possible heavy particles with a purge valve.

The unpressurized upper reject chute rejects continuously to reject conveyer.

5.5 Sealing water piping

The required monitoring and control unit is installed to the sealing water distribution piping for the mechanical seal (► Fig. 5-1 Sealing water piping, on page 5-19).

The rotameter and the pressure gauge are the sealing water measuring devices. As a last protection, a 40 micron pipe filter prevents impurities from entering the seal. A high-capacity 40 micron pipe filter is recommended for the inlet pipe.

The rotameter is provided with flow alarm.

CAUTION

The pressure of the water led to the seal must be min. 300 kPa. However, it is recommended that the seal water pressure is 100 kPa higher than the inlet pressure of the screen.

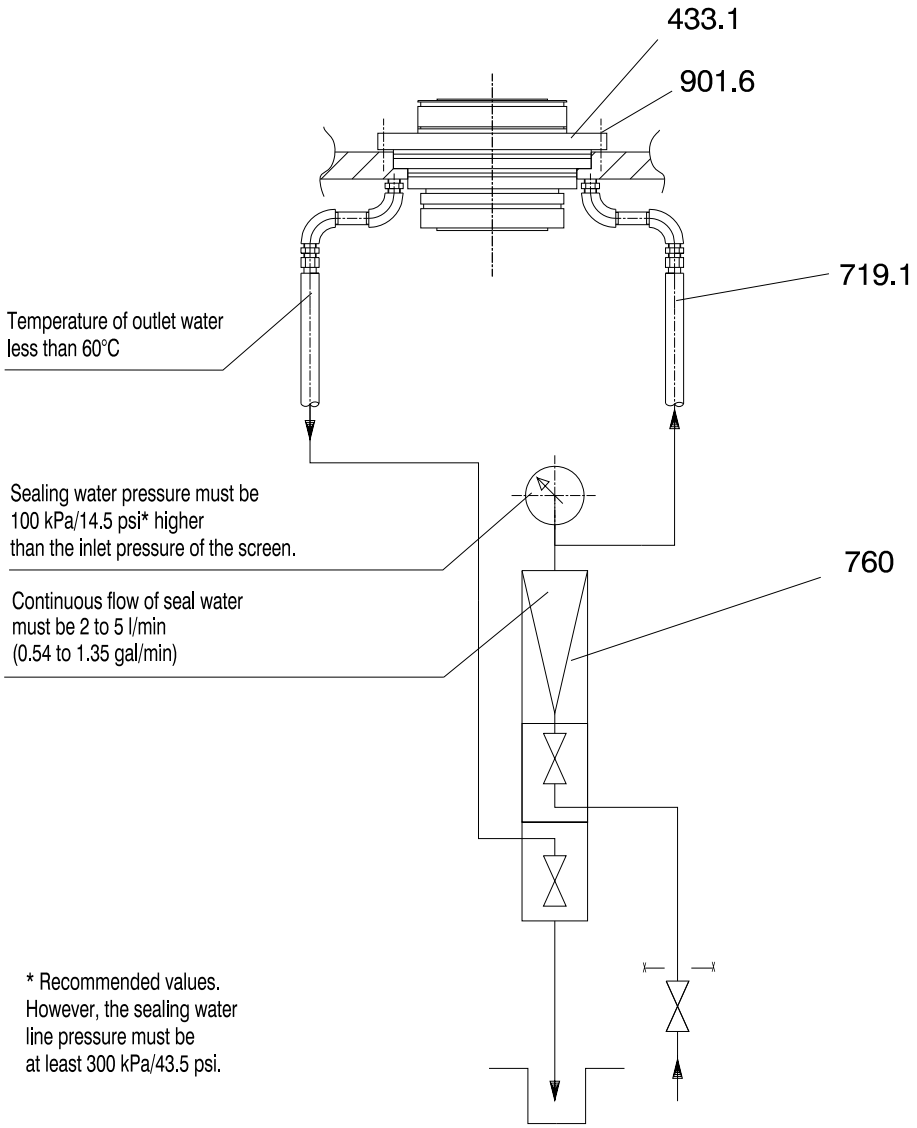


Fig. 5-1 Sealing water piping

5.6 Dilution, filling and washing piping

The water connection in the upper part of the screen can also be used for filling and washing, but its main function is to enhance the fibre recovery. The water flow may be continuous, if needed. A hand valve may be used to regulate the water amount.

The R 1/2 water connection in the stand is for under rotor flushing. Purpose of flushing water is to prevent depositing under the lower rotor.

5.7 Drain pipe(s)

The screen can be emptied through the lower accept connection drain valve and by opening the purge valve.

6 OPERATION

6.1 Inspection before operation

Preconditions

- The motor is disconnected from the electric network according to regulations.

Step	Action
1	Flush sealing water line.
2	Inspect the pipe supports and ensure that the pipelines are in accordance with approved drawings.
3	The screen basket (► Sec. 8.2 Cleaning of a plugged screen, on page 8-34) is removed.
4	Check that the interior is clean and that no foreign objects have entered the screen during transportation and installation.
5	Flush inside if necessary.
6	Check the belt tension.
7	Check the direction of motor rotation. The direction of rotation is clockwise. The arrow on the motor stand shows the direction of rotation.
8	Install the cover.
9	Perform a water test run according to (► Sec. 6.2 Water test run, on page 6-21).

Tab. 6-1 Inspection before start-up

The lower screen plate can be on its place during the water test run.

6.2 Water test run

Before the screen is taken into productive use, perform a water test run in order to flush the piping from wastes and foreign objects.

CAUTION

The screen must not be running during the water test run.

Water test run

Perform the water test run as follows:

Preconditions

Step	Action
1	Fill the pressurized lower part with water.
2	Start the screen drive motor.
3	Keep the accept valve closed.
4	Start the feed pump of the screen.
5	Open the feed valve 2 % per second. Fill the screen carefully so that the water does not flow out from the non-pressurized upper part of the screen.
6	Adjust the required flow with the accept valve while the feed valve is fully open.
7	Let the water flow through the screen for 10 to 15 min, meanwhile, adjust the flow control instrumentation and check the pressure instruments.
8	Stop the feed pump.

Tab. 6-2 Performing a water test run

After the water test run

Step	Action
1	Drain the screen.
2	Open the upper part (► Sec. 8.2 Cleaning of a plugged screen, on page 8-34).
3	Inspect the screen inside.
4	Remove possible wastes and foreign objects.
5	Rotate the rotor by hand to ensure that it rotates freely.
6	Install the screen basket (► Sec. 8.2 Cleaning of a plugged screen, on page 8-34) and the cover.

Tab. 6-3 Check up after water test run

After these actions the screen can be taken into productive use.

6.3 Recommended instrumentation, alarms and interlockings

Recommended instrumentation

- accept flow measurement and control
- upper part water valve
- lower part flushing valve
- lower part reject purge valve
- pressure measurement of feed, accept and pressure difference
- motor current/load measurement

- sealing water flow monitoring

Of the instruments, the pressure difference measurement system with alarm is the most important. The normal pressure difference is 0 - 50 kPa. The alarm limit can be set to e.g. 60 kPa. Pressure difference high high interlocking limit is normally set 10 - 20 kPa above the alarm limit.

The screen is equipped with sealing water equipment. The sealing water flow is measured and adjusted with a rotameter. The sealing water equipment is equipped with an inductive alarm from which the alarm information is carried to DCS.

Nominal feed consistency to ModuScreen is in the range of 1.5 – 2.0 %.

Recommended alarms

- pressure difference
- motor load
- sealing water

Recommended interlockings

- pressure difference high high -> cleaning sequence starts
- motor load high high -> cleaning sequence starts
- sealing water off more than 5 min. -> screen stops
- start-up interlock of sealing water: the sealing water must be flowing before the screen can be started

There must be an alarm after 30 s in case the sealing water flow drops. In case of alarm always check the sealing water flow. The screen must be stopped if the sealing water does not flow for 5 min.

Recommended cleaning sequence

If the pressure difference or the motor load reach the high high interlocking limit the cleaning sequence starts:

- the accept valve will close in 5 s
- the upper water opens ramped to max. 80 % output

When the cause of the interlocking disappears the valves are released for control after 10 s delay.

6.4 Start-up

Start-up

Start-up the screen in the following sequence:

Step	Action
1	Fill the screen with water.
2	Start the screen drive motor.
3	Keep the accept valve closed.
4	Start the feed pump of the screen.
5	Open the feed valve 2 % per second.
6	Adjust the required flow with the accept valve while the feed valve is fully open.

Tab. 6-4 Start-up of the screen

The most important operational parameter is the feed pressure. Nominal feed pressure is in the range of 0.8 – 1.5 bar. If the feed pressure is too low the screen might plug. If the feed pressure is too high the reject is too wet.

6.5 Operational control and flow adjustment

Once the screen has been started and the flow adjustments are in the correct ranges, the screen requires very little attention under normal operating conditions.

If the instrumentation has been equipped with remote control, the necessary adjustments can easily be made from the control room.

Most important issues in operational control are:

- Pressure difference measurement indicates the most of the operating conditions of a screen. The measurement must be equipped with a pressure difference alarm. The pressure difference in the screen varies depending on screen basket perforation, flow rate, consistency, reject percentage and pulp type. Generally, an increase in the flow rate and consistency will increase the pressure difference; the perforation is to be chosen on the basis of the pulp type and cleanliness requirements.
- The motor load increase may be an indication of plugging.
- The normal pressure difference range is 0 - 50 kPa.
- The pressure and flow of sealing water should be checked once in each shift.

CAUTION

The pipe filter in sealing water supply must be cleaned regularly to avoid plugging, and at the latest when the flow indicator gives an alarm.

6.6 Instructions in case of a disturbance

When the screen starts to plug, the accept pressure decreases rapidly and the stock flow ceases. The pressure difference alarm has already given alarm of the disturbance.

Slightly plugged screen basket

Partly and slightly plugged basket / plate can be cleared by:

Step	Action
1	Close the accept valve slowly.
2	Open the purge valve.
3	Let the screen run for several minutes.

Tab. 6-5 Cleaning slightly plugged screen basket

The above mentioned unplugging sequence will usually result in excessive rejecting of wet and fibrous reject.

Severely plugged screen

If the screen is plugged so severely that the above procedure do not help, the screen must be stopped, flushed and drained (► Sec. 8.2 Cleaning of a plugged screen, on page 8-34).

It is not necessary to empty the screen if it is out of operation for a short time only, e.g. due to a power failure.

If the shutdown period is longer, the screen should be drained (► Sec. 6.7 Shutdown, on page 6-25) and restarted (► Sec. 6.4 Start-up, on page 6-23).

Fill screen with water during a shutdown. This will prevent depositing.

6.7 Shutdown

Shutdown and flush the screen in the following sequence.

Step	Action
1	Stop the feed pump.
2	Close the accept valve completely while the screen is still operating.
3	Close the feed valve completely.
4	Keep the water valves open in order to flush the reject and fibers to reject treatment.

Tab. 6-6 Shutting down the screen

Short downtime

Unless it is necessary to open the cover and carry out a maintenance inspection, the screen can be left filled with water until the next start-up.

Step	Action
1	Close the water valves.
2	Stop the screen drive motor.
3	Close the sealing water valve.

Tab. 6-7 Completing the shutdown for a short downtime

Prolonged shutdown

If the downtime is longer or intended for maintenance inspections, continue as follows:

Step	Action
1	Close the feed, accept and reject valves.
2	Drain the screen by opening the purge valve and drain valve.
3	Close the sealing water valve.

Tab. 6-8 Completing the shutdown for a prolonged downtime

Maintenance/Inspection

Preconditions

- The motor is disconnected from the electric network according to regulations.

The screen is now ready to be maintained and inspected (► Sec. 8 Inspection and maintenance, on page 8-33).

6.8 Troubleshooting

In case of a disturbance, its cause can be found out on the basis of the following figures (► Fig. 6-1 Breakdown due to disturbance in operation, on page 6-27 and ► Fig. 6-2 Breakdown due to mechanical causes, on page 6-28).

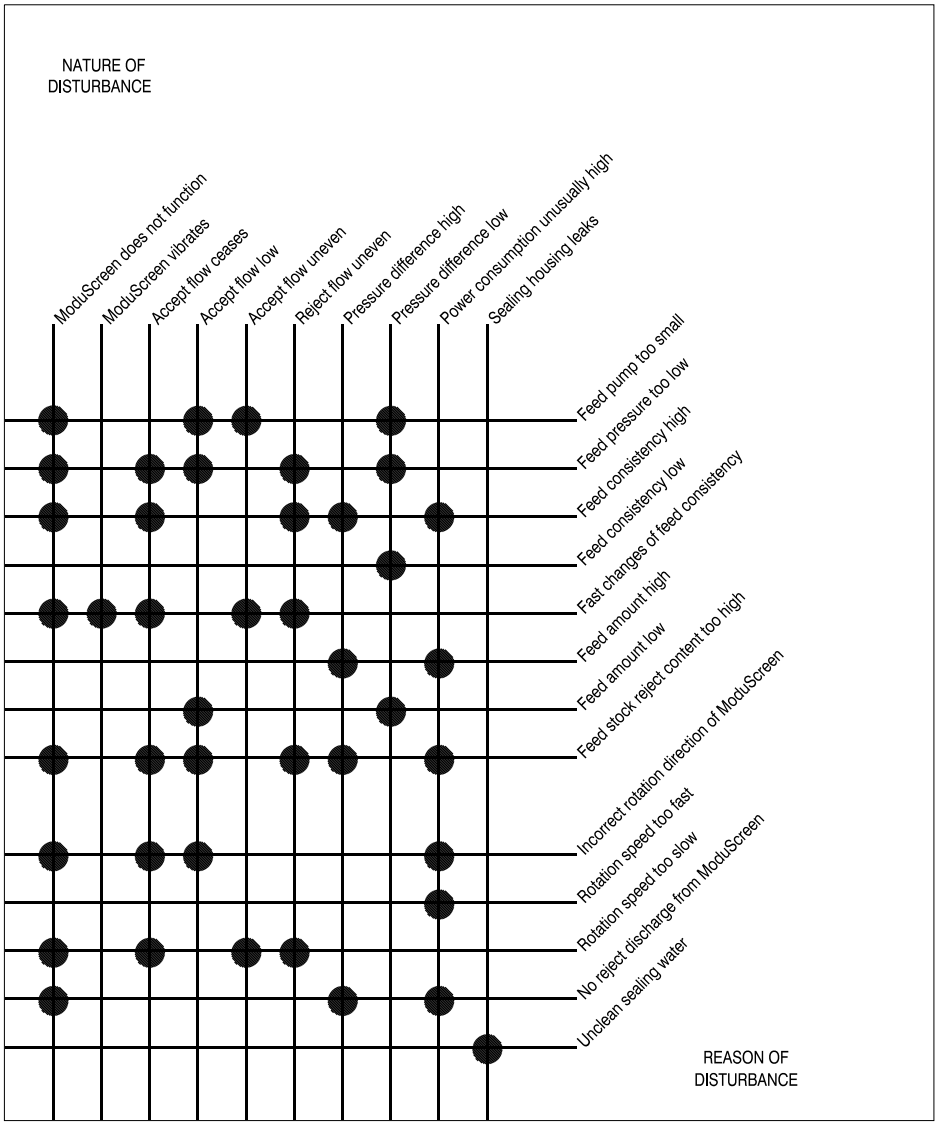


Fig. 6-1 Breakdown due to disturbance in operation

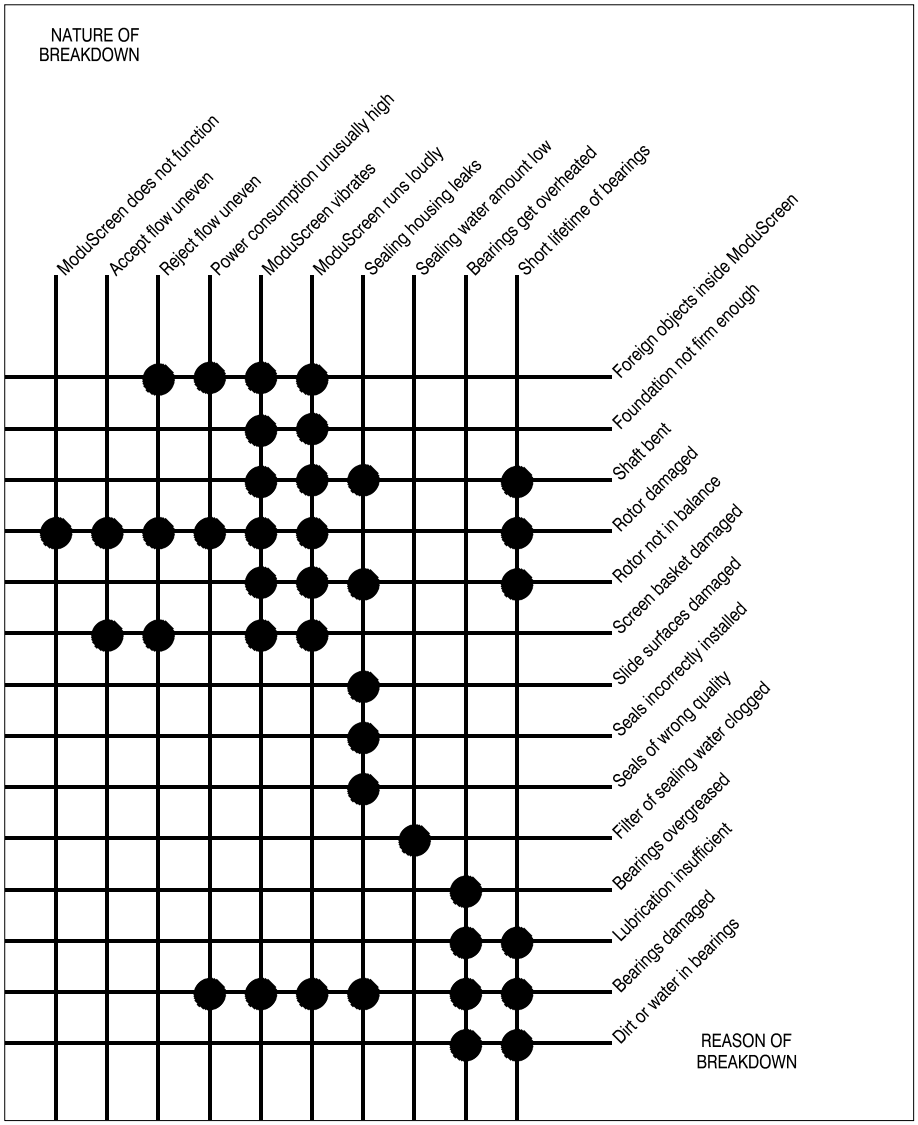


Fig. 6-2 Breakdown due to mechanical causes

7 SEALS AND LUBRICATION

The bearings of the supplied screens are pre-lubricated. In post-lubrication, lubricants of different manufacturers can be used. See the table below.

The bearing housing re-greasing quantities and the lubrication intervals are given in the tables below.

The intervals for manual lubrication on the basis of operation hours are given at a temperature of +70°C and +110°C. If the bearing is used at higher temperatures, the greasing interval should be reduced so that each increase of +15°C reduces the greasing interval by a half.

If required, small changes can be made to the values of the tables as long as the ratio between the grease amount and lubrication interval is constant.

Locations of the lubricating hoses inside the screen are shown in the figure (► Fig. 7-1 Location of the lubricating hoses inside the screen, on page 7-31).

Temperature: -30°C...+110°C	**Temperature: > +110°C***
Mobilux EP 2	Mobilith SHC 460
Esso Beacon EP 2	Esso Ronex Extra Duty 1
Shell Alvania G3	Shell Grease 135 1 LiX 1
Tebo Multi-Purpose Extra	SKF LGEM 2
SKF LGMT 3	Neste Templex
*) Heat resisting lubricant grades only.	

Tab. 7-1 Recommended lubricants for the re-lubrication of the bearing housings

Size	Bearing type	Temperature 70 °C		Temperature 110 °C	
		Manual lubrication: **Amount / interval**	**Centralized lubrication:** **Amount / interval**	**Manual lubrication:** **Amount / interval**	**Centralized lubrication:** **Amount / interval**
T4D	2 x 7316 BECBM	66 g/ 6100 h	0.6 g/ d*	66 g/ 910 h	3.4 g/d**
*) The standard delivery does not include a lubrication center.					

Tab. 7-2 Re-greasing of the upper bearing housing

Size	Bearing type	Temperature 70 °C		Temperature 110 °C	
		Manual lubrication: **Amount / interval**	**Centralized lubrication:** **Amount / interval**	**Manual lubrication:** **Amount / interval**	**Centralized lubrication:** **Amount / interval**
T4D	NU 2316 ECP (lower bearing)	49 g/ 5200 h	0.5 g/ d**	49 g/ 810 h	2.9 g/d**
T4D	NU 2313 ECP (upper part bearing)	34 g/ 5600 h	0.3 g/ d**	34 g/ 890 h	1.8 g/d**
**) The standard delivery does not include a lubrication center.					

Tab. 7-3 Re-greasing of the lower and the upper part bearing housing

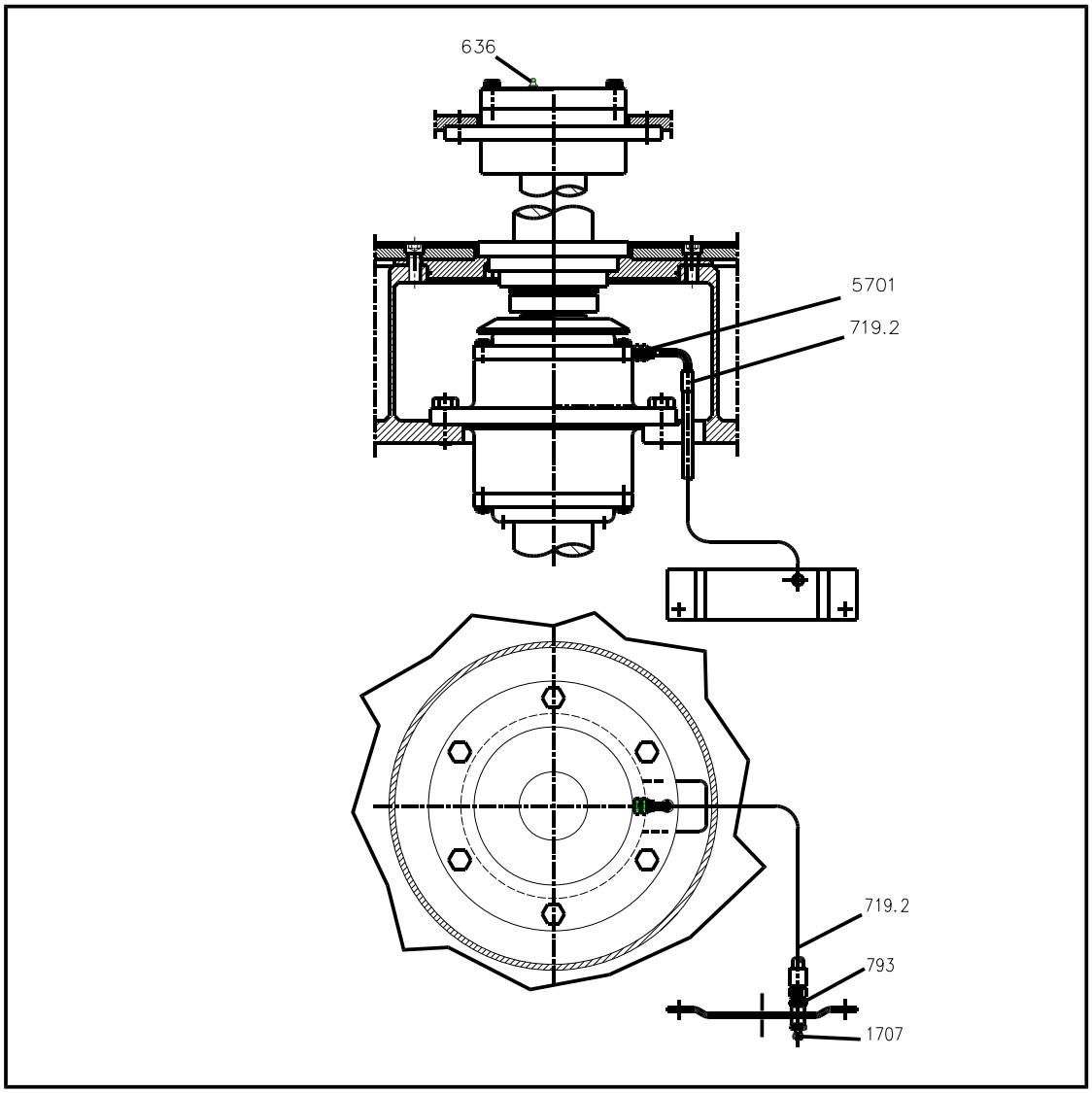


Fig. 7-1 Location of the lubricating hoses inside the screen

7.1 Mechanical sealing water supply

In order to operate properly, mechanical shaft seal always requires the use of sealing water.

CAUTION

The pressure of the water led to the seal must be min. 300 kPa. However, it is recommended that the seal water pressure is 100 kPa higher than the inlet pressure of the screen.

CAUTION

Do not rotate the screen without sealing water.

Sealing water value	Max. value
Solids content:	Max. 10 mg/l
Particle size:	Max. 50/µm
Permanganate number:	Max. 30
Iron content:	Max. 1 mg/l
Total hardness:	Max. 10°dH

Tab. 7-4 Recommended sealing water values

The normal sealing water flow amount is 0.05 l/s (3 l/min). In case the mechanical seal requires cooling, for example in connection with hot stock, the amount of sealing water flow can be increased up to 0.08 l/s (5 l/min).

CAUTION

The temperature of the water leaving the seal should not exceed +60°C.

8 INSPECTION AND MAINTENANCE

8.1 ModuScreen

In the design of ModuScreen, modern methods have been used to utilize the development of materials and accessories. ModuScreen has been divided into easily exchangeable functional scopes of delivery which minimize the time required by the exchange of parts due to damage or due to a process modernization.

The main scopes of delivery are:

- Housing and stand
- Screen basket (► Sec. 8.2 Cleaning of a plugged screen, on page 8-34) and lower screen plate (► Sec. 8.4 Lower rotor and screen plate, on page 8-40)
- Upper rotor (► Sec. 8.3 Upper rotor and upper frame, on page 8-38)
- Mechanical seal (► Sec. 8.5 Mechanical seal, on page 8-42)
- Electric motor (► Sec. 8.7 Motor and power transmission, on page 8-45)
- Belt pulleys, taper lock bush and belts (► Sec. 8.7 Motor and power transmission, on page 8-45)
- Shaft package (► Sec. 8.8 Shaft package, on page 8-3)
- Sealing water and lubricating hoses

The maintenance and inspection instructions of the screen have been prepared to ensure that normal repair and service procedures can be easily carried out by following these instructions, provided that the instructions for installation and operation have also been studied.

If the lubrication instructions for bearings and the cleanliness requirements for the sealing water of the mechanical seal are followed, together with the operating instructions in various situations in general, your screen will function reliably and without disturbances, and no production downtimes will occur.

8.2 Cleaning of a plugged screen

Opening and cleaning of a plugged screen

Under difficult operating conditions, screen may sometimes plug so thoroughly that it is necessary to open it and remove the screen basket for a clean up.

Step	Action
1	Stop, flush and drain the screen (► Sec. 6.7 Shutdown, on page 6-25).
2	Disconnect the motor from the electrical network according to regulations and attach a warning tag to the power supply.
3	Remove the hexagonal screws (► Fig. 8-1/**901.24**)
4	Remove the hexagonal screws (► Fig. 8-1/**901.68**) and lift the cover (► Fig. 8-1/**160**) away.
5	Remove the upper shaft assembly (► Fig. 8-1/**210.2**) by unscrewing the hexagonal screws(► Fig. 8-1/**901.71**).
6	Remove the fastening flange(► Fig. 8-1/**893**) by unscrewing the socket head screws (► Fig. 8-1/**914.21**).
7	Screw two lifting eyes into lifting holes and lift off the screen basket (► Fig. 8-1/**5201.2**).
8	Wash the detached screen basket(s) and all inner parts with high-pressure water.
9	Inspect for potential wear.

Tab. 8-1 Cleaning of screen basket

After cleaning the screen basket, clean the screen plate as follows:

Step	Action
1	Disconnect the upper accept and dilution connection from piping.
2	Remove the rotor fastening screw (► Fig. 8-1/**901.4**) by using 1/2" extension wrench set included in the delivery.
3	Screw lifting eyes to the rotor top flange and lift out the rotor (► Fig. 8-1/**5672.2**)
4	Remove the hexagonal screws (► Fig. 8-1/**901.51**) and remove the upper reject chute (► Fig. 8-1/**5280**)
5	Remove the hexagonal screws (► Fig. 8-1/**901.64**) and remove the upper frame (► Fig. 8-1/**1103.2**).
6	Wash the screen plate and all inner parts with high-pressure water.
7	Inspect for potential wear.

Tab. 8-2 Cleaning of screen plate

In coarse screening the screen basket / plate must be regularly checked for wear and washed with high-pressure water.

Reassembly after cleaning

After washing and inspection, reassemble ModuScreen into working condition as follows:

Step	Action
1	Place the upper frame (► Fig. 8-1/**1103.2**) on the lower frame (► Fig. 8-1/**1103.1**). Fasten the upper frame onto its place with hexagonal screws (► Fig. 8-1/**901.64**) with washers (► Fig. 8-1/**554.64**).
2	Place the rotor (► Fig. 8-1/**5657.2**) into the shaft and remove lifting eyes.
3	Fasten the rotor fastening screw (► Fig. 8-1/**901.4**) **Note!** Wrench set on delivery.
4	Connect the upper accept and washing connections to piping.
5	Connect the upper reject chute (► Fig. 8-1/**5280**) to the frame and fasten screws (► Fig. 8-1/**901.51**). Remember the gasket (► Fig. 8-1/**400.3**)
6	Lift the screen basket (► Fig. 8-1/**5201**) onto place. The anti-torsion pins at the bottom of the upper frame will guide the basket to correct place.
7	Fasten the screen basket to the upper frame with socked head screws (► Fig. 8-1/**914.21**).
8	Spread sealing paste to the rotor upper flange.
9	Put the upper shaft assembly (► Fig. 8-1/**210.2**) on its place on the upper rotor (► Fig. 8-1/**5657.1**) and tighten the hexagonal screws (► Fig. 8-1/**901.71**) with washers (► Fig. 8-1/**554.71**)
10	Fasten the cover (► Fig. 8-1/**160**) with the hexagonal screws (► Fig. 8-1/**901.68/901.24**) with washers (► Fig. 8-1/**554.68/559.24**).

Tab. 8-3 Reassembly after cleaning

ModuScreen is now ready to be taken into use in accordance with the starting instructions (► Sec. 6.4 Start-up, on page 6-23).

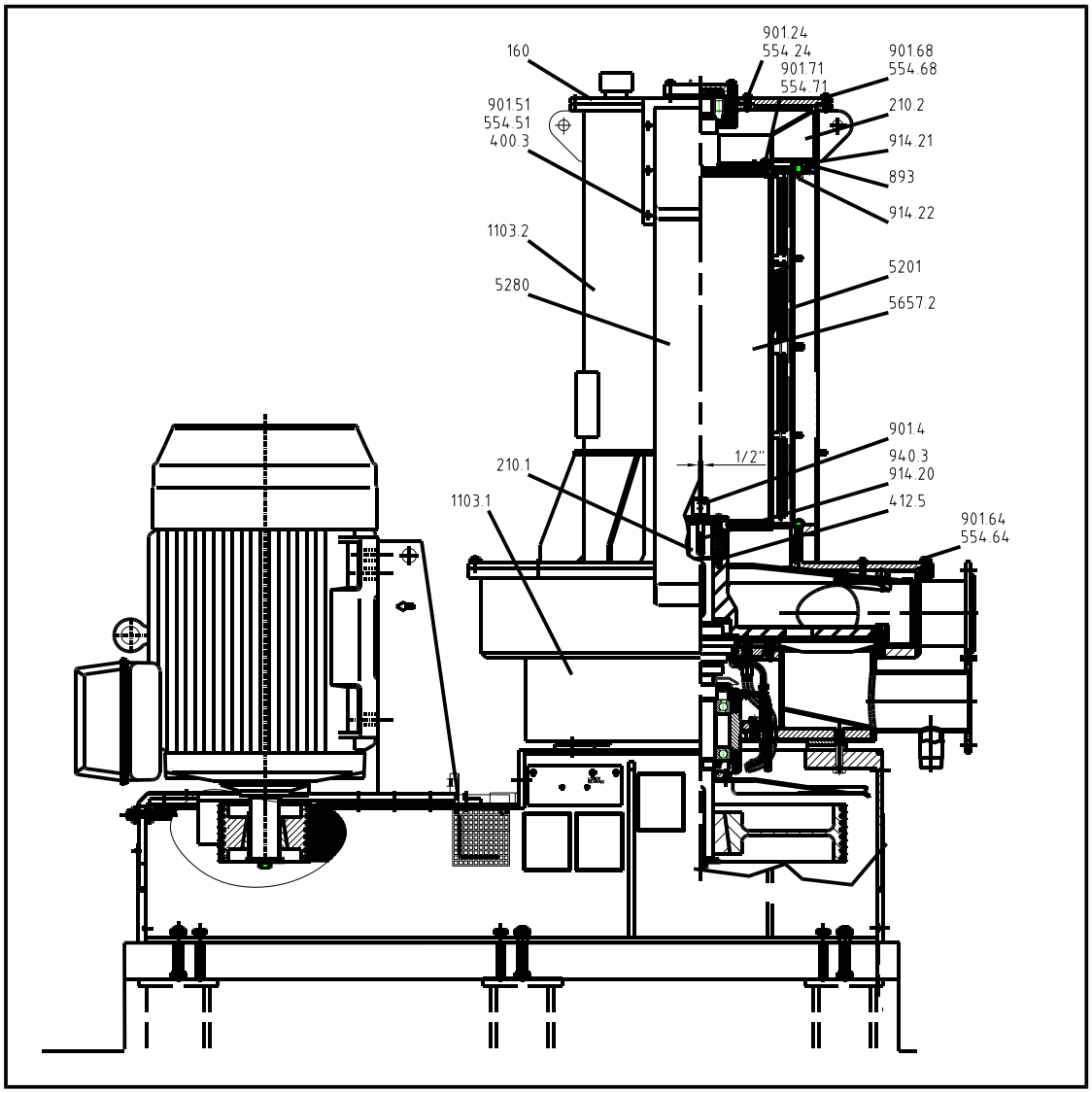


Fig. 8-1 Housing and stand

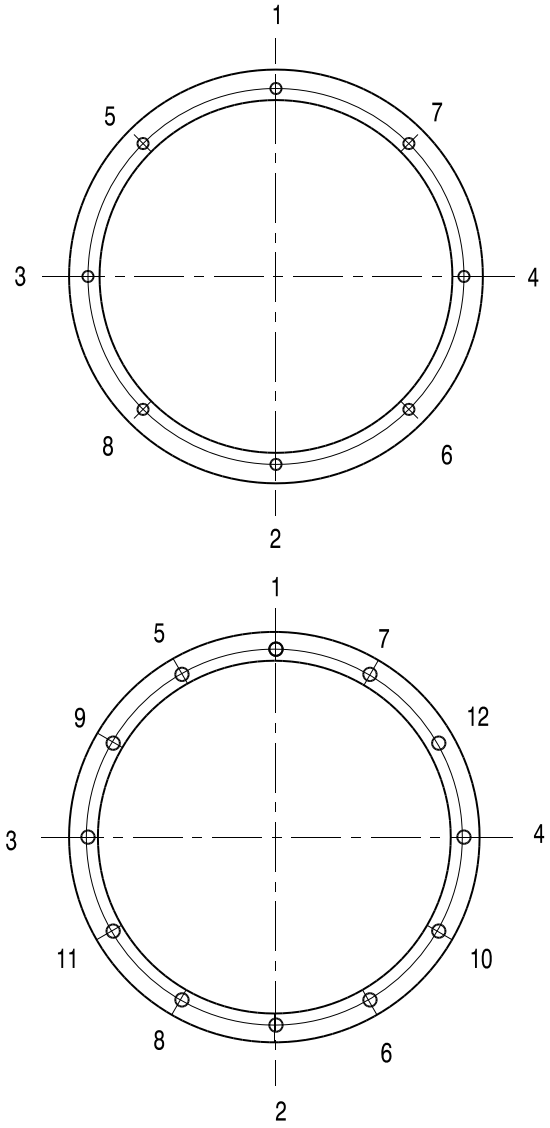


Fig. 8-2 Tightening of the screen basket

8.3 Upper rotor and upper frame

The upper rotor, as well as other upper parts, have to be removed for maintenance purposes or for the inspection of the shaft seal or the bearing unit.

Preconditions

- Remove the cover, top shaft and screen baskets according to (► Sec. 8.2 Cleaning of a plugged screen, on page 8-34).

Removing the upper rotor

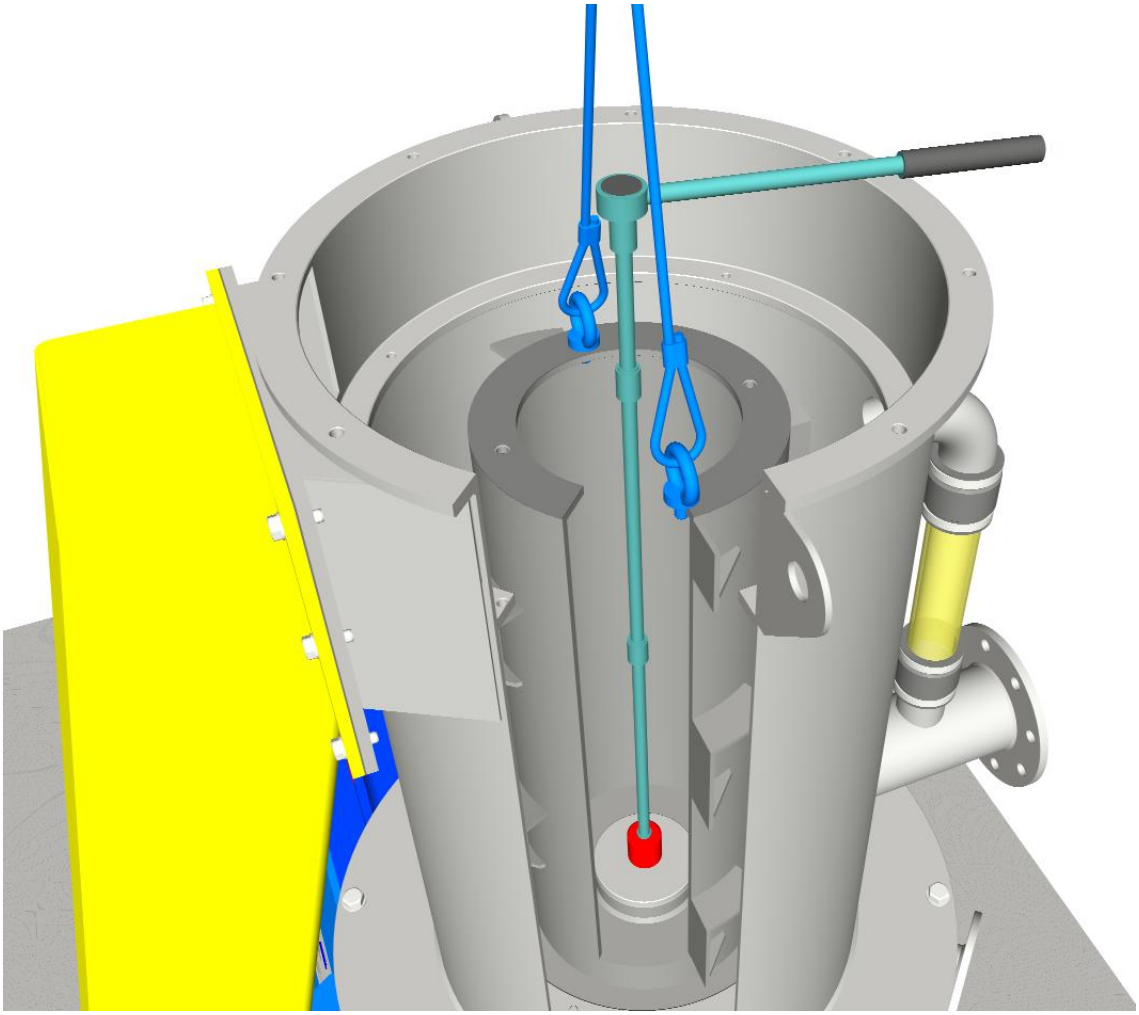
Step	Action
1	Unscrew the hexagonal screw (► Fig. 8-1/**901.4**) using the socket wrench (► **5752**) included in the delivery.
2	Screw two lifting eyes into two opposite holes and lift off the upper rotor (► Fig. 8-1/**5657.1**).

Tab. 8-4 Removing the upper rotor

Reinstalling the upper rotor

Step	Action
1	Put the O-ring (► Fig. 8-1/**412.5**) correctly on its place.
2	Put a parallel key (► Fig. 8-1/**940.3**) in the groove in the lower shaft with the help of vaseline and secure with the socket head screws (► Fig. 8-1/**914.20**).
3	Screw two lifting eyes into two opposite holes and lift the upper rotor (► Fig. 8-1/**5657.2**) on the shaft (► Fig. 8-1/**210.1**)
4	Tighten the fixing screw (► Fig. 8-1/**901.4**).
5	Mount the screen basket with fastening flange, upper shaft with bearing and cover according to (► Sec. 8.2 Cleaning of a plugged screen, on page 8-34).

Tab. 8-5 Reinstalling the upper rotor



Removing the upper frame

This way the screen basket stays inside the upper frame.

Step	Action
1	Remove the cover and upper shaft assembly according to (► Sec. 8.2 Cleaning of a plugged screen, on page 8-34).
2	Disconnect the upper accept water and upper reject connection from piping
3	Remove the upper rotor according to (► Tab. 8-4 Removing the upper rotor, on page 8-38)
4	Remove the hexagonal screws (► Fig. 8-1/**901.64**) and remove the upper frame (► Fig. 8-1/**1103.2**).

Tab. 8-6 Removing the upper frame

Reinstalling the upper frame according to (► Sec. 8.2 Cleaning of a plugged screen, on page 8-34).

8.4 Lower rotor and screen plate

Removing the rotor and screen plate

Preconditions

- Remove the cover, upper shaft, upper screen basket, upper rotor and upper frame according to (► Sec. 8.2 Cleaning of a plugged screen, on page 8-34) and (► Sec. 8.3 Upper rotor and upper frame, on page 8-38).

Removing the lower rotor

Step	Action
1	Install lifting eye together with flange (► Fig. 8-3/**5207**) and hexagonal screws (► Fig. 8-3/**5965**).
2	Lift out the rotor (► Fig. 8-3/**5657.1**)

Tab. 8-7 Removing the lower rotor

Removing the screen plate

Step	Action
1	Unscrew socked head screws (► Fig. 8-3/**914.1**/**914.22)**.
2	Attach lifting eyes (► Fig. 8-3/**919.1**).
3	Lift out the screen plate (► Fig. 8-3/**5108**).

Tab. 8-8 Removing the screen plate

Reinstalling the screen plate and lower rotor

After the service and inspection procedures, reinstall the screen plate together with impact blogs. Then install lower rotor onto the shaft as follows:

Step	Action
1	Wash the shaft end and the drive flange hub with a solvent.
2	Thinly oil the washed surfaces.
3	Attach two eye screws into the holes of the screen plate and lift the screen plate to its place (► Fig. 8-3/**5108**).
4	Tighten the screen plate by using socked head screws (► Fig. 8-3/**914.1**/**914.22**) and impact blogs (► Fig. 8-3/**5208**).
5	Install the lower rotor (► Fig. 8-3/**5657.1**).

Tab. 8-9 Reinstalling the screen plate and lower rotor

When installing lower rotor check clearance between lower rotor and screen plate. Adjust with shim plate **5808.3**. Minimal clearance is 0.5 mm.

Confirm that rotor is pushed to its lowest position. Then recheck clearance again.

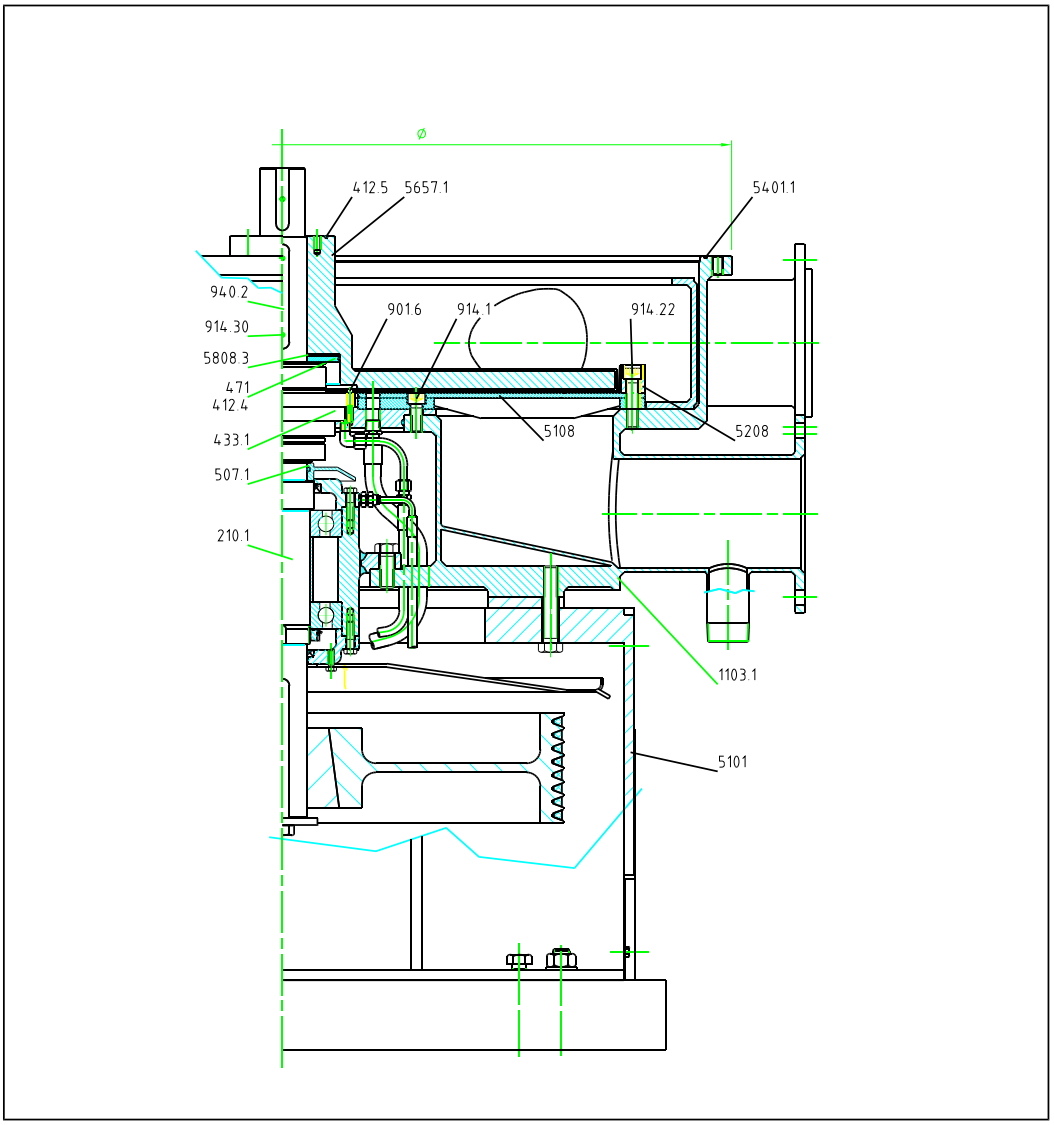


Fig. 8-3 Lower rotor and screen plate

8.5 Mechanical seal

Dismounting the mechanical seal

Due to wear and aging it may be necessary in the long run to dismount the mechanical seal for a check-up or for possible exchange.

Do not dismount the mechanical seal unless it is apparent that the seal is leaking too much or it is necessary to dismount the bearing. Excess leakage of the mechanical seal is discovered from the amount of water or fibers running on the splashguard.

Preconditions

- Remove the upper part bearing, cover, upper shaft, spacer ring, upper screen baskets, upper rotor and upper frame according to (► Sec. 8.2 Cleaning of a plugged screen, on page 8-34) and (► Sec. 8.3 Upper rotor and upper frame, on page 8-38).
- Remove the lower rotor (► Sec. 8.4 Lower rotor and screen plate, on page 8-40).

Step	Action
1	Remove hexagonal screws (► Fig. 8-4/**914.20/914.30**) and keys (► Fig. 8-4/**940.30/940.20**).
2	Remove shim plates (► Fig. 8-4/**5808.3/471)**
3	Slacken and remove the hexagonal screws (► Fig. 8-4/**901.6**) of the seal (► Fig. 8-4/**433.1**).
4	Lock the flange and the shaft-side end of the seal (► Fig. 8-4/**433.1**) to each other with fastening plates (► Fig. 8-4/**A**) to prevent damage to the seal sliding surfaces.
5	Pull the seal (► Fig. 8-4/433.1) off from the shaft (► Fig. 8-4/210.1) using an extractor.

Tab. 8-10 Dismounting the mechanical seal

Replacing the mechanical seal

After above actions, mount a new or serviced mechanical seal onto the shaft as follows:

- The previous mounted mechanical seal is removed.

Step	Action
1	Carefully wipe the seal surfaces of the bearing frame cover (► Fig. 8-4/**5301**) clean from possible impurities which may allow the leakage of sealing water.
2	Check dimension X=60 (► Fig. 8-4/**X**). When the dimension is correct at the tolerance accuracy (+/- 0.5 mm), the seal surfaces of the shaft seal press against each other at a correct force, ensuring the tightness of the shaft seal. If the dimension is below the allowed tolerance, it can be corrected by placing a gasket between the frame (► Fig. 8-4/**1103.1**) and the bearing frame cover (► Fig. 8-4/**5301**). When dimension X is above the tolerance, place a gasket between the seal (► Fig. 8-4/**433.1**) and the deflector (► Fig. 8-4/**507.1**).
3	Grease the O-ring seals with silicon grease. Surround the water drilling in the bearing frame cover with silicon.
4	Push the seal package onto the shaft so that the water drilling marks on the mechanical seal (► Fig. 8-4/**433.1**) and on the bearing frame cover (► Fig. 8-4/**5301**) meet each other. The double-sided mechanical seal must always be mounted so that sealing water enters through the hole marked with "IN" and comes out through the "OUT" hole.
5	When installing new mechanical seal remove the transport supports.

Tab. 8-11 Replacing the mechanical seal

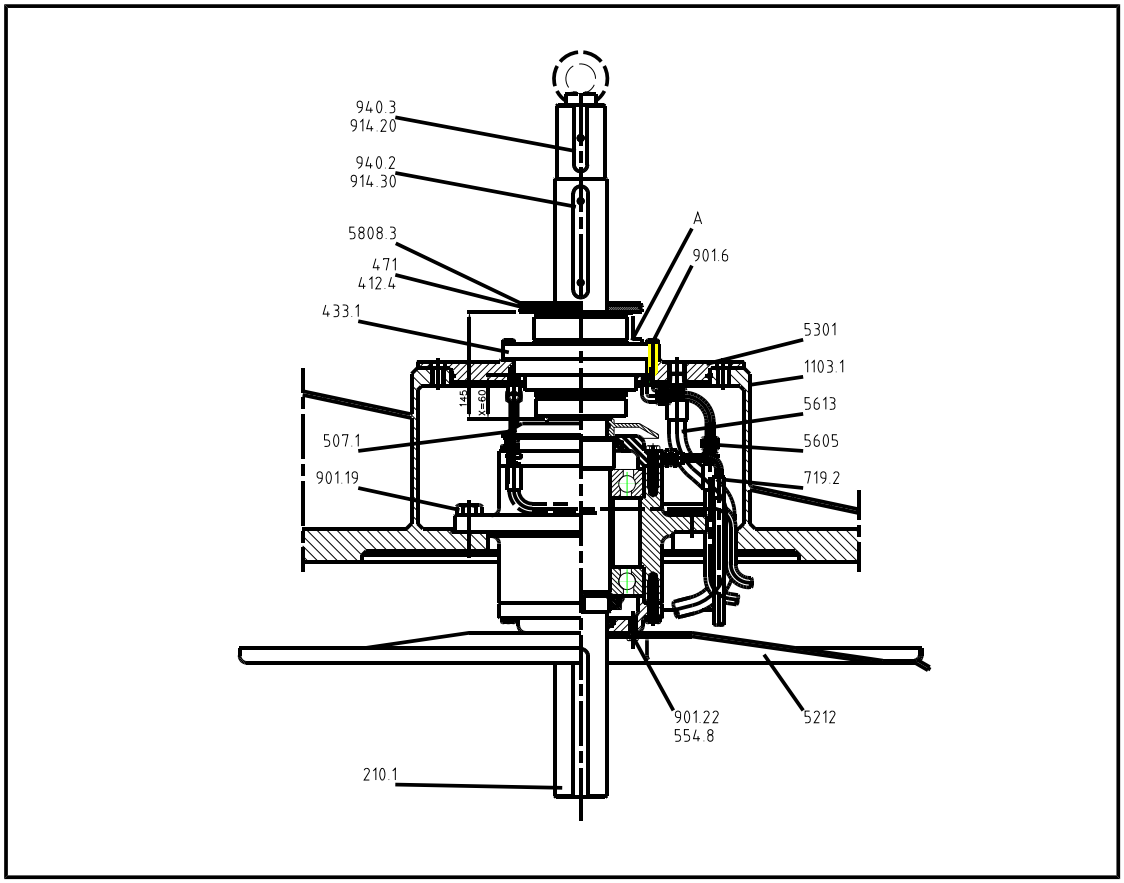


Fig. 8-4 Mechanical seal

8.6 General on the installation of the seal

It is essential to use the correct method of mounting and to observe the rules of cleanliness during installation.

CAUTION	**Do not mount the parts by applying direct blows on them; the parts must slide into their places by pushing them manually. Avoid touching the sliding surfaces. If this cannot be avoided, wipe over the surfaces with a cleaning solvent and a soft cloth before they are pressed against each other. Smear the joint surfaces of the various components and auxiliary seals before they are joined together. Remove sharp edges from all shoulders over which the seal is pushed during mounting.**

Prior to mounting:

Inspect the seal consignment to ensure that no damage has occurred during transportation. Follow the assembly and mounting instructions of the screen.

8.7 Motor and power transmission

Dismounting the drive equipment

The dismounting of the drive equipment will become necessary if a part of the drive equipment must be changed or if the shaft must be dismounted for a change of bearings.

Preconditions

- Screen is stopped, flushed and emptied (► Sec. 6.7 Shutdown, on page 6-25).
- The electric motor is disconnected from the electrical network according to regulations and a warning tag is attached to the power supply.

Choose only necessary action:

Step	Action
1	Loosen the screws and remove the drive safety guards (► Fig. 8-5/**683/5804**)
2	Loosen the hexagonal screws (► Fig. 8-5/**901.65**) and washers (► Fig. 8-5/**554.9**) of the motor stand (► Fig. 8-5/**5801**).
3	Loosen the hexagonal nuts (► Fig. 8-5/**920.5**) of the motor stand (► Fig. 8-5/**5801**).
4	Push the electric motor (► Fig. 8-5/**800**) with its mounting plate/stand towards the screen so that the V- belt (► Fig. 8-5/**884**) comes off and can be removed.

Motor side actions:

Step	Action
1	Detach the hexagonal screws (► Fig. 8-5/**901.14**) and the washer (► Fig. 8-5/**554.6**).
2	Loosen, but do not detach, the taper lock bush (► Fig. 8-5/**1812.2**) screws and detach the V-belt pulley (► Fig. 8-5/**882.2**) from the motor shaft.
3	Detach the screws from the taper lock bush (► Fig. 8-5/**1812.2**) and detach it from the V-belt pulley (► Fig. 8-5/**882.2**).
4	If the motor is exchanged, fasten it to the lifting device by the lifting eye and two feet, detach the hexagonal nuts (► Fig. 8-5/**920.3**) and the hexagonal screws (► Fig. 8-5/**901.10**) and lift it onto the transfer pallet.

Screen side actions:

Step	Action
1	Detach the hexagonal screws (► Fig. 8-5/**901.13**) and the washer (► Fig. 8-5/**554.5**).
2	Loosen, but do not detach, the taper lock bush (► Fig. 8-5/**1812.1**) screws and detach the V-belt pulley (► Fig. 8-5/**882.1**) from the screen shaft.
3	**Note! the V-belt pulley is heavy and must be supported to prevent injuries.**
4	Detach the screws from the taper lock bush (► Fig. 8-5/**1812.1**) and detach it from the V-belt pulley (► Fig. 8-5/**882.1**).

Tab. 8-12 Dismounting the drive equipment

Reinstalling the drive equipment

When the service and inspection procedure of the drive equipment has been carried out and the drive belt has been replaced (if necessary), reinstall the drive equipment as follows:

Choose only necessary action:

Screen side actions:

Step	Action
1	Check that the taper lock bush (► Fig. 8-5/**1812.1**) and the flat key (► Fig. 8-5/**940.1**) fit to the shaft (► Fig. 8-5/**210.1**).
2	Fasten the taper lock bush (► Fig. 8-5/**1812.1**) screws to the V-belt pulley (► Fig. 8-5/**882.1**) so that they stay together while lifted.
3	Put the key to the screen shaft (► Fig. 8-5/**210.1**).
4	Lift the V-belt pulley to the shaft and support the V-belt pulley. **Note! the V-belt pulley is heavy and must be supported to prevent injuries.**
5	Tighten the taper lock bush screws.
6	Secure with a washer (► Fig. 8-5/**554.5**) and the hexagonal screw(s) (► Fig. 8-5/**901.13**).

Motor side actions:

Step	Action
1	If the electric motor (► Fig. 8-5/**800**) has been removed, lift it into upright position with a lifting eye and two feet. While lifted, fasten the motor to the motor stand (► Fig. 8-5/**5801**) with hexagonal screws (► Fig. 8-5/**901.10**) and hexagonal nuts (► Fig. 8-5/**920.3**).
2	Fasten the taper lock bush (► Fig. 8-5/**1812.2**) to the V-belt pulley (► Fig. 8-5/**882.2**) so that they stay together while lifted.
3	Put the key to the motor shaft.
4	Lift the V-belt pulley to the shaft to the same level as the screen V-belt pulley.
5	Check the direction of motor rotation. The direction of rotation is clockwise. The arrow on the motor stand shows the direction of rotation.
6	Tighten the taper lock bush screws.
7	Secure with a washer (► Fig. 8-5/**554.6**) and hexagonal screw(s) (► Fig. 8-5/**901.14**).
8	Install the V-belt (► Fig. 8-5/**884**) and tighten it to the tension recommended above (► Sec. 4.7 Tensioning of V-belts, on page 4-13). Increase the tension by turning the hexagonal nuts (► Fig. 8-5/**920.5**) which lies by the motor stand, whereby the motor stand moves away from the screen.
9	When the desired belt tension has been reached, lock the motor stand into place by tightening the hexagonal nuts (► Fig. 8-5/**920.5**) and hexagonal screws (► Fig. 8-5/**901.65**) with washers (► Fig. 8-5/**554.9**).
10	Fasten the power transmission guards (► Fig. 8-5/**683 and 5804**) with screws.
11	Connect the electrical motor to the electric network and remove the warning tag from the power supply.

Tab. 8-13 Reinstalling the drive equipment

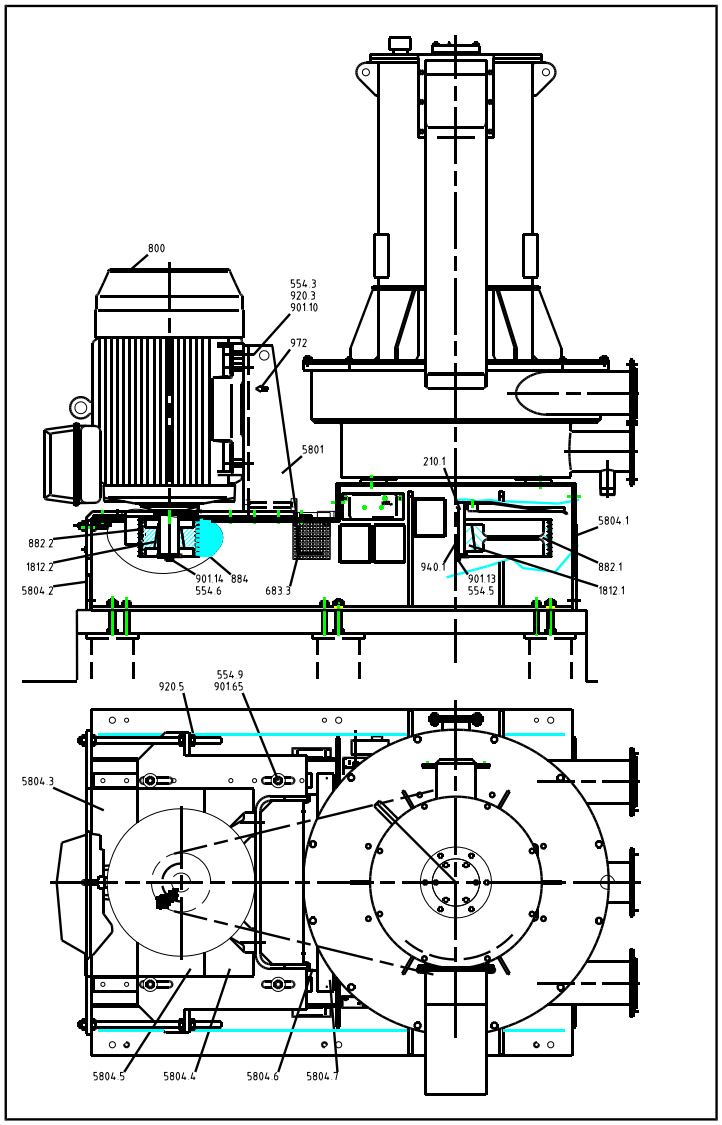


Fig. 8-5 Motor and power transmission

8.8 Shaft package

Dismounting the shaft

The shaft must be dismounted in connection with service inspection or change of bearings. As many other parts must be dismounted before the shaft, can these at the same time be cleaned and serviced.

Preconditions

- The electric motor is disconnected from the electrical network according to regulations and a warning tag is attached to the power supply.
- Remove the cover, upper shaft assembly, upper screen basket, upper rotor and upper frame according to (► Sec. 8.2 Cleaning of a plugged screen, on page 8-34) and (► Sec. 8.3 Upper rotor and upper frame, on page 8-38).
- Remove the lower rotor and screen plate according to (► Sec. 8.4 Lower rotor and screen plate, on page 8-40)
- The drive equipment is removed (► Sec. 8.7 Motor and power transmission, on page 8-45).
- The mechanical seal is removed according to (► Sec. 8.5 Mechanical seal, on page 8-42).

Step	Action
1	Detach the bearing lubricating and sealing water hoses (► **5605, 719.2**) from the plate fastened to the screen's stand and other potential bearing condition monitoring cables from the instrument panel.
2	Slacken and remove the hexagonal screws (► Fig. 8-4/901.22) with their washers (► Fig. 8-4/554.8) and remove the splash guard (► Fig. 8-4/5212).
3	Remove the hex. head screws (► Fig. 8-4/**901.19**) of the frame (► Fig. 8-4/**1103.1**)
4	Remove the flushing water hose (► Fig. 8-4/**5613**) from the panel attached to the stand and lift the bearing frame cover away (► Fig. 8-4/**5301**)
5	Remove the hex. head screws (► Fig. 8-4/**901.19**) from the frame.
6	Remove the deflector (► Fig. 8-4/**507.1**) and the O-ring (► Fig. 8-4/**412.1**).
7	Attach an lifting eye screw to the shaft end (► Fig. 8-4/**210.1**) and lift the shaft package away.

Tab. 8-14 Shaft package removal

Mark the water hoses separately as ' to seal ' and ' from seal ', so that they will be installed to the same connections as originally installed.

8.9 Dismounting the lower bearing

Dismounting the lower bearing

If the lower bearing needs to be dismounted, proceed as follows:

Step	Action
1	Detach the bearing lubricating hoses and possible measuring cables.
2	Remove the hexagonal screws (► Fig. 8-6/**901.20/901.18**) and pull the bearing cover (► Fig. 8-6/**360.2/360.1**) with the shaft seal (► Fig. 8-6/**420.1/420.2**) from the shaft.
3	Remove the bearing nut (► Fig. 8-6/**923.1**) and the lock washer (► Fig. 8-6/**931.1**) of the bearing unit using a suitable wrench.
4	Remove the shaft from bearing housing by pushing shaft according to (► Fig. 8-6 Dismounting the lower bearing, on page 8-5).
5	Remove the bearing (► Fig. 8-6/**320.1**)
6	Clean the bearing housing, shaft seal, deflector and O-ring.
7	Inspect the bearing housing, shaft seal, deflector and O-ring.

Tab. 8-15 Dismounting the lower bearing

Inspection of lower bearing

Inspect whether the condition of the lower bearing is satisfactory.

Do not remove the lower bearing from the shaft when its condition is satisfactory.

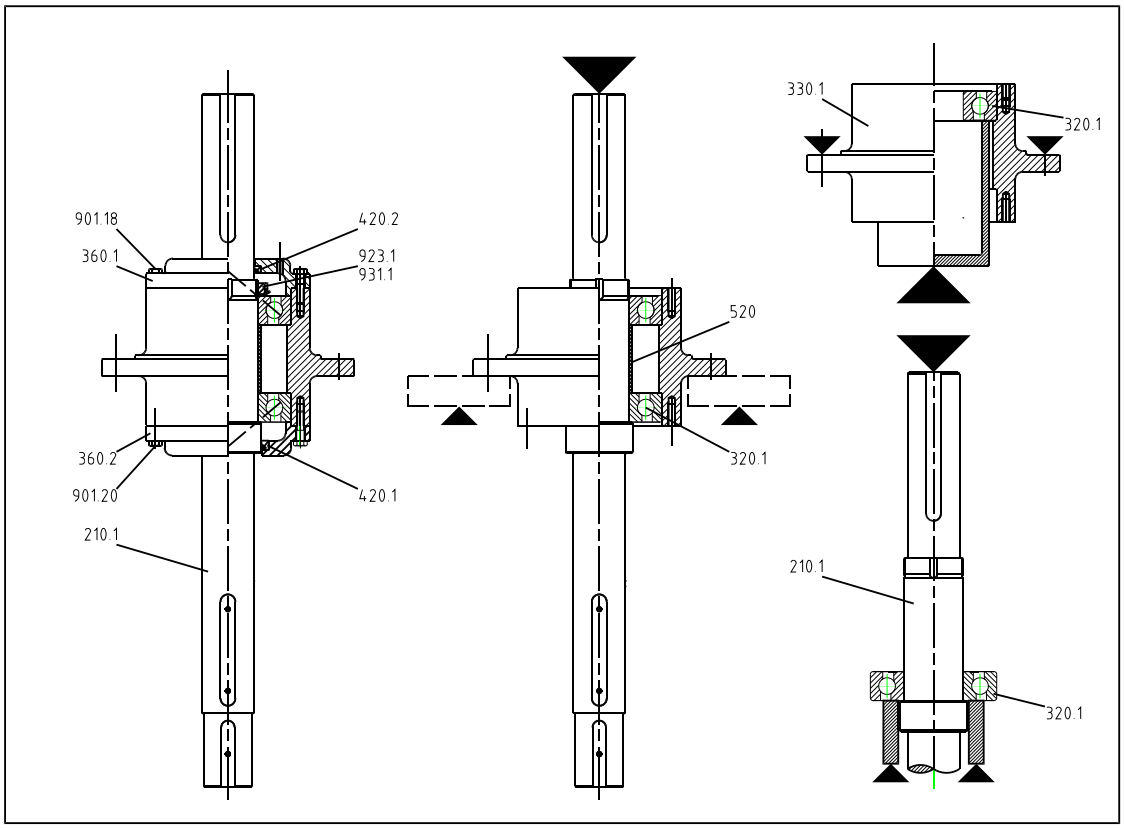


Fig. 8-6 Dismounting the lower bearing

8.10 Dismounting the upper bearing

Preconditions

- Remove the cover and upper shaft assembly according to (► Sec. 8.2 Cleaning of a plugged screen, on page 8-34).

Dismounting the upper bearing

Proceed as follows when the upper bearings are to be dismantled:

Step	Action
1	Remove the hexagonal screw (► Fig. 8-7/**901.24**).
2	Remove the bearing housing cover (► Fig. 8-7/**360.3**).
3	Remove hexagonal screw and washer (► Fig. 8-7/**901.105/554.105**).
4	Pull the bearing housing with upper bearing ring and rollers.
5	Remove outer ring and rollers from bearing housing.
6	Pull inner ring from the shaft.

Tab. 8-16 Dismounting the upper bearing

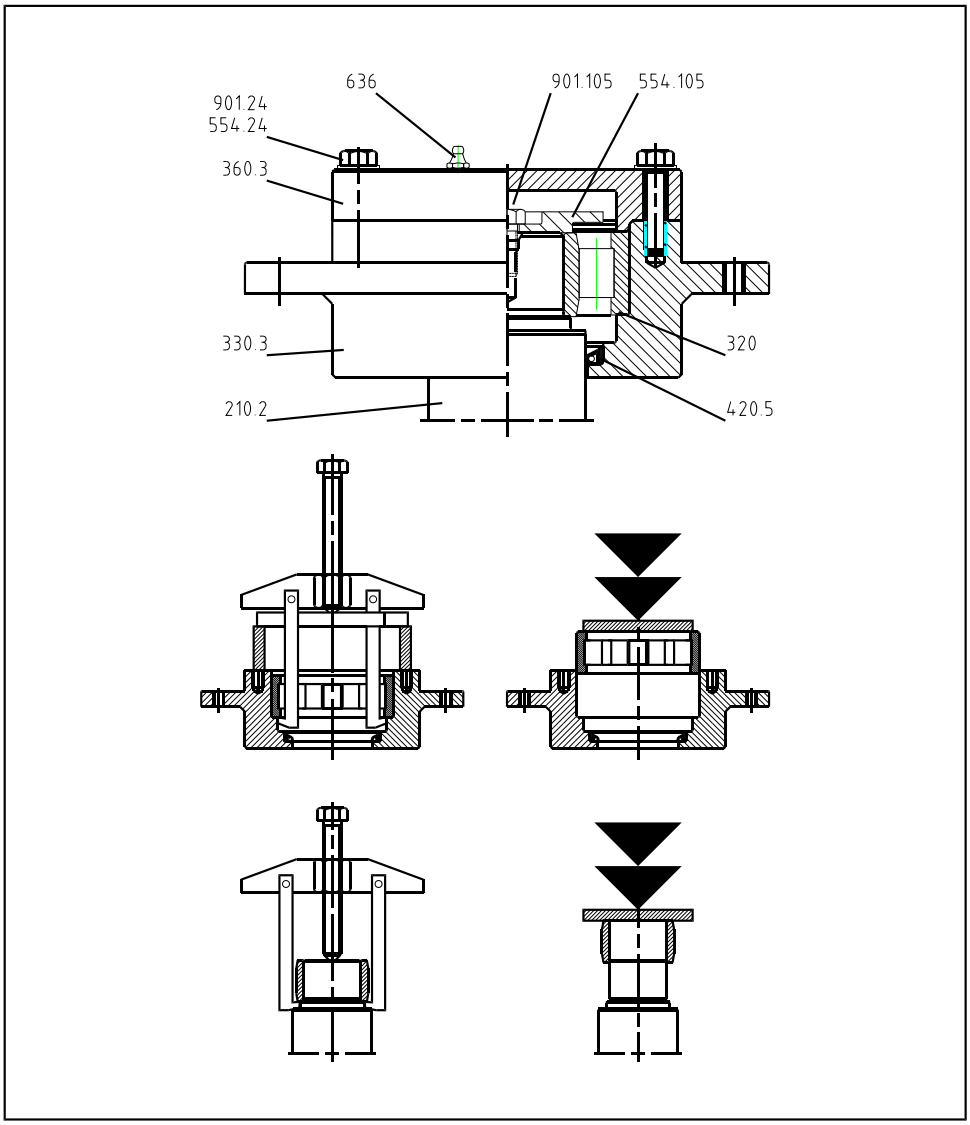


Fig. 8-7 Dismounting the upper bearing

8.11 Bearing maintenance and mounting instructions

 CAUTION	**When greasing a new or cleaned bearing, fill the free spaces between the bearing and the bearing housing only partially with grease: 30 - 50% depending on the housing. When operating at high rotational speeds, too much grease will only cause a rise in the temperature of the bearing housing.**

At low rotational speeds, the free spaces in the bearing and bearing housing can be completely filled with grease, as this does not affect the temperature.

 CAUTION	**When mounting the bearings, it is imperative to avoid hitting directly on bearing rings, retainers or rolling parts as the bearings will be damaged. The mounting force must never be directed through the rolling parts. OIL THE JOINT FACES THINLY.**

Particularly when assembling ball-shaped bearings, an assembly ring should be used between the bearing and the pipe punch. This ring will transfer the mounting force evenly over the lateral surfaces of the inner and outer rings, preventing the outer ring from turning or slanting.

 CAUTION	**When lubricating and handling the bearings, carefully follow the instructions given by the manufacturer!**

8.12 Mounting the upper bearing

Preconditions

- The parts belonging to the upper bearing are cleaned, inspected and changed (if necessary).
- Appropriate spare parts are at hand for those parts used and in need of being replaced.

Assemble the upper bearing according the provided figure (► Fig. 8-8 Mounting the upper bearing, on page 8-10).

Step	Action
1	Push the bearing inner ring to the shaft (► Fig. 8-8/**330.1**).
2	Push outer ring and roller into the bearing housing.
3	Assemble bearing housing with outer ring and rollers onto the shaft.
4	Install washer and hexagonal screw (► Fig. 8-8/**554.105/901.105**).
5	Install bearing housing cover and hexagonal screws with washers (► Fig. 8-8/**901.24/554.24**)

Tab. 8-17 Mounting the upper bearing

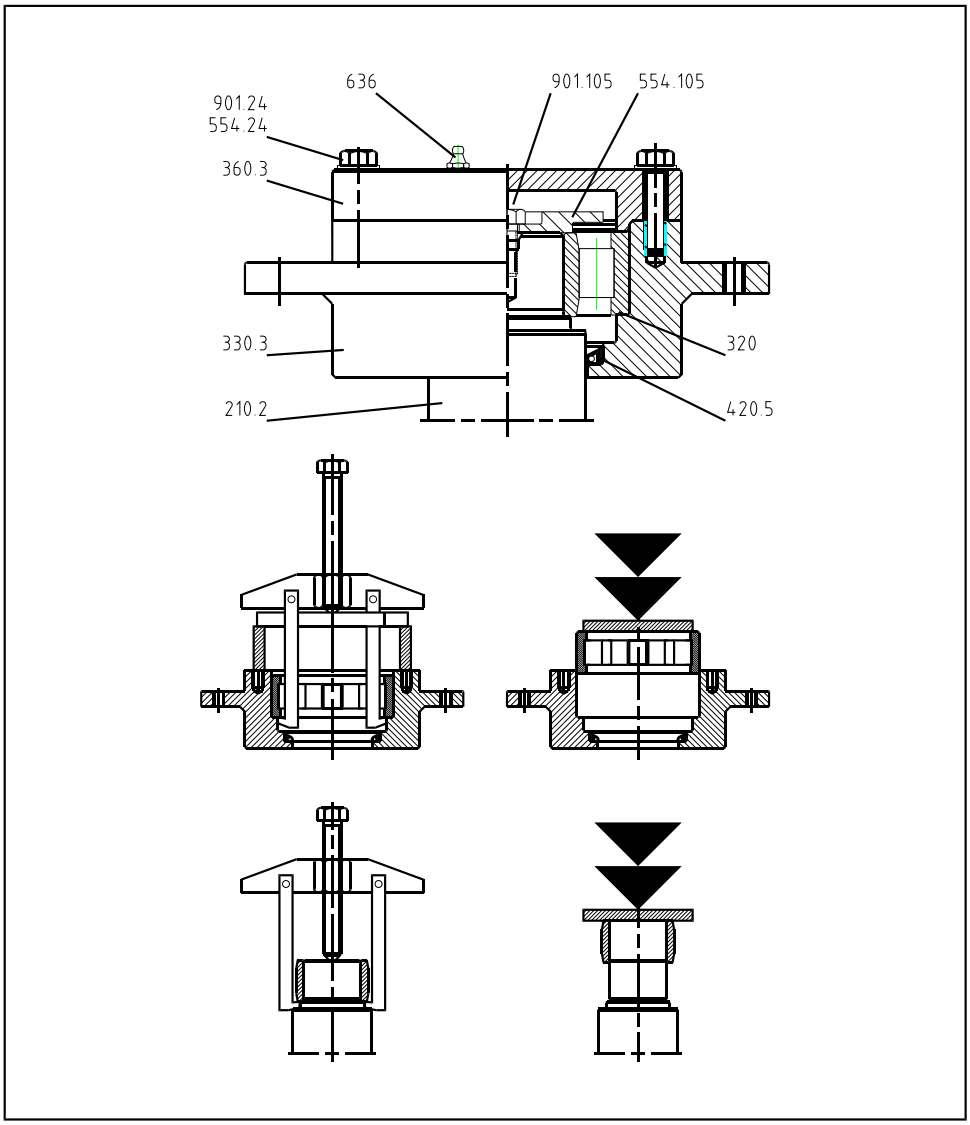


Fig. 8-8 Mounting the upper bearing

8.13 Mounting the lower bearing

Preconditions

- The parts belonging to the lower bearing(s) are cleaned and inspected.
- Appropriate spare parts are at hand for those parts used and in need of being replaced.

Assemble the lower bearing(s) according the provided drawing (► Fig. 8-9 Mounting the lower bearing, on page 8-12).

Ensure that bearing orientation is correct during assembly, so that bearings are not incorrectly upsidedown.

Step	Action
1	Install 1st of bearings (► Fig. 8-9/**320.1**) onto the shaft.
2	Assemble sleeve onto the shaft (► Fig. 8-9/**520**).
3	Assemble bearing housing and 2 nd bearing (► Fig. 8-9/**320.1**) onto the shaft.
4	Push the lock washer (► Fig. 8-9/**931.1**) into place and lock the bearing onto the shaft with the bearing nut (► Fig. 8-9/**923.1**) using a suitable wrench.
5	Mount bearing housing cover (► Fig. 8-9/**360.1**) with shaft seal (► Fig. 8-9/**420.1**) onto the shaft and fasten them to the bearing housing with hexagonal screws (► Fig. 8-9/**901.20**).
6	Attach the bearing lubrication hoses and possible measuring cables.

Tab. 8-18 Mounting the lower bearing

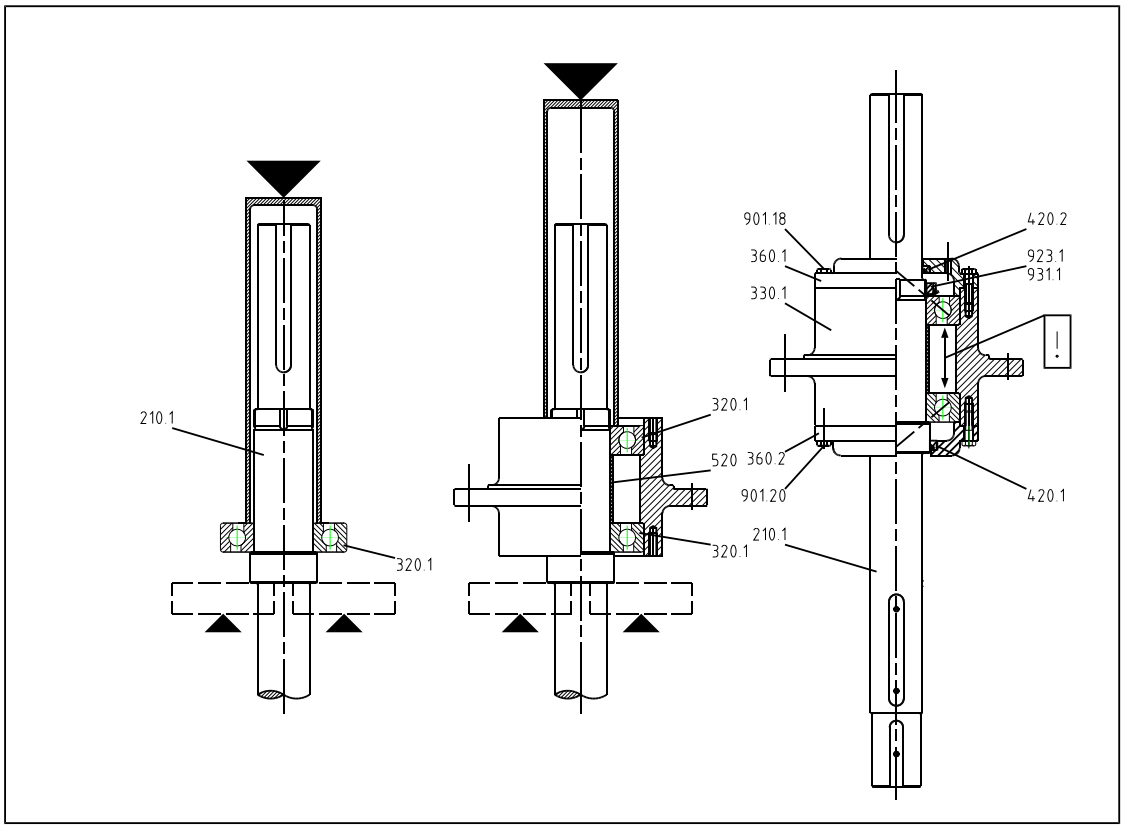


Fig. 8-9 Mounting the lower bearing

8.14 Assembly of ModuScreen

Assemble the screen in stages following the part numbers of the assembly drawing.

Shaft

The assembled shaft is mounted into the screen by attaching a lifting eye to the shaft end and lifting the shaft into the screen. Whereby the ear lugs of the bearing housings pass the fastening supports of the bearing frame.

Inspect at the same time that the ends of the bearing lubricating hoses, leakage hoses and the ends of potential bearing measuring cables are in the vicinity of their mounting locations.

Mounting the shaft with the mechanical seal into the bearing frame

If the shaft with its bearing frame has been removed for service, the shaft, shaft seal(s) and bearings can be installed into the bearing frame outside the screen in the way described in (► Sec. 8.12 Mounting the upper bearing, on page 8-9 and ► Sec. 8.13 Mounting the lower bearing, on page 8-11).

Ensure that lubrication and sealing water hoses and potential measuring cables (if any) are in the same line.

Lift the shaft package into the screen and fasten it to its place .

Hoses and cables

Attach the lubricating hoses to the grease nipples.

Connect the leakage hose to leakage connection.

Connect the measuring cables (if any) to their indicating devices.

Check that all hoses are at the outer edge of the bearing frame.

Power transmission

Install the power transmitting equipment (► Sec. 8.7 Motor and power transmission, on page 8-45 and ► Fig. 8-5 Motor and power transmission, on page 8-2).

Shaft seal

If the shaft seal has not been installed earlier, install it now (► Sec. 8.5 Mechanical seal, on page 8-42 and ► Fig. 8-4 Mechanical seal, on page 8-44).

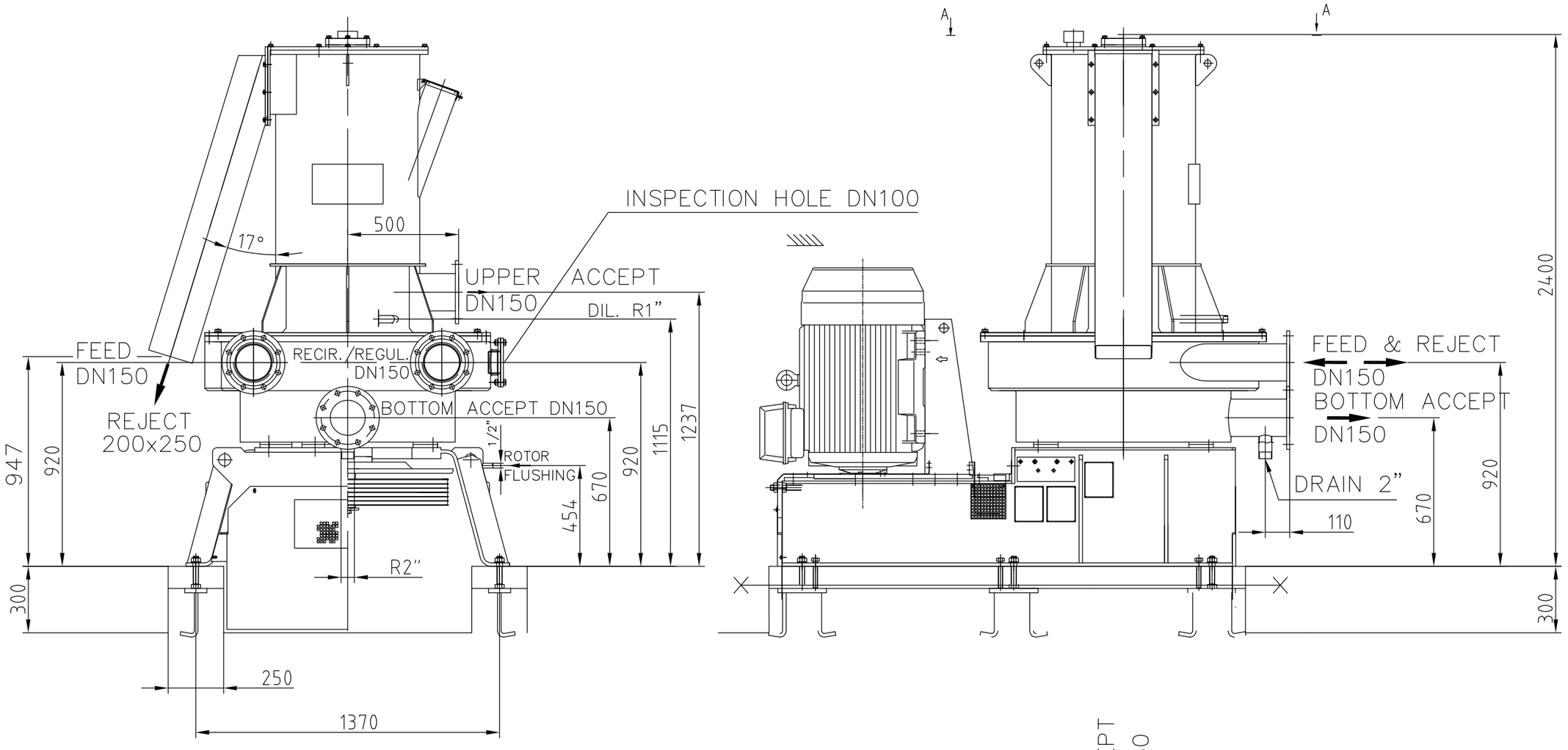
Upper rotor and upper frame

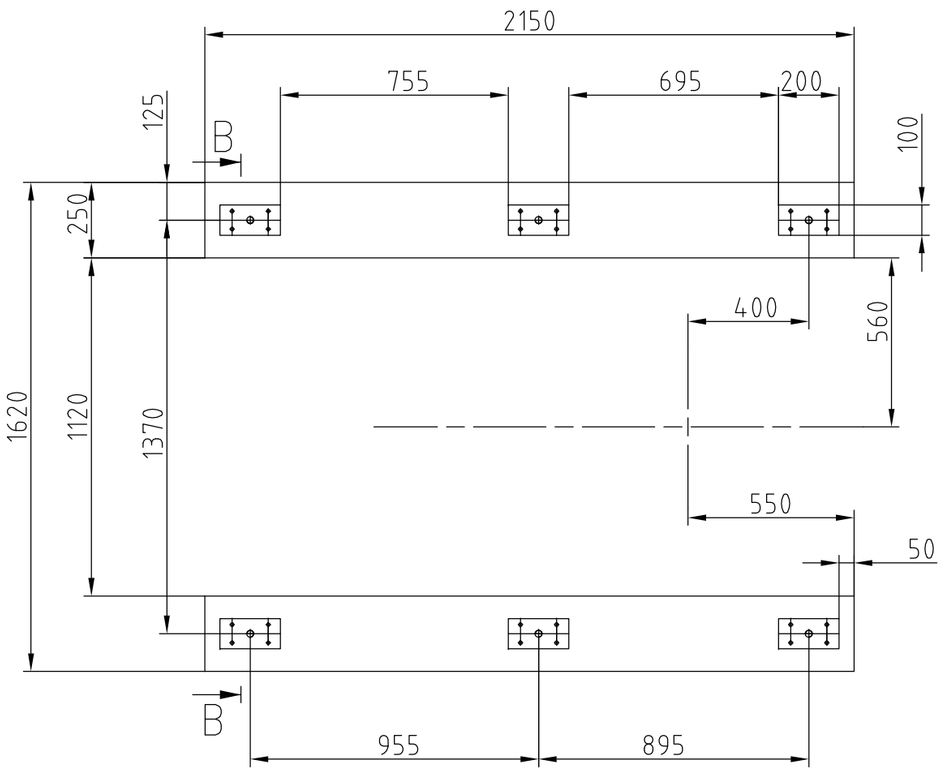
Install the upper rotor and upper frame according to (► Sec. 8.3 Upper rotor and upper frame, on page 8-38).

Lower rotor and screen plate

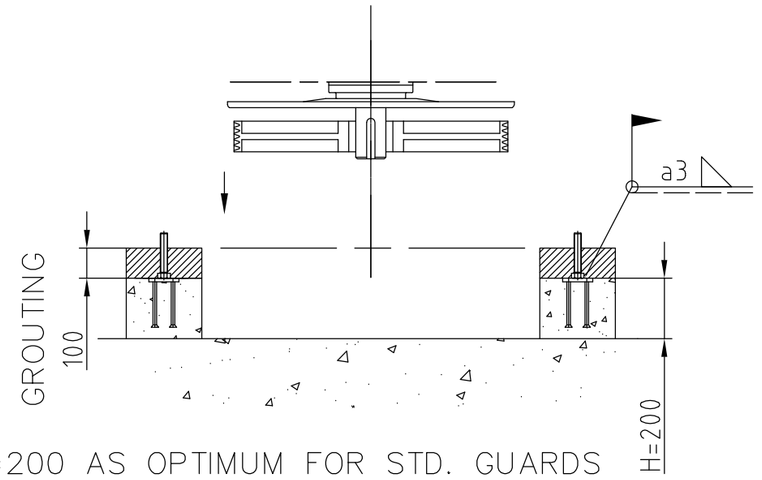
Install the lower rotor and screen plate according to (► Sec. 8.4 Lower rotor and screen plate, on page 8-40).

The ModuScreen is now ready to be started (► Sec. 6.4 Start-up, on page 6-23).



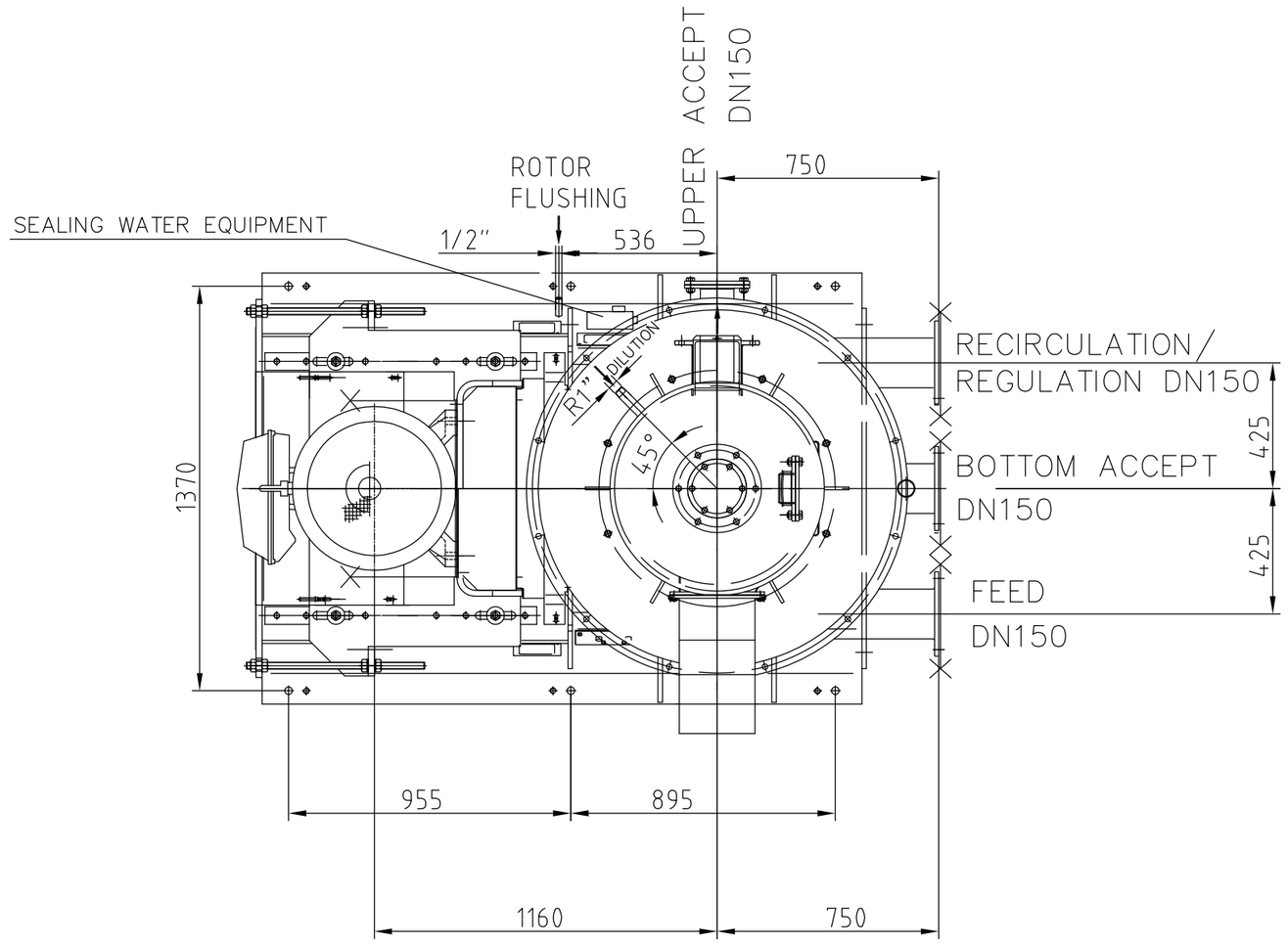


A–A



H=200 AS OPTIMUM FOR STD. GUARDS

B–B



A–A

DELIVERY LIMIT	⟷
MOTOR	90kW, 1500 rpm
FLANGE DRILLINGS	DIN 2576/ISO 7005 PN10
TOTAL WEIGHT FILLED WITH STOCK	4150 kg
NET WEIGHT WITHOUT MOTOR	3150 kg
MAX.INLET PRESSURE	300 kPa
DYNAMIC FACTOR	1.3

Customer: JIANGSU FUXING PAPER Co		AMC: ----	Basic Material Name: ----	Basic Material Standard: ----	Net Weight kg: 0.0
Pos. No.: ----	Customer Drawing No.: ----			Designed: ----	Date: ----
Product Type: ----	Product Code: ----			Drawn: Ktkpek05	Date: 01/02/2012
Size: A2	Scale: 1:20	Description Line 1 (EN): DIMENSIONAL DRAWING MODUScreen T4D		Checked: ----	Date: ----
Division: PF	Prod. Home: 1023	System: AUTOCAD_01	Description Line 2 (EN): ----	Approved: Ktkjaa05	Date: 01/02/2012
ANDRITZ PF		Replacement for Drawing: ---- Rev.: --	Replaced by Drawing: ---- Rev.: --	Copy from Drawing: ---- Rev.: ----	Sort: ----
		SAP Mat. No./Variant: 202658597	Reference Drawing: ----	Old Drawing No.: ---- Rev.: ----	M-Film: ----
		SAP Main WBS Element: C-14-811297-010-3150		Drawing No.: 702134038 Rev.: –	Sheet: /1


GUARD ON ASSEMBLY
Service guard
517 Locking ring
Fastening screw
Frame
GUARD ON SERVICE
A-A
Drilled at assembly
FLUSHING R1/2"
INSPECTION HOLE DN100
RECIRCULATION/ REGULATION DN150
BOTTOM ACCEPT DN150
FEED DN150
DN150 UPPER ACCEPT
DILUTION R1"
FEED DN150
RECIRCUL. REGUL.DN150
ROTOR
FLUSHING
REJECT
Det 1
Det 2
Lining mantle for wearing
FEED & REJECT DN150
BOTTOM ACCEPT DN150
R2" DRAIN
Det 1 1:2,5
Det 2 1:2,5
ROTOR GAP ADJUSTMENT WITH FIXING WASHER
SCREEN PLATE
ROTOR
1:2
Customer JIANGSU FUXING PAPER Co
Description Line 1 (EN) MODUSCREEN T T4D
Size A1
Scale 1:10
Division PF
Prod. Home 1023
System AUTOCAD_01
Drawn Ktkpek05 01/02/2012
Approved Ktkjaa05 01/02/2012
SAP Mat. No./Variant 132074771
SAP Main WBS Element C-14-811297-010-3150
Drawing No. 702134149
Rev. A
Sheet /1
Net Weight kg 0.0
ANDRITZ
PF
GENERAL TOLERANCES
LINEAR DIMENSIONS
ANGULAR DIMENSIONS
SYMBOLS
GEOM.TOL.
MISCELLANEOUS
-Flame cutting ISO 9013-IIB ISO 9013-IIG
-Castings, machine. ISO 8062-CT10
-Castings, handm. ISO 8062-CT12
-Forgings SFS 3507, DIN 7527
-Weldingclass C (min.), ISO 5817