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Machine Screen Book

International Paper Co.
Bucksport, ME, USA
PM 4
OptiScreen MS-900HT

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Operation and Maintenance
Manual
International Paper Co., Bucksport
OptiScreen MS-900HT

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Checked by

1 SAFETY INSTRUCTIONS

1 SAFETY

These operation and maintenance instructions contain warnings. On the basis of the type of accident or damage that can result from the danger, the warnings are divided into two groups:

Indicates that the danger in question could result in an accident or death.

Indicates that the product, process, or environment could suffer damage from the event in question.

1.1 Ensuring Safety

These operation and service instructions must be kept for the entire service life of the equipment. If the equipment is moved to another location or sold, the person responsible for operating and servicing it must ensure that the instructions are kept with the equipment.

The following is a presentation of safety instructions designed to ensure the safety of personnel who operate, monitor, and service the machinery, and other persons in its immediate vicinity.

In the interest of safety, Metso Paper, as the manufacturer of the equipment, requires that:

- the owner of the equipment make the safety instructions available to all personnel responsible for operating, monitoring, and servicing the equipment, and ensure that personnel follow these instructions

- the personnel operating, servicing, and monitoring the equipment have been trained and have acquainted themselves carefully with the safety instructions before beginning work

- the operating, servicing, and monitoring personnel possess the basic qualifications and expertise required for their work

- the operating, servicing, and monitoring personnel comply with these instructions, current legislation applicable at the location of the equipment, and general occupational safety regulations

1.2 Safety during Installation

All installation work must be carried out in accordance with general occupational safety regulations, and specific requirements of plant conditions must be taken into account.

Lifting and transferring parts of the equipment must be performed in accordance with general occupational safety regulations, and no parts of the unit are to be allowed to fall.

The weight of the equipment and the parts is indicated in Section 2 of this book, “Technical Data”. Always ensure that the lifting equipment used is intended for loads at least as heavy as the load to be lifted.

When working on top of the screen, care must be taken and general occupational safety regulations observed to prevent falling off.

In belt-driven screens, where the motor is attached to the screen frame, the motor must be installed only after fastening the screen to the foundation. This eliminates the danger of the screen and the motor falling over.

When installing the conical sleeve, carefully follow the installation instructions so that the pulley does not become detached and fall off.

Handling and disposal of substances used during transport and installation (e.g., sealants, oils, glues, paints, chemicals) must be done in accordance with the instructions in operational safety bulletins, plant-specific waste disposal instructions, and current local legislation.

1.3 Safety during Operation

Before commissioning and performing initial start-up, ensure that the equipment's motor voltage corresponds to the mains voltage.

Check regularly (at least once a year) the following fastening and joint points:

- the fastening and tightness of the pipe connections
- the fastening and tightness of the seal water connections
- the fastening and tightness of the instrumentation's air connections
- the flange coupling and bolted joints of the cover and frame

Mind the surfaces of the screen frame and the connections – they can occasionally become dangerously hot.

Periodically check the tightness of the V-belts and fastening of the belt pulley in accordance with the separate instructions, to prevent the pulley from becoming detached due to slipping of the belts.

If the screen is a pressure vessel, it must be checked in accordance with current applicable regulations. The person responsible for operating the screen must ensure that the screen has been checked before using it.

Dust and other dirt accumulating on the surfaces of the screen should be washed off periodically.

Due to noise generated by the motor, hearing protectors must be used during operation.

Keep the working environment clean! There is a risk of slipping if any stock or lye leaks onto the floor.

1.4 Safety during Servicing

Servicing work must be carried out in accordance with general occupational safety regulations, and specific requirements of plant conditions must be taken into account.

Lifting and transferring parts of the equipment must be performed in accordance with general occupational safety regulations, and no parts of the unit are to be allowed to fall.

The weight of the equipment and the parts is indicated in Section 2 of this book, “Technical Data”. Always ensure that the maximum load marked on the lifting equipment is not exceeded.

Do the following before you begin servicing:

- Before any servicing, make sure that the hot parts of the equipment have cooled off.
- Before opening a seal water pipe or pressure lubrication unit, ensure that the system is depressurized and empty.

If the motor needs to be replaced, follow the motor manufacturer’s installation instructions.

Use protective gloves when handling melted or burned O-rings that contain Viton!

Weld-locked screws (mounting bolts of rotor blades, for example) must always be replaced after they are detached.

If the servicing requires opening the screen cover, in the interest of safety ensure that:

- the person responsible for operating the equipment has been notified of the start of the servicing and of its estimated duration
- signs warning of the servicing have been placed in appropriate places
- the safety switch of the screen’s drive motor has been locked in the STOP position and/or the fuses removed to prevent starting
- the depressurization of the screen has been verified before opening the cover (open the discharge valve)

- suitable lifting equipment, possibly delivered with the equipment, is used for lifting the cover, screen cylinder, and rotor, and general occupational safety regulations are followed to prevent parts of equipment from falling
- the heavy cover cannot hit an employee or pin anyone against other structures

- the valves of the connections have been closed and locked to prevent unexpected opening

For the safety of personnel entering the screen, make sure that:

- harmful chemicals and bacteria have been rinsed out of the screen and the flow of fresh air into the screen has been ensured
- electric tools used during servicing have been inspected for defects before they enter the equipment
- servicing personnel use personal protective equipment in order to prevent slipping, for example

Once the servicing is complete, ensure that all of the equipment's protective covers are in the correct places and the inside of the screen is clean.

Remove warning signs regarding servicing.

Let the person responsible for operating the equipment know that servicing is finished.

2 TECHNICAL DATA

1 TECHNICAL DATA

1.1 OptiScreen Machine Screen MS-900HT

Technical data		
Total area of screen cylinder	9.61	m^2
-Typical hole diameter	1.4–2.4	mm
-Typical gap size	0.15–0.40	mm
Maximum operating temperature	70	°C
Maximum operating pressure	600	kPa
Minimum feed pressure	100	kPa
Design pressure drop: infeed–accept	50	kPa
Rotor's typical speed of rotation	140	RPM
Number of rotor foils	10	pcs
Materials		
Parts that come into contact with stock: acid-proof steel	(EN 1.4404)	
Other parts: structural steel (painted)	(EN 10025)	
Drive equipment		
Belt drive		
Main dimensions		
Length	3600	mm
Width	3000	mm
Height	2875	mm
Weight		
Weight when empty, without motor	12500	kg
Weight when filled with water, without motor	20500	kg
Cover	2450	kg
Screen cylinder and lifting tools	1490	kg
Rotor and lifting tools	2000	kg
Bearing unit	955	kg
Shaft seal		
Double-acting mechanical seal		
Accessories		
Control unit for seal water		
Lifting tools for screen cylinder and rotor		

3 DESIGN AND OPERATING PRINCIPLE

1 CONSTRUCTION AND OPERATION

The OptiScreen product family includes a comprehensive range of coarse, fine, and machine screening equipment for mechanical pulping, stock handling, and recycled fiber processes.

Based on the intended application, OptiScreen screens have been divided into the following product groups:

- CS coarse screens
- FS fine screens
- MS machine screens

This book has been compiled for horizontal machine screens of the OptiScreen MS type, which are fed either tangentially or axially.

1.1 Intended Use and Operation of the OptiScreen Machine Screen

OptiScreen machine screens are used as screens before the headbox in paper machines or board machines. The purpose of the machine screen is to prevent impurities from entering the headbox; to weaken the pressure pulsation caused by the feed pump; and to improve the mixing of the stock, white water, and stock components, thus improving formation and runnability. The machine screens are continuously operating, vertical or horizontal devices, whereby the screening takes place under pressure in a completely closed space. The inlet pressure of stock depends on the machine speed. The pressure body is often dimensioned case-specifically.

A dilution water screen, which is needed with a dilution water headbox, is usually considered a machine screen. The purpose of the dilution water screen is to ensure the purity of dilution water, and it has the same operating principle and requirements as a machine screen.

The stock to be cleaned (or the dilution water of the headbox) is fed in through the feed connection. The screening stage consists of the screen cylinder and the rotating rotor. Accept flow passes through the screening surface from the inside to the outside, from which it is led through the accept connection to the headbox. The turbulence of a rotating rotor foil prevents the clogging of the screening surface. Impurities and fiber bundles that do not go through the screening

surface are led out through the reject connection. A suitable reject flow rate can be selected using a control valve.

1.2 OptiScreen MS-H Machine Screen Type Codes

OptiScreen MS machine screens are manufactured as vertical and horizontal models. They are fed either tangentially or axially.

Example of a type code: OptiScreen MS-200HT

Key to the code:

MS = **M**achine **S**creen

200 = screening area, ~ 2 m^2

H = **H**orizontal model

T = **T**angential feed / A = **A**xial feed

Type codes:

OptiScreen MS-200HT	OptiScreen MS-200HA
OptiScreen MS-340HT	OptiScreen MS-340HA
OptiScreen MS-450HT	OptiScreen MS-450HA
OptiScreen MS-600HT	OptiScreen MS-600HA
OptiScreen MS-900HT	OptiScreen MS-900HA
OptiScreen MS-1200HT	OptiScreen MS-1200HA
OptiScreen MS-1800HT	OptiScreen MS-1800HA

1.3 Construction and Materials

Figure 1. Construction of the OptiScreen MS-HT machine screen (STOA009530)

1. Frame
2. Cover
3. Feed connection
4. Reject connection
5. Accept connection
6. Deaeration connection (with tangential feed only)

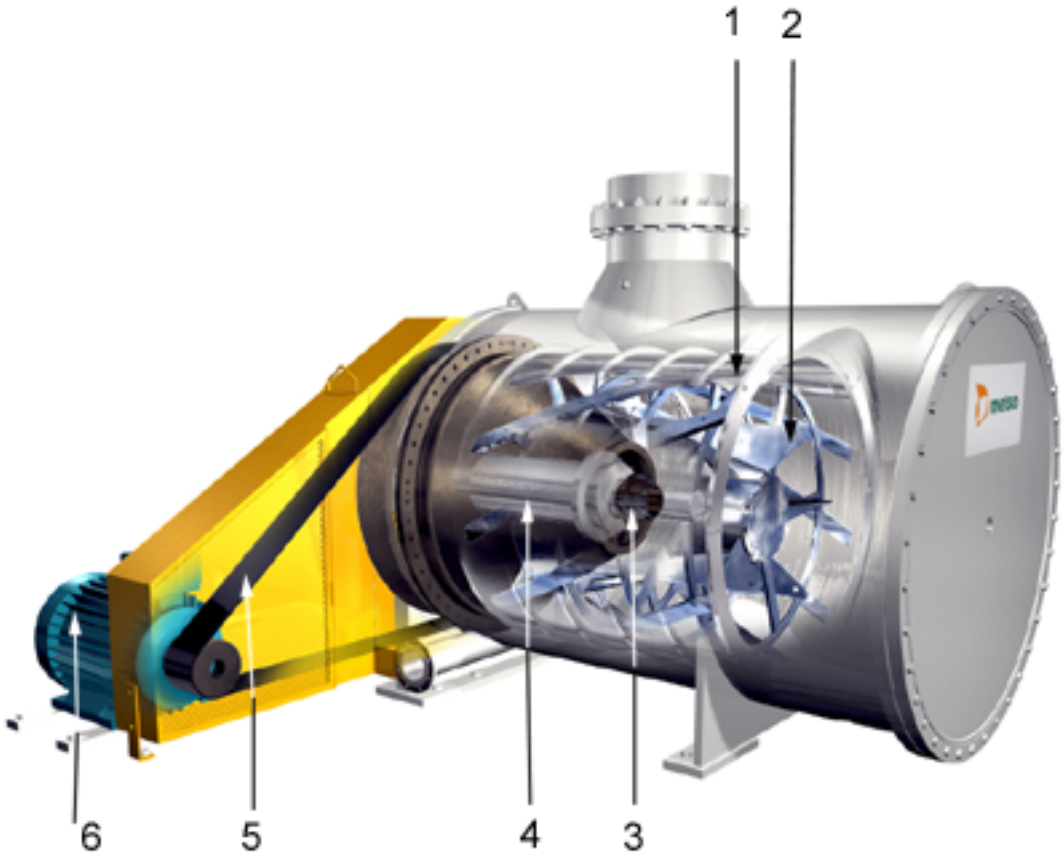


Figure 2. Main components of the OptiScreen MS-HT machine screen (STOA009531)

1. Screen cylinder
2. Rotor
3. Mechanical seal
4. Bearing assembly
5. Belt drive
6. Drive motor

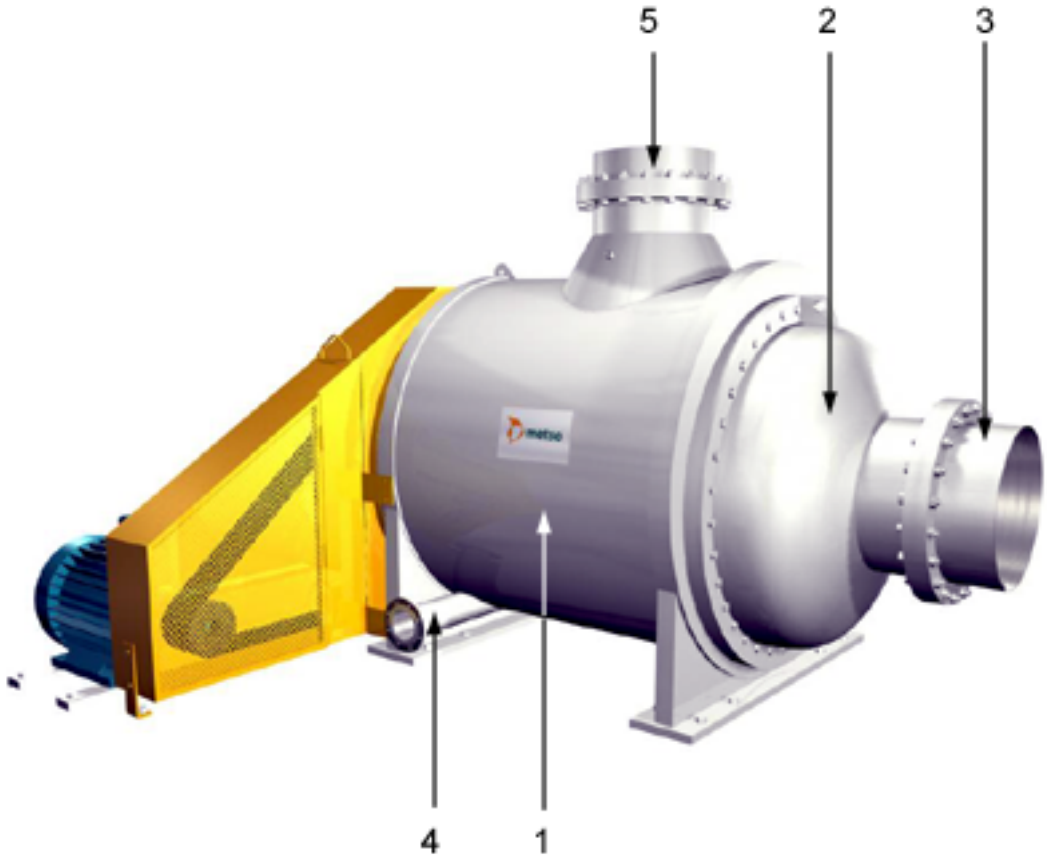


Figure 3. Construction of the OptiScreen MS-HA machine screen (STOA009533)

1. Frame
2. Cover
3. Feed connection
4. Reject connection
5. Accept connection

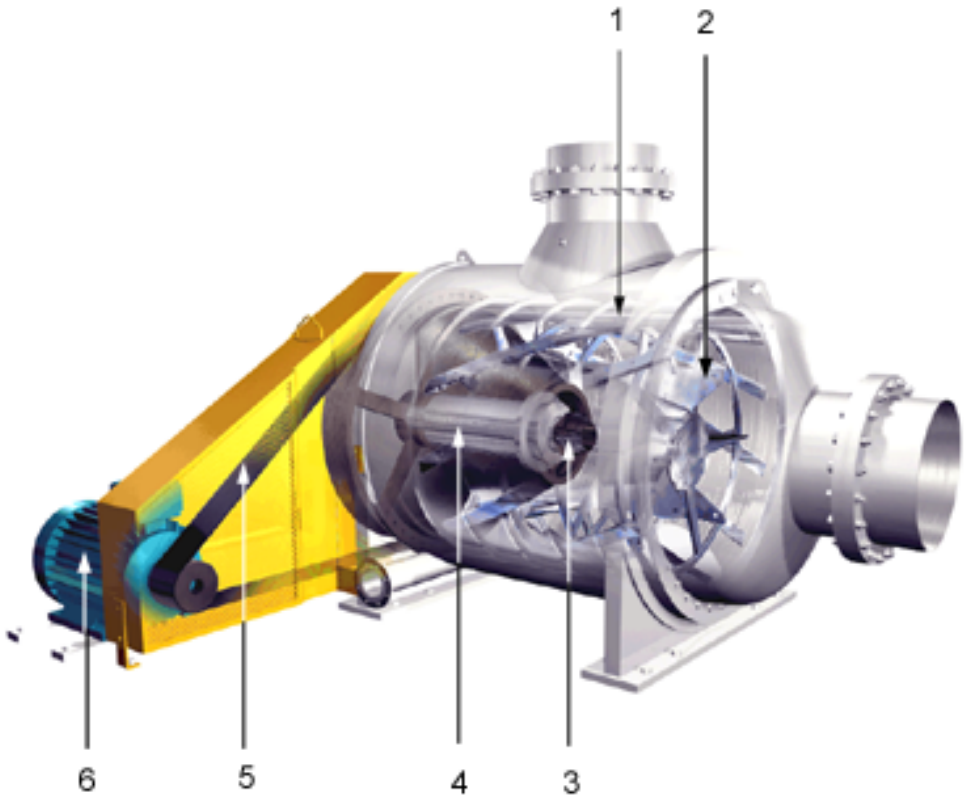


Figure 4. Main components of the OptiScreen MS-HA machine screen (STOA009533)

1. Screen cylinder
2. Rotor
3. Mechanical seal
4. Bearing assembly
5. Belt drive
6. Drive motor

1.3.1 Frame

The screen frame is of welded steel construction. The biggest part of the frame consists of a pressure-proof part, the so-called pressure frame. All parts that come into contact with the stock are made of acid-proof steel. The pressure frame has infeed, accept, and reject connections. The standard of equipment is usually agreed upon case-specifically. The accept connection's flange connections, for example, can guide material forward so harmful blockages cannot be formed. The inside surfaces can be polished in a manner fitting the customer's requirements - using electrolytic polishing, for example.

1.3.2 Cover

The cover is of welded steel construction. It is sealed to the frame using an O-ring seal.

Depending on the feed method, there is either a feed connection or a deaeration connection in the middle of the cover.

1.3.3 Bearing Assembly

The bearing assembly, which is fastened to the body with a screw joint, is a separate unit. It consists of spherical roller bearings and is grease-lubricated. The grease nipples of the bearings are on the side of the device. The grease is led from there to the bearings with hoses.

Figure 5. Bearing assembly (STOA009517)

1.3.4 Seal

In the standard construction, the shaft inlet to the pressurized space is sealed with a double-acting mechanical slide ring seal. The seal needs clean water for lubrication and cooling. The seal water pressure should always be about 1 bar higher than the process pressure inside the screen. This prolongs the service life of the seal. If the process pressure is more than 10 bar, the seal water pressure should be 10 bar or the seal manufacturer's separate instructions should be used. The seal water flow must have prevention of starting and a low limit alarm.

For seal solutions for constructions other than the standard one, the seal manufacturer's instructions should be followed.

1.3.5 Rotor

The rotor frame is of welded steel construction. The rotor has adjustable foils, i.e., pulsating blades. The clearances between the foil and screen cylinder are adjusted using shims or adjusting nuts.

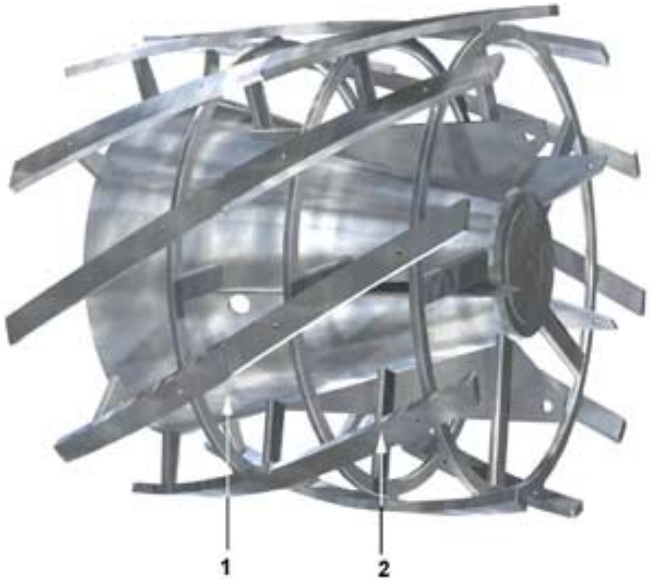


Figure 6. OptiScreen MS-H machine screen rotor (STOA009518)

1. Rotor frame
2. Foil, i.e., pulsating blade

1.3.6 Screen Cylinder

The screen cylinder, which is the screening surface, can be a so-called wedge wire slot cylinder made of wires, a slot cylinder made from a plate by machining, or a hole cylinder made from a plate by drilling. The material used is acid-proof steel. Screen cylinders are always electrolytically polished.

Figure 7. Screen cylinder (STOA009519)

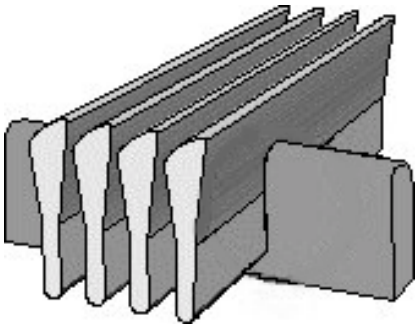


Figure 8. Screening surface of the wedge wire slot cylinder (STOA009520)

Figure 9. Screening surface of the hole cylinder (STOA009521)

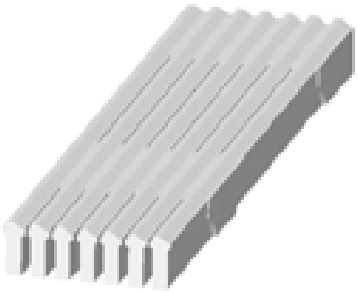


Figure 10. Machined surface of the slot cylinder (STOA009522)

1.3.7 Drive Equipment

The drive equipment is determined by the power required by the machine screen and the space available. All horizontal machine screens except the largest model are belt-driven.

Belt drive

The V-belt pulleys are fastened using conical sleeves.

The speed of rotation can be changed, by changing the diameter of the driving pulley. The speed of the screen can be changed easily if the drive motor is equipped with inverter control. Using inverter control is recommended, as this makes it easy to avoid harmful rotation speeds.

Gear drive

The drive motor and gear, if any, are located in a stand fastened to the floor or separately from the pressure body. This construction ensures that the drive equipment will not cause pressure pulses through the screen body.

There is a coupling between the motor and the gear.

Using an inverter for belt-driven screens is highly recommended.

4 OPERATING INSTRUCTIONS

1 OPERATION

1.1 Safety during Operation

Before commissioning and performing initial start-up, ensure that the equipment's motor voltage corresponds to the mains voltage.

Check regularly (at least once a year) the following fastening and joint points:

- the fastening and tightness of the pipe connections
- the fastening and tightness of the seal water connections
- the fastening and tightness of the instrumentation's air connections
- the flange coupling and bolted joints of the cover and frame

Mind the surfaces of the screen frame and the connections – they can occasionally become dangerously hot.

Periodically check the tightness of the V-belts and fastening of the belt pulley in accordance with the separate instructions, to prevent the pulley from becoming detached due to slipping of the belts.

If the screen is a pressure vessel, it must be checked annually in accordance with the current applicable regulations. The person responsible for operating the screen must ensure that the screen has been checked before using it.

Dust and other dirt accumulating on the surfaces of the screen should be washed off periodically.

Keep the working environment clean! There is a risk of slipping if any stock or lye leaks onto the floor.

1.2 Procedures before Commissioning

Before commissioning, the installation inspection must be carried out and any defects repaired.

- Set the seal water flow to 3–4 LPM.
- Set the pressure to 1 bar above the process pressure or follow the seal manufacturer's instructions.
- Set the low limit alarm for the flow.

Checking the rotor's direction of rotation:

Ensure that

- the rotor rotates in the direction of the arrow - you can check the direction of rotation by looking at the pulley or the screen shaft
- the seal water flow is on during checking of the direction of rotation

Ensure that

- the rotor clearances are correct
- the rotor can rotate freely

1.2.1 Checks before Start-up

Ensure that

- the cover is properly attached
- all mounting bolts are in place and tightened
- the flange joints have been properly tightened
- the drain plugs (if any) are in place and the discharge valves closed
- the tightness of the V-belts is correct (belt-driven screens)
- all guards are in place
- the gear has enough oil (gear-driven screens)

1.3 Starting

1.3.1 Automatic Starting

The most practical way to control the screen is by using automatic computer control of common procedures. We will deliver the basic engineering material for automation on request. According to these instructions, the start-up, operation, and stopping processes are always carried out in the same, controlled manner.

There are differences in the manner of operation between manual and automatic starting. With an automated system, several operations can be performed simultaneously and sub-processes related to start-up can be organized in various start groups.

1.3.2 Manual Starting

When manual starting is used, only one operation can usually be performed at a time. Manual start-up of the screen can be begun after performing these initial procedures:

- Before start-up, fill the screen with water.
- In a horizontal screen, the accept pipe usually goes up from the top of the screen to the headbox. This way, the air exits through the pipe and no separate bleed valve is needed.

After this, follow these steps:

1. Close the bleed valve, if any.
2. Ensure that air has been removed from the infeed end as well.
3. Ensure that the paper or board machine is running and that reject handling is ready to receive reject from the machine screen.
4. Start the screen's drive motor.
5. Start the feed pump at a low speed of rotation (usually by inverter control).
6. Open the feed valve (if any) and the reject valves. The feed valve must be opened slowly enough that no harmful shock pressure is generated.

7. Slowly increase the feed flow by opening the valve or increasing the pump's speed of rotation, and adjust the reject flow to the appropriate level.

8. Start feeding high-consistency stock (does not apply to dilution water screens) and set the operation values to the appropriate level.

9. Set the correct reject flow rate, and check the screen's pressure difference and power intake.

10. Check seal water flow and seal tightness.

1.4 Monitoring during Operation

After start-up, it is a good idea to make a note of the normal pressure difference and power intake. The operation of the screen can later be monitored, by checking against these values.

During operation, certain operational and mechanical parameters have to be monitored. Most of this monitoring can be carried out by the instruments, which sound an alarm if a deviation from the parameter's set value or operation range occurs. For example, the low limit alarm for mechanical seal water prevents process disturbances and servicing costs due to lack of seal water.

The tightness of the mechanical seal must be monitored visually. A water leak does not require stopping the equipment immediately, if a double-acting seal is used. You should, however, immediately start making plans for servicing. If a stock leak occurs, the screen must be stopped as quickly as possible.

Monitoring the condition of bearings is an essential part of preventive maintenance, and equipping the bearings with condition control sensors is recommended.

The condition of the V-belt drive system must be checked after blockage has occurred, and the tightness and condition of the belts should be monitored regularly. The breaking of one belt does not require stopping the screen immediately, but all the belts should be replaced as soon as possible.

1.5 Troubleshooting

MALFUNCTION	POSSIBLE CAUSE	ACTIONS
1. Motor overload	- screen cylinder blocked	- clean the screen cylinder
	- accept flow too high	- decrease the accept flow
	- reject ratio too low	- increase the amount of reject
	- feed consistency too high	- decrease the feed consistency
	- reject space filled with thickened reject	- increase the amount of dilution water
	- inconsistent feed stock quality (consistency, waste content, amount of coarse fractions, etc.)	
2. High pressure difference	- screen cylinder blocked	- clean the screen cylinder
	- accept flow too high	- decrease the accept flow
	- reject ratio too low	- increase the amount of reject
	- feed consistency too high	- decrease the feed consistency - increase the dilution of reject - increase the amount of reject
	- reject consistency too high	- decrease the feed consistency - increase the dilution of reject - increase the amount of reject
	- improper operation of the accept and/or reject valve	- check the valve's operation and control circuit parameters
	- amount of impurities in the feed stock too high	

MALFUNCTION	POSSIBLE CAUSE	ACTIONS
	- too large and rapid changes in production	
3. Decreased capacity	- slots in the screen cylinder have become narrower (due to resin, lignin, bark, etc.) - screen cylinder profile has become lower	- chemical and pressure cleaning of the screen cylinder - temporary solution: • decrease the feed consistency - replace the screen cylinder - temporary solution: • decrease the feed consistency

1.6 Blockages

The existence of screen cylinder blockage can be concluded from a rise in the pressure difference. There may also be a rise in the power intake.

The machine screen's pressure difference can be calculated as follows:

- $\Delta P = P_{\text{infeed (feed or reject connection)}} - P_{\text{accept}}$

If the screen is equipped with tangential feed, the feed pressure is measured at the feed connection. In a screen with axial feed, the feed pressure is measured at the reject connection.

There must be an alarm for high pressure difference. The alarm limit is determined case-specifically. A recommended initial value is 0.7 bar.

Increasing the reject amount makes impurities move more quickly and makes it easier to keep the screen surface clean.

Decreasing the feed amount and at the same time the pressure loss also helps clean the cylinder that is about to become clogged.

After a total blockage, the foil clearance and fastening of foils have to be checked. In a situation like this, the screen always has to be opened and the cylinder has to be cleaned using a pressure washer, for example.

The screen cylinder can also be replaced or lifted off for a more thorough cleaning. Lifting equipment for lifting the screen cylinder is delivered with the screen.

! The screen cylinder must under no circumstances be cleaned by feeding pressurized water outside the screen cylinder, into the accept chamber.

Screen capacity can be improved by:

- a larger amount of reject
- a higher speed of rotation
- a smaller foil clearance

Screen pulsation can be reduced by:

- a lower speed of rotation
- a larger foil clearance

The speed of rotation of a belt-driven screen can be changed, by changing the diameter of the driving pulley. The speed of both belt-driven and gear-driven screens can be changed easily if the drive motor is equipped with inverter control. Using inverter control is recommended, as this makes it easy to avoid harmful speeds of rotation.

1.7 Stopping

1.7.1 Short Shutdown Period

1. Stop feeding high-consistency stock (does not apply to dilution water screens). The cleanness of water to be fed can be ensured by, for example, leading clean white water to the feed pump. Stop the flow of additives and retention aids.

2. Open the reject valve fully.

3. Adjust the feed pump to a low rotation speed but ensure the flow of clean water to the headbox. Check via, for example, sampling connections that there are no fibers left in the screen.

4. Slowly close the accept valve, if any.

5. Slowly close the feed valve and the reject valve.

6. Stop the feed pump.

7. Stop the screen's drive motor.

The screen should now be full of water and ready for start-up.

1.7.2 Long Shutdown Period

In case of a long shutdown period, perform the following steps in addition to the measures for a short shutdown period:

1. Stop the seal water flow.

2. Drain the accept piping through the discharge valve. This special valve is usually located at the lowest point of the accept pipe. Cleaning using back flow through the screen cylinder is not recommended, especially not for slot cylinders, in the event that stopping cannot be performed with clean water.

3. Open the bleed valve, if any.

4. Open the reject valve and the reject line drain valve. Drain the rest of the water in the screen through this. The water remaining at the bottom of the accept chamber can be drained through the drain plug.

- Ensure safety by preventing starting or operation of the screen and the auxiliary devices (e.g., pumps and valves).
- Follow the general safety instructions and the separate instructions given for the screen.
- Open the screen cover and flush the inner side with a clean water shower or a pressure cleaner.
- Detaching and washing the screen cylinder for long shutdown periods is recommended.

5 MECHANICAL MAINTENANCE

1 SERVICING

1.1 Safety during Servicing

Servicing work must be carried out in accordance with general occupational safety regulations, and specific requirements of plant conditions must be taken into account.

Lifting and transferring parts of the equipment must be performed in accordance with general occupational safety regulations, and no parts of the unit are to be allowed to fall.

The weight of the equipment and the parts is indicated in Section 2 of this book, “Technical Data”. Always ensure that the maximum load marked on the lifting equipment is not exceeded.

Do the following before you begin servicing:

- Before any servicing, make sure that the hot parts of the equipment have cooled off.
- Before opening a seal water pipe or pressure lubrication unit, ensure that the system is depressurized and empty.
- If the motor needs to be replaced, follow the motor manufacturer’s installation instructions.

- Use protective gloves when handling melted or burned O-rings that contain Viton!
- Weld-locked screws (mounting bolts of rotor blades, for example) must always be replaced after they are detached.

If the servicing requires opening the screen cover, in the interest of safety ensure that:

- the person responsible for operating the equipment has been notified of the start of the servicing and of its estimated duration
- signs warning of the servicing have been placed in appropriate places

- the safety switch of the screen’s drive motor has been locked in the STOP position and/or the fuses removed to prevent starting
- the depressurization of the screen has been verified before opening the cover (open the discharge valve)

- suitable lifting equipment, possibly delivered with the equipment, is used for lifting the cover, screen cylinder, and rotor, and general occupational safety regulations are followed to prevent parts of equipment from falling
- the heavy cover cannot hit an employee or pin anyone against other structures

- the valves of the connections have been closed and locked to prevent unexpected opening

For the safety of personnel entering the screen, make sure that:

- harmful chemicals and bacteria have been rinsed out of the screen and the flow of fresh air into the screen has been ensured
- electric tools used during servicing have been inspected for defects before they enter the equipment
- servicing personnel use personal protective equipment in order to prevent slipping, for example

Once the servicing is complete, ensure that all of the equipment's protective covers are in the correct places and the inside of the screen is clean.

Remove warning signs regarding servicing.

Let the person responsible for operating the equipment know that servicing is finished.

1.2 Recommended Inspection and Servicing Intervals

Target/Inspection interval	Start-up	Every day	Every month	Every six months	Every year	Comments
Is the seal water valve open?	X					If started dry, the seal will break.
Is the rotor rotating in the right direction?	X					See the arrow indicating rotation direction.
Are the rotor foils properly attached?	X					Check the attachment after blockage.
Is the clearance between the rotor foils and the screen cylinder correct and equal throughout the cycle?	X			X		When checking the clearance, rotate the rotor.
Is the screen vibrating?	X			X		The reason for the vibration might be rotor imbalance. The imbalance might be caused by accumulation of impurities in the rotor.
Is the rotor tightly fastened to the shaft?	X			X		To check the bearing clearances and rotor fastening, insert a screwdriver between the rotor blade and the screen cylinder.
Is the tightness of the V-belts correct?	X			X		See belt drive instructions.
Bearing inspection					X	
Bearing re-lubrication						See lubrication recommendations.
Motor bearing re-lubrication						See the motor manufacturer's instructions.

Target/Inspection interval	Start-up	Every day	Every month	Every six months	Every year	Comments
Is the bleed valve open?	X					When the screen and the feed piping are full, the valve can be closed.
Is the shaft seal tight?	X	X				
Replacement of the shaft seal						When leakage occurs.
Cleaning of the screen cylinder			(X)		X	During every shutdown.

1.3 Lubrication Recommendations

The parts to be lubricated are the screen rotor and drive motor bearing assemblies. There is also a separate bearing assembly for the driving belt pulley in high-power models. The manufacturer's lubrication recommendations are to be followed in re-lubricating the motor's bearing assembly.

The screen bearing assemblies, as well as the separate bearing assembly of the driving belt pulley, use spherical roller bearings. The exact bearing types can be found in the parts lists for the bearing assemblies.

OEM LUBRICANT

The bearing assembly has been lubricated prior to delivery, but the first re-lubrication must be performed before commissioning. The OEM lubricant is Mobilith SHC PM. Re-lubrication grease must be Mobilith SHC PM or compatible therewith.

Grease characteristics, typical values:

Mobilith SHC PM

Thickener: Lithium complex

Base oil: Synthetic hydrocarbon fluid ISO VG 460

Penetration (worked): 305–335

NLGI class: 1 ½

Drop point: 290 °C

Operating temperature range: -40 – +230 °C

Color: Light tan

Base oil viscosity: 46.5 mm^2/s/100 °C

RE-LUBRICATION GREASE

Thanks to its synthetic base oil, Mobilith SHC PM is suited for a very wide temperature range. This makes it a good choice for these screens under all process conditions. Due to its good pumping ability, it is also suitable for central lubrication systems.

Hot process conditions

If the stock temperature exceeds 70 °C, special attention has to be paid to the base oil viscosity at the bearing's running temperature when choosing the lubrication grease. For hot conditions, we recommend using grease with synthetic base oil whose qualities correspond to those of the OEM lubricant. If grease other than Mobilith SHC PM is used, the heat endurance of EP additives in the grease has to be verified. Using automatic lubrication for hot conditions is also highly recommended.

The running temperature of the screen's upper bearing, i.e., the bearing on the rotor side, is about 20–25 °C higher than the stock temperature in the process. If there is no system for measuring the bearing temperature, this estimate can be used as a base when choosing the lubricant and the re-lubrication interval.

The running temperature of the upper bearing is affected also by the amount of seal water. Mechanical seals without seal water are not recommended for process conditions above 70 °C.

When choosing the re-lubrication grease, attention must be paid to the running temperature. This is affected by the temperature of both the process and the environment. Also to be noted are other environmental conditions, such as relative air humidity, splash water, etc. If necessary, oil companies can be called upon to assist in

choosing the lubrication grease, as can the leading bearing manufacturers.

Cooler process conditions

When the temperature of the stock is below 70 °C, the following or corresponding grease types can be used:

- Mobil Mobilux EP2
- Esso Beacon EP2
- Shell Alvania EP Grease 2
- Neste Multi-Purpose Grease EP2

RE-LUBRICATION INTERVAL AND AMOUNT

The re-lubrication intervals and amounts are indicated in the included tables.

Manual re-lubrication

The effect of the temperature on the lubrication interval has to be considered according to the point to be lubricated. **The values in the table are only valid for bearing temperatures below 70 °C.** When the bearing temperature (t) is above 70 °C, the lubrication interval has to be cut in half for each rise of 15 °C in the bearing temperature. The temperature referred to here is the bearing's running temperature, not the stock temperature.

Automatic lubrication

The table shows the grease amounts calculated for one-hour lubrication intervals. You can easily obtain the necessary amounts for longer lubrication intervals by multiplying them by the appropriate number of hours.

LUBRICATION INTERVALS AND AMOUNTS FOR HORIZONTAL SCREENS

OptiScreen	Bearing location	Automatic lubrication amount g/h	Manual lubrication g each	Manual lubrication interval weeks (<70 °C)
MS-200H	Rotor side Driving side	0.23 0.35	96 147	9 9
MS-340H	Rotor side Driving side	0.23 0.35	96 147	13 13
MS-450H	Rotor side Driving side	0.35 0.36	147 153	13 13
MS-600H	Rotor side Driving side	0.35 0.36	147 153	16 16
MS-900H	Rotor side Driving side	0.49 0.43	204 179	15 15
MS-1200H	Rotor side Driving side	0.49 0.43	204 179	18 18
MS-1800H	Rotor side Driving side	0.76 0.51	320 212	18

1.4 Tightening Torques

Follow the guidelines given in the following tables, unless otherwise specified in the customer-specific drawings.

TIGHTENING TORQUES steel screws and nuts SFS-ISO 4014, SFS-ISO 4016, SFS-ISO 2219			
Thread	**8.8 Zne Nm 1)**	**A4-80 Nm 2)**	**A4-70 Nm 2)**
M 5	5	5	
M 6	9	8	
M 8	24	22	
M 10	45	42	
M 12	85	75	
M 14	125	115	
M 16	200	175	
M 20	400	350	
M 22	525	465	
M 24	675	600	
M 27	980		795
M 30	1345		990
M 33	1820		1200
M 36	2350		1385
M 39	3000		1800
1) Dry 2) Primarily: Molykote 1000/Molykote HSC Plus Substitute: e.g., Chesterton 785, Loctite 8155 Hirange (friction coefficient always < 0.20) USE CALIBRATED TIGHTENING TOOL			

TIGHTENING TORQUES steel screws and nuts ANSI 18, 2, 1, ANSI B 18, 3						
Thread	**8.8**	**Zne 1)**	**A4-80 2)**		**A4-70 2)**	
	Nm	**Ft-lbs**	**Nm**	**Ft - lbs**	**Nm**	**Ft - lbs**
1 / 4 UNC	10	8	10	7		
5 / 16 UNC	23	17	22	15		
3 / 8 UNC	42	30	38	28		
1 / 2 UNC	100	73	89	65		
5 / 8 UNC	200	145	175	130		
3 / 4 UNC	350	260	315	230		
7 / 8 UNC	560	410	500	365		
1 UNC	825	610	730	540		
1 ¼ UNC	1640	1210			1210	895
1 ½ UNC	2850	2100			1680	1240
1) Dry 2) Primarily: Molykote 1000/Molykote HSC Plus Substitute: e.g., Chesterton 785, Loctite 8155 Hirange (friction coefficient always < 0.20) USE CALIBRATED TIGHTENING TOOL						

1.5 Opening and Closing Cover

These instructions apply to all horizontal screens.

As a result of blockage or servicing work - the screen's cover might need to be opened. The screen must be stopped before opening the cover so that all the stock is washed away from inside the screen. The absence of pressure inside the equipment has to be ensured and the possibility of starting prevented.

A lifting bar should be installed above a horizontal screen if it is not possible to use, for example, a hoist. The lifting bar must be installed directly above the screen's central axis and parallel to it. The lifting bar is also needed in other servicing work besides opening the cover.

There are two types of screens: some are equipped with axial feed and others with tangential feed. The feed method affects the opening of the cover. In screens with axial feed, the feed connection is in the middle of the cover.

A detachable elbow pipe must be installed in screens with axial feed, to enable opening the cover and servicing the equipment. The recommended pipe length is indicated in the installation and foundation drawing. The pipe is often so heavy that a hoist is needed for lifting it. The pipe should be equipped with lifting lugs. After detachment of the pipe, if applicable, the cover of either screen model can be opened as follows:

Opening the cover

1. Lift the cover lightly from the lifting lug on the cover, and loosen the cover mounting bolts.
2. Lift the cover so that it is entirely held up by the hoist, and remove the mounting bolts. (On special order, the delivery can include a hinge device for the cover, which makes this lifting operation unnecessary.)
3. Detach the O-ring seal without removing it from its slot, and move the cover aside.

4. Make sure that the cover is in a safe location during the servicing work so that it cannot fall.

Closing the cover

To reinstall the cover, follow these steps:

1. Insert the O-ring seal in its slot if it has become detached.
2. Move the cover to its proper position.
3. Manually screw in the cover mounting bolts.
4. Tighten the bolts alternately from the opposite sides.
5. Lower the lifting hook and move the hoist away.
6. For screens with axial feed, attach the elbow pipe to the feed pipe.

1.6 Replacing Screen Cylinder

Removing the screen cylinder

Tools designed for the removal of the screen cylinder are part of the delivery. The following instructions are based on the part numbering in the lifting tool drawing

Removal steps are performed in the following order. The rotor can remain in its place at this stage.

1. Open the screen cover according to the opening instructions.
2. Turn the rotor to a position such that one of the rotating foils points straight up.
3. Push a thick piece of cardboard or similar material into the wing gap above the rotor.
4. Remove the cylinder fastening ring by loosening first the retaining screws that hold down the cylinder and then the ring mounting bolts.
5. Remove the thick O-ring.
6. Mount the screen cylinder support (part 3) on the lifting tool, and attach the lifting tool to the screen.
7. The screen cylinder lifting tool is controlled from the end of the shaft and from the point of support on the collar of the frame structure. Remove the rotor mounting plate and protective cover (if any) before attaching the tool.
8. Tighten the withdrawal screw (part 5) on the end of the shaft. Using the nut (part 8), pull the lifting beam to the shaft. The adjusting screw (part 7) has been adjusted by the supplier.
9. Attach the screen cylinder support (part 3) to the cylinder, using the screws provided.
10. The screen cylinder is removed from the guides by using the extraction screws that are attached to the outermost holes in the screen cylinder support.
11. When the cylinder has been removed from the flange guides on the frame, ensure that it does not rest on the rotor. You can do this by, e.g., testing whether you can lightly move the protective cardboard between the rotor and the cylinder. You can compensate for any harmful deflections by using the adjustment

screws on the two lower arms of the screen cylinder support (part 3). This is only possible in the larger models and is usually needed for MacroFlow cylinders only.

12. You can now pull the cylinder out - by using a block pulley, for example - and attach it to the lifting beam with screws. Pulling it out is easiest when you use the top of the cylinder support as the pulling point.
13. Lift with a hoist so that there is a gap of a couple of millimeters under the adjusting screw (part 7).
14. Remove the lifting tool from the shaft and move the cylinder to the desired location using the hoist. Using the lifting tool, you can turn the cylinder to a vertical orientation for storage by using two lifting hooks. Storing the cylinder vertically is recommended, but it can also be stored horizontally. For more details, see the instructions for handling the cylinder.

Installing the screen cylinder

1. Push the cylinder into its place by pushing from its lower edge with a hydraulic jack.
2. When the cylinder is back on its guides, remove the lifting tools.
3. Remove the retaining screws from the fastening ring, and install the ring in its place but the other way round.
4. Using the ring's mounting bolts, pull the screen cylinder heavily against the cone. You can also push the cylinder all the way with the jack, but please note that it cannot endure a high point load. If you do this, ensure that the cylinder is properly in place. In large screens, you can check this by using a thin feeler gauge to verify that there is no clearance at the top edge of the cone control.
5. Remove the fastening ring.
6. Install the thick O-ring in its proper place.
7. Then install the fastening ring in accordance with the assembly drawing and tighten the mounting bolts.
8. After this, tighten the retaining screws to hold down the cylinder.
9. Check the rotor clearances.

1.7 Screen Cylinder Handling

The following instructions must be followed whenever handling screen cylinders.

Screen cylinders must always be handled with special care. They are manufactured using precise tolerances, and even the slightest changes in measurements can adversely affect the result of the process.

- Always use cylinder-specific special tools. The screen delivery includes a cylinder lifting tool, with which the cylinder can be turned to a vertical orientation for storage by using two lifting hooks.
- Avoid hitting the screen cylinder while handling it, as this could damage the cylinder.
- Only professional, trained personnel are allowed to service and handle screen cylinders. The personnel must have the competence necessary for lifting work.

Handling during transport and storage

During transport and storage, screen cylinders should rest on level foundations made of wood or another soft material.

Screen cylinders must be vertical during transport. A vertical orientation is also recommended for storage. In lifting screen cylinders, the tools delivered with the screen must be used.

Screen cylinders must not be moved, by rolling them on the floor, as this will cause permanent deformations in the cylinders and scratch the surfaces.

Screen cylinders should be stored in their boxes. If a screen cylinder is stored outdoors, it must be covered.

If a screen cylinder is oriented horizontally during transport, which is against our recommendations, its supports must subtend an angle of at least 120^{o} and be made of wood or another soft material. (See the figure below.)

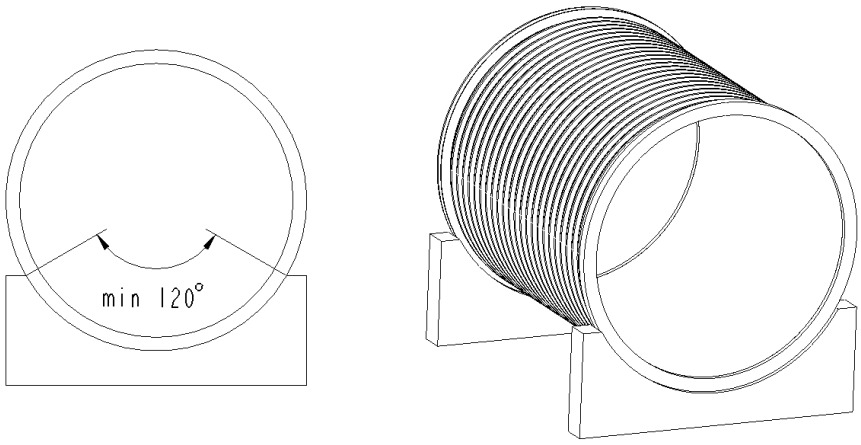


Figure 1. Storing a screen cylinder horizontally (STOA009524)

Handling during installation

Only special tools are to be used when installing a screen cylinder in a screen. The installation must be performed according to the installation instructions in this manual.

Special instructions for MacroFlow screen cylinders

- Avoid sudden or rapid movements when transporting and lifting a MacroFlow screen cylinder. These can cause deformations in the screen cylinder.
- When a MacroFlow cylinder is reinstalled in a screen, it should be rotated by 180º so that the top becomes the bottom and vice versa.
- If a large MacroFlow screen cylinder needs to be stored horizontally, we recommend using a support for the center flange as well.

1.8 Replacing Rotor

Tools designed for removing the rotor are part of the screen delivery. The following instructions are based on the part numbering in the lifting tool drawing (section 10 of the manual).

Removing the rotor

1. Open the screen cover according to the opening instructions.
2. If the rotor is equipped with a protective cover, remove this next.
3. The rotor is fastened to the shaft with a mounting plate and a hub screw. There may also be screws on the outer rim of the mounting plate. Unscrew all screws and remove the mounting plate.
4. Attach the rotor extraction tool/support (part 4) to the lifting tool.
5. The lifting tool is controlled from the end of the screen shaft and the point of support at the top of the frame collar. Move the lifting tool to this position, and insert the withdrawal screw (part 5) in the hole in the center of the shaft.
6. Tighten the withdrawal screw (part 5) on the end of the shaft. Using the nut (part 8), pull the lifting beam to the shaft. The adjusting screw (part 7), which supports the tool at the top of the collar frame, has been adjusted by the supplier.
7. If the screen cylinder is in place, protect it by pushing a thick piece of cardboard or similar material into the wing gap below the rotor.
8. By using the rotor support (part 4) and stud bolts (part 14), you can pull out the rotor from the fitting section and attach it to the support with screws.
9. You can then pull the rotor out – using a block pulley, for example - and attach it to the lifting beam. The pulling point must be located above the shaft line.
10. Lift with a hoist so that there is a gap of a couple of millimeters under the adjusting screw (part 7).
11. Remove the lifting tool from the shaft. You can now move the rotor to the desired location with the hoist. With the lifting tool, you can turn the rotor to a vertical orientation using two lifting hooks. Storing the rotor vertically is recommended, but it can also be stored in a horizontal orientation on a suitable stand. The

rotor must be supported at the attachment points of the foils and never, e.g., at the end of the foils.

Installing the rotor

- Clean and lubricate the shaft guide surfaces.
- Insert a new O-ring seal in the mechanical seal sleeve.

Essentially, the reinstallation of the rotor is done in the opposite order to removal.

1. Push the rotor, which rests on the rotor support (part 4), far enough that it comes into contact with the end of the screen shaft. Use a hydraulic jack and push from below the shaft line.
2. Detach the rotor from the rotor support (part 4).
3. Push the rotor onto the shaft guides using the jack, but do not push it all the way, as this might DAMAGE THE MECHANICAL SEAL in some models. Leave it approximately 20 mm from the final position.
4. Remove the lifting tools and move the rotor the rest of the way using its mounting plate and the threaded rod (part 18).
5. Install the rotor mounting plate using the enclosed bolts. Attach the rotor's protective cover, if any. Use new O-ring seals.
6. Check the clearance distances between the rotor and the screen cylinder, and adjust according to the instructions if necessary.
7. Install the screen cover.

1.9 Using Lifting Tools, Quick Guide

The figures below illustrate the use of lifting tools for handling the screen cylinder and the rotor.

Handling the screen cylinder

When the screen cylinder support is used, the tools are attached to the screen as shown below. A support with four arms can also be used.

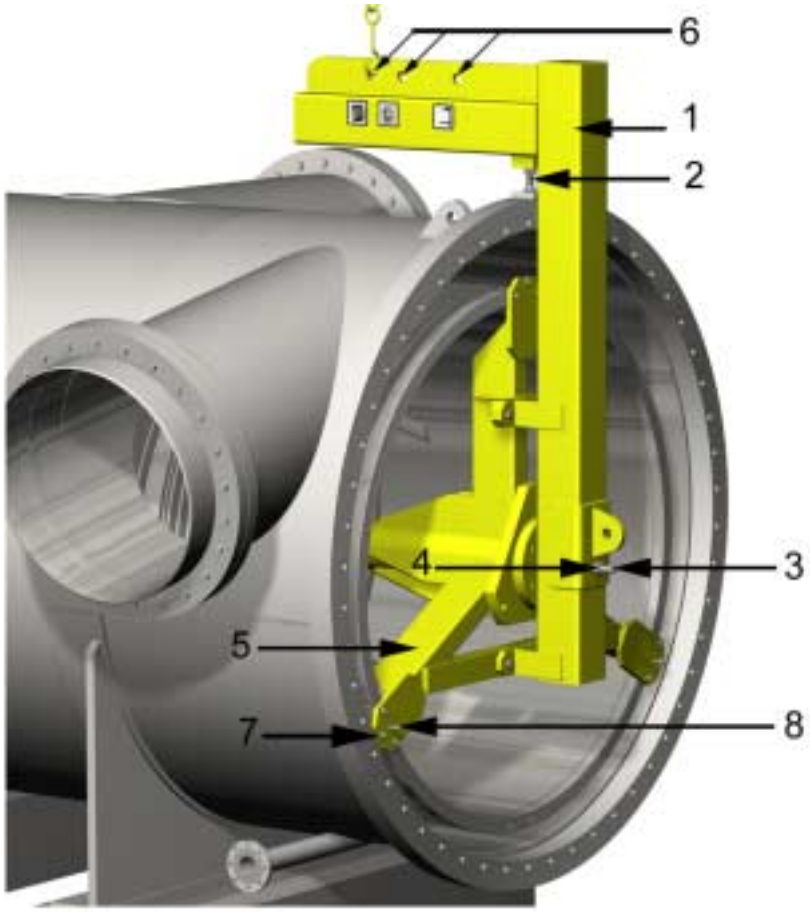


Figure 2. Screen cylinder support (STOA009385)

1. Lifting beam
2. Adjustable point of support, adjusting screw (part 7)
3. Withdrawal screw (part 5)

4. Tightening nut (part 8)
5. Screen cylinder support (part 3) (replaced by rotor support when lifting a rotor)
6. Lifting holes for various lifting operations
   - Lifting a tool only
   - Lifting a screen cylinder
   - Lifting a rotor
7. Threaded holes for removing the cylinder
8. Compensation screws (2 pcs) for bending disortion (large MacroFlow screen cylinders)

The lower lifting point is used when turning the screen cylinder (or rotor) to a vertical orientation.

Figure 3. Turning the screen cylinder from horizontal to vertical orientation (STOA009386)

1. Lower lifting point

The screen cylinder is turned to a vertical orientation for transport and storage.

Figure 4. Screen cylinder oriented vertically (STOA009387)

Handling the rotor

When the rotor support is used, the tools are attached to the screen as shown below.

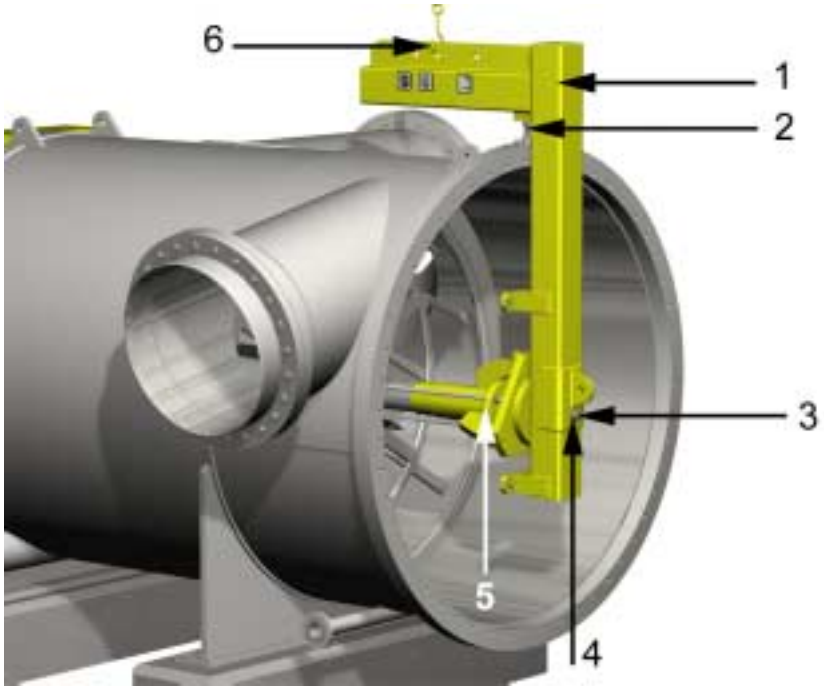


Figure 5. Rotor support (STOA009384)

1. Lifting beam
2. Adjustable point of support, adjusting screw (part 7)
3. Withdrawal screw (part 5)
4. Tightening nut (part 8)
5. Rotor support (part 5) (replaced by screen cylinder support when lifting a screen cylinder)
6. Lifting holes for various lifting operations
   - Lifting a tool only
   - Lifting a screen cylinder
   - Lifting a rotor

In some cases, the rotor and the screen cylinder can be lifted using the same hole (same center of gravity). In OEM equipment, the places for the holes are exactly at the center of gravity and are marked with symbol stickers.

The principles for handling a rotor are the same as with a screen cylinder.

Figure 6. Handling the rotor (STOA009388)

1.10 Adjusting Rotor Clearance

The clearance of a screen rotor is the radial distance between the inner surface of the screen cylinder and the outer surface of the rotor. The clearance must always be checked when the screen cylinder is replaced. The clearance also has to be checked and adjusted when installing a new rotor.

Instructions for adjusting the clearance are given below. Also enclosed is the rotor assembly drawing, which clearly shows the adjustment method and the rotor's construction.

The foil is fastened to the fastening arm from the outside with a radial screw. If necessary, you can install shims of different thicknesses between the foil and the arm. By combining shims of different thicknesses, you can make the adjustment in steps of 0.5 mm.

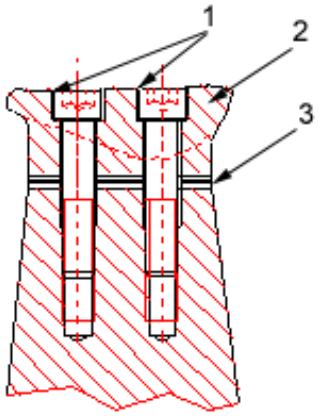


Figure 7. Adjusting the clearance using shims (STOA009523)

1. Lock weld
2. Rotor foil
3. Shims

Adjusting the clearance

The first step is to ensure work safety and prevent accidental starting of the motor. To check the screen rotor clearance, you need to open the screen cover. A feeler gauge of approximately 300 mm is needed for checking the clearance. For large screens, a useful tool is a wedge-shaped feeler gauge attached to an extension arm.

We recommend numbering the rotor foils in order to identify them. This also makes it easier to draw up the inspection report. Measure the clearance of an individual foil lengthwise approximately every 300–400 mm. Turn the rotor 45° and then measure the clearance of the same foil again. Again turn the rotor 45°; measure again. Repeat this for a total of eight times to ensure that you have obtained sufficiently accurate information on the foil clearance around the screen cylinder.

Measure all foil clearances using the same procedure. Make an inspection report based on these measurements. Compare the results with the standard values. The standard clearance value depends on the rotor type and is usually indicated in the rotor assembly drawing. Depending on the process, the clearance can deviate from the standard value; acceptable deviation can be determined on the basis of experience gained from previous start-ups, for example.

In order to change the clearance, you must remove the rotor from the screen. If the clearance is adjusted using shims, the screws are locked in place either by lock welding or with thread-locking compounds. Locked screws must always be replaced after they have been removed.

Install the adjusted rotor in its proper place using new seals. Check the final clearance and draw up an inspection report based on the measurements.

1.11 Mechanical Slip-ring Seal Maintenance

1. Take the necessary safety precautions and close the cutoff valve of the seal water line.
2. Open the screen cover according to the opening instructions.
3. Remove the rotor according to the instructions.
4. The mechanical seal is a unit mounted on a separate shaft sleeve. The sleeve is locked onto the screen shaft with retaining screws. The casing piece is fastened to the screen frame with screws. The rotating piece and the static piece in the separate seal have been propped up together using installation supports. The supports can be removed only after the installation.
5. Remove the seal according to the seal manufacturer's instructions, and deliver it to the seal manufacturer or its representative for servicing.
6. Install the new or reconditioned seal. Follow the seal manufacturer's instructions.
7. The condition of a double-acting seal can be checked, by testing it for pressure using seal water.
8. Lubricate the screen shaft with silicone grease or equivalent installation grease that does not damage the O-ring seal in the upper end of the mechanical seal. Any grease with a mineral oil base will destroy the EPDM rubber seal.

9. Mount the rotor in its place.
10. Close the screen cover according to the instructions.

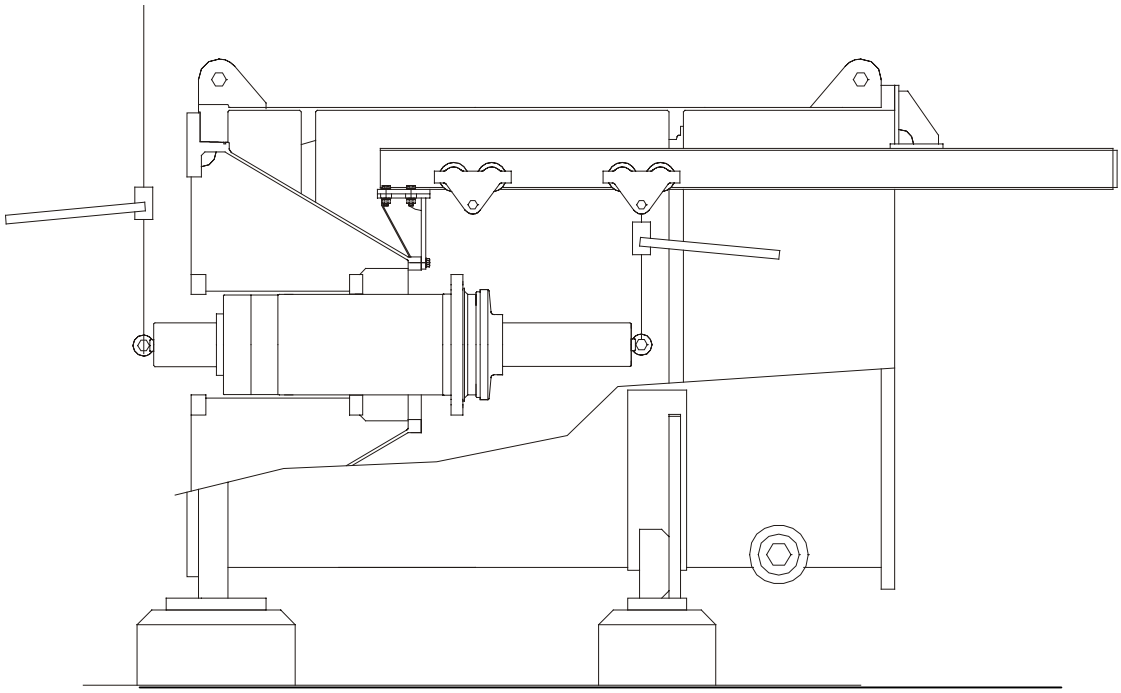
1.12 Removing and Installing Bearing Assembly

Removing the bearing assembly

The bearing assembly rarely needs to be removed. This is why the regular delivery does not include tools for this. On special order, we can deliver a lifting bar to be attached to the screen, which will make the operation considerably safer. When there is no lifting bar, the following instructions can be applied in order for a forklift truck, for example, to be used for lifting instead of the lifting bar. A lifting bar can also be made quickly by placing the inner end of the bar inside the frame, supported by feet. The inner surface of the frame must be covered for the duration of the servicing in order to avoid scratching.

The figures below and the screen assembly drawing also aid in the work.

Step 1:



Step 2:

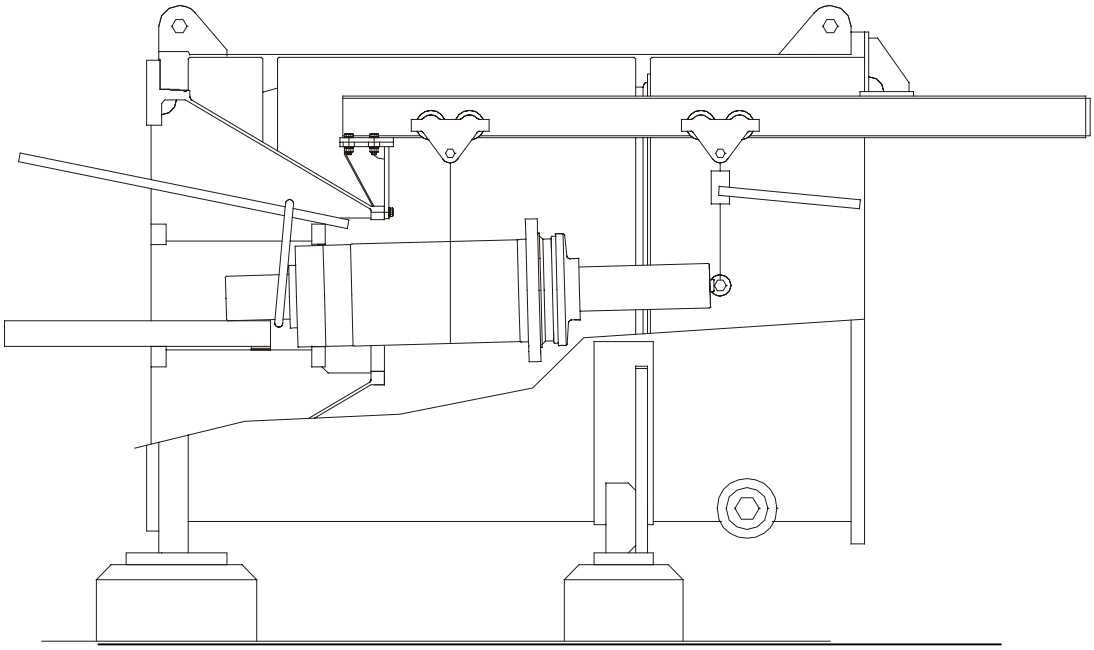


Figure 8. Steps for removing the bearing assembly (STOA009389, STOA008711)

Remove the bearing assembly according to the following instructions. The first few steps are described in more detail in their respective sections.

1. Open the screen cover.
2. Remove the screen cylinder and the rotor from the screen.
3. Remove the mechanical slip ring seal and its foundation with the hoses.
4. Remove the belt cover and the belts. Remove the larger pulley.
5. Detach the lubrication and condition control connections and the angle coupling from the bearing assembly.
6. Remove the bearing assembly mounting bolts, and detach the assembly from its controls by using the extraction screws that are screwed into the bearing pipe flange.

7. Attach the bearing assembly lifting bar. If no lifting bar is available, use a forklift truck, for example.
8. Lift the bearing assembly so that its rotor end is held up by the transfer trolley on the lifting bar.
9. You can first support the pulley end using a small hoist.
10. Pull out the supported bearing assembly by prying or using a block pulley.
11. As the assembly comes out, you will need to change the way it is supported at the pulley end. Insert some soft, sliding material under the shaft - e.g., plastic or wood - that will not damage the shaft surface. Alternatively, you can wrap a short hoisting sling around the shaft journal and pry the bearing assembly up from inside the cone. This way, you can move the bearing assembly up in small, controlled movements.
12. When you have lifted the bearing assembly high enough, hang it on the other transfer trolley as well.

Reinstalling the bearing assembly

- Reinstall the bearing assembly in reverse order.
- Make sure that no impurities, such as loose paint, get between the guide surfaces. Impurities between the mounting flange surfaces cause deformations after tightening of the bolts. These can lead to bearing damage.

1.13 Bearing Assembly Maintenance, Drawing STO1012990

MS-900HT, MS-900HA, MS1200HT, MS-1200HA:

Remove the bearing assembly according to the removal instructions.

Removing the bearings

1. Move the bearings to a dust-free room that has a crane.
2. Set the bearings in an upright position on a fitting stand, resting on their mounting flange with the rotor end up.
3. Detach the retaining screws (part 13) from the labyrinth rings (parts 8 and 10) and remove the flanges. Part 10 is threaded.
4. Loosen the mounting bolts (part 7, 9) from the head flanges (part 11, 12) and remove the covers.
5. Screw a lifting eye onto the end of the shaft, and carefully lift the shaft and the bearing out of the housing.
6. Place the shaft horizontally on the fitting stands.
7. Remove the adapter sleeve nut (part 6) and the sleeve, preferably using a hydraulic extraction nut. Remove the bearing.
8. Remove the bearing (part 3) using an extraction tool. Remove the washer (part 17) from the shaft.

Bearing installation

1. Clean all parts carefully, removing old grease and other impurities.
2. Mount the bearing (part 4) and the adapter sleeve. Tighten the sleeve, preferably using a hydraulic tightening nut, so that about 50% of the bearing clearance is eliminated. Lock the sleeve using the securing plate (part 5) and shaft nut (part 6).
3. Mount the washer (part 17) on the shaft.
4. Mount the other bearing (part 3). Heat the bearing to about 80 °C before mounting (using an oil bath or induction heater, for example).
5. Lift the shaft upright and install it in the bearing tube. Ensure that the washer and the outer races of the bearings remain perpendicular during the installation. Also perform basic lubrication of the bearings. See the lubrication instructions.

6. Continue the mounting by following the removal steps in reverse order. Replace all rubber seals with new ones. In mounting of the bearing, absolute cleanliness should be observed.
7. After mounting the bearing, ensure that all grease, water, and condition control connections are intact and properly attached.

2 INSTALLATION

These installation instructions apply to both vertical and horizontal machine screens.

Delivery

- Belt-driven screens are the most common screen type. They are delivered with the screen assembled. The motor, driving pulley, V-belts, and guards are usually delivered as separate units.
- In high-power screens and machine screens, the motor stand is usually a separate unit.
- In gear-driven machine screens, the gear is delivered as a separate unit.

Space requirements

About one meter of free space should be allowed around the screen for inspection and maintenance. We also recommend allowing space for the removal of the large pulley, even though it is not normally subject to wear and replacement. The space required for replacing the cylinder and the rotor is indicated in the installation drawing.

Placement

The screen must be installed indoors with an ambient temperature of 0–40 °C. There are no other requirements for placement or operating environment.

Installation

The foundation of the screen is made in accordance with the installation drawing. The minimum height of the concrete foundation is important for servicing. With small screens, additional height can make servicing easier. When designing the foundation, it must be ensured that there are no points under the screen that might collect water or stock.

The loading data are included in the installation drawing. With vertical screens, allow space for turning the cover aside. In screens with axial feed, the direction of the feed pipe also affects the direction in which the cover can be turned.

In installing V-belt pulleys, the general precision requirements for belt-driven equipment are to be followed. This ensures a long service life for the belts. Tighten the V-belts according to the belt drive instructions.

The coupling manufacturer's instructions are to be followed concerning the installation precision of couplings.

Check the direction of rotation before installing the belts or attaching the coupling. The direction of rotation is indicated by the arrow on the screen.

Installing pipes and valves

Pipes must be installed so that no air accumulates in the screen, and the necessary bleed valves must be installed at the appropriate locations. The pipes must be firmly fixed to the building frame, and the screen must not be used for supporting the pipes. Sampling valves must be installed on the feed, accept, and reject pipes.

For draining the screen, there must be a drain connection on the reject pipe. If accept pipes go upward, they must be equipped with a drain connection as well.

If there is a deaeration or light reject connection on the cover, it is most likely connected with a hose to a pipe with a control valve. When installing the hose, note that you must be able to detach it when the screen requires servicing.

High-pressure fresh water is connected to the seal water piping. The delivery includes a rotameter with a control valve. The appropriate seal water flow rate is 3-5 L/min. The seal water piping must be made so that no particles can become detached from inside the piping that might damage the slip ring seal. Also note the seal manufacturer's requirements concerning the cleanness of the seal water.

Installation inspection

Finally, an installation inspection is to be performed. This should pay special attention to the operational safety of the equipment. All guards must be properly attached so that they cannot be removed without using tools. All electrical work must be checked by a qualified electrician.

3 SEPARATE INSTRUCTIONS

3.1 Belt Drive

3.2 Taper Lock

3.3 Mechanical Seal (SAF-180-TREN-304595)

3.4 Bearing Control Sensors (Wilcoxon)

3.5 Flowmeter (Safematic)

Belt drive

Installation

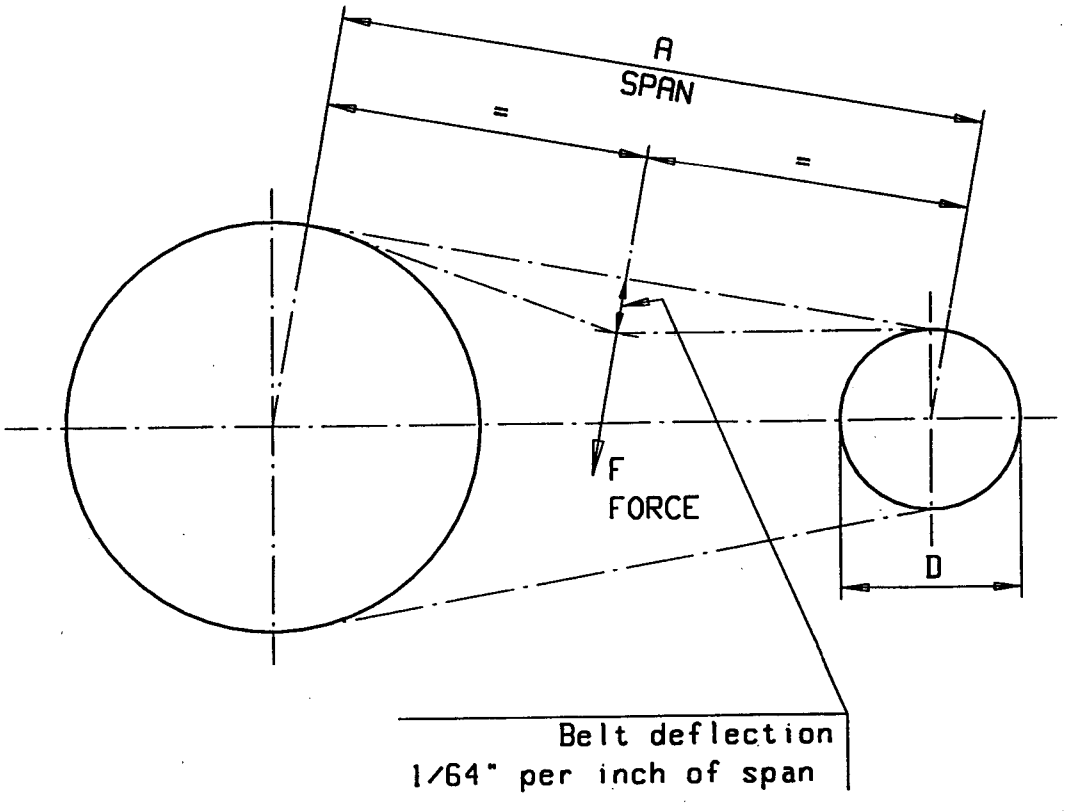
1. Clean the pulley grooves, removing oil and grease.
2. Shorten the center distance so you can get the pulleys in the grooves without applying force.
3. Ensure that the belt grooves are aligned. The deviation must not be greater than 0.002 A (A = center distance).
4. You can check this from the head flanges of the pulleys with a ruler, taking into account the distance of the belt groove from the end.
5. Ensure that the shafts are aligned.
6. Insert the belts into the grooves and tighten them. Use a group V-belt in a series arrangement.

Usage and maintenance

Tightening the belts:

1. Press the slack to the same side of the drive and tighten the belts.
2. Rotate the drive by hand for a few cycles so that the belts settle in the grooves and the tension evens out.
3. Check the tightness of the belts as follows:
4. Measure the center distance.
5. Push the V-belt in the middle of the center distance using a measuring instrument pressed perpendicularly to the belt.
6. The deflection of the belt must equal the center distance in meters x 16 mm. For the thrust value, see the table below.
7. Check the tightness for one belt at a time.
8. Tighten a new drive to the highest value in the table.
9. The first re-tightening should be done after approximately 1 hour of operation.
10. The second re-tightening should be done after approximately 3 hours of operation.
11. The third re-tightening should be done after 3 days; after this, tightness should be checked every three months.

BELT SEC-TION	SMALL SHEAVE		BELT DEFLECTION FORCE	
	RPM RANGE	OUTSIDE DIAM.	Min.	Max.
3 V	1000 THRU 3000	2,6 THRU 3,5	3,7	5,6
		3,65 THRU 6,0	5,1	7,5
		6,2 THRU 10,0	5,5	8,4
	ABOVE 3000 THRU 5000	2,6 THRU 3,5	3,3	5,0
		3,65 THRU 6,0	4,4	6,6
5 V	600 THRU 1700	7,0 THRU 8,5	11,2	16,8
		8,6 THRU 12,0	13,3	19,9
		12,5 THRU 16,0	14,3	21,5
	ABOVE 1700 THRU 2250	7,0 THRU 8,5	10,6	15,9
		8,6 THRU 12,0	12,8	19,3
8 V	300 THRU 1000	12,5 THRU 14,5	27,7	41,8
		15,0 THRU 21,0	33,0	49,7
		21,2 THRU 25,0	35,5	53,4
	ABOVE 1000 THRU 1700	12,5 THRU 14,5	25,8	38,5
		15,0 THRU 21,0	29,7	45,1

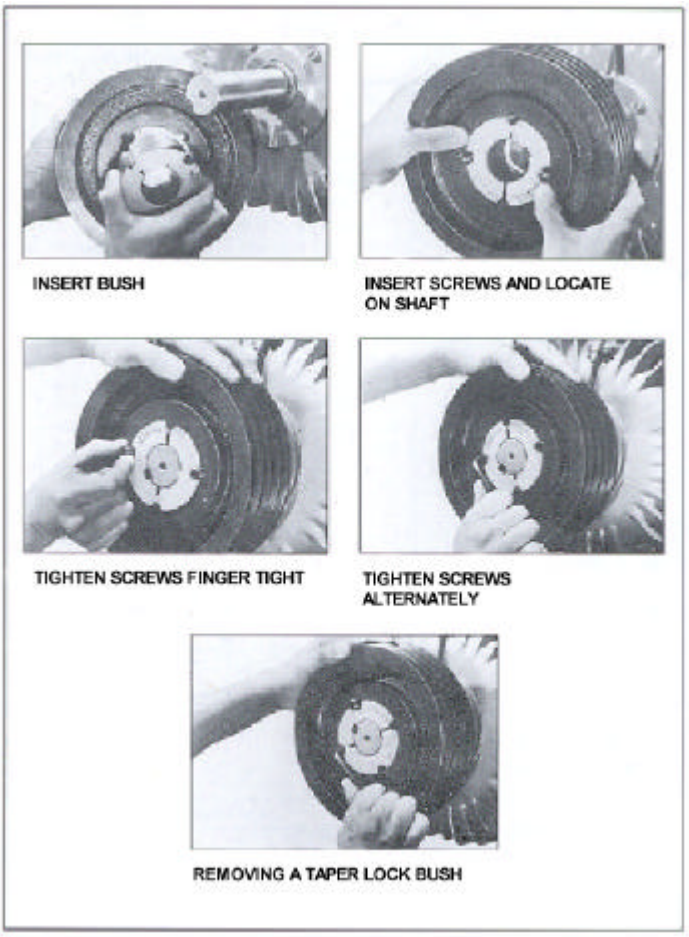


482849
Vrt. 482651

Taper Lock® Installation Instructions

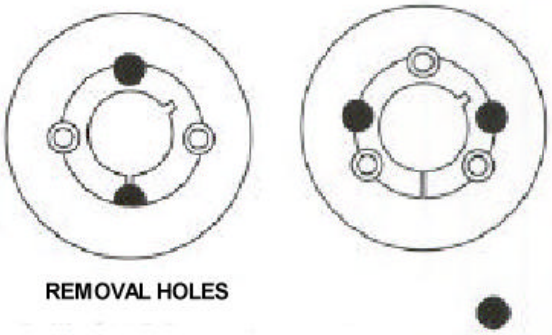
TO INSTALL

1. **Remove the protective coating from the bore and outside of bush, and bore of hub. After ensuring that the mating tapered surfaces are completely clean and free from oil or dirt, insert bush in hub so that holes line up.**
2. **Sparingly oil thread and point of grub screws, or thread and under head of cap screws. Place screws loosely in holes threaded in hub, shown thus○ in diagram.**
3. **Clean shaft and fit hub to shaft as one unit and locate in position desired, remembering that bush will nip the shaft first and then hub will be slightly drawn on to the brush.**
4. **Using a hexagon wrench tighten screws gradually and alternately to torque shown in table below.**
5. **Hammer against large-end of bush, using a block or sleeve to prevent damage. (This will ensure that the bush is seated squarely in the bore.) Screws will now turn a little more. Repeat this alternate hammering and screw tightening once or twice to achieve maximum grip on the shaft.**
6. **If a key is to be fitted place it in the shaft key way before fitting the bush. It is essential that it is a parallel key and side fitting only and has TOP CLEARANCE.**
7. **After drive has been running under load for a short time stop and check tightness of screws.**
8. **Fill empty holes with grease to exclude dirt.**



TO REMOVE

1. **Slacken all screws by several turns , remove one or two according to number of removal holes shown thus？ in diagram. Insert screws into removal holes after oiling thread and under head of cap screws.**
2. **Tighten screws alternately until bush is loosened in hub and assembly is free on the shaft.**
3. **Remove assembly from shaft.**



Bush size		1008	1108	1210	1610	1615	2012	2517	3020	3030	3525	3535	4030	4040	4535	4545	5040	5050
Screw tightening torque (Nm)		5.6	5.6	20	20	20	30	50	90	90	115	115	170	170	190	190	270	270
Screw details	qty	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3
	size (BSW)	¼"	¼"	3/8"	3/8"	3/8"	7/16"	½"	5/8"	5/8"	½"	½"	5/8"	5/8"	¾"	¾"	7/8"	7/8"
	Hex. socket size (mm)	3	3	5	5	5	6	6	8	8	10	10	12	12	14	14	14	14
Large end dia. (mm)		35.0	38.0	47.5	57.0	57.0	70.0	85.5	108.0	108.0	127.0	127.0	146.0	146.0	162.0	162.0	177.5	177.5
Approx. Mass (kg)		0.1	0.1	0.2	0.3	0.5	0.7	1.5	2.7	3.6	3.8	5.0	5.6	7.7	7.5	10.0	11.1	14.0

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INSTALLATION AND OPERATION INSTRUCTIONS

No. 20000056EN
Date 7.4.1993
Revision No. 1
Date 29.5.1998

SAF-180-TREN-302589
SAF-180-TREN-304595

PRESSURE SCREEN TL 900, VALMET

MAX. OPERATION CIRCUMSTANCES

T_{max} = 180 °C (350 °F)
p_{max} = 10 bar (145 psi)
n_{max} = 500 l/min

SEAL MATERIALS AND SPECIAL CHARACTERISTICS

The materials of the seal are listed on the attached assembly drawings. The identification code is etched on the seal.

INSTALLATION OF THE SEAL

Points to be observed in installation

Care and cleanness have to be observed during installation. The parts must not be force fitted as they are designed to require hand fitting only. Touching of sliding faces should be avoided. If this is not avoidable, the faces should be cleaned with a cleaning solvent and a soft cloth prior to pressing the sliding faces together.

Lubricate the visible O-rings and connecting parts of the seal and pump. Remove sharp edges from all shoulders, over which the seal parts have to be pushed. Note! Only inert lubricant with oxygen can be used e.g. Klüber Barrierta L 55/2 grease.

Prior to the istallation check the seal delivery for any damage during the transportation. Follw the installation instructions of the equipment.

Installation

1. The seal is of cartridge type and shall be installed as a package.
2. Lubricate the shaft of the pressure screen and the O-rings with silicon grease or liquid soap. NOTE! Do not use mineral base lubricants particularly for EPDM O-rings as they will be severely damaged.
3. Slide the seal package onto the screen shaft. Tighten the seal with four screws (M10).
4. Tighten the set screws (part 18, 4 pcs) evenly onto the shaft.
5. Remove the allen screws (part 20, 3 pcs) and the assembly locks (part 19, 3 pcs). NOTE! The assembly locks are also needed when removing the seal.

Removing Mount the assembly locks. Loosen the set screws and detach the seal.

OPERATION, USE AND SERVICE OF THE SEAL

Operation The SE2-seal is a double-acting mechanical seal. It requires seal water for operation. The sliding faces get their lubrication from seal water.

Use NOTICE! The seal should not be run without seal water. Regulate the seal water flow to 1-3 l/min (0,26-0,75 gal/min). If the seal requires more cooling increase the flow. Outcoming seal water temperature should not exceed +60 ^{O}C (140 ^{o}F). Regulate the seal water pressure 1 bar (14,5 psi) higher than the product pressure to be sealed.

Requirements for seal water quality:

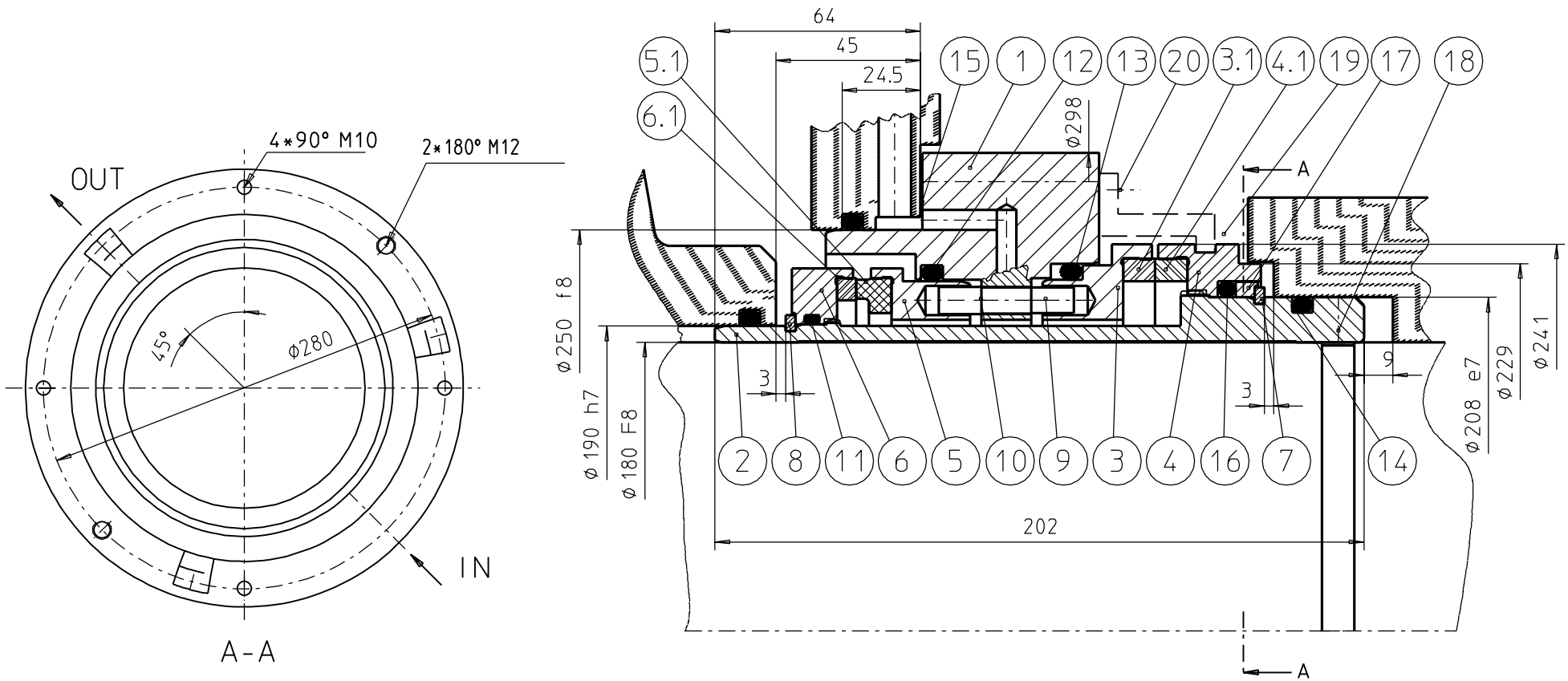
- Solid particles max 10 mg/l
- Particle size max 50 µm
- Permanganate max 30 mg/l
- Amount of iron max 1 mg/l
- Total hardness max 10 ^{O}dH

For sealing water control we recommend the use of Safematic Safeunit control unit.

Safematic Safeseals are designed and manufactured to operate safely if used properly. These operation and installation instructions are general requiremants for the operation of a mechanical seal. General safety and mill regulations should also be followed. Possible danger caused by eventual seal damage should also be taken account.

Service When service or repair is required please contact the manufacturer of the seal or his representative.

ENCL. Assembly drawing

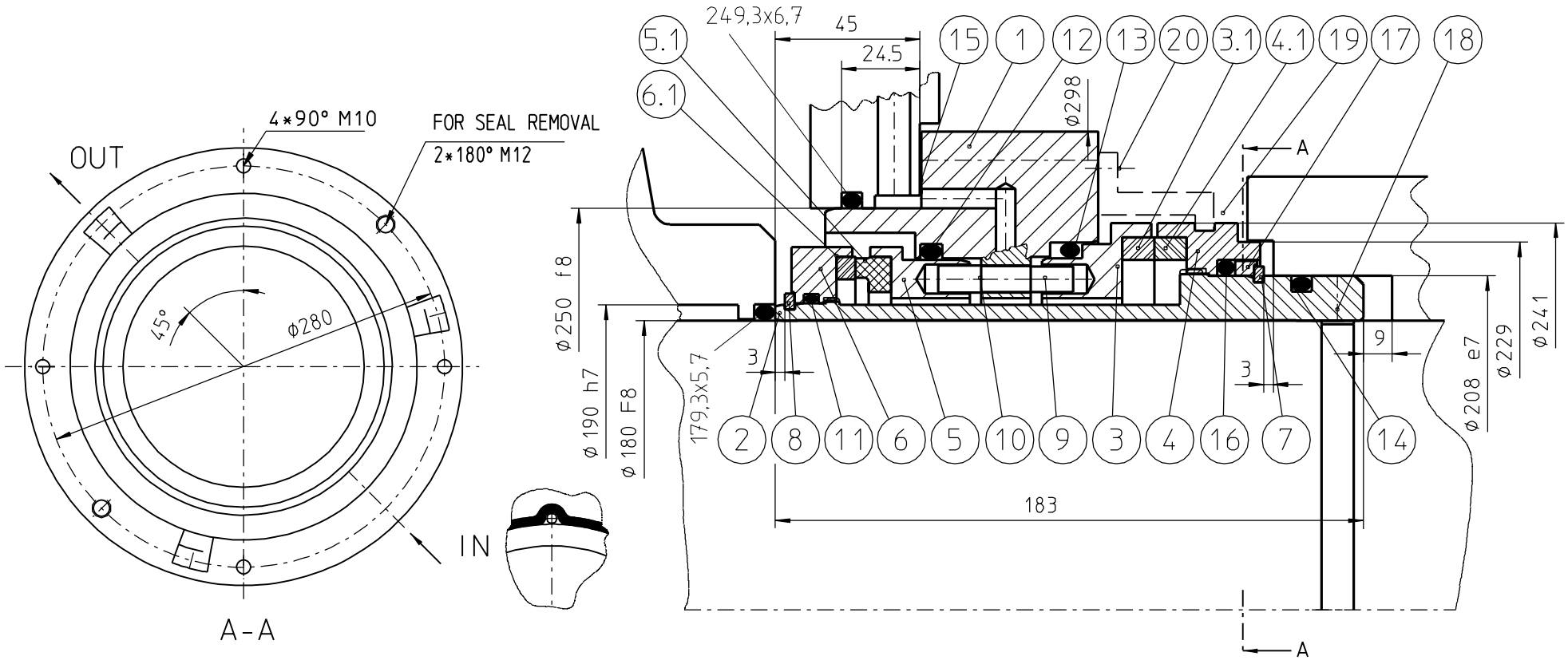


21	MOUNTING INSTRUCTION	20000056		1	06	SEAT RING	402904	AISI329	1
20	ALLEN SCREW	21661990	AISI316 M6*12	3	05.1	FACE	-2649.37	CARBON	1
19	ASSEMBLY LOCK	401812	ALUMINIUM	3	05	SEALING RING	402903	AISI329	1
18	SET SCREW	21661820	AISI316 M8*12	4	04.1	FACE	-6742.62	TUNGSTEN CARBIDE	1
17	BACK-UP RING	402905	AISI329	1	04	SEAT RING	402902	AISI329	1
16	O-RING	21683330	EPDM	1	03.1	FACE	-6742.62	TUNGSTEN CARBIDE	1
15	GASKET	21791610	GORE-TEX	1	03	SEALING RING	402901	AISI329	1
14	O-RING	21683320	EPDM	1	02	SHAFT SLEEVE	302649	AISI329	1
13	O-RING	21683350	EPDM	1	01	SEAL BODY	302648	AISI316	1
12	O-RING	21683350	EPDM	1					
11	O-RING	21682440	EPDM	1					
10	SPRING	21770420	AISI316	18					
09	DRIVE PIN	401975	AISI316	2					
08	RETAINING RING	-6121.51	AISI329	1					
07	RETAINING RING	-6121.52	AISI329	1					
06.1	FACE	-6742.63	TUNGSTEN CARBIDE	1					

OSA NO	NIMITYS		PIIR NO	LAATU	MITAT.MALLI	MÄÄRÄ / OSA
				AINES	(MASSA KG)	KPL
			OSAN ERITTELY			

SUUNN.	ESv	PIIRT.	TARK.	SAFESEAL 21002229 SAF-180-TREN- 302589 PAINELAJITIN TL900	KORVAA / KORVATTU
					PVM 25.02.1993
					SUHDE / PIIR.NO 302589X

SAFEMATIC
MUURAME - FINLAND



21	MOUNTING INSTRUCTION	20000056			1	06	SEAT RING	402904	AISI329		1
20	ALLEN SCREW	21661990	AISI316	M6x12	3	05.1	FACE	2649.37	CARBON		1
19	ASSEMBLY LOCK	401812	ALUMINIUM		3	05	SEALING RING	402903	AISI329		1
18	SET SCREW	21661820	AISI316	M8x12	4	04.1	FACE	6742.62	KM		1
17	BACK-UP RING	402905	AISI329		1	04	SEAT RING	402902	AISI329		1
16	O-RING	21683330	EPDM		1	03.1	FACE	6742.62	KM		1
15	SAFESEALANT	21791610	PTFE	5	1	03	SEALING RING	402901	AISI329		1
14	O-RING	21683320	EPDM	D189.3x5.7	1	02	SHAFT SLEEVE	304597	AISI329		1
13	O-RING	21683350	EPDM		1	01	SEAL BODY	302648	AISI316		1
12	O-RING	21683350	EPDM		1						
11	O-RING	21682440	EPDM		1						
10	SPRING	21770420	AISI316		18						
09	DRIVE PIN	401975	AISI316		2						
08	RETAINING RING	6121.51	AISI329		1						
07	RETAINING RING	6121.52	AISI329		1						
06.1	FACE	6742.63	KM		1						

ITEM	DESCRIPTION	DETAIL DRAW	MATERIAL	DIMENSIONS.TYPES	QTY/ITEM	PCS
			MATERIAL DESCRIPTION		(WEIGHT KG)	
			SPECIFICATION OF ITEM			

DESIGNED	DRAWN	CHECKED
ROS	ROS	

SAFEMATIC
MUURAME - FINLAND

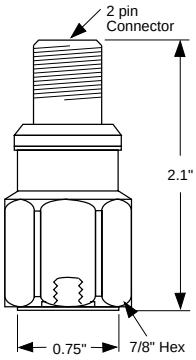
21002234
SAF-180-TREN-304595
VALMET TL900

PREVIOUS DRG	NEW DRG
DATE 14.10.1997	
SCALE	DRAWING NUMBER 304595X REV.

w i l c o x o n

Model 786A
General Purpose Accelerometer

FEATURES:
- Rugged design
- Corrosion resistant
- Hermetic seal
- Case isolated
- ESD protection
- Reverse wiring protection



DYNAMIC

Sensitivity, ±5%, 25°C		100 mV/g
Acceleration Range		80 g peak
Amplitude Nonlinearity		1%
Frequency Response:		
± 5%		3 - 5,000 Hz
±10%		1 - 9,000 Hz
± 3 dB		0.5 - 14,000 Hz
Resonance Frequency		30 kHz
Transverse Sensitivity, max		5% of axial
Temperature Response		–50°C –5% +120°C +5%

ELECTRICAL

Power Requirement:	voltage source	18 - 30 VDC
	current regulating diode	2 - 10 mA
Electrical Noise, equiv. g:		
Broadband	2.5 Hz to 25 kHz	700 µg
Spectral	10 Hz	10 µg/√Hz
	100 Hz	5 µg/√Hz
	1000 Hz	5 µg/√Hz
Output Impedance, max.		100 Ω
Bias Output Voltage		12 VDC
Grounding		case isolated, internally shielded

ENVIRONMENTAL

Temperature Range	–50 to 120°C
Vibration Limit	500 g peak
Shock Limit	5,000 g peak
Electromagnetic Sensitivity, equiv. g, max	70 µg/gauss
Sealing	Hermetic
Base Strain Sensitivity, max.	0.0002 g/µstrain

PHYSICAL

Sensing Element Design	PZT ceramic / shear
Weight	90 grams
Case Material	316L stainless steel
Mounting	1/4 - 28 UNF tapped hole
Output Connector	2 pin, MIL-C-5015 style
Mating Connector	R6 type
Recommended Cabling	J10 / J9T2A

CONNECTOR PIN	FUNCTION
SHELL	ground
A	power/ signal
B	common

ACCESSORIES SUPPLIED: SF6 mounting stud (International customers specify mounting requirements); Calibration data (level 2).

WILCOXON RESEARCH
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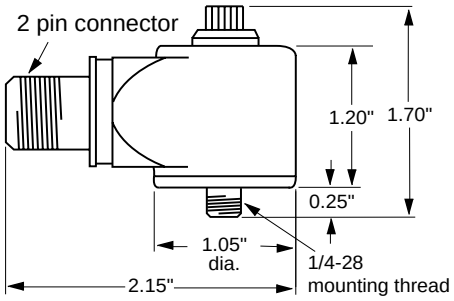
w i l c o x o n

Model 797

Low Profile, Industrial IsoRing® Accelerometer

FEATURES:

- Rugged, general purpose
- Corrosion resistant
- Hermetic seal
- Ground isolated
- ESD protection
- Miswiring protection
- Intrinsic safety certified options



SPECIFICATIONS

DYNAMIC		
Sensitivity, ±5%, 25°C		100 mV/g
Acceleration Range[1]		50 g peak
Amplitude Nonlinearity		1%
Frequency Response:		
±5%		3 - 5,000 Hz
±10%.		2 - 7,000 Hz
±3 dB		1 - 12,000 Hz
Resonance Frequency		26 kHz
Transverse Sensitivity, max		5 % of axial
Temperature Response		see graph
ELECTRICAL		
Power Requirement: voltage source		18 - 30 VDC
current regulating diode[1,2]		2 - 10 mA
Electrical Noise, equiv. g, nominal:		
Broadband	2.5 Hz to 25 kHz	600 µg
Spectral	10 Hz	8 µg/√Hz
	100 Hz	5 µg/√Hz
	1000 Hz	5 µg/√Hz
Output Impedance, max.		100 Ω
Bias Output Voltage, nominal		12 VDC
Grounding		case isolated, internally shielded
ENVIRONMENTAL		
Temperature Range		–50 to 120°C
Vibration Limit		500 g peak
Shock Limit		5,000 g peak
Electromagnetic Sensitivity, equiv. g		30 µg/gauss
Base Strain Sensitivity		0.002 g/µstrain
PHYSICAL		
Weight		135 grams
Case Material		316L stainless steel
Mounting		1/4-28 screw
Output Connector		MIL-C-5015, 2 pin
Pin A		signal, power
Pin B		common
Cabling: Mating connector		Wilcoxon Research R6 (Amphenol 97-3106A-10SL-4S)
Recommended Cable		J9T2, two conductor shielded, Tefzel jacket, 30 pF/ft

NOTES:

[1] To minimize the possibility of signal distortion when driving long cables with high vibration signals, 24 to 30 VDC powering is recommended. The higher level constant current source should be used when driving long cables (please consult Wilcoxon Customer Service).

[2] A maximum current of 6 mA is recommended for operating temperatures in excess of 100 °C.

OPTIONS: Intrinsic Safety certifications; stainless steel flexible hose; customer specified sensitivity, filtering, cable length

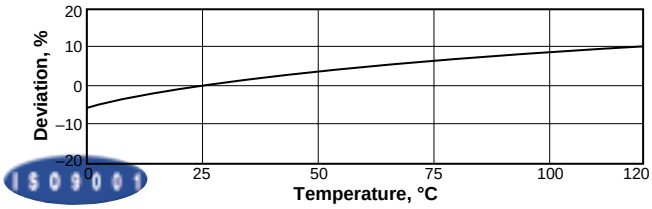
ACCESSORIES SUPPLIED: 1/4 - 28 screw, calibration data

ACCESSORIES AVAILABLE: R6SL-J9T2-XX splash-proof cable assembly, magnetic mounting bases, SF8-2 cementing stud, power supplies, amplifiers,signal conditioners

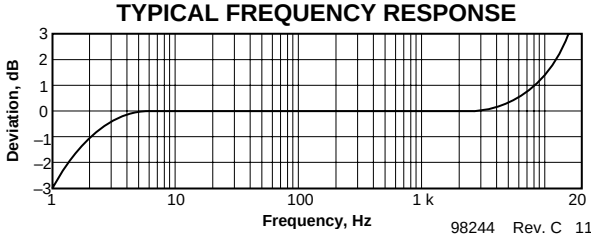
FM APPROVED

Optional Safety Approvals

TYPICAL TEMPERATURE RESPONSE



TYPICAL FREQUENCY RESPONSE



ISO 9001

98244 Rev. C 11/97

Due to continued research and development, Wilcoxon Research reserves the right to amend this specification without notice.

WILCOXON RESEARCH

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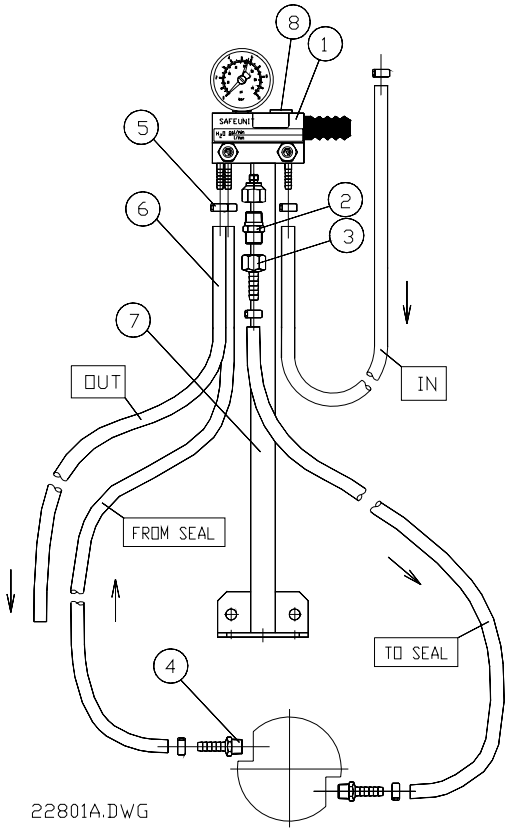
INSTALLATION AND OPERATION INSTRUCTIONS

No. 20000228EN
Date 1.6.1998
Revision No. 1
Date 24.6.1999

SAFEUNIT MONITORING AND CONTROL SYSTEM FOR SEAL WATER TYPE SFD COMPLETE FOR DOUBLE SEALS

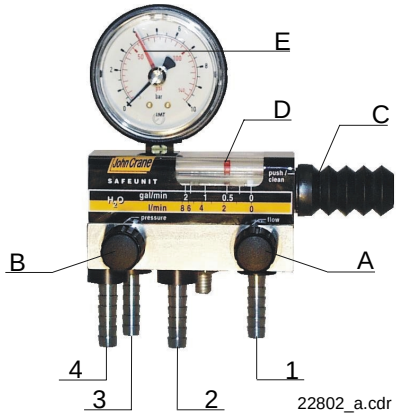


BILL OF MATERIAL

1. Flowmeter	1 pc
2. Back valve	1 pc
3. Hose coupling	1 pc
4. Hose coupling	2 pcs
5. Hose clamp	7 pcs
6. Hose 3/8”	4 pcs
7. Stand	1 pc (option)
8. Alarm device	1 pc (option)*

* Alarm device type: AC-1, DC-1 or EX-1 (*see separate instructions: 20000224, 20000225 or 20000246*).

OPERATION INSTRUCTIONS OF SAFEUNIT FLOWMETER



Type SFD

- Lead water to the flowmeter
- Open both valves (A and B) fully open.
- Use the regulating valve (A) to adjust the desired flow.
- Use the regulating valve (B) to adjust the desired pressure (altough the flow decreases).
- Calibrate flow and pressure by turning both valves (add and reduce) to reach desired values.
- Adjust the red indicator (D) of the flowmeter and the red arrow (E) of the pressure gauge to show the desired values. This allows you to control changes in flow and pressure. These changes indicate the condition of the seal.

Water connections

1. Water in
2. To seal
3. From seal
4. Out

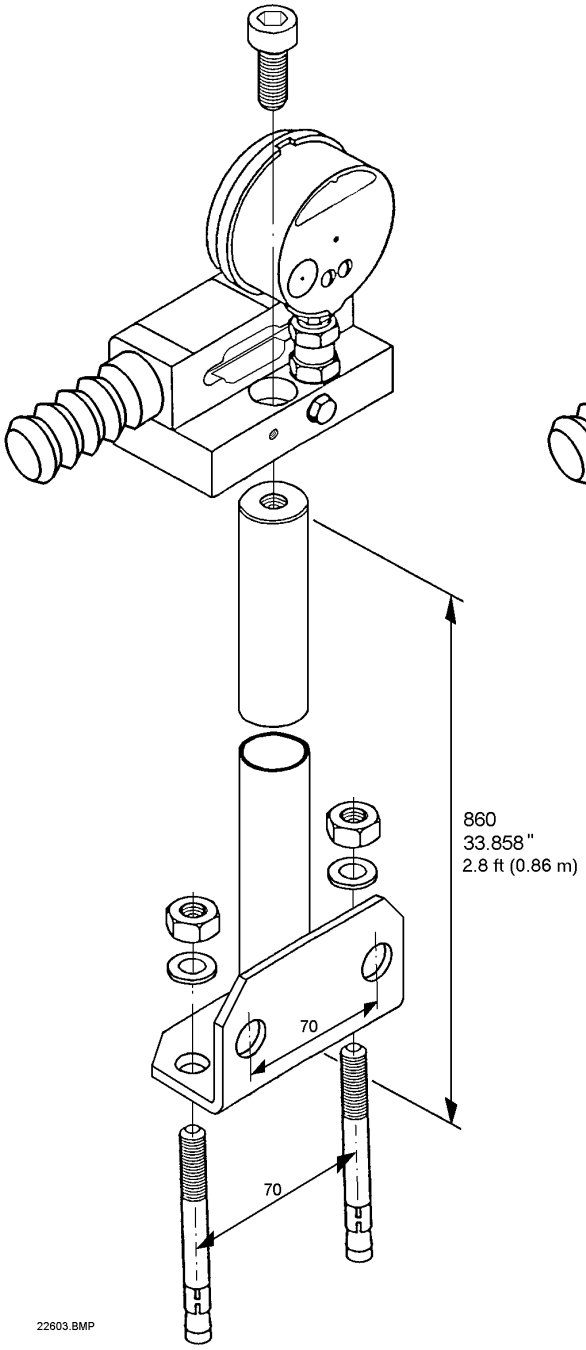
Cleaning

1. Press the button (C) on the right side of the unit. This does not affect the pressure or the flow of the sealing water.
2. The display surface is now cleaned by the float.
3. Repeat until full readability is reached.
4. When the alarm is connected, pushing the cleaning button won't cause an extra alarm.

Flow			**Pressure**
3 = 0 - 3	l/min	(0 - 0,75 GPM)	10 = max 10 bar, 145 psi
8 = 0 - 8	l/min	(0 - 2 GPM)	25 = max 25 bar, 360 psi
15 = 0 - 15	l/min	(0 - 4 GPM)	

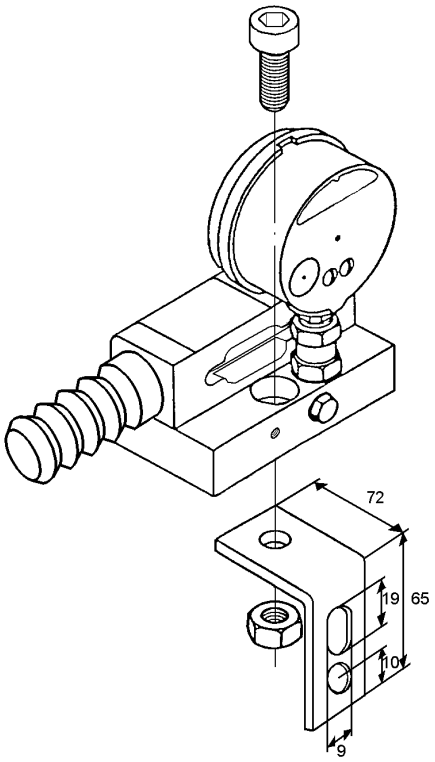
INSTALLATION OF SAFEUNIT

Install the Safeunit to a place where it is accessable for reading and testing according to drawings 1 or 2.



Drawing 1

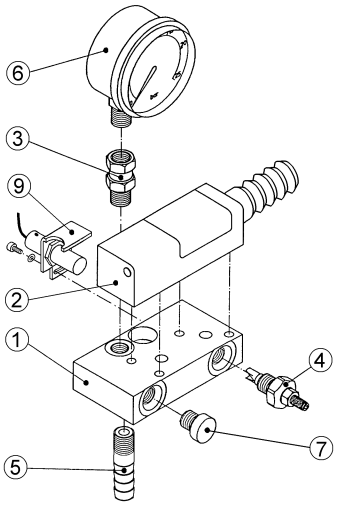
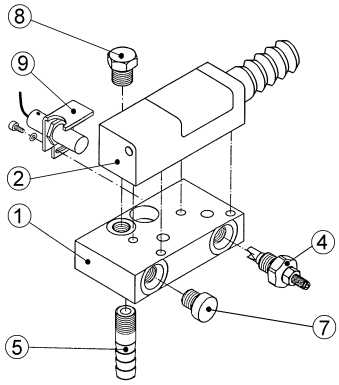
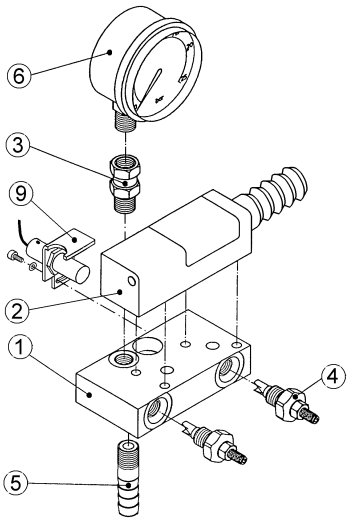
Safeunit installation to stand 404317.



Drawing 2

Safeunit installation to any other stand.

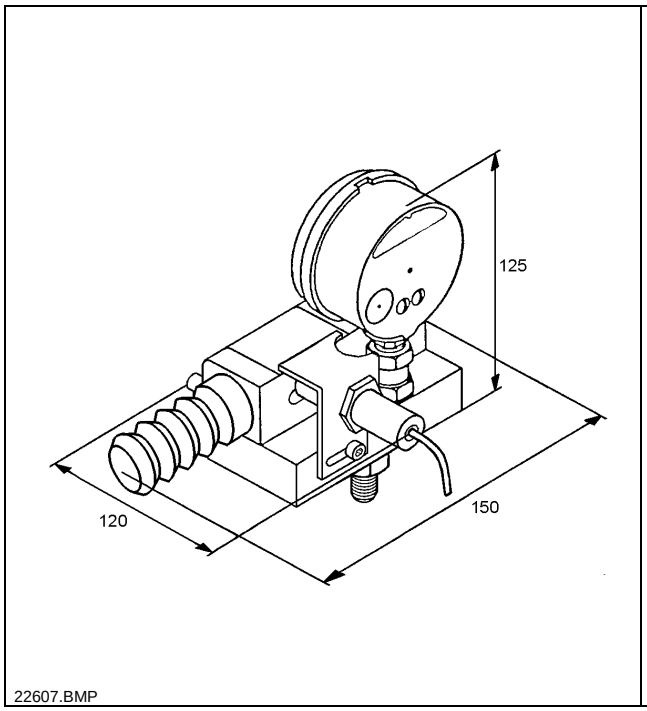
SAFEUNIT SEALWATER MONITORING AND CONTROL SYSTEM SPARE PARTS

Type SFP	Type SFQ	Type SFD
 22604.BMP	 22605.BMP	 22606.BMP

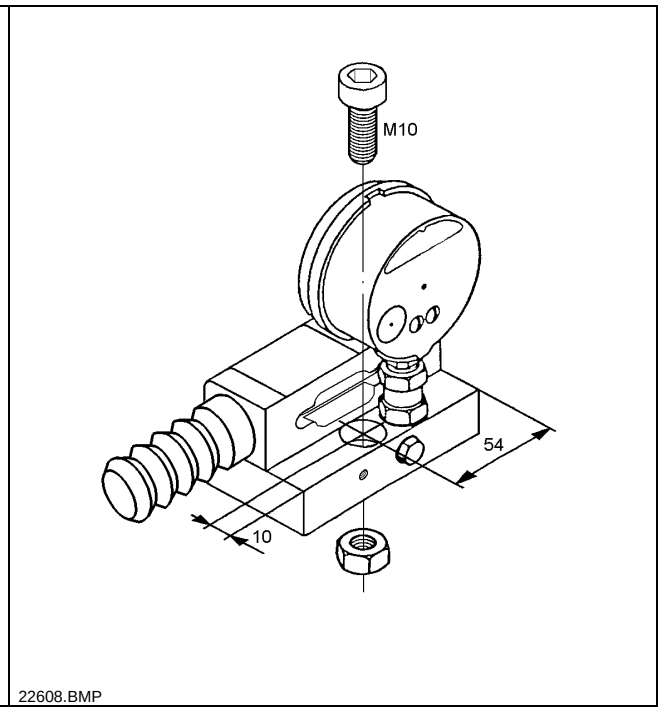
ITEM	Type SFP	Type SFQ	Type SFD
1. BASE PLATE			
R-thread	22771370	22771370	22771370
NPT-thread	22771350	22771350	22771350
2. ACRYL PART			
3 l/min	22400050	22400050	22400050
8 l/min	22400100	22400100	22400100
15 l/min	22400150	22400150	22400150
3. PRESSURE GAUGE COUPLING	22640850		22640850
4. REGULATING VALVE	22400200 (1 pc)	22400200 (1 pc)	22400200 (2 pcs)
5. HOSE COUPLING	22640400 (2 pcs)	22640400 (2 pcs)	22640400 (4 pcs)
6. PRESSURE GAUGE			
0-10 bar	22600050		22600050
0-10 bar (AISI 316)	22600100		22600100
0-25 bar	22600150		22600150
0-25 bar (AISI 316)	22600200		22600200
7. PLUG FOR REGULATING VALVE	22770030 (1 pc)	22770030 (1 pc)	
8. PLUG FOR PRESSURE GAUGE		22661350	
9. ALARM			
AC-1	22770511	22770511	22770511
DC-1	22770515	22770515	22770515

DIMENSIONS

Flowmeter, model 3, 8 and 15 l/min



22607.BMP



22608.BMP

John Crane Safematic®
Safematic Oy
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40951 MUURAME
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Tel +358 14 600 611
Fax +358 14 600 600

INSTALLATION AND OPERATION INSTRUCTIONS

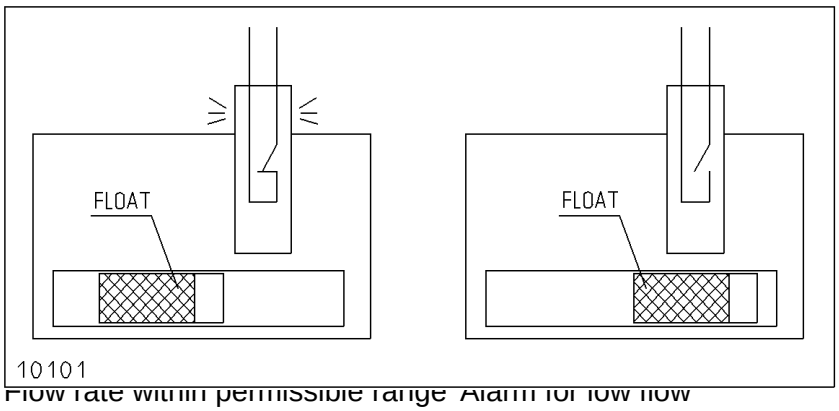
No. 20000224EN
Date 1.6.1998
Revision no.
Date

SEAL WATER MONITORING UNIT FOR TYPES SFP, SFQ AND SFD

Inductive alarm unit for low flow, AC-1 Suitable for AC- and DC-service

ALARM FUNCTION

The alarm signal is issued by an opening contact. The normally closed contact opens when the flow rate falls below a preset lower limit.



Flow rate within permissible range Alarm for low flow

INDICATOR FUNCTION

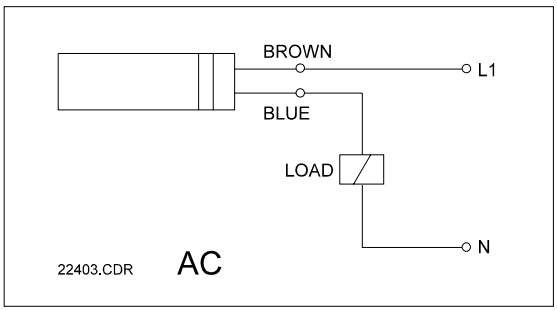
LED light on. Flow rate within permissible range.
LED light off. Low flow alarm activated.

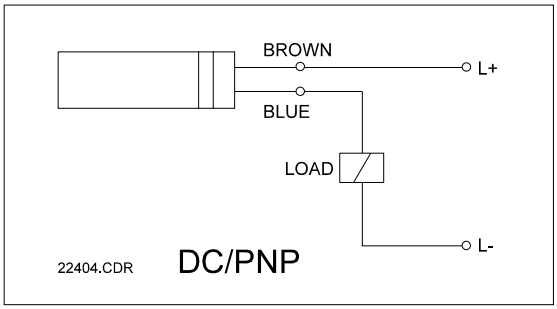
ADJUSTMENT RANGE OF THE ALARM UNIT

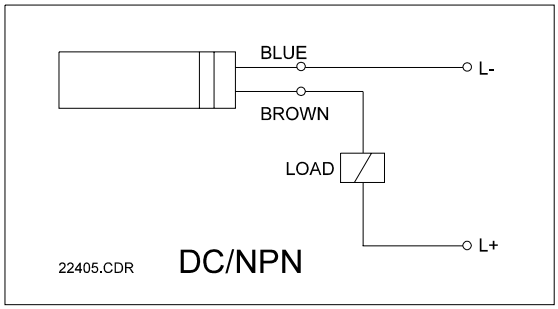
- Model 3: 0,5 - 2,0 l/min (0,1 - 0,5 GPM)
- Model 8: 1,0 - 3,0 l/min (0,25 - 0,75 GPM)
- Model 15: 6,0 - 12,0 l/min (1,5 - 3,0 GPM)

ELECTRICAL CONNECTION OF INDUCTIVE ALARM

Supply voltage: 20 ... 250 VAC/DC, 45 ... 65 Hz for AC
Load current: I min. = 5 mA, I max. = 350 mA AC/100 mA DC
Leakage current: Less than 2,5 mA/250 VAC; 0,8 mA/24 VDC
Switch contact: Normally-closed (N/C) when the alarm is not activated
Protection class: NEMA 4, IP 67







ADJUSTMENT OF THE ALARM UNIT

1. Set the flow to the desired lower limit by the flowmeter.
2. Loosen the locking screw and attach the alarm in to the body and move the alarm horizontally to the position in which the alarm is activated. The alarm is at the minimum value of the adjustment range when the alarm is in the leftmost position as viewed from the rear of the alarm unit which is, e.g., 1 l/min (0,25 GPM) for Model 8. To increase the setting toward its max. value which is, e.g., 3 l/min (0,75 GPM) for Model 8, move the alarm to the right.
3. Tighten the lock screw of the alarm.
4. Check the correct function of the alarm unit by the LED indicator. The LED should turn off at the alarm point and stay off when the flow rate is reduced to zero. The LED should stay on only when the flow is within the permissible range of flow rate.
5. Finally adjust the seal water flow rate to desired value with the help of the flowmeter.

NOTE! Unnecessary alarms may also be caused by the occational pressure fluctuations in the sealing water line. Such erroneous alarms can be inhibited by, e.g, programming a delay in the logic control system or using a delay unit with an independent power supply.

The delay can be programmed as follows:

Fluctuation in the flow -> delay 20 seconds -> alarm -> delay 5 minutes -> shut down of the equipment.

9 SERVICE AND SPARE PARTS

If you need our Customer service or spare parts, please contact

Metso Paper Oy

Service, Valkeakoski

P.O. Box 125

37601 Valkeakoski

Finland

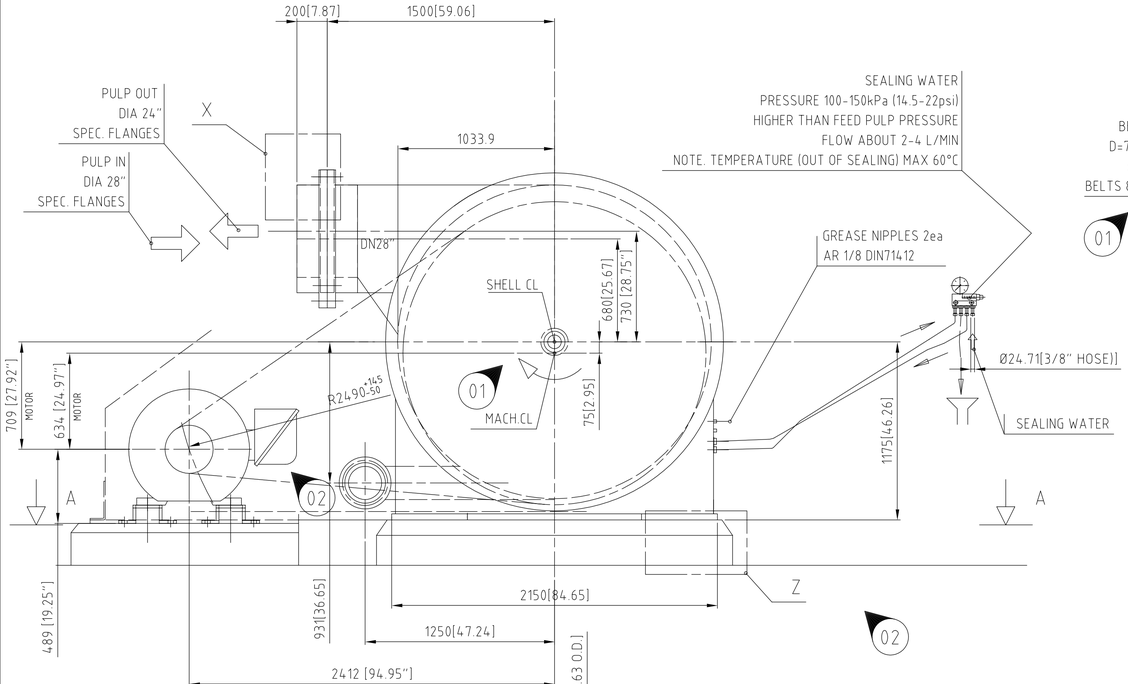
tel. int'l +358 20 482 170

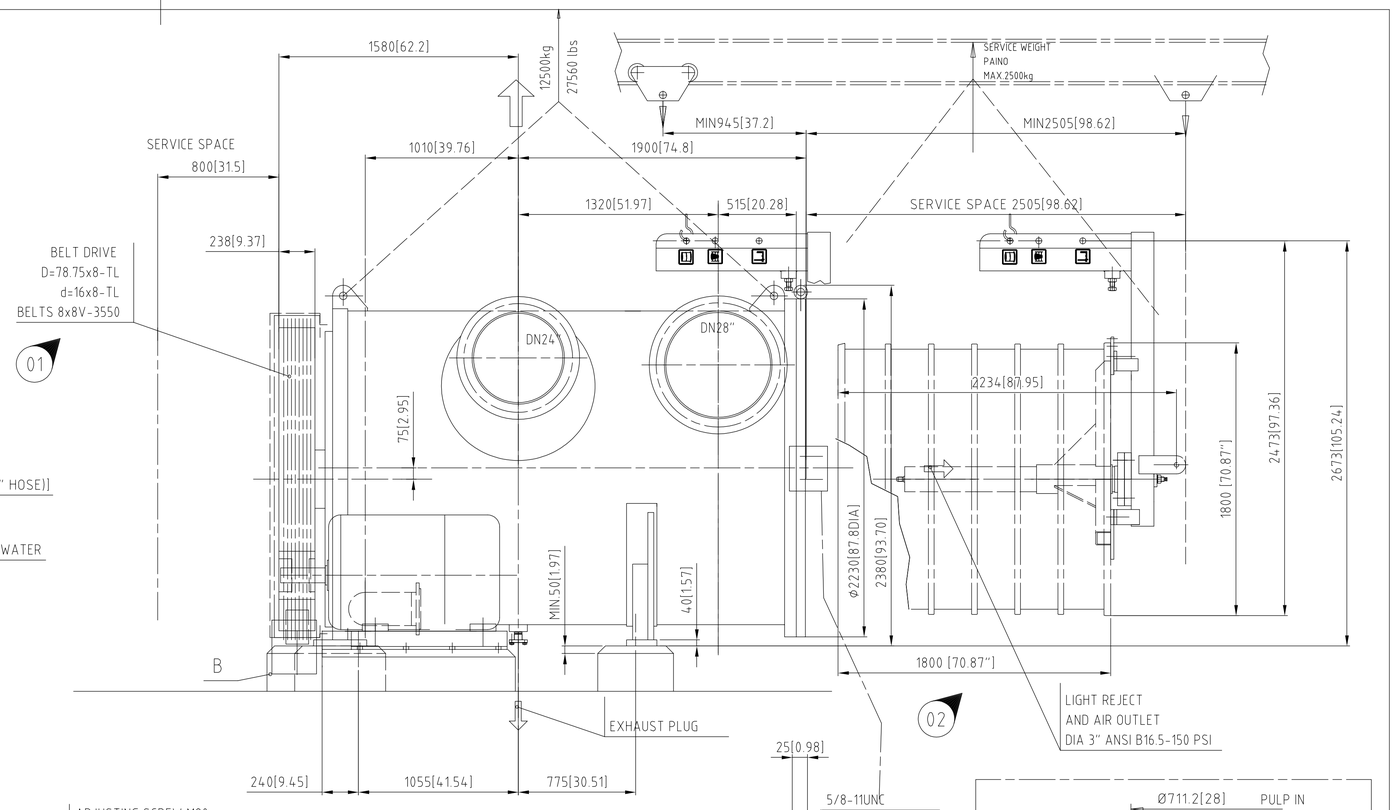
fax int'l +358 20 482 171

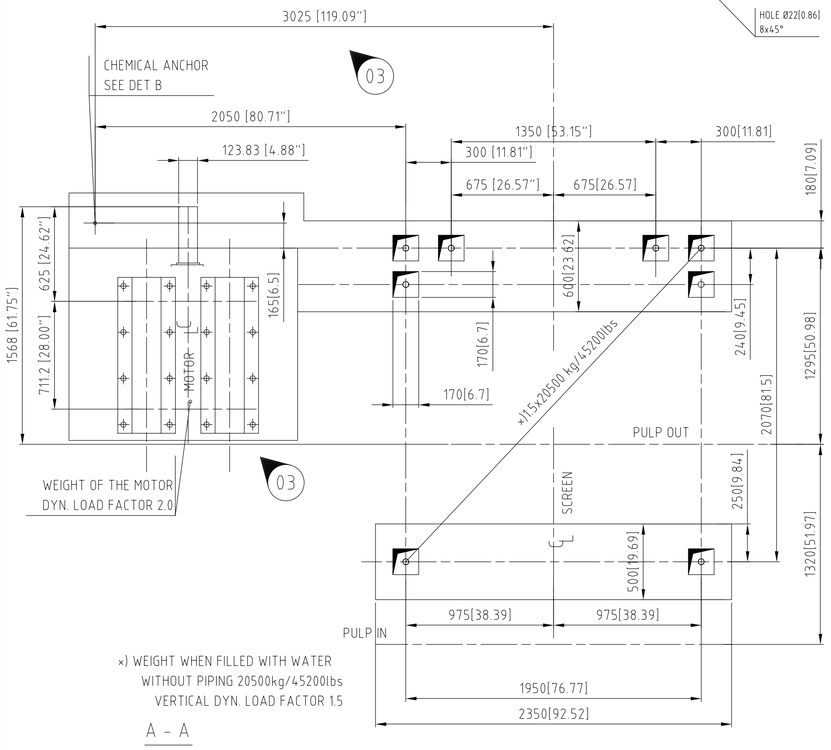
www.metso.com

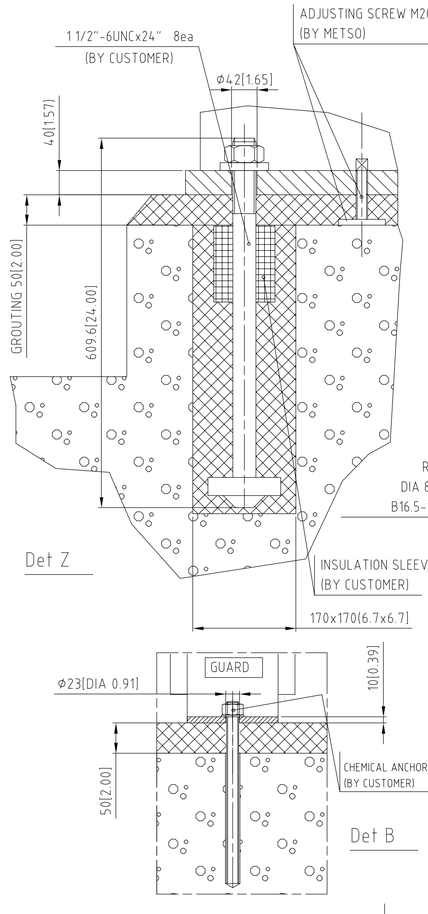
10 DRAWINGS

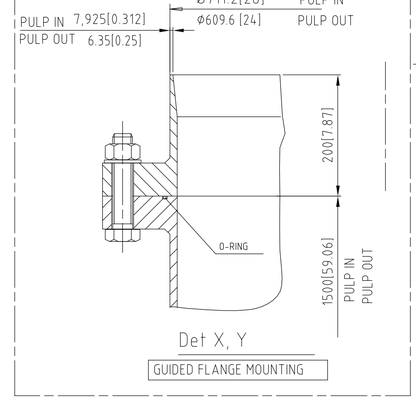
Title	Drawing No.
Assembly	STOD018924
Customer assembly	STOD018922-01
Rotor	STOD016557A-01
Shaft bearing	STO1012990-01
Sealing box	STO3025588-01
Sealing water piping	STO2001037-01
Bearing control sensors	STO3010041-01
Lifting tool	STO1013365-01











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CERTIFIED

Signature SDVJUER

Date 10.09.2003

INTERNATIONAL PAPER
BUCKSPORT MILL
NO.4 PM

PURCHASE ORDER S063004207

PART	DESCRIPTION	DIMENSIONS	MATERIAL	DRAWING/IDENTIFICATION NO	QTY

GENERAL TOLERANCES:
DIMENSIONS WITHOUT INDIVIDUAL TOLERANCE INDICATIONS:
MACHINING ISO 2768-MK (SFS-EN 22768-1, SFS-EN 22768-2)
WELDING ISO 13920-BE (SFS-EN ISO 13920)
CASTING ISO 8062-CT 11 (SFS-ISO 8062)
WELDING QUALITY LEVEL C (SFS-EN 25817, ISO 5817)
FLAME CUTTING ISO 9013-1AH (SFS-EN ISO 9013)

EN / FI

metso paper | PROJECTION ISO | SCALE 1:20 | WEIGHT kg

NO. 4 PM
BUCKSPORT, ME
PRIMARY SCREEN
DIMENSIONAL LAYOUT

PRODUCT OPTISCREEN MS-900
DESD SDVJUER DATE 030819
CHKD SDVJUER DATE 030819
APPD SDVJUER DATE 030819

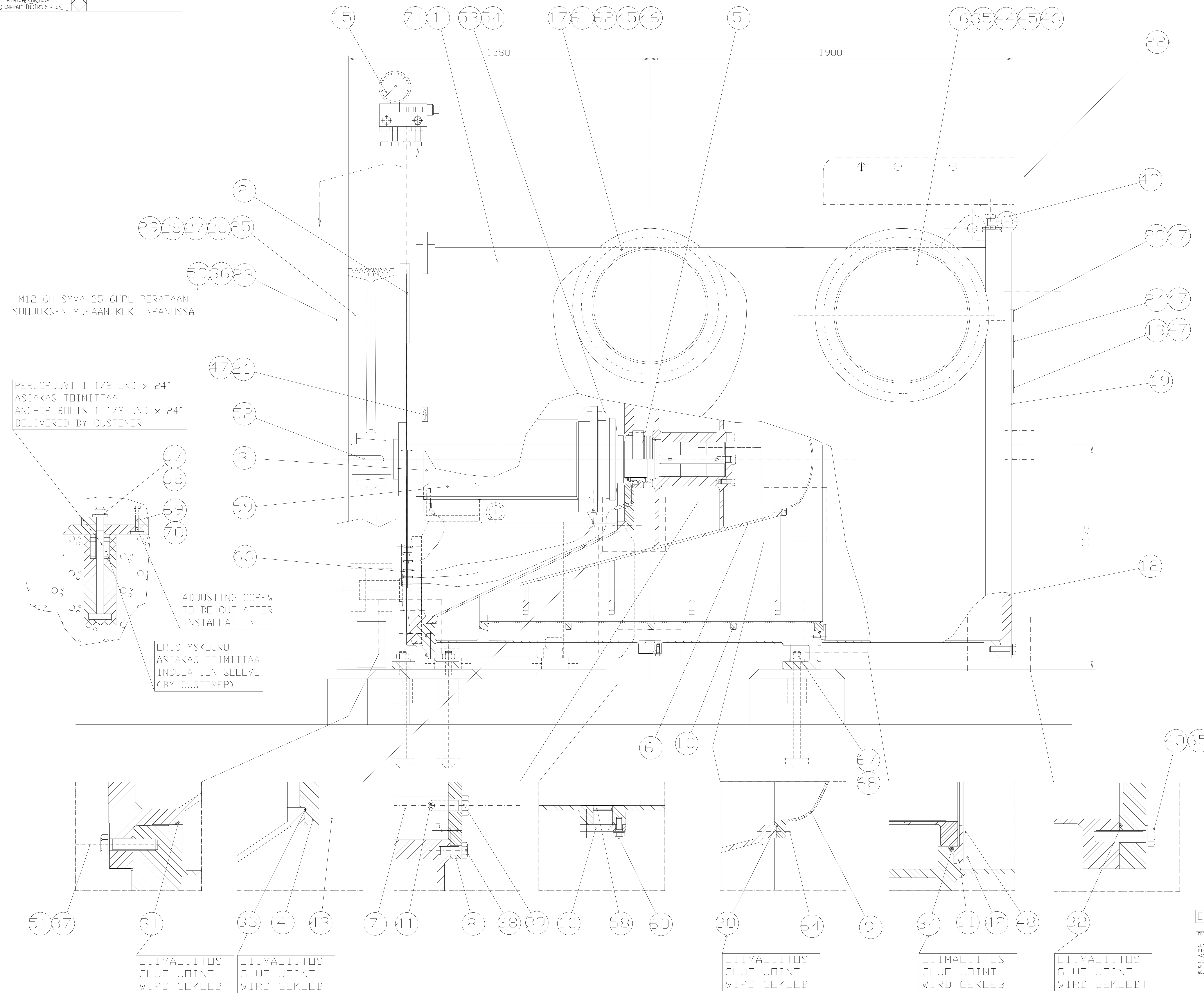
CUSTOMER ASSEMBLY ASIAKASKOKOONPANO
ASSEMBLY DRAWING

REF. STOD014057 | SUPERS. | A1 | DRAWING ID STOD018924 . 03 | SHEET 1/1
WORK | FILE STOD018924 | AutoCAD

DATE	NAME	CHKD	REVISION	CHS/KEY

DO NOT PAINT	
~~PAINT ACCORDING TO GENERAL INSTRUCTIONS~~	

PART NO	NAME, DIMENSIONS AND QUALITY OF MATERIAL OR GOODS	CODE	AMOUNT/PCS	UNIT	WEIGHT KG/EA	PCS/TIME



-PUTKIYHTEIDEN KOOT JA SUUNNAT ASENNUS- JA PERUSTUSPIIRUSTUKSEN STOD018924 MUKAAN.

-PIPE DIRECTIONS AND SIZES ON DWG. STOD018924

INTERNATIONAL PAPER
BUCKSPORT MILL
NO. 4 PM
PRIMARY SCREEN
P. O. S063004207

Erikson puh. 29403

DEPT	SUBPIC.	MF NUMBER	PATTERN	PCS 1	ASS'Y DWG
GENERAL TOLERANCES. DIMENSIONS WITHOUT INDIVIDUAL TOLERANCE INDICATIONS: MACHINING: ISO 2768-MK (SFS-EN 22768-1, SFS-EN 22768-2) CASTING: ISO 8062-CT 11 (SFS-ISO 8062) WELDING: DIN 8570-BE (DIN 8570 T1, DIN 8570 T3) WELDING QUALITY LEVEL C (SFS-EN 25817, ISO 5817)	BUCKSPORT / EN				
metso paper	PROJECTION	SCALE 1: 10	WEIGHT / kg 12500	ALSO FOR:	
PRODUCT MS-900HT PRESSUR SCREEN			DESD JER	DATE 2003-09-09	
ASSEMBLY OptiScreen MS-900HT			CHKD JER	DATE 2003-09-09	
			APPD JER	DATE 2003-09-09	
REF. STOD012787	SUPERS.	A1	DRAWING ID STOD018922.	REV. 00	SHEET
WORK 63913020	FILE	VERTEX			

DATE	NAME	CHKD BY	REVISION	CHANGES	KEY

BILL OF MATERIAL

METSO PAPER

LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A T
1	STOD018922				ASSEMBLY PRESSURE SCREEN MS-900HT I-P BUCKSPORT		R
2					TYPE MS-900HT STOD018922-01 SERIAL NO. 63913020 MANUF.YEAR 2003		
3					SFS-EN ISO 12944-5/S4.13 (EPPUR 240/3), FeSa 2.5 MACHINE : IP SAFETY GREEN *FEDERAL #14260 SHIELDS: RAL1021		
4					ASSEMBLY AND INSTALLATION DWG. STOD018924		
5					NOTE! -PUT THE MECHANICAL SEAL'S TRANSPORT LOCKINGS IN THE PLASTIC BAG , WHICH IS FASTENED TO THE SCREEN.		
10	STOD018930-01	1	1	PCS	FRAME DN28"/24"/8"		1
20	STOD015774-01	2	1	PCS	BOTTOM CONE 6BAR		1
30	STO1012990-01	3	1	PCS	SHAFT BEARING SYSTEM		1
40	VT-258 510	4	1	PCS	SEALING BASE 2-ACTION		2
50	STO3025588-01	5	1	PCS	SEALING BOX SAF-180 TREN-304595		1

BILL OF MATERIAL
METSO PAPER

LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A T
60	STOD016557A-01	6	1	PCS	ROTOR (AC) GAP 3,5 +1,0/-0,5		1
70	VT-445 346	7	1	PCS	KEY St60K		2
80	STO4011034	8	1	PCS	FASTENING FLANGE		2
90	STO3011935	9	1	PCS	COVER FOR ROTOR		2
100	STOM000548EE	10	1	PCS	SCREEN BASKET MF0929 #0.25, A=7.94%, HB		R
110	VT-3M01335	11	1	PCS	FASTENING RING SS2343-02		2
120	STOD014060-01	12	1	PCS	COVER (US) 75PSI		1
130	STO4011030	13	1	PCS	PLUG SS2343-02		2
150	STO2001037-01	15	1	PCS	GREASE AND SEALING WATER PIPING		1
160		16	1	PCS	GUIDED FLANGE DN28" DWG STOD018933 IN PART 1		
170		17	1	PCS	GUIDED FLANGE DN24" DWG STOD018934 IN PART 1		

BILL OF MATERIAL
METSO PAPER

LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A	T
180	STOD011081	18	1	PCS	NAME PLATE OPTISCREEN 250x128 mm			R
190	STO4010763	19	1	PCS	WARNING SIGN, SCREEN ANGLOPHONE			2
200	STOD010121	20	1	PCS	MANUFACTURER'S PLATE DETAIL DRAWING			2
210	VT-420 164	21	1	PCS	DIRECTION ARROW SS2343			2
220	STO1013365-01	22	1	PCS	LIFTING TOOLS (C-ROTOR, 5BAR)			1
230	STOD002180	23	1	PCS	BELT COVER TLA900H			2
240	STOD010124-03	24	1	PCS	LOGOTYPE PLATE DETAIL DRAWING			1
250	7263 510	25	1	PCS	V-GROOVED PULLEY DODGE TL8/8V78,75 FOR ADAPTER SLEEVE 7060			4
260	9909 030	26	1	PCS	ADAPTER SLEEVE 7060 SH=160			4

LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A	T
270	VAL0165491	27	1	PCS	V-BELT SHEAVE DODGE 8/8V16.0-4545 Bore for bush 4545			4
280	7252 710	28	1	PCS	ADAPTER SLEEVE 4545 SH=4,875"			4
290	VAL0165490	29	8	PCS	V-BELT DODGE 8V3550			4
300	5401 680	30	1.7	M	O-RING STRING			4
			1	PCS	L= 1655 W= MM 5,7MM NBR/NITRILE 70 SH			
310	5401 680	31	5.4	M	O-RING STRING			4
			1	PCS	L= 5390 W= MM 5,7MM NBR/NITRILE 70 SH			
320	5401 680	32	6.6	M	O-RING STRING			4
			1	PCS	L= 6505 W= MM 5,7MM NBR/NITRILE 70 SH			
330	5401 680	33	2.1	M	O-RING STRING			4
			1	PCS	L= 2082 W= MM 5,7MM NBR/NITRILE 70 SH			
340	6169 309	34	5.8	M	O-RING STRING			4
			1	PCS	L= 5702 W= MM 15MM NBR/NITRILE 70 SH			

LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A	T
350		35	1	PCS	O-RING 3,0 NITRILE (4712710) L=2243 IN PART 1			
360	VAL0100161	36	8	PCS	SCREW,HEX ISO4017 M12x30-8.8-tZn	4		
370	VAL0001320	37	50	PCS	HEXAGON HEAD SCREW ISO4014 M24x90-8.8-tZn with tZn type finish acc. to DIN 267 part 10	4		
380	VAL0108943	38	6	PCS	SCREW,HEX ISO4017 M24x60-8.8-tZn	4		
390	VAL0109073	39	1	PCS	SCREW,HEX ISO4017 M30x80-8.8-tZn	4		
400	7093 807	40	58	PCS	HEXAGON HEAD SCREW ANSI B18.2.1 1" UNC X 5" 8.8 FE/ZN 45	4		
410	3931 743	41	2	PCS	HEX SOCKET HEAD CAP SCREW ISO 4762 M12 X 30 8.8 FE/ZN 8 C1	4		
420	4964 135	42	10	PCS	HEX SOCKET HEAD CAP SCREW ISO 4762 M16 X 50 A4-80	4		

LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A T
430	4964 111	43	6	PCS	HEX SOCKET HEAD CAP SCREW ISO 4762 M16 X 40 A4-80	4	
440		44	24	PCS	HEX. HEAD SKREW 1 1/8 UNC x 152 8.8 FE/ZN 45 IN PART 1 (5638556)		
450		45	44	PCS	HEXAGON NUT 1 1/8 FE/ZN 45 (8622710) IN PART 1		
460		46	44	PCS	WASHER 1 1/8" A4 (4624781) IN PART 1		
470	7074 668	47	18	PCS	SCREW SMS 1549 KDS NR 6X6 D=3,5 A4	4	
480	9783 555	48	10	PCS	SET SCREW ISO 4029 M10 X 16 A4	4	
490	VAL0018177	49	1	PCS	LIFTING EYE BOLT DIN580 M24 STC15	4	
500	VAL0167754	50	8	PCS	WASHER ISO7089 12-A200-A4	4	
510	5410 358	51	50	PCS	WASHER ISO 7089 24-A 200 A4	4	

LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A T
520	3890 891	52	0.2 1	M PCS	KEY SECTIONS L= 150 W= MM SS 212190 40 X 22		4
530	VAL0100298	53	6	PCS	SCREW,HEX ISO4014 M24x80-8.8-tZn		4
540	5410 358	54	6	PCS	WASHER ISO 7089 24-A 200 A4		4
560	VAL0144523	56	2	PCS	STUD SMS1948 1UNCx90-8.8- tZn		4
570	3929 030	57	2	PCS	NUT SMS 1989 U6M 1 UNC 8 FE/ZN 45		4
580	VAL0074755	58	1	PCS	O-RING METRIC 44,2x3 NBR		4
590		59	1	PCS	MOTOR 200hp/720RPM FROM CUSTOMER		
600	3927 953	60	4	PCS	HEXAGON BOLT ISO 4017 M16 X 40 8.8 FE/ZN 8 C1		4

BILL OF MATERIAL
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LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A	T
610		61	1	PCS	O-RING 3,0 NITRILE (4712710) L=1906 IN PART 1			
620		62	20	PCS	HEX. HEAD SKREW 1 1/8 UNC x 127 8.8 FE/ZN 45 IN PART 1 (5638556)			
640	4964 025	64	10	PCS	HEX SOCKET HEAD CAP SCREW ISO 4762 M12 X 30 A4-80	4		
650	7050 747	65	60	PCS	WASHER ISO 7089 26-A 200 A4 DIM. NOT STANDARD	4		
660	STO3010041-01	66	1	PCS	BEARING CONTROL SENSORS WILCOXON	1		
670	4635 983	67	8	PCS	NUT SMS 1989 U6M 1 1/2 UNC 8 FE/ZN 45	4		
680	VT-412 028/3	68	8	PCS	WASHER 40 ZINK	2		
690	VAL0100164	69	4	PCS	HEXAGON SCREW ISO4017 M20x120-8.8- tZn	4		
700	VT-D717500	71	4	PCS	WASHER	2		

BILL OF MATERIAL
METSO PAPER

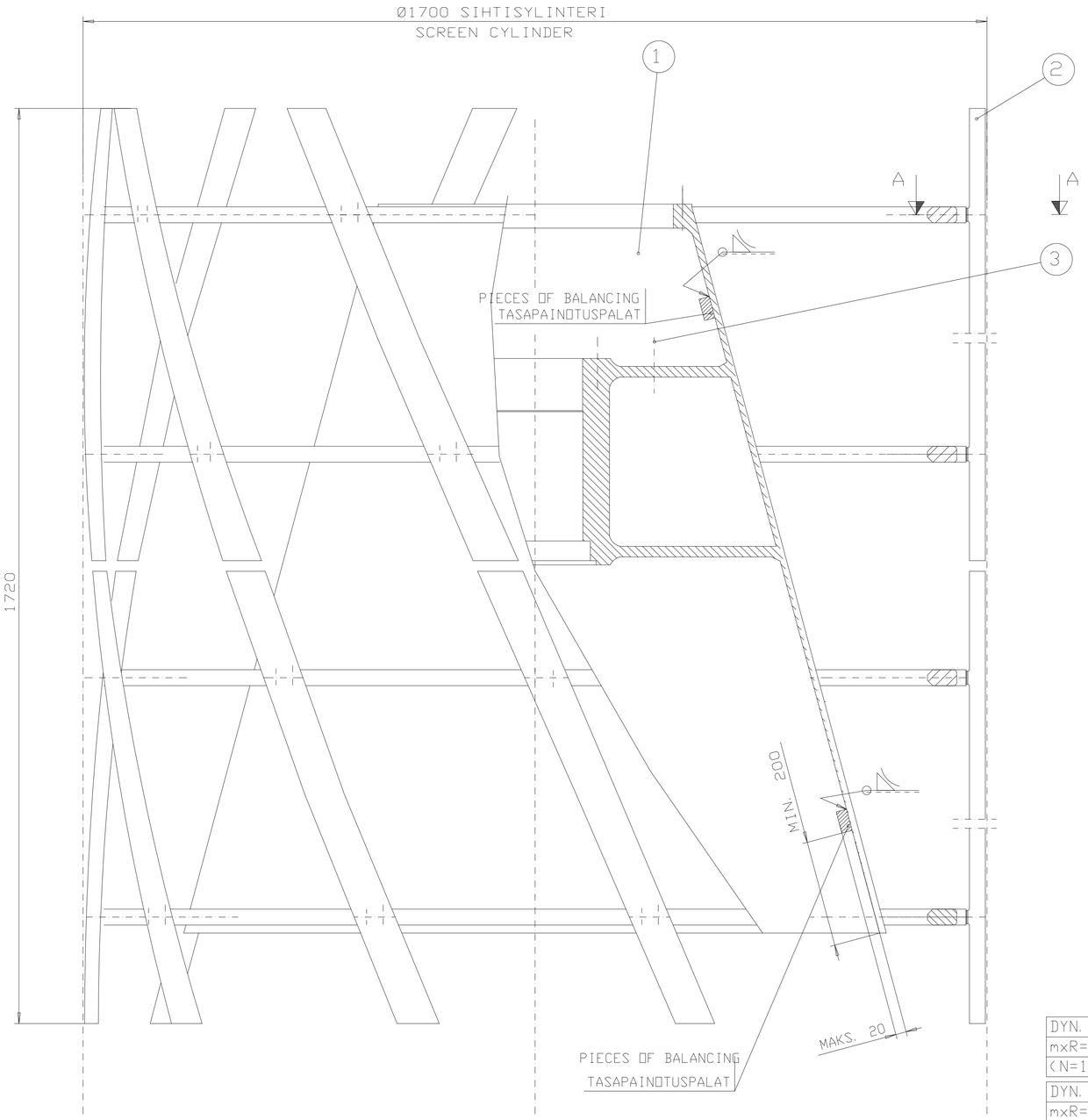
LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A	T
710	STOD013103-01	71	1	PCS	POLISHING VALUES			R
790					SPARE PARTS			
800	9-999 0134-01	80	1	PCS	SPARE PARTS IP-BUCKSPORT PM4 6391300701			1

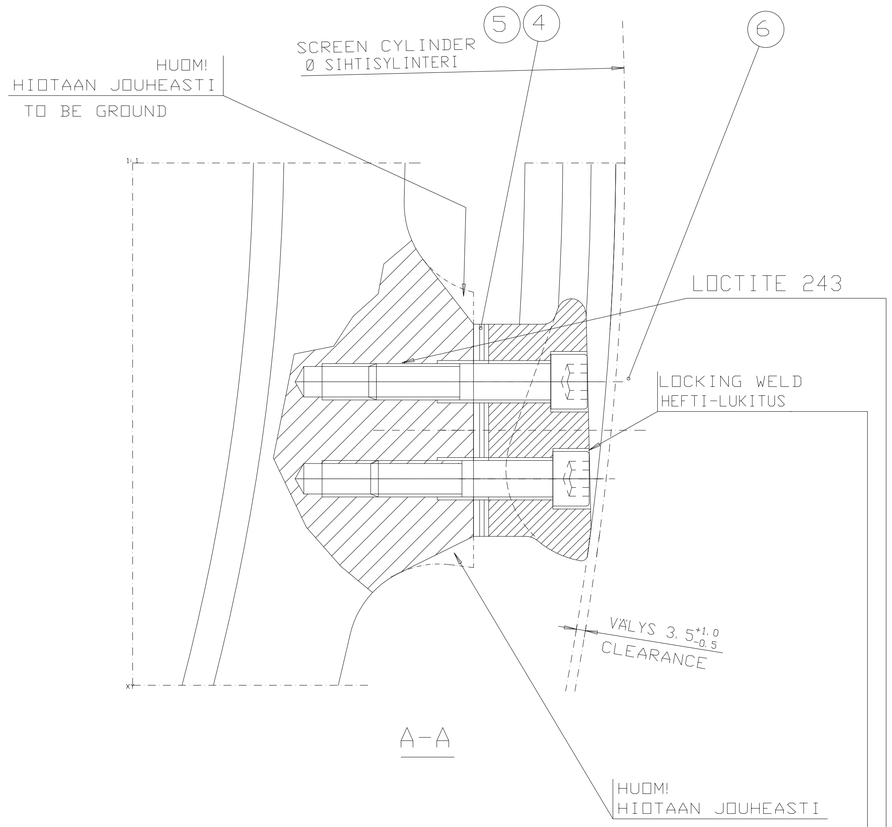
REV - APPROVED SDVHASI 030918
REV A APPROVED SDVTELA 031017
REV B APPROVED SDVHASI 031024

END OF STRUCTURES

DO NOT PAINT		
PAINT ACCORDING TO GENERAL INSTRUCTIONS		

PART NO	NAME, DIMENSIONS AND QUALITY OF MATERIAL OR GOODS	CODE	AMOUNT/PCS	UNIT	WEIGHT KG/EA	PCS/ TIME





A–A

DYN. TASAPAINOTUS:
mxR=150gx846mm=126900 gmm
(N=140 1/min)

DYN. BALANCING:
mxR=150gx846mm=126900 gmm
(N=140 1/min)

TUNNISTE CODE	KUVAUS DESCRIPTION
STOD016557A-01	NORMAALIFOILIT NORMAL FOILS
STOD016557B-02	KROMATUT FOILIT FOILS WITH CHROME

DEPT	SUBPIC	MF NUMBER	PATTERN	PCS	ASS'Y DWG
6110					

GENERAL TOLERANCES:
DIMENSIONS WITHOUT INDIVIDUAL TOLERANCE INDICATIONS:
MACHINING: ISO 2768-MK (SFS-EN 22768-1, SFS-EN 22768-2)
CASTING: ISO 8062-CT 11 (SFS-ISO 8062)
WELDING: DIN 8570-BE (DIN 8570 T1, DIN 8570 T3)
WELDING QUALITY LEVEL C (SFS-EN 25817, ISO 5817)

ENFI

metso paper

PROJECTION	SCALE	WEIGHT / kg	ALSO FOR:
ISO	1:5	1280	MS-900

PRODUCT	DESD	DATE
OPTISCREEN	VMR	2003-05-07
ROOTTORI AC ROTOR AC	CHKD	DATE
	APPD	DATE

REF.	SUPERS.		DRAWING ID	REV.	SHEET
STO1012477		A1	STOD016557		
	WORK	FILE	VERTEX		

DATE	NAME	CHKD BY	REVISION	CHANGES	KEY

BILL OF MATERIAL

METSO PAPER

LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A T
1	STOD016557				ROTOR (AC) GAP 3,5 +1,0/-0,5		R
10	STOD016556-01	1	1	PCS	BODY ROTOR AC		1
20	STO1012457	2	20	PCS	FOIL AL		2
30	VAL0006790	3	2	PCS	PLUG ISO4144 ISO4144-3/4 T8 SS2343, R3/4		4
40	STO4010958	4	80	PCS	ADJUSTING PLATE 1.5 ROTOR		2
50	STO4010959	5	40	PCS	ADJUSTING PLATE 2.0 ROTOR		2
60	VAL0017980	6	80	PCS	HEX SOCKET HEAD CAP SCREW ISO4762 M12x60-A4-80		4

REV - APPROVED SDVHASI 031031

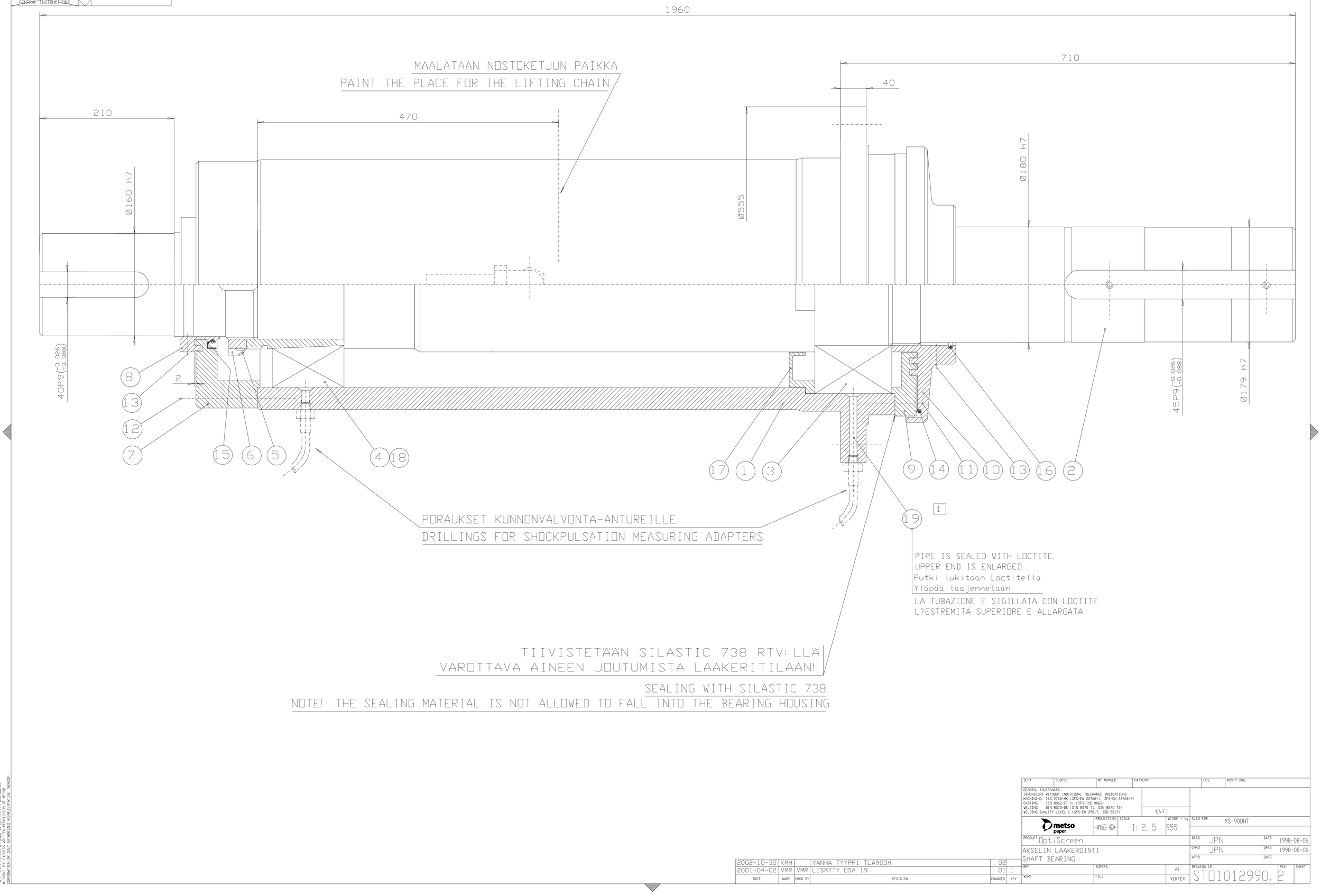
END OF STRUCTURES

WEIGHT/ PCS			
0.00	MS-900 METSO PAPER	ROTOR (AC) GAP 3,5 +1,0/-0,5	RESP : V HO MKO STP DEAL : SDVJUER CHECK: APPRO: SDVHASI 031031

DO NOT PAINT

PAINT ACCORDING TO GENERAL INSTRUCTIONS

PART NO	NAME, DIMENSIONS AND QUALITY OF MATERIAL OR GOODS	CODE	AMOUNT/PCS	UNIT	WEIGHT KG/EA	PCS/ TIME



DATE	NAME	CHKD BY	REVISION	CHANGES	KEY
2002-10-30	KMH		VANHA TYYPPI TLA900H	.02	
2001-04-02	VMR	VMR	LISÄTTY OSA 19	.01	1

DEPT	SUBPIC	MF NUMBER	PATTERN	PCS	ASS'Y DWG

GENERAL TOLERANCES
DIMENSIONS WITHOUT INDIVIDUAL TOLERANCE INDICATIONS:
MACHINING: ISO 2768-MK (SFS-EN 22768-1, SFS-EN 22768-2)
CASTING: ISO 8062-CT 11 (SFS-ISO 8062)
WELDING: DIN 8570-BE (DIN 8570 T1, DIN 8570 T3)
WELDING QUALITY LEVEL C (SFS-EN 25817, ISO 5817)

ENFI

metso paper

PROJECTION	SCALE	WEIGHT / kg	ALSO FOR
	1:2.5	955	MS-900HT

PRODUCT	DESD	DATE
OptiScreen	JPN	1998-08-06
AKSELIN LAAKEROINTI	CHKD JPN	1998-08-06
SHAFT BEARING	APPD	DATE

REF.	SUPERS.	A1	DRAWING ID	REV.	SHEET
WORK	FILE	VERTEX	STD1012990.2		

BILL OF MATERIAL
METSO PAPER

LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A T
1	STO1012990				SHAFT BEARING SYSTEM		R
10	STO1012987	1	1	PCS	BEARING PIPE		2
20	VT-133 083	2	1	PCS	SHAFT		2
30	8586 179	3	1	PCS	SPHERICAL ROLLER BEARING SKF 23238 CC/W33		4
40	6598 420	4	1	PCS	SPHERICAL ROLLER BEARING SKF 23236 CCK/W33		4
50	3024 430	5	1	PCS	LOCKWASHER ISO 2982 170 MB 34		4
60	3022 786	6	1	PCS	ROUND NUT ISO 2982 M170X3 KM 34		4
70	VT-445 160	7	1	PCS	COVER		2
80	VT-445 161	8	1	PCS	LABYRINTH RING		2
90	VT-445 162	9	1	PCS	COVER		2
100	VT-445 163	10	1	PCS	FLINGER RIN		2

WEIGHT/ PCS	MS-900V/H	SHAFT BEARING SYSTEM	RESP : V HO MKO STP	
955.00 KG	METSO PAPER		DEAL : SDVJUNI	PAGE 1 (3) REV: C
			CHECK: SDVVERA 010402	
			APPRO: SDVTELA 000117	NO: STO1012990-01

LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A T
110	3931 619	11	8	PCS	HEX SOCKET HEAD CAP SCREW ISO 4762 M10 X 40 8.8 FE/ZN 8 C1		4
120	3927 692	12	4	PCS	HEXAGON BOLT ISO 4014 M12 X 120 8.8 FE/ZN 8 C1		4
130	7081 510	13	6	PCS	SET SCREW DIN 916 M8 X 20 A4		4
140	7089 031	14	1	PCS	V-RING TIIVISTEK. VL-400 NBR/NITRILE		4
150	4701 264	15	1	PCS	SEALING RING ISO 6194 TYPE 1 170 X 200 X 15		4
160	3867 295	16	1	PCS	O-RING SMS 1586 189,3 X 5,7 NBR/NITRILE 70 SH		4
160					O-RING TO SHAFT (3765160 3 PCS) ACCORDING TO SEALING BOX		
170	STO3026301	17	1	PCS	SPACER RING		2
180	9947 229	18	1	PCS	WITHDRAWAL SLEEVE SKF AH 3236 G		4

BILL OF MATERIAL
METSO PAPER

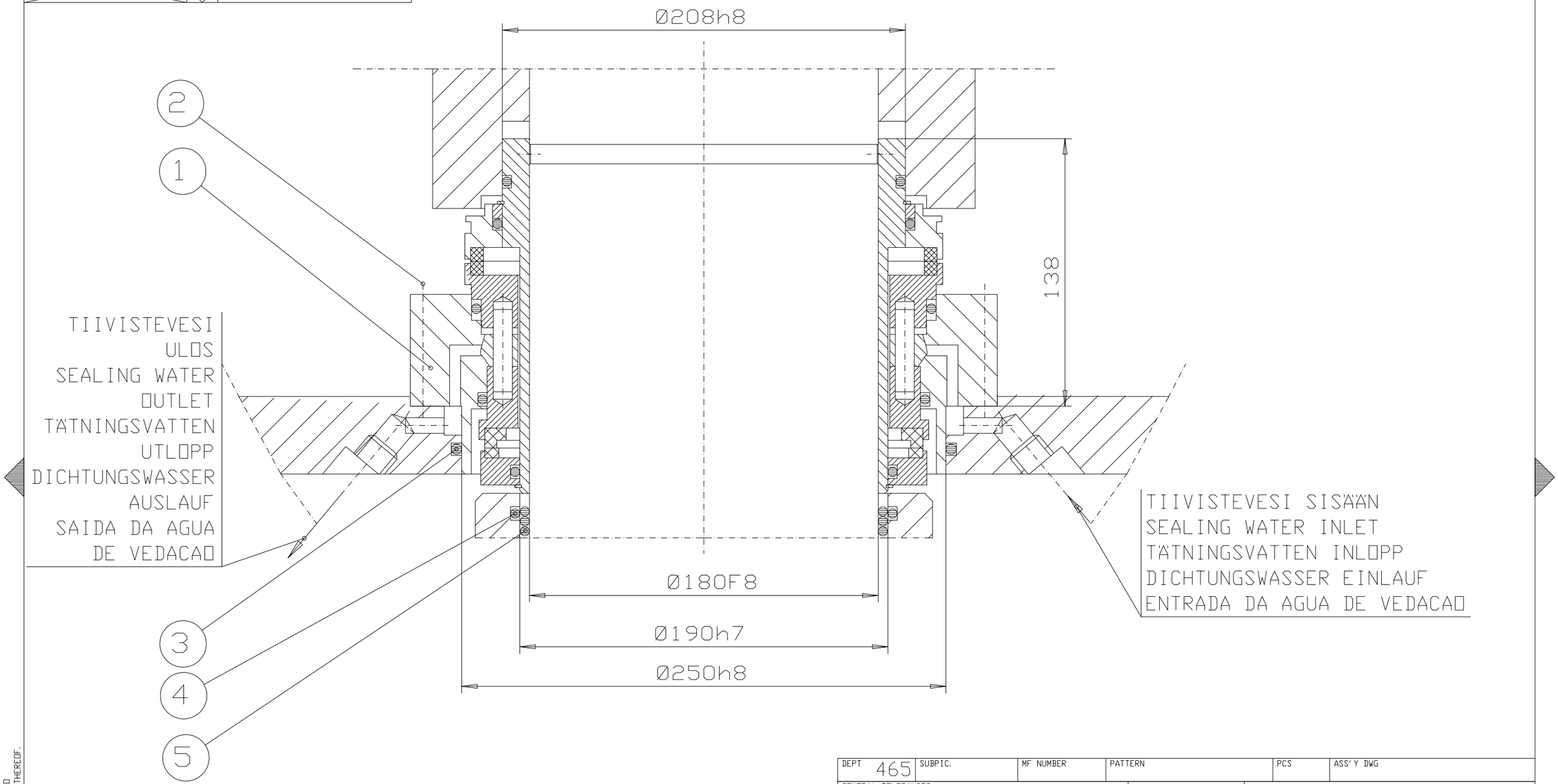
LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A	T
190	7080 559	19			COPPER TUBE	1		4
			1	PCS	L= 85 W= MM			
					SFS 2249 10 X 1			
					CU-DHP-04			

REV A APPROVED SDVVERA 010402
REV B APPROVED SDVKTHA 021031
REV C APPROVED SDVKYVI 021126

END OF STRUCTURES

DO NOT PAINT		
~~PAINT ACCORDING TO GENERAL INSTRUCTIONS~~		

PART NO	NAME, DIMENSIONS AND QUALITY OF MATERIAL OR GOODS	CODE	AMOUNT/PCS	UNIT	WEIGHT KG/EA	PCS/ TIME



DATE	NAME	CHKD BY	REVISION	CHANGES	KEY
2003-01-08	RHA		OLD TYPE TL900	.01	

DEPT	SUBPIC.	MF NUMBER	PATTERN	PCS	ASS'Y DWG
465					

GENERAL TOLERANCES.
DIMENSIONS WITHOUT INDIVIDUAL TOLERANCE INDICATIONS:
MACHINING: ISO 2768-MK (SFS-EN 22768-1, SFS-EN 22768-2)
CASTING: ISO 8062-CT 11 (SFS-ISO 8062)
WELDING: DIN 8570-BE (DIN 8570 T1, DIN 8570 T3)
WELDING QUALITY LEVEL C (SFS-EN 25817, ISO 5817)

ENFI

valmet
A member of Metso Corporation

PROJECTION	SCALE	WEIGHT / kg
ISO	1:2	

ALSO FOR: TL900...TL1200
MS-900HT

PRODUCT: OptiScreen

TIIVISTEPESÄ SAF-180 TREN-304595
SEALING BOX SAF-180 TREN-304595

DESD	JA	DATE	1997-10-14
CHKD	JA	DATE	1997-10-14
APPD	JA	DATE	1997-10-14

REF.	SUPERS.		DRAWING ID	REV.	SHEET
3M00947		A3	STO3025588.	1	
WORK	FILE	VERTEX			

BILL OF MATERIAL
METSO PAPER

LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A T
1	STO3025588				SEALING BOX SAF-180 TREN-304595		R
10	7073 700	1	1	PCS	MECHANICAL SEAL SAFEMATIC SAF-180-TREN- 304595		4
20	4963 992	2	4	PCS	HEX SOCKET HEAD CAP SCREW ISO 4762 M10 X 70 A4-80		4
30	3867 635	3	1	PCS	O-RING SMS 1586 249,3 X 5,7 NBR/NITRILE 70 SH		4
40	3867 295	4	1	PCS	O-RING SMS 1586 189,3 X 5,7 NBR/NITRILE 70 SH		4
40					INCLUDED IN BEARING UNIT		
50	3765 160	5	3	PCS	O-RING SMS 1586 179,3 X 5,7 NBR/NITRILE 70 SH		4

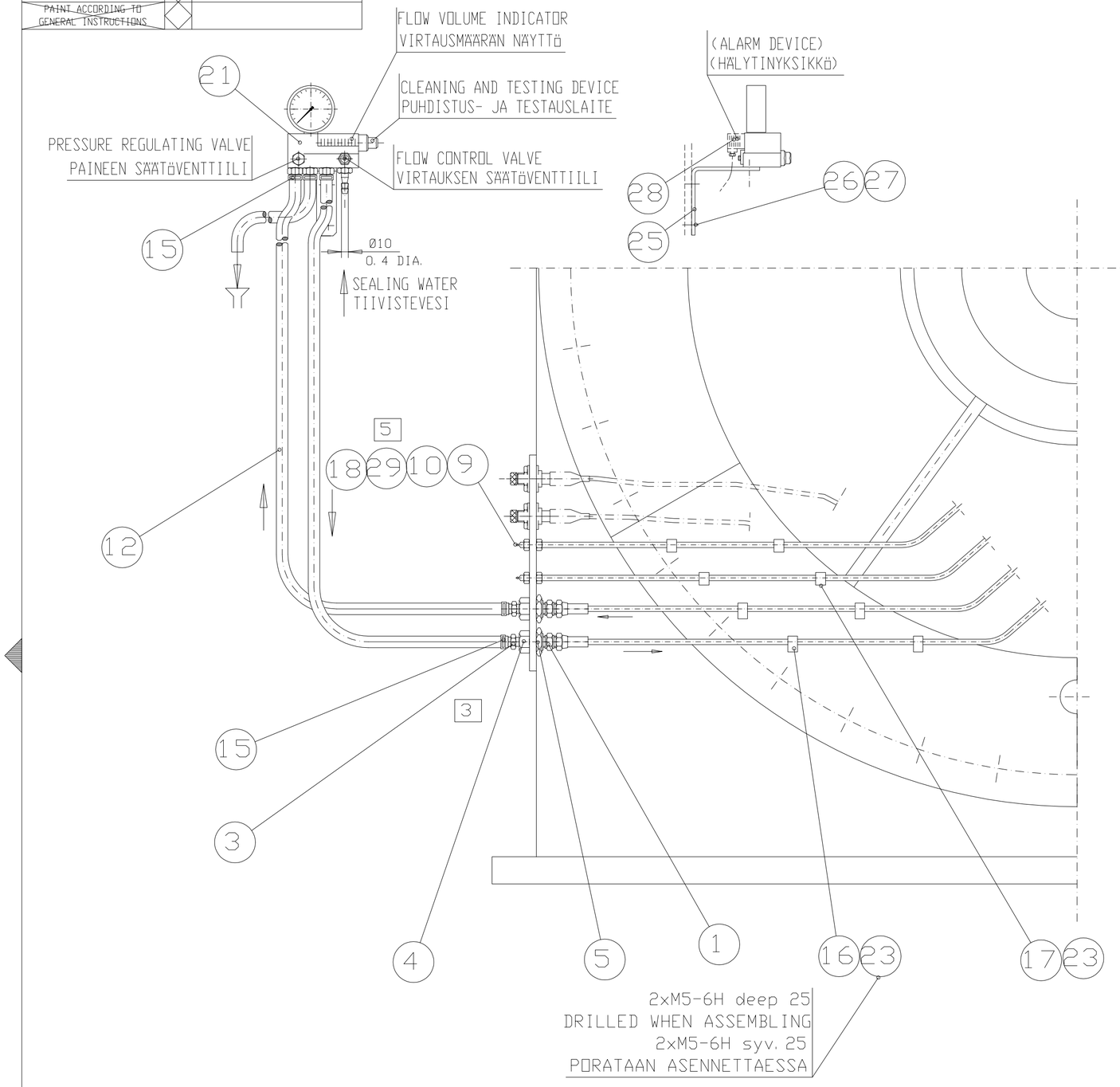
REV A APPROVED SDVRIHA 030108

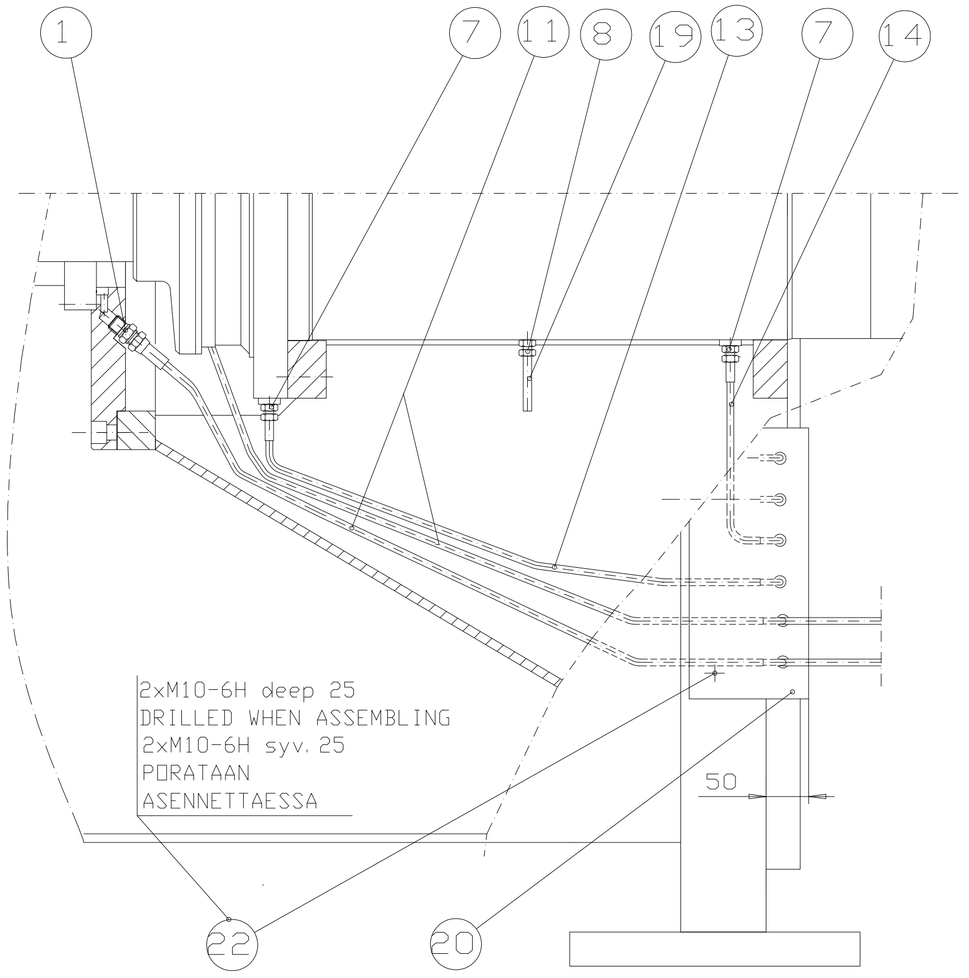
END OF STRUCTURES

WEIGHT/ PCS	MS-900 (TL900)	SEALING BOX	RESP : V HO MKO STP	
0.00	METSO PAPER	SAF-180 TREN-304595	DEAL : SDVJUNI	PAGE 1 (1) REV: A
			CHECK:	
			APPRO: SDVKYVI 000828	NO: STO3025588-01

DO NOT PAINT	
~~PAINT ACCORDING TO GENERAL INSTRUCTIONS~~	

PART NO	NAME, DIMENSIONS AND QUALITY OF MATERIAL OR GOODS	CODE	AMOUNT/PCS	UNIT	WEIGHT KG/EA	PCS/ TIME





DATE	NAME	CHKD BY	REVISION	CHANGES	KEY
2002-12-20	KyV		Lisätty osa 29	. 05	5
2002-10-30	KMH		VANHA TYYPPI TLA900H	. 04	
1999-10-25	JPN		PIKALIITIN POISTETTU	. 03	3
1999-03-07	JA		LETKUT MUUTETTU (OSA 11.)	. 02	2
1998-05-21	JA		OSA 1. MUUTTUNUT	. 01	1

DEPT	SUBPIC.	MF NUMBER	PATTERN	PCS	ASS'Y DWG

GENERAL TOLERANCES.
DIMENSIONS WITHOUT INDIVIDUAL TOLERANCE INDICATIONS:
MACHINING: ISO 2768-MK (SFS-EN 22768-1, SFS-EN 22768-2)
CASTING: ISO 8062-CT 11 (SFS-ISO 8062)
WELDING: DIN 8570-BE (DIN 8570 T1, DIN 8570 T3)
WELDING QUALITY LEVEL C (SFS-EN 25817, ISO 5817)

ENFI

metso paper

PROJECTION | SCALE 1:5 | WEIGHT / kg

ALSO FOR: MS-900HT

PRODUCT OptiScreen

RASVA- JA TIIVISTEVESIPUTKISTO
GREASE AND SEALING WATER PIPING

DESD	DATE
JA	1993-03-25
CHKD JA	DATE 1994-11-25
APPD	DATE

REF. 258454 | SUPERS. | A2

WORK | FILE | VERTEX

DRAWING ID ST02001037. | REV. 05 | SHEET

BILL OF MATERIAL
METSO PAPER

LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A T
1	STO2001037				GREASE AND SEALING WATER PIPING		R
10	7095 355	1	4	PCS	NIPPLE HYTAR 203-06 R 3/8" X RK 3/8" SS STEEL 2343		4
30	7087 088	2	2	PCS	HOSE CONNECTION ONNINEN 10-R 3/8" SS STEEL 2343		4
40	VT-445 343	4	2	PCS	LEAD THROUGH R 3/8 - R 3/8		2
50	7087 095	5	2	PCS	PIPE NUT DIN 431 A 3/4" BRASS		4
70	9078 033	7	2	PCS	PIPE COUPLING DIN 2353 DL 8 ST-ZN		4
80	7095 922	8	1	PCS	PIPE COUPLING DIN 2353 DS 16 ST FE/ZN 45		4
90	VT-46 311	9	2	PCS	LEAD THROUGH FOR GREASE		2

WEIGHT/ PCS	MS-900	GREASE AND SEALING WATER	RESP : V HO MKO STP	
0.00	METSO PAPER	PIPING	DEAL : SDVJUNI	PAGE 1 (4) REV: A
			CHECK:	
			APPRO: SDVATVI 991213	NO: STO2001037-01

BILL OF MATERIAL
METSO PAPER

LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A T
100	7084 531	10	2	PCS	PIPE NUT DIN 431 A 1/2" BRASS		4
110	STO3025799/4	11	2	PCS	HOSES FOR SEALING WATER L=2500		2
120	7061 956	12	15 3	M PCS	PRESSURE HOSE L= 5000 W= MM TEKNIKUM 12010 12BAR		4
130	7086 319	13	1	PCS	HYDRAULIC HOSE HYTAR IT4 UK-08 R 1/4" UK-08 R 1/4" SS STEEL 2333 L=2500MM		4
140	7086 302	14	1	PCS	HYDRAULIC HOSE HYTAR IT4 UK-08 R 1/4" UK-08 R 1/4" SS STEEL 2333 L=1500MM		4
150	4576 279	15	5	PCS	HOSE CLIP SMS 2298 17 SS STEEL 2343		4
160	7084 548	16	4	PCS	MOUNTING STRIP HI-FLEX LEP-19		4

LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A T
170	7084 555	17	4	PCS	MOUNTING STRIP HI-FLEX LEP-17		4
180	9066 980	18	2	PCS	LUBRICATING NIPPLE DIN 71412 AR 1/8" SS STEEL 2333		4
190	7046 108	19	0.2 1	M PCS	STEEL PIPE L= 120 W= MM DIN 2445 16 X 1,5 ST 35.4 NBK		4
200	VT-3M01456	20	1	PCS	FASTENING PLATE		2
210	6550 499	21	1	PCS	FLOW CONTROL UNIT SAFEMATIC SFD-08-10 0-8 L/MIN		4
220	4962 924	22	2	PCS	HEXAGON BOLT ISO 4017 M10 X 20 A4-80		4
230	4948 618	23	8	PCS	CHEESE HEAD SCREW ISO 1207 M5 X 10 SS STEEL 2343		4
250	VT-481 256	25	1	PCS	CLAMP FOR FLOW CONTROL UNIT SF		2

BILL OF MATERIAL
METSO PAPER

LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A	T
260	4963 954	26	2	PCS	HEX SOCKET HEAD CAP SCREW ISO 4762 M10 X 40 A4-80			4
270	3928 701	27	2	PCS	HEXAGON NUT ISO 4032 M10 A4-80			4
280	9737 408	28	1	PCS	INDUCTIVE TRANSDUCER SAFEMATIC AC-1 20-250VAC/DC 45-65HZ/AC IMIN=5MA IMAX=350MA AC/100MA DC 22770511			4

REV A APPROVED SDVKTHA 021031

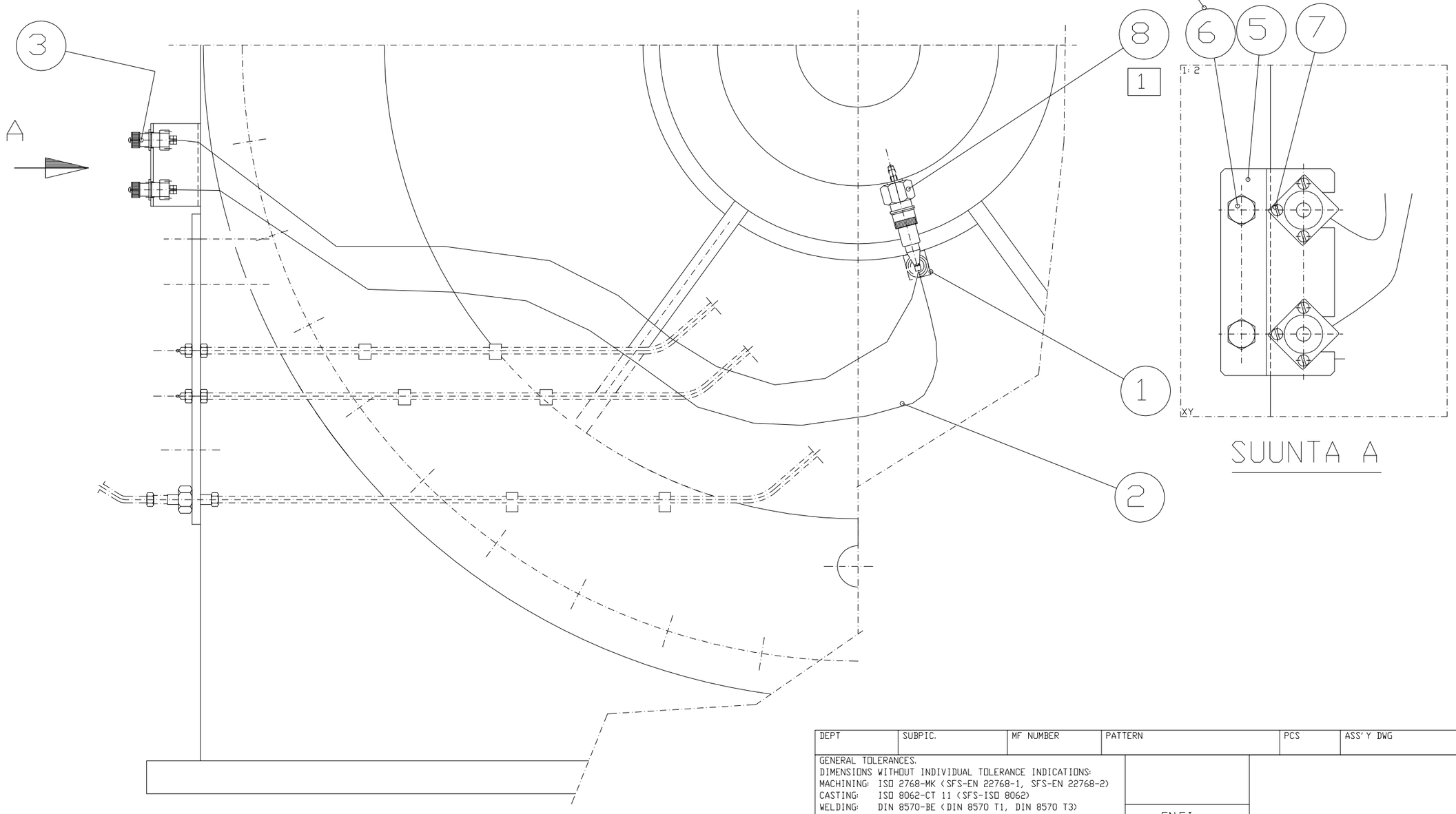
END OF STRUCTURES

DO NOT PAINT		
~~PAINT ACCORDING TO GENERAL INSTRUCTIONS~~		

PART NO	NAME, DIMENSIONS AND QUALITY OF MATERIAL OR GOODS	CODE	AMOUNT/PCS	UNIT	WEIGHT KG/EA	PCS/ TIME

M8-6H DRILLED AT ASSEMBLY

KIERRER. M8-6H POR. ASENNUKSESSA



SUUNTA A

DATE	NAME	CHKD BY	REVISION	CHANGES	KEY
2002-10-28	KMH		VANHA TYYPPI TL450, TL600	.02	
1997-04-15	JA		OSA 8 LISÄTTY	.01	1

DEPT	SUBPIC.	MF NUMBER	PATTERN	PCS	ASS'Y DWG

GENERAL TOLERANCES.
DIMENSIONS WITHOUT INDIVIDUAL TOLERANCE INDICATIONS:
MACHINING: ISO 2768-MK (SFS-EN 22768-1, SFS-EN 22768-2)
CASTING: ISO 8062-CT 11 (SFS-ISO 8062)
WELDING: DIN 8570-BE (DIN 8570 T1, DIN 8570 T3)
WELDING QUALITY LEVEL C (SFS-EN 25817, ISO 5817)

ENFI

metso paper

PROJECTION	SCALE	WEIGHT / kg
ISO	1:5	

ALSO FOR: MS-600, MS-450
MS-900HT

PRODUCT: OptiScreen

KUNNONVALVONTALAITTEET
BEARING CONTROL SENSORS

DESD	DATE
JA	1995-03-31
CHKD	DATE
APPD	DATE

REF.	SUPERS.	A3
3M01457		
WORK	FILE	VERTEX

DRAWING ID	REV.	SHEET
ST03010041.	2	

BILL OF MATERIAL
METSO PAPER

LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A T
1	STO3010041				BEARING CONTROL SENSORS		R
10	7092 509	1	1	PCS	ACCELEROMETER WILCOXON WR797 1/4" UNF		4
20	7092 585	2	2	PCS	CONNECTION CABLE CONTROLWAY R6W-J9T2A-16 +MS3100E+PROTECTION CAP		4
20					NOTE! DO NOT CUT THE CABLES		
30		3	2	PCS	CONNECTOR MS3100E-10SL-4P+PROTECTION CAP INCLUDED IN PART 2		
50	VT-3M00602	5	1	PCS	SUPPORT		2
60	4642 794	6	2	PCS	HEXAGON HEAD SCREW ISO 4017 M8 X 16 8.8 FE/ZN 25		4
70	3935 464	7	6	PCS	CHEESE HEAD SCREW ISO 1207 M3 X 10 5.8 FE/ZN 5 C1		4
80	7092 547	8	1	PCS	ACCELEROMETER WILCOXON WR786		4

REV - APPROVED SDVHATO 991028
REV A APPROVED SDVJAJO 020423
REV B APPROVED SDVKTHA 021031

END OF STRUCTURES

WEIGHT/ PCS 0.00	MS-600 METSO PAPER	BEARING CONTROL SENSORS WILCOXON	RESP : V HO MKO STP DEAL : SDVKYVI CHECK: APPRO: SDVHATO 991028	PAGE 1 (1) REV: B NO: STO3010041-01

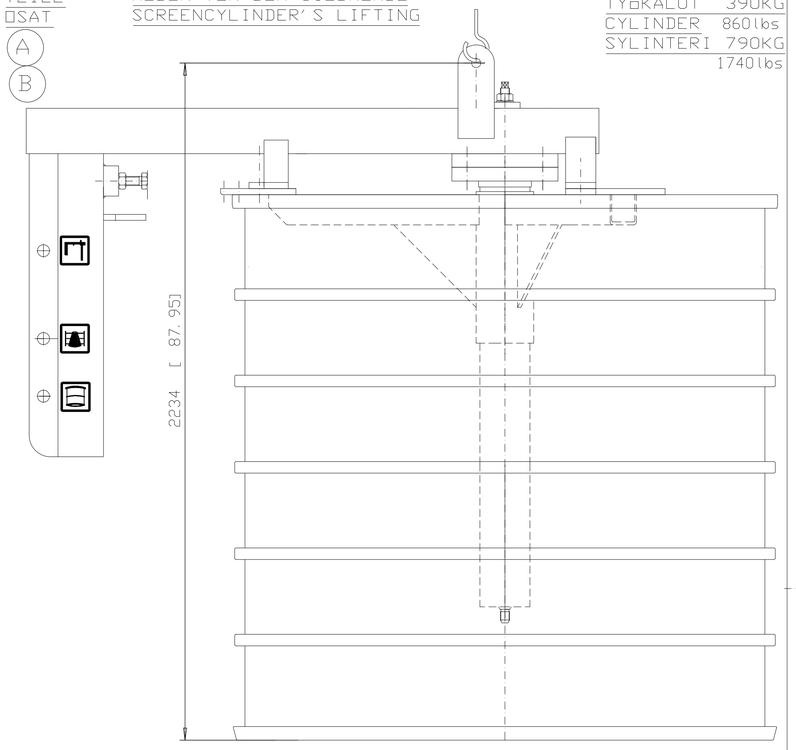
PAINT ACCORDING TO GENERAL INSTRUCTIONS | Maalaamattomat pinnat suojarasvataan

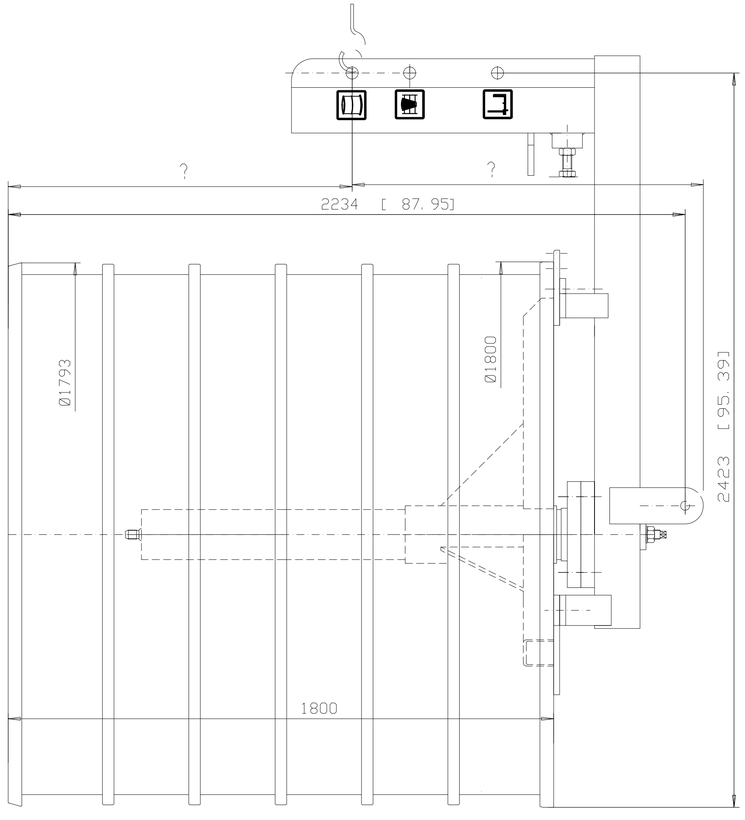
PART NO	NAME, DIMENSIONS AND QUALITY OF MATERIAL OR GOODS	CODE	AMOUNT/PCS	UNIT	WEIGHT KG/EA	PCS/ TIME

PARTS
TEILE
OSAT
A
B

SIHTISYLINTERIN NOSTO
HEBEN VON DEM SIEBKORBE
SCREENCYLINDER'S LIFTING

TOOLS
WERKZEUGE
TYÖKALUT 390KG
CYLINDER 860lbs
SYLINTERI 790KG
1740lbs

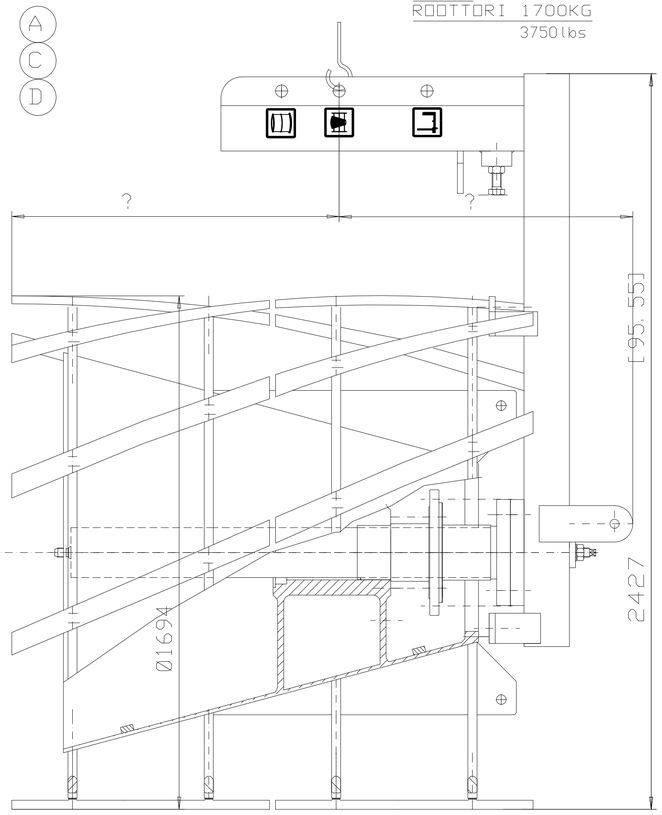




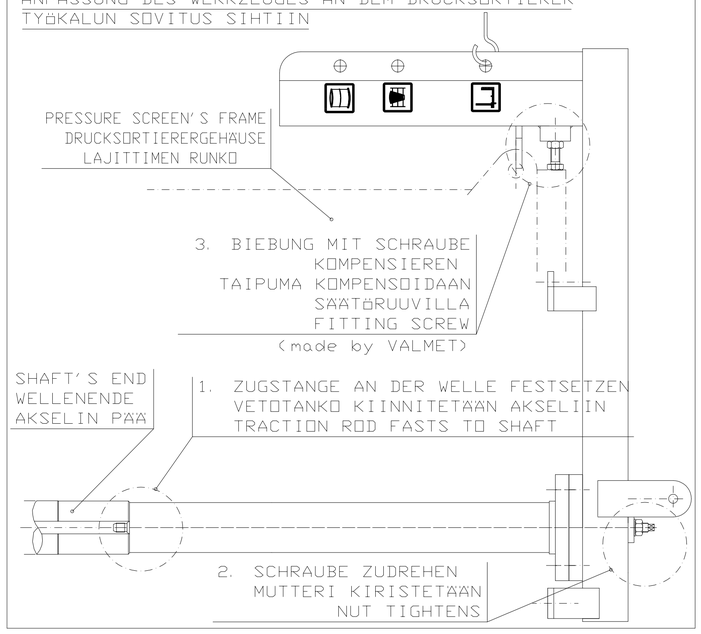
PARTS
TEILE
OSAT
A
C
D

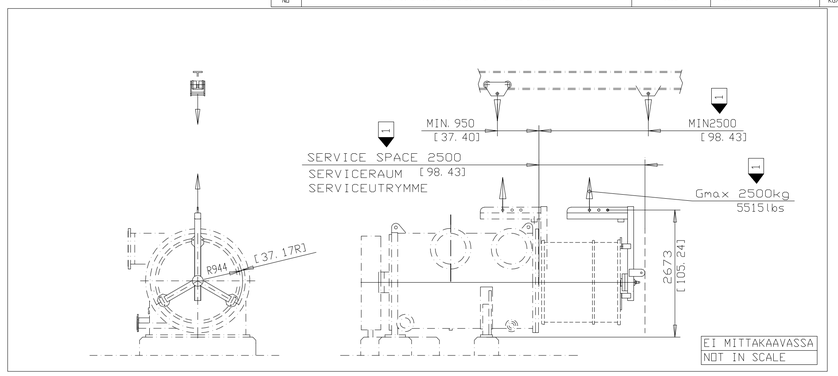
ROOTTORIN NOSTO
HEBEN VON DEM ROTOR
ROTOR'S LIFTING

TOOLS
WERKZEUGE
TYÖKALUT 300KG
ROTOR 660lbs
ROOTTORI 1700KG
3750lbs



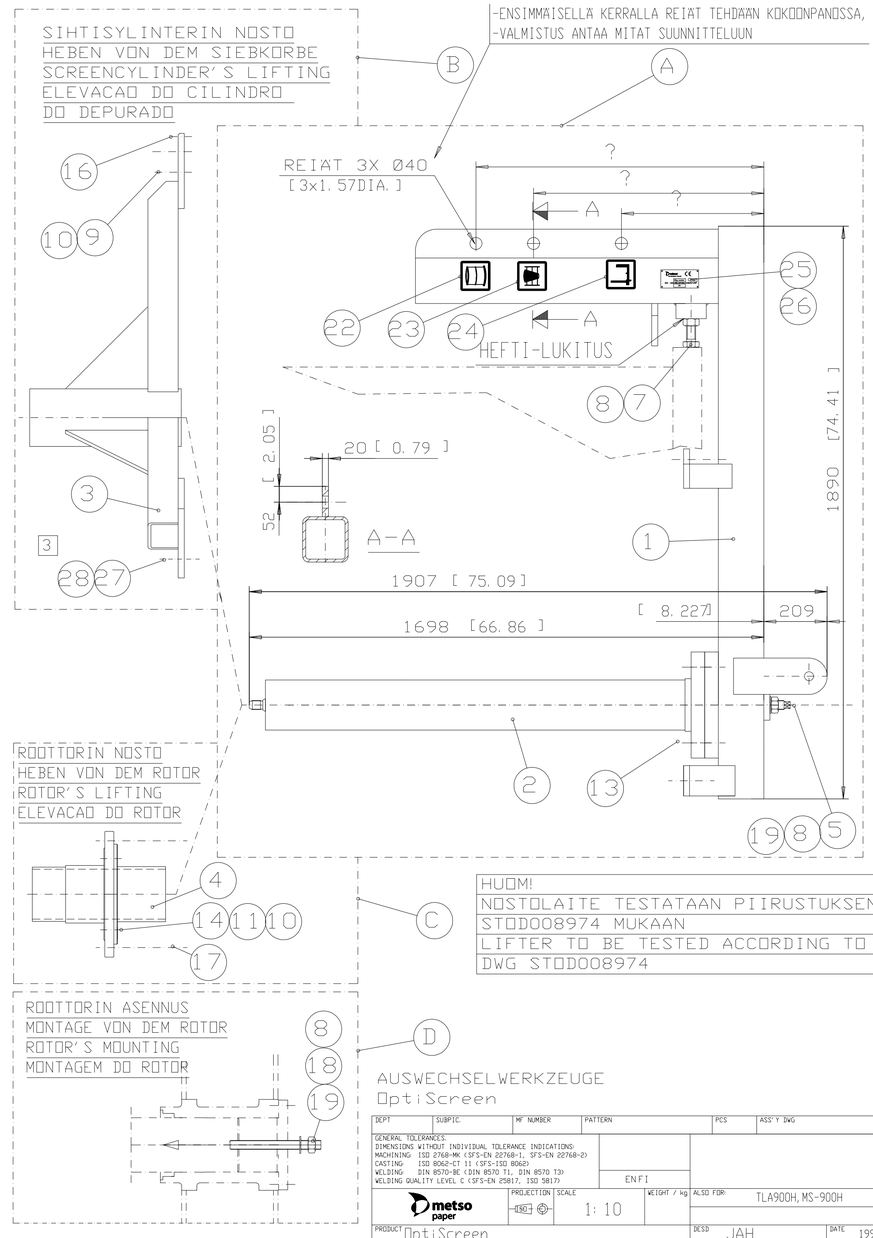
TOOL'S FITTING IN PRESSURE SCREEN
ANPASSUNG DES WERKZEUGES AN DEM DRUCKSORTIERER
TYÖKALUN SOVITUS SIHTIIN





SIHTISYLINTERIN NOSTO
HEBEN VON DEM SIEBKORBE
SCREENCYLINDER'S LIFTING
ELEVACAO DO CILINDRO
DO DEPURADO

-ENSIMMÄISELLÄ KERRALLA REIÄT TEHDÄÄN KOKOONPANOSSA,
-VALMISTUS ANTAA MITAT SUUNNITTELUUN



ROOTTORIN NOSTO
HEBEN VON DEM ROTOR
ROTOR'S LIFTING
ELEVACAO DO ROTOR

ROOTTORIN ASENNUS
MONTAGE VON DEM ROTOR
ROTOR'S MOUNTING
MONTAGEM DO ROTOR

HUOM!
NOSTOLAITE TESTATAAN PIIRUSTUKSEN
STOD008974 MUKAAN
LIFTER TO BE TESTED ACCORDING TO
DWG STOD008974

AUSWECHSELWERKZEUGE
OptiScreen

2002-10-30	KMH		VANHA TYYPPI TLA900H	. 04	
2001-12-12	VMR		LISÄTTY OSAT 27 JA 28	. 03	3
2001-08-16	TTL		LISÄ. TEKSTI KOEKUORMITUKSESTA JA OSAT 25,26	. 02	2
2000-04-06	TTL		Gmax AND SERVICE SPACE ARE CHANGED	. 01	1
DATE	NAME	CHKD BY	REVISION	CHANGES	KEY

DEPT	SUBPIC	MF NUMBER	PATTERN	PCS	ASS'Y DWG

GENERAL TOLERANCES:
DIMENSIONS WITHOUT INDIVIDUAL TOLERANCE INDICATIONS:
MACHINING ISO 2768-MK (SFS-EN 22768-1, SFS-EN 22768-2)
CASTING ISO 8062-CT 11 (SFS-ISO 8062)
WELDING DIN 8570-BE (DIN 8570 T1, DIN 8570 T3)
WELDING QUALITY LEVEL C (SFS-EN 25817, ISO 5817)

ENFI

metso paper | PROJECTION | SCALE 1:10 | WEIGHT / kg | ALSO FOR: TLA900H, MS-900H

PRODUCT: OptiScreen
NOSTOTYÖKALUT (C-ROOTTORI, 5bar)
LIFTING TOOLS

DESD	JAH	DATE	1999-03-07
CHKD	JAH	DATE	1999-03-07
APPD	JAH	DATE	1999-03-07

REF. STO1012579 | SUPERS. | A1 | DRAWING ID STO1013365. 04 | REV. | SHEET
WORK | FILE | VERTEX

METSO PAPER

BILL OF MATERIAL

LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A T
1	STO1013365				LIFTING TOOLS (C-ROTOR, 5BAR)		R
2					NOTE. LIFTER TO BE TESTED ACCORDING TO DWG.STOD008974		
10	STO2012216-01	1	1	PCS	LIFTING BEAM	1	
20	VT-358 546	2	1	PCS	LIFTING BOOM	2	
30	VT-244 963-01	3	1	PCS	SUPPORT FOR SCREEN BASKET	1	
40	STO2011454	4	1	PCS	BEARER FOR ROTOR	2	
50	VT-358 547	5	1	PCS	FEED SHAFT	2	
70	7084 517	7	1	PCS	HEXAGON HEAD SCREW ISO 4017 M30 X 140 8.8 FE/ZN 45	4	
80	4643 470	8	3	PCS	HEXAGON NUT ISO 4032 M30-8 FE/ZN 45	4	
90	4643 157	9	3	PCS	HEXAGON HEAD SCREW ISO 4014 M16 X 80 8.8 FE/ZN 45	4	

WEIGHT/ PCS 82.00 KG	MS-900H METSO PAPER	LIFTING TOOLS (C-ROTOR, 5BAR)	RESP : V HO MKO STP DEAL : SDVTELA CHECK: SDVTELA 010815 APPRO: SDVTELA 000404	PAGE 1 (4) REV: C NO: STO1013365-01

BILL OF MATERIAL

METSO PAPER

LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A T
100	4643 425	10	3	PCS	HEXAGON NUT ISO 4032 M16-8 FE/ZN 45		4
110	4643 449	11	3	PCS	HEXAGON NUT ISO 4032 M24-8 FE/ZN 45		4
120	5410 358	12	3	PCS	WASHER ISO 7089 24-A 200 A4		4
130	4643 250	13	12	PCS	HEXAGON BOLT ISO 4014 M24 X 80 8.8 FE/ZN 45		4
140	STO4011434	14	3	PCS	WITHDRAWAL SCREW M24		2
160	3931 884	16	9	PCS	HEX SOCKET HEAD CAP SCREW ISO 4762 M16 X 40 8.8 FE/ZN 8 C1		4
170	7097 023	17	2	PCS	HEXAGON HEAD SCREW ISO 4014 M20 X 320 8.8		4
180	8529 040	18	0.3 1	M PCS	THREADED BAR L= 300 W= MM DIN 975 M 30 8.8 FE/ZN 45		4

LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A T
190	8330 552	19	2	PCS	WASHER ISO 7089 30-A 200 A4		4
210	STO4011114	21	1	PCS	GUIDING PIECE		2
220	STO4010976	22	2	PCS	LABEL SCREEN BASKET		2
230	STO4010977	23	2	PCS	LABEL ROTOR		2
240	STO4010978	24	2	PCS	LABEL LIFTING TOOLS		2
250	STOM000250	25	1	PCS	PRODUCT SIGN FOR LIFTING TOOLS 60X125		2
260	7074 668	26	4	PCS	SCREW SMS 1549 KDS NR 6X6 D=3,5 A4		4
270	8761 688	27	2	PCS	HEXAGON BOLT ISO 4017 M16 X 70 A4-80		4
280	3928 725	28	2	PCS	HEXAGON NUT ISO 4032 M16 A4-80		4

LINE	COMPONENT NO	POS	QUANTITY	UNIT	DESCRIPTION/DIMENSION	SPARE QTY	A	T

REV A APPROVED SDVTELA 010815
REV B APPROVED SDVVERA 011212
REV C APPROVED SDVKTHA 021031

END OF STRUCTURES