OPERATIONS AND MAINTENANCE MANUAL

CHAPTER 1: THE TETRA PAK SCANIMA CONCEPT

1. THE TETRA PAK SCANIMA CONCEPT

Tetra Pak Scanima is a limited *company* with its registered head office in Aalborg, Denmark. TP Scanima employs approximately 100 people.

Figure 1.1: Tetra Pak Scanima Head Office

TP Scanima is specialised in manufacturing and developing Turbo Process Mixing Systems, High Shear Mixing Plants, Blending Vessels, Cooling Vessels and In-Line Mixing – supplying to the world market.

Section 1.1 gives basic process principle for our Inline Mixers, whereas section 1.2 gives basic process principle for our Batch Mixers. Please read these descriptions in order to see the great world of TP Scanima Mixers.

TP Scanima can meet all national standards and regulations when supplying equipment. Our highly educated and experienced staff will make sure that the TP Scanima Systems will work to your satisfaction.

The TP Scanima Systems are used for producing: Dairy Products, Prepared Food, Baby Food, Convenience Food, Pre Spray Dried, Health Care, Cosmetic, Veterinarian, Dental, Technical, Chemical and Pharmaceutical Products.

The TP Scanima Systems technology gives optimal liquid/liquid, liquid/powder or liquid/solid mixing, with or without high shear mixing.

Products/ingredients homogenise, emulsify and disperse in a matter of a few seconds, even products with a very high total solids or very high viscosity. Particles can be blended gently into the product. All powder and additives can be drawn into the system by vacuum, and the product can be de-aerated. All these functions can be fully automated to suit the individual product and process.

To achieve this total process, technology has taken several years of on-going research and development. TP Scanima can confidently say that we can provide equipment which will give you an "All in one process"

production and therefore reduce processing time, handling time, down time for CIP/cleaning and down time for maintenance.

The TP Scanima system "All in one process" gives you:

- Turbo Mixing
- High Shear Mixing
- Gentle Mixing
- Blending
- Homogenising
- Emulsions
- Pasteurisation
- Dispersing
- In-Direct Heating
- Direct Heating
- De-Aerating
- Cooking
- Cooling

Please refer to www.scanima.com for further information.

1.1 PROCESS PRINCIPLE - INLINE MIXER

The TP Scanima Turbo Mixer is a self discharging mixing plant which can be operated with continuous discharge to a buffer tank

A pre-set amount of (preheated) liquid (water - milk - etc.) is fed into the buffer tank and brought into circulation over the TP Scanima turbo mixer. Powder and additives are fed into the mixing vessel or into the powder funnel. The raw materials are mixed with the liquid to a homogeneous product under circulation over a buffer tank (see Figure 1.2).

When the desired dry matter content and/or composition are reached, the product is discharged from the buffer tank.

The efficient turbo unit produces a homogeneous product free from lumps and ensures optimal wetting and processing. A continuous processing is achieved by using two or more buffer tanks, arranged for alternating storing or emptying.

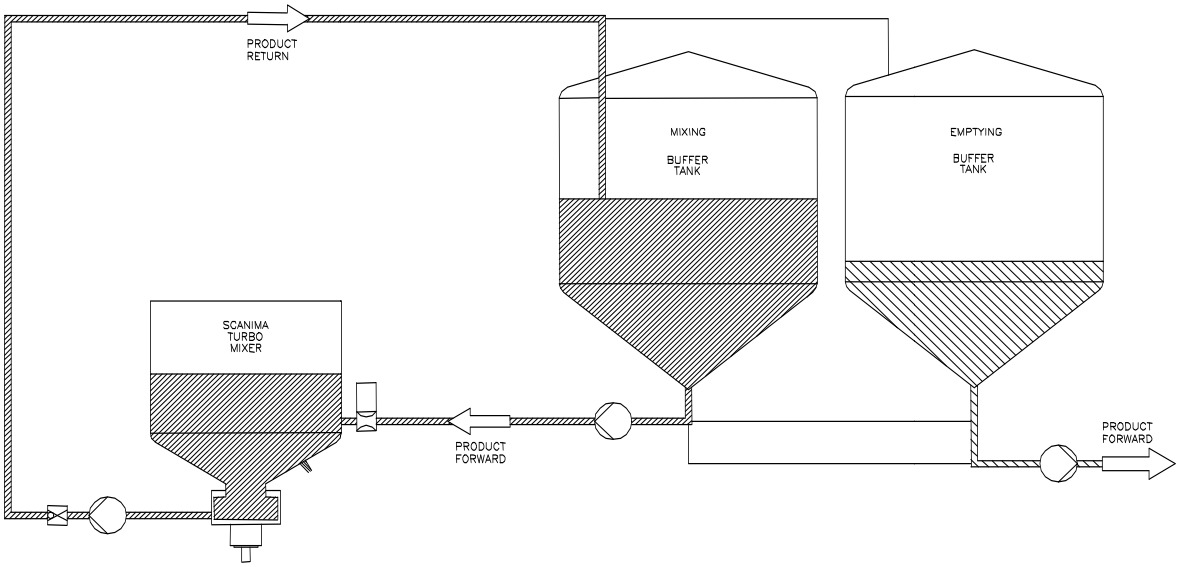

Figure 1.2: Principle for continuous processing

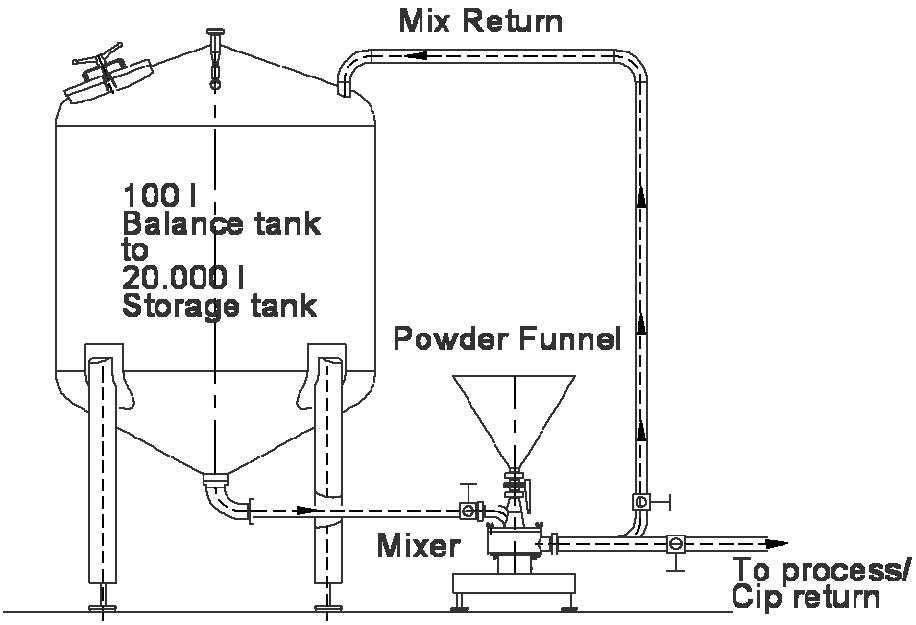

Figure 1.3: Principle for continuous processing, SFM 200

1.1.1 INLINE MIXING UNIT, PRINCIPLE

The mixing plant is built around the special designed turbo, see Figure 1.4.

When operating the turbo unit the product is sucked down into the turbo wheel and pressed out through the holes in the perforation ring. On its way through the perforation ring, the impeller wings cut the product.

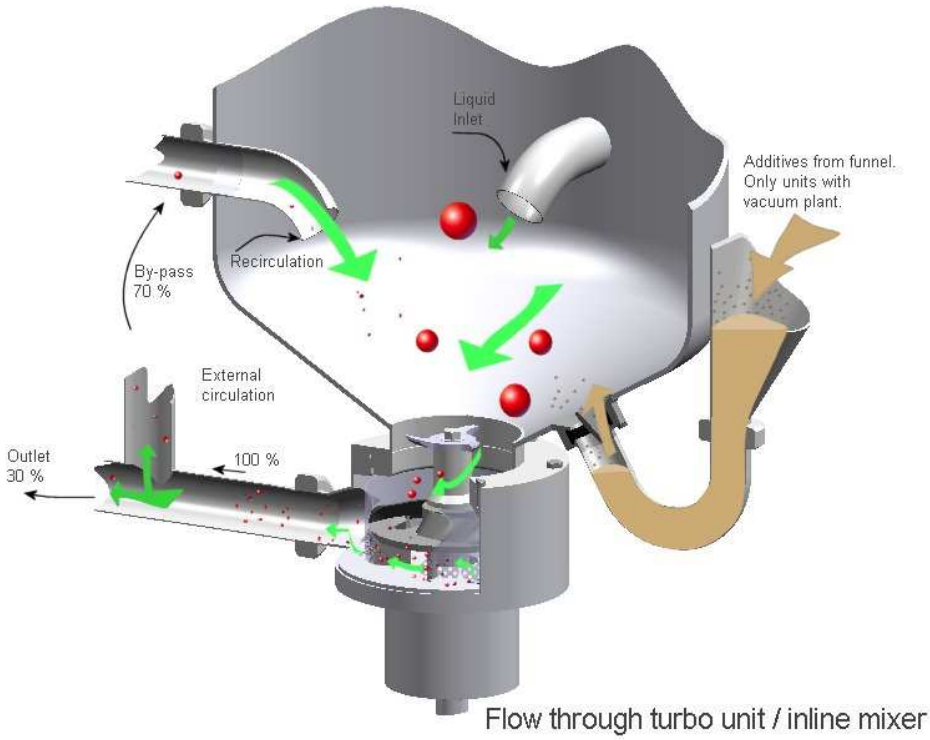

Figure 1.4: Inline principle

1.2 PROCESS PRINCIPLE – BATCH MIXER

1.2.1 TURBO UNIT PRINCIPLE

TP Scanima's new revolutionary Dynamic stator system now allows the same machine to be used for high/low shear mixing and blending by raising/lowering the stator. Powders and liquids can be mixed in seconds using high shear; the mixture can then be powerfully circulated using no shear. This innovation further enhances our superior all-in-one system.

When homogenising/dispersing the product it is pushed through the small holes in the stator ring, however with the adjustable stator ring you can lift the ring and by that create "free flow". The mixer will then work as agitator/blender.

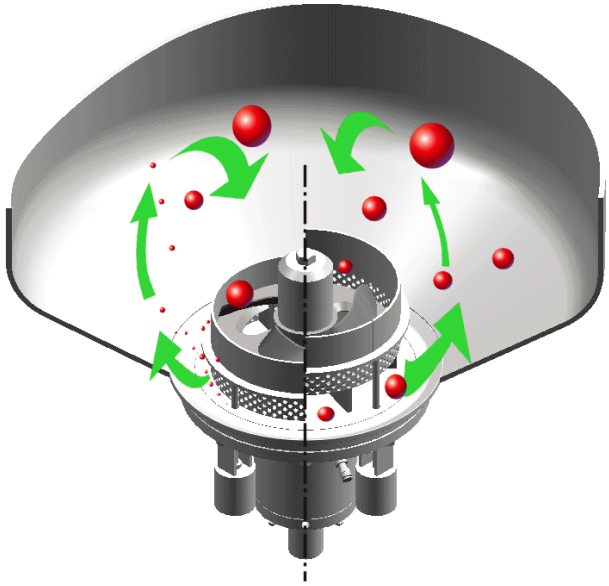

Figure 1.5: Adjustable stator in the Tetra Pak Scanima Mixer (optional)

Left side: Stator ring in homogenizing/dispersing position.

Right side: Stator ring elevated for agitating/blending mode

When operating the turbo unit, the stator can be put into one of two positions. With the adjustable stator you can put the stator ring in the Homogenizing /dispersing position. In that position the product is sucked down into the turbo wheel and pressed out through the holes in the perforation ring. On its way through the perforation ring the impeller wings cut the product.

With the adjustable stator in the agitating/blending position, the product will be sucked down into the turbo wheel and out through the bottom, under the perforation ring. In that position the wings will not cut the product.

The turbo unit can, depending on how the customer wants to run the mixing plant, be equipped with a knife or a blind cap and perforation rings with different shape of holes.

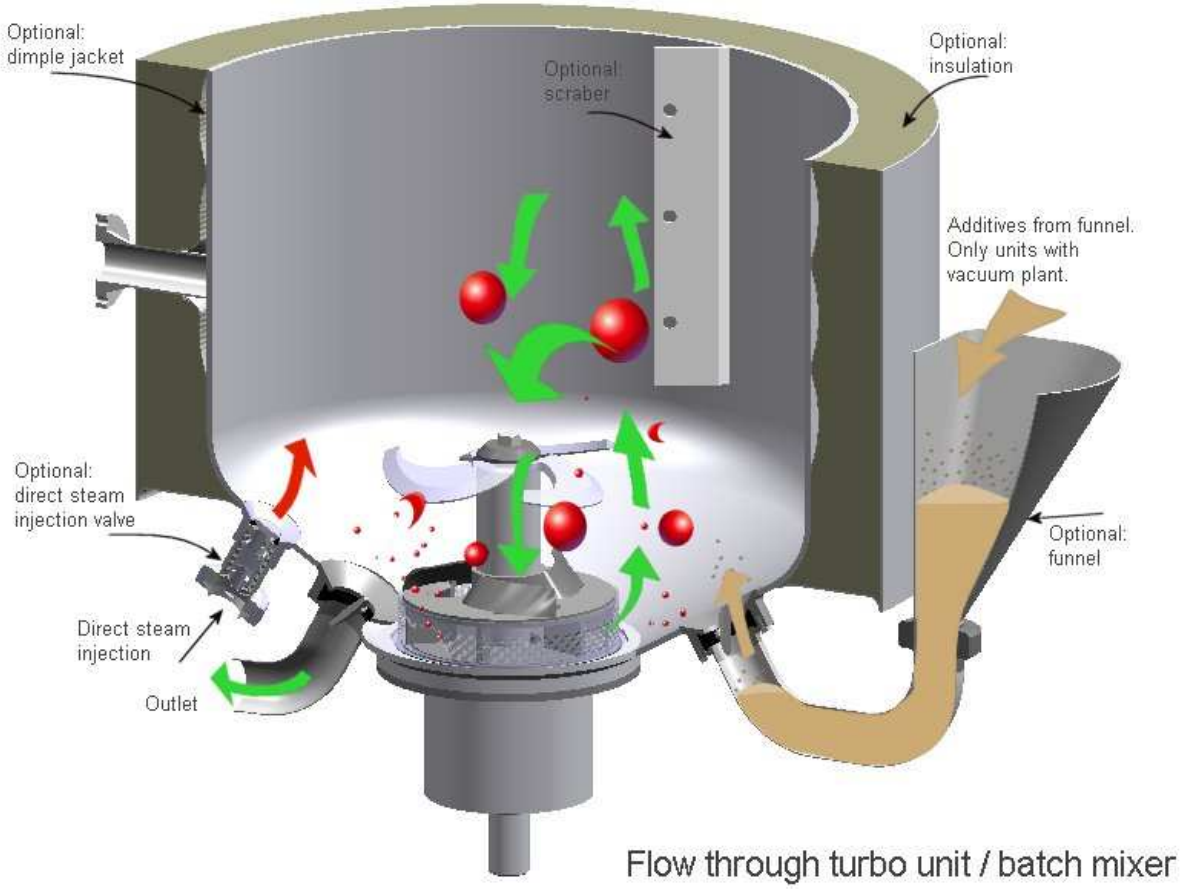

Figure 1.6: Principle function

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OPERATIONS AND MAINTENANCE MANUAL

CHAPTER 2: GENERAL INFORMATION

2. GENERAL INFORMATION

2.1 ABOUT THE MANUAL

Tetra Pak Scanima congratulates you with your new TP Scanima Mixer. In order for you to achieve optimum satisfaction with your new equipment, we strongly encourage you to read this manual carefully before using the equipment.

Later in this chapter the exact specification for your TP Scanima Mixer can be viewed. When reading the manual some explanation/drawings are not valid for your TP Scanima Mixer, this because the overall manual is used for a wide range of TP Scanima Mixers. Therefore, please see section 2.4 "Plant Description" for the exact specification of your TP Scanima Mixer.

The manual itself is divided into 9 chapters described briefly below.

2 "General Information": Contains information that should be read by everybody involved with the TP Scanima equipment, described in this manual.

3 "Safety Precautions": Contains important information concerning the safety of all operating personnel. To ensure maximum safety, carefully read the safety precautions section before carrying out any work on the facility.

4 "Installation Manual": Contains information regarding installation and start-up of the mixing unit.

5 "Cleaning of TP Scanima Equipment" gives our guidance for optimal cleaning of TP Scanima Equipment.

6 "Operators Manual": Contains information for the operator. If your equipment is bought with PLC, the operation of the mixer will be included in this section.

7 "Electrical Documentation": Present your electrical diagrams etc. if Mixer is bought with control system.

8 "Maintenance": Describes key points of maintenance on the mixer. Included is guidance for making your own maintenance schedule.

9 "Spare Parts": This chapter gives you the specific spare parts for your TP Scanima Mixer. This is presented as spare parts for turbo units, agitator etc and spare part list for flow sheet.

10 "Appendix"

2.1.1 CD IN THE MANUAL

Together with the manual you will find enclosed a CD. Put this CD into your computer, and a program named "TP Scanima Search Engine" will automatic opens up. If not, please browse to your CD-drive and choose the file "TP Scanima.exe".

In the program you can type in a TP Scanima part number and search our library for supplier data sheets and manuals, and you can open present manual in individual chapters as PDF-files. TP Scanima Part Numbers are given in chapter 9 "Spare Parts". Please also read the help-file under menu "Help" in the "TP Scanima Search Engine".

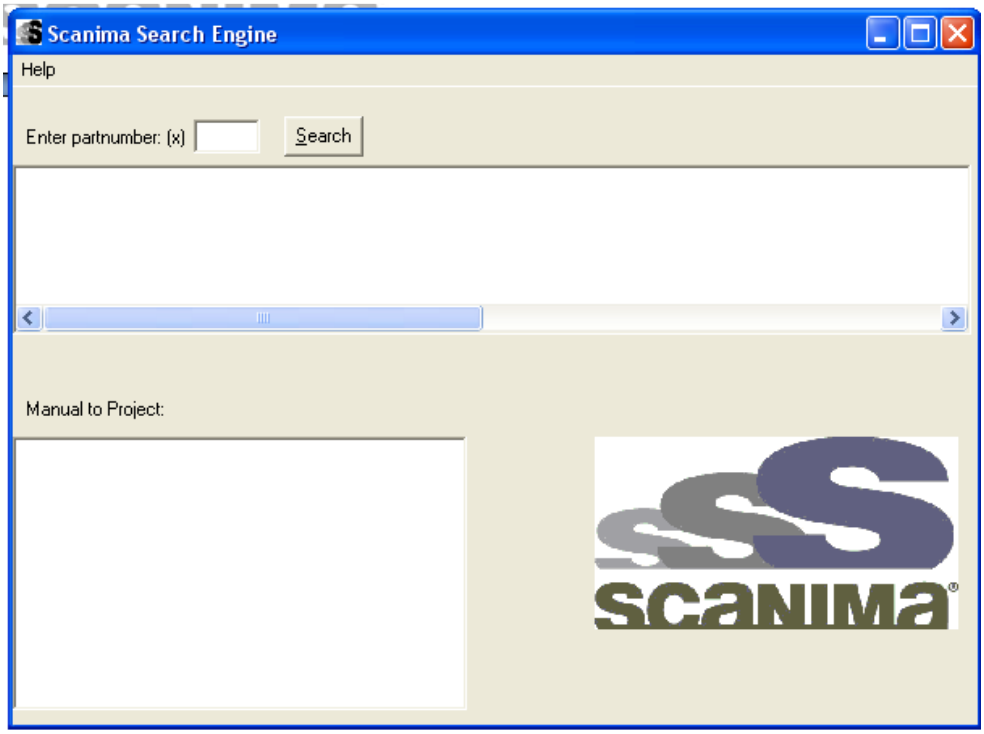

Figure 2.1: Screen dump of Tetra Pak Scanima Search Engine

2.2 SUPPLIER DETAILS

Name ..... Tetra Pak Scanima
Address ..... Gugvej 152
Post code ..... DK-9210 Aalborg SØ
Telephone ..... +45 96 33 10 00
Fax ..... +45 96 33 10 12
E-mail:
General enquiry ..... TPScanima@tetrapak.com
Spare part enquiry ..... TPScanima.Sparepart@tetrapak.com
Web ..... www.scanima.com

2.3 DOCUMENT INFORMATION

2.3.1 ADDITIONAL COPIES

Further copies of technical publications can be ordered from TP Scanima. When ordering, always quote the TP Scanima Order Number

2.3.2 DESIGN MODIFICATIONS

The information given in this documentation is in accordance with the design and construction of the machine at the time of delivery.

2.3.3 COPYRIGHT © 2010

2.4 PLANT DESCRIPTION

The overall specification for your Tetra Pak Scanima Mixer is given in following table. The specification is meant as a quick overview of your Mixer Plant, i.e. not to replace your Order Confirmation. For further information, please refer to chapter 9 "Spare Parts" giving you layout drawing and flow sheet for your TP Scanima Mixer.

Project No	13861
Serial No	
Delivery Date	28-06-2010
Mixer Type	STM-7000 V Special T13
Turbo Unit	Ø400 Batch, static
Agitator	Excl Agitator
Steam Jacket	Excl Steam Jacket
Vacuum System	Incl Vacuum
Control System	Excl Control System
Platform	Excl Platform
Silos	Excl Funnel/Silo
Frequency [Hz]	50
Power 3x [V]	400
Control Panel type	
Others	

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CHAPTER 3: SAFETY PRECAUTIONS

3. SAFETY PRECAUTIONS

3.1 NOTIFICATION

The responsible owner/user of this mixer unit must choose one person as accountable, that any person who is occupied around the mixer unit has the necessary qualification.

The responsible owner/user of the facility must ensure that this manual is properly updated during any modifications of the mixer unit.

This manual must be found in the immediate vicinity of the mixer unit. If this is not possible, it must clearly be indicated on the mixer unit where this manual is stored.

Below table can be filled to ensure responsible persons are appointed.

	Name	*Date*	*Name*	*Date*
Owner				
Selected responsible				
Selected responsible				

3.2 GENERAL SAFETY PRECAUTIONS

The mixer unit should not be operated before it is installed and all safety devices are connected, and the complete machinery is declared to be in conformity with applicable standards.

It is not permitted to modify the construction, operation, capacity, electric installation, etc. on the mixer unit.

Only trained personnel are allowed to operate the equipment.

If the safety precautions are not followed, risk of personal injury may be present.

It is not allowed to interrupt the safety switch.

Be careful not to drop any hard objects of metal, plastic etc. into the equipment.

Do not place any objects underneath the machine since the V-belt drive is located here and could be damaged. When lifting, be careful to lift under both rims of the motor foundation and not between.

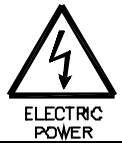
Always regard all electrical equipment as live and regard all pipes and vessels as hot.

Do not enter the Mixer before the tank is ventilated, there might be some gas left in the tank.

It is recommendable that there are made a measuring of the gas in the mixer before entering the tank.

It is recommendable that there are made some kind of surveillance to detect if there is running gas out in the operator room. The gas can be dangerous and can cost live.

3.2.1 SPOTS OF DANGER

Heading	*Symbol*	*Description*
Vacuum system		Do not get near any inlets/outlets when operating the mixer with vacuum. Take care not to interfere with vacuum when sucking in powder or regulating the vacuum level. Please see layout and flow sheet in chapter 9 for location of vacuum inlets/outlets
Steam system		Do not touch the steam equipment during operation. It may cause severe burns. Do not ever disassemble the steam equipment, unless the main steam supply valve is turned off and the entire system is depressurised and cool. With the steam system in operation, hot steam may be released throughout the air regulation valve, the safety valve
C.I.P. system		Risk of exposure is present if the piping system fails during the C.I.P sequence. If this happens please follow safety precautions concerning the operator described in section 3.4
Mixing vessel		The mixing vessel must be considered hot when operating with steam. Some vessels are equipped with a steam jacket and in these cases, the vessel must be considered hot especially in the top and in the bottom. Risk of burns must be considered
Turbo unit with adjustable stator		If the turbo unit is equipped with an adjustable stator, a risk of fingers getting caught must be considered. Therefore do not get near the turbo unit during operation
High voltage components		Always consider high voltage components as live and dangerous. Do not perform any modifications during operation
V-belt		The V-belt drive is located underneath the machine and protected with some shielding. There is no safety device attached to the shielding and therefore it is possible to operate the machine without shielding. However, it is recommended not to operate the machine without the shielding properly installed. Do not place any objects underneath the machine since the V-belt drive is located here, even though it is properly shielded

The facility is not equipped with warning signs. All personnel must observe the warnings indicated in Figure 3.1 – 3.4. Above table gives explanation for all sports of danger on the equipment. Please notice, that your mixer may not have all sports of danger. This depends on the mixer is equipped.

Other

- Agitator - Beware of agitator if man way or lid is opened.
- Automatic man way - Beware of the man way lid when opening and closing the man way. Also take care when opening the funnel, if any.

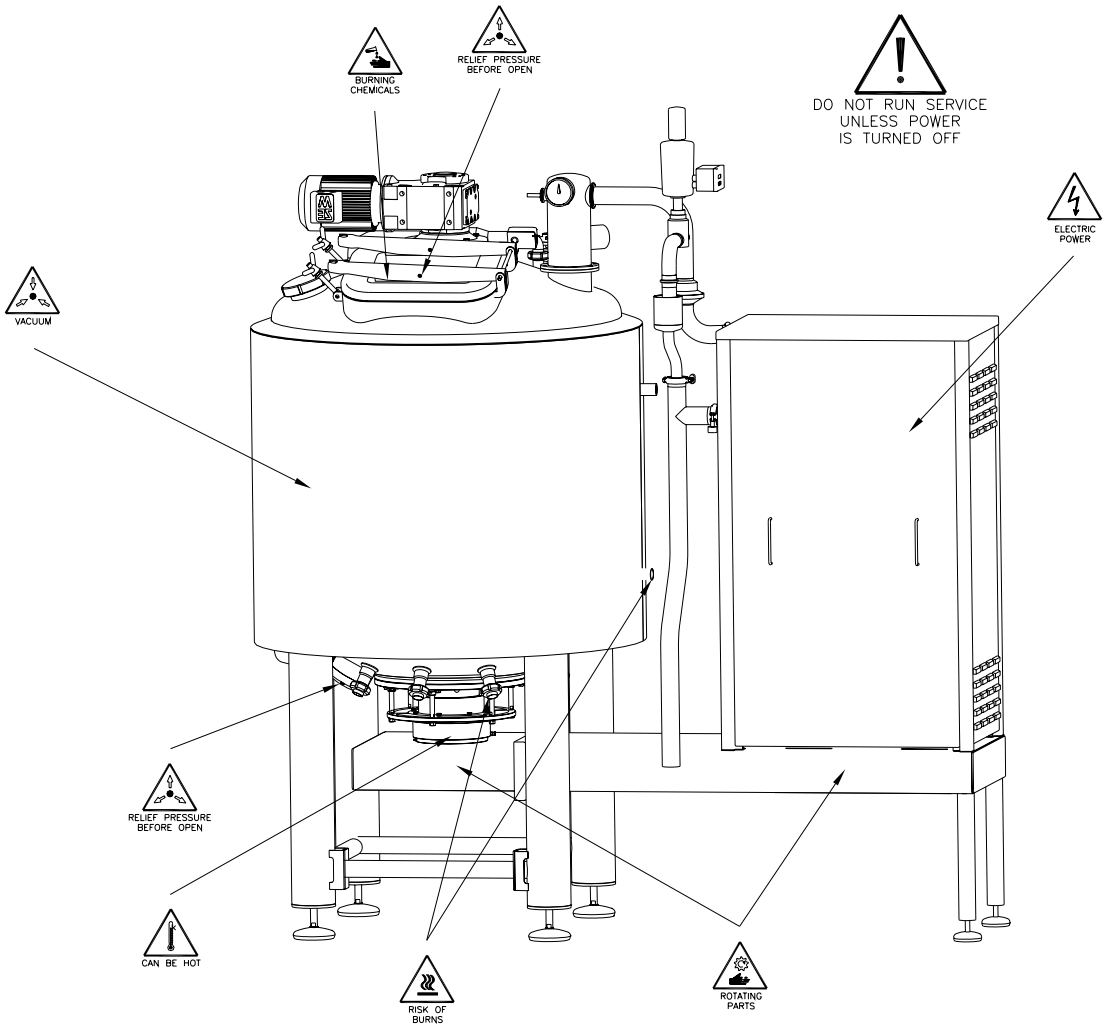


Figure 3.1: Safety precautions

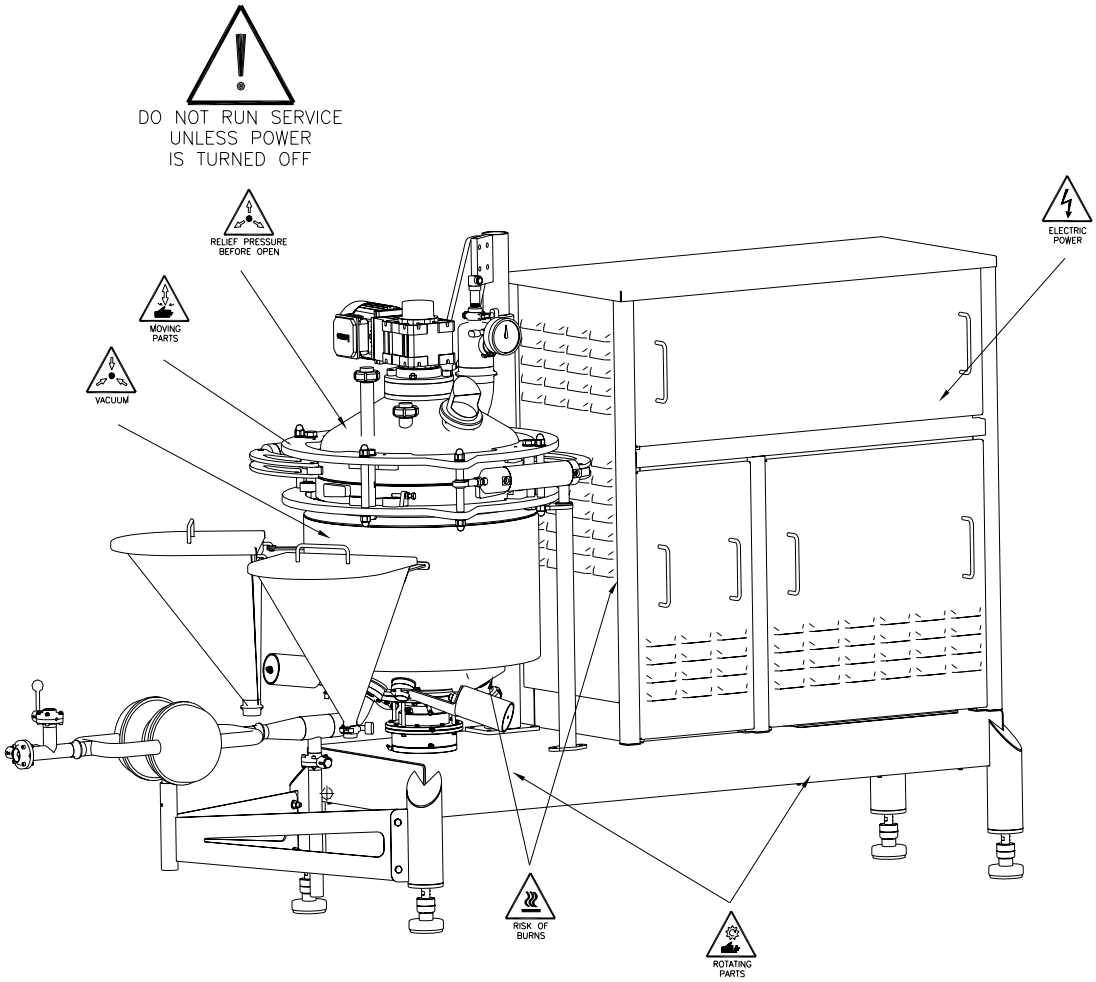


Figure 3.2: Safety precautions

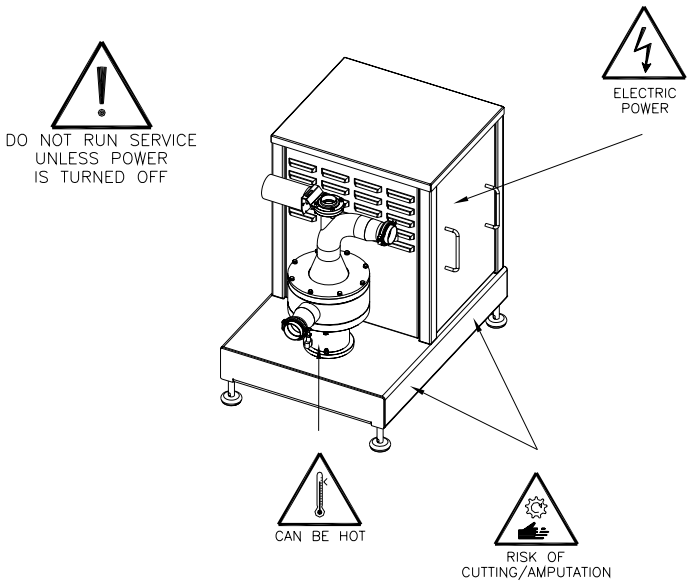


Figure 3.3: Safety precautions

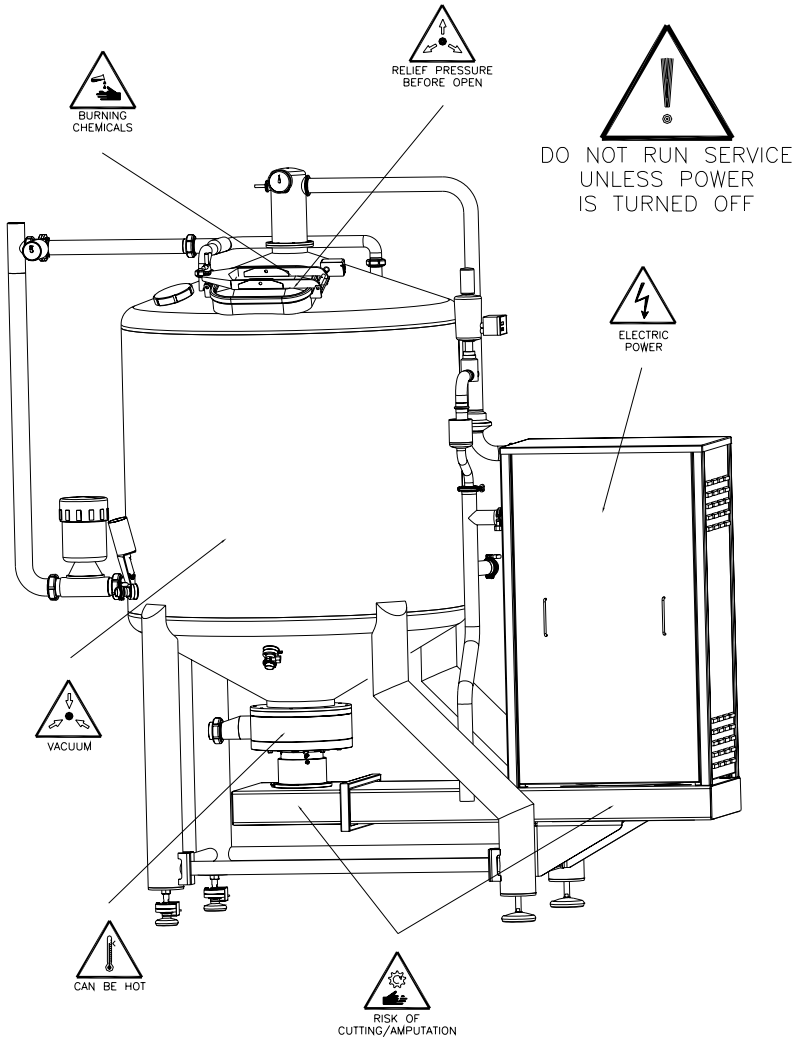


Figure 3.4: Safety precautions

3.2.2 GENERAL SAFETY MEASURES

Other rules and regulations established by national- or by other authorities or by the company itself must be followed.

Safety measures stated elsewhere in this manual or stated by other local regulating authority, that the use of personal protective devices (i.e. hearing protection, helmet, shoes, protective gloves, etc.) must be followed.

3.3 CAUTION CONCERNING USE OF THE FACILITY

The mixer is intended for use, according to the specifications stated in this manual and related document.

Use of the equipment for inflammable or dangerous products is not allowed.

TP Scanima will not be held responsible for injury or damage if the equipment is manipulated or used for any other purpose than the function designed for.

3.4 SAFETY PRECAUTION CONCERNING THE OPERATOR

This manual must be read before any use of the facility.

All operators and other personnel operating this facility must go through this manual before any operation with the facility begins. The word "operator" is defined as all personnel working around the facility, ordinary operators as well as any other employee working the vicinity, i.e. loading materials, cleaning, maintenance etc. Only personnel operating the facility are allowed entrance near the facility.

If access for unauthorized personnel is necessary (i.e. during repairs, visits or demonstrations), must this take place according to predetermined security measures. The responsible personnel of the facility's operation must be informed of the presence of any unauthorised persons.

No person under the age of 16 is allowed entrance near the facility.

3.4.1 CLEANING

The cleaning solution normally contains caustic soda (NaOH) or nitric acid (HNO3). This chemical may cause severe burning to skin and eyes. Follow the instructions given by the supplier.

Whenever there is a risk of exposure to these chemicals, always wear:

- Safety glasses
- Protective gloves
- Shoes made of PVC, PE plastic or rubber.
- Apron

If exposed - wash with water as soon as possible with as much water as possible. Seek medical assistance.

3.5 SAFETY PRECAUTION CONCERNING MAINTENANCE

Cleaning of the mixer after stoppage caused by error or malfunction (i.e. blockage etc.), the mixer must be disconnected.

Then the following measures must be taken:

- That any start-up of the facility is not possible before all repairs are complete, and all personnel are placed at a safe distance.
- That no accumulation of pressure, heat or other materials with the ability of injury to personnel will take place, even with the machine turned off.
- Cleaning or removing of objects during operation is not allowed

3.5.1 MAINTENANCE

All service and maintenance must be carried out according to specifications stated in chapter 8. TP Scanima will not be held responsible if the operator does not follow these standards or for the use of non-original spare parts.

Before service or maintenance of the equipment is carried out, inform relevant personnel and put warning signs on prominent places. Switch the main power off and lock it with a padlock.

Depressurize and allow the equipment to cool and make sure that it is completely empty before maintenance.

Only use original spare parts.

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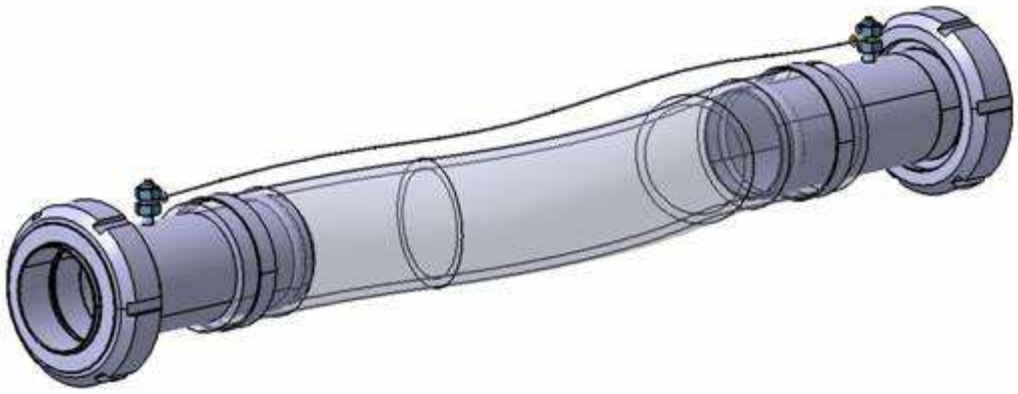
OPERATIONS AND MAINTENANCE MANUAL

CHAPTER 4: INSTALLATION MANUAL

4. INSTALLATION MANUAL

4.1 CONDITIONS PRIOR TO START UP OF EQUIPMENT

- Regarding the risk of powder explosion in the powder funnels all powder types to be used must be approved by TP Scanima.
- Regarding the risk of spark generating and the risk for powder explosion the powder funnel and mixer tank must each be connected according to the existing rules. The connection to the ground has to be with a cobber wire of minimum 16 mm². The connection shall be from the leg on the powder funnel (above the load cell) and the leg on the mixer (above the load cell) to the ground.
- Regarding the risk of spark generating and the risk of powder explosion there have to be a potential equalization over any isolated connection (flex hoses, compensators etc., see example on sketch.) between the powder funnel and mixer and between the powder funnel and other connected equipment. The potential equalization has to be with a copper wire of minimum 16 mm² according to the existing rules.



- Regarding the risk of rising surface temperature and powder explosion there may not be used or mounted other type of equipment than delivered from Scanima (ex. Sight glass light, mechanical shaft seal, gear etc.)
- The electrical control system and function of the plant have to be approved by TP Scanima before start up of the plant.
- The plant may not be used before it is installed and every safety device is connected and the equipment is declared in conformity with the existing standards.
- It is not allowed to change the equipments construction, handling, capacities, electrical installation etc.
- The equipment may only be operated by trained personal.

- If the safety regulations are disrespected there is a risk for personal injury.
- It is not allowed to disconnect the safety switches
- Be careful not to drop any hard object of metal, plastic etc. down in the equipment
- Do not place any object under the mixer because it is blocking the access way to the V-belt .They have to be changed occasionally. Remember when lifting the fundament to do it on the 2 edges and not on the middle.
- Consider always the electrical equipment as live and all pipes and tanks as hot.

4.2 PREPARATORY WORK

Prior to delivery, the premises should be made ready to receive the equipment. Prepare:

- Floor (quality, load, surface)
- Foundations (if applicable)
- Ventilation (if applicable)
- Lifting devices (if applicable)
- Insulation (if applicable)

Check that doorways and passages are of sufficient width and height to allow the facility to pass with no obstructions.

4.2.1 SERVICES

To facilitate the installation and to save time, the required services should be installed in advance:

- Floor drains are necessary to collect liquid waste from the facility.
- Service water supply
- Steam supply for the steam system
- Power supply for electrical components
- Compressed air supply for the pneumatic system
- Surrounding air might get in contact with the product via ventilation or vacuum regulation of the vessel. Observe that air quality must fulfil requirements so it does not contaminate the product. Refer to relevant documentation concerning air quality requirements.

4.3 TRANSPORT & LIFTING INSTRUCTIONS

To avoid damage during transport, the mixer is wrapped in a plastic seal. Do not remove this seal before the transportation work is complete.

In general the vessel is disassembled from motor foundation if total height of mixer is above 2300mm. The total height can be seen on layout drawing in chapter 9. If vessel is disassembled from foundation it will lay down horizontally on a cradle. On separate pallet the motor foundation with motor, transmission etc. will be placed.

To install mixer do following:

1. Unload vessel and motor foundation from truck by using a fork lift.
2. Take the vessel and motor foundation to installation area
3. Remove the transportation belts and lift the vessel into vertical position by lifting with a crane or forklift in the lifting lugs (if no lifting lugs use flanges) in the top of the vessel is in horizontal position.

CAUTION: The vessel has to be lifted free from transportation pallet before turning into vertical position in order to avoid damage on insulation shell

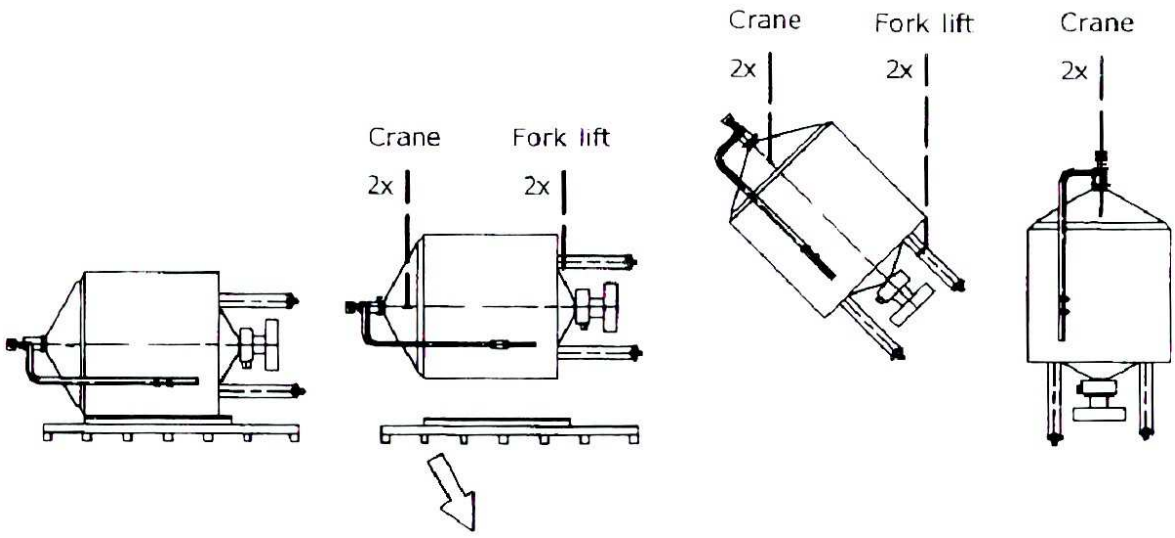


Figure 4.1: Lifting the vessel and placing in vertical position

4. Remove the transportation belts, funnel and tubing and lift the transmission part up and remove the transportation pallet using a crane and a forklift.
5. Place the transmission on a mobile pallet lift and move the transmission underneath the vessel and assemble the two components by fastening all bolt connections. (4-bolt connections at vessel legs and 7 inside the transmission). Bolts, screws and washers are to be found in a box fastened onto the transportation pallet. For further detail please see section 4.4.7

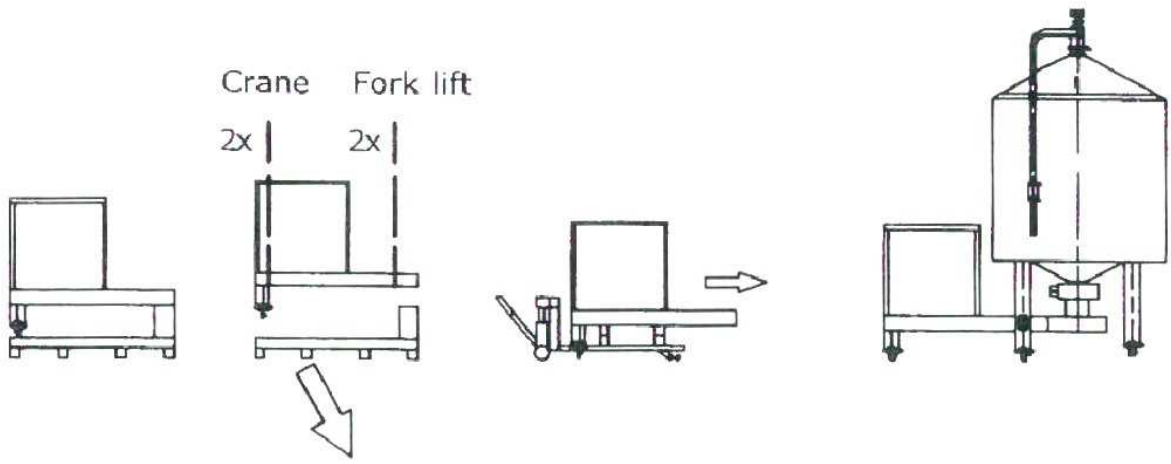


Figure 4.2: Lifting the motor foundation from transportation pallet and assembling with vessel

6. The assembled vessel and transmission is to be lifted by a crane or forklift by using equipment that is able to lift two points at least at the same time. Lift mixer to correct spot. Make sure all connections are tightened and level up mixer on machine feet.

   CAUTION: All bolts connections has to be assembled before any further lifting can take place

7. Piping, vacuum etc can now be assembled on mixer

During all operation no steel chains are allowed in direct contact with vessel or motor foundation.

4.4 INSTALLATION INSTRUCTIONS

4.4.1 REQUIREMENTS OF PERSONNEL

Operation by unauthorised personnel may endanger personnel and property. TP Scanima recommends following personnel.

Electrician

Certified according to local regulations. At least 3 years of experience of similar types of installations. Proven skills in reading and working from drawings and cable lists. Knowledge of local safety regulations for power and automation. Furthermore, the electrician must ensure that the electrical installation, including the equipment or device where the work has been carried out, has been adequately checked regarding the safety of personnel and property before it is put into operation.

TIG welder

At least 3 years of experience of similar types of installations, including argon gas welding with stainless steel, thin-walled material. Proven skills in reading installation drawings and isometric drawings.

Utility welder and erector

At least 3 years of experience of similar types of installations covering arc and gas welding in e.g. steam pipes and compressed air pipes. Proven skills in reading installation drawings and isometric drawings.

4.4.2 STORAGE

To avoid damage of the equipment during storage, it should be stored indoors, warm (10°C to 40°C) and dry (20%-85% humidity).

4.4.3 TRANSPORTATION AND UNLOADING

The equipment is packed properly from the factory in consideration of the means of transport. The mixing plant should be treated carefully though.

During transport, using a forklift truck or pallet lifter the equipment can be lifted from underneath the motor foundation. Be aware of pipes and cables placed under the equipment when lifting.

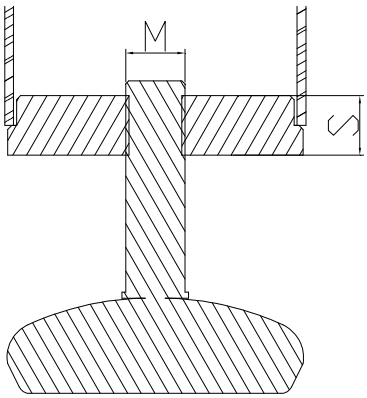
4.4.4 UNPACKING

Unpacking the equipment should take place very gently.

After testing at TP Scanima, parts of the equipment may be disassembled into smaller "easier to handle" units that will need to be reassembled on site.

4.4.5 POSITIONING AND ERECTION

The equipment should be placed on a level floor and should be levelled before fitting pipes and other connections. When the mixer is levelled it is important that the machine feet are screwed a minimum distance into fittings in mixer leg. This distance depends on thread diameter, according to below figure and table:



Thread diameter M	Minimum distance S
M20	22mm
M24	27mm
M52	55mm

4.4.6 LOAD CELLS

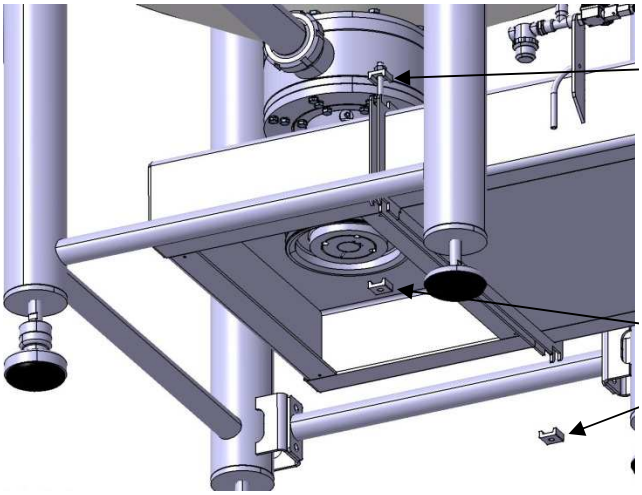
Load cell calibration

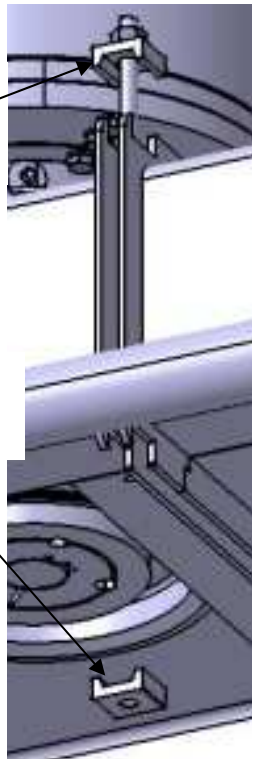
When mixer is installed and level correct, the load cell calibration must be checked. Use known weight of app. 80-120kg. Applied load over each load cell, one at a time. If there is deviation on output (either measured by mV signal or read from control panel) higher than equal to ± 1kg, the legs of the mixer must be adjusted further. The load cell with highest deviation must be adjusted by turning the foot of the load cell.

When calibration is satisfactory, mixer is filled with known amount of water. Load is controlled (measured by mV signal or read from control panel), and if necessary the gain on the amplifier is calibrated. For further information on this, please see suppliers' manual for amplifier, or if mixer is supplied with MCC from TP Scanima please refer to spare parts section 9.

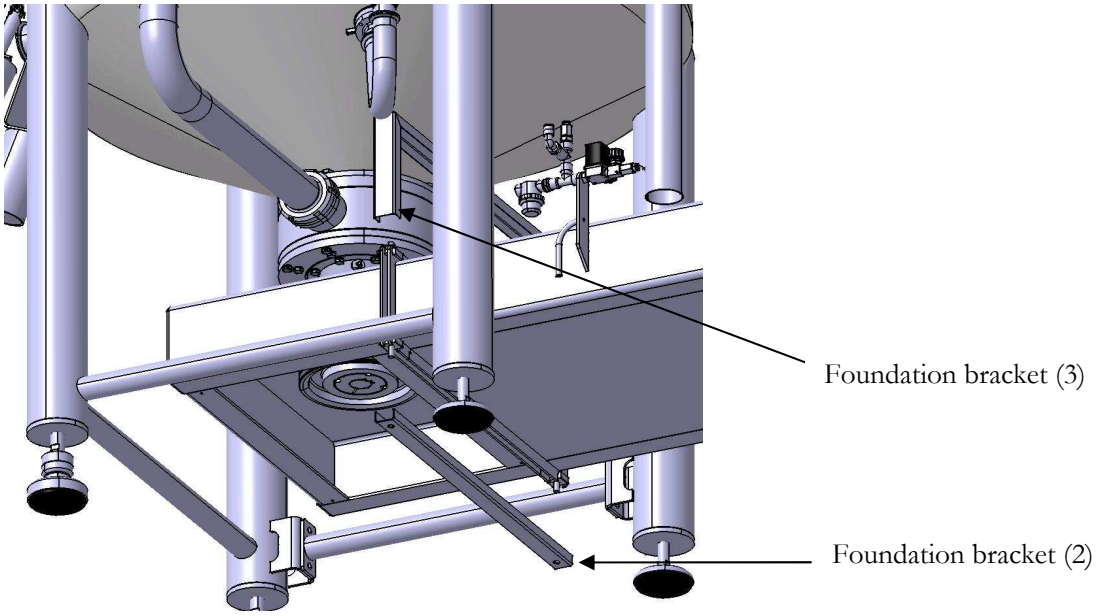
4.4.7 MOUNTING THE MOTOR- AND TURBO UNIT FOUNDATION

The motor foundation must be installed and supported properly, before the motor foundation and turbo unit foundation can be connected.

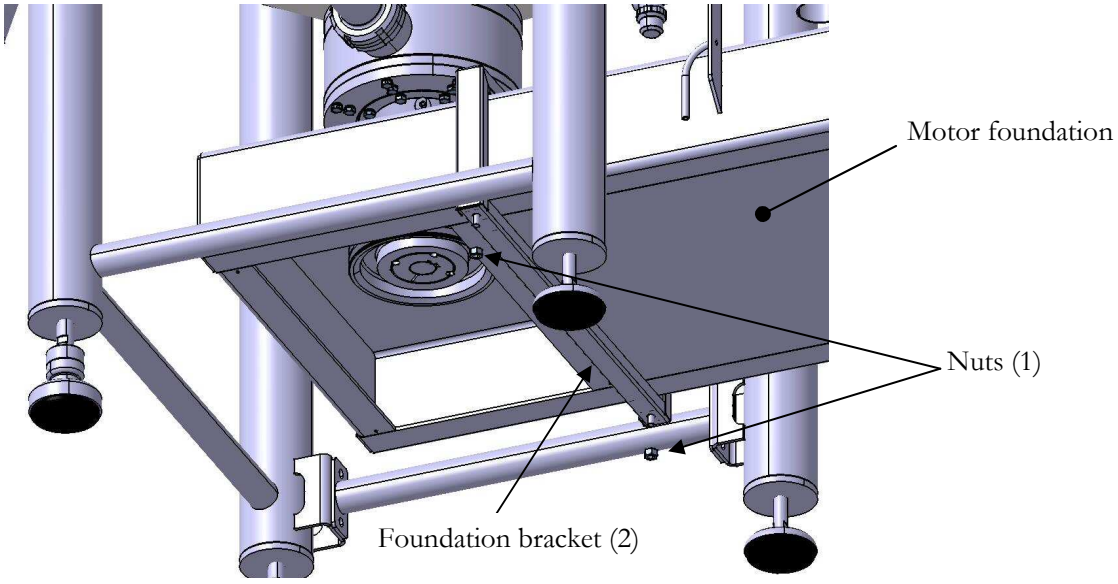




- Turbo unit installed on vessel
- Assembly the foundation clamps, bolts and nuts (5) and the Threaded foundation clamps (4)



- Assembly the foundation bracket (2) & (3)



- Assembly the nuts (1) holding the Foundation bracket (2)

4.4.8 CONTROLLING THE V-BELT TENSION

Tension of the belts on a V-belt drive is usually not critical. A few simple rules will satisfy most requirements.

The best tension is the lowest tension at which the belts will not slip under the highest load conditions i.e. water - the highest current consumption

Check the tension frequently during the first day of operation

Check the tension periodically after this

Keep belts and pulleys free of any foreign material which may cause slip

If a belt slips, tighten it.

Caution:

With too much tension on the belts, jarring sounds will be heard from the bearings. **Too much tension will shorten belt and bearing life!**

Life-time

The lifetime of the bearings is based on a working time of about 5,000 hours. When overloading, for example, at a too large V-belt tension, when missing lubrication or leaking oil seals, the lifetime will be considerably reduced.

If jarring sounds are heard from the bearings, it is recommended to check and possibly replace them. While the service is carried out, it is recommended that all bearings be replaced.

The shaft seals, the O-rings, drive seals, etc. can also last for about 5,000-10,000 hours at normal operation. However, operation time will be considerably reduced if running dry.

It is, however, recommended to replace all seals in connection with a possible disassembling, irrespective of the cause.

4.4.9 CONNECTIONS

Connections sizes are indicated on the Flow sheet and location can be seen on Layout Drawing. Please see section 9 for further information on this matter.

4.5 SERVICE CONNECTIONS ON TURBO UNIT

Following notations will be used throughout this section with service connections:

A = Service water inlet, cooling jacket

B = Service water outlet, cooling jacket

C = Service water inlet, mechanical shaft seal

D = Service water outlet, mechanical shaft seal

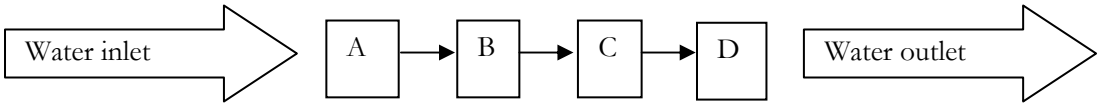
E = Service air inlet, stator up

F = Service air inlet, stator down

G = Grease nipple

H = Grease plug/overflow (connected to grease collector if supplied)

From factory the mixer is configured so the service water enters the mixer unit at one point, and returns again from one point. This is done by looping outlet from cooling jacket to inlet shaft seal, i.e. the service water is in serial connections.

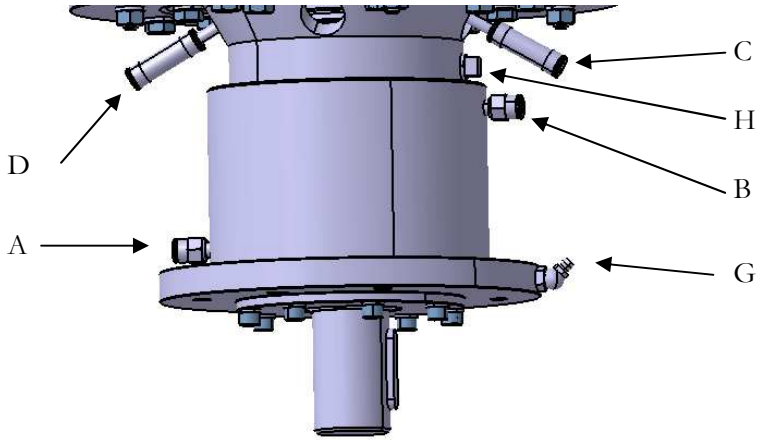


IMPORTANT NOTICE:

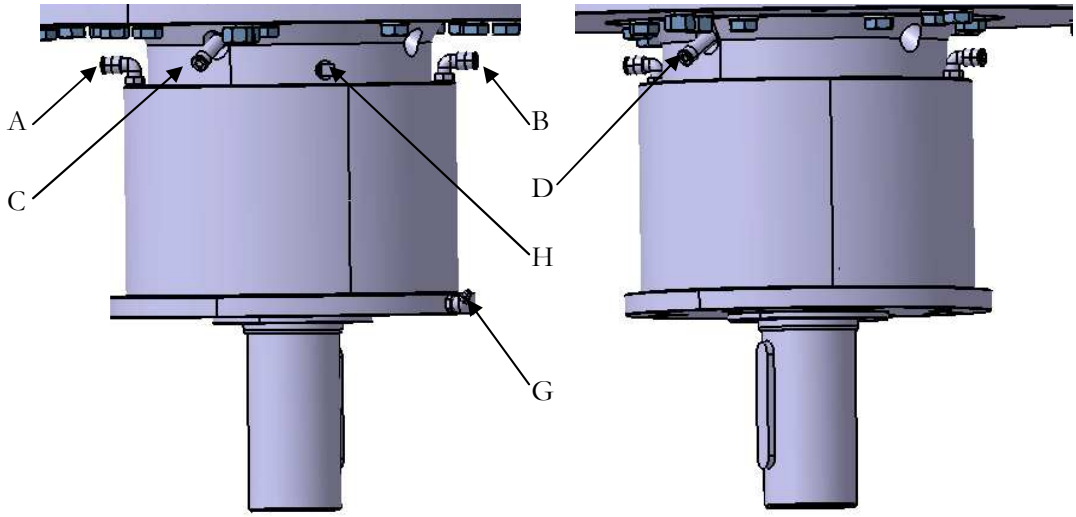
If mixer unit is bought as an USDA accepted unit the service water must NOT be in serial connection. To fully comply with USDA requirements for Safe Water the service water for the shaft seal must be supplied separately.

4.5.1 INLINE- AND STATIC BATCH TURBO UNIT

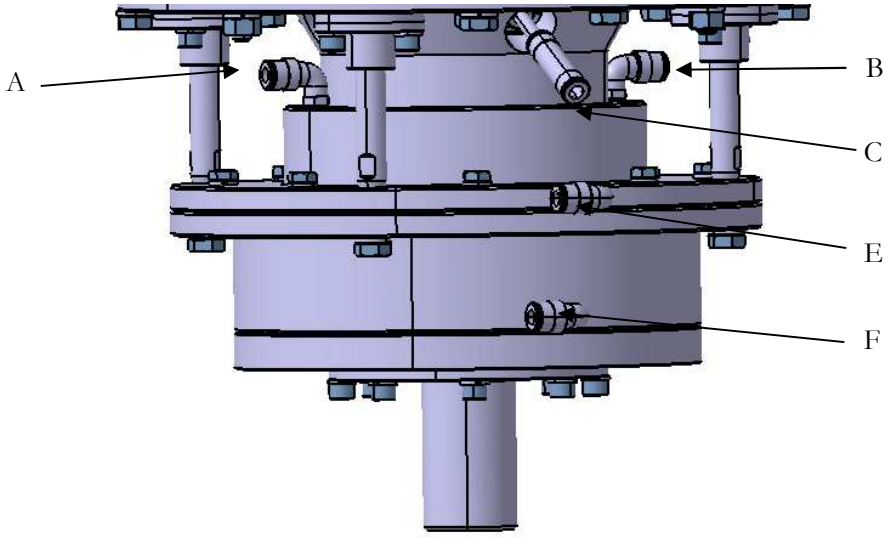
Ø200 and Ø300 sizes:

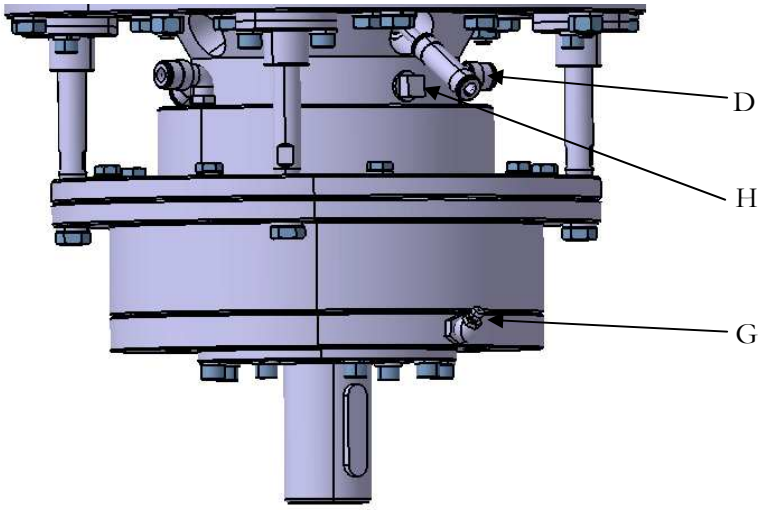


Ø400 size:



4.5.2 DYNAMIC BATCH TURBO UNIT





4.6 GENERAL RECOMMENDATIONS FOR SERVICE MEDIA

The following specification is a short description upon the recommended quality demands for the service media to be used in a TP Scanima process plant

4.6.1 STEAM (S)

- The steam shall be of good quality and free from condensate air.
- The steam supply line should be equipped with a pressure controller in order to maintain a constant feed pressure
- Condensate traps should be provided close to the process line, in order to produce dry steam
- A master shut off valve should be installed in the steam supply line.
- The steam pipes should be insulated.
- Before connecting the steam supply to the process line the pipe should be blown clear with repeated blasts of steam, lasting 5-10 minutes.

Requirements of steam

Steam supply must be of a quality satisfactory for the product. The general requirements of steam are:

Direct steam	Max 4 bar
Indirect steam	Max 4 bar
Working pressure	4 bar

Characteristic of steam (applicable for dimple jacket also)

Quality	dry saturated steam

Humidity	max 5% condensaten
pH	8,5-9,2
Carbon dioxide	max 2 ppm
Chloride	max 2 ppm
Turbidity	max 3 ppm $KMnO_4$

Characteristic of saturated steam for direct injection

Quality	dry clean steam satisfactory for the product
Humidity	max 5% condensaten
pH	7-8
Chloride	max 7-8 ppm
Solid particles	max 0,5 mm
Turbidity	max 3 ppm $KMnO_4$
K and Na	max 0,01 mg/kg
Fe	max 0,02 mg/kg
NO_2	0,02 ppm
Conductivity	0,3 uS

No trace of organic matter

4.6.2 CONDENSATE (C)

The condensate system should be designed upon the same capacity pressure and temperature demands as for the steam generating system.

Collection of the condensate should be:

- Without back pressure, otherwise the condensate needs a pump to be sent back to the boiler.
- With back pressure, max. 0.5 bar

4.6.3 REQUIREMENTS OF INSTRUMENT AIR

Water will condense within the pneumatic system varying in quantities determined by the humidity of the input air, the temperature of air before and after the compressor. In order to avoid condensation, the air must be kept dry.

Dirt in the form of solid particles down to the size of 0.01mm must be filtered off. The filter must be positioned in order for easy inspections. The filters must be inspected regularly and their inserts must be replaced whenever necessary.

The air supply line must include a master shut off valve

Recommended pressure: 6-8 bar.

4.6.4 REQUIREMENTS OF WATER

Water used in the mixer must be soft and clean in order to avoid deposits in vital parts. Deposits due to water of inferior quality circulating in the mixer can cause malfunctions. The hardness (high concentration of Calcium carbonate $CaCO_3$) of the water is important, as it could be one of the ingredients in the product. Additionally, if the water is hard, deposits will accumulate in all parts getting in contact with the water. This process will accelerate at high temperatures.

Recommended hardness: <7° dH

Water used for cooling, product flushing, rinsing and cleaning should meet the requirements of the European drinking water directive or equivalent.

Temperature of cooling water must not exceed 25°C. Pressure should be min. 1 bar and maximum 3 bar.

4.6.5 SERVICE WATER TURBOUNIT

Service water is used at the turbo unit to cool down the bearing house, and as service water to mechanical shaft seal. Service water enters the turbounit at the cooling house before going into the mechanical shaft seals. This to minimize the difference in water pressures against the mechanical shaft seal. From mechanical shaft seal the water goes to drainage.

The amount of water going into the turbo unit should be adjusted when mixer is running. The drain waters temperature should be app. 35°C-40°C. Amount is adjusted on service water needle valve. Normally the mixer will use app. 20 l/hrs of water. Caution not to add to high pressure on the water. This will damage the shaft seal. Maximum pressure on service water should be 3 bar, minimum pressure to ensure cooling is 1 bar.

4.6.6 SERVICE WATER VACUUM PUMP

Service water is used at the vacuum pump. Water is going into the water reduction tank (noise and water reduction system) in mixers motor cabinet. Water flow is adjusted at needle valve so temperature in water reduction tank is app. 35°C-40°C when vacuum pump is running.

4.6.7 SERVICE AIR AT TURBOUNIT

If your mixer is equipped with a dynamic stator, air is used to move stator up and down. The system works as a normally pneumatic cylinder. If your mixer is bought with control system, this will work from factory. If you have bought a TP Scanima mixer without control system, it will be delivered from factory without pneumatic valves for the stator lift. We recommend using either one 5/2way valve or two 3/2way valves to control the movement of the dynamic stator.

Lowest air connection point on Turbounit lowers the stator; highest air connection point on the Turbounit lifts the stator.

4.7 TAKING MIXER INTO OPERATION

The mixer unit should not be operated before it is installed and all safety devices are connected, and the complete machinery is declared to be in conformity with applicable standards.

All operators and other personnel operating this facility must go through this manual before any operation with the facility begins. The word "operator" is defined as all personnel working around the facility, ordinary operators as well as any other employee working the vicinity, i.e. loading materials, cleaning, maintenance etc. Only personnel operating the facility are allowed entrance near the facility.

Only trained personnel are allowed to operate the equipment..

No person under the age of 16 is allowed entrance near the facility.

PLC or controlsystem must be tested and approved regarding safety issues prior to start up of mixer.

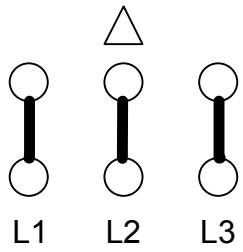
4.7.1 RUNNING THE MIXER UNIT FOR THE FIRST TIME

Make sure that the bearing house is filled with grease before starting up for the first time. When running for the first time, the temperature inside the bearing house will eventually be increased. The grease temperature will then also be increased. This will result in grease expansion due to high temperature, and an excessive amount of grease will overflow trough the grease plug. Please also refer to the Maintenance section for re-greasing the mixer unit.

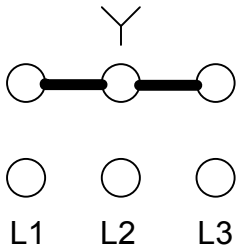
4.8 MOTOR CONNECTION SCEME AND VOLTAGE

Motor signature data:	Mains power supply:			Motor Rpm:	
	3x200..240	3x380..420	3x440..480	2 Poles	4 Poles
230/400 volt – 50 Hz △/Y	△ (III)	Y (--)	-	2810	1420
277/480 volt – 60 Hz △/Y	-	-	Y (--)	3400	1720
400/692 volt – 50 Hz △/Y	-	△ (III)	-	2810	1420
480 volt – 60 Hz △	-	-	△ (III)	3400	1720

Connection type Delta: Low voltage = △ (III)



Connection type Star: High voltage = Y (--)



Note: Connection of motors for 3x220 volt 60 Hz can only be done with specially manufactured motors or with oversized motors, for example 7,5 kW-> for 5,5 kW operation.

Special motors or oversized types must be used for 3x200 volt (operation limit 180..210 volt).

4.8.1 SAFETY INSTRUCTIONS:

- Motors may only be installed and commissioned by skilled electricians
  - Before bringing the motor in operation for the first time, the following conditions must be fulfilled:
  - The installation must be checked for any damage and incorrect connections on the motor, wiring and cables
  - Safety circuits must be checked for correct operation before switching on the power on the motor
    Voltage on motor signs and connection types must be checked for correct connection with the help of the attached information

- The motor and any earth wires need to be correctly connected with the ground before switching on the power on the motor
- Before starting the motor, all high-voltage parts >50 volt must be safely covered and the isolation of the electrical parts must be checked and approved.
- The correct rotation direction must be checked shortly after switching on the power on the motor. If the rotation direction is incorrect, the motor must be stopped and the wiring must be corrected **only when the mains voltage has been safely disconnected**.

- When running the motor for the first time the actual motor current FLA for e.g. phase needs to be measured and must not be higher than 10% of the nominal motor current over a short period of time. See also the motor sign plate.
- The setting and the function of the motor overload system must also be checked.

4.9 CONDITIONS FOR OPERATING THE DIMPLE JACKET (IF APPLICABLE)

4.9.1 STEAM AND CONDENSATE CONNECTIONS

It is important that the steam supply to the dimple jacket is supplied with dry and clean steam, in accordance with good steam engineering practice. Also refer to the "General recommendations for service media".

It should also be ensured that all connecting pipe work is stress free and adequately supported. The steam supply should always be maintained at the specified design pressure and temperature for the unit. The steam jacket must not operate above the maximum steam pressure and temperature indicated on the mixer name plate. The installation of an appropriately sized safety valve, to protect any lower pressured equipment on either the primary or secondary side of the jacket, is strongly recommended. TP Scanima supply a range of traps, strainers, separators, safety valves and pressure reducing equipment.

4.9.2 SHOCK HEATING OR COOLING.

The definition of shock cooling of dimple jacket heat transfer surface is to cause a change in cooling or heating media of more than 4° C per minute.

Rapid temperature changes causes an unequal rate of thermal expansion between vessel wall and the dimple jacket resulting in high operating stresses in the dimple jacket and welds. Examples of this are instantaneously switching from steam to cooling water or instantaneously switching from cooling water to steam.

Thermally shocking dimple jackets will shorten the service life and may cause unscheduled down time.

The warranty on the vessel does not cover any damages caused by thermally shocking the dimple jackets.

It is recommended that when switching from steam to cooling water one of the following procedures be followed.

A

Vent steam out of jackets and completely drain condensate.

Blow jackets out from top to bottom with compressed air.

Close vents and slowly introduce coolant into jackets to prevent thermal shocking.

B

Vent steam out jackets and completely drain condensate.

Let jackets cool down

When jackets are cool, close vents and introduce cooling water.

C

Vent steam out of jackets and completely drain condensate.

Close vents and slowly introduce cooling water at a rate taking approximately 10 minutes to fill jacket from bottom to top

When jacket is 100% filled, slowly increase flow to predetermined process conditions.

D

Vent steam out of jackets and completely drains condensate.

Close vents and slowly introduce hot water to dimple jacket.

Increase flow rate to process conditions and decrease water temperature at a rate less than 4°C per minute to predetermined process conditions

4.9.3 DESIGN PRESSURE OF DIMPLE JACKET

Allowable pressure in dimple jacket depends on temperature. Below table gives values, where pressure PS is bar overpressure [baro].

PS [baro]	Temp [°]
6,5	20
5,2	100
5,0	150

For values in-between interpolation is allowed.

4.10 TAKING DOWN INSTRUCTIONS

In the event of taking down and disposal of the equipment please refer to local authorities that all disposals must be done in accordance with local authority regulations.

For efficient dismantling of modules use:

- Machine layout
- Flow diagram
- Components instructions

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CHAPTER 5: CLEANING OF EQUIPMENT

5. CLEANING

Tetra Pak Scanima mixers are ready for C.I.P cleaning (Clean In Place). Vessel is equipped with spray-balls and all design and manufacturing is done under consideration of cleaning of the plant.

Cleaning may be undertaken according to the customer's own wish and choice. As all equipment getting in contact with the product it is made of stainless steel, it is easy to clean the equipment.

Electric control panel should be cleaned with care and that it must be closed while cleaning. Direct water splashes and drops may cause destruction of the very sensitive electric components in the panel.

Please also avoid water spill on the V-belts connected to the turbo unit underneath the plant.

Direct splashing of all electric motors and electrically controlled valves should also be avoided.

Never clean electric equipment with high pressure cleaning equipment. Do not use cleaning agents on electric equipment.

5.1 GENERAL RECOMMENDATIONS FOR INSIDE CLEANING

The following description is under the assumption that C.I.P. program is implemented in the operating software, and is meant as a guideline on how a C.I.P. sequence can be programmed.

5.1.1 FIRST RINSE

The rough cleaning can be done manually by a brush and pressure water hose. Depending on the available amount of water it can also be done by opening valve to the CIP spray ball. The CIP program can now make a rough cleaning. After first rinse the vessel is controlled before entering alkaline cleaning.

5.1.2 ALKALINE CLEANING

For alkaline cleaning following is recommended:

Detergent:	caustic soda.
Concentration:	1-1,5%.
Temperature:	70-75°C.
Time:	10-20min.
Mixer speed:	20%
Agitator speed:	20%.

For the last 5 minutes the mixer- and agitator speed is set to 100%. If mixer is with dynamic stator, the stator is lifted up and down in sequence of 30 seconds.

Depending on the control system for the mixer, alkaline cleaning can be done manually, semi automatic or automatic.

During alkaline cleaning, all valves and routes on flow sheet must be flipped in reasonable sequence. If vacuum pump is to be cleaned it must be started 2-3 times and run for 30 seconds each time. If this is done, it is important that vacuum pump also is cleaned with water afterwards.

After cleaning CIP-liquid is disposed to storage tank or drain.

5.1.3 SECOND RINSE

Rinse must be performed to get rid of CIP-liquids left in the tank. The CIP-liquid will be on all surfaces, so this first rinse is done by taking water in over spray-balls and then flushing directly to drain. If piping is to be rinsed, these are flushed before taking CIP-liquid to drain.

5.1.4 THIRD RINSE

Water is taken into vessel through spray-balls. The water is circulated in same sequence as the alkaline cleaning.

After 20 minutes drain to floor. Mixer is now clean.

5.1.5 ACID CLEANING

Acid cleaning is done once or twice every week depending on the hardness of the water and the product made on the mixer. If Acid cleaning is done, this can be done in between second and third rinse. However, after acid cleaning rinse "Second rinse" must be performed once again!

Acid cleaning is recommend as:

Detergent:	Nitric acid, HNO_3
Concentration:	0.5%.
Temperature:	50°C.
Time: 1	0min.
Mixer speed:	20%.
Agitator speed:	20%.

For the last 5 minutes the mixer- and agitator speed is set to 100%. If mixer is with dynamic stator, the stator is lifted up and down in sequence of 30 seconds.

Follow the same procedure as described for the alkaline cleaning except never run the vacuum pump with acid.

5.1.6 STERILISATION WITH HYDROGEN PEROXIDE

Follow the same procedure as described for the alkaline cleaning.

Detergent:	H_2O_2
Concentration:	0.3%.
Temperature:	max 30°C.
Time:	3-5min.

Mixer speed: 20%.

Agitator speed: 20%.

After 3 minutes the temperature can be taken up to 85-95°C. H_2O_2 will be split into H_2O and O_2. Thereby the normal rinse after sterilisation is not necessary. Just drain the tank.

5.1.7 STERILISATION WITH STEAM

Use direct steam to reach desired temperature.

5.1.8 VACUUM SYSTEM

It is recommended to run the vacuum pump a few times during C.I.P (but never with acid). Run the vacuum pump for 30 seconds two or three times.. During the last rinse with water, after alkaline or acid cleaning, the vacuum system must be flushed properly with water to avoid corrosion of the vacuum pump. Let the vacuum pump run at least 30 seconds in order to clean the pump.

5.1.9 VACUUM SYSTEM WITH SHUT-OFF VALVES

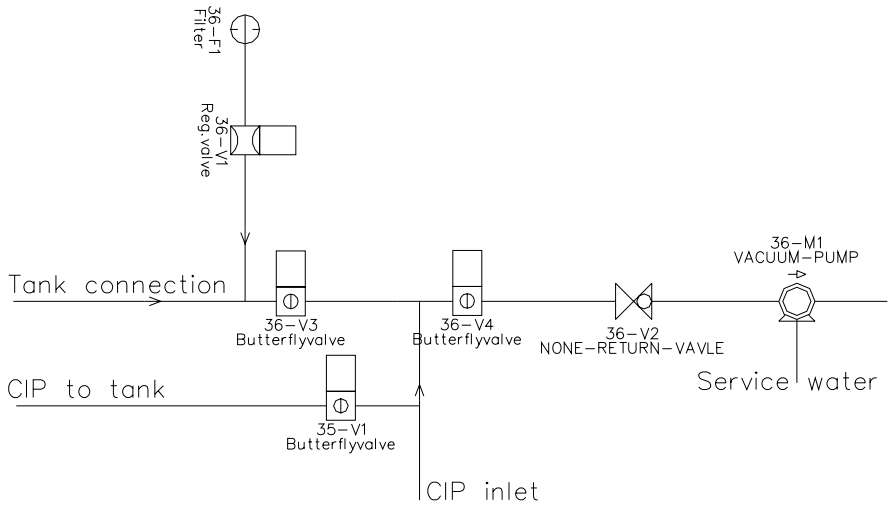

Figure 5.1: Vacuum system with shut-off valves

If vacuum system is build with shut-off valves pos. 36-V3 and 36-V4, the vacuum line can be cleaned without cleaning the vacuum pump. Please refer to flowsheet in section 9 for specific flow sheet.

Cleaning vessel

Open CIP inlet. Open valve 35-V1 to CIP vessel. Keep valve 36-V3 and 36-V4 closed.

Cleaning vacuum line

Open CIP inlet. Open valve 36-V3 to clean vacuum line. Keep 36-V4 closed

Cleaning of vacuum pump

Open CIP inlet. Open valve 36-V4 to clean vacuum pump pos. 36-M1. Keep 36-V3 closed. If vacuum pump is made of cast iron, 36-V4 must be closed at all time during CIP with acid.

5.2 OUTSIDE CLEANING

Cleaning of the outside of the mixer is done by normal manual cleaning. By foam cleaning, first make a rough manual cleaning. Follow the instructions for the specific detergent.

5.2.1 CLEANING FUNNELS

The funnels have to be cleaned manually. The water used for manual cleaning can be sucked into the mixer and used in the C.I.P. In that way the hoses will be cleaned too.

5.2.2 IMPORTANT:

Cover the operation panel. Do not foam the motor. Rinse everything carefully with water to avoid corrosion and long term action on plastic parts.

5.2.3 RECOMMENDED DETERGENTS

Caustic: NaOH, 2% by weight.

Acid: $HN0_3$, 1-2% by weight

Detergents must be dosed gradually to avoid excessive local and temporary concentrations.

Warning: Getting in contact with any of these cleaning agents may result in injury to operating personnel. In case of exposal please refer to the safety data sheet delivered by the supplier or to the safety data sheet described in this manual (see chapter 10).

5.3 CLEANING PRIOR TO FIRST PRODUCTION

Before any production is made on your TP Scanima mixer, it must be cleaned properly by above mentioned CIP procedures. The vessel and its pipework are not ready for production when leaving TP Scanima. They have not been exposed to CIP procedures.

5.4 CLEANING OF SPV-05 POWDER VALVE

Powder line and powder valve must be sucked empty after each production in order to avoid residue powder to harden (due to air moisture etc). The powder valve must be cleaned manually or by a CIP procedure after each production. It is very important to dry out the powder feed line and powder valve after cleaning! Visual inspection of powder valve must be perform to ensure powder valve is clean and dry after cleaning.

If SPV-05 is equipped with bleed air it is important to manually clean this bleed valve and pipe fitting.

If powder connection line to SPV-05 is from above, it is important to disconnect the blind clamp on the SPV-05 after cleaning, in order to make sure the SPV-05 house is drained.

CIP-liquids can be either sucked through the valve and into the mixing vessel using the vacuum pump on the mixing plant or pushed into powder valve by pressure. The powder valve can withstand up to 3 bars pressure during cleaning. CIP-liquids temperature must not exceed 90°C.

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CHAPTER 6: OPERATORS MANUAL

6. OPERATORS MANUAL

Control system made by customer.

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OPERATIONS AND MAINTENANCE MANUAL

CHAPTER 7: ELECTRICAL DOCUMENTATION

7. ELECTRICAL DOCUMENTATION

Control system made by customer.

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OPERATIONS AND MAINTENANCE MANUAL

CHAPTER 8: MAINTENANCE

8. MAINTENANCE

8.1 PREVENTIVE MAINTENANCE

8.1.1 REQUIREMENTS OF PERSONNEL

Skilled mechanic with at least two years of experience in industrial maintenance. Proven skills in reading engineering drawings.

8.1.2 DAILY MAINTENANCE

- Check that service water is running through the mechanical shaft seal. See Figure 8.1
- Check that service water is running through the cooling jacket on the bearing house. See Figure 8.1
- Vacuum system: Check that the vacuum pump is continuously supplied with service water. Reuse of service water is possible trough the re-circulation device. Adjust the service water supply using the needle valve on the re-circulation system so the temperature is 30-37°C during operation.

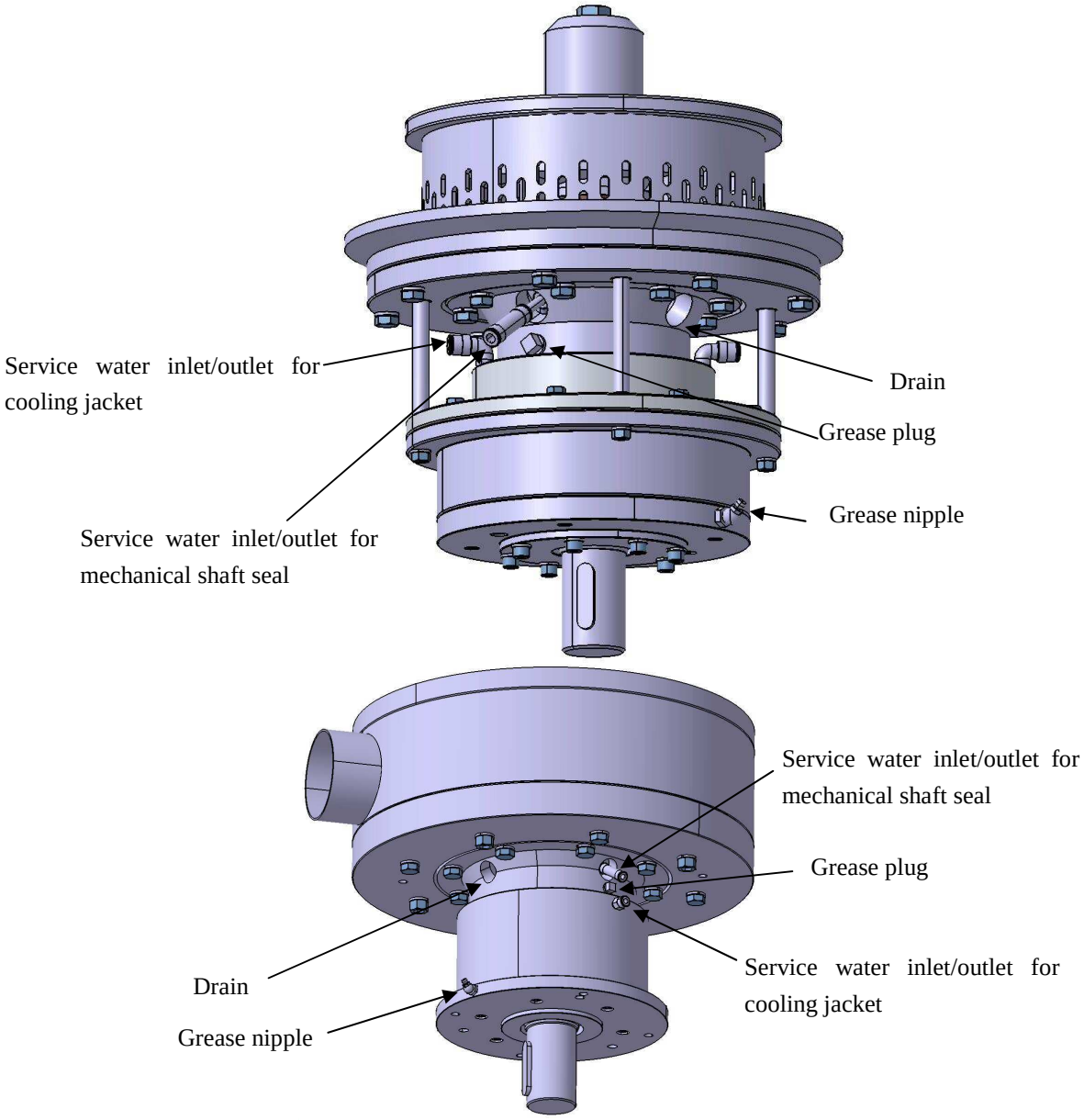


Figure 8.1: Maintenance checkpoints. Upper image: Batch mixer. Lower image: Inline mixer

8.1.3 WEEKLY MAINTENANCE (EVERY 60HRS)

- Check unions for leakage; tighten if necessary.
- Check gaskets for leakage; change if necessary
- Check that the mixing unit is tightened properly
- Check the mixing unit that no water is coming out of upper drain on the bearing house of the mixing unit. See Figure 8.1

- Check that there are no traces of products in the water from the water inlet/outlet on the turbo unit. See Figure 8.1
- Check that agitator mounting bolt is tightened at gear motor

8.1.4 MONTHLY MAINTENANCE (EVERY 240HRS)

- Check bearings on the mixing unit for grease. Press grease into the bearing house by using the grease nipple at the side of the Turbo bearing house until grease comes out of the drain hole (grease plug on bearing house). See Figure 8.1. Always perform this shortly after turbo unit has run so the temperature is high at the bearing house. Never use more than 2-3 stroke on grease lubrication gun to top up the grease level.
- Check V-belt tension.
- If mixer is equipped with grease overflow accumulation the level on this should be checked every month. If filled, empty the grease overflow accumulation.

8.1.5 YEARLY MAINTENANCE

- Check the safety equipment. Let an expert do it. If errors or defects are observed, the responsible person should be informed at once. If the safety equipment is out of operation, usage of the unit should be stopped until the safety equipment is replaced.
- Vacuum system: Please refer to technical documentation for the vacuum pump.

8.1.6 LUBRICATION

Recommended grease type for the mixer unit:

Tetra Pak SCANIMA FOOD-GRADE MIXER AND HIGH LOAD GREASE

0,4kg: JX SCN44-2, item no. 18609

15,9kg: JX SCN44-2/020, item no. 18606

Note: Only use the recommended grease type for the mixer unit. Otherwise the warranty of the mixer unit will be void.

8.2 SERVICE CONNECTIONS ON TURBO UNIT

Following notations will be used throughout this section with service connections:

A = Service water inlet, cooling jacket

B = Service water outlet, cooling jacket

C = Service water inlet, mechanical shaft seal

D = Service water outlet, mechanical shaft seal

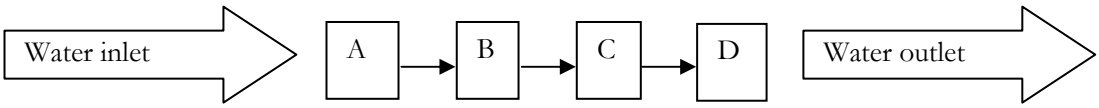
E = Service air inlet, stator up

F = Service air inlet, stator down

G = Grease nipple

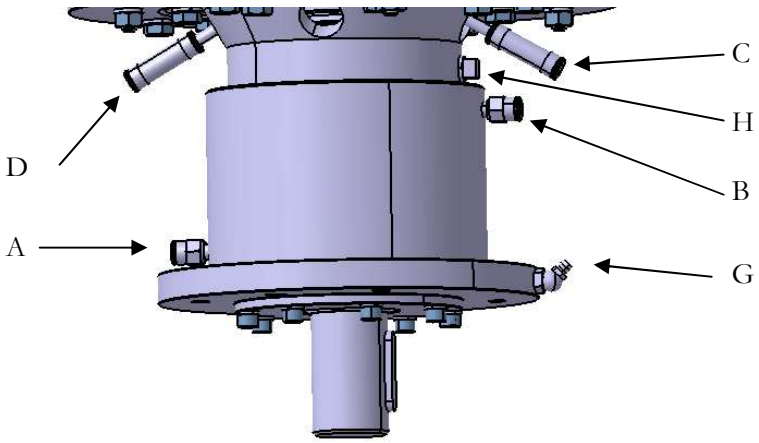
H = Grease plug

From factory the mixer is configured so the service water enters the mixer unit at one point, and returns again from one point. This is done by looping outlet from cooling jacket to inlet shaft seal, i.e. the service water is in serial connections.

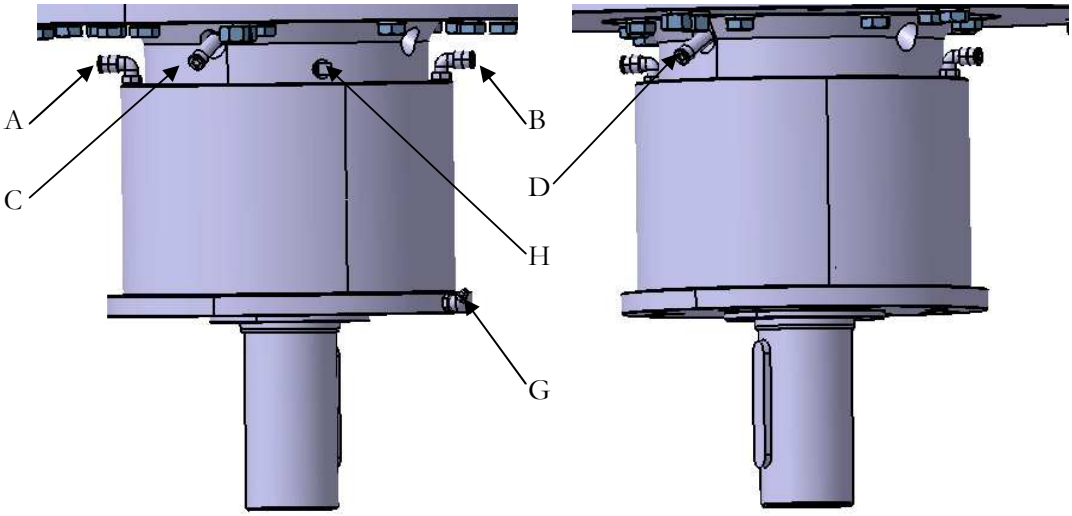


8.2.1 INLINE- AND STATIC BATCH TURBO UNIT

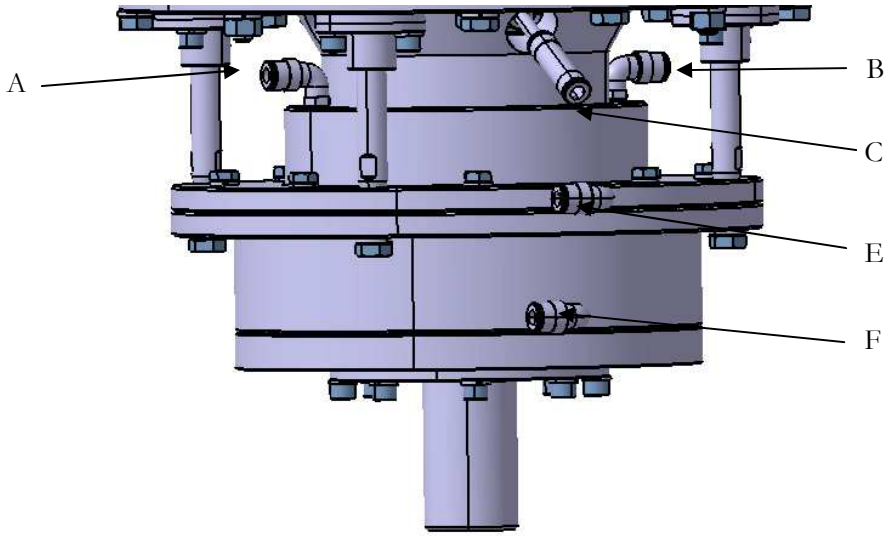
Ø200 and Ø300 sizes:

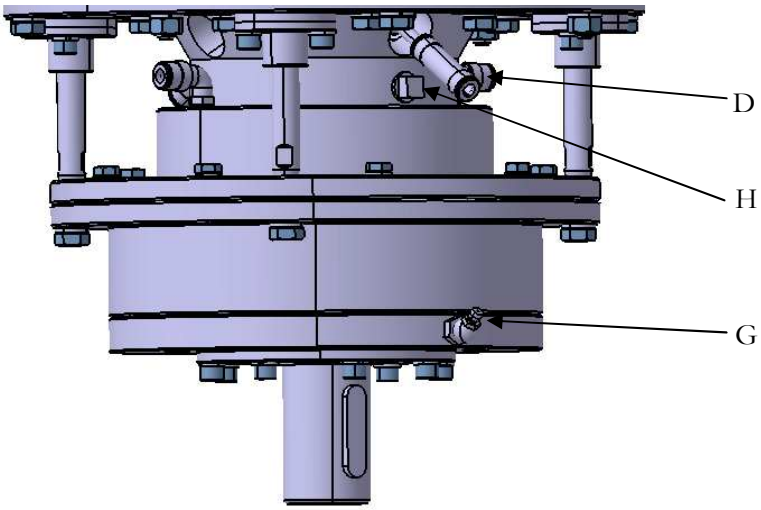


Ø400 size:



8.2.2 DYNAMIC BATCH TURBO UNIT





8.3 MAINTENANCE – V-BELT & MOTOR FOUNDATION

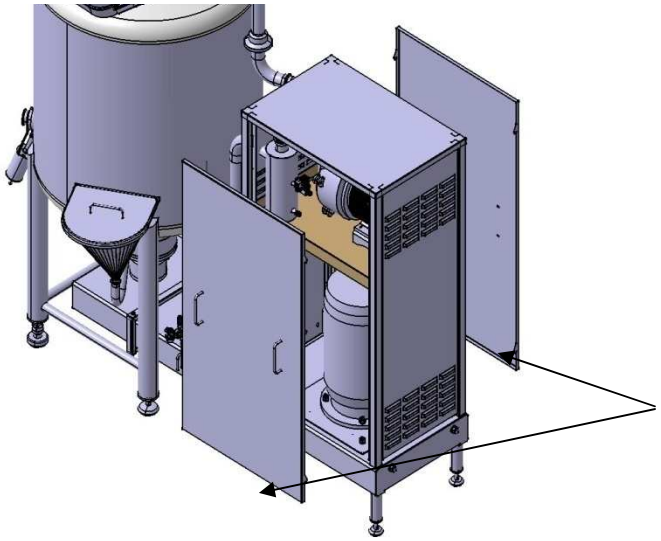
Requirements of personnel

- Skilled mechanic with at least two years' experience of industrial maintenance.
- Proven skills in reading engineering drawings.

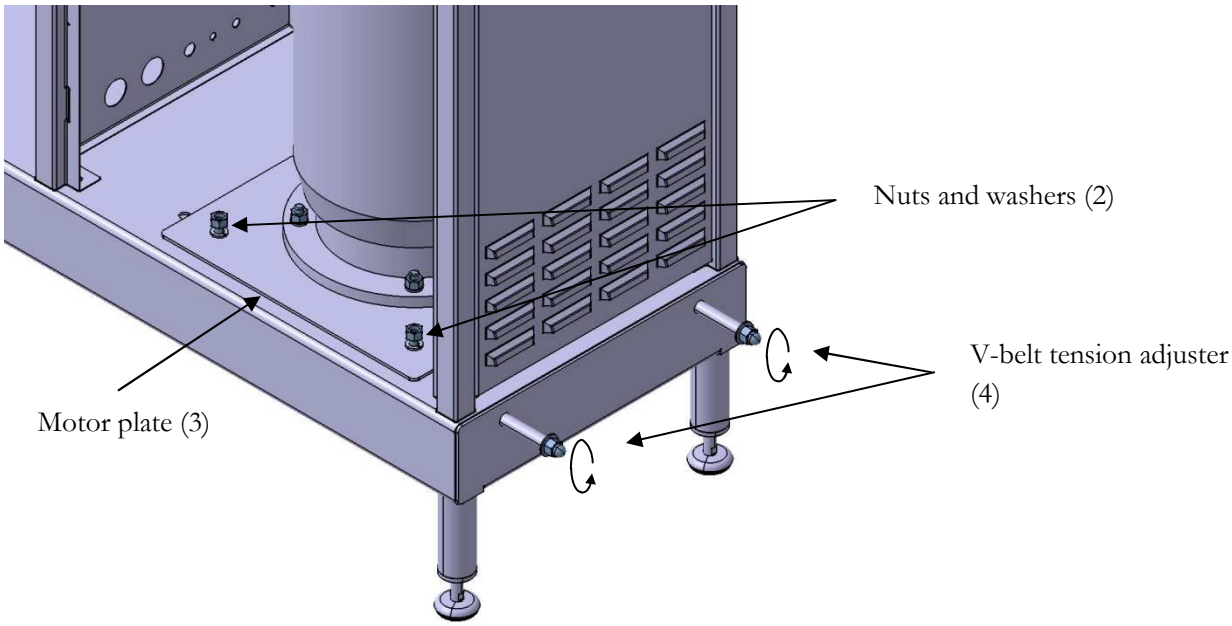
Warning:

Before carrying out any service, make sure that the main power switch is turned to OFF position and locked. Inform relevant personnel.

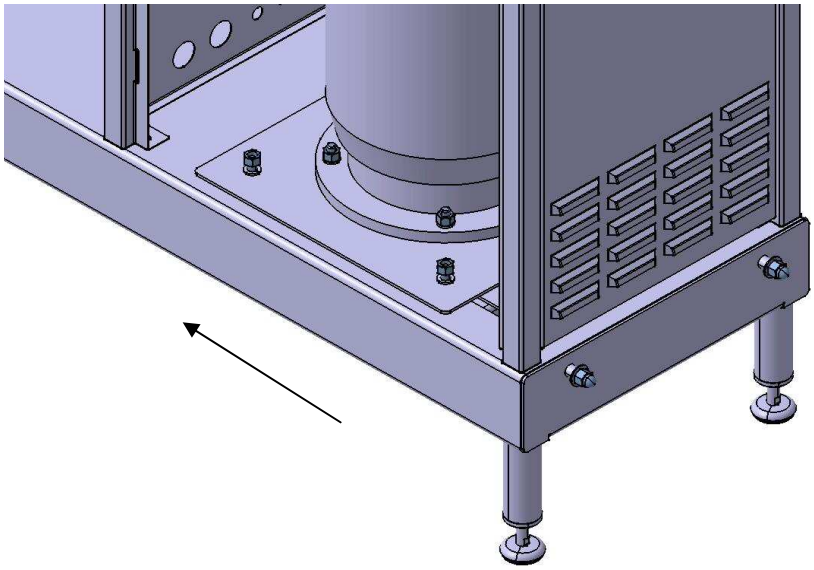
8.3.1 REPLACING THE V-BELTS



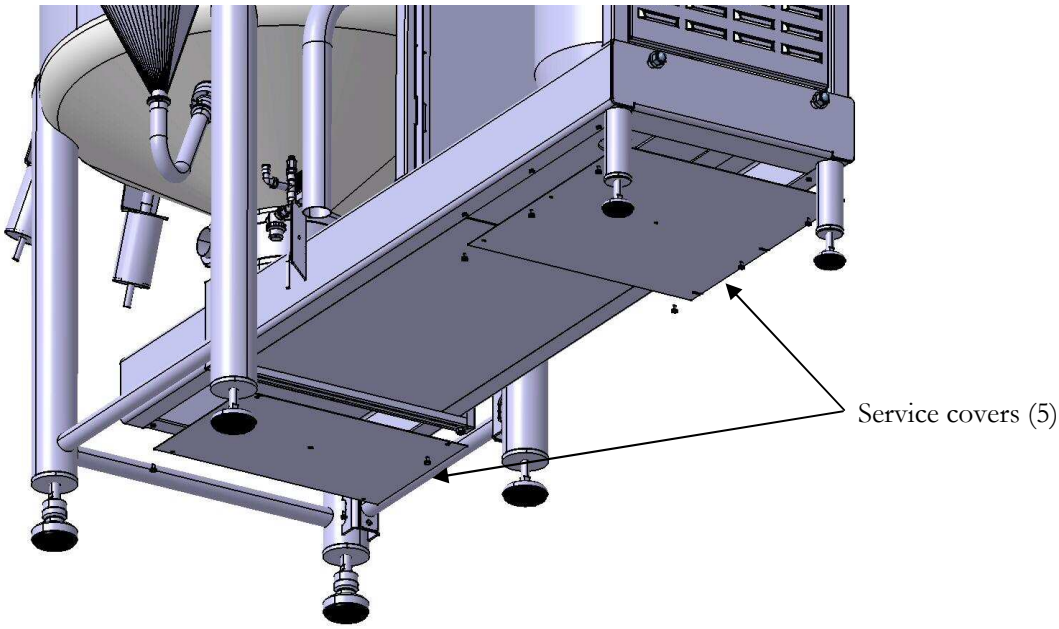
- Remove the Service doors (1)



- Loosen the Nuts and washers (2) holding the Motor plate (3)
- Loosen the V-belt tension adjuster (4)



- Push the motor forward



- Undo the bolts holding the Service covers (5) and remove the covers
- It is now possible to replace the V-belts
- Reassemble in reverse order
- IMPORTANT: when replacing V-belts it is vital to control that drive pulley on electrical motor is levelled correct together with pulley on turbo unit.

8.3.2 CONTROLLING THE V-BELT TENSION

Before controlling the belt tension, the pulley on motor and turbo unit must be levelled correct.

Tension of the belts on a V-belt drive is usually not critical. A few simple rules will satisfy most requirements.

The best tension is the lowest tension at which the belts will not slip under the highest load conditions i.e. water - the highest current consumption

Check the tension frequently during the first weeks of operation

Check the tension periodically after this (monthly maintenance)

Keep belts and pulleys free of any foreign material which may cause slip

If a belt slips, tighten it.

Caution:

With too much tension on the belts, jarring sounds will be heard from the bearings. **Too much tension will shorten belt and bearing life!**

Life-time

The lifetime of the bearings is based on a working time of about 5,000 hours. When overloading, for example, at a too large V-belt tension, when missing lubrication or leaking oil seals, the lifetime will be considerably reduced.

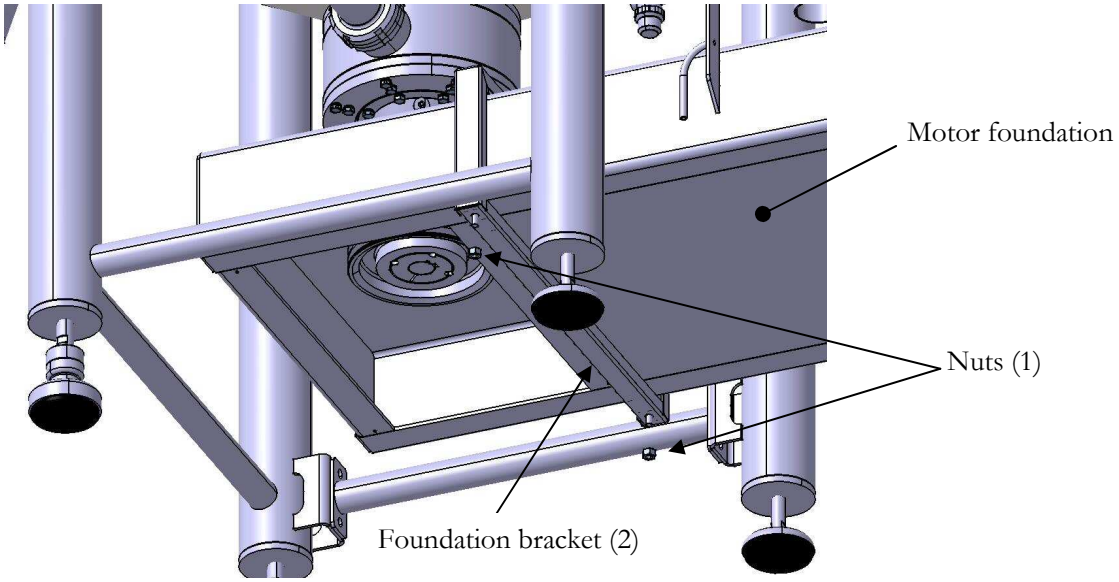
If jarring sounds are heard from the bearings, it is recommended to check and possibly replace them. While the service is carried out, it is recommended that all bearings be replaced.

The shaft seals, the O-rings, drive seals, etc. can also last for about 5,000-10,000 hours at normal operation. However, operation time will be considerably reduced if running dry.

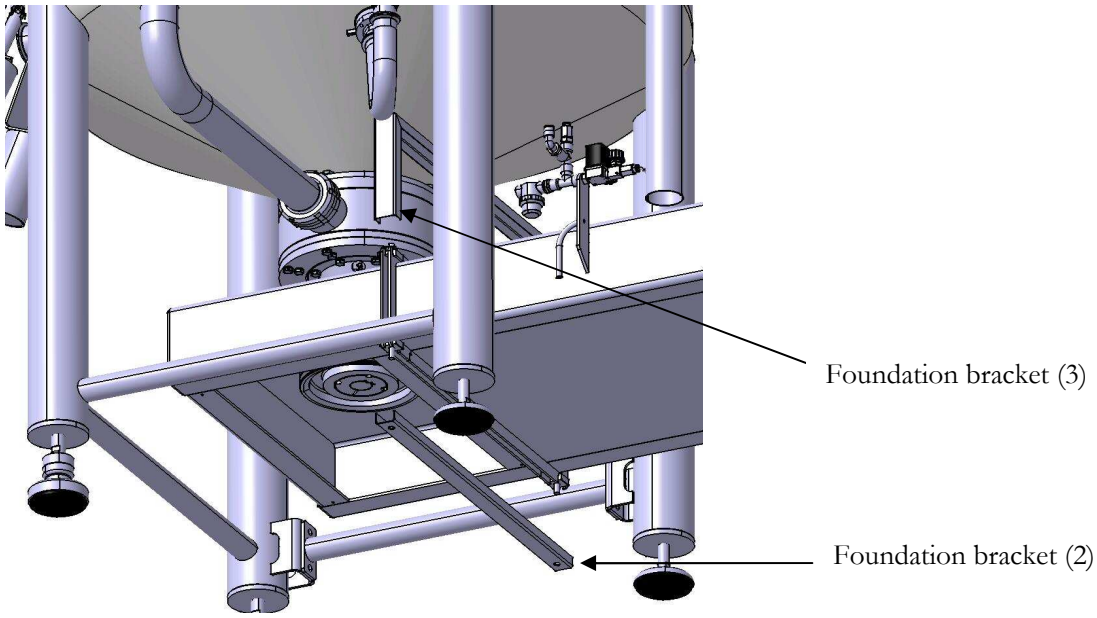
It is, however, recommended to replace all seals in connection with a possible disassembling, irrespective of the cause.

8.3.3 DISMANTLING THE MOTOR FOUNDATION

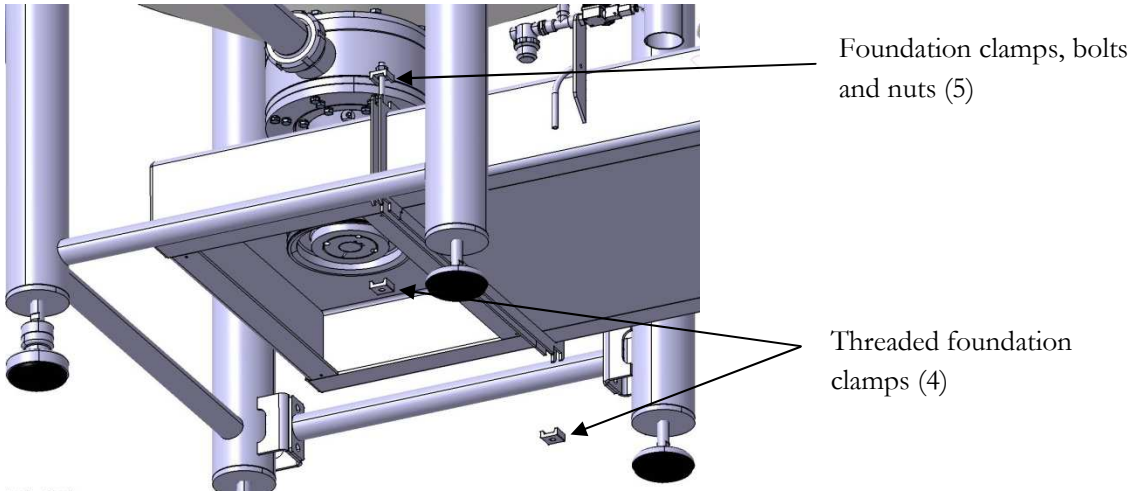
Before dismantling the Motor foundation follow instructions described in section 8.3.1Also make sure that the Motor foundation is properly supported.



- Undo and remove the nuts (1) holding the Foundation bracket (2)



- Remove the Foundation bracket (2) & (3)



- Undo and remove the foundation clamps, bolts and nuts (5) and the Threaded foundation clamps (4)
- It is now possible to proceed doing maintenance work on the Turbo unit
- Reassemble in reverse order

8.4 MAINTENANCE MIXER UNIT

8.4.1 CHANGE OF PERFORATION RING

Static version:

On the Inline turbo unit it is possible to replace the perforation ring without dismantling the Inline house or the Rotor from the rest of the unit.

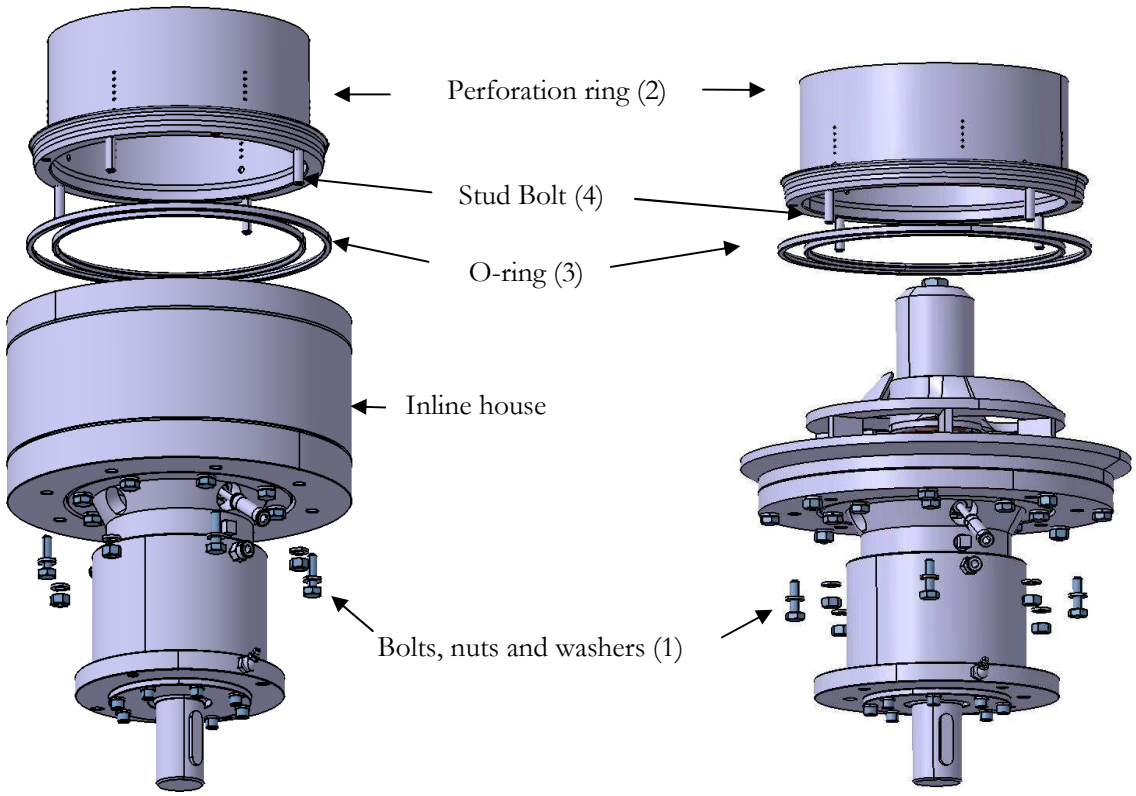


Figure 8.2: Left: Inline mixer unit. Right: Batch mixer unit

- Undo the bolts, nuts and washers (1)
- Remove the Perforation ring (2)
- Check the O-rings for damage and replace if needed (3).
- Reassemble in reverse order making sure that the stud bolts (4) are fitted in the Perforation ring (2)

Dynamic version:

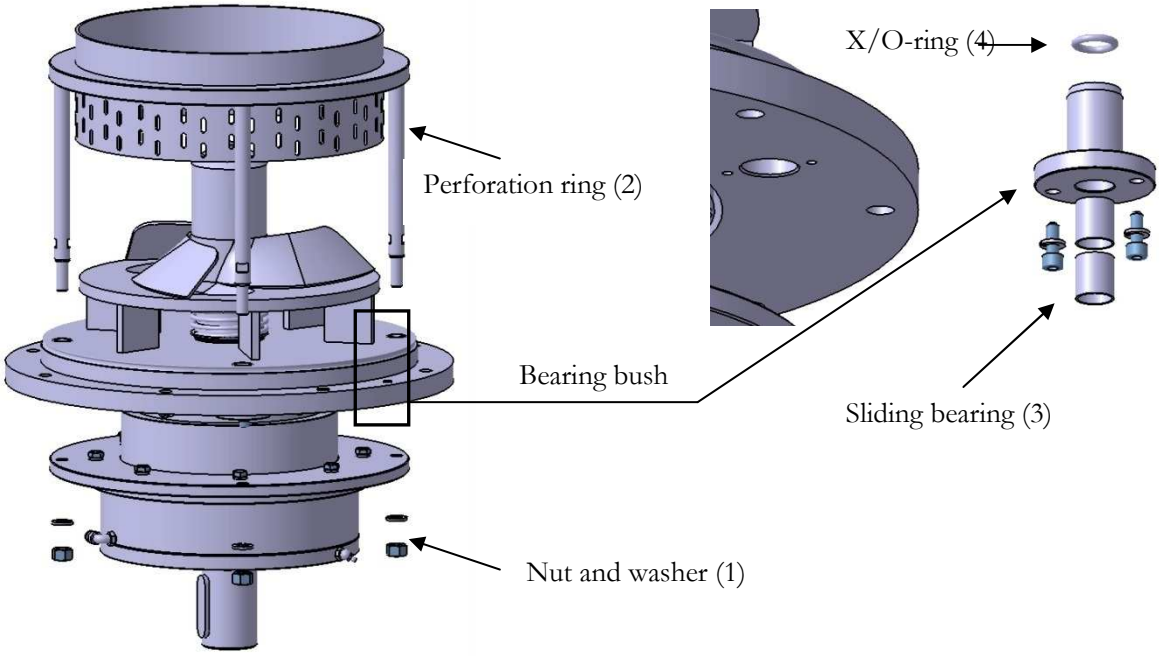


Figure 8.3: Batch mixer unit with stator lift

- Undo the nuts and washers (1)
- Remove the Perforation ring (2)
- Check the Sliding bearing (3) for damage. Replace if needed
- Check the O-ring (4) for damage. Replace if needed

8.4.2 REPLACEMENT OF MECHANICAL SHAFT SEAL

The following description is applicable for all versions of the mixer units, inline mixer unit, batch mixer unit (static and dynamic).

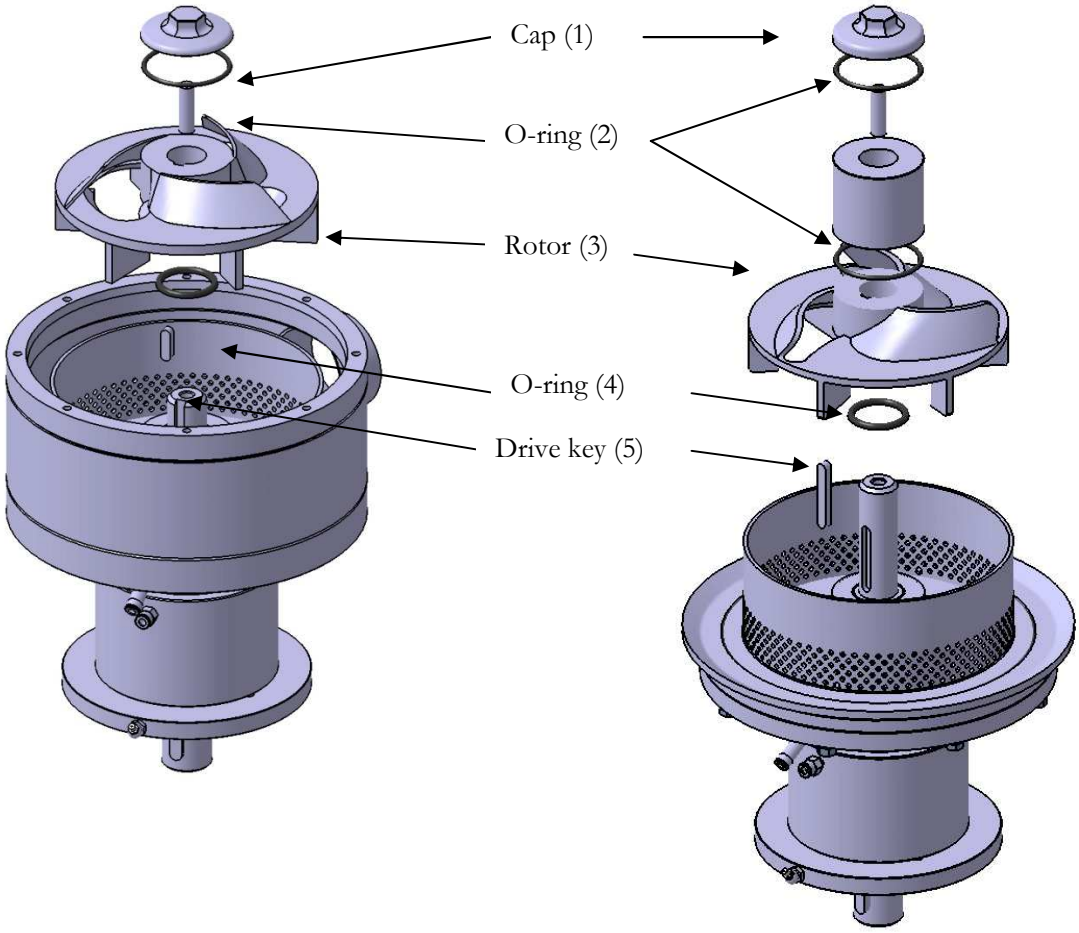


Figure 8.4: Left: Inline mixer unit. Right: Batch mixer unit

- Undo and remove the Cap (1)
- Check the O-ring (2) for damage and replace if needed
- Remove the Rotor (3) and check the O-ring (4) for damage. Replace the O-ring if needed
- Remove the Drive key (5)

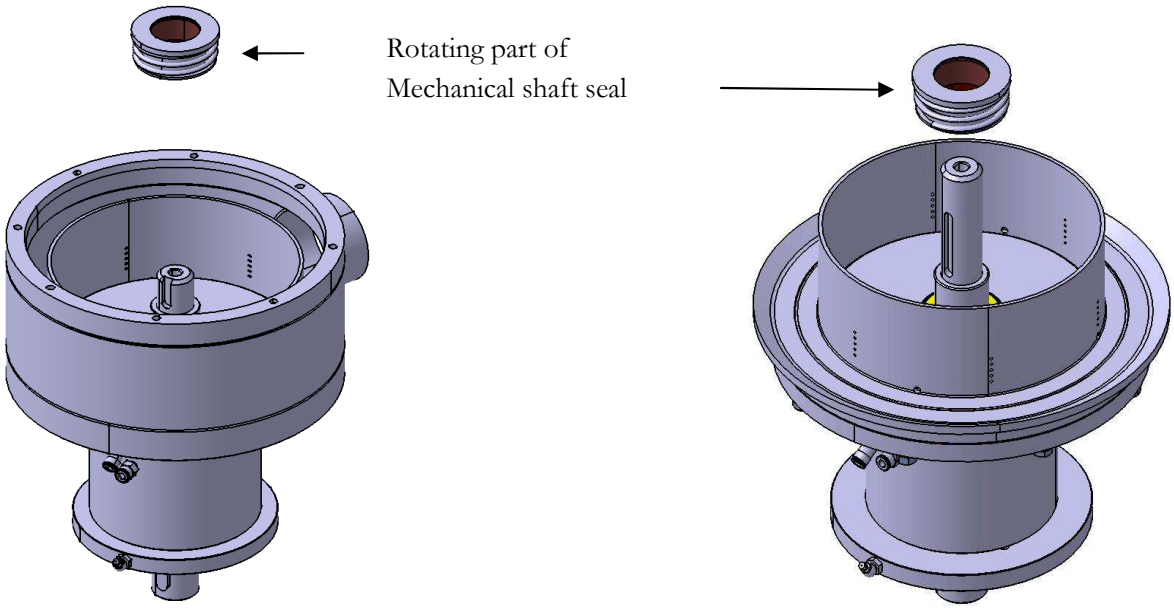


Figure 8.5: Left: Inlinemixer unit. Right: Batch mixer unit

- It is now possible to replace the rotating part of the Mechanical shaft seal
- It should now also be possible to remove the static part of the mechanical shaft seal using a small screwdriver. See Figure 8.6
- Reassemble in reverse order

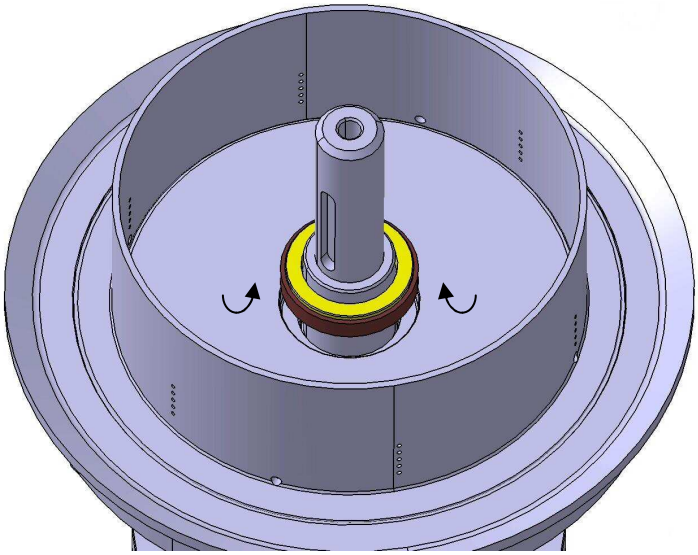


Figure 8.6 Static part of mechanical shaft seal.

8.4.3 REPLACEMENT OF BEARINGS AND SEALS

- The following description is applicable for both for the static version of the Batch mixer unit and Inline mixer unit. For dynamic version of mixer unit, also refer to section 8.4.4.

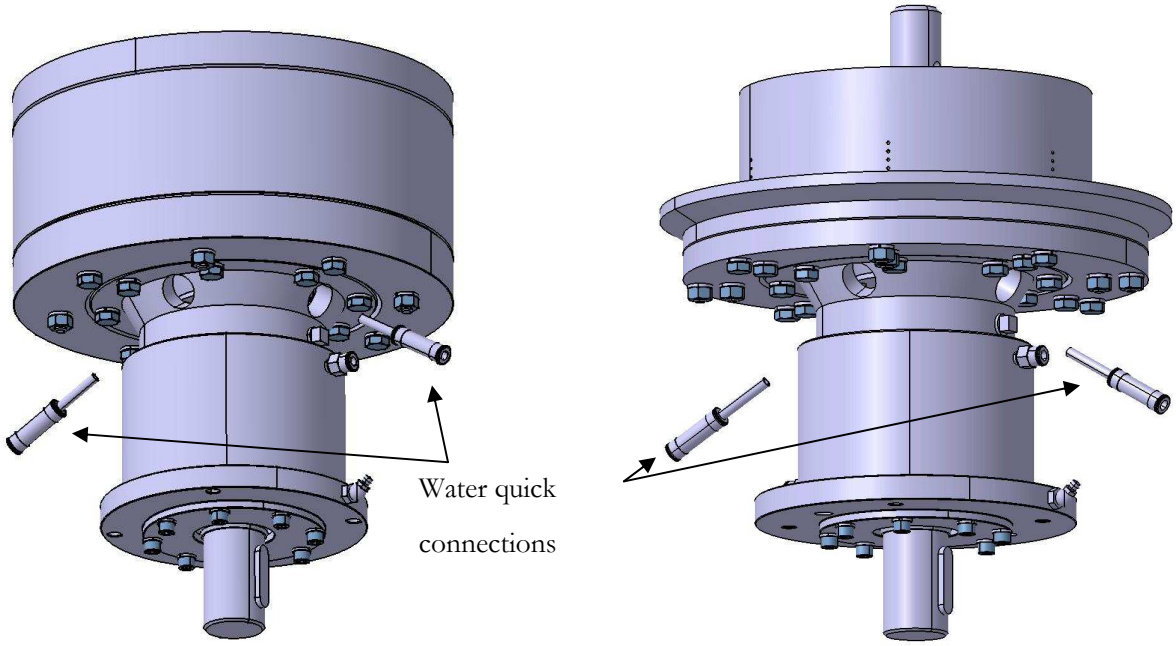
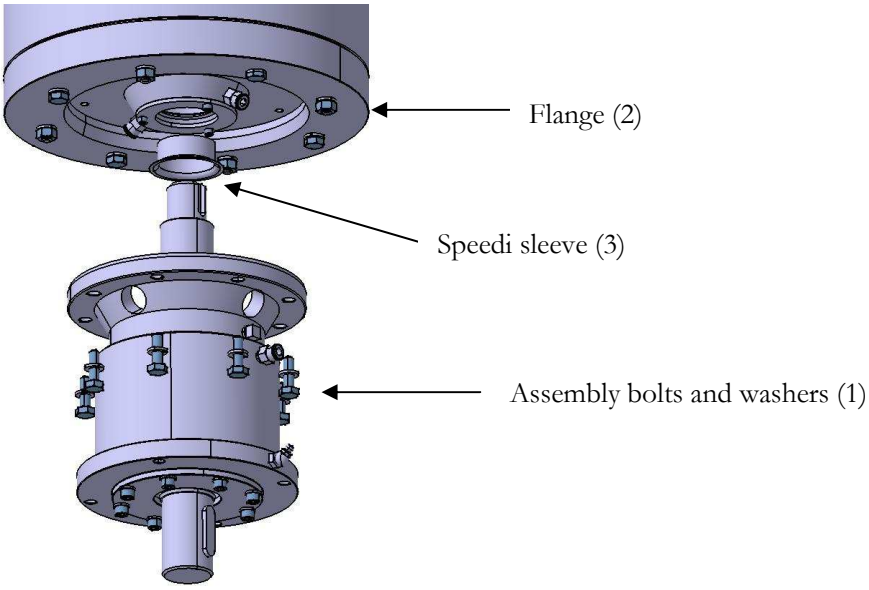
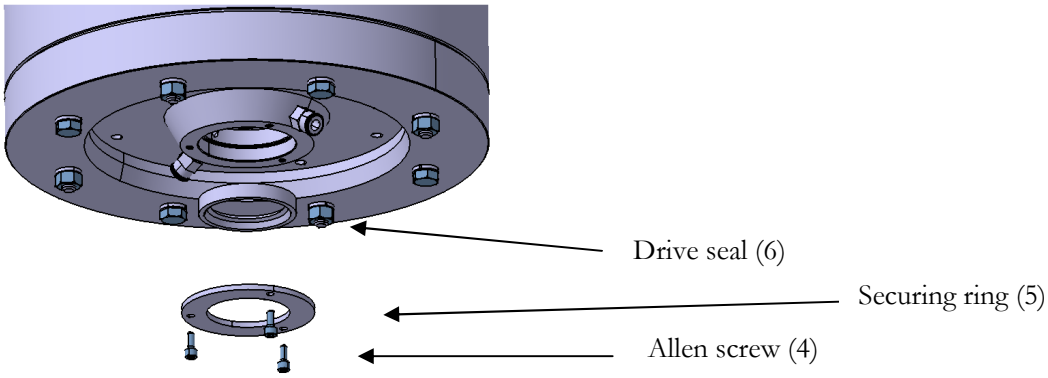


Figure 8.7 Left: Inline mixer unit. Right: Batch mixer unit.

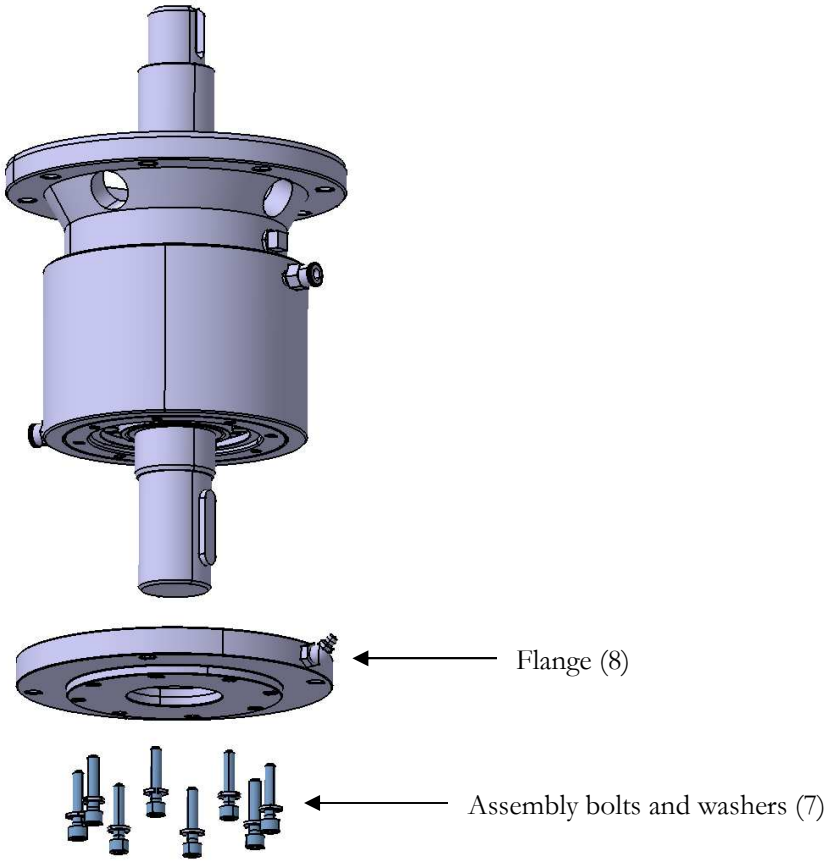
- Follow instructions described in section 8.4.2
- Undo and remove the Water quick connections



- Undo and remove the Assembly bolts and washers (1)
- Carefully remove the flange (2) without damaging the Drive seal (6) and the static part of mechanical shaft seal (7)
- Remove the Speedi sleeve (3) Replace if needed

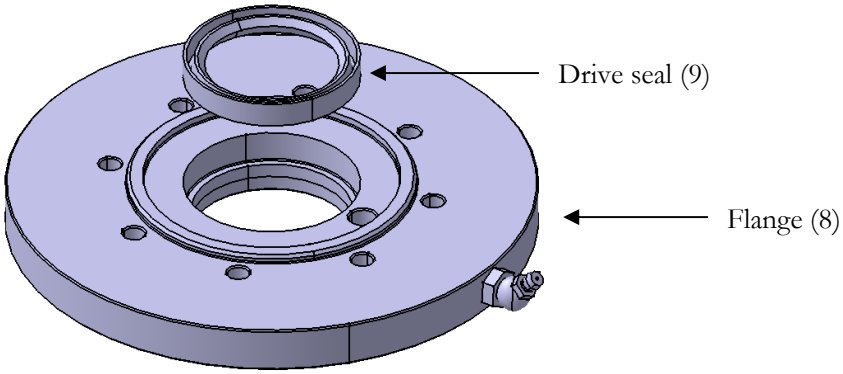


- Undo and remove the Allen screw (4) and the Securing ring (5)
- Check the drive seal (6) and replace if needed

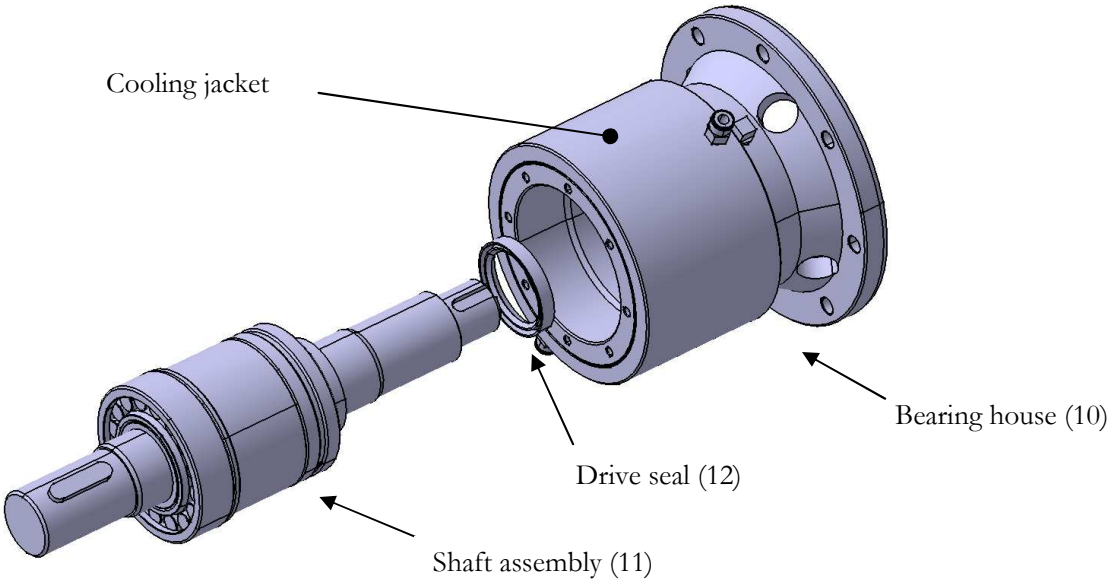


- Undo and remove the assembly bolts and washers (7)

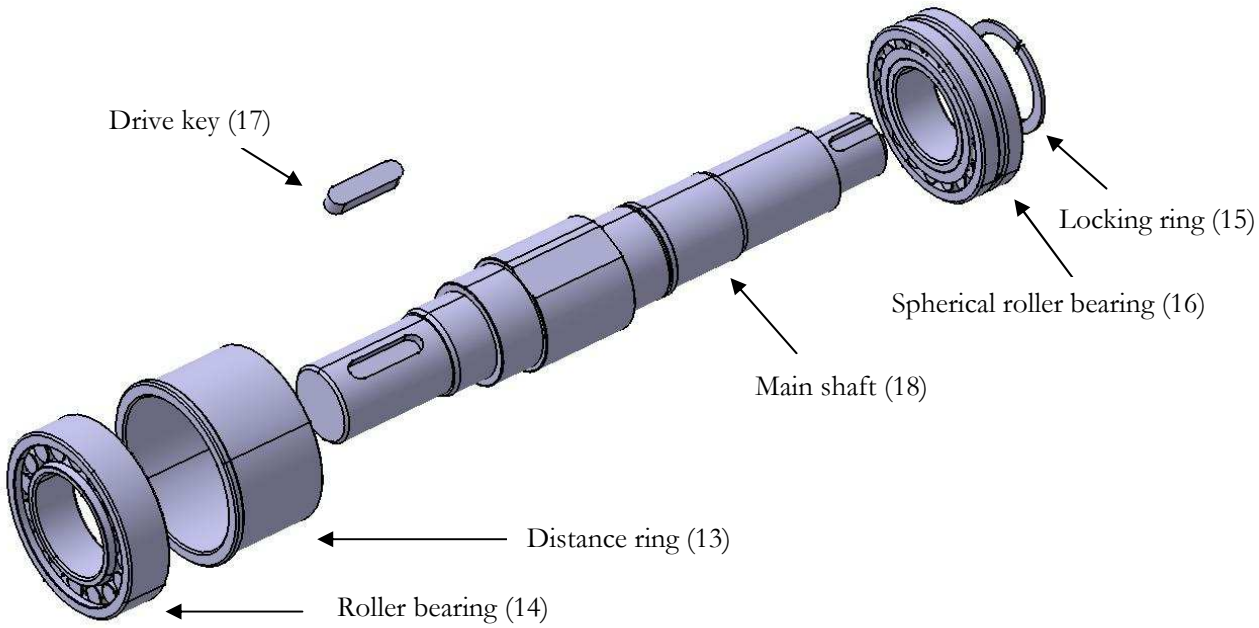
- Remove the Flange (8)



- Check the Drive seal (9) and replace if needed



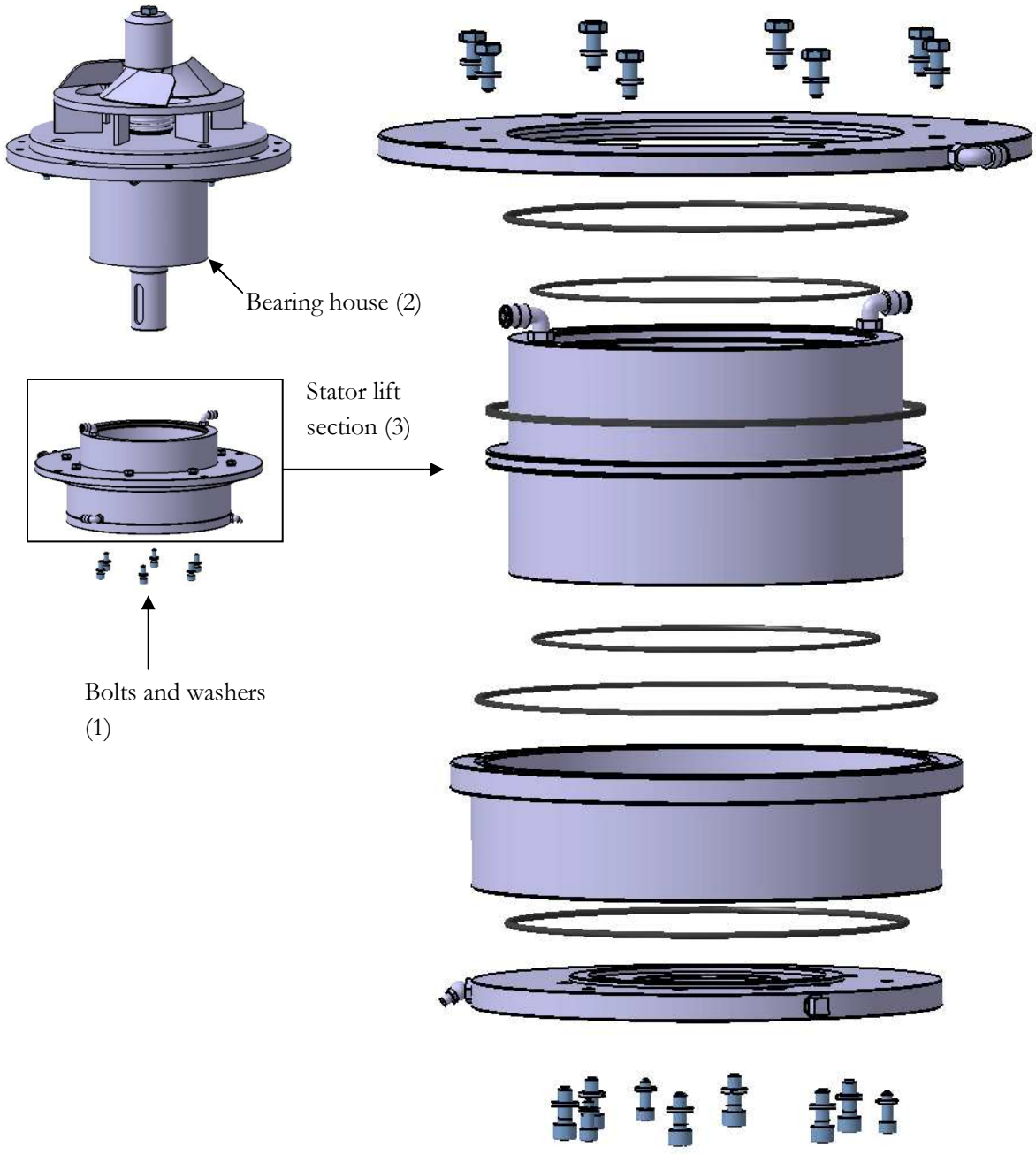
- Carefully remove the Shaft assembly (11) from the Bearing house (10)
- Check the Drive Seal (12) and replace if needed



- Carefully remove the Roller bearing (14) and the Distance ring (13)
- Undo and remove the Locking ring (15) from the Main shaft (18)
- Remove the Spherical roller bearing (16) from the Main shaft (18)
- Replace the Bearings (14) & (16) if needed
- Reassemble in reverse order

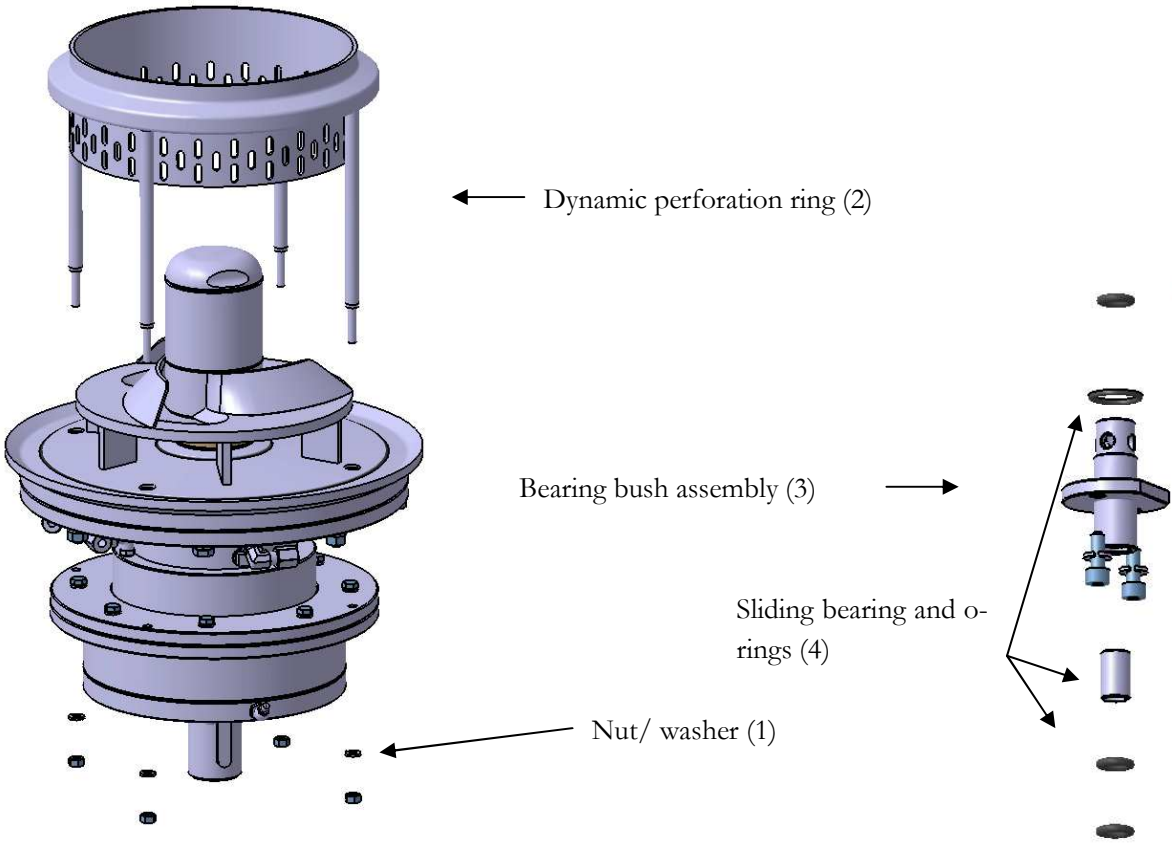
8.4.4 CHANGING O-RINGS IN STATOR LIFT SECTION

- Undo and remove the bolts and washers (1) attached to the bearing house (2)
- Remove the stator lift section (3) from the mixer unit
- Check the o-rings for damage and replace if needed



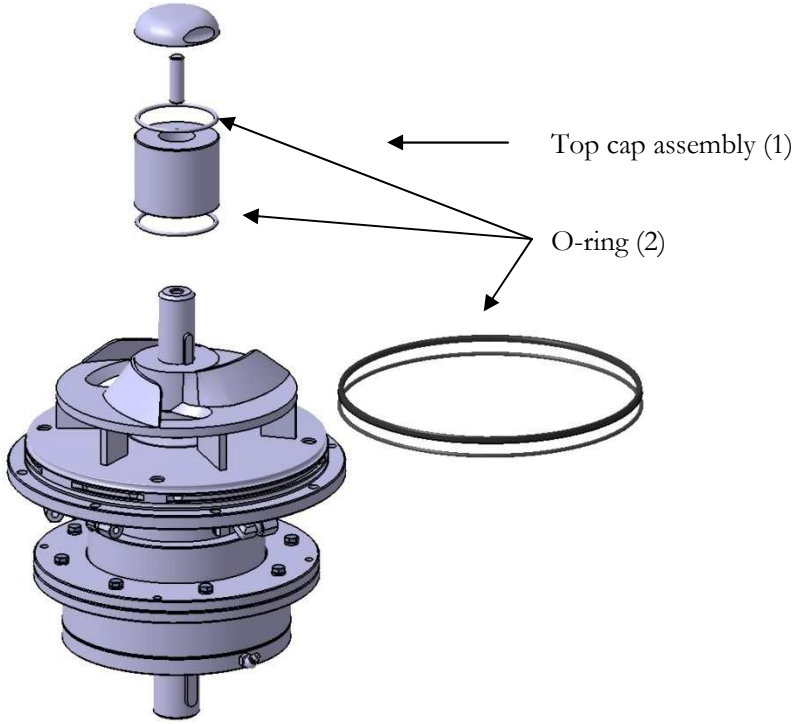
8.5 MAINTENANCE – DYNAMIC TURBO UNIT, ASEPTIC VERSION

8.5.1 CHANGE OF DYNAMIC PERFORATION RING, ASEPTIC VERSION

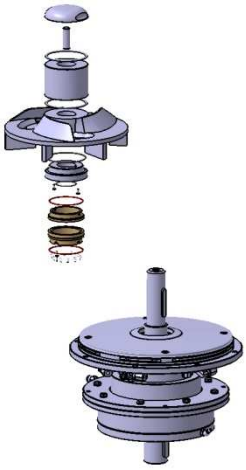


- Undo and remove the nuts and washers (1)
- Remove the dynamic perforation ring (2)
- It is now possible to dismantle the Bearing bush assembly (3) for inspection.
- Inspect the Sliding bearing and o-rings (4) for damage and replace if needed.

8.5.2 INSPECTING UPPER PART OF MECHANICAL SHAFT SEAL

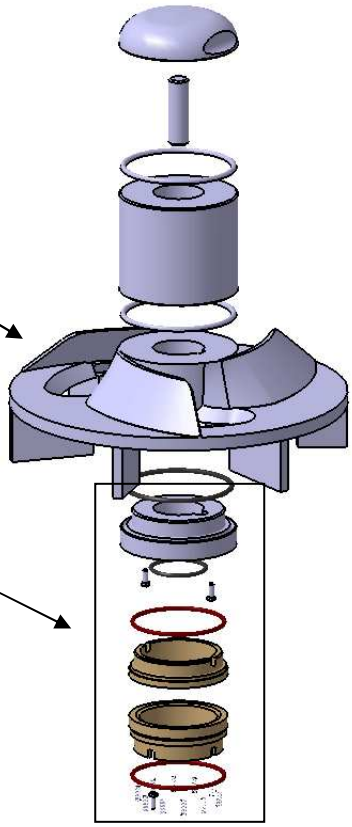


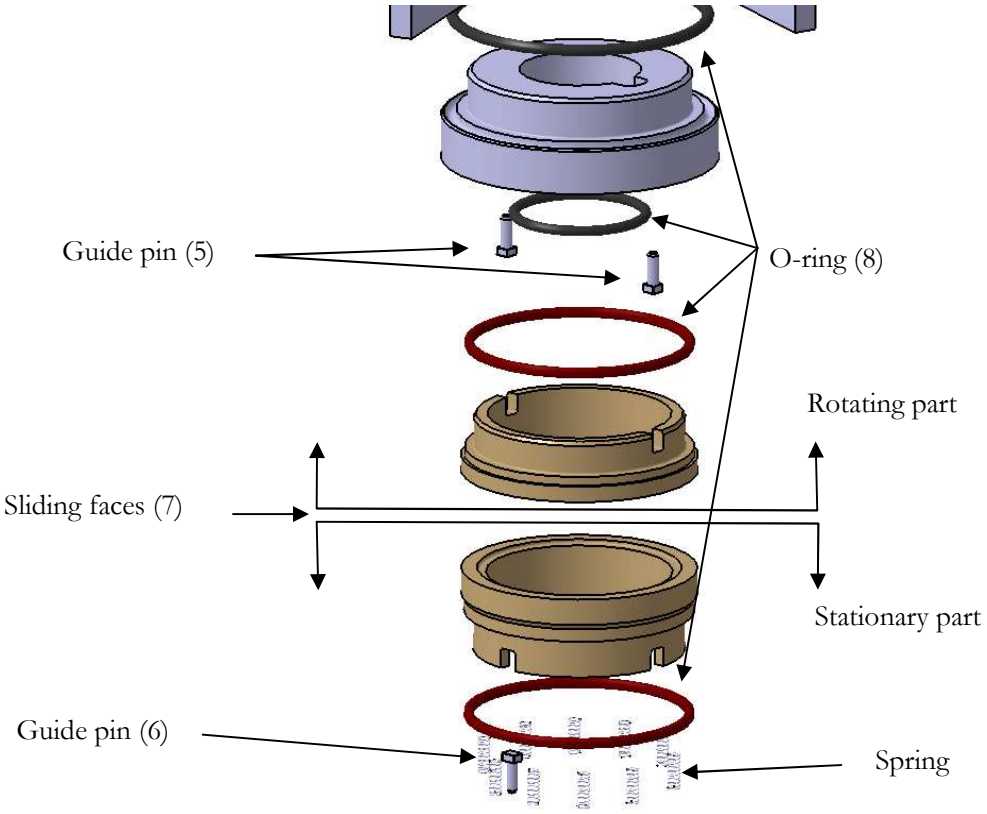
- Dismantle the Top cap assembly (1)
- Inspect the o-rings (2) for damage. Replace if needed.
- It is now possible to remove the rotor (3) and the upper part of mechanical shaft seal (4).



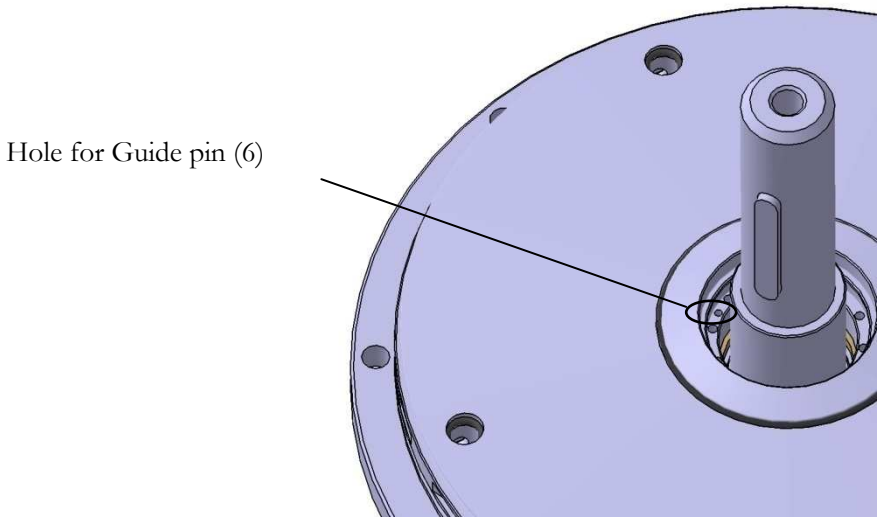
Rotor (3)

Upper part of Mechanical shaft seal (4)



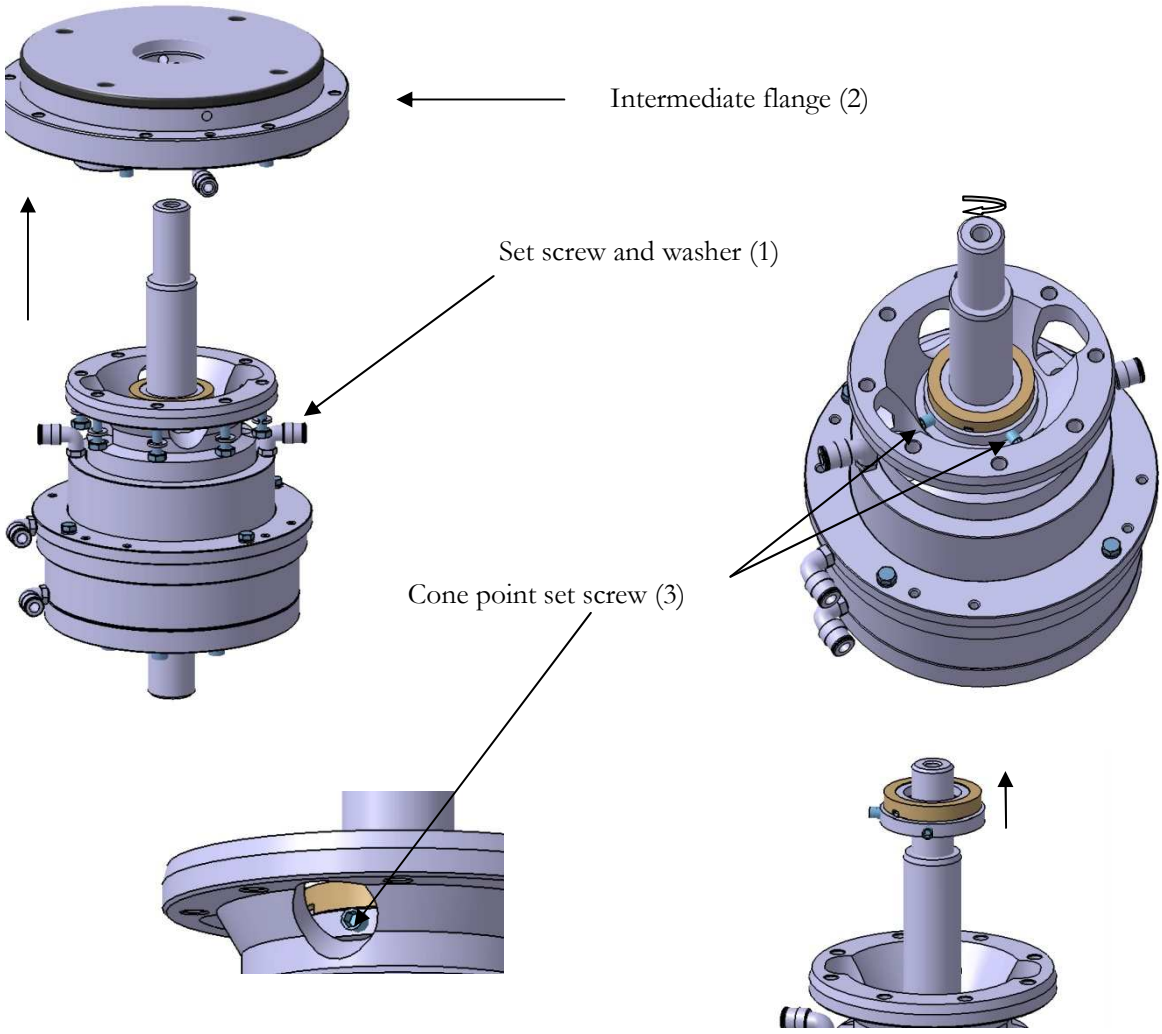


- Check the sliding faces (7) and O-rings (8) for damage, and replace if needed
- Make sure that the Guide pin (5) and (6) are present and properly seated when refitting

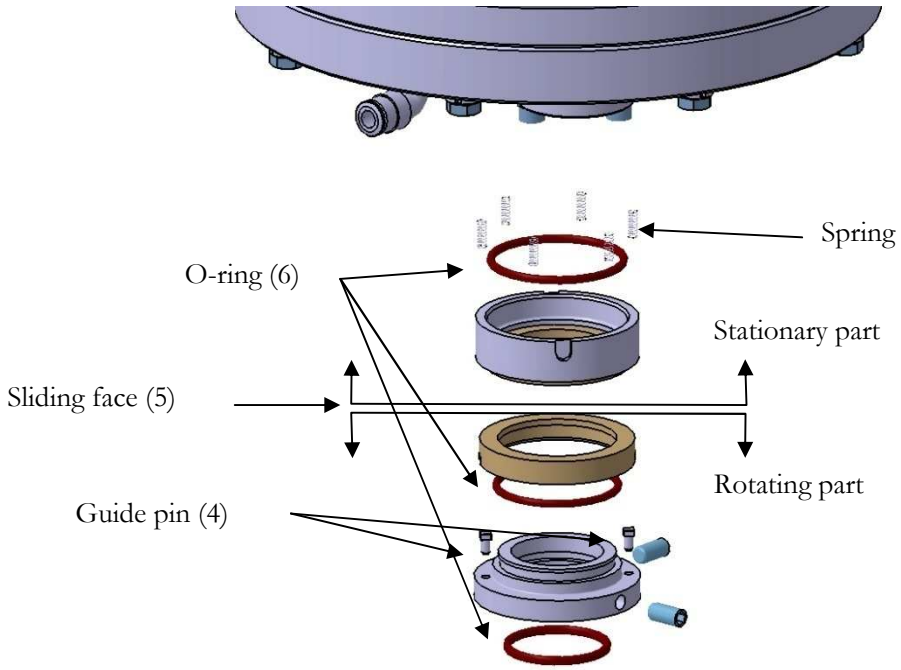


8.5.3 INSPECTING THE LOWER PART OF MECHANICAL SHAFT SEAL

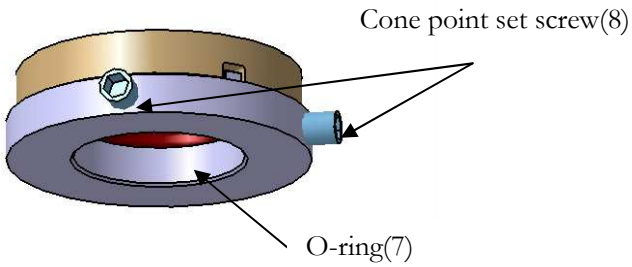
Before beginning this task, remove the dynamic stator as described in previous section

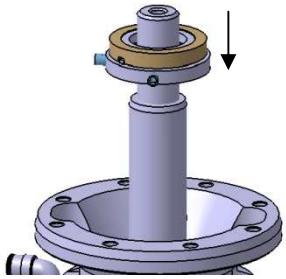


- Undo and remove the screw and washer (1)
- Remove the intermediate flange(2)
- Rotate the shaft in order to release the two Cone point set screws (3)
- It is now possible to remove the remaining part of the seal.

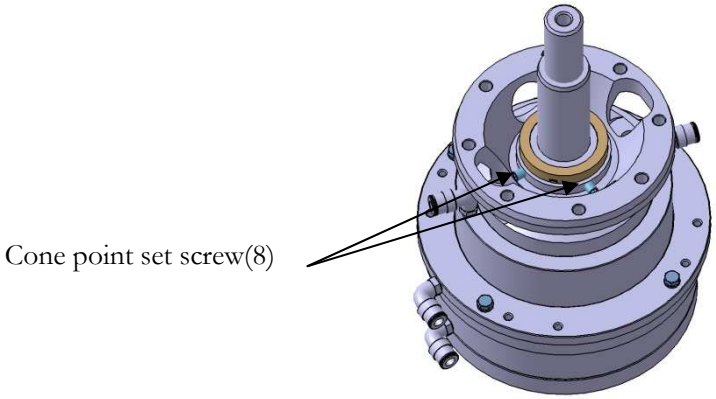


- Inspect the sliding faces (5) and o-rings (6) for damage, and replace if needed
- When refitting, make sure that the Guide pin (4) are present and properly seated

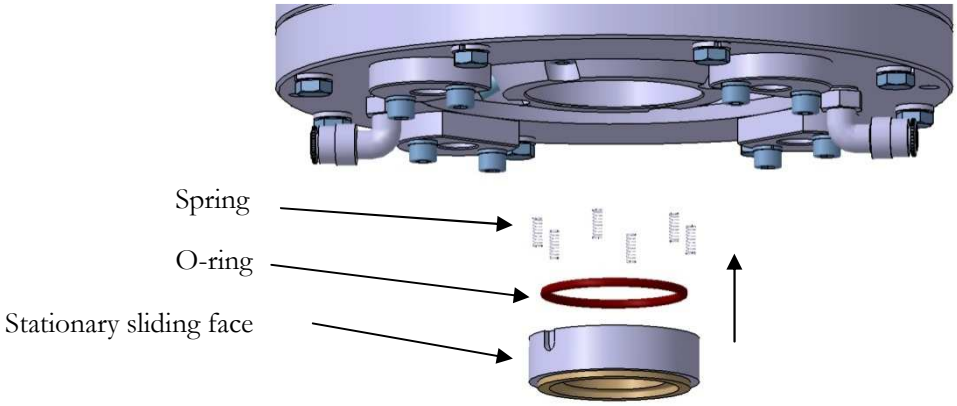




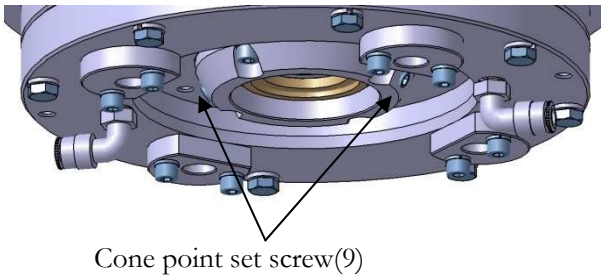
- Make sure that the O-ring(7) are present.
- Release the Cone point set screw (8) and refit to the shaft



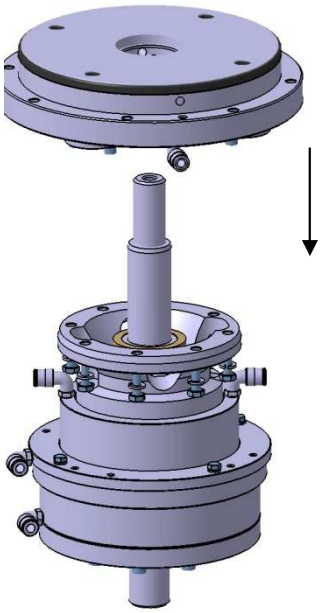
- Tighten the Cone point set screw(8) before continuing



- Insert the Spring, O-ring and Stationary sliding face into the intermediate flange



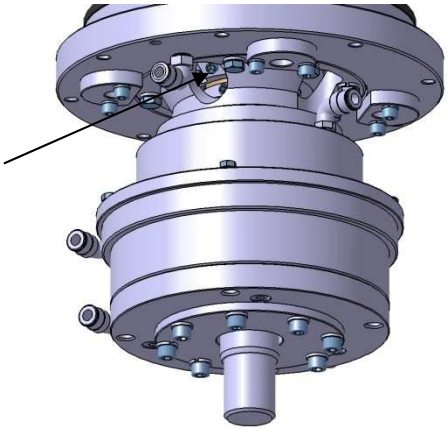
- Tighten the two Cone point set screw(9) in order to hold the stationary sliding face in its place during refitting.



- Refit the Intermediate flange

Release the two

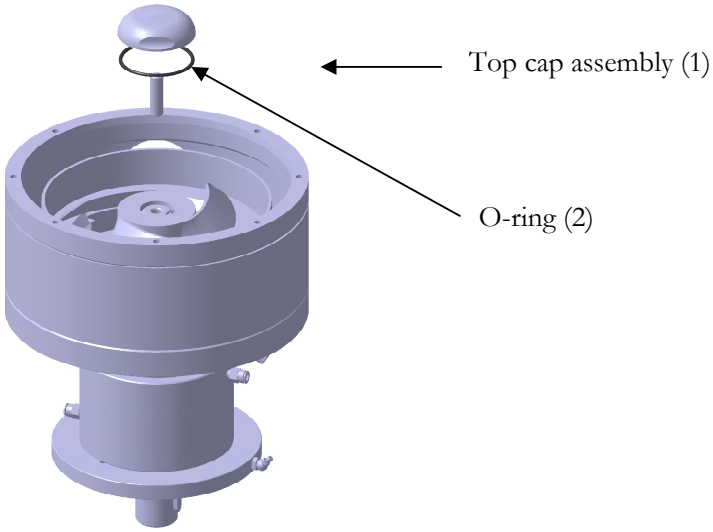
Cone point set screw(9)



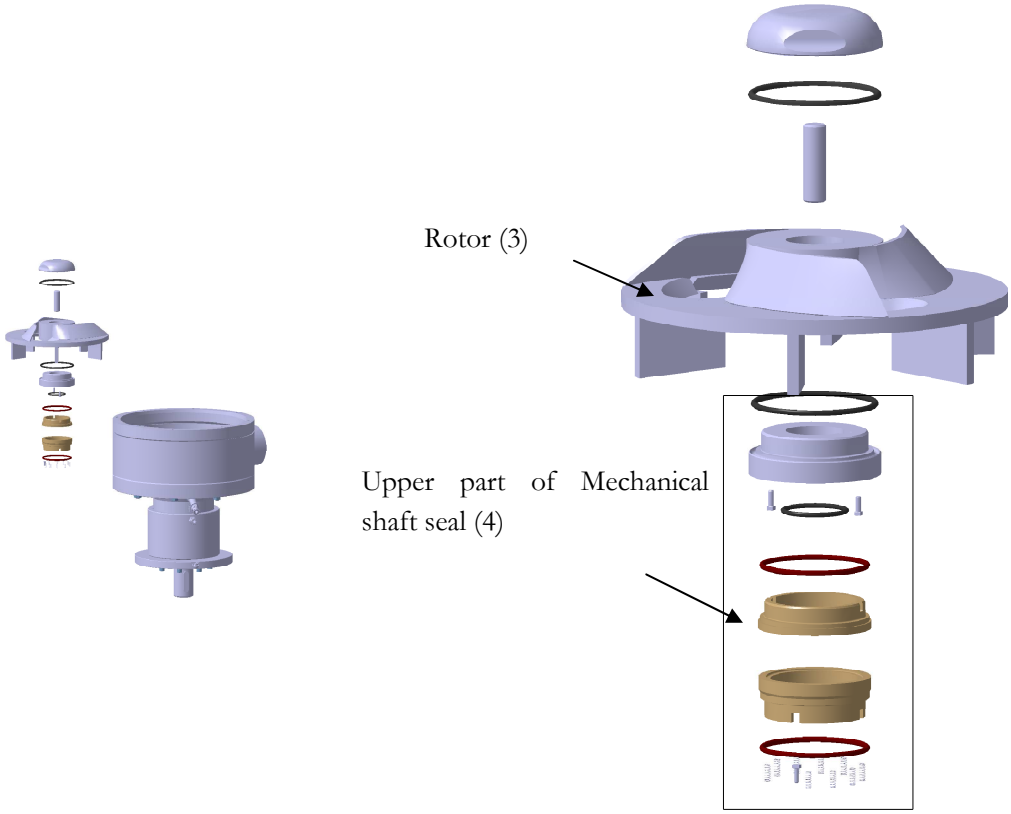
- **Note!**
  After refitting the Intermediate flange, the two Cone point set screw (9) must be released in order to make the seal working properly. Otherwise the seal can be damaged.

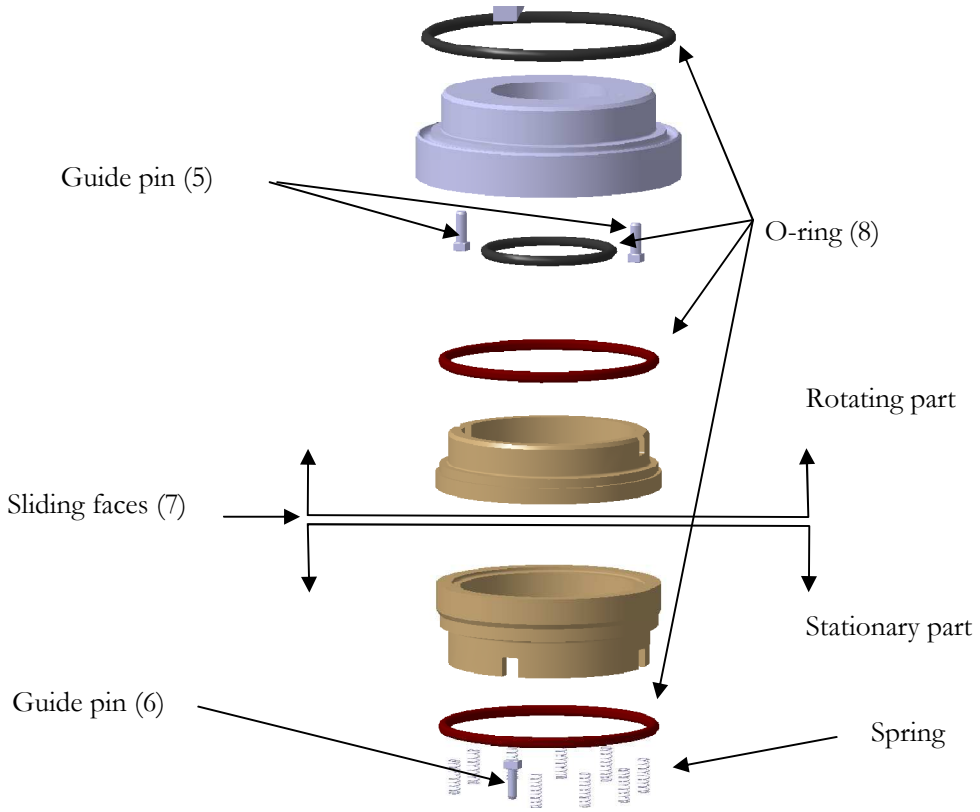
8.6 MAINTENANCE – IN-LINE TURBO UNIT, ASEPTIC VERSION

8.6.1 INSPECTING UPPER PART OF MECHANICAL SHAFT SEAL

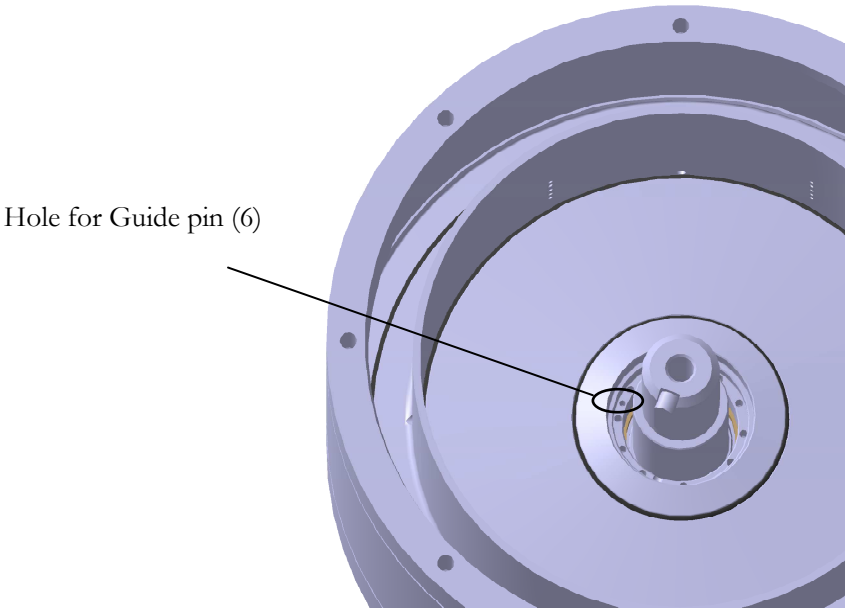


- Dismantle the Top cap assembly (1)
- Inspect the o-rings (2) for damage. Replace if needed.
- It is now possible to remove the rotor (3) and the upper part of mechanical shaft seal (4).

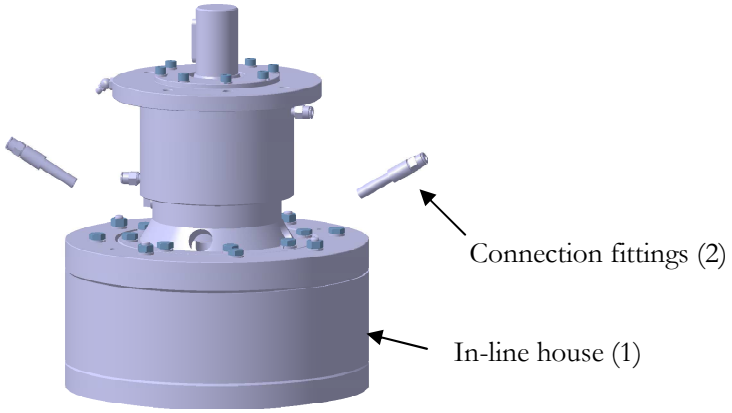




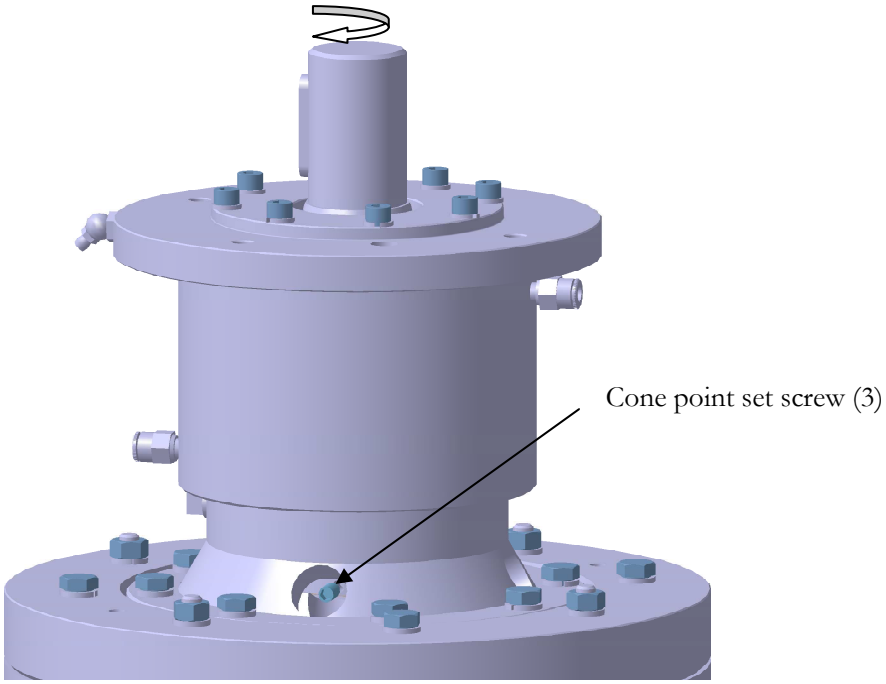
- Check the sliding faces (7) and O-rings (8) for damage, and replace if needed
- Make sure that the Guide pin (5) and (6) are present and properly seated when refitting



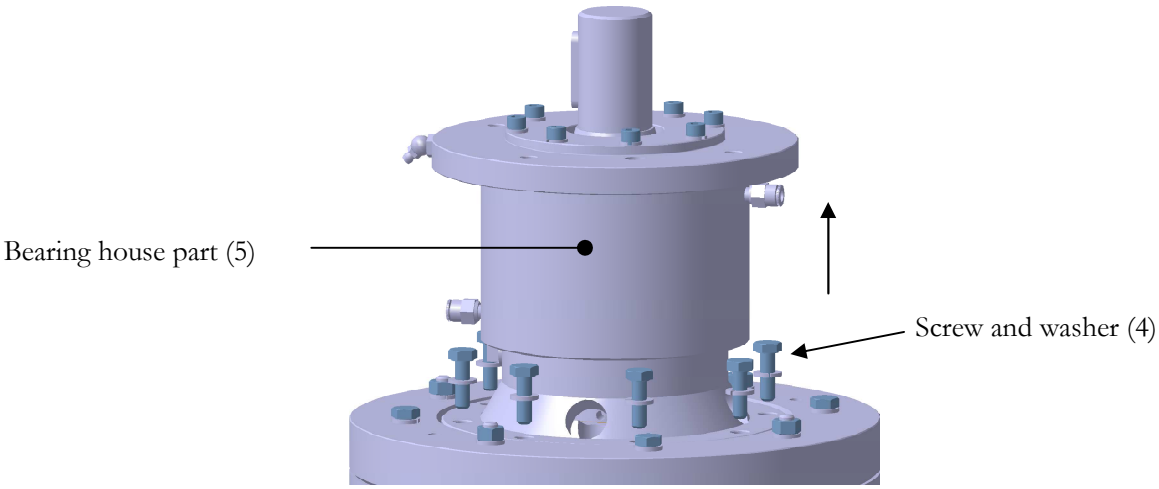
8.6.2 INSPECTING THE LOWER PART OF MECHANICAL SHAFT SEAL



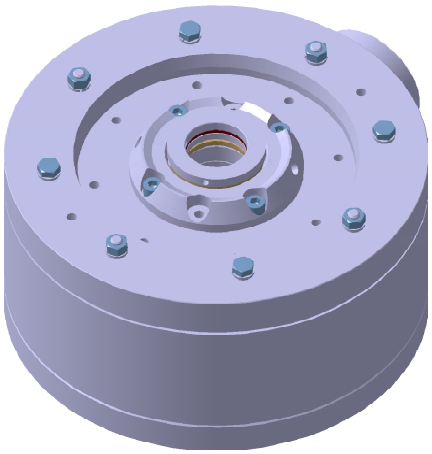
- Place the mixer unit upside down and make sure that the in-line house (1) is properly supported
- Remove the connection fittings (2) for the barrier fluid



- Rotate the shaft in order to remove the two Cone point set screws (3)

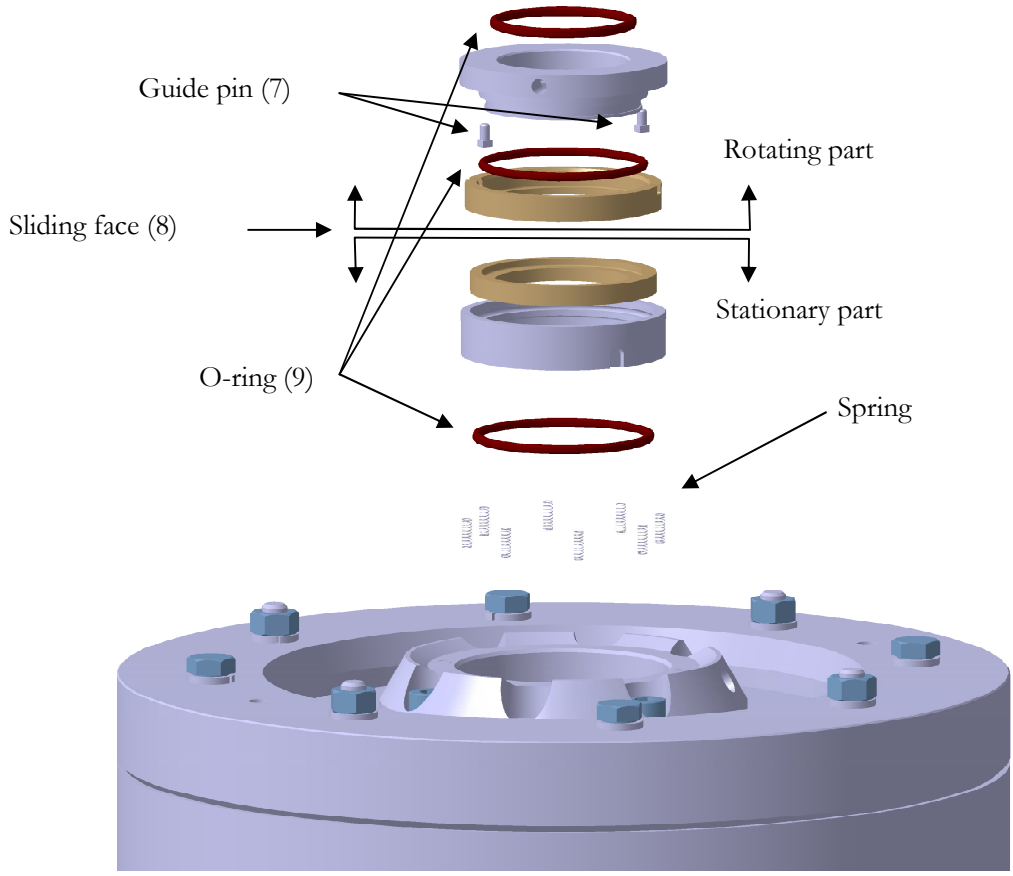


- Undo and remove the screw and washer (4)
- It is now possible to remove bearing house part (5)



In-line house without Bearing house part (6)

- It is now possible to inspect the lower part of the mechanical shaft seal



- Check the sliding faces (8) and O-rings (9) for damage, and replace if needed
- Make sure that the Guide pin (7) are present and properly seated when refitting
- Reassemble in reverse order

8.7 TROUBLE SHOOTING

AREA	FAULT	CAUSE	REMEDY
Turbo unit	Jarring sound	Too much tension on the V-belt	Loosen the V-belt tension
		Bearing may be worn	Replace bearings
	Water leakage	The drive seals may be worn	Replace the Drive seals
Agitator	Fails to start	Main switch not on	Turn main switch on
		Emergency stop is activated	Reset emergency stop
		A fuse has blown	Detect and replace fuse
		Thermal relay has switched off	Find error on switchboard and reactivate
		Control input missing	Use wiring diagram to find missing impulse
Steam system	No or to slow heating	No steam or to small pressure to the vessel	Correct the error on the steam supply
		Steam supply OK, but only small amount of steam reaches the vessel	Filter of strainer is clogged up. Water discharge is defective, or steam quality too wet due to priming the boiler or missing water separation before the place of consumption
		Temperature control device is not working	Check if control valve is blocked or defective, check if the control unit is operated wrongly (setpoints keyed in). Check if the temperature transmitter is working correct
Vacuum system	Foaming	Air bleeds into mixer below product level	Eliminate leakage
		Foaming product	Reduce vacuum level
		Air in powder	Vibrate the powder to avoid rat holes
	Back flush In powder convey line	Free flow is obstructed	Check powder convey line for blocks. Remove unnecessary valves

	Powder convey line is too long	Keep down distance between mixer and powder silo
	Vacuum level too low	Stop adding powder before vacuum level gets too low

Tetra Pak

OPERATIONS AND MAINTENANCE MANUAL

CHAPTER 9: SPARE PARTS

9. SPARE PARTS

9.1 GENERAL

This chapter contains several drawings and parts list. Drawings and parts lists are attached to this manual from different programs, meaning that several of the pages have no page number typed on it. In order to clear out what is presented on each page, please read following list carefully, as this list gives succession of drawings and part list through the rest of present chapter. In document is:

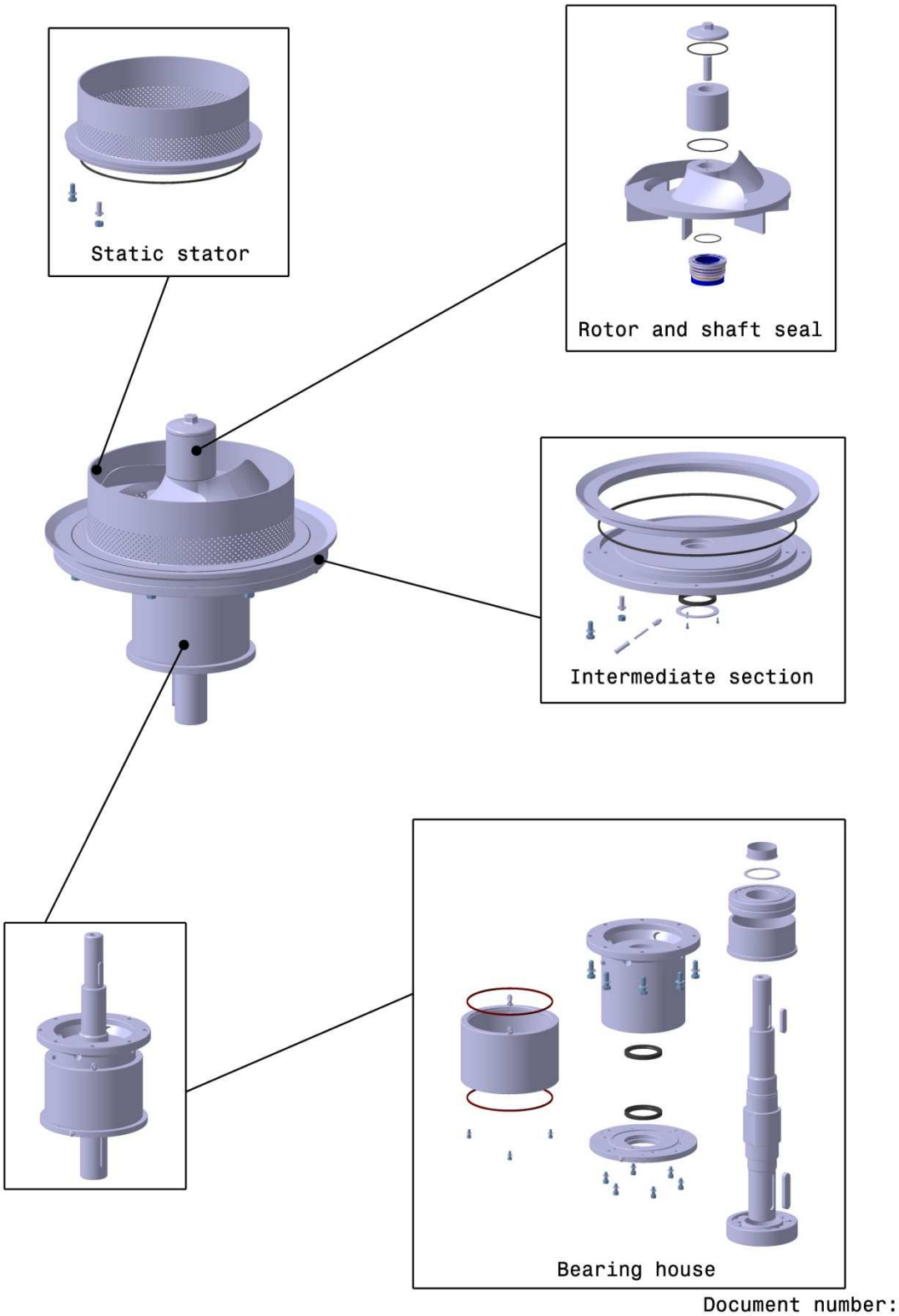
- Mixer unit – Overview
- Stator
- Rotor and shaft seal
- Intermediate section
- Bearing house
- Stator lift (if mixer unit is with dynamic stator)
- Knife system overview (if mixer is equipped with knife)
- Part list for transmission
- Agitator overview (if mixer is equipped with agitator)
- Flow symbols
- Part list for flow diagram
- Flow Diagram
- Layout drawing

For further information on bought parts, please use the enclosed CD Rom to find information on a TP Scanima Part Number as described in chapter 2

9.2 MIXER UNIT SPARE PARTS

Following drawings represent spare parts drawings for the mixer unit. After these drawings the respective spare parts lists are presented.

Ø400 Batch mixer unit, static - Overview



Document number:
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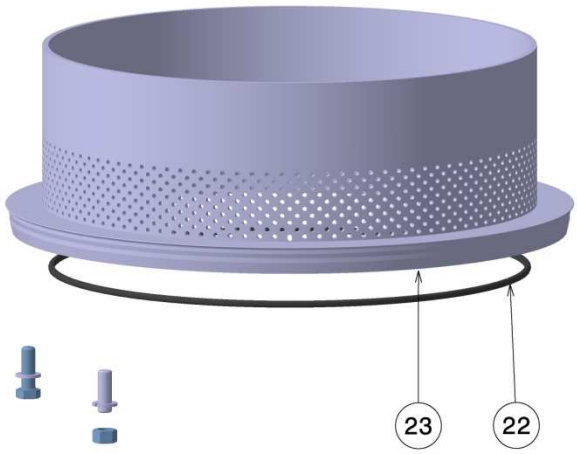
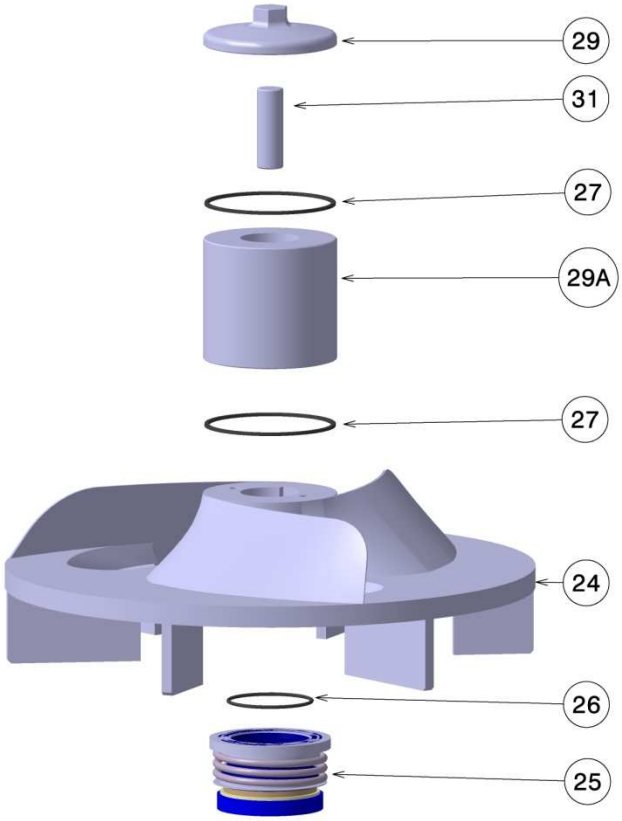
Static stator



Rotor and shaft seal



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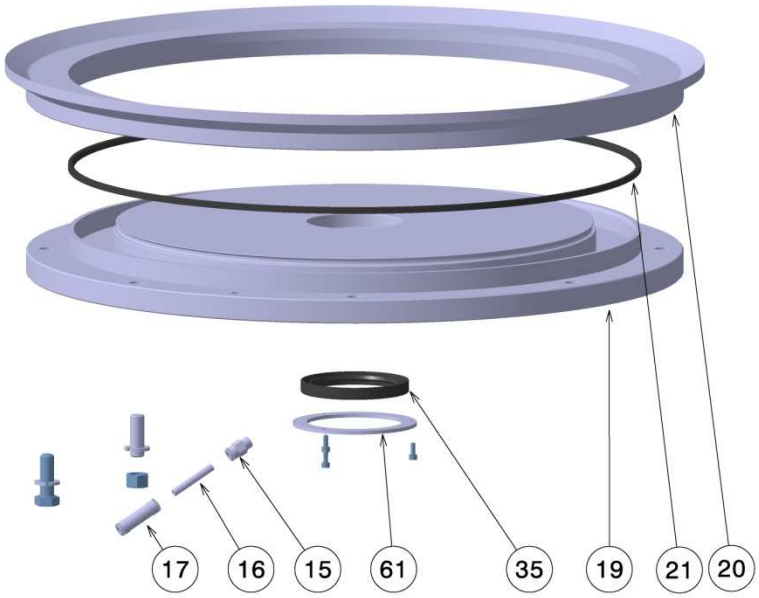
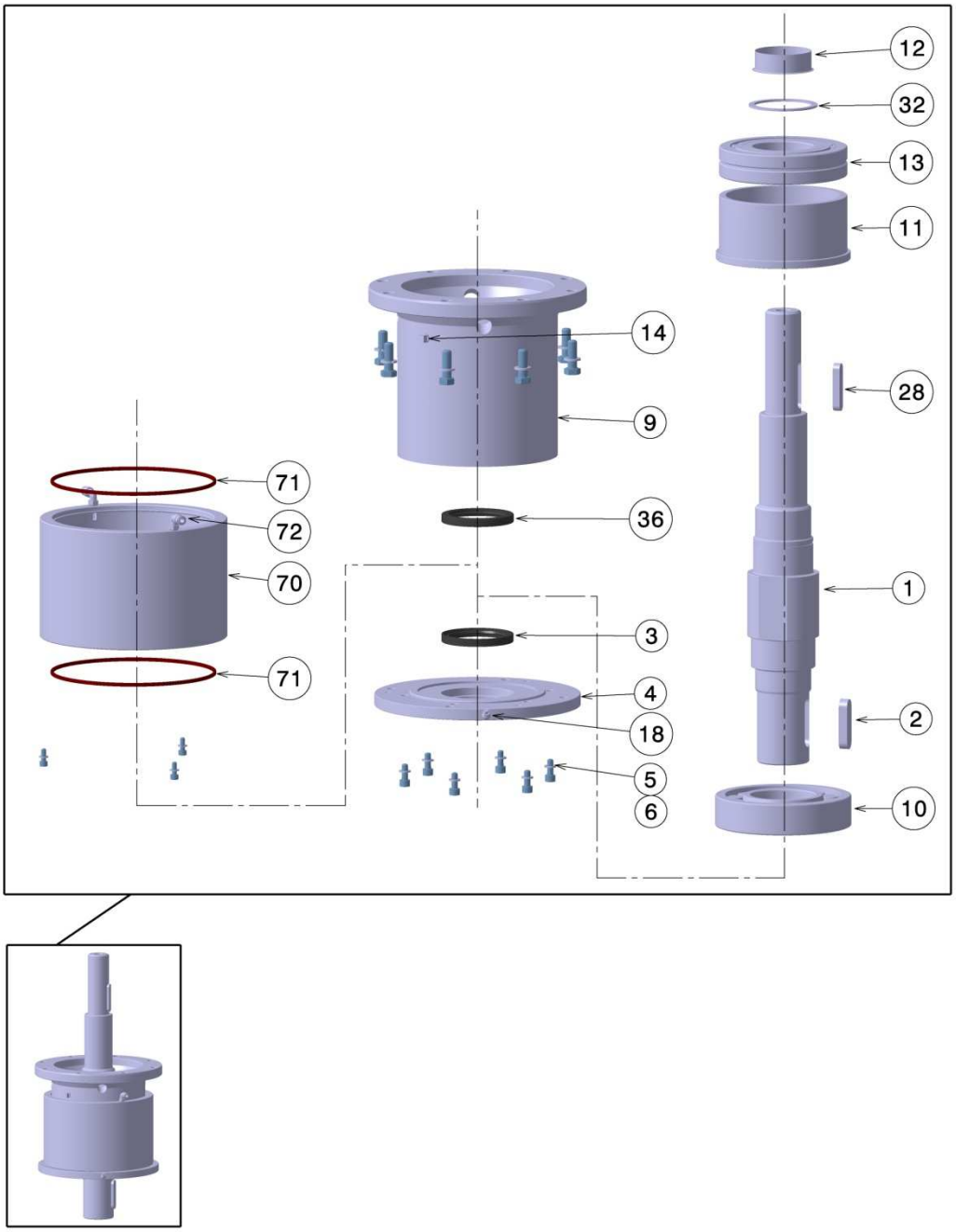
Intermediate section



Bearing house for Ø400 mixer unit, long version



Document number:
CD3015901

Tetra Pak

Project no:					13861
Drawing:					Stator
Pos No	**Rec. Spare Parts**	**TPS Part No**	**TP Part No**	**Qty**	**Description**
022	Yes	33554	┐	1	O-ring EPDM FDA
023		24604	┐	1	Perforation ring Blind

Project no:					13861
Drawing:					Rotor and Shaft Seal
Pos No	**Rec. Spare Parts**	**TPS Part No**	**TP Part No**	**Qty**	**Description**
025	Yes	10276	90503-9186	1	Mech. shaft seal Ø 60
026	Yes	33557	┐	1	O-ring EPDM FDA

Project no:					13861
Drawing:					Intermediate section
Pos No	**Rec. Spare Parts**	**TPS Part No**	**TP Part No**	**Qty**	**Description**
015		12161	┐	2	Super Rapid Straight nickleplated Ø6x1
016		30312	90511-4349	0,2	Airhose Ø6/4 PUN-H
017		17112	┐	2	Super Rapid double union nickleplated
019		16361	┐	1	Intermediate flange
020		16366	┐	1	Weld in flange Ø400
021	Yes	33555	┐	1	O-ring EPDM FDA
035	Yes	11358	90506-0206	1	Drive seal NBR
061		24575	┐	1	Securing ring

Project no:					13861
Drawing:					Bearing House
Pos No	**Rec. Spare Parts**	**TPS Part No**	**TP Part No**	**Qty**	**Description**
070		26129	90510-2638	1	Cooling jacket for Ø400 bearing housing
071	Yes	22964	90510-2639	2	O-ring NBR
072		11658	90510-2640	2	Super Rapid angle - nickleplated Ø6x1/
DIV	Yes	26184	90511-2062	1	Bearing house complete Ø400 mixer ur

Part no:					26184
Drawing:					Bearing House
Pos No	Rec Spare Parts	TPS Part No	TP Part No	Qty	Description
01		20974	90510-2577	1	Shaft for Ø 400 turbo unit
02		12599		1	Drive key A4 18x11x90
03		11358	90506-0206	1	Drive seal NBR
04		24534		1	End cover Ø400
05		11128		6	Spring washer M8 DIN 127B
06		13804		6	Allen screw A2 M8x20 DIN 912 CHI
09		16362		1	Bearing housing for Ø400 turbounit
10		21007	90503-9183	1	Roller bearing SKF
11		20975		1	Spacer ring
12		22617	90503-9185	1	Speedi sleeve
13		14905	90506-0224	1	Roller bearing SKF
13-1		18606		0,03	Grease Scanima food grade mixer 15,9kg
14		11656		1	Stopper PA 66 nature
18		23175		1	Lubricating nipple
28		11261		1	Drive key A4 14x9x60 A
32		11407	90503-9180	1	Locking ring u- 75. Ø75 DIN471
36		11358	90506-0206	1	Drive seal NBR

TP Scanima Food Grade Grease can be bought in 400g cartridge. Order Part number 18609.

9.3 PART LIST FOR TRANSMISSION

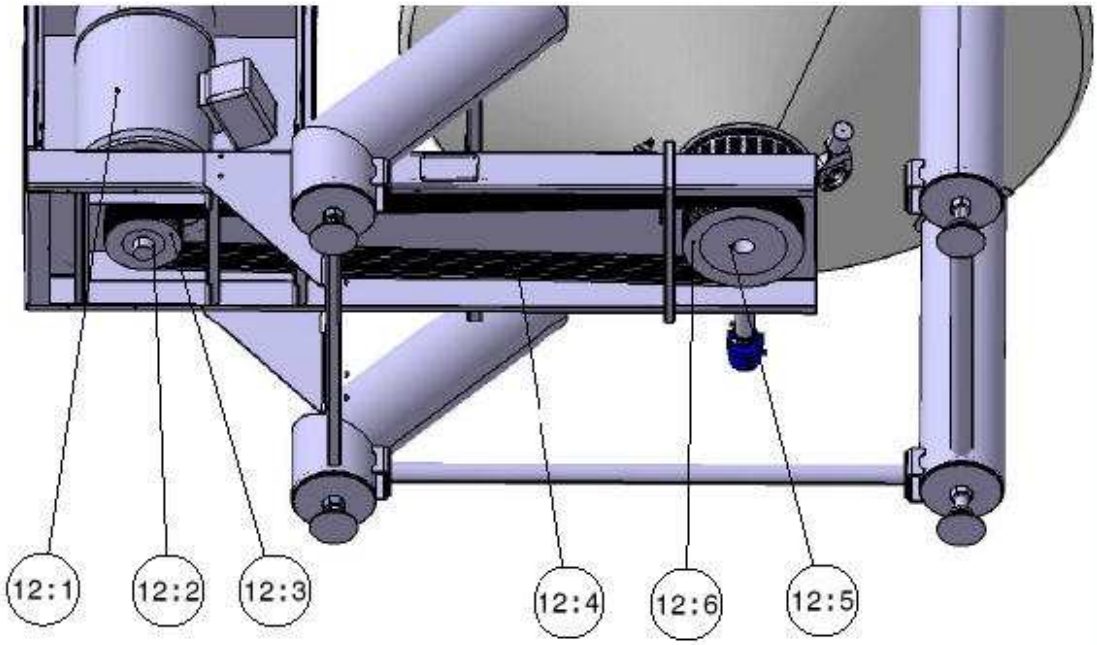
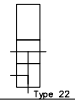
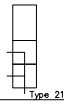


Figure 9-1 Layout for transmission

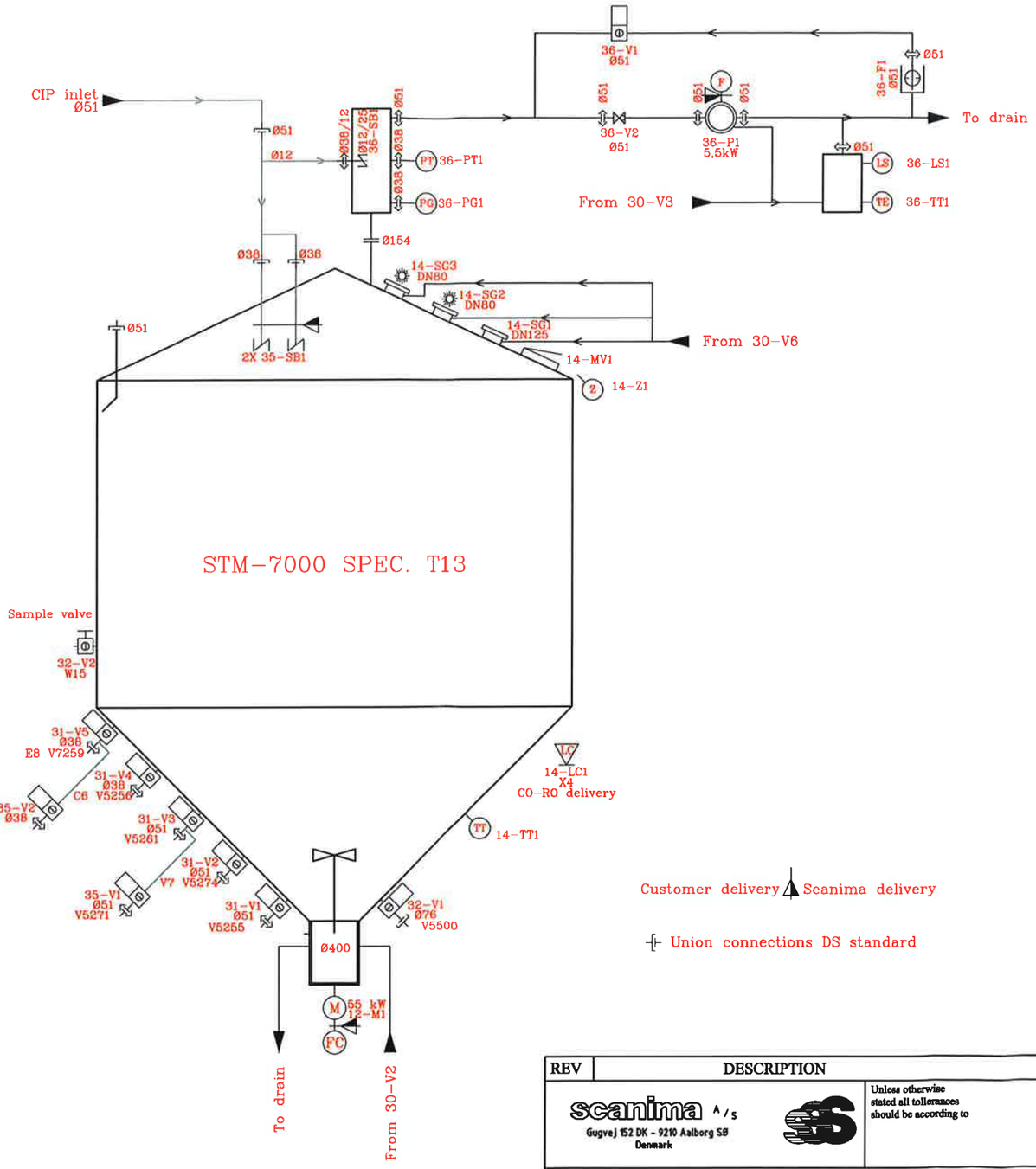
Project no:					13861
Drawing:					Transmission
Pos No	**Rec. Spare Parts**	**TPS Part No**	**TP Part No**	**Qty**	**Description**
12-M01		28857	90143-0097	1	Motor MEZ 55 kW Type 250M-4 B5/V1
12-002		11377	┐	1	Taper Bush Ø65 3020
12-003		12201	90503-5854	1	V-belt pully SPB 224-4 tp3020
12-004		24491	┐	1	V-belt SPB
12-004		24491	┐	3	V-belt SPB
12-005		11415	┐	1	Taper Bush Ø65 3535
12-006		32446	┐	1	V belt pully SPB 500-4 tp3535

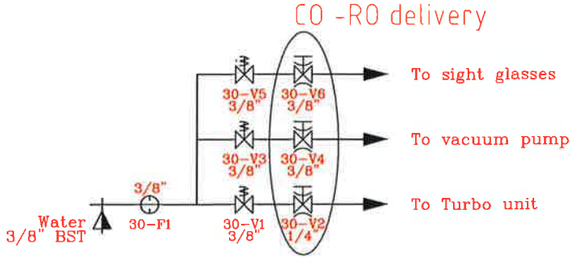
FLOWSYMBOLS

REGULATING VALVE, MANUAL	CONNECTION POINT	 VACUUM PUMP
 BALL VALVE, MANUAL	PIPELINE CROSS	 POSITIVE PUMP
 NONE RETURN VALVE	 T–PIECE	 CENTRIFUGAL PUMP
 BUTTERFLY VALVE, MANUAL	 SPRAY BALL	 VIBRATOR
 SAFETY VALVE	 CYLINDER	 LOADCELL
 SOLENOID VALVE	 FLEXIBLE HOSE	 MOTOR
 3–WAY VALVE, MANUAL	 FLANGE CONNECTION	 AGITATOR
 FLOAT VALVE	 CIP	 AGITATOR W. SCRAPER
 NEEDLE REGULATING VALVE, MANUAL	 UNION CONNECTION	 PRESSURE GAUGE
 NEEDLE REGULATING VALVE MANUAL, W. PRESSURE GAUGE	 CLAMP CONNECTION	 PRESSURE TRANSMITTER
 POWDER VALVE	 WATER MANIFOLD	 TEMP. TRANSMITTER
SIGHT GLASS	STRAINER	 LEVEL SENSOR
 SIGHT GLASS, ILLUMINATED	 CAP	 SAFETY SWITCH
 WATER DISCHARGER	 STRAINER W. DRAIN	 EXTEND OF DELIVERY
 3–WAY VALVE W. ACTUATOR	 BUTTERFLY VALVE W. ACTUATOR (NORMALLY CLOSED)	
 REGULATING VALVE W. ACTUATOR	 BUTTERFLY VALVE W. ACTUATOR (NORMALLY OPEN)	
 BUTTERFLY VALVE W. ACTUATOR	 INCLINED SEAT VALVE W. ACTUATOR	
FLOW ARROW	 BALL VALVE W. ACTUATOR	
 SRC SEAT VALVE TYPE 22	 SRC SEAT VALVE TYPE 20	
 SRC SEAT VALVE TYPE 30	 SRC SEAT VALVE TYPE 21	
 FUNNEL		

9.4 PART LIST FOR FLOW DIAGRAM

Project no:						**13861**
Flow Chart No:						**2010066**
Project Name:						**CO-RO**
Pos No	**Rec. S. P.**	**TPS Part No**	**TP Part No**	**QTY**	**DESCRIPTION**	
12-M01		28857	90143-0097	1	Motor MEZ 55 kW Type 250M-4 B5/V1	400/690V 50/60Hz
14-0Z1		12042	90503-3598	1	Safety switch Type rotacam HS2	24V AC/DC
14-MV1		12539	6-9612944359	1	Man way 1600/B 430x556x100	
14-SG1		28339	┐	1	Glass for sightglass Polycarbonate	
14-SG2		21472	┐	1	Sightglass DN80 DIN 11851	
14-SG2		34336	┐	1	Light for sight glass USL03 LED 24V 4,5W	24V AC/DC 4,5W - IP65
14-SG3		34336	┐	1	Light for sight glass USL03 LED 24V 4,5W	24V AC/DC 4,5W - IP65
14-SG3		21472	┐	1	Sightglass DN80 DIN 11851	
14-TT1		25307	┐	1	Temp. sensor PT 100 incl. transmitter	4-20 mA. Prog. 0-100℃
30-F01		11773	┐	1	Strainer ½"	
31-V01		10268	6-9612194002	1	Actuator LKLA.T for butterflyvalve 25-63	Actuator LKLA-T Prepared for think top
31-V01		25288	6-9612578901	1	Think Top. No solenoid.	
31-V01		12006	┐	1	Weld in valve ø51	Inlet/outlet Butterflyvalve Ø51
31-V01	Yes	10242	6-9611923030	1	Service set Ø51 EPDM	Service Kit Ø51 EPDM Butterflyvalve
31-V02		10268	6-9612194002	1	Actuator LKLA.T for butterflyvalve 25-63	Actuator LKLA-T Prepared for think top
31-V02		25288	6-9612578901	1	Think Top. No solenoid.	
31-V02		12006	┐	1	Weld in valve ø51	Inlet/outlet Butterflyvalve Ø51
31-V02		10242	6-9611923030	1	Service set Ø51 EPDM	Service Kit Ø51 EPDM Butterflyvalve
31-V03		10268	6-9612194002	1	Actuator LKLA.T for butterflyvalve 25-63	Actuator LKLA-T Prepared for think top
31-V03		25288	6-9612578901	1	Think Top. No solenoid.	
31-V03		12006	┐	1	Weld in valve ø51	Inlet/outlet Butterflyvalve Ø51
31-V03		10242	6-9611923030	1	Service set Ø51 EPDM	Service Kit Ø51 EPDM Butterflyvalve
31-V04		10268	6-9612194002	1	Actuator LKLA.T for butterflyvalve 25-63	Actuator LKLA-T Prepared for think top
31-V04		25288	6-9612578901	1	Think Top. No solenoid.	
31-V04		12005	┐	1	Weld in valve ø38	
31-V04	Yes	10241	6-9611923029	1	Service set Ø38 EPDM	Service Kit Ø38 EPDM Butterflyvalve
31-V05		10241	6-9611923029	1	Service set Ø38 EPDM	Service Kit Ø38 EPDM Butterflyvalve
31-V05		12005	┐	1	Weld in valve ø38	
31-V05		25288	6-9612578901	1	Think Top. No solenoid.	
31-V05		10268	6-9612194002	1	Actuator LKLA.T for butterflyvalve 25-63	Actuator LKLA-T Prepared for think top
32-V01		10269	6-9612194003	1	Actuator LKLA-T Ø76 NC	Actuator LKLA-T Prepared for think top
32-V01		25288	6-9612578901	1	Think Top. No solenoid.	
32-V01		12008	┐	1	Weld in valve Ø76	
32-V01	Yes	10244	6-9611923032	1	Service set Ø76 EPDM	
32-V02		32447	se 3. linie	1	Sample Valve Keofitt W15	
35-V01		10233	6-9611444521	1	Butterfly valve LKB 316 Ø51 EPDM	
35-V01		10268	6-9612194002	1	Actuator LKLA.T for butterflyvalve 25-63	Actuator LKLA-T Prepared for think top
35-V01		25288	6-9612578901	1	Think Top. No solenoid.	
35-V02		25288	6-9612578901	1	Think Top. No solenoid.	
35-V02		10268	6-9612194002	1	Actuator LKLA.T for butterflyvalve 25-63	Actuator LKLA-T Prepared for think top
35-V02		10232	6-9611444511	1	Butterfly valve LKB 316 Ø38 EPDM	
36-F01		30531	90510-4645	1	Filter/silencer Ø51 for drain Ø101,6	
36-P01		24284	90503-6737	1	Vacuumpump SIHI LEMB161 380V 50/60Hz	3x380-480D/660-725VY50/60Hz 5.0/6.0kW
36-PG1		11822	90503-9254	1	Pressure Gauge -1-+1,5bar ø 38	
36-PT1		14622	┐	1	Pressure transmitter CERABAR-M PMP46	0-1 bar.
36-SB1		11821	6-3180196251	1	Cleaning ball Ø25 360* for Ø12 pipes	3,3 m3/H 2,5 Bar
36-TT1		34701	┐	1	Temper. sensor ½". Cooling neck	0-100℃. 4-20mA
36-V01		10233	6-9611444521	1	Butterfly valve LKB 316 Ø51 EPDM	
36-V01		10268	6-9612194002	1	Actuator LKLA.T for butterflyvalve 25-63	Actuator LKLA-T Prepared for think top
36-V01		25288	6-9612578901	1	Think Top. No solenoid.	
36-V02		10264	6-9612220009	1	Non-return valve LKC-2 316 ISO Ø51 EPDM	





Customer delivery ▲ Scanima delivery

Union connections DS standard

REV	DESCRIPTION		YEAR MONTH DAY	SIGN	CHECKED	APPROVED
scanima A/S Gugvej 152 DK - 9210 Aalborg SØ Denmark		Unless otherwise stated all tollerances should be according to	SURFACE TREATMENT ACC. TO		DRAWN JC	
			YEAR MONTH DAY 2010-03-18		CHECKED	
					APPROVED	
TITLE FLOW SHEET FOR SCANIMA TURBO MIXER TYPE STM-7000 SPECIAL T13			DRAWING NUMBER 2010066		SIZE A3 / SCALE – / SHEET OF	
			EQUIPMENT 13861		Material (X if separate part-list)	

Tetra Pak

OPERATIONS AND MAINTENANCE MANUAL

CHAPTER 10: APPENDICES

10. APPENDICES

10.1 SAFETY DATA SHEET NAOH (CONCENTRATED)

Section 1 – Product Information

Product Name: Caustic Soda

Synonyms: Sodium Hydroxide, Anhydrous Sodium, NaOH

Section 2 – Composition Information On Ingredients

Chemical Name: Sodium Hydroxide

Cas Number: 1310-73-2

% Range: 50 and less

OSHA PEL: 2 mg/m^3 Ceiling

Section 3 – Hazards Identification

Colourless or slightly coloured, clear and opaque, odourless.

Vapour in high concentrations can cause irritations in respiratory passage.

Potential Health Effects

- Inhalation:
  Breathing this material is harmful and can cause death. Harmful effects include burns and permanent damage to the airways, including the nose, throat and lungs.
- Skin:
  Causes skin burns and permanent skin damage
- Eyes:
  Causes burns and permanent injury to eye tissue. Can cause blindness
- Ingestion:
  Swallowing this material may be harmful or cause death. Harmful effects include burns and permanent damage to the digestive tract, including the mouth and stomach. Symptoms may include severe abdominal pain and vomiting of blood. Blood loss through damaged tissue can lead to low blood pressure and shock.
- Interaction with other chemicals, which enhance toxicity: None known.

Section 4 – First Aid Measures

- Inhalation:
  Remove individual to fresh air and get immediate medical attention. If breathing is difficult, give oxygen. If breathing stops, give artificial respiration.
- Skin:
  Immediately wash exposed skin with plenty of soap and water while removing contaminated clothing and shoes. Get medical attention.
- Eyes:
  Hold the eyelids apart and flush gently with plenty of water for at least 15 minutes. Get medical attention.
- Ingestion:
  Get immediate medical attention. Do not induce vomiting unless directed to do so by medical personnel since that can damage the mouth and throat.

See Section 11 for Toxicological Information

Section 5 – Fire Fighting Measures

- Fire Fighting Instructions:
  Approach fire from upwind to avoid hazardous vapours, Use flooding quantities of water as fog or spray to keep fire-exposed containers cool. Fire fighters should wear self-contained positive pressure breathing apparatus, and avoid skin contact, Refer to Reactive Data, Section 10.

Section 6 – Accidental Release Measures

Cleanup personnel must wear proper protective equipment (refer to Section 8). Completely contain spilled material with dikes, sandbags, etc., and prevent run-off into ground or surface waters or sewers. Recover as much material as possible into containers for disposal. Remaining material may be diluted with water and neutralized with dilute hydrochloric acid. Neutralization products, both liquid and solid, must be recovered for disposal. Notify local authority of uncontained releases to the environment.

Section 7 – Handling and Storage

- Handling:
  Follow protective controls set forth in section 8 when handling this product. Do not taste or swallow. Avoid contact with skin and avoid breathing mist. Do not eat, drink or smoke in work area. Wash hands prior to eating, drinking or using restroom. Any protective clothing or shoes contaminated with caustic should be removed immediately and thoroughly laundered before any reuse.
- Storage Conditions:
  Store in closed, properly labelled tanks or containers. Do not remove or deface labels or tags.

- Incompatible Materials for Storage or Transport:
  Aluminium equipment should not be used for storage and/or transfer

When diluting with water, slowly add caustic to the water. If product is added to rapidly, or without stirring and becomes concentrated at bottom of mixing vessel, excessive heat may be generated, resulting in dangerous boiling and splattering, and a possible immediate and violent reaction.

Contact of caustic soda cleaning solutions with food and beverage products (in enclosed vessels or spaces) can produce lethal concentrations of carbon monoxide gas. Do not enter confined spaces such as tanks or pits without following proper entry procedures as required by 29 CFR 1910.146.

Section 8 – Exposure Controls, Personal Protection

- Ventilation:
  As necessary to maintain concentration in air below 2mg/m^3 at all times.
- Eye and Face Protection:
  Wear chemical goggles. A face shield should be worn in addition to goggles where splashing or spraying is a possibility.
- Skin Protection:
  Wear chemical resistant clothing, boots, and gloves witch are made of neoprene, PVC or rubber. Always place pants legs over boots.
- Respiratory Protection:
  Where concentrations exceed or are likely to exceed 2mg/m^3 use a high-efficiency particulate filter with full-face piece or self-contained breathing apparatus. Follow any applicable respirator use standards and regulations.
- General:
  Safety shower and eyewash station must be located in immediate work area. Protective equipment and clothing should be selected, used, and maintained according to applicable standards and regulations.

Section 9 – Physical and Chemical Properties

Chemical formula: NaOH

pH: 13,75

Appearance and odour: Colourless or slightly coloured, clear or opaque, odourless.

Boiling point, 50% Solution: 145°C

Section 10 – Stability and Reactivity

- Chemical Stability:
  Stable

- Conditions to Avoid:
  Mixture with water, acid or incompatible materials can cause splattering and release of large amount of heat (Refer to Section 8). Will react with some metals forming flammable gas.
- Incompatibility With Other Materials:
  Chlorinated and fluorinated hydrocarbons (i.e. chloroform, difluoroethane), acetaldehyde, acrolein, aluminum, chlorine trifluoride, hydroquinone, maleic anhydride, phosphorous pentoxide and tetrahydrofuran.
- Hazardous Decomposition Products:
  Will not decompose
- Hazardous Polymerization:
  Will not occur.

Section 11 – Toxicological Information

- Inhalation:
  Inhalation of solution mist can cause mild irritation at 2 mg/m^3. More severe burns and tissue damage at the upper respiratory tract can occur at higher concentration. Pneumonitis can result from severe exposures.
- Skin:
  Major potential hazards – contact with the skin can cause severe burns with deep ulcerations. Contact with solution or mist can cause mutiple with temporary loss of hair at burn site. Solutions of 4% may not cause irritation and burning for several hours, while 25% to 50% solutions can cause these effects in less than 3 minutes.
- Eye:
  Major potential hazards – Liquid in the eye can cause severe destruction and blindness. These effects can occur rapidly effecting all parts of the eye. Mist or dust can cause irritation with high concentrations causing destructive burns.
- Ingestion:
  Ingestion of Sodium Hydroxide can cause severe burning in lips, mouth, tongue, throat and stomach. Severe scarring of the throat can occur after swallowing. Death can result from ingestion.
- Chronic Toxicity:
- No known chronic effects

Section 12 – Ecological Information

- Water: Will dissolve readily in water, raising pH.
- Danger to aquatic life with high concentration. Not expected to bio-accumulate.

Section 13 – Disposal Considerations

- All disposals of this material must be done in accordance with local authority regulations. Waste characterizations and compliance with disposal are the responsibility of the waste generator.
- Spill Residues:
  Recovered solids or liquids may be sent to a licensed reclaimer or disposed of in a permitted waste management facility. Consult local disposal authority for approved procedures.

Section 14 – Transport information

- Dot Identification No.
  UN 1824
- Dot Shipping Description (49 CFR 172.101)
  Sodium Hydroxide Solution, 8, UN 1824, PG II, RQ
- Placard Required
  Corrosive, 1824, Class 8
- Label Required
  Corrosive, Class 8.
  Label as required by OSHA Hazards Communication Standard, and any applicable state and local regulations.
- IMO Requirements
  EmS No.: 8-06 MFAG Table No.: 705 IMDG Code Page: 8226

Section 15 – Regulatory Information

- U S Federal Regulations
- Reportable Quantity (RQ):
  Reportable Quantity (RQ) is 1000 lbs.
- Toxic Substance Control Act:
  Listed on TSCA Inventory

International Regulations

Canada

- Workplace Hazardous Material Information System (WHIMIS) Classification:
  E (Corrosive Material) based on assignment to TDG Class 8
- Canadian Environmental Protection Act (CEPA):
  All components of this product are on the Domestic Substance List (DSL).

- Hazardous Products Act:
  This product has been classified in accordance with the hazard criteria of the Canadian controlled Products Regulations (CPR).

Europe

- EINECS No.: 215-185-5

Section 16 – Other Information

To our actual knowledge, the information contained herein is accurate as of the date of this document. However, neither TP Scanima nor any of its affiliates makes any warranty, expressed or implied, or accepts any liability in connection with this information or its use. This information is for use by technically skilled persons at their own discretion and risk and does not relate to the use of this product in combination with any other substance or any other process. This is not a license under any patent or other proprietary right. The user alone must finally determine suitability of any information or material for any contemplated use, the manner of use and whether any patents are infringed

10.2 SAFETY DATA SHEET HNO_3 (CONCENTRATED)

Section 1 – Product Information

Product Name: Nitric Acid

Chemical Formula: HNO_3

Section 2 – Composition Information On Ingredients

Chemical Name: Nitric Acid

Cas Number: 7697-37-2

% Range: 99 and less

EINECS Name: Concentrated Nitric acid solution

Section 3 – Hazards Identification

- Contact with combustible material may cause fire. Nitric Acid is not flammable, but can initiate fire by chemical reaction with reducing agents/combustible materials. Exposure to fire will result in increased evolution of acid vapour and decomposition gases which if inhaled may cause delayed lung effects.
- Nitric acid reacts violently with some combustible materials and many organic compounds.

Potential Health Effects:

- Inhalation:
  Acid vapour and decomposition gases are both toxic. Acid vapour, normally colourless, has

harmful effects include burns and permanent damage to the airways, including the nose, throat and lungs.

- Skin:
  Causes skin burns and permanent skin damage
- Eyes:
  Causes burns and permanent injury to eye tissue. Can cause blindness.
- Ingestion:
  Swallowing this material may be harmful or cause death. Harmful effects include burns and permanent damage to the digestive tract, including the mouth and stomach. Symptoms may include severe abdominal pain and vomiting of blood. Blood loss through damaged tissue can lead to low blood pressure and shock.

Section 4 – First Aid Measures

- Inhalation:
  Remove individual to fresh air and get immediate medical attention. If breathing is difficult, give oxygen. If breathing stops, give artificial respiration.
- Skin:
  Immediately wash exposed skin with plenty of soap and water while removing contaminated clothing and shoes. Get immediate medical attention.
- Eyes:
  Hold the eyelids apart and flush gently with plenty of water for at least 15 minutes. Get immediate medical attention.
- Ingestion:
  Rinse mouth with water and give plenty of milk or water to drink. Do not induce vomiting unless directed to do so by medical personnel since that can damage the mouth and throat. Get immediate medical attention

See Section 11 for Toxicological Information

Section 5 – Fire Fighting Measures

- Fire Fighting Instructions
  Approach fire from upwind to avoid hazardous vapours. Use flooding quantities of water as fog or spray to keep fire-exposed containers cool. Avoid breathing fumes, wear breathing apparatus as necessary. Suitable extinguishing media are foam, water and dry powder.

Section 6 – Accidental Release Measures

- Completely contain spilled material with dikes, sandbags, etc., and prevent run-off into the environment. Recover as much material as possible into containers for disposal.
- Cleanup personnel must wear proper protective equipment (refer to Section 8). Neutralization products, both liquid and solid, must be recovered for disposal. Notify local authority of uncontained releases to the environment.

Section 7 – Handling and Storage

- Handling:
  Follow protective controls set forth in section 8 when handling this product. Do not taste or swallow. Avoid contact with skin and avoid breathing mist. Do not eat, drink or smoke in work area. Wash hands prior to eating, drinking or using restroom. Any protective clothing or shoes contaminated with acid should be removed immediately and thoroughly laundered before any reuse.
- Storage Conditions:
  Store in closed, properly labelled tanks or containers. Do not remove or deface labels or tags. Tanks should be bunded to facilitate protection from accidental impact and secondary containment in the event of tank failure or spillage. Pure grade aluminium provides the best long term storage for concentrated nitric acid
- Incompatible Materials:
  Avoid using materials such as brass, copper, bronze, polyethylene, wood or cotton.
  If product is added to rapidly, or without stirring and becomes concentrated at bottom of mixing vessel, excessive heat may be generated, resulting in dangerous boiling and splattering, and a possible immediate and violent reaction.

Section 8 – Exposure Controls, Personal Protection

- Ventilation:
  As necessary to maintain concentration in air below 2mg/m^3 at all times.
- Eye and Face Protection:
  Wear chemical goggles. A face shield should be worn in addition to goggles where splashing or spraying is a possibility.
- Skin Protection:
  Wear chemical resistant clothing, boots, and gloves witch are made of neoprene, PVC or rubber. Always place pants legs over boots.
- Respiratory Protection:
  Where concentrations exceed or are likely to exceed 2mg/m^3 use a high-efficiency particulate filter with full-face piece or self-contained breathing apparatus. Follow any applicable respirator use standards and regulations.

- General:
  Safety shower and eyewash station must be located in immediate work area. Protective equipment and clothing should be selected, used, and maintained according to applicable standards and regulations.

Section 9 – Physical and Chemical Properties

Chemical formula:HNO_3

pH: below 1 (highly acidic)

Appearance: Clear, colourless liquid

Odour: Pungent and sharp

Boiling point: +86°C

Section 10 – Stability and Reactivity

- Chemical Stability:
  Stable
- Conditions to Avoid:
  Decomposes in heat and strong sunlight giving off toxic fumes of oxides of nitrogen and nitric acid vapour.
- Reactivity:
  Nitric acid is highly corrosive reacting rapidly with many metals, bases, organic compounds and common construction materials such as concrete, mild steel, limestone and mortar. It is a strong oxidant that can react vigorously with combustible and reducing materials. Any of the above reactions can evolve toxic fumes of NO_X (oxides of nitrogen).
- Hazardous Reactions:
  Nitric acid may react violently with powerful reducing agents.

Section 11 – Toxicological Information

- Nitric acid is highly corrosive to all parts of the body.
- Inhalation:
  Inhalation of solution mist can cause mild irritation at 2 mg/m^3. More severe burns and tissue damage at the upper respiratory tract can occur at higher concentration.
- Skin and eyes
  Major potential hazards – Liquid in the eye can cause severe destruction and blindness. These effects can occur rapidly affecting all parts of the eye. Mist or dust can cause irritation with high concentrations causing destructive burns.

- Ingestion:
  Ingestion of Sodium Hydroxide can cause severe burning in lips, mouth, tongue, throat and stomach. Severe scarring of the throat can occur after swallowing. Death can result from ingestion.

Section 12 – Ecological Information

- General:
  Vegetation contacted with undiluted Nitric Acid will be destroyed by corrosive actions. In rivers, lakes, etc. Nitric Acid will cause a lowering of pH which may prove fatal to aquatic live forms. Not expected to bio-accumulate.

Section 13 – Disposal Considerations

- All disposals of this material must be done in accordance with local authority regulations. Waste characterizations and compliance with disposal are the responsibility of the waste generator. Avoid contact with combustible materials.
  Spill Residues:
  Recovered solids or liquids may be sent to a licensed reclaimer or disposed of in a permitted waste management facility. Consult local disposal authority for approved procedures.

Section 14 – Transport information

UN No.: 2032

Hazard class: 8 – corrosive substance

Packing group: II – medium danger

Tremcard No.: CEFIC TEC(R) – 9a

E.A.C.: 2PE

ADR/RID: Class 8, Item 2°(b), label 8
Packing Group ii

Material No. 2032
Danger No. 885

IMDG: Class 8, Label 8, Packaging Group II
UNO-2031

Section 15 – Regulatory Information

EEC Directives:

Classifications and labelling according to Directive 67/548/EEC

Classification: Corrosive

Hazard Symbol:

C, Representation of acid action

O, Oxidant

Risk Phrase:

R8: May lead to ignition of combustible materials

R35: Causes severe burns

Safety Phrases:

S2: Keep out of reach of children

S23: Do not breathe vapour
S26: In case of contact with eyes, rinse with plenty of water and seek medical advice.

S36: Wear suitable protective clothing.

S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)

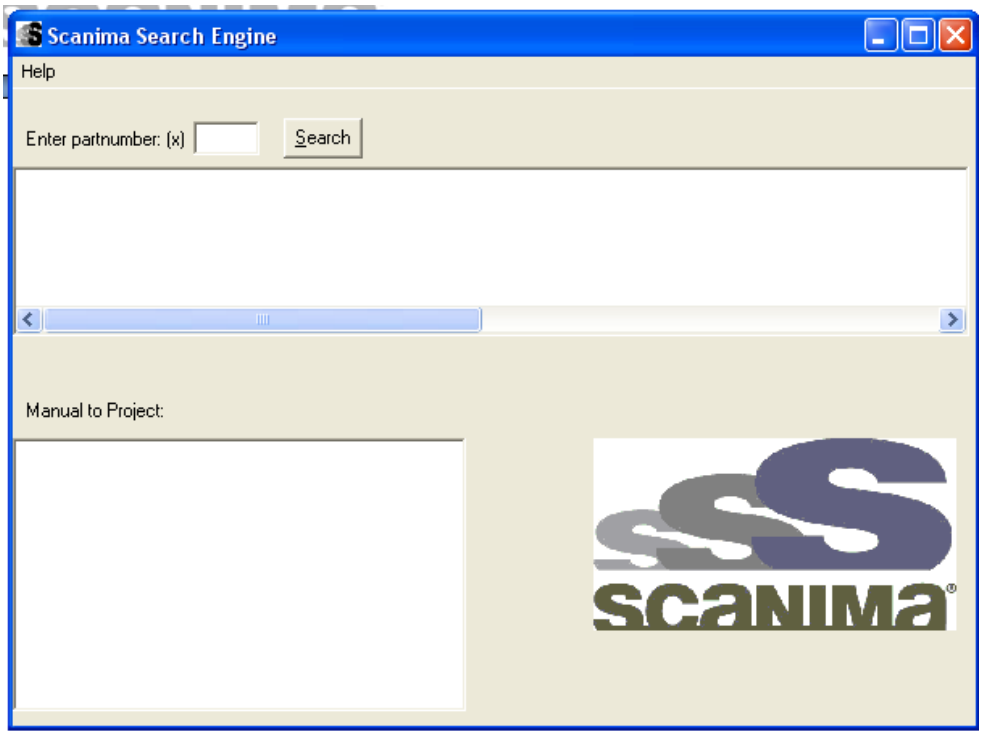
Section 16 – Other Information

To our actual knowledge, the information contained herein is accurate as of the date of this document. However, neither TP Scanima nor any of its affiliates makes any warranty, expressed or implied, or accepts any liability in connection with this information or its use. This information is for use by technically skilled persons at their own discretion and risk and does not relate to the use of this product in combination with any other substance or any other process. This is not a license under any patent or other proprietary right. The user alone must finally determine suitability of any information or material for any contemplated use, the manner of use and whether any patents are infringed.

10.3 DOCUMENTATION FOR COMPONENTS

For documentations to components used on the mixer plant, please refer to CD-ROM delivered together with this manual.

The CD-ROM will start automatically when inserted, and a Search Program will appear, please see below.



To find documentation to a specific part number, please type in the wanted part number. To read or print founded files, click twice on the file.

In "Manual to Project" section, the manual can be read or printed as PDF-files. Click specific file to open manual files.

10.4 CERTIFICATE