Content

1 The Scanima Concept

Scanima A/S is a limited company with its registered head office in Aalborg, Denmark. Scanima employs approximately 85 people.

Scanima Head office

Scanima A/S 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.

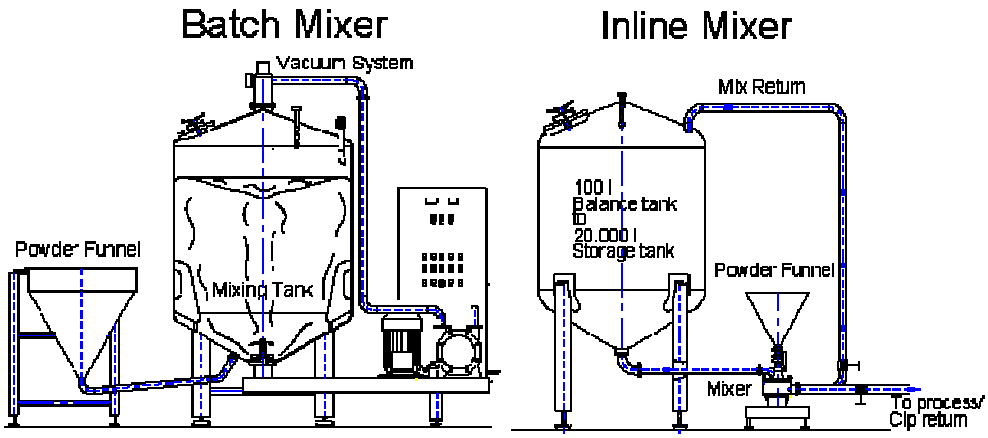


Figure 1-1 The Batch versus In-line mixer principle

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 Scanima Mixers. Section 1.3, 1.4 and 1.5 gives principle of vacuum, vortex and steam.

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

The 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 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. 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 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 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 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.

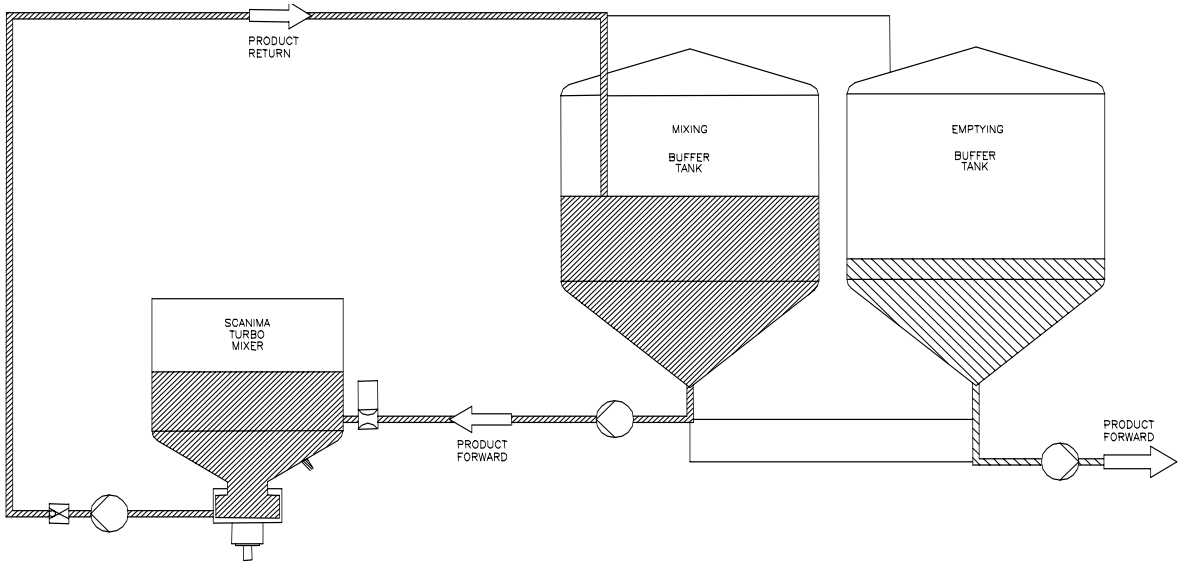


Figure 1-2 Principle for continuous processing

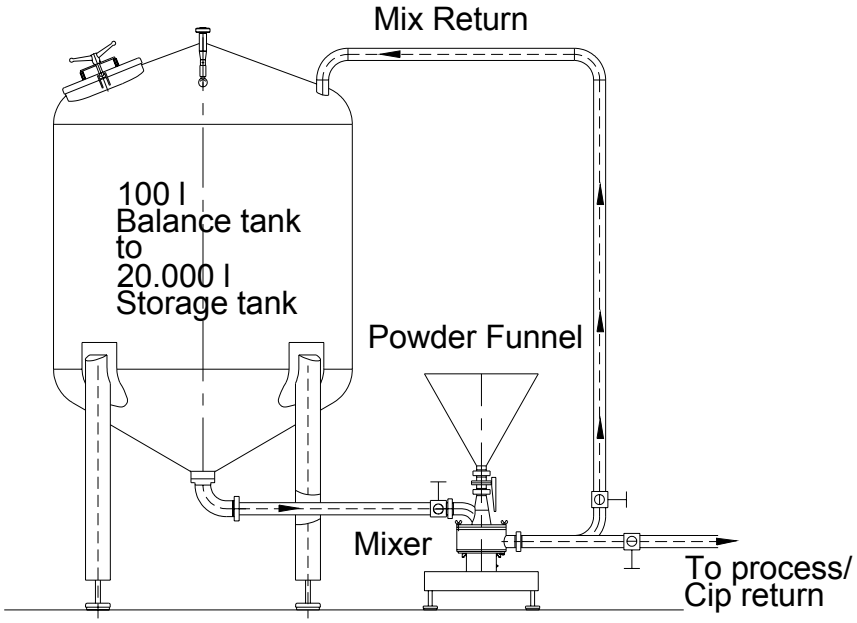


Figure 1-3 Principle for continuous processing, SFM 200

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.

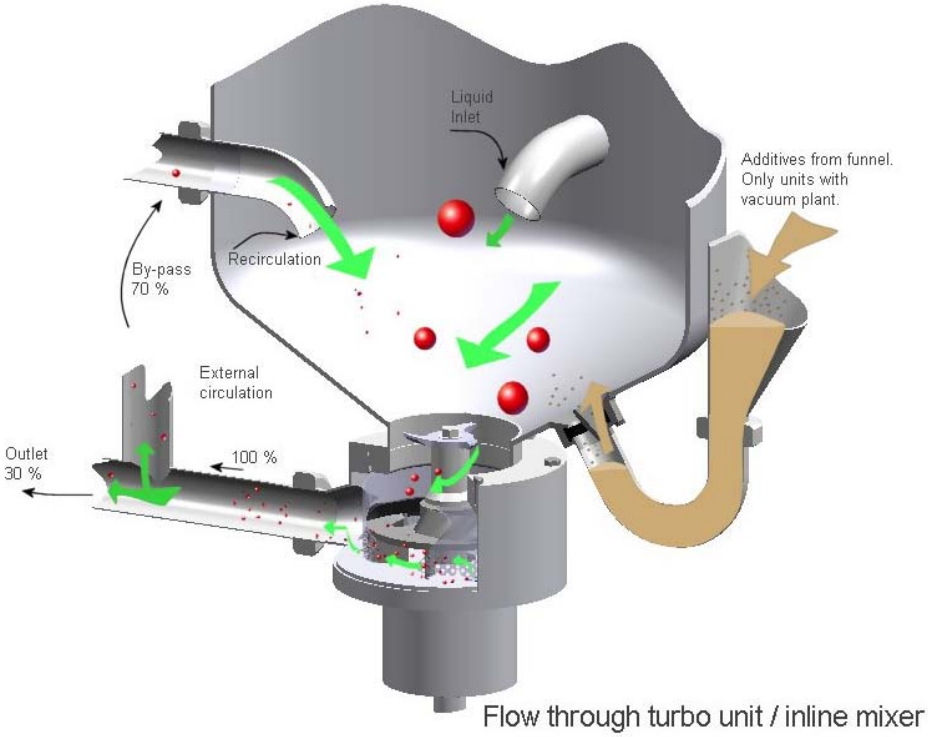


Figure 1-4 Inline Principle

1.2 Process principle – Batch Mixer

1.2.1 Turbo unit principle

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.

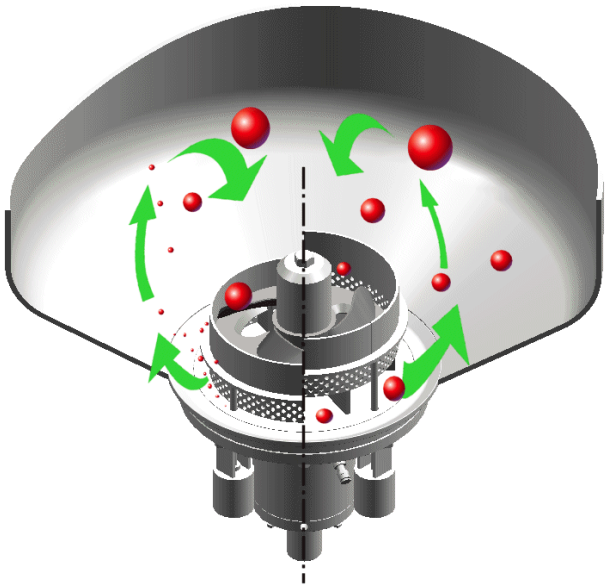


Figure 1-5 Adjustable stator in the Scanima Mixer (optional)
Left side: Stator ring in homogenising/dispersing position.
Right side: Stator ring elevated for agitating/blending mode

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 Homogenising /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.

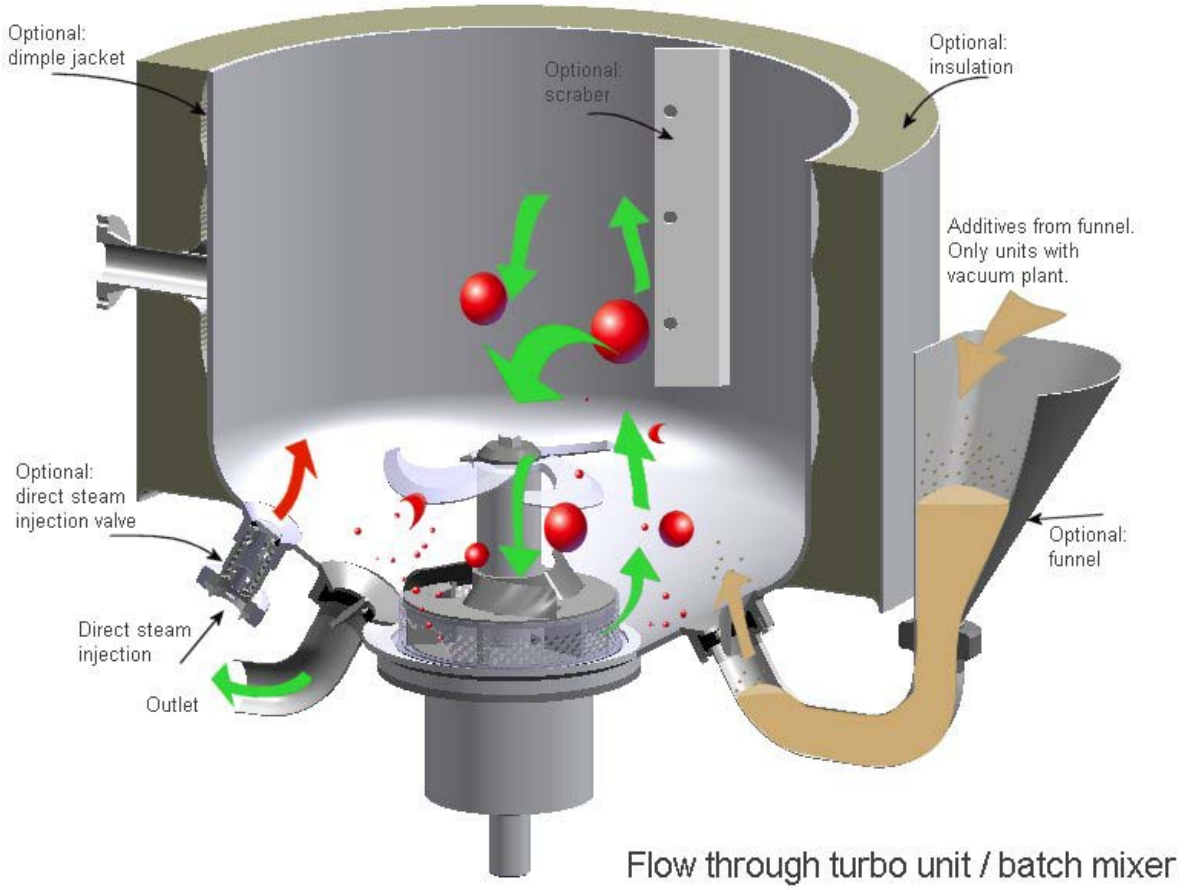


Figure 1-6 Principle function

1.3 Vacuum system

The mixing unit is equipped with a vacuum system that can create vacuum in the mixing vessel down to approximately –0,85 bar. This feature has two advantages:

- Powder can be sucked into the vessel due to the vacuum in the vessel.
- Product can be de-aerated, as air is sucked out of the product. (Applicable to batch mixers only)

The vacuum is established by a vacuum pump. The capacity in terms of powder transport is in theory equal to the capacity of the vacuum pump. In practice capacity in terms of kilos is reduced by other parameters: Air in powder, Humidity, Powder type and geometry of the powder convey line. Capacity of a specific application must be determined by trials.

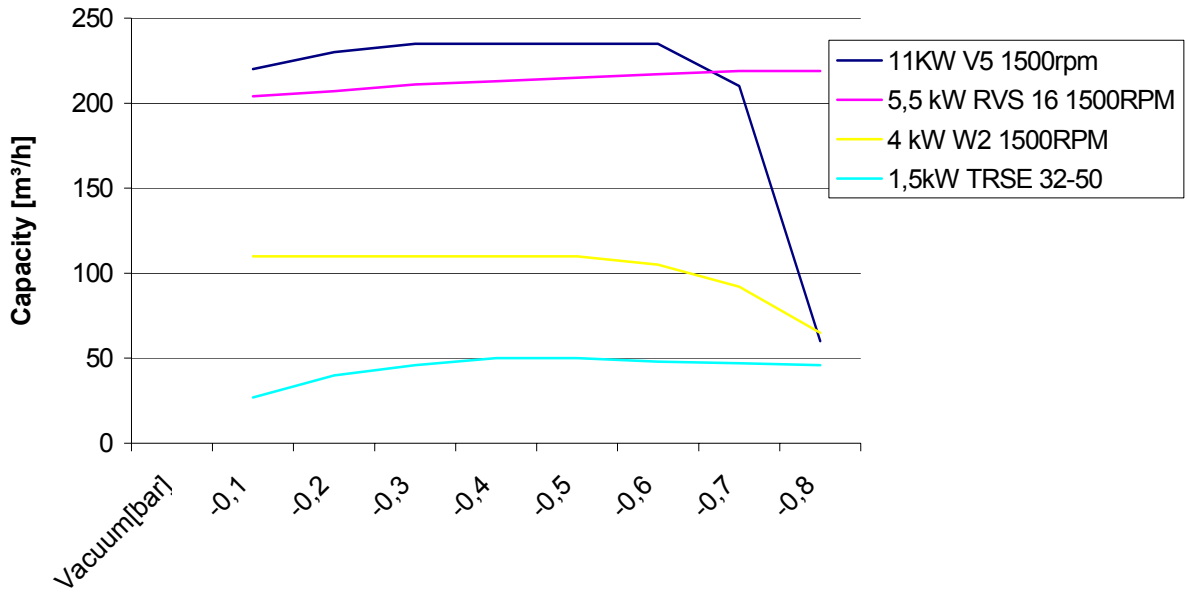


Figure 1-7 Capacity of vacuum pump in terms of Air

1.4 Vortex control

Mixers can create a vortex in the product, which helps the powder getting down to the mixing head. A big vortex helps the mixing process, but on the other hand, the vortex allows air to get into the mixer and the product might foam heavily. Hence the vortex size must be controlled. This can be done by means of:

- Mixer rpm
- Mixer vessel level
- Recirculation (increases rotational speed in vessel)
- Extra propeller on mixing head

Apart from the above-mentioned bulletin, other parameters are relevant for foaming. These are:

- Air content in powder
- Powder funnel runs dry and leaks in air
- Vortex in holding vessel leaks in air to mixer

The capacity of the mixer is also dependent of the viscosity of the product. Adding powder by using the full capacity of the vacuum pump or by manual feeding may cause the viscosity of the mixed product to be increased, and this again will cause a low flow in terms of volume when using an in-line mixer (or a pump).

To keep viscosity down, powder in-take must be levelled to the flow through the in-line mixer. This level is to be found by trials.

1.5 Steam system

The temperature of the steam is dependent of the steam pressure. The correlation between pressure and temperature are given in following table together with specific volume, heat capacity etc. for steam.

Pressure	Steam Temp	Steam Temp	Specifik volume (steam)	Heat of Saturated Liquid (water)	Latent Heat	Heat of Saturated Liquid (water)	Latent Heat
bar(a)	°C	°K	m^3/kg	kJ/kg	kJ/kg	kcal/kg	kcal/kg
1,0	99,60	372,75	1,6940	417	2,257	99,7	539,3
1,5	111,40	384,55	1,1590	467	2,226	111,5	531,8
2,0	120,20	393,35	0,8854	504	2,201	120,5	525,9
2,5	127,40	400,55	0,7184	535	2,181	127,8	521,0
3,0	133,50	406,65	0,6056	561	2,163	134,1	516,7
3,5	138,90	412,05	0,5240	584	2,147	139,0	512,9
4,0	143,60	416,75	0,4622	604	2,133	144,4	509,5
4,5	147,90	421,05	0,4138	623	2,119	148,8	506,3
5,0	151,80	424,95	0,3747	640	2,107	152,8	503,4
6,0	158,80	431,95	0,3155	670	2,084	160,1	498,0

Table 1-1 Steam data

Direct steam

Direct steam is used to heat up the product with steam which is injected direct into the product, See figure below.

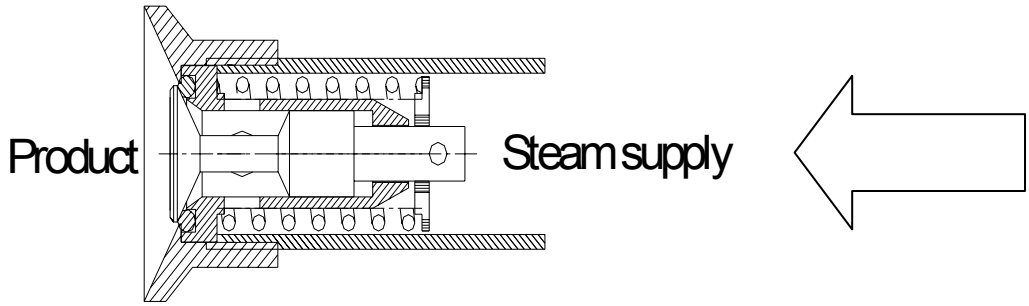


Figure 1-8 Direct steam valve

Indirect heating or cooling

Indirect heating is used to heat up the product with steam, which is circulated via a dimple jacket, See Figure 1-9

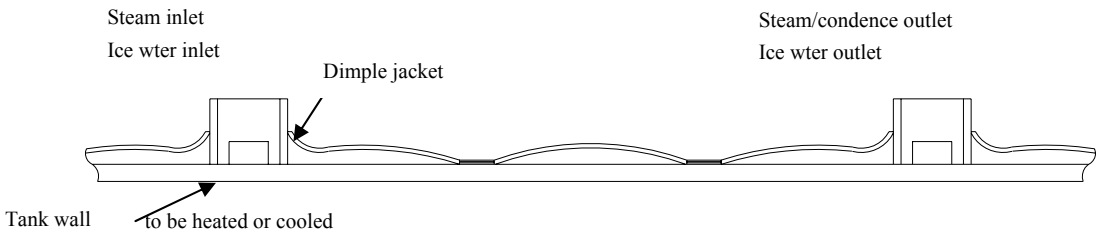


Figure 1-9 Dimple jacket principle

1.6 Agitator

Mounted with scrapers, the agitator prevents burning of product on the tank wall.

In general, the agitator is used for gentle agitating the product, but can also help the mixing process if rotated in same direction as the turbo unit, in order to facilitate a better vortex for products with high viscosity or large vacuum tanks.

Content

2 General Information

2.1 About the manual

Scanima A/S congratulates you with your new 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 Scanima Mixer can be viewed. When reading the manual some explanation/drawings are not valid for your Scanima Mixer, this because the overall manual is used for a wide range of Scanima Mixers. Therefore, please see section 2.4 “Plant Description” for the exact specification of your 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 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 “Operator’s Manual”: Contains information for the operator. Also, it is applicable for technical staff that installs and commissions the Scanima equipment, described in this manual.

6 & 7. Technical Manual – Mechanical- and Electrical Part contains information related to installation and commissioning of the Scanima equipment, described in this manual.

8 “Maintenance“: Describes key points of maintenance on the mixer

9 “Spare Parts”: This chapter gives you the specific spare parts for your Scanima Mixer.

10 “Appendix”

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

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

2.2 Supplier details

Name .....Scanima A/S
Address..... Gugvej 152
Post code..... DK-9210 Aalborg SØ
Telephone..... +45 96331000
Fax..... +45 96331011
E-mail..... Scanima@scanima.dk
Web .....www.scanima.com

2.3 Document information

2.3.1 Additional copies

Further copies of technical publications can be ordered from Scanima A/S. When ordering, always quote the 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 © 2008

2.4 Plant Description

The overall specification for your 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 flowdiagram.

Project No	11880
Serial No	11880-08
Delivery Date	08-10-2008
Mixer Type	Mixer STM-7000 SPECIAL
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	Stator/Turbo replaced by Rotofoil

Content

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.

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

The facility is not equipped with warning signs. All personnel must observe the warnings indicated in Figure 3-1. Below is explanation to all warnings shown in Figure 3-1.

Vacuum system (if applicable):

Do not get near any inlet/outlets in operation when sucking in powder or when regulating vacuum.

Do not obstruct free flow from vacuum pump. The vacuum outlet serves as outlet in case of the vessel getting pressurised.

Steam system (if applicable):

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 or the vacuum pump.

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 applicable):

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.

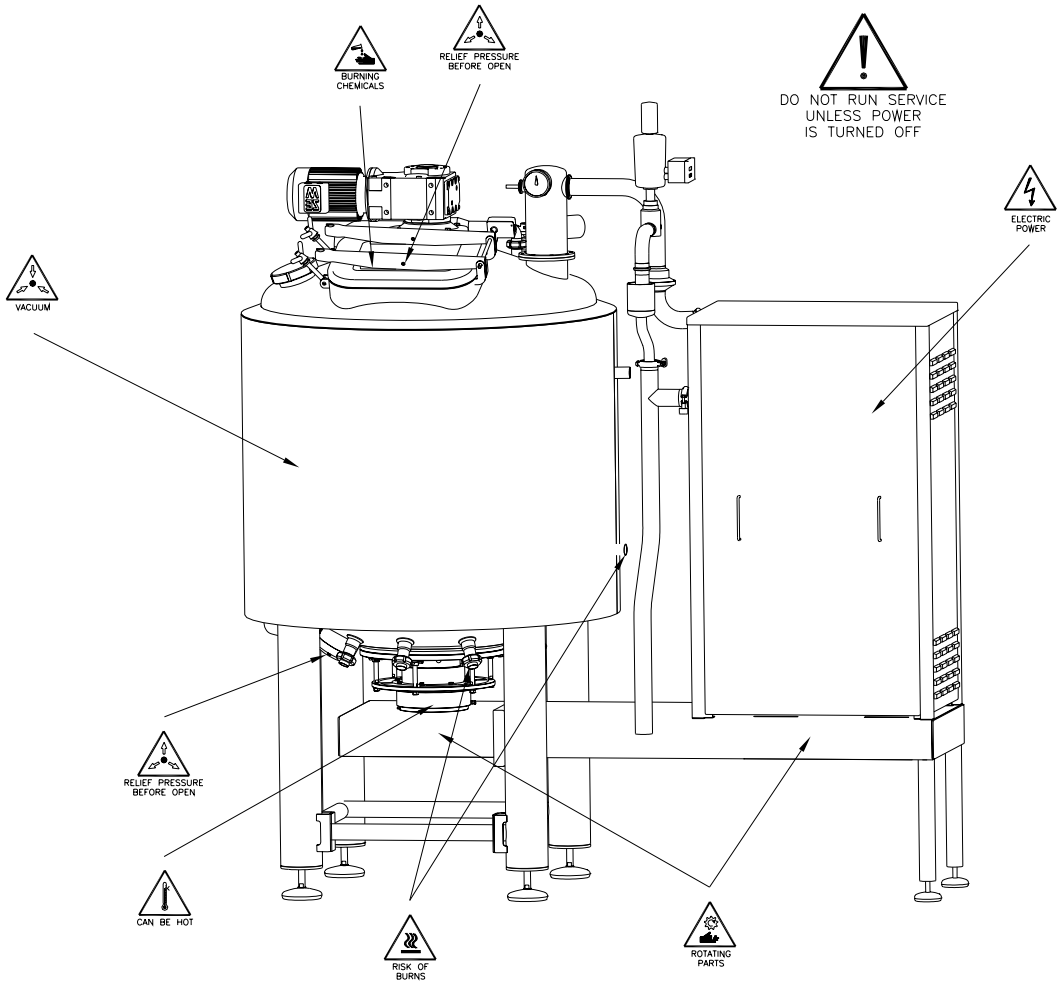
V-belt:

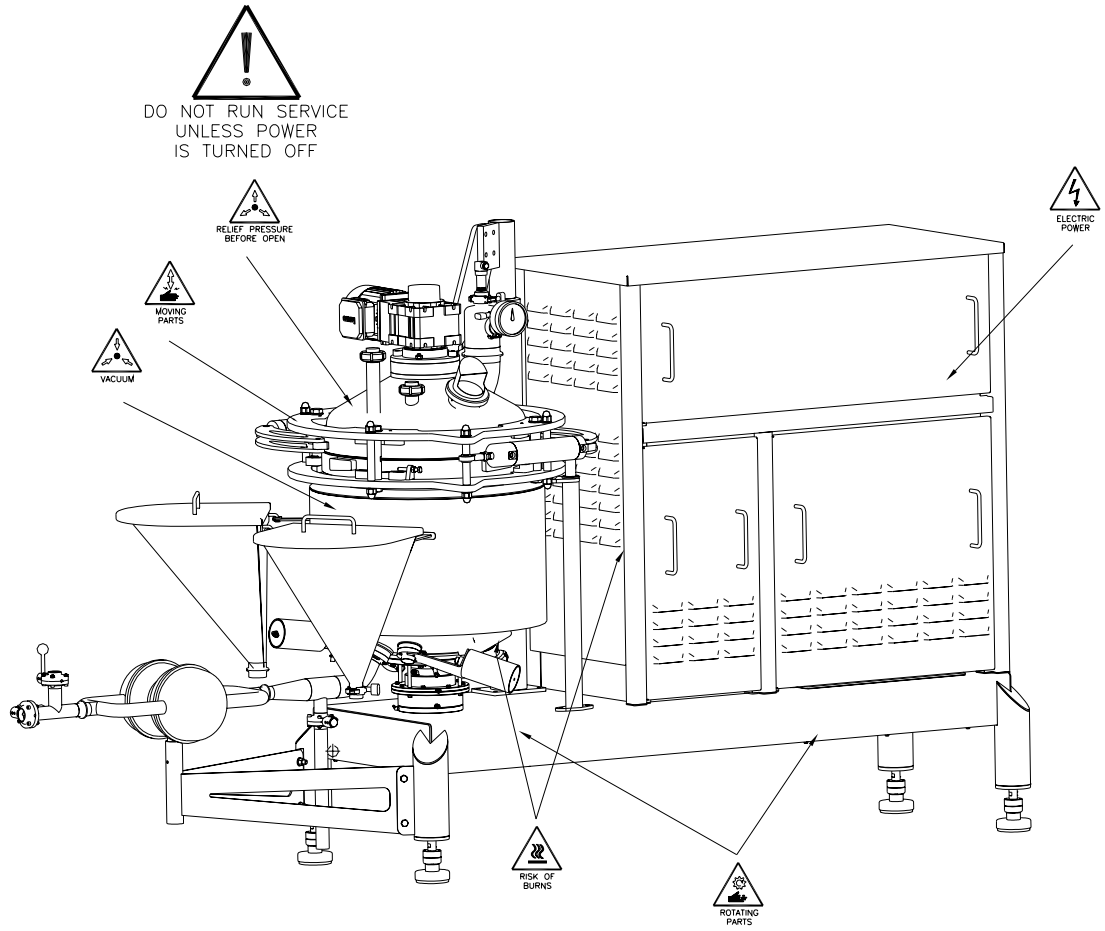
The V-belt drive is located underneath the machine and protected with some shielding. There is no safety device attached to the shielding and therefore it is possible to operate the machine without shielding. However, it is recommended not to operate the machine without the shielding properly installed.

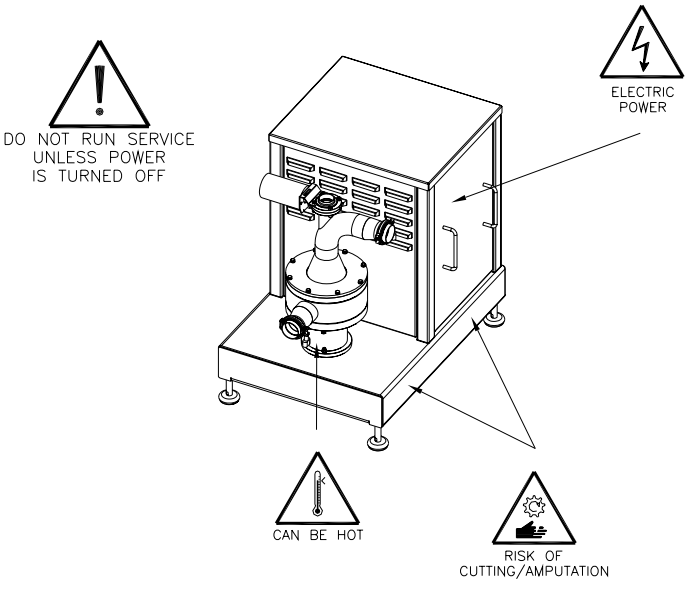
Do not place any objects underneath the machine since the V-belt drive is located here, even though it is properly shielded.

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.




DO NOT RUN SERVICE
UNLESS POWER
IS TURNED OFF
RELIEF PRESSURE
BEFORE OPEN
MOVING
PARTS
VACUUM
ELECTRIC
POWER
RISK OF
BURNS
ROTATING
PARTS


DO NOT RUN SERVICE
UNLESS POWER
IS TURNED OFF
ELECTRIC
POWER
CAN BE HOT
RISK OF
CUTTING/AMPUTATION

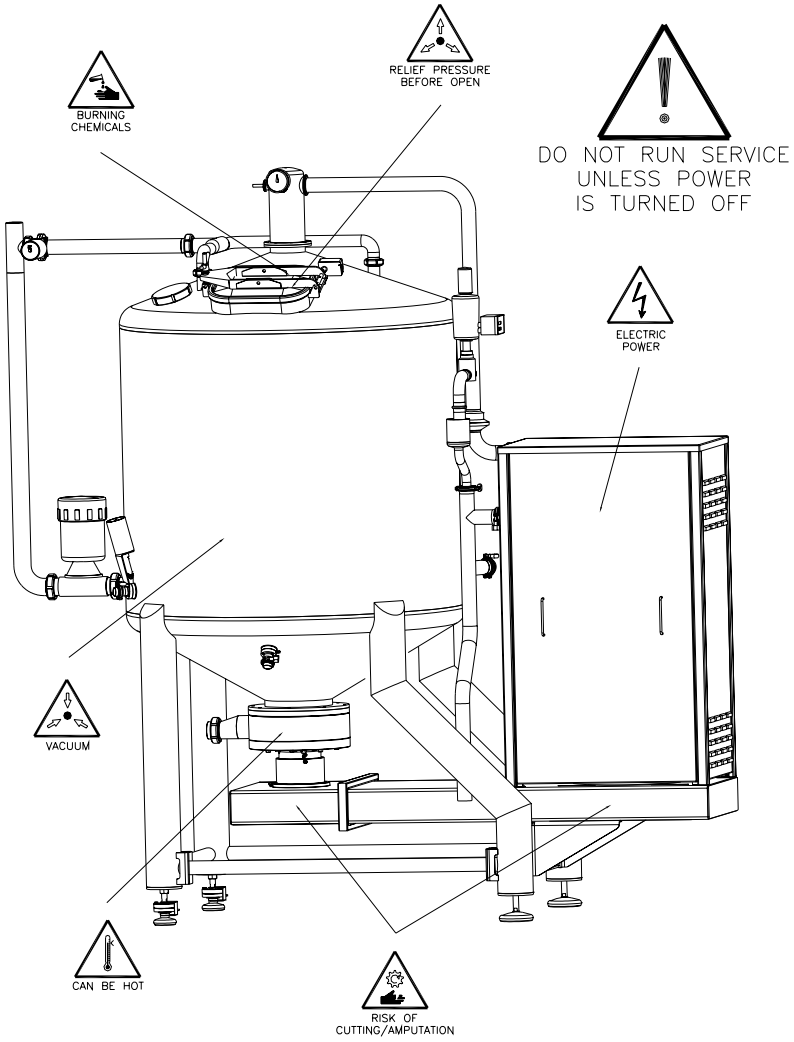


Figure 3-1 Safety drawings

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 documents.

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

Scanima A/S 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.

In the circumstance of access for unauthorised 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 (HNO_3). 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 6. Scanima A/S 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.

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

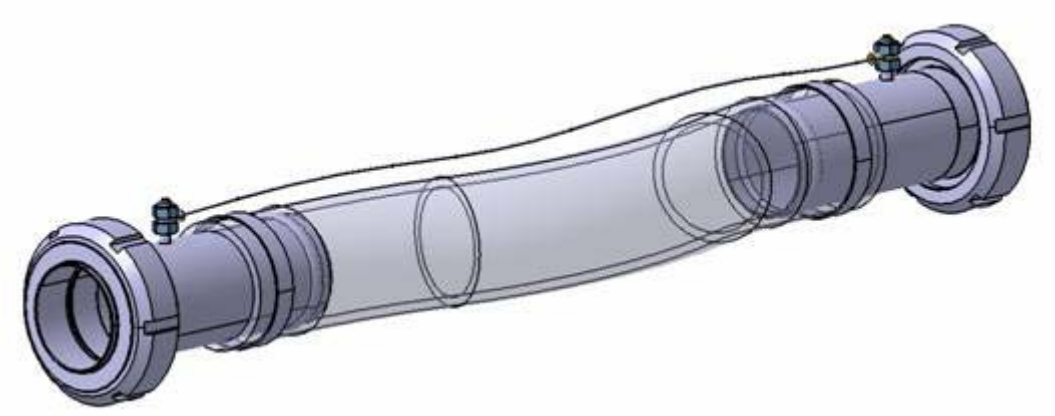
Only use original spare parts.

Content

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 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 have 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., se example on sketches.) between the powder funnel and mixer and between the powder funnel and other connected equipment. The potential equalization have 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.)
- Regarding the risk of spark generating and the risk of powder explosion the agitator on the powder funnel must not run above 50 Hz when using VSD motor.

- The electrical control system and function of the plant have to be approved by 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 not are followed is there 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 change 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 Conditions for operating the dimple jacket (if applicable)

4.3.1 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” section for

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. Scanima supply a range of traps, strainers, separators, safety valves and pressure reducing equipment.

4.3.2 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

4.3.3 Design pressure of dimple jacket

Max inlet pressure: 4bar

4.4 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 Scanima process plant

4.4.1 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% condensate
pH	8.5-9.2
Carbon dioxide	max 2 ppm
Chloride	max 8 ppm
Solid particles	max 0.5 mm
Turbidity	max 3 ppm $KMnO_4$

Characteristic of saturated steam for direct injection

Quality	dry clean steam satisfactory for the product
Humidity	max 5% condensate
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	

4.4.2 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

4.4.3 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: <7º dH

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

4.4.4 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.

4.5 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.

1. Unload the truck for the vessel and transmission by using a fork lift.

2. Mount the vacuum unit on the top of the vessel and also use the pipe holder on the side of the vessel.

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.

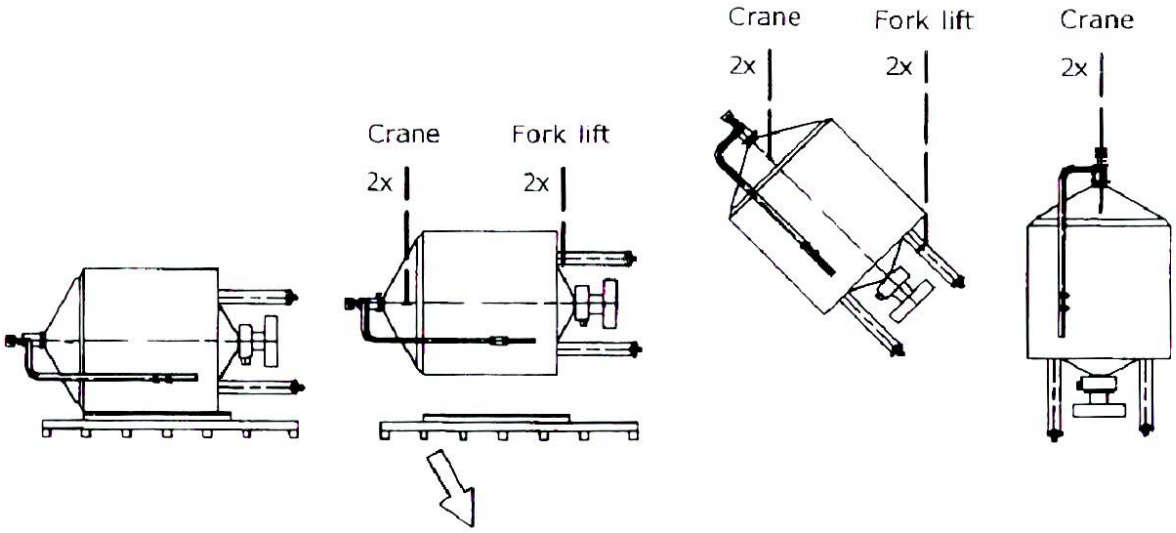
> Caution:
> The vessel has to be lifted free form the transportation pallet before turning from horizontal to vertical position, otherwise the insulation shell will be damaged.

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.

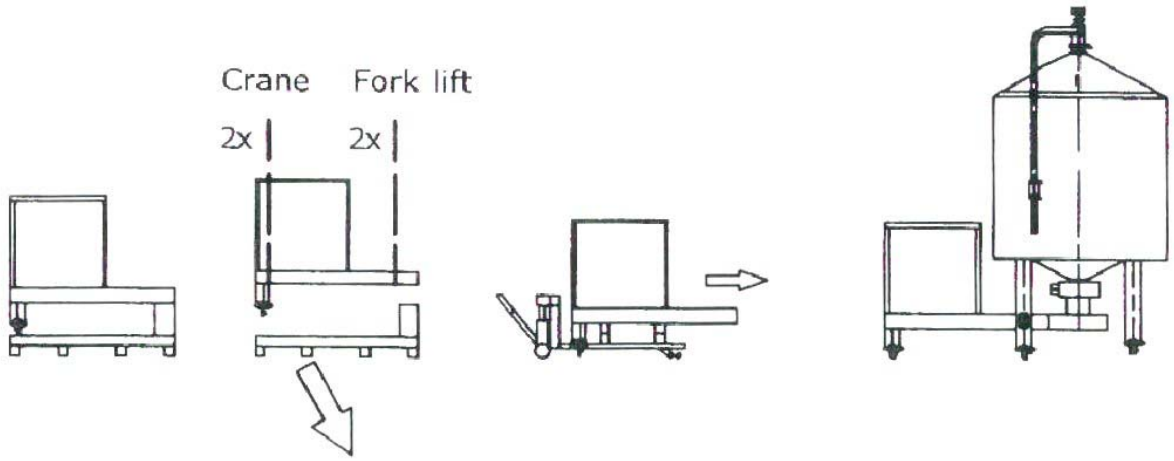
5. Place the transmission on a mobile pallet lift and move the transmission underneath the vessel and assemble the two components by fastening all bolt connections. (4-bolt connections at vessel legs and 7 inside the transmission). Bolts, screws and washers are to be found in a box fastened onto the transportation pallet.

> Caution:
> All bolt connections has to be assembled before any further lifting operations can take place.

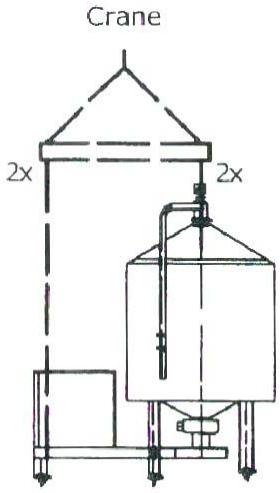
6: The assembled vessel and transmission is to be lifted by a crane or forklift by using equipment that is able to lift two points at least at the same time.



1-2-3: Lifting the vessel from the transportation pallet and placing in vertical position



4-5: Lifting the transmission from the transportation pallet and assembling with the vessel



CAUTION:
No steel chains are allowed in direct contact with the vessel or transmission during lifting operations.

4.6 Installation instructions

4.6.1 Requirements of personnel

Operation by unauthorised personnel may endanger personnel and property. Scanima A/S recommends the 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.

4.6.2 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).

4.6.3 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.

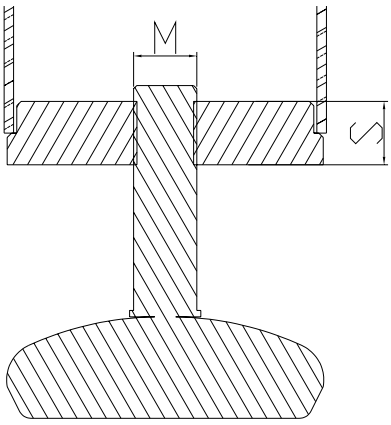
4.6.4 Unpacking

Unpacking the equipment should take place very gently.

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

4.6.5 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

4.6.6 Connections

Connections sizes are indicated on the Flow Diagram, and location can be seen on Layout Drawing. Please see section 8 for further information on this matter.

4.7 Mixer Startup

4.7.1 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°. Amount is adjusted on service water needle valve. Normally the mixer will use app. 20 l/hrs of water.

4.7.2 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° when vacuum pump is running.

4.7.3 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 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.

4.8 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

Content

5 Operator's Manual

5.1 Operating the mixer – Batch

5.1.1 Preparation

Open for service water supply

- Make sure that valves are in correct positions
- Make sure that mixing vessel is clean and drained

Vacuum system

- Prepare the powders in the funnel.
- Close the air relief valve. With the air relief regulating valve (if delivered) the pressure in the mixing vessel can be adjusted to the vacuum set point desired.
- Vacuum system with re-circulation/silencer:
  At commission of the mixing plant it takes about 1-2 minutes before the vacuum system starts to operate. To adjust the freshwater supply to the vacuum system, let the pump run for approximately 10 minutes. Then adjust the needle valve on the re-circulation system so the temperature is hand-warm (30-37ºC).

Steam system

- Provide the equipment with steam.

5.1.2 Mixing Cycle

- Add liquid into the mixer
- Start the mixer
- Add powder
- Stop the mixer

Vacuum system

- Start the vacuum pump

- Fill powder into the mixer, by opening the powder inlet valves. Keep inserting powder and/or minor ingredients until the desired dry matter content and/or composition is reached.
- Stop the vacuum pump

Steam system

Heat up the product if wanted.

Cool the product if necessary.

5.1.3 Set-up of the pressure regulation valves

The pressure regulating valves at the inlet and outlet of the dimple jacket is used to regulate not only the pressure in the dimple jacket, but also the temperature of the jacket.

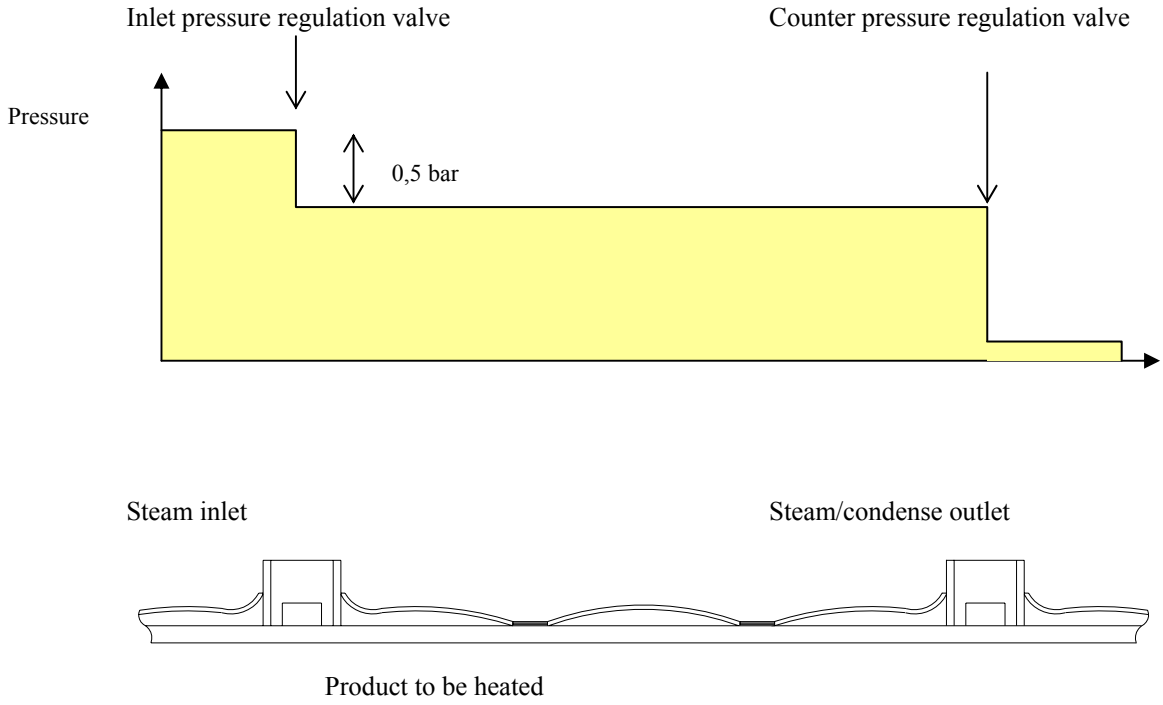


Figure 5-1 Pressure in dimple jacket

When setting up the steam pressure regulation valves, it must be considered which temperature that is wanted. Use water for setting up the valves. The set-up procedure is as follows:
Close the manual steam regulating inlet valve completely.
Open the jacket steam solenoid valve.
Open the steam regulating inlet valve slowly until the manometer shows the wanted pressure P + 0,5 bar.

Close the jacket steam solenoid valve.
Open the counter pressure valve slowly until the manometer shows 0,5 bar less than before (=P)

Caution: The counter pressure valve is hot!

Note that no flow will be established before the pressure exceeds the pressure P because of the counter pressure valve.

5.1.4 Safety devices

Warning:	Any attempt to bypass the safety devices installed on the unit is not allowed. Please make sure that all safety devices are working properly at all times. If errors or defects are observed, the responsible person must be informed immediately. If the safety devices are out of operation, usage of the unit must be stopped immediately until the safety devices are repaired or replaced.

Emergency stop and safety device on manhole door

Due to the safety of the operator the unit is equipped with an emergency stop and a safety device on the manhole door. If the emergency stop is activated or the manhole door is open the machine will not be able to start. If the emergency stop is activated or the door is opened during operation, the production sequence will stop immediately and it will not be able to restart before resetting the whole system.

5.2 Trouble shooting

Turbo Unit

Effect	Cause	Elimination
Jarring sounds	To much tension on the V-belt	Loosen the V-belt tension
	Bearings may be worn	Replace the bearings
Water leakage	The Drive seals are worn	Replace the Drive seals

Table 5-1 Trouble shooting chart of the turbo unit

Vacuum system

Effect	Cause	Elimination
Foaming	Air bleeds into mixer below product level	Eliminate leakage
	Foaming product	Reduce vacuum level
	Pressure to low	Increase pressure (bleed air into mixer above product level)
	Air in powder	Vibrate the powder to avoid rat holes
Back flush in powder convey line	Free flow is obstructed in powder convey line.	Check powder convey line for blocks. Remove unnecessary valves.
	Powder convey line is too long	Keep down the distance between mixer and powder silo
	Vacuum level to low	Stop adding powder before this happens

Table 5-2 Trouble shooting chart of the vacuum system

Steam system

Effect	Cause	Elimination
No or to slow heating	No steam or to small pressure to the vessel	Correct the error at the steam supply
	The steam supply is OK, but only little steam reaches the vessel.	The filter or strainer is clogged up. Water discharge is defective, or steam quality too wet due to priming in the boiler or missing water separation before the place of consumption
	Temperature control device is not working	Check if the control valve is blocked or defective, check if the control unit is operated wrongly (the set-points keyed in is not what was intended etc.). Check if the temperature transmitter is working correct

Table 5-3 Trouble shooting chart of the steam system

Agitator

Effect	Cause	Elimination
The Agitator fails to start	The main switch has not been switched on	Turn the main switch on
	The emergency stop is activated	Reset emergency stop.
	A fuse has blown	Find the defective fuse and replace it.
	The thermal relay has switched off	Find the error on the switchboard and reactivate
	Missing control impulse	Follow the wiring diagram and use a pole device to find the missing impulse

Table 5-4 Trouble shooting chart Agitator

5.3 Cleaning

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.

We draw your attention to the fact that the 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.

Vacuum system

It is recommended to run the vacuum pump a few times during C.I.P. After C.I.P. run the vacuum pump 15 seconds in order to clean the pump. It is recommended to clean the powder convey line regularly.

Manual cleaning of powder funnel

It is recommended to clean the powder funnel manually.

The Cleaning In Place (C.I.P.) system

The C.I.P system is a fully automated cleaning system. The system is particularly useful if a high level of containment and/or automation is required such as in a mixing facility. For information on how to run the C.I.P sequence please refer to technical documentation for further details.

Recommended detergents

Caustic: NaOH, 2% by weight.

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

Temperature: maximum 70°C

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

When handling these detergents, please refer to section 7 in the safety data sheets for both detergents described in this chapter.

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.

5.4 Storage of this manual

This manual must be available for all operating personnel at all times.

Content

6 Controlling the Mixing Process

This chapter gives different PID-loops for controlling the Mixing Process. When reading this chapter, please notice that some of the loops are applicable for both Inline and Batch mixers, others are only applicable for one of the Mixing types

Reading the process diagrams

A mixer can be delivered with various kind of configurations, and therefore in order to satisfy that variety, the diagrams are developed with intend to consider all kinds of configurations. In order to illustrate, the diagrams are build with different kind of flowchart shapes. See Figure 6-1.

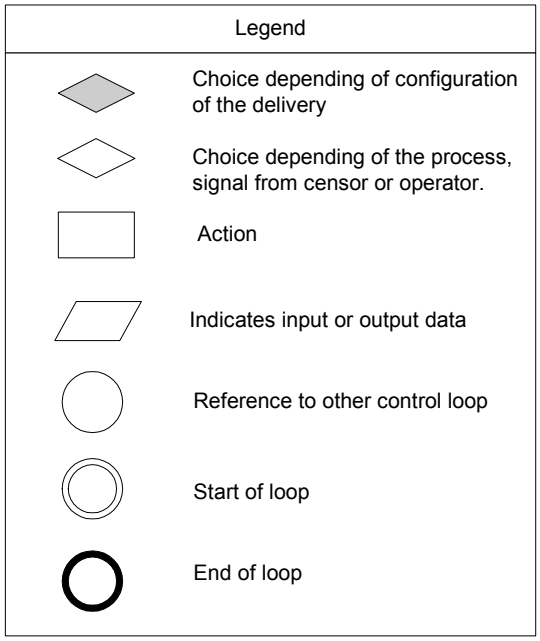


Figure 6-1 Used legends in developing the process diagrams.

PID loops

On a mixer there are several PID controllers installed. Depending on the configuration of the delivery, an Inline mixer contains the following PID loops:

- Inlet valve regulation loop
- Re-circulation flow regulation loop
- Transfer valve regulation loop
- Regulating loop powder inlet

- Vacuum regulation loop

PID stands for Proportional, Integral and Derivative. Controllers are designed to eliminate the need for continuous operator attention, and to automatically adjust some variable to hold the measurement (or process variable) at the set-point. The set-point is where you would like the measurement to be. Error is defined as the difference between the set-point and the measurement.

6.1 Main control loop - Inline

The Main control loop diagram shows the way the process is controlled during the continuous mixing process.

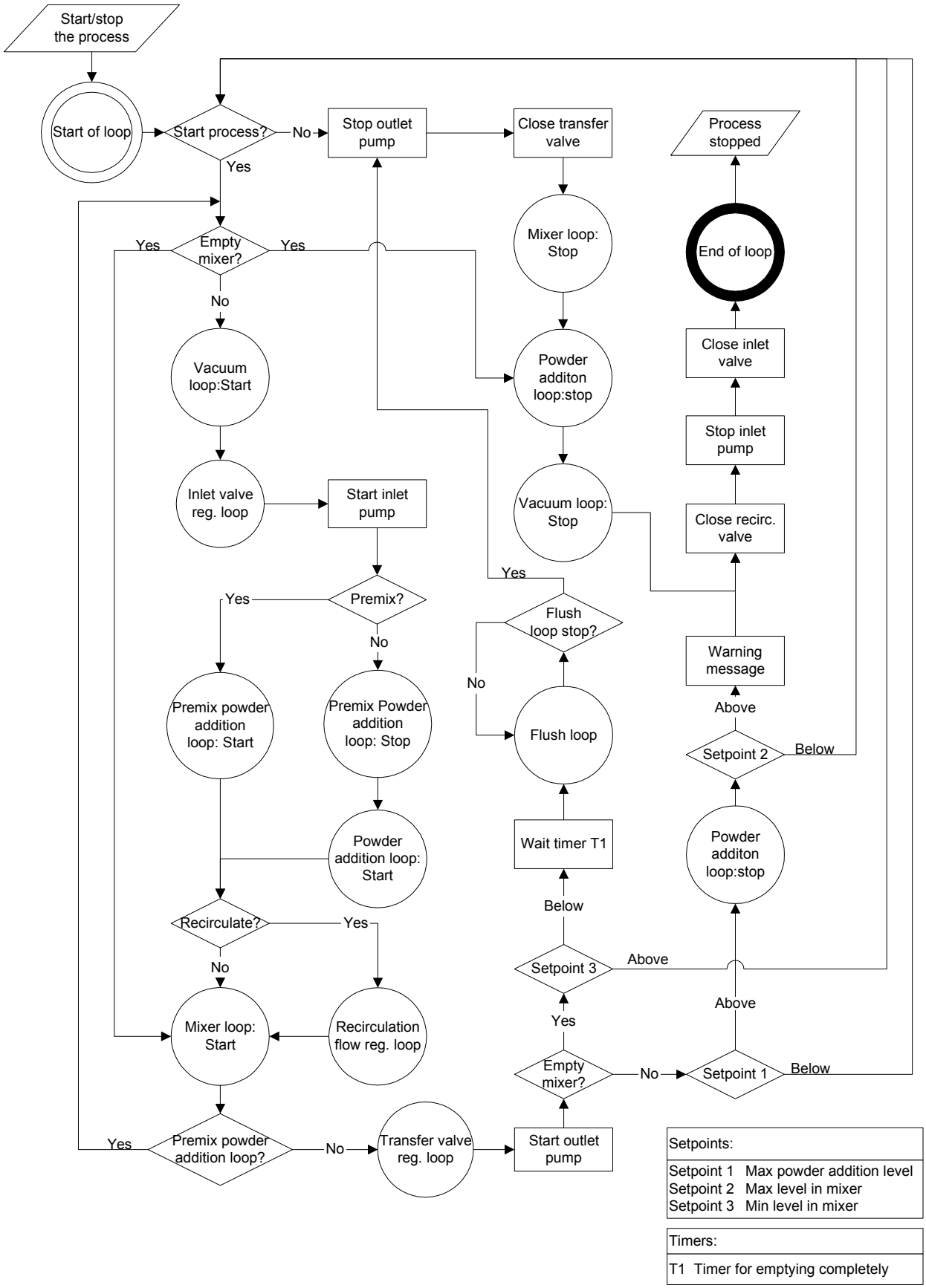


Figure 6-2 Main control loop - Inline

The "Empty mixer" options

During the process there are two "Empty mixer" options:

- An "empty mixer" option before the main process begins
- An "empty mixer" option during the process.

Before starting the main process, some product may still be present in the mixer from a previous process where the operator for some reason may have intervened the process. Therefore the Main control loop needs a signal whether the mixer is going to be emptied or not. The operator must initiate the first "empty mixer" option.

During the process, a second "empty mixer" option will be activated by a signal from a censor.

The Premix option

During the process the premix option is available. With the Premix option selected, the Premix powder addition loop is predetermined to the yes option in advance. Please refer to section Figure 6-8 and Figure 6-10 for further details.

The Recirculation option

During the process a recirculation option is available. With the "yes" option selected the Recirculation flow reg. loop is activated. See section 6.4 for further details.

The Set point options

During the process there is tree set point option in the main control loop:

Set point 1: sets the maximum powder addition level

Set point 2: sets the maximum level of product in the mixer. If the level of the product in the mixer is above set point 2, a warning massage will be displayed.

Set point 3: sets the minimum level of product in the mixer

The "Flush loop stop" option

The "Flush loop stop" option is controlled by operator or a timer. See section 6.7 for further details regarding the flush loop.

6.2 Main control loop - Batch

The Main control loop diagram shows how the process is controlled during the batch sequence.

The control continuously cycles through all the decision options in the Main control loop until the “End of batch” signal is given, and then the process will stop. In the meantime, all available options can be selected or un-selected at any desired time during the batch.

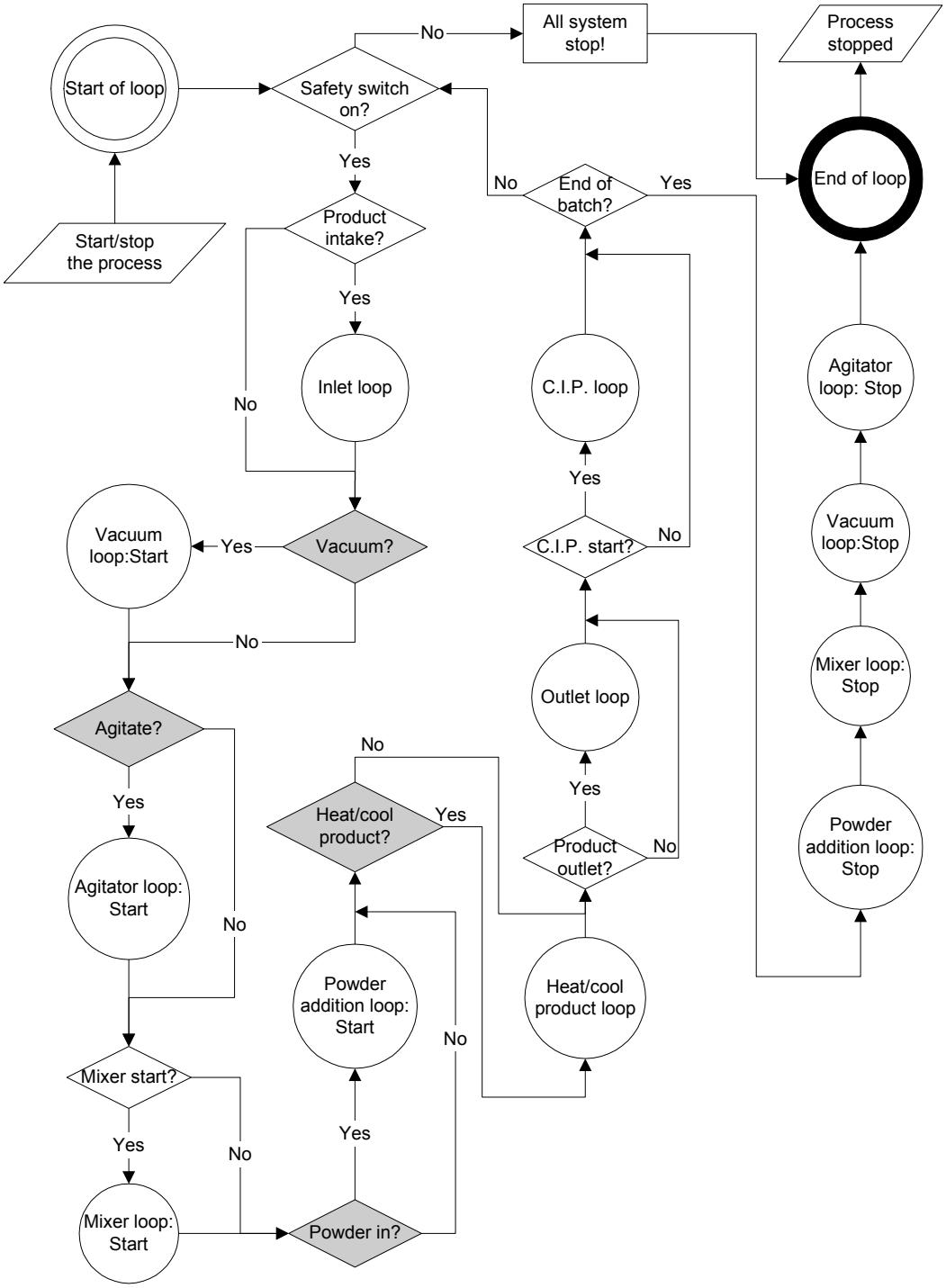


Figure 6-3 Main control loop - Batch

The Vacuum configuration option

Vacuum is created inside the mixing vessel, which is used when ingredients are added to the product. Also see section 6.3

The Agitate configuration option

The Agitate configuration option is suitable when product need to be scraped of the tank wall during production (i.e. such as high viscosity products). Also see section 6.8

The Powder in configuration option

The Powder in configuration option is available if the mixer is fitted with a vacuum system. See section 0

The Heat/cool product configuration option

When certain product temperature is desired before the product is transferred, the Heat/cool product configuration option is available on costumer demand. See section 6.9

The Inlet loop

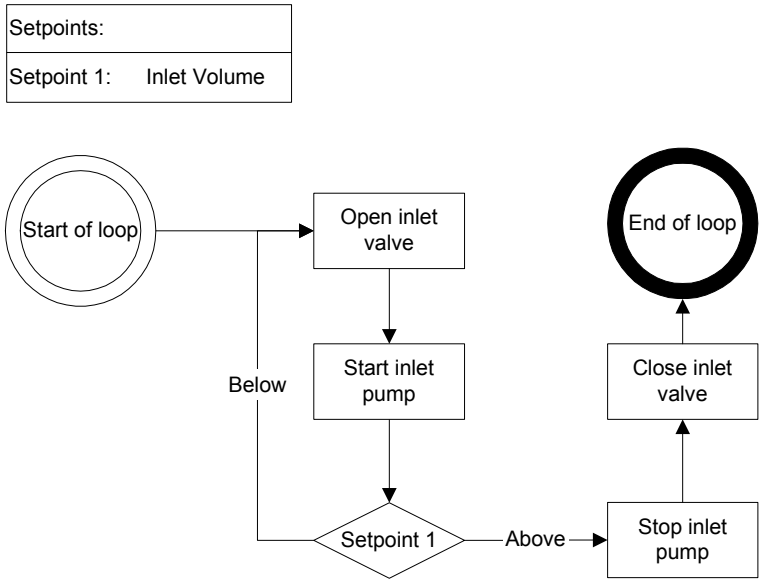


Figure 6-4 Inlet loop

During a batch the product intake option decides when the Inlet loop starts during the batch, and the Set point 1 option controls the inlet pump and the inlet valve.

6.3 Vacuum system

Vacuum loop

The vacuum pump must be started. The vacuum pump creates a vacuum inside the mixing vessel of -0.7/ -0.8 bar (0.3-0.2 bar absolute), and the pump should be left running while adding powder.

When operating the vacuum pump, service water supply must be secured, either by a solenoid valve, or by a water saving system.

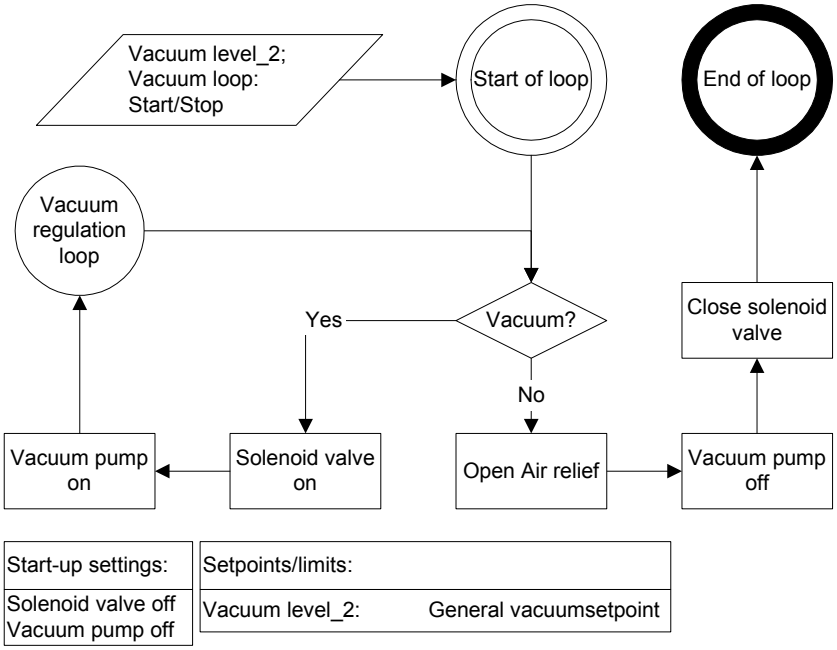


Figure 6-5 Vacuum loop

Vacuum regulation loop

The vacuum regulation loop is a PID loop, which is included in the vacuum loop.

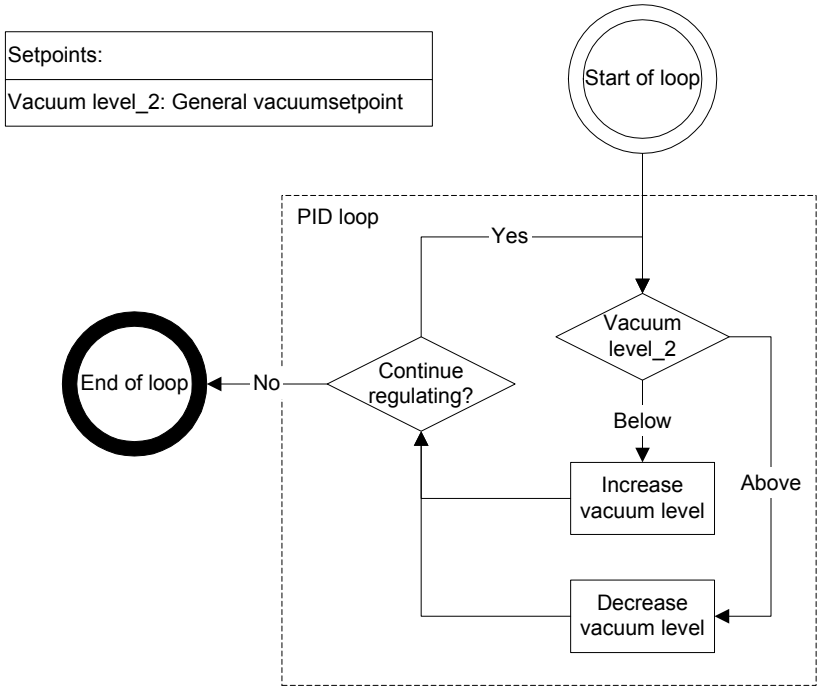


Figure 6-6 Vacuum regulation loop

Inlet valve regulation loop

With the vacuum loop running, the inlet regulation starts running. The Inlet valve regulating loop is a PID loop, which controls the inlet flow into the mixing vessel.

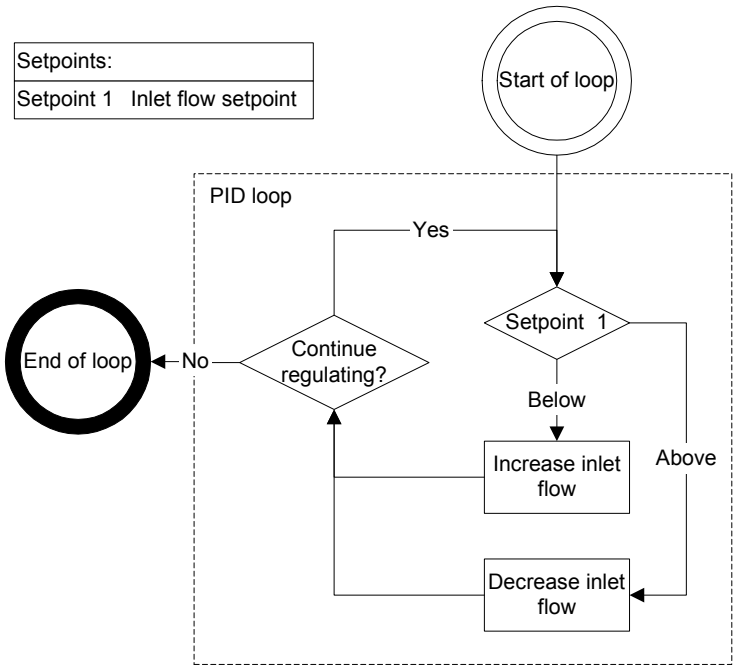


Figure 6-7 Inlet valve regulation loop

Premix powder addition loop

With the Premix option selected, the Premix powder addition loop is activated. See Figure 6-8 and Table 6-1. Some of the options in the Premix powder addition loop and the ordinary Powder addition loop are practically the same. However, the set points can of course be programmed differently from one another.

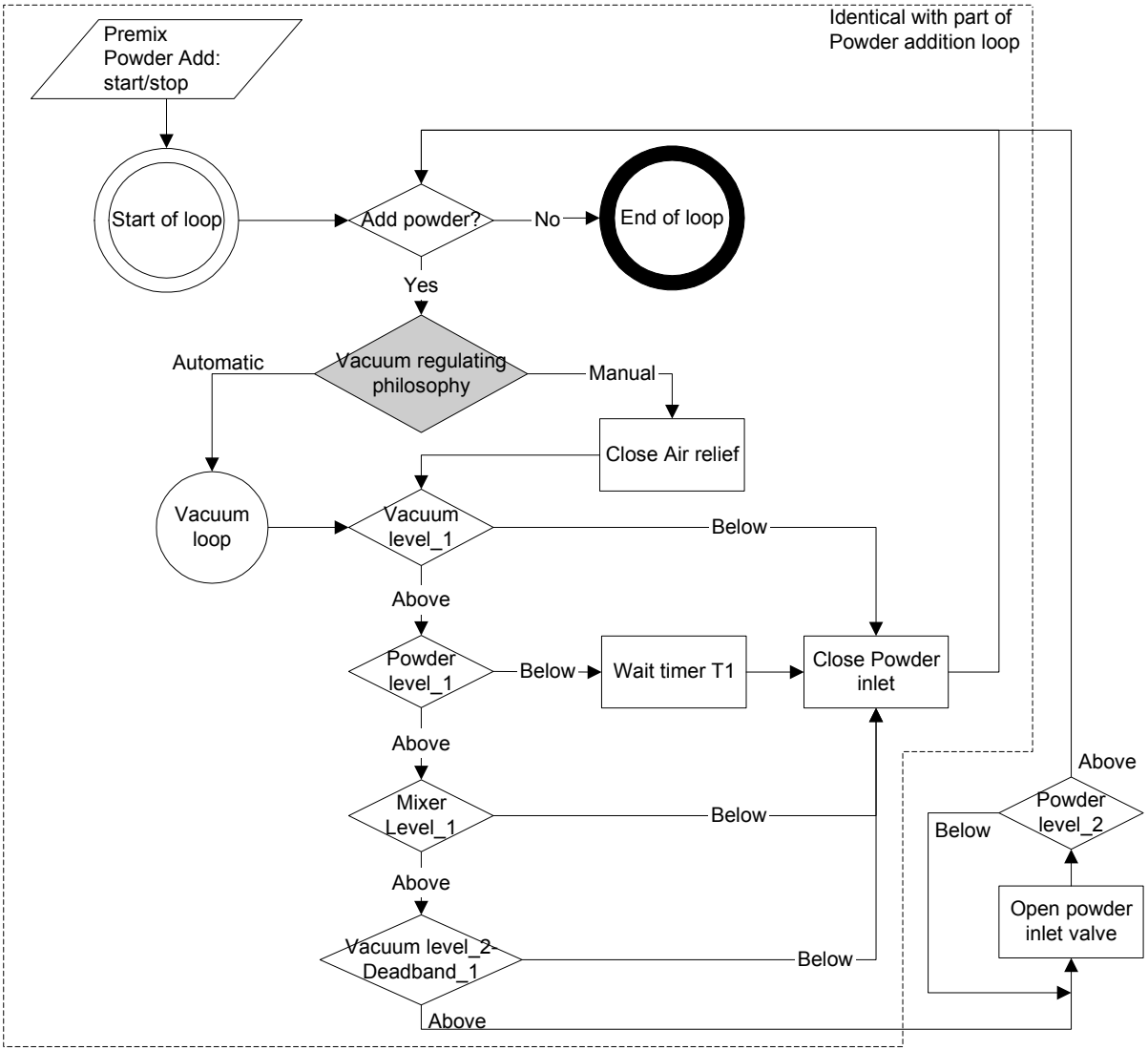


Figure 6-8 Premix powder addition loop

The Vacuum regulating philosophy option

As indicated, the Vacuum regulation can be regulated either manually or automatically depend of the configuration of the mixer. With the automatic Vacuum regulating philosophy option selected, the Vacuum loop will be activated. See Figure 6-5.

The Vacuum level_2 and Deadband_1 option

Start-up settings:	Timers:
Solenoid valve off Vacuum pump off Air relief valve open Powder inlet valves closed	T1: After run for emptying powder funnel completely

Setpoints/limits:	
Vacuum level_1:	Minimum vacuumlevel for powder addition
Vacuum level_2:	General vacuumsetpoint
Deadband_1:	Deadband to insure powder addition before vacuum
Powder Level_1:	Level in powder hopper
Powder Level_2:	Premix powder setpoint
Mixer Level_1:	Minimum mixer level for powder addition

Table 6-1 Start-up settings, timers and setpoints/limits for the Premix powder addition loop

Before the powder inlet valve opens for the first time, the Vacuum level_2 and Deadband_1 option has to be fulfilled. See Figure 6-9.

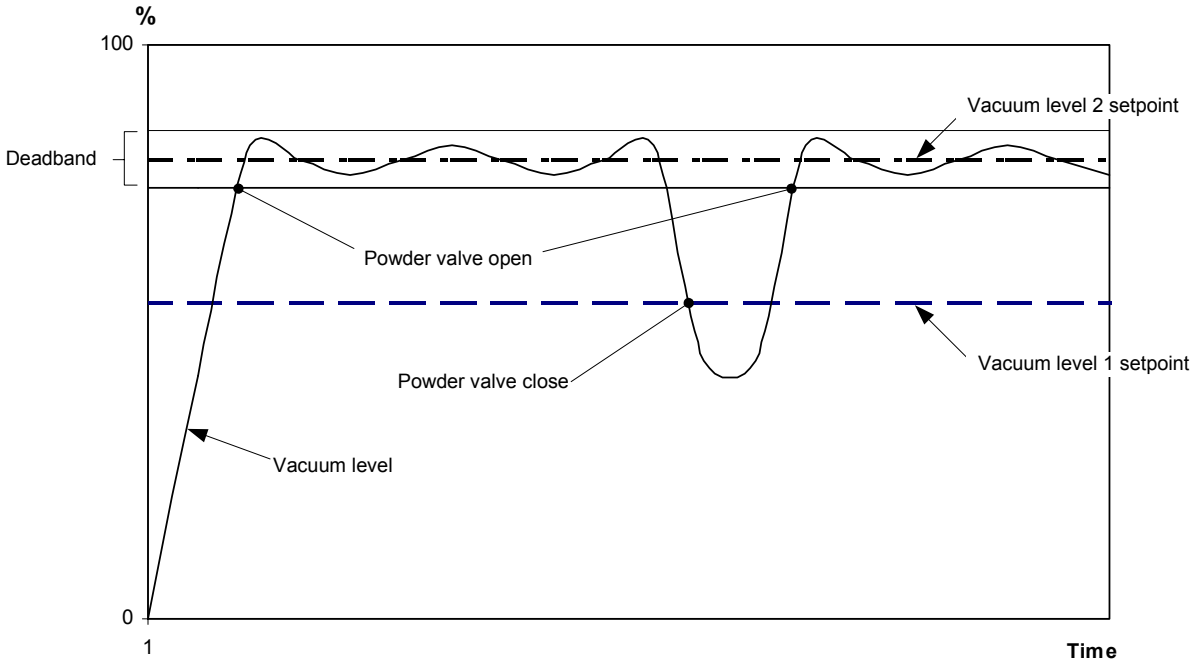


Figure 6-9 Controlling the powder inlet

Powder addition loop

When Premix is finished the ordinary powder addition loop starts.

See Figure 6-10.

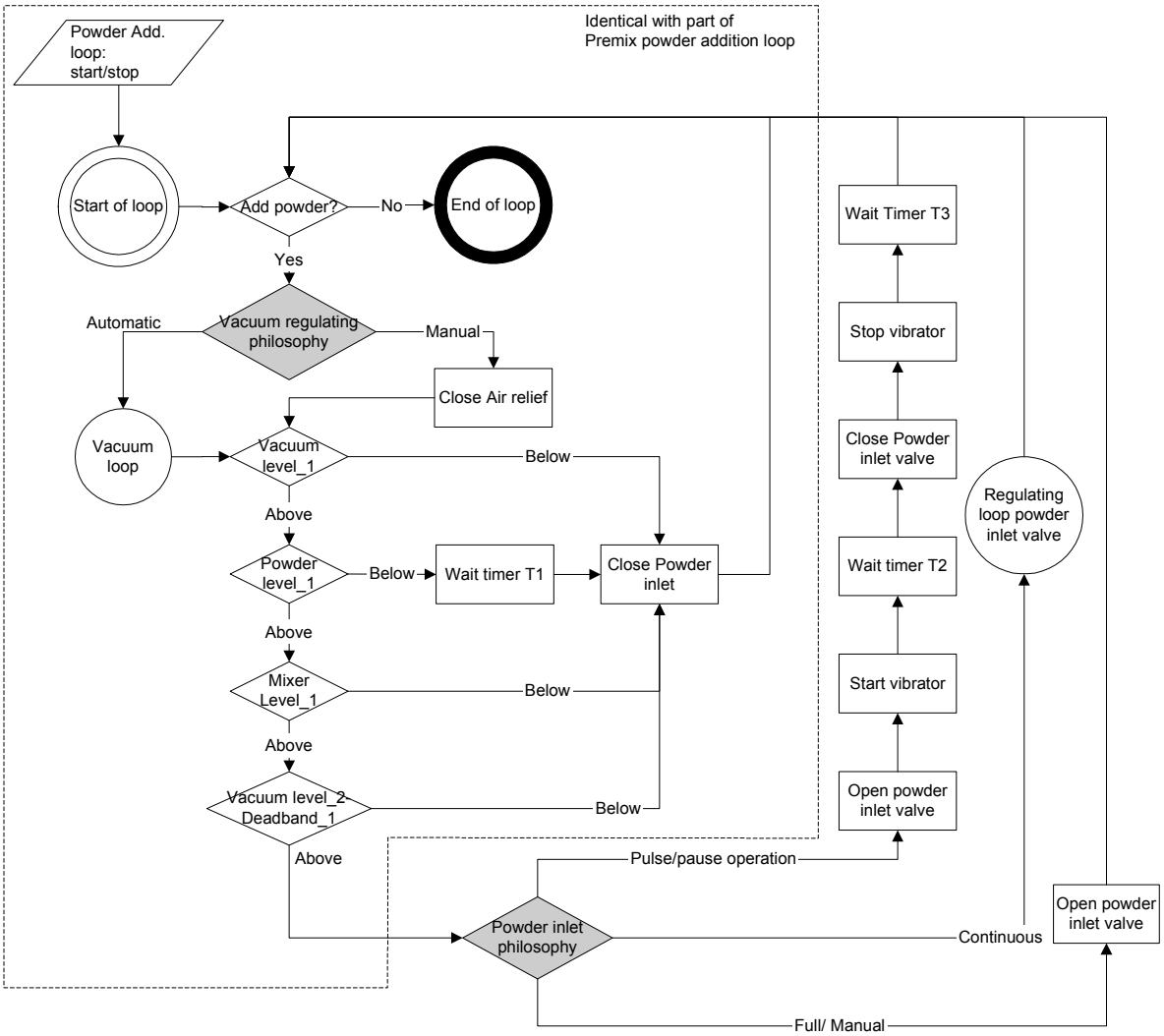


Figure 6-10 Powder addition loop

Start-up settings:	Timers:
Solenoid valve off Vacuum pump off Air relief valve open Pow der inlet valves closed	T1: After run for emptying pow der funnel completely T2: Pow der inlet pulse time T3: Pow der inlet pause time

Setpoints/limits:	
Vacuum level_1:	Minimum vacuumlevel for pow der addition
Vacuum level_2:	General vacuumsetpoint
Deadband_1:	Deadband to insure pow der addition before vacuum
Pow der Level_1:	Level in pow der hopper
Mixer Level_1:	Minimum mixer level for pow der addition

Table 6-2 Start-up settings, timers and set points/limits for powder addition

Regulating loop powder inlet valve

When powders are to be added, it should be checked that powder is available in the powder funnel(s). Check that vacuum level in the mixer is above minimum vacuum level and that a minimum level of product is present in the mixer.

Fill the powder and additives into the mixing vessel by opening the powder inlet valve at the bottom of the mixing vessel. The valves can be pulsed/paused in order to doze the powder supply. When the hopper is empty quickly close the valve in order to avoid liquid running back into the powder line.

If, for some reason, the vacuum drops to -0.5 bar (0.5 bar absolute) during powder insertion it is recommended to close the inlet valve in order to accumulate vacuum before inserting the rest of the powder.

If the powder hopper is supplied with a vibration device it will be activated simultaneously with the inlet valve.

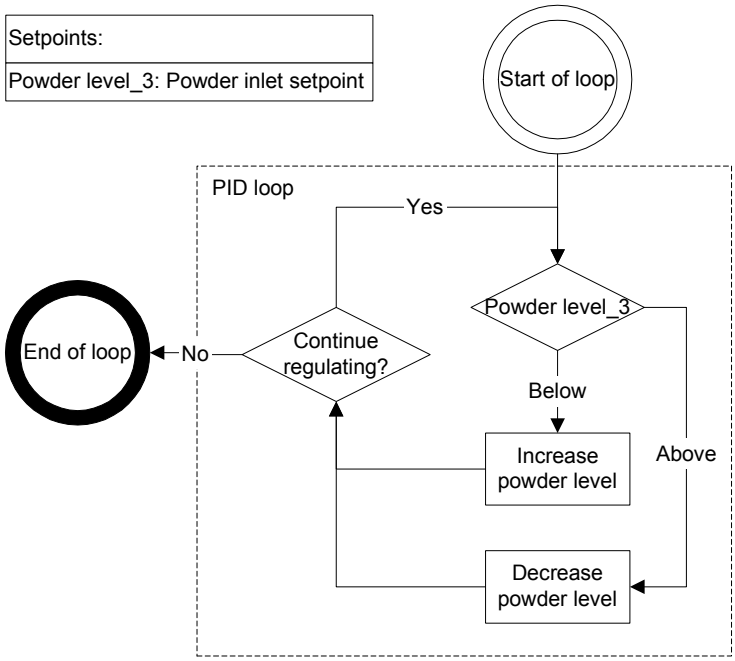


Figure 6-11 Regulating loop powder inlet valve

6.4 Re-circulation flow regulation loop - Inline

In an inline mixer, a re-circulation option is available. With the re-circulation option selected, the re-circulation flow is controlled with a PID controller or a constant pressure valve. See Figure 6-12.

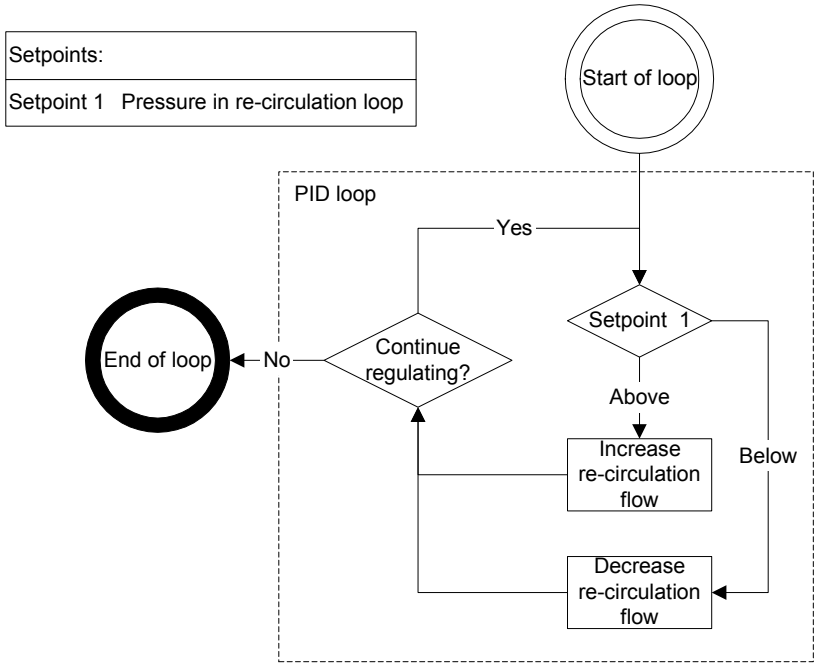


Figure 6-12 Recirculation flow regulation loop

6.5 Transfer valve regulation loop - Inline

The transfer valve is controlled by a PID controller, which controls the outlet flow from the mixer. See Figure 6-13. Always make sure that the inlet flow is less than the outlet flow capacity.

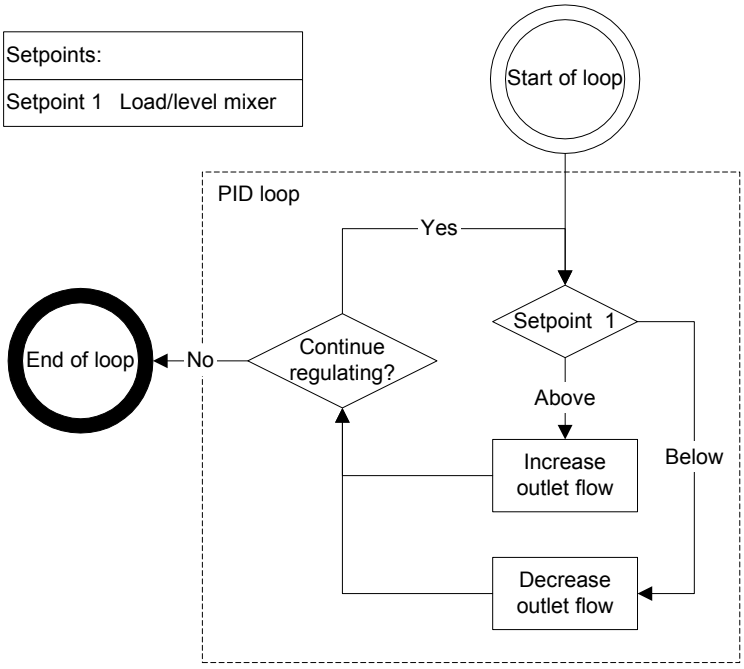


Figure 6-13 Transfer valve regulation loop

6.6 Mixer loop

Again there are several configuration options when it comes to mixing the product. The configuration options are:

- Dynamic stator option (batch mixer only)
- With or without feedback on dynamic stator (batch mixer only)
- With or without a frequency converter (the control philosophy option)

The most important option is whether the mixing unit is fitted with a Dynamic stator. With a dynamic stator fitted, it is possible to mix products with high viscosity or products containing substance with some degree of solidity, i.e. all sorts of spices. With the High shear mix option selected, the product is most likely with high viscosity.

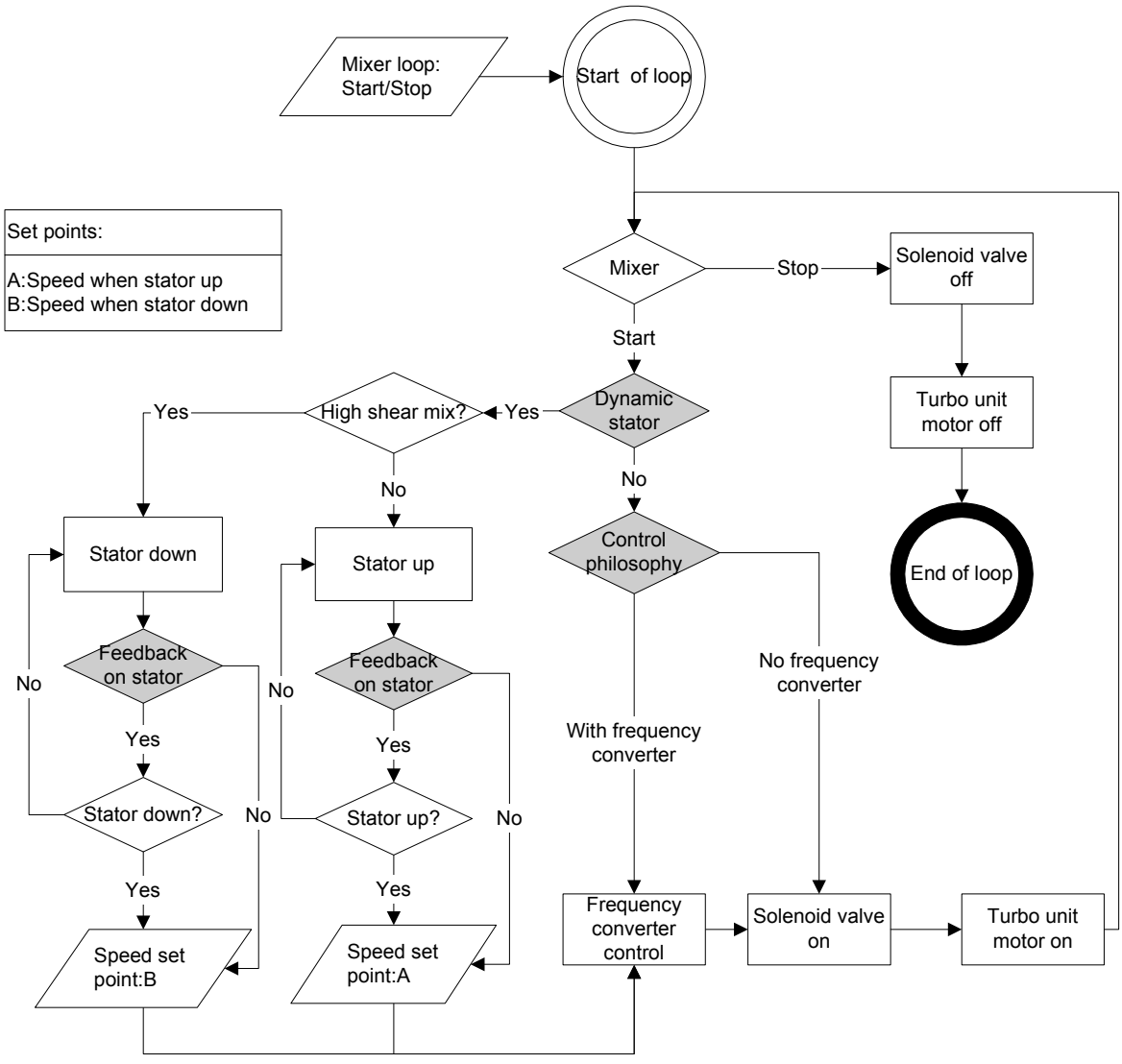


Figure 6-14 Mixer loop

6.7 Flush loop

At end of batch, the Flush loop clean and flush out remaining product in the vessel. The flush volume is normally determined by volume in pipes, and remaining goes to the drains.

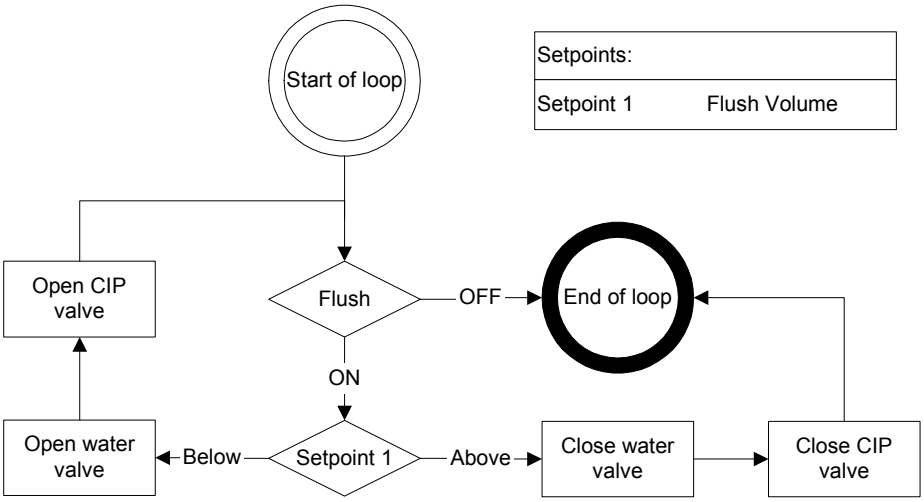


Figure 6-15 Flush loop

6.8 The Agitator loop (if applicable)

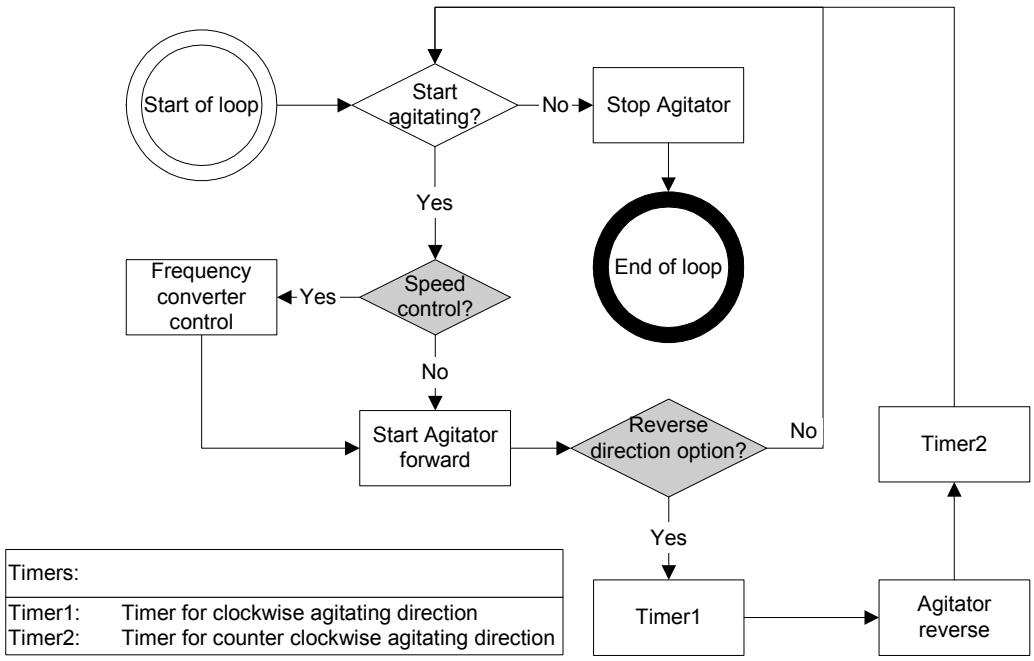


Figure 6-16 Agitator loop

The Speed control configuration option

The Speed control option is available if the mixer is fitted with a frequency converter. The frequency converter is then programmed to control the agitator at any desired agitating speed.

The Reverse direction configuration option

In order to homogenize products with high viscosity the reverse direction option of the agitator is available. When reversing the agitator the product will be stirred in a different direction resulting in a homogeneous product.

In other cases the Reverse direction can be used in order to speed up the outlet process.

6.9 The Heat/cool product loop (if applicable)

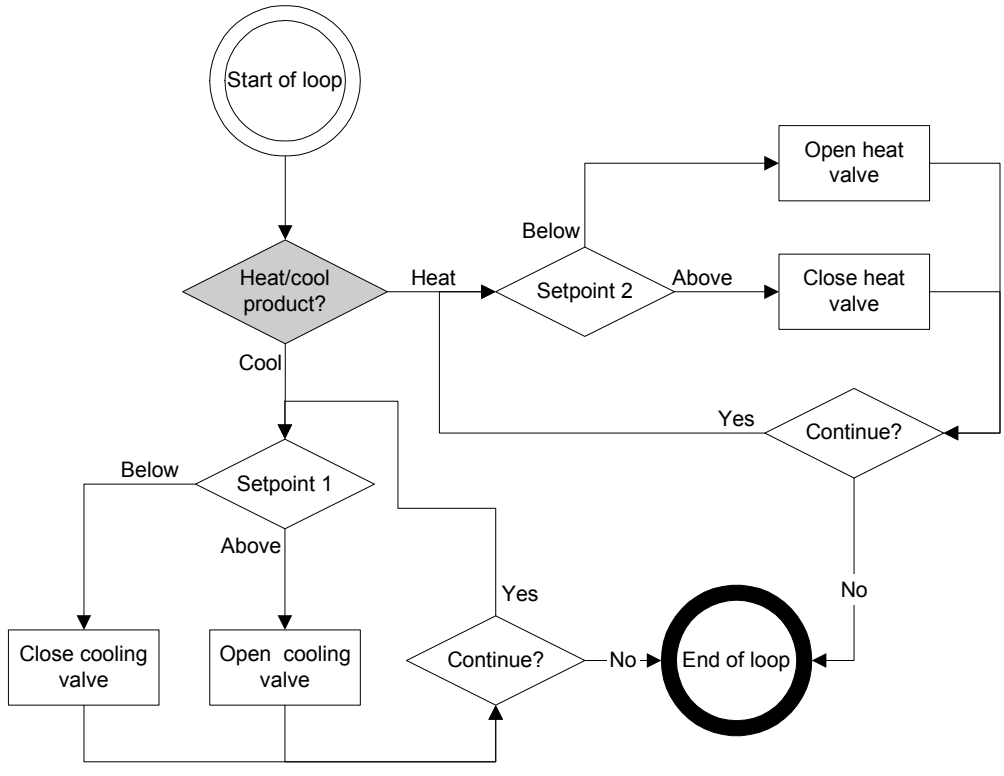


Figure 6-17 Heat/cool product loop

A mixer can be fitted with dimple jackets. One jacket fitted on the tank wall and one jacket fitted in the bottom of the mixing vessel. Both the cooling and the heating configuration are possible at same time on the same mixer.

6.10 The Outlet loop

With the Product outlet option selected, the Outlet loop is activated. The Outlet loop controls the outlet valve and the outlet pump. See Figure 6-18.

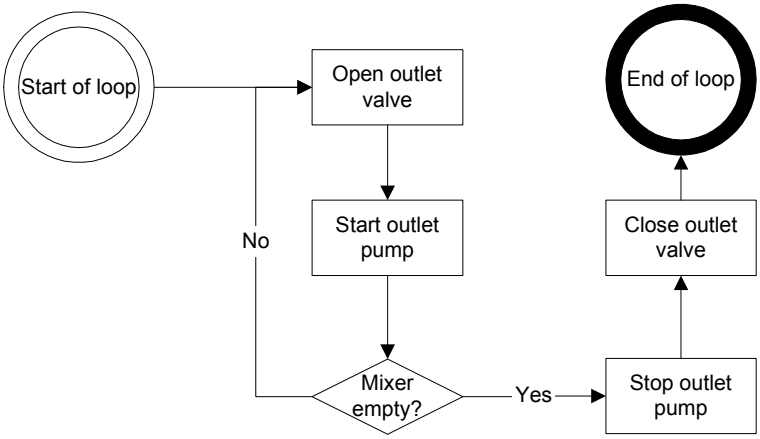


Figure 6-18 Outlet loop

6.11 The C.I.P. loop

Figure 6-19 shows how the automatic cleaning sequence is working.

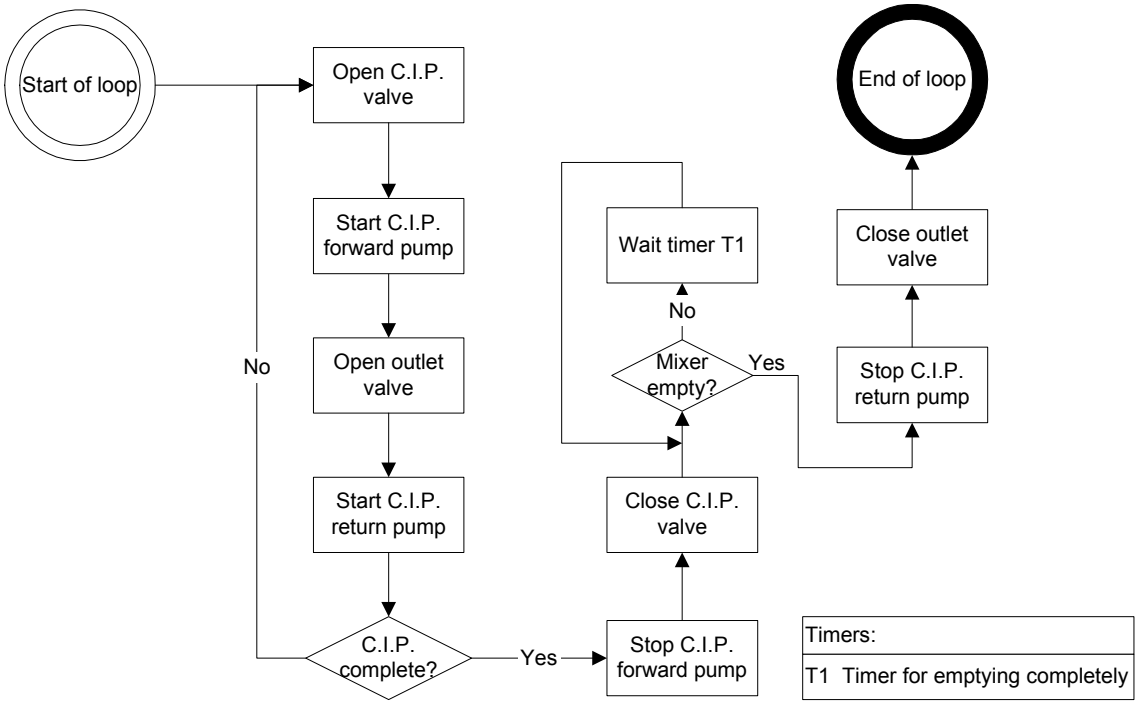


Figure 6-19 C.I.P. loop

Content

7 Electrical Documentation

Content

8 Maintenance

8.1 Preventive maintenance

Requirements of personnel

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

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

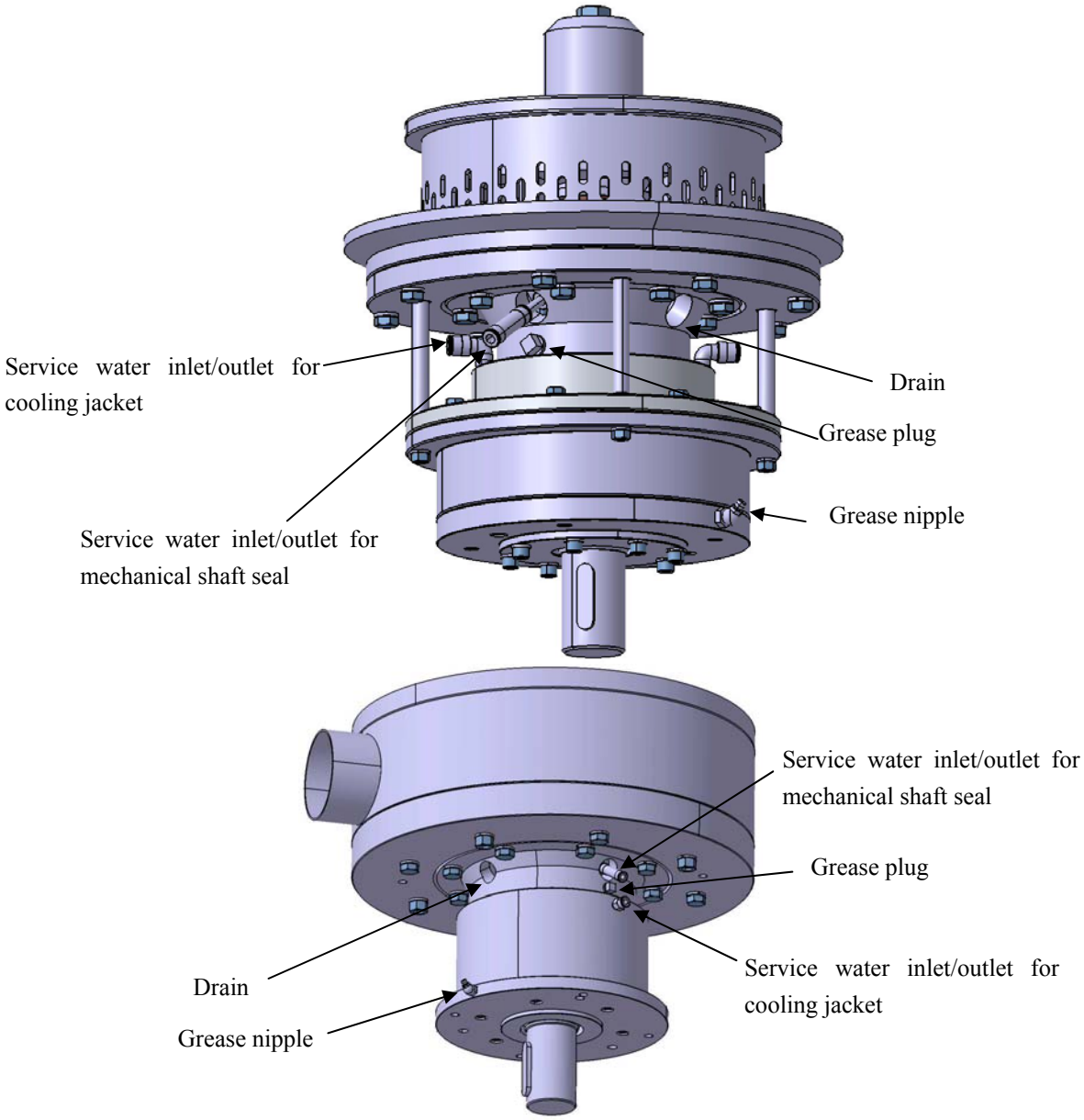


Figure 8-1 Maintenance checkpoints on the mixer unit. Upper image: Batch mixer unit. Lower image: Inline mixer unit

- 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 30-37ºC during operation.

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

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

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.

Lubrication

Recommended grease type for the mixer unit:

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 Maintenance – V-belt & Motor foundation

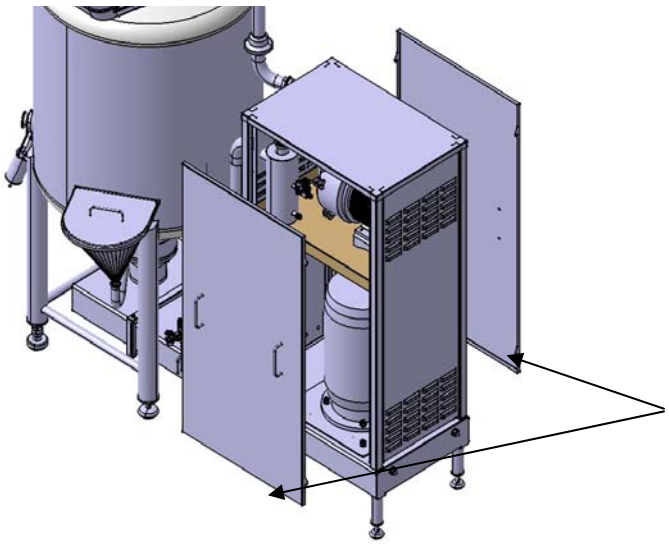
Requirements of personnel

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

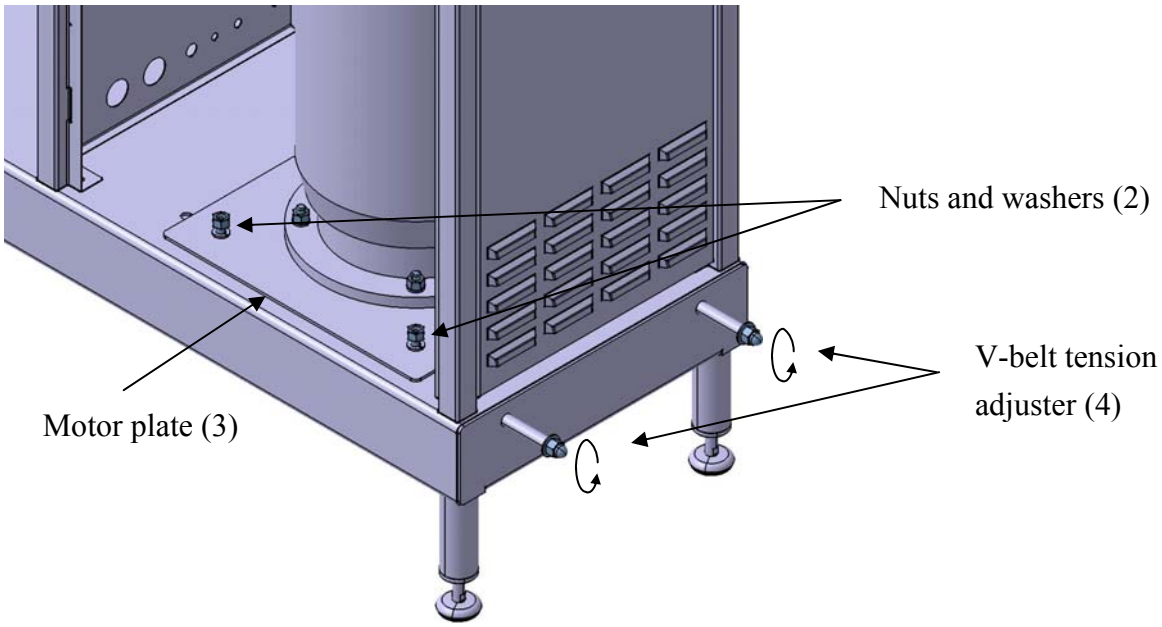
Warning:

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

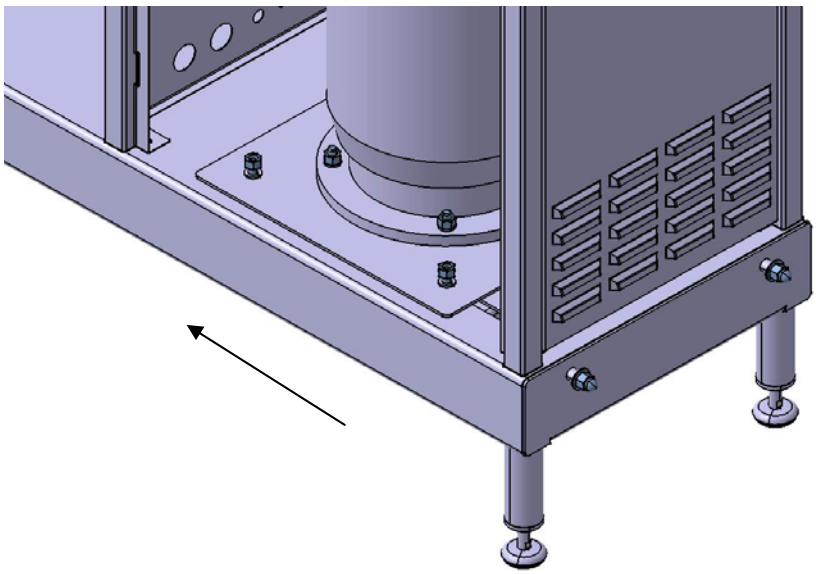
8.2.1 Replacing the V-belts



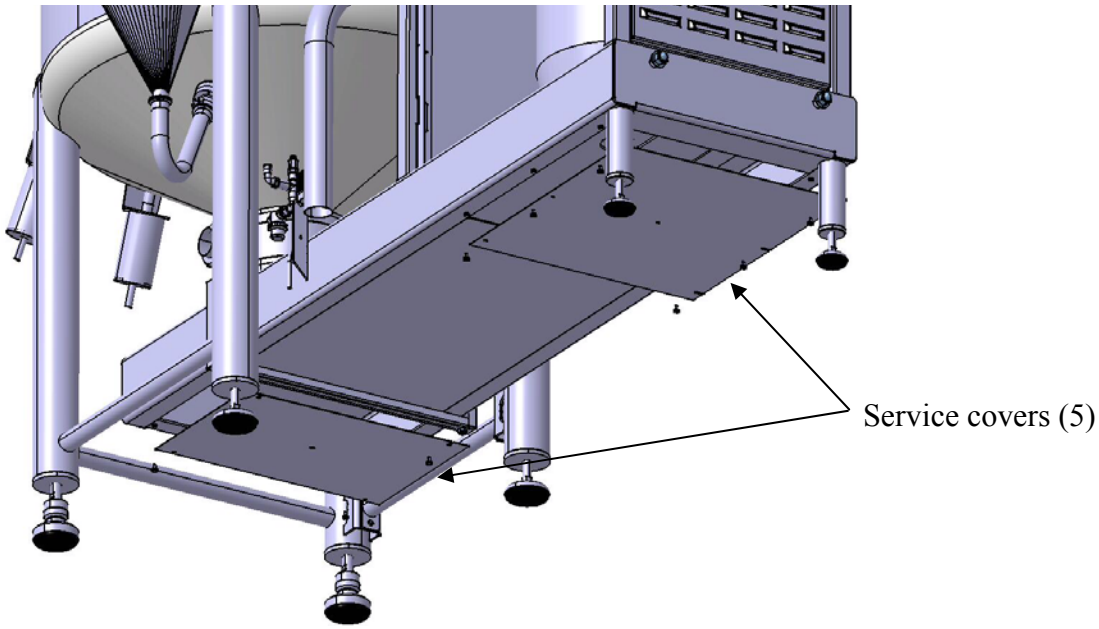
- Remove the Service doors (1)



- 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

8.2.2 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.

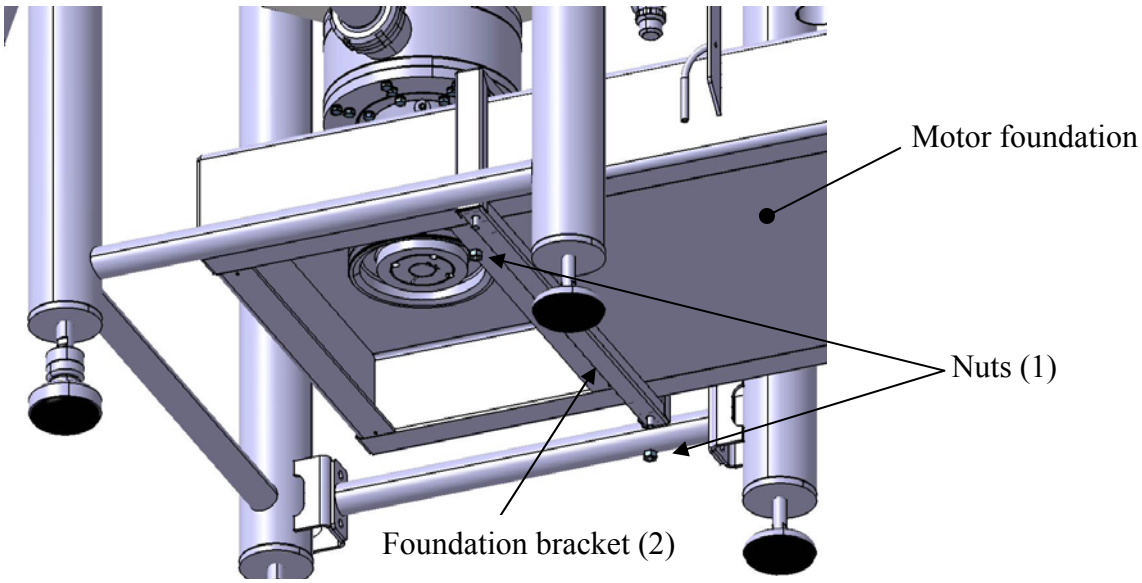
If jarring sounds are heard from the bearings, it is recommended to check and possibly replace them. While the service is carried out, it is recommended that all bearings be replaced.

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.

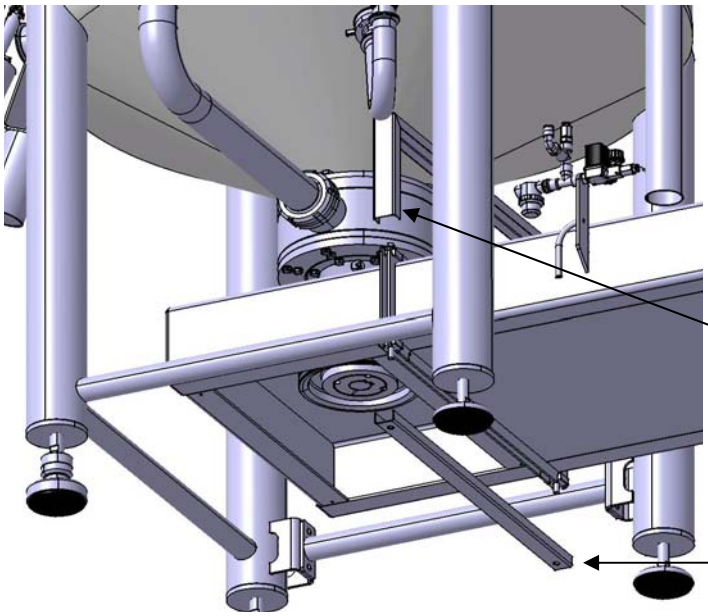
It is, however, recommended to replace all seals in connection with a possible disassembling, irrespective of the cause.

8.2.3 Dismantling the motor foundation

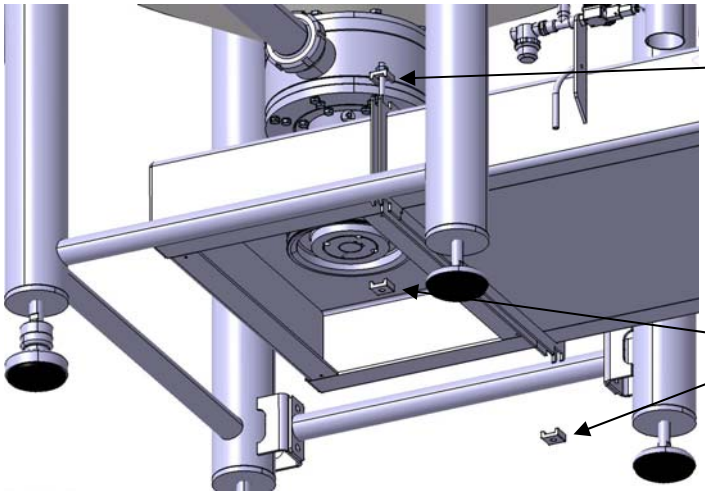
Before dismantling the Motor foundation follow instructions described in section 8.2.1 Also make sure that the Motor foundation is properly supported.



- 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

8.3 Maintenance Mixer Unit

8.3.1 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.

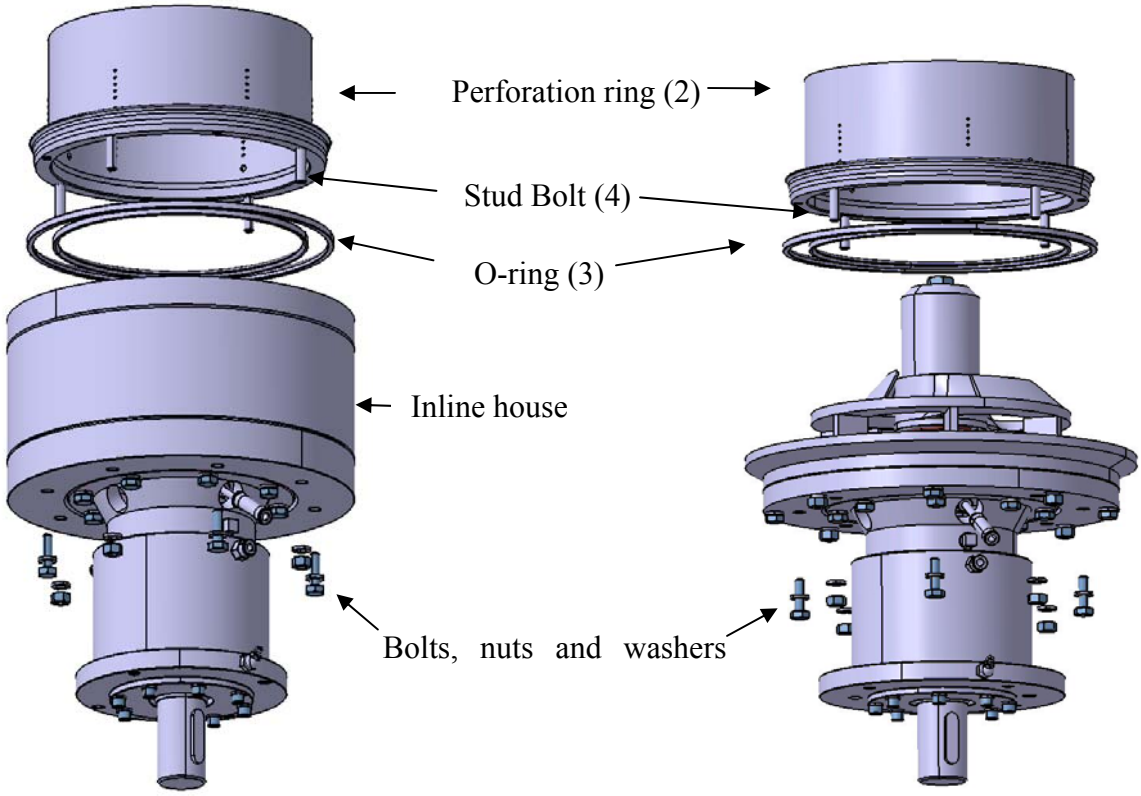


Figure 8-2 Left: Inline mixer unit. Right: Batch mixer unit.

- 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:

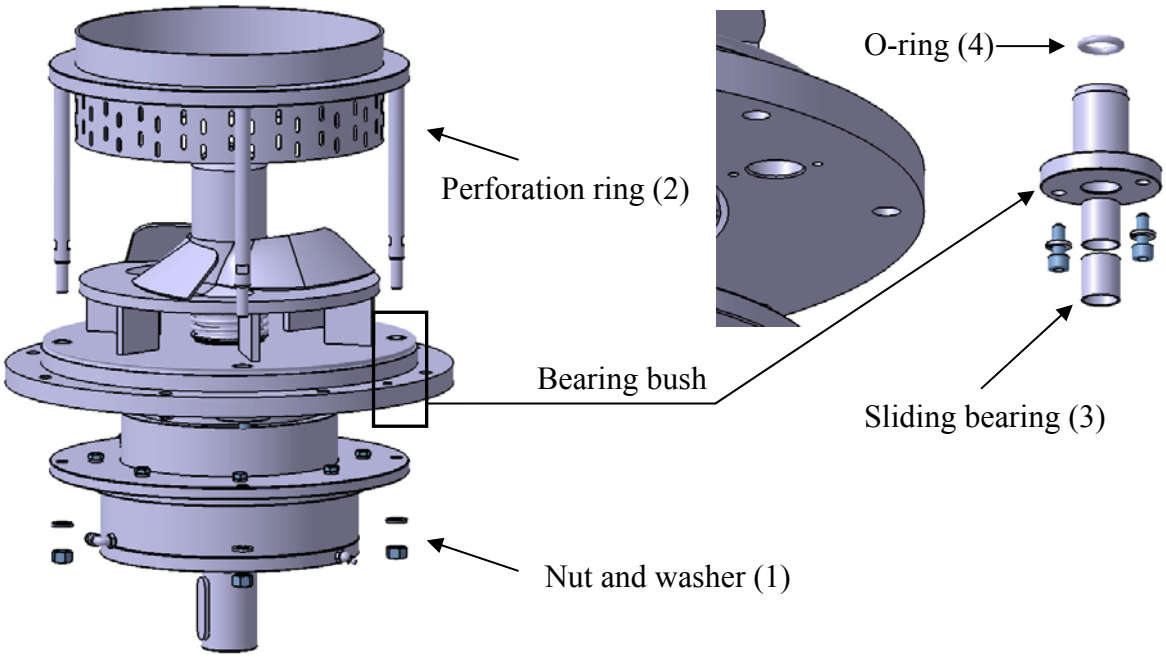


Figure 8-3 Batch mixer unit with stator lift

- 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

8.3.2 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).

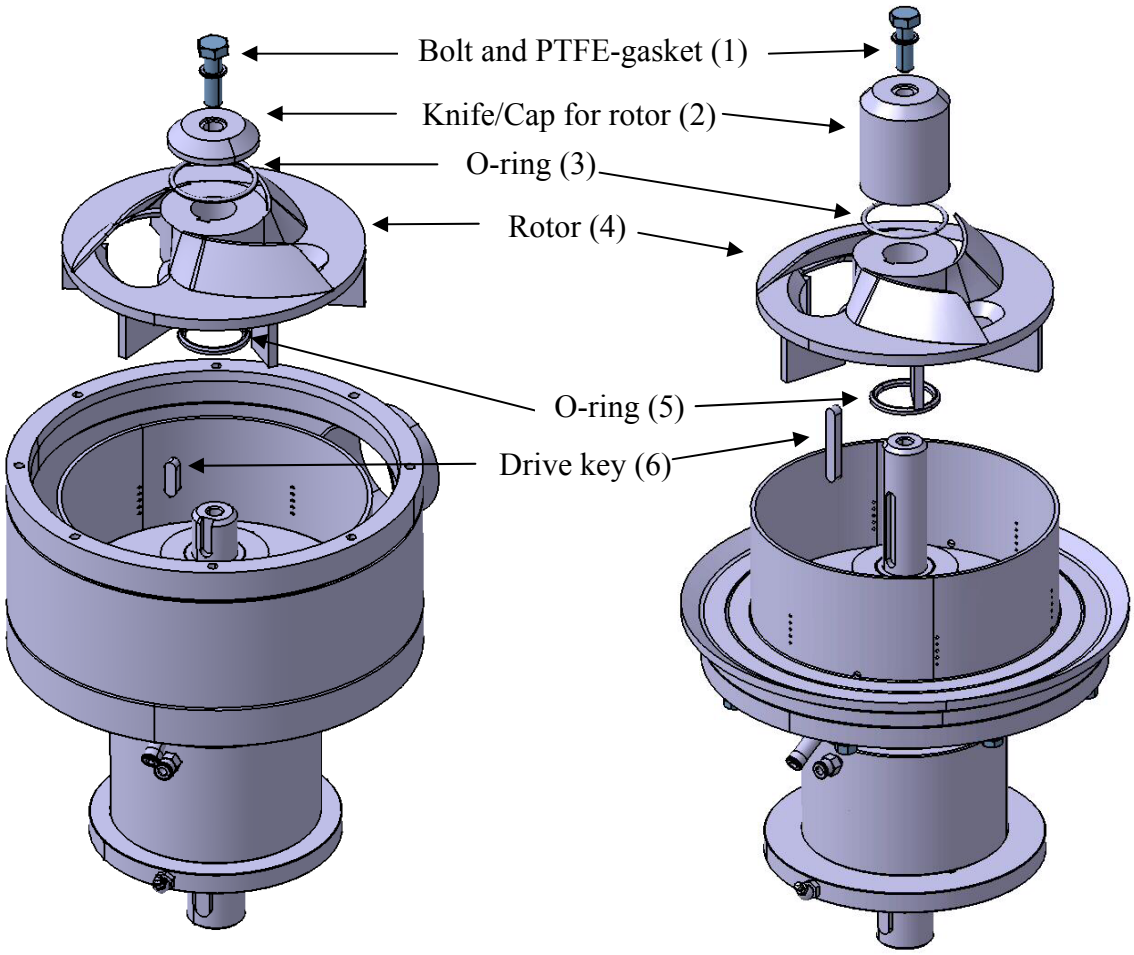


Figure 8-4 Left: Inline mixer unit. Right: Batch mixer unit

- Undo and remove the bolt and PTFE-gasket (1)
- Remove the Knife/Cap for rotor (2)
- Check the O-ring (3) for damage and replace if needed
- Remove the Rotor (4) and check the O-ring (5) for damage. Replace the O-ring if needed
- Remove the Drive key (6)

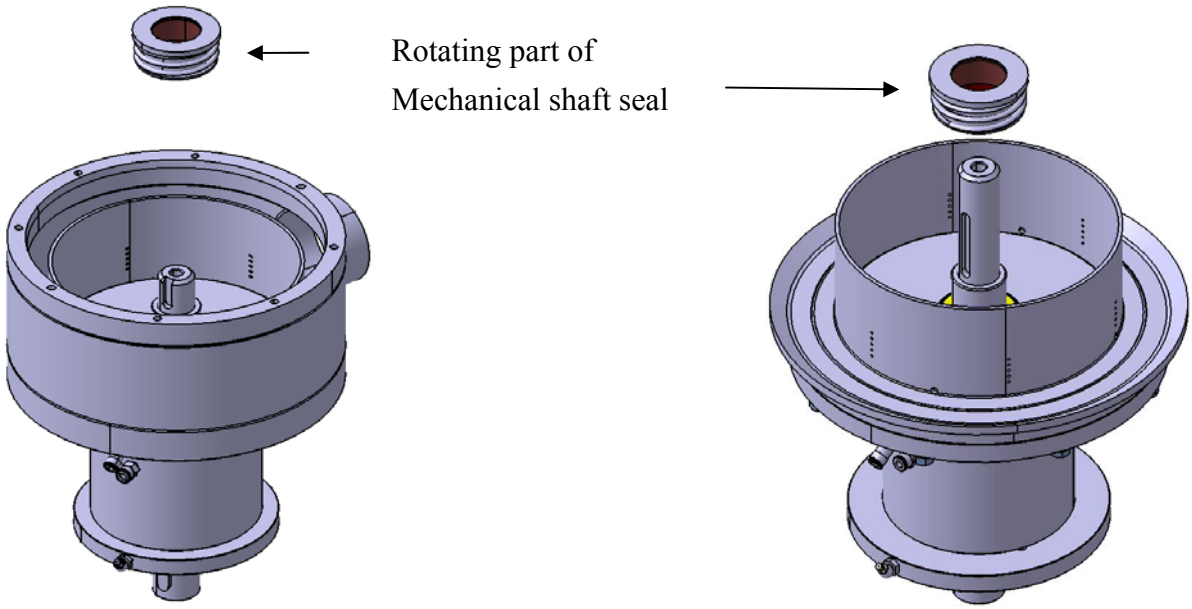


Figure 8-5 Left: Inline mixer unit. Right: Batch mixer unit

- 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

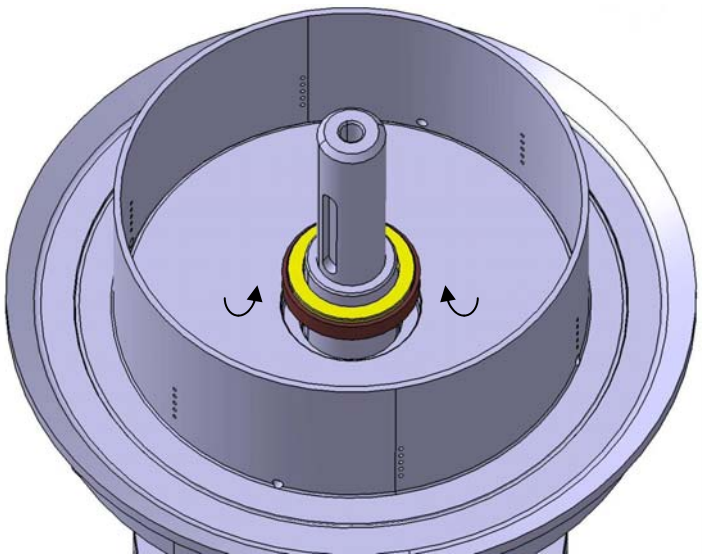


Figure 8-6 Static part of mechanical shaft seal.

8.3.3 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 8.3.4 .

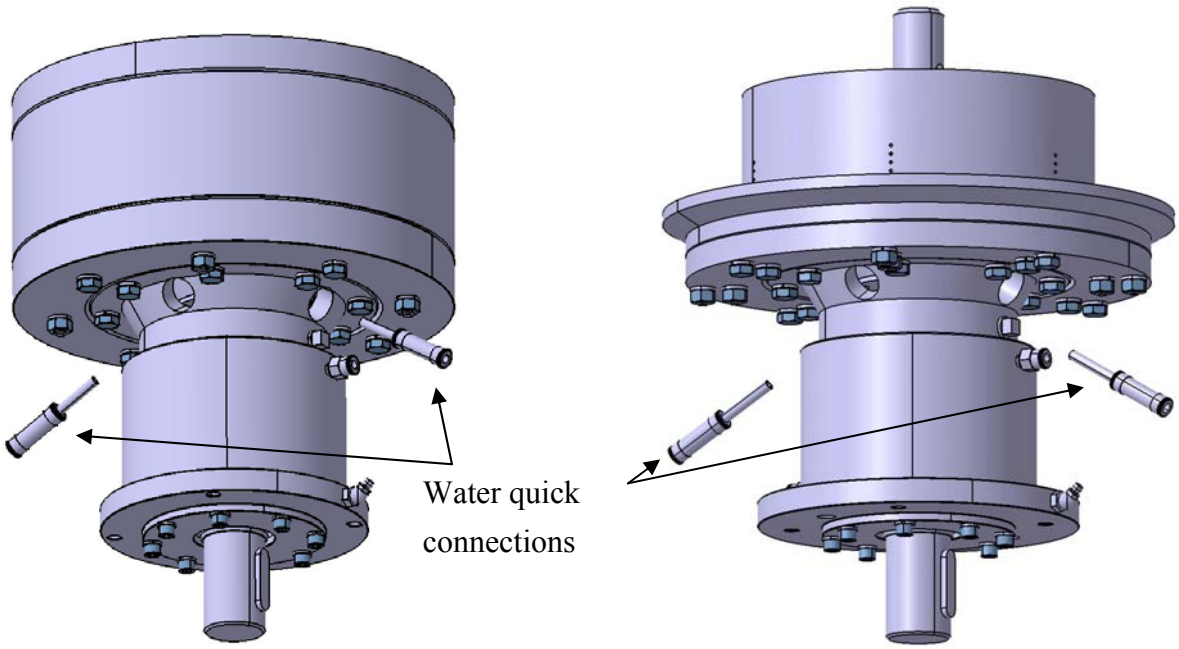
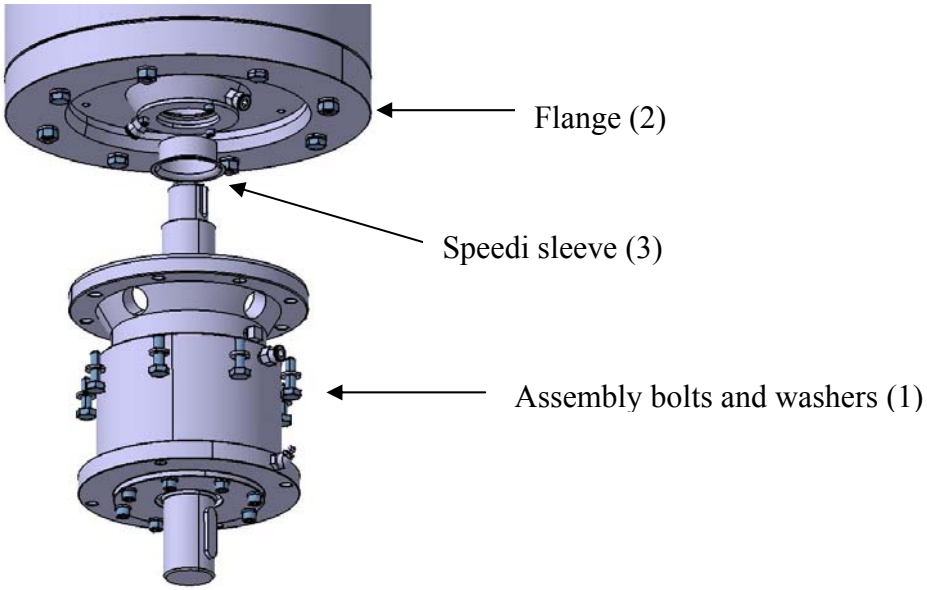
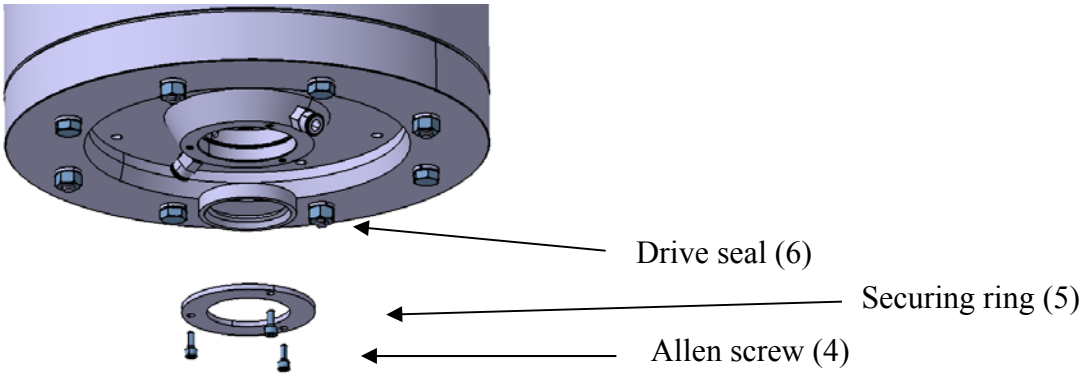


Figure 8-7 Left: Inline mixer unit. Right: Batch mixer unit.

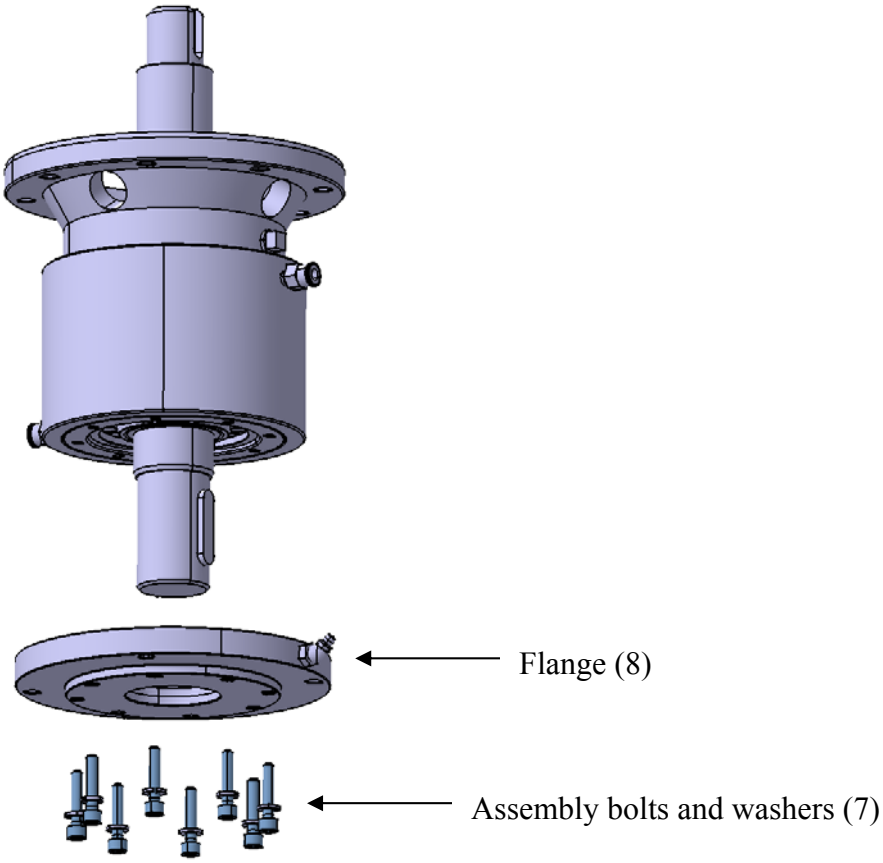
- Follow instructions described in section 8.3.2
- Undo and remove the Water quick connections



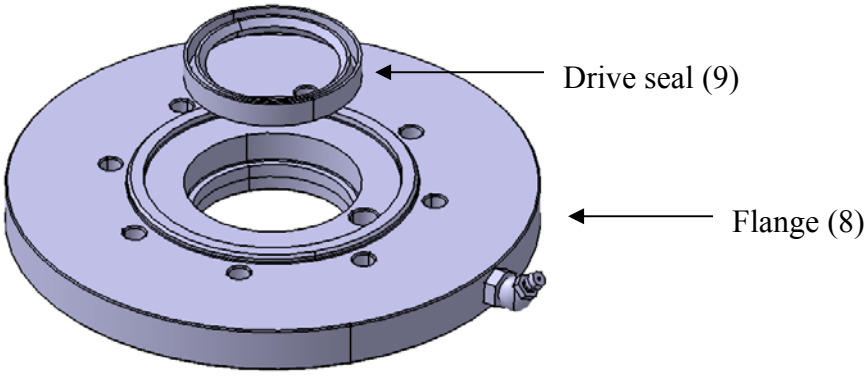
- Undo and remove the Assembly bolts and washers (1)
- Carefully remove the flange (2) without damaging the Drive seal (6) and the static part of mechanical shaft seal (7)
- Remove the Speedi sleeve (3) Replace if needed



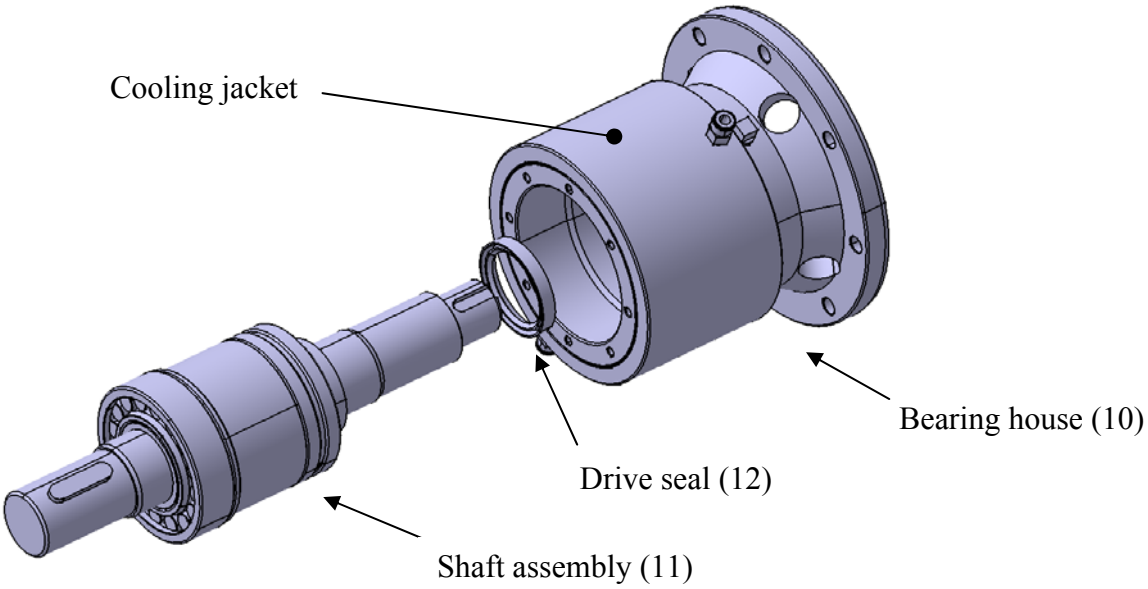
- Undo and remove the Allen screw (4) and the Securing ring (5)
- Check the drive seal (6) and replace if needed



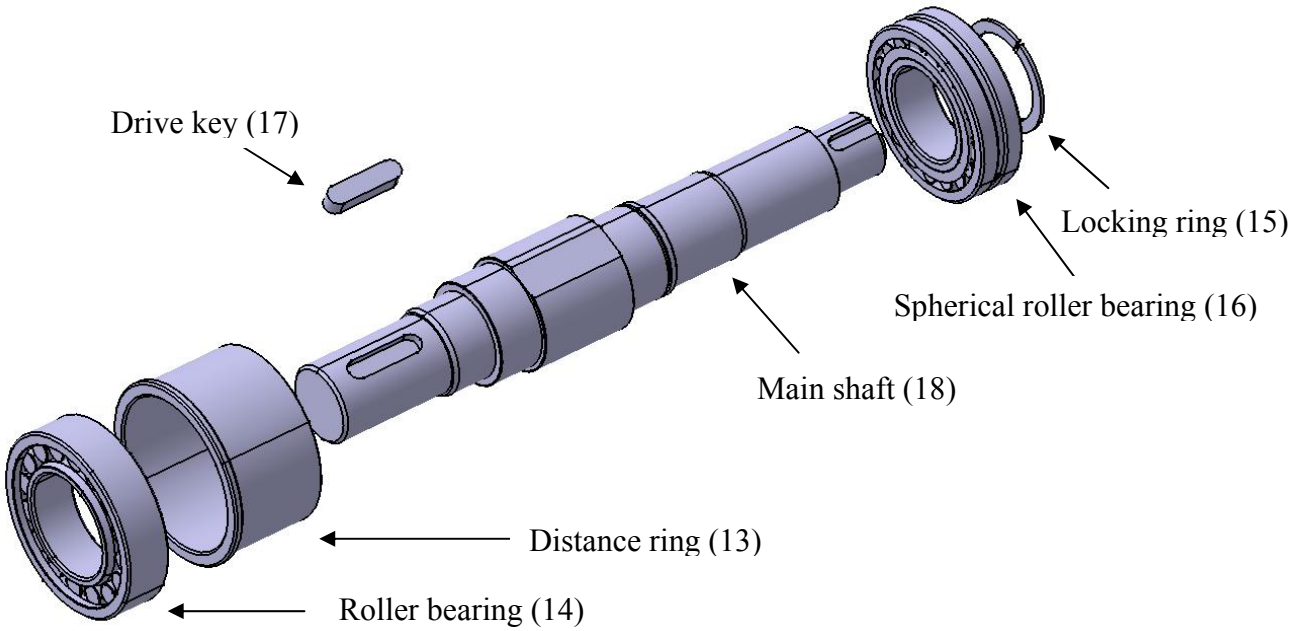
- Undo and remove the assembly bolts and washers (7)
- Remove the Flange (8)



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



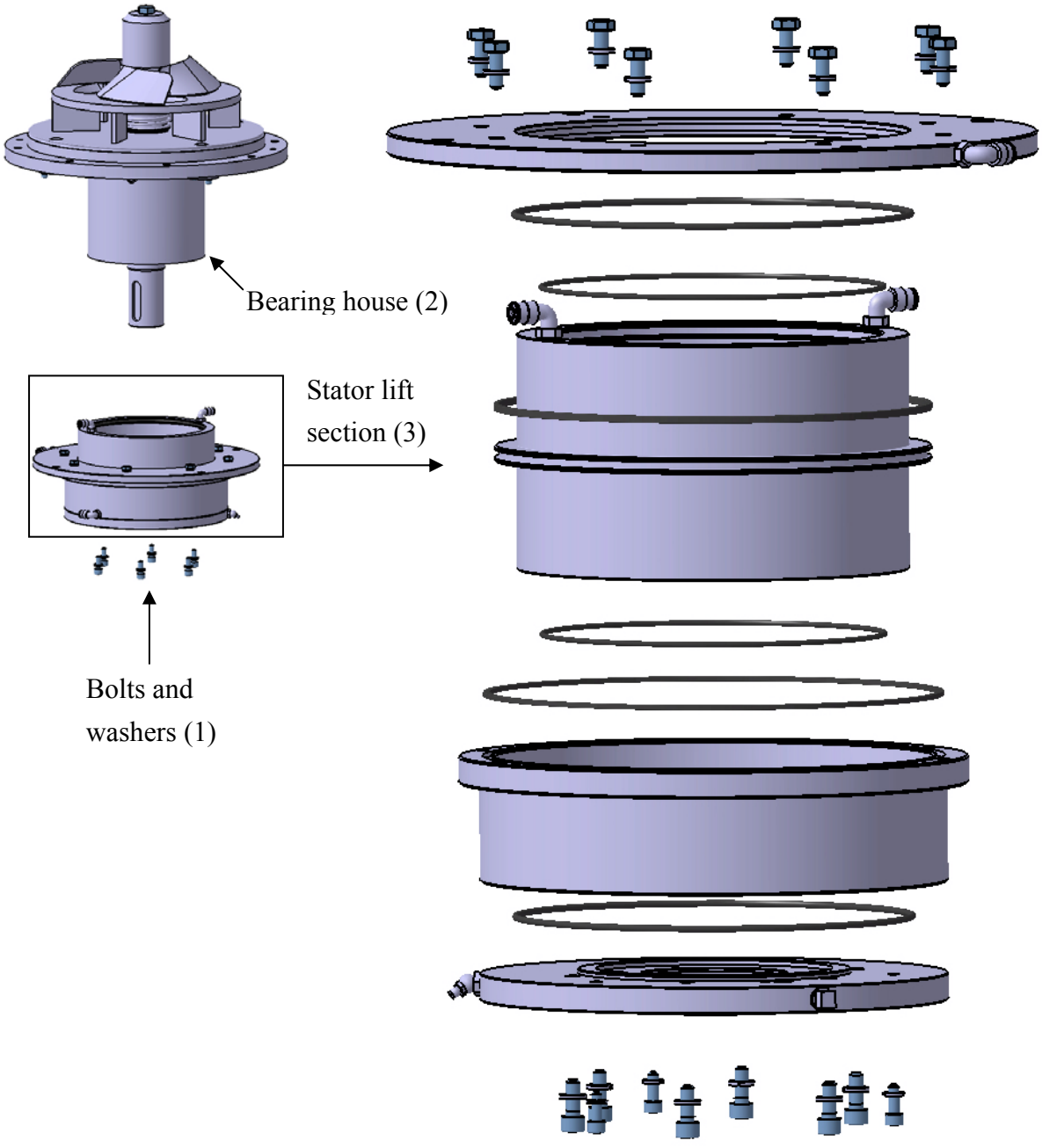
- Carefully remove the Shaft assembly (11) from the Bearing house (10)
- Check the Drive Seal (12) and replace if needed



- Carefully remove the Roller bearing (15) and the Distance ring (14)
- 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

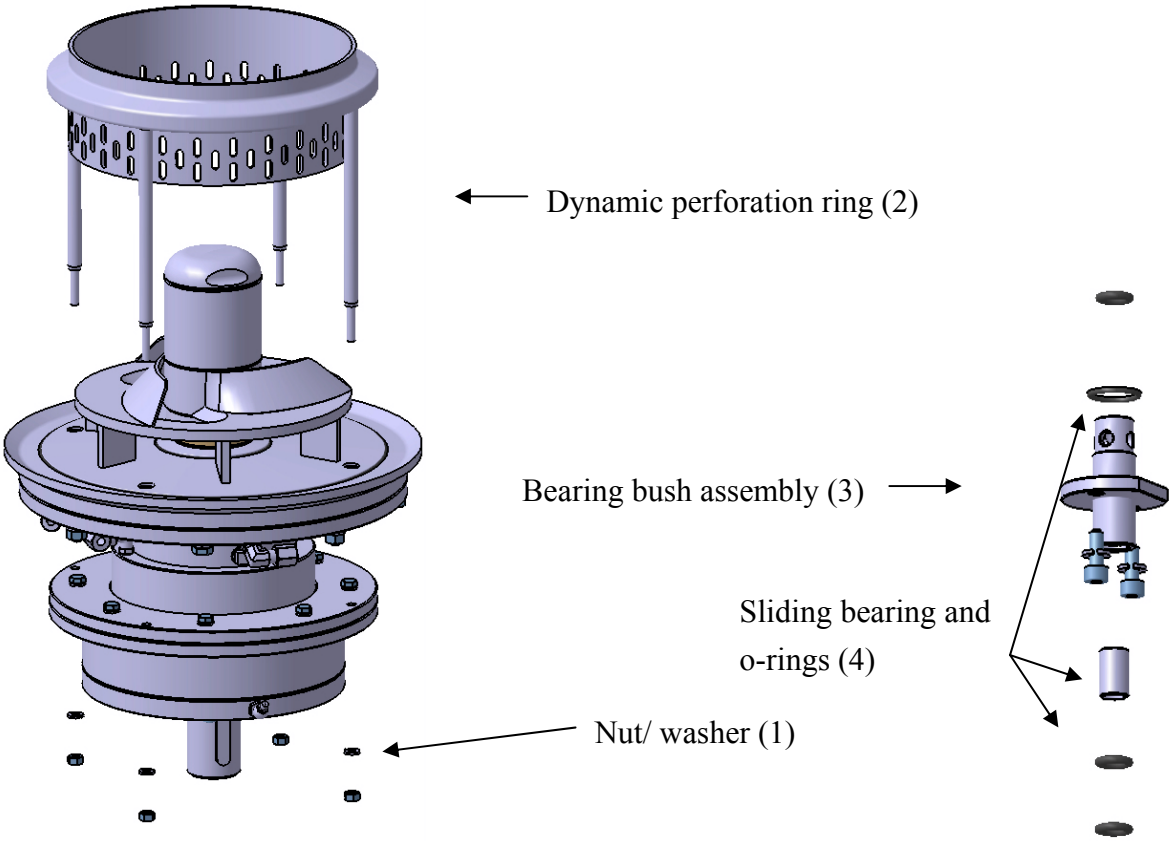
8.3.4 Changing o-rings in stator lift section

- 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



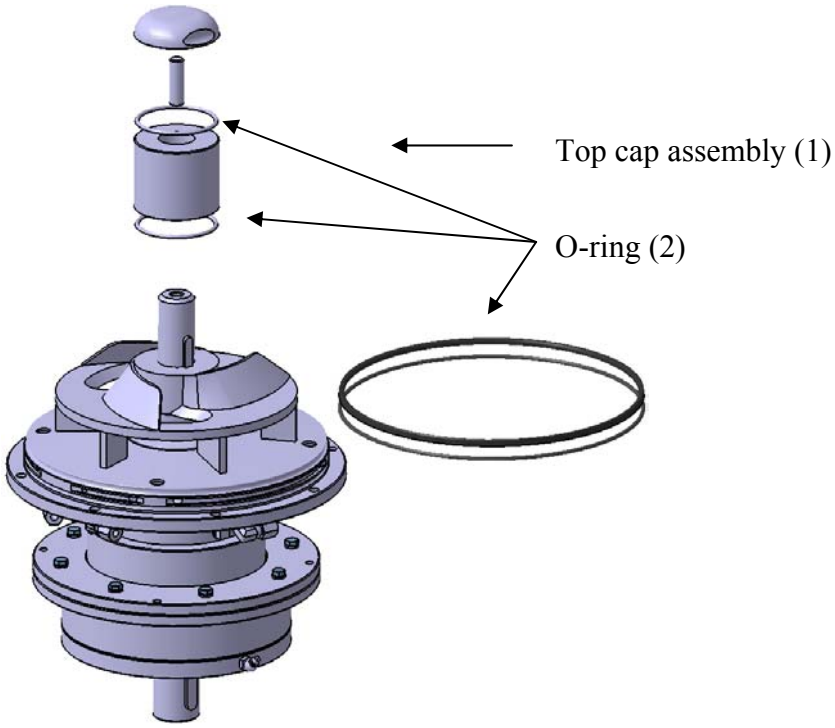
8.4 Maintenance – Dynamic turbo unit, aseptic version

8.4.1 Change of dynamic perforation ring, aseptic version

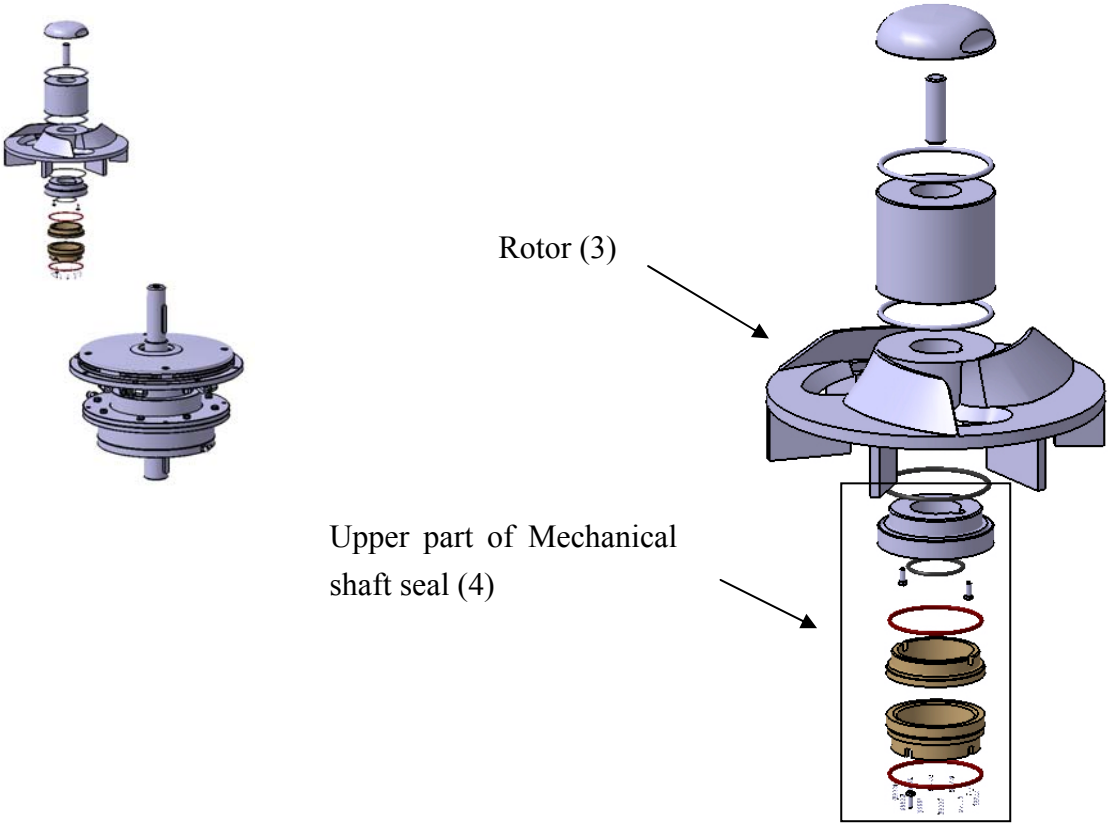


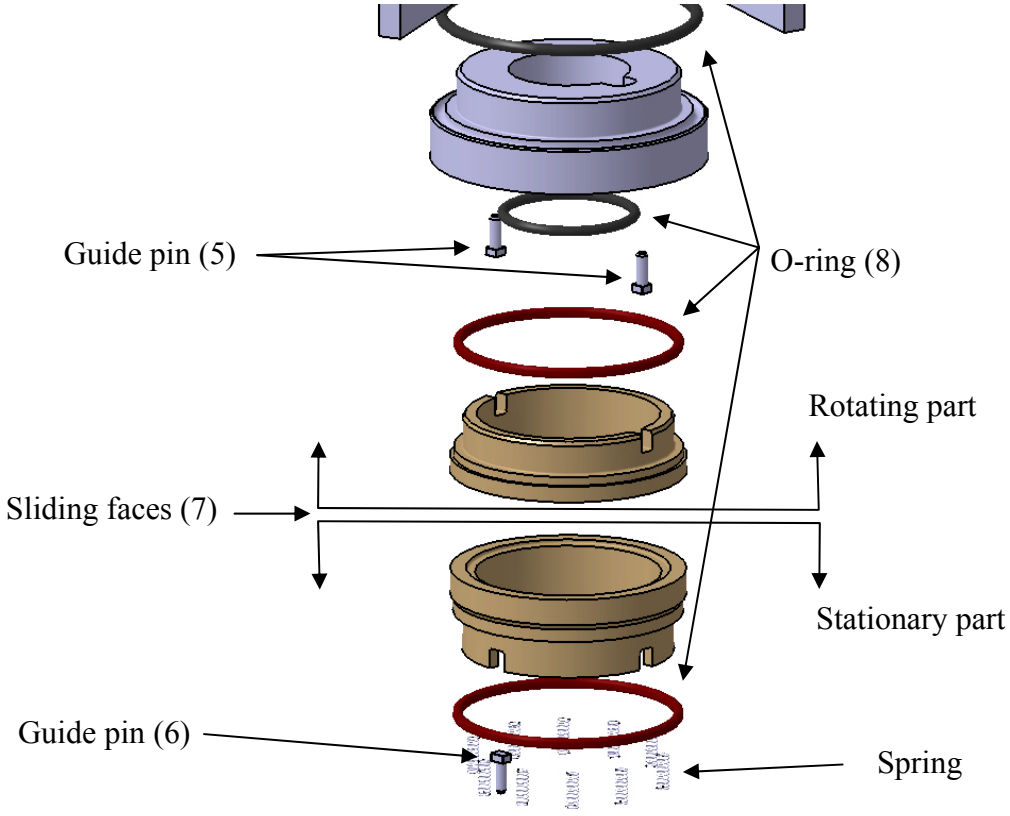
- Undo and remove the nuts and washers (1)
- Remove the dynamic perforation ring (2)
- It is now possible to dismantle the Bearing bush assembly (3) for inspection.
- Inspect the Sliding bearing and o-rings (4) for damage and replace if needed.

8.4.2 Inspecting upper part of Mechanical shaft seal



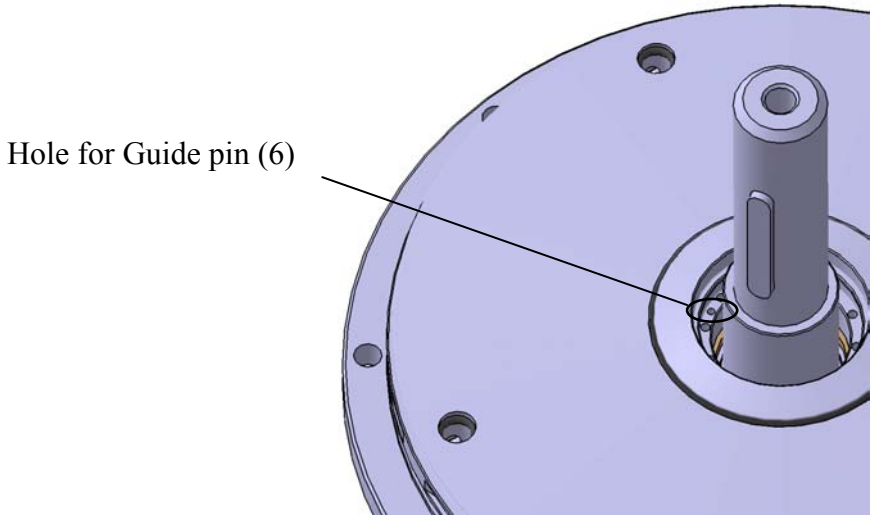
- Dismantle the Top cap assembly (1)
- Inspect the o-rings (2) for damage. Replace if needed.
- It is now possible to remove the rotor (3) and the upper part of mechanical shaft seal (4).



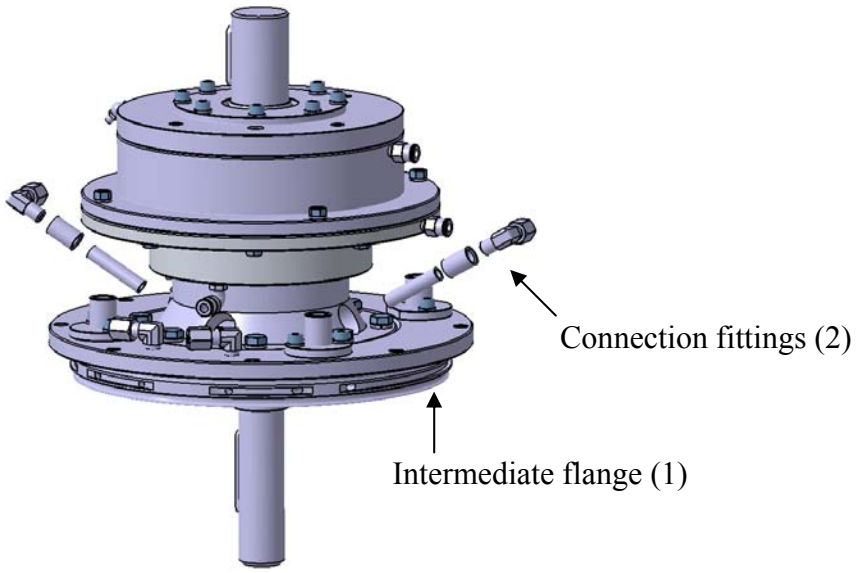


- Check the sliding faces (7) and O-rings (8) for damage, and replace if needed

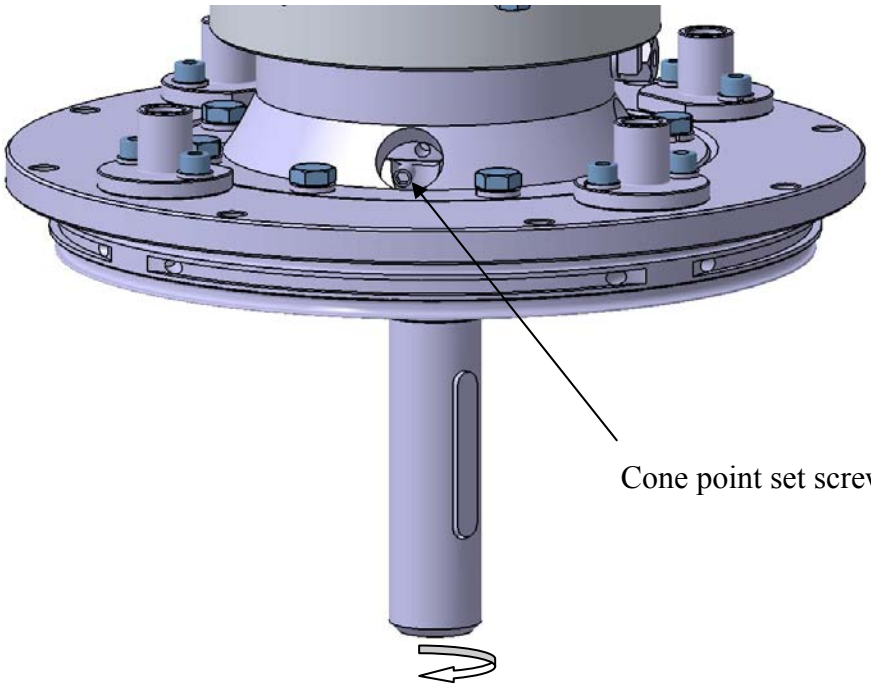
- Make sure that the Guide pin (5) and (6) are present and properly seated when refitting



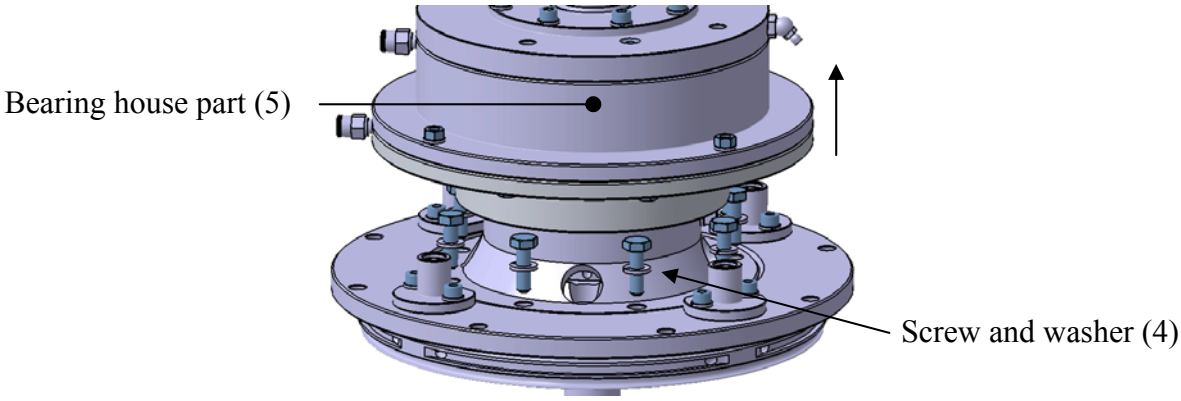
8.4.3 Inspecting the lower part of mechanical shaft seal



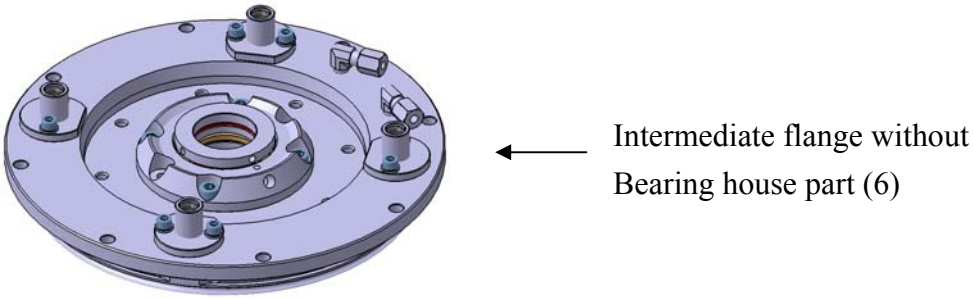
- Place the mixer unit upside down and make sure that the intermediate flange (1) is properly supported
- Remove the connection fittings (2) for the barrier fluid



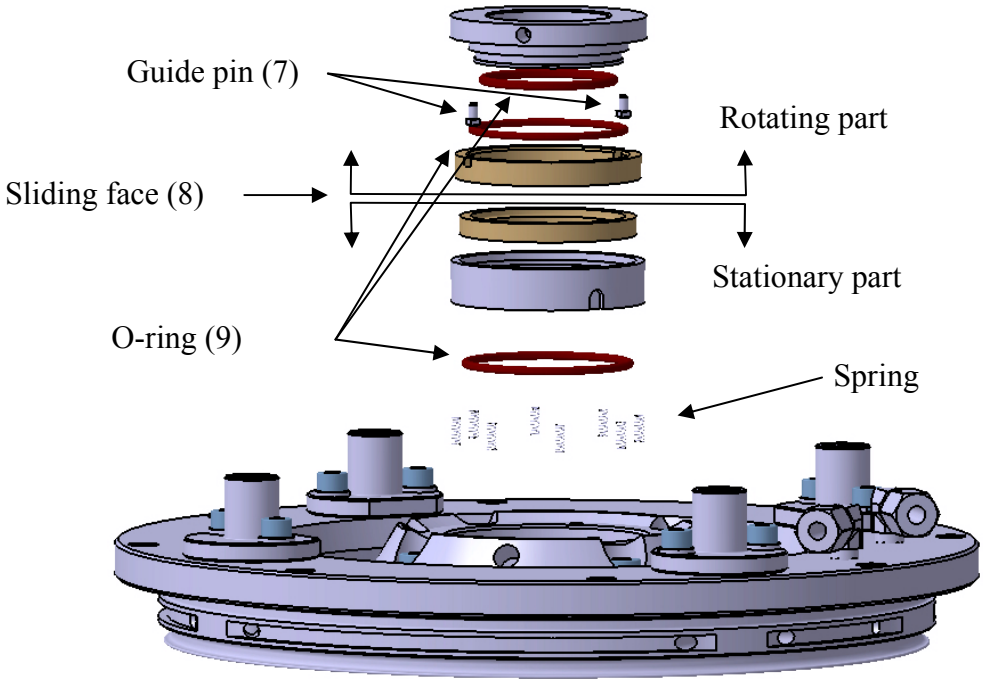
- Rotate the shaft in order to remove the two Cone point set screws (3)



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



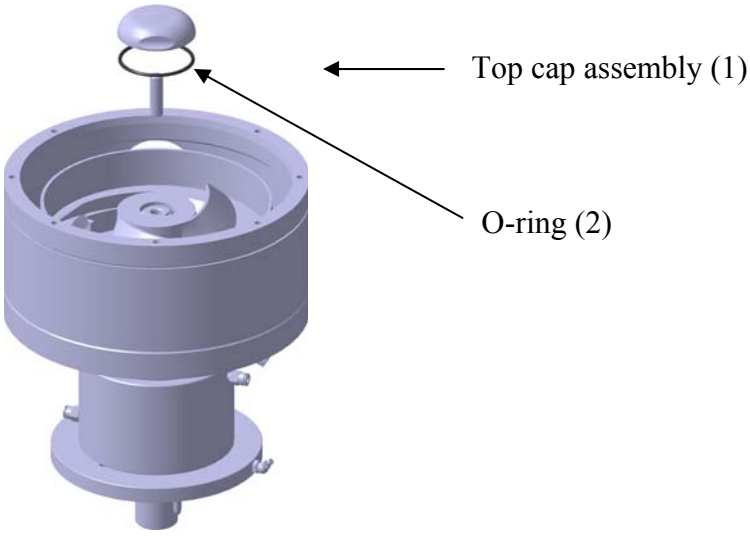
It is now possible to inspect the lower part of the mechanical shaft seal



- 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

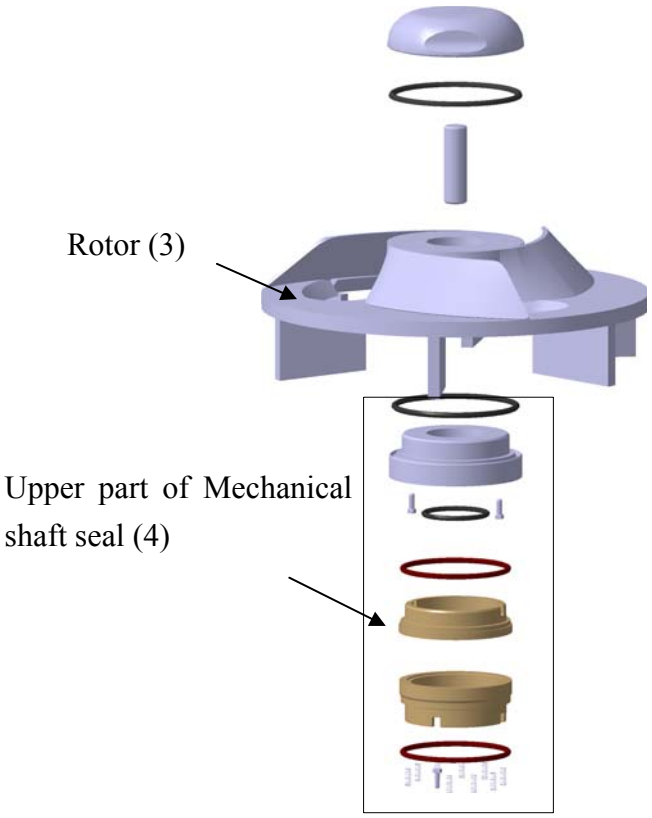
8.5 Maintenance – In-line turbo unit, aseptic version

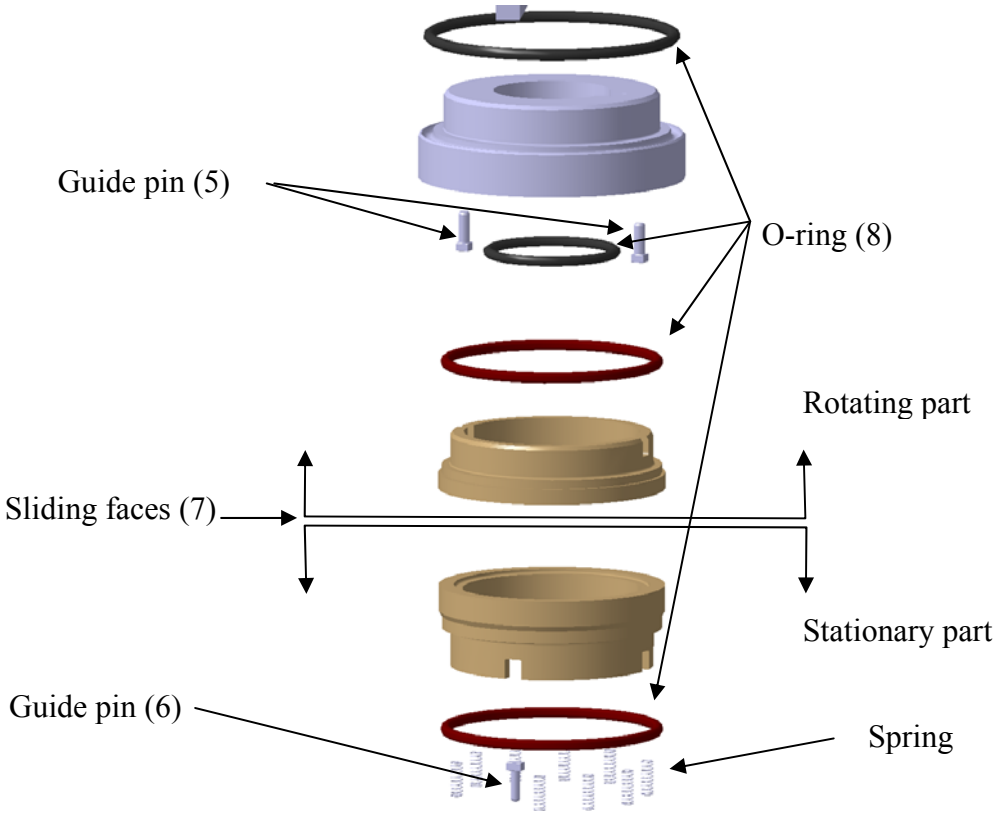
8.5.1 Inspecting upper part of Mechanical shaft seal



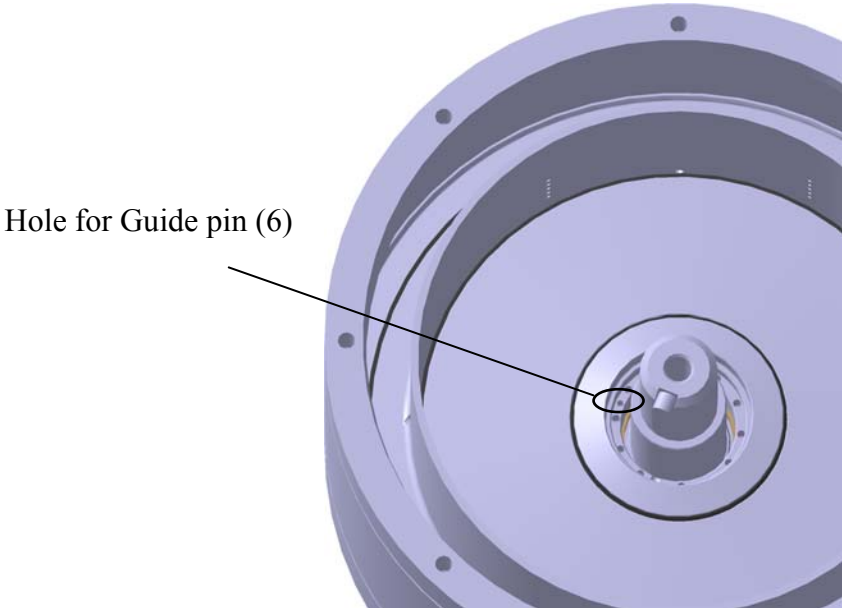
- Dismantle the Top cap assembly (1)

- 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).

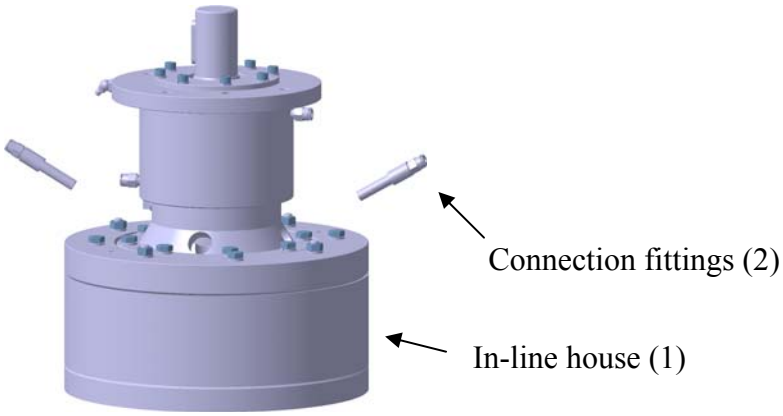




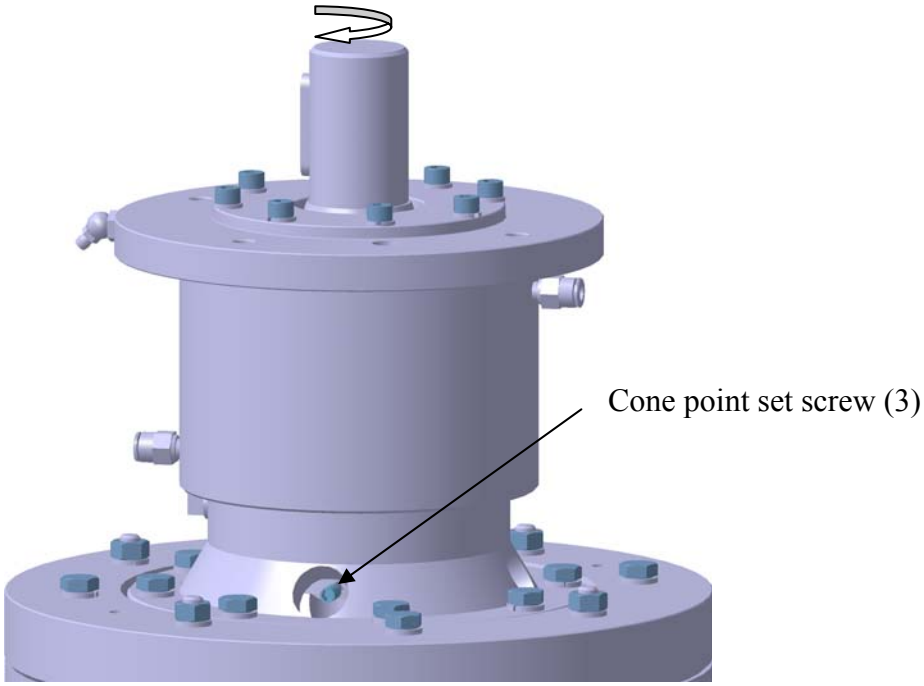
- Check the sliding faces (7) and O-rings (8) for damage, and replace if needed
- Make sure that the Guide pin (5) and (6) are present and properly seated when refitting



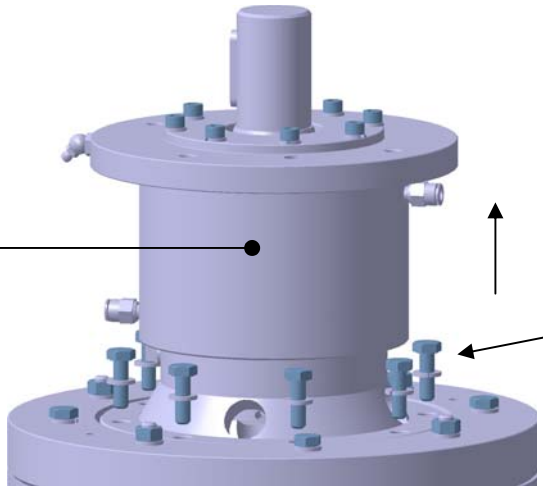
8.5.2 Inspecting the lower part of mechanical shaft seal



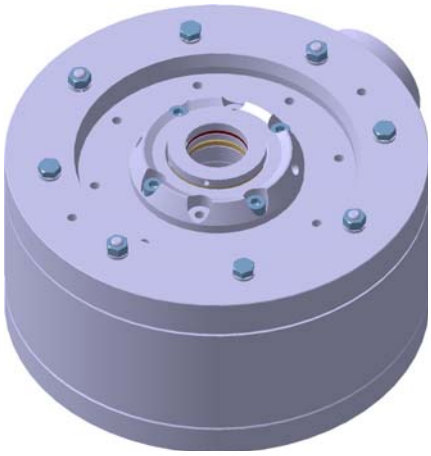
- Place the mixer unit upside down and make sure that the in-line house (1) is properly supported
- Remove the connection fittings (2) for the barrier fluid



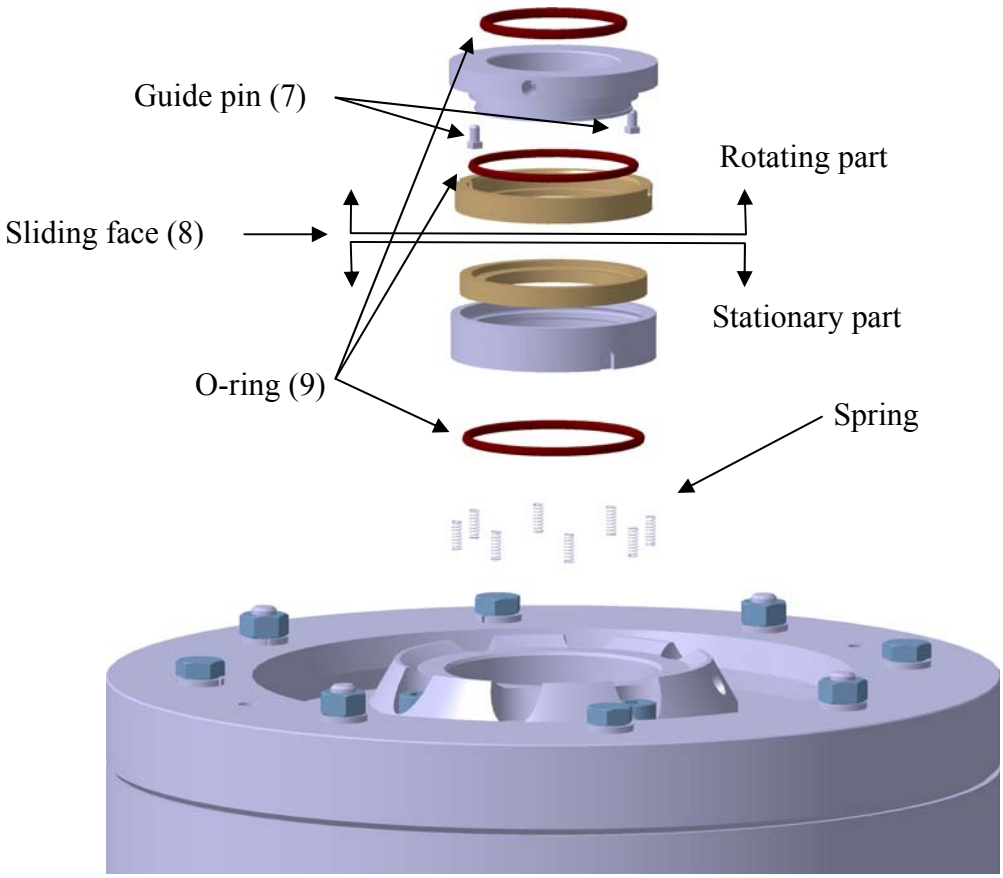
- Rotate the shaft in order to remove the two Cone point set screws (3)



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



- 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

Content

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:

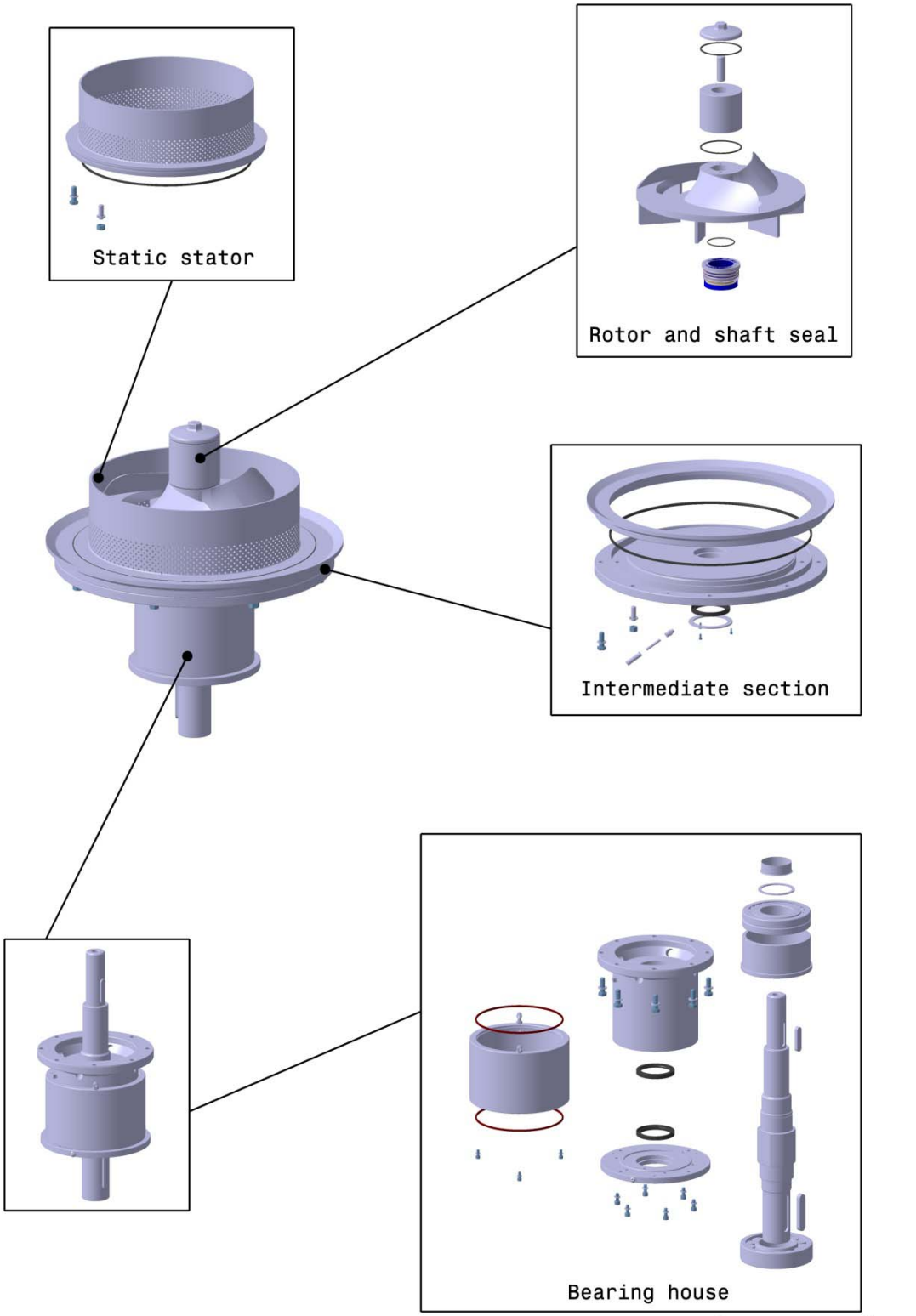
- Mixer unit – Overview
- Stator
- Rotor and shaft seal
- Intermediate section
- Bearing house
- Stator lift (if mixer unit is with dynamic stator)
- Knife system overview (if mixer is equipped with knife)
- Part list for transmission
- Agitator overview (if mixer is equipped with agitator)
- Flow symbols
- 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 Scanima Part Number as described in chapter 2

9.2 Mixer Unit Spare Parts

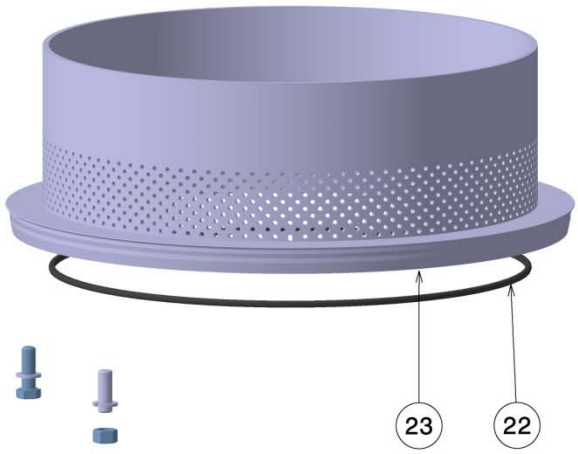
Following drawings represent spare parts drawings for the mixer unit. After these drawings the respective spare parts lists are presented.

Ø400 Batch mixer unit, static - Overview



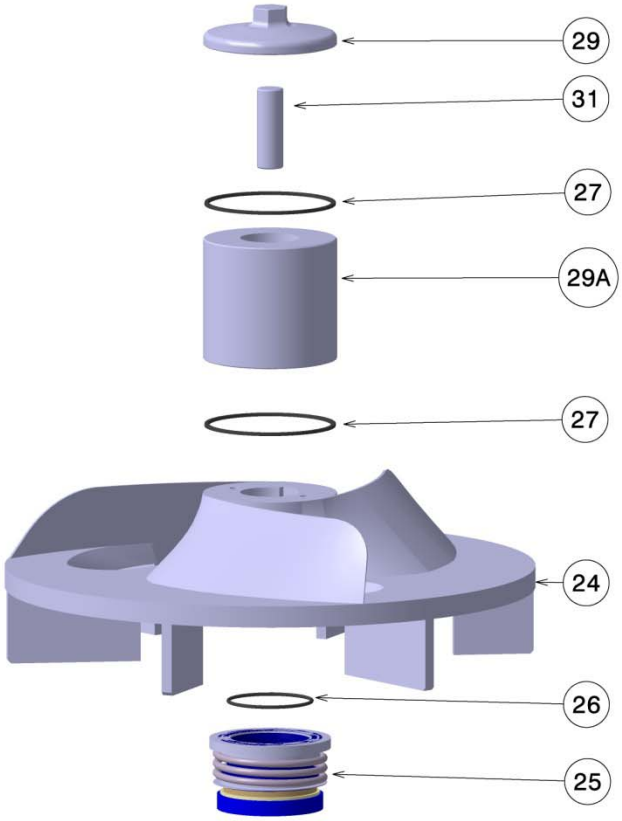
Document number:
CD3015892

Static stator



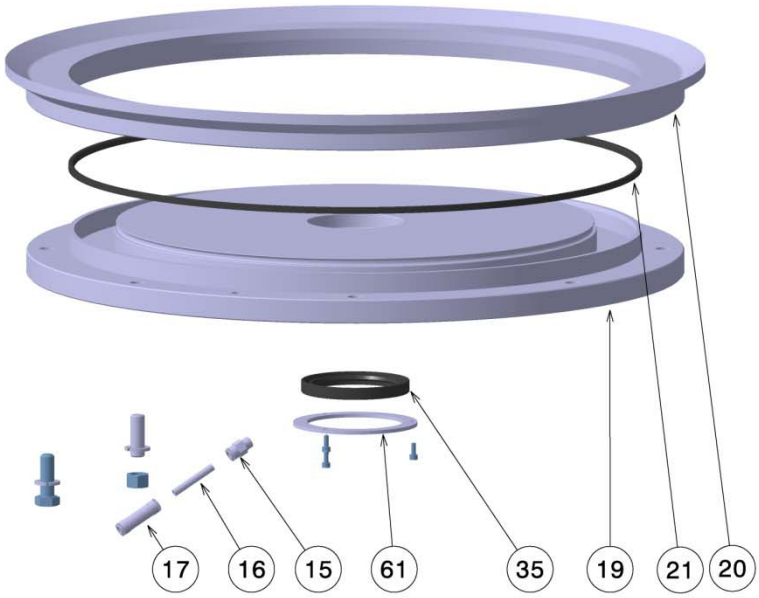
Document number:
CD3015898

Rotor and shaft seal



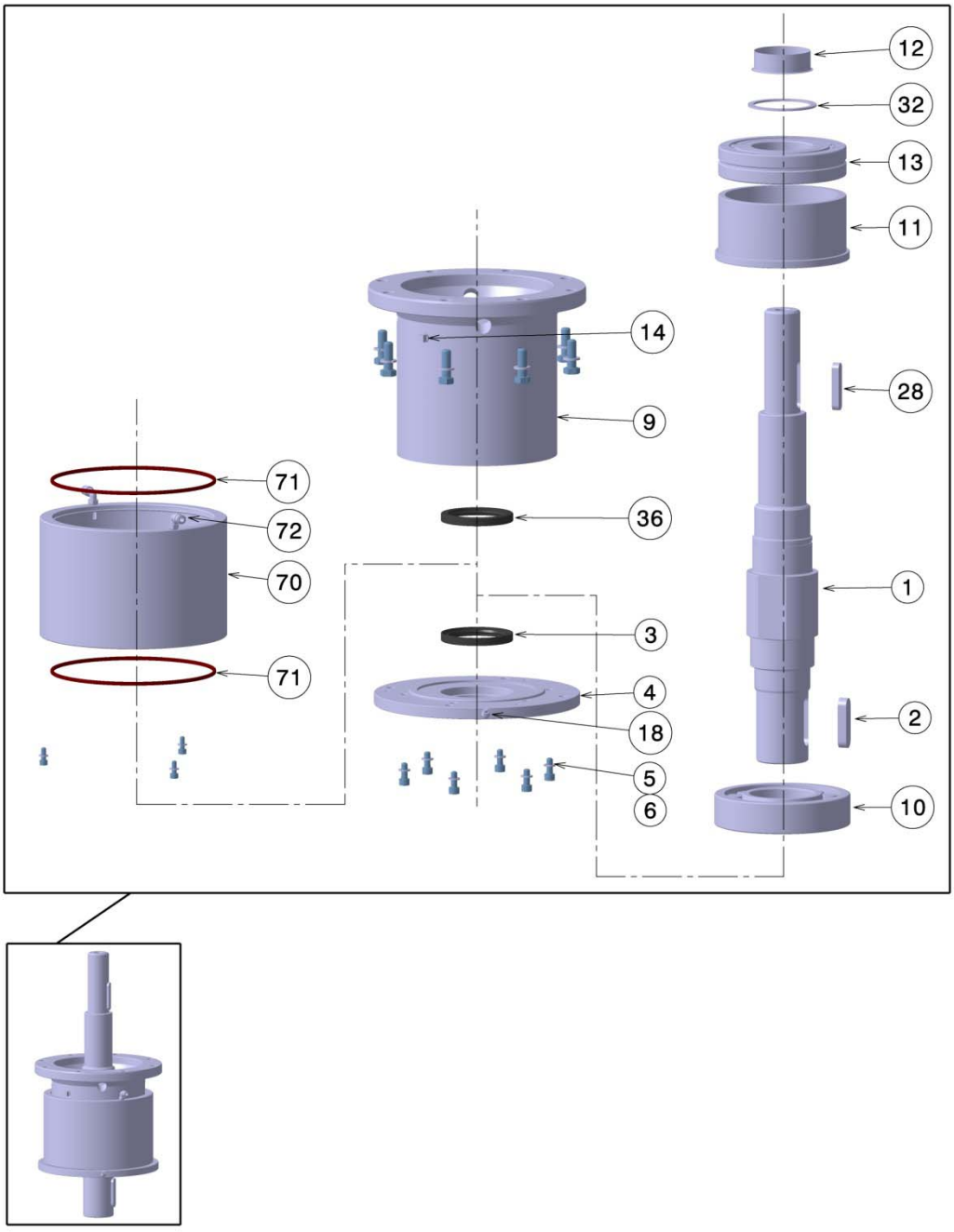
Document number:
CD3015859

Intermediate section



Document number:
CD3015899

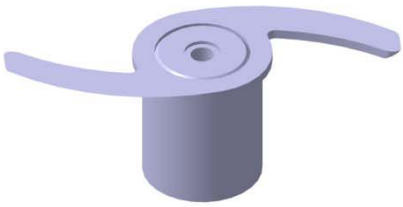
Bearing house for Ø400 mixer unit, long version



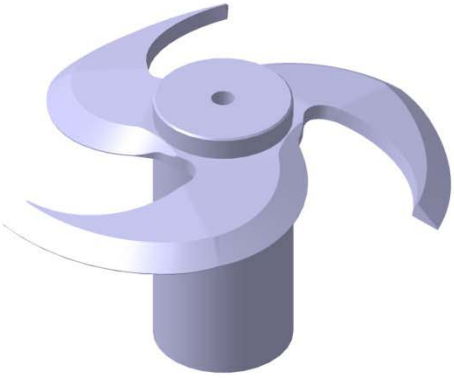
Document number:
CD3015901

Knife system overview

Propeller



Knife, type HERO

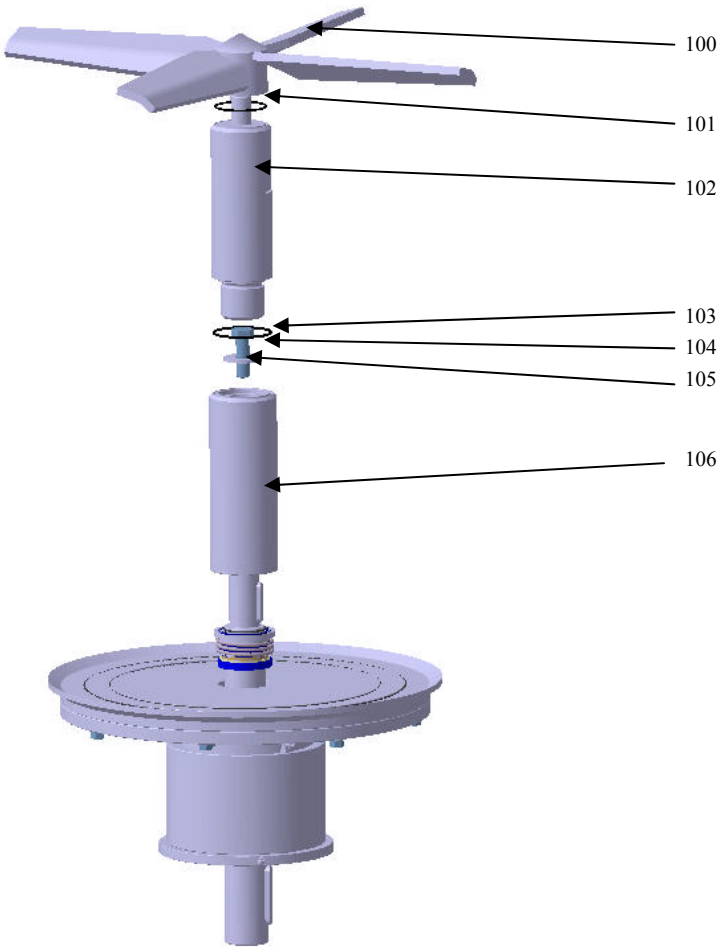


Knife

Chopping knife

Inline propeller

Document number:
CD3015617



Project no:				11880
Drawing:				Stator
Pos No	**Rec. Spare Parts**	**Part No**	**Qty**	**Description**
022	Yes	16370	1	O-ring NBR
023		24604	1	Perforation ring Blind

Project no:				11880
Drawing:				Rotor and Shaft Seal
Pos No	**Rec. Spare Parts**	**Part No**	**Qty**	**Description**
025	Yes	10276	1	Mech. shaft seal Ø 60
026	Yes	11404	1	O-ring NBR
027	Yes	21081	1	O-ring NBR

Project no:				11880
Drawing:				Intermediate section
Pos No	**Rec. Spare Parts**	**Part No**	**Qty**	**Description**
015		12161	2	Super Rapid Straight nickleplated Ø6x1/8
016		30312	0,2	Airhose Ø6/4 PUN-H
017		17112	2	Super Rapid double union nickleplated Ø6
019		16361	1	Intermediate flange
020		16366	1	Weld in flange Ø400
021	Yes	25436	1	O-ring NBR
035	Yes	11358	1	Drive seal NBR
061		24575	1	Securing ring

Project no:				11880
Drawing:				Bearing House
Pos No	**Rec. Spare Parts**	**Part No**	**Qty**	**Description**
071	Yes	22964	2	O-ring NBR
072		11658	2	Super Rapid angle - nickleplated Ø6x1/8"
DIV	Yes	26184	1	Bearing house complete Ø400 mixer unit

Part no:				26184
Drawing:				Bearing House
Pos No	**Rec Spare Parts**	**Part No**	**Qty**	**Description**
01		20974	1	Shaft for Ø 400 turbo unit
02		11262	1	Drive key A4 18x11x65 DS 96A
03	Yes	11358	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	Yes	21007	1	Roller bearing SKF
11		20975	1	Spacer ring
12	Yes	22617	1	Speedi sleeve
13	Yes	14905	1	Roller bearing SKF
13-1	Yes	18606	0,03	Scanima Food Grade and High Load Grease
14		11656	1	Stopper PA 66 nature
18		23175	1	Lubricating nipple
28		11261	1	Drive key A4 14x9x60 A
32		11407	1	Locking ring u- 75. Ø75 DIN471
36	Yes	11358	1	Drive seal NBR

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

Project no:				11880
Drawing:				Knife System Overview
Pos No	**Rec. Spare Parts**	**Part No**	**Qty**	**Description**
100			1	Knife customer delevery
101		25394	1	O-ring NBR Ø71,44x3,53
102		CP3067777	1	
103		21083	1	Bolt M20x60 DIN933
104		22278	1	O-ring NBR ø80X4
105		CP3067271	1	Disk M20
106		CP3067211	1	

9.3 Part list for transmission

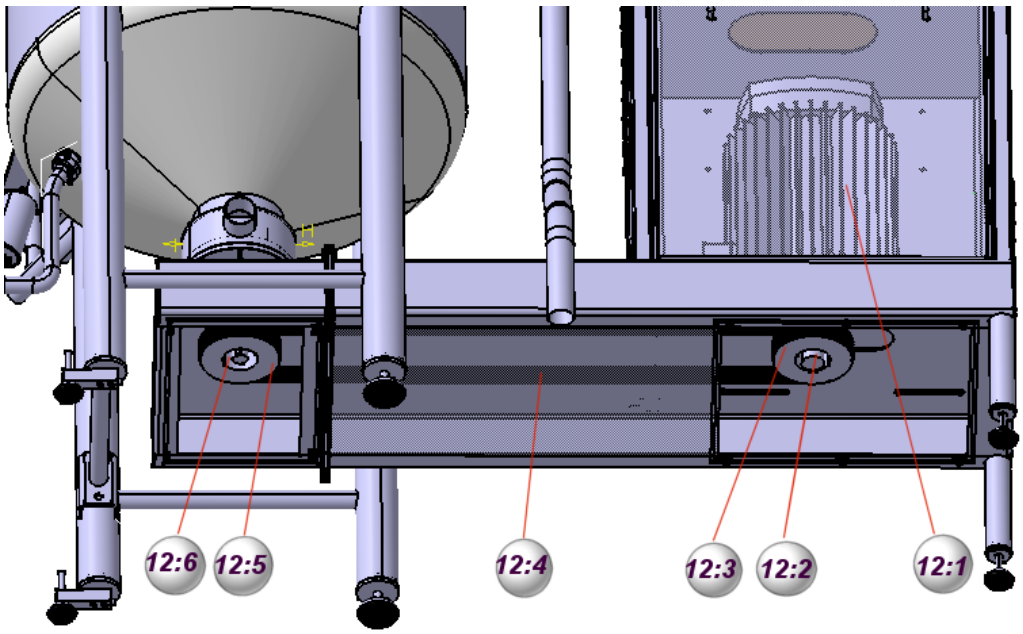


Figure 9-1 Layout for transmission

Project no:				11880
Drawing:				Transmission
Pos No	**Rec. Spare Parts**	**Part No**	**Qty**	**Description**
12-M01		28857	1	Motor MEZ 55 kW Type 250M-4 B5/V1
12-002		20187	1	V-belt pully SPB 160-4 tp2517
12-003		11415	1	Taper Bush Ø65 3535
12-004	Yes	24490	4	V-belt XPB
12-005		32446	1	V belt pully SPB 500-4 tp3535
12-006		11377	1	Taper Bush Ø65 3020

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:				**11880**	
Flow Chart No:				**2007769**	
Project Name:				**CO-RO Food**	
Pos No	**Rec. Spare Parts**	**Part No**	**Qty**	**Description**	**EL-data**
12-M01		28857	1	Motor MEZ 55 kW Type 250M-4 B5/V1	400/690V 50/60Hz
14-0Z1		12042	1	Safety switch Type rotacam HS2	24V AC/DC
14-MV1		12539	1	Man way 1600/B 430x556x100	
14-SG1		26280	1	Sight glass MV125 DIN11851 PN6	20W, 24V AC/DC
14-SG2		14717	1	Light for sight glass USL03 2	24VUC 20W
14-SG3		21472	1	Sightglass DN80 DIN 11851	
14-TT1		25307	1	Temp. sensor PT 100 incl. transmitter	4-20 mA. Prog. 0-100°C
30-F01		10221	1	Filter 0.3 3/8"	
30-V01		10286	1	Plug for solinoid valve AC/DC	Plug Solenoid:12-240V 2A IP65 W Rectifer
30-V01		11780	1	Solenoid valve 6013 1/4" NC	24VDC+/-10%, 8W, IP65
30-V02		11772	1	Needle Valve 1/4" BSP	
30-V03		15110	1	Solinoide valve 6213 3/8"	10W 24VDC IP65
30-V03		10286	1	Plug for solinoid valve AC/DC	Plug Solenoid:12-240V 2A IP65 W Rectifer
30-V04		14406	1	Needle valve 2810 3/8"	
30-V05		10286	1	Plug for solinoid valve AC/DC	Plug Solenoid:12-240V 2A IP65 W Rectifer
30-V05		15110	1	Solinoide valve 6213 3/8"	10W 24VDC IP65
30-V06		14406	1	Needle valve 2810 3/8"	
31-V01		18125	1	Butterfly valve Ø63,5 EPDM inlet/outlet	
31-V01		10268	1	Actuator LKLA.T for butterflyvalve 25-63	Actuator LKLA-T Prepared for think top
31-V01		25288	1	Think Top. No solenoid.	
31-V02		10268	1	Actuator LKLA.T for butterflyvalve 25-63	Actuator LKLA-T Prepared for think top
31-V02		25288	1	Think Top. No solenoid.	
31-V02		18124	1	Butterflyvalve Ø51 EPDM inlet/outlet	
31-V03		18124	1	Butterflyvalve Ø51 EPDM inlet/outlet	
31-V03		25288	1	Think Top. No solenoid.	
31-V03		10268	1	Actuator LKLA.T for butterflyvalve 25-63	Actuator LKLA-T Prepared for think top
31-V04		25288	1	Think Top. No solenoid.	
31-V04		12005	1	Weld in valve ø38	
31-V04		10268	1	Actuator LKLA.T for butterflyvalve 25-63	Actuator LKLA-T Prepared for think top
31-V05		10268	1	Actuator LKLA.T for butterflyvalve 25-63	Actuator LKLA-T Prepared for think top
31-V05		12005	1	Weld in valve ø38	
31-V05		25288	1	Think Top. No solenoid.	
32-V01		18126	1	Butterfly valve Ø76 EPDM inlet/outlet	
32-V01		10269	1	Actuator LKLA-T Ø76 NC	Actuator LKLA-T Prepared for think top
32-V01		25288	1	Think Top. No solenoid.	
32-V02		32447	1		
35-V01		10233	1	Butterfly valve LKB 316 Ø51 EPDM	
35-V01		10268	1	Actuator LKLA.T for butterflyvalve 25-63	Actuator LKLA-T Prepared for think top
35-V01		25288	1	Think Top. No solenoid.	
35-V02		25288	1	Think Top. No solenoid.	
35-V02		10232	1	Butterfly valve LKB 316 Ø38 EPDM	
35-V02		10268	1	Actuator LKLA.T for butterflyvalve 25-63	Actuator LKLA-T Prepared for think top
36-F01		30531	1	Filter/silencer Ø51 for drain Ø101,6	
36-F02		25395	1	Water recir./silencer vacuum pump Ø51	
36-P01		24284	1	Vacuumpump SIHI LEMB 161	3x380-480D/660-725VY50/60Hz 5.0/6.0kW
36-PG1		11822	1	Pressure Gauge -1-+1,5bar ø 38	
36-PT1		14622	1	Pressure transmitter CERABAR-M PMP46	0-1 bar.
36-SB1		11821	1	Cleaning ball Ø25 360* for Ø12 pipes	3,3 m3/H 2,5 Bar
36-TI1		26309	1	Thermometer Bimetal 0-60° Ø80	
36-V01		25289	1	Reg. valve Bürkert 2712 DN40 NO.	24VDC 4-20 mA/0-10V
36-V02		10264	1	Non-return valve LKC-2 316 ISO Ø51 EPDM	

Content

10 Safety data sheets

10.1.1 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 Scanima A/S 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

10.1.2 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: Packing Group ii Material No. 2032 Danger No. 885	Class 8, Item 2°(b), label 8
IMDG: UNO-2031	Class 8, Label 8, Packaging Group II

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

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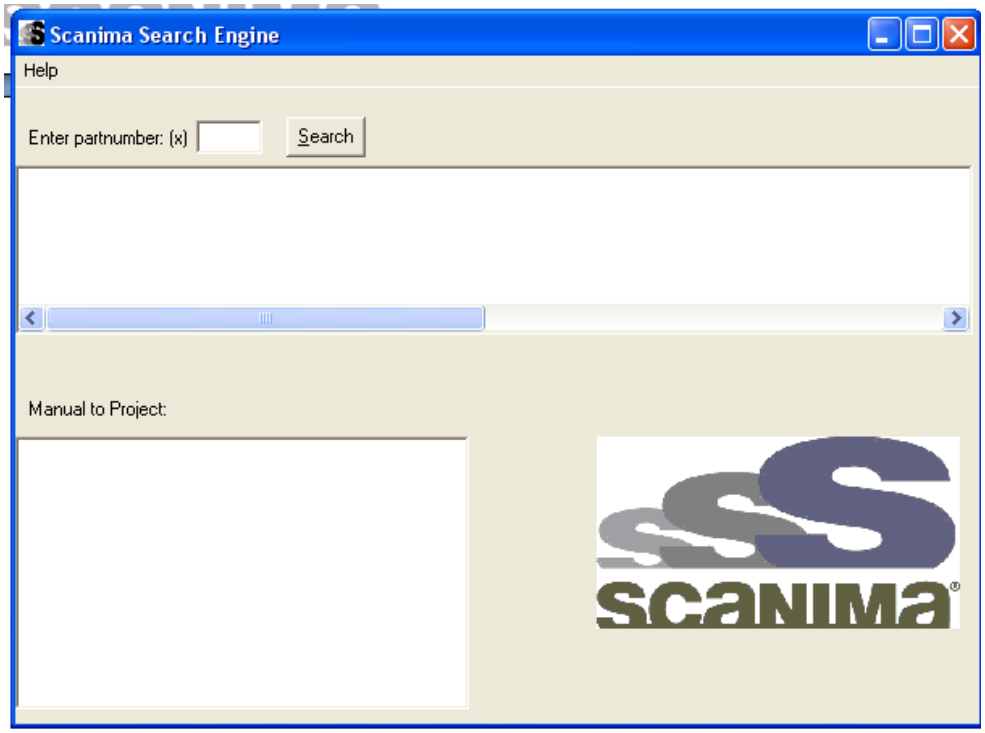
product in combination with any other substance or any other process. This is not a license under any patent or other proprietary right. The user alone must finally determine suitability of any information or material for any contemplated use, the manner of use and whether any patents are infringed.

10.2 Documentation for components

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

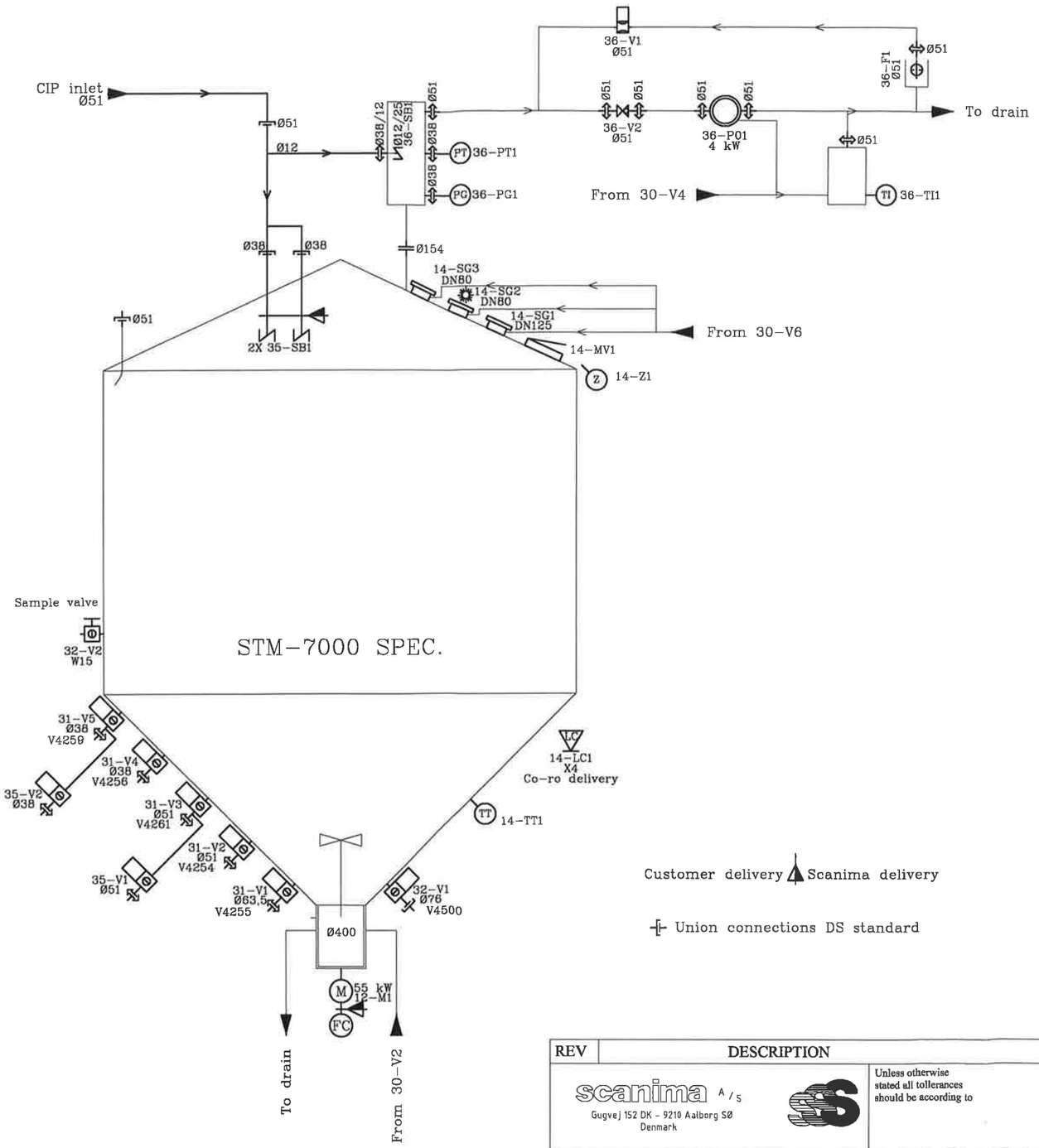
The CD-ROM will start automatically when inserted, and a Search Program will appear, please see below.



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.

10.3 Certificate



Customer delivery ▲ Scanima delivery

Union connections DS standard

REV	DESCRIPTION	YEAR MONTH DAY	SIGN	CHECKED	APPROVED
		SURFACE TREATMENT ACC. TO		DRAWN FL	
scanima A/S Gugvej 152 DK - 9210 Aalborg SØ Denmark	Unless otherwise stated all tollerances should be according to	YEAR MONTH DAY 2008-07-04		CHECKED	
				APPROVED	
TITLE: FLOW SHEET FOR SCANIMA TURBO MIXER TYPE STM-7000 SPECIAL		DRAWING NUMBER 2007769		SIZE A3	SCALE – / SHEET OF
		EQUIPMENT 11880		Material (X if separate part-list)	