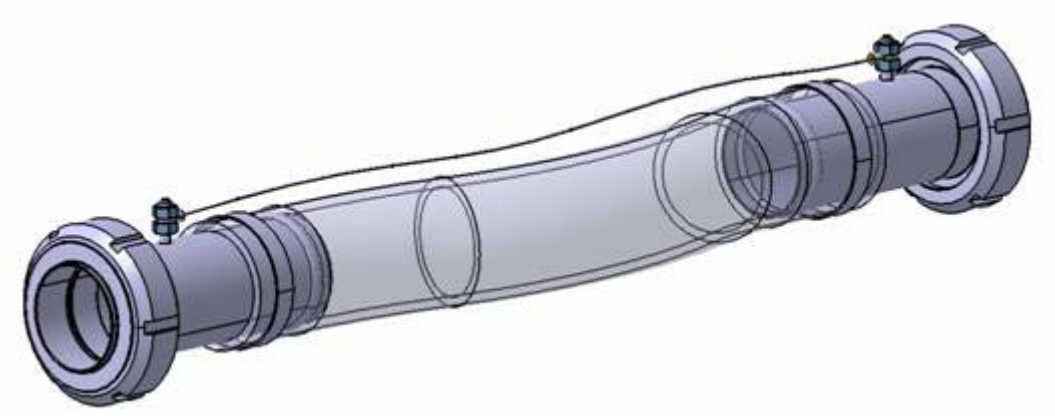
Content

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.

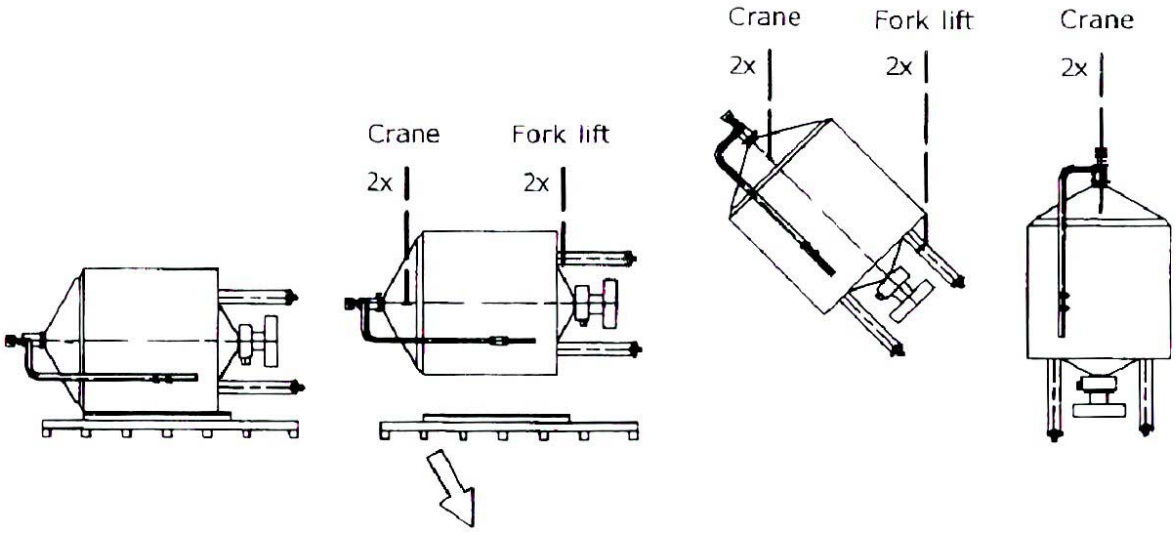
> Caution:
> The vessel has to be lifted free form the transportation pallet before turning from horizontal to vertical position, otherwise the insulation shell will be damaged.

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.

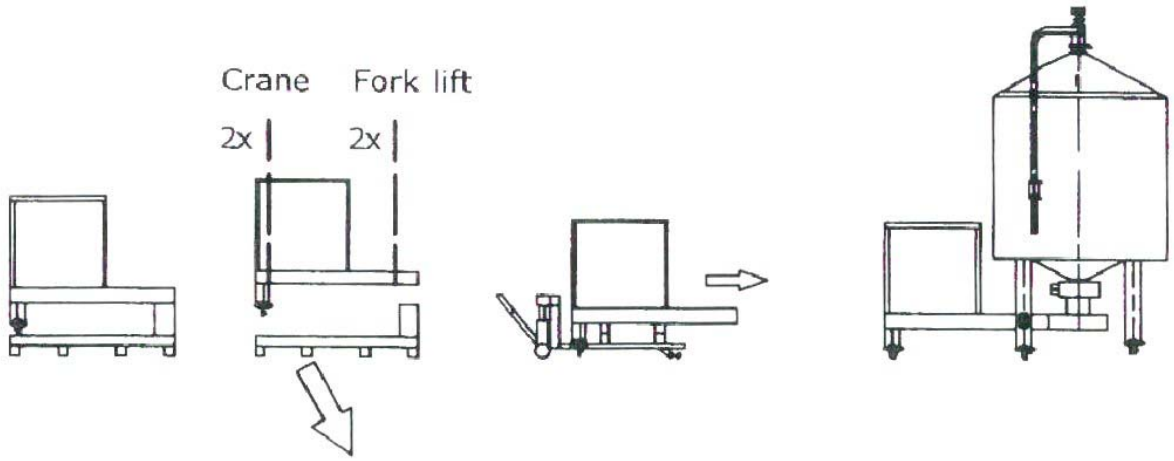
5. Place the transmission on a mobile pallet lift and move the transmission underneath the vessel and assemble the two components by fastening all bolt connections. (4-bolt connections at vessel legs and 7 inside the transmission). Bolts, screws and washers are to be found in a box fastened onto the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

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

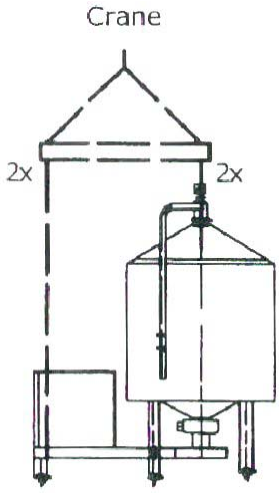
6: The assembled vessel and transmission is to be lifted by a crane or forklift by using equipment that is able to lift two points at least at the same time.



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.

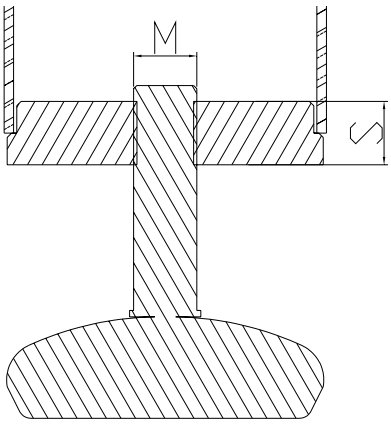
4.6.4 Unpacking

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