

# Installation, Service and Maintenance Instructions



## Blender





## 1 Safety

### 1.1. Instructions Manual

This manual contains information on the reception, installation, operation, assembly, dismantling and maintenance of the STURSAN blenders.

The information published in the instruction manual is based on latest information. STURSAN reserves the right to modify this instruction manual without prior notice.

### 1.2. Start-up instructions

This instruction manual contains vital and useful information to appropriately handle and maintain your blender.

Read these instructions carefully before starting up the blender; become familiar with the operation and use of your blender and follow the instructions closely. These instructions should be kept in a safe location near the installation.

### 1.3. Safety

#### 1.3.1. Warning symbols



General Danger



Danger of injury caused by rotating equipment parts



Electricshock danger



Danger! Caustic or corrosive agents



Danger! Suspended loads



Danger to operation of the equipment



Commitment to safety at the workplace



Protective goggles requirement

### 1.4. General safety instructions

Read carefully this instruction manual before installing and starting the blender.

Contact STURSAN in case of doubt.

#### 1.4.1. Installation

The Technical Specifications of Chapter 8 should always be observed.



Do not start up the blender before being connected to the tubing.

Do not start up the blender if the cover is removed or impeller is not fixed.

Make sure the specifications of motor meet the requirements, especially when working under conditions that involve the risk of explosion.



During the installation, all the electric work should be carried out by authorised personnel.

#### 1.4.2. Operation

The Technical Specifications of Chapter 8 should always be observed. Can not be ignored under any circumstances.



NEVER touch the blender and pipe during operation or it is being used to decant hot fluids or when it is being cleaned.



The blender contains rotor parts. Never place your fingers inside the blender while it is in operation.

Do not operate the pump with the suction and delivery valves closed.



Do not spray the electrical motor directly with water. The standard protection for the motor is IP-55: Protection against dust and sprayed water.

### 1.4.3. Maintenance

The Technical Specifications of Chapter 8 should always be observed.



Do not disassemble the blender until the pipes have been emptied. Remember that some of the fluid will always remain in the blender housing (when no drainage is provided).

Noted that the pumped fluid may be dangerous or high temperature. Consult the regulations in effect in each country for these cases.

Do not leave parts loose on the floor.



Make sure the blender is powered off before maintenance.

Remove the fuses and disconnect the cables from the motor terminals.

All electrical work should be carried out by authorised personnel.

### 1.4.4. Compliance with the instructions

Any non-fulfilment of the instructions may result in a risk for the operators, the environment and the machine, and may result in the loss of your right to claim.

This non-fulfilment may result in the following risks:

- Failure of important functions of the machines/plant.
- Failure of specific maintenance and repair procedures.
- Possibility of electric, mechanical and chemical risks.
- Possibility causing environment danger due to the release of substances.

### 1.4.5. Guarantee

Any warranty provided shall immediately be cancelled and void *ipso jure*, and STURSAN shall be compensated for any product liability claim from third parties, if:

- the service and maintenance work was not carried out in accordance with the service instructions, or the repair work has not been carried out by our personnel or it has been conducted without our written authorization;
- our equipment has been changed without prior written authorization;
- the parts or lubricants used are not original STURSAN parts and products;
- the materials were used incorrectly or negligently, or not in accordance with these instructions and their intended use;
- blender parts were damaged by excessive pressure owing to the lack of a safety valve.

The provided General Delivery Terms also apply:



Do not do any change the equipment without prior discussion with the manufacturer. For your safety, please use original spare parts and accessories.

The useage of other parts will exempt the manufacturer from any liability.

The service terms can only be changed with prior written authorisation from STURSAN.

**Please do not hesitate to contact us in case of doubts or more complete explanations are required on specific data (adjustments, installation, disassembly, etc.).**



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### 3 General information

#### 3.1. Description

In the blender design, it is possible to distinguish three parts or areas that define its build and operation.

The top part consists of the hopper, solid-material area. we can add powder by using a butterfly valve with an adjustable handle. Optionally, the butterfly valve can be equipped with a pneumatic actuator.

The middle area consists of the venturi tube, which is the blender's suction, and where the liquid is introduced.

The mixing chamber, which is located in the bottom part, is where the liquid meets the powder and mix together.

Blender 226 is of a compact design, with the hydraulic part joined to the motor, and clamp-type connections. In the M-440 model, the hydraulic part and the motor are separate and mounted on a baseplate. Transmission is through pulleys mounted beneath the baseplate.

The standard motor complies with IEC standards, with IP-55 protection and class F insulation. Optionally, the motors can provide with other protections.

All the parts entering into contact with the material are manufactured in AIS 304/316L.

This equipment is designed for usage in food process.

#### 3.2. Operating Principle

The blender basically consists of a casing and a centrifugal-pump impeller which are mounted vertically. The suction consists of a double-wall tube that keeps the liquid and powder separate until they enter the mixing chamber. This tube prevents the powder from becoming damp (refer figure 3.1).

The suction created by the blender impeller sucks the powder from the hopper through the internal venturi to the mixing chamber.

The other pipe is used to introduce the liquid towards the impeller. The liquid is introduced tangentially into the impeller blades where the pressure gradient of the blender is zero. The liquid enters the mixing chamber tangentially, following the same rotating direction as the impeller.

In this way, the powder-inlet pipe remains dry while the blender is in operation. If the inlet pipe appears to be blocked, firstly, check that the rotating direction of the impeller is correct and then, make sure the installation is correct. In order to check the impeller turning is correct, draw a continuous arrow from the inlet to outlet without changing direction (refer figure 3.2).

During normal operation, vortex is formed in the centre of impeller, sucking powder through the internal venturi and remaining it dry. If it is not formed, the powder might become damp and flocs may form in the mixture, the inlet tube might be blocked.

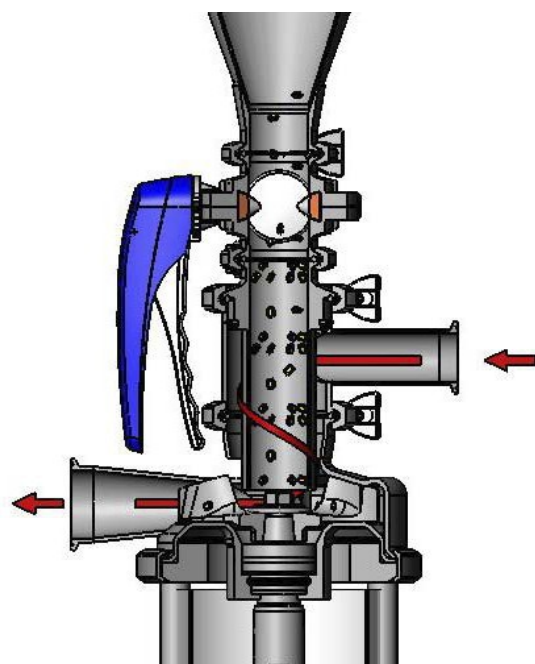


Figure 3.1

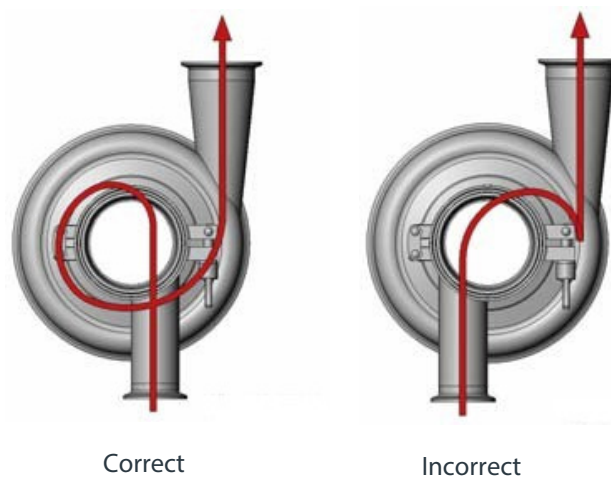


Figure 3.2



Here are the reasons why the powder may become damp or wet:

- **Incorrect liquid-intake flow rate:** A very high flow rate and/or pressure may destroy the blender vortex, and don't have enough speed to pump the liquid, at the same time, it may lead to a very slow flow rate, as it causes by powder accumulated in the impeller, thus making it impossible to form the vortex in the centre of the impeller.
- **Incorrect pressure:** The differential pressure of the blender must be low (6-9 m), as same as the pressure at the blender suction, which must be negative.
- **High viscosity:** A viscous product naturally causes counterpressure. Adding this to the counterpressure caused by the grille, leads to very high pressure. It is advisable to remove the grille, which is an optional part, when highly viscous products need to be mixed.
- **High delivery pressure:** If the delivery piping is too long or it is too small in diameter, or viscosity is too high, it will cause a very high counterpressure.

In order to solve these problems, the piping must be of correct dimensions, or if necessary, place a pump on the outlet of blender. It may be a centrifugal pump, but its pumping capacity is limited if maximum mixture yield is required. If counterpressure increases in the blender, the diminish of vortex reduces the mixing capacity of the solid and liquid ingredients. The key is to maintain negative pressure at the blender intake.

The amount of powder that can be added is very difficult to define, as a great number of variables are involved. Some of these variables are particularly important, such as:

- Dampness
- Fatty material content
- Microscopic texture (smooth, rough)
- Density
- Fluidity (air volume in the product)
- Powder type (granular, flaky, fines, etc.)



The amount of powder that can be dissolved in the blender depends on the characteristics of the product.

### 3.3. Materials to be avoided

- **Abrasives:** These substances damage to mechanical seal and impeller.
- **Effervescent materials:** The gas caused by these substances prevents the formation of vacuum and prevents the power falling from the hopper.
- **High temperatures:** It is not advised to work at 65 °C, as vapours may cause the venturi blocked. It also may cause cavitation in the blender as it approaches boiling point.
- **High viscosities:** The blenders cannot pump highly viscous products. The maximum viscosity of the blenders is 250 cPs.
- **Incompatible Materials:** such as mechanical seals and elastomers.

### 3.4. Application

HQ-20 to 60 blenders can be used in any process where powder is added first and is then dissolved in liquid. Examples:

- Powdered milk
- Whey
- Chocolates
- Sauces
- Brines
- Fertilisers
- Lactose
- Stabilisers, mixtures with milk
- Pesticides, etc

## 4 Installation

### 4.1. Receiving the blender



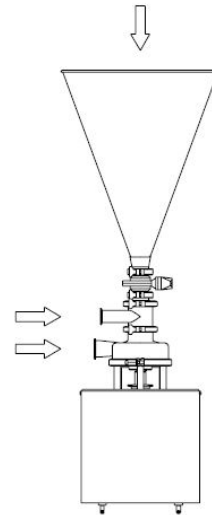
STURSAN will not take responsible for the damage sustained by the equipment during transport or unpacking. Visually check that the packaging is not damaged.

Attached documents:

- Dispatch notes.
- Instructions and Maintenance Manual.
- Motor Instructions and Maintenance Manual (\*)  
(\*) when the motor is supplied with blender by STURSAN.

Unpack the blender and check:

- The blender hopper suction and delivery connections, removing the remains of any packaging materials.
- Check that the blender and the motor have not suffered any damage.
- If the equipment is not in good condition and/or any part is missing, the carrier should draw up a report accordingly as soon as possible.

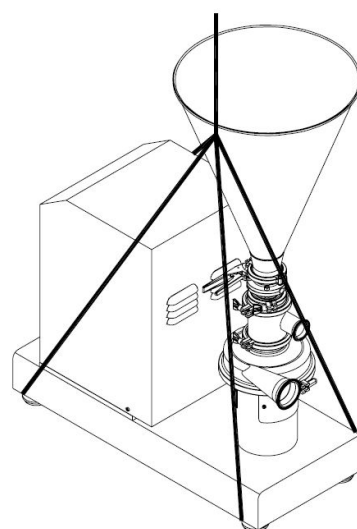
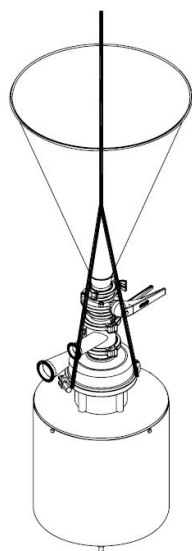


### 4.2. Transport and storage



The blender is too heavy to handle or store manually.

Lift the blender as shown below:



### 4.3. Installation position

Place the blender as close as possible to the suction tank, and it is best to place below the fluid level. Make sure there is sufficient space around pump to allow worker access the blender and the motor. (Refer Chapter 8 Technical Specifications for dimensions and weight). Set up the blender on a flat, level surface.



Install the blender so as to allow sufficient ventilation. If the blender is installed outdoors, it should be protected by a roof. Its location should enable easy access for any inspection or maintenance operations.



#### 4.4. Pipes

- As a general rule, the suction and delivery pipes should be fitted in straight sections, with the least possible number of bends and accessories, in order to minimise head loss caused by friction.
- Ensure that blender input and output fittings are properly aligned with the piping and of a similar diameter to the blender connections.
- Place the blender as close as possible to the suction tank, with the suction nozzle underneath the liquid level to facilitate priming.
- Place pipe supports as close as possible to the blender's suction inlet and delivery outlet.

#### 4.5. Shut-off valves

The blender can be isolated for maintenance purposes. To this end, shut-off valves should be fitted to the blender's suction and delivery connections. These valves should ALWAYS be open when the blender is operating.

#### 4.6. Electrical installation



The connection of the electrical motors must be performed by qualified personnel. Take all necessary measures to prevent damage to connections and cables.



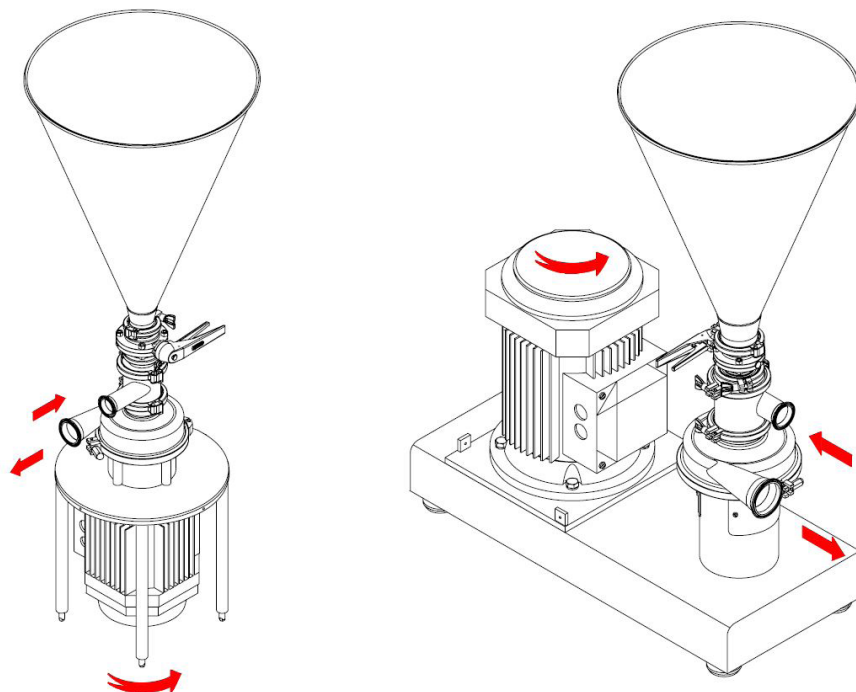
The electrical equipment, terminals and components of the control systems may still contain electric current when switched off. Touching with them maybe dangerous for operators or cause irreversible damage to the equipment. Before handling the blender, make sure that the engine is fully disconnected from the power.



ALWAYS check the direction of rotation of engine with fluid inside the blender. For models with a seal chamber, ALWAYS make sure that the chamber is full of fluid while checking the rotation direction.

- Connect up the motor following the manufacturer's instructions.
- Check the direction of rotation (see the label on the blender).

Start up the blender motor briefly. Looking at the blenders from the hopper side, check the motor fan rotates anti-clockwise.





## 5 Start-up



Before starting the blender, carefully read the instructions provided in Chapter 4. Installation.

### 5.1. START-UP



Read Technical Specification of Chapter 8 carefully. STURSAN will not hold responsible for any incorrect use of the equipment.



NEVER touch the blender or the pipes when hot fluid is being pumped.

#### 5.1.1. Checks before starting up the blender



The blender must NEVER run in the dry state.

- Fully open the shut-off valves on the suction and delivery pipes.
- If the fluid does not flow into the blender, fill it with the fluid to be pumped.
- Make sure the motor's direction of rotation is correct.
- Check that the impeller rotates without scraping, taking into account the mechanical seals and the transmission belts (in M-440).
- If the blender has a double seal or a cooled mechanical seal, mount the auxiliary connection corresponding according to Technical Specification of Chapter 8

#### 5.1.2. Checks when starting up the blender

- Check that the blender is not making any unusual noises.
- Check whether the absolute inlet pressure is enough to avoid cavitation in the blender.
- Check the flow pressure.
- Check that there are no leaks through the sealed areas.



A shut-off valve on the suction pipe must not be used to regulate flow. Shut-off valves must be fully open during operation.



Check the motor's power to avoid electric overload.



## 6 Operating Problems

The following table provides solutions to problems that might arise during blender operation. The blender is assumed to have been properly installed and correctly selected for the application. Please contact STURSAN if technical assistance is required.

Operating Problems	Probable causes
No suction	1, 2, 3, 4, 5, 6, 7, 8, 9
Insufficient pressure on delivery	10, 11, 12
Motor overload	13, 14
Noise	15, 16, 17
Vibrations	17, 18, 19, 20
Leaks	6, 7, 21, 22, 23

Probable causes	Solutions
1 Select incorrect pump	Select the correct pump size for application. See chapter 3
2 Wrong direction of rotation	Adjust the motor rotation to right direction
3 Accessories are not properly assembled	Check and assemble accessories as instructed in chapter 8
4 Very high powder proportion	See chapter 3.
5 Excessive temperature	Lowering temperature
6 Leak in pump suction	Check the suction pipe and all its connections
7 Worn mechanical seal	Replace the mechanical seal of the blender and/or the delivery pump
8 Outlet pressure is too high	Reduce pressure. See chapter 3
9 Suction pressure is too high	Reduce suction pressure. It may be have to stop using the delivery pump. See chapter 3
10 The surface of filters is not enough, or an excessively or an excessively high proportion of solid.	Remove the mesh/Adjust the solid proportions
11 Insufficient liquid	Check the delivery pump
12 Highly viscous product or delivery height too high	Fit a lobe pump
13 Solids proportion too high to mix with mesh	Remove the mesh
14 High solids proportion	Fit a lobe pump
15 Worn motor bearings	Replace the bearings as indicated in the manufacturer's instructions manual
16 Worn blender bearings	Replace bearings; review the blender
17 Impurities inside the blender	Disassemble the blender and remove the Impurities. Check the housing, impeller, and mechanical seal
18 The blender is not at the right level	Correct the blender level and alignment
19 The impeller has been damaged	Replace the impeller
20 Blender cavitation	Reduce suction pressure or use a delivery pump
21 O-rings unsuitable for the fluid	Fit suitable O-rings after checking with the manufacturer
22 The spring tension of mechanical seal is too low	Adjust as indicated in this Manual
23 Clamp is loose	Tighten the clamp



If the problems persist, stop using the blender immediately. Contact the blender manufacturer or its local representative

## 7 Maintenance

### 7.1 General information

Same as other machine, this blender requires maintenance. The instructions contained in this manual cover the identification and replacement of spare parts. The instructions have been prepared for maintenance personnel and for those responsible for the supply of spare parts.



Please carefully read Chapter 8 Technical Specification.  
All replaced materials should be duly eliminated/recycled according to effective instruction in the area.



Make sure the power of blender is cut off before undertaking maintenance work.

#### 7.1.1. Checking the mechanical seal

Regularly check that there are no leaks in the shaft area. If there are leaks through the mechanical seal, replace it following the instructions given under the Assembly and Disassembly section.

### 7.2. Storage

The blender must be completely emptied of fluid while storage. If possible, avoid exposing the components of the pump to excessively damp environments.

### 7.3. Cleaning



The use of aggressive cleaning products such as caustic soda and nitric acid may cause burns to the skin.  
Use rubber gloves during the cleaning process.



Always use protective goggles.

#### 7.3.1. CIP cleaning (Clean-in-place)

If the blender is installed in a system with a CIP process, it is not necessary to dismantle the blender.  
If there is no automatic cleaning process, dismantle the blender as indicated in the Assembly and Disassembly section.

#### Cleaning solutions for CIP processes

Only use clear water (chlorine-free) to mix with the cleaning agents:

##### a) Alkaline solution:

1% by weight of caustic soda (NaOH) at 70°C (150°F)

1 Kg NaOH + 100 l. of water = cleaning solution  
or

2.2 l. NaOH at 33% + 100 l. of water = cleaning solution

##### b) Acid solution:

0.5% by weight of nitric acid (HNO<sub>3</sub>) at 70°C (150°F)

0.7 l. HNO<sub>3</sub> at 53% + 100 l. of water = cleaning solution



Check the concentration of cleaning solutions; which may causes damage to the blender seal.

To remove any remains of cleaning products, ALWAYS perform a final rinse with clean water on completion of the cleaning process



### 7.3.2. Automatic SIP (sterilization-in-place)

Steam sterilization is for the entire device, including pump.

Do not operate the equipment while steam sterilization.

The product/material will not suffer damage if operate following this instruction.



Do not fill cleaning liquid until the temperature of the pump is less than 60°C (140°F).

We recommend the use of a relief valve in the pipeline to ensure that the steam/superheated water sterilizes the pipeline.

Maximum conditions during the SIP process with steam or superheated water.

**a. Max. temperature:** 140°C / 284°F

**b. Max. time:** 30 min.

**c. Cooling:** Sterile air or inert gas

**d. Materials:**

- EPDM / PTFE (recomended)
- FPM / NBR (no recomended)

## 8 Dismantle to unload and install

### 8.1. Disassembly / Assembly of the blender

#### Housing and impeller

##### → Disassembly

Close the suction and delivery valves.

Remove the parts from up to down in sequence: hopper (01), clamp (02), gasket (03) and butterfly valve (04), take off the clamp (06) and then venturi tube (05), seat (07). Take off clamp (06A), disassembly Assembly part(08), and Release the four nuts with the wrench and remove them, now use hand or rubber hammer to tap pump head (12) lightly until it is removed. Loosen and remove the nut on the impeller (16) with the appropriate wrench, remove the sealing (17), beat impeller (18) lightly with a rubber hammer, until it can be rotated out and removed by hand. Please noted that the mechanical seal (20) and O-ring (19) should be on the impeller while you remove the impeller.

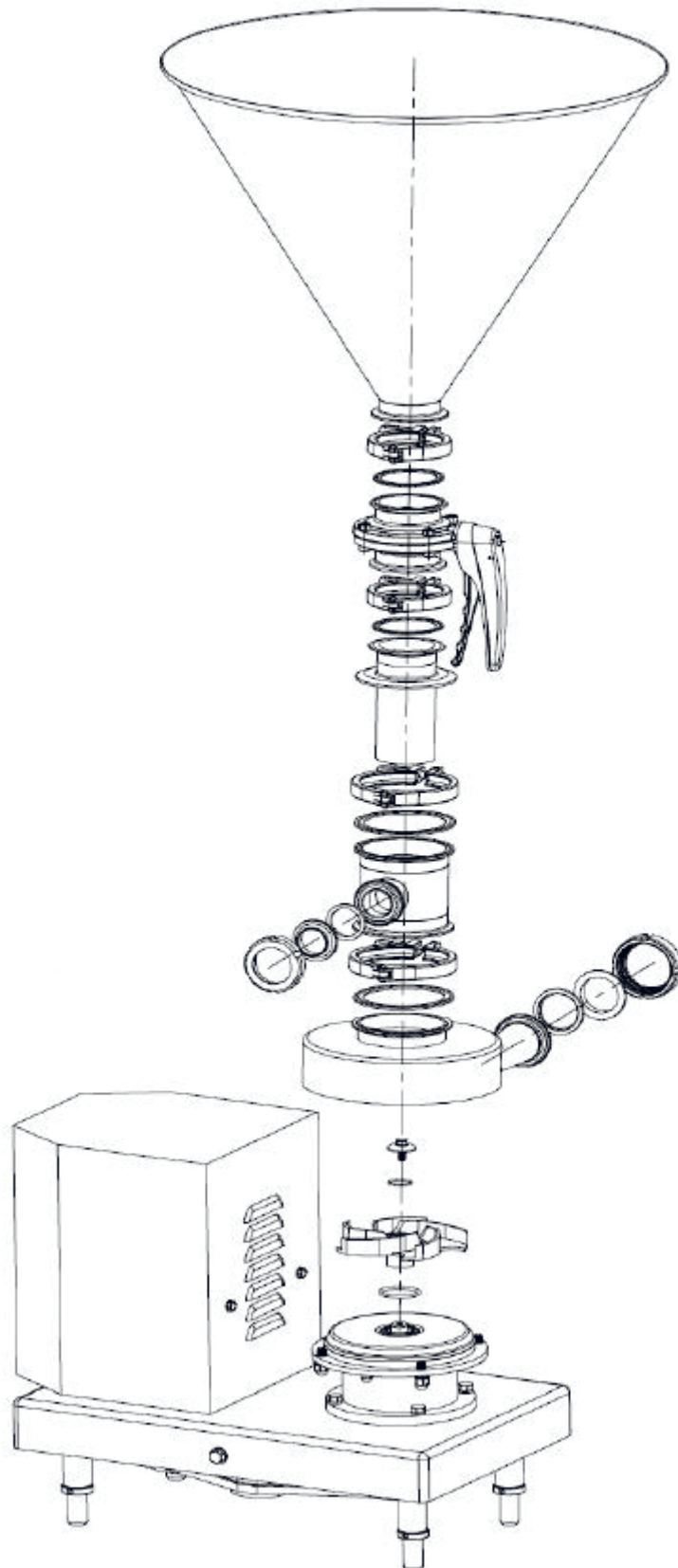
##### ← Assembly

**Note:** Make sure all seals intact Before installing the impeller and the pump head. If necessary, replace the O-rings and seals. Carefully place the mechanical seals (21,20) in the center hole of pump seat (24), install the impeller (18) to the shaft slowly by hand and tighten it, put the O-ring(17) accurately in the groove of impeller, then install the impeller nut (16) and tight with the wrench. Carefully place pump head (12) on pump seat (24), and aligning the 4 bolt holes on the bracket (25), then install pump head on the bracket and tighten the nut with the wrench. Fit gaskets (07A) and assembly part (08), and then clamp (06A) the assembly part and pump head together. Place gasket (07) and venturi tube (05) on assembly part (08) and tight it with clamp (06), clamp (02) gasket (03A) and butterfly valve (04) together, finally clamp (02) gaske (03) and hopper (01) on the butterfly valve (04) tightly.

The installation of housing and impeller is finished



Make sure to fit the distribution assembly in the right direction for smooth operation of the blender (see exploded views in Chapter 9).

**8 Dismantle to unload and install****8.1. Disassembly / Assembly of the blender****Housing and impeller**

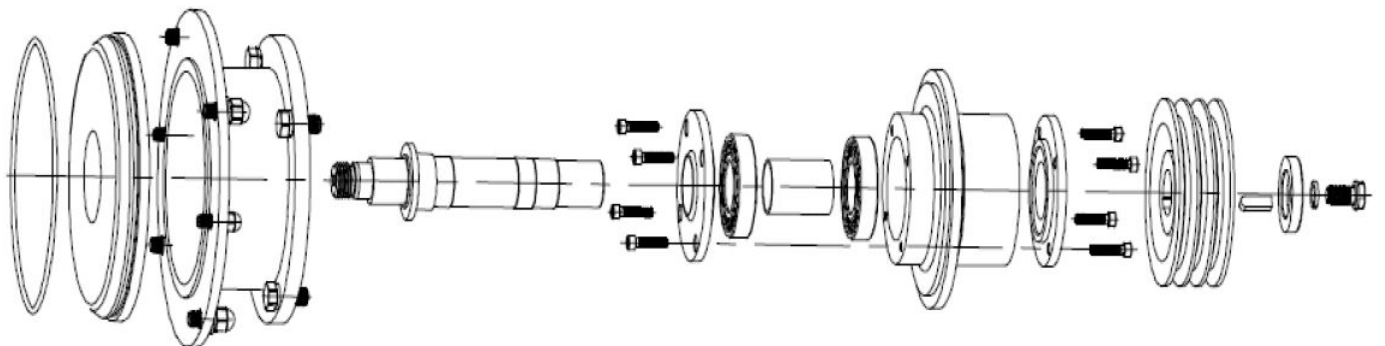
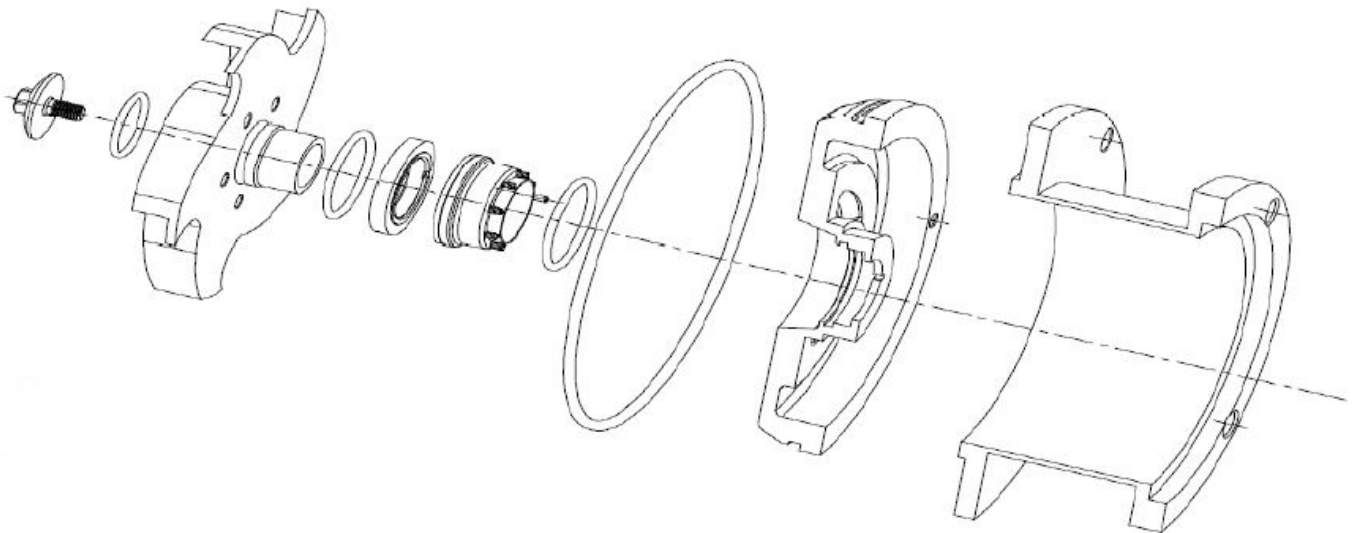


## 8.2. Pump seat and shaft

### → Disassembly

Remove stationary seal ring (21,22) from pump seat, remove O-ring (23), loose and take off units (24), gently prize open and remove the pump seat (24) with a suitable tool, remove the belt (59), take off connection bracket (25), then remove the complete set of pump shaft (36,41,44...). Loose pulley bolts (46), remove the gasket (45), lightly beat the pulley (43) with a rubber or plastic hammer until it is removed, then fix complete set of bearing (41) to the device. Next release and remove the bolt (37A), take off the bearing cover (42), release and remove the bolt (37), lightly beat the shaft (36) with rubber or plastic hammer.

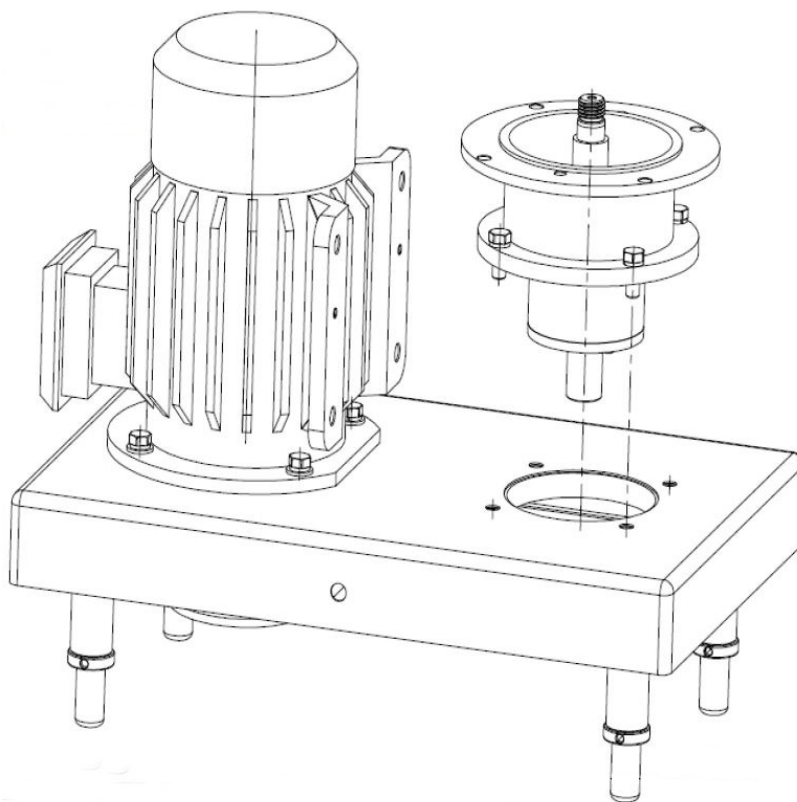
**Note:** You can only beat the side of shaft which the pulley is installed to replace the bearing or pump shaft.



## 8.2. Pump seat and shaft

### ← Assembly

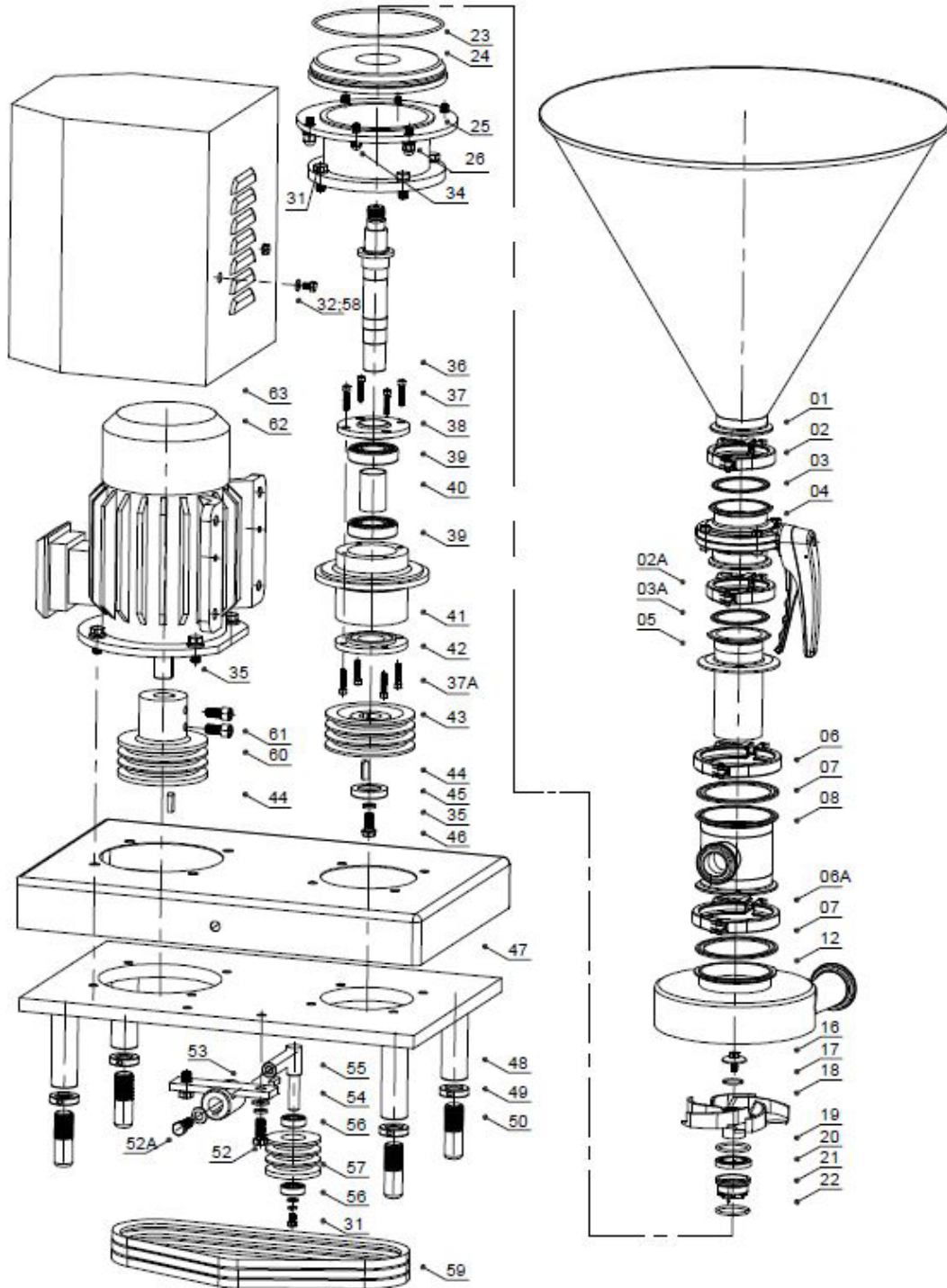
**Note:** Make sure all seals intact Before installing the impeller and the pump head. If necessary, replace the O-rings and seals. Clean the shaft (36) and coat with a suitable grease, then fix two bearings (39) and bearing bushing (40) on the shaft (36). Noted only beat by rubber or plastic hammer while fixing. Install the assembled shaft to inside of bearing seat (41), then cover the both sides by bearing cover (38,42), fix and tight the Hexagon fitted bolts (37A,37) with the wrench. Now place the entire shaft on the worktable (47), fix the connection bracket (25) on the bearing seat, then fix and tight them on the worktable with 4 bolts (31) tight 2 double-head threaded bolts (34) to the pump seat (24), then fix and tight them to the connection bracket with 2 cap-type nut (34) by wrench. Fix o-ring(23) to pump seat.





## 9 Exploded View

### 9.1. Exploded View



### 9.2. Part List

No.	Part Name	Qty	Material
01	Hopper	1	304/316L
02	Clamp	1	304
03	Gasket	1	EPDM/SILICON



## 9.2. Part List

No.	Part Name	Qty	Material
04	Butterfly Valve	1	304/316L
05	ventrui tube	1	304/316L
02A	Clamp	1	304
03A	Gasket	1	EPDM/SILICON
06	Clamp	1	304
07	Gasket	1	EPDM/SILICON
08	Assembly part	1	304/316L
06A	Clamp	1	304
07A	Gasket	1	EPDM/SILICON
12	Pump Head	1	304/316L
16	Impeller nut	1	304/316L
17	O-ring	1	EPDM/SILICON
18	Impeller	1	304/316L
19	O-ring for Mechanical seal		
20	Rotating seal ring		
21	Stationary seal ring		
22	O-ring for Mechanical seal		
23	O-ring for pump seat		
24	Pump Seat	1	304/316L
25	Connection bracket	1	304/316L
26	Bolt & nut	4	304
31	Outer hexagonal bolt	4	304
34	Bolt & nut	2	304
36	Shaft	1	304/316L
37	Hexagon socket bolt	4	304
38	Bearing cover	1	WCB
39	Bearing	2	
40	Bearing bushing	1	WCB
41	Bearing seat	1	WCB
42	Bearing cover	1	WCB
37A	Hexagon socket bolt	4	304
43	Belt pulley	1	WCB
44	Pin	2	WCB
45	Gasket	1	WCB
35	Spring gasket	1	WCB
46	Outer hexagonal bolt	1	304
47	Worktable cover	1	304
48	Worktable	1	WCB
49	Nut of worktable leg	1	304
50	Worktable leg	1	304
52	Outer hexagonal bolt	2	304
52A	Outer hexagonal bolt	1	304
53	Belt pulley support seat	1	304
54	Belt pulley support bearing	1	304
56	Bearing	2	
57	Belt pulley	1	WCB
58	Outer hexagonal bolt	2	304
60	Belt pulley	1	WCB
61	Outer hexagonal bolt	2	304
62	Motor	1	
63	Motor cover	1	304



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 [www.stursan.com](http://www.stursan.com)