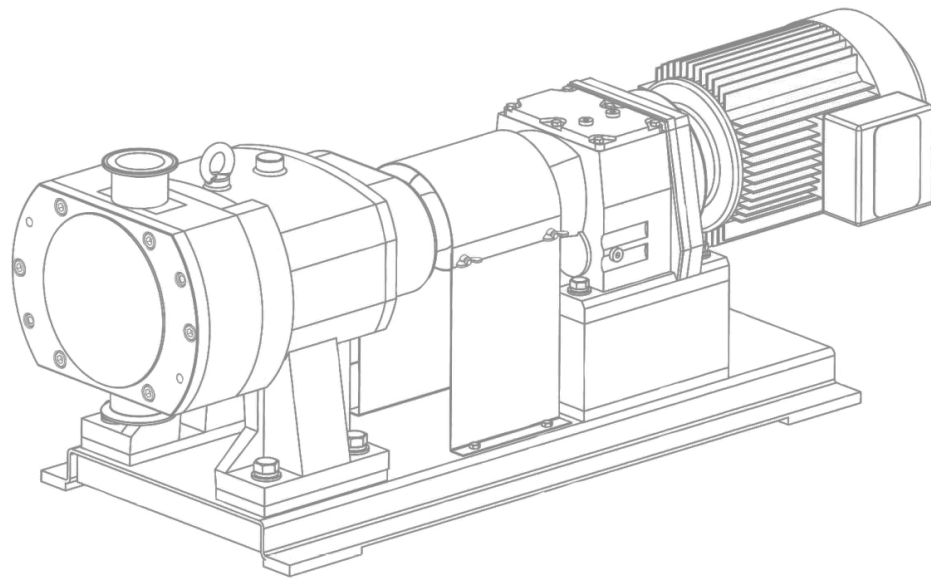




Operating and Maintenance Manual Serie LX



Sanitary Lobe Pumps

Catalogue

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1 Summarize

Manual is composed of two parts, the text part and the appendix. The text part of the manual contains the general knowledge of the storage, installation, operation and maintenance of Serie LX lobe pump. The appendix of the manual includes the special debugging of this pump and the name of spare parts.

1.2. Safety warning symbol



Warning symbol
Warning you of personal danger



Warning symbol
Warning of electrical hazard



Warning symbol
Warning of falling objects



Warning symbol
Warning the danger of mechanical injury



Attention symbol
Ensure security responsibilities



Warning symbol
Warning risk of mechanical damage

2 Safety precautions

2.1. Basic safety instructions



Before using the pump, please read this operation manual carefully and save the manual in the pump working area for easy viewing.
All pump-related work require careful operation by experienced person

2.2. Application range

- Serie LX lobe pumps are commonly used in food, pharmaceutical, biopharmaceutical, daily chemical and CIP applications
- Serie LX lobe pumps are available in different operating temperature and pressure range depending on different design and model
- Serie LX lobe pumps need choose suitable mechanical seal material according to different media

2.3. Common error operation



Improper media may cause damage to the pump
Impurities present in the media may cause the pump to get stuck or even be damaged

2.4. Safety instruction for pump



- Exceed the working pressure range or exceed the working temperature range
May cause explosion or leakage of pump, resulting in personal and property damage



- Running without medium
Pump is strictly prohibited to run without medium.
If using double mechanical seal, it is allowed to run without medium for a short time.
If using single mechanical seal, short time dry rotation may also cause damage to the mechanical seal.



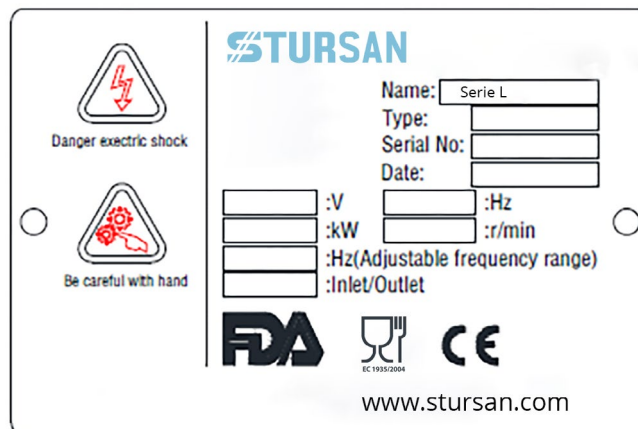
- Pump surface high temperature
It will cause high temperature after pump running, do not touch, it will hurt you
Check the surface temperature before touching pump.



- Revolution speed of pump

Model	Suggested speed	Max speed
LX-15	10rpm-720rpm	720rpm
LX-25		
LX-40		
LX-50	10rpm-500rpm	500rpm
LX-60		
LX-65		
LX-75		
LX-80		
LX-100		
LX-125	10rpm-350rpm	350rpm
LX-140		

2.5. Name plate



2.6. Warning sign

Please set warning sign in the pump working area

2.7. Waste treatment

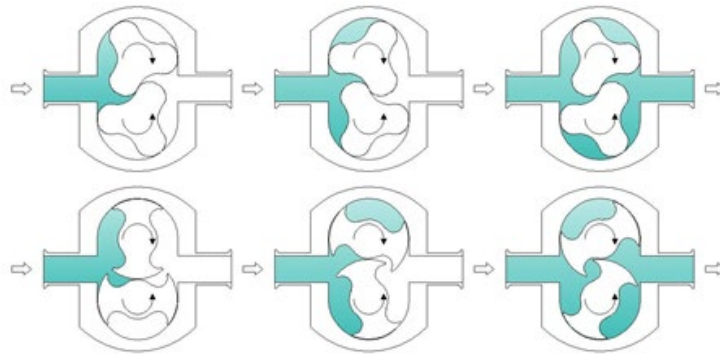


Please follow the relevant regulations to dispose of the disassembled waste

3 Structural feature and working principle

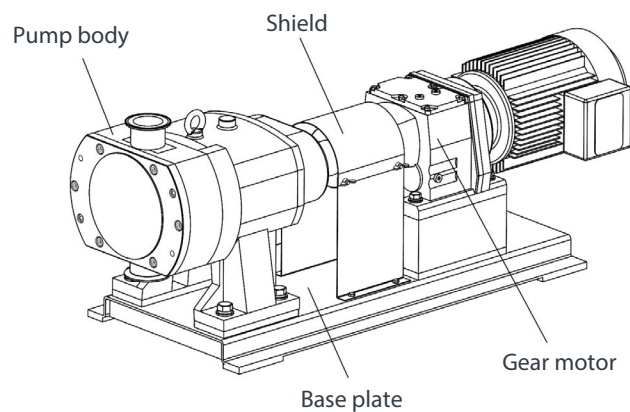
3.1. Working principles

The Lobe pump relies on two synchronous and counter-rotating rotors. When the rotor rotates, the cavity formed by the rotor and the rotor box will transport the medium from the inlet end to the outlet end. A certain suction force will be formed in the inlet end as the medium is continuously transported away. The suction force continuously sucks the medium into the pump cavity, so that the medium is continuously transported out. As shown below:

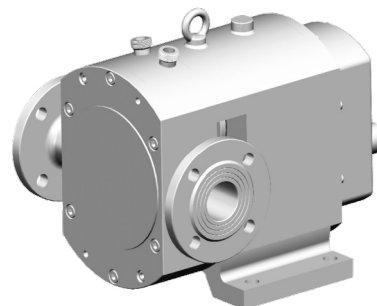


3.2. Basic structure

- Figure 1
 - A. Serie LX lobe pump
 - B. Coupling and coupling over
 - C. Gear reducer & motor



- Figure 2
 - Part#1 Front cover of pump
 - Part#2 Pump Body
 - Part#3 Bearing housing
 - Part#4 Back cover gear box
 - Part#5 Drive shaft



- Coupling
 - Coupling use to connect motor shaft and pump drive shaft (Part #5)

- Gear reducer or motor
 - The motor is fixedly mounted on the base plate using a fixed speed or variable speed motor

3.3. General configuration

- Single mechanical or double mechanical seal (double mechanical seal recommended)
- Horizontal or vertical inlet and outlet direction



3.4. Model

Model	LX15	LX25	LX40	LX50	LX60	LX65	LX75	LX80	LX100	LX125	LX140
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3.5. Model Description

LX40S-1200EBY&-S16RG

PUMP SIZE	LX15	LX25	LX40	LX50	LX60	LX65	LX75	LX80	
PORTS SIZE	S: Standard ports	R: Reduced ports	L: Enlarged ports	H: Hopper (rectangle)					
PORTS TYPE	1: DIN 11851	2: SMS	3: DIN 11864-1-a	4: FLANGE DIN 11864-2	5: CLAMP DIN 11864-3	6: CLAMP DIN 32676	7: CLAMP BPE	8: CLAMP ISO 2852	X: Other requirements
MECHANICAL SEAL	1: Double, flushed SiC/SiC primary, c/SiC secondary	2: Single SiC/SiC	3: Special design for chocolate	4: Double, flushed TC/TC primary, TC/TC secondary	5: Single TC/TC	7: Single flushed SiC/SiC	8: Single flushed TC/TC		
ROTOR	0: Tri-impeller	1: Butterfly (scimitar)	2: Bi-wing	3: Single butterfly	4: 2-leaves	5: 5-leaves	6: 6-leaves		
END COVERS	0: Plain	1: Pressure relief valve	2: Pump head jackets heating/cooling G3/4"H	3: Relief valve and pump head jackets G3/4"H	X: Other requirements				
PUMP ORING ELASTOMERS	E: EPDM	F: FKM							
OTHER OPTIONS (POSITION AND DRAINAGE)	: Horizontal pump with upper drive shaft	B: Horizontal ports/botton shaft drive	D: Horizontal ports & drainage 3/4"	C: Horizontal ports & drainage 3/4" / botton shaft drive	U: Vertical ports & self-drain rotor case				
OTHER OPTIONS (POLISH)	: Mechanical polish 0,8 microm	Y: Electro-polish to 0,5 micron	Z: Internal polish & electro-polish to 0,5 micron						
OTHER OPTIONS (CERTIFICATIONS)	: CE/1935/2004	&: Special certification							
OTHER OPTIONS (SPECIAL MATERIAL)	: AISI 316L material	S04: Aisi 304 material	S16: Aisi 316 material						
OTHER OPTIONS (SMALL GAP)	: Standard GAP	RG: Small GAP							

Basic part number 316L with standard ports and Upper Shaft / polish to 0.8 micron

4 Transportation

- ! Trained person are required to transport the pump
The complete set pump can be handled by forklift or crane

4.1. Safety instructions

- Be careful to drop or unfixed parts that can cause severe abrasions.
- Do not remove the inlet and outlet end caps of the pump until the piping is connected.

4.2. Forklift transportation instructions

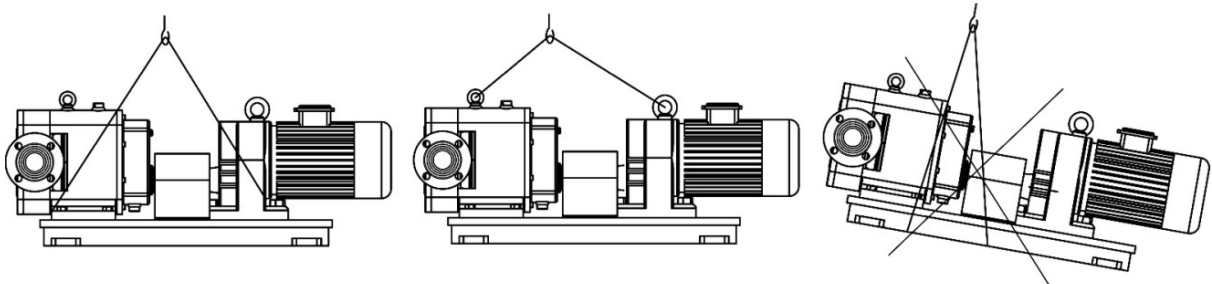


- Pay attention to parts falling, which may cause serious injury and bruises on your hands and feet. To prevent rollover during transportation, use a conveyor belt or bolt to fix the plate

4.3. Crane transportation instructions



- «**Warning**», pay attention to parts falling, which may cause serious injury, bruises and even death. To prevent falling during transportation, use a suitable lifting tool
- Do not transport the complete set pump only through pump head or the swinging ring of motor. Because the swinging ring of pump head & motor are not designed according to the weight of whole pump.
- Make sure nobody stay under pump
- Correct hoisting method



5 Store

5.1. Storage environment of the pump



- The pump shall be stored according to the following procedures:
 1. Drain the pump medium and keep it dry. Store it in a dry environment
 2. Storage temperature should not be too high or too low, suitable for storing temperature is 20 °C to 25 °C (normal temperature)
 3. The storage environment shall be ventilated and dust-free
 4. All parts of the pump are required to rotate regularly (three months)

5.2. Long-term storage

- If the storage time is more than six months, please follow the following procedures:
 1. Before storing the pump, remove the mechanical seal and store it independently.
 2. Add lubricating oil to the gear box, and the gear should be completely immersed by lubricating oil

5.3. Restart to use

- After storage, please check the mechanical seal and lubrication oil before restart to use.



6 Installation and use procedures

6.1. Installation safety instructions

- ! Make sure that each part is fixed during installation, falling parts may cause damage to the pump, as well as injury to personnel
- Please wear labor protection shoes when installing
- Fix bolt according to the specified torque, please check 11.1 (Bolt Fixed Torque Table)
- Use a torque wrench

6.2. Precautions for pump installation

- ! Confirm the installation environment of the pump, explosion-proof pump should be used in the explosion-proof environment
- The environment must be dust-free
- Working environment temperature at -20°C to 40°C
- The installation platform must be strong enough to support the whole pump
- The installation platform must be horizontal
- Sufficient maintenance space must be guaranteed
- Ensure the air circulation of the installation environment and promote the heat dissipation of the motor

6.3. Reduce noise and vibration

6.3.1 Main measures

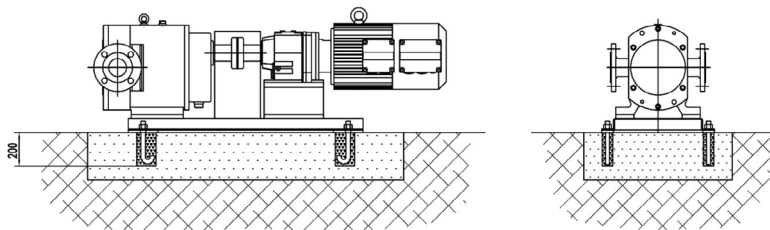
- Operate in optimum working conditions to avoid cavitation
- Avoid resonance of inlet and outlet pipeline
- Fix inlet and outlet pipelines

6.3.2 Auxiliary measures

- Isolation measures can be used to isolate noise, such as sound insulation coverage, space isolation, etc

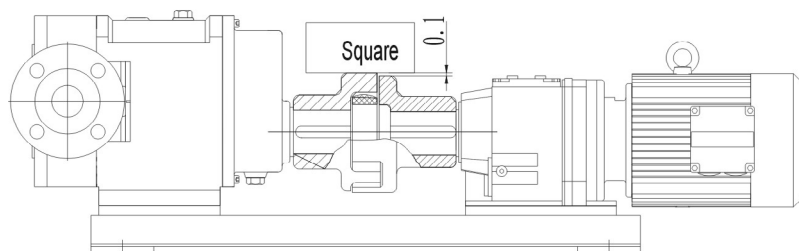
6.4. Installation method

- Use base mounting to install the pump, and the pump is mounted on a fixed mounting platform
- Use base mounting to install (with adjustable support foot), the height of the support foot can be adjusted freely to ensure the stable installation of the pump



6.5. Coupling installation

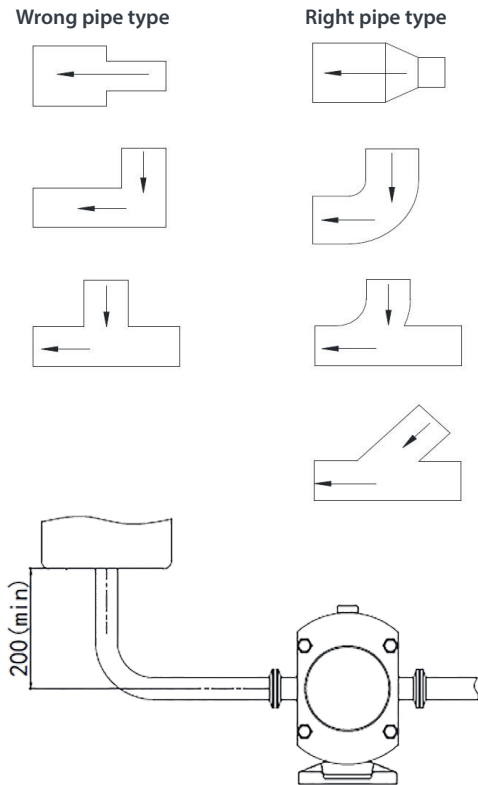
1. Check the center deviation and angle deviation between the drive shaft of the pump and the motor shaft



2. Adjust the coaxiality of the shaft so that the two shafts are aligned

6.6. Pipeline installation

- Reduce pipe resistance as much as possible and avoid to use unnecessary elbows and valves
- When designing piping connection, try to avoid causing pressure loss and avoid cavitation caused by inhalation end
- The inlet and outlet control valves should be as close as possible to the inlet and outlet end
- Inhalation end pipeline should be as short as possible
- The inlet end pipeline should be installed horizontally to reduce the possibility of residual air in the pipeline
- Design pipeline reasonably according to pressure, temperature and medium characteristics
- Avoid stress from pipes to pumps (pipes must be supported independently)
- In order to ensure stable operation and prolong the service life of lobe pump, the liquid level must be higher than pump inlet about 200mm, otherwise it will easily cause pump mechanical seal dry mill or damage.

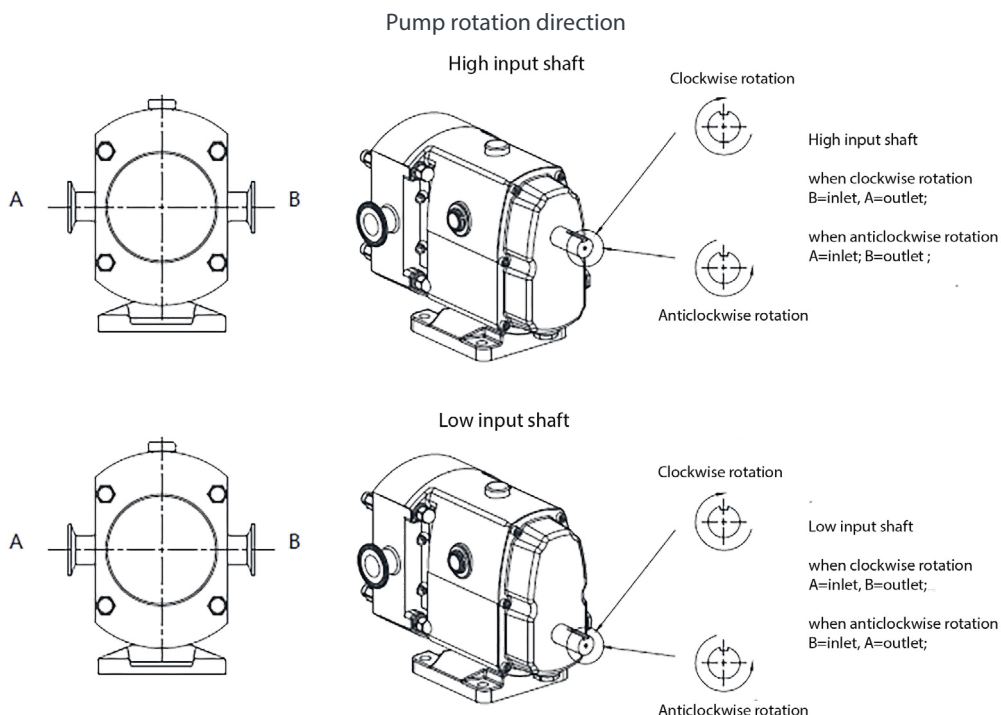


6.7. Electric Power Installation



- «**Warning**» Attention should be paid to using ground wire to connect pumps to eliminate static electricity
- Electrical connections need to be completed by qualified electrical engineers
 1. Check motor nameplate to confirm rated power, rated voltage and wiring mode
 2. Follow the wiring diagram in the Motor junction box to connect the electricity
 3. Click start motor with less than 1 second and check motor rotation direction
 4. Rewiring is required if the rotation direction is wrong

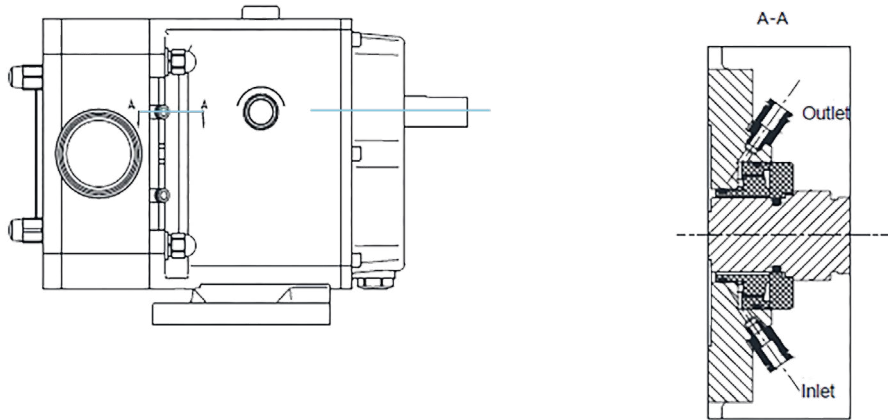
Note: Pay attention to the direction of rotation when the rotor pump is installed and debugged.
The rotor pump input shaft has two types: high-position input shaft and low-position input shaft.





6.8. Water Flushing Pipeline Connection (Double Machine Seal)

- Pumps with double mechanical seals must be connected to water flushing lines and supplied with cooling water



- It is recommended that the flushing water should be entered from below and discharged from the top

6.9. Cleaning



1. Before cleaning, make sure there is no impurities in the pump chamber and pipeline
2. Confirm that the pump is in the stop state
3. Connecting the pipeline
4. Before the first use, please thoroughly clean the pump and pipeline

7 Running Operation

7.1. Safety Instruction



- Please confirm outlet valve has been opened when turning on pump and in operation. In order to avoid overhigh outlet pressure, it could be added with bypass line or safety valve etc. protective measures
- Please confirm inlet valve has been opened when turning on pump. If inlet valve is closed, will be occurred with idling, and mechanical seal will be damaged



- Please confirm pump chamber has been full filled with liquid before turning on pump. If without liquid in pump chamber, will be occurred with idling, and mechanical seal will be damaged

7.2. Advance Preparation



1. Double mechanical seal: to confirm cooling water has been connected .
Note: cooling water temperature <70 °C; to adjust the pressure of wash water <1bar
2. To open inlet valve
3. To open outlet valve
4. Waiting for a while, to confirm the pump chamber and inlet pipeline has been full filled with liquid
5. Start motor

7.3. Observe Operation

Safety Instruction in pump operation:

- Pump was stuck or damaged: there might be with impurity in your media
- It's prohibited to close outlet valve in pump operation, if not, will be caused with moment overhigh pressure and damage on pump
- It's prohibited to close inlet valve in pump operation, if not, will be caused with cavitation and idling and damage on mechanical seal

7.4. Finish operation

1. To turn off motor
2. To close inlet valve, to avoid idling in next operation
3. To close outlet valve

8 Cleaning

8.1. CIP Cleaning

- Serie LX pump is supported with CIP cleaning

CIP Cleaning Solvents

Only mix the cleaning solution with clean (chlorine-free) water

a. Alkaline solution:

1% Caustic soda T70°C(150°F)

1kg NaOH + 100 L Water=Cleaning Solvents

2.2L 33% NaOH + 100L Water=Cleaning Solvents

b) Acid solution:

0.5% Nitric acid(HNO₃) T 70°C(150°F)

0.7L 53% HNO₃ + 100L Water=Cleaning Solvents

- Controlling the concentration of detergent may cause damage to seals

8.2. SIP Cleaning



- **Note:** Do not turn on pump in SIP sterilization, idling will be caused with damage on mechanical seal
- Allow with max. steam temperature 145°C

9 Common Fault and Removal

- See appendix 11.3 (Common Fault and Removal)

10 Maintenance

- See appendix 11.2 (Maintenance Periodic Table)

10.1 .Safety Instruction



- To confirm the motor has been turned off and powered off when touch pump
- Please wear safety shoes, to avoid unnecessary damage
- To close inlet and outlet valve
- Double mechanical seal pump: to switch off wash water
- To fully discharge liquid in pump chamber before separating pump

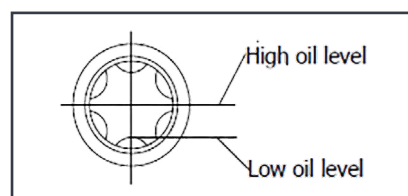
10.2. To inspect wash water (double mechanical seal)

If choose double mechanical seal pump:

- To inspect wash water pressure <1bar.
- To confirm wash water temperature <70 °C

10.3. Check the oil level

- To see the height of oil level by sight glass, to confirm oil level is within normal range.

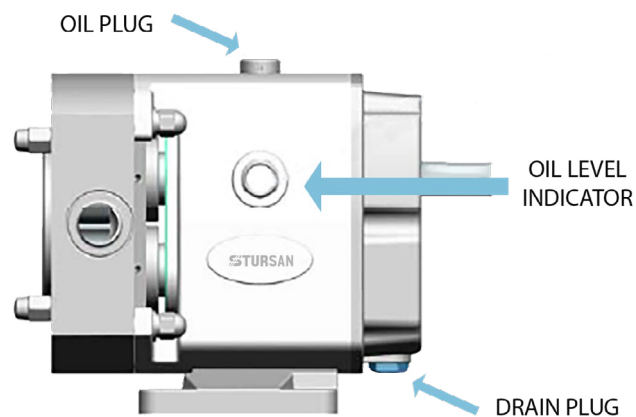




10.4. Change oil

- Change the oil after the first 150 hours of use
- To replace lubricating oil regularly: every 6 months or 2000 hours.
- Extreme condition such as high temperature, humid environment: every 1000 hours.
- Recommended brand: Mobil, Shell
- Recommended oil model: ISO VG320

Ambient Temperature	Oil Grade
-18°C to 0°C (0°F to 32°F)	EP 150
0°C to 30°C (32°F to 86°F)	EP 220
30°C to 80°C (86°F to 180°F)	EP 320



10.5. To replace mechanical seal

Need to replace mechanical seal in the following situation:

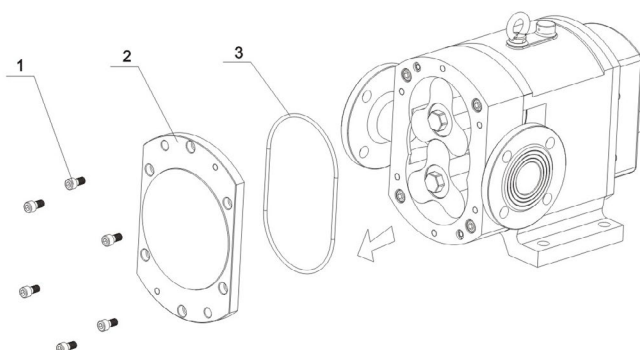
- When conveying media, with leakage
- When conveying media, with leakage of wash water
- When conveying media, wash water was into conveying liquid

Please refer to the chapter of disassembly and installation of pump head - mechanical seal, when to replace.

10.6. Disassembly of the rotor pump head

10.6.1. Front cover disassembly

1. Remove the front cover nut (part 1), remove the pump front cover (part 2), and the front cover O-ring gasket (part 3)



10.6.2. Rotor disassembly

1. Use a plastic rod to clamp the rotor (as shown in the figure), remove the lock nut (part 4),

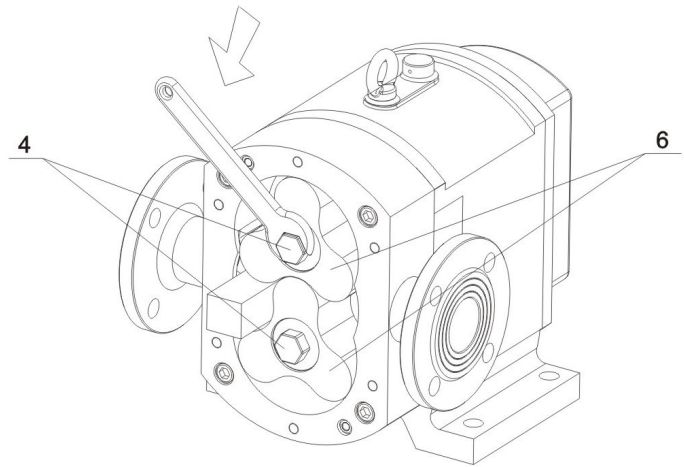
Attention:

The nut on the drive shaft must be removed in a counterclockwise direction.
The nut on the driven shaft must be removed in the clockwise direction.

Warning:

The rotating screw may cause injury to hands

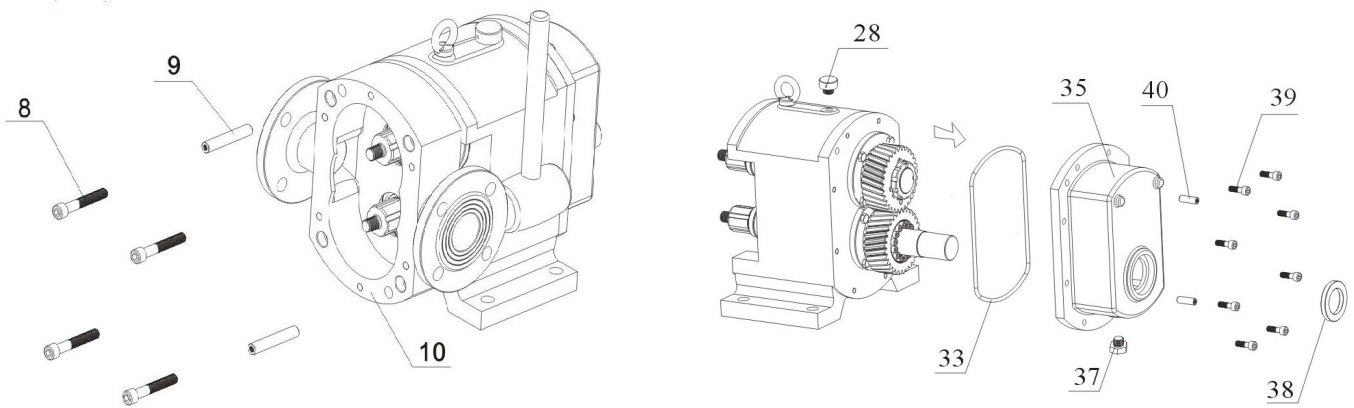
2. Remove O-ring gasket (part 5), rotor (part 6), O-ring gasket (part 7) in turn



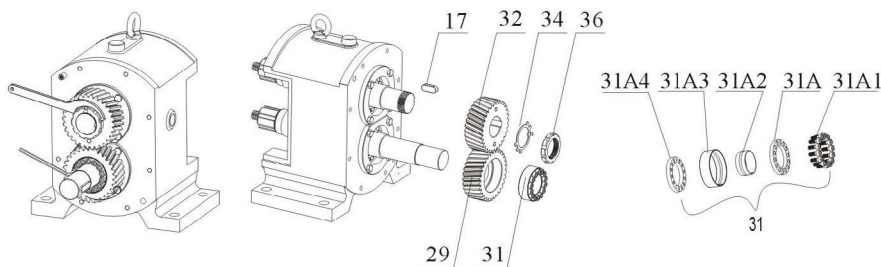
10.6.3. Rotor box disassembly

1. Using an open-end wrench, remove the nut, remove the elastic gasket and the flat gasket

2. Remove the rotor box, and remove the adjusting gasket



Disassembling of gear



1. Screw out gear lock nut (36) with spanner.
2. Pull out lock washer (34).
3. Unload bolt (31A1).
4. Pull out ring (31A) with bolt.
5. Take out gear (29) (32).
6. Take out flat key (17).



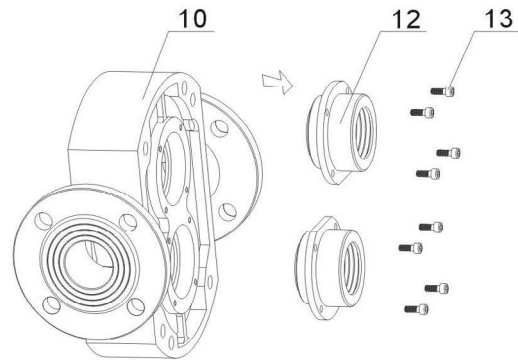
10.6.4. Disassembly of mechanical seal

Disassembling of mechanical seal

Keep using if there is no damage in mechanical seal.

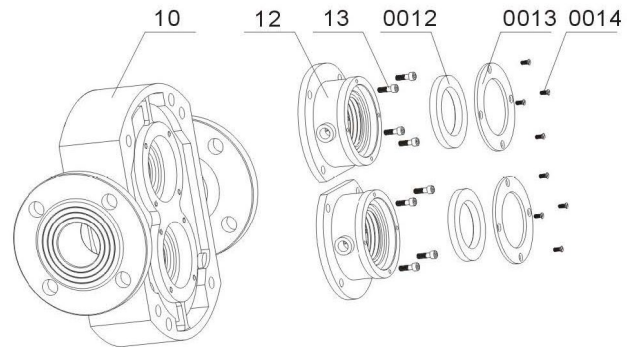
Disassembling of breech-loading mechanical seal

1. Unload bolt (13).
2. Unload mechanical seal seat (12) from pump body (10) and take out rotor ring, rotor ring O-ring and rotor ring shim. Better not to dismantle the stator ring and other components (need to clear it with water if necessary). If the stator ring is worn, replace it an O-ring.



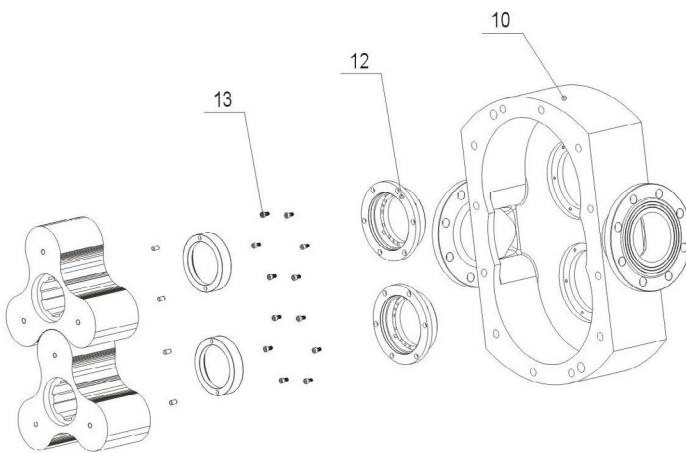
Disassembling of water lubrication and oil flush mechanical seal

1. Unload bolt (13).
2. Unload mechanical seal seat (12) from pump body (10) and take out rotor ring, rotor ring O-ring and rotor ring shim. Better not to dismantle the stator ring and other components (need to clear it with water if necessary). If the stator ring is worn, replace it an O-ring.
3. Check lip seal (0012) in mechanical seal seat, if damaged, screw out bolt (0014), unload seal seat gland (0013), replace lip seal.

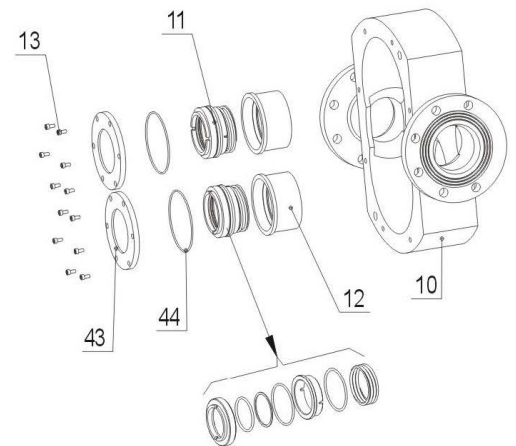


Disassembling of water lubrication and oil flush mechanical seal

1. Muzzle-loading mechanical seal divided into two type: rotor ring fixed in rotor hole and rotor ring in seal seat.



(Rotor ring is in rotor)



(Rotor ring is in mechanical seal seat)

2. Unload bolt (13).
3. Unload mechanical seal seat gland (43), O-ring (44) and seal seat (12) from pump body (10). Better not dismantle the stator ring and other components. If the stator ring is worn, replace it and O-ring.

10.7. Screw pump head assembly

Preparing before assembly

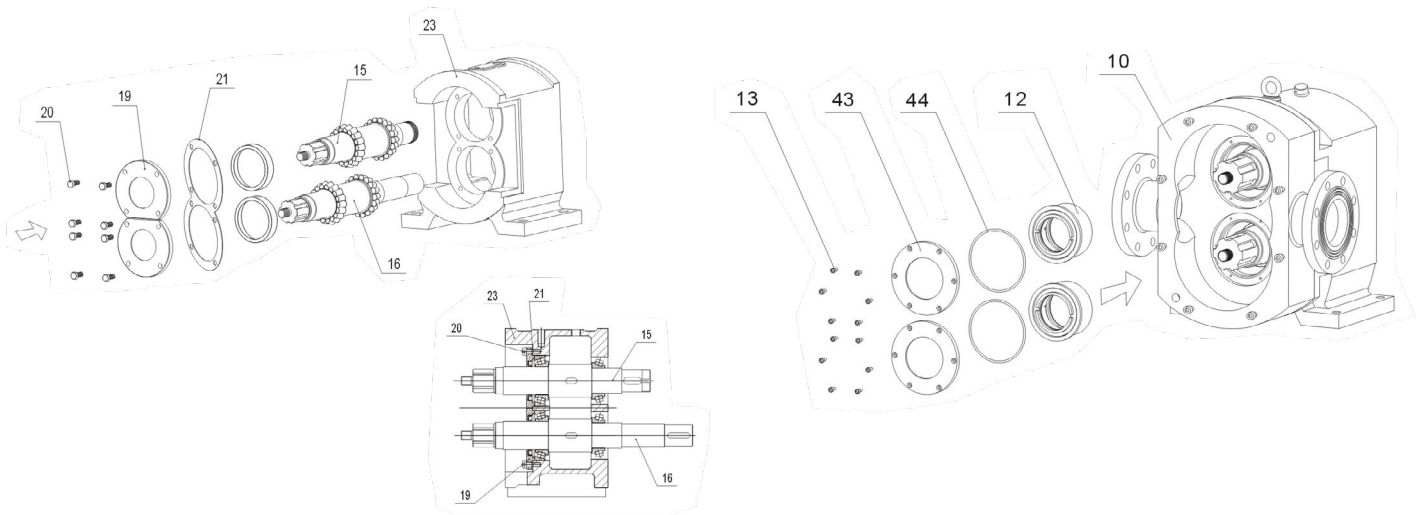
- Cleaning the component
- If there is some part to replace
- Please note that it should be assembled in a clean environment while the mechanical seal is easy to be damaged
- Please use water or lubricating grease to clean the mechanical seal before assembly
- Please do not touch after cleaning

10.7.1. Mechanical seal assembly

In accordance with the disassembly steps of the mechanical seal can be installed after the reverse. (Mechanical seal structure refer to mechanical seal structure diagram)

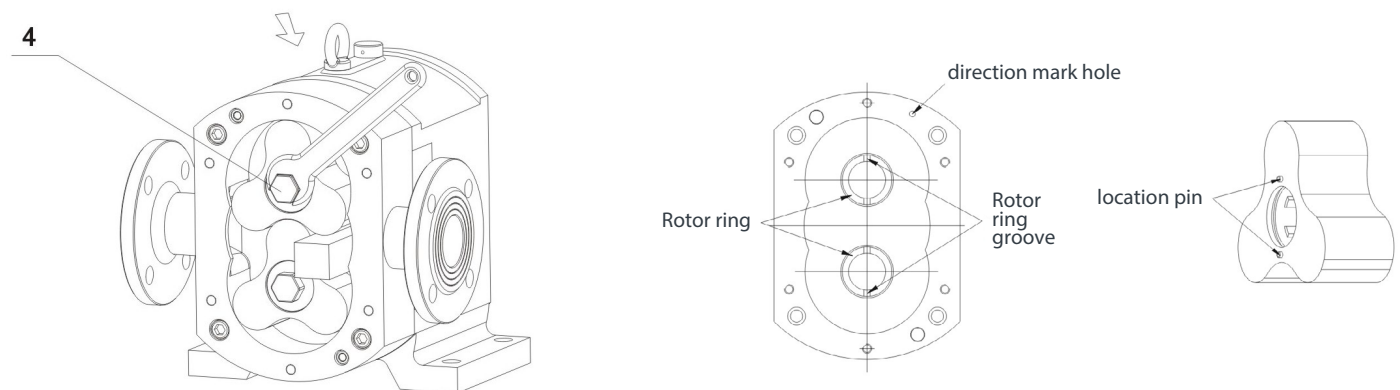
10.7.2. Rotor box installation

- Follow the rotor box disassembly steps and assembly reversely



10.7.3. Rotor installation

1. Install O-ring gasket (part 7), rotor (part 6), O-ring gasket (part 5), cam lock nut (part 4) into the pump shaft in turn.
2. Insert a plastic rod or wooden stick into the position shown in the figure to block the rotor, and use a wrench to tighten the cam lock nut (part 4)



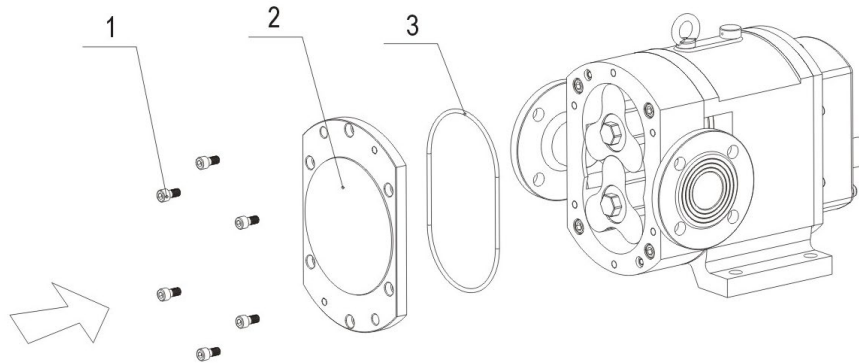
Attention:
Tighten the nut on the drive shaft in the clockwise direction;
Tighten the nut on the driven shaft counterclockwise.

Before tightening the nut, check the rotor clearance, see Chapter 10.7.5



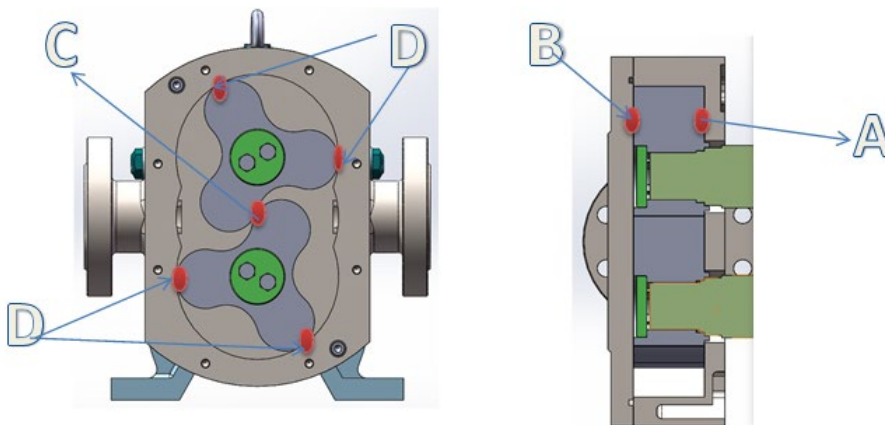
10.7.4. Install the pump front cover

1. Put the O-ring gasket into the sealing groove of the front cover
2. Install the front cover
3. Tighten the front cover and fix nut



10.7.5. Checklist for rotor clearance

Check the rotor clearance according to the following table



Pump Model	Rotor and pump body behind (A)	Rotor and pump cover (B)	Between rotors (C)	Rotor and pump side (D)
LX15	0.13 — 0.17	0.13 — 0.17	0.18 — 0.22	0.13 — 0.16
LX25	0.13 — 0.17	0.13 — 0.17	0.24 — 0.30	0.13 — 0.17
LX40	0.13 — 0.17	0.13 — 0.17	0.24 — 0.30	0.13 — 0.17
LX50	0.16 — 0.20	0.16 — 0.20	0.30 — 0.36	0.16 — 0.19
LX60	0.17 — 0.21	0.17 — 0.21	0.30 — 0.36	0.18 — 0.22
LX65	0.18 — 0.22	0.18 — 0.22	0.33 — 0.37	0.18 — 0.22
LX75	0.18 — 0.22	0.18 — 0.22	0.34 — 0.38	0.23 — 0.27
LX80	0.23 — 0.27	0.23 — 0.27	0.38 — 0.42	0.28 — 0.32
LX100	0.28 — 0.32	0.28 — 0.32	0.38 — 0.42	0.31 — 0.35

11 Appendix

11.1. Bolt torque

Tighten the bolt and nut torque $\pm 15\%$

Nut/bolt	M6	M8	M10	M12	M16	M20
Torque NM	7	18	36	63	143	262

11.2. Maintenance period

Maintenance period	Applicable working condition	Maintenance operations	Detail Information
Routine maintenance	All working conditions	Check lubricating oil level	Refer to 10.3
Routine maintenance	Double mechanical seal	Check the rinse solution	Refer to 10.2
1000 hours	Extreme operating condition	Replace the lubricating oil	Refer to 10.4
2000 hours	Normal working condition	Replace the lubricating oil	Refer to 10.4
According to requirements	All working conditions	Replace the mechanical seals	Refer to 10.5

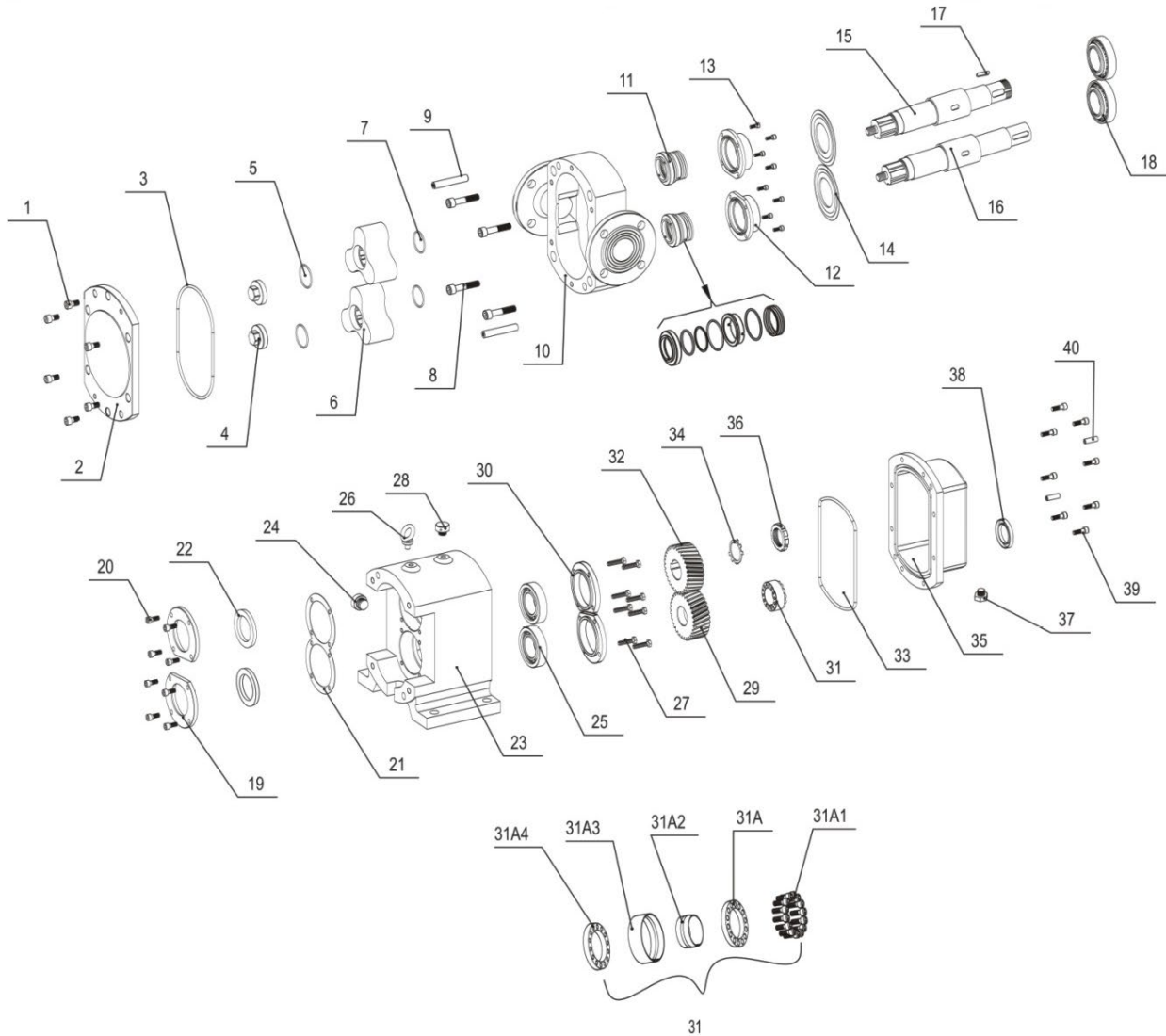


11.3. Common operating problem and troubleshooting

Operating problems	Usual causes problems	Solutions
No flow rate or flow rate instability	The pump cavity is not filled with liquid	Fill up with liquid
	The outlet valve is closed	Open the outlet valve
	The inlet pipe is closed or blocked	Open the inlet pipe or clean
	Inlet pipe leaking and pump cover leaked into the gas	Repair of inlet line and replace the pump cover o-ring
	There is retention gas in the inlet pipe	Raise the inlet line so that there is no gas in the pipe
	The pump is stuck	Clean the pump cavity and check for foreign bodies
	Wrong operate direction	Adjust the motor rotation direction
	The viscosity of the media is too high to be sucked	Increase the diameter of the inlet pipe and shorten pipe
Flow rate is high	The type of pump is too large	Contact Stursan
	The revolving speed is too high	Reduce the revolving speed
Flow rate and head is too low	The type of pump is too small.	Contact Stursan
	Leakage at the suction of the pipe or pump	Check and repair piping
	The media is hard to flow because of the high viscosity	Increase the diameter of the inlet pipe and shorten pipe
	Lobe spacing is over because of the wear	Repair or replace the screw
	Low revolving speed	Improve revolving speed
	The installation position is over than the suction capacity of pump	Reduce the sucked height and sucked resistance of the pipe
Mechanical noise	There are hard objects in the pump cavity	Eliminate foreign body
	Pump overload or lack of lubrication resulting in gear wear	Check, repair or replace the gear
	The revolving speed is too high	Contact Stursan
	Suction pipe obstructed	Check and clear blockages
Shake	Pipe weight and pressure act directly on the pump	Add pipe holder to eliminate resonance
	Wrong assembly for the coupling	Adjust coupling coaxiality
	Not enough strength for the baseplate	Strengthen the baseplate
Temperature of the pump gearbox is too high	Damaged bearing	Replace the bearing
	Lack of lubricating oil	Fill up with oil or change oil
	Wrong assembly for the coupling	Adjust coupling coaxiality
The shaft power increased suddenly	The back pressure of the outlet is too high (low flow rate)	Increase the outlet pipe diameter
	The viscosity of the pumped medium is too high	Contact Stursan
	Bearing or motor is damaged	Check and repair
Mechanical seal leaked	Damaged mechanical seal (wear)	Replace the mechanical seal
	Mechanical seal rotate with out lubrication, the medium's temperature is too high.	Suggest to use double mechanical seal
	Mechanical seal is corroded	Contact Stursan
	The flushing circulation run with out lubrication because of blocked pipe.	Check and repair

11.4. Exploded view and parts list

Please check the below breackdown drawing carefully before disassembling.

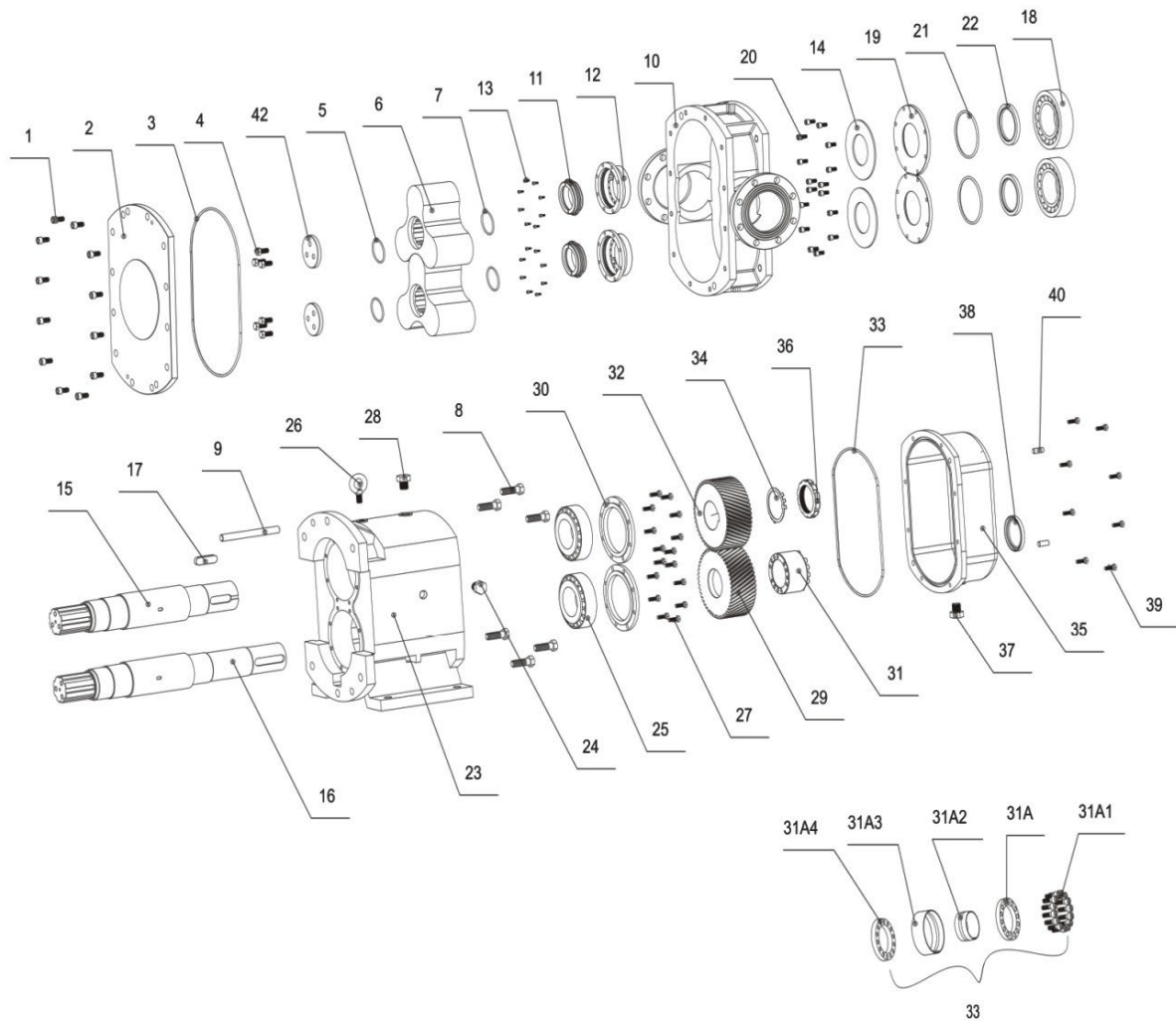


Breakdown drawing 1 (breech-loading mechanical seal)

- | | | | |
|-------------------------|--------------------------|------------------------------------|------------------------------|
| 1. Bolt | 11. Mechanical seal | 21. Seal shim/front end lid O-ring | 31. Lock assemblies |
| 2. Pump cover | 12. Mechanical seal seat | 22. Front end lid lip seal | 32. Gear |
| 3. Pump cover O-ring | 13. Bolt | 23. Gear box | 33. Rear tank cover O-ring |
| 4. Rotor lock nut | 14. Shim | 24. Oil gauge | 34. Lock washer |
| 5. Rotor O-ring (front) | 15. Sub-shaft | 25. Rear bearing | 35. Rear tank cover |
| 6. Rotor | 16. Main shaft | 26. Link bolt | 36. Gear lock nut |
| 7. Rotor O-ring (rear) | 17. Flat key | 27. Bolt | 37. Oil plug |
| 8. Bolt | 18. Front bearing | 28. Porous plug | 38. Rear tank cover lip seal |
| 9. Location pin | 19. Front end lid | 29. Gear | 39. Bolt |
| 10. Pump body | 20. Bolt | 30. Rear end lid | 40. Location pin |



Breakdown drawing 2 (muzzle-loading mechanical seal)

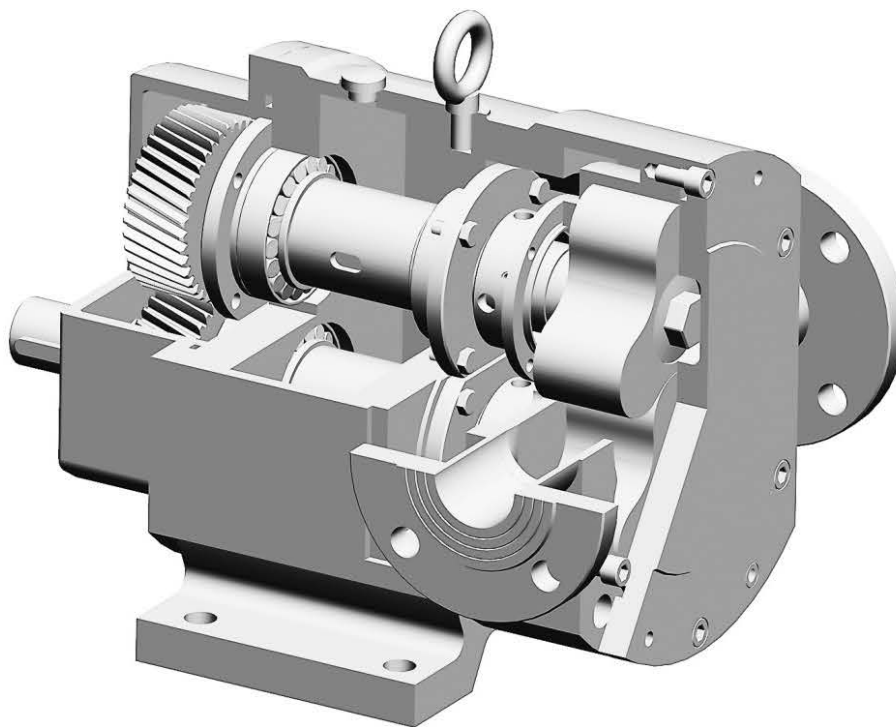


- | | | | |
|-------------------------|--------------------------|----------------------------|------------------------------|
| 1. Bolt | 11. Mechanical seal | 21. Front end lid O-ring | 31. Lock assemblies |
| 2. Pump cover | 12. Mechanical seal seat | 22. Front end lid lip seal | 32. Gear |
| 3. Pump cover O-ring | 13. Bolt | 23. Gear box | 33. Rear tank cover O-ring |
| 4. Rotor lock nut | 14. Shim | 24. Oil gauge | 34. Lock washer |
| 5. Rotor O-ring (front) | 15. Sub-shaft | 25. Rear bearing | 35. Rear tank cover |
| 6. Rotor | 16. Main shaft | 26. Link bolt | 36. Gear lock nut |
| 7. Rotor O-ring (rear) | 17. Flat key | 27. Bolt | 37. Oil plug |
| 8. Bolt | 18. Front bearing | 28. Porous plug | 38. Rear tank cover lip seal |
| 9. Location pin | 19. Front end lid | 29. Gear | 39. Bolt |
| 10. Pump body | 20. Bolt | 30. Rear end lid | 40. Location pin |

Attention:

Before disassembling pump, shut off pipe valve at the inlet and outlet of pump, drain up balance medium in the pump. If it is steam jacket pump, close steam valve also and cooling pump to ambient temperature, then disassemble pump. (Spare parts 5 and 7 are only for sanitary grade lobe pump.)

Structure drawing and main material



(diagram 7)

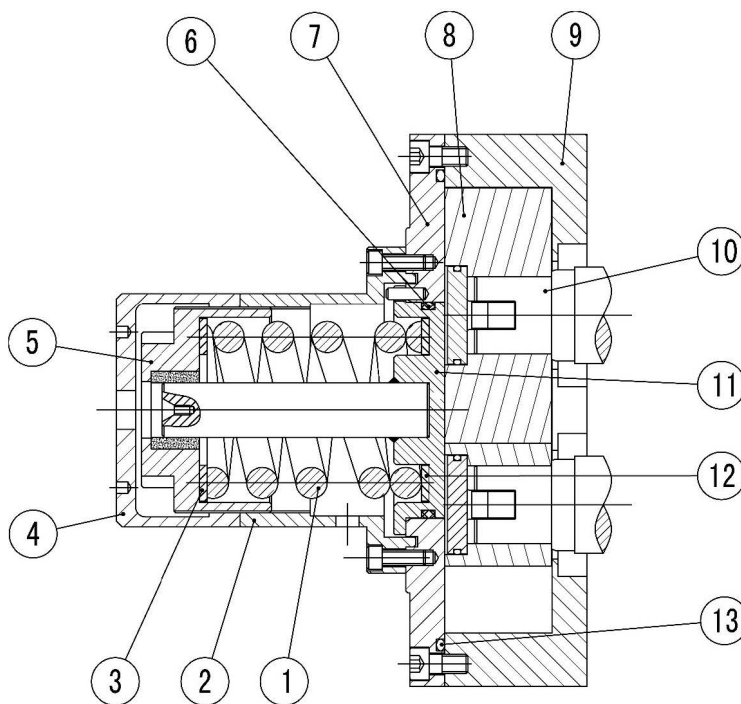
Description	Material	Quantity
Pump cover	45#/304/304L/316/316L	1
Pump body	QT400-15/304/304L/316/316L	1
Rotor	Rubber/45#/304/304L/316/316L	2
Main shaft	316-316L/42CrMo	1
Sub-shaft	316-316L/42CrMo	1
Rotor lock nut	45#/304/304L/316/316L	2
Mechanical seal seat	304/304L/316/316L	2
Gear box	HT200	1
Rear tank cover	A1	1
Front end lid	HT200/45#	2
Gear	40Cr	2
Gear lock nut	45#	1
Bearing lock nut	45#	2
Bering shim	45#	2
Set piece	45#	2
O-ring	Silicone rubber / fluororubber / EPDM / fluorine-covered rubber	1
Lip seal	Nitrile rubber / Fluororubber	3
Internal screw cylindrical pin	3Cr13	4
Bearing	Bearing steel	4
Bolt Bolt	45#/304/316	



Safety valve instruction


The safety valve is set pressure index according to customer requirement, if need to adjust pressure, please follow the operation step:


1. Screw off dust guard(4):
2. Loosen adjusting nut(5) (clockwise tighten and anti-clockwise loosen);
3. Starting pump, the show value of manometer at pump outlet is rated pressure valve this moment;
4. After confirm the rated pressure, fixing dust guard(4);
5. The range of hygienic safety valve is 0.1-1.2MPa.



1. Spring
2. Base
3. Shim
4. Dust guard
5. Adjusting nut
6. O-ring
7. Pump cover
8. Rotor
9. Pump body
10. Shaft
11. Valve core
12. Shim
13. O-ring



 info@stursan.com

 www.stursan.com

Cleaning in place (CIP) & Manual cleaning (Strip clean)

Cleaning In Place (CIP) & Manual Cleaning (Strip Clean)

In many applications, not only in the hygienic industries (food, pharmaceutical, etc.) but also in chemical and industrial duties, fast and effective cleaning is important.

Living contaminants such as bacteria and other organisms must not be introduced or allowed to multiply. All traces of fluid must be removed at the end of a batch, process or at product changeover to prevent any intermixing. To understand the features and benefits of the L & LX pumps it is important to understand why and how equipment is cleaned.

How Clean Is Clean?

In order to clean a pump or other piece of 'closed' equipment, it must either be dismantled (manual cleaning), or cleaned in place (CIP) as part of the procedure for cleaning the entire process. The higher the standard required, the more sophisticated the Cleaning process. The standard (level) of cleaning required depends on the needs of the process. There are four generally recognised levels:

Cleaning Systems

The type of cleaning system used depends partly on the level of cleaning required and on what is to be removed. Cleaning, whether mechanical or CIP, depends on a combination of:

Chemical reaction	Detergents, a cid, alkalis
Scouring action	Turbulent flow, scrubbing
Heat	Hot water
Time	Residence time for cleaning liquids in contact

Organic materials such as oils, fats and proteins need a different system to inorganic materials such as mineral salts. Detergent manufacturers can give advice on the correct use of chemicals and temperature. CIP usually needs a velocity of 1.5 m/sec (5 ft/sec) through the pipeline to achieve the turbulent flow required.

Choice Of Cleaning Processes

Manual cleaning has the advantage that special pipework and CIP equipment (tank, heater etc) are not needed. Clean in place (CIP), with the advantages it has over manual cleaning, is fast becoming the common standard in maintaining the high expectations of the customer (see Benefit of CIP table over the page).

User's requirement	Level of cleaning	Pump
To prevent intermixing of, for example, paints, dyes, inert chemicals at product change-over	Visually clean. Manual cleaning or simple CIP	L & LX
Food process for ingredients, prepasturisation, stable foods and short storage life	Hygienic, with small but acceptable levels of bacteria remaining. Rigorous manual cleaning, or ordinary CIP	L & LX
After pasteurisation medicines, unstable and long shelf-life foods, multi-product chemical facilities	Semi (pseudo) sterile No or almost no micro-organism remaining in the pump., Can only be achieved with CIP	L & LX
Sterile pharmaceuticals manufacture, bio-technology	Truly sterile. Absolutely no living organism remaining in the pump, guaranteed every time. CIP followed by SIP (sterilise in place with steam)	L & LX



Benefit of CIP	Value to te user
CIO is faster by up to 75% so saves time	Process equipment in available for production form more hours (up-time) when it is earning profits not standing idle
CIP can be controlled automatically	Less labour costs - peopple can carry out other more protective work
CIP achieves a much higher standard of cleaning if suitable pumps are installed	Equipment is cleaner and is more consistently clean. This gives much higher confidence in the process and reduces risk of product contamination. It is essential for very high levels of cleaning but only some pumps can be CIP cleaned to an acceptable standards
Pump does not need to be stripped down to be CIP cleaned	No risk of damage to parts during cleaning so less cost of spares, no chance of incorrent re-assembly so pump will always work correctly when process is re-started
Easy access to the pump is less important	Pump can be positioned anywhere, allowing more efficient use of space, shorter pipe runs and a safer working environment
High temperatures and aggressive chemicals can be used	No danger of injury to operators

Design

Most pumps with internally contacting parts (or with internal bearings) cannot generally be cleaned in place to the standards demanded by contaminant-sensitive industries. This includes most gear pumps, sliding-vane pumps etc. (including most gear and sliding vane pumps).

Also manufacturers of many older designs of lobe pumps and circumferential piston pumps, claim that their products can be CIP cleaned. This may only be partly true and is dependant on two factors; the pump design itself and the level of cleaning required by the customer.

L & LX lobe pumps are designed to be either manually or CIP cleaned to a high standard. (For more details on these features, refer to appropriate data sheets)

Crevice free shaft seals: L & LX pumps both use essentially the same shaft seals, which not only provide a bacteria tight joint but also meet the highest CIP requirements. In most rotary lobe pumps the fluid contacts the inside diameter of the shaft seals, This is an area of the pump that can be very difficult to remove product and contaminants from. In the L & LX seal, fluid only contacts the outside diameter of the seal.

Self-Draining Features: By careful attention to the shape of the rotor bores and the shaft seals, L & LX pumps can be drained of fluid prior to cleaning. Both these models can be completely emptied of CIP fluid prior to restarting the process. To achieve this, mount the pump with the inlet and outlet pipes in the vertical orientation.

Surface Finish: L & LX lobe pumps are manufactured to a high standard of internal smoothness, 0.8 μ Ra (32 micro-inches). Optional electropolishing cleans and smoothens the surfaces without reducing efficiency. A further option of mechanical polishing to a surface finish down to 0.5 μ Ra (20 micro inches) also can be specified.

External Standards: L & LX pumps are designed to the US 3A Sanitary Standards for Centrifugal and Positive Rotary Pumps for Milk and Milk Products, 02-11 as well as many customers' own internal standards for hygienic equipment. These standards specify design, dimensional, construction and material requirements.

L & LX pumps have additional features making CIP even faster and more effective, allowing the very highest standards of CIP to be achieved:

External Standards: FDA & EC 1935-2004

Procedures For Cleaning In Place

1. Rinse through system with a suitable liquid, usually water at approximately 50°C (120°F), This should be done as priority after the completion of process. It will remove the bulk of residues before they dry and harden onto surfaces.

2. If CIP cannot be carried out immediately after rinsing, then the pump and system should be left with the rinse fluid contained within.

3. Choose chemical cleaning agents to suit the nature of the contamination to be removed noting the manufacturer's recommended dilution, temperature and circulation time.

Note: do not exceed 90°C (195°F) and confirm compatibility with the construction of the pump materials before use.

4. CIP fluid flow should result in a mean pipeline velocity of at least 1.5 m/sec. (5 ft/ sec).

If using the lobe pump to circulate the CIP fluid, refer to the Performance Data Sheet for pump speed to give required flow. Remembering to take into account of pressure losses through pipework. Note that all pumps are more susceptible to cavitation when pumping hot liquids. Ensure adequate Net Inlet Pressure is available. If deciding to use a separate pump to circulate CIP fluids, the lobe pump may need to be rotated at a sufficient speed to allow the fluid to pass freely through. Sufficient pipe velocity cannot be achieved, fit a by-pass loop to divert excess flow past pump.

CIP fluid pressures must equal or exceed process pressure for all points in the system to ensure fluid reaches all contact surfaces.

It may be necessary to restrict flow in discharge pipework to achieve this. Do not exceed differential pressure temperatures shown on pump Performance Data Sheet. A minimum differential pressure of 1 bar is recommended for effective cleaning.

5. Once CIP has been completed, rinse through with neutralisers and clean water to remove all traces of cleaning agents. Important note: Do not pass cold liquid through pump immediately after hot - allow temperature to change slowly. Failure to observe can result in pump seizure.

Procedures For Manual Cleaning

See Installation, Operating and Maintenance Manual for procedures to dismantle and re-assemble fluid contact parts. L & LX pumps are not intended to be manually cleaned. However this operation can be completed by carefully following the below guidelines.

- Take care not to scratch or damage pump parts especially seal faces.

- Do not use steel abrasive wool or brushes on fluid wetted surfaces as particles may become embedded in the surface and cause corrosion.

- Use suitable cleaning agents in accordance with their manufacturer's instructions regarding temperatures, dilutions, skin contact precautions and other safety information. Thoroughly clean all fluid contact surfaces and rinse as required. As a minimum it will be necessary to remove the end cover and rotors and stationary seal faces. It should not be necessary to remove the seal rotating seats from the rotors during routine cleaning.

- This information is provided should be used as guidance only. It is the responsibility of the pump user to satisfy themselves that the CIP protocol chosen is adequate to achieve the desired levels of cleanliness.

Important notice: Jabsco cannot accept any responsibility or be liable for contamination or loss of pumped fluids.



Sterilising In Place (SIP)

Sterilising In Place

1. Rinse through system with a suitable liquid, usually water. Where truly sterile processes are required, all product contact components need to be sterilised. Normally this is achieved by heating to high temperature (up to 140°C, 285°F) to kill organisms still remaining on the surface of the equipment. This process involves physically dismantling the pump and autoclaving the parts, bagging, taking back to the pump and reassembling; a long, costly process which causes problems with personnel and can result in accidental damage to components. The benefit gained from both the L & LX pumps means no dismantling of the pump. Instead it is possible to pass steam through the complete assembly system to sterilise the internal surfaces.

To achieve 100% sterility, it is important to steam through for a reach the correct temperature and hold for the time period required to kill off the organisms. L & LX pump heads are designed to completely self drain, ensuring all surfaces are exposed to steam and the component shape and choice of materials ensures thermal stability and temperature tolerance.

Procedure

If using chemical sanitisers, follow guidelines as for CIP above.

If using steam, pump specification must be chosen at time of selection noting:
EPDM elastomers offer best resistance to repeated steam contact but will need to be changed periodically.

PTFE is least suitable for steam contact - PTFE end cover joints may need to be replaced every time the pump is sterilised.

Note: Pump should be mounted with the port axis vertical to avoid collecting liquid pools.

1. Thoroughly clean pump and process lines prior to sterilisation.

2. Pass clean, wet steam through system until all component temperatures have stabilised. Steam must be free of scale, rust and particles - a filter may be necessary.

Typically steam will be at 121°C (250°F) and 1 bar (15 psi) and soak time, to bring the pump up to temperature, is typically 20 minutes. This should be established, e.g. using thermocouples, as the required soak time will vary with individual installations.

Do not rotate the lobe pump during this heating phase.

Do not loosen or remove any pump components or pipe connections during steam sterilisation as escaping steam may cause pump damage, system damage or serious injury.

3. Continue to pass wet steam through the lobe pump and process lines during the hold time. Hold time will be determined by the user to achieve desired level of sterility. Typically this will be between 20 and 60 minutes.

To achieve sterility the lobe pump should not be rotated unless absolutely essential. The risk of pump seizure increases if rotated. All pump components will normally reach desired temperature by thermal conduction without rotating the pump.

If essential, the lobe pump can be rotated during hold time by hand - beware of danger of hot surfaces - or at a maximum of 50 rpm if the pump is fitted with either:

- Single carbon/stainless steel or carbon/ silicon carbide seals .
- Flushed or double seals provided a liquid flush, e.g. condensate, is connected and operating at a pressure above the steam pressure within the pump during SIP.

Important Note:

If the lobe pump is fitted with single silicon carbide/silicon carbide seals it must not be rotated during hold time as the seal faces can bind together.

4. At the end of hold time, pump must be allowed to cool naturally or can be purged with sterile air/inert gas. Pump must not be rotated during cooling.

5. Do not allow cool liquid to enter the lobe pump before pump temperature has fallen to 60°C (140°F) or lower.

Important Note:

If the pump is fitted with single silicon carbide/silicon carbide seals , flood it with liquid to lubricate the seals before rotating it.