



User's Manual

LPTF Series



Centrifugal Pumps

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1 Introduction

The operation instruction is applicable to all LPTF series. Before installing and operating the pump, please read carefully the instruction manual and safety instructions.

1.1. Product Application

CIP Solution, clearance, conveying with gaseous medium.

2 Safety

The operation manual includes several important basic instructions that must be observed during the installation, operation and maintenance. Therefore, the assembles, operators and maintenance workers must read the manual. Please keep the manual handy in the machine system site so as to look it up at any time. Except for the machine system site so as to look it up at any time. Except for the safety instructions under safety title and special safety tips (such as special reminder), the safety instructions under other titles also must be observed.

2.1. Marking Instruction of Operation Manual

When personal safety would be endangered for non-compliance with the safety instructions of the manual, we adopt general hazard symbols for warning.



Safety signs should be warned according to DIN4844-W9 or voltage warning signs.



Safety signs should follow DIN4844-W8

CAUTION

If it endangers the machine or function, we use CAUTION embedded in the box for warning.

The crucial warning will be directly marked on the machine, e.g.:

- Arrowhead of rotation direction
- Fluid connection sign

Please abide by these warning and keep the warning in good condition.

2.2. Personnel Qualification and Training

Personnel engaging in operation, maintenance, check and installation must have the corresponding qualifications. Scope of responsibilities, obligations and management of personnel must be clearly determined; if the personnel don't have the corresponding knowledge, they should receive training or education. If required, the machine manufacturer or distributor should provide the training.

In addition, the user must make sure that the relevant personnel fully understand the contents of the manual. Before entering ir returning to the running state, ir must abide by several instructions under the chapter titled "Put into Operation" (see [Chapter 6](#)).

2.3. Hazards for Non-Compliance with Safety Instructions

Non-compliance with safety instructions will endanger the personal safety, environment and machine, and lose the power of getting compensation.

Below are some examples causing danger due to non-compliance with safety instructions:

- Important machine/system function will break down.
- When conducts the maintenance and repair, the problems may occur.
- Personal hazard caused by electricity, machine and chemicals.
- Environmental hazard caused by leakage of hazardous substances.

2.4. Self-conscious Safe Production

Safety instructions contained in the operation manual, existing national accident prevention regulations and any internal work issued by the user, operation and safety rules must be abided by.

2.5. Safety Instructions for Users and Operators

- Overheated or super cooled machine parts will bring the danger; the user should make sure that the parts are not touched by human body.
- When the machine is running, stay away from the moving parts.
- Handling the leakage (such as damage of shaft seal) of hazardous fluid (such as explosion, toxicity and high temperature) in a way doing no harm to human body and environment, must abide by the laws and regulations.
- Must prevent the danger caused by electric power, read the detailed information of local electric power company.

2.6. Safety instructions for Maintenance, Check and Installation

The user must make sure that all the maintenance, check and installation work must be conducted by the real qualified personnel with the relevant knowledge, and must deeply learn the operation manual.

The above-mentioned work can be conducted after stopping the machine, must strictly abide by the shutdown procedure stipulated by the manual.

Must eliminate the danger brought by the mediator of pump or pumping device conveying that may endanger the health. After completing the work, all the safety and protection devices must be newly installed, and restore to the former condition.

2.7. Unauthorized Change and Machining of Spare Parts

Change or modification of machine can be conducted after consulting with the manufacturer; the original devices and accessories authorized by the manufacturer can improve the safety.

We are not responsible for the consequences caused by use of the parts of another manufacturer's.

2.8. Operation Method Not Allowed

Only when it is correctly used, running of machine can be ensured the safety; it is not allowed to exceed the limit value stipulated by the series of documents.



3 Transportation & Storage

3.1. Safety Measures



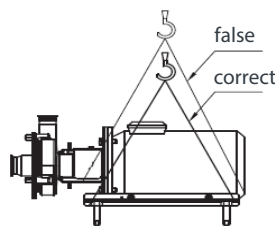
Before conveying the pump, must make sure that the pump will not fall down. For example:

- Check whether the lifting rope is firm.
- Check whether the lifting hook bolt is loose.

3.2. Transportation

Select the means of transport according to weight and size of pump; pump conveying can use the crane, low hoisting pallet forklift or hand forklift, for example:

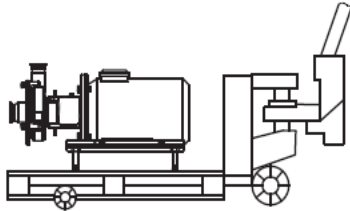
a) Use the crane



CAUTION

- Must guarantee that the crane and lifting rope have the sufficient bearing force and strength.
- Lifting hook of motor is not suitable for hoisting or conveying the pump.

b) Use low hoisting pallet forklift or hand forklift



3.3. Storage of Pump

Place of storing the pump

- Dustproof should meet the following conditions:
- Dry
- Temperature is about 20°C to 25°C
- Well-ventilated

CAUTION

The pump must be cleaned before storage; otherwise residue of pumping medium is hardened and damages the pump

CAUTION

After rinsing the pump, before sealing the suction inlet and discharge opening, inside of pump must be wiped dry and kept dry.

3.4. Protection

When air humidity is very high (>50%), it is suggested spreading silicone over the pump body to achieve sealing.

When the pump is wrapped up by a tarpaulin, be careful of preventing the condensation of water vapor.

If the pump is stored for a very long time (more than 6 months), when it is put into use, carefully check the seal, bearing and lubricant. In addition, moving parts should be rotated every 3 months.

4 Pumps and other accessories

4.1. Overview

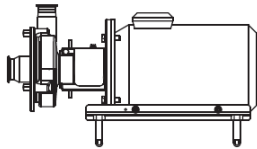
LPTF uses a unique eccentric screw and recirculation loop to generate the liquid ring required to process the aerated product and generate a vacuum.

LPTF series self-priming sanitary pump is based on the STFD series high-efficiency centrifugal pump, and a screw induction wheel is installed at the front end of its suction end. The clever design results in an efficient pumping unit for liquids containing large amounts of gas.

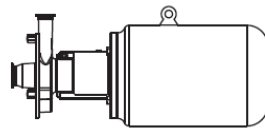
The design allows the pump to be matched to a specific operating point by using standard centrifugal pump assemblies to produce efficiencies previously unattainable with liquid ring pumps. The impeller is cut and used to suit the customer's specific work requirements. Higher efficiency, lower power consumption, simpler components and less noise than traditional liquid ring self-priming pumps.

4.2. Model

IEC/NEMA Series Model for options



A series: IEC standard motor with chuck B3/B5 specification



B series: C-FACE NEMA flange without bottom corner installation

IEC type equipped with sanitary dust cover and adjustable feet.

5 Installation and fixing

5.1. Know the information of installation site

Before installing the pump, make sure that:

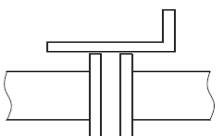
1. The base can completely bear the weight of pump.
2. Mounting surface is horizontal.
3. There is enough space for carrying out the repairs.
4. There is proper space behind the motor fan, can guarantee the sufficient air circulation so as to cool down the motor.
5. Sound characteristics of installation room should conform to the regulations of maximum sound pressure permitted by law.
6. Installation site should be suitable for pump operation, for example, the pump can't be run in the environment having potential explosion hazard.

CAUTION

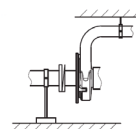
If the pump is not equipped with an explosion-proof motor, it is absolutely not allowed to operate in the explosive environment.

During installation, be careful of operation; make sure that the pump is not deformed after being influenced by external force. To avoid pump deformation of pump, we should:

- Align the connection of pump and pipeline
- Install the upholding bracket on the pipeline in front of pump or at the rear of pump



Adjust alignment with an angle square



Reduce pipeline pressure on the pump



5.2. Check before Installation

The pump must be cleaned before operation, make sure that no impurity enters the pump through the system.

5.3. Electric Power Installation



Abide by the relevant regulations of electricity; only the qualified personnel can install the connection of pump and power supply.

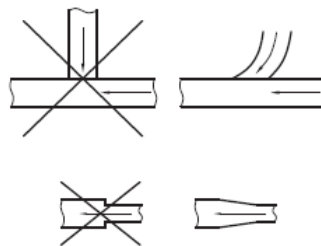
- Adjust the load according to the motor nameplate.
- Overload operation of the equipment is not allowed.
- Please connect electrically according to the wiring diagram of junction box.
- Be careful of protecting the junction box and cable sheath, avoid dampness.

5.4. Pipeline

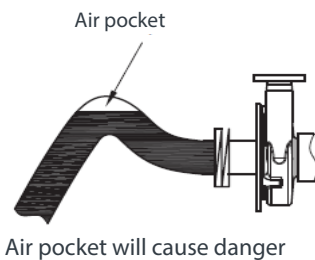
5.4.1 Overview

To make sure that the pump doesn't have trouble during the operation, must abide by the following installation instructions:

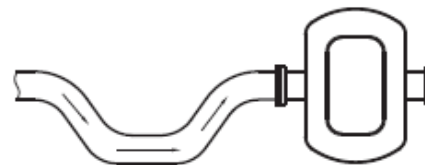
- Avoid the sudden pipeline transition



- Avoid producing the air pockets in the pipeline

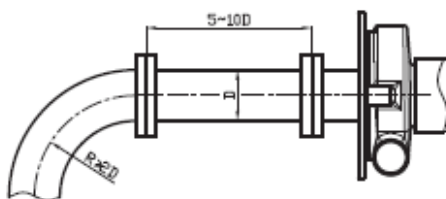


- Avoid deposition



5.4.2 Suction pipeline

- Make it as short as possible.
- Bending the pipeline in front of the suction port is not allowed.



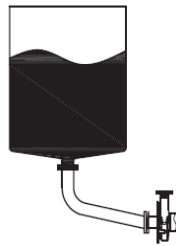
Bending of suction pipeline

- When the pump is stopped, it is never allowed to drain off. For example, install one pedal valve.
- If stop valve must be installed, installation position should be close to the pump as much as possible.

CAUTION It is not allowed to adjust pumps with stop valve.

5.4.3 Conveying pipeline

- Pipe diameter should be big enough to guarantee $NPSH_{System} > NPSH_{Pump}$.
- Angle of installing the pipeline should be constantly downwards, upward angle is not allowed.



The optimum conveying pipeline

- Keep low resistance in the pipeline, install the valve, elbow and flow regulator piece as little as possible.

5.4.4 Liquid level

Before the operation, pump suction port and pump must be filled with pumping medium, should at least exceed the discharge port.

5.4.5 Discharge pipeline

Install a stop valve in the discharge pipeline.

CAUTION

During the pump operation, if you shut off the discharge pipeline suddenly, the pump will produce the sound of hammering, and do harm to the pumping fluid and pump.

5.4.6 Desoldering Fluid Pipeline

- Install a throttle valve in the conveying pipeline.
- Install a flowmeter in the discharge pipeline.

6 Put into operation

6.1. Overview

- Cleaning pump
- Cleaning pipeline system
- Fill up the pump and suction pipeline
- Before starting the pump, must make sure that all the valves are open

CAUTION

Check the rotation direction (see the mark on the pump): Wrong rotation direction will damage the one-way shaft seal.

Fill the pump with pumping fluid, start the sealing liquid system, please follow the specified pressure (see Table 1).

CAUTION

Running the pump in the dry environment will damage the shaft seal; when the pump is a double shaft seal, must ensure that fluid flows through the shaft seal before the operation.

CAUTION

If you shut off the discharge pipeline for a too long time, pumping fluid may be damaged, and also may damage the pumping equipment.

CAUTION

Maximum rotational speed can't exceed 3600 RPM.



6.2. Special Reminder

6.2.1 Double Shaft Seal

- Make sure that rinsing pressure is correct (see Table 1).
- The sealing fluid must be clean and free of abrasive components.
- Temperature of the sealing liquid can't exceed 70°C.
- When sealing liquid is water, its hardness can't exceed 10° dH if the temperature is 60°C.

6.2.2 Control and monitoring equipment

If it is equipped, please see the relevant detailed introduction of order documents.

7 Cancel operation

- If equipped, shut off the valve of suction pipeline and discharge pipeline.
- Drain pump
- Cleaning pump
- Drying pump
- Protect the pump from being affected by environment (protect against dust, damp and heat).

8 Maintenance

8.1. Overview



It is necessary to maintain the pump frequently; otherwise efficiency and service life of pump will be affected.



Before conducting any maintenance work, cut off the power supply first.

8.2. Maintenance Instructions

8.2.1 A, B, C, Form

The motor has one thrust bearing at A end (drive), one floating bearing at B end, motor bearing can't be injected oil for lubrication.

Under normal conditions, motor bearing must be replaced after running about 15,000 to 20,000 hours.

8.2.2 Double Shaft Seal

Check the pressure of sealing liquid, which should be consistent with the information of Table 1.

Shaft seal type	Maximum flushing pressure P(bar)
Face to face	P=0.2
Back to back	P=System pressure +0.5

Table 1 Flushing Pressure

For the special type, please refer to the order documents.

8.3. Disassembly



- Cut off power supply of the pump. (refer to Table 8.1)
- If it is equipped, shut off the valve of suction pipeline and discharge pipeline.
- Take down the connector of suction/discharge pipe; remove the pump from the system.



If hazardous fluid is pumped, must abide by the provisions of laws and regulations and safe production.

8.3.1 Disassembly of Shaft Seal

- Unscrew the emptying pump of pump cover; please rinse it if necessary.
- Block the impeller, for example, stuff the aluminum rod or plastic rod into the discharge port for fixing the impeller.
- Unscrew the impeller nut.
- Take down the impeller from the shaft, and take down the driving key.
- Refer to the instructions of order documents; carefully take down the detachable parts of shaft seal.
Regarding the tips of double shaft seal:
Sealing liquid of pump must be poured out before the disassembly of pump housing.
- Disassemble the pump housing.

Difference between two connection types:

Chuck-connected pump

- a. Unscrew the chuck screws.
- b. Enlarge the chuck opening a little using one screwdriver.
- c. Pull out the pump housing from the chuck.

Flange-connected pump

- a. Unscrew the fastening screws of flange.
- b. Pull out the pump housing.
- c. Take down the remaining parts of shaft seal.

8.4. Assembly

8.4.1 Overview

Before assembling the pump, the following operations must be completed:

- Clean the parts.
- Clean the sealing surface; please conduct re-machining if necessary (such as grinding).
- Check the precision of all the parts; please conduct re-machining if necessary.
- Replace the worn-out parts.
- Before the assembly, O-ring (elastomer) must be replaced usually.

CAUTION

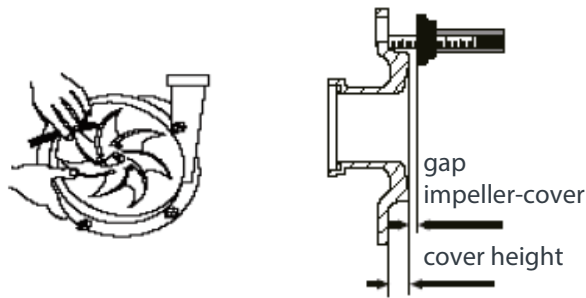
During the installation of pump cover and shaft seal, use of lubricant:

1. Lubricant must be compatible with pumping products, such as food safety class.
2. Lubricant or lubricating grease is not allowed for O-ring of EPDM material.
3. Lubricant or lubricating grease is not allowed on the sealing surface.



8.4.1.1 Set up Clearance

Please set up the clearance value according to the table 3 below:



Model of pump	Axial clearance impeller/pump cover	Axial clearance impeller/pump shell
LPTF-03	/	/
LPTF-05	/	/

Table 3 clearance value

8.4.1.2 Tightening Torque of Screws

Please follow the tightening torque in the table below

Material: Steel

Strength grade: 8.8

	M6	M8	M10	M12	M16	M20
Nm	10	25	49	85	210	420

Material: Stainless steel.

Strength grade: A2~70 and A4~70

	M6	M8	M10	M12	M16	M20
Nm	7.3	17.5	35	69	144	281

Table 4 Tightening torque of screws

8.4.2 Assembled Pump Head

8.4.2.1 Chuck or flange-connected LPTF Pump

Model: A, B, C,

Specifications LPTF-03/LPTF-05

Difference between two connection types:

- Chuck connection
- Flange connection

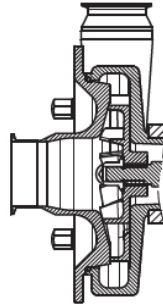
The above two types can equip with single shaft seal or double shaft seal.

Assembly of shaft seal:

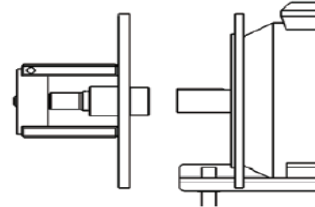
- For assembly of single shaft seal, please perform Step II and III.
- For assembly of double shaft seal, please perform Step I and III. Refer to the relevant order documents.

Pump with chuck connection:

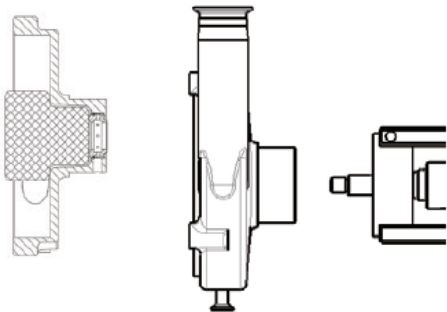
1. Push in rear seal (drive end) on the pump shaft (It is applicable only to double shaft seal)



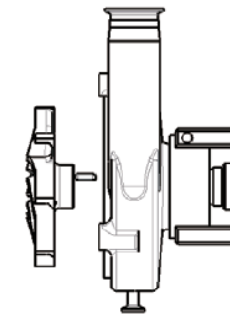
2. Install the main shaft on the motor shaft without locking; Install the middle seat on the motor flange and fix it.



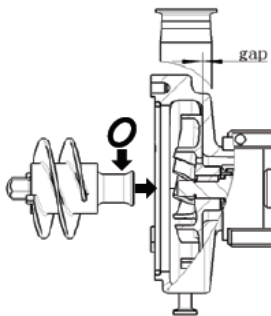
3. Install the stationary ring with seal into the pump housing, and install the pump housing into the middle seat.



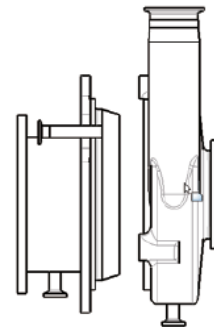
4. Push in front seal (product end) on the shaft.
5. Fit into the flat key; install the impeller.



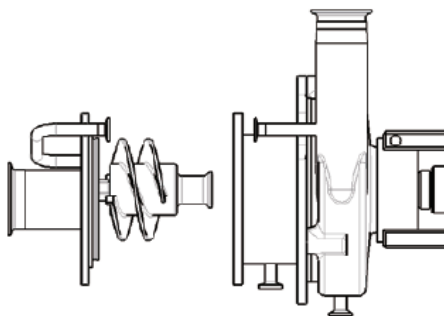
6. Embed the sealing ring into induction wheel, make sure that the impeller is not warped, and tighten the induction wheel using 100Nm of torque.



7. Fix induction wheel housing.



8. Install the induction wheel cover, tighten the cover nut.



9. Tighten the chuck screws according to the torque value below:

- Special motor M10 uses 36Nm
- Others motor M10 uses 45Nm, M12 uses 75Nm

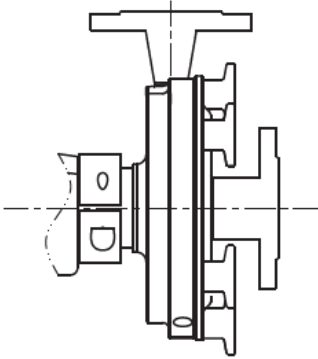
CAUTION

When installs the impeller each time, make sure that the impeller can't contact with any point of pump housing.



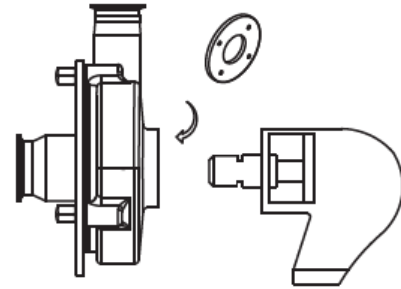
Pump with flange connection:

1. Push in rear seal (drive end) on the pump shaft (It is applicable only to double shaft seal).

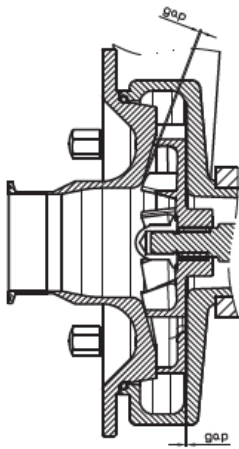


2. (It is applicable to single or double shaft seal): Put the whole shaft seal housing with seal into the pump housing, be careful of no displacement.

3. Tighten the pump housing, convey parts by thin gasket padding in (e.g. bearing seat).



- 4. Push in front seal (product end) on the shaft.
- 5. Fit into the flat key; install the impeller; and tighten induction wheel.
- 6. Set up the clearance dimension of pump cover/ impeller and impeller/pump housing. (Refer to clearance dimension of Table 3)



7. Take down induction wheel, install positioning ring on shaft.

8. Embed the sealing ring into induction wheel, block the impeller, and tighten the nut using 100Nm of torque.

9. Install the pump cover with seal in the pump housing; tighten the nut of pump cover.

CAUTION

When installs the impeller each time, make sure that the impeller can't contact with any point of pump housing.

8.4.2.2 LPTF Series with Single Mechanical Shaft Seal

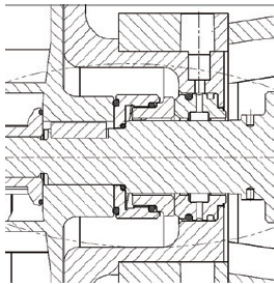
Specifications LPTF-03/LPTF-05

1. Take down the driving key from the motor extension shaft.
2. Wash off grease of holes in the motor extension shaft and sleeve shaft.
3. Spread the sealant (such as Stucarit sealing gel 309) over the shaft shoulder of motor extension shaft.
4. Tighten the main shaft on the motor shaft using the main shaft lock sleeve; be careful of alignment of three grooves.

5. Check the concentricity and straightness of sleeve shaft; maximum concentricity:
0.06mm, when motor is $\leq 30\text{kW}$
0.08mm, when motor is $> 30\text{kW}$

6. Install the chuck in the motor flange.
7. Embed the stationary ring with seal into the pump housing; make sure that installation is reliable.

8. Fasten the pump housing and chuck using the screws by hand.
9. Install the front end seal of shaft seal.



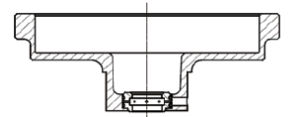
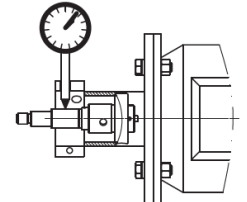
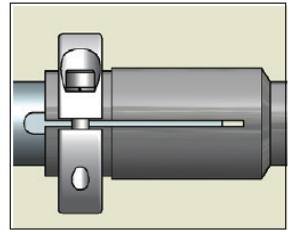
10. Embed O-ring into the impeller nut, push the stator into the pump shaft, make sure that it is not warped and tighten the impeller, tightening torque is 100Nm.

11. Through adjusting the distance of making the pump housing enter the chuck, set up the clearance between pump cover, impeller and pump body. (refer to Table 3).

12. Tighten the fastening screws of chuck using the torque below:

- M10 uses 45Nm - M12 uses 75Nm

13. Embed the O-ring after spreading sealant into the pump housing; install the sealing cover with the radial seal in the pump.



CAUTION

When installs the impeller each time, make sure that the impeller can't contact with any point of pump housing.



8.4.2.3 LPTF Series with Double Mechanical Shaft Seal

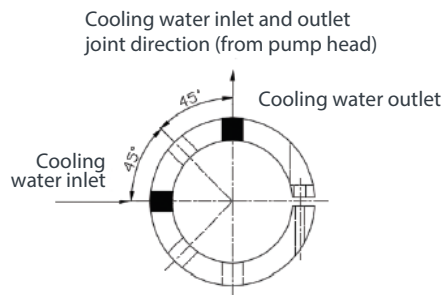
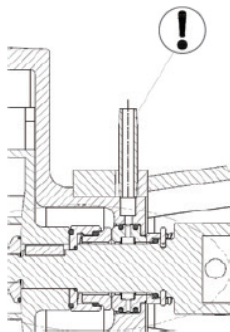
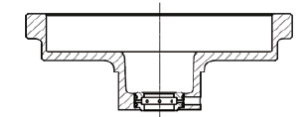
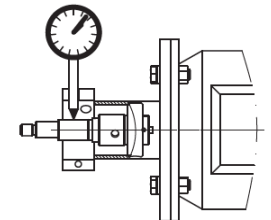
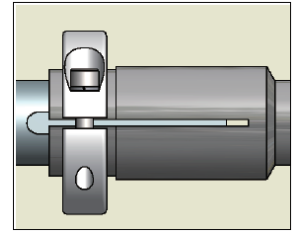
Specifications LPTF-03/LPTF-05

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4. Tighten the main shaft on the motor shaft using the main shaft lock sleeve; be careful of alignment of three grooves.

5. Check the concentricity and straightness of sleeve shaft; maximum concentricity:
0.06mm, when motor is $\leq 30\text{kW}$
0.08mm, when motor is $>30\text{kW}$

6. Install the chuck in the motor flange.
7. Embed the stationary ring with seal into the pump housing; make sure that installation is reliable.

8. Fasten the pump housing and chuck using the screws by hand.
9. Install the front end seal of shaft seal.



10. Embed O-ring into the impeller nut, push the stator into the pump shaft, make sure that it is not warped and tighten the impeller, tightening torque is 100Nm.

11. Through adjusting the distance of making the pump housing enter the chuck, set up the clearance between pump cover, impeller and pump body. (refer to Table 3).

12. Tighten the fastening screws of chuck using the torque below:

- M10 uses 45Nm - M12 uses 75Nm

13. Embed the O-ring after spreading sealant into the pump housing; install the sealing cover with the radial seal in the pump.

CAUTION

When installs the impeller each time, make sure that the impeller can't contact with any point of pump housing.

9 Spare Parts

Use the original spare parts of the STURSAN only; we don't authorize the use of accessories of other manufacturers. In order to provide the spare parts in time, we require the following information;

1. Pump type and number
2. Serial number of list of components
3. Number of relevant spare parts
4. Required materials
5. Quantity of relevant spare parts

10 FAQ

Problem	Cause	Take action
Output pressure is too small	a. Rotation direction of motor is wrong	Wire connection of motor is wrong, open the junction box for reconnection
	b. Rotational speed of motor is too low (voltage error)	Check the supply voltage according to the machine nameplate
	c. Impeller diameter is too small	Contact with technical department of the STURSAN and replace the impeller
	d. Impeller is not set up correctly	Check the impeller clearance and reset
	e. Viscosity of pumping medium is too high	Contact STURSAN Technical Department
Flow is too low	a. Rotation direction of motor is wrong	Wire connector of motor is wrong, open the junction box for reconnection
	b. Resistance of suction pipeline and/or discharge pipeline is too large	Add the pipeline diameter and/or reduce the quantity of pipe elbows and valves
	c. Viscosity of the pumping medium is too high	Contact STURSAN Technical Department
	d. Impeller is not set up correctly	Check the impeller clearance and reset
Power consumption of motor is too high	a. Viscosity of the pumping medium is too high	Contact STURSAN Technical Department
	b. Impeller was not set up correctly	Check the impeller clearance and reset
	c. Resistance of the discharge pipeline is too small (flow is too high)	Control the speed, for example, use the frequency converter, or install one control valve in the discharge line
	d. Impeller diameter is too large	Contact STURSAN Technical Department and replace the impeller
Too much noise	a. Resistance of suction pipeline is too high	Add the diameter of suction pipeline and/or reduce the length of suction line
	b. Liquid level of suction pipeline is too low	Add NPSH level
	c. The impeller touches the pump housing	Check the impeller clearance and reset
	d. Bearing wear	Replace the bearing

If you are uncertain or still can't solve the problem after taking measures, STURSAN technical department will serve you at any time. When contacting us, please provide the following information:


1. Operating conditions, situation and environment.
2. Please correctly describe the problems occurred in detail.
3. Pump model, specification and serial number.
4. If possible, please draw the installation draft of pump.


11 Match Code

BST-HC-LPTF-03/7,5/2/O-175/DDN65-DN50/n/SSE/PC3

Polished	Type	Motor Power (kw)	N° Pole	Impeller diameter	D	DN65-DN50	n	SS	E	P	C	3	Assembly Configuration								
														Connection Type in/out	Connection Size	Drainage	Mechanical Seal	O'rings	Motor Option	Engine Manufacturer	Motor Efficiency
O: Standard polished (Housing Ra < 0,8, Impeller Ra < 3,2)	LPTF-03	1,1	2		D: DIN 11851	DN40 (1,5")	n: NO	SS: Single SiC / SiC	E: EPDM	S: No options	A: ABB	3	C: Complete								
														T: Tri-clamp ISO 2852	DN50 (2")	m90: Tri-clamp ASME BPE 90°	DS: Double SiC / SiC	F: FKM	P: PTC	C: CEMER	S: WO shroud
														U: Tri-clamp DIN 32676	DN65 (2,5")	m45: Tri-clamp ASME BPE 45°	ST: Single TC / TC	B: BUNA	X: Without motor	X: SPECIAL	
P08: Special polished Ra<0,8	LPTF-05	1,5	4		M: Tri-clamp ASME BPE	DN80 (3")															
														R: Tri-clamp BS 4825	DN100 (4")		DS: Double TC / TC	K: FFKM			
														S: SMS							
P05: Special polished Ra<0,5		2,2	6																		
		3																			
		4																			
		5,5																			
		7,5																			
		11																			
		15																			
		18,5																			
		22																			
		30																			



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