



FTS

TWIN SCREW PUMP OPERATING INSTRUCTIONS

CONTENTS

1. SUMMARIZE	3
a. ABOUT THE USER MANUAL	3
b. SAFETY WARNING SYMBOL	3
2. SECURITY ANNOUNCEMENTS	3
a. BASIC SECURITY INSTRUCTIONS	3
b. APPLICATION RANGE	3
c. COMMON ERROR OPERATION	3
d. SAFETY INSTRUCTION FOR PUMP	3
e. WARNING SIGN	4
f. WASTE TREATMENT	4
3. MODELS	4
a. MODEL	4
4. TRANSPORTATION	6
a. SAFETY INSTRUCTIONS	6
b. FORKLIFT TRANSPORTATION INSTRUCTIONS	6
c. CRANE TRANSPORTATION INSTRUCTIONS	6
5. STORAGE	6
a. STORAGE ENVIRONMENT OF THE PUMP	6
b. LONG-TERM STORAGE	6
c. RESTART TO USE	6
6. INSTALLATION AND USE PROCEDURES	6
a. INSTALLATION SAFETY INSTRUCTIONS	6
b. PRECAUTIONS FOR PUMP INSTALLATION	7
c. REDUCE NOISE AND VIBRATION	7
d. INSTALLATION METHOD	7
e. COUPLING INSTALLATION	7
f. PIPELINE INSTALLATION	8
g. ELECTRICAL INSTALLATION	8
h. WATER FLUSH PIPELINE CONNECTION	8
i. CLEANING	8
7. RUNNING OPERATION	9
a. SAFETY INSTRUCTION	9
b. ADVANCE PREPARATION	9
c. OBSERVE OPERATION	9
d. FINISH OPERATION	9
8. CLEANING	9
a. CIP CLEANING	9
b. SIP CLEANING	9
9. COMMON FAULT AND REMOVAL	9
10. MAINTENANCE	10
a. SECURITY INSTRUCTIONS	10
b. CHECK RINSE SOLUTION (DOUBLE MECHANICAL SEAL)	10
c. CHECK THE OIL LEVEL	10
d. CHANGE OIL	10
e. REPLACE MECHANICAL SEAL	10
f. DISASSEMBLY OF TWIN SCREW PUMP	10
g. SCREW PUMP HEAD ASSEMBLY	11
11. APPENDIX	12
a. TORQUE TABLE FOR BOLTS AND NUTS	12
b. MAINTAINANCE PERIODIC	12
c. COMMON OPERATING PROBLEM AND TROUBLESHOOTING	12
d. EXPLODED VIEW AND PARTS LIST	13

1. SUMMARIZE

a. ABOUT THE USER MANUAL

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 FTS double screw pump. The appendix of the manual includes the special debugging of this pump and the name of spare parts.

b. 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



Warning symbol
Ensure security responsibilities



Warning symbol
Warning risk of mechanical damage

2. SAFETY PRECAUTIONS

a. 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

b. APPLICATION RANGE

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

c. 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

d. 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

e. WARNING SIGN

Please set warning sign in the pump working area

f. WASTE TREATMENT



Please follow the relevant regulations to dispose of the disassembled waste.

3. MODELS

a. MODELS

FTS A -20-18
FTS A -20-26
FTS A -20-48
FTS B -30-26
FTS B -30-36
FTS B -30-60
FTS C -70-32
FTS C -70-48
FTS C -70-80

FTS A



FTS B



FTS C



4. TRANSPORTATION



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

a.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.

b. 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

c. 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

5. STORE

a.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)



b.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

c.RESTART TO USE

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

6. INSTALLATION AND USE PROCEDURES

a.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

b. 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.



c. REDUCE NOISE AND VIBRATION

c. a. REDUCE NOISE AND VIBRATION

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

c. b. AUXILIARY MEASURES

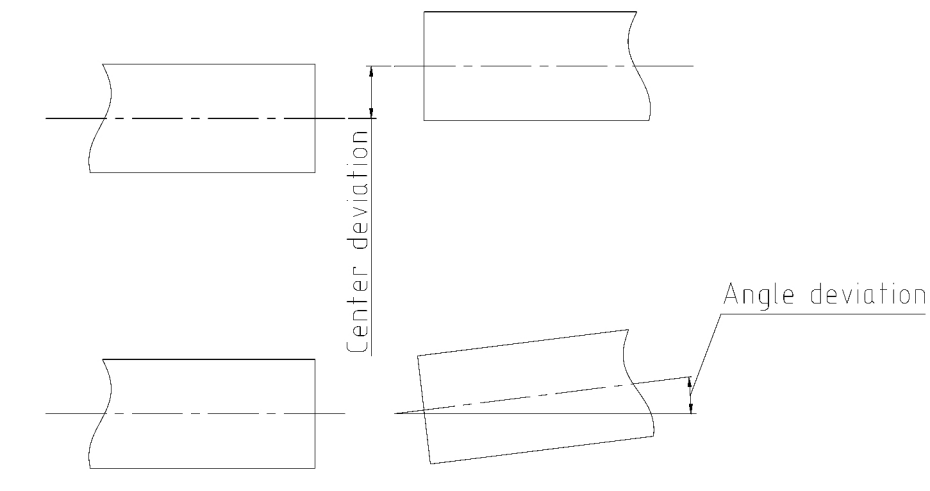
- Isolation measures can be used to isolate noise, such as sound insulation coverage, space isolation, etc.

d. 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.

e. COUPLING INSTALLATION

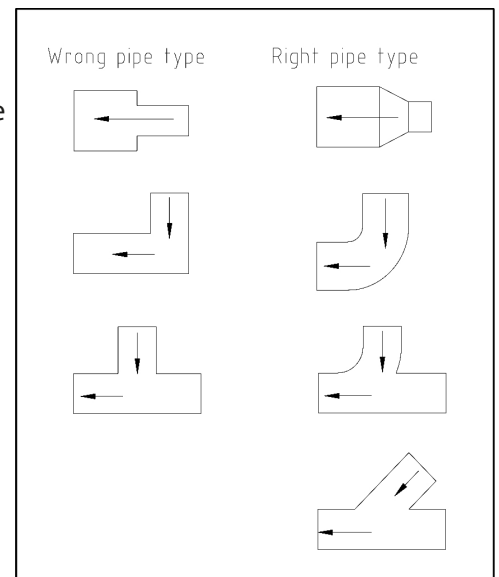
- Check the center deviation and angle deviation between the drive shaft of the pump and the motor shaft



- Adjust the coaxiality of the shaft so that the two shafts are aligned (adjustable with pad block)

f. 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)

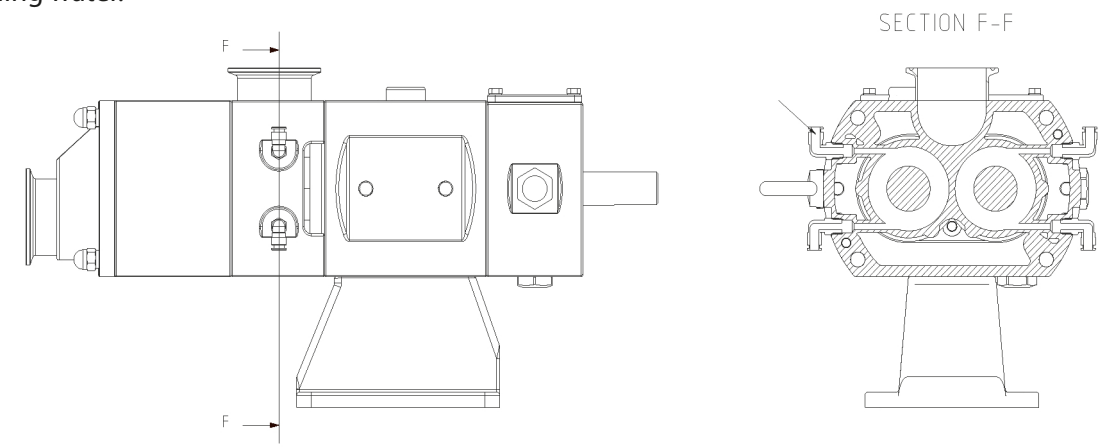


g. ELECTRICAL INSTALLATION

- “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 2-3 seconds and check motor rotation direction.
 4. Rewiring is required if the rotation direction is wrong.

h. 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.

i. 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

a.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.

b.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.

c.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.

d.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

a.CIP CLEANING

- FTS twin screw pump is supported with CIP cleaning.

b.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

a.CIP CLEANING

- See appendix 11.3 (Common Fault and Removal).

10. MAINTENANCE

- See appendix 11.2 (Maintenance Periodic Table) .

a.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.



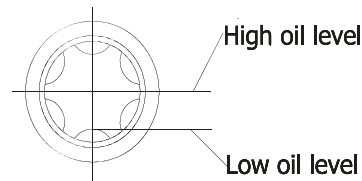
b.TO INSPECT WASH WATER (DOUBLE MECHANICAL SEAL)

If choose double mechanical seal pump:

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

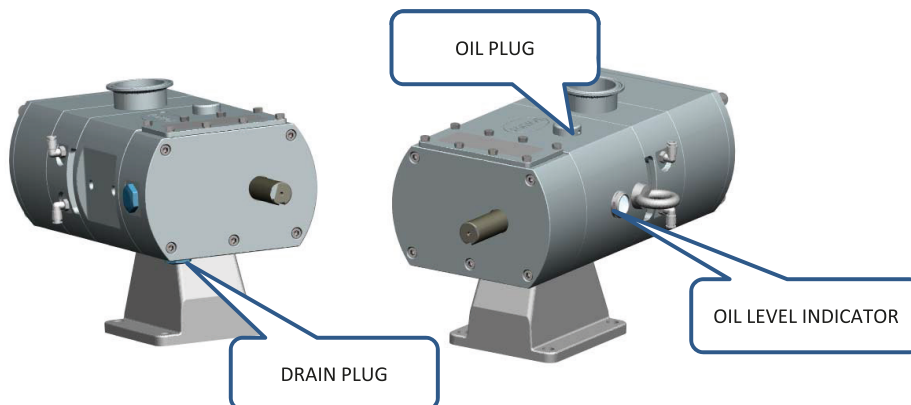
c.CHECK THE OIL LEVEL

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



d.CHANGE OIL

- To replace lubricating oil regularly: every 6 months or 2000 hours.
- Extreme condition such as high temperature, humid environment: every 1000 hours.



e.TO REPLACE MECHANICAL SEAL

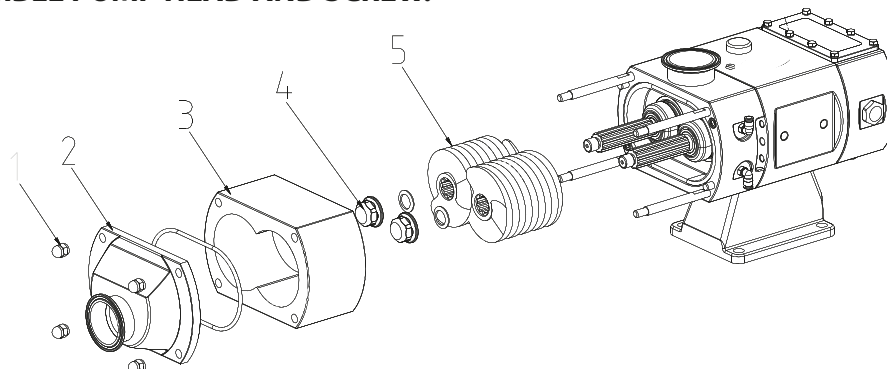
Need to replace mechanical seal in the following situation:

- 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.

f.DISASSEMBLY OF TWIN SCREW PUMP

a.TO DISASSEMBLE PUMP HEAD AND SCREW.



1. To disassemble the nut(part 1) of front cover.
2. To disassemble front cover(part 2), rotor casing(part 3).
3. To disassemble locknut(part 4), take out o-ring.

Warning:

the rotating screw might be caused with hurt on your hands, please use plastic bar to lock the screw(part 5).

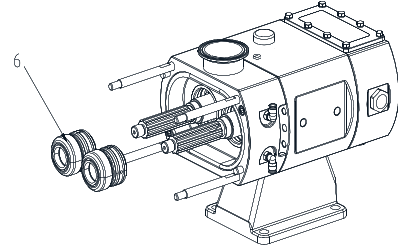
4. To take out the screw(part 5) from pump shaft.

b.DISASSEMBLY OF MECHANICAL SEAL

Mechanical seal with 2 kinds: single mechanical and double mechanical seal

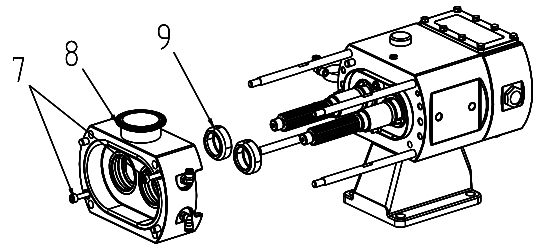
Disassembly of single mechanical seal:

1. To take out single mechanical seal(part 6) as picture at right.

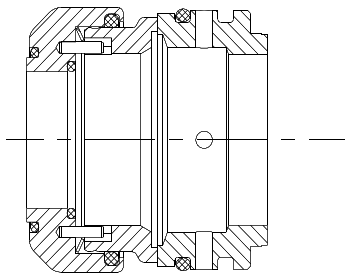


Disassembly of double mechanical seal:

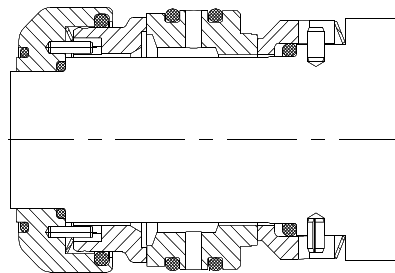
1. To take out single mechanical seal(part 6) as picture at right.
2. To disassemble tightening screw(part 7).
3. To take out mechanical seal casing(part 8).
4. To take out the outer ring of double mechanical seal(part 9).



Attached pictures (structure sketch of single and double mechanical seal)



SINGLE SEAL



DOUBLE SEAL

g.SCREW PUMP HEAD ASSEMBLY

Preparing before assembly

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

a.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)

- In accordance with the disassembly steps of the pump head can be installed after the reverse.
- Locked nut mounting torque as the following table

1. Place the O-ring into the front cover seal groove
2. Place the front cover
3. Tighten the front cover retaining nuts

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

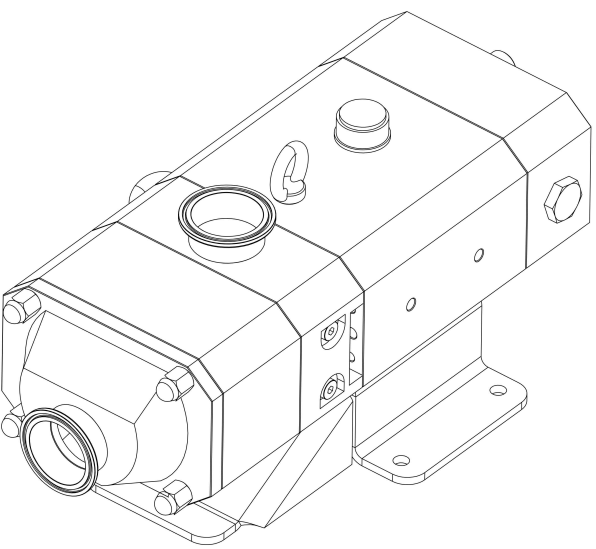
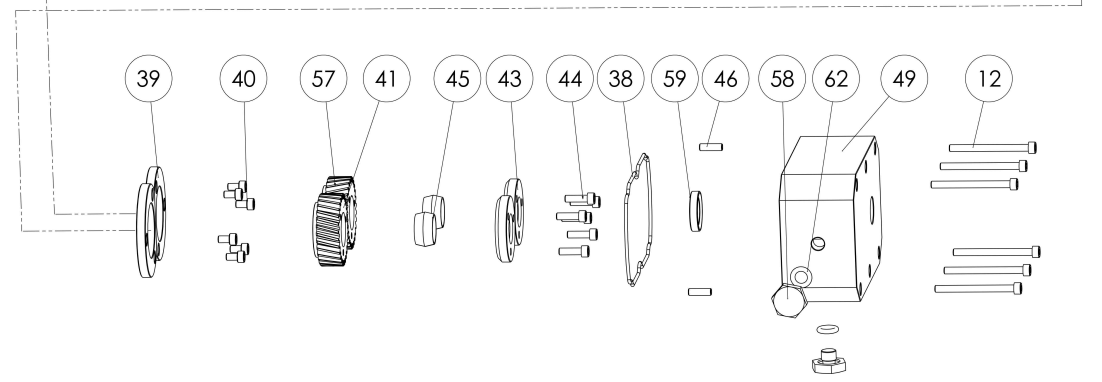
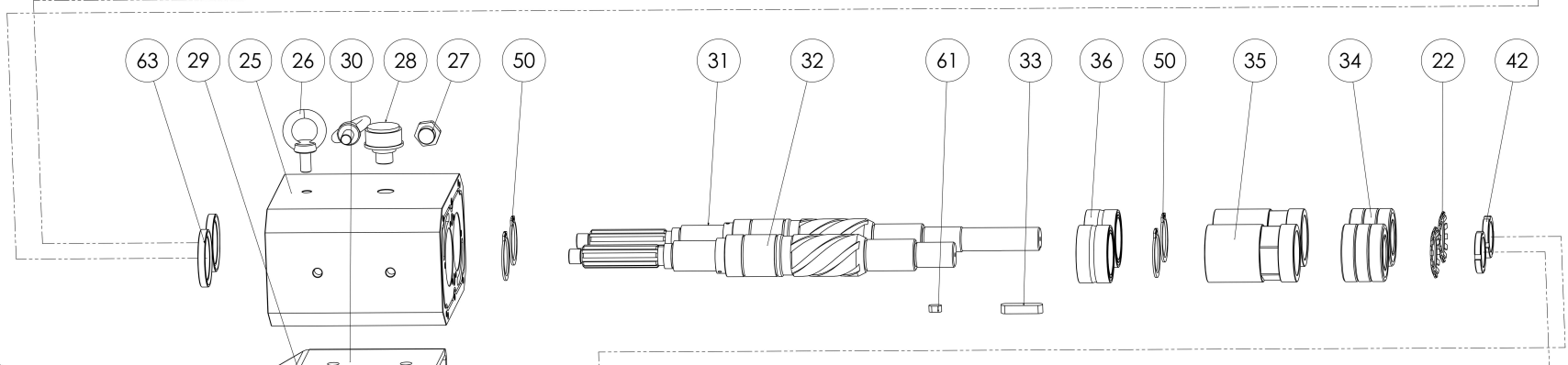
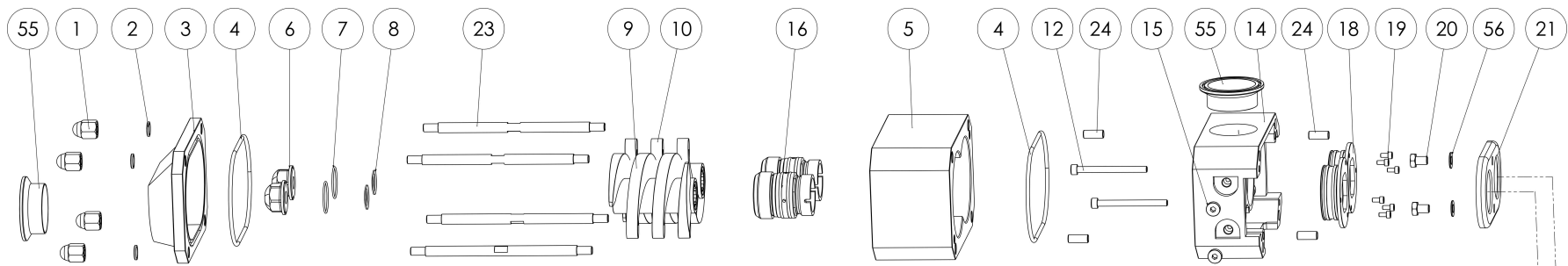
Material grade: A2-70

Maintenance period	Applicable working conditions	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
1000hours	Extreme operating conditions	Replace the lubricating oil	Refer to 10.4
2000hours	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

Operating problems	Usual causes problems	Solutions
No flow rate or flow rate	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 Flussmann
	The revolving speed is too high	Reduce the revolving speed

Operating problems	Usual causes problems	Solutions
Flow rate and head is too low.	The type of pump is too small	Contact Flussmann
	Leakage at the suction of the pipe or pump	Check and repair piping
	The the media is hard to flow because of the high viscosity	Increase the diameter of the inlet pipe and shorten pipe
	Screw 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
	The bolt and nut are loose.	Retighten according to specified torque
	Screw pump overload or lack of lubrication resulting in gear wear	Check,repair or replace the gear
	The revolving speed is too high	Contact Flussmann
	Suction pipe obstructed.	Check and clear blockages
Mechanical noise	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 Flussmann
	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 Flussmann
	The flushing circulation run with out lubrication because of blocked pipe.	Check and repair

11.d Exploded view and parts list



NO.	PART NUMBER	PART NAME	DESCRIPTION	MATERIAL	QTY.
1	FTS.A.000.01	FRON COVER HEX NUT	M8	AISI-304	4
2	FTS.A.000.02	O-RING	Ø1,6	VITON	4
3	FTS.A.000.03	FRONT COVER	115x178x40,5	AISI-316L	1
4	FTS.A.000.04	O-RING	Ø3,5	VITON	2
5	FTS.A.000.05	ROTOR CASE	115x178x80,35	AISI-316L	1
6	FTS.A.000.06	CAM LOCK NUT	M14	AISI-304	2
7	FTS.A.000.07	O-RING	Ø1,5	VITON	2
8	FTS.A.000.08	WASHER	M14	AISI-304	2
9	FTSA+018.09	SCREW-R	Ø84,5x81,5	AISI-316L	1
10	FTSA+018.10	SCREW-L	Ø84,5x81,5	AISI-316L	1
12	FTS.A.000.12	INBUS	M6x70	AISI-304	8
14	FTS.A.000.14	HOUSING	115x178x65	AISI-316L	1
15	FTS.A.000.15	AIR TAP	1/8	AISI-304	4
16	FTS.A.000.16	SINGLE MECHANICAL SEAL			2
18	FTS.A.000.18	MACHINE SEALING SHEEL	Ø70x21	AISI-304	2
19	FTS.A.000.19	INBUS	M4x7,5	A2-70	6
20	FTS.A.000.20	INBUS	M8x10	A2-70	2
21	FTS.A.000.21	OIL SEAL LIMITED BOARD		AISI-304	1
22	FTSA+000.22	OIL SEAL	M30	AISI-304	2
23	FTS.A.000.23	STUD BOLD	Ø10x182	AISI-304	4
24	FTS.A.000.24	CYLINDRICAL PIN	Ø8x20	AISI-304	4
25	FTSA+000.25	GEAR CASE	115x178x168,5	ST 37	1
26	FTS.A.000.26	EYEBOLD	M10x20	A2-70	2
27	FTS.A.000.27	OIL LEVEL SIGHT GLASS	3/8	AL.	1
28	FTSA+000.28	OIL PLUG	3/8	AISI-304	1
29	FTS.A.000.29	HEXAGON HEAD BOLD	M10x20	A2-70	2
30	FTSA+000.30	GEAR CASE LEGG	6x325x280	AISI-304	1
31	FTSA+000.31	LONG DRIVE SHAFT	Ø40x444,65	AISI-316L	1
32	FTSA+000.32	SHORT DRIVE SHAFT	Ø40x370,15	AISI-316L	1
33	FTSA+000.33	WEDGE	8x8x40	AISI-304	1
34	FTSA+000.34	BEARING	30x55x13		6
35	FTSA+000.35	BEARING LOCATION	Ø55x85,5	AISI-304	2
36	FTSA+000.36	NEEDLE BEARING	40x55x30		2
38	FTSA+000.38	O-RING	Ø2,6	NBR	1
39	FTSA+000.39	BED BRACELED	Ø82x8	AISI-304	2
40	FTS.A.000.40	CYLINFRICAL HEAD BOLD	M6x10	AISI-304	6
41	FTS.A.000.41	GEAR RIGHT	Ø63,9x24	20Cr	1
42	FTS.A.000.42	GEAR TIGHT BUSHING	M30		2
43	FTS.A.000.43	GEAR GLAND	Ø58x10,5	20Cr	2
44	FTS.A.000.44	INBUS	M6x20	A2-70	6
45	FTS.A.000.45	OIL SEAL	Ø30,2x16		2
46	FTS.A.000.46	CYRINDRICAL PIN	Ø6x20	A2-70	2
59	FTS.A.000.49	GEAR CASE REAR COVER	115x178x66	ST 37	2
50	FTSA+000.50	RING	Ø40		4
55	FTS.A.000.55	FERULLE	DN50	AISI-316L	2
56	FTS.A.000.56	WASHER	M8	AISI-304	2
57	FTS.A.000.57	GEAR-L	Ø63,9x24	20Cr	1
58	FTS.A.000.58	SIX CORNER PLUG	1/2		2
59	FTS.A.000.59	OIL SEAL	22x35x7	NBR	1
61	FTSA+000.61	WEDGE	6x6x12	AISI-304	1
62	FTS.A.000.62	O-RING	Ø4	AISI-304	2
63	FTSA+000.63	OIL SEAL	40x55x7	VITON	2