INSTRUCTION MANUAL

FIP - series

FLEXIBLE IMPELLER PUMPS

A.0100.316 – IM-FIP/08.00 US (04/2014)
REVISION: 08.00

ORIGINAL INSTRUCTIONS / TRANSLATION OF ORIGINAL INSTRUCTIONS
READ AND UNDERSTAND THIS MANUAL PRIOR TO OPERATING OR SERVICING THIS PRODUCT.

Johnson Pump®

EC-Declaration of conformity

Machinery Directive 2006/42/EC, Annex IIA

Manufacturer
SPX Flow Technology Sweden AB
P.O. Box 1436
SE-701 14 Örebro, Sweden

We hereby guarantee that

FIP-range – Flexible Impeller Pumps

are in conformity with the relevant provisions of the Machinery Directive 2006/42/EC, Annex I.

Manufacturer Declaration

Machinery Directive 2006/42/EC, Annex IIB

The product must not be put into service until the machinery into which it is to be incorporated has been declared to conform with the provisions of the Directive.

Örebro, Sweden, 1 March 2011

Michael Strålman
Managing Director

Declaration of Compliance for food contact materials

We hereby certify the compliance of the materials coming into contact with food during the intended use with the general requirements as of the date of this Declaration of

Regulation (EC) No 1935/2004 of 27 October 2004 on materials and articles intended to come into contact with food and repealing Directives 80/590/EEC and 89/109/EEC.

This Declaration applies to the following product(s):

FIP, Flexible Impeller Pump SH-execution and spare parts for FIP SH-execution

FIP 20 SH
FIP 25 SH
FIP 40 SH
FIP 50 SH *)
FIP 65 SH

**) impeller is only FDA milk approved*

This Declaration shall be valid for a period of three years from the date written below.

This Declaration does not modify any contractual arrangements, in particular regarding warranty and liability.

Örebro, Sweden, 26 February 2014

Michael Strålman
Managing Director

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1.0 Introduction

1.1 General

This instruction manual contains necessary information on the impeller pumps and must be read carefully before installation, service and maintenance. The manual must be kept easily accessible to the operator.

Important!

The pump must not be used for other purposes than recommended and quoted for without consulting your distributor.

Liquids not suitable for the pump can cause damages to the pump unit and imply risk of personal injury.

1.2 Reception, handling and storage

1.2.1 Reception

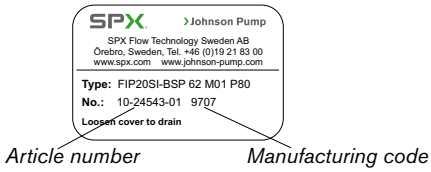
Remove all packing materials immediately after reception. Check the consignment for damage immediately on arrival and make sure that the name plate/type designation is in accordance with the packing slip and your order.

In case of damage and/or missing parts, a report should be drawn up and presented to the carrier at once.
Notify your distributor.

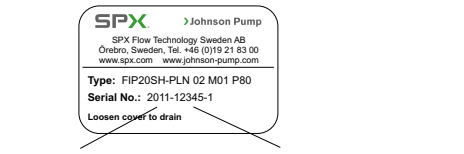
All pumps have the article number stamped on the front cover or on a name plate. This number should be stated in all correspondence with your distributor.

The manufacturing code, e.g. 9707, states the year and week of production.

Nameplate Bronze and Industrial pumps

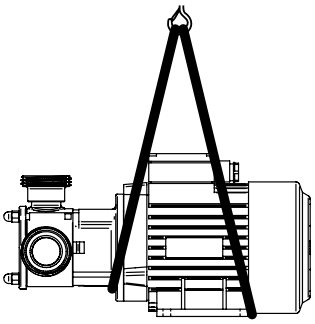


Nameplate Hygienic pumps

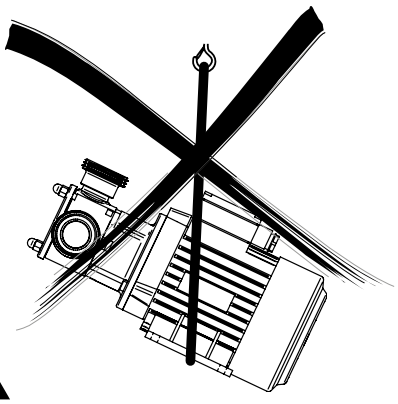


1.2.2 Handling

Check the weight of the pump unit. All parts weighing more than 45 pounds must be lifted using lifting slings and suitable lifting devices, e.g. overhead crane or industrial truck. See section 6.0 for the weights.



Always use two lifting slings. Make sure that they are secured in such a way as to prevent them from slipping and that the pump unit is hanging straight.



Never lift the pump unit with only one fastening point. Incorrect lifts can cause personal injury and/or damage to the product.

1.2.3 Storage

A pump which is not installed immediately should be stored in a cool and dark room and the impeller should be removed. The rubber material of the impeller ages and should be treated as perishables. The storage should not exceed 2 years. If the pump has been out of operation for a longer period of time, the impeller should be greased before use to obtain optimal suction ability.

1.3 Safety

1.3.1 General

Important!

The pump must not be used for other purposes than recommended and quoted for without consulting your supplier.

A pump must always be installed and used in accordance with national, local, sanitary and safety regulations.

- Always wear suitable safety clothing when handling the pump.

- Anchor the pump properly before start-up to avoid personal injury and/or damage to the pump unit.

- Install shut-off valves on both sides of the pump to be able to shut off the in- and outlet before service and maintenance. Check to see that the pump can be drained without injuring anyone and without damaging the environment or nearby equipment.

- Make sure that all movable parts are properly covered to avoid personal injury.

- All electrical installation work must be carried out by authorized personnel in accordance with local regulations. Install a lockable circuit breaker to avoid inadvertent starting. Protect the motor and other electrical equipment from overloads with suitable equipment. The electric motors must be supplied with ample cooling air.

  In environments where there is risk of explosion, motors classified as explosion-safe must be used, along with special safety devices. Check with the governmental agency responsible for such precautions. Improper installation can cause fatal injuries.

- Dust, liquids and gases that can cause overheating, short circuits, corrosion damage and fire must be kept away from motors and other exposed equipment. If the pump handles liquids hazardous for person or environment, some sort of container must be installed into which leakage can be led.

- If the surface temperature of the system or parts of the system exceeds 60°C/140°F, these areas must be marked with warning text reading "Hot surface" to avoid burns.

- The pump unit must not be exposed to rapid temperature changes of the liquid without prior pre-heating/pre-cooling. Do not flush a hot pump with cold water. Big temperature changes can cause damage to the impeller, pump along with severe personal injuries.

- The pump must not operate above stated performance.

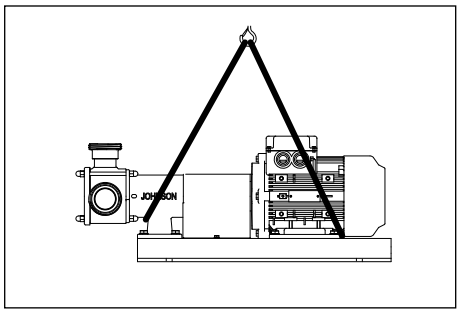
- Before inspecting the pump/system, the power must be shut off and the starting device be locked. When inspecting the pump unit, follow the instructions for disassembly/assembly, section 4.0. If the instructions are not followed, the pump or parts of the pump can be damaged. It will also void the warranty.

- Impeller pumps must not be run dry. Dry running will create friction heat which will damage the impeller and other parts sensitive to extreme heat. If there is a risk of dry running, install a suitable dry running protection.
- If the pump does not function satisfactorily, contact your supplier.

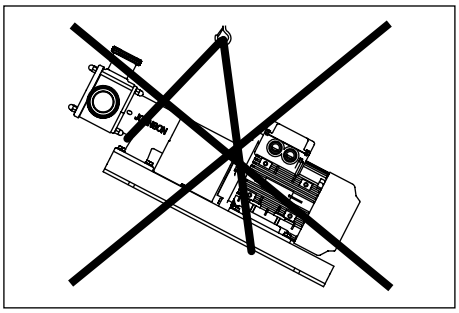
1.3.2 Pump units

1.3.2.1 Pump unit handling

Use an overhead crane, forklift or other suitable lifting device



Secure lifting slings around the front part of the pump and the back part of the motor. Make sure that the load is balanced before attempting the lift. ***NB!*** *Always use two lifting slings.*



Warning
Never lift the pump unit with only one fastening point. Incorrect lifts can result in personal injury and/or damage to the unit.

1.3.2.2 Installation

All pump units should be equipped with a locking safety switch to prevent accidental start during installation, maintenance or other work on the unit.

Warning
The safety switch must be turned to off and locked before any work is carried out on the pump unit. Accidental start can cause serious personal injury.

The pump unit must be mounted on a level surface and either be bolted to the foundation or be fitted with rubber-clad feet.

The pipe connections to the pump must be stress-free mounted, securely fastened to the pump and well supported. Incorrectly fitted pipe can damage the pump and the system.

Warning
Electric motors must be installed by authorized personnel in accordance with local regulations. Faulty electrical installation can cause the pump unit and system to be electrified, which can lead to fatal injuries.

Electric motors must be supplied with adequate cooling ventilation. Electric motors must not be enclosed in airtight cabinets, hoods etc.

Dust, liquids and gases which can cause overheating and fire must be diverted away from the motor.

Warning
Pump units to be installed in potentially explosive environments must be fitted with an Ex-class (explosion safe) motor. Sparks caused by static electricity can give shocks and ignite explosions. Make sure that the pump and system are properly grounded. Check with the proper authorities for the existing regulations. A faulty installation can lead to fatal injuries.

1.3.2.3 Before commissioning the pump unit

Read the pump's operating and safety manual. Make sure that the installation has been correctly carried out according to the relevant pump's manual.

Check the alignment of the pump and motor shafts. The alignment may have been altered during transport, lifting and mounting of the pump unit. For safe disassembly of the coupling guard see below: Disassembly/assembly of the coupling guard.

Warning

The pump unit must not be used with other liquids than those for which it was recommended and sold. If there are any uncertainties contact your sales representative. Liquids, for which the pump is not appropriate, can damage the pump and other parts of the unit as well as cause personal injury.

1.3.2.4 Disassembly/assembly of the coupling guard

The coupling guard is a fixed guard to protect the users and operator from fastening and injuring themselves on the rotating shaft/shaft coupling. The pump unit is supplied with factory mounted guards with certified maximum gaps in accordance with OSHA standards.

Warning

The coupling guard must never be removed during operation. The locking safety switch must be turned to off and locked. The coupling guard must always be reassembled after it has been removed. Make sure to also reassemble any extra protective covers. There is a risk of personal injury if the coupling guard is incorrectly mounted.

a) Turn off and lock the power switch.

b) Disassemble the coupling guard.

c) Complete the work.

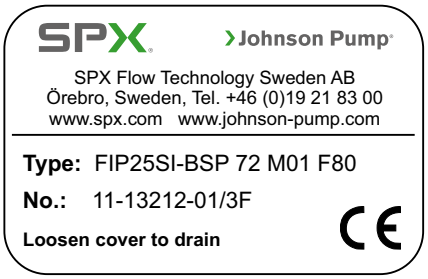
d) Reassemble the coupling guard and any other protective covers. Make sure that the screws are properly tightened.

1.3.2.5 Name plate – CE Declaration of Conformity

Always quote the serial number on the name plate together with questions concerning the pump unit, installation, maintenance etc.

When changing the operating conditions of the pump please contact your supplier to ensure a safe and reliable working pump.

This also applies to modifications on a larger scale, such as a change of motor or pump on an existing pump unit.



1.4 Function and operating principle

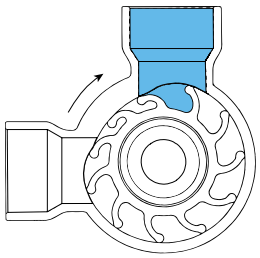
The flexible impeller pump is designed for circulation, transport, emptying, filtration and dosing of liquids.

The pumps are self-priming. The suction capacity is related to speed, viscosity and pipe dimension. An untight suction pipe will reduce the suction capacity considerably.

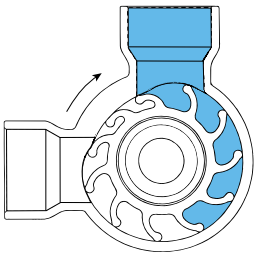
The flexible impeller pump can handle both high and low viscous liquids as well as liquids containing solid particles, air and gases.

1.4.1 Operating principle

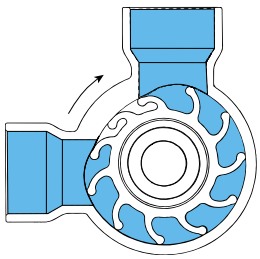
Due to the eccentric interior cross-section of the pump body, a partial vacuum is created as the volume increases between the flexible impeller wings at the inlet port.
The resulting suction draws the liquid into the pump.



The rotating impeller carries the liquid from the inlet towards the outlet port. During this part of the cycle, the volume between the wings remains virtually constant. The distance between the wings allows fairly large solids to pass through the pump without any harm being done to the liquid.



The liquid is discharged from the pump in a continuous, uniform flow when the wings bend, thus decreasing the volume between them, as they come into contact with the flattened part of the eccentric interior walls of the body.



Liquids can be pumped in the opposite direction by reversing the rotation of the pump.

1.5 Model Specifications

Example:	FIP	20	SH	–	DIN	4	2	M01	P80
	1	2	3		4	5	6	7	8

1. Family name

FIP = Flexible Impeller Pump

2. Pump size

20 =
25 =
40 = } Average inlet and outlet port diameter, mm
50 =
65 =

See dimensional drawings, section 6.0

3. Material of pump body and cover

SH = Stainless steel, sanitary version
SI = Stainless steel, industrial version

4. Port/connection

FIP 20/25SI
NPT = NPT thread/hose combination

FIP 40/50/65SI
NPT = NPT thread

FIP 20/25/40/50/65SH
CLP = S-Line sanitary connection

Other connections on request

5. Impeller code

0 = Neoprene industrial version – standard pressure
3 = EPDM, FDA, food grade – high pressure
4 = Neoprene, FDA, milk grade
6 = Neoprene, industrial version – high/intermediate pressure
7 = EPDM, FDA, food grade – standard pressure
9 = Nitrile, splined drive – low pressure

Example: FIP 20 SH – DIN 4 2 M01 P80
1 2 3 4 5 6 7 8

6. Shaft

0 = Splines – Stainless steel
2 = Double flat – Stainless steel

7. Shaft seals

M = Single mechanical seal
L = Lip seal

Material of single mechanical seals

01 = Carbon/ceramic/nitrile
03 = Silicon carbide/silicon carbide/FKM (on request only)

8. Shaft end

P = Pedestal
F = Flange for IEC motor

80 = FIP 20/25 – Pedestal; shaft height, mm
Flange; IEC motor size
90 = FIP 40 – Pedestal; shaft height, mm
Flange; IEC motor size
100 = FIP 50 – Pedestal; shaft height, mm
Flange; IEC motor size
112 = FIP 65 – Pedestal only; shaft height, mm

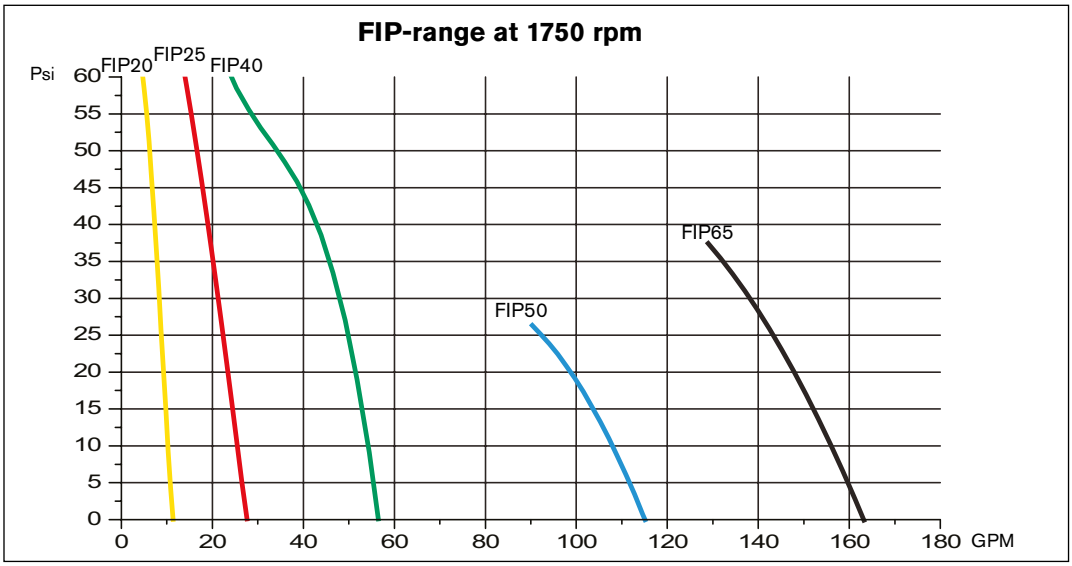
1.6 Impeller data

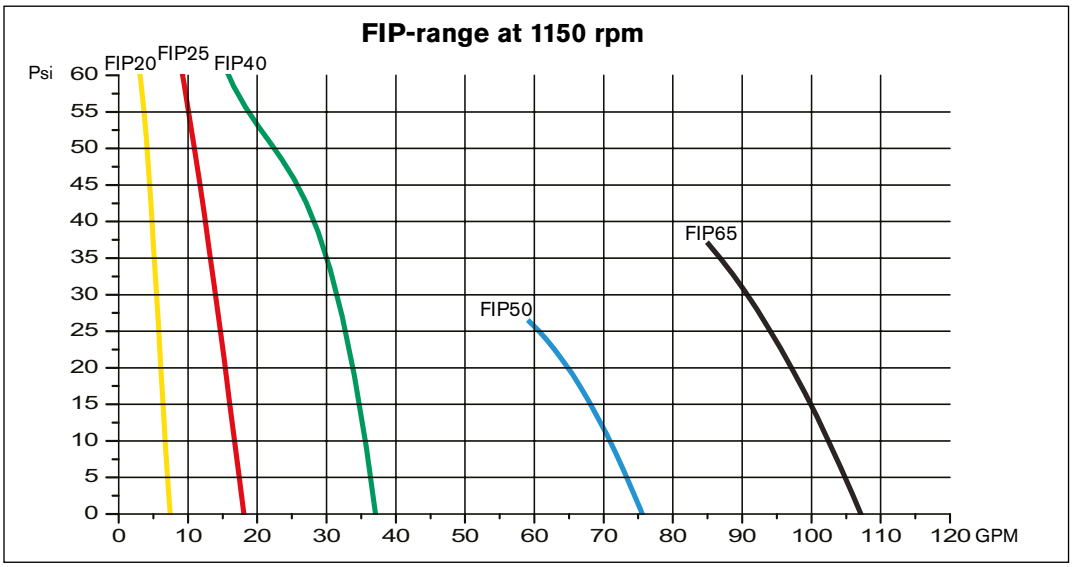
Pump size	Impeller No	Hub type	Impeller material	Impeller code	Min. start torque (Nm)	Min. reverse torque (Nm)	Max. head (psi)	Max suction lift dry (ft)
FIP20S	832S-7	Double flat	EPDM, FDA, Food	7	2.2	5.2	36	15
FIP20S	833S-4	Double flat	Neoprene, FDA, Milk	4	2.2	5.2	36	15
FIP20S	833S-7	Double flat	EPDM, FDA, Food HP	3	3.0	6.0	58	15
FIP25S	837S	Double flat	Neoprene HP	6	7.2	12.0	58	16
FIP25S	836S-7	Double flat	EPDM, FDA, Food	7	4.6	8.3	36	16
FIP25S	837S-4	Double flat	Neoprene, FDA, Milk	4	7.2	12.0	36	16
FIP25S	1028S-9	Splined	Nitrile	9	4.6	8.3	25	13
FIP40S	835S-4	Double flat	Neoprene, FDA, Milk	4	11.0	25.0	36	16
FIP40S	835S-7	Double flat	EPDM, FDA Food HP	3	19.0	32.5	58	16
FIP40S	838S	Double flat	Neoprene Std	0	11.0	25.0	36	16
FIP40S	1029S-9	Splined	Nitrile	9	8.8	25.0	25	13
FIP50S	803S	Double flat	Neoprene Std	0	19.6	36.4	19	13
FIP50S	809S	Double flat	Neoprene IP	6	22.2	42.0	26	16
FIP50S	809S-4	Double flat	Neoprene, FDA, Milk	4	22.2	42.0	19	13
FIP65S	815S	Double flat	Neoprene Std	0	40.0	75.0	36	13
FIP65S	840S-7	Double flat	EPDM, FDA, Food HP	7	30.3	65.0	36	13

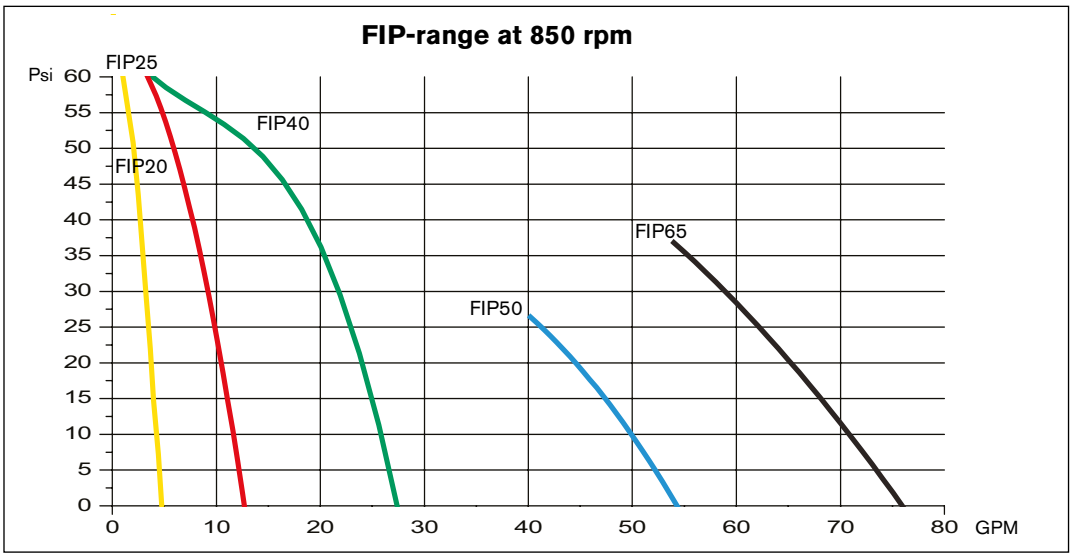
Hub material in all impellers = SS
Std = Standard pressure
IP = Intermediate pressure
HP = High pressure

1.7 Capacity range FIP20S – FIP65S

Neoprene/EPDM high pressure impellers – Curves based on water at 20°C/68°F







2.0 Technical information

Important!
The pump must not be used for other applications than recommended and quoted for without consulting your supplier.

2.1 Dry running

Thanks to the self-priming ability of the pump it will only take a few seconds before the pump starts to prime. The small amount of friction heat that is being created during these few seconds will not damage the pump.

Stainless steel pumps can withstand a dry running period of 30 seconds without damaging the impeller or the pump. Frequent dry running will however shorten the service life of the impeller.

2.2 Pump body

2.2.1 Body design

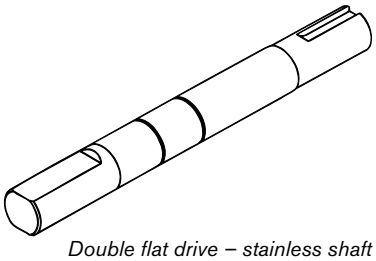
The FIP-range is available in 2 different pump body designs:

- Sanitary stainless steel, AISI 316, polished according to sanitary standards
- Stainless steel, AISI 316

Stainless steel

2.3 Shaft material

- Sanitary stainless steel and industrial stainless steel pumps are supplied with double flat drive, stainless steel AISI 329 shafts. The double flat drive is designed to avoid growth of bacteria in pockets of stagnant media, and is easy to clean.



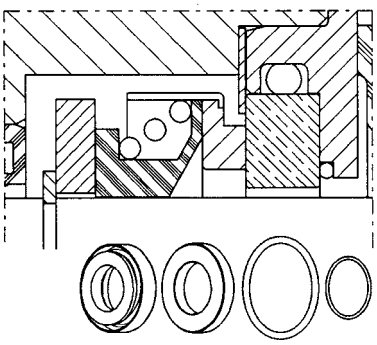
Double flat drive – stainless shaft

2.4 Shaft seals

2.4.1 Mechanical seals

Recommended for food products, solvents and heavier chemicals. Delivered as standard with seal surfaces in carbon vs ceramic.

The mechanical seal for hygienic stainless steel pumps are supplied with an extra O-ring to seal off the area behind the stationary seal part. This will allow easy cleaning with seal in place, and eliminate liquid to remain behind the seal.



2.4.2 Lip seals

Recommended for sticky and viscous liquids as lip seals do not require as much lubrication as mechanical seals.

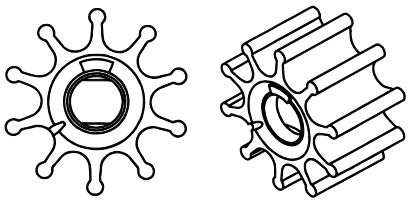
2.5 Impellers

The impeller is a wearing part and the performance of the pump will change with the wear. Flow and pressure will be reduced with the length of the duty.

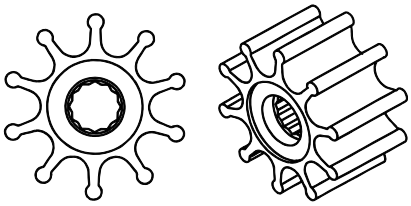
Abrasive liquids will shorten the service life of the impeller, and low speed is recommended. With low speed, a constant flow will be achieved during a longer period of time.

Following factors will effect the service life:

- Temperature, see next page
- The working pressure of the pump
- The speed of the pump
- Impeller material properties
- Lubrication properties of the liquid being pumped



Double flat



Splines

2.5.1 Liquid temperature and impeller life

The service life indicated below is based on several tests with water at 20°C/68°F at continuous duty.

Continuous duty will not effect the service life of the impeller, but in installations with frequent change of rotation, the service life of the impellers will decrease.

Neoprene and EPDM

- Temperature range +3° to +65° / +37° to +149°F
- When operating in the lower and upper areas of the indicated temperature range, performance will be reduced and the service life of the impeller will be shortened

Nitrile

- Temperature range -15° to +65°C / +5° to +149°F
- When operating in the lower and upper areas of the indicated temperature range, performance will be reduced and the service life of the impeller will be shortened

For higher tempatures please consult your supplier.

2.6 Storage

A pump which is not installed immediately should be stored in a cool and dark room, and the impeller be removed. The rubber material of the impeller ages and should be treated as perishables. The storage should not exceed 2 years. If the pump has been out of operation for a longer period of time, the impeller should be lubricated before use, to receive optimal suction ability.

2.7 Sound level

Pump size	Speed rpm	Head psi	Sound pressure level dB (A)	Sound effect level dB (A)	Noise declaration in accordance with ISO 4871, dB (A)
FIP20	2 800	58	79.8	–	–
FIP25	1 450	58	79.9	–	–
FIP40	2 800	58	85.8	85.3	88.3/92.3
FIP50	1 450	26	86.3	85.8	88.8/92.8
FIP65	1 450	36	89.9	89.4	92.4/96.4

2.8 Tightening torque for cap screws

Pump size	Tightening torque (Lbs-in.)	
	Min	Max
FIP20S	22	70
FIP25S	22	70
FIP40S	44	88
FIP50S	106	142
FIP65S	133	177

2.9 Motor size

Flange mounted pumps are to be mounted to IEC standard motors with foot and small flange (B3/B14):

FIP20 = Motor size 80

FIP25 = Motor size 80

FIP40 = Motor size 90

FIP50 = Motor size 100

Pedestal pumps shall be mounted on a suitable base plate and be connected to any type of drive.

3.0 Installation, operation and maintenance

Note! See also section 1.3 Safety.

3.1 Pumping of food products

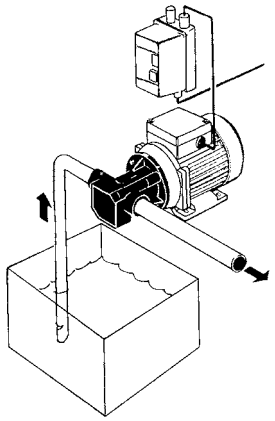
When pumping food products and other liquids with sanitary demands, the pump and the system must always be drained and cleaned after **every** use.

3.2 Pumping of corrosive liquids

Corrosive and sometimes even relatively neutral liquids will attack the material of pump and pump system. Draining and flushing of the pump and the system are recommended after **every** use or after each working day. This is also recommended for liquids that has a tendency to solidify at a lower temperature than the pumping temperature.

3.3 Installation and piping

- Anchor the pump unit and check that it is properly aligned.
- Install the pump closest possible to the tank to be pumped from.
- Use at least the same diameter of the pipes from and to the pump as for the diameter of the in- and outlet ports of the pump.
- If hose is used on the suction side, it should to be reinforced.
- Make sure all pipes to and from the pump are clean from scraps, slag and other particles that would damage the pump.



- Make sure all pipe lines are correctly aligned with the pump connections and **unloaded** to prevent loads from being applied to the pump.
- Install shut-off valves on both sides of the pump to be able to shut off the in- and outlet before service and maintenance. Check to see that the pump can be drained without injuring anyone and without damaging the environment or nearby equipment.
- Protect the pump from excessive pressure by installing a suitable safety valve in the system. Install meters/sensors in the in- and outlet of the system to monitor the system.
- Check the rotation of the pump.
- If there is a risk of dry running, install a suitable dry running protection. Contact your supplier for advice.
- All electrical installation work must be carrried out by authorized personnel in accordance with existing regulations.

Important!

Improper installation, operation, service and/or maintenance can cause serious personal injury and/or material damage. It will also invalidate the warranty.

3.4 Starting up

- Make sure that all valves are open.

- Check that all safety devices are in place, e.g. coupling guards, lockable circuit breakers and other safety guards keeping personnel from coming into contact with the rotating parts of the unit.
- Check the rotation of the pump by turning the pump on **briefly once.** Clock-wise rotation involves priming at the right port, when the pump is viewed from the motor end. Reversed rotation gives reversed flow direction.
- Start the pump and check the liquid flow rate. If the pump does not function within the dry running limitations (30 seconds), turn off the pump and follow the instructions in the trouble shooting chart, section 7.0.
- Check the pressure, temperature and flow and make sure that the pump is operating within the limits.

- Before inspecting the pump/system, the power must be shut off and the starting device be locked.
- If the pump has not been in operation for a long period of time, lubricate the impeller before start.
- If the pump does not function satisfactorily, contact your supplier for further advice.
- When returning a pump for inspection or repair, it must be cleaned and wrapped up in a proper way. Documention stating pumped liquid, operating conditions, your own opinion of fault/failure reason and your contact person must be included in the pump package. Also contact the consignee before returning the pump.

3.5 Frequent check points

- Check regularly that noise level, vibrations and bearing temperature are normal.
- Check that there is no leakage.
- Check pressure and flow. Change impeller if performance is dropping.
- Check shaft seal and other wearing parts and replace when needed.

4.0 Disassembly and assembly

4.1 Assembly of head kit (pump without motor) to IEC-motor

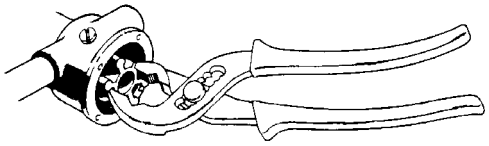
See drawing section 5.1.

1) Clean the motor shaft and make sure that the surface does not have any cuts or marks.
2) Put the pump and motor shaft together by using a plastic hammer or equivalent. Make sure not to damge the pump shaft.
3) Clean the surface area of the rotating seal part and assemble to the pump shaft.
4) Bolt the flange to the motor.
5) Clean the surface area of the stationary seal part, which is assembled in the pump body.
6) Slide the complete pump head kit onto the flange, taking care not to damage the seals. Twist the pump back and forth to get the shaft connected correctly in the impeller. In case of necessity, pull out the impeller and assemble the pump body separately.
7) Tighten the cap screws according to section 2.8.

4.2 Disassembly of impeller and shaft seal

See drawing section 5.1, 5.3.

1) If check valves are installed, close the valves on both sides of the pump and drain the pump.
2) Remove the front cover (2) and gasket.
3) Remove the impeller (3) from the pump body (4) by using suitable pliers or two levers. Take care not to damage the pump body.



4) Separate the pump body from the pedestal/flange (6).
5) Press out the seal seat from the pump body. Remove the seal assembly from the shaft.
6) Inspect and clean all parts which will be reused.

4.3 Assembly of shaft seal and impeller

See drawing section 5.1, 5.3.

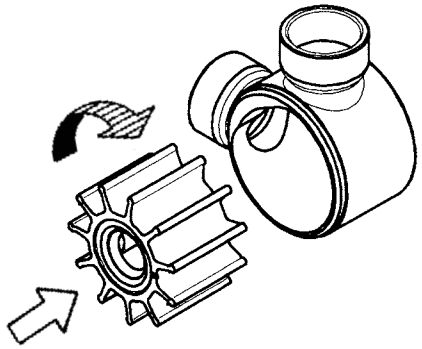
1) Slide the rotating seal part onto the shaft with a twisting movement, and press the stationary seal part into the pump body. Lubrication with soap solution will ease the assembly.

3) Assemble the pump body to the pedestal/ flange, taking care not to damage the seal.

4) Lubricate the impeller with grease or vaseline. For food products applications use appropriate food grade lubricant.

   Push the impeller into the pump body with a twisting movement in the operating direction, centralizing the impeller hub.

5) Assemble the front cover gasket and the front cover (see section 2.8 Tightening torque for cap screws).



4.4 Disassembly of pedestal

See drawing section 5.3.

1) Remove the pump with its components following the instructions in section 4.2.
2) Pry out the outer bearing seal (20).
3) Remove the retaining ring (19) from the pedestal.
4) Press on the impeller drive end of the shaft to remove the shaft (7) and bearing assembly.
5) Press off the ball bearings from the shaft and remove the retaining ring (17) and spacer (18).
6) Press out the lip seal (14) if necessary to change.
7) Clean all parts that are going to be reused and check the shaft for wear.

4.5 Assembly of pedestal

See drawing section 5.3.

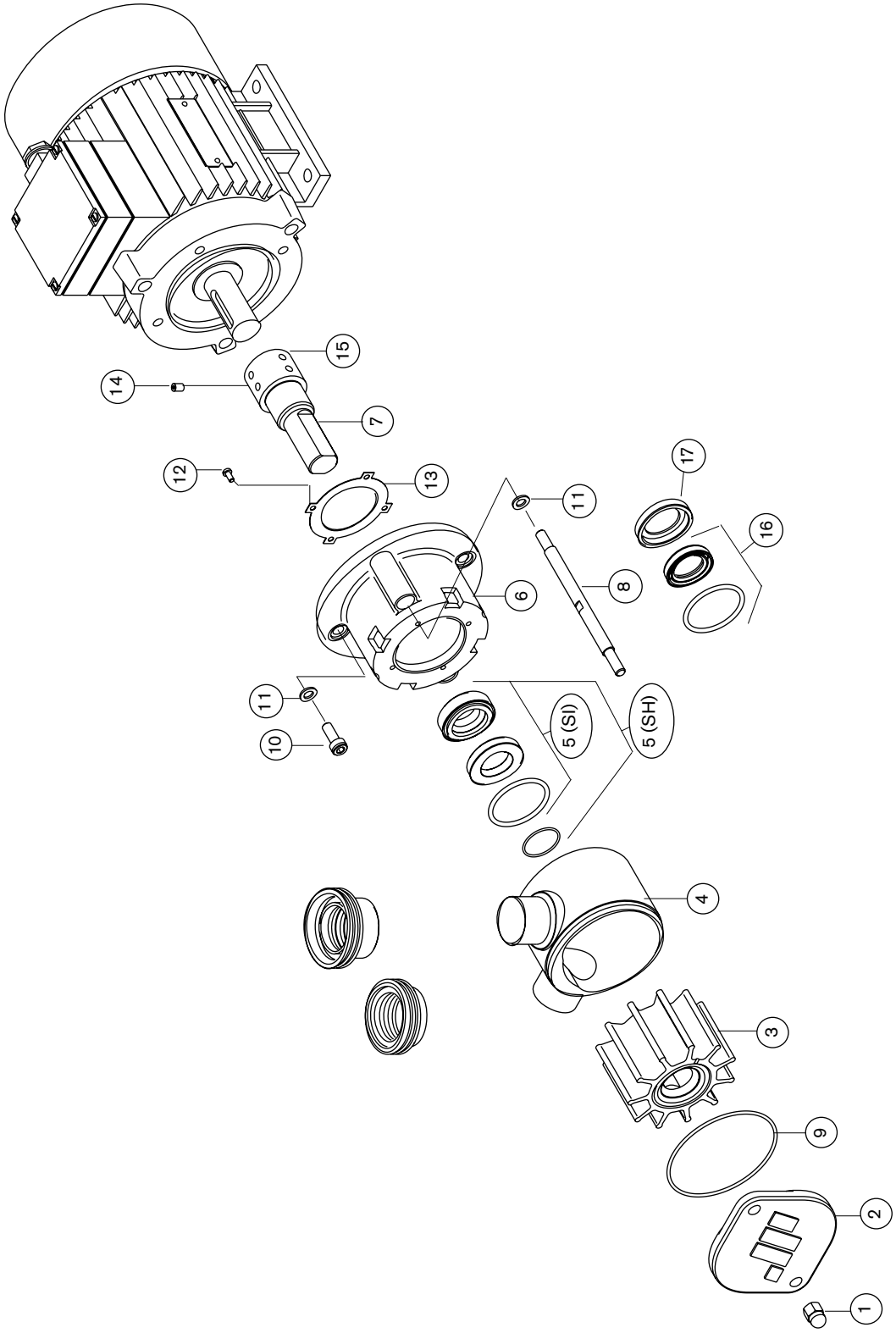
1) Mount ball bearings, spacer and retaining ring on the shaft (see pos 16, 17 and 18).
2) Mount lip seal (14). Lubrication with soap solution will ease the assembly.
3) Press in the shaft including the bearing assembly into the pedestal.
4) Mount the retaining ring (19) and the new lip seal (20). Lubrication with soap solution will ease the assembly.
5) Assemble the pump according to the instructions in section 4.3.

4.6 Waste handling/material recycling

At the products end of life, please dispose of the product according to applicable law. Where applicable, please disassemble the product and recycle the parts material.

5.0 Sectional drawings and Spare part lists

5.1 Drawing – Stainless steel pumps (S) – Flange mounted



5.2 Spare part list

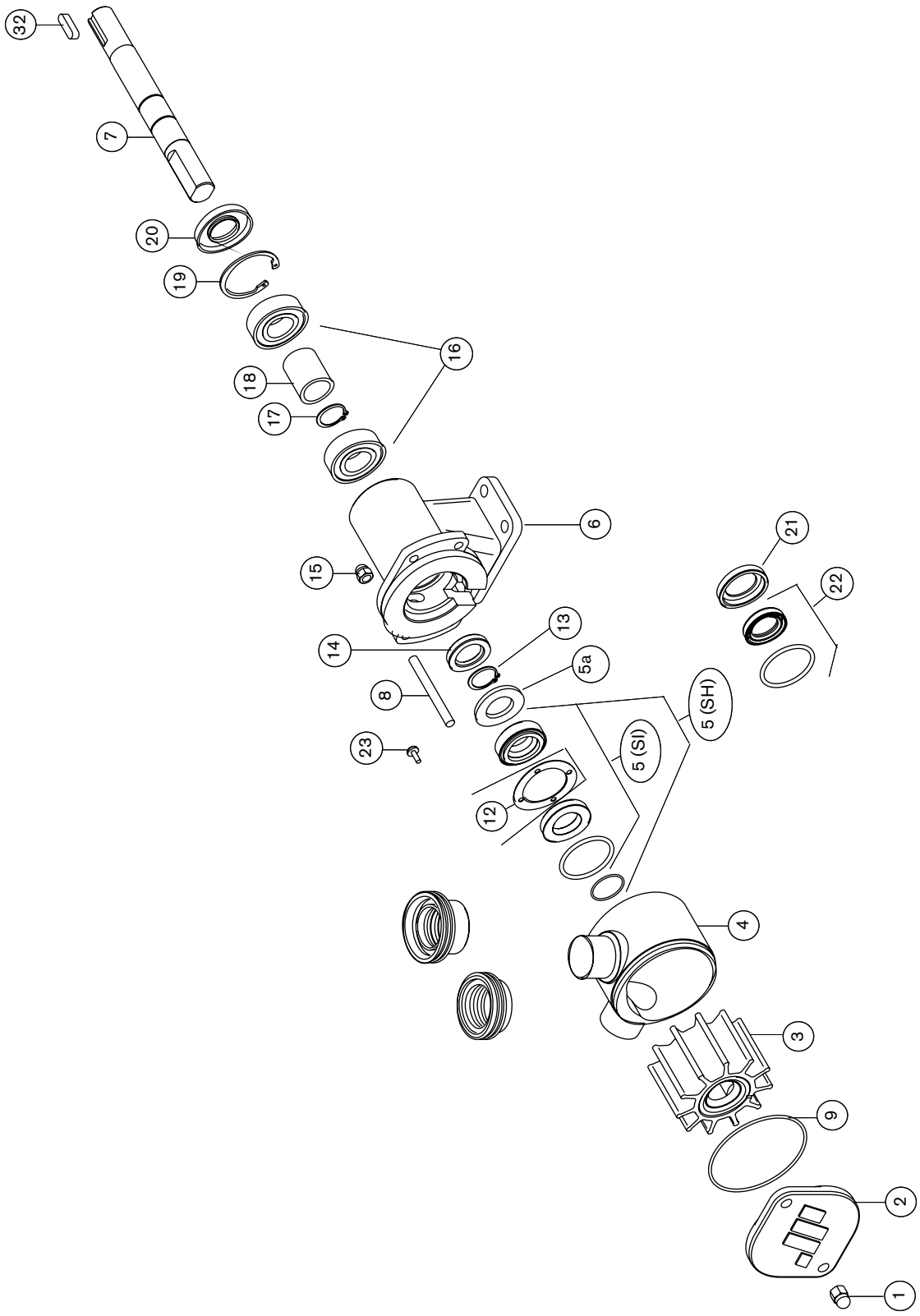
FIP20S, FIP25S, FIP40S, FIP50S – Flange mounted

Drawing: Page 22

Pos	Nos	Description	Version *)	FIP20SI/SH 10-13211 SI 10-13210 SH	FIP25SI/SH 10-13212 SI 10-13213 SH	FIP40SI/SH 10-13214 SI 10-13215 SH	FIP50SI/SH 10-13218 SI 10-13216 SH
1	2	Cap screw (cover)		01-46505	01-46505	01-46505	01-46505
2	1	Cover SI	SI	01-35817	01-35818	01-35822	01-24532
		Cover SH	SH	01-35849	01-35850	01-35851	01-24549
3	1	Impeller - Neoprene	0	–	–	09-838S	09-803S
	1	Impeller - Neoprene, high pressure	6	–	09-837S	–	09-809S
	1	Impeller - FDA, Neoprene	4	09-833S-4	09-837S-4	09-835S-4	09-809S-4
	1	Impeller - FDA, EPDM	7	09-832S-7	09-836S-7	–	–
	1	Impeller - FDA, EPDM high pressure	3	09-833S-7	–	09-835S-7	–
	1	Impeller - Nitrile, splined	9	–	09-1028S-9	09-1029S-9	–
4	1	Pump body - NPT SI	SI-NPT	01-24525-4	01-24527-4	01-24529-4	01-13190-4
	1	Pump body - CLP SH	SH-CLP	01-24774-1	01-24775-1	01-24776-1	01-24777
5	1	Mechanical seal SI Carbon/Ceramic/Nitrile	M01	09-46686-02	09-46686-02	09-46686-06	09-46686-05
		Mechanical seal SH Carbon/Ceramic/EPDM	M06	09-46686-04	09-46686-04	09-46686-08	09-46686-07
6	1	Motor flange		01-24252	01-24252	01-24255	01-24079
7	1	Shaft	2	01-46633	01-46634	01-46635	01-35040
8	2	Screw stud		01-46636	01-46638	01-46640	01-46642
9	1	O-ring - Nitrile (cover)		0.2173.446	0.2172.013	0.2173.441	0.2173.437
10	2	Screw		0.0141.911	0.0141.911	0.0257.036	0.0141.918
11	4	Washer		0.0350.116	0.0350.116	01-45767	0.0350.118
12	4	Screw		0.0150.001	0.0150.001	0.0278.802	–
13	1	Washer		01-45782	01-45782	01-45768	01-45692
14	4	Lock screw		0.0300.943	0.0300.943	0.0300.943	0.0300.943
15	1	Sleeve		01-45214	01-45214	–	–
16	1	Lip seal set		09-46688-01	09-46688-01	09-46688-03	09-46688-01
17	1	Lip seal retainer		01-46900	01-46900	01-46901	01-46900

**) See key to model specification system, chapter 1.5.*

5.3 Drawing – Stainless steel pumps (S) – Pedestal mounted



5.4 Spare part list

FIP20S, FIP25S, FIP40S, FIP50S, FIP65S – Pedestal mounted

Drawing: Page 28

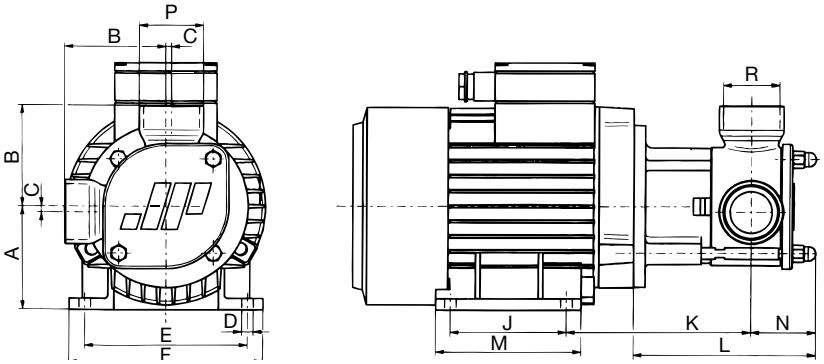
Pos	Nos	Description	Version *)	FIP20SI/SH 10-24544 SI 10-24543 SH	FIP25SI/SH 10-24546 SI 10-24545 SH	FIP40SI/SH 10-24548 SI 10-24547 SH	FIP50SI/SH 10-13219 SI 10-13217 SH
1	2	Cap screw (cover)		01-46505	01-46505	01-46505	01-46505
2	1	Cover SI	SI	01-35817	01-35818	01-35822	01-24532
		Cover SH	SH	01-35849	01-35850	01-35851	01-24549
3	1	Impeller - Neoprene	0	–	–	09-838S	09-803S
	1	Impeller - Neoprene, high pressure	6	–	09-837S	–	09-809S
	1	Impeller - FDA, Neoprene	4	09-833S-4	09-837S-4	09-835S-4	09-809S-4
	1	Impeller - FDA, EPDM	7	09-832S-7	09-836S-7	–	–
	1	Impeller - FDA, EPDM high pressure	3	09-833S-7	–	09-835S-7	–
	1	Impeller - Nitrile, splined	9	09-1028S-9	–	09-1029S-9	–
4	1	Pump body - NPT SI	SI-NPT	01-24525-5	01-24527-5	01-24529-5	01-13190-4
	1	Pump body - CLP SH	SH-CLP	01-24774-3	01-24775-3	01-24776-3	01-24777
5	1	Mechanical seal SI Carbon/Ceramic/Nitrile	M01	09-46686-01	09-46686-01	09-46686-05	09-46686-05
	1	Mechanical seal SH Carbon/Ceramic/EPDM	M06	09-46686-03	09-446686-03	09-46686-07	09-46686-07
5a	1	Washer		01-46632	01-46632	01-45692	01-45692
6	1	Pedestal		01-24248	01-24248	01-24249	01-24012
7	1	Shaft	2	01-35835	01-35836	01-35837	01-32609
8	2	Screw stud		01-46637	01-46639	01-46641	01-46642
9	1	O-ring - Nitrile (cover)		0.2173.446	0.2172.013	0.2173.441	0.2173.437
12	1	Retainer		01-46632	01-46632	01-45692	01-45692
13	1	Retaining ring		0.0370.516	0.0370.516	0.0370.525	–
14	1	Lip seal		0.2233.014	0.2233.014	0.2233.008	0.2234.002
15	2	Nut		0.0195.100	0.0195.100	0.0195.100	0.0195.100
16	2	Ball bearing		0.3431.778	0.3431.778	0.3431.001	0.3431.488
	1	Roller bearing		–	–	–	0.3428.570
17	1	Retaining ring		0.0370.516	0.0370.516	0.0370.525	0.0370.040
18	1	Spacer		01-42583	01-42583	01-42747	01-45005
19	1	Retaining ring		0.0371.047	0.0371.047	0.0371.052	0.0371.080
20	1	Lip seal		0.2234.004	0.2234.004	0.2233.013	0.2234.003
21	1	Lip seal retainer		–	–	–	–
22	1	Lip seal set		–	–	–	–
23	1	Screw		–	–	–	–
32	1	Key		–	–	0.0502.231	0.0502.03

**) See key to model specification system, chapter 1.5.*

6.0 Dimensions and weights

6.1 FIP20S-FIP65S – Flange mounted

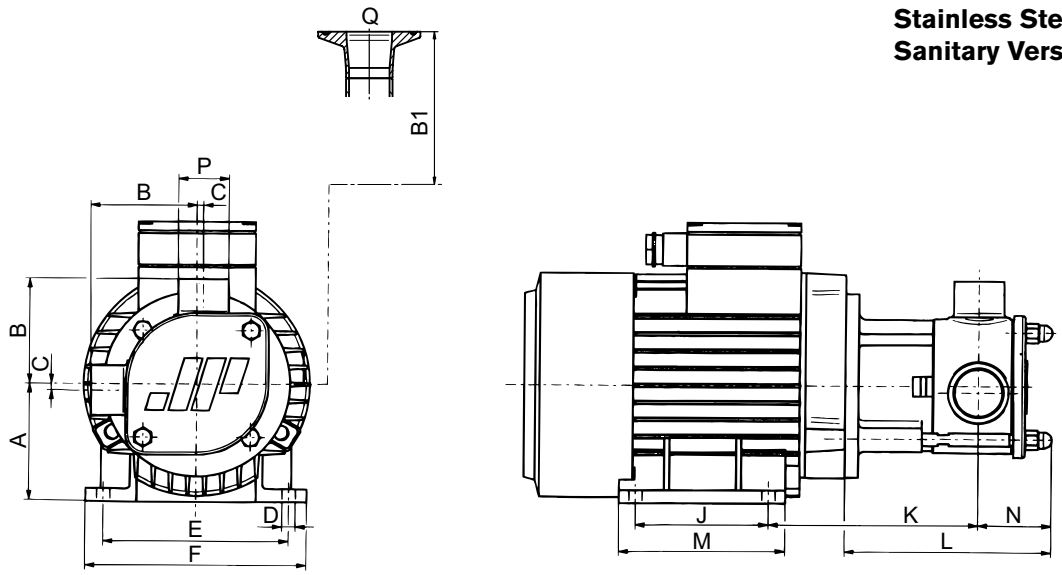
Stainless Steel SS316
Industrial Version



	A	B	C	D	E	F	J	K	L	M	N	P
FIP20SI	3.15	2.75	0.098	ø0.39	4.92	5.9	3.94	4.84	4.49	4.96	1.61	ø1.25
FIP25SI	3.15	2.99	0.078	ø0.39	4.92	5.9	3.94	5.24	5.24	4.96	1.97	ø1.49
FIP40SI	3.54	3.42	0.197	ø0.39	5.51	6.57	3.94	6.18	6.12	5	2.16	ø2.16
FIP50SI	3.94	4.33	0.256	ø0.47	6.3	7.4	5.51	8.19	8.43	6.57	2.72	ø2.64

	R	IEC motor size	Weight pump+ motor, lbs
FIP20SI	NPT 3/4"	80	23.1
FIP25SI	NPT 1"	80	26
FIP40SI	NPT 1.1/2"	90	36.7
FIP50SI	NPT 2"	100	64.9

Stainless Steel SS316
Sanitary Version

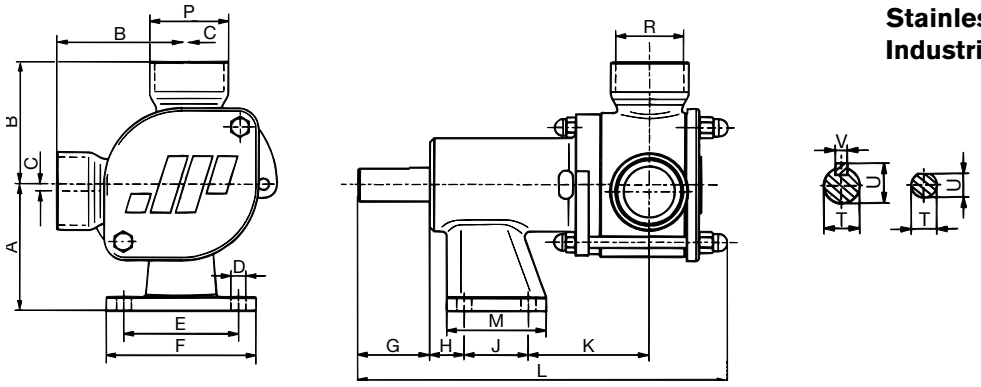


	A	B	B1	C	D	E	F	J	K	L	M	N	P
FIP20SH	3.15	2.44	2.97	0.098	ø0.39	4.92	5.9	3.94	4.84	4.49	4.96	1.61	ø0.87
FIP25SH	3.15	2.44	3.23	0.078	ø0.39	4.92	5.9	3.94	5.24	5.24	4.96	1.97	ø0.98
FIP40SH	3.54	2.44	3.9	0.197	ø0.39	5.51	6.57	3.94	6.18	6.12	5	2.16	ø1.49
FIP50SH	3.94	4.33	4.78	0.256	ø0.47	6.3	7.4	5.51	8.19	8.43	6.57	2.72	ø2

	Q	IEC motor size	Weight pump+ motor, lbs
FIP20SH	S-Line sanitary connection, 1"	80	23.1
FIP25SH	S-Line sanitary connection, 1"	80	26
FIP40SH	S-Line sanitary connection, 1.1/2"	90	36.7
FIP50SH	S-Line sanitary connection, 2"	100	64.9

6.2 FIP20S-FIP65S – Pedestal mounted

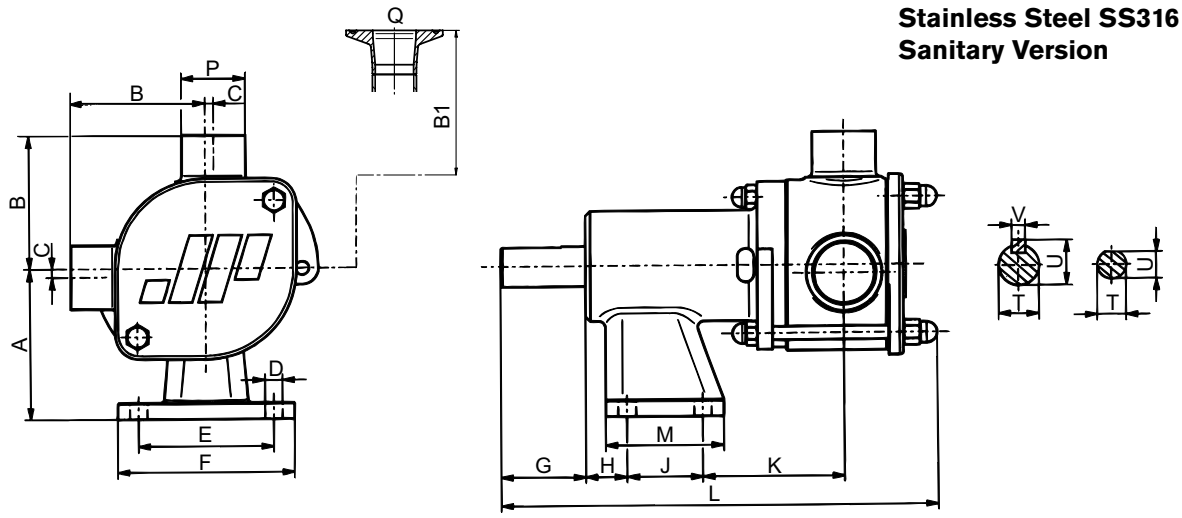
Stainless Steel SS316
Industrial Version



	A	B	C	D	E	F	G	H	J	K	L	M	P
FIP20SI	3.15	2.75	0.098	ø0.35	2.75	3.54	1.57	1.61	1.18	1.89	7.87	1.97	ø1.25
FIP25SI	3.15	2.99	0.078	ø0.35	2.75	3.54	1.57	1.61	1.18	2.28	8.62	1.97	ø1.49
FIP40SI	3.54	3.42	0.197	ø0.41	3.15	4.13	1.97	0.96	1.77	3.31	10.2	2.75	ø2.16
FIP50SI	3.94	4.33	0.256	ø0.43	2.95	4.13	2.75	0.98	2.95	3.6	13.03	4.13	ø2.64
FIP65SI	4.41	4.53	0.394	ø0.43	3.94	5.12	2.75	1.77	2.75	3.84	14.05	3.94	ø3.31

	R	T	U	V	Weight pump, lbs
FIP20SI	NPT 3/4"	ø0.67	0.63	–	5.28
FIP25SI	NPT 1"	ø0.67	0.63	–	5.28
FIP40SI	NPT 1.1/2"	ø0.94	1.06	0.315	11
FIP50SI	NPT 2"	ø1.1	1.22	0.315	19.8
FIP65SI	NPT 2.1/2"	ø1.1	1.22	0.315	29.7

Stainless Steel SS316
Sanitary Version



	A	B	B1	C	D	E	F	G	H	J	K	L	M	P
FIP20SH	3.15	2.44	2.97	0.098	ø0.35	2.75	3.54	1.57	1.61	1.18	1.89	7.87	1.97	ø0.87
FIP25SH	3.15	2.44	3.23	0.078	ø0.35	2.75	3.54	1.57	1.61	1.18	2.28	8.62	1.97	ø0.98
FIP40SH	3.54	3.15	3.9	0.197	ø0.41	3.15	4.13	1.97	0.96	1.77	3.31	10.2	2.75	ø1.49
FIP50SH	3.94	4.33	4.78	0.256	ø0.43	2.95	4.13	2.75	0.98	2.95	3.6	13.03	4.13	ø2
FIP65SH	4.41	4.53	4.96	0.394	ø0.43	3.94	5.12	2.75	1.77	2.75	3.84	14.05	3.94	ø2.5

	Q	T	U	V	Weight pump, lbs
FIP20SH	S-Line sanitary connection, 1"	ø0.67	0.63	–	5.28
FIP25SH	S-Line sanitary connection, 1"	ø0.67	0.63	–	5.28
FIP40SH	S-Line sanitary connection, 1.1/2"	ø0.94	1.06	0.315	11
FIP50SH	S-Line sanitary connection, 1.1/2"	ø1.1	1.22	0.315	19.8
FIP65SH	S-Line sanitary connection, 2"	ø1.1	1.22	0.315	31.24

7.0 Trouble shooting chart

7.1 Pump

Cause	Remedy
Pump is not starting	
No electric power	*Check/replace the fuse. Check that the electric system is not overloaded.*
Low voltage	*Check that the wiring is not too long and that it has the right dimension.*
Unsufficient starting torque of motor	*Check starting torque required, change the motor if necessary*
Unnormal swelling of the impeller	*Change the impeller. Contact your supplier for suitable impeller material.*
Pump is not priming	
Wrong rotation of the pump	*Reverse rotation*
Loose front cover screws	*Tighten the screws according to section 2.8 Tightening torque for cap screws.*
Torn front cover gasket	*Replace*
Blocked inlet/outlet pipes	*Flush and clean pipings and connections. Open all valves*
Suction lift too high	*Fill suction pipe/reduce suction lift*
Motor speed too low	*Increase speed*
Air leakage in suction line	*Seal the line and the connection ports*
Worn or damaged impeller	*Replace impeller*
Worn or damaged front cover, wear plate, cam	*Replace parts*
Worn or damaged shaft seal	*Replace shaft seal*
No sealing compound on cam and cam screw	*Apply recommended sealing compound*

Cause	Remedy
Pump is leaking	
Pressure too high	*Decrease pressure by increasing the diameter of the pipings and also on any filters installed. Clean filter if installed*
Worn shaft seal	*Replace shaft seal*
Worn ball bearings, shaft deflection	*Replace ball bearings*
Common reasons for unnormal wear of the mechanical seal ▪ Abrasive liquid ▪ Liquid is crystallizing ▪ Sticky liquids	*Contact your supplier for further advice.*
Insufficient flow	
System pressure too high	*Increase diameter of the pipings, clean filter if installed.*
Pump too small	*Choose other pump size*
Worn pump	*Replace worn parts*
Suction line too small or blocked	*Increase diameter*
Pump speed too low	*Increase pump speed*
Air leakage in suction line	*Seal the line and the connection ports*
Suction hose sucked against tank wall	*Angle cut the hose*
Diameter of suction/discharge line too small for specified capacity/viscosity	*Increase the diameter of the pipings*

7.2 Impeller

This guide is designed to help you to identify typical application problems that now and then occur in flexible impellers during normal use.

Rubber is a “living” material and impellers should be kept in a dark and cool place for long term storage. The impeller life is strongly reduced by frequent dry running excessive pressure and/ or temperature. It is advised to operate between +10° to +50°C / +50° to +122°F to obtain a long life.

Problem 1
Pieces are missing from vanes/tips, especially in centre of impeller.
Edges eaten away, hollowed out.
Pitting on ends of impeller.

Causes
Cavitation, i.e. pressure too low at pump inlet, fluid evaporates locally.

Precautions
Reduce pump speed. Increase inlet pipe diameter. Reduce inlet pipe length and restrictions.

Problem 2
End faces hard, polished, cracked, looks like carbon. Some or all vanes completely missing in severe cases.

Causes
Dry running.

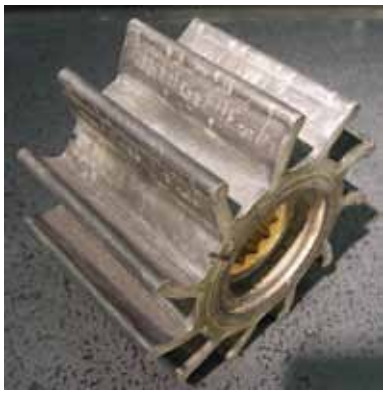
Precautions
Do not run more for than 30 seconds without liquid in the pump. Stop the pump as soon as liquid is exhausted. Arrange the pipe work to trap liquid in the pump on the discharge side. Prevents dry running for several minutes. Install a dry running protection device, i.e. an electronic pump guard.

Problem 3
Vanes cracked half way up their height. Pieces of vanes are missing.

Causes
Normal end of useful life. Excessive outlet pressure reduces impeller life. A crease on trailing side of each vane can indicate excessive pressure. Liquid temp above 131°F reduces impeller life.

Precautions
Reduce the discharge pressure by reducing the pump speed and/or increase the outlet pipe diameter. Reduce the pipe length and restrictions. Reduce the liquid temperature.

Problem 4
Vanes permanently and excessively curved.



Causes
Long term storage in pump. Normal end of useful life. (Especially for Nitrile impellers.)

Precautions
Always remove the impeller for long term storage. Keep it in a dark and cool place. Refit the impeller to rotate in opposite direction.

Problem 5
Worn vane tips and faces. Worn impeller drive.

Causes
Abrasive wear from pump or fluid. Worn impeller drive can also be due to excessive pressure.

Precautions
Pump should continue to operate satisfactorily in worn condition. Replace severely worn pump parts. Reduce the pump speed to prolong the service life.

JOHNSON PUMP

FIP - series

FLEXIBLE IMPELLER PUMP

SPX FLOW TECHNOLOGY
611 Sugar Creek Road
Delavan, WI 53115
Phone: (262) 728.1900 Toll free: (800) 252.5200
Fax: (262) 728.4904

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