



*Instruction Manual*  
*FIP-range*  
*Flexible Impeller Pumps*

## Declaration of conformity (Directive 98/37/EG, Annex 2A)

### **Manufacturer**

Johnson Pump  
P.O. Box 1436  
SE-701 14 Örebro  
Sweden

We declare under our sole responsibility that the product:

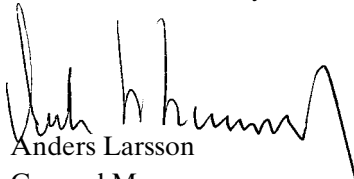
### **FIP-range Flexible Impeller Pumps**

is in conformity with  
COUNCIL DIRECTIVE on the approximation of the laws of the Member  
States relating to Machinery 98/37/EG.

## Declaration of incorporation (Directive 98/37/EG, Annex 2B)

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

Örebro, Sweden, May 1, 2002



Anders Larsson  
General Manager

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# 1.0 Introduction

## 1.1 General

The flexible impeller pumps for industrial use are manufactured by Johnson Pump AB, Örebro, Sweden, and are sold and marketed by a net of authorized distributors.

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 Johnson Pump's 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

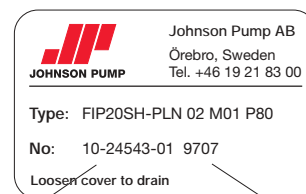
### 1.2.1 Reception

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 Johnson Pump 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.

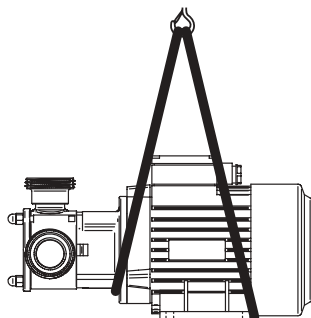


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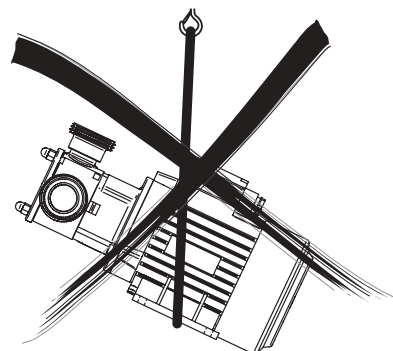
Manufacturing code

### 1.2.2 Handling

Check the weight of the pump unit. All parts weighing more than 20 kg 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. 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 receive optimal suction ability.

## 1.3 Safety

### ***Important!***

The pump must not be used for other purposes than recommended and quoted for without consulting Johnson Pump's distributor.

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



- 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 EN60204-1. 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, 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. Absolutely forbidden to flush a hot pump with cold water. Big temperature changes can cause crack formation or explosion, which in turn can entail severe personal injuries.
- The pump must not operate above stated performance. See section 1.7 Performance data.

- Before intervening in the pump/system, the power must be shut off and the starting device be locked. When intervening in 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 invalidate 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. Consult your Johnson Pump distributor.
- If the pump does not function satisfactorily, contact your distributor.

## 1.4 Function and operating principle

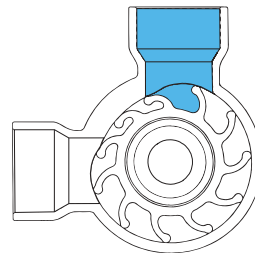
The impeller pump is designed for circulation, transport, emptying, filtration and dosing of liquids.

The pumps are self-priming. The manometric suction lift for a pump not filled with liquid is up to 5 m. The suction ability is related to speed, viscosity and pipe dimension. An untight suction pipe will reduce the suction ability considerably.

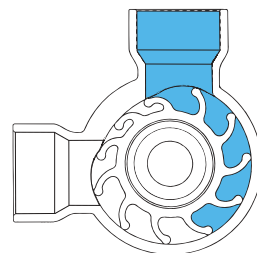
The impeller pump can handle both high and low viscous liquids as well as liquids containing solid particles, air and gases.

### 1.4.1 Operating principle

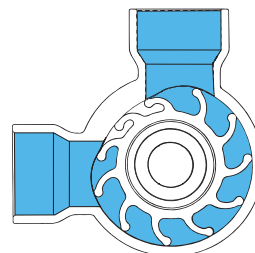
Due to the eccentric interior cross-section of the pump body, a partial vacuum is created as the volume increases between the flexible impeller wings at the inlet port. The resulting suction draws the liquid into the pump.



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 =  
50 =  
65 =

} Average inlet and outlet port diameter, mm

See dimensional drawings, section 6.0

### 3. Material of pump body and cover

SH = Stainless steel, hygienic version  
SI = Stainless steel, industrial version  
B = Bronze

### 4. Port/connection

FIP 20/25SI, FIP 25/40B

BSP = BSP thread/hose combination

FIP 40/50/65SI

BSP = BSP thread

FIP 20/25/40/50/65SH

DIN = DIN 11851

SMS = SMS 1145

PLN = Plain without coupling

Other connections on request

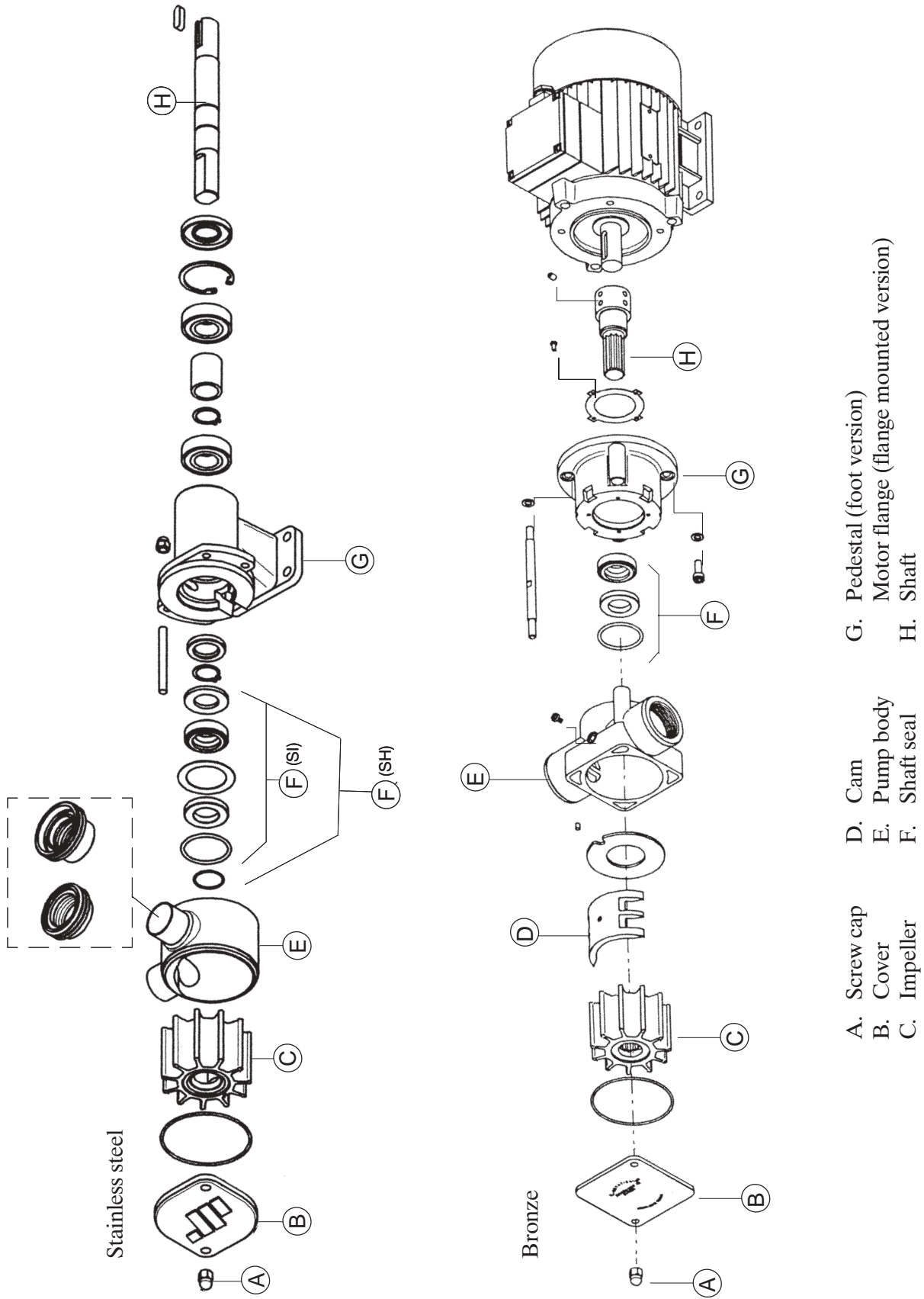
### 5. Impeller code

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 – standard pressure





## 1.6 Standard parts of pump



- A. Screw cap
- B. Cover
- C. Impeller
- D. Cam
- E. Pump body
- F. Shaft seal
- G. Pedestal (foot version)  
Motor flange (flange mounted version)
- H. Shaft

## 1.7 Performance data

### 1.7.1 Pump sizes FIP20S – FIP65S

Pump size	Impeller No	Hub type	Impeller material	Rubber code	Min. start torque (Nm)	Min. reverse torque (Nm)	Liquid temp. (°C)	Max. head (bar)	Max flow (l/min)	Max speed (rpm)	Max suction lift dry (m)
FIP20S	832S-7	Double flat	EPDM, FDA, Food	7	2.2	5.2	+3 to +80	2.5	70	2 800	4.5
FIP20S	833S-4	Double flat	Neoprene, FDA, Milk	4	2.2	5.2	+3 to +80	2.5	68	2 800	4.5
FIP20S	833S-7	Double flat	EPDM, FDA, Food HP	3	3.0	6.0	+3 to +90	4.0	68	2 800	4.5
FIP25S	837S	Double flat	Neoprene HP	6	7.2	12.0	+3 to +90	4	83	1 400	5.0
FIP25S	836S-7	Double flat	EPDM, FDA, Food	7	4.6	8.3	+3 to +80	2.5	147	2 800	5.0
FIP25S	837S-4	Double flat	Neoprene, FDA, Milk	4	7.2	12.0	+3 to +80	2.5	129	1 400	5.0
FIP25S	1028S-9	Spined	Nitrile	9	4.6	8.3	-15 to +85	1.75	140	2 800	4.0
FIP40S	835S-4	Double flat	Neoprene, FDA, Milk	4	11.0	25.0	+3 to +80	2.5	256	1 400	5.0
FIP40S	835S-7	Double flat	EPDM, FDA Food HP	3	19.0	32.5	+3 to +80	4	259	2 000	5.0
FIP40S	838S	Double flat	Neoprene Std	0	11.0	25.0	+3 to +80	2.5	264	2 500	5.0
FIP40S	1029S-9	Spined	Nitrile	9	8.8	25.0	-15 to +85	1.75	265	2 500	4.0
FIP50S	803S	Double flat	Neoprene Std	0	19.6	36.4	+3 to +80	1.3	440	2 000	4.0
FIP50S	809S	Double flat	Neoprene IP	6	22.2	42.0	+3 to +80	1.8	421	2 000	5.0
FIP50S	809S-4	Double flat	Neoprene, FDA, Milk	4	22.2	42.0	+3 to +80	1.3	310	1 400	4.0
FIP65S	815S	Double flat	Neoprene Std	0	40.0	75.0	+3 to +80	2.5	495	1 400	4.0
FIP65S	840S-7	Double flat	EPDM, FDA, Food HP	7	30.3	65.0	+3 to +90	2.5	495	1 400	4.0

Hub material in all impeller = SS

Std = Standard pressure

IP = Intermediate pressure

HP = High pressure

## 1.7.2 Impeller sizes FIP25B and FIP40B

Pump size	Impeller No	Hub material	Hub type	Impeller material	Rubber code	Min. start torque (Nm)	Min. reverse torque (Nm)	Liquid temp. (°C)	Max. head (bar)	Max flow (l/min)	Max speed (rpm)	Max suction lift dry (m)
FIP25B	1028B	Bronze	Splined	Neoprene Std	0	4.6	8.3	+3 to +80	2.5	158	2 800	5.0
FIP25B	1028S	SS	Splined	Neoprene Std	0	4.6	8.3	+3 to +80	2.5	158	2 800	5.0
FIP25B	816B	Bronze	Splined	Neoprene HP	6	7.2	12.0	+3 to +80	4.0	105	1 400	5.0
FIP25B	816S	SS	Splined	Neoprene HP	6	7.2	12.0	+3 to +80	4.0	83	1 400	5.0
FIP25B	1028B-9	Bronze	Splined	Nitrile	9	4.6	8.3	-15 to +85	1.75	158	2 800	4.0
FIP25B	1028S-9	SS	Splined	Nitrile	9	4.6	8.3	-15 to +85	1.75	158	2 800	4.0
FIP40B	819B	Bronze	Splined	Neoprene Std	0	11.0	25.0	+3 to +80	2.5	295	2 500	5.0
FIP40B	1029S	SS	Splined	Neoprene Std	0	8.8	25.0	+3 to +80	2.5	295	2 500	5.0
FIP40B	818B	Bronze	Splined	Neoprene HP	6	19.0	32.5	+3 to +80	4.0	295	2 000	5.0
FIP40B	818S	SS	Splined	Neoprene HP	6	19.0	32.5	+3 to +80	4.0	295	2 000	5.0
FIP40B	819B-9	Bronze	Splined	Nitrile	9	11.0	25.0	-15 to +85	1.75	295	2 500	4.0
FIP40B	1029S-9	SS	Splined	Nitrile	9	8.8	25.0	-15 to +85	1.75	295	2 500	4.0

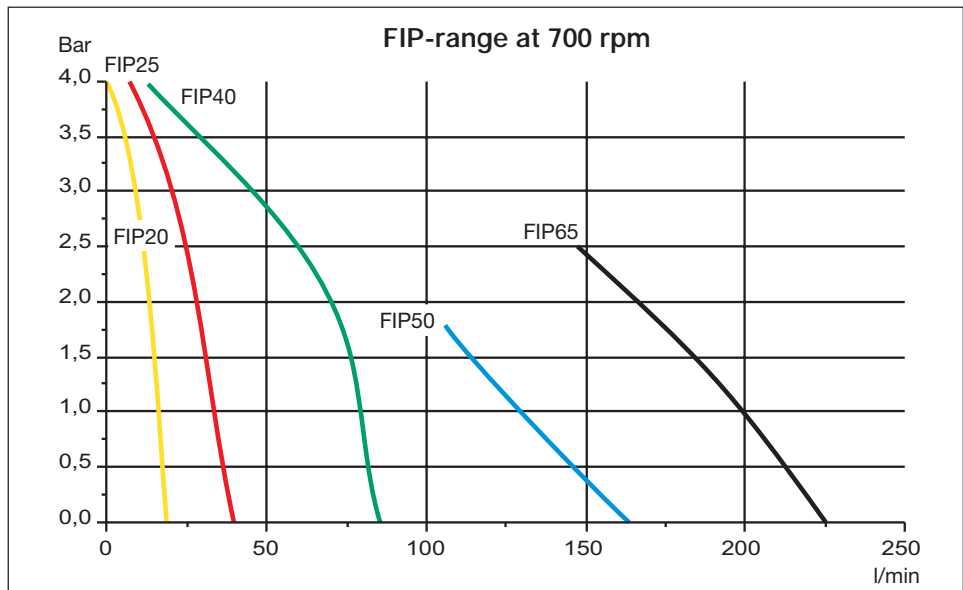
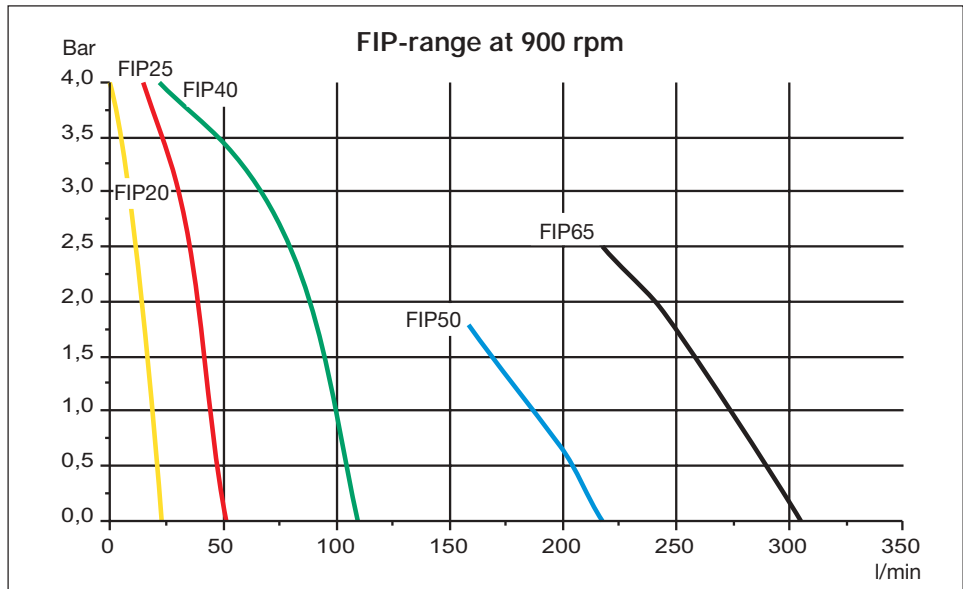
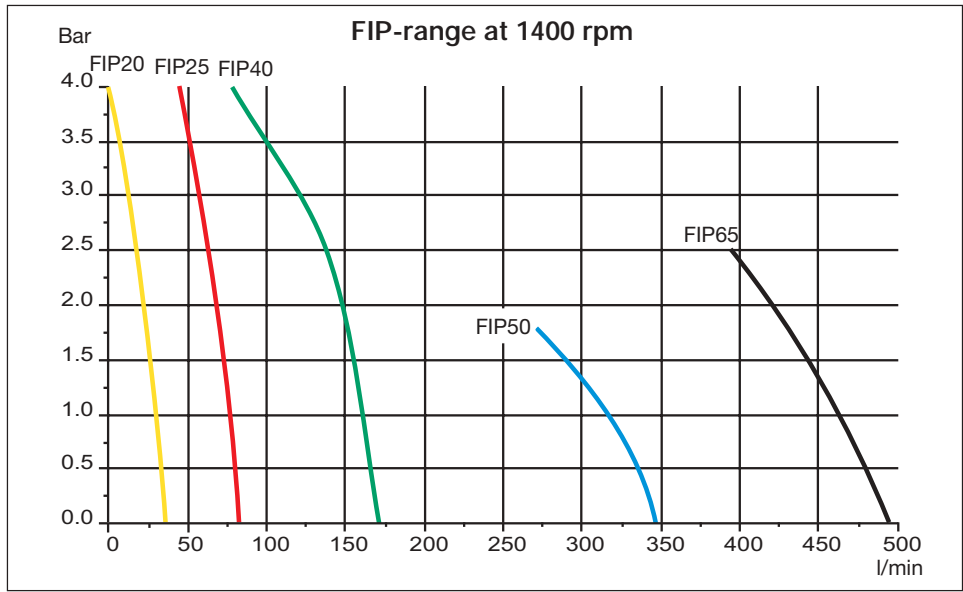
Std = Standard pressure

IP = Intermediate pressure

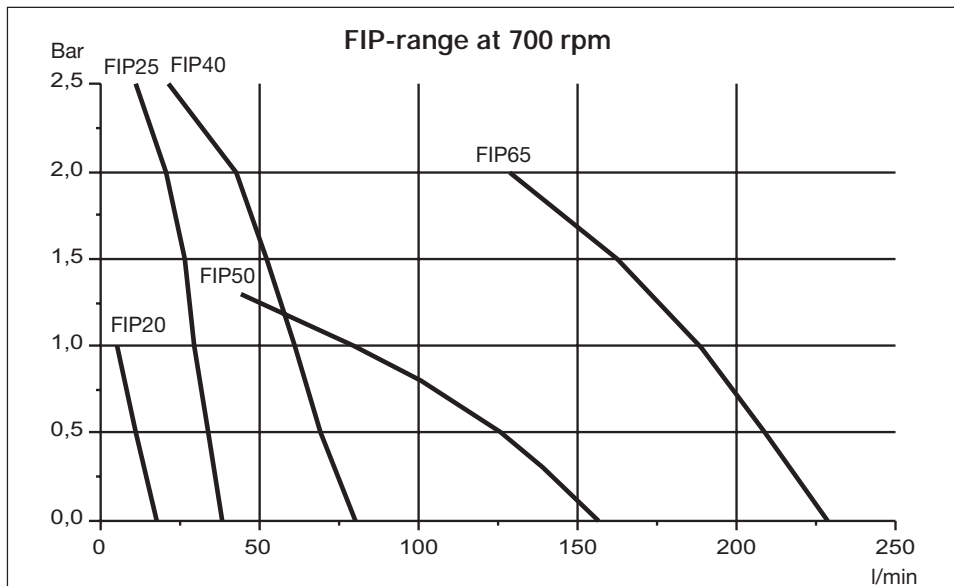
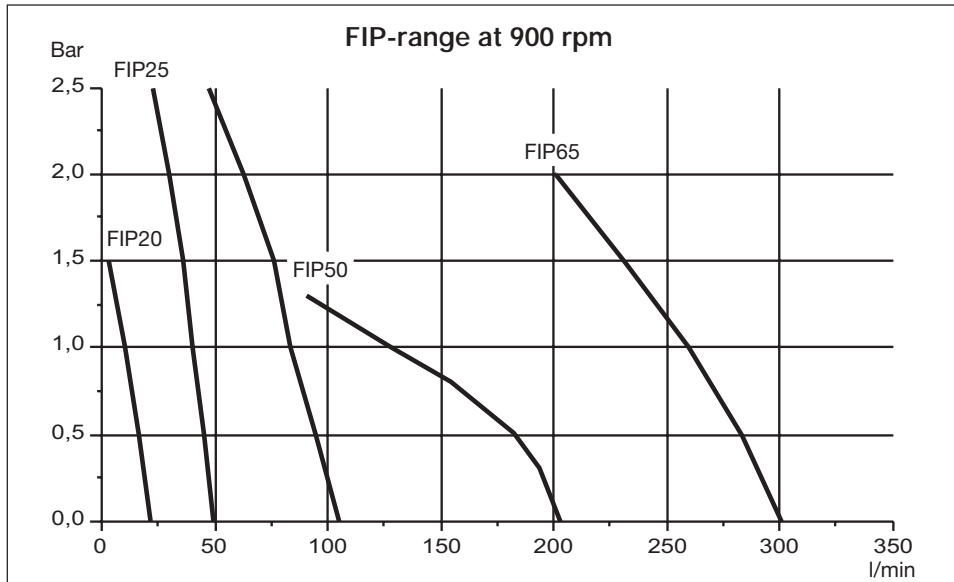
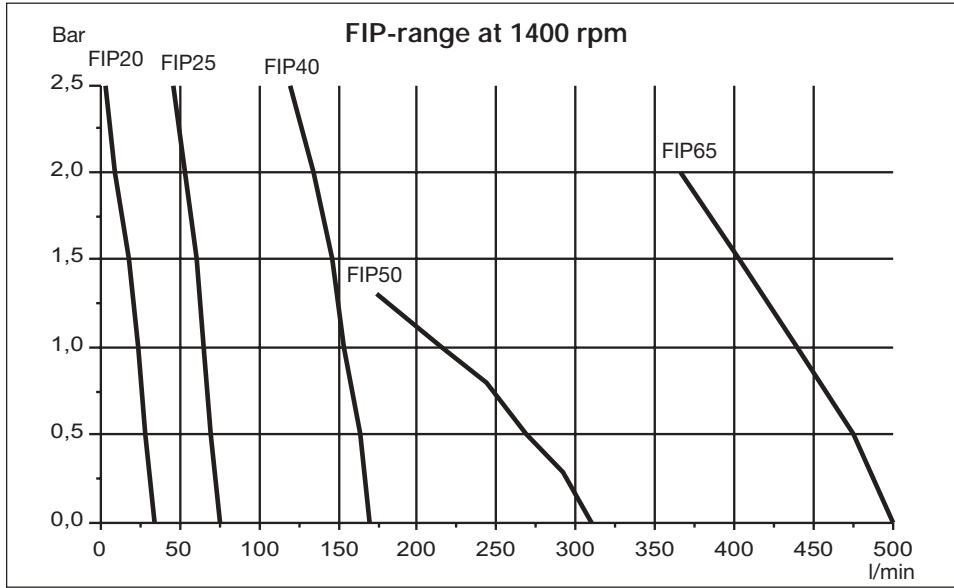
HP = High pressure

### 1.7.3 Capacity range FIP20S – FIP65S at 1 400, 900 and 700 rpm

*Neoprene impeller – Curves based on water at 20°C*



1.7.4 Capacity range FIP20S–FIP65S pumps at 1 400, 900 and 700 rpm  
*Neoprene milk impeller – Curves based on water at 20°C.*



## 2.0 Technical information

### ***Important!***

The pump must not be used for any other liquids than recommended and quoted for without consulting Johnson Pump's distributor.

### 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.

Bronze and 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.

At delivery, the impeller is lubricated with grease to minimize the risk of dry-running at the first start-up.

### 2.2 Pump body

For chemical resistance, contact your Johnson Pump supplier.

#### 2.2.1 Body executions

The FIP-range is available in 3 different pump body executions:

- Hygienic stainless steel, AISI 316, polished according to sanitary standards
- Stainless steel, AISI 316
- Bronze, dezincification resistant brass

Chemical resistance and hygienic requirements are primarily responsible for which material is most suited.



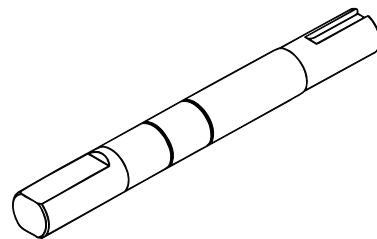
*Stainless steel*



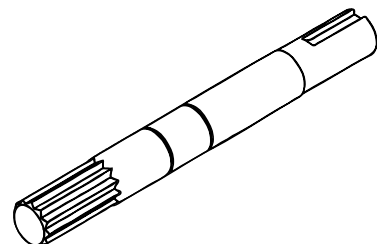
*Bronze*

### 2.3 Shaft material

- Hygienic 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.
- Bronze pumps are supplied with splined drive stainless steel AISI 329 shafts. The splined drive ensures that the drive torque is distributed evenly over an increased area between the impeller and the shaft to reduce abrasive wear.



*Double flat drive, stainless shaft*



*Splined drive, stainless shaft*

## 2.4 Shaft seals

For chemical resistance, contact your Johnson Pump supplier.

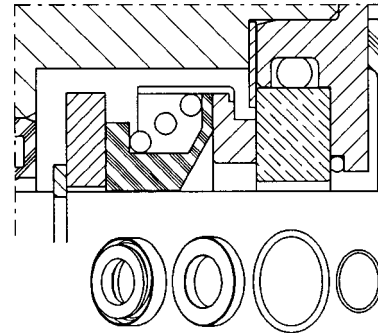
### 2.4.1 Mechanical seals

Recommended for foodstuffs, solvents and heavier chemicals.

Delivered as standard with seal surfaces in carbon vs ceramic.

Mechanical seals can also, upon request, be supplied with seal faces of silicon carbide vs silicon carbide.

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 high viscous liquids as lip seals do not require as much lubrication as mechanical seals.

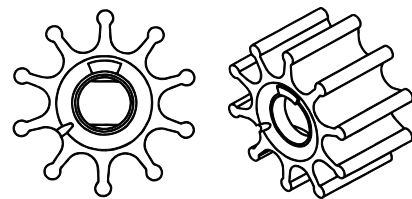
## 2.5 Impellers

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.

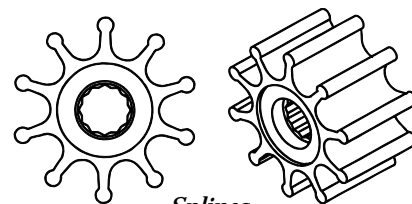
Abrasive liquids will shorten the service life of the impeller, and low speed is recommended. With low speed, a constant flow will be achieved during a longer period of time.

Following factors will effect the service life:

- The working pressure of the pump
- The speed of the pump
- Impeller material properties
- Lubrication properties of the liquid being pumped



*Double flat*



*Splines*

For chemical resistance, contact your Johnson Pump supplier.



### 2.5.1 Liquid temperature and impeller life

The service life indicated below is based on several tests with water at 20°C 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**

- Temperature range +3° till +80°C
- 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
- To receive maximum service life, **operate below +50°C**
- Service life is normally 500-2,000 h, provided that the liquid is not pitting the material
- High pressure neoprene impeller will last somewhat less than the standard type  
***Note! High pressure impellers may not be used in the flange mounted pumps due to risk of motor shaft breakage***

#### **Nitrile**

- Temperature range -15° till +85°C
- 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
- Service life is normally 200 - 500 h

### 2.6 Storage

A pump which is not installed immediately should be stored in a cool and dark room. 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 receive optimal suction ability.

### 2.7 Revolutions

An impeller pump which is run within the limits shown in Performance data, 1.8, will reach its maximum service life in the speed range of 1,400-2,000 rpm provided it is pumping non-abrasive liquids. For Food-graded impeller, maximum service life will be achieved at a speed range up to 900 rpm.

### 2.8 Contact your Johnson Pump supplier for information on

- Flow at different vacuum
- Required power and starting torque
- Calculation of available starting torque

## 2.9 Sound level

Pump size	Speed rpm	Head bar	Sound pressure level dB (A)	Sound effect level dB (A)	Noise declaration in accordance with ISO 4871 dB (A)
FIP20	2,800	4.0	79.8	–	–
FIP25	1,400	4.0	79.9	–	–
FIP40	2,800	4.0	85.8	85.3	88.3/92.3
FIP50	1,400	1.8	86.3	85.8	88.8/92.8
FIP65	1,400	2.5	89.9	89.4	92.4/96.4

## 2.10 Pressure

The pump may not be operating above its performance - see max pressure, temperature, etc. at Performance data, section 1.7.

If the pump is operating above these data, there will be a risk of shaft breakage, leaking shaft seal, impeller breakage or total wreckage of the pump.

Max recommended inlet pressure is 0.5 bar.

### 2.10.1 Max operating pressure

#### **Flange mounted pumps**

FIP20 - 4.0 bar at max 2,800 rpm

FIP25 - 1.75 bar at max 1,500 rpm

FIP40 - 2.5 bar at max 1,500 rpm

FIP50 - 1.3 bar at max 1,500 rpm

FIP50 - 1.8 bar at max 1,500 rpm

#### **Pedestal mounted pumps**

FIP20 - 4.0 bar at max 2,800 rpm

FIP25 - 2.5 bar at max 2,800 rpm

FIP25 - 4.0 bar at max 1,500 rpm

FIP40 - 2.5 bar at max 2,000 rpm

FIP40 - 4.0 bar at max 1,500 rpm

FIP50 - 1.3 bar at max 1,500 rpm

FIP50 - 1.8 bar at max 1,500 rpm

FIP65 - 2.5 bar at max 1,500 rpm

## 2.11 Motor size

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

FIP20 = Motorsize 80

FIP25 = Motorsize 80

FIP40 = Motorsize 90

FIP50 = Motorsize 100

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

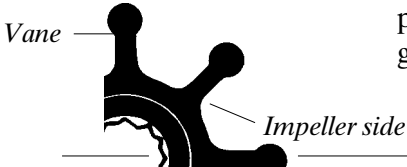
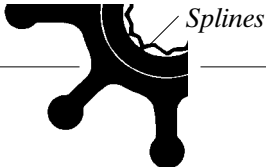
## 3.0 Installation, operation and maintenance

*Note! See also section 1.3 Safety..*

### 3.1 General information

During normal duty an impeller will operate up to 2000 h. If the impeller of any reason is wearing unnormally, check schedule below and make precautions.

**Important!** Always use JP-original parts.

Symptom	Cause	Precaution
Wear on the top of the impeller vanes or at the insert	The pump is not getting sufficient flow Can also be caused by the liquid, e.g. solvents	Increase the diameter of the suction line or reduce the speed
Impeller vanes are heavily worn	Liquid is crystallizing or contains abrasive particles like sand, graphite, pigments	If crystallizing, clean pump after each use If abrasive, lower the speed
		
Impeller sides are hard and glossy	Dry running or pumping liquid that is making the impeller to swell	If dry running - install appropriate pump guard* If impeller is swelling, check other impeller material*
Broken impeller vanes	Dry running, cavitation, high pressure, wrong impeller material	Prevent dry running and cavitation Lower the pressure, check chemical resistance of impeller material*
Aged impeller	Performance is dropping	Check the performance regularly and replace impeller when performance is dropping
Pump does not start	Impeller is swelled due to wrong impeller material or longer stops with liquid standing in the system	Change impeller material* Always drain and clean the system after use
No flow	Bonding between insert and impeller has failed because of swelling or high pressure	See above Lower the pressure
Worn splines	Speed is too high	Lower the speed
		

\* Contact Johnson Pump supplier for advice.

## 3.2 Pumping of foodstuffs



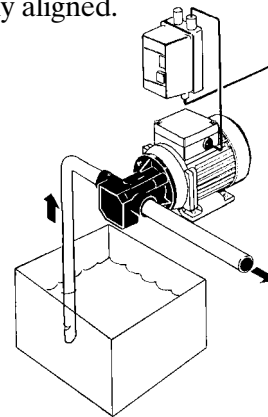
When pumping foodstuffs and other liquids with hygienic demands, the pump and the system must always be drained and cleaned after **every** use.

## 3.3 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 temperature at operation.

## 3.4 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 ought to be reinforced.
- Make sure that all pipes to and from the pump are clean from scraps, slag and other particles that would damage the pump.
- See to it that 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 Johnson Pump supplier for advice.



- All electrical installation work must be carried 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.

## 3.5 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 for bronze and SS pumps), 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 stated in Performance data 1.7



- Before intervening in 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 longer period of time, grease the impeller before start.
- If the pump does not function satisfactorily, contact your Johnson Pump supplier for further advice.
- When returning a pump for repair, investigation or other reason, it must be cleaned and wrapped up in a proper way. Documentation 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.

## 3.6 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

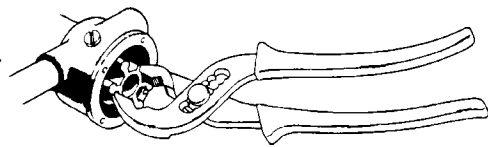
See drawing sections 5.1 and 5.5.

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 damage 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 screw caps (1).

### 4.2 Disassembly of impeller and shaft seal

See drawing sections 5.1, 5.3, 5.5 and 5.7.

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). Check for wear inside the pump body and replace wearing parts if necessary (bronze pumps only).
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 sections 5.1, 5.3, 5.5 and 5.7.

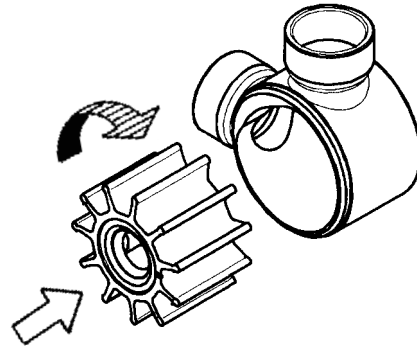
1. Slide the rotating seal part onto the shaft with a twisting movement, and press the stationary seal part into the pump body. Lubrication with soap solution will ease the assembly.
2. Bronze pumps: Change wear plate (22) and cam (21) if worn. Before assembling, apply sealing compound onto cam, e.g. Permatex Form-a-gasket No. 3, and cam screw, e.g. Permatex Form-a-gasket No. 2.

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 foodstuff applications use appropriate food grease.

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.

#### 4.4 Disassembly of pedestal

See drawing sections 5.3 and 5.7.

1. Remove the pump with its components following the instructions in section 4.2.
2. Prize 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.

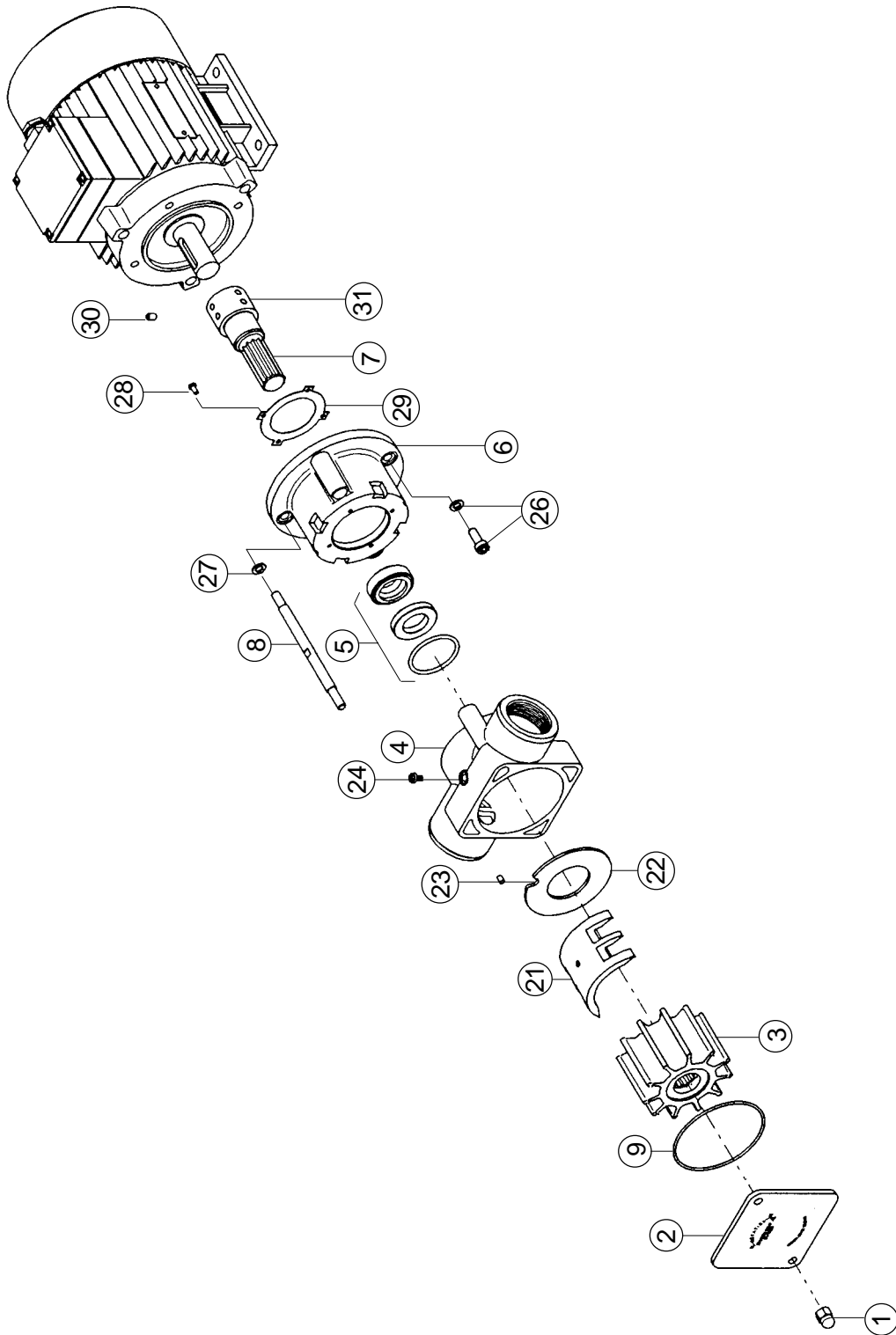
#### 4.5 Assembly of pedestal

See drawing sections 5.3 and 5.7.

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.

## 5.0 Sectional drawings and Spare part lists

### 5.1 Drawing – Bronze pumps (B) – Flange mounted





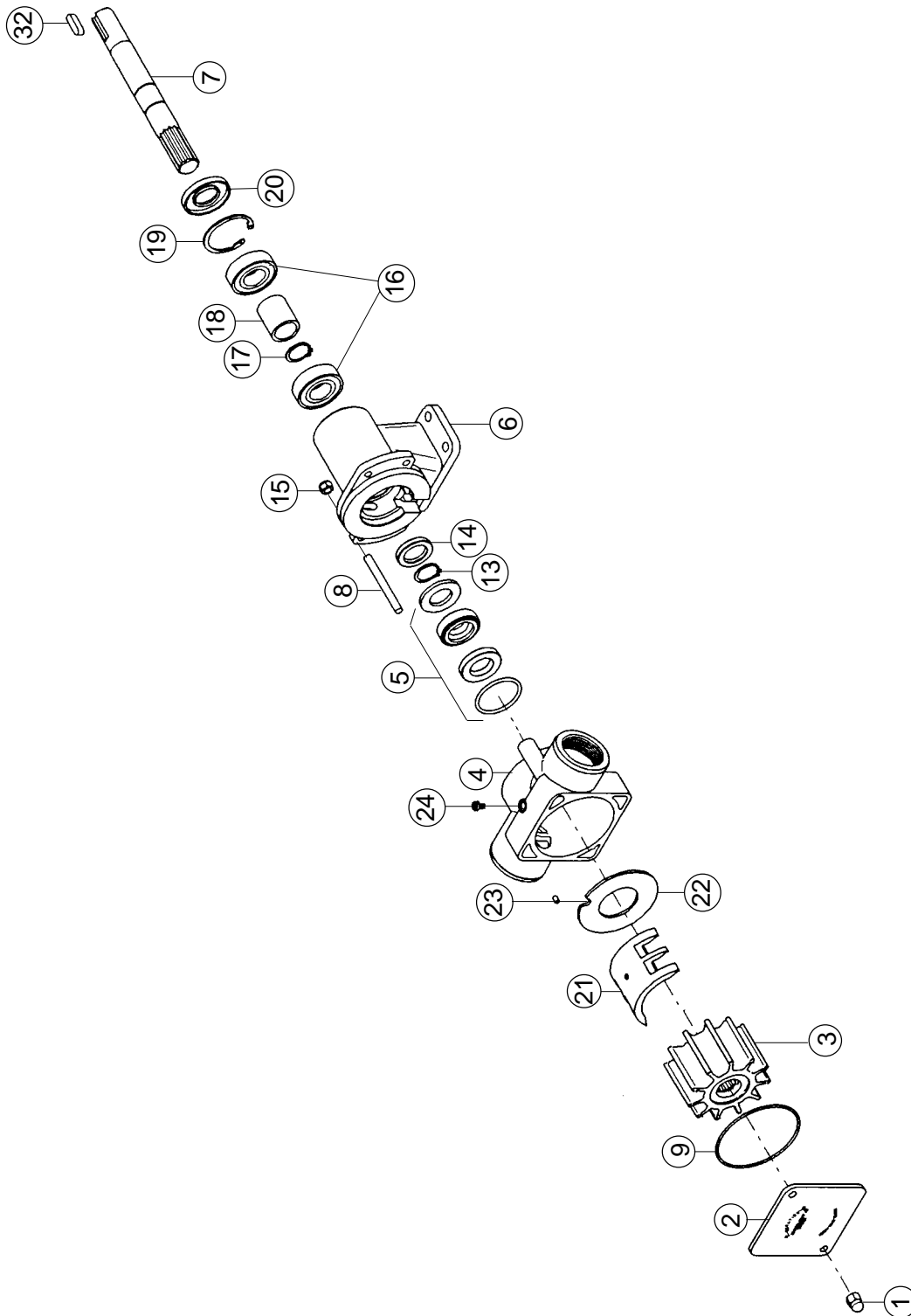
## 5.2 Spare part list – FIP25B and FIP40B – Flange mounted

Drawing: Page 22

Pos	Nos	Description	Version*)	FIP25B 10-45874	FIP40B 10-45880
1	2	Screw cap (front cover)		01-46505	01-46505
2	1	Front cover		01-45781	01-45778
3	1	Impeller - Neoprene	0	09-1028B	09-819B
	1	Impeller - Neoprene, high pressure	6	–	–
	1	Impeller - Nitrile	9	09-1028B-9	09-819B-9
4	1	Pump body - BSP		01-24250-1 (1")	01-24251-1 (1.1/2")
5	1	Mechanical seal (SS-shaft) Carbon/Ceramic/Nitrile	M01	09-45860-01	09-45860-13
	1	Mechanical seal (SS-shaft) Silicon carbide/Silicon carbide/Viton	M03	09-45860-04	09-45860-16
6	1	Motor flange	Flange	01-24252	01-24255
7	1	Shaft (SS)		01-45780	01-45766
8	2	Screw stud		01-45779	01-45765
9	1	O-ring - Nitrile (front cover)		0.2172.024	0.2173.459
21	1	Cam - 1/1		01-42679	01-45771
	1	Cam - 1/2		01-42584	–
	1	Cam - 2/3		01-42442	–
22	1	Wear plate		01-42443	01-42423
23	1	Pin		01-42400	01-42426
24	1	Cam screw - 1/1		01-46794-01	01-46794-02
	1	Cam screw - 1/2		01-46794-06	–
	1	Cam screw - 2/3		01-46794-07	–
26	2	Screw	Flange	0.0141.911	0.0257.036
27	4	Washer	Flange	0.0350.116	01-45767
28	4	Screw	Flange	0.0150.001	0.0278.802
29	1	Washer	Flange	01-45782	01-45768
30	4	Lock screw	Flange	0.0300.943	0.0300.943
31	1	Sleeve	Flange	01-45214	–

\*) See key to Johnson Pump model specification system, chapter 1.5

### 5.3 Drawing – Bronze pumps (B) – Pedestal mounted



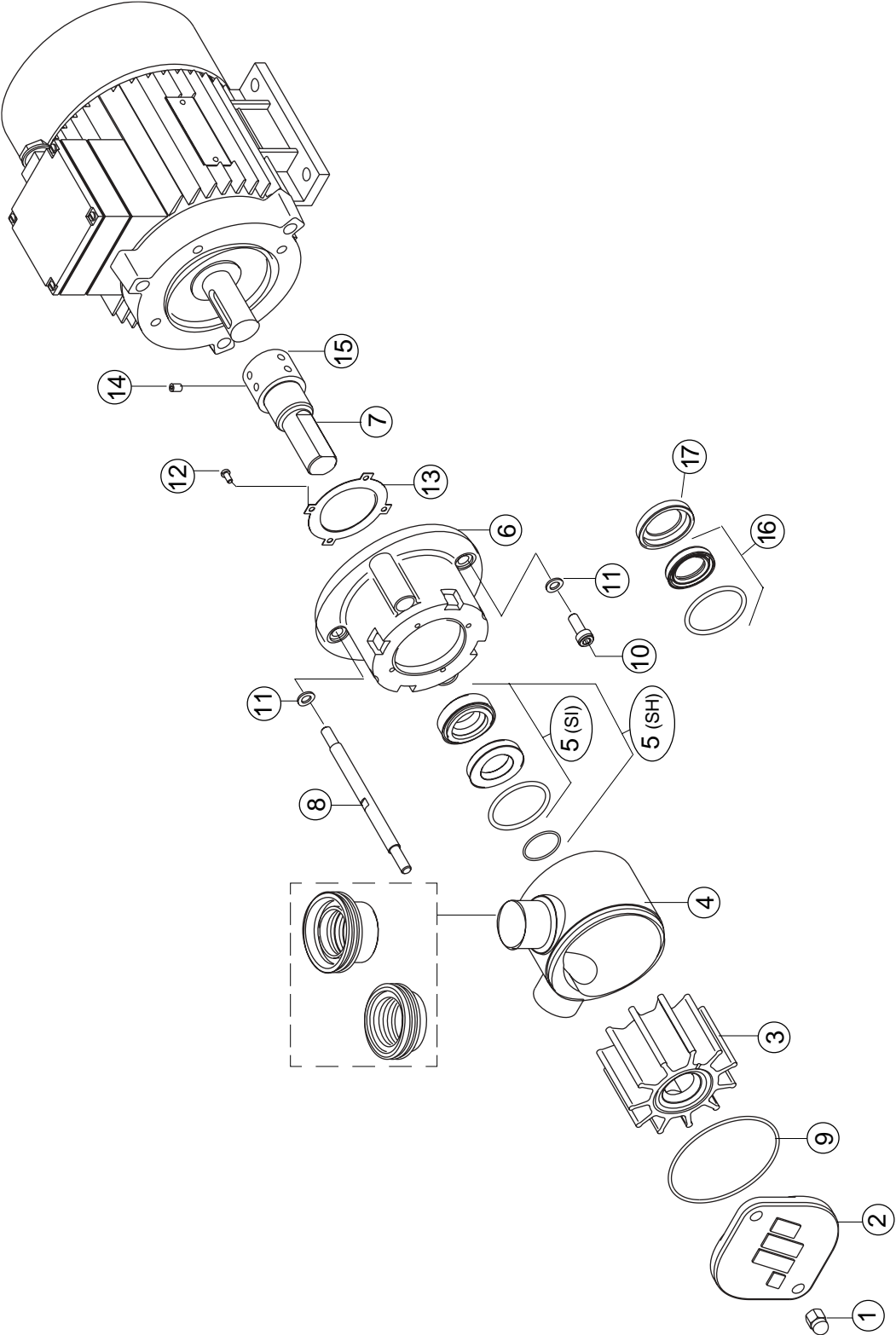
## 5.4 Spare part list – FIP25B and FIP40B – Pedestal mounted

Drawing: Page 24

Pos	Nos	Description	Version*)	FIP25B 10-45875	FIP40B 10-45881
1	2	Screw cap (front cover)		01-46505	01-46505
2	1	Front cover		01-45781	01-45778
3	1	Impeller - Neoprene	0	09-1028B	09-819B
	1	Impeller - Neoprene, high pressure	6	09-816B	09-818B
	1	Impeller - Nitrile	9	09-1028B-9	09-819B-9
4	1	Pump body - BSP		01-24250-1 (1")	01-24251-1 (1.1/2")
5	1	Mechanical seal (SS-shaft) Carbon/Ceramic/Nitrile	M01	09-45860-02	09-45860-14
	1	Mechanical seal (SS-shaft) Silicon carbide/Silicon carbide/Viton	M03	09-45860-06	09-45860-17
6	1	Pedestal	Pedestal	01-24248	01-24249
7	1	Shaft (SS)		01-35072	01-35041
8	2	Screw stud		01-45784	01-45770
9	1	O-ring - Nitrile (front cover)		0.2172.024	0.2173.459
	1	O-ring - Viton (front cover)		0.2172.023	-
13	1	Retaining ring	Pedestal	0.0370.516	0.0370.525
14	1	Lip seal	Pedestal	0.2233.014	0.2233.008
15	2	Nut	Pedestal	0.0195.100	0.0195.100
16	1	Ball bearing	Pedestal	0.3431.778	0.3431.001
17	1	Retaining ring	Pedestal	0.0370.516	0.0370.525
18	1	Spacer	Pedestal	01-42583	01-42747
19	1	Retaining ring	Pedestal	0.0371.047	0.0371.052
20	1	Lip seal	Pedestal	0.2234.004	0.2233.013
21	1	Cam - 1/1		01-42679	01-45771
	1	Cam - 1/2		01-42584	-
	1	Cam - 2/3		01-42442	-
22	1	Wear plate		01-42443	01-42423
23	1	Pin		01-42400	01-42426
24	1	Cam screw - 1/1		01-46794-01	01-46794-02
	1	Cam screw - 1/2		01-46794-06	-
	1	Cam screw - 2/3		01-46794-07	-
32	1	Key	Pedestal	-	0.0502.231

\*) See key to Johnson Pump model specification system, chapter 1.5

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



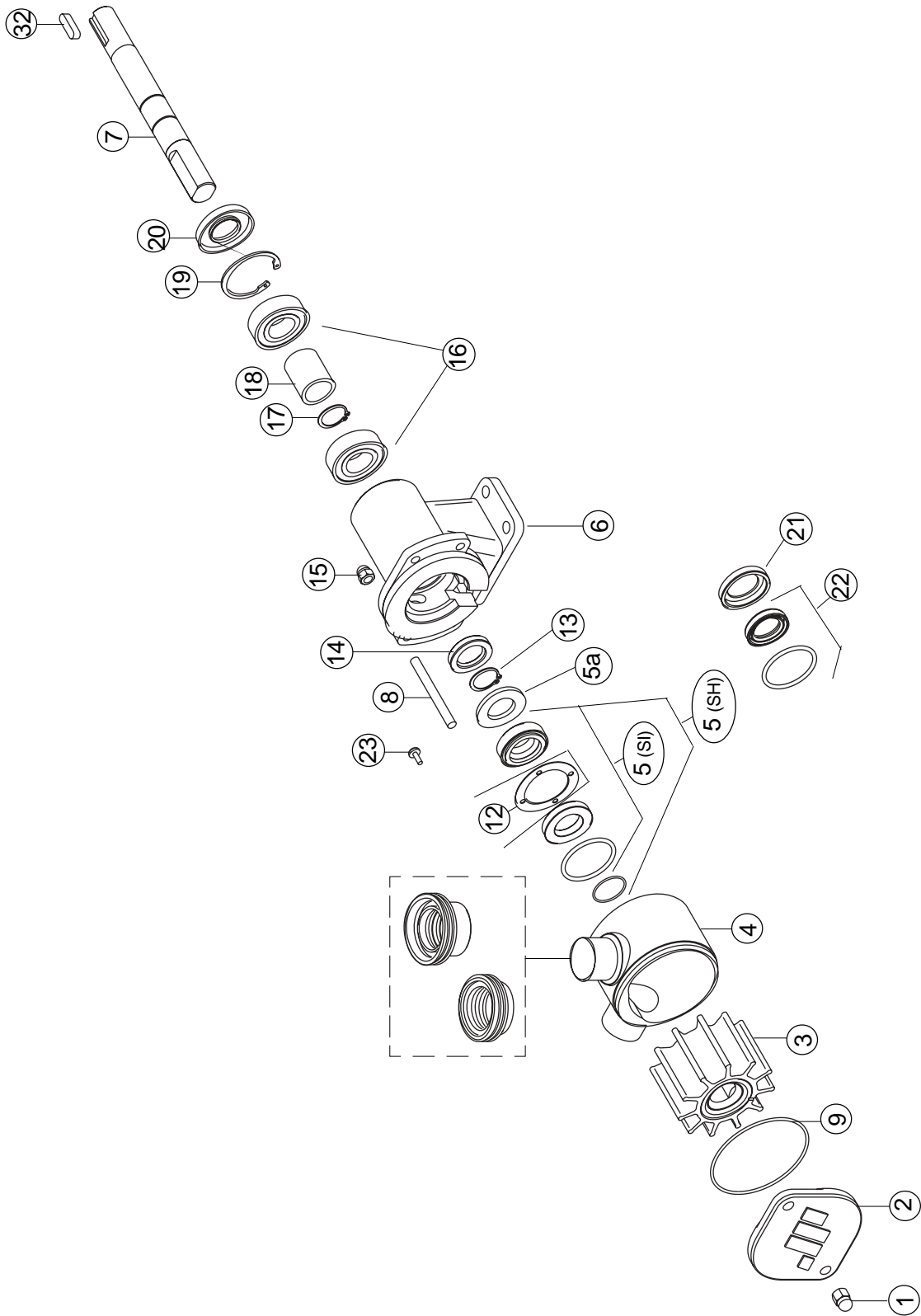
## 5.6 Spare part list – FIP20S, FIP25S, FIP40S, FIP50S – Flange mounted

Drawing: Page 26

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	Screw cap (cover)		01-46505	01-46505	01-46505	01-46505
2	1	Cover SI Cover SH	SI SH	01-35817 01-35849	01-35818 01-35850	01-35822 01-35851	01-24532 01-24549
3	1 1 1 1 1 1	Impeller - Neoprene Impeller - Neoprene, high pressure Impeller - FDA-milk Impeller - Food grade Impeller - Food grade, high pressure Impeller - Nitrile, splined	0 6 4 7 3 9	– – 09-833S-4 09-832S-7 09-833S-7 –	– 09-837S 09-837S-4 09-836S-7 – 09-1028S-9	09-838S – 09-835S-4 – 09-835S-7 09-1029S-9	09-803S 09-809S 09-809S-4 – – –
4	1 1 1 1	Pump body - BSP SI Pump body - Plain SH Pump body - SMS SH Pump body - DIN SH	SI-BSP SH-PLN SH-SMS SH-DIN	01-24525-1 01-24526-1 09-46687-01 09-46687-03	01-24527-1 01-24528-1 09-46687-05 09-46687-07	01-24529-1 01-24530-1 09-46687-09 09-46687-11	01-13190 01-13191 09-46687-13 09-46687-14
5	1	Mechanical seal SI Carbon/Ceramic/Nitrile Mechanical seal SH Carbon/Ceramic/Nitrile	M01 M01	09-46686-02 09-46686-04	09-46686-02 09-46686-04	09-46686-06 09-46686-08	09-46686-05 09-46686-07
6	1	Motor flange	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	Flange	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	Flange	0.0141.911	0.0141.911	0.0257.036	0.0141.918
11	4	Washer	Flange	0.0350.116	0.0350.116	01-45767	0.0350.118
12	4	Screw	Flange	0.0150.001	0.0150.001	0.0278.802	–
13	1	Washer	Flange	01-45782	01-45782	01-45768	01-45692
14	4	Lock screw	Flange	0.0300.943	0.0300.943	0.0300.943	0.0300.943
15	1	Sleeve	Flange	01-45214	01-45214	–	–
16	1	Lip seal set	Flange	09-46688-01	09-46688-01	09-46688-03	09-46688-01
17	1	Lip seal retainer	Flange	01-46900	01-46900	01-46901	01-46900

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

## 5.7 Drawing – Stainless steel pumps (S) – Pedestal mounted



## 5.8 Spare part list – FIP20S, FIP25S, FIP40S, FIP50S, FIP65S – Pedestal mounted

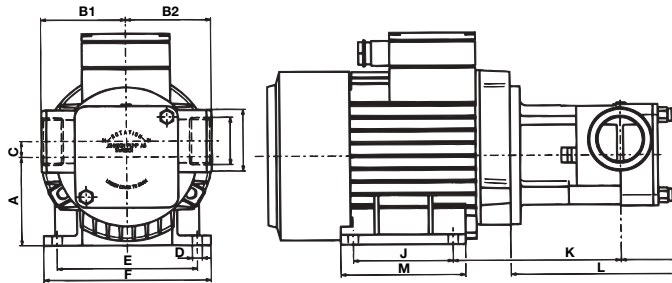
Drawing: Page 28

Pos	Nos	Description	Version *)	FIP20SI/SH	FIP25SI/SH	FIP40SI/SH	FIP50SI/SH	FIP65SI/SH
				10-24544 SI 10-24543 SH	10-24546 SI 10-24545 SH	10-24548 SI 10-24547 SH	10-13219 SI 10-13217 SH	10-13220 SI 10-13221 SH
1	2	Screw cap (cover)		01-46505	01-46505	01-46505	01-46505	0.0195.200
2	1	Cover SI Cover SH	SI SH	01-35817 01-35849	01-35818 01-35850	01-35822 01-35851	01-24532 01-24549	01-24533 01-24550
3	1	Impeller - Neoprene	0	–	–	09-838S	09-803S	09-815S
	1	Impeller - Neoprene, high pressure	6	–	09-837S	–	09-809S	–
	1	Impeller - FDA-milk	4	09-833S-4	09-837S-4	09-835S-4	09-809S-4	–
	1	Impeller - Food grade	7	09-832S-7	09-836S-7	–	–	09-840S-7
	1	Impeller - Food grade, high pressure	3	09-833S-7	–	09-835S-7	–	–
	1	Impeller - Nitrile, splined	9	09-1028S-9	–	09-1029S-9	–	–
4	1	Pump body - BSP SI	SI-BSP	01-24525-3	01-24527-3	01-24529-3	01-13190	01-13192
	1	Pump body - Plain SH	SH-PLN	01-24526-3	01-24528-3	01-24530-3	01-13191	01-13193
	1	Pump body - SMS SH	SH-SMS	09-46687-02	09-46687-06	09-46687-10	09-46687-13	09-46687-15
	1	Pump body - DIN SH	SH-DIN	09-46687-04	09-46687-08	09-46687-12	09-46687-14	09-46687-16
5	1	Mechanical seal SI Carbon/Ceramic/Nitrile	M01	09-46686-01	09-46686-01	09-46686-05	09-46686-05	09-46686-09
	1	Mechanical seal SH Carbon/Ceramic/Nitrile	M01	09-46686-03	09-446686-03	09-46686-07	09-46686-07	09-46686-10
5a	1	Washer	Pedestal	01-46632	01-46632	01-45692	01-45692	01-46631
6	1	Pedestal	Pedestal	01-24248	01-24248	01-24249	01-24012	01-13204
7	1	Shaft	2	01-35835	01-35836	01-35837	01-32609	01-35840
8	2	Screw stud	Pedestal	01-46637	01-46639	01-46641	01-46642	01-46643
9	1	O-ring - Nitrile (cover)		0.2173.446	0.2172.013	0.2173.441	0.2173.437	0.2173.467
12	1	Retainer	Pedestal	01-46632	01-46632	01-45692	01-45692	01-46631
13	1	Retaining ring	Pedestal	0.0370.516	0.0370.516	0.0370.525	–	–
14	1	Lip seal	Pedestal	0.2233.014	0.2233.014	0.2233.008	0.2234.002	0.2234.012
15	2	Nut	Pedestal	0.0195.100	0.0195.100	0.0195.100	0.0195.100	0.0195.200
16	2	Ball bearing	Pedestal	0.3431.778	0.3431.778	0.3431.001	0.3431.488	0.3431.741
	1	Roller bearing	Pedestal	–	–	–	0.3428.570	0.3428.570
17	1	Retaining ring	Pedestal	0.0370.516	0.0370.516	0.0370.525	0.0370.040	0.0370.040
18	1	Spacer	Pedestal	01-42583	01-42583	01-42747	01-45005	01-46656
19	1	Retaining ring	Pedestal	0.0371.047	0.0371.047	0.0371.052	0.0371.080	0.0371.090
20	1	Lip seal	Pedestal	0.2234.004	0.2234.004	0.2233.013	0.2234.003	0.2233.201
21	1	Lip seal retainer	Pedestal	–	–	–	–	01-46902
22	1	Lip seal set	Pedestal	–	–	–	–	09-46688-04
23	1	Screw	Pedestal	–	–	–	–	0.0279.300
32	1	Key	Pedestal	–	–	0.0502.231	0.0502.03	0.0502.038

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

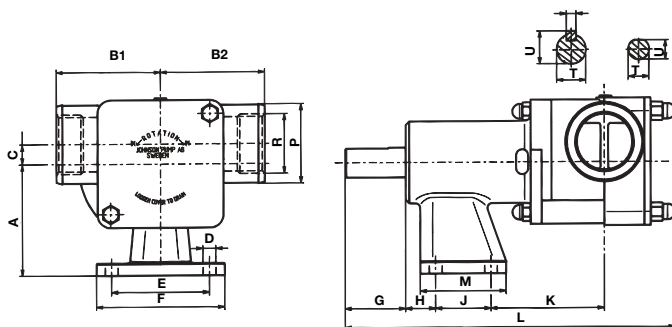
## 6.0 Dimensions and weights

### 6.1 FIP25B and FIP40B – Flange and Pedestal mounted



**Bronze Version – Flange**

	A	B1	B2	C	D	E	F	J	K	L	M	N	P	R	IEC motor size	Weight, kg pump+motor
FIP25B	80	68	75	13	ø10	125	150	100	140	140	126	50	ø38	BSP 1"	80	12.8
FIP40B	90	85	85	16	ø10	140	167	100	165	167	127	58	ø63	BSP 1.1/2"	90	18.2

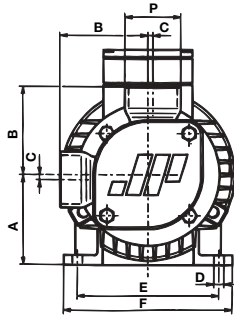


**Bronze Version – Pedestal**

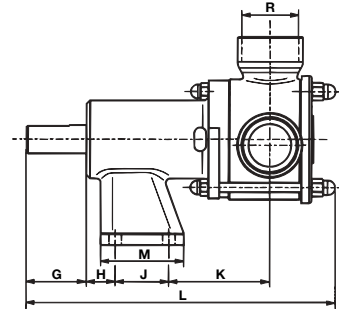
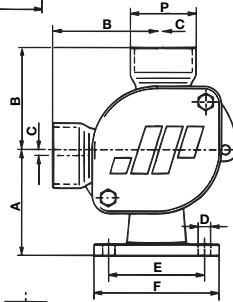
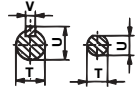
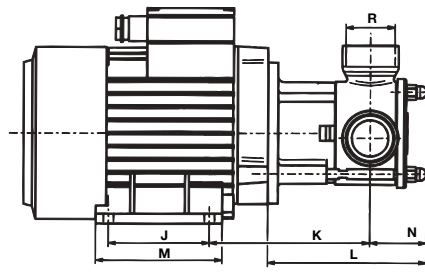
	A	B1	B2	C	D	E	F	G	H	J	K	L	M	P	R	T	U	V	Weight, kg pump
FIP25B	80	68	75	13	ø9	70	90	40	41	30	66	227	50	ø38	BSP 1"	ø17	16	-	3.4
FIP40B	90	85	85	16	ø10.5	80	105	50	24.5	45	93	270	70	ø63	BSP 1.1/2"	ø24	24	8	6.4



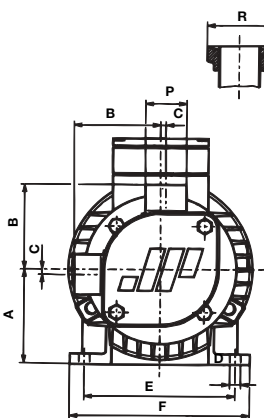
## 6.2 FIP20S-FIP65S – Flange and Pedestal mounted



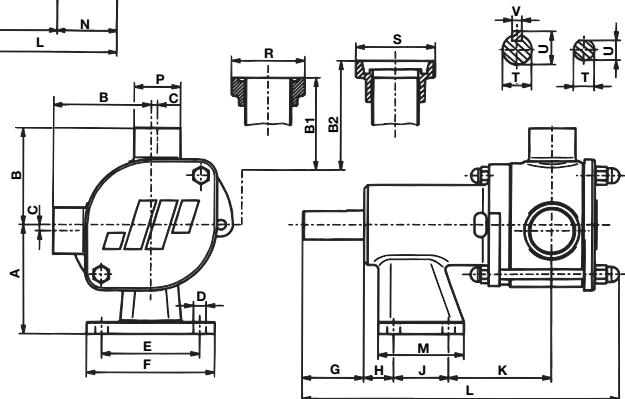
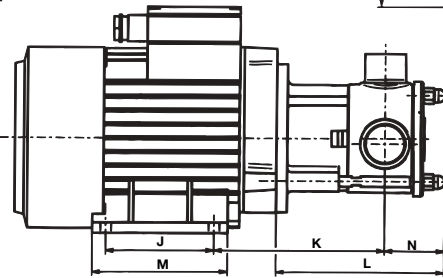
**Stainless Steel Industrial Version – Flange**



**Stainless Steel Industrial Version – Pedestal**



**Stainless Steel Hygienic Version – Flange**



**Stainless Steel Hygienic Version – Pedestal**

**Stainless Steel Industrial and Hygienic Version – Flange**

	A	B	B1	B2	C	D	E	F	J	K	L	M	N	P	R	S	IEC motor size	Weight, kg pump+motor
FIP20SI	80	70	-	-	2.5	ø10	125	150	100	123	114	126	41	ø31.8	BSP 3/4"	-	80	10.5
FIP20SH	80	62	62	74	2.5	ø10	125	150	100	123	114	126	41	ø22.2	25/SMS1145	NW20/DIN11851	80	10.5
FIP25SI	80	76	-	-	2	ø10	125	150	100	133	133	126	50	ø38	BSP 1"	-	80	11.8
FIP25SH	80	62	62	76	2	ø10	125	150	100	133	133	126	50	ø25	25/SMS1145	NW25/DIN11851	80	11.8
FIP40SI	90	87	-	-	5	ø10	140	167	100	157	155.5	127	55	ø55	BSP 1.1/2"	-	90	16.7
FIP40SH	90	80	80	94	5	ø10	140	167	100	157	155.5	127	55	ø38	38/SMS1145	NW40/DIN11851	90	16.7
FIP50SI	100	110	-	-	6.5	ø12	160	188	140	208	214	167	69	ø67	BSP 2"	-	100	29.5
FIP50SH	100	110	110	124	6.5	ø12	160	188	140	208	214	167	69	ø51	51/SMS1145	NW50/DIN11851	100	29.5

**Stainless Steel Industrial and Hygienic Version – Pedestal**

	A	B	B1	B2	C	D	E	F	G	H	J	K	L	M	P	R	S	T	U	V	Weight, kg pump
FIP20SI	80	70	-	-	2.5	ø9	70	90	40	41	30	48	200	50	ø31.8	BSP 3/4"	-	ø17	16	-	2.4
FIP20SH	80	62	62	74	2.5	ø9	70	90	40	41	30	48	200	50	ø22.2	25/SMS1145	NW20/DIN11851	ø17	16	-	2.4
FIP25SI	80	76	-	-	2	ø9	70	90	40	41	30	58	219	50	ø38	BSP 1"	-	ø17	16	-	2.7
FIP25SH	80	62	62	76	2	ø9	70	90	40	41	30	58	219	50	ø25	25/SMS1145	NW25/DIN11851	ø17	16	-	2.7
FIP40SI	90	87	-	-	5	ø10.5	80	105	50	24.5	45	84	259	70	ø55	BSP 1.1/2"	-	ø24	27	8	5
FIP40SH	90	80	80	94	5	ø10.5	80	105	50	24.5	45	84	259	70	ø38	38/SMS1145	NW40/DIN11851	ø24	27	8	5
FIP50SI	100	110	-	-	6.5	ø11	75	105	70	25	75	91.5	331	105	ø67	BSP 2"	-	ø28	31	8	9
FIP50SH	100	110	110	124	6.5	ø11	75	105	70	25	75	91.5	331	105	ø51	51/SMS1145	NW50/DIN11851	ø28	31	8	9
FIP65SI	112	115	-	-	10	ø11	100	130	70	45	70	97.5	357	100	ø84	BSP 2.1/2"	-	ø28	31	8	13.5
FIP65SH	112	115	115	130	10	ø11	100	130	70	45	70	97.5	357	100	ø63.5	63.5/SMS1145	NW65/DIN11851	ø28	31	8	14.2

## 7.0 Trouble shooting chart

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

<b>Cause</b>	<b>Remedy</b>
<b>Pump is leaking</b>	
Pressure too high	<i>Decrease pressure by increasing the diameter of the pipings and also on any filters installed Clean filter if installed</i>
Worn shaft seal	<i>Replace shaft seal</i>
Worn ball bearings, shaft deflection	<i>Replace ball bearings</i>
Common reasons for unnormal wear of the mechanical seal: <ul style="list-style-type: none"> <li>• Abrasive liquid</li> <li>• Liquid is crystallizing</li> <li>• Sticky liquids</li> </ul>	<i>Contact your Johnson Pump distributor for further advice</i>
<b>Insufficient flow</b>	
System pressure too high	<i>Increase diameter of the pipings, clean filter if installed</i>
Pump too small	<i>Choose other pump size</i>
Worn pump	<i>Replace worn parts</i>
Suction line too small or blocked	<i>Increase diameter</i>
Pump speed too low	<i>Increase pump speed</i>
Air leakage in suction line	<i>Seal the line and the connection ports</i>
Suction hose sucked against tank wall	<i>Angle cut the hose</i>
Diameter of suction/discharge line too small for specified capacity/viscosity	<i>Increase the diameter of the pipings</i>

# Johnson Pump Group

## Parent Company

### SWEDEN

Johnson Pump AB  
Tel. +46 (0)19 21 83 00  
Fax +46 (0)19 27 23 30

## National Sales Organisations

### AUSTRALIA

Johnson Pump (Australia) Pty. Ltd.  
Tel. +61 (0)7 3899 9933  
Fax +61 (0)7 3899 8574

### BELGIUM

Johnson Pump N.V./S.A.  
Belgium:  
Tel. +32 (0)2 422 15 50  
Fax +32 (0)2 422 15 59  
the Netherlands:  
Tel. +31 (0)592 34 28 33  
Fax +31 (0)592 40 93 51

### DENMARK

Johnson Pumper A/S  
Tel. +45 43 52 24 00  
Fax +45 43 52 15 77

### FINLAND

Johnson Pump Oy  
Tel. +358 (0)9 348 3800  
Fax +358 (0)9 348 38495

### FRANCE

Johnson Pompes  
Tel. +33 (0)1 39 20 50 00  
Fax +33 (0)1 39 56 54 22

### GERMANY

Johnson Pumpen GmbH  
Tel. +49 (0)5731 480 80  
Fax +49 (0)5731 414 00

### ITALY

Johnson Pump Italiana S.r.l.  
Tel. +39 039 604 14 63  
Fax +39 039 604 90 97

### NETHERLANDS

*Centrifugal Pumps,  
Positive Displacement Pumps,  
contact Belgium.*

Johnson Pump B.V.  
Tel. +31 (0)592 37 67 67  
Fax +31 (0)592 37 67 60

Johnson Pump Horticulture  
Tel. +31 (0)174 51 84 10  
Fax +31 (0)174 51 84 44

### NORWAY

Johnson Pump A/S  
Tel. +47 22 74 08 40  
Fax +47 22 28 03 30

### SPAIN

Johnson Pump España, S.L.  
Tel. +34 972 58 08 01  
Fax +34 972 58 08 03  
Sales Office:  
Madrid: Tel. +34 91 888 79 22

### SWEDEN

Johnson Pump Svenska  
Tel. +46 (0)19 21 83 70  
Fax +46 (0)19 27 23 18

### SWITZERLAND

Johnson Pumpen AG  
Tel. +41 (0)43 477 71 22  
Fax +41 (0)43 477 71 20

### UNITED KINGDOM

JP Pumps Ltd.  
Tel. +44 (0)1293 55 34 95  
Fax +44 (0)1293 52 46 35  
Northern Regional Office:  
Bradford: Tel. +44 (0)1274 74 22 47  
Fax +44 (0)1274 74 22 28

## Business Units

### BELGIUM

Johnson Pump Brussels N.V.  
Tel. +32 (0)53 60 27 15  
Fax +32 (0)53 60 27 01

### INDIA

Johnson Pump (India) Ltd.  
Tel. +91 (0)79 287 03 11  
Fax +91 (0)79 287 25 22

### NETHERLANDS

Johnson Pump Water B.V.  
Tel. +31 (0)592 37 67 67  
Fax +31 (0)592 37 67 60

### SWEDEN

Johnson Pump AB  
Tel. +46 (0)19 21 83 00  
Fax +46 (0)19 27 23 72

### USA

Johnson Pumps of America, Inc.  
Tel. +1 847 671 7867  
Fax +1 847 671 7909

[www.johnson-pump.com](http://www.johnson-pump.com)

