



INSTALLATION, SERVICE AND MAINTENANCE INSTRUCTIONS

PROLAC HP (HIGH PRESSURE)



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Certificado ISO 9001 por





EC DECLARATION OF CONFORMITY

(according to Directive 98/37/CE, annex II, part A)

Manufacturer: INOXPA, S.A.
C/ Telers, 54
17820 Banyoles (Girona) - SPAIN

Hereby declares, that the product:

CENTRIFUGAL PUMP	PROLAC HP	2008
Name	Type	Year of manufacture

conforms to the specifications of the Council Directive:

Machine Directive 98/37/CE, and complies with the essential requirements of the Directive and Harmonised Standards:

UNE-EN ISO 12100-1/2:2003
UNE-EN 1050:1996
UNE-EN 809/AC:2001
UNE-EN 294/AC:1993
UNE-EN 953:1997
UNE-EN 563/A1/AC:2000

Low Voltage Directive 2006/95/EC (repeals 73/23/CEE Directive), and conforms to UNE-EN 60204-1:1997 and UNE-EN 60034-1/A11:2002


EMC Directive 2004/108/EC (repeals 89/336/CEE Directive), and conforms to UNE-EN 60034-1/A11:2002

In compliance with the Regulations **(CE) nº 1935/2004**, on materials and objects intended to come into contact with foodstuffs (repealing 89/109/EEC), in accordance with which the materials in contact with the product do not transfer its constituents to the foodstuffs in quantities large enough to put human health at risk.

Declaration of Incorporation (Directive 98/37/CE, annex II, part B):

The aforementioned equipment shall not be commissioned until the machine in which they will be incorporated has been declared as being in conformity with the Machine Directive.

Banyoles, January 2008


Marc Pons Bague Technical Manager

1. Safety

1.1. INSTRUCTION MANUAL

This instruction manual contains information on the reception, installation, operation, fitting, disassembly and maintenance for the PROLAC HP pump.

The information given herein is based on the most up-to-date data available.

INOXPA reserves the right to modify this instructions manual without prior notice.

1.2. START-UP INSTRUCTIONS

This instruction manual contains vital and useful information for properly operating the pump and for keeping it in good running condition.

Not only should the safety instructions set forth in this chapter be carefully read before putting the pump into operation, but those concerned must also familiarise themselves with the operating features of the pump and strictly adhere to the instructions given herein. It is extremely important that these instructions be kept in a set place near the installation

1.3. SAFETY

1.3.1. Warning signs



Danger for people in general.



Danger of injury caused by rotating parts of the equipment.



Danger! Electricity.



Danger! Caustic or corrosive agents.



Danger! Suspended loads.



Danger to the proper operating of the machine.



Obligation to ensure safety at work.



Use of safety goggles obligatory.

1.4. GENERAL SAFETY INSTRUCTIONS



Please read the instruction manual thoroughly before installing and commissioning the pump. Should you have any doubts or queries, contact INOXPA.

1.4.1. During the installation



You must always bear in mind the *Technical Specifications* set forth in Chapter 8.

Do not put the pump into operation before connecting it to the pipes.

Do not put the pump into operation if the cover of the pump has not been fitted and the impeller fixed in the pump.

Check that the motor specifications are correct, especially if there is a special risk of explosion due to the work conditions.



During the installation procedure, all the electrical work must be carried out by duly authorised personnel.

1.4.2. During operation



You must always bear in mind the *Technical Specifications* set forth in Chapter 8. The limit values that have been set must NEVER be exceeded.

NEVER touch the pump or pipes whenever the pump is being used to decant hot liquids or during the cleaning procedure.



The pump has moving parts. Do not put your fingers into the pump when it is operating.



NEVER work with the suction and the delivery valves shut off.

NEVER directly sprinkle the electric motor with water. Standard motor protection is IP-55: dust and water sprinkling protection.

1.4.3. During maintenance



You must always bear in mind the *Technical Specifications* set forth in Chapter 8.

NEVER strip the pump down until the pipes have been drained. Remember that there will always be some liquid left in the pump casing (if it has not been fitted with a drain). Always remember that the liquid that has been pumped may be dangerous or subject to high temperatures. For situations of this type, please consult the prevailing regulations in the country in question.

Do not leave loose parts on the floor.



ALWAYS turn the power supply to the pump off before embarking on maintenance work. Take out the fuses and disconnect the wires from the motor terminals.

All electrical work must be carried out by duly authorised personnel.

1.4.4. In accordance with the instructions

Any failure to comply with the instructions could lead to a hazard for the operators, the atmospheric conditions of the room, and the machine, and it could lead to a loss to any right to make a claim for damages.

Such non-compliance could bring with it the following risks:

- Important operating failures of the machine / plant.
- Failure to comply with specific maintenance and repair procedures.
- Potential electrical, mechanical and chemical hazards.
- Atmospheric conditions in the room could be hazardous due to the release of chemical substances.

1.4.5. Warranty

We wish to point out that any warranty issued will be null and void and that we are entitled to an indemnity for any civil liability claim for products which might be filed by third parties if:

- Operation and maintenance work has not been done following the corresponding instructions; the repairs have not been made by our personnel or have been made without our written authorization;
- Modifications are made to our material without prior written authorization;
- The parts or lubricants used are not original INOXPA parts/lubricants;
- The material has been improperly used due to error or negligence or have not been used according to the indications and the intended purpose.
- The parts of the pump have been damaged as a result of having been exposed to strong pressure as there was no safety valve.

The General Delivery Terms which you have already received are also applicable.



No modification can be made to the machine without the prior consent of the manufacturer. For your safety, use spare parts and original accessories. The use of other parts exempts the manufacturer from any and all responsibility.

Any change in operating conditions can only be done with the prior written consent of INOXPA.

In the event of doubt or should you require a fuller explanation on particular data (adjustment, assembly, disassembly...), please do not hesitate to contact us

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3. General Information

3.1. DESCRIPTION

INOXPA PROLAC HP-series centrifugal pumps have been especially designed to work under pressure of up to 40 bar. PROLAC HP centrifugal pump is a robust close-coupled pump with a shrouded motor, axial suction and radial delivery, and hygienic-type connections. The impeller is of an open or half-open design according to the model, and manufactured in a single piece. The mechanical seal is balanced, specially made to work at high pressure, and it is completely hygienic. The working surfaces are silicon carbide and graphite and gaskets material is EPDM in the standard version.

The motor complies with IEC standards. IP-55 protection. Class-F insulation. Three-phase power 220-240 / 380-420 V or 380-420 / 660 V at 50 Hz, depending on power supply. It is a motor with reinforced bearings in order to counteract the axial impulse caused by the impeller. On demand, it is possible to provide motors intended for work in explosive environments. Depending on the environmental conditions, the motors can be flameproof (EExd) or increased safety (EExe).

The parts in contact with the product are made of AISI 316L stainless steel and an internal finish is Ra 0.8. PROLAC HP pumps are hygienic pumps that comply with the highest hygiene requirements for use in the food and pharmaceuticals industries.

3.2. OPERATING PRINCIPLE

The pump impeller, housed in the pump housing, turns along with the pump shaft. It is fitted with a certain number of blades in accordance with the model of pump chosen.

Given this design, the impeller blades transmit both pressure and kinetic energy to the fluid in question.

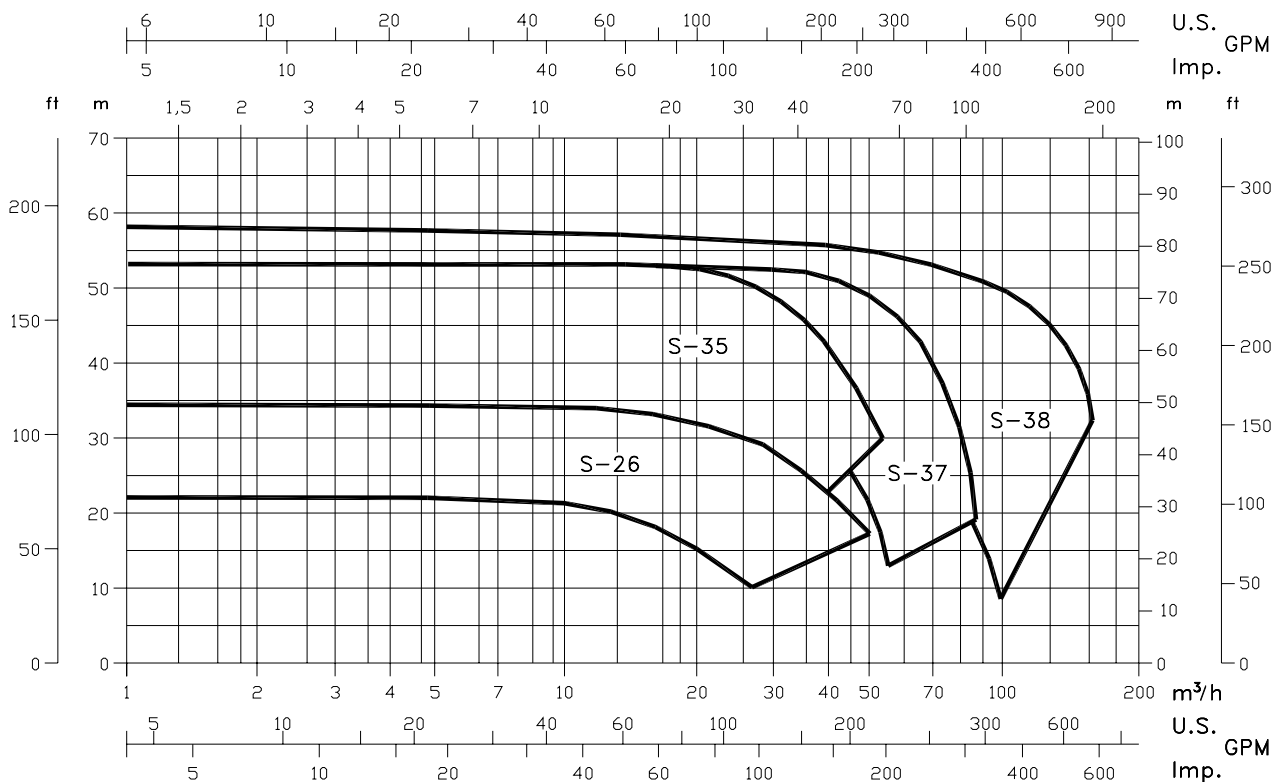
The pump cannot be reversed by simply changing of the rotation direction. The rotation direction, to be seen from the rear of the motor, should be clockwise.

3.3. APPLICATION

As a general rule, standard version PROLAC HP pumps are mainly used in the filtering and reverse osmosis processes. For each pump type the hydraulic specifications are provided depending on impeller diameters and speed rates. The performance curves also show the absorbed power and required NPSH.

3.3.1. Range of application

3600 r.p.m. 60 Hz



3000 r.p.m. 50 Hz



Each pump has a limited field of application. The pump in question was selected for certain pumping conditions at the time the order was made. INOXPA is not liable for any damages that might arise if the information furnished by the purchaser is incomplete (nature of the liquid, RPM...).

4. Installation

4.1. PUMP RECEPTION

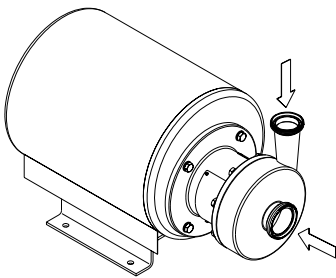


INOXPA is not responsible for any deterioration of the material as a result of its transportation or unpacking. Visually check that the packing has not suffered any damage.

The pump will be accompanied by the following documentation:

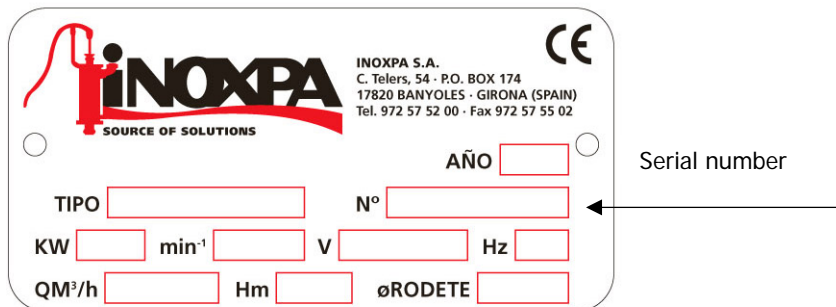
- Dispatch notes.
- Pump Instruction and Service Manual.
- Motor Instruction and Service Manual (*).
- (*) If the pump has been supplied with a motor from INOXPA.

Unpack the pump and check the following:



- The pump suction and delivery connections, removing the remains of any packing material.
- Check that the pump and the motor have not suffered any damage.
- Should the pump not be in proper condition and/or does not have all the parts, the carrier must draw up a report as soon as possible with regard to the same.

4.1.1. Pump identification and marking



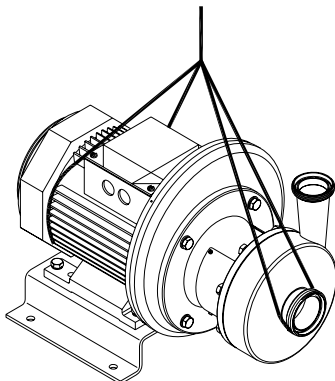
Pump plate

4.2. TRANSPORT AND STORAGE



PROLAC HP pumps are quite often too heavy to be put into their storage space manually.

Lift the pump as shown below:



- Always remove the shroud, if installed, before lifting the pump.

4.3. LOCATION

- Position the pump as near as possible to the suction tank, and whenever possible below the level of the liquid.
- Place the pump in such a way that there is enough space around it to provide access both to the same and to the motor. (See Chapter 8. *Technical Specifications* to consult dimensions and weights).
- Place the pump on a level and flat surface.
- The basement must be rigid, horizontal and against any vibration.



Install the pump in such a way that it can be properly ventilated. If the pump is to be installed outside, it must be done so under cover. Its positioning must enable easy access for any inspection and maintenance operations that may need to be carried out.

4.4. PIPES

- In general, suction and delivery pipes should be fitted in straight stretches, with the minimum amount of elbows and accessories, in order to reduce, as far as possible, any load loss that might be produced by friction.
- Make sure that the pump mouths are well aligned with respect to the piping, and that they are similar in diameter to that of the pipe connections.
- Position the pump as near as possible to the suction tank, and whenever possible below the level of the liquid, or even lower with respect to the tank in order for the static suction head to be at its maximum.
- Place supports for the pipes as near as possible to the suction and delivery nozzles of the pump.

4.4.1. Shut-off valves

The pump can be isolated for the purpose of carrying out maintenance work. To this end, shut-off valves should be fitted at the pump suction and delivery connections.

These valves must ALWAYS be open whenever the pump is operating.

4.5. ELECTRICAL INSTALLATION



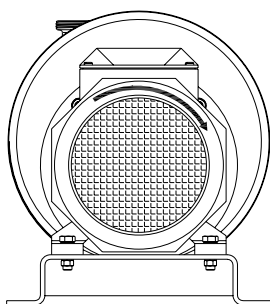
Leave the connecting of the electrical motors to qualified personnel. Take the necessary measures to prevent any breakdowns in the connections and wires.



The electrical equipment, the terminals and the components of the control systems may still carry an electric charge even when disconnected. Contact with them may put the safety of operators at risk, or cause irreparable damage to the material.

Before manoeuvring the pump, make sure that the electric box is switched off.

- Connect the motor in accordance with the instructions supplied by the manufacturer.
- Check the direction of the rotation (see the signaling label on the pump).



Put the pump motor into operation momentarily. Make sure, by looking at the pump from the rear, that the motor ventilator is rotating in a clockwise direction.



Check ALWAYS the direction of the motor rotation with liquid inside the pump.

For the models with sealing chamber, make sure always that it is filled with liquid before checking the rotating direction.

5. Start-Up



Before putting the pump into operation read thoroughly the instructions on installation given in Chapter 4. *Installation*.

5.1. START-UP



Read Chapter 8. *Technical Specifications* thoroughly. INOXPA will not assume responsibility for any improper or incorrect use of the equipment.



Do not touch the pump or the piping while it is pumping products at a high temperature.

5.1.1. Checks to be carried out before putting the pump into operation

- Completely open the pipe suction and delivery shut-off valves.
- If the liquid fails to flow toward the pump, fill it with the liquid to be pumped.



The pump must **NEVER** be run dry.

- Check that the rotation direction of the motor is correct.

5.1.2. Checks to be carried out on putting the pump into operation

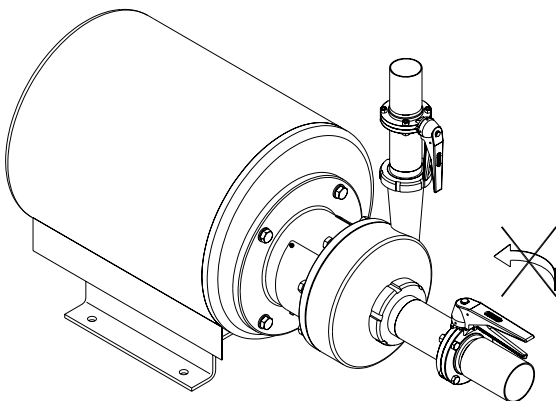
- Check to make sure that the pump is not making any strange noises.
- Check to see if the absolute inlet pressure is sufficient, in order to avoid cavitations in the pump. Consult the curve for the minimum required pressure above the steam pressure (NPSHr).
- Monitor the delivery pressure.
- Check that there are no leaks in the sealed areas.



A shut-off valve should not be used in the suction pipe to regulate the flow rate. It must be completely open during operation.



Monitor motor consumption in order to avoid a circuit overload.



Reduce the flow and the power consumed by the motor:

- Regulating the flow to the pump delivery.
- Decreasing motor speed.

6. Operating problems

The table given below provides solutions to problems that might arise during pump operation. With respect to the same, it is assumed that the pump has been properly installed and has been correctly selected for the application in question. Should there be a need for technical service please contact INOXPA.

Incidentes de funcionamiento	Causas probables
Overloading of motor.	8, 9, 13, 14, 20, 21, 22, 23, 24.
Insufficient flow rate or pressure in pump.	1, 2, 4, 5, 7, 9, 10, 17, 19.
No pressure on the discharge side.	2, 3, 6, 18.
Irregular discharge flow rate / pressure.	1, 2, 4, 5, 6, 9.
Noise and vibrations.	2, 4, 5, 6, 7, 8, 9, 10, 13, 14, 15, 20, 21, 22, 23, 24.
The pump gets clogged.	9, 10, 13, 14, 15, 20, 21, 22, 24.
Overheating of the pump.	8, 9, 10, 13, 14, 15, 20, 21, 22, 23, 24.
Abnormal wear.	4, 5, 10, 14, 15, 20, 24.
Leak in mechanical seal.	11, 12, 16.

Causas probables	Soluciones
1 Wrong rotation direction.	Invert the direction of rotation.
2 Insufficient NPSH.	Increase available NPSH: <ul style="list-style-type: none"> - Raise the suction deposit. - Lower the pump. - Reduce the vapour pressure. - Increase the diameter of the suction pipe. - Shorten and simplify the suction pipe.
3 Non-purged pump.	Purge or fill.
4 Cavitation.	Increase suction pressure (also see 2).
5 The pump is sucking air.	Check the suction pipe and all its connections.
6 Obstructed suction piping.	Check suction pipe and the filters, if any.
7 Delivery pressure is too high.	If necessary, reduce head losses, for ex., by increasing the pipe diameter.
8 Flow is too high.	Reduce the flow rate: <ul style="list-style-type: none"> - Reduce the flow rate using a diaphragm. - Partially close the discharge valve. - Trim the impeller. - Decrease the speed.
9 The viscosity of the liquid is too high.	Reduce the viscosity, for ex., by heating the liquid.
10 The temperature of the liquid is too high.	Reduce the temperature by cooling the liquid.
11 Mechanical seal either damaged or worn.	Replace the seal.
12 Unsuitable O-ring for the liquid in question.	Insert the proper O-rings; check with the supplier.
13 The impeller is rubbing.	<ul style="list-style-type: none"> - Decrease the temperature. - Decrease the suction pressure. - Adjust the clearance between the impeller and the housing.
14 Pressure in the pipes.	Connect the pipelines to the pump free of tension.
15 There are foreign bodies in the liquid.	Place a filter in the suction.
16 The tension of the mechanical seal spring is too low.	Adjust as indicated in the manual.
17 The pump speed is too low.	Increase the speed.
18 The suction shutoff valve is closed.	Check and open.
19 Delivery pressure is too low.	Increase the pressure: <ul style="list-style-type: none"> - Increase the diameter or the impeller. - Increase the speed of the pump.
20 Worn bearing.	Replace the bearings, check the pump.
21 Not enough lubricating oil.	Fill up with oil.
22 Unsuitable lubricating oil.	Use an appropriate oil.
23 Non aligned coupling.	Align the coupling.
24 Pump and/or motor not fixed to the base-plate.	Affix the pump and/or the motor to the base-plate, check to see if the pipes are connected without pressure and align the coupling.



If the problems persist stop using the pump immediately. Contact the pump manufacturer or his representative.

7. Maintenance

7.1. GENERAL MAINTENANCE

This pump, as with any other machine, needs to be maintained. The instructions contained in this manual deal with the identification and replacement of the spare parts. These instructions have been drawn up by maintenance staff and are destined for those people who are responsible for supplying spare parts.



Read thoroughly Chapter 8. *Technical specifications.*

All the parts or materials that are changed must be duly eliminated/recycled in accordance with the prevailing directives in each area.



ALWAYS disconnect the pump before starting out on any maintenance work.

7.1.1. Check the mechanical seal

Periodically check that there are no leaks in the shaft area. Should there be any leaks in the mechanical seal area, replace the same pursuant to the instructions given in the section Disassembly and Assembly of the pump.

7.2. DRY THREAD TORQUE

Material	Dry thread torque [N.m.]								
	M5	M6	M8	M10	M12	M14	M16	M18	M20
8.8	6	10	25	49	86	135	210	290	410
A2	5	9	21	42	74	112	160	210	300

7.3. STORAGE

Before being stored the pump must be completely emptied of liquids. Avoid, as far as possible, the exposure of the parts to excessively damp atmospheres.

7.4. CLEANING



The use of aggressive cleaning products such as caustic soda and nitric acid may cause skin burns.

Use rubber gloves during the cleaning process.



Always use protective goggles.

7.4.1. Automatic CIP (Clean-in-place)

If the pump is installed in a system provided with a CIP process, there will be no need for disassembly. If it is not fitted with an automatic cleaning process, disassemble the pump pursuant to the instructions given in the section *Disassembly and Assembly* of the pump.

Cleaning solutions for CIP processes.

Only use clear water (chloride free) to mix with the cleaning agents:

a) Alkaline solution: 1% in weight of caustic soda (NaOH) to 70°C (150°F)

1 Kg NaOH + 100 l. water = cleaning solution

or

2.2 l. NaOH at 33% + 100 l. of water = cleaning solution

b) Acid solution: 0.5% in weight of nitric acid (HNO₃) to 70°C (150°F)

0.7 liters HNO₃ to 53% + 100 l. water = cleaning solution



Monitor the concentration of cleaning solutions, it could cause the deterioration of the pump sealing gaskets.

In order to remove any remains of cleaning products, ALWAYS rinse the element in question with clean water after completing the cleaning process.

7.4.2. Automatic SIP (sterilization-in-place)

The process of sterilization with steam is applied to all the equipment including the pump.



Do NOT start the equipment during the process of sterilization with steam. The parts/materials suffer no damage if the indications specified in this manual are observed.

No cold liquid can enter the equipment till the temperature of the equipment is lower than 60°C (140°F).

A flow by-pass is recommended to be used in order to assure the flow of sterile product after the pump.

Maximum conditions during the SIP process with steam or overheated water

- | | | |
|----|--------------------------|--|
| a) | Max. temperature: | 140°C / 284°F |
| b) | Max. time: | 30 min |
| c) | Cooling: | Sterile air or inert gas |
| d) | Materials: | EPDM / PTFE (recommended)
FPM / NBR (not recommended) |

7.5. PUMP DISASSEMBLY/ASSEMBLY

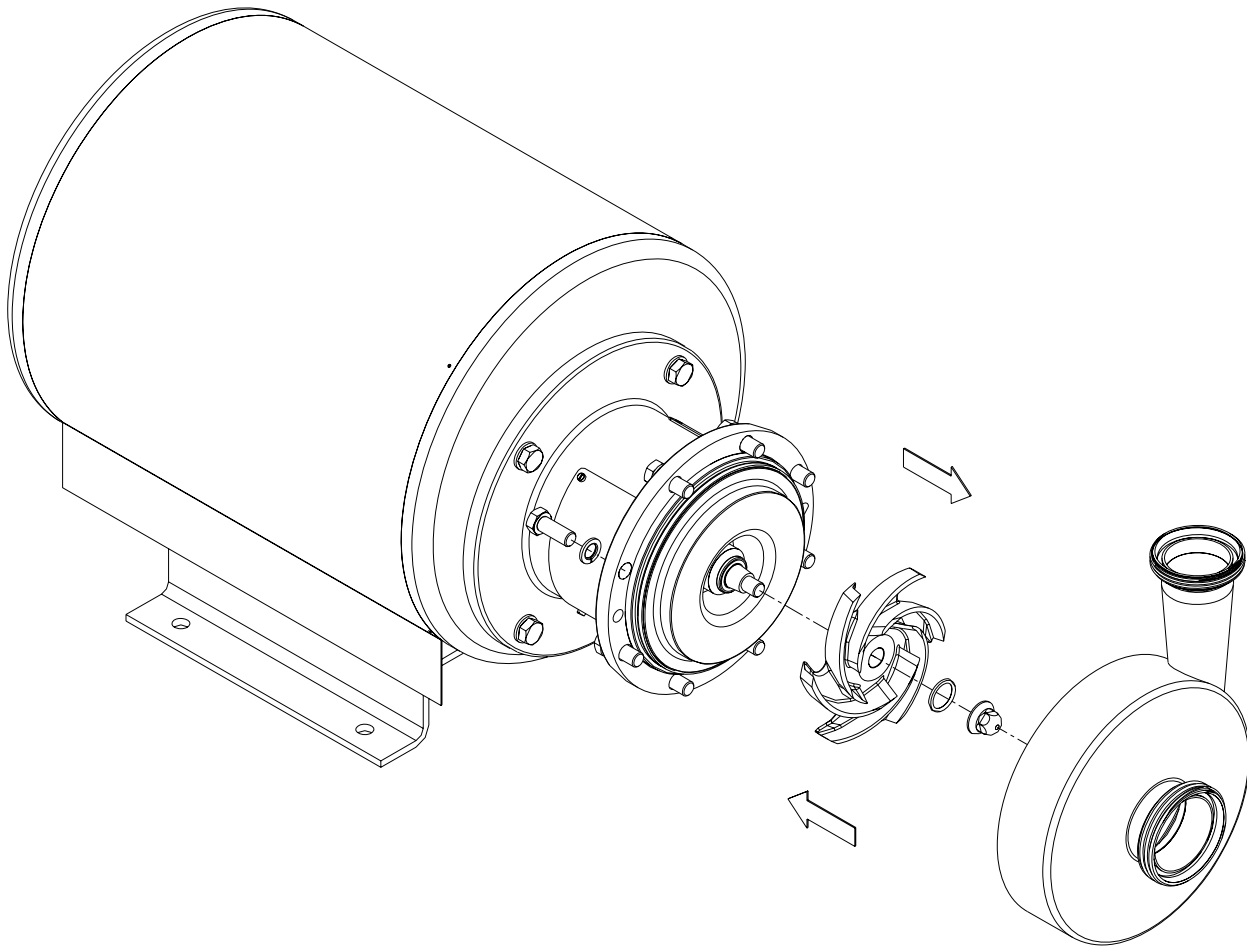
7.5.1. Pump casing and impeller

⇒ Disassembly

Remove the hexagonal screws (52) and washers (53A) that fix the housing (01) to the lantern (04). Remove the blind nut (45) and O-ring (80D), then take out the impeller (02).

⇐ Assembly

Slide the impeller (02) over the shaft (05), place the O-ring (80D) in the slot of the blind nut (45) and tighten the nut (45). Assemble the housing (01) and fix it to the lantern (04) with hexagonal screws (52) and washers (53A).



7.5.2. Simple mechanical seal

⇒ Disassembly

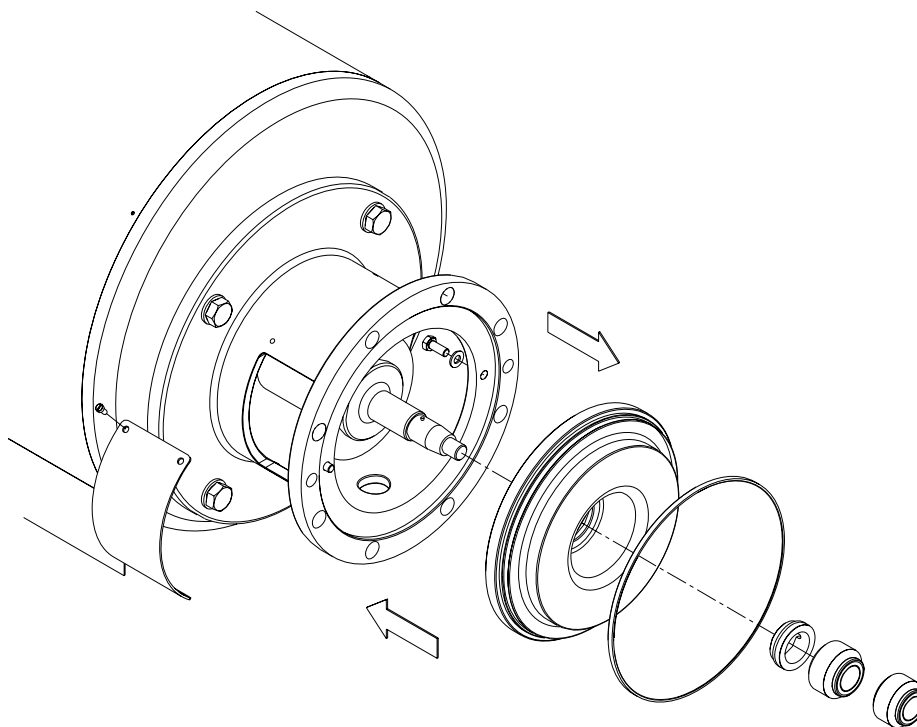
Remove the rotary part of the mechanical seal (08).

Remove the protector (47A) by removing the screws (50A).

Remove the screws (52C) and washers (53E) that fix the cover (03) with the lantern (04).

Remove the pump cover (03), the fixed part of the mechanical seal (08) will remain housed inside the cover.

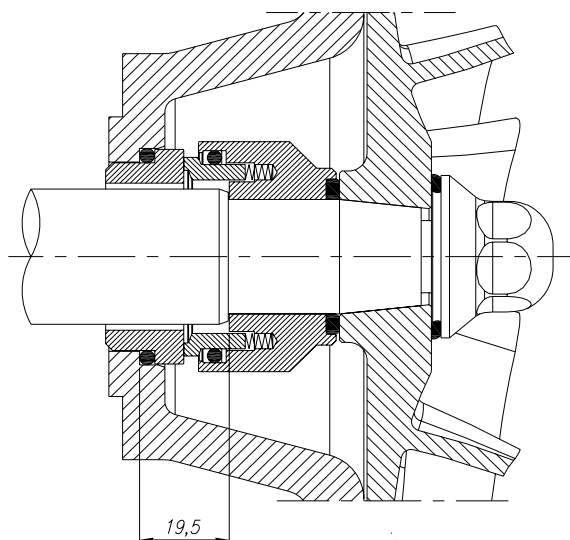
Remove the fixed part of the mechanical seal (08).



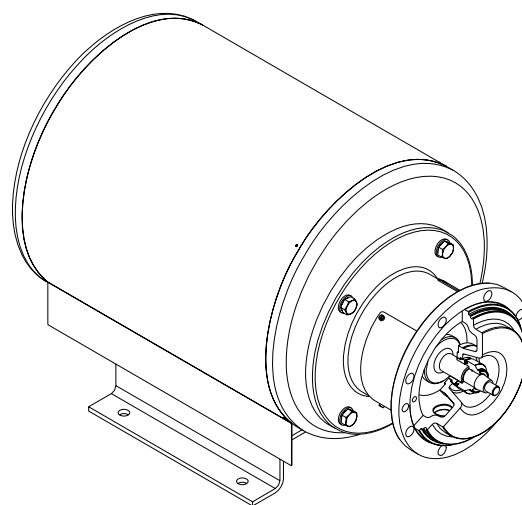
ATTENTION! When assembling the new seal, be careful and mount the parts and the O-rings with soapy water in order to allow an easy glide of the parts, either the stationary part and the rotary part on the shaft.

← Assembly

Check the position of the shaft (05) in relation to the pump cover (03). See section 7.5.3. [Adjusting the pump shaft](#).
 Attach the pump cover (03) to the lantern (04) and fasten the screws (52C) and washers (53E).
 Place the fixed part of the mechanical seal in the cover housing (03), mind the pivot.
 Check that the assembly dimension used is as described below:



Slide the rotating part of the mechanical seal (08) over the shaft (05) till the end.



Finally, fix the protectors (47A) with the screws (50A).

7.5.3. Adjusting the pump shaft

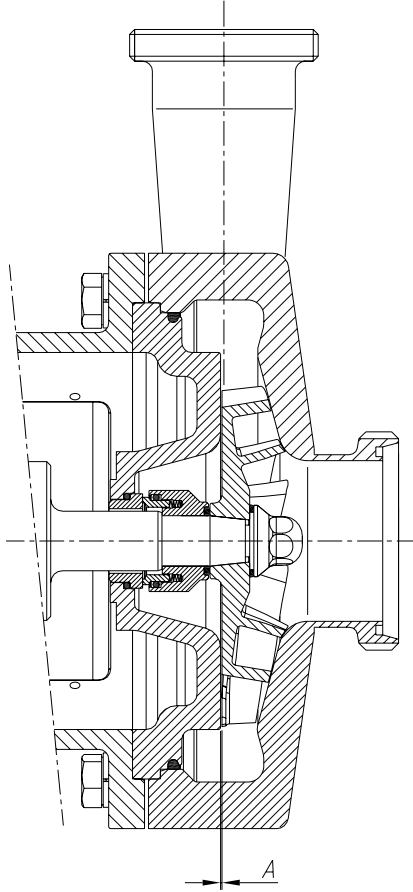
Slide the impeller (02) over the shaft (05) until reaching the rotary part of the mechanical seal (08).

Place a rod in the hole of the shaft (05) to prevent rotation.

Attach the O-ring (80D) in the slot at the base of the blind nut (45).

Tighten the blind nut (45).

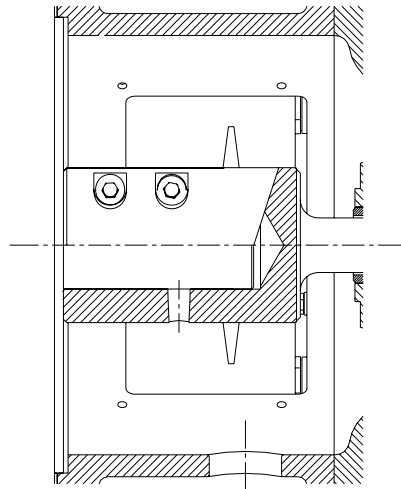
Check that the clearance between the impeller (02) and the cover (03) is as indicated below.



Pump type	A (mm)
S-26	1
S-35	0,7
S-37	0,7
S-38	0,5

If not, adjust the dimension until it is as indicated below.

- Loosen the Allen screws (51) and slide the shaft (05) until the dimension has been adjusted. Finally, tighten the screws.



7.5.4. Lantern and motor

⇒ Disassembly

Remove the shroud.

Remove the hexagonal screws (52A), nuts (54), and washers (53) and (53B), take out the lantern (04) and the front part of the shroud.

Loosen the Allen screws (51) and take out the shaft (05) and splash ring (82).

Remove the screws (52B), nuts (54A), and washers (53C) and (53D). This will make it possible to remove the motor (93) from the base plate (38).

⇐ Assembly

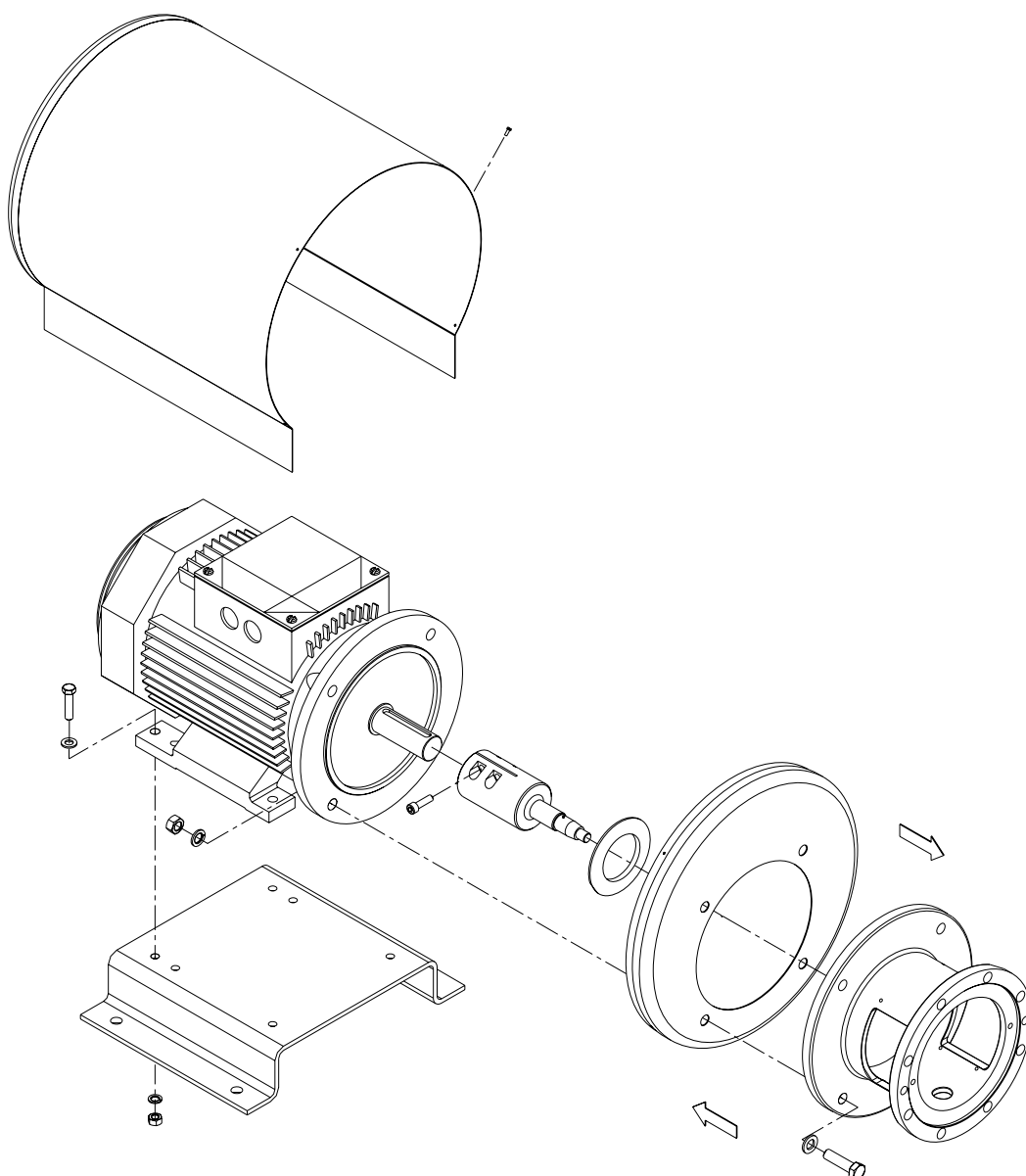
Place the motor (93) onto the base plate (38) and place screws (52B), nuts (54A), and washers (53C) and (53D).

Slide the shaft (05) over the shaft of the motor (93) till the end, and fasten it with Allen screws (51).

Attach the splash ring (82) to the shaft (05).

Place the front part of the shroud and the lantern (04) in their assembly position and fix them to the motor (93) with hexagonal screws (52A), nuts (54), and washers (53) and (53B).

Assemble the shroud.



8. Technical Specifications

8.1. TECHNICAL SPECIFICATION

	50Hz	60Hz
Maximum flow rate (1450 min ⁻¹)	160m ³ /h (704 US g.p.m.)	190 m ³ /h (837 US g.p.m.)
Maximum differential height	60m (197 ft)	80m (262,5 ft)
Maximum operating pressure	40 bar (580 PSI)	40 bar (580 PSI)
Operating temperature	-10 °C to +120 °C (EPDM) 14 °F to 248 °F (EPDM)	-10 °C to +120 °C (EPDM) 14 °F to 248 °F (EPDM)
	Temporal temperature up to 140 °C / 284 °F (EPDM)	Temporal temperature up to 140 °C / 284 °F (EPDM)
Maximum speed.....	3000 r.p.m.	3600 r.p.m.
Suction / discharge connections	DIN 11851 (Standard)	DIN 11851 (Standard)



Whenever the noise level in the area of operation exceeds 85 dB(A) use special protection.

Materials

Parts in contact with the product	AISI 316L
Other parts in stainless steel	AISI 304
Gaskets in contact with the product	EPDM (Standard)
Other optional gasket materials	Consult your supplier
Surface finish	Standard finish

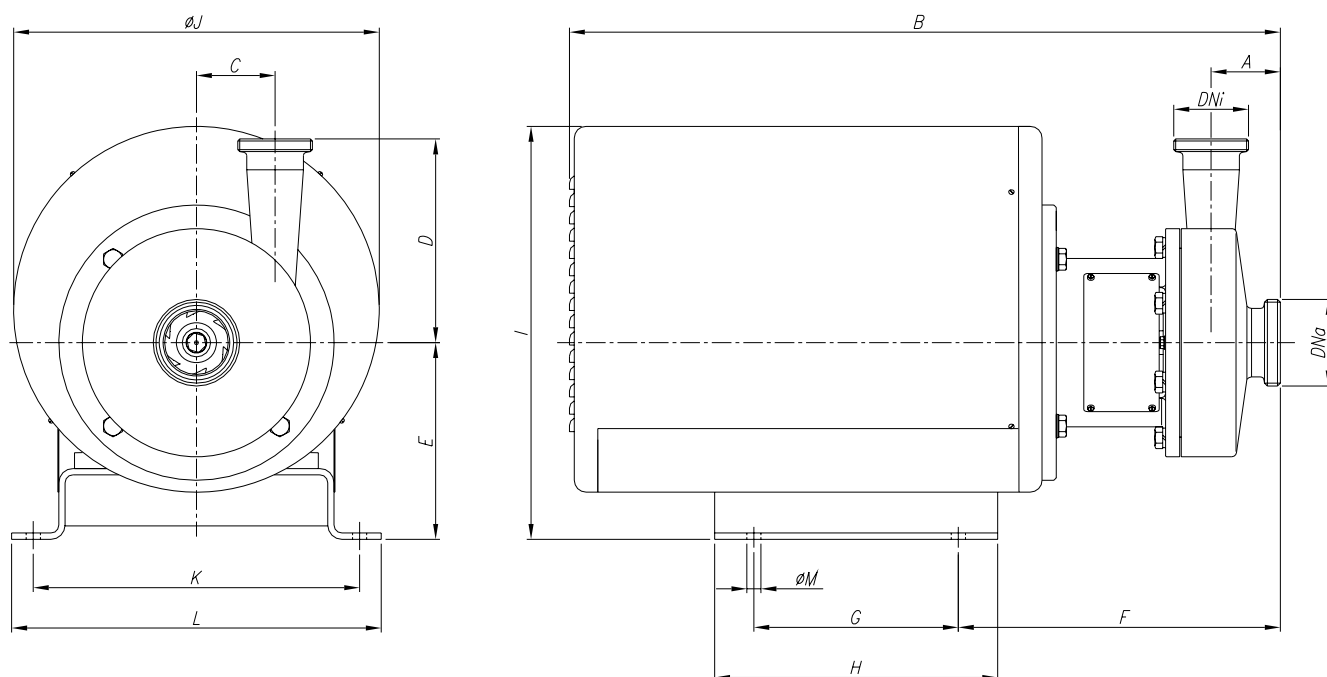
Mechanical seal

Seal type	Internal balanced single seal
Stationary parts material	Graphite
Rotary parts material	SiC
Seals material	EPDM (Standard)

8.2. WEIGHTS

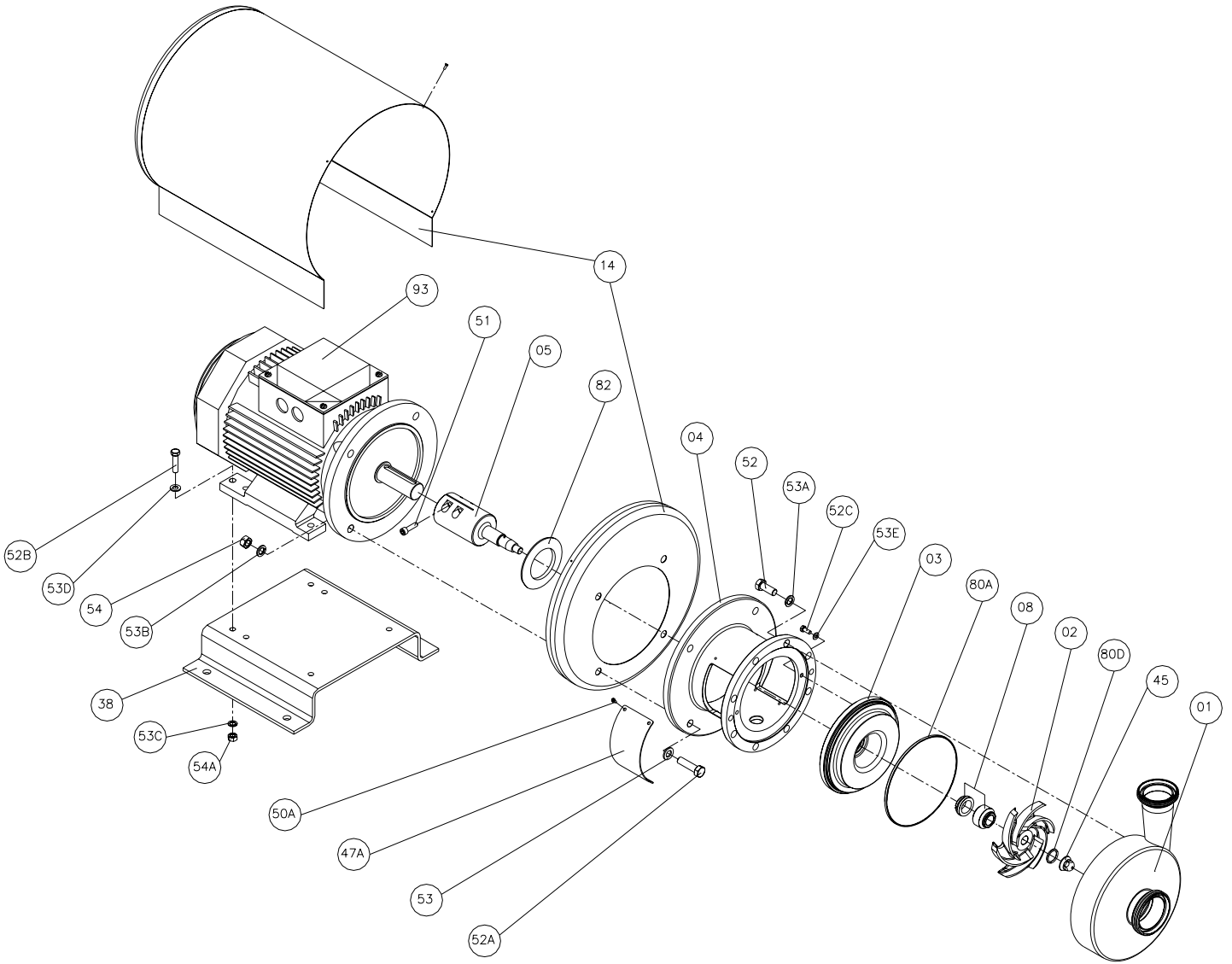
Pump Type	MOTOR	Weight [kg]	Weight [lbs]
S-26	100	60	132
	112	65	143
S-35	132	98	216
S-37	160	173	381
S-38	160	196	432
	180	216	476
	200	347	765

8.3. PROLAC HP DIMENSIONS

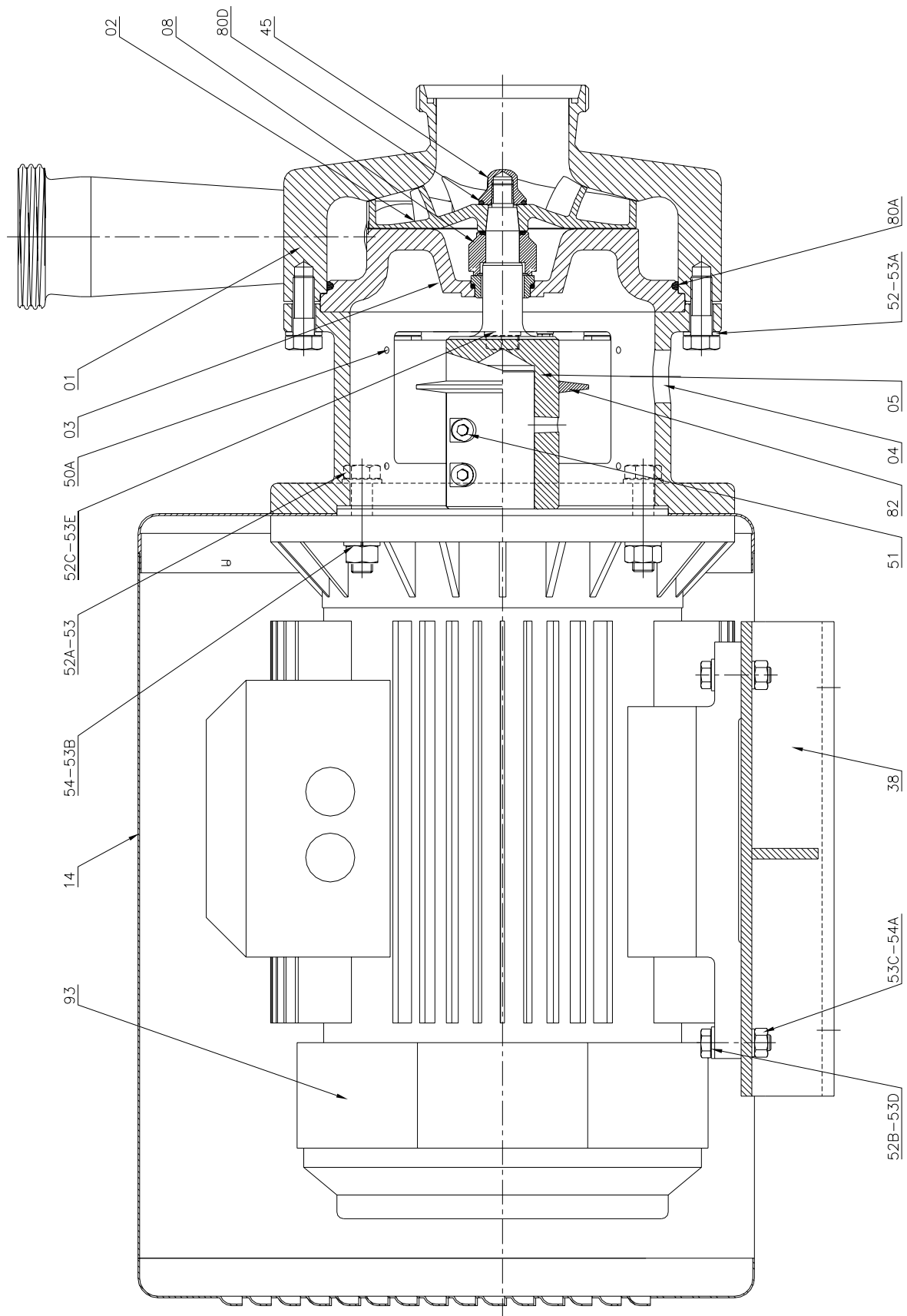


PUMP TYPE		DNa	DNi	A	B	C	D	E	F	G	H	I	J	K	L	M
S-26	D	65	50	76	600	79	239	170	290	140	185	355	330	265	295	13
	E								297							
S-35	F	65	50	84	740	101	284	192	358	170	220	410	380	310	350	13
S-37	G	80	65	88	905	100	259	250	410	260	360	525	465	415	470	18
S-38	G	100	80	115	930	107	365	250	432	260	360	505	465	415	470	18
	H				457				525							
	J				340				459			305				

8.4. PROLAC HP PUMP



8.5. PROLAC HP PUMP SECTION



8.6. PARTS LIST PROLAC HP PUMP

Position	Description	Quantity				Material
		S-26	S-35	S-37	S-38	
01	Pump housing	1	1	1	1	AISI 316L
02	Impeller	1	1	1	1	AISI 316L
03	Pump cover	1	1	1	1	CF-3M
04	Lantern	1	1	1	1	CF-8
05	Shaft	1	1	1	1	AISI 316L
08	Mechanical seal	1	1	1	1	SiC/C/EPDM
14	Shroud	1	1	1	1	AISI 304
38	Baseplate	1	1	1	1	AISI 304
45	Blind nut	1	1	1	1	AISI 316L
47A	Protection	2	2	2	2	PET-PLUS
50A	Screw	4	8	8	8	A2
51	Allen screw	2	2	2	2	A2
52	Hexagonal screw	6	8	8	12	A2
52A	Hexagonal screw	4	4	4	4	A2
52B	Hexagonal screw	4	4	4	4	A2
52C	Hexagonal screw	2	2	2	2	A2
53	Plane washer	4	8	4	4	A2
53A	Grower washer	6	8	12	16	A2
53B	Grower washer	4	8	-	-	A2
53C	Grower washer	4	-	4	4	A2
53D	Plane washer	4	-	4	4	A2
53E	Plane washer	2	2	2	2	A2
54	Hexagonal nut	4	8	4	4	A2
54A	Hexagonal nut	4	-	4	4	A2
80A	O-ring	1	1	1	1	EPDM
80D	O-ring	1	1	1	1	EPDM
82	Splash ring	1	1	1	1	EPDM
93	Motor	1	1	1	1	-

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