INSTALLATION, SERVICE AND MAINTENANCE INSTRUCTIONS

DIN-FOOD

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ISO 9001
ACREDITADO POR ENAC

MIDF-01_EN
ED. 18.07/05

MANUFACTURER DECLARATION

According the EC directive about machines 98/37/CE, Annex II B

The manufacturer:

INOXPA, S. A.
c/ Telers, 54
17820 Banyoles (Girona) - Spain

Hereby declares, that the pumps

CENTRIFUGAL PUMP	**DIN-FOOD**	**2005**
Denomination	Type	Manufacturing year

Comply with the pertinent disposition, in the execution supplied by **INOXPA, S.A.** for the incorporation in a machine or installation, or for the assembly with other machines as a subunit of other higher order machine.
Harmonized norms used, particularly:

EN ISO 12100-1/2, EN 809

The machine above must not be put into service until the machinery into which it has been incorporated have been declared in conformity with the EC Machinery Directive. It must meet, particularly, the standards EN 294, EN 563, EN 809 y EN 953 in its respective current editions.

Year of CE marking: CE 95
Banyoles, January 1995

Marc Pons Bague Technical Manager

EC DECLARATION OF CONFORMITY

According the EC directive about machines 98/37/CE, Annex II A

The manufacturer:

INOXPA, S. A.
c/ Telers, 54
17820 Banyoles (Girona) - Spain

Hereby declares, that the pump

CENTRIFUGAL PUMP	**DIN-FOOD**	**2005**
Denomination	Type	Manufacturing year

Are in conformity with the essential requirements of the Machinery Directive 98/37/CE (latest modifications included) and according the following Council Direcitves and harmonized norms:

- 73/23/CE Directive “low voltage”
- Norms EN ISO 12100-1/2, EN 809

Year of CE marking: CE 95
Banyoles, January 1995

Marc Pons Bague Technical Manager

1. Safety

1.1. INSTRUCTION MANUAL

This instruction manual contains information on the reception, installation, operation, fitting, stripping and maintenance for the DIN-FOOD 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 having to give 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 carefully 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 DIN-FOOD series centrifugal pumps with volute that made of a pump housing of thick plate, which has been cold pressed. The parts that come in contact with the product are made of AISI316L stainless steel with a Ra = 0.8μm interior finish.
The DIN-FOOD pump is built as monoblock unit with volute motor casing, axial suction and radial impeller, while the connections are DIN-11864-2-B PN-10 flanges. The pump impeller has been designed as a single-bodied, half-open double-curved part. The mechanical seal is balanced and completely sanitary, the springs are protected in order to prevent their contact with the product. The friction surfaces are made of silicon carbide, graphite and EPDM joints in the standard version.
The motor is designed in accordance with IEC Standards, has IP-55 protection and Class F insulation. Three-phase 220-240 / 380-420 or 380-420 / 660 V feed at 50 Hz, in accordance with power supply. Motors adapted to operate under explosive conditions can be supplied upon request. In accordance with the prevailing environmental conditions, the motors can be explosion proof (EExd) or have increased safety features (EExe).
The DIN-FOOD series has been especially designed to comply with all the hygienic demands required by the food industry. As far as hygiene, reliability and robustness are concerned, the whole range meets all of the requisites demanded by aforementioned industries. Due to its design qualities, optimum interchangeability is to be had between parts.

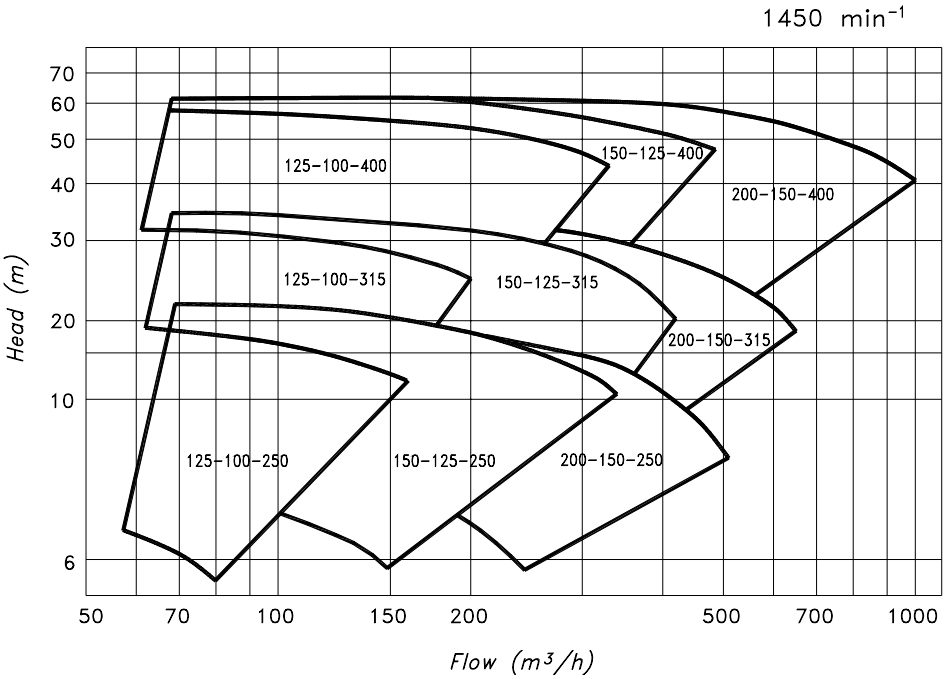
3.2. OPERATING PRINCIPLE

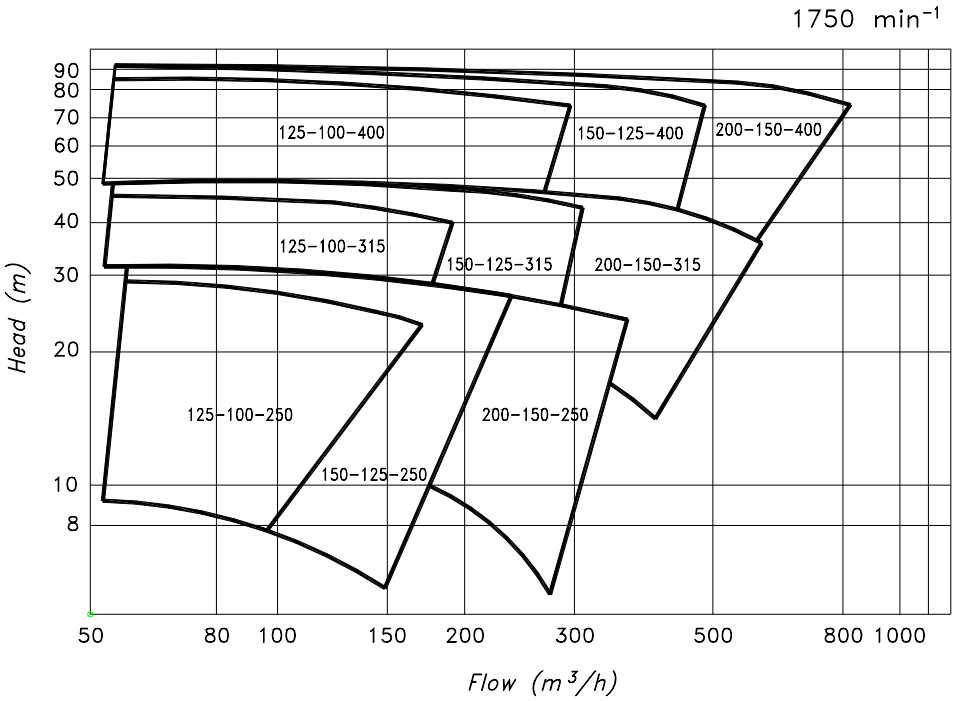
The pump impeller, housed in the pump housing, turns along with the pump shaft. It is fitted with a certain number of blades in accordance with the model of pump chosen.
Given this design, the impeller blades transmit both pressure and kinetic energy to the fluid in question.
The pump cannot be reversed 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

In general terms, DIN-FOOD pumps, at least in their standard version, are mainly used in the food industry to decant liquids. Each different type of pump has special hydraulic features in accordance with the pump impeller diameter and various speeds. In the curves reflecting the characteristics, we are also given the required NPSH and the absorbed power.

3.3.1. Field of application





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

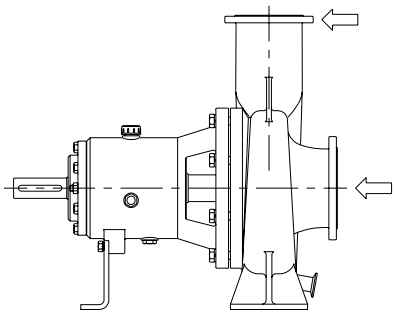
4.1. PUMP RECEPTION

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:

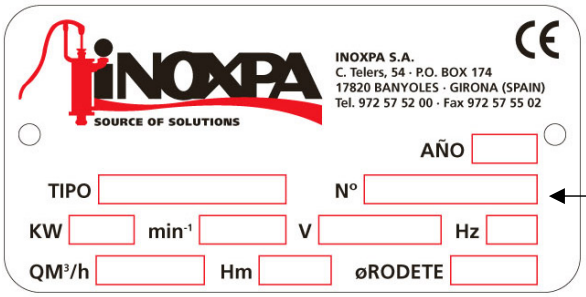
- Dispatch notes.
- Pump Instruction and Service Manual.
- Motor Instruction and Service Manual (*).
- (*) If the pump has been supplied with a motor from INOXPA.

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 haulier must draw up a report as soon as possible with regard to the same.

4.1.1. Pump identification and marking

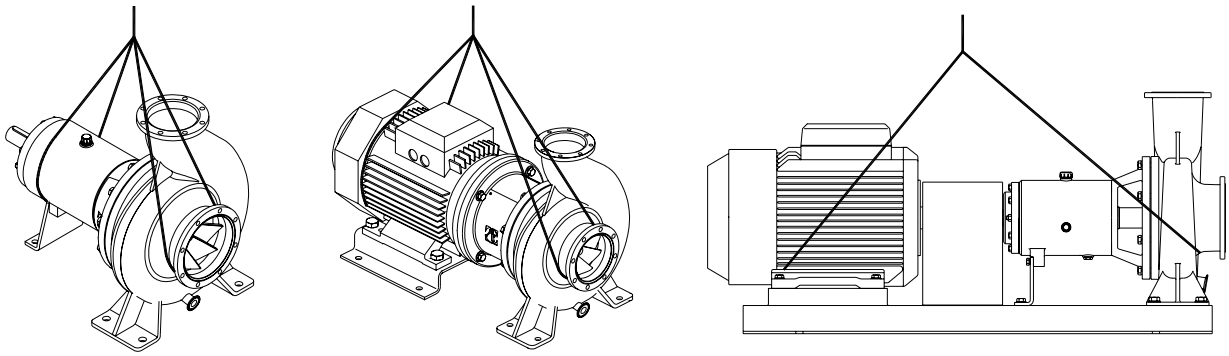


Pump plate

4.2. TRANSPORT AND STORAGE

DIN-FOOD pumps are quite often too heavy to be put into their storage space manually.

Lift the pump as is shown below:



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.

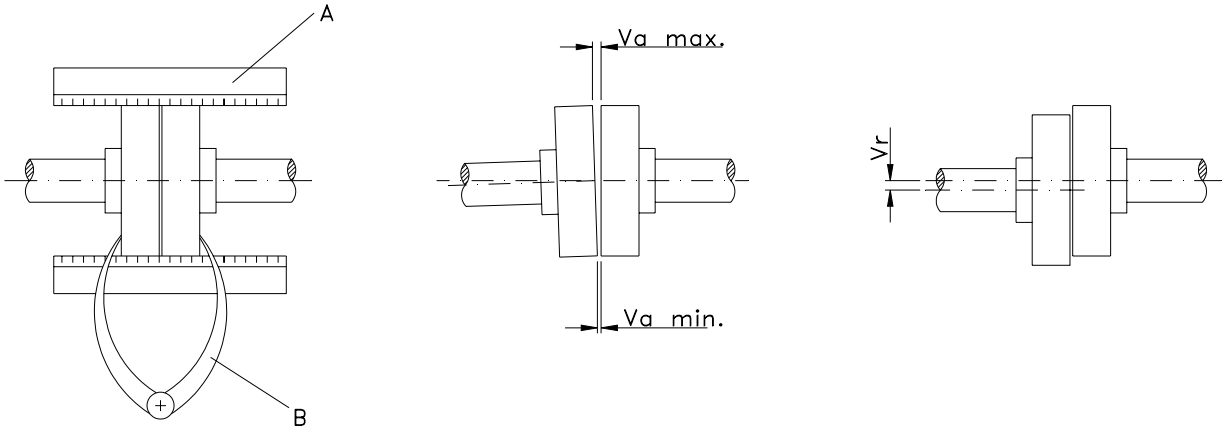
4.4. COUPLING

For the couplings selection and assembly consult to the supplier manual. Sometimes the torque of the positive displacement pumps can be high enough. Therefore, a coupling have been chosen 1.5 to 2 the adequate torque.

Alignment.
The pump and motor shaft of complete units have been accurately pre-aligned in our factory.

After installations of the pump unit, the pump and motor shaft should be re-aligned.

Place a straight-edge (A) on top of the coupling: the straight should make contact with both halves of the coupling over their entire length. See figure.
Repeat the check, but this time on both sides of the coupling near the shaft. For the sake of accuracy, this chech should also be done using an outside caliper (B) at two diametrically opposite points on the outside surfaces of the two halves of the coupling.



Maximum alignment deviations:

Outside diameter of the coupling [mm.]	Va min. [mm.]	Va max. [mm.]	Va max. - Va min. [mm.]	Vr. [mm.]
70 - 80	2	4	0,13	0,13
81 - 95	2	4	0,15	0,15
96 - 110	2	4	0,18	0,18
111 - 130	2	4	0,21	0,21
131 - 140	2	4	0,24	0,24
141 - 160	2	6	0,27	0,27
161 - 180	2	6	0,3	0,3
181 - 200	2	6	0,34	0,34
201 - 225	2	6	0,38	0,38

4.5. PIPES

- In general, suction and delivery pipes should be fitted in straight stretches, with the minimum amount of elbows and accessories, in order 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 are 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 be at its maximum.
- Place brackets for the piping as near as possible to the suction and delivery mouths of the pump.

4.5.1. 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's suction and delivery connections.
These valves must ALWAYS be open whenever the pump is operating.

4.6. PRESSURE TANK

For models with double mechanical seal will be necessary the installation of a pressure tank.

Install ALWAYS the pressure tank between 1 and 2 meters above the mechanical seals. See the figure 4.6.1.

Connect ALWAYS the refrigeration liquid input connection with the bottom chamber seal connection. So, the refrigeration liquid outlet will be carried out by the top chamber connection. See the figure 4.6.1.

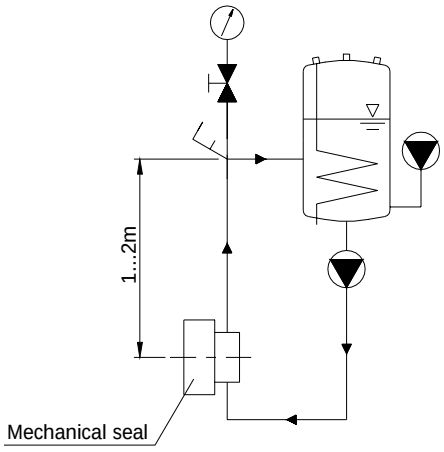


Figure 4.6.1: Pressure tank connection lay out

To obtain further information about the pressure tank (installation, operation, maintenance, ...), consult the instruction manual supplied by the manufacturer.

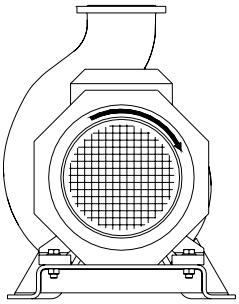
4.7. ELECTRICAL INSTALLATION

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 of the same.
- 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's ventilator is rotating in a clockwise direction.

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

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

5. Start-up

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

5.1. START-UP

Read Chapter 8. *Technical Specifications* carefully. 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 pipes' suction and delivery shut-off valves.
- Check oil level of the pump. Add correct grade of oil as necessary to maintain level in center of oil sight glass (In the case of first start-up: pumps are shipped with oil in the gearbox, nevertheless this check may be skipped).
- If the liquid fails to flow toward the pump, fill it with the liquid to be pumped.

The pump must NEVER rotate without liquid.

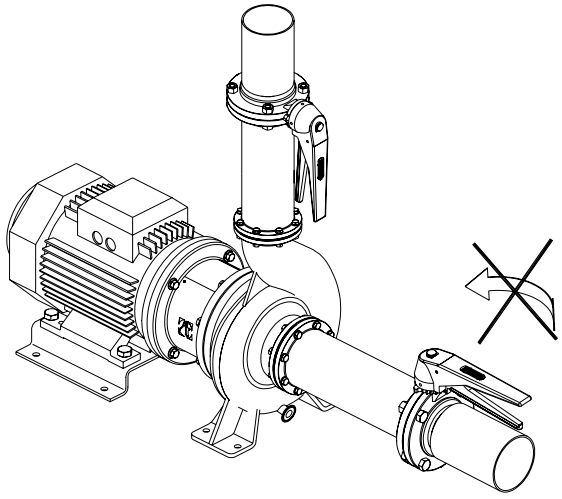
- Check that the rotation direction of the motor is correct.

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.

Operating problems	Probable causes
Overloading of motor.	8, 9, 13, 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, 15, 20, 21, 22, 24.
Overheating of the pump.	8, 9, 10, 13, 15, 20, 21, 22, 23, 24.
Abnormal wear.	4, 5, 10, 15, 20, 24.
Leak in mechanical seal.	11, 12, 16.

Probable causes		Solutions
1	Wrong rotation direction.	Change the direction of the rotation.
2	Insufficient NPSH.	Increase the NPSH available: - Raise the suction tank. - Lower the pump. - Decrease the steam tension. - Increase the diameter of the suction piping. - Shorten and simplify the suction piping.
3	Non-purged pump.	Purge or fill.
4	Cavitation.	Increase the suction pressure.(See Number 2 also)
5	The pump is sucking air.	Check the suction piping and all of its connections.
6	Obstructed suction piping.	Check the suction piping and the filters, if there are any.
7	Delivery pressure is too high.	If necessary, decrease the load losses by increasing the diameter of the piping, for example.
8	Flow is too high.	Decrease the flow: - Reduce the flow by means of a diaphragm. - Partially close off the delivery valve. - Trim the impeller. - Decrease the speed.
9	The viscosity of the liquid is too high.	Decrease the viscosity by heating the liquid, for example.
10	The temperature of the liquid is too high.	Decrease the temperature of the liquid by cooling it.
11	Mechanical seal either damaged or worn.	Replace the seal.
12	Unsuitable O-ring for the liquid in question.	Fit more suitable O-ring by consulting the supplier with respect to the same.
13	The impeller is rubbing.	- Lower the temperature. - Lower suction pressure. - Adjust impeller / cover set.
14	Pressure in the pipes.	Connect the pipes to the pump without pressure.
15	There are foreign bodies in the liquid.	Place a filter at the suction piping.
16	The tension of the mechanical seal spring is too low.	Adjust in accordance with the instructions given herein.
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: - Increase the diameter of the impeller. - Increase pump speed.
20	Worn bearing.	Replace the bearings; check the pump.
21	Not enough lubricating oil.	Fill with oil.
22	Unsuitable lubricating oil.	Use adequate oil.
23	Non aligned coupling.	Align 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 carefully 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 entitled Stripping 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. OILING

The bearings are oiled by immersion in an oil bath.
The pumps are supplied with oil.

- Regularly check the oil level, for example, weekly or eery 150 operating hours.
- The first oil change must be carried out after 150 hours of operation.
- Afterwards, it can be changed every 2500 operating hours or at least once a year when operating under normal conditions.

When change the oil: the oil sump must be filled up to the level in the middle of the peephole.

Do not pour too much oil into the sump.

Leave the pump switched off for a while and then re-check the oil level; if necessary, add a little oil.

Oils for environment temperatures of 5 to 50ºC: ISO VG 68

PUMP TYPE	Quantity of oil in the support (l.)
125-100-250 **125-100-315** **125-100-400** **150-125-250** **150-125-315** **150-125-400** **200-150-250**	1,75
200-150-315 **200-150-400**	2

7.4. 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.

7.5. CLEANING

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

Use rubber gloves during the cleaning process.

Always use protective goggles.

If the pump is installed in a system fitted with a CIP process, there will be no need for stripping.
If it is not fitted with an automatic cleaning process, strip the pump pursuant to the instructions given in the section entitled Stripping 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 70ºC (150ºF)

1 Kg NaOH + 100 l. water = cleaning solution
or
2.2 l. NaOH al 33% + 100 l. of water = cleaning solution

b) Acid solution: 0.5% in weight of nitric acid (HNO_3) to 70ºC (150ºF)

0.7 liters HNO_3 to 53% + 100 l. water = cleaning solution

Monitor the concentration of cleaning solutions, it could give rise to 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.

7.6. PUMP DISASSEMBLY/ASSEMBLY

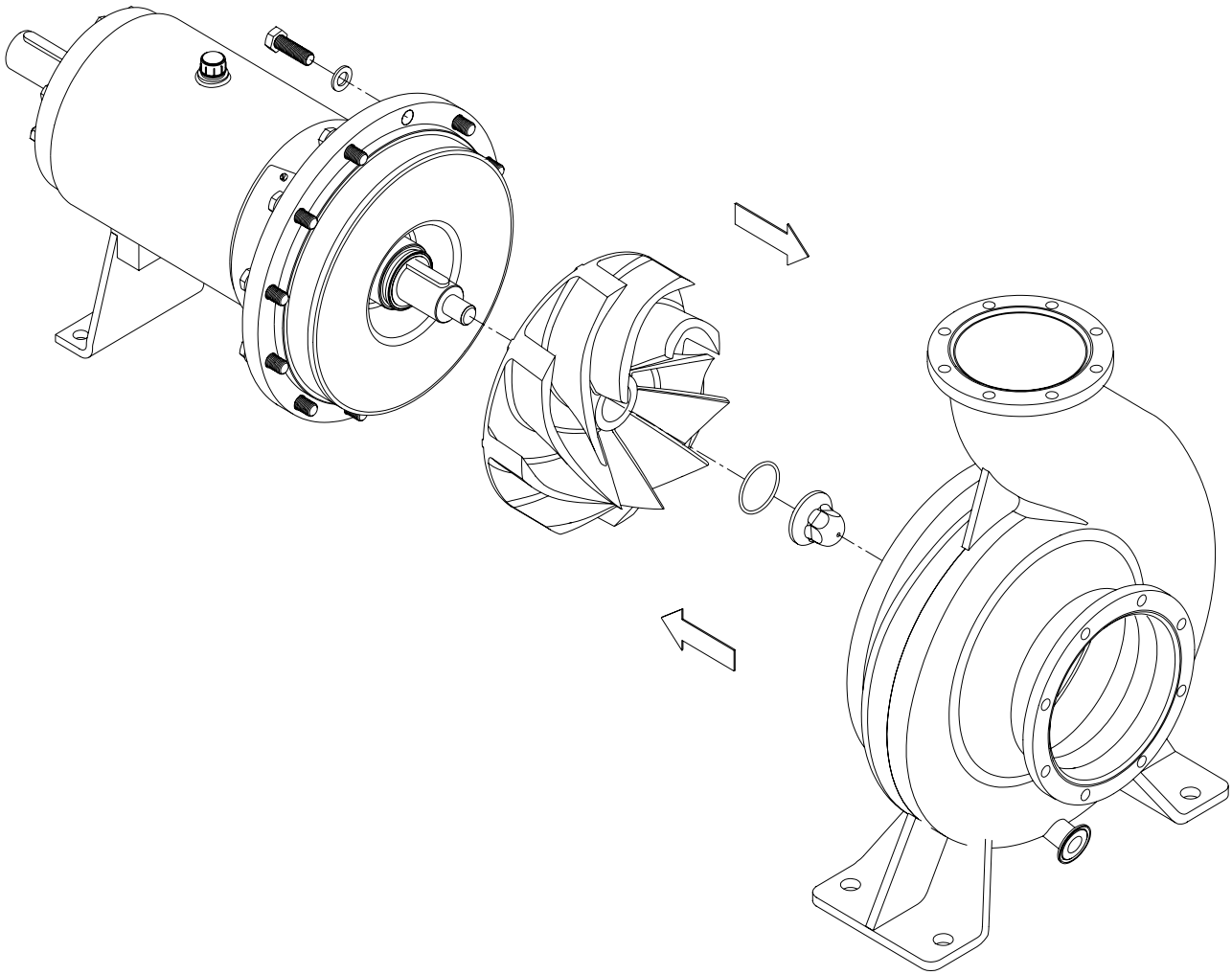
7.6.1. Pump casing and impeller

⇨ **Disassembly**

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

⇦ **Assembly**

Slip the impeller (02) onto the shaft (05) until it reaches the rotational part of the mechanical seal (08), fit the O-ring (80D) into the blind nut slot (45) and tighten the nut (45). Fit the pump housing (01) and fix it to the lantern (04) with the hexagonal screws (52) and the washers (53).

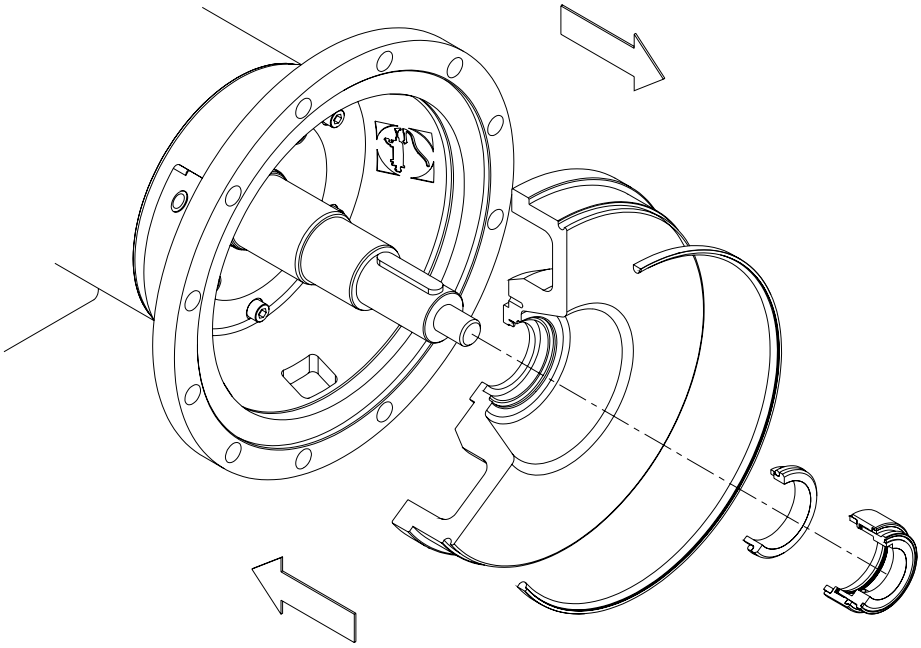


¡IMPORTANT! When assembling the new seal, be careful and mount the parts and the O-rings with soapy water in order to allow an easy glide of the parts, either the stationary part and the rotary part on the shaft.

7.6.2. Simple mechanical seal

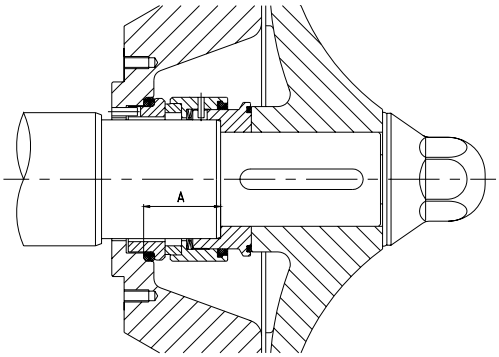
⇨ Disassembly

Remove the rotational part from the mechanical seal (08).
Take off the pump cover (03), the fixed part of the mechanical seal (08) will remain housed in the cover.
Remove the fixed part of the mechanical seal (08).



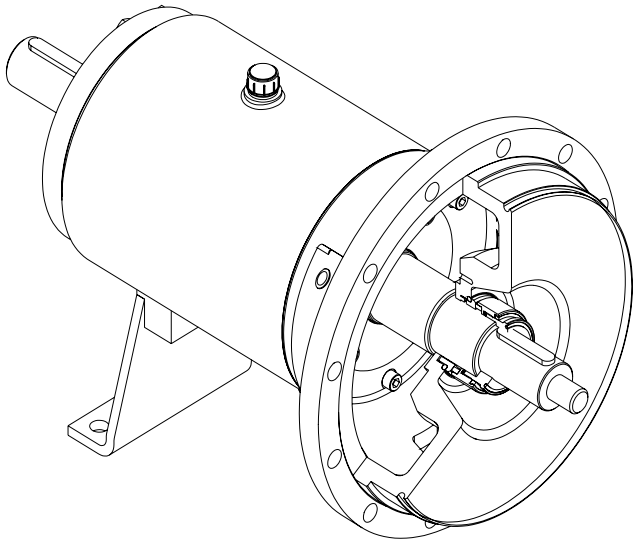
⇦ Assembly

Check the situation of the shaft (05) in relation to the pump cover (03). See the chapter 7.6.5. *Shaft pump fitting*.
Fit the pump cover (03) to the lantern (04).
Place the fixed part of the mechanical seal in the cover housing (03) taking the stud into account.
Check to make sure that the assembly measurement is that which is given below:



Seal diameter	A
53	34,5
60	37,5

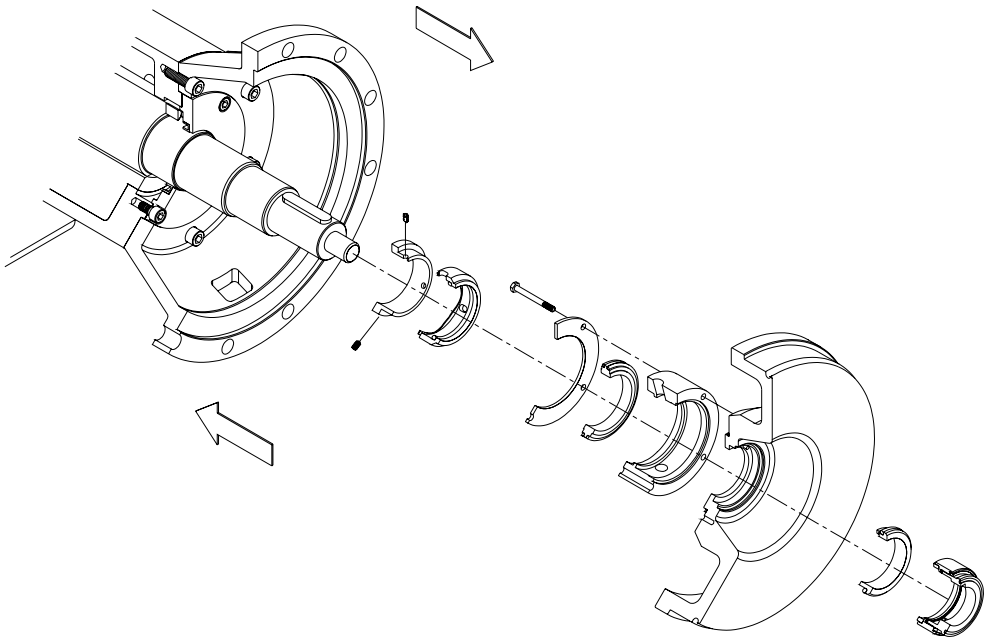
Slide the rotating part of the mechanical seal (08) over the shaft (05) until it can go no further.



7.6.3. Flushed mechanical seal

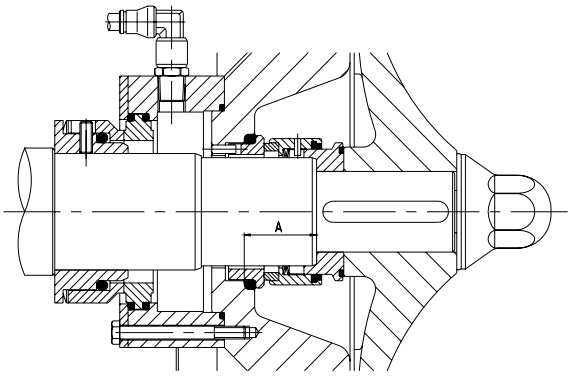
⇨ Disassembly

Remove the rotating part of the mechanical seal (08).
Take off the pump cover (03) leaving the ring (30) and the lid (10) as they are. The fixed parts of the mechanical seal (08, 08B) will remain housed in the group.
Remove the fixed part from the inner seal (08) taking the stud into account.
Remove the screws (52C), the fixed part of the outer seal will come out (08B).
Loosen the studs (55A) in order to remove the rotating part from the outer seal (08A) with the sleeve (13).



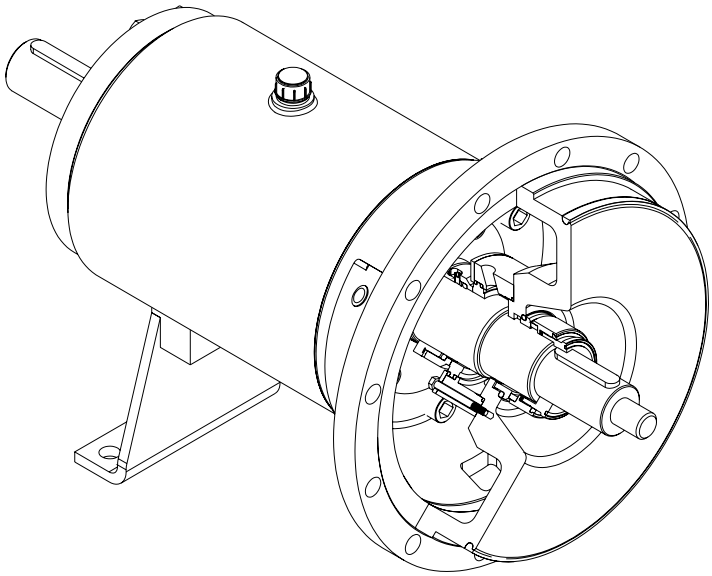
⇦ Assembly

Check the situation of the shaft (05) in relation to the pump cover (03). See the chapter 7.6.5. *Shaft pump fitting*.
Fit the sleeve (13) until it can go no further on the shaft (05).
Fit the rotating part of the outer mechanical seal (08A) with the gasket and spring on the sleeve (13) and fix the shaft (05) by means of the studs (55A).
Position the O-ring (80B) on the pump cover centering (03).



Seal diameter	A
53	34,5
60	37,5

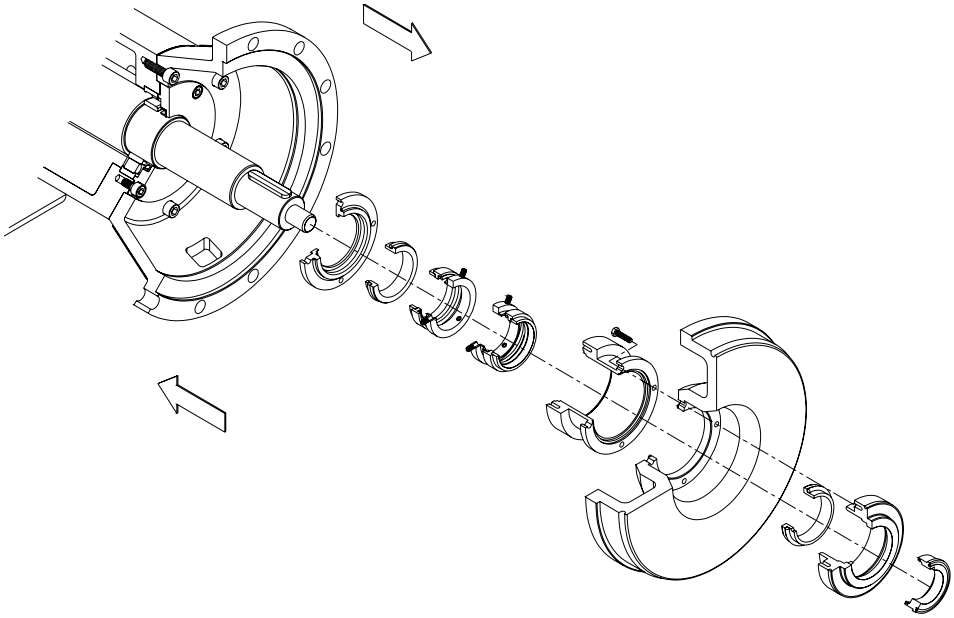
Fit the lid (10) in this centering, the fixed part of the outer seal (08B), the cool seal ring (30) and fix the whole to the pump cover (03) by means of the hexagonal screws (52C).
Carefully fit this whole group to the lantern center (04). At the same time, the two rub faces of the outer seal will touch (08A, 08B).
See the section on the assembly of the simple mechanical seal in order to fit the inner mechanical seal.



7.6.4. Double mechanical seal

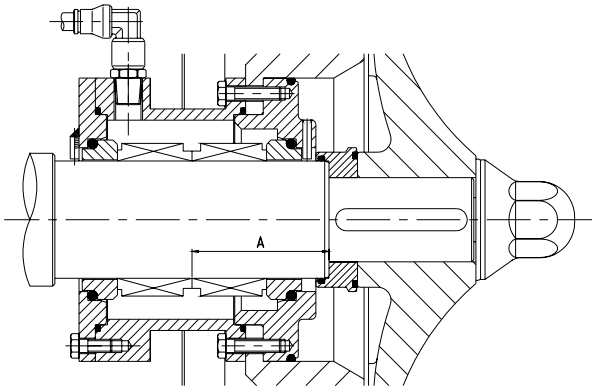
⇨ Disassembly

Remove the shaft separator (17).
Remove the screws (52C), thus freeing the external cover (10B).
Remove the group of the three fitted covers (03A, 10A and 10C), the fixed part of the inner mechanical seal (08) will remain housed in the internal cover (10C).
Loosen the screws (52D) to strip the internal cover (10C) and the double seal lid (10A) from the pump cover (03A).
Loosen the studs from the rotating parts of the seals. Then, remove these rotating parts from the mechanical seals (08, 08A) of the shaft (05A).
Remove the external cover (10B), the fixed part of the exterior mechanical seal (08A) will remain housed in the cover.



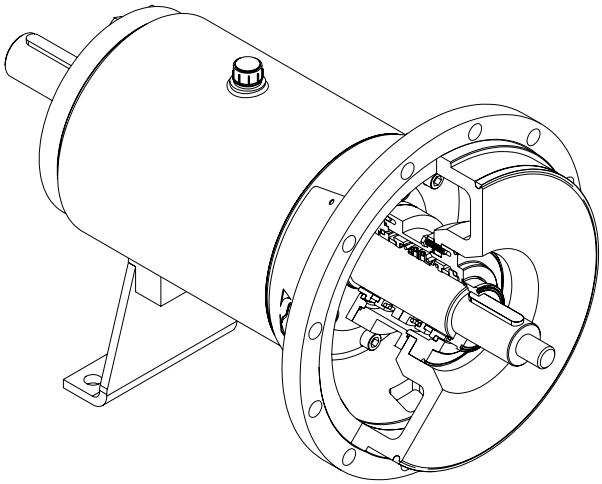
⇦ Assembly

Check the situation of the shaft (05) in relation to the pump cover (03). See the chapter 7.6.5. *Shaft pump fitting*.
Position the fixed part of the mechanical seal (08A) in the cover housing (10B), taking the stud into account.
Fit into the external cover (10B), leaving it loose at the end of the shaft (05A).



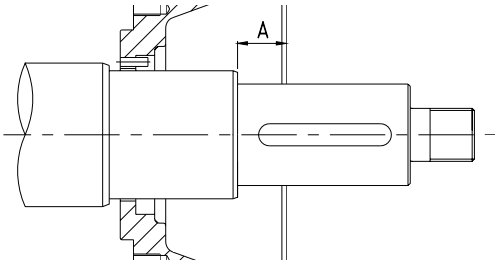
Seal diameter	A
53	62,5
60	68

Slip on the rotating part of the outer mechanical seal (08A). Fix in accordance with the assembly dimensions indicated.
Fit the rotating part of the internal mechanical seal (08) up to the outer seal (08A), and then fix it.
Place the fixed part of the internal seal (08) into the cover housing (10C), taking the stud into account.
Fit the covers (03A, 10A and 10C) by means of the screws (52D).
Position the aforementioned covers in the lantern (04) and fix the external cover (10B) with the screws (52C).
Fit the separator (17) up to the back of the shaft (05A).



7.6.5. Shaft pump fitting

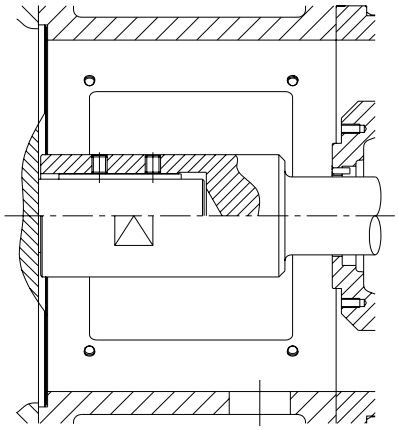
Check that the shaft (05) assembly dimension in relation to the pump cover (03) is in accordance with the indicated below:

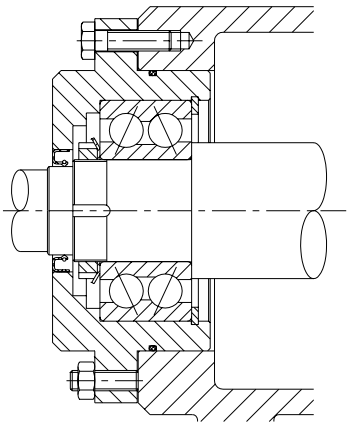


Tipo bomba	Diámetro cierre	A
250	53	16
300	53	8
400	60	20

Otherwise adjust the assembly dimension in accordance with the indicated below.

- For monoblock models; loosen the studs (55) and slide the shaft (05) until it can go no further. Finally, fix the studs.
- For bareshaft models; loosen the hexagonal screws (52A) and the nuts (54), adjust the assembly dimension by means of the studs (55). Once time it has been adjusted, fix the studs (54) and the screws (52A).





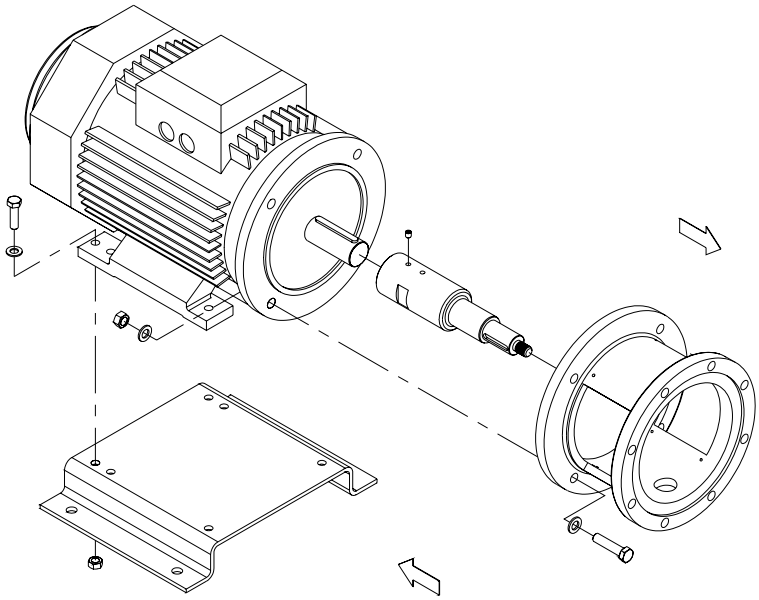
7.6.6. Lantern and motor (MONOBLOCK)

⇨ **Disassembly**

Remove the hexagonal screws (52A), the nuts (54) and the washers (53, 53A). Then, the lantern (04) could be removed.
Loosen the studs (55) and remove the shaft (05).
Remove the screws (52B), the nuts (54A) and the washers (53B). Then, the motor (93) could be removed from the base plate.

⇦ **Assembly**

Place the motor (93) on the base plate (38) and fix them by means of the screws (52B), the nuts (54) and the washers (53B).
Slide the shaft (05) over the motor shaft (93) until it can go no further. Fix the studs (55).
Place the lantern (04) on the motor (93) and fix them by means of hexagonal screws (52A), the nuts (54) and the washers (53) and (53A).



8. Technical Specifications

8.1. TECHNICAL SPECIFICATIONS

	50Hz	60Hz
Maximum flow rate (1450 min^{-1})	1000 m^3/h	1000 m^3/h
Maximum differential pressure	6 bar (87 PSI)	9 bar (131 PSI)
Maximum suction pressure	14 bar (203 PSI)	11 bar (160 PSI)
Maximum operating pressure	20 bar (290 PSI)	20 bar (290 PSI)
Operating temperature	-10 ºC a +140ºC (EPDM)	-10 ºC a +140ºC (EPDM)
	14 ºF a 284 ºF (EPDM)	14 ºF a 284 ºF (EPDM)
Maximum speed	1450 min^{-1}	1750 min^{-1}
Suction / delivery connections	DIN 11864-2 (estándar)	DIN 11864-2 (estándar)

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 and joints in contact with the product	EPDM (standard)
Other optional joints materials	Consult your supplier
Surface finish	Standard finish

Mechanical seal

Seal type	Single internal mechanical seal

Flushed mechanical seal

Maximum pressure	1 bar (14,5 PSI)
Flow	6-10 l/min

Double mechanical seal

Operating pressure	1,5~2 bar (22~29 PSI) over the pump operating pressure

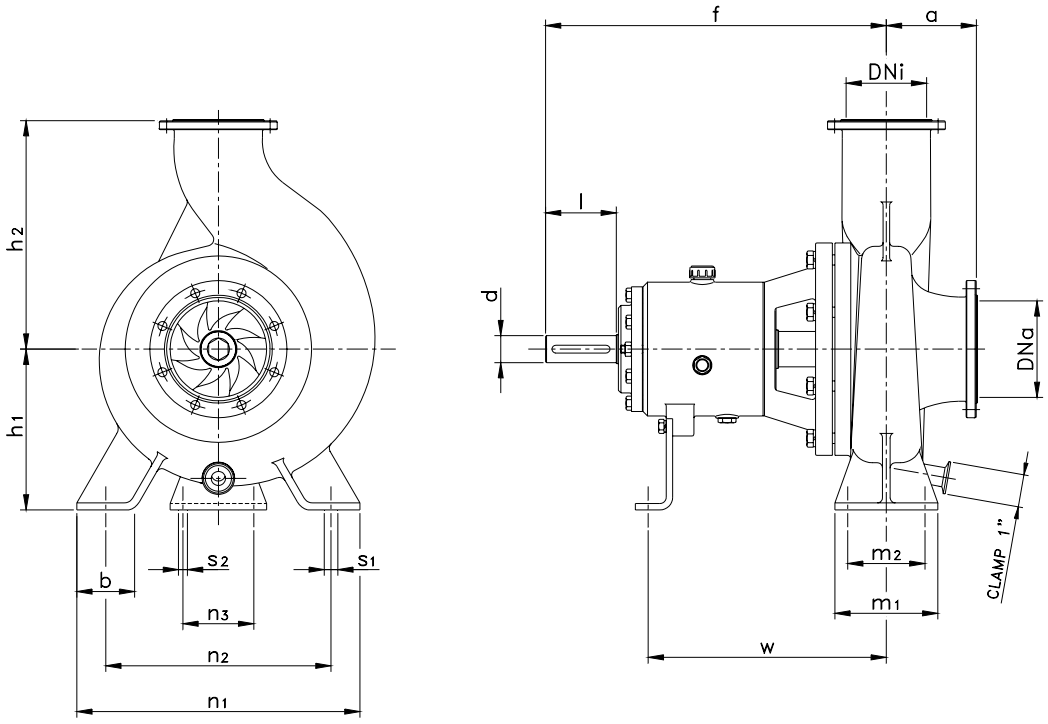
Mechanical seal materials	Type of mechanical seal			
	Single internal	Flushed	Double [atmospheric side]	Double [product side]
Stationary part	Graphite			Silicon carbide
Rotary part	Silicon carbide			

8.2. WEIGHTS

Pump Type - bareshaft -	Weight [Kg]	Weight [lbs]
125-100-250	113	249
125-100-315	127	280
125-100-400	135	298
150-125-250	118	260
150-125-315	133	293
150-125-400	149	329
200-150-250	124	273
200-150-315	194	428
200-150-400	210	463

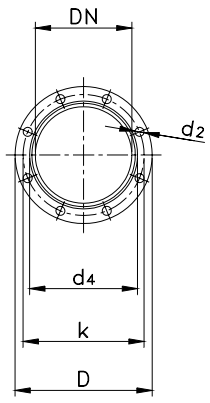
Pump Type - monoblock -	MOTOR	Weight [Kg]	Weight [lbs]
125-100-250	160	204	449
	180	239	526
150-125-250	160	210	462
	180	256	563
200-150-250	180	263	579
	200	360	792

8.3. DIN-FOOD DIMENSIONS (BARESHAFT)



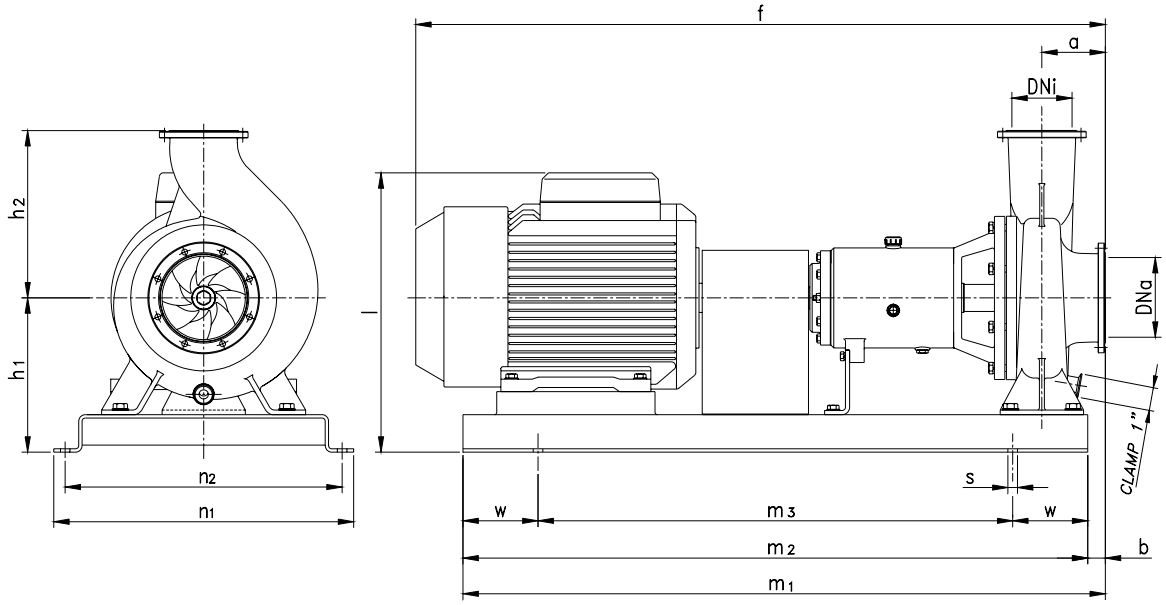
DIN 11864-2-A flange dimensions

DN	D	k	d4	d2
100	159	137	117	8 x ∅11
125	183	161	142	
150	213	188	168	8 x ∅14
200	263	238	218	



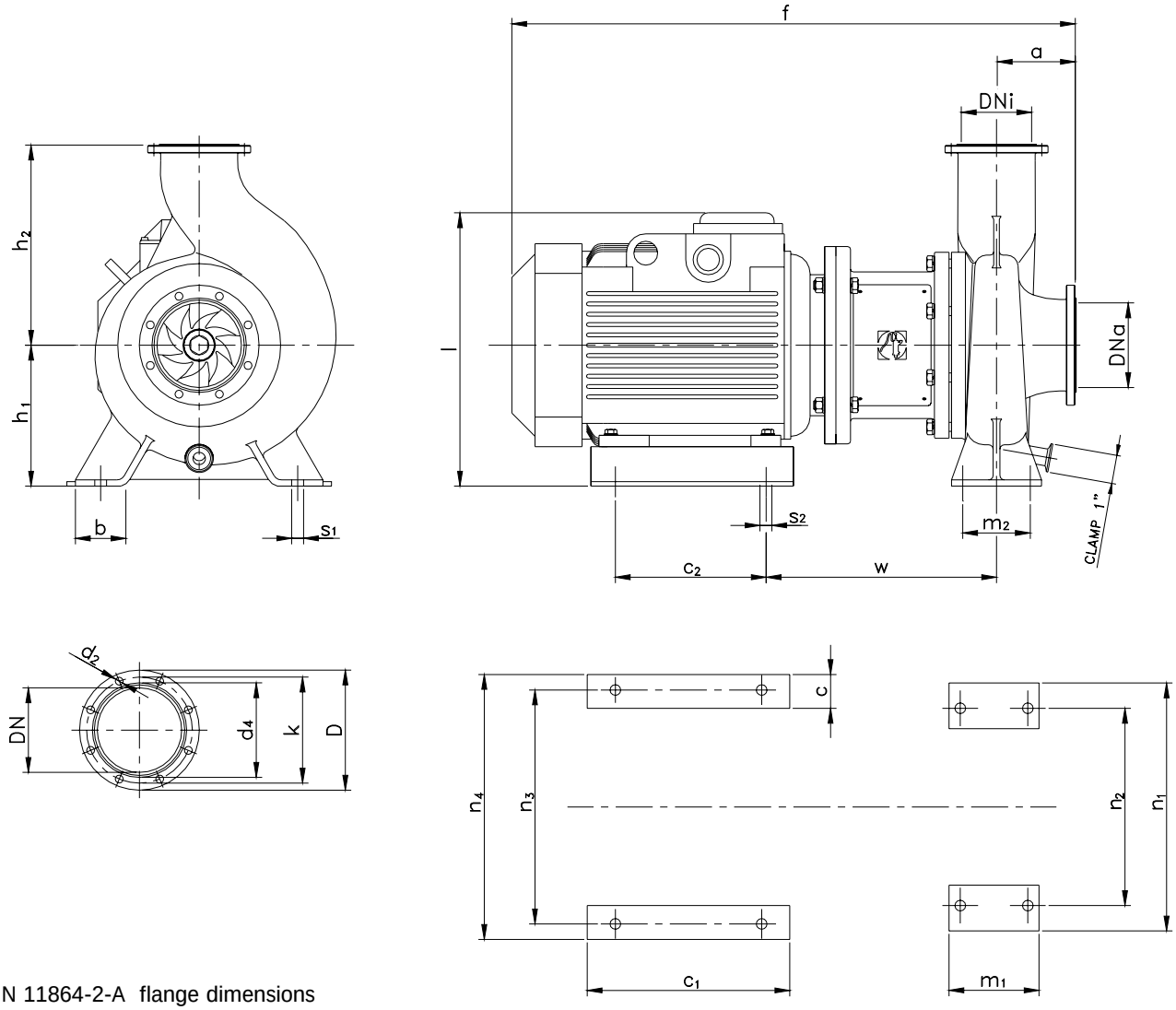
PUMP TYPE	DNa	DNi	d	l	a	f	h_1	h_2	b	m_1	m_2	n_1	n_2	n_3	s_1	s_2	w
125-100-250	125	100	42	110	121	522	250	316	90	160	120	440	350	110	18	14	363
125-100-315						510	280	352				490	400				350
125-100-400					130		330	402	100	200	150	550	450		23		
150-125-250	150	125	42	110	128	530	250	355	90	160	120	440	350	110	18	14	370
150-125-315					137	518	280	372		200	150	490	400		23		358
150-125-400					140		330	422	100			550	450				
200-150-250	200	150	42	110	142	537	250	375	90	200	150	440	350	110	23	14	378
200-150-315			48		153	670	280	402				490	400	140		18	500
200-150-400						667	330	452	100			550	450				498

8.4. DIN-FOOD DIMENSIONS (BARESHAFT WITH BASE PLATE)



PUMP TYPE	MOTOR	DNa	DNi	a	f	h_1	h_2	b	l	m_1	m_2	m_3	n_1	n_2	s	w
125-100-250	160 M	125	100	121	1250	340	316	35	550	1335	1300	1020	620	565	23	140
	160 L				1290											
	180 M				1330				565							
150-125-250	160 M	150	125	128	1265		355	40	550	1340						
	160 L				1305											
	180 M				1345				565							
	180 L				1365											
200-150-250	160 L	200	150	142	1330		375	35	550	1335						
	180 M				1365											
	180 L				1385				565							
	200 L				1405				620							
125-100-315	160 M	125	100	121	1240		352	35	580	1385	1350	990	720	665		180
	160 L				1280											
	180 M				1315				595							
	180 L				1335											
	200 L				1355				650							
150-125-315	160 L	150	125	137	1305	370	372	30	580	1380						
	180 M				1340				595							
	180 L				1360											
	200 L				1380				650							
	225				1490				670							
200-150-315	160 L	200	150	153	1470		402	45	580	1395	1500	1140				
	180 M				1510				595	1545						
	200 L				1550				650							
	225				1660				670							
	250 M				1725											
	280 S				1820			35	820	1735	1700	1300				200
125-100-400	200 L	125	100	130	1365	420		20	700	1370	1350	990				180
	225				1475				720							
	250 M				1540					1520	1500	1140				
	280 S				1705			10	870	1710	1700	1300				200
150-125-400	225	150	125	140	1495		422	30	720	1380	1350	990				180
	250 M				1560					1530	1500	1140				
	280 S				1725			20	870	1720	1700	1300				200
	280 M				1785											
	315 S				1790	430			935	1820	1800	1400	820	765		
200-150-400	225	200	150	153	1655	420	452	45	720	1545	1500	1140	720	665		180
	250 M				1720											
	280 S				1885			35	870	1735	1700	1300				200
	280 M				1945											
	315 S				1950	430			935	1835	1800	1400	820	765		
	315 M				2090											
	315 L				2120											

8.5. DIN-FOOD DIMENSIONS (MONOBLOCK)

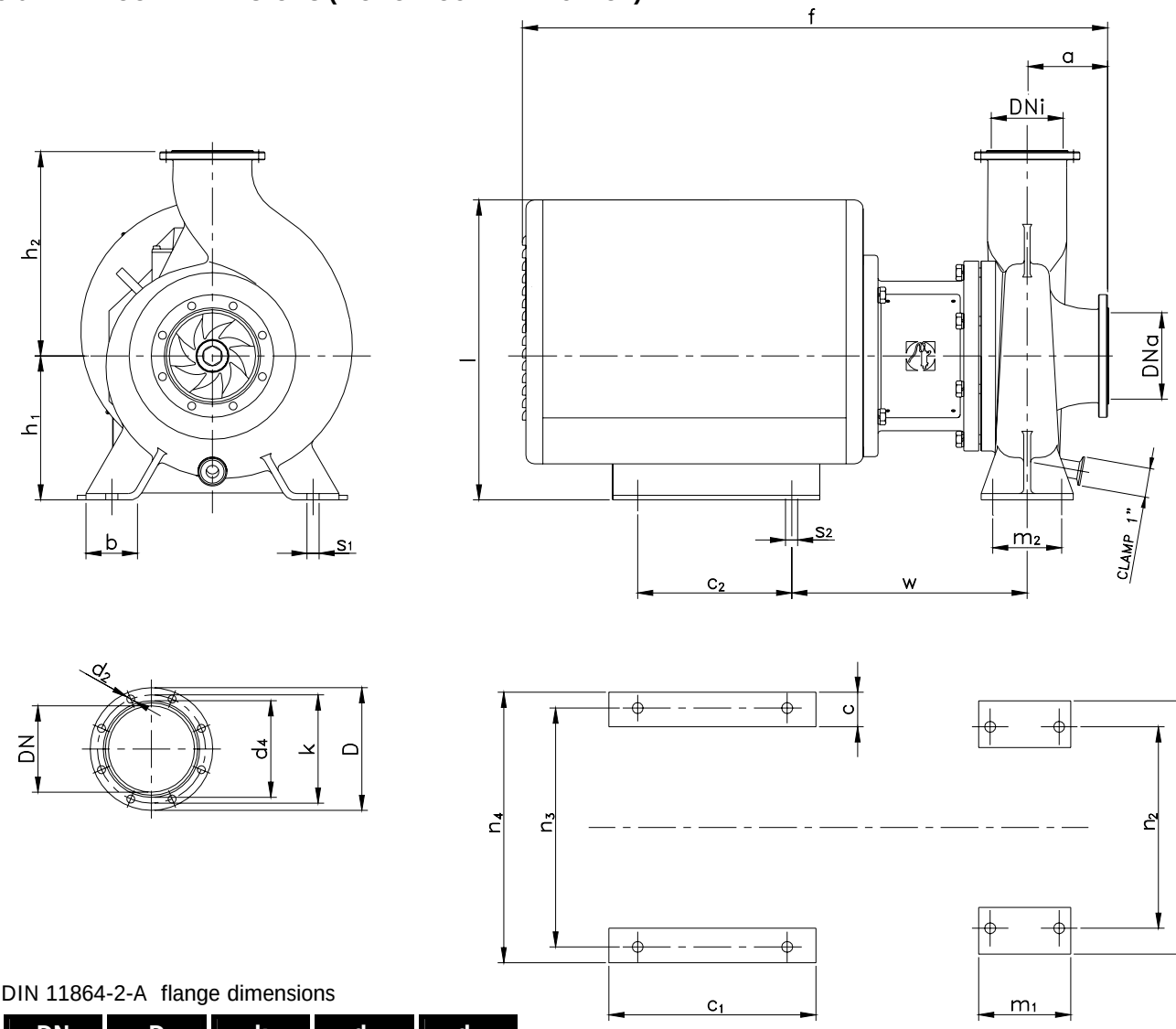


DIN 11864-2-A flange dimensions

DN	D	k	d_4	d_2
100	159	137	117	8 x ∅11
125	183	161	142	
150	213	188	168	8 x ∅14
200	263	238	218	

PUMP TYPE	MOTOR	DNa	DNi	a	f	h_1	h_2	b	c	c_1	c_2	l	m_1	m_2	n_1	n_2	n_3	n_4	s_1	s_2	w
125-100-250	160	125	100	121	850	250	316	90	68	360	260	460	160	120	440	350	415	470	18	18	342
	180				930							475									367
150-125-250	160	150	125	128	865		355					460									349
	180				945							475									374
200-150-250	180	200	150	142	965		375						200	150					23		381
	200				1005	340		68	88	400	305	585	210		600	545	545	600		23	384

8.6. DIN-FOOD DIMENSIONS (MONOBLOCK WITH CAPOT)

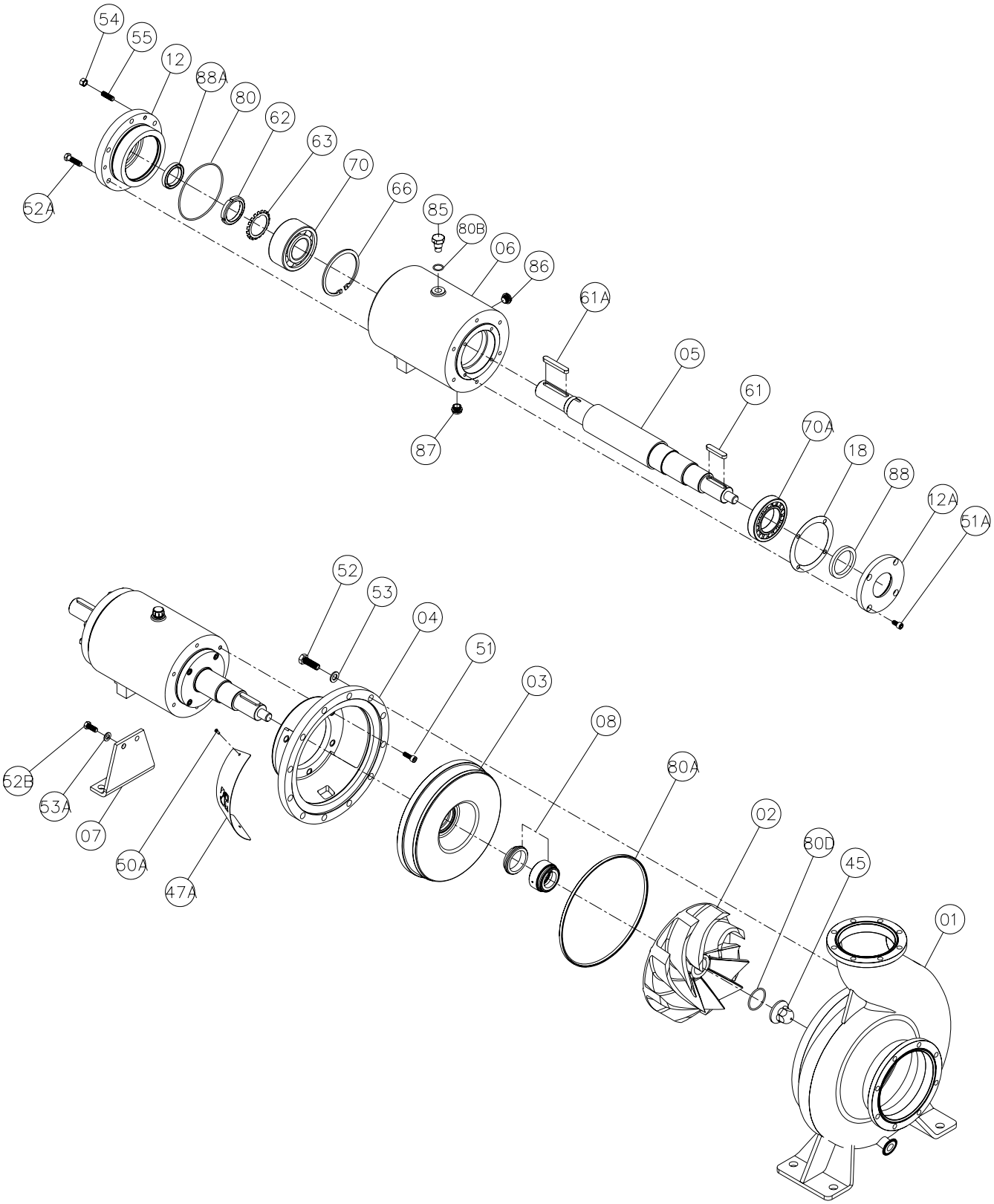


DIN 11864-2-A flange dimensions

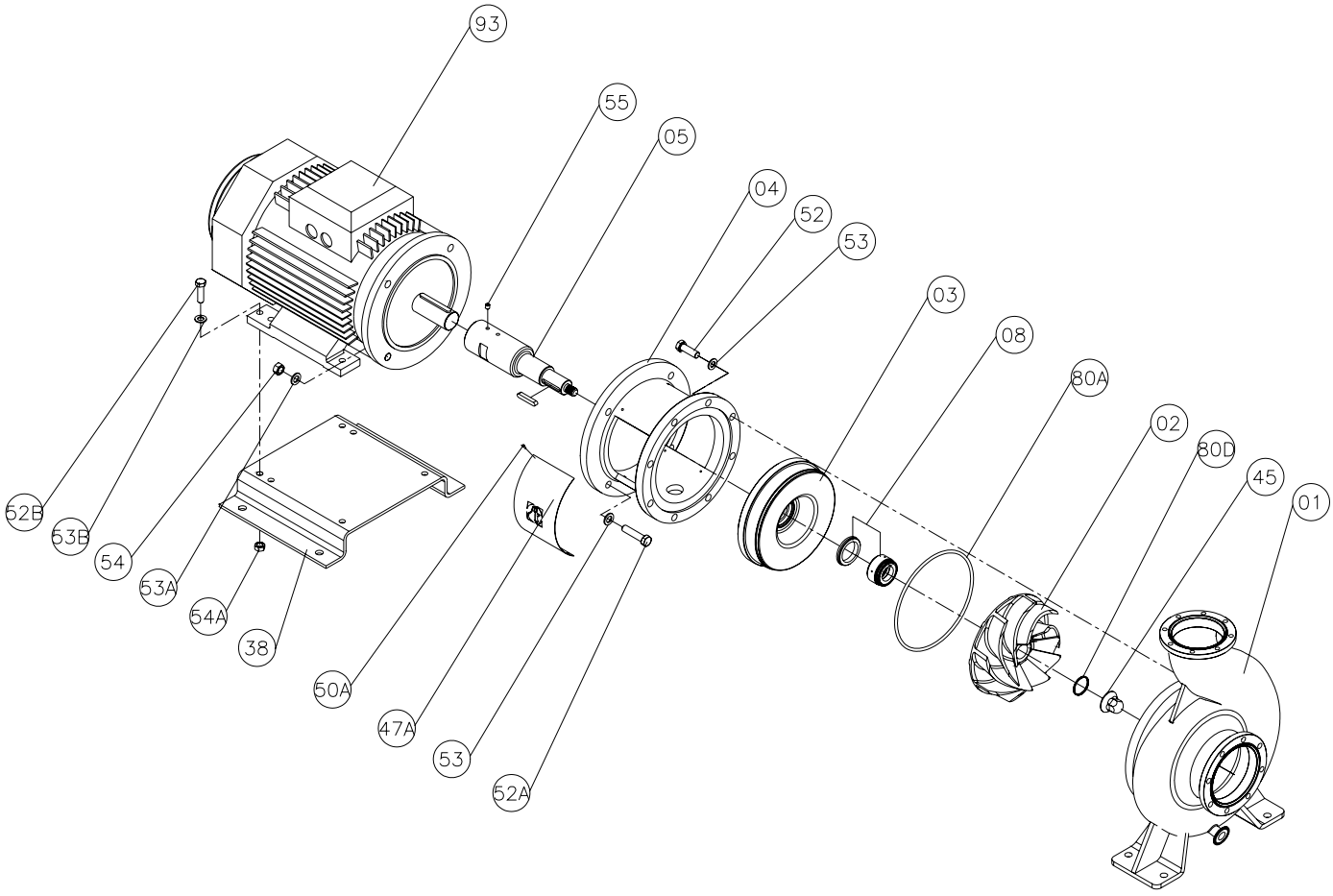
DN	D	k	d_4	d_2
100	159	137	117	8 x ∅11
125	183	161	142	
150	213	188	168	8 x ∅14
200	263	238	218	

PUMP TYPE	MOTOR	DNa	DNi	a	f	h_1	h_2	b	c	c_1	c_2	l	m_1	m_2	n_1	n_2	n_3	n_4	s_1	s_2	w
125-100-250	160	125	100	121	960	250	316	90	68	360	260	525	160	120	440	350	415	470	18	18	344
	180																				369
150-125-250	160	150	125	128	975		355														351
	180																				376
200-150-250	180	200	150	142	995		375						200	150					23		383
	200				1105	340		68	88	400	305	690	210		600	545	545	600		23	386

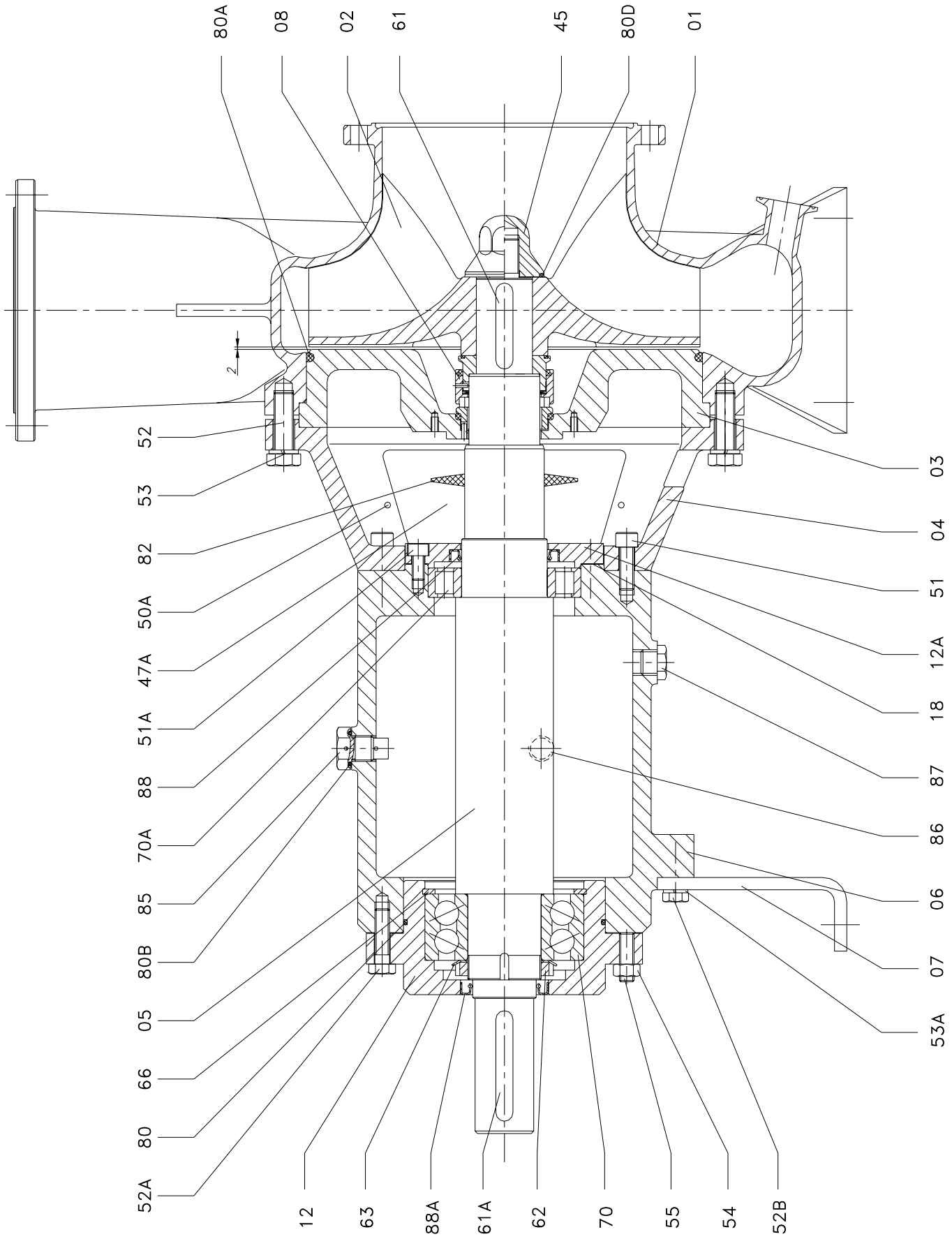
8.7. DIN-FOOD PUMP (BARESHAFT)



8.8. DIN-FOOD PUMP (MONOBLOCK)



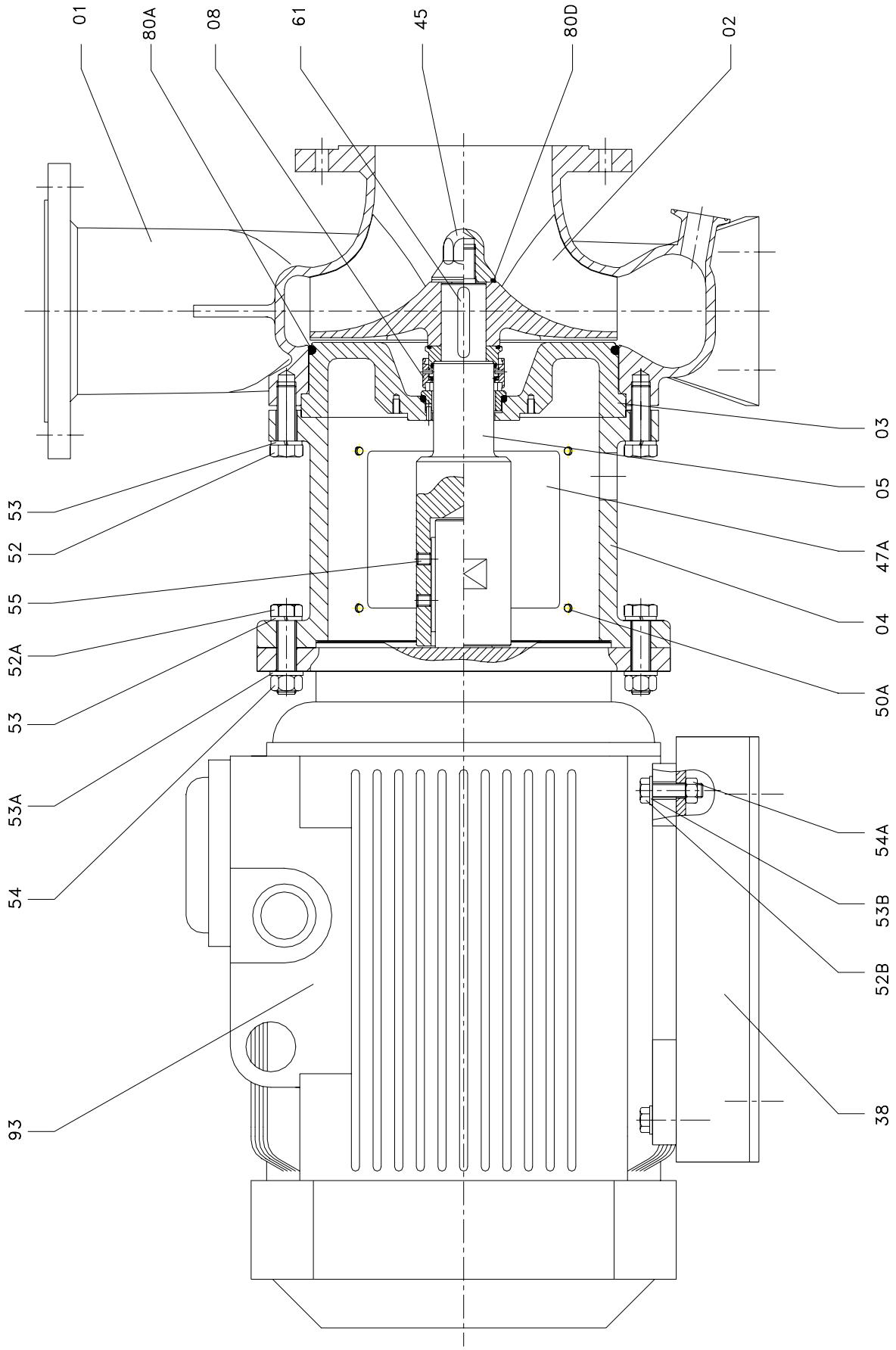
8.9. DIN-FOOD PUMP SECTION (BARESHAFT)



8.10. PARTS LIST DIN-FOOD PUMP (BARESHAFT)

Position	Description	Quantity	Material
01	Pump housing	1	AISI 316L
02	Impeller	1	AISI 316L
03	Pump cover	1	AISI 316L
04	Lantern	1	GG-15
05	Shaft	1	AISI 316L
06	Bearing support	1	GG-15
07	Leg	1	GG-15
08	Mechanical seal	1	-
12	Bearing house	1	F-114
12A	Bearing cover	1	F-114
18	Front cover gasket	1	Paper gasket
45	Blind nut	1	AISI 316L
47A	Protection	2	AISI 304
50A	Screw	4	A2
51	Allen screw	6	8.8
51A	Allen screw	4	8.8
52	Hexagonal screw	12	A2
52A	Hexagonal screw	6	8.8
52B	Hexagonal screw	2	A2
53	Grower washer	12	A2
53A	Grower washer	2	A2
54	Hexagonal nut	3	8.8
55	Stud	3	8.8
61	Key	1	A2
61A	Key	1	F-114
62	Safety nut	1	Steel
63	Safety washer	1	Steel
66	Elastic ring	1	Steel
70	Double angular contact bearing	1	Steel
70A	Cylindrical roller bearing	1	Steel
80	O-ring	1	EPDM
80A	O-ring	1	EPDM
80B	O-ring	1	NBR
80D	O-ring	1	EPDM
85	Oil plug	1	AISI 303
86	Peephole	1	Plastic
87	Bleeder	1	Plastic
88	Lip seal	1	NBR
88A	Lip seal	1	NBR

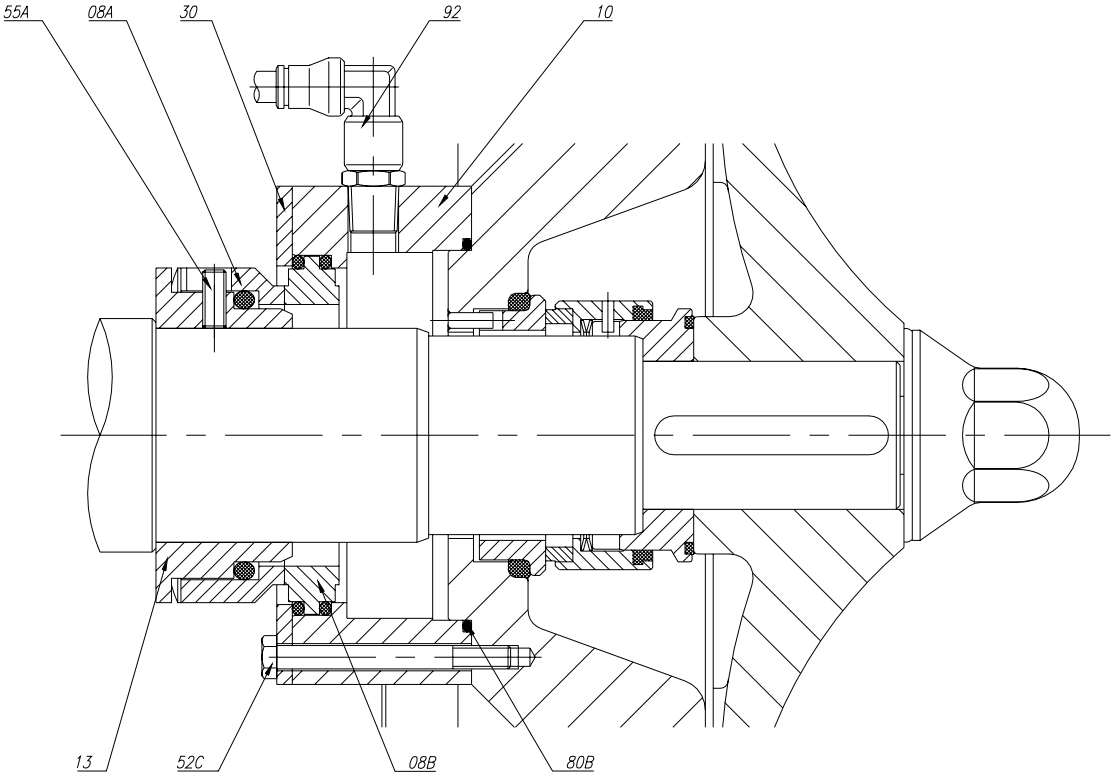
8.11. DIN-FOOD PUMP SECTION (MONOBLOCK)



8.12. PARTS LIST DIN-FOOD PUMP (MONOBLOCK)

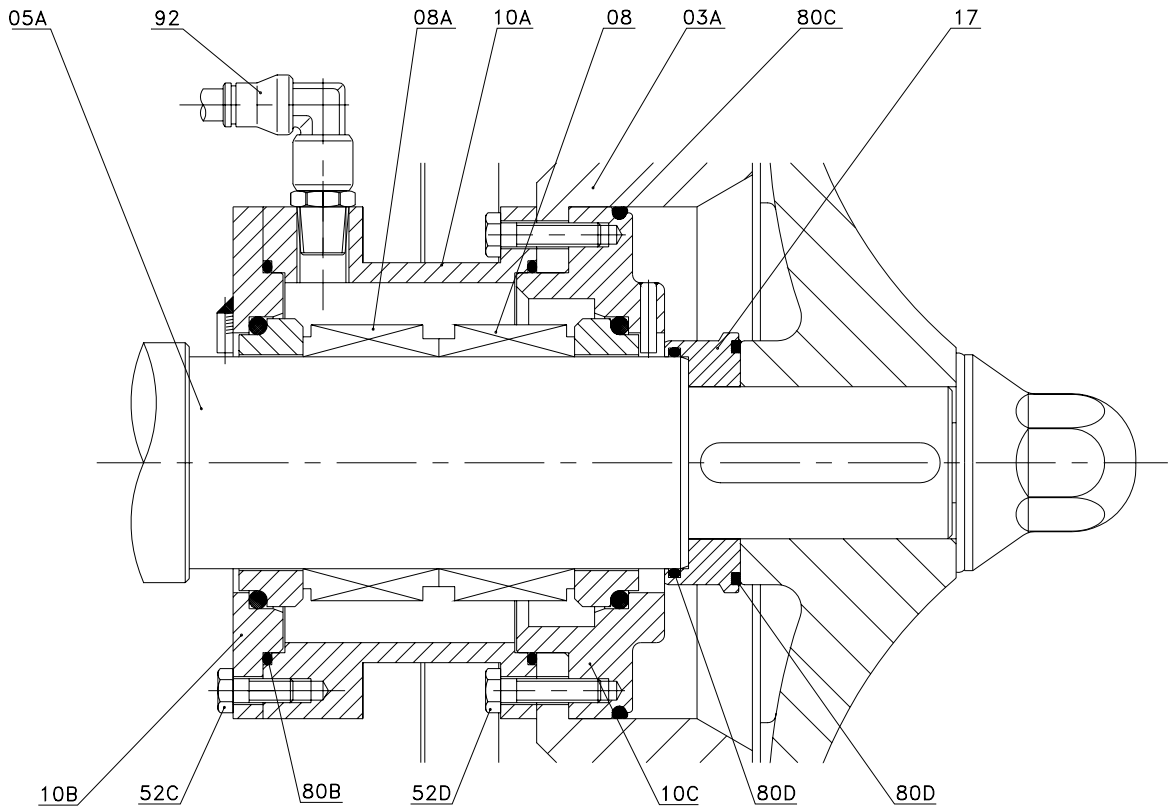
Position	Description	Quantity	Material
01	Pump housing	1	AISI 316L
02	Impeller	1	AISI 316L
03	Pump cover	1	AISI 316L
04	Lantern	1	GG-15
05	Shaft	1	AISI 316L
08	Mechanical seal	1	-
38	Base plate	1	AISI 304
45	Blind nut	1	AISI 316L
47A	Protection	2	AISI 304
50A	Screw	8	A2
52	Hexagonal screw	8	A2
52A	Hexagonal screw	4	A2
52B	Hexagonal screw	4	A2
53	Grower washer	12	A2
53A	Flat washer	4	A2
53B	Flat washer	4	A2
54	Hexagonal nut	4	A2
54A	Hexagonal nut	4	A2
55	Stud	2	A2
61	Key	1	A2
80A	O-ring	1	EPDM
80D	O-ring	1	EPDM
93	Motor	1	-

8.13. DIN-FOOD FLUSHED MECHANICAL SEAL



Position	Quantity	Description	Material
08A	1	Mechanical seal - rotary part -	-
08B	1	Mechanical seal - stationary part -	-
10	1	Lid	AISI 316L
13	1	Flushed mechanical seal sleeve	AISI 316L
30	1	Flushed mechanical seal ring	AISI 316L
52C	4	Hexagonal screw	A2
55A	3	Stud	A2
80B	1	O-ring	EPDM
92	2	Elbow connection	AISI 316

8.14. DIN-FOOD DOUBLE MECHANICAL SEAL



Position	Quantity	Description	Material
03A	1	Pump cover	AISI 316L
05A	1	Shaft	AISI 316L
08	1	Internal mechanical seal	-
08A	1	External mechanical seal	-
10A	1	Double mechanical seal lid	AISI 316L
10B	1	External cover	AISI 316L
10C	1	Internal cover	AISI 316L
17	1	Separator	AISI 316L
52C	4	Hexagonal screw	A2
52D	4	Hexagonal screw	A2
80B	2	O-ring	EPDM
80C	1	O-ring	EPDM
80D	2	O-ring	EPDM
92	2	Elbow connection	AISI 316

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