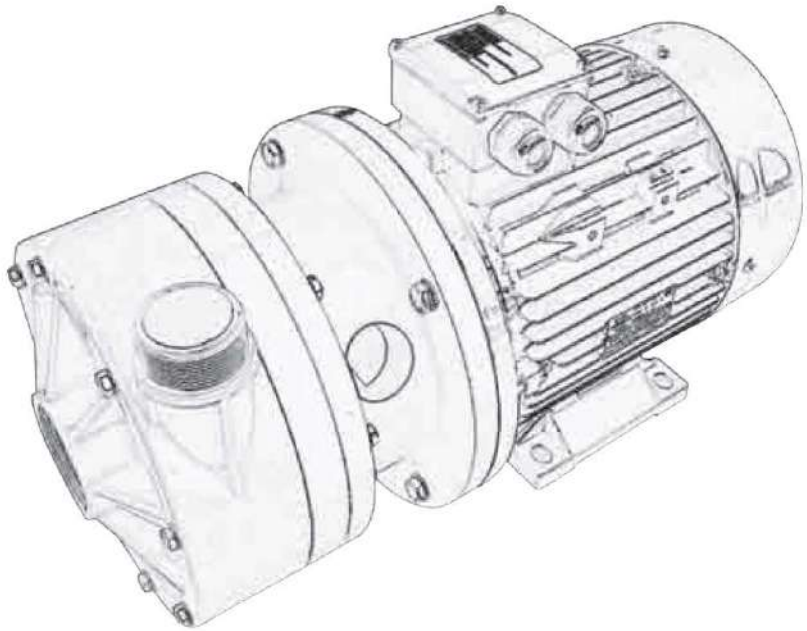
ADH

Horizontal Centrifugal Pumps

Installation, Operation and Maintenance



AlphaDynamic PUMPS

We Make The Difference

AlphaDynamic Pumps SA

Industrial Park of Inofita - HELLAS

www.alphadynamic.eu

INDEX

1. Introduction

1.1 General

This manual refers to ADH horizontal centrifugal pumps series. Pumps of series ADH are made of thermoplastic materials (Polypropylene or PVDF) and can be of different sizes. Dimensions and capacities available are described in paragraph 7.

1.2 Purpose of the manual

The main purpose of this manual is to assure that the activities of installation, operation and maintenance of the pumps are executed in a correct and safe way by all personnel in charge of these operations. This document also offers indications useful for the customer to solve the problems, order spare parts and contact AlphaDynamic Pumps SA repair service.

1.3 Warning symbols for safety

This symbol indicates a possible danger caused by the presence of electrical fields, contacts or wires with electric current.

All the symbols with the exclamation mark indicate an important situation that needs the attention of the personnel. In particular, these are indications useful for the correct functioning and prevention of possible damage to the equipment.

This symbol signals danger or a situation that requires the maximum attention of the personnel. It's important to respect the instructions stated at the margin of this symbol and proceed very carefully. It's necessary to inform all the personnel and/or users that the rules indicated prevent injuries.

1.4 Qualification and training of the personnel

Those in charge of the installation, operation and maintenance of the pumps have to be qualified to carry out the actions indicated in this manual. AlphaDynamic Pumps SA is not responsible for the inadequate qualification and training of the customer's staff or for the lack of information of the staff regarding the contents of this manual. It's compulsory to always show this manual to the workers in charge of the installation, operation and maintenance of the pump. Keep this manual in a safe place for future consultations.

1.5 Explosive Atmosphere Zones

The pumps described in this manual **CANNOT be used in explosive atmospheres.** These uses require special pumps that AlphaDynamic Pumps SA manufactures with particular materials and precautions. Customers who want to use special pumps in these kind of zones have to contact the AlphaDynamic Pumps SA technical office for the correct choice of the product.

WE REMIND YOU THAT THE CLASSIFICATION OF THE ZONE (REF. ATEX 2014/34 DIRECTIVE) FOR POTENTIALLY EXPLOSIVE ATMOSHPERE ZONES HAVE TO BE DONE BY THE CUSTOMER AND COMMUNICATED TO AlphaDynamic Pumps SA FOR THE RIGHT CHOICE OF THE KIND OF PUMP SUITABLE TO WORK IN THESE ZONES.

Furthermore, the customer is responsible of the correct installation of the pump in accordance with the requirements stated in the Directive.

2. Installation

Preliminary remarks

All references to the pumps have to be considered applicable also to systems that use these pumps unless it's specified otherwise.

2.1 Safety general warnings

2.1.1 Introduction about danger

ATTENTION: the non-observance of the indications stated in this manual or the inappropriate use of the equipment by unqualified or unauthorized staff, can cause serious personal injuries or death and damages to products and apparatus! The technical assistance office is at your complete disposal; in case of doubts or problems you can contact us by phone (Number +30 215 2159520) or write an email to info@alphadynamic.eu. It's strongly recommended that you keep **AlphaDynamic Pumps SA** written answer.

2.1.2 Indications of danger

For the safety of those in charge of the installation of the pump it's necessary to use safety clothing and individual safety devices approved by the current provisions of the law (e.g. Safety glass, gloves and safety insulating-shoes).

These pumps have been designed and manufactured to be used in specific conditions and within defined limits. The use outside these specifications has to be agreed and approved by the AlphaDynamic Pumps SA technical service. **It must also be considered that, if the pumps are used outside their technical specifications, the CE Certifications and the warranty are no longer valid. Furthermore, if the pump is used outside the technical specifications communicated to us at the moment of the quotation and confirmed in our order confirmation, the customer becomes responsible for the issue of a new CE Certification.**

The pump has to be used only for the applications specified in the order for which AlphaDynamic Pump SA has selected the model, the construction materials and has tested the pump to respect the specifications. For other uses, different from those stated in the order, the customer has to send always a written request to the AlphaDynamic Pump SA technical office, which on its part will reply in written form. There will not be any warranty for repairs or alterations on the product done by the users or third parties not specifically authorized by AlphaDynamic Pump SA.

Always shut down the pump before touching or proceeding with any intervention on it or on the circuit of installation. The pump must be empty of pumped liquid and it must be completely decontaminated and successfully rinsed with water before any manual operations or disassembling. Make sure that the electrical system, to which the pump will be connected has, the adequate power and has the correct protection devices (e.g. Grounding, Life safe).

Always switch off the electrical supply before working on the pump for maintenance or part substitution. Always keep an extinguisher next to the pump installed.

Always pay maximum attention to the execution of maintenance activities on pumps and on the connected circuits when they are used with dangerous liquids.

The use of an electric starter is recommended. A simple switch can be insufficient to start and stop the electric motor connected to the main electric system. An appropriate starter:

· can prevent accidental starting after a failed attempt to start
· is a safe switch, protected against water
· protects the electric motor against overloads due to a short circuit (a fuse only protects the wires)
· resists against starting in overload on the motor, preventing dangerous electric arc and early wear of the electrical contacts

2.2 Receipt and Inspection

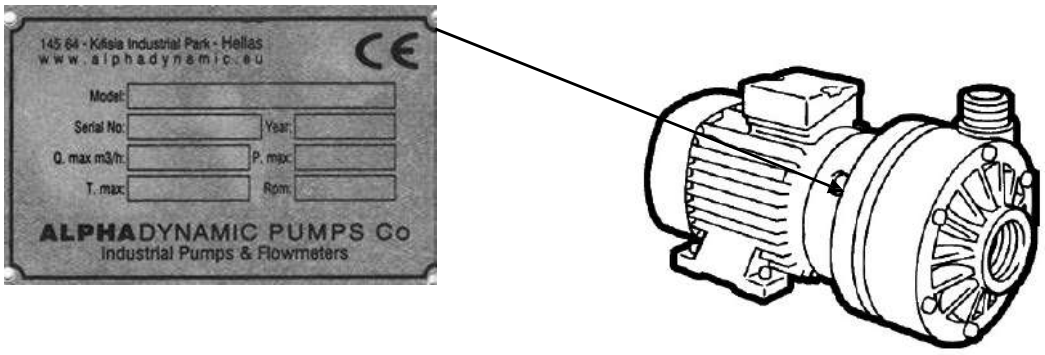
Even if AlphaDynamic Pumps SA takes all the necessary precautions during packaging, we suggest that you carefully check the received material. Check for any missing parts caused by the courier and/or by AlphaDynamic Pumps SA Check the data on the label of the received pump and compare it with those relative to your purchase order. If the pump has been supplied with the motor, remove the protective shield from the fan of the motor and try to rotate the motor shaft by hand. If you feel a strong resistance to rotation or if you hear abnormal noises contact your reliable reseller or contact the AlphaDynamic Pumps SA assistance service directly. Reassemble the protective fan shield before starting the pump.

2.2.1 Pump Identification

Each pump is fitted with an identification plate detailing its specification and materials. This data must always be reported in all communications to the manufacturer, dealer or service centers.

WARNING: It is forbidden to remove and/or modify the identification plate and/or the data therein.

The identification code * listed aside the TYPE heading, details the pump composition and construction materials in order to determine its suitability and compatibility with the product to be pumped.



2.2.2 Pump description

Recommended use:

ADH horizontal, centrifugal pumps made from resin have been designed and manufactured to pump below head liquids having an apparent viscosity between 1 and 500cps, and that are chemically compatible with the components of the pump. Fluid service temperatures must range from 3°C to a maximum of 60°C for PP pumps and 90°C for PVDF pumps, according to the type of material used to build the pump. ADH centrifugal pumps are designed for a maximum working speed of 2900 revs/min, in direct drive with motors equipped with a rear axial compensator.

2.2.3 Working principles

ADH horizontal, centrifugal pumps must be installed below head with appropriate procedures to avoid vortex formation and consequent air bubble suction. The pump must work ONLY when PRIMED. The impeller - integrally joined to the shaft and to the direct drive mounted motor- must be set in rotation at a preset speed (max 2.900 revs/min). Its centrifugal effect activates suction in the main duct and delivery in the secondary duct.

WARNING: use of ADH horizontal, centrifugal pumps for anything other than that previously described is to be considered improper use and is forbidden by AlphaDynamic Pumps SA .

Improper use.

It is SPECIFICALLY forbidden to use ADH pumps:

- for pumping petrol and/or flammable liquids
- for pumping food liquids
- with an opposite rotation to the one specified
- in self-priming working conditions
- for suction in the presence of vortexes, turbulence or air bubbles
- for creating vacuum
- with liquids that are chemically incompatible with the construction materials
- with solids in suspension that have a higher specific weight than the liquid (e.g. water and sand)
- with water that is particularly hard and/ or full of deposits

WARNING: due to the wide variety of products and chemical compositions, the operator is considered to be the best evaluator of reactions and compatibility with the pump's construction materials. Therefore, before use, carry out all necessary checks and tests to avoid any possible hazardous situation, that cannot be predicted or for which the manufacturer cannot be held liable.

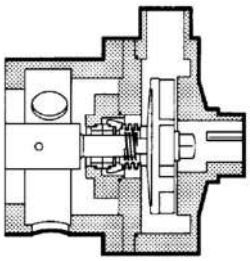
WARNING: the use of the pump that does not comply with the instructions indicated in the use and maintenance manual will cancel compliance to the requirements for safety.

The risks associated with the use of the pump under the exact conditions set forth in the use and maintenance manual have been analyzed, whilst the analysis of the risks associated with the interface with other system components must be carried out by the installer.

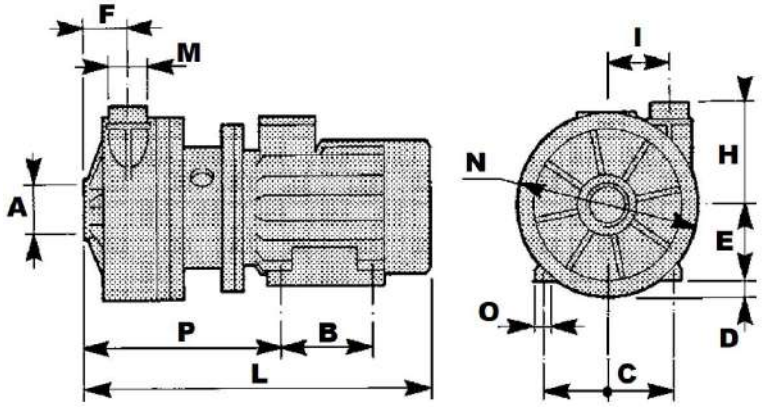
2.2.4 Technical specifications

The data related to performance refer to standard procedures. The NOMINAL flow and the MAX head values refer to pumping of water at 18°C with free-flow suction and delivery.

ADH – TYPE B



ADH – TYPE A



Pump				Dimensions –mm-								
type	KW	SUCTION ΦA	DELIVERY ΦA	L	D	E	F	H	I	C	B	N
ADH 080	0.55	1 1/2" f	1" m	325	1	71	47	89	48	112	90	140
ADH100	0.55	1 1/2" f	1" m	325	1	71	47	89	48	112	90	140
ADH 110	1.1	2" f	1 1/2" m	406	20	80	75	130	40	140	100	203
ADH 120	1.5	2" f	1 1/2" m	456	10	90	75	130	40	140	100	203
ADH 130	2.2	2" f	1 1/2" m	468	10	90	75	130	40	140	125	203
ADH 140	3.0	2" f	1 1/2" m	505	2	100	75	130	40	160	140	203
ADH 150	4.0	2 1/2' 'f	2" m	529	12	112	67,5	153	97	190	140	274
ADH 155	5.5	2 1/2" f	2" m	620	18	132	67,5	153	97	216	140	274
ADH 160	7.5	2 1/2" f	2" m	628	18	132	67,5	153	97	216	140	274
ADH 180	11	2 1/2" f	2" m	695	18	132	68	158	96	216	178	300

2.3 Storage

If the pump is kept in the warehouse, make sure that it's placed in a dry and protected position. Always use the original package or an equivalent protection. If the pump has to remain stored for a long period and/or in particularly damp places the use of hygroscopic substance (silica gel) is recommended to prevent damages.

Don't remove the protections of the flanges until the installation and close, if they are not closed already, the discharge and suction pump connections to prevent the intrusion of foreign bodies.

Be informed that a long period of storage of the pumps can provoke:

· deterioration of the isolation of the motor due to absorption of dampness

· deterioration of the gaskets

2.3.1 Transporting and Positioning

The operators in charge of the assembly/disassembly must be informed and trained on the dangers relating to the use of mechanical tools, even small ones. When receiving the goods, check that the pump packaging is undamaged; afterwards proceed as follows:

-According to the equipment size and weight, the plant is either packaged with cardboard, boxes or on pallets.

-Open and discard the packaging

-Consult the Use and Maintenance Manual and comply with its instructions

-Lift the pump with appropriate lifting means, suitable to the weight indicated on the ID plate

-Check the correct tightening of all screws

NOTE: ADH pumps are supplied complete with motor. In case of future handling, if the pump is detached from the motor, before proceeding with its positioning it must be assembled as described in the Chapter 2.8.

WARNING: the pumps are designed to be positioned and fixed horizontally from the ceiling using hangers or on the floor on the feet of the motor. The horizontal, centrifugal pumps are not self priming, therefore they must always be installed next to the suction point, and without forming siphon in suction.

WARNING: ADH pumps working with heavy solids in suspension or in dry conditions can damage the sealing as well as cause the fusion of sliding friction parts that may result in fire, therefore the following rules must be complied with:

A – the pump is not self priming and must be positioned below head

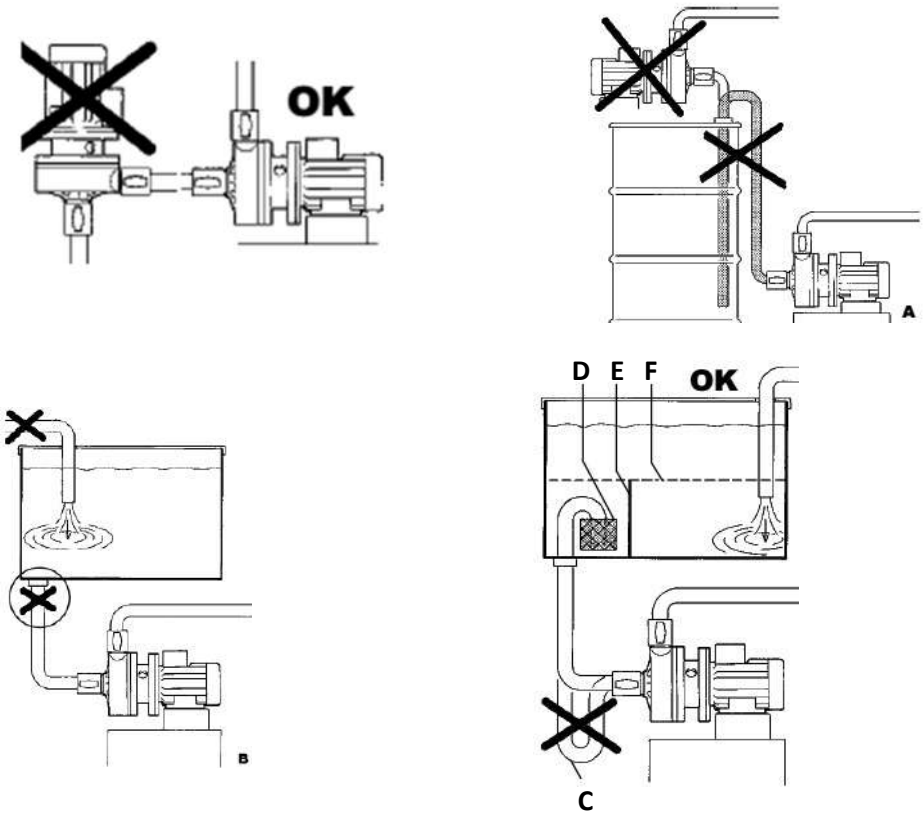
B – the dip tube of the suction pipe must be bent to avoid clogging due to reflux, grit and heavy matter, and it must be kept away from vortexes or the tank filling pipes

C – the suction pipe must not create siphon

D – any suction filters must be of the basket-type and appropriately oversized (approx. 3 times the pump suction diameter, to avoid loss of pressure)

E – the dip tube of the suction pipe must be housed inside the weir and away from vortexes, turbulence and open drains

F – fit a level regulator device that can halt the motor when the pump is under the minimum level



2.4 Installation

AlphaDynamic Pumps SA is not responsible for injury to people or damage to things caused by the wrong installation of the pump or installation executed by non-qualified personnel. Install the pump in a position that guarantees a simple use.

The unit motor/pump has to be fixed on a rigid structure that will enable the support of the entire structure. Make sure that the pump is fixed on a plane surface, in this case use shims under the base-plate of the motor. If necessary use "bumpers" to reduce vibrations towards the fixing surface.

2.5 Hydraulic system

The pump is generally part of a hydraulic system that can include a various number of components such as: valves, fittings, filters, expansion joints, instruments, etc. The way the piping is arranged and the position of the components has a great influence on the operation and on the life of the pump.

2.6 Pipes Connection [2]

Position the pump as near as possible to the liquid source and under the level of the liquid (under head). Always use pipes as short and straight as possible and limit the number of bends assuring radius of curvature as large as possible. Avoid air siphon that can be created in the long piping line. Avoid the creation of siphon also before the suction of the pump. The piping should be properly supported and kept in line independently from the pump, up to its connections, so that the piping doesn't exert loads on the pump.

The size of the suction and discharge pipes have to be at least as large as the inlet connection of the pump. Diameter restriction of the suction pipe is responsible and causes cavitation of the pump, creating a loss in the performance of the pump and a rapid wear. It's always advisable to use (if needed) flexible reinforced pipes that can withstand the discharge pressure.

The suction line has to be clean and/or contain a filter to protect the impeller from damage due to impurities, or other foreign particles, especially when starting the plant for the first time.
Don't use metallic piping with plastic pumps.
Don't use tools to connect piping to plastic pumps. Make sure that the connections are properly tightened otherwise the suction capacity will be reduced.

The installation of a proper pressure gauge on both the suction and discharge piping is recommended. The installation of gauges allows an easy control of the correct functioning of the pump in relation with the required working point. In case of cavitation or other dysfunctions, the gauges will show evident pressure fluctuations.

[2] If these warnings are not observed the Certification and the Warranty of the pump can be invalidated.

2.7 Monitoring Equipment

According to the importance of the pumping system, it could be useful to maintain a strict control of the performances and conditions of the process. The use of instruments to monitor the pressure of the suction and discharge circuit is recommended. Even the monitoring of the electric power absorbed by the motor is possible using a wattmeter.

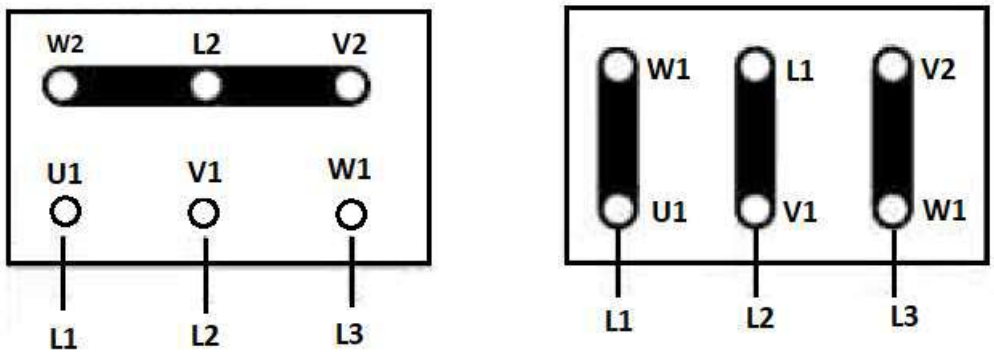
If the temperature of the pumped liquid represents a critical factor, install in the system a thermometer, preferably on the suction line. These control instruments can advise of abnormal operating conditions of pumps such as: accidentally closed valves, missing liquid, overloads etc.

2.8 Motor connection

Check that the voltage and frequency printed on the label of the motor correspond to those of the electric system to be used. Don't connect the electric motor directly to the main system but protect the dedicated system with a suitable main switch with adequate safety protections against overloads. The electric connections have to always be carried out by an expert qualified electrician.

The motors have to be supplied with three-phase voltage, or if required by the customer, with single phase voltage. The type of connection of the three-phase motors can be Star (Y) or Delta (Δ) according to the power supply 380 or 220 VAC (see picture 1).

STAR (Y) **DELTA (Δ)**



Picture 1

Make sure that the direction of rotation of the motor is that as specified on the pump head and eventually indicated by a sticker arrow on the motor fan. To change the sense of rotation it's sufficient to change two of the three entering line (E.g. L1 with L2) in three-phase motors.

Read the following instructions to change the direction of rotation:

- wear individual authorized protection equipment (e.g. gloves, glasses)
- make sure that the operating conditions are similar to the specifications of the pump
- install the pump in the hydraulic system.
- open the suction and the discharge valve completely.
- fill the pump with the liquid. It' s recommended to perform this test with an inert liquid like water.

- do not run the pump dry (Note: the design of ADH horizontal centrifugal pumps don't allow dry-running because it causes damage to the inner components of the pump).
- start the motor for only one or two seconds to check that the direction of rotation is the same as the arrow on the pump head.

NOTE: a pump turning backwards will pump but at a greatly reduced capacity and pressure.

3. Operation

3.1 Use and Safety

ATTENTION:
Dangerous or hazardous actions can cause serious injuries or death to people or serious damage to materials and so it's important to assure the respect of all the warnings relative to the safety and the correct use written in this manual.

Verify always that the pumped liquid is compatible with the construction materials of the pump. For any clarification, please contact AlphaDynamic Pumps SA technical office.

In case of use for pumping aggressive, toxic liquids or liquids dangerous for the health of the personnel, it's necessary to install on the pump an adequate protection from possible contamination, proper drainage in case of leakage and warning signs of dangerous product in case of leakage: e.g. DANGER OF POLLUTION, CONTAMINATION, INJURIES AND/OR DEATH!

Do not downsize the suction. Downsizing the suction is responsible of the cavitation of the pump, which causes a loss of efficiency and a rapid wear. Downsizing of the discharge is not advisable. If required, reduction of the capacity can be obtained by means of a valve installed on the discharge pipe.

Do not loosen the connection of the pump while it's under pressure.
Do not start and/or use the pump if there are signs of leakage in the system.

The working temperatures have to respect the characteristics of the construction materials of the pump:

- **60 °C** polypropylene execution (PP)
- **90° C** PVDF execution

DO NOT ALLOW THE PUMP TO RUN DRY (note: the ADH horizontal centrifugal pump design doesn't allow dry-running operation because it will damage irrevocably the inner parts of the pump)

An accidental failure can generate sparks up to considerable distances.
In case of vibrations or abnormal noises, stop the pump immediately.

Do not pump flammable liquids.
Do not touch the pump while it's operating.
Before touching the motor or the bracket switch off the power supply.

3.2 Dry-running

Fill the pump with water or with the liquid to be pumped before starting the unit. This will protect the bearings and the shaft of the pump against dry running. **DO NOT ALLOW THE PUMP TO RUN DRY** because this can cause serious damage to the internal parts of the pump due to the lack of the necessary lubrication.

3.3 Temperature

Increasing the temperature of the pumped liquid can damage the pump and/or the piping/fittings and there can be a situation of serious danger for the personnel nearby. Avoid sudden changes of the temperature and do not exceed the temperature specified in your order. See the value of temperatures of the construction materials of the pumps in paragraph 3.1.

3.4 Before Starting

Make sure that the pump is installed in accordance with the instructions previously stated in section 2. When the pumping station is new, it's necessary to fill the system with water to ensure that there is no leakage.

WHEN THE PUMP IS INSTALLED ABOVE HEAD IT HAS TO BE PRIMED, THIS MEANS THAT IT HAS TO BE FILLED WITH THE LIQUID AND THE SUCTION PIPING HAS TO BE KEPT FULL WITH LIQUID BEFORE STARTING THE PUMP.

ATTENTION: some liquids react with water. VERIFY IF THE LIQUID TO BE PUMPED REACTS WITH WATER. IN THIS CASE THE SYSTEM HAS TO BE COMPLETELY EMPTIED AND DRAINED.

3.5 Starting

Start the electric motor and gradually open the discharge pipe until you reach the required flow. The pump can't operate more than two or three minutes with its discharge closed. A longer period can cause serious damage to the pump. If the pressure shown on the pressure gauge on the discharge piping does not increase, stop the pump immediately and release the pressure carefully. Repeat the operation of installation of the pump as in paragraph 2. If during the starting procedure there are changes of flow-rate, density, temperature or viscosity of the liquid, stop the pump and contact AlphaDynamic Pumps SA technical service.

3.6 Optimum conditions for use

Operating continuously at the peak performance (maximum capacity/head) may cause early wear of the pump. As a general rule, we recommend using the pump at half of its maximum capacity (see the paragraph relative to the technical data). The flow capacity and head of the pump refer to water pumping at room temperature. If it pumps high temperature liquids or other viscosities and densities, the performance has to be proportionately decreased. Pumps of series ADH work well with liquids having a viscosity up to 500 cP[3] and specific gravity up to 1.9[3]. **HOWEVER BOTH VISCOSITY AND THE SPECIFIC GRAVITY HAVE TO BE COMMUNICATED AT THE MOMENT OF QUOTATION.** The electric motor is selected for the viscosity and the specific gravity communicated. In the case of higher values, the power of the motor could be insufficient.

[3] The values indicated are merely indicative and can vary in the series of pumps mod. ADH

3.7 Shut down

Normally the pump should be shut down only after closing the discharge valve. If the suction valve is closed before the other, cavitation of the pump can occur. If the suction is flooded, close the valve after shutting down the pump. In some cases the pump can be used to empty tanks. In these situations the liquid can stop flowing in the pump while the pump is still working. In these cases, a pump operating without liquid (this means dry-running) can be dangerously damaged if it's not stopped immediately. For such applications the use of automatic equipment or the constant presence of personnel who can shut down the pump is recommended.

3.8 Long pump inactivity

If the pump has to remain inactive for a long period, before stopping it, it's recommended to let water flow in the system for several minutes so that you avoid any risk of internal deposits or sediments or settlement of solid parts. Drain the liquid in the pump. An eventual freezing of the liquid inside the pump can cause damage. Always verify if the pumped liquid reacts with water. In this case contact

AlphaDynamic Pumps SA to find an alternative solution. If the pump is temporarily removed from the system and kept in stock, it's necessary to follow the instructions of paragraph 2.3 "Storage".

3.9 Noise Level

In some circumstances, for example when the pump works with high pressure and low capacity, the increase of the noise can be disturbing for the personnel working in the proximity. In this case it's possible to intervene with:

- earplugs
- protective authorized caps against noises for the personnel in the proximity
- soundproofing canopy for the pump. In this case, make sure that the motor ventilation is guaranteed

4. Maintenance

4.1 General Dispositions

During the warranty period disassembly activities of the pump are allowed only for AlphaDynamic Pumps SA personnel or personnel authorized by AlphaDynamic Pumps SA. All the operations described in the paragraphs below have to be done exclusively by qualified staff and all the warnings written in this manual must be followed step by step.

Clean the external surface of the pump using only antistatic equipment. Every operation executed on the apparatus has to be done after the disconnection of electric supply.

Use exclusively lifting machinery to move pumps with weight higher than 16 kg. During the moving of the machine or parts of the machine avoid collisions or falls which can damage the apparatus.

Before disassembling the parts of the pump, make sure that the dangerous internal liquids have been removed /washed. **THE PUMP HAS TO BE DRAINED AND DECONTAMINATED.**

Pay close attention that some internal liquids can have a dangerous reaction when contacting water. During the operations of unloading dangerous liquids make sure to eliminate any danger for the surrounding personnel and the environment.

4.2 Inspections

In general, ADH horizontal centrifugal pumps do not need a "routine" maintenance and most of all they don't require frequent dismantling. However, periodical inspection is advisable to verify the state of wear of the impeller, the shaft and the bearings and if the general conditions of the internal parts of the pump are good. The time between the inspections is strongly dependent on the operating conditions of the pump: the characteristics of the liquid, the temperature, the materials used and obviously the time of operation. If a problem occurs or the pump needs a complete inspection see section "Problem solutions".

4.3 Product circuit connection

After having correctly positioned the pump, proceed with connecting the pump to the product circuit, as follows:

WARNING: To connect the pump only use connections with cylindrical gas threads made by materials compatible with the fluid to be pumped and with the pump construction materials. E.g.: pump in PP = connections in PP

1. On the suction and delivery ports, install a manual ball valve (fullbore) with a diameter equal to the connection to the pump (never smaller), to ensure the liquid is shut-off in case of leakage and/or future maintenance.
2. Proceed with the installation of pipe couplings in order to fasten the flexible pipes on to both manual valves.

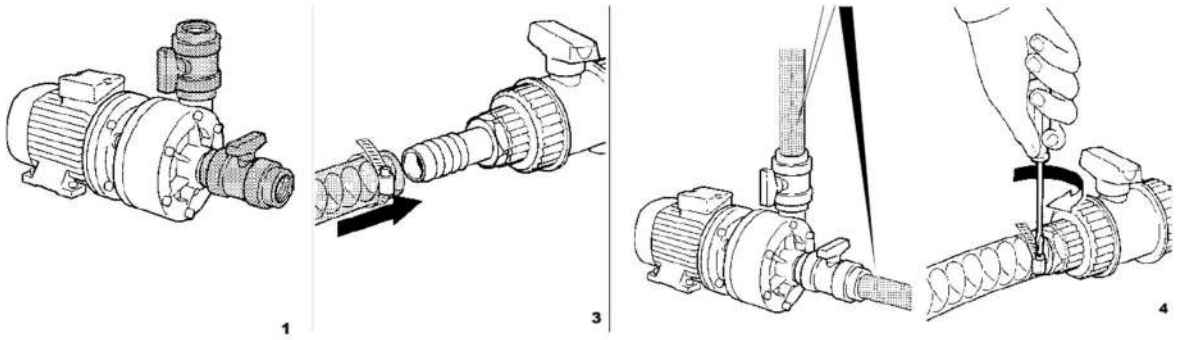
WARNING: The connection pipes to the pump must be FLEXIBLE, RIGID SPIRAL REINFORCED pipes never of a smaller diameter than the connection ports of the pump.
For viscous liquids, use pipes with an OVERSIZED DIAMETER, particularly in suction line/port.

3. Proceed to connect the product suction and delivery pipes to their respective joints. Check if the connection tubes to the pump are clean inside and do not contain any working residue.
4. Proceed with fastening the pipes with appropriate metal rings.

WARNING: the pipes must be adequately supported. PIPES MUST BE STRONG ENOUGH TO NOT DEFORM DURING SUCTION AND MUST NEVER WEIGHT THE PUMP DOWN OR VICEVERSA.

WARNING: Check that the treated liquid does not or could not contain suspended solids of a large diameter or with a potentially damaging shape and that the suction and/or delivery ports are not obstructed in order to avoid cavitation or electric motor strain or dry operation.

Connection with rigid pipes can cause strong vibrations.



4.4 Start-up

The installer/operator must always use material compatible with the pumped liquid and in line with the pump design.

WARNING: it is forbidden to use liquids that are incompatible with the construction materials of the pump's components or in an environment where there are incompatible liquids.

In order to start-up the pump, proceed as follows:

1 Check that the suction and delivery pipes are correctly connected.

WARNING: Dry operation of ADH pumps, besides damaging the sealing, causes the fusion of sliding friction elements and may result in fire.

2. Open the manual ball valves of the suction and delivery liquid pipes.

3. The level of the liquid must be 0.5m above the pump.

4. Start the motor with the appropriate controls.

5. To stop the pump, only use the stop controls of the pump's electric motor.

WARNING: never stop a working pump by closing the liquid circuit suction and/or delivery ball valves: DANGER OF PUMP STALLING AND/OR FIRE DUE TO SEAL BURN-OUT CAUSED BY DRY OPERATION.

WARNING: check that there is no abnormal noise while the pump is working. If so, immediately stop the pump, check and eliminate the cause.

WARNING: check that there is no air or gas bubbles in the output liquid. If so, immediately stop the pump, check and eliminate the cause.

WARNING: do not install filters on the suction pipe that may cause a loss of pressure.

6. After the pump's first two working hours, and after correctly stopping it, perform the following inspection:

A. through the inspection hole in the casing, visually check that there is no leakage from the seal.

B. check the tightening of all bolts.

C. check the product pipes.

The noise level of the machine corresponds to:

The sound pressure level of the A weighted emission, in the working place, is less than 75 dB.

4.5 Standard maintenance time schedule

In order to guarantee performance and safe use, ADH pumps need standard maintenance operations throughout their life span and in accordance to the time-schedule detailed in the following table. The time schedule for routine maintenance shown in the table refers to standard use and working conditions. More demanding working conditions require more frequent operations, with a 30% to 50% more frequent interventions than those indicated.

WARNING: failure to proceed and/or comply with standard maintenance and/or its time schedule, renders the warranty null and can excessively wear and damage the internal parts of the pump and/or the motor, as well as create hazardous situations, for which the manufacturer is not to be held liable.

CHECK AND/OR OPERATION	EVERY 1000 HOURS	EVERY 5000 HOURS	EVERY 10000 HOURS
CHECK FOR ROTARY SEAL LEAKS	•		
CLEANING INSIDE PUMP		•	
STATIC SEAL REPLACEMENT			•
ROTARY SEAL REPLACEMENT			•

4.6 Maintenance for the product circuit

WARNING: before any operation on the pump and/ or before any maintenance or repair operation, proceed as follows:

A. discharge the product being pumped and close the product intercepting valve (delivery)

B. run an appropriate, nonflammable washing liquid through the circuit, after which discharge it by opening the delivery valve. Stop the pump's motor

C. close the ON-OFF valve (delivery/suction)

D. cut off the power supply to the pump's motor and ensure it is safe

E. wear the appropriate protective clothing before any operation (mask, gloves, closed shoes,

aprons, etc.). LIQUID EJECTION HAZARD.

WARNING: To clean the pump, only use a clean cloth, moistened with an appropriate detergent:

1. Disconnect the liquid suction and discharge pipes of the pump
2. Disconnect the electrical power supply cable from the motor
3. Proceed with disassembling and remove the pump from the installation area, using appropriate lifting machinery

NOTE: For the pump assembly and disassembly sequence of the operations hereafter described, consult the relevant spare parts table.

Before intervening on the pump and/or before carrying out maintenance or repair operations, you must:

- Wait for the pump to cool down for at least fifteen (15) minutes
- Perform the necessary operations while wearing protection gloves and any other appropriate personal protection equipment (face masks, gloves, closed shoes, etc.): Danger of burning and ejection of liquid under pressure

4.7 Pump opening and internal cleaning

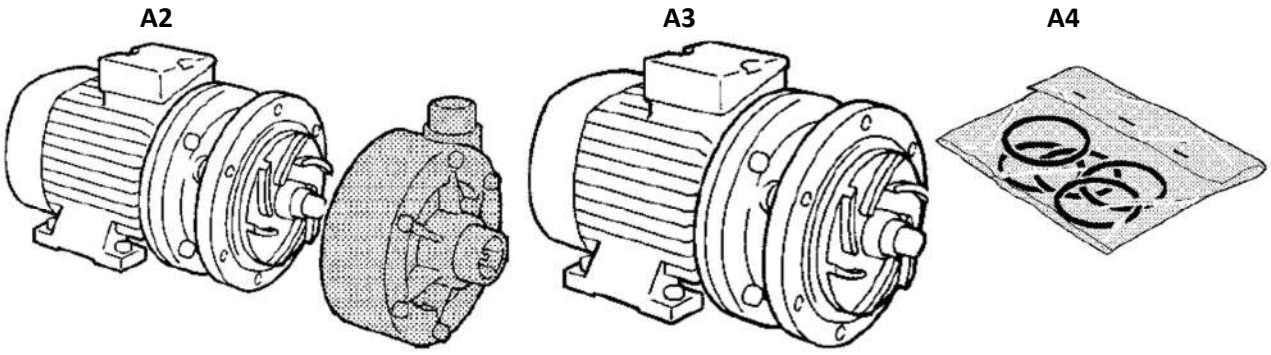
This operation must be carried out regularly every 1000 working hours or, in the event of a decline in performance, for checking the pump's conditions and / or replacing the impeller. To open the pump, proceed as follows:

A1 Disassemble the pump as described in the preliminary operations in this Chapter

A2 Remove the screws and the outer cover of the pump body

A3 Clean the impeller and/or replace with original spare parts, if necessary

A4 Check the condition of the seals and replace with original spare parts, if necessary



WARNING: all of the ORings and gaskets must be replaced every time the pump is opened/reassembled:

PRODUCT LEAKAGE HAZARD.

WARNING: check that there is no sediment inside the pump, if so, remove.

A5 Proceed with reassembly, following the inverse order and fasten the bolts on the pump cover evenly.

The impeller cleaning and/or replacement is now completed and it is now possible to reposition and connect the pump as described in the previous Chapters.

4.8 Sealing disassembly

This standard maintenance operation must be carried out every 2000 working hours, either for a check or due to leakage or leaks through the holes of the drainage casing. In order to disassemble the seal, proceed as follows:

B1 Disassemble the pump as described in the preliminary operations in this Chapter.

B2 Remove the screws and the outer casing of the pump body.

B3 Keep the motor fan still and loosen the impeller lock nut.

B4 Withdraw the O-Ring, gaskets and the impeller.

B5 Withdraw the central part of the pump body.

WARNING: The seals are composed of extremely precise elements, made from ceramic material and silicon carbide, hence they must never be lubricated and/or handled with dirty hands, in order to avoid irreparable damage.

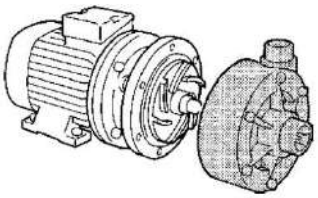
B6 Wear clean, latex gloves and remove the sealing elements from their housings.

B7 Remove the fastening screws and the motor from the pump casing.

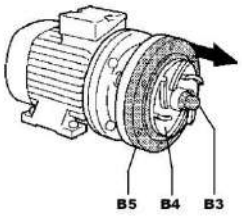
B8 Remove the key from the shaft and withdraw the ceramic bushing.

B9 Visually check that the contact surfaces of the seals are shiny and flat. In case of scratches or opaque surfaces, replace them.

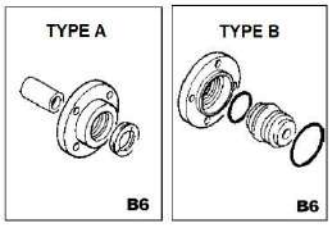
The sealing disassembly and check is now complete. For reassembly proceed as described in the following section.

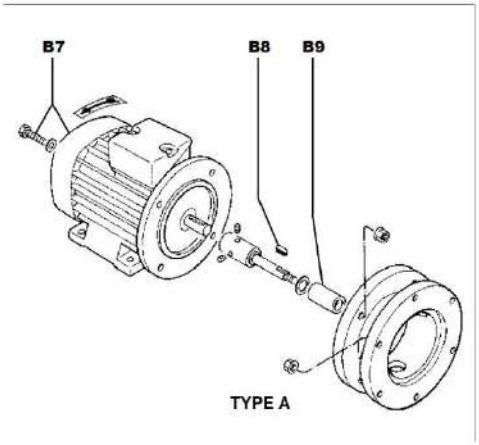


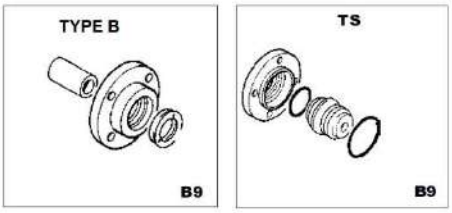
B2



LIP SEAL BELLOW SEAL







4.8.1 Sealing and motor assembly

In order to assemble the sealing and the motor, proceed as follows:

C1 If the motor is being assembled for the first time, fit the pump shaft into its housing and gradually screw the lock nuts tight.

NOTE: Tighten the nuts in a progressive sequence, to ensure perfect tolerances.

C2 Position the motor on a test-bench and use an appropriate tool to check if the shaft is concentric by rotating it in different points.

NOTE: correct assembly will show tolerance values of ± 0,03 mm

C3 If necessary, repeat the operation described in point C1 with more care, until the shaft is correctly concentric.

C4 Referring to the exploded drawings, insert the sealing ring and the ceramic bushing on the pump shaft.

C5 Fasten the motor to the pump casing with the appropriate screws.

WARNING: the seals are composed of extremely precise elements, made from ceramic material and silicon carbide, and to avoid irreparable damage they must never be lubricated and/or handled with dirty hands.

C6 Wear clean, latex gloves.

C7 To clean the seals, use a clean cloth moistened with alcohol.

C8 Assemble the central part of the pump body.

WARNING: all Oring and gaskets must be replaced every time the pump is opened. PRODUCT LEAKAGE HAZARD.

C9 Fit the O-ring seal and the impeller on the shaft.

C10 Fit the front O-ring seal and the nut and tighten until the impeller is locked.

C11 Reassemble the pump casing and the fastening screws and evenly tighten with a cross sequence.

The sealing and motor assembly is now complete. To install proceed as described in the "TRANSPORTATION and POSITIONING" Chapter.

5. Problem solutions

The following instructions are exclusively reserved to qualified and authorized maintenance operators. In case of any anomaly and in order to avoid repair any malfunctions, follow the instructions hereafter to identify the anomaly.

WARNING: for any major intervention, contact AlphaDynamic Pumps SA ASSISTANCE. our technicians will assist you in the shortest possible time.

DEFECTS	POSSIBLE CAUSE	SUGGESTION
1. The pump does not start	1.1 Power failure	1.1 Check the electrical power circuit and supply
	1.2 Seized impeller	1.2 Disassemble the pump body and check
2. The pump is operating and not pumping	2.1 The impeller is damaged	2.1 Disassemble the pump and check the impeller
	2.2 The manual delivery valve is closed	2.2 Open the delivery valve and /or check the delivery pipes
	2.3 Suction is blocked	2.3 Open the suction valve and /or check the suction pipes and filter conditions
	2.4 Fluid is too dense	2.4 Install oversized pipes, especially for suction and decrease the pump revolutions
	2.5 Clogged suction	2.5 Check and clean
3.The pump does not deliver as per performance curve	3.1 Fluid is too dense	3.1 No solution
	3.2 Clogged delivery pipe	3.2 Check and clean
	3.3 Clogged suction	3.3 Check and clean
	3.4 The impeller is damaged	3.4 Replace the impeller
	3.5 Damaged pump body	3.5 Disassemble the pump body and check
	3.6 Electrical motor wrongly connected	3.6 Check the electrical connection and power voltage

	3.7 The electric motor is damaged	3.7 Replace the motor
4.Noise and vibrations	4.1 Suction clogs while working	4.1 Replace the motor
	4.2 Damaged pump shaft	4.2 Disassemble pump and motor and check the shaft and its rotation concentricity
	4.3 The impeller touches the pump body	4.3 Open the pump and check
	4.4 Worn-out bearings	4.4. Open the pump and replace the bearings
	4.5 Incorrect installation	4.5 Check the installation again with greater care
	4.6 Worn-out sealing	4.6 Open the pump, disassemble the sealing and check its conditions
5.The Motor overheats	5.1 Fluid is too dense	5.1 No solution
	5.2 Wrong electrical connection	5.2 Check the supply voltage and the motor connections
	5.3 The impeller touches the pump body or there is some foreign matter	5.3 Open the pump and check
	5.4 Damaged pump shaft	5.4 Open the pump, disassemble the motor and check the pump shaft and its rotation concentricity

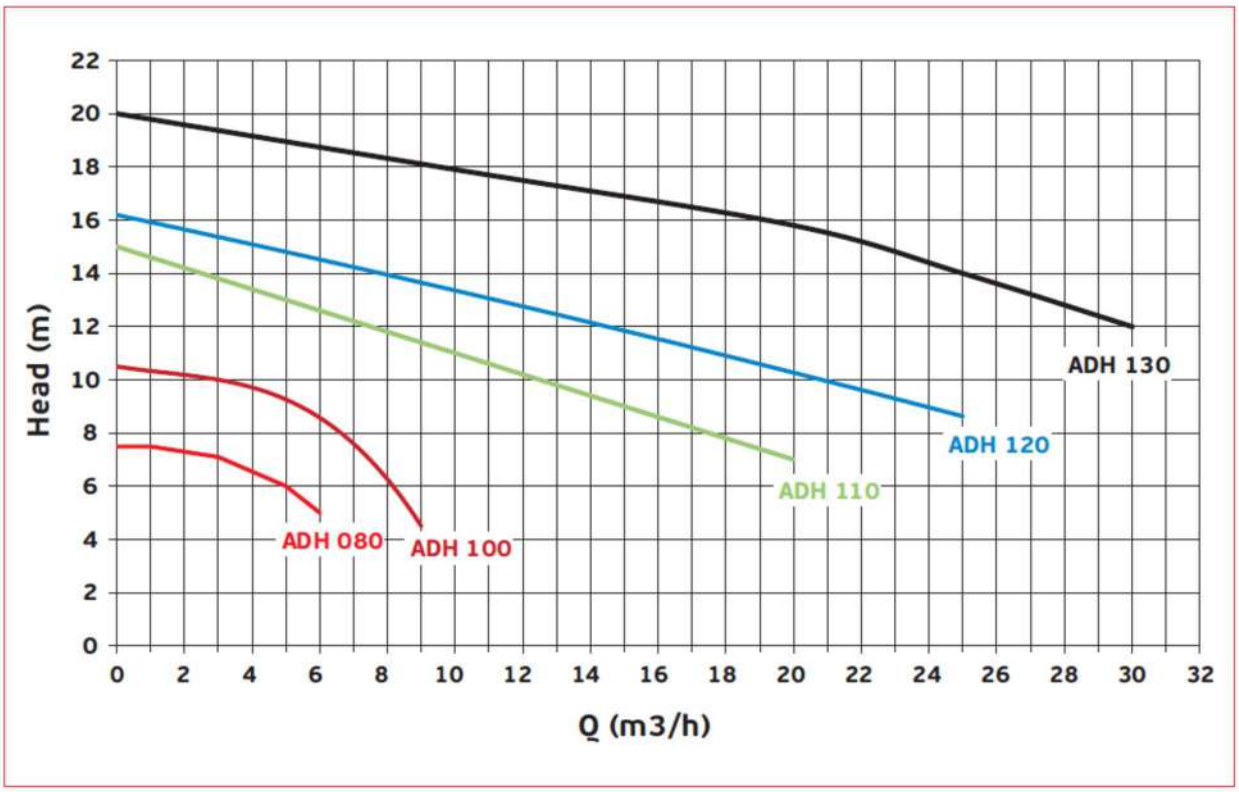
6. Spare parts

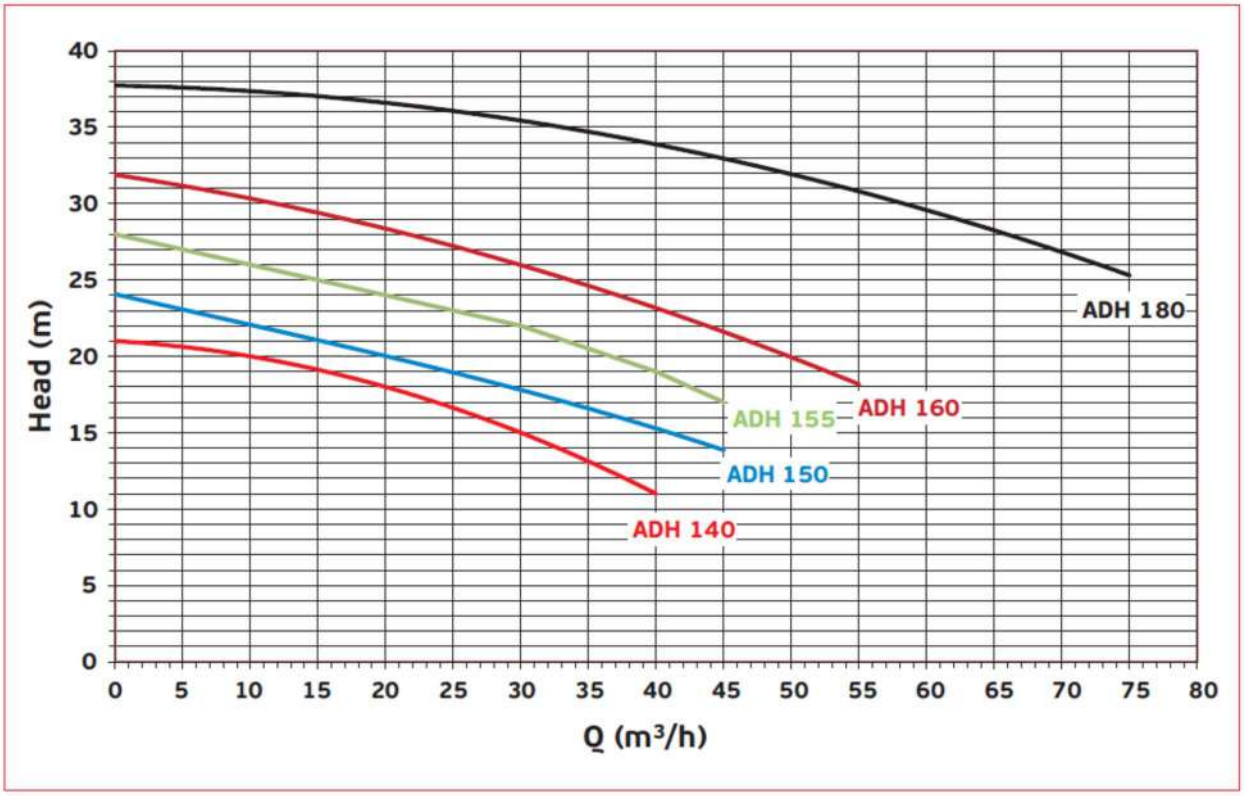
6.1 How to order spare parts

A complete kit of spare parts for these kinds of pumps is available. Please contact AlphaDynamic Pumps SA or our distributors. To have the spare parts it's necessary to communicate the model of the pump, the size, the material, the serial number, the year of construction and the number relative to the spare part required. All the references are written directly on the pump label and on the section drawings of the pump. If you don't have the necessary drawings, please contact the AlphaDynamic Pumps SA.

7. Data

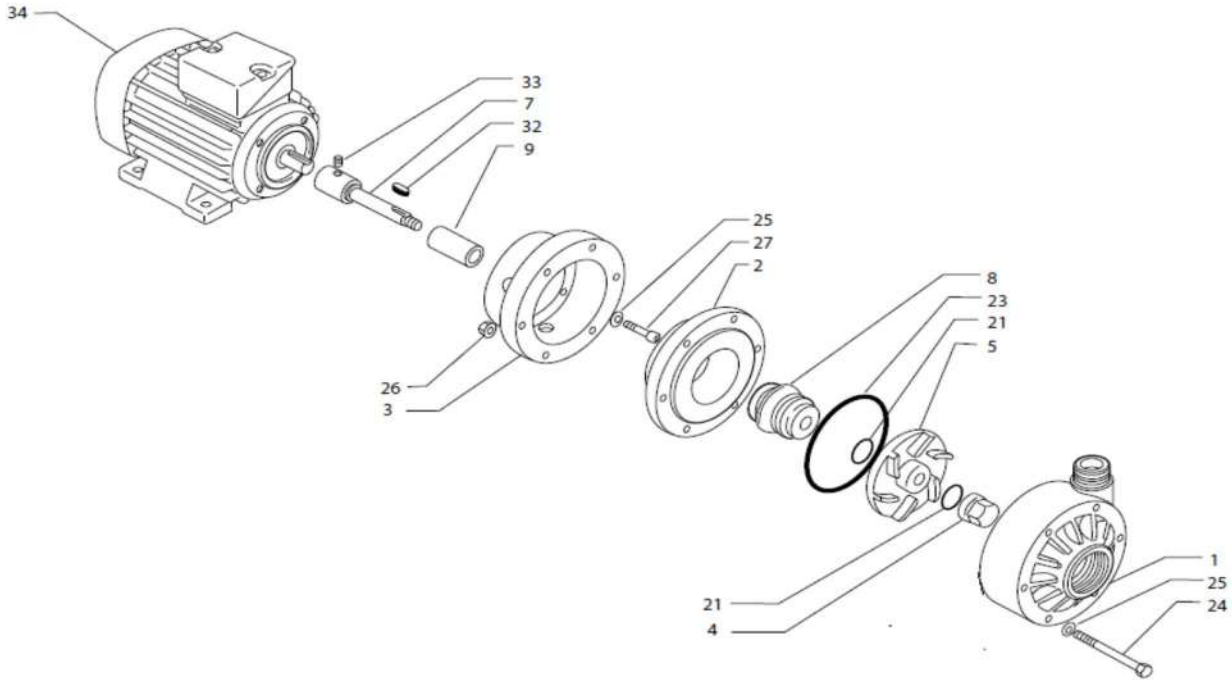
7.1 Performance curves



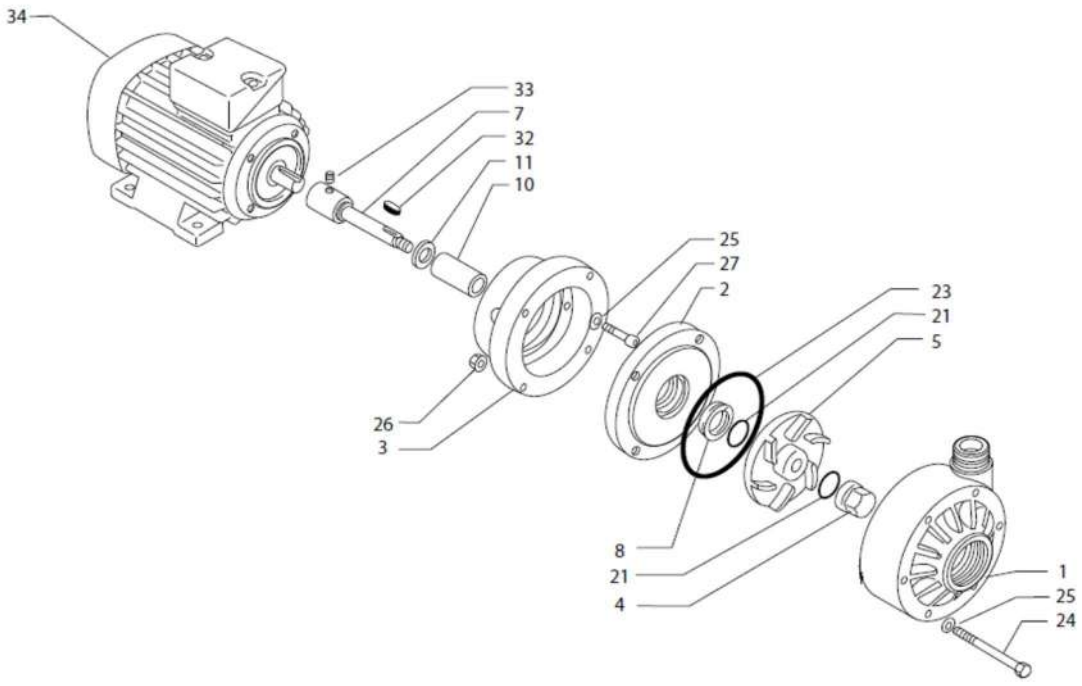


8.Exploded View

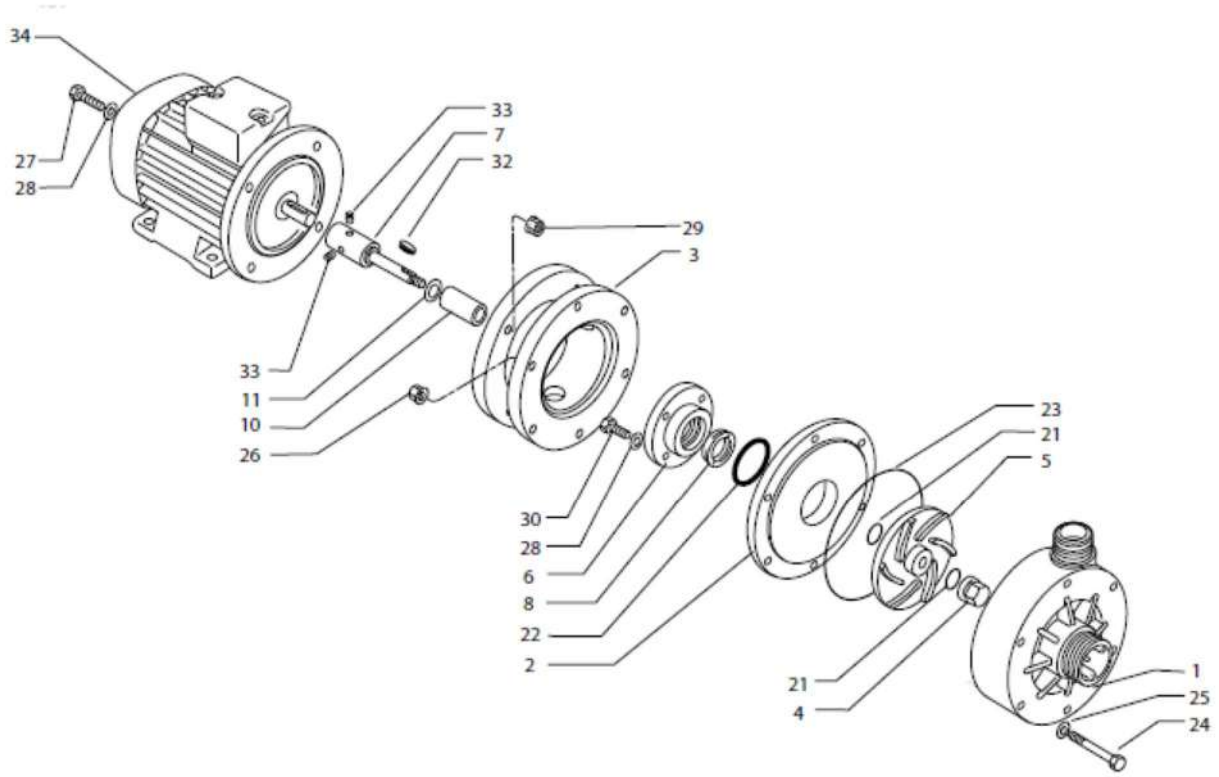
ADH 080/100 Bellow seal



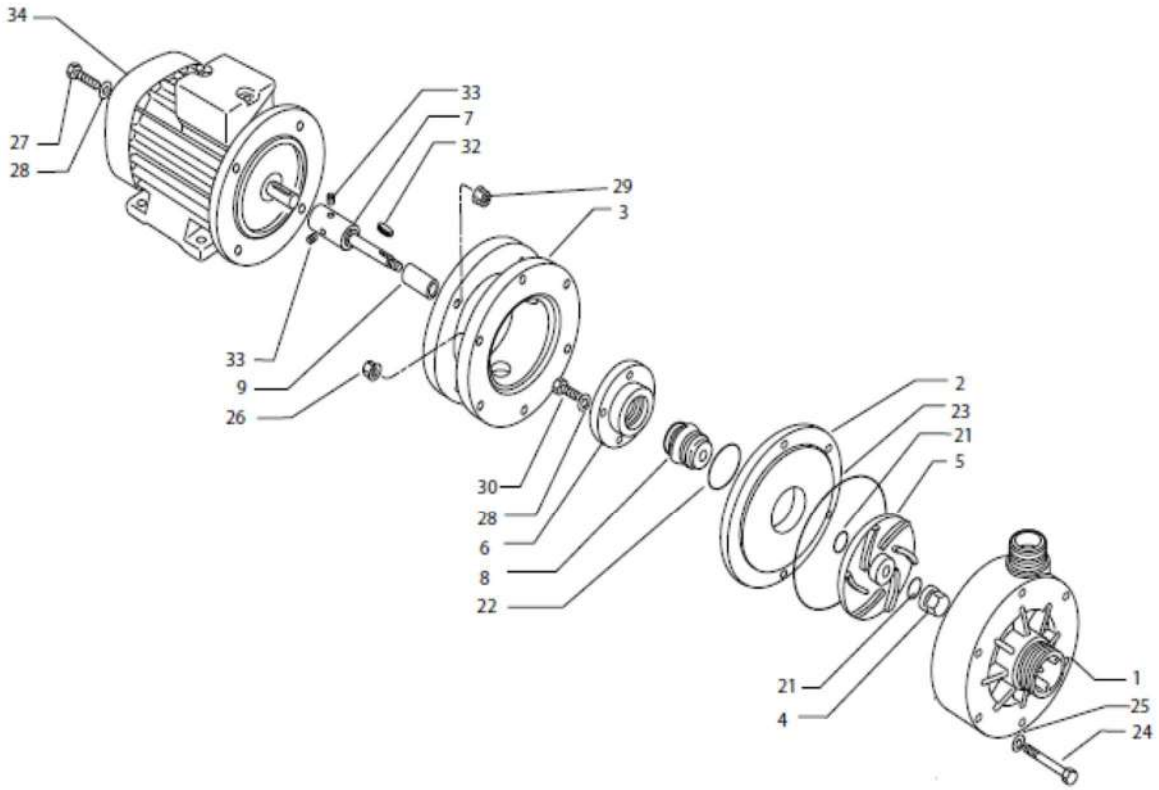
ADH 080/100 Lip seal



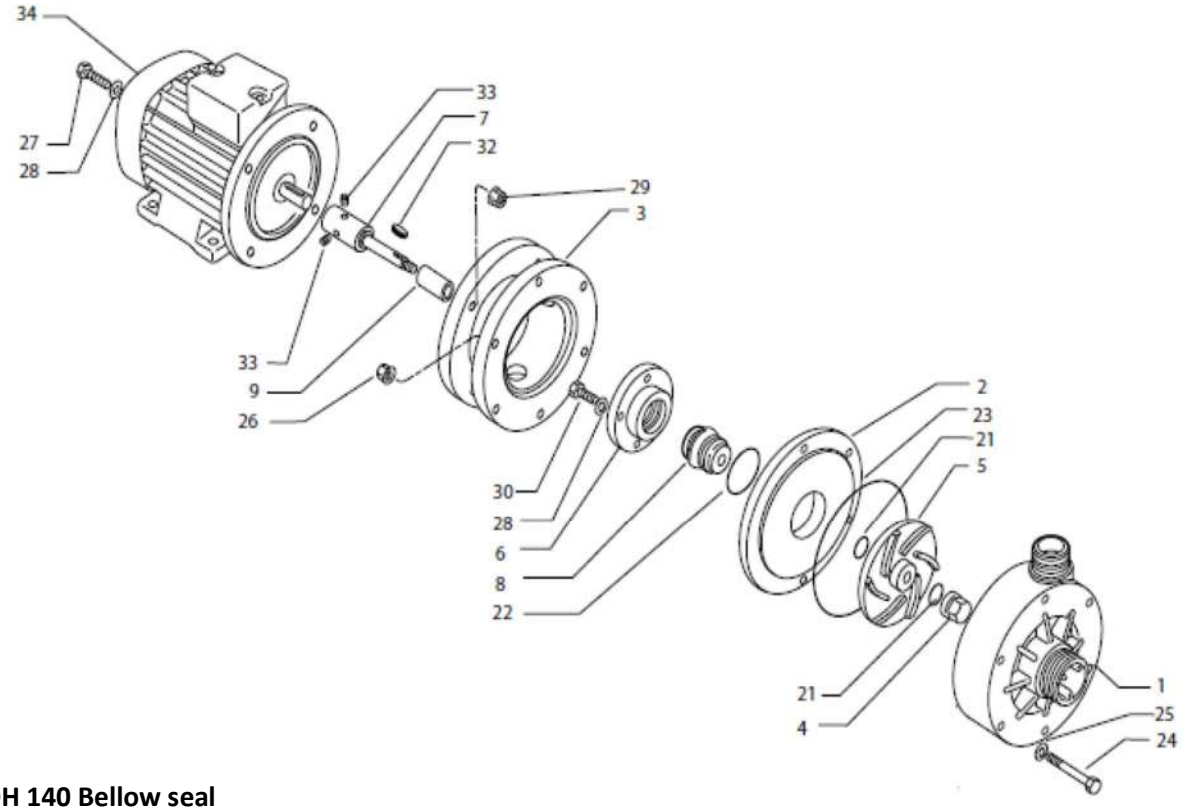
ADH 110/120/130 Lip seal



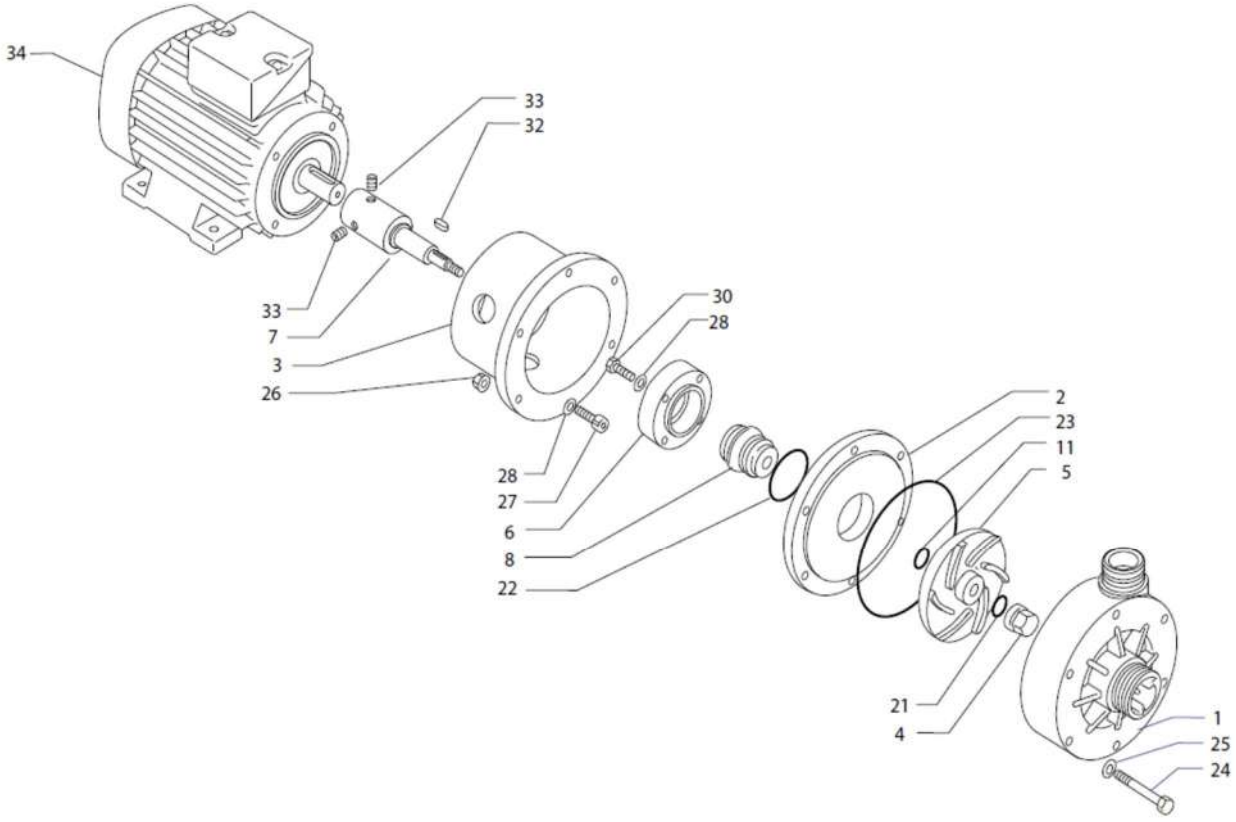
ADH 110 Bellow seal



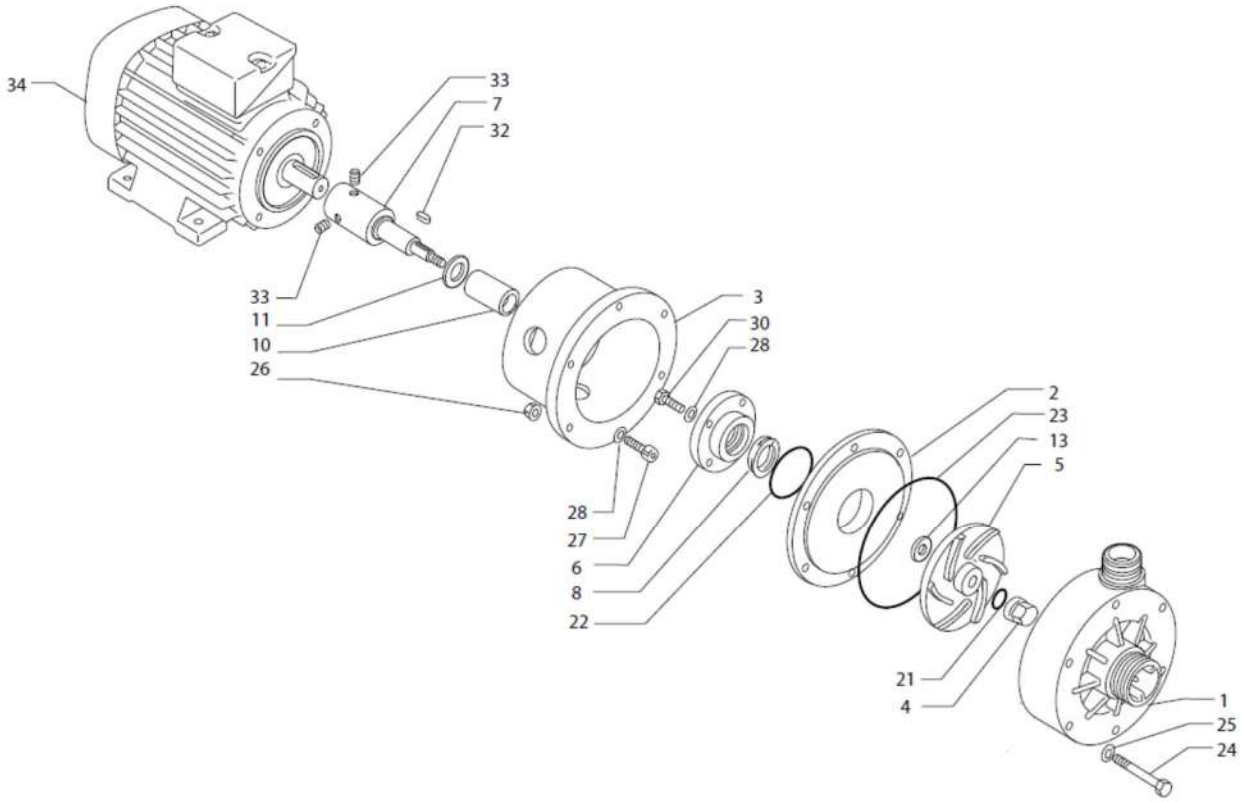
ADH 120/130 Bellow seal



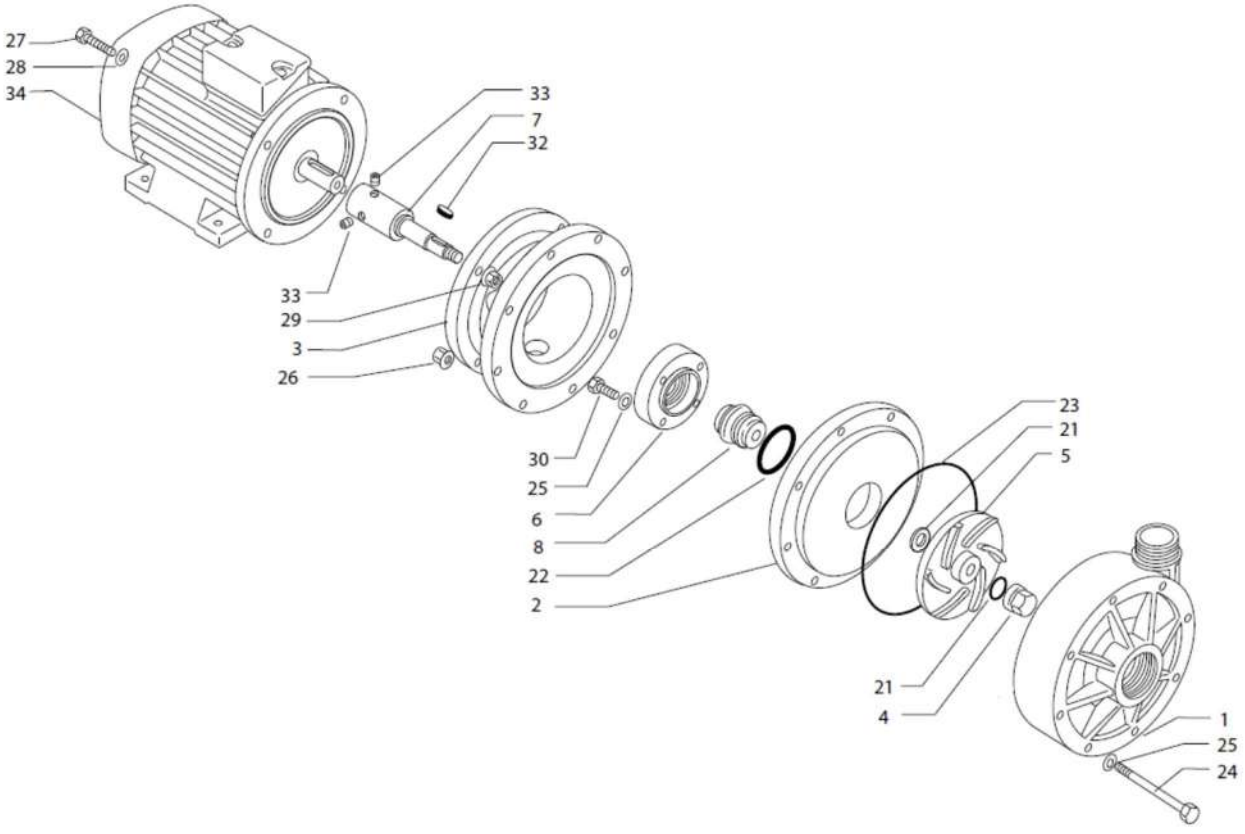
ADH 140 Bellow seal



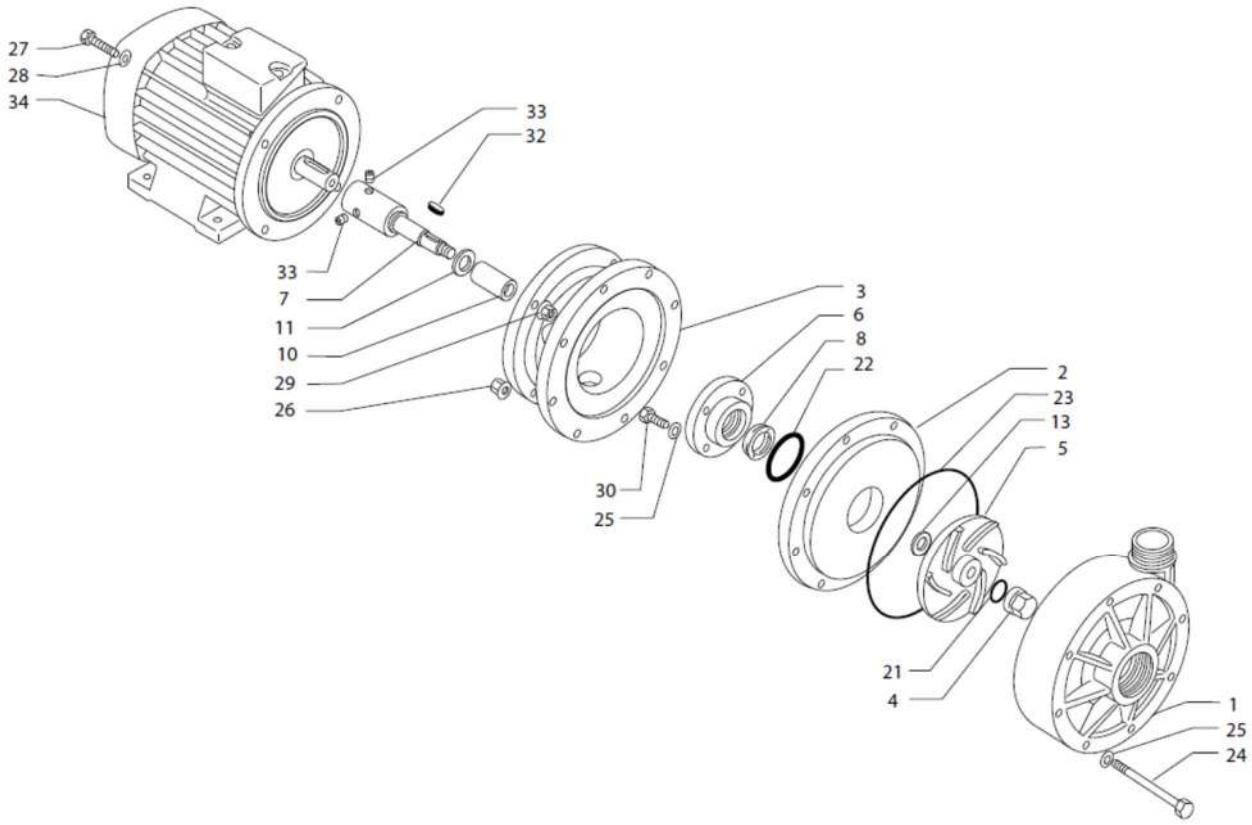
ADH 140 Lip seal



ADH 150/155/160/180 Bellow seal



ADH 150/155/160/180 Lip seal



9. Warranty

All AlphaDynamic Pumps SA products are guaranteed for a period of twelve (12) months starting from the delivery date of the goods. For the warranty service to be applicable the customer must report the defect in writing no later than 8 (eight) days from the moment that the damage occurs and must return the part (or parts) to AlphaDynamic Pumps SA for repair or replacement. Pumps cannot be repaired or substituted on site. In the case of a request of warranty service, it's better to send the complete pump together with its motor to AlphaDynamic Pumps SA. The costs of delivery and the relative risks, and possible customs duties have to be paid by the customer. AlphaDynamic Pumps SA will not accept the costs of collection and shipment. The manufacturer is not responsible for damage caused during the shipment of the parts or of the pump sent to AlphaDynamic Pumps SA to be repaired under warranty. The warranty system provides that, after a careful examination at our factory, AlphaDynamic Pumps SA is free to choose to repair or replace the part (or parts) of the pump which is/are defective in materials or in workmanship, or both. We will not give any refund or credit for the defective material or for direct or indirect damage caused by our pumps. In any case, any reimbursement cannot exceed the cost of the pump or of the supplied material. If the pumped liquid and the needed performances have not been communicated to AlphaDynamic Pumps SA before the offer and confirmed in the quotation and order confirmation, the customer takes the whole responsibility for the usage of the product, especially if not used in an appropriate way, and the warranty, the conformity to the Machine Directive 2006/42/CE and the relative CE declaration are no longer valid. In this case the customer is the sole responsible for the introduction of the pump in the market, for the declaration of conformity to the Machine Directive and the CE mark. In any case, the user is considered the one who knows better the chemical compatibility and the reactions between the liquid to be pumped and the construction materials of the pump and consequently the information given in this regard by AlphaDynamic Pumps SA is merely indicative. If the returned piece is no longer covered by warranty, or if after inspection AlphaDynamic Pumps SA finds the piece to not be defective, inspection charges will be charged to the customer and the repaired or substituted piece will be returned to the customer at the customer's own expense. Pumps which have been repaired or substituted under warranty will be supplied on the same delivery conditions as the order and the warranty will not be extended. Warranty does not cover components subject to natural wear due to time, such as mechanical seals, bearings, bushings and lip seals. The customer is solely responsible for the good performance of pumps and for their careful maintenance. Therefore, no claims will be allowed when goods have been improperly handled (not stored in a suitable closed dry place, which is necessary because of the fragility of materials), contaminated, handled with negligence, improperly installed, tampered with or not well regulated, incorrectly used in wrong applications. In particular, AlphaDynamic Pumps SA will not take any responsibility in the case of wear due to corrosion. Ordinary maintenance and repair carried out outside AlphaDynamic Pumps SA authorized network, will cause invalidation of the warranty and of the CE declaration of conformity. The warranty does not cover damage

due to extraordinary or natural events, such as lightning, ice, fire and others. All the warranty obligations are considered fully satisfied after the repair or substitution of the defective parts. The warranty service will be suspended in the case of faulty or delayed payment and the period lost cannot be recovered. This warranty is an integral part of the offer and of the order confirmation. In the case of litigation the court which has jurisdiction is the Athens (Greece) and the law that will be applied is the Greek Law.

ADH

Horizontal Centrifugal Pumps

ALPHADYNAMIC PUMPS

Industrial Pumps & Flowmeters

Industrial Park of Inofita-HELLAS

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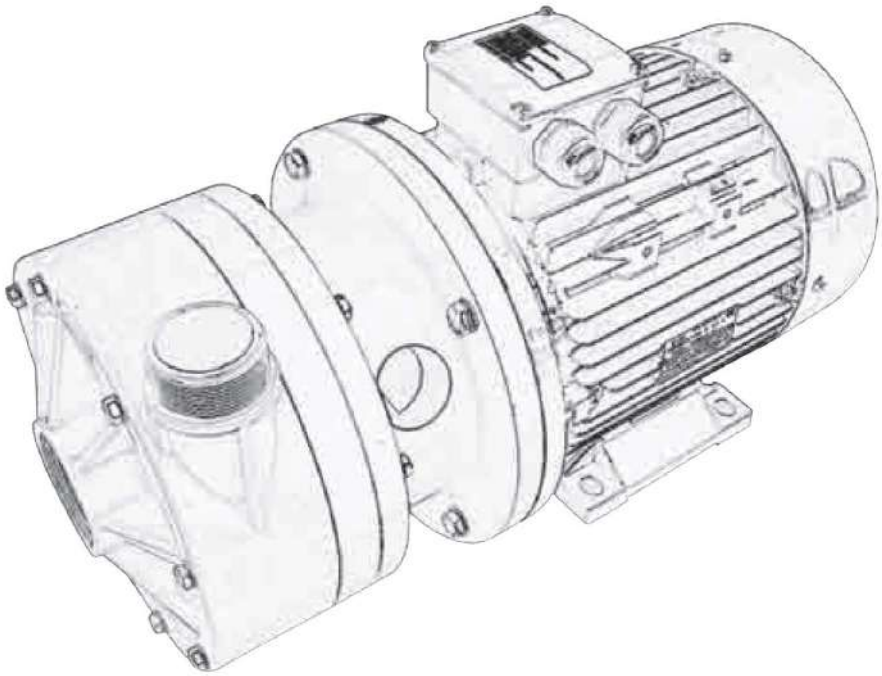

AlphaDynamic PUMPS

We Make The Difference