HIGH QUALITY AND PERFORMANCE VACUUM

EAD
Diaphragm vacuum pumps

Diaphragm Pumps for Vacuum and Pressure

General Instructions for Installation and Use

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Read carefully and understand this document regarding general instructions for installation and use. Always contact us for help.

Valued customer,

Your Electro A.D. product will provide you the solution you are looking for according to the application demands.

Supported by a high industry experience we obtained a great breadth of knowledge on diaphragm pumps that we put in practice every day to offer the most efficient, safety and reliable products for our customers.

We are fully committed to continue providing our customers with high quality products and the finest and nearest personal treatment.

With appreciation,

The complete staff of Electro A.D., S.L.

Contents

1. Regarding this document

Read carefully and understand this document regarding general instructions for installation and use of your product. Following these instructions is essential in order to achieve a fault-free operation and also to assure a safe use of our pumps.

This document provides general information of your product. For products created specifically for you as a customer please also have in mind any other instructions or specifications agreed.

Always contact us for help if any doubt related to the product appears at any moment. In the front page of this document you can find our contact details. We will be more than pleased to answer.

The following safety signs are used throughout this document:

Relates to high probability of death or severe damage. Immediate danger.

Relates to some probability of death or severe damage. Possible danger.

Relates to some probability of minor or moderate damage. Possible danger.

Relates directly or indirectly to the safety of personnel or protection of property.

The information contained in this document is subject to change without notice.

2. Safety and Reliability

Carefully remove the pump from the delivery box. If damage from shipment is detected a claim must be filed with the carrier instantly. The delivery box and paperwork must be well-kept for future examinations by the carrier.

Installation, maintenance or any other action related to the pump may only be done by authorized personnel and in a safe way.

It is not allowed the use of explosive mediums as danger of explosion or fire due to high temperatures could appear. The pumps are not designed to be explosion-proof.

Likewise the pumps must not be used in areas with a risk of explosion.

If the product falls into liquid it has to be unplugged immediately and never powered again until it is completely dry. Particularly, be sure no liquid remains around electrical parts.

All connections, hose lines and other elements of the application in which the pump is mounted should be designed considering the pumps technical specifications (e. g. pressure, flow, etc.) always withstanding the performance of the pump.

It is the customer responsibility to perform every test necessary to ensure that the product/application containing the pump is reliable.

For applications where a regulated flow is necessary, it must be considered that this regulation can only be done before the inlet connection/s of the pump and therefore never after the outlet connection/s. Comply with the above ensures that no dangerous overpressure will appear inside the pump.

The surface of motor and pump's head/s (when a fluid or gas is used at high temperature) can go beyond 40°C and consequently give a risk of burns. Always be protected before getting in contact with this and other parts at high temperature.

The materials of the pump's head/s, membrane/s, and valves need to be checked for compatibility with the application's medium (gas or fluid) before starting pump's operation.

Information regarding chemical compatibility for the main materials used in our pumps can be found in the *Added Value* section of our official website at www.electroad.es

Before removing the pump from the application ensure there is no pressure in the system.

Rubber parts (membranes, valves and O-rings) are always parts that can wear down as the pump's operation time increases and this could end up affecting the performance of the pump. It is recommended to check on the pump regularly and take appropriate protective measures to avoid any other damage.

Clean dirt around the fan to keep it always as clean as possible.

3. Description and Use

3.1 Intended use

Our pumps are designed to create different vacuum and/or pressure levels at specific flow rates either in gas and/or liquid applications.

It is very important to follow the instructions agreed related to the use of the pump:

- If it's suitable for gas and/or liquid and at which temperature.
- If it's suitable to perform at vacuum or pressure process and at which operating range.

A use of the pump outside of its intended one is not allowed.

3.2 Specifications

NOTICE

In the case of standard pump models, information about dimensions, material of parts, performance specifications and others, can be found in the *Products* section of our official website at www.electroad.es. Note that some data contained in our different datasheets may not be updated due to modifications on the pump being made recently.

NOTICE

If the pump received comes from a particular design specific for your application always contact us for specifications or other information.

Also, there is always a nameplate on the pump that contains the most relevant data to consider.

4. Installation

4.1 General information

WARNING

Before starting to mount the pump in the application in which it is destined to work, this instruction manual has to be read at least one time completely and if any doubt appears you should contact us for a response. Always follow the instructions provided.

The pump is allowed to operate only when fully assembled.

NOTICE

Storage: The pumps must not be stored in environments at extreme temperatures (either high or low) or humidity. We recommend storing the pump in similar conditions to the ones in the future operating location.

DANGER

The pump and also the motor must be fully protected from external agents like water, atmospheres with corrosive gases, dust, oils, fats, etc. Always ensure protection against impacts and reduce vibrations to the lowest.

CAUTION

The gas or liquid used through the pump may not contain dust or any other solid particles because this can end up affecting the pump's performance. When the previous cannot be assured, a proper filter must be installed.

Any media containing chemical products has to be looked at with care because in some cases will deteriorate mainly rubber parts but also could affect plastics. Contact us for compatibility.

4.2 Mounting

CAUTION

When the pump is provided with silentblocks, it has to be fixed always using those and never with other mounting system.

The torque applied to the screws used to fix the pump's silentblocks should be enough to guarantee the pump will not move but never too much. If too much torque is applied, the silentblock will end up twisting itself. This situation must be avoided.

WARNING

Always avoid blows or any other damage to the pump when mounting. Take special care with the motor's axis and other parts related and also assure the motor's wire connections are not forced.

DANGER

If the pump's motor is provided with fan/s it is required to mount the pump in a way that the motor's fan can take enough cool air to reduce internal temperature. Protective actions also need to be taken to guarantee that foreign objects don't come near the fan/s or other parts of the pump during operation.

4.3 Electrical connection

NOTICE

The electrical connection of the pump to the application's source always has to be done by qualified electric personnel.

DANGER

Always ensure that the power is turned off before plugging the pump.

DANGER Never operate this product if it has a damaged electric wire.

If the pump provides earth (ground) connection it is mandatory to connect it to the application's earth connection.

WARNING The supplied voltage must be the one indicated on the pump's nameplate and should not deviate more than ±5% from that value. Alternate current (AC) pumps also need to be powered at the proper frequency. For additional information on that matter please contact us.

Direct current (DC) pumps always have to be connected respecting the correct polarity and that is:

- Pump's red wire (positive polarity) always plugged to the positive pole of the supply voltage.
- Pump's black or blue wire (negative polarity) always plugged to the negative pole of the supply voltage.

If the correct polarity is not supplied, the motor will end up inoperative.

Take proper care to assure that the electrical wires are not in contact with heated surfaces during operation.

Finally, all connection plugs and other live parts should be protected against direct contacts (e.g. using plastic housings).

NOTICE We recommend the installation of a proper fuse between the power supply and the pumps electrical connections. Select the correct fuse according to the operating current given in the pump's nameplate and also be sure that it can work with the type of power supply used (AC or DC).

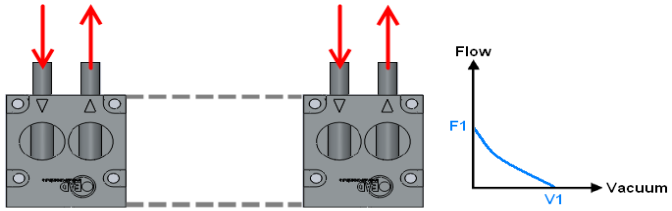
4.4 Pneumatic/Hydraulic connection

CAUTION The hoes/pipes connected to the pump's ports should have an inner diameter equal to the one the ports have and must be perfectly fixed to the nozzles (especially the outlet port). We recommend using at least a plastic bridle to fix the hoses to the nozzles.

CAUTION Inlet and outlet ports are always marked with small arrows in the pump's head or near the nozzles in some cases. The direction indicated by these arrows has to be respected when connecting the ports to the pneumatic/hydraulic system.

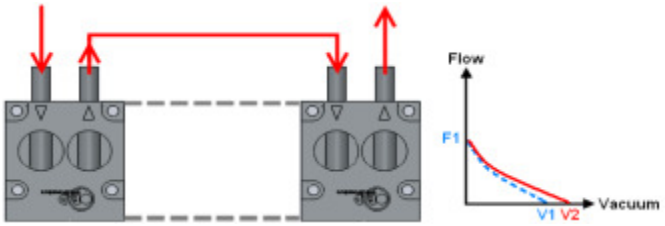
Pumps incorporating two heads (with an inlet and an outlet port each one) allow three possible connections:

<u>1 – Heads working independently:</u>



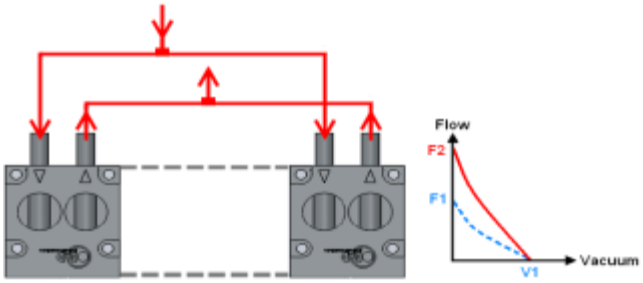
This connection allows you to pump two different mediums at the same time. Performance values will be the standards per head (flow F1 and vacuum V1).

<u>2 – Heads working combined in series connection:</u>



This connection allows you to pump only one fluid but will let you achieve a vacuum level (V2) higher than the one with independent or parallel connection.

3 – Heads working combined in parallel connection:



The parallel connection also admits only one medium at the same time but with a flow rate (F2) that nearly doubles the standard with only one head (F1).

5. Operation

WARNING

Before starting to operate with the pump make sure all instructions from previous chapters are fulfilled. If there are not, avoid operating with the pump.

Ambient temperature during operation should be between +5°C and +40°C and relative humidity must be considered.

When the pump is working vacuum process make sure the output port/s of the pump are never blocked and neither the rest of the exhaust line/s. If this is not avoided, pressure will build up inside the pump's head and create a hazardous situation.

A situation that demands special care is the start-up of the pump. Every time before the pump is connected it's crucial to assure there is no level of vacuum or pressure in the system, atmospheric pressure must be established before every start-up.

The above includes situations of power failure even when they are for a short time and also re-starts of pumps that mount a thermal switch in the winding (only the ones powered in AC).

WARNING

Pumps incorporating motors with thermal switch will automatically stop when the motor overheats and remain that way until it cools down. At that time the pump will re-start automatically.

If the proper measures are not applied, the situations described above could end up burning the motor rendering it inoperative and creating a hazardous situation.

NOTICE

Electro A.D. pumps are designed for continuous operation and therefore start-stop cycles may affect the working life of the motor.

6. Troubleshooting

NOTICE

The pump can be open only by qualified personnel when fully disassembled and under the customer's responsibility.

CAUTION

If any element looks damaged (mainly rubber parts) it should be replaced only with original spare parts that our company will provide.

When a pump head is open, the O-rings that can be found inside must be replaced by new ones even if the original ones seemed perfectly fine. That measure will eliminate possible leaks during future operation.

NOTICE

Contact us when doubts appear so we can guide you to the proper solution and also to avoid further damage.

Below are some guidelines that may help you identify the problem affecting the pump and direct you towards the proper solution.

• **THE PUMP HAS STOPPED RUNNING**
The power supply is not providing the correct voltage or the power lines are damaged Check the pump's nameplate and use the proper equipment to measure the supplied voltage on the pump's electrical connections. The voltage measured should not deviate more than 5% from the voltage shown in the nameplate. If it does, the fault must be corrected by qualified electrical personnel. Frequency also needs to be checked in AC pumps.
The pump is powered correctly but cannot start running against vacuum or pressure levels present in the application. Atmospheric pressure needs to be established in the application so the pump can start operating.
Too much liquid is collected inside the pump's head/s. Allow the pump to work pumping gas for a minute so the outlet port can expel the liquid collected. If there is a risk of explosion use an inert gas.

• **THE PUMP IS RUNNING BUT NO FLOW IS GENERATED**
Other elements on the application outside of the pump may not be working properly. A filter could be clogged due to dirt, a valve could be closed, a hose line is strangled, etc. If an external problem is causing the fault, take the proper measures to correct it.

• **THE PUMP IS RUNNING BUT VACUUM, PRESSURE AND/OR FLOW ARE BELOW THE PERFORMANCE STANDARDS.**
Hose lines or other elements on the application have an inner diameter too small and they are limiting the flow in the application. All elements on the application should have an inner diameter equal to the one the pump's ports have, and if that is not the case the pump could work bellow standards. If there is no restriction on the application, disconnect the pump from the application and if possible, use the proper equipment to measure performance values.
There are gas/liquid leaks in the application outside of the pump or inside the pump's head/s. Check for external leaks and secure connections with clamping elements. If clearly the leak comes from the pump contact us for a solution.
Rubber parts inside the pump's head/s (mainly diaphragms and valves) can be excessively worn and affect the pump's performance. The pump's head/s should be open by qualified personnel and the parts that are worn must be replaced by new original parts.
There is dirt inside the pump's head/s (mainly around the valves). The pump's head/s should be open by qualified personnel and cleaned properly with a soft dry cloth or with compressed air if obtainable. Never use chemical products to clean inside the pump's head/s. If it is expected that dust reappears, a proper filter should be installed before the inlet port.

If the problem affecting the pump can't be identified, the pump should be isolated from the power supply and disassembled from the application. Make sure there is no pressure in the installation before disassembling.

Contact us or send the pump to our facility for examination. In the front page of this document you can find our contact details.

When sending a pump for examination you should provide us correct information about the transported medium, especially if it's some kind of aggressive media.

Pumps that have been used with dangerous or aggressive gases/liquids must be cleaned completely before being sent to our facility.

7. EC Directives and other legislation

Electro A.D. pumps comply with the following EC directives:

- Machinery Directive (MD) 2006/42/EC.
- Low Voltage Directive (LVD) 2006/95/EC.
- Electromagnetic Compatibility (EMC) Directive 2004/108/EC.
- Restriction of the use of certain hazardous substances Directive 2011/65/EU (RoHS).

Always remember that our pumps are partly completed machinery (OEM product) and therefore are products fitted with or intended to be fitted with a drive system other than directly applied human or animal effort. Pumps are not considered ready for direct use.

Information regarding CSA-UL or ISO certificates is available in the main page of our official website at www.electroad.es.

8. Disposal

Please contribute to a better environment by disposing packaging materials in an environmentally-friendly manner so they can be properly recycled.

At the end of its useful life, the pump should not be disposed of as unsorted waste but instead it must be send it to the proper recycling facilities in compliance with local and national environmental legislation. The presence of some of the pump's materials, if not disposed of properly, has potential adverse effects on the environment and human health. Also replaced parts during maintenance should follow the above.