

O&M MANUAL
FDN SERIES

This operation manual should be read carefully before the installation process. Installation must be in accordance with local regulations.

1 DESCRIPTION

These pumps are designed to recirculate clean water lightly treated in private and public swimming pools, without abrasive or aggressive products that could damage the pump.

1.1 Technical specifications

Motor:

- Ambient temperature: 4 ° C / 40 ° C.
- Service: Continuous.
- Protection: IP 55.
- Bearing 2Z: Armored greased for life.
- Power: (See plate of the motor).
- Consumption: (See motor nameplate).
- Voltage: (See motor nameplate).
- Voltage: (See motor nameplate).
- Efficiency: (See motor nameplate).
- Nominal RPM: 1,450 or 2,850. (See nameplate of the motor).

Pump:

- Pump body: Cast iron (Bronze on request).
- Turbine type: Cast iron (Bronze on request)
- Impeller type: Closed
- Shaft: Steel AISI 316.
- Type mechanical seal: Carbon + Resin-ceramic.
- Density of liquid: 1.
- Liquid temperature: 4 ° C / 40 ° C.

2 GENERAL INFORMATION

2.1 Introduction

This manual contains instructions for installation, the use and maintenance of the pump. To obtain the performance is indicated in the data pages, you must meet and correctly follow all recommendations given in this manual. This will bring a safe and durable equipment. The supplier of the equipment shall provide the user with additional information, if required.

2.2 Responsibility

All equipment supplied by BOMBES PSH BARCELONA S.L. are duly protected to avoid accidents, but in any case all safety recommendations outlined in the equipment, documents supplied with it and especially the local regulations that apply must be followed. It is the sole responsibility of the installer / user to evaluate the individual risks that exist in each facility and not to allow the connection and start up of the equipment without the appropriate protections.

3 INSTRUCCIONES GENERALES RELATIVAS A SEGURIDAD DEL USUARIO

The enclosed safety recommendations are based on our experience and on normal use of the equipment.

The Equipment security can only be guaranteed if their use corresponds to what is indicated in the information and diagrams supplied by the manufacturer. It is mandatory to meet what is legislated by the Safety Standards in force in each country.

Be sure equipment is properly selected the application for which it was intended and that their status, installation, commissioning and subsequent use are correct .

Before starting up the pump, all its elements, especially those relating to security, must be properly installed and secured. Never operate the pump with non authorised people in the area.



All installation, repair and maintenance should always be with the team switched off the mains



While the machine is in operation it cannot be moved or its position corrected. These operations should always be done with standstill equipment.



Never use the cord or the discharge pipe as a means to raise or support the pump. You must place a rope, wire rope or chain, appropriate to the weight attached to the handle or hook intended for it.

Close checks the condition of the installation. If your/state is not safe, the equipment must be stopped and proceed to repair. The necessary spare parts will be the original manufacturer or recommended by him. The use of other spare parts from another source, or original spare parts rectified by third parties is not allowed and exempt the manufacturer or supplier of all its responsibilities.

4 TRANSPORTE

The manufacturer supplies the equipment protected with proper packaging, so that when transporting or storing will not be damaged preventing proper installation and / or operation.

The user, upon receipt of the equipment, shall check the state of the external packaging. If signs of major damage this must be stated formally to whom it delivers. Also shall check the state of content; if the defect presumably would prevent proper operation, it shall be submitted, also formally, to the provider within 8 days from receipt.

When stored humid environments should be avoided. Due to temperature changes condensation may occur, also, in order to avoid dilatation misalignments, avoid the sun exposure.

5 INSTALLATION AND SETUP

5.1 Location

Access to the pump or installation should be restricted, so that anyone can access it inadvertently and specially must have secure items to prevent access by children that should never stay in the equipment location while the pump works.

The location must be dry. Must always be a sufficient size drain in the bottom ground to prevent flooding. If the pump is installed in a wet room a ventilation system must be provided to prevent from condensation water.

Motor pump is cooled by means of air, installing the pump in tight spaces, or in very hot climates may become in air cooling being not enough or null if necessary aeration (forced ventilation) should be provide in order not to exceed the ambient temperature of 40 ° C.

It is important to reserve enough space to remove the engine block horizontally for repair and also enough space to remove the pre-filter vertically for cleaning and maintenance.

It is also important to avoid obstacles that may avoid a correct air cooling of the engine and provide enough space for the regular inspections and maintenance.

Do not run the pump with the keys locked, this would increase the temperature of the liquid and vapor bubbles form inside the pump.

Do not run the pump with the valves keys locked, this would increase the temperature of the liquid and steam bubbles inside the pump.

5.2 Installation Lay out

The pump equipment, has to be installed as close as possible to the pool. This distance should not exceed 5 m from surface jacks (skimmer / overflow), (for greater distances, consider the pressure drop of the pipes).

In the under load normal operation of the pump, a distance - 0.5 m - 3 m from the water level to the pump shaft height must be respected. The union of the pipes with the pump body will be preferably of a PVC material. The diameter of the pipes depends on the flow.

Provide pipe \varnothing so that the maximum speed of the water does not exceed 1 m/s at the inlet and 2.5 m/s on the drive mouth. In any case, the diameter of the suction pipe must not be less than the diameter of the drive pipe.

The suction pipe must be perfectly sealed and must be installed with an upward slope in the direction of water direction (not less than 1/100), thus preventing the formation of air bubbles.

In all under load installations, a suction valve and a drive valve should be placed. If the suction valve is not a gate one, it has to be assembled with the wheel shaft horizontally.

To connect the pump suction with the pipes, if its diameter is bigger than mouth suction diameter, you should use an eccentric coupling.

In suction installations (maximum 4 meters) you must take into account the NPSH curves, besides installing a valve with strainer which must always be submerged and clean.

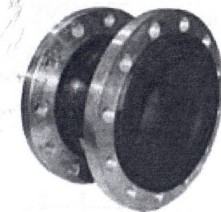
When the geodesic drive level is greater than 15 meters, a stopper valve between the pump and the closing valve on the drive mouth must be inserted to protect the pump from the "water hammer" effect.

Do not use the pump as a support for the pipes. Pipes have to be anchored on its own support. Take into account the weight of the water filled pipes.

The position of connecting pipes must match perfectly without deviations and efforts with the suction and discharge mouth of the pump. Thus avoiding that tensions may cause pipes misalignments between the body and the motor shaft, reducing the life of the mechanical seal and an also an unnecessary torque effort in the connecting screws of the two scrolls and of these with the engine.

It is recomended to install elastic sleeves to absorb the vibrations of the pump and the expansion of the pipes installation at the suction and the discharge port of the pump.

During assembly check that the gaskets between the flanges do not protrude into the pipes. Before connecting the pipes, be sure they are internally clean.



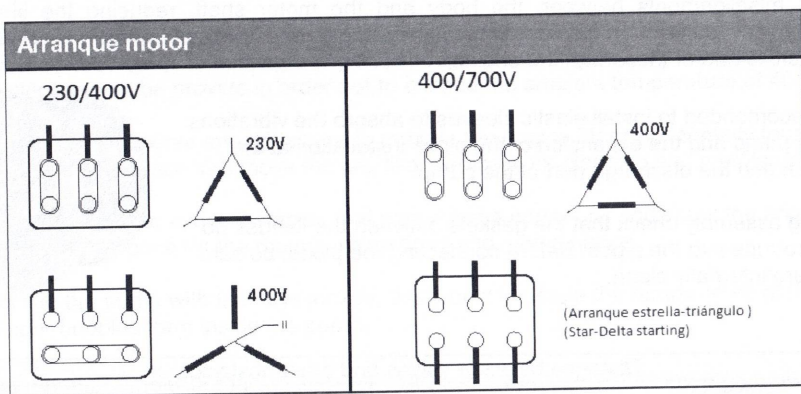
Distance between valves and other obstacles		
Suction	Discharge	Motor
Minimum of 1 meter to the first valve or elbow	Minimum of 1 meter to the first valve or elbow	To allow a proper ventilation: The distance between the fan guard and the wall should be minimum of 2.5 times the fan diameter.

5.3 electrical connection

- In general, the electrical installation has to be done in accordance with the requirements of the regulations and complementary technical provisions that apply.
- It is necessary that the electrical installation and wiring the pump is checked by a licensed electrician.
- The mains will have neutral and ground conductors. The grounding wire should be the first to be connected, and the last to be disconnected.
- The supply voltage must correspond to that shown on the nameplate of the equipment. The pump motor supports maximum voltage variations $\pm 10\%$.
- The section of conductors used must be enough to bear the intensity absorbed by the unit (see nameplate on the motor).
- The ground wire will be connected to the metal parts of the equipment that must not be under electrically tension.
- It is mandatory to install an electrical protection and control box where all the elements

required and other recommended are located, which generally will have:

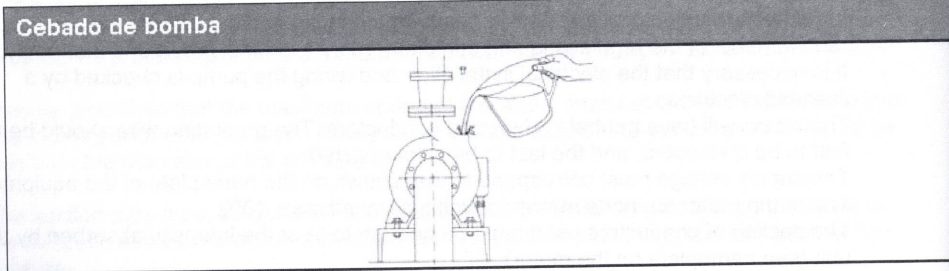
1. A system pole disconnection (for all phases) with opening of at least 3mm contact separation.
 2. Devices circuit protection and overload engine
 3. High sensitivity RCD, 30mA
- The electrical characteristics of protective devices and regulation, will agree to protect motors under the intended service conditions, and with the instructions provided by the manufacturer listed on the nameplate.
 - The bridges that interconnect the motor windings should be correctly positioned. (According to the following scheme and to what is indicated on the nameplate of the motor)



- The input and output wires to the terminal box will be connected by means of a cable gland to ensure tightness, lack of moisture and dirt. The wires will be equipped with the suitable terminals to allow a secure connection to the terminal box.

6 START UP

6.1 Priming Pump



Before starting up the pump must be primed with water. The water cools and

lubricates the mechanical seal.

- In under load installations, priming is not required, the pump works under load if the water level of the pool is above the pump shaft, but due to the pressure drops and flow valves, it is recommended that at least there is an available height of 1.5 meters from the pump shaft height to the water level of the pool.
- In suction installations, you must remove the side purge cap of the pump and fill it up till you are sure that all the suction circuit is filled with water as shown in the drawing. Alternatively you can prime the pump through the prefilter, if the installation has this element.

6.2 Rotation direction

- In the first connection, the rotation direction of the pump should be particularly monitored. Continued reverse rotation can damage the mechanical seal. For proper connection, switch the pump for a few seconds and check if the rotating direction is according to what is indicated on the arrow on the fan cover.

6.3 Motor Lock

- If the pump has been idle for a long period of time, the engine could be slightly stiff. Check with a screwdriver that the motor is not locked; ensure that the motor shaft turns freely, if the engine is seized attempt to release by means of a reasonable force through the fan. Do not switch on if it is locked.

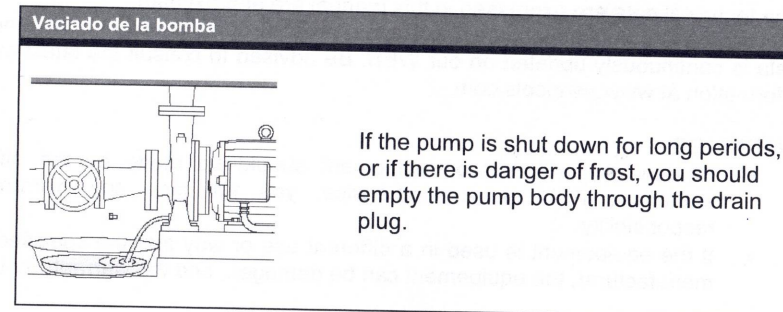
7 MAINTENANCE / STORAGE

Disconnect the pump from the mains before any manipulation.

With the pump stopped, regularly check and clean the pre-filter basket. To extract the basket, place the suction and discharge valves in position "closed". Release the pre-filter cover, remove the basket and clean it under a tap. In order to avoid damaging, do not hit it. To relocate the basket again, insert it gently until it is in its initial position

Place the seal in the lid and greased with Vaseline.

Do not place chemical products in the prefilter basket. Do not forget that the changes in position of the valves should always be made with the pump stopped



Before starting the pump again, replace the plug with its seal. Fill prefilter with water and check with a screwdriver that the motor is not locked. If the engine is seized attempt to

release it by means of a reasonable force through the fan. Do not switch on if blocked

8 UNASSEMBLING

Before any operation, all valves keys have to be closed.
Disconnect the electrical main switch and circuit breaker
Loosen and remove the power cables from the terminal box.
Drain the pump. Use the drain plug
Release the suction and discharge pipes

8.1 Removing the pump and impeller.

- Proceed to disassemble the pump body. To do it loosen the 8 bolts that are fastening the pump back cover.
- Extract the motor-shaft-turbine assembly withdrawing back.
- Then we will block the motor shaft by means of a vise, while we turn the nut of the impeller to the left (counter clockwise) with a wrench.
- To remove the impeller from the shaft we are going to use and extractor, we will remove the shaft key and thus the rolling part of the mechanical seal will be released.

9 ASSEMBLING

Before assembling check that all parts are clean and in perfect conditions.

To assemble the pump:

- Lubricate the mechanical seal gasket with Vaseline, never with oil or fat, as this could damage the gasket and thus not sealing.
- Assemble the mechanical seal. Press it down onto its seat.
- Insert the key into its settlement in the shaft. Assemble the impeller on the shaft, place the washer and tighten the nut.
- Proceed to the relocation on the pump casing and retighten the screws.

To apply for any spare parts, specify the name and number of the spare part position in the exploded drawing and the data from the nameplate on the motor.

The technical data are expressed in this manual are approximate.
Our pumps and equipments are subject to a process of continuous improvement and data is continuously updated on our WEB. Be advised to consult the latest available information at www.pshpools.com

WARNINGS:

- All repairs performed on equipment should be made by the official or authorized service; otherwise, you will lose any warranty and responsibility.
- If the equipment is used in a different use or way that the specified by the manufacturer, the equipment can be damaged, and the warranty lost.

10 RECYCLING



In compliance with the Directive **2012/19/EU** for waste electrical and electronic equipment (WEEE), the products marked with this symbol must be deposited at the local recycling center in each region for their selective collection, optimize the recycling of the components and materials and, reduce the impact on human health and the environment.

The consumer should contact the local authority or the seller to inquire about the proper disposal of their appliance.