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KEY

The following symbols have been used in the discussion:



SITUATION OF GENERAL DANGER.

Failure to respect the following instructions may cause damage to persons and property.



SITUATION OF RISK OF ELECTRIC SHOCK.

Failure to respect the following instructions may cause a situation of serious danger for personal safety.



Notes and general information.

WARNINGS



Read this documentation carefully before installation.

Installation and operation must comply with the local safety regulations in force in the country in which the product is installed. Everything must be done in a workmanlike manner.

Failure to respect the safety regulations not only causes risk to personal safety and damage to the equipment, but invalidates every right to assistance under guarantee.



Skilled personnel

It is advisable that installation be carried out by competent, skilled personnel in possession of the technical qualifications required by the specific legislation in force.

The term skilled personnel means persons whose training, experience and instruction, as well as their knowledge of the respective standards and requirements for accident prevention and working conditions, have been approved by the person in charge of plant safety, authorizing them to perform all the necessary activities, during which they are able to recognize and avoid all dangers (Definition for technical personnel IEC 364).



The appliance may be used by children over 8 years old and by persons with reduced physical, sensory or mental capacities, or who lack experience or knowledge, on condition that they are under supervision or after they have received instructions concerning the safe use of the appliance and the understanding of the dangers involved. Children must not play with the appliance. Cleaning and maintenance intended to be carried out by the user must not be performed by children without supervision.



Overload protection. The pump is equipped with a thermal motor protector. If the motor overheats, the motor protector switches the pump off automatically. The cooling time is about 15-20 min. after which the pump automatically switches on again. After the motor protector has tripped, it is absolutely necessary to find the cause and eliminate it. See Troubleshooting.



The power supply cable and the float switch must never be used to carry or lift the pump. Always use the pump handle.



Use is allowed only if the electric system is in possession of safety precautions in accordance with the regulations in force in the country where the product is installed (for Italy CEI64/2).



Never pull on the cable to detach the plug from the socket.



If the power cable is damaged, it must be replaced by the manufacturer or by their authorised technical assistance service, so as to avoid any risk.

Failure to observe the warnings may create situations of risk for persons or property and will void the product guarantee.

Particular warnings



Always switch off the mains power supply before working on the electrical or mechanical part of the system. Only firmly cabled mains connections are admissible. The appliance must be earthed (IEC 536 class 1, NEC and other applicable standards).



Mains terminals and motor terminals may still have dangerous voltage when the motor is stopped.



The appliance may only be used for the functions for which it was designed.

Under certain calibration conditions, the converter can start automatically after a power failure.

RESPONSIBILITY

The Manufacturer does not vouch for correct operation of the electropumps or answer for any damage that they may cause if they have been tampered with, modified and/or run outside the recommended work range or in contrast with other indications given in this manual.

The Manufacturer declines all responsibility for possible errors in this instructions manual, if due to misprints or errors in copying. The Manufacturer reserves the right to make any modifications to the products that it may consider necessary or useful, without affecting their essential characteristics.

1 GENERAL

1.1 Applications

Multistage submerged pump with integrated electronics, ideal for use in rainwater systems and irrigation networks, for pumping water from tanks, cisterns, wells, lakes and for other domestic applications requiring high pressure.

Thanks to their compact and handy shape, they are also used for particular applications as portable pumps for emergency situations such as for drawing water from tanks or rivers, draining swimming pools and fountains. Also suitable for gardening and general hobby activity.

The electronics automatically control starting and stopping (ON/OFF) of the application depending on the request for water by the user.

The ideal working situation is with the pump completely submerged; however, the motor cooling system allows its use up to the minimum suction height (50 mm).



These pumps cannot be used in swimming pools, ponds or basins where people are present, or for pumping hydrocarbons (petrol, diesel fuel, combustible oils, solvents, etc.) in accordance with the accident-prevention regulations in force. They should be cleaned before putting them away (See chapter "Maintenance and Cleaning").

1.2 Pumpable Liquids



Only use the pump in clean water.
The pump must not be used to pump salt water, sewage, inflammable, corrosive or explosive liquids (e.g. petroleum, petrol, thinners), greases, oils.



The temperature of the liquid to be pumped must not exceed 40°C (104°F)



If the pump is used for the domestic water supply, respect the local regulations of the authorities responsible for the management of water resources.



Maximum size of solid particles dispersed in the liquid: Diameter 3 mm (0.12 in)

1.3 Technical Data

DIVERTRON pumps are equipped with a filter, which can be opened (see figure 1, A) or closed (called X) (see figure 1, B), depending on the application.

The open filter prevents the passage of suspended particles with a diameter greater than 3 mm.

Products with filter X are characterized by the X next to the pump name.

The filter X is characterized by a base, which is not watertight, with a 1" female connection. The filter X is designed to be used with the KIT X : suction kit with float (see figure 2).

Pump models DIVERTRON are identified as below (Table 1):

| | P1 [W] | Q MAX [l/min – m3/h – gpm] | H MAX [m – psi] |
|---------------|--------|----------------------------|-----------------|
| DIVERTRON 650 | 650 | 100 – 6 – 26.4 | 30 – 52.6 |
| DIVERTRON 900 | 900 | 105 – 6.3 – 27.7 | 45 – 64 |

Table 1

All technical data are marked on the technical label on the pump. The various items are explained below (Fig. 4):

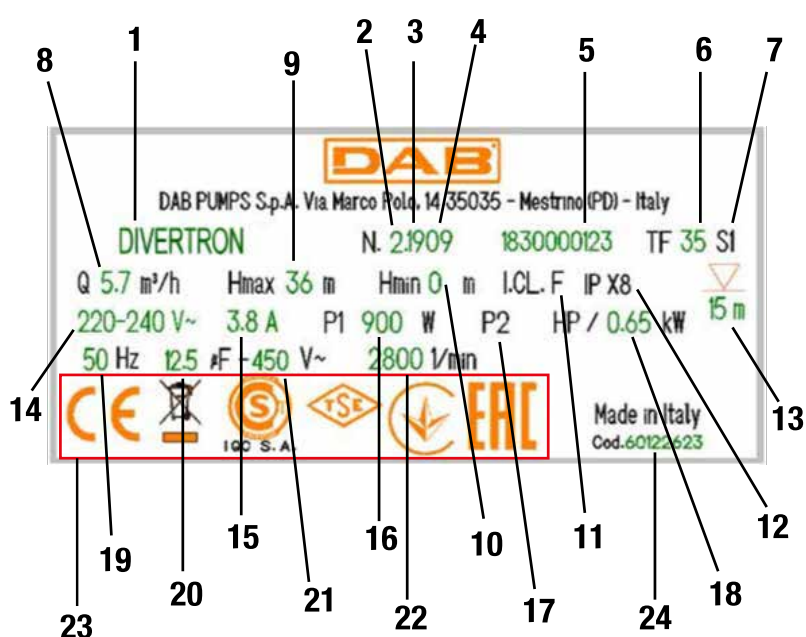


Fig.4 Label

| Pos. | Description |
|------|----------------------------|
| 1 | Description |
| 2 | Revision |
| 3 | Year |
| 4 | Week |
| 5 | Serial number |
| 6 | Maximum liquid temperature |
| 7 | Use |
| 8 | Flow rate |
| 9 | Maximum head |
| 10 | Minimum head |
| 11 | Insulation class |
| 12 | Degree of protection |
| 13 | Submersibility |
| 14 | Rated voltage |
| 15 | Ampere |
| 16 | P1 |
| 17 | P2 HP |
| 18 | P2 kW |
| 19 | Frequency |
| 20 | Condenser capacity |
| 21 | Voltage |

| | |
|----|-----------------------------|
| 22 | Rated number of revolutions |
| 23 | Logos |
| 24 | Pump code |

2 **INSTALLATION**

Before starting up the pump, check that:



The voltage and frequency on the pump's technical data plate correspond to the values of the power supply system.
 The pump's power cable or the pump is not damaged.
 The electrical connection must be made in a dry place, far from any possible flooding.
 The electrical system is provided with a residual-current circuit breaker with $I \Delta n \leq 30 \text{ mA}$ and that the earth system is efficient.
 Any extension cables comply with the regulations in force.

2.1 **Mechanical Installation**



Install the pump in a location that is not exposed to freezing.
 When the pump remains inactive at a temperature lower than 0°C, it is necessary to ensure that there is no water residue which could freeze and damage it.



Hang the pump by passing the rope through the hole provided (see figure 5). Do not hang the pump by the handle.



Do not install check valves near the pump delivery (distance less than 1 metre (3.28ft)). The pump already has a built-in check valve on delivery.

It is recommended to install a small auxiliary tank (Figure 5, A) (0.5 - 2 litres) that can be ordered as an accessory.
 If you want to install an additional non return valve (Figure 5, B), it is recommended to position it downstream from the auxiliary tank.

Do not subject the motor to excessive starts per hour. It is strictly recommended not to exceed 20 starts per hour.

It is advisable to use pipes having a minimum diameter of 1", to avoid the decrease of pump performance.
 The maximum submersibility of the pump depends on the length of the power cable: 12m (39.4 ft) in the case of a cable 15m (49.2 ft) long.
 Check the details on the technical data plate, as shown in figure 3.

In order to always guarantee a good water flow, it is advisable not to exceed the following heights between the service taps and the pump (see figure 6).

| DIVERTRON 900 | DIVERTRON 650 |
|----------------|----------------|
| 20 m (65.6 ft) | 13 m (42.6 ft) |

The pump has an air vent valve (see figure 7). This valve allows the pump to prime in a very short time. If the water level is lower than the valve level, some water may escape from the vent valve.

Installation in a well

Install the pump so that the pump suction is at least 1 m (3.28ft) above the bottom of the well to prevent the intake of sand and impurities. Use rigid metal pipes to hang the pump and secure the pipes with brackets at the top of the well.

Installation in a tank

The minimum dimensions for the pump passage in the collecting tank must be greater than diameter 160 mm (6.7 in).
 Hold the pump slightly up from the bottom so as to avoid possible noises/vibrations transmitted to the tank.
 The pump will make noise if it is placed on the bottom of the tank.



To avoid obstruction of the suction passages, it is recommended to check periodically that no dirt has accumulated in the collection trap (leaves, sand, etc.).

Installation of VERSION WITH FLOAT

The minimum overall dimensions of the pump with float inside a well or tank are as follows:

The minimum recommended distance between the end of the pump float and the wall is 3cm (1.18 in) (see figure 9).

3 FUNCTION

The electronics automatically control starting and stopping (ON/OFF) of the pump depending on the request for water.

The electronics protect the pump from faults in the Non Return Valve (NRV) in the pump casing, which are generally caused by dirt or sand deposits. The deposits may prevent the NRV from closing, even in the absence of water. Adequate maintenance of the NRV is therefore recommended.

The pump is automatically switched off every hour; if everything is normal, the user only notices a very slight drop in pressure lasting a few seconds. If the NRV is blocked, the pump will go into alarm and can be restarted after removing the causes of the obstruction, preferably by disconnecting and reconnecting it to the power supply. However, the alarm stops if the valve is released mechanically.

The electronics protect the pump from dry running, that is without water (see anti-DRYRUN function).

The electronics protect the pump from false starts in the event of water bubbling (see anti-burping function).

In the case of pumps equipped with a float switch, this will prevent restarts due to the software routine.

3.1 Pump start and stop conditions

When water is consumed in the water supply network, the pump starts when the starting conditions are met. This is done, for example, by turning on a tap and lowering the pressure in the system. The pump stops again when the water consumption stops, that is when the tap is turned off.

Start conditions

The pump starts when one of the following conditions is met:

- The flow rate is higher than the minimum flow rate of 2 l/min (0.53 gpm).
- The pressure is lower than the starting pressure (CUT-IN). The cut-in is factory set at 2.4 bar (34.8 psi) for the DIVERTRON 900 model, and 1.8 bar (26.1 psi) for the DIVERTRON 650 model.

Stop conditions

The pump stops with a delay of 10 seconds when:

- The flow rate is lower than the minimum flow rate with pressure above the CUT-IN.
- The pump stops even when there is no water, safeguarding the motor (see ANTI DRYRUN function)

3.2 Pump On – OFF

The pump motor is powered by the electronic control board, located inside the pump body, with an alternating voltage equal to that of the electrical power mains.

The pump power supply is supplied to the motor according to the evolution of the user's requirements and the hydraulic conditions of the system, as described below.

CUT-IN / Flow – Normal operation

Normally (in the absence of alarms and when the pump has been primed) the motor is switched on immediately if the pressure is lower than the cut-in (see paragraph 3.1) or if there is flow. The motor is switched off if the pressure is greater than the CUT-IN and the flow is absent (however, after 10 seconds of permanence in this condition).

Connection to the power mains - first priming of the pump

After connecting the pump to the mains, the pump motor is switched off and the non-return valve is at rest: if this is not the case, the pump stops and the motor will never start (see ANTIFLOOD paragraph).

In the normal case, however, the pump behaves as follows:

- If the hydraulic circuit upstream from the pump has a pressure higher than CUT-IN, the pump motor does not start, the priming is finished regularly.
- If the circuit is not under pressure ($P < \text{CUT-IN}$), the pump motor is started. In this case,
 - If the hydraulic circuit goes under pressure ($P > \text{CUT-IN}$) and there is no flow, for example because the delivery tap is closed, the motor is switched off 10 seconds after starting: the pump is primed.
 - If there is no flow or pressure for 20 seconds ($P < \text{CUT-IN}$), the pump goes into DRYRUN alarm and is switched off: the pump is not primed.
 - Finally, if there is flow, the pump is primed and runs normally.

Anti DRYRUN

If no pressure and flow is detected during normal operation (or during pump start-up) for 20 seconds, the pump will go into DRYRUN alarm and the motor will be switched off.

The pump control electronics will try to restart the pump until the dry running condition, i.e. the absence of flow and pressure, is no longer detected.

These restart attempts will be scheduled as follows:

4 times (PUMP ON 30" + PUMP OFF 5"), the first after 1h, if it fails after a further 5h, if it fails every 24h

The pump electronics have an anti-burping system that prevents false priming due to possible water bubbles.

Version with float

In the case of the DIVERTRON version with built-in float switch, the Anti BURPING and Anti DRYRUN controls are exercised by the float switch itself: float switch ON → the pump operates normally, as described above; float switch OFF → the pump does not activate under any circumstances.

ANTIFLOOD

The pump keeps the motor off for 5 seconds when starting. If hydraulic flow is detected during this period, the motor will be kept off as a mechanical malfunction of the pump shutter may occur.

To avoid the same problem, which would lead to an indefinite start-up of the pump motor (as the presence of hydraulic flow would always be detected), during normal continuous operation, the motor will be switched off every 60 minutes.

If the hydraulic flow does not go to zero, as expected, the pump goes into ANTIFLOOD alarm and its motor will be kept off.

If this alarm is present, the pump must be switched off. Mechanical problems with the non-return valve must be solved. If the valve is still mechanically released, e.g. due to vibration of the pump body, the ANTIFLOOD alarm will be removed.

4 CLEANING STORAGE MAINTENANCE

The pump does not require any maintenance. Frost can damage the pump. In very cold temperatures, remove the pump from the liquid, empty it and store it away from frost. Before any cleaning work is carried out, the pump must be disconnected from the power mains.

Once the pump has been removed from the liquid, it is advisable to clean the following parts with a simple jet of water:

- Filter (open, see figure 1A)
- Suction filter with float, in case of version X (see figure 2)
- Non-return valve. In this case, remove the part concerned as shown in figure 10.

Be sure to reassemble all parts correctly.

5 TROUBLESHOOTING



Before starting to look for faults it is necessary to disconnect the power supply to the pump (take the plug out of the socket). If the power cable or any electrical part of the pump is damaged, the repair or replacement must be carried out by the manufacturer or by their technical assistance service, or by a person with equivalent qualifications, so as to prevent any risk.

| FAULTS | PROBABLE CAUSES | REMEDIES |
|---|--|---|
| The pump does not turn on or does not stay on. | 1. Pump is not powered | 1. Check power supply |
| | 2. No water | 2. Restore the water level |
| | 3. The non-return valve is blocked | 3. Remove obstruction on the non-return valve |
| The pump does not deliver water | 1. The suction grid or the pipes are blocked | 1. Remove the obstructions |
| | 2. The impeller is worn or blocked | 2. Replace the impeller or remove the blockage |
| | 3. The head required is higher than the pump's characteristics | |
| The flow rate is insufficient | 1. The suction grid is partly blocked | 1-2 Remove any obstructions |
| | 2. The impeller or the delivery pipe are partly blocked or encrusted | |
| Pump stops (possible tripping of the thermal safety switch) | 1. The liquid to be pumped is too thick and overheats the motor. | 1-2-3-4 Disconnect the plug and remove the cause that caused the overheating, wait for the pump to cool down and reinsert the plug. |
| | 2. The water temperature is too high | |
| | 3. A solid body is blocking the impeller | |
| | 4. Power supply not in accordance with data plate values | |