

SUBMERSIBLE PUMPS

Type DS, DR, SPV



Owner's manual

Terms of use and installation

SP, SPV, DS, DC, DR have a vertical axis and are monoblock single-impeller pumps designed to work «submerged» in fixed and mobile installation. They are suitable for pumping :

Pump type	Water type	Suspended solids		Minimum suction depth with manual operation
		Quantity (%)	size (mm)	
SP 40 and 60	Clean	<5	<4	15 mm
SP 80 and 100	Clean	<5	<7	20 mm
SPV 80 and 100	Clean / dirty	<5	<15	55 mm
DS 80 and 100	Clean / sewage water	<15	<28	110 mm
DC 80 and 100	Clean / sewage water	<15	<35	115 mm
DC 82 and 102	Clean / sewage water	<15	<50	150 mm
DR 80 and 100	Clean / dirty	<5	<10	45 mm

None of this machines are suitable for pumping liquids with the features below:

- temperatures exceeding 40 °C, density greater than 1000 kg/m³ and kinematic viscosity greater than 1 mm²/s (1 cSt);
- pH lower than 5 or greater than 8;
- chemically and mechanically aggressive substances for the materials of the pump;
- flammable and/or explosive substances;
- features other than those specified for each type of pump.

None of this machines are suitable to be installed in pits, tanks or other areas containing gas and/or with explosion hazards : The maximum depth of immersion (with appropriate cable length) is 5m for SP/SPV/DS/DC/DR.

For continuous operation, in order to allow for proper cooling of the motor, the motor must be completely immersed in the liquid to be pumped (minimum depth of immersion).

To avoid possible damage to the motor-driven pump, the number of equally distributed starts/per hour must be less than :

- 30, for the SP / DS / DC / DR series;
- 20, for motor-driven pumps with a rated power of up to 4 kW;
- 10, for motor-driven pumps with a rated power of up to 5.5-7.5 kW.

The sound pressure, measured in the minimum depth that allows the pump to operate, is less than 70 dB (A) when the pump is submerged the noise disappears.

Installation

The internal diameter of the pipes depends on their length and the flow they need to deliver. To prevent possible obstructions and blockages the speed of the liquid in the delivery pipe must be greater than 0.8-1 m/s; in the presence of sand or suspended particles, the speed must be of at least 1.6 m/s in horizontal pipes and 2.5 m/s in vertical ones: in any case speed must not exceed the rate of 3.5-4 m/s. The delivery pipe should never have a diameter smaller than the diameter of the outlet of the pump. To avoid sedimentation to the stops of the pump, it is best to limit to a minimum the vertical sections of the delivery pipe and install the horizontal sections slightly sloping in the direction of the flow.

The pump must be lifted and transported using the appropriate eyebolt or handle and never using the power cord and/ or of float : if damaged, this may cause of a failure or more serious incidents. -Fig.1

Place the pump, along its vertical axis, on the bottom of the pit or the installation site. Make sure that the pumped liquid does not contain or does not generate explosive gas mixtures: always make sure that the collection tank (pit) is well ventilated and do not allow for gas stagnation.

The size of the collection tank should allow:

- the available volume to limit the starts/per hour of the motor-driven pump: see maximum number of start-ups allowed,
- when the motor-driven pump is not operating, it should not allow the formation of hard sediments.

Fixed installation -Fig.2- :

Fit a check valve on the delivery pipe, preferably in horizontal sections that are easy to access. To be able to remove the pump without draining the system, place a lock gate and a nozzle downstream of the valve, thus allowing for maintenance and cleaning of the valve. In order not to amplify the vibrations typical of any rotating machine, it would be best to have the resting base of the pump fixed firmly to the bottom of the tank; provide for anchoring devices and supports also for the delivery pipe. If the pump needs to operate in sandy and/or muddy conditions, it should be placed a stable base and in any case kept a certain distance from the bottom.

Fixed installation with coupling foot -Fig.3-:

For motor-driven pumps that have this option, proceed as follows :

- secure the coupling foot to the bottom of the tank by means of expansion bolts;
- install the delivery pipe with its check valve and lock gate : to conduct maintenance and cleaning operations on the valve, we recommend installing the lock gate and check valve in horizontal sections with easy access, with the lock gate downstream of the check valve;
- engage the two guide tubes on the coupling foot, fastening them to the top using the pipe guide bracket and their rubber dampers and threaded washers (to ensure the two guide tubes are parallel);
- fix the coupling slide to the pump and with a chain or a rope (made with non-perishable materials) attached to the eyebolt on the cover of the motor, lower the pump down: thanks to the two tube guides, it will fit perfectly into the foot.

This is the most convenient solution for fixed installations because it allows you to easily and quickly extract and the subsequently reposition the motor-driven pump in the tank, allowing you to conduct perform maintenance and cleaning of the pump without having to empty the collection tank or remove any bolt.

Portable installation -Fig.4-:

Always fix a rope or a safety chain made with non-perishable material to the eyebolt or the pump's handle. If using a delivery pipe made with plastic or in general with flexible materials, always use the safety rope to raise, lower, move and anchor the pump. Never use the electric power cord and/or float to support the pump. Always remember to secure the safety rope used to lower the pump at the top, on the edge of the pit or the trap door. Secure the electric power cord to the safety rope or to the delivery pipe with the designated straps: if the delivery pipe is a flexible tube, leave the cable loosened to avoid tension caused by expansion of the pipe under load. It is always preferable, even for portable installations, that during operation the pump is not suspended but is leaning against a solid base.

Electrical connection - Fig 8



The electrical connection should always be conducted by qualified personnel, in compliance with local regulations. Make sure the voltage and frequency of the mains power supply match those reported on the plate of the motor-driven pump. Make sure that the mains power supply has an efficient grounding connection and conducting the grounding of the motor-driven pump. The power cord and/or cable of the float, if any, must never be stressed, stretched or bent with sharp bends. During installation, make sure that the free end of the power cord is never immersed in water and is well protected against possible infiltrations of water or moisture. Special attention should be given to the integrity of the cables: even small leaks can cause infiltration in the electric motor. In case of damage to the cables it is best to replace them rather than repair them: in any case always contact qualified personnel. If using an extension, the junction must remain dry and the cable must be sized appropriately.

The electric motor of single-phase motor-driven pumps (SP / DS / DC / DR) is protected by a thermal breaking device with automatic closing inserted into the winding: before conducting any maintenance and/or repair on the motor-driven pump disconnect it from the mains power supply as if the motor is on standby following intervention of the thermal device or due to incorrect positioning (jamming) of the float, it may suddenly restart. In case of excessive overheating of the motor, the thermal device can stop the machine: the cooling time is about 15 minutes, after which the pump turns on again automatically. You must always try to eliminate the cause that triggered the intervention of the thermal protector (impeller blocked due to foreign objects in the pump, coolant temperature too high).

For all motor-driven pumps, both single and three-phase pumps, it is always necessary to install an adequate electrical protection (adequately set circuit breaker and differential switch with an operating current of less than 30 mA) that can provide an all-pole disconnection from the mains with an opening distance between the contacts of at least 3 mm.

The maximum admitted shift between the actual voltage of the power supply and the rated value indicated on the plate of the motor-driven pump is of $\pm 6\%$ for single-phase machines and $\pm 10\%$ for three-phase ones. Before conducting any maintenance and/or repair disconnect the machine from the power supply.

Start-up -Fig.5-

Before installing the pump, make sure that the machine is not connected to the mains supply and that the rotor turns freely: to do this, act on the impeller (or, in the case of FAR motor-driven pumps, on the rotating part of the grinding system) through the suction outlet. For three-phase motor-driven pumps make sure the rotation direction is correct, i.e. clockwise looking from above of the machine (see the arrow next to the delivery outlet on the motor-driven pump). To do this, before installation, interrupt the motor-driven pump and start the motor for a few seconds (connection and disconnection): if the rotation is correct, the pump rebounds in an anticlockwise direction. When performing this test, make sure that the machine is at a safe distance from people, animals or property. To change the direction of rotation, switch the two phases of the supply line.

There is no need to check the direction of rotation for single-phase motor-driven pumps. DO NOT operate the machine in dry conditions.

Start-up with float : the float switch connected directly to the motor-driven pump starts and stops the pump itself. If necessary, adjust the cable length of the float, making sure that an excessive length does not cause the engine to overheat or run in dry conditions. Make sure the float switch can move freely providing for pits of an adequate size. The size of the pit must always be considered also in relation to the amount of incoming water and the capacity of the pump, in order not to subject the electric motor to an excessive number of starts. Check that the motor-driven pump operates within a rated performance shown on the plaques; otherwise adjust as necessary the lock gates located on the delivery pipe.

Start-up without float : start the pump only when immersed in the liquid to pump out; check the minimum suction depth on the machine installed. NOTE In both start-up methods, with or without float, for continuous operations of the motor-driven pump the electric motor must be completely immersed in the liquid to be pumped.

Maintenance

Any work on the motor-driven pumps must be carried out by qualified personnel with adequate preparation and suitable equipment.

In normal conditions of use they do not require any special maintenance. Disassembly is not recommended, even of individual parts, since any tampering can jeopardise the performance of the machine. If there is a danger of frost, you should empty the body of the pump completely and the delivery pipe, then remove the machine from the water and place somewhere dry. The DS, DC and DR motors have an electric motor and are mechanically sealed when immersed in by biodegradable hydraulic oil (Fina Biohidran SR 38 or similar): pay attention because this oil may be characterized by excess pressure and/or temperature with respect to the external environment. Apart from that, the oil used does not have special risks and does not contain substances harmful to health: in case of direct contact, simply wash the affected area with water.

In the case of operation with muddy liquids or very dirty water, immediately after use or before prolonged inactivity, clean the pump thoroughly by briefly operating with clean water in order to remove residual solids that may clog the impeller and obstruct internal passages. Before starting up the pump again, check that the shaft turns freely, i.e. is not blocked by deposits or other causes and that electrical insulation of the motor and power cord are correct, that the oil is intact and at the right level. During transport and storage to keep its base resting on the relative suction pump, upright and with the cord wrapped around the frame of the motor.

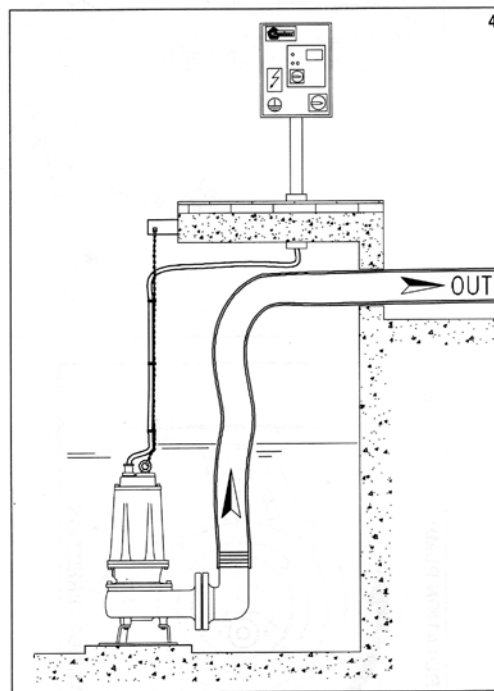
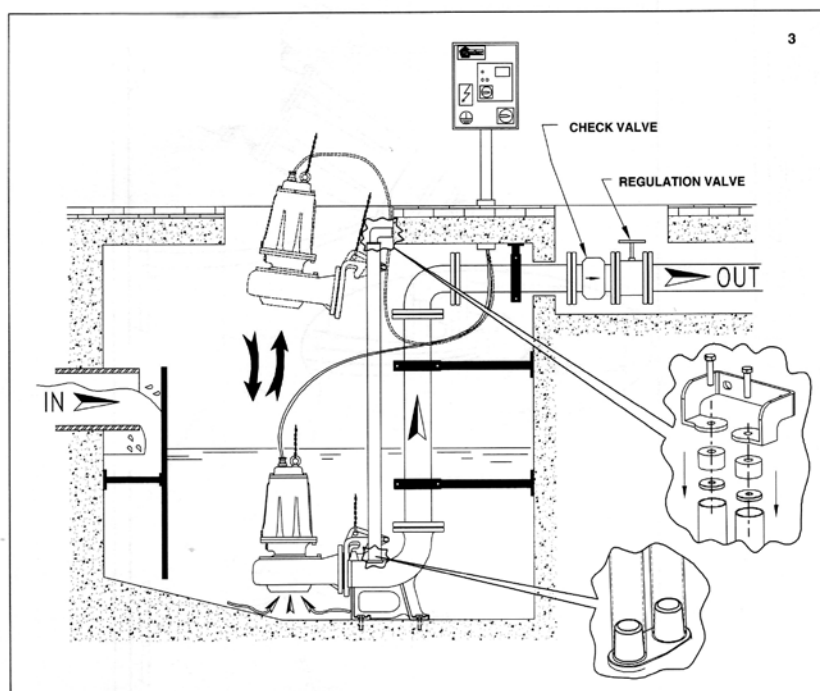
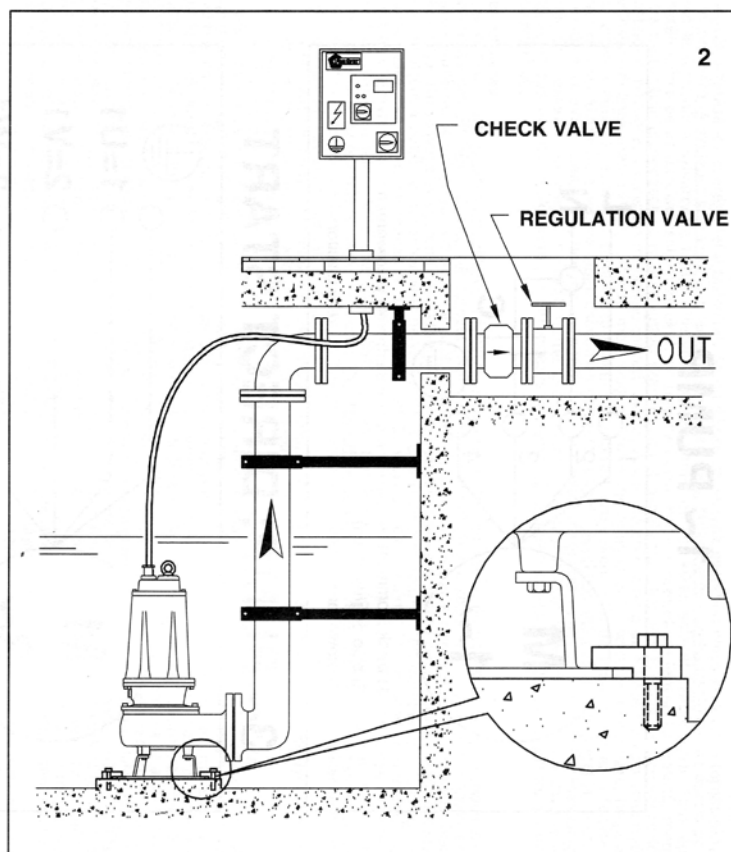
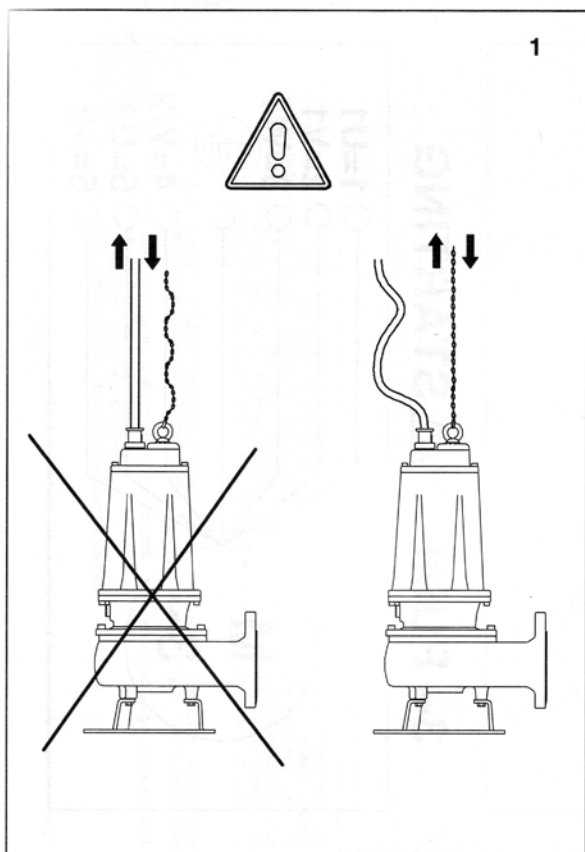


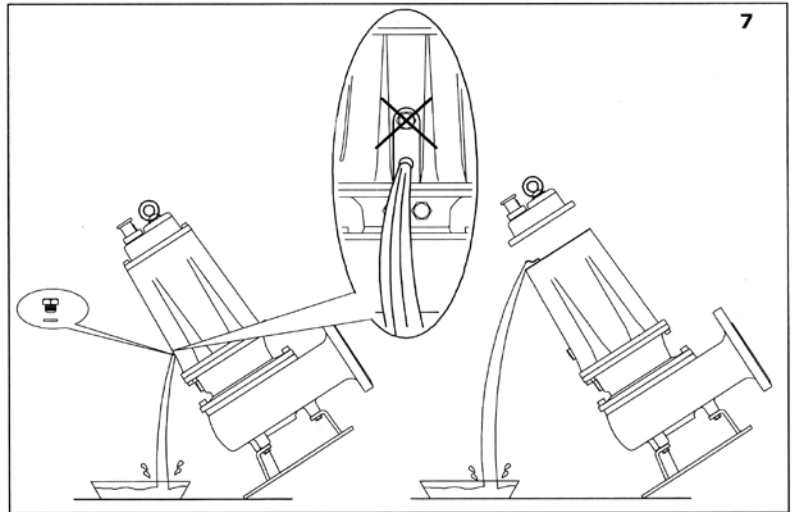
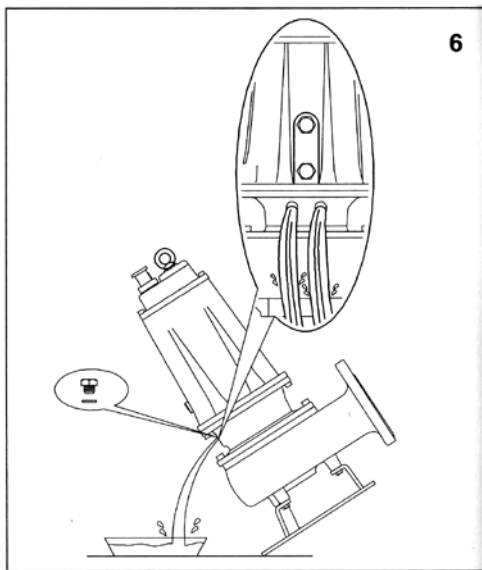
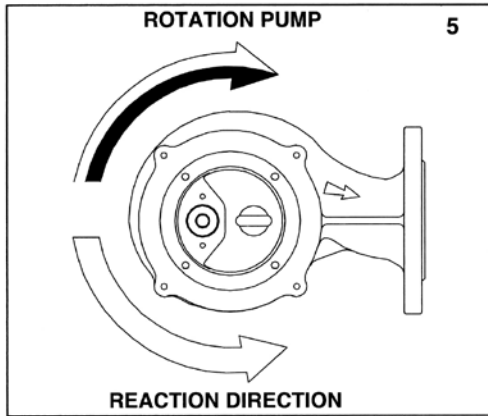
Before conducting an maintenance and or repair disconnect the machine from the sower supply

- Never remove water from the pump when the pump is still running.
- This equipment should not be used by children or retorted people. Only professional person and well trained individuals are intiteled to use such equipment.
- Keep equipment away from the children for their safety.
- Do not use the devise while people are swimming in swimming pools or in the ponds.

Disposal

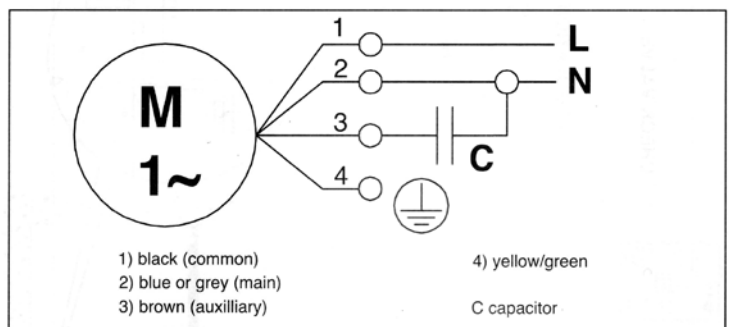
There is no need for special disposal procedures, please refer to local requirements in terms of disposal, recovery, reuse and recycling of materials.



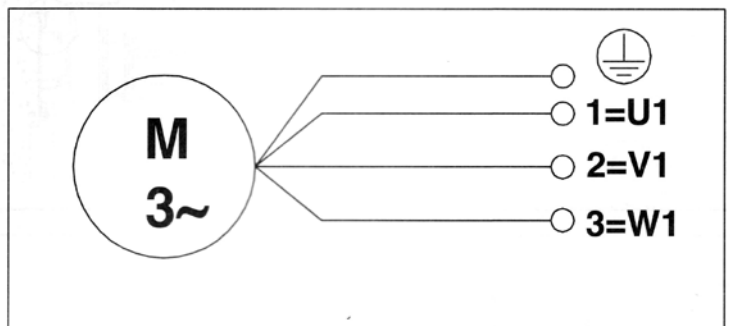


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1~ PUMP



3~ PUMP: DIRECT START



3~ PUMP: Y/Δ STARTING

