Subpack 1000

Booster sets with 2 to 4 Submersible pumps 50 Hz

Lubi

PUMPS•MOTORS

ISO 9001 Company

Pumping Solution

Subpack 1000

BOOSTER SETS WITH 2 TO 4 SUBMERSIBLE PUMPS

INTRODUCTION

Lubi **Subpack 1000** booster sets consist of 2 to 4 identical stainless steel submersible pumps installed in parallel in the water tank with an integrated **LE 1000** series controller.

These pumps are automatically operated according to system requirement by means of pressure switches (one for each pump). The setting of the pressure switches have to be within the optimal performance area of each pump model.

Automatic operation of one or more pumps with VFD control is optional.

Subpack 1000 booster sets are supplied as complete and tested systems including discharge manifolds, isolating valves, non-return valves, pressure gauge and pressure switches.

To ensure stable operation the booster set must be fitted with a suitable hydro-pneumatic diaphragm tank.

APPLICATIONS

Lubi Subpack 1000 booster sets are designed for the transfer and pressure boosting of clean water for community water supply, apartment complex, hotels, hospitals, industries, commercial buildings, schools, bungalows etc.

FEATURES AND BENEFITS

Following are the main features & benefits offered by the Subpack 1000:

- ❒ Since submersible pumps are used on the Subpack pressure boosting system there is no priming requirement or requirement of costly mechanical seals for the pumps. The entire pressure booster system reliability is increased against a similar system of surface mount pumps due to this feature. There is no problem associated with foot valve leakage and mechanical seal leakage and system failure and damage to the pumps due to dry running is eliminated.
- ❒ All pumps are of stainless steel 304 construction which has the following advantages.

  – Operating energy costs are very low due to state-of-theart hydraulic design and usage of stainless steel 304 sheet metal which offers a very low coefficient of friction.

  – Stainless Steel 304 offers wear and corrosion resistance. This also provides a hygienic water supply system for human consumption and also offers a very long life for the pumps. The motors used with the pumps can also be stainless steel 304 at additional cost.
- ❒ Since all the pumps are installed in the water tank this system saves floor space which in turn is beneficial to the customer especially in metro cities where floor space costs are very high.
- ❒ Since all pumps are operating inside the water tank there is no noise or vibration of the pumps and hence offers a quieter installation.
- ❒ The Subpack system is designed so that any single pump can be removed with ease and serviced while the system operation is not affected while the pump is being serviced. This offers a high degree of system uptime to customers.

OPERATING CONDITIONS

Flow range	: Up to 457 m³/h
Pressure range	: 0.7 to 26.4 kgf/cm² (10 to 375 psi)
Ambient temperature	: 0°C to +45°C
Water pH	: 6.5 - 8

MOTOR

Motor type	: Submersible rewindable motor
Ratings	: 1 phase - 0.37 to 1.5 kW per pump 3 phase - 0.37 to 26 kW per pump
Rated speed	: 2900 rpm
Enclosure class	: IP 68
Nominal voltage	: 1 phase - 220, 230 V 3 phase - 380, 400, 415 V
Supply frequency	: 50 Hz
Duty / Rating	: S1 / Continuous
Direction of rotation	: Clockwise as seen from the pump coupling side

FUNCTION

When a tap is opened, water is taken from the hydro-pneumatic tank. Then the pressure drops to the first cut-in pressure, and the first pump is cut in. As the consumption rises, more pumps will be cut in until the performance of the pumps in operation corresponds to the requirement.

When the water consumption falls, the discharge pressure rises to the cut-out pressure and the LE 1000 Controller cuts out one pump.

As the consumption falls, more pumps will be cut out.

Please see fig. 1 which explains how the pumps will operate based on consumption of water.

Example: Subpack 1000 with 3 pumps

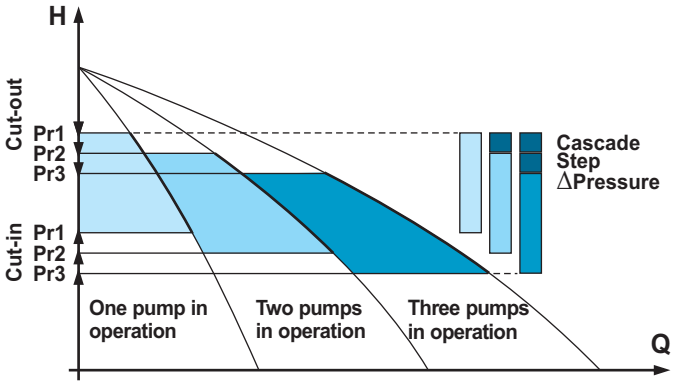

FIG. 1 OPERATION WITH CUT-IN AND CUT-OUT

LE 1000 CONTROLLER FOR 2 TO 4 PUMPS

The Lubi LE 1000 Controller supervises a given number of mains-operated pumps.

The LE 1000 Controller offers the following features/functions:

- ❒ Attractive control box with a dust proof & water proof IP 58 protection & lockable key.
- ❒ Cascade control, only the required number of pumps are in operation at any time.
- ❒ Highly reliable magnetic motor contactors.
- ❒ Single phase prevention & overload motor rotection.
- ❒ Dry run protection & low pressure protection.
- ❒ Delay & minimum run timers to eliminate unnecessary pump cycle.
- ❒ Manual operation.
- ❒ Pump ON & pump Fault indication.
- ❒ Automatic alternation (changeover) of lead pump to ensure equal run time of all pumps.
- ❒ At the heart of the controller is a PLC controller with 5.7” Colour Touch Screen Display (HMI) to programme the Aquapack 1000 system as per the customer site requirement.

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LE 1000V CONTROLLER FOR 2 TO 4 PUMPS

LE 1000V Controller is a premium series state-of-the-art controller which offers all the features mentioned in LE 1000 Controller.

This controller is additionally equipped with a Variable Frequency Drive (VFD) for customer required quantity of pumps. Following are the additional features with VFD Controller.

- ❒ A pressure transducer connected on the discharge manifold, provides a continuous feedback to the VFD to either increase or decrease the speed of the pump, to provide constant pressure during varying flow condition. These means that when demand for water reduces, the pump speed reduces which in turn reduces energy consumption. These feature provides the benefit of lower energy consumption to the customer.

- ❒ The Variable Frequency Drive also provides a smooth, ramp up of speed when the pump motor is started. These drastically reduces the starting current requirement for the pump motor. It also reduces wear and tear on motor bearings & pump rotating components.

LE 1000V Controller also provides a special feature which is called “Zero Flow/Demand” to avoid unnecessary running of pump motor at very low speeds. Whenever there is no demand of water there is a small leakage loss thru faucets which is detected by the controller and it shuts down the pump motor to save energy. When the pump motor is shut down the leakage losses as mentioned above are supplied by the water from the hydro pneumatic tank. Once the pressure in hydro pneumatic tank falls below a preset condition, the controller will start one of the pump shortly to boost up the pressure in the hydro pneumatic tank.

When the usage of water increases, again the controller will detect this and will start operating in a normal condition.

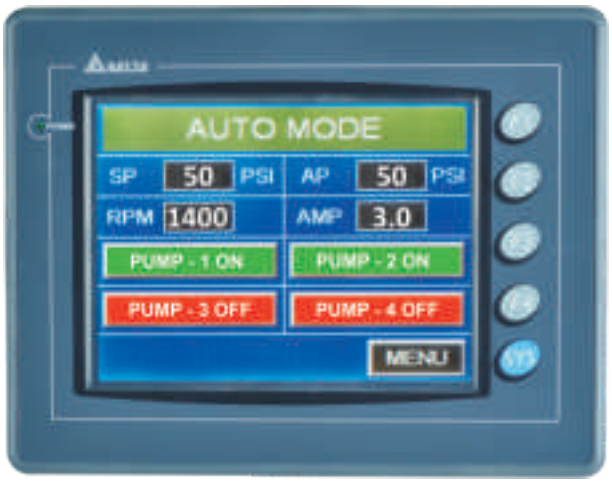

FIG. 2 LE 1000V CONTROLLER DISPLAY FOR 2 TO 4 PUMPS

PROTECTION

A float switch in the water tank is used as dry-running protection. When the water level or pressure has been restored, automatic or manual resetting is possible.

TIME CONTROL

To adapt the booster set operation to the actual conditions, the following settings can be made with the touch screen display:

Start-up delay : Prevents simultaneous start-up of all pumps.

Stop delay : Prevents simultaneous stop of all pumps.

After-run delay: Keeps pumps in operation for few seconds, after cut-out pressure is reached.

Time control is particularly convenient to reduce the number of starts and stops per hour and to prevent water hammer as well as other problems that can arise under certain conditions.

PUMP

The submersible pumps used in the system are completely made out of fabricated stainless steel 304 sheet metal. They are multistage pumps with a suction strainer and a non-return valve. All bearings are made out of rubber and are water lubricated.

Non-return valve

All pumps are equipped with a reliable non-return valve which prevents back flow in connection with pump stoppage.

Furthermore, the short closing time of the non-return valve means that the risk of destructive water hammer is reduced to a minimum.

The valve casing is designed for optimum hydraulic properties, to minimize the pressure loss across the valve and thus contributes to the high efficiency of the pump.

Bearings with sand channels

All bearings are water-lubricated and have a squared shape enabling sand particles, if any, to leave the pump together with the pumped liquid.

Stop ring

The stop ring prevents damage to the pump during transport and in case of up-thrust in connection with start-up.

The stop ring, which is designed as a thrust bearing, limits axial movements of the pump shaft.

The stationary part of the stop ring is secured in the upper intermediate chamber. The rotating part is fitted above the split cone.

Inlet strainer

The inlet strainer prevents particles over a certain size from entering the pump.

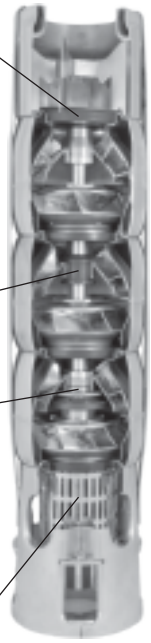

FIG. 3 STAINLESS STEEL SUBMERSIBLE PUMP

MOTOR

The submersible motors used in the system are rewindable, maintenance free motors. They have water or oil lubricated radial and axial thrust bearings. The electrical design of the motors are highly efficient with lower temperature rise. They can withstand frequent starts and stops and are robust in construction. Submersible motors made completely out of stainless steel 304 can be offered at extra cost.

Ratings	: 1 phase - 0.37 to 1.5 kW per pump (0.5 to 2 HP per pump) 3 phase - 0.37 to 26 kW per pump (0.5 to 35 HP per pump)
Rated speed	: 2900 rpm
Enclosure class	: IP 68
Insulation class	: F (Oil Filled motors)
Nominal voltages (Tolerance +6% / -10%)	: 1 phase - 220, 230 V 3 phase - 380, 400, 415 V
Supply frequency	: 50 Hz

CONSTRUCTION

Subpack 1000 is provided with support pipes which have to be grouted right on the top of the water tank. The pumps are then suspended in the tank and then connected with a discharge manifold which will have all the non-return valves, isolating valves, pressure gage and pressure switches or sensors.

The Control cabinet can be floor or wall mounted based on the customer requirement.

The hydro-pneumatic diaphragm tank is connected to the discharge manifold.

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SYSTEM COMPONENTS

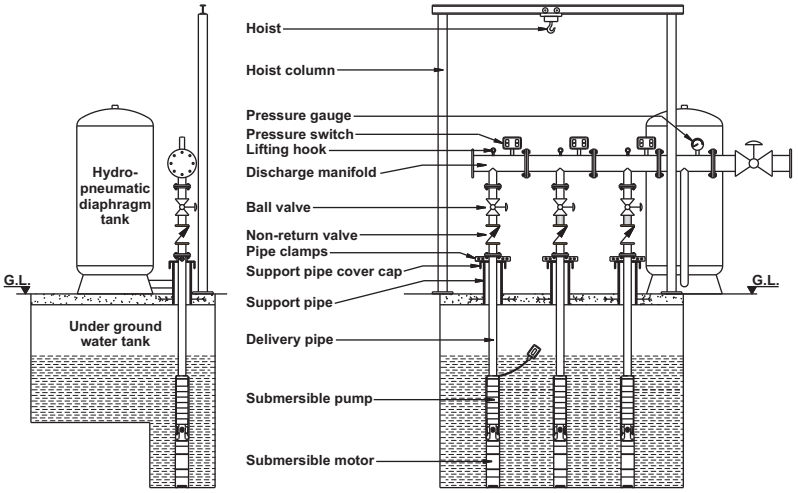


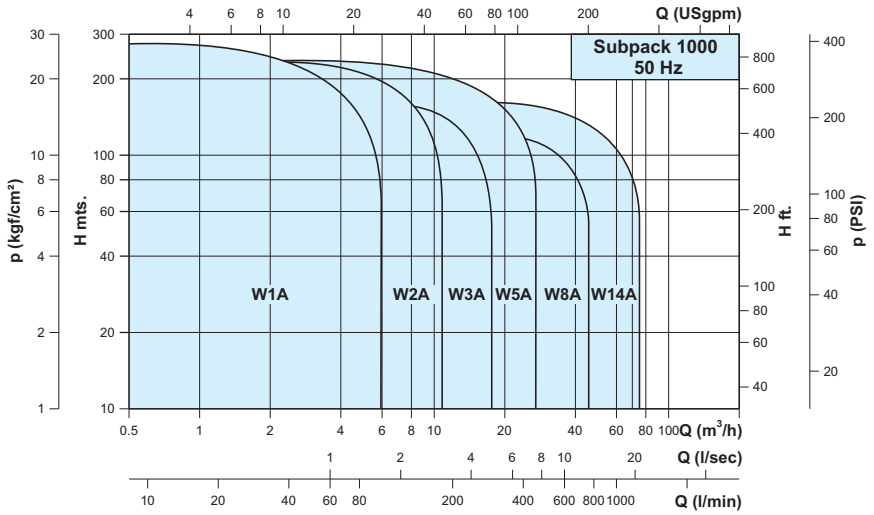
FIG. 4 SYSTEM COMPONENTS

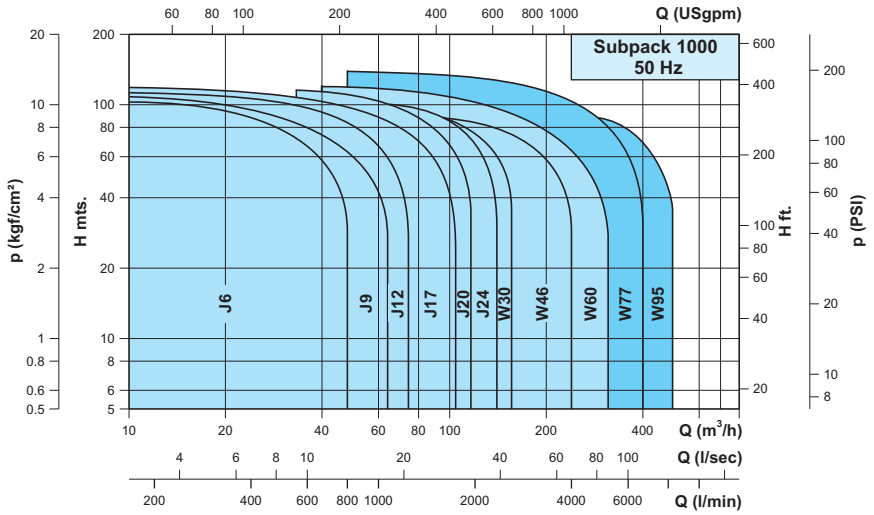
Please see the fig. 4 which shows the general arrangement of the Subpack 1000 system with all its components.

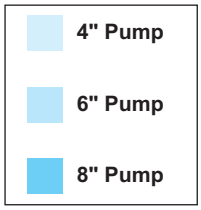
DESCRIPTION	QTY.	MATERIAL
Pressure gauge	1 per system	-
Pressure switch	1 per pump	-
Discharge manifold	1 per system	Galvanized steel*
Ball valve/Butterfly valve	1 per pump	Brass/Cast iron
Non-return valve	1 per pump	Brass/Cast iron
Support pipe cover cap	1 per pump	Galvanized steel
Support pipe	1 per pump	Carbon steel
Delivery pipe	1 per pump	Galvanized steel
Submersible pump	2 - 4 per system	Stainless steel
Diaphragm tank	1 per system	-

* Copper or stainless steel AISI 304 is available on request.

PERFORMANCE RANGE







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