Aquapack 1000

# Booster sets with 2 to 4 LCR pumps 50 Hz

Lubi ® ©

Passion for Pumps™


Pumping Solution

# Aquapack 1000

## BOOSTER SETS WITH 2 TO 4 LCR PUMPS

## INTRODUCTION

The Lubi **Aquapack 1000** booster sets consist of 2 to 4 identical vertical multistage (LCR) pump mounted in parallel on a common base frame, control cabinet with motor protection and 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.

Aquapack 1000 booster sets are supplied as complete, preassembled and tested systems including suction and 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 diaphragm tank.

## APPLICATIONS

Lubi Aquapack 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, etc.

## FEATURES AND BENEFITS

The state-of-the-art features introduced into this new vertical multistage pump generation offer the following benefits:

- ❒ **High efficiency** — Minimized energy cost
- ❒ **Low NPSH** — Improves suction capability
- ❒ **Air handling** — Reduces risk of dry-running
- ❒ **Spacer coupling** — Allows easy disassembly of motor from pump (for 11 kW motor onwards)
- ❒ **Sleeve sealing** — Provides high resistance to pressure pulses and withstands temperature fluctuations as well as external forces
- ❒ **Tungsten carbide bearings** — Wear resistance, improved dry-running capability and handling of thermal shocks enable longer operating time
- ❒ **Reinforced shaft lock ring** — Strong axial locking force and high torque lock system enable robust and reliable operation of rotating assembly

## OPERATING CONDITIONS

| | |
|---|---|
| Flow range | : Up to 232 m³/h |
| Operating pressure | : Max. 16 bar |
| Ambient temperature | : Max. + 40°C |
| Liquid temperature range | : 0°C to +90°C |
| Maximum suction lift (H) | : The maximum suction lift (H) can be calculated as follows: H = 10.33 m - NPSH of the pump - other suction losses - a safety margin of 0.5 metres |
| Maximum inlet pressure | : 6 bar |

## MOTOR

| | |
|---|---|
| Motor type | : TEFC 2-pole motor |
| Ratings | : Up to 30 kW per pump |
| Rated speed | : 2900 rpm |
| Nominal voltage | : 3 phase 400 V |
| Supply frequency | : 50 Hz |
| DOL starting | : Up to 7.5 kW |
| SD starting | : 11 to 30 kW |
| Direction of rotation | : Anticlockwise as seen from the motor rear end |

## OTHER VERSIONS ON REQUEST

The following versions are available on request:

- ❒ Booster set with jokey pump
- ❒ Booster set with LCRI 2, 3, 4, 5, 10, 15, 20 pumps
- ❒ Different material combination - see chapter System components
- ❒ Single-phase power supply: 1 x 230 V, 50 Hz
- ❒ Three-phase power supply: 3 x 230 V, 50 Hz
- ❒ Starting configuration other than standard
- ❒ 60 Hz

## FUNCTION

When a tap is opened, water is taken from the diaphragm 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: Aquapack 1000 with 3 pumps

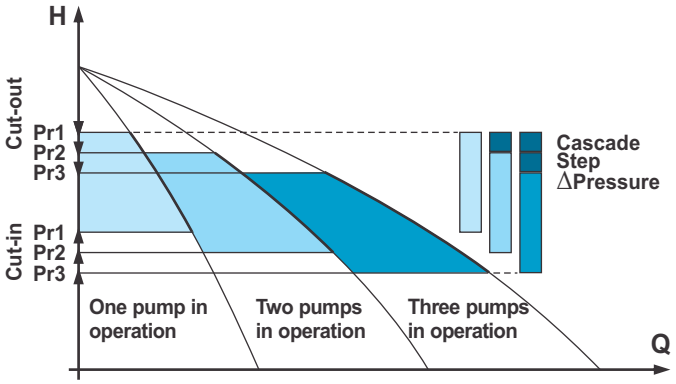



**FIG. 1** OPERATION WITH CUT-IN AND CUT-OUT

## 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.

# Aquapack 1000

## BOOSTER SETS WITH 2 TO 4 LCR PUMPS

## 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 pressure switch or a level switch at the suction side can be 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, to prevent water hammer and negative pressure in the suction manifold as well as other problems that can arise under certain conditions.

## PUMP

The LCR pumps are non-self-priming, vertical multistage centrifugal pumps. The pump consists of a base and a pump head. The chamber stack and the outer sleeve are secured between the pump head and the base by means of tiebolts. The base has suction and discharge connections on the same level (in-line). All pumps are equipped with a maintenance-free mechanical shaft seal.

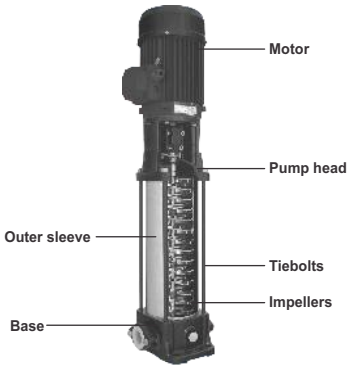



**FIG. 3** LCR PUMP

## MOTOR

These pumps are fitted with a Totally Enclosed Fan Cooled, 2-pole motor with principal dimensions in accordance with the EN/IEC and DIN standards.

Electrical tolerances according to EN 60034/IEC 34.

**Motor protection**
All motors are protected by the control panel of the booster set.

Three-phase motors from 3 kW upwards have a built-in thermistor (PTC) according to DIN 44082.

Single-phase motors have a built in thermal overload switch.

Mounting designation: Up to 4 kW - V18 and From 5.5 kW - V1
Enclosure class : IP 55
Insulation class : F
Efficiency class : EFF 2
Nominal voltage : 3 phase, 220-240/380-415 V - 0.37 to 3 kW
(Tolerance ±10%) : 3 phase, 380-415 V - 4 to 30 kW
Supply frequency : 50 Hz

## SHAFT SEAL

The operating range of the shaft seal depends on operating pressure, pump type, type of shaft seal and liquid temperature. The following table apply to clean water and water with anti-freeze liquids.

| SHAFT SEAL | DESCRIPTION | Max. temperature range [°C] |
|---|---|---|
| BBQE | Bellow type shaft seal, Carbon/Sic/SS 316/EPDM | -40°C to +120°C |
| BBQV | Bellow type shaft seal, Carbon/Sic/SS 316/FKM | -40°C to +120°C |
| HQQE | Cartridge type shaft seal, Sic/Sic/SS 316/EPDM | -40°C to +120°C |
| HBQE | Cartridge type shaft seal, Carbon/Sic/SS 316/EPDM | 0°C to +120°C |
| HBQV | Cartridge type shaft seal, Carbon/Sic/SS 316/FKM | 0°C to +90°C |
| HQQV | Cartridge type shaft seal, Sic/Sic/SS 316/FKM | -20°C to +90°C |

## CONSTRUCTION

Aquapack 1000 is built up on a common base frame. The pumps are fixed to the base frame by means of bolts. The control cabinets are divided into three groups based on construction.

- ❒ Systems with the control cabinet mounted on the pump base frame.
- ❒ Systems with the control cabinet mounted on a separate base frame.
- ❒ Systems with the control cabinet without a base frame, therefore suitable for floor mounting.

A discharge manifold is mounted on the discharge side of the pumps. An isolating valve and non-return valve are mounted between the discharge manifold and the individual pumps. The non-return valve may be mounted on the suction side on request.

A suction manifold is mounted on the suction side of the pumps. An isolating valve is mounted between the suction manifold and the individual pumps.

# Aquapack 1000

## BOOSTER SETS WITH 2 TO 4 LCR PUMPS

## SYSTEM COMPONENTS

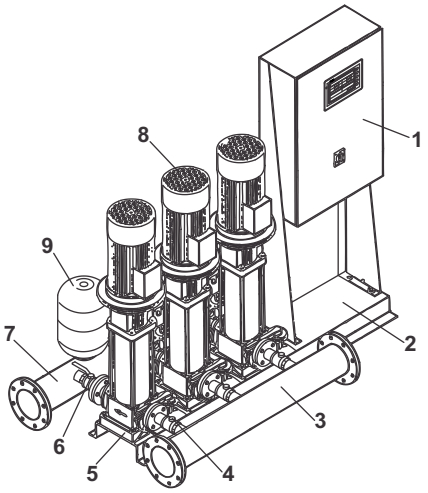
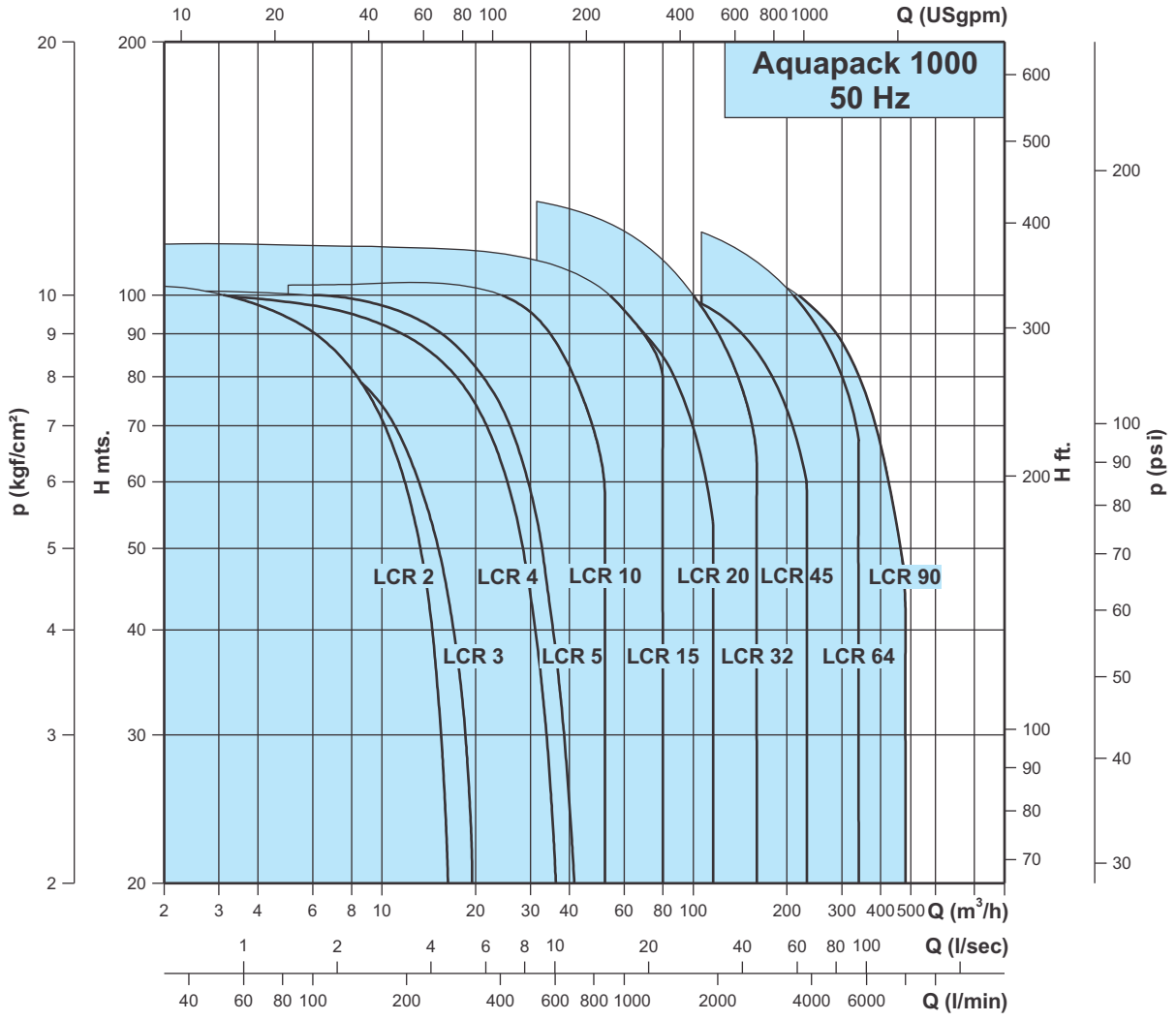



FIG. 4 SYSTEM COMPONENTS

| POS. | DESCRIPTION | QTY. | VERSIONS | | |
|---|---|---|---|---|---|
| | | | "G" | "L" | "N" |
| 1 | Control panel | 1 | Metal, painted | Metal, painted | Metal, painted |
| 2 | Panel stand | 2 | Galvanized steel | Galvanized steel | 1.4301 (AISI 304) |
| 3 | Suction manifold | 1 | Galvanized steel | 1.4301 (AISI 304) | 1.4401 (AISI 316) |
| 4 | Isolating valve | 2 per pump | Brass NiCr- plated or cast iron | Brass NiCr- plated or cast iron | 1.4401 (AISI 316) and cast iron |
| 5 | Base frame | 1 | Galvanized steel/Painted | Galvanized steel/Painted | 1.4301 (AISI 304) |
| 6 | Non-return valve | 1 per pump | Brass NiCr- plated or cast iron | Brass NiCr- plated or cast iron | 1.4401 (AISI 316) |
| 7 | Discharge manifold | 1 | Galvanized steel | 1.4301 (AISI 304) | 1.4401 (AISI 316) |
| 8 | Pump | 1-4 | LCR | LCRI | LCRN |
| 9 | Diaphragm tank | 1 | As per customer requirement | | |

## PERFORMANCE RANGE





**LUBI INDUSTRIES LLP**

Near Kalyan Mills, Naroda Road, Ahmedabad-380 025, INDIA.
Phone : +91 - 79 - 61700100, Fax No. :+91 - 79 - 61700399.
**Sales Enquiries:** indsales@lubipumps.com, expsales@lubipumps.com
**www.lubipumps.com**


ISO 9001 ISO 14001

*Product Improvement is a continuous process at 'LUBI'. The data given in this publication is therefore subject to revision.*


04.00.050517.0107


**Customer Care Number : 09824200800**