

Sales Application Note

Drinking Water Supply

APPLICATION

Water is a vital element in each of our lives. Not only is it essential to our health, but we also use it for numerous household tasks. In our daily life water is used for cooking, bathing, cleaning and drinking.



As leaving areas become more populated, the increasing demand for reliable and precise pressure control becomes a challenge to many communities. FRENIC-AQUA, the specific Fuji Electric inverter for pumping applications, has innovative pumping functions to assist in maintaining precise pressure and flow while reducing system leakage and energy consumption. In many cases, it can also provide a cost-effective alternative to water towers.

APPLICATION REQUIREMENTS

The target of a pressure control system is to provide a variable flow with a constant pressure for the water system of an apartment building, machine refrigeration systems, mixing liquids in chemical industry, etc.

A very typical example is to provide the water supply for a residential building. In this case, the flow (water consumption) is greater in the morning than during the night. A peak water demand may be seven to eight in the morning, when most of people are taking the shower for going to work or school. In the other hand, demand is almost zero when people sleep. The pressure control system must be able to provide, at the same pressure, both types of consumption, during daytime higher flow, at night almost no flow; in addition, the system has to adapt to the demand variations that occur normally in this kind of application, for example, when people turn on and off many taps at the same time.

FUJI ELECTRIC SOLUTION

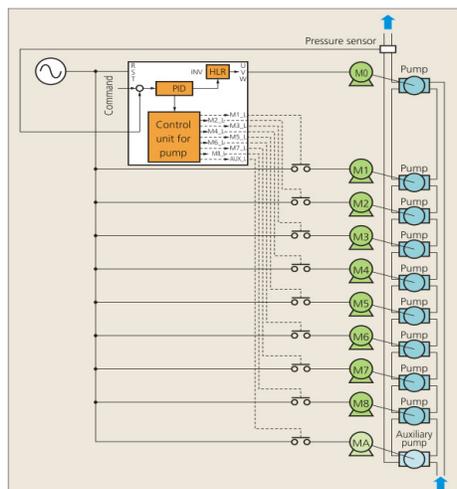
FRENIC-AQUA makes a step forward on user-friendliness and functionalities created for use in pump applications. We have used our extensive experience in the field to handpick all the features that are best suited to application requirements and putting them in one dedicated product. For instance, no external controller is needed, as inverter includes all basic functions like PID control (by means of pressure feedback sensor) to keep pressure on the system.

A PID control is a regulation system involving the set value (SV - pressure command) and a process value (PV - Feedback, measure of real pressure or flow from a transducer). From these two values the difference, or error, is calculated, subtracting one from the other. The PID control then adjusts its output demand (MV - pump's speed) in order to minimize the error.

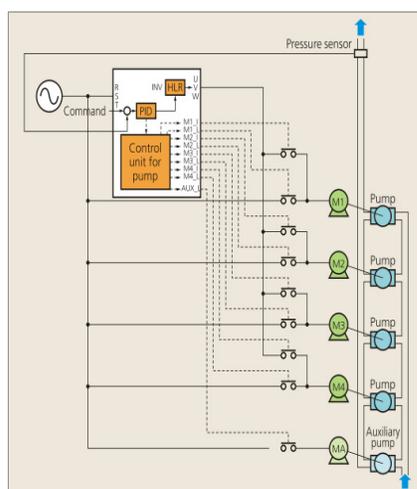


ADVANTAGES OF FUJI ELECTRIC SOLUTION

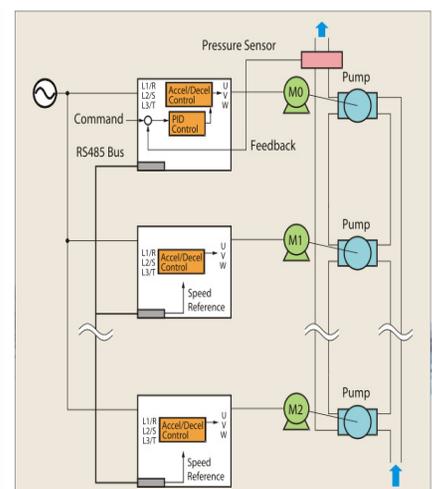
- Full power range on 3-phases 400 VAC power supply from 0,75 to 710 kW. Built-in EMC filter and DC-reactor and IP55 enclosure available on capacities from 0,75 to 90 kW.
- Multifunction LCD keypad with multiple user units built-in
- Stop function due to low water flow (Sleep Function) for energy saving and pump lifetime
- Start-up function because of water demand (Wake-up Function)



Control of multiple pumps on 1 regulated pump + auxiliary pumps topology (Mono-regulated pump Control)



Control of multiple pumps on multi regulated pumps topology (Multi-regulated pump Control)



Control of multiple inverters without external controller. Mutual regulated pumps topology (Mutual-regulated pump Control)

- Operation limits (current, voltage and frequency) to protect the motor and the pump
- Pipe fill mode allows a controlled filling of pipes. Prevents water hammering and bursting water pipes, or blowing off sprinkler heads.
- Pressure sensor disconnection detection
- End of Pump Curve to detect breaks and leakages.
- Dry Pump Protection ensures lowers maintenance costs preventing pumps working when no water is in the system.
- Motor alternation prevents the pump from sticking. Additionally, an internal timer assures equal usage of the pumps
- Gradual deceleration time for check valve protection
- “By-pass” sequence integrated
- Several field buses available for remote control and monitoring:
 - Built-in: BACnet MS/TP, Modbus RTU, Metasys N2
 - Optional: LonWorks, Ethernet, Profibus, DeviceNet, CANopen, CC-Link