



Non contractual photo

SERVICE : 3 X 380 V 50 HZ - 16 A WATER SUPPLY.

DIMENSIONS : 1800 X 700 X 2000 MM

WEIGHT : 220KG

REFERENCE : SPH400

This product, conceived in collaboration with teachers, allows to cover a number of themes rich in automatism notably in the teaching sections in electrical engineering and maintenance of automated systems. The SPH400 Dedicated Pump Station is a scaled replica of a small city distribution network and surrounding countryside that is powered by a water storage tank.

This system was chosen because: the variable number of users, the very strong fluctuations in the water reserves collected, especially in summer, a large water reserve because the installed capacity of the system can not meet this high demand for flow during these periods. It is desired to model the rural pumping station comprising: a well in connection with the water table; a buffer tank; A water tower The dewatering pump pumps into the water table and fills a buffer tank. Three pumps take this water and fill a water tower. Three solenoid valves placed on the water tower simulate household consumption with a return of water to the tank.

Technical specifications :

The "well" consists of a tank with a manual drain valve located at the lowest point of the system.

The dewatering pump consists of a centrifugal pump driven by a three-phase asynchronous motor cage, itself controlled by a variable speed drive U / f (power = 0.75 kW).

The transparent buffer tank is equipped with an analog level sensor which, in conjunction with the industrial programmable logic controller and the U / f drive, provides a PID control of the water level in the buffer tank. In addition, two on-off sensors control the min levels. and max. of this buffer tank. A pipe with a manual ball valve connects the buffer tank to the "well". This pipe allows a discharge rate greater than the flow of the dewatering pump.

From this buffer tank, three centrifugal pumps driven by three three-phase asynchronous cage motors fill the transparent water tower.

Household consumption is modeled by three solenoid valves allowing manually by pressing three push buttons or automatically by the programmable logic controller, to simulate the different consumption regimes by return of the water of the "water tower" at the "well". These three solenoid valves are placed on 3 pipes of different sections to find 7 different flow rates by combinations of the three solenoid valve controls.

The water tower is equipped with three all-or-nothing sensors. Two to capture the min levels. and max., the third for the average nominal level. The latter makes it possible to maintain a level ensuring sufficient hydrostatic pressure in the distribution network. Depending on the household consumption (1, 2 or 3 solenoid valves supplied) 1, 2 or 3 repeating pumps will be started. The automation is controlled by a compact industrial PLC. A communication module is installed and allows the dialogue with a PC over serial link. The diagnostics, setpoints and maintenance messages are sent on a "liquid crystal" type display with 2 message lines.

The compact industrial programmable logic controller is equipped with a PID control unit. The system is equipped with all the safeties to ensure safe operation and maintenance. This bench complies with standard C.E. The control components of the system (programmable logic controller, pre-actuators, etc ...) are placed in a metal cabinet

located so as to allow easy interventions safely. The system is equipped with wheels (with lock) allowing its movement.

a) Operative part

Mobile chassis incorporating :

- 1 water catchment well (capacity 130 liters)
- 1 catch basin (capacity 60 liters)
- 1 water tower (capacity, 60 liters)
- 1 dewatering group (stainless steel centrifugal pump, flow rate 5 m³ / h, 0.75 kW)
- 3 recovery units (stainless steel centrifugal pumps flow 1.5 m³ / h, 0.37 kW)
- 1 analog flow sensor and a pressure gauge on the dewatering system circuit
- 5 digital level sensors
- 1 analog level sensor
- 3 electro-valves

b) Control part

An electrical cabinet integrating :

- An M241 programmable controller with analog and digital outputs and inputs, a PID control block, 2 communication interfaces
- A terminal operating dialogue terminal with 2 display lines, 20 characters, communication with the PLC on the serial line, UNI-TELWAY protocol, keyboard 12 function keys, 10 service keys and 12 numeric keys. Programming done on several application pages and alarm pages
- A digital frequency converter
- Devices for supply and protection of the installation

OPTIONS :

Supervision software: This software has been designed for dialogue with the programmable controller of the pumping station, in addition to the existing operator dialogue terminal. A special effort has been made to ergonomics to allow a quick and intuitive understanding of the machine by the student during practical work. Moving the mouse over the mimic displays a tooltip giving more details about the chosen item. The analog and logical variables (the level measurement, the output of the PID block, the state of the pumps, etc.) are stored in the form of files that can be consulted later. The "curve" window is equipped with a zoom and a pointer displaying the coordinates of the curves. Grafcet: This screen displays the animated grafcet of the automatic tank cycle as well as a chronogram with the logic states of the pumps, solenoid valves and tank level detectors. Alarms: The alarms present are displayed as a list and must be acknowledged by the operator. This screen also allows you to view the history of alarms and events.