

# Monitoring Water Consumption CTQ and Horner's X4 and Cscape Software



# Water Consumption Project, Monterrey, Nuevo León, Mexico

## OPPORTUNITY

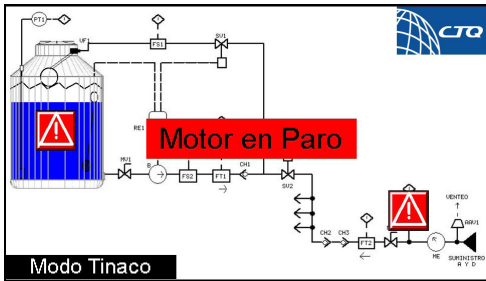
With the shortage of water lately in Monterrey, NL, awareness about water consumption has been increasing. Also, it has been detected that providers are charging when water is not actually being supplied. Air passes through the meter instead of water, which causes the consumer to be charged for water they are not receiving.

The goal is to monitor, control and archive the water consumption process of a house. This refers to being able to read the water level in the tank and the pressure levels in the supply pipe. To keep track of accumulated and instantaneous fluid in and out, have an alarm log, a data file and control valves and motors to open or close the process.

## CHALLENGES

To achieve the objective, it is necessary to be able to read flow sensors with a calibration function for a more accurate reading and to be able to change them when required without affecting the process. It is also necessary to be able to display the accumulated and instantaneous flow of these sensors in a numerical value and animated visualization.

Another point to overcome is to have both a numerical and graphic representation of the reading of analog inputs with values of 4-20 mA and to convert this reading to its real representation, depending on the sensor, whether it is the level of the water in the tank (0-2 meters) or the water supply pressure (0-100 PSI). In addition, it is necessary to have an electrical control to close or open the system, a datalogging to see the historical data and a remote control to see and modify the process in real time.



Water & Pressure Level Flow Chart



Horner X4 & Cscape Software





### Agriculture

- Reduce energy consumption
- Increase overall productivity

### Building Automation

- Improve occupant comfort
- Economical operation systems

### Material Handling

- Minimize HMI inefficiencies
- Track/log/catalog data

### Oil & Gas

- Maximize capacity utilization
- Maintain emission standards

### Renewable Energy

- Data logging, remote access
- Sunlight and UV protection

### Water/Wastewater

- Station pump control
- Remote water well controls

## SOLUTION

For the project solution it was decided to use a Horner Automation controller, specifically an OCS from the Micro Series. An X4 was chosen due to the required size. We decided to use this equipment because it has digital inputs, analog inputs, digital outputs, HSC, a 4" touch screen and an ethernet port for remote control and remote data extraction, as well as a slot for a microSD card to extract the data physically.

The Cscape software was used to design the HMI interface in which it shows the numerical data, the graphs, and a visual representation of the process. Cscape was also used to program the PLC in Advanced Ladder. With this, the function logic that was implemented was intended to activate or deactivate the digital outputs depending on what is being read in the digital and analog inputs.

The fluid sensors were connected to the HSC. This was configured in frequency and in this way, by adding a mathematical relationship from Hz to L/s, the accumulated and instantaneous fluid could be represented. By configuring the analog inputs as 4-20mA, data is recorded as counts from 0-32,000, adding a scaling function that could represent water level and supply pressure values.

Thanks to the datalogging and alarms function of the controller, historical archives of the process can be created. Also, the WebMI function of Horner Automation offers remote control.

