Lab 3 - Soda Drink Production - Wago -

GreEn-ER Industrial Control systems Sandbox (G-ICS)
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Introduction

During this lab, you will learn autonomously how to program a complex application using *Grafcet*, *Ladder*, and *Structured Text*. This training will be accompanied by videos about each part of the lab. A detailed correction will be distributed at the end of the training.

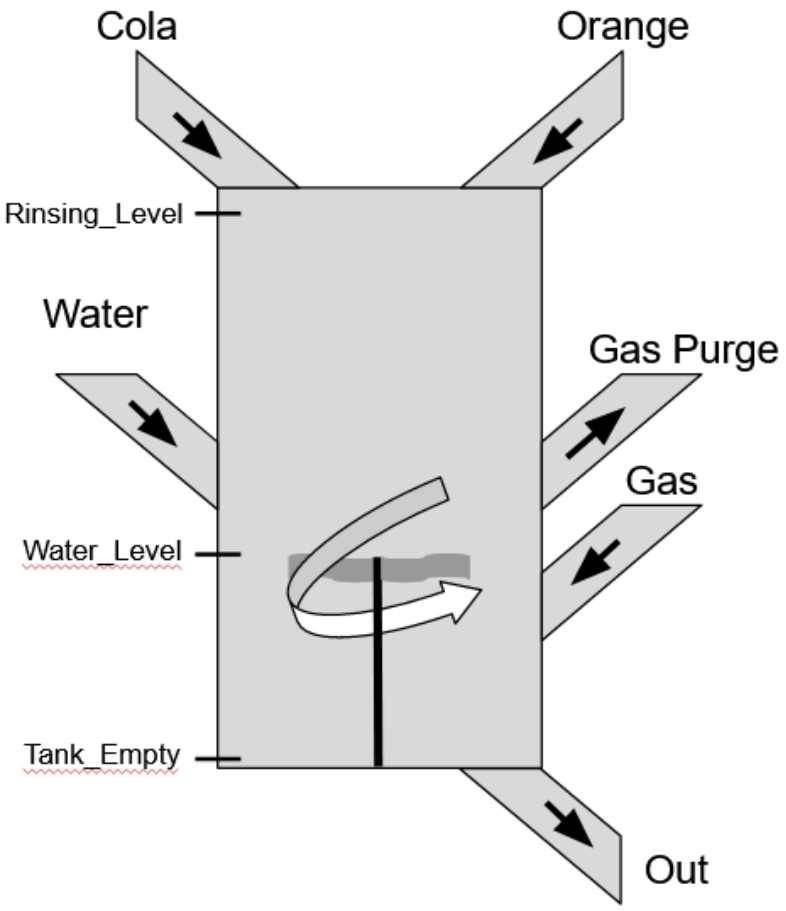

Figure 1 : Scheme of the process

Work to do

During this lab, you will work on an example of the management of a liquid tank. You have to implement a process that will create a soda drink in a tank. The user can choose between two different syrups (cola and orange) with a switch. When the mode is changed, the production cycle will finish. Then during the syrup changing, the tank must be rinsed with the water. When the rinsing is done, the process is functioning with the other syrup.

To verify the functioning of the process, you will create a HMI with a diagram of the production tank. You can see a diagram of the process on figure 1 just above.

Control specifications

Normal Process Cycle

In the normal process cycle, this is what the user see of the process :

1. Choose the syrup
2. Launch the process by turning on a switch
3. The tank is filled by the syrup for 4s
4. The tans is filled up to the status of "*Water_Level*" and in the same time the mixer is turned on
5. The gas is added into the liquid up to a predefined pressure level (a manometer could monitor it)
6. The tank is depressurised (gas purge)
7. The outlet valve is opened and then the liquid will flow out
8. When the tank is emptied, a new cycle will begin automatically

Rinsing Process Cycle

At **any** moment you can change the syrup with a switch button. Here is what the user see :

1. The user change the syrup (at **any** moment in the cycle process)
2. The cycle ends normally
3. Instead of a new cycle, the tank is filled up to the status of "*Rinsing_Level*", and the mixer is running in the same time
4. When the level is reached, the mixer will run again for 10 seconds
5. The tank is emptied and a new syrup cycle begins

Hints

You should start by preparing the program you want to do on a sheet of paper. After that, you could do the standard functioning mode before implementing the 2-syrups mode.

Consider using all the languages you have learned, and don't be afraid to look and ask for information about the languages seen in the labs. Remember that there is no unique solution.

Conclusion

In this lab, you saw how to create a complex program using different languages. You are now able to :

- Understand all the objectives of a complex industrial process
- Find the inputs and the outputs
- Determine the most appropriate languages to use
- Write the programs
- Create a HMI
- Simulate the process

If the lab was difficult for you, remember that this is not an easy one. We encourage you to review the last labs and try again this one. A complete 37 pages solution will be given at the end of the lab, so you could read it to understand the complex aspects of this lab.

In the future part of the training, in Laos, you will learn how to program the PLC for real and how to connect inputs and outputs to the controller to actually implement the process.