

Bryn project powerpoint

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Volac, Lactose and Protein production

Volac is a large process international company with factory's in Felinfach, Liverpool, Port Talbot, Sleaford, and also factory's further away in Ireland and Indonesia. Their main goal is producing the highest quality dairy products but also produce proteins for other products such as protein powder for Athletes.

The problem

- Our UF plant filtering our used water to be reused in the factory at the moment only has one filter on the income the UF, this means that once the filter is blocked and starts building back pressure the operators have to stop the plant and replace the filter which mean hours of downtime for the rest of the factory also as there is a lack of water and cant produce products until the UF is back online.

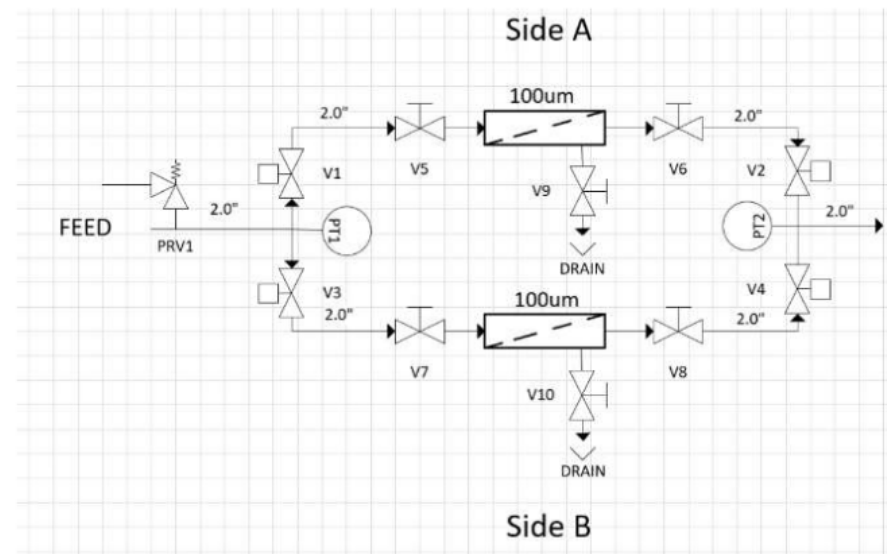
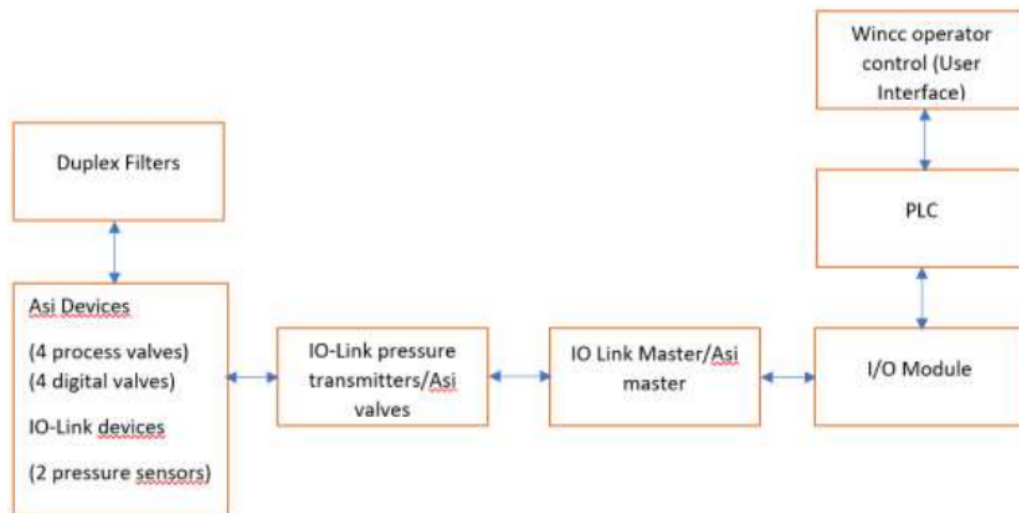
Objective

- The objective is to add a duplex filter to the UF which will allow the operator to swap one filter over to another while the dirty blocked filter is replaced with a clean filter while the UF is still running and the factory not missing out on making and product therefore saving money for the company.
- Using S7-1500 ET200SP CPU with Tia portal V16 we can implement the Asi-master and IO-link master into the code to control the duplex filter skid. We can then add more code to implement Wincc for operating the Duplex filter.

Functional Spec and Software/Hardware Spec

Functional Spec

The operator is able to control the duplex filter by accessing Wincc from the control room and pressing the necessary buttons to switch the flow over to another filter. Be able to change the High Pressure and Low Pressure SP so it runs how the operators want and only switches filter according to the SP they have set and then sends out the necessary alarms for when a filter needs to be changed/cleaned.



Solutions

Solution1 Method

The first solution includes using Asi devices for all the automatic valves and manual valves feedback, and then have IO-Link for the Pressure transmitters. We will have 6 Auto valves and 4 manual valve feedback working on Asi. Then two pressure sensors on IO-link



Solution2 Method

This solution includes using Analogue 4-20ma instead of Asi and IO-link



Comparison of solutions and chosen solution

IO-link will work in our favour as it has fewer data errors in comparison to analogue 4-20ma as analogue signals can have interference caused by other electronics that are nearby and the IO-link digital signals are far less susceptible to interference.

Another limitation to analogue signals is that they don't provide as much process data such as accurate measurements and fault codes that are difficult to figure out quickly, whereas IO-link diagnostics can help resolve issues quickly which is very helpful for a factory that needs to run 24/7.

IO link and Asi devices allows to reduce the amount of cable used and less wiring.

Solution1 is the chosen solution due to IO-link benefits and the lower cost and simplicity of using Asi devices allows an overall easier implementation of this solution. Testing the devices is also faster due to having an Asi master we can look at the ports in the asi master and check for faults there which is good for our factory as it help diagnose problems faster so there is less down time when there is a problem which makes a big difference as the factory is running 24/7. The valves we have chosen meet the factory standards and only supports Asi because this method is widely implemented in our factory and is the best standard for us as it decreases downtime and is a tidier job with less wiring.

Test Plan

<u>Test No</u>	Low Pressure	High Pressure	Good pressure	Change filter alarm	Other alarm	Switch Filter Auto	<u>Pass/Fail</u>
<u>1</u>	<u>N</u>	<u>N</u>	<u>Y</u>	<u>N</u>	<u>N</u>	<u>N</u>	<u>pass</u>
<u>2</u>	<u>Y</u>	<u>N</u>	<u>N</u>	<u>N</u>	<u>Y</u>	<u>N</u>	<u>fail</u>
<u>3</u>	<u>N</u>	<u>Y</u>	<u>N</u>	<u>Y</u>	<u>N</u>	<u>Y</u>	<u>fail</u>
<u>4</u>	<u>N</u>	<u>N</u>	<u>N</u>	<u>N</u>	<u>Y</u>	<u>Y</u>	<u>fail</u>

Budget Breakdown



AC2900-£259-x2



Duplex filter construction-£2740



PI2794-£724-x2



AWH valves-£324 x6



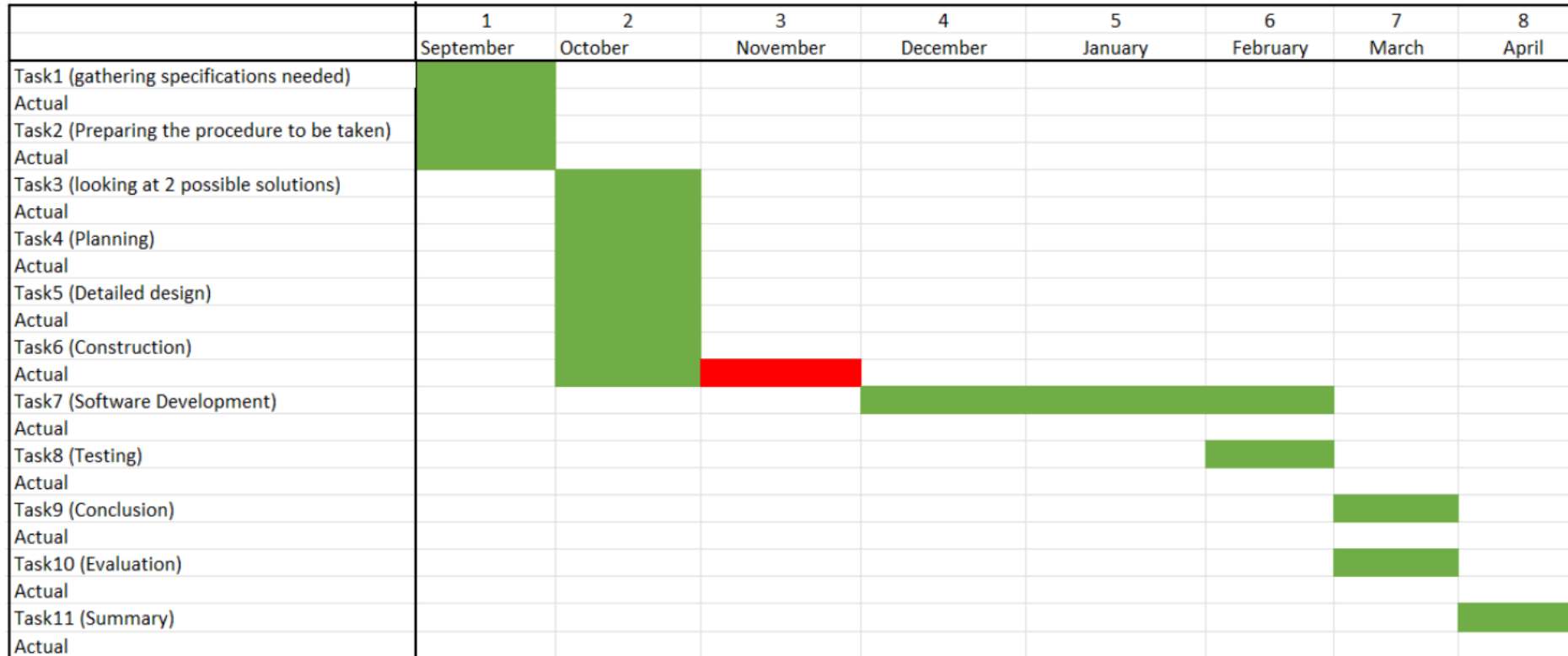
AC2315-£285.50-x2



IO-Link master-£456

Overall budget-\$9000

Project Plan Gantt Chart



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GRADEMARK REPORT

FINAL GRADE

GENERAL COMMENTS

Instructor

68/100

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BRYN JANES

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RESEARCH-INFORMED LITERATURE

-  Background research has been carried out and includes relevance for project. 6.5/10
Research for solutions has been explained, however more depth of reading and understanding is needed. Solutions indicated are relevant with good arguments. 6.5/10

13/20

KNOWLEDGE AND UNDERSTANDING

-  Problem definition was explained in detail, and a good understanding of the process was shown with application from industry. 3.5/5
Constraints and codes of practice were identified with software licencing, standards and intellectual properties relevant to the industry. 3/5
Environmental issues have been included in the form of software replacing hardware, and sustainable program structure will enable expansion of the system. 3/5
Functional design was explained with a block diagram and backed up with test plan. 3.5/5
Response to questioning was very good and demonstrated a good understanding of the project and the process. 7/10

20/30

ANALYSIS

 Problem definition has been identified with a good clear understanding of the objective and procedures needed. 3.5/5
Functional design was understood and the specification was explained. A good block diagram was included. 7/10
Final solution was justified with good arguments, and explained with environmental and sustainability issues used in the justification. 3.5/5

14/20

PRACTICAL APPLICATION AND DEP.

 Design spec was explained in detail with relevant additional components identified for practical deployment. 3.5/5
Critical choice has been justified through evaluation and showed an understanding of PLC's. 7/10
Project plan with breakdown of activities was included and explained with management methods. A relevant test plan was included. 3.5/5

14/20

SKILLS FOR PROFESSIONAL PRAC.

 Slides included good relevant content. 3.5/5
Delivery of content demonstrated a good understanding of the project. 3.5/5

7/10