Condition Based Monitoring of Lindt Bar Line

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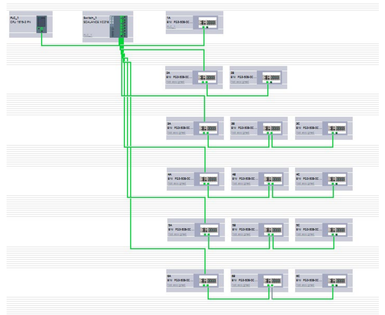
Objectives

- To install and program 83 sensors on the Lindt Bar Line to improve performance visibility
- To tie sensors into Ignition, the SCADA system used by Lindt, to allow data collecting and analysis to be done by employees
- To improve product quality, reduce waste, and move towards preventative maintenance

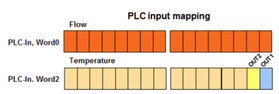
Programming Set Up

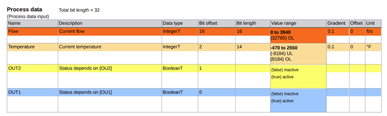
Network Devices

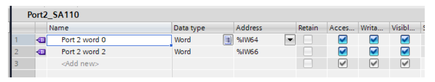


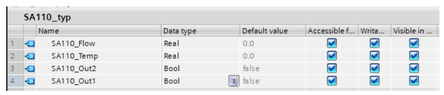
The PLC, switch, and 15 IO Link Masters were added and connected according to the connection charts.

PLC Tag and Type





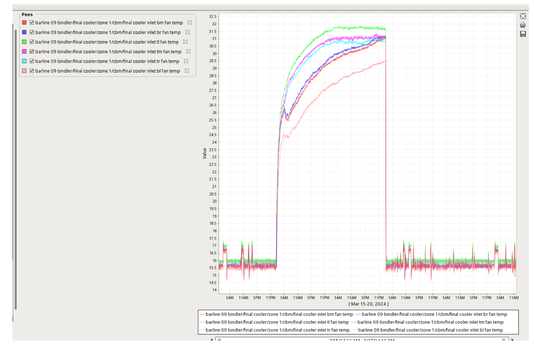




The user manuals were used to set up 83 tags and 7 types in the Siemens TIA Portal PLC programming software.

Results

- Graphical data representation of sensor measurements in Ignition
- Alarms set with display path in place



Planning

- Investment Request
- Sensor layout
- Master Layout/ Placement
- Purchase Orders
- Installation Management

IO-Link Master Plant 4A (P4AM)		
	Connection	
Profinet LK1	XC216 Port 5	
Profinet LK2	4B LK1	
Power IN	CBM Power Supply	
Power OUT	4B Power IN	
	Sensor	**Location**
IO-Link Port 0	Humidity Sensor (LDH292)	Inside Wall of Final Cooler Inlet
IO-Link Port 1	Flow/Temp Sensor (SA4110)	Top Left Fan
IO-Link Port 2	Flow/Temp Sensor (SA4110)	Top Middle Fan
IO-Link Port 3	Flow/Temp Sensor (SA4110)	Top Right Fan
IO-Link Port 4	Flow/Temp Sensor (SA4110)	Bottom Left Fan
IO-Link Class B Port 5	Flow/Temp Sensor (SA4110)	Bottom Middle Fan
IO-Link Class B Port 6	Flow/Temp Sensor (SA4110)	Bottom Right Fan
IO-Link Class B Port 7		

Balluff Vibration Sensor (49)

Ifm Vibration Sensor (7)

Ifm Flow Sensor (19)

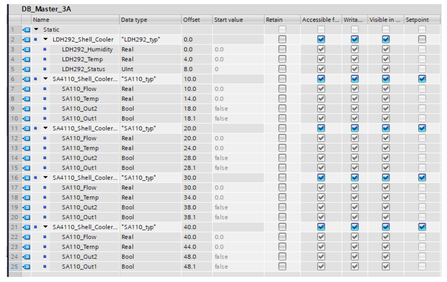
Baumer Strain Gauge (4)

Ifm Humidity Sensor (3)

Ifm Pressure Sensor (2)

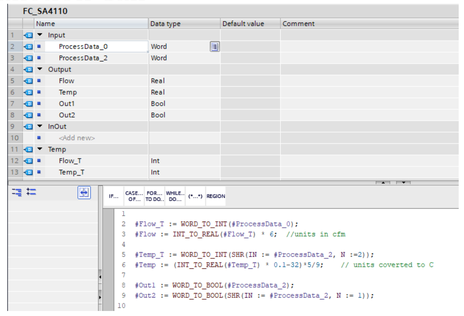
Programming

Data Block



Each line of the Data Block corresponds to a port on the IO Link Master. This is where the measurement from the sensors is displayed in the PLC.

Function Call

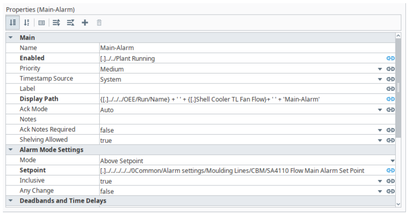


The function calls take the words that come into the PLC and separates them into the desired parameters.

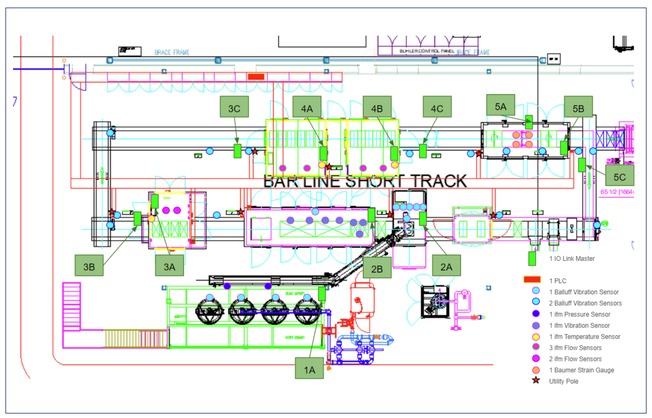
Conclusions

- Everything is connected , programmed, outputting data, and an alarm infrastructure is in place
- Next step is an R&D Trial to fine tune alarm setpoints
- Turn over to maintenance

What I learned…
- Manufacturing controls
- Data types
- Importance of documentation

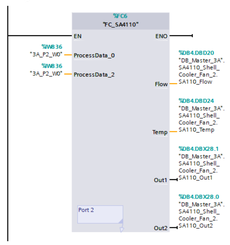


Sensor Layout



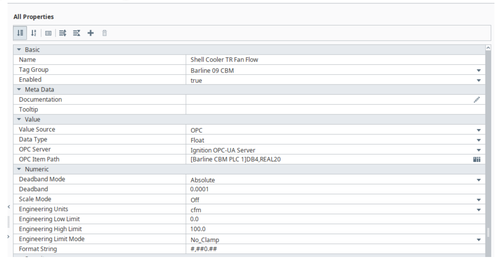
Programming Communication

Main (OB1)



In Main OB1, the function call blocks were added for each of the 83 sensors. This is where the data change from tag to type occurs.

Ignition Tag



Tags were constructed to pull the output data from the PLC into Ignition for centralized data and analysis.

Acknowledgements

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