

Interpreting Functional Descriptions

What is a Functional Description?

- It is a written descriptive document which describes *something*.
- In automation it refers to how a system shall function in all its operating modes.
- It is the foundation of the electrical design and the source for the control system code.
- It is the **most** important document!

What does it describe?

- **An overview of what the system does**
 - Tangible item i.e. a component or part
 - Process i.e. mixes 2 or more liquids, heats or cools
 - Collects data i.e. log temperature over time
 - Perform calculations i.e. production efficiency
- **Modes of operation**
 - RUN, IDLE, MAINTENANCE, SHUTDOWN, etc.

What does it describe?

- **Sequence of Operation**
 - Mode transitions
 - User input and output
 - Interlocks to other controllers
 - Safety routines
- **Inputs and Outputs**
 - Full or partial list of IO
 - Specific brand, type or model number

What can we determine from it?

- **Control Strategy**

- Type of process i.e. discrete or process oriented
- Type of controller to use
- Programming editors to use
- Programming limitations

- **Communication Requirements**

- Interlocks to other controllers
- Connection to business systems i.e. SAP
- Networks for remote IO, HMIs, or PCs

What can we determine from it?

- **Controller Hardware**

- Control strategy determines controller type
- IO count determines IO modules
- Communication requirements determine communication modules
- Power supplies and media can be determined

- **Visualization Hardware/Software**

- HMI terminals
- SCADA systems

What does it look like?

Refer to Handout #1

**“Functional Description for the Infeed Sorting
Conveyor”**

Interpreting Handout #1

Take a moment to answer the following questions:

- What control strategy should I use?
- Are there any communication requirements?
- What hardware should I select?
- How is this system visualized?
- What are the unknowns?

**Write your answers on a piece of paper.
5 minutes**

Interpreting Handout #1

Compare your answers to the person next to you:

- Are your answers the same?
- What's different?

Compile a new set of answers – discuss in class.

Interpreting Handout #1

Answers

Control Strategy

Interpreting Handout #1

Answers

Inputs

Interpreting Handout #1

Answers

Outputs

Interpreting Handout #1

Answers

Communication Requirements

Interpreting Handout #1

Answers

Visualization Hardware/Software

Interpreting Handout #1

Answers

Unknowns

Sometimes not all the information is provided in the Functional Description.

Does the customer have restrictions on power? Do you need to transform the voltage?

Does the customer have plant standards that may limit IO voltage? This might affect IO module choice.

How will this system interlock with upstream conveyor system?

Interpretation Complete

Now What?

Functional Description understood?



Develop Pseudo Code.



Develop PLC code.