Application Note AN2009-56

Product Handling – Online Accumulator

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INTRODUCTION

In processing plants, line production rates are carefully studied. The outcome of a process equipment area in a production line needs to be balanced with the rest of the system. When there is an unexpected downstream equipment delay, an online accumulation system can avoid starting and stopping critical processes involved in continuous production operations, thus increasing product quality and consistency and maximizing line efficiency. These types of accumulators are common in the food and pharmaceutical industries and are located downstream of freezers, fryers, ovens, and other critical process equipment.

SEL SOLUTION

SEL-2440 Discrete Programmable Automation Controller (DPAC) logic can be used to implement a control solution for commercially available accumulators. Logic using timers, latch bits, counters, inputs, and outputs can operate the accumulator, allowing for a certain number of products to accumulate.

Operation Summary

The accumulator has two discrete speeds depending on the state of operation: slow while accumulating and fast for normal transfer operation. The accumulator mode of operation is determined by the level of product sensed by four conveyor photo eyes.

The accumulator has an end gate, which is down during normal discharge and raised while accumulating.

Products from upstream equipment are fed into the accumulator and transferred through the unit's pan to the downstream equipment. Uninterrupted run time and line flow through the downstream process cause the accumulator to operate in transfer mode and run at its fast speed operation. The accumulator operates in its accumulation mode when the downstream equipment is satisfied with the product and stops running.

The accumulator is considered full when either the discharge photo eye or the infeed photo eye and middle photo eye are covered, and the gate is in the up position. When it is full, the accumulator stops and will start again when the gate is in the down position.

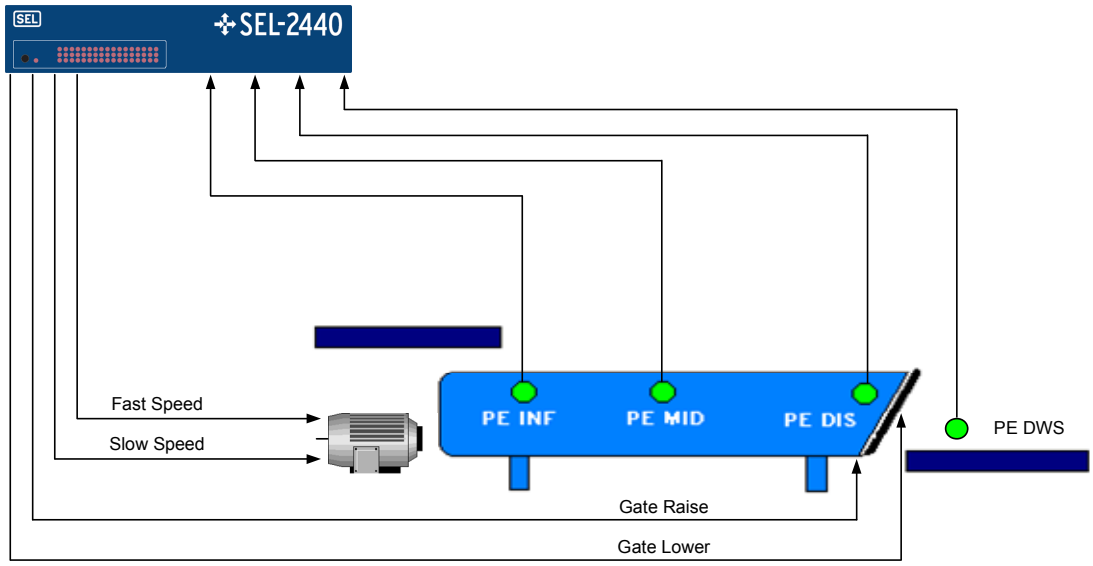

Figure 1 Online Accumulator

Required Inputs and Outputs

The required outputs from the SEL-2440 for this operation include the following:

- Accumulator run/fast speed command
- Accumulator run/slow speed command
- Accumulator gate raise solenoid command
- Accumulator gate lower solenoid command

The required inputs to the SEL-2440 for this operation include the following:

- Accumulator conveyor running signal
- Accumulator infeed end photo eye (PE INF)
- Accumulator accumulate photo eye (PE MID)
- Accumulator discharge end photo eye (PE DIS)
- Accumulator downstream end photo eye (PE DWS)

The extra I/O in the SEL-2440 allows for local, automatic, or manual control of the system and its components via pushbuttons.

The flexible communications features of the SEL-2440 also allow the integration of the controller with the plant PLC (programmable logic controller) or directly to an OIT (operator interface terminal) through Modbus® RTU or Modbus TCP.

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