Enpro Filler Vent Tube RFID (FVTR) System Integration with Plant Beverage Filler PLC

Purpose of Document

This document provides a detailed narrative for integrating the Enpro Filler Vent Tube RFID (FVTR) System into the existing PLC infrastructure for beverage filler operations. The purpose is to ensure seamless and safe communication between the Enpro FVTR System and the production line, preventing downtime and protecting critical equipment.

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1. System Integration Overview

The Enpro FVTR System is designed to monitor and record individual serial numbers of cans passing through the filler. It will interface with the filler's PLC to enable coordinated shutdown and fault recovery processes. This document specifies the necessary configurations and signals to facilitate smooth integration and operation of the Enpro FVTR System within the filler line.

2. Fault Relay Activation and Shutdown Sequence

When the ** fault relay** triggers, the following actions should occur:

Can Gate Closure and Run-Out Delay

Upon triggering, the can gate will close. A brief delay timer should be set to allow the cans within the filler to exit safely, preventing can jams within the filler system. This ensures that no cans remain on the backside with open valves.

Conveyor and Seamer Protection

Cans should pass through the seamer and move onto the exit conveyor from the seamer before stopping. The first three conveyors will also stop after the seamer exit to prevent backflow towards the filler. This setup will maintain a buffer space of approximately three revolutions of cans (230–500 cans, based on filler capacity), protecting the seamer from potential backups.

Restart Protocol

Once a fault is resolved, a ***latching button*** on the filler HMI will be used to restart. To avoid unintended starts, the filler will not automatically resume; the restart must be initiated manually via the filler HMI. The restart should be a "soft stop" with a controlled ramp-down to prevent abrupt stoppage, typically achieved through a gradual reduction in the variable frequency drive (VFD) speed.

3. Signal Descriptions and HMI Indicators

The Enpro FVTR System will output various signals to indicate its current status:

Initialize Relay

The system initiates this relay when looking up and recording serial numbers. It is not in active monitoring mode at this stage. The filler HMI should display a **yellow status bar** when this relay is active. This will mirror the yellow status on the FVTR Display and FVTR beacon light.

Run Relay

The run relay does not indicate an operational state but signals that the Enpro system is in active monitoring mode. This status should be reflected as a **green status bar** on the filler HMI. This will mirror the green status on the FVTR Display and FVTR beacon light.

Bypass Output Relay

A manually-selected bypass function, allowing operations to bypass monitoring temporarily. The filler HMI should display this as a **blue and purple flashing bar** when activated. This will mirror the blue and purple flashing status on the FVTR Display and FVTR beacon light.

CIP Signal Input

When receiving a Clean-in-Place (CIP) signal from the filler PLC, the Enpro system will halt monitoring and recording, overriding other signals. The filler PLC must set up a conditional output that activates this relay if the filler is in CIP mode or manual jog mode. This safeguard protects the antenna during manual and CIP operations. The filler HMI should display this as a **blue bar** when activated. This will mirror the blue status on the FVTR Display and FVTR beacon light.

Air Pressure Switch

Set at a threshold of 3 bar. If the pressure falls below this level, it will generate a fault signal, prompting a visual alarm on the filler HMI. Although the Enpro system does not display this fault directly, the filler HMI should alert the maintenance team to investigate the cause of air pressure loss. This is a normally open (NO) switch, that closes with air pressure.

4. Recommended Configuration and Settings

For successful integration, the maintenance team should ensure the following configurations:

1. PLC Fault Delay Timer: Configure the delay timer to allow the can run-out, ensuring no cans are left inside the filler on fault.

2. Conveyor and Seamer Buffer Management: Maintain enough space on conveyors between the filler and warmer to handle up to three filler revolutions.

3. Conditional Logic for CIP Relay: Set up the PLC to trigger the CIP relay only when in CIP mode or jog mode, protecting the RFID antenna and system components.

4. Air Pressure Monitoring: Program the filler HMI to provide a prominent alert when air pressure falls below 3 bar, ensuring swift action from the maintenance team.

5. Testing and Verification

We recommend conducting a series of tests to verify the Enpro FVTR System integration, including:

- Fault Simulation: Trigger the air fault relay to confirm the sequence of can gate closure, conveyor stops, and HMI notifications.

- Restart Procedure: Validate the latching button functionality for manual restarts, ensuring the system does not restart automatically.

- Relay and Status Bar Testing: Verify each relay's corresponding HMI indicator (yellow for initialize, green for run, blue/purple flashing for bypass).

- CIP Mode Simulation: Confirm that the CIP signal correctly halts all monitoring and protects the system when in CIP or jog mode.

Conclusion

This document provides the necessary technical details for the maintenance team to integrate the Enpro FVTR System with the existing PLC. Proper implementation and adherence to these instructions will ensure a smooth transition and protect production equipment. Please direct any questions regarding configuration or testing to the Enpro support team.