Calculating Flow Rate w/Rotameter

Software Used: RSLogix 500, RSEmulate 500, RSLinx Classic
Inputs: Simulated Pulse Signal (Rotameter)
Outputs: Calculated Flow Rate (GPM)
Key Instructions Used: Timers, Counters, Math Instructions

Project Overview

This project simulates a flow monitoring system using a **rotameter**, a digital pulse-type flow sensor. The PLC tracks incoming pulses, calculates the flow rate in **gallons per minute (GPM)**, and updates the value every 12 seconds. The logic demonstrates how to apply a **K-factor** to convert raw pulse data into flow rate data.

Note: In real-world applications, digital flow sensors typically output multiple pulses per gallon (e.g., 100 pulses/gallon) to increase resolution. However, due to limitations in RSLogix Emulate when handling fast pulses, this project uses a simplified **K-factor of 6.3 gallons per pulse** to ensure accurate pulse counting and reliable simulation. A different K-factor would simply mean working the math calculations a bit differently.

How It Works

- A **pulsing timer** simulates a Rotameter that sends one pulse for every 6.3 gallons of fluid.
- A **12-second timer** defines the sampling/calculation window.
- During each 12-second window, the PLC counts the number of pulses received.
- At the end of each sampling window, the flow rate is calculated using the formula: (Pulses in sampling window) x K-Factor x 5 = GPM.

Potential Use Cases

This type of flow monitoring logic can be applied in various industrial and commercial settings, including but not limited to:

- **Agricultural irrigation systems –** monitoring water delivery to detect blockages or inefficiencies.
- **Oil or fuel pipelines –** tracking flow rate to identify leaks, blockages or verify system throughput.
- **Chemical batching processes –** ensuring correct fluid amounts are delivered during production.