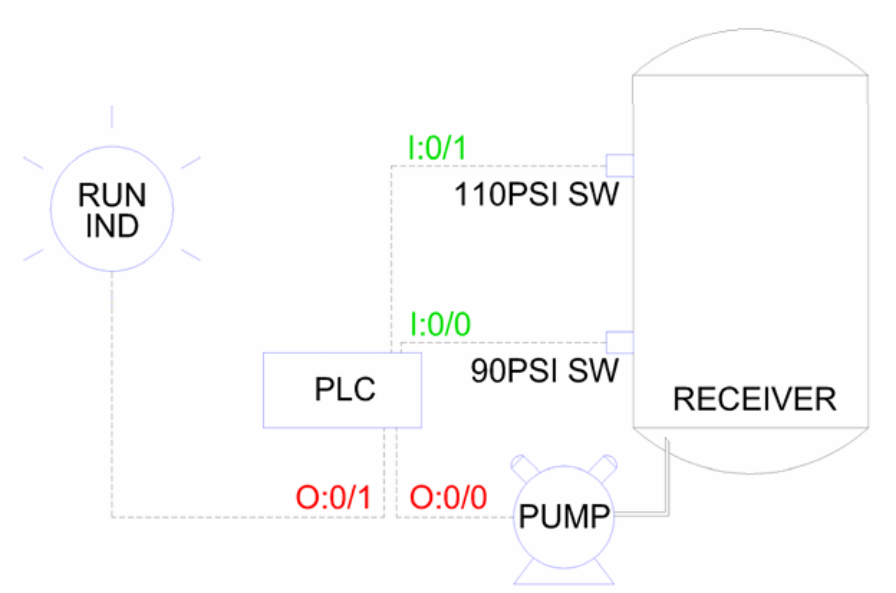
**PORTFOLIO PLC OF RIYAN SEPTIANA**

**Project 1 — Pressure Control System**



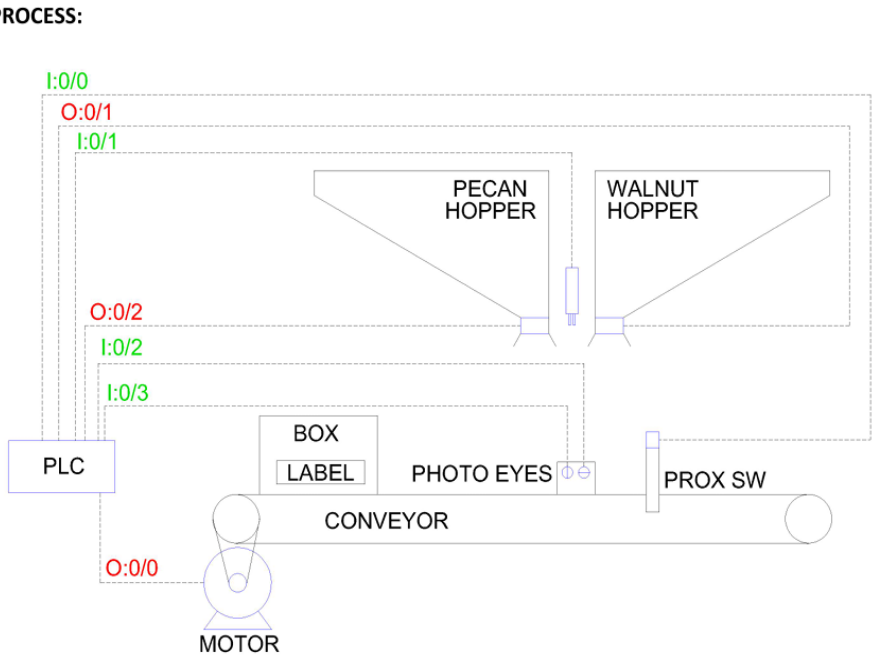

This project simulates an automatic pressure control system using two pressure sensors and two actuators. The pump (O:0/0) is energized when the receiver tank pressure is below 90 PSI and stops once it reaches 110 PSI. Two pressure switches are used — (I:0/0) for the lower limit and (I:0/1) for the upper limit.
A running indicator (O:0/1) turns ON when pressure exceeds 90 PSI, indicating system readiness.

**Key Features:**

- Automatic pump control based on pressure limits
- System operation indicator
- Pressure switch–based control logic

**Technology:** Allen-Bradley PLC, Digital I/O, Ladder Logic Programming

**Project 2 — Conveyor Sorting and Filling System**




This conveyor system sorts and fills red- or blue-labeled boxes. A proximity sensor detects incoming boxes. If the box has a red label, the pecan valve opens; if blue, the walnut valve opens. When the level switch detects the box is full, it advances to the next station.

**Key Features:**

- Automatic color-based sorting
- Pneumatic valve control for material filling
- Level detection for process completion

**Technology:** Allen-Bradley PLC, Proximity Sensor, Solenoid Valve, Ladder Logic

**Project 3 — Material Tracking and Inventory Logging**

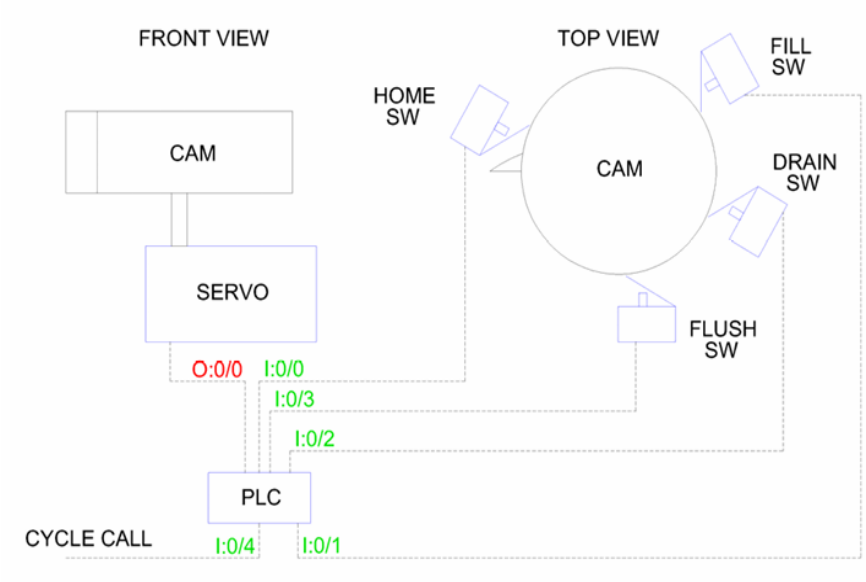
This project manages inventory for three material types: widget (123), doodads (456), and wockies (789). A scanner reads codes formatted as PPP-QQ:D, representing part number, quantity, and direction (1 = inbound, 2 = outbound). Data is stored in dedicated integer registers for each material type.

**Key Features:**

- Automatic barcode reading and processing
- Quantity tracking by material type
- Data integration for inventory management

**Technology:** Allen-Bradley PLC, Barcode Simulation, Integer Data Handling

**Project 4 — Modular Water System Sequencer**



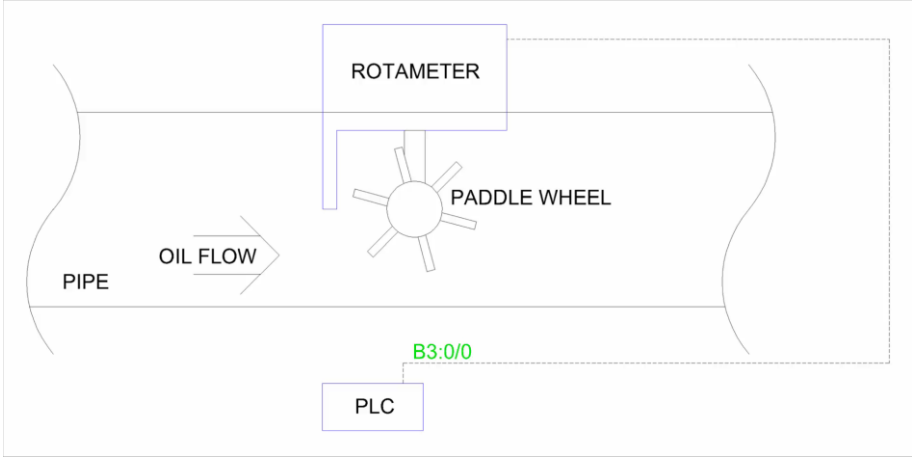

This system controls a servo motor moving between multiple stations: fill, drain, and flush. Upon pressing start, the servo moves sequentially between each position with predefined timing and returns to home. Limit switches confirm each station position. There is a feature we can control it in manual mode to go through to specific station and we can disable some of station to go through to the next station

**Key Features:**

- Time-based servo control
- Position feedback via limit switches
- Automated multi-station cycle
- Manual mode controlling
- Disable station without break the sequence

**Technology:** Allen-Bradley PLC, Servo Motor, Limit Switch, Ladder Logic

**Project 5 — Flow Measurement using Digital Rotameter**



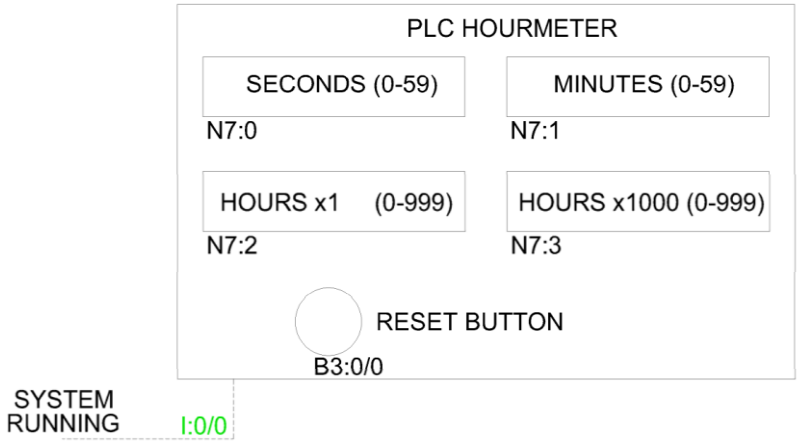

This project simulates flow measurement using a digital rotameter that generates one pulse per 6.3 gallons. A timer simulates the pulse every 12 seconds. The system calculates total flow and flowrate per minute based on pulse count.

**Key Features:**

- Timer-based flow signal simulation
- Total flow and flowrate computation
- Auto-calibration via K-factor

**Technology:** Allen-Bradley PLC, Timer, Counter, Ladder Logic

**Project 6 — Running Time Tracker**



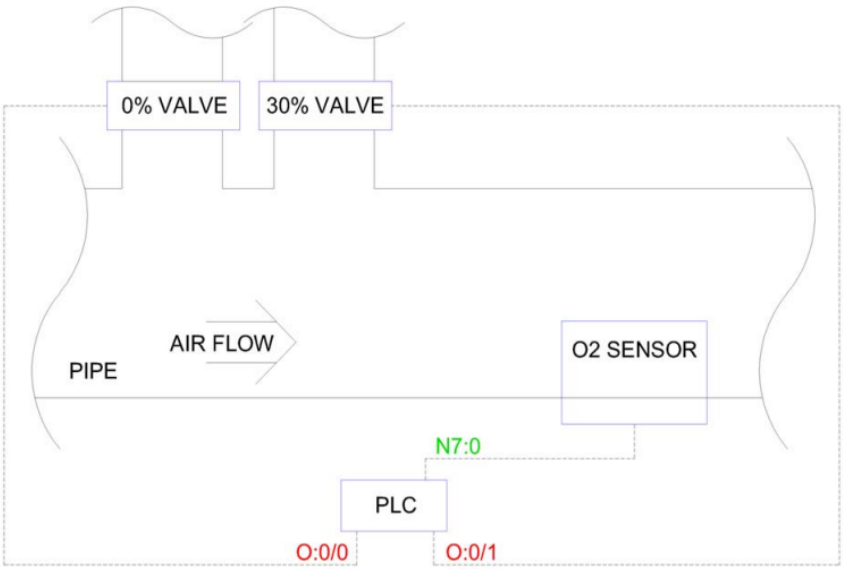

This system tracks machine operation time in a 1000h:h:m:s format using integer registers. When the system runs, the timer increments; when stopped, it freezes. A reset button resets all counters to zero.

**Key Features:**

- Real-time runtime tracking
- Multi-tier time storage
- Reset and freeze functions

**Technology:** Allen-Bradley PLC, Timer, Integer Registers, Ladder Logic

**Project 7 — Oxygen Sensor Calibration System**



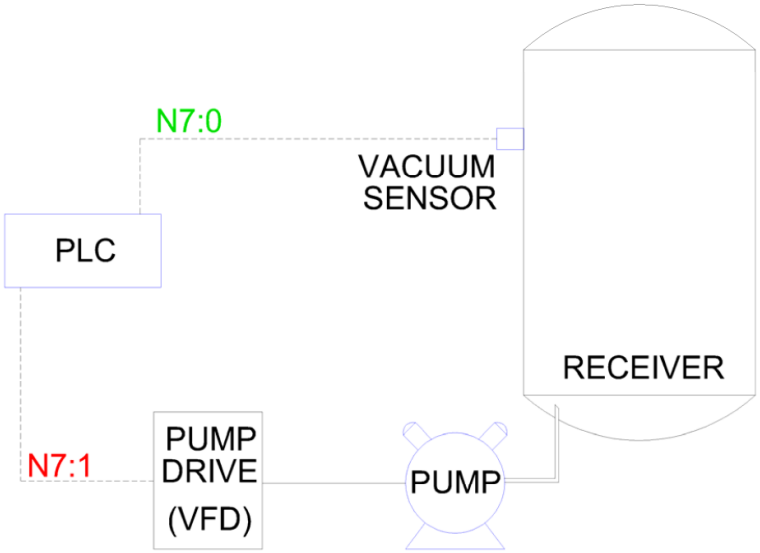

This calibration system uses two reference gases (0% and 30% $O_2$) to recalibrate an oxygen sensor. Each gas flows for 10 seconds, and average readings are used to compute the calibration factor using standard formulas.

**Key Features:**

- Two-point (zero & span) calibration process
- Automatic average value computation
- Formula-based sensor compensation

**Technology:** Allen-Bradley PLC, Analog Simulation, Math Functions

**Project 8 — Vacuum Pressure Control without PID**



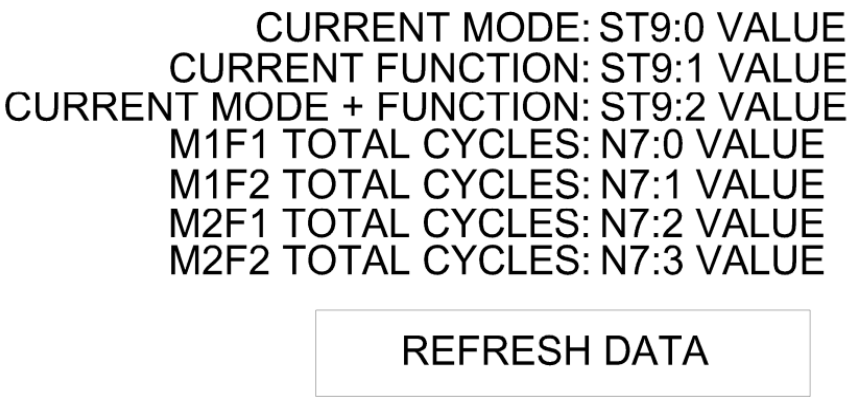

This system maintains a vacuum pressure of 15 inHg without using PID. Motor speed is adjusted stepwise based on sensor deviation from the setpoint, evaluated every 10 seconds to ensure stable suction performance.

**Key Features:**

- Non-PID logic-based motor speed control
- Periodic comparison of sensor and setpoint
- Adaptive pressure correction logic

**Technology:** Allen-Bradley PLC, Timer, Comparison Logic, Analog Output

**Project 9 — Mode and Function Sequencing System**



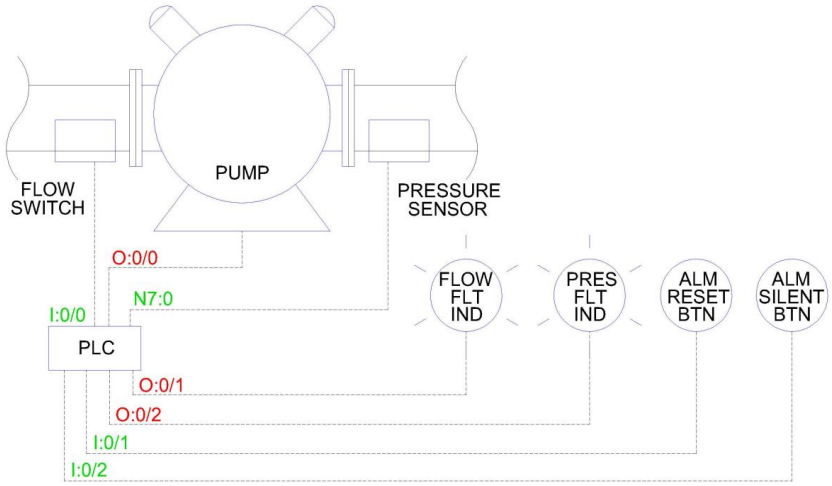

This project manages a dual-mode, dual-function sequence operating as Mode1F1 → Mode1F2 → Mode2F1 → Mode2F2 with each cycle lasting 10 seconds. System states and counters are stored as strings and exported in spreadsheet-like format.

**Key Features:**

- Automatic mode and function sequencing
- String-based state tracking
- Data logging for process monitoring

**Technology:** Allen-Bradley PLC, String Data, Timer, Ladder Logic

**Project 10 — Pump Protection and HOA Control**




This project controls a pump with a 10s ON / 5s OFF cycle. The pump stops automatically if no flow is detected for 5 seconds or if pressure exceeds 30 PSI for 5 seconds. Equipped with *Flow Fault* and *Pressure Fault* indicators, *Silence* and *Reset* buttons, and *Hand-Off-Auto* control for manual or automatic operation.

**Key Features:**

- Pump protection against flow loss and overpressure
- Alarm handling with reset and silence buttons
- HOA (Hand-Off-Auto) operational mode

**Technology:** Allen-Bradley PLC, Pressure Sensor, Flow Switch, Alarm Logic