Automated Water Transfer System (PLC/HMI)

Tools: Siemens S7-1200, TIA Portal, WinCC HMI

Overview: Developed an automated system to control water transfer between tanks using PLC logic and HMI visualization.

Objectives

• Automate pump operation based on tank level sensors.
• Provide operator control and visualization via HMI.
• Improve reliability and reduce manual switching.

Technical Approach

• Configured analog and digital inputs for level sensors.
• Programmed PID and interlock logic in TIA Portal.
• Designed HMI screens for system overview, manual mode, and alarms.
• Simulated system in PLCSIM for validation.

Challenges & Solutions

Challenge: Inconsistent sensor readings
Solution: Implemented signal filtering and scaling blocks.

Challenge: Alarm spamming
Solution: Added delay and hysteresis functions.

Results

Fully automated tank transfer cycle achieved, reducing operator intervention by 90%.

Future Enhancements

Integrate data logging and remote monitoring via MQTT or OPC UA.