

PLC Project Documentation

PumpStation_A

Source: sample_pumpstation.L5X

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1. Controller Summary

Property	Value
Controller name	PumpStation_A
Processor type	1769-L33ER
Firmware revision	33.11
Description	Booster pump station A - two duty/standby pumps with wet well level control
Programs	1
Controller-scope tags	7
I/O modules	4
User-defined data types	1
Add-On Instructions	0

2. Task and Program Structure

Task	Type	Rate	Priority	Scheduled programs
MainTask	CONTINUOUS	—	10	MainProgram

Program: MainProgram

Station sequencing, pump duty rotation and alarm handling

Routine	Type	Rungs	Description
MainRoutine (main)	RLL	2	Calls subsystem routines in order
PumpControl	RLL	4	Duty/standby pump start-stop on wet well level
Alarms	RLL	2	Alarm generation and ESD latching

3. I/O Module Map

Module	Catalog number	Parent	Slot/Address	Inhibited
Local	1769-L33ER	Local	0	false
DI_Slot1	1769-IQ16	Local	1	false
DO_Slot2	1769-OB16	Local	2	false
AI_Slot3	1769-IF4	Local	3	false

4. Tag Database

Controller-scope tags

Tag	Data type	Type	Description
WetWell_Level	REAL	Base	Wet well level, scaled 0-100 %
Level_HiHi_ALM	BOOL	Base	Wet well high-high

			level alarm - overflow imminent
Level_Lo_Cutout	BOOL	Base	Low level pump protection cutout
Pump1	UDT_Motor	Base	Duty pump P-101
Pump2	UDT_Motor	Base	Standby pump P-102
Station_ESD	BOOL	Base	Station emergency shutdown from HMI or field pushbutton
Spare_DINT	DINT	Base	—

Program-scope tags — MainProgram

Tag	Data type	Type	Description
Duty_Select	DINT	Base	1 = Pump1 duty, 2 = Pump2 duty
Start_Level_SP	REAL	Base	Duty pump start setpoint, %
Stop_Level_SP	REAL	Base	—
Pump_Start_Tmr	TIMER	Base	Anti-cycle delay before duty pump start

5. User-Defined Data Types

UDT: UDT_Motor

Standard motor control data block

Member	Type	Dim	Description
Run_Cmd	BOOL	0	Run command to starter
Running_Fbk	BOOL	0	Auxiliary contact running feedback
Fault	BOOL	0	Overload / starter fault
RunHours	DINT	0	Accumulated run hours

6. Add-On Instruction Definitions

No Add-On Instructions in export.

7. Alarm and Fault Tag Summary

Tags whose name or description matches common alarm/fault naming patterns (ALM, ALARM, FAULT, FLT, FAIL, TRIP, SHUTDOWN, ESD).

Tag	Scope	Data type	Description
Level_HiHi_ALM	Controller	BOOL	Wet well high-high level alarm - overflow imminent

Station_ESD	Controller	BOOL	Station emergency shutdown from HMI or field pushbutton
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8. Tag Cross-Reference

Tag	Refs	Locations (program/routine rung)
Duty_Select	2	MainProgram/PumpControl rung 1; MainProgram/PumpControl rung 2
Level_HiHi_ALM	1	MainProgram/Alarms rung 0
Level_Lo_Cutout	1	MainProgram/PumpControl rung 0
Pump1	3	MainProgram/PumpControl rung 1; MainProgram/PumpControl rung 3; MainProgram/Alarms rung 1
Pump2	3	MainProgram/PumpControl rung 2; MainProgram/PumpControl rung 3; MainProgram/Alarms rung 1
Pump_Start_Tmr	3	MainProgram/PumpControl rung 0; MainProgram/PumpControl rung 1; MainProgram/PumpControl rung 2
Start_Level_SP	1	MainProgram/PumpControl rung 0
Station_ESD	2	MainProgram/PumpControl rung 0; MainProgram/Alarms rung 1
Stop_Level_SP	1	MainProgram/PumpControl rung 3
WetWell_Level	3	MainProgram/PumpControl rung 0; MainProgram/PumpControl rung 3; MainProgram/Alarms rung 0

Tags with no ladder references

Spare_DINT

9. Logic Narrative (Rung Comments)

MainProgram / MainRoutine

Rung 0: Call pump control logic every scan

```
JSR(PumpControl,0);
```

Rung 1: Call alarm handling logic every scan

```
JSR(Alarms,0);
```

MainProgram / PumpControl

Rung 0: Start duty pump when level rises above start setpoint. Anti-cycle timer prevents short cycling. Blocked by low level cutout and station ESD.

```
GEQ(WetWell_Level,Start_Level_SP)XIO(Level_Lo_Cutout)XIO(Station_ESD)TON(Pump_Start_Tmr,?,?);
```

Rung 1: Route run command to selected duty pump

```
XIC(Pump_Start_Tmr.DN)EQU(Duty_Select,1)OTE(Pump1.Run_Cmd);
```

Rung 3: Stop all pumps when level falls below stop setpoint

```
LEQ(WetWell_Level,Stop_Level_SP)[OTU(Pump1.Run_Cmd),OTU(Pump2.Run_Cmd)];
```

MainProgram / Alarms

Rung 0: High-high level alarm at 95%

```
GEQ(WetWell_Level,95.0)OTE(Level_HiHi_ALM);
```

Rung 1: Latch station ESD on either pump fault while running

```
XIC(Pump1.Fault)XIC(Pump2.Fault)OTL(Station_ESD);
```

10. Documentation Quality Checks

Tag description coverage: 81% (9/11 tags documented).

Undocumented tags: Spare_DINT, Stop_Level_SP

Unreferenced tags: 1.