

Totally Integrated Automation Portal

Main [OB1]

Main Properties

General

| | | | | | |
|----------|------|-----------|--------|------|----|
| Name | Main | Number | 1 | Type | OB |
| Language | LAD | Numbering | Manual | | |

Information

| | | | | | |
|--------|------------------------------|---------|-----|-----------------|--|
| Title | "Main Program Sweep (Cycle)" | Author | | Comment | |
| Family | | Version | 0.1 | User-defined ID | |

| Name | Data type | Default value |
|----------------|---------------|---------------|
| ▼ Temp | | |
| OB1_EV_CLASS | Byte | |
| OB1_SCAN_1 | Byte | |
| OB1_PRIORITY | Byte | |
| OB1_OB_NUMBR | Byte | |
| OB1_RESERVED_1 | Byte | |
| OB1_RESERVED_2 | Byte | |
| OB1_PREV_CYCLE | Int | |
| OB1_MIN_CYCLE | Int | |
| OB1_MAX_CYCLE | Int | |
| OB1_DATE_TIME | Date_And_Time | |
| Constant | | |

Network 1: SP14-4

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SP14-4 Valve Leak Check Station Control Using S7-GRAPH with Simulation

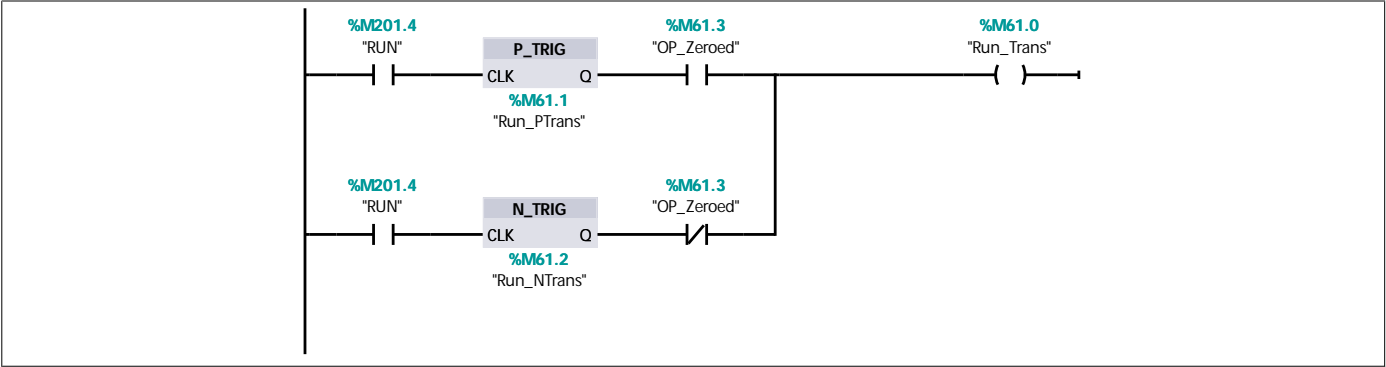
Additional internal memory:
Tag Address
Int_Reset %M5.1 BOOL Internal reset
Ret_Val %MW12 WORD Return value from SCALE block
Run_Trans %M61.0 BOOL Run has changed
Run_PTrans %M61.1 BOOL Bit for Run neg transition
Run_NTrans %M61.2 BOOL Bit for Run pos transition
OP_Zeroed %M61.3 BOOL Operation paused
Reset_Trans %M61.4 BOOL Reset_PB transition to start-kick
SFC
ResetPB_PTrans %M61.5 BOOL Bit for Reset_PB pos trans

%M1.0
"Dummy"

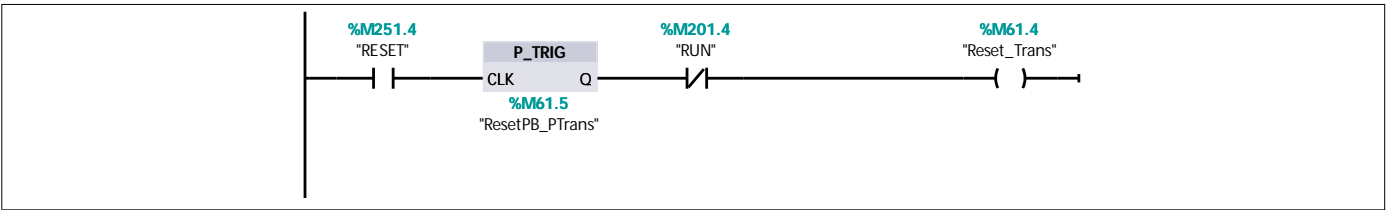
%M1.0
"Dummy"

Network 2: Generate pulse to toggle pause for SFC

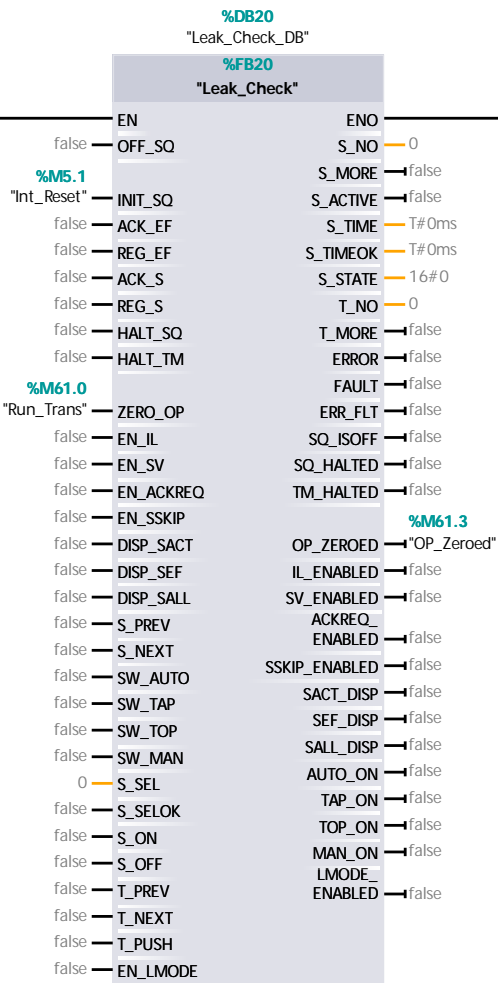
. Positive transition on Run used only
when already paused. Negative transition on Run used when not paused.



Network 3: Positive transition for reset to start reset operation.



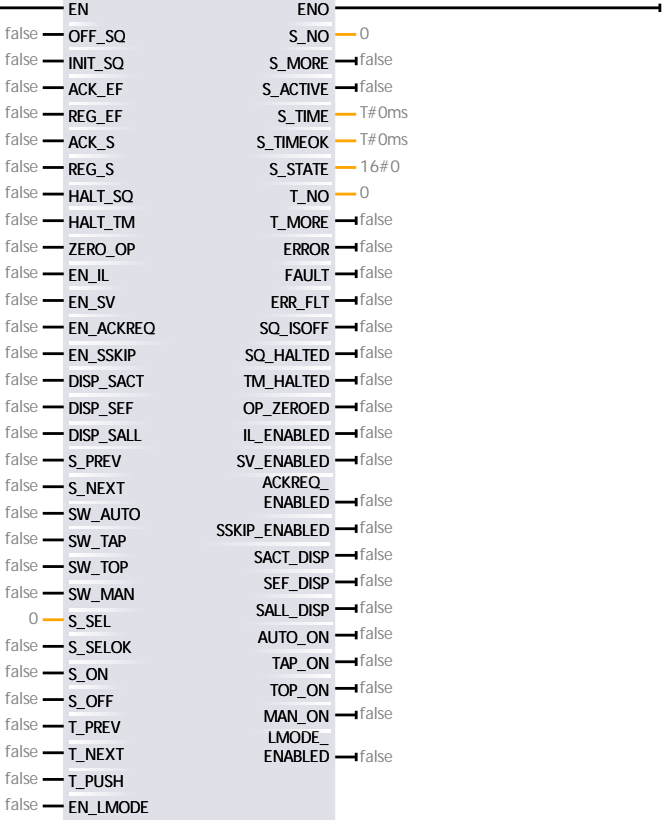
Network 4: Leak Check S7-GRAPH



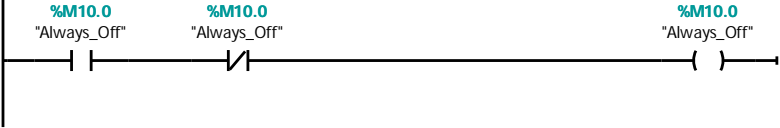
Network 5: Leak Check Reset S7-GRAPH

%DB21
"Leak_Check_
Reset_DB"

%FB21
"Leak_Check_Reset"

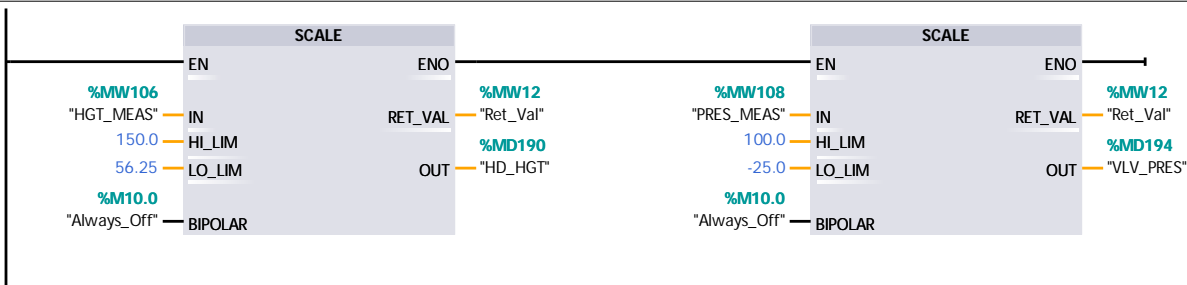


Network 6: Always Off



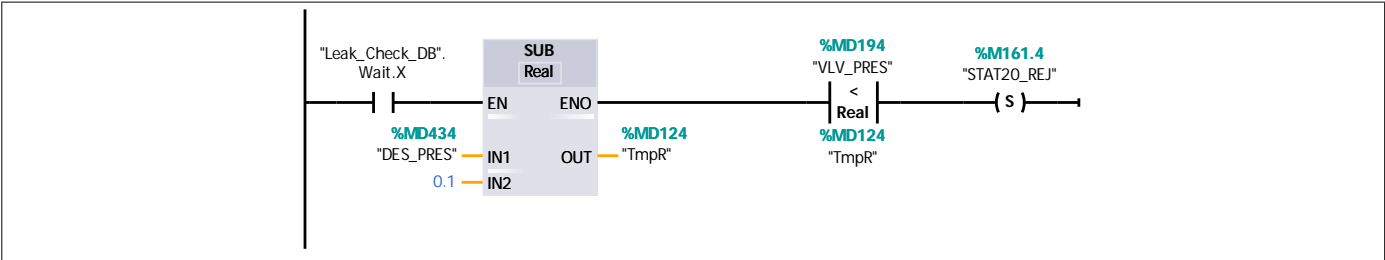
Network 7: Convert height measurement to mm and pressure measurement to psi.

Uses SCALE block. Note that the lo_lim input is 25% lower than zero weight to account for this block assuming the minimum value of the analog in is zero rather than the 5530 (which corresponds to 4 mA).

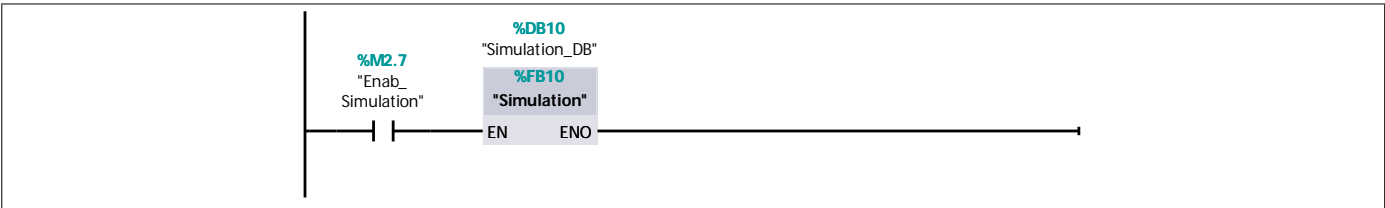


Network 8: Set if valve is to be rejected because it will not hold pressure

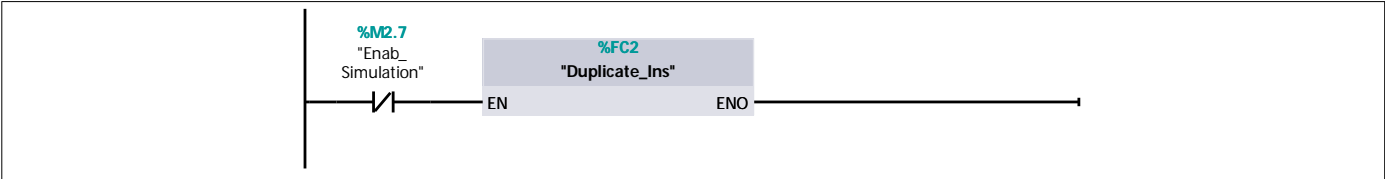
Check valve pressure during 30 sec wait. If failing, set reject bit.



Network 9: Simulation



Network 10: Copy real inputs to input image if not simulating



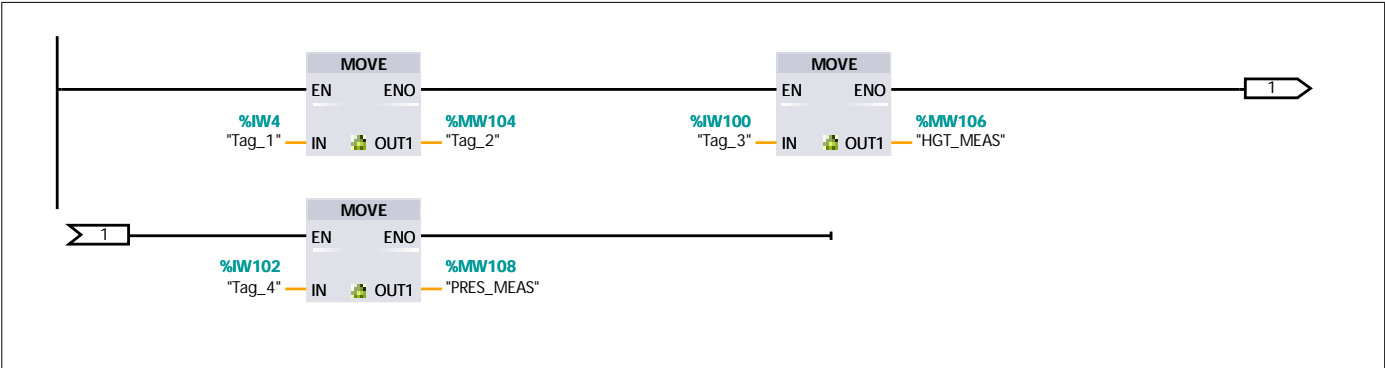
Duplicate_Ins [FC2]

Duplicate_Ins Properties

| General | | | | | |
|-------------|---------------|-----------|--------|-----------------|----|
| Name | Duplicate_Ins | Number | 2 | Type | FC |
| Language | LAD | Numbering | Manual | | |
| Information | | | | | |
| Title | | Author | | Comment | |
| Family | | Version | 0.1 | User-defined ID | |

| Name | Data type | Default value |
|---------------|-----------|---------------|
| Input | | |
| Output | | |
| InOut | | |
| Temp | | |
| Constant | | |
| ▼ Return | | |
| Duplicate_Ins | Void | |

Network 1:



Leak_Check [FB20]

Leak_Check Properties

General

| | | | | | |
|----------------------|------------|------------------|--------|-------------------------|-----|
| Name | Leak_Check | Number | 20 | Type | FB |
| Language | GRAPH | Numbering | Manual | Network language | LAD |
| Block version | V2.0 | | | | |

Information

| | | | | | |
|---------------|--|----------------|-----|------------------------|--|
| Title | | Author | | Comment | |
| Family | | Version | 0.1 | User-defined ID | |

| Name | Data type | Default value | Retain |
|-----------|-----------|---------------|------------|
| ▼ Input | | | |
| OFF_SQ | Bool | false | Non-retain |
| INIT_SQ | Bool | false | Non-retain |
| ACK_EF | Bool | false | Non-retain |
| REG_EF | Bool | false | Non-retain |
| ACK_S | Bool | false | Non-retain |
| REG_S | Bool | false | Non-retain |
| HALT_SQ | Bool | false | Non-retain |
| HALT_TM | Bool | false | Non-retain |
| ZERO_OP | Bool | false | Non-retain |
| EN_IL | Bool | false | Non-retain |
| EN_SV | Bool | false | Non-retain |
| EN_ACKREQ | Bool | false | Non-retain |
| EN_SSKIP | Bool | false | Non-retain |
| DISP_SACT | Bool | false | Non-retain |
| DISP_SEF | Bool | false | Non-retain |
| DISP_SALL | Bool | false | Non-retain |
| S_PREV | Bool | false | Non-retain |
| S_NEXT | Bool | false | Non-retain |
| SW_AUTO | Bool | false | Non-retain |
| SW_TAP | Bool | false | Non-retain |
| SW_TOP | Bool | false | Non-retain |
| SW_MAN | Bool | false | Non-retain |
| S_SEL | Int | 0 | Non-retain |
| S_SELOK | Bool | false | Non-retain |
| S_ON | Bool | false | Non-retain |
| S_OFF | Bool | false | Non-retain |
| T_PREV | Bool | false | Non-retain |
| T_NEXT | Bool | false | Non-retain |
| T_PUSH | Bool | false | Non-retain |
| EN_LMODE | Bool | false | Non-retain |
| ▼ Output | | | |
| S_NO | Int | 0 | Non-retain |
| S_MORE | Bool | false | Non-retain |
| S_ACTIVE | Bool | false | Non-retain |

| | | | |
|--------------------------------------|-----------------------|----------------------|---------------|
| Totally Integrated Automation Portal | | | |
| Name | Data type | Default value | Retain |
| S_TIME | Time | T#0ms | Non-retain |
| S_TIMEOK | Time | T#0ms | Non-retain |
| S_STATE | Word | 16#0 | Non-retain |
| T_NO | Int | 0 | Non-retain |
| T_MORE | Bool | false | Non-retain |
| ERROR | Bool | false | Non-retain |
| FAULT | Bool | false | Non-retain |
| ERR_FLT | Bool | false | Non-retain |
| SQ_ISOFF | Bool | false | Non-retain |
| SQ_HALTED | Bool | false | Non-retain |
| TM_HALTED | Bool | false | Non-retain |
| OP_ZEROED | Bool | false | Non-retain |
| IL_ENABLED | Bool | false | Non-retain |
| SV_ENABLED | Bool | false | Non-retain |
| ACKREQ_ENABLED | Bool | false | Non-retain |
| SSKIP_ENABLED | Bool | false | Non-retain |
| SACT_DISP | Bool | false | Non-retain |
| SEF_DISP | Bool | false | Non-retain |
| SALL_DISP | Bool | false | Non-retain |
| AUTO_ON | Bool | false | Non-retain |
| TAP_ON | Bool | false | Non-retain |
| TOP_ON | Bool | false | Non-retain |
| MAN_ON | Bool | false | Non-retain |
| LMODE_ENABLED | Bool | false | Non-retain |
| InOut | | | |
| ▼ Static | | | |
| RT_DATA | G7_RTDataPlus_V2 | | Non-retain |
| Trans1 | G7_Transition-Plus_V2 | | Non-retain |
| Trans2 | G7_Transition-Plus_V2 | | Non-retain |
| Trans3 | G7_Transition-Plus_V2 | | Non-retain |
| Trans4 | G7_Transition-Plus_V2 | | Non-retain |
| Trans5 | G7_Transition-Plus_V2 | | Non-retain |
| Trans6 | G7_Transition-Plus_V2 | | Non-retain |
| Trans7 | G7_Transition-Plus_V2 | | Non-retain |
| Initial | G7_StepPlus_V2 | | Non-retain |
| Wait_For_Valve | G7_StepPlus_V2 | | Non-retain |
| Head_Down | G7_StepPlus_V2 | | Non-retain |
| Pressurize | G7_StepPlus_V2 | | Non-retain |
| Wait | G7_StepPlus_V2 | | Non-retain |
| Head_Up | G7_StepPlus_V2 | | Non-retain |
| Move_Out | G7_StepPlus_V2 | | Non-retain |
| Temp | | | |
| Constant | | | |
| | | | |

| | | |
|--------------------------------------|--|--|
| Totally Integrated Automation Portal | | |
|--------------------------------------|--|--|

Alarms

| | |
|---------------|------|
| Enable alarms | True |
|---------------|------|

| Category | Category enabler | Display class |
|------------|------------------|---------------|
| Error | | 0 |
| Warning | | 0 |
| Info | | 0 |
| Category 4 | | 0 |
| Category 5 | | 0 |
| Category 6 | | 0 |
| Category 7 | | 0 |
| Category 8 | | 0 |

| | | | | | |
|-----------------------------|---------|----------------------------------|--|----------------------------------|--|
| Category for interlocks | Error | Subcategory 1 for interlocks | | Subcategory 2 for interlocks | |
| Category for supervisions | Error | Subcategory 1 for supervisions | | Subcategory 2 for supervisions | |
| Category for GRAPH warnings | Warning | Subcategory 1 for GRAPH warnings | | Subcategory 2 for GRAPH warnings | |

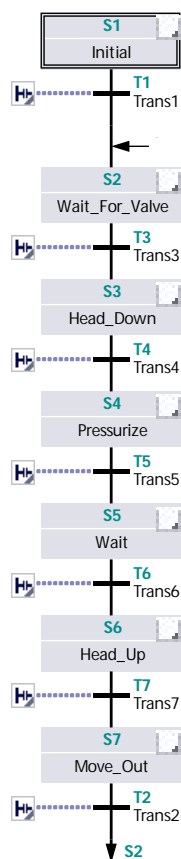
Permanent pre-instructions

1:

Sequences (1)

1:

| | | |
|--|--|--|
| | | |
|--|--|--|

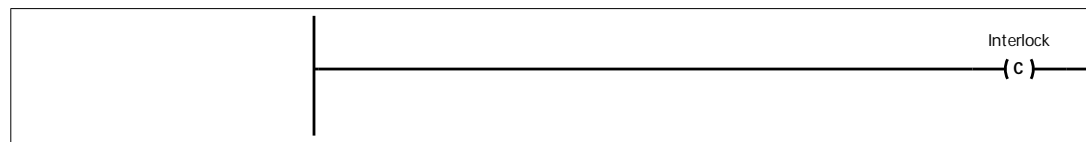


S1 - [Initial step]:Initial

Interlock -(c)-:

Interlock alarm

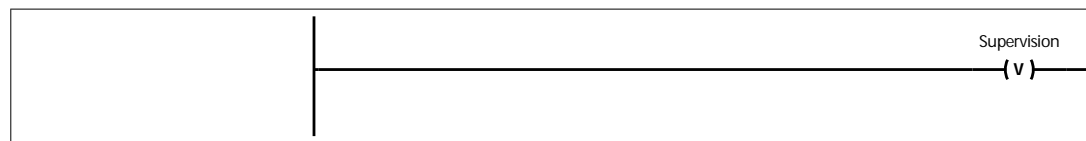
Alarm text



Supervision -(v)-:

Supervision alarm

Alarm text

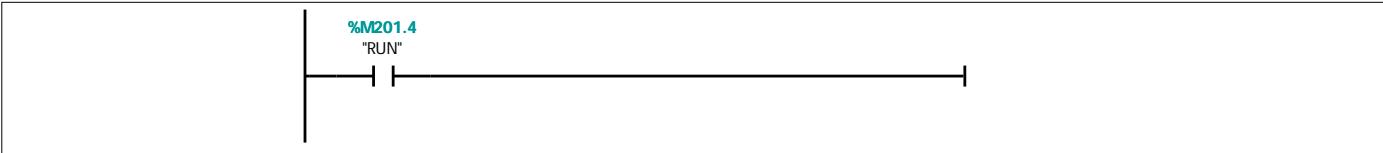


Actions:

Actions:

| Interlock | Event | Qualifier | Action |
|-----------|-------|-----------|--------|
| | | | |

T1:Trans1



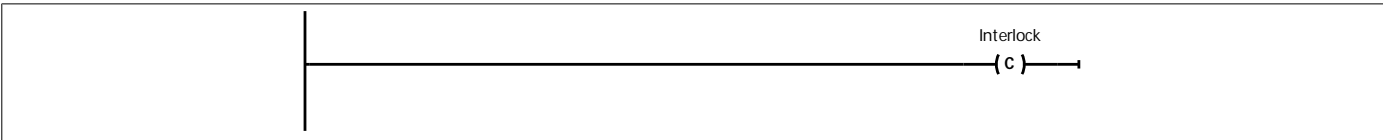
S2:Wait_For_Valve

Step comment

Interlock -(c)-:

Interlock alarm

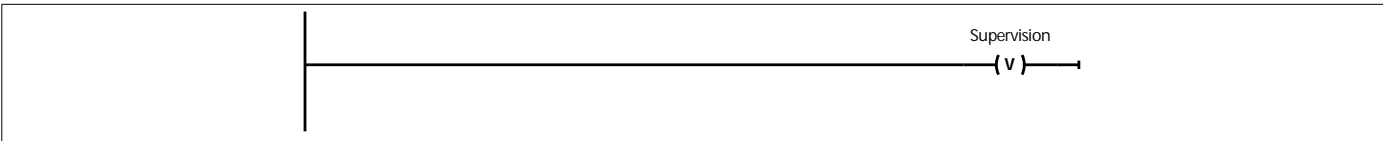
| | |
|------------|----------------|
| Alarm text | Wait_For_Valve |
|------------|----------------|



Supervision -(v)-:

Supervision alarm

| | |
|------------|----------------|
| Alarm text | Wait_For_Valve |
|------------|----------------|

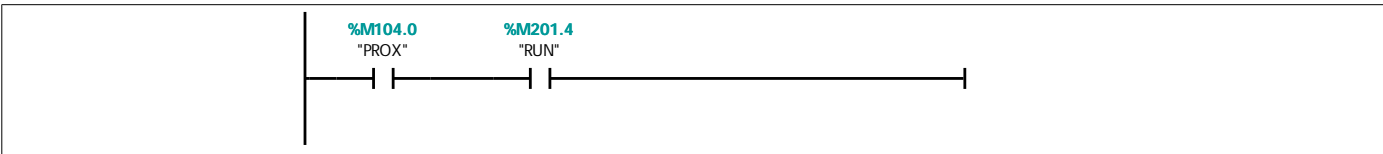


Actions:

Actions:

| Interlock | Event | Qualifier | Action |
|-----------|-------|-----------|--------|
| | | | |

T3:Trans3



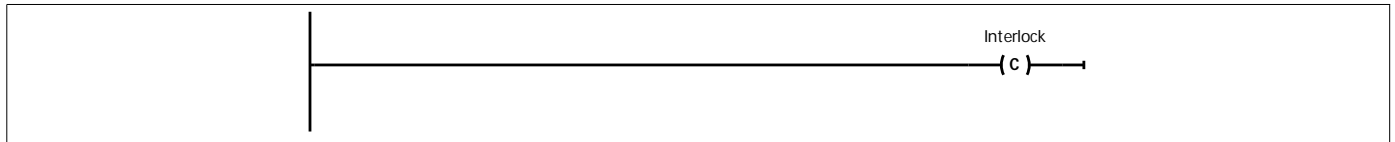
S3:Head_Down

Step comment

Interlock -(c)-:

Interlock alarm

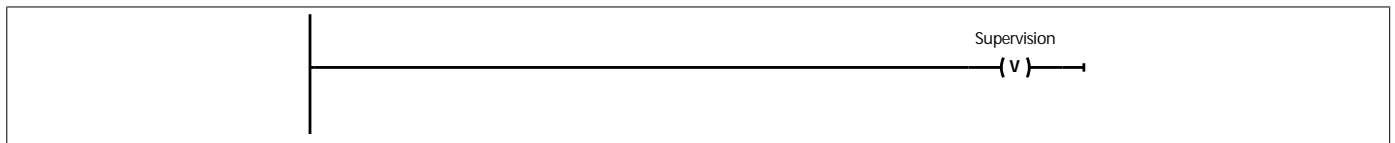
Alarm text Head_Down



Supervision -(v)-:

Supervision alarm

Alarm text Head_Down

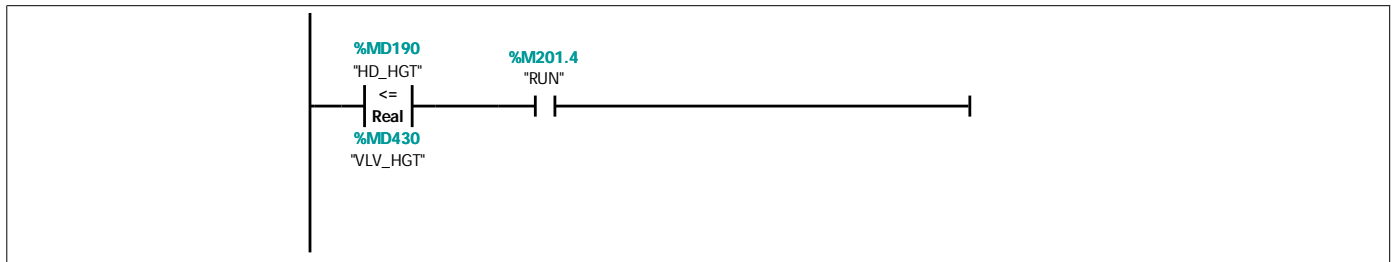


Actions:

Actions:

| Interlock | Event | Qualifier | Action |
|-----------|-------|-----------|------------|
| | | S | "LIFT_SOL" |
| | | N | "HD_DOWN" |
| | | | |

T4:Trans4



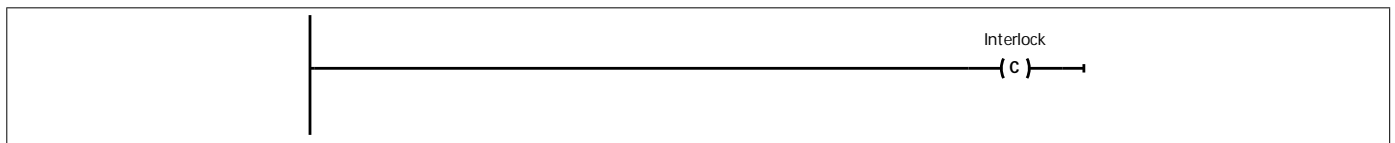
S4:Pressurize

Step comment

Interlock -(c)-:

Interlock alarm

Alarm text Pressurize



Supervision -(v)-:

Supervision alarm

Alarm text Pressurize

Supervision

(v)

Actions:

Actions:

| Interlock | Event | Qualifier | Action |
|-----------|-------|-----------|-----------|
| | | N | "AIR_VLV" |
| | | | |

T5:Trans5

%MD194

"VLV_PRES"

>=

Real

%MD434

"DES_PRES"

%M201.4

"RUN"

S5:Wait

Step comment

Interlock -(c)-:

Interlock alarm

Alarm text Wait

Interlock

(c)

Supervision -(v)-:

Supervision alarm

Alarm text Wait

Supervision

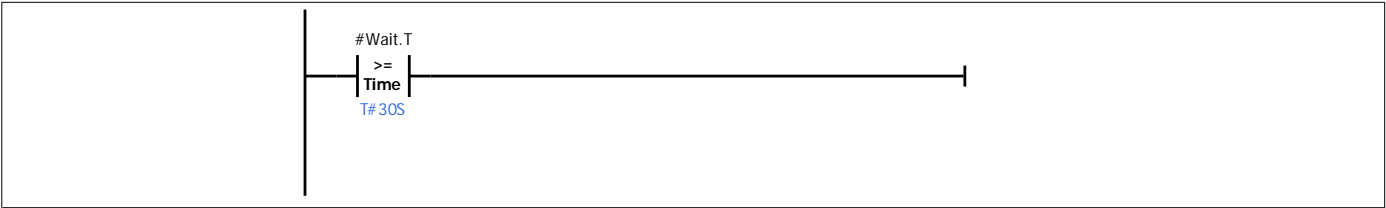
(v)

Actions:

Actions:

| Interlock | Event | Qualifier | Action |
|-----------|-------|-----------|--------|
| | | | |

T6:Trans6



S6:Head_Up

Step comment

Interlock -(c)-:

Interlock alarm

| | |
|------------|---------|
| Alarm text | Head_Up |
|------------|---------|



Supervision -(v)-:

Supervision alarm

| | |
|------------|---------|
| Alarm text | Head_Up |
|------------|---------|

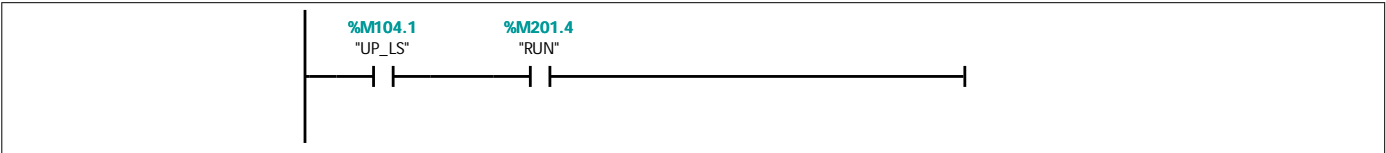


Actions:

Actions:

| Interlock | Event | Qualifier | Action |
|-----------|-------|-----------|---------|
| | | N | "HD_UP" |
| | | | |

T7:Trans7



S7:Move_Out

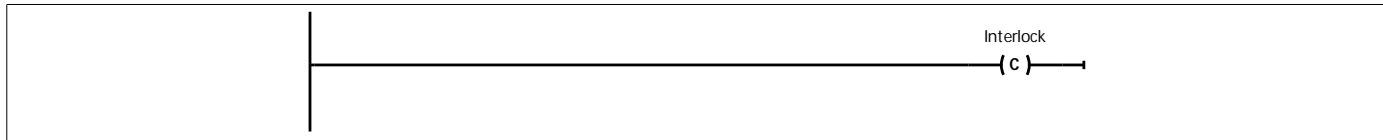
Step comment

| | | |
|--|--|--|
| | | |
|--|--|--|

Interlock -(c)-:

Interlock alarm

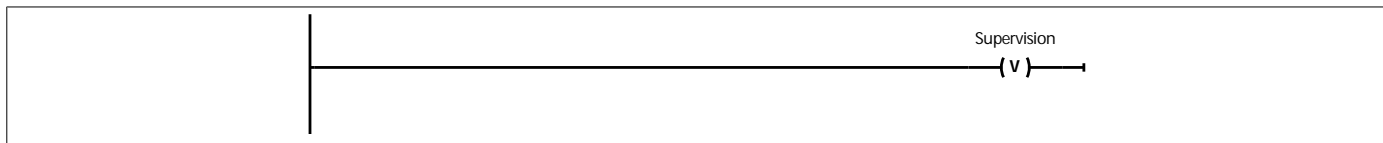
Alarm text Move_Out



Supervision -(v)-:

Supervision alarm

Alarm text Move_Out

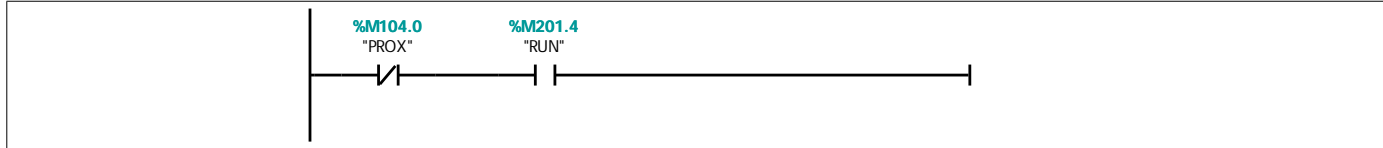


Actions:

Actions:

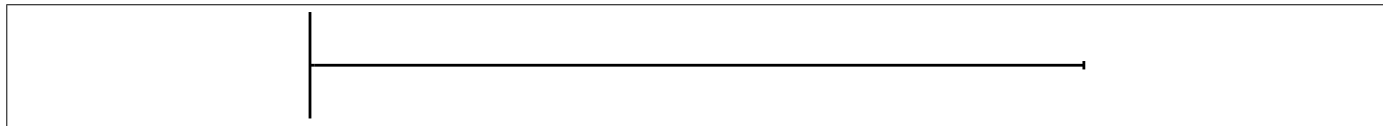
| Interlock | Event | Qualifier | Action |
|-----------|-------|-----------|--------|
| | | | |

T2:Trans2



Permanent post-instructions

1:



Leak_Check_Reset [FB21]

Leak_Check_Reset Properties

General

| | | | | | |
|----------------------|------------------|------------------|--------|-------------------------|-----|
| Name | Leak_Check_Reset | Number | 21 | Type | FB |
| Language | GRAPH | Numbering | Manual | Network language | LAD |
| Block version | V2.0 | | | | |

Information

| | | | | | |
|---------------|--|----------------|-----|------------------------|--|
| Title | | Author | | Comment | |
| Family | | Version | 0.1 | User-defined ID | |

| Name | Data type | Default value | Retain |
|-----------|-----------|---------------|------------|
| ▼ Input | | | |
| OFF_SQ | Bool | false | Non-retain |
| INIT_SQ | Bool | false | Non-retain |
| ACK_EF | Bool | false | Non-retain |
| REG_EF | Bool | false | Non-retain |
| ACK_S | Bool | false | Non-retain |
| REG_S | Bool | false | Non-retain |
| HALT_SQ | Bool | false | Non-retain |
| HALT_TM | Bool | false | Non-retain |
| ZERO_OP | Bool | false | Non-retain |
| EN_IL | Bool | false | Non-retain |
| EN_SV | Bool | false | Non-retain |
| EN_ACKREQ | Bool | false | Non-retain |
| EN_SSKIP | Bool | false | Non-retain |
| DISP_SACT | Bool | false | Non-retain |
| DISP_SEF | Bool | false | Non-retain |
| DISP_SALL | Bool | false | Non-retain |
| S_PREV | Bool | false | Non-retain |
| S_NEXT | Bool | false | Non-retain |
| SW_AUTO | Bool | false | Non-retain |
| SW_TAP | Bool | false | Non-retain |
| SW_TOP | Bool | false | Non-retain |
| SW_MAN | Bool | false | Non-retain |
| S_SEL | Int | 0 | Non-retain |
| S_SELOK | Bool | false | Non-retain |
| S_ON | Bool | false | Non-retain |
| S_OFF | Bool | false | Non-retain |
| T_PREV | Bool | false | Non-retain |
| T_NEXT | Bool | false | Non-retain |
| T_PUSH | Bool | false | Non-retain |
| EN_LMODE | Bool | false | Non-retain |
| ▼ Output | | | |
| S_NO | Int | 0 | Non-retain |
| S_MORE | Bool | false | Non-retain |
| S_ACTIVE | Bool | false | Non-retain |

| | | | |
|--------------------------------------|--|--|--|
| Totally Integrated Automation Portal | | | |
|--------------------------------------|--|--|--|

| Name | Data type | Default value | Retain |
|----------------|-----------------------|---------------|------------|
| S_TIME | Time | T#0ms | Non-retain |
| S_TIMEOK | Time | T#0ms | Non-retain |
| S_STATE | Word | 16#0 | Non-retain |
| T_NO | Int | 0 | Non-retain |
| T_MORE | Bool | false | Non-retain |
| ERROR | Bool | false | Non-retain |
| FAULT | Bool | false | Non-retain |
| ERR_FLT | Bool | false | Non-retain |
| SQ_ISOFF | Bool | false | Non-retain |
| SQ_HALTED | Bool | false | Non-retain |
| TM_HALTED | Bool | false | Non-retain |
| OP_ZEROED | Bool | false | Non-retain |
| IL_ENABLED | Bool | false | Non-retain |
| SV_ENABLED | Bool | false | Non-retain |
| ACKREQ_ENABLED | Bool | false | Non-retain |
| SSKIP_ENABLED | Bool | false | Non-retain |
| SACT_DISP | Bool | false | Non-retain |
| SEF_DISP | Bool | false | Non-retain |
| SALL_DISP | Bool | false | Non-retain |
| AUTO_ON | Bool | false | Non-retain |
| TAP_ON | Bool | false | Non-retain |
| TOP_ON | Bool | false | Non-retain |
| MAN_ON | Bool | false | Non-retain |
| LMODE_ENABLED | Bool | false | Non-retain |
| InOut | | | |
| ▼ Static | | | |
| RT_DATA | G7_RTDataPlus_V2 | | Non-retain |
| Trans1 | G7_Transition-Plus_V2 | | Non-retain |
| Trans2 | G7_Transition-Plus_V2 | | Non-retain |
| Trans3 | G7_Transition-Plus_V2 | | Non-retain |
| Reset_Initial | G7_StepPlus_V2 | | Non-retain |
| Reset_Head_Up | G7_StepPlus_V2 | | Non-retain |
| Reset_Unlatch | G7_StepPlus_V2 | | Non-retain |
| Temp | | | |
| Constant | | | |

Alarms

| | |
|---------------|------|
| Enable alarms | True |
|---------------|------|

| Category | Category enabler | Display class |
|------------|------------------|---------------|
| Error | | 0 |
| Warning | | 0 |
| Info | | 0 |
| Category 4 | | 0 |
| Category 5 | | 0 |
| Category 6 | | 0 |
| Category 7 | | 0 |

| | | |
|--|--|--|
| | | |
|--|--|--|

| | | | | | |
|--|---------|----------------------------------|--|----------------------------------|--|
| Totally Integrated Automation Portal | | | | | |
| Category | | Category enabler | | Display class | |
| Category 8 | | | | 0 | |
| Category for interlocks | Error | Subcategory 1 for interlocks | | Subcategory 2 for interlocks | |
| Category for supervisions | Error | Subcategory 1 for supervisions | | Subcategory 2 for supervisions | |
| Category for GRAPH warnings | Warning | Subcategory 1 for GRAPH warnings | | Subcategory 2 for GRAPH warnings | |
| Permanent pre-instructions | | | | | |
| 1: | | | | | |
| <div></div> | | | | | |
| Sequences (1) | | | | | |
| 1: | | | | | |
| <div><pre>graph TD; S1[S1 Reset_Initial] -- T1 Trans1 --> S2[S2 Reset_Head_Up]; S2 -- T3 Trans3 --> S3[S3 Reset_Unlatch]; S3 -- T2 Trans2 --> S1;</pre></div> | | | | | |
| S1 - [Initial step]:Reset_Initial | | | | | |
| Interlock -(c)-: | | | | | |
| Interlock alarm | | | | | |
| Alarm text | | | | | |
| <div></div> | | | | | |
| | | Interlock (c) | | | |
| | | | | | |
| | | | | | |

Supervision -(v)-:

Supervision alarm

Alarm text

Supervision

(v)

Actions:

Actions:

| Interlock | Event | Qualifier | Action |
|-----------|-------|-----------|--------|
| | | | |

T1:Trans1

%M61.4
"Reset_Trans"

S2:Reset_Head_Up

Step comment

Interlock -(c)-:

Interlock alarm

Alarm textReset_Head_Up

Interlock

(c)

Supervision -(v)-:

Supervision alarm

Alarm textReset_Head_Up

Supervision

(v)

Actions:

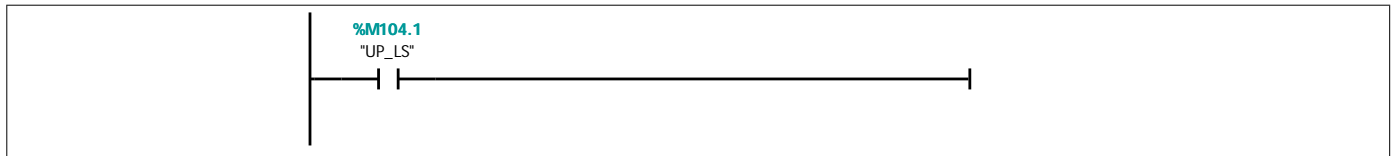
Actions:

| Interlock | Event | Qualifier | Action |
|-----------|-------|-----------|-------------|
| | | S | "Int_Reset" |

N

"HD_UP"

T3:Trans3

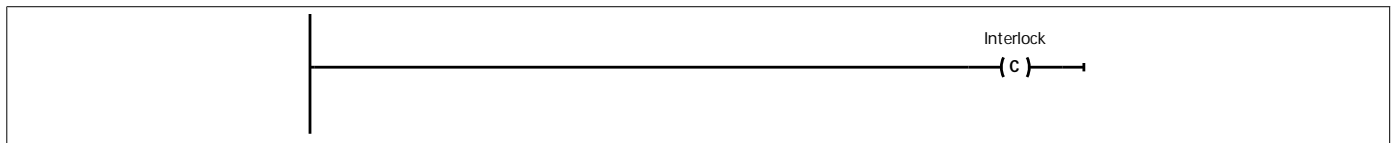


S3:Reset_Unlatch

Step comment

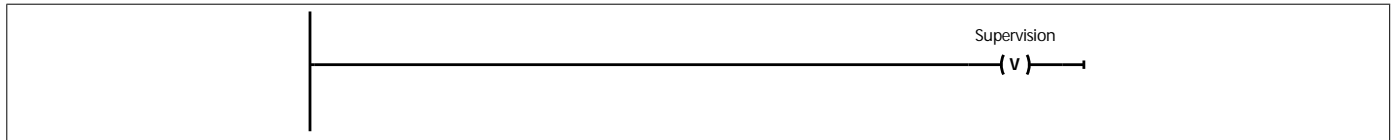
Interlock -(c)-:

| Interlock alarm | |
|-----------------|---------------|
| Alarm text | Reset_Unlatch |



Supervision -(v)-:

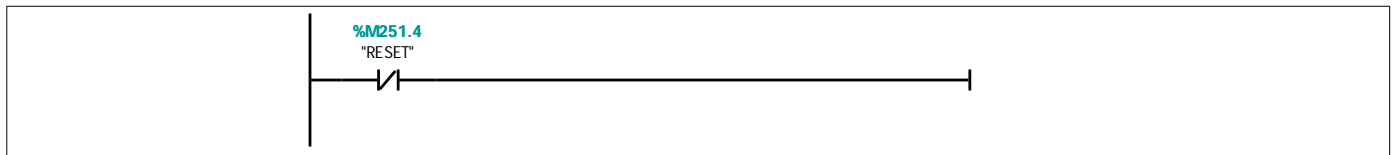
| Supervision alarm | |
|-------------------|---------------|
| Alarm text | Reset_Unlatch |



Actions:

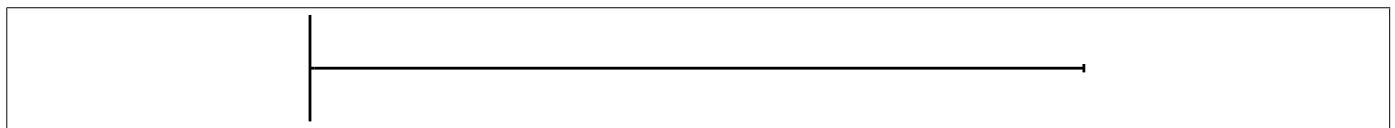
| Actions: | | | |
|-----------|-------|-----------|-------------|
| Interlock | Event | Qualifier | Action |
| | | R | "Int_Reset" |
| | | | |

T2:Trans2



Permanent post-instructions

1:



Simulation [FB10]

Simulation Properties

General

| | | | | | |
|-----------------|------------|------------------|--------|-------------|----|
| Name | Simulation | Number | 10 | Type | FB |
| Language | LAD | Numbering | Manual | | |

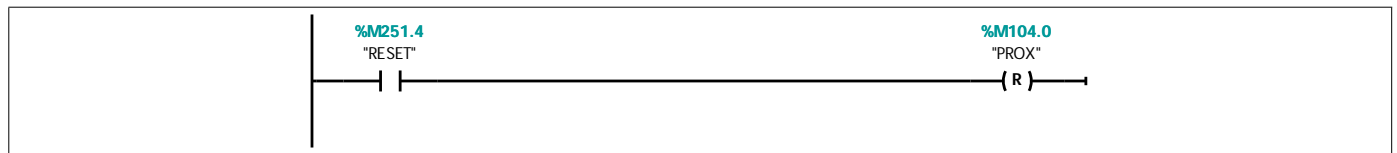
Information

| | | | | | |
|---------------|--|----------------|-----|------------------------|--|
| Title | | Author | | Comment | Copyright (c) 2011 Dogwood Valley Press, LLC SIMULATION LOGIC |
| Family | | Version | 0.1 | User-defined ID | |

| Name | Data type | Default value |
|--------------|-----------|---------------|
| Input | | |
| Output | | |
| InOut | | |
| ▼ Static | | |
| Sim_Tmr0 | TON_TIME | |
| Sim_Tmr1 | TON_TIME | |
| Sim_Tmr2 | TON_TIME | |
| Sim_Tmr3 | TON_TIME | |
| Sim_Tmr4 | TON_TIME | |
| Sim_Tmr5 | TON_TIME | |
| Sim_Tmr6 | TON_TIME | |
| Sim_Tmr7 | TON_TIME | |
| Sim_Tmr1_IN | Bool | false |
| HD_Up_NTrans | Bool | false |
| Sim_Tmr4_Q | Bool | false |
| Sim_Tmr5_Q | Bool | false |
| Sim_Tmr6_Q | Bool | false |
| Sim_Tmr7_Q | Bool | false |
| Sim_TmpInt | Int | 0 |
| Temp | | |
| Constant | | |

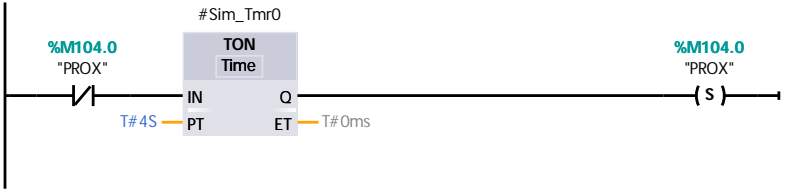
Network 1:

On reset, reset PROX

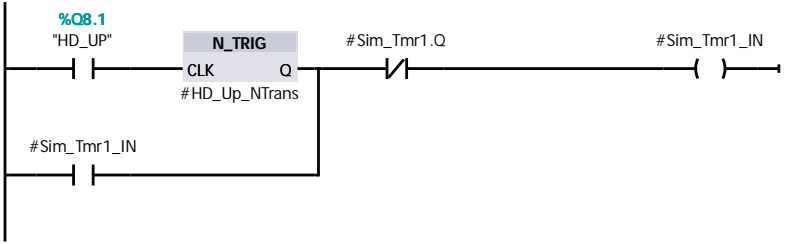


Network 2:

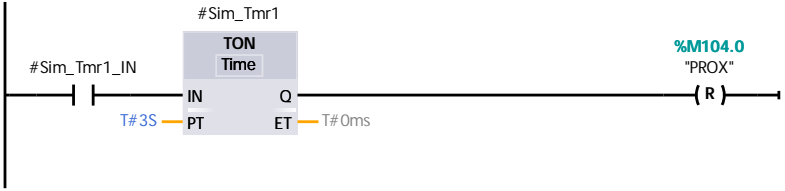
PROX simulation: Set when PROX off for 4 secs.
Reset 3 secs after HD_UP transitions off



Network 3:

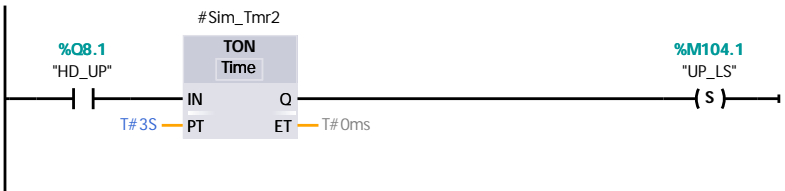


Network 4:

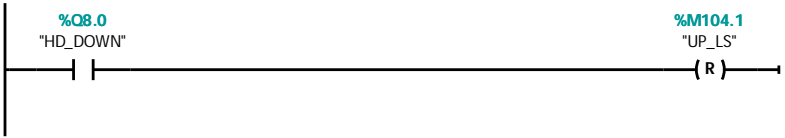


Network 5: Limit switch that closes (on) when pressurizing head is fully up

UP_LS simulation: Latch when HD_UP on for 3 sec. Unlatch when HD_DOWN



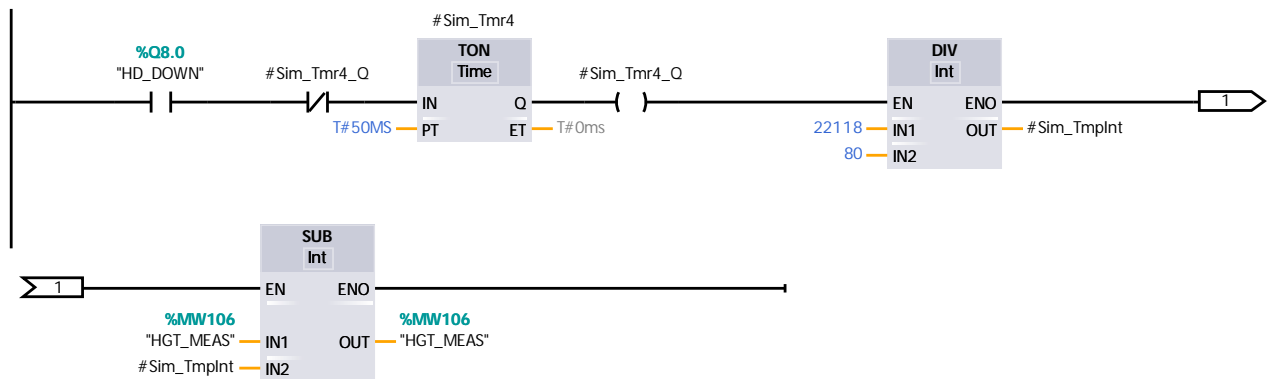
Network 6: Limit switch that closes (on) when pressurizing head is fully up



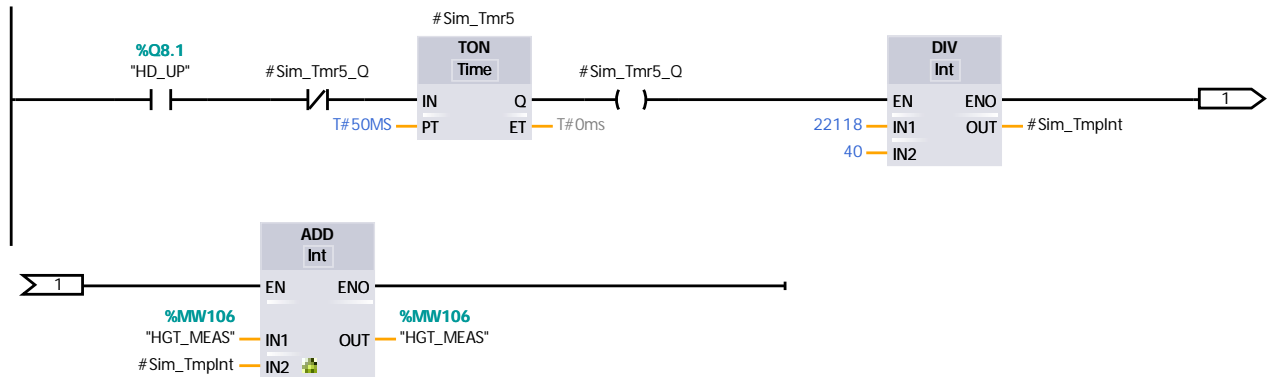
Network 7:

HGT_MEAS Simulation: When HD_DOWN, decrement every 50 ms by 22118/80, meaning it goes from high to low in 4 sec. Also make sure no less than 5530.

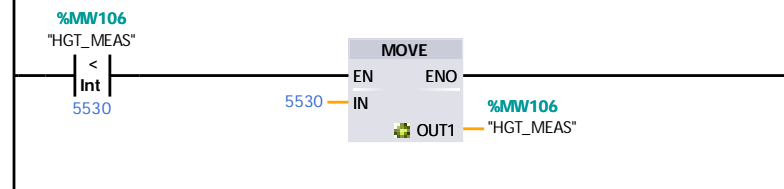
When HD_UP increment every 50 ms by 22118/40 meaning it goes to high in at most 2 sec, and then make sure not larger than 27648



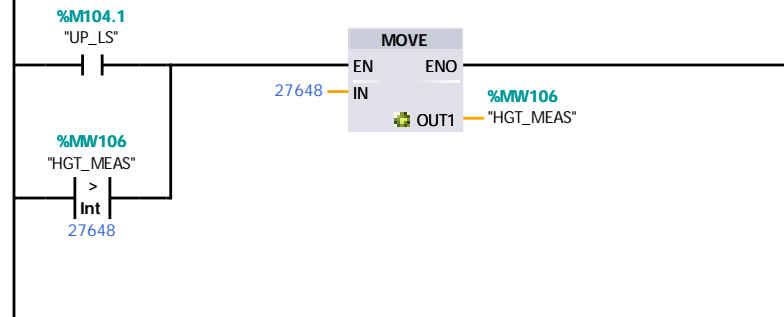
Network 8:



Network 9:

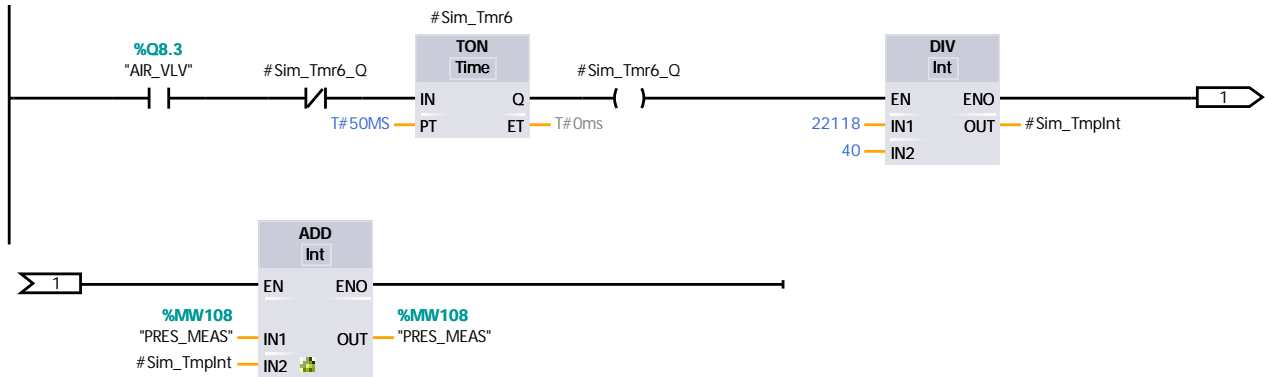


Network 10:

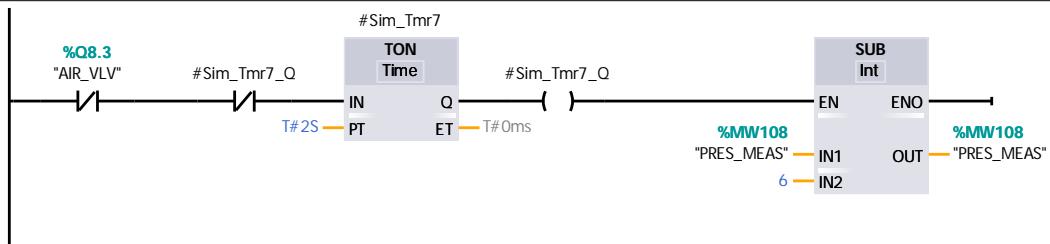


Network 11:

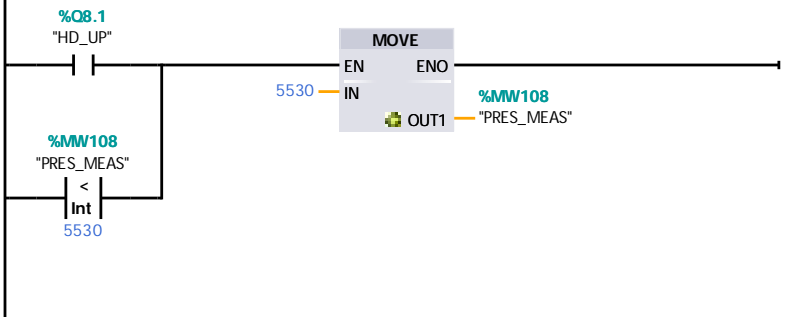
PRESS_MEAS Simulation: When AIR_VLV, increment every 50 ms by 22118/40, meaning it goes from low to high in 4 sec.
When AIR_VLV off, decrement every 2 sec by 6 meaning a slow leak, and then make sure not less than zero. HD_UP also resets it.



Network 12:



Network 13:



Network 14:

