

Main [OB1]

Main Properties

General

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

Information

| | | | | | |
|---------------|--------|----------------|-----|------------------------|--|
| Title | SP7-13 | 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: SP7-13

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SP7-13 Batch Reactor Control

Additional internal memory:

Tag Address

Run %M5.0 BOOL On while batch running

Step_1 to Step_6 %M0.1 to M0.6 BOOL Step-in-progress bits

Fast_Agit_Tmr %DB1 IEC_TIMER Timer fast agitation step

Decr_Agit_Tmr %DB2 IEC_TIMER Timer decreasing agitation step

Count_A %DB3 IEC_COUNTER Measures amount of A being added

Count_B %DB4 IEC_COUNTER Measures amount of B being added

Count_Out %DB5 IEC_COUNTER Measures amount of product being drained

Count_A_Acc %MW150 INT Count_A accumulator

Count_B_Acc %MW152 INT Count_B accumulator

Count_Out_Acc %MW154 INT Count_Out accumulator

Decr_Agit_Acc %MD158 TIME Decr_Agit_Tmr accumulator

TmpDI %MD120 DINT Temporary double integer

TmpR %MD124 REAL Temporary real

TmpR2 %MD128 REAL Temporary real

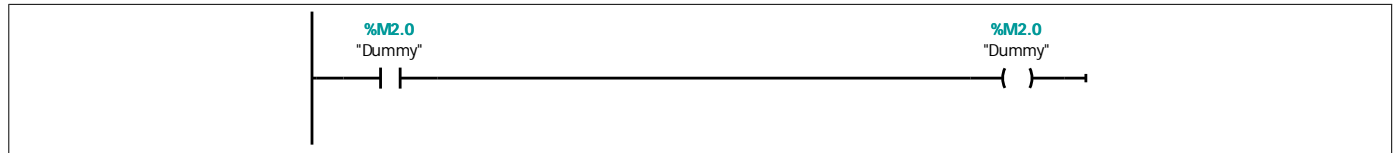
Ret_Val %MW12 WORD Return value from SCALE block

Conversion formulas

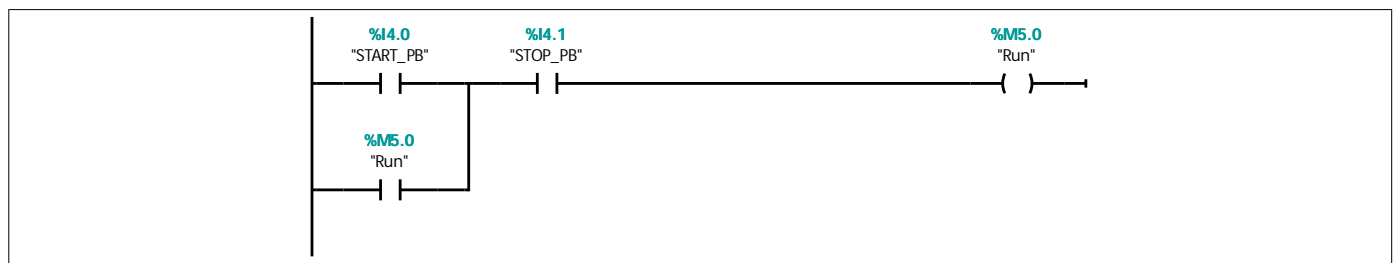
$$\text{AGIT_CURR} = ((\text{ACUR_MEAS} - 5530) / 22118) * (100)$$

$$\text{AGIT_AO} = (\text{AGIT_RPM} / 1000) * (22118) + 5530$$

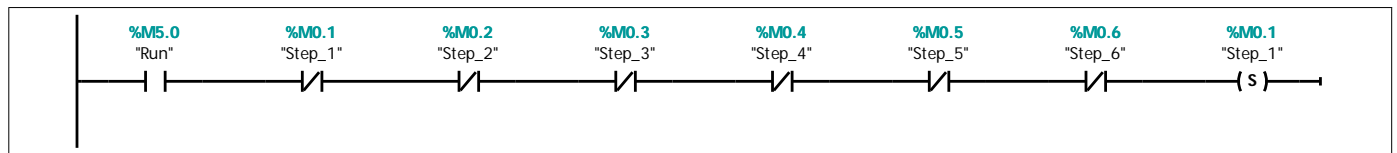
In Step_5, AGIT_RPM = 500 - Decr_Agit_Tmr/10000
because accum of TON has resolution of 1 ms, ranges from 0 to 2400000 over 40 minutes.



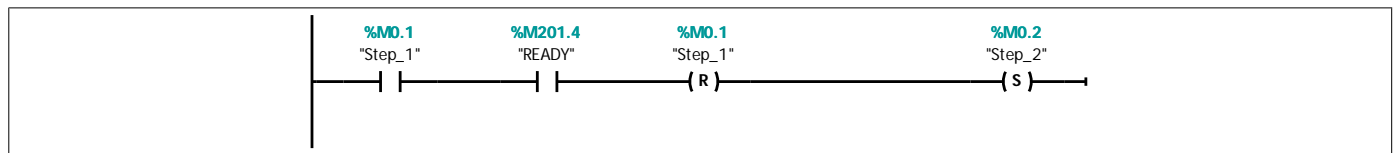
Network 2: Start/Stop



Network 3: Initial Start



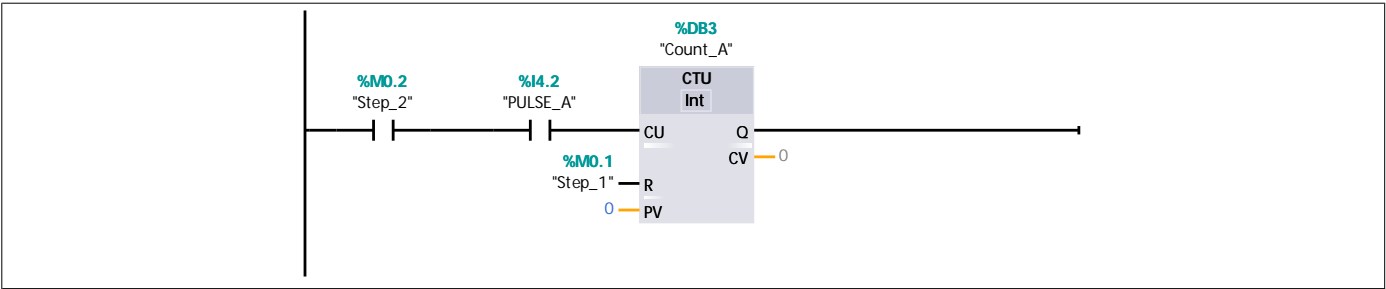
Network 4: Step 1 Wait for ready permissive



Network 5: Step 2 Counter

Note that the PV is not used and the CV must be converted to a real before it can be compared.

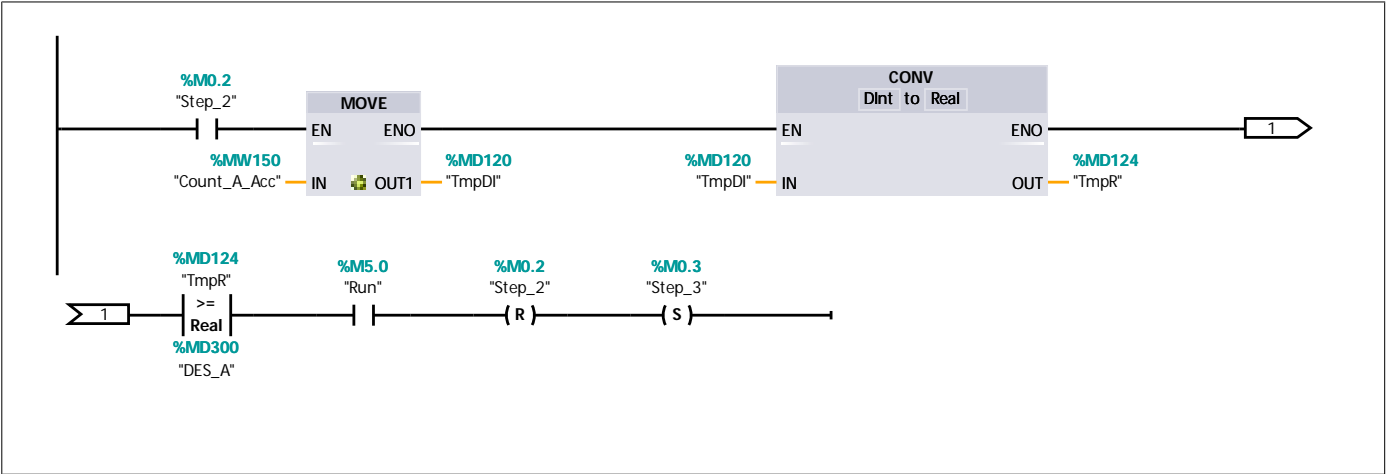
An alternate way is to convert the desired amount to an integer and use it as the PV and the .Q of the counter for the transition condition.



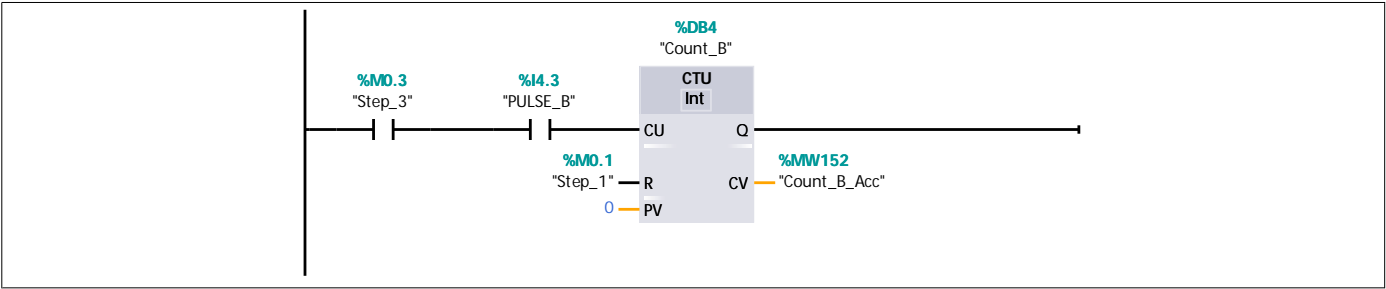
Network 6: Step 2 Fill A

Note that the PV is not used and the CV must be converted to a real before it can be compared.

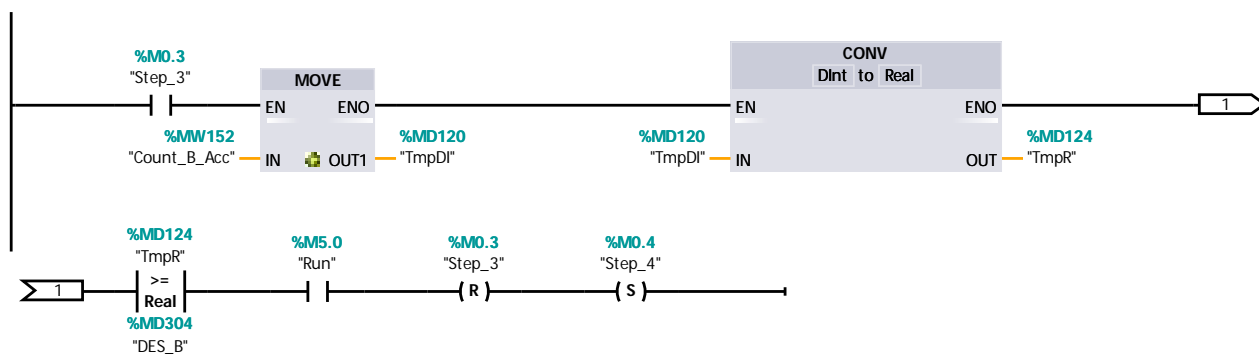
An alternate way is to convert the desired amount to an integer and use it as the PV and the .Q of the counter for the transition condition.



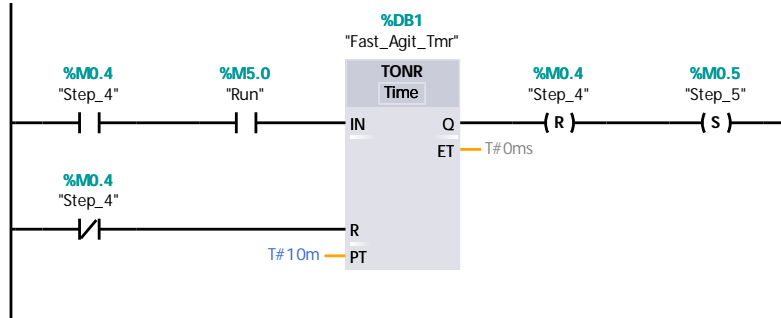
Network 7: Step 3 Counter



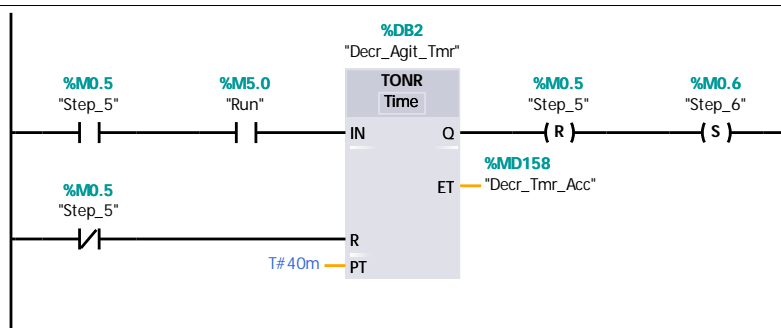
Network 8: Step 3 Fill B



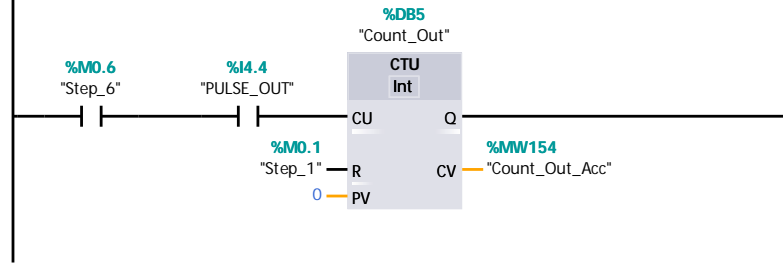
Network 9: Step 4. Agitate at constant speed.



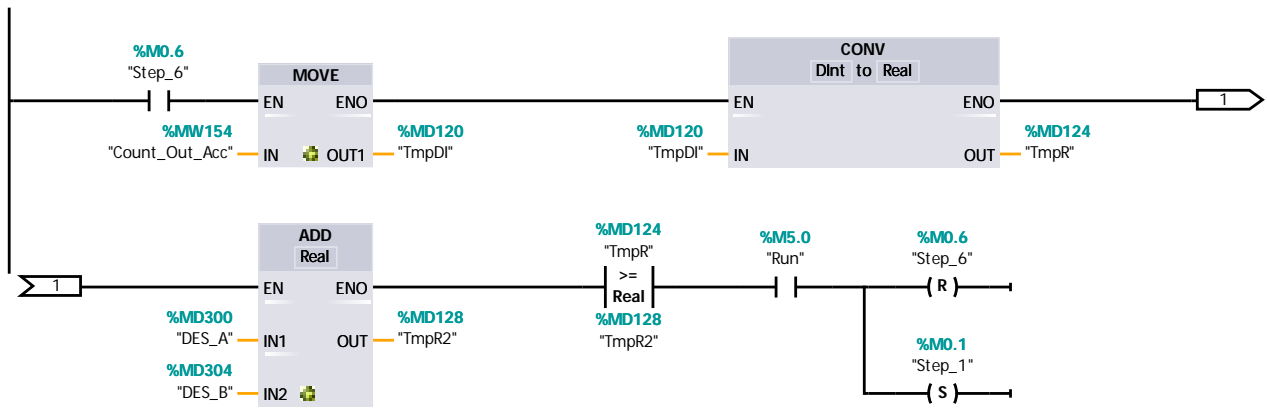
Network 10: Step 5 Agitate at decreasing speed



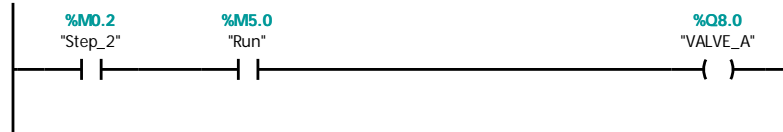
Network 11: Step 6 - Counter



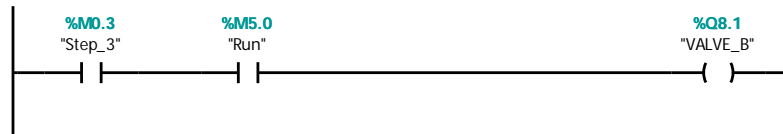
Network 12: Step 6 - Drain tank



Network 13: Valves

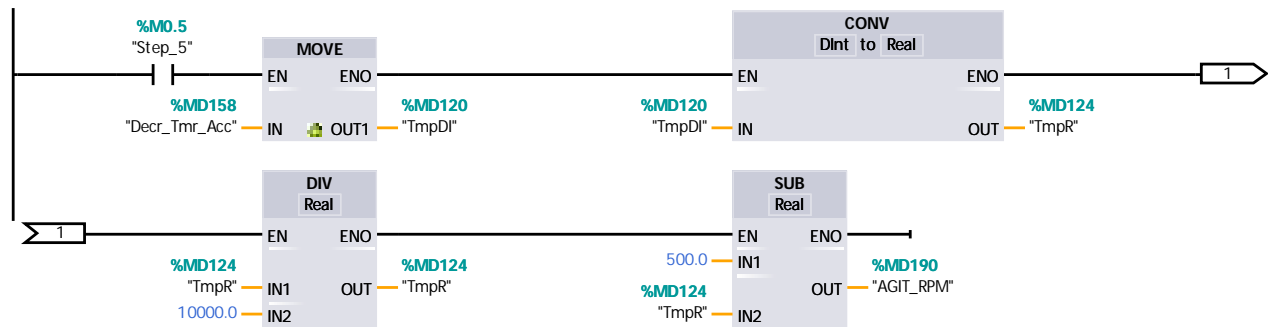


Network 14: Solenoid valve to allow ingredient B to flow into mixing vessel



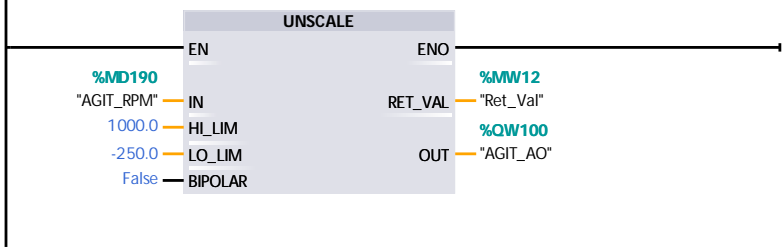
Network 15: Solenoid valve to allow flow out of mixing vessel

| | | |
|---|--|--|
| Totally Integrated Automation Portal | | |
| <div><div></div><div><div>%M0.6 "Step_6"</div><div>%M5.0 "Run"</div><div>%Q8.2 "VALVE_OUT"</div></div><div></div></div> | | |
| Network 16: Air Valve | | |
| <div><div></div><div><div>%M0.3 "Step_3"</div><div>%M0.4 "Step_4"</div><div>%M0.5 "Step_5"</div><div>%M0.6 "Step_6"</div></div><div><div>%M201.4 "READY"</div><div>%Q8.3 "AGIT_ON"</div></div><div></div></div> | | |
| Network 17: Control Agitator RPM | | |
| <div><div></div><div><div>%M0.3 "Step_3"</div></div><div><div>MOVE</div><div>100.0 IN</div><div>EN</div><div>ENO</div><div>OUT1</div><div>%MD190 "AGIT_RPM"</div></div><div></div></div> | | |
| Network 18: | | |
| <div><div></div><div><div>%M0.4 "Step_4"</div></div><div><div>MOVE</div><div>500.0 IN</div><div>EN</div><div>ENO</div><div>OUT1</div><div>%MD190 "AGIT_RPM"</div></div><div></div></div> | | |
| Network 19: Calculate agitator RPM in step 5 | | |
| <p>Agitator speed decreases from 500 to 240 over 40 minutes (2400 seconds). Since the timer accumulator is in ms, divide accumulator by 10000 and subtract from 500.</p> | | |
| | | |



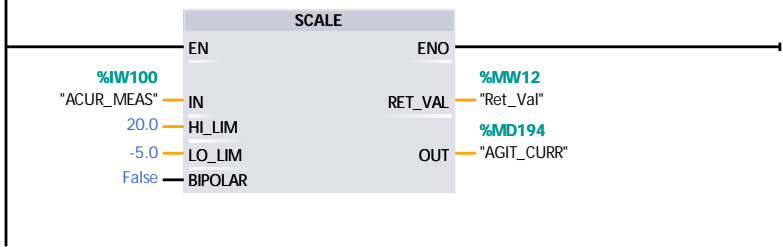
Network 20: Convert AGIT_RPM into AGIT_AO with UNSCALE

Convert AGIT_RPM into AGIT_AO.
Uses UNSCALE block. Note that the lo_lim input is 25% lower than zero RPM to account for this block assuming the minimum value of the analog out is zero rather than the 5530 (which corresponds to 4 mA).

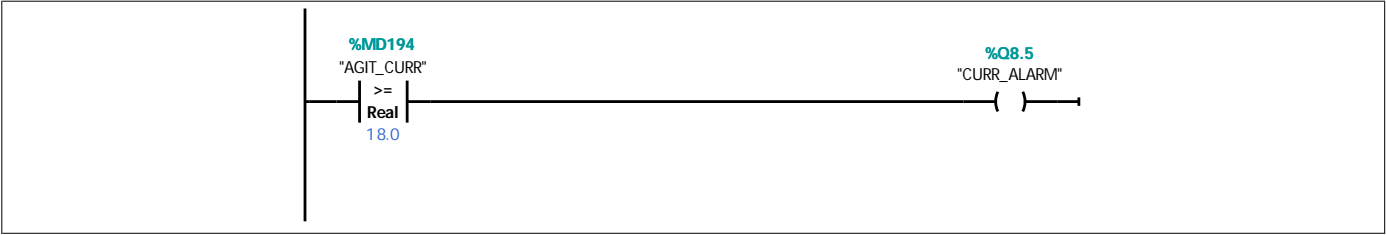


Network 21: Convert current measurement with SCALE

Convert current measurement to amperes.
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 22: Current alarm



Network 23: Current warning

On when agitator current is between 15 amps and 18 amps

