

## Main\_Program [OB1]

### Main\_Program Properties

#### General

<b>Name</b>	Main_Program	<b>Number</b>	1	<b>Type</b>	OB
<b>Language</b>	LAD	<b>Numbering</b>	Manual		

#### Information

<b>Title</b>	SP7-13	<b>Author</b>		<b>Comment</b>	
<b>Family</b>		<b>Version</b>	0.1	<b>User-defined ID</b>	

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 TON\_SFB Tic timer fast agitation step

Decr\_Agit\_Tmr DB2 TON\_SFB Tic timer decreasing agitation step

Count\_A DB3 CTU\_SFB Measures amount of A being added

Count\_B DB4 CTU\_SFB Measures amount of B being added

Count\_Out DB5 CTU\_SFB Measures amount of product being drained

Fast\_Agit\_Ctr DB6 CTU\_SFB Counter for fast agit timer

Decr\_Agit\_Ctr DB7 CTU\_SFB Counter for decr agit timer

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

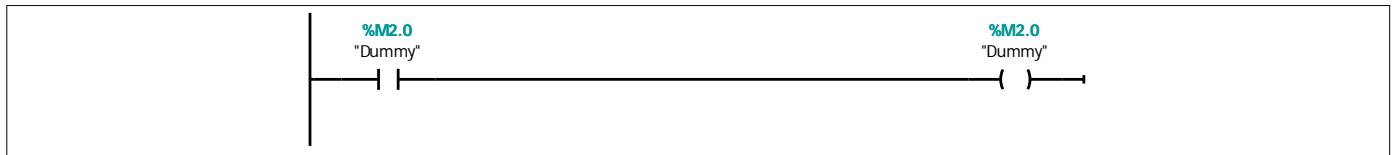
TmpR2 MD128 REAL Temporary real  
Ret\_Val MW12 WORD Return value from SCALE block  
Always\_Off M10.0 BOOL Always off bit for SCALE block

Conversion formulas

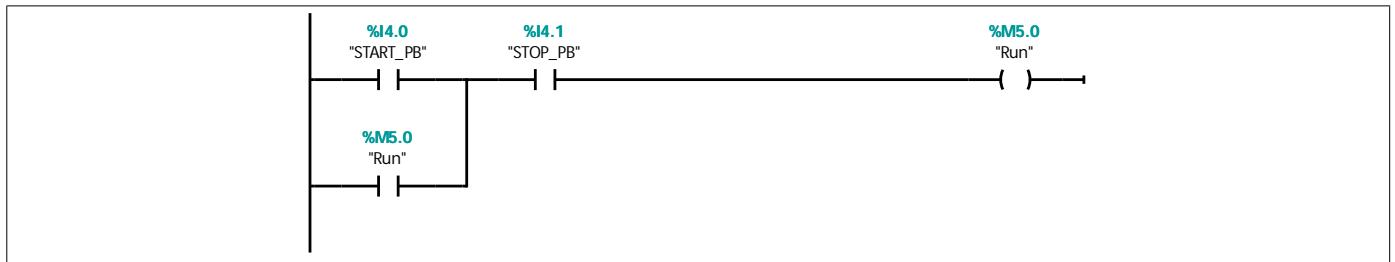
$AGIT\_CURR = ((ACUR\_MEAS - 5530) / 22118) * (100)$

$AGIT\_AO = (AGIT\_RPM / 1000) * (22118) + 5530$

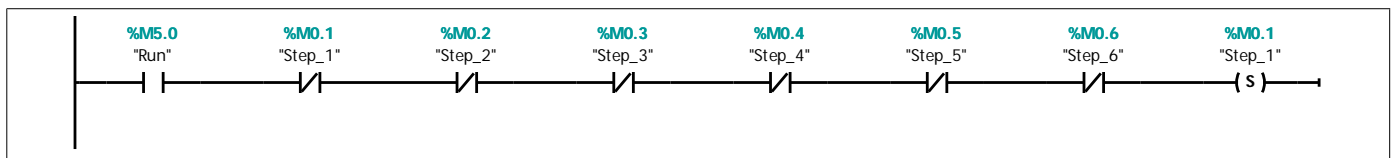
In Step\_5, AGIT\_RPM = 500 - Decr\_Agit\_Tmr/10000  
because accum of TON has resolution of 1 ms, ranges from 0 to  
to 2400000 over 40 minutes.



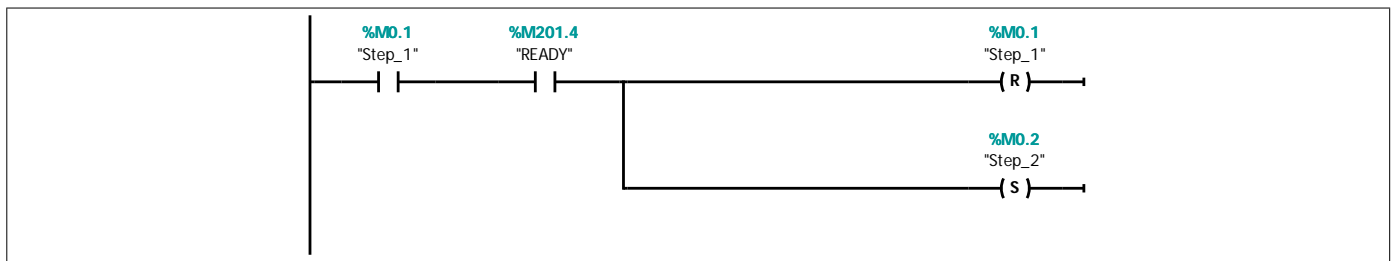
### Network 2: Start/Stop



### Network 3: Initial Start



### Network 4: Step 1 Wait for ready permissive

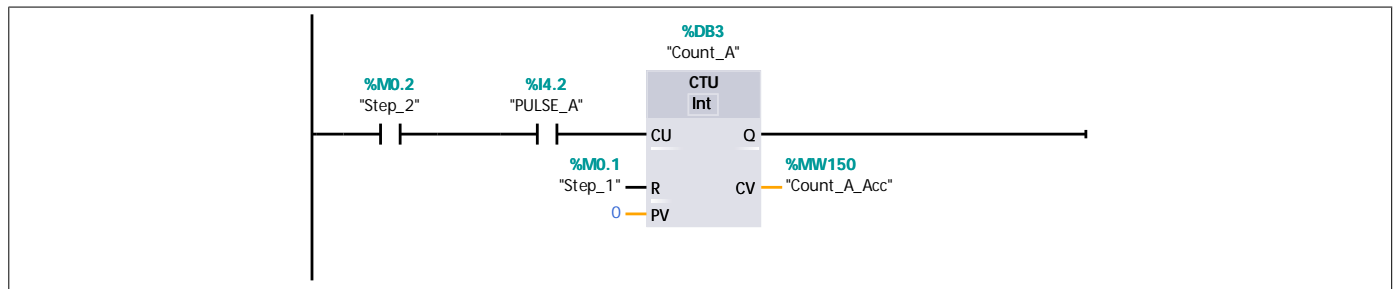


### Network 5: Step 2 Counter

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

can be compared.

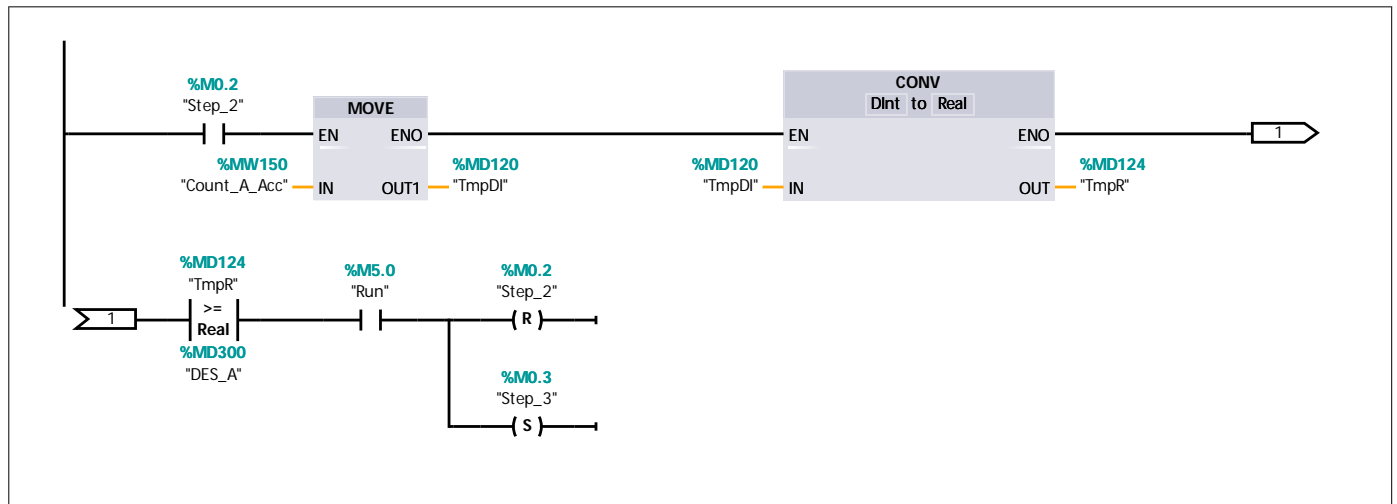
An alternate way is to convert the desired amount to an integer and use it as the PV and the .Q of the counter for the transition condition.



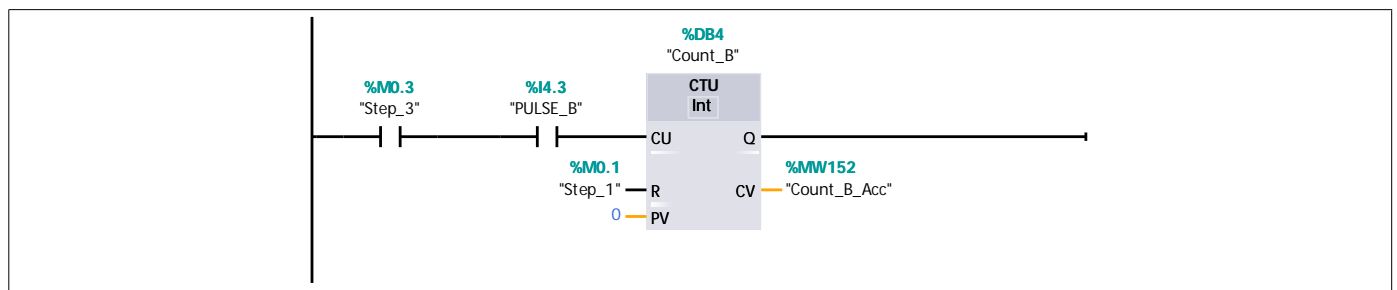
## Network 6: Step 2 Fill A

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

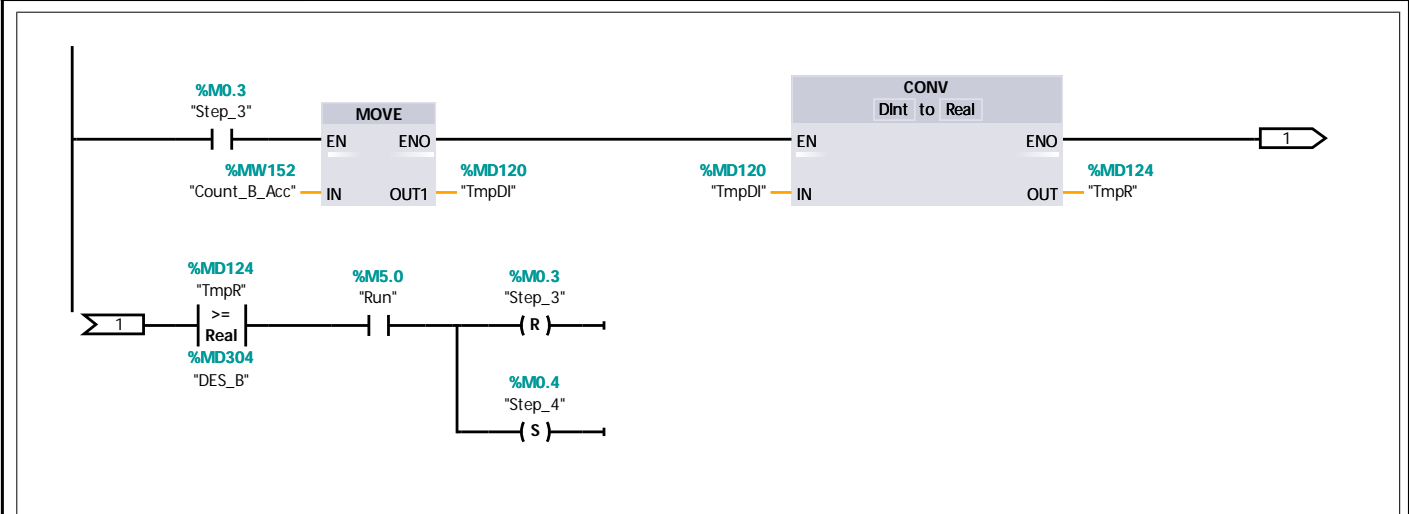
An alternate way is to convert the desired amount to an integer and use it as the PV and the .Q of the counter for the transition condition.



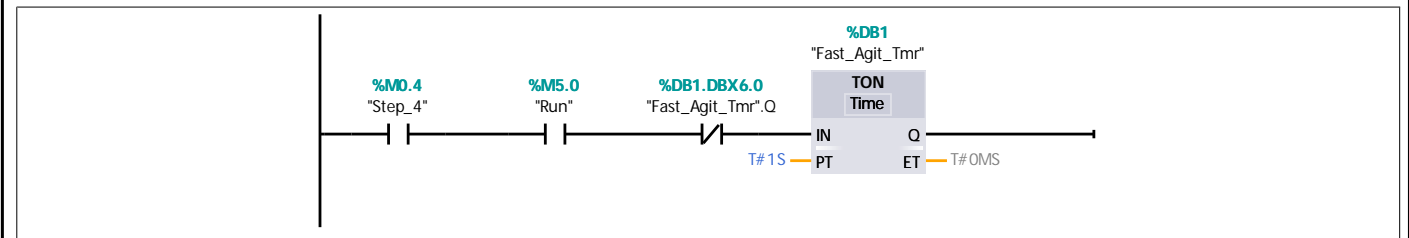
## Network 7: Step 3 Counter



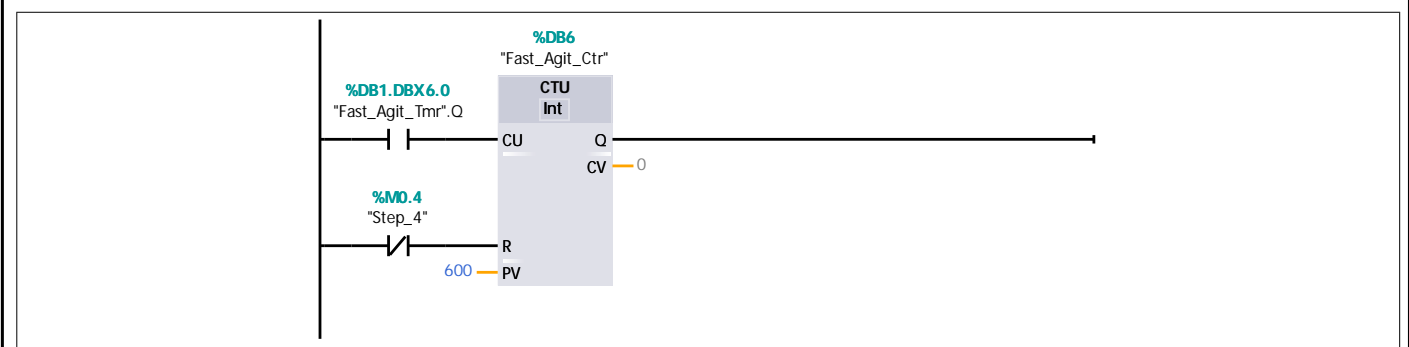
## Network 8: Step 3 Fill B



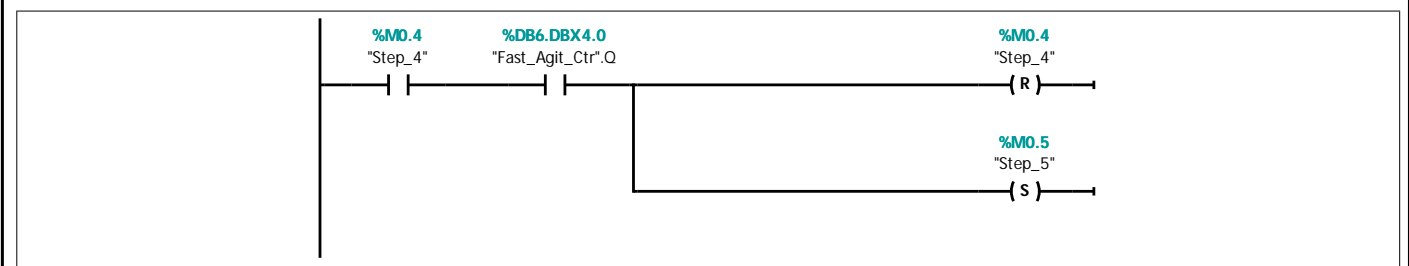
**Network 9: Step 4. Tic timer for retentive timer**



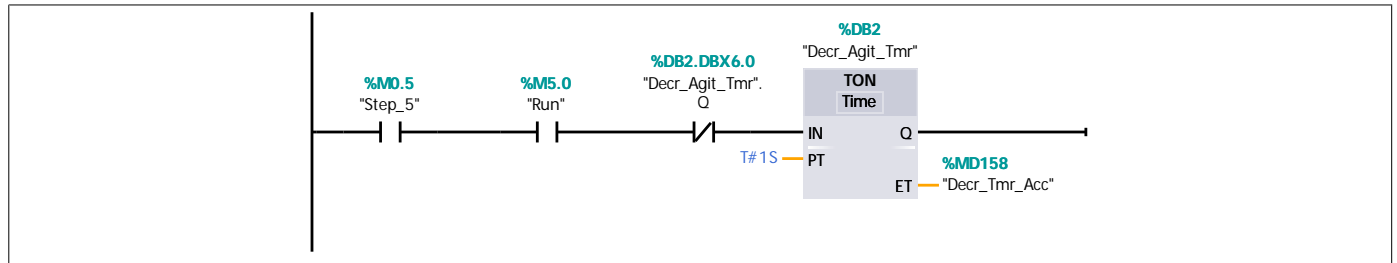
**Network 10: Step 4. Counter for retentive timer**



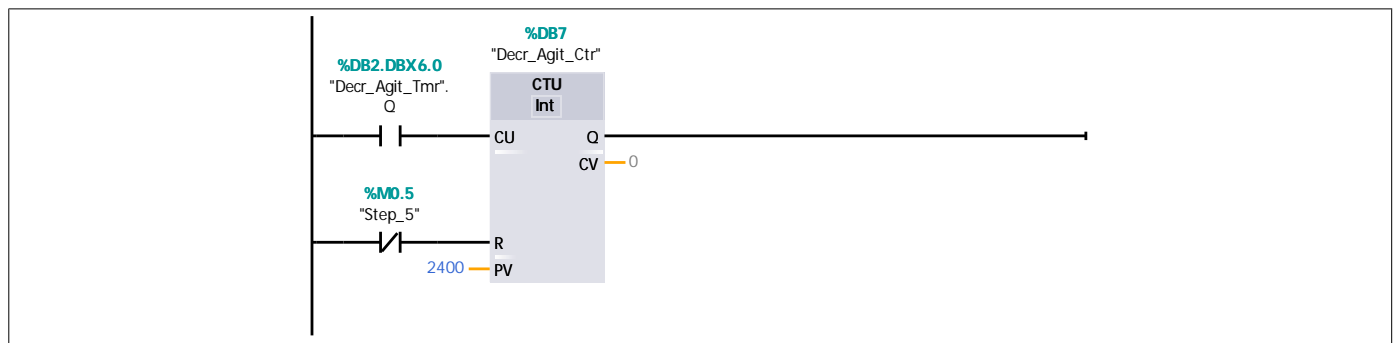
**Network 11: Step 4. Agitate at constant speed.**



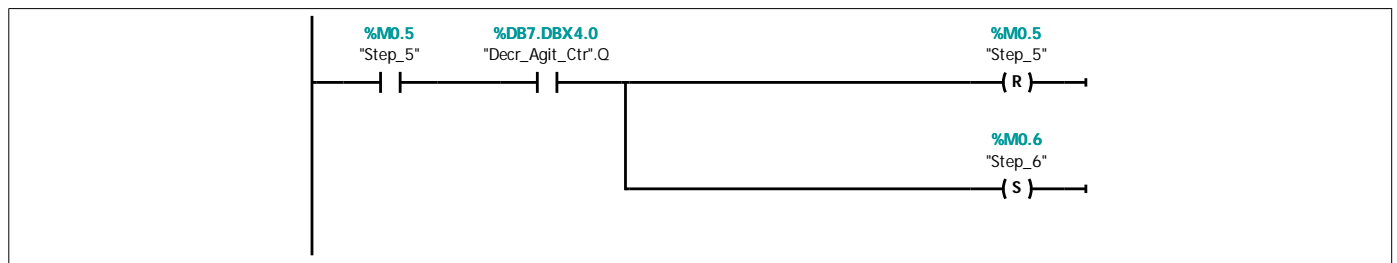
### Network 12: Step 5. Tic timer for retentive timer



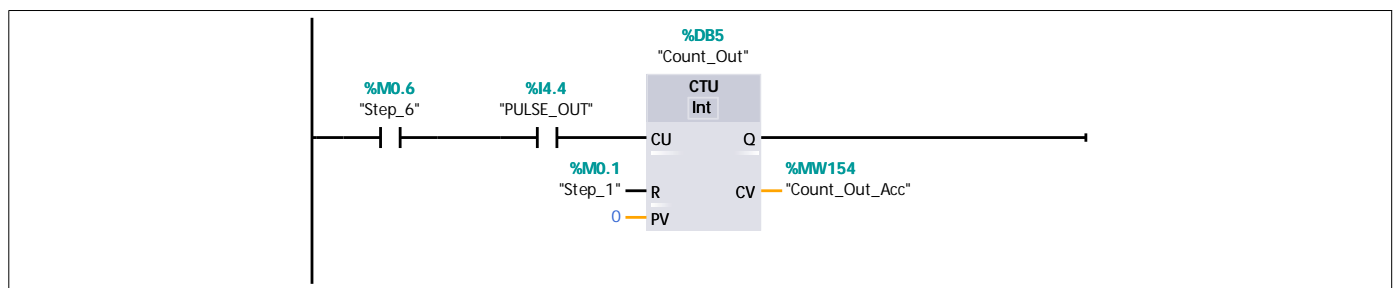
### Network 13: Step 5. Counter for retentive timer



### Network 14: Step 5 Agitate at decreasing speed

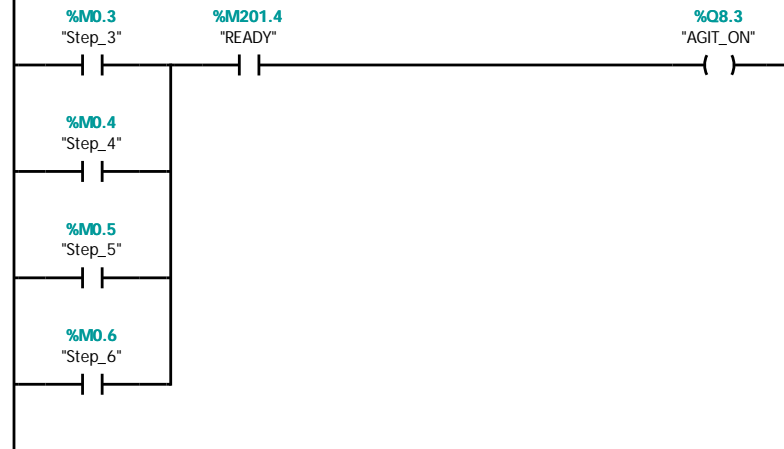


### Network 15: Step 6 - Counter



### Network 16: Step 6 - Drain tank





### Network 21: Control Agitator RPM

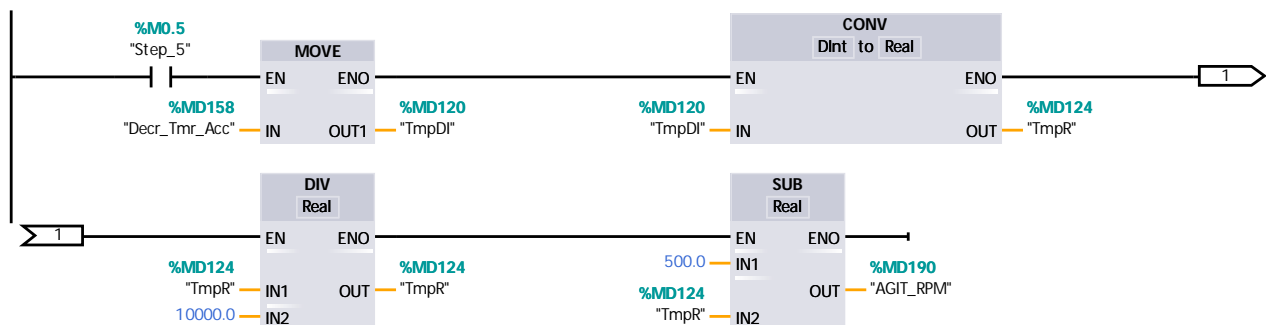


### Network 22:



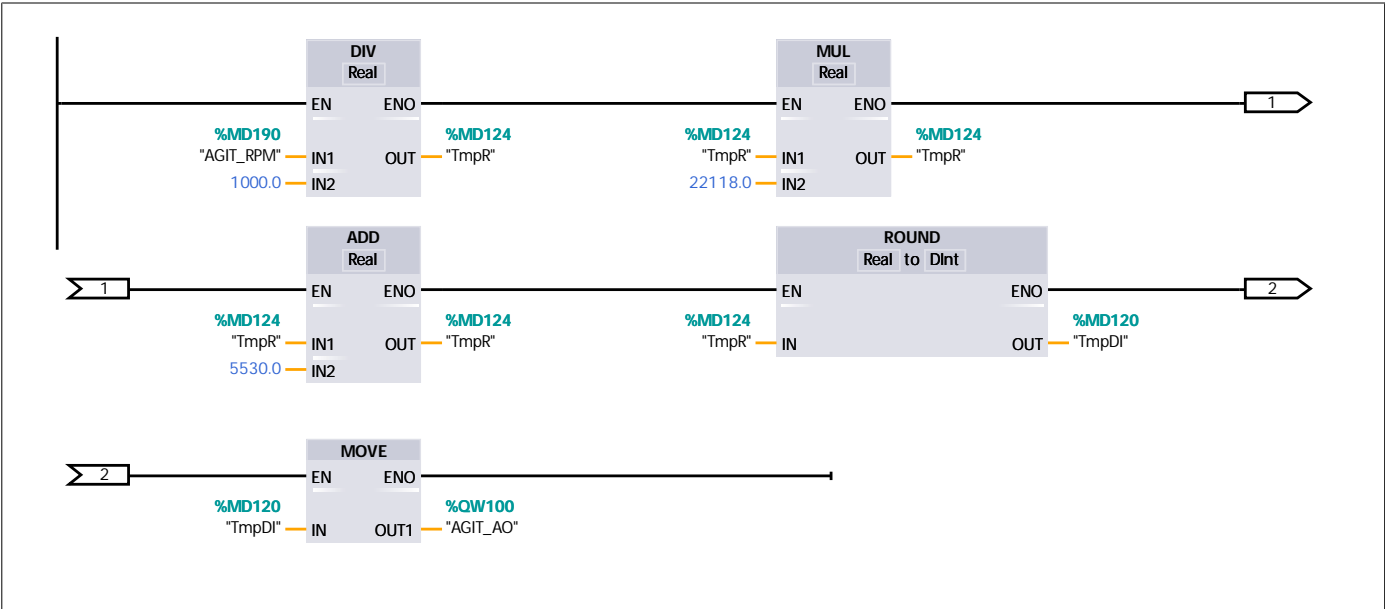
### Network 23: Calculate agitator RPM in step 5

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.

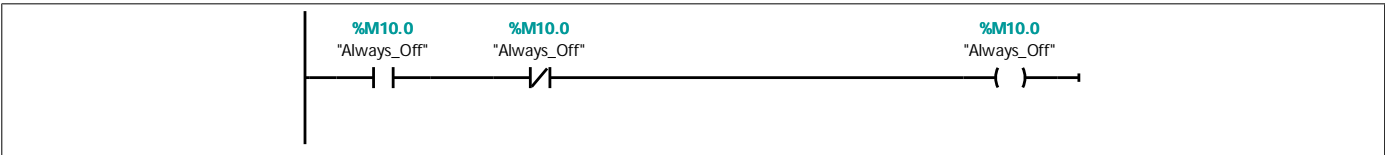


### Network 24: Convert AGIT\_RPM into AGIT\_AO with comp blocks

Convert AGIT\_RPM into AGIT\_AO.  
Uses individual computation blocks.

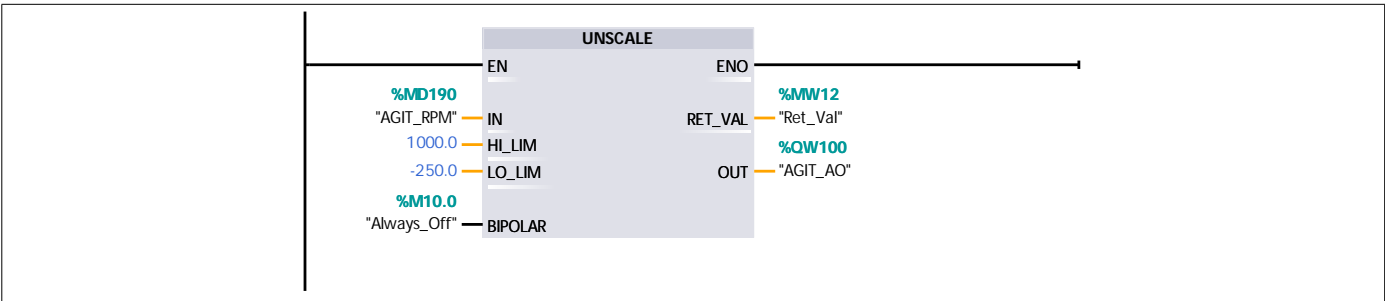


### Network 25: Always Off



### Network 26: Convert AGIT\_RPM into AGIT\_AO with UNSCALE

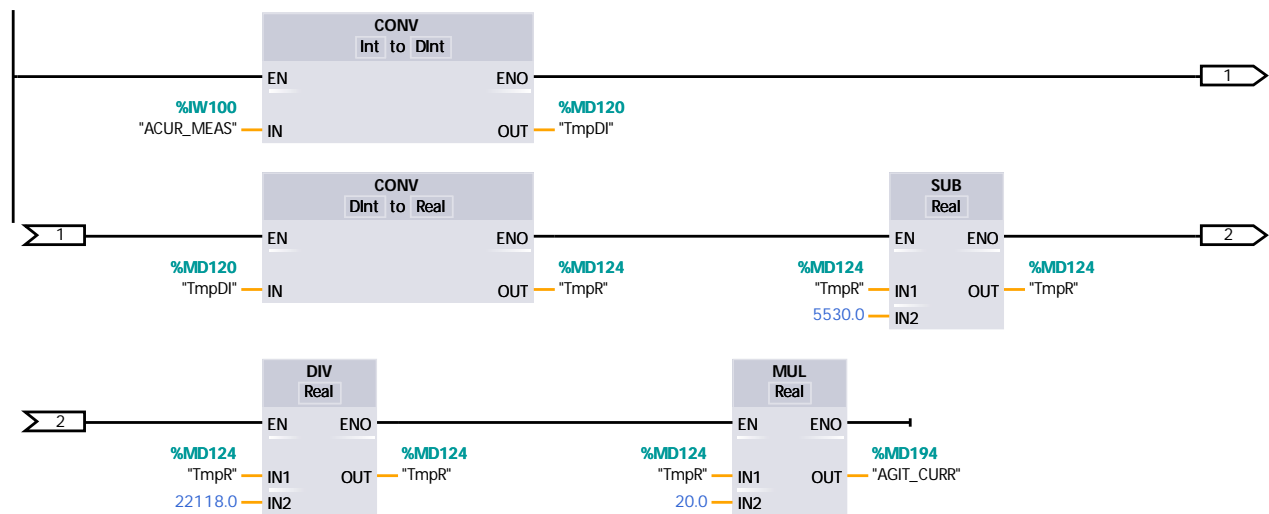
Convert AGIT\_RPM into AGIT\_AO.  
Uses UNSCALE block. Note that the lo\_lim input is 25% lower than zero RPM to account for this block assuming the minimum value of the analog out is zero rather than the 5530 (which corresponds to 4 mA).



### Network 27: Convert current measurement with comp blocks

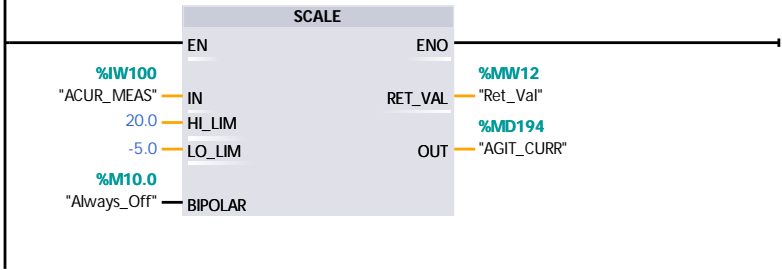
Convert current measurement to amperes.  
Uses individual computation blocks.



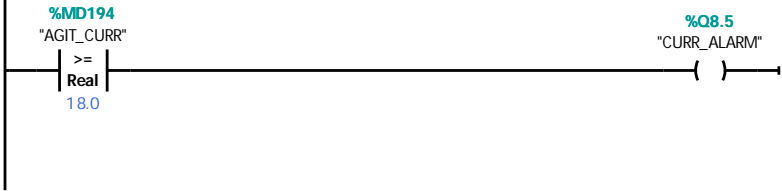


**Network 28: Convert current measurement with SCALE**

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 29: Current alarm**



**Network 30: Current warning**

On when agitator current is between 15 amps and 18 amps

