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2

3 Batch Reactor Control

4 Additional internal variable declarations:

| Variables | Data Type | |
|---|---|---|
| Run | BOOL | On while station running |
| Int_Reset BOOL | Internal reset | |
| Step_1 to Step_6 | BOOL | Step-in-progress bits |
| Fast_Agit_Tmr | ONDTR | Times fast agitation step |
| Decr_Agit_Tmr | ONDTR | Times decreasing agitation step |
| Count_A | UPCTR | Measures amount of A being added |
| Count_B | UPCTR | Measures amount of B being added |
| Count_Out UPCTR | Measures amount of product being drained | |

Conversion formulas
AGIT_AO = (AGIT_RPM / 1000) * (32000)
AGIT_CURR = ACUR_MEAS /32000) * (20 - 0) + 0

In Step_5, AGIT_RPM = 500 -

5 Start/stop/pause and initial start.

6 START_PB %I00001 Run; STOP_PB %I00002; Run M

7 Run; Step_1; Step_2; Step_3; Step_4; Step_5; Step_6; Step_1 S

8 Step 1 - Wait for Ready. Transition when Ready.

9 Step_1; Ready %M00720; Run; Step_1 R; Step_2 S

10 Step 2 - Fill A. Transition when desired amount.

11 Step_2; GE INT: Count_A[0] IN1, DES_A IN2 %R00300, Q; Run; Step_2 R; Step_3 S

12 Step 3 - Fill B. Transition when desired amount.

13 Step_3; GE INT: COUNT_B[0] IN1, DES_B IN2 %R00302, Q; Run; Step_3 R; Step_4 S

14 Step 4 - Agitate at constant speed. Transition when at 10 min

15 Step_4; Run; ONDTR SEC: Fast_Agit_... R, 600 PV, CV; Step_4 R; Step_5 S

16 Step 5 - Agitate at decreasing speed. Transition when at 40 min.

17 Step_5 Run ONDTR SEC Step_5 R
Step_5 Decr_Agit_... R Step_6 S
2400 PV CV

18 Step 6 - Drain tank. Transition when material moved out.

19 ADD INT
DES_A IN1 Q DES_TOTAL
%R00300
DES_B IN2
%R00302

20 Step_6 GE INT Run Step_6 R
Step_1 S
COUNT_OUT[0] IN1 Q
DES_TOTAL IN2

21 ????

22 Discrete Physical Outputs

Valves

23 Step_2 Run VALVE_A M %Q00001

24 Step_3 Run VALVE_B M %Q00002

25 Step_6 Run VALVE_OUT M %Q00003

26 Agitator Control

27 Step_3 Run AGIT_ON M %Q00004
Step_4
Step_5
Step_6

28 Control Agitator RPM

29 Step_3 MOVE REAL
1
100.0 IN Q AGIT_RPM
%R00190

30 Step_4 MOVE REAL
1
500.0 IN Q AGIT_RPM
%R00190

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31 Step_5

INT TO REAL: Decr_Agit_Tmr[0] → IN, Q → IN1

DIV REAL: IN1 ← Q, IN2 ← 10.0, Q → IN1

SUB REAL: IN1 ← 500.0, IN2 ← Q, Q → AGIT_RPM %R00190

32 Step_6

MOVE REAL: 1, IN ← 260.0, Q → AGIT_RPM %R00190

33 Calculate agitator speed AO from desired RPM

34

DIV REAL: IN1 ← AGIT_RPM %R00190, IN2 ← 1000.0, Q → IN1

MUL REAL: IN1 ← Q, IN2 ← 32000, Q → IN

REAL TO INT: IN ← Q, Q → AGIT_AO %AQ0001

35 Calculate agitator current and do alarms.

36

INT TO REAL: IN ← ACUR_MEAS %AI0001, Q → IN1

DIV REAL: IN1 ← Q, IN2 ← 32000.0, Q → TmpR

SUB REAL: IN1 ← 20.0, IN2 ← 0.0, Q → TmpR2

37

MUL REAL: IN1 ← TmpR, IN2 ← TmpR2, Q → IN1

ADD REAL: IN1 ← Q, IN2 ← 0.0, Q → AGIT_CURR %R00192

38

GE REAL: IN1 ← AGIT_CURR %R00192, IN2 ← 18.0, Q → CURR_ALARM %Q00006

39

GE REAL: IN1 ← AGIT_CURR %R00192, IN2 ← 15.0, Q → CURR_ALARM %Q00006 → CURR_WARN %Q00005

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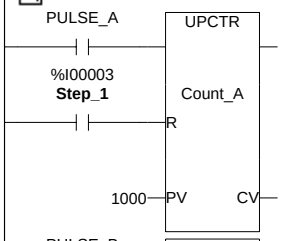
40 Handle Flow Accumulations. Presets ignored.

41

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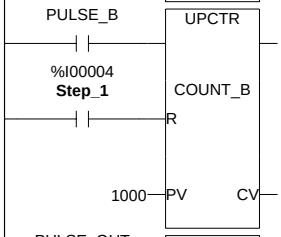


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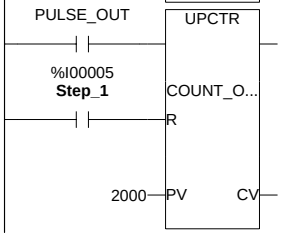


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