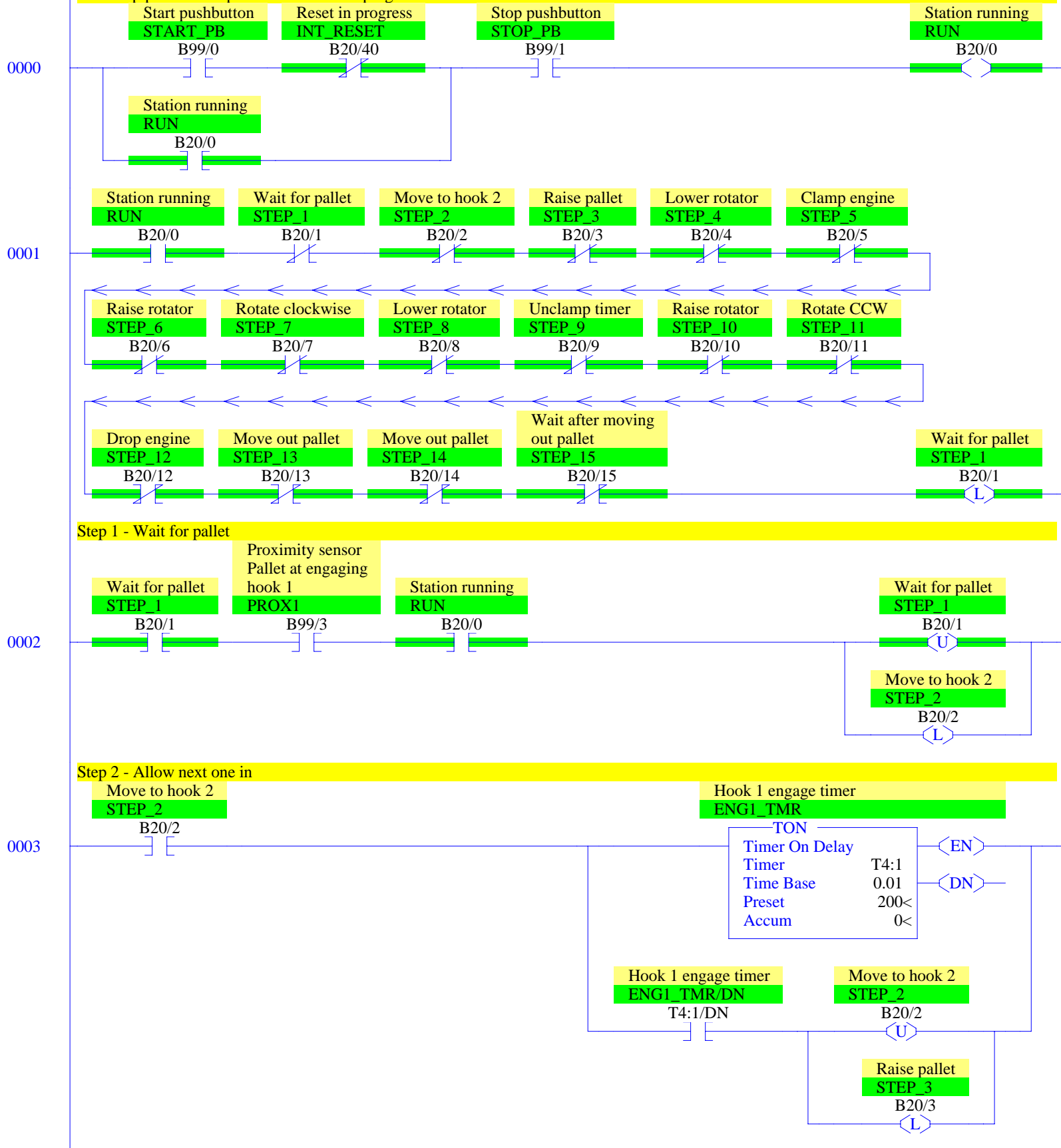
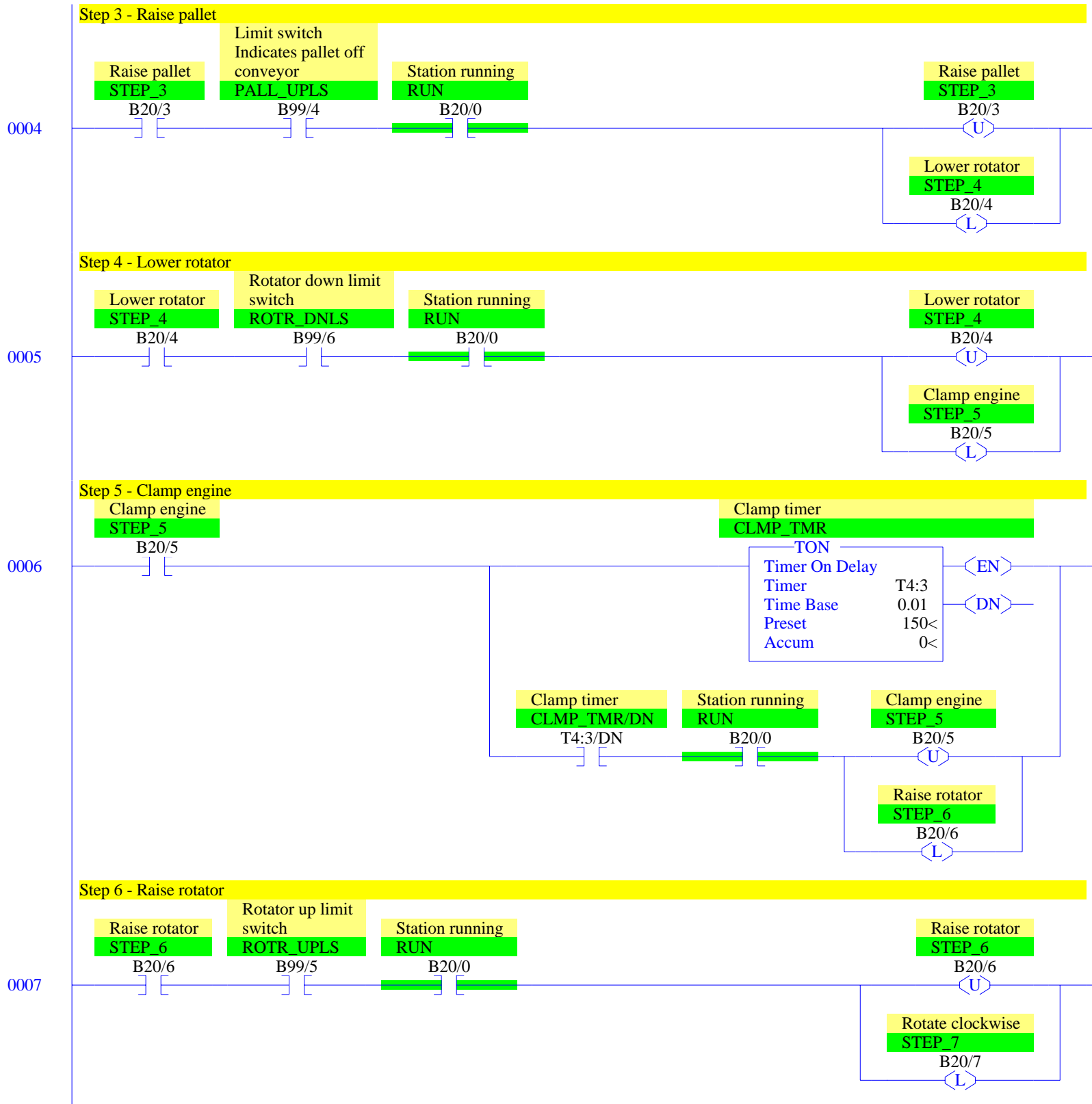


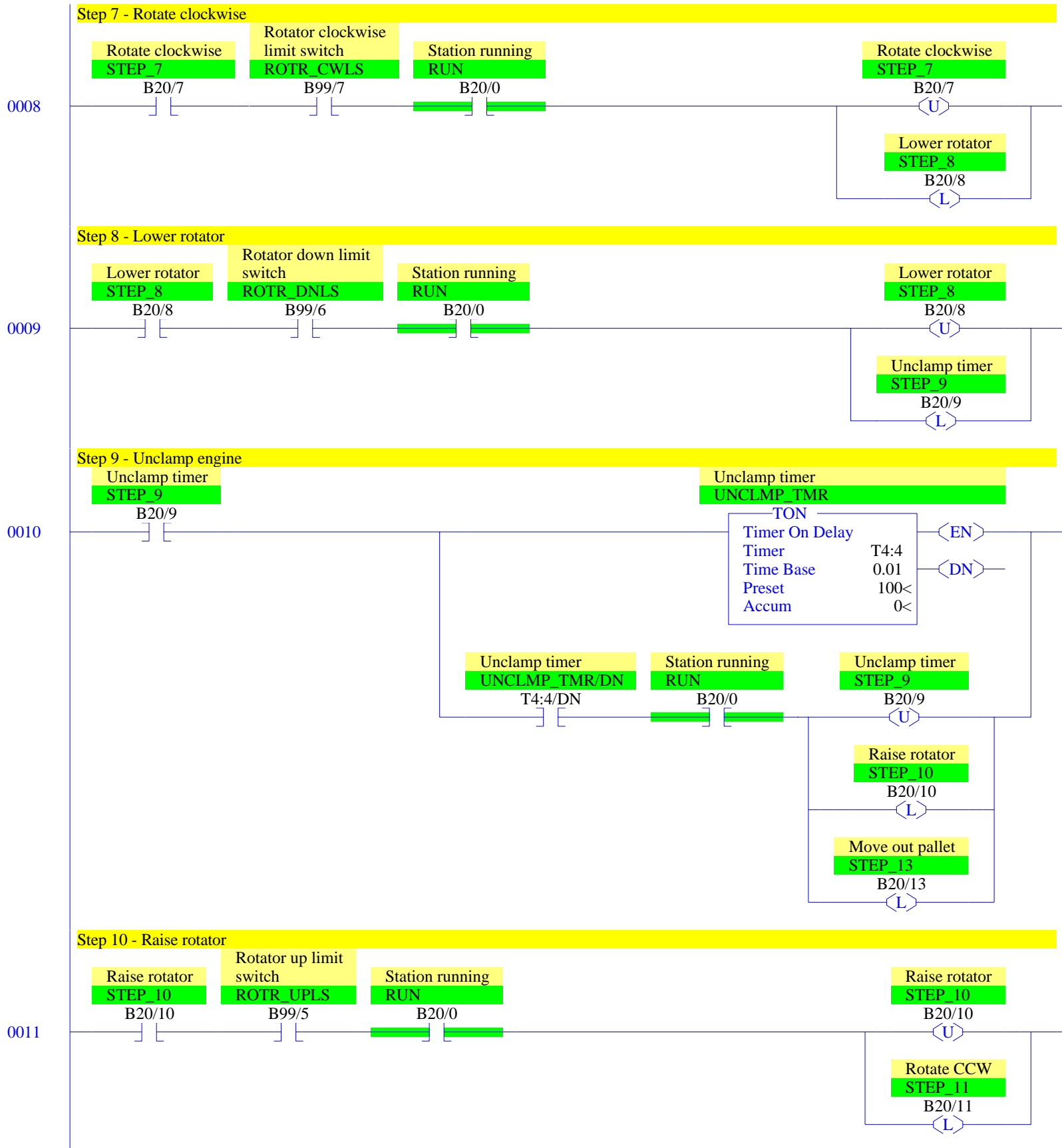
Example 6.5 - Engine Inverter Control with Parallel Branches with Simulation

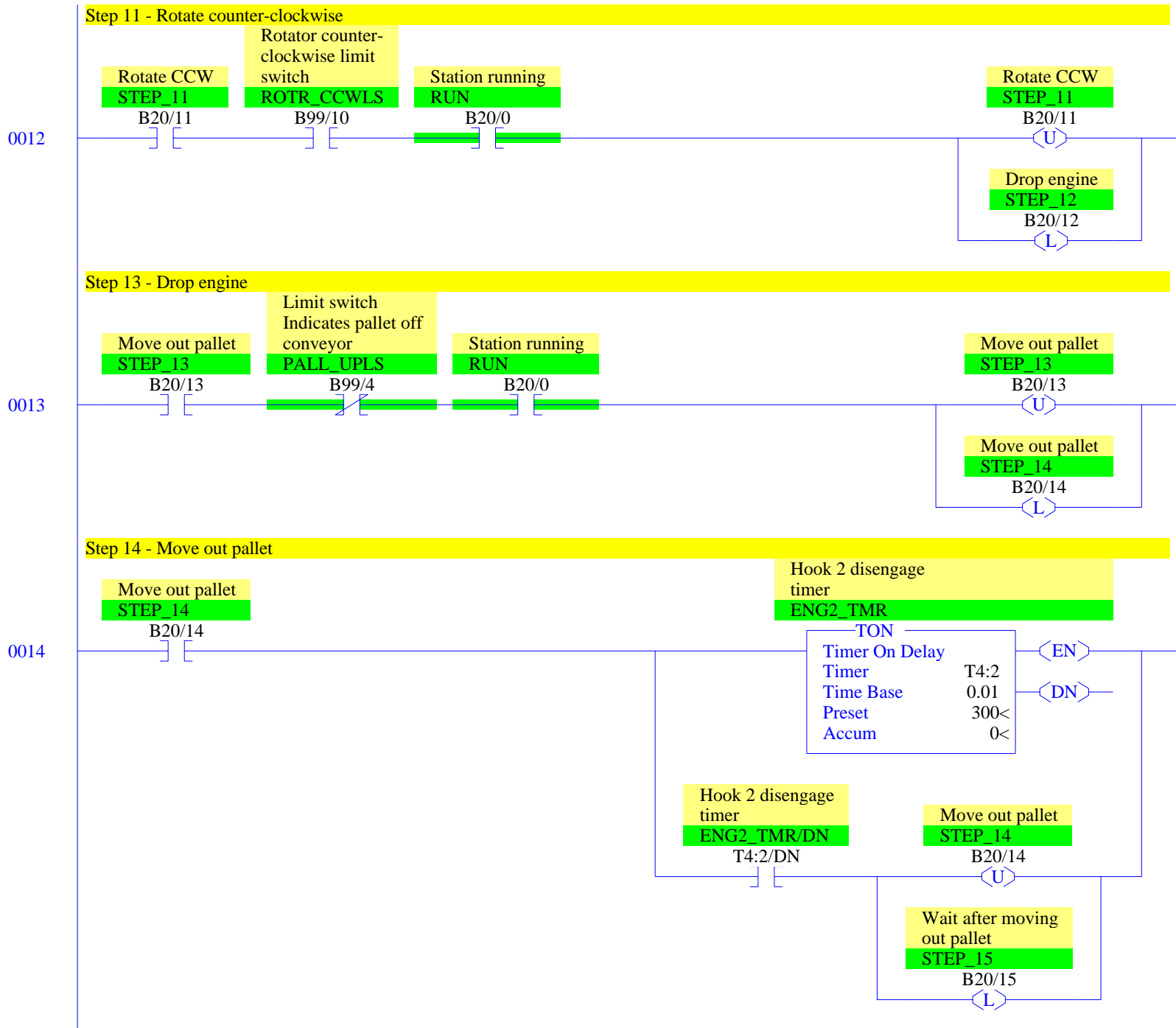
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Start/stop/pause. Start prevented if reset in progress.



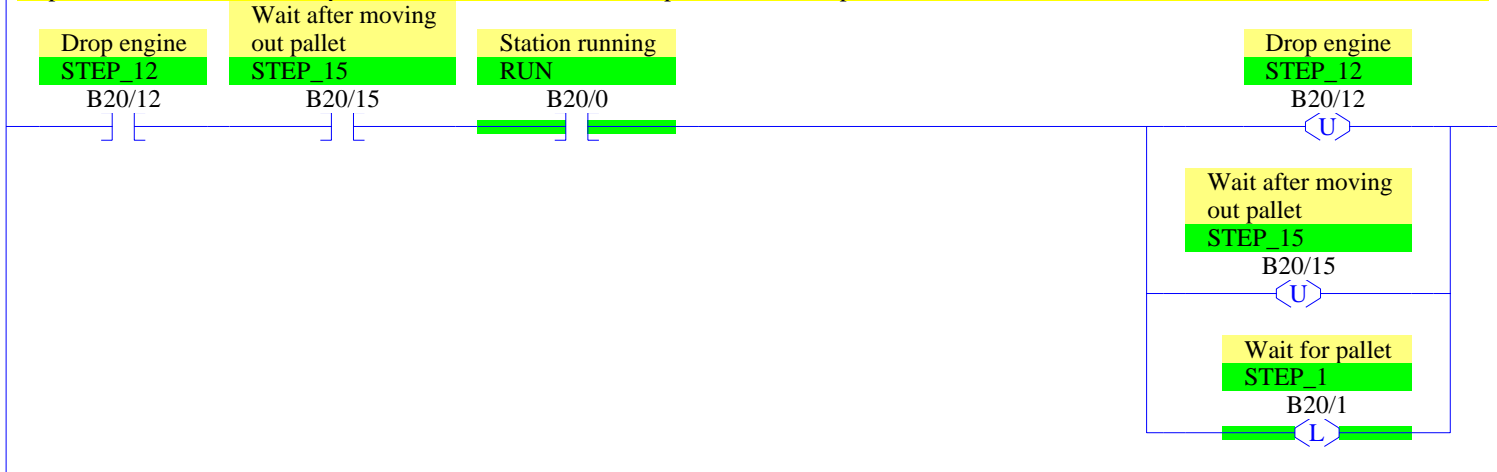


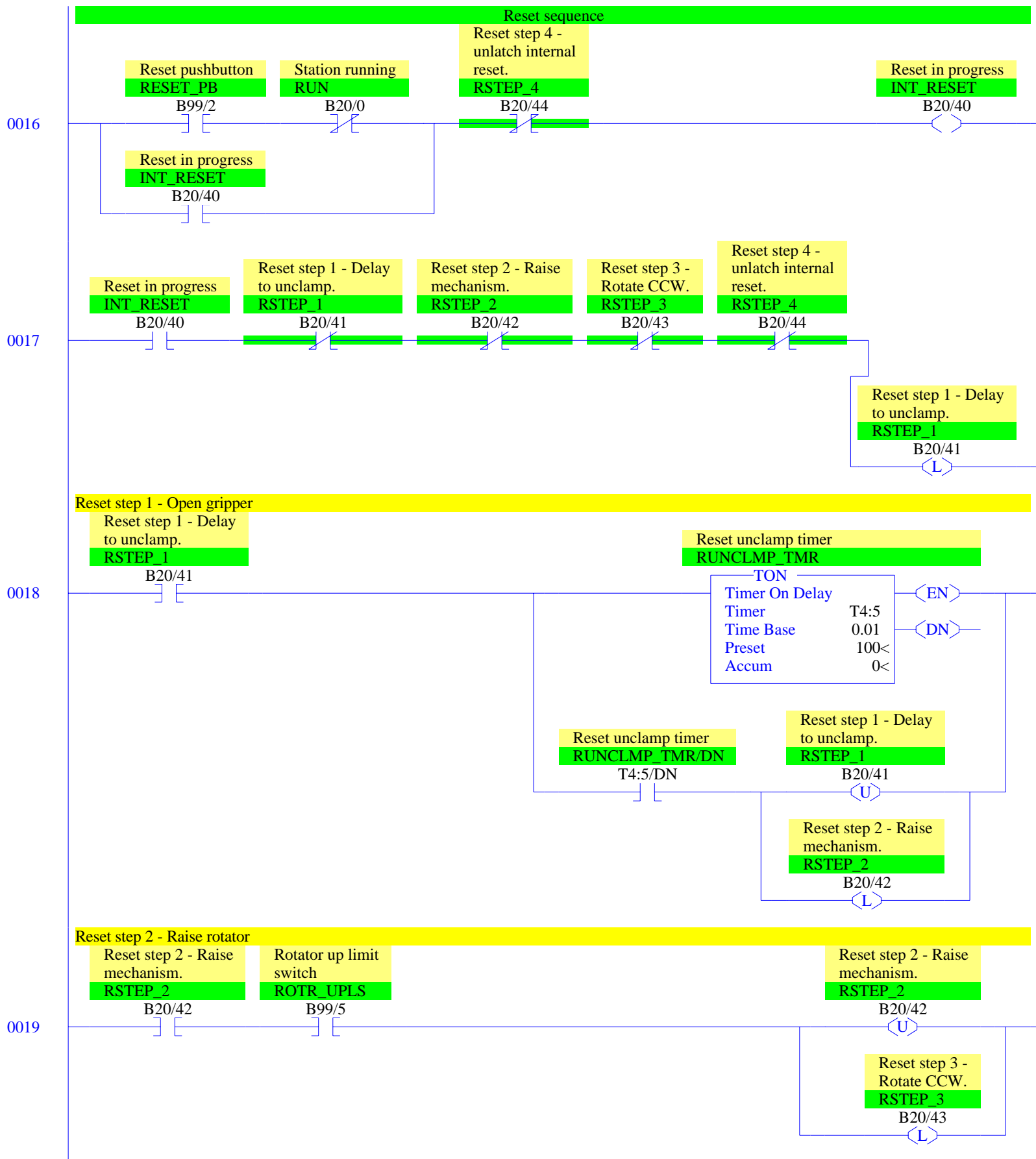


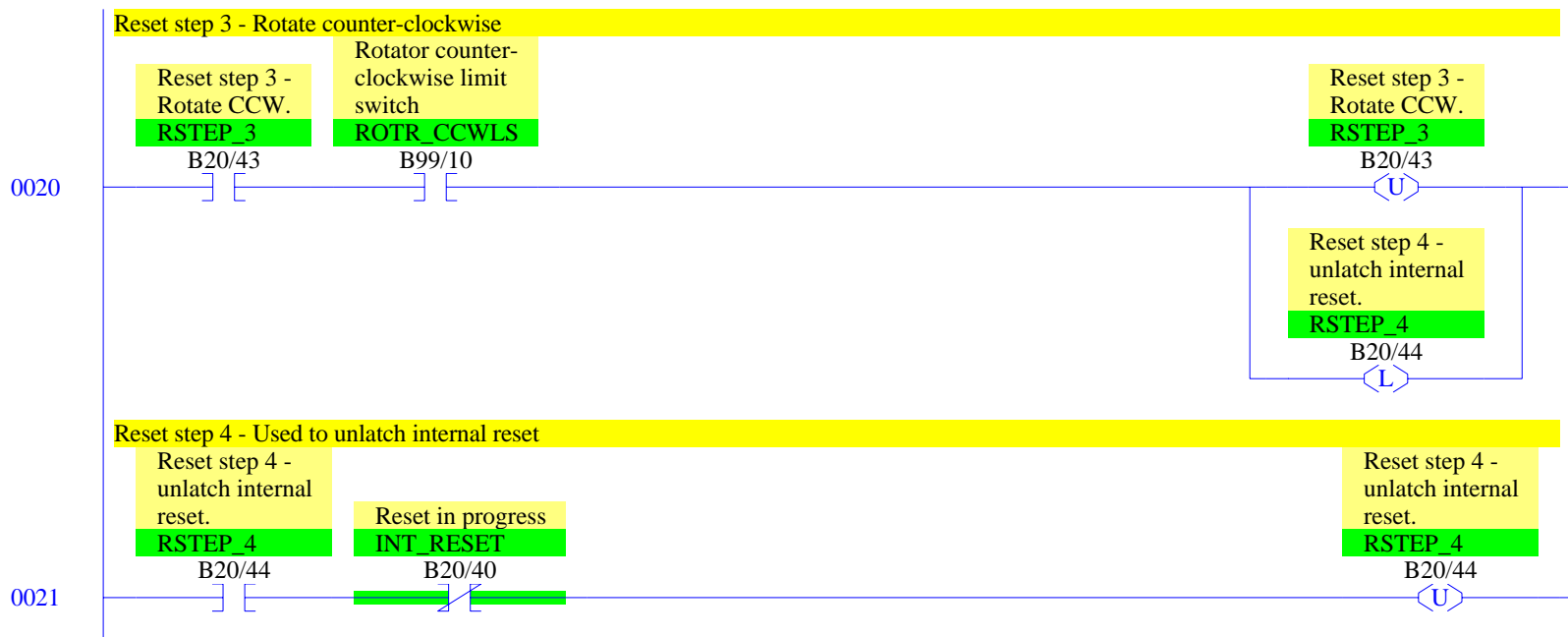


0015

Steps 12 & 15 - Wait at end of parallel branches. Transition to step 1 when both steps active.







0022

Reset unlatches all normal operation step-in progress bits

Reset in progress

INT_RESET

B20/40

Wait for pallet

STEP_1

B20/1

U

Move to hook 2

STEP_2

B20/2

U

Raise pallet

STEP_3

B20/3

U

Lower rotator

STEP_4

B20/4

U

Clamp engine

STEP_5

B20/5

U

Raise rotator

STEP_6

B20/6

U

Rotate clockwise

STEP_7

B20/7

U

Lower rotator

STEP_8

B20/8

U

Unclamp timer

STEP_9

B20/9

U

Raise rotator

STEP_10

B20/10

U

Rotate CCW

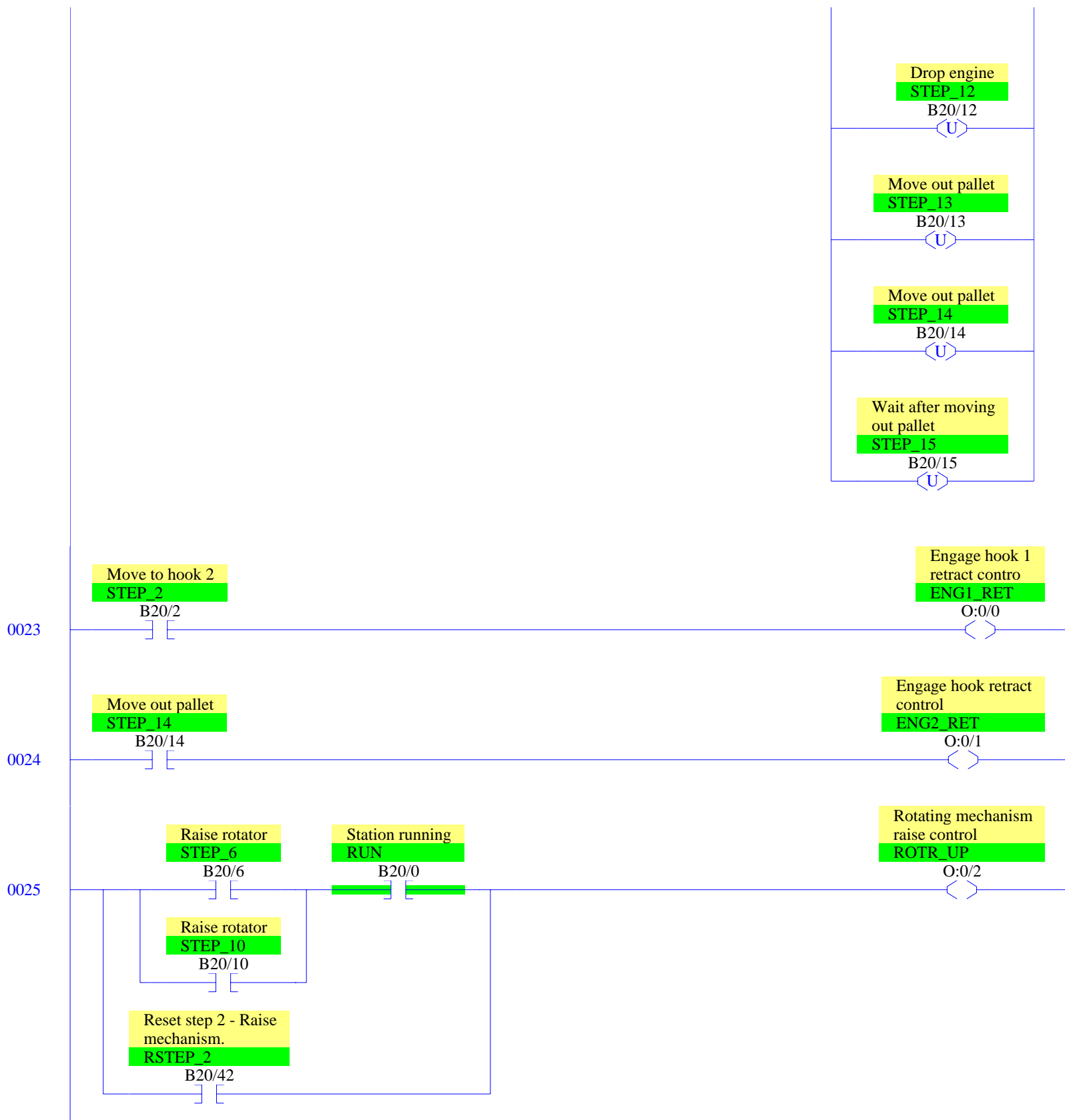
STEP_11

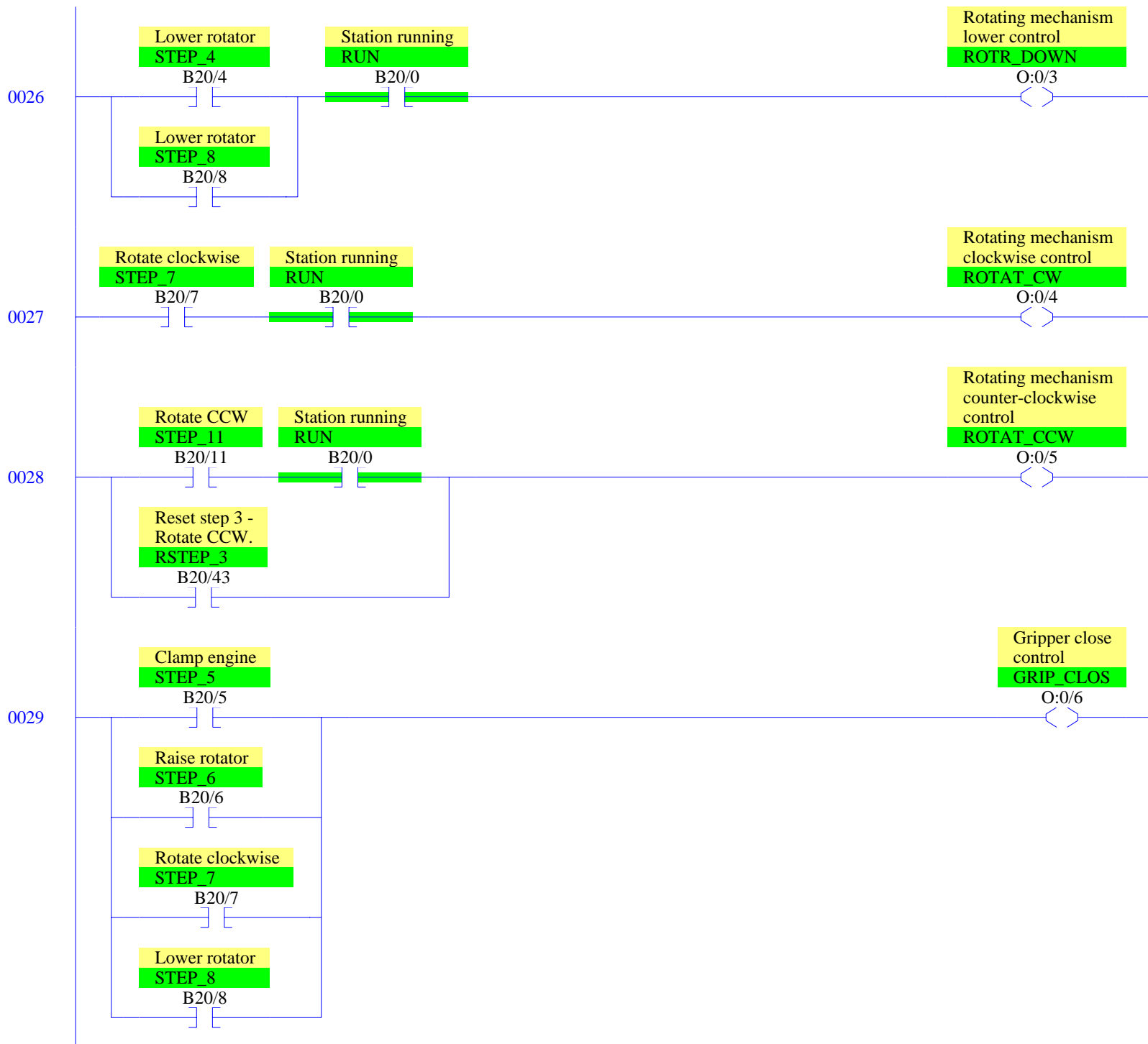
B20/11

U

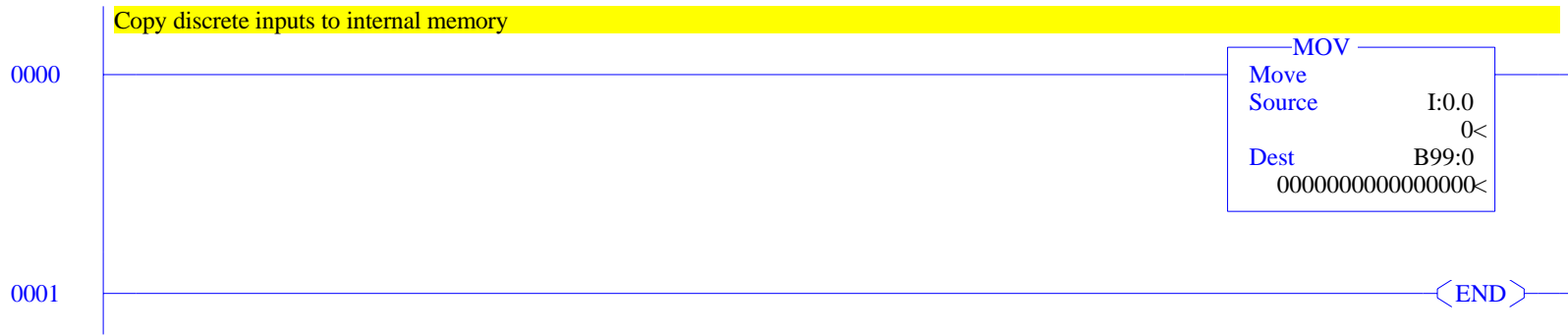
Drop engine

STEP_12







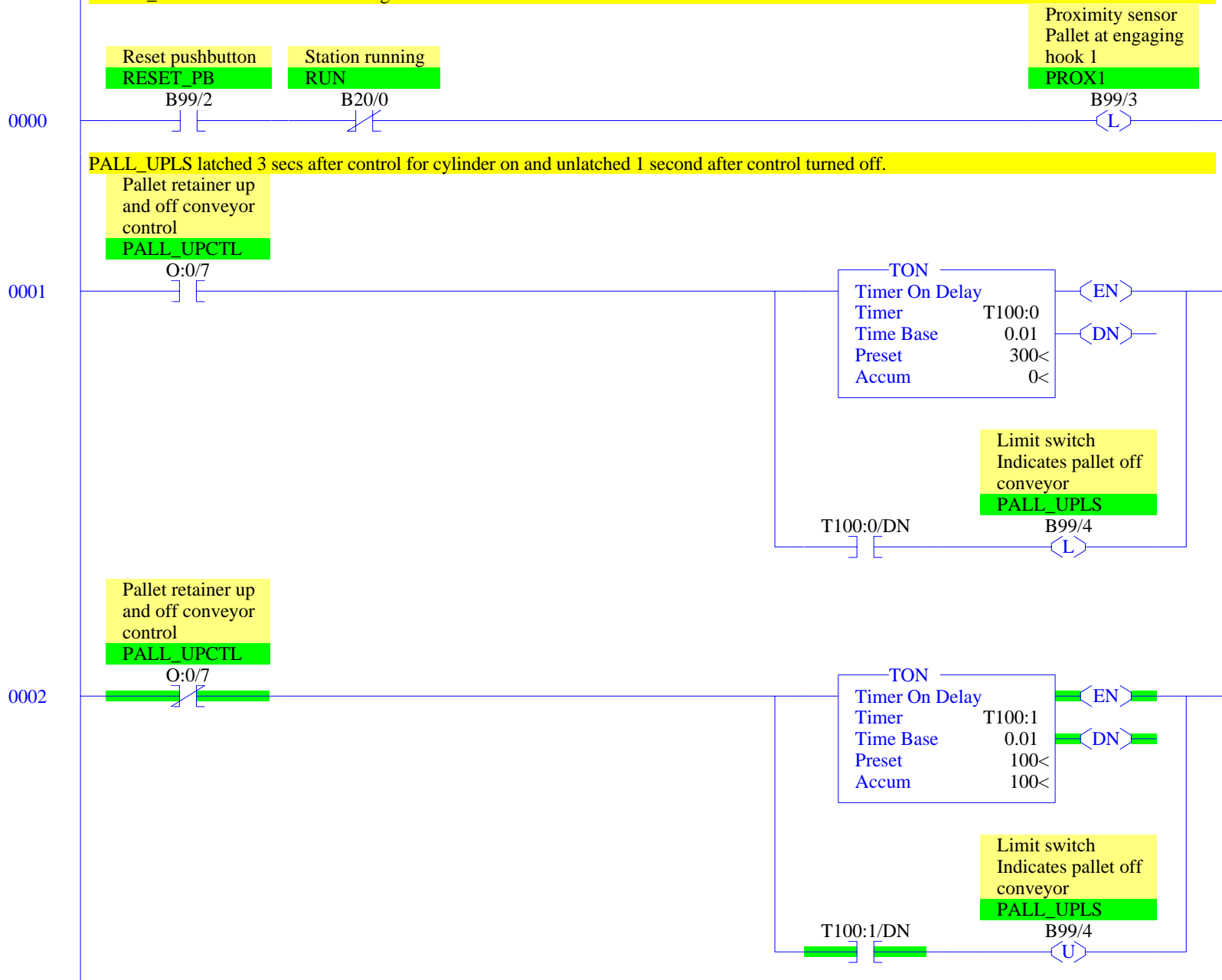


Tieback Logic for Simulation

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This version uses RESET_PB to generate first engine. Each subsequent engine appears 5 seconds after second engage hook goes back up.

RESET_PB latches PROX1 so that engine is at first station when run.



Up/Down limit switches.

Down LS latched 3 secs after down control active and unlatched immediately when up control active.

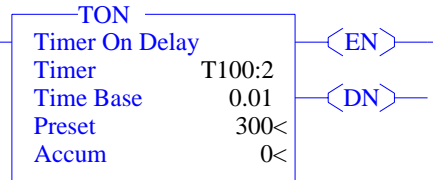
Up LS latched 3 secs after up control active and unlatched immediately when down control active.

Rotating mechanism
lower control

ROTR_DOWN

O:0/3

0003

Rotator down limit
switch

ROTR_DNLS

T100:2/DN

B99/6

(L)

Rotator up limit
switch

ROTR_UPLS

B99/5

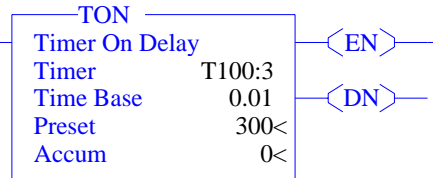
(U)

Rotating mechanism
raise control

ROTR_UP

O:0/2

0004

Rotator up limit
switch

ROTR_UPLS

T100:3/DN

B99/5

(L)

Rotator down limit
switch

ROTR_DNLS

B99/6

(U)

Clockwise/Counterclockwise limit switches.

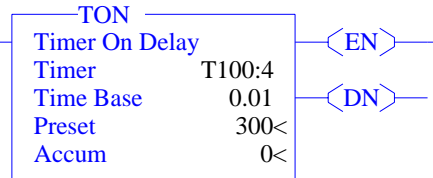
CW LS latched 3 secs after CW control active and unlatched immediately when CCW control active.

CCW LS latched 3 secs after CCW control active and unlatched immediately when CW control active.

Rotating mechanism
clockwise control

ROTAT_CW

O:0/4



Rotator clockwise
limit switch

ROTR_CWLS

T100:4/DN

B99/7

L

Rotator counter-
clockwise limit
switch

ROTR_CCWLS

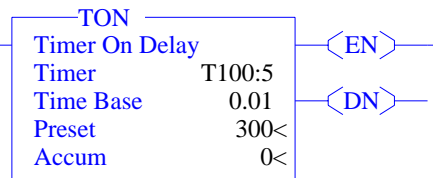
B99/10

U

Rotating mechanism
counter-clockwise
control

ROTAT_CCW

O:0/5



Rotator counter-
clockwise limit
switch

ROTR_CCWLS

T100:5/DN

B99/10

L

Rotator clockwise
limit switch

ROTR_CWLS

B99/7

U

Generate next engine present by latching PROX1. Each subsequent engine appears 5 seconds after second engage hook goes back up.

Engage hook retract
control

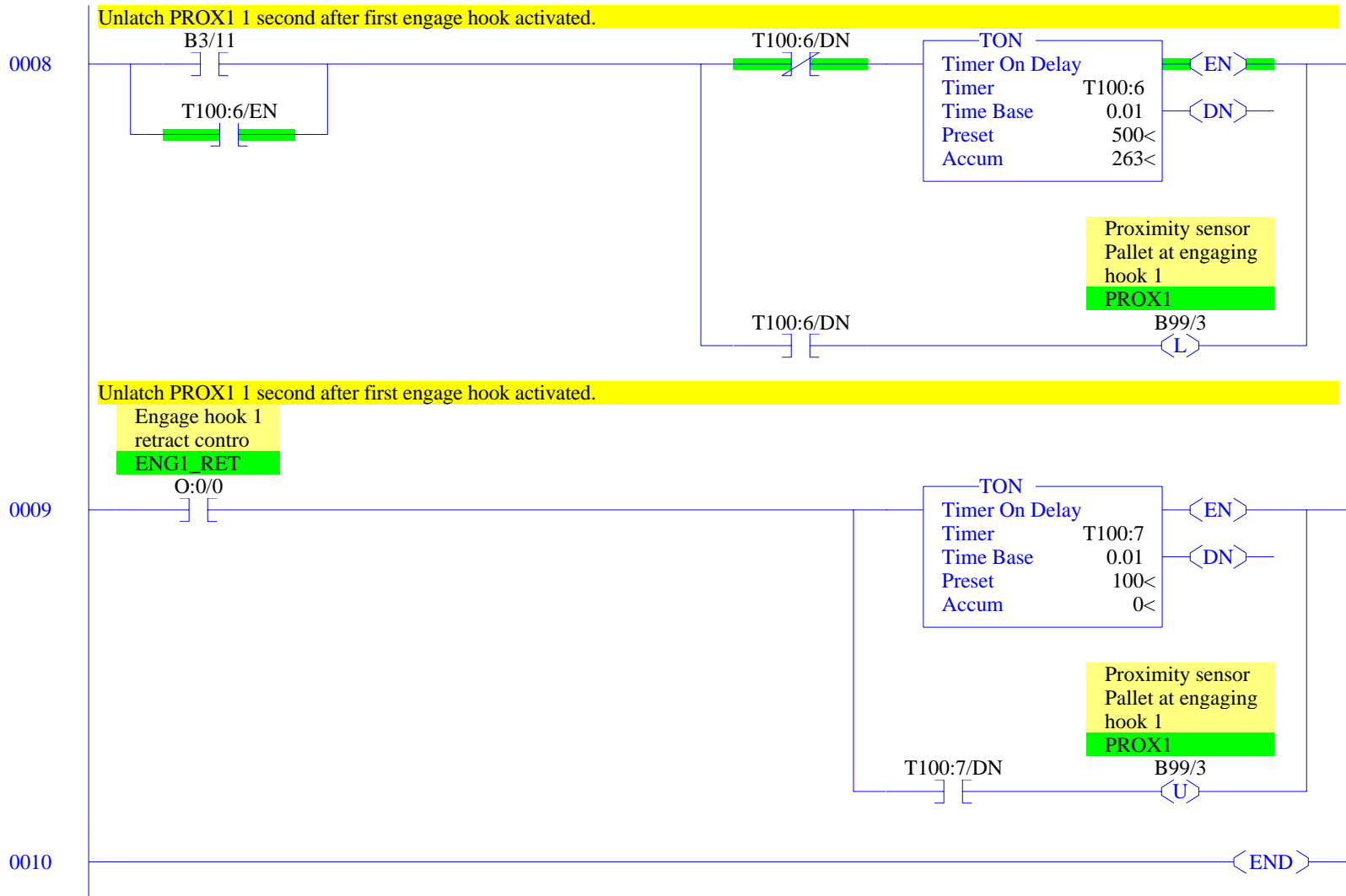
ENG2_RET

O:0/1

B3/10

ONS

B3/11



RSLogix 500 Cross Reference Report - Sorted by Address

O:0/0	- {ENG1_RET} Engage hook 1 retract contro XIC - File #100 TIEBACK - 9 OTE - File #2 - 23
O:0/1	- {ENG2_RET} Engage hook retract control OTE - File #2 - 24 XIO - File #100 TIEBACK - 7
O:0/2	- {ROTR_UP} Rotating mechanism raise control OTE - File #2 - 25 XIC - File #100 TIEBACK - 4
O:0/3	- {ROTR_DOWN} Rotating mechanism lower control OTE - File #2 - 26 XIC - File #100 TIEBACK - 3
O:0/4	- {ROTAT_CW} Rotating mechanism clockwise control OTE - File #2 - 27 XIC - File #100 TIEBACK - 5
O:0/5	- {ROTAT_CCW} Rotating mechanism counter-clockwise control OTE - File #2 - 28 XIC - File #100 TIEBACK - 6
O:0/6	- {GRIP_CLOS} Gripper close control OTE - File #2 - 29
O:0/7	- {PALL_UPCTL} Pallet retainer up and off conveyor control OTE - File #2 - 30 XIC - File #100 TIEBACK - 1 XIO - File #100 TIEBACK - 2
I:0.0	- MOV - File #99 DUPLIC_INS - 0
B3/10	- ONS - File #100 TIEBACK - 7
B3/11	- XIC - File #100 TIEBACK - 8 OTE - File #100 TIEBACK - 7
B3/200	- {ENAB_TIE_BACK} Enable tie-back simulation logic XIC - File #2 - 31 XIO - File #2 - 32
T4:1	- {ENG1_TMR} Hook 1 engage timer TON - File #2 - 3
T4:1/DN	- XIC - File #2 - 3
T4:2	- {ENG2_TMR} Hook 2 disengage timer TON - File #2 - 14
T4:2/DN	- XIC - File #2 - 14
T4:3	- {CLMP_TMR} Clamp timer TON - File #2 - 6
T4:3/DN	- XIC - File #2 - 6
T4:4	- {UNCLMP_TMR} Unclamp timer TON - File #2 - 10
T4:4/DN	- XIC - File #2 - 10
T4:5	- {RUNCLMP_TMR} Reset unclamp timer TON - File #2 - 18
T4:5/DN	- XIC - File #2 - 18
B20/0	- {RUN} Station running OTE - File #2 - 0 XIC - File #2 - 0, 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 25 26, 27, 28 XIO - File #2 - 16 File #100 TIEBACK - 0
B20/1	- {STEP_1} Wait for pallet OTL - File #2 - 1, 15 OTU - File #2 - 2, 22 XIC - File #2 - 2 XIO - File #2 - 1
B20/2	- {STEP_2} Move to hook 2 OTL - File #2 - 2 OTU - File #2 - 3, 22 XIC - File #2 - 3, 23 XIO - File #2 - 1
B20/3	- {STEP_3} Raise pallet OTL - File #2 - 3 OTU - File #2 - 4, 22 XIC - File #2 - 4, 30

RSLogix 500 Cross Reference Report - Sorted by Address

B20/4	XIO - File #2 - 1 - {STEP_4} Lower rotator OTL - File #2 - 4 OTU - File #2 - 5, 22 XIC - File #2 - 5, 26, 30 XIO - File #2 - 1
B20/5	- {STEP_5} Clamp engine OTL - File #2 - 5 OTU - File #2 - 6, 22 XIC - File #2 - 6, 29, 30 XIO - File #2 - 1
B20/6	- {STEP_6} Raise rotator OTL - File #2 - 6 OTU - File #2 - 7, 22 XIC - File #2 - 7, 25, 29, 30 XIO - File #2 - 1
B20/7	- {STEP_7} Rotate clockwise OTL - File #2 - 7 OTU - File #2 - 8, 22 XIC - File #2 - 8, 27, 29, 30 XIO - File #2 - 1
B20/8	- {STEP_8} Lower rotator OTL - File #2 - 8 OTU - File #2 - 9, 22 XIC - File #2 - 9, 26, 29, 30 XIO - File #2 - 1
B20/9	- {STEP_9} Unclamp timer OTL - File #2 - 9 OTU - File #2 - 10, 22 XIC - File #2 - 10, 30 XIO - File #2 - 1
B20/10	- {STEP_10} Raise rotator OTL - File #2 - 10 OTU - File #2 - 11, 22 XIC - File #2 - 11, 25 XIO - File #2 - 1
B20/11	- {STEP_11} Rotate CCW OTL - File #2 - 11 OTU - File #2 - 12, 22 XIC - File #2 - 12, 28 XIO - File #2 - 1
B20/12	- {STEP_12} Drop engine OTL - File #2 - 12 OTU - File #2 - 15, 22 XIC - File #2 - 15 XIO - File #2 - 1
B20/13	- {STEP_13} Move out pallet OTL - File #2 - 10 OTU - File #2 - 13, 22 XIC - File #2 - 13 XIO - File #2 - 1
B20/14	- {STEP_14} Move out pallet OTL - File #2 - 13 OTU - File #2 - 14, 22 XIC - File #2 - 14, 24 XIO - File #2 - 1
B20/15	- {STEP_15} Wait after moving out pallet OTL - File #2 - 14 OTU - File #2 - 15, 22 XIC - File #2 - 15 XIO - File #2 - 1
B20/40	- {INT_RESET} Reset in progress OTE - File #2 - 16 XIC - File #2 - 16, 17, 22 XIO - File #2 - 0, 21
B20/41	- {RSTEP_1} Reset step 1 - Delay to unclamp.

RSLogix 500 Cross Reference Report - Sorted by Address

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      OTL - File #2 - 17
      OTU - File #2 - 18
      XIC - File #2 - 18
      XIO - File #2 - 17
B20/42  - {RSTEP_2} Reset step 2 - Raise mechanism.
      OTL - File #2 - 18
      OTU - File #2 - 19
      XIC - File #2 - 19, 25
      XIO - File #2 - 17
B20/43  - {RSTEP_3} Reset step 3 - Rotate CCW.
      OTL - File #2 - 19
      OTU - File #2 - 20
      XIC - File #2 - 20, 28
      XIO - File #2 - 17
B20/44  - {RSTEP_4} Reset step 4 - unlatch internal reset.
      OTL - File #2 - 20
      OTU - File #2 - 21
      XIC - File #2 - 21
      XIO - File #2 - 16, 17
B99:0   - MOV - File #99 DUPLIC_INS - 0
B99/0   - {START_PB} Start pushbutton
      XIC - File #2 - 0
B99/1   - {STOP_PB} Stop pushbutton
      XIC - File #2 - 0
B99/2   - {RESET_PB} Reset pushbutton
      XIC - File #2 - 16
           File #100 TIEBACK - 0
B99/3   - {PROX1} Proximity sensor Pallet at engaging hook 1
      OTL - File #100 TIEBACK - 0, 8
      OTU - File #100 TIEBACK - 9
      XIC - File #2 - 2
B99/4   - {PALL_UPLS} Limit switch Indicates pallet off conveyor
      OTL - File #100 TIEBACK - 1
      OTU - File #100 TIEBACK - 2
      XIC - File #2 - 4
      XIO - File #2 - 13
B99/5   - {ROTR_UPLS} Rotator up limit switch
      OTU - File #100 TIEBACK - 3
      OTL - File #100 TIEBACK - 4
      XIC - File #2 - 7, 11, 19
B99/6   - {ROTR_DNLS} Rotator down limit switch
      OTL - File #100 TIEBACK - 3
      OTU - File #100 TIEBACK - 4
      XIC - File #2 - 5, 9
B99/7   - {ROTR_CWLS} Rotator clockwise limit switch
      OTL - File #100 TIEBACK - 5
      OTU - File #100 TIEBACK - 6
      XIC - File #2 - 8
B99/10  - {ROTR_CCWLS} Rotator counter- clockwise limit switch
      OTU - File #100 TIEBACK - 5
      OTL - File #100 TIEBACK - 6
      XIC - File #2 - 12, 20
T100:0  - TON - File #100 TIEBACK - 1
T100:0/DN - XIC - File #100 TIEBACK - 1
T100:1  - TON - File #100 TIEBACK - 2
T100:1/DN - XIC - File #100 TIEBACK - 2
T100:2  - TON - File #100 TIEBACK - 3
T100:2/DN - XIC - File #100 TIEBACK - 3
T100:3  - TON - File #100 TIEBACK - 4
T100:3/DN - XIC - File #100 TIEBACK - 4
T100:4  - TON - File #100 TIEBACK - 5
T100:4/DN - XIC - File #100 TIEBACK - 5
T100:5  - TON - File #100 TIEBACK - 6
T100:5/DN - XIC - File #100 TIEBACK - 6
T100:6  - TON - File #100 TIEBACK - 8
T100:6/DN - XIC - File #100 TIEBACK - 8

```

RSLogix 500 Cross Reference Report - Sorted by Address

	XIO - File #100 TIEBACK - 8
T100:6/EN	- XIC - File #100 TIEBACK - 8
T100:7	- TON - File #100 TIEBACK - 9
T100:7/DN	- XIC - File #100 TIEBACK - 9
U:99	- JSR - File #2 - 32
U:100	- {TIEBACK}
	JSR - File #2 - 31