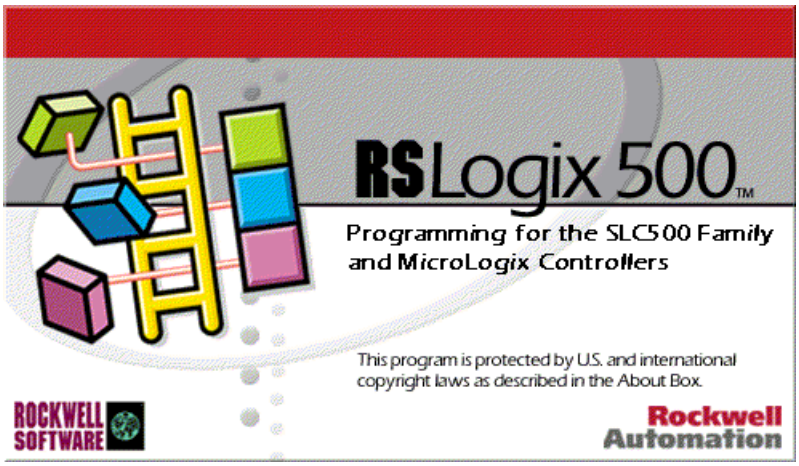
Generic 3 Station Vacuum Loader



Processor Type: Bul.1761 MicroLogix 1000

Processor Name: LOADER

Total Memory Used: *

Total Memory Left: *

Program Files: 17

Data Files: 8

Program ID: 0

Generic 3 Station Vacuum Loader

This is an example of a three station loading system modeled after a motorized cam switch control. In such a system a series of cam-actuated switches turned by a shaded pole motor is driven when no stations require load. When one does (as sensed by closing a level switch) the cam switch stops at that station, and waits for the fill timer to complete before continuing.

This example has two unusual features:
1. a 'proportional' low level control for station 1, and
2. a method to prevent station 2 from loading unless station 1 is full.

0000

'Dummy' bit
Always
Open
B3
99
2:0

dummy bit, always
open
B3
99
B3/99 - XIC - 2:0

This timer sounds a startup alarm when the PLC is being powered up.

0001

Startup
Delay
TON
Timer On Delay
Timer T4:2
Time Base 1.0
Preset 5<
Accum 5<
EN
DN

T4:2/DN - XIC - 2:3, 2:7
XIO - 6:0, 6:3, 6:4, 6:5, 6:6

0002

Alarm
Control
Subroutine
JSR
Jump To Subroutine
SBR File Number U:6

When the startup timer completes turn on the MCR, and energize outputs

0003

Startup
Delay
Complete
T4:2
DN
2:1
MCR

This turns on the dump valves while preventing the fill valves and vac pump from running during a PLC initialization to clear material out of the hoppers.

0004

Dump
Initialize
Timer
TON
Timer On Delay
Timer T4:1
Time Base 0.01
Preset 1500<
Accum 1500<
EN
DN

T4:1/DN - XIC - 2:7, 2:14
T4:1/TT - XIC - 7:19, 8:12, 9:12

Station Sequencer

Reset the sequencer counter to station 1 if out-of-bounds value somehow occurs.

0005

Sequencer
SEQUENCER.ACC
LES
Less Than (A<B)
Source A C5:0.ACC 2<
Source B 1 1<
2:5

Sequencer
SEQUENCER.ACC
GEQ
Grtr Than or Eql (A>=B)
Source A C5:0.ACC 2<
Source B 4 4<
2:5

Sequencer
SEQUENCER.ACC
MOV
Move
Source 1 1<
Dest C5:0.ACC 2<

C5:0.ACC - EQU - 7:12, 8:5, 9:5
GEQ - 2:5
LES - 2:5
C5:0 - CTU - 2:7
RES - 2:6

If the counter ever goes to some wierd value, then plonk it back down to station 1 by resetting the counter.
Reset the station count when the last stage has completed, and on first PLC scan.

0006

Sequencer
SEQUENCER/DN
C5:0
DN
2:6, 2:7

PLC Alive
1 Shot
S:1
15

Reset
Station
Count
SEQUENCER
C5:0
RES

C5:0 - CTU - 2:7
C5:0/DN - XIC - 2:6
C5:0.ACC - MOV - 2:5
EQU - 7:12, 8:5, 9:5
GEQ - 2:5
LES - 2:5

This is the core rung of the station selection logic.The count increments cyclically and pauses when it encounters a station with a fill in progress. When the fill completes cycling resumes.
1= Station 1
2= Station 2
3= Station 3
Insert additional 'in progress' contacts to add more stations.

0007

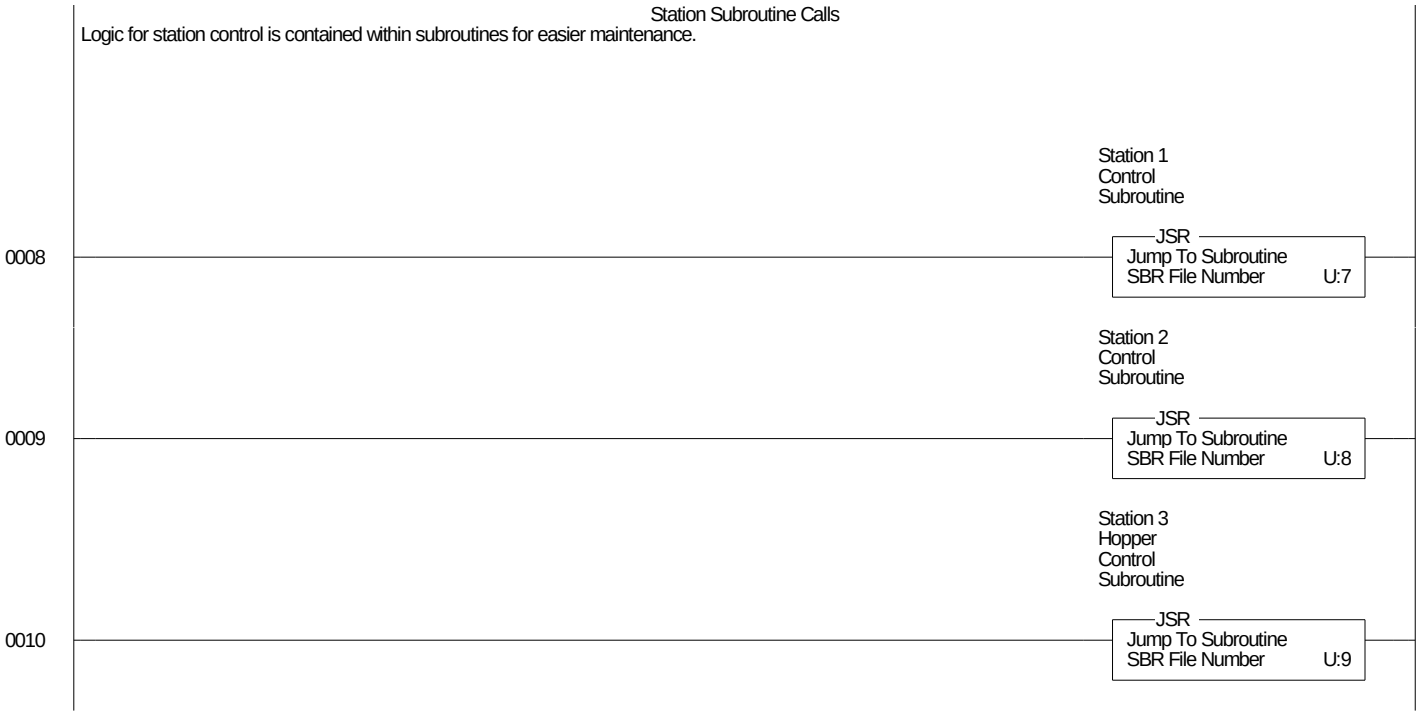
Startup Delay Complete T4:2 DN 2:1
Dump Initialize Complete DUMPINIT T4:1 DN 2:4
1 Sec TB ONESEC T4:0 DN 6:39
Station 1 Fill NOT In Progress B3 12 7:11, 7:13
Station 2 Fill NOT In Progress B3 22 8:4, 8:6
Station 3 Fill NOT In Progress B3 32 9:4, 9:6

Station Selector
SEQUENCER
CTU
Count Up
Counter C5:0
Preset 3<
Accum 2<
CU
DN

C5:0 - RES - 2:6
C5:0/DN - XIC - 2:6
C5:0.ACC - MOV - 2:5
EQU - 7:12, 8:5, 9:5
GEQ - 2:5
LES - 2:5

Station Subroutine Calls

Logic for station control is contained within subroutines for easier maintenance.



Vac Pump Control

This timer allows the vac pump to run for the setpoint time after the last station has called for material to minimize the number of times the pump is cycled on, and improve system speed. Set to a low value or eliminate when using soft starters.

0011

Fill Not Needed
B3
73
2:12

Vac Pump
Run After
Fill Dwell

TON
Timer On Delay
Timer T4:8
Time Base 0.01
Preset 1200<
Accum 0<
EN
DN

T4:8/DN - XIC - 2:13

When no stations have called to be filled turn on htis bit. It is used to control vacuum loader operation.

0012

Station 1
Fill NOT
In Progress
B3
12
7:11, 7:13

Station 2
Fill NOT
In Progress
B3
22
8:4, 8:6

Station 3
Fill NOT
In Progress
B3
32
9:4, 9:6

Fill Not
Needed
B3
73
B3/73 - XIC - 2:11, 2:13

Unlatch the call for vac upon initialization, and when no station is calling for material.

0013

Fill Not Needed
B3
73
2:12

Vac Pump
Wait Before
Shutdown
Dwell
T4:8
DN
2:11

PLC Alive
1 Shot
S:1
15

Vac Pump
Call for
Vac
Unlatch
B3
U
44
B3/44 - OTL - 2:14
XIC - 2:18

After dump initialize completes on startup, the vac pump run status is controlled by the stations as they call for fill.
If the motor auxiliary does not close the circuit within T4:7 after a call for motor start then a fault will occur.

0014

After the anti-restart timer finishes, and the DN (done) bit is set the next call for material will unlatch the anti-restart bit, and allow the vac pump to turn on again.

0015

The moment the vac pump turns off, and there isn't a call for fill then one shot on this latch relay, which is then timed out for the setpoint in the 'Vac Pump Antirestart' timer. This prevents the pump from short cycling.

0016

This timer prevents the vac pump motor from short cycling.

0017

Vac Pump AntiRestart ON
B3
71
2:15, 2:16

Vac Pump AntiRestart Timer
TON
Timer On Delay
Timer T4:9
Time Base 0.01
Preset 800<
Accum 0<
EN
DN

T4:9/DN - XIC - 2:15

When a call for fill exists, and the anti-restart timer has completed then allow the vac pump motor starter to turn on. If the motor starter auxiliary does not pull in within 2 seconds, then a motor fault exists. The thermal overload relay has tripped, the PLC output fusing is open, PLC output has failed open, wiring has opened, motor starter coil has opened, etc.).

0018

Vac Pump AntiRestart NOT On
B3
71
2:15, 2:16

Vac Pump Material Call Latch
B3
44
2:13, 2:14

Vac Pump Motor Starter Coil VACPUMPMS
O:0
0
1761-Micro
O:0/0 - XIC - 7:14, 8:7, 9:7
XIO - 2:16

Vac Pump MS Aux NOT On VACPUMPAUX
I:0
0
1761-Micro

Vac Pump Aux Fault Delay
TON
Timer On Delay
Timer T4:7
Time Base 0.01
Preset 200<
Accum 0<
EN
DN

T4:7/DN - XIC - 6:2, 6:3
XIO - 6:0

0019

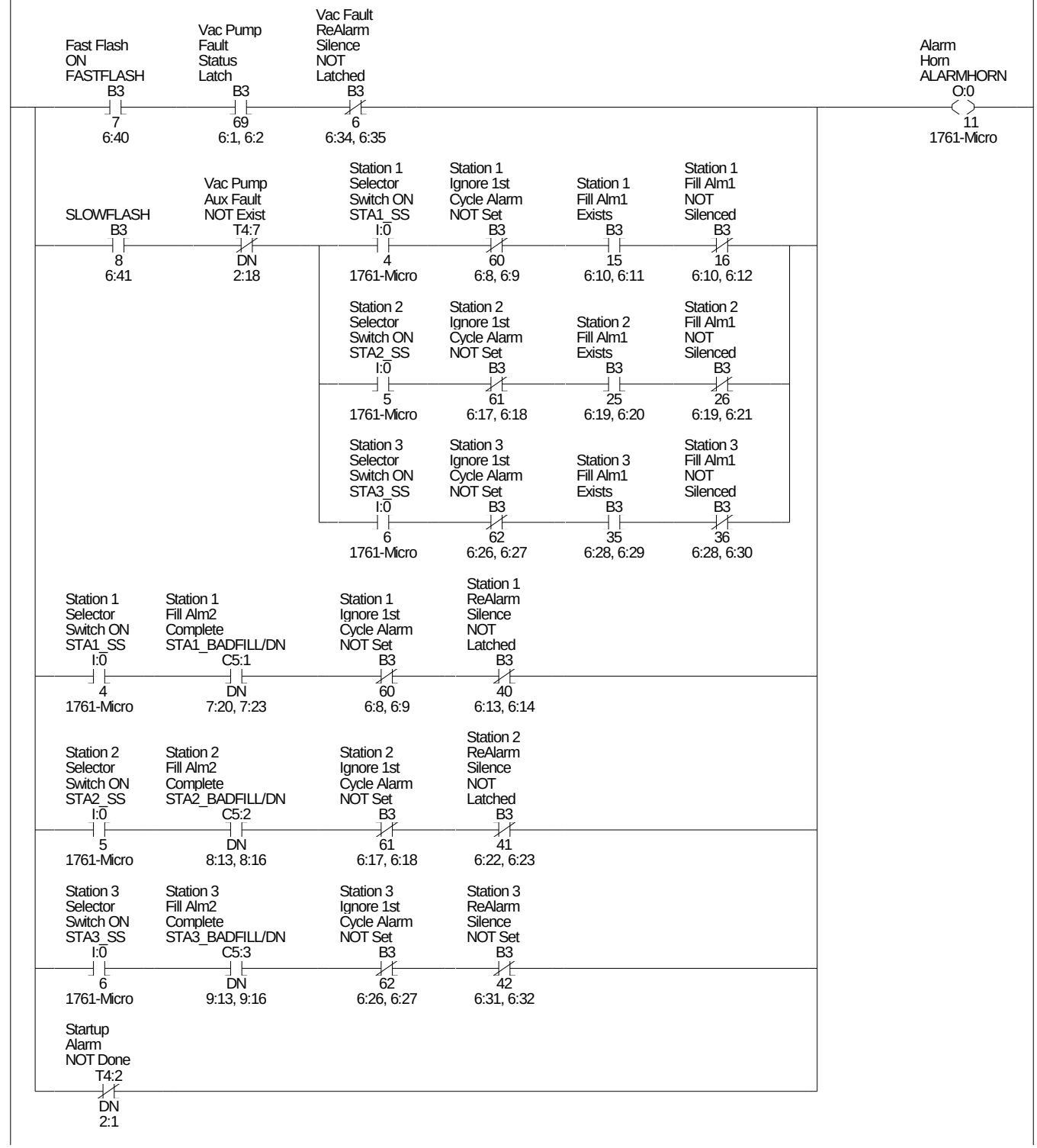
MCR

0020

END

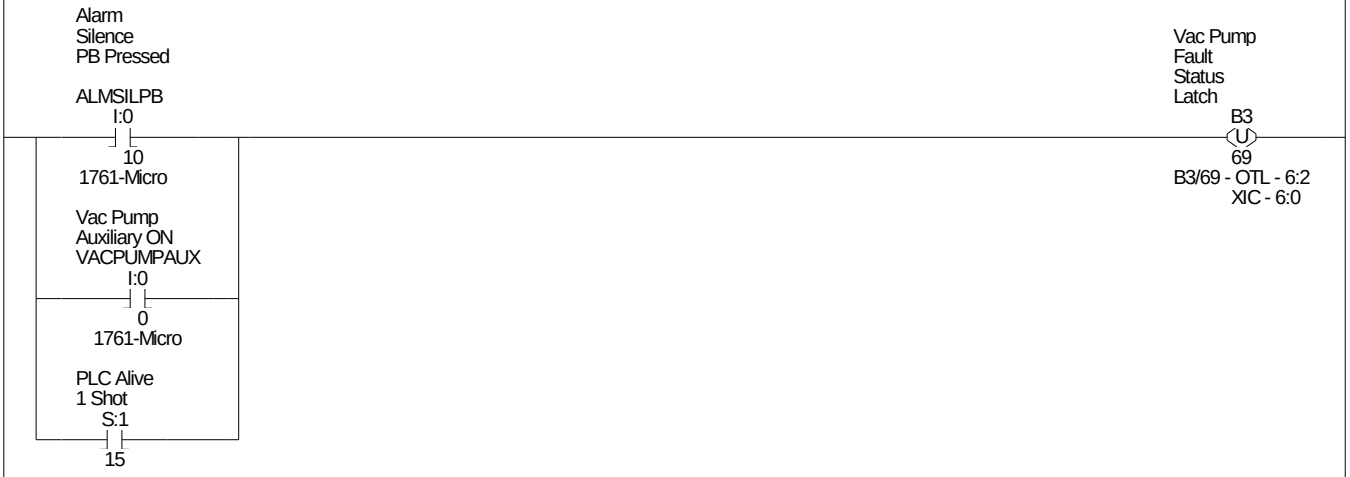
Alarm Horn

This is the alarm horn logic featuring several rate and priority levels.
Status pilot lamps are turned on during initialization to show their operational status (functioning or burned-out).



Set fault is vac pump commanded on, and auxiliary switch does not pull in within the alloted time. Unlatch fault if alarm silence pressed, or after the auxiliary switch is made.

0001



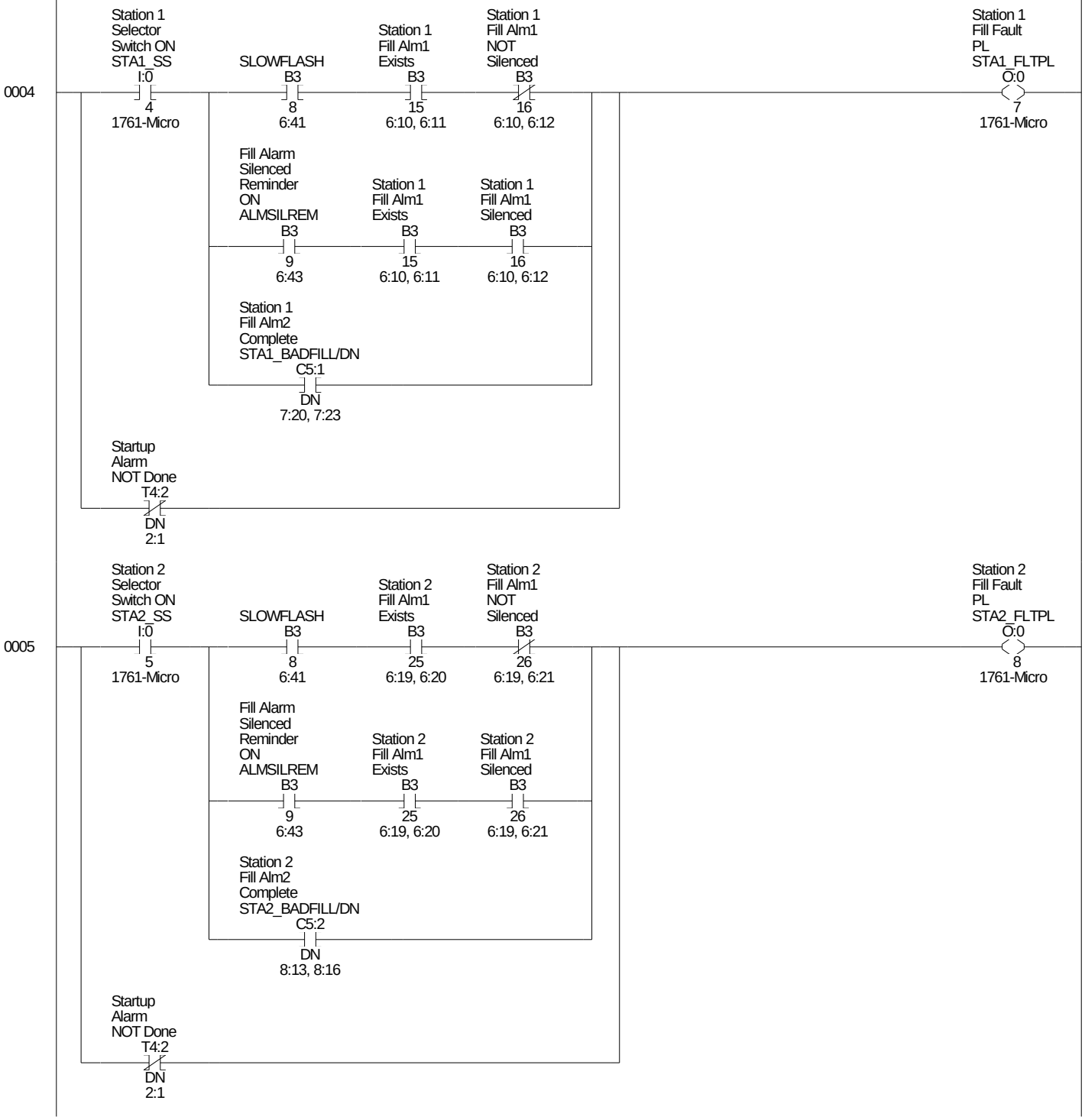
Set fault is vac pump commanded on, and auxiliary switch does not pull in within the alloted time. Unlatch fault if alarm silence pressed, or after the auxiliary switch is made.

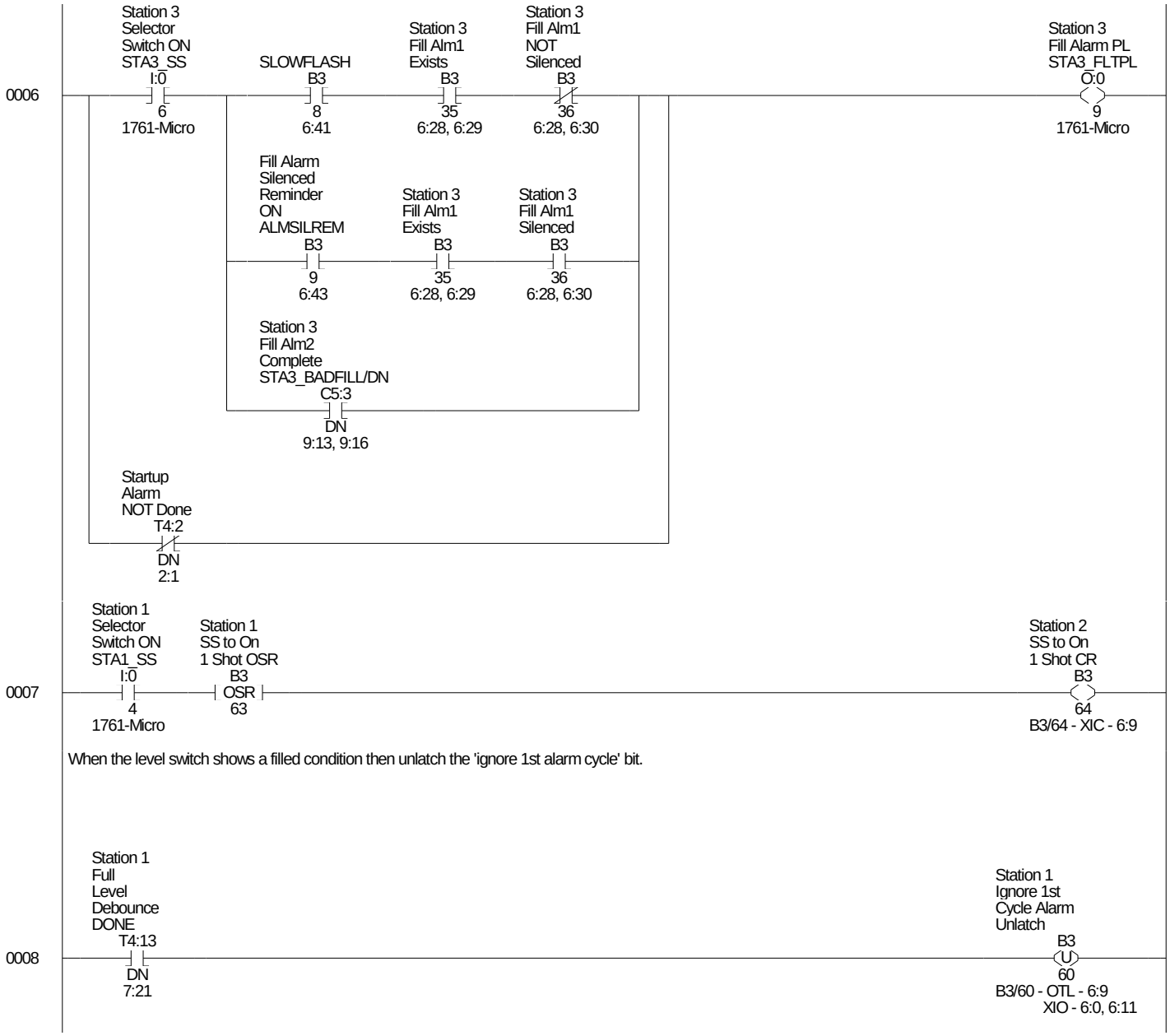
0002

All of the pilot lamps are turned on during the startup alarm so its easy to see if any have failed. The vac pump fault lamp flashes to indicate failure.

0003

Slow flash for an early warning of poor filling performance, and turn on 100% for load failure.




0006
Station 3 Selector Switch ON STA3_SS I:0 6 1761-Micro
SLOWFLASH B3 8 6:41
Station 3 Fill Alm1 Exists B3 35 6:28, 6:29
Station 3 Fill Alm1 NOT Silenced B3 36 6:28, 6:30
Station 3 Fill Alarm PL STA3_FLTPL O:0 9 1761-Micro
Fill Alarm Silenced Reminder ON ALMSILREM B3 9 6:43
Station 3 Fill Alm1 Exists B3 35 6:28, 6:29
Station 3 Fill Alm1 Silenced B3 36 6:28, 6:30
Station 3 Fill Alm2 Complete STA3_BADFILL/DN C5:3 DN 9:13, 9:16
Startup Alarm NOT Done T4:2 DN 2:1
0007
Station 1 Selector Switch ON STA1_SS I:0 4 1761-Micro
Station 1 SS to On 1 Shot OSR B3 OSR 63
Station 2 SS to On 1 Shot CR B3 64 B3/64 - XIC - 6:9
When the level switch shows a filled condition then unlatch the 'ignore 1st alarm cycle' bit.
0008
Station 1 Full Level Debounce DONE T4:13 DN 7:21
Station 1 Ignore 1st Cycle Alarm Unlatch B3 U 60 B3/60 - OTL - 6:9 XIO - 6:0, 6:11

This relay is turned on to prevent nusiance alarming on system startup, and whenever the selector switch is switched to the 'on' position.

0009

PLC Alive
1 Shot
S:1
15

Station 1
Low Level
STA1LOLVL
I:0
1
1761-Micro

Station 1
Ignore 1st
Cycle Alarm
Latch
B3
L
60
B3/60 - OTU - 6:8
XIO - 6:0, 6:11

Station 2
SS to On
1 Shot CR
B3
64
6:7

Alarm
Silence
PB Pressed
ALMSILPB
I:0
10
1761-Micro

Station 1
Fill Alm1
Exists
B3
15
6:10, 6:11

This unlatches station 1 quick-warning alarm latch.

0010

Station 1
Full
Level
Debounce
DONE
T4:13
DN
7:21

PLC Alive
1 Shot
S:1
15

Station 1
Fill Alm1
Reset
B3
U
15
B3/15 - OTL - 6:11
XIC - 6:0, 6:4, 6:9
6:12

Station 1
Fill Alm1
Silence
Reset
B3
U
16
B3/16 - OTL - 6:12
XIC - 6:4
XIO - 6:0, 6:4

This turns on station 1 'quick warning' alarm.

0011

Station 1
Fill Fault
STA1_BADFILL.ACC
GEQ
Grtr Than or Eql (A>=B)
Source A C5:1.ACC
0<
Source B N7:15
100<

Station 1
Fill Alm2
NOT
Complete
STA1_BADFILL/DN
C5:1
DN
7:20, 7:23

Station 1
Ignore 1st
Cycle Alarm
NOT Set
B3
60
6:8, 6:9

Station 1
Fill Alm1
Set
B3
L
15
B3/15 - OTU - 6:10
XIC - 6:0, 6:4, 6:9
6:12

If station 1 low fill alarm occurs, and the alarm silence pushbutton is pressed this relay latches in to quiet the alarm, and latch in the alarm silence relay.

0012

This unlatches station 1 alarm silence latch when the alarm recycling timer completes.

0013

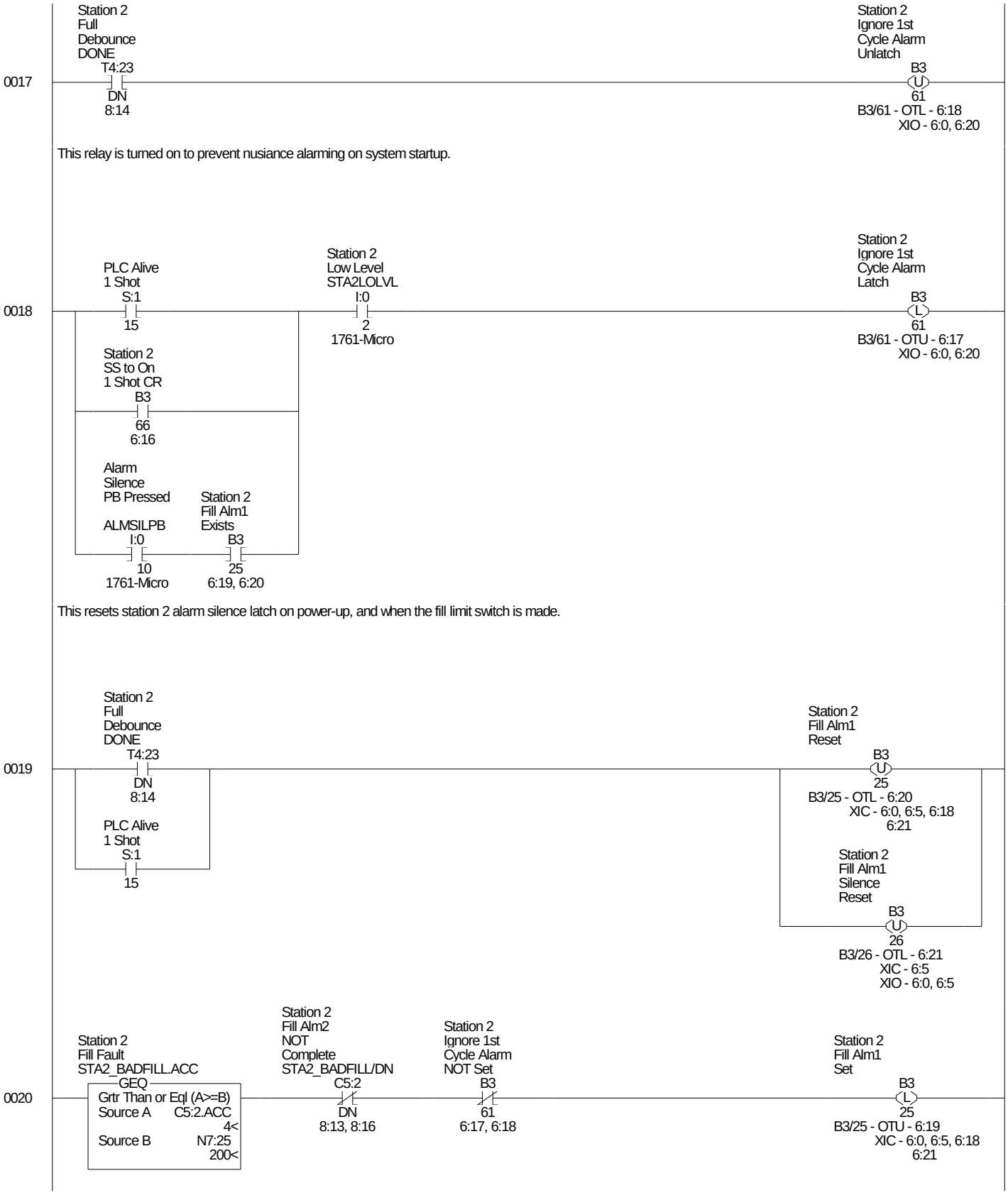
If station 1 alarm silence isn't already on this latches on the alarm silence relay timer when the alarm silence pushbutton is pressed.

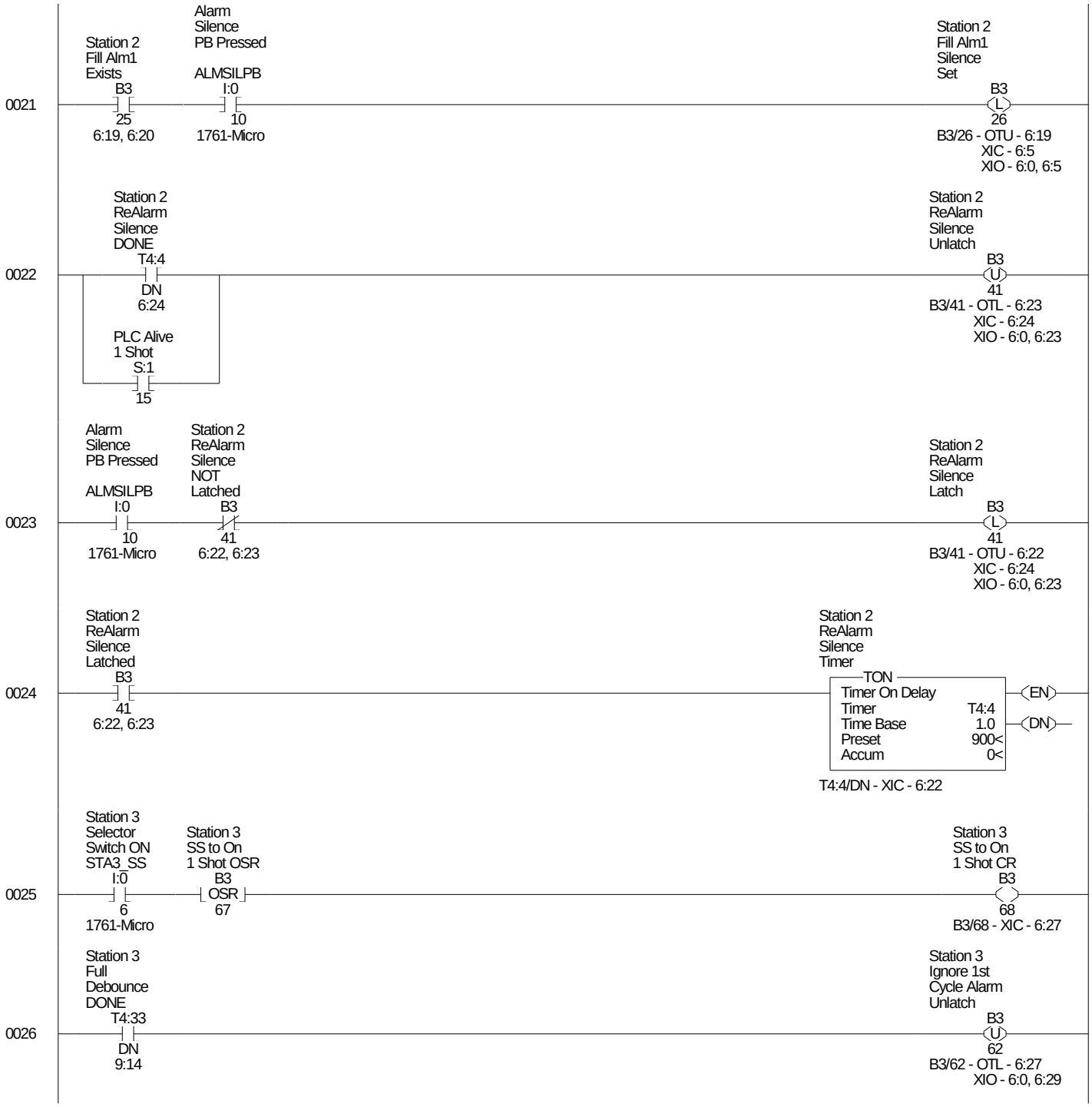
0014

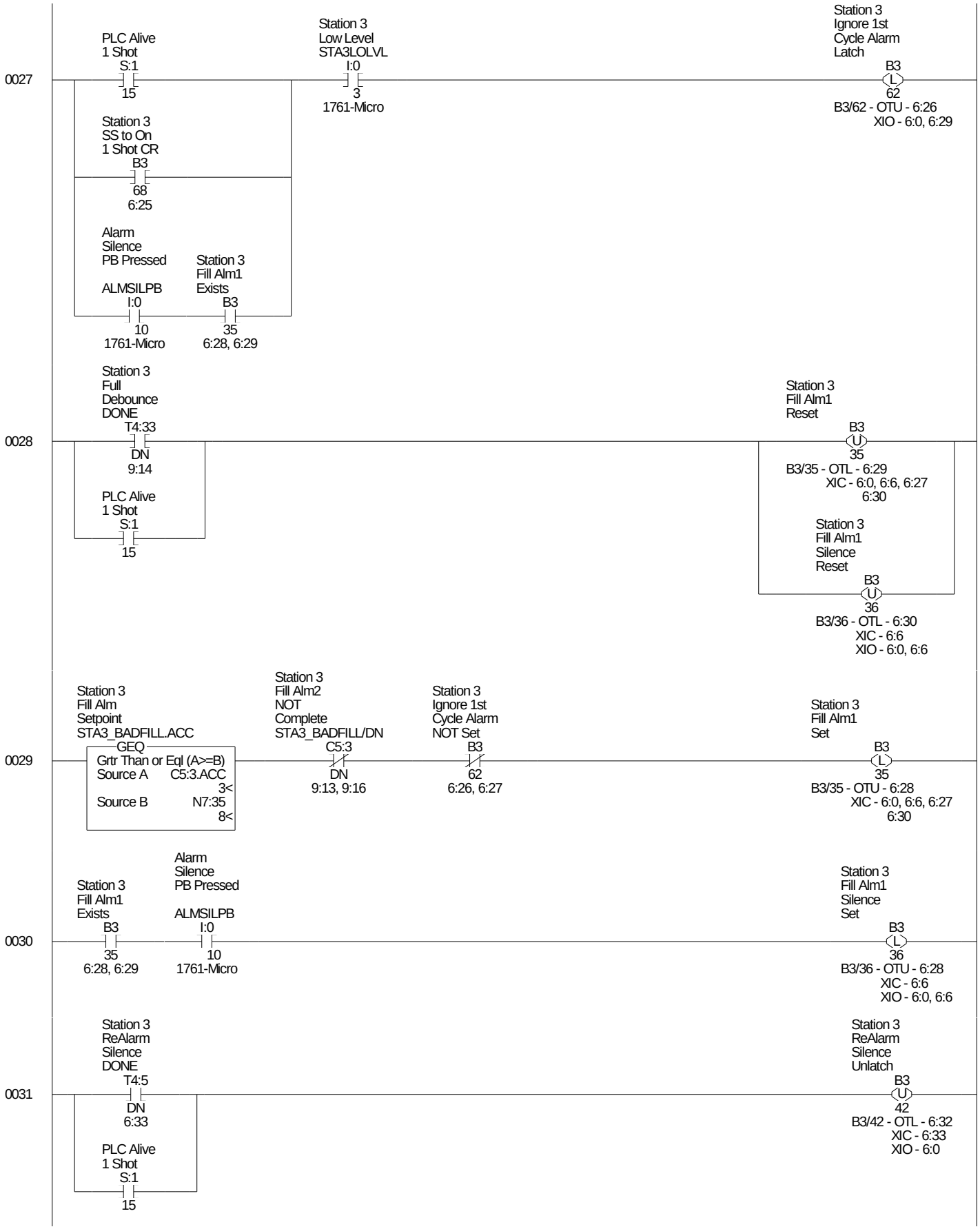
This is a 15 minute timer used to silence Station 1 fill alarm.

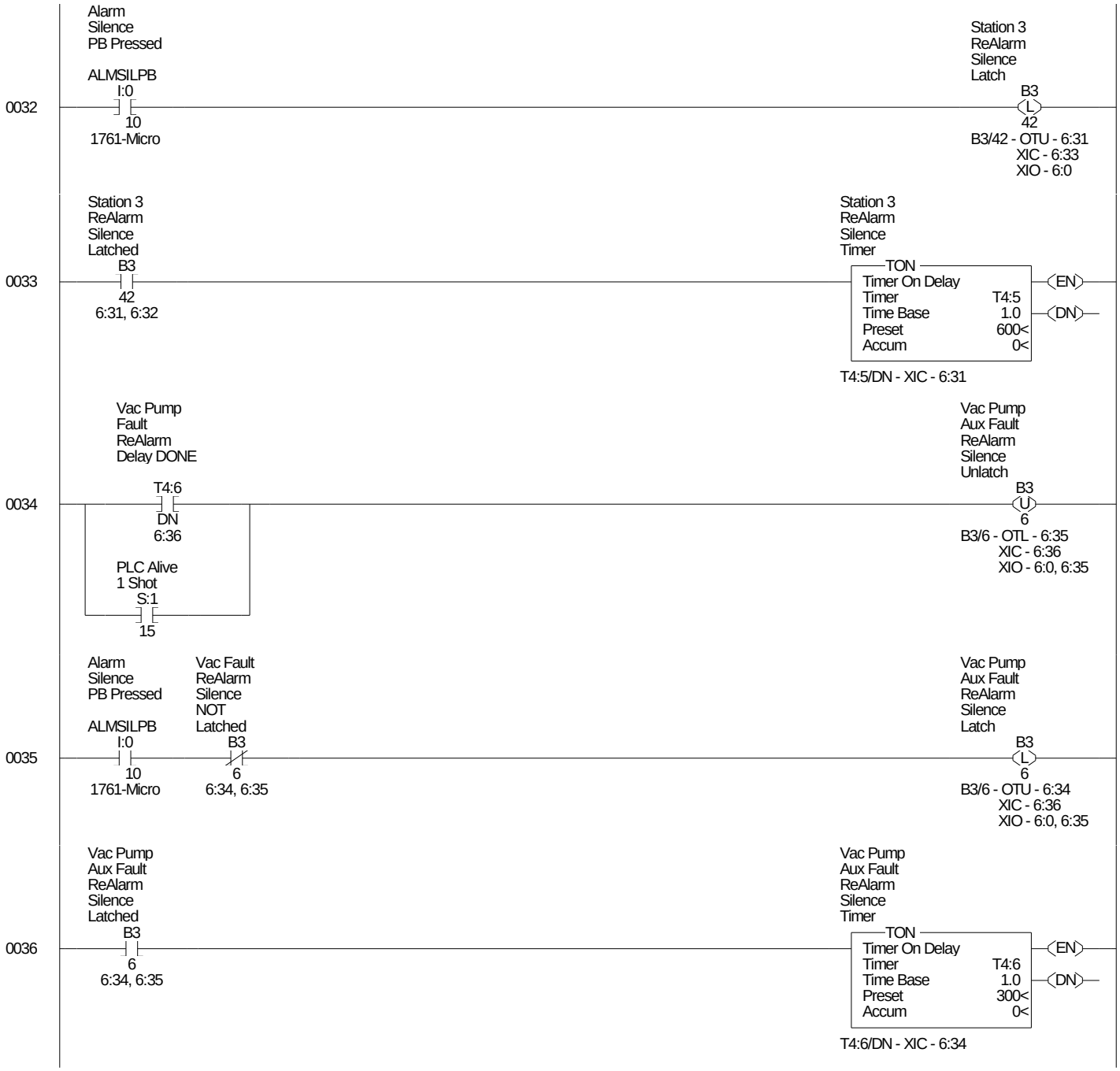
0015

0016


0017
Station 2
Full
Debounce
DONE
T4:23
DN
8:14
Station 2
Ignore 1st
Cycle Alarm
Unlatch
B3
U
61
B3/61 - OTL - 6:18
XIO - 6:0, 6:20
This relay is turned on to prevent nusiance alarming on system startup.
0018
PLC Alive
1 Shot
S:1
15
Station 2
Low Level
STA2LOLVL
I:0
2
1761-Micro
Station 2
Ignore 1st
Cycle Alarm
Latch
B3
L
61
B3/61 - OTU - 6:17
XIO - 6:0, 6:20
Station 2
SS to On
1 Shot CR
B3
66
6:16
Alarm
Silence
PB Pressed
ALMSILPB
I:0
10
1761-Micro
Station 2
Fill Alm1
Exists
B3
25
6:19, 6:20
This resets station 2 alarm silence latch on power-up, and when the fill limit switch is made.
0019
Station 2
Full
Debounce
DONE
T4:23
DN
8:14
PLC Alive
1 Shot
S:1
15
Station 2
Fill Alm1
Reset
B3
U
25
B3/25 - OTL - 6:20
XIC - 6:0, 6:5, 6:18
6:21
Station 2
Fill Alm1
Silence
Reset
B3
U
26
B3/26 - OTL - 6:21
XIC - 6:5
XIO - 6:0, 6:5
0020
Station 2
Fill Fault
STA2_BADFILL.ACC
GEQ
Grtr Than or Eql (A>=B)
Source A C5:2.ACC
4<
Source B N7:25
200<
Station 2
Fill Alm2
NOT
Complete
STA2_BADFILL/DN
C5:2
DN
8:13, 8:16
Station 2
Ignore 1st
Cycle Alarm
NOT Set
B3
61
6:17, 6:18
Station 2
Fill Alm1
Set
B3
L
25
B3/25 - OTU - 6:19
XIC - 6:0, 6:5, 6:18
6:21


0021
Station 2 Fill Alm1 Exists
B3 25
6:19, 6:20
Alarm Silence PB Pressed
ALMSILPB I:0 10
1761-Micro
Station 2 Fill Alm1 Silence Set
B3 L 26
B3/26 - OTU - 6:19
XIC - 6:5
XIO - 6:0, 6:5
0022
Station 2 ReAlarm Silence DONE
T4:4 DN
6:24
PLC Alive 1 Shot
S:1 15
Station 2 ReAlarm Silence Unlatch
B3 U 41
B3/41 - OTL - 6:23
XIC - 6:24
XIO - 6:0, 6:23
0023
Alarm Silence PB Pressed
ALMSILPB I:0 10
1761-Micro
Station 2 ReAlarm Silence NOT Latched
B3 41
6:22, 6:23
Station 2 ReAlarm Silence Latch
B3 L 41
B3/41 - OTU - 6:22
XIC - 6:24
XIO - 6:0, 6:23
0024
Station 2 ReAlarm Silence Latched
B3 41
6:22, 6:23
Station 2 ReAlarm Silence Timer
TON
Timer On Delay
Timer T4:4
Time Base 1.0
Preset 900<
Accum 0<
EN
DN
T4:4/DN - XIC - 6:22
0025
Station 3 Selector Switch ON STA3_SS
I:0 6
1761-Micro
Station 3 SS to On 1 Shot OSR
B3 OSR 67
Station 3 SS to On 1 Shot CR
B3 68
B3/68 - XIC - 6:27
0026
Station 3 Full Debounce DONE
T4:33 DN
9:14
Station 3 Ignore 1st Cycle Alarm Unlatch
B3 U 62
B3/62 - OTL - 6:27
XIO - 6:0, 6:29


0027
PLC Alive
1 Shot
S:1
15
Station 3
Low Level
STA3LOLVL
I:0
3
1761-Micro
Station 3
Ignore 1st
Cycle Alarm
Latch
B3
L
62
B3/62 - OTU - 6:26
XIO - 6:0, 6:29
Station 3
SS to On
1 Shot CR
B3
68
6:25
Alarm
Silence
PB Pressed
ALMSILPB
I:0
10
1761-Micro
Station 3
Fill Alm1
Exists
B3
35
6:28, 6:29
0028
Station 3
Full
Debounce
DONE
T4:33
DN
9:14
PLC Alive
1 Shot
S:1
15
Station 3
Fill Alm1
Reset
B3
U
35
B3/35 - OTL - 6:29
XIC - 6:0, 6:6, 6:27
6:30
Station 3
Fill Alm1
Silence
Reset
B3
U
36
B3/36 - OTL - 6:30
XIC - 6:6
XIO - 6:0, 6:6
0029
Station 3
Fill Alm
Setpoint
STA3_BADFILL.ACC
GEQ
Grtr Than or Eql (A>=B)
Source A C5:3.ACC
3<
Source B N7:35
8<
Station 3
Fill Alm2
NOT
Complete
STA3_BADFILL/DN
C5:3
DN
9:13, 9:16
Station 3
Ignore 1st
Cycle Alarm
NOT Set
B3
62
6:26, 6:27
Station 3
Fill Alm1
Set
B3
L
35
B3/35 - OTU - 6:28
XIC - 6:0, 6:6, 6:27
6:30
0030
Station 3
Fill Alm1
Exists
B3
35
6:28, 6:29
Alarm
Silence
PB Pressed
ALMSILPB
I:0
10
1761-Micro
Station 3
Fill Alm1
Silence
Set
B3
L
36
B3/36 - OTU - 6:28
XIC - 6:6
XIO - 6:0, 6:6
0031
Station 3
ReAlarm
Silence
DONE
T4:5
DN
6:33
PLC Alive
1 Shot
S:1
15
Station 3
ReAlarm
Silence
Unlatch
B3
U
42
B3/42 - OTL - 6:32
XIC - 6:33
XIO - 6:0


0032
Alarm Silence PB Pressed
ALMSILPB
I:0
10
1761-Micro
Station 3 ReAlarm Silence Latch
B3
L
42
B3/42 - OTU - 6:31
XIC - 6:33
XIO - 6:0
0033
Station 3 ReAlarm Silence Latched
B3
42
6:31, 6:32
Station 3 ReAlarm Silence Timer
TON
Timer On Delay
Timer T4:5
Time Base 1.0
Preset 600
Accum 0
EN
DN
T4:5/DN - XIC - 6:31
0034
Vac Pump Fault ReAlarm Delay DONE
T4:6
DN
6:36
PLC Alive 1 Shot
S:1
15
Vac Pump Aux Fault ReAlarm Silence Unlatch
B3
U
6
B3/6 - OTL - 6:35
XIC - 6:36
XIO - 6:0, 6:35
0035
Alarm Silence PB Pressed
ALMSILPB
I:0
10
1761-Micro
Vac Fault ReAlarm Silence NOT Latched
B3
6
6:34, 6:35
Vac Pump Aux Fault ReAlarm Silence Latch
B3
L
6
B3/6 - OTU - 6:34
XIC - 6:36
XIO - 6:0, 6:35
0036
Vac Pump Aux Fault ReAlarm Silence Latched
B3
6
6:34, 6:35
Vac Pump Aux Fault ReAlarm Silence Timer
TON
Timer On Delay
Timer T4:6
Time Base 1.0
Preset 300
Accum 0
EN
DN
T4:6/DN - XIC - 6:34

Timebases

0037

Up counter reading the 1 second timebase, and turning on for one scan after 60 seconds to create a 1 minute timebase.

0038

Alarm Flash Control

This is a 1 second recycling timer to create a 1 second timebase for alarm lamps, etc.

0039

Alarm Flasher 1 Second Timebase NOT Done ONESEC T4:0 DN 6:39

Alarm Flash 1 Second Timebase
TON
Timer On Delay
Timer T4:0
Time Base 0.01
Preset 100<
Accum 57<
EN
DN

T4:0/DN - XIC - 2:7, 6:38
XIO - 6:39
T4:0.ACC - GRT - 6:40, 6:41
LEQ - 6:40, 6:41

This rung provides the 'fast flash' alarm rate.

0040

1 second Timebase
GRT
Greater Than (A>B)
Source A T4:0.ACC 57<
Source B 0 0<

1 second Timebase
LEQ
Less Than or Eql (A<=B)
Source A T4:0.ACC 57<
Source B 25 25<

1 second Timebase
GRT
Greater Than (A>B)
Source A T4:0.ACC 57<
Source B 50 50<

1 second Timebase
LEQ
Less Than or Eql (A<=B)
Source A T4:0.ACC 57<
Source B 75 75<

Fast Flash ON FASTFLASH B3 7

B3/7 - XIC - 6:0, 6:3

This rung provides the 'slow flash' alarm rate.

0041

1 second Timebase
GRT
Greater Than (A>B)
Source A T4:0.ACC 57<
Source B 0 0<

1 second Timebase
LEQ
Less Than or Eql (A<=B)
Source A T4:0.ACC 57<
Source B 50 50<

Slow Flash ON SLOWFLASH B3 8

B3/8 - XIC - 6:0, 6:4, 6:5
6:6

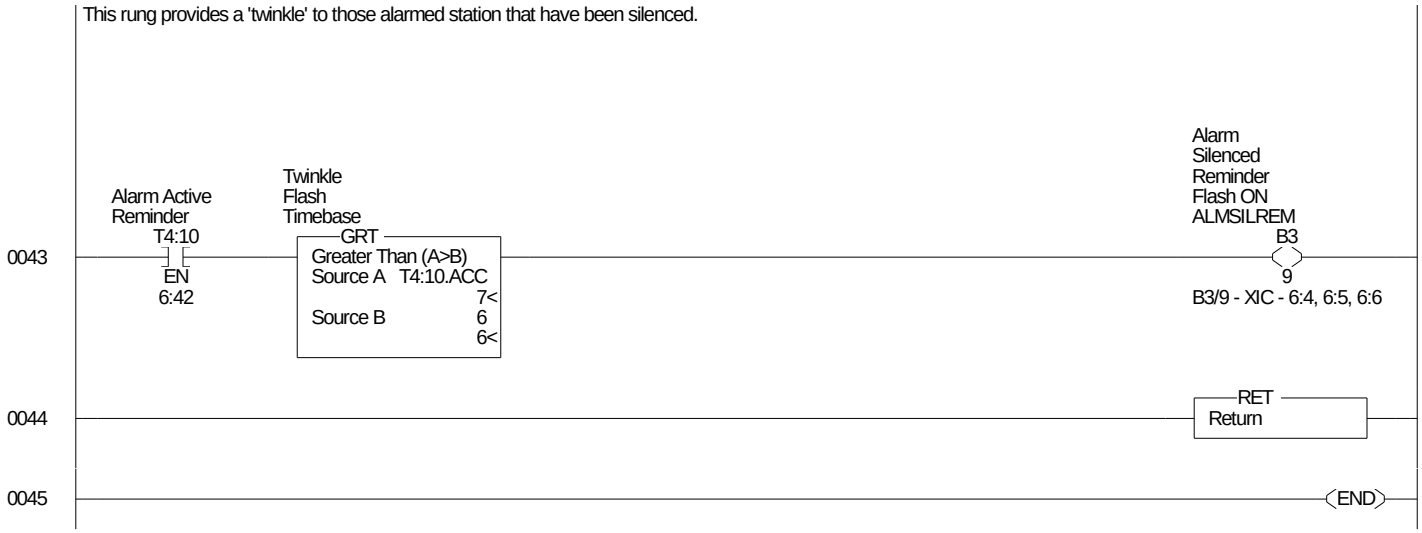
This timebase is used to give a short flash every x seconds on the fill alarm lamps to show that an alarm has been silenced, but the fill fault still exists.

0042

Twinkle Flash Timebase T4:10 DN 6:42

Twinkle Flash Timebase
TON
Timer On Delay
Timer T4:10
Time Base 1.0
Preset 10<
Accum 7<
EN
DN

T4:10/DN - XIO - 6:42
T4:10/EN - XIC - 6:43
T4:10.ACC - GRT - 6:43


This rung provides a 'twinkle' to those alarmed station that have been silenced.
Alarm Active Reminder
T4:10
EN
6:42
Twinkle Flash Timebase
GRT
Greater Than (A>B)
Source A T4:10.ACC
7<
Source B
6
6<
Alarm Silenced Reminder Flash ON ALMSILREM
B3
9
B3/9 - XIC - 6:4, 6:5, 6:6
0043
RET
Return
0044
END
0045

Station 1 Control Subroutine

This uses the same control logic as the other two, but with a twist -
the system this was originally written for had an agitated hopper, and the level switch operation was highly variable.
This station shows an example of crude proportioning control using a retentive timer to decouple the agitation effect from level measurement.

0000

Station 1 Selector Switch OFF
STA1_SS
I:0
4
1761-Micro

Station 1 Selector Switch to Off 1 Shot OSR
B3
OSR
17

Station 1 Selector Switch to Off 1 Shot CR
B3
18
B3/18 - XIC - 7:2, 7:11

0001

Station 1 Last Dump Cycle Timeout
T4:17
DN
7:3

PLC Alive 1 Shot
S:1
15

Station 1 Last Dump Cycle RESET
B3
U
19
B3/19 - OTL - 7:2
XIC - 7:3, 7:19

When the station selector switch si turned to 'Off', or the startup alarm timer has reached 4 seconds (to allow dump on startup) then latch in this relay.

0002

Station 1 Selector Switch to Off 1 Shot
B3
18
7:0

Station 1 Last Dump Cycle SET
B3
L
19
B3/19 - OTU - 7:1
XIC - 7:3, 7:19

This timer is set to allow material to dump when the selector switch is turned to 'Off'.

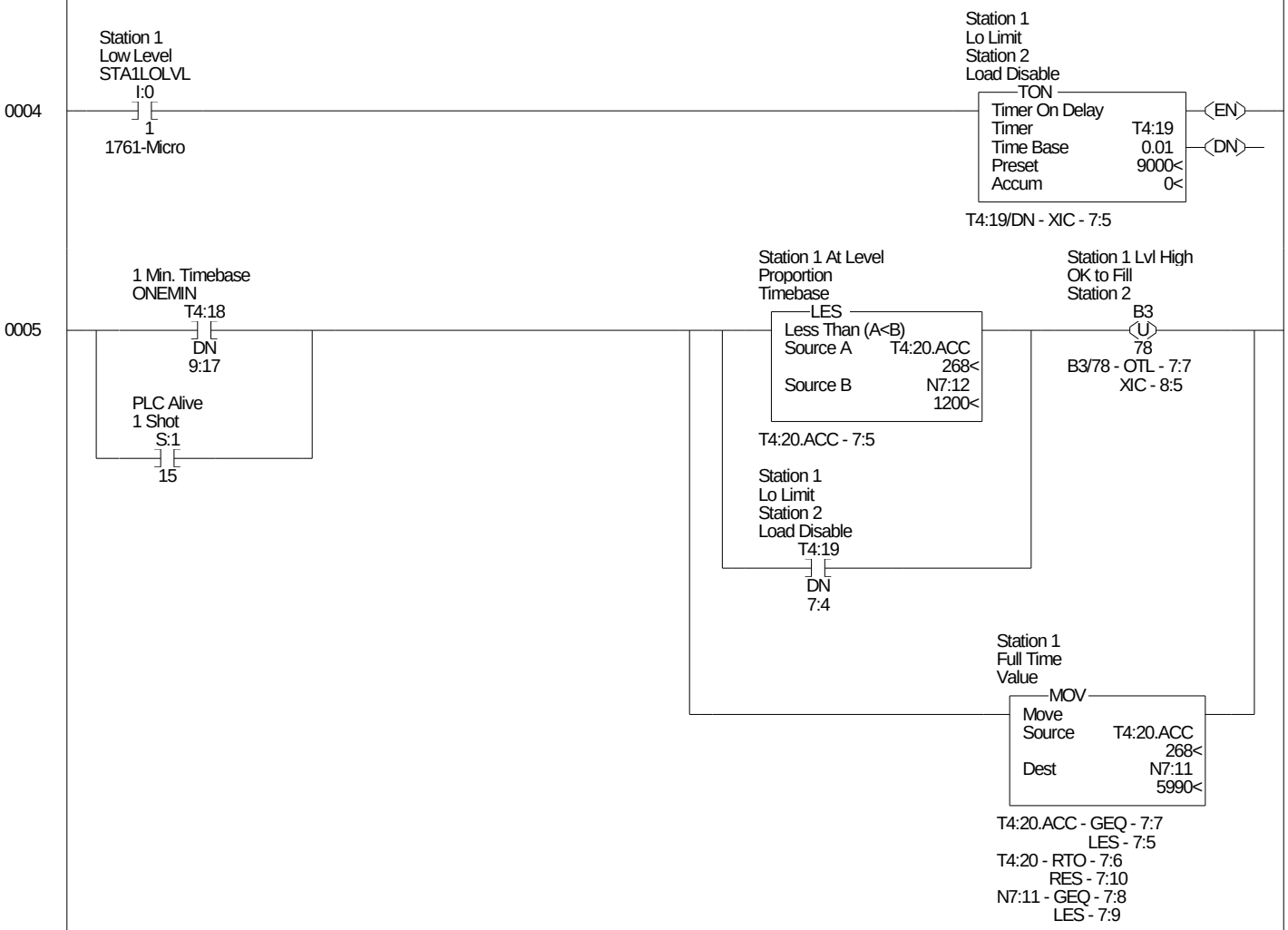
0003

Station 1 Last Dump Cycle in Progress
B3
19
7:1, 7:2

Station 1 Last Dump Timer
TON
Timer On Delay
Timer T4:17
Time Base 1.0
Preset 15<
Accum 0<
EN
DN
T4:17/DN - XIC - 7:1

Station 1 - Allow Dryer Load Level Determination

When a low level is sensed for greater than the setpoint (default of 90 seconds) dryer loading is unconditionally disabled until a full condition is again sensed.



This retentive timer is reset once per minute, so can time out to a maximum value of 6000. Greater and less than comparisons are performed using the accumulated value at the one minute mark to determine whether Station 1 is below or above the high level sensor. Note: because it is evaluated only once per minute it will normally allow a load one cycle past the point where the low level pilot lamp turns off.

These rungs are a crude proportioning device to show station 1 fill level. The high level sensor is fed into a retentive timer, and the accumulated time is evaluated every minute. If the full time is more than 50% then station 1 is considered full, and if less than 30% considered empty. The proportioning values aren't programmic, and can be changed by altering the N7 registers to other values.

0007

1 Min. Timebase
ONEMIN
T4:18
DN
9:17

Station 1 At Level
Proportion
Timebase
GEQ
Grtr Than or Eql (A>=B)
Source A T4:20.ACC
268<
Source B N7:13
3000<
T4:20.ACC - 7:5

Station 1 Lvl High
OK to Fill
Station 2
B3
L
78
B3/78 - OTU - 7:5
XIC - 8:5

If station 1 level is high for less than half the time (3000 of 6000 - 30 in 60 seconds) then consider it low.

0008

Station 1
Full Time
Value
GEQ
Grtr Than or Eql (A>=B)
Source A N7:11
5990<
Source B 3500
3500<
7:5

PLC Alive
1 Shot
S:1
15

Station 1
Low - Need
Fill
B3
U
80
B3/80 - OTL - 7:9
XIC - 7:12

If station 1 level is high for less than half the time (3000 of 6000 - 30 in 60 seconds) then consider it low.

0009

Station 1
Full Time
Value
LES
Less Than (A<B)
Source A N7:11
5990<
Source B 3000
3000<
7:5

Station 1
Low - Need
Fill
B3
L
80
B3/80 - OTU - 7:8
XIC - 7:12

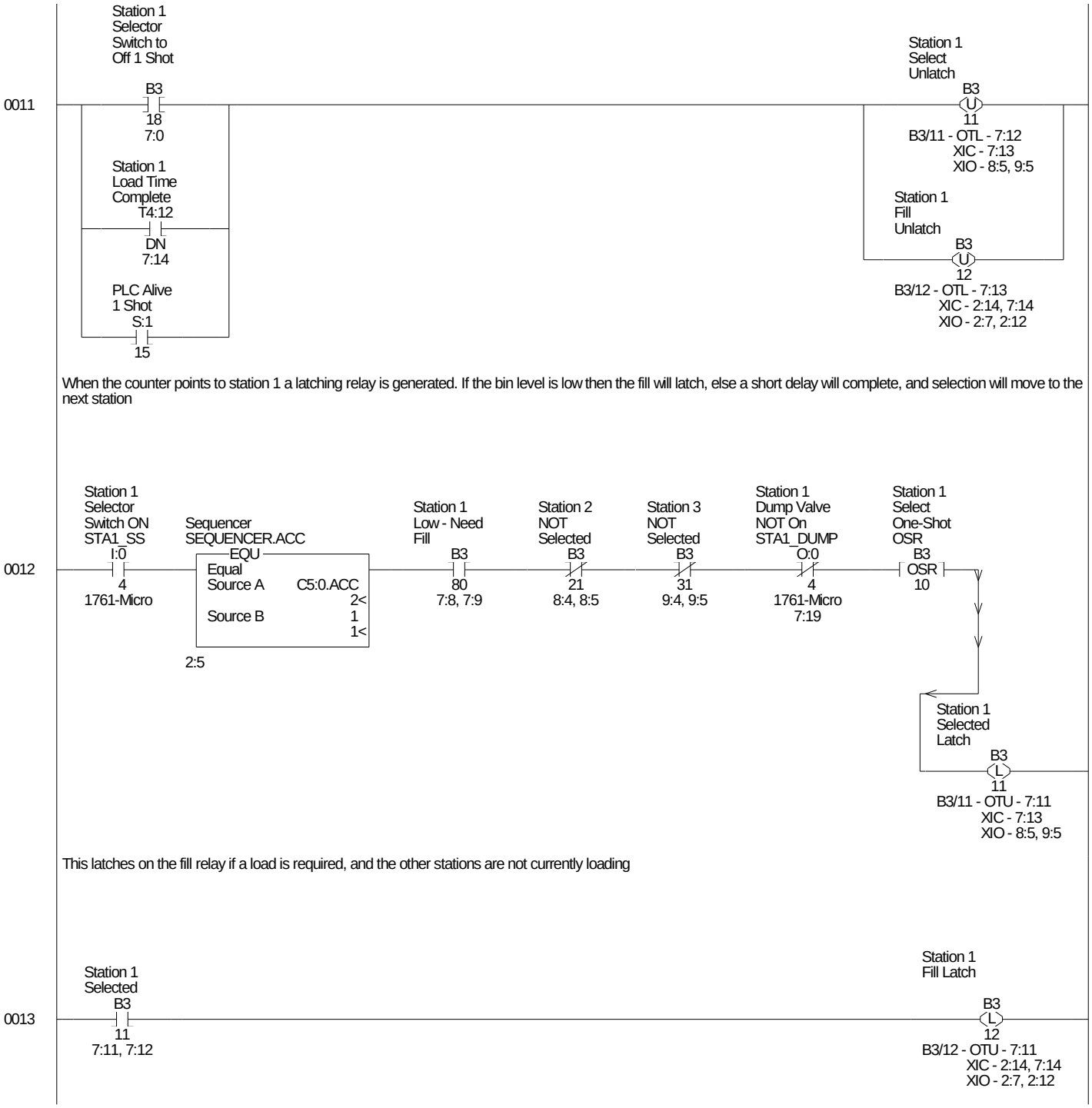
This retentive timer is reset once per minute, so can time out to a maximum value of 6000. Greater and less than comparisons are performed using the accumulated value at the one minute mark to determine whether Station 1 is below or above the high level sensor. Note: because it is evaluated only once per minute it will normally allow a load one cycle past the point where the low level pilot lamp turns off.

0010

PLC Alive
1 Shot
S:1
15

1 Min. Timebase
ONEMIN
T4:18
DN
9:17

Station 1 At Level
Proportion
Timebase
T4:20
RES
T4:20 - RTO - 7:6
T4:20.ACC - MOV - 7:5
GEQ - 7:7
LES - 7:5


0011
Station 1
Selector
Switch to
Off 1 Shot
B3
18
7:0
Station 1
Load Time
Complete
T4:12
DN
7:14
PLC Alive
1 Shot
S:1
15
Station 1
Select
Unlatch
B3
U
11
B3/11 - OTL - 7:12
XIC - 7:13
XIO - 8:5, 9:5
Station 1
Fill
Unlatch
B3
U
12
B3/12 - OTL - 7:13
XIC - 2:14, 7:14
XIO - 2:7, 2:12
When the counter points to station 1 a latching relay is generated. If the bin level is low then the fill will latch, else a short delay will complete, and selection will move to the next station
0012
Station 1
Selector
Switch ON
STA1_SS
I:0
4
1761-Micro
Sequencer
SEQUENCER.ACC
EQU
Equal
Source A
C5:0.ACC
2<
Source B
1
1<
2:5
Station 1
Low - Need
Fill
B3
80
7:8, 7:9
Station 2
NOT
Selected
B3
21
8:4, 8:5
Station 3
NOT
Selected
B3
31
9:4, 9:5
Station 1
Dump Valve
NOT On
STA1_DUMP
O:0
4
1761-Micro
7:19
Station 1
Select
One-Shot
OSR
B3
OSR
10
Station 1
Selected
Latch
B3
L
11
B3/11 - OTU - 7:11
XIC - 7:13
XIO - 8:5, 9:5
This latches on the fill relay if a load is required, and the other stations are not currently loading
0013
Station 1
Selected
B3
11
7:11, 7:12
Station 1
Fill Latch
B3
L
12
B3/12 - OTU - 7:11
XIC - 2:14, 7:14
XIO - 2:7, 2:12

Wait for the vac pump to turn on before enabling the load timer.

0014

Station 1 Fill In Progress
B3
12
7:11, 7:13

Vac Pump Motor Starter VACPUMPMS
O:0
0
1761-Micro
2:18

Station 1 Load Time
TON
Timer On Delay
Timer T4:12
Time Base 1.0
Preset 12<
Accum 0<
EN
DN

T4:12/DN - XIC - 7:11, 7:17
T4:12/TT - XIC - 7:15

If the dump valve (slide gate) isn't on, the station selector switch is on, and the station is selected for fill, then turn on the fill valve

0015

Station 1 Load Timer Timing
T4:12
TT
7:14

Station 1 Fill Valve
STA1_FILL
O:0
1
1761-Micro
O:0/1 - XIC - 7:20

0016

Station 1 Dump Complete
T4:14
DN
7:18

PLC Alive 1 Shot
S:1
15

Station 1 Dump Unlatch
B3
U
14
B3/14 - OTL - 7:17
XIC - 7:18

0017

Station 1 Load Time Complete
T4:12
DN
7:14

Station 1 Dump Latch
B3
L
14
B3/14 - OTU - 7:16
XIC - 7:18

When a dump is called for this timer controls how long the dump valve (slide gate) is turned on.

0018

Station 1 Selector Switch ON STA1_SS
I:0
4
1761-Micro

Station 1 Dump Latched
B3
14
7:16, 7:17

Station 1 Dump Time
TON
Timer On Delay
Timer T4:14
Time Base 1.0
Preset 10<
Accum 0<
EN
DN

T4:14/DN - XIC - 7:16
T4:14/TT - XIC - 7:19

The dump valve (slide gate) is turned on during normal operation in the first line of this rung, when the selector switch is turned to 'Off' (for one last cycle) in the second line, and during system initialization in the third line.

0019

Each time a fill is commanded this counter increments. If the fill is successful in restoring hopper level then it is reset.
This counter is monitored and used by alarm logic that pefines 'early warning' and 'serious condition' setpoints.
Also reset if the counter ends up nearing 32767, although for most applications this will not be possible (the machine will run out of material well before this happens).

0020

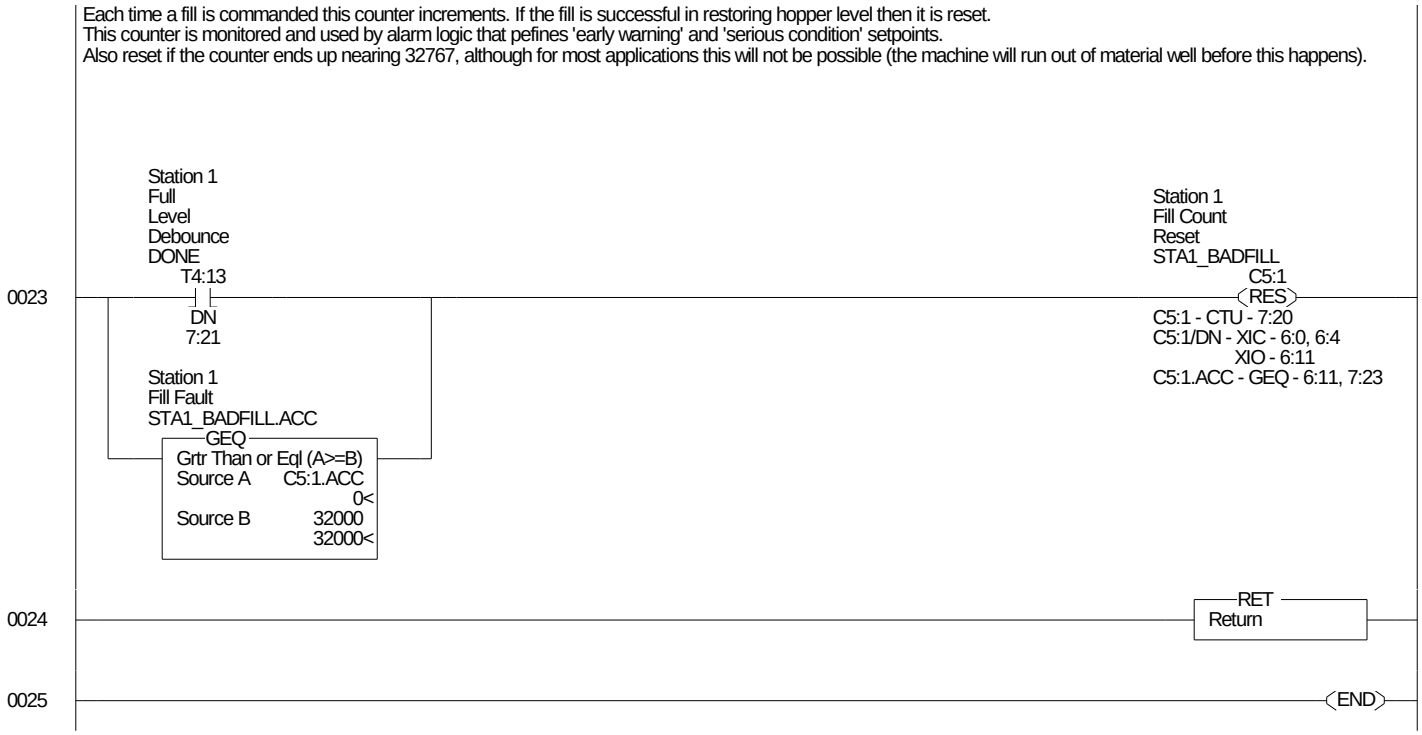
C5:1 - RES - 7:23
C5:1/DN - XIC - 6:0, 6:4
XIO - 6:11
C5:1.ACC - GEQ - 6:11, 7:23

This is how long the level switch must show full before the 'bad fill' counter is reset.

0021

T4:13/DN - XIC - 6:8, 6:10, 7:22, 7:23

0022


Each time a fill is commanded this counter increments. If the fill is successful in restoring hopper level then it is reset.
This counter is monitored and used by alarm logic that pefines 'early warning' and 'serious condition' setpoints.
Also reset if the counter ends up nearing 32767, although for most applications this will not be possible (the machine will run out of material well before this happens).
Station 1
Full
Level
Debounce
DONE
T4:13
DN
7:21
Station 1
Fill Fault
STA1_BADFILL.ACC
GEQ
Grtr Than or Eql (A>=B)
Source A C5:1.ACC
0<
Source B 32000
32000<
Station 1
Fill Count
Reset
STA1_BADFILL
C5:1
RES
C5:1 - CTU - 7:20
C5:1/DN - XIC - 6:0, 6:4
XIO - 6:11
C5:1.ACC - GEQ - 6:11, 7:23
0023
RET
Return
0024
END
0025

Station 2 Control Subroutine

0000

Station 2 Selector Switch OFF
STA2_SS
I:0
5
1761-Micro

Station 2 Selector Switch to Off 1 Shot OSR
B3
OSR
27

Station 2 Selector Switch to Off 1 Shot CR
B3
28
B3/28 - XIC - 8:2, 8:4

0001

Station 2 Last Dump Cycle In Progress Timeout
T4:27
DN
8:3

PLC Alive 1 Shot
S:1
15

Station 2 Last Dump Cycle In Progress Reset
B3
U
29
B3/29 - OTL - 8:2
XIC - 8:3, 8:12

0002

Station 2 Selector Switch to Off 1 Shot
B3
28
8:0

Station 2 Last Dump Cycle In Progress Set
B3
L
29
B3/29 - OTU - 8:1
XIC - 8:3, 8:12

0003

Station 2 Last Dump Cycle In Progress
B3
29
8:1, 8:2

Station 2 Last Dump Cycle In Progress Timer
TON
Timer On Delay
Timer T4:27
Time Base 1.0
Preset 15<
Accum 0<
EN
DN
T4:27/DN - XIC - 8:1

0004

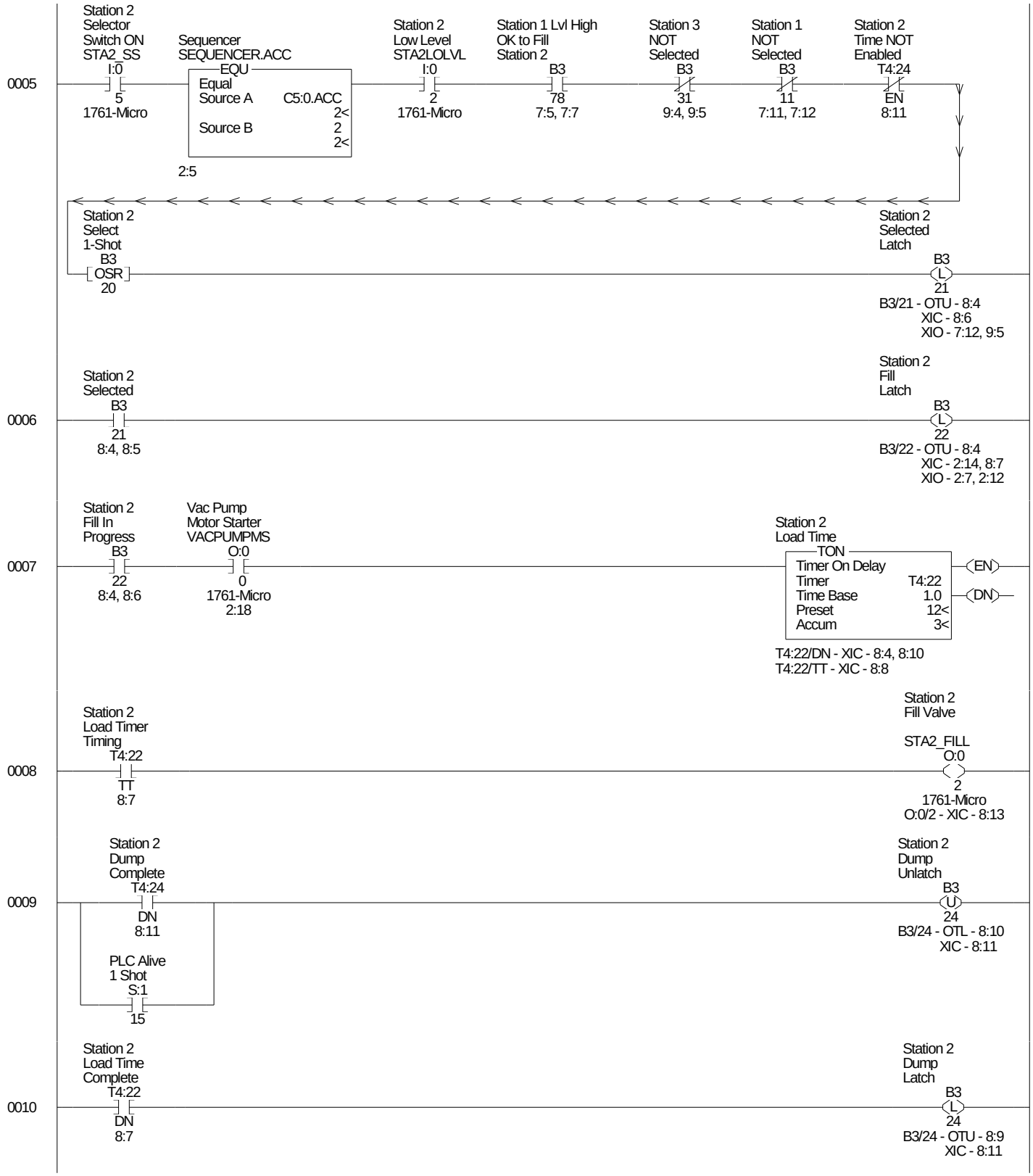
Station 2 Selector Switch to Off 1 Shot
B3
28
8:0

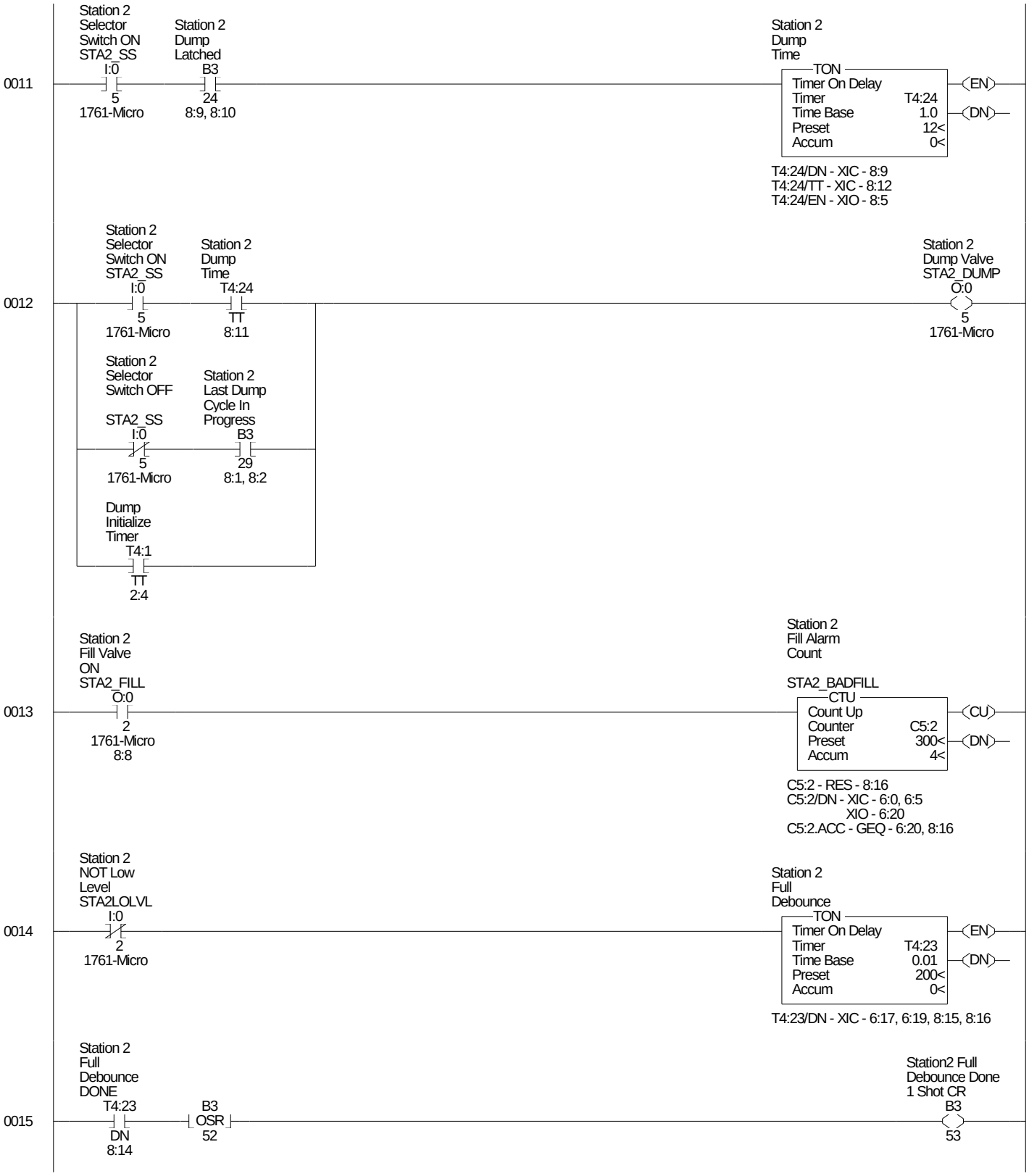
Station 2 Load Time Complete
T4:22
DN
8:7

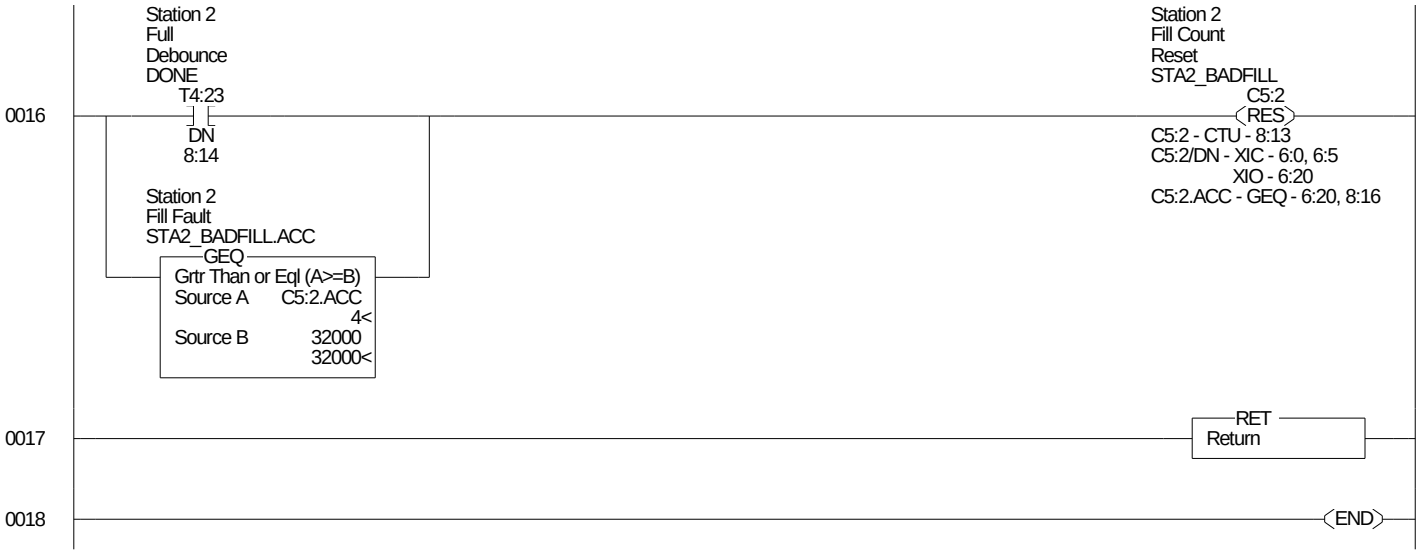
PLC Alive 1 Shot
S:1
15

Station 2 Selected Unlatch
B3
U
21
B3/21 - OTL - 8:5
XIC - 8:6
XIO - 7:12, 9:5

Station 2 Fill Unlatched
B3
U
22
B3/22 - OTL - 8:6
XIC - 2:14, 8:7
XIO - 2:7, 2:12


0005
Station 2 Selector Switch ON STA2_SS I:0 5 1761-Micro
Sequencer SEQUENCER.ACC
EQU Equal Source A C5:0.ACC 2< Source B 2 2<
2:5
Station 2 Low Level STA2LOLVL I:0 2 1761-Micro
Station 1 Lvl High OK to Fill Station 2 B3 78 7:5, 7:7
Station 3 NOT Selected B3 31 9:4, 9:5
Station 1 NOT Selected B3 11 7:11, 7:12
Station 2 Time NOT Enabled T4:24 EN 8:11
Station 2 Select 1-Shot B3 OSR 20
Station 2 Selected Latch B3 L 21
B3/21 - OTU - 8:4
XIC - 8:6
XIO - 7:12, 9:5
0006
Station 2 Selected B3 21 8:4, 8:5
Station 2 Fill Latch B3 L 22
B3/22 - OTU - 8:4
XIC - 2:14, 8:7
XIO - 2:7, 2:12
0007
Station 2 Fill In Progress B3 22 8:4, 8:6
Vac Pump Motor Starter VACPUMPMS O:0 0 1761-Micro 2:18
Station 2 Load Time
TON Timer On Delay Timer T4:22 Time Base 1.0 Preset 12< Accum 3< EN DN
T4:22/DN - XIC - 8:4, 8:10
T4:22/TT - XIC - 8:8
0008
Station 2 Load Timer Timing T4:22 TT 8:7
Station 2 Fill Valve STA2_FILL O:0 2 1761-Micro
O:0/2 - XIC - 8:13
0009
Station 2 Dump Complete T4:24 DN 8:11
PLC Alive 1 Shot S:1 15
Station 2 Dump Unlatch B3 U 24
B3/24 - OTL - 8:10
XIC - 8:11
0010
Station 2 Load Time Complete T4:22 DN 8:7
Station 2 Dump Latch B3 L 24
B3/24 - OTU - 8:9
XIC - 8:11


0011
Station 2 Selector Switch ON STA2_SS I:0 5 1761-Micro
Station 2 Dump Latched B3 24 8:9, 8:10
Station 2 Dump Time
TON
Timer On Delay
Timer T4:24
Time Base 1.0
Preset 12<
Accum 0<
EN
DN
T4:24/DN - XIC - 8:9
T4:24/TT - XIC - 8:12
T4:24/EN - XIO - 8:5
0012
Station 2 Selector Switch ON STA2_SS I:0 5 1761-Micro
Station 2 Dump Time T4:24 TT 8:11
Station 2 Dump Valve STA2_DUMP O:0 5 1761-Micro
Station 2 Selector Switch OFF STA2_SS I:0 5 1761-Micro
Station 2 Last Dump Cycle In Progress B3 29 8:1, 8:2
Dump Initialize Timer T4:1 TT 2:4
0013
Station 2 Fill Valve ON STA2_FILL O:0 2 1761-Micro 8:8
Station 2 Fill Alarm Count
STA2_BADFILL
CTU
Count Up
Counter C5:2
Preset 300<
Accum 4<
CU
DN
C5:2 - RES - 8:16
C5:2/DN - XIC - 6:0, 6:5
XIO - 6:20
C5:2.ACC - GEQ - 6:20, 8:16
0014
Station 2 NOT Low Level STA2LOLVL I:0 2 1761-Micro
Station 2 Full Debounce
TON
Timer On Delay
Timer T4:23
Time Base 0.01
Preset 200<
Accum 0<
EN
DN
T4:23/DN - XIC - 6:17, 6:19, 8:15, 8:16
0015
Station 2 Full Debounce DONE T4:23 DN 8:14
B3 OSR 52
Station2 Full Debounce Done 1 Shot CR B3 53


0016
Station 2
Full
Debounce
DONE
T4:23
DN
8:14
Station 2
Fill Fault
STA2_BADFILL.ACC
GEQ
Grtr Than or Eql (A>=B)
Source A C5:2.ACC
4<
Source B 32000
32000<
Station 2
Fill Count
Reset
STA2_BADFILL
C5:2
RES
C5:2 - CTU - 8:13
C5:2/DN - XIC - 6:0, 6:5
XIO - 6:20
C5:2.ACC - GEQ - 6:20, 8:16
0017
RET
Return
0018
END

Station 3 Control Subroutine

0000
Station 3 Selector Switch OFF
STA3_SS
I:0
6
1761-Micro
Station 3 Sel Sw to Off 1 Shot OSR
B3
OSR
37
Station 3 Sel Sw to Off 1 Shot CR
B3
38
B3/38 - XIC - 9:2, 9:4

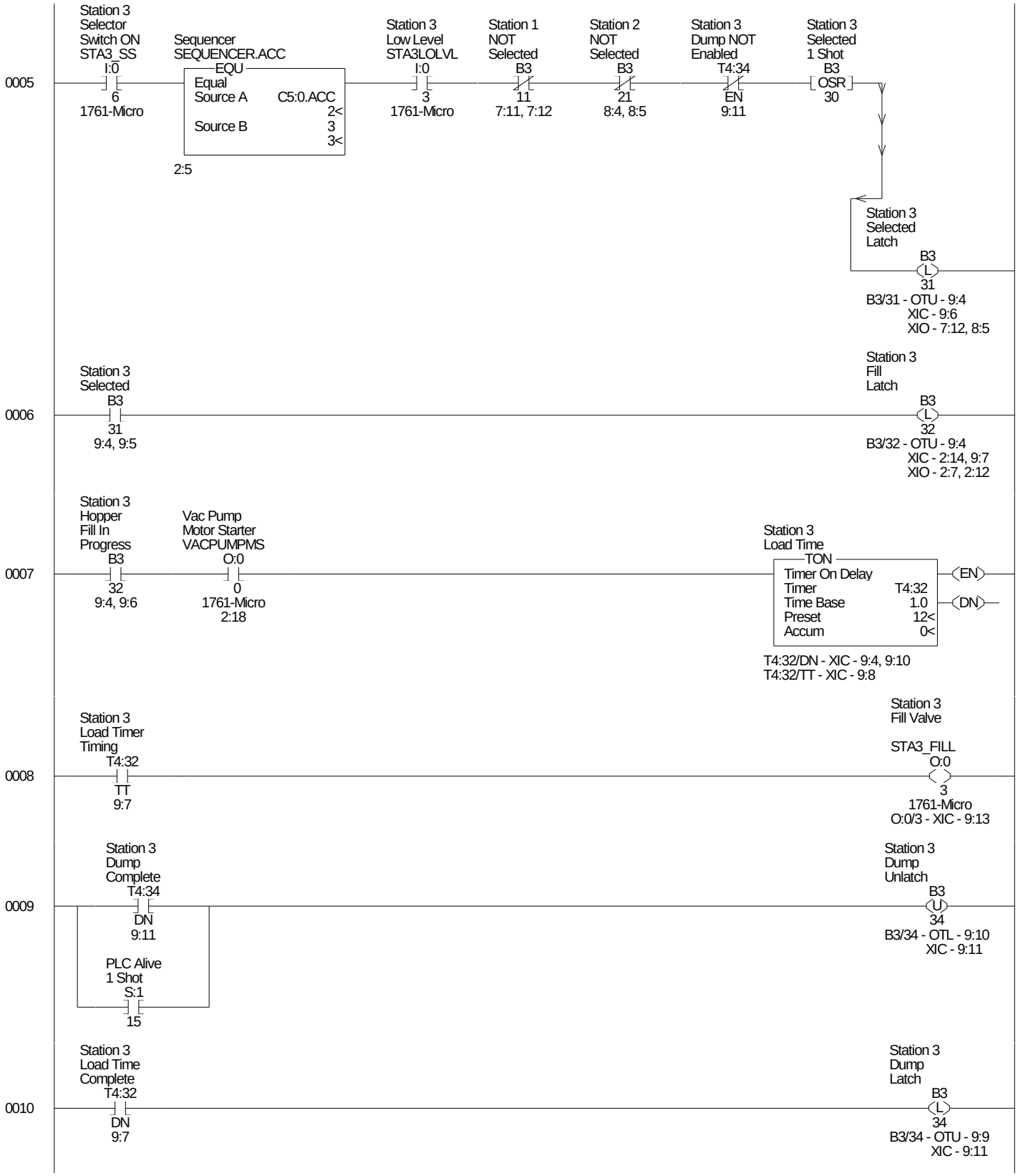
0001
Station 3 Last Dump Cycle Timeout
T4:37
DN
9:3
PLC Alive 1 Shot
S:1
15
Station 3 Last Dump Cycle RESET
B3
U
39
B3/39 - OTL - 9:2
XIC - 9:3, 9:12

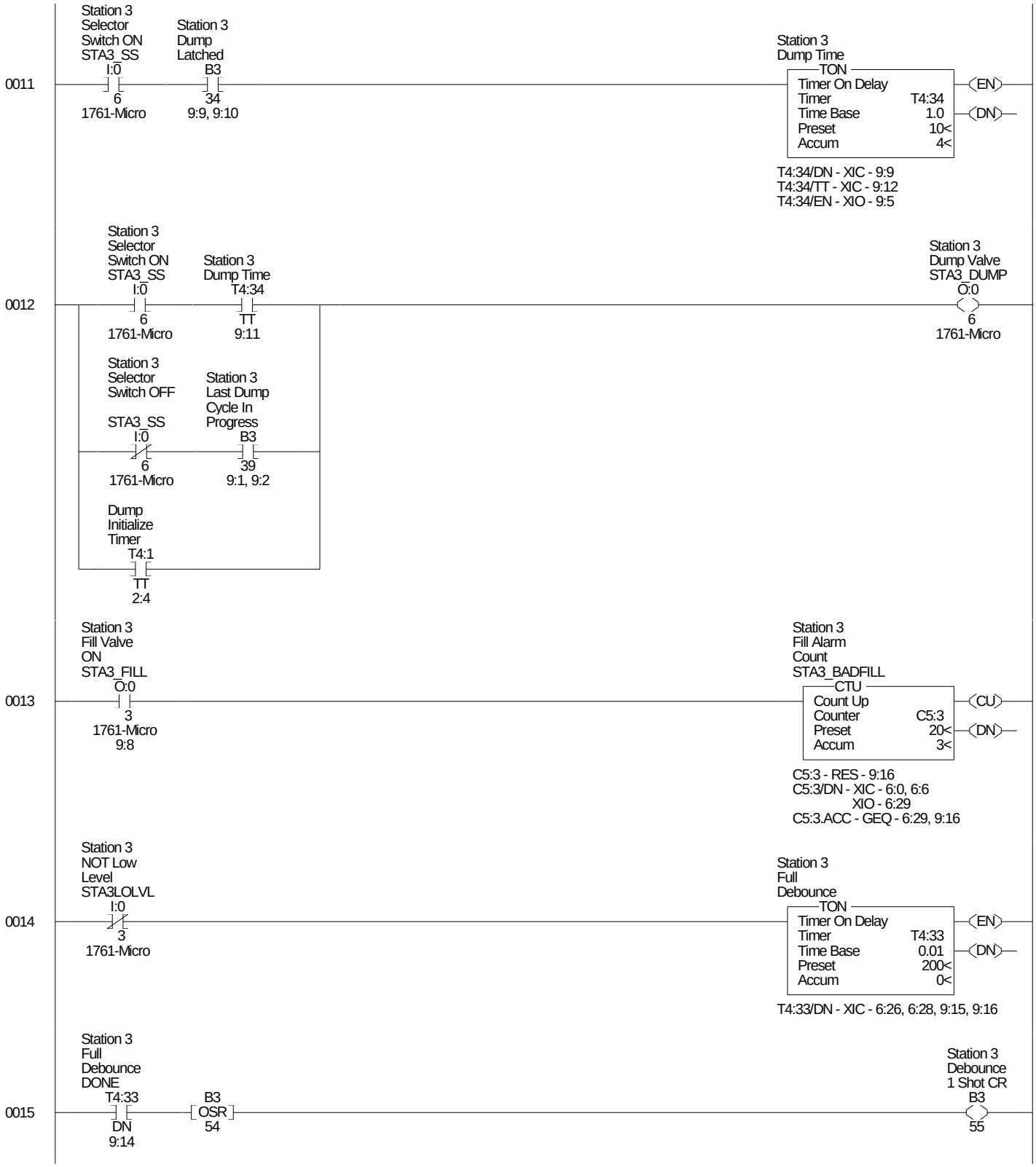
0002
Station 3 Selector Switch to Off 1 Shot
B3
38
9:0
Station 3 Last Dump Cycle SET
B3
L
39
B3/39 - OTU - 9:1
XIC - 9:3, 9:12

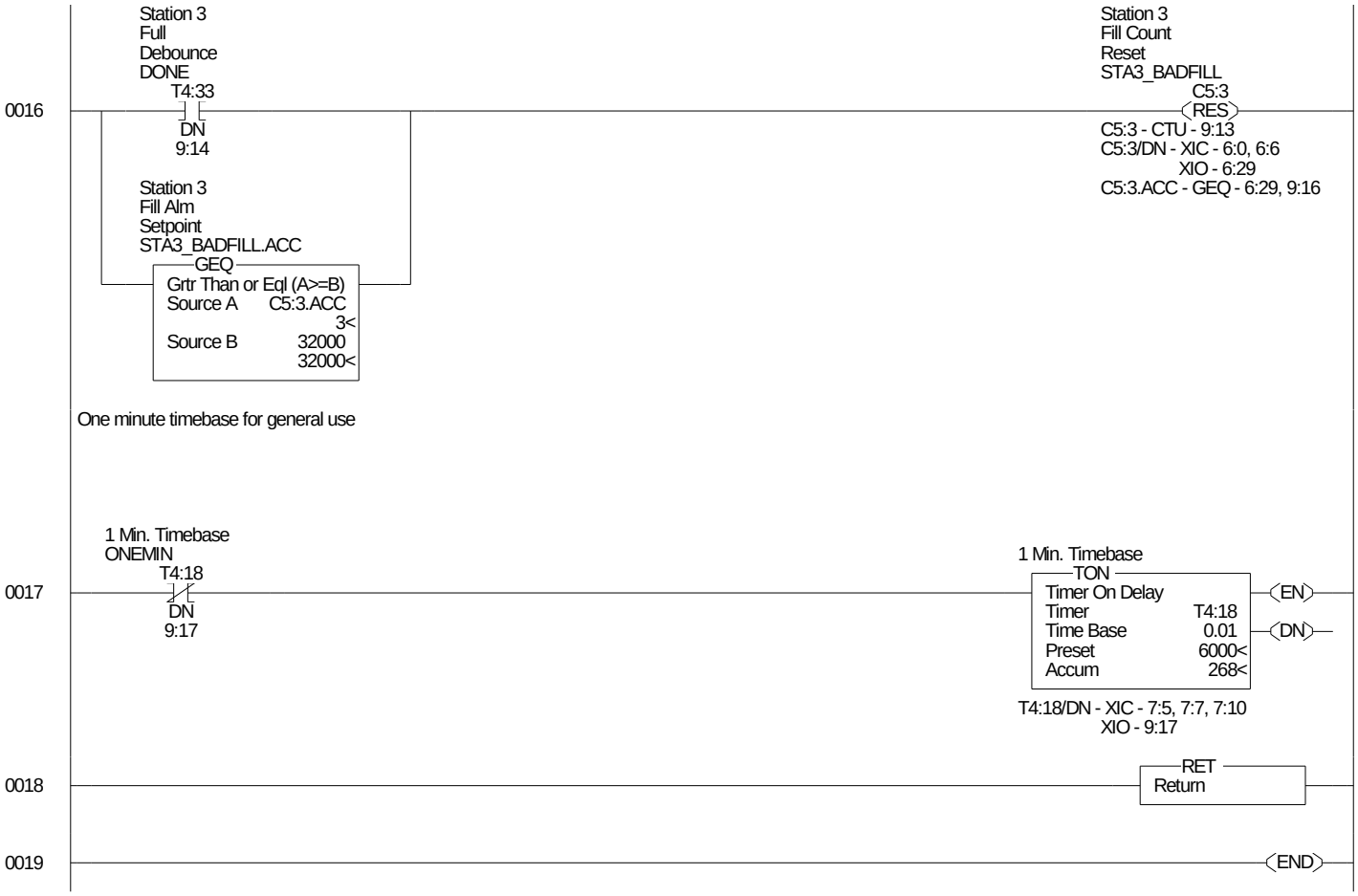
0003
Station 3 Last Dump Cycle In Progress
B3
39
9:1, 9:2
Station 3 Last Cycle Timer
TON
Timer On Delay
Timer T4:37
Time Base 1.0
Preset 15<
Accum 0<
EN
DN
T4:37/DN - XIC - 9:1

When the feed hopper fill is complete then reset the fill latches, and cycle to the next station.

0004
Station 3 Selector Switch to Off 1 Shot
B3
38
9:0
Station 3 Load Time Complete
T4:32
DN
9:7
PLC Alive 1 Shot
S:1
15
Station 3 Selected Unlatch
B3
U
31
B3/31 - OTL - 9:5
XIC - 9:6
XIO - 7:12, 8:5
Station 3 Fill Unlatch
B3
U
32
B3/32 - OTL - 9:6
XIC - 2:14, 9:7
XIO - 2:7, 2:12


0005
Station 3 Selector Switch ON STA3_SS I:0 6 1761-Micro
Sequencer SEQUENCER.ACC
EQU Equal Source A C5:0.ACC 2< Source B 3 3<
2:5
Station 3 Low Level STA3LOLVL I:0 3 1761-Micro
Station 1 NOT Selected B3 11 7:11, 7:12
Station 2 NOT Selected B3 21 8:4, 8:5
Station 3 Dump NOT Enabled T4:34 EN 9:11
Station 3 Selected 1 Shot B3 OSR 30
Station 3 Selected Latch B3 L 31
B3/31 - OTU - 9:4
XIC - 9:6
XIO - 7:12, 8:5
0006
Station 3 Selected B3 31 9:4, 9:5
Station 3 Fill Latch B3 L 32
B3/32 - OTU - 9:4
XIC - 2:14, 9:7
XIO - 2:7, 2:12
0007
Station 3 Hopper Fill In Progress B3 32 9:4, 9:6
Vac Pump Motor Starter VACPUMPMS O:0 0 1761-Micro 2:18
Station 3 Load Time
TON Timer On Delay Timer T4:32 Time Base 1.0 Preset 12< Accum 0< EN DN
T4:32/DN - XIC - 9:4, 9:10
T4:32/TT - XIC - 9:8
0008
Station 3 Load Timer Timing T4:32 TT 9:7
Station 3 Fill Valve STA3_FILL O:0 3 1761-Micro
O:0/3 - XIC - 9:13
0009
Station 3 Dump Complete T4:34 DN 9:11
PLC Alive 1 Shot S:1 15
Station 3 Dump Unlatch B3 U 34
B3/34 - OTL - 9:10
XIC - 9:11
0010
Station 3 Load Time Complete T4:32 DN 9:7
Station 3 Dump Latch B3 L 34
B3/34 - OTU - 9:9
XIC - 9:11


0011
Station 3 Selector Switch ON STA3_SS I:0 6 1761-Micro
Station 3 Dump Latched B3 34 9:9, 9:10
Station 3 Dump Time
TON
Timer On Delay
Timer T4:34
Time Base 1.0
Preset 10<
Accum 4<
EN
DN
T4:34/DN - XIC - 9:9
T4:34/TT - XIC - 9:12
T4:34/EN - XIO - 9:5
0012
Station 3 Selector Switch ON STA3_SS I:0 6 1761-Micro
Station 3 Dump Time T4:34 TT 9:11
Station 3 Dump Valve STA3_DUMP O:0 6 1761-Micro
Station 3 Selector Switch OFF STA3_SS I:0 6 1761-Micro
Station 3 Last Dump Cycle In Progress B3 39 9:1, 9:2
Dump Initialize Timer T4:1 TT 2:4
0013
Station 3 Fill Valve ON STA3_FILL O:0 3 1761-Micro 9:8
Station 3 Fill Alarm Count STA3_BADFILL
CTU
Count Up
Counter C5:3
Preset 20<
Accum 3<
CU
DN
C5:3 - RES - 9:16
C5:3/DN - XIC - 6:0, 6:6
XIO - 6:29
C5:3.ACC - GEQ - 6:29, 9:16
0014
Station 3 NOT Low Level STA3LOLVL I:0 3 1761-Micro
Station 3 Full Debounce
TON
Timer On Delay
Timer T4:33
Time Base 0.01
Preset 200<
Accum 0<
EN
DN
T4:33/DN - XIC - 6:26, 6:28, 9:15, 9:16
0015
Station 3 Full Debounce DONE T4:33 DN 9:14
B3 OSR 54
Station 3 Debounce 1 Shot CR B3 55


0016
Station 3
Full
Debounce
DONE
T4:33
DN
9:14
Station 3
Fill Alm
Setpoint
STA3_BADFILL.ACC
GEQ
Grtr Than or Eql (A>=B)
Source A C5:3.ACC
3<
Source B 32000
32000<
Station 3
Fill Count
Reset
STA3_BADFILL
C5:3
RES
C5:3 - CTU - 9:13
C5:3/DN - XIC - 6:0, 6:6
XIO - 6:29
C5:3.ACC - GEQ - 6:29, 9:16
One minute timebase for general use
0017
1 Min. Timebase
ONEMIN
T4:18
DN
9:17
1 Min. Timebase
TON
Timer On Delay
Timer T4:18
Time Base 0.01
Preset 6000<
Accum 268<
EN
DN
T4:18/DN - XIC - 7:5, 7:7, 7:10
XIO - 9:17
0018
RET
Return
0019
END

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
O:0.0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	Bul.1761	MicroLogix 1000

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
I:0.0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	0	1	Bul.1761	MicroLogix 1000
I:0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1761	MicroLogix 1000

Main

First Pass S:1/15 = No
Index Register S:24 = 0
Free Running Clock S:4 = 0011-0001-1100-0011

Scan Times

Maximum (x10 ms) S:22 = 1
Current (x10 ms) S:3 (low byte) = 0
Watchdog (x10 ms) S:3 (high byte) = 10

Math

Math Overflow Selected S:2/14 = 0
Overflow Trap S:5/0 = 0
Carry S:0/0 = 0
Overflow S:0/1 = 0
Zero Bit S:0/2 = 0
Sign Bit S:0/3 = 0
Math Register (lo word) S:13 = 0
Math Register (high word) S:14-S:13 = 0
Math Register (32 Bit) S:14-S:13 = 0

Comms

Processor Mode S:1/0- S:1/4 = Remote Run
Baud Rate S:15 (high byte) = 19200
Comms Active S:1/7 = 1

Debug

Suspend Code = 0

Errors

Extend I/O Configuration S:0/8 = 0
Fault Override At Power Up S:1/8 = 0
Startup Protection Fault S:1/9 = 0
Major Error Halt S:1/13 = 0
Overflow Trap S:5/0 = 0
Control Register Error S:5/2 = 0
Major Error Executing User
Fault Rtn. S:5/3 = 0
Retentive Data Lost S:5/8 = 0
Input Filter Selection Modified S:5/13 = 0
Major Error S:6 = 0h
Error Description:

STI

Pending Bit S:2/0 = 0
Enable Bit S:2/1 = 1
Executing Bit S:2/2 = 0
Overflow Bit S:5/10 = 0
Setpoint (x10ms) S:30 = 0

Protection

RUN Aways S:1/12 = 0
Deny Future Access S:1/14 = 1

Forces

Forces Enabled S:1/5 = Yes
Forces Installed S:1/6 = No

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	(Symbol) Description
B3:0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	
B3:1	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	
B3:2	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	
B3:3	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	
B3:4	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	
B3:5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Offset	EN	TT	DN	BASE	PRE	ACC	(Symbol) Description
T4:0	1	1	0	.01 sec	100	57	1 second Timebase
T4:1	1	0	1	.01 sec	1500	1500	DumpInitializeTimer
T4:2	1	0	1	1.0 sec	5	5	CabinetStartupDelay
T4:3	1	1	0	1.0 sec	25	0	
T4:4	0	0	0	1.0 sec	900	0	
T4:5	0	0	0	1.0 sec	600	0	
T4:6	0	0	0	1.0 sec	300	0	
T4:7	0	0	0	.01 sec	200	0	Vac PumpAux FaultDelay
T4:8	0	0	0	.01 sec	1200	0	Vac PumpRun AfterSatisfiedTimer
T4:9	0	0	0	.01 sec	800	0	
T4:10	1	1	0	1.0 sec	10	7	TwinkleFlashTimebase
T4:11	0	0	0	.01 sec	300	0	
T4:12	0	0	0	1.0 sec	12	0	
T4:13	1	0	1	.01 sec	300	300	
T4:14	0	0	0	1.0 sec	10	0	Station 1DumpTime
T4:15	0	0	0	.01 sec	50	0	
T4:16	0	0	0	.01 sec	52	0	
T4:17	0	0	0	1.0 sec	15	0	
T4:18	1	1	0	.01 sec	6000	268	1 Min. Timebase
T4:19	0	0	0	.01 sec	9000	0	Station 1Lo LimitStation 2Load Disable
T4:20	1	1	0	.01 sec	6010	268	Station 1 At LevelProportionTimebase
T4:21	0	0	0	.01 sec	60	0	
T4:22	1	1	0	1.0 sec	12	3	
T4:23	0	0	0	.01 sec	200	0	
T4:24	0	0	0	1.0 sec	12	0	Station 2DumpTime
T4:25	0	0	0	.01 sec	52	0	
T4:26	0	0	0	.01 sec	100	0	
T4:27	0	0	0	1.0 sec	15	0	
T4:28	0	0	0	.01 sec	0	0	
T4:29	0	0	0	.01 sec	0	0	
T4:30	0	0	0	.01 sec	0	0	
T4:31	0	0	0	.01 sec	120	0	
T4:32	0	0	0	1.0 sec	12	0	
T4:33	0	0	0	.01 sec	200	0	
T4:34	1	1	0	1.0 sec	10	4	Station 3Dump Time
T4:35	0	0	0	.01 sec	52	0	
T4:36	0	0	0	.01 sec	52	0	
T4:37	0	0	0	1.0 sec	15	0	
T4:38	0	0	0	1.0 sec	900	0	Station 1ReAlarmSilenceTimer
T4:39	0	0	0	.01 sec	0	0	

Offset	CU	CD	DN	OV	UN	UA	PRE	ACC	(Symbol) Description
C5:0	0	0	0	0	0	0	3	2	(SEQUENCER) Sequencer
C5:1	0	0	0	0	0	0	300	0	(STA1_BADFILL) Station 1Fill Fault
C5:2	1	0	0	0	0	0	300	4	(STA2_BADFILL) Station 2Fill Fault
C5:3	0	0	0	0	0	0	20	3	(STA3_BADFILL) Station 3Hopper Fill Fault
C5:4	0	0	0	0	0	0	60	30	
C5:5	0	0	0	0	0	0	60	7	1 MinTimebase
C5:6	0	0	0	0	0	0	5	0	
C5:7	0	0	0	0	0	0	180	0	
C5:8	0	0	0	0	0	0	1	0	
C5:9	0	0	0	0	0	0	0	0	
C5:10	0	0	0	0	0	0	3600	315	
C5:11	0	0	0	0	0	0	3600	158	
C5:12	0	0	0	0	0	0	3600	593	
C5:13	0	0	0	0	0	0	3600	330	
C5:14	0	0	0	0	0	0	3600	0	
C5:15	0	0	0	0	0	0	3600	330	
C5:16	0	0	0	0	0	0	0	0	
C5:17	0	0	0	0	0	0	0	0	
C5:18	0	0	0	0	0	0	0	0	
C5:19	0	0	0	0	0	0	0	0	
C5:20	0	0	0	0	0	0	0	0	
C5:21	0	0	0	0	0	0	0	0	
C5:22	0	0	0	0	0	0	0	0	
C5:23	0	0	0	0	0	0	0	0	
C5:24	0	0	0	0	0	0	0	0	
C5:25	0	0	0	0	0	0	0	0	
C5:26	0	0	0	0	0	0	0	0	
C5:27	0	0	0	0	0	0	0	0	
C5:28	0	0	0	0	0	0	0	0	
C5:29	0	0	0	0	0	0	0	0	
C5:30	0	0	0	0	0	0	0	0	
C5:31	0	0	0	0	0	0	0	0	

Offset	EN	EU	DN	EM	ER	UL	IN	FD	LEN	POS	(Symbol) Description
R6:0	0	0	0	0	0	0	0	0	0	0	
R6:1	0	0	0	0	0	0	0	0	0	0	
R6:2	0	0	0	0	0	0	0	0	0	0	
R6:3	0	0	0	0	0	0	0	0	0	0	
R6:4	0	0	0	0	0	0	0	0	0	0	
R6:5	0	0	0	0	0	0	0	0	0	0	
R6:6	0	0	0	0	0	0	0	0	0	0	
R6:7	0	0	0	0	0	0	0	0	0	0	
R6:8	0	0	0	0	0	0	0	0	0	0	
R6:9	0	0	0	0	0	0	0	0	0	0	
R6:10	0	0	0	0	0	0	0	0	0	0	
R6:11	0	0	0	0	0	0	0	0	0	0	
R6:12	0	0	0	0	0	0	0	0	0	0	
R6:13	0	0	0	0	0	0	0	0	0	0	
R6:14	0	0	0	0	0	0	0	0	0	0	
R6:15	0	0	0	0	0	0	0	0	0	0	

Offset	0	1	2	3	4	5	6	7	8	9
N7:0	0	0	0	0	0	0	0	0	0	0
N7:10	9	5990	1200	3000	0	100	0	0	0	0
N7:20	11	1	0	0	0	200	0	0	0	0
N7:30	9	1	0	0	0	8	0	0	0	0
N7:40	0	4	0	2	0	0	11	0	6	0
N7:50	0	7	0	6	0	0	0	0	0	0
N7:60	0	0	0	0	0	0	0	0	0	0
N7:70	0	0	0	0	0	0	0	0	0	0
N7:80	0	0	0	0	0	0	0	0	0	0
N7:90	0	0	0	0	0	0	0	0	0	0
N7:100	0	0	0	0	0					

Address (Symbol) = Value

C5:0.ACC = 2
C5:1.PRE = 300
C5:1.ACC = 0
C5:2.PRE = 300
C5:2.ACC = 4
C5:3.PRE = 20
C5:3.ACC = 3
T4:7.ACC = 0
T4:12.PRE = 12
T4:12.ACC = 0
T4:22.PRE = 12
T4:22.ACC = 3
T4:32.PRE = 12
T4:32.ACC = 0
T4:16.PRE = 52
T4:16.ACC = 0
T4:14.ACC = 0
T4:26.PRE = 100
T4:26.ACC = 0
T4:24.PRE = 12
T4:24.ACC = 0
T4:26.PRE = 100
T4:26.ACC = 0
T4:14.PRE = 10

Address (Symbol) = Value

T4:12.PRE = 12
T4:12.ACC = 0
T4:14.PRE = 10
T4:14.ACC = 0
T4:22.PRE = 12
T4:22.ACC = 3
T4:24.PRE = 12
T4:24.ACC = 0
T4:32.PRE = 12
T4:32.ACC = 0
T4:34.PRE = 10
T4:34.ACC = 4

```
O:0/0       - {VACPUMPMS} Vac Pump Motor Starter
              OTE - File #2 MAIN_PROG - 18
              XIC - File #7 STA1_CTRL - 14
                    File #8 STA2_CTRL - 7
                    File #9 STA3_CTRL - 7
              XIO - File #2 MAIN_PROG - 16
O:0/1       - {STA1_FILL} Station 1 Fill Valve
              OTE - File #7 STA1_CTRL - 15
              XIC - File #7 STA1_CTRL - 20
O:0/2       - {STA2_FILL} Station 2 Fill Valve
              OTE - File #8 STA2_CTRL - 8
              XIC - File #8 STA2_CTRL - 13
O:0/3       - {STA3_FILL} Station 3 Fill Valve
              OTE - File #9 STA3_CTRL - 8
              XIC - File #9 STA3_CTRL - 13
O:0/4       - {STA1_DUMP} Station 1 Dump Valve ON
              OTE - File #7 STA1_CTRL - 19
              XIO - File #7 STA1_CTRL - 12
O:0/5       - {STA2_DUMP} Station 2 Dump Valve ON
              OTE - File #8 STA2_CTRL - 12
O:0/6       - {STA3_DUMP} Station 3 Dump Valve ON
              OTE - File #9 STA3_CTRL - 12
O:0/7       - {STA1_FLTPL} Station 1 Fill Alarm PL
              OTE - File #6 AlarmCtrl - 4
O:0/8       - {STA2_FLTPL} Station 2 Fill Alarm PL
              OTE - File #6 AlarmCtrl - 5
O:0/9       - {STA3_FLTPL} Station 3 Fill Alarm PL
              OTE - File #6 AlarmCtrl - 6
O:0/10      - {VACFLTPL} Vac Pump Fault PL
              OTE - File #6 AlarmCtrl - 3
O:0/11      - {ALARMHORN} Alarm Horn
              OTE - File #6 AlarmCtrl - 0
I:0/0       - {VACPUMPAUX} Vac Pump Auxiliary SW
              XIC - File #6 AlarmCtrl - 1
              XIO - File #2 MAIN_PROG - 18
I:0/1       - {STA1LOLVL} Station 1 Low Level
              XIC - File #6 AlarmCtrl - 9
                    File #7 STA1_CTRL - 4
              XIO - File #7 STA1_CTRL - 6, 21
I:0/2       - {STA2LOLVL} Station 2 Low Level
              XIC - File #6 AlarmCtrl - 18
                    File #8 STA2_CTRL - 5
              XIO - File #8 STA2_CTRL - 14
I:0/3       - {STA3LOLVL} Station 3 Low Level
              XIC - File #6 AlarmCtrl - 27
                    File #9 STA3_CTRL - 5
              XIO - File #9 STA3_CTRL - 14
I:0/4       - {STA1_SS} Station 1 Selector SW
              XIC - File #6 AlarmCtrl - 0, 4, 7
                    File #7 STA1_CTRL - 12, 18, 19
              XIO - File #7 STA1_CTRL - 0, 19
I:0/5       - {STA2_SS} Station 2 Selector SW
              XIC - File #6 AlarmCtrl - 0, 5, 16
                    File #8 STA2_CTRL - 5, 11, 12
              XIO - File #8 STA2_CTRL - 0, 12
I:0/6       - {STA3_SS} Station 3 Selector SW
              XIC - File #6 AlarmCtrl - 0, 6, 25
                    File #9 STA3_CTRL - 5, 11, 12
              XIO - File #9 STA3_CTRL - 0, 12
I:0/10      - {ALMSILPB} Alarm Silence PB
              XIC - File #6 AlarmCtrl - 1, 9, 12, 14, 18, 21, 23, 27, 30, 32
                      35
S:1/15      - First Pass
              XIC - File #2 MAIN_PROG - 6, 13, 15
                    File #6 AlarmCtrl - 1, 9, 10, 13, 18, 19, 22, 27, 28, 31
                      34, 37
                    File #7 STA1_CTRL - 1, 5, 8, 10, 11, 16
                    File #8 STA2_CTRL - 1, 4, 9
                    File #9 STA3_CTRL - 1, 4, 9
```

```
B3/6        - OTL - File #6 AlarmCtrl - 35
              OTU - File #6 AlarmCtrl - 34
              XIC - File #6 AlarmCtrl - 36
              XIO - File #6 AlarmCtrl - 0, 35
B3/7        - {FASTFLASH}
              OTE - File #6 AlarmCtrl - 40
              XIC - File #6 AlarmCtrl - 0, 3
B3/8        - {SLOWFLASH}
              OTE - File #6 AlarmCtrl - 41
              XIC - File #6 AlarmCtrl - 0, 4, 5, 6
B3/9        - {ALMSILREM}
              OTE - File #6 AlarmCtrl - 43
              XIC - File #6 AlarmCtrl - 4, 5, 6
B3/10       - OSR - File #7 STA1_CTRL - 12
B3/11       - OTL - File #7 STA1_CTRL - 12
              OTU - File #7 STA1_CTRL - 11
              XIC - File #7 STA1_CTRL - 13
              XIO - File #8 STA2_CTRL - 5
                    File #9 STA3_CTRL - 5
B3/12       - OTL - File #7 STA1_CTRL - 13
              OTU - File #7 STA1_CTRL - 11
              XIC - File #2 MAIN_PROG - 14
                    File #7 STA1_CTRL - 14
              XIO - File #2 MAIN_PROG - 7, 12
B3/14       - OTL - File #7 STA1_CTRL - 17
              OTU - File #7 STA1_CTRL - 16
              XIC - File #7 STA1_CTRL - 18
B3/15       - OTL - File #6 AlarmCtrl - 11
              OTU - File #6 AlarmCtrl - 10
              XIC - File #6 AlarmCtrl - 0, 4, 9, 12
B3/16       - OTL - File #6 AlarmCtrl - 12
              OTU - File #6 AlarmCtrl - 10
              XIC - File #6 AlarmCtrl - 4
              XIO - File #6 AlarmCtrl - 0, 4
B3/17       - OSR - File #7 STA1_CTRL - 0
B3/18       - OTE - File #7 STA1_CTRL - 0
              XIC - File #7 STA1_CTRL - 2, 11
B3/19       - OTL - File #7 STA1_CTRL - 2
              OTU - File #7 STA1_CTRL - 1
              XIC - File #7 STA1_CTRL - 3, 19
B3/20       - OSR - File #8 STA2_CTRL - 5
B3/21       - OTL - File #8 STA2_CTRL - 5
              OTU - File #8 STA2_CTRL - 4
              XIC - File #8 STA2_CTRL - 6
              XIO - File #7 STA1_CTRL - 12
                    File #9 STA3_CTRL - 5
B3/22       - OTL - File #8 STA2_CTRL - 6
              OTU - File #8 STA2_CTRL - 4
              XIC - File #2 MAIN_PROG - 14
                    File #8 STA2_CTRL - 7
              XIO - File #2 MAIN_PROG - 7, 12
B3/24       - OTL - File #8 STA2_CTRL - 10
              OTU - File #8 STA2_CTRL - 9
              XIC - File #8 STA2_CTRL - 11
B3/25       - OTL - File #6 AlarmCtrl - 20
              OTU - File #6 AlarmCtrl - 19
              XIC - File #6 AlarmCtrl - 0, 5, 18, 21
B3/26       - OTL - File #6 AlarmCtrl - 21
              OTU - File #6 AlarmCtrl - 19
              XIC - File #6 AlarmCtrl - 5
              XIO - File #6 AlarmCtrl - 0, 5
B3/27       - OSR - File #8 STA2_CTRL - 0
B3/28       - OTE - File #8 STA2_CTRL - 0
              XIC - File #8 STA2_CTRL - 2, 4
B3/29       - OTL - File #8 STA2_CTRL - 2
              OTU - File #8 STA2_CTRL - 1
              XIC - File #8 STA2_CTRL - 3, 12
B3/30       - OSR - File #9 STA3_CTRL - 5
B3/31       - OTL - File #9 STA3_CTRL - 5
```

```
                OTU - File #9 STA3_CTRL - 4
                XIC - File #9 STA3_CTRL - 6
                XIO - File #7 STA1_CTRL - 12
                      File #8 STA2_CTRL - 5
B3/32         - OTL - File #9 STA3_CTRL - 6
                OTU - File #9 STA3_CTRL - 4
                XIC - File #2 MAIN_PROG - 14
                      File #9 STA3_CTRL - 7
                XIO - File #2 MAIN_PROG - 7, 12
B3/34         - OTL - File #9 STA3_CTRL - 10
                OTU - File #9 STA3_CTRL - 9
                XIC - File #9 STA3_CTRL - 11
B3/35         - OTL - File #6 AlarmCtrl - 29
                OTU - File #6 AlarmCtrl - 28
                XIC - File #6 AlarmCtrl - 0, 6, 27, 30
B3/36         - OTL - File #6 AlarmCtrl - 30
                OTU - File #6 AlarmCtrl - 28
                XIC - File #6 AlarmCtrl - 6
                XIO - File #6 AlarmCtrl - 0, 6
B3/37         - OSR - File #9 STA3_CTRL - 0
B3/38         - OTE - File #9 STA3_CTRL - 0
                XIC - File #9 STA3_CTRL - 2, 4
B3/39         - OTL - File #9 STA3_CTRL - 2
                OTU - File #9 STA3_CTRL - 1
                XIC - File #9 STA3_CTRL - 3, 12
B3/40         - OTL - File #6 AlarmCtrl - 14
                OTU - File #6 AlarmCtrl - 13
                XIC - File #6 AlarmCtrl - 15
                XIO - File #6 AlarmCtrl - 0, 14
B3/41         - OTL - File #6 AlarmCtrl - 23
                OTU - File #6 AlarmCtrl - 22
                XIC - File #6 AlarmCtrl - 24
                XIO - File #6 AlarmCtrl - 0, 23
B3/42         - OTL - File #6 AlarmCtrl - 32
                OTU - File #6 AlarmCtrl - 31
                XIC - File #6 AlarmCtrl - 33
                XIO - File #6 AlarmCtrl - 0
B3/44         - Vac Pump #1 Call for Vac NOT On
                OTL - File #2 MAIN_PROG - 14
                OTU - File #2 MAIN_PROG - 13
                XIC - File #2 MAIN_PROG - 18
B3/50         - OSR - File #7 STA1_CTRL - 22
B3/51         - OTE - File #7 STA1_CTRL - 22
B3/52         - OSR - File #8 STA2_CTRL - 15
B3/53         - Station2 Full Debounce Done 1 Shot CR
                OTE - File #8 STA2_CTRL - 15
B3/54         - OSR - File #9 STA3_CTRL - 15
B3/55         - Station 3 Debounce 1 Shot CR
                OTE - File #9 STA3_CTRL - 15
B3/60         - OTL - File #6 AlarmCtrl - 9
                OTU - File #6 AlarmCtrl - 8
                XIO - File #6 AlarmCtrl - 0, 11
B3/61         - Station 2 Ignore 1st Cycle Alarm Unlatch
                OTL - File #6 AlarmCtrl - 18
                OTU - File #6 AlarmCtrl - 17
                XIO - File #6 AlarmCtrl - 0, 20
B3/62         - OTL - File #6 AlarmCtrl - 27
                OTU - File #6 AlarmCtrl - 26
                XIO - File #6 AlarmCtrl - 0, 29
B3/63         - Station 1 SS to On 1 Shot OSR
                OSR - File #6 AlarmCtrl - 7
B3/64         - Station 2 SS to On 1 Shot CR
                OTE - File #6 AlarmCtrl - 7
                XIC - File #6 AlarmCtrl - 9
B3/65         - Station 2 SS to On 1 Shot OSR
                OSR - File #6 AlarmCtrl - 16
B3/66         - Station 2 SS to On 1 Shot CR
                OTE - File #6 AlarmCtrl - 16
                XIC - File #6 AlarmCtrl - 18
```

```
B3/67        - Station 3 SS to On 1 Shot OSR
               OSR - File #6 AlarmCtrl - 25
B3/68        - Station 3 SS to On 1 Shot CR
               OTE - File #6 AlarmCtrl - 25
               XIC - File #6 AlarmCtrl - 27
B3/69        - Vac Pump Fault Status Latch
               OTL - File #6 AlarmCtrl - 2
               OTU - File #6 AlarmCtrl - 1
               XIC - File #6 AlarmCtrl - 0
B3/70        - Vac Pump Anti-Restart OSR
               OSR - File #2 MAIN_PROG - 16
B3/71        - Vac Pump AntiRestart Latch
               OTL - File #2 MAIN_PROG - 16
               OTU - File #2 MAIN_PROG - 15
               XIC - File #2 MAIN_PROG - 17
               XIO - File #2 MAIN_PROG - 18
B3/73        - Fill Not Needed
               OTE - File #2 MAIN_PROG - 12
               XIC - File #2 MAIN_PROG - 11, 13
B3/78        - Station 1 Lvl High OK to Fill Station 2
               OTL - File #7 STA1_CTRL - 7
               OTU - File #7 STA1_CTRL - 5
               XIC - File #8 STA2_CTRL - 5
B3/80        - Station 1 Low - Need Fill
               OTL - File #7 STA1_CTRL - 9
               OTU - File #7 STA1_CTRL - 8
               XIC - File #7 STA1_CTRL - 12
B3/99        - dummy bit, always open
               OTE - File #2 MAIN_PROG - 0
               XIC - File #2 MAIN_PROG - 0
T4:0         - 1 second Timebase
               TON - File #6 AlarmCtrl - 39
T4:0/DN      - {ONESEC} 1 Sec TB
               XIC - File #2 MAIN_PROG - 7
                     File #6 AlarmCtrl - 38
               XIO - File #6 AlarmCtrl - 39
T4:0.ACC     - GRT - File #6 AlarmCtrl - 40, 41
               LEQ - File #6 AlarmCtrl - 40, 41
T4:1         - Dump Initialize Timer
               TON - File #2 MAIN_PROG - 4
T4:1/DN      - {DUMPINIT}
               XIC - File #2 MAIN_PROG - 7, 14
T4:1/TT      - XIC - File #7 STA1_CTRL - 19
                     File #8 STA2_CTRL - 12
                     File #9 STA3_CTRL - 12
T4:2         - Cabinet Startup Delay
               TON - File #2 MAIN_PROG - 1
T4:2/DN      - XIC - File #2 MAIN_PROG - 3, 7
               XIO - File #6 AlarmCtrl - 0, 3, 4, 5, 6
T4:4         - TON - File #6 AlarmCtrl - 24
T4:4/DN      - XIC - File #6 AlarmCtrl - 22
T4:5         - TON - File #6 AlarmCtrl - 33
T4:5/DN      - XIC - File #6 AlarmCtrl - 31
T4:6         - TON - File #6 AlarmCtrl - 36
T4:6/DN      - XIC - File #6 AlarmCtrl - 34
T4:7         - Vac Pump Aux Fault Delay
               TON - File #2 MAIN_PROG - 18
T4:7/DN      - XIC - File #6 AlarmCtrl - 2, 3
               XIO - File #6 AlarmCtrl - 0
T4:8         - Vac Pump Run After Satisfied Timer
               TON - File #2 MAIN_PROG - 11
T4:8/DN      - XIC - File #2 MAIN_PROG - 13
T4:9         - TON - File #2 MAIN_PROG - 17
T4:9/DN      - Vac Pump AntiRestart Timer
               XIC - File #2 MAIN_PROG - 15
T4:10        - Twinkle Flash Timebase
               TON - File #6 AlarmCtrl - 42
T4:10/DN     - XIO - File #6 AlarmCtrl - 42
T4:10/EN     - Alarm Active Reminder
```

```
                XIC - File #6 AlarmCtrl - 43
T4:10.ACC     - GRT - File #6 AlarmCtrl - 43
T4:12         - TON - File #7 STA1_CTRL - 14
T4:12/DN      - XIC - File #7 STA1_CTRL - 11, 17
T4:12/TT      - XIC - File #7 STA1_CTRL - 15
T4:13         - TON - File #7 STA1_CTRL - 21
T4:13/DN      - XIC - File #6 AlarmCtrl - 8, 10
                      File #7 STA1_CTRL - 22, 23
T4:14         - Station 1 Dump Time
                TON - File #7 STA1_CTRL - 18
T4:14/DN      - XIC - File #7 STA1_CTRL - 16
T4:14/TT      - XIC - File #7 STA1_CTRL - 19
T4:17         - TON - File #7 STA1_CTRL - 3
T4:17/DN      - XIC - File #7 STA1_CTRL - 1
T4:18         - 1 Min. Timebase
                TON - File #9 STA3_CTRL - 17
T4:18/DN      - {ONEMIN}
                XIC - File #7 STA1_CTRL - 5, 7, 10
                XIO - File #9 STA3_CTRL - 17
T4:19         - Station 1 Lo Limit Station 2 Load Disable
                TON - File #7 STA1_CTRL - 4
T4:19/DN      - XIC - File #7 STA1_CTRL - 5
T4:20         - Station 1 At Level Proportion Timebase
                RTO - File #7 STA1_CTRL - 6
                RES - File #7 STA1_CTRL - 10
T4:20.ACC     - MOV - File #7 STA1_CTRL - 5
                GEQ - File #7 STA1_CTRL - 7
                LES - File #7 STA1_CTRL - 5
T4:22         - TON - File #8 STA2_CTRL - 7
T4:22/DN      - XIC - File #8 STA2_CTRL - 4, 10
T4:22/TT      - XIC - File #8 STA2_CTRL - 8
T4:23         - TON - File #8 STA2_CTRL - 14
T4:23/DN      - XIC - File #6 AlarmCtrl - 17, 19
                      File #8 STA2_CTRL - 15, 16
T4:24         - Station 2 Dump Time
                TON - File #8 STA2_CTRL - 11
T4:24/DN      - XIC - File #8 STA2_CTRL - 9
T4:24/TT      - XIC - File #8 STA2_CTRL - 12
T4:24/EN      - XIO - File #8 STA2_CTRL - 5
T4:27         - TON - File #8 STA2_CTRL - 3
T4:27/DN      - XIC - File #8 STA2_CTRL - 1
T4:32         - TON - File #9 STA3_CTRL - 7
T4:32/DN      - XIC - File #9 STA3_CTRL - 4, 10
T4:32/TT      - XIC - File #9 STA3_CTRL - 8
T4:33         - TON - File #9 STA3_CTRL - 14
T4:33/DN      - XIC - File #6 AlarmCtrl - 26, 28
                      File #9 STA3_CTRL - 15, 16
T4:34         - Station 3 Dump Time
                TON - File #9 STA3_CTRL - 11
T4:34/DN      - XIC - File #9 STA3_CTRL - 9
T4:34/TT      - XIC - File #9 STA3_CTRL - 12
T4:34/EN      - XIO - File #9 STA3_CTRL - 5
T4:37         - TON - File #9 STA3_CTRL - 3
T4:37/DN      - XIC - File #9 STA3_CTRL - 1
T4:38         - Station 1 ReAlarm Silence Timer
                TON - File #6 AlarmCtrl - 15
T4:38/DN      - XIC - File #6 AlarmCtrl - 13
C5:0          - {SEQUENCER} Sequencer
                CTU - File #2 MAIN_PROG - 7
                RES - File #2 MAIN_PROG - 6
C5:0/DN       - XIC - File #2 MAIN_PROG - 6
C5:0.ACC      - MOV - File #2 MAIN_PROG - 5
                EQU - File #7 STA1_CTRL - 12
                      File #8 STA2_CTRL - 5
                      File #9 STA3_CTRL - 5
                GEQ - File #2 MAIN_PROG - 5
                LES - File #2 MAIN_PROG - 5
C5:1          - {STA1_BADFILL} Station 1 Fill Fault
                CTU - File #7 STA1_CTRL - 20
```

```
                RES - File #7 STA1_CTRL - 23
C5:1/DN       - XIC - File #6 AlarmCtrl - 0, 4
                XIO - File #6 AlarmCtrl - 11
C5:1.ACC      - GEQ - File #6 AlarmCtrl - 11
                      File #7 STA1_CTRL - 23
C5:2          - {STA2_BADFILL} Station 2 Fill Fault
                CTU - File #8 STA2_CTRL - 13
                RES - File #8 STA2_CTRL - 16
C5:2/DN       - XIC - File #6 AlarmCtrl - 0, 5
                XIO - File #6 AlarmCtrl - 20
C5:2.ACC      - GEQ - File #6 AlarmCtrl - 20
                      File #8 STA2_CTRL - 16
C5:3          - {STA3_BADFILL} Station 3 Hopper Fill Fault
                CTU - File #9 STA3_CTRL - 13
                RES - File #9 STA3_CTRL - 16
C5:3/DN       - XIC - File #6 AlarmCtrl - 0, 6
                XIO - File #6 AlarmCtrl - 29
C5:3.ACC      - GEQ - File #6 AlarmCtrl - 29
                      File #9 STA3_CTRL - 16
C5:5          - 1 Min Timebase
                CTU - File #6 AlarmCtrl - 38
                RES - File #6 AlarmCtrl - 37
C5:5/DN       - XIC - File #6 AlarmCtrl - 37
N7:11         - Station 1 Full Time Value
                MOV - File #7 STA1_CTRL - 5
                GEQ - File #7 STA1_CTRL - 8
                LES - File #7 STA1_CTRL - 9
N7:12         - {STA2_OK2LD_SP1} Station 1 At Level Low SP Limit
                LES - File #7 STA1_CTRL - 5
N7:13         - {STA2_OK2LD_SP2} Station 1 At Level Hi SP Limit
                GEQ - File #7 STA1_CTRL - 7
N7:15         - GEQ - File #6 AlarmCtrl - 11
N7:25         - GEQ - File #6 AlarmCtrl - 20
N7:35         - GEQ - File #6 AlarmCtrl - 29
U:6           - JSR - File #2 MAIN_PROG - 2
U:7           - JSR - File #2 MAIN_PROG - 8
U:8           - JSR - File #2 MAIN_PROG - 9
U:9           - JSR - File #2 MAIN_PROG - 10
```

Address	Symbol	Scope	Description	Sym Group	Dev.
B3/6					
B3/7	FASTFLASH	Global			
B3/8	SLOWFLASH	Global			
B3/9	ALMSILREM	Global			
B3/10					
B3/11					
B3/12					
B3/14					
B3/15					
B3/16					
B3/17					
B3/18					
B3/19					
B3/20					
B3/21					
B3/22					
B3/24					
B3/25					
B3/26					
B3/27					
B3/28					
B3/29					
B3/30					
B3/31					
B3/32					
B3/34					
B3/35					
B3/36					
B3/37					
B3/38					
B3/39					
B3/40					
B3/41					
B3/42					
B3/44			Vac Pump #1 Call for Vac NOT On		
B3/50					
B3/51					
B3/53			Station2 Full Debounce Done 1 Shot CR		
B3/55			Station 3 Debounce 1 Shot CR		
B3/60					
B3/61			Station 2 Ignore 1st Cycle Alarm Unlatch		
B3/62					
B3/63			Station 1 SS to On 1 Shot OSR		
B3/64			Station 2 SS to On 1 Shot CR		
B3/65			Station 2 SS to On 1 Shot OSR		
B3/66			Station 2 SS to On 1 Shot CR		
B3/67			Station 3 SS to On 1 Shot OSR		
B3/68			Station 3 SS to On 1 Shot CR		
B3/69			Vac Pump Fault Status Latch		
B3/70			Vac Pump Anti-Restart OSR		
B3/71			Vac Pump AntiRestart Latch		
B3/73			Fill Not Needed		
B3/78			Station 1 Lvl High OK to Fill Station 2		
B3/80			Station 1 Low - Need Fill		
B3/99			dummy bit, always open		
C5:0	SEQUENCER	Global	Sequencer		
C5:0.ACC					
C5:1	STA1_BADFILL	Global	Station 1 Fill Fault		
C5:1/DN					
C5:2	STA2_BADFILL	Global	Station 2 Fill Fault		
C5:2/DN					
C5:3	STA3_BADFILL	Global	Station 3 Hopper Fill Fault		
C5:3.ACC					
C5:3/DN					
C5:5			1 Min Timebase		
C5:5/DN					
I:0/0	VACPUMPAUX	Global	Vac Pump Auxiliary SW		
I:0/1	STA1LOLVL	Global	Station 1 Low Level		
I:0/2	STA2LOLVL	Global	Station 2 Low Level		
I:0/3	STA3LOLVL	Global	Station 3 Low Level		
I:0/4	STA1_SS	Global	Station 1 Selector SW		
I:0/5	STA2_SS	Global	Station 2 Selector SW		
I:0/6	STA3_SS	Global	Station 3 Selector SW		
I:0/10	ALMSILPB	Global	Alarm Silence PB		
N7:11			Station 1 Full Time Value		
N7:12	STA2_OK2LD_SP1	Global	Station 1 At Level Low SP Limit		
N7:13	STA2_OK2LD_SP2	Global	Station 1 At Level Hi SP Limit		

Address	Symbol	Scope	Description	Sym Group	Dev. C
O:0/0	VACPUMPMS	Global	Vac Pump Motor Starter		
O:0/1	STA1_FILL	Global	Station 1 Fill Valve		
O:0/2	STA2_FILL	Global	Station 2 Fill Valve		
O:0/3	STA3_FILL	Global	Station 3 Fill Valve		
O:0/4	STA1_DUMP	Global	Station 1 Dump Valve ON		
O:0/5	STA2_DUMP	Global	Station 2 Dump Valve ON		
O:0/6	STA3_DUMP	Global	Station 3 Dump Valve ON		
O:0/7	STA1_FLTPL	Global	Station 1 Fill Alarm PL		
O:0/8	STA2_FLTPL	Global	Station 2 Fill Alarm PL		
O:0/9	STA3_FLTPL	Global	Station 3 Fill Alarm PL		
O:0/10	VACFLTPL	Global	Vac Pump Fault PL		
O:0/11	ALARMHORN	Global	Alarm Horn		
S:0			Arithmetic Flags		
S:0/0			Processor Arithmetic Carry Flag		
S:0/1			Processor Arithmetic Underflow/ Overflow Flag		
S:0/2			Processor Arithmetic Zero Flag		
S:0/3			Processor Arithmetic Sign Flag		
S:1			Processor Mode Status/ Control		
S:1/0			Processor Mode Bit 0		
S:1/1			Processor Mode Bit 1		
S:1/2			Processor Mode Bit 2		
S:1/3			Processor Mode Bit 3		
S:1/4			Processor Mode Bit 4		
S:1/5			Forces Enabled		
S:1/6			Forces Present		
S:1/7			Comms Active		
S:1/8			Fault Override at Powerup		
S:1/9			Startup Protection Fault		
S:1/10			Load Memory Module on Memory Error		
S:1/11			Load Memory Module Always		
S:1/12			Load Memory Module and RUN		
S:1/13			Major Error Halted		
S:1/14			Access Denied		
S:1/15			First Pass		
S:2/0			STI Pending		
S:2/1			STI Enabled		
S:2/2			STI Executing		
S:2/3			Index Addressing File Range		
S:2/4			Saved with Debug Single Step		
S:2/5			DH-485 Incoming Command Pending		
S:2/6			DH-485 Message Reply Pending		
S:2/7			DH-485 Outgoing Message Command Pending		
S:2/15			Comms Servicing Selection		
S:3			Current Scan Time/ Watchdog Scan Time		
S:4			Time Base		
S:5/0			Overflow Trap		
S:5/2			Control Register Error		
S:5/3			Major Err Detected Executing UserFault Routine		
S:5/4			M0-M1 Referenced on Disabled Slot		
S:5/8			Memory Module Boot		
S:5/9			Memory Module Password Mismatch		
S:5/10			STI Overflow		
S:5/11			Battery Low		
S:6			Major Error Fault Code		
S:7			Suspend Code		
S:8			Suspend File		
S:9			Active Nodes		
S:10			Active Nodes		
S:11			I/O Slot Enables		
S:12			I/O Slot Enables		
S:13			Math Register		
S:14			Math Register		
S:15			Node Address/ Baud Rate		
S:16			Debug Single Step Rung		
S:17			Debug Single Step File		
S:18			Debug Single Step Breakpoint Rung		
S:19			Debug Single Step Breakpoint File		
S:20			Debug Fault/ Powerdown Rung		
S:21			Debug Fault/ Powerdown File		
S:22			Maximum Observed Scan Time		
S:23			Average Scan Time		
S:24			Index Register		
S:25			I/O Interrupt Pending		
S:26			I/O Interrupt Pending		
S:27			I/O Interrupt Enabled		
S:28			I/O Interrupt Enabled		
S:29			User Fault Routine File Number		

Address	Symbol	Scope	Description	Sym Group	Dev. C
S:30			STI Setpoint		
S:31			STI File Number		
S:32			I/O Interrupt Executing		
S:33			Extended Proc Status Control Word		
S:33/0			Incoming Command Pending		
S:33/1			Message Reply Pending		
S:33/2			Outgoing Message Command Pending		
S:33/3			Selection Status User/DF1		
S:33/4			Communicat Active		
S:33/5			Communicat Servicing Selection		
S:33/6			Message Servicing Selection Channel 0		
S:33/7			Message Servicing Selection Channel 1		
S:33/8			Interrupt Latency Control Flag		
S:33/9			Scan Toggle Flag		
S:33/10			Discrete Input Interrupt Reconfigur Flag		
S:33/11			Online Edit Status		
S:33/12			Online Edit Status		
S:33/13			Scan Time Timebase Selection		
S:33/14			DTR Control Bit		
S:33/15			DTR Force Bit		
S:34			Pass-thru Disabled		
S:34/0			Pass-Thru Disabled Flag		
S:34/1			DH+ Active Node Table Enable Flag		
S:34/2			Floating Point Math Flag		
S:35			Last 1 ms Scan Time		
S:36			Extended Minor Error Bits		
S:36/8			Dll Lost		
S:36/9			STI Lost		
S:36/10			Memory Module Data File Overwrite Protection		
S:37			Clock Calendar Year		
S:38			Clock Calendar Month		
S:39			Clock Calendar Day		
S:40			Clock Calendar Hours		
S:41			Clock Calendar Minutes		
S:42			Clock Calendar Seconds		
S:43			STI Interrupt Time		
S:44			I/O Event Interrupt Time		
S:45			Dll Interrupt Time		
S:46			Discrete Input Interrupt- File Number		
S:47			Discrete Input Interrupt- Slot Number		
S:48			Discrete Input Interrupt- Bit Mask		
S:49			Discrete Input Interrupt- Compare Value		
S:50			Processor Catalog Interrupt- Preset		
S:51			Discrete Input Interrupt- Return Number		
S:52			Discrete Input Interrupt- Accumulat		
S:53			Discrete Input Interrupt- Timer		
S:54			Discrete Input Interrupt- Timer		
S:55			Last Dll Scan Time		
S:56			Maximum Observed Dll Scan Time		
S:57			Operating System Catalog Number		
S:58			Operating System Series		
S:59			Operating System FRN		
S:61			Processor Series		
S:62			Processor Revision		
S:63			User Program Type		
S:64			User Program Functional Index		
S:65			User RAM Size		
S:66			Flash EEPROM Size		
S:67			Channel 0 Active Nodes		
S:68			Channel 0 Active Nodes		
S:69			Channel 0 Active Nodes		
S:70			Channel 0 Active Nodes		
S:71			Channel 0 Active Nodes		
S:72			Channel 0 Active Nodes		
S:73			Channel 0 Active Nodes		
S:74			Channel 0 Active Nodes		
S:75			Channel 0 Active Nodes		
S:76			Channel 0 Active Nodes		
S:77			Channel 0 Active Nodes		
S:78			Channel 0 Active Nodes		
S:79			Channel 0 Active Nodes		
S:80			Channel 0 Active Nodes		
S:81			Channel 0 Active Nodes		
S:82			Channel 0 Active Nodes		
S:83			DH+ Active Nodes		
S:84			DH+ Active Nodes		
S:85			DH+ Active Nodes		

Address	Symbol	Scope	Description	Sym Group	Dev. C
S:86			DH+ Active Nodes		
T4:0			1 second Timebase		
T4:0/DN	ONESEC	Global	1 Sec TB		
T4:1			Dump Initialize Timer		
T4:1/DN	DUMPINIT	Global			
T4:2			Cabinet Startup Delay		
T4:2/DN					
T4:4					
T4:4/DN					
T4:5					
T4:5/DN					
T4:6					
T4:6/DN					
T4:7			Vac Pump Aux Fault Delay		
T4:7/DN					
T4:8			Vac Pump Run After Satisfied Timer		
T4:8/DN					
T4:9					
T4:9/DN			Vac Pump AntiRestart Timer		
T4:10			Twinkle Flash Timebase		
T4:10/EN			Alarm Active Reminder		
T4:12					
T4:12/DN					
T4:12/TT					
T4:13					
T4:13/DN					
T4:14			Station 1 Dump Time		
T4:14/DN					
T4:14/TT					
T4:17					
T4:17/DN					
T4:18			1 Min. Timebase		
T4:18/DN	ONEMIN	Global			
T4:19			Station 1 Lo Limit Station 2 Load Disable		
T4:20			Station 1 At Level Proportion Timebase		
T4:22					
T4:22/DN					
T4:22/TT					
T4:23					
T4:23/DN					
T4:24			Station 2 Dump Time		
T4:24/DN					
T4:24/EN					
T4:27					
T4:27/DN					
T4:32					
T4:32/DN					
T4:32/TT					
T4:33					
T4:33/DN					
T4:34			Station 3 Dump Time		
T4:34/DN					
T4:34/EN					
T4:37					
T4:37/DN					
T4:38			Station 1 ReAlarm Silence Timer		
U:6					
U:7					
U:8					
U:9					
U:10					