# CITY OF PETALUMA

POST OFFICE BOX 61
PETALUMA, CA 94953-0061




**ADDENDUM NO. 2**

**D Street Bridge Electric and System Upgrades**
**City Project No. C16101933**

**February 04, 2020**

This Addendum No. 2 modifies the Bidding Documents for the D Street Bridge Electrical and Systems Upgrade, City Project No. C16101933, and shall become part of the Contract Documents for this Project.

## I. QUESTION AND ANSWER

**Q: Can the PLC code that is currently being used on the D Street Bridge be provided?**

A: Yes the *Main PLC* and the *Remote Side* are attached.

**Q: Can the D Street Leaf Bridge Electrical Report be provided?**

A: Yes, attached.

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Public Works & Utilities Department


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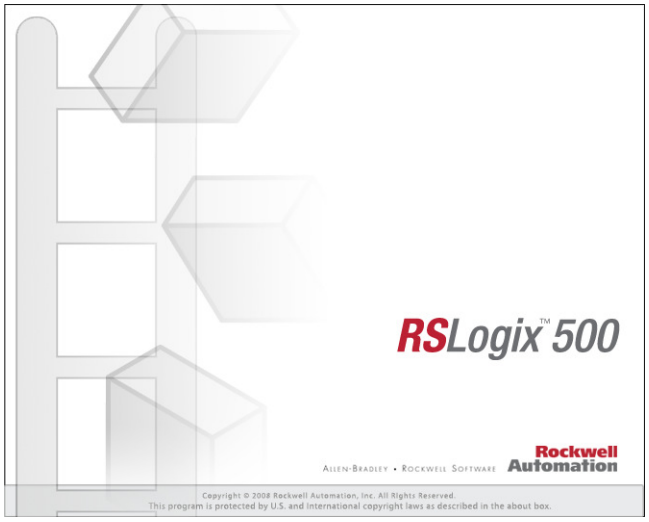
# RSLogix 500 Project Report



## Processor Information

Processor Type: 1747-L532C/D 5/03 CPU - 16K Mem. OS302

Processor Name: PLC_2605

Total Memory Used: 1527 Instruction Words Used - 432 Data Table Words Used

Total Memory Left: 10761 Instruction Words Left

Program Files: 6

Data Files: 13

Program ID: 352d

I/O Configuration

| | | |
|---|---|---|
| 0 | 1747-L532C/D | 5/03 CPU - 16K Mem. OS302 |
| 1 | | |
| 2 | 1746-HSCE2 | High Speed Counter - Class 4 |
| 3 | 1746-NI4 | Analog  4 Channel Input Module |
| 4 | 1746-NO4I | Analog 4 Ch. Current Output |
| 5 | 1746-NO4V | Analog 4 Ch. Voltage Output |
| 6 | 1746-IA16 | 16-Input 100/120 VAC |
| 7 | 1746-IA16 | 16-Input 100/120 VAC |
| 8 | 1746-IA16 | 16-Input 100/120 VAC |
| 9 | 1746-OA16 | 16-Output (TRIAC) 100/240 VAC |
| 10 | 1746-OA16 | 16-Output (TRIAC) 100/240 VAC |
| 11 | 1746-OA16 | 16-Output (TRIAC) 100/240 VAC |
| 12 | | |

Channel Configuration

GENERAL
   Channel 1 Write Protected:  No
   Channel 1 Edit Resource/Owner Timeout(x1 sec):  60
   Channel 1 Passthru Link ID(dec):  2

   Channel 0 Write Protected:  No
   Channel 0 Edit Resource/Owner Timeout(x1 sec):  60
   Channel 0 Passthru Link ID(dec):  1
   Channel 0 Current Mode:  System
   Channel 0 Mode Change Enabled:  No
   Channel 0 Mode Change Attention Character:  \1b
   Channel 0 Mode Change System Character:  S
   Channel 0 Mode Change User Character:  U


CHANNEL 1 (SYSTEM) - Driver: DH485
   Node :  1 (decimal)
   Baud: 19200
   Token Hold Factor:  1
   Max Node Address:  31


CHANNEL 0 (SYSTEM) - Driver: DF1 Half Duplex Master
   Node :  1 (decimal)
   Baud: 19200
   Parity:  NONE
   Stop Bits:  1
   Control Line :  No Handshaking
   Error Detection:  CRC
   Polling Mode:  Msg, Allow Slaves to Initiate
   Duplicate Packet Detect:  Yes
   Reply Message Timeout(x20 ms):  1
   ACK Timeout(x20 ms):  50
   Message Retries:  3
   Pre Transmit Delay(x1 ms):  0

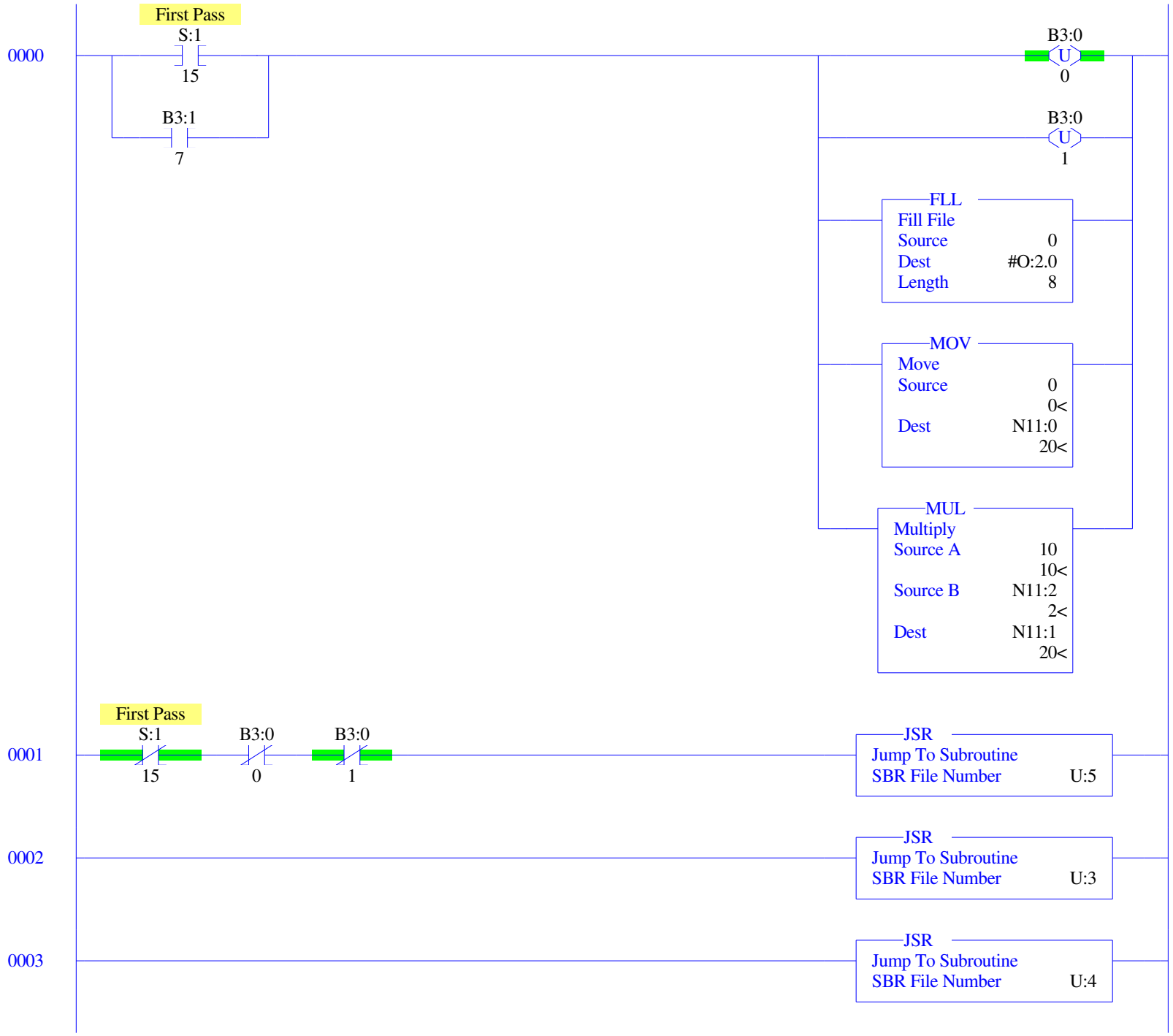

CHANNEL 0 (USER) - Driver: Shutdown

Program File List

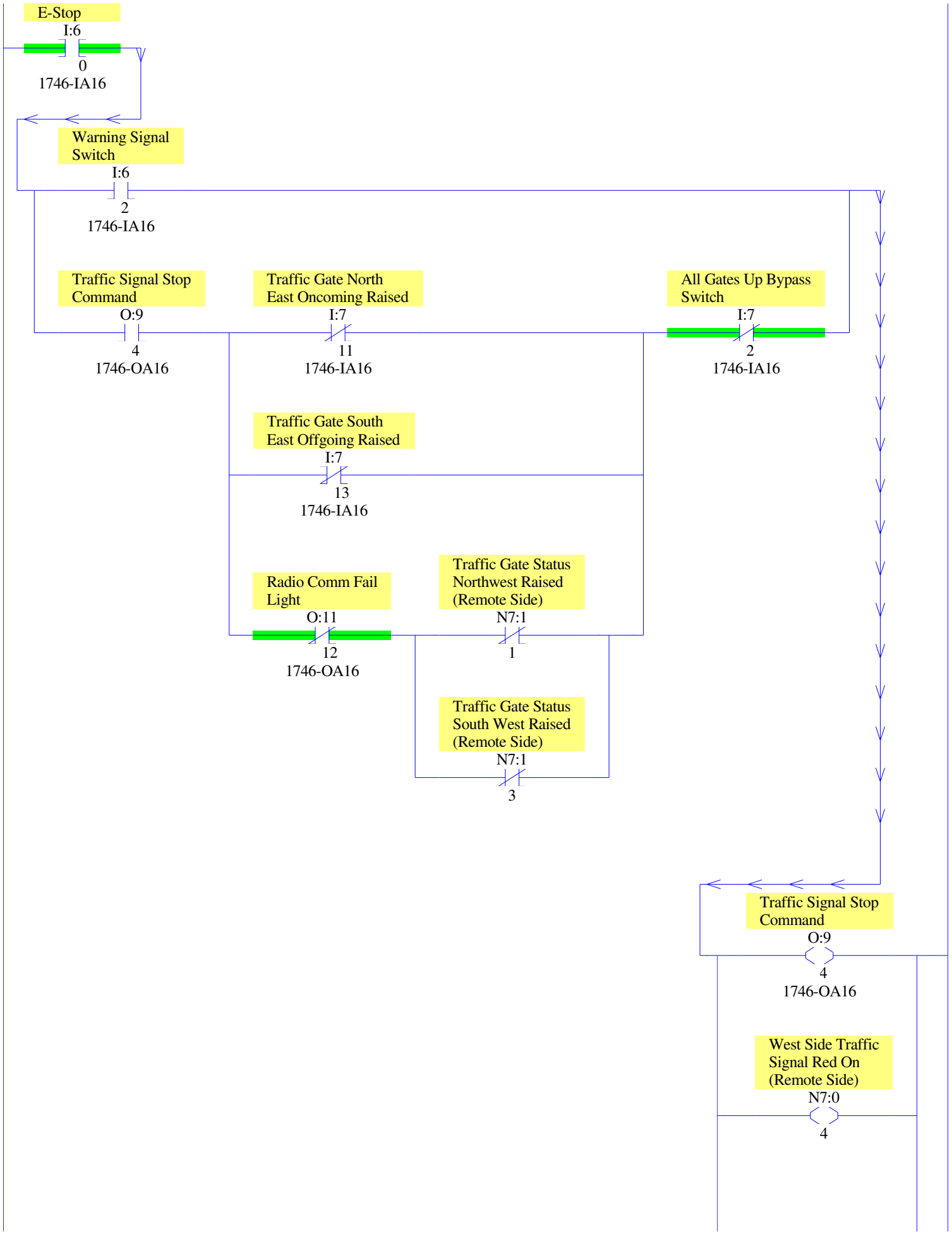
| Name | Number | Type | Rungs | Debug | Bytes |
|---|---|---|---|---|---|
| [SYSTEM] | 0 | SYS | 0 | No | 0 |
| | 1 | SYS | 0 | No | 0 |
| | 2 | LADDER | 55 | No | 4467 |
| | 3 | LADDER | 88 | No | 3164 |
| | 4 | LADDER | 13 | No | 363 |
| | 5 | LADDER | 6 | No | 238 |

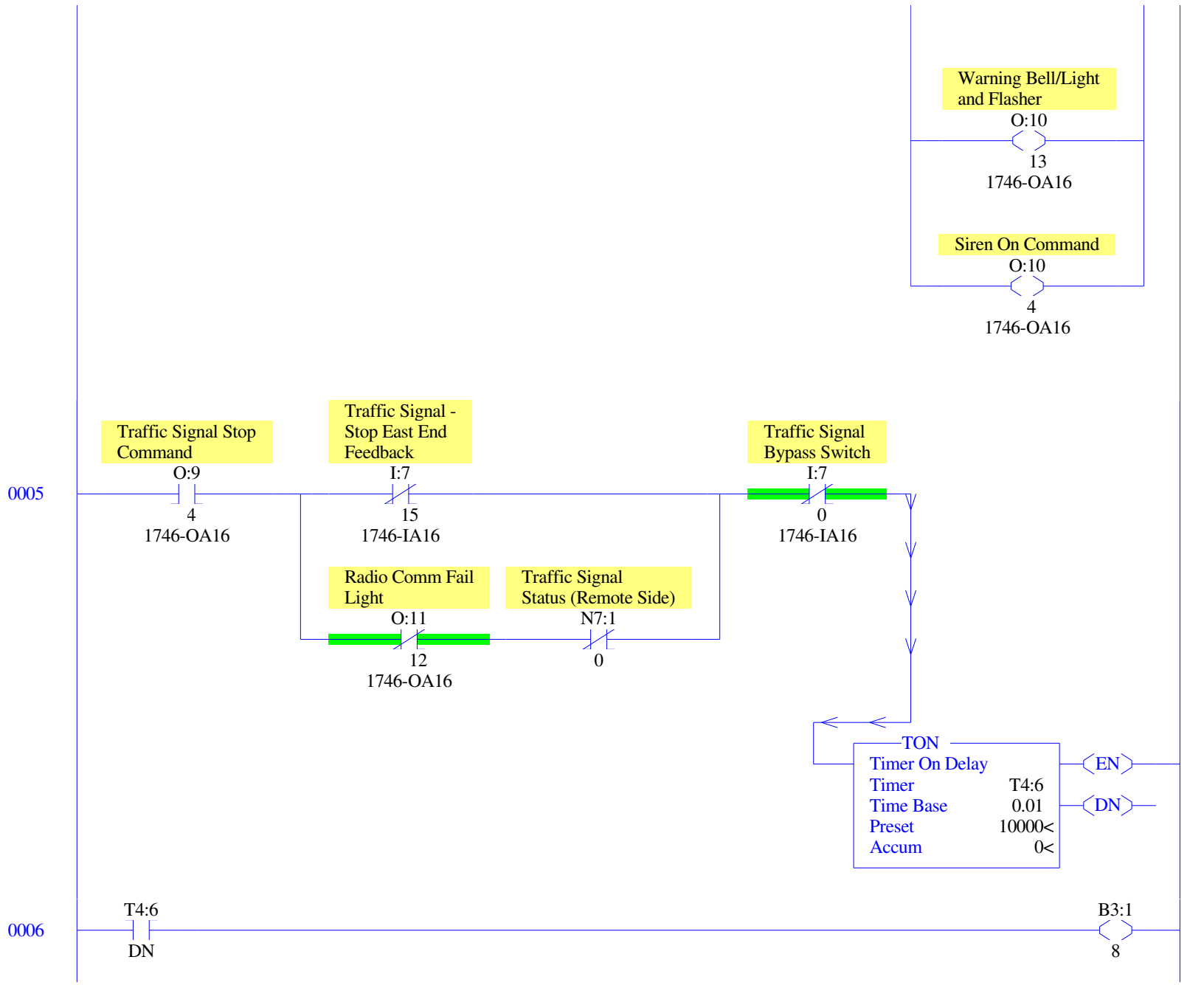
Data File List

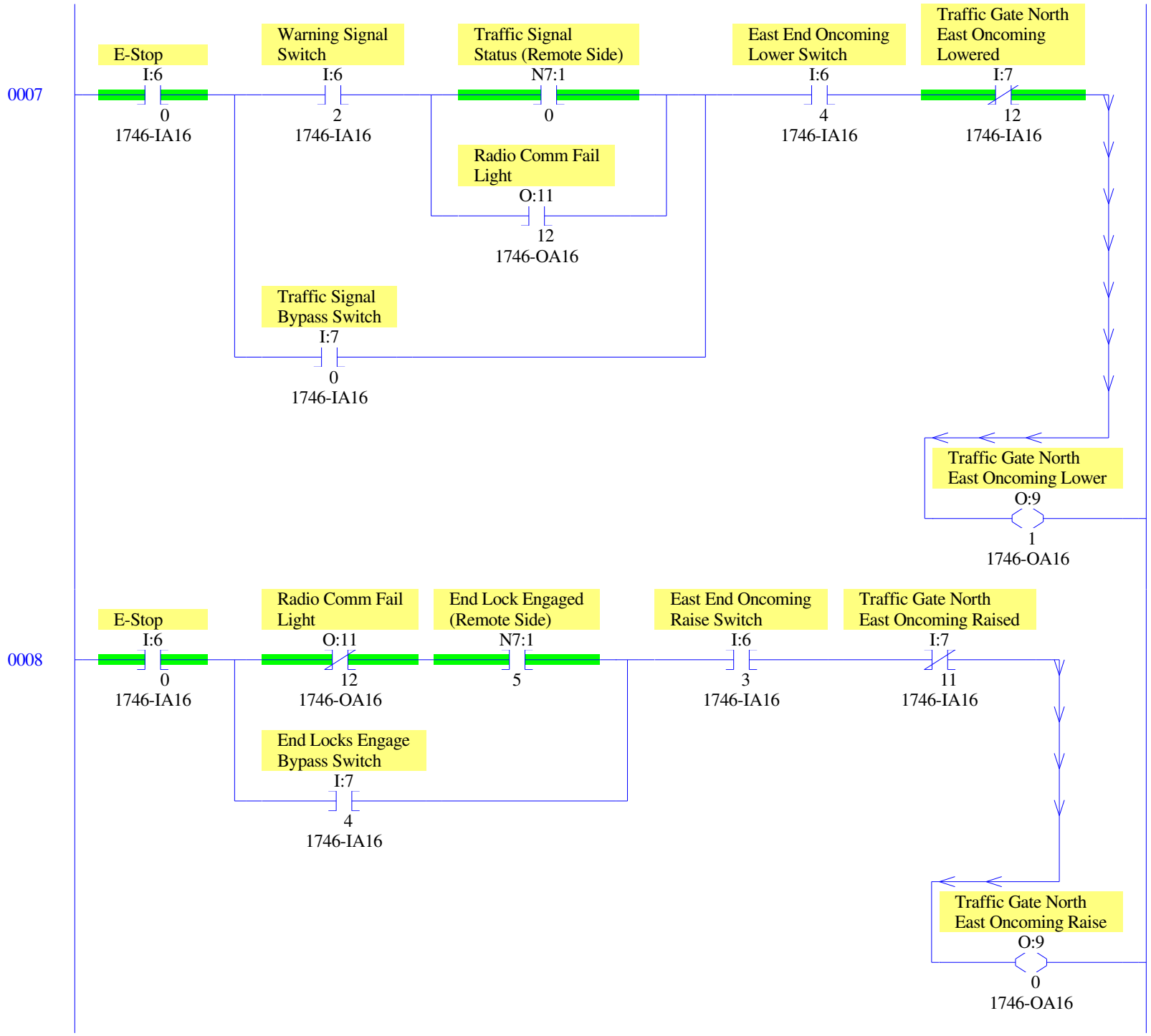
| Name | Number | Type | Scope | Debug | Words | Elements | Last |
|---|---|---|---|---|---|---|---|
| OUTPUT | 0 | O | Global | No | 57 | 19 | O:18 |
| INPUT | 1 | I | Global | No | 90 | 30 | I:29 |
| STATUS | 2 | S | Global | No | 0 | 83 | S:82 |
| BINARY | 3 | B | Global | No | 3 | 3 | B3:2 |
| TIMER | 4 | T | Global | No | 51 | 17 | T4:16 |
| COUNTER | 5 | C | Global | No | 6 | 2 | C5:1 |
| CONTROL | 6 | R | Global | No | 3 | 1 | R6:0 |
| INTEGER | 7 | N | Global | No | 33 | 33 | N7:32 |
| FLOAT | 8 | F | Global | No | 42 | 21 | F8:20 |
| | 9 | N | Global | No | 15 | 15 | N9:14 |
| | 10 | N | Global | No | 67 | 67 | N10:66 |
| | 11 | N | Global | No | 15 | 15 | N11:14 |
| | 12 | N | Global | No | 50 | 50 | N12:49 |

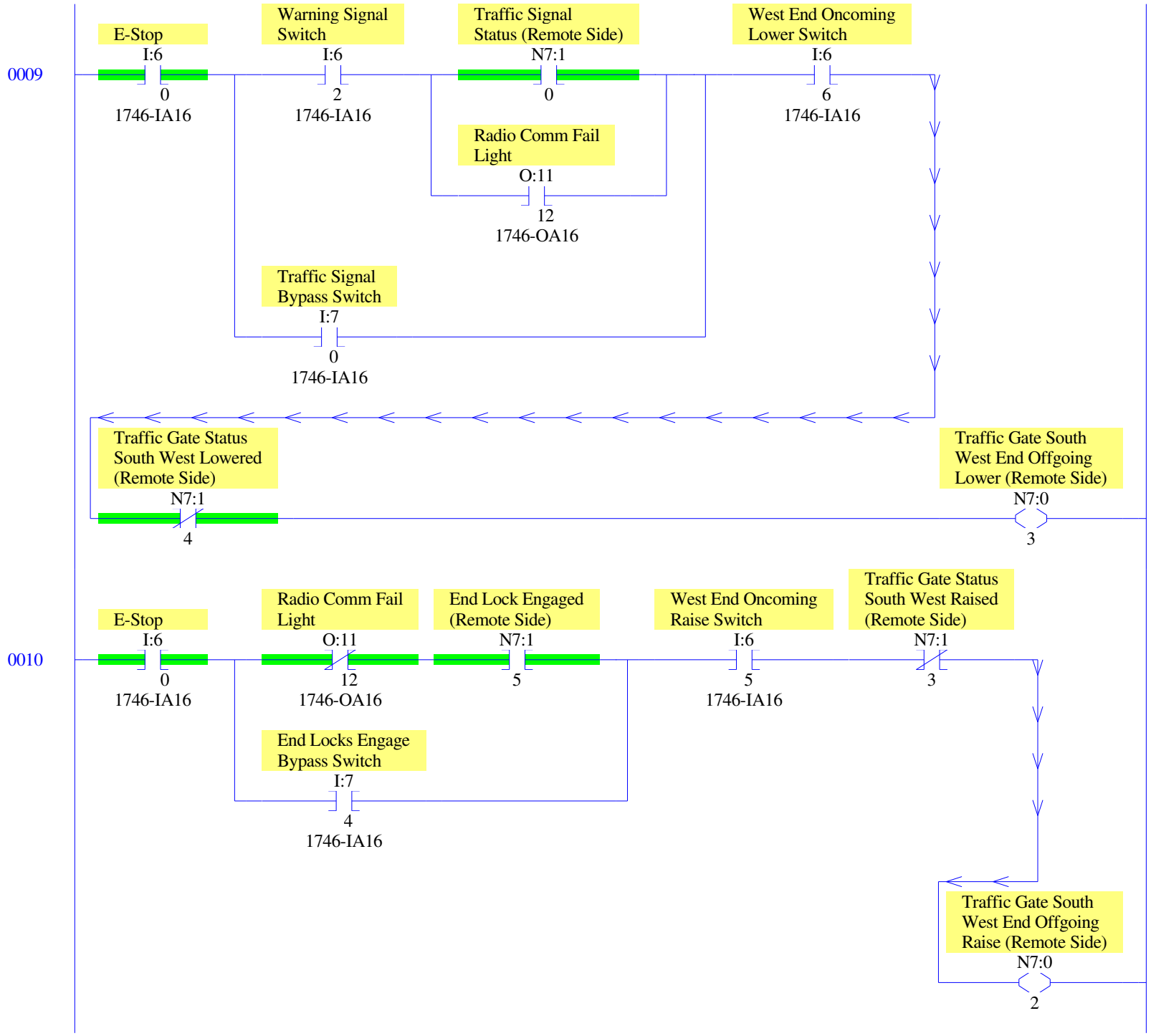

First Pass
S:1
15
B3:1
7
B3:0
U
0
B3:0
U
1
FLL
Fill File
Source 0
Dest #O:2.0
Length 8
MOV
Move
Source 0
0<
Dest N11:0
20<
MUL
Multiply
Source A 10
10<
Source B N11:2
2<
Dest N11:1
20<
0000
First Pass
S:1
15
B3:0
0
B3:0
1
JSR
Jump To Subroutine
SBR File Number U:5
0001
JSR
Jump To Subroutine
SBR File Number U:3
0002
JSR
Jump To Subroutine
SBR File Number U:4
0003

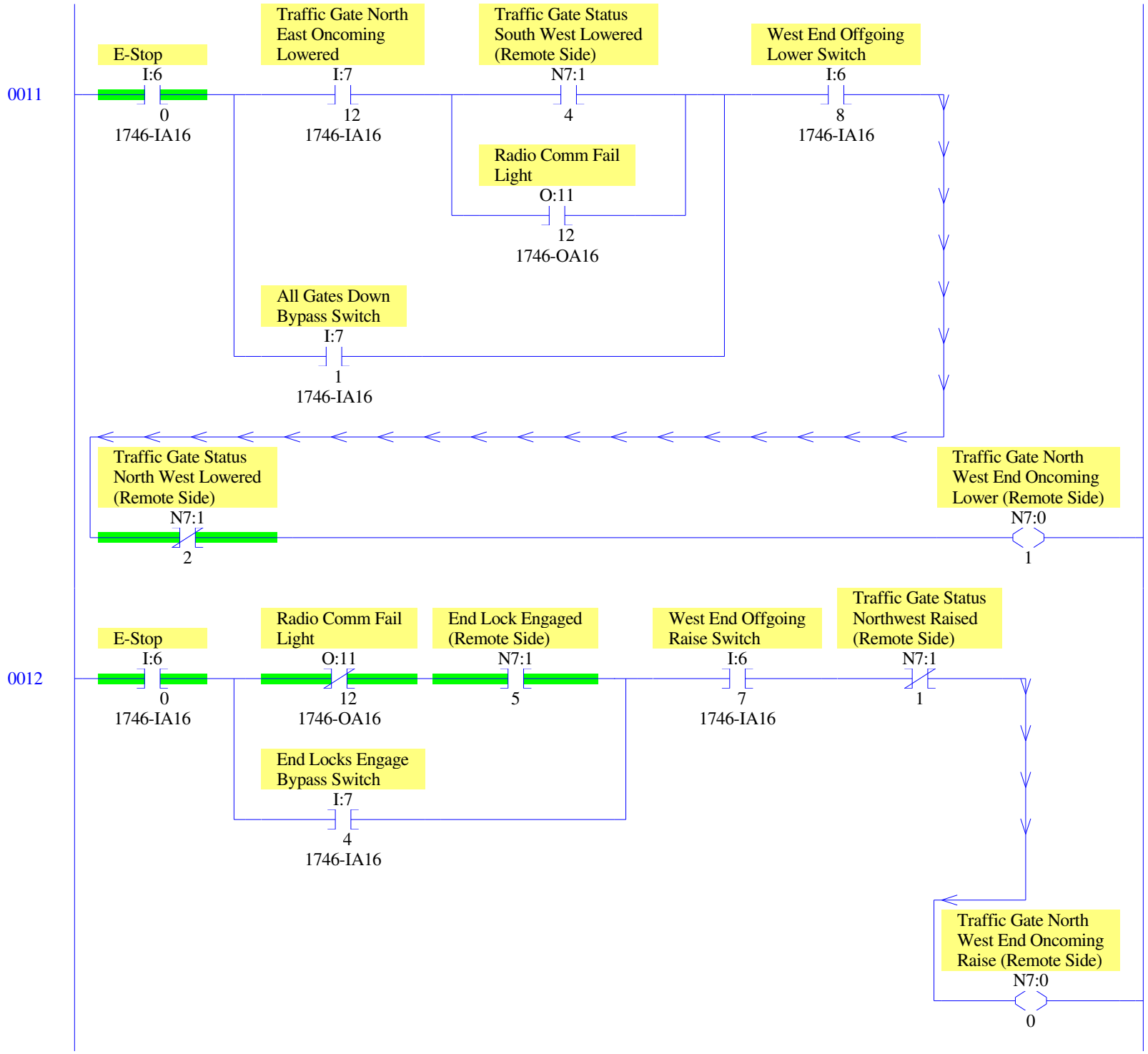
0004

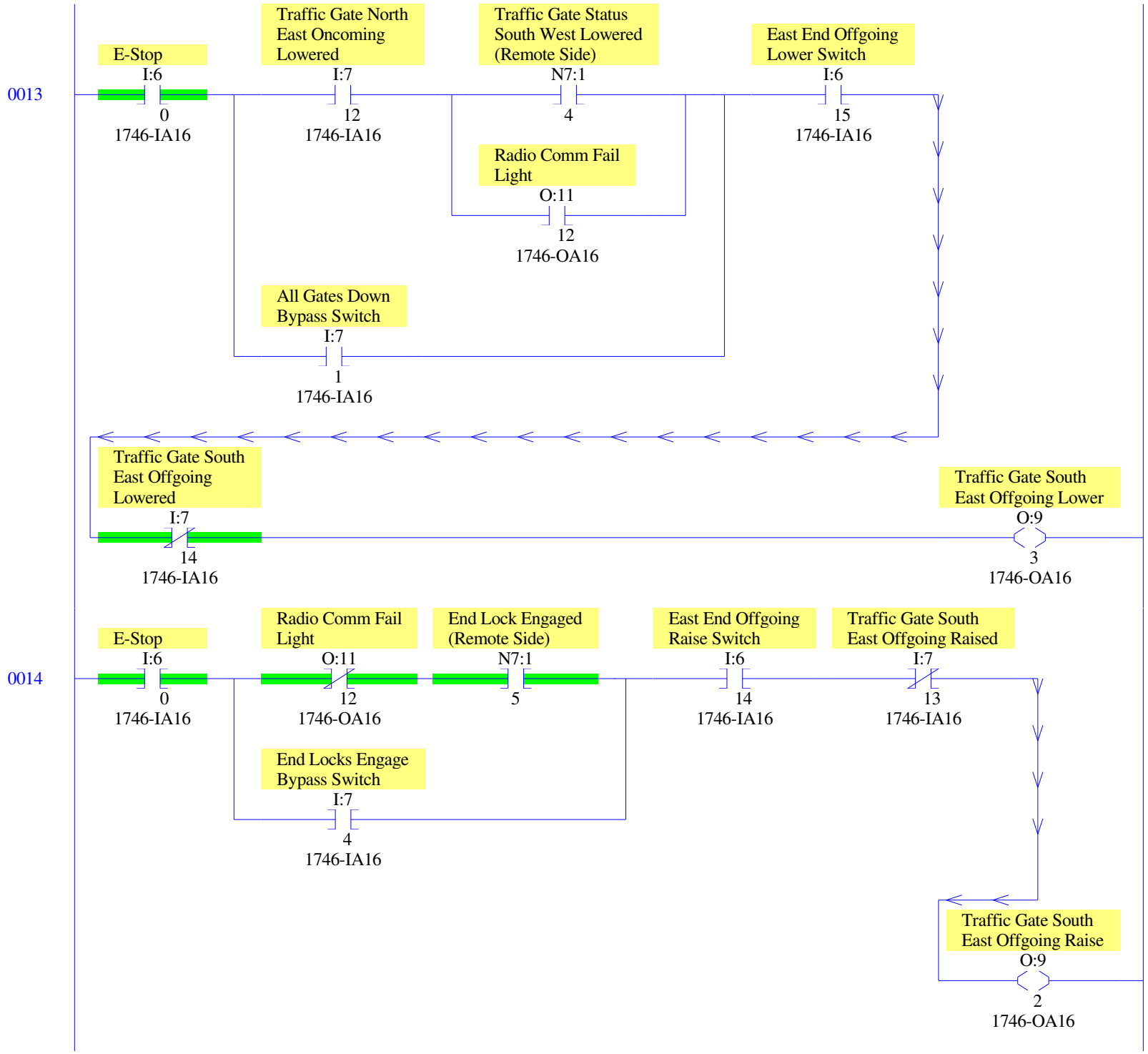

E-Stop
I:6
0
1746-IA16
Warning Signal Switch
I:6
2
1746-IA16
Traffic Signal Stop Command
O:9
4
1746-OA16
Traffic Gate North East Oncoming Raised
I:7
11
1746-IA16
All Gates Up Bypass Switch
I:7
2
1746-IA16
Traffic Gate South East Offgoing Raised
I:7
13
1746-IA16
Radio Comm Fail Light
O:11
12
1746-OA16
Traffic Gate Status Northwest Raised (Remote Side)
N7:1
1
Traffic Gate Status South West Raised (Remote Side)
N7:1
3
Traffic Signal Stop Command
O:9
4
1746-OA16
West Side Traffic Signal Red On (Remote Side)
N7:0
4

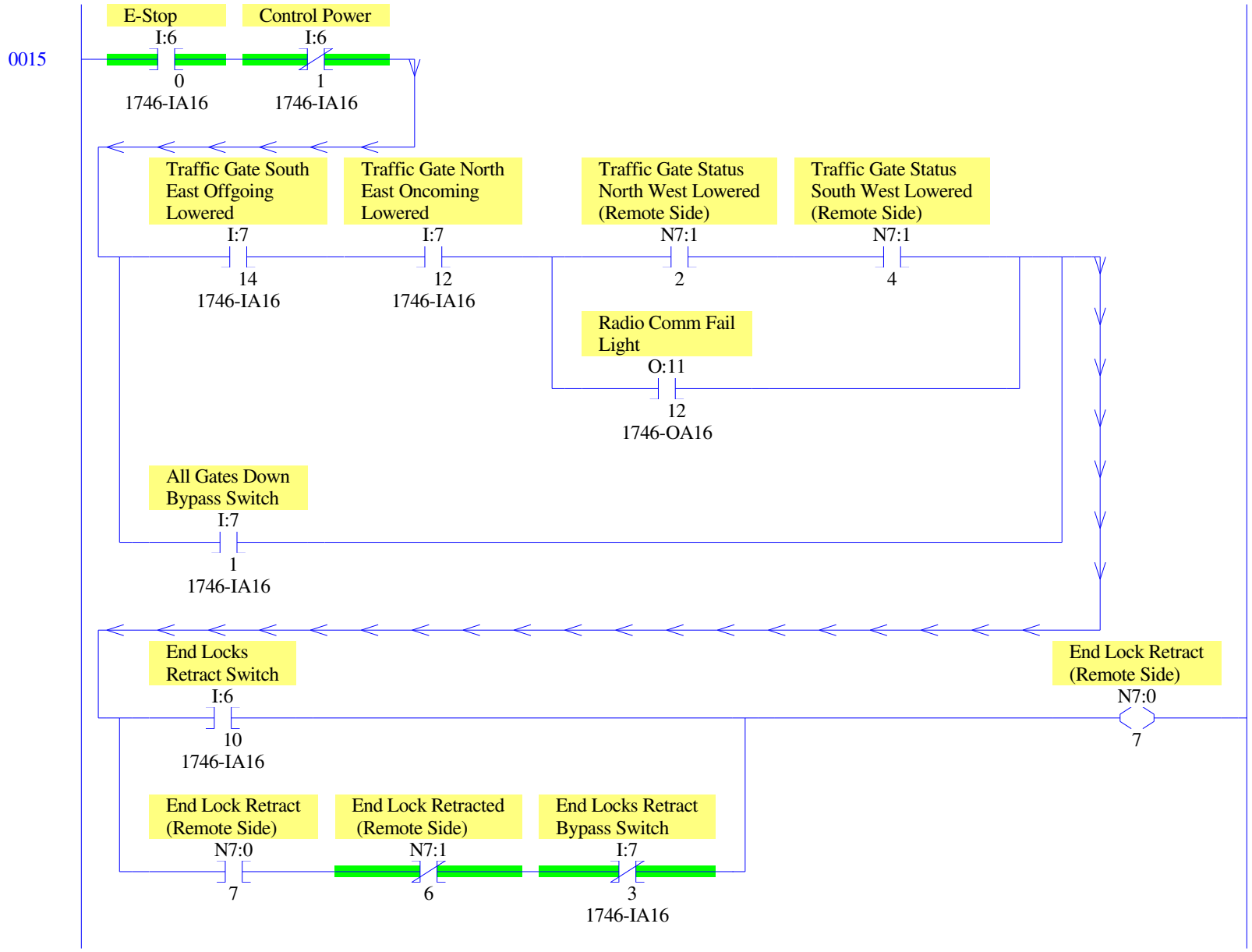

Warning Bell/Light and Flasher
O:10
13
1746-OA16
Siren On Command
O:10
4
1746-OA16
Traffic Signal Stop Command
O:9
4
1746-OA16
Traffic Signal - Stop East End Feedback
I:7
15
1746-IA16
Traffic Signal Bypass Switch
I:7
0
1746-IA16
0005
Radio Comm Fail Light
O:11
12
1746-OA16
Traffic Signal Status (Remote Side)
N7:1
0
TON
Timer On Delay
Timer T4:6
Time Base 0.01
Preset 10000<
Accum 0<
EN
DN
T4:6
DN
0006
B3:1
8

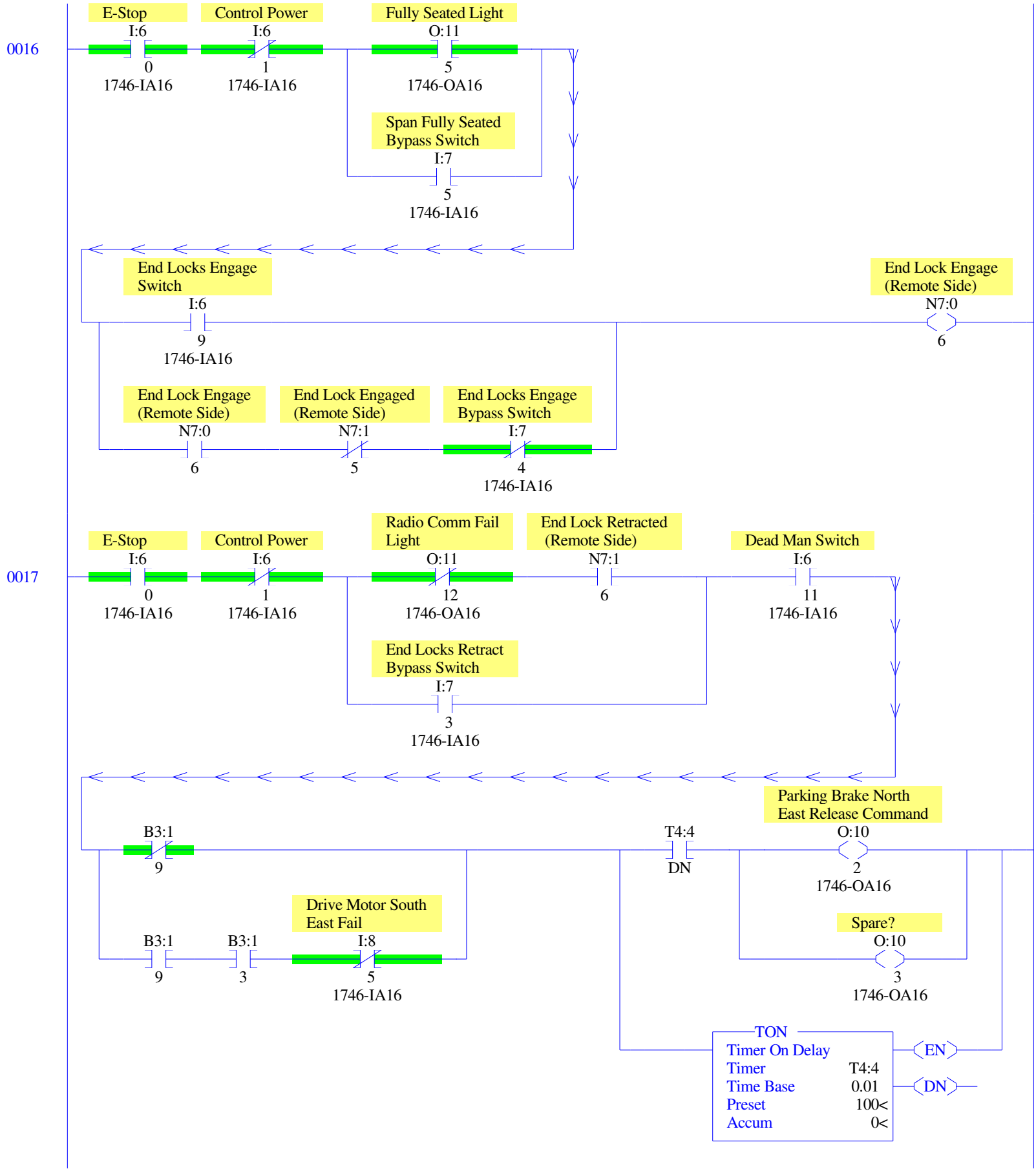

0007
E-Stop
I:6
0
1746-IA16
Warning Signal Switch
I:6
2
1746-IA16
Traffic Signal Status (Remote Side)
N7:1
0
Radio Comm Fail Light
O:11
12
1746-OA16
East End Oncoming Lower Switch
I:6
4
1746-IA16
Traffic Gate North East Oncoming Lowered
I:7
12
1746-IA16
Traffic Signal Bypass Switch
I:7
0
1746-IA16
Traffic Gate North East Oncoming Lower
O:9
1
1746-OA16
0008
E-Stop
I:6
0
1746-IA16
Radio Comm Fail Light
O:11
12
1746-OA16
End Lock Engaged (Remote Side)
N7:1
5
East End Oncoming Raise Switch
I:6
3
1746-IA16
Traffic Gate North East Oncoming Raised
I:7
11
1746-IA16
End Locks Engage Bypass Switch
I:7
4
1746-IA16
Traffic Gate North East Oncoming Raise
O:9
0
1746-OA16

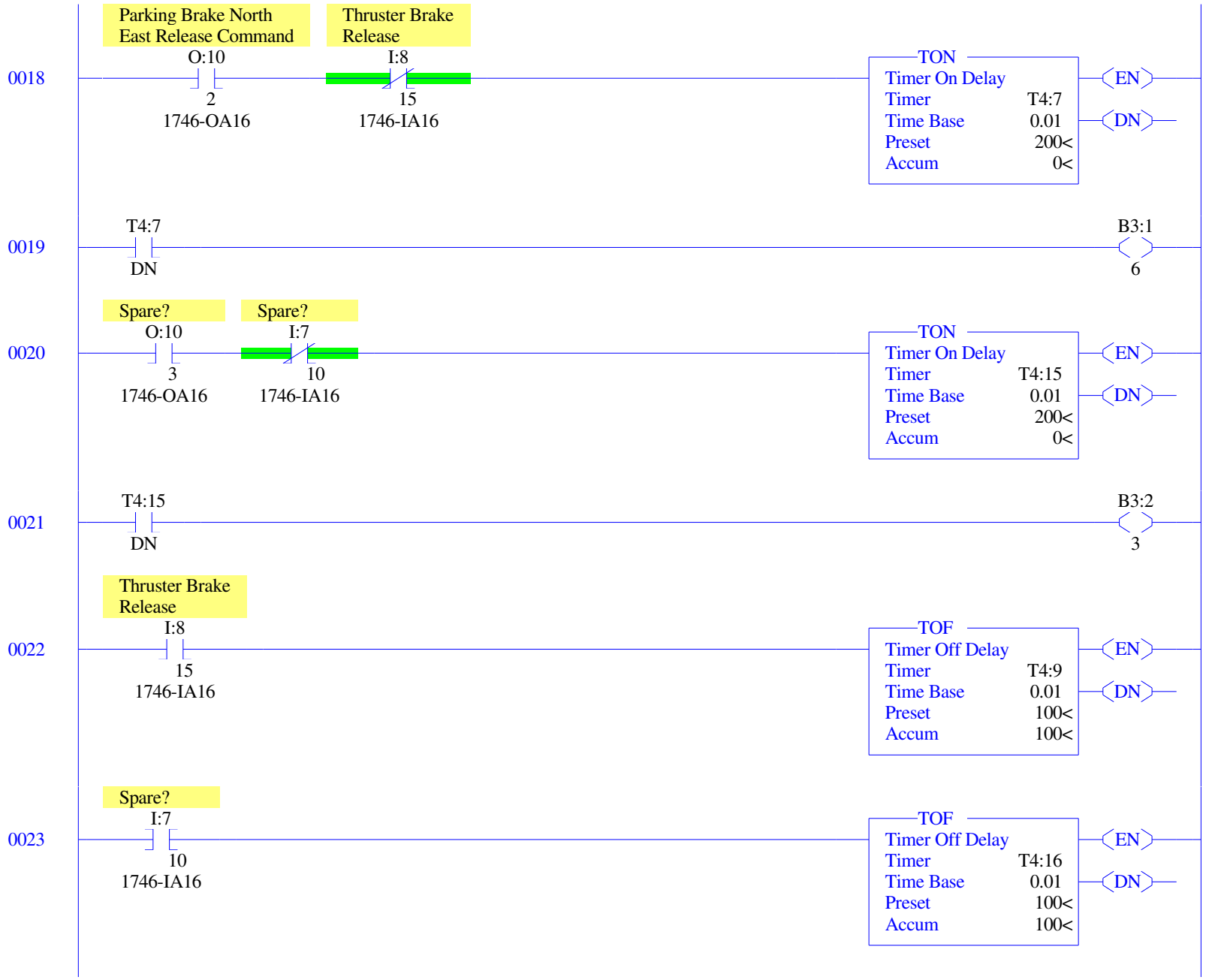

0009
E-Stop
I:6
0
1746-IA16
Warning Signal Switch
I:6
2
1746-IA16
Traffic Signal Status (Remote Side)
N7:1
0
Radio Comm Fail Light
O:11
12
1746-OA16
West End Oncoming Lower Switch
I:6
6
1746-IA16
Traffic Signal Bypass Switch
I:7
0
1746-IA16
Traffic Gate Status South West Lowered (Remote Side)
N7:1
4
Traffic Gate South West End Offgoing Lower (Remote Side)
N7:0
3
0010
E-Stop
I:6
0
1746-IA16
Radio Comm Fail Light
O:11
12
1746-OA16
End Lock Engaged (Remote Side)
N7:1
5
West End Oncoming Raise Switch
I:6
5
1746-IA16
Traffic Gate Status South West Raised (Remote Side)
N7:1
3
End Locks Engage Bypass Switch
I:7
4
1746-IA16
Traffic Gate South West End Offgoing Raise (Remote Side)
N7:0
2

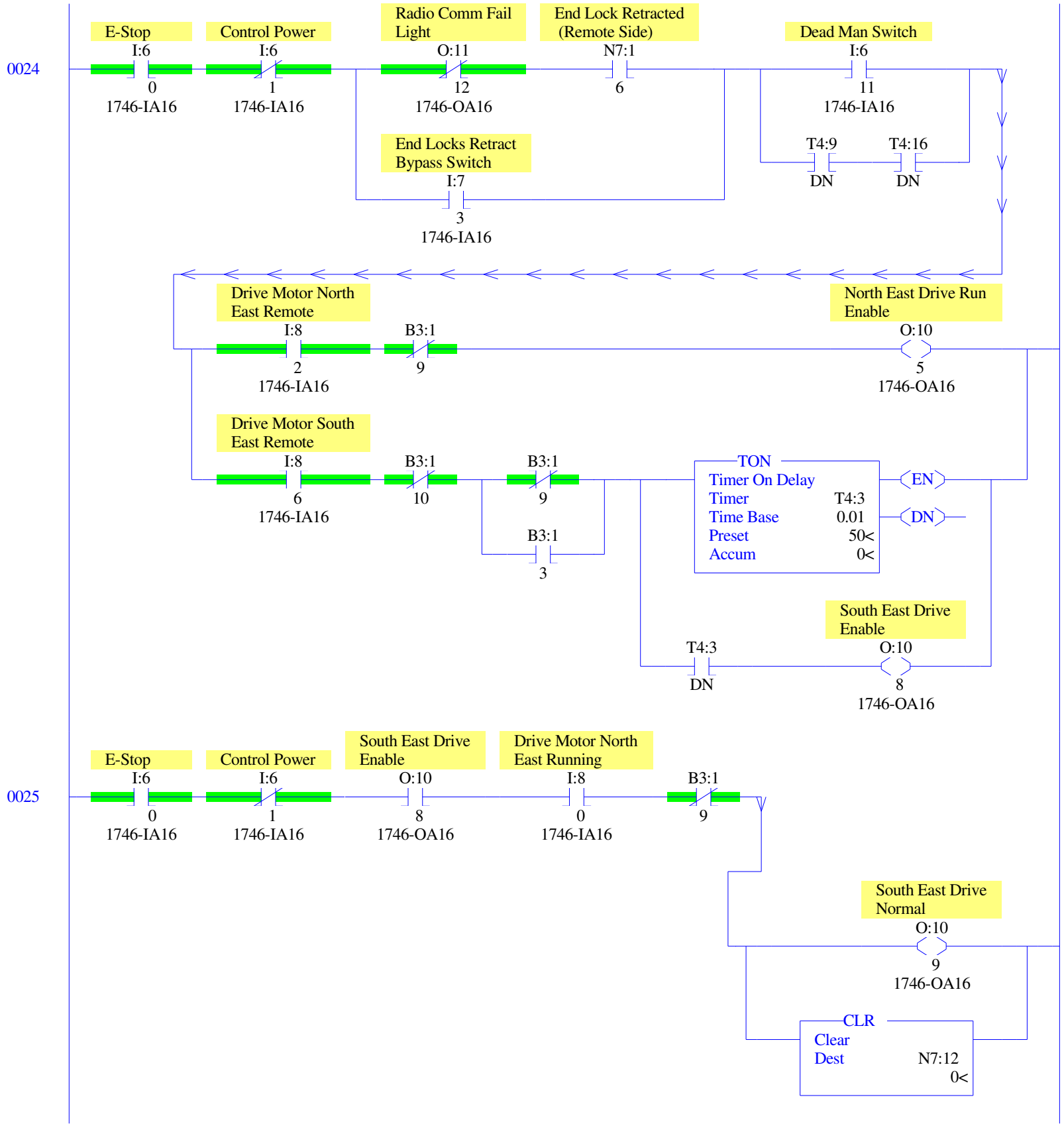

0011
E-Stop
I:6
0
1746-IA16
Traffic Gate North East Oncoming Lowered
I:7
12
1746-IA16
Traffic Gate Status South West Lowered (Remote Side)
N7:1
4
West End Offgoing Lower Switch
I:6
8
1746-IA16
Radio Comm Fail Light
O:11
12
1746-OA16
All Gates Down Bypass Switch
I:7
1
1746-IA16
Traffic Gate Status North West Lowered (Remote Side)
N7:1
2
Traffic Gate North West End Oncoming Lower (Remote Side)
N7:0
1
0012
E-Stop
I:6
0
1746-IA16
Radio Comm Fail Light
O:11
12
1746-OA16
End Lock Engaged (Remote Side)
N7:1
5
West End Offgoing Raise Switch
I:6
7
1746-IA16
Traffic Gate Status Northwest Raised (Remote Side)
N7:1
1
End Locks Engage Bypass Switch
I:7
4
1746-IA16
Traffic Gate North West End Oncoming Raise (Remote Side)
N7:0
0

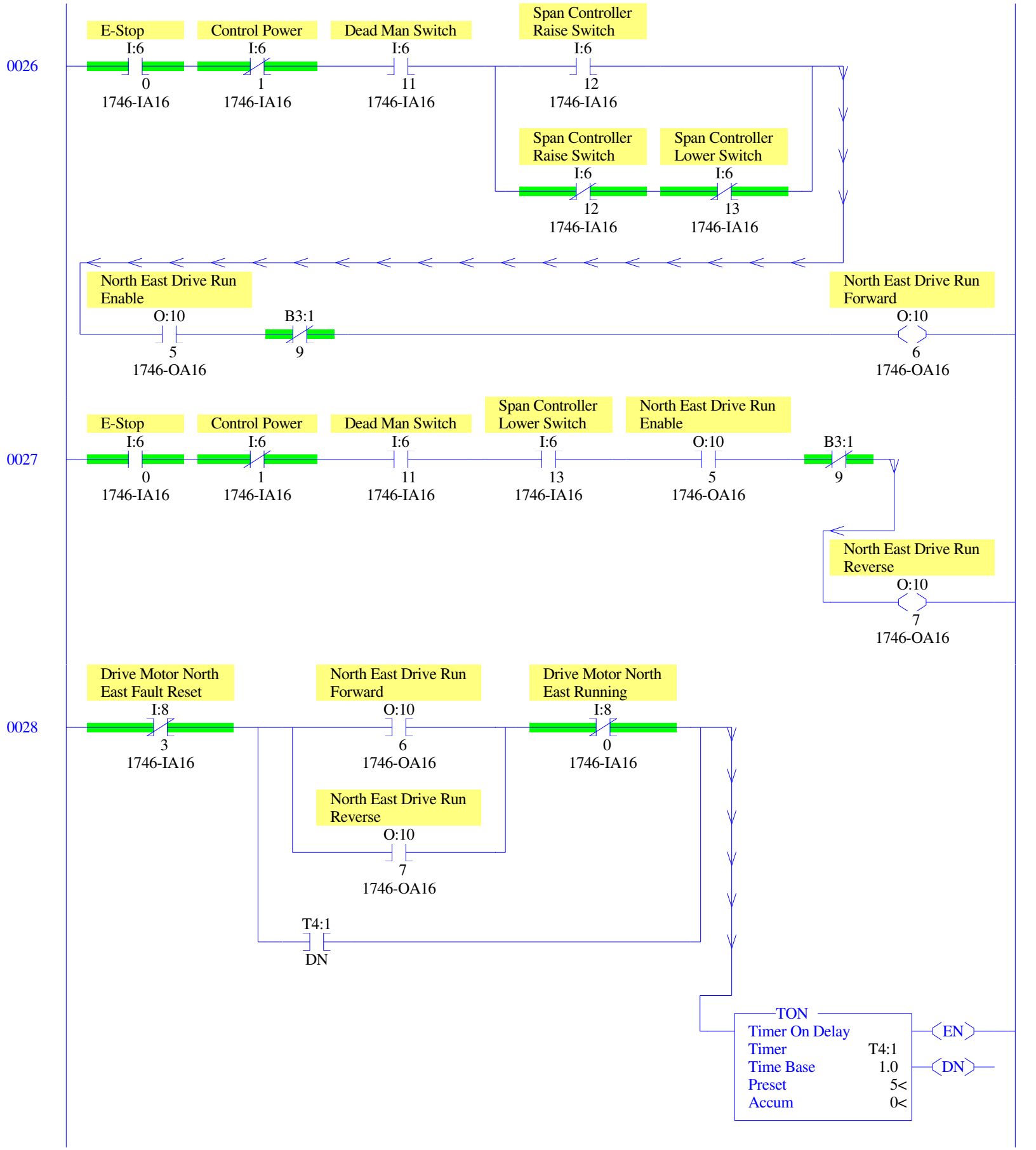

0013
E-Stop
I:6
0
1746-IA16
Traffic Gate North East Oncoming Lowered
I:7
12
1746-IA16
Traffic Gate Status South West Lowered (Remote Side)
N7:1
4
East End Offgoing Lower Switch
I:6
15
1746-IA16
Radio Comm Fail Light
O:11
12
1746-OA16
All Gates Down Bypass Switch
I:7
1
1746-IA16
Traffic Gate South East Offgoing Lowered
I:7
14
1746-IA16
Traffic Gate South East Offgoing Lower
O:9
3
1746-OA16
0014
E-Stop
I:6
0
1746-IA16
Radio Comm Fail Light
O:11
12
1746-OA16
End Lock Engaged (Remote Side)
N7:1
5
East End Offgoing Raise Switch
I:6
14
1746-IA16
Traffic Gate South East Offgoing Raised
I:7
13
1746-IA16
End Locks Engage Bypass Switch
I:7
4
1746-IA16
Traffic Gate South East Offgoing Raise
O:9
2
1746-OA16

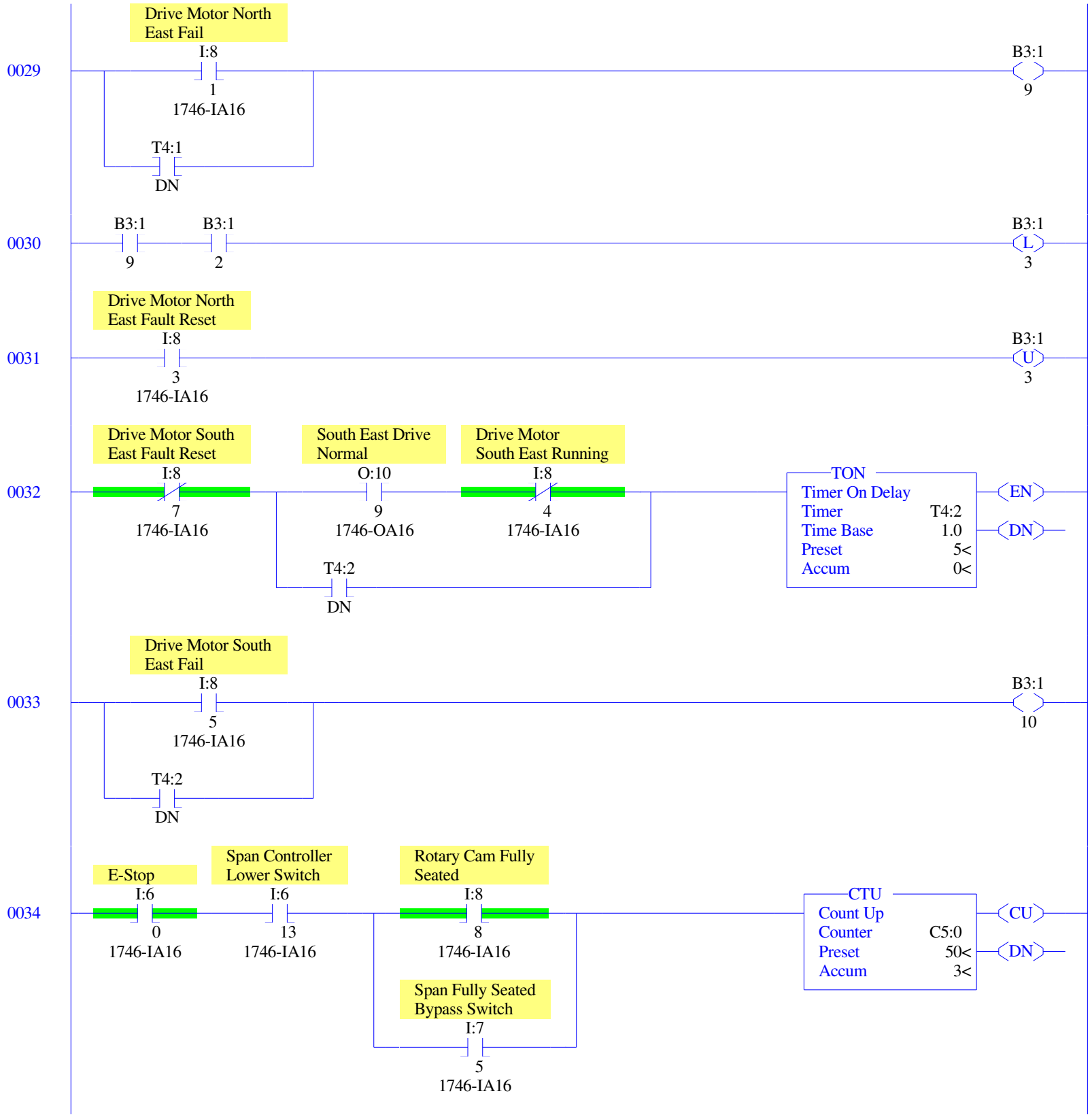

0015
E-Stop
I:6
0
1746-IA16
Control Power
I:6
1
1746-IA16
Traffic Gate South East Offgoing Lowered
I:7
14
1746-IA16
Traffic Gate North East Oncoming Lowered
I:7
12
1746-IA16
Traffic Gate Status North West Lowered (Remote Side)
N7:1
2
Traffic Gate Status South West Lowered (Remote Side)
N7:1
4
Radio Comm Fail Light
O:11
12
1746-OA16
All Gates Down Bypass Switch
I:7
1
1746-IA16
End Locks Retract Switch
I:6
10
1746-IA16
End Lock Retract (Remote Side)
N7:0
7
End Lock Retract (Remote Side)
N7:0
7
End Lock Retracted (Remote Side)
N7:1
6
End Locks Retract Bypass Switch
I:7
3
1746-IA16

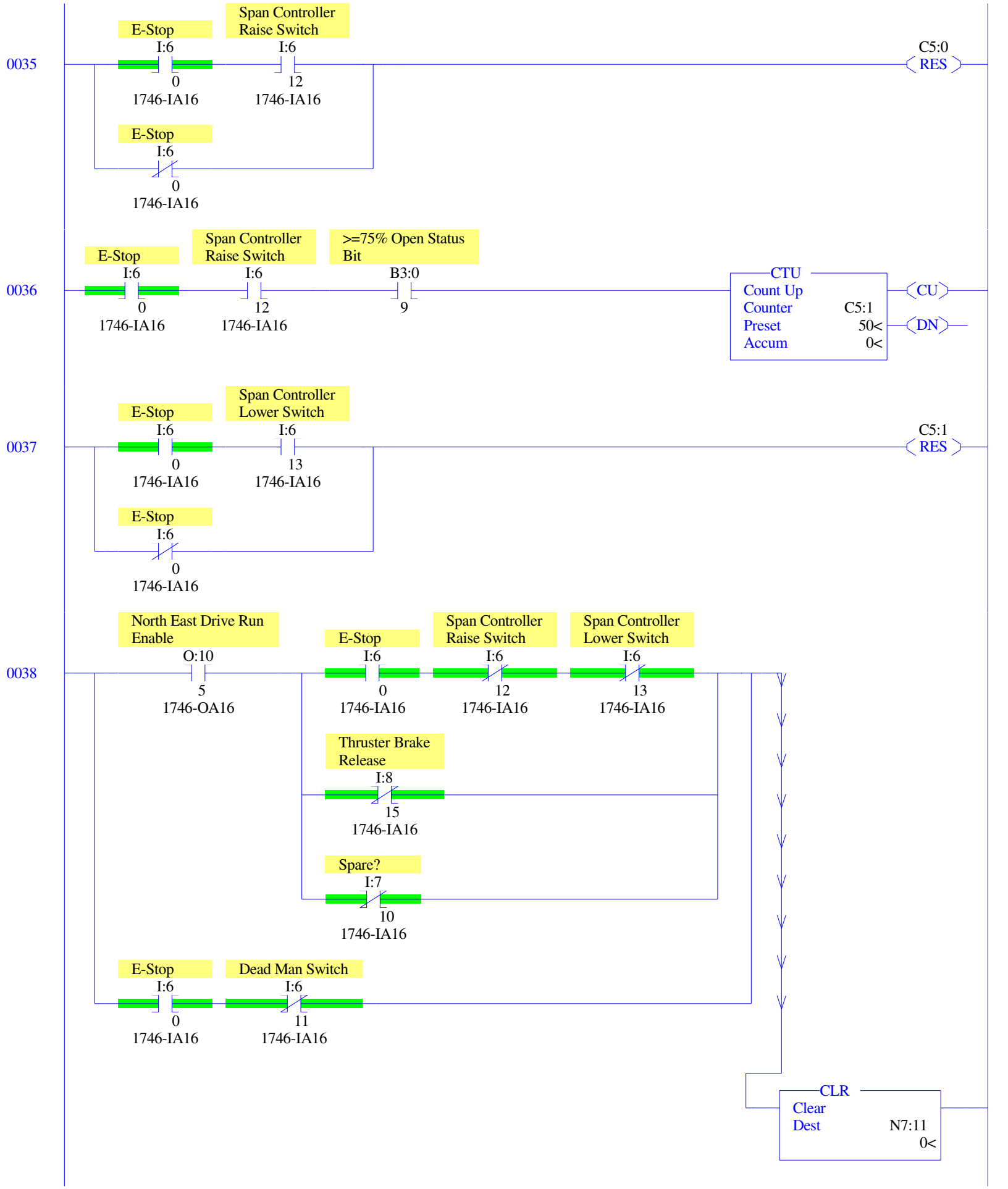

0016
E-Stop
I:6
0
1746-IA16
Control Power
I:6
1
1746-IA16
Fully Seated Light
O:11
5
1746-OA16
Span Fully Seated Bypass Switch
I:7
5
1746-IA16
End Locks Engage Switch
I:6
9
1746-IA16
End Lock Engage (Remote Side)
N7:0
6
End Lock Engage (Remote Side)
N7:0
6
End Lock Engaged (Remote Side)
N7:1
5
End Locks Engage Bypass Switch
I:7
4
1746-IA16
0017
E-Stop
I:6
0
1746-IA16
Control Power
I:6
1
1746-IA16
Radio Comm Fail Light
O:11
12
1746-OA16
End Lock Retracted (Remote Side)
N7:1
6
Dead Man Switch
I:6
11
1746-IA16
End Locks Retract Bypass Switch
I:7
3
1746-IA16
Parking Brake North East Release Command
O:10
2
1746-OA16
B3:1
9
T4:4
DN
Drive Motor South East Fail
B3:1
9
B3:1
3
I:8
5
1746-IA16
Spare?
O:10
3
1746-OA16
TON
Timer On Delay
Timer T4:4
Time Base 0.01
Preset 100<
Accum 0<
EN
DN

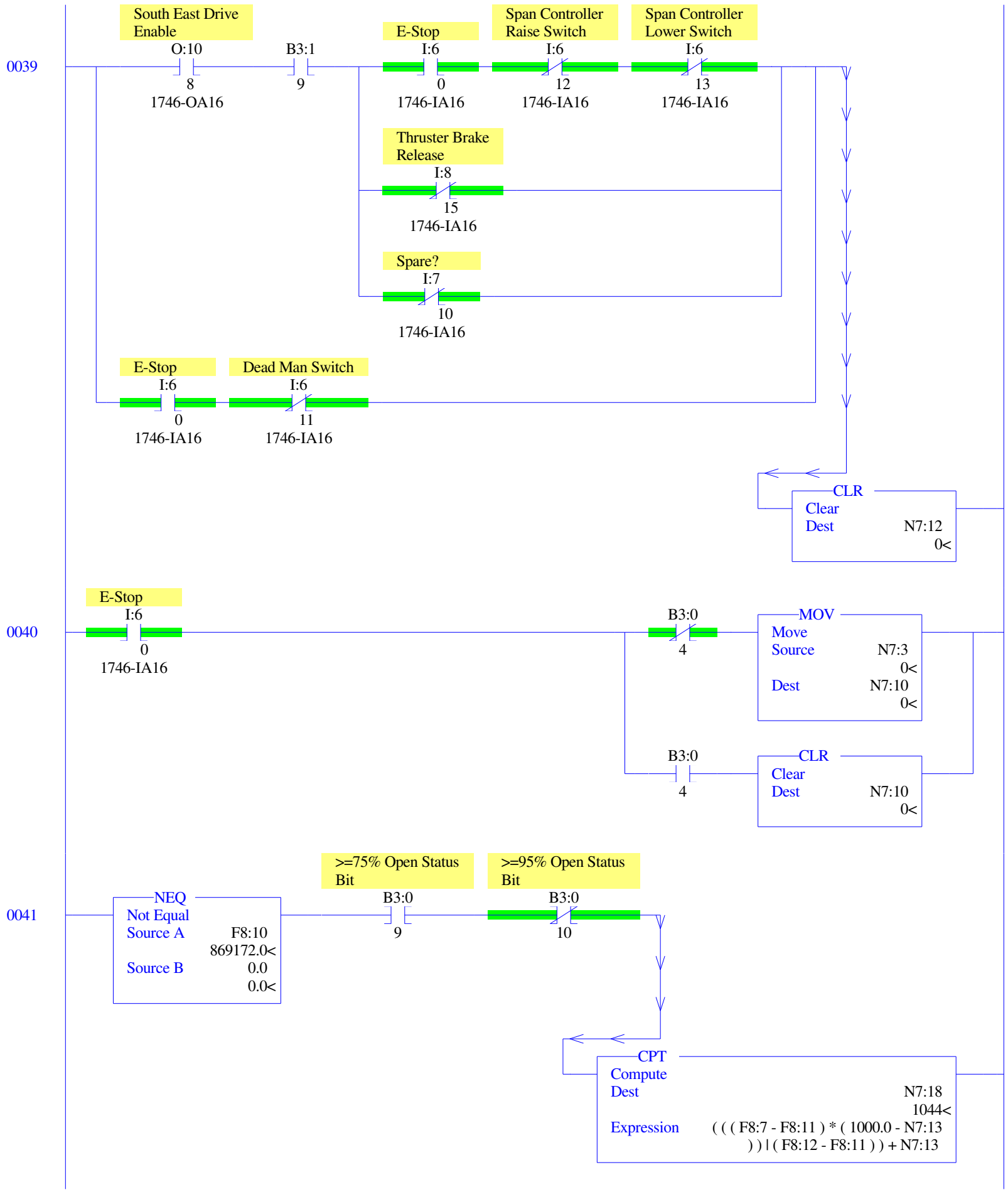

Parking Brake North East Release Command
O:10
2
1746-OA16
Thruster Brake Release
I:8
15
1746-IA16
TON
Timer On Delay
Timer T4:7
Time Base 0.01
Preset 200<
Accum 0<
EN
DN
0018
T4:7
DN
B3:1
6
0019
Spare?
O:10
3
1746-OA16
Spare?
I:7
10
1746-IA16
TON
Timer On Delay
Timer T4:15
Time Base 0.01
Preset 200<
Accum 0<
EN
DN
0020
T4:15
DN
B3:2
3
0021
Thruster Brake Release
I:8
15
1746-IA16
TOF
Timer Off Delay
Timer T4:9
Time Base 0.01
Preset 100<
Accum 100<
EN
DN
0022
Spare?
I:7
10
1746-IA16
TOF
Timer Off Delay
Timer T4:16
Time Base 0.01
Preset 100<
Accum 100<
EN
DN
0023

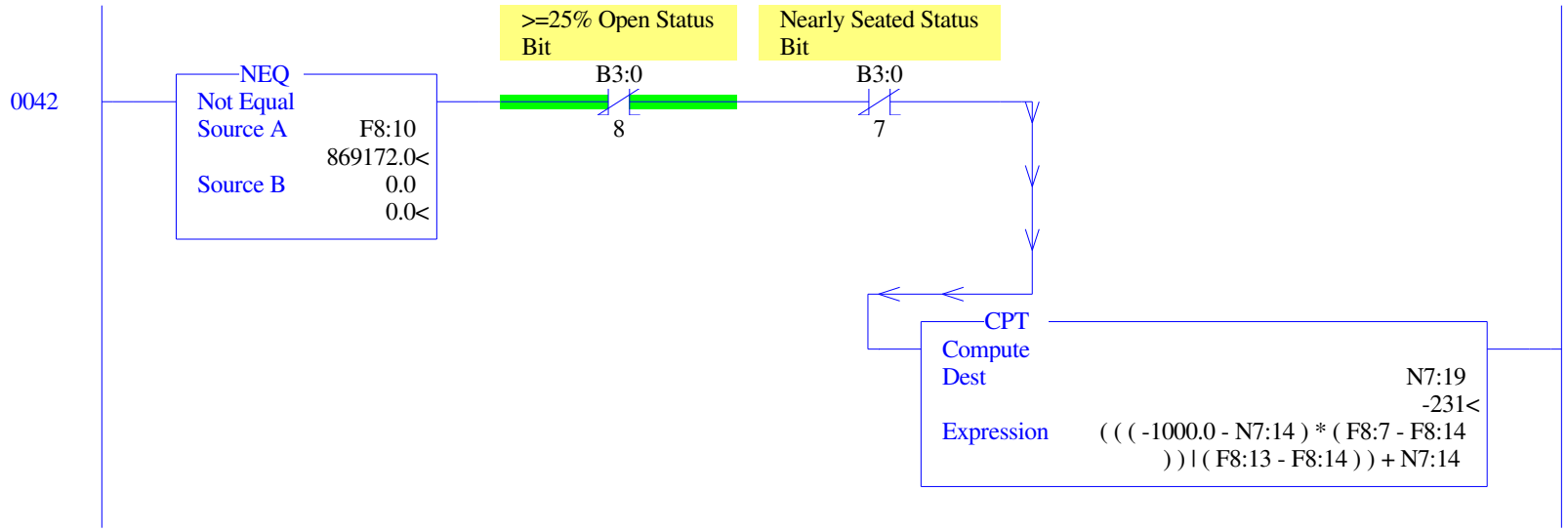

0024
E-Stop
I:6
0
1746-IA16
Control Power
I:6
1
1746-IA16
Radio Comm Fail Light
O:11
12
1746-OA16
End Lock Retracted (Remote Side)
N7:1
6
Dead Man Switch
I:6
11
1746-IA16
T4:9
DN
T4:16
DN
End Locks Retract Bypass Switch
I:7
3
1746-IA16
Drive Motor North East Remote
I:8
2
1746-IA16
B3:1
9
North East Drive Run Enable
O:10
5
1746-OA16
Drive Motor South East Remote
I:8
6
1746-IA16
B3:1
10
B3:1
9
B3:1
3
TON
Timer On Delay
Timer T4:3
Time Base 0.01
Preset 50<
Accum 0<
EN
DN
South East Drive Enable
T4:3
DN
O:10
8
1746-OA16
0025
E-Stop
I:6
0
1746-IA16
Control Power
I:6
1
1746-IA16
South East Drive Enable
O:10
8
1746-OA16
Drive Motor North East Running
I:8
0
1746-IA16
B3:1
9
South East Drive Normal
O:10
9
1746-OA16
CLR
Clear
Dest N7:12
0<

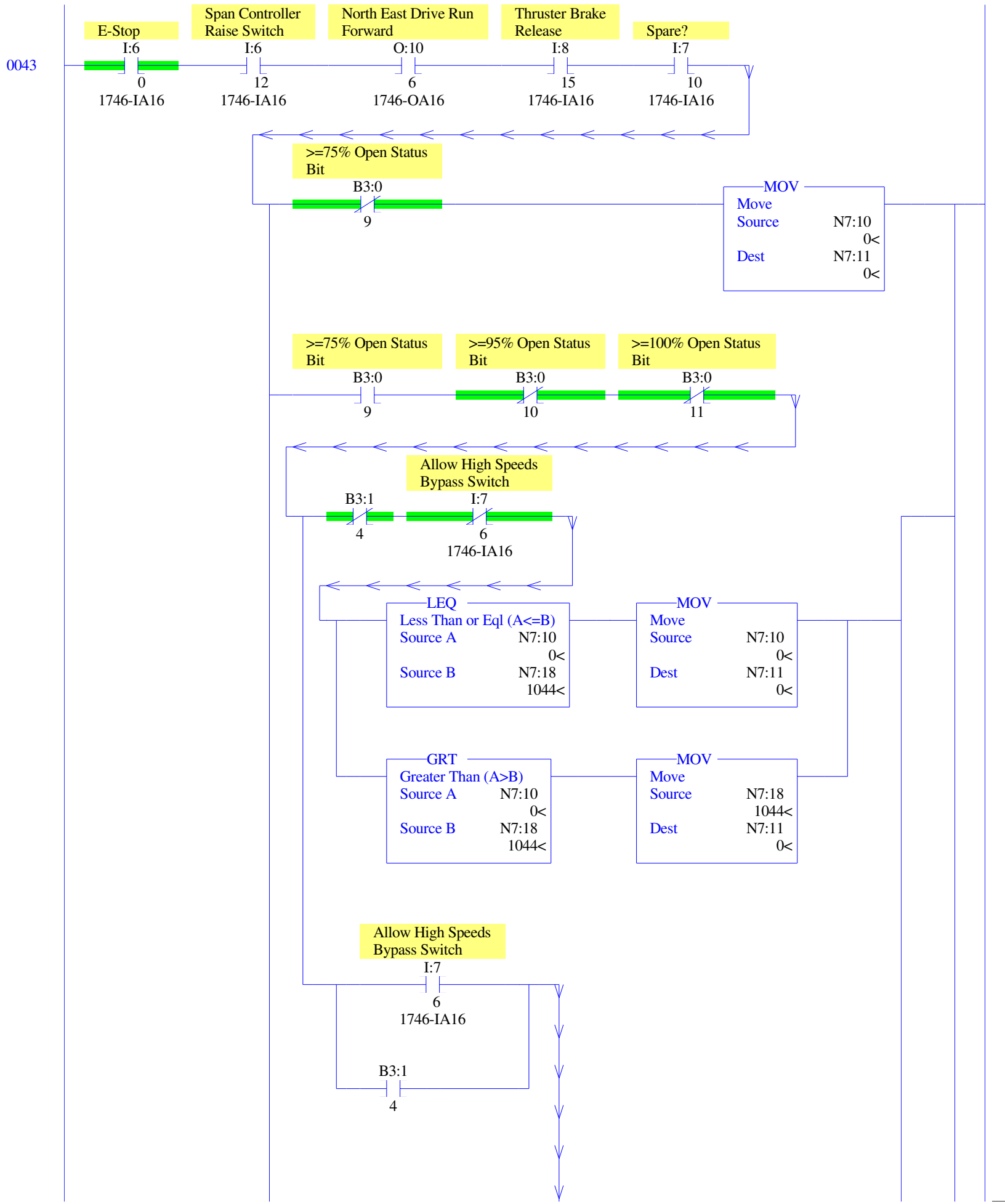

0026
E-Stop
I:6
0
1746-IA16
Control Power
I:6
1
1746-IA16
Dead Man Switch
I:6
11
1746-IA16
Span Controller Raise Switch
I:6
12
1746-IA16
Span Controller Raise Switch
I:6
12
1746-IA16
Span Controller Lower Switch
I:6
13
1746-IA16
North East Drive Run Enable
O:10
5
1746-OA16
B3:1
9
North East Drive Run Forward
O:10
6
1746-OA16
0027
E-Stop
I:6
0
1746-IA16
Control Power
I:6
1
1746-IA16
Dead Man Switch
I:6
11
1746-IA16
Span Controller Lower Switch
I:6
13
1746-IA16
North East Drive Run Enable
O:10
5
1746-OA16
B3:1
9
North East Drive Run Reverse
O:10
7
1746-OA16
0028
Drive Motor North East Fault Reset
I:8
3
1746-IA16
North East Drive Run Forward
O:10
6
1746-OA16
Drive Motor North East Running
I:8
0
1746-IA16
North East Drive Run Reverse
O:10
7
1746-OA16
T4:1
DN
TON
Timer On Delay
Timer T4:1
Time Base 1.0
Preset 5<
Accum 0<
EN
DN

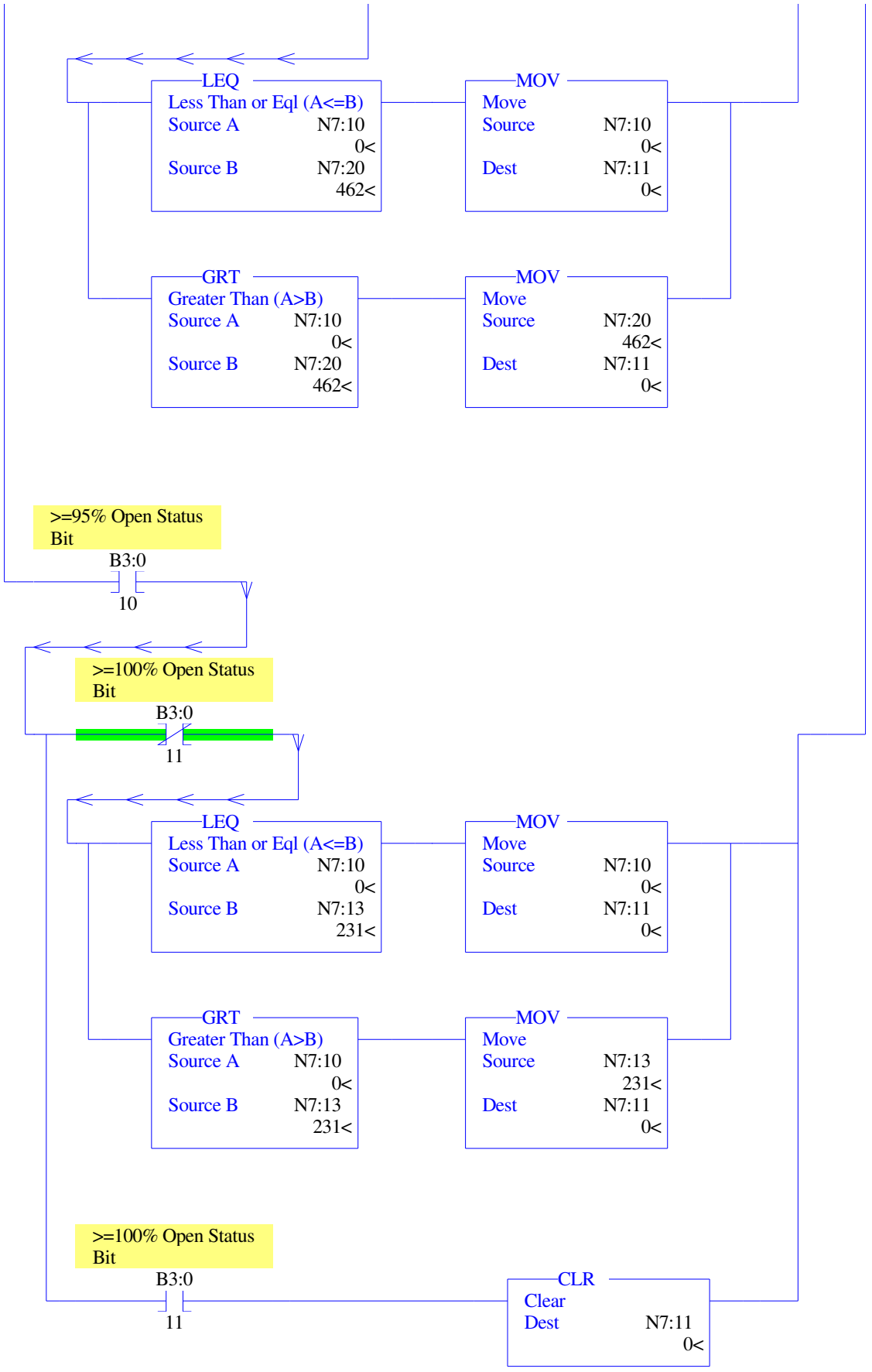

Drive Motor North East Fail
I:8
1
1746-IA16
T4:1
DN
B3:1
9
0029
B3:1
9
0030
B3:1
9
B3:1
2
B3:1
L
3
Drive Motor North East Fault Reset
I:8
3
1746-IA16
0031
B3:1
U
3
Drive Motor South East Fault Reset
I:8
7
1746-IA16
South East Drive Normal
O:10
9
1746-OA16
Drive Motor South East Running
I:8
4
1746-IA16
T4:2
DN
0032
TON
Timer On Delay
Timer T4:2
Time Base 1.0
Preset 5<
Accum 0<
EN
DN
Drive Motor South East Fail
I:8
5
1746-IA16
T4:2
DN
B3:1
10
0033
E-Stop
I:6
0
1746-IA16
Span Controller Lower Switch
I:6
13
1746-IA16
Rotary Cam Fully Seated
I:8
8
1746-IA16
Span Fully Seated Bypass Switch
I:7
5
1746-IA16
0034
CTU
Count Up
Counter C5:0
Preset 50<
Accum 3<
CU
DN

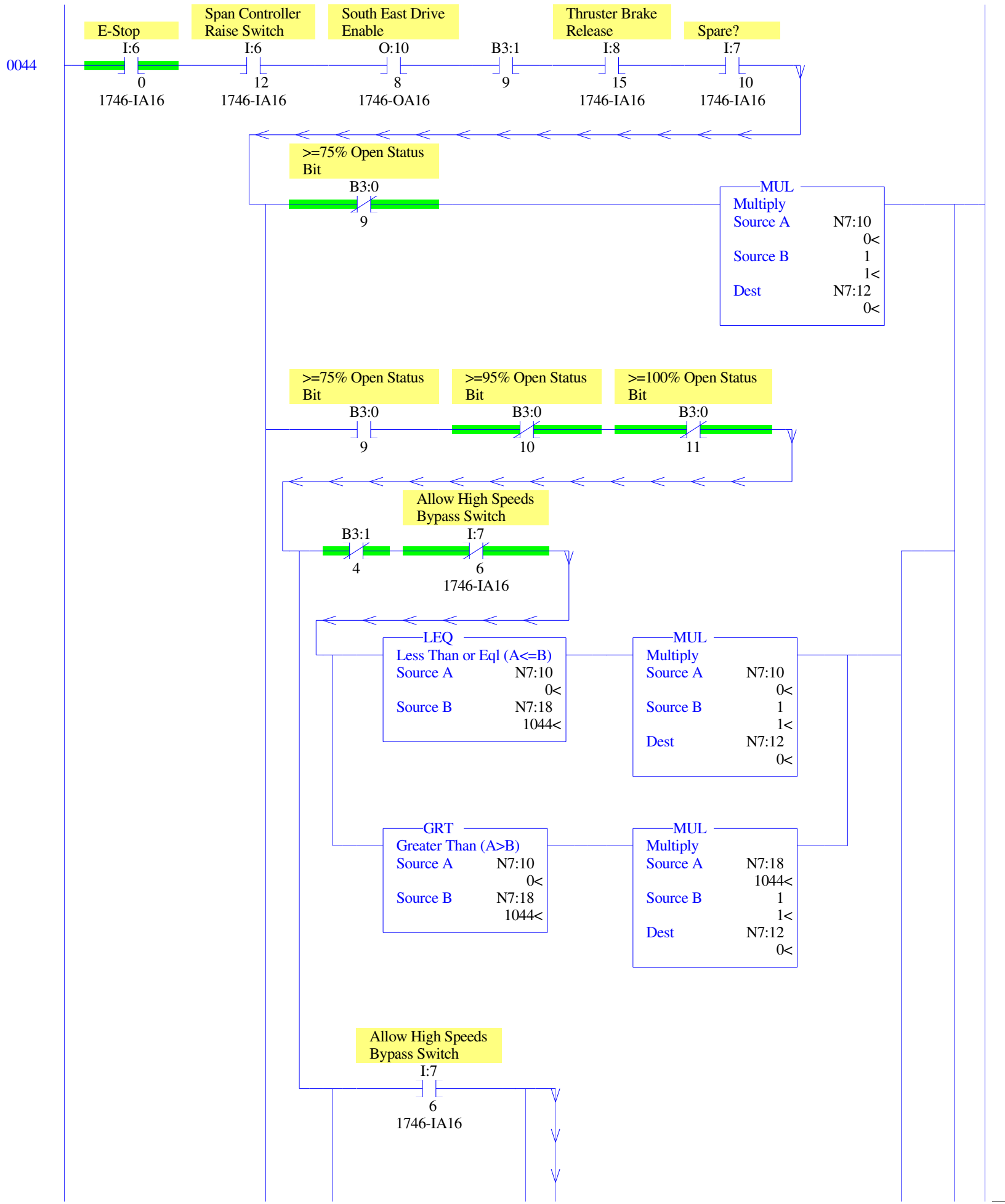

0035
E-Stop
I:6
0
1746-IA16
Span Controller Raise Switch
I:6
12
1746-IA16
C5:0
RES
E-Stop
I:6
0
1746-IA16
0036
E-Stop
I:6
0
1746-IA16
Span Controller Raise Switch
I:6
12
1746-IA16
>=75% Open Status Bit
B3:0
9
CTU
Count Up
Counter C5:1
Preset 50<
Accum 0<
CU
DN
0037
E-Stop
I:6
0
1746-IA16
Span Controller Lower Switch
I:6
13
1746-IA16
C5:1
RES
E-Stop
I:6
0
1746-IA16
0038
North East Drive Run Enable
O:10
5
1746-OA16
E-Stop
I:6
0
1746-IA16
Span Controller Raise Switch
I:6
12
1746-IA16
Span Controller Lower Switch
I:6
13
1746-IA16
Thruster Brake Release
I:8
15
1746-IA16
Spare?
I:7
10
1746-IA16
E-Stop
I:6
0
1746-IA16
Dead Man Switch
I:6
11
1746-IA16
CLR
Clear
Dest N7:11
0<

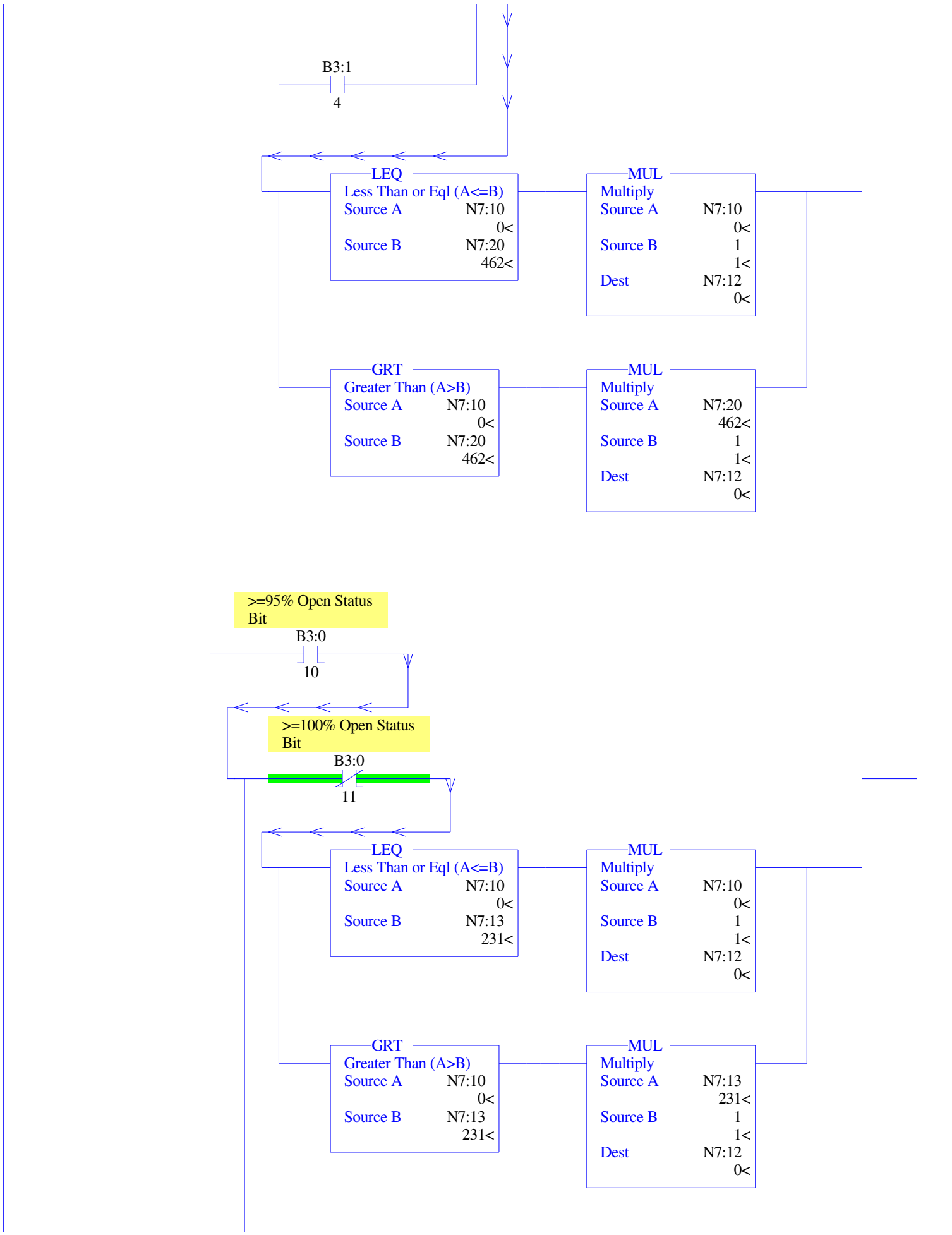

0039
South East Drive Enable
O:10
8
1746-OA16
B3:1
9
E-Stop
I:6
0
1746-IA16
Span Controller Raise Switch
I:6
12
1746-IA16
Span Controller Lower Switch
I:6
13
1746-IA16
Thruster Brake Release
I:8
15
1746-IA16
Spare?
I:7
10
1746-IA16
E-Stop
I:6
0
1746-IA16
Dead Man Switch
I:6
11
1746-IA16
CLR
Clear
Dest N7:12
0<
0040
E-Stop
I:6
0
1746-IA16
B3:0
4
MOV
Move
Source N7:3
0<
Dest N7:10
0<
B3:0
4
CLR
Clear
Dest N7:10
0<
0041
NEQ
Not Equal
Source A F8:10
869172.0<
Source B 0.0
0.0<
>=75% Open Status Bit
B3:0
9
>=95% Open Status Bit
B3:0
10
CPT
Compute
Dest N7:18
1044<
Expression ( ( ( F8:7 - F8:11 ) * ( 1000.0 - N7:13 ) ) / ( F8:12 - F8:11 ) ) + N7:13

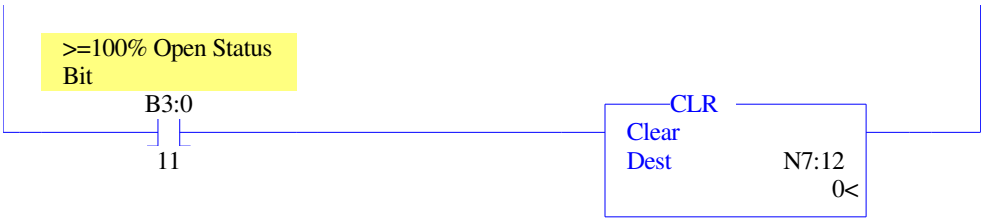

0042
NEQ
Not Equal
Source A
F8:10
869172.0<
Source B
0.0
0.0<
>=25% Open Status Bit
B3:0
8
Nearly Seated Status Bit
B3:0
7
CPT
Compute
Dest
N7:19
-231<
Expression
( ( ( -1000.0 - N7:14 ) * ( F8:7 - F8:14 ) ) / ( F8:13 - F8:14 ) ) + N7:14

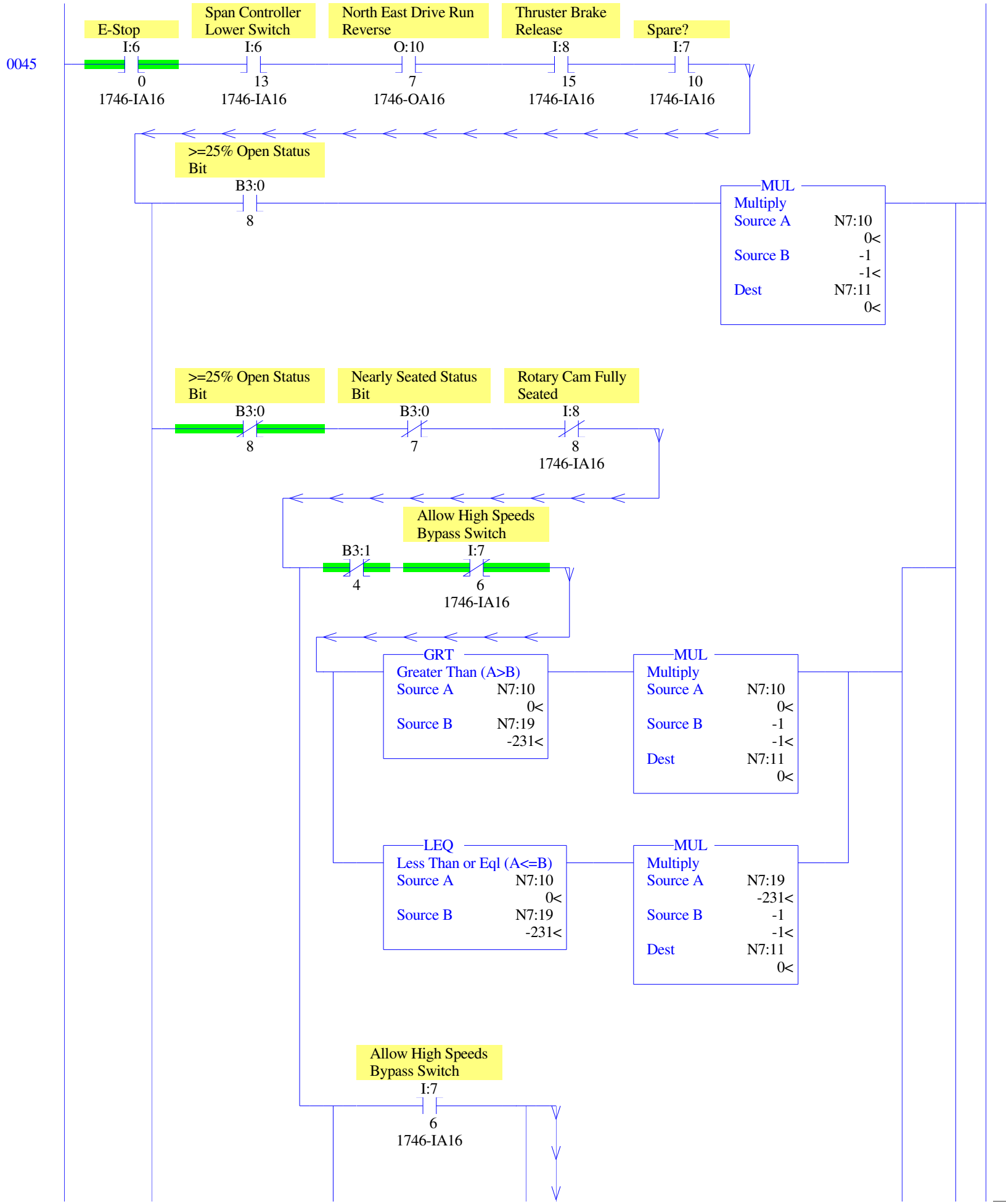

0043
E-Stop
I:6
0
1746-IA16
Span Controller Raise Switch
I:6
12
1746-IA16
North East Drive Run Forward
O:10
6
1746-OA16
Thruster Brake Release
I:8
15
1746-IA16
Spare?
I:7
10
1746-IA16
>=75% Open Status Bit
B3:0
9
MOV
Move
Source N7:10 0<
Dest N7:11 0<
>=75% Open Status Bit
B3:0
9
>=95% Open Status Bit
B3:0
10
>=100% Open Status Bit
B3:0
11
Allow High Speeds Bypass Switch
B3:1
4
I:7
6
1746-IA16
LEQ
Less Than or Eql (A<=B)
Source A N7:10 0<
Source B N7:18 1044<
MOV
Move
Source N7:10 0<
Dest N7:11 0<
GRT
Greater Than (A>B)
Source A N7:10 0<
Source B N7:18 1044<
MOV
Move
Source N7:18 1044<
Dest N7:11 0<
Allow High Speeds Bypass Switch
I:7
6
1746-IA16
B3:1
4

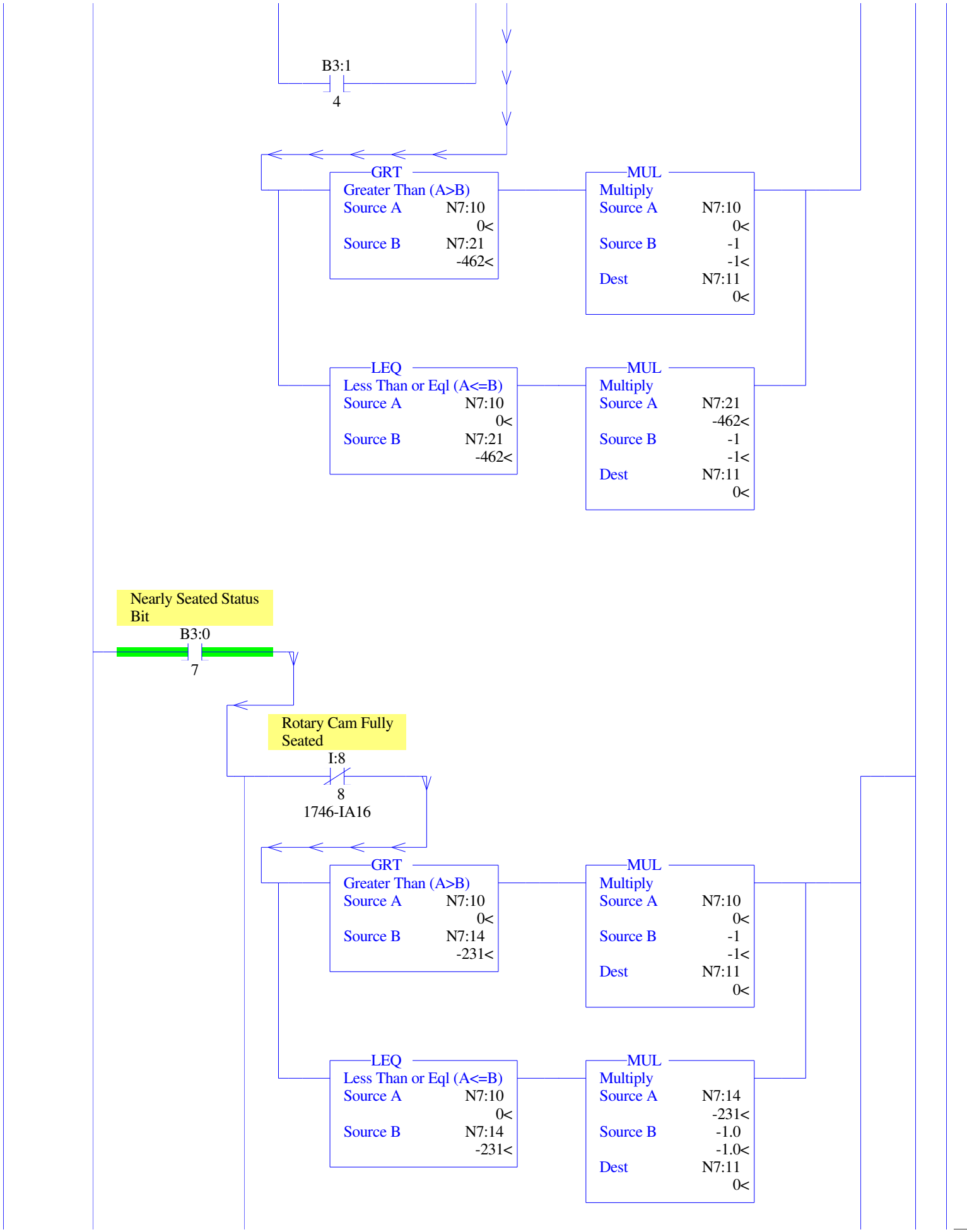

LEQ
Less Than or Eql (A<=B)
Source A N7:10 0<
Source B N7:20 462<
MOV
Move
Source N7:10 0<
Dest N7:11 0<
GRT
Greater Than (A>B)
Source A N7:10 0<
Source B N7:20 462<
MOV
Move
Source N7:20 462<
Dest N7:11 0<
>=95% Open Status Bit
B3:0
10
>=100% Open Status Bit
B3:0
11
LEQ
Less Than or Eql (A<=B)
Source A N7:10 0<
Source B N7:13 231<
MOV
Move
Source N7:10 0<
Dest N7:11 0<
GRT
Greater Than (A>B)
Source A N7:10 0<
Source B N7:13 231<
MOV
Move
Source N7:13 231<
Dest N7:11 0<
>=100% Open Status Bit
B3:0
11
CLR
Clear
Dest N7:11 0<

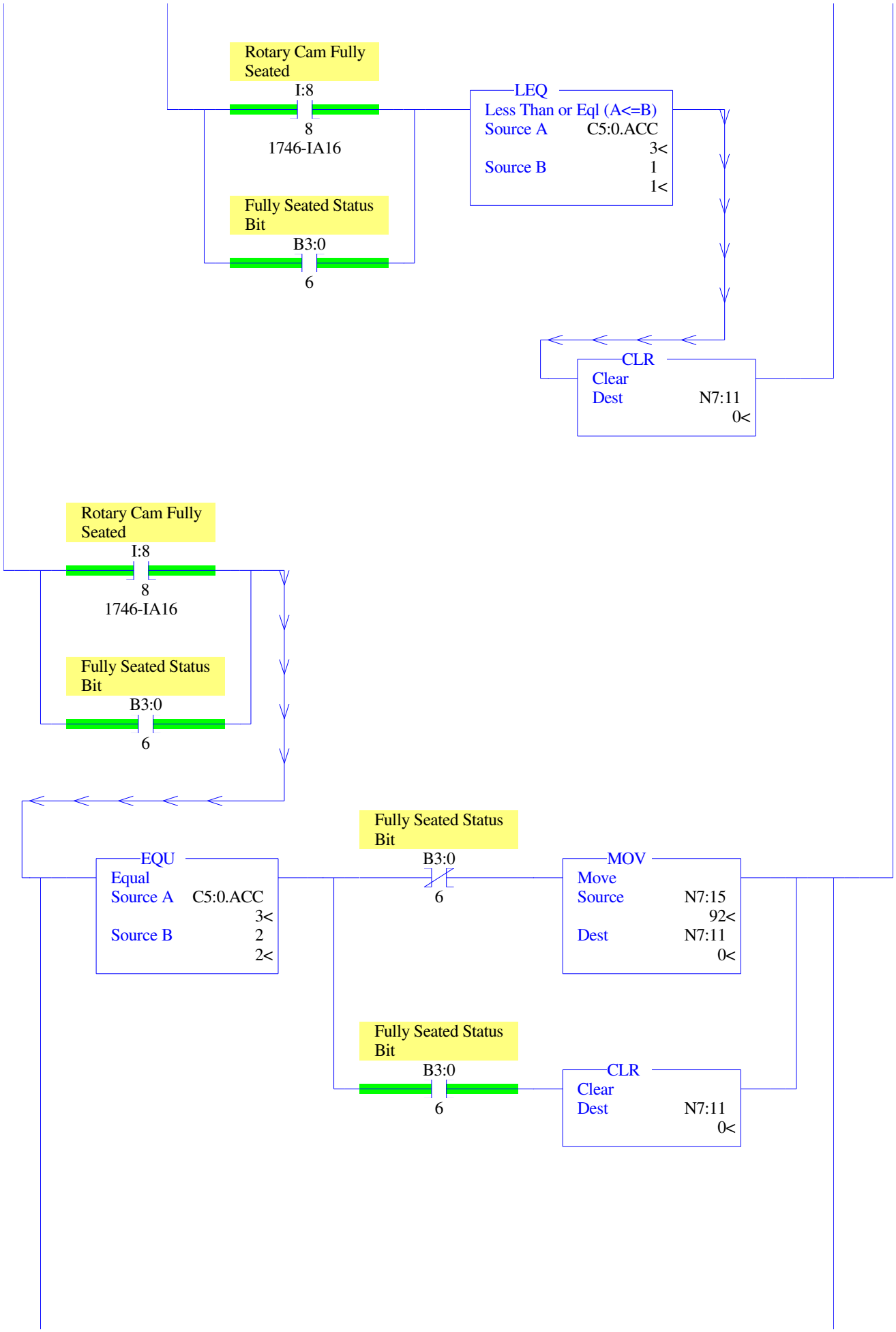

0044
E-Stop
I:6
0
1746-IA16
Span Controller Raise Switch
I:6
12
1746-IA16
South East Drive Enable
O:10
8
1746-OA16
B3:1
9
Thruster Brake Release
I:8
15
1746-IA16
Spare?
I:7
10
1746-IA16
>=75% Open Status Bit
B3:0
9
MUL
Multiply
Source A N7:10 0<
Source B 1 1<
Dest N7:12 0<
>=75% Open Status Bit
B3:0
9
>=95% Open Status Bit
B3:0
10
>=100% Open Status Bit
B3:0
11
Allow High Speeds Bypass Switch
B3:1
4
I:7
6
1746-IA16
LEQ
Less Than or Eql (A<=B)
Source A N7:10 0<
Source B N7:18 1044<
MUL
Multiply
Source A N7:10 0<
Source B 1 1<
Dest N7:12 0<
GRT
Greater Than (A>B)
Source A N7:10 0<
Source B N7:18 1044<
MUL
Multiply
Source A N7:18 1044<
Source B 1 1<
Dest N7:12 0<
Allow High Speeds Bypass Switch
I:7
6
1746-IA16

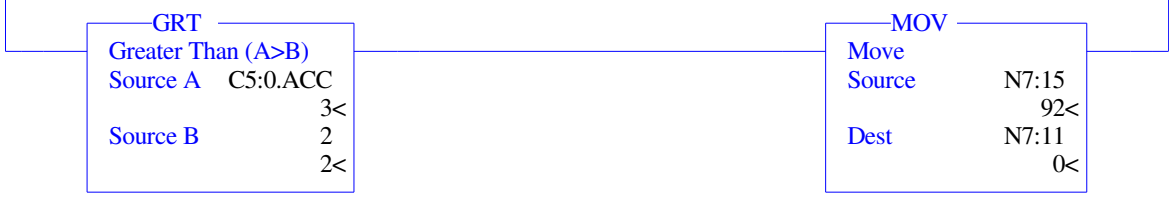

B3:1
4
LEQ
Less Than or Eql (A<=B)
Source A N7:10 0<
Source B N7:20 462<
MUL
Multiply
Source A N7:10 0<
Source B 1 1<
Dest N7:12 0<
GRT
Greater Than (A>B)
Source A N7:10 0<
Source B N7:20 462<
MUL
Multiply
Source A N7:20 462<
Source B 1 1<
Dest N7:12 0<
>=95% Open Status Bit
B3:0
10
>=100% Open Status Bit
B3:0
11
LEQ
Less Than or Eql (A<=B)
Source A N7:10 0<
Source B N7:13 231<
MUL
Multiply
Source A N7:10 0<
Source B 1 1<
Dest N7:12 0<
GRT
Greater Than (A>B)
Source A N7:10 0<
Source B N7:13 231<
MUL
Multiply
Source A N7:13 231<
Source B 1 1<
Dest N7:12 0<

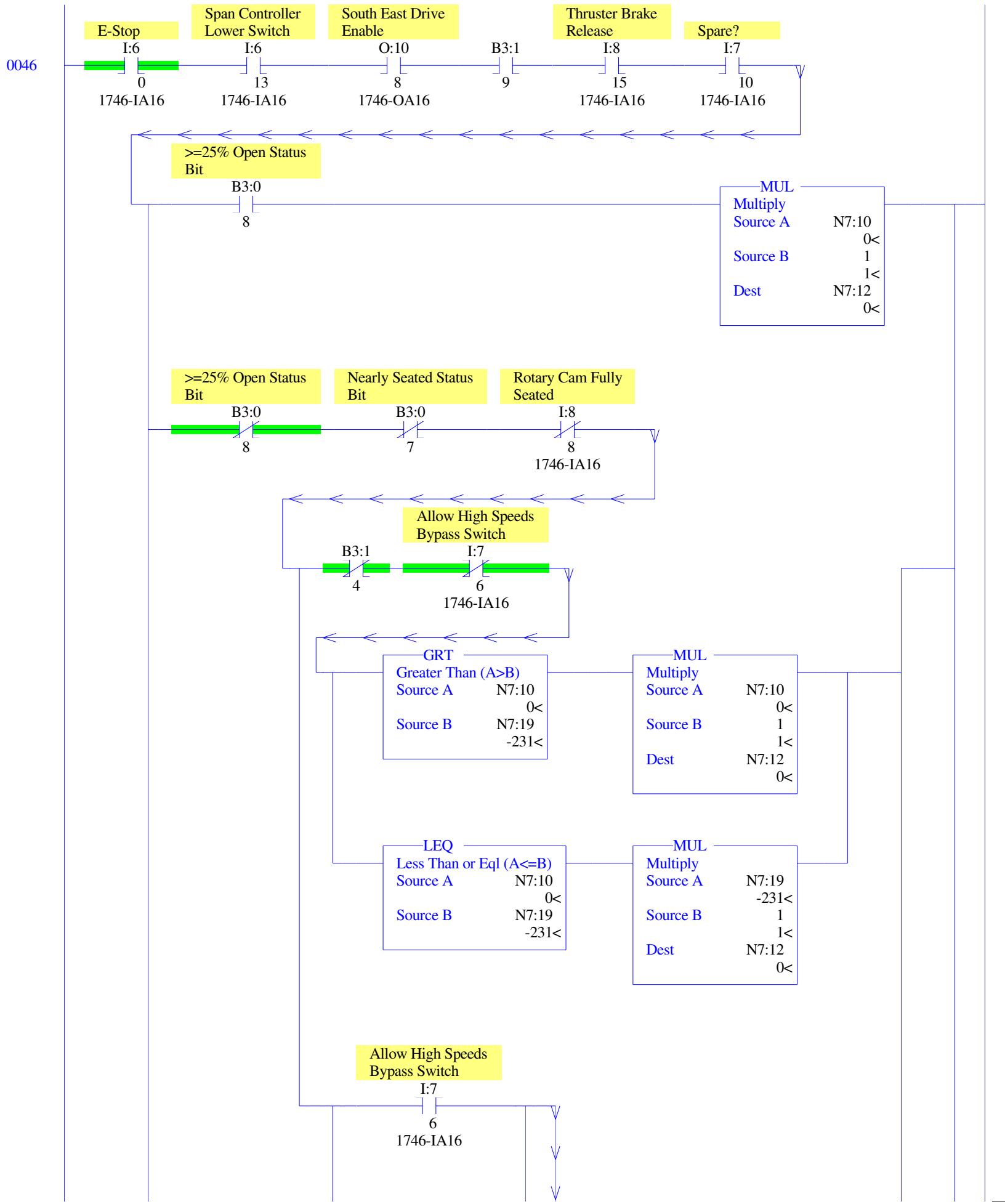

>=100% Open Status Bit
B3:0
11
CLR
Clear
Dest
N7:12
0<

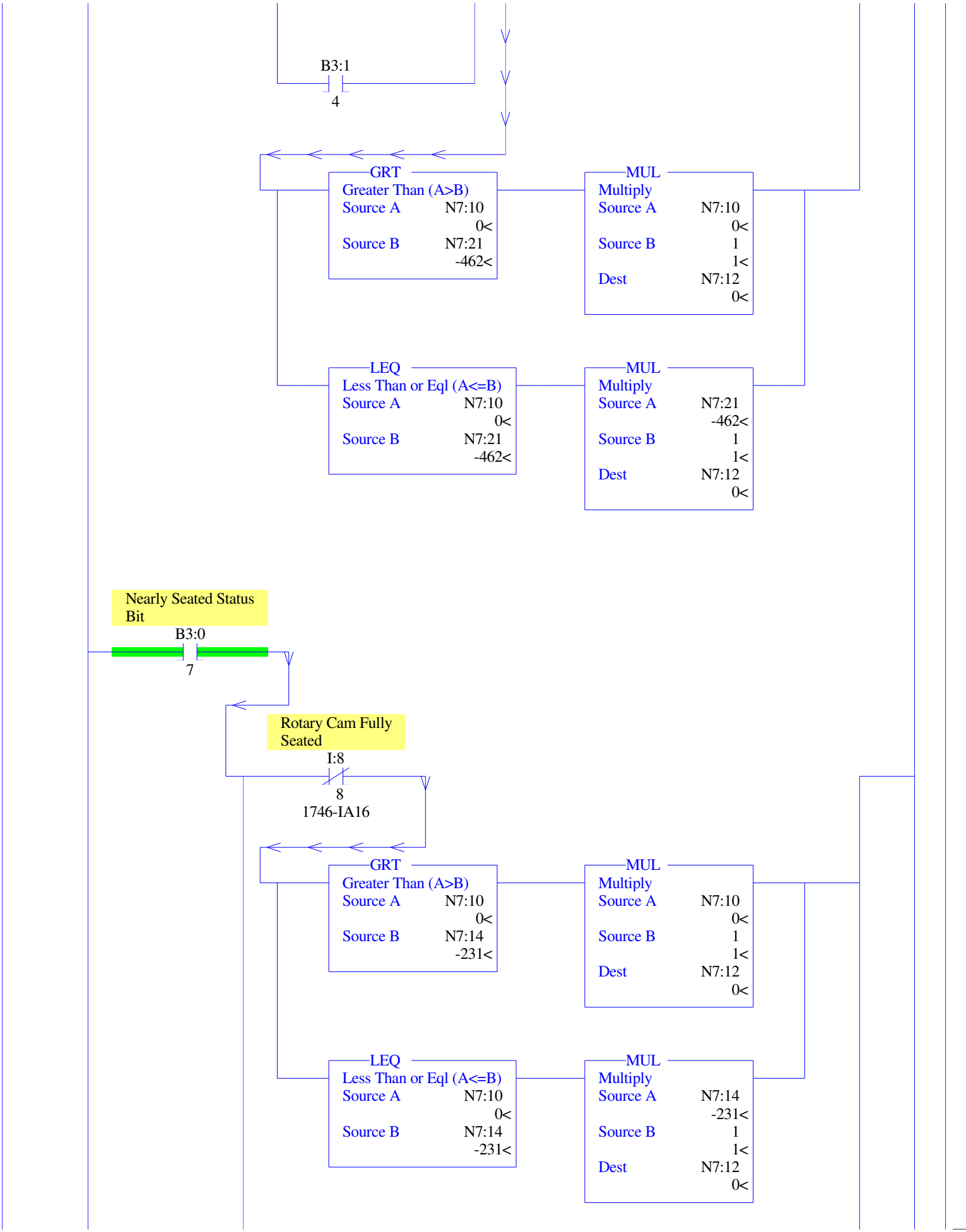

0045
E-Stop
I:6
0
1746-IA16
Span Controller Lower Switch
I:6
13
1746-IA16
North East Drive Run Reverse
O:10
7
1746-OA16
Thruster Brake Release
I:8
15
1746-IA16
Spare?
I:7
10
1746-IA16
>=25% Open Status Bit
B3:0
8
MUL
Multiply
Source A N7:10 0<
Source B -1 -1<
Dest N7:11 0<
>=25% Open Status Bit
B3:0
8
Nearly Seated Status Bit
B3:0
7
Rotary Cam Fully Seated
I:8
8
1746-IA16
Allow High Speeds Bypass Switch
B3:1
4
I:7
6
1746-IA16
GRT
Greater Than (A>B)
Source A N7:10 0<
Source B N7:19 -231<
MUL
Multiply
Source A N7:10 0<
Source B -1 -1<
Dest N7:11 0<
LEQ
Less Than or Eql (A<=B)
Source A N7:10 0<
Source B N7:19 -231<
MUL
Multiply
Source A N7:19 -231<
Source B -1 -1<
Dest N7:11 0<
Allow High Speeds Bypass Switch
I:7
6
1746-IA16

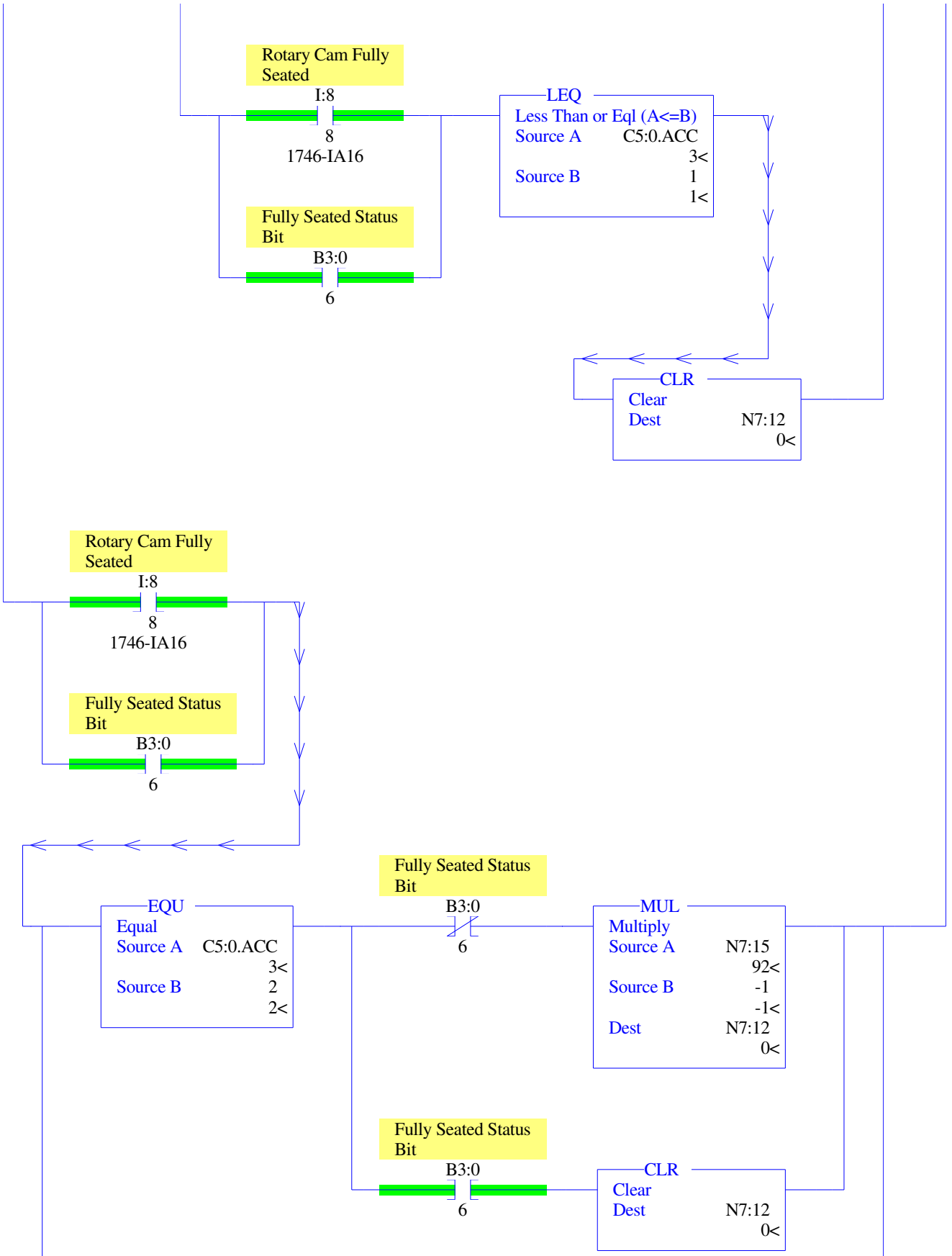

B3:1
4
GRT
Greater Than (A>B)
Source A N7:10
0<
Source B N7:21
-462<
MUL
Multiply
Source A N7:10
0<
Source B -1
-1<
Dest N7:11
0<
LEQ
Less Than or Eql (A<=B)
Source A N7:10
0<
Source B N7:21
-462<
MUL
Multiply
Source A N7:21
-462<
Source B -1
-1<
Dest N7:11
0<
Nearly Seated Status Bit
B3:0
7
Rotary Cam Fully Seated
I:8
8
1746-IA16
GRT
Greater Than (A>B)
Source A N7:10
0<
Source B N7:14
-231<
MUL
Multiply
Source A N7:10
0<
Source B -1
-1<
Dest N7:11
0<
LEQ
Less Than or Eql (A<=B)
Source A N7:10
0<
Source B N7:14
-231<
MUL
Multiply
Source A N7:14
-231<
Source B -1.0
-1.0<
Dest N7:11
0<

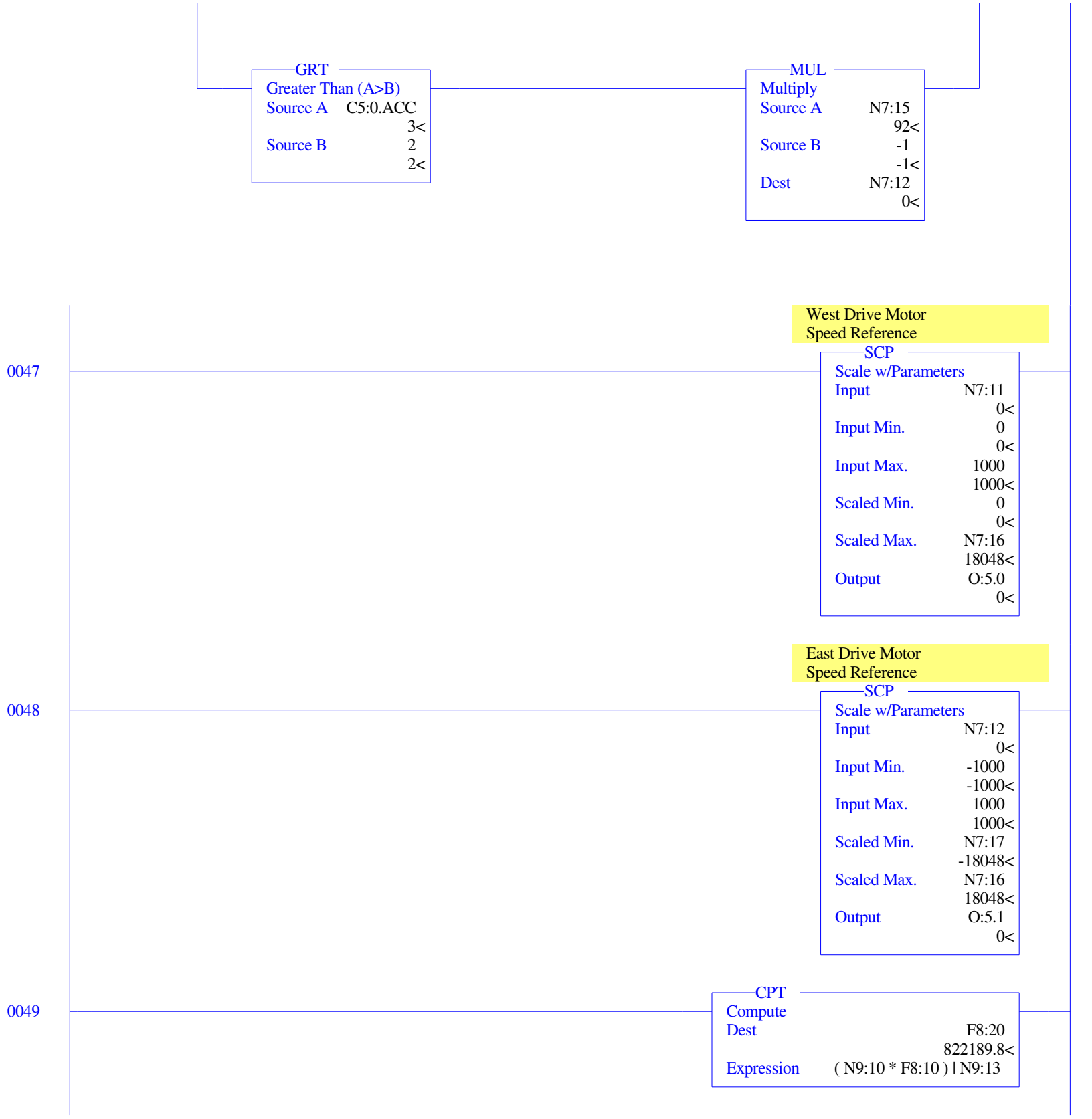

Rotary Cam Fully Seated
I:8
8
1746-IA16
Fully Seated Status Bit
B3:0
6
LEQ
Less Than or Eql (A<=B)
Source A C5:0.ACC
3<
Source B 1
1<
CLR
Clear
Dest N7:11
0<
Rotary Cam Fully Seated
I:8
8
1746-IA16
Fully Seated Status Bit
B3:0
6
Fully Seated Status Bit
B3:0
6
EQU
Equal
Source A C5:0.ACC
3<
Source B 2
2<
MOV
Move
Source N7:15
92<
Dest N7:11
0<
Fully Seated Status Bit
B3:0
6
CLR
Clear
Dest N7:11
0<

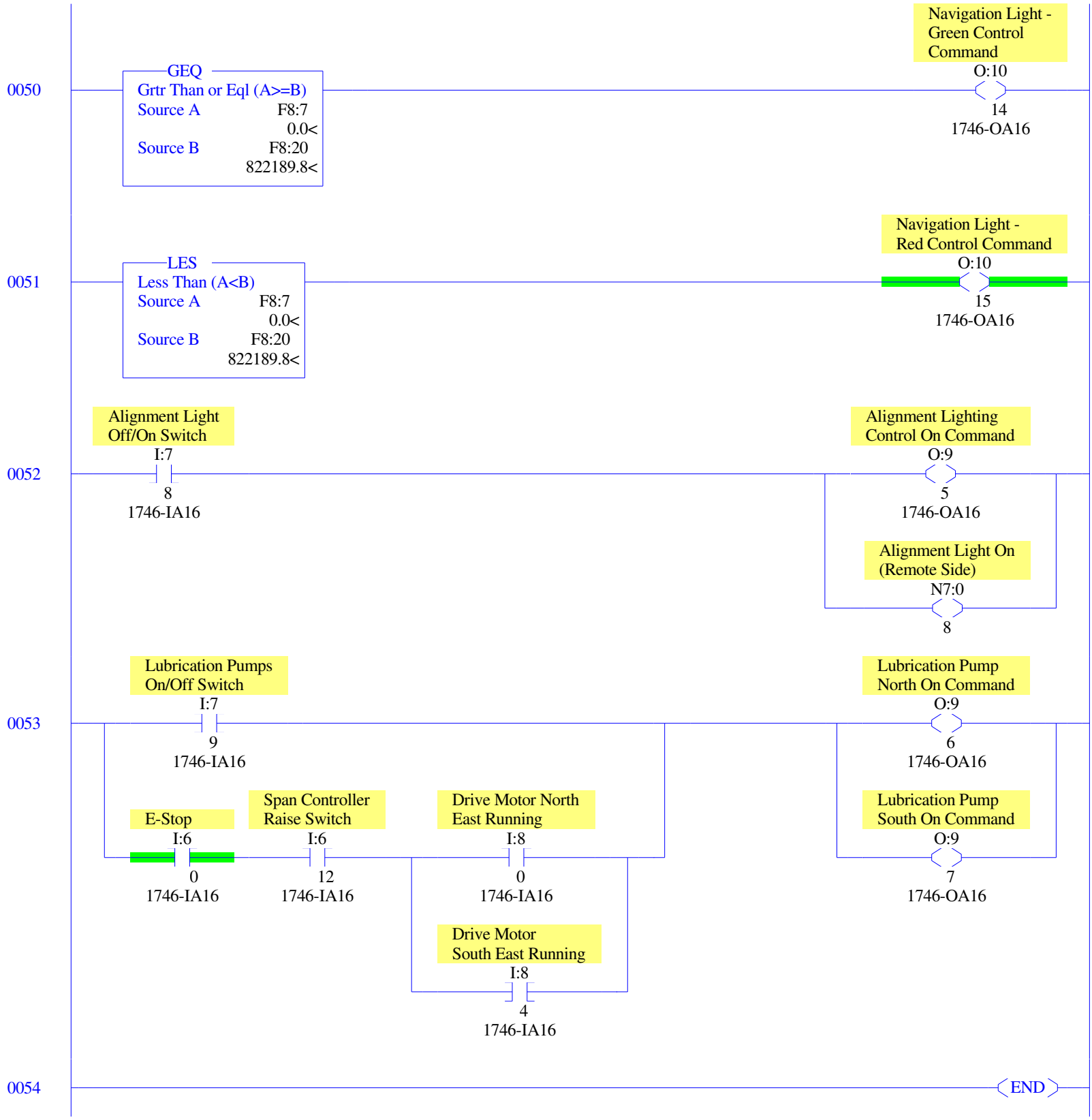

GRT
Greater Than (A>B)
Source A C5:0.ACC
3<
Source B 2
2<
MOV
Move
Source N7:15
92<
Dest N7:11
0<

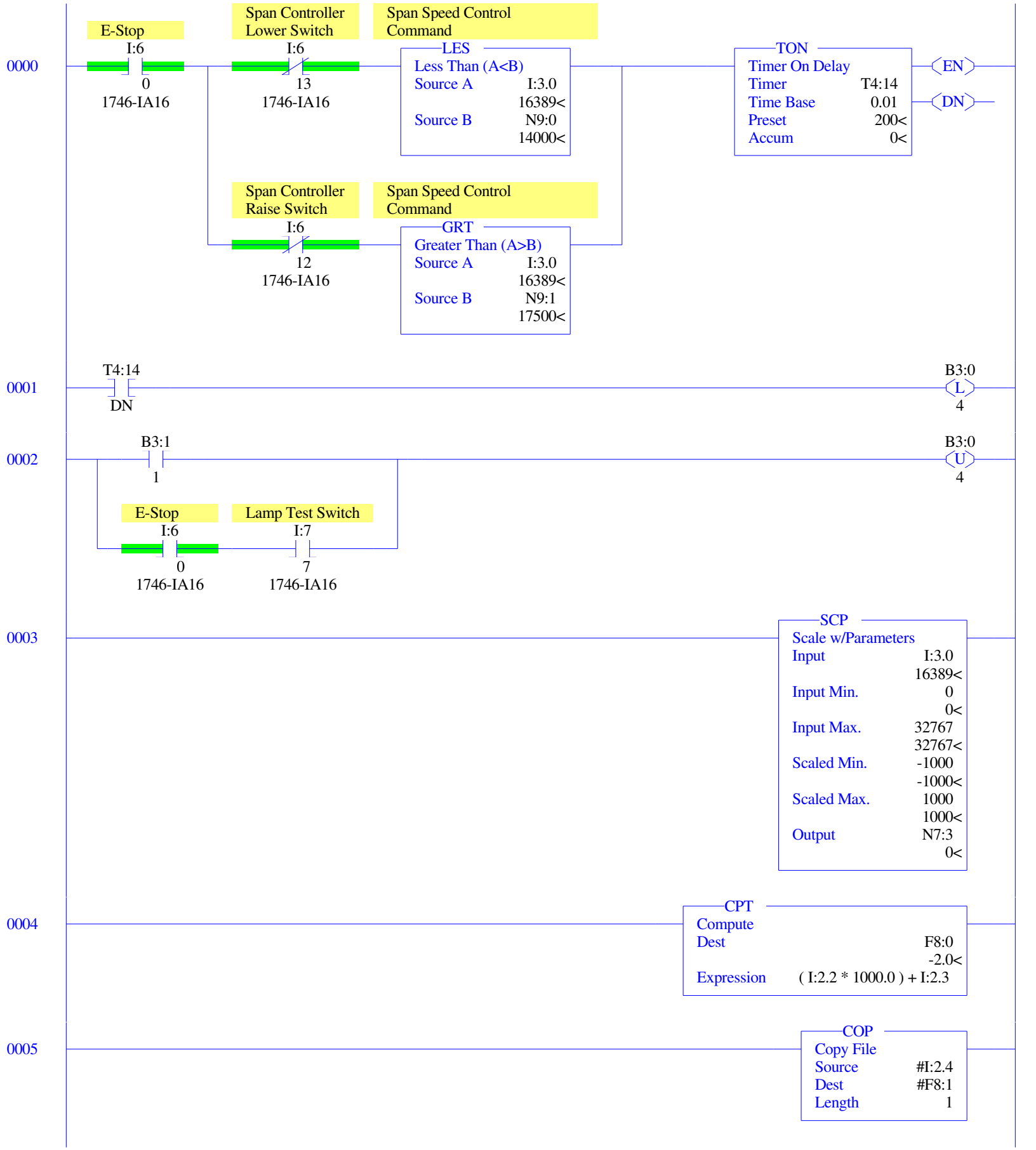

0046
E-Stop
I:6
0
1746-IA16
Span Controller Lower Switch
I:6
13
1746-IA16
South East Drive Enable
O:10
8
1746-OA16
B3:1
9
Thruster Brake Release
I:8
15
1746-IA16
Spare?
I:7
10
1746-IA16
>=25% Open Status Bit
B3:0
8
MUL
Multiply
Source A N7:10 0<
Source B 1 1<
Dest N7:12 0<
>=25% Open Status Bit
B3:0
8
Nearly Seated Status Bit
B3:0
7
Rotary Cam Fully Seated
I:8
8
1746-IA16
Allow High Speeds Bypass Switch
B3:1
4
I:7
6
1746-IA16
GRT
Greater Than (A>B)
Source A N7:10 0<
Source B N7:19 -231<
MUL
Multiply
Source A N7:10 0<
Source B 1 1<
Dest N7:12 0<
LEQ
Less Than or Eql (A<=B)
Source A N7:10 0<
Source B N7:19 -231<
MUL
Multiply
Source A N7:19 -231<
Source B 1 1<
Dest N7:12 0<
Allow High Speeds Bypass Switch
I:7
6
1746-IA16

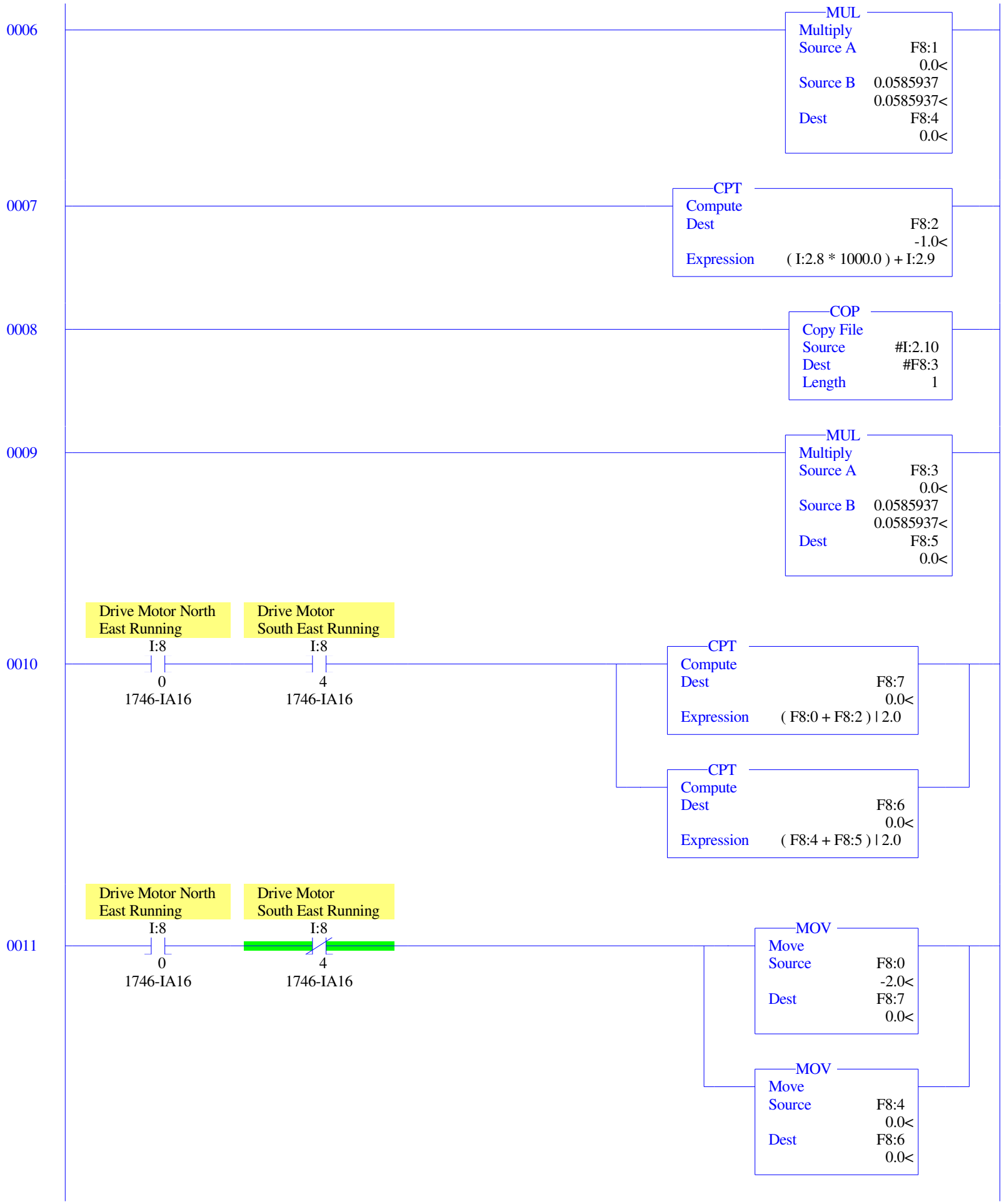

B3:1
4
GRT
Greater Than (A>B)
Source A N7:10
0<
Source B N7:21
-462<
MUL
Multiply
Source A N7:10
0<
Source B 1
1<
Dest N7:12
0<
LEQ
Less Than or Eql (A<=B)
Source A N7:10
0<
Source B N7:21
-462<
MUL
Multiply
Source A N7:21
-462<
Source B 1
1<
Dest N7:12
0<
Nearly Seated Status Bit
B3:0
7
Rotary Cam Fully Seated
I:8
8
1746-IA16
GRT
Greater Than (A>B)
Source A N7:10
0<
Source B N7:14
-231<
MUL
Multiply
Source A N7:10
0<
Source B 1
1<
Dest N7:12
0<
LEQ
Less Than or Eql (A<=B)
Source A N7:10
0<
Source B N7:14
-231<
MUL
Multiply
Source A N7:14
-231<
Source B 1
1<
Dest N7:12
0<

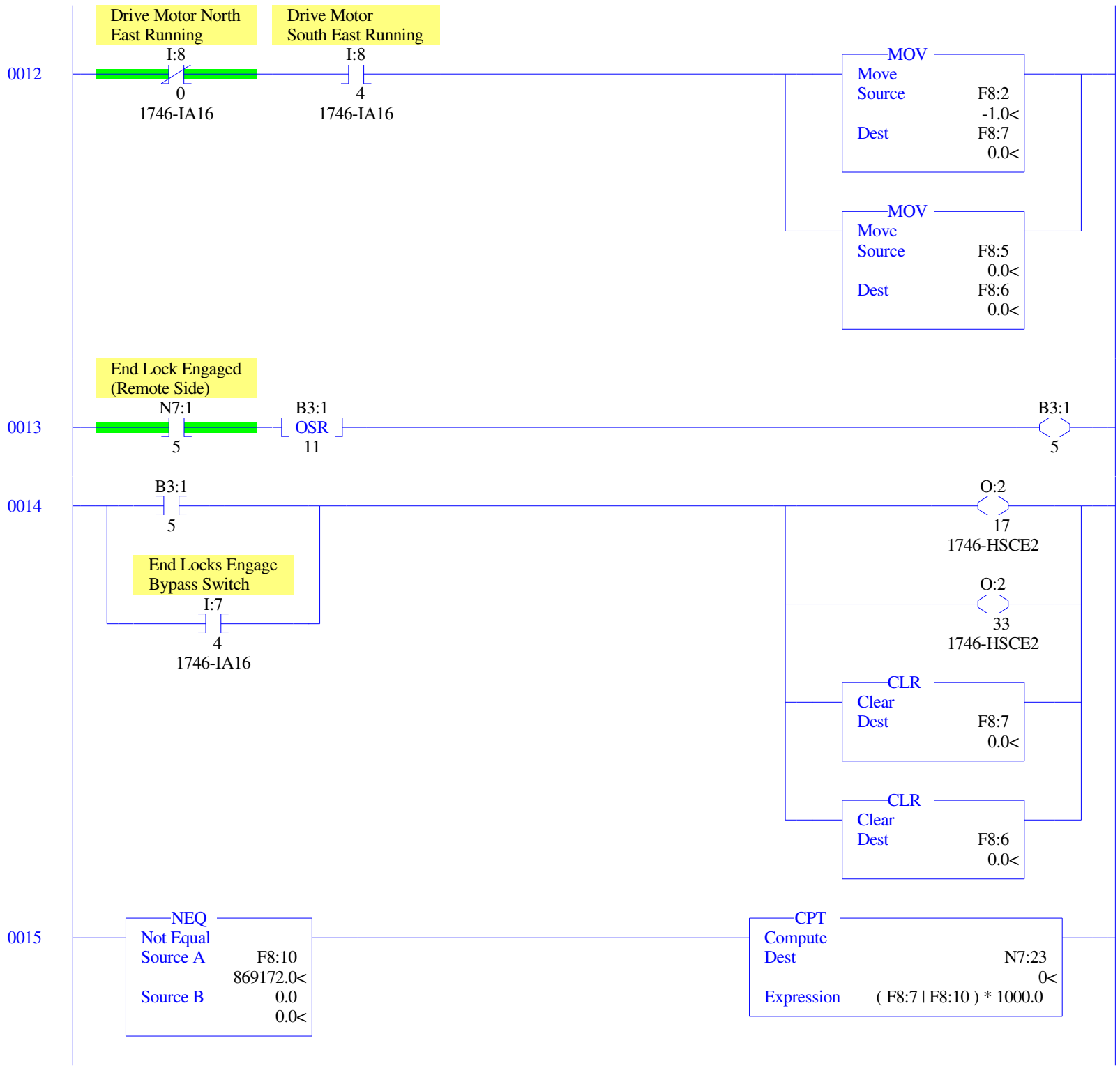

Rotary Cam Fully Seated
I:8
8
1746-IA16
Fully Seated Status Bit
B3:0
6
LEQ
Less Than or Eql (A<=B)
Source A C5:0.ACC
3<
Source B 1
1<
CLR
Clear
Dest N7:12
0<
Rotary Cam Fully Seated
I:8
8
1746-IA16
Fully Seated Status Bit
B3:0
6
EQU
Equal
Source A C5:0.ACC
3<
Source B 2
2<
Fully Seated Status Bit
B3:0
6
MUL
Multiply
Source A N7:15
92<
Source B -1
-1<
Dest N7:12
0<
Fully Seated Status Bit
B3:0
6
CLR
Clear
Dest N7:12
0<

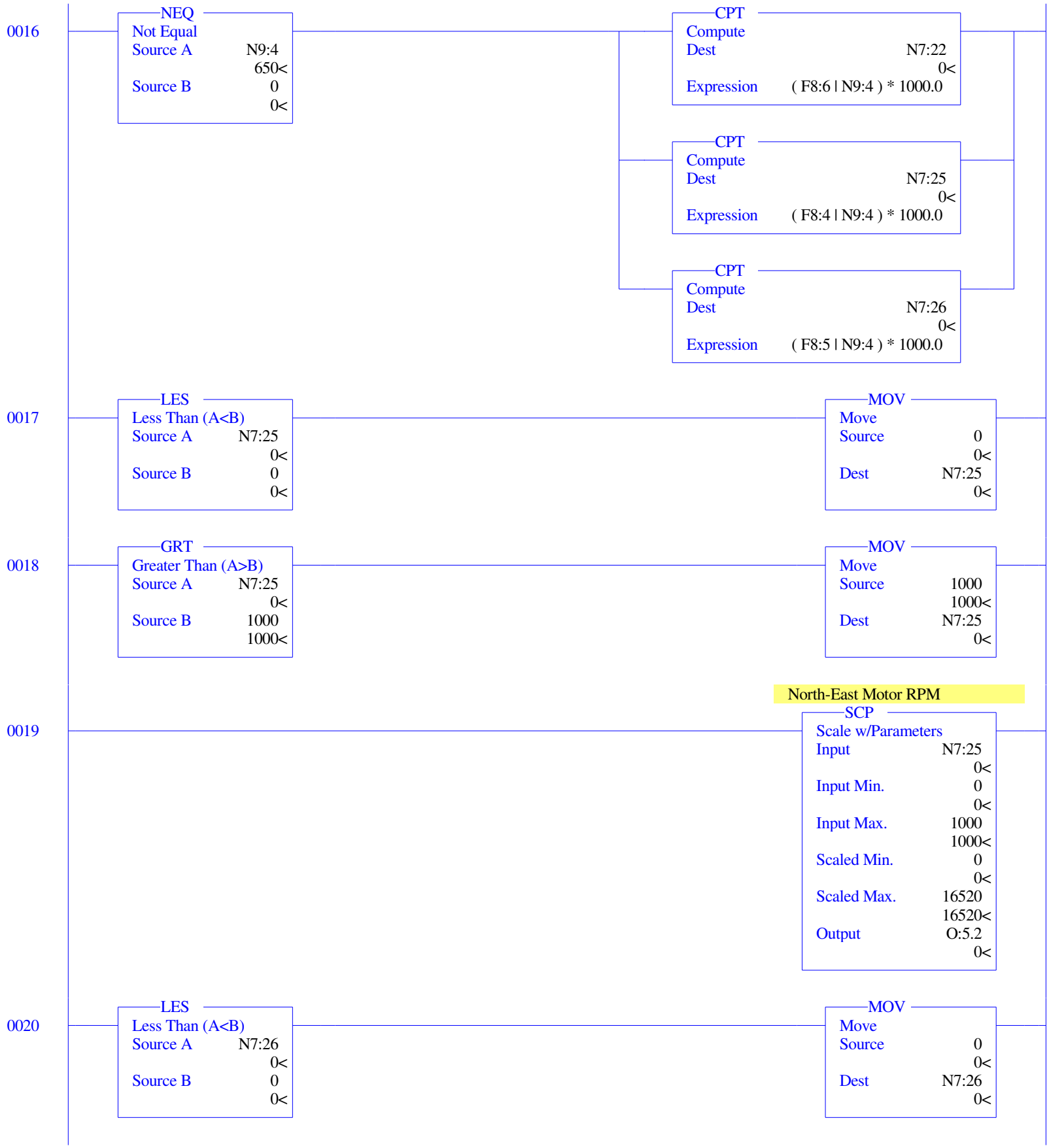

GRT
Greater Than (A>B)
Source A C5:0.ACC
3<
Source B 2
2<
MUL
Multiply
Source A N7:15
92<
Source B -1
-1<
Dest N7:12
0<
West Drive Motor
Speed Reference
0047
SCP
Scale w/Parameters
Input N7:11
0<
Input Min. 0
0<
Input Max. 1000
1000<
Scaled Min. 0
0<
Scaled Max. N7:16
18048<
Output O:5.0
0<
East Drive Motor
Speed Reference
0048
SCP
Scale w/Parameters
Input N7:12
0<
Input Min. -1000
-1000<
Input Max. 1000
1000<
Scaled Min. N7:17
-18048<
Scaled Max. N7:16
18048<
Output O:5.1
0<
0049
CPT
Compute
Dest F8:20
822189.8<
Expression ( N9:10 * F8:10 ) | N9:13

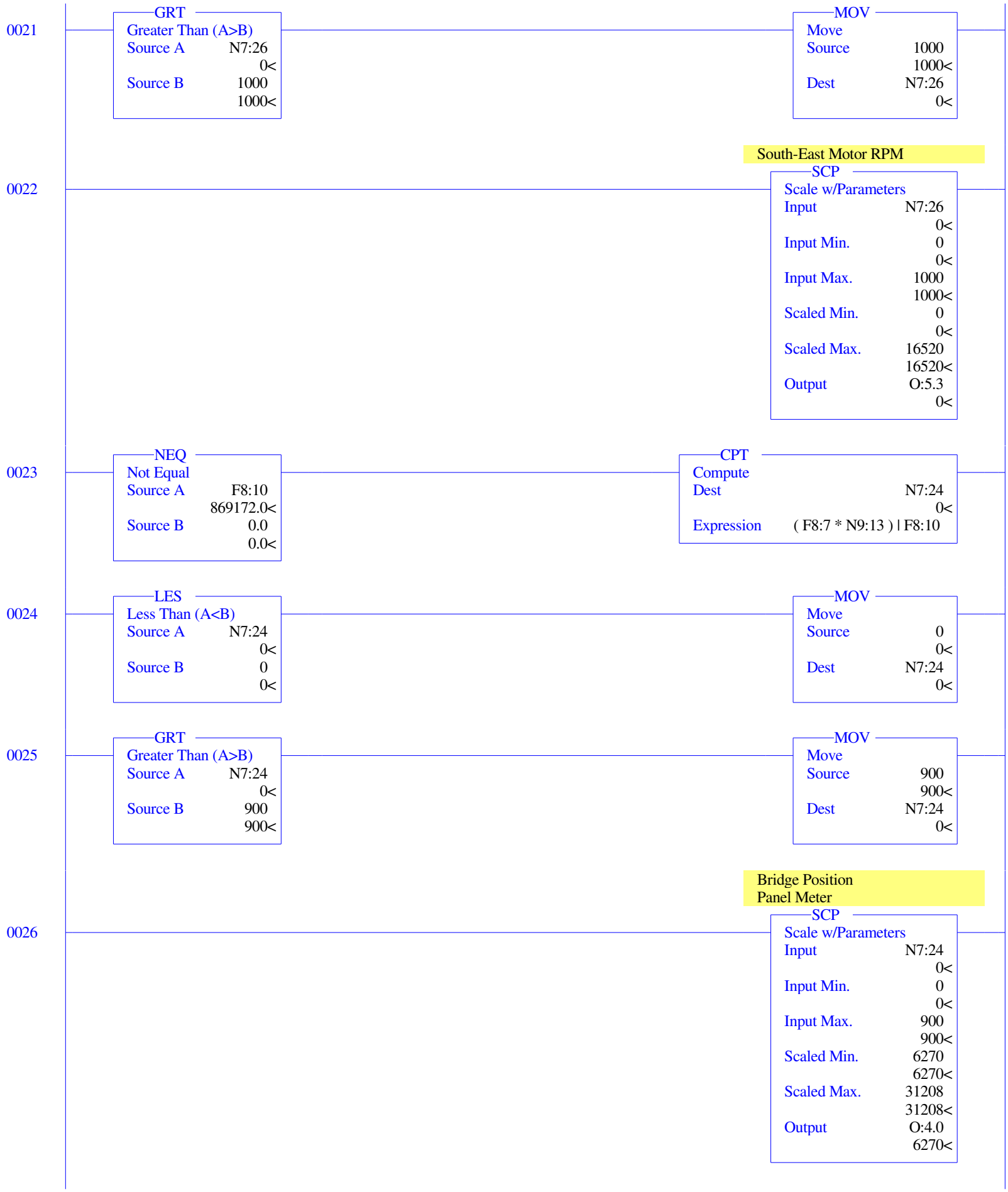

0050
GEQ
Grtr Than or Eql (A>=B)
Source A F8:7
0.0<
Source B F8:20
822189.8<
Navigation Light - Green Control Command
O:10
14
1746-OA16
0051
LES
Less Than (A<B)
Source A F8:7
0.0<
Source B F8:20
822189.8<
Navigation Light - Red Control Command
O:10
15
1746-OA16
0052
Alignment Light Off/On Switch
I:7
8
1746-IA16
Alignment Lighting Control On Command
O:9
5
1746-OA16
Alignment Light On (Remote Side)
N7:0
8
0053
Lubrication Pumps On/Off Switch
I:7
9
1746-IA16
Lubrication Pump North On Command
O:9
6
1746-OA16
E-Stop
I:6
0
1746-IA16
Span Controller Raise Switch
I:6
12
1746-IA16
Drive Motor North East Running
I:8
0
1746-IA16
Drive Motor South East Running
I:8
4
1746-IA16
Lubrication Pump South On Command
O:9
7
1746-OA16
0054
END

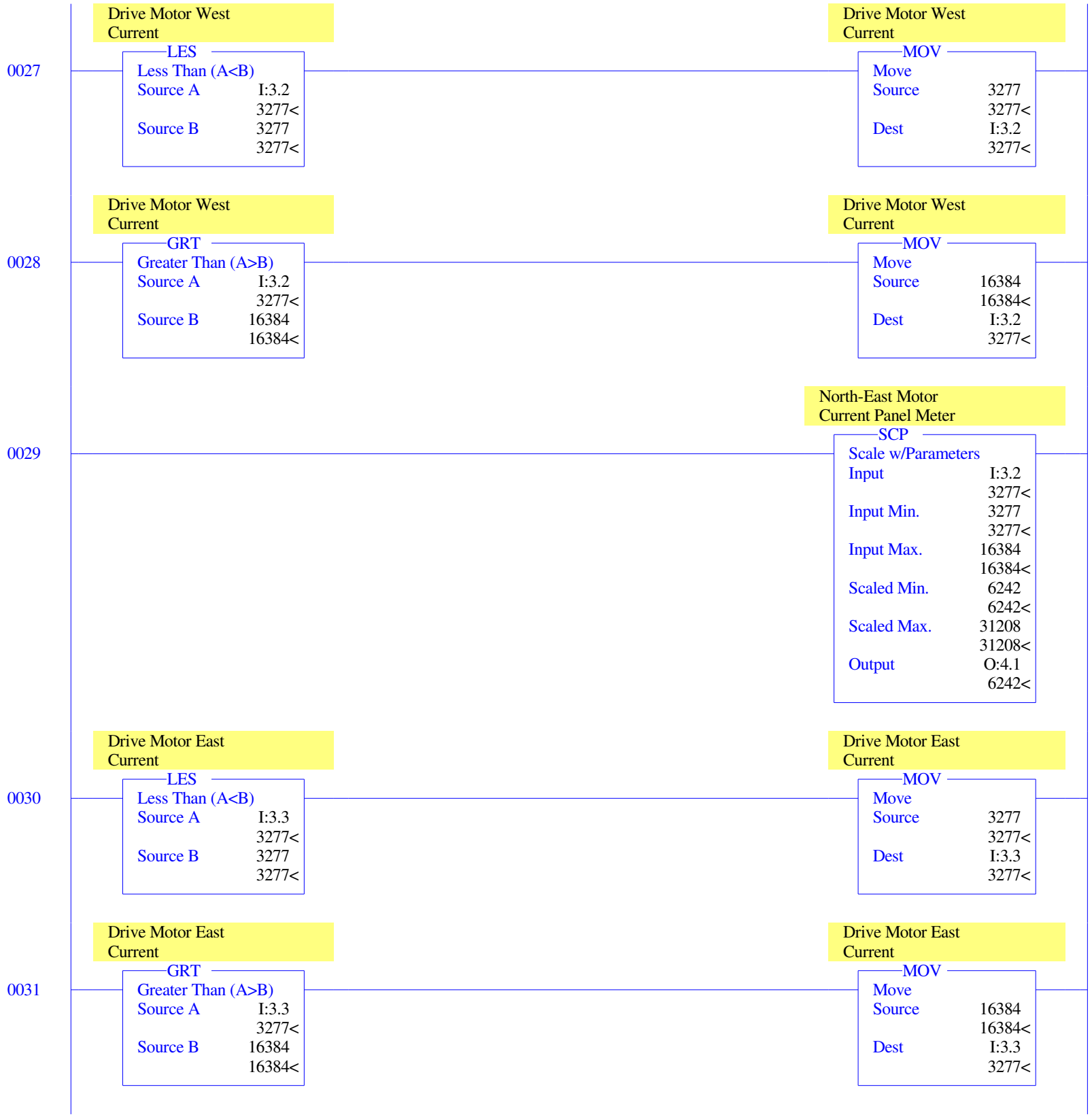

0000
E-Stop
I:6
0
1746-IA16
Span Controller Lower Switch
I:6
13
1746-IA16
Span Speed Control Command
LES
Less Than (A<B)
Source A I:3.0 16389<
Source B N9:0 14000<
TON
Timer On Delay
Timer T4:14
Time Base 0.01
Preset 200<
Accum 0<
EN
DN
Span Controller Raise Switch
I:6
12
1746-IA16
Span Speed Control Command
GRT
Greater Than (A>B)
Source A I:3.0 16389<
Source B N9:1 17500<
0001
T4:14
DN
B3:0
L
4
0002
B3:1
1
B3:0
U
4
E-Stop
I:6
0
1746-IA16
Lamp Test Switch
I:7
7
1746-IA16
0003
SCP
Scale w/Parameters
Input I:3.0 16389<
Input Min. 0 0<
Input Max. 32767 32767<
Scaled Min. -1000 -1000<
Scaled Max. 1000 1000<
Output N7:3 0<
0004
CPT
Compute
Dest F8:0 -2.0<
Expression ( I:2.2 * 1000.0 ) + I:2.3
0005
COP
Copy File
Source #I:2.4
Dest #F8:1
Length 1


0006
MUL
Multiply
Source A F8:1
0.0<
Source B 0.0585937
0.0585937<
Dest F8:4
0.0<
0007
CPT
Compute
Dest F8:2
-1.0<
Expression ( I:2.8 * 1000.0 ) + I:2.9
0008
COP
Copy File
Source #I:2.10
Dest #F8:3
Length 1
0009
MUL
Multiply
Source A F8:3
0.0<
Source B 0.0585937
0.0585937<
Dest F8:5
0.0<
0010
Drive Motor North East Running
I:8
0
1746-IA16
Drive Motor South East Running
I:8
4
1746-IA16
CPT
Compute
Dest F8:7
0.0<
Expression ( F8:0 + F8:2 ) | 2.0
CPT
Compute
Dest F8:6
0.0<
Expression ( F8:4 + F8:5 ) | 2.0
0011
Drive Motor North East Running
I:8
0
1746-IA16
Drive Motor South East Running
I:8
4
1746-IA16
MOV
Move
Source F8:0
-2.0<
Dest F8:7
0.0<
MOV
Move
Source F8:4
0.0<
Dest F8:6
0.0<


Drive Motor North East Running
I:8
0
1746-IA16
Drive Motor South East Running
I:8
4
1746-IA16
0012
MOV
Move
Source F8:2
-1.0<
Dest F8:7
0.0<
MOV
Move
Source F8:5
0.0<
Dest F8:6
0.0<
End Lock Engaged (Remote Side)
N7:1
5
B3:1
OSR
11
0013
B3:1
5
B3:1
5
0014
End Locks Engage Bypass Switch
I:7
4
1746-IA16
O:2
17
1746-HSCE2
O:2
33
1746-HSCE2
CLR
Clear
Dest F8:7
0.0<
CLR
Clear
Dest F8:6
0.0<
0015
NEQ
Not Equal
Source A F8:10
869172.0<
Source B 0.0
0.0<
CPT
Compute
Dest N7:23
0<
Expression ( F8:7 | F8:10 ) * 1000.0


0016
NEQ
Not Equal
Source A N9:4
650<
Source B 0
0<
CPT
Compute
Dest N7:22
0<
Expression ( F8:6 | N9:4 ) * 1000.0
CPT
Compute
Dest N7:25
0<
Expression ( F8:4 | N9:4 ) * 1000.0
CPT
Compute
Dest N7:26
0<
Expression ( F8:5 | N9:4 ) * 1000.0
0017
LES
Less Than (A<B)
Source A N7:25
0<
Source B 0
0<
MOV
Move
Source 0
0<
Dest N7:25
0<
0018
GRT
Greater Than (A>B)
Source A N7:25
0<
Source B 1000
1000<
MOV
Move
Source 1000
1000<
Dest N7:25
0<
North-East Motor RPM
0019
SCP
Scale w/Parameters
Input N7:25
0<
Input Min. 0
0<
Input Max. 1000
1000<
Scaled Min. 0
0<
Scaled Max. 16520
16520<
Output O:5.2
0<
0020
LES
Less Than (A<B)
Source A N7:26
0<
Source B 0
0<
MOV
Move
Source 0
0<
Dest N7:26
0<


0021
GRT
Greater Than (A>B)
Source A N7:26
0<
Source B 1000
1000<
MOV
Move
Source 1000
1000<
Dest N7:26
0<
South-East Motor RPM
0022
SCP
Scale w/Parameters
Input N7:26
0<
Input Min. 0
0<
Input Max. 1000
1000<
Scaled Min. 0
0<
Scaled Max. 16520
16520<
Output O:5.3
0<
0023
NEQ
Not Equal
Source A F8:10
869172.0<
Source B 0.0
0.0<
CPT
Compute
Dest N7:24
0<
Expression ( F8:7 * N9:13 ) | F8:10
0024
LES
Less Than (A<B)
Source A N7:24
0<
Source B 0
0<
MOV
Move
Source 0
0<
Dest N7:24
0<
0025
GRT
Greater Than (A>B)
Source A N7:24
0<
Source B 900
900<
MOV
Move
Source 900
900<
Dest N7:24
0<
Bridge Position
Panel Meter
0026
SCP
Scale w/Parameters
Input N7:24
0<
Input Min. 0
0<
Input Max. 900
900<
Scaled Min. 6270
6270<
Scaled Max. 31208
31208<
Output O:4.0
6270<


Drive Motor West Current
LES
Less Than (A<B)
Source A I:3.2 3277<
Source B 3277 3277<
Drive Motor West Current
MOV
Move
Source 3277 3277<
Dest I:3.2 3277<
0027
Drive Motor West Current
GRT
Greater Than (A>B)
Source A I:3.2 3277<
Source B 16384 16384<
Drive Motor West Current
MOV
Move
Source 16384 16384<
Dest I:3.2 3277<
0028
North-East Motor Current Panel Meter
SCP
Scale w/Parameters
Input I:3.2 3277<
Input Min. 3277 3277<
Input Max. 16384 16384<
Scaled Min. 6242 6242<
Scaled Max. 31208 31208<
Output O:4.1 6242<
0029
Drive Motor East Current
LES
Less Than (A<B)
Source A I:3.3 3277<
Source B 3277 3277<
Drive Motor East Current
MOV
Move
Source 3277 3277<
Dest I:3.3 3277<
0030
Drive Motor East Current
GRT
Greater Than (A>B)
Source A I:3.3 3277<
Source B 16384 16384<
Drive Motor East Current
MOV
Move
Source 16384 16384<
Dest I:3.3 3277<
0031

South-East Motor
Current Panel Meter

0032

SCP
Scale w/Parameters
Input I:3.3
3277<
Input Min. 3277
3277<
Input Max. 16384
16384<
Scaled Min. 6242
6242<
Scaled Max. 31208
31208<
Output O:4.2
6242<

0033

MUL
Multiply
Source A F8:10
869172.0<
Source B 0.05
0.05<
Dest F8:14
43458.6<

0034

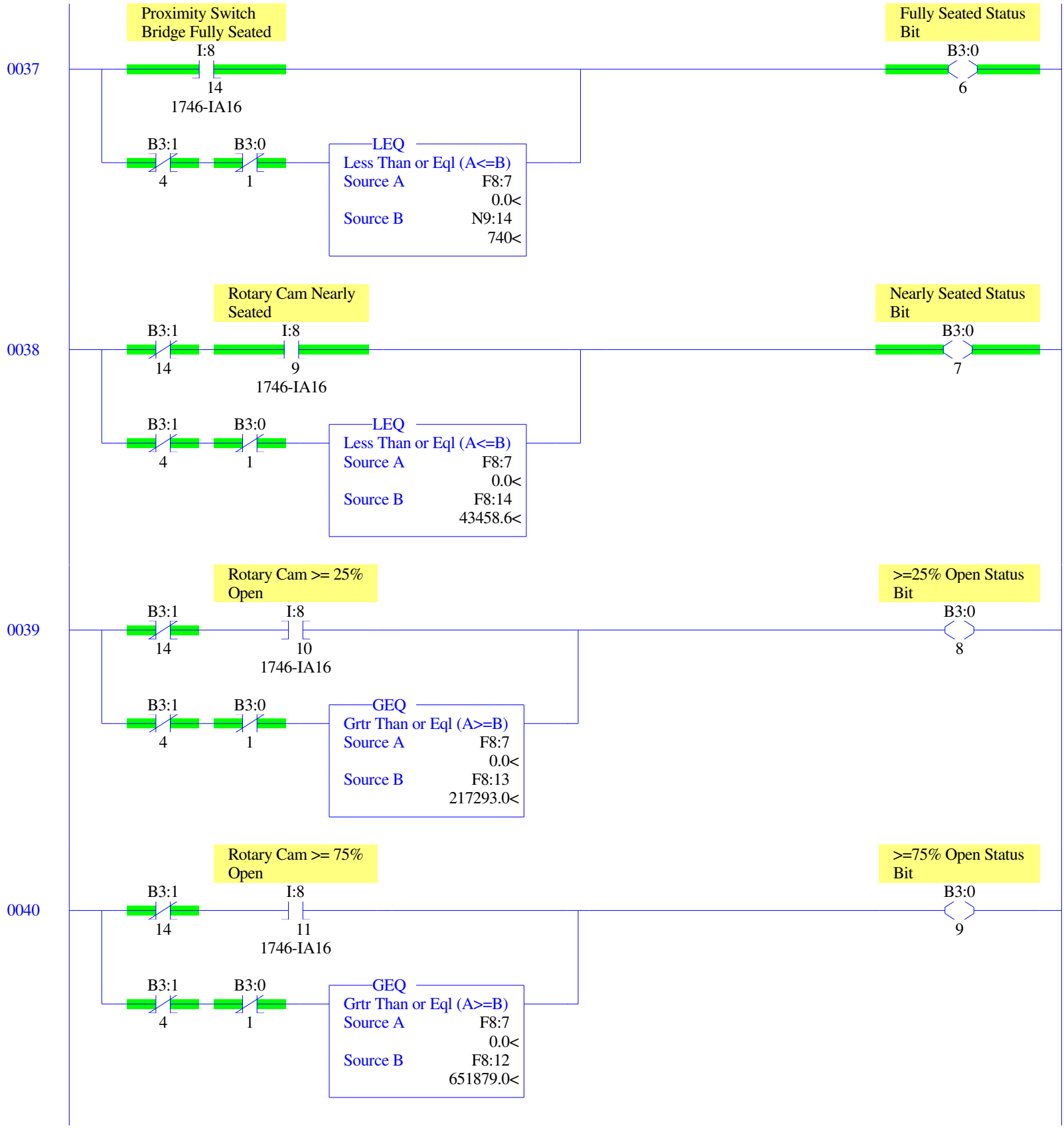
MUL
Multiply
Source A F8:10
869172.0<
Source B 0.25
0.25<
Dest F8:13
217293.0<

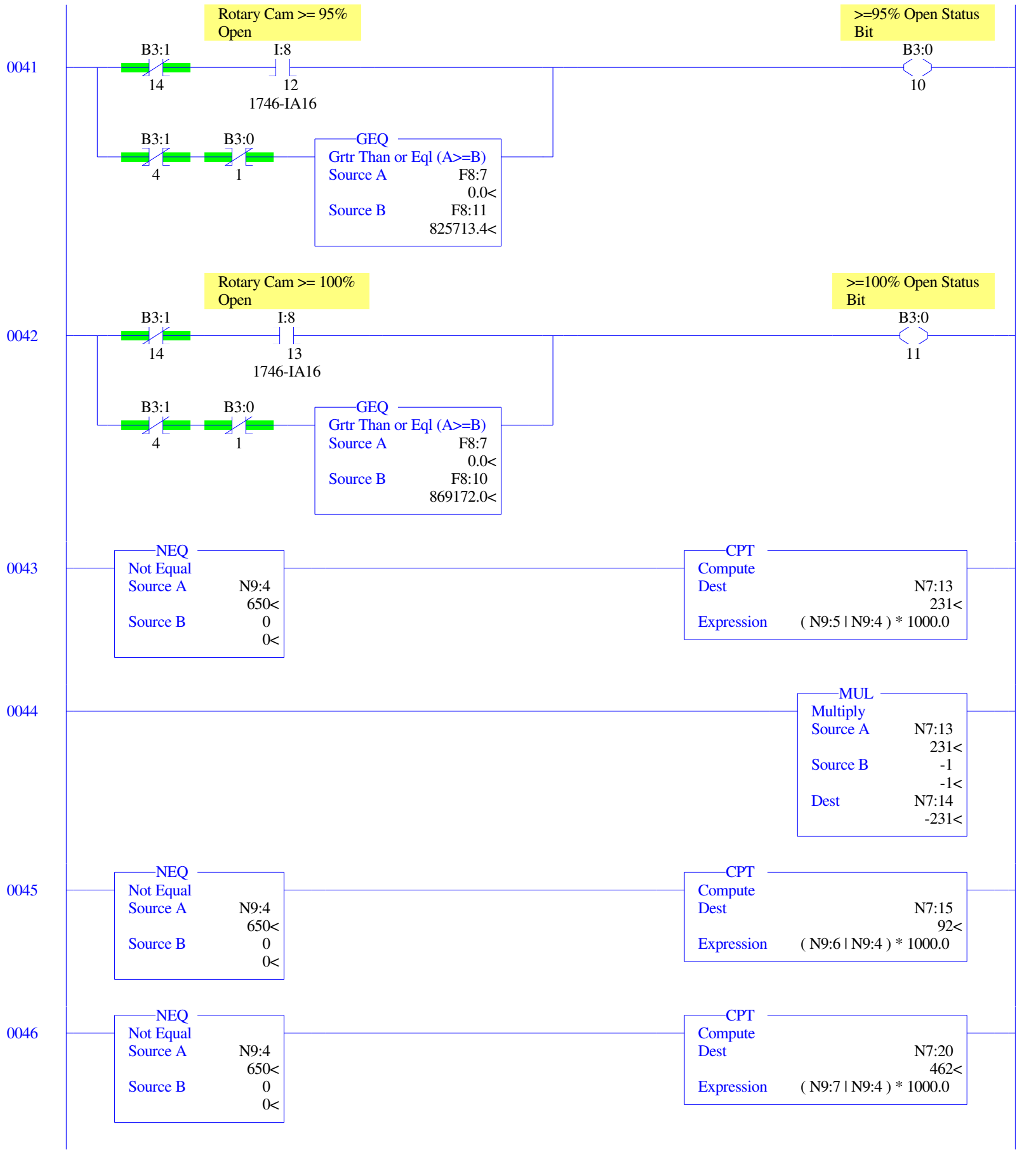
0035

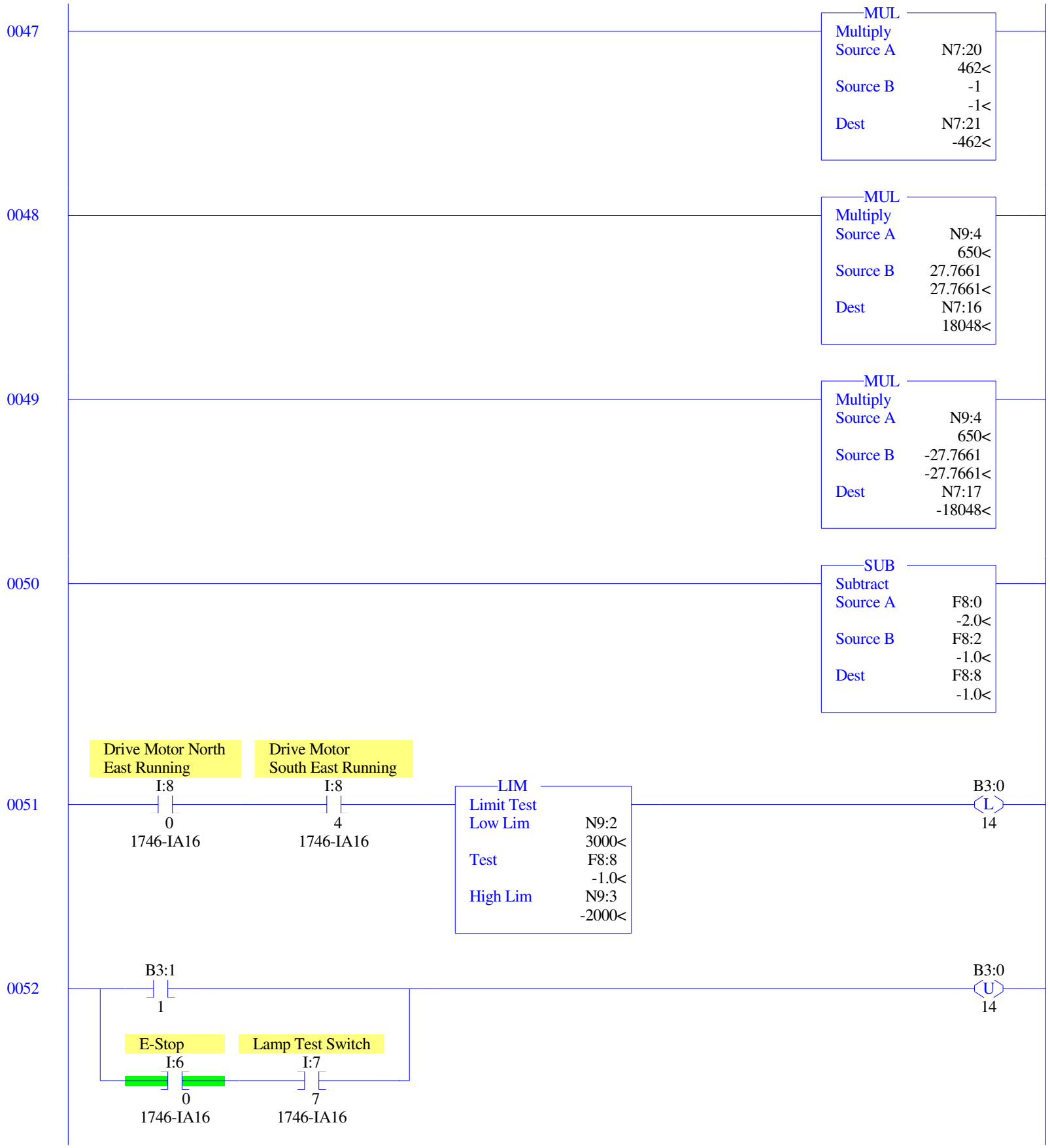
MUL
Multiply
Source A F8:10
869172.0<
Source B 0.75
0.75<
Dest F8:12
651879.0<

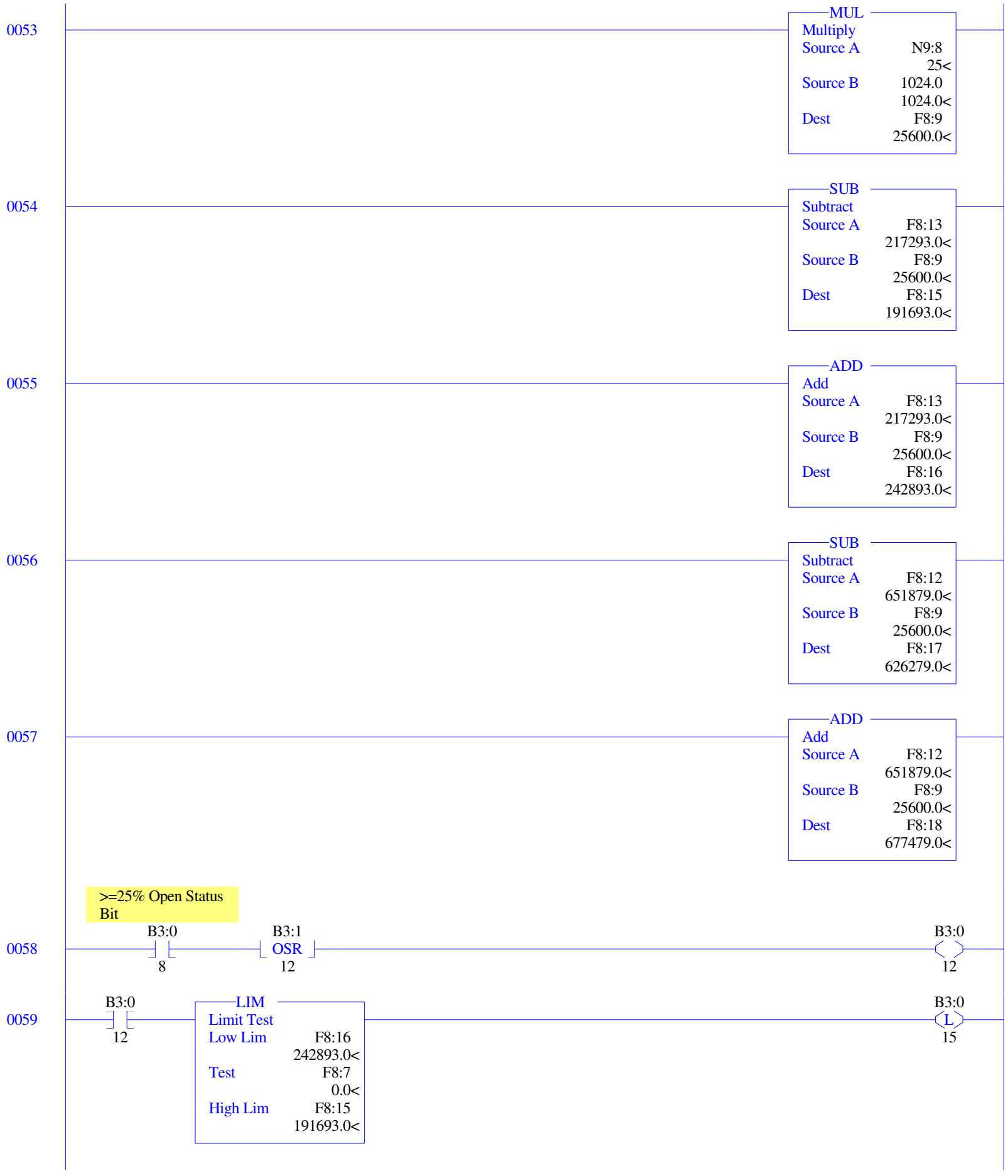
0036

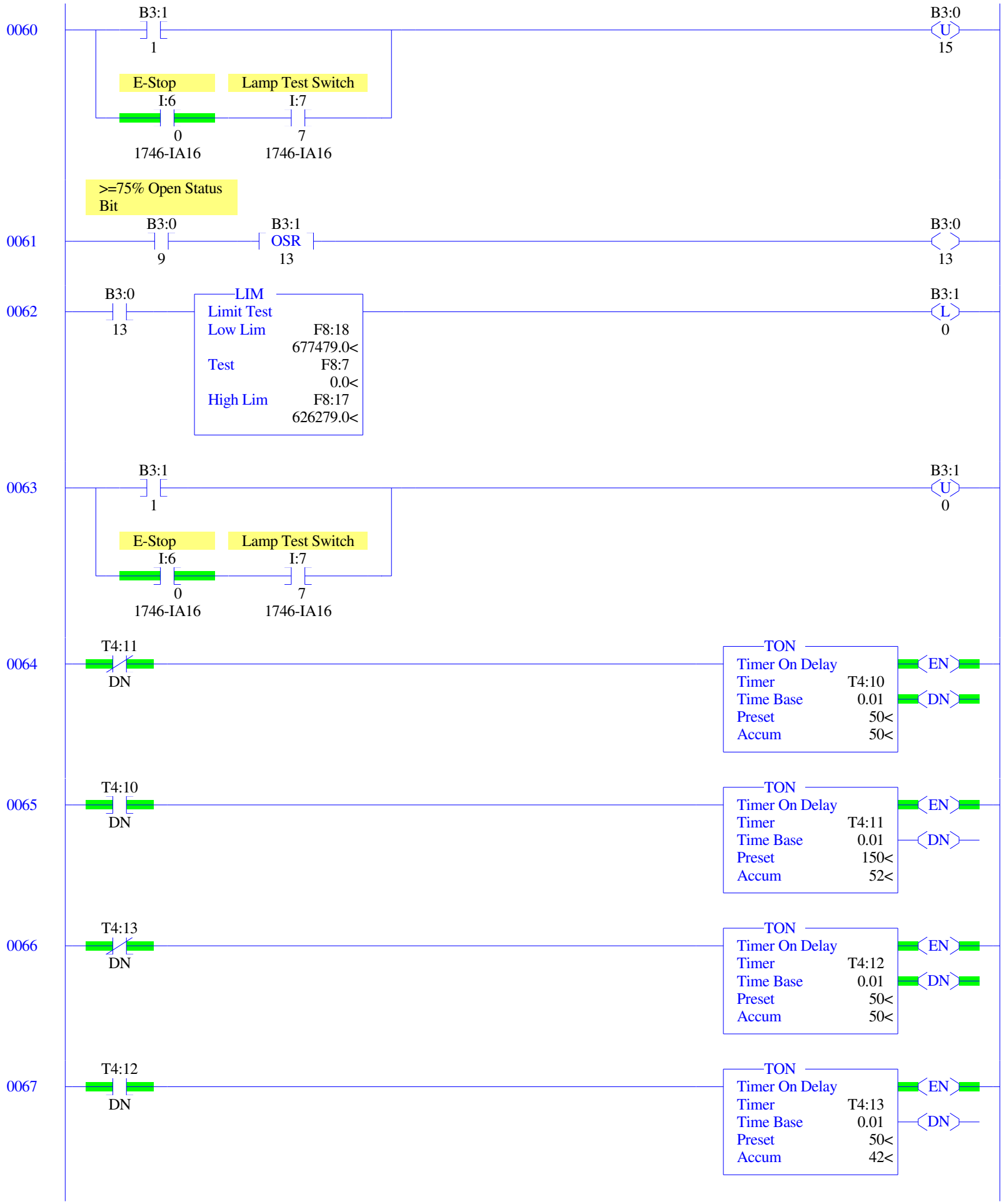
MUL
Multiply
Source A F8:10
869172.0<
Source B 0.95
0.95<
Dest F8:11
825713.4<

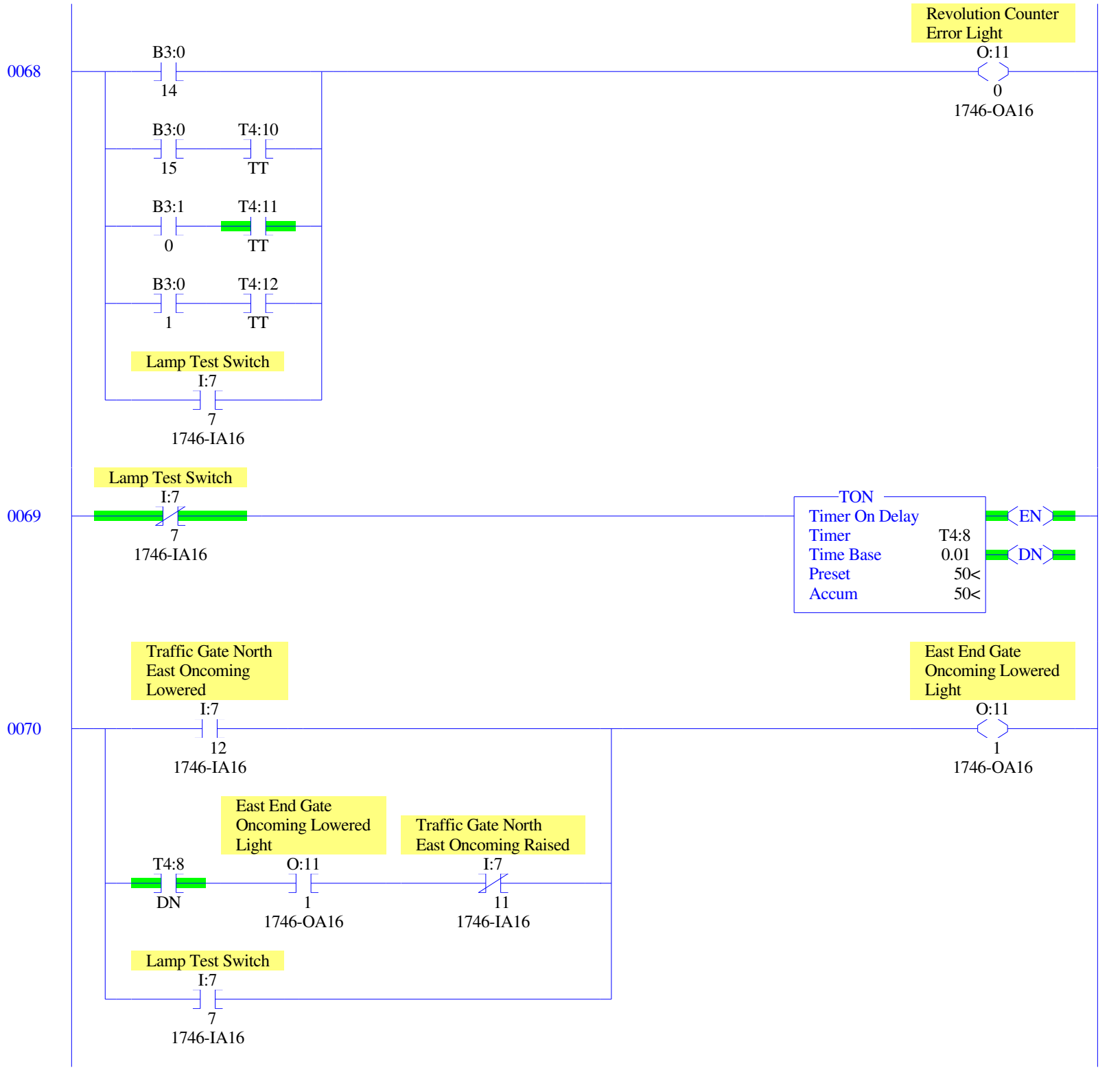

Proximity Switch Bridge Fully Seated
I:8
14
1746-IA16
Fully Seated Status Bit
B3:0
6
0037
B3:1
4
B3:0
1
LEQ
Less Than or Eql (A<=B)
Source A F8:7
0.0<
Source B N9:14
740<
Rotary Cam Nearly Seated
B3:1
14
I:8
9
1746-IA16
Nearly Seated Status Bit
B3:0
7
0038
B3:1
4
B3:0
1
LEQ
Less Than or Eql (A<=B)
Source A F8:7
0.0<
Source B F8:14
43458.6<
Rotary Cam >= 25% Open
B3:1
14
I:8
10
1746-IA16
>=25% Open Status Bit
B3:0
8
0039
B3:1
4
B3:0
1
GEQ
Grtr Than or Eql (A>=B)
Source A F8:7
0.0<
Source B F8:13
217293.0<
Rotary Cam >= 75% Open
B3:1
14
I:8
11
1746-IA16
>=75% Open Status Bit
B3:0
9
0040
B3:1
4
B3:0
1
GEQ
Grtr Than or Eql (A>=B)
Source A F8:7
0.0<
Source B F8:12
651879.0<

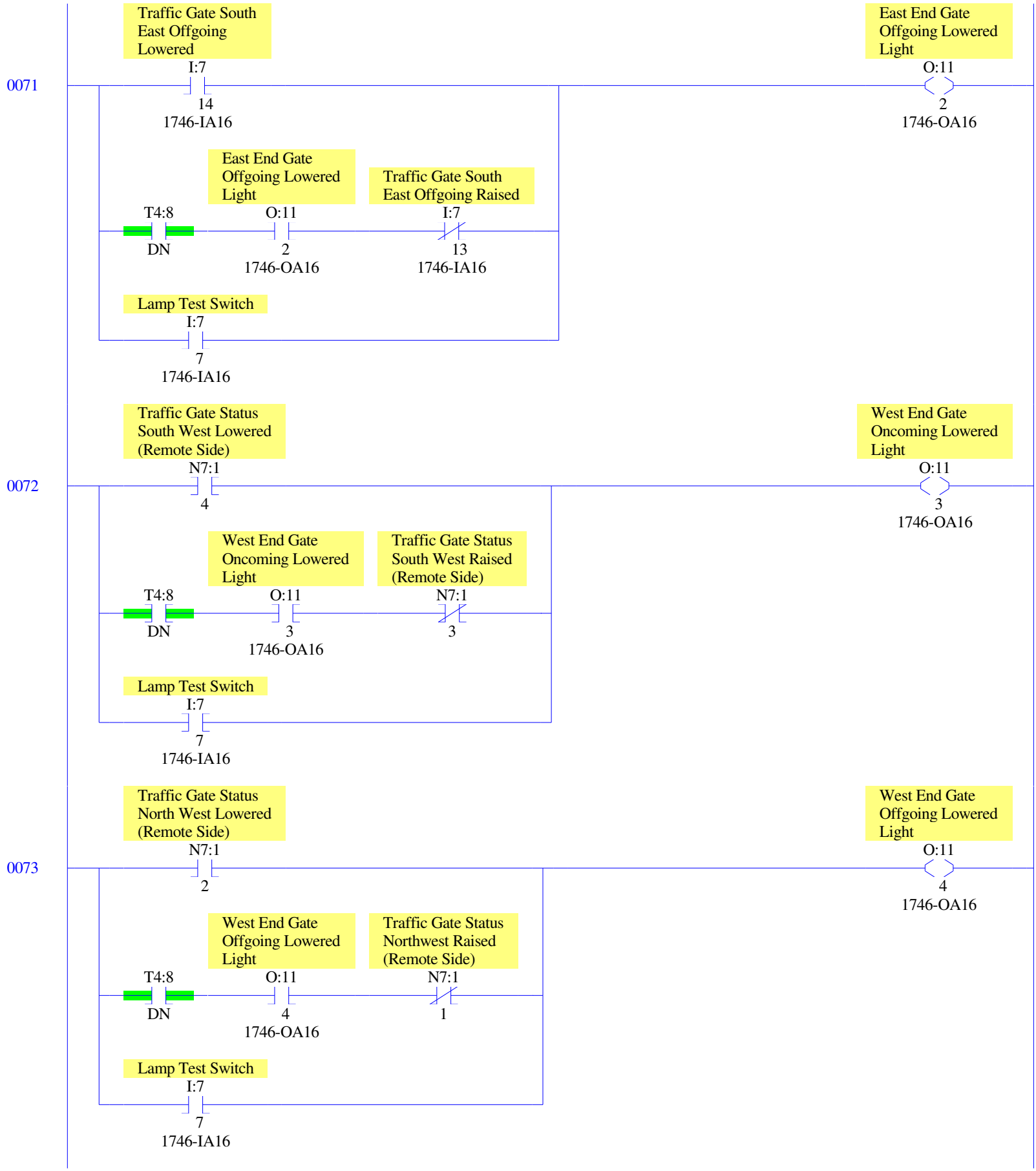

Rotary Cam >= 95% Open
>=95% Open Status Bit
0041
B3:1
14
I:8
12
1746-IA16
B3:0
10
B3:1
4
B3:0
1
GEQ
Grtr Than or Eql (A>=B)
Source A F8:7
0.0<
Source B F8:11
825713.4<
Rotary Cam >= 100% Open
>=100% Open Status Bit
0042
B3:1
14
I:8
13
1746-IA16
B3:0
11
B3:1
4
B3:0
1
GEQ
Grtr Than or Eql (A>=B)
Source A F8:7
0.0<
Source B F8:10
869172.0<
0043
NEQ
Not Equal
Source A N9:4
650<
Source B 0
0<
CPT
Compute
Dest N7:13
231<
Expression ( N9:5 | N9:4 ) * 1000.0
0044
MUL
Multiply
Source A N7:13
231<
Source B -1
-1<
Dest N7:14
-231<
0045
NEQ
Not Equal
Source A N9:4
650<
Source B 0
0<
CPT
Compute
Dest N7:15
92<
Expression ( N9:6 | N9:4 ) * 1000.0
0046
NEQ
Not Equal
Source A N9:4
650<
Source B 0
0<
CPT
Compute
Dest N7:20
462<
Expression ( N9:7 | N9:4 ) * 1000.0

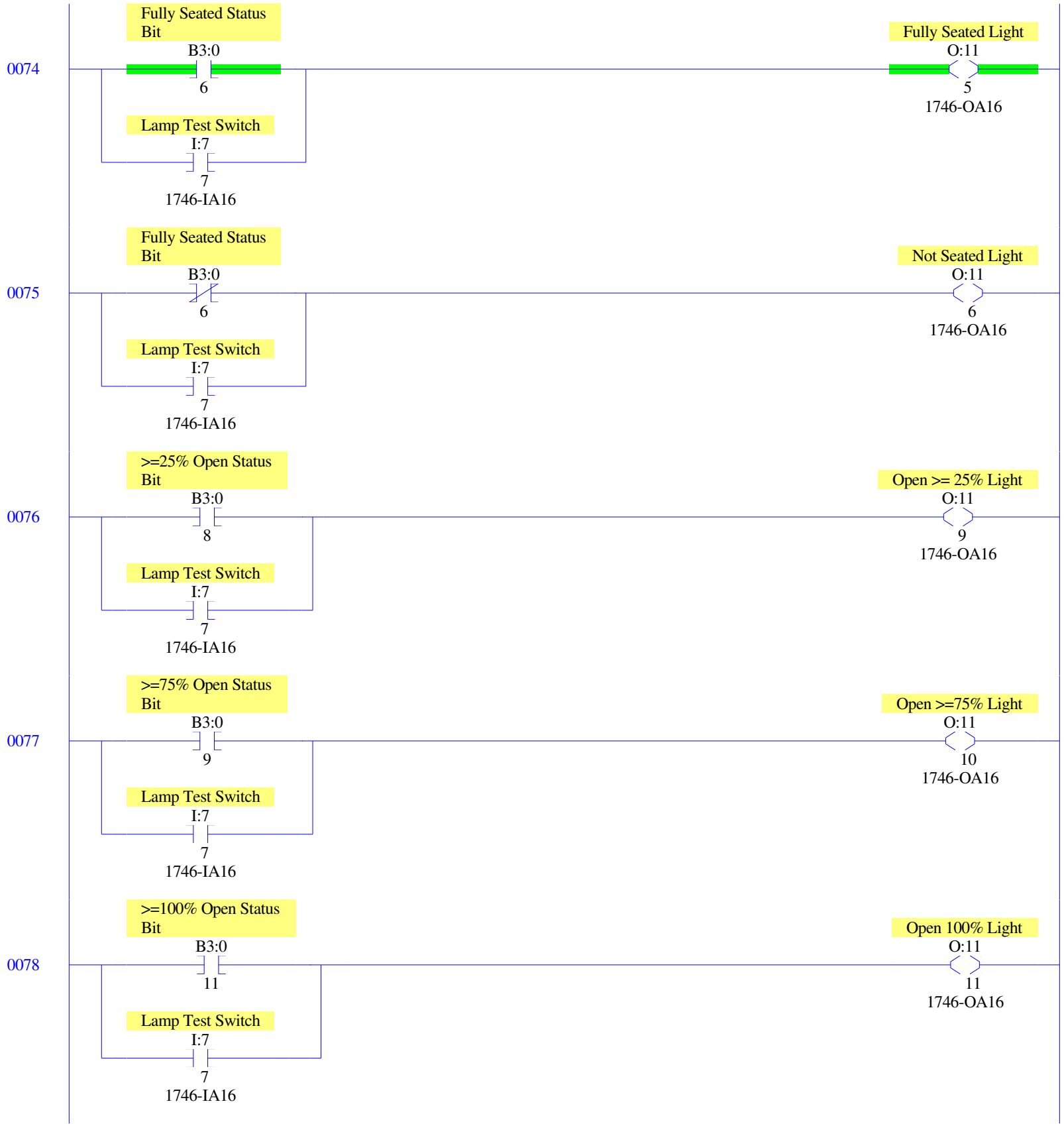

0047
MUL
Multiply
Source A N7:20 462<
Source B -1 -1<
Dest N7:21 -462<
0048
MUL
Multiply
Source A N9:4 650<
Source B 27.7661 27.7661<
Dest N7:16 18048<
0049
MUL
Multiply
Source A N9:4 650<
Source B -27.7661 -27.7661<
Dest N7:17 -18048<
0050
SUB
Subtract
Source A F8:0 -2.0<
Source B F8:2 -1.0<
Dest F8:8 -1.0<
Drive Motor North East Running
I:8
0
1746-IA16
Drive Motor South East Running
I:8
4
1746-IA16
0051
LIM
Limit Test
Low Lim N9:2 3000<
Test F8:8 -1.0<
High Lim N9:3 -2000<
B3:0
L
14
B3:1
1
0052
B3:0
U
14
E-Stop
I:6
0
1746-IA16
Lamp Test Switch
I:7
7
1746-IA16

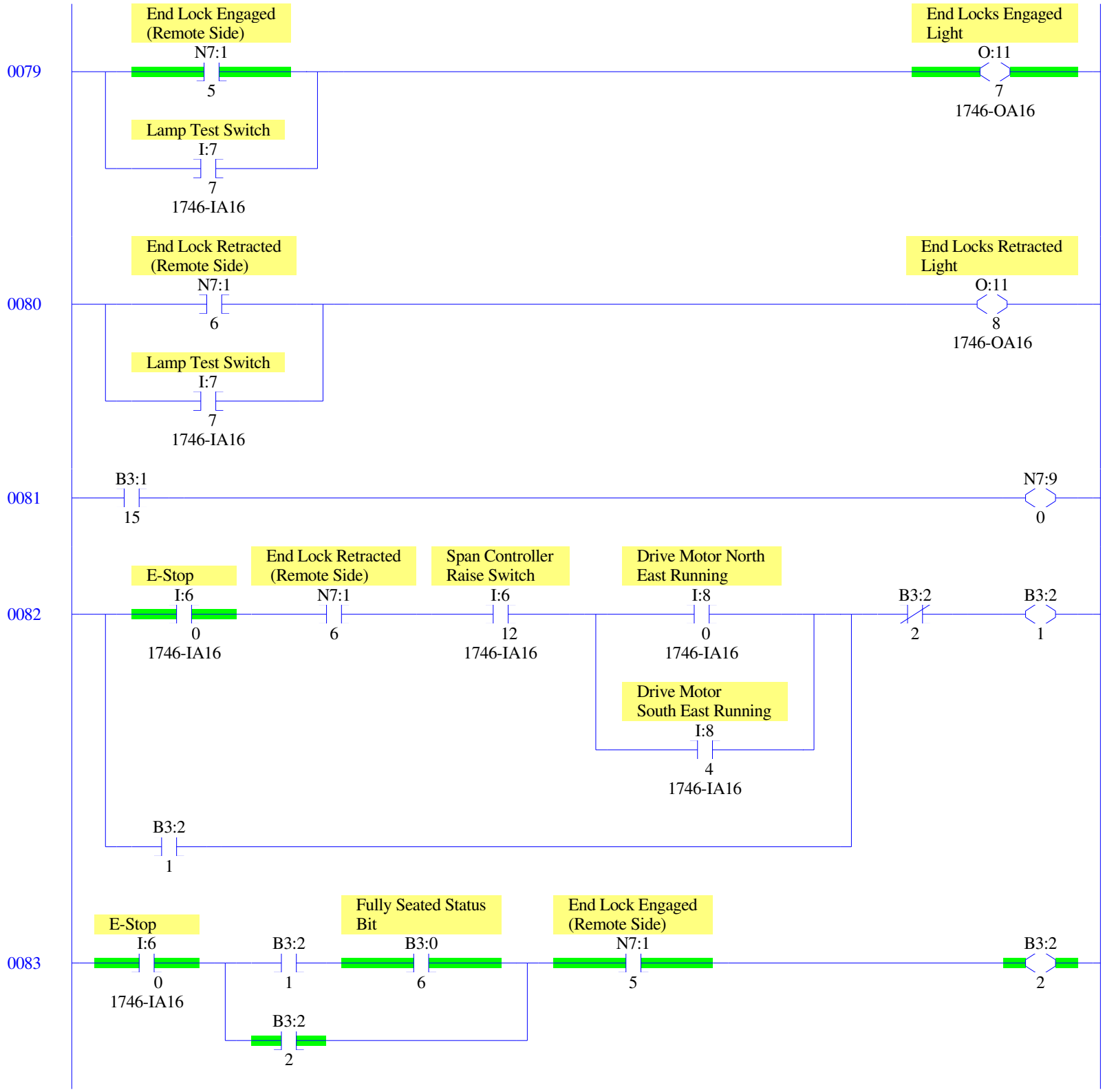

0053
MUL
Multiply
Source A N9:8
25<
Source B 1024.0
1024.0<
Dest F8:9
25600.0<
0054
SUB
Subtract
Source A F8:13
217293.0<
Source B F8:9
25600.0<
Dest F8:15
191693.0<
0055
ADD
Add
Source A F8:13
217293.0<
Source B F8:9
25600.0<
Dest F8:16
242893.0<
0056
SUB
Subtract
Source A F8:12
651879.0<
Source B F8:9
25600.0<
Dest F8:17
626279.0<
0057
ADD
Add
Source A F8:12
651879.0<
Source B F8:9
25600.0<
Dest F8:18
677479.0<
>=25% Open Status Bit
0058
B3:0
8
B3:1
OSR
12
B3:0
12
0059
B3:0
12
LIM
Limit Test
Low Lim F8:16
242893.0<
Test F8:7
0.0<
High Lim F8:15
191693.0<
B3:0
L
15

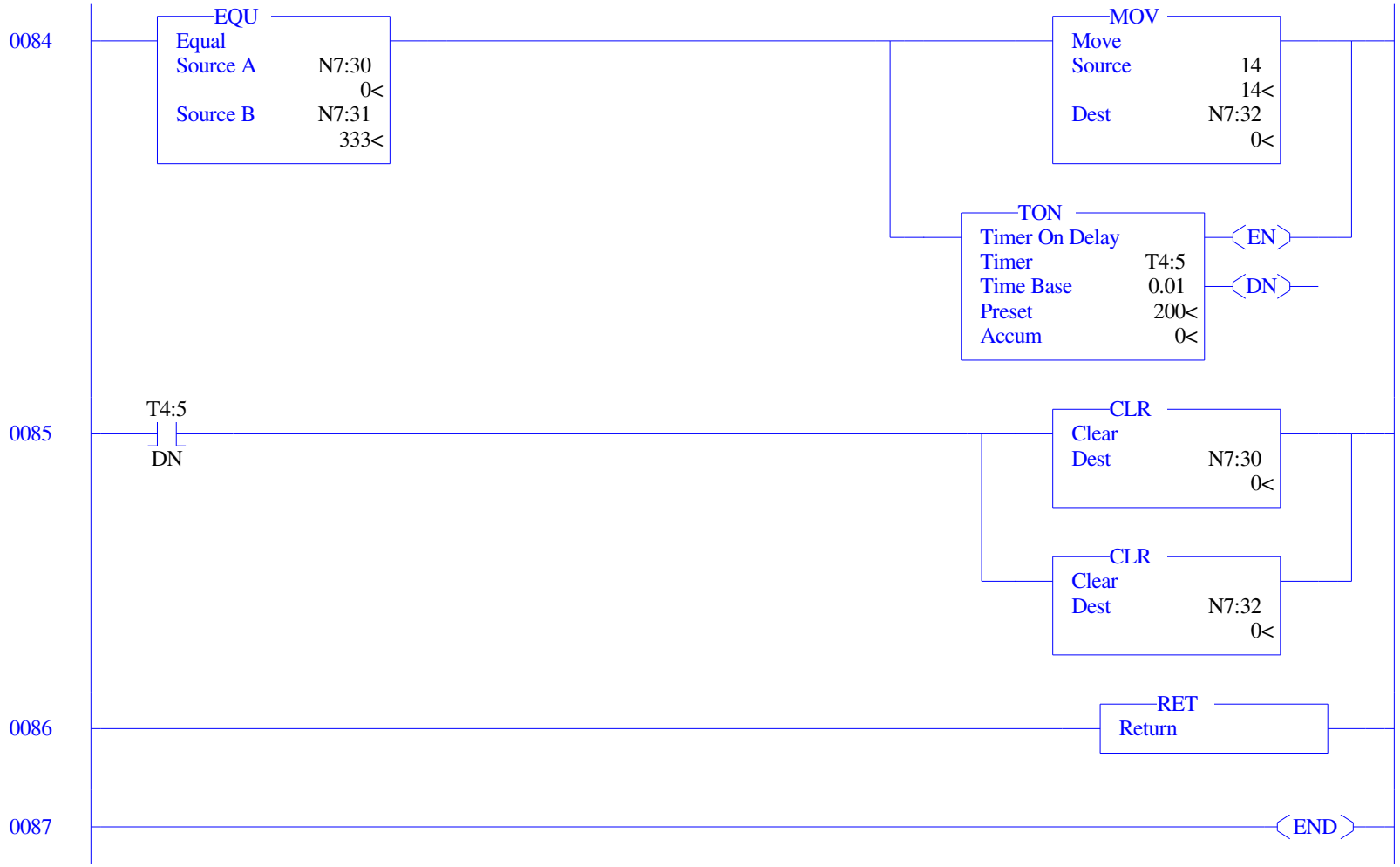

0060
B3:1
1
B3:0
U
15
E-Stop
I:6
0
1746-IA16
Lamp Test Switch
I:7
7
1746-IA16
>=75% Open Status Bit
0061
B3:0
9
B3:1
OSR
13
B3:0
13
0062
B3:0
13
LIM
Limit Test
Low Lim F8:18 677479.0<
Test F8:7 0.0<
High Lim F8:17 626279.0<
B3:1
L
0
0063
B3:1
1
B3:1
U
0
E-Stop
I:6
0
1746-IA16
Lamp Test Switch
I:7
7
1746-IA16
0064
T4:11
DN
TON
Timer On Delay
Timer T4:10
Time Base 0.01
Preset 50<
Accum 50<
EN
DN
0065
T4:10
DN
TON
Timer On Delay
Timer T4:11
Time Base 0.01
Preset 150<
Accum 52<
EN
DN
0066
T4:13
DN
TON
Timer On Delay
Timer T4:12
Time Base 0.01
Preset 50<
Accum 50<
EN
DN
0067
T4:12
DN
TON
Timer On Delay
Timer T4:13
Time Base 0.01
Preset 50<
Accum 42<
EN
DN

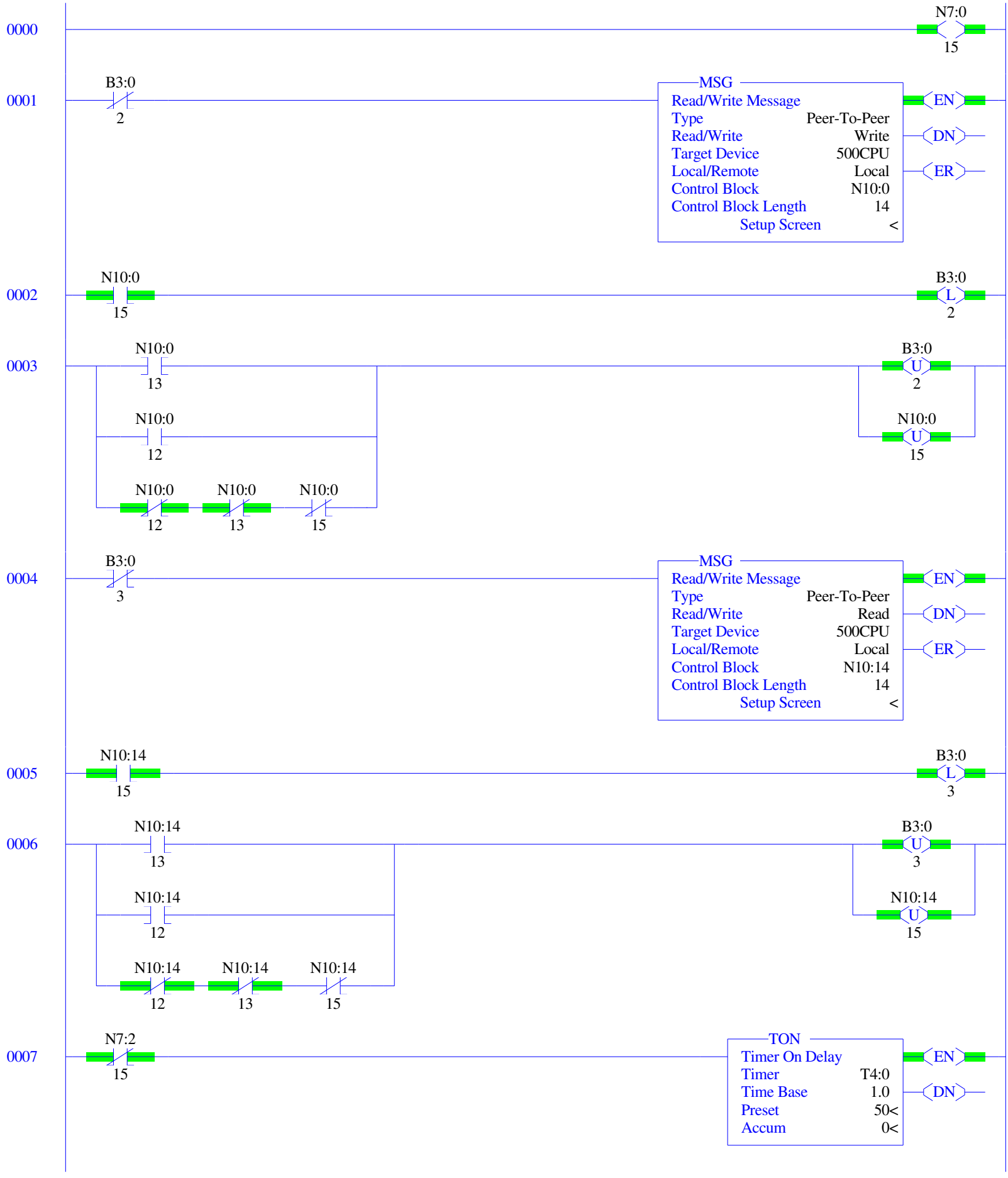

0068
B3:0
14
B3:0
15
T4:10
TT
B3:1
0
T4:11
TT
B3:0
1
T4:12
TT
Lamp Test Switch
I:7
7
1746-IA16
Revolution Counter Error Light
O:11
0
1746-OA16
0069
Lamp Test Switch
I:7
7
1746-IA16
TON
Timer On Delay
Timer T4:8
Time Base 0.01
Preset 50<
Accum 50<
EN
DN
0070
Traffic Gate North East Oncoming Lowered
I:7
12
1746-IA16
East End Gate Oncoming Lowered Light
O:11
1
1746-OA16
East End Gate Oncoming Lowered Light
T4:8
DN
O:11
1
1746-OA16
Traffic Gate North East Oncoming Raised
I:7
11
1746-IA16
Lamp Test Switch
I:7
7
1746-IA16


0071
Traffic Gate South East Offgoing Lowered
I:7
14
1746-IA16
East End Gate Offgoing Lowered Light
O:11
2
1746-OA16
East End Gate Offgoing Lowered Light
T4:8
DN
O:11
2
1746-OA16
Traffic Gate South East Offgoing Raised
I:7
13
1746-IA16
Lamp Test Switch
I:7
7
1746-IA16
0072
Traffic Gate Status South West Lowered (Remote Side)
N7:1
4
West End Gate Oncoming Lowered Light
O:11
3
1746-OA16
West End Gate Oncoming Lowered Light
T4:8
DN
O:11
3
1746-OA16
Traffic Gate Status South West Raised (Remote Side)
N7:1
3
Lamp Test Switch
I:7
7
1746-IA16
0073
Traffic Gate Status North West Lowered (Remote Side)
N7:1
2
West End Gate Offgoing Lowered Light
O:11
4
1746-OA16
West End Gate Offgoing Lowered Light
T4:8
DN
O:11
4
1746-OA16
Traffic Gate Status Northwest Raised (Remote Side)
N7:1
1
Lamp Test Switch
I:7
7
1746-IA16

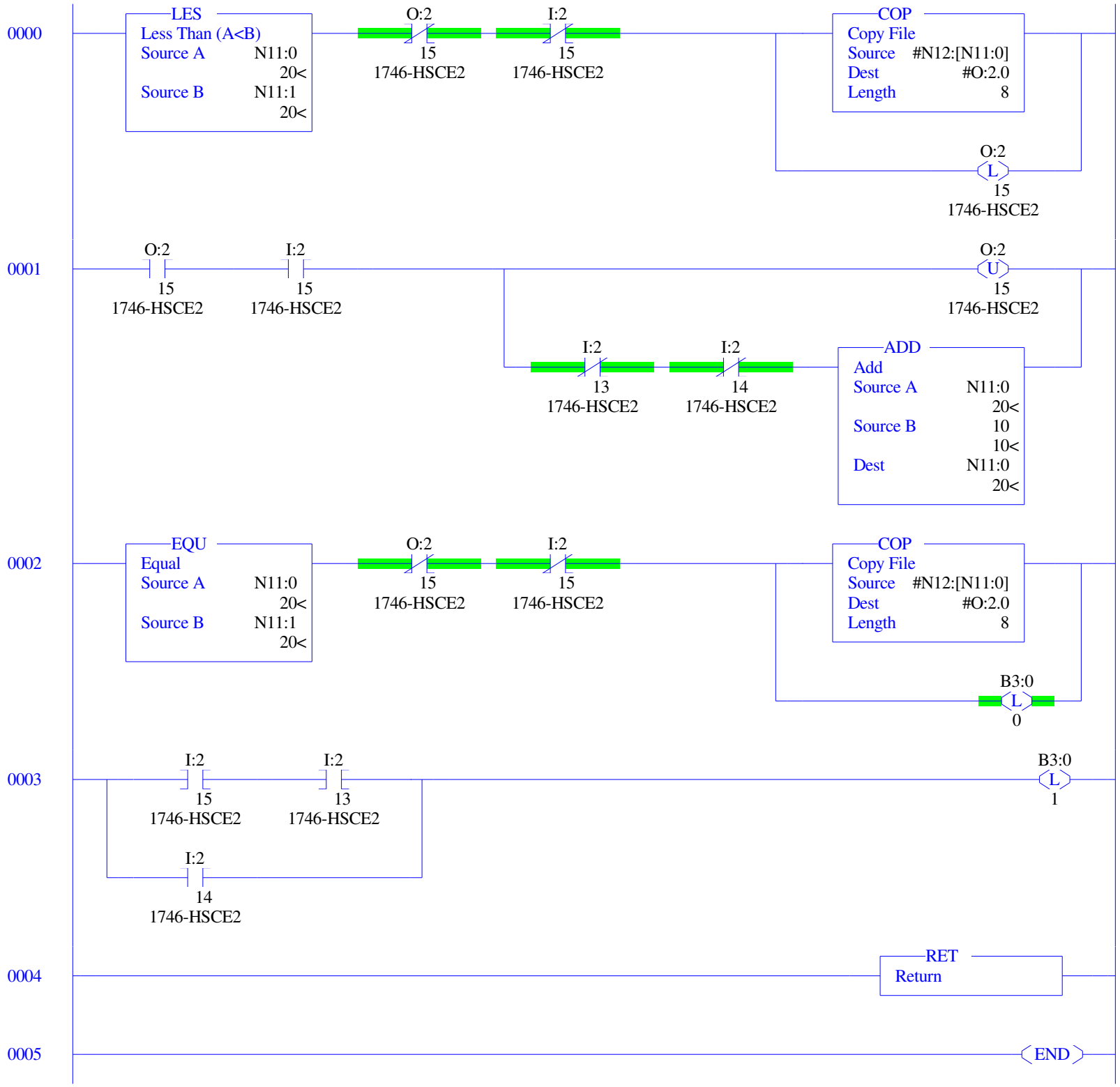

0074
Fully Seated Status Bit
B3:0
6
Lamp Test Switch
I:7
7
1746-IA16
Fully Seated Light
O:11
5
1746-OA16
0075
Fully Seated Status Bit
B3:0
6
Lamp Test Switch
I:7
7
1746-IA16
Not Seated Light
O:11
6
1746-OA16
0076
>=25% Open Status Bit
B3:0
8
Lamp Test Switch
I:7
7
1746-IA16
Open >= 25% Light
O:11
9
1746-OA16
0077
>=75% Open Status Bit
B3:0
9
Lamp Test Switch
I:7
7
1746-IA16
Open >=75% Light
O:11
10
1746-OA16
0078
>=100% Open Status Bit
B3:0
11
Lamp Test Switch
I:7
7
1746-IA16
Open 100% Light
O:11
11
1746-OA16


0079
End Lock Engaged (Remote Side)
N7:1
5
Lamp Test Switch
I:7
7
1746-IA16
End Locks Engaged Light
O:11
7
1746-OA16
0080
End Lock Retracted (Remote Side)
N7:1
6
Lamp Test Switch
I:7
7
1746-IA16
End Locks Retracted Light
O:11
8
1746-OA16
0081
B3:1
15
N7:9
0
0082
E-Stop
I:6
0
1746-IA16
End Lock Retracted (Remote Side)
N7:1
6
Span Controller Raise Switch
I:6
12
1746-IA16
Drive Motor North East Running
I:8
0
1746-IA16
Drive Motor South East Running
I:8
4
1746-IA16
B3:2
2
B3:2
1
B3:2
1
0083
E-Stop
I:6
0
1746-IA16
B3:2
1
B3:2
2
Fully Seated Status Bit
B3:0
6
End Lock Engaged (Remote Side)
N7:1
5
B3:2
2


0084
EQU
Equal
Source A N7:30
0<
Source B N7:31
333<
MOV
Move
Source 14
14<
Dest N7:32
0<
TON
Timer On Delay
Timer T4:5
Time Base 0.01
Preset 200<
Accum 0<
EN
DN
0085
T4:5
DN
CLR
Clear
Dest N7:30
0<
CLR
Clear
Dest N7:32
0<
0086
RET
Return
0087
END


0000
N7:0
15
0001
B3:0
2
MSG
Read/Write Message
Type Peer-To-Peer
Read/Write Write
Target Device 500CPU
Local/Remote Local
Control Block N10:0
Control Block Length 14
Setup Screen <
EN
DN
ER
0002
N10:0
15
B3:0
L
2
0003
N10:0
13
N10:0
12
N10:0
12
N10:0
13
N10:0
15
B3:0
U
2
N10:0
U
15
0004
B3:0
3
MSG
Read/Write Message
Type Peer-To-Peer
Read/Write Read
Target Device 500CPU
Local/Remote Local
Control Block N10:14
Control Block Length 14
Setup Screen <
EN
DN
ER
0005
N10:14
15
B3:0
L
3
0006
N10:14
13
N10:14
12
N10:14
12
N10:14
13
N10:14
15
B3:0
U
3
N10:14
U
15
0007
N7:2
15
TON
Timer On Delay
Timer T4:0
Time Base 1.0
Preset 50<
Accum 0<
EN
DN


0008
T4:0
DN
B3:0
5
Radio Comm Fail Light
0009
T4:0
DN
O:11
12
1746-OA16
Lamp Test Switch
I:7
7
1746-IA16
0010
N7:2
U
15
0011
RET
Return
0012
END


0000
LES
Less Than (A<B)
Source A N11:0 20<
Source B N11:1 20<
O:2 15 1746-HSCE2
I:2 15 1746-HSCE2
COP
Copy File
Source #N12:[N11:0]
Dest #O:2.0
Length 8
O:2 L 15 1746-HSCE2
0001
O:2 15 1746-HSCE2
I:2 15 1746-HSCE2
O:2 U 15 1746-HSCE2
I:2 13 1746-HSCE2
I:2 14 1746-HSCE2
ADD
Add
Source A N11:0 20<
Source B 10 10<
Dest N11:0 20<
0002
EQU
Equal
Source A N11:0 20<
Source B N11:1 20<
O:2 15 1746-HSCE2
I:2 15 1746-HSCE2
COP
Copy File
Source #N12:[N11:0]
Dest #O:2.0
Length 8
B3:0 L 0
0003
I:2 15 1746-HSCE2
I:2 13 1746-HSCE2
I:2 14 1746-HSCE2
B3:0 L 1
0004
RET
Return
0005
END

Data File O0 (bin) -- OUTPUT

| Offset | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O:2.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| O:2.1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1746-HSCE2 - High Speed Counter - Class 4 |
| O:2.2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1746-HSCE2 - High Speed Counter - Class 4 |
| O:2.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| O:2.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| O:2.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| O:2.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| O:2.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| O:4.0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1746-NO4I - Analog 4 Ch. Current Output |
| O:4.1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1746-NO4I - Analog 4 Ch. Current Output |
| O:4.2 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1746-NO4I - Analog 4 Ch. Current Output |
| O:4.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-NO4I - Analog 4 Ch. Current Output |
| O:5.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-NO4V - Analog 4 Ch. Voltage Output |
| O:5.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-NO4V - Analog 4 Ch. Voltage Output |
| O:5.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-NO4V - Analog 4 Ch. Voltage Output |
| O:5.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-NO4V - Analog 4 Ch. Voltage Output |
| O:9.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-OA16 - 16-Output (TRIAC) 100/240 VAC |
| O:10.0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-OA16 - 16-Output (TRIAC) 100/240 VAC |
| O:11.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1746-OA16 - 16-Output (TRIAC) 100/240 VAC |

Data File I1 (bin) -- INPUT

| Offset | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I:2.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.9 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:2.22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-HSCE2 - High Speed Counter - Class 4 |
| I:3.0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1746-NI4 - Analog 4 Channel Input Module |
| I:3.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-NI4 - Analog 4 Channel Input Module |
| I:3.2 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1746-NI4 - Analog 4 Channel Input Module |
| I:3.3 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1746-NI4 - Analog 4 Channel Input Module |
| I:6.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1746-IA16 - 16-Input 100/120 VAC |
| I:7.0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1746-IA16 - 16-Input 100/120 VAC |
| I:8.0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1746-IA16 - 16-Input 100/120 VAC |

# Data File S2 (hex) -- STATUS

**Main**

```
First Pass S:1/15 = No                                          DD / MM / YYYY
Index Register S:24 = 0                              Date S:39-37 = 16 / 12 / 1914
Free Running Clock S:4 = 1111-1000-0110-0001
Index Across Data Files S:2/3 = No                              HH : MM : SS
CIF Addressing Mode S:2/8 = 0                        Time S:40-42 = 6 : 32 : 22
Online Edits S:33/11 - S:33/12 = No online edits exist
```

**Proc**

```
OS Catalog Number S:57 = 302           User Program Type S:63 = 1
OS Series S:58 = B                     User Program Functionality Index S:64 = 65
OS FRS S:59 = 14                       User RAM Size S:66 = 16
Processor Catalog Number S:60 = 532    OS Memory Size S:66 = 480
Processor Series S:61 = D
Processor FRN S:62 = 4
```

**Scan Times**

```
Maximum (x10 ms) S:22 = 3
Average (x10 ms) S:23 = 1
Current (x10 ms) S:3 (low byte) = 1
Watchdog (x10 ms) S:3 (high byte) = 160
Last 1ms Scan Time S:35 = 9
Scan Toggle Bit S:33/9 = 0
Time Base Selection S:33/13 = 0
```

**Math**

```
Math Overflow Selected S:2/14 = 0          Math Register (lo word) S:13 = -462
Overflow Trap S:5/0 = 0                    Math Register (high word) S:14-S:13 = -1
Carry S:0/0 = 0                            Math Register (32 Bit) S:14-S:13 = -462
Overflow S:0/1 = 0
Zero Bit S:0/2 = 0
Sign Bit S:0/3 = 0
```

**IO**

```
I/O Interrupt Executing S:32 = 0            Interrrupt Latency Control S:33/8 = 0
                                            Event Interrupt 10 uS Time Stamp S:44 = 0

I/O Slot Enables: S:11 _S:12
0               10              20              30
11111111       11111111       11111111       11111111

I/O Slot Interrupt Enables: S:27 _S:28
0               10              20              30
11111111       11111111       11111111       11111111

I/O Slot Interrupt Pending: S:25 _S:26
0               10              20              30
00000000       00000000       00000000       00000000
```

**Chan 0**

```
Processor Mode S:1/0- S:1/4 = Remote Run
Channel Mode S:33/3 = 1                    DTR Control Bit S:33/14 = 0
Comms Active S:33/4 = 0                    DTR Force Bit S:33/15 = 0
Incoming Cmd Pending S:33/0 = 0            Outgoing Msg Cmd Pending S:33/2 = 0
Msg Reply Pending S:33/1 = 0               Comms Servicing Sel S:33/5 = 0
                                           Msg Servicing Sel S:33/6 = 0
                                           Modem Lost S:5/14 = 1
```

Data File S2 (hex) -- STATUS

**Ch 0 Nodes**

DF1 Half-Duplex Master Channel 0 Active Node Table (S:67-S:82):

| Node | 0 | 16 |
|---|---|---|
| 0 | 0000-0000-0000-0000 | 0000-0000-0000-0000 |
| 32 | 0000-0000-0000-0000 | 0000-0000-0000-0000 |
| 64 | 0000-0000-0000-0000 | 0000-0000-0000-0000 |
| 96 | 0000-0000-0000-0000 | 0000-0000-0000-0000 |
| 128 | 0000-0000-0000-0000 | 0000-0000-0000-0000 |
| 160 | 0000-0000-0000-0000 | 0000-0000-0000-0000 |
| 192 | 0000-0000-0000-0000 | 0000-0000-0000-0000 |
| 224 | 0000-0000-0000-0000 | 0000-0000-0000-0000 |

**Chan 1**

Processor Mode S:1/0- S:1/4 = Remote Run
Node Address S:15 (low byte) = 1
Baud Rate S:15 (high byte) = 19200
Comms Active S:1/7 = 1
Incoming Cmd Pending S:2/5 = 0
Msg Reply Pending S:2/6 = 0
Outgoing Msg Cmd Pending S:2/7 = 0
Comms Servicing Sel S:2/15 = 1
Msg Servicing Sel S:33/7 = 0

Active Nodes: S:9 _S:10

| 0 | 10 | 20 | 30 |
|---|---|---|---|
| 11000000 | 00000000 | 00000000 | 00000000 |

**Debug**

Suspend Code S:7 = 0
Suspend File S:8 = 0
Compiled For Single Step S:2/4 = Yes
Test Single Step Breakpoint
Rung # S:18 = 0
File # S:19 = 0

Fault/Powerdown
Fault/Powerdown (Rung #) S:20 = 54
(File #) S:21 = 2
Test Single Step
Rung # S:16 = 0
File # S:17 = 2

**Errors**

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
M0/M1 Referenced On Disabled
Slot S:5/4 = 0
Battery Low S:5/11 = 0
Fault/Powerdown (Rung #) S:20 = 54
(File #) S:21 = 2
ASCII String Manipulation error S:5/15 = 0
Fault Routine S:29 = 0
Major Error S:6 = 0h
Error Description:

**STI**

Setpoint (x10ms) S:30 = 0
File Number S:31 = 0
10 uS Time Stamp S:43 = 0
Pending Bit S:2/0 = 0
Enable Bit S:2/1 = 1
Resolution Select Bit S:2/10 = 0
Executing Bit S:2/2 = 0
Overflow Bit S:5/10 = 0
Lost S:36/9 = 0
Interrrupt Latency Control S:33/8 = 0

**DII**

Preset S:50 = 0
Accumulator S:52 = 0
Pending Bit S:2/11 = 0
Enable Bit S:2/12 = 1
Executing Bit S:2/13 = 0
Reconfiguration Bit S:33/10 = 0
Overflow Bit S:5/12 = 0
Lost S:36/8 = 0
10 uS Time Stamp S:45 = 0
File Number S:46 = 0
Slot Number S:47 = 0
Bit Mask S:48 = 0h
Compare Value S:49 = 0h
Return Mask S:51 = 0h
Last Scan Time (x1 ms) S:55 = 0
Max Observed Scan Time (x1 ms) S:56 = 0
Interrrupt Latency Control S:33/8 = 0

**Protection**

Deny Future Access S:1/14 = No

**Mem Module**

Memory Module Loaded On Boot S:5/8 = 0
Password Mismatch S:5/9 = 0
Load Memory Module On Memory Error S:1/10 = 0
Load Memory Module Always S:1/11 = 0
Load Memory Module and RUN S:1/12 = 0
Program Compare S:2/9 = 0
Data File Overwrite Protection Lost S:36/10 = 0

**Forces**

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

Data File B3 (bin) -- BINARY

| 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 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | |
| B3:1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| B3:2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | |

Data File T4 -- TIMER

| Offset | EN | TT | DN | BASE | PRE | ACC | (Symbol) | Description |
|---|---|---|---|---|---|---|---|---|
| T4:0 | 1 | 1 | 0 | 1.0 sec | 50 | 0 | | |
| T4:1 | 0 | 0 | 0 | 1.0 sec | 5 | 0 | | |
| T4:2 | 0 | 0 | 0 | 1.0 sec | 5 | 0 | | |
| T4:3 | 0 | 0 | 0 | .01 sec | 50 | 0 | | |
| T4:4 | 0 | 0 | 0 | .01 sec | 100 | 0 | | |
| T4:5 | 0 | 0 | 0 | .01 sec | 200 | 0 | | |
| T4:6 | 0 | 0 | 0 | .01 sec | 10000 | 0 | | |
| T4:7 | 0 | 0 | 0 | .01 sec | 200 | 0 | | |
| T4:8 | 1 | 0 | 1 | .01 sec | 50 | 50 | | |
| T4:9 | 0 | 0 | 0 | .01 sec | 100 | 100 | | |
| T4:10 | 1 | 0 | 1 | .01 sec | 50 | 50 | | |
| T4:11 | 1 | 1 | 0 | .01 sec | 150 | 52 | | |
| T4:12 | 1 | 0 | 1 | .01 sec | 50 | 50 | | |
| T4:13 | 1 | 1 | 0 | .01 sec | 50 | 42 | | |
| T4:14 | 0 | 0 | 0 | .01 sec | 200 | 0 | | |
| T4:15 | 0 | 0 | 0 | .01 sec | 200 | 0 | | |
| T4:16 | 0 | 0 | 0 | .01 sec | 100 | 100 | | |

Data File C5 -- COUNTER

| Offset | CU | CD | DN | OV | UN | UA | PRE | ACC | (Symbol) | Description |
|---|---|---|---|---|---|---|---|---|---|---|
| C5:0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 3 | | |
| C5:1 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 0 | | |

Data File R6 -- CONTROL

| 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 | | |

Data File N7 (dec) -- INTEGER

| Offset | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| N7:0 | -480 | 43 | 0 | 0 | 2650 | 0 | 16520 | -16520 | 1037 | -146 |
| N7:10 | 0 | 0 | 0 | 231 | -231 | 92 | 18048 | -18048 | 1044 | -231 |
| N7:20 | 462 | -462 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| N7:30 | 0 | 333 | 0 | | | | | | | |

Data File F8 -- FLOAT

| Offset | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| F8:0 | -2 | 0 | -1 | 0 | 0 |
| F8:5 | 0 | 0 | 0 | -1 | 25600 |
| F8:10 | 869172 | 825713.4 | 651879 | 217293 | 43458.6 |
| F8:15 | 191693 | 242893 | 626279 | 677479 | 0 |
| F8:20 | 822189.8 | | | | |

Data File N9 (dec)

| Offset | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| N9:0 | 14000 | 17500 | 3000 | -2000 | 650 | 150 | 60 | 300 | 25 | 45 |
| N9:10 | 700 | 0 | 0 | 740 | 740 | | | | | |

Data File N10 (dec)

| Offset | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| N10:0 | -31744 | 9 | 1 | 7 | 137 | 0 | 0 | 164 | 10 | 146 |
| N10:10 | 0 | 2 | 256 | 0 | -16384 | 9 | 2 | 7 | 137 | 1 |
| N10:20 | 0 | 228 | 10 | 146 | 1 | 4 | 2304 | 0 | 0 | 0 |
| N10:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| N10:40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| N10:50 | -30708 | 16384 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| N10:60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |

Data File N11 (dec)

| Offset | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| N11:0 | 20 | 20 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| N11:10 | 0 | 0 | 0 | 0 | 0 | | | | | |

Data File N12 (dec)

| Offset | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| N12:0 | 1 | 769 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| N12:10 | 770 | 25 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 |
| N12:20 | 128 | -32767 | -32767 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| N12:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| N12:40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Address (Symbol) = Value [Description]

# Address/Symbol Database

| Address | Symbol | Scope | Description | Sym Group | Dev. Code | ABV |
|---|---|---|---|---|---|---|
| B3:0/6 | | | Fully Seated Status Bit | | | |
| B3:0/7 | | | Nearly Seated Status Bit | | | |
| B3:0/8 | | | >=25% Open Status Bit | | | |
| B3:0/9 | | | >=75% Open Status Bit | | | |
| B3:0/10 | | | >=95% Open Status Bit | | | |
| B3:0/11 | | | >=100% Open Status Bit | | | |
| I:3.0 | | | Span Speed Control Command | | | |
| I:3.2 | | | Drive Motor West Current | | | |
| I:3.3 | | | Drive Motor East Current | | | |
| I:6/0 | | | E-Stop | | | |
| I:6/1 | | | Control Power | | | |
| I:6/2 | | | Warning Signal Switch | | | |
| I:6/3 | | | East End Oncoming Raise Switch | | | |
| I:6/4 | | | East End Oncoming Lower Switch | | | |
| I:6/5 | | | West End Oncoming Raise Switch | | | |
| I:6/6 | | | West End Oncoming Lower Switch | | | |
| I:6/7 | | | West End Offgoing Raise Switch | | | |
| I:6/8 | | | West End Offgoing Lower Switch | | | |
| I:6/9 | | | End Locks Engage Switch | | | |
| I:6/10 | | | End Locks Retract Switch | | | |
| I:6/11 | | | Dead Man Switch | | | |
| I:6/12 | | | Span Controller Raise Switch | | | |
| I:6/13 | | | Span Controller Lower Switch | | | |
| I:6/14 | | | East End Offgoing Raise Switch | | | |
| I:6/15 | | | East End Offgoing Lower Switch | | | |
| I:7/0 | | | Traffic Signal Bypass Switch | | | |
| I:7/1 | | | All Gates Down Bypass Switch | | | |
| I:7/2 | | | All Gates Up Bypass Switch | | | |
| I:7/3 | | | End Locks Retract Bypass Switch | | | |
| I:7/4 | | | End Locks Engage Bypass Switch | | | |
| I:7/5 | | | Span Fully Seated Bypass Switch | | | |
| I:7/6 | | | Allow High Speeds Bypass Switch | | | |
| I:7/7 | | | Lamp Test Switch | | | |
| I:7/8 | | | Alignment Light Off/On Switch | | | |
| I:7/9 | | | Lubrication Pumps On/Off Switch | | | |
| I:7/10 | | | Spare? | | | |
| I:7/11 | | | Traffic Gate North East Oncoming Raised | | | |
| I:7/12 | | | Traffic Gate North East Oncoming Lowered | | | |
| I:7/13 | | | Traffic Gate South East Offgoing Raised | | | |
| I:7/14 | | | Traffic Gate South East Offgoing Lowered | | | |
| I:7/15 | | | Traffic Signal - Stop East End Feedback | | | |
| I:8/0 | | | Drive Motor North East Running | | | |
| I:8/1 | | | Drive Motor North East Fail | | | |
| I:8/2 | | | Drive Motor North East Remote | | | |
| I:8/3 | | | Drive Motor North East Fault Reset | | | |
| I:8/4 | | | Drive Motor South East Running | | | |
| I:8/5 | | | Drive Motor South East Fail | | | |
| I:8/6 | | | Drive Motor South East Remote | | | |
| I:8/7 | | | Drive Motor South East Fault Reset | | | |
| I:8/8 | | | Rotary Cam Fully Seated | | | |
| I:8/9 | | | Rotary Cam Nearly Seated | | | |
| I:8/10 | | | Rotary Cam >= 25% Open | | | |
| I:8/11 | | | Rotary Cam >= 75% Open | | | |
| I:8/12 | | | Rotary Cam >= 95% Open | | | |
| I:8/13 | | | Rotary Cam >= 100% Open | | | |
| I:8/14 | | | Proximity Switch Bridge Fully Seated | | | |
| I:8/15 | | | Thruster Brake Release | | | |
| N7:0/0 | | | Traffic Gate North West End Oncoming Raise (Remote Side) | | | |
| N7:0/1 | | | Traffic Gate North West End Oncoming Lower (Remote Side) | | | |
| N7:0/2 | | | Traffic Gate South West End Offgoing Raise (Remote Side) | | | |
| N7:0/3 | | | Traffic Gate South West End Offgoing Lower (Remote Side) | | | |
| N7:0/4 | | | West Side Traffic Signal Red On (Remote Side) | | | |
| N7:0/6 | | | End Lock Engage (Remote Side) | | | |
| N7:0/7 | | | End Lock Retract (Remote Side) | | | |
| N7:0/8 | | | Alignment Light On (Remote Side) | | | |
| N7:1/0 | | | Traffic Signal Status (Remote Side) | | | |
| N7:1/1 | | | Traffic Gate Status Northwest Raised (Remote Side) | | | |
| N7:1/2 | | | Traffic Gate Status North West Lowered (Remote Side) | | | |
| N7:1/3 | | | Traffic Gate Status South West Raised (Remote Side) | | | |
| N7:1/4 | | | Traffic Gate Status South West Lowered (Remote Side) | | | |
| N7:1/5 | | | End Lock Engaged (Remote Side) | | | |
| N7:1/6 | | | End Lock Retracted (Remote Side) | | | |
| O:4.0 | | | Bridge Position Panel Meter | | | |
| O:4.1 | | | North-East Motor Current Panel Meter | | | |
| O:4.2 | | | South-East Motor Current Panel Meter | | | |
| O:5.0 | | | West Drive Motor Speed Reference | | | |
| O:5.1 | | | East Drive Motor Speed Reference | | | |
| O:5.2 | | | North-East Motor RPM | | | |
| O:5.3 | | | South-East Motor RPM | | | |
| O:9/0 | | | Traffic Gate North East Oncoming Raise | | | |
| O:9/1 | | | Traffic Gate North East Oncoming Lower | | | |
| O:9/2 | | | Traffic Gate South East Offgoing Raise | | | |
| O:9/3 | | | Traffic Gate South East Offgoing Lower | | | |
| O:9/4 | | | Traffic Signal Stop Command | | | |

Address/Symbol Database

| Address | Symbol | Scope | Description | Sym Group | Dev. Code | ABV |
|---|---|---|---|---|---|---|
| O:9/5 | | | Alignment Lighting Control On Command | | | |
| O:9/6 | | | Lubrication Pump North On Command | | | |
| O:9/7 | | | Lubrication Pump South On Command | | | |
| O:10/2 | | | Parking Brake North East Release Command | | | |
| O:10/3 | | | Spare? | | | |
| O:10/4 | | | Siren On Command | | | |
| O:10/5 | | | North East Drive Run Enable | | | |
| O:10/6 | | | North East Drive Run Forward | | | |
| O:10/7 | | | North East Drive Run Reverse | | | |
| O:10/8 | | | South East Drive Enable | | | |
| O:10/9 | | | South East Drive Normal | | | |
| O:10/13 | | | Warning Bell/Light and Flasher | | | |
| O:10/14 | | | Navigation Light - Green Control Command | | | |
| O:10/15 | | | Navigation Light - Red Control Command | | | |
| O:11/0 | | | Revolution Counter Error Light | | | |
| O:11/1 | | | East End Gate Oncoming Lowered Light | | | |
| O:11/2 | | | East End Gate Offgoing Lowered Light | | | |
| O:11/3 | | | West End Gate Oncoming Lowered Light | | | |
| O:11/4 | | | West End Gate Offgoing Lowered Light | | | |
| O:11/5 | | | Fully Seated Light | | | |
| O:11/6 | | | Not Seated Light | | | |
| O:11/7 | | | End Locks Engaged Light | | | |
| O:11/8 | | | End Locks Retracted Light | | | |
| O:11/9 | | | Open >= 25% Light | | | |
| O:11/10 | | | Open >=75% Light | | | |
| O:11/11 | | | Open 100% Light | | | |
| O:11/12 | | | Radio Comm Fail Light | | | |
| 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 | | | |

Address/Symbol Database

| Address | Symbol | Scope | Description | Sym Group | Dev. Code | ABV |
|---|---|---|---|---|---|---|
| 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 | | | |
| 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 Disable,Fl | | | |
| S:35 | | | Last 1 ms Scan Time | | | |
| S:36 | | | Extended Minor Error Bits | | | |
| S:36/8 | | | DII 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 | | | DII 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 Number | | | |
| S:51 | | | Discrete Input Interrupt- Return Number | | | |
| S:52 | | | Discrete Input Interrupt- Accumulat | | | |
| S:53 | | | Reserved/ Clock Calendar Day of the Week | | | |
| S:55 | | | Last DII Scan Time | | | |
| S:56 | | | Maximum Observed DII 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 Database

| Address | Symbol | Scope | Description | Sym Group | Dev. Code | ABV |
|---|---|---|---|---|---|---|
| S:86 | | | DH+ Active Nodes | | | |

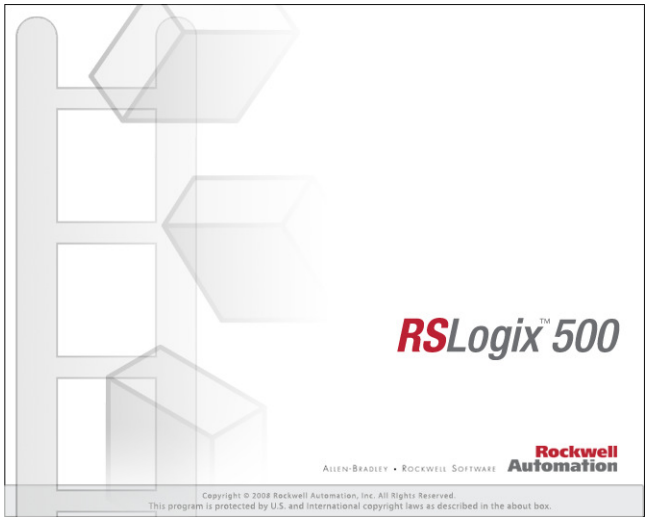
Instruction Comment Database

| Address | Instruction | Description |
|---|---|---|

Symbol Group Database

| Group_Name | Description |
|---|---|

# RSLogix 500 Project Report



## Processor Information

Processor Type: Bul.1761 MicroLogix 1000 DH-485/HDSlave

Processor Name: RTU

Total Memory Used: 246 Instruction Words Used - 410 Data Table Words Used

Total Memory Left: 695 Instruction Words Left

Program Files: 17

Data Files: 8

Program ID: 8931

I/O Configuration

| | | |
|---|---|---|
| 0 | Bul.1761 | MicroLogix 1000 DH-485/HDSlave |

## Channel Configuration

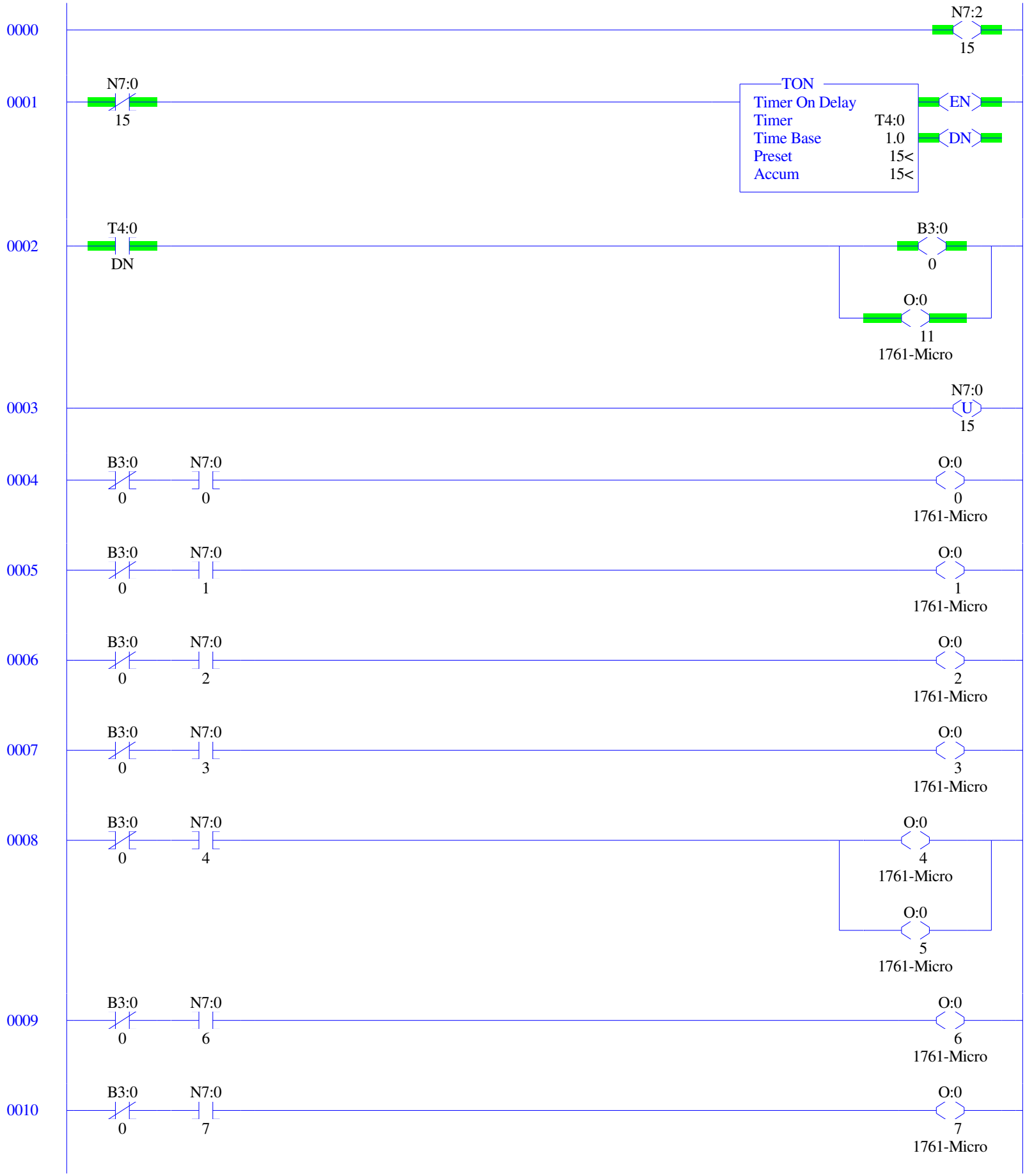
DF1 Baud: 19200
DF1 Node : 9 (decimal)
DH485 Baud: 19200
DH485 Node : 1 (decimal)
Primary Protocol: DF1
DF1: DF1 Full Duplex

Program File List

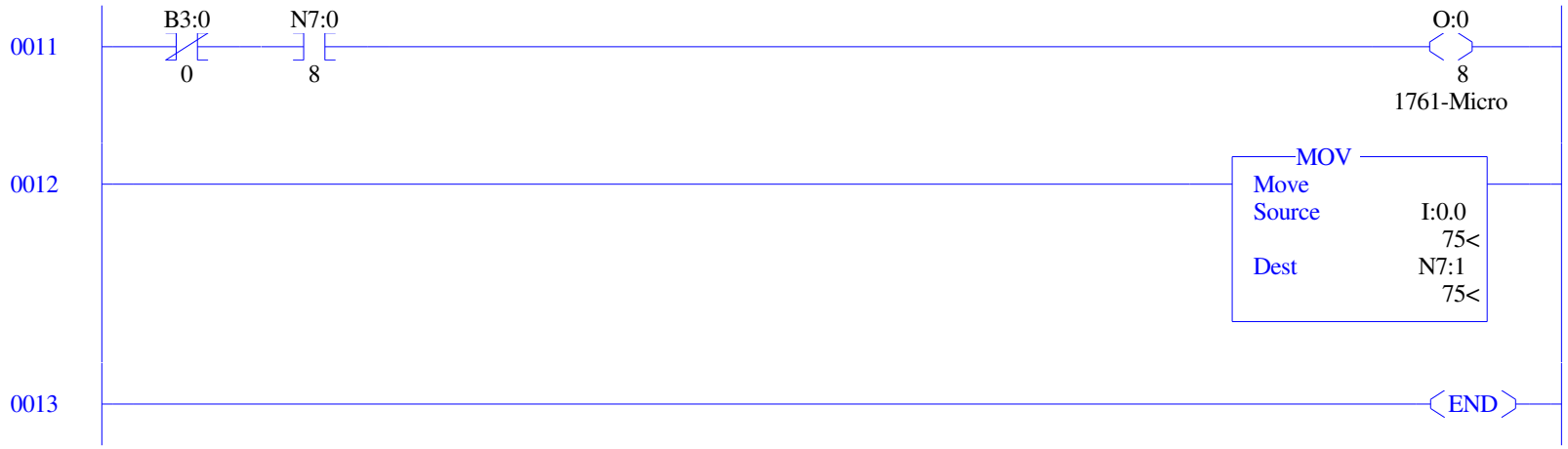
| Name | Number | Type | Rungs | Debug | Bytes |
|---|---|---|---|---|---|
| [SYSTEM] | 0 | SYS | 0 | No | 0 |
| | 1 | SYS | 0 | No | 0 |
| MAIN_PROG | 2 | LADDER | 14 | No | 278 |
| USER_FAULT | 3 | LADDER | 1 | No | 3 |
| HSC_INT | 4 | LADDER | 1 | No | 3 |
| STI_INT | 5 | LADDER | 1 | No | 3 |
| | 6 | LADDER | 1 | No | 3 |
| | 7 | LADDER | 1 | No | 3 |
| | 8 | LADDER | 1 | No | 3 |
| | 9 | LADDER | 1 | No | 3 |
| | 10 | LADDER | 1 | No | 3 |
| | 11 | LADDER | 1 | No | 3 |
| | 12 | LADDER | 1 | No | 3 |
| | 13 | LADDER | 1 | No | 3 |
| | 14 | LADDER | 1 | No | 3 |
| | 15 | LADDER | 1 | No | 3 |
| | 16 | LADDER | 1 | Yes | 3 |

Data File List

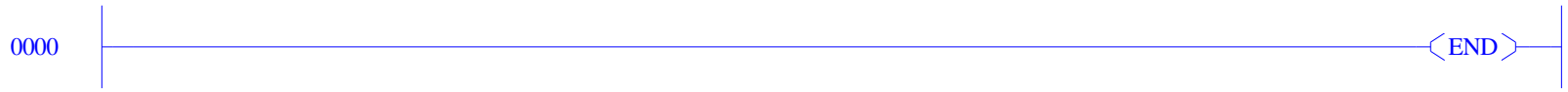
| Name | Number | Type | Scope | Debug | Words | Elements | Last |
|---|---|---|---|---|---|---|---|
| OUTPUT | 0 | O | Global | No | 3 | 1 | O:0 |
| INPUT | 1 | I | Global | No | 6 | 2 | I:1 |
| STATUS | 2 | S | Global | No | 0 | 33 | S:32 |
| BINARY | 3 | B | Global | No | 32 | 32 | B3:31 |
| TIMER | 4 | T | Global | No | 120 | 40 | T4:39 |
| COUNTER | 5 | C | Global | No | 96 | 32 | C5:31 |
| CONTROL | 6 | R | Global | No | 48 | 16 | R6:15 |
| INTEGER | 7 | N | Global | No | 105 | 105 | N7:104 |


0000
N7:2
15
0001
N7:0
15
TON
Timer On Delay
Timer T4:0
Time Base 1.0
Preset 15<
Accum 15<
EN
DN
0002
T4:0
DN
B3:0
0
O:0
11
1761-Micro
0003
N7:0
U
15
0004
B3:0
0
N7:0
0
O:0
0
1761-Micro
0005
B3:0
0
N7:0
1
O:0
1
1761-Micro
0006
B3:0
0
N7:0
2
O:0
2
1761-Micro
0007
B3:0
0
N7:0
3
O:0
3
1761-Micro
0008
B3:0
0
N7:0
4
O:0
4
1761-Micro
O:0
5
1761-Micro
0009
B3:0
0
N7:0
6
O:0
6
1761-Micro
0010
B3:0
0
N7:0
7
O:0
7
1761-Micro

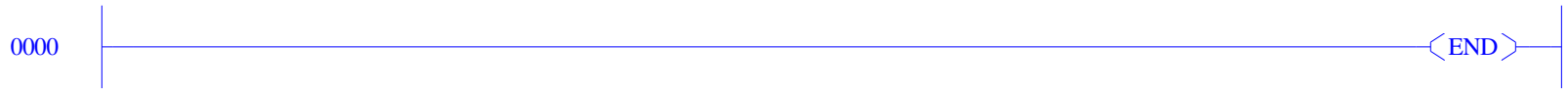
LAD 2 - MAIN_PROG --- Total Rungs in File = 14



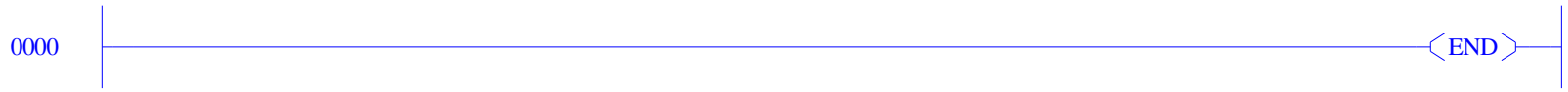
LAD 3 - USER_FAULT --- Total Rungs in File = 1



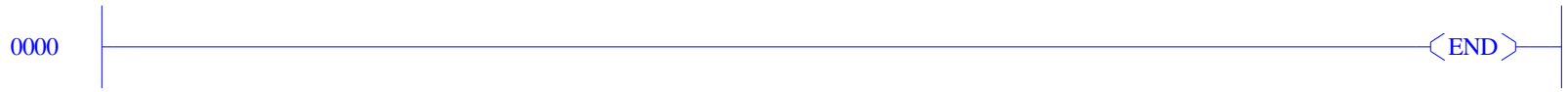
LAD 4 - HSC_INT --- Total Rungs in File = 1



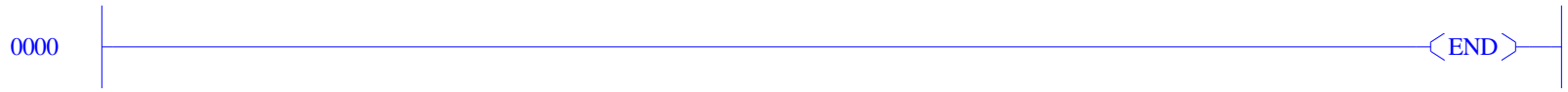
LAD 5 - STI_INT --- Total Rungs in File = 1



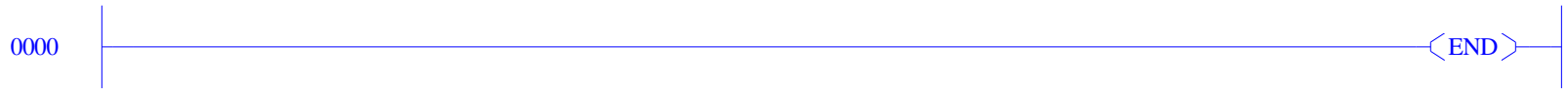
LAD 6 - --- Total Rungs in File = 1



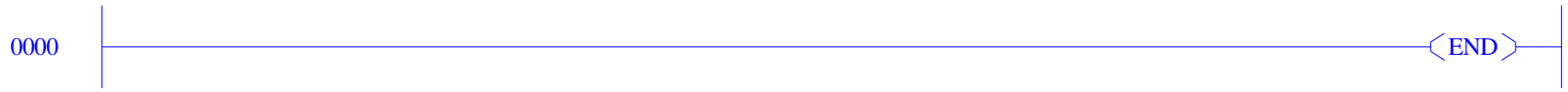
LAD 7 - --- Total Rungs in File = 1



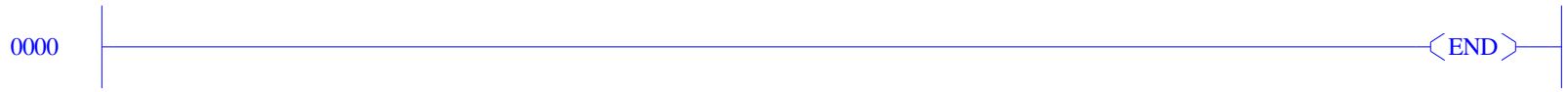
LAD 8 - --- Total Rungs in File = 1



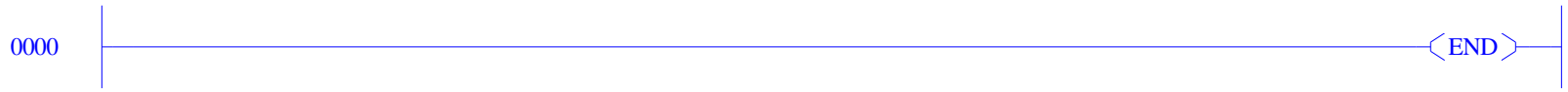
LAD 9 - --- Total Rungs in File = 1



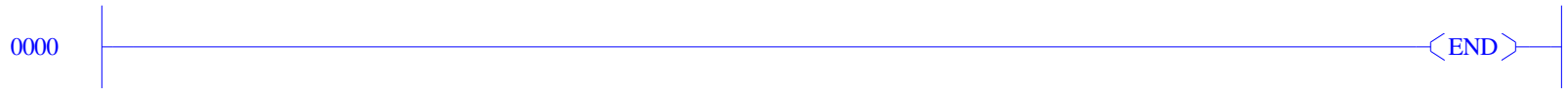
LAD 10 - --- Total Rungs in File = 1



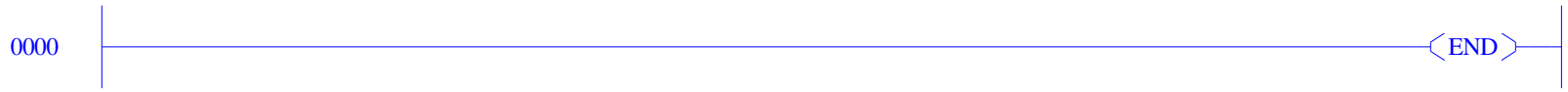
LAD 11 - --- Total Rungs in File = 1



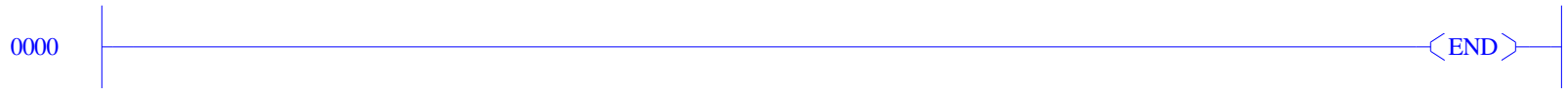
LAD 12 - --- Total Rungs in File = 1



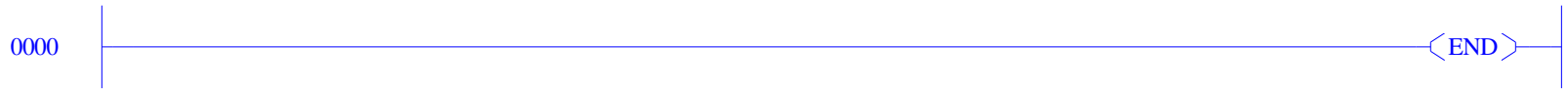
LAD 13 - --- Total Rungs in File = 1



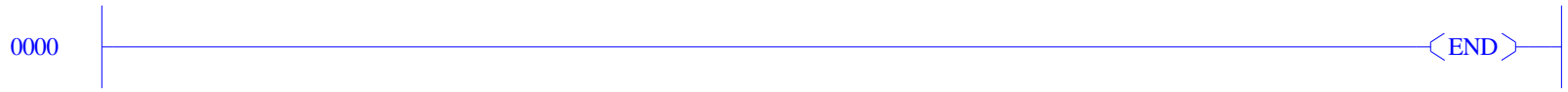
LAD 14 - --- Total Rungs in File = 1



LAD 15 - --- Total Rungs in File = 1



LAD 16 - --- Total Rungs in File = 1



Data File O0 (bin) -- OUTPUT

| Offset | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O:0.0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Bul.1761 | MicroLogix 1000 DH-485/HDSlave |

Data File I1 (bin) -- INPUT

| 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 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | Bul.1761 | MicroLogix 1000 DH-485/HDSlave |
| I:0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Bul.1761 | MicroLogix 1000 DH-485/HDSlave |

Data File S2 (hex) -- STATUS

**Main**

First Pass S:1/15 = No
Index Register S:24 = 0
Free Running Clock S:4 = 1111-1110-0100-0001

**Scan Times**

Maximum (x10 ms) S:22 = 1
Current (x10 ms) S:3 (low byte) = 0
Watchdog (x10 ms) S:3 (high byte) = 50

**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

**Debug**

Suspend Code S:7 = 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 = No
Deny Future Access S:1/14 = No

**Forces**

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

Data File B3 (bin) -- BINARY

| 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 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| B3:1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| B3:2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| B3:3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| B3:4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 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 | |

Data File T4 -- TIMER

| Offset | EN | TT | DN | BASE | PRE | ACC | (Symbol) Description |
|---|---|---|---|---|---|---|---|
| T4:0 | 1 | 0 | 1 | 1.0 sec | 15 | 15 | |
| T4:1 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:2 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:3 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:4 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:5 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:6 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:7 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:8 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:9 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:10 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:11 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:12 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:13 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:14 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:15 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:16 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:17 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:18 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:19 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:20 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:21 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:22 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:23 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:24 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:25 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:26 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:27 | 0 | 0 | 0 | .01 sec | 0 | 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 | 0 | 0 | |
| T4:32 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:33 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:34 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:35 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:36 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:37 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:38 | 0 | 0 | 0 | .01 sec | 0 | 0 | |
| T4:39 | 0 | 0 | 0 | .01 sec | 0 | 0 | |

Data File C5 -- COUNTER

| Offset | CU | CD | DN | OV | UN | UA | PRE | ACC | (Symbol) Description |
|---|---|---|---|---|---|---|---|---|---|
| C5:0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| C5:1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| C5:2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| C5:3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| C5:4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| C5:5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| C5:6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| C5:7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| C5:8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| C5:9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| C5:10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| C5:11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| C5:12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| C5:13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| C5:14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| C5:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 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 | |

Data File R6 -- CONTROL

| 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 | | |

Data File N7 (dec) -- INTEGER

| Offset | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| N7:0 | 32288 | 75 | -32768 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| N7:10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| N7:20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| N7:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| N7:40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| N7:50 | 0 | 0 | 0 | 0 | 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 Database

| Address | Symbol | Scope | Description | Sym Group | Dev. Code | ABV | BLW |
|---|---|---|---|---|---|---|---|
| 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 | | | | |
| 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 | | | | |

Address/Symbol Database

| Address | Symbol | Scope | Description | Sym Group | Dev. Code | ABV | BLW |
|---|---|---|---|---|---|---|---|
| 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 Disable,Fl | | | | |
| S:35 | | | Last 1 ms Scan Time | | | | |
| S:36 | | | Extended Minor Error Bits | | | | |
| S:36/8 | | | DII 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 | | | DII 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 Number | | | | |
| S:51 | | | Discrete Input Interrupt- Return Number | | | | |
| S:52 | | | Discrete Input Interrupt- Accumulat | | | | |
| S:53 | | | Reserved/ Clock Calendar Day of the Week | | | | |
| S:55 | | | Last DII Scan Time | | | | |
| S:56 | | | Maximum Observed DII 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 | | | | |
| S:86 | | | DH+ Active Nodes | | | | |

Instruction Comment Database

| Address | Instruction | Description |
|---|---|---|

Symbol Group Database

| Group_Name | Description |
|---|---|

AECOM

# D STREET LEAF BRIDGE
# PETALUMA, CA.

## Electrical Report

# Table of Contents

# 1 Electrical

## 1.1 Summary

AECOM performed an in-depth electrical inspection of the D St. Bridge on June 19 and 20, 2018. The bridge electrical hardware and control systems were found to be in generally fair operating condition with the exceptions detailed in this report.

Deficiencies observed during the electrical inspection include, but are not limited to; deteriorating exterior flexible liquid tight conduits, improperly supported conduits, and moderate to heavy corrosion on main electrical equipment enclosures, motors as well as electrical disconnects. The north east pit thruster brake insulation values were found to be below the recommended values in IEEE 43-2013 (Recommended Practice for Testing Insulation Resistance of Rotating Machinery). In all other motors the insulation resistance results tested were within the acceptable threshold indicated in IEEE 43-2013. The bridge power and control system are functional. Additional deficiencies and findings are listed in this report.

This report includes an overall description of the bridge, electrical inspection findings, analyses of the findings and recommended repairs including associated costs. The report Appendices includes Electrical Data Tables, Photographs of Deficiencies, Chart Recording Graphs, and insulation resistance Tables.

## 1.2 Scope of Inspection

AECOM performed the electrical inspection of the single leaf bascule bridge at the city of Petaluma, CA. The bridge electrical system was inspected by team leader, Senior Electrical Engineer, Carlos Turcios PE on June 2018 to evaluate the condition of the existing electrical power and control systems of the bridge. An in-depth inspection of the complete electrical system was performed that included visual and auditory inspection of all electrical components, including the main span motors, motor machinery brakes, programmable logic control (PLC) based control systems, traffic control devices, power distribution equipment, conduit/wiring, navigation aids, and control house lighting systems. The bridge position indicators at the control console were observed during operation.

Span motor electrical currents were recorded over multiple operating cycles. Chart recording of motor current for span locks were also documented. Insulation testing was performed on several motor feeders. Navigation lighting was inspected for minimal compliance with water requirements. The electrical inspection was performed in accordance with the requirements of the AASHTO Movable Bridge Inspection, Evaluation and Maintenance Manual.

The insulation resistance (megger) testing of the individual conductors within the droop cables was not performed. In addition, bypass testing of the control system was not performed during the inspection.

Equipment and motor nameplate data and condition assessment notes are included in Appendix A. Photographs of deficiencies noted are included under Appendix B. All chart recording graphs and insulation testing data are presented in Appendix C.

## 1.3 Electrical Descriptions and Findings

### 1.3.1 Electric Service and Power Distribution

Local electrical utility point of connection consists of two independent electrical services. The north side of the bridge is served by an exterior 600A service with a 400A fuse holder section with a 225A fuse located on a NEMA-3R, 65K Amps interrupting capacity (AIC) service entrance rated switchboard enclosure. The south side of the bridge is served by an exterior 100A service with a 100A main located in a 400A NEMA-3R service entrance rated switchboard. Each electrical service is a 3-phase, 4-wire rated at 240/120V connection.

The D St. Bascule Bridge is equipped with a control house located on the North-West end of the bridge that houses the 600A split bus motor control center (MCC-1) and power distribution equipment. MCC-1 receives power from the 600A exterior service entrance rated switch board. One bus of the MCC-1 powers a lighting panel (LP1), a 3/4-HP sump pump and a monitoring circuit for a voltmeter located on the control console. The other bus at the same MCC-1 powers two bridge span 25-HP motors through vector drives, two 2-HP parking brake thrusters, two 2-HP traffic gates, and two 0.5-HP lubrication pumps. The lubrication pumps are out of service and have been abandoned in place.

Lighting panel LP1 inside the control house distributes power to light and receptacles inside the control house, control console, north navigation and street lights, warning signals, motor heaters, alignment and fender lights, water heater, wall heater and north pits light and receptacles.

On the South Westof the bridge is located a 400A 42K AIC switchboard (MCC-2) with a 100A Main Breaker that powers a lighting panel (LP2), a 2-HP end lock motor and two 2-HP traffic gates.

Lighting panel LP2 distributes power to lights and receptacles in the end lock machinery pit, south warning signals and bells, south alignment and fender lights, south street lights and 120V devices in side MCC-2 such as heaters, PLC and wireless equipment.

### 1.3.2 Service Entrance Switchboard

The existing 600A switchboard houses a 400A (200A fused) disconnect which was installed about 18 years ago. It shows signs of metal skin deterioration due to corrosion on portions of the exterior, interior, below the ceiling, and handles of the enclosure. Rust corrosion on the metal skin of the enclosure may indicate internal electrical parts with possible moisture and condensation of water. Circuit breakers and other tripping devices damaged by water condensation may not trip when an electrical overload occurs creating an unsafe condition for personnel. The enclosure was not identified with an Arc Flash Label which is required by NFPA-

70E (Standard for Electrical Safety in the Workplace) and identifies the hazard potential when the switchboard is energized.

At the span opening, the amperage on the incoming lines ramped up to 74 Amps. While closing, after ramping up to full speed, the motor drew 22.5 amps of current. Refer to appendix C for additional information. Refer to Photos E-1, E-2, E-3 and E-4 for pictures of Service Entrance Switchboard findings.

### 1.3.3 MCC-1

The existing MCC-1 located in the control house electrical room is a 600A MCC manufactured by Cutler-Hammer Freedom Series 2100 and installed about 18-years ago. It is in good condition over all. Recently one of the 40-HP motor vector controllers manufactured by Baldor was serviced/replaced including its associated breaking resistor. The enclosure was not identified with an Arc Flash Label.

### 1.3.4 MCC-2

The existing MCC-2 is a 400A service entrance rated MCC located on the South West side of the bridge which was installed about 18-years ago. It shows minor signs of metal skin deterioration below the ceiling of the enclosure. The interior of the enclosure includes heat strips that remove moisture and water condensation and are powered from the interior lighting panel LP2. It was noticeable that the wireless antenna mounting hardware attached on the side of MCC-2 was very corroded and in need of replacement. The enclosure was not identified with an Arc Flash Label. Refer to photos E-5, and E-6.

### 1.3.5 Main Drive Systems

There are two main drive control systems located inside MCC-1. Each motor span drive is a vector drive manufactured by BALDOR Catalog No ZD18H240-MO. Nameplate and torque settings are listed in the Appendix A. According to the manufacturer's website (BALDOR which is owned by ABB), the drive has been discontinued. The main drive for the North West span motor was replaced within the last 2 years. Both drives were found to be in good condition.

### 1.3.6 Main Drive Motors

Each movable span is operated by one Baldor Electric Vector Drive motor model M00-91433151. Nameplate and torque settings are listed in the Appendix A. The motors were installed about 18-years ago. Motors were visually inspected and show signs of corrosion on the body and metal plate support. Refer to Photos E-7 and E-8.

Operation of main span drive motors was observed during several bridge openings. Both motors operated successfully. During span operation, the motor currents were monitored and recorded.

At the span opening, the output of the North-West Main Drive Motor ramped up to 125 Amps for one second and then down to an average of 50 Amps. These amperage values are within the manufacturer's operating conditions. The total operating time from fully closed to fully open was

approximately 60 seconds. Similarly, the operating time from fully open to fully close was about 60 seconds. While closing, after ramping up to full speed, the motor drew 120.4 amps of current.

At the span opening, the output of the North-East Main Drive Motor ramped up to 85.4 Amps for one second and then down to an average of 50 Amps.. These amperage values are within the manufacturer's operating conditions. The total operating time from fully closed to fully open was approximately 60 seconds. Similarly, the operating time from fully open to fully close was about 60 seconds. While closing, after ramping up to full speed, the motor drew 83.3 amps of current.

### 1.3.7 Brake Thruster Motors

There are two Electro Thrust- release shoe type brakes located in each pit. One in the North-West machinery pit and one in the North-East machinery pit. Each motor is equipped with a 2-HP motor. Motors are equipped with a disconnect switch located in-sight of the motor. Full nameplate settings are located in Appendix A. The brakes and thruster motors, hand release mechanisms, and limit switches were visually inspected during operation and were found to be in fair operating condition. Each brake is only equipped with a single limit switch.

It was noted during the insulation resistance test that the insulation on the North-West Electro Thrust motor, which prevents interconnection between the motor windings to earth, was 0.1 Mega Ohms. This value is well below the 100 Mega Ohm which is the minimum accepted value per IEEE 43-2013. Low insulation resistance value of the insulation indicates the high possibility of insulation failure which can cause personnel injury due to dangerous voltages, fires, high-fault currents and explosions.

At the span operation, output of the North-West brake Thruster Motor ramped up to 1.95 Amps holding a steady value of 0.9 Amps throughout the bridge operation. This amperage value is within the manufacturer's operating conditions.
At span operation, output of the North-East brake thruster Motor ramped up to 2.096 Amps holding a steady value of 0.941 Amps throughout the bridge operation. This amperage value is within the manufacturer's operating conditions.

Refer to the Insulation Resistance Testing tables in Appendix C. Refer to the data tables in Appendix B for additional details.

It appears that the Thruster Brake Motors and machinery brake are original, and for the most part, obsolete and reaching the end of its useful mechanical life.

### 1.3.8 Span Locks

There is one span lock located inside the End Lock machinery pit. The span lock is powered by a 2 HP Baldor industrial motor. Although the end lock machinery pit is underneath and covered, it is open to the environment through the lock-bridge window. The pit shows heavy collection of dust and the motor frame exhibits body corrosion (Refer to Photo E-9). Span locks are equipped

with a rotary cam limit switch for position indication. The cam limit switch shows signs of heavy corrosion on the limit switch enclosure hinge. Refer to pictures E-10 and E-11. The cam limit switch interior of the enclosure is in good condition. The base of the span lock gear and shaft coupling shows sign of extreme corrosion. Refer to pictures E-12 and E-13.

The span lock assemblies were visually inspected and observed during operation and appear to be operating properly. The motor insulation resistance test results were within the acceptable threshold indicated in IEEE 43-2013. Refer to the Insulation Resistance Testing tables in Appendix C. The overall condition of the span lock motors and electrical equipment is fair. Several components including the electric motor, conduit, limit switch junction box, and wiring exhibits moderate to severe deterioration due to corrosion. Overall, the condition of the span lock system is fair.

### 1.3.9 Bridge Control Systems

Current control system designs for movable bridges employ a redundant set of PLCs (Programmable Logic Controllers) per control location to minimize PLC point of failure and to be able to switch from one PLC to another in the event one PLC fails to operate.

The D Street Bridge control system is equipped with a single PLC Allen-Bradley SLC 5/03 in the north house main control console and a single PLC Allen-Bradley Micrologix 1000 in the south housed inside the exterior NENA-3R enclosure of MCC-2 to perform all the bridge control logic. According to the manufacturer the SLC 5/03 has reached the end of its lifecycle and is now planned to be obsolete with limited support and limited or no replacement parts. The Mircrologix 1000 has been discontinued with limited support and no replacement parts.

The operational sequence of the PLC system is interlocked so that operation of the bridge warning gates, span locks, and lift span can only occur in the proper sequence. Several control interlock tests were performed with no issues. It was noted that the bypasses are hardwired to the PLC inputs. In the event that the either PLC in the north or south fails to operate, the bridge will need to be put out of service for an extended period of time until the failed PLC is repaired or replaced.

The local indication for alarms and PLC input and output status is located on the face of the control console via an Allen Bradley PanelView local interface terminal. This local interface is obsolete and has reached the end of its lifecycle with no support from the manufacturer.

Communication between the PLC in the control console in the control room and the PLC in the south of the bridge inside MCC-2 is performed via a ZLinx wireless radio modem at each end. Bridge controls are performed through the wireless communications. The bridge control operator indicated that every time the bridge is exercised, a wireless malfunction indication at the local panel view operator interface needs to be reset.

Although the control system hardware is becoming vintage the bridge control system operated as intended.

Due to the lack of redundancy on the PLC inside the main control console and the PLC inside the MCC-2 on the south side of the bridge were found to be in severe condition in need for an upgrade.

### 1.3.10 Control Consoles

The bridge is controlled from a main console in the operator room located in the control house. The main console houses all the control and communication hardware at the control house. The face of the main console consists of selector switches, pushbuttons, indicator lights for bridge status and a local PanelView operator for PLC alarm and other bridge end devices status. The control console is equipped with a lockable steel bar that prevents unauthorized operation of the emergency bypass switches.

Attached to the side of the console is a Motorolla enclosure housing a remote terminal unit (RTU) that communicates with the weather system mounted on top of the control house. Weather signals from the RTU are hard wired to the PLC in the main control console. The RTU and weather system have been abandoned and unpowered.

Although the PLC components and the local interface terminal are outdated, they have reached the end of the manufacturer lifecycle and with limited or no support or spare parts, the components on the main control console are in satisfactory operating condition and provided correct bridge status during operations. Overall the control console was in fair condition. Refer to Photos E-14, E-15 and E-16.

### 1.3.11 Traffic Signals and Signs

There are two traffic signals on the each side of the bridge facing oncoming traffic. The bridge traffic signals are controlled from the main control console. All traffic signals were in good operating condition at the time of inspection.

### 1.3.12 Traffic Warning Gates

There are a total of four electro-mechanically operated traffic gates for the D Street Bridge. There are two gates for each approach that close one lane of traffic each. Each traffic gate has a separate gate arm to warn pedestrian traffic. A rotary cam operated limit switch within the gate housing controls the gate arm travel. A warning gong is mounted at the top of each traffic gate enclosure and all gates are equipped with an auxiliary pedestrian gate arm to block the sidewalk. There are three (3) red warning lights located along the top of each gate arm which are designed to alternately flash on and off when the bridge operator lowers the traffic gates. All warning gates are in satisfactory operating condition.

### 1.3.13 Conduit, Cables, Disconnects and Wiring

The bridge conduit system is a combination of Galvanized Rigid Steel (RGS) and Liquid Tight Flexible Metal (LFMC) used to transition from the fixed span to the movable span. The conduits are supported with conduit clamps throughout the bridge structure. There are multiple deficiencies with the conduit system specifically within the LFMC conduit:

- The LFMC conduits installed on the exterior of the bridge are beginning to fail due to improper support, exposure to the environment, UV rays and age. At locations where the conduits are broken, conductors are shown exposed creating a cavity for rain water accumulation inside the conduit.
- CCTV conductors are run with no conduits and no support.
- The North West span motor disconnect housing is damaged (bent due to external pressure) and rust is accumulating at the conduit bushing inside the enclosure.
- The North West thruster brakes disconnect was found with water intrusion in the interior of the enclosure with extreme metal corrosion in the back plate of the enclosure. This needs to be remediated immediately, as water accumulation inside the disconnect enclosure may create a low resistance fault that tripping devices such as circuit breakers can't react to putting personnel at risk of an electric shock.

Overall the GRS conduits are in good condition. The LFMC conduits are in poor condition in need for complete replacement. Junction boxes are in good condition. Conduits supports are in poor condition, CCTV conductors need conduit and conduit support, disconnects are in good to poor condition where indicated. Refer to Photos E-17 through E-29.

### 1.3.14 Limit Switches and Instrumentation

The bridge is equipped with lever-arm limit switches and rotary cam limit switches for the brakes, span locks, traffic gates and bridge positons. The limit switch equipment appears to be operating satisfactory.

SPAN FULLY SEATED LIMIT SWITCHES: The fully seated limit switches are located on the underside of the lift span, one on each corner. The fully closed limit switches appear to be in fair condition with minor surface corrosion.

BRAKE LIMIT SWITCHES: The brake limit switches appear to be in fair condition with minor surface corrosion.

SPAN ROTARY LIMIT SWITCH: Span rotary limit switches are located in the north west machinery pit and end lock machinery pit. The span rotary limit switch enclosure exhibit surface corrosion at one hinge. The end lock rotary switch exhibits a high degree of corrosion in one of its hinges.

WARNING GATE LIMIT SWITCHES: Two warning gate enclosures (one on the north side of the bridge and one on the south side of the bridge) are equipped with a rotary cam limit switch

each. Two warning gate enclosures (one on the north side of the bridge and one on the south side of the bridge) are equipped with limit switches. All the components are in fair condition.

### 1.3.15 Lighting and Receptacles

Light and receptacles at the control house and machinery pits are fair condition.

### 1.3.16 Navigational Lighting

One navigational light on the north east of the bridge appeared to be broken at the green lantern body. The navigation light on the south section below the bridge appeared to have damaged light bulbs. At the time of the inspection, with the exception noted, all navigation lights appear to be operating as intended.

### 1.3.17 Lubrication Pumps

Two lubrication pumps were found to be out of service. The power sources at MCC-1 in the control house electrical room where in the off position. The user indicated that these pumps were not used to exercise or maintain the bridge. Refer to Photo E-30.

### 1.3.18 Pedestrian Lighting

Two pedestrian pole lights were found not operational. Refer to Photos E-31 and E-32.

### 1.3.19 Operational Tests

Several span operational tests and chart recordings were performed during the inspection. The bridge operated well during each operation. Operational tests were performed from the control console located in the control house. Electrical testing that included chart recording of the main drive motors and span lock motors were performed. Electrical testing at the electrical service through the incoming feed of MCC-1 during bridge operations was also performed. AECOM performed the insulation resistance (megger) testing of selected motors. All chart recordings and insulation testing results are located in Appendix C.

The operational tests indicate that the power and controls systems are in satisfactory condition. Bride positioning was observed at the control console over the course of several test lifts. The bridge control system appeared to be operating satisfactory while raising and lowering the span. The operational sequence of the PLC system was interlocked so that operation of the bridge warning gates, span locks, and lift span could only occur in the proper sequence. Several control interlock tests were performed with no issues. During the opening sequence, the span accelerated to full speed until it reached the nearly open position and then continued in creep speed until the bridge reached the fully open position. The opening sequence took about 60 seconds. During the closing sequence, span accelerated to full speed until it reached the nearly closed position and then continued in creep speed until the bridge reached the fully closed position. The closing sequence took about 60 seconds. Drive system operated as intended.

## 1.4 Analysis and Recommendations

The bridge was rehabilitated in the year 2000. Typical life cycle for control equipment such as PLCs is between 10 to 15 years. The life cycle of power distribution hardware and equipment

varies depending on climate conditions, operating temperature, mechanical installation, and usage frequency, among other factors.

Overall, the bridge electrical power is in fair condition. The control system hardware, although functional, is in severe condition due to the lack of redundancy. The conduits and conductors that distribute power to lock starters, brake starters, motor control cabinet, control console, and braking resistors are in fair condition. None of the electrical enclosures were identified with an Arc Flash Label. OSHA (Occupational Safety and Health Administration) requires employees to perform a PPE (Personnel Protection Equipment) hazard assessment to determine necessary PPE.

It is suggested that an Arc Flash analysis is done on the distribution system and Arc Flash Labels be posted on MCCs and disconnects.

Although not required by the user, the bridge is not equipped with connections to backup power source in the event of a utility failure.

The Service Entrance Switchboard, MCC-1 and MCC-2 were found in fair condition.

Disconnects located in the north west pit associated with the span motor and thruster motors need to be replaced due to water intrusion, corrosion and enclosure damage.

All exterior Liquid Tight Flexible Metal (LFMC) conduits are in need of replacement. The flex conduit is damaged due to UV rays and weather. Flex conduit termination at clearance lights and other areas is broken and water intrusion into the conduit is expected at every rain event.

Although the main span motors show small corrosion, wear and tear due to age, they performed well during the testing. Their resistance held well above 100 Mega Ohms. However, two motors are needed to lift the bridge. If one motor or motor drive fails to operate, the bridge will need to be put out of service until the failed motor or motor drive is repaired or replaced. No redundancy on the motors creates a point of failure. Unfortunately upsizing the motors to be able to lift the bridge with only one motor is not practical or economical due to constrains in the machinery as it is installed and lack of space requirements for machinery and motors upgrade. It is recommended that one motor and one vector drive sized and configured in kind with the existing equipment be purchased and put on a secured place uninstalled within the control building to minimize downtime of the bridge upon motor or vector drive failure and replacement.

One out of two thruster motors (the thrust motor at the north west pit) failed the insulation test with a reading below 100 Mega Ohms. It is highly recommended that this motor be replaced with a motor in kind to prevent potential injuries associated with electrical faults between the motor cage (enclosure) and its windings.

The motor and machine brakes, span lock motors and rotary cam limit switches appear to be the in fair condition. The rotary cam limit switch at the end lock machinery pit is in need of replacement due to corrosion in one of its hinges.

Recommendations are shown below:

### 1.4.1 ITEMS REQUIRING IMMEDIATE ATTENTION

1. Replace the north west pit drive machinery thruster brake 2-HP motor.
2. Replace north west span motor 100A disconnect.
3. Replace north west thrust motor 30A disconnect.
4. Replace rusted steel pipe holder for the antenna pole.
5. Replace the PLC at the control house main console and the PLC at the MCC-2 with redundant PLCs at each location.
6. Replace wireless communication system.
7. Replace the main console at the control house to accommodate additional space for redundant PLCs and new operator interface. There is space at the MCC-2 to replace the existing PLC with redundant PLCs.
8. Replace all exterior mounted Liquid Tight Flexible Metal (LFMC) including conduit supports.
9. Provide galvanize conduit or flex conduit as required for CCTV cameras.
10. Repair signal from CCTV camera #4 (west river view).
11. Replace all navigational lights bulbs with LED equivalent.
12. Replace light bulb at two pedestrian light poles.

### 1.4.2 SHORT TERM OR TIMELY REPAIRS

1. Replace service entrance switchboard.
2. Replace MCC-2.
3. Clean/remove (wire brush) excess corrosion and prime paint each Span Motor Base Plate (total of 2).
4. Replace end lock rotary limit switch enclosure.
5. Clean (remove debris), remove (wire brush) rusted areas of Span Bridge Motors and Prime Paint motor enclosure.
6. Clean (remove debris), remove (wire brush) rusted areas from brake shoes components.
7. Replace missing, broken and corroded conduit supports.
8. Clean and painted span lock motors.
9. Purchase a spare Span Motor and Controller

### 1.4.3 LONG TERM ITEMS

1. Provide an Power Fault and Arc Flash Analysis for the entire electrical distribution and provide Arc Flash Labels at Service Entrance Switchboard, MCC-1, MCC-2 and power disconnects in the Pits.
2. Remove Weather System roof mounted hardware.
3. Replace limit switches.
4. Replace navigation lighting fixtures with LED equivalent.
5. Replace span lock system.
6. Replace CCTV.

## 1.5 Estimated Cost Repairs

### 1.5.1 Items Requiring Immediate Attention

| Item | Description | Unit | Qty. | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| 1. | Replace NW pit 2-HP motor | LS | 1 | 7,000 | 7,000 |
| 2. | Replace NW pit span motor 100A disconnect | LS | 1 | $1,000 | $1,000 |
| 3. | Replace NW pit thrust motor 30A disconnect | LS | 1 | $500 | $500 |
| 4. | Replace rusted steel pipe holder for the antenna pole at MCC-2 | LS | 1 | Maint. | Maint. |
| 5. | Replace the PLC at the control house main console and the PLC at the MCC-2 with redundant PLCs at each location. | LS | 2 | $15,000 | $30,000 |
| 6. | Replace wireless communication system | LS | 2 | $1,200 | $2,400 |
| 7. | Replace the main console at the control house to accommodate additional space for redundant PLCs and new operator interface | LS | 1 | $40,000 | $40,000 |
| 8. | Replace all exterior mounted Liquid Tight Flexible Metal (LFMC) including conduit supports | LF | 60 | $30 | $1,800 |
| 9. | Provide galvanize conduit or flex conduit as required for CCTV cameras | LS | 120 | $30 | $3,750 |
| 10. | Repair signal from CCTV camera #4 | LS | 1 | Maint. | Maint. |
| 11. | Replace all navigational lights bulbs with LED equivalent | LS | 1 | Maint. | Maint. |
| 12. | Replace light bulb at two pedestrian light poles | LS | 1 | Maint. | Maint. |

### 1.5.2 Important Or Timely Repairs

| Item | Description | Unit | Qty. | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| 1. | Replace service entrance switchboard | LS | 1 | $60,000 | $60,000 |
| 2. | Replace MCC-2 | LS | 1 | $50,000 | $50,000 |
| 3. | Clean/remove (wire brush) excess corrosion and prime paint each Span Motor Base Plate (total of 2). | EA | 2 | Maint. | Maint. |
| 4. | Replace end lock rotary limit switch enclosure | EA | 1 | $500 | $500 |
| 5. | Clean (remove debris), remove (wire brush) rusted areas of Span Bridge Motors and Prime Paint motor enclosure. | LS | 1 | $200 | $200 |
| 6. | Clean (remove debris), remove (wire brush) rusted areas from brake shoes components | LS | 1 | Maint. | Maint. |
| 7. | Replace missing, broken and corroded conduit supports | LS | 1 | Maint. | Maint. |
| 8. | Clean and painted span lock motors | LS | 1 | $200 | $200 |
| 9. | Spare Span motor and motor controller | EA | 1 | $20,000 | $20,000 |



### 1.5.3 Long Term Items

| Item | Description | Unit | Qty. | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| 1. | Provide a Power Fault and Arc Flash Analysis for the entire electrical distribution and provide Arc Flash Labels at Service Entrance Switchboard, MCC-1, MCC-2 and power disconnects in the Pits | LS | 1 | $5,000 | $5,000 |
| 2. | Remove Weather System roof mounted hardware | LS | 1 | $3,000 | $3,000 |
| 3. | Replace limit switches | LS | 1 | $24,000 | $24,000 |

| | | | | | |
|---|---|---|---|---|---|
| 4. | Replace navigation lighting fixtures with LED equivalent | EA | 8 | $1,000 | $8,000 |
| 5. | Replace span lock system | LS | 1 | $25,000 | $25,000 |
| 6. | Replace CCTV | LS | 1 | 20,000 | $20,000 |

# Appendix A – Data Tables

| DEFECTS | CONDITION STATUS | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| | GOOD | FAIR | POOR | SEVERE |
| Electrical | • New or like new condition<br>• No discernable problems<br>• Fully functional<br>• Megger readings above 10 Megaohms | • Minor corrosion or paint deterioration<br>• Some deterioration in electrical components and their performance<br>• Megger readings between 1 and 10 Megaohms | • Megger readings between 100K and 1 Meg-ohms | • Megger readings less than 100K |
| Operation | • All operational modes operate without problem<br>• All interlocks are working | • Bridge operates without use of any bypasses.<br>• One mode of operation may not function properly, such as under generator or automatic mode. | • Equipment is non-functional, but it has a redundant or backup system. | • Equipment that has no redundant system is non-functional.<br>• Example 1 - Traffic gate.<br>• Example 2 – If 1 of 4 rear locks on a side is non-functional it would be poor, but if all 4 were failed, it is severe |



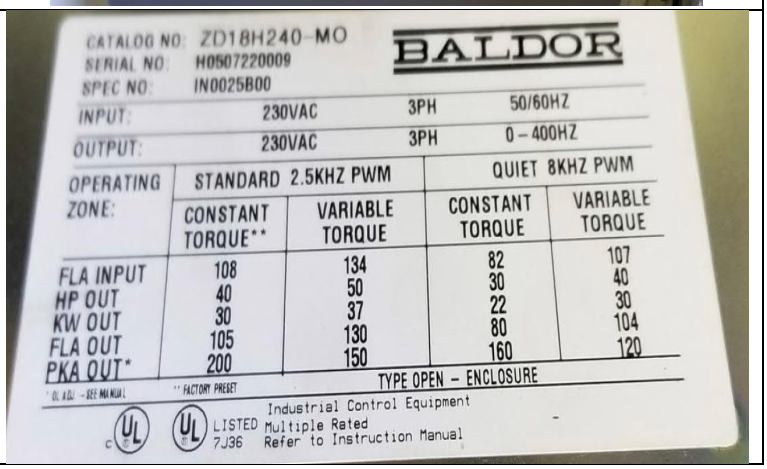
**Notes:**

1. Items rated as poor (3) or severe (4) requires a comment and reference to photo (if applicable). Note the photograph number with the comments.
2. Enter rating in shaded boxes.

# NORTH WEST BRIDGE MOTOR DATA

| | |
|---|---|
| **EQUIPMENT IDENTIFICATION: Vector Drive – Information shown for North West Drive. Typical for North East Drive.** | Baldor Vector Drive |
| **LOCATION: Main Control House**<br><br>**Electrical Room**<br><br>**MCC-1**<br><br>**NUMERICAL RATING: 1** | 20-40 HP 3 PH<br>230 VOLTS<br>60 CYCLES<br>Cat No. ZD10H240 MO<br>SERIAL H0507220009 |

| ITEM | CONDITION |
|---|---|
| **FRAME EXTERIOR** | |
| CONDUIT BOXES | N/A |
| MOUNTING BOLTS | Good |
| FRAME MOVEMENT | Good |
| PAINT | Good |
| OPERATION / NOISE LEVEL | Good |
| VIBRATION LEVEL | Good |
| WIRING | Good |
| TEMPERATURE | Good |

# NORTH WEST BRIDGE MOTOR DATA

| | |
|---|---|
| **MOTOR IDENTIFICATION: Induction Motor B** | General Electric Induction Motor |
| **LOCATION: North West Machinery Pit**<br><br>**NUMERICAL RATING: 2** | 25-HP 3 PH<br>230 VOLTS<br>60 CYCLES<br>Cat No. M00 91433151<br>SERIAL M12S054W887Z1<br>FRAME 324TC<br>69 AMPS PER TERMINAL<br>1180 RPM AT FULL LOAD |

| ITEM | CONDITION |
|---|---|
| **FRAME EXTERIOR** | |
| CONDUIT BOXES | Fair |
| MOUNTING BOLTS | Poor |
| FRAME MOVEMENT | Fair |
| PAINT | Poor |
| OPERATION / NOISE LEVEL | Fair |
| VIBRATION LEVEL | Fair |
| BASE PLATE | Poor |
| MOTOR HOUSING | Fair |


# NORTH EAST BRIDGE MOTOR DATA

| | |
|---|---|
| **MOTOR IDENTIFICATION: Induction Motor B** | General Electric Induction Motor |
| **LOCATION: North East Machinery Pit**<br><br>**NUMERICAL RATING: 2** | 25HP 3 PH<br>230 VOLTS<br>60 CYCLES<br>Cat No. M00 91433151<br>SERIAL M12S054W887Z1<br>FRAME 324TC<br>69 AMPS PER TERMINAL<br>1180 RPM AT FULL LOAD |

| ITEM | CONDITION |
|---|---|
| **FRAME EXTERIOR** | |
| CONDUIT BOXES | Fair |
| MOUNTING BOLTS | Poor |
| FRAME MOVEMENT | Fair |
| PAINT | Poor |
| OPERATION / NOISE LEVEL | Fair |
| VIBRATION LEVEL | Fair |
| BASE PLATE | Poor |
| MOTOR HOUSING | Fair |
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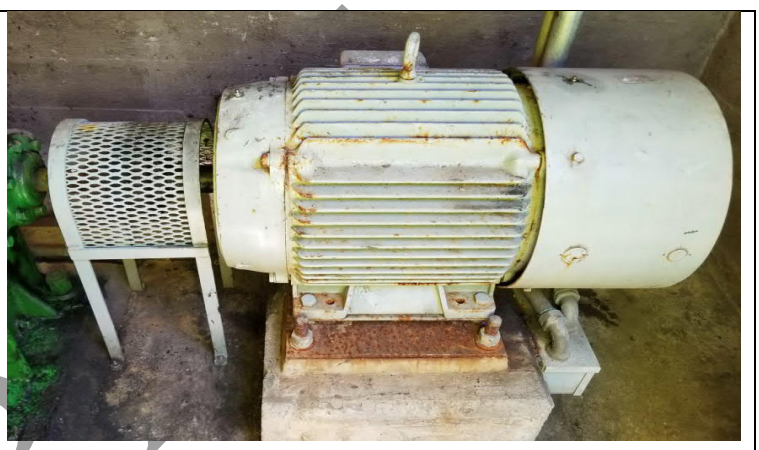

# SPAN LOCK MOTOR DATA

| | |
|---|---|
| **MOTOR IDENTIFICATION: Induction Motor A** | Baldor Industrial Motor |
| **LOCATION: End Lock Machinery Pit**<br><br>**NUMERICAL RATING: 2** | 2-HP 3 PH<br>230 VOLTS FRAME 184T<br>60 CYCLES 6.6 AMPS PER TERMINAL<br>CAT No. BM3614T 1140 RPM AT FULL LOAD<br>SPEC 36A21-197-D |

| ITEM | CONDITION |
|---|---|
| **FRAME EXTERIOR** | |
| CONDUIT BOXES | Poor |
| MOUNTING BOLTS | Poor |
| FRAME MOVEMENT | Fair |
| PAINT | Poor |
| OPERATION / NOISE LEVEL | Fair |
| VIBRATION LEVEL | Fair |
| MOTOR HOUSING | Poor |
| BASE PLATE | Poor |
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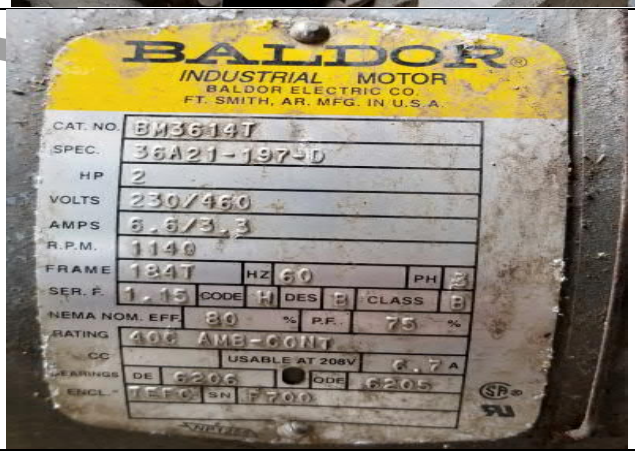

# NORTH WEST THRUSTER BRAKE DATA

| | | |
|---|---|---|
| **EQUIPMENT IDENTIFICATION: Ne Motor Brake** | | GEMCO Thruster Brake |
| **LOCATION: North West Machinery Pit**<br><br>**NUMERICAL RATING: 4**<br><br>**NOTE: THE MOTOR FAILED THE INSULATION TEST** | MODEL No Available<br>HP 2<br>VOLTAGE 230V PH 3 | MODEL 82101076<br>DATE CODE 4300<br>TORQUE SETTING 230 Lb.Ft.<br>230V, 3-Phase, 60 Hz |

| ITEM | CONDITION |
|---|---|
| BRAKE FRAME | Fair |
| CONDUIT BOXES | Fair |
| MOUNTING BOLTS | Fair |
| FRAME MOVEMENT | Fair |
| LINKAGE, PINS, SPRING | Fair |
| OPERATION / NOISE LEVEL | Fair |
| BRAKE WHEEL | Fair |
| SHOE LINING | Fair |
| BRAKE RELEASED LIMIT SWITCH | Fair |
| BRAKE SET LIMIT SWITCH | Fair |
| HAND RELEASE LIMIT SWITCH – Honeywell Micro Switch GLAA01A1B | Fair |
| HAND RELEASE MECHANISM | None |
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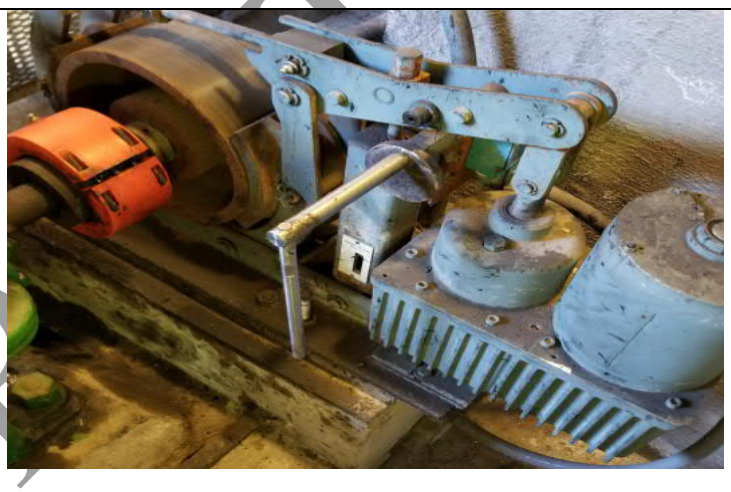

# NORTH EAST THRUSTOR BRAKE DATA

| | | |
|---|---|---|
| **BRAKE IDENTIFICATION: NE MOTOR BRAKE** | PUMP | GEMCO Thruster Brake |
| **LOCATION: North East Machinery Pit**<br><br>**NUMERICAL RATING: 4**<br><br>**Note: Motor Failed Insulation Test** | MODEL No Available<br>HP 2<br>VOLTAGE 230V PH 3 | MODEL 82101076<br>DATE CODE 4300<br>TORQUE SETTING 230 Lb.Ft.<br>230V, 3-Phase, 60 Hz |

| ITEM | CONDITION |
|---|---|
| BRAKE FRAME | Fair |
| CONDUIT BOXES | Fair |
| MOUNTING BOLTS | Fair |
| FRAME MOVEMENT | Fair |
| LINKAGE, PINS, SPRING | Fair |
| OPERATION / NOISE LEVEL | Fair |
| BRAKE WHEEL | Fair |
| SHOE LINING | Fair |
| BRAKE RELEASED LIMIT SWITCH | Fair |
| BRAKE SET LIMIT SWITCH | Fair |
| HAND RELEASE LIMIT SWITCH – Honeywell Micro Switch GLAA01A1B | Fair |
| HAND RELEASE MECHANISM | None |
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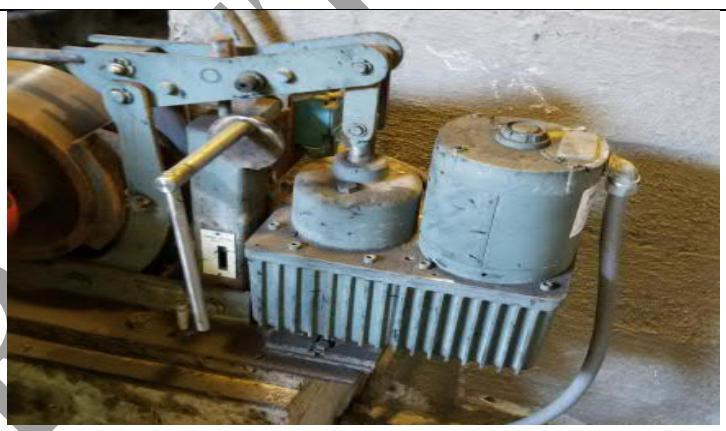

## LIMIT SWITCHES AND INSTRUMENTATION

| | |
|---|---|
| **TRANSMITTER IDENTIFICATION:**<br>**NE Motor Drive Rotary Cam Limit Switch** | GEMCO Rotating Cam Limit Switch |
| **LOCATION: NE Machinery Pit**<br><br>**NUMERICAL RATING: 2** | |

| ITEM | CONDITION |
|---|---|
| ENCLOSURE | Fair |
| CONDUIT ENTRY | Fair |
| MOUNTING BOLTS | Fair |
| CABLES / CONNECTIONS | Fair |
| | |
| | |

| | |
|---|---|
| TRANSMITTER IDENTIFICATION:<br>NE Thruster Brake Limit Switch | |
| LOCATION: NW MACHINERY PIT<br><br>NUMERICAL RATING: 2 | MANUFACTURER Honeywell<br>MODEL GLAA01A1B Micro Switch |

| ITEM | CONDITION |
|---|---|
| ENCLOSURE | Fair |
| CONDUIT ENTRY | Fair |
| MOUNTING BOLTS | Fair |
| CABLES / CONNECTIONS | Fair |
| | |
| | |

Note: Same condition as the NW Thruster Brake Limit Switch

| TRAFFIC GATES | |
|---|---|
| **IDENTIFICATION: Traffic Gate** | |
| **LOCATION: NORTH GATES**<br><br>**Typical for NW and NE gates**<br><br>**NUMERICAL RATING: 2** | Note: NW Gate replaced within the last three (3) years |

| ITEM | CONDITION |
|---|---|
| HOUSING | Fair |
| MOUNTING BOLTS | Fair |
| ROADWAY ARM | Poor |
| SIDEWALK ARM | Fair |
| ARM LIGHTS | Fair |
| FLEXIBLE CABLE | Fair |
| GONG | Fair |
| DOOR HARWARE | Fair |
| OPERATION | Fair |
| INTERNAL | Fair |
| GATE LIMIT SWITCH | Fair |
| DOOR LIMIT SWITCH | Fair |
| HAND CRANK LIMIT SWITCH | Fair |
| CONTROLS | Fair |
| CONDUIT ENTRIES | Fair |
| WIRING | Fair |
| MOTOR | Fair |
| BRAKE | Fair |
| | |
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| TRAFFIC GATES | |
|---|---|
| **IDENTIFICATION: Traffic Gate** | |
| **LOCATION: SOUTH GATES**<br><br>**Typical for SW and SE gates**<br><br>**NUMERICAL RATING: 2** | Note: SE Gate replaced within the last three (3) years |

| ITEM | CONDITION |
|---|---|
| HOUSING | Fair |
| MOUNTING BOLTS | Fair |
| ROADWAY ARM | Fair |
| SIDEWALK ARM | Fair |
| ARM LIGHTS | Fair |
| FLEXIBLE CABLE | Fair |
| GONG | Fair |
| DOOR HARWARE | Fair |
| OPERATION | Fair |
| INTERNAL | Fair |
| GATE LIMIT SWITCH | Fair |
| DOOR LIMIT SWITCH | Fair |
| HAND CRANK LIMIT SWITCH | Fair |
| CONTROLS | Fair |
| CONDUIT ENTRIES | Fair |
| WIRING | Fair |
| MOTOR | Fair |
| BRAKE | Fair |
| | |
| | |
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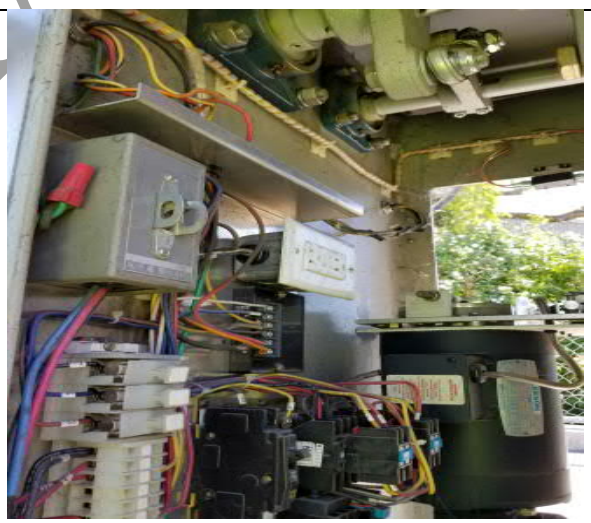

| POWER DISTRIBUTION SYSTEM | |
|---|---|
| **IDENTIFICATION: Electrical 1 Service Metering** | |
| **LOCATION: North Exterior Switchboard**<br>**NUMERICAL RATING: 2** | Main Disconnect Switch: 600VOLT GEAR, 240V, 400A FUSED AT 200A<br>Meter: 3 Phase, 4W, Wye, 240V DETLA |

| ITEM | CONDITION |
|---|---|
| HOUSING | Fair |
| WIRING | Fair |
| BREAKER | Fair |
| DISCONNECT SWITCHES | Fair |
| CONDUITS | Fair |
| | |
| | |
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| POWER DISTRIBUTION SYSTEM | |
|---|---|
| **IDENTIFICATION: Electrical 2 Service Metering** | |
| **LOCATION: South Weston the side of MCC-2**<br>**NUMERICAL RATING: 1** | Main Disconnect Switch: 600V, GEAR 240V, 100A<br>Meter: 3 Phase, 4W, Wye, 240V DETLA |

| ITEM | CONDITION |
|---|---|
| HOUSING | Fair |
| WIRING | Fair |
| BREAKER | Fair |
| DISCONNECT SWITCHES | N/A |
| CONDUITS | Fair |
| | |
| | |

| POWER DISTRIBUTION SYSTEM | |
|---|---|
| IDENTIFICATION: MCC-1 | |
| LOCATION: Control House Electrical Room<br>NUMERICAL RATING: 1 | Double BUSED AT 400A EACH<br>Main Disconnect Switch: 600V, 250A AT BUS 2 (NO DISCONNECT AT BUS 1)<br>MUST DISCONNECT SERVICE ENTRANCE SWITCHBOARD TO REMOVE POWER FROM BUS 1. |

| ITEM | CONDITION |
|---|---|
| HOUSING | Good |
| WIRING | Good |
| BREAKER | Good |
| DISCONNECT SWITCHES | Good |
| CONDUITS | Good |
| | |
| | |
| | |
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| | |

| POWER DISTRIBUTION SYSTEM | |
|---|---|
| IDENTIFICATION: MCC-2 | |
| LOCATION: Control House Electrical Room<br>NUMERICAL RATING: 2 | Main Disconnect Switch: 600V, 100A<br>Meter: 3 Phase, 4W, Wye |

| ITEM | CONDITION |
|---|---|
| HOUSING | Poor |
| WIRING | Good |
| BREAKER | Good |
| DISCONNECT SWITCHES | Good |
| CONDUITS | Good |
| | |
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| CONTROL CONSOLE | |
|---|---|
| IDENTIFICATION: Control Desk | Base Line Road |
| LOCATION: **Control Room**<br><br>NUMERICAL RATING: 4<br><br>**NOTE: A NUMERICAL RATING OF 4 IS GIVEN DUE TO LACK OF REDUNDANCY ON THE CONTROL SYSTEM. THE FAILURE OF ANY PLC IN THE SYSTEM WILL PUT THE BRIDGE OUT OF SERVICE FOR A PERIOD EQUAL TO THE TIME NEEDED TO REPLACE OR REPAIR OF THE FAILED PLC PLUS THE TIME TO RECONFIGURE/REPROGRAM THE NEW UNIT.** | |

| ITEM | CONDITION |
|---|---|
| HOUSING | Fair |
| WIRING | Fair |
| INDICATOR LIGHTS | Fair |
| PUSH BUTTONS | Fair |
| EMERGENCY STOP | Fair |
| HMI SCREEN | Fair |
| TERMINAL BLOCKS | Fair |
| | |
| | |
| | |

# Appendix B - Electrical Inspection Photographs and Deficiencies


Photo E- 1
Exterior Service Entrance Switchboard

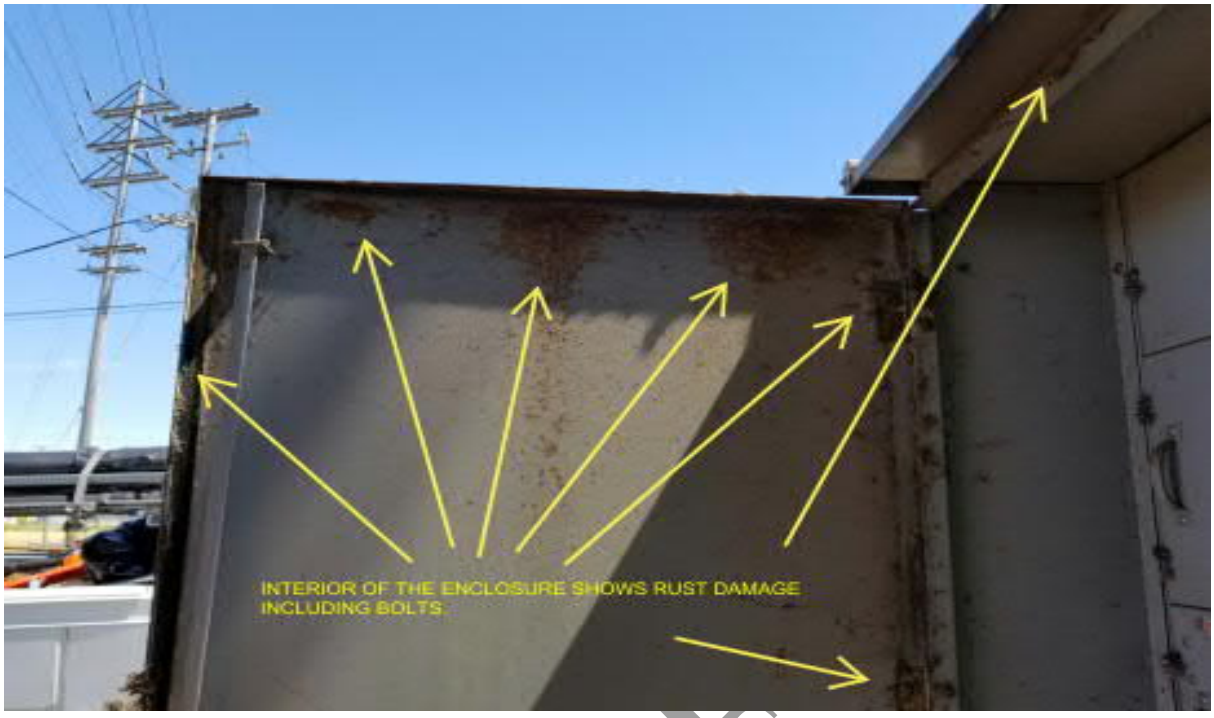



Photo E- 2
Exterior Service Entrance Switchboard Interior of Enclosure


Photo E- 3
Exterior Service Entrance Switchboard Enclosure Ceiling


Photo E- 4
Exterior Service Entrance Switchboard Skin Door.


Photo E- 5
MCC-2


Photo E- 6
Wireless Antenna Pole Support Fastener at MCC-2.

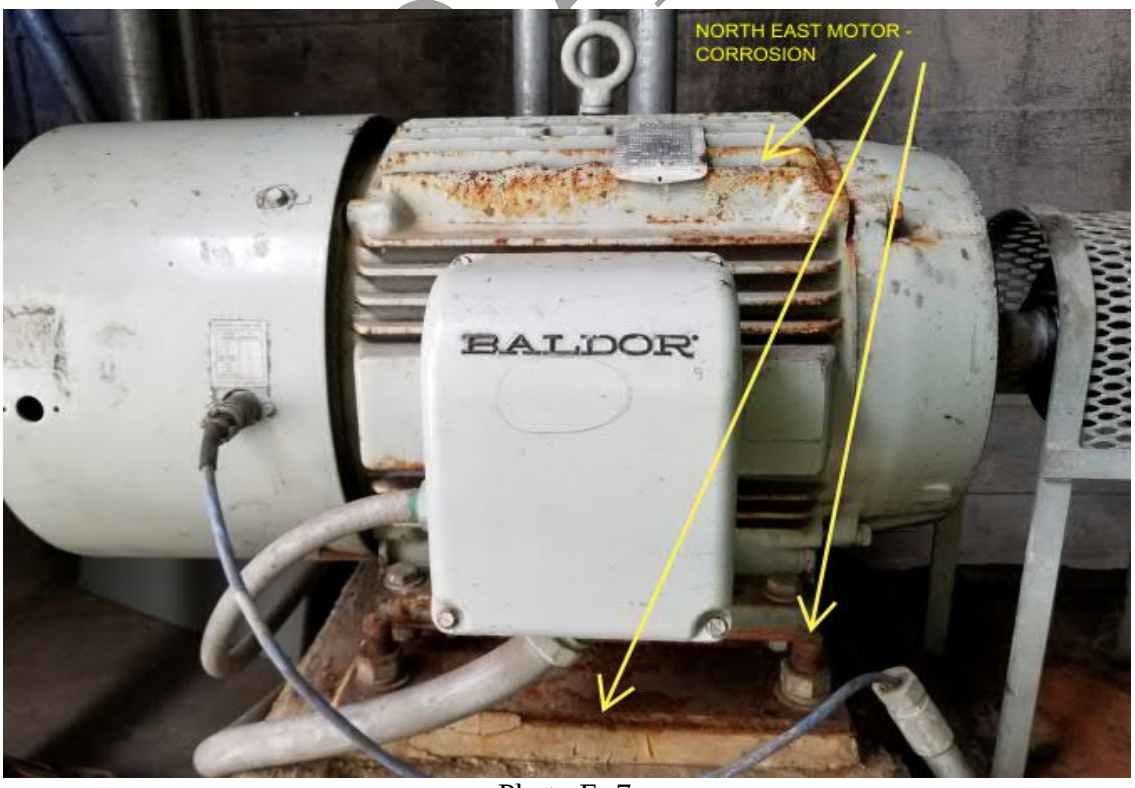



Photo E- 7

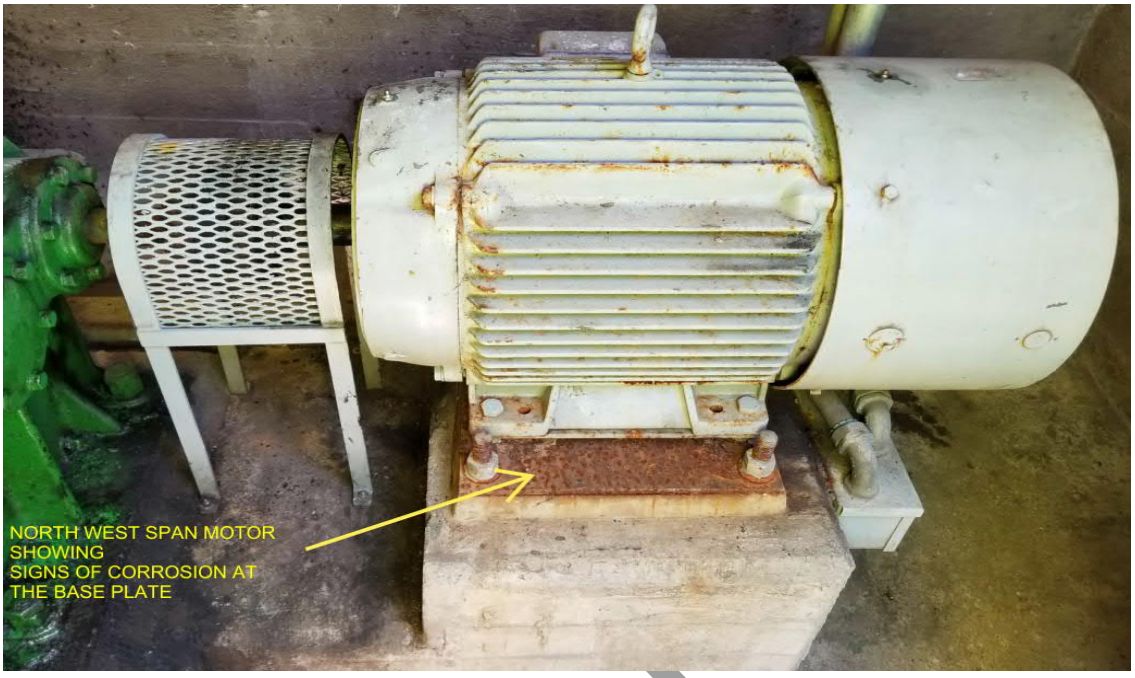



Photo E- 8


Photo E- 9

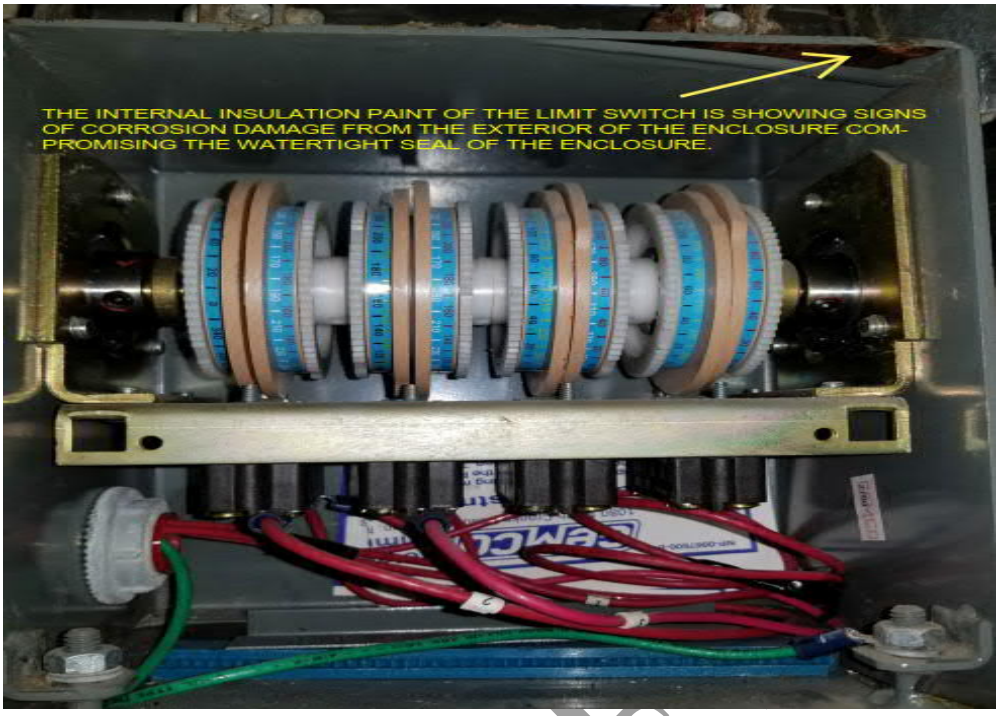



Photo E- 10

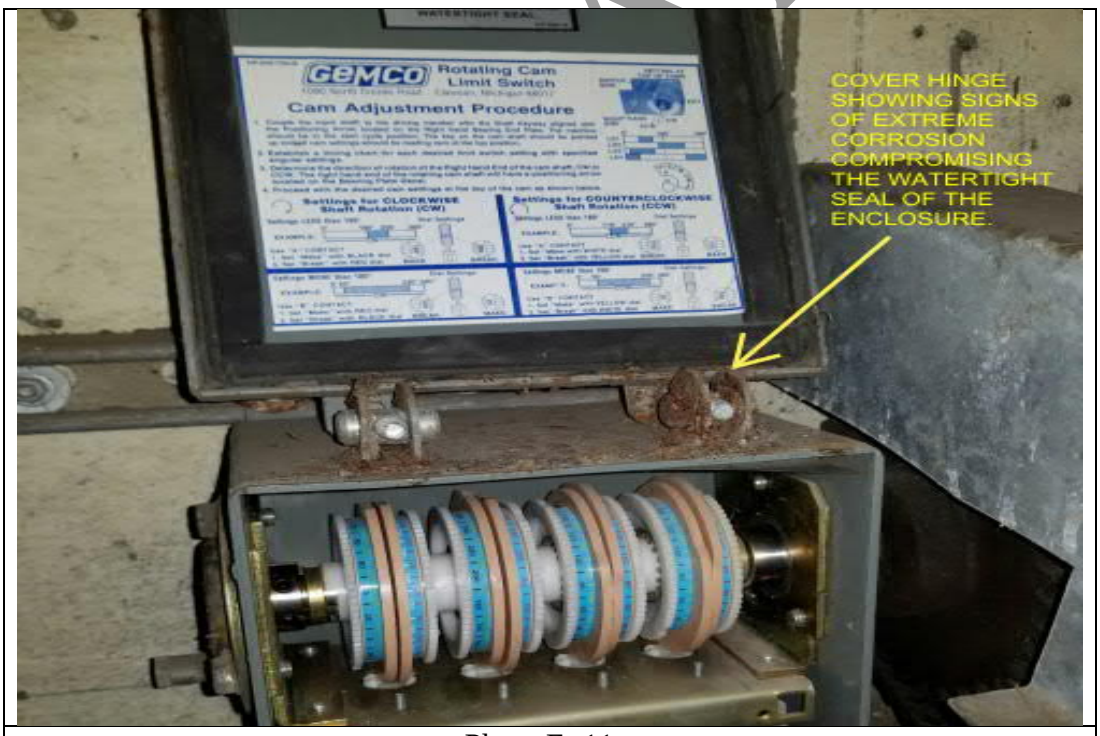



Photo E- 11

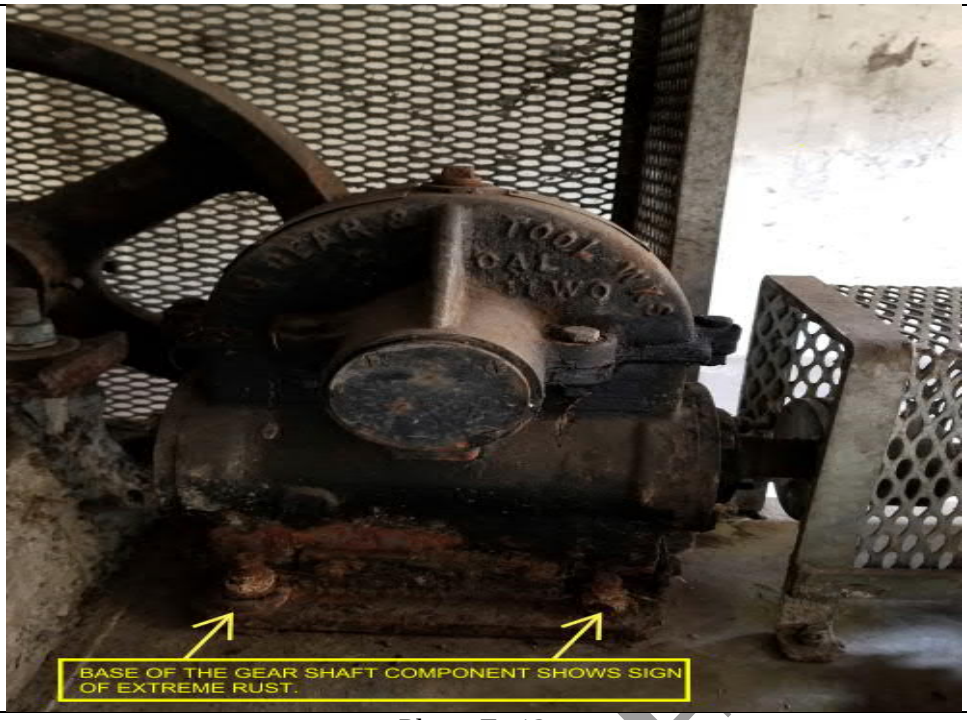



Photo E- 12


Photo E- 13


Photo E- 14

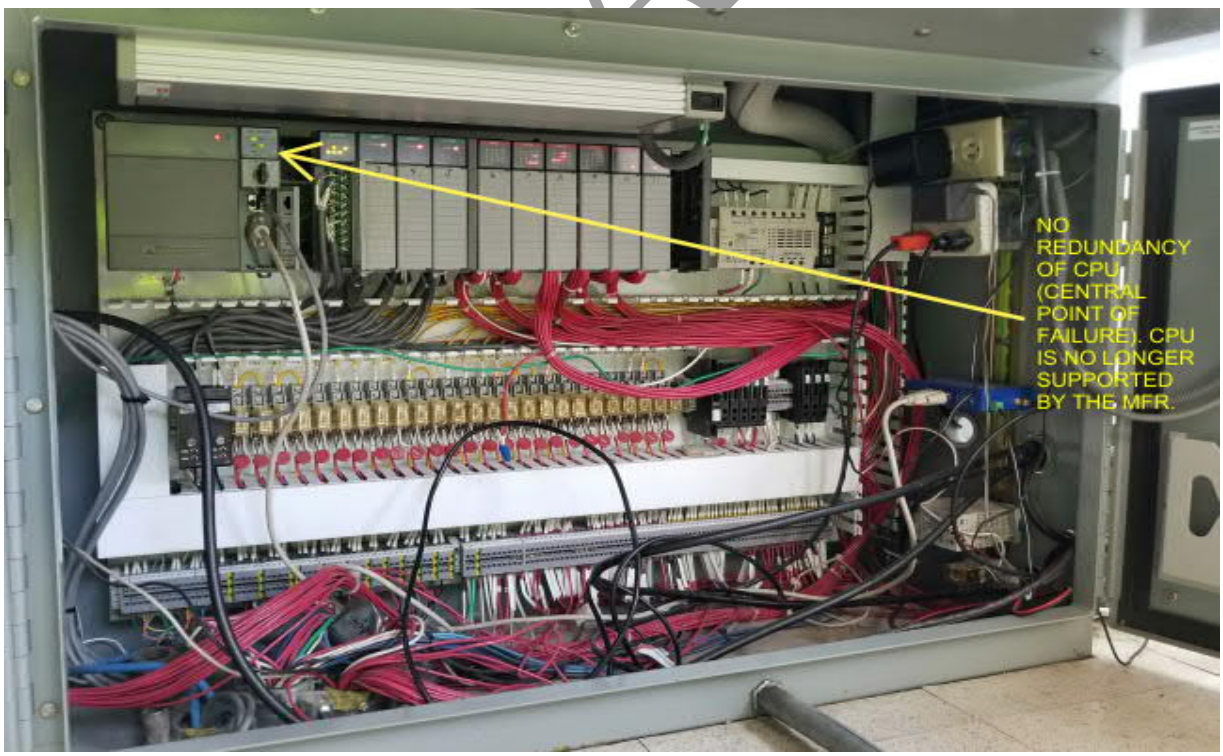



Photo E- 15


Photo E- 16

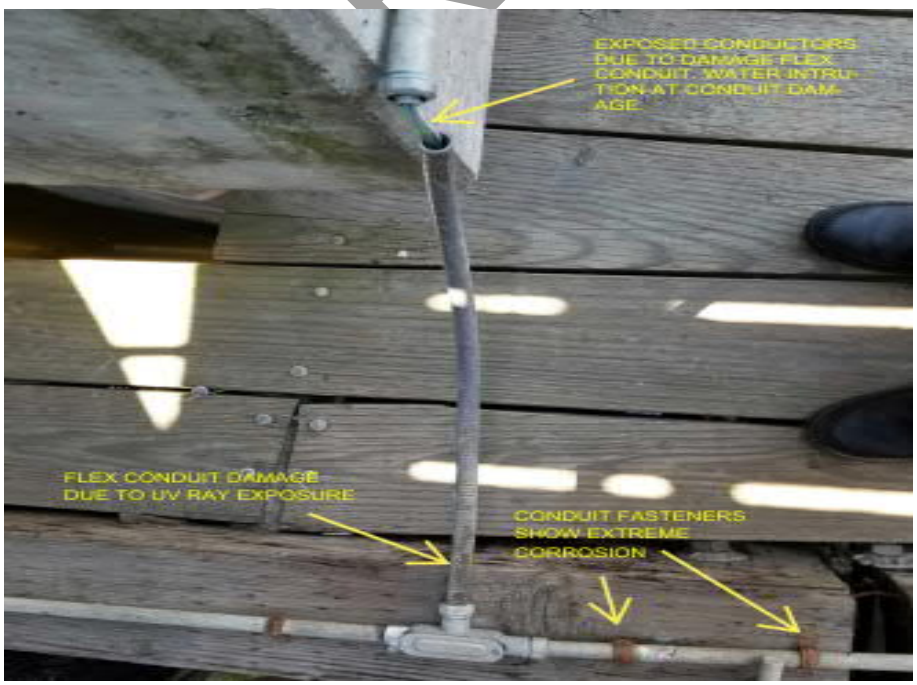



Photo E- 17

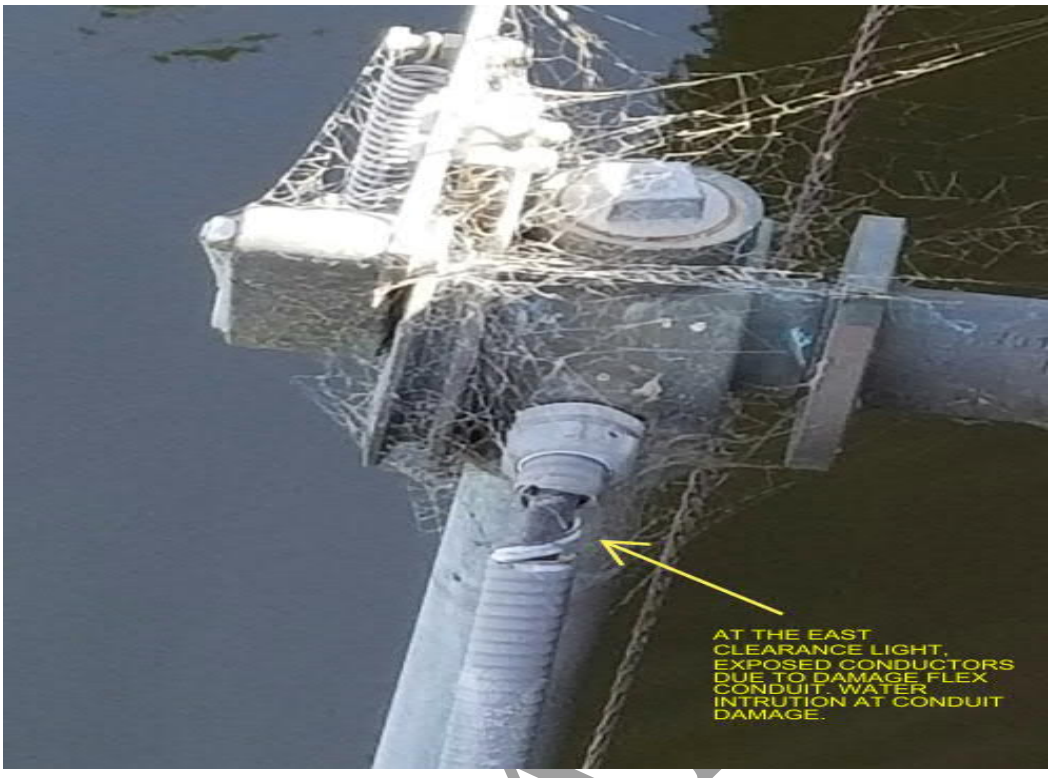



Photo E- 18

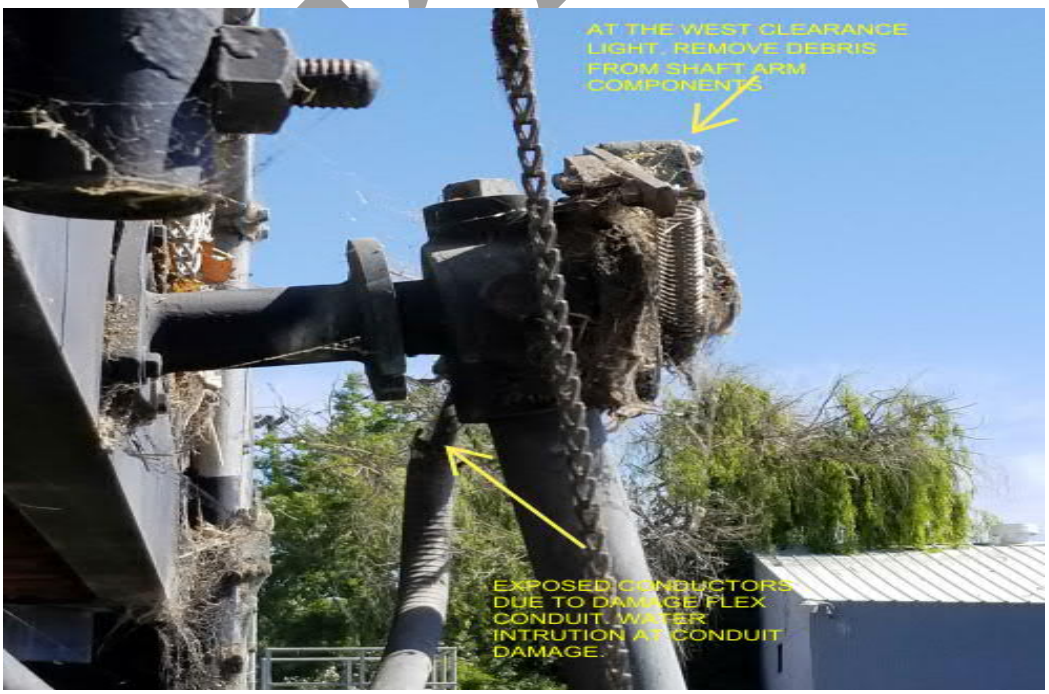



Photo E- 19


Photo E- 20

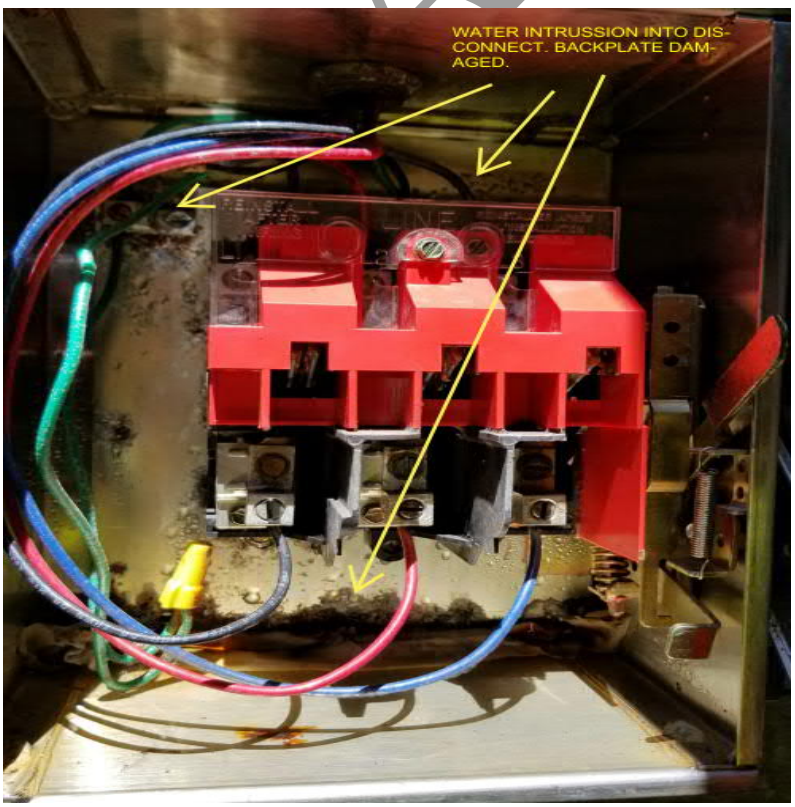



Photo E- 21

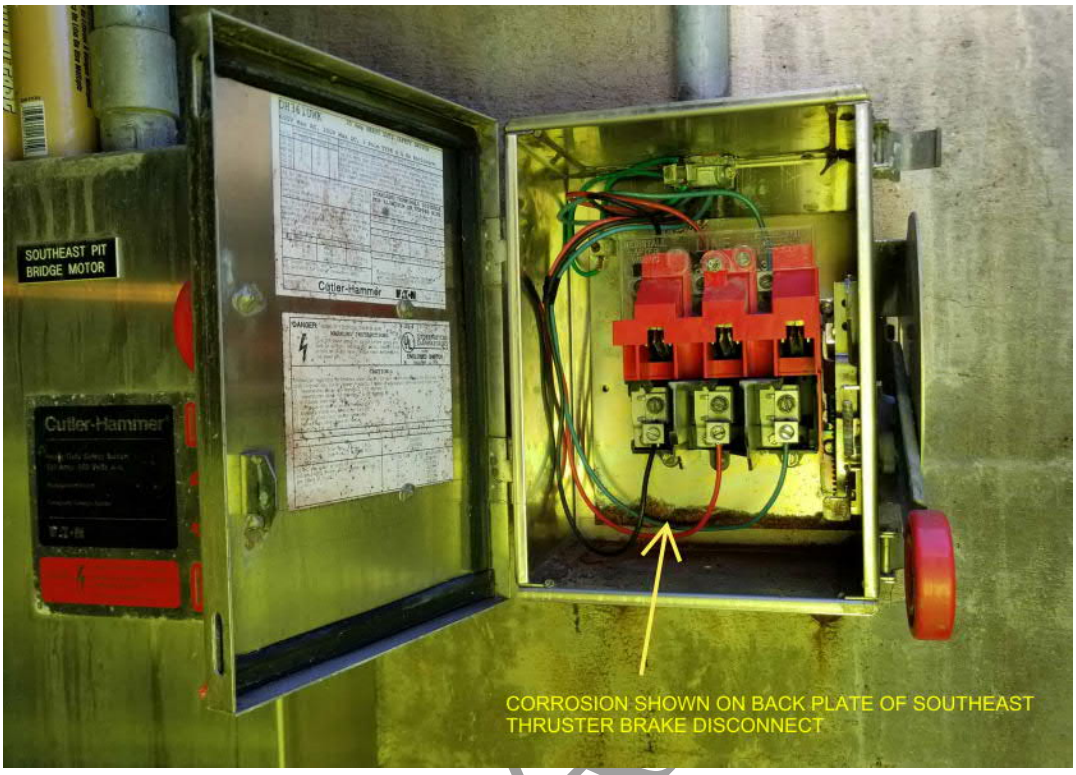



Photo E- 22

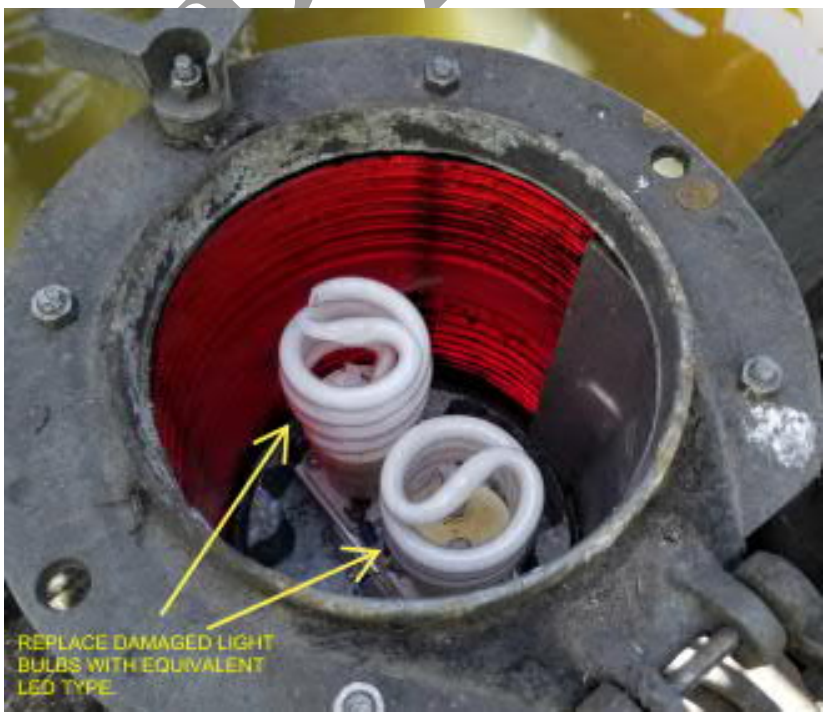



Photo E- 23

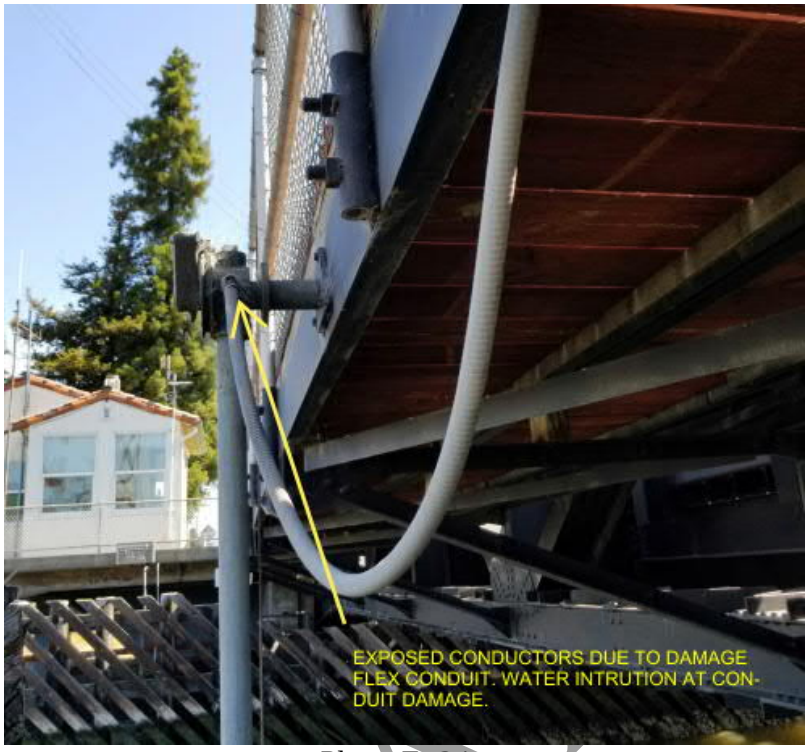



Photo E- 24


Photo E- 25


Photo E- 26


Photo E- 27


Photo E- 28

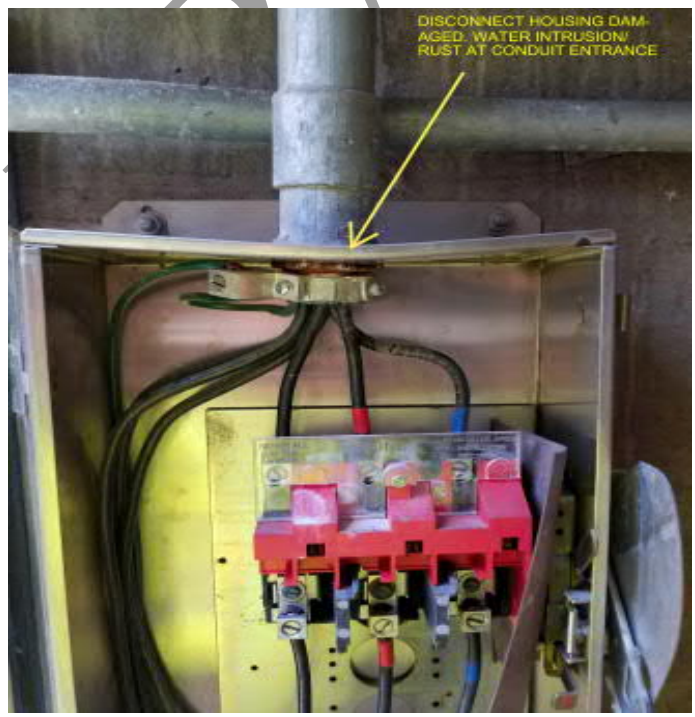



Photo E- 29

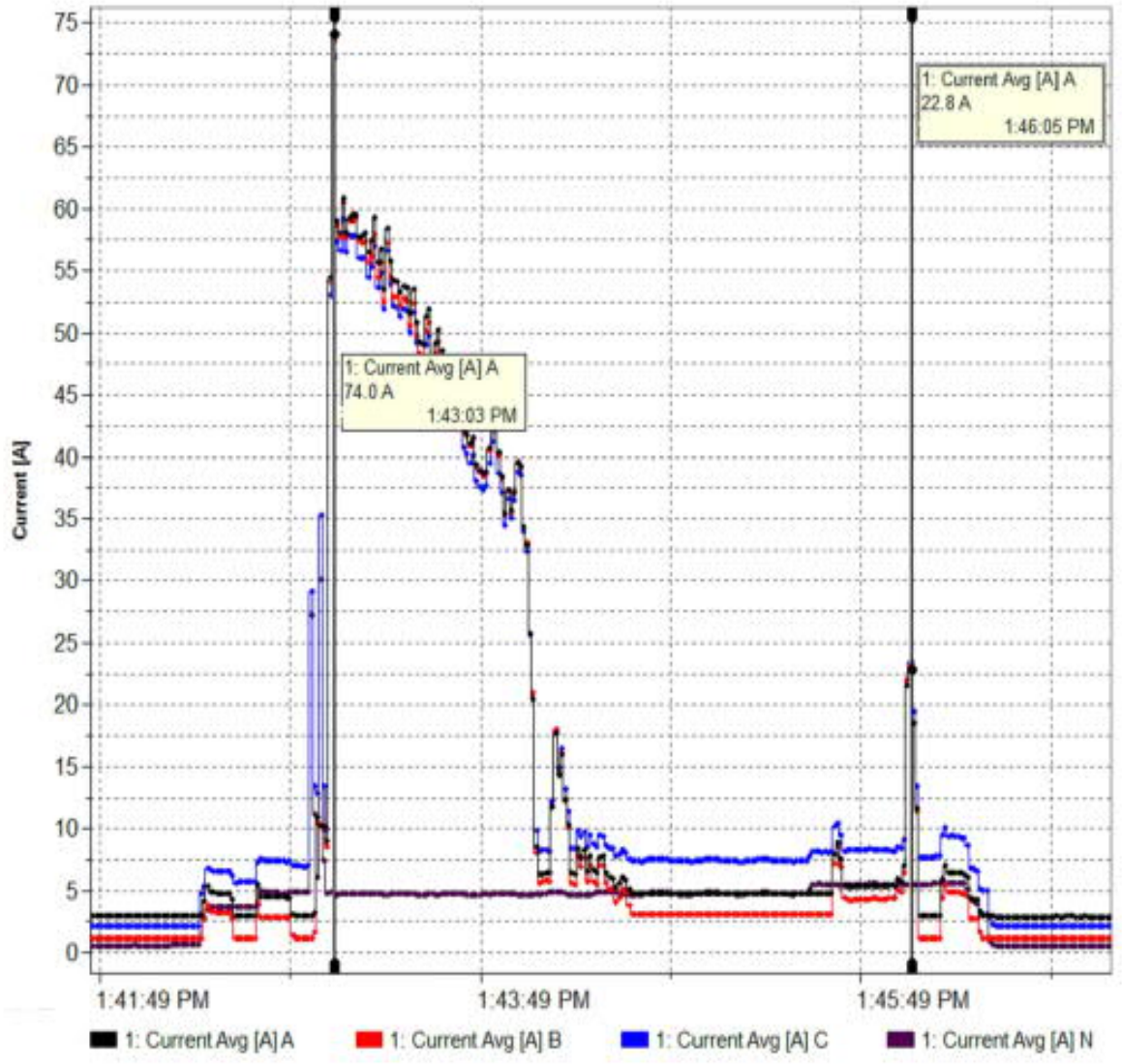

Photo E- 30


Photo E- 31


Photo E- 32

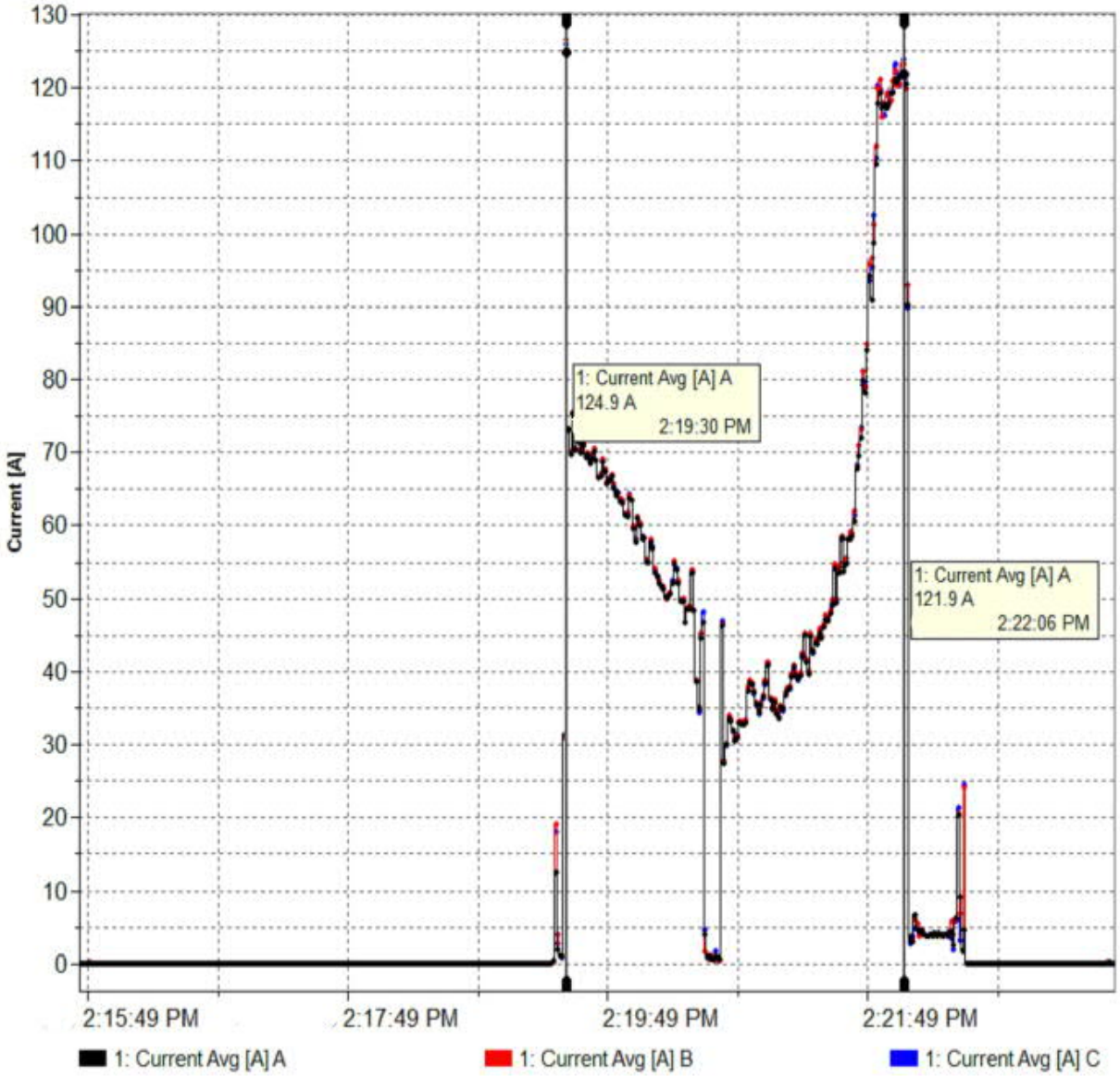
# Appendix C – Electrical Chart Recording Graphs and Insulation Resistance Tables

## North West Main Service Entrance



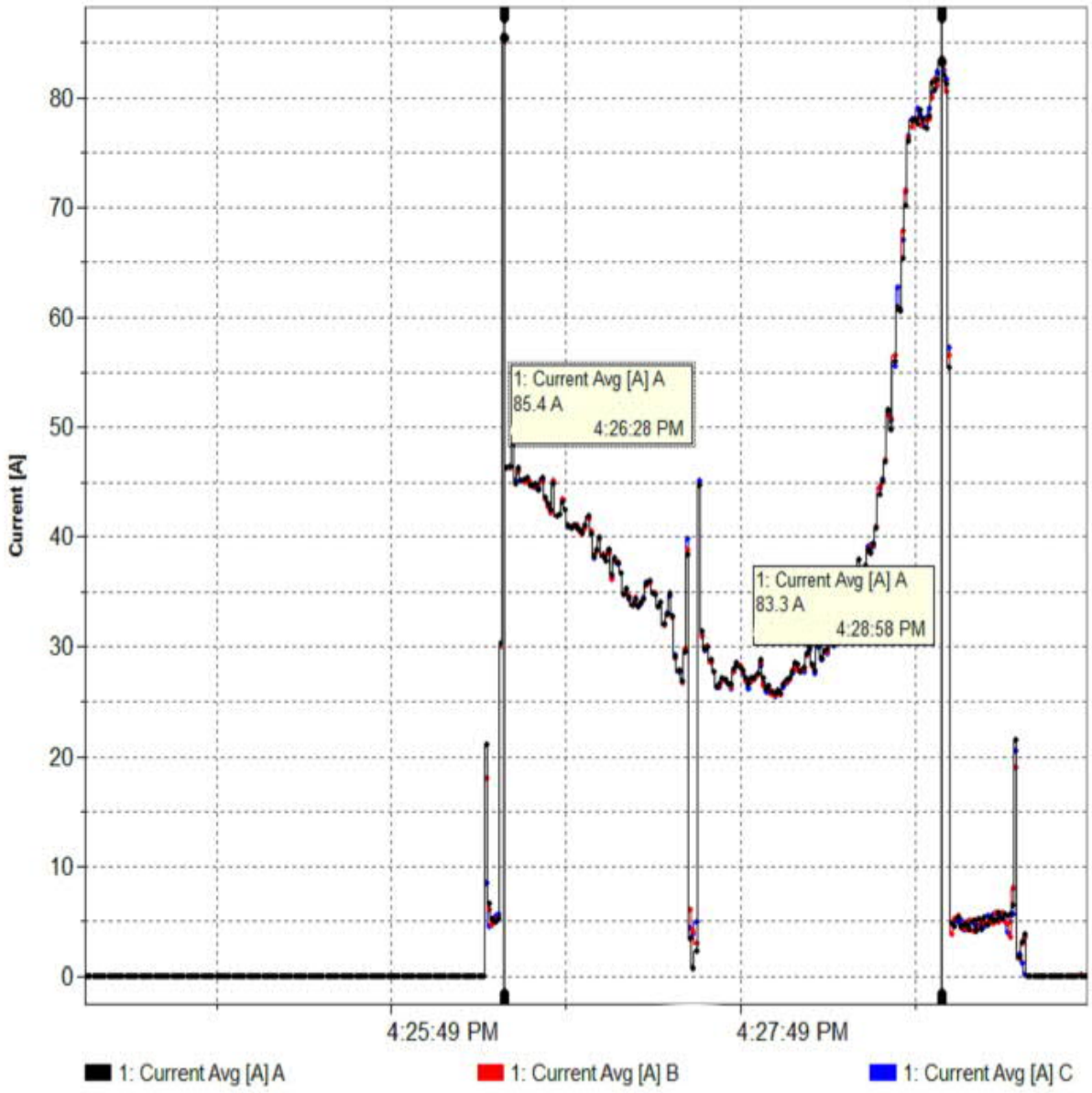

Note: Current transformers located before the mains at MCC-1 for the North West utility service. It was not possible to monitor the mains of the South West service due to logistics in service connection and lack of Arc Flash Label indicating the appropriate PPE required to open a live compartment to install the power logger.

### North East Bridge Span Motor



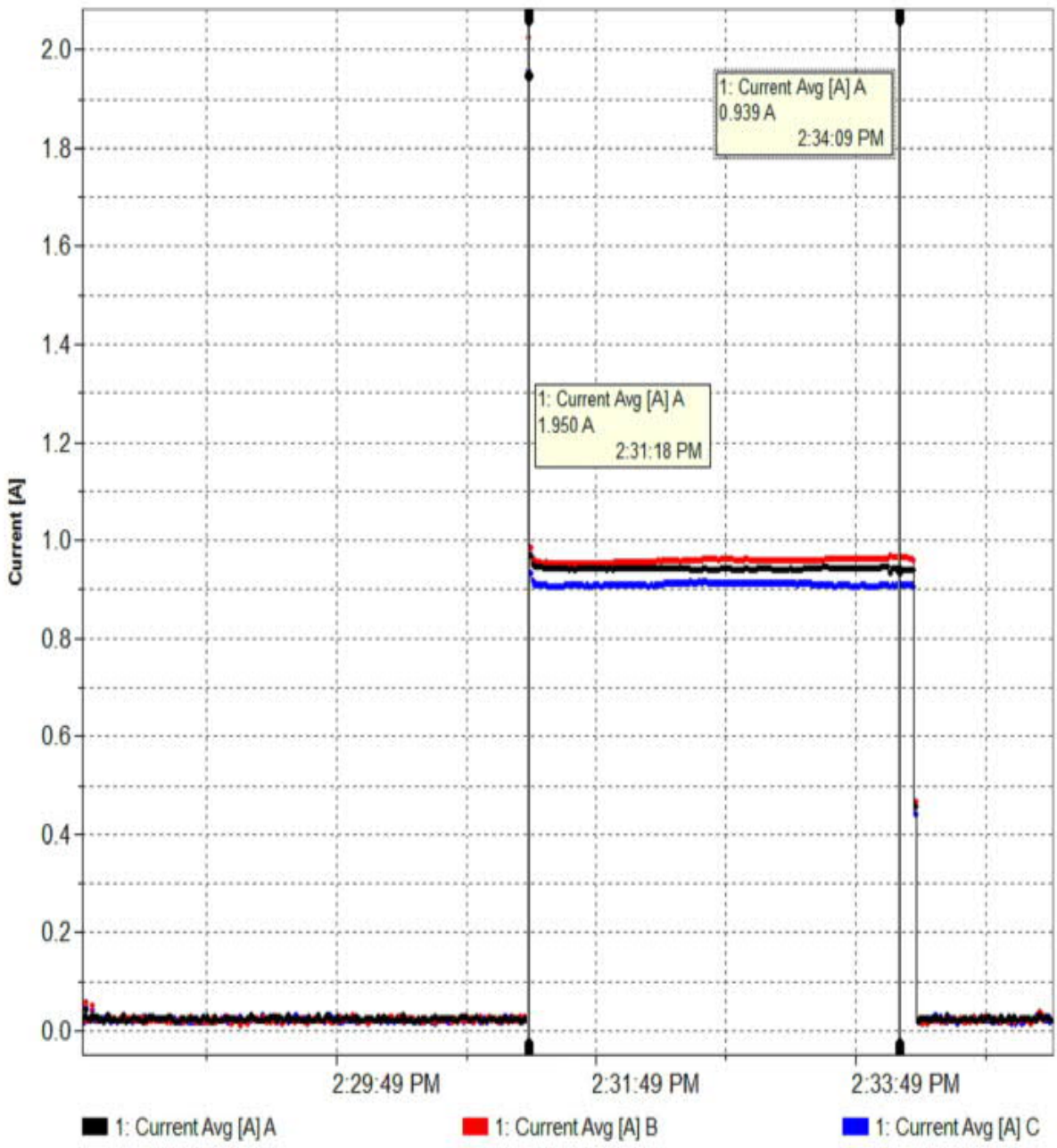

Note: Current transformers connected at motor disconnect (on the secondary of the main drive).

### North West Bridge Span Motor



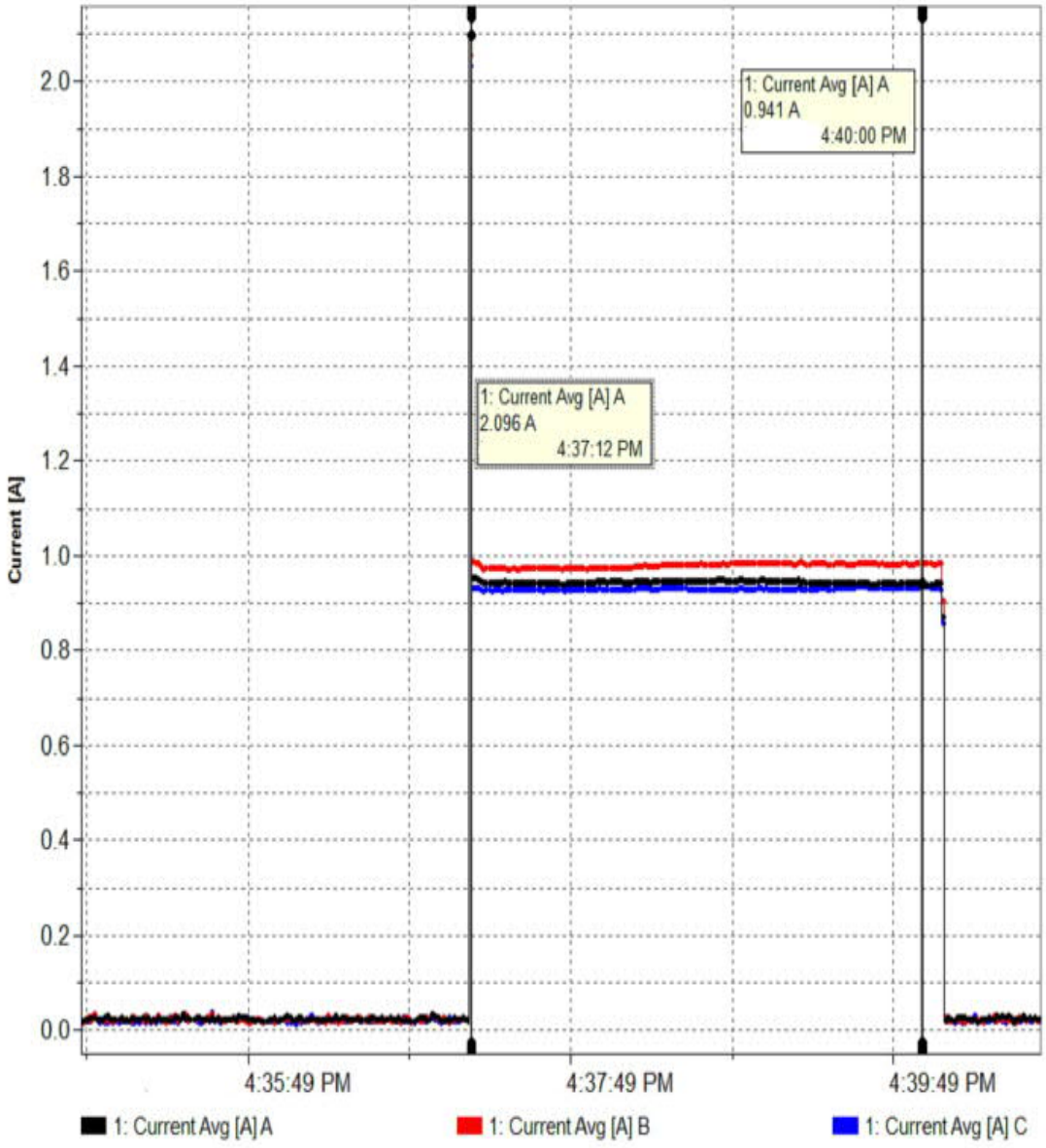

Note: Current transformers connected at motor disconnect (on the secondary of the main drive).

### North East Brake Thruster Motor




Note: Current transformers connected at motor disconnect.

### North West Brake Thruster Motor




Note: Current transformers connected at motor disconnect.

## Insulation Resistance Results

| | | | | |
|---|---|---|---|---|
| Test Voltage: | 1000V/500V | Temperature: | 62° F | |
| Instrument Brand & Model: | Fluke 17507 | Humidity: | 89% | |
| Date: 6/19/2018 | | Weather Conditions: | Blue Sky | |
| Time: 10:00 AM | | | | |

Insulation Resistance (Megger) Measurements – North East Bridge Motor

| Measurement # | Megger Readings At 1000V/500V | Test Duration | Test Location | Notes |
|---|---|---|---|---|
| T1-GND | 150MΩ/ 167MΩ | 60 seconds | Disconnect Switch | **LOW RESISTANCE READING** |
| T2-GND | 155MΩ/ 171MΩ | 60 seconds | Disconnect Switch | **LOW RESISTANCE READING** |
| T3-GND | 157MΩ/ 192MΩ | 60 seconds | Disconnect Switch | **LOW RESISTANCE READING** |
| T1-T3 | 0Ω/0Ω | 60 seconds | Disconnect Switch | **PASSED** |
| T1-T2 | 0Ω/0Ω | 60 seconds | Disconnect Switch | **PASSED** |
| T2-T3 | 0Ω/0Ω | 60 seconds | Disconnect Switch | **PASSED** |

Insulation Resistance (Megger) Measurements – North East Thruster Brake Motor

| Measurement # | Megger Reading | Test Duration | Test Location | Notes |
|---|---|---|---|---|
| T1-GND | 0.1MΩ/ 0.15MΩ | 60 seconds | Disconnect Switch | **Failed Test** |
| T2-GND | 0.1MΩ/ 0.15MΩ | 60 seconds | Disconnect Switch | **Failed Test** |
| T3-GND | 0.2MΩ/ 0.16MΩ | 60 seconds | Disconnect Switch | **Failed Test** |
| T1-T3 | 0Ω/0Ω | 60 seconds | Disconnect Switch | **PASSED** |
| T1-T2 | 0Ω/0Ω | 60 seconds | Disconnect Switch | **PASSED** |
| T2-T3 | 0Ω/0Ω | 60 seconds | Disconnect Switch | **PASSED** |

Insulation Resistance (Megger) Measurements – North West Bridge Motor

| Measurement # | Megger Reading | Test Duration | Test Location | Notes |
|---|---|---|---|---|
| T1-GND | 1468MΩ/ 550MΩ | 60 seconds | Disconnect Switch | **PASSED** |
| T2-GND | 1325MΩ/ 550MΩ | 60 seconds | Disconnect Switch | **PASSED** |
| T3-GND | 1388MΩ/ 550MΩ | 60 seconds | Disconnect Switch | **PASSED** |
| T1-T3 | 0Ω/0Ω | 60 seconds | Disconnect Switch | **PASSED** |
| T1-T2 | 0Ω/0Ω | 60 seconds | Disconnect Switch | **PASSED** |
| T2-T3 | 0Ω/0Ω | 60 seconds | Disconnect Switch | **PASSED** |

Notes:

| | | | | |
|---|---|---|---|---|
| Test Voltage: | 1000V/500V | Temperature: | 62° F | |
| Instrument Brand & Model:<br>Date: 6/19/2018<br>Time: 10:45<br>AM | Fluke 17507 | Humidity:<br>Weather Conditions: | 89%<br>Blue Sky | |

Insulation Resistance (Megger) Measurements – North East Thruster Brake Motor

| Measurement # | Megger Readings At 1000V/500V | Test Duration | Test Location | Notes |
|---|---|---|---|---|
| T1-GND | 11GΩ/500MΩ | 60 seconds | Disconnect Switch | **PASSED** |
| T2-GND | 11GΩ/500MΩ | 60 seconds | Disconnect Switch | **PASSED** |
| T3-GND | 11GΩ/ 500MΩ | 60 seconds | Disconnect Switch | **PASSED** |
| T1-T3 | 0Ω/0Ω | 60 seconds | Disconnect Switch | **PASSED** |
| T1-T2 | 0Ω/0Ω | 60 seconds | Disconnect Switch | **PASSED** |
| T2-T3 | 0Ω/0Ω | 60 seconds | Disconnect Switch | **PASSED** |

Insulation Resistance (Megger) Measurements – End Lock Motor

| Measurement # | Megger Reading | Test Duration | Test Location | Notes |
|---|---|---|---|---|
| T1-GND | 11GΩ/500MΩ | 60 seconds | Disconnect Switch | **PASSED** |
| T2-GND | 11GΩ/500MΩ | 60 seconds | Disconnect Switch | **PASSED** |
| T3-GND | 11GΩ/ 500MΩ | 60 seconds | Disconnect Switch | **PASSED** |
| T1-T3 | 0Ω/0Ω | 60 seconds | Disconnect Switch | **PASSED** |
| T1-T2 | 0Ω/0Ω | 60 seconds | Disconnect Switch | **PASSED** |
| T2-T3 | 0Ω/0Ω | 60 seconds | Disconnect Switch | **PASSED** |

Notes:

# Statement of Limitations

This report has been prepared in accordance with the customary standards of care and diligence practiced by firms that conduct services of a similar nature. The report is based on data, site conditions and other information that is generally applicable as of the date that the structure was inspected, and the conclusions and recommendations herein are therefore applicable only to that timeframe. AECOM makes no representation as to the condition of the bridge after the date the structure was inspected.

Background information, drawings, load ratings, and other data used in preparation of this report have been provided to AECOM by the Municipality of Petaluma and / or third parties. AECOM has relied on this information as furnished and has not confirmed the accuracy of this information. AECOM does not assume responsibility for inaccuracies in information obtained from Municipality of Petaluma or third parties. This document and the information contained in this report have been prepared solely for the use of the Municipality of Petaluma in accordance with applicable state and federal law. No third party shall have the right to rely on this report without the written consent of AECOM and the third party's agreement to be bound to the same conditions and limitations as the Municipality of Petaluma.

This report is a statement of professional opinion only. AECOM does not warrant or guarantee the condition or performance of the bridge. AECOM does not assume liability for bridge conditions not present at the time the bridge was observed by AECOM, or not readily visible through reasonable inspection efforts. For purposes of this report, AECOM assumes the bridge design is correct and the bridge has been constructed as designed. AECOM has not analyzed the adequacy of bridge design or whether the bridge has been constructed as designed. AECOM assumes no responsibility for failure to detect hidden, covered, inaccessible, or internal structural or material defects, corrosion, or damages in component members, reinforcing, anchorages and parts of equipment, structures, or mechanisms being inspected.