Go Initialize Remote I/O space.

1 _FirstScan SP0 — K1 GTS

Blink for Easy Viewing

2 _1Second SP4 — 1 Hz HeartBeat Power PLC Link4 Y17 OUT; Remote Blinker Y217 OUT; Y17 Blinker Stat C220 OUT

3 Y217 Blinker RB X237 — X237 Blinkr Stat C221 OUT

Fast Valve Beam Permit to Power PLC

4 HEBT FastVlv Sum C167; 212 IsoVlv Close X3; 212 IsoVlv Open X4 — RF Beam Permit Power PLC Link2 Y13 OUT

Maps X0 to PLC18 word for diagnostics.

5 _On SP1 — LD V10037 Pointer P10037; OUT PLC18 V10030

MapsStage Bits to PLC1A.

6 _On SP1 — LD VS0; OUT PLC1A V10032

MapsStage Bits to PLC1B.

7 _On SP1 — LD VS20; OUT PLC1B V10033

MapsStage Bits to PLC1C.

8 _On SP1 — LD VS40; OUT PLC1C V10034

MapsStage Bits to PLC1D.

9 _On SP1 — LD VS60; OUT PLC1D V10035

MapsStage Bits to PLC1E.

10 _On SP1 — LD VS100 — OUT PLC1E V10036

MapsStage Bits to PLC1E. Forces bits if venting.

11 Source Vent Req C360 — LD PLC1A V10032 — ANDD Kff00 — ORD K40 — OUT PLC1A V10032

---------- End of test bits ----------

12 212 Vent Req C361 — LD PLC1A V10032 — ANDD Kff — ORD K4000 — OUT PLC1A V10032

Fan out Turbo Water Flow status to all the digital words.

13 212 Vent Req C361 — LD K4040 — OUT PLC1B V10033

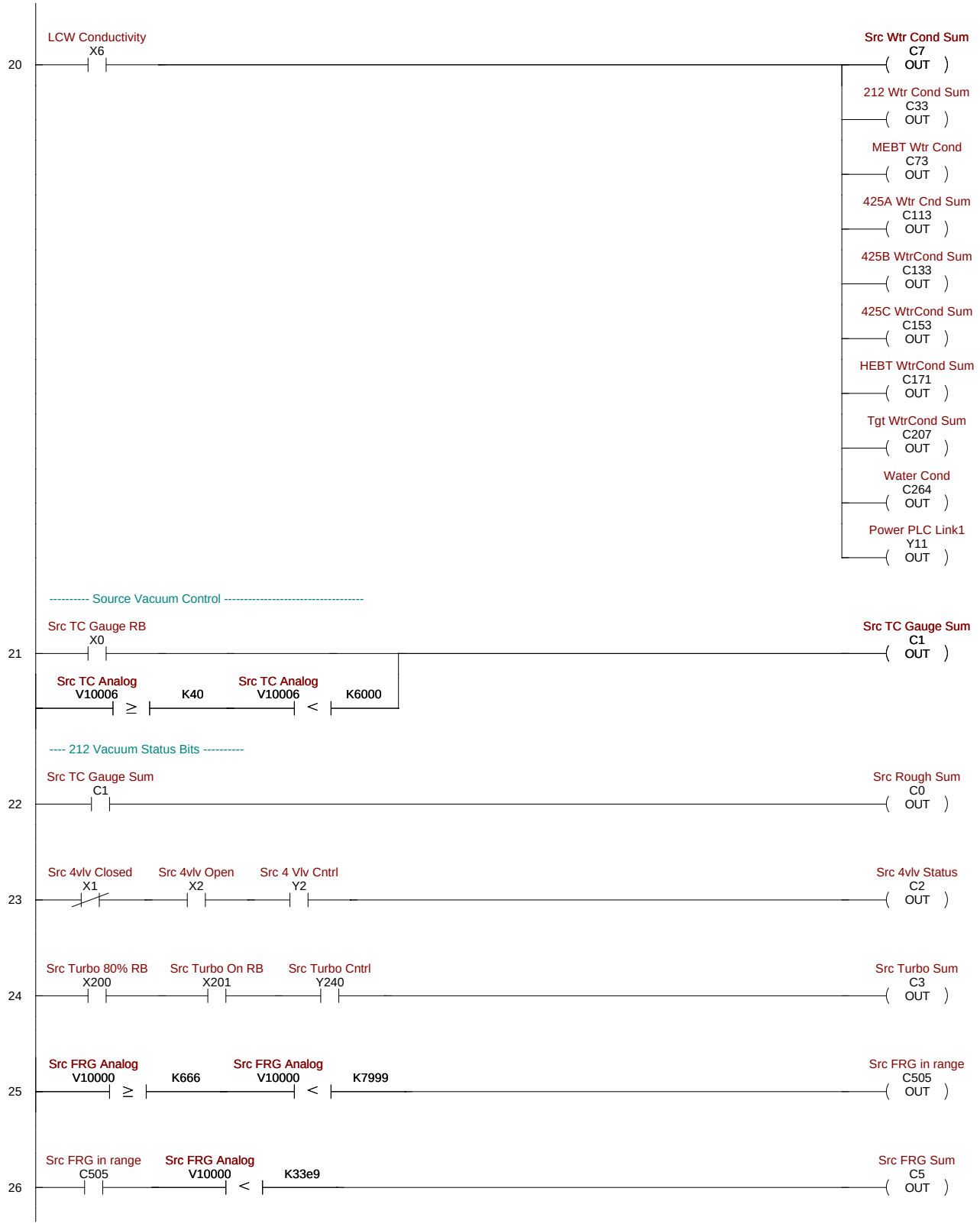
Fan out LCW Conductivity to all the status bits.

14 425 Vent Req C363 — LD K4040 — OUT PLC1C V10034

------- Source Vacuum Status Bits ----------

15 425 Vent Req C363 — LD PLC1D V10035 — ANDD Kff00 — ORD K40 — OUT PLC1D V10035

16
HEBT Vent Req
C364
LD
PLC1D
V10035
ANDD
Kff
ORD
K4000
OUT
PLC1D
V10035
17
Tgt Vent Req
C365
LD
K40
OUT
PLC1E
V10036
18
NOP
19
Turbo Water Flow
X5
Src Trb Wtr Sum
C6
OUT
212 Trb Wtr Sum
C32
OUT
MEBT Trb Wtr Sum
C72
OUT
Tgt TrboWtr Sum
C206
OUT
Turbo Wtr Flow
C265
OUT


20
LCW Conductivity
X6
Src Wtr Cond Sum
C7
OUT
212 Wtr Cond Sum
C33
OUT
MEBT Wtr Cond
C73
OUT
425A Wtr Cnd Sum
C113
OUT
425B WtrCond Sum
C133
OUT
425C WtrCond Sum
C153
OUT
HEBT WtrCond Sum
C171
OUT
Tgt WtrCond Sum
C207
OUT
Water Cond
C264
OUT
Power PLC Link1
Y11
OUT
---------- Source Vacuum Control ----------
21
Src TC Gauge RB
X0
Src TC Gauge Sum
C1
OUT
Src TC Analog
V10006
≥
K40
Src TC Analog
V10006
<
K6000
---- 212 Vacuum Status Bits ----------
22
Src TC Gauge Sum
C1
Src Rough Sum
C0
OUT
23
Src 4vlv Closed
X1
Src 4vlv Open
X2
Src 4 Vlv Cntrl
Y2
Src 4vlv Status
C2
OUT
24
Src Turbo 80% RB
X200
Src Turbo On RB
X201
Src Turbo Cntrl
Y240
Src Turbo Sum
C3
OUT
25
Src FRG Analog
V10000
≥
K666
Src FRG Analog
V10000
<
K7999
Src FRG in range
C505
OUT
26
Src FRG in range
C505
Src FRG Analog
V10000
<
K33e9
Src FRG Sum
C5
OUT

27
- Src Vac Cntrl C340 (NC)
- Turbo Water Flow X5 (NC)
- → Src 4 Vlv Cntrl Y2 RST
- → Src Turbo Cntrl Y240 RST
- → Start pump down from air. Src from Air S1 S7 RST
- → Determine the state of the vacuum. Src Initial Stg S0 SET

28
- Src Vac Cntrl C340 (NC)
- Determine the state of the vacuum. Src Initial Stg S0
- Source Vent Req C360
- → Src Vent Cntrl Y40 OUT

29
- Src Vac Cntrl C340
- → Source Vent Req C360 RST

30
- → NOP

31
- 212 TC Gauge RB C21
- → 212 Rough Pump C20 OUT

32
- 212 TC Gauge X7
- → 212 TC Gauge RB C21 OUT
- 212 TC Analog V10007 ≥ K40
- 212 TC Analog V10007 < K6000

33
- 212 510 4vv Clsd X10 (NC)
- 212 510 4vv Open X11
- → 212 510 4vv Sum C22 OUT

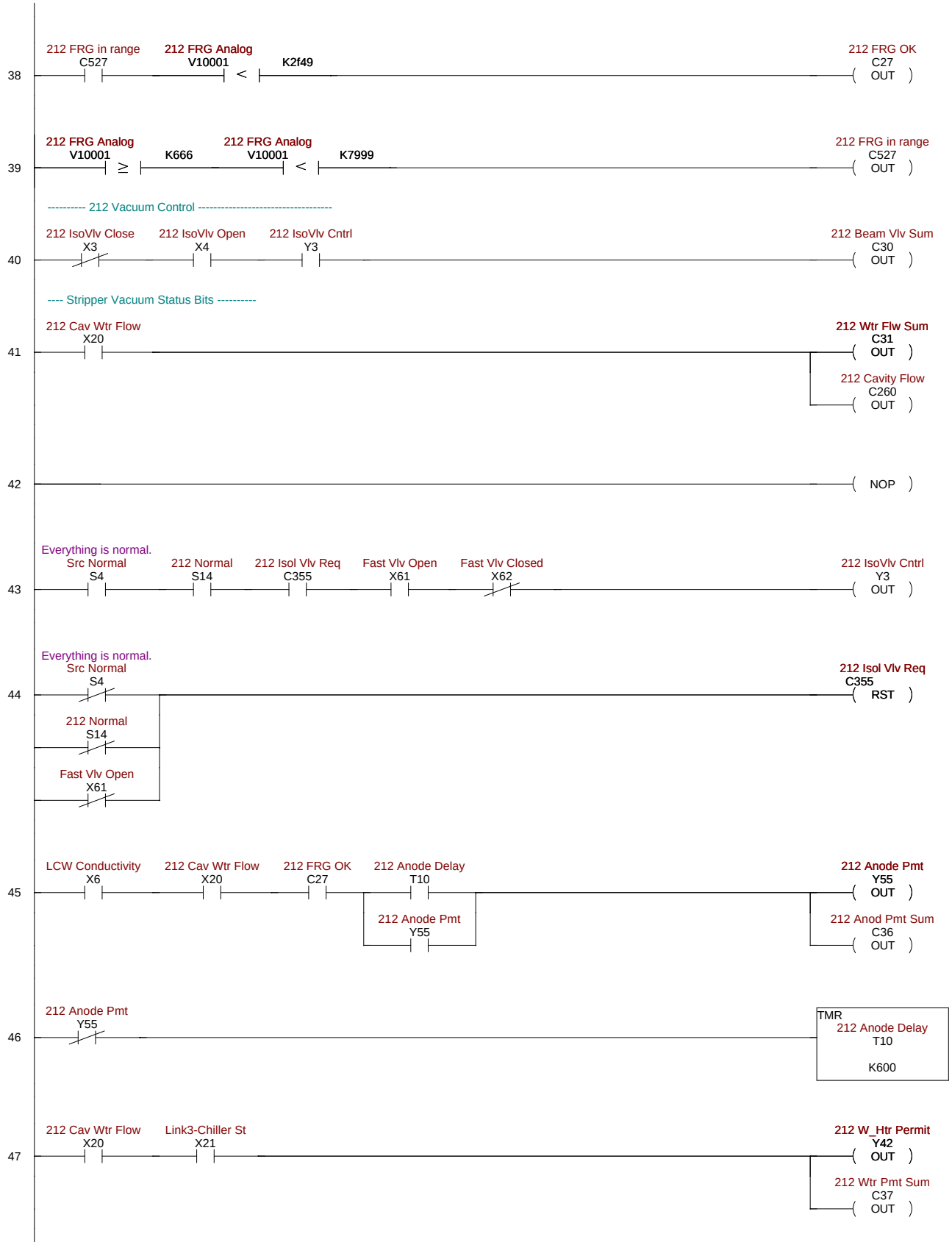
---------- 212 Cavity Interlocks ----------

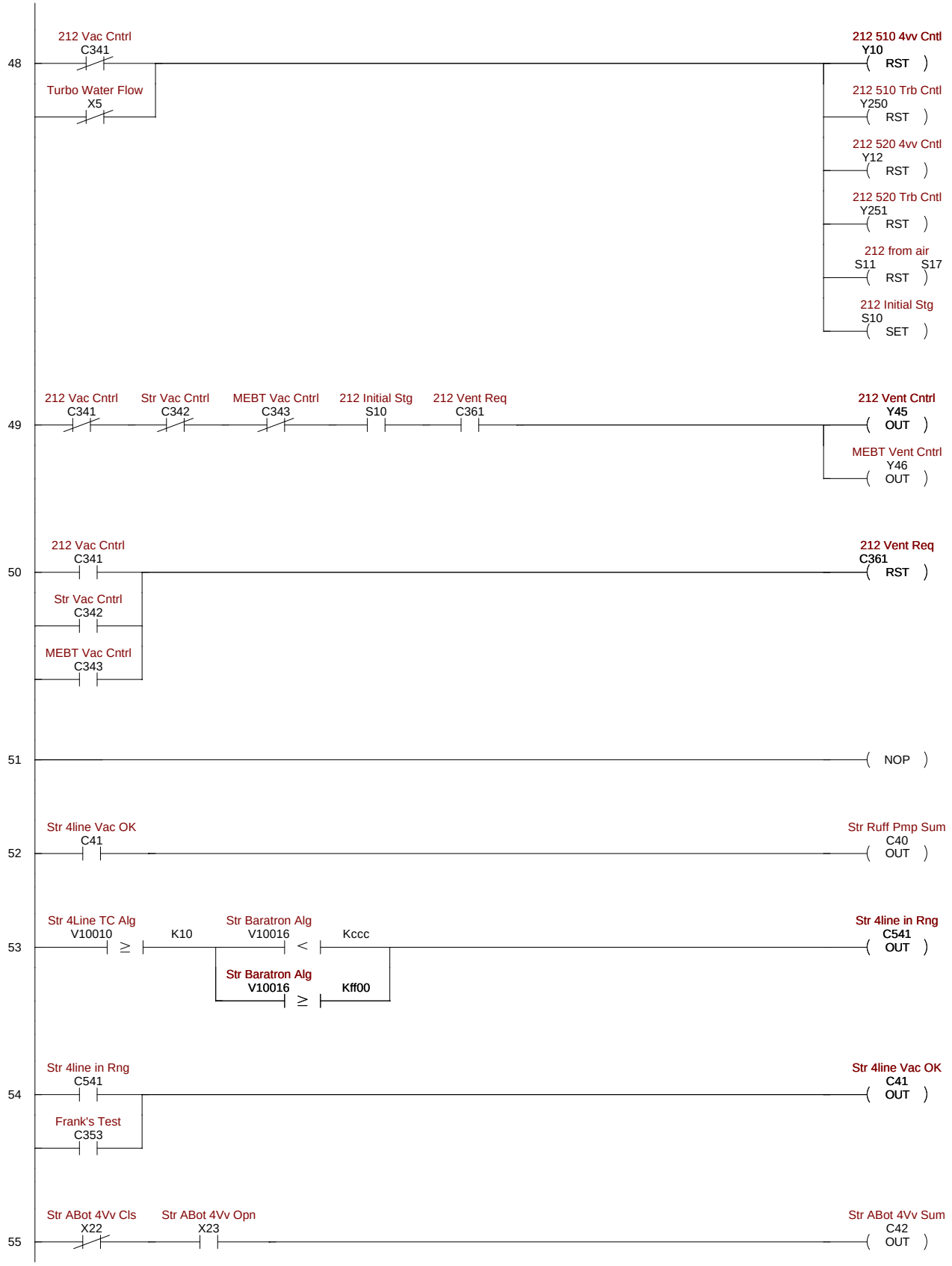
34
- 212 510 Trb 80% X12
- 212 510 Trb On X13
- → 212 510 Trb Sum C23 OUT

35
- 212 520 4vv Clsd X14 (NC)
- 212 520 4vv Open X15
- → 212 520 4vv Sum C24 OUT

36
- 212 520 Trb 80% X16
- 212 520 Trb On X17
- → 212 520 Trb Sum C25 OUT

37
- 212 Vent Cntrl Y45
- → 212 Vent Sum C26 OUT


38
212 FRG in range
C527
212 FRG Analog
V10001
<
K2f49
212 FRG OK
C27
OUT
39
212 FRG Analog
V10001
≥
K666
212 FRG Analog
V10001
<
K7999
212 FRG in range
C527
OUT
--------- 212 Vacuum Control ----------
40
212 IsoVlv Close
X3
212 IsoVlv Open
X4
212 IsoVlv Cntrl
Y3
212 Beam Vlv Sum
C30
OUT
---- Stripper Vacuum Status Bits ---------
41
212 Cav Wtr Flow
X20
212 Wtr Flw Sum
C31
OUT
212 Cavity Flow
C260
OUT
42
NOP
43
Everything is normal.
Src Normal
S4
212 Normal
S14
212 Isol Vlv Req
C355
Fast Vlv Open
X61
Fast Vlv Closed
X62
212 IsoVlv Cntrl
Y3
OUT
44
Everything is normal.
Src Normal
S4
212 Normal
S14
Fast Vlv Open
X61
212 Isol Vlv Req
C355
RST
45
LCW Conductivity
X6
212 Cav Wtr Flow
X20
212 FRG OK
C27
212 Anode Delay
T10
212 Anode Pmt
Y55
212 Anode Pmt
Y55
OUT
212 Anod Pmt Sum
C36
OUT
46
212 Anode Pmt
Y55
TMR
212 Anode Delay
T10
K600
47
212 Cav Wtr Flow
X20
Link3-Chiller St
X21
212 W_Htr Permit
Y42
OUT
212 Wtr Pmt Sum
C37
OUT


48
212 Vac Cntrl
C341
Turbo Water Flow
X5
212 510 4vv Cntl
Y10
RST
212 510 Trb Cntl
Y250
RST
212 520 4vv Cntl
Y12
RST
212 520 Trb Cntl
Y251
RST
212 from air
S11
S17
RST
212 Initial Stg
S10
SET
49
212 Vac Cntrl
C341
Str Vac Cntrl
C342
MEBT Vac Cntrl
C343
212 Initial Stg
S10
212 Vent Req
C361
212 Vent Cntrl
Y45
OUT
MEBT Vent Cntrl
Y46
OUT
50
212 Vac Cntrl
C341
Str Vac Cntrl
C342
MEBT Vac Cntrl
C343
212 Vent Req
C361
RST
51
NOP
52
Str 4line Vac OK
C41
Str Ruff Pmp Sum
C40
OUT
53
Str 4Line TC Alg
V10010
≥
K10
Str Baratron Alg
V10016
<
Kccc
Str Baratron Alg
V10016
≥
Kff00
Str 4line in Rng
C541
OUT
54
Str 4line in Rng
C541
Frank's Test
C353
Str 4line Vac OK
C41
OUT
55
Str ABot 4Vv Cls
X22
Str ABot 4Vv Opn
X23
Str ABot 4Vv Sum
C42
OUT

56 Str ABot Trb>80% X24 | Str ABot Trb On X25 | → Str ABot Trb Sum C43 OUT

57 Str IBot 4Vv Cls X26 (NC) | Str IBot 4Vv Opn X27 | → Str IBot 4Vv Sum C44 OUT

58 Str IBot Trb>80% X30 | Str IBot Trb On X31 | → Str IBot Trb Sum C45 OUT

---------- Stripper Interlocks ----------

59 Str Trb FRG Anlg V10002 ≥ K666 | Str Trb FRG Anlg V10002 < K7999 | → Str TrbFRG in Rg C546 OUT

60 Str TrbFRG in Rg C546 | Str Trb FRG Anlg V10002 < K4653 | → Str Trb FRG OK C46 OUT

61 Str ATop 4Vv Cls X32 (NC) | Str ATop 4Vv Opn X33 | → Str ATop 4Vv Sum C47 OUT

62 Str ATop Trb>80% X34 | Str ATop Trb On X35 | → Str ATop Trb Sum C50 OUT

63 Str ITop 4Vv Cls X36 (NC) | Str ITop 4Vv Opn X37 | → Str ITop 4Vv Sum C51 OUT

--------- Stripper Vacuum Control ----------

64 Str ITop Trb>80% X40 | Str ITop Trb On X41 | → Str ITop Trb Sum C52 OUT

MEBT

65 Str Cmb FRG Anlg V10003 ≥ K666 | Str Cmb FRG Anlg V10003 < K7999 | → Str CmbFRG in Rg C553 OUT

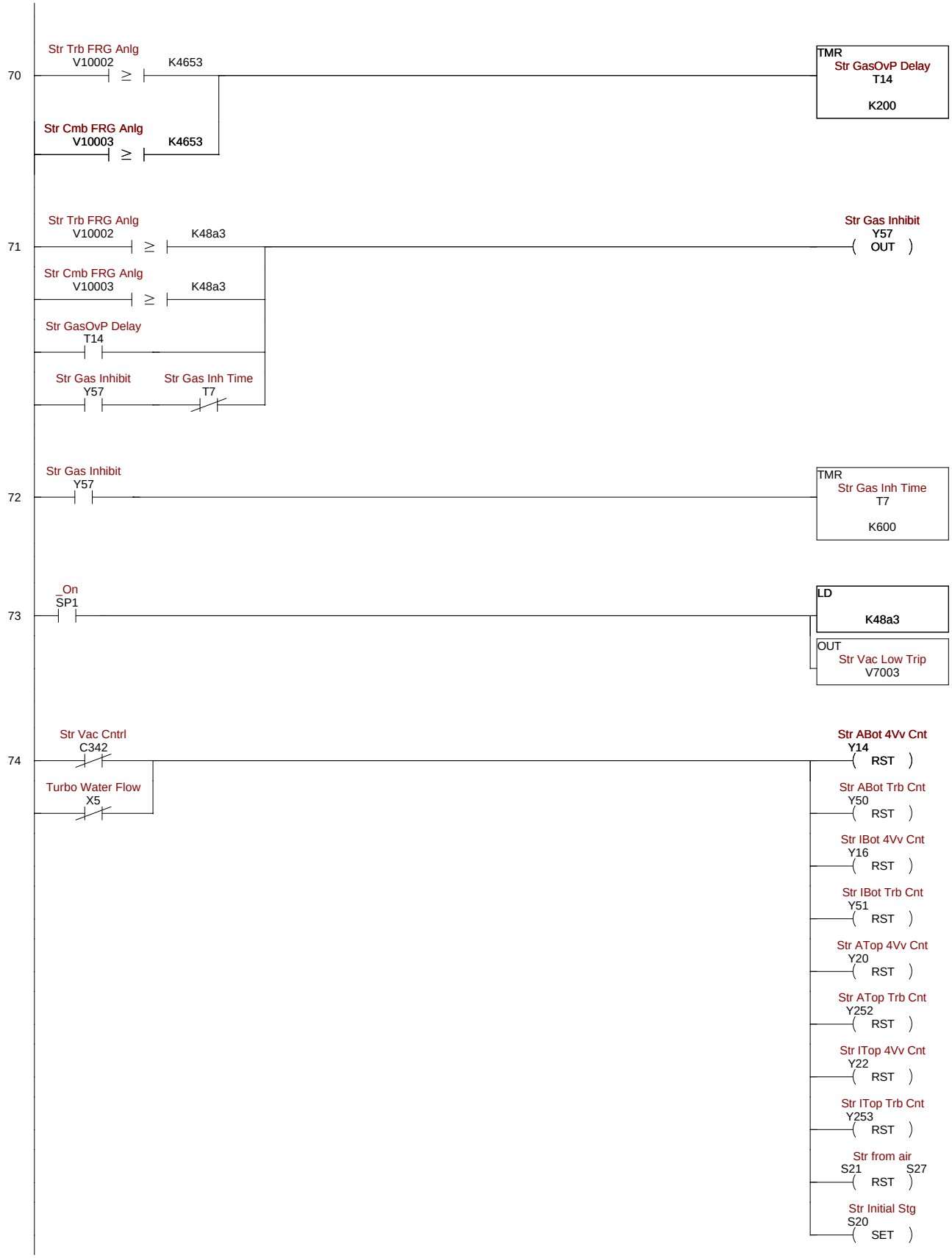
----MEBT Vacuum Status Bits ---------

66 Str CmbFRG in Rg C553 | Str Cmb FRG Anlg V10003 < K4653 | → Str Cmb FRG OK C53 OUT

67 212 Vent Sum C26 | → Str Vent Sum C54 OUT

68 Turbo Water Flow X5 | → Str Trb Wtr Sum C55 OUT

69 → NOP


70
Str Trb FRG Anlg
V10002
≥
K4653
Str Cmb FRG Anlg
V10003
≥
K4653
TMR
Str GasOvP Delay
T14
K200
71
Str Trb FRG Anlg
V10002
≥
K48a3
Str Cmb FRG Anlg
V10003
≥
K48a3
Str GasOvP Delay
T14
Str Gas Inhibit
Y57
Str Gas Inh Time
T7
Str Gas Inhibit
Y57
OUT
72
Str Gas Inhibit
Y57
TMR
Str Gas Inh Time
T7
K600
73
_On
SP1
LD
K48a3
OUT
Str Vac Low Trip
V7003
74
Str Vac Cntrl
C342
Turbo Water Flow
X5
Str ABot 4Vv Cnt
Y14
RST
Str ABot Trb Cnt
Y50
RST
Str IBot 4Vv Cnt
Y16
RST
Str IBot Trb Cnt
Y51
RST
Str ATop 4Vv Cnt
Y20
RST
Str ATop Trb Cnt
Y252
RST
Str ITop 4Vv Cnt
Y22
RST
Str ITop Trb Cnt
Y253
RST
Str from air
S21
S27
RST
Str Initial Stg
S20
SET

75 NOP

76 NOP

77 MEBT TC A OK C61 — MEBT Ruff A Sum C60 OUT

78 MEBT TC A Alg V10011 ≥ K60 — MEBT TC A Alg V10011 < K7999 — MEBT TC A in Rng C561 OUT

79 MEBT TC A in Rng C561 — MEBT TC A Alg V10011 < K4e02 — MEBT TC A OK C61 OUT

----------MEBT Interlocks ----------

80 MEBT A 4Vv Clsd X42 — MEBT A 4Vv Opnd X43 — MEBT 4Vv A Sum C62 OUT

--------- MEBT Vacuum Control ----------

81 MEBT A Trb >80% X44 — MEBT A Trb On X45 — MEBT Trb A Sum C63 OUT

End of MEBT

82 MEBT TC B OK C65 — MEBT Ruff B Sum C64 OUT

---- 425A Vacuum Status Bits ----------

83 MEBT TC B Alg V10012 ≥ K60 — MEBT TC B Alg V10012 < K7999 — MEBT TC B in Rng C565 OUT

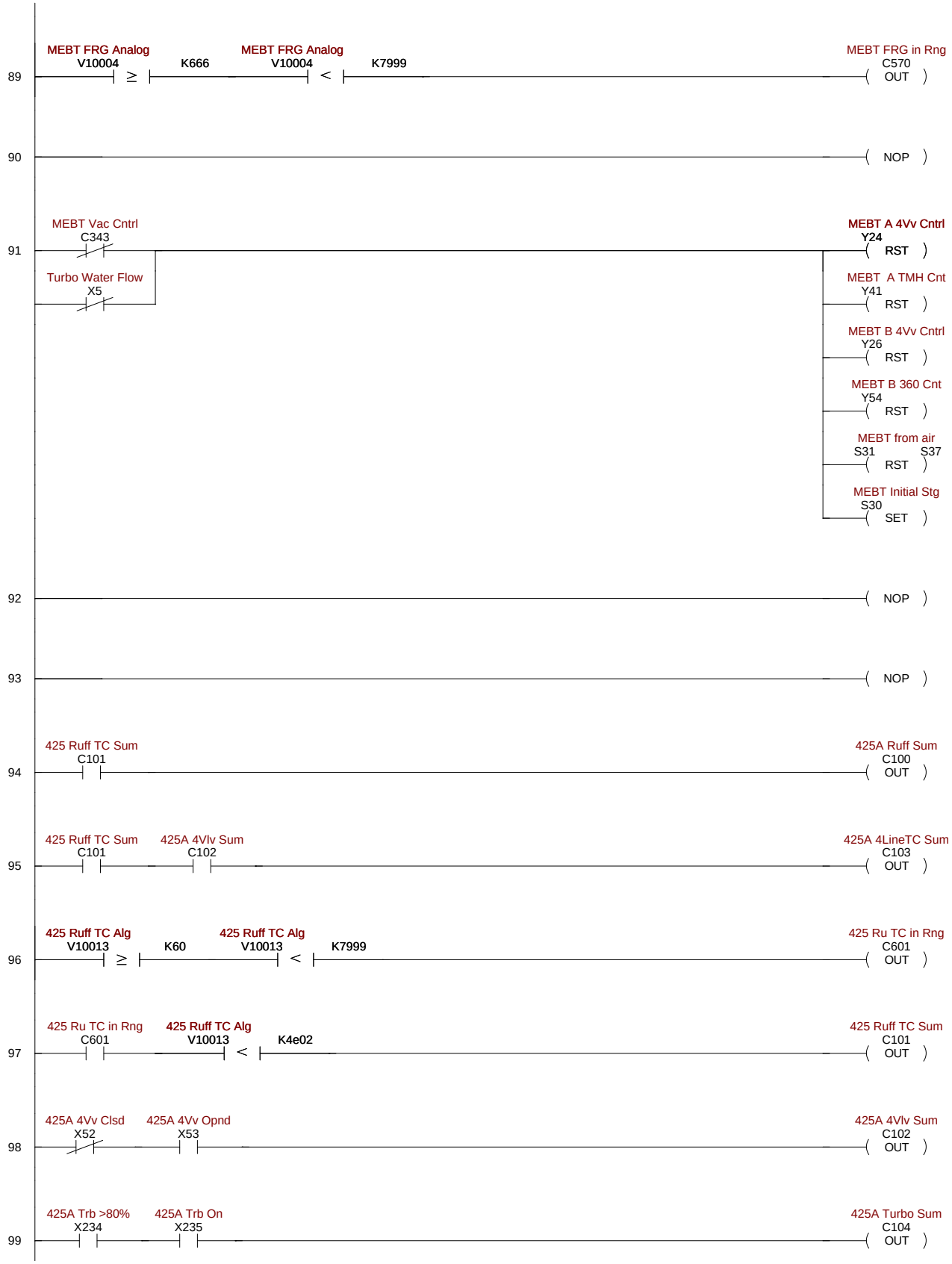
84 MEBT TC B in Rng C565 — MEBT TC B Alg V10012 < K4c02 — MEBT TC B OK C65 OUT

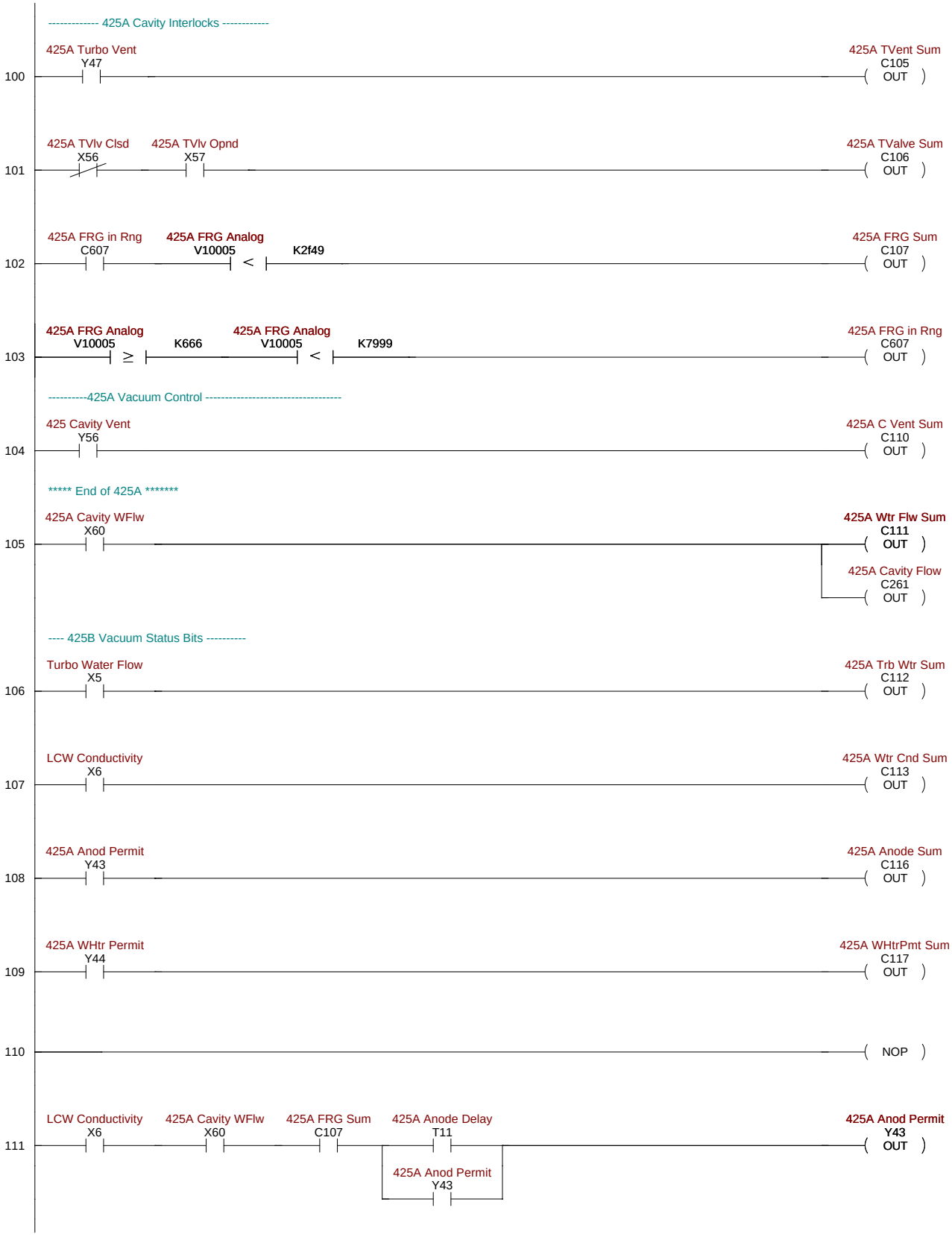
85 NOP

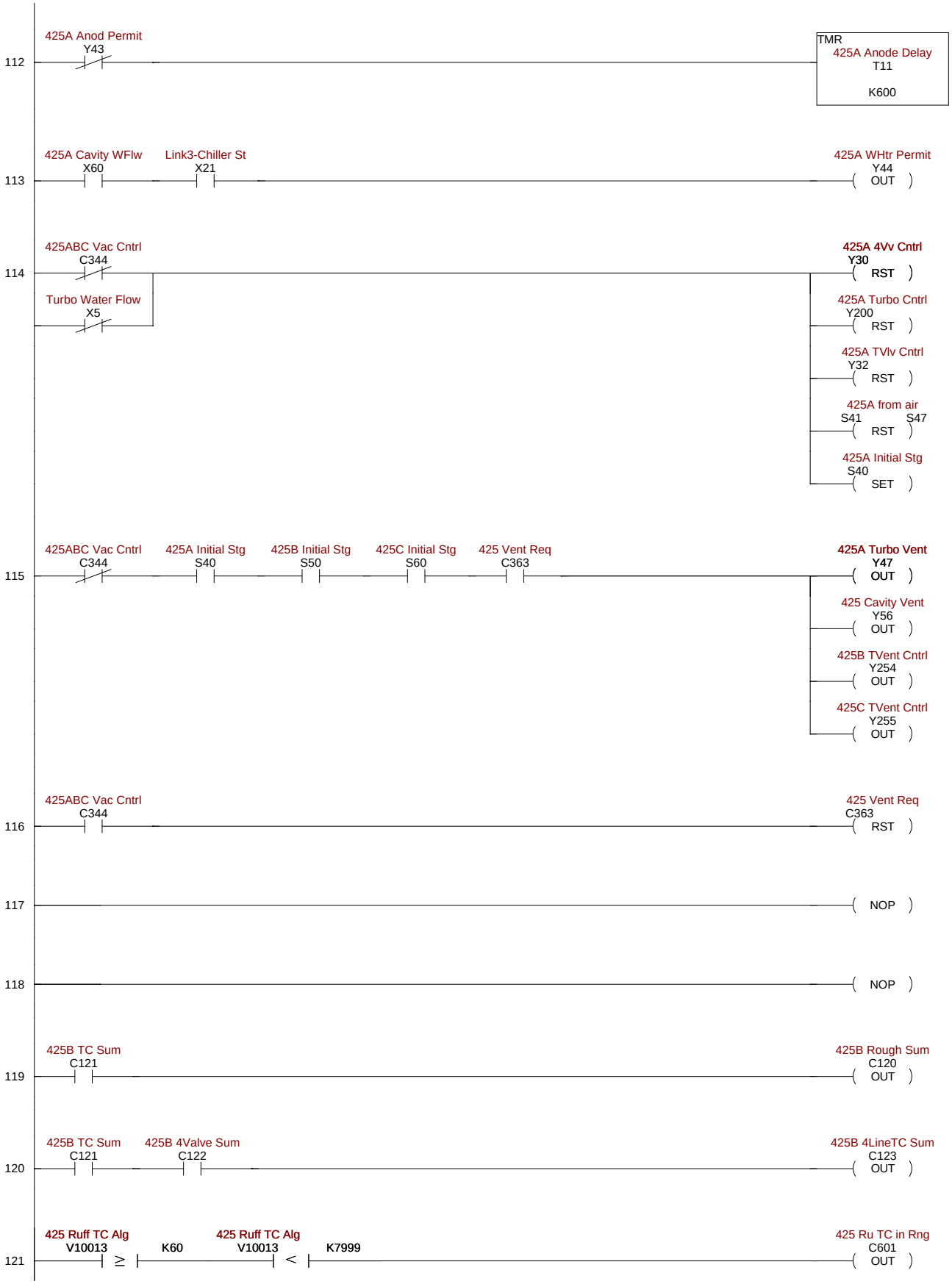
86 MEBT B 4Vv Clsd X46 — MEBT B 4Vv Opnd X47 — MEBT 4Vv B Sum C66 OUT

87 MEBT B Trb OK X50 — MEBT Trb B Sum C67 OUT

88 MEBT FRG in Rng C570 — MEBT FRG Analog V10004 < K4653 — MEBT FRG OK C70 OUT


89
MEBT FRG Analog
V10004
≥
K666
MEBT FRG Analog
V10004
<
K7999
MEBT FRG in Rng
C570
OUT
90
NOP
91
MEBT Vac Cntrl
C343
Turbo Water Flow
X5
MEBT A 4Vv Cntrl
Y24
RST
MEBT A TMH Cnt
Y41
RST
MEBT B 4Vv Cntrl
Y26
RST
MEBT B 360 Cnt
Y54
RST
MEBT from air
S31
S37
RST
MEBT Initial Stg
S30
SET
92
NOP
93
NOP
94
425 Ruff TC Sum
C101
425A Ruff Sum
C100
OUT
95
425 Ruff TC Sum
C101
425A 4Vlv Sum
C102
425A 4LineTC Sum
C103
OUT
96
425 Ruff TC Alg
V10013
≥
K60
425 Ruff TC Alg
V10013
<
K7999
425 Ru TC in Rng
C601
OUT
97
425 Ru TC in Rng
C601
425 Ruff TC Alg
V10013
<
K4e02
425 Ruff TC Sum
C101
OUT
98
425A 4Vv Clsd
X52
425A 4Vv Opnd
X53
425A 4Vlv Sum
C102
OUT
99
425A Trb >80%
X234
425A Trb On
X235
425A Turbo Sum
C104
OUT


---------- 425A Cavity Interlocks ----------
100
425A Turbo Vent
Y47
425A TVent Sum
C105
OUT
101
425A TVlv Clsd
X56
425A TVlv Opnd
X57
425A TValve Sum
C106
OUT
102
425A FRG in Rng
C607
425A FRG Analog
V10005
<
K2f49
425A FRG Sum
C107
OUT
103
425A FRG Analog
V10005
≥
K666
425A FRG Analog
V10005
<
K7999
425A FRG in Rng
C607
OUT
----------425A Vacuum Control ----------
104
425 Cavity Vent
Y56
425A C Vent Sum
C110
OUT
***** End of 425A *******
105
425A Cavity WFlw
X60
425A Wtr Flw Sum
C111
OUT
425A Cavity Flow
C261
OUT
---- 425B Vacuum Status Bits ----------
106
Turbo Water Flow
X5
425A Trb Wtr Sum
C112
OUT
107
LCW Conductivity
X6
425A Wtr Cnd Sum
C113
OUT
108
425A Anod Permit
Y43
425A Anode Sum
C116
OUT
109
425A WHtr Permit
Y44
425A WHtrPmt Sum
C117
OUT
110
NOP
111
LCW Conductivity
X6
425A Cavity WFlw
X60
425A FRG Sum
C107
425A Anode Delay
T11
425A Anod Permit
Y43
425A Anod Permit
Y43
OUT


112
425A Anod Permit
Y43
TMR
425A Anode Delay
T11
K600
113
425A Cavity WFlw
X60
Link3-Chiller St
X21
425A WHtr Permit
Y44
OUT
114
425ABC Vac Cntrl
C344
Turbo Water Flow
X5
425A 4Vv Cntrl
Y30
RST
425A Turbo Cntrl
Y200
RST
425A TVlv Cntrl
Y32
RST
425A from air
S41
S47
RST
425A Initial Stg
S40
SET
115
425ABC Vac Cntrl
C344
425A Initial Stg
S40
425B Initial Stg
S50
425C Initial Stg
S60
425 Vent Req
C363
425A Turbo Vent
Y47
OUT
425 Cavity Vent
Y56
OUT
425B TVent Cntrl
Y254
OUT
425C TVent Cntrl
Y255
OUT
116
425ABC Vac Cntrl
C344
425 Vent Req
C363
RST
117
NOP
118
NOP
119
425B TC Sum
C121
425B Rough Sum
C120
OUT
120
425B TC Sum
C121
425B 4Valve Sum
C122
425B 4LineTC Sum
C123
OUT
121
425 Ruff TC Alg
V10013
≥
K60
425 Ruff TC Alg
V10013
<
K7999
425 Ru TC in Rng
C601
OUT

122 425 Ru TC in Rng C601 | 425 Ruff TC Alg V10013 < K4e02 | 425B TC Sum C121 OUT

---------- 425B Cavity Interlocks ----------

123 425B 4Vlv Clsd X202 (NC) | 425B 4Vlv Open X203 | 425B 4Valve Sum C122 OUT

124 425B Turbo >80% X204 | 425B Turbo On X205 | 425B Turbo Sum C124 OUT

125 425B TVent Cntrl Y254 | 425B TrbVent Sum C125 OUT

126 425B TVlv Clsd X206 (NC) | 425B TVlv Open X207 | 425B TrbVlv Sum C126 OUT

----------425B Vacuum Control ----------

127 425B FRG in Rng C627 | 425B FRG Analog V10020 < K2f49 | 425B FRG Sum C127 OUT

***** End of 425B *******

128 425B FRG Analog V10020 ≥ K666 | 425B FRG Analog V10020 < K7999 | 425B FRG in Rng C627 OUT

---- 425C Vacuum Status Bits ----------

129 425 Cavity Vent Y56 | 425B CavVent Sum C130 OUT

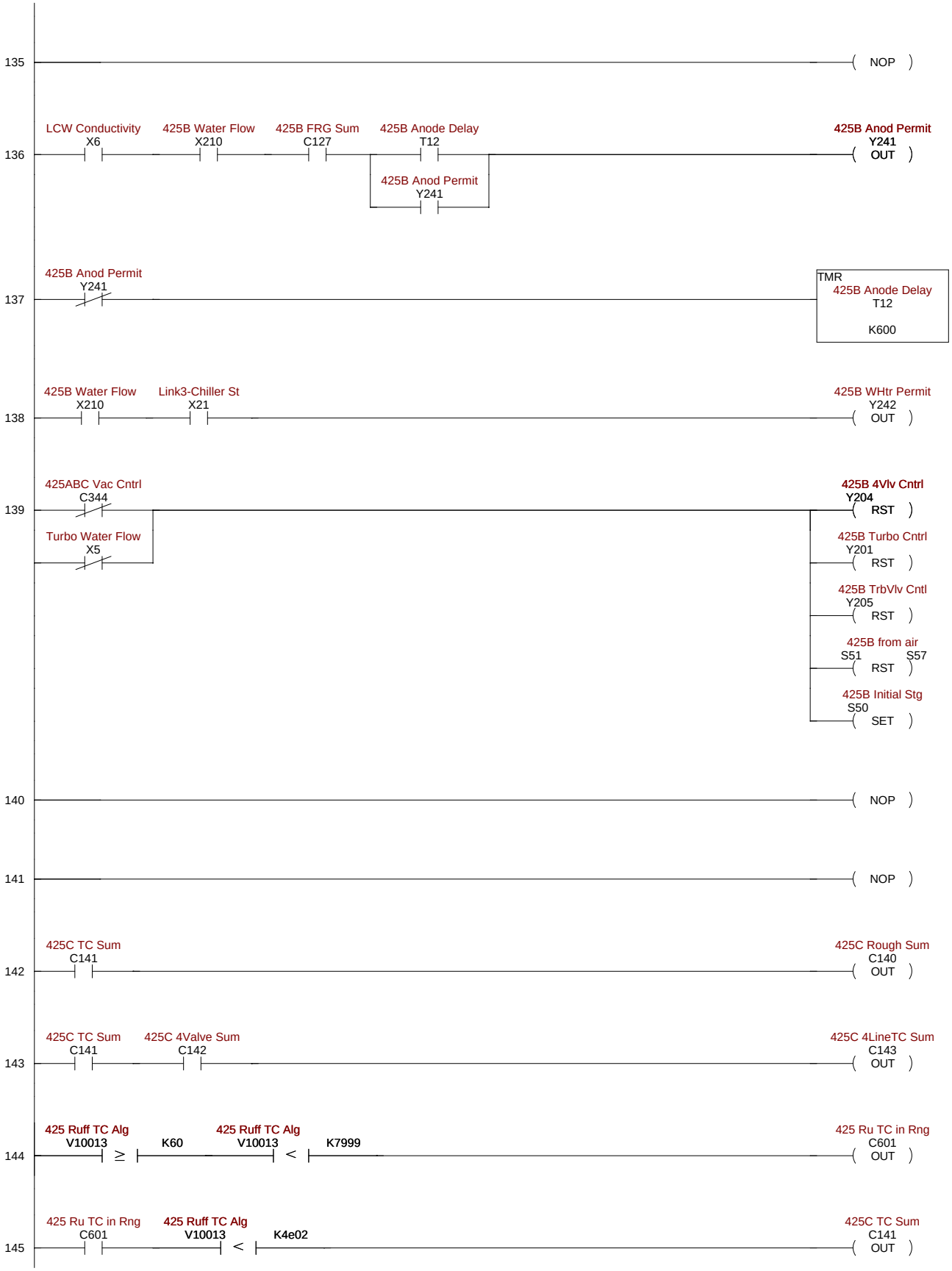
130 425B Water Flow X210 | 425B CavWtr Sum C131 OUT | 425B Cavity Flow C262 OUT

131 Turbo Water Flow X5 | 425B TrboWtr Sum C132 OUT

132 LCW Conductivity X6 | 425B WtrCond Sum C133 OUT

133 425B Anod Permit Y241 | 425B Anode Sum C136 OUT

134 425B WHtr Permit Y242 | 425B WHtrPmt Sum C137 OUT


135
NOP
136
LCW Conductivity X6
425B Water Flow X210
425B FRG Sum C127
425B Anode Delay T12
425B Anod Permit Y241
425B Anod Permit Y241 OUT
137
425B Anod Permit Y241
TMR 425B Anode Delay T12 K600
138
425B Water Flow X210
Link3-Chiller St X21
425B WHtr Permit Y242 OUT
139
425ABC Vac Cntrl C344
Turbo Water Flow X5
425B 4Vlv Cntrl Y204 RST
425B Turbo Cntrl Y201 RST
425B TrbVlv Cntl Y205 RST
425B from air S51 S57 RST
425B Initial Stg S50 SET
140
NOP
141
NOP
142
425C TC Sum C141
425C Rough Sum C140 OUT
143
425C TC Sum C141
425C 4Valve Sum C142
425C 4LineTC Sum C143 OUT
144
425 Ruff TC Alg V10013 ≥ K60
425 Ruff TC Alg V10013 < K7999
425 Ru TC in Rng C601 OUT
145
425 Ru TC in Rng C601
425 Ruff TC Alg V10013 < K4e02
425C TC Sum C141 OUT

---------- 425C Cavity Interlocks ----------

146 425C 4Vlv Clsd X212 (/) | 425C 4Vlv Open X213 | → 425C 4Valve Sum C142 OUT

147 425C Turbo >80% X214 | | 425C Turbo On X215 | → 425C Turbo Sum C144 OUT

148 425C TVent Cntrl Y255 | → 425C TrbVent Sum C145 OUT

149 425C TVlv Clsd X216 (/) | 425C TVlv Open X217 | → 425C TrbVlv Sum C146 OUT

----------425C Vacuum Control ----------

150 425C FRG in rng C647 | | 425C FRG Analog V10021 | < | K2f49 | → 425C FRG Sum C147 OUT

***** End of 425C *******

151 425C FRG Analog V10021 | ≥ | K666 | 425C FRG Analog V10021 | < | K7999 | → 425C FRG in rng C647 OUT

----HEBT Vacuum Status Bits ----------

152 425 Cavity Vent Y56 | → 425C CavVent Sum C150 OUT

153 425C Water Flow X211 | → 425C CavWtr Sum C151 OUT
→ 425C Cavity Flow C263 OUT

154 Turbo Water Flow X5 | → 425C TrboWtr Sum C152 OUT

155 LCW Conductivity X6 | → 425C WtrCond Sum C153 OUT

156 425C Anod Permit Y243 | → 425C Anode Sum C156 OUT

157 425C WHtr Permit Y244 | → 425C WHtrPmt Sum C157 OUT

158 → NOP

159 LCW Conductivity X6 | 425C Water Flow X211 | 425C FRG Sum C147 | 425C Anode Delay T13 | 425C Anod Permit Y243 → 425C Anod Permit Y243 OUT

160 425C Anod Permit Y243 → TMR 425C Anode Delay T13 K600

161 425C Water Flow X211 | Link3-Chiller St X21 → 425C WHtr Permit Y244 OUT

162 425ABC Vac Cntrl C344 | Turbo Water Flow X5 → 425C 4Vlv Cntrl Y206 RST; 425C Turbo Cntrl Y202 RST; 425C TrbVlv Cntl Y207 RST; 425C from air S61 S67 RST; 425C Initial Stg S60 SET

163 NOP

164 NOP

----- Fast Valve Control & Status ---------

165 HEBT TC Sum C161 → HEBT Rough Sum C160 OUT

166 HEBT TC V10014 ≥ K60 | HEBT TC V10014 < K7999 → HEBT TC in Rng C661 OUT

167 HEBT TC in Rng C661 | HEBT TC V10014 < K4e02 → HEBT TC Sum C161 OUT

168 HEBT 4Vlv Clsd X220 | HEBT 4Vlv Open X221 → HEBT 4Valve Sum C162 OUT

169 HEBT Turbo >80% X222 | HEBT Turbo On X223 → HEBT Turbo Sum C163 OUT

170 HEBT TVent Cntrl Y256 — HEBT TrbVent Sum C164 OUT

If Fast Valve really tripped then set flag and shut down HEBT Vac Control.

171 HEBT TVlv Clsd X224 (NC), HEBT TVlv Open X225 — HEBT TrbVlv Sum C165 OUT

172 HEBT FRG in rng C667, HEBT FRG Analog V10022 < K2f49 — HEBT FRG Sum C166 OUT

173 HEBT FRG Analog V10022 ≥ K666, HEBT FRG Analog V10022 < K7999 — HEBT FRG in rng C667 OUT

174 Fast Vlv Open X61, Fast Vlv Closed X62 (NC) — HEBT FastVlv Sum C167 OUT

175 Turbo Water Flow X5 — HEBT TrboWtr Sum C170 OUT

176 LCW Conductivity X6 — HEBT WtrCond Sum C171 OUT

177 Fast Vlv Ready X63 — FastVlv Rdy Stat C172 OUT

----------HEBT Vacuum Control ----------

178 Fast Vlv Remote X64 — FastVlv Rmt Stat C173 OUT

***** End of HEBT *******

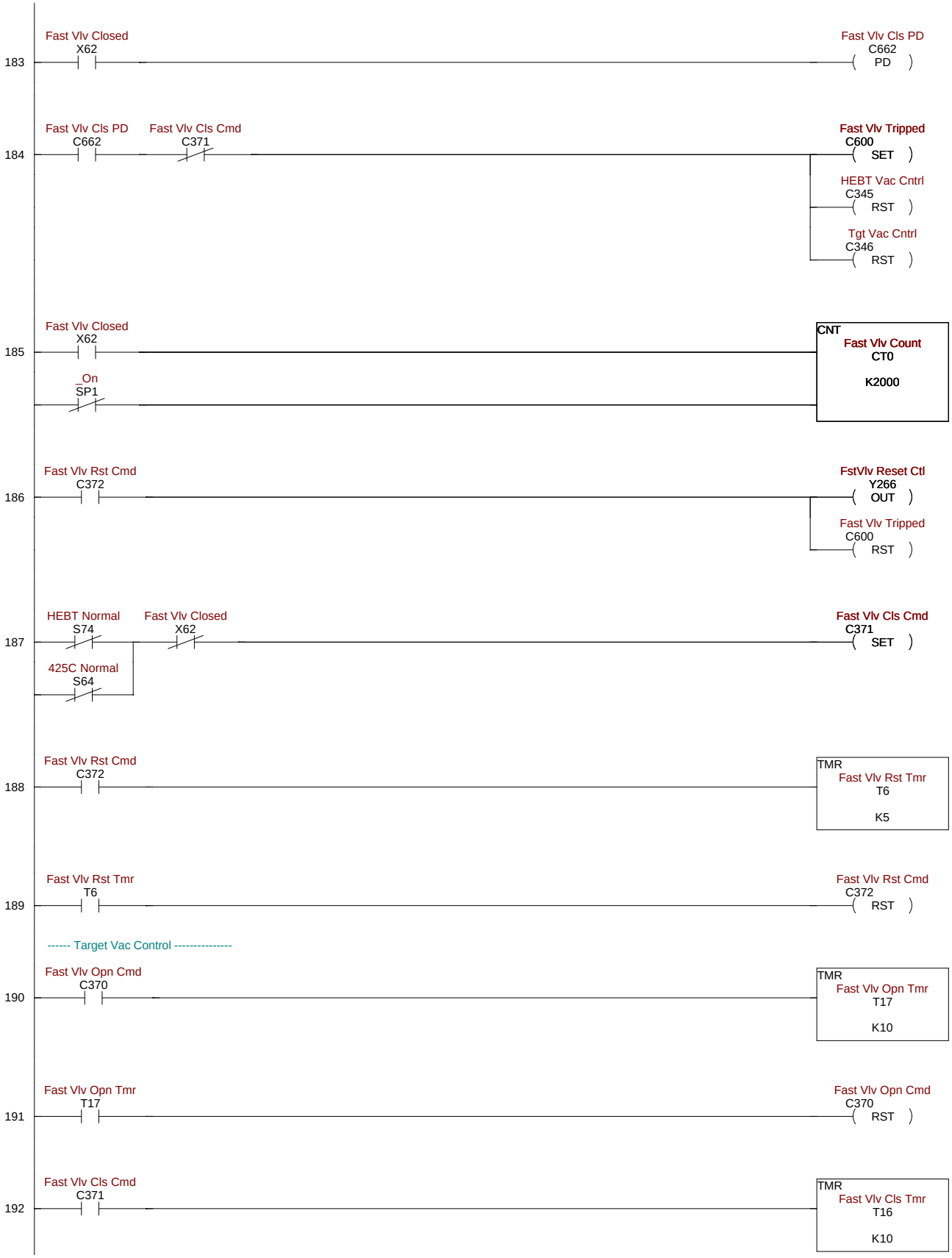
179 425C Normal S64, HEBT Normal S74, Fast Vlv Opn Cmd C370, Fast Vlv Remote X64 — FstVlv Open Ctl Y264 OUT

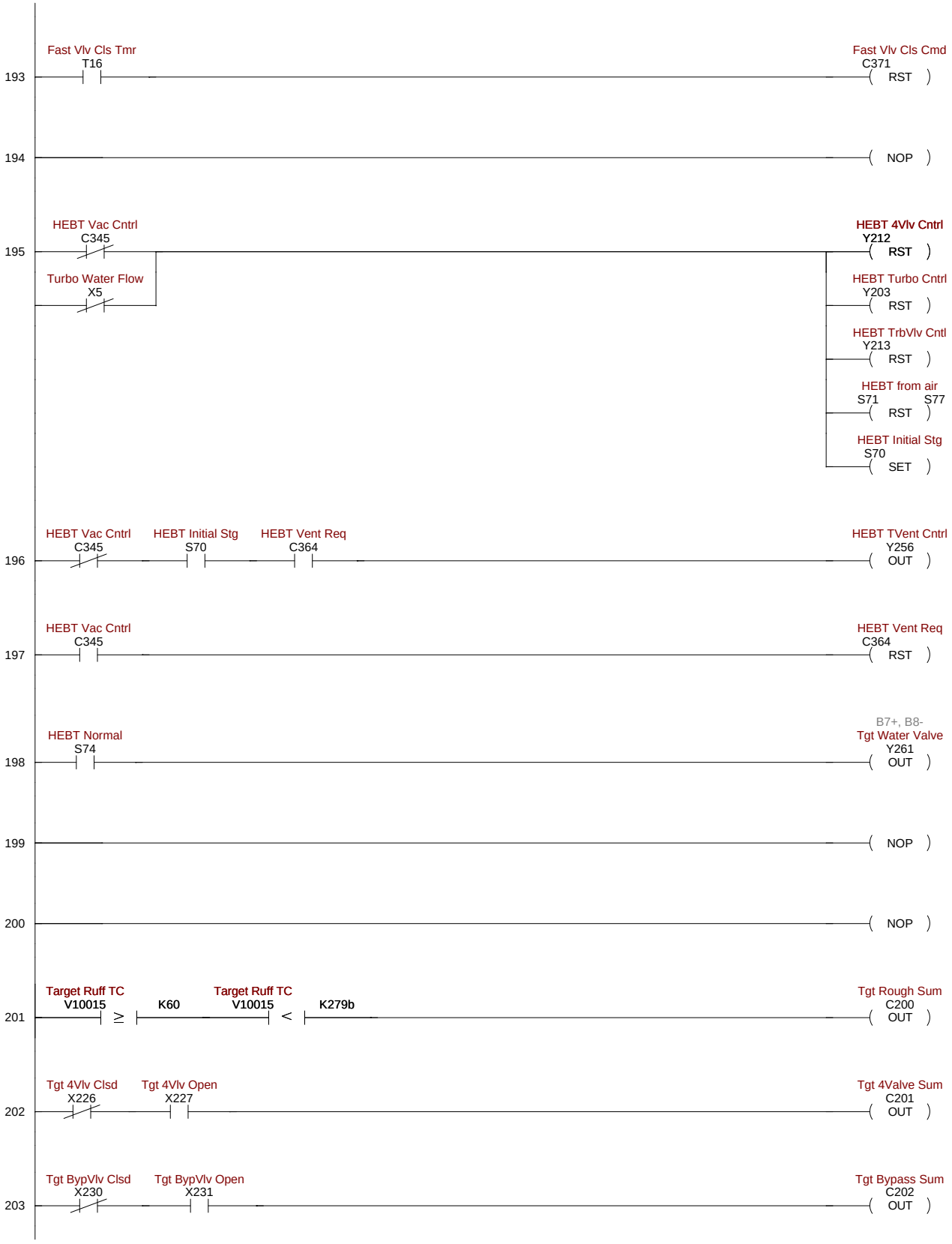
------- Target Vacuum Status Bits ----------

180 Fast Vlv Cls Cmd C371, Fast Vlv Remote X64, Fast Vlv Ready X63 — FstVlv Close Ctl Y265 OUT

181 Fast Vlv Cls Cmd C371, Fast Vlv Remote X64, Fast Vlv Ready X63 (NC) — C603 PD

182 C603 — Fast Vlv Rst Cmd C372 SET


183
Fast Vlv Closed
X62
Fast Vlv Cls PD
C662
PD
184
Fast Vlv Cls PD
C662
Fast Vlv Cls Cmd
C371
Fast Vlv Tripped
C600
SET
HEBT Vac Cntrl
C345
RST
Tgt Vac Cntrl
C346
RST
185
Fast Vlv Closed
X62
_On
SP1
CNT
Fast Vlv Count
CT0
K2000
186
Fast Vlv Rst Cmd
C372
FstVlv Reset Ctl
Y266
OUT
Fast Vlv Tripped
C600
RST
187
HEBT Normal
S74
Fast Vlv Closed
X62
425C Normal
S64
Fast Vlv Cls Cmd
C371
SET
188
Fast Vlv Rst Cmd
C372
TMR
Fast Vlv Rst Tmr
T6
K5
189
Fast Vlv Rst Tmr
T6
Fast Vlv Rst Cmd
C372
RST
------ Target Vac Control ----------
190
Fast Vlv Opn Cmd
C370
TMR
Fast Vlv Opn Tmr
T17
K10
191
Fast Vlv Opn Tmr
T17
Fast Vlv Opn Cmd
C370
RST
192
Fast Vlv Cls Cmd
C371
TMR
Fast Vlv Cls Tmr
T16
K10


193
Fast Vlv Cls Tmr
T16
Fast Vlv Cls Cmd
C371
RST
194
NOP
195
HEBT Vac Cntrl
C345
Turbo Water Flow
X5
HEBT 4Vlv Cntrl
Y212
RST
HEBT Turbo Cntrl
Y203
RST
HEBT TrbVlv Cntl
Y213
RST
HEBT from air
S71
S77
RST
HEBT Initial Stg
S70
SET
196
HEBT Vac Cntrl
C345
HEBT Initial Stg
S70
HEBT Vent Req
C364
HEBT TVent Cntrl
Y256
OUT
197
HEBT Vac Cntrl
C345
HEBT Vent Req
C364
RST
198
HEBT Normal
S74
B7+, B8-
Tgt Water Valve
Y261
OUT
199
NOP
200
NOP
201
Target Ruff TC
V10015
≥
K60
Target Ruff TC
V10015
<
K279b
Tgt Rough Sum
C200
OUT
202
Tgt 4Vlv Clsd
X226
Tgt 4Vlv Open
X227
Tgt 4Valve Sum
C201
OUT
203
Tgt BypVlv Clsd
X230
Tgt BypVlv Open
X231
Tgt Bypass Sum
C202
OUT

-------- End of Target ----------

204 Tgt Vent Cntrl Y257 → Tgt Vent Sum C203 OUT

Scan and format the analog information for the IRM.

205 Tgt Cnv in Rng C704 | Tgt Convectron A V10027 < K250 → Tgt Cnvctron Sum C204 OUT

206 Tgt Convectron A V10027 ≥ K0 | Tgt Convectron A V10027 < K7999 → Tgt Cnv in Rng C704 OUT

207 Tgt IsolVlv Clsd X232 | Tgt IsolVlv Open X233 → Tgt IsolVlv Sum C205 OUT

208 Faraday Cup IN X72 | Faraday Cup OUT X73 → Faraday Cup Sum C210 OUT

209 Chemist Sw UP X74 → Chemist Sw Sum C211 OUT

------ Force analog value to zero if slightly negative --------

210 → NOP

211 Tgt Pump Button X236 → Tgt Vac Cntrl C346 SET

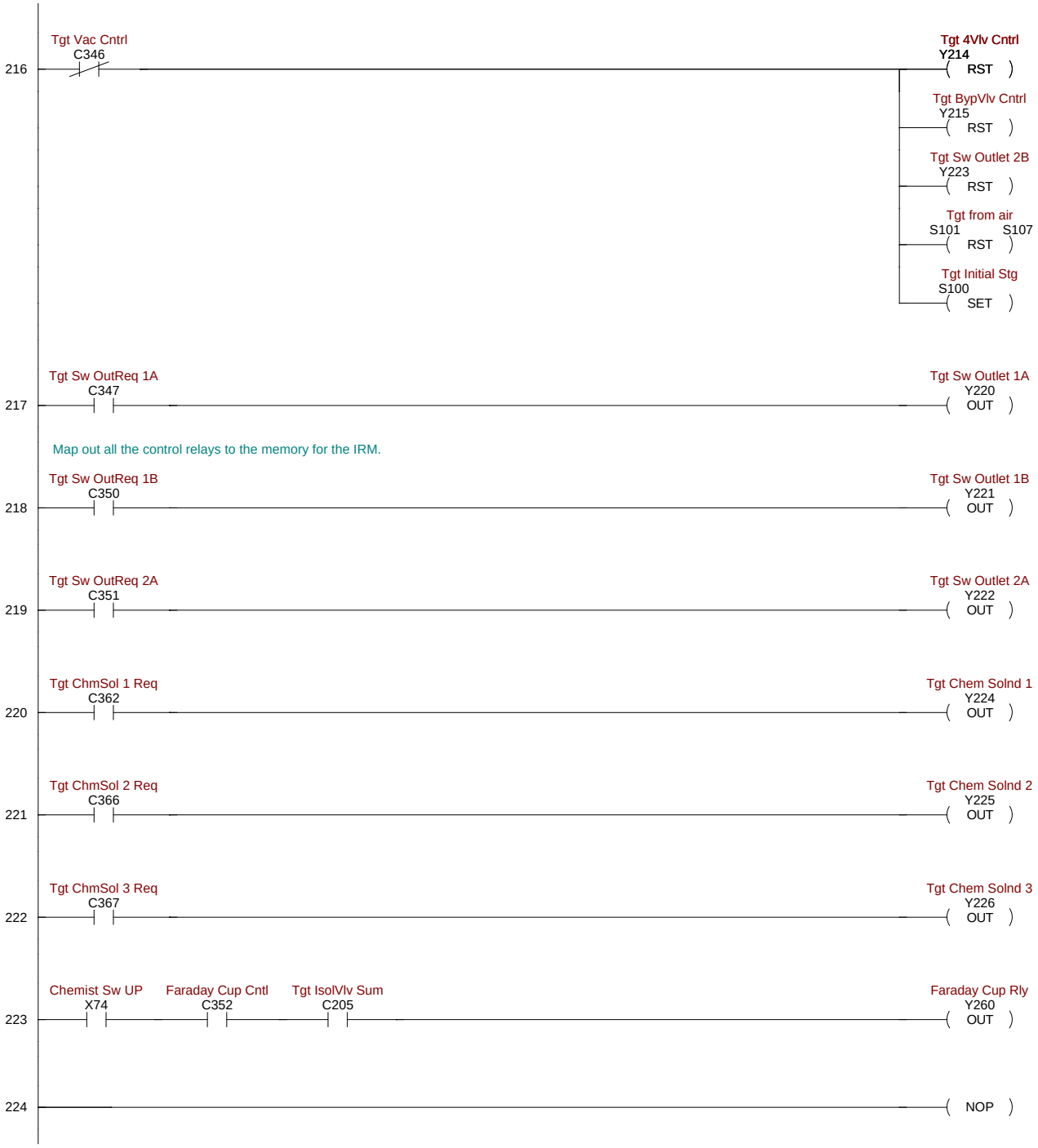
Stick Thermocouple readouts into unused analog channels.

212 HEBT Normal S74 | Tgt Normal S104 | Tgt Isol Vlv Req C357 → Tgt Isol Vlv Cnt Y216 OUT

213 HEBT Normal S74 / Tgt Normal S104 → Tgt Isol Vlv Req C357 RST

214 Tgt Vac Cntrl C346 | Tgt Initial Stg S100 | Tgt Vent Req C365 → Tgt Vent Cntrl Y257 OUT

215 Tgt Vac Cntrl C346 → Tgt Vent Req C365 RST


216
Tgt Vac Cntrl
C346
Tgt 4Vlv Cntrl
Y214
RST
Tgt BypVlv Cntrl
Y215
RST
Tgt Sw Outlet 2B
Y223
RST
Tgt from air
S101 S107
RST
Tgt Initial Stg
S100
SET
217
Tgt Sw OutReq 1A
C347
Tgt Sw Outlet 1A
Y220
OUT
Map out all the control relays to the memory for the IRM.
218
Tgt Sw OutReq 1B
C350
Tgt Sw Outlet 1B
Y221
OUT
219
Tgt Sw OutReq 2A
C351
Tgt Sw Outlet 2A
Y222
OUT
220
Tgt ChmSol 1 Req
C362
Tgt Chem Solnd 1
Y224
OUT
221
Tgt ChmSol 2 Req
C366
Tgt Chem Solnd 2
Y225
OUT
222
Tgt ChmSol 3 Req
C367
Tgt Chem Solnd 3
Y226
OUT
223
Chemist Sw UP
X74
Faraday Cup Cntl
C352
Tgt IsolVlv Sum
C205
Faraday Cup Rly
Y260
OUT
224
NOP

225 _On SP1

LDF
Analog L1
X100
K12

SHFL
K4

SUBB
K8000

LDF
X114
K4

OUTX
Src FRG Analog
V10000

226 _On SP1

LDF
Analog L2
X120
K12

SHFL
K4

SUBB
K8000

LDF
X134
K4

OUTX
Str 4Line TC Alg
V10010

227 _On SP1

LDF
Analog R1
X240
K12

SHFL
K4

SUBB
K8000

LDF
X254
K4

OUTX
425B FRG Analog
V10020

228 _On SP1

LDF
Analog R2 Thermo
X260
K12

LDF
X274
K3

OUTX
ThermoK Ch1
V10060

229 _On SP1
- LDF Analog R3 Thermo X300 K12
- LDF X314 K3
- OUTX Thermo J Ch1 V10100

Map the locations for IRM writes into control relays.
Compare C to Mirror. If not equal then write to V and Mirror.

230 Tgt Convectron A V10027 ≥ Kff00
- LD K0
- OUT Tgt Convectron A V10027

231 NOP

Compare V to Mirror. If not equal then write to C and Mirror.

232 _On SP1
- LD Thermo J Ch1 V10100
- OUT PLC 0F V10017

233 _On SP1
- LD Thermo J Ch2 V10101
- OUT PLC 13 V10023

Map the locations for IRM writes into control relays.
Compare C to Mirror. If not equal then write to V and Mirror.

234 _On SP1
- LD Thermo J Ch3 V10102
- OUT PLC 14 V10024

235 _On SP1
- LD Thermo J Ch4 V10103
- OUT PLC 15 V10025

Compare V to Mirror. If not equal then write to C and Mirror.

236 _On SP1
- LD Thermo J Ch5 V10104
- OUT PLC19 V10031

237 NOP

Map the locations for IRM writes into control relays.
Compare C to Mirror. If not equal then write to V and Mirror.

238 _On SP1 — LD Ion Source word VC0 — OUT Digital Word 00 V10040

239 _On SP1 — LD 212 word VC20 — OUT Digital Word 01 V10041

Compare V to Mirror. If not equal then write to C and Mirror.

240 _On SP1 — LD Stripper word VC40 — OUT Digital Word 02 V10042

241 _On SP1 — LD MEBT word VC60 — OUT Digital Word 03 V10043

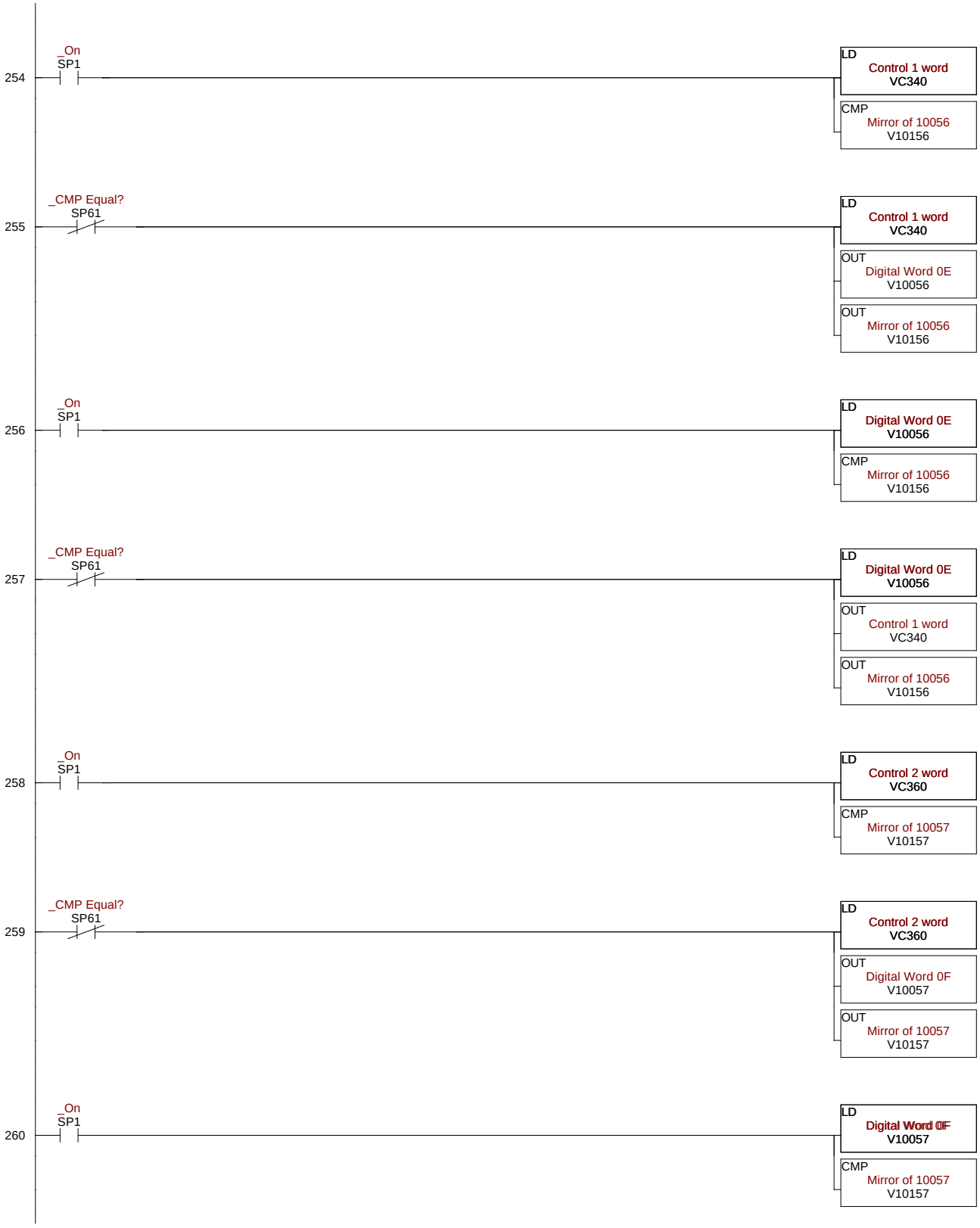
242 _On SP1 — LD 425A word VC100 — OUT Digital Word 04 V10044

243 _On SP1 — LD 425B word VC120 — OUT Digital Word 05 V10045

244 _On SP1 — LD 425C word VC140 — OUT Digital Word 06 V10046

245 _On SP1 — LD HEBT word VC160 — OUT Digital Word 07 V10047

246
_On
SP1
LD
Target word
VC200
OUT
Digital Word 08
V10050
247
_On
SP1
LD
PS1 word
VC220
OUT
Digital Word 09
V10051
248
_On
SP1
LD
PS2 word
VC240
OUT
Digital Word 0A
V10052
249
_On
SP1
LD
Water word
VC260
OUT
Digital Word 0B
V10053
250
_On
SP1
LD
Extra 3 word
VC320
CMP
Mirror of 10055
V10155
251
_CMP Equal?
SP61
LD
Extra 3 word
VC320
OUT
Digital Word 0D
V10055
OUT
Mirror of 10055
V10155
252
_On
SP1
LD
Digital Word 0D
V10055
CMP
Mirror of 10055
V10155
253
_CMP Equal?
SP61
LD
Digital Word 0D
V10055
OUT
Extra 3 word
VC320
OUT
Mirror of 10055
V10155


254
_On
SP1
LD
Control 1 word
VC340
CMP
Mirror of 10056
V10156
255
_CMP Equal?
SP61
LD
Control 1 word
VC340
OUT
Digital Word 0E
V10056
OUT
Mirror of 10056
V10156
256
_On
SP1
LD
Digital Word 0E
V10056
CMP
Mirror of 10056
V10156
257
_CMP Equal?
SP61
LD
Digital Word 0E
V10056
OUT
Control 1 word
VC340
OUT
Mirror of 10056
V10156
258
_On
SP1
LD
Control 2 word
VC360
CMP
Mirror of 10057
V10157
259
_CMP Equal?
SP61
LD
Control 2 word
VC360
OUT
Digital Word 0F
V10057
OUT
Mirror of 10057
V10157
260
_On
SP1
LD
Digital Word 0F
V10057
CMP
Mirror of 10057
V10157

261 _CMP Equal? SP61 — LD Digital Word 0F V10057; OUT Control 2 word VC360; OUT Mirror of 10057 V10157

262 NOP

---------- 212 RFQ Stages ----------

ISG Determine the state of the vacuum. Src Initial Stg S0

264 Src Vac Cntrl C340 | Turbo Water Flow X5 | Src FRG in range C505 | Src FRG Analog V10000 ≥ K4e02 — Start pump down from air. Src from Air S1 JMP

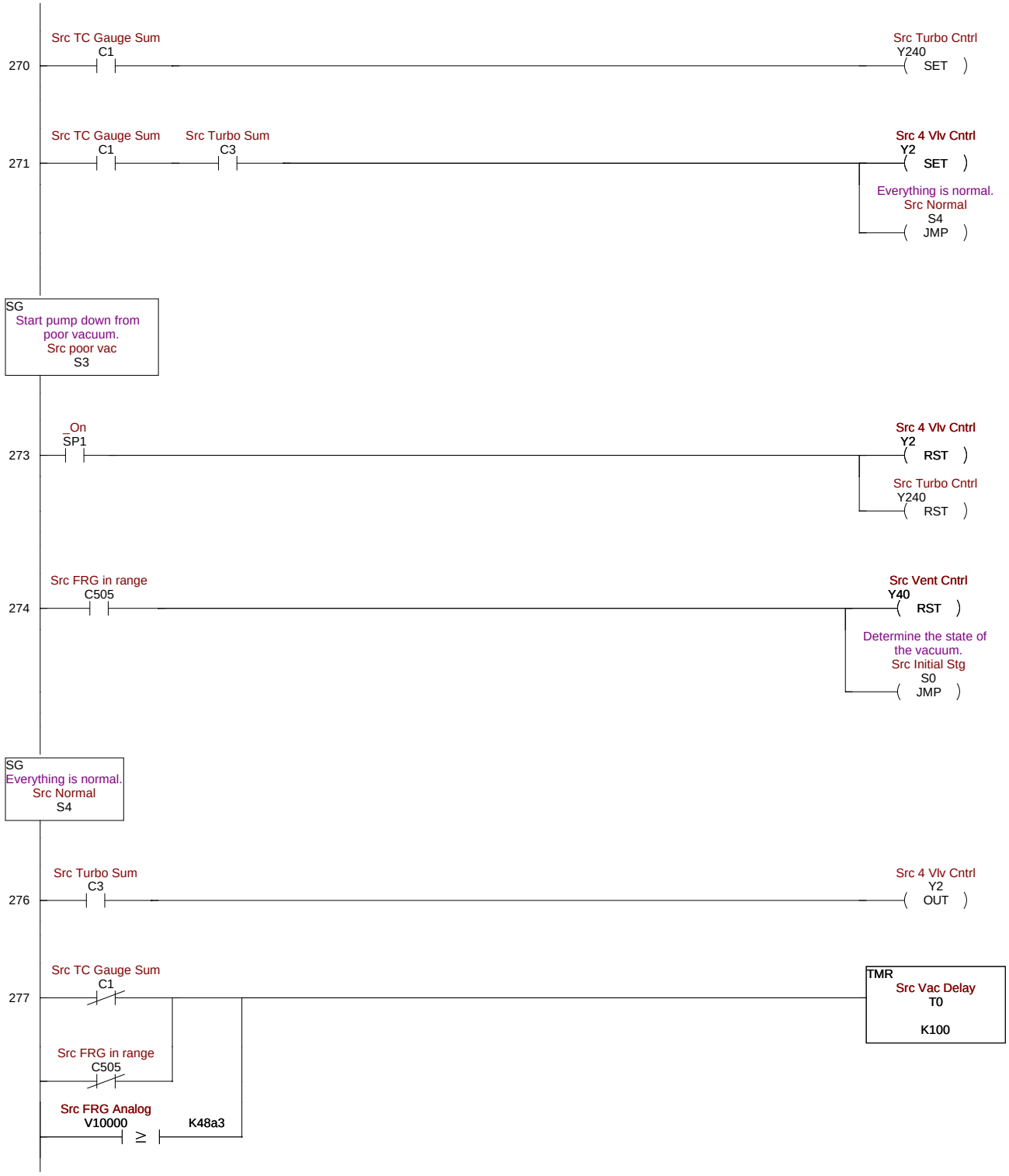
265 Src Vac Cntrl C340 | Turbo Water Flow X5 | Src FRG in range C505 | Src FRG Analog V10000 < K48a3 — Start pump down from good vacuum. Src frm Good Vac S2 JMP

266 Src Vac Cntrl C340 | Turbo Water Flow X5 | Src FRG in range C505 | Src FRG Analog V10000 ≥ K48a3 | Src FRG Analog V10000 < K4e02 — Start pump down from poor vacuum. Src poor vac S3 JMP

SG Start pump down from air. Src from Air S1

268 Src TC Gauge Sum C1 — Src 4 Vlv Cntrl Y2 SET; Src Turbo Cntrl Y240 SET; Now pumping down from air. Src Pumping S5 JMP

SG Start pump down from good vacuum. Src frm Good Vac S2


270
Src TC Gauge Sum
C1
Src Turbo Cntrl
Y240
SET
271
Src TC Gauge Sum
C1
Src Turbo Sum
C3
Src 4 Vlv Cntrl
Y2
SET
Everything is normal.
Src Normal
S4
JMP
SG
Start pump down from
poor vacuum.
Src poor vac
S3
273
_On
SP1
Src 4 Vlv Cntrl
Y2
RST
Src Turbo Cntrl
Y240
RST
274
Src FRG in range
C505
Src Vent Cntrl
Y40
RST
Determine the state of
the vacuum.
Src Initial Stg
S0
JMP
SG
Everything is normal.
Src Normal
S4
276
Src Turbo Sum
C3
Src 4 Vlv Cntrl
Y2
OUT
277
Src TC Gauge Sum
C1
TMR
Src Vac Delay
T0
K100
Src FRG in range
C505
Src FRG Analog
V10000
≥
K48a3

278 Src Vac Delay T0 — Src 4 Vlv Cntrl Y2 RST; Src Turbo Cntrl Y240 RST; Determine the state of the vacuum. Src Initial Stg S0 JMP

279 Src Turbo Sum C3 / Holiday Inhibit C354 — Src Vac Cntrl C340 RST; Determine the state of the vacuum. Src Initial Stg S0 JMP

SG Now pumping down from air. Src Pumping S5

281 Src TC Gauge Sum C1 / Src Turbo Sum C3 — Everything is normal. Src Normal S4 JMP

282 NOP

ISG 212 Initial Stg S10

284 212 Vac Cntrl C341 / Turbo Water Flow X5 / 212 FRG in range C527 / 212 FRG Analog V10001 ≥ K5051 — 212 from air S11 JMP

285 212 Vac Cntrl C341 / Turbo Water Flow X5 / 212 FRG in range C527 / 212 FRG Analog V10001 < K40f5 — 212 frm good vac S12 JMP

286 212 Vac Cntrl C341 / Turbo Water Flow X5 / 212 FRG in range C527 / 212 FRG Analog V10001 ≥ K40f5 / 212 FRG Analog V10001 < K5051 — 212 poor vac S13 JMP

SG 212 from air S11

288 212 TC Gauge RB C21 → 212 510 4vv Cntl Y10 SET; 212 520 4vv Cntl Y12 SET; 212 510 Trb Cntl Y250 SET; 212 520 Trb Cntl Y251 SET; 212 Pumping S15 JMP

SG 212 frm good vac S12

290 212 TC Gauge RB C21 → 212 510 Trb Cntl Y250 SET; 212 520 Trb Cntl Y251 SET

291 212 TC Gauge RB C21, 212 510 Trb Sum C23 → 212 510 4vv Cntl Y10 SET

292 212 TC Gauge RB C21, 212 520 Trb Sum C25 → 212 520 4vv Cntl Y12 SET

293 212 TC Gauge RB C21, 212 510 Trb Sum C23, 212 520 Trb Sum C25 → 212 Normal S14 JMP

SG 212 poor vac S13

295 On SP1 → 212 510 4vv Cntl Y10 RST; 212 510 Trb Cntl Y250 RST; 212 520 4vv Cntl Y12 RST; 212 520 Trb Cntl Y251 RST

296 212 FRG in range C527 → 212 Initial Stg S10 JMP

SG
212 Normal
S14

298 212 510 Trb Sum C23 — 212 510 4vv Cntl Y10 OUT

299 212 520 Trb Sum C25 — 212 520 4vv Cntl Y12 OUT

300 212 TC Gauge RB C21 (NC)
212 FRG in range C527 (NC)
212 FRG Analog V10001 ≥ K40f5
→ 212 510 4vv Cntl Y10 RST
212 520 4vv Cntl Y12 RST
212 510 Trb Cntl Y250 RST
212 520 Trb Cntl Y251 RST
212 Initial Stg S10 JMP

301 212 510 Trb Sum C23 (NC) Holiday Inhibit C354 (NC) — Turbo Errors S500 JMP
212 520 Trb Sum C25 (NC)

SG
212 Pumping
S15

303 212 TC Gauge RB C21 212 510 Trb Sum C23 212 520 Trb Sum C25 — 212 Normal S14 JMP

304 — NOP

ISG
Str Initial Stg
S20

306 Str Vac Cntrl C342 Turbo Water Flow X5 Str CmbFRG in Rg C553 Str Cmb FRG Anlg V10003 ≥ K5051 — Str from air S21 JMP

307 Str Vac Cntrl C342 Turbo Water Flow X5 Str CmbFRG in Rg C553 Str Cmb FRG Anlg V10003 < Str Vac Low Trip V7003 — Str frm good vac S22 JMP

308 — Str Vac Cntrl C342 | Turbo Water Flow X5 | Str CmbFRG in Rg C553 | Str Cmb FRG Anlg V10003 ≥ Str Vac Low Trip V7003 | Str Cmb FRG Anlg V10003 < K5051 → Str poor vac S23 JMP

SG Str from air S21

310 — Str 4line Vac OK C41 → Str ABot 4Vv Cnt Y14 SET
- Str IBot 4Vv Cnt Y16 SET
- Str ATop 4Vv Cnt Y20 SET
- Str ITop 4Vv Cnt Y22 SET
- Str ABot Trb Cnt Y50 SET
- Str IBot Trb Cnt Y51 SET
- Str ATop Trb Cnt Y252 SET
- Str ITop Trb Cnt Y253 SET
- Str Pumping S25 JMP

SG Str frm good vac S22

312 — Str 4line Vac OK C41 → Str ABot Trb Cnt Y50 SET
- Str IBot Trb Cnt Y51 SET
- Str ATop Trb Cnt Y252 SET
- Str ITop Trb Cnt Y253 SET

--------- MEBT Stages ----------

313 — Str 4line Vac OK C41 | Str ABot Trb Sum C43 → Str ABot 4Vv Cnt Y14 SET

314 — Str 4line Vac OK C41 | Str IBot Trb Sum C45 → Str IBot 4Vv Cnt Y16 SET

315 Str 4line Vac OK C41 | Str ATop Trb Sum C50 | Str ATop 4Vv Cnt Y20 (SET)

316 Str 4line Vac OK C41 | Str ITop Trb Sum C52 | Str ITop 4Vv Cnt Y22 (SET)

317 Str 4line Vac OK C41 | Str ABot 4Vv Sum C42 | Str IBot 4Vv Sum C44 | Str ATop 4Vv Sum C47 | Str ITop 4Vv Sum C51 | Str Normal S24 (JMP)

SG Str poor vac S23

319 _On SP1 | Str ABot 4Vv Cnt Y14 (RST)
- Str IBot 4Vv Cnt Y16 (RST)
- Str ATop 4Vv Cnt Y20 (RST)
- Str ITop 4Vv Cnt Y22 (RST)
- Str ABot Trb Cnt Y50 (RST)
- Str IBot Trb Cnt Y51 (RST)
- Str ATop Trb Cnt Y252 (RST)
- Str ITop Trb Cnt Y253 (RST)

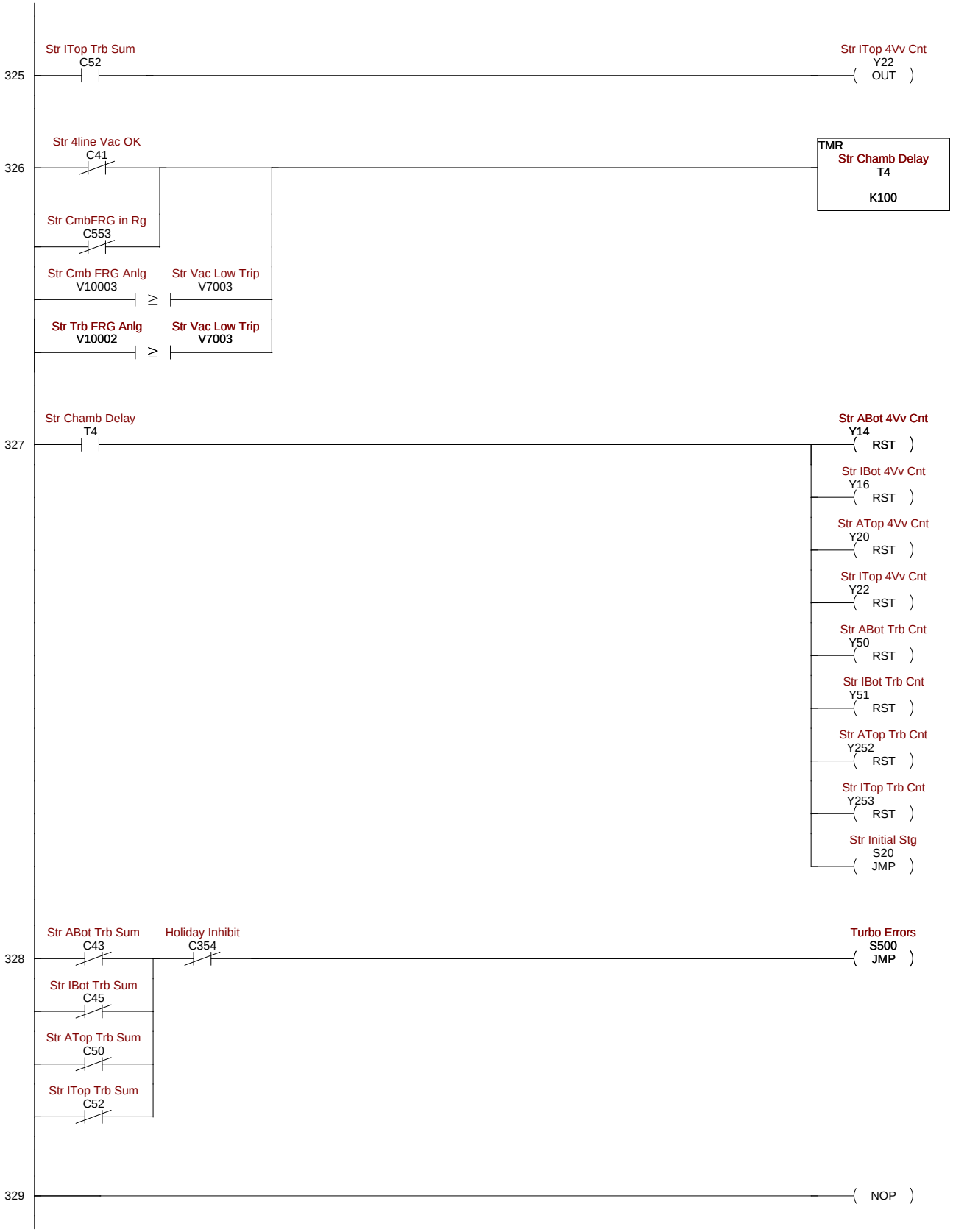
320 Str CmbFRG in Rg C553 | Str Initial Stg S20 (JMP)

SG Str Normal S24

322 Str ABot Trb Sum C43 | Str ABot 4Vv Cnt Y14 (OUT)

323 Str IBot Trb Sum C45 | Str IBot 4Vv Cnt Y16 (OUT)

324 Str ATop Trb Sum C50 | Str ATop 4Vv Cnt Y20 (OUT)


325
Str ITop Trb Sum
C52
Str ITop 4Vv Cnt
Y22
OUT
326
Str 4line Vac OK
C41
TMR
Str Chamb Delay
T4
K100
Str CmbFRG in Rg
C553
Str Cmb FRG Anlg
V10003
≥
Str Vac Low Trip
V7003
Str Trb FRG Anlg
V10002
≥
Str Vac Low Trip
V7003
327
Str Chamb Delay
T4
Str ABot 4Vv Cnt
Y14
RST
Str IBot 4Vv Cnt
Y16
RST
Str ATop 4Vv Cnt
Y20
RST
Str ITop 4Vv Cnt
Y22
RST
Str ABot Trb Cnt
Y50
RST
Str IBot Trb Cnt
Y51
RST
Str ATop Trb Cnt
Y252
RST
Str ITop Trb Cnt
Y253
RST
Str Initial Stg
S20
JMP
328
Str ABot Trb Sum
C43
Holiday Inhibit
C354
Turbo Errors
S500
JMP
Str IBot Trb Sum
C45
Str ATop Trb Sum
C50
Str ITop Trb Sum
C52
329
NOP

SG
Str Pumping
S25

331 Str 4line Vac OK C41 | Str ABot Trb Sum C43 | Str IBot Trb Sum C45 | Str ATop Trb Sum C50 | Str ITop Trb Sum C52 → Str Normal S24 JMP

332 → NOP

ISG
MEBT Initial Stg
S30

334 MEBT Vac Cntrl C343 | Turbo Water Flow X5 | MEBT FRG in Rng C570 | MEBT FRG Analog V10004 ≥ K5051 → MEBT from air S31 JMP

335 MEBT Vac Cntrl C343 | Turbo Water Flow X5 | MEBT FRG in Rng C570 | MEBT FRG Analog V10004 < K48a3 → MEBT frm good vc S32 JMP

336 MEBT Vac Cntrl C343 | Turbo Water Flow X5 | MEBT FRG in Rng C570 | MEBT FRG Analog V10004 ≥ K48a3 | MEBT FRG Analog V10004 < K5051 → MEBT poor vac S33 JMP

---------- 425A RFQ Stages ----------

SG
MEBT from air
S31

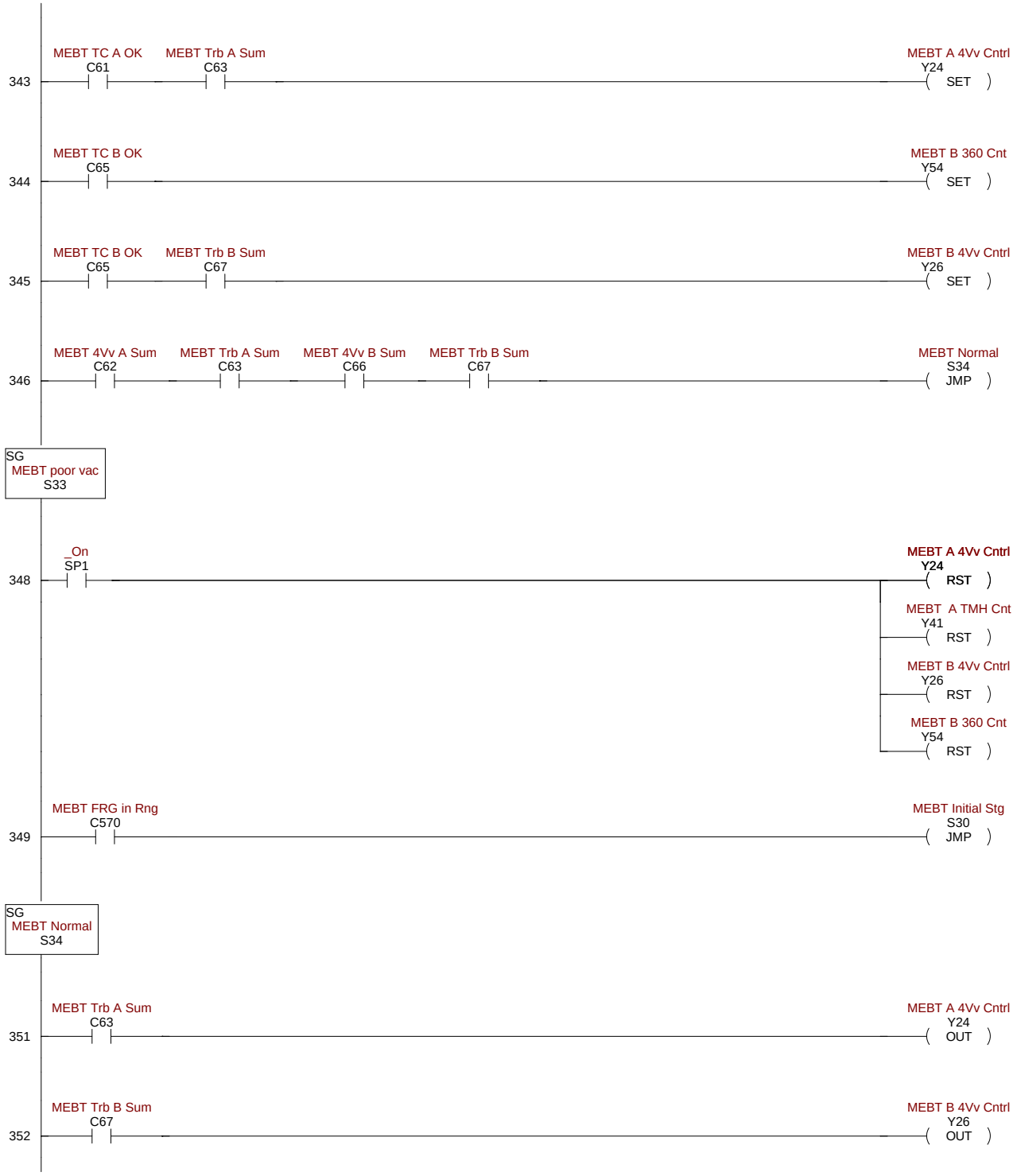
338 MEBT TC A OK C61 → MEBT A 4Vv Cntrl Y24 SET; MEBT A TMH Cnt Y41 SET

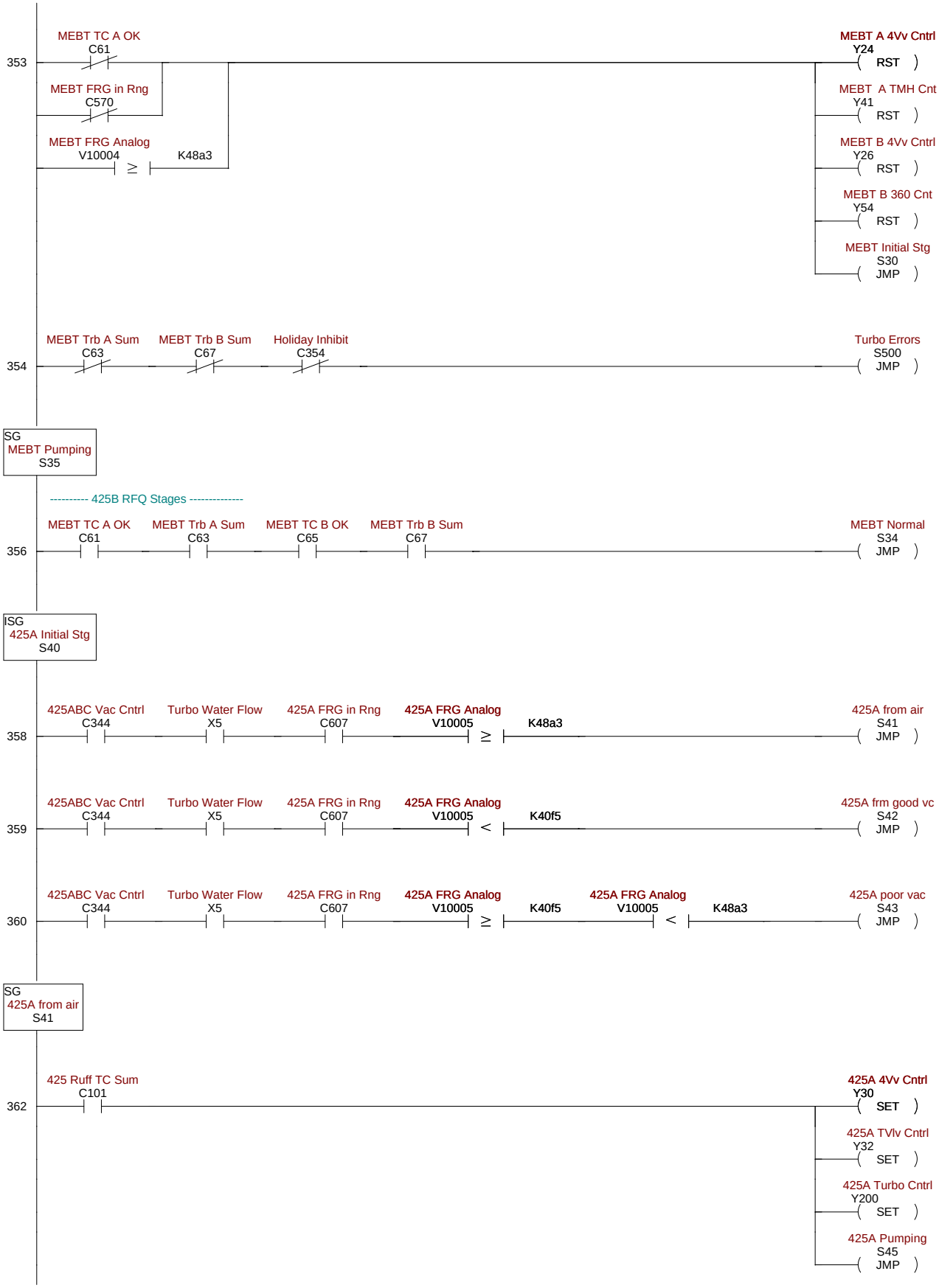
339 MEBT TC B OK C65 → MEBT B 4Vv Cntrl Y26 SET; MEBT B 360 Cnt Y54 SET

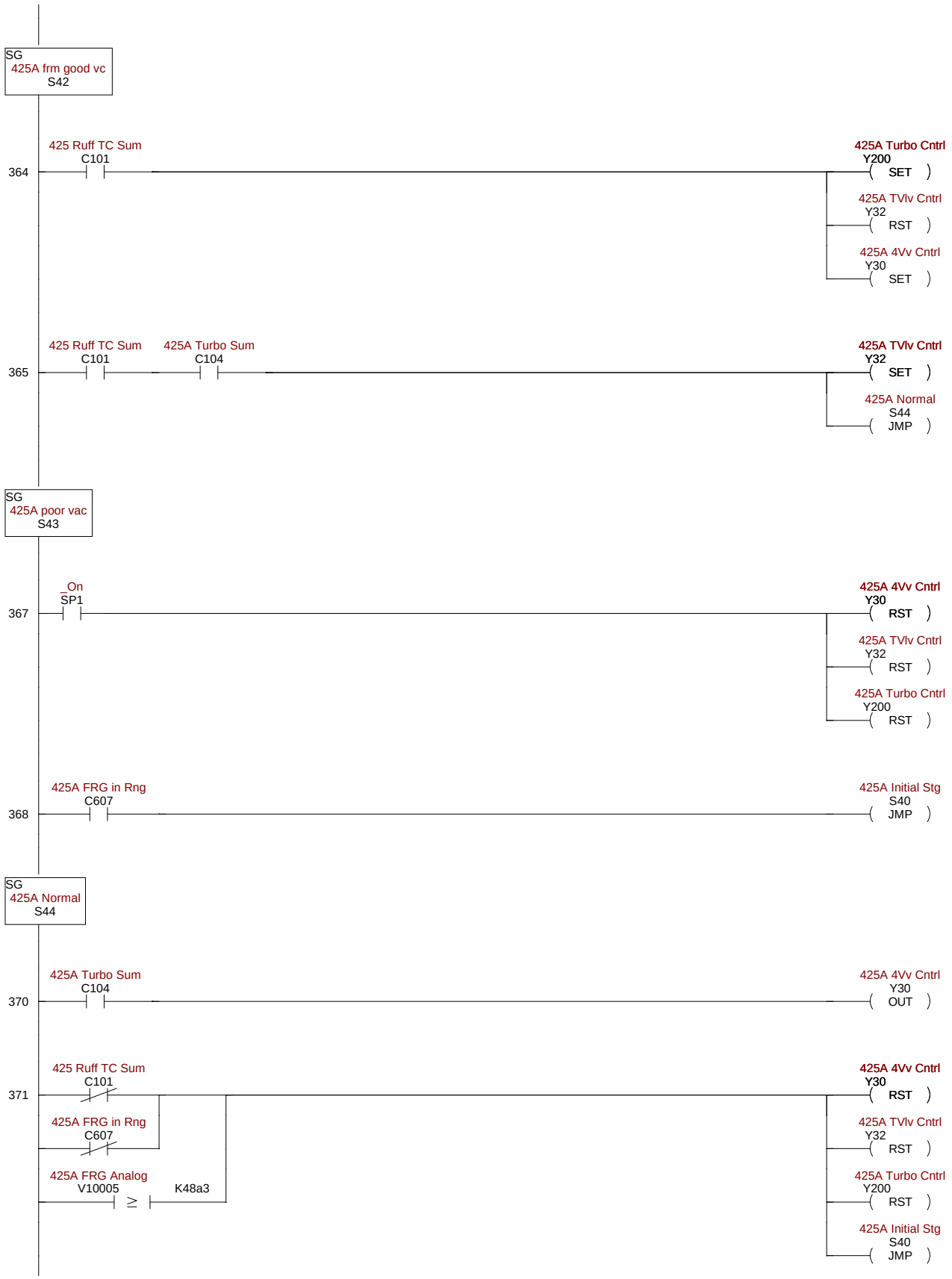
340 MEBT 4Vv A Sum C62 | MEBT 4Vv B Sum C66 → MEBT Pumping S35 JMP

SG
MEBT frm good vc
S32

342 MEBT TC A OK C61 → MEBT A TMH Cnt Y41 SET


343
MEBT TC A OK
C61
MEBT Trb A Sum
C63
MEBT A 4Vv Cntrl
Y24
SET
344
MEBT TC B OK
C65
MEBT B 360 Cnt
Y54
SET
345
MEBT TC B OK
C65
MEBT Trb B Sum
C67
MEBT B 4Vv Cntrl
Y26
SET
346
MEBT 4Vv A Sum
C62
MEBT Trb A Sum
C63
MEBT 4Vv B Sum
C66
MEBT Trb B Sum
C67
MEBT Normal
S34
JMP
SG
MEBT poor vac
S33
348
_On
SP1
MEBT A 4Vv Cntrl
Y24
RST
MEBT A TMH Cnt
Y41
RST
MEBT B 4Vv Cntrl
Y26
RST
MEBT B 360 Cnt
Y54
RST
349
MEBT FRG in Rng
C570
MEBT Initial Stg
S30
JMP
SG
MEBT Normal
S34
351
MEBT Trb A Sum
C63
MEBT A 4Vv Cntrl
Y24
OUT
352
MEBT Trb B Sum
C67
MEBT B 4Vv Cntrl
Y26
OUT


353
MEBT TC A OK
C61
MEBT FRG in Rng
C570
MEBT FRG Analog
V10004
≥
K48a3
MEBT A 4Vv Cntrl
Y24
RST
MEBT A TMH Cnt
Y41
RST
MEBT B 4Vv Cntrl
Y26
RST
MEBT B 360 Cnt
Y54
RST
MEBT Initial Stg
S30
JMP
354
MEBT Trb A Sum
C63
MEBT Trb B Sum
C67
Holiday Inhibit
C354
Turbo Errors
S500
JMP
SG
MEBT Pumping
S35
---------- 425B RFQ Stages ----------
356
MEBT TC A OK
C61
MEBT Trb A Sum
C63
MEBT TC B OK
C65
MEBT Trb B Sum
C67
MEBT Normal
S34
JMP
ISG
425A Initial Stg
S40
358
425ABC Vac Cntrl
C344
Turbo Water Flow
X5
425A FRG in Rng
C607
425A FRG Analog
V10005
≥
K48a3
425A from air
S41
JMP
359
425ABC Vac Cntrl
C344
Turbo Water Flow
X5
425A FRG in Rng
C607
425A FRG Analog
V10005
<
K40f5
425A frm good vc
S42
JMP
360
425ABC Vac Cntrl
C344
Turbo Water Flow
X5
425A FRG in Rng
C607
425A FRG Analog
V10005
≥
K40f5
425A FRG Analog
V10005
<
K48a3
425A poor vac
S43
JMP
SG
425A from air
S41
362
425 Ruff TC Sum
C101
425A 4Vv Cntrl
Y30
SET
425A TVlv Cntrl
Y32
SET
425A Turbo Cntrl
Y200
SET
425A Pumping
S45
JMP


SG
425A frm good vc
S42
364
425 Ruff TC Sum
C101
425A Turbo Cntrl
Y200
SET
425A TVlv Cntrl
Y32
RST
425A 4Vv Cntrl
Y30
SET
365
425 Ruff TC Sum
C101
425A Turbo Sum
C104
425A TVlv Cntrl
Y32
SET
425A Normal
S44
JMP
SG
425A poor vac
S43
367
_On
SP1
425A 4Vv Cntrl
Y30
RST
425A TVlv Cntrl
Y32
RST
425A Turbo Cntrl
Y200
RST
368
425A FRG in Rng
C607
425A Initial Stg
S40
JMP
SG
425A Normal
S44
370
425A Turbo Sum
C104
425A 4Vv Cntrl
Y30
OUT
371
425 Ruff TC Sum
C101
425A FRG in Rng
C607
425A FRG Analog
V10005
≥
K48a3
425A 4Vv Cntrl
Y30
RST
425A TVlv Cntrl
Y32
RST
425A Turbo Cntrl
Y200
RST
425A Initial Stg
S40
JMP

372 425A Turbo Sum C104 | Holiday Inhibit C354 → Turbo Errors S500 JMP

SG 425A Pumping S45

374 425 Ruff TC Sum C101 | 425A Turbo Sum C104 → 425A Normal S44 JMP

---------- 425C RFQ Stages ----------

375 → NOP

ISG 425B Initial Stg S50

377 425ABC Vac Cntrl C344 | Turbo Water Flow X5 | 425B FRG in Rng C627 | 425B FRG Analog V10020 ≥ K48a3 → 425B from air S51 JMP

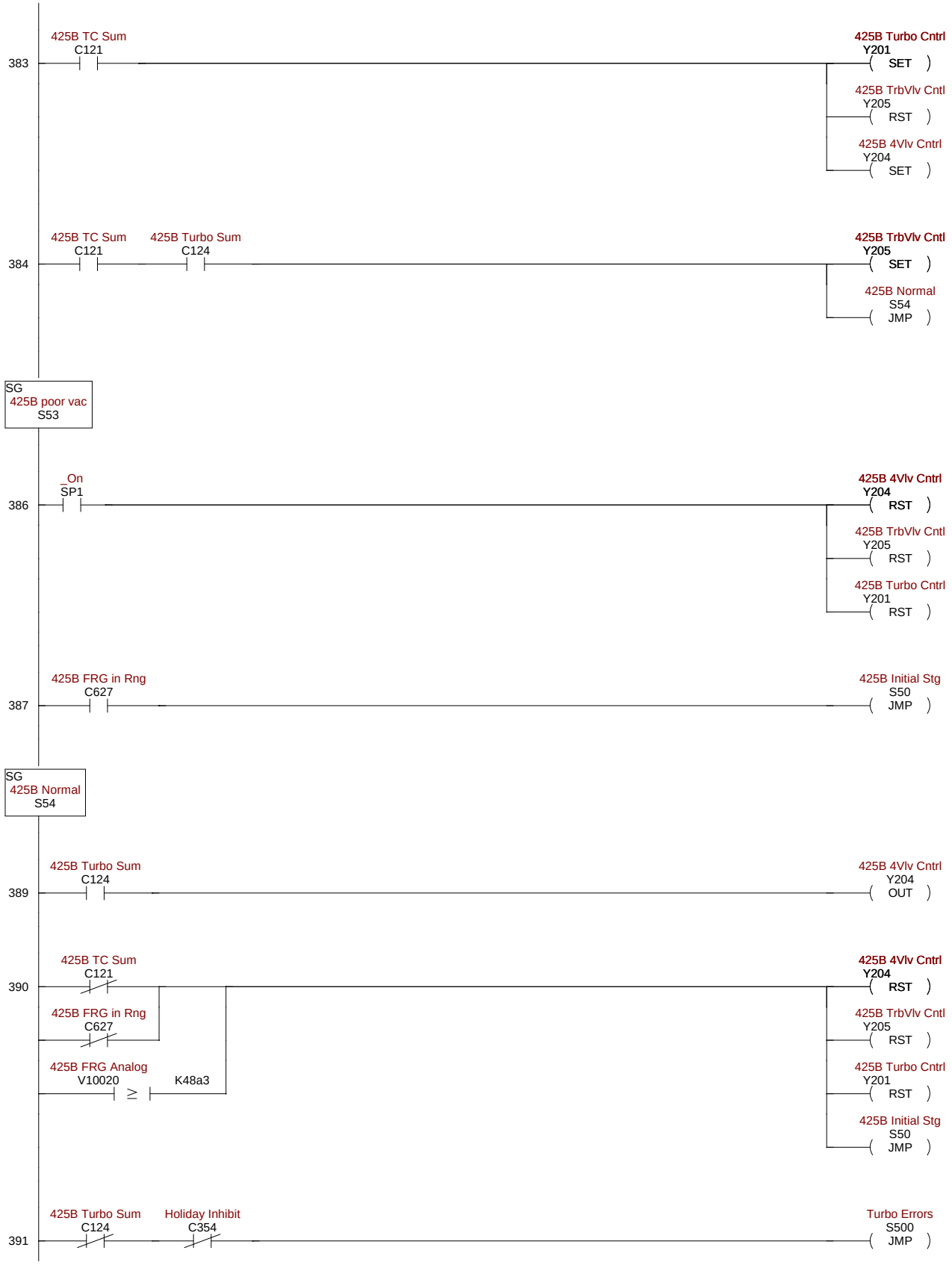
378 425ABC Vac Cntrl C344 | Turbo Water Flow X5 | 425B FRG in Rng C627 | 425B FRG Analog V10020 < K40f5 → 425B frm good vc S52 JMP

379 425ABC Vac Cntrl C344 | Turbo Water Flow X5 | 425B FRG in Rng C627 | 425B FRG Analog V10020 ≥ K40f5 | 425B FRG Analog V10020 < K48a3 → 425B poor vac S53 JMP

SG 425B from air S51

381 425B TC Sum C121 →
- 425B 4Vlv Cntrl Y204 SET
- 425B TrbVlv Cntl Y205 SET
- 425B Turbo Cntrl Y201 SET
- 425B Pumping S55 JMP

SG 425B frm good vc S52


383
425B TC Sum
C121
425B Turbo Cntrl
Y201
SET
425B TrbVlv Cntl
Y205
RST
425B 4Vlv Cntrl
Y204
SET
384
425B TC Sum
C121
425B Turbo Sum
C124
425B TrbVlv Cntl
Y205
SET
425B Normal
S54
JMP
SG
425B poor vac
S53
386
_On
SP1
425B 4Vlv Cntrl
Y204
RST
425B TrbVlv Cntl
Y205
RST
425B Turbo Cntrl
Y201
RST
387
425B FRG in Rng
C627
425B Initial Stg
S50
JMP
SG
425B Normal
S54
389
425B Turbo Sum
C124
425B 4Vlv Cntrl
Y204
OUT
390
425B TC Sum
C121
425B FRG in Rng
C627
425B FRG Analog
V10020
≥
K48a3
425B 4Vlv Cntrl
Y204
RST
425B TrbVlv Cntl
Y205
RST
425B Turbo Cntrl
Y201
RST
425B Initial Stg
S50
JMP
391
425B Turbo Sum
C124
Holiday Inhibit
C354
Turbo Errors
S500
JMP

SG
425B Pumping
S55

393 425B TC Sum C121 | 425B Turbo Sum C124 | (425B Normal S54 JMP)

---------- HEBT Stages ----------

394 (NOP)

ISG
425C Initial Stg
S60

396 425ABC Vac Cntrl C344 | Turbo Water Flow X5 | 425C FRG in rng C647 | 425C FRG Analog V10021 ≥ K48a3 | (425C from air S61 JMP)

397 425ABC Vac Cntrl C344 | Turbo Water Flow X5 | 425C FRG in rng C647 | 425C FRG Analog V10021 < K40f5 | (425C frm good vc S62 JMP)

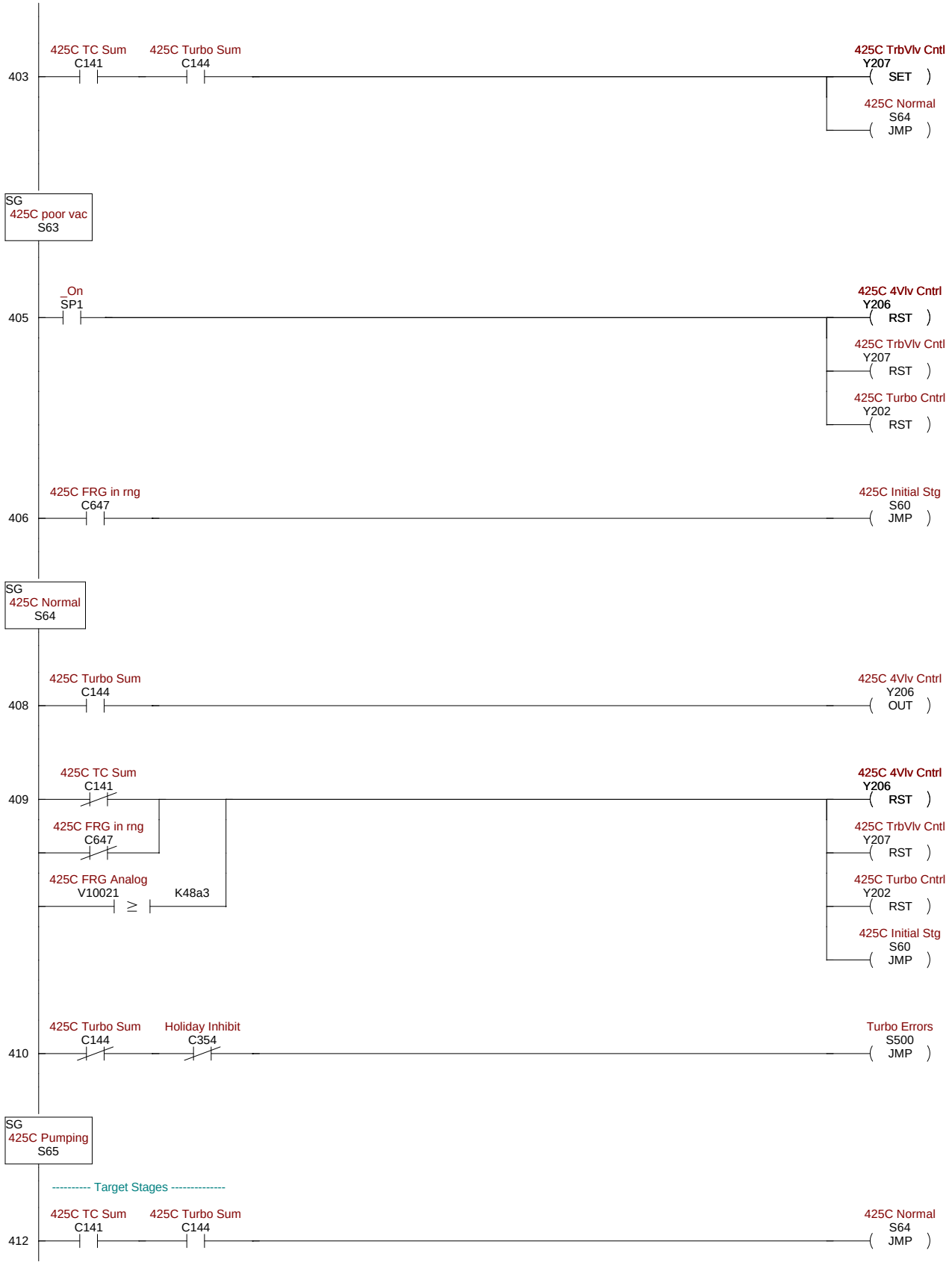
398 425ABC Vac Cntrl C344 | Turbo Water Flow X5 | 425C FRG in rng C647 | 425C FRG Analog V10021 ≥ K40f5 | 425C FRG Analog V10021 < K48a3 | (425C poor vac S63 JMP)

SG
425C from air
S61

400 425C TC Sum C141 | (425C 4Vlv Cntrl Y206 SET)
- (425C TrbVlv Cntl Y207 SET)
- (425C Turbo Cntrl Y202 SET)
- (425C Pumping S65 JMP)

SG
425C frm good vc
S62

402 425C TC Sum C141 | (425C Turbo Cntrl Y202 SET)
- (425C TrbVlv Cntl Y207 RST)
- (425C 4Vlv Cntrl Y206 SET)


403
425C TC Sum
C141
425C Turbo Sum
C144
425C TrbVlv Cntl
Y207
SET
425C Normal
S64
JMP
SG
425C poor vac
S63
405
On
SP1
425C 4Vlv Cntrl
Y206
RST
425C TrbVlv Cntl
Y207
RST
425C Turbo Cntrl
Y202
RST
406
425C FRG in rng
C647
425C Initial Stg
S60
JMP
SG
425C Normal
S64
408
425C Turbo Sum
C144
425C 4Vlv Cntrl
Y206
OUT
409
425C TC Sum
C141
425C FRG in rng
C647
425C FRG Analog
V10021
≥
K48a3
425C 4Vlv Cntrl
Y206
RST
425C TrbVlv Cntl
Y207
RST
425C Turbo Cntrl
Y202
RST
425C Initial Stg
S60
JMP
410
425C Turbo Sum
C144
Holiday Inhibit
C354
Turbo Errors
S500
JMP
SG
425C Pumping
S65
---------- Target Stages ----------
412
425C TC Sum
C141
425C Turbo Sum
C144
425C Normal
S64
JMP

413 — NOP

ISG
HEBT Initial Stg
S70

415 — HEBT Vac Cntrl C345 — Turbo Water Flow X5 — HEBT FRG in rng C667 — HEBT FRG Analog V10022 ≥ K4656 — HEBT from air S71 JMP

416 — HEBT Vac Cntrl C345 — Turbo Water Flow X5 — HEBT FRG in rng C667 — HEBT FRG Analog V10022 < K4653 — HEBT frm good vc S72 JMP

417 — HEBT Vac Cntrl C345 — Turbo Water Flow X5 — HEBT FRG in rng C667 — HEBT FRG Analog V10022 ≥ K4653 — HEBT FRG Analog V10022 < K4656 — HEBT poor vac S73 JMP

SG
HEBT from air
S71

419 — HEBT TC Sum C161
- HEBT 4Vlv Cntrl Y212 SET
- HEBT TrbVlv Cntl Y213 SET
- HEBT Turbo Cntrl Y203 SET
- HEBT Pumping S75 JMP

SG
HEBT frm good vc
S72

421 — HEBT TC Sum C161
- HEBT Turbo Cntrl Y203 SET
- HEBT TrbVlv Cntl Y213 RST
- HEBT 4Vlv Cntrl Y212 SET

422 — HEBT TC Sum C161 — HEBT Turbo Sum C163
- HEBT TrbVlv Cntl Y213 SET
- HEBT Normal S74 JMP

SG
HEBT poor vac
S73

424 _On SP1 — HEBT 4Vlv Cntrl Y212 RST; HEBT TrbVlv Cntl Y213 RST; HEBT Turbo Cntrl Y203 RST

425 HEBT FRG in rng C667 — HEBT Initial Stg S70 JMP

SG
HEBT Normal
S74

427 HEBT Turbo Sum C163 — HEBT 4Vlv Cntrl Y212 OUT

428 HEBT TC Sum C161 (NC); HEBT FRG in rng C667 (NC); HEBT FRG Analog V10022 ≥ K48a3 — HEBT 4Vlv Cntrl Y212 RST; HEBT TrbVlv Cntl Y213 RST; HEBT Turbo Cntrl Y203 RST; HEBT Initial Stg S70 JMP

429 HEBT Turbo Sum C163 (NC); Holiday Inhibit C354 (NC) — Turbo Errors S500 JMP

SG
HEBT Pumping
S75

431 HEBT TC Sum C161; HEBT Turbo Sum C163; HEBT FRG Analog V10022 < K4800 — HEBT Normal S74 JMP

ISG
Tgt Initial Stg
S100

433 Tgt Vac Cntrl C346; Tgt Cnv in Rng C704; Tgt Convectron A V10027 ≥ K101 — Tgt from air S101 JMP

434 Tgt Vac Cntrl C346 | Tgt Cnv in Rng C704 | Tgt Convectron A V10027 < K100 → Tgt frm good vac S102 JMP

********** End of Normal Scan Region **********

435 Tgt Vac Cntrl C346 | Tgt Cnv in Rng C704 | Tgt Convectron A V10027 ≥ K100 | Tgt Convectron A V10027 < K101 → Tgt poor vac S103 JMP

SG Tgt from air S101

437 _On SP1 → Tgt Sw Outlet 2B Y223 SET

438 Tgt Rough Sum C200 → Tgt 4Vlv Cntrl Y214 SET; Tgt Pumping S105 JMP

SG Tgt frm good vac S102

440 Tgt Cnvctron Sum C204 | HEBT Normal S74 → Tgt 4Vlv Cntrl Y214 RST; Tgt Normal S104 JMP

Location (octal) and number of inputs (decimal).

SG Tgt poor vac S103

Location (octal) and number of outputs (decimal).

442 _On SP1 → Tgt 4Vlv Cntrl Y214 RST; Tgt BypVlv Cntrl Y215 RST

Unused locations in table (hex).

443 Tgt Cnv in Rng C704 → Tgt Initial Stg S100 JMP

SG Tgt Normal S104

445 Tgt IsolVlv Sum C205 | Tgt Bypass Prmt C356 → Tgt BypVlv Cntrl Y215 OUT

446
Tgt BypVlv Cntrl Y215 (NC)
Tgt Isol Vlv Cnt Y216 (NC)
Tgt Sw Outlet 2B Y223 OUT
Tgt Rough Sum C200
Tgt 4Vlv Cntrl Y214 OUT

447
Tgt Cnvctron Sum C204 (NC)
Tgt Cnv in Rng C704 (NC)
Tgt Convectron A V10027 ≥ K777
Tgt 4Vlv Cntrl Y214 RST
Tgt BypVlv Cntrl Y215 RST
Tgt Isol Vlv Cnt Y216 RST
Tgt Initial Stg S100 JMP

SG Tgt Pumping S105

449
Tgt Rough Sum C200
Tgt Cnvctron Sum C204
HEBT Normal S74
Tgt Convectron A V10027 < K100
Tgt Convectron A V10027 < K150
Fast Vlv Closed X62
Tgt 4Vlv Cntrl Y214 RST

450
Tgt 4Vlv Clsd X226
Tgt 4Vlv Open X227 (NC)
Tgt 4Vlv Cntrl Y214 (NC)
Tgt Cnvctron Sum C204
TMR Tgt Ruff Delay T5 K10

451
Tgt Ruff Delay T5
Tgt Sw Outlet 2B Y223 RST
Tgt Normal S104 JMP

452
NOP

SG Turbo Errors S500

454
_On SP1
212 Vac Cntrl C341 C345 RST
212 Initial Stg S10 JMP

455 NOP

456 END

457 NOP

458 NOP

459 NOP

SBR K1

461 _FirstScan SP0
- LDA O40410
- OUT V7404
- LD K80
- OUT V7405

462 _FirstScan SP0
- LDA O40510
- OUT V7406
- LD K56
- OUT V7407

463 _FirstScan SP0
- LD K34
- LDA O7410
- FILL K0
- Rmt I/O Flag C670 SET

464 RT

465 NOP