This document was too large to scan as a whole document,
therefore it required breaking into smaller sections.

Document number: SD-FF-CSWD-061

Section 1 of 2

Title: Sodium Storage Facility Ladder
Logic Diagrams

Date: 6/12/97 Revision: A000

Originator: Jones DD
Co: BWNC

Recipient: _____
Co: _____

References: EDT-619594

Sodium Storage Facility Ladder Logic Diagrams

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Abstract: This document provides the computer technician or software engineer with a way to study the algorithms that are actually used by the SSF PLC.

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JUN 12 1997			ID:
DATE:			
STA:			
#222			

Release Approval

Date

Release Stamp

Approved for Public Release

Rung 2:0

```
*****
First Rung for initializing heatup rate data for each PID
*****
|
|
|
|
| TMR_SU/DN
| T4:60
|-----] [----- 8
| DN (JMP)-----
| (2:2)
```

Rung 2:1

```
*****
** FIRST PASS CALL TO SUBROUTINE 3 **
First Pass configures each channel of each T/C module
MODULE # is the # of the slot where the module resides
*****
|
| FIRST_PASS
| S:1
|-----] [-----+JSR-----+
| 15 +JUMP TO SUBROUTINE+
| | |SBR file number 3|
| | |
| | |
```

Rung 2:2

```

setup timer used for initializing heatup rates
|
|-----+TON-----+
|-----+TIMER ON DELAY +-(EN)---
| |Timer TMR_SU+-(DN)
| |Time Base 0.01|
| |Preset 600|
| |Accum 601|
| |-----+
|
```

Rung 2:3

```
*****
JUMPS TO SECTION 1 IF DN_1 IS NOT LATCHED DN_1 GETS LATCHED WHEN THE
SECTION IS ENTERED
| MD1
| TMR_SU/DN
| T4:60
|-----] [----- 1
| DN (JMP)-----
| (2:2)
```

Rung 2:4

RATE CHECKING

```

1  TMR__SU/DN
1      T4:60
1  ----] [---
1      DN
1      (2:2)

```

```

+MOV-----+
+--MOVE-----+
|Source          AV110A|
|                1743|
|Dest            R1_110A|
|                1743|
+-----+
+MOV-----+
+--MOVE-----+
|Source          AV110A|
|                1743|
|Dest            R2_110A|
|                1743|
+-----+
+MOV-----+
+--MOVE-----+
|Source          10|
|Dest            DIF1_110A|
|                10|
+-----+
+MOV-----+
+--MOVE-----+
|Source          10|
|Dest            DIF2_110A|
|                10|
+-----+
+CLR-----+
+--CLEAR-----+
|Dest            DDIF1|
|                0|
+-----+
+CLR-----+
+--CLEAR-----+
|Dest            DDIF2|
|                0|
+-----+

```

Rung 2:5

RATE CHECKING

```

1 TMR_SU/DN
1     T4:60
1 ----} [---
1     DN
1     (2:2)

```

```

+MOV-----+
+-+MOVE-+-+
|Source      AV110B|
|              1743|
|Dest        R1_110B|
|              1743|
+-----+
|
|
++          ++

```



```

+++
+---+
+MOV-----+
+MOVE-----+
|Source      AV110B|
|            1743|
|Dest        R2_110B|
|            1743|
+-----+
+MOV-----+
+MOVE-----+
|Source      10|
|Dest        DIF1_110B|
|            10|
+-----+
+MOV-----+
+MOVE-----+
|Source      10|
|Dest        DIF2_110B|
|            10|
+-----+
+CLR-----+
+CLEAR-----+
|Dest        DDIF1|
|            0|
+-----+
+CLR-----+
+CLEAR-----+
|Dest        DDIF2|
|            0|
+-----+

```

Rung 2:6

RATE CHECKING

```

| TMR_SU/DN
| T4:60
| ] [
|   DN
| (2:2)

```

```

+---+
+MOV-----+
+MOVE-----+
|Source      AV110C|
|            1742|
|Dest        R1_110C|
|            1742|
+-----+
+MOV-----+
+MOVE-----+
|Source      AV110C|
|            1742|
|Dest        R2_110C|
|            1742|
+-----+
+MOV-----+
+MOVE-----+
|Source      10|
|Dest        DIF1_110C|
|            10|
+-----+
+++

```

```
+++
+MOV-----+
+MOVE
|Source      10|
|
|Dest      DIF2_110C|
|      10|
+-----+
+CLR-----+
+CLEAR
|Dest      DDIF1|
|      0|
+-----+
+CLR-----+
+CLEAR
|Dest      DDIF2|
|      0|
+-----+
+++
```

Rung 2:7

RATE CHECKING

```
| TMR_SU/DN
| T4:60
| [-----]
| DN
| (2:2)
```

```
+MOV-----+
+MOVE
|Source      AV111A|
|      1753|
|Dest      R1_111A|
|      1753|
+-----+
+MOV-----+
+MOVE
|Source      AV111A|
|      1753|
|Dest      R2_111A|
|      1753|
+-----+
+MOV-----+
+MOVE
|Source      10|
|
|Dest      DIF1_111A|
|      10|
+-----+
+MOV-----+
+MOVE
|Source      10|
|
|Dest      DIF2_111A|
|      10|
+-----+
+CLR-----+
+CLEAR
|Dest      DDIF1|
|      0|
+-----+
+++
```


Rung 2:9

RATE CHECKING

| TMR_SU/DN
T4:60
DN
(2:2)

```

+MOV-----+
+MOVE-----+
|Source      AV111C|
|          1750|
|Dest       R1_111C|
|          1749|
+-----+
+MOV-----+
+MOVE-----+
|Source      AV111C|
|          1750|
|Dest       R2_111C|
|          1749|
+-----+
+MOV-----+
+MOVE-----+
|Source      10|
|Dest      DIF1_111C|
|          10|
+-----+
+MOV-----+
+MOVE-----+
|Source      10|
|Dest      DIF2_111C|
|          10|
+-----+
+CLR-----+
+CLEAR-----+
|Dest      DDIF1|
|          0|
+-----+
+CLR-----+
+CLEAR-----+
|Dest      DDIF2|
|          0|
+-----+

```

Rung 2:10

RATE CHECKING

| TMR_SU/DN
T4:60
DN
(2:2)

```

+MOV-----+
+MOVE-----+
|Source      AV112A|
|          1752|
|Dest       R1_112A|
|          32767|
+-----+
+-----+
+-----+
+-----+

```



```

+--+
| +MOV-----+ +--+
| +MOVE      +--+
| |Source      10|
| |           |
| |Dest      DIF2_112B|
| |           101|
| +-----+
| +CLR-----+
+--+CLEAR      +--+
| |Dest      DDIF1|
| |           01|
| +-----+
| +CLR-----+
+--+CLEAR      +--+
| |Dest      DDIF2|
| |           01|
| +-----+

```

Rung 2:12

RATE CHECKING

```

TMR_SU/DN
T4:60
-] [-----
  DN
  (2:2)

+MOV-----+
+MOVE-----+
|Source      AV112C|
|            1746|
|Dest        R1_112C|
|            1746|
+-----+
+MOV-----+
+MOVE-----+
|Source      AV112C|
|            1746|
|Dest        R2_112C|
|            1746|
+-----+
+MOV-----+
+MOVE-----+
|Source      101|
|            |
|Dest        DIF1_112C|
|            101|
+-----+
+MOV-----+
+MOVE-----+
|Source      101|
|            |
|Dest        DIF2_112C|
|            101|
+-----+
+CLR-----+
+CLEAR-----+
|Dest        DDIF1|
|            01|
+-----+
+++

```

Rung 2:13

RATE CHECKING

| TMR_SU/DN
T4:60
1
DN
(2:2)

```
+++
|+CLR-----+|
|+CLEAR      +|
|Dest        DDIF2|
|              0|
|+-----+|
+++

|+MOV-----+|
|+MOVE      +|
|Source      AV113A|
|              1726|
|Dest        R1_113A|
|              1725|
|+-----+|
|+MOV-----+|
|+MOVE      +|
|Source      AV113A|
|              1726|
|Dest        R2_113A|
|              1725|
|+-----+|
|+MOV-----+|
|+MOVE      +|
|Source      10|
|Dest        DIF1_113A|
|              10|
|+-----+|
|+MOV-----+|
|+MOVE      +|
|Source      10|
|Dest        DIF2_113A|
|              10|
|+-----+|
|+CLR-----+|
|+CLEAR      +|
|Dest        DDIF1|
|              0|
|+-----+|
|+CLR-----+|
|+CLEAR      +|
|Dest        DDIF2|
|              0|
|+-----+|
+++
```

Rung 2:14

RATE CHECKING

TMR_SU/DN
 T4:60
 DN
 (2:2)

```

+-----+
+MOV-----+
+MOVE-----+
|Source    AV113B|
|          1732|
|Dest      R1_113B|
|          1733|
+-----+
+MOV-----+
+MOVE-----+
|Source    AV113B|
|          1732|
|Dest      R2_113B|
|          1733|
+-----+
+MOV-----+
+MOVE-----+
|Source      10|
|          10|
|Dest      DIF1_113B|
|          10|
+-----+
+MOV-----+
+MOVE-----+
|Source      10|
|          10|
|Dest      DIF2_113B|
|          10|
+-----+
+CLR-----+
+CLEAR-----+
|Dest      DDIF1|
|          0|
+-----+
+CLR-----+
+CLEAR-----+
|Dest      DDIF2|
|          0|
+-----+
  
```

Rung 2:15

RATE CHECKING

TMR_SU/DN
 T4:60
 DN
 (2:2)

```

+-----+
+MOV-----+
+MOVE-----+
|Source    AV113C|
|          1732|
|Dest      R1_113C|
|          1732|
+-----+
+-----+
  
```



```

+++
| +MOV-----+
| +MOVE      +
| |Source      AV113C|
| |          1732|
| |Dest       R2_113C|
| |          1732|
| +-----+
| +MOV-----+
| +MOVE      +
| |Source      10|
| |          |
| |Dest       DIF1_113C|
| |          10|
| +-----+
| +MOV-----+
| +MOVE      +
| |Source      10|
| |          |
| |Dest       DIF2_113C|
| |          10|
| +-----+
| +CLR-----+
| +CLEAR     +
| |Dest       DDIF1|
| |          0|
| +-----+
| +CLR-----+
| +CLEAR     +
| |Dest       DDIF2|
| |          0|
| +-----+

```

Rung 2:16

RATE CHECKING

```

| TMR_SU/DN
| T4:60
| ---1 [
|   DN
|   (2:2)

```

```

+MOV-----+
+MOVE      +
|Source      AV119|
|          1702|
|Dest       R1_119|
|          1702|
+-----+
+MOV-----+
+MOVE      +
|Source      AV119|
|          1702|
|Dest       R2_119|
|          1702|
+-----+
+MOV-----+
+MOVE      +
|Source      10|
|          |
|Dest       DIF1_119|
|          10|
+-----+
+++

```

```

+---+
| +MOV-----+
+---+
| |Source      101|
| |Dest        DIF2_119|
| |            101|
+---+
| +CLR-----+
+---+
| |Dest        DDIF1|
| |            01|
+---+
| +CLR-----+
+---+
| |Dest        DDIF2|
| |            01|
+---+

```

Rung 2:17

RATE CHECKING

```

1 TMR_SU/DN
1 T4:60
1 ----] [----
1 DN
1 (2:2)

```

```

+MOV-----+
+MOVE-----+
|Source          AV120|
|              1720|
|Dest            R1_120|
|              1720|
+-----+
+MOV-----+
+MOVE-----+
|Source          AV120|
|              1720|
|Dest            R2_120|
|              1720|
+-----+
+MOV-----+
+MOVE-----+
|Source          101|
|Dest            DIF1_120|
|              101|
+-----+
+MOV-----+
+MOVE-----+
|Source          101|
|Dest            DIF2_120|
|              101|
+-----+
+CLR-----+
+CLEAR-----+
|Dest            DDIF1|
|              01|
+-----+
+++

```

Rung 2:18

RATE CHECKING

TMR_SU/DN
 T4:60
 J [-----
 DN
 (2:2)

```

+++
|+CLR-----+|
|+--CLEAR    +--+
| |Dest      DDIF2|
| |          0|
|+-----+|
|
|+MOV-----+|
|+--MOVE     +--+
| |Source    AV121|
| |          1727|
| |Dest      R1_121|
| |          1727|
|+-----+|
|
|+MOV-----+|
|+--MOVE     +--+
| |Source    AV121|
| |          1727|
| |Dest      R2_121|
| |          1727|
|+-----+|
|
|+MOV-----+|
|+--MOVE     +--+
| |Source    10|
| |Dest      DIF1_121|
| |          10|
|+-----+|
|
|+MOV-----+|
|+--MOVE     +--+
| |Source    10|
| |Dest      DIF2_121|
| |          10|
|+-----+|
|
|+CLR-----+|
|+--CLEAR    +--+
| |Dest      DDIF1|
| |          0|
|+-----+|
|
|+CLR-----+|
|+--CLEAR    +--+
| |Dest      DDIF2|
| |          0|
|+-----+|

```

Rung 2:19

RATE CHECKING

TMR_SU/DN		+MOV-----+
T4:60		+MOVE-----+
1 [-----]		Source AV122
DN		1736
(2:2)		Dest R1_122
		1734
		+-----+
		+MOV-----+
		+--MOVE-----+
		Source AV122
		1736
		Dest R2_122
		1734
		+-----+
		+MOV-----+
		+--MOVE-----+
		Source 10
		Dest DIF1_122
		10
		+-----+
		+MOV-----+
		+--MOVE-----+
		Source 10
		Dest DIF2_122
		10
		+-----+
		+CLR-----+
		+--CLEAR-----+
		Dest DDIF1
		0
		+-----+
		+CLR-----+
		+--CLEAR-----+
		Dest DDIF2
		0
		+-----+

Rung 2:20

RATE CHECKING

TMR_SU/DN		+MOV-----+
T4:60		+MOVE-----+
1 [-----]		Source AV123
DN		1740
(2:2)		Dest R1_123
		1740
		+-----+
		+-----+

```

+++
|
| +MOV-----+
| +MOVE      +
| |Source      AV123|
| |          1740|
| |Dest       R2_123|
| |          1740|
| +-----+
| +MOV-----+
| +MOVE      +
| |Source      10|
| |          |
| |Dest       DIF1_123|
| |          10|
| +-----+
| +MOV-----+
| +MOVE      +
| |Source      10|
| |          |
| |Dest       DIF2_123|
| |          10|
| +-----+
| +CLR-----+
| +CLEAR     +
| |Dest       DDIF1|
| |          0|
| +-----+
| +CLR-----+
| +CLEAR     +
| |Dest       DDIF2|
| |          0|
| +-----+
  
```

Rung 2:21

RATE CHECKING

```

| TMR_SU/DN
| T4:60
| |-----+
| |DN
| |(2:2)
|
| +MOV-----+
| +MOVE      +
| |Source      AV124|
| |          1750|
| |Dest       R1_124|
| |          1750|
| +-----+
| +MOV-----+
| +MOVE      +
| |Source      AV124|
| |          1750|
| |Dest       R2_124|
| |          1750|
| +-----+
| +MOV-----+
| +MOVE      +
| |Source      10|
| |          |
| |Dest       DIF1_124|
| |          10|
| +-----+
+++
  
```

```

+---+
| +MOV-----+
+---+
| |MOVE|-----+
| |Source|10|
| |Dest|DIF2_124|
| |10|
| +-----+
| +CLR-----+
+---+
| |CLEAR|-----+
| |Dest|DDIF1|
| |0|
| +-----+
| +CLR-----+
+---+
| |CLEAR|-----+
| |Dest|DDIF2|
| |0|
| +-----+

```

Rung 2:22

RATE CHECKING

```

| TMR_SU/DN
|   T4:60
| ----] [---
|       DN
|   (2:2)

```

```

+MOV-----+
+MOVE-----+
|Source          AV125|
|                1736|
|Dest           R1_125|
|                1737|
+-----+
+MOV-----+
+MOVE-----+
|Source          AV125|
|                1736|
|Dest           R2_125|
|                1737|
+-----+
+MOV-----+
+MOVE-----+
|Source          10|
|Dest           DIF1_125|
|                10|
+-----+
+MOV-----+
+MOVE-----+
|Source          10|
|Dest           DIF2_125|
|                10|
+-----+
+CLR-----+
+CLEAR-----+
|Dest           DDIF1|
|                0|
+-----+
+++

```

```
+++
|
| +CLR-----+
| +-+CLEAR    +-+
| |Dest      DDIF2|
| |          0|
| +-----+
|
```

Rung 2:23

RATE CHECKING

```
| TMR_SU/DN
| T4:60
|-----|
| DN
| (2:2)
```

```
+MOV-----+
+-+MOVE      +-+
| |Source    AV130|
| |          1722|
| |Dest      R1_130|
| |          1722|
| +-----+
+MOV-----+
+-+MOVE      +-+
| |Source    AV130|
| |          1722|
| |Dest      R2_130|
| |          1722|
| +-----+
+MOV-----+
+-+MOVE      +-+
| |Source    10|
| |          |
| |Dest      DIF1_130|
| |          10|
| +-----+
+MOV-----+
+-+MOVE      +-+
| |Source    10|
| |          |
| |Dest      DIF2_130|
| |          10|
| +-----+
+CLR-----+
+-+CLEAR      +-+
| |Dest      DDIF1|
| |          0|
| +-----+
+CLR-----+
+-+CLEAR      +-+
| |Dest      DDIF2|
| |          0|
| +-----+
```

RATE CHECKING

```

+MOV-----+
+MOVE      +
|Source     AV131|
|           1724|
|Dest       R1_131|
|           1723|

```

```

+MOV-----+
+MOVE+
|Source      AV131|
|            1724|
|Dest       R2_131|
|            1723|

```

```

+MOV-----+
+MOVE      +
|Source      10|
|           |
|Dest       DIF1_131|
|           10|

```

```

+MOV-----+
-MOVE      +
|Source    10|
|          |
|Dest      DIF2_131|
|          10|

```

```

+CLR-----+
+CLEAR      +
|Dest      DDIF1
|          0

```

```

+CLR-----+
-CLEAR
|Dest      DDIF2
|          01

```

RATE CHECKING

```

+MOV-----+
--MOVE
|Source      AV132
|            1728
|Dest        R1_132
|            1727

```

+++


```

+++
| +MOV-----+
| +MOVE      +
| |Source      AV132|
| |          1728|
| |Dest       R2_132|
| |          1727|
| +-----+
| +MOV-----+
| +MOVE      +
| |Source      10|
| |          |
| |Dest       DIF1_132|
| |          10|
| +-----+
| +MOV-----+
| +MOVE      +
| |Source      10|
| |          |
| |Dest       DIF2_132|
| |          10|
| +-----+
| +CLR-----+
| +CLEAR     +
| |Dest       DDIF1|
| |          0|
| +-----+
| +CLR-----+
| +CLEAR     +
| |Dest       DDIF2|
| |          0|
| +-----+

```

Rung 2:26

RATE CHECKING

```

| TMR_SU/DN
| T4:60
| ] [
|   DN
| (2:2)

```

```

+++
| +MOV-----+
| +MOVE      +
| |Source      AV133|
| |          1721|
| |Dest       R1_133|
| |          1721|
| +-----+
| +MOV-----+
| +MOVE      +
| |Source      AV133|
| |          1721|
| |Dest       R2_133|
| |          1721|
| +-----+
| +MOV-----+
| +MOVE      +
| |Source      10|
| |          |
| |Dest       DIF1_133|
| |          10|
| +-----+
+++

```

```

+++
+MOV-----+
+MOVE      +
|Source      10|
|Dest      DIF2_133|
|          10|
+-----+
+CLR-----+
+CLEAR      +
|Dest      DDIF1|
|          0|
+-----+
+CLR-----+
+CLEAR      +
|Dest      DDIF2|
|          0|
+-----+

```

Rung 2:27

RATE CHECKING

```

TMR_SU/DN
T4:60
J [-----
  DN
  (2:2)

```

```

+MOV-----+
+MOVE      +
|Source      AV134|
|          1723|
|Dest      R1_134|
|          1722|
+-----+
+MOV-----+
+MOVE      +
|Source      AV134|
|          1723|
|Dest      R2_134|
|          1722|
+-----+
+MOV-----+
+MOVE      +
|Source      10|
|Dest      DIF1_134|
|          10|
+-----+
+MOV-----+
+MOVE      +
|Source      10|
|Dest      DIF2_134|
|          10|
+-----+
+CLR-----+
+CLEAR      +
|Dest      DDIF1|
|          0|
+-----+

```

```

+++
| +CLR-----+
| +--CLEAR      +
| |Dest        DDIF2|
| |            01
| +-----+
  
```

Rung 2:28

RATE CHECKING

```

| TMR_SU/DN
| T4:60
| ] [-----
|   DN
|   (2:2)
  
```

```

+MOV-----+
+--MOVE      +
| |Source     AV140|
| |          1728|
| |Dest       R1_140|
| |          1728|
| +-----+
+MOV-----+
+--MOVE      +
| |Source     AV140|
| |          1728|
| |Dest       R2_140|
| |          1728|
| +-----+
+MOV-----+
+--MOVE      +
| |Source     10|
| |Dest       DIF1_140|
| |          10|
| +-----+
+MOV-----+
+--MOVE      +
| |Source     10|
| |Dest       DIF2_140|
| |          10|
| +-----+
+CLR-----+
+--CLEAR      +
| |Dest       DDIF1|
| |          01
| +-----+
+CLR-----+
+--CLEAR      +
| |Dest       DDIF2|
| |          01
| +-----+
  
```

Rung 2:29

RATE CHECKING

TMR_SU/DN	+MOV-----+
T4:60	+MOVE-----+
-----] [-----	Source AV141
DN	1728
(2:2)	Dest R1_141
	1728
	+-----+
	+MOV-----+
	+MOVE-----+
	Source AV141
	1728
	Dest R2_141
	1728
	+-----+
	+MOV-----+
	+MOVE-----+
	Source 10
	Dest DIF1_141
	10
	+-----+
	+MOV-----+
	+MOVE-----+
	Source 10
	Dest DIF2_141
	10
	+-----+
	+CLR-----+
	+CLEAR-----+
	Dest DDIF1
	0
	+-----+
	+CLR-----+
	+CLEAR-----+
	Dest DDIF2
	0
	+-----+

Rung 2:30

RATE CHECKING

TMR_SU/DN	+MOV-----+
T4:60	+MOVE-----+
-----] [-----	Source AV142
DN	1729
(2:2)	Dest R1_142
	1729
	+-----+

+++

```

+++
| +MOV-----+
| +MOVE
| |Source      AV142|
| |           1729|
| |Dest       R2_142|
| |           1729|
| +-----+
| +MOV-----+
| +MOVE
| |Source      10|
| |           |
| |Dest       DIF1_142|
| |           10|
| +-----+
| +MOV-----+
| +MOVE
| |Source      10|
| |           |
| |Dest       DIF2_142|
| |           10|
| +-----+
| +CLR-----+
| +CLEAR
| |Dest       DDIF1|
| |           0|
| +-----+
| +CLR-----+
| +CLEAR
| |Dest       DDIF2|
| |           0|
| +-----+

```

Rung 2:31

TMR_SU/DN	DN_1
T4:60	N20:5
DN	(U)
(2:2)	1
	DN_2
	N20:5
	(U)
	2
	DN_3
	N20:5
	(U)
	3
	DN_4
	N20:5
	(U)
	4
	END
	7
	(JMP)

0

```

+-----+-----+
+TON-----+
+TIMER ON DELAY +-(EN)-+
|Timer      TMR_SCH+-(DN)|
|Time Base   0.01|
|Preset      52|
|Accum       0|
+-----+-----+
+TON-----+
+TIMER ON DELAY +-(EN)-+
|Timer      RT_TMR+-(DN)|
|Time Base   1.0|
|Preset      180|
|Accum       78|
+-----+-----+

```

175

A diagram of a rectangular box. The top edge is labeled with two plus signs (+ +). The left edge is labeled with a plus sign (+). The right edge has four arrows pointing outwards, labeled with greater-than signs (>). The bottom edge has four arrows pointing outwards, labeled with greater-than signs (>).

[illegible]

Rung 2:35

```

*****
JUMPS TO SECTION 1 IF DN_1 IS NOT LATCHED DN_1 GETS LATCHED WHEN THE
SECTION IS ENTERED
|
| MD1
|
| DN_1
| N20:5 1
|-----1/----- (JMP)-----
| Source A TMR_SCH.ACC 1
| | 01 (2:31)
| Source B 131
| |
|-----+
| T4:61.ACC - (2:33)

```

Rung 2:36

```

*****
JUMPS TO SECTION 2 IF DN_2 IS NOT LATCHED DN_2 GETS LATCHED WHEN THE
SECTION IS ENTERED
|
| MD2
|
| DN_2
| N20:5 2
|+-----+-----+
|+GRTR THAN OR EQUAL +-----+ (JMP) -----+
| |Source A TMR_SCH.ACC| 2
| | | 01 (2:31)
| |Source B 26|
| | | 1
| |-----+
| T4:61.ACC - (2:33)

```

Rung 2:37

```
*****
JUMPS TO SECTION 3 IF DN_3 IS NOT LATCHED DN_3 GETS LATCHED WHEN THE
SECTION IS ENTERED
|
| MD3
|      DN_3
|      N20:5
|+GEQ-----+
|-GRTR THAN OR EQUAL +---1/|------(JMP)-----+
|Source A    THR_SCH.ACC|      3
|                  |      01
|Source B          39|      (2:31)
|                  |
|+-----+
|T4:61.ACC - (2:33)
```

Rung 2:38

```

*****
JUMPS TO SECTION 4 IF DN_4 IS NOT LATCHED DN_4 GETS LATCHED WHEN THE
SECTION IS ENTERED
|
| MD4
| DN_4
| +GEQ-----+ N20:5 4
| -GRTR THAN OR EQUAL +---1/(-)----- (JMP)-----
| |Source A THR_SCH.ACC| 4
| | | 01 (2:31)
| |Source B 52|
| | |
| +-----+
| T4:61.ACC - (2:33)

```


Rung 2:39

NOT END

6

(JMP)

Rung 2:40

BEGIN SECTION 1

MD1

1

[LBL]

DUMMY4

N20:7

()

3

Rung 2:41

DN_1

N20:5

(L)

1

Rung 2:42

Read each T/C and store each T/C's value in its own memory register

+ADD-

+ADD

|Source A TC110A1|

|742|

|Source B 1000|

|Dest C110A1|

|1742|

+-----+

Rung 2:43

+GRT-

+GREATER THAN

|Source A C110A1|

|1742|

|Source B 16383|

|1742|

+-----+

N7:1 - (2:42)

+MOV-

+MOVE

|Source 16383|

|Dest C110A1|

|1742|

+-----+

Rung 2:44

+ADD-

+ADD

|Source A TC110A2|

|745|

|Source B 1000|

|Dest C110A2|

|1745|

+-----+

Rung 2:45

+GRT-----+	+MOV-----+
+GREATER THAN	+MOVE
Source A C110A2	Source 16383
1745	
Source B 16383	Dest C110A2
	1745
+-----+	+-----+
N7:2 - (2:44)	

Rung 2:46

	+ADD-----+
	+ADD
	Source A TC110A3
	744
	Source B 1000
	Dest C110A3
	1744
	+-----+

Rung 2:47

+GRT-----+	+MOV-----+
+GREATER THAN	+MOVE
Source A C110A3	Source 16383
1744	
Source B 16383	Dest C110A3
	1744
+-----+	+-----+
N7:3 - (2:46)	

Rung 2:48

	+ADD-----+
	+ADD
	Source A TC110A4
	741
	Source B 1000
	Dest C110A4
	1741
	+-----+

Rung 2:49

+GRT-----+	+MOV-----+
+GREATER THAN	+MOVE
Source A C110A4	Source 16383
1741	
Source B 16383	Dest C110A4
	1741
+-----+	+-----+
N7:4 - (2:48)	

Rung 2:50

	+ADD-----+
-----+	+ADD-----+
	Source A TC110B1
	742
	Source B 1000
	Dest C110B1
	1742
	-----+

Rung 2:51

	+GRT-----+		+MOV-----+
	---GREATER THAN		---MOVE
	Source A C110B1		Source 16383
	1742		
	Source B 16383		Dest C110B1
			1742
	-----+		-----+

N7:5 - (2:50)

Rung 2:52

	+ADD-----+
-----+	+ADD-----+
	Source A TC110B2
	745
	Source B 1000
	Dest C110B2
	1745
	-----+

Rung 2:53

	+GRT-----+		+MOV-----+
	---GREATER THAN		---MOVE
	Source A C110B2		Source 16383
	1745		
	Source B 16383		Dest C110B2
			1745
	-----+		-----+

N7:6 - (2:52)

Rung 2:54

	+ADD-----+
-----+	+ADD-----+
	Source A TC110B3
	744
	Source B 1000
	Dest C110B3
	1744
	-----+

```

Rung 2:55
| +GRT-----+
| -+GREATER THAN +-----+
| |Source A      C110B3|
| |              1744|
| |Source B      16383|
| |              1744|
| +-----+
| N7:7 - (2:54)

```

```

Rung 2:56
|
| +ADD-----+
| +ADD
| |Source A      TC110B4|
| |              740|
| |Source B      1000|
| |              1740|
| |Dest          C110B4|
| |              1740|
| +-----+

```

```

Rung 2:57
| +GRT-----+
| -+GREATER THAN +-----+
| |Source A      C110B4|
| |              1740|
| |Source B      16383|
| |              1740|
| +-----+
| N7:8 - (2:56)

```

```

Rung 2:58
|
| +ADD-----+
| +ADD
| |Source A      TC110C1|
| |              740|
| |Source B      1000|
| |              1740|
| |Dest          C110C1|
| |              1740|
| +-----+

```

```

Rung 2:59
| +GRT-----+
| -+GREATER THAN +-----+
| |Source A      C110C1|
| |              1740|
| |Source B      16383|
| |              1740|
| +-----+
| N7:9 - (2:58)

```

Rung 2:60

	+ADD-----+
	+ADD
	Source A TC110C2
	742
	Source B 1000
	Dest C110C2
	1742
	+-----+

Rung 2:61

	+GRT-----+		+MOV-----+
	+GREATER THAN		+MOVE
	Source A C110C2		Source 16383
	1742		
	Source B 16383		Dest C110C2
			1742
	+-----+		+-----+
	N7:10 - (2:60)		

Rung 2:62

	+ADD-----+
	+ADD
	Source A TC110C3
	745
	Source B 1000
	Dest C110C3
	1745
	+-----+

Rung 2:63

	+GRT-----+		+MOV-----+
	+GREATER THAN		+MOVE
	Source A C110C3		Source 16383
	1745		
	Source B 16383		Dest C110C3
			1745
	+-----+		+-----+
	N7:11 - (2:62)		

Rung 2:64

	+ADD-----+
	+ADD
	Source A TC110C4
	741
	Source B 1000
	Dest C110C4
	1741
	+-----+

Rung 2:65		
+GRT-----+	+MOV-----+	
-+GREATER THAN +-----+	+MOVE-----+	
Source A C110C4	Source 16383	
1741		
Source B 16383	Dest C110C4	
	1741	
+-----+	+-----+	
N7:12 - (2:64)		

Rung 2:66		T-3003
	+ADD-----+	
	+ADD-----+	
	Source A TC111A1	
	752	
	Source B 1000	
	Dest C111A1	
	1752	
	+-----+	

Rung 2:67		T-3003
	+MOV-----+	
+GRT-----+	+MOVE-----+	
-+GREATER THAN +-----+	Source 16383	
Source A C111A1		
1752		
Source B 16383	Dest C111A1	
	1752	
+-----+	+-----+	
N7:13 - (2:66)		

Rung 2:68		
	+ADD-----+	
	+ADD-----+	
	Source A TC111A2	
	755	
	Source B 1000	
	Dest C111A2	
	1755	
	+-----+	

Rung 2:69		
+GRT-----+	+MOV-----+	
-+GREATER THAN +-----+	+MOVE-----+	
Source A C111A2	Source 16383	
1755		
Source B 16383	Dest C111A2	
	1755	
+-----+	+-----+	
N7:14 - (2:68)		

Rung 2:70

	+ADD-----+
	+ADD
	Source A TC111A3
	753
	Source B 1000
	Dest C111A3
	1753
	+-----+

Rung 2:71

	+GRT-----+		+MOV-----+
	+GREATER THAN		+MOVE
	Source A C111A3		Source 16383
	1753		
	Source B 16383		Dest C111A3
			1753
	+-----+		+-----+
	N7:15 - (2:70)		

Rung 2:72

	+ADD-----+
	+ADD
	Source A TC111A4
	750
	Source B 1000
	Dest C111A4
	1750
	+-----+

Rung 2:73

	+GRT-----+		+MOV-----+
	+GREATER THAN		+MOVE
	Source A C111A4		Source 16383
	1750		
	Source B 16383		Dest C111A4
			1750
	+-----+		+-----+
	N7:16 - (2:72)		

Rung 2:74

	+ADD-----+
	+ADD
	Source A TC111B1
	749
	Source B 1000
	Dest C111B1
	1749
	+-----+

Rung 2:75		
+GRT-----+	+MOV-----+	
+GREATER THAN	+MOVE-----+	
Source A C111B1	Source 16383	
1749	1749	
Source B 16383	Dest C111B1	
1749	1749	
+-----+	+-----+	
N7:17 - (2:74)		

Rung 2:76		
	+ADD-----+	
	+ADD-----+	
	Source A TC111B2	
	752	
	Source B 1000	
	1000	
	Dest C111B2	
	1752	
	+-----+	

Rung 2:77		
+GRT-----+	+MOV-----+	
+GREATER THAN	+MOVE-----+	
Source A C111B2	Source 16383	
1752	1752	
Source B 16383	Dest C111B2	
16383	1752	
+-----+	+-----+	
N7:18 - (2:76)		

Rung 2:78		
	+ADD-----+	
	+ADD-----+	
	Source A TC111B3	
	750	
	Source B 1000	
	1000	
	Dest C111B3	
	1750	
	+-----+	

Rung 2:79		
+GRT-----+	+MOV-----+	
+GREATER THAN	+MOVE-----+	
Source A C111B3	Source 16383	
1750	1750	
Source B 16383	Dest C111B3	
16383	1750	
+-----+	+-----+	
N7:19 - (2:78)		

Rung 2:80

	+ADD-----+
-----+	+ADD-----+
	Source A TC111B4
	749
	Source B 1000
	Dest C111B4
	1749
	+-----+

Rung 2:81

	+GRT-----+		+MOV-----+
	+GREATER THAN-----+		+MOVE-----+
	Source A C111B4		Source 16383
	1749		
	Source B 16383		Dest C111B4
			1749
	+-----+		+-----+

N7:20 - (2:80)

Rung 2:82

	+ADD-----+
-----+	+ADD-----+
	Source A TC111C1
	747
	Source B 1000
	Dest C111C1
	1747
	+-----+

Rung 2:83

	+GRT-----+		+MOV-----+
	+GREATER THAN-----+		+MOVE-----+
	Source A C111C1		Source 16383
	1747		
	Source B 16383		Dest C111C1
			1747
	+-----+		+-----+

N7:21 - (2:82)

Rung 2:84

	+ADD-----+
-----+	+ADD-----+
	Source A TC111C2
	752
	Source B 1000
	Dest C111C2
	1752
	+-----+

```

| +GRT-----+
| +GREATER THAN +
| |Source A      C111C2|
| |              1752|
| |Source B      16383|
| |                  |
| +-----+
| NZ:22 - (2:84)

```

```

+MOV-----+
+MOVE-----+
|Source      16383|
|            |
|Dest        C111C2|
|            1752|

```

```
+ADD-----+
+ADD+
|Source A      TC111C3|
|              749|
|Source B      1000|
|              |
|Dest          C111C3|
|              1749|
```

```

| +-----+
| -+GREATER THAN +
| |Source A      C111C3|
| |              1749|
| |Source B      16383|
| |              |
| +-----+
| N7:23 - (2:86)

```

```

+MOV-----+
+MOVE-----+
|Source      16383|
|            |
|Dest        C111C3|
|            1749|

```

```
+ADD-----+
+ADD+
|Source A    TC111C4|
|              751|
|Source B    1000|
|              |
|Dest        C111C4|
|              1751|
```

```

| +GRT-----+
| -+GREATER THAN +
| |Source A      C11104|
| |              1751|
| |Source B      16383|
| |              |
| +-----+
| N7:24 - (2:88)

```

```

+MOV-----+
+MOVE      +
|Source      1638|
|           |
|Dest        C111C4|
|           |
|           1751|

```

 For each T/C read its STATUS BITS to detect T/C problems
 HARDWARE ALARMS FOR TANK T-3002

Rung 2:91

```

T/C ENABLE

I:3
] / [
| 91 |
| OPEN T/C |
| I:3 |
| ] [-----+
| 92 |
| LO LIMIT |
| I:3 |
| ] [-----+
| 93 |
| HI LIMIT |
| I:3 |
| ] [-----+
| 94 |
| CNFG ERROR |
|
| I:3 |
| ] [-----+
| 95 |

```

Rung 2:92
 T/C ENABLE

I:3	HA110A3
1/1	N7:240
-----1/1-----	()-----
107	2
OPEN T/C	
I:3	
-----1/1-----	
108	
LO LIMIT	
I:3	
-----1/1-----	
109	
HI LIMIT	
I:3	
-----1/1-----	
110	
CNFG ERROR	
I:3	
-----1/1-----	
111	

Rung 2:93
 T/C ENABLE

I:3	HA110A4
1/1	N7:240
-----1/1-----	()-----
123	3
OPEN T/C	
I:3	
-----1/1-----	
124	
LO LIMIT	
I:3	
-----1/1-----	
125	
HI LIMIT	
I:3	
-----1/1-----	
126	
CNFG ERROR	
I:3	
-----1/1-----	
127	

Rung 2:94
 T/C ENABLE

I:4	HA110B1
1/1	N7:240
-----1/1-----	()-----
75	4
+++	

5

6

```

+++          +++
| | HI LIMIT |
| | I:4      |
| +-----+ |
| | 110      |
| | CNFG ERROR |
| | I:4      |
| +-----+ |
| | 111      |

```

Rung 2:97
 T/C ENABLE

```

| | I:4      | HA110B4
| | 1/[-]   | N7:240
| +-----+ | ( )
| | 123      | 7
| | OPEN T/C |
| | I:4      |
| +-----+ |
| | 124      |
| | LO LIMIT |
| | I:4      |
| +-----+ |
| | 125      |
| | HI LIMIT |
| | I:4      |
| +-----+ |
| | 126      |
| | CNFG ERROR |
| | I:4      |
| +-----+ |
| | 127      |

```

Rung 2:98
 T/C ENABLE

```

| | I:5      | HA110C1
| | 75       | N7:240
| +-----+ | ( )
| | OPEN T/C | 8
| | I:5      |
| +-----+ |
| | 76       |
| | LO LIMIT |
| | I:5      |
| +-----+ |
| | 77       |
| | HI LIMIT |
| | I:5      |
| +-----+ |
| | 78       |
| | CNFG ERROR |
| | I:5      |
| +-----+ |
| | 79       |

```

```

Rung 2:99
|   T/C ENABLE
|   I:5
|   ]/[-----+-----+-----+-----+-----+-----+
|   91
|   OPEN T/C
|   I:5
|   ] [-----+-----+-----+-----+-----+-----+
|   92
|   LO LIMIT
|   I:5
|   ] [-----+-----+-----+-----+-----+-----+
|   93
|   HI LIMIT
|   I:5
|   ] [-----+-----+-----+-----+-----+-----+
|   94
|   CNFG ERROR
|   I:5
|   ] [-----+-----+-----+-----+-----+-----+
|   95
  
```

HA110C2
 N7:240
 ()
 9

```

Rung 2:100
|   T/C ENABLE
|   I:5
|   ]/[-----+-----+-----+-----+-----+-----+
|   107
|   OPEN T/C
|   I:5
|   ] [-----+-----+-----+-----+-----+-----+
|   108
|   LO LIMIT
|   I:5
|   ] [-----+-----+-----+-----+-----+-----+
|   109
|   HI LIMIT
|   I:5
|   ] [-----+-----+-----+-----+-----+-----+
|   110
|   CNFG ERROR
|   I:5
|   ] [-----+-----+-----+-----+-----+-----+
|   111
  
```

HA110C3
 N7:240
 ()
 10

```

Rung 2:101
|   T/C ENABLE
|   I:5
|   ]/[-----+-----+-----+-----+-----+-----+
|   123
|   OPEN T/C
|   I:5
|   ] [-----+-----+-----+-----+-----+-----+
|   124
|   ]
|
|   ***
  
```

HA110C4
 N7:240
 ()
 11

```

+++
|      |      |
| LO LIMIT |
| I:5      |
| +-----+ |
| 125      |
| HI LIMIT  |
| I:5      |
| +-----+ |
| 126      |
| CNFG ERROR |
| I:5      |
| +-----+ |
| 127      |
|      |      |

```

Rung 2:102

 for each T/C read its STATUS BITS to detect T/C problems
 HARDWARE ALARMS FOR TANK T-3003

```

|      |      |      |      |
| T/C ENABLE |
| I:6      |
| 1/1      |
| 75      |
| OPEN T/C  |
| I:6      |
| +-----+ |
| 76      |
| LO LIMIT  |
| I:6      |
| +-----+ |
| 77      |
| HI LIMIT  |
| I:6      |
| +-----+ |
| 78      |
| CNFG ERROR |
| I:6      |
| +-----+ |
| 79      |
|      |      |

```

HA111A1
 N7:240
 ()-----
 12

Rung 2:103

T/C ENABLE

```

|      |      |      |      |
| I:6      |
| 1/1      |
| 91      |
| OPEN T/C  |
| I:6      |
| +-----+ |
| 92      |
| LO LIMIT  |
| I:6      |
| +-----+ |
| 93      |
| HI LIMIT  |
| I:6      |
| +-----+ |
| 94      |
|      |      |

```

HA111A2
 N7:240
 ()-----
 13

+++


```

+++          +++
|          |
| CNFG ERROR |
|          I:6 |
| +-----] [-----+
|          95 |
|          |

```

Rung 2:104
 T/C ENABLE

```

|          |
|          I:6 |
| +-----] [-----+
|          107 |
| OPEN T/C |
|          I:6 |
| +-----] [-----+
|          108 |
| LO LIMIT |
|          I:6 |
| +-----] [-----+
|          109 |
| HI LIMIT |
|          I:6 |
| +-----] [-----+
|          110 |
| CNFG ERROR |
|          I:6 |
| +-----] [-----+
|          111 |
|          |

```

HA111A3
 N7:240
 ()
 14

Rung 2:105
 T/C ENABLE

```

|          |
|          I:6 |
| +-----] [-----+
|          123 |
| OPEN T/C |
|          I:6 |
| +-----] [-----+
|          124 |
| LO LIMIT |
|          I:6 |
| +-----] [-----+
|          125 |
| HI LIMIT |
|          I:6 |
| +-----] [-----+
|          126 |
| CNFG ERROR |
|          I:6 |
| +-----] [-----+
|          127 |
|          |

```

HA111A4
 N7:240
 ()
 15

Rung 2:106
 T/C ENABLE

I:7	HA111B1
1/[	N7:241
75	()
OPEN T/C	0
I:7	
76	
LO LIMIT	
I:7	
77	
HI LIMIT	
I:7	
78	
CNFG ERROR	
I:7	
79	

Rung 2:107
 T/C ENABLE

I:7	HA111B2
1/[	N7:241
91	()
OPEN T/C	1
I:7	
92	
LO LIMIT	
I:7	
93	
HI LIMIT	
I:7	
94	
CNFG ERROR	
I:7	
95	

Rung 2:108
 T/C ENABLE

I:7	HA111B3
1/[	N7:241
107	()
OPEN T/C	2
I:7	
108	

+++

```

+++          +++
|  | LO LIMIT |
|  | I:7      |
|  |-----|
|  | 109     |
|  | HI LIMIT |
|  | I:7      |
|  |-----|
|  | 110     |
|  | CNFG ERROR
|  | I:7      |
|  |-----|
|  | 111     |

```

Rung 2:109
 T/C ENABLE

```

|  | I:7      |
|  |-----|
|  | 123     |
|  | OPEN T/C |
|  | I:7      |
|  |-----|
|  | 124     |
|  | LO LIMIT |
|  | I:7      |
|  |-----|
|  | 125     |
|  | HI LIMIT |
|  | I:7      |
|  |-----|
|  | 126     |
|  | CNFG ERROR
|  | I:7      |
|  |-----|
|  | 127     |

```

HA111B4
 N7:241
 ()-----
 3

Rung 2:110
 T/C ENABLE

```

|  | I:8      |
|  |-----|
|  | 75      |
|  | OPEN T/C |
|  | I:8      |
|  |-----|
|  | 76      |
|  | LO LIMIT |
|  | I:8      |
|  |-----|
|  | 77      |
|  | HI LIMIT |
|  | I:8      |
|  |-----|
|  | 78      |
|  | CNFG ERROR
|  | I:8      |
|  |-----|
|  | 79      |

```

HA111C1
 N7:241
 ()-----
 4

Rung 2:111

```
|
|      T/C ENABLE
|
|      I:8
|      ]/[-----
|      91
|      OPEN T/C
|      I:8
|      +-----] [-----
|      92
|      LO LIMIT
|      I:8
|      +-----] [-----
|      93
|      HI LIMIT
|      I:8
|      +-----] [-----
|      94
|      CNFG ERROR
|      I:8
|      +-----] [-----
|      95
|
```

HA111C2
N7:241
()
5

Rung 2:112

```
|      T/C ENABLE
|
|      I:8
|      ]/[-----
|      107
|      OPEN T/C
|      I:8
|      +-----] [-----
|      108
|      LO LIMIT
|      I:8
|      +-----] [-----
|      109
|      HI LIMIT
|      I:8
|      +-----] [-----
|      110
|      CNFG ERROR
|      I:8
|      +-----] [-----
|      111
|
```

HA111C3
N7:241
()
6

Rung 2:113

```
|
|      I:8
|      ]/[-----
|      123
|      OPEN T/C
|      I:8
|      +-----] [-----
|      124
|
|      +++
|
```

HA111C4
N7:241
()
7

```

+++          +++
| | LO LIMIT | |
| | I:8      | |
| +---+ | +---+
| | 125      | |
| | HI LIMIT | |
| | I:8      | |
| +---+ | +---+
| | 126      | |
| | CNFG ERROR | |
| | I:8      | |
| +---+ | +---+
| | 127      | |

```

Rung 2:114

```

*****
READ STATUS OF PRESSURE SWITCHES
| PSH_3001                                PSH_1
| I:2                                    N7:246
| ---] [-----] ( )
| 0                                     0

```

Rung 2:115

```

| PSH_3002                                PSH_2
| I:2                                    N7:246
| ---] [-----] ( )
| 1                                     1

```

Rung 2:116

```

| PSH_3003                                PSH_3
| I:2                                    N7:246
| ---] [-----] ( )
| 2                                     2

```

Rung 2:117

```

| PSH_3004                                PSH_4
| I:2                                    N7:246
| ---] [-----] ( )
| 3                                     3

```

Rung 2:118

```

*****
SET DEVIATION SWITCH FOR SECTION_1 AND JUMP TO SECTION 1 AVERAGING ROUTINE
| DEV_1
| N20:6
| ---] [-----] (L)
| AV1 1
| 13
| ---] (JMP)-----]

```

Rung 2:119

```

| DEV1
| 9
| ---] [LBL]-----]
| DUMMYS
| N20:7
| 4

```

Rung 2:120

ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
 IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

	+ADD-----+	
	+ADD	
	Source A	AV110A
		1743
	Source B	DEVIATION
		1250
	Dest	H110A
		2993
	+-----+	
	+SUB-----+	
	+SUBTRACT	
	Source A	AV110A
		1743
	Source B	DEVIATION
		1250
	Dest	L110A
		493
	+-----+	

Rung 2:121

	HA110A1		D110A1
	N7:240	+GRT-----+	N7:148
		+GREATER THAN	
		Source A	C110A1
			1742
		Source B	H110A1
			2993
		+-----+	
		N7:1 - (2:42)	
		N10:91 - (2:120)	
		+LES-----+	
		+LESS THAN	
		Source A	C110A1
			1742
		Source B	L110A1
			493
		+-----+	
		N7:1 - (2:42)	
		N11:1 - (2:120)	

Rung 2:122

	HA110A2		D110A2
	N7:240	+GRT-----+	N7:148
		+GREATER THAN	
		Source A	C110A2
			1745
		Source B	H110A1
			2993
		+-----+	
		N7:2 - (2:44)	
		N10:91 - (2:120)	

```

+++
|
| +LES-----+
| +-LESS THAN +-
| |Source A   C110A2|
| |          1745|
| |Source B   L110A|
| |          493|
| +-----+
| N7:2 - (2:44)
| N11:1 - (2:120)
|

```

Rung 2:123

```

| H110A3
| N7:240
| 1/[-----+GRT-----+
| 2 |Source A   C110A3|
| (2:92) |          1744|
| |Source B   H110A|
| |          2993|
| +-----+
| N7:3 - (2:46)
| N10:91 - (2:120)
| +LES-----+
| +-LESS THAN +-
| |Source A   C110A3|
| |          1744|
| |Source B   L110A|
| |          493|
| +-----+
| N7:3 - (2:46)
| N11:1 - (2:120)
|

```

D110A3
 N7:148
 ()

2

Rung 2:124

```

| H110A4
| N7:240
| 1/[-----+GRT-----+
| 3 |Source A   C110A4|
| (2:93) |          1741|
| |Source B   H110A|
| |          2993|
| +-----+
| N7:4 - (2:48)
| N10:91 - (2:120)
| +LES-----+
| +-LESS THAN +-
| |Source A   C110A4|
| |          1741|
| |Source B   L110A|
| |          493|
| +-----+
| N7:4 - (2:48)
| N11:1 - (2:120)
|

```

D110A4
 N7:148
 ()

3

Rung 2:125

ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

	+ADD-----+	
	+ADD	
	Source A	AV110B1
		17431
	Source B DEVIATION	
		12501
	Dest	H110B1
		29931
	+-----+	
	+SUB-----+	
	+SUBTRACT	
	Source A	AV110B1
		17431
	Source B DEVIATION	
		12501
	Dest	L110B1
		4931
	+-----+	

Rung 2:126

	HA110B1		D110B1
	N7:240	+GRT-----+	N7:148
	-)/[-----	+GREATER THAN	()
	4	Source A	C110B1
	(2:94)		17421
		Source B	H110B1
			29931
		+-----+	
		N7:5 - (2:50)	
		N10:92 - (2:125)	
		+LES	
		+LESS THAN	
		Source A	C110B1
			17421
		Source B	L110B1
			4931
		+-----+	
		N7:5 - (2:50)	
		N11:2 - (2:125)	

Rung 2:127

	HA110B2		D110B2
	N7:240	+GRT-----+	N7:148
	-)/[-----	+GREATER THAN	()
	5	Source A	C110B2
	(2:95)		17451
		Source B	H110B1
			29931
		+-----+	
		N7:6 - (2:52)	
		N10:92 - (2:125)	

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Rung 2:130

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
 IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

+ADD-----+		
+ADD		
	Source A	AV110C
		1742
	Source B	DEVIATION
		1250
	Dest	H110C
		2992
+-----+		
+SUB-----+		
+SUBTRACT		
	Source A	AV110C
		1742
	Source B	DEVIATION
		1250
	Dest	L110C
		492
+-----+		

Rung 2:131

	HA110C1		D110C1
	N7:240	+GRT-----+	N7:148
	1/	+GREATER THAN	() -18
	8	Source A	C110C1
	(2:98)		1740
		Source B	H110C
			2992
+-----+			
	N7:9 - (2:58)		
	N10:93 - (2:130)		
	+LES-----+		
+LESS THAN			
	Source A	C110C1	
		1740	
	Source B	L110C	
		492	
+-----+			
	N7:9 - (2:58)		
	N11:3 - (2:130)		

Rung 2:132

	HA110C2		D110C2
	N7:240	+GRT-----+	N7:148
	1/	+GREATER THAN	() -18
	9	Source A	C110C2
	(2:99)		1742
		Source B	H110C
			2992
+-----+			
	N7:10 - (2:60)		
	N10:93 - (2:130)		

+++

+++

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Rung 2:135

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
 IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

+ADD-----+
+ADD
|Source A    AV111A|
|          1753|
|Source B DEVIATION|
|          1250|
|Dest        H111A|
|          3003|
+-----+
+SUB-----+
+SUBTRACT
|Source A    AV111A|
|          1753|
|Source B DEVIATION|
|          1250|
|Dest        L111A|
|          503|
+-----+
  
```

Rung 2:136

```

T-3003
|HA111A1|D111A1
|N7:240|N7:148
+-----+
|/|GREATER THAN
|12|Source A    C111A1|12
|(2:102)|          1752|
|          H111A|
|          3003|
+-----+
|N7:13 - (2:66)|
|N10:94 - (2:135)|
|T-3003|
+-----+
+LESS THAN
|Source A    C111A1|
|          1752|
|Source B    L111A|
|          503|
+-----+
|N7:13 - (2:66)|
|N11:4 - (2:135)|
  
```

Rung 2:137

```

|HA111A2|D111A2
|N7:240|N7:148
+-----+
|/|GREATER THAN
|13|Source A    C111A2|13
|(2:103)|          1755|
|          H111A|
|          3003|
+-----+
|N7:14 - (2:68)|
|N10:94 - (2:135)|
+++
  
```

```

+++
|
| +LES-----+
| +-LESS THAN +
| |Source A   C111A2|
| |          1755|
| |Source B   L111A|
| |          503|
| +-----+
| N7:14 - (2:68)
| N11:4 - (2:135)
|

```

Rung 2:138

```

| HA111A3
| N7:240
| +GRT-----+
| -1/[- +GREATER THAN +-----+
| 14 | |Source A   C111A3|
| (2:104) | |          1753|
| | |Source B   H111A|
| | |          3003|
| | +-----+
| | N7:15 - (2:70)
| | N10:94 - (2:135)
| | +LES-----+
| | +-LESS THAN +
| | |Source A   C111A3|
| | |          1753|
| | |Source B   L111A|
| | |          503|
| | +-----+
| | N7:15 - (2:70)
| | N11:4 - (2:135)
|

```

D111A3

N7:148

()

14

Rung 2:139

```

| HA111A4
| N7:240
| +GRT-----+
| -1/[- +GREATER THAN +-----+
| 15 | |Source A   C111A4|
| (2:105) | |          1750|
| | |Source B   H111A|
| | |          3003|
| | +-----+
| | N7:16 - (2:72)
| | N10:94 - (2:135)
| | +LES-----+
| | +-LESS THAN +
| | |Source A   C111A4|
| | |          1750|
| | |Source B   L111A|
| | |          503|
| | +-----+
| | N7:16 - (2:72)
| | N11:4 - (2:135)
|

```

D111A4

N7:148

()

15

Rung 2:140

ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
 IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

+ADD-----+	
	ADD
	Source A AV111B
	1750
	Source B DEVIATION
	1250
	Dest H111B
	3000
+-----+	
	+SUB-----+
+SUBTRACT	
	Source A AV111B
	1750
	Source B DEVIATION
	1250
	Dest L111B
	500
+-----+	

Rung 2:141

+GRT-----+		D111B1
	H111B1	N7:149
	N7:241	
+-----+		
	GREATER THAN	
	0	0
	(2:106)	
	Source A C111B1	
	1749	
	Source B H111B	
	3000	
+-----+		
	N7:17 - (2:74)	
	N10:95 - (2:140)	
+-----+		
	+LES-----+	
+LESS THAN		
	Source A C111B1	
	1749	
	Source B L111B	
	500	
+-----+		
	N7:17 - (2:74)	
	N11:5 - (2:140)	

Rung 2:142

+GRT-----+		D111B2
	H111B2	N7:149
	N7:241	
+-----+		
	GREATER THAN	
	1	1
	(2:107)	
	Source A C111B2	
	1752	
	Source B H111B	
	3000	
+-----+		
	N7:18 - (2:76)	
	N10:95 - (2:140)	

+++

+++

```

    ***
    |
    | +LES-----+
    | +--LESS THAN
    | |Source A   C111B2|
    | |          1752|
    | |Source B   L111B|
    | |          500|
    | +-----+
    | N7:18 - (2:76)
    | N11:5 - (2:140)
  
```

Rung 2:143
 HA111B3
 N7:241

D111B3
 N7:149

```

    |-----+-----+
    | J/[-] +--GREATER THAN
    | 2 |Source A   C111B3|
    | (2:108) |          1750|
    | |Source B   H111B|
    | |          3000|
    | +-----+
    | N7:19 - (2:78)
    | N10:95 - (2:140)
    | +LES-----+
    | +--LESS THAN
    | |Source A   C111B3|
    | |          1750|
    | |Source B   L111B|
    | |          500|
    | +-----+
    | N7:19 - (2:78)
    | N11:5 - (2:140)
  
```

() 2

Rung 2:144
 HA111B4
 N7:241

D111B4
 N7:149

```

    |-----+-----+
    | J/[-] +--GREATER THAN
    | 3 |Source A   C111B4|
    | (2:109) |          1749|
    | |Source B   H111B|
    | |          3000|
    | +-----+
    | N7:20 - (2:80)
    | N10:95 - (2:140)
    | +LES-----+
    | +--LESS THAN
    | |Source A   C111B4|
    | |          1749|
    | |Source B   L111B|
    | |          500|
    | +-----+
    | N7:20 - (2:80)
    | N11:5 - (2:140)
  
```

() 3

Rung 2:145

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
 IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

+ADD-----+
|Source A    AV111C|
|            1750|
|Source B DEVIATION|
|            1250|
|Dest        H111C|
|            3000|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A    AV111C|
|            1750|
|Source B DEVIATION|
|            1250|
|Dest        L111C|
|            500|
+-----+
  
```

Rung 2:146

```

| HA111C1                                     D111C1
| N7:241                                     N7:149
|-----+-----+-----+
|1/[    +GREATER THAN+
| 4      |Source A    C111C1|
|(2:110) |            1747|
|         |Source B    H111C|
|         |            3000|
|         +-----+
|         |N7:21 - (2:82)|
|         |N10:96 - (2:145)|
|         +-----+
|         +LESS THAN+
|         |Source A    C111C1|
|         |            1747|
|         |Source B    L111C|
|         |            500|
|         +-----+
|         |N7:21 - (2:82)|
|         |N11:6 - (2:145)|
|         +-----+
  
```

Rung 2:147

```

| HA111C2                                     D111C2
| N7:241                                     N7:149
|-----+-----+-----+
|1/[    +GREATER THAN+
| 5      |Source A    C111C2|
|(2:111) |            1752|
|         |Source B    H111C|
|         |            3000|
|         +-----+
|         |N7:22 - (2:84)|
|         |N10:96 - (2:145)|
|         +-----+
|         +-----+
  
```


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Rung 2:151

| AV1

| 13

| [LBL]

DUMMY6

N20:7

5

Rung 2:152

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

+CLR-----+	
+CLEAR	
Dest	COUNT
	4
+-----+	
+CLR-----+	
+---CLEAR	
Dest	TOTAL
	3472.000
+-----+	

Rung 2:153

| HA110A1
 N7:240

| D110A1
 N7:148

| OUT110A1
 N7:246

+ADD-----+	
+ADD	
Source A	1
Source B	COUNT
Dest	COUNT
	4
+-----+	
+ADD-----+	
+ADD	
Source A	C110A1
	1742
Source B	TOTAL
	3472.000
Dest	TOTAL
	3472.000
+-----+	

Rung 2:154

| HA110A2
 N7:240

| D110A2
 N7:148

| OUT110A2
 N7:246

+ADD-----+	
+ADD	
Source A	1
Source B	COUNT
Dest	COUNT
	4
+-----+	
+ADD-----+	
+ADD	
Source A	C110A1
	1742
Source B	TOTAL
	3472.000
Dest	TOTAL
	3472.000
+-----+	

Rung 2:155		Rung 2:156	
HA110A3 N7:240	D110A3 N7:148	HA110A4 N7:240	D110A4 N7:148
1 (2:118)	1 (2:118)	3 (2:93)	3 (2:124)
DEV_1 N20:6	DEV_1 N20:6	DEV_1 N20:6	DEV_1 N20:6
OUT110A3 N7:246	OUT110A3 N7:246	OUT110A4 N7:246	OUT110A4 N7:246
2 (2:92)	2 (2:123)	3 (2:93)	3 (2:124)
6	6	7	7
+ADD-----+ +ADD Source A C110A2 1745 Source B TOTAL 3472.000 Dest TOTAL 3472.000 +-----+		+ADD-----+ +ADD Source A 1 Source B COUNT 4 Dest COUNT 4 +-----+	
+ADD-----+ +ADD Source A C110A3 1744 Source B TOTAL 3472.000 Dest TOTAL 3472.000 +-----+		+ADD-----+ +ADD Source A 1 Source B COUNT 4 Dest COUNT 4 +-----+	

```

+DIV-----+
+DIVIDE      +
|Source A      TOTAL|
|              3472.000|
|Source B      COUNT|
|              41     |
|Dest          AV110A  |
|              1743|
+-----+

```

CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES HAVE BEEN TAKEN OUT (TE OUTxxx) THEN AVERAGE THE T/C

```

+CLR-----+
+-+CLEAR      +-+
| |Dest      COUNT| |
| |         4|    |
| +-----+    |
| +CLR-----+    |
+-+CLEAR      +-+
| |Dest      TOTAL| |
| |        3472.000|
+-----+

```

HA110B1
N7:240

D110B1
N7:148

OUT110B1
N7:246

+ADD-----+	
+ADD	
Source A	1
Source B	COUNT
Dest	COUNT
	4
+-----+	
+ADD-----+	
+ADD	
Source A	C110B1
	1742
Source B	TOTAL
	3472.000
Dest	TOTAL
	3472.000

Rung 2:160

HA110B2 N7:240	D110B2 N7:148	OUT110B2 N7:246	
5 (2:95)	5 (2:127)	9	
			+ADD-----+
			Source A 1
			Source B COUNT
			Dest COUNT
			4
			4
			+-----+
			+ADD-----+
			+ADD
			Source A C110B2
			1745
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+
			+ADD-----+
			+ADD
			Source A C110B2
			1745
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:161

HA110B3 N7:240	D110B3 N7:148	OUT110B3 N7:246	
6 (2:96)	6 (2:128)	10	
			+ADD-----+
			Source A 1
			Source B COUNT
			Dest COUNT
			4
			4
			+-----+
			+ADD-----+
			+ADD
			Source A C110B3
			1744
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+
			+ADD-----+
			+ADD
			Source A C110B3
			1744
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:162

HA110B4 N7:240	D110B4 N7:148	OUT110B4 N7:246	
7	7	11	+ADD-----+
(2:97)	(2:129)		Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_1		+ADD-----+
	N20:6		+ADD-----+
	1		Source A C110B4
	(2:118)		1740
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:163

	+DIV-----+
	+DIVIDE
	Source A TOTAL
	3472.000
	Source B COUNT
	4
	Dest AV110B
	1743
	+-----+

Rung 2:164

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

	+CLR-----+
	+CLEAR
	Dest COUNT
	4
	+-----+
	+CLR-----+
	+CLEAR
	Dest TOTAL
	3472.000
	+-----+

Rung 2:165		D110C1	OUT110C1	
HA110C1	N7:240	N7:148	N7:246	
1/[-	8	8	12	+ADD-----+
(2:98)	(2:131)			Source A 1
				Source B COUNT
				Dest COUNT
				Dest COUNT
				+-----+
		DEV_1		
		N20:6		+ADD-----+
		1		+ADD-----+
		(2:118)		Source A C110C1
				1740
				Source B TOTAL
				3472.000
				Dest TOTAL
				3472.000
				+-----+

Rung 2:166		D110C2	OUT110C2	
HA110C2	N7:240	N7:148	N7:246	
1/[-	9	9	13	+ADD-----+
(2:99)	(2:132)			Source A 1
				Source B COUNT
				Dest COUNT
				Dest COUNT
				+-----+
		DEV_1		
		N20:6		+ADD-----+
		1		+ADD-----+
		(2:118)		Source A C110C2
				1742
				Source B TOTAL
				3472.000
				Dest TOTAL
				3472.000
				+-----+

Rung 2:167

HA110C3 N7:240	D110C3 N7:148	OUT110C3 N7:246	
10 (2:100)	10 (2:133)	14	
			+ADD-----+
			+ADD-----+
			Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_1 N20:6		+ADD-----+
			+ADD-----+
	1		Source A C110C3
	(2:118)		1745
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:168

HA110C4 N7:240	D110C4 N7:148	OUT110C4 N7:246	
11 (2:101)	11 (2:134)	15	
			+ADD-----+
			+ADD-----+
			Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_1 N20:6		+ADD-----+
			+ADD-----+
	1		Source A C110C4
	(2:118)		1741
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:169

			+DIV-----+
			+DIVIDE-----+
			Source A TOTAL
			3472.000
			Source B COUNT
			4
			Dest AV110C
			1742
			+-----+

Rung 2:170

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

+CLR-----+	
+CLEAR	
Dest	COUNT
	4
+-----+	
+CLR-----+	
+CLEAR	
Dest	TOTAL
	3472.000
+-----+	

Rung 2:171

HA111A1 N7:240	D111A1 N7:148	OUT111A1 N7:247	+ADD-----+
12	12	0	+ADD
(2:102)	(2:136)		Source A
			1
			Source B
			COUNT
			4
			Dest
			COUNT
			4
			+-----+
	DEV_1		+ADD-----+
	N20:6		+ADD
	1		Source A
	(2:118)		C111A1
			1752
			Source B
			TOTAL
			3472.000
			Dest
			TOTAL
			3472.000
			+-----+

Rung 2:172

HA111A2 N7:240	D111A2 N7:148	OUT111A2 N7:247	+ADD-----+
13	13	1	+ADD
(2:103)	(2:137)		Source A
			1
			Source B
			COUNT
			4
			Dest
			COUNT
			4
			+-----+
+++	+++	+++	+++

[illegible]

Rung 2:175

```

+DIV-----+
|DIVIDE|
|Source A    TOTAL|
|          3472.000|
|Source B    COUNT|
|          4|
|Dest       AV111A|
|          1753|
+-----+
  
```

Rung 2:176

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

```

+CLR-----+
|CLEAR|
|Dest    COUNT|
|          4|
+-----+
|CLR-----+
|CLEAR|
|Dest    TOTAL|
|          3472.000|
+-----+
  
```

Rung 2:177

HA111B1 N7:241	D111B1 N7:149	OUT111B1 N7:247
0 (2:106)	0 (2:141)	4
	DEV_1 N20:6	
	1 (2:118)	

```

+ADD-----+
|ADD|
|Source A    1|
|Source B    COUNT|
|Dest        COUNT|
|          4|
+-----+
|ADD-----+
|ADD|
|Source A    C111B1|
|          1749|
|Source B    TOTAL|
|          3472.000|
|Dest        TOTAL|
|          3472.000|
+-----+
  
```

Rung 2:178

HA111B2 N7:241	D111B2 N7:149	OUT111B2 N7:247	+ADD-----+
1	1	5	+ADD
(2:107)	(2:142)		Source A 1
			Source B COUNT
			Dest COUNT
			Dest 4
			+-----+
	DEV_1		+ADD-----+
	N20:6		+ADD
	1		Source A C111B2
	(2:118)		1752
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:179

HA111B3 N7:241	D111B3 N7:149	OUT111B3 N7:247	+ADD-----+
2	2	6	+ADD
(2:108)	(2:143)		Source A 1
			Source B COUNT
			Dest COUNT
			Dest 4
			+-----+
	DEV_1		+ADD-----+
	N20:6		+ADD
	1		Source A C111B3
	(2:118)		1750
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:180

HA111B4 N7:241	DI111B4 N7:149	OUT111B4 N7:247	
1/1	1/1	1/1	+ADD-----+
3	3	7	+ADD
(2:109)	(2:144)		Source A 1
			Source B COUNT
			Dest COUNT
			Dest COUNT
			+-----+
	DEV_1		+ADD-----+
	N20:6		+ADD
	1		Source A C111B4
	(2:118)		Source B 1749
			Source B TOTAL
			Dest 3472.000
			Dest TOTAL
			Dest 3472.000
			+-----+

Rung 2:181

+DIV-	+DIVIDE
Source A	TOTAL
	3472.000
Source B	COUNT
	4
Dest	AV111B
	1750

Rung 2:182

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE OUTxxx) THEN AVERAGE THE T/C

	CLR	
	CLEAR	
Dest	COUNT	
	41	
	CLR	
	CLEAR	
Dest	TOTAL	
	3472.000	

Rung 2:183

HA111C1	D111C1	OUT111C1	
N7:241	N7:149	N7:247	
4	4	8	+ADD-----+
(2:110)	(2:146)		Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_1		
	N20:6		+ADD-----+
			+ADD
	1		Source A C111C1
	(2:118)		1747
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:184

HA111C2	D111C2	OUT111C2	
N7:241	N7:149	N7:247	
5	5	9	+ADD-----+
(2:111)	(2:147)		Source A 1
			Source B COUNT
			4
			Dest COUNT
			4
			+-----+
	DEV_1		
	N20:6		+ADD-----+
			+ADD
	1		Source A C111C2
	(2:118)		1752
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

HA111C3	D111C3	OUT111C3
N7:241	N7:149	N7:247

N7:241	N7:149	N7:247	+ADD-----+
1/[-	1/[-	1/[-	+ADD
6	6	10	
(2:112)	(2:148)		Source A 1
			Source B COUNT
			4
			Dest COUNT
			4
			+-----+
	DEV_1		
	N20:6		
	1/[-		+ADD-----+
	1		+ADD
	(2:118)		Source A C111C3
			1749
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

1	HA111C4	D111C4	OUT113C4
1	N7:241	N7:149	N7:249

N7:241	N7:149	N7:249	+ADD-----+
-1/[	-1/[	-1/[	+ADD
7	7	3	Source A
(2:113)	(2:149)		COUNT
			4
			Dest
			COUNT
			4
			+-----+
	DEV_1		+ADD-----+
	N20:6		+ADD
	-1 [		Source A
	1		C111C4
	(2:118)		1751
			Source B
			TOTAL
			3472.000
			Dest
			TOTAL
			3472.000
			+-----+

DIV	
DIVIDE	
Source A	TOTAL
	3472.000
Source B	COUNT
	4
Dest	AV111C
	1750

Rung 2:188

```

IF DEVIATION SET FOR SECTION 1 THEN GO THERE AND CALCULATE DEVIATION
|
|
|   DEV_1
|   N20:6
|-----] [-----9
|               (JMP)
|   1
| (2:118)

```

Rung 2:189

```

IF RATE CALCULATIONS ARE FINISHED THEN GO TO THE PID BLOCK
|
| RT_TMR/DN
| T4:62
|-----J/[----- (JMP)-----
| DN
| (2:33)

```

Rung 2:190

RATE CHECKING

Address	Instruction	Source	Destination
0000	MOV	AV110A	1743
0001	MOV	Source	AV110A
0002		Dest	R1_110A
0003			1743
0004	SUBTRACT	Source A	R1_110A
0005		Source B	R2_110A
0006		Dest	DIF1_110A
0007			10
0008	MOV	Source	R1_110A
0009		Dest	R2_110A
0010			1743
0011	SUBTRACT	Source A	DIF1_110A
0012		Source B	DIF2_110A
0013		Dest	DDIF
0014			1


```

+++
|
|
|-----+-----+
|+MOV-----+
|+MOVE-----+
|Source  DIF1_110A|
|         101|
|Dest    DIF2_110A|
|         101|
|-----+-----+
|+SUB-----+
|+SUBTRACT-----+
|Source A DIF1_110A|
|         101|
|Source B          9|
|         101|
|Dest    DIF1_110A|
|         101|
|-----+-----+
|+MUL-----+
|+MULTIPLY-----+
|Source A DIF1_110A|
|         101|
|Source B DIF1_110A|
|         101|
|Dest      ACC1|
|         828|
|-----+-----+
|+MUL-----+
|+MULTIPLY-----+
|Source A DIF1_110A|
|         101|
|Source B          ACC1|
|         828|
|Dest      ACC1|
|         828|
|-----+-----+
|+CLR-----+
|+CLEAR-----+
|Dest      S:51|
|         01|
|-----+-----+
|+MUL-----+
|+MULTIPLY-----+
|Source A      DDIF1|
|         11|
|Source B      DDIF1|
|         11|
|Dest      ACC1|
|        -728|
|-----+-----+
|+MUL-----+
|+MULTIPLY-----+
|Source A      DDIF1|
|         11|
|Source B      ACC1|
|        -728|
|Dest      ACC1|
|        -728|
|-----+-----+
|
|
+++

```

+++

```

++
| +GRT-----+ +MOV-----+
| +GREATER THAN +--MOVE
| |Source A      ACC| |Source      100|
| |            828| |
| |Source B      100| |Dest      N12:11|
| |            | |            100|
| +-----+
| N20:0 - (2:190)
| +LES-----+ +MOV-----+
| +LESS THAN +--MOVE
| |Source A      ACC| |Source      1|
| |            828| |
| |Source B      1| |Dest      N12:11|
| |            | |            100|
| +-----+
| N20:0 - (2:190)
| +LIM-----+ +MOV-----+
| +LIMIT TEST +--MOVE
| |Low Lim      1| |Source      ACC|
| |            | |            828|
| |Test        ACC| |Dest      N12:11|
| |            828| |            100|
| |High Lim    100| +-----+
| |            |
| +-----+
| N20:0 - (2:190)

```

Rung 2:191

1 PID110A

17

1 - - - [LBL]

DUMMY16

N20:7

15

Rung 2:192

DETECT FROM SCADA PID ON/OFF

IF PID OFF

THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

1 ON 110A

N7:239

$$|-----|/[-----]$$

1 3

(2:820)

+CLR-----+

-+CLEAR +

!Dest PW110A!

01

+-----+

56

```
-- (JMP) 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
```

Rung 2:193

DETECT AUTO/MANUAL FROM SCADA

SET APPROPRIATE MODE IN PID BLOCK

1 AM110A

N7:118

$$\{ \text{---} \} / [\text{---}]$$

0

(3.23)

PID110A/1

N12:0

— — — — — () — — — — —

1

• **Stress** is a response to a stimulus that is perceived as a threat to well-being.

Rung 2:194

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

```
|
|-----+MOV-----+
|         +MOVE      +
|         |Source      SET110A|
|         |          1779|
|         |Dest       PIDSP110A|
|         |          1779|
|         +-----+
|
```

Rung 2:195

PID BLOCK OPERATION

```
|
|-----+PID-----+
|         +PID      +
|         |Control Block  PID110A|
|         |Process Variable AV110A|
|         |Control Variable CV110A|
|         |Control Block Length 23|
|         +-----+
|         +SCL-----+
|         +SCALE      +
|         |Source      CV110A|
|         |          0|
|         |Rate [ /10000] 15|
|         |          |
|         |Offset      0|
|         |          |
|         |Dest       PW110A|
|         |          0|
|         +-----+
|         +CLR-----+
|         +CLEAR      +
|         |Dest       S:5|
|         |          0|
|         +-----+
|
```

Rung 2:196

```
| 56 N20:9
|-----+ ( ) -----+
| [LBL]-----+
|
```

Rung 2:197

```
|
| RT_TMR/DN PID110B
| T4:62 18
|-----+ (JMP) -----+
| 1/[ DN
| (2:33)
```

Rung 2:198

RATE CHECKING

```

+MOV-----+
+MOVE-----+
|Source      AV110B|
|              1743|
|Dest        R1_110B|
|              1743|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A    R1_110B|
|              1743|
|Source B    R2_110B|
|              1743|
|Dest        DIF1_110B|
|              101|
+-----+
+MOV-----+
+MOVE-----+
|Source      R1_110B|
|              1743|
|Dest        R2_110B|
|              1743|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A    DIF1_110B|
|              101|
|Source B    DIF2_110B|
|              101|
|Dest        DDIF1|
|              1|
+-----+
+MOV-----+
+MOVE-----+
|Source      DIF1_110B|
|              101|
|Dest        DIF2_110B|
|              101|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A    DIF1_110B|
|              101|
|Source B      9|
|              101|
|Dest        DIF1_110B|
|              101|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A    DIF1_110B|
|              101|
|Source B    DIF1_110B|
|              101|
|Dest        ACC1|
|              82B|
+-----+

```

+++

Rung 2:199

| PID110B

|

| 18

| ---[LBL]---

DUMMY17

N20:8

()

0

Rung 2:200

DETECT FROM SCADA PID ON/OFF

IF PID OFF

THEN ZERO PW FOR ZERO OUTPUT AT SCR

AND JUMP AROUND THE PID BLOCK

| ON_110B

| N7:239

| ---] / [---

| 4

| (2:820)

+CLR-----+

+---CLEAR-----+

| |Dest PW110B|

| | 0|

+-----+

| 57

+---(JMP)-----+

Rung 2:201

DETECT AUTO/MANUAL FROM SCADA

SET APPROPRIATE MODE IN PID BLOCK

| AM110B

| N7:118

| ---] / [---

| 2

| (3:23)

PID110B/1

N12:30

()

1

Rung 2:202

DETECT SETPOINT VALUE FROM SCADA

PUT VALUE IN PID BLOCK

+MOV-----+

+---MOVE-----+

| |Source SET110B|

| | 0|

| |Dest PIDSP110B|

| | 0|

+-----+

Rung 2:203

+PID-----+

+---PID-----+

| |Control Block PID110B|

| |Process Variable AV110B|

| |Control Variable CV110B|

| |Control Block Length 23|

+-----+

+++

+++


```

+++
| +SCL-----+
| +SCALE-----+
| |Source      CV110B|
| |Rate [/10000] 15|
| |Offset      0|
| |Dest        PW110B|
| |CLR-----+
| +CLEAR-----+
| |Dest        S:5|
| |-----+
| +-----+
+++

```

Rung 2:204

```

| 57
| --[LBL]----- N20:9
|                                     ( )
|                                     11

```

Rung 2:205

```

| RT_TMR/DN
| T4:62
| --1/[------ 19
| DN
| (2:33)
|                                     (JMP)

```

Rung 2:206

RATE CHECKING

```

| +MOV-----+
| +MOVE-----+
| |Source      AV110C|
| |Dest        R1_110C|
| |-----+
| +SUB-----+
| +SUBTRACT-----+
| |Source A    R1_110C|
| |Source B    R2_110C|
| |Dest        DIF1_110C|
| |-----+
| +MOV-----+
| +MOVE-----+
| |Source      R1_110C|
| |Dest        R2_110C|
| |-----+
| +-----+
+++

```

```

+++
+-----+
+SUB-----+
+SUBTRACT
+Source A DIF1_110C|
+      10|
+Source B DIF2_110C|
+      10|
+Dest      DDIF|
+      1|
+-----+
+MOV-----+
+MOVE
+Source  DIF1_110C|
+      10|
+Dest    DIF2_110C|
+      10|
+-----+
+ADD-----+
+ADD
+Source A DIF1_110C|
+      10|
+Source B      9|
+      1|
+Dest    DIF1_110C|
+      10|
+-----+
+MUL-----+
+MULTIPLY
+Source A DIF1_110C|
+      10|
+Source B DIF1_110C|
+      10|
+Dest      ACC|
+      828|
+-----+
+MUL-----+
+MULTIPLY
+Source A DIF1_110C|
+      10|
+Source B      ACC|
+      828|
+Dest      ACC|
+      828|
+-----+
+CLR-----+
+CLEAR
+Dest      S:5|
+      0|
+-----+
+MUL-----+
+MULTIPLY
+Source A      DDIF|
+      1|
+Source B      DDIF|
+      1|
+Dest      ACC|
+      -728|
+-----+
+++

```

```

+++
|
|-----+SUB-----+
|+SUBTRACT+--+
|Source A      N12:71|
|              1|
|Source B      ACC1|
|              -728|
|Dest          ACC1|
|              828|
|-----+-----+
|+GRT-----+MOV-----+
|+GREATER THAN+MOVE+--+
|Source A      ACC1|Source      100|
|              828|
|Source B      100|Dest          N12:71|
|              1|
|-----+-----+
|N20:0 - (2:190)|
|+LES-----+MOV-----+
|+LESS THAN+MOVE+--+
|Source A      ACC1|Source      1|
|              828|
|Source B      1|Dest          N12:71|
|              1|
|-----+-----+
|N20:0 - (2:190)|
|+LIM-----+MOV-----+
|+LIMIT TEST+MOVE+--+
|Low Lim      1|Source      ACC1|
|              |              828|
|Test          ACC1|Dest          N12:71|
|              828|
|High Lim     100|
|-----+-----+
|N20:0 - (2:190)|

```

Rung 2:207
PID110C

```

| 19
|-----+-----+
|+DUMMY18+--+
|N20:8
|              1
|

```

Rung 2:208

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

```

| ON_110C
| N7:239
|-----+-----+
|+CLR-----+
|+CLEAR+--+
|Dest          PW110C|
|              0|
|-----+-----+
|              58
|+-(JMP)+--+

```

Rung 2:209

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

```

|      AM110C                                     PID110C/1
|      N7:118                                     NI2:60
|-----1/[-----)-----
|              4
|      (3:23)                                     1

```

Rung 2:210

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

```

|-----+MOV-----+
|-----+MOVE-----+
|      |Source      SET110C|
|      |Dest       PIDSP110C|
|      |              0|
|      |              0|
|-----+-----+

```

Rung 2:211

```

|-----+PID-----+
|-----+PID-----+
|      |Control Block  PID110C|
|      |Process Variable AV110C|
|      |Control Variable CV110C|
|      |Control Block Length 23|
|-----+-----+
|-----+SCL-----+
|-----+SCALE-----+
|      |Source      CV110C|
|      |              0|
|      |Rate [/10000] 15|
|      |Offset      0|
|      |Dest       PW110C|
|      |              0|
|-----+-----+
|-----+CLR-----+
|-----+CLEAR-----+
|      |Dest       S:5|
|      |              0|
|-----+-----+

```

Rung 2:212

```

|      58
|-----[LBL]-----)-----
|                                     N20:9
|                                     12

```

Rung 2:213

```

|      RT_TMR/DN                                     PID111A
|      T4:62
|-----1/[-----)-----
|      DN                                     (JMP)
|      (2:33)

```

Rung 2:214

RATE CHECKING

```

+MOV-----+
|MOVE|
|Source AV111A|
|1753|
|Dest R1_111A|
|1753|
+-----+
+SUB-----+
|SUBTRACT|
|Source A R1_111A|
|1753|
|Source B R2_111A|
|1753|
|Dest DIF1_111A|
|10|
+-----+
+MOV-----+
|MOVE|
|Source R1_111A|
|1753|
|Dest R2_111A|
|1753|
+-----+
+SUB-----+
|SUBTRACT|
|Source A DIF1_111A|
|10|
|Source B DIF2_111A|
|10|
|Dest DDIF|
|1|
+-----+
+MOV-----+
|MOVE|
|Source DIF1_111A|
|10|
|Dest DIF2_111A|
|10|
+-----+
+SUB-----+
|SUBTRACT|
|Source A DIF1_111A|
|10|
|Source B 9|
|Dest DIF1_111A|
|10|
+-----+
+MUL-----+
|MULTIPLY|
|Source A DIF1_111A|
|10|
|Source B DIF1_111A|
|10|
|Dest ACC|
|828|
+-----+

```

```

+++
| SCRATCH
| N20:12
| 1 |---+---+
| 0 |Source A ACC|
| (2:190) |Source B 828|
| |Dest 1|
| |ACC|
| |828|
|---+---+
|
|+ADD---+---+
|+ADD
|Source A ACC|
|Source B 828|
|Source B ACC1|
|Dest -728|
|Dest ACC1|
| -728|
|---+---+
|+SUB---+---+
|+SUBTRACT
|Source A N12:101|
|Source B 100|
|Source B ACC1|
|Dest -728|
|Dest ACC|
| 828|
|---+---+
|+GRT---+---+
|+GREATER THAN
|Source A ACC|Source 100| |
| 828| |
|Source B 100|Dest N12:101|
| | |100|
|---+---+
| N20:0 - (2:190)
|+LES---+---+
|+LESS THAN
|Source A ACC|Source 1| |
| 828| |
|Source B 1|Dest N12:101|
| | |100|
|---+---+
| N20:0 - (2:190)
|+LIM---+---+
|+LIMIT TEST
|Low Lim 1|Source ACC| |
| | |828|
|Test ACC|Dest N12:101|
| 828| |100|
|High Lim 100|
|---+---+
| N20:0 - (2:190)

```


Rung 2:215

| PID111A

|

| 20

| [LBL]

DUMMY19

N20:8

()

2

Rung 2:216

DETECT FROM SCADA PID ON/OFF

IF PID OFF

THEN ZERO PW FOR ZERO OUTPUT AT SCR

AND JUMP AROUND THE PID BLOCK

| ON_111A

| N7:239

|

| 6

| (2:822)

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|

+CLR-----+

+CLEAR-----+

|Dest PW111A|

| 0|

|+-----+

| 59|

+--(JMP)-----+

Rung 2:217

DETECT AUTO/MANUAL FROM SCADA

SET APPROPRIATE MODE IN PID BLOCK

| AM111A

| N7:118

|

| 6

| (3:23)

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PID111A/1

N12:90

()

1

Rung 2:218

DETECT SETPOINT VALUE FROM SCADA

PUT VALUE IN PID BLOCK

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|

+MOV-----+

+MOVE-----+

|Source SET111A|

| 0|

|Dest PIDSP111A|

| 0|

|+-----+

Rung 2:219

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|

+PID-----+

+PID-----+

|Control Block PID111A|

|Process Variable AV111A|

|Control Variable CV111A|

|Control Block Length 23|

|+-----+

+++

+++

```

+++
| +SCL-----+
| +SCALE
| |Source      CV111A|
| |Rate [1/10000] 15|
| |Offset      0|
| |Dest        PW111A|
| |            0|
| +-----+
| +CLR-----+
| +CLEAR
| |Dest        S:5|
| |            0|
| +-----+

```

Rung 2:220
59

N20:9

```

| --[LBL]----- ( )
|
| 13

```

Rung 2:221

PID111B

```

| RT_TMR/DN
| T4:62
| --] / (
| DN
| (2:33)

```

21

(JMP)

Rung 2:222

RATE CHECKING

```

+MOV-----+
+MOVE
| |Source      AV111B|
| |          1750|
| |Dest        R1_111B|
| |          1751|
| +-----+
+SUB-----+
+SUBTRACT
| |Source A     R1_111B|
| |          1751|
| |Source B     R2_111B|
| |          1751|
| |Dest        DIF1_111B|
| |          10|
| +-----+
+MOV-----+
+MOVE
| |Source      R1_111B|
| |          1751|
| |Dest        R2_111B|
| |          1751|
| +-----+

```



```

+-----+
| | | | +MUL-----+ | | | | | |
| | | | +MULTIPLY-----+ | | |
| | | | |Source A DDIF| | | |
| | | | | | 1| | | |
| | | | |Source B ACC1| | | |
| | | | | -728| | | |
| | | | |Dest ACC1| | | |
| | | | | -728| | | |
| | | | +-----+ | | |
| | | | +CLR-----+ | | |
| | | | +CLEAR-----+ | | |
| | | | |Dest S:5| | | |
| | | | | 0| | | |
| | | | +-----+ | | |
| | | | SCRATCH-----+ | | |
| | | | N20:12-----+ | | |
| | | | +EQU-----+ | | |
| | | | +EQUAL-----+ | | |
| | | | |Source A ACC1| | | |
| | | | | 828| | | |
| | | | |Source B 0| | | |
| | | | +-----+ | | |
| | | | N20:0 - (2:190)-----+ | | |
| | | | +EQU-----+ | | |
| | | | +SUB-----+ | | |
| | | | +SUBTRACT-----+ | | |
| | | | |Source A ACC1| | | |
| | | | | 828| | | |
| | | | |Source B 1| | | |
| | | | |Source B 1| | | |
| | | | |Dest ACC1| | | |
| | | | | 828| | | |
| | | | +-----+ | | |
| | | | N20:0 - (2:190)-----+ | | |
| | | | +-----+ | | |
| | | | SCRATCH-----+ | | |
| | | | N20:12-----+ | | |
| | | | | 0-----+ | | |
| | | | | (2:190)-----+ | | |
| | | | +ADD-----+ | | |
| | | | +ADD-----+ | | |
| | | | |Source A ACC1| | | |
| | | | | 828| | | |
| | | | |Source B 1| | | |
| | | | |Dest ACC1| | | |
| | | | | 828| | | |
| | | | +-----+ | | |
| | | | +ADD-----+ | | |
| | | | +ADD-----+ | | |
| | | | |Source A ACC1| | | |
| | | | | 828| | | |
| | | | |Source B ACC1| | | |
| | | | | -728| | | |
| | | | |Dest ACC1| | | |
| | | | | -728| | | |
| | | | +-----+ | | |

```

```

***
+-----+
+SUB-----+
+SUBTRACT+
+Source A  N12:131|
+          100|
+Source B   ACC1|
+          -728|
+Dest      ACC|
+          828|
+-----+
+GRT-----+
+GREATER THAN+
+Source A  ACC|
+          828|
+Source B  100|
+Dest     N12:131|
+          100|
+-----+
+N20:0 - (2:190)
+LES-----+
+LESS THAN+
+Source A  ACC|
+          828|
+Source B   1|
+Dest     N12:131|
+          100|
+-----+
+N20:0 - (2:190)
+LIM-----+
+LIMIT TEST+
+Low Lim   1|
+          828|
+Test      ACC|
+          828|
+High Lim  100|
+-----+
+N20:0 - (2:190)
+LIM-----+
+LIMIT TEST+
+Low Lim   1|
+          828|
+Test      ACC|
+          828|
+High Lim  100|
+-----+
+N20:0 - (2:190)

```

Rung 2:223
PID111B

```

21
--[LBL]-----
DUMMY20
N20:8
( )
3

```

Rung 2:224

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

```

ON_111B
N7:239
1/1
7
(2:822)
+CLR-----+
+CLEAR+
+Dest  PW111B|
+      01|
+-----+
60
+---(JMP)---+

```

Rung 2:225

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

	AM111B	PID111B/1
	N7:118	N12:120
	-J/[-	()-
	8	1
	(3:23)	

Rung 2:226

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

		+MOV-----+
		+MOVE
	Source	SET111B
		0
	Dest	PIDSP111B
		0
		+-----+

Rung 2:227

		+PID-----+
		+PID
	Control Block	PID111B
	Process Variable	AV111B
	Control Variable	CV111B
	Control Block Length	23
		+-----+
		+SCL-----+
		+SCALE
	Source	CV111B
		0
	Rate [/10000]	15
	Offset	0
	Dest	PW111B
		0
		+-----+
		+CLR-----+
		+CLEAR
	Dest	S:5
		0
		+-----+

Rung 2:228

	60	N20:9
	--[LBL]	()
		14

Rung 2:229

		PID111C
	RT_TMR/DN	
	T4:62	22
	-J/[-	(JMP)
	DN	
	(2:33)	

DNR_1
N20:5
--(L)--
5

RATE CHECKING

```

+MOV-----+
+MOVE-----+
|Source      AV111C|
|            1750|
|Dest       R1_111C|
|            1749|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A    R1_111C|
|            1749|
|Source B    R2_111C|
|            1749|
|Dest       DIF1_111C|
|            10|
+-----+
+MOV-----+
+MOVE-----+
|Source      R1_111C|
|            1749|
|Dest       R2_111C|
|            1749|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A    DIF1_111C|
|            10|
|Source B    DIF2_111C|
|            10|
|Dest       DDIF1_111C|
|            1|
+-----+
+MOV-----+
+MOVE-----+
|Source      DIF1_111C|
|            10|
|Dest       DIF2_111C|
|            10|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A    DIF1_111C|
|            10|
|Source B    9|
|            |
|Dest       DIF1_111C|
|            10|
+-----+

```

+++

+++

```

+++
+---+
+*EQU-----+ +SUB-----+
+*EQUAL      +---+SUBTRACT  +---+
|Source A    ACC| |Source A    ACC|
|            828| |            828|
|Source B    1|  |Source B    1|
|            |  |            |
+---+ +---+
|N20:0 - (2:190)| |Dest      ACC|
|            |  |            828|
+---+ +---+

|SCRATCH
|N20:12
+---+ +---+
|] [-----+ +ADD-----+
| 0          +---+ADD      +---+
|(2:190)     |Source A    ACC|
|            |            828|
|            |Source B    1|
|            |            |
|            |Dest      ACC|
|            |            828|
+---+ +---+

+---+ +---+
+*ADD-----+ +ADD-----+
|Source A    ACC|
|            828|
|Source B    ACC1|
|            -728|
|Dest      ACC1|
|            -728|
+---+ +---+

+---+ +---+
+*SUB-----+ +SUBTRACT  +---+
|Source A    N12:161|
|            100|
|Source B    ACC1|
|            -728|
|Dest      ACC|
|            828|
+---+ +---+

+*GRT-----+ +MOV-----+
+*GREATER THAN +---+MOVE      +---+
|Source A    ACC| |Source    100|
|            828| |            |
|Source B    100| |Dest      N12:161|
|            |  |            100|
+---+ +---+
|N20:0 - (2:190)|
+---+ +---+

+*LES-----+ +MOV-----+
+*LESS THAN    +---+MOVE      +---+
|Source A    ACC| |Source    1|
|            828| |            |
|Source B    1|  |Dest      N12:161|
|            |  |            100|
+---+ +---+
|N20:0 - (2:190)|
+---+

```

```

+++
|
| +LIM-----+ +MOV-----+
| +--LIMIT TEST      +--MOVE
| |Low Lim          1| |Source      ACC|
| |Test              ACC| |Dest      N12:161|
| |High Lim          828| |          100|
| |                  100| +-----+
|
| +-----+
| N20:0 - (2:190)

```

Rung 2:232

```

| PID111C
|
| 22
| ---[LBL]----- ( )
|
| 4

```

Rung 2:233

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

```

| ON_111C
| N7:239
| ---1/[-----+
| 8
| (2:822)
|
| +CLR-----+
| +CLEAR
| |Dest      PW111C|
| |          0|
| +-----+
| NOT END
| 6
| --- (JMP)-----+

```

Rung 2:234

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

```

| AM111C
| N7:118
| ---1/[-----+
| 10
| (3:23)
|
| PID111C/1
| N12:150
| --- ( )
|
| 1

```

Rung 2:235

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

```

|
| +MOV-----+
| +MOVE
| |Source      SET111C|
| |          0|
| |Dest      PIDSP111C|
| |          0|
| +-----+

```

Rung 2:236

```
+-----+
+PID-----+
|Control Block PID111C|
|Process Variable AV111C|
|Control Variable CV111C|
|Control Block Length 23|
+-----+
+SCL-----+
+SCALE-----+
|Source CV111C|
|Rate [1/10000] 15|
|Offset 0|
|Dest PW111C|
|0|
+-----+
+CLR-----+
+CLEAR-----+
|Dest S:5|
|0|
+-----+
```

Rung 2:237

NOT END
6

------(JMP)-----

Rung 2:238

```
*****
BEGIN SECTION 2
| MD2
| 2 DUMMY7
|---[LBL]-----N20:7
| ( )
| 6
```

Rung 2:239

DN_2
N20:5
------(L)-----
2

Rung 2:240

```
T-3004
+ADD-----+
+ADD-----+
|Source A TC112A1|
| 753|
|Source B 1000|
| 1|
|Dest C112A1|
| 1753|
+-----+
```

Rung 2:241

```
*****
Read each T/C and store each T/C's value in its own memory register
T-3004                                     T-3004
| +GRT-----+                               +MOV-----+
| +GREATER THAN +-----+                     +MOVE-----+
| |Source A      C112A1|                     |Source      16383|
| |              1753|                     |              |
| |Source B      16383|                     |Dest        C112A1|
| |              |                     |              1753|
| +-----+                               +-----+
| N7:25 - (2:240)
```

Rung 2:242

```
|
| +ADD-----+
| +ADD-----+
| |Source A      TC112A2|
| |              754|
| |Source B      1000|
| |              |
| |Dest          C112A2|
| |              1754|
| +-----+
```

Rung 2:243

```
| +GRT-----+                               +MOV-----+
| +GREATER THAN +-----+                     +MOVE-----+
| |Source A      C112A2|                     |Source      16383|
| |              1754|                     |              |
| |Source B      16383|                     |Dest        C112A2|
| |              |                     |              1754|
| +-----+                               +-----+
| N7:26 - (2:242)
```

Rung 2:244

```
|
| +ADD-----+
| +ADD-----+
| |Source A      TC112A3|
| |              752|
| |Source B      1000|
| |              |
| |Dest          C112A3|
| |              1752|
| +-----+
```

Rung 2:245

```
| +GRT-----+                               +MOV-----+
| +GREATER THAN +-----+                     +MOVE-----+
| |Source A      C112A3|                     |Source      16383|
| |              1752|                     |              |
| |Source B      16383|                     |Dest        C112A3|
| |              |                     |              1752|
| +-----+                               +-----+
| N7:27 - (2:244)
```

Rung 2:246

	+ADD-----+
	+ADD
	Source A TC112A4
	749
	Source B 1000
	Dest C112A4
	1749
	+-----+

Rung 2:247

	+GRT-----+		+MOV-----+
	+GREATER THAN		+MOVE
	Source A C112A4		Source 16383
	1749		
	Source B 16383		Dest C112A4
			1749
	+-----+		+-----+
	N7:28 - (2:246)		

Rung 2:248

			T-3004
	+ADD-----+		+ADD-----+
	+ADD		+ADD
	Source A TC112B1		Source A TC112B1
	751		751
	Source B 1000		Source B 1000
	Dest C112B1		Dest C112B1
	1751		1751
	+-----+		+-----+

Rung 2:249

			T-3004
	+GRT-----+		+MOV-----+
	+GREATER THAN		+MOVE
	Source A C112B1		Source 16383
	1751		
	Source B 16383		Dest C112B1
			1751
	+-----+		+-----+
	N7:29 - (2:248)		

Rung 2:250

	+ADD-----+
	+ADD
	Source A TC112B2
	753
	Source B 1000
	Dest C112B2
	1753
	+-----+

Rung 2:251

+GRT-----+	+MOV-----+
+GREATER THAN	+MOVE-----+
Source A C112B2	Source 16383
1753	
Source B 16383	Dest C112B2
	1753
+-----+	+-----+
N7:30 - (2:250)	

Rung 2:252

	+ADD-----+
	+ADD-----+
	Source A TC112B3
	750
	Source B 1000
	Dest C112B3
	1750
	+-----+

Rung 2:253

+GRT-----+	+MOV-----+
+GREATER THAN	+MOVE-----+
Source A C112B3	Source 16383
1750	
Source B 16383	Dest C112B3
	1750
+-----+	+-----+
N7:31 - (2:252)	

Rung 2:254

	+ADD-----+
	+ADD-----+
	Source A TC112B4
	748
	Source B 1000
	Dest C112B4
	1748
	+-----+

Rung 2:255

+GRT-----+	+MOV-----+
+GREATER THAN	+MOVE-----+
Source A C112B4	Source 16383
1748	
Source B 16383	Dest C112B4
	1748
+-----+	+-----+
N7:32 - (2:254)	

T-3004

```

+ADD-----+
+ADD      +
|Source A   TC112C1|
|           746|
|Source B   1000|
|           |
|Dest       C112C1|
|           1746|
|           |

```

T-3004

T-3004

```

+-----+
+GREATER THAN +
|Source A      C112C1|
|                1746|
|Source B      16383|
+-----+
N7:33 - (2:256)

```

```

+MOV-----+
+MOVE-----+
|Source      16383|
|            |
|Dest        C112C1|
|            1746|
+-----+

```

```

+ADD-----+
-+ADD-----+
|Source A      TC112C2|
|              749|
|Source B      1000|
|              |
|Dest          C112C2|
|              1749|
+-----+

```

```

+MOV-----+
-MOVE-----+
|Source      16383|
|            |
|Dest        C112C2|
|            1749|
+-----+

```

```

+ADD-----+
-+ADD-----+
|Source A      TC112C3
|              746
|Source B      1000
|
|Dest          C112C3
|              1746
+-----+

```

Rung 2:261

+GRT-----+	+MOV-----+
--GREATER THAN	+MOVE-----+
Source A C112C3	Source 16383
1746	
Source B 16383	Dest C112C3
1746	1746
+-----+	+-----+
N7:35 - (2:260)	

Rung 2:262

+ADD-----+	+ADD-----+
	Source A TC112C4
	743
	Source B 1000
	Dest C112C4
	1743
+-----+	+-----+

Rung 2:263

+GRT-----+	+MOV-----+
--GREATER THAN	+MOVE-----+
Source A C112C4	Source 16383
1743	
Source B 16383	Dest C112C4
1743	1743
+-----+	+-----+
N7:36 - (2:262)	

Rung 2:264

	T-3001
+ADD-----+	+ADD-----+
	Source A TC113A1
	725
	Source B 1000
	Dest C113A1
	1725
+-----+	+-----+

Rung 2:265

T-3001	T-3001
+GRT-----+	+MOV-----+
--GREATER THAN	+MOVE-----+
Source A C113A1	Source 16383
1725	
Source B 16383	Dest C113A1
1725	1725
+-----+	+-----+
N7:37 - (2:264)	

Rung 2:266

	+ADD-----+
	+ADD-----+
	Source A TC113A2
	727
	Source B 1000
	Dest C113A2
	1727
	+-----+

Rung 2:267

	+GRT-----+		+MOV-----+
	+GREATER THAN-----+		+MOVE-----+
	Source A C113A2		Source 16383
	1727		
	Source B 16383		Dest C113A2
			1727
	+-----+		+-----+

N7:38 - (2:266)

Rung 2:268

	+ADD-----+
	+ADD-----+
	Source A TC113A3
	726
	Source B 1000
	Dest C113A3
	1726
	+-----+

Rung 2:269

	+GRT-----+		+MOV-----+
	+GREATER THAN-----+		+MOVE-----+
	Source A C113A3		Source 16383
	1726		
	Source B 16383		Dest C113A3
			1726
	+-----+		+-----+

N7:39 - (2:268)

Rung 2:270

	+ADD-----+
	+ADD-----+
	Source A TC113A4
	724
	Source B 1000
	Dest C113A4
	1724
	+-----+

Rung 2:271

+GRT-----+	+MOV-----+
-+GREATER THAN	+MOVE-----+
Source A C113A4	Source 16383
1724	
Source B 16383	Dest C113A4
	1724
+-----+	+-----+
N7:40 - (2:270)	

Rung 2:272

	+ADD-----+
	+ADD-----+
	Source A TC113B1
	733
	Source B 1000
	Dest C113B1
	1733
	+-----+

Rung 2:273

+GRT-----+	+MOV-----+
-+GREATER THAN	+MOVE-----+
Source A C113B1	Source 16383
1733	
Source B 16383	Dest C113B1
	1733
+-----+	+-----+
N7:41 - (2:272)	

Rung 2:274

	+ADD-----+
	+ADD-----+
	Source A TC113B2
	735
	Source B 1000
	Dest C113B2
	1735
	+-----+

Rung 2:275

+GRT-----+	+MOV-----+
-+GREATER THAN	+MOVE-----+
Source A C113B2	Source 16383
1735	
Source B 16383	Dest C113B2
	1735
+-----+	+-----+
N7:42 - (2:274)	

Rung 2:276

	+ADD-----+
	+ADD-----+
	Source A TC113B3
	732
	Source B 1000
	732
	Dest C113B3
	1733
	+-----+

Rung 2:277

	+GRT-----+		+MOV-----+
	+GREATER THAN		+MOVE-----+
	Source A C113B3		Source 16383
	1733		732
	Source B 16383		Dest C113B3
	1733		1733
	+-----+		+-----+

N7:43 - (2:276)

Rung 2:278

	+ADD-----+
	+ADD-----+
	Source A TC113B4
	727
	Source B 1000
	727
	Dest C113B4
	1727
	+-----+

Rung 2:279

	+GRT-----+		+MOV-----+
	+GREATER THAN		+MOVE-----+
	Source A C113B4		Source 16383
	1727		731
	Source B 16383		Dest C113B4
	1727		1727
	+-----+		+-----+

N7:44 - (2:278)

Rung 2:280

	+ADD-----+
	+ADD-----+
	Source A TC113C1
	731
	Source B 1000
	731
	Dest C113C1
	1731
	+-----+

Rung 2:281

```

| +GRT-----+
| +GREATER THAN
| |Source A    C113C1|
| |           1731|
| |Source B    16383|
| |
| +-----+
| N7:45 - (2:280)

```

```

+MOV-----+
+MOVE
|Source      16383|
|
|Dest        C113C1|
|           1731|
+-----+

```

Rung 2:282

```

|
|
|
|
|
|
|
|

```

```

+ADD-----+
+ADD
|Source A    TC113C2|
|           734|
|Source B    1000|
|
|Dest        C113C2|
|           1734|
+-----+

```

Rung 2:283

```

| +GRT-----+
| +GREATER THAN
| |Source A    C113C2|
| |           1734|
| |Source B    16383|
| |
| +-----+
| N7:46 - (2:282)

```

```

+MOV-----+
+MOVE
|Source      16383|
|
|Dest        C113C2|
|           1734|
+-----+

```

Rung 2:284

```

|
|
|
|
|
|
|
|

```

```

+ADD-----+
+ADD
|Source A    TC113C3|
|           732|
|Source B    1000|
|
|Dest        C113C3|
|           1732|
+-----+

```

Rung 2:285

```

| +GRT-----+
| +GREATER THAN
| |Source A    C113C3|
| |           1732|
| |Source B    16383|
| |
| +-----+
| N7:47 - (2:284)

```

```

+MOV-----+
+MOVE
|Source      16383|
|
|Dest        C113C3|
|           1732|
+-----+

```

Rung 2:286

		+ADD-----+
		ADD
		Source A TC113C4
		730
		Source B 1000
		1730
		Dest C113C4
		1730
		+-----+

Rung 2:287

	+CRT-----+	+MOV-----+
	GREATER THAN	MOVE
	Source A C113C4	Source 16383
	1730	1730
	Source B 16383	Dest C113C4
	1730	1730
	+-----+	+-----+
	N7:48 - (2:286)	

Rung 2:288

For each T/C read its STATUS BITS to detect T/C problems
HARDWARE ALARMS FOR TANK T-3002

	T/C ENABLE	HA112A1
	I:9	N7:241
	I	()
	75	8
	OPEN T/C	
	I:9	
	+-----] [-----+	
	76	
	I:9	
	+-----] [-----+	
	77	
	HI LIMIT	
	I:9	
	+-----] [-----+	
	78	
	CNFG ERROR	
	I:9	
	+-----] [-----+	
	79	

Rung 2:289

[illegible]

Rung 2:290

```

T/C ENABLE
I:9
-] [-----
107
OPEN T/C
I:9
-] [-----
108
LO LIMIT
I:9
-] [-----
109
HI LIMIT
I:9
-] [-----
110
CNFG ERROR
I:9
-] [-----
111

```

Rung 2:291

T/C ENABLE		HA112A4
I:9		N7:241
-]/[-		()--
123		11
OPEN T/C		
I:9		
+---] [---+		
124		
LO LIMIT		
I:9		
+---] [---+		
125		
HI LIMIT		
I:9		
+---] [---+		
126		
CNFG ERROR		
I:9		
+---] [---+		
127		

Rung 2:292

T/C ENABLE		HA112B1
I:10		N7:241
-]/[-		()--
75		12
OPEN T/C		
I:10		
+---] [---+		
76		
LO LIMIT		
I:10		
+---] [---+		
77		
HI LIMIT		
I:10		
+---] [---+		
78		
CNFG ERROR		
I:10		
+---] [---+		
79		

Rung 2:293

```
|
|
|      T/C ENABLE
|
|      I:10
|      +-----+-----+-----+-----+-----+-----+
|      | 1/ |
|      | 91 |
|      | OPEN T/C |
|      | I:10 |
|      | +-----+ |
|      | 92 |
|      | LO LIMIT |
|      | I:10 |
|      | +-----+ |
|      | 93 |
|      | HI LIMIT |
|      | I:10 |
|      | +-----+ |
|      | 94 |
|      | CNFG ERROR |
|      | I:10 |
|      | +-----+ |
|      | 95 |
|
```

HA112B2
N7:241

13

Rung 2:294

```
|
|
|      T/C ENABLE
|
|      I:10
|      +-----+-----+-----+-----+-----+-----+
|      | 1/ |
|      | 107 |
|      | OPEN T/C |
|      | I:10 |
|      | +-----+ |
|      | 108 |
|      | LO LIMIT |
|      | I:10 |
|      | +-----+ |
|      | 109 |
|      | HI LIMIT |
|      | I:10 |
|      | +-----+ |
|      | 110 |
|      | CNFG ERROR |
|      | I:10 |
|      | +-----+ |
|      | 111 |
|
```

HA112B3
N7:241

14

Rung 2:295

```

|
|   T/C ENABLE
|
|   I:10
|   +-----+
|   | 123 |
|   | OPEN T/C |
|   | I:10 |
|   +-----+
|   | 124 |
|   | LO LIMIT |
|   | I:10 |
|   +-----+
|   | 125 |
|   | HI LIMIT |
|   | I:10 |
|   +-----+
|   | 126 |
|   | CNFG ERROR |
|   | I:10 |
|   +-----+
|   | 127 |
|

```

HA112B4
 N7:241

15

Rung 2:296

```

|
|   T/C ENABLE
|
|   I:11
|   +-----+
|   | 75 |
|   | OPEN T/C |
|   | I:11 |
|   +-----+
|   | 76 |
|   | LO LIMIT |
|   | I:11 |
|   +-----+
|   | 77 |
|   | HI LIMIT |
|   | I:11 |
|   +-----+
|   | 78 |
|   | CNFG ERROR |
|   | I:11 |
|   +-----+
|   | 79 |
|

```

HA112C1
 N7:242

0

Rung 2:297

```

|
|   T/C ENABLE
|
|   I:11
|   +-----+
|   | 91 |
|   |
|   +-----+
|
|   ***

```

HA112C2
 N7:242

1

```

+++      +++
| | OPEN T/C |
| | I:11 |
| +-----+ |
| | 92 |
| | LO LIMIT |
| | I:11 |
| +-----+ |
| | 93 |
| | HI LIMIT |
| | I:11 |
| +-----+ |
| | 94 |
| | CNFG ERROR |
| | I:11 |
| +-----+ |
| | 95 |

```

Rung 2:298

```

| | T/C ENABLE |
| | I:11 |
| +-----+ |
| | 107 |
| | OPEN T/C |
| | I:11 |
| +-----+ |
| | 108 |
| | LO LIMIT |
| | I:11 |
| +-----+ |
| | 109 |
| | HI LIMIT |
| | I:11 |
| +-----+ |
| | 110 |
| | CNFG ERROR |
| | I:11 |
| +-----+ |
| | 111 |

```

HA112C3
 N7:242
 ()
 2

Rung 2:299

```

| | T/C ENABLE |
| | I:11 |
| +-----+ |
| | 123 |
| | OPEN T/C |
| | I:11 |
| +-----+ |
| | 124 |

```

HA112C4
 N7:242
 ()
 3

```

+++      +++

```

```
+++
|
| LO LIMIT
| I:11
|-----|
| 125
| HI LIMIT
| I:11
|-----|
| 126
| CNFG ERROR
| I:11
|-----|
| 127
|
```

Rung 2:300

For each T/C read its STATUS BITS to detect T/C problems
HARDWARE ALARMS FOR TANK T-3002

```

|
| T/C ENABLE
|
| I:12
|-----|
| 75
| OPEN T/C
| I:12
|-----|
| 76
| LO LIMIT
| I:12
|-----|
| 77
| HI LIMIT
| I:12
|-----|
| 78
| CNFG ERROR
| I:12
|-----|
| 79
|
| HA113A1
| N7:242
|-----|
| ( )
| 4
|
```

Rung 2:301

```

|
| T/C ENABLE
|
| I:12
|-----|
| 91
| OPEN T/C
| I:12
|-----|
| 92
|
| HA113A2
| N7:242
|-----|
| ( )
| 5
|
|+++
|
```

```
+++
|
| LO LIMIT
| I:12
| +-----+
| 93
| HI LIMIT
| I:12
| +-----+
| 94
| CNFG ERROR
| I:12
| +-----+
| 95
|
```

Rung 2:302

T/C ENABLE

```
|
| I:12
| +-----+
| 107
| OPEN T/C
| I:12
| +-----+
| 108
| LO LIMIT
| I:12
| +-----+
| 109
| HI LIMIT
| I:12
| +-----+
| 110
| CNFG ERROR
| I:12
| +-----+
| 111
|
```

HA113A3
N7:242

6

Rung 2:303

T/C ENABLE

```
|
| I:12
| +-----+
| 123
| OPEN T/C
| I:12
| +-----+
| 124
| LO LIMIT
| I:12
| +-----+
| 125
|
```

HA113A4
N7:242

7

+++

```

+++
| | HI LIMIT | |
| | I:12 | |
| +-----+ |
| | 126 | |
| | CNFG ERROR | |
| | I:12 | |
| +-----+ |
| | 127 | |

```

Rung 2:304

```

| | T/C ENABLE | |
| | I:13 | |
| | 75 | |
| | OPEN T/C | |
| | I:13 | |
| +-----+ |
| | 76 | |
| | LO LIMIT | |
| | I:13 | |
| +-----+ |
| | 77 | |
| | HI LIMIT | |
| | I:13 | |
| +-----+ |
| | 78 | |
| | CNFG ERROR | |
| | I:13 | |
| +-----+ |
| | 79 | |

```

HA113B1
 N7:242

8

Rung 2:305

```

| | T/C ENABLE | |
| | I:13 | |
| | 91 | |
| | OPEN T/C | |
| | I:13 | |
| +-----+ |
| | 92 | |
| | LO LIMIT | |
| | I:13 | |
| +-----+ |
| | 93 | |
| | HI LIMIT | |
| | I:13 | |
| +-----+ |
| | 94 | |
| | CNFG ERROR | |
| | I:13 | |
| +-----+ |
| | 95 | |

```

HA113B2
 N7:242

9

10

11

12

```
+++
| | OPEN T/C |
| | I:14 |
| |-----|
| | 76 |
| | LO LIMIT |
| | I:14 |
| |-----|
| | 77 |
| | HI LIMIT |
| | I:14 |
| |-----|
| | 78 |
| | CNFG ERROR |
| | I:14 |
| |-----|
| | 79 |
| |
```

Rung 2:309

```
| | T/C ENABLE
| |
| | I:14
| |-----|
| | 91 |
| | OPEN T/C |
| | I:14 |
| |-----|
| | 92 |
| | LO LIMIT |
| | I:14 |
| |-----|
| | 93 |
| | HI LIMIT |
| | I:14 |
| |-----|
| | 94 |
| | CNFG ERROR |
| | I:14 |
| |-----|
| | 95 |
| |
```

HA113C2
N7:242
()
13

Rung 2:310

```
| | T/C ENABLE
| |
| | I:14
| |-----|
| | 107 |
| | OPEN T/C |
| | I:14 |
| |-----|
| | 108 |
| |
```

HA113C3
N7:242
()
14

```

+++
|  | LO LIMIT |  |
|  | I:14     |  |
|  +-----+  |
|  | 109     |  |
|  | HI LIMIT |  |
|  | I:14     |  |
|  +-----+  |
|  | 110     |  |
|  | CNFG ERROR |  |
|  | I:14     |  |
|  +-----+  |
|  | 111     |  |

```

Rung 2:311

T/C ENABLE

```

|  | I:14     |  |
|  +-----+  |
|  | 123     |  |
|  | OPEN T/C |  |
|  | I:14     |  |
|  +-----+  |
|  | 124     |  |
|  | LO LIMIT |  |
|  | I:14     |  |
|  +-----+  |
|  | 125     |  |
|  | HI LIMIT |  |
|  | I:14     |  |
|  +-----+  |
|  | 126     |  |
|  | CNFG ERROR |  |
|  | I:14     |  |
|  +-----+  |
|  | 127     |  |

```

HA113C4

N7:242

()

15

Rung 2:312

DEV_2
N20:6

(L)

```

|  | 2 |  |
|  +---+  |
|  | AV2 |  |
|  | 14 |  |
|  +---+  |
|  | (JMP) |  |

```

Rung 2:313

DEV2

```

|  | 10 |  |
|  +---+  |
|  | [LBL] |  |

```

DUMMY8

N20:7

()

7


```

      +++
      |
      | +LES-----+
      | +--LESS THAN +--+
      | |Source A   C112A2|
      | |           1754|
      | |Source B   L112A1|
      | |           502|
      | +-----+
      | N7:26 - (2:242)
      | N11:7 - (2:314)
  
```

Rung 2:317

```

      | HA112A3
      | N7:241
      | +GRT-----+
      | -1/[-----+-----+-----+
      | |10
      | | (2:290)
      | | |Source A   C112A3|
      | | |           1752|
      | | |Source B   H112A1|
      | | |           3002|
      | | +-----+
      | | |N7:27 - (2:244)
      | | |N10:97 - (2:314)
      | | +LES-----+
      | | +--LESS THAN +--+
      | | |Source A   C112A3|
      | | |           1752|
      | | |Source B   L112A1|
      | | |           502|
      | | +-----+
      | | N7:27 - (2:244)
      | | N11:7 - (2:314)
  
```

D112A3
 N7:149

10

Rung 2:318

```

      | HA112A4
      | N7:241
      | +GRT-----+
      | -1/[-----+-----+-----+
      | |11
      | | (2:291)
      | | |Source A   C112A4|
      | | |           1749|
      | | |Source B   H112A1|
      | | |           3002|
      | | +-----+
      | | |N7:28 - (2:246)
      | | |N10:97 - (2:314)
      | | +LES-----+
      | | +--LESS THAN +--+
      | | |Source A   C112A4|
      | | |           1749|
      | | |Source B   L112A1|
      | | |           502|
      | | +-----+
      | | N7:28 - (2:246)
      | | N11:7 - (2:314)
  
```

D112A4
 N7:149

11

Rung 2:319

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
 IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

+ADD-----+
+ADD-----+
|Source A   AV112B|
|          1751|
|Source B DEVIATION|
|          1250|
|Dest       H112B|
|          3001|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A   AV112B|
|          1751|
|Source B DEVIATION|
|          1250|
|Dest       L112B|
|          501|
+-----+
  
```

Rung 2:320

```

T-3004
HA112B1
N7:241
+GRT-----+
|/|GREATER THAN|
|12|Source A   C112B1|
|(2:292)|          1751|
|          |Source B   H112B1|
|          |          3001|
+-----+
|N7:29 - (2:248)|
|N10:98 - (2:319)|
|T-3004|
+LES-----+
+LESS THAN-----+
|Source A   C112B1|
|          1751|
|Source B   L112B1|
|          501|
+-----+
N7:29 - (2:248)
N11:8 - (2:319)
  
```

Rung 2:321

```

HA112B2
N7:241
+GRT-----+
|/|GREATER THAN|
|13|Source A   C112B2|
|(2:293)|          1753|
|          |Source B   H112B1|
|          |          3001|
+-----+
|N7:30 - (2:250)|
|N10:98 - (2:319)|
+---+
  
```

```

+++
|
| +LES-----+
| +-LESS THAN +-+
| |Source A   C112B2|
| |           1753|
| |Source B   L112B|
| |           501|
| +-----+
| N7:30 - (2:250)
| N11:8 - (2:319)
|

```

Rung 2:322

```

| HA112B3
| N7:241 +GRT-----+
| -1/[---+GREATER THAN +-----+
| 14 | |Source A   C112B3|
| (2:294) | |           1750|
| | |Source B   H112B|
| | |           3001|
| | +-----+
| | N7:31 - (2:252)
| | N10:98 - (2:319)
| | +LES-----+
| | +-LESS THAN +-+
| | |Source A   C112B3|
| | |           1750|
| | |Source B   L112B|
| | |           501|
| | +-----+
| | N7:31 - (2:252)
| | N11:8 - (2:319)
|

```

D112B3
 N7:149
 ()

14

Rung 2:323

```

| HA112B4
| N7:241 +GRT-----+
| -1/[---+GREATER THAN +-----+
| 15 | |Source A   C112B4|
| (2:295) | |           1748|
| | |Source B   H112A|
| | |           3002|
| | +-----+
| | N7:32 - (2:254)
| | N10:97 - (2:314)
| | +LES-----+
| | +-LESS THAN +-+
| | |Source A   C112B4|
| | |           1748|
| | |Source B   L112B|
| | |           501|
| | +-----+
| | N7:32 - (2:254)
| | N11:8 - (2:319)
|

```

D112B4
 N7:149
 ()

15

Rung 2:324

ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

	+ADD-----+
	+ADD
	Source A AV112C
	1746
	Source B DEVIATION
	1250
	Dest H112C
	2996
	+-----+
	+SUB-----+
	+SUBTRACT
	Source A AV112C
	1746
	Source B DEVIATION
	1250
	Dest L112C
	496
	+-----+

Rung 2:325

T-3004

HA112C1		D112C1
N7:242		N7:150
	+GRT-----+	
-]/[	+GREATER THAN	-()
0	Source A C112C1	0
(2:296)	1746	
	Source B H112C	
	2996	
	+-----+	
	N7:33 - (2:256)	
	N10:99 - (2:324)	
	T-3004	
	+LES-----+	
	+LESS THAN	
	Source A C112C1	
	1746	
	Source B L112C	
	496	
	+-----+	
	N7:33 - (2:256)	
	N11:9 - (2:324)	

Rung 2:326

HA112C2		D112C2
N7:242		N7:150
	+GRT-----+	
-]/[	+GREATER THAN	-()
1	Source A C112C2	1
(2:297)	1749	
	Source B H112C	
	2996	
	+-----+	
	N7:34 - (2:258)	
	N10:99 - (2:324)	

+++

```

    ***
    |
    | +LES-----+
    | +LESS THAN +
    | |Source A   C112C2|
    | |          1749|
    | |Source B   L112C|
    | |          496|
    | +-----+
    | N7:34 - (2:258)
    | N11:9 - (2:324)
    |
  
```

Rung 2:327

```

    | HA112C3
    | N7:242
    | +GRT-----+
    | -J/[-----+GREATER THAN-----+-----+
    | 2 |Source A   C112C3|
    | (2:298) |          1746|
    | |Source B   H112C|
    | |          2996|
    | +-----+
    | N7:35 - (2:260)
    | N10:99 - (2:324)
    | +LES-----+
    | +LESS THAN +
    | |Source A   C112C3|
    | |          1746|
    | |Source B   L112C|
    | |          496|
    | +-----+
    | N7:35 - (2:260)
    | N11:9 - (2:324)
    |
  
```

D112C3
 N7:150

2

Rung 2:328

```

    | HA112C4
    | N7:242
    | +GRT-----+
    | -J/[-----+GREATER THAN-----+-----+
    | 3 |Source A   C112C4|
    | (2:299) |          1743|
    | |Source B   H112C|
    | |          2996|
    | +-----+
    | N7:36 - (2:262)
    | N10:99 - (2:324)
    | +LES-----+
    | +LESS THAN +
    | |Source A   C112C4|
    | |          1743|
    | |Source B   L112C|
    | |          496|
    | +-----+
    | N7:36 - (2:262)
    | N11:9 - (2:324)
    |
  
```

D112C4
 N7:150

3

$$\begin{array}{c} +\text{ADD}-\cdots-\cdots- \\ -+\text{ADD}\qquad\qquad+ \end{array}$$

Source A	AV113A
	17261
Source B DEVIATION	
	12501
Dest	H113A
	29761
-----+	
+SUB	-----+
+SUBTRACT	+
Source A	AV113A
	17261
Source B DEVIATION	
	12501
Dest	L113A
	4761
-----+	

T-3001

```

HA113A1                                D113A1
N7:242                                N7:150
+-----+-----+
-1/[-] +GREATER THAN +-----+
      4      |Source A   C113A1|
(2:300)      |          1725|
            |Source B   H113A1|
            |          2976|
            +-----+
            N7:37 - (2:264)
            N10:100 - (2:329)
            T-3001
            +-----+
            +LES-----+
+-----+LESS THAN +-----+
      |Source A   C113A1|
      |          1725|
      |Source B   L113A1|
      |          476|
      +-----+
      N7:37 - (2:264)
      N11:10 - (2:329)

```

```

HA113A2                                     D113A2
N7:242                                     N7:160
-----+GRT-----+-----+D113A2
|1/(-)GREATER THAN|+-----+N7:160
|      |          C113A2|         |
|   5   |Source A       |1727|    |5
|(2:301)|              |     |    |
|      |Source B       |H113A|    |
|      |              |2976|    |
|      |              +-----+
|      |N7:38 - (2:266)
|      |N10:100 - (2:329)
|      +-----+
+++                                     +++

```

```
+++
|
| +LES-----+
| +-+LESS THAN +-+
| |Source A C113A2|
| |          1727|
| |Source B L113A|
| |          476|
| +-----+
| N7:38 - (2:266)
| N11:10 - (2:329)
```

Rung 2:332

```
| HA113A3
| N7:242 +GRT-----+
| -1/[-+GREATER THAN
| 6 |Source A C113A3|
| (2:302) |          1726|
| |Source B H113A|
| |          2976|
| +-----+
| N7:39 - (2:268)
| N10:100 - (2:329)
| +LES-----+
| +-+LESS THAN +-+
| |Source A C113A3|
| |          1726|
| |Source B L113A|
| |          476|
| +-----+
| N7:39 - (2:268)
| N11:10 - (2:329)
```

D113A3

N7:150

()

6

Rung 2:333

```
| HA113A4
| N7:242 +GRT-----+
| -1/[-+GREATER THAN
| 7 |Source A C113A4|
| (2:303) |          1724|
| |Source B H113A|
| |          2976|
| +-----+
| N7:40 - (2:270)
| N10:100 - (2:329)
| +LES-----+
| +-+LESS THAN +-+
| |Source A C113A4|
| |          1724|
| |Source B L113A|
| |          476|
| +-----+
| N7:40 - (2:270)
| N11:10 - (2:329)
```

D113A4

N7:150

()

7

Rung 2:334

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
 IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

+ADD-----+
|Source A      AV113B|
|              1732|
|Source B DEVIATION|
|              1250|
|Dest          H113B|
|              2982|
+-----+
+SUB-----+
+SUBTRACT
|Source A      AV113B|
|              1732|
|Source B DEVIATION|
|              1250|
|Dest          L113B|
|              482|
+-----+

```

Rung 2:335

```

HA113B1
N7:242      +GRT-----+
-]/[-----+GREATER THAN+-----+
|      8      |Source A      C113B1|
|(2:304)      |              1733|
|              |Source B      H113B|
|              |              2982|
|              +-----+
|              |N7:41 - (2:272)|
|              |N10:101 - (2:334)|
|              +LES-----+
|              +LESS THAN+-----+
|              |Source A      C113B1|
|              |              1733|
|              |Source B      L113B|
|              |              482|
|              +-----+
|              |N7:41 - (2:272)|
|              |N11:11 - (2:334)|

```

Rung 2:336

```

HA113B2
N7:242      +GRT-----+
-]/[-----+GREATER THAN+-----+
|      9      |Source A      C113B2|
|(2:305)      |              1735|
|              |Source B      H113B|
|              |              2982|
|              +-----+
|              |N7:42 - (2:274)|
|              |N10:101 - (2:334)|

```

```

      +++
      |
      | +LES-----+
      | +-LESS THAN +--+
      | |Source A   C113B2|
      | |          1735|
      | |Source B   L113B|
      | |          482|
      | +-----+
      | N7:42 - (2:274)
      | N11:11 - (2:334)
      |
  
```

```

Rung 2:337
| HA113B3
| N7:242 +GRT-----+
| -J/[-+GREATER THAN +-----+
| 10 |Source A   C113B3|
| (2:306) |          1733|
|         |Source B   H113B|
|         |          2982|
|         +-----+
|         N7:43 - (2:276)
|         N10:101 - (2:334)
|         +LES-----+
|         +-LESS THAN +--+
|         |Source A   C113B3|
|         |          1733|
|         |Source B   L113B|
|         |          482|
|         +-----+
|         N7:43 - (2:276)
|         N11:11 - (2:334)
|
  
```

```

Rung 2:338
| HA113B4
| N7:242 +GRT-----+
| -J/[-+GREATER THAN +-----+
| 11 |Source A   C113B4|
| (2:307) |          1727|
|         |Source B   H113B|
|         |          2982|
|         +-----+
|         N7:44 - (2:278)
|         N10:101 - (2:334)
|         +LES-----+
|         +-LESS THAN +--+
|         |Source A   C113B4|
|         |          1727|
|         |Source B   L113B|
|         |          482|
|         +-----+
|         N7:44 - (2:278)
|         N11:11 - (2:334)
|
  
```

Rung 2:339

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
 IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

	+ADD-----+	
	+ADD	
	Source A	AV113C
		1732
	Source B DEVIATION	
		1250
	Dest	H113C
		2982
	+SUB-----+	
	+SUBTRACT	
	Source A	AV113C
		1732
	Source B DEVIATION	
		1250
	Dest	L113C
		482
	+-----+	

Rung 2:340

	HA113C1		D113C1
	N7:242	+GRT-----+	N7:150
	12	+GREATER THAN	()
	(2:308)	Source A	C113C1
			1731
		Source B	H113C
			2982
		+-----+	
		N7:45 - (2:280)	
		N10:102 - (2:339)	
		+LES-----+	
		+LESS THAN	
		Source A	C113C1
			1731
		Source B	L113C
			482
		+-----+	
		N7:45 - (2:280)	
		N11:12 - (2:339)	

Rung 2:341

	HA113C2		D113C2
	N7:242	+GRT-----+	N7:150
	13	+GREATER THAN	()
	(2:309)	Source A	C113C2
			1734
		Source B	H113C
			2982
		+-----+	
		N7:46 - (2:282)	
		N10:102 - (2:339)	
		+-----+	
		+++	+++

```

      ***
      |
      | +LES-----+
      | +--LESS THAN +
      | |Source A   C113C2|
      | |          1734|
      | |Source B   L113C|
      | |          482|
      | +-----+
      | N7:46 - (2:282)
      | N11:12 - (2:339)
      |
  
```

Rung 2:342

```

      | HA113C3
      | N7:242
      | +GRT-----+
      | |-----+-----+
      | |1/(-----+GREATER THAN +-----+
      | |14 |Source A   C113C3|
      | |   |          1732|
      | |   |Source B   H113C|
      | |   |          2982|
      | |   +-----+
      | |   |N7:47 - (2:284)
      | |   |N10:102 - (2:339)
      | |   +LES-----+
      | | +--LESS THAN +
      | | |Source A   C113C3|
      | | |          1732|
      | | |Source B   L113C|
      | | |          482|
      | | +-----+
      | | N7:47 - (2:284)
      | | N11:12 - (2:339)
      |
  
```

Rung 2:343

```

      | HA113C4
      | N7:242
      | +GRT-----+
      | |-----+-----+
      | |1/(-----+GREATER THAN +-----+
      | |15 |Source A   C113C4|
      | |   |          1730|
      | |   |Source B   H113C|
      | |   |          2982|
      | |   +-----+
      | |   |N7:48 - (2:286)
      | |   |N10:102 - (2:339)
      | |   +LES-----+
      | | +--LESS THAN +
      | | |Source A   C113C4|
      | | |          1730|
      | | |Source B   L113C|
      | | |          482|
      | | +-----+
      | | N7:48 - (2:286)
      | | N11:12 - (2:339)
      |
  
```

Rung 2:344

```

      |
      |
      |-----+-----+
      | DEV_2
      | N20:6
      | (U)
      | 2
  
```

Rung 2:345

| AV2

| 14

| [LBL]-----

DUMMY9

N20:7

()

8

Rung 2:346

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUT:xxx) THEN AVERAGE THE T/C

+CLR-----+

+CLEAR

| Dest COUNT |

| 41 |

+-----+

+CLR-----+

+CLEAR

| Dest TOTAL |

| 3472.000 |

+-----+

Rung 2:347

| HA112A1

| D112A1

| OUT112A1

| N7:241

| N7:149

| N7:247

+ADD-----+

+ADD

| Source A 1 |

| 8

| 8

| 12

| (2:288)

| (2:315)

| Source B COUNT |

| 41 |

| Dest COUNT |

| 41 |

+-----+

| DEV_2

| N20:6

+ADD-----+

+ADD

| Source A C112A1 |

| 1753 |

| Source B TOTAL |

| 3472.000 |

| Dest TOTAL |

| 3472.000 |

+-----+

| 2

| (2:312)

Rung 2:348

| HA112A2

| D112A2

| OUT112A2

| N7:241

| N7:149

| N7:247

+ADD-----+

+ADD

| Source A 1 |

| 9

| 9

| 13

| (2:289)

| (2:316)

| Source B COUNT |

| 41 |

| Dest COUNT |

| 41 |

+-----+

+++

+++

+++

+++

```

+++
|
|
|+ADD-----+
++-+ADD++
|Source A      C112A2|
|              1754|
|Source B      TOTAL|
|              3472.000|
|Dest          TOTAL|
|              3472.000|
|
|-----+

```

+ADD-----+	
+ADD	
Source A	1
Source B	COUNT
Dest	COUNT
	4
	4
+ADD-----+	
+ADD	
Source A	C112A3
	1752
Source B	TOTAL
	3472.000
Dest	TOTAL
	3472.000

+ADD-----+	
+ADD	
Source A	1
Source B	COUNT 4
Dest	COUNT 4
+-----+	
+ADD-----+	
+ADD	
Source A	C112A4
	1749
Source B	TOTAL 3472.000
Dest	TOTAL 3472.000

Rung 2:351

```

+DIV-----+
+DIVIDE
|Source A      TOTAL|
|              3472.000|
|Source B      COUNT|
|              4|
|Dest          AV112A|
|              1752|
+-----+
  
```

Rung 2:352

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

```

+CLR-----+
+CLEAR
|Dest          COUNT|
|              4|
+-----+
+CLR-----+
+--CLEAR
|Dest          TOTAL|
|              3472.000|
+-----+
  
```

Rung 2:353

HA112B1 D112B1 OUT112B1
 N7:241 N7:149 N7:248

1/1 1/1 1/1
 12 12 0
 (2:292) (2:320)

```

+ADD-----+
+ADD
|Source A      1|
|Source B      COUNT|
|              4|
|Dest          COUNT|
|              4|
+-----+
  
```

DEV_2

N20:6

---] [---

2

(2:312)

```

+ADD-----+
+ADD
|Source A      C112B1|
|              1751|
|Source B      TOTAL|
|              3472.000|
|Dest          TOTAL|
|              3472.000|
+-----+
  
```

Rung 2:354			
HA112B2	D112B2	OUT112B2	
N7:241	N7:149	N7:248	
-----] / [-----			+ADD-----+
13	13	1	Source A 1
(2:293)	(2:321)		Source B COUNT
			Dest COUNT
			Dest COUNT
			+-----+
	DEV_2		+ADD-----+
	N20:6		+ADD-----+
	2		Source A C112B2
	(2:312)		Source B 1753
			Source B TOTAL
			Dest 3472.000
			Dest TOTAL
			Dest 3472.000
			+-----+

Rung 2:355			
HA112B3	D112B3	OUT112B3	
N7:241	N7:149	N7:248	
-----] / [-----			+ADD-----+
14	14	2	Source A 1
(2:294)	(2:322)		Source B COUNT
			Dest COUNT
			Dest COUNT
			+-----+
	DEV_2		+ADD-----+
	N20:6		+ADD-----+
	2		Source A C112B3
	(2:312)		Source B 1750
			Source B TOTAL
			Dest 3472.000
			Dest TOTAL
			Dest 3472.000
			+-----+

Rung 2:356

HA112B4 N7:241	D112B4 N7:149	OUT112B4 N7:248	
15 (2:295)	15 (2:323)	3	+ADD-----+ +ADD Source A 1 Source B COUNT Dest COUNT 4 +-----+
	DEV_2 N20:6		+ADD-----+ +ADD Source A C112B4 1748 Source B TOTAL 3472.000 Dest TOTAL 3472.000 +-----+
	2 (2:312)		

Rung 2:357

	+DIV-----+ +DIVIDE Source A TOTAL 3472.000 Source B COUNT 4 Dest AV112B 1751 +-----+

Rung 2:358

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

	+CLR-----+ +CLEAR Dest COUNT 4 +-----+ +CLR-----+ +CLEAR Dest TOTAL 3472.000 +-----+

Rung 2:359

HA112C1 N7:242	D112C1 N7:150	OUT112C1 N7:248	+ADD-----+
1/[	1/[	1/[	+ADD
0	0	4	Source A 1
(2:296)	(2:325)		Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_2 N20:6		+ADD-----+
	2		+ADD
	(2:312)		Source A C112C1
			1746
			Source B TOTAL
			Dest 3472.000
			TOTAL
			3472.000
			+-----+

Rung 2:360

HA112C2 N7:242	D112C2 N7:150	OUT112C2 N7:248	+ADD-----+
1/[	1/[	1/[	+ADD
1	1	5	Source A 1
(2:297)	(2:326)		Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_2 N20:6		+ADD-----+
	2		+ADD
	(2:312)		Source A C112C2
			1749
			Source B TOTAL
			Dest 3472.000
			TOTAL
			3472.000
			+-----+

Rung 2:361

HA112C3 N7:242	D112C3 N7:150	OUT112C3 N7:248	
1/[	1/[	1/[	+ADD-----+
2	2	6	+ADD
(2:298)	(2:327)		Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_2		
	N20:6		+ADD-----+
	2		+ADD
	(2:312)		Source A C112C3
			1746
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:362

HA112C4 N7:242	D112C4 N7:150	OUT112C4 N7:248	
1/[	1/[	1/[	+ADD-----+
3	3	7	+ADD
(2:299)	(2:328)		Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_2		
	N20:6		+ADD-----+
	2		+ADD
	(2:312)		Source A C112C4
			1743
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:363

			+DIV-----+
			+DIVIDE
			Source A TOTAL
			3472.000
			Source B COUNT
			4
			Dest AV112C
			1746
			+-----+

Rung 2:364

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

Rung 2:364		
HA113A1	D113A1	OUT113A1
N7:242	N7:150	N7:248
4	4	8
(2:300)	(2:330)	
	DEV_2	
	N20:6	
	2	
	(2:312)	

+CLR-----+	
CLEAR	
Dest	COUNT
	4
+CLR-----+	
CLEAR	
Dest	TOTAL
	3472.000
+-----+	

Rung 2:365

Rung 2:365		
HA113A1	D113A1	OUT113A1
N7:242	N7:150	N7:248
4	4	8
(2:300)	(2:330)	
	DEV_2	
	N20:6	
	2	
	(2:312)	

+ADD-----+	
ADD	
Source A	1
Source B	COUNT
Dest	COUNT
	4
+ADD-----+	
ADD	
Source A	C113A1
	1725
Source B	TOTAL
	3472.000
Dest	TOTAL
	3472.000
+-----+	

Rung 2:366

Rung 2:366		
HA113A2	D113A2	OUT113A2
N7:242	N7:150	N7:248
5	5	9
(2:301)	(2:331)	

+ADD-----+	
ADD	
Source A	1
Source B	COUNT
Dest	COUNT
	4
+-----+	

```

***                                     ***
|                                     |
| +ADD-----+ |
| -ADD        | -+
| |Source A      C113A2|
| |              1727|
| |Source B      TOTAL|
| |              3472.000|
| |Dest          TOTAL|
| |              3472.000|
| +-----+ |

```

```

+-----+
+ADD-----+
+-----+
|Source A|1|
|Source B|COUNT|
|Dest|COUNT|
+-----+
+-----+
+ADD-----+
+-----+
|Source A|C113A3|
|Source B|1726|
|Dest|TOTAL|
|3472.000|TOTAL|
|3472.000|
+-----+

```

```

+ADD-----+
+--ADD
|Source A          1|
|Source B          COUNT|
|Dest              COUNT|
|                  4|
|                  4|
+-----+

+ADD-----+
+--ADD
|Source A          C113A4|
|                  1724|
|Source B          TOTAL|
|                  3472.000|
|Dest              TOTAL|
|                  3472.000|

```

Rung 2:369

```

+DIV-----+
+DIVIDE
|Source A      TOTAL|
|              3472.000|
|Source B      COUNT|
|              4|
|Dest          AV113A|
|              1726|
+-----+

```

Rung 2:370

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

```

+CLR-----+
+CLEAR
|Dest          COUNT|
|              4|
+-----+
+CLR-----+
+CLEAR
|Dest          TOTAL|
|              3472.000|
+-----+

```

Rung 2:371

HA113B1	D113B1	OUT113B1
N7:242	N7:150	N7:248
8	8	12
(2:304)	(2:335)	
	DEV_2	
	N20:6	
	2	
	(2:312)	

```

+ADD-----+
+ADD
|Source A      1|
|Source B      COUNT|
|              4|
|Dest          COUNT|
|              4|
+-----+
+ADD-----+
+ADD
|Source A      C113B1|
|              1733|
|Source B      TOTAL|
|              3472.000|
|Dest          TOTAL|
|              3472.000|
+-----+

```

Rung 2:372

HA113B2 N7:242	D113B2 N7:150	OUT113B2 N7:248	+ADD-----+
9	9	13	+ADD
(2:305)	(2:336)		Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_2		+ADD-----+
	N20:6		+ADD
	2		Source A C113B2
	(2:312)		1735
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:373

HA113B3 N7:242	D113B3 N7:150	OUT113B3 N7:248	+ADD-----+
10	10	14	+ADD
(2:306)	(2:337)		Source A 1
			Source B COUNT
			4
			Dest COUNT
			4
			+-----+
	DEV_2		+ADD-----+
	N20:6		+ADD
	2		Source A C113B3
	(2:312)		1733
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:374

HA113B4	D113B4	OUT113B4	
N7:242	N7:150	N7:248	
11	11	15	
(2:307)	(2:338)		
	DEV_2		
	N20:6		
	2		
	(2:312)		

+ADD-----+	
Source A	1
Source B	COUNT
Dest	COUNT
	4
+ADD-----+	
+ADD-----+	
Source A	C113B4
	1727
Source B	TOTAL
	3472.000
Dest	TOTAL
	3472.000
+ADD-----+	

Rung 2:375

+DIV-----+	
+DIVIDE	
Source A	TOTAL
	3472.000
Source B	COUNT
	4
Dest	AV113B
	1732
+DIV-----+	

Rung 2:376

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

+CLR-----+	
+CLEAR	
Dest	COUNT
	4
+CLR-----+	
+CLEAR	
Dest	TOTAL
	3472.000
+CLR-----+	

Rung 2:377

HA113C1 N7:242	D113C1 N7:150	OUT113C1 N7:249	
1/1	1/1	1/1	+ADD-----+
12 (2:308)	12 (2:340)	0	Source A 1
			Source B COUNT
			Dest COUNT
			4
			4
			+-----+
	DEV_2		
	N20:6		+ADD-----+
	2		Source A C113C1
	(2:312)		1731
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:378

HA113C2 N7:242	D113C2 N7:150	OUT113C2 N7:249	
1/1	1/1	1/1	+ADD-----+
13 (2:309)	13 (2:341)	1	Source A 1
			Source B COUNT
			Dest COUNT
			4
			4
			+-----+
	DEV_2		
	N20:6		+ADD-----+
	2		Source A C113C2
	(2:312)		1734
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:379			
HA113C3	D113C3	OUT113C3	
N7:242	N7:150	N7:249	
14	14	2	+ADD-----+
(2:310)	(2:342)		+ADD-----+
			Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_2		
	N20:6		+ADD-----+
			+ADD-----+
	2		Source A C113C3
	(2:312)		1732
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:380			
HA113C4	D113C4	OUT113C4	
N7:242	N7:150	N7:249	
15	15	3	+ADD-----+
(2:311)	(2:343)		+ADD-----+
			Source A 1
			Source B COUNT
			4
			Dest COUNT
			4
			+-----+
	DEV_2		
	N20:6		+ADD-----+
			+ADD-----+
	2		Source A C113C4
	(2:312)		1730
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:381			
			+DIV-----+
			+DIVIDE-----+
			Source A TOTAL
			3472.000
			Source B COUNT
			4
			Dest AV113C
			1732
			+-----+

Rung 2:382

IF DEVIATION SET FOR SECTION 2 THEN GO THERE AND CALCULATE DEVIATION

```

| DEV_2
| N20:6
|-----] [-----] (JMP)
| 2
| (2:312)

```

Rung 2:383

IF RATE CALCULATIONS ARE FINISHED THEN GO TO THE PID BLOCK

```
RT_TMR/DN                                PID112A  
T4:62                                     23  
-----] / [------(JMP)-----  
DN  
(2:33)
```

Rung 2:384

RATE CHECKING

```

+MOV-----+
|MOVE|
|Source      AV112A|
|          1752|
|Dest        R1_112A|
|          32767|
+-----+
+SUB-----+
|SUBTRACT|
|Source A    R1_112A|
|          32767|
|Source B    R2_112A|
|          32767|
|Dest        DIF1_112A|
|          10|
+-----+
+MOV-----+
|MOVE|
|Source      R1_112A|
|          32767|
|Dest        R2_112A|
|          32767|
+-----+
+SUB-----+
|SUBTRACT|
|Source A    DIF1_112A|
|          10|
|Source B    DIF2_112A|
|          10|
|Dest        DDIF|
|          1|
+-----+

```

```

+++
|
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE
| |Source A ACC| |Source 100|
| | 828| |
| |Source B 100| |Dest N13:11|
| | | | 100|
| +-----+
| N20:0 - (2:190)
| +LES-----+ +MOV-----+
| +LESS THAN +MOVE
| |Source A ACC| |Source 1|
| | 828| |
| |Source B 1| |Dest N13:11|
| | | | 100|
| +-----+
| N20:0 - (2:190)
| +LIM-----+ +MOV-----+
| +LIMIT TEST +MOVE
| |Low Lim 1| |Source ACC|
| | | | 828|
| |Test ACC| |Dest N13:11|
| | 828| | 100|
| |High Lim 100| +-----+
| +-----+
| N20:0 - (2:190)

```

Rung 2:385

| PID112A

| 23

| [LBL]

DUMMY22

N20:8

()

5

Rung 2:386

DETECT FROM SCADA PID ON/OFF

IF PID OFF

THEN ZERO PW FOR ZERO OUTPUT AT SCR

AND JUMP AROUND THE PID BLOCK

```

| ON_112A
| N7:239
| ---J/[-----+ +CLR-----+
| 9 +CLEAR
| (2:824) | |Dest PW112A|
| | | 01|
| +-----+
| 82
| +---(JMP)-----+

```

Rung 2:387

DETECT AUTO/MANUAL FROM SCADA

SET APPROPRIATE MODE IN PID BLOCK

```

| AM112A
| N7:118
| ---J/[-----+
| 12
| (3:23)

```

PID112A/1

N13:0

()

1

Rung 2:388

DETECT SETPOINT VALUE FROM SCADA
 PUT VALUE IN PID BLOCK

```

+MOV-----+
+MOVE
|Source      SET112A|
|           1779|
|Dest       PIDSP112A|
|           1779|
+-----+
  
```

Rung 2:389

```

+PID-----+
+PID
|Control Block  PID112A|
|Process Variable AV112A|
|Control Variable CV112A|
|Control Block Length 23|
+-----+
+SCL-----+
+SCALE
|Source      CV112A|
|           0|
|Rate [ /10000] 15|
|Offset      0|
|Dest       PW112A|
|           0|
+-----+
+CLR-----+
+CLEAR
|Dest       S:5|
|           0|
+-----+
  
```

Rung 2:390

```

| 82
|---[LBL]-----+-----+-----+-----+-----+-----+-----+
|                                                    N9:20
|                                                    ( )
|                                                    15
  
```

Rung 2:391

```

| RT_TMR/DN
| T4:62
|---1/[-----+-----+-----+-----+-----+-----+-----+
| DN
| (2:33)
|                                                    PID112B
|                                                    24
|                                                    (JMP)
  
```

Rung 2:392

RATE CHECKING

```

+MOV-----+
+MOVE
|Source      AV112B|
|           1751|
|Dest       R1_112B|
|           1751|
+-----+
  
```

+++

+++

```

+-----+
+SUB-----+
+SUBTRACT-----+
|Source A      R1_112B|
|              1751|
|Source B      R2_112B|
|              1751|
|Dest          DIF1_112B|
|              101|
+-----+
+MOV-----+
+MOVE-----+
|Source        R1_112B|
|              1751|
|Dest          R2_112B|
|              1751|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A      DIF1_112B|
|              101|
|Source B      DIF2_112B|
|              101|
|Dest          DDIF1|
|              11|
+-----+
+MOV-----+
+MOVE-----+
|Source        DIF1_112B|
|              101|
|Dest          DIF2_112B|
|              101|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A      DIF1_112B|
|              101|
|Source B      91|
|Dest          DIF1_112B|
|              101|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A      DIF1_112B|
|              101|
|Source B      DIF1_112B|
|              101|
|Dest          ACC1|
|              8281|
+-----+

```



```

+++
+-----+
+MUL-----+
+MULTIPLY
|Source A DIF1_112B|
|          10|
|Source B      ACC|
|          828|
|Dest         ACC|
|          828|
+-----+
+CLR-----+
+CLEAR
|Dest          S:5|
|              0|
+-----+
+MUL-----+
+MULTIPLY
|Source A      DDIF|
|          1|
|Source B      DDIF|
|          1|
|Dest         ACC1|
|          -728|
+-----+
+MUL-----+
+MULTIPLY
|Source A      DDIF|
|          1|
|Source B      ACC1|
|          -728|
|Dest         ACC1|
|          -728|
+-----+
+CLR-----+
+CLEAR
|Dest          S:5|
|              0|
+-----+
SCRATCH
N20:12
+-----+
+EQU-----+
+EQUAL
|Source A      ACC|
|          828|
|Source B      0|
|              |
+-----+
N20:0 - (2:190)
+-----+
+EQU-----+
+SUB-----+
+SUBTRACT
|Source A      ACC|
|          828|
|Source B      1|
|              |
+-----+
|Dest         ACC|
|          828|
N20:0 - (2:190)
+-----+
+++

```

```

***
|
|                                     +ADD-----+
|-----+ADD                         +--+
|                                     |Source A      ACC|
|                                     |828|
|                                     |Source B      ACC|
|                                     |-728|
|                                     |Dest          ACC|
|                                     |-728|
|-----+
|                                     +SUB-----+
|-----+SUBTRACT                     +--+
|                                     |Source A      N13:41|
|                                     |100|
|                                     |Source B      ACC|
|                                     |-728|
|                                     |Dest          ACC|
|                                     |828|
|-----+
|+GRT-----+ +MOV-----+
|+GREATER THAN +--MOVE                     +--+
| |Source A      ACC| |Source      100|
| |828|
| |Source B      100| |Dest        N13:41|
| |100|
|-----+
| N20:0 - (2:190)
|
|+LES-----+ +MOV-----+
|+LESS THAN   +--MOVE                     +--+
| |Source A      ACC| |Source      1|
| |828|
| |Source B      1| |Dest        N13:41|
| |1|
|-----+
| N20:0 - (2:190)
|
|+LIM-----+ +MOV-----+
|+LIMIT TEST  +--MOVE                     +--+
| |Low Lim      1| |Source      ACC|
| |828|
| |Test          ACC| |Dest        N13:41|
| |828|
| |High Lim     100|
|-----+
| N20:0 - (2:190)

```

Rung 2:393
PID112B

24

[LBL]

DUMMY23

N20:8

()

6

Rung 2:394

DETECT FROM SCADA PID ON/OFF
 IF PID OFF
 THEN ZERO PW FOR ZERO OUTPUT AT SCR
 AND JUMP AROUND THE PID BLOCK

ON_112B		+CLR-----+
N7:239		+CLEAR-----+
1/[		Dest PW112B
10		0
(2:824)		+-----+
		62
		+--(JMP)-----+

Rung 2:395

DETECT AUTO/MANUAL FROM SCADA
 SET APPROPRIATE MODE IN PID BLOCK

AM112B		PID112B/1
N7:118		N13:30
1/[		()
14		1
(3:23)		

Rung 2:396

DETECT SETPOINT VALUE FROM SCADA
 PUT VALUE IN PID BLOCK

		+MOV-----+
		+MOVE-----+
		Source SET112B
		0
		Dest FIDSP112B
		0
		+-----+

Rung 2:397

		+PID-----+
		+PID-----+
		Control Block PID112B
		Process Variable AV112B
		Control Variable CV112B
		Control Block Length 23
		+-----+
		+SCL-----+
		+SCALE-----+
		Source CV112B
		0
		Rate [1/10000] 15
		Offset 0
		Dest PW112B
		0
		+-----+
		+CLR-----+
		+CLEAR-----+
		Dest S:5
		0
		+-----+

```

1 62 N20:10
|--[LBL]----- ( )
1 0

```

```

PID112C
| RT_TMR/DN
| T4:62
|-----] / [-----
| DN
| (2:33)

```

```

+MOV-----+
+MOVE-----+
|Source      AV112C|
|              1746|
|Dest        R1_112C|
|              1746|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A     R1_112C|
|              1746|
|Source B     R2_112C|
|              1746|
|Dest        DIF1_112C|
|              101|
+-----+
+MOV-----+
+MOVE-----+
|Source      R1_112C|
|              1746|
|Dest        R2_112C|
|              1746|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A     DIF1_112C|
|              101|
|Source B     DIF2_112C|
|              101|
|Dest        DDIF1|
|              11|
+-----+
+MOV-----+
+MOVE-----+
|Source      DIF1_112C|
|              101|
|Dest        DIF2_112C|
|              101|
+-----+

```

```

+++
+-----+
+SUB-----+
+SUBTRACT      +-+
|Source A DIF1_112C|
|               101|
|Source B       91|
|               101|
|Dest    DIF1_112C|
|               101|
+-----+
+MUL-----+
+MULTIPLY      +-+
|Source A DIF1_112C|
|               101|
|Source B DIF1_112C|
|               101|
|Dest          ACC1|
|             8281|
+-----+
+MUL-----+
+MULTIPLY      +-+
|Source A DIF1_112C|
|               101|
|Source B       ACC1|
|             8281|
|Dest          ACC1|
|             8281|
+-----+
+CLR-----+
+CLEAR         +-+
|Dest          S:51|
|              01|
+-----+
+MUL-----+
+MULTIPLY      +-+
|Source A       DDIF1|
|              11|
|Source B       DDIF1|
|              11|
|Dest          ACC11|
|            -7281|
+-----+
+MUL-----+
+MULTIPLY      +-+
|Source A       DDIF1|
|              11|
|Source B       ACC11|
|            -7281|
|Dest          ACC11|
|            -7281|
+-----+
+CLR-----+
+CLEAR         +-+
|Dest          S:51|
|              01|
+-----+
+++

```

```

+++
|
|                                     SCRATCH
| +EQU-----+ N20:12
| +EQU-----+-----+
| |Source A      ACC|      0
| |              828|
| |Source B      0|
| |
| +-----+
| N20:0 - (2:190)
| +EQU-----+ +SUB-----+
| +EQU-----+ +SUBTRACT-----+
| |Source A      ACC| |Source A      ACC|
| |              828| |              828|
| |Source B      1| |Source B      1|
| |
| +-----+ |Dest      ACC|
| N20:0 - (2:190) |              828|
| +-----+
|
| SCRATCH
| N20:12
| ] [-----+
| 0 |Source A      ACC|
| (2:190) |              828|
|          |Source B      1|
|          |
|          |Dest      ACC|
|          |              828|
|          +-----+
|
|          +ADD-----+
|          +ADD-----+
|          |Source A      ACC|
|          |              828|
|          |Source B      ACC|
|          |              -728|
|          |Dest      ACC|
|          |              -728|
|          +-----+
|
|          +SUB-----+
|          +SUBTRACT-----+
|          |Source A      N13:71|
|          |              100|
|          |Source B      ACC|
|          |              -728|
|          |Dest      ACC|
|          |              828|
|          +-----+
|
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE-----+
| |Source A      ACC| |Source      100|
| |              828| |
| |Source B      100| |Dest      N13:71|
| |              | |              100|
| +-----+
| N20:0 - (2:190)
|
+++

```

```

***
|
| +LES-----+ +MOV-----+
| +-+LESS THAN +-+MOVE +-+
| |Source A ACC| |Source 1|
| | 828| |
| |Source B 1| |Dest N13:71|
| | | | 100|
| +-----+
| N20:0 - (2:190)
| +LIM-----+ +MOV-----+
| +-+LIMIT TEST +-+MOVE +-+
| |Low Lim 1| |Source ACC|
| | 828| |
| |Test ACC| |Dest N13:71|
| | 828| | 100|
| |High Lim 100| +-----+
|
| N20:0 - (2:190)

```

Rung 2:401
PID112C

```

| 25 DUMMY24
| [LBL] N20:8
|-----|
| 7

```

Rung 2:402

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

```

| ON_112C
| N7:239
| |-----| +CLR-----+
| | | | +CLEAR +-+
| | 11 | |Dest PW112C|
| | (2:824) | | 0|
| | | | +-----+
| | 63
| | [JMP]-----+

```

Rung 2:403

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

```

| AM112C PID112C/1
| N7:119 N13:60
| |-----| ( )
| | 0 |
| | (3:24) 1

```

Rung 2:404

DETECT SETPOINT VALUE FROM SCADA
 PUT VALUE IN PID BLOCK

```

+MOV-----+
+MOVE-----+
|Source      SET112C|
|            01|
|Dest        PIDSP112C|
|            01|
+-----+

```

Rung 2:405

```

+PID-----+
+PID-----+
|Control Block  PID112C|
|Process Variable AV112C|
|Control Variable CV112C|
|Control Block Length 23|
+-----+
+SCL-----+
+SCALE-----+
|Source          CV112C|
|                01|
|Rate [/10000]    15|
|Offset           01|
|Dest            PW112C|
|                01|
+-----+
+CLR-----+
+CLEAR-----+
|Dest            S:5|
|                01|
+-----+

```

Rung 2:406

```

63
--[LBL]-----N20:10
|                ( )
|                1

```

Rung 2:407

```

| RT_TMR/DN PID113A
| T4:62 26
|---] / [----- (JMP)
| DN
| (2:33)

```

Rung 2:408

RATE CHECKING

```

+MOV-----+
+MOVE-----+
|Source          AV113A|
|                1726|
|Dest            R1_113A|
|                1725|
+-----+

```

+++

+++

+++

```

+++
+-----+
+MUL-----+
+MULTIPLY   +
|Source A DIF1_113A|
|              10|
|Source B      ACC|
|              828|
|Dest          ACC|
|              828|
+-----+
+CLR-----+
+CLEAR      +
|Dest              S:5|
|                  0|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A      DDIF|
|              1|
|Source B      DDIF|
|              1|
|Dest          ACC1|
|              -728|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A      DDIF|
|              1|
|Source B      ACC1|
|              -728|
|Dest          ACC1|
|              -728|
+-----+
+CLR-----+
+CLEAR      +
|Dest              S:5|
|                  0|
+-----+
SCRATCH
N20:12
+-----+
+EQU-----+
+EQUAL      +
|Source A      ACC|
|              828|
|Source B      0|
|              |
+-----+
N20:0 - (2:190)
+-----+
+SUB-----+
+SUBTRACT   +
|Source A      ACC|
|              828|
|Source B      1|
|              |
+-----+
|Dest          ACC|
|              828|
N20:0 - (2:190)
+-----+
+++

```

```

+++
| SCRATCH
| N20:12
|-----+ADD-----+
| 1 [-----+ADD-----+
| 0 |Source A ACC|
| (2:190) |Source B 1|
| |Dest ACC|
| | 828|
|-----+
|
|-----+ADD-----+
| |Source A ACC|
| | 828|
| |Source B ACC|
| | -728|
| |Dest ACC|
| | -728|
|-----+
|
|-----+SUB-----+
| |Source A N13:101|
| | 100|
| |Source B ACC|
| | -728|
| |Dest ACC|
| | 828|
|-----+
|
|-----+GRT-----+
| |Source A ACC|
| | 828|
| |Source B 100|
| |Dest N13:101|
| | 100|
|-----+
|
| N20:0 - (2:190)
|-----+LES-----+
| |Source A ACC|
| | 828|
| |Source B 1|
| |Dest N13:101|
| | 100|
|-----+
|
| N20:0 - (2:190)
|-----+LIM-----+
| |Low Lim 1|
| |Test ACC|
| | 828|
| |High Lim 100|
|-----+
|
| N20:0 - (2:190)

```

Rung 2:409

| PID113A

| 26

DUMMY25

N20:8

| [LBL]

()

8

Rung 2:410

DETECT FROM SCADA PID ON/OFF

IF PID OFF

THEN ZERO PW FOR ZERO OUTPUT AT SCR

AND JUMP AROUND THE PID BLOCK

| ON_113A

| N7:239

| 12

| (2:826)

+CLR-----+

+CLEAR-----+

|Dest PW113A|

| 0|

+-----+

| 64|

+-(JMP)-----+

Rung 2:411

DETECT AUTO/MANUAL FROM SCADA

SET APPROPRIATE MODE IN PID BLOCK

| AM113A

| N7:119

| 2

| (3:24)

PID113A/1

N13:90

()

1

Rung 2:412

DETECT SETPOINT VALUE FROM SCADA

PUT VALUE IN PID BLOCK

|

+MOV-----+

|

+MOVE-----+

|

|Source SET113A|

|

| 0|

|

|Dest PIDSP113A|

|

| 0|

|

+-----+

Rung 2:413

|

+PID-----+

|

+PID-----+

|

|Control Block PID113A|

|

|Process Variable AV113A|

|

|Control Variable CV113A|

|

|Control Block Length 23|

|

+-----+

+++

+++

```

+++
| +SCL-----+
| +SCALE-----+
| |Source      CV113A|
| |           01|
| |Rate [/10000] 15|
| |           01|
| |Offset      01|
| |Dest        PW113A|
| |           01|
| +-----+
| +CLR-----+
| +CLEAR-----+
| |Dest        S:5|
| |           01|
| +-----+
  
```

Rung 2:414

```

| 64
| --[LBL]----- N20:10
|                                     ( )
|                                     2
  
```

Rung 2:415

```

|
| RT_TMR/DN PID113B
| T4:62
| ---1/[----- 27
| DN (JMP)
| (2:33)
  
```

Rung 2:416

RATE CHECKING

```

|-----+
| +MOV-----+
| +MOVE-----+
| |Source      AV113B|
| |           1732|
| |Dest        R1_113B|
| |           1733|
| +-----+
| +SUB-----+
| +SUBTRACT-----+
| |Source A    R1_113B|
| |           1733|
| |Source B    R2_113B|
| |           1733|
| |Dest        DIF1_113B|
| |           10|
| +-----+
| +MOV-----+
| +MOVE-----+
| |Source      R1_113B|
| |           1733|
| |Dest        R2_113B|
| |           1733|
| +-----+
+++
  
```

```

+-----+
+SUB-----+
+SUBTRACT
|Source A DIF1_113B|
|10|
|Source B DIF2_113B|
|10|
|Dest DDIF|
|1|
+-----+
+MOV-----+
+MOVE
|Source DIF1_113B|
|10|
|Dest DIF2_113B|
|10|
+-----+
+SUB-----+
+SUBTRACT
|Source A DIF1_113B|
|10|
|Source B 9|
|Dest DIF1_113B|
|10|
+-----+
+MUL-----+
+MULTIPLY
|Source A DIF1_113B|
|10|
|Source B DIF1_113B|
|10|
|Dest ACC|
|828|
+-----+
+MUL-----+
+MULTIPLY
|Source A DIF1_113B|
|10|
|Source B ACC|
|828|
|Dest ACC|
|828|
+-----+
+CLR-----+
+CLEAR
|Dest S:5|
|0|
+-----+
+MUL-----+
+MULTIPLY
|Source A DDIF|
|1|
|Source B DDIF|
|1|
|Dest ACC1|
|-728|
+-----+
+-----+

```



```

++
+-----+
+SUB-----+
+SUBTRACT  +--+
|Source A  N13:131|
|          100|
|Source B   ACC1|
|          -728|
|Dest       ACC1|
|          828|
+-----+
+GRT-----+ +MOV-----+
+GREATER THAN +--MOVE +--+
|Source A     ACC1| |Source      100|
|          828| |          |
|Source B     100| |Dest       N13:131|
|          | |          100|
+-----+
N20:0 - (2:190)
+LES-----+ +MOV-----+
+LESS THAN  +--MOVE +--+
|Source A     ACC1| |Source      1|
|          828| |          |
|Source B     1| |Dest       N13:131|
|          | |          100|
+-----+
N20:0 - (2:190)
+LIM-----+ +MOV-----+
+LIMIT TEST +--MOVE +--+
|Low Lim      1| |Source      ACC1|
|          | |          828|
|Test         ACC1| |Dest       N13:131|
|          828| |          100|
|High Lim     100|
+-----+
N20:0 - (2:190)

```

Rung 2:417

| PID113B

| 27

-----[LBL]----- () 9

Rung 2:418

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

| ON_113B
| N7:239
| 13
| (2:826)

```

+-----+
+CLR-----+
+CLEAR +--+
|Dest   PW113B|
|          0|
+-----+
| 65|
+--(JMP)-----+

```


Rung 2:419

DETECT AUTO/MANUAL FROM SCADA
 SET APPROPRIATE MODE IN PID BLOCK

	AM113B	FID113B/1
	N7:119	N13:120
	1/[	()
	4	1
	(3:24)	

Rung 2:420

DETECT SETPOINT VALUE FROM SCADA
 PUT VALUE IN PID BLOCK

		+MOV-----+
		+MOVE-----+
	Source	SET113B
		0
	Dest	PIDSP113B
		0
		+-----+

Rung 2:421

		+PID-----+
		+PID-----+
	Control Block	PID113B
	Process Variable	AV113B
	Control Variable	CV113B
	Control Block Length	23
		+-----+
		+SCL-----+
		+SCALE-----+
	Source	CV113B
		0
	Rate [1/10000]	15
	Offset	0
	Dest	PW113B
		0
		+-----+
		+CLR-----+
		+CLEAR-----+
	Dest	S:5
		0
		+-----+

Rung 2:422

	65	N20:10
	[LBL]	()
		3

Rung 2:423

		PID113C
	RT_TMR/DN	
	T4:62	28
	1/[	(JMP)
	DN	
	(2:33)	

Rung 2:424

| RT_TMR/DN

DNR_2

| T4:62

N20:5

|] [

(L)

| DN

6

| (2:33)

Rung 2:425

RATE CHECKING

```

+MOV-----+
+MOVE-----+
|Source      AV113C|
|            1732|
|Dest        R1_113C|
|            1732|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A     R1_113C|
|            1732|
|Source B     R2_113C|
|            1732|
|Dest         DIF1_113C|
|            10|
+-----+
+MOV-----+
+MOVE-----+
|Source      R1_113C|
|            1732|
|Dest        R2_113C|
|            1732|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A     DIF1_113C|
|            10|
|Source B     DIF2_113C|
|            10|
|Dest         DDIF|
|            1|
+-----+
+MOV-----+
+MOVE-----+
|Source      DIF1_113C|
|            10|
|Dest        DIF2_113C|
|            10|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A     DIF1_113C|
|            10|
|Source B          9|
|Dest         DIF1_113C|
|            10|
+-----+

```

+++

+++

```

+++
+-----+
+MUL-----+
+MULTIPLY  +
|Source A DIF1_113C|
|101|
|Source B DIF1_113C|
|101|
|Dest      ACC|
|828|
+-----+
+MUL-----+
+MULTIPLY  +
|Source A DIF1_113C|
|101|
|Source B      ACC|
|828|
|Dest          ACC|
|828|
+-----+
+CLR-----+
+CLEAR     +
|Dest      S:5|
|0|
+-----+
+MUL-----+
+MULTIPLY  +
|Source A      DDIF|
|1|
|Source B      DDIF|
|1|
|Dest          ACC1|
|-728|
+-----+
+MUL-----+
+MULTIPLY  +
|Source A      DDIF|
|1|
|Source B      ACC1|
|-728|
|Dest          ACC1|
|-728|
+-----+
+CLR-----+
+CLEAR     +
|Dest      S:5|
|0|
+-----+
+SCRATCH   +
+-----+
+EQU-----+
+EQUAL     +
|Source A      ACC|
|828|
|Source B      0|
+-----+
N20:0 - (2:190)

```



```

+++
| +LIM-----+ +MOV-----+
| +--LIMIT TEST +--MOVE +--
| |Low Lim      | |Source      ACC|
| |             | |           828|
| |Test         ACC| |Dest      N13:161|
| |             828| |           100|
| |High Lim     100| +-----+
| |             |
| +-----+
N20:0 - (2:190)

```

Rung 2:426
PID113C

DUMMY27
N20:8

```

| 28
| [LBL]----- ( )
|
| 10

```

Rung 2:427

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

```

| ON_113C
| N7:239
| /|-----+
| 14 +--CLR-----+
| (2:826) | +--CLEAR +--
|         | |Dest      PW113C|
|         | |           01 |
|         | +-----+
|         | NOT END
|         | 6
|         +--(JMP)-----+

```

Rung 2:428

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

```

| AM113C
| N7:119
| /|----- PID113C/1
| 6 N13:150
| (3:24) |
|
| 1

```

Rung 2:429

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

```

| +MOV-----+
| +--MOVE +--
| |Source      SET113C|
| |           01 |
| |Dest      PIDSP113C|
| |           01 |
| +-----+

```

Rung 2:430

+PID-----+	
PID	
Control Block PID113C	
Process Variable AV113C	
Control Variable CV113C	
Control Block Length 23	
+-----+	
+SCL-----+	
+SCALE-----+	
Source CV113C	
Rate (/10000) 15	
Offset 0	
Dest PW113C	
CLR 0	
+-----+	
+CLEAR-----+	
Dest S:5	
0	
+-----+	

Rung 2:431

NOT END	
6	
(JMP)-----	

Rung 2:432

 BEGIN SECTION 3
 MD3
 3 DUMMY14
 [LBL]-----N20:7
 13

Rung 2:433

DN_3	
N20:5	
(L)-----	
3	

Rung 2:434

SECTION 3 SUBROUTINE 7

PIPE ZONE	
+ADD-----+	
+ADD	
Source A	TC119A
Source B	691
Dest	1000
Dest	C119A
	1691
+-----+	

Rung 2:435			
	PIPE ZONE		PIPE ZONE
	+GRT-----+		+MOV-----+
	---GREATER THAN		---MOVE
	Source A C119A		Source 16383
	1691		
	Source B 16383		Dest C119A
			1691
	+-----+		+-----+
	N7:49 - (2:434)		

Rung 2:436			
			+ADD-----+
			+ADD
			Source A TC119B
			710
			Source B 1000
			Dest C119B
			1710
			+-----+

Rung 2:437			
	+GRT-----+		+MOV-----+
	---GREATER THAN		---MOVE
	Source A C119B		Source 16383
	1710		
	Source B 16383		Dest C119B
			1710
	+-----+		+-----+
	N7:50 - (2:436)		

Rung 2:438			
			+ADD-----+
			+ADD
			Source A TC119C
			704
			Source B 1000
			Dest C119C
			1704
			+-----+

Rung 2:439			
	+GRT-----+		+MOV-----+
	---GREATER THAN		---MOVE
	Source A C119C		Source 16383
	1704		
	Source B 16383		Dest C119C
			1704
	+-----+		+-----+
	N7:51 - (2:438)		

Rung 2:440

			+ADD-----+
			+ADD
		Source A	TC120A
			709
		Source B	1000
		Dest	C120A
			1709
			+-----+

Rung 2:441

	+GRT-----+		+MOV-----+	
	--GREATER THAN		MOVE	
	Source A	C120A	Source	16383
		1709		
	Source B	16383	Dest	C120A
				1709
				+-----+
	N7:52 - (2:440)			

Rung 2:442

			+ADD-----+
			+ADD
		Source A	TC120B
			722
		Source B	1000
		Dest	C120B
			1722
			+-----+

Rung 2:443

	+GRT-----+		+MOV-----+	
	--GREATER THAN		MOVE	
	Source A	C120B	Source	16383
		1722		
	Source B	16383	Dest	C120B
				1722
				+-----+
	N7:53 - (2:442)			

Rung 2:444

			+ADD-----+
			+ADD
		Source A	TC120C
			730
		Source B	1000
		Dest	C120C
			1730
			+-----+

Rung 2:445

+GRT-----+	+MOV-----+
~+GREATER THAN	MOVE
Source A C120C	Source 16383
1730	1730
Source B 16383	Dest C120C
1730	1730
+-----+	+-----+

| N7:54 - (2:444)

Rung 2:446

	+ADD-----+
	ADD
	Source A TC121A
	724
	Source B 1000
	1000
	Dest C121A
	1724
	+-----+

Rung 2:447

+GRT-----+	+MOV-----+
~+GREATER THAN	MOVE
Source A C121A	Source 16383
1724	16383
Source B 16383	Dest C121A
1724	1724
+-----+	+-----+

| N7:55 - (2:446)

Rung 2:448

	+ADD-----+
	ADD
	Source A TC121B
	726
	Source B 1000
	1000
	Dest C121B
	1726
	+-----+

Rung 2:449

+GRT-----+	+MOV-----+
~+GREATER THAN	MOVE
Source A C121B	Source 16383
1726	16383
Source B 16383	Dest C121B
1726	1726
+-----+	+-----+

| N7:56 - (2:448)

Rung 2:450

	+ADD-----+
	+ADD-----+
	Source A TC121C
	731
	Source B 1000
	Dest C121C
	1731
	+-----+

Rung 2:451

	+GRT-----+		+MOV-----+
	+GREATER THAN-----+		+MOVE-----+
	Source A C121C		Source 16383
	1731		
	Source B 16383		Dest C121C
			1731
	+-----+		+-----+
	N7:57 - (2:450)		

Rung 2:452

	+ADD-----+
	+ADD-----+
	Source A TC122A
	735
	Source B 1000
	Dest C122A
	1735
	+-----+

Rung 2:453

	+GRT-----+		+MOV-----+
	+GREATER THAN-----+		+MOVE-----+
	Source A C122A		Source 16383
	1735		
	Source B 16383		Dest C122A
			1735
	+-----+		+-----+
	N7:58 - (2:452)		

Rung 2:454

	+ADD-----+
	+ADD-----+
	Source A TC122B
	737
	Source B 1000
	Dest C122B
	1737
	+-----+

Rung 2:455

```
| +GRT-----+  
| --GREATER THAN  
| |Source A      C122B|  
| |              1737|  
| |Source B      16383|  
| |              |  
| +-----+  
| N7:59 - (2:454)
```

```
+MOV-----+  
+MOVE  
|Source      16383|  
|              |  
|Dest        C122B|  
|              1737|  
+-----+
```

Rung 2:456

```
|  
| +-----+  
|  
|  
|  
|  
|  
|  
|  
|
```

```
+ADD-----+  
+ADD  
|Source A      TC122C|  
|              735|  
|Source B      1000|  
|              |  
|Dest          C122C|  
|              1735|  
+-----+
```

Rung 2:457

```
| +GRT-----+  
| --GREATER THAN  
| |Source A      C122C|  
| |              1735|  
| |Source B      16383|  
| |              |  
| +-----+  
| N7:60 - (2:456)
```

```
+MOV-----+  
+MOVE  
|Source      16383|  
|              |  
|Dest        C122C|  
|              1735|  
+-----+
```

Rung 2:458

```
|  
| +-----+  
|  
|  
|  
|  
|  
|  
|  
|
```

```
+ADD-----+  
+ADD  
|Source A      TC123A|  
|              736|  
|Source B      1000|  
|              |  
|Dest          C123A|  
|              1736|  
+-----+
```

Rung 2:459

```
| +GRT-----+  
| --GREATER THAN  
| |Source A      C123A|  
| |              1736|  
| |Source B      16383|  
| |              |  
| +-----+  
| N7:61 - (2:458)
```

```
+MOV-----+  
+MOVE  
|Source      16383|  
|              |  
|Dest        C123A|  
|              1736|  
+-----+
```

Rung 2:460

	+ADD-----+
	+ADD-----+
	Source A TC123B
	740
	Source B 1000
	Dest C123B
	1740
	+-----+

Rung 2:461

	+GRT-----+		+MOV-----+
	+GREATER THAN-----+		+MOVE-----+
	Source A C123B		Source 16383
	1740		
	Source B 16383		Dest C123B
			1740
	+-----+		+-----+
	N7:62 - (2:460)		

Rung 2:462

	+ADD-----+
	+ADD-----+
	Source A TC123C
	744
	Source B 1000
	Dest C123C
	1744
	+-----+

Rung 2:463

	+GRT-----+		+MOV-----+
	+GREATER THAN-----+		+MOVE-----+
	Source A C123C		Source 16383
	1744		
	Source B 16383		Dest C123C
			1744
	+-----+		+-----+
	N7:63 - (2:462)		

Rung 2:464

	+ADD-----+
	+ADD-----+
	Source A TC124A
	755
	Source B 1000
	Dest C124A
	1755
	+-----+

Rung 2:465

*GRT-----+	*MOV-----+
--GREATER THAN	MOVE
Source A C124A	Source 16383
1755	1755
Source B 16383	Dest C124A
1755	1755
+-----+	+-----+
N7:64 - (2:464)	

Rung 2:466

	*ADD-----+
	ADD
	Source A TC124B
	745
	Source B 1000
	1000
	Dest C124B
	1745
	+-----+

Rung 2:467

*GRT-----+	*MOV-----+
--GREATER THAN	MOVE
Source A C124B	Source 16383
1745	1745
Source B 16383	Dest C124B
1745	1745
+-----+	+-----+
N7:65 - (2:466)	

Rung 2:468

	*ADD-----+
	ADD
	Source A TC125A
	737
	Source B 1000
	1000
	Dest C125A
	1737
	+-----+

Rung 2:469

*GRT-----+	*MOV-----+
--GREATER THAN	MOVE
Source A C125A	Source 16383
1737	1737
Source B 16383	Dest C125A
1737	1737
+-----+	+-----+
N7:66 - (2:468)	

Rung 2:470

		+ADD-----+
		+ADD-----+
	Source A	TC125B
		735
	Source B	1000
	Dest	C125B
		1735
		+-----+

Rung 2:471

	+GRT-----+	+MOV-----+
	+GREATER THAN	+MOVE-----+
	Source A	C125B
		1735
	Source B	16383
	Dest	C125B
		1735
		+-----+

N7:67 - (2:470)

Rung 2:472

 For each T/C read its STATUS BITS to detect T/C problems
 HARDWARE ALARMS FOR TANK T-3002

	T/C ENABLE		HA119A
	I:15		N7:243
	/ -----		()
	75		0
	OPEN T/C		
	I:15		
	+-----		
	76		
	LO LIMIT		
	I:15		
	+-----		
	77		
	HI LIMIT		
	I:15		
	+-----		
	78		
	CNFG ERROR		
	I:15		
	+-----		
	79		

Rung 2:473

	T/C ENABLE		HA119B
	I:15		N7:243
	/ -----		()
	91		1
	***	***	

```

+++
| OPEN T/C |
| I:15 |
|-----|
| 92 |
| LO LIMIT |
| I:15 |
|-----|
| 93 |
| HI LIMIT |
| I:15 |
|-----|
| 94 |
| CNFG ERROR |
| I:15 |
|-----|
| 95 |

```

Rung 2:474

```

| T/C ENABLE |
| I:15 |
|-----|
| 107 |
| OPEN T/C |
| I:15 |
|-----|
| 108 |
| LO LIMIT |
| I:15 |
|-----|
| 109 |
| HI LIMIT |
| I:15 |
|-----|
| 110 |
| CNFG ERROR |
| I:15 |
|-----|
| 111 |

```

HA119C
N7:243
()
2

Rung 2:475

```

| T/C ENABLE |
| I:15 |
|-----|
| 123 |
| OPEN T/C |
| I:15 |
|-----|
| 124 |

```

HA120A
N7:243
()
3

```

+++

```

```

+++
| LO LIMIT |
| I:15 |
| +-----+
| 125 |
| HI LIMIT |
| I:15 |
| +-----+
| 126 |
| CNFG ERROR |
| I:15 |
| +-----+
| 127 |

```

Rung 2:476

```

| T/C ENABLE |
| I:16 |
| +-----+
| 75 |
| OPEN T/C |
| I:16 |
| +-----+
| 76 |
| LO LIMIT |
| I:16 |
| +-----+
| 77 |
| HI LIMIT |
| I:16 |
| +-----+
| 78 |
| CNFG ERROR |
| I:16 |
| +-----+
| 79 |

```

HA120B
 N7:243
 4

Rung 2:477

```

| T/C ENABLE |
| I:16 |
| +-----+
| 91 |
| OPEN T/C |
| I:16 |
| +-----+
| 92 |

```

HA120C
 N7:243
 5


```

+++
|  | LO LIMIT  |
|  | I:16      |
|  |-----|
|  | 125      |
|  | HI LIMIT  |
|  | I:16      |
|  |-----|
|  | 126      |
|  | CNFG ERROR|
|  | I:16      |
|  |-----|
|  | 127      |

```

Rung 2:480

```

|  | T/C ENABLE
|
|  | I:17
|  |-----|
|  | 75
|  | OPEN T/C
|  | I:17
|  |-----|
|  | 76
|  | LO LIMIT
|  | I:17
|  |-----|
|  | 77
|  | HI LIMIT
|  | I:17
|  |-----|
|  | 78
|  | CNFG ERROR
|  | I:17
|  |-----|
|  | 79

```

HA121C
 N7:243
 8

Rung 2:481

```

|  | T/C ENABLE
|
|  | I:17
|  |-----|
|  | 91
|  | OPEN T/C
|  | I:17
|  |-----|
|  | 92

```

HA122A
 N7:243
 9

```

+++
| |
| | LO LIMIT | |
| | I:17 |
| |-----| |
| | 93 |
| | HI LIMIT |
| | I:17 |
| |-----| |
| | 94 |
| | CNFG ERROR |
| |
| | I:17 | |
| |-----| |
| | 95 |
| |

```

Rung 2:482

```

| |
| | T/C ENABLE |
| |
| | I:17 | |
| |-----| |
| | 107 |
| | OPEN T/C |
| | I:17 |
| |-----| |
| | 108 |
| | LO LIMIT |
| | I:17 |
| |-----| |
| | 109 |
| | HI LIMIT |
| | I:17 |
| |-----| |
| | 110 |
| | CNFG ERROR |
| |
| | I:17 | |
| |-----| |
| | 111 |
| |

```

HA122B
 N7:243
 10

Rung 2:483

```

| |
| | T/C ENABLE |
| |
| | I:17 | |
| |-----| |
| | 123 |
| | OPEN T/C |
| | I:17 |
| |-----| |
| | 124 |
| |

```

HA122C
 N7:243
 11

```

+++
|      |      |
|  LO LIMIT  |
|      I:17  |
|  +-----+ |
|      125   |
|  CNFG ERROR|
|      I:17  |
|  +-----+ |
|      126   |
|  CNFG ERROR|
|      I:17  |
|  +-----+ |
|      126   |
|      |      |

```

Rung 2:484

T/C ENABLE

```

|      |      |
|      I:18   |
|  +-----+ |
|      75     |
|  OPEN T/C   |
|      I:18   |
|  +-----+ |
|      76     |
|  LO LIMIT   |
|      I:18   |
|  +-----+ |
|      77     |
|  HI LIMIT   |
|      I:18   |
|  +-----+ |
|      78     |
|  CNFG ERROR |
|      I:18   |
|  +-----+ |
|      79     |
|      |      |

```

HA123A
 N7:243
 ()
 12

Rung 2:485

T/C ENABLE

```

|      |      |
|      I:18   |
|  +-----+ |
|      91     |
|  OPEN T/C   |
|      I:18   |
|  +-----+ |
|      92     |
|      |      |

```

HA123B
 N7:243
 ()
 13

```
+++
| | LO LIMIT |
| | I:18 |
| +-----+ |
| | 93 |
| | HI LIMIT |
| | I:18 |
| +-----+ |
| | 94 |
| | CNFG ERROR |
| | I:18 |
| +-----+ |
| | 95 |
|
```

Rung 2:486

T/C ENABLE

```

| | I:18 |
| +-----+ |
| | 107 |
| | OPEN T/C |
| | I:18 |
| +-----+ |
| | 108 |
| | LO LIMIT |
| | I:18 |
| +-----+ |
| | 109 |
| | HI LIMIT |
| | I:18 |
| +-----+ |
| | 110 |
| | CNFG ERROR |
| | I:18 |
| +-----+ |
| | 111 |
|
```

HA123C
N7:243

14

Rung 2:487

T/C ENABLE

```

| | I:18 |
| +-----+ |
| | 123 |
| | OPEN T/C |
| | I:18 |
| +-----+ |
| | 124 |
|
```

HA124A
N7:243

15

```
+++
|
| LO LIMIT
| I:18
|-----] [-----+
| 125
| HI LIMIT
| I:18
|-----] [-----+
| 126
| CNFG ERROR
|
| I:18
|-----] [-----+
| 127
|
```

Rung 2:488

T/C ENABLE

```

|
| I:19
|-----] [-----+
| 75
| OPEN T/C
| I:19
|-----] [-----+
| 76
| LO LIMIT
| I:19
|-----] [-----+
| 77
| HI LIMIT
| I:19
|-----] [-----+
| 78
| CNFG ERROR
|
| I:19
|-----] [-----+
| 79
|
```

HA124B
N7:244

()
0

Rung 2:489

T/C ENABLE

```

|
| I:19
|-----] [-----+
| 91
| OPEN T/C
| I:19
|-----] [-----+
| 92
|
```

HA125A
N7:244

()
1

```

***                                     ***
| | LO LIMIT | |
| | I:19 | |
| +-----+ | |
| | .93 | |
| | HI LIMIT | |
| | I:19 | |
| +-----+ | |
| | 94 | |
| | CNFG ERROR | |
| | | |
| | I:19 | |
| +-----+ | |
| | 95 | |

```

Rung 2:490

T/C ENABLE

```

|          I:19
|-----|/|-----|
| |          107
| | OPEN T/C
| |          I:19
| +-----| [-----+
| |          108
| | LO LIMIT
| |          I:19
| +-----| [-----+
| |          109
| | HI LIMIT
| |          I:19
| +-----| [-----+
| |          110
| | CNFG ERROR
| |
| |          I:19
| +-----| [-----+
| |          111

```

HA125B

N7:244

2

Rung 2:491

DEV_3	
N20:6	
(L)	
3	
AV3	
15	
(JMP)	

Rung 2:492

```

| DEV3
|
| 11
|-----[LBL]-----DUMMY10
|                      N20:7
|                      ( )
|                      0

```

Rung 2:493

ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
 IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

+-----+
+ADD-----+
| |Source A      AV119| |
| |      1702| |
| |Source B DEVIATION| |
| |      1250| |
| |Dest        H119| |
| |      2951| |
+-----+
+SUB-----+
+--SUBTRACT--+
| |Source A      AV119| |
| |      1702| |
| |Source B DEVIATION| |
| |      1250| |
| |Dest        L119| |
| |      451| |
+-----+
  
```

Rung 2:494

```

                                PIPE ZONE
HA119A                                D119A
N7:243                                N7:151
+GRT-----+
-]/[-----+GREATER THAN+-----+
| |0| |Source A      C119A| |
| |(2:472)| |      1691| |
| |      | |Source B      H119| |
| |      | |      2951| |
| |      | |
| |N7:49 - (2:434)| |
| |N10:103 - (2:493)| |
| |      PIPE ZONE| |
| |      +LES-----+
| |      +--LESS THAN+--+
| |      | |Source A      C119A| |
| |      | |      1691| |
| |      | |Source B      L119| |
| |      | |      451| |
| |      | |
| |N7:49 - (2:434)| |
| |N11:13 - (2:493)| |
  
```

Rung 2:495

```

                                D119B
HA119B                                N7:151
N7:243                                N7:151
+GRT-----+
-]/[-----+GREATER THAN+-----+
| |1| |Source A      C119B| |
| |(2:473)| |      1710| |
| |      | |Source B      H119| |
| |      | |      2951| |
| |      | |
| |N7:50 - (2:436)| |
| |N10:103 - (2:493)| |
| |      | |
+-----+
  
```



```

+++
|
| +LES-----+
| +-+LESS THAN +-+
| |Source A      C119B|
| |              1710|
| |Source B      L119|
| |              451|
| +-----+
| N7:50 - (2:436)
| N11:13 - (2:493)
|

```

Rung 2:496
 HA119C
 N7:243

D119C
 N7:151

```

|-----+GRT-----+
| 1/[-----+GREATER THAN
| 2 | |Source A      C119C|
| (2:474) | |              1704|
|         | |Source B      H119|
|         | |              2951|
|         | +-----+
|         | N7:51 - (2:438)
|         | N10:103 - (2:493)
|         | +LES-----+
|         | +-+LESS THAN +-+
|         | |Source A      C119C|
|         | |              1704|
|         | |Source B      L119|
|         | |              451|
|         | +-----+
|         | N7:51 - (2:438)
|         | N11:13 - (2:493)
|

```

2

Rung 2:497

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
 IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|-----+ADD-----+
| |Source A      AV120|
| |              1720|
| |Source B DEVIATION|
| |              1250|
| |Dest          H120|
| |              2970|
| +-----+
| +SUB-----+
| +-+SUBTRACT +-+
| |Source A      AV120|
| |              1720|
| |Source B DEVIATION|
| |              1250|
| |Dest          L120|
| |              470|
| +-----+

```

Rung 2:498

HA120A				D120A
N7:243				N7:151
+GRT-----+				
-]/[	+GREATER THAN			()-
3	Source A	C120A		3
(2:475)		1709		
	Source B	H120		
		2970		
+-----+				
	N7:52 - (2:440)			
	N10:104 - (2:497)			
+LES-----+				
+LESS THAN				
	Source A	C120A		
		1709		
	Source B	L120		
		470		
+-----+				
	N7:52 - (2:440)			
	N11:14 - (2:497)			

Rung 2:499

HA120B				D120B
N7:243				N7:151
+GRT-----+				
-]/[	+GREATER THAN			()-
4	Source A	C120B		4
(2:476)		1722		
	Source B	H120		
		2970		
+-----+				
	N7:53 - (2:442)			
	N10:104 - (2:497)			
+LES-----+				
+LESS THAN				
	Source A	C120B		
		1722		
	Source B	L120		
		470		
+-----+				
	N7:53 - (2:442)			
	N11:14 - (2:497)			

Rung 2:500

HA120C				D120C
N7:243				N7:151
+GRT-----+				
-]/[	+GREATER THAN			()-
5	Source A	C120C		5
(2:477)		1730		
	Source B	H120		
		2970		
+-----+				
	N7:54 - (2:444)			
	N10:104 - (2:497)			
+-----+				
+++				

```

      +--+
      |  +LES-----+
      |  +-LESS THAN +
      |  |Source A    C120C|
      |  |             1730|
      |  |Source B    L120|
      |  |             470|
      |  +-----+
      |  N7:54 - (2:444)
      |  N11:14 - (2:497)

```

Rung 2:501

ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
 IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

      +-----+
      |  +ADD-----+
      |  |Source A    AV121|
      |  |             1727|
      |  |Source B DEVIATION|
      |  |             1250|
      |  |Dest        H121|
      |  |             2977|
      |  +-----+
      |  +SUB-----+
      |  +-SUBTRACT +--+
      |  |Source A    AV121|
      |  |             1727|
      |  |Source B DEVIATION|
      |  |             1250|
      |  |Dest        L121|
      |  |             477|
      |  +-----+

```

Rung 2:502

```

      |  HA121A
      |  N7:243
      |  +GRT-----+
      |  |Source A    C121A|
      |  |             1724|
      |  |Source B    H121|
      |  |             2977|
      |  +-----+
      |  N7:55 - (2:446)
      |  N10:105 - (2:501)
      |  +LES-----+
      |  +-LESS THAN +--+
      |  |Source A    C121A|
      |  |             1724|
      |  |Source B    L121|
      |  |             477|
      |  +-----+
      |  N7:55 - (2:446)
      |  N11:15 - (2:501)

```

```

lung 2:503
HA121B
N7:243
+GRT-----+
-1/(-)-----+
7 | Source A C121B | 7
(2:479) | 1726 |
| Source B H121 |
| 2977 |
+-----+
N7:56 - (2:448)
N10:105 - (2:501)
+LES-----+
+LESS THAN +
| Source A C121B |
| 1726 |
| Source B L121 |
| 477 |
+-----+
N7:56 - (2:448)
N11:15 - (2:501)

```

```

Run# 2:504
      HAI21C
      N7:243
      +GRT-----+
      -1/(-
      8
      (2:480)
      |Source A      C121C|
      |                1731|
      |Source B      H121|
      |                2977|
      +-----+
      N7:57 - (2:450)
      N10:105 - (2:501)
      +LES-----+
      +LESS THAN-----+
      |Source A      C121C|
      |                1731|
      |Source B      L121|
      |                477|
      +-----+
      N7:57 - (2:450)
      N11:15 - (2:501)

```

Rung 2:505

```

*****
ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION
+ADD-----+
|-----+-----+
|Source A      AV122|
|              1736|
|Source B DEVIATION|
|              1250|
|Dest          H122|
|              2986|
|-----+-----+
+---+
+---+

```

```

+++
|+SUB-----+|
|+SUBTRACT+|
|Source A      AV122|
|              1736|
|Source B DEVIATION|
|              1250|
|Dest          L122|
|              486|
|+-----+|
+++

```

Rung 2:506

HA122A

N7:243

+GRT-----+

D122A

N7:151

-1/[-

+GREATER THAN

()

```

9      |Source A      C122A|
(2:481)|              1735|
|      |Source B      H122|
|      |              2986|
|      +-----+
|      N7:58 - (2:452)
|      N10:106 - (2:505)
|      +LES-----+
|      +LESS THAN+
|      |Source A      C122A|
|      |              1735|
|      |Source B      L122|
|      |              486|
|      +-----+
|      N7:58 - (2:452)
|      N11:16 - (2:505)

```

9

Rung 2:507

HA122B

N7:243

+GRT-----+

D122B

N7:151

-1/[-

+GREATER THAN

()

```

10     |Source A      C122B|
(2:482)|              1737|
|      |Source B      H122|
|      |              2986|
|      +-----+
|      N7:59 - (2:454)
|      N10:106 - (2:505)
|      +LES-----+
|      +LESS THAN+
|      |Source A      C122B|
|      |              1737|
|      |Source B      L122|
|      |              486|
|      +-----+
|      N7:59 - (2:454)
|      N11:16 - (2:505)

```

10

```

Rung 2:508
| HA122C                                     D122C
| N7:243                                     N7:151
|-----+-----+-----+-----+
| 1/1 | +GREATER THAN |-----+-----+
| 11 | |Source A      C122C| |
| (2:483) | |      1735| |
| | |Source B      H122| |
| | |      2986| |
| | +-----+-----+
| | N7:60 - (2:456) |
| | N10:106 - (2:505) |
| | +LES-----+
| | +LESS THAN |-----+-----+
| | |Source A      C122C| |
| | |      1735| |
| | |Source B      L122| |
| | |      486| |
| | +-----+-----+
| | N7:60 - (2:456) |
| | N11:16 - (2:505) |
|

```

Rung 2:509

```

*****
ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION
|-----+-----+-----+-----+
| | +ADD-----+-----+
| | |Source A      AV123| |
| | |      1740| |
| | |Source B DEVIATION| |
| | |      1250| |
| | |Dest          H123| |
| | |      2990| |
| | +-----+-----+
| | +SUB-----+-----+
| | +SUBTRACT |-----+-----+
| | |Source A      AV123| |
| | |      1740| |
| | |Source B DEVIATION| |
| | |      1250| |
| | |Dest          L123| |
| | |      490| |
| | +-----+-----+

```

```

Rung 2:510
| HA123A                                     D123A
| N7:243                                     N7:151
|-----+-----+-----+-----+
| 1/1 | +GREATER THAN |-----+-----+
| 12 | |Source A      C123A| |
| (2:484) | |      1736| |
| | |Source B      H123| |
| | |      2990| |
| | +-----+-----+
| | N7:61 - (2:458) |
| | N10:107 - (2:509) |
|
|+++                                     +++|

```

```

+++
|
| +LES-----+
| +-LESS THAN +-
| |Source A    C123A|
| |           1736|
| |Source B    L123|
| |           490|
| +-----+
| N7:61 - (2:458)
| N11:17 - (2:509)
|

```

Rung 2:511
 HA123B
 N7:243

D123B
 N7:151

```

|-----+-----+
| 1/I | +GREATER THAN |
|-----+-----+
| 13 | |Source A    C123B|
| (2:485) | |           1740|
|         | |Source B    H123|
|         | |           2990|
|         | +-----+
|         | N7:62 - (2:460)
|         | N10:107 - (2:509)
|         | +LES-----+
|         | +-LESS THAN +-
|         | |Source A    C123B|
|         | |           1740|
|         | |Source B    L123|
|         | |           490|
|         | +-----+
|         | N7:62 - (2:460)
|         | N11:17 - (2:509)
|

```

()
 13

Rung 2:512
 HA123C
 N7:243

D123C
 N7:151

```

|-----+-----+
| 1/I | +GREATER THAN |
|-----+-----+
| 14 | |Source A    C123C|
| (2:486) | |           1744|
|         | |Source B    H123|
|         | |           2990|
|         | +-----+
|         | N7:63 - (2:462)
|         | N10:107 - (2:509)
|         | +LES-----+
|         | +-LESS THAN +-
|         | |Source A    C123C|
|         | |           1744|
|         | |Source B    L123|
|         | |           490|
|         | +-----+
|         | N7:63 - (2:462)
|         | N11:17 - (2:509)
|

```

()
 14


```

      ++
      |
      | +LES-----+
      |
      | +--LESS THAN-----+
      | |Source A          C124B|
      | |                  1745|
      | |Source B          L124|
      | |                  500|
      | +-----+
      |
      | N7:65 - (2:466)
      | N11:18 - (2:513)

```

Rung 2:516

ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

+ADD-----+
+ADD-----+
|Source A      AV125|
|              1736|
|Source B DEVIATION|
|              1250|
|Dest          H125|
|              2986|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A      AV125|
|              1736|
|Source B DEVIATION|
|              1250|
|Dest          L125|
|              486|
+-----+

```

Rung 2:517

[illegible]

```

Rung 2:518
  HA125B
  N7:244
  ]/[-----+GRT-----+-----+-----+-----+
    2      |Source A      C125B|
  (2:490)  |      |      1735|
           |Source B      H125|
           |      |      2986|
           |-----+-----+
           |N7:67 - (2:470)|
           |N10:109 - (2:516)|
           |-----+-----+
           |---+LESS THAN---+---+
           |Source A      C125B|
           |      |      1735|
           |Source B      L125|
           |      |      486|
           |-----+-----+
           |N7:67 - (2:470)|
           |N11:19 - (2:516)|
  
```

```

Rung 2:519
  DEV_3
  N20:6
  -----(U)-----
  3
  
```

```

Rung 2:520
  AV3
  15
  [LBL]-----+-----+-----+-----+-----+
  DUMMY11
  N20:7
  -----( )-----
  10
  
```

```

Rung 2:521
*****
CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C
  -----+CLR-----+-----+-----+-----+
  |---+CLEAR---+---+
  |Dest      COUNT|
  |      |      4|
  |-----+-----+
  |---+CLR-----+---+
  |---+CLEAR---+---+
  |Dest      TOTAL|
  |      |      3472.000|
  |-----+-----+
  
```

Rung 2:522

HA119A N7:243	D119A N7:151	OUT119A N7:249	
1/[-	1/[-	1/[-	+ADD-----+
0	0	4	+ADD
(2:472)	(2:494)		Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_3		+ADD-----+
	N20:6		+ADD
	3		Source A C119A
	(2:491)		1691
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:523

HA119B N7:243	D119B N7:151	OUT119B N7:249	
1/[-	1/[-	1/[-	+ADD-----+
1	1	5	+ADD
(2:473)	(2:495)		Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_3		+ADD-----+
	N20:6		+ADD
	3		Source A C119B
	(2:491)		1710
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Runq 2:525

Runq 2:526

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

	+CLR-----+
	CLEAR
	Dest COUNT
	4
	+CLR-----+
	+CLEAR
	Dest TOTAL
	3472.000
	+-----+

Rung 2:527			
HA120A	D120A	OUT120A	
N7:243	N7:151	N7:249	
1/[	1/[	1/[	+ADD-----+
3	3	7	+ADD
(2:475)	(2:498)		Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_3		+ADD-----+
	N20:6		+ADD
	3		Source A C120A
	(2:491)		1709
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:528			
HA120B	D120B	OUT120B	
N7:243	N7:151	N7:249	
1/[	1/[	1/[	+ADD-----+
4	4	8	+ADD
(2:476)	(2:499)		Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_3		+ADD-----+
	N20:6		+ADD
	3		Source A C120B
	(2:491)		1722
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

```

+ADD-----+
+ADD-----+
|Source A          |1|
|Source B          |COUNT|
|Dest              |COUNT|
+-----+
+-----+
+ADD-----+
+ADD-----+
|Source A          |C120C|
|                  |1730|
|Source B          |TOTAL|
|                  |3472.000|
|Dest              |TOTAL|
|                  |3472.000|

```

```

+DIV-----+
+DIVIDE      +
|Source A      TOTAL|
|              3472.000|
|Source B      COUNT|
|              41|
|Dest          AV120|
|              1720|
+-----+

```

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

```

+CLR-----+
+CLEAR      +-+
|Dest      COUNT|
|          4|
+-----+
+CLR-----+
+CLEAR      +-+
|Dest      TOTAL|
|          3472.000|
+-----+

```

Rung 2:532			
HA121A	D121A	OUT121A	
N7:243	N7:151	N7:249	
1/[	1/[	1/[	+ADD-----+
6	6	10	+ADD-----+
(2:478)	(2:502)		Source A 1
			Source B COUNT
			Dest COUNT
			Dest COUNT
			+-----+
	DEV_3		+ADD-----+
	N20:6		+ADD-----+
	3		Source A C121A
	(2:491)		Source B 1724
			Source B TOTAL
			Dest 3472.000
			Dest TOTAL
			Dest 3472.000
			+-----+

Rung 2:533			
HA121B	D121B	OUT121B	
N7:243	N7:151	N7:249	
1/[	1/[	1/[	+ADD-----+
7	7	11	+ADD-----+
(2:479)	(2:503)		Source A 1
			Source B COUNT
			Dest COUNT
			Dest COUNT
			+-----+
	DEV_3		+ADD-----+
	N20:6		+ADD-----+
	3		Source A C121B
	(2:491)		Source B 1726
			Source B TOTAL
			Dest 3472.000
			Dest TOTAL
			Dest 3472.000
			+-----+

[illegible]

Rung 2:535

	+DIV-----+
	+DIVIDE +
	Source A TOTAL
	3472.000
	Source B COUNT
	41
	Dest AV121
	1727
	+-----+

Rung 2:536

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE OUT=xx) THEN AVERAGE THE T/C

```

+CLR-----+
|CLEAR|
|Dest          COUNT|
|              4|
+-----+
+CLR-----+
+CLEAR|
|Dest          TOTAL|
|              3472.000|
+-----+

```


Rung 2:537

HA122A N7:243	D122A N7:151	OUT122A N7:249	
9 (2:481)	9 (2:506)	13	+ADD-----+ +ADD Source A 1 Source B COUNT Dest COUNT +-----+ +ADD-----+ +ADD Source A C122A 1735 Source B TOTAL 3472.000 Dest TOTAL 3472.000 +-----+
	DEV_3 N20:6 3 (2:491)		

Rung 2:538

HA122B N7:243	D122B N7:151	OUT122B N7:249	
10 (2:482)	10 (2:507)	14	+ADD-----+ +ADD Source A 1 Source B COUNT Dest COUNT +-----+ +ADD-----+ +ADD Source A C122B 1737 Source B TOTAL 3472.000 Dest TOTAL 3472.000 +-----+
	DEV_3 N20:6 3 (2:491)		

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Rung 2:542			
HA123A N7:243	D123A N7:151	OUT123A N7:250	
1/1	1/1	1/1	+ADD-----+
12	12	0	+ADD
(2:484)	(2:510)		Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_3		+ADD-----+
	N20:6		+ADD
	3		Source A C123A
	(2:491)		1736
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:543			
HA123B N7:243	D123B N7:151	OUT123B N7:250	
1/1	1/1	1/1	+ADD-----+
13	13	1	+ADD
(2:485)	(2:511)		Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_3		+ADD-----+
	N20:6		+ADD
	3		Source A C123B
	(2:491)		1740
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

```

+ADD-----+
+ADD
|Source A          |1|
|Source B          |COUNT|
|Dest              |COUNT|
|                  |41|
+-----+
|
+ADD-----+
+ADD
|Source A          |C123C|
|                  |1744|
|Source B          |TOTAL|
|                  |3472.000|
|Dest              |TOTAL|
|                  |3472.000|
+-----+

```

```

+DIV-----+
+DIVIDE      +
|Source A      TOTAL|
|              3472.000|
|Source B      COUNT|
|              4|
|Dest          AV123|
|              1740|
+-----+

```

```

+CLR-----+
+--CLEAR-----+
| |Dest          COUNT|
| |              4|
| +-----+
| +CLR-----+
+--CLEAR-----+
| |Dest          TOTAL|
| |              3472.000|
+-----+

```


Rung 2:550

Average the good T/Cs of each zone:

Reset count and total,

For each T/C that has no alarm, count and add,

Finally divide total by count to get the Zone Average Temperature.

```

+-----+
+MOV-----+
|Source      0|
|Dest      COUNT|
|           4|
+-----+
+MOV-----+
+MOVE-----+
|Source      0.000000|
|Dest      TOTAL|
|           3472.000|
+-----+

```

Rung 2:551

HA125A N7:244	D125A N7:152	OUT125A N7:250	
1	1	5	
(2:489)	(2:517)		
	DEV_3		
	N20:6		
	3		
	(2:491)		

```

+-----+
+ADD-----+
|Source A      1|
|Source B      COUNT|
|Dest      COUNT|
|           4|
+-----+
+ADD-----+
+ADD-----+
|Source A      C125A|
|           1737|
|Source B      TOTAL|
|           3472.000|
|Dest      TOTAL|
|           3472.000|
+-----+

```

Rung 2:552

HA125B N7:244	D125B N7:152	OUT125B N7:250	
2	2	6	
(2:490)	(2:518)		

```

+-----+
+ADD-----+
|Source A      1|
|Source B      COUNT|
|Dest      COUNT|
|           4|
+-----+
+-----+

```

```

      ***
      |
      |   DEV_3
      |   N20:6
      +-----] [-----+
                3
          (2:491)

```

```

+++                                     +++
|                                     |
| +ADD-----+                       |
| +ADD                                     |
| |Source A           C125B|         |
| |                   1735|         |
| |Source B           TOTAL|         |
| |                   3472.000|       |
| |Dest              TOTAL|         |
| |                   3472.000|       |
| +-----+                           |

```

Rung 2:553

+DIV-----+	
+DIVIDE-----+	
Source A	TOTAL
	3472.000
Source B	COUNT
	4
Dest	AV125
	1736
+-----+	

Rung 2:554

```
*****
IF DEVIATION SET FOR SECTION 3 THEN GO THERE AND CALCULATE DEVIATION
DEV3
DEV_3
N20:6
-1 [------11
3 (JMP)-
(2:491)
```

Rung 2:555

```

*****
IF RATE CALCULATIONS ARE FINISHED THEN GO TO THE PID BLOCK
PID119
| RT_TMR/DN
| T4:62
|-----29
| -1/[- (JMP)-
| DN
| (2:33)

```

Rung 2:556

RATE CHECKING

```

+-----+-----+-----+-----+-----+-----+-----+-----+
|                                         |MOV-----|
|                                         |MOVE-----|
|                                         |Source      AV119|
|                                         |1702|
|                                         |Dest       RI_119|
|                                         |1702|
|                                         |-----|
|                                         |-----|
+-----+-----+-----+-----+-----+-----+-----+

```

```

+++
|
|
|-----+SUB-----+
|SUBTRACT
|Source A      R1_119|
|              1702|
|Source B      R2_119|
|              1702|
|Dest          DIF1_119|
|              10|
|-----+
|MOV-----+
|MOVE
|Source        R1_119|
|              1702|
|Dest          R2_119|
|              1702|
|-----+
|SUB-----+
|SUBTRACT
|Source A      DIF1_119|
|              10|
|Source B      DIF2_119|
|              10|
|Dest          DDIF|
|              1|
|-----+
|MOV-----+
|MOVE
|Source        DIF1_119|
|              10|
|Dest          DIF2_119|
|              10|
|-----+
|SUB-----+
|SUBTRACT
|Source A      DIF1_119|
|              10|
|Source B      9|
|Dest          DIF1_119|
|              10|
|-----+
|MUL-----+
|MULTIPLY
|Source A      DIF1_119|
|              10|
|Source B      DIF1_119|
|              10|
|Dest          ACC|
|              828|
|-----+
|
|
+++

```



```

+++
+-----+
+MUL-----+
+MULTIPLY  +-----+
|Source A  DIF1_119|
|          10|
|Source B   ACC1|
|Dest       828|
|          828|
+-----+
+CLR-----+
+CLEAR     +-----+
|Dest      S:5|
|          0|
+-----+
+MUL-----+
+MULTIPLY  +-----+
|Source A   DDIF|
|          1|
|Source B   DDIF|
|          1|
|Dest      ACC1|
|          -728|
+-----+
+MUL-----+
+MULTIPLY  +-----+
|Source A   DDIF|
|          1|
|Source B   ACC1|
|          -728|
|Dest      ACC1|
|          -728|
+-----+
+CLR-----+
+CLEAR     +-----+
|Dest      S:5|
|          0|
+-----+
SCRATCH
+-----+
+EQU-----+ N20:12
+-----+
+EQU-----+ +-----+
|Source A   ACC1| 0
|          828|
|Source B   0|
|          1|
+-----+
N20:0 - (2:190)
+-----+
+EQU-----+ +SUB-----+
+-----+
+EQU-----+ +SUBTRACT +-----+
|Source A   ACC1| |Source A   ACC1|
|          828| |          828|
|Source B   1| |Source B   1|
|          1| |          1|
+-----+
|Dest      ACC1|
|          828|
+-----+
N20:0 - (2:190)
+-----+
+-----+
+++

```

```

+++
SCRATCH
N20:12
+ADD-----+
+ADD-----+
|Source A      ACC|
|      828|
|Source B      1|
|Dest          ACC|
|      828|
+-----+
+ADD-----+
+ADD-----+
|Source A      ACC|
|      828|
|Source B      ACC1|
|      -728|
|Dest          ACC1|
|      -728|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A      N13:191|
|      100|
|Source B      ACC1|
|      -728|
|Dest          ACC|
|      828|
+-----+
+GRT-----+
+GREATER THAN-----+
|Source A      ACC|
|      828|
|Source B      100|
|Dest          N13:191|
|      100|
+-----+
N20:0 - (2:190)
+LES-----+
+LESS THAN-----+
|Source A      ACC|
|      828|
|Source B      1|
|Dest          N13:191|
|      100|
+-----+
N20:0 - (2:190)
+LIM-----+
+LIMIT TEST-----+
|Low Lim      1|
|Source          ACC|
|      828|
|Test          ACC|
|      828|
|High Lim     100|
|Dest          N13:191|
|      100|
+-----+
N20:0 - (2:190)

```


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```

+++
+-----+
+SUB-----+
+SUBTRACT   +
|Source A   DIF1_120|
|           101|
|Source B   DIF2_120|
|           101|
|Dest       DDIF|
|           11|
+-----+
+MOV-----+
+MOVE       +
|Source     DIF1_120|
|           101|
|Dest       DIF2_120|
|           101|
+-----+
+SUB-----+
+SUBTRACT   +
|Source A   DIF1_120|
|           101|
|Source B    91|
|           1|
|Dest       DIF1_120|
|           101|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A   DIF1_120|
|           101|
|Source B   DIF1_120|
|           101|
|Dest       ACC1|
|           828|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A   DIF1_120|
|           101|
|Source B    ACC1|
|           828|
|Dest       ACC1|
|           828|
+-----+
+CLR-----+
+CLEAR      +
|Dest       S:51|
|           01|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A    DDIF|
|           11|
|Source B    DDIF|
|           11|
|Dest       ACC1|
|          -728|
+-----+
+++

```

Rung 2:567

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

	AM120		PID120:1
	N7:119		N14:0
	-----1/[-----		----- () -----
	10		1
	(3:24)		

Rung 2:568

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

		+MOV-----+
		+MOVE-----+
	Source	SET120:1
		01
	Dest	PIDSP120:1
		01
		-----+

Rung 2:569

		+PID-----+
		+PID-----+
	Control Block	PID120:1
	Process Variable	AV120:1
	Control Variable	CV120:1
	Control Block Length	23
		-----+
		+SCL-----+
		+SCALE-----+
	Source	CV120:1
		01
	Rate [1/10000]	15
	Offset	01
	Dest	PW120:1
		01
		-----+
		+CLR-----+
		+CLEAR-----+
	Dest	S:5
		01
		-----+

Rung 2:570

	68		N20:10
	---[LBL]-----		----- () -----
			6

Rung 2:571

			PID121
	RT_TMR/DN		
	T4:62		31
	---1/[-----		----- (JMP) -----
	DN		
	(2:33)		

RATE CHECKING

```

+MOV-----+
+MOVE-----+
|Source      AV121|
|            1727|
|Dest        R1_121|
|            1727|
+-----+
+SUB-----+
+SUBTRACT---+
|Source A     R1_121|
|            1727|
|Source B     R2_121|
|            1727|
|Dest        DIF1_121|
|            101|
+-----+
+MOV-----+
+MOVE-----+
|Source      R1_121|
|            1727|
|Dest        R2_121|
|            1727|
+-----+
+SUB-----+
+SUBTRACT---+
|Source A     DIF1_121|
|            101|
|Source B     DIF2_121|
|            101|
|Dest        DDIF1_1|
|            1|
+-----+
+MOV-----+
+MOVE-----+
|Source      DIF1_121|
|            101|
|Dest        DIF2_121|
|            101|
+-----+
+SUB-----+
+SUBTRACT---+
|Source A     DIF1_121|
|            101|
|Source B     9|
|            1|
|Dest        DIF1_121|
|            101|
+-----+
+MUL-----+
+MULTIPLY---+
|Source A     DIF1_121|
|            101|
|Source B     DIF1_121|
|            101|
|Dest        ACC1_828|
|            828|

```

+++

```

***
+-----+
+MUL-----+
+MULTIPLY   +
|Source A   DIF1_121|
|           10|
|Source B    ACC|
|           828|
|Dest       ACC|
|           828|
+-----+
+CLR-----+
+CLEAR      +
|Dest       S:5|
|           0|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A    DDIF|
|           1|
|Source B    DDIF|
|           1|
|Dest       ACC1|
|          -728|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A    DDIF|
|           1|
|Source B    ACC1|
|          -728|
|Dest       ACC1|
|          -728|
+-----+
+CLR-----+
+CLEAR      +
|Dest       S:5|
|           0|
+-----+
+SCRATCH
+-----+
+EQUAL-----+
+EQUAL      +
|Source A    ACC|
|           828|
|Source B    0|
+-----+
N20:0 - (2:190)
+-----+
+SUB-----+
+SUBTRACT   +
|Source A    ACC|
|           828|
|Source B    1|
|Source B    1|
|Dest       ACC|
|          828|
+-----+
N20:0 - (2:190)
+-----+
+-----+
***

```

N20:0 - (2:190)

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[illegible]

Rung 2:583

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

	AM122	PID122/1
	N7:119	N14:60
	1/[-	()
	14	1
	(3:24)	

Rung 2:584

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

		+MOV-----+
		+MOVE
	Source	SET122
		0
	Dest	PIDSP122
		0
		+-----+

Rung 2:585

		+PID-----+
		+PID
	Control Block	PID122
	Process Variable	AV122
	Control Variable	CV122
	Control Block Length	23
		+-----+
		+SCL-----+
		+SCALE
	Source	CV122
		0
	Rate [1/10000]	15
	Offset	0
	Dest	PW122
		0
		+-----+
		+CLR-----+
		+CLEAR
	Dest	S:5
		0
		+-----+

Rung 2:586

	70	N20:10
	--[LBL]	()
		8

Rung 2:587

		PID123
	RT_TMR/DN	
	T4:62	33
	1/[-	(JMP)
	DN	
	(2:33)	

Rung 2:588

RATE CHECKING

		+MOV-----+
		MOVE
		Source AV123
		1740
		Dest R1_123
		1740
		+-----+
		+SUB-----+
		SUBTRACT
		Source A R1_123
		1740
		Source B R2_123
		1740
		Dest DIF1_123
		10
		+-----+
		+MOV-----+
		MOVE
		Source R1_123
		1740
		Dest R2_123
		1740
		+-----+
		+SUB-----+
		SUBTRACT
		Source A DIF1_123
		10
		Source B DIF2_123
		10
		Dest DDIF
		1
		+-----+
		+MOV-----+
		MOVE
		Source DIF1_123
		10
		Dest DIF2_123
		10
		+-----+
		+SUB-----+
		SUBTRACT
		Source A DIF1_123
		10
		Source B 9
		1
		Dest DIF1_123
		10
		+-----+
		+MUL-----+
		MULTIPLY
		Source A DIF1_123
		10
		Source B DIF1_123
		10
		Dest ACC
		828
		+-----+

```

+++
| SCRATCH
| N20:12
|-----+ADD-----+
| 1 |-----+ADD
| 0 |Source A ACC|
| (2:190) |Source B 1|
| |Dest ACC|
| |828|
|-----+
|
|-----+ADD-----+
| |-----+ADD
| |Source A ACC|
| |828|
| |Source B ACC|
| |728|
| |Dest ACC|
| |728|
|-----+
|
|-----+SUB-----+
| |-----+SUBTRACT
| |Source A N14:101|
| |100|
| |Source B ACC|
| |728|
| |Dest ACC|
| |828|
|-----+
|
|-----+GRT-----+
|-----+GREATER THAN
| |Source A ACC|
| |828|
| |Source B 100|
| |Dest N14:101|
| |100|
|-----+
| N20:0 - (2:190)
|-----+LES-----+
|-----+LESS THAN
| |Source A ACC|
| |828|
| |Source B 1|
| |Dest N14:101|
| |100|
|-----+
| N20:0 - (2:190)
|-----+LIM-----+
|-----+LIMIT TEST
| |Low Lim 1|
| |Source ACC|
| |828|
| |Test ACC|
| |828|
| |High Lim 100|
|-----+
| N20:0 - (2:190)

```



```

      +---+
      | +SCL-----+
      | +SCALE-----+
      | |Source      CV123|
      | |              0|
      | |Rate [ /10000] 15|
      | |              |
      | |Offset       0|
      | |              |
      | |Dest        PW123|
      | |              0|
      | +-----+
      | +CLR-----+
      | +CLEAR-----+
      | |Dest        S:5|
      | |              0|
      | +-----+
  
```

Rung 2:594
 71

N20:10
 ()
 9

```

      +-----+
      | [LBL]-----+
      +-----+
  
```

Rung 2:595

RT_TMR/DN

T4:62

34

DN

(2:33)

(JMP)

Rung 2:596

RATE CHECKING

```

      +-----+
      | +MOV-----+
      | +MOVE-----+
      | |Source      AV124|
      | |              1750|
      | |Dest        R1_124|
      | |              1750|
      | +-----+
      | +SUB-----+
      | +SUBTRACT-----+
      | |Source A    R1_124|
      | |              1750|
      | |Source B    R2_124|
      | |              1750|
      | |Dest        DIF1_124|
      | |              10|
      | +-----+
      | +MOV-----+
      | +MOVE-----+
      | |Source      R1_124|
      | |              1750|
      | |Dest        R2_124|
      | |              1750|
      | +-----+
  
```

```

+++
+SUB-----+
+SUBTRACT    +
|Source A    DIF1_124|
|           10|
|Source B    DIF2_124|
|           10|
|Dest        DDIF|
|           1|
+-----+
+MOV-----+
+MOVE        +
|Source      DIF1_124|
|           10|
|Dest        DIF2_124|
|           10|
+-----+
+SUB-----+
+SUBTRACT    +
|Source A    DIF1_124|
|           10|
|Source B      9|
|           |
|Dest        DIF1_124|
|           10|
+-----+
+MUL-----+
+MULTIPLY    +
|Source A    DIF1_124|
|           10|
|Source B    DIF1_124|
|           10|
|Dest        ACC|
|           828|
+-----+
+MUL-----+
+MULTIPLY    +
|Source A    DIF1_124|
|           10|
|Source B      ACC|
|           828|
|Dest        ACC|
|           828|
+-----+
+CLR-----+
+CLEAR       +
|Dest        S:5|
|           0|
+-----+
+MUL-----+
+MULTIPLY    +
|Source A      DDIF|
|           1|
|Source B      DDIF|
|           1|
|Dest        ACC1|
|          -728|
+-----+
+++

```

```

+++
+MUL-----+
+MULTIPLY+
+Source A   DDIF|
+Source B   ACC1|
+Dest       ACC1|
+           -728|
+           -728|
+-----+
+CLR-----+
+CLEAR-----+
+Dest       S:5|
+           0|
+-----+
+SCRATCH
N20:12
+-----+
+EQ-----+
+EQUAL-----+
+Source A   ACC|
+           828|
+Source B   0|
+-----+
N20:0 - (2:190)
+EQ-----+
+SUB-----+
+SUBTRACT-----+
+Source A   ACC|
+           828|
+Source B   1|
+Source B   1|
+Dest       ACC|
+           828|
N20:0 - (2:190)
+-----+
SCRATCH
N20:12
+-----+
+ADD-----+
+ADD-----+
+Source A   ACC|
+           828|
+Source B   1|
+Dest       ACC|
+           828|
+-----+
+ADD-----+
+ADD-----+
+Source A   ACC|
+           828|
+Source B   ACC1|
+           -728|
+Dest       ACC1|
+           -728|
+-----+
+++

```



```

+++
|                                     +SUB-----+
|                                     +SUBTRACT    +
|                                     |Source A    N14:131|
|                                     |          100|
|                                     |Source B    ACC1|
|                                     |          -728|
|                                     |Dest       ACC|
|                                     |          828|
|                                     +-----+
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE
| |Source A    ACC| |Source 100|
| |          828| |
| |Source B    100| |Dest   N14:131|
| |          | |          100|
| +-----+
| N20:0 - (2:190)
| +LES-----+ +MOV-----+
| +LESS THAN    +MOVE
| |Source A    ACC| |Source 1|
| |          828| |
| |Source B    1| |Dest   N14:131|
| |          | |          100|
| +-----+
| N20:0 - (2:190)
| +LIM-----+ +MOV-----+
| +LIMIT TEST   +MOVE
| |Low Lim     1| |Source  ACC|
| |          | |          828|
| |Test       ACC| |Dest   N14:131|
| |          828| |          100|
| |High Lim    100| +-----+
| |          |
| +-----+
| N20:0 - (2:190)

```

Rung 2:597
PID124

34
--[LBL]-----

DUMMY33
N20:9

()
0

Rung 2:598

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

```

| ON124
| N7:120
| -J/[-----+CLR-----+
| 3          +CLEAR
| (3:25)     |Dest   PW124|
|           |          0|
|           +-----+
|           |
|           72
| +---(JMP)-----+

```

Rung 2:599

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

```
| AM124 PID124/1  
| N7:120 N14:120  
|---1/[----- ( )  
| 2 1  
| (3:25)
```

Rung 2:600

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

```
|-----+MOV-----+  
| |MOVE |  
| |Source SET124|  
| | 0|  
| |Dest PIDSP124|  
| | 0|  
|-----+-----+
```

Rung 2:601

```
|-----+PID-----+  
| |PID |  
| |Control Block PID124|  
| |Process Variable AV124|  
| |Control Variable CV124|  
| |Control Block Length 23|  
| |-----+-----+  
| |SCL-----+  
| |SCALE |  
| |Source CV124|  
| | 0|  
| |Rate [ /10000] 15|  
| | 0|  
| |Offset 0|  
| | 0|  
| |Dest PW124|  
| | 0|  
| |-----+-----+  
| |CLR-----+  
| |CLEAR |  
| |Dest S:5|  
| | 0|  
|-----+-----+
```

Rung 2:602

```
| 72 N20:10  
|---[LBL]----- ( )  
| 10
```

Rung 2:603

```
| PID125  
| RT_TMR/DN 35  
| T4:62  
|---1/[----- (JMP)  
| DN  
| (2:33)
```

Rung 2:604
 | RT_TMR/DN
 | T4:62
 |] [-----
 | DN
 | (2:33)

DNR_3
 N20:5
 (L)
 7

Rung 2:605

RATE CHECKING

		+MOV-----+
		+MOVE-----+
	Source	AV125
	Dest	1736
		1737
		+-----+
		+SUBTRACT-----+
	Source A	R1_125
		1737
	Source B	R2_125
		1737
	Dest	DIF1_125
		10
		+-----+
		+MOV-----+
		+MOVE-----+
	Source	R1_125
		1737
	Dest	R2_125
		1737
		+-----+
		+SUB-----+
		+SUBTRACT-----+
	Source A	DIF1_125
		10
	Source B	DIF2_125
		10
	Dest	DDIF
		1
		+-----+
		+MOV-----+
		+MOVE-----+
	Source	DIF1_125
		10
	Dest	DIF2_125
		10
		+-----+
		+SUB-----+
		+SUBTRACT-----+
	Source A	DIF1_125
		10
	Source B	9
	Dest	DIF1_125
		10
		+-----+

+++

+++

+++

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```

      +++
      |
      | +LIM-----+ +MOV-----+
      | +--LIMIT TEST +--MOVE
      | |Low Lim      | |Source      ACC|
      | |              | |            828|
      | |Test         ACC| |Dest      N14:161|
      | |              828| |          100|
      | |High Lim     100| +-----+
      | +-----+
      | N20:0 - (2:190)
  
```

Rung 2:606
PID125

DUMMY34
N20:9

```

      | 35
      |-----[LBL]----- ( )
      | 1
  
```

Rung 2:607

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

```

      | ON125
      | N7:120
      |-----] / [-----+CLR-----+
      | 5 +--CLEAR
      | (3:25) | |Dest      PW125|
      |         | |          0|
      |         +-----+
      |         | NOT END
      |         | 6
      |         +--(JMP)-----+
  
```

Rung 2:608

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

```

      | AM125
      | N7:120
      |-----] / [-----PID125/1
      | 4 N14:150
      | (3:25) ( )
      | 1
  
```

Rung 2:609

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

```

      |
      |-----+MOV-----+
      | +--MOVE
      | |Source      SET125|
      | |            0|
      | |Dest       PIDSP125|
      | |            0|
      | +-----+
  
```

Rung 2:610

```

+-----+
+PID-----+
|Control Block   PID125|
|Process Variable AV125|
|Control Variable CV125|
|Control Block Length 23|
+-----+
+SCL-----+
+SCALE-----+
|Source          CV125|
|                0|
|Rate [1/10000]  15|
|Offset          0|
|Dest            PW125|
|                0|
+-----+
+CLR-----+
+CLEAR-----+
|Dest            S:5|
|                0|
+-----+
  
```

Rung 2:611

```

NOT END
6
----- (JMP) -----
  
```

Rung 2:612

```

*****
BEGIN SECTION 4
| MD4
|
| 4 DUMMY15
|---[LBL]----- ( )
|
| 14
  
```

Rung 2:613

```

DN_4
N20:5
----- (L) -----
4
  
```

Rung 2:614

Read each T/C and place each T/C's value in its own memory register

```

+-----+
+ADD-----+
+ADD-----+
|Source A      TC130A|
|              724|
|Source B      1000|
|              |
|Dest          C130A|
|              1724|
+-----+
  
```

Rung 2:615

```

| +GRT-----+
| +-GREATER THAN +
| |Source A      C130A|
| |              1724|
| |Source B      16383|
| |              |
| +-----+
| N7:68 - (2:614)

```

```

+MOV-----+
+MOVE-----+
|Source      16383|
|            |
|Dest        C130A|
|            |
|            1724|

```

Rung 2:616

```

+ADD-----+
-+ADD      +-
|Source A   TC130B|
|           720|
|Source B   1000|
|           |
|Dest       C130B|
|           1720|
+-----+

```

Rung 2:617

```

| +GRT-----+
| -+GREATER THAN +
| |Source A      C130B
| |              1720|
| |Source B      16383|
| |              |
| +-----+
| N7:69 - (2:616)

```

```

+MOV-----+
+MOVE+
|Source      16383|
|            |
|Dest        C130B|
|            1720|

```

Rung 2:618

```

+ADD-----+
-+ADD-----+
|Source A      TC130C|
|              721|
|Source B      1000|
|              |
|Dest          C130C|
|              1721|
+-----+

```

Rung 2:619

```

| +GRT-----
| -+GREATER THAN
| |Source A      C130C
| |              1721
| |Source B      16383
| |
| +-----
| N7:70 - (2:618)

```

```

+MOV-----+
+MOVE-----+
|Source      16383|
|            |
|Dest        C130C|
|            1721|
+-----+

```


Rung 2:620

		+ADD-----+
		+ADD-----+
	Source A	TC131A
		727
	Source B	1000
	Dest	C131A
		1727
		+-----+

Rung 2:621

+GRT-----+		+MOV-----+	
--GREATER THAN		+MOVE-----+	
Source A	C131A	Source	16383
	1727		
Source B	16383	Dest	C131A
			1727
		+-----+	
N7:71 - (2:620)			

Rung 2:622

		+ADD-----+
		+ADD-----+
	Source A	TC131B
		722
	Source B	1000
	Dest	C131B
		1722
		+-----+

Rung 2:623

+GRT-----+		+MOV-----+	
--GREATER THAN		+MOVE-----+	
Source A	C131B	Source	16383
	1722		
Source B	16383	Dest	C131B
			1722
		+-----+	
N7:72 - (2:622)			

Rung 2:624

		+ADD-----+
		+ADD-----+
	Source A	TC131C
		724
	Source B	1000
	Dest	C131C
		1724
		+-----+

Rung 2:625

+GRT-----+ -GREATER THAN Source A C131C 1724 Source B 16383 -----+ N7:73 - (2:624)	+MOV-----+ +MOVE Source 16383 Dest C131C 1724 -----+
--	---

Rung 2:626

-----+ 	+ADD-----+ +ADD Source A TC132A 727 Source B 1000 Dest C132A 1727 -----+
--------------------------------	--

Rung 2:627

+GRT-----+ -GREATER THAN Source A C132A 1727 Source B 16383 -----+ N7:74 - (2:626)	+MOV-----+ +MOVE Source 16383 Dest C132A 1727 -----+
--	---

Rung 2:628

-----+ 	+ADD-----+ +ADD Source A TC132B 728 Source B 1000 Dest C132B 1728 -----+
--------------------------------	--

Rung 2:629

+GRT-----+ -GREATER THAN Source A C132B 1728 Source B 16383 -----+ N7:75 - (2:628)	+MOV-----+ +MOVE Source 16383 Dest C132B 1728 -----+
--	---

Rung 2:630

	+ADD-----+
	+ADD-----+
	Source A TC133A
	724
	Source B 1000
	1724
	Dest C133A
	1724
	+-----+

Rung 2:631

	+GRT-----+		+MOV-----+
	+GREATER THAN		+MOVE-----+
	Source A C133A		Source 16383
	1724		16383
	Source B 16383		Dest C133A
	16383		1724
	+-----+		+-----+
	N7:76 - (2:630)		

Rung 2:632

	+ADD-----+
	+ADD-----+
	Source A TC133B
	717
	Source B 1000
	1717
	Dest C133B
	1717
	+-----+

Rung 2:633

	+GRT-----+		+MOV-----+
	+GREATER THAN		+MOVE-----+
	Source A C133B		Source 16383
	1717		16383
	Source B 16383		Dest C133B
	16383		1717
	+-----+		+-----+
	N7:77 - (2:632)		

Rung 2:634

	+ADD-----+
	+ADD-----+
	Source A TC134A
	723
	Source B 1000
	1723
	Dest C134A
	1723
	+-----+

Rung 2:635

```
| +GRT-----+
| +GREATER THAN
| |Source A      C134A|
| |              1723|
| |Source B      16383|
| |              1723|
| +-----+
```

```
+MOV-----+
+MOVE
|Source      16383|
|              |
|Dest        C134A|
|              1723|
+-----+
```

N7:78 - (2:634)

Rung 2:636

```
|
|
|
|
|
|
|
```

```
+ADD-----+
+ADD
|Source A      TC134B|
|              722|
|Source B      1000|
|              |
|Dest          C134B|
|              1722|
+-----+
```

Rung 2:637

```
| +GRT-----+
| +GREATER THAN
| |Source A      C134B|
| |              1722|
| |Source B      16383|
| |              |
| +-----+
```

```
+MOV-----+
+MOVE
|Source      16383|
|              |
|Dest        C134B|
|              1722|
+-----+
```

N7:79 - (2:636)

Rung 2:638

```
|
|
|
|
|
|
|
```

```
+ADD-----+
+ADD
|Source A      TC140A|
|              726|
|Source B      1000|
|              |
|Dest          C140A|
|              1726|
+-----+
```

Rung 2:639

```
| +GRT-----+
| +GREATER THAN
| |Source A      C140A|
| |              1726|
| |Source B      16383|
| |              |
| +-----+
```

```
+MOV-----+
+MOVE
|Source      16383|
|              |
|Dest        C140A|
|              1726|
+-----+
```

N7:80 - (2:638)

Rung 2:640

```
+ADD-----+
+ADD-----+
|Source A    TC140B|
|              726|
|Source B    1000|
|              |
|Dest        C140B|
|              1726|
+-----+
```

Rung 2:641

```
+GRT-----+
+GREATER THAN
|Source A    C140B|
|              1726|
|Source B    16383|
|              |
+-----+
```

```
+MOV-----+
+MOVE-----+
|Source      16383|
|              |
|Dest        C140B|
|              1726|
+-----+
```

N7:81 - (2:640)

Rung 2:642

```
+ADD-----+
+ADD-----+
|Source A    TC140C|
|              732|
|Source B    1000|
|              |
|Dest        C140C|
|              1732|
+-----+
```

Rung 2:643

```
+GRT-----+
+GREATER THAN
|Source A    C140C|
|              1732|
|Source B    16383|
|              |
+-----+
```

```
+MOV-----+
+MOVE-----+
|Source      16383|
|              |
|Dest        C140C|
|              1732|
+-----+
```

N7:82 - (2:642)

Rung 2:644

```
+ADD-----+
+ADD-----+
|Source A    TC141A|
|              731|
|Source B    1000|
|              |
|Dest        C141A|
|              1731|
+-----+
```

Rung 2:645

+GRT-----+ -GREATER THAN Source A C141A 1731 Source B 16383 +-----+ N7:83 - (2:644)	+MOV-----+ +MOVE Source 16383 Dest C141A 1731 +-----+
---	--

Rung 2:646

 -----+ 	+ADD-----+ +ADD Source A TC141B 725 Source B 1000 Dest C141B 1725 +-----+
-------------------------------------	---

Rung 2:647

+GRT-----+ -GREATER THAN Source A C141B 1725 Source B 16383 +-----+ N7:84 - (2:646)	+MOV-----+ +MOVE Source 16383 Dest C141B 1725 +-----+
---	--

Rung 2:648

 -----+ 	+ADD-----+ +ADD Source A TC141C 728 Source B 1000 Dest C141C 1729 +-----+
-------------------------------------	---

Rung 2:649

+GRT-----+ -GREATER THAN Source A C141C 1729 Source B 16383 +-----+ N7:85 - (2:648)	+MOV-----+ +MOVE Source 16383 Dest C141C 1729 +-----+
---	--

Rung 2:650

```

+ADD-----+
+ADD+
|Source A      TC142A|
|              727|
|Source B      1000|
|              |
|Dest          C142A|
|              1727|
+-----+

```

Rung 2:651

```

| +GRT-----+
| -+GREATER THAN +
| |Source A      C142A|
| |              1727|
| |Source B      16383|
| |              |
| +-----+
| N7:86 - (2:650)

```

```

+MOV-----+
+MOVE-----+
|Source      16383|
|            |
|Dest        C142A|
|            1727|
+-----+

```

Rung 2:652

```

+ADD-----+
+ADD+
|Source A      TC142B|
|              730|
|Source B      1000|
|              |
|Dest          C142B|
|              1730|
+-----+

```

Rung 2:653

```

| +GRT-----+
| -+GREATER THAN +
| |Source A      C142B|
| |              1730|
| |Source B      16383|
| |              |
| +-----+
| N7:87 - (2:652)

```

```

+MOV-----+
+MOVE-----+
|Source      16383|
|            |
|Dest        C142B|
|            1730|

```

Rung 2:654

For each T/C read its STATUS BITS to detect T/C problems

T/C ENABLE

I:19

HA130A
N7:244

123

3

```
+++
| |
| | OPEN T/C |
| | I:19 |
| |-----|
| | 124 |
| | LO LIMIT |
| | I:19 |
| |-----|
| | 125 |
| | HI LIMIT |
| | I:19 |
| |-----|
| | 126 |
| | CNFG ERROR |
| |
| | I:19 |
| |-----|
| | 127 |
| |
```

Rung 2:655

T/C ENABLE

```

| |
| | I:20 |
| |-----|
| | 75 |
| | OPEN T/C |
| | I:20 |
| |-----|
| | 76 |
| | LO LIMIT |
| | I:20 |
| |-----|
| | 77 |
| | HI LIMIT |
| | I:20 |
| |-----|
| | 78 |
| | CNFG ERROR |
| |
| | I:20 |
| |-----|
| | 79 |
| |
```

HA130B
N7:244

4

Rung 2:656

T/C ENABLE

```

| |
| | I:20 |
| |-----|
| | 91 |
| |
| |
| |
```

HA130C
N7:244

5


```

+++
| OPEN T/C |
| I:20 |
|-----|
| 124 |
| LO MLIMIT |
| I:20 |
|-----|
| 125 |
| HI LIMIT |
| I:20 |
|-----|
| 126 |
| CNFG ERROR |
| I:20 |
|-----|
| 127 |

```

Rung 2:659

T/C ENABLE

```

| I:21 |
|-----|
| 75 |
| OPEN T/C |
| I:21 |
|-----|
| 76 |
| LO LIMIT |
| I:21 |
|-----|
| 77 |
| HI LIMIT |
| I:21 |
|-----|
| 78 |
| CNFG ERROR |
| I:21 |
|-----|
| 79 |

```

HA131C

N7:244

()

8

Rung 2:660

T/C ENABLE

```

| I:21 |
|-----|
| 91 |

```

HA132A

N7:244

()

9

```
+++
| | OPEN T/C |
| | I:21 |
| +-----+ |
| | 92 |
| | LO LIMIT |
| | I:21 |
| +-----+ |
| | 93 |
| | HI LIMIT |
| | I:21 |
| +-----+ |
| | 94 |
| | CNFG ERROR |
| | I:21 |
| +-----+ |
| | 95 |
| |
```

Rung 2:661

T/C ENABLE

```
| | I:21 |
| | 107 |
| | OPEN T/C |
| | I:21 |
| +-----+ |
| | 108 |
| | LO LIMIT |
| | I:21 |
| +-----+ |
| | 109 |
| | HI LIMIT |
| | I:21 |
| +-----+ |
| | 110 |
| | CNFG ERROR |
| | I:21 |
| +-----+ |
| | 111 |
| |
```

HA132B
N7:244
() 10

Rung 2:662

T/C ENABLE

```
| | I:21 |
| | 123 |
| |
```

HA133A
N7:244
() 11

+++

```

+++
| |
| | OPEN T/C | |
| | I:21 |
| |-----| |
| | 124 |
| | LO LIMIT |
| | I:21 |
| |-----| |
| | 125 |
| | HI LIMIT |
| | I:21 |
| |-----| |
| | 126 |
| | CNFG ERROR |
| | I:21 |
| |-----| |
| | 127 |
| |

```

Rung 2:663

```

| |
| | T/C ENABLE |
| |
| | I:22 | |
| |-----| |
| | 75 |
| | OPEN T/C |
| | I:22 |
| |-----| |
| | 76 |
| | LO LIMIT |
| | I:22 |
| |-----| |
| | 77 |
| | HI LIMIT |
| | I:22 |
| |-----| |
| | 78 |
| | CNFG ERROR |
| | I:22 |
| |-----| |
| | 79 |
| |

```

HA133B
 N7:244
 () 12

Rung 2:664

```

| |
| | T/C ENABLE |
| |
| | I:22 | |
| |-----| |
| | 91 |
| |

```

HA134A
 N7:244
 () 13

+++

```
+++
| | OPEN T/C |
| | I:22 |
| +-----+
| | 92 |
| | LO LIMIT |
| | I:22 |
| +-----+
| | 93 |
| | HI LIMIT |
| | I:22 |
| +-----+
| | 94 |
| | CNFG ERROR |
| | I:22 |
| +-----+
| | 95 |
| |
```

Rung 2:665

T/C ENABLE

```

| | I:22 |
| | 1/ |
| | 107 |
| | OPEN T/C |
| | I:22 |
| +-----+
| | 108 |
| | LO LIMIT |
| | I:22 |
| +-----+
| | 109 |
| | HI LIMIT |
| | I:22 |
| +-----+
| | 110 |
| | CNFG ERROR |
| | I:22 |
| +-----+
| | 111 |
| |
```

HA134B

N7:244

14

Rung 2:666

T/C ENABLE

```

| | I:22 |
| | 1/ |
| | 123 |
| |
```

HA140A

N7:244

15

```
+++
|
| OPEN T/C
| I:22
|-----+
| 124
| LO LIMIT
| I:22
|-----+
| 125
| HI LIMIT
| I:22
|-----+
| 126
| CNFG ERROR
|
| I:22
|-----+
| 127
|
```

Rung 2:667

```

|
| T/C ENABLE
|
| I:23
|-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 75
| OPEN T/C
| I:23
|-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 76
| LO LIMIT
| I:23
|-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 77
| HI LIMIT
| I:23
|-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 78
| CNFG ERROR
|
| I:23
|-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 79
|
```

HA140B
N7:245
() 0

Rung 2:668

```

|
| T/C ENABLE
|
| I:23
|-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 91
|
|
|
```

HA140C
N7:245
() 1

+++

```

+++
| OPEN T/C |
| I:23 |
|-----|
| 92 |
| LO LIMIT |
| I:23 |
|-----|
| 93 |
| HI LIMIT |
| I:23 |
|-----|
| 94 |
| CNFG ERROR |
| I:23 |
|-----|
| 95 |

```

Rung 2:669

```

| T/C ENABLE |
| I:23 |
|-----|
| 107 |
| OPEN T/C |
| I:23 |
|-----|
| 108 |
| LO LIMIT |
| I:23 |
|-----|
| 109 |
| HI LIMIT |
| I:23 |
|-----|
| 110 |
| CNFG ERROR |
| I:23 |
|-----|
| 111 |

```

HA141A
 N7:245

2

Rung 2:670

```

| T/C ENABLE |
| I:23 |
|-----|
| 123 |

```

HA141B
 N7:245

3

```

+++
| | OPEN T/C |
| | I:23 |
| |-----|
| | 124 |
| | LO LIMIT |
| | I:23 |
| |-----|
| | 125 |
| | HI LIMIT |
| | I:23 |
| |-----|
| | 126 |
| | CNFG ERROR |
| | I:23 |
| |-----|
| | 127 |

```

Rung 2:671

```

| |
| | T/C ENABLE
| |
| | I:24
| |-----|
| | 75 |
| | OPEN T/C |
| | I:24 |
| |-----|
| | 76 |
| | LO LIMIT |
| | I:24 |
| |-----|
| | 77 |
| | HI LIMIT |
| | I:24 |
| |-----|
| | 78 |
| | CNFG ERROR |
| | I:24 |
| |-----|
| | 79 |

```

HA141C
 N7:245
 4

Rung 2:672

```

| |
| | T/C ENABLE
| |
| | I:24
| |-----|
| | 91 |
| |
| |

```

HA142A
 N7:245
 5

+++


```

+++
| | OPEN T/C | |
| | I:24 | |
| |-----| |
| | 92 | |
| | LO LIMIT | |
| | I:24 | |
| |-----| |
| | 93 | |
| | HI LIMIT | |
| | I:24 | |
| |-----| |
| | 94 | |
| | CNFG ERROR | |
| |-----| |
| | I:24 | |
| |-----| |
| | 95 | |

```

Rung 2:673

T/C ENABLE

```

| | I:24 | |
| |-----| |
| | 107 | |
| | OPEN T/C | |
| | I:24 | |
| |-----| |
| | 108 | |
| | LO LIMIT | |
| | I:24 | |
| |-----| |
| | 109 | |
| | HI LIMIT | |
| | I:24 | |
| |-----| |
| | 110 | |
| | CNFG ERROR | |
| |-----| |
| | I:24 | |
| |-----| |
| | 111 | |

```

HA142B
 N7:245

()
 6

Rung 2:674

DEV_4

N20:6

(L)

4

AV4

16

(JMP)

Rung 2:675

| DEV4

| 12

| [LBL]

DUMMY12

N20:7

11

Rung 2:676

ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
 IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

+ADD-----+

+ADD-----+

| Source A AV130|

| 1722|

| Source B DEVIATION|

| 1250|

| Dest H130|

| 2972|

+-----+

+SUB-----+

+SUBTRACT-----+

| Source A AV130|

| 1722|

| Source B DEVIATION|

| 1250|

| Dest L130|

| 472|

+-----+

Rung 2:677

| HA130A

| N7:244

D130A

N7:152

| [/] [GREATER THAN] |

| 3 | Source A C130A | 3

| (2:654) | 1724 |

| | Source B H130 |

| | 2972 |

| +-----+

| N7:68 - (2:614) |

| N10:110 - (2:676) |

| +LES-----+

| +LESS THAN-----+

| Source A C130A |

| 1724 |

| Source B L130 |

| 472 |

| +-----+

| N7:68 - (2:614) |

| N11:20 - (2:676) |

```

Rung 2:678
HA130B
N7:244
+GRT-----+
-|/|-+GREATER THAN-+-----+
4 |Source A C130B|
(2:655) | 1720| 4
|Source B H130|
| 2972|
+-----+
|N7:69 - (2:616)
|N10:110 - (2:676)
|+LES-----+
+--+LESS THAN--+
|Source A C130B|
| 1720|
|Source B L130|
| 472|
+-----+
|N7:69 - (2:616)
|N11:20 - (2:676)

```

```

Rung 2:679
HA130C
N7:244
+-----+
+GREATER THAN+
+-----+
5 | Source A | C130C |
(2:656) | 1721 |
| Source B | H130 |
| 2972 |
+-----+
N7:70 - (2:618)
N10:110 - (2:676)
+LESS THAN+
+-----+
| Source A | C130C |
| 1721 |
| Source B | L130 |
| 472 |
+-----+
N7:70 - (2:618)
N11:20 - (2:676)

```

Rung 2:680

ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING

IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

+ADD-----+
+ADD-----+
| |Source A    AV131| |
| |          1724| |
| |Source B DEVIATION| |
| |          1250| |
| |Dest       H131| |
| |          2974| |
+-----+
+++

```

```

+++
| +SUB-----+
| +SUBTRACT
| |Source A      AV131|
| |              1724|
| |Source B DEVIATION|
| |              1250|
| |Dest          L131|
| |              474|
| +-----+
  
```

```

Rung 2:681
| HA131A
| N7:244
| 1/[-]
| 6
| (2:657)
|
| +GRT-----+
| |Source A      C131A|
| |              1727|
| |Source B      H131|
| |              2974|
| +-----+
| |N7:71 - (2:620)|
| |N10:111 - (2:680)|
| +-----+
| +LESS THAN
| |Source A      C131A|
| |              1727|
| |Source B      L131|
| |              474|
| +-----+
| |N7:71 - (2:620)|
| |N11:21 - (2:680)|
|
| D131A
| N7:152
| ( )
| 6
  
```

```

Rung 2:682
| HA131B
| N7:244
| 1/[-]
| 7
| (2:658)
|
| +GRT-----+
| |Source A      C131B|
| |              1722|
| |Source B      H131|
| |              2974|
| +-----+
| |N7:72 - (2:622)|
| |N10:111 - (2:680)|
| +-----+
| +LESS THAN
| |Source A      C131B|
| |              1722|
| |Source B      L131|
| |              474|
| +-----+
| |N7:72 - (2:622)|
| |N11:21 - (2:680)|
|
| D131B
| N7:152
| ( )
| 7
  
```

```

Rung 2:683
| HA131C
| N7:244
|-----+GRT-----+
| J/I | GREATER THAN |-----+
| 8 | Source A C131C |
| (2:659) | 1724 |
| | Source B H131 |
| | 2974 |
| |-----+
| | N7:73 - (2:624) |
| | N10:111 - (2:680) |
| | +LES-----+
| | +LESS THAN |-----+
| | Source A C131C |
| | 1724 |
| | Source B L131 |
| | 474 |
| |-----+
| | N7:73 - (2:624) |
| | N11:21 - (2:680) |

```

Rung 2:684

ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|-----+ADD-----+
| ADD |
| | Source A AV132 |
| | 1728 |
| | Source B DEVIATION |
| | 1250 |
| | Dest H132 |
| | 2978 |
| |-----+
| | +SUB-----+
| | +SUBTRACT |-----+
| | Source A AV132 |
| | 1728 |
| | Source B DEVIATION |
| | 1250 |
| | Dest L132 |
| | 478 |
| |-----+

```

Rung 2:685

```

| HA132A
| N7:244
|-----+GRT-----+
| J/I | GREATER THAN |-----+
| 9 | Source A C132A |
| (2:660) | 1727 |
| | Source B H132 |
| | 2978 |
| |-----+
| | N7:74 - (2:626) |
| | N10:112 - (2:684) |
| |-----+
| |-----+
| |-----+

```

```

+++
|
| +LES-----+
| +-LESS THAN +-+
| |Source A    C132A|
| |           1727|
| |Source B    L132|
| |           478|
| +-----+
| N7:74 - (2:626)
| N11:22 - (2:684)
|

```

Rung 2:686

```

| HA132B
| N7:244
|
| +GRT-----+
| -]/[-----+ +GREATER THAN +-----+
| 10 |Source A    C132B|
| (2:661) |           1728|
| |Source B    H132|
| |           2978|
| +-----+
| N7:75 - (2:628)
| N10:112 - (2:684)
| +LES-----+
| +-LESS THAN +-+
| |Source A    C132B|
| |           1728|
| |Source B    L132|
| |           478|
| +-----+
| N7:75 - (2:628)
| N11:22 - (2:684)
|

```

Rung 2:687

ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
 IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|
| +ADD-----+
| +ADD
| |Source A    AV133|
| |           1721|
| |Source B DEVIATION|
| |           1250|
| |Dest        H133|
| |           2971|
| +-----+
| +SUB-----+
| +SUBTRACT
| |Source A    AV133|
| |           1721|
| |Source B DEVIATION|
| |           1250|
| |Dest        L133|
| |           471|
| +-----+
|

```

```

Rung 2:688
HA133A
N7:244 +GRT-----+
|/|-----+GREATER THAN+-----+
| 11 | |Source A C133A| | |
| (2:662) | | 1724| |
| | | |Source B H133| |
| | | | 2971| |
| | | +-----+
| | | N7:76 - (2:630) |
| | | N10:113 - (2:687) |
| | | +LES-----+
| | | +-LESS THAN+--+
| | | |Source A C133A|
| | | | 1724|
| | | |Source B L133|
| | | | 471|
| | | +-----+
| | | N7:76 - (2:630)
| | | N11:23 - (2:687)
  
```

```

Rung 2:689
HA133B
N7:244 +GRT-----+
|/|-----+GREATER THAN+-----+
| 12 | |Source A C133B| | |
| (2:663) | | 1717| |
| | | |Source B H133| |
| | | | 2971| |
| | | +-----+
| | | N7:77 - (2:632) |
| | | N10:113 - (2:687) |
| | | +LES-----+
| | | +-LESS THAN+--+
| | | |Source A C133B|
| | | | 1717|
| | | |Source B L133|
| | | | 471|
| | | +-----+
| | | N7:77 - (2:632)
| | | N11:23 - (2:687)
  
```

Rung 2:690

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
 IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

+ADD-----+
| | | +ADD+-----+
| | | |Source A AV134| |
| | | | 1723| |
| | | |Source B DEVIATION| |
| | | | 1250| |
| | | |Dest H134| |
| | | | 2973| |
| | | +-----+
  
```

```

      +--+
      |
      | +SUB-----+
      | +SUBTRACT +--+
      | |Source A      AV134|
      | |              1723|
      | |Source B DEVIATION|
      | |              1250|
      | |Dest           L134|
      | |              473|
      | +-----+
  
```

Rung 2:691

```

  | HA134A
  | N7:244
  | +GRT-----+
  | 1/|-----+ GREATER THAN +-----+
  | 13 | |Source A      C134A|
  | (2:664) | |              1723|
  |         | |Source B      H134|
  |         | |              2973|
  |         | +-----+
  |         | N7:78 - (2:634)
  |         | N10:114 - (2:690)
  |         | +LES-----+
  |         | +LESS THAN +--+
  |         | |Source A      C134A|
  |         | |              1723|
  |         | |Source B      L134|
  |         | |              473|
  |         | +-----+
  |         | N7:78 - (2:634)
  |         | N11:24 - (2:690)
  
```

Rung 2:692

```

  | HA134B
  | N7:244
  | +GRT-----+
  | 1/|-----+ GREATER THAN +-----+
  | 14 | |Source A      C134B|
  | (2:665) | |              1722|
  |         | |Source B      H134|
  |         | |              2973|
  |         | +-----+
  |         | N7:79 - (2:636)
  |         | N10:114 - (2:690)
  |         | +LES-----+
  |         | +LESS THAN +--+
  |         | |Source A      C134B|
  |         | |              1722|
  |         | |Source B      L134|
  |         | |              473|
  |         | +-----+
  |         | N7:79 - (2:636)
  |         | N11:24 - (2:690)
  
```


Rung 2:693

```

*****
ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION
+ADD-----+
|Source A      AV140|
|              1728|
|Source B DEVIATION|
|              1250|
|Dest          H140|
|              2978|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A      AV140|
|              1728|
|Source B DEVIATION|
|              1250|
|Dest          L140|
|              478|
+-----+
  
```

Rung 2:694

```

| HA140A                      D140A
| N7:244                      N7:152
| +GRT-----+              ( )
| 1/[-----+GREATER THAN-----+
| 15      |Source A      C140A|
| (2:666) |              1726|
|          |Source B      H140|
|          |              2978|
|          +-----+
|          |N7:80 - (2:638)|
|          |N10:115 - (2:693)|
|          +LES-----+
|          +LESS THAN-----+
|          |Source A      C140A|
|          |              1726|
|          |Source B      L140|
|          |              478|
|          +-----+
|          |N7:80 - (2:638)|
|          |N11:25 - (2:693)|
  
```

Rung 2:695

```

| HA140B                      D140B
| N7:245                      N7:153
| +GRT-----+              ( )
| 1/[-----+GREATER THAN-----+
| 0      |Source A      C140B|
| (2:667) |              1726|
|          |Source B      H140|
|          |              2978|
|          +-----+
|          |N7:81 - (2:640)|
|          |N10:115 - (2:693)|
  
```

+++

+++

```

+++
|
| +LES-----+
| +--LESS THAN--+
| |Source A      C140B|
| |              1726|
| |Source B      L140|
| |              478|
| +-----+
| N7:81 - (2:640)
| N11:25 - (2:693)
|

```

Rung 2:696

```

| HA140C
| N7:245
|-----+GRT-----+-----+
| 1/| GREATER THAN |-----+
| |Source A      C140C|
| (2:668) |          1732|
| |Source B      H140|
| |          2978|
| +-----+
| N7:82 - (2:642)
| N10:115 - (2:693)
| +-----+
| +LES-----+
| +--LESS THAN--+
| |Source A      C140C|
| |          1732|
| |Source B      L140|
| |          478|
| +-----+
| N7:82 - (2:642)
| N11:25 - (2:693)
|

```

Rung 2:697

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
 IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|-----+ADD-----+
| |Source A      AV141|
| |          1728|
| |Source B DEVIATION|
| |          1250|
| |Dest          H141|
| |          2978|
| +-----+
| +SUB-----+
| +SUBTRACT
| |Source A      AV141|
| |          1728|
| |Source B DEVIATION|
| |          1250|
| |Dest          L141|
| |          478|
| +-----+

```

```

Rung 2:698
| HA141A
| N7:245
|-----+GRT-----+
| 1/[-----+GREATER THAN-----+-----+-----+
| 2 | |Source A | C141A| |
| (2:669) | | | 1731| |
| | |Source B | H141| |
| | | | 2978| |
| | |-----+
| | N7:83 - (2:644) |
| | N10:116 - (2:697) |
| | +LES-----+
| | +LESS THAN +--+
| | |Source A | C141A| |
| | | | 1731| |
| | |Source B | L141| |
| | | | 478| |
| | |-----+
| | N7:83 - (2:644) |
| | N11:26 - (2:697) |
  
```

D141A
 N7:153

()

2

```

Rung 2:699
| HA141B
| N7:245
|-----+GRT-----+
| 1/[-----+GREATER THAN-----+-----+-----+
| 3 | |Source A | C141B| |
| (2:670) | | | 1725| |
| | |Source B | H141| |
| | | | 2978| |
| | |-----+
| | N7:84 - (2:646) |
| | N10:116 - (2:697) |
| | +LES-----+
| | +LESS THAN +--+
| | |Source A | C141B| |
| | | | 1725| |
| | |Source B | L141| |
| | | | 478| |
| | |-----+
| | N7:84 - (2:646) |
| | N11:26 - (2:697) |
  
```

D141B
 N7:153

()

3

```

Rung 2:700
| HA141C
| N7:245
|-----+GRT-----+
| 1/[-----+GREATER THAN-----+-----+-----+
| 4 | |Source A | C141C| |
| (2:671) | | | 1729| |
| | |Source B | H141| |
| | | | 2978| |
| | |-----+
| | N7:85 - (2:648) |
| | N10:116 - (2:697) |
  
```

D141C
 N7:153

()

4

+++

+++

```

+++
|
| +LES-----+
| +-LESS THAN +-
| |Source A      C141C|
| |              1729|
| |Source B      L141|
| |              478|
| +-----+
| N7:85 - (2:648)
| N11:26 - (2:697)
|

```

Rung 2:701

```

*****
ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING
IF NO HARDWARE ALARMS EXIST CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION
|
| +ADD-----+
| +ADD
| |Source A      AV142|
| |              1729|
| |Source B DEVIATION|
| |              1250|
| |Dest          H142|
| |              2979|
| +-----+
| +SUB-----+
| +SUBTRACT
| |Source A      AV142|
| |              1729|
| |Source B DEVIATION|
| |              1250|
| |Dest          L142|
| |              479|
| +-----+

```

Rung 2:702

```

| HA142A
| N7:245
|
| +GRT-----+
| 1/| +GREATER THAN
| 5 | |Source A      C142A|
| (2:672) | |              1727|
| | |Source B      H142|
| | |              2979|
| | +-----+
| | N7:86 - (2:650)
| | N10:117 - (2:701)
| | +LES-----+
| | +-LESS THAN +-
| | |Source A      C142A|
| | |              1727|
| | |Source B      L142|
| | |              479|
| | +-----+
| | N7:86 - (2:650)
| | N11:27 - (2:701)
|

```

D142A
 N7:153

```

Rung 2:703
| HA142B
| N7:245
|-----+GRT-----+-----+
| 6 | |Source A C142B| |
| (2:673) | | 1730| |
| | |Source B H142| |
| | | 2979| |
| |-----+-----+
| N7:87 - (2:652)
| N10:117 - (2:701)
| +LES-----+
| +LESS THAN +--+
| |Source A C142B|
| | 1730|
| |Source B L142|
| | 479|
| |-----+-----+
| N7:87 - (2:652)
| N11:27 - (2:701)
  
```

D142B
 N7:153
 ()
 6

Rung 2:704

DEV_4
 N20:6
 (U)
 4

Rung 2:705
 | AV4

DUMMY13
 N20:7
 ()
 12

Rung 2:706

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

```

+CLR-----+
+CLEAR +--+
|Dest COUNT| |
| | 4| |
| +-----+ |
| +CLR-----+ |
+--CLEAR +--+
|Dest TOTAL|
| 3472.000|
+-----+
  
```

Rung 2:707			
D130A	HA130A	OUT130A	
N7:152	N7:244	N7:250	
1/[	1/[	1/[	+ADD-----+
3	3	7	+ADD
(2:677)	(2:654)		Source A 1
			Source B COUNT
			Dest COUNT
			Dest COUNT
			+-----+
	DEV_4		+ADD-----+
	N20:6		+ADD
	4		Source A C130A
	(2:674)		1724
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:708			
HA130B	D130B	OUT130B	
N7:244	N7:152	N7:250	
1/[	1/[	1/[	+ADD-----+
4	4	8	+ADD
(2:655)	(2:678)		Source A 1
			Source B COUNT
			Dest COUNT
			Dest COUNT
			+-----+
	DEV_4		+ADD-----+
	N20:6		+ADD
	4		Source A C130B
	(2:674)		1720
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

N7:251

34[--

5.

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CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
HAVE BEEN TAKEN OUT (TE OUTxxx) THEN AVERAGE THE T/C

107.

Rung 2:712			
HA131A	D131A	OUT131A	
N7:244	N7:152	N7:250	
1/[	1/[	1/[	+ADD-----+
6	6	10	+ADD
(2:657)	(2:681)		Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_4		+ADD-----+
	N20:6		+ADD
	4		Source A C131A
	(2:674)		1727
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:713			
HA131B	D131B	OUT131B	
N7:244	N7:152	N7:250	
1/[	1/[	1/[	+ADD-----+
7	7	11	+ADD
(2:658)	(2:682)		Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_4		+ADD-----+
	N20:6		+ADD
	4		Source A C131B
	(2:674)		1722
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:717

HA132A	D132A	OUT132A	
N7:244	N7:152	N7:250	
1/[	1/[	1/[	+ADD-----+
9	9	13	+ADD
(2:660)	(2:685)		Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_4		+ADD-----+
	N20:6		+ADD
	4		Source A C132A
	(2:674)		1727
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:718

HA132B	D132B	OUT132B	
N7:244	N7:152	N7:250	
1/[	1/[	1/[	+ADD-----+
10	10	14	+ADD
(2:661)	(2:686)		Source A 1
			Source B COUNT
			4
			Dest COUNT
			4
			+-----+
	DEV_4		+ADD-----+
	N20:6		+ADD
	4		Source A C132B
	(2:674)		1728
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+

Rung 2:719

			+DIV-----+
			+DIVIDE
			Source A TOTAL
			3472.000
			Source B COUNT
			4
			Dest AV132
			1728
			+-----+

Rung 2:720

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

		+CLR-----+
		+CLEAR-----+
	Dest	COUNT
		4
		+-----+
		+CLR-----+
		+CLEAR-----+
	Dest	TOTAL
		3472.000
		+-----+

Rung 2:721

HA133A	D133A	OUT133A	
N7:244	N7:152	N7:250	
-1/[	-1/[	-1/[	+ADD-----+
11	11	15	+ADD-----+
(2:662)	(2:688)		Source A
			1
			Source B
			COUNT
			4
			Dest
			COUNT
			4
			+-----+
	DEV_4		
	N20:6		+ADD-----+
			+ADD-----+
	4		Source A
	(2:674)		C133A
			1724
			Source B
			TOTAL
			3472.000
			Dest
			TOTAL
			3472.000
			+-----+

Rung 2:722

HA133B	D133B	OUT133B	
N7:244	N7:152	N7:251	
-1/[	-1/[	-1/[	+ADD-----+
12	12	0	+ADD-----+
(2:663)	(2:689)		Source A
			1
			Source B
			COUNT
			4
			Dest
			COUNT
			4
			+-----+

```

++                                     ++
|                                     |
|                                     |
|+ADD-----+
+--ADD                                     +-+
|Source A          C133B|
|                  1717|
|Source B          TOTAL|
|                  3472.000|
|Dest              TOTAL|
|                  3472.000|
|-----+

```

```

+DIV-----+
+DIVIDE      +-
|Source A      TOTAL|
|              3472.000|
|Source B      COUNT|
|              4|
|Dest          AV133|
|              1721|
+-----+

```

```

+CLR-----+
+---+CLEAR+---+
| |Dest          COUNT| |
| |          41      | |
| +-----+ |
| +CLR+-----+ |
+---+CLEAR+---+
| |Dest          TOTAL| |
| |          3472.000| |
+---+-----+

```

```

+ADD-----+
+-+ADD      +-+
| |Source A    |1| |
| |          |  | |
| |Source B    |COUNT| |
| |          |4| |
| |Dest       |COUNT| |
| |          |4| |
+-----+
+-----+

```

```

++                                     ++
|                                     |
|                                     |
| +ADD-----+
+--ADD                               +-+
|Source A           C134A|
|                   1723|
|Source B           TOTAL|
|                   3472.000|
|Dest              TOTAL|
|                   3472.000|
|-----|

```

+ADD-----+	
+ADD	
Source A	1
Source B	COUNT
	4
Dest	COUNT
	4
+ADD-----+	
+ADD	
Source A	C134B
	1722
Source B	TOTAL
	3472.000
Dest	TOTAL
	3472.000

```

+DIV-----+
+DIVIDE      +
|Source A      TOTAL|
|              3472.000|
|Source B      COUNT|
|              41|
|Dest          AV134|
|              1723|
+-----+

```

CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

```

|                                     +CLR-----+
|-----+-----+-----+-----+-----+-----+-----+-----+-----+
|                                     +CLEAR-----+
|                                     |Dest          COUNT|
|                                     | |              4 |
|                                     +-----+-----+
|                                     |
|                                     +-----+-----+
|                                     +++             +++

```

			+++	+++
			+CLR-----+	
			+CLEAR-----+	
			Dest	TOTAL
				3472.000
			+-----+	
Rung 2:729	D140A	OUT140A		
HA140A	N7:152	N7:251		
N7:244			+ADD-----+	+
1/[-	1/[-	1/[-	+ADD	+
15	15	3	Source A	1
(2:666)	(2:694)		Source B	COUNT
			Dest	COUNT
				4
			+-----+	
	DEV_4			
	N20:6		+ADD-----+	+
	]-[-		+ADD	+
	4		Source A	C140A
	(2:674)			1726
			Source B	TOTAL
				3472.000
			Dest	TOTAL
				3472.000
			+-----+	
Rung 2:730	D140B	OUT140B		
HA140B	N7:153	N7:251		
N7:245			+ADD-----+	+
1/[-	1/[-	1/[-	+ADD	+
0	0	4	Source A	1
(2:667)	(2:695)		Source B	COUNT
			Dest	COUNT
				4
			+-----+	
	DEV_4			
	N20:6		+ADD-----+	+
	]-[-		+ADD	+
	4		Source A	C140B
	(2:674)			1726
			Source B	TOTAL
				3472.000
			Dest	TOTAL
				3472.000
			+-----+	

Rung 2:731

HA140C	D140C	OUT140C	
N7:245	N7:153	N7:251	
1	1	5	+ADD-----+
(2:668)	(2:696)		Source A
			Source B
			Dest
			+-----+
	DEV_4		+ADD-----+
	N20:6		Source A
			Source B
			Dest
			+-----+
	4		+ADD-----+
	(2:674)		Source A
			Source B
			Dest
			+-----+

Rung 2:732

	+DIV-----+
	DIVIDE
	Source A
	Source B
	Dest
	+-----+

Rung 2:733

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

	+CLR-----+
	CLEAR
	Dest
	+-----+
	+CLR-----+
	CLEAR
	Dest
	+-----+

Rung 2:734			
HA141A	D141A	OUT141A	
N7:245	N7:153	N7:251	
1/[-	1/[-	1/[-	+ADD-----+
2	2	6	+ADD
(2:669)	(2:698)		Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_4		+ADD-----+
	N20:6		+ADD
			Source A C141A
			1731
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+
	4		
	(2:674)		

Rung 2:735			
HA141B	D141B	OUT141B	
N7:245	N7:153	N7:251	
1/[-	1/[-	1/[-	+ADD-----+
3	3	7	+ADD
(2:670)	(2:699)		Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_4		+ADD-----+
	N20:6		+ADD
			Source A C141B
			1725
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+
	4		
	(2:674)		

Rung 2:739

HA142A	D142A	OUT142A	
N7:245	N7:153	N7:251	
5	5	9	+ADD-----+
(2:672)	(2:702)		+ADD-----+
			Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_4		+ADD-----+
	N20:6		+ADD-----+
			Source A C142A
			1727
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+
	4		
	(2:674)		

Rung 2:740

HA142B	D142B	OUT142B	
N7:245	N7:153	N7:251	
6	6	10	+ADD-----+
(2:673)	(2:703)		+ADD-----+
			Source A 1
			Source B COUNT
			Dest COUNT
			4
			+-----+
	DEV_4		+ADD-----+
	N20:6		+ADD-----+
			Source A C142B
			1730
			Source B TOTAL
			3472.000
			Dest TOTAL
			3472.000
			+-----+
	4		
	(2:674)		

Rung 2:741

			+DIV-----+
			+DIVIDE-----+
			Source A TOTAL
			3472.000
			Source B COUNT
			4
			Dest AV142
			1729
			+-----+

Rung 2:742

```

*****
IF DEVIATION SET FOR SECTION 4 THEN GO THERE AND CALCULATE DEVIATION
|
|          DEV4
|  DEV_4
|  N20:6
|
|          12
|  ] [-----(JMP)
|  4
|  (2:674)

```

Rung 2:743

```

*****
IF RATE CALCULATIONS ARE FINISHED THEN GO TO THE PID BLOCK
|
| RT_TMR/DN PID130
| T4:62
|
|-----] / [-----] 36
| DN (JMP)
| (2:33)

```

Rung 2:744

RATE CHECKING

```

+MOV-----+
|MOVE|
|Source AV130|
|1722|
|Dest R1_130|
|1722|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A R1_130|
|1722|
|Source B R2_130|
|1722|
|Dest DIF1_130|
|10|
+-----+
+MOV-----+
+MOVE-----+
|Source R1_130|
|1722|
|Dest R2_130|
|1722|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A DIF1_130|
|10|
|Source B DIF2_130|
|10|
|Dest DDIF|
|1|
+-----+

```

```

+++
+MOV-----+
+MOVE-----+
|Source      DIF1_130|
|              10|
|Dest        DIF2_130|
|              10|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A    DIF1_130|
|              10|
|Source B      9|
|Dest        DIF1_130|
|              10|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A    DIF1_130|
|              10|
|Source B    DIF1_130|
|              10|
|Dest        ACC|
|              828|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A    DIF1_130|
|              10|
|Source B      ACC|
|              828|
|Dest        ACC|
|              828|
+-----+
+CLR-----+
+CLEAR-----+
|Dest        S:5|
|              0|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A      DDIF|
|              1|
|Source B      DDIF|
|              1|
|Dest        ACC1|
|              -728|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A      DDIF|
|              1|
|Source B      ACC1|
|              -728|
|Dest        ACC1|
|              -728|
+-----+
+++

```

```

+++
|
|
|-----+CLR-----+
|
|-----+CLEAR
|Dest      S:5|
|          0|
|-----+
|
|SCRATCH
|N20:12
+-----+
+|EQU-----+
+|EQUAL      +-----+
|Source A    ACC| 0
|          828|
|Source B    0|
|
|-----+
|N20:0 - (2:190)
+|EQU-----+
+|EQUAL      +-----+SUB-----+
|Source A    ACC| |Source A    ACC|
|          828| |          828|
|Source B    1| |Source B    1|
|
|-----+
|N20:0 - (2:190) |Dest      ACC|
|          828|
|-----+
|
|SCRATCH
|N20:12
|] [-----+
|          0
|(2:190)
|
|-----+ADD-----+
|
|-----+ADD
|Source A    ACC|
|          828|
|Source B    1|
|
|-----+
|Dest      ACC|
|          828|
|-----+
|
|-----+ADD-----+
|
|-----+ADD
|Source A    ACC|
|          828|
|Source B    ACC|
|          -728|
|Dest      ACC|
|          -728|
|-----+
|
|-----+SUB-----+
+-----+SUBTRACT
|Source A    N14:191|
|          100|
|Source B    ACC|
|          -728|
|Dest      ACC|
|          828|
|-----+
+++

```

```

***
|
| +GRT-----+ +MOV-----+
| +--GREATER THAN +--MOVE
| |Source A      ACC| |Source      100|
| |              828| |              |
| |Source B      100| |Dest      N14:191|
| |              | |              100|
| +-----+ +-----+
| N20:0 - (2:190)
|
| +LES-----+ +MOV-----+
| +--LESS THAN +--MOVE
| |Source A      ACC| |Source      1|
| |              828| |              |
| |Source B      1| |Dest      N14:191|
| |              | |              100|
| +-----+ +-----+
| N20:0 - (2:190)
|
| +LIM-----+ +MOV-----+
| +--LIMIT TEST +--MOVE
| |Low Lim      1| |Source      ACC|
| |              | |              828|
| |Test          ACC| |Dest      N14:191|
| |              828| |              100|
| |High Lim      100| +-----+
| +-----+
| N20:0 - (2:190)

```

Rung 2:745

```

| PID130
|
| 36
| ---[LBL]----- ( )
|
| 2

```

Rung 2:746

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

```

| ON130
| N7:120
| 1/[
| 7
| (3:25)
|
| +CLR-----+
| +CLEAR
| |Dest      PW130|
| |              0|
| +-----+
| 74
| +--(JMP)-----+

```

Rung 2:747

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

```

| AM130
| N7:120
| 1/[
| 6
| (3:25)
|
| PID130/1
| N14:180
| --- ( )
|
| 1

```

Rung 2:748

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

```

|-----+MOV-----+
|-----+MOVE-----+
|Source      SET130|
|            01|
|Dest        PIDSP130|
|            01|
|-----+-----+

```

Rung 2:749

```

|-----+PID-----+
|-----+PID-----+
|Control Block  PID130|
|Process Variable AV130|
|Control Variable CV130|
|Control Block Length 23|
|-----+-----+
|+SCL-----+
|+SCALE-----+
|Source      CV130|
|            01|
|Rate [ /10000] 15|
|Offset      01|
|Dest        PW130|
|            01|
|-----+-----+
|+CLR-----+
|+CLEAR-----+
|Dest        S:5|
|            01|
|-----+-----+

```

Rung 2:750

```

| 74
|---[LBL]-----N20:10
|                                     ( )
|                                     12

```

Rung 2:751

```

|-----PID131
| RT_TMR/DN
| T4:62
|-----1/[-----37
| DN (JMP)
| (2:33)

```

Rung 2:752

RATE CHECKING

```

|-----+MOV-----+
|-----+MOVE-----+
|Source      AV131|
|            1724|
|Dest        R1_131|
|            1723|
|-----+-----+

```

```

***
+-----+
+SUB-----+
+SUBTRACT   +
|Source A   R1_131|
|           1723|
|Source B   R2_131|
|           1723|
|Dest       DIF1_131|
|           10|
+-----+
+MOV-----+
+MOVE       +
|Source     R1_131|
|           1723|
|Dest       R2_131|
|           1723|
+-----+
+SUB-----+
+SUBTRACT   +
|Source A   DIF1_131|
|           10|
|Source B   DIF2_131|
|           10|
|Dest       DDIF|
|           1|
+-----+
+MOV-----+
+MOVE       +
|Source     DIF1_131|
|           10|
|Dest       DIF2_131|
|           10|
+-----+
+SUB-----+
+SUBTRACT   +
|Source A   DIF1_131|
|           10|
|Source B   9|
|Dest       DIF1_131|
|           10|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A   DIF1_131|
|           10|
|Source B   DIF1_131|
|           10|
|Dest       ACC|
|           828|
+-----+
***

```


+++

```

+++
| SCRATCH
| N20:12
| ] [-
| 0
| (2:190)
|
| +ADD-----+
| +ADD
| |Source A      ACC|
| |              828|
| |Source B      1|
| |Dest          ACC|
| |              828|
| +-----+
| +ADD-----+
| +ADD
| |Source A      ACC|
| |              828|
| |Source B      ACC1|
| |              -728|
| |Dest          ACC1|
| |              -728|
| +-----+
| +SUB-----+
| +SUBTRACT
| |Source A      N15:11|
| |              100|
| |Source B      ACC1|
| |              -728|
| |Dest          ACC|
| |              828|
| +-----+
| +GRT-----+
| +GREATER THAN
| |Source A      ACC|
| |              828|
| |Source B      100|
| |Dest          N15:11|
| |              100|
| +-----+
| N20:0 - (2:190)
| +LES-----+
| +LESS THAN
| |Source A      ACC|
| |              828|
| |Source B      1|
| |Dest          N15:11|
| |              100|
| +-----+
| N20:0 - (2:190)
| +LIM-----+
| +LIMIT TEST
| |Low Lim      1|
| |Test          ACC|
| |              828|
| |High Lim     100|
| +-----+
| N20:0 - (2:190)

```

Rung 2:753
 PID131

	37	DUMMY36
	----	N20:9
	[LBL]-----	()
		3

Rung 2:754

DETECT FROM SCADA PID ON/OFF
 IF PID OFF
 THEN ZERO PW FOR ZERO OUTPUT AT SCR
 AND JUMP AROUND THE PID BLOCK

	ON131		
	N7:120		
	----	+CLR-----	
	9	+CLEAR	
	(3:25)	Dest	PW131
			0
		+	
		75	
		+(JMP)-----	

Rung 2:755

DETECT AUTO/MANUAL FROM SCADA
 SET APPROPRIATE MODE IN PID BLOCK

	AM131		PID131/1
	N7:120		N15:0
	----	-----	()
	8		1
	(3:25)		

Rung 2:756

DETECT SETPOINT VALUE FROM SCADA
 PUT VALUE IN PID BLOCK

		+MOV-----	
		+MOVE	
		Source	SET131
			0
		Dest	PIDSP131
			0
		+	

Rung 2:757

		+PID-----	
		+PID	
		Control Block	PID131
		Process Variable	AV131
		Control Variable	CV131
		Control Block Length	23
		+	
		+++	+++

```

+++
|
| +SCL-----+
| +SCALE
| |Source      CV131|
| |Rate [ /10000] 15|
| |Offset      0|
| |Dest        PW131|
| |            0|
| +-----+
| +CLR-----+
| +CLEAR
| |Dest        S:5|
| |            0|
| +-----+
  
```

Rung 2:758

```

| 75
| [LBL]-----N20:10
|                                     ( )
|                                     13
  
```

Rung 2:759

```

|
| RT_TMR/DN PID132
| T4:62
| ]/[-----38
| DN (JMP)
| (2:33)
  
```

Rung 2:760

RATE CHECKING

```

|
| +MOV-----+
| +MOVE
| |Source      AV132|
| |            1728|
| |Dest        R1_132|
| |            1727|
| +-----+
| +SUB-----+
| +SUBTRACT
| |Source A     R1_132|
| |            1727|
| |Source B     R2_132|
| |            1727|
| |Dest        DIF1_132|
| |            10|
| +-----+
| +MOV-----+
| +MOVE
| |Source      R1_132|
| |            1727|
| |Dest        R2_132|
| |            1727|
| +-----+
  
```

```

***
+-----+
+SUB-----+
|SUBTRACT|
|Source A  DIF1_132|
|           10|
|Source B  DIF2_132|
|           10|
|Dest      DDIF|
|           1|
+-----+
+MOV-----+
+MOVE-----+
|Source     DIF1_132|
|           10|
|Dest       DIF2_132|
|           10|
+-----+
+SUB-----+
|SUBTRACT|
|Source A  DIF1_132|
|           10|
|Source B           |
|           9|
|Dest      DIF1_132|
|           10|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A  DIF1_132|
|           10|
|Source B  DIF1_132|
|           10|
|Dest      ACC|
|           828|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A  DIF1_132|
|           10|
|Source B      ACC|
|           828|
|Dest      ACC|
|           828|
+-----+
+CLR-----+
+CLEAR-----+
|Dest      S:5|
|           0|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A      DDIF|
|           1|
|Source B      DDIF|
|           1|
|Dest      ACC1|
|           -728|
+-----+
***

```

```

+++
+MUL-----+
+MULTIPLY   +
+Source A    + DDIF|
+Source B    + 1|
+Dest        + ACC1|
+            + -728|
+            + ACC1|
+            + -728|
+-----+
+CLR-----+
+CLEAR      +
+Dest       + S:5|
+           + 0|
+-----+
+EQU-----+
+EQUAL      +
+Source A    + ACC|
+Source B    + 828|
+           + 0|
+-----+
N20:0 - (2:190)
+EQU-----+
+SUB-----+
+SUBTRACT   +
+Source A    + ACC|
+Source B    + 828|
+           + 1|
+Dest        + ACC|
+           + 828|
+-----+
N20:0 - (2:190)
SCRATCH
N20:12
1 [-
0
(2:190)
+ADD-----+
+ADD        +
+Source A    + ACC|
+Source B    + 828|
+           + 1|
+Dest        + ACC|
+           + 828|
+-----+
+ADD-----+
+ADD        +
+Source A    + ACC|
+Source B    + 828|
+           + ACC1|
+Dest        + -728|
+           + ACC1|
+           + -728|
+-----+
+++

```

```

+++
+-----+
+SUB-----+
+SUBTRACT
+-----+
|Source A      N15:41|
|              100|
|Source B      ACC1|
|              -728|
|Dest          ACC|
|              828|
+-----+
+GRT-----+ +MOV-----+
+GREATER THAN +MOVE
+-----+ +-----+
|Source A      ACC| |Source      100|
|              828| |
|Source B      100| |Dest        N15:41|
|              | |              100|
+-----+ +-----+
|N20:0 - (2:190)|
+LES-----+ +MOV-----+
+LESS THAN    +MOVE
+-----+ +-----+
|Source A      ACC| |Source      1|
|              828| |
|Source B      1| |Dest        N15:41|
|              | |              100|
+-----+ +-----+
|N20:0 - (2:190)|
+LIM-----+ +MOV-----+
+LIMIT TEST   +MOVE
+-----+ +-----+
|Low Lim      1| |Source      ACC|
|              | |              828|
|Test         ACC| |Dest        N15:41|
|              828| |              100|
|High Lim     100| +-----+
|              |
+-----+
|N20:0 - (2:190)|

```

Rung 2:761

PID132

38

[LBL]

DUMMY37

N20:9

4

Rung 2:762

DETECT FROM SCADA PID ON/OFF
 IF PID OFF
 THEN ZERO PW FOR ZERO OUTPUT AT SCR
 AND JUMP AROUND THE PID BLOCK

ON132
 N7:120

1/(

11

(3:25)

```

+-----+
+CLR-----+
+CLEAR
+-----+
|Dest          PW132|
|              01|
+-----+
|              76|
+-(JMP)-+

```

Rung 2:763

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

	AM132	PID132/1
	N7:120	N15:30
	1/1	()
	10	1
	(3:25)	

Rung 2:764

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

		+MOV-	+
		+MOVE	+
		Source	SET132
			0
		Dest	PIDSP132
			0
		+-----+	

Rung 2:765

		+PID-	+
		+PID	+
		Control Block	PID132
		Process Variable	AV132
		Control Variable	CV132
		Control Block Length	23
		+-----+	
		+SCL-	+
		+SCALE	+
		Source	CV132
			0
		Rate [/10000]	15
		Offset	0
		Dest	PW132
			0
		+-----+	
		+CLR-	+
		+CLEAR	+
		Dest	S:5
			0
		+-----+	

Rung 2:766

	76	N20:10
	[LBL]	()
		14

Rung 2:767

		PID133
	RT_TMR/DN	
	T4:62	39
	1/1	(JMP)
	DN	
	(2:33)	

Rung 2:768

RATE CHECKING

```

+MOV-----+
+MOVE-----+
|Source      AV133|
|            1721|
|Dest        R1_133|
|            1721|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A    R1_133|
|            1721|
|Source B    R2_133|
|            1721|
|Dest        DIF1_133|
|            10|
+-----+
+MOV-----+
+MOVE-----+
|Source      R1_133|
|            1721|
|Dest        R2_133|
|            1721|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A    DIF1_133|
|            10|
|Source B    DIF2_133|
|            10|
|Dest        DDIF1|
|            1|
+-----+
+MOV-----+
+MOVE-----+
|Source      DIF1_133|
|            10|
|Dest        DIF2_133|
|            10|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A    DIF1_133|
|            10|
|Source B      9|
|Dest        DIF1_133|
|            10|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A    DIF1_133|
|            10|
|Source B    DIF1_133|
|            10|
|Dest        ACC|
|            828|
+-----+

```

```

***
| SCRATCH
| N20:12
| +ADD-----+
| +---1 | +ADD
| 0 | |Source A ACC|
| (2:190) | |828|
| | |Source B |
| | |Dest ACC|
| | |828|
| +-----+
| +ADD-----+
| +ADD
| |Source A ACC|
| |828|
| |Source B ACC|
| | -728|
| |Dest ACC|
| | -728|
| +-----+
| +SUB-----+
| +SUBTRACT
| |Source A N15:71|
| |100|
| |Source B ACC|
| | -728|
| |Dest ACC|
| |828|
| +-----+
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE
| |Source A ACC| |Source 100|
| |828| |
| |Source B 100| |Dest N15:71|
| | | |100|
| +-----+
| N20:0 - (2:190)
| +LES-----+ +MOV-----+
| +LESS THAN +MOVE
| |Source A ACC| |Source 1|
| |828| |
| |Source B 1| |Dest N15:71|
| | | |100|
| +-----+
| N20:0 - (2:190)
| +LIM-----+ +MOV-----+
| +LIMIT TEST +MOVE
| |Low Lim 1| |Source ACC|
| | | |828|
| |Test ACC| |Dest N15:71|
| |828| |100|
| |High Lim 100| +-----+
| +-----+
| N20:0 - (2:190)

```

Rung 2:769

| PID133

|

39

DUMMY38

N20:9

|---[LBL]-----

))

5

Rung 2:770

DETECT FROM SCADA PID ON/OFF

IF PID OFF

THEN ZERO PW FOR ZERO OUTPUT AT SCR

AND JUMP AROUND THE PID BLOCK

| ON133

| N7:120

|

13

| (3:25)

|

|

|

|

|

+CLR-----+

+CLEAR-----+

|Dest PW133|

| | 01 |

+-----+

|

77

+--(JMP)-----+

Rung 2:771

DETECT AUTO/MANUAL FROM SCADA

SET APPROPRIATE MODE IN PID BLOCK

| AM133

| N7:120

|

12

| (3:25)

|

PID133/1

N15:60

))

1

Rung 2:772

DETECT SETPOINT VALUE FROM SCADA

PUT VALUE IN PID BLOCK

|

|

|

|

|

|

|

|

+MOV-----+

+MOVE-----+

|Source SET133|

| | 01 |

|Dest PIDSP133|

| | 01 |

+-----+

Rung 2:773

|

|

|

|

|

|

|

|

+PID-----+

+PID-----+

|Control Block PID133|

|Process Variable AV133|

|Control Variable CV133|

|Control Block Length 23|

+-----+

+++

+++

```

+++
| +SCL-----+
| +SCALE-----+
| |Source      CV133|
| |Rate [ /10000] 15|
| |Offset      0|
| |Dest        PW133|
| |            0|
| +-----+
| +CLR-----+
| +CLEAR-----+
| |Dest        S:5|
| |            0|
| +-----+
  
```

Rung 2:774

```

| 77
| --[LBL]-----N20:10
|                                     ( )
|                                     15
  
```

Rung 2:775

```

|                                     PID134
| RT_TMR/DN
| T4:62
| -----40
| 1/[----- (JMP)
| DN
| (2:33)
  
```

Rung 2:776

RATE CHECKING

```

| +MOV-----+
| +MOVE-----+
| |Source      AV134|
| |            1723|
| |Dest        R1_134|
| |            1722|
| +-----+
| +SUB-----+
| +SUBTRACT-----+
| |Source A     R1_134|
| |            1722|
| |Source B     R2_134|
| |            1722|
| |Dest        DIF1_134|
| |            10|
| +-----+
| +MOV-----+
| +MOVE-----+
| |Source      R1_134|
| |            1722|
| |Dest        R2_134|
| |            1722|
| +-----+
  
```

```

+++
+-----+
+SUB-----+
+SUBTRACT
|Source A  DIF1_134|
|          10|
|Source B  DIF2_134|
|          10|
|Dest      DDIF|
|          1|
+-----+
+MOV-----+
+MOVE
|Source    DIF1_134|
|          10|
|Dest      DIF2_134|
|          10|
+-----+
+SUB-----+
+SUBTRACT
|Source A  DIF1_134|
|          10|
|Source B          9|
|Dest      DIF1_134|
|          10|
+-----+
+MUL-----+
+MULTIPLY
|Source A  DIF1_134|
|          10|
|Source B  DIF1_134|
|          10|
|Dest      ACC|
|          828|
+-----+
+MUL-----+
+MULTIPLY
|Source A  DIF1_134|
|          10|
|Source B  ACC|
|          828|
|Dest      ACC|
|          828|
+-----+
+CLR-----+
+CLEAR
|Dest      S:5|
|          0|
+-----+
+MUL-----+
+MULTIPLY
|Source A  DDIF|
|          1|
|Source B  DDIF|
|          1|
|Dest      ACC1|
|          -728|
+-----+
+++

```

```

+++
|
|-----+MUL-----+
|MULTIPLY
|Source A      DDIF|
|      1|
|Source B      ACC1|
|      -728|
|Dest         ACC1|
|      -728|
|-----+
|CLR-----+
|CLEAR
|Dest         S:5|
|      0|
|-----+
|SCRATCH
|N20:12
+-----+
+EQU-----+
+EQUAL
|Source A      ACC|
|      828|
|Source B      0|
|-----+
|N20:0 - (2:190)
+EQU-----+
+SUB-----+
+SUBTRACT
|Source A      ACC|
|      828|
|Source B      1|
|Dest         ACC|
|N20:0 - (2:190)|
|      828|
|-----+
|SCRATCH
|N20:12
|      0
|      (2:190)
|-----+
|ADD-----+
|ADD
|Source A      ACC|
|      828|
|Source B      1|
|Dest         ACC|
|      828|
|-----+
|ADD-----+
|ADD
|Source A      ACC|
|      828|
|Source B      ACC1|
|      -728|
|Dest         ACC1|
|      -728|
|-----+
+++

```

Page 314

Rung 2:779

DETECT AUTO/MANUAL FROM SCADA
 SET APPROPRIATE MODE IN PID BLOCK

	AM134	PID134/1
	N7:120	N15:90
	1/(-	()
	14	1
	(3:25)	

Rung 2:780

DETECT SETPOINT VALUE FROM SCADA
 PUT VALUE IN PID BLOCK

		+MOV-----+
		+MOVE-----+
	Source	SET134
		0
	Dest	PIDSP134
		0
		+-----+

Rung 2:781

		+PID-----+
		+PID-----+
	Control Block	PID134
	Process Variable	AV134
	Control Variable	CV134
	Control Block Length	23
		+-----+
		+SCL-----+
		+SCALE-----+
	Source	CV134
		0
	Rate [1/10000]	15
		0
	Offset	0
		0
	Dest	PW134
		0
		+-----+
		+CLR-----+
		+CLEAR-----+
	Dest	S:5
		0
		+-----+

Rung 2:782

	78	N20:11
	[LBL]	()
		0

Rung 2:783

		PID140
	RT_TMR/DN	
	T4:62	41
	1/(-	(JMP)
	DN	
	(2:33)	

Rung 2:784

RATE CHECKING

		+MOV-----+
		+MOVE-----+
		Source AV140
		1728
		Dest R1_140
		1728
		+-----+
		+SUB-----+
		+SUBTRACT-----+
		Source A R1_140
		1728
		Source B R2_140
		1728
		Dest DIF1_140
		10
		+-----+
		+MOV-----+
		+MOVE-----+
		Source R1_140
		1728
		Dest R2_140
		1728
		+-----+
		+SUB-----+
		+SUBTRACT-----+
		Source A DIF1_140
		10
		Source B DIF2_140
		10
		Dest DDIF
		1
		+-----+
		+MOV-----+
		+MOVE-----+
		Source DIF1_140
		10
		Dest DIF2_140
		10
		+-----+
		+SUB-----+
		+SUBTRACT-----+
		Source A DIF1_140
		10
		Source B 9
		10
		Dest DIF1_140
		10
		+-----+
		+MUL-----+
		+MULTIPLY-----+
		Source A DIF1_140
		10
		Source B DIF1_140
		10
		Dest ACC
		828
		+-----+

+++

+++

```

+++
| SCRATCH
| N20:12
| ] [-----+ADD-----+
| 0
| (2:190)
| |Source A ACC|
| | 828|
| |Source B |
| | |
| |Dest ACC|
| | 828|
| |-----+
|
| +ADD-----+
| +ADD
| |Source A ACC|
| | 828|
| |Source B ACC1|
| | -728|
| |Dest ACC1|
| | -728|
| |-----+
|
| +SUB-----+
| +SUBTRACT
| |Source A N15:151|
| | 0|
| |Source B ACC1|
| | -728|
| |Dest ACC|
| | 828|
| |-----+
|
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE
| |Source A ACC| |Source 100|
| | 828| |
| |Source B 100| |Dest N15:131|
| | | | 100|
| |-----+
| N20:0 - (2:190)
|
| +LES-----+ +MOV-----+
| +LESS THAN +MOVE
| |Source A ACC| |Source 1|
| | 828| |
| |Source B 1| |Dest N15:131|
| | | | 100|
| |-----+
| N20:0 - (2:190)
|
| +LIM-----+ +MOV-----+
| +LIMIT TEST +MOVE
| |Low Lim 1| |Source ACC|
| | | | 828|
| |Test ACC| |Dest N15:131|
| | 828| | 100|
| |High Lim 100| +-----+
|
| N20:0 - (2:190)

```

Rung 2:785
 PID140

	41		DUMMY40
	[LBL]	-----	N20:9
			()
			7

Rung 2:786

DETECT FROM SCADA PID ON/OFF
 IF PID OFF
 THEN ZERO PW FOR ZERO OUTPUT AT SCR
 AND JUMP AROUND THE PID BLOCK

	ON140		
	N7:121		
	1/[	-----	+CLR-----+
	(3:26)		+CLEAR
			Dest PW140
			0
			+-----+
			79
			+(JMP)-----+

Rung 2:787

DETECT AUTO/MANUAL FROM SCADA
 SET APPROPRIATE MODE IN PID BLOCK

	AM140		PID140/O
	N7:121		N15:120
	1/[	-----	()
	0		0
	(3:26)		

Rung 2:788

DETECT SETPOINT VALUE FROM SCADA
 PUT VALUE IN PID BLOCK

			+MOV-----+
			+MOVE
			Source SET140
			0
			Dest PIDSP140
			0
			+-----+

Rung 2:789

			+PID-----+
			+PID
			Control Block PID140
			Process Variable AV140
			Control Variable CV140
			Control Block Length 23
			+-----+
+++			+++

```

+++
|
| +SCL-----+
| +SCALE-----+
| |Source      CV140|
| |Rate [//10000] 15|
| |Offset      0|
| |Dest        PW140|
| |            0|
| +-----+
| +CLR-----+
| +CLEAR-----+
| |Dest        S:5|
| |            0|
| +-----+
  
```

Rung 2:790

```

| 79
| --[LBL]-----N20:11
|                                     ( )
|                                     1
  
```

Rung 2:791

```

| RT_TMR/DN
| T4:62
| -----PID141
| 1/[-----42
| DN
| (2:33)----- (JMP)
  
```

Rung 2:792

RATE CHECKING

```

|
| +MOV-----+
| +MOVE-----+
| |Source      AV141|
| |Dest        R1_141|
| |            1728|
| +-----+
| +SUB-----+
| +SUBTRACT-----+
| |Source A     R1_141|
| |            1728|
| |Source B     R2_141|
| |            1728|
| |Dest        DIF1_141|
| |            10|
| +-----+
| +MOV-----+
| +MOVE-----+
| |Source      R1_141|
| |Dest        R2_141|
| |            1728|
| +-----+
  
```

```

+++
+-----+
+SUB-----+
+SUBTRACT   +
|Source A   DIF1_141|
|           10|
|Source B   DIF2_141|
|           10|
|Dest       DDIF|
|           1|
+-----+
+MOV-----+
+MOVE       +
|Source     DIF1_141|
|           10|
|Dest       DIF2_141|
|           10|
+-----+
+SUB-----+
+SUBTRACT   +
|Source A   DIF1_141|
|           10|
|Source B   9|
|           |
|Dest       DIF1_141|
|           10|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A   DIF1_141|
|           10|
|Source B   DIF1_141|
|           10|
|Dest       ACC|
|           828|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A   DIF1_141|
|           10|
|Source B   ACC|
|           828|
|Dest       ACC|
|           828|
+-----+
+CLR-----+
+CLEAR      +
|Dest       S:5|
|           0|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A   DDIF|
|           1|
|Source B   DDIF|
|           1|
|Dest       ACC1|
|           -728|
+-----+
+++

```

+++


```

+---+
|                                     +SUB-----+
|                                     +SUBTRACT    +
|                                     |Source A      N15:161|
|                                     |              1001|
|                                     |Source B      ACC1|
|                                     |              -728|
|                                     |Dest          ACC1|
|                                     |              828|
|                                     +-----+
| +GRT-----+ +MOV-----+
| +GREATER THAN +--MOVE-----+
| |Source A      ACC| |Source      1001|
| |              828| |              |
| |Source B      100| |Dest        N15:161|
| |              | |              1001|
| +-----+ +-----+
| N20:0 - (2:190)
| +LES-----+ +MOV-----+
| +LESS THAN    +--MOVE-----+
| |Source A      ACC| |Source      1|
| |              828| |              |
| |Source B      1| |Dest        N15:161|
| |              | |              1001|
| +-----+ +-----+
| N20:0 - (2:190)
| +LIM-----+ +MOV-----+
| +LIMIT TEST   +--MOVE-----+
| |Low Lim      1| |Source      ACC|
| |              | |              828|
| |Test         ACC| |Dest        N15:161|
| |              828| |              1001|
| |High Lim     1001| +-----+
| +-----+
| N20:0 - (2:190)

```

Rung 2:793

1 PID141

42

| --- [LBL]

DUMMY41

N20:9

'8

Rung 2:794

DETECT FROM SCADA PID ON/OFF

IF PID OFF

THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

```

|      ON141
|      N7:121
|-----]/[---
|              3
|      (3:26)

```

```

+CLR-----+
+---+CLEAR+---+
| |Dest          PW141|
| |              01 |
| +-----+
|
|      80
|
+---(JMP)-----+

```

Rung 2:795

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

	AM141	PID141/1
	N7:121	N15:150
	1/[	()
	2	1
	(3:26)	

Rung 2:796

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

		+MOV-----+
		+MOVE-----+
	Source	SET141
		0
	Dest	PIDSP141
		0
		+-----+

Rung 2:797

		+PID-----+
		+PID-----+
	Control Block	PID141
	Process Variable	AV141
	Control Variable	CV141
	Control Block Length	23
		+-----+
		+SCL-----+
		+SCALE-----+
	Source	CV141
		0
	Rate [/10000]	15
	Offset	0
	Dest	PW141
		0
		+-----+
		+CLR-----+
		+CLEAR-----+
	Dest	S:5
		0
		+-----+

Rung 2:798

	80	N20:11
	--[LBL]	()
		2

Rung 2:799

		PID142
	RT_TMR/DN	
	T4:62	43
	1/[	(JMP)
	DN	
	(2:33)	

Rung 2:800
 | RT_TMR/DN
T4:62
DN
(2:33)

DNR_4
 N20:5
 (L)
 8

Rung 2:801

RATE CHECKING

		+MOV-----+
		+MOVE-----+
	Source	AV1421
		17291
	Dest	R1_1421
		17291
		+-----+
		+SUB-----+
		+SUBTRACT-----+
	Source A	R1_1421
		17291
	Source B	R2_1421
		17291
	Dest	DIF1_1421
		101
		+-----+
		+MOV-----+
		+MOVE-----+
	Source	R1_1421
		17291
	Dest	R2_1421
		17291
		+-----+
		+SUB-----+
		+SUBTRACT-----+
	Source A	DIF1_1421
		101
	Source B	DIF2_1421
		101
	Dest	DDIF1
		11
		+-----+
		+MOV-----+
		+MOVE-----+
	Source	DIF1_1421
		101
	Dest	DIF2_1421
		101
		+-----+
		+SUB-----+
		+SUBTRACT-----+
	Source A	DIF1_1421
		101
	Source B	91
		1
	Dest	DIF1_1421
		101
		+-----+
		+++

```

+++
+-----+
+MUL-----+
+MULTIPLY
+Source A DIF1_142|
+      10|
+Source B DIF1_142|
+      10|
+Dest ACC|
+      828|
+-----+
+MUL-----+
+MULTIPLY
+Source A DIF1_142|
+      10|
+Source B ACC|
+      828|
+Dest ACC|
+      828|
+-----+
+CLR-----+
+CLEAR
+Dest S:5|
+      0|
+-----+
+MUL-----+
+MULTIPLY
+Source A DDIF|
+      1|
+Source B DDIF|
+      1|
+Dest ACC1|
+     -728|
+-----+
+MUL-----+
+MULTIPLY
+Source A DDIF|
+      1|
+Source B ACC1|
+     -728|
+Dest ACC1|
+     -728|
+-----+
+CLR-----+
+CLEAR
+Dest S:5|
+      0|
+-----+
+SCRATCH
+N20:12
+-----+
+---( )-----+
+EQU-----+
+EQUAL
+Source A ACC|
+      828|
+Source B 0|
+-----+
+N20:0 - (2:190)
+++

```

```

+++
|
| +EQU-----+ +SUB-----+
| +EQU-----+ +SUBTRACT-----+
| |Source A      ACC| |Source A      ACC|
| |      828| |      828|
| |Source B      1| |Source B      1|
| |      | |      |
| +-----+ |Dest      ACC|
| N20:0 - (2:190) |      828|
|
|
| SCRATCH
| N20:12
| ] [-----+ +ADD-----+
| |      0      | |Source A      ACC|
| | (2:190)     | |      828|
| |             | |Source B      1|
| |             | |      |
| |             | |Dest      ACC|
| |             | |      828|
| +-----+
|
| +ADD-----+
| +ADD-----+
| |Source A      ACC|
| |      828|
| |Source B      ACC|
| |     -728|
| |Dest      ACC|
| |     -728|
| +-----+
|
| +SUB-----+
| +SUBTRACT-----+
| |Source A      N15:191|
| |      100|
| |Source B      ACC|
| |     -728|
| |Dest      ACC|
| |      828|
| +-----+
|
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE-----+
| |Source A      ACC| |Source      100|
| |      828| |      |
| |Source B      100| |Dest      N15:191|
| |      | |      100|
| +-----+
|
| N20:0 - (2:190)
|
| +LES-----+ +MOV-----+
| +LESS THAN +MOVE-----+
| |Source A      ACC| |Source      1|
| |      828| |      |
| |Source B      1| |Dest      N15:191|
| |      | |      100|
| +-----+
|
| N20:0 - (2:190)
|
+++

```



```

+PID-----+
+PID-----+
|Control Block      PID142|
|Process Variable   AV142|
|Control Variable   CV142|
|Control Block Length 23|
+-----+
+SCALE-----+
+SCALE-----+
|Source              CV142|
|                    0|
|Rate [(10000)]     15|
|                    |
|Offset              0|
|                    |
|Dest                PW142|
|                    0|
+-----+
+CLR-----+
+CLEAR-----+
|Dest                S:5|
|                    0|
+-----+

```

```

NOT END
  6
---(JMP)

```

DUMMY2
N20:7
--()--
1

```

+CLR-----+
-CLEAR      +
|Dest      S:5|
|          0|
+-----+

```

T1_T3	ON110A
B3	N7:118
-J [-	-(U)-
61	1
(2:815)	
T1_T4	ON110B
B3	N7:118
-J [-	-(U)-
62	3
(2:816)	

```

+++          +++
|            |
| ON110C    |
| N7:118    |
+--(U)--+
      5

```

T1_T2	ON111A
B3	N7:118
60	(U)
(2:814)	7
T1_T4	ON111B
B3	N7:118
62	(U)
(2:816)	9
T2_T4	ON111C
B3	N7:118
64	(U)
(2:818)	11

T1_T2	ON112A
B3	N7:118
+	(U)
60	13
(2:814)	
T1_T4	ON112B
B3	N7:118
+	(U)
62	15
(2:816)	
T2_T3	ON112C
B3	N7:119
+	(U)
63	1
(2:817)	

[illegible]


```

+++
| | T2_T4 |
| | B3 |
| | +-----] [------+
| | 64 |
| | (2:818) |
| | T3_T4 |
| | B3 |
| | +-----] [------+
| | 65 |
| | (2:819) |

```

```

+++
| | ON113B |
| | N7:119 |
| | +---(U)---+
| | 5 |
| | |
| | ON113C |
| | N7:119 |
| | +---(U)---+
| | 7 |

```

Rung 2:814

```

*****
IF TANK-1 AND TANK-2 ARE ENABLED THEN SET THE PAIR_ON BIT
| TNK T-3001|TNK T-3002
|
|
| ENABLE_T1 ENABLE_T2 T1_T2
| B3 B3 B3
| ---] [------] [------ ( )---
| 24 21 60
| (2:827) (2:821)

```

Rung 2:815

```

*****
IF T-3001 AND T-3003 ARE ENABLED THEN SET THE PAIR_ON BIT
| TNK T-3001|TNK T-3003
|
|
| ENABLE_T1 ENABLE_T3 T1_T3
| B3 B3 B3
| ---] [------] [------ ( )---
| 24 22 61
| (2:827) (2:823)

```

Rung 2:816

```

*****
IF T-3001 AND T-3004 ARE ENABLED THEN SET THE PAIR_ON BIT
| TNK T-3001|TNK T-3004
|
|
| ENABLE_T1 ENABLE_T4 T1_T4
| B3 B3 B3
| ---] [------] [------ ( )---
| 24 23 62
| (2:827) (2:825)

```

Rung 2:817

```

*****
IF T-3003 AND T-3002 ARE ENABLED THEN SET THE PAIR_ON BIT
| TNK T-3003|TNK T-3002
|
|
| ENABLE_T3 ENABLE_T2 T2_T3
| B3 B3 B3
| ---] [------] [------ ( )---
| 22 21 63
| (2:823) (2:821)

```

Rung 2:818

IF T-3004 AND T-3002 ARE ENABLED THEN SET THE PAIR ON BIT

! TNK T-3004!TNK T-3002

[illegible]

Rung 2:819

IF T-3003 AND T-3004 ARE ENABLED THEN SET THE PAIR ON BIT

1 TNK T-3003 | TNK T-3004

ENABLE_T3	ENABLE_T4	T3_T4
B3	B3	B3
22	23	65
(2:823)	(2:825)	

Rung 2:820

***** AS LONG AS A PAIR OF TANKS HAVE NOT BEEN ENABLED LET T-3002
ZONES COME ON AS SELECTED

ENABLE_T3		ENABLE_T4		ON110A		ON_110A	
B3		B3		N7:118		N7:239	
1/[-----]1/[-----]		1/[-----]1/[-----]		1[-----]1[-----]		1[-----]1[-----]	
22		23		1		3	
(2:823)		(2:825)		(2:810)			
ENABLE_T3		ENABLE_T1		ON110B		ON_110B	
B3		B3		N7:118		N7:239	
1/[-----]1/[-----]		1/[-----]1/[-----]		1[-----]1[-----]		1[-----]1[-----]	
22		24		3		4	
(2:823)		(2:827)		(2:810)			
ENABLE_T4		ENABLE_T1		ON110C		ON_110C	
B3		B3		N7:118		N7:239	
1/[-----]1/[-----]		1/[-----]1/[-----]		1[-----]1[-----]		1[-----]1[-----]	
23		24		5		5	
(2:825)		(2:827)		(2:810)			

Rung 2:821

IF ANY TANK ZONE IS SELECTED SET THE ENABLE BIT FOR TANK PAIR COMPARISONS

```

|      ON_110A      |      ENABLE_T2      |
|      N7:239      |      B3      |
|-----] [-----|-----) B3-----|
|      3      |      21      |
| (2:820) |      |
| ON_110B |      |
| N7:239 |      |
|-----] [-----|-----) B3-----|
|      4      |      |
| (2:820) |      |
|      |      |
| ***      |      |

```

```

+++      +++
|      |
|  ON_110C  |
|  N7:239  |
|  +-----+  |
|      5      |
|  (2:820)  |

```

Rung 2:822

***** AS LONG AS A PAIR OF TANKS HAVE NOT BEEN ENABLED LET T-3003 ZONES
 COME ON AS SELECTED

ENABLE_T2	ENABLE_T4	ON111A	ON_111A
B3	B3	N7:118	N7:239
+-----+ 1/[-----] 1/[-----]		+-----+ 1/[-----] () +-----+	
21	23	7	6
(2:821)	(2:825)	(2:811)	
ENABLE_T3	ENABLE_T1	ON111B	ON_111B
B3	B3	N7:118	N7:239
+-----+ 1/[-----] 1/[-----]		+-----+ 1/[-----] () +-----+	
22	24	9	7
(2:823)	(2:827)	(2:811)	
ENABLE_T4	ENABLE_T1	ON111C	ON_111C
B3	B3	N7:118	N7:239
+-----+ 1/[-----] 1/[-----]		+-----+ 1/[-----] () +-----+	
23	24	11	8
(2:825)	(2:827)	(2:811)	

Rung 2:823

IF ANY TANK ZONE IS SELECTED SET THE ENABLE BIT FOR TANK PAIR COMPARISONS

ON_111A	ENABLE_T3
N7:239	B3
+-----+ 1/[-----] () +-----+	
6	22
(2:822)	
ON_111B	
N7:239	
+-----+ 1/[-----] () +-----+	
7	
(2:822)	
ON_111C	
N7:239	
+-----+ 1/[-----] () +-----+	
8	
(2:822)	

Rung 2:824

***** AS LONG AS A PAIR OF TANKS HAVE NOT BEEN ENABLED LET T-3004 COME
 ON AS SELECTED

ENABLE_T3	ENABLE_T2	ON112A	ON_112A
B3	B3	N7:118	N7:239
+-----+ 1/[-----] 1/[-----]		+-----+ 1/[-----] () +-----+	
22	21	13	9
(2:823)	(2:821)	(2:812)	

```

+++
| |
| | ENABLE_T3  ENABLE_T1 |
| | B3          B3      |
| |-----1/[-----1/[-----+
| | 22          24      |
| | (2:823)    (2:827)  |
| |
| | ENABLE_T1  ENABLE_T2 |
| | B3          B3      |
| |-----1/[-----1/[-----+
| | 24          21      |
| | (2:827)    (2:821)  |
| |

```

```

+++
| |
| | ON112B  ON_112B |
| | N7:118  N7:239 |
| |-----] [-----]-----+
| | 15          10 |
| | (2:812)      |
| |
| | ON112C  ON_112C |
| | N7:119  N7:239 |
| |-----] [-----]-----+
| | 1          11 |
| | (2:812)      |
| |

```

Rung 2:825

```

*****
| | IF ANY TANK ZONE IS SELECTED SET THE ENABLE BIT FOR TANK PAIR COMPARISONS
| | ON_112A                                     ENABLE_T4
| | N7:239                                     B3
| |-----] [-----]-----+
| | 9                                     23
| | (2:824)
| | ON_112B
| | N7:239
| |-----] [-----]-----+
| | 10
| | (2:824)
| | ON_112C
| | N7:239
| |-----] [-----]-----+
| | 11
| | (2:824)
| |

```

Rung 2:826

***** AS LONG AS A PAIR OF TANKS HAVE NOT BEEN ENABLED LET T-3001 ZONES
COME ON AS SELECTED

```

| |
| | ENABLE_T3  ENABLE_T2 |
| | B3          B3      |
| |-----1/[-----1/[-----+
| | 22          21      |
| | (2:823)    (2:821)  |
| | ENABLE_T3  ENABLE_T4 |
| | B3          B3      |
| |-----1/[-----1/[-----+
| | 22          23      |
| | (2:823)    (2:825)  |
| |
| | ENABLE_T4  ENABLE_T2 |
| | B3          B3      |
| |-----1/[-----1/[-----+
| | 23          21      |
| | (2:825)    (2:821)  |
| |

```

```

| |
| | ON113A  ON_113A |
| | N7:119  N7:239 |
| |-----] [-----]-----+
| | 3          12 |
| | (2:813)      |
| | ON113B  ON_113B |
| | N7:119  N7:239 |
| |-----] [-----]-----+
| | 5          13 |
| | (2:813)      |
| |
| | ON113C  ON_113C |
| | N7:119  N7:239 |
| |-----] [-----]-----+
| | 7          14 |
| | (2:813)      |
| |

```

Rung 2:827

```
*****
IF ANY TANK ZONE IS SELECTED SET THE ENABLE BIT FOR TANK PAIR COMPARISONS
|   ON_113A                                     ENABLE_T1
|   N7:239                                     B3
|-----] [-----]-----] [-----]-----]
|   12                                         24
|   (2:826)
|   ON_113B
|   N7:239
|-----] [-----]-----] [-----]-----]
|   13
|   (2:826)
|   ON_113C
|   N7:239
|-----] [-----]-----] [-----]-----]
|   14
|   (2:826)
```

Rung 2:828

** FIRE SCRs **
 TANK ZONES

There is one timer for each zone. Each timer is reset when it reaches 200ms.
 The zone's SCR is turned on when the timer is less than the zone's pulse width
 (PW). Note: no more than two tanks can be enabled at the same time.

```
|   ON_110A
|   N7:239
|-----] [-----]-----] [-----]-----]
|   3                                         +TON-----+
|   (2:820)                                +TIMER ON DELAY +-(EN)--
|                                         |Timer      TMR110A--(DN)
|                                         |Time Base   0.01|
|                                         |Preset      25|
|                                         |Accum       0|
|-----] [-----]-----] [-----]-----]
```

Rung 2:829

```
|   TMR110A/DN                                     TMR110A
|   T4:1                                           T4:1
|-----] [-----]-----] [-----]-----]
|   DN                                           (RES)
|   (2:828)
```

Rung 2:830

```
|   ON_110A                                     SCR_110A
|   N7:239                                     0:25
|-----] [-----]-----] [-----]-----]
|   3                                         LESS THAN
|   (2:820)                                +Source A   TMR110A.ACC|
|                                         |           0|
|                                         |Source B   PW110A|
|                                         |           0|
|-----] [-----]-----] [-----]-----]
|                                         T4:1.ACC - (2:828)
|                                         N7:182 - (2:192)
```

```

Rung 2:831
| ON_110B
| N7:239
|-----] [-----+TON-----+
|           4          |TIMER ON DELAY  +-(EN)--
| (2:820)              |Timer      TMR110B+-(DN)
|                      |Time Base   0.01|
|                      |Preset      25|
|                      |Accum        0|
|                      +-----+
  
```

```

Rung 2:832
| TMR110B/DN
| T4:2
|-----] [-----TMR110B
|           DN          |T4:2
| (2:831)              |-(RES)--
  
```

```

Rung 2:833
| ON_110C
| N7:239
|-----] [-----+LES-----+
|           5          |LESS THAN
| (2:820)              |Source A    TMR110B.ACC|
|                      |              0|
|                      |Source B    PW110B|
|                      |              0|
|                      +-----+
|                      T4:2.ACC - (2:831)
|                      N7:183 - (2:200)
  
```

```

Rung 2:834
| ON_110C
| N7:239
|-----] [-----+TON-----+
|           5          |TIMER ON DELAY  +-(EN)--
| (2:820)              |Timer      TMR110C+-(DN)
|                      |Time Base   0.01|
|                      |Preset      25|
|                      |Accum        0|
|                      +-----+
  
```

```

Rung 2:835
| TMR110C/DN
| T4:3
|-----] [-----TMR110C
|           DN          |T4:3
| (2:834)              |-(RES)--
  
```

```

Rung 2:836
| ON_110C
| N7:239
|-----] [-----+LES-----+
|           5          |LESS THAN
| (2:820)              |Source A    TMR110C.ACC|
|                      |              0|
|                      |Source B    PW110C|
|                      |              0|
|                      +-----+
|                      T4:3.ACC - (2:834)
|                      N7:184 - (2:208)
  
```

Rung 2:837

```

1  ON_111A
1  N7:239
1  ----] [---
1          6
1  (2:822)

```

```

+TON-----+
+TIMER ON DELAY +-(EN)--
|Timer          TMR111A+-(DN)
|Time Base      0.01|
|Preset         25|
|Accum          0|
+-----+

```

Rung 2:838

```

1 TMR111A/DN
1      T4:4
1 ----] [----
1      DN
1      (2:837)

```

TMR111A
T4:4

Rung 2:839

```

ON 111A
| N7:239 | +LES-----+
| -----| +LESS THAN
| 6 | Source A TMR111A.ACC
| (2:822) | | 0
| | Source B PW111A
| | | 0
| +-----+
| T4:4.ACC - (2:837)
| N7:185 - (2:216)

```

SCR_111A
O:25
---()---
3

Rung 2:840

```

1  ON_111B
1      N7:239
1-----] {---
1          7
1      (2:822)

```

```

+TON-----+
-TIMER ON DELAY      +- (EN)
|Timer              TMR11B+- (DN)
|Time Base          0.01|
|Preset             25|
|Accum              0|
+-----+

```

Rung 2:841

```

I TMR111B/DN
I      T4:5
I ----] [----
I      DN
I      (2:840)

```

TMR111B
T4:5/

Rung 2:842

```
| ON_111B  
| N7:239 +LES-----  
| | [---] +LESS THAN  
| | 7 |Source A TMR111B.ACC  
| | (2:822) | | 0  
| | |Source B PW111B  
| | | | 0  
| | |  
| | +-----+  
| | T4:5.ACC - (2:840)  
| | N7:186 - (2:224)
```

SCR_111B
O:25
---()---
4

```

Rung 2:843
| ON_111C
| N7:239
|-----] [-----+TON-----+
| 8 |-----+TIMER ON DELAY +--(EN)--
| (2:822) |Timer TMR111C+--(DN)
| |Time Base 0.01|
| |Preset 25|
| |Accum 0|
| |-----+-----+
  
```

```

Rung 2:844
| TMR111C/DN
| T4:6
|-----] [-----TMR111C
| DN T4:6
| (2:843) |------(RES)-----
  
```

```

Rung 2:845
| ON_111C
| N7:239 +LES-----+ SCR_111C
|-----] [-----+LESS THAN O:25
| 8 |Source A TMR111C.ACC|------( )-----
| (2:822) | 0| 5
| |Source B PW111C|
| | 0|
| |-----+-----+
| T4:6.ACC - (2:843)
| N7:187 - (2:233)
  
```

```

Rung 2:846
| ON_112A
| N7:239
|-----] [-----+TON-----+
| 9 |-----+TIMER ON DELAY +--(EN)--
| (2:824) |Timer TMR112A+--(DN)
| |Time Base 0.01|
| |Preset 25|
| |Accum 0|
| |-----+-----+
  
```

```

Rung 2:847
| TMR112A/DN
| T4:7
|-----] [-----TMR112A
| DN T4:7
| (2:846) |------(RES)-----
  
```

```

Rung 2:848
| ON_112A
| N7:239 +LES-----+ SCR_112A
|-----] [-----+LESS THAN O:25
| 9 |Source A TMR112A.ACC|------( )-----
| (2:824) | 0| 6
| |Source B PW112A|
| | 0|
| |-----+-----+
| T4:7.ACC - (2:846)
| N7:188 - (2:386)
  
```



```

Rung 2:849
| ON_112B
| N7:239
|-----] [-----+TON-----+
| 10 |-----+TIMER ON DELAY +- (EN)--
| (2:824) |Timer TMR112B+- (DN)
| |Time Base 0.01|
| |Preset 25|
| |Accum 0|
| |-----+-----+

```

```

Rung 2:850
| TMR112B/DN
| T4:8
|-----] [-----TMR112B
| DN T4:8
| (2:849) (RES)-----

```

```

Rung 2:851
| ON_112B
| N7:239 +LES-----+ SCR_112B
| |-----+LESS THAN +-----+ O:25
| 10 |Source A TMR112B.ACC| ( )-----
| (2:824) | | 0| 7
| |Source B PW112B|
| | | 0|
| |-----+-----+
| T4:8.ACC - (2:849)
| N7:189 - (2:394)

```

```

Rung 2:852
| ON_112C
| N7:239
|-----] [-----+TON-----+
| 11 |-----+TIMER ON DELAY +- (EN)--
| (2:824) |Timer TMR112C+- (DN)
| |Time Base 0.01|
| |Preset 25|
| |Accum 0|
| |-----+-----+

```

```

Rung 2:853
| TMR112C/DN
| T4:9
|-----] [-----TMR112C
| DN T4:9
| (2:852) (RES)-----

```

```

Rung 2:854
| ON_112C
| N7:239 +LES-----+ SCR_112C
| |-----+LESS THAN +-----+ O:25
| 11 |Source A TMR112C.ACC| ( )-----
| (2:824) | | 0| 8
| |Source B PW112C|
| | | 0|
| |-----+-----+
| T4:9.ACC - (2:852)
| N7:190 - (2:402)

```

Rung 2:855
 | ON_113A
 | N7:239
 |-----] [-----
 | 12
 | (2:826)

+TON-----+
 +TIMER ON DELAY +--(EN)--
 |Timer TMR113A+--(DN)
 |Time Base 0.01|
 |Preset 25|
 |Accum 0|
 +-----+

Rung 2:856
 | TMR113A/DN
 | T4:10
 |-----] [-----
 | DN
 | (2:855)

TMR113A
 T4:10
 (RES)

Rung 2:857
 | ON_113A
 | N7:239
 |-----] [-----
 | 12
 | (2:826)

+LES-----+
 +LESS THAN +-----+
 |Source A TMR113A.ACC|
 | 0|
 |Source B PW113A|
 | 0|
 +-----+
 T4:10.ACC - (2:855)
 N7:191 - (2:410)

SCR_113A
 0:25
 ()
 9

Rung 2:858
 | ON_113B
 | N7:239
 |-----] [-----
 | 13
 | (2:826)

+TON-----+
 +TIMER ON DELAY +--(EN)--
 |Timer TMR113B+--(DN)
 |Time Base 0.01|
 |Preset 25|
 |Accum 0|
 +-----+

Rung 2:859
 | TMR113B/DN
 | T4:11
 |-----] [-----
 | DN
 | (2:858)

TMR113B
 T4:11
 (RES)

Rung 2:860
 | ON_113B
 | N7:239
 |-----] [-----
 | 13
 | (2:826)

+LES-----+
 +LESS THAN +-----+
 |Source A TMR113B.ACC|
 | 0|
 |Source B PW113B|
 | 0|
 +-----+
 T4:11.ACC - (2:858)
 N7:192 - (2:418)

SCR_113B
 0:25
 ()
 10

```

Rung 2:861
| ON_113C
| N7:239
|-----] [-----+TON-----+
|          14          |TIMER ON DELAY  +-(EN)--
|          (2:826)      |Timer      TMR113C+-(DN)
|                      |Time Base   0.01|
|                      |Preset      25|
|                      |Accum        0|
|                      +-----+
  
```

```

Rung 2:862
| TMR113C/DN
| T4:12
|-----] [-----TMR113C
|          DN          |T4:12
|          (2:861)     |(RES)--
  
```

```

Rung 2:863
| ON_113C
| N7:239
|-----] [-----+LES-----+
|          14          |LESS THAN
|          (2:826)      |Source A      TMR113C.ACC| |
|                      |      |      |
|                      |Source B      PW113C|
|                      |      |      |
|                      +-----+
|                      T4:12.ACC - (2:861)
|                      N7:193 - (2:427)
  
```

Rung 2:864

** FIRE SCRs **
 PIPE ZONES

```

|-----] [-----+TON-----+
|          14          |TIMER ON DELAY  +-(EN)--
|          (2:826)      |Timer      TMR119+-(DN)
|                      |Time Base   0.01|
|                      |Preset      25|
|                      |Accum        11|
|                      +-----+
  
```

```

Rung 2:865
| TMR119/DN
| T4:13
|-----] [-----TMR119
|          DN          |T4:13
|          (2:864)     |(RES)--
  
```

```

Rung 2:866
|
| +LES-----+
| --LESS THAN +-----+
| |Source A      TMR119.ACC|
| |              11|
| |Source B      PW119|
| |              0|
| +-----+
| T4:13.ACC - (2:864)
| N7:194 - (2:558)
  
```

SCR_119
 0:25
 ()
 12

```

Rung 2:867
|
| +TON-----+
| --TIMER ON DELAY +-(EN)-
| |Timer          TMR120+-(DN)
| |Time Base      0.01|
| |Preset         25|
| |Accum          11|
| +-----+
  
```

```

Rung 2:868
| TMR120/DN
| T4:14
| ] [-----+-(RES)-
| DN
| (2:867)
  
```

TMR120
 T4:14

```

Rung 2:869
|
| +LES-----+
| --LESS THAN +-----+
| |Source A      TMR120.ACC|
| |              11|
| |Source B      PW120|
| |              0|
| +-----+
| T4:14.ACC - (2:867)
| N7:195 - (2:566)
  
```

SCR_120
 0:25
 ()
 13

```

Rung 2:870
|
| +TON-----+
| --TIMER ON DELAY +-(EN)-
| |Timer          TMR121+-(DN)
| |Time Base      0.01|
| |Preset         25|
| |Accum          11|
| +-----+
  
```

```

Rung 2:871
| TMR121/DN
| T4:15
| ] [-----+-(RES)-
| DN
| (2:870)
  
```

TMR121
 T4:15

```

Rung 2:872
|
| +LES-----+
| --LESS THAN
| |Source A      TMR121.ACC|
| |              11|
| |Source B      PW121|
| |              01|
| +-----+
| T4:15.ACC - (2:870)
| N7:196 - (2:574)
  
```

SCR_121
 0:25
 ()
 14

```

Rung 2:873
|
| +TON-----+
| --TIMER ON DELAY +-(EN)--
| |Timer          TMR122+-(DN)
| |Time Base      0.01|
| |Preset         25|
| |Accum          11|
| +-----+
  
```

```

Rung 2:874
| TMR122/DN
| T4:16
| ----] [-----
|      DN
|      (2:873)
  
```

TMR122
 T4:16
 (RES)

```

Rung 2:875
|
| +LES-----+
| --LESS THAN
| |Source A      TMR122.ACC|
| |              11|
| |Source B      PW122|
| |              01|
| +-----+
| T4:16.ACC - (2:873)
| N7:197 - (2:582)
  
```

SCR_122
 0:25
 ()
 15

```

Rung 2:876
|
| +TON-----+
| --TIMER ON DELAY +-(EN)--
| |Timer          TMR123+-(DN)
| |Time Base      0.01|
| |Preset         25|
| |Accum          11|
| +-----+
  
```

```

Rung 2:877
| TMR123/DN
| T4:17
| ----] [-----
|      DN
|      (2:876)
  
```

TMR123
 T4:17
 (RES)

Rung 2:878

```

|                                     SCR_123
| +LES-----+
| +LESS THAN
| |Source A      TMR123.ACC|
| |              11|
| |Source B      PW123|
| |              01|
| +-----+
| T4:17.ACC - (2:876)
| N7:198 - (2:590)
```

Rung 2:879

```

|                                     +TON-----+
| +TIMER ON DELAY +--(EN)---
| |Timer          TMR124+-(DN)
| |Time Base      0.01|
| |Preset         25|
| |Accum          11|
| +-----+
```

Rung 2:880

```

| TMR124/DN                                     TMR124
| T4:18
| ----] [----- (RES)-----
|      DN
| (2:879)
```

Rung 2:881

```

|                                     SCR_124
| +LES-----+
| +LESS THAN
| |Source A      TMR124.ACC|
| |              11|
| |Source B      PW124|
| |              01|
| +-----+
| T4:18.ACC - (2:879)
| N7:199 - (2:598)
```

Rung 2:882

```

|                                     +TON-----+
| +TIMER ON DELAY +--(EN)---
| |Timer          TMR125+-(DN)
| |Time Base      0.01|
| |Preset         25|
| |Accum          11|
| +-----+
```

Rung 2:883

```

| TMR125/DN                                     TMR125
| T4:19
| ----] [----- (RES)-----
|      DN
| (2:882)
```

Rung 2:884

SCR_125

0:25

18

```
| +LES-----+
| -+LESS THAN
| |Source A      TMR125.ACC|
| |              11|
| |Source B      PW125|
| |              01
| +-----+
| T4:19.ACC - (2:882)
| N7:200 - (2:607)
```

Rung 2:885

```
+TON-----+
+TIMER ON DELAY +--(EN)--
|Timer          TMR130+--(DN)
|Time Base      0.01|
|Preset         25|
|Accum          11|
+-----+
```

Rung 2:886

TMR130

| TMR130/DN

| T4:20

|] [-----

| DN

| (2:885)

(RES)--

Rung 2:887

SCR_130

0:25

19

```
| +LES-----+
| -+LESS THAN
| |Source A      TMR130.ACC|
| |              11|
| |Source B      PW130|
| |              01
| +-----+
| T4:20.ACC - (2:885)
| N7:201 - (2:746)
```

Rung 2:888

```
+TON-----+
+TIMER ON DELAY +--(EN)--
|Timer          TMR131+--(DN)
|Time Base      0.01|
|Preset         25|
|Accum          11|
+-----+
```

Rung 2:889

TMR131

| TMR131/DN

| T4:21

|] [-----

| DN

| (2:888)

(RES)--

Rung 2:890

```

|                                     SCR_131
| +LES-----+                       0:25
| -LESS THAN +-----+ ( )-----+
| |Source A      TMR131.ACC|
| |              11|
| |Source B      PW131|
| |              0|
| +-----+
| T4:21.ACC - (2:888)
| N7:202 - (2:754)

```

Rung 2:891

```

|                                     +TON-----+
| -----+TIMER ON DELAY +--(EN)--+
| |Timer      TMR132+--(DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       11|
| +-----+

```

Rung 2:892

```

| TMR132/DN                                     TMR132
| T4:22                                         T4:22
| -] [-----+ (RES)-----+
| |DN
| | (2:891)

```

Rung 2:893

```

|                                     SCR_132
| +LES-----+                       0:25
| -LESS THAN +-----+ ( )-----+
| |Source A      TMR132.ACC|
| |              11|
| |Source B      PW132|
| |              0|
| +-----+
| T4:22.ACC - (2:891)
| N7:203 - (2:762)

```

Rung 2:894

```

|                                     +TON-----+
| -----+TIMER ON DELAY +--(EN)--+
| |Timer      TMR133+--(DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       11|
| +-----+

```

Rung 2:895

```

| TMR133/DN                                     TMR133
| T4:23                                         T4:23
| -] [-----+ (RES)-----+
| |DN
| | (2:894)

```


Rung 2:896

```

| +LES-----+
| -+LESS THAN
| |Source A      TMR133.ACC|
| |              11|
| |Source B      PW133|
| |              01|
| +-----+
| T4:23.ACC - (2:894)
| N7:204 - (2:770)
  
```

SCR_133
0:25
()
22

Rung 2:897

```

| +TON-----+
| -+TIMER ON DELAY +-(EN)-
| |Timer      TMR134+-(DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       11|
| +-----+
  
```

Rung 2:898

```

| TMR134/DN
| T4:24
| ---] [----- (RES)---
| DN
| (2:897)
  
```

TMR134
T4:24

Rung 2:899

```

| +LES-----+
| -+LESS THAN
| |Source A      TMR134.ACC|
| |              11|
| |Source B      PW134|
| |              01|
| +-----+
| T4:24.ACC - (2:897)
| N7:205 - (2:778)
  
```

SCR_134
0:25
()
23

Rung 2:900

```

| +TON-----+
| -+TIMER ON DELAY +-(EN)-
| |Timer      TMR140+-(DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       11|
| +-----+
  
```

Rung 2:901

```

| TMR140/DN
| T4:25
| ---] [----- (RES)---
| DN
| (2:900)
  
```

TMR140
T4:25

```

Rung 2:902
|
| +LES-----+
| +LESS THAN          SCR_140
| |Source A      TMR140.ACC| 0:25
| |              11|      ( )
| |Source B      PW140|    24
| |              01|
| +-----+
| T4:25.ACC - (2:900)
| N7:206 - (2:786)

```

```

Rung 2:903
|
| +TON-----+
| +TIMER ON DELAY    +- (EN)--
| |Timer      TMR141+- (DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       15|
| +-----+

```

```

Rung 2:904
| TMR141/DN
| T4:26
| ] [-----+
| DN
| (2:903)
|
| TMR141
| T4:26
| (RES)--

```

```

Rung 2:905
|
| +LES-----+
| +LESS THAN          SCR_141
| |Source A      TMR141.ACC| 0:25
| |              15|      ( )
| |Source B      PW141|    25
| |              01|
| +-----+
| T4:26.ACC - (2:903)
| N7:207 - (2:794)

```

```

Rung 2:906
|
| +TON-----+
| +TIMER ON DELAY    +- (EN)--
| |Timer      TMR142+- (DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       15|
| +-----+

```

```

Rung 2:907
| TMR142/DN
| T4:27
| ] [-----+
| DN
| (2:906)
|
| TMR142
| T4:27
| (RES)--

```

Rung 2:908

```
|
|+LES-----+
|+LESS THAN
| |Source A      TMR142.ACC|
| |              15|
| |Source B      PW142|
| |              0|
|+-----+
| T4:27.ACC - (2:906)
| N7:208 - (2:803)
```

SCR_142

0:25

()

26

Rung 2:909

```
| END
|
| 7
|---[LBL]-----+
|
|
```

DUMMY3

N20:7

()

2

Rung 2:910

```
|
|+CLR-----+
|+CLEAR
| |Dest      S:5|
| |          0|
|+-----+
```

Rung 2:911

```
|
|+-----+END+
|
```

Rung 3:0

 Initialization Subroutine, runs once when the PLC is started.

 write configuration number (2369d), (100001000001b) to
 N7:0 (CONFIGURE) for use below, CONFIGURE T/C MODULES

	+MOV-----+
-----	+MOVE-----+
	Source 2369
	Dest CONFIGURE
	2369
	+-----+

Rung 3:1

** CONFIGURE T/C MODULES **

Use Fill File to copy the configuration to each channel of each T/C module

MODULE 3

	+FLL-----+
-----	+FILL FILE-----+
	Source CONFIGURE
	Dest #0:3.0
	Length 4
	+-----+

Rung 3:2

MODULE 4

	+FLL-----+
-----	+FILL FILE-----+
	Source CONFIGURE
	Dest #0:4.0
	Length 4
	+-----+

Rung 3:3

MODULE 5

	+FLL-----+
-----	+FILL FILE-----+
	Source CONFIGURE
	Dest #0:5.0
	Length 4
	+-----+

Rung 3:4

MODULE 6

	+FLL-----+
-----	+FILL FILE-----+
	Source CONFIGURE
	Dest #0:6.0
	Length 4
	+-----+

Rung 3:5

MODULE 7

```
|
|-----+FLL-----+
|-----+FILL FILE-----+
|Source  CONFIGURE|
|Dest      #0:7.0|
|Length      4|
|-----+-----+
```

Rung 3:6

MODULE 8

```
|
|-----+FLL-----+
|-----+FILL FILE-----+
|Source  CONFIGURE|
|Dest      #0:8.0|
|Length      4|
|-----+-----+
```

Rung 3:7

MODULE 9

```
|
|-----+FLL-----+
|-----+FILL FILE-----+
|Source  CONFIGURE|
|Dest      #0:9.0|
|Length      4|
|-----+-----+
```

Rung 3:8

MODULE 10

```
|
|-----+FLL-----+
|-----+FILL FILE-----+
|Source  CONFIGURE|
|Dest      #0:10.0|
|Length      4|
|-----+-----+
```

Rung 3:9

MODULE 11

```
|
|-----+FLL-----+
|-----+FILL FILE-----+
|Source  CONFIGURE|
|Dest      #0:11.0|
|Length      4|
|-----+-----+
```

Rung 3:10

MODULE 12

```
|
|-----+FLL-----+
|-----+FILL FILE-----+
|Source  CONFIGURE|
|Dest      #0:12.0|
|Length      4|
|-----+-----+
```

Rung 3:11

MODULE 13

```
|
|-----+FLL-----+
|-----+FILL FILE-----+
|Source  CONFIGURE|
|Dest      #0:13.0|
|Length      4|
|-----+-----+
```

Rung 3:12

MODULE 14

```
|
|-----+FLL-----+
|-----+FILL FILE-----+
|Source  CONFIGURE|
|Dest      #0:14.0|
|Length      4|
|-----+-----+
```

Rung 3:13

MODULE 15

```
|
|-----+FLL-----+
|-----+FILL FILE-----+
|Source  CONFIGURE|
|Dest      #0:15.0|
|Length      4|
|-----+-----+
```

Rung 3:14

MODULE 16

```
|
|-----+FLL-----+
|-----+FILL FILE-----+
|Source  CONFIGURE|
|Dest      #0:16.0|
|Length      4|
|-----+-----+
```

Rung 3:15

MODULE 17

```
|
|-----+FLL-----+
|-----+FILL FILE-----+
|Source  CONFIGURE|
|Dest      #0:17.0|
|Length      4|
|-----+-----+
```

Rung 3:16

MODULE 18

```
|
|-----+FLL-----+
|-----+FILL FILE-----+
|Source  CONFIGURE|
|Dest      #0:18.0|
|Length      4|
|-----+-----+
```

Rung 3:17

MODULE 19

```
|
|-----+FLL-----+
|-----+FILL FILE-----+
|Source  CONFIGURE|
|Dest    #0:19.0|
|Length  4|
|-----+-----+
```

Rung 3:18

MODULE 20

```
|
|-----+FLL-----+
|-----+FILL FILE-----+
|Source  CONFIGURE|
|Dest    #0:20.0|
|Length  4|
|-----+-----+
```

Rung 3:19

MODULE 21

```
|
|-----+FLL-----+
|-----+FILL FILE-----+
|Source  CONFIGURE|
|Dest    #0:21.0|
|Length  4|
|-----+-----+
```

Rung 3:20

MODULE 22

```
|
|-----+FLL-----+
|-----+FILL FILE-----+
|Source  CONFIGURE|
|Dest    #0:22.0|
|Length  4|
|-----+-----+
```

Rung 3:21

MODULE 23

```
|
|-----+FLL-----+
|-----+FILL FILE-----+
|Source  CONFIGURE|
|Dest    #0:23.0|
|Length  4|
|-----+-----+
```

Rung 3:22

MODULE 24

```
|
|-----+FLL-----+
|-----+FILL FILE-----+
|Source  CONFIGURE|
|Dest    #0:24.0|
|Length  4|
|-----+-----+
```

Rung 3:23

```
|
|-----+CLR-----+
|-----+CLEAR-----+
|Dest    N7:118|
|      0|
|-----+-----+
```

Rung 3:24

```
+CLR-----+
+CLEAR      +
|Dest      N7:119|
|          01|
+-----+
```

Rung 3:25

```
+CLR-----+
+CLEAR      +
|Dest      N7:120|
|          01|
+-----+
```

Rung 3:26

```
+CLR-----+
+CLEAR      +
|Dest      N7:121|
|          01|
+-----+
```

Rung 3:27

```
+MOV-----+
+MOVE       +
|Source     43|
|          |
|Dest      PID110A|
|          43|
+-----+
```

Rung 3:28

```
+MOV-----+
+MOVE       +
|Source     43|
|          |
|Dest      PID110B|
|          43|
+-----+
```

Rung 3:29

```
+MOV-----+
+MOVE       +
|Source     43|
|          |
|Dest      PID110C|
|          43|
+-----+
```

Rung 3:30

```
+MOV-----+
+MOVE       +
|Source     43|
|          |
|Dest      PID111A|
|          43|
+-----+
```


Rung 3:31

```
+MOV-----+  
+MOVE-----+  
|Source      43|  
|            |  
|Dest       PID111B|  
|            43|  
+-----+
```

Rung 3:32

```
+MOV-----+  
+MOVE-----+  
|Source      43|  
|            |  
|Dest       PID111C|  
|            43|  
+-----+
```

Rung 3:33

```
+MOV-----+  
+MOVE-----+  
|Source      43|  
|            |  
|Dest       PID112A|  
|            43|  
+-----+
```

Rung 3:34

```
+MOV-----+  
+MOVE-----+  
|Source      43|  
|            |  
|Dest       PID112B|  
|            43|  
+-----+
```

Rung 3:35

```
+MOV-----+  
+MOVE-----+  
|Source      43|  
|            |  
|Dest       PID112C|  
|            43|  
+-----+
```

Rung 3:36

```
+MOV-----+  
+MOVE-----+  
|Source      43|  
|            |  
|Dest       PID113A|  
|            43|  
+-----+
```

Rung 3:37

```
+MOV-----+
+MOVE-----+
|Source      43|
|            |
|Dest      PID113B|
|            43|
+-----+
```

Rung 3:38

```
+MOV-----+
+MOVE-----+
|Source      43|
|            |
|Dest      PID113C|
|            43|
+-----+
```

Rung 3:39

```
+MOV-----+
+MOVE-----+
|Source      43|
|            |
|Dest      PID119|
|            43|
+-----+
```

Rung 3:40

```
+MOV-----+
+MOVE-----+
|Source      43|
|            |
|Dest      PID120|
|            43|
+-----+
```

Rung 3:41

```
+MOV-----+
+MOVE-----+
|Source      43|
|            |
|Dest      PID121|
|            43|
+-----+
```

Rung 3:42

```
+MOV-----+
+MOVE-----+
|Source      43|
|            |
|Dest      PID122|
|            43|
+-----+
```

Rung 3:43

```
+MOV-----+  
+MOVE-----+  
|Source      43|  
|            |  
|Dest        PID123|  
|            43|  
+-----+
```

Rung 3:44

```
+MOV-----+  
+MOVE-----+  
|Source      43|  
|            |  
|Dest        PID124|  
|            43|  
+-----+
```

Rung 3:45

```
+MOV-----+  
+MOVE-----+  
|Source      43|  
|            |  
|Dest        PID125|  
|            43|  
+-----+
```

Rung 3:46

```
+MOV-----+  
+MOVE-----+  
|Source      43|  
|            |  
|Dest        PID130|  
|            43|  
+-----+
```

Rung 3:47

```
+MOV-----+  
+MOVE-----+  
|Source      43|  
|            |  
|Dest        PID131|  
|            43|  
+-----+
```

Rung 3:48

```
+MOV-----+  
+MOVE-----+  
|Source      43|  
|            |  
|Dest        PID132|  
|            43|  
+-----+
```

Rung 3:49

```
+MOV-----+
+MOVE-----+
|Source      43|
|            |
|Dest        PID133|
|            43|
+-----+
```

Rung 3:50

```
+MOV-----+
+MOVE-----+
|Source      43|
|            |
|Dest        PID134|
|            43|
+-----+
```

Rung 3:51

```
+MOV-----+
+MOVE-----+
|Source      43|
|            |
|Dest        PID140|
|            43|
+-----+
```

Rung 3:52

```
+MOV-----+
+MOVE-----+
|Source      43|
|            |
|Dest        PID141|
|            43|
+-----+
```

Rung 3:53

```
+MOV-----+
+MOVE-----+
|Source      43|
|            |
|Dest        PID142|
|            43|
+-----+
```

Rung 3:54

SET WORD 11 OF THE PID BLOCK TO ZERO ON START UP

```
+CLR-----+
+CLEAR-----+
|Dest        N12:11|
|            01|
+-----+
```

Rung 3:55

```
+CLR-----+
+CLEAR-----+
|Dest        N12:31|
|            01|
+-----+
```

Rung 3:56

```
|
|-----+CLR-----+
|-----CLEAR-----+
|Dest      N12:61|
|              0|
|-----+-----+
|
```

Rung 3:57

```
|
|-----+CLR-----+
|-----CLEAR-----+
|Dest      N12:91|
|              0|
|-----+-----+
|
```

Rung 3:58

```
|
|-----+CLR-----+
|-----CLEAR-----+
|Dest      N12:121|
|              0|
|-----+-----+
|
```

Rung 3:59

```
|
|-----+CLR-----+
|-----CLEAR-----+
|Dest      N12:151|
|              0|
|-----+-----+
|
```

Rung 3:60

```
|
|-----+CLR-----+
|-----CLEAR-----+
|Dest      N12:180|
|              0|
|-----+-----+
|
```

Rung 3:61

```
|
|-----+CLR-----+
|-----CLEAR-----+
|Dest      N13:11|
|              0|
|-----+-----+
|
```

Rung 3:62

```
|
|-----+CLR-----+
|-----CLEAR-----+
|Dest      N13:31|
|              0|
|-----+-----+
|
```

Rung 3:63

```
|
|-----+CLR-----+
|-----CLEAR-----+
|Dest      N13:61|
|              0|
|-----+-----+
|
```

Rung 3:64

	+CLR	+
	+CLEAR	+
	Dest	N13:91
		0
	+-----+	

Rung 3:65

	+CLR	+
	+CLEAR	+
	Dest	N13:121
		0
	+-----+	

Rung 3:66

	+CLR	+
	+CLEAR	+
	Dest	N13:151
		0
	+-----+	

Rung 3:67

	+CLR	+
	+CLEAR	+
	Dest	N13:181
		0
	+-----+	

Rung 3:68

	+CLR	+
	+CLEAR	+
	Dest	N14:11
		0
	+-----+	

Rung 3:69

	+CLR	+
	+CLEAR	+
	Dest	N14:31
		0
	+-----+	

Rung 3:70

	+CLR	+
	+CLEAR	+
	Dest	N14:61
		0
	+-----+	

Rung 3:71

	+CLR	+
	+CLEAR	+
	Dest	N14:91
		0
	+-----+	

Rung 3:72

```
|
|-----+CLR-----+
|          +CLEAR      +
|          |Dest      N14:121|
|          |          OI    |
|          +-----+
|
```

Rung 3:73

```
|
|-----+CLR-----+
|          +CLEAR      +
|          |Dest      N14:151|
|          |          OI    |
|          +-----+
|
```

Rung 3:74

```
|
|-----+CLR-----+
|          +CLEAR      +
|          |Dest      N14:181|
|          |          OI    |
|          +-----+
|
```

Rung 3:75

```
|
|-----+CLR-----+
|          +CLEAR      +
|          |Dest      N15:11|
|          |          OI    |
|          +-----+
|
```

Rung 3:76

```
|
|-----+CLR-----+
|          +CLEAR      +
|          |Dest      N15:31|
|          |          OI    |
|          +-----+
|
```

Rung 3:77

```
|
|-----+CLR-----+
|          +CLEAR      +
|          |Dest      N15:61|
|          |          OI    |
|          +-----+
|
```

Rung 3:78

```
|
|-----+CLR-----+
|          +CLEAR      +
|          |Dest      N15:91|
|          |          OI    |
|          +-----+
|
```

Rung 3:79

```
|
|-----+CLR-----+
|          +CLEAR      +
|          |Dest      N15:121|
|          |          OI    |
|          +-----+
|
```

Rung 3:80

```
+CLR-----+
|CLEAR
|Dest      N15:151|
|              0|
+-----+
```

Rung 3:81

```
+CLR-----+
|CLEAR
|Dest      N15:181|
|              0|
+-----+
```

Rung 3:82

```
+END+
```


Rung 2:0

```
*****
Beginning of main ladder program

Set up scheduling timer

*****
|                                     SCHTMR
| TMR_SU/DN
| T4:85
|-----1 [----- (JMP)-----
|         DN
|         (2:2)
```

Rung 2:1

```
*****
** FIRST PASS CALL TO SUBROUTINE 3 **
First Pass configures each channel of each T/C module
MODULE # is the # of the slot where the module resides
*****

| FIRST_PASS
| S:1
|-----1 [-----+JSR-----+
|         15        |SBR file number 3|
|                   +-----+
```

Rung 2:2

```
SETUP TIMER USED FOR INITIALIZING HEATUP RATES

|                                     +TON-----+
|-----+TIMER ON DELAY +--(EN)---
|       |Timer          TMR_SU--(DN)
|       |Time Base      0.01|
|       |Preset         6000|
|       |Accum          6001|
|       +-----+
```

Rung 2:3

```
*****
JUMPS TO SECTION 1 IF DN_1 IS NOT LATCHED DN_1 GETS LATCHED WHEN THE SECTION
IS ENTERED

|                                     MD1
| TMR_SU/DN
| T4:85
|-----1/[----- (JMP)-----
|         DN
|         (2:2)
```

Rung 2:4

RATE CHECKING

TMR_SU/DN	+MOV-----+
T4:85	+MOVE-----+
-----	Source AV143
DN	1724
(2:2)	Dest R1_143
	1724
	+-----+
	+MOV-----+
	+MOVE-----+
	Source AV143
	1724
	Dest R2_143
	1724
	+-----+
	+MOV-----+
	+MOVE-----+
	Source 10
	Dest DIF1_143
	-10
	+-----+
	+MOV-----+
	+MOVE-----+
	Source 10
	Dest DIF2_143
	-1
	+-----+
	+CLR-----+
	+CLEAR-----+
	Dest DDIF1
	-1
	+-----+
	+CLR-----+
	+CLEAR-----+
	Dest DDIF2
	0
	+-----+

Rung 2:5

RATE CHECKING

	+MOV-----+
-----	+MOVE-----+
	Source AV144
	1720
	Dest R1_144
	1720
	+-----+
	+MOV-----+
	+MOVE-----+
	Source AV144
	1720
	Dest R2_144
	1720
	+-----+

```

+++
+---+
+MOV-----+
+MOVE      +--+
|Source      10|
|Dest        DIF1_144|
|            -9|
+---+
+MOV-----+
+MOVE      +--+
|Source      10|
|Dest        DIF2_144|
|            0|
+---+
+CLR-----+
+CLEAR     +--+
|Dest        DDIF1|
|            -1|
+---+
+CLR-----+
+CLEAR     +--+
|Dest        DDIF2|
|            0|
+---+

```

Rung 2:6

RATE CHECKING

```

+---+
+MOV-----+
+MOVE      +--+
|Source      AV150|
|            1735|
|Dest        R1_150|
|            1734|
+---+
+MOV-----+
+MOVE      +--+
|Source      AV150|
|            1735|
|Dest        R2_150|
|            1734|
+---+
+MOV-----+
+MOVE      +--+
|Source      10|
|Dest        DIF1_150|
|            -9|
+---+
+MOV-----+
+MOVE      +--+
|Source      10|
|Dest        DIF2_150|
|            0|
+---+
+++

```

```
+++
+---+
+CLR-----+
+---+
+CLEAR
|Dest      DDIF1|
|          -1|
+---+
+CLR-----+
+---+
+CLEAR
|Dest      DDIF2|
|          0|
+---+
```

Rung 2:7

RATE CHECKING

```
+---+
+MOV-----+
+---+
+MOVE
|Source     AV151|
|          1738|
|Dest      R1_151|
|          1737|
+---+
+MOV-----+
+---+
+MOVE
|Source     AV151|
|          1738|
|Dest      R2_151|
|          1737|
+---+
+MOV-----+
+---+
+MOVE
|Source     10|
|          -9|
|Dest      DIF1_151|
|          -9|
+---+
+MOV-----+
+---+
+MOVE
|Source     10|
|          0|
|Dest      DIF2_151|
|          0|
+---+
+CLR-----+
+---+
+CLEAR
|Dest      DDIF1|
|          -1|
+---+
+CLR-----+
+---+
+CLEAR
|Dest      DDIF2|
|          0|
+---+
```

Rung 2:8

RATE CHECKING

```

+MOV-----+
|MOVE
|Source      AV152|
|      1734|
|Dest      R1_152|
|      1733|
+-----+
+MOV-----+
|MOVE
|Source      AV152|
|      1734|
|Dest      R2_152|
|      1733|
+-----+
+MOV-----+
|MOVE
|Source      10|
|      -9|
|Dest      DIF1_152|
+-----+
+MOV-----+
|MOVE
|Source      10|
|      0|
|Dest      DIF2_152|
|      0|
+-----+
+CLR-----+
|CLEAR
|Dest      DDIF1|
|      -1|
+-----+
+CLR-----+
|CLEAR
|Dest      DDIF2|
|      0|
+-----+

```

Rung 2:9

RATE CHECKING

```

+MOV-----+
|MOVE
|Source      AV153|
|      1721|
|Dest      R1_153|
|      1722|
+-----+
+MOV-----+
|MOVE
|Source      AV153|
|      1721|
|Dest      R2_153|
|      1722|
+-----+

```

+++

```

+++
+MOV-----+
+MOVE
|Source      10|
|Dest      DIF1_153|
|          -8|
+-----+
+MOV-----+
+MOVE
|Source      10|
|Dest      DIF2_153|
|          1|
+-----+
+CLR-----+
+CLEAR
|Dest      DDIF1|
|          -1|
+-----+
+CLR-----+
+CLEAR
|Dest      DDIF2|
|          0|
+-----+
  
```

Rung 2:10

RATE CHECKING

```

+MOV-----+
+MOVE
|Source      AV154|
|          1719|
|Dest      R1_154|
|          1720|
+-----+
+MOV-----+
+MOVE
|Source      AV154|
|          1719|
|Dest      R2_154|
|          1720|
+-----+
+MOV-----+
+MOVE
|Source      10|
|Dest      DIF1_154|
|          -9|
+-----+
+MOV-----+
+MOVE
|Source      10|
|Dest      DIF2_154|
|          0|
+-----+
+++
  
```

```

+++
| +CLR-----+
| +--CLEAR      +--+
| |Dest          DDIF1|
| |              -1|
| |              +--+
| +CLR-----+
| +--CLEAR      +--+
| |Dest          DDIF2|
| |              0|
| |              +--+
| +-----+

```

Rung 2:11

RATE CHECKING

```

+MOV-----+
+--MOVE      +--+
| |Source      AV160|
| |           1733|
| |Dest        R1_160|
| |           1733|
| |           +--+
| +MOV-----+
| +--MOVE      +--+
| |Source      AV160|
| |           1733|
| |Dest        R2_160|
| |           1733|
| |           +--+
| +MOV-----+
| +--MOVE      +--+
| |Source      10|
| |           |
| |Dest        DIF1_160|
| |           -8|
| |           +--+
| +MOV-----+
| +--MOVE      +--+
| |Source      10|
| |           |
| |Dest        DIF2_160|
| |           1|
| |           +--+
| +CLR-----+
| +--CLEAR      +--+
| |Dest          DDIF1|
| |              -1|
| |              +--+
| +CLR-----+
| +--CLEAR      +--+
| |Dest          DDIF2|
| |              0|
| |              +--+
| +-----+

```

Rung 2:12

RATE CHECKING

```
+MOV-----+
+MOVE
+Source      AV161|
+           1734|
+Dest        R1_161|
+           1733|
+-----+
+MOV-----+
+MOVE
+Source      AV161|
+           1734|
+Dest        R2_161|
+           1733|
+-----+
+MOV-----+
+MOVE
+Source      10|
+Dest        DIF1_161|
+           -9|
+-----+
+MOV-----+
+MOVE
+Source      10|
+Dest        DIF2_161|
+           0|
+-----+
+CLR-----+
+CLEAR
+Dest        DDIF1|
+           -1|
+-----+
+CLR-----+
+CLEAR
+Dest        DDIF2|
+           0|
+-----+
```

Rung 2:13

RATE CHECKING

```
+MOV-----+
+MOVE
+Source      AV162|
+           1730|
+Dest        R1_162|
+           1730|
+-----+
+MOV-----+
+MOVE
+Source      AV162|
+           1730|
+Dest        R2_162|
+           1730|
+-----+
```



```

+++
+MOV-----+
+--MOVE-----+
|Source      10|
|Dest      DIF1_162|
|          -9|
+-----+
+MOV-----+
+--MOVE-----+
|Source      10|
|Dest      DIF2_162|
|          0|
+-----+
+CLR-----+
+--CLEAR-----+
|Dest      DDIF1|
|          -1|
+-----+
+CLR-----+
+--CLEAR-----+
|Dest      DDIF2|
|          0|
+-----+
+++

```

Rung 2:14

RATE CHECKING

```

+MOV-----+
+--MOVE-----+
|Source      AV163|
|          1731|
|Dest      R1_163|
|          1730|
+-----+
+MOV-----+
+--MOVE-----+
|Source      AV163|
|          1731|
|Dest      R2_163|
|          1730|
+-----+
+MOV-----+
+--MOVE-----+
|Source      10|
|Dest      DIF1_163|
|          -8|
+-----+
+MOV-----+
+--MOVE-----+
|Source      10|
|Dest      DIF2_163|
|          1|
+-----+
+++

```

```
+++
+---+
+CLR-----+
+---+
+---+CLEAR+---+
|Dest      DDIF1|
|          -1|
|          +---+
+CLR-----+
+---+
+---+CLEAR+---+
|Dest      DDIF2|
|          0|
|          +---+
+---+
```

Rung 2:15

RATE CHECKING

```
+---+
+MOV-----+
+---+
+---+MOVE+---+
|Source     AV164|
|          1727|
|Dest       R1_164|
|          1727|
|          +---+
+MOV-----+
+---+
+---+MOVE+---+
|Source     AV164|
|          1727|
|Dest       R2_164|
|          1727|
|          +---+
+MOV-----+
+---+
+---+MOVE+---+
|Source     10|
|          +---+
|Dest       DIF1_164|
|          -8|
|          +---+
+MOV-----+
+---+
+---+MOVE+---+
|Source     10|
|          +---+
|Dest       DIF2_164|
|          1|
|          +---+
+CLR-----+
+---+
+---+CLEAR+---+
|Dest      DDIF1|
|          -1|
|          +---+
+CLR-----+
+---+
+---+CLEAR+---+
|Dest      DDIF2|
|          0|
|          +---+
+---+
```

Rung 2:16

RATE CHECKING

```

+MOV-----+
+MOVE
|Source      AV170B|
|            1721|
|Dest       R1_170B|
|            1720|
+-----+
+MOV-----+
+MOVE
|Source      AV170B|
|            1721|
|Dest       R2_170B|
|            1720|
+-----+
+MOV-----+
+MOVE
|Source      10|
|            -9|
|Dest      DIF1_170B|
|            -9|
+-----+
+MOV-----+
+MOVE
|Source      10|
|            0|
|Dest      DIF2_170B|
|            0|
+-----+
+CLR-----+
+CLEAR
|Dest      DDIF1|
|            -1|
+-----+
+CLR-----+
+CLEAR
|Dest      DDIF2|
|            0|
+-----+

```

Rung 2:17

RATE CHECKING

```

+MOV-----+
+MOVE
|Source      AV170V|
|            1718|
|Dest       R1_170V|
|            1718|
+-----+
+MOV-----+
+MOVE
|Source      AV170V|
|            1718|
|Dest       R2_170V|
|            1718|
+-----+

```

```

+++
| +MOV-----+ |
| +MOVE      +--+ |
| |Source      10| |
| |          | |
| |Dest      DIF1_170V| |
| |          -9| |
| +-----+ |
| +MOV-----+ |
| +MOVE      +--+ |
| |Source      10| |
| |          | |
| |Dest      DIF2_170V| |
| |          0| |
| +-----+ |
| +CLR-----+ |
| +CLEAR     +--+ |
| |Dest      DDIF1| |
| |          -1| |
| +-----+ |
| +CLR-----+ |
| +CLEAR     +--+ |
| |Dest      DDIF2| |
| |          0| |
| +-----+ |
  
```

Rung 2:18

RATE CHECKING

```

+++
| +MOV-----+ |
| +MOVE      +--+ |
| |Source      AV171B| |
| |          1722| |
| |Dest      R1_171B| |
| |          1722| |
| +-----+ |
| +MOV-----+ |
| +MOVE      +--+ |
| |Source      AV171B| |
| |          1722| |
| |Dest      R2_171B| |
| |          1722| |
| +-----+ |
| +MOV-----+ |
| +MOVE      +--+ |
| |Source      10| |
| |          | |
| |Dest      DIF1_171B| |
| |          -9| |
| +-----+ |
| +MOV-----+ |
| +MOVE      +--+ |
| |Source      10| |
| |          | |
| |Dest      DIF2_171B| |
| |          0| |
| +-----+ |
+++
  
```

```

+++
+CLR-----+
+--CLEAR-----+
|Dest          DDIF1|
|              -1|
+-----+
+CLR-----+
+--CLEAR-----+
|Dest          DDIF2|
|              0|
+-----+

```

Rung 2:19

RATE CHECKING

```

+MOV-----+
+--MOVE-----+
|Source        AV171V|
|              1721|
|Dest          R1_171V|
|              1721|
+-----+
+MOV-----+
+--MOVE-----+
|Source        AV171V|
|              1721|
|Dest          R2_171V|
|              1721|
+-----+
+MOV-----+
+--MOVE-----+
|Source        10|
|Dest          DIF1_171V|
|              -8|
+-----+
+MOV-----+
+--MOVE-----+
|Source        10|
|Dest          DIF2_171V|
|              1|
+-----+
+CLR-----+
+--CLEAR-----+
|Dest          DDIF1|
|              -1|
+-----+
+CLR-----+
+--CLEAR-----+
|Dest          DDIF2|
|              0|
+-----+

```

Rung 2:20

RATE CHECKING

```
+MOV-----+
+MOVE
|Source      AV172B|
|            1733|
|Dest       R1_172B|
|            1733|
+-----+
+MOV-----+
+MOVE
|Source      AV172B|
|            1733|
|Dest       R2_172B|
|            1733|
+-----+
+MOV-----+
+MOVE
|Source      10|
|            -8|
|Dest      DIF1_172B|
+-----+
+MOV-----+
+MOVE
|Source      10|
|            1|
|Dest      DIF2_172B|
+-----+
+CLR-----+
+CLEAR
|Dest      DDIF1|
|            -1|
+-----+
+CLR-----+
+CLEAR
|Dest      DDIF2|
|            0|
+-----+
```

Rung 2:21

RATE CHECKING

```
+MOV-----+
+MOVE
|Source      AV172V|
|            1727|
|Dest       R1_172V|
|            1727|
+-----+
+MOV-----+
+MOVE
|Source      AV172V|
|            1727|
|Dest       R2_172V|
|            1727|
+-----+
```

```

+++
+---+
+MOV-----+
+MOVE      +--+
|Source          10|
|Dest      DIF1_172V|
|              -8|
+---+
+MOV-----+
+MOVE      +--+
|Source          10|
|Dest      DIF2_172V|
|              1|
+---+
+CLR-----+
+CLEAR     +--+
|Dest          DDIF1|
|              -1|
+---+
+CLR-----+
+CLEAR     +--+
|Dest          DDIF2|
|              0|
+---+

```

Rung 2:22

RATE CHECKING

```

+---+
+MOV-----+
+MOVE      +--+
|Source      AV173B|
|          1727|
|Dest      R1_173B|
|          1727|
+---+
+MOV-----+
+MOVE      +--+
|Source      AV173B|
|          1727|
|Dest      R2_173B|
|          1727|
+---+
+MOV-----+
+MOVE      +--+
|Source          10|
|Dest      DIF1_173B|
|              -9|
+---+
+MOV-----+
+MOVE      +--+
|Source          10|
|Dest      DIF2_173B|
|              0|
+---+

```

```

***
| +CLR-----+
| +--CLEAR    +--
| |Dest      DDIF1|
| |          -1|
| +-----+
| +CLR-----+
| +--CLEAR    +--
| |Dest      DDIF2|
| |          0|
| +-----+

```

Rung 2:23

RATE CHECKING

```

+MOV-----+
| +--MOVE    +--
| |Source    AV174V|
| |          1727|
| |Dest      R1_174V|
| |          1727|
| +-----+
| +MOV-----+
| +--MOVE    +--
| |Source    AV174V|
| |          1727|
| |Dest      R2_174V|
| |          1727|
| +-----+
| +MOV-----+
| +--MOVE    +--
| |Source    10|
| |          -9|
| |Dest      DIF1_174V|
| |          -9|
| +-----+
| +MOV-----+
| +--MOVE    +--
| |Source    10|
| |          0|
| |Dest      DIF2_174V|
| |          0|
| +-----+
| +CLR-----+
| +--CLEAR    +--
| |Dest      DDIF1|
| |          -1|
| +-----+
| +CLR-----+
| +--CLEAR    +--
| |Dest      DDIF2|
| |          0|
| +-----+

```


Rung 2:24

RATE CHECKING

```

+-----+
+MOV-----+
+MOVE-----+
|Source      AV175B|
|            1728|
|Dest        R1_175B|
|            1727|
+-----+
+MOV-----+
+MOVE-----+
|Source      AV175B|
|            1728|
|Dest        R2_175B|
|            1727|
+-----+
+MOV-----+
+MOVE-----+
|Source      10|
|            -9|
|Dest        DIF1_175B|
|            -9|
+-----+
+MOV-----+
+MOVE-----+
|Source      10|
|            0|
|Dest        DIF2_175B|
|            0|
+-----+
+CLR-----+
+CLEAR-----+
|Dest        DDIF1|
|            -1|
+-----+
+CLR-----+
+CLEAR-----+
|Dest        DDIF2|
|            0|
+-----+

```

Rung 2:25

RATE CHECKING

```

+-----+
+MOV-----+
+MOVE-----+
|Source      AV175V|
|            1723|
|Dest        R1_175V|
|            1722|
+-----+
+MOV-----+
+MOVE-----+
|Source      AV175V|
|            1723|
|Dest        R2_175V|
|            1722|
+-----+

```

```
+++
+---+
+MOV-----+
+MOVE-----+
|Source      10|
|Dest      DIF1_175V|
|      -10|
+---+
+MOV-----+
+MOVE-----+
|Source      10|
|Dest      DIF2_175V|
|      -1|
+---+
+CLR-----+
+CLEAR-----+
|Dest      DDIF1|
|      -1|
+---+
+CLR-----+
+CLEAR-----+
|Dest      DDIF2|
|      0|
+---+
+++
```

Rung 2:26

RATE CHECKING

```
+++
+MOV-----+
+MOVE-----+
|Source      AV176B|
|      1712|
|Dest      R1_176B|
|      1713|
+---+
+MOV-----+
+MOVE-----+
|Source      AV176B|
|      1712|
|Dest      R2_176B|
|      1713|
+---+
+MOV-----+
+MOVE-----+
|Source      10|
|Dest      DIF1_176B|
|      -8|
+---+
+MOV-----+
+MOVE-----+
|Source      10|
|Dest      DIF2_176B|
|      1|
+---+
+++
```

```
+++
|+CLR-----+
|+CLEAR      +
| |Dest      DDIF1|
| |          -1|
|+-----+
|+CLR-----+
|+CLEAR      +
| |Dest      DDIF2|
| |          0|
|+-----+
```

Rung 2:27

RATE CHECKING

```
+++
|+MOV-----+
|+MOVE      +
| |Source    AV176V|
| |          1711|
| |Dest      R1_176V|
| |          1711|
|+-----+
|+MOV-----+
|+MOVE      +
| |Source    AV176V|
| |          1711|
| |Dest      R2_176V|
| |          1711|
|+-----+
|+MOV-----+
|+MOVE      +
| |Source     10|
| |Dest      DIF1_176V|
| |          -9|
|+-----+
|+MOV-----+
|+MOVE      +
| |Source     10|
| |Dest      DIF2_176V|
| |          0|
|+-----+
|+CLR-----+
|+CLEAR      +
| |Dest      DDIF1|
| |          -1|
|+-----+
|+CLR-----+
|+CLEAR      +
| |Dest      DDIF2|
| |          0|
|+-----+
```

Rung 2:28

RATE CHECKING

```

+MOV-----+
+MOVE
|Source      AV177B|
|            1732|
|Dest        R1_177B|
|            1732|
+-----+
+MOV-----+
+MOVE
|Source      AV177B|
|            1732|
|Dest        R2_177B|
|            1732|
+-----+
+MOV-----+
+MOVE
|Source      10|
|Dest        DIF1_177B|
|            -9|
+-----+
+MOV-----+
+MOVE
|Source      10|
|Dest        DIF2_177B|
|            0|
+-----+
+CLR-----+
+CLEAR
|Dest        DDIF1|
|            -1|
+-----+
+CLR-----+
+CLEAR
|Dest        DDIF2|
|            0|
+-----+
  
```

Rung 2:29

RATE CHECKING

```

+MOV-----+
+MOVE
|Source      AV177V|
|            1732|
|Dest        R1_177V|
|            1732|
+-----+
+MOV-----+
+MOVE
|Source      AV177V|
|            1732|
|Dest        R2_177V|
|            1732|
+-----+
  
```

```
+++
+MOV-----+
+MOVE      +
|Source      10|
|Dest      DIF1_177V|
|          -9|
+-----+
+MOV-----+
+MOVE      +
|Source      10|
|Dest      DIF2_177V|
|          0|
+-----+
+CLR-----+
+CLEAR
|Dest      DDIF1|
|          -1|
+-----+
+CLR-----+
+CLEAR
|Dest      DDIF2|
|          0|
+-----+
+++
```

Rung 2:30

RATE CHECKING

```
+++
+MOV-----+
+MOVE      +
|Source      AV178B|
|          1728|
|Dest      R1_178B|
|          1729|
+-----+
+MOV-----+
+MOVE      +
|Source      AV178B|
|          1728|
|Dest      R2_178B|
|          1729|
+-----+
+MOV-----+
+MOVE      +
|Source      10|
|Dest      DIF1_178B|
|          -8|
+-----+
+MOV-----+
+MOVE      +
|Source      10|
|Dest      DIF2_178B|
|          1|
+-----+
+++
```

```

+++
|+CLR-----+|
|+CLEAR-----+|
|Dest          DDIF1|
|              -1|
|+CLR-----+|
|+CLEAR-----+|
|Dest          DDIF2|
|              0|
|+CLR-----+|

```

Rung 2:31

RATE CHECKING

```

+MOV-----+
+MOVE-----+
|Source        AV179V|
|              1716|
|Dest          R1_179V|
|              1716|
|+MOV-----+|
+MOVE-----+
|Source        AV179V|
|              1716|
|Dest          R2_179V|
|              1716|
|+MOV-----+|
+MOVE-----+
|Source        10|
|Dest          DIF1_179V|
|              -9|
|+MOV-----+|
+MOVE-----+
|Source        10|
|Dest          DIF2_179V|
|              0|
|+CLR-----+|
+CLEAR-----+
|Dest          DDIF1|
|              -1|
|+CLR-----+|
+CLEAR-----+
|Dest          DDIF2|
|              0|
|+CLR-----+|

```

Rung 2:32

RATE CHECKING

```

+MOV-----+
+MOVE
|Source      AV180B|
|            1733|
|Dest        R1_180B|
|            1733|
+-----+
+MOV-----+
+MOVE
|Source      AV180B|
|            1733|
|Dest        R2_180B|
|            1733|
+-----+
+MOV-----+
+MOVE
|Source      10|
|            |
|Dest        DIF1_180B|
|            -9|
+-----+
+MOV-----+
+MOVE
|Source      10|
|            |
|Dest        DIF2_180B|
|            0|
+-----+
+CLR-----+
+CLEAR
|Dest        DDIF1|
|            -1|
+-----+
+CLR-----+
+CLEAR
|Dest        DDIF2|
|            0|
+-----+
  
```

Rung 2:33

RATE CHECKING

```

+MOV-----+
+MOVE
|Source      AV180V|
|            1731|
|Dest        R1_180V|
|            1731|
+-----+
+MOV-----+
+MOVE
|Source      AV180V|
|            1731|
|Dest        R2_180V|
|            1731|
+-----+
  
```

```

+++
| +MOV-----+ |
| +--MOVE      +-+ |
| |Source      10| |
| |Dest       DIF1_180V| |
| |           -9| |
| +-----+ |
| +MOV-----+ |
| +--MOVE      +-+ |
| |Source      10| |
| |Dest       DIF2_180V| |
| |           0| |
| +-----+ |
| +CLR-----+ |
| +--CLEAR     +-+ |
| |Dest       DDIF1| |
| |           -1| |
| +-----+ |
| +CLR-----+ |
| +--CLEAR     +-+ |
| |Dest       DDIF2| |
| |           0| |
| +-----+ |

```

Rung 2:34

RATE CHECKING

```

| +MOV-----+ |
| +--MOVE      +-+ |
| |Source      AV181B| |
| |           1732| |
| |Dest       R1_181B| |
| |           1732| |
| +-----+ |
| +MOV-----+ |
| +--MOVE      +-+ |
| |Source      AV181B| |
| |           1732| |
| |Dest       R2_181B| |
| |           1732| |
| +-----+ |
| +MOV-----+ |
| +--MOVE      +-+ |
| |Source      10| |
| |Dest       DIF1_181B| |
| |           -10| |
| +-----+ |
| +MOV-----+ |
| +--MOVE      +-+ |
| |Source      10| |
| |Dest       DIF2_181B| |
| |           -1| |
| +-----+ |
+++

```



```

***
+---+
| +CLR-----+
| +---+CLEAR +---+
| |Dest          DDIF1|
| |              -1|
| +---+-----+
| +CLR-----+
| +---+CLEAR +---+
| |Dest          DDIF2|
| |              0|
| +---+-----+
  
```

Rung 2:35

RATE CHECKING

```

+---+
| +MOV-----+
| +---+MOVE +---+
| |Source        AV181V|
| |              1727|
| |Dest          E1_181V|
| |              1727|
| +---+-----+
| +MOV-----+
| +---+MOVE +---+
| |Source        AV181V|
| |              1727|
| |Dest          E2_181V|
| |              1727|
| +---+-----+
| +MOV-----+
| +---+MOVE +---+
| |Source        10|
| |              |
| |Dest          DIF1_181V|
| |              -10|
| +---+-----+
| +MOV-----+
| +---+MOVE +---+
| |Source        10|
| |              |
| |Dest          DIF2_181V|
| |              -1|
| +---+-----+
| +CLR-----+
| +---+CLEAR +---+
| |Dest          DDIF1|
| |              -1|
| +---+-----+
| +CLR-----+
| +---+CLEAR +---+
| |Dest          DDIF2|
| |              0|
| +---+-----+
  
```

Rung 2:36

RATE CHECKING

```
+MOV-----+
+MOVE      +-+
|Source     AV182B|
|           1722|
|Dest       R1_182B|
|           1723|
+-----+
+MOV-----+
+MOVE      +-+
|Source     AV182B|
|           1722|
|Dest       R2_182B|
|           1723|
+-----+
+MOV-----+
+MOVE      +-+
|Source     10|
|           |
|Dest       DIF1_182B|
|           -9|
+-----+
+MOV-----+
+MOVE      +-+
|Source     10|
|           |
|Dest       DIF2_182B|
|           0|
+-----+
+CLR-----+
+CLEAR     +-+
|Dest       DDIF1|
|           -1|
+-----+
+CLR-----+
+CLEAR     +-+
|Dest       DDIF2|
|           0|
+-----+
```

Rung 2:37

RATE CHECKING

```
+MOV-----+
+MOVE      +-+
|Source     AV182V|
|           1723|
|Dest       R1_182V|
|           1724|
+-----+
+MOV-----+
+MOVE      +-+
|Source     AV182V|
|           1723|
|Dest       R2_182V|
|           1724|
+-----+
```

```

+++
| +MOV-----+
| +MOVE      +
| |Source      10|
| |Dest       DIF1_182V|
| |           -8|
| +-----+
| +MOV-----+
| +MOVE      +
| |Source      10|
| |Dest       DIF2_182V|
| |           1|
| +-----+
| +CLR-----+
| +CLEAR     +
| |Dest       DDIF1|
| |           -1|
| +-----+
| +CLR-----+
| +CLEAR     +
| |Dest       DDIF2|
| |           0|
| +-----+
  
```

Rung 2:38

RATE CHECKING

```

| +MOV-----+
| +MOVE      +
| |Source      AV183B|
| |           1733|
| |Dest       R1_183B|
| |           1732|
| +-----+
| +MOV-----+
| +MOVE      +
| |Source      AV183B|
| |           1733|
| |Dest       R2_183B|
| |           1732|
| +-----+
| +MOV-----+
| +MOVE      +
| |Source      10|
| |Dest       DIF1_183B|
| |           -8|
| +-----+
| +MOV-----+
| +MOVE      +
| |Source      10|
| |Dest       DIF2_183B|
| |           1|
| +-----+
+++
  
```

```

+++
| +CLR-----+ |
| +--CLEAR    +--|
| |Dest      DDIF1|
| |          -1| |
| +-----+ |
| +CLR-----+ |
| +--CLEAR    +--|
| |Dest      DDIF2|
| |          0| |
| +-----+ |
  
```

Rung 2:39

RATE CHECKING

```

+MOV-----+
| +MOVE      +--|
| |Source    AV183V|
| |          1730|
| |Dest      R1_183V|
| |          1729|
| +-----+ |
| +MOV-----+ |
| +--MOVE      +--|
| |Source    AV183V|
| |          1730|
| |Dest      R2_183V|
| |          1729|
| +-----+ |
| +MOV-----+ |
| +--MOVE      +--|
| |Source    10| |
| |          | |
| |Dest      DIF1_183V|
| |          -9| |
| +-----+ |
| +MOV-----+ |
| +--MOVE      +--|
| |Source    10| |
| |          | |
| |Dest      DIF2_183V|
| |          0| |
| +-----+ |
| +CLR-----+ |
| +--CLEAR    +--|
| |Dest      DDIF1|
| |          -1| |
| +-----+ |
| +CLR-----+ |
| +--CLEAR    +--|
| |Dest      DDIF2|
| |          0| |
| +-----+ |
  
```

SCHTMR	DUMMY1
7	N22:7
[LBL]	()
	0

```

+-----+-----+
+TON-----+
+TIMER ON DELAY +-(EN)-+
|Timer      TMR_SCH+-(DN)|
|Time Base   0.01|
|Preset      52|
|Accum       49|
+-----+-----+
+TON-----+
+TIMER ON DELAY +-(EN)-+
|Timer      RT_TMR+-(DN)|
|Time Base   1.0|
|Preset      180|
|Accum       51|
+-----+-----+

```

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```

+++          +++++
|            |    | |
|            |    | RT_TMR |
|            |    | T4:87 |
|            |    |-----|
|            |    | (RES) |
|            |    |-----|
DN_1          |
< N22:5       |
<--(U)-----|
< 1           |
|            |
DN_2          |
< N22:5       |
<--(U)-----|
< 2           |
|            |
DN_3          |
< N22:5       |
<--(U)-----|
< 3           |
|            |
DN_4          |
< N22:5       |
<--(U)-----|
< 4           |
|            |
TMR_SCH       |
< T4:86       |
<--(RES)-----|
<

```

Rung 2:44

 JUMPS TO SECTION 1 IF DN_1 IS NOT LATCHED DN_1 GETS LATCHED WHEN THE SECTION
 IS ENTERED

```

|                                                    MD1
|
| +GEQ-----+ DN_1
| |-----+ N22:5
| |-----+ 1
| |-----+ (JMP)-----
| |GRTR THAN OR EQUAL |
| |Source A TMR_SCH.ACC| 1
| | 49| (2:40)
| |Source B 13|
| |-----|
| | T4:86.ACC - (2:42)
|

```

Rung 2:45

 JUMPS TO SECTION 2 IF DN_2 IS NOT LATCHED DN_2 GETS LATCHED WHEN THE SECTION IS
 ENTERED

```

|                                                    MD2
|
| +GEQ-----+ DN_2
| |-----+ N22:5
| |-----+ 2
| |-----+ (JMP)-----
| |GRTR THAN OR EQUAL |
| |Source A TMR_SCH.ACC| 2
| | 49| (2:40)
| |Source B 26|
| |-----|
| | T4:86.ACC - (2:42)
|

```

Rung 2:46

```
*****
JUMPS TO SECTION 3 IF DN_3 IS NOT LATCHED DN_3 GETS LATCHED WHEN THE SECTION IS
ENTERED
|
|                                     DN_3
|                                     MD3
| +GEQ-----+ N22:5
| +GRTR THAN OR EQUAL +---1/[----- (JMP)-----
| |Source A TMR_SCH.ACC| 3
| | 49| (2:40)
| |Source B 39|
| |
| +-----+
| T4:86.ACC - (2:42)
```

Rung 2:47

```
*****
JUMPS TO SECTION 3 IF DN_3 IS NOT LATCHED DN_3 GETS LATCHED WHEN THE SECTION IS
ENTERED
|
|                                     DN_4
|                                     MD4
| +GEQ-----+ N22:5
| +GRTR THAN OR EQUAL +---1/[----- (JMP)-----
| |Source A TMR_SCH.ACC| 4
| | 49| (2:43)
| |Source B 52|
| |
| +-----+
| T4:86.ACC - (2:42)
```

Rung 2:48

```
|
|                                     NOT END
|                                     5
|----- (JMP)-----
|
```

Rung 2:49

```
*****
BEGIN SECTION 1
| MD1
|
| 1 DUMMY3
| N22:7
| [LBL]----- ( )
| 2
```

Rung 2:50

```
|
| DN_1
| N22:5
|----- (L)-----
| 1
```


Rung 2:51

Read each T/C and store each T/C's value in its own memory register

		+ADD-----+
		+ADD-----+
		Source A TC143A
		733
		Source B 1000
		1733
		Dest C143A
		1733
		+-----+

Rung 2:52

	+GRT-----+	+MOV-----+
	+GREATER THAN	+MOVE-----+
	Source A C143A	Source 16383
	1733	1733
	Source B 16383	Dest C143A
	1733	1733
	+-----+	+-----+
	N7:1 - (2:51)	

Rung 2:53

		+ADD-----+
		+ADD-----+
		Source A TC143B
		714
		Source B 1000
		1714
		Dest C143B
		1714
		+-----+

Rung 2:54

	+GRT-----+	+MOV-----+
	+GREATER THAN	+MOVE-----+
	Source A C143B	Source 16383
	1714	1714
	Source B 16383	Dest C143B
	1714	1714
	+-----+	+-----+
	N7:2 - (2:53)	

Rung 2:55

		+ADD-----+
		+ADD-----+
		Source A TC144A
		720
		Source B 1000
		1720
		Dest C144A
		1720
		+-----+

Rung 2:56		
+GRT-----+		+MOV-----+
+GREATER THAN		+MOVE-----+
Source A C144A		Source 16383
1720		1720
Source B 16383		Dest C144A
1720		1720
+-----+		+-----+
N7:3 - (2:55)		

Rung 2:57		
		+ADD-----+
		+ADD-----+
		Source A TC144B
		720
		Source B 1000
		1720
		Dest C144B
		1720
		+-----+

Rung 2:58		
+GRT-----+		+MOV-----+
+GREATER THAN		+MOVE-----+
Source A C144B		Source 16383
1720		1720
Source B 16383		Dest C144B
1720		1720
+-----+		+-----+
N7:4 - (2:57)		

Rung 2:59		
		+ADD-----+
		+ADD-----+
		Source A TC150A
		731
		Source B 1000
		1731
		Dest C150A
		1731
		+-----+

Rung 2:60		
+GRT-----+		+MOV-----+
+GREATER THAN		+MOVE-----+
Source A C150A		Source 16383
1731		1731
Source B 16383		Dest C150A
1731		1731
+-----+		+-----+
N7:5 - (2:59)		

Rung 2:61

	+ADD-----+
	+ADD-----+
	Source A TC150B
	731
	Source B 1000
	Dest C150B
	1731
	+-----+

Rung 2:62

	+GRT-----+	+MOV-----+
	+GREATER THAN-----+	+MOVE-----+
	Source A C150B	Source 16383
	1731	
	Source B 16383	Dest C150B
		1731
	+-----+	+-----+

N7:6 - (2:61)

Rung 2:63

	+ADD-----+
	+ADD-----+
	Source A TC150C
	743
	Source B 1000
	Dest C150C
	1743
	+-----+

Rung 2:64

	+GRT-----+	+MOV-----+
	+GREATER THAN-----+	+MOVE-----+
	Source A C150C	Source 16383
	1743	
	Source B 16383	Dest C150C
		1743
	+-----+	+-----+

N7:7 - (2:63)

Rung 2:65

	+ADD-----+
	+ADD-----+
	Source A TC151A
	735
	Source B 1000
	Dest C151A
	1735
	+-----+

```

Runng 2:66
| *GRT-----+
| -GREATER THAN +-----+
| |Source A      C151A|
| |              1735|
| |Source B      16383|
| |              |
| |              |
| +-----+
| N7:8 - (2:65)

```

```

Rung 2:67
+-----+
+ADD-----+
+-----+
|Source A   TC151B|
|              736|
|Source B   1000|
|              |
|Dest       C151B|
|              1736|
+-----+

```

```

Rung 2:68
| *GRT-----+          +MOV-----+
| *GREATER THAN +-----+ *MOVE-----+
| |Source A      C151B|    |Source      16383|
| |      1736|          |
| |Source B      16383|    |Dest        C151B|
| |      1736|          |
| *-----+          +-----+
| N7:9 ~ (2:67)

```

```

Rung 2:69
+-----+
+ADD-----+
+ADD-----+
|Source A   TC151C|
|              742|
|Source B   1000|
|              |
|Dest       C151C|
|              1742|
+-----+

```

```

Rung 2:70
| *GRT-----+
| *GREATER THAN +-----+
| |Source A      C151C| |Source      16383| |
| |              1742| |              |
| |Source B      16383| |Dest       C151C|
| |              |   | |       1742|
| |-----+
| N7:10 - (2:69)

```

Rung 2:71

	+ADD-----+
	+ADD-----+
	Source A TC152A
	733
	Source B 1000
	Dest C152A
	1733
	+-----+

Rung 2:72

	+GRT-----+		+MOV-----+
	+GREATER THAN		+MOVE-----+
	Source A C152A		Source 16383
	1733		
	Source B 16383		Dest C152A
			1733
	+-----+		+-----+

| N7:11 - (2:71)

Rung 2:73

	+ADD-----+
	+ADD-----+
	Source A TC152B
	734
	Source B 1000
	Dest C152B
	1734
	+-----+

Rung 2:74

	+GRT-----+		+MOV-----+
	+GREATER THAN		+MOVE-----+
	Source A C152B		Source 16383
	1734		
	Source B 16383		Dest C152B
			1734
	+-----+		+-----+

| N7:12 - (2:73)

Rung 2:75

	+ADD-----+
	+ADD-----+
	Source A TC153A
	736
	Source B 1000
	Dest C153A
	1736
	+-----+

Rung 2:76		
+GRT-----+		+MOV-----+
+GREATER THAN		+MOVE-----+
Source A C153A		Source 16383
1736		1736
Source B 16383		Dest C153A
1736		1736
+-----+		+-----+
N7:13 - (2:75)		

Rung 2:77		
		+ADD-----+
		+ADD-----+
		Source A TC153B
		707
		Source B 1000
		1000
		Dest C153B
		1706
		+-----+

Rung 2:78		
+GRT-----+		+MOV-----+
+GREATER THAN		+MOVE-----+
Source A C153B		Source 16383
1706		16383
Source B 16383		Dest C153B
1706		1706
+-----+		+-----+
N7:14 - (2:77)		

Rung 2:79		
		+ADD-----+
		+ADD-----+
		Source A TC154A
		718
		Source B 1000
		1000
		Dest C154A
		1718
		+-----+

Rung 2:80		
+GRT-----+		+MOV-----+
+GREATER THAN		+MOVE-----+
Source A C154A		Source 16383
1718		16383
Source B 16383		Dest C154A
1718		1718
+-----+		+-----+
N7:15 - (2:79)		

Rung 2:81

	+ADD-----+
	+ADD-----+
	Source A TC154B
	720
	Source B 1000
	Dest C154B
	1720
	-----+

Rung 2:82

	+GRT-----+		+MOV-----+
	+GREATER THAN		+MOVE-----+
	Source A C154B		Source 16383
	1720		
	Source B 16383		Dest C154B
			1720
	-----+		-----+
	N7:16 - (2:81)		

Rung 2:83

	+ADD-----+
	+ADD-----+
	Source A TC160A
	729
	Source B 1000
	Dest C160A
	1729
	-----+

Rung 2:84

	+GRT-----+		+MOV-----+
	+GREATER THAN		+MOVE-----+
	Source A C160A		Source 16383
	1729		
	Source B 16383		Dest C160A
			1729
	-----+		-----+
	N7:17 - (2:83)		

Rung 2:85

	+ADD-----+
	+ADD-----+
	Source A TC160B
	731
	Source B 1000
	Dest C160B
	1731
	-----+

```

Rung 2:86
| +GRT-----+
| |-GREATER THAN
| |Source A      C160B|
| |              1731|
| |Source B      16383|
| |              |
| |              |
| +-----+
| N7:18 - (2:85)

```

```

+MOV-----+
+MOVE      +
|Source      16383|
|           |
|Dest       C160B|
|           |
|           1731|

```

Rung 2:87

```

+ADD-----+
+ADD+
|Source A      TC160C|
|              738|
|Source B      1000|
|              |
|Dest          C160C|
|              1738|
+-----+

```

Rung 2:88

```

| +GRT-----+
| ->GREATER THAN +
| |Source A      C160C|
| |              1738|
| |Source B      16383|
| |              |
| +-----+
| N7:19 - (2:87)

```

```

+MOV-----+
+MOVE-----+
|Source      16383|
|            |
|Dest        C160C|
|            1738|
+-----+

```

Rung 2:89

```

+ADD-----+
+ADD+
|Source A      TC161A|
|              734|
|Source B      1000|
|              |
|Dest          C161A|
|              1734|
+-----+

```

Rung 2:90

```

| +GRT-----+
| -+GREATER THAN +
| |Source A      C161A
| |              1734
| |Source B      16383
| |
| +-----+
| NZ:20 - (2:89)

```

```

+MOV-----7+
+MOVE+
|Source      16383|
|            |
|Dest        C161A|
|            1734|

```


Rung 2:91

	+ADD-----+
-----+	+ADD-----+
	Source A TC161B
	731
	Source B 1000
	Dest C161B
	1731
	-----+

Rung 2:92

	+GRT-----+		+MOV-----+
	--GREATER THAN		+MOVE-----+
	Source A C161B		Source 16383
	1731		
	Source B 16383		Dest C161B
			1731
	-----+		-----+
	N7:21 - (2:91)		

Rung 2:93

	+ADD-----+
-----+	+ADD-----+
	Source A TC161C
	736
	Source B 1000
	Dest C161C
	1736
	-----+

Rung 2:94

	+GRT-----+		+MOV-----+
	--GREATER THAN		+MOVE-----+
	Source A C161C		Source 16383
	1736		
	Source B 16383		Dest C161C
			1736
	-----+		-----+
	N7:22 - (2:93)		

Rung 2:95

	+ADD-----+
-----+	+ADD-----+
	Source A TC162A
	729
	Source B 1000
	Dest C162A
	1729
	-----+

Rung 2:96

```
+GRT-----+
+GREATER THAN
|Source A      C162A|
|              1729|
|Source B      16383|
|
+-----+
N7:23 - (2:95)
```

```
+MOV-----+
+MOVE-----+
|Source      16383|
|
|Dest        C162A|
|              1729|
+-----+
```

Rung 2:97

```
+GRT-----+
+GREATER THAN
|Source A      C162B|
|              731|
|Source B      1000|
|
|Dest        C162B|
|              1731|
+-----+
```

```
+ADD-----+
+ADD-----+
|Source A      TC162B|
|              731|
|Source B      1000|
|
|Dest        C162B|
|              1731|
+-----+
```

Rung 2:98

```
+GRT-----+
+GREATER THAN
|Source A      C162B|
|              1731|
|Source B      16383|
|
+-----+
N7:24 - (2:97)
```

```
+MOV-----+
+MOVE-----+
|Source      16383|
|
|Dest        C162B|
|              1731|
+-----+
```

Rung 2:99

Read each T/C and store each T/Cs value in it's own memory register

```
+GRT-----+
+GREATER THAN
|Source A      C163A|
|              737|
|Source B      1000|
|
|Dest        C163A|
|              1737|
+-----+
```

```
+ADD-----+
+ADD-----+
|Source A      TC163A|
|              737|
|Source B      1000|
|
|Dest        C163A|
|              1737|
+-----+
```

Rung 2:100

```
+GRT-----+
+GREATER THAN
|Source A      C163A|
|              1737|
|Source B      16383|
|
+-----+
N7:25 - (2:99)
```

```
+MOV-----+
+MOVE-----+
|Source      16383|
|
|Dest        C163A|
|              1737|
+-----+
```

Rung 2:101

	+ADD-----+
	+ADD-----+
	Source A TC163B
	724
	Source B 1000
	1
	Dest C163B
	1724
	+-----+

Rung 2:102

	+GRT-----+	+MOV-----+
	+GREATER THAN-----+	+MOVE-----+
	Source A C163B	Source 16383
	1724	1
	Source B 16383	Dest C163B
	1	1724
	+-----+	+-----+

N7:26 - (2:101)

Rung 2:103

	+ADD-----+
	+ADD-----+
	Source A TC164A
	727
	Source B 1000
	1
	Dest C164A
	1727
	+-----+

Rung 2:104

	+GRT-----+	+MOV-----+
	+GREATER THAN-----+	+MOVE-----+
	Source A C164A	Source 16383
	1727	1
	Source B 16383	Dest C164A
	1	1727
	+-----+	+-----+

N7:27 - (2:103)

Rung 2:105

	+ADD-----+
	+ADD-----+
	Source A TC164B
	726
	Source B 1000
	1
	Dest C164B
	1726
	+-----+

Rung 2:106

+GRT-----+	+MOV-----+
GREATER THAN	+MOVE-----+
Source A C164B	Source 16383
1726	
Source B 16383	Dest C164B
1726	1726
+-----+	+-----+
N7:28 - (2:105)	

Rung 2:107

** Alarms **

For each T/C read its STATUS BITS to detect T/C problems

T/C ENABLE

	I:3	HA143A
1/[		N7:224
75		()
OPEN T/C		0
I:3		
76		
LO LIMIT		
I:3		
77		
HI LIMIT		
I:3		
78		
CNFG ERROR		
I:3		
79		

Rung 2:108

T/C ENABLE

	I:3	HA143B
1/[		N7:224
91		()
OPEN T/C		1
I:3		
92		
LO LIMIT		
I:3		
93		
HI LIMIT		
I:3		
94		

+++ +++

```
+++
|      |      |
| CNFG ERROR |
|      |      |
|      I:3      |
| +-----+ |
|      95      |
|      |      |
```

Rung 2:109

T/C ENABLE

```
|      |      |
|      I:3      |
| 1/1 |
| 107 |
| OPEN T/C |
|      I:3      |
| +-----+ |
|      108      |
| LO LIMIT |
|      I:3      |
| +-----+ |
|      109      |
| HI LIMIT |
|      I:3      |
| +-----+ |
|      110      |
| CNFG ERROR |
|      I:3      |
| +-----+ |
|      111      |
|      |      |
```

HA144A
N7:224

2

Rung 2:110

T/C ENABLE

```
|      |      |
|      I:3      |
| 1/1 |
| 123 |
| OPEN T/C |
|      I:3      |
| +-----+ |
|      124      |
| LO LIMIT |
|      I:3      |
| +-----+ |
|      125      |
| HI LIMIT |
|      I:3      |
| +-----+ |
|      126      |
|      |      |
```

HA144B
N7:224

3

```
+++
|
| CNFG ERROR
|
| I:3
|
|-----| [-----+
|
| 127
```

Rung 2:111

T/C ENABLE

```

|
| I:4
|
|-----| [-----+
|
| 75
| OPEN T/C
| I:4
|
|-----| [-----+
|
| 76
| LO LIMIT
| I:4
|
|-----| [-----+
|
| 77
| HI LIMIT
| I:4
|
|-----| [-----+
|
| 78
| CNFG ERROR
| I:4
|
|-----| [-----+
|
| 79
```

HA150A
N7:224

() 4

Rung 2:112

T/C ENABLE

```

|
| I:4
|
|-----| [-----+
|
| 91
| OPEN T/C
| I:4
|
|-----| [-----+
|
| 92
| LO LIMIT
| I:4
|
|-----| [-----+
|
| 93
| HI LIMIT
| I:4
|
|-----| [-----+
|
| 94
| CNFG ERROR
| I:4
|
|-----| [-----+
|
| 95
```

HA150B
N7:224

() 5

Rung 2:113

T/C ENABLE

```
I:4
+-----] [-----+
| | 107 |
| | OPEN T/C |
| | I:4 |
| +-----] [-----+
| | 108 |
| | LO LIMIT |
| | I:4 |
| +-----] [-----+
| | 109 |
| | HI LIMIT |
| | I:4 |
| +-----] [-----+
| | 110 |
| | CNFG ERROR |
| | I:4 |
| +-----] [-----+
| | 111 |
```

HA150C
N7:224

()---
6

Rung 2:114

T/C ENABLE

```
I:4
+-----] [-----+
| | 123 |
| | OPEN T/C |
| | I:4 |
| +-----] [-----+
| | 124 |
| | LO LIMIT |
| | I:4 |
| +-----] [-----+
| | 125 |
| | HI LIMIT |
| | I:4 |
| +-----] [-----+
| | 126 |
| | CNFG ERROR |
| | I:4 |
| +-----] [-----+
| | 127 |
```

HA151A
N7:224

()---
7

Rung 2:115

T/C ENABLE		HA151B
I:5		N7:224
1/1		()
75		8
OPEN T/C		
I:5		
76		
LO LIMIT		
I:5		
77		
HI LIMIT		
I:5		
78		
CNFG ERROR		
I:5		
79		

Rung 2:116

T/C ENABLE		HA151C
I:5		N7:224
1/1		()
91		9
OPEN T/C		
I:5		
92		
LO LIMIT		
I:5		
93		
HI LIMIT		
I:5		
94		
CNFG ERROR		
I:5		
95		

Rung 2:117

T/C ENABLE

```
|
| I:5
|-----J/|-----
| | 107
| | OPEN T/C
| | I:5
| +-----J |-----+
| | 108
| | LO LIMIT
| | I:5
| +-----J |-----+
| | 109
| | HI LIMIT
| | I:5
| +-----J |-----+
| | 110
| | CNFG ERROR
| | I:5
| +-----J |-----+
| | 111
|
```

HA152A
N7:224

10

Rung 2:118

T/C ENABLE

```
|
| I:5
|-----J/|-----
| | 123
| | OPEN T/C
| | I:5
| +-----J |-----+
| | 124
| | LO LIMIT
| | I:5
| +-----J |-----+
| | 125
| | HI LIMIT
| | I:5
| +-----J |-----+
| | 126
| | CNFG ERROR
| | I:5
| +-----J |-----+
| | 127
|
```

HA152B
N7:224

11

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Rung 2:119

```

|
|
|   T/C ENABLE
|
|   I:6
|   1/[-----]----- HA153A
|   75 N7:224
|   OPEN T/C ( )
|   I:6 12
|   76
|   LO LIMIT
|   I:6
|   77
|   HI LIMIT
|   I:6
|   78
|   CNFG ERROR
|   I:6
|   79
|

```

Rung 2:120

```

|   T/C ENABLE
|
|   I:6 HA153B
|   1/[-----]----- N7:224
|   91 ( )
|   OPEN T/C 13
|   I:6
|   92
|   LO LIMIT
|   I:6
|   93
|   HI LIMIT
|   I:6
|   94
|   CNFG ERROR
|   I:6
|   95
|

```

Rung 2:121

```

|   T/C ENABLE
|
|   I:6 HA154A
|   1/[-----]----- N7:224
|   107 ( )
|   OPEN T/C 14
|   I:6
|   108
|
|   ***

```

```

+++      +++
|      |
|      | LO LIMIT |
|      | I:6      |
|      | +-----+ |
|      | 109      |
|      | HI LIMIT |
|      | I:6      |
|      | +-----+ |
|      | 110      |
|      | CNFG ERROR |
|      | I:6      |
|      | +-----+ |
|      | 111      |
|      |

```

Rung 2:122
T/C ENABLE

```

|      |
|      | I:6      |
|      | +-----+ |
|      | 123      |
|      | OPEN T/C  |
|      | I:6      |
|      | +-----+ |
|      | 124      |
|      | LO LIMIT  |
|      | I:6      |
|      | +-----+ |
|      | 125      |
|      | HI LIMIT  |
|      | I:6      |
|      | +-----+ |
|      | 126      |
|      | CNFG ERROR |
|      | I:6      |
|      | +-----+ |
|      | 127      |
|      |

```

HA154B
N7:224
- () -
15

Rung 2:123
T/C ENABLE

```

|      |
|      | I:7      |
|      | +-----+ |
|      | 75       |
|      | OPEN T/C  |
|      | I:7      |
|      | +-----+ |
|      | 76       |
|      | LO LIMIT  |
|      | I:7      |
|      | +-----+ |
|      | 77       |
|      | HI LIMIT  |
|      | I:7      |
|      | +-----+ |
|      | 78       |
|      | CNFG ERROR |
|      | I:7      |
|      | +-----+ |
|      | 79       |
|      |

```

HA160A
N7:225
- () -
0

Rung 2:124

T/C ENABLE

	I:7	HA160B
	/(-	N7:225
	91	
	OPEN T/C	
	I:7	

	92	
	LO LIMIT	
	I:7	

	93	
	HI LIMIT	
	I:7	

	94	
	CNFG ERROR	
	I:7	

	95	

Rung 2:125

T/C ENABLE

	I:7	HA160C
	/(-	N7:225
	107	
	OPEN T/C	
	I:7	

	108	
	LO LIMIT	
	I:7	

	109	
	HI LIMIT	
	I:7	

	110	
	CNFG ERROR	
	I:7	

	111	

Rung 2:126

T/C ENABLE

	I:7	HA161A
	/(-	N7:225
	123	
	OPEN T/C	
	I:7	

	124	

+++ +++

```

+++      +++
| |      | |
| | LO LIMIT | |
| | I:7      | |
| |-----| |
| | 125      | |
| | HI LIMIT | |
| | I:7      | |
| |-----| |
| | 126      | |
| | CNFG ERROR | |
| | I:7      | |
| |-----| |
| | 127      | |

```

Rung 2:127
 T/C ENABLE

```

| |      | |
| | I:8      | |
| |-----| |
| | 75      | |
| | OPEN T/C | |
| | I:8      | |
| |-----| |
| | 76      | |
| | LO LIMIT | |
| | I:8      | |
| |-----| |
| | 77      | |
| | HI LIMIT | |
| | I:8      | |
| |-----| |
| | 78      | |
| | CNFG ERROR | |
| | I:8      | |
| |-----| |
| | 79      | |

```

HA161B
 N7:225

4

Rung 2:128
 T/C ENABLE

```

| |      | |
| | I:8      | |
| |-----| |
| | 91      | |
| | OPEN T/C | |
| | I:8      | |
| |-----| |
| | 92      | |
| | LO LIMIT | |
| | I:8      | |
| |-----| |
| | 93      | |
| | HI LIMIT | |
| | I:8      | |
| |-----| |
| | 94      | |
| | CNFG ERROR | |
| | I:8      | |
| |-----| |
| | 95      | |

```

HA161C
 N7:225

5

Rung 2:129

T/C ENABLE

```

| I:8
|-----] / [-----+
| 107
| OPEN T/C
| I:8
|-----] [-----+
| 108
| LO LIMIT
| I:8
|-----] [-----+
| 109
| HI LIMIT
| I:8
|-----] [-----+
| 110
| CNFG ERROR
| I:8
|-----] [-----+
| 111

```

HA162A

N7:225

6

Rung 2:130

T/C ENABLE

```

| I:8
|-----] / [-----+
| 123
| OPEN T/C
| I:8
|-----] [-----+
| 124
| LO LIMIT
| I:8
|-----] [-----+
| 125
| HI LIMIT
| I:8
|-----] [-----+
| 126
| CNFG ERROR
| I:8
|-----] [-----+
| 127

```

HA162B

N7:225

7

Rung 2:131

 SET DEVIATION SWITCH FOR SECTION 1 AND JUMP TO SECTION 1 AVERAGING ROUTINE

```

| DEV_1
| N22:6
|-----] (L) [-----+
| 1
| AV1
| 12
|-----] (JMP) [-----+

```

Rung 2:132

| DEV1

|

| 8

| ---[LBL]-----

|

DUMMY5

N22:7

4

Rung 2:133

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

	+	ADD	-----	+
	+	ADD		+
		Source A	AV143	
			1724	
		Source B DEVIATION		
			1250	
		Dest	H143	
			2974	
	+			+
	+	SUB	-----	+
	+	SUBTRACT		+
		Source A	AV143	
			1724	
		Source B DEVIATION		
			1250	
		Dest	L143	
			474	
	+			+

Rung 2:134

| HA143A

| N7:224

|

| 0

| (2:107)

+GRT-----

+GREATER THAN

+

| Source A C143A|

| | 1733|

| | Source B H143|

| | 2974|

| +-----+

| N7:1 - (2:51)

| N10:91 - (2:133)

| +LES-----

+LESS THAN

+

| Source A C143A|

| | 1733|

| | Source B L143|

| | 474|

| +-----+

| N7:1 - (2:51)

| N10:42 - (2:133)

				D143A
				N7:171
				()
				0

```

Rung 2:135
| HA143B
| N7:224 +GRT-----+
|-----] / [-----+GREATER THAN-----+-----+
| 1 | |Source A C143B| |
| (2:108) | | 1714| |
| | |Source B H143| |
| | | 2974| |
| | +-----+
| | N7:2 - (2:53) |
| | N10:91 - (2:133) |
| | +LES-----+
| | +LESS THAN +--+
| | |Source A C143B|
| | | 1714|
| | |Source B L143|
| | | 474|
| | +-----+
| | N7:2 - (2:53)
| | N10:42 - (2:133)
  
```

Rung 2:136

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

| | | | | +ADD-----+
| | | | | +ADD +--+
| | |Source A AV144| |
| | | 1720| |
| | |Source B DEVIATION|
| | | 1250| |
| | |Dest H144| |
| | | 2970| |
| | | +-----+
| | | +SUB-----+
| | | +SUBTRACT +--+
| | |Source A AV144|
| | | 1720|
| | |Source B DEVIATION|
| | | 1250|
| | |Dest L144|
| | | 470|
| | | +-----+
  
```

Rung 2:137

```

| HA144A
| N7:224 +GRT-----+
|-----] / [-----+GREATER THAN-----+-----+
| 2 | |Source A C144A| |
| (2:109) | | 1720| |
| | |Source B H144| |
| | | 2970| |
| | +-----+
| | N7:3 - (2:55) |
| | N10:92 - (2:136) |
| | +-----+
| | +--+
  
```



```

+++
| |
| | +LES-----+
| | +-+LESS THAN +-+
| | |Source A      C144A|
| | |              1720|
| | |Source B      L144|
| | |              470|
| | +-----+
| | N7:3 - (2:55)
| | N10:43 - (2:136)
| |

```

Rung 2:138
 HA144B
 N7:224

D144B
 N7:171

```

| | +GRT-----+
| | |1/|-----+GREATER THAN +-----+
| | |3| |Source A      C144B|
| | |(2:110)| |              1720|
| | | |Source B      H144|
| | | |              2970|
| | | +-----+
| | | N7:4 - (2:57)
| | | N10:92 - (2:136)
| | | +LES-----+
| | | +-+LESS THAN +-+
| | | |Source A      C144B|
| | | |              1720|
| | | |Source B      L144|
| | | |              470|
| | | +-----+
| | | N7:4 - (2:57)
| | | N10:43 - (2:136)
| |

```

3

Rung 2:139

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

| | +ADD-----+
| | |Source A      AV150|
| | |              1735|
| | |Source B DEVIATION|
| | |              1250|
| | |Dest          H150|
| | |              2985|
| | | +-----+
| | | +SUB-----+
| | | +-+SUBTRACT +-+
| | | |Source A      AV150|
| | | |              1735|
| | | |Source B DEVIATION|
| | | |              1250|
| | | |Dest          L150|
| | | |              485|
| | | +-----+

```



```

+++
|
| +LES-----+
| +-LESS THAN +-+
| |Source A      C150C|
| |              1743|
| |Source B      L150|
| |              485|
| +-----+
| N7:7 - (2:63)
| N10:44 - (2:139)

```

Rung 2:143

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|
| +-----+
| +ADD-----+
| +ADD
| |Source A      AV151|
| |              1738|
| |Source B DEVIATION|
| |              1250|
| |Dest          H151|
| |              2988|
| +-----+
| +SUB-----+
| +-SUBTRACT +-+
| |Source A      AV151|
| |              1738|
| |Source B DEVIATION|
| |              1250|
| |Dest          L151|
| |              488|
| +-----+

```

Rung 2:144

```

| HA151A
| N7:224
|
| +-----+
| +GRT-----+
| |Source A      C151A|
| |              1735|
| |Source B      H151|
| |              2988|
| +-----+
| N7:8 - (2:65)
| N10:94 - (2:143)
| +LES-----+
| +-LESS THAN +-+
| |Source A      C151A|
| |              1735|
| |Source B      L151|
| |              488|
| +-----+
| N7:8 - (2:65)
| N10:45 - (2:143)

```

HA151B N7:224	+GRT +GREATER THAN	D151B N7:171
8 (2:115)	Source A C151B 1736 Source B H151 2988	8
	N7:9 - (2:67) N10:94 - (2:143)	
	+LES +LESS THAN	
	Source A C151B 1736 Source B L151 488	
	N7:9 - (2:67) N10:45 - (2:143)	

```

HA151C                                     D151C
N7:224                                     N7:171
+-----+-----+-----+-----+
-|/[-]-----+GREATER THAN-----|-----|-----|-----|-----|
|          9| |Source A      C151C| |          9|
|(2:116)| | |1742|
| |Source B      H151|
| |2988|
|-----+-----+
| N7:10 - (2:69)|
| N10:94 - (2:143)|
|-----+-----+
|-----+LESS THAN-----+-----+
| |Source A      C151C|
| |1742|
| |Source B      L151|
| |488|
|-----+-----+
| N7:10 - (2:69)|
| N10:45 - (2:143)|

```

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

+ADD-----+
|-----+
|Source A      AV152|
|              1734|
|Source B DEVIATION|
|              1250|
|Dest          H152|
|              2984|
|-----+
+---+

```

```

+++                                     +++
|                                     |
| +SUB-----+ |
+-SUBTRACT                                     +-
|Source A          AV152|
|                  1734|
|Source B DEVIATION|
|                  1250|
|Dest              L152|
|                  484|
|                                     |
+-----+

```

```

Rung 2:148
HA152A
N7:224      +GRT-----+
| 10 | |Source A | C152A | |
| (2:117) | | | 1733 | |
| | |Source B | H152 | |
| | | | 2984 | |
| | +-----+
| | N7:11 - (2:71)
| | N10:95 - (2:147)
| | +LES-----+
| +---+LESS THAN+---+
| |Source A | C152A | |
| | | 1733 | |
| |Source B | L152 | |
| | | 484 | |
| | +-----+
| | N7:11 - (2:71)
| | N10:46 - (2:147)

```

```

Rung 2:149
HA152B
N7:224
+GRT-----+
|/|-----+GREATER THAN|-----+
|11| |Source A| C152B| |11
|(2:118)| | |1734| |
| | |Source B| H152| |
| | | |2984| |
|-----+
|N7:12 - (2:73)|
|N10:95 - (2:147)|
|+LES-----+
|+LESS THAN|-----+
| |Source A| C152B|
| | |1734|
| |Source B| L152|
| | |484|
|-----+
|N7:12 - (2:73)|
|N10:46 - (2:147)|

```

Rung 2:150

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

+ADD-----+
+ADD+-----+
|Source A      AV153|
|              1721|
|Source B DEVIATION|
|              1250|
|Dest          H153|
|              2971|
+-----+
+SUB-----+
+SUBTRACT+-----+
|Source A      AV153|
|              1721|
|Source B DEVIATION|
|              1250|
|Dest          L153|
|              471|
+-----+

```

Rung 2:151

```

HA153A
N7:224
+GRT-----+
|/|-----+GREATER THAN+-----+
|12|Source A      C153A|
|(2:119)|1736|
|      |Source B      H153|
|      |2971|
|      +-----+
|      N7:13 - (2:75)
|      N10:96 - (2:150)
|      +LES-----+
+--LESS THAN+--+
|Source A      C153A|
|              1736|
|Source B      L153|
|              471|
+-----+
N7:13 - (2:75)
N10:47 - (2:150)

```

Rung 2:152

```

HA153B
N7:224
+GRT-----+
|/|-----+GREATER THAN+-----+
|13|Source A      C153B|
|(2:120)|1706|
|      |Source B      H153|
|      |2971|
|      +-----+
|      N7:14 - (2:77)
|      N10:96 - (2:150)
|
+-----+

```

```

+++
|
| +LES-----+
| +-LESS THAN +-+
| |Source A      C153B|
| |              1706|
| |Source B      L153|
| |              471|
| +-----+
| N7:14 - (2:77)
| N10:47 - (2:150)
|

```

Rung 2:153

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|
| -----+-----+
| |ADD-----+
| |ADD
| |Source A      AV154|
| |              1719|
| |Source B DEVIATION|
| |              1250|
| |Dest          H154|
| |              2969|
| +-----+
| +SUB-----+
| +-SUBTRACT +-+
| |Source A      AV154|
| |              1719|
| |Source B DEVIATION|
| |              1250|
| |Dest          L154|
| |              469|
| +-----+
|

```

Rung 2:154

```

| HA154A
| N7:224
| 14
| (2:121)
|
| +GRT-----+
| |GREATER THAN
| |Source A      C154A|
| |              1718|
| |Source B      H154|
| |              2969|
| +-----+
| |N7:15 - (2:79)
| |N10:97 - (2:153)
| +LES-----+
| +-LESS THAN +-+
| |Source A      C154A|
| |              1718|
| |Source B      L154|
| |              469|
| +-----+
| N7:15 - (2:79)
| N10:48 - (2:153)
|

```

D154A
 N7:171
 ()

14

```

Rung 2:155
| HA154B                                     D154B
| N7:224                                     N7:171
|-----+GRT-----+-----+-----+
| 1/|-----+GREATER THAN-----+-----+
| 15 | |Source A      C154B| | 15
| (2:122) | | 1720| |
| | |Source B      H154| |
| | | 2969| |
| |-----+-----+
| |N7:16 - (2:81) | |
| |N10:97 - (2:153)| |
| |-----+-----+
| |LESS THAN-----+-----+
| |Source A      C154B| |
| | 1720| |
| |Source B      L154| |
| | 469| |
| |-----+-----+
| |N7:16 - (2:81) | |
| |N10:48 - (2:153)| |

```

Rung 2:156

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|-----+ADD-----+-----+
| |Source A      AV160| |
| | 1733| |
| |Source B DEVIATION| |
| | 1250| |
| |Dest      H160| |
| | 2983| |
| |-----+-----+
| |SUB-----+-----+
| |SUBTRACT-----+-----+
| |Source A      AV160| |
| | 1733| |
| |Source B DEVIATION| |
| | 1250| |
| |Dest      L160| |
| | 483| |
| |-----+-----+

```

Rung 2:157
 HA160A
 N7:225

```

|-----+GRT-----+-----+
| 1/|-----+GREATER THAN-----+-----+
| 0 | |Source A      C160A| | 0
| (2:123) | | 1729| |
| | |Source B      H160| |
| | | 2983| |
| |-----+-----+
| |N7:17 - (2:83) | |
| |N10:98 - (2:156)| |
| |-----+-----+
| |-----+-----+
| |-----+-----+

```



```

+++
|
| +LES-----+
| +-LESS THAN +-+
| |Source A      C160A|
| |              1729|
| |Source B      L160|
| |              483|
| +-----+
| N7:17 - (2:83)
| N10:49 - (2:156)
|

```

Rung 2:158

HA160B
 N7:225

D160B

N7:172

```

|-----1/|-----+GREATER THAN-----+-----+
| 1 | |Source A      C160B| | 1
| (2:124) | |          1731| |
| | |Source B      H160| |
| | |          2983| |
| | +-----+
| | N7:18 - (2:85)
| | N10:98 - (2:156)
| | +LES-----+
| | +-LESS THAN +-+
| | |Source A      C160B|
| | |          1731|
| | |Source B      L160|
| | |          483|
| | +-----+
| | N7:18 - (2:85)
| | N10:49 - (2:156)
|

```

Rung 2:159

HA160C
 N7:225

D160C

N7:172

```

|-----1/|-----+GREATER THAN-----+-----+
| 2 | |Source A      C160C| | 2
| (2:125) | |          1738| |
| | |Source B      H160| |
| | |          2983| |
| | +-----+
| | N7:19 - (2:87)
| | N10:98 - (2:156)
| | +LES-----+
| | +-LESS THAN +-+
| | |Source A      C160C|
| | |          1738|
| | |Source B      L160|
| | |          483|
| | +-----+
| | N7:19 - (2:87)
| | N10:49 - (2:156)
|

```

Runq 2:160

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

+ADD-----+	
Source A	AV161
	1734
Source B DEVIATION	
	1250
Dest	H161
	2984
+SUB-----+	
+SUBTRACT-----+	
Source A	AV161
	1734
Source B DEVIATION	
	1250
Dest	L161
	484
+-----+	

Runq 2:161

HA161A N7:225	+GRT- +GREATER THAN	D161A N7:172
3 (2:126)	Source A C161A 1734 Source B H161 2984 N7:20 - (2:89) N10:99 - (2:160)	3
	+LES- +LESS THAN	
	Source A C161A 1734 Source B L161 484 N7:20 - (2:89) N10:50 - (2:160)	

Rung 2:162

```

HA161B      D161B
N7:225      N7:172
+GRT-----+
-1/[-+GREATER THAN-(-)-
  4      |Source A      C161B|
(2:127)  |      |      1731|
         |Source B      H161|
         |      |      2984|
         +-----+
         |N7:21 - (2:91)|
         |N10:99 - (2:160)|
         +-----+
         +---+

```

```

+++
|
| +LES-----+
| +--LESS THAN +--+
| |Source A      C161B|
| |              1731|
| |Source B      L161|
| |              484|
| +-----+
| N7:21 - (2:91)
| N10:50 - (2:160)

```

Rung 2:163

```

| HA161C
| N7:225
|
| +GRT-----+
| +--GREATER THAN +--+
| |Source A      C161C|
| |              1736|
| |Source B      H161|
| |              2984|
| +-----+
| N7:22 - (2:93)
| N10:99 - (2:160)
| +LES-----+
| +--LESS THAN +--+
| |Source A      C161C|
| |              1736|
| |Source B      L161|
| |              484|
| +-----+
| N7:22 - (2:93)
| N10:50 - (2:160)

```

Rung 2:164

ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|
| +ADD-----+
| +--ADD +--+
| |Source A      AV162|
| |              1730|
| |Source B DEVIATION|
| |              1250|
| |Dest          H162|
| |              2980|
| +-----+
| +SUB-----+
| +--SUBTRACT +--+
| |Source A      AV162|
| |              1730|
| |Source B DEVIATION|
| |              1250|
| |Dest          L162|
| |              480|
| +-----+

```

```

Rung 2:165
| HA162A
| N7:225
|-----+GRT-----+
| 1/(-)-----+GREATER THAN-----+-----+-----+
| 6 | |Source A | C162A|
| (2:129) | | | 1729|
| | |Source B | H162|
| | | | 2980|
| | |-----+
| | N7:23 - (2:95)
| | N10:100 - (2:164)
| | +LES-----+
| | +LESS THAN +-----+
| | |Source A | C162A|
| | | | 1729|
| | |Source B | H162|
| | | | 480|
| | |-----+
| | N7:23 - (2:95)
| | N10:51 - (2:164)

```

```

Rung 2:166
| HA162B
| N7:225
|-----+GRT-----+
| 1/(-)-----+GREATER THAN-----+-----+-----+
| 7 | |Source A | C162B|
| (2:130) | | | 1731|
| | |Source B | H162|
| | | | 2980|
| | |-----+
| | N7:24 - (2:97)
| | N10:100 - (2:164)
| | +LES-----+
| | +LESS THAN +-----+
| | |Source A | C162B|
| | | | 1731|
| | |Source B | H162|
| | | | 480|
| | |-----+
| | N7:24 - (2:97)
| | N10:51 - (2:164)

```

Rung 2:167 ***** END OF DEVIATION CHECKING *****

```

|
|
|-----+-----+
| (U)-----+
| 1

```

```

Rung 2:168
| AV1
|
| 12
| [LBL]-----+-----+
|
|

```

Rung 2:169

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

+CLR-----+	
	CLEAR
	Dest COUNT
	2
+-----+	
	CLR-----+
	CLEAR
	Dest TOTAL
	3453.000
+-----+	

Rung 2:170

HA143A	D143A	OUT143A	
N7:224	N7:171	N7:236	
1/[-	1/[-	1/[-	+ADD-----+
0	0	12	+ADD
(2:107)	(2:134)		Source A 1
			Source B COUNT
			Dest COUNT
			2
			+-----+
	DEV_1		+ADD-----+
	N22:6		+ADD
	1		Source A C143A
	(2:131)		1733
			Source B TOTAL
			3453.000
			Dest TOTAL
			3453.000
			+-----+

Rung 2:171

HA143B	D143B	OUT143B	
N7:224	N7:171	N7:236	
1/[-	1/[-	1/[-	+ADD-----+
1	1	13	+ADD
(2:108)	(2:135)		Source A 1
			Source B COUNT
			Dest COUNT
			2
			+-----+
			+-----+
			+-----+


```

+++
|
|
| +ADD-----+
+-+ADD
|Source A      C144A|
|              1720|
|Source B      TOTAL|
|              3453.000|
|Dest          TOTAL|
|              3453.000|
|
|
|-----+

```

+ADD-----+	
+ADD-----+	
Source A	1
Source B	COUNT
Dest	2
	2
+ADD-----+	
+ADD-----+	
Source A	C144B
	1720
Source B	TOTAL
	3453.000
Dest	TOTAL
	3453.000

```

+DIV-----+
+DIVIDE      +
|Source A      TOTAL|
|              3453.000|
|Source B      COUNT|
|              2|
|Dest          AV144|
|              1720|
+-----+

```

CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
HAVE BEEN TAKEN OUT (TE OUTxxx) THEN AVERAGE THE T/C

```

+CLR-----+
-+-+CLEAR      +-+
| |Dest          COUNT| |
| |              2| |
| +-----+
|
+ + + + + + + + + +

```

			+++	+++
			+CLR-----+	
			+CLEAR	+--
			Dest	TOTAL
				3453.000
			+-----+	
Rung 2:178				
HA150A	D150A	OUT150A		
N7:224	N7:171	N7:237		
1/[-----]			+ADD-----+	+--
4	4	0	Source A	1
(2:111)	(2:140)		Source B	COUNT
				2
			Dest	COUNT
				2
			+-----+	
	DEV_1		+ADD-----+	+--
	N22:6		Source A	C150A
				1731
			Source B	TOTAL
				3453.000
			Dest	TOTAL
				3453.000
			+-----+	

Rung 2:179				
HA150B	D150B	OUT150B		
N7:224	N7:171	N7:237		
1/[-----]			+ADD-----+	+--
5	5	1	Source A	1
(2:112)	(2:141)		Source B	COUNT
				2
			Dest	COUNT
				2
			+-----+	
	DEV_1		+ADD-----+	+--
	N22:6		Source A	C150B
				1731
			Source B	TOTAL
				3453.000
			Dest	TOTAL
				3453.000
			+-----+	

Rung 2:183

HA151A N7:224	D151A N7:171	OUT151A N7:237	
1/[	1/[	1/[	+ADD-----+
7	7	3	+ADD
(2:114)	(2:144)		Source A 1
			Source B COUNT
			Dest COUNT
			Dest COUNT
			+-----+
	DEV_1		+ADD-----+
	N22:6		+ADD
	1		Source A C151A
	(2:131)		Source B 1735
			Source B TOTAL
			Dest 3453.000
			Dest TOTAL
			Dest 3453.000
			+-----+

Rung 2:184

HA151B N7:224	D151B N7:171	OUT151B N7:237	
1/[	1/[	1/[	+ADD-----+
8	8	4	+ADD
(2:115)	(2:145)		Source A 1
			Source B COUNT
			Dest COUNT
			Dest COUNT
			+-----+
	DEV_1		+ADD-----+
	N22:6		+ADD
	1		Source A C151B
	(2:131)		Source B 1736
			Source B TOTAL
			Dest 3453.000
			Dest TOTAL
			Dest 3453.000
			+-----+

+ADD-----+

```

|Source A          1
|
|Source B          COUNT
|                2
|Dest             COUNT
|                2
+-----+
+ADD-----+
+ADD
|Source A          C151C
|                1742
|Source B          TOTAL
|                3453.000
|Dest             TOTAL
|                3453.000
+-----+

```

+DIV-----

```

-DIVIDE
|Source A      TOTAL
|              3453.00
|Source B      COUN
|
|Dest          AV15
|              173

```

+CLR-----+

```

+-----+
+CLEAR                                     +
|Dest                                     COUNT|
|                                     21    |
+-----+
+CLR-----+
+CLEAR                                     +
|Dest                                     TOTAL|
|                                     3453.000|
+-----+

```

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Rung 2:191

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

+CLR-----+			
CLEAR			
Dest		COUNT	
		2	
+-----+			
+CLR-----+			
+CLEAR			
Dest		TOTAL	
		3453.000	
+-----+			

Rung 2:192

HA153A N7:224	D153A N7:171	OUT153A N7:237	
1/[	1/[	1/[	+ADD-----+
12	12	8	+ADD
(2:119)	(2:151)		Source A
			1
			Source B
			COUNT
			2
			Dest
			COUNT
			2
+-----+			+ADD-----+
	DEV_1		+ADD
	N22:6		Source A
			C153A
			1736
			Source B
			TOTAL
			3453.000
			Dest
			TOTAL
			3453.000
+-----+			+-----+

Rung 2:193

HA153B N7:224	D153B N7:171	OUT153B N7:237	
1/[	1/[	1/[	+ADD-----+
13	13	9	+ADD
(2:120)	(2:152)		Source A
			1
			Source B
			COUNT
			2
			Dest
			COUNT
			2
+-----+			+-----+
+++	+++		+++

```

++                                     ++
|                                     |
|                                     |
| +ADD-----+                       +
+-+ADD                                     +-+
|Source A          C153B|
|                  1706|
|Source B          TOTAL|
|                  3453.000|
|Dest              TOTAL|
|                  3453.000|
+-----+

```

```

+DIV-----+
+DIVIDE      +
|Source A      TOTAL|
|              3453.000|
|Source B      COUNT|
|              2|
|Dest          AV153|
|              1721|
+-----+

```

CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES HAVE BEEN TAKEN OUT (TE OUTxxx) THEN AVERAGE THE T/C

```

+CLR-----+
+CLEAR      +-+
|Dest      COUNT|
|           2|
+-----+
+CLR-----+
+CLEAR      +-+
|Dest      TOTAL|
|           3453.000|
+-----+

```

	HA154A	D154A	OUT154A
	N7:224	N7:171	N7:237
	14	14	10
	(2:121)	(2:154)	

```

+ADD-----+
+ADD          +-+
|Source A      |1| |
|              |1| |
|Source B      |COUNT| |
|              |2| |
|Dest          |COUNT| |
|              |2| |
+-----+

```

```

+++      -      +++
|        |        |
|        DEV_1    |
|        N22:6     |
+-----] [-----+
              1
            (2:131)

```

```

++                                     ++
|                                     |
|                                     |
|+ADD-----+
+-+ADD      +-+
|Source A      C154A|
|              1718|
|Source B      TOTAL|
|              3453.000|
|Dest          TOTAL|
|              3453.000|
|-----+

```

```

Rung 2:197
      HA154B          D154B          OUT154B
      N7:224          N7:171         N7:237
    -1/[-----] -1/[-----] -1/[-----]
        15              15             11
    (2:122)           (2:155)
                                     |
                                     |
                                     |
                                     |
                                DEV_1
                                N22:6
                        +---] [-----+
                              1
                    (2:131)

```

+ADD-----+	
+ADD	
Source A	1
Source B	COUNT
Dest	COUNT

+ADD-----+	
+ADD	
Source A	C154B
	1720
Source B	TOTAL
	3453.000
Dest	TOTAL
	3453.000

Rung 2:198

```

+DIV-----+
+DIVIDE      +-
|Source A      TOTAL|
|              3453.000|
|Source B      COUNT|
|              2|
|Dest          AV154|
|              1719|
+-----+

```

Rung 2:199

CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
HAVE BEEN TAKEN OUT (TE OUTxxx) THEN AVERAGE THE T/C

```

+CLR-----+
-+-+CLEAR-+-+
| |Dest          COUNT| |
| |                2| |
| +-----+
|
+++

```

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Rung 2:205			
HA161A	D161A	OUT161A	
N7:225	N7:172	N7:237	
1/[	1/[	1/[	+ADD-----+
3	3	15	+ADD
(2:126)	(2:161)		Source A 1
			Source B COUNT
			Dest COUNT
			Dest COUNT
			+-----+
	DEV_1		+ADD-----+
	N22:6		+ADD
	1		Source A C161A
	(2:131)		Source B 1734
			Source B TOTAL
			Dest 3453.000
			Dest TOTAL
			Dest 3453.000
			+-----+

Rung 2:206			
HA161B	D161B	OUT161B	
N7:225	N7:172	N7:238	
1/[	1/[	1/[	+ADD-----+
4	4	0	+ADD
(2:127)	(2:162)		Source A 1
			Source B COUNT
			Dest COUNT
			Dest COUNT
			+-----+
	DEV_1		+ADD-----+
	N22:6		+ADD
	1		Source A C161B
	(2:131)		Source B 1731
			Source B TOTAL
			Dest 3453.000
			Dest TOTAL
			Dest 3453.000
			+-----+

1	HA161C	D161C	OUT161C
1	N7:225	N7:172	N7:238

[illegible]

CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES HAVE BEEN TAKEN OUT (TE OUTxxx) THEN AVERAGE THE T/C

✚ 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 ✚

Rung 2:210			
HA162A	D162A	OUT162A	
N7:225	N7:172	N7:238	
-----1/1-----1/1-----1/1-----			+ADD-----+
6	6	2	+ADD
(2:129)	(2:165)		Source A 1
			Source B COUNT
			Dest COUNT
			Dest COUNT
			+ADD-----+
	DEV_1		+ADD
	N22:6		Source A C162A
	1		1729
	(2:131)		Source B TOTAL
			3453.000
			Dest TOTAL
			3453.000
			+ADD-----+

Rung 2:211			
HA162B	D162B	OUT162B	
N7:225	N7:172	N7:238	
-----1/1-----1/1-----1/1-----			+ADD-----+
7	7	3	+ADD
(2:130)	(2:166)		Source A 1
			Source B COUNT
			Dest COUNT
			Dest COUNT
			+ADD-----+
	DEV_1		+ADD
	N22:6		Source A C162B
	1		1731
	(2:131)		Source B TOTAL
			3453.000
			Dest TOTAL
			3453.000
			+ADD-----+

Rung 2:212			
-----			+DIV-----+
			+DIVIDE
			Source A TOTAL
			3453.000
			Source B COUNT
			2
			Dest AV162
			1730
			+DIV-----+

Rung 2:214

Rung 2:215

RATE CHECKING

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```

+++
+MOV-----+
+MOVE-----+
|Source      DIF1_143|
|            -10|
|Dest        DIF2_143|
|            -1|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A     DIF1_143|
|            -10|
|Source B      9|
|            |
|Dest         DIF1_143|
|            -10|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A     DIF1_143|
|            -10|
|Source B     DIF1_143|
|            -10|
|Dest         ACC|
|            -731|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A     DIF1_143|
|            -10|
|Source B      ACC|
|            -731|
|Dest         ACC|
|            -731|
+-----+
+CLR-----+
+CLEAR-----+
|Dest         S:5|
|            0|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A     DDIF1|
|            -1|
|Source B     DDIF1|
|            -1|
|Dest         ACC|
|            -730|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A     DDIF1|
|            -1|
|Source B      ACC|
|            -730|
|Dest         ACC|
|            -730|
+-----+
+++

```

+++

```

+++
| +GRT-----+ +MOV-----+
| +--GREATER THAN +--MOVE
| |Source A ACC| |Source 100| |
| | -731| |
| |Source B 100| |Dest N12:11|
| | | | |1|
| +-----+
| N22:0 - (2:215)
| +LES-----+ +MOV-----+
| +--LESS THAN +--MOVE
| |Source A ACC| |Source 1| |
| | -731| |
| |Source B 1| |Dest N12:11|
| | | | |1|
| +-----+
| N22:0 - (2:215)
| +LIM-----+ +MOV-----+
| +--LIMIT TEST +--MOVE
| |Low Lim 1| |Source ACC| |
| | | | | -731|
| |Test ACC| |Dest N12:11|
| | -731| | |1|
| |High Lim 100| +-----+
| | |
| +-----+
| N22:0 - (2:215)

```

Rung 2:216

```

| PID143
|
| 16 DUMMY16
| [LBL]----- ( )
| 15

```

Rung 2:217

DETECT FROM SCADA PID ON/OFF
 IF PID OFF
 THEN ZERO PW FOR ZERO OUTPUT AT SCR
 AND JUMP AROUND THE PID BLOCK

```

| ON143
| N7:230
| |-----+ +CLR-----+
| | /| +--CLEAR
| | 1 | |Dest PW143|
| | (3:22) | | 0|
| | | +-----+
| | | 56
| | | +--(JMP)-----+

```

Rung 2:218

DETECT AUTO/MANUAL FROM SCADA
 SET APPROPRIATE MODE IN PID BLOCK

```

| AM143
| N7:230
| |-----+ +-----+
| | /| | PID143/1
| | 0 | | N12:0
| | (3:22) | | 1

```


Rung 2:219

DETECT SETPOINT VALUE FROM SCADA
 PUT VALUE IN PID BLOCK

```

+MOV-----+
|MOVE
|Source      SET143|
|            01
|Dest        PIDSP143|
|            01
+-----+

```

Rung 2:220

PID BLOCK OPERATION

```

+PID-----+
|PID
|Control Block  PID143|
|Process Variable AV143|
|Control Variable CV143|
|Control Block Length 23|
+-----+
+SCALE-----+
|Source      CV143|
|            01
|Rate [1/10000] 15|
|            1
|Offset      01
|            1
|Dest        PW143|
|            01
+-----+
+CLR-----+
+CLEAR-----+
|Dest        S:51
|            01
+-----+

```

Rung 2:221

```

| 56
|-[LBL]-----+ N7:229
|              ( )
|              4

```

Rung 2:222

```

| RT_TMR/DN
| T4:87
|-----+ PID144
| DN
|-----+ 17
| (2:42) (JMP)

```

Rung 2:223

RATE CHECKING

		+MOV-----+
		MOVE
		Source AV144
		1720
		Dest R1_144
		1720
		+-----+
		+SUB-----+
		SUBTRACT
		Source A R1_144
		1720
		Source B R2_144
		1720
		Dest DIF1_144
		-9
		+-----+
		+MOV-----+
		MOVE
		Source R1_144
		1720
		Dest R2_144
		1720
		+-----+
		+SUB-----+
		SUBTRACT
		Source A DIF1_144
		-9
		Source B DIF2_144
		0
		Dest DDIF1
		-1
		+-----+
		+MOV-----+
		MOVE
		Source DIF1_144
		-9
		Dest DIF2_144
		0
		+-----+
		+SUB-----+
		SUBTRACT
		Source A DIF1_144
		-9
		Source B 9
		9
		Dest DIF1_144
		-9
		+-----+
		+MUL-----+
		MULTIPLY
		Source A DIF1_144
		-9
		Source B DIF1_144
		-9
		Dest ACC
		-731
		+-----+
		+++

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```

+++
| SCRATCH
| N7:235
|-----+ADD-----+
| 1 |-----+ADD-----+
| 6 |Source A ACC|
| (2:215) |Source B 1|
| |Dest ACC|
| | -731|
|-----+
| +ADD-----+
| +ADD-----+
| |Source A ACC|
| | -731|
| |Source B ACC|
| | -730|
| |Dest ACC|
| | -730|
|-----+
| +SUB-----+
| +SUBTRACT-----+
| |Source A ACC|
| | -730|
| |Source B N12:41|
| | 1|
| |Dest ACC|
| | -731|
|-----+
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE-----+
| |Source A ACC| |Source 100|
| | -731| | |
| |Source B 100| |Dest N12:41|
| | 1|
|-----+
| N22:0 - (2:215) +MOV-----+
| +LES-----+ +MOVE-----+
| +LESS THAN +MOVE-----+
| |Source A ACC| |Source 1|
| | -731| | |
| |Source B 1| |Dest N12:41|
| | 1|
|-----+
| N22:0 - (2:215) +MOV-----+
| +LIM-----+ +MOVE-----+
| +LIMIT TEST +MOVE-----+
| |Low Lim 1| |Source ACC|
| | | | -731|
| |Test ACC| |Dest N12:41|
| | -731| | 1|
| |High Lim 100|
|-----+
| N22:0 - (2:215)

```



```

+++
|
| +SCL-----+
| +SCALE      +-----+
| |Source      CV144|
| |             0|
| |Rate [ /10000] 15|
| |Offset      0|
| |Dest        PW144|
| |             0|
| +-----+
| +CLR-----+
| +CLEAR      +-----+
| |Dest        S:5|
| |             0|
| +-----+
+++

```

Rung 2:229

```

| 57
| --[LBL]-----N7:229
|                                     ( )
|                                     5

```

Rung 2:230

```

| RT_TMR/DN
| T4:87
| --1/[-----18
| |DN
| |         (JMP)
| (2:42)

```

Rung 2:231

RATE CHECKING

```

|
| +MOV-----+
| +MOVE      +-----+
| |Source      AV150|
| |             1735|
| |Dest        R1_150|
| |             1734|
| +-----+
| +SUB-----+
| +SUBTRACT  +-----+
| |Source A     R1_150|
| |             1734|
| |Source B     R2_150|
| |             1734|
| |Dest        DIF1_150|
| |             -9|
| +-----+
| +MOV-----+
| +MOVE      +-----+
| |Source      R1_150|
| |             1734|
| |Dest        R2_150|
| |             1734|
| +-----+
|
+++

```

```

***
+-----+
+SUB-----+
+SUBTRACT   +
|Source A   DIF1_150|
|           -9|
|Source B   DIF2_150|
|           0|
|Dest       DDIF1|
|           -1|
+-----+
+MOV-----+
+MOVE       +
|Source     DIF1_150|
|           -9|
|Dest       DIF2_150|
|           0|
+-----+
+SUB-----+
+SUBTRACT   +
|Source A   DIF1_150|
|           -9|
|Source B           |
|           9|
|Dest       DIF1_150|
|           -9|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A   DIF1_150|
|           -9|
|Source B   DIF1_150|
|           -9|
|Dest       ACC|
|           -731|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A           |
|           ACC|
|           -731|
|Source B   DIF1_150|
|           -9|
|Dest       ACC|
|           -731|
+-----+
+CLR-----+
+CLEAR      +
|Dest       S:5|
|           0|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A       DDIF1|
|           -1|
|Source B       DDIF1|
|           -1|
|Dest          ACC1|
|           -730|
+-----+
***

```

```

+++
+-----+
+MUL-----+
+MULTIPLY
|Source A      DDIF1|
|              -1|
|Source B      ACC1|
|              -730|
|Dest          ACC1|
|              -730|
+-----+
+CLR-----+
+CLEAR
|Dest          S:5|
|              0|
+-----+
SCRATCH
+-----+
+EQU-----+ N7:235
+EQUAL
|Source A      ACC|
|              -731|
|Source B      0|
|              |
+-----+
N22:0 - (2:215)
+-----+
+SUB-----+
+SUBTRACT
|Source A      ACC|
|              -731|
|Source B      1|
|              |
|Dest          ACC|
|              -731|
+-----+
N22:0 - (2:215)
SCRATCH
N7:235
] [-----+
6
(2:215)
+-----+
+ADD-----+
+ADD
|Source A      ACC|
|              -731|
|Source B      1|
|              |
|Dest          ACC|
|              -731|
+-----+
+ADD-----+
+ADD
|Source A      ACC|
|              -731|
|Source B      ACC1|
|              -730|
|Dest          ACC1|
|              -730|
+-----+
+++

```



```

+++
+-----+
+SUB-----+
+SUBTRACT-----+
+Source A      ACC1|
+              -730|
+Source B      N12:71|
+              1|
+Dest          ACC|
+              -731|
+-----+
+GRT-----+ +MOV-----+
++GREATER THAN++ +MOVE-----+
+Source A      ACC| +Source      100|
+              -731| +Dest          N12:71|
+Source B      100| +              1|
+-----+
+N22:0 - (2:215)
+LES-----+ +MOV-----+
++LESS THAN++ +MOVE-----+
+Source A      ACC| +Source      1|
+              -731| +Dest          N12:71|
+Source B      1| +              1|
+-----+
+N22:0 - (2:215)
+LIM-----+ +MOV-----+
++LIMIT TEST++ +MOVE-----+
+Low Lim      1| +Source      ACC|
+              | +              -731|
+Test          ACC| +Dest          N12:71|
+              -731| +              1|
+High Lim     100| +-----+
+-----+
+N22:0 - (2:215)
  
```

Rung 2:232
 PID150

18
 --[LBL]

DUMMY18
 N22:8

1

Rung 2:233

DETECT FROM SCADA PID ON/OFF
 IF PID OFF
 THEN ZERO PW FOR ZERO OUTPUT AT SCR
 AND JUMP AROUND THE PID BLOCK

ON150
 N7:230
 --1/I-----
 5
 (3:22)

```

+CLR-----+
+CLEAR-----+
+Dest          PW150|
+              0|
+-----+
+58
+--(JMP)-----+
  
```

Rung 2:234

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

| AM150
| N7:230
| 1/[
| 4
| (3:22)

PID150/1
N12:60

1

Rung 2:235

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

+MOV-----+
| MOVE |
| Source SET150 |
| | 0 |
| Dest PIDSP150 |
| | 0 |
+-----+

Rung 2:236

+PID-----+
| PID |
| Control Block PID150 |
| Process Variable AV150 |
| Control Variable CV150 |
| Control Block Length 23 |
+-----+
+SCL-----+
| SCALE |
| Source CV150 |
| | 0 |
| Rate [/10000] 15 |
| | |
| Offset 0 |
| | |
| Dest PW150 |
| | 0 |
+-----+
+CLR-----+
| CLEAR |
| Dest S:5 |
| | 0 |
+-----+

Rung 2:237

| 58

N7:229

| [LBL]-----

6

Rung 2:238

| RT_TMR/DN
| T4:87
| 1/[
| DN
| (2:42)

PID151

19

(JMP)

Rung 2:239

RATE CHECKING

```
+MOV-----+
+MOVE-----+
|Source      AV151|
|            1737|
|Dest       R1_151|
|            1737|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A    R1_151|
|            1737|
|Source B    R2_151|
|            1737|
|Dest       DIF1_151|
|            -9|
+-----+
+MOV-----+
+MOVE-----+
|Source      R1_151|
|            1737|
|Dest       R2_151|
|            1737|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A    DIF1_151|
|            -9|
|Source B    DIF2_151|
|            0|
|Dest       DDIF1|
|            -1|
+-----+
+MOV-----+
+MOVE-----+
|Source      DIF1_151|
|            -9|
|Dest       DIF2_151|
|            0|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A    DIF1_151|
|            -9|
|Source B      9|
|            |
|Dest       DIF1_151|
|            -9|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A    DIF1_151|
|            -9|
|Source B    DIF1_151|
|            -9|
|Dest       ACC|
|            -73|
+-----+
```

```

+++
+MUL-----+
+MULTIPLY    +
|Source A      ACC|
|              -731|
|Source B DIF1_151|
|              -91|
|Dest         ACC|
|              -731|
+-----+
+CLR-----+
+CLEAR        +
|Dest         S:5|
|              01|
+-----+
+MUL-----+
+MULTIPLY    +
|Source A      DDIF1|
|              -11|
|Source B      DDIF1|
|              -11|
|Dest         ACC1|
|              -730|
+-----+
+MUL-----+
+MULTIPLY    +
|Source A      DDIF1|
|              -11|
|Source B      ACC1|
|              -730|
|Dest         ACC1|
|              -730|
+-----+
+CLR-----+
+CLEAR        +
|Dest         S:5|
|              01|
+-----+
SCRATCH
+EQU-----+ N7:235
+EQUAL        + ( )
|Source A      ACC| 6
|              -731|
|Source B      01|
+-----+
N22:0 ~ (2:215)
+EQU-----+ +SUB-----+
+EQUAL        +SUBTRACT +
|Source A      ACC| |Source A      ACC|
|              -731| |              -731|
|Source B      11| |Source B      11|
+-----+ |Dest         ACC|
N22:0 ~ (2:215) |              -731|
+-----+
+++

```


Rung 2:240
| PID151
|
| 19
|---[LBL]-----
|

DUMMY19
N22:8
()
2

Rung 2:241

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

| ON151
| N7:230
| 1/I
| 7
| (3:22)
|
|
|

+CLR-----+
+CLEAR
|Dest PW151|
| | 01 |
+-----+
| 59 |
+--(JMP)-----+

Rung 2:242

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

| AM151
| N7:230
| 1/I
| 6
| (3:22)
|

PID151/1
N12:90
()
1

Rung 2:243

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

|
|
|
|
|

+MOV-----+
+MOVE
|Source SET151|
| | 01 |
|Dest PIDSP151|
| | 01 |
+-----+

Rung 2:244

|
|
|
|
|

+PID-----+
+PID
|Control Block PID151|
|Process Variable AV151|
|Control Variable CV151|
|Control Block Length 23|
+-----+
+++


```

+++
+-----+
+SUB-----+
+SUBTRACT   +
+Source A   DIF1_152|
+          -9|
+Source B   DIF2_152|
+          0|
+Dest       DDIF1|
+          -1|
+-----+
+MOV-----+
+MOVE       +
+Source     DIF1_152|
+          -9|
+Dest       DIF2_152|
+          0|
+-----+
+SUB-----+
+SUBTRACT   +
+Source A   DIF1_152|
+          -9|
+Source B    9|
+Dest       DIF1_152|
+          -9|
+-----+
+MUL-----+
+MULTIPLY   +
+Source A   DIF1_152|
+          -9|
+Source B   DIF1_152|
+          -9|
+Dest       ACC1|
+          -731|
+-----+
+MUL-----+
+MULTIPLY   +
+Source A    ACC1|
+          -731|
+Source B   DIF1_152|
+          -9|
+Dest       ACC1|
+          -731|
+-----+
+CLR-----+
+CLEAR      +
+Dest       S:5|
+          0|
+-----+
+MUL-----+
+MULTIPLY   +
+Source A    DDIF1|
+          -1|
+Source B    DDIF1|
+          -1|
+Dest       ACC1|
+          -730|
+-----+
+++

```

```

+++
+-----+
+SUB-----+
+SUBTRACT   +-+
|Source A    ACC1|
|            -730|
|Source B    N12:131|
|            1|
|Dest        ACC|
|            -731|
+-----+
+GRT-----+ +MOV-----+
+GREATER THAN +MOVE
|Source A    ACC| |Source    100|
|            -731| |Dest      N12:131|
|Source B    100| |            1|
+-----+ +-----+
N22:0 - (2:215)
+LES-----+ +MOV-----+
+LESS THAN   +MOVE
|Source A    ACC| |Source    1|
|            -731| |Dest      N12:131|
|Source B    1|  |            1|
+-----+ +-----+
N22:0 - (2:215)
+LIM-----+ +MOV-----+
+LIMIT TEST  +MOVE
|Low Lim     1| |Source    ACC|
|            1| |            -731|
|Test        ACC| |Dest      N12:131|
|            -731| |            1|
|High Lim    100| +-----+
+-----+
N22:0 - (2:215)

```

Rung 2:248
PID152

20
--[LBL]-----

DUMMY21
N22:8

()

4

Rung 2:249

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

ON152
N7:230
-1/[
9
(3:22)

```

+CLR-----+
+CLEAR
|Dest        PW152|
|            01|
+-----+
60
+-(JMP)-----+

```

Rung 2:250

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

	AM152	PID152/1
	N7:230	N12:120
	1/[	()
	8	1
	(3:22)	

Rung 2:251

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

		+MOV-----+
		+MOVE-----+
	Source	SET152
		0
	Dest	PIDSP152
		0
		+-----+

Rung 2:252

		+PID-----+
		+PID-----+
	Control Block	PID152
	Process Variable	AV152
	Control Variable	CV152
	Control Block Length	23
		+-----+
		+SCL-----+
		+SCALE-----+
	Source	CV152
		0
	Rate [/10000]	15
	Offset	0
	Dest	PW152
		0
		+-----+
		+CLR-----+
		+CLEAR-----+
	Dest	S:5
		0
		+-----+

Rung 2:253

	60	N7:229
	--[LBL]	()
		8

Rung 2:254

		PID153
	RT_TMR/DN	
	T4:87	21
	1/[	(JMP)
	DN	
	(2:42)	

Rung 2:255

RATE CHECKING

```

+-----+
+MOV-----+
+MOVE-----+
|Source      AV153|
|            1721|
|Dest        R1_153|
|            1722|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A      R1_153|
|            1722|
|Source B      R2_153|
|            1722|
|Dest          DIF1_153|
|            -8|
+-----+
+MOV-----+
+MOVE-----+
|Source        R1_153|
|            1722|
|Dest          R2_153|
|            1722|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A      DIF1_153|
|            -8|
|Source B      DIF2_153|
|             1|
|Dest          DDIF1|
|            -1|
+-----+
+MOV-----+
+MOVE-----+
|Source        DIF1_153|
|            -8|
|Dest          DIF2_153|
|             1|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A      DIF1_153|
|            -8|
|Source B           9|
|            -8|
|Dest          DIF1_153|
|            -8|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A      DIF1_153|
|            -8|
|Source B      DIF1_153|
|            -8|
|Dest          ACC|
|           -731|
+-----+

```

+++

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```

+++
+-----+
+MUL-----+
+MULTIPLY+
+Source A  ACC|
+          -731|
+Source B  DIF1_153|
+          -8|
+Dest      ACC|
+          -731|
+-----+
+CLR-----+
+CLEAR+
+Dest      S:5|
+          0|
+-----+
+MUL-----+
+MULTIPLY+
+Source A  DDIF1|
+          -1|
+Source B  DDIF1|
+          -1|
+Dest      ACC1|
+          -730|
+-----+
+MUL-----+
+MULTIPLY+
+Source A  DDIF1|
+          -1|
+Source B  ACC1|
+          -730|
+Dest      ACC1|
+          -730|
+-----+
+CLR-----+
+CLEAR+
+Dest      S:5|
+          0|
+-----+
+SCRATCH
+N7:235
+-----+
+EQU-----+
+EQUAL+
+Source A  ACC|
+          -731|
+Source B  0|
+-----+
+N22:0 - (2:215)
+-----+
+EQU-----+
+SUB-----+
+SUBTRACT+
+Source A  ACC|
+          -731|
+Source B  1|
+Dest      ACC|
+          -731|
+N22:0 - (2:215)
+-----+

```

```

+++
| SCRATCH
| N7:235
|-----+ADD-----+
| 6 |Source A | ACC |
| (2:215) | -731 |
| |Source B | 1 |
| |Dest | ACC |
| | -731 |
|-----+
|
|-----+ADD-----+
| |Source A | ACC |
| | -731 |
| |Source B | ACC |
| | -730 |
| |Dest | ACC |
| | -730 |
|-----+
|-----+SUB-----+
| |Source A | ACC |
| | -730 |
| |Source B | N12:161 |
| | 1 |
| |Dest | ACC |
| | -731 |
|-----+
|-----+GRT-----+
|-----+GREATER THAN-----+
| |Source A | ACC |Source | 100 |
| | -731 | |
| |Source B | 100 |Dest | N12:161 |
| | 1 |
|-----+
| N22:0 - (2:215)
|-----+LES-----+
|-----+LESS THAN-----+
| |Source A | ACC |Source | 1 |
| | -731 | |
| |Source B | 1 |Dest | N12:161 |
| | 1 |
|-----+
| N22:0 - (2:215)
|-----+LIM-----+
|-----+LIMIT TEST-----+
| |Low Lim | 1 |Source | ACC |
| | | | -731 |
| |Test | ACC |Dest | N12:161 |
| | -731 | | 1 |
| |High Lim | 100 |
|-----+
| N22:0 - (2:215)

```


9


```

+++
+SUB-----+
+SUBTRACT+
+Source A  DIF1_154|
+          -9|
+Source B  DIF2_154|
+          0|
+Dest      DDIF1|
+          -1|
+-----+
+MOV-----+
+MOVE+
+Source    DIF1_154|
+          -9|
+Dest      DIF2_154|
+          0|
+-----+
+SUB-----+
+SUBTRACT+
+Source A  DIF1_154|
+          -9|
+Source B      9|
+          -9|
+Dest      DIF1_154|
+          -9|
+-----+
+MUL-----+
+MULTIPLY+
+Source A  DIF1_154|
+          -9|
+Source B  DIF1_154|
+          -9|
+Dest      ACC|
+          -731|
+-----+
+MUL-----+
+MULTIPLY+
+Source A      ACC|
+          -731|
+Source B  DIF1_154|
+          -9|
+Dest      ACC|
+          -731|
+-----+
+CLR-----+
+CLEAR+
+Dest      S:5|
+          0|
+-----+
+MUL-----+
+MULTIPLY+
+Source A      DDIF1|
+          -1|
+Source B      DDIF1|
+          -1|
+Dest      ACC1|
+          -730|
+-----+
+++

```



```

***
+-----+
+SUB-----+
+SUBTRACT+
+Source A ACC1+
+-----+
+Source B N12:191+
+-----+
+Dest ACC1+
+-----+
+-----+
+GRT-----+ +MOV-----+
+GREATER THAN+ +MOVE+
+Source A ACC1+ +Source 100+
+-----+
+Source B 100+ +Dest N12:191+
+-----+
+-----+
N22:0 - (2:215)
+LES-----+ +MOV-----+
+LESS THAN+ +MOVE+
+Source A ACC1+ +Source 1+
+-----+
+Source B 1+ +Dest N12:191+
+-----+
+-----+
N22:0 - (2:215)
+LIM-----+ +MOV-----+
+LIMIT TEST+ +MOVE+
+Low Lim 1+ +Source ACC1+
+-----+
+Test ACC1+ +Dest N12:191+
+-----+
+High Lim 100+ +-----+
+-----+
N22:0 - (2:215)
  
```

Rung 2:264
 PID154

```

22
---[LBL]-----DUMMY22
N22:8
( )
5
  
```

Rung 2:265

DETECT FROM SCADA PID ON/OFF
 IF PID OFF
 THEN ZERO PW FOR ZERO OUTPUT AT SCR
 AND JUMP AROUND THE PID BLOCK

```

ON154
N7:230
---J/L-----+CLR-----+
13 +CLEAR+
(3:22) +Dest PW154+
+-----+
62 +-----+
+-----+
+-----+
62
+-----+
(JMP)
  
```

Rung 2:266

DETECT AUTO/MANUAL FROM SCADA
 SET APPROPRIATE MODE IN PID BLOCK

	AM154		PID154/1
	N7:230		N12:180
	1/1	-----	()
	12		1
	(3:22)		

Rung 2:267

DETECT SETPOINT VALUE FROM SCADA
 PUT VALUE IN PID BLOCK

		+MOV-----+
		+MOVE
	Source	SET154
		0
	Dest	PIDSP154
		0
		+-----+

Rung 2:268

		+PID-----+
		+PID
	Control Block	PID154
	Process Variable	AV154
	Control Variable	CV154
	Control Block Length	23
		+-----+
		+SCL-----+
		+SCALE
	Source	CV154
		0
	Rate [1/10000]	15
	Offset	0
	Dest	PW154
		0
		+-----+
		+CLR-----+
		+CLEAR
	Dest	S:5
		0
		+-----+

Rung 2:269

	62		N7:229
	[LBL]	-----	()
			10

Rung 2:270

			PID160
	RT_TMR/DN		
	T4:87		23
	1/1	-----	(JMP)
	DN		
	(2:42)		

Rung 2:271

RATE CHECKING

```

+-----+
+MOV-----+
+MOVE-----+
|Source      AV160|
|            1733|
|Dest        R1_160|
|            1733|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A     R1_160|
|            1733|
|Source B     R2_160|
|            1733|
|Dest         DIF1_160|
|            -8|
+-----+
+MOV-----+
+MOVE-----+
|Source      R1_160|
|            1733|
|Dest        R2_160|
|            1733|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A     DIF1_160|
|            -8|
|Source B     DIF2_160|
|            1|
|Dest         DDIF1|
|            -1|
+-----+
+MOV-----+
+MOVE-----+
|Source      DIF1_160|
|            -8|
|Dest        DIF2_160|
|            1|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A     DIF1_160|
|            -8|
|Source B          9|
|            |
|Dest         DIF1_160|
|            -8|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A     DIF1_160|
|            -8|
|Source B     DIF1_160|
|            -8|
|Dest         ACC|
|            -731|
+-----+

```

```

+++
+MUL-----+
+MULTIPLY+
|Source A      ACC|
|              -731|
|Source B      DIF1_160|
|              -81|
|Dest          ACC|
|              -731|
+-----+
+CLR-----+
+CLEAR+
|Dest          S:5|
|              0|
+-----+
+MUL-----+
+MULTIPLY+
|Source A      DDIF1|
|              -1|
|Source B      DDIF1|
|              -1|
|Dest          ACC1|
|              -730|
+-----+
+MUL-----+
+MULTIPLY+
|Source A      DDIF1|
|              -1|
|Source B      ACC1|
|              -730|
|Dest          ACC1|
|              -730|
+-----+
+CLR-----+
+CLEAR+
|Dest          S:5|
|              0|
+-----+
SCRATCH
+EQU-----+ N7:235
+--( )-----+
|Source A      ACC| 6
|              -731|
|Source B      0|
|              |
+-----+
N22:0 - (2:215)
+EQU-----+ +SUB-----+
+--( )-----+ +--( )-----+
|Source A      ACC| |Source A      ACC|
|              -731| |              -731|
|Source B      1| |Source B      1|
|              | |              |
+-----+ +-----+
|Dest          ACC|
|              -731|
N22:0 - (2:215)
+-----+

```

```

+++
| SCRATCH
| N7:235
| +ADD-----+
| +-----+ +ADD
| 6 |Source A ACC|
| (2:215) | -731|
| |Source B 1|
| |Dest ACC|
| | -731|
| +-----+
| +ADD-----+
| +-----+ +ADD
| |Source A ACC|
| | -731|
| |Source B ACC|
| | -730|
| |Dest ACC|
| | -730|
| +-----+
| +ADD-----+
| +-----+ +ADD
| |Source A ACC|
| | -730|
| |Source B N13:11|
| | 1|
| |Dest ACC|
| | -731|
| +-----+
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE
| |Source A ACC| |Source 100|
| | -731| | |
| |Source B 100| |Dest N13:11|
| | 1|
| +-----+
| N22:0 - (2:215)
| +LES-----+ +MOV-----+
| +LESS THAN +MOVE
| |Source A ACC| |Source 1|
| | -731| | |
| |Source B 1| |Dest N13:11|
| | 1|
| +-----+
| N22:0 - (2:215)
| +LIM-----+ +MOV-----+
| +LIMIT TEST +MOVE
| |Low Lim 1| |Source ACC|
| | | | -731|
| |Test ACC| |Dest N13:11|
| | -731| | 1|
| |High Lim 100|
| +-----+
| N22:0 - (2:215)

```

DUMMY23
N22:8
---()---
6

```

DETECT FROM SCADA PID ON/OFF
      IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
      AND JUMP AROUND THE PID BLOCK

```

```

+CLR-----+
+--CLEAR-----+
| |Dest          PW160|
| |              01 |
| +-----+
|
| 63
|
+--(JMP)-----+

```

PID160/1
N13:0
---()---
1

```

+MOV-----+
+MOVE-----+
|Source      SET160|
|              01  |
|Dest        PIDSP160|
|              01  |
+-----+

```

```

+PID-----+
+PID      +-+
|Control Block      PID160|
|Process Variable   AV160|
|Control Variable   CV160|
|Control Block Length 23|
+-----+
+
+

```



```

+++
| +SCL-----+
| +SCALE-----+
| |Source      CV160|
| |Rate [ /10000] 15|
| |Offset      0|
| |Dest        PW160|
| |            0|
| +-----+
| +CLR-----+
| +CLEAR-----+
| |Dest        S:5|
| |            0|
| +-----+
  
```

Rung 2:277

```

| 63
| --[LBL]-----N7:229
|                                     ( )
|                                     12
  
```

Rung 2:278

```

| RT_TMR/DN
| T4:87
| --1/[-----24
| DN
| (2:42)----- (JMP)
  
```

Rung 2:279

RATE CHECKING

```

| +MOV-----+
| +MOVE-----+
| |Source      AV161|
| |Dest        R1_161|
| |            1734|
| |            1733|
| +-----+
| +SUB-----+
| +SUBTRACT-----+
| |Source A     R1_161|
| |            1733|
| |Source B     R2_161|
| |            1733|
| |Dest        DIF1_161|
| |            -9|
| +-----+
| +MOV-----+
| +MOVE-----+
| |Source      R1_161|
| |Dest        R2_161|
| |            1733|
| |            1733|
| +-----+
  
```

```

***
+-----+
+SUB-----+
+SUBTRACT+
|Source A  DIF1_161|
|          -9|
|Source B  DIF2_161|
|          0|
|Dest      DDIF1|
|          -1|
+-----+
+MOV-----+
+MOVE-----+
|Source    DIF1_161|
|          -9|
|Dest      DIF2_161|
|          0|
+-----+
+SUB-----+
+SUBTRACT+
|Source A  DIF1_161|
|          -9|
|Source B          |
|          9|
|Dest      DIF1_161|
|          -9|
+-----+
+MUL-----+
+MULTIPLY+
|Source A  DIF1_161|
|          -9|
|Source B  DIF1_161|
|          -9|
|Dest      ACC|
|          -731|
+-----+
+MUL-----+
+MULTIPLY+
|Source A          |
|          ACC|
|          -731|
|Source B  DIF1_161|
|          -9|
|Dest      ACC|
|          -731|
+-----+
+CLR-----+
+CLEAR-----+
|Dest      S:5|
|          0|
+-----+
+MUL-----+
+MULTIPLY+
|Source A          |
|          DDIF1|
|          -1|
|Source B          |
|          DDIF1|
|          -1|
|Dest      ACC|
|          -730|
+-----+
***

```

```

***
+-----+
+MUL-----+
+MULTIPLY
|Source A      DDIF1|
|              -1|
|Source B      ACC1|
|              -730|
|Dest          ACC1|
|              -730|
+-----+
+CLR-----+
+CLEAR
|Dest          S:5|
|              0|
+-----+
AM164
+EQU-----+
+N7:231
+-----+
+EQUAL-----+
+-----+
|Source A      ACC1|
|              -731|
|Source B      0|
|              0|
+-----+
N22:0 - (2:215)
+EQU-----+
+SUB-----+
+-----+
+EQUAL-----+
+SUBTRACT
|Source A      ACC1|
|              -731|
|Source B      1|
|              1|
+-----+
|Dest          ACC1|
|              -731|
+-----+
N22:0 - (2:215)
+-----+
SCRATCH
N7:235
+ADD-----+
+-----+
+ADD
|Source A      ACC1|
|              -731|
|Source B      1|
|              1|
+-----+
|Dest          ACC1|
|              -731|
+-----+
+ADD-----+
+-----+
+ADD
|Source A      ACC1|
|              -731|
|Source B      ACC1|
|              -730|
|Dest          ACC1|
|              -730|
+-----+
+-----+
***

```

```

+++
|                                     +SUB-----+
|                                     +SUBTRACT
|                                     |Source A      ACC1|
|                                     |              -730|
|                                     |Source B      N13:41|
|                                     |              1|
|                                     |Dest          ACC|
|                                     |              -731|
|                                     +-----+
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE
| |Source A      ACC| |Source      100| |
| |              -731| |
| |Source B      100| |Dest        N13:41|
| |              | | |              1|
| +-----+ +-----+
| N22:0 - (2:215)
| +LES-----+ +MOV-----+
| +LESS THAN +MOVE
| |Source A      ACC| |Source      1| |
| |              -731| |
| |Source B      1| |Dest        N13:41|
| |              | | |              1|
| +-----+ +-----+
| N22:0 - (2:215)
| +LIM-----+ +MOV-----+
| +LIMIT TEST +MOVE
| |Low Lim      1| |Source      ACC| |
| |              | | |              -731|
| |Test          ACC| |Dest        N13:41|
| |              -731| | |              1|
| |High Lim     100| +-----+
| +-----+
| N22:0 - (2:215)

```

Rung 2:280
| PID161

```

|      24
| --[LBL]-----+-----+
|                                     DUMMY24
|                                     N22:8
|                                     ( )
|                                     '7

```

Rung 2:281

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

```

| ON172B
| N7:231
| 1/[-----+-----+
|      1
| (3:23)
|                                     +CLR-----+
|                                     +CLEAR
|                                     |Dest      PW161|
|                                     |              0|
|                                     +-----+
|                                     64
|                                     +-(JMP)-----+

```

Rung 2:282

DETECT AUTO/MANUAL FROM SCADA
 SET APPROPRIATE MODE IN PID BLOCK

	AM161		PID161/1
	N7:231		N13:30
	----- / -----		()-----
	0		1
	(3:23)		

Rung 2:283

DETECT SETPOINT VALUE FROM SCADA
 PUT VALUE IN PID BLOCK

		+MOV-----+
		+MOVE-----+
	Source	SET161
		0
	Dest	PIDSP161
		0
		+-----+

Rung 2:284

		+PID-----+
		+PID-----+
	Control Block	PID161
	Process Variable	AV161
	Control Variable	CV161
	Control Block Length	23
		+-----+
		+SCL-----+
		+SCALE-----+
	Source	CV161
		0
	Rate [/10000]	15
	Offset	0
	Dest	PW161
		0
		+-----+
		+CLR-----+
		+CLEAR-----+
	Dest	S:5
		0
		+-----+

Rung 2:285

	64		N7:229
	----- LBL -----		()-----
			12

Rung 2:286

			PID162
	RT_TMR/DN		
	T4:87		25
	----- / -----		(JMP)-----
	DN		
	(2:42)		

Rung 2:287

DNR_1

N22:5

(L)

5

Rung 2:288

RATE CHECKING

```

+MOV-----+
+MOVE
|Source      AV162|
|            1730|
|Dest        R1_162|
|            1730|
+-----+
+SUB-----+
+SUBTRACT
|Source A     R1_162|
|            1730|
|Source B     R2_162|
|            1730|
|Dest         DIF1_162|
|            -9|
+-----+
+MOV-----+
+MOVE
|Source      R1_162|
|            1730|
|Dest        R2_162|
|            1730|
+-----+
+SUB-----+
+SUBTRACT
|Source A     DIF1_162|
|            -9|
|Source B     DIF2_162|
|            0|
|Dest         DDIF1|
|            -1|
+-----+
+MOV-----+
+MOVE
|Source      DIF1_162|
|            -9|
|Dest        DIF2_162|
|            0|
+-----+
+SUB-----+
+SUBTRACT
|Source A     DIF1_162|
|            -9|
|Source B     9|
|Dest         DIF1_162|
|            -9|
+-----+

```

```

+++
+-----+
+MUL-----+
+MULTIPLY
+Source A  DIF1_162|
+          -9|
+Source B  DIF1_162|
+          -9|
+Dest      ACC|
+          -731|
+-----+
+MUL-----+
+MULTIPLY
+Source A      ACC|
+          -731|
+Source B  DIF1_162|
+          -9|
+Dest      ACC|
+          -731|
+-----+
+CLR-----+
+CLEAR
+Dest      S:5|
+          0|
+-----+
+MUL-----+
+MULTIPLY
+Source A      DDIF1|
+          -1|
+Source B      DDIF1|
+          -1|
+Dest      ACC1|
+          -730|
+-----+
+MUL-----+
+MULTIPLY
+Source A      DDIF1|
+          -1|
+Source B      ACC1|
+          -730|
+Dest      ACC1|
+          -730|
+-----+
+CLR-----+
+CLEAR
+Dest      S:5|
+          0|
+-----+
+SCRATCH
+EQ-----+
+EQ-----+
+Source A      ACC|
+          -731|
+Source B      0|
+-----+
+N22:0 - (2:215)

```

```

+++
| +EQU-----+ +SUB-----+
| +EQU-----+ +SUBTRACT-----+
| |Source A      ACC| |Source A      ACC| |
| |              -731| |              -731|
| |Source B      1| |Source B      1|
| |              | | |              |
| |N22:0 - (2:215)| |Dest      ACC|
| |              | | |              -731|
| |              +-----+
|
| SCRATCH
| N7:235
| |-----+ +ADD-----+
| |-----+ +ADD-----+
| |      6      | |Source A      ACC|
| | (2:215)    | |              -731|
| |              | |Source B      1|
| |              | |Dest      ACC|
| |              | |              -731|
| |              +-----+
|
| +ADD-----+
| +ADD-----+
| |Source A      ACC|
| |              -731|
| |Source B      ACC1|
| |              -730|
| |Dest      ACC1|
| |              -730|
| |              +-----+
|
| +SUB-----+
| +SUBTRACT-----+
| |Source A      ACC1|
| |              -730|
| |Source B      N13:71|
| |              1|
| |Dest      ACC|
| |              -731|
| |              +-----+
|
| +GRT-----+ +MOV-----+
| +GREATER THAN +--MOVE-----+
| |Source A      ACC| |Source      100| |
| |              -731| |              |
| |Source B      100| |Dest      N13:71|
| |              | | |              1|
| |              +-----+
| |N22:0 - (2:215)|
|
| +LES-----+ +MOV-----+
| +LESS THAN    +--MOVE-----+
| |Source A      ACC| |Source      1| |
| |              -731| |              |
| |Source B      1| |Dest      N13:71|
| |              | | |              1|
| |              +-----+
| |N22:0 - (2:215)|
|
+++

```



```

      ***
      |
      | +LIM-----+ +MOV-----+
      | +--LIMIT TEST +--MOVE
      | |Low Lim      | |Source      ACC|
      | |              | |              -731|
      | |Test         ACC| |Dest      N13:71|
      | |              -731| |              1|
      | |High Lim     100| +-----+
      | +-----+
      | N22:0 - (2:215)
  
```

Rung 2:289
 | PID162

```

      | 25
      |-----+-----+
      | [LBL]                                     DUMMY25
      |                                           N22:8
      |                                           8
  
```

Rung 2:290

DETECT FROM SCADA PID ON/OFF
 IF PID OFF
 THEN ZERO PW FOR ZERO OUTPUT AT SCR
 AND JUMP AROUND THE PID BLOCK

```

      | ON162
      | N7:231
      |-----+-----+
      | -]/[ 3
      | (3:23)
      |
      | +CLR-----+
      | +--CLEAR
      | |Dest      PW162|
      | |              01|
      | +-----+
      | NOT END
      | 5
      |-----+ (JMP)
  
```

Rung 2:291

DETECT AUTO/MANUAL FROM SCADA
 SET APPROPRIATE MODE IN PID BLOCK

```

      | AM162
      | N7:231
      |-----+-----+
      | -]/[ 2
      | (3:23)
      |
      | PID162/1
      | N13:60
      |-----+ ( )
      | Y
  
```

Rung 2:292

DETECT SETPOINT VALUE FROM SCADA
 PUT VALUE IN PID BLOCK

```

      |
      |-----+-----+
      | +MOV-----+
      | +--MOVE
      | |Source      SET162|
      | |              01|
      | |Dest      PIDSP162|
      | |              01|
      | +-----+
  
```

Rung 2:293

```

+PID-----+
|PID|
|Control Block PID162|
|Process Variable AV162|
|Control Variable CV162|
|Control Block Length 23|
+-----+
|SCL-----+
+SCALE-----+
|Source CV162|
|Rate [1/10000] 15|
|Offset 0|
|Dest PW162|
| 0|
+-----+
|CLR-----+
+CLEAR-----+
|Dest S:5|
| 0|
+-----+
  
```

Rung 2:294

```

|NOT END
|5
|----- (JMP)-----
|
  
```

Rung 2:295

```

*****
|BEGIN SECTION 2
|MD2
|2 DUMMY7
|---[LBL]--- N22:7
| 6
  
```

Rung 2:296

```

|DN_2
|N22:5
|----- (L)-----
|2
  
```

Rung 2:297

```

*****
|READ EACH THERMOCOUPLE AND STORE EACH TE'S VALUE IN ITS OWN MEMORY REGISTER
|*****
|ADD-----+
|ADD-----+
|Source A TC170B1|
| 719|
|Source B 1000|
| 1|
|Dest C170B1|
| 1719|
+-----+
  
```

Rung 2:298

+GRT-----+ --GREATER THAN Source A C170B1 1719 Source B 16383 1719 +-----+ N7:29 - (2:297)	+MOV-----+ MOVE Source 16383 1719 Dest C170B1 1719 +-----+
---	--

Rung 2:299

+ADD-----+ ADD Source A TC170B2 722 Source B 1000 1722 Dest C170B2 1722 +-----+	
--	--

Rung 2:300

+GRT-----+ --GREATER THAN Source A C170B2 1722 Source B 16383 1722 +-----+ N7:30 - (2:299)	+MOV-----+ MOVE Source 16383 1722 Dest C170B2 1722 +-----+
---	--

Rung 2:301

+ADD-----+ ADD Source A TC170V1 719 Source B 1000 1719 Dest C170V1 1719 +-----+	
--	--

Rung 2:302

+GRT-----+ --GREATER THAN Source A C170V1 1719 Source B 16383 1719 +-----+ N7:31 - (2:301)	+MOV-----+ MOVE Source 16383 1719 Dest C170V1 1719 +-----+
---	--

Rung 2:303

```
| +ADD-----+
| +ADD-----+
| |Source A   TC170V2|
| |          717|
| |Source B   1000|
| |          |
| |Dest       C170V2|
| |          1717|
| +-----+
```

Rung 2:304

```
| +GRT-----+
| +GREATER THAN-----+
| |Source A   C170V2|
| |          1717|
| |Source B   16383|
| |          |
| +-----+
| N7:32 - (2:303)
```

```
+MOV-----+
+MOVE-----+
|Source      16383|
|          |
|Dest        C170V2|
|          1717|
+-----+
```

Rung 2:305

```
| +ADD-----+
| +ADD-----+
| |Source A   TC171B1|
| |          719|
| |Source B   1000|
| |          |
| |Dest       C171B1|
| |          1719|
| +-----+
```

Rung 2:306

```
| +GRT-----+
| +GREATER THAN-----+
| |Source A   C171B1|
| |          1719|
| |Source B   16383|
| |          |
| +-----+
| N7:33 - (2:305)
```

```
+MOV-----+
+MOVE-----+
|Source      16383|
|          |
|Dest        C171B1|
|          1719|
+-----+
```

Rung 2:307

```
| +ADD-----+
| +ADD-----+
| |Source A   TC171B2|
| |          725|
| |Source B   1000|
| |          |
| |Dest       C171B2|
| |          1725|
| +-----+
```

Rung 2:308

+GRT-----+	+MOV-----+
--GREATER THAN	+MOVE-----+
Source A C171B2	Source 16383
1725	1725
Source B 16383	Dest C171B2
1725	1725
+-----+	+-----+
N7:34 - (2:307)	

Rung 2:309

	+ADD-----+
	+ADD-----+
	Source A TC171V1
	721
	Source B 1000
	1000
	Dest C171V1
	1721
	+-----+

Rung 2:310

+GRT-----+	+MOV-----+
--GREATER THAN	+MOVE-----+
Source A C171V1	Source 16383
1721	1721
Source B 16383	Dest C171V1
16383	1721
+-----+	+-----+
N7:35 - (2:309)	

Rung 2:311

	+ADD-----+
	+ADD-----+
	Source A TC171V2
	720
	Source B 1000
	1000
	Dest C171V2
	1720
	+-----+

Rung 2:312

+GRT-----+	+MOV-----+
--GREATER THAN	+MOVE-----+
Source A C171V2	Source 16383
1720	1720
Source B 16383	Dest C171V2
16383	1720
+-----+	+-----+
N7:36 - (2:311)	

Rung 2:313

	+ADD-----+
	+ADD-----+
	Source A TC172B1
	732
	Source B 1000
	Dest C172B1
	1732
	+-----+

Rung 2:314

	+GRT-----+		+MOV-----+
	+GREATER THAN		+MOVE-----+
	Source A C172B1		Source 16383
	1732		
	Source B 16383		Dest C172B1
			1732
	+-----+		+-----+
	N7:37 - (2:313)		

Rung 2:315

	+ADD-----+
	+ADD-----+
	Source A TC172B2
	733
	Source B 1000
	Dest C172B2
	1733
	+-----+

Rung 2:316

	+GRT-----+		+MOV-----+
	+GREATER THAN		+MOVE-----+
	Source A C172B2		Source 16383
	1733		
	Source B 16383		Dest C172B2
			1733
	+-----+		+-----+
	N7:38 - (2:315)		

Rung 2:317

	+ADD-----+
	+ADD-----+
	Source A TC172V1
	727
	Source B 1000
	Dest C172V1
	1727
	+-----+

Rung 2:318

```
| +GRT-----+  
|--GREATER THAN  
| |Source A   C172V1|  
| |           1727|  
| |Source B   16383|  
| |           1727|  
|-----+  
| N7:39 - (2:317)
```

```
+MOV-----+  
+MOVE  
|Source      16383|  
|           1727|  
|Dest        C172V1|  
|           1727|  
+-----+
```

Rung 2:319

```
|  
|-----+  
|  
|  
|  
|  
|  
|  
|  
|  
|  
|-----+
```

```
+ADD-----+  
+ADD  
|Source A   TC172V2|  
|           726|  
|Source B   1000|  
|           1726|  
|Dest       C172V2|  
|           1726|  
+-----+
```

Rung 2:320

```
| +GRT-----+  
|--GREATER THAN  
| |Source A   C172V2|  
| |           1726|  
| |Source B   16383|  
| |           1726|  
|-----+  
| N7:40 - (2:319)
```

```
+MOV-----+  
+MOVE  
|Source      16383|  
|           1726|  
|Dest       C172V2|  
|           1726|  
+-----+
```

Rung 2:321

```
|  
|-----+  
|  
|  
|  
|  
|  
|  
|  
|  
|  
|-----+
```

```
+ADD-----+  
+ADD  
|Source A   TC173B1|  
|           726|  
|Source B   1000|  
|           1726|  
|Dest       C173B1|  
|           1726|  
+-----+
```

Rung 2:322

```
| +GRT-----+  
|--GREATER THAN  
| |Source A   C173B1|  
| |           1726|  
| |Source B   16383|  
| |           1726|  
|-----+  
| N7:41 - (2:321)
```

```
+MOV-----+  
+MOVE  
|Source      16383|  
|           1726|  
|Dest       C173B1|  
|           1726|  
+-----+
```

This document was too large to scan as a whole document,
therefore it required breaking into smaller sections.

Document number: SD-FF-CSWD-061

Section 2 of 2

Title: Sodium Storage Facility Ladder
Logic Diagrams

Date: 6/12/97 Revision: A000

Originator: Jones DD
Co: BWNC

Recipient: _____
Co: _____

References: EDT-619594

Rung 2:323

	+ADD-----+
	+ADD-----+
	Source A TC173B2
	727
	Source B 1000
	Dest C173B2
	1727
	-----+

Rung 2:324

	+GRT-----+		+MOV-----+
	-GREATER THAN		+MOVE-----+
	Source A C173B2		Source 16383
	1727		
	Source B 16383		Dest C173B2
			1727
	-----+		-----+
	N7:42 - (2:323)		

Rung 2:325

	+ADD-----+
	+ADD-----+
	Source A TC173V1
	725
	Source B 1000
	Dest C173V1
	1725
	-----+

Rung 2:326

	+GRT-----+		+MOV-----+
	-GREATER THAN		+MOVE-----+
	Source A C173V1		Source 16383
	1725		
	Source B 16383		Dest C173V1
			1725
	-----+		-----+
	N7:43 - (2:325)		

Rung 2:327

	+ADD-----+
	+ADD-----+
	Source A TC173V2
	719
	Source B 1000
	Dest C173V2
	1719
	-----+

Rung 2:328

```
| +GRT-----+
| +GREATER THAN
| |Source A   C173V2|
| |           1719|
| |Source B   16383|
| +-----+
| N7:44 - (2:327)
```

```
+MOV-----+
+MOVE
|Source      16383|
|
|Dest        C173V2|
|           1719|
+-----+
```

Rung 2:329

```
|
|
|
|
|
|
|
```

```
+ADD-----+
+ADD
|Source A   TC174B1|
|           728|
|Source B   1000|
|
|Dest        C174B1|
|           1728|
+-----+
```

Rung 2:330

```
| +GRT-----+
| +GREATER THAN
| |Source A   C174B1|
| |           1728|
| |Source B   16383|
| +-----+
| N7:45 - (2:329)
```

```
+MOV-----+
+MOVE
|Source      16383|
|
|Dest        C174B1|
|           1728|
+-----+
```

Rung 2:331

```
|
|
|
|
|
|
|
```

```
+ADD-----+
+ADD
|Source A   TC174B2|
|           729|
|Source B   1000|
|
|Dest        C174B2|
|           1730|
+-----+
```

Rung 2:332

```
| +GRT-----+
| +GREATER THAN
| |Source A   C174B2|
| |           1730|
| |Source B   16383|
| +-----+
| N7:46 - (2:331)
```

```
+MOV-----+
+MOVE
|Source      16383|
|
|Dest        C174B2|
|           1730|
+-----+
```

Rung 2:333

	+ADD-----+
	+ADD-----+
	Source A TC174V1
	727
	Source B 1000
	Dest C174V1
	1727
	+-----+

Rung 2:334

	+GRT-----+
	+GREATER THAN-----+
	Source A C174V1
	1727
	Source B 16383
	+-----+
	+MOV-----+
	+MOVE-----+
	Source 16383
	Dest C174V1
	1727
	+-----+

N7:47 - (2:333)

Rung 2:335

	+ADD-----+
	+ADD-----+
	Source A TC174V2
	726
	Source B 1000
	Dest C174V2
	1726
	+-----+

Rung 2:336

	+GRT-----+
	+GREATER THAN-----+
	Source A C174V2
	1726
	Source B 16383
	+-----+
	+MOV-----+
	+MOVE-----+
	Source 16383
	Dest C174V2
	1726
	+-----+

N7:48 - (2:335)

Rung 2:337

** Alarms **

For each T/C read its STATUS BITS to detect T/C problems

T/C ENABLE

	I:9	HA163A
	J/[	N7:225
	75	() -
	OPEN T/C	8
	I:9	
	76	
	I:9	
	77	
	+++	

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```

+++
| | HI LIMIT |
| | I:9 |
| | +-----+ |
| | 78 |
| | CNFG ERROR |
| | I:9 |
| | +-----+ |
| | 79 |
|

```

Rung 2:338

```

| | T/C ENABLE |
| | I:9 | HA163B
| | J/[ | N7:225
| | 91 | ( )
| | OPEN T/C | 9
| | I:9 |
| | +-----+ |
| | 92 |
| | LO LIMIT |
| | I:9 |
| | +-----+ |
| | 93 |
| | HI LIMIT |
| | I:9 |
| | +-----+ |
| | 94 |
| | CNFG ERROR |
| | I:9 |
| | +-----+ |
| | 95 |
|

```

Rung 2:339

```

| | T/C ENABLE |
| | I:9 | HA164A
| | J/[ | N7:225
| | 107 | ( )
| | OPEN T/C | 10
| | I:9 |
| | +-----+ |
| | 108 |
| | LO LIMIT |
| | I:9 |
| | +-----+ |
| | 109 |
| | HI LIMIT |
| | I:9 |
| | +-----+ |
| | 110 |
|
+++

```

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```
+++
| | CNFG ERROR |
| | I:9 |
| +-----+ |
| | 111 |
```

Rung 2:340

```

| | T/C ENABLE
| |
| | I:9
| | 123
| | OPEN T/C
| | I:9
| | 124
| | LO LIMIT
| | I:9
| | 125
| | HI LIMIT
| | I:9
| | 126
| | CNFG ERROR
| | I:9
| | 127
```

HA164B
N7:225
11

Rung 2:341

```

| | T/C ENABLE
| |
| | I:10
| | 75
| | OPEN T/C
| | I:10
| | 76
| | LO LIMIT
| | I:10
| | 77
| | HI LIMIT
| | I:10
| | 78
| | CNFG ERROR
| | I:10
| | 79
```

HA170B1
N7:225
12

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Rung 2:342

```
|
|      T/C ENABLE
|      I:10
|      ]/[-----+-----+-----+-----+-----+-----+
|      91
|      | OPEN T/C
|      | I:10
|      +-----] [-----+
|      92
|      | LO LIMIT
|      | I:10
|      +-----] [-----+
|      93
|      | HI LIMIT
|      | I:10
|      +-----] [-----+
|      94
|      | CNFG ERROR
|      | I:10
|      +-----] [-----+
|      95
|
```

HA170B2
N7:225
13

Rung 2:343

```
|
|      T/C ENABLE
|      I:10
|      ]/[-----+-----+-----+-----+-----+-----+
|      107
|      | OPEN T/C
|      | I:10
|      +-----] [-----+
|      108
|      | LO LIMIT
|      | I:10
|      +-----] [-----+
|      109
|      | HI LIMIT
|      | I:10
|      +-----] [-----+
|      110
|      | CNFG ERROR
|      | I:10
|      +-----] [-----+
|      111
|
```

HA170V1
N7:225
14

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```
+++
| | OPEN T/C
| | I:11
| |-----] [-----+
| | 92
| | LO LIMIT
| | I:11
| |-----] [-----+
| | 93
| | HI LIMIT
| | I:11
| |-----] [-----+
| | 94
| | CNFG ERROR
| | I:11
| |-----] [-----+
| | 95
|
```

Rung 2:347

```

| | T/C ENABLE
| |
| | I:11
| |-----] [-----+
| | 107
| | OPEN T/C
| | I:11
| |-----] [-----+
| | 108
| | LO LIMIT
| | I:11
| |-----] [-----+
| | 109
| | HI LIMIT
| | I:11
| |-----] [-----+
| | 110
| | CNFG ERROR
| | I:11
| |-----] [-----+
| | 111
|
```

HA171V1
N7:226

2

Rung 2:348

```

| | T/C ENABLE
| |
| | I:11
| |-----] [-----+
| | 123
| | OPEN T/C
| | I:11
| |-----] [-----+
| | 124
|
```

HA171V2
N7:226

3


```
+++
| |
| | LO LIMIT |
| | I:11 |
| +-----+ |
| | 125 |
| | HI LIMIT |
| | I:11 |
| +-----+ |
| | 126 |
| | CNFG ERROR |
| | I:11 |
| +-----+ |
| | 127 |
| |
```

Rung 2:349

```
| |
| | T/C ENABLE |
| | I:12 |
| +-----+ |
| | 75 |
| | OPEN T/C |
| | I:12 |
| +-----+ |
| | 76 |
| | LO LIMIT |
| | I:12 |
| +-----+ |
| | 77 |
| | HI LIMIT |
| | I:12 |
| +-----+ |
| | 78 |
| | CNFG ERROR |
| | I:12 |
| +-----+ |
| | 79 |
| |
```

HA172B1
N7:226

4

Rung 2:350

```
| |
| | T/C ENABLE |
| | I:12 |
| +-----+ |
| | 91 |
| | OPEN T/C |
| | I:12 |
| +-----+ |
| | 92 |
| | LO LIMIT |
| | I:12 |
| +-----+ |
| | 93 |
| |
```

HA172B2
N7:226

5

```
+++
| HI LIMIT |
| I:12     |
| +-----+ |
| 94       |
| CNFG ERROR |
| I:12     |
| +-----+ |
| 95       |
|
```

Rung 2:351

```

| T/C ENABLE
|
| I:12
| +-----+ |
| 107       |
| OPEN T/C  |
| I:12     |
| +-----+ |
| 108       |
| LO LIMIT  |
| I:12     |
| +-----+ |
| 109       |
| HI LIMIT  |
| I:12     |
| +-----+ |
| 110       |
| CNFG ERROR |
| I:12     |
| +-----+ |
| 111       |
|
```

HA172V1
N7:226
()-----
6

Rung 2:352

```

| T/C ENABLE
|
| I:12
| +-----+ |
| 123       |
| OPEN T/C  |
| I:12     |
| +-----+ |
| 124       |
| LO LIMIT  |
| I:12     |
| +-----+ |
| 125       |
| HI LIMIT  |
| I:12     |
| +-----+ |
| 126       |
| CNFG ERROR |
| I:12     |
| +-----+ |
| 127       |
|
```

HA172V2
N7:226
()-----
.7

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Rung 2:353

```
|
|   T/C ENABLE
|
|   I:13
|   -] / [----- HA173B1
|   75 | N7:226
|   |   ( )-----
|   |   8
|   | OPEN T/C |
|   | I:13 |
|   | -] [-----
|   | 76 |
|   | LO LIMIT |
|   | I:13 |
|   | -] [-----
|   | 77 |
|   | HI LIMIT |
|   | I:13 |
|   | -] [-----
|   | 78 |
|   | CNFG ERROR |
|   | I:13 |
|   | -] [-----
|   | 79 |
```

Rung 2:354

```
|
|   T/C ENABLE
|
|   I:13
|   -] / [----- HA173B2
|   91 | N7:226
|   |   ( )-----
|   |   9
|   | OPEN T/C |
|   | I:13 |
|   | -] [-----
|   | 92 |
|   | LO LIMIT |
|   | I:13 |
|   | -] [-----
|   | 93 |
|   | HI LIMIT |
|   | I:13 |
|   | -] [-----
|   | 94 |
|   | CNFG ERROR |
|   | I:13 |
|   | -] [-----
|   | 95 |
```

Rung 2:355

```
|
|   T/C ENABLE
|
|   I:13
|   -] / [----- HA173V1
|   107 | N7:226
|   |   ( )-----
|   |   10
|
|   +++
|   +++
```

```

+++
| OPEN T/C
| I:13
| +-----] [-----+
| 108
| LO LIMIT
| I:13
| +-----] [-----+
| 109
| HI LIMIT
| I:13
| +-----] [-----+
| 110
| CNFG ERROR
| I:13
| +-----] [-----+
| 111
|

```

Rung 2:356

```

| T/C ENABLE
|
| I:13
| +-----] [-----+
| 123
| OPEN T/C
| I:13
| +-----] [-----+
| 124
| LO LIMIT
| I:13
| +-----] [-----+
| 125
| HI LIMIT
| I:13
| +-----] [-----+
| 126
| CNFG ERROR
| I:13
| +-----] [-----+
| 127
|

```

HA173V2
N7:226

11

Rung 2:357

```

| T/C ENABLE
|
| I:14
| +-----] [-----+
| 75
| OPEN T/C
| I:14
| +-----] [-----+
| 76
|
+++

```

HA174B1
N7:226

12

```
+++
|
| LO LIMIT
| I:14
| +-----] [-----+
| 77
| HI LIMIT
| I:14
| +-----] [-----+
| 78
|
| CNFG ERROR
| I:14
| +-----] [-----+
| 79
|
```

Rung 2:358

```

|
| T/C ENABLE
|
| I:14
| +-----] [-----+
| 91
| OPEN T/C
| I:14
| +-----] [-----+
| 92
| LO LIMIT
| I:14
| +-----] [-----+
| 93
| HI LIMIT
| I:14
| +-----] [-----+
| 94
| CNFG ERROR
| I:14
| +-----] [-----+
| 95
|
```

HA174B2
N7:226
()
13

Rung 2:359

```

|
| T/C ENABLE
|
| I:14
| +-----] [-----+
| 107
| OPEN T/C
| I:14
| +-----] [-----+
| 108
| LO LIMIT
| I:14
| +-----] [-----+
| 109
|
```

HA174V1
N7:226
()
14

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+++

```
+++
|
| HI LIMIT
| I:14
| +---] [---+
| 110
| CNFG ERROR
| I:14
| +---] [---+
| 111
|
```

Rung 2:360

```

|
| T/C ENABLE
|
| I:14
| +---] [---+
| 123
| OPEN T/C
| I:14
| +---] [---+
| 124
| LO LIMIT
| I:14
| +---] [---+
| 125
| HI LIMIT
| I:14
| +---] [---+
| 126
| CNFG ERROR
| I:14
| +---] [---+
| 127
|
```

HA174V2
N7:226

()
15

Rung 2:361

```
*****
| SET DEVIATION SWITCH FOR SECTION 2 AND JUMP TO SECTION 2 AVERAGING ROUTINE
|
| DEV_2
| N22:6
| +---] [---+
| (L)
|
| 2
| AV2
| 13
| +---] [---+
| (JMP)
|
```

Rung 2:362

```

| DEV2
|
| 9
| +---] [---+
| [LBL]
|
```

DUMMY9

N22:7

()
8

Rung 2:363

```
*****
ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION
```

```

+ADD-----+
+ADD-----+
|Source A      AV163|
|              1731|
|Source B DEVIATION|
|              1250|
|Dest          H163|
|              2981|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A      AV163|
|              1731|
|Source B DEVIATION|
|              1250|
|Dest          L163|
|              481|
+-----+

```

Rung 2:364

HA163A N7:225	+GRT+ +GREATER THAN	D163A N7:172
1/[	()	
8	Source A C163A	8
(2:337)	1737	
	Source B H163	
	2981	
	+-----+	
	N7:25 - (2:99)	
	N10:101 - (2:363)	
	+LES+ +LESS THAN	
	Source A C163A	
	1737	
	Source B L163	
	481	
	+-----+	
	N7:25 - (2:99)	
	N10:52 - (2:363)	

Rung 2:365

```

      HA163B                                     D163B
      N7:225                                     N7:172
|-----+GRT-----+-----+-----+-----+
| 1/(   | +GREATER THAN |-----+-----+-----+
|    9   | |Source A     | C163B| |-----+-----+
| (2:338)| |             | 1724| |          9
|         | |Source B     | H163|
|         | |             | 2981|
|         | +-----+
|         | N7:26 - (2:101)
|         | N10:101 - (2:363)
|         |
|         |+++

```

```

+++
|
| +LES-----+
| +-LESS THAN +-+
| |Source A      C163B|
| |              1724|
| |Source B      L163|
| |              481|
| +-----+
| N7:26 - (2:101)
| N10:52 - (2:363)
|

```

Rung 2:366

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|
|-----+ADD-----+
| +ADD
| |Source A      AV164|
| |              1727|
| |Source B DEVIATION|
| |              1250|
| |Dest          H164|
| |              2977|
| +-----+
| +SUB-----+
| +-SUBTRACT +-+
| |Source A      AV164|
| |              1727|
| |Source B DEVIATION|
| |              1250|
| |Dest          L164|
| |              477|
| +-----+
|

```

Rung 2:367

```

| HA164A
| N7:225
| 10
| (2:339)
|
|-----+GRT-----+
| |Source A      C164A|
| |              1727|
| |Source B      H164|
| |              2977|
| +-----+
| N7:27 - (2:103)
| N10:102 - (2:366)
| +LES-----+
| +-LESS THAN +-+
| |Source A      C164A|
| |              1727|
| |Source B      L164|
| |              477|
| +-----+
| N7:27 - (2:103)
| N10:53 - (2:366)
|

```

D164A
 N7:172
 10

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```

Rung 2:368
| HA164B                                     D164B
| N7:225                                     N7:172
|-----+GRT-----+-----+-----+
| 1/[-----+GREATER THAN-----+-----+
| 11 |Source A C164B|
| (2:340) | 1726|
| |Source B H164|
| | 2977|
|-----+-----+
| N7:28 - (2:105)
| N10:102 - (2:366)
| +LES-----+
| +LESS THAN-----+
| |Source A C164B|
| | 1726|
| |Source B L164|
| | 477|
|-----+-----+
| N7:28 - (2:105)
| N10:53 - (2:366)
    
```

Rung 2:369

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|-----+ADD-----+
| +ADD
| |Source A AV170B|
| | 1721|
| |Source B DEVIATION|
| | 1250|
| |Dest H170B|
| | 2971|
|-----+-----+
| +SUB-----+
| +SUBTRACT-----+
| |Source A AV170B|
| | 1721|
| |Source B DEVIATION|
| | 1250|
| |Dest L170B|
| | 471|
|-----+-----+
    
```

Rung 2:370

```

| HA170B1                                     D170B1
| N7:225                                     N7:172
|-----+GRT-----+-----+-----+
| 1/[-----+GREATER THAN-----+-----+
| 12 |Source A C170B1|
| (2:341) | 1719|
| |Source B H170B1|
| | 2971|
|-----+-----+
| N7:29 - (2:297)
| N10:103 - (2:369)
    
```

```

+++
|
| +LES-----+
| +-LESS THAN +-
| |Source A   C170B1|
| |          1719|
| |Source B   L170B1|
| |          471|
| +-----+
| N7:29 - (2:297)
| N10:54 - (2:369)

```

Rung 2:371

```

| HA170B2
| N7:225
| 1/[-----+GRT-----+
| 13 |GREATER THAN |
| (2:342) |Source A   C170B2|
|          1722|
|          |Source B   H170B1|
|          2971|
| +-----+
| N7:30 - (2:299)
| N10:103 - (2:369)
| +LES-----+
| +-LESS THAN +-
| |Source A   C170B2|
| |          1722|
| |Source B   L170B1|
| |          471|
| +-----+
| N7:30 - (2:299)
| N10:54 - (2:369)

```

D170B2
 N7:172

13

Rung 2:372

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|
| +ADD-----+
| +ADD
| |Source A   AV170V|
| |          1718|
| |Source B DEVIATION|
| |          1250|
| |Dest      H170V|
| |          2968|
| +-----+
| +SUB-----+
| +SUBTRACT
| |Source A   AV170V|
| |          1718|
| |Source B DEVIATION|
| |          1250|
| |Dest      L170V|
| |          468|
| +-----+

```

D170V1
N7:172
--()--
14

D170V2
N7:172
--()--
15

```

+-----+
+ADD-----+
|-----+
|Source A      AV171B|
|              1722|
|Source B DEVIATION|
|              1250|
|Dest          H171B|
|              2972|
|-----+
+-----+

```

```

+++
|
| +SUB-----+
|++SUBTRACT++
|Source A AV171B|
|1722|
|Source B DEVIATION|
|1250|
|Dest L171B|
|472|
+-----+

```

Rung 2:376

```

| HA171B1 D171B1
| N7:226 N7:173
|-----+-----+
|1/[ +GRT-----+
| |GREATER THAN
| |
| 0 |Source A C172B1|
| (2:345) |1732|
| |Source B H172B|
| |2983|
| |
| +-----+
| N7:37 - (2:313)
| N10:107 - (2:381)
| +LES-----+
|++LESS THAN++
| |Source A C172B1|
| |1732|
| |Source B L172B|
| |483|
| |
| +-----+
| N7:37 - (2:313)
| N10:58 - (2:381)
|

```

Rung 2:377

```

| HA171B2 D171B2
| N7:226 N7:173
|-----+-----+
|1/[ +GRT-----+
| |GREATER THAN
| |
| 1 |Source A C171B2|
| (2:346) |1725|
| |Source B H171B|
| |2972|
| |
| +-----+
| N7:34 - (2:307)
| N10:105 - (2:375)
| +LES-----+
|++LESS THAN++
| |Source A C171B2|
| |1725|
| |Source B L171B|
| |472|
| |
| +-----+
| N7:34 - (2:307)
| N10:56 - (2:375)
|

```

Runq 2:378

```
*****
ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION
```

+ADD-----+	
+ADD	
Source A	AV171V
	1721
Source B DEVIATION	
	1250
Dest	H171V
	2971
+-----+	
+SUB-----+	
+SUBTRACT	
Source A	AV171V
	1721
Source B DEVIATION	
	1250
Dest	L171V
	471
+-----+	

Rung 2:379

```

HA171V1                                     D171V1
N7:226                                     N7:173
-----] / [-----+GREATER THAN-----+----- ( ) -----
      2                                     2
(2:347) | |Source A      C171V1| |
        | |      1721| |
        | |Source B      H171V1| |
        | |      2971| |
        | |-----+-----+
        | |N7:35 - (2:309)| |
        | |N10:106 - (2:378)| |
        | |-----+-----+
        | |LESS THAN-----+-----+
        | |Source A      C171V1| |
        | |      1721| |
        | |Source B      L171V1| |
        | |      471| |
        | |-----+-----+
        | |N7:35 - (2:309)| |
        | |N10:57 - (2:378)| |

```

Rung 2:380

HA171V2 N7:226	+GRT-----+	D171V2 N7:173
3 (2:348)	+GREATER THAN Source A C171V2 1720 Source B H171V 2971 +-----+ N7:36 - (2:311) N10:106 - (2:378)	() 3

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```

+++
|
| +LES-----+
| +-LESS THAN +-+
| |Source A   C171V2|
| |           1720|
| |Source B   L171V|
| |           471|
| +-----+
| N7:36 - (2:311)
| N10:57 - (2:378)
|

```

Rung 2:381

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|
| -----+ADD-----+
| |ADD|
| |Source A   AV172B|
| |           1733|
| |Source B' DEVIATION|
| |           1250|
| |Dest       H172B|
| |           2983|
| +-----+
| +SUB-----+
| +-SUBTRACT +-+
| |Source A   AV172B|
| |           1733|
| |Source B DEVIATION|
| |           1250|
| |Dest       L172B|
| |           483|
| +-----+
|

```

Rung 2:382

```

| HA172B1
| N7:226
| 4
| (2:349)
|
| +GRT-----+
| |GREATER THAN|
| |Source A   C172B1|
| |           1732|
| |Source B   H172B|
| |           2983|
| +-----+
| |N7:37 - (2:313)|
| |N10:107 - (2:381)|
| +LES-----+
| +-LESS THAN +-+
| |Source A   C172B1|
| |           1732|
| |Source B   L172B|
| |           483|
| +-----+
| N7:37 - (2:313)
| N10:58 - (2:381)
|

```

D172B1
 N7:173

4

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```

Rung 2:383
| HA172B2
| N7:226
|-----+GRT-----+-----+-----+
| -1/[-----+GREATER THAN-----+-----+-----+
| 5 | |Source A C172B2| |
| (2:350) | | 1733| |
| | |Source B H172B| |
| | | 2983| |
| | +-----+
| | N7:38 - (2:315) |
| | N10:107 - (2:381) |
| | +LES-----+
| | +LESS THAN +--+
| | |Source A C172B2|
| | | 1733|
| | |Source B L172B|
| | | 483|
| | +-----+
| | N7:38 - (2:315)
| | N10:58 - (2:381)

```

Rung 2:384

ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|-----+ADD-----+-----+-----+
| | +ADD
| | |Source A AV172V|
| | | 1727|
| | |Source B DEVIATION|
| | | 1250|
| | |Dest H172V|
| | | 2977|
| | +-----+
| | +SUB-----+
| | +SUBTRACT +--+
| | |Source A AV172V|
| | | 1727|
| | |Source B DEVIATION|
| | | 1250|
| | |Dest L172V|
| | | 477|
| | +-----+

```

Rung 2:385

```

| HA172V1
| N7:226
|-----+GRT-----+-----+-----+
| -1/[-----+GREATER THAN-----+-----+-----+
| 6 | |Source A C172V1| |
| (2:351) | | 1727| |
| | |Source B H172V| |
| | | 2977| |
| | +-----+
| | N7:39 - (2:317)
| | N10:108 - (2:384)
|
|+++

```

```

+++
|
| +LES-----+
| +-LESS THAN +-+
| |Source A    C172V1|
| |           1727|
| |Source B    L172V|
| |           477|
| +-----+
| N7:39 - (2:317)
| N10:59 - (2:384)
|

```

Rung 2:386

```

| HA172V2                                     D172V2
| N7:226                                     N7:173
| -----+-----+-----+-----+-----+-----+
| 1/[      +GREATER THAN
| 7         |Source A    C172V2|
| (2:352)   |           1726|
|           |Source B    H172V|
|           |           2977|
| +-----+
| N7:40 - (2:319)
| N10:108 - (2:384)
| +LES-----+
| +-LESS THAN +-+
| |Source A    C172V2|
| |           1726|
| |Source B    L172V|
| |           477|
| +-----+
| N7:40 - (2:319)
| N10:59 - (2:384)
|

```

Rung 2:387

ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|
| +-----+
| +ADD-----+
| |Source A    AV173B|
| |           1727|
| |Source B DEVIATION|
| |           1250|
| |Dest        H173B|
| |           2977|
| +-----+
| +SUB-----+
| +-SUBTRACT +-+
| |Source A    AV173B|
| |           1727|
| |Source B DEVIATION|
| |           1250|
| |Dest        L173B|
| |           477|
| +-----+

```



```

Rung 2:388
| HA173B1 | D173B1
| N7:226 | N7:173
|-----|-----+-----+
| 1/[ | +GREATER THAN | ( )
| 8 | |Source A C173B1 | 8
| (2:353) | | 1726 |
| | |Source B H173B1 |
| | | 2977 |
|-----|-----+-----+
| | N7:41 - (2:321) |
| | N10:109 - (2:387) |
| | +LES-----+
| | +LESS THAN | |
| | |Source A C173B1 |
| | | 1726 |
| | |Source B L173B1 |
| | | 477 |
|-----|-----+-----+
| | N7:41 - (2:321) |
| | N10:60 - (2:387) |

```

```

Rung 2:389
| HA173B2 | D173B2
| N7:226 | N7:173
|-----|-----+-----+
| 1/[ | +GREATER THAN | ( )
| 9 | |Source A C173B2 | 9
| (2:354) | | 1727 |
| | |Source B H173B1 |
| | | 2977 |
|-----|-----+-----+
| | N7:42 - (2:323) |
| | N10:109 - (2:387) |
| | +LES-----+
| | +LESS THAN | |
| | |Source A C173B2 |
| | | 1727 |
| | |Source B L173B1 |
| | | 477 |
|-----|-----+-----+
| | N7:42 - (2:323) |
| | N10:60 - (2:387) |

```

Rung 2:390

ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|-----|-----+-----+
| | +ADD-----+
| | +ADD | |
| | |Source A AV173V |
| | | 1722 |
| | |Source B DEVIATION |
| | | 1250 |
| | |Dest H173V |
| | | 2972 |
|-----|-----+-----+
| | +-----+
| | +-----+

```

```
+++
|
| +SUB-----+
| +SUBTRACT +
| |Source A    AV173V|
| |           1722|
| |Source B DEVIATION|
| |           1250|
| |Dest       L173V|
| |           472|
|-----|
+++
```

Rung 2:391

```
| HA173V1                                     D173V1
| N7:226                                     N7:173
|-----|-----+-----+-----+-----+
| 1/[-----] +GREATER THAN +-----+
| 10          | |Source A    C173V1| |
| (2:355)      | |           1725| |
|              | |Source B    H173V| |
|              | |           2972| |
|              | +-----+
|              | N7:43 - (2:325)
|              | N10:110 - (2:390)
|              | +LES-----+
| +--LESS THAN +-----+
| |Source A    C173V1|
| |           1725|
| |Source B    L173V|
| |           472|
| +-----+
| N7:43 - (2:325)
| N10:61 - (2:390)
```

Rung 2:392

```
| HA173V2                                     D173V2
| N7:226                                     N7:173
|-----|-----+-----+-----+-----+
| 1/[-----] +GREATER THAN +-----+
| 11          | |Source A    C173V2| |
| (2:356)      | |           1719| |
|              | |Source B    H173V| |
|              | |           2972| |
|              | +-----+
|              | N7:44 - (2:327)
|              | N10:110 - (2:390)
|              | +LES-----+
| +--LESS THAN +-----+
| |Source A    C173V2|
| |           1719|
| |Source B    L173V|
| |           472|
| +-----+
| N7:44 - (2:327)
| N10:61 - (2:390)
```

Rung 2:393

```
*****
ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION
```

```

+ADD-----+
+ADD-----+
|Source A      AV174B|
|              1729|
|Source B DEVIATION|
|              1250|
|Dest          H174B|
|              2979|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A      AV174B|
|              1729|
|Source B DEVIATION|
|              1250|
|Dest          L174B|
|              479|
+-----+

```

Rung 2:394

```

HA174B1                                     D174B1
N7:226                                     N7:173
-----+GRT-----+
-1/[-+GREATER THAN-+------( )-----
12                                     12
(2:357) | |Source A      C174B1| |
        | |          1728| |
        | |Source B      H174B1| |
        | |          2979| |
        | |-----+-----+
        | |N7:45 - (2:329)| |
        | |N10:111 - (2:393)| |
        | |-----+-----+
+-----+LESS THAN-----+
|Source A      C174B1|
|          1728|
|Source B      L174B1|
|          4791|
+-----+
N7:45 ~ (2:329)
N10:62 - (2:393)

```

Rung 2:395

```

HA174B2                                     D174B2
N7:226                                     N7:173
-----+GRT-----+-----
-1/(-+GREATER THAN+-----(-)-----
13      |Source A      C174B2|      13
(2:358) |      1730|
        |Source B      H174B|
        |      2979|
        +-----+
        |N7:46 ~ (2:331)|
        |N10:111 ~ (2:393)|
        +-----+
***                                     ***

```

```

+++
|
| +LES-----+
| +-LESS THAN +-+
| |Source A    C174B2|
| |           1730|
| |Source B    L174B|
| |           479|
| +-----+
| N7:46 - (2:331)
| N10:62 - (2:393)
|

```

Rung 2:396

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|
| +ADD-----+
| +-ADD +-+
| |Source A    AV174V|
| |           1727|
| |Source B DEVIATION|
| |           1250|
| |Dest        H174V|
| |           2977|
| +-----+
| +SUB-----+
| +-SUBTRACT +-+
| |Source A    AV174V|
| |           1727|
| |Source B DEVIATION|
| |           1250|
| |Dest        L174V|
| |           477|
| +-----+

```

Rung 2:397

```

| HA174V1
| N7:226
|
| +GRT-----+
| +-GREATER THAN +-+
| |14
| |(2:359) |Source A    C174V1|
| |           1727|
| |Source B    H174V|
| |           2977|
| +-----+
| |N7:47 - (2:333)
| |N10:112 - (2:396)
| +LES-----+
| +-LESS THAN +-+
| |Source A    C174V1|
| |           1727|
| |Source B    L174B|
| |           479|
| +-----+
| N7:47 - (2:333)
| N10:62 - (2:393)
|

```

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```

Rung 2:401
*****
CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C
+CLR-----+
|CLEAR
|Dest          COUNT|
|                2|
+-----+
+CLR-----+
+CLEAR
|Dest          TOTAL|
|                3453.000|
+-----+

```

Rung 2:402			
HA163A	D163A	OUT163A	
N7:225	N7:172	N7:238	
1/[	1/[	1/[	+ADD-----+
8	8	4	+ADD
(2:337)	(2:364)		Source A 1
			Source B COUNT
			Dest COUNT
			2
			2
			+-----+
	DEV_2		+ADD-----+
	N22:6		+ADD
	1 [		Source A C163A
	2		1737
	(2:361)		Source B TOTAL
			3453.000
			Dest TOTAL
			3453.000
			+-----+

Rung 2:403			
HA163B	D163B	OUT163B	
N7:225	N7:172	N7:238	
1/[	1/[	1/[	+ADD-----+
9	9	5	+ADD
(2:338)	(2:365)		Source A 1
			Source B COUNT
			Dest COUNT
			2
			2
			+-----+
	DEV_2		+ADD-----+
	N22:6		+ADD
	1 [		Source A C163B
	2		1724
	(2:361)		Source B TOTAL
			3453.000
			Dest TOTAL
			3453.000
			+-----+

Rung 2:404			
			+DIV-----+
			+DIVIDE
			Source A TOTAL
			3453.000
			Source B COUNT
			2
			Dest AV163
			1731
			+-----+

Rung 2:405

CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

+CLR-----+	
+CLEAR	
Dest	COUNT
	2
+-----+	
+CLR-----+	
+CLEAR	
Dest	TOTAL
	3453.000
+-----+	

Rung 2:406

HA164A	D164A	OUT164A	
N7:225	N7:172	N7:238	
+ADD-----+		+ADD-----+	
+ADD		+ADD	
1/[	1/[	1/[	
10	10	6	Source A
(2:339)	(2:367)		1
			Source B
			COUNT
			2
			Dest
			COUNT
			2
			+-----+
			+ADD-----+
			+ADD
			Source A
			C164A
			1727
			Source B
			TOTAL
			3453.000
			Dest
			TOTAL
			3453.000
			+-----+

Rung 2:407

HA164B	D164B	OUT164B	
N7:225	N7:172	N7:238	
+ADD-----+		+ADD-----+	
+ADD		+ADD	
1/[	1/[	1/[	
11	11	7	Source A
(2:340)	(2:368)		1
			Source B
			COUNT
			2
			Dest
			COUNT
			2
			+-----+
			+ADD-----+
			+ADD
			Source A
			C164A
			1727
			Source B
			TOTAL
			3453.000
			Dest
			TOTAL
			3453.000
			+-----+

```

+++
|
|   DEV_2
|   N22:6
|-----|
|      2
|   (2:361)
|

```

```

+++
|
| +ADD-----+
| +ADD
| |Source A      C164B|
| |              1726|
| |Source B      TOTAL|
| |              3453.000|
| |Dest          TOTAL|
| |              3453.000|
|-----+

```

Rung 2:408

```

+DIV-----+
+DIVIDE
| |Source A      TOTAL|
| |              3453.000|
| |Source B      COUNT|
| |              2|
| |Dest          AV164|
| |              1727|
+-----+

```

Rung 2:409

CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

```

+CLR-----+
+CLEAR
| |Dest          COUNT|
| |              2|
|-----+
+CLR-----+
+CLEAR
| |Dest          TOTAL|
| |              3453.000|
+-----+

```

Rung 2:410

```

| HA170B1      D170B1      OUT170B1
| N7:225       N7:172     N7:238
|-----|-----|-----|
| 12          12          8
| (2:341)     (2:370)
|

```

```

+ADD-----+
+ADD
| |Source A      1|
| |              |
| |Source B      COUNT|
| |              2|
| |Dest          COUNT|
| |              2|
|-----+

```



```

      +---+
      | +CLR-----+ |
      | +CLEAR      + |
      | |Dest          TOTAL|
      | |              3453.000|
      | +-----+ |
      |
Rung 2:414
      | HA170V1      D170V1      OUT170V1
      | N7:225      N7:172      N7:238
      |-----|-----|-----|
      | 14          14          10
      | (2:343)    (2:373)
      |
      |              DEV_2
      |              N22:6
      |              +---+
      |              | 2
      |              | (2:361)
      |
      |              +ADD-----+
      |              |ADD      +---+
      |              |Source A      1|
      |              |Source B      COUNT|
      |              |Dest          COUNT|
      |              |              2|
      |              | +-----+ |
      |              |
      |              +ADD-----+
      |              |ADD      +---+
      |              |Source A      C170V1|
      |              |              1719|
      |              |Source B      TOTAL|
      |              |              3453.000|
      |              |Dest          TOTAL|
      |              |              3453.000|
      |              | +-----+ |
      |
  
```

```

Rung 2:415
      | HA170V2      D170V2      OUT170V2
      | N7:225      N7:172      N7:238
      |-----|-----|-----|
      | 15          15          11
      | (2:344)    (2:374)
      |
      |              DEV_2
      |              N22:6
      |              +---+
      |              | 2
      |              | (2:361)
      |
      |              +ADD-----+
      |              |ADD      +---+
      |              |Source A      1|
      |              |Source B      COUNT|
      |              |Dest          COUNT|
      |              |              2|
      |              | +-----+ |
      |              |
      |              +ADD-----+
      |              |ADD      +---+
      |              |Source A      C170V2|
      |              |              1717|
      |              |Source B      TOTAL|
      |              |              3453.000|
      |              |Dest          TOTAL|
      |              |              3453.000|
      |              | +-----+ |
  
```

```

+DIV-----+
-DIVIDE      +
|Source A      TOTAL|
|              3453.000|
|Source B      COUNT|
|              21|
|Dest          AV170V|
|              1718|
+-----+

```

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

```

+CLR-----+
+-+CLEAR+-+
|DestCOUNT|
|2|
|-----|
+CLR-----+
+-+CLEAR+-+
|DestTOTAL|
|3453.000|
|-----|

```

```

+ADD-----+
+ADD
|Source A          1|
|Source B          COUNT|
|Dest              COUNT|
|                  2|
|                  2|
+-----+

+ADD-----+
+ADD
|Source A          C171B1|
|                  1719|
|Source B          TOTAL|
|                  3453.000|
|Dest              TOTAL|
|                  3453.000|

```

Rung 2:419

```
| HA171B2      D171B2  OUT171B2
|   N7:226      N7:173   N7:238
|-----1/[-----1/[-----1/[-----
|           1           1           13
|   (2:346)      (2:377)
```

```
+ADD-----+
+ADD
|Source A      1|
|Source B      COUNT|
|Dest          COUNT|
|              2|
|              2|
+-----+
+ADD-----+
+ADD
|Source A      C171B2|
|              1725|
|Source B      TOTAL|
|              3453.000|
|Dest          TOTAL|
|              3453.000|
+-----+
```

Rung 2:420

```
+DIV-----+
+DIVIDE
|Source A      TOTAL|
|              3453.000|
|Source B      COUNT|
|              2|
|Dest          AV171B|
|              1722|
+-----+
```

Rung 2:421

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

```
+CLR-----+
+CLEAR
|Dest          COUNT|
|              2|
+-----+
+CLR-----+
+CLEAR
|Dest          TOTAL|
|              3453.000|
+-----+
```

```

Runng 2:422
HA171V1      D171V1      OUT171V1
N7:226      N7:173      N7:238
-]/[-----] / [-----] / [-----]
      2          2          14
(2:347)      (2:379)
      DEV_2
      N22:6
      ] [-----]
      2
      (2:361)

+ADD-----+
+ADD-----+
|Source A      |1|
|Source B      |COUNT|
|Dest          |COUNT|
|              |2|
+-----+
+ADD-----+
+ADD-----+
|Source A      |C171V1|
|              |1721|
|Source B      |TOTAL|
|              |3453.000|
|Dest          |TOTAL|
|              |3453.000|
+-----+

```

```

Rung 2:423
| HA171V2      D171V2      OUT171V2
| N7:226       N7:173      N7:238
+-----+-----+-----+-----+
| 1/[         | 1/[         | 1/[         | +ADD-----+
|   3          |   3          |   15         | +ADD-----+
| (2:348)      | (2:380)      |              | |Source A    | 1|
|              |              |              | |Source B    | COUNT|
|              |              |              | |Dest        | COUNT|
|              |              |              | |            | 2|
|              |              |              | +-----+
|              |              |              |
|              | DEV_1     |              | +ADD-----+
|              | N22:6    |              | +ADD-----+
|              | 1       |              | |Source A    | C171V2|
|              | (2:131)|              | |           1720|
|              |              |              | |Source B    | TOTAL|
|              |              |              | |           3453.000|
|              |              |              | |Dest        | TOTAL|
|              |              |              | |           3453.000|
|              |              |              | +-----+

```

```

Rung 2:424
+DIV-----+
+DIVIDE-----+
|Source A      TOTAL|
|              3453.000|
|Source B      COUNT|
|              21|
|Dest          AV171V|
|              1721|
+-----+

```

Rung 2:425

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

+CLR-----+	
Dest	COUNT
	2
+-----+	
+CLR-----+	
Dest	TOTAL
	3453.000
+-----+	

Rung 2:426

HA172B1 N7:226	D172B1 N7:173	OUT172B1 N7:239	+ADD-----+
1	1	1	+ADD
4	4	0	Source A
(2:349)	(2:382)		1
			Source B
			COUNT
			2
			Dest
			COUNT
			2
+-----+			+-----+
DEV_2			+ADD-----+
N22:6			+ADD
2			Source A
(2:361)			C172B1
			1732
			Source B
			TOTAL
			3453.000
			Dest
			TOTAL
			3453.000
			+-----+

Rung 2:427

HA172B2 N7:226	D172B2 N7:173	OUT172B2 N7:239	+ADD-----+
1	1	1	+ADD
5	5	1	Source A
(2:350)	(2:383)		1
			Source B
			COUNT
			2
			Dest
			COUNT
			2
+-----+			+-----+
+++			+++


```

+++
|
|      DEV_2
|      N22:6
|-----] [-----
|              2
|      (2:361)
|
|
|

```

```

+++
|
|+ADD-----+
|+ADD-----+
|Source A      C172V1|
|              1727|
|Source B      TOTAL|
|              3453.000|
|Dest          TOTAL|
|              3453.000|
|-----+

```

Rung 2:431

```

| HA172V2      D172V2      OUT172V2
| N7:226       N7:173      N7:239
|-----] [-----] [-----
|              7          7          3
|      (2:352)      (2:386)
|
|
|      DEV_2
|      N22:6
|-----] [-----
|              2
|      (2:361)
|
|
|

```

```

|+ADD-----+
|+ADD-----+
|Source A      1|
|Source B      COUNT|
|Dest          COUNT|
|              2|
|              2|
|-----+
|+ADD-----+
|+ADD-----+
|Source A      C172V2|
|              1726|
|Source B      TOTAL|
|              3453.000|
|Dest          TOTAL|
|              3453.000|
|-----+

```

Rung 2:432

```

|-----+
|+DIV-----+
|+DIVIDE-----+
|Source A      TOTAL|
|              3453.000|
|Source B      COUNT|
|              2|
|Dest          AV172V|
|              1727|
|-----+

```

Rung 2:433

CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
HAVE BEEN TAKEN OUT (TE_OUT***) THEN AVERAGE THE T/C

```

|-----+
|+CLR-----+
|+CLEAR-----+
|Dest          COUNT|
|              2|
|-----+
|
|
|

```


Rung 2:434			
HA173B1 N7:226	D173B1 N7:173	OUT173B1 N7:239	
8 (2:353)	8 (2:388)	4	
DEV_2 N22:6			
2 (2:361)			
			+ADD-----+ ADD Source A 1 Source B COUNT Dest COUNT 3453.000 +-----+
			+ADD-----+ ADD Source A C173B1 1726 Source B TOTAL 3453.000 Dest TOTAL 3453.000 +-----+

Rung 2:435			
HA173B2 N7:226	D173B2 N7:173	OUT173B2 N7:239	
9 (2:354)	9 (2:389)	5	
DEV_2 N22:6			
2 (2:361)			
			+ADD-----+ ADD Source A 1 Source B COUNT Dest COUNT 3453.000 +-----+
			+ADD-----+ ADD Source A C173B2 1727 Source B TOTAL 3453.000 Dest TOTAL 3453.000 +-----+

	+DIV-----+
	DIVIDE
	Source A TOTAL
	3453.000
	Source B COUNT
	2
	Dest AV173B
	1727

CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

	+CLR-----+
	+CLEAR-----+
	Dest COUNT
	2
	+CLR-----+
	+CLEAR-----+
	Dest TOTAL
	3453.000
	+-----+

HA173V1 N7:226	D173V1 N7:173	OUT173V1 N7:239	
-1/[	-1/[	-1/[	+ADD-----+
10	10	6	+ADD-----+
(2:355)	(2:391)		Source A 11
			Source B COUNT
			Dest COUNT
			21
			+-----+
	DEV_2		+ADD-----+
	N22:6		+ADD-----+
	2		Source A C173V1
	(2:361)		1725
			Source B TOTAL
			3453.000
			Dest TOTAL
			3453.000
			+-----+

Rung 2:442

HA174B1 N7:226	D174B1 N7:173	OUT174B1 N7:239	
12 (2:357)	12 (2:394)	8	+ADD-----+
			Source A 1
			Source B COUNT
			Dest COUNT
			2
			+-----+
	DEV_2 N22:6		+ADD-----+
	2 (2:361)		+ADD
			Source A C174B1
			1728
			Source B TOTAL
			3453.000
			Dest TOTAL
			3453.000
			+-----+

Rung 2:443

HA174B2 N7:226	D174B2 N7:173	OUT174B2 N7:239	
13 (2:358)	13 (2:395)	9	+ADD-----+
			Source A 1
			Source B COUNT
			Dest COUNT
			2
			+-----+
	DEV_2 N22:6		+ADD-----+
	2 (2:361)		+ADD
			Source A C174B2
			1730
			Source B TOTAL
			3453.000
			Dest TOTAL
			3453.000
			+-----+

Rung 2:444

			+DIV-----+
			+DIVIDE
			Source A TOTAL
			3453.000
			Source B COUNT
			2
			Dest AV174B1
			1729
			+-----+

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE OUTxxx) THEN AVERAGE THE T/C

CLR--	
*CLEAR	
Dest	COUNT
	2
CLR--	
*CLEAR	
Dest	TOTAL
	3453.000

HA174V1 N7:226	D174V1 N7:173	OUT174V1 N7:239	+ADD-----+
-]/[-	-]/[-	-]/[-	+ADD-----+
14	14	10	Source A 1
(2:359)	(2:397)		Source B COUNT
			2
			Dest COUNT
			2
			+-----+
	DEV_2		
	N22:6		+ADD-----+
	-]/[-		+ADD-----+
	2		Source A C174V1
	(2:361)		1727
			Source B TOTAL
			3453.000
			Dest TOTAL
			3453.000
			+-----+

HA174V2 N7:226	D174V2 N7:173	OUT174V2 N7:239	+ADD-----+
15 (2:360)	15 (2:398)	11	Source A 11
			Source B COUNT
			Dest COUNT
***	***	***	***

```

+++
|
|   DEV_2   |
|   N22:6   |
|-----| [-----|
|           | 2
|           | (2:361)
|
|
|

```

```

+++
|
|   +ADD-----+
|   +--ADD
|   |Source A   C174V2|
|   |           1726|
|   |Source B   TOTAL|
|   |           3453.000|
|   |Dest       TOTAL|
|   |           3453.000|
|-----+

```

Rung 2:448

```

|-----+
|   +DIV-----+
|   +--DIVIDE
|   |Source A   TOTAL|
|   |           3453.000|
|   |Source B   COUNT|
|   |           2|
|   |Dest       AV174V|
|   |           1727|
|-----+

```

Rung 2:449

```

*****
IF DEVIATION SET FOR SECTION 2 THEN GO THERE AND CALCULATE DEVIATION
|
|   DEV_2   |
|   N22:6   |
|-----| [-----|
|           | 9
|           | (JMP)
|           |
|   2
|   (2:361)

```

Rung 2:450

```

*****
IF RATE CALCULATIONS ARE FINISHED THEN GO TO THE PID BLOCK
|
|   RT_TMR/DN
|   T4:87
|-----| [-----|
|           | 26
|           | (JMP)
|           |
|   DN
|   (2:42)

```

Rung 2:451

RATE CHECKING

```

|-----+
|   +MOV-----+
|   +--MOVE
|   |Source     AV163|
|   |           1731|
|   |Dest       R1_163|
|   |           1730|
|-----+

```

+++

+++

```

+++
+-----+
+SUB-----+
+SUBTRACT   +
+Source A   R1_163|
+           1730|
+Source B   R2_163|
+           1730|
+Dest      DIF1_163|
+           -8|
+-----+
+MOV-----+
+MOVE       +
+Source     R1_163|
+           1730|
+Dest      R2_163|
+           1730|
+-----+
+SUB-----+
+SUBTRACT   +
+Source A   DIF1_163|
+           -8|
+Source B   DIF2_163|
+           1|
+Dest      DDIF1|
+           -1|
+-----+
+MOV-----+
+MOVE       +
+Source     DIF1_163|
+           -8|
+Dest      DIF2_163|
+           1|
+-----+
+SUB-----+
+SUBTRACT   +
+Source A   DIF1_163|
+           -8|
+Source B   9|
+Dest      DIF1_163|
+           -8|
+-----+
+MUL-----+
+MULTIPLY   +
+Source A   DIF1_163|
+           -8|
+Source B   DIF1_163|
+           -8|
+Dest      ACC|
+           -731|
+-----+
+++

```

```

+++
|
|  SCRATCH
|  N7:235
|  +-----+
|  +ADD-----+
|  +-----+
|  | 6
|  | (2:215)
|  |
|  |Source A      ACC|
|  |              -731|
|  |Source B      1|
|  |
|  |Dest          ACC|
|  |              -731|
|  +-----+
|
|  +ADD-----+
|  +ADD-----+
|  |Source A      ACC|
|  |              -731|
|  |Source B      ACC|
|  |              -730|
|  |Dest          ACC|
|  |              -730|
|  +-----+
|  +SUB-----+
|  +SUBTRACT-----+
|  |Source A      ACC|
|  |              -730|
|  |Source B      N13:101|
|  |              1|
|  |Dest          ACC|
|  |              -731|
|  +-----+
|
|  +GRT-----+
|  +GREATER THAN-----+
|  |Source A      ACC|
|  |              -731|
|  |Source B      100|
|  |              1|
|  +-----+
|
|  N22:0 - (2:215)
|  +LES-----+
|  +LESS THAN-----+
|  |Source A      ACC|
|  |              -731|
|  |Source B      1|
|  |              1|
|  +-----+
|
|  N22:0 - (2:215)
|  +LIM-----+
|  +LIMIT TEST-----+
|  |Low Lim      1|
|  |Test          ACC|
|  |              -731|
|  |High Lim     100|
|  +-----+
|
|  N22:0 - (2:215)
|
|  +MOV-----+
|  +MOVE-----+
|  |Source        100|
|  |Dest          N13:101|
|  |              1|
|  +-----+
|
|  +MOV-----+
|  +MOVE-----+
|  |Source        1|
|  |Dest          N13:101|
|  |              1|
|  +-----+
|
|  +MOV-----+
|  +MOVE-----+
|  |Source        ACC|
|  |Dest          N13:101|
|  |              1|
|  +-----+
|
|  +MOV-----+
|  +MOVE-----+
|  |Source        ACC|
|  |Dest          N13:101|
|  |              1|
|  +-----+
|
|  N22:0 - (2:215)
|

```

9

AND JUMP AROUND THE PID BLOCK

1.

--- (JMP) -----

Rung 2:455

➤ 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020

```

+++
|
| +SCL-----+
| +SCALE      +-----+
| |Source      CV163|
| |              0|
| |Rate [/10000] 15|
| |Offset       0|
| |Dest         PW163|
| |              0|
| +-----+
| +CLR-----+
| +CLEAR      +-----+
| |Dest       S:5|
| |              0|
| +-----+

```

Rung 2:457

```

| 66
| --[LBL]-----N7:229
|                                     ( )
|                                     14

```

Rung 2:458

```

|
| RT_TMR/DN
| T4:87
| --]/[-----PID164
|                                     27
|                                     (JMP)
| DN
| (2:42)

```

Rung 2:459

RATE CHECKING

```

|
| +MOV-----+
| +MOVE      +-----+
| |Source      AV164|
| |              1727|
| |Dest       R1_164|
| |              1727|
| +-----+
| +SUB-----+
| +SUBTRACT   +-----+
| |Source A     R1_164|
| |              1727|
| |Source B     R2_164|
| |              1727|
| |Dest       DIF1_164|
| |              -8|
| +-----+
| +MOV-----+
| +MOVE      +-----+
| |Source      R1_164|
| |              1727|
| |Dest       R2_164|
| |              1727|
| +-----+

```

```

***
+-----+
+SUB-----+
+SUBTRACT+
+Source A  DIF1_164|
+          -8|
+Source B  DIF2_164|
+          1|
+Dest      DDIF1|
+          -1|
+-----+
+MOV-----+
+MOVE-----+
+Source    DIF1_164|
+          -8|
+Dest      DIF2_164|
+          1|
+-----+
+SUB-----+
+SUBTRACT+
+Source A  DIF1_164|
+          -8|
+Source B          |
+          9|
+Dest      DIF1_164|
+          -8|
+-----+
+MUL-----+
+MULTIPLY+
+Source A  DIF1_164|
+          -8|
+Source B  DIF1_164|
+          -8|
+Dest      ACC|
+          -731|
+-----+
+MUL-----+
+MULTIPLY+
+Source A  ACC|
+          -731|
+Source B  DIF1_164|
+          -8|
+Dest      ACC|
+          -731|
+-----+
+CLR-----+
+CLEAR-----+
+Dest      S:5|
+          0|
+-----+
+MUL-----+
+MULTIPLY+
+Source A  DDIF1|
+          -1|
+Source B  DDIF1|
+          -1|
+Dest      ACC1|
+          -730|
+-----+
***

```

```

+++
+-----+
+MUL-----+
+MULTIPLY
|Source A      DDIF1|
|              -1|
|Source B      ACC1|
|              -730|
|Dest          ACC1|
|              -730|
+-----+
+CLR-----+
+CLEAR
|Dest          S:5|
|              0|
+-----+
SCRATCH
N7:235
+-----+
+EQU-----+
+EQUAL
|Source A      ACC| 6
|              -731|
|Source B      0|
+-----+
N22:0 - (2:215)
+EQU-----+
+SUB-----+
+SUBTRACT
|Source A      ACC| 6
|              -731|
|Source B      1|
|Source B      1|
+-----+
|Dest          ACC|
N22:0 - (2:215) |              -731|
+-----+
SCRATCH
N7:235
+-----+
+ADD-----+
+ADD
|Source A      ACC| 6
|              -731|
|Source B      1|
|Dest          ACC|
|              -731|
+-----+
+ADD-----+
+ADD
|Source A      ACC|
|              -731|
|Source B      ACC|
|              -730|
|Dest          ACC|
|              -730|
+-----+
+++

```

```

***
+-----+
+SUB-----+
+SUBTRACT
|Source A      ACC1|
|              -730|
|Source B      N13:131|
|              1|
|Dest          ACC|
|              -731|
+-----+
+GRT-----+ +MOV-----+
+GREATER THAN +MOVE
|Source A      ACC| |Source      100|
|              -731| |Dest      N13:131|
|Source B      100| |              1|
+-----+
N22:0 - (2:215)
+LES-----+ +MOV-----+
+LESS THAN +MOVE
|Source A      ACC| |Source      1|
|              -731| |Dest      N13:131|
|Source B      1| |              1|
+-----+
N22:0 - (2:215)
+LIM-----+ +MOV-----+
+LIMIT TEST +MOVE
|Low Lim      1| |Source      ACC|
|              -731| |Dest      N13:131|
|Test          ACC| |              1|
|              -731|
|High Lim     100|
+-----+
N22:0 - (2:215)
  
```

Rung 2:460
 PID164

27
 [LBL]

DUMMY27
 N22:8

10

Rung 2:461

DETECT FROM SCADA PID ON/OFF
 IF PID OFF
 THEN ZERO PW FOR ZERO OUTPUT AT SCR
 AND JUMP AROUND THE PID BLOCK

ON164
 N7:231
 1/[
 7
 (3:23)

```

+CLR-----+
+CLEAR
|Dest          PW164|
|              0|
+-----+
67
+--(JMP)-----+
  
```

Rung 2:462

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

	AM164	PID164/1
	N7:231	N13:120
	1/I	()
	6	1
	(2:279)	

Rung 2:463

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

	+MOV-----+
	+MOVE-----+
	Source SET164
	0
	Dest PIDSP164
	0
	+-----+

Rung 2:464

	+PID-----+
	+PID-----+
	Control Block PID164
	Process Variable AV164
	Control Variable CV164
	Control Block Length 23
	+-----+
	+SCL-----+
	+SCALE-----+
	Source CV164
	0
	Rate [/100000] 15
	0
	Offset 0
	0
	Dest PW164
	0
	+-----+
	+CLR-----+
	+CLEAR-----+
	Dest S:5
	0
	+-----+

Rung 2:465

	67	N7:229
	[LBL]	()
		15

Rung 2:466

		PID170B
	RT_TMR/DN	
	T4:87	28
	1/I	(JMP)
	DN	
	(2:42)	

Rung 2:467

RATE CHECKING

		MOV-----
		MOVE-----
		Source AV170B
		1721
		Dest R1_170B
		1720
		+-----+
		SUB-----
		SUBTRACT-----
		Source A R1_170B
		1720
		Source B R2_170B
		1720
		Dest DIF1_170B
		-9
		+-----+
		MOV-----
		MOVE-----
		Source R1_170B
		1720
		Dest R2_170B
		1720
		+-----+
		SUB-----
		SUBTRACT-----
		Source A DIF1_170B
		-9
		Source B DIF2_170B
		0
		Dest DDIF1
		-1
		+-----+
		MOV-----
		MOVE-----
		Source DIF1_170B
		-9
		Dest DIF2_170B
		0
		+-----+
		SUB-----
		SUBTRACT-----
		Source A DIF1_170B
		-9
		Source B 9
		1
		Dest DIF1_170B
		-9
		+-----+
		MUL-----
		MULTIPLY-----
		Source A DIF1_170B
		-9
		Source B DIF1_170B
		-9
		Dest ACC
		-731
		+-----+

+++

```

+++
SCRATCH
N7:235
+ADD-----+
+--] [-----+
6
(2:215)
|Source A      ACC|
|Source B      -731|
|Dest          ACC|
|              -731|
+-----+
+ADD-----+
+ADD-----+
|Source A      ACC|
|              -731|
|Source B      ACC|
|              -730|
|Dest          ACC|
|              -730|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A      ACC|
|              -730|
|Source B      N13:161|
|              1|
|Dest          ACC|
|              -731|
+-----+
+GRT-----+ +MOV-----+
+GREATER THAN +MOVE-----+
|Source A      ACC| |Source      100|
|              -731| |Dest          N13:161|
|Source B      100| |              1|
+-----+
N22:0 - (2:215)
+LES-----+ +MOV-----+
+LESS THAN +MOVE-----+
|Source A      ACC| |Source      1|
|              -731| |              1|
|Source B      1| |Dest          N13:161|
|              1| |              1|
+-----+
N22:0 - (2:215)
+LIM-----+ +MOV-----+
+LIMIT TEST +MOVE-----+
|Low Lim      1| |Source      ACC|
|              1| |              -731|
|Test          ACC| |Dest          N13:161|
|              -731| |              1|
|High Lim     100|
+-----+
N22:0 - (2:215)

```

Rung 2:468
 | PID170B
 |
 | 28
 |---[LBL]-----

DUMMY28
 N22:8
 ()
 11

Rung 2:469

DETECT FROM SCADA PID ON/OFF
 IF PID OFF
 THEN ZERO PW FOR ZERO OUTPUT AT SCR
 AND JUMP AROUND THE PID BLOCK

| ON170B
 | N7:231
 | J/[
 | 9
 | (3:23)
 |
 |
 |
 |

+CLR-----+
 | CLEAR
 | Dest PW170B |
 | | 0 |
 |-----+
 | 68
 +---(JMP)-----+

Rung 2:470

DETECT AUTO/MANUAL FROM SCADA
 SET APPROPRIATE MODE IN PID BLOCK

| AM170B
 | N7:231
 | J/[
 | 8
 | (3:23)
 |

PID170B/1
 N13:150
 ()
 1

Rung 2:471

DETECT SETPOINT VALUE FROM SCADA
 PUT VALUE IN PID BLOCK

|
 |
 |
 |
 |

+MOV-----+
 | MOVE
 | Source SET170B |
 | | 0 |
 | Dest PIDSP170B |
 | | 0 |
 +-----+

Rung 2:472

|
 |
 |
 |
 |

+PID-----+
 | PID
 | Control Block PID170B |
 | Process Variable AV170B |
 | Control Variable CV170B |
 | Control Block Length 23 |
 +-----+

+++

+++

```

+--+
|
| +SCL-----+
+--+SCALE-----+
|Source          CV170B|
|                01    |
|Rate [ /10000]  15|
|                01    |
|Offset          01    |
|                01    |
|Dest            PW170B|
|                01    |
+--+-----+
+CLR-----+
+--+CLEAR-----+
|Dest            S:5|
|                01    |
+--+-----+

```

Rung 2:473

1 68 N7:235
1--[LBL]-----{ }--
1 0

Rung 2:474

```

| PID170V
| RT_TMR/DN
| T4:87
|-----J/[----- (JMP)
| DN
| (2:42)

```

```

+++
|
|
|-----+SUB-----+
|SUBTRACT      +-+
|Source A DIF1_170V|
|          -9|
|Source B DIF2_170V|
|          0|
|Dest          DDIF1|
|          -1|
|-----+
|MOV-----+
|MOVE
|Source      DIF1_170V|
|          -9|
|Dest        DIF2_170V|
|          0|
|-----+
|SUB-----+
|SUBTRACT      +-+
|Source A DIF1_170V|
|          -9|
|Source B      9|
|          |
|Dest          DIF1_170V|
|          -9|
|-----+
|MUL-----+
|MULTIPLY      +-+
|Source A DIF1_170V|
|          -9|
|Source B DIF1_170V|
|          -9|
|Dest          ACC|
|          -731|
|-----+
|MUL-----+
|MULTIPLY      +-+
|Source A      ACC|
|          -731|
|Source B DIF1_170V|
|          -9|
|Dest          ACC|
|          -731|
|-----+
|CLR-----+
|CLEAR
|Dest          S:5|
|          0|
|-----+
|MUL-----+
|MULTIPLY      +-+
|Source A      DDIF1|
|          -1|
|Source B      DDIF1|
|          -1|
|Dest          ACC|
|          -730|
|-----+
|
|
+++

```

```

+++
+-----+
+MUL-----+
+MULTIPLY+
|Source A   DDIF1|
|           -1|
|Source B   ACC1|
|           -730|
|Dest       ACC1|
|           -730|
+-----+
+CLR-----+
+CLEAR+
|Dest       S:5|
|           0|
+-----+
SCRATCH
N7:235
+-----+
+EQU-----+
+EQUAL+
|Source A   ACC1|
|           -731|
|Source B   0|
|           |
+-----+
N22:0 - (2:215)
+-----+
+SUB-----+
+SUBTRACT+
|Source A   ACC1|
|           -731|
|Source B   1|
|           |
+-----+
|Dest       ACC1|
|           -731|
+-----+
N22:0 - (2:215)
+-----+
SCRATCH
N7:235
+-----+
] [-----+
+ADD+
|Source A   ACC1|
|           -731|
|Source B   1|
|           |
+-----+
|Dest       ACC1|
|           -731|
+-----+
+-----+
+ADD-----+
+ADD+
|Source A   ACC1|
|           -731|
|Source B   ACC1|
|           -730|
|Dest       ACC1|
|           -730|
+-----+
+-----+
+++

```

```

+++
|                                     +SUB-----+
|                                     +SUBTRACT    +
|                                     |Source A      ACC1|
|                                     |              -730|
|                                     |Source B      N13:191|
|                                     |              1|
|                                     |Dest          ACC|
|                                     |              -731|
|                                     +-----+
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE
| |Source A      ACC| |Source      100| |
| |              -731| |              |
| |Source B      100| |Dest        N13:191|
| |              |   | |              1|
| +-----+ +-----+
| N22:0 - (2:215)
| +LES-----+ +MOV-----+
| +LESS THAN    +MOVE
| |Source A      ACC| |Source      11| |
| |              -731| |              |
| |Source B      1|  |Dest        N13:191|
| |              |   | |              1|
| +-----+ +-----+
| N22:0 - (2:215)
| +LIM-----+ +MOV-----+
| +LIMIT TEST   +MOVE
| |Low Lim      1|  |Source      ACC| |
| |              |   | |              -731|
| |Test         ACC| |Dest        N13:191|
| |              -731| |              1|
| |High Lim     100| +-----+
| |              |
| +-----+
| N22:0 - (2:215)

```

Rung 2:476
PID170V

```

| 29
| [LBL]-----
|                                     DUMMY29
|                                     N22:8
|                                     ( )
|                                     12

```

Rung 2:477

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

```

| ON170V
| N7:231
| ]/[-----
| 11
| (3:23)
|                                     +CLR-----+
|                                     +CLEAR
| |Dest          PW170V|
| |              0|
| +-----+
| 69
| +---(JMP)-----+

```

Rung 2:478

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

	AM170V	PID170V/1
	N7:231	N13:180
	1/[	()
	10	1
	(3:23)	

Rung 2:479

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

		+MOV-----+
		+MOVE
	Source	SET170V
		0
	Dest	PIDSP170V
		0
		+-----+

Rung 2:480

		+PID-----+
		+PID
	Control Block	PID170V
	Process Variable	AV170V
	Control Variable	CV170V
	Control Block Length	23
		+-----+
		+SCALE-----+
	Source	CV170V
		0
	Rate [/10000]	15
	Offset	0
	Dest	PW170V
		0
		+-----+
		+CLR-----+
		+CLEAR
	Dest	S:5
		0
		+-----+

Rung 2:481

	69	N7:235
	--[LBL]	()
		1

Rung 2:482

		PID171B
	RT_TMR/DN	
	T4:87	30
	1/[	(JMP)
	DN	
	(2:42)	

Rung 2:483

RATE CHECKING

		+MCV-----+	
		+MOVE-----+	
		Source	AV171B
			1722
		Dest	R1_171B
			1722
		+-----+	
		+SUB-----+	
		+SUBTRACT-----+	
		Source A	R1_171B
			1722
		Source B	R2_171B
			1722
		Dest	DIF1_171B
			-9
		+-----+	
		+MOV-----+	
		+MOVE-----+	
		Source	R1_171B
			1722
		Dest	R2_171B
			1722
		+-----+	
		+SUB-----+	
		+SUBTRACT-----+	
		Source A	DIF1_171B
			-9
		Source B	DIF2_171B
			0
		Dest	DDIF1
			-1
		+-----+	
		+MOV-----+	
		+MOVE-----+	
		Source	DIF1_171B
			-9
		Dest	DIF2_171B
			0
		+-----+	
		+SUB-----+	
		+SUBTRACT-----+	
		Source A	DIF1_171B
			-9
		Source B	9
		Dest	DIF1_171B
			-9
		+-----+	
		+MUL-----+	
		+MULTIPLY-----+	
		Source A	DIF1_171B
			-9
		Source B	DIF1_171B
			-9
		Dest	ACC
			-731
		+-----+	
		+++	

```

+---+
|MUL-----|
+MULTIPLY--+
|Source A      ACC|
|              -731|
|Source B DIF1_171B|
|              -9|
|Dest          ACC|
|              -731|
+-----+
+CLR-----+
+CLEAR-----+
|Dest          S:S|
|              0|
+-----+
+MUL-----+
+MULTIPLY--+
|Source A      DDIF|
|              -1|
|Source B      DDIF|
|              -1|
|Dest          ACC|
|              -730|
+-----+
+MUL-----+
+MULTIPLY--+
|Source A      DDIF|
|              -1|
|Source B      ACC|
|              -730|
|Dest          ACC|
|              -730|
+-----+
+CLR-----+
+CLEAR-----+
|Dest          S:S|
|              0|
+-----+
SCRATCH
N7:235
+EQU-----+
+EQUAL-----+
|Source A      ACC|
|              -731|
|Source B      0|
+-----+
N22:0 - (2:215)
+EQU-----+
+SUB-----+
+EQUAL-----+SUBTRACT--+
|Source A      ACC|Source A      ACC| |
|              -731|              -731|
|Source B      1| |Source B      1|
+-----+
|Dest          ACC|
|              -731|
+-----+
N22:0 - (2:215)

```

```

+++
| SCRATCH
| N7:235
|-----+ADD-----+
| ] [-----+ADD-----+
| 6 |Source A ACC|
| (2:215) |Source B 1|
| |Dest ACC|
| | -731|
|-----+
| +ADD-----+
| +ADD-----+
| |Source A ACC|
| | -731|
| |Source B ACC|
| | -730|
| |Dest ACC|
| | -730|
|-----+
| +SUB-----+
| +SUBTRACT-----+
| |Source A ACC|
| | -730|
| |Source B N14:41|
| | 1|
| |Dest ACC|
| | -731|
|-----+
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE-----+
| |Source A ACC| |Source 100|
| | -731| | |
| |Source B 100| |Dest N14:11|
| | 1| | |
|-----+
| N22:0 - (2:215)
| +LES-----+ +MOV-----+
| +LESS THAN +MOVE-----+
| |Source A ACC| |Source 1|
| | -731| | |
| |Source B 1| |Dest N14:11|
| | 1| | |
|-----+
| N22:0 - (2:215)
| +LIM-----+ +MOV-----+
| +LIMIT TEST +MOVE-----+
| |Low Lim 1| |Source ACC|
| | | | -731|
| |Test ACC| |Dest N14:11|
| | -731| | 1|
| |High Lim 100| +-----+
|-----+
| N22:0 - (2:215)

```



```

+++
|
|+SCL-----+
|+SCALE-----+
| |Source      CV171B|
| |             01|
| |Rate [ /10000] 15|
| |Offset       01|
| |Dest         PW171B|
| |             01|
|+-----+
|+CLR-----+
|+CLEAR-----+
| |Dest         S:5|
| |             01|
|+-----+
  
```

Rung 2:489

```

| 70
|---[LBL]-----N7:235
|                                     ( )
|                                     2
  
```

Rung 2:490

```

| RT_TMR/DN
| T4:87
|---1/[
| DN
| (2:42)
|                                     PID171V
|                                     31
|                                     (JMP)
  
```

Rung 2:491

RATE CHECKING

```

|
|+MOV-----+
|+MOVE-----+
| |Source      AV171V|
| |             1721|
| |Dest        R1_171V|
| |             1721|
|+-----+
|+SUB-----+
|+SUBTRACT-----+
| |Source A     R1_171V|
| |             1721|
| |Source B     R2_171V|
| |             1721|
| |Dest        DIF1_171V|
| |             -81|
|+-----+
|+MOV-----+
|+MOVE-----+
| |Source      R1_171V|
| |             1721|
| |Dest        R2_171V|
| |             1721|
|+-----+
  
```

```

+++
+-----+
+SUB-----+
|SUBTRACT|
|Source A DIF1_171V|
|      -8|
|Source B DIF2_171V|
|      1|
|Dest     DDIF1|
|      -1|
+-----+
+MOV-----+
|MOVE|
|Source   DIF1_171V|
|      -8|
|Dest     DIF2_171V|
|      1|
+-----+
+SUB-----+
|SUBTRACT|
|Source A DIF1_171V|
|      -8|
|Source B      9|
|Dest     DIF1_171V|
|      -8|
+-----+
+MUL-----+
|MULTIPLY|
|Source A DIF1_171V|
|      -8|
|Source B DIF1_171V|
|      -8|
|Dest     ACC|
|      -731|
+-----+
+MUL-----+
|MULTIPLY|
|Source A      ACC|
|      -731|
|Source B DIF1_171V|
|      -8|
|Dest     ACC|
|      -731|
+-----+
+CLR-----+
|CLEAR|
|Dest     S:5|
|      0|
+-----+
+MUL-----+
|MULTIPLY|
|Source A      DDIF1|
|      -1|
|Source B      DDIF1|
|      -1|
|Dest     ACC1|
|      -730|
+-----+
+++

```



```

***
|
|                                     +SUB-----+
|                                     +SUBTRACT  +--+
|                                     |Source A    ACC1|
|                                     |          -730|
|                                     |Source B    N14:41|
|                                     |          1|
|                                     |Dest      ACC1|
|                                     |          -731|
|                                     +-----+
|
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE +--+
| |Source A    ACC1| |Source      100|
| |          -731| |          |
| |Source B    100| |Dest      N14:41|
| |          | |          1|
| +-----+ +-----+
| N22:0 - (2:215)
| +LES-----+ +MOV-----+
| +LESS THAN +MOVE +--+
| |Source A    ACC1| |Source      1|
| |          -731| |          |
| |Source B    1| |Dest      N14:41|
| |          | |          1|
| +-----+ +-----+
| N22:0 - (2:215)
| +LIM-----+ +MOV-----+
| +LIMIT TEST +MOVE +--+
| |Low Lim    1| |Source      ACC1|
| |          | |          -731|
| |Test      ACC1| |Dest      N14:41|
| |          -731| |          1|
| |High Lim   100| +-----+
| |          |
| +-----+
| N22:0 - (2:215)

```

Rung 2:492
 PID171V

31
 [LEBL]

DUMMY31
 N22:8
 ()
 14

Rung 2:493

DETECT FROM SCADA PID ON/OFF
 IF PID OFF
 THEN ZERO PW FOR ZERO OUTPUT AT SCR
 AND JUMP AROUND THE PID BLOCK

ON171V
 N7:231
 1/1
 15
 (3:23)

```

+CLR-----+
+CLEAR +--+
|Dest    PW171V|
|          0|
|
|
| 71
| +-(JMP)-----+

```


Rung 2:494

DETECT AUTO/MANUAL FROM SCADA
 SET APPROPRIATE MODE IN PID BLOCK

	AM171V	PID171V/1
	N7:231	N14:30
	14	()
	(3:23)	1

Rung 2:495

DETECT SETPOINT VALUE FROM SCADA
 PUT VALUE IN PID BLOCK

	+MOV-----+
	+MOVE
	Source SET171V
	Dest PIDSP171V
	+-----+

Rung 2:496

	+PID-----+
	+PID
	Control Block PID171V
	Process Variable AV171V
	Control Variable CV171V
	Control Block Length 23
	+-----+
	+SCL-----+
	+SCALE
	Source CV171V
	Rate [/10000] 15
	Offset 0
	Dest PW171V
	+-----+
	+CLR-----+
	+CLEAR
	Dest S:5
	+-----+

Rung 2:497

	71	N7:235
	[LBL]	()
		3

Rung 2:498

	RT_TMR/DN	PID172B
	T4:87	32
	1/[	(JMP)
	DN	
	(2:42)	

Rung 2:499

RATE CHECKING

		+MOV-----+
		+MOVE-----+
	Source	AV172B
		1733
	Dest	R1_172B
		1733
		+-----+
		+SUB-----+
		+SUBTRACT-----+
	Source A	R1_172B
		1733
	Source B	R2_172B
		1733
	Dest	DIF1_172B
		-8
		+-----+
		+MOV-----+
		+MOVE-----+
	Source	R1_172B
		1733
	Dest	R2_172B
		1733
		+-----+
		+SUB-----+
		+SUBTRACT-----+
	Source A	DIF1_172B
		-8
	Source B	DIF2_172B
		1
	Dest	DDIF1
		-1
		+-----+
		+MOV-----+
		+MOVE-----+
	Source	DIF1_172B
		-8
	Dest	DIF2_172B
		1
		+-----+
		+SUB-----+
		+SUBTRACT-----+
	Source A	DIF1_172B
		-8
	Source B	9
	Dest	DIF1_172B
		-8
		+-----+
		+MUL-----+
		+MULTIPLY-----+
	Source A	DIF1_172B
		-8
	Source B	DIF1_172B
		-8
	Dest	ACC
		-731
		+-----+

+++

N22:0 - (2:215)

```
Rung 2:500
| PID172B
|
| 32
|-----[LBL]-----
|
| DUMMY32
| N22:8
| ( )
| 15
```

Rung 2:501

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

```
| ON172B
| N7:231
|-----1/[-----+CLR-----+
| 1
| (3:23)
|
| Dest PW172B|
| 0|
|-----+-----+
| 72
|----- (JMP)-----+
```

Rung 2:502

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

```
| AM172B
| N7:232
|-----1/[-----PID172B/1
| 0
| (3:24)
|
| N14:60
| ( )
| 1
```

Rung 2:503

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

```
|
|-----+MOV-----+
|
|-----+MOVE-----+
| Source SET172B|
| 0|
| Dest PIDSP172B|
| 0|
|-----+-----+
```

Rung 2:504

```
|
|-----+PID-----+
|
|-----+PID-----+
| Control Block PID172B|
| Process Variable AV172B|
| Control Variable CV172B|
| Control Block Length 23|
|-----+-----+
|
|+++
```

```

+++
|
| +SCL-----+
| +SCALE-----+
| |Source      CV172B|
| |Rate [ /10000] 15|
| |Offset      0|
| |Dest        PW172B|
| |            0|
| +-----+
| +CLR-----+
| +CLEAR-----+
| |Dest        S:5|
| |            0|
| +-----+
  
```

Rung 2:505

```

| 72
| --[LBL]----- N7:235
|                                     ( )
|                                     4
  
```

Rung 2:506

```

| RT_TMR/DN PID172V
| T4:87
| ]/[----- 33
| DN (JMP)
| (2:42)
  
```

Rung 2:507

RATE CHECKING

```

|
| +MOV-----+
| |MOVE-----+
| |Source      AV172V|
| |            1727|
| |Dest        R1_172V|
| |            1727|
| +-----+
| +SUB-----+
| |SUBTRACT-----+
| |Source A     R1_172V|
| |            1727|
| |Source B     R2_172V|
| |            1727|
| |Dest        DIF1_172V|
| |            -8|
| +-----+
| +MOV-----+
| |MOVE-----+
| |Source      R1_172V|
| |            1727|
| |Dest        R2_172V|
| |            1727|
| +-----+
  
```

```

+++
|
|-----+SUB-----+
|SUBTRACT
|Source A DIF1_172V|
|      -8|
|Source B DIF2_172V|
|      1|
|Dest      DDIF1|
|      -1|
|-----+
|MOV-----+
|MOVE
|Source  DIF1_172V|
|      -8|
|Dest    DIF2_172V|
|      1|
|-----+
|SUB-----+
|SUBTRACT
|Source A DIF1_172V|
|      -8|
|Source B      9|
|      1|
|Dest    DIF1_172V|
|      -8|
|-----+
|MUL-----+
|MULTIPLY
|Source A DIF1_172V|
|      -8|
|Source B DIF1_172V|
|      -8|
|Dest      ACC|
|      -731|
|-----+
|MUL-----+
|MULTIPLY
|Source A      ACC|
|      -731|
|Source B DIF1_172V|
|      -8|
|Dest      ACC|
|      -731|
|-----+
|CLR-----+
|CLEAR
|Dest      S:5|
|      0|
|-----+
|MUL-----+
|MULTIPLY
|Source A      DDIF1|
|      -1|
|Source B      DDIF1|
|      -1|
|Dest      ACC|
|      -730|
|-----+
|
+++

```

```

***
+-----+
+MUL-----+
+MULTIPLY
+Source A      DDIF1
+              -1|
+Source B      ACC1|
+              -730|
+Dest          ACC1|
+              -730|
+-----+
+CLR-----+
+CLEAR
+Dest          S:5|
+              0|
+-----+
+SCRATCH
+N7:235
+-----+
+EQU-----+
+EQUAL
+Source A      ACC|
+              -731|
+Source B      0|
+-----+
+N22:0 - (2:215)
+-----+
+SUB-----+
+SUBTRACT
+Source A      ACC|
+              -731|
+Source B      1|
+Dest          ACC|
+              -731|
+-----+
+N22:0 - (2:215)
+-----+
+SCRATCH
+N7:235
+-----+
+] [-
+6
+(2:215)
+-----+
+ADD-----+
+ADD
+Source A      ACC|
+              -731|
+Source B      1|
+Dest          ACC|
+              -731|
+-----+
+ADD-----+
+ADD
+Source A      ACC|
+              -731|
+Source B      ACC1|
+              -730|
+Dest          ACC1|
+              -730|
+-----+
***

```



```

+++
|                                     +SUB-----+
|                                     +SUBTRACT
|                                     |Source A      ACC1|
|                                     |              -730|
|                                     |Source B      N14:101|
|                                     |              1|
|                                     |Dest          ACC1|
|                                     |              -731|
|                                     +-----+
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE
| |Source A      ACC1 |Source      100|
| |              -731|
| |Source B      100 |Dest        N14:101|
| |              1|
| +-----+
| N22:0 - (2:215)
| +LES-----+ +MOV-----+
| +LESS THAN +MOVE
| |Source A      ACC1 |Source      1| |
| |              -731|
| |Source B      1| |Dest        N14:101|
| |              1|
| +-----+
| N22:0 - (2:215)
| +LIM-----+ +MOV-----+
| +LIMIT TEST +MOVE
| |Low Lim      1| |Source      ACC1|
| |              1| |              -731|
| |Test          ACC1 |Dest        N14:101|
| |              -731|
| |High Lim     1001|
| |              1|
| +-----+
| N22:0 - (2:215)

```

Rung 2:508
PID172V

```

|                                     DUMMY33
|                                     N22:9
| 33
| ---[LBL]----- ( )
|                                     0

```

Rung 2:509

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

```

| ON172V
| N7:232
| /|-----+
| 3 +CLR-----+
| (3:24) +CLEAR
|                                     |Dest      PW172V|
|                                     |              01|
|                                     +-----+
|                                     |
|                                     | 73
|                                     +---(JMP)-----+

```

Rung 2:510

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

	AM172V	PID172V/1
	N7:232	N14:90
	1/[	()
	2	1
	(3:24)	

Rung 2:511

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

	+MOV-----+
	+MOVE-----+
	Source SET172V
	O
	Dest FIDSP172V
	O
	+-----+

Rung 2:512

	+PID-----+
	+PID-----+
	Control Block FID172V
	Process Variable AV172V
	Control Variable CV172V
	Control Block Length 23
	+-----+
	+SCL-----+
	+SCALE-----+
	Source CV172V
	O
	Rate [1/10000] 15
	O
	Offset O
	O
	Dest PW172V
	O
	+-----+
	+CLR-----+
	+CLEAR-----+
	Dest S:5
	O
	+-----+

Rung 2:513

	73	N7:235
	[LBL]	()
		5

Rung 2:514

	RT_TMR/DN	PID173B
	T4:87	34
	1/[	(JMP)
	DN	
	(2:42)	

Rung 2:515

RATE CHECKING

		+MOV-----+
		MOVE
		Source AV173B
		1727
		Dest R1_173B
		1727
		+-----+
		+SUB-----+
		SUBTRACT
		Source A R1_173B
		1727
		Source B R2_173B
		1727
		Dest DIF1_173B
		-9
		+-----+
		+MOV-----+
		MOVE
		Source R1_173B
		1727
		Dest R2_173B
		1727
		+-----+
		+SUB-----+
		SUBTRACT
		Source A DIF1_173B
		-9
		Source B DIF2_173B
		0
		Dest DDIF1
		-1
		+-----+
		+MOV-----+
		MOVE
		Source DIF1_173B
		-9
		Dest DIF2_173B
		0
		+-----+
		+SUB-----+
		SUBTRACT
		Source A DIF1_173B
		-9
		Source B 9
		-9
		Dest DIF1_173B
		-9
		+-----+
		+MUL-----+
		MULTIPLY
		Source A DIF1_173B
		-9
		Source B DIF1_173B
		-9
		Dest ACC
		-731
		+-----+
		+++

```

+++
+MUL-----+
+MULTIPLY+
|Source A    ACC|
|            -731|
|Source B DIF1_173B|
|            -9|
|Dest        ACC|
|            -731|
+-----+
+CLR-----+
+CLEAR+
|Dest        S:5|
|            0|
+-----+
+MUL-----+
+MULTIPLY+
|Source A    DDIF1|
|            -1|
|Source B    DDIF1|
|            -1|
|Dest        ACC1|
|            -730|
+-----+
+MUL-----+
+MULTIPLY+
|Source A    DDIF1|
|            -1|
|Source B    ACC1|
|            -730|
|Dest        ACC1|
|            -730|
+-----+
+CLR-----+
+CLEAR+
|Dest        S:5|
|            0|
+-----+
SCRATCH
+-----+
+MUL-----+
+MULTIPLY+
|Source A    ACC|
|            -731|
|Source B    0|
+-----+
N22:0 - (2:215)
+MUL-----+
+MULTIPLY+
|Source A    ACC|
|            -731|
|Source B    1|
|Dest        ACC|
|N22:0 - (2:215)|
+-----+
+SUB-----+
+SUBTRACT+
|Source A    ACC|
|            -731|
|Source B    1|
|Dest        ACC|
|N22:0 - (2:215)|
+-----+

```

```

+++
| SCRATCH                                     |
| N7:235                                     |
|-----] [-----+ADD-----+
|      6                                     |
| (2:215)                                   |
| Source A      ACC|
| Source B      1|
| Dest          ACC|
|               -731|
|-----+
|
| ADD-----+
| ADD-----+
| Source A      ACC|
|               -731|
| Source B      ACC|
|               -730|
| Dest          ACC|
|               -730|
|-----+
|
| SUB-----+
| SUBTRACT-----+
| Source A      ACC|
|               -730|
| Source B      N14:131|
|               1|
| Dest          ACC|
|               -731|
|-----+
|
| GRT-----+MOV-----+
| GREATER THAN +MOVE-----+
| Source A      ACC| Source      100|
|               -731|
| Source B      100| Dest        N14:131|
|               1|
|-----+
|
| N22:0 - (2:215)
|
| LES-----+MOV-----+
| LESS THAN +MOVE-----+
| Source A      ACC| Source      1|
|               -731|
| Source B      1| Dest        N14:131|
|               1|
|-----+
|
| N22:0 - (2:215)
|
| LIM-----+MOV-----+
| LIMIT TEST +MOVE-----+
| Low Lim      1| Source      ACC|
|               -731|
| Test          ACC| Dest        N14:131|
|               -731|
| High Lim      100|
|-----+
|
| N22:0 - (2:215)

```

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```

***
+---+
+SCALE-----+
|Source      CV173B|
|Rate [ /10000] 15|
|Offset      0|
|Dest        PW173B|
|              0|
+---+
+CLR-----+
+CLEAR-----+
|Dest        S:5|
|              0|
+---+
  
```

Rung 2:521

```

| 74
|---[LBL]----- ( )
|
| 7
  
```

Rung 2:522

```

| RT_TMR/DN
| T4:87
|---] / [----- (JMP)
| DN
| (2:42)
  
```

Rung 2:523

```

+---+
+MOV-----+
+MOVE-----+
|Source      AV173V|
|              1722|
|Dest        R1_173V|
|              1721|
+---+
+SUB-----+
+SUBTRACT---+
|Source A    R1_173V|
|              1721|
|Source B    R2_173V|
|              1721|
|Dest        DIF1_173V|
|              -10|
+---+
+MOV-----+
+MOVE-----+
|Source      R1_173V|
|              1721|
|Dest        R2_173V|
|              1721|
+---+
  
```

```

+++
+SUB-----+
|SUBTRACT|
|Source A DIF1_173V|
|   -10|
|Source B DIF2_173V|
|   -1|
|Dest      DDIF1|
|   -1|
+-----+
+MOV-----+
|MOVE|
|Source  DIF1_173V|
|   -10|
|Dest    DIF2_173V|
|   -1|
+-----+
+SUB-----+
|SUBTRACT|
|Source A DIF1_173V|
|   -10|
|Source B      9|
|Dest    DIF1_173V|
|   -10|
+-----+
+MUL-----+
|MULTIPLY|
|Source A DIF1_173V|
|   -10|
|Source B DIF1_173V|
|   -10|
|Dest      ACC|
|   -731|
+-----+
+MUL-----+
|MULTIPLY|
|Source A      ACC|
|   -731|
|Source B DIF1_173V|
|   -10|
|Dest      ACC|
|   -731|
+-----+
+CLR-----+
|CLEAR|
|Dest      S:5|
|          0|
+-----+
+MUL-----+
|MULTIPLY|
|Source A      DDIF1|
|   -1|
|Source B      DDIF1|
|   -1|
|Dest      ACC|
|   -730|
+-----+
+++

```



```

+++
+-----+
+MUL-----+
+MULTIPLY  +
|Source A   DDIF1|
|           -1|
|Source B   ACC1|
|           -730|
|Dest       ACC1|
|           -730|
+-----+
+CLR-----+
+CLEAR      +
|Dest       S:5|
|           0|
+-----+
SCRATCH
N7:235
+-----+
+EQU-----+
+EQUAL      +
|Source A   ACC| 6
|           -731|
|Source B   0|
|           |
+-----+
N22:0 - (2:215)
+-----+
+SUB-----+
+SUBTRACT   +
|Source A   ACC| |Source A   ACC|
|           -731| |           -731|
|Source B   1| |Source B   1|
|           |
+-----+
|Dest       ACC|
|           -731|
+-----+
N22:0 - (2:215)
+-----+
SCRATCH
N7:235
+-----+
+ADD-----+
+ADD        +
|Source A   ACC|
|           -731|
|Source B   1|
|           |
+-----+
|Dest       ACC|
|           -731|
+-----+
+-----+
+ADD-----+
+ADD        +
|Source A   ACC|
|           -731|
|Source B   ACC1|
|           -730|
|Dest       ACC1|
|           -730|
+-----+
+++

```

```

+++
|                                     +SUB-----+
|                                     +SUBTRACT
|                                     |Source A      ACC1|
|                                     |              -730|
|                                     |Source B      N14:161|
|                                     |              1|
|                                     |Dest          ACC1|
|                                     |              -731|
|                                     +-----+
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE
| |Source A      ACC1| |Source      100|
| |              -731| |              1|
| |Source B      100| |Dest        N14:161|
| |              1| |              1|
| +-----+
| N22:0 - (2:215)
| +LES-----+ +MOV-----+
| +LESS THAN +MOVE
| |Source A      ACC1| |Source      1|
| |              -731| |              1|
| |Source B      1| |Dest        N14:161|
| |              1| |              1|
| +-----+
| N22:0 - (2:215)
| +LIM-----+ +MOV-----+
| +LIMIT TEST +MOVE
| |Low Lim      1| |Source      ACC1|
| |              -731|
| |Test          ACC1| |Dest        N14:161|
| |              -731| |              1|
| |High Lim     100| +-----+
| +-----+
| N22:0 - (2:215)

```

Rung 2:524
 | PID173V

```

| 35
| ---[LBL]-----
|                                     DUMMY35
|                                     N22:9
|                                     ( )
|                                     ,2

```

Rung 2:525

DETECT FROM SCADA PID ON/OFF
 IF PID OFF
 THEN ZERO PW FOR ZERO OUTPUT AT SCR
 AND JUMP AROUND THE PID BLOCK

```

| ON173V
| N7:232
| 1/[-]-----+
| 7
| (3:24)
|                                     +CLR-----+
|                                     +CLEAR
|                                     |Dest        PW173V|
|                                     |              01|
|                                     +-----+
| 75
| +--(JMP)-----+

```

Rung 2:526

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

	AM173V	PID173V/1
	N7:232	N14:150
	1/[	()
	6	1
	(3:24)	

Rung 2:527

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

		+MOV-----+
		MOVE
	Source	SET173V
		0
	Dest	PIDSP173V
		0
		+-----+

Rung 2:528

		+PID-----+
		PID
	Control Block	PID173V
	Process Variable	AV173V
	Control Variable	CV173V
	Control Block Length	23
		+-----+
		+SCL-----+
		+SCALE-----+
	Source	CV173V
		0
	Rate [1/10000]	15
	Offset	0
	Dest	PW173V
		0
		+-----+
		+CLR-----+
		+CLEAR-----+
	Dest	S:5
		0
		+-----+

Rung 2:529

	75	N7:235
	[LBL]	()
		8

Rung 2:530

		PID174B
	RT_TMR/DN	
	T4:87	36
	1/[	(JMP)
	DN	
	(2:42)	

Rung 2:531

```

+-----+
+MOV-----+
+MOVE-----+
|Source      AV174B|
|              1729|
|Dest        R1_174B|
|              1728|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A    R1_174B|
|              1728|
|Source B    R2_174B|
|              1728|
|Dest        DIF1_174B|
|              -10|
+-----+
+MOV-----+
+MOVE-----+
|Source      R1_174B|
|              1728|
|Dest        R2_174B|
|              1728|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A    DIF1_174B|
|              -10|
|Source B    DIF2_174B|
|              -1|
|Dest        DDIF1|
|              -1|
+-----+
+MOV-----+
+MOVE-----+
|Source      DIF1_174B|
|              -10|
|Dest        DIF2_174B|
|              -1|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A    DIF1_174B|
|              -10|
|Source B      9|
|Dest        DIF1_174B|
|              -10|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A    DIF1_174B|
|              -10|
|Source B    DIF1_174B|
|              -10|
|Dest        ACC|
|              -731|
+-----+

```

+++

```

+++
SCRATCH
N7:235
+ADD-----+
+ADD-----+
6
(2:215)
Source A ACC
-731
Source B
1
Dest ACC
-731
+-----+
+ADD-----+
+ADD-----+
Source A ACC
-731
Source B ACC
-730
Dest ACC
-730
+-----+
+SUB-----+
+SUBTRACT-----+
Source A ACC
-730
Source B N14:101
1
Dest ACC
-731
+-----+
+GRT-----+
+MOV-----+
+GREATER THAN-----+
+MOVE-----+
Source A ACC Source 100
-731
Source B 100 Dest N14:191
1
+-----+
+LES-----+
+MOV-----+
N22:0 - (2:215)
+LESS THAN-----+
+MOVE-----+
Source A ACC Source 1
-731
Source B 1 Dest N14:191
1
+-----+
+LES-----+
+MOV-----+
N22:0 - (2:215)
+LIM-----+
+MOV-----+
+LIMIT TEST-----+
+MOVE-----+
Low Lim 1 Source ACC
-731
Test ACC Dest N14:191
-731
High Lim 100
+-----+
N22:0 - (2:215)

```

Rung 2:532

| PID174B

|

| 36

| [LBL]-----

|

DUMMY36

N22:9

()-----

3

Rung 2:533

DETECT FROM SCADA PID ON/OFF

IF PID OFF

THEN ZERO PW FOR ZERO OUTPUT AT SCR

AND JUMP AROUND THE PID BLOCK

| ON174B

| N7:232

| 1/1-----

| 9

| (3:24)

|

|

|

|

|

|

+CLR-----+

+CLEAR-----+

| Dest PW174B|

| 0|

+-----+

| 76

+--(JMP)-----+

Rung 2:534

DETECT AUTO/MANUAL FROM SCADA

SET APPROPRIATE MODE IN PID BLOCK

| AM174B

| N7:232

| 1/1-----

| 8

| (3:24)

|

PID174B/1

N14:180

()-----

1

Rung 2:535

DETECT SETPOINT VALUE FROM SCADA

PUT VALUE IN PID BLOCK

|

|

|

|

|

|

|

+MOV-----+

+MOVE-----+

| Source SET174B|

| 0|

| Dest PIDSP174B|

| 0|

+-----+

Rung 2:536

|

|

|

|

|

|

|

|

+PID-----+

+PID-----+

| Control Block PID174B|

| Process Variable AV174B|

| Control Variable CV174B|

| Control Block Length 23|

+-----+

+++

+++

```

+++
| +SCL-----+
| +SCALE
| |Source      CV174B|
| |Rate [1/100001 15|
| |Offset      0|
| |Dest        PW174B|
| |            0|
| +-----+
| +CLR-----+
| +CLEAR
| |Dest        S:5|
| |            0|
| +-----+
  
```

Rung 2:537

```

| 76
| --[LBL]----- ( )
|                                     9
  
```

Rung 2:538

```

| RT_TMR/DN
| T4:87
| --1/[----- (JMP)
| DN
| (2:42)
  
```

Rung 2:539

```

|
| DNR_2
| N22:5
| ----- (L)
|                                     6
  
```

Rung 2:540

RATE CHECKING

```

| +MOV-----+
| +MOVE
| |Source      AV174V|
| |           1727|
| |Dest        R1_174V|
| |           1727|
| +-----+
| +SUB-----+
| +SUBTRACT
| |Source A    R1_174V|
| |           1727|
| |Source B    R2_174V|
| |           1727|
| |Dest        DIF1_174V|
| |           -9|
| +-----+
  
```



```

+++
|
|
|-----+
|+MOV-----+
|+MOVE-----+
|Source      R1_174V|
|      1727|
|Dest        R2_174V|
|      1727|
|-----+
|+SUB-----+
|-----+
|+SUBTRACT-----+
|Source A DIF1_174V|
|      -9|
|Source B DIF2_174V|
|      0|
|Dest        DDIF1|
|      -1|
|-----+
|+MOV-----+
|-----+
|+MOVE-----+
|Source      DIF1_174V|
|      -9|
|Dest        DIF2_174V|
|      0|
|-----+
|+SUB-----+
|-----+
|+SUBTRACT-----+
|Source A DIF1_174V|
|      -9|
|Source B      9|
|Dest        DIF1_174V|
|      -9|
|-----+
|+MUL-----+
|-----+
|+MULTIPLY-----+
|Source A DIF1_174V|
|      -9|
|Source B DIF1_174V|
|      -9|
|Dest        ACC|
|      -731|
|-----+
|+MUL-----+
|-----+
|+MULTIPLY-----+
|Source A      ACC|
|      -731|
|Source B DIF1_174V|
|      -9|
|Dest        ACC|
|      -731|
|-----+
|+CLR-----+
|-----+
|+CLEAR-----+
|Dest        S:5|
|      0|
|-----+
|
|
+++

```

```

+++
+-----+
+MUL-----+
+MULTIPLY
|Source A      DDIF1|
|      -1|
|Source B      DDIF1|
|      -1|
|Dest          ACC1|
|      -730|
+-----+
+MUL-----+
+MULTIPLY
|Source A      DDIF1|
|      -1|
|Source B      ACC1|
|      -730|
|Dest          ACC1|
|      -730|
+-----+
+CLR-----+
+CLEAR
|Dest          S:5|
|              0|
+-----+
SCRATCH
N7:235
+-----+
+EQU-----+
+EQUAL
|Source A      ACC|      6
|      -731|
|Source B      0|
|              |
+-----+
N22:0 - (2:215)
+-----+
+SUB-----+
+SUBTRACT
|Source A      ACC|      -731|
|      -731|
|Source B      1|      1|
|              |
+-----+
|Dest          ACC|
|N22:0 - (2:215)|      -731|
+-----+
SCRATCH
N7:235
+-----+
+ADD-----+
+ADD
|      6|
|      (2:215)|
|Source A      ACC|      -731|
|Source B      1|
|Dest          ACC|
|              -731|
+-----+
+++

```

```

+++
+ADD-----+
+ADD
|Source A      ACC|
|              -731|
|Source B      ACC1|
|              -730|
|Dest          ACC1|
|              -730|
+-----+
+SUB-----+
+SUBTRACT
|Source A      ACC1|
|              -730|
|Source B      N15:11|
|              1|
|Dest          ACC|
|              -731|
+-----+
+GRT-----+ +MOV-----+
+GREATER THAN +MOVE
|Source A      ACC| |Source      100|
|              -731|
|Source B      100| |Dest       N15:11|
|              1|
+-----+
N22:0 - (2:215)
+LES-----+ +MOV-----+
+LESS THAN    +MOVE
|Source A      ACC| |Source      1|
|              -731|
|Source B      1| |Dest       N15:11|
|              1|
+-----+
N22:0 - (2:215)
+LIM-----+ +MOV-----+
+LIMIT TEST   +MOVE
|Low Lim      1| |Source      ACC|
|              -731|
|Test         ACC| |Dest       N15:11|
|              -731|
|High Lim     100|
+-----+
N22:0 - (2:215)

```

Rung 2:541
PID174V

37
[LBL]

DUMMY37

N22:9

4

Rung 2:542

DETECT FROM SCADA PID ON/OFF
 IF PID OFF
 THEN ZERO PW FOR ZERO OUTPUT AT SCR
 AND JUMP AROUND THE PID BLOCK

ON174V		+CLR-----+
N7:232		+CLEAR-----+
1/(		Dest PW174V
11		0
(3:24)		+-----+
		NOT END
		5
		+---(JMP)-----+

Rung 2:543

DETECT AUTO/MANUAL FROM SCADA
 SET APPROPRIATE MODE IN PID BLOCK

AM174V		PID174V/1
N7:232		N15:0
1/(		()
10		1
(3:24)		

Rung 2:544

DETECT SETPOINT VALUE FROM SCADA
 PUT VALUE IN PID BLOCK

		+MOV-----+
		+MOVE-----+
		Source SET174V
		0
		Dest PIDSP174V
		0
		+-----+

Rung 2:545

		+PID-----+
		+PID-----+
		Control Block PID174V
		Process Variable AV174V
		Control Variable CV174V
		Control Block Length 23
		+-----+
		+SCL-----+
		+SCALE-----+
		Source CV174V
		0
		Rate [1/10000] 15
		0
		Offset 0
		0
		Dest PW174V
		0
		+-----+
		+CLR-----+
		+CLEAR-----+
		Dest S:5
		0
		+-----+

Rung 2:546

NOT END

5

(JMP)

Rung 2:547

BEGIN SECTION 3

| MD3

DUMMY14

| 3

N22:7

| [LBL]

()

13

Rung 2:548

DN_3

N22:5

(L)

3

Rung 2:549

READ EACH THERMOCOUPLE AND STORE EACH TE'S VALUE IN ITS OWN MEMORY REGISTER

+ADD-----+

| ADD

| Source A TC175B1|

| 727|

| Source B 1000|

| Dest C175B1|

| 1727|

+-----+

Rung 2:550

| +GRT-----+

| +GREATER THAN

| Source A C175B1|

| 1727|

| Source B 16383|

| +-----+

+MOV-----+

| MOVE

| Source 16383|

| Dest C175B1|

| 1727|

+-----+

| N7:49 - (2:549)

Rung 2:551

+ADD-----+

| ADD

| Source A TC175B2|

| 728|

| Source B 1000|

| Dest C175B2|

| 1728|

+-----+

```

Rung 2:552
| +GRT-----+
| -+GREATER THAN
| |Source A   C175B2|
| |           1728|
| |Source B   16383|
| |           1728|
| +-----+
| N7:50 - (2:551)

```

```

+MOV-----+
+MOVE
|Source      16383|
|
|Dest        C175B2|
|           1728|
+-----+

```

Rung 2:553

```

|
|
|
|
|
|
|
|

```

```

+ADD-----+
+ADD
|Source A   TC175V1|
|           724|
|Source B   1000|
|
|Dest        C175V1|
|           1724|
+-----+

```

Rung 2:554

```

| +GRT-----+
| -+GREATER THAN
| |Source A   C175V1|
| |           1724|
| |Source B   16383|
| |           1724|
| +-----+
| N7:51 - (2:553)

```

```

+MOV-----+
+MOVE
|Source      16383|
|
|Dest        C175V1|
|           1724|
+-----+

```

Rung 2:555

```

|
|
|
|
|
|
|
|

```

```

+ADD-----+
+ADD
|Source A   TC175V2|
|           722|
|Source B   1000|
|
|Dest        C175V2|
|           1722|
+-----+

```

Rung 2:556

```

| +GRT-----+
| -+GREATER THAN
| |Source A   C175V2|
| |           1722|
| |Source B   16383|
| |           1722|
| +-----+
| N7:52 - (2:555)

```

```

+MOV-----+
+MOVE
|Source      16383|
|
|Dest        C175V2|
|           1722|
+-----+

```

Rung 2:557

+ADD-----+	
+ADD	
Source A	TC176B1
	711
Source B	1000
Dest	C176B1
	1711
+-----+	

Rung 2:558

+GRT-----+	
+GREATER THAN	
Source A	C176B1
	1711
Source B	16383
+-----+	

+MOV-----+	
+MOVE	
Source	16383
Dest	C176B1
	1711
+-----+	

N7:53 - (2:557)

Rung 2:559

+ADD-----+	
+ADD	
Source A	TC176B2
	713
Source B	1000
Dest	C176B2
	1713
+-----+	

Rung 2:560

+GRT-----+	
+GREATER THAN	
Source A	C176B2
	1713
Source B	16383
+-----+	

+MOV-----+	
+MOVE	
Source	16383
Dest	C176B2
	1713
+-----+	

N7:54 - (2:559)

Rung 2:561

+ADD-----+	
+ADD	
Source A	TC176V1
	711
Source B	1000
Dest	C176V1
	1711
+-----+	

Rung 2:562

```
| +GRT-----+  
| -+GREATER THAN  
| |Source A    C176V1|  
| |           1711|  
| |Source B    16383|  
| |  
| +-----+  
| N7:55 - (2:561)
```

```
+MOV-----+  
+MOVE  
+-----+  
|Source    16383|  
|  
|Dest      C176V1|  
|           1711|  
+-----+
```

Rung 2:563

```
|  
|  
|  
|  
|  
|  
|
```

```
+ADD-----+  
+ADD  
+-----+  
|Source A   TC176V2|  
|           711|  
|Source B   1000|  
|  
|Dest      C176V2|  
|           1711|  
+-----+
```

Rung 2:564

```
| +GRT-----+  
| -+GREATER THAN  
| |Source A    C176V2|  
| |           1711|  
| |Source B    16383|  
| |  
| +-----+  
| N7:56 - (2:563)
```

```
+MOV-----+  
+MOVE  
+-----+  
|Source      16383|  
|  
|Dest        C176V2|  
|           1711|  
+-----+
```

Rung 2:565

```
|  
|  
|  
|  
|  
|  
|
```

```
+ADD-----+  
+ADD  
+-----+  
|Source A   TC177B1|  
|           731|  
|Source B   1000|  
|  
|Dest      C177B1|  
|           1731|  
+-----+
```

Rung 2:566

```
| +GRT-----+  
| -+GREATER THAN  
| |Source A    C177B1|  
| |           1731|  
| |Source B    16383|  
| |  
| +-----+  
| N7:57 - (2:565)
```

```
+MOV-----+  
+MOVE  
+-----+  
|Source      16383|  
|  
|Dest        C177B1|  
|           1731|  
+-----+
```


Rung 2:567

	+ADD-----+
-----	+ADD-----+
	Source A TC177B2
	733
	Source B 1000
	1
	Dest C177B2
	1733

Rung 2:568

	+GRT-----+		+MOV-----+
	+GREATER THAN		+MOVE-----+
	Source A C177B2		Source 16383
	1733		1
	Source B 16383		Dest C177B2
	1		1733
	-----		-----
	N7:58 - (2:567)		

Rung 2:569

	+ADD-----+
-----	+ADD-----+
	Source A TC177V1
	731
	Source B 1000
	1
	Dest C177V1
	1731

Rung 2:570

	+GRT-----+		+MOV-----+
	+GREATER THAN		+MOVE-----+
	Source A C177V1		Source 16383
	1731		1
	Source B 16383		Dest C177V1
	1		1731
	-----		-----
	N7:59 - (2:569)		

Rung 2:571

	+ADD-----+
-----	+ADD-----+
	Source A TC177V2
	732
	Source B 1000
	1
	Dest C177V2
	1732

Rung 2:572

+GRT-----+	+MOV-----+
-+GREATER THAN +-----+	+MOVE-----+
Source A C177V2	Source 16383
1732	
Source B 16383	Dest C177V2
	1732
+-----+	+-----+
N7:60 - (2:571)	

Rung 2:573

	+ADD-----+
	+ADD-----+
	Source A TC178B1
	727
	Source B 1000
	Dest C178B1
	1727
	+-----+

Rung 2:574

+GRT-----+	+MOV-----+
-+GREATER THAN +-----+	+MOVE-----+
Source A C178B1	Source 16383
1727	
Source B 16383	Dest C178B1
	1727
+-----+	+-----+
N7:61 - (2:573)	

Rung 2:575

	+ADD-----+
	+ADD-----+
	Source A TC178B2
	729
	Source B 1000
	Dest C178B2
	1729
	+-----+

Rung 2:576

+GRT-----+	+MOV-----+
-+GREATER THAN +-----+	+MOVE-----+
Source A C178B2	Source 16383
1729	
Source B 16383	Dest C178B2
	1729
+-----+	+-----+
N7:62 - (2:575)	

Rung 2:577

	+ADD-----+
	+ADD-----+
	Source A TC178V1
	726
	Source B 1000
	Dest C178V1
	1726
	+-----+

Rung 2:578

	+GRT-----+		+MOV-----+
	+GREATER THAN		+MOVE-----+
	Source A C178V1		Source 16383
	1726		
	Source B 16383		Dest C178V1
			1726
	+-----+		+-----+
	N7:63 - (2:577)		

Rung 2:579

	+ADD-----+
	+ADD-----+
	Source A TC178V2
	726
	Source B 1000
	Dest C178V2
	1726
	+-----+

Rung 2:580

	+GRT-----+		+MOV-----+
	+GREATER THAN		+MOVE-----+
	Source A C178V2		Source 16383
	1726		
	Source B 16383		Dest C178V2
			1726
	+-----+		+-----+
	N7:64 - (2:579)		

Rung 2:581

	+ADD-----+
	+ADD-----+
	Source A TC179B1
	716
	Source B 1000
	Dest C179B1
	1716
	+-----+

Rung 2:582

```

+GRT-----+
+GREATER THAN
Source A C179B1
      1716
Source B 16383
+-----+
N7:65 - (2:581)
  
```

```

+MOV-----+
+MOVE-----+
Source 16383
Dest C179B1
      1716
+-----+
  
```

Rung 2:583

```

+ADD-----+
+ADD-----+
Source A TC179B2
      718
Source B 1000
Dest C179B2
      1718
+-----+
  
```

```

+ADD-----+
+ADD-----+
Source A TC179B2
      718
Source B 1000
Dest C179B2
      1718
+-----+
  
```

Rung 2:584

```

+GRT-----+
+GREATER THAN
Source A C179B2
      1718
Source B 16383
+-----+
N7:66 - (2:583)
  
```

```

+MOV-----+
+MOVE-----+
Source 16383
Dest C179B2
      1718
+-----+
  
```

Rung 2:585

** Alarms **

For each T/C read its STATUS BITS to detect T/C problems

T/C ENABLE

```

I:15
---] [---+
75
OPEN T/C
I:15
---] [---+
76
LO LIMIT
I:15
---] [---+
77
HI LIMIT
I:15
---] [---+
78
CNFG ERROR
I:15
---] [---+
79
  
```

HA175B1
 N7:227

0

T/C ENABLE

I:15

HA175V2
N7:227

1/[-]

OPEN T/C

I:15

124

LO LIMIT

I:15

125

HI LIMIT

I:15

126

CNFG ERROR

I:15

127

Rung 2:589

T/C ENABLE

I:16

HA176B1
N7:227

0/5--

75

OPEN T/C

I:16

76

LO LIMIT

I:16

77

HI LIMIT

I:16

78

CNFG ERROR

I:16

79

Rung 2:590

T/C ENABLE

I:16

HA176B2
 N7:227

```

+-----+
| 91 |
| OPEN T/C |
| I:16 |
+-----+
| 92 |
| LO LIMIT |
| I:16 |
+-----+
| 93 |
| HI LIMIT |
| I:16 |
+-----+
| 94 |
| CNFG ERROR |
| I:16 |
+-----+
| 95 |

```

5

Rung 2:591

T/C ENABLE

I:16

HA176V1
 N7:227

```

+-----+
| 107 |
| OPEN T/C |
| I:16 |
+-----+
| 108 |
| LO LIMIT |
| I:16 |
+-----+
| 109 |
| HI LIMIT |
| I:16 |
+-----+
| 110 |
| CNFG ERROR |
| I:16 |
+-----+
| 111 |

```

6

Rung 2:592

T/C ENABLE

```
|
|
|      I:16
|      -] / (-----
|      123
|      OPEN T/C
|      I:16
|      +-----] (-----
|      124
|      LO LIMIT
|      I:16
|      +-----] (-----
|      125
|      HI LIMIT
|      I:16
|      +-----] (-----
|      126
|      CNFG ERROR
|
|      I:16
|      +-----] (-----
|      127
|
```

HA176V2
N7:227

7

Rung 2:593

T/C ENABLE

```
|
|
|      I:17
|      -] / (-----
|      75
|      OPEN T/C
|      I:17
|      +-----] (-----
|      76
|      LO LIMIT
|      I:17
|      +-----] (-----
|      77
|      HI LIMIT
|      I:17
|      +-----] (-----
|      78
|      CNFG ERROR
|
|      I:17
|      +-----] (-----
|      79
|
```

HA177B1
N7:227

8

Rung 2:594

T/C ENABLE

```

      I:17
    ]/[-----+
    | 91 |
    | OPEN T/C |
    | I:17 |
    | +-----+
    | 92 |
    | LO LIMIT |
    | I:17 |
    | +-----+
    | 93 |
    | HI LIMIT |
    | I:17 |
    | +-----+
    | 94 |
    | CNFG ERROR |
    | I:17 |
    | +-----+
    | 95 |

```

HA177B2
N7:227

9

Rung 2:595

T/C ENABLE

```

      I:17
    ]/[-----+
    | 107 |
    | OPEN T/C |
    | I:17 |
    | +-----+
    | 108 |
    | LO LIMIT |
    | I:17 |
    | +-----+
    | 109 |
    | HI LIMIT |
    | I:17 |
    | +-----+
    | 110 |
    | CNFG ERROR |
    | I:17 |
    | +-----+
    | 111 |

```

HA177V1
N7:227

10

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Rung 2:596

T/C ENABLE

I:17	HA177V2
123	N7:227
OPEN T/C	11
I:17	
124	
LO LIMIT	
I:17	
125	
HIGH LIMIT	
I:17	
126	
CNFG ERROR	
I:17	
127	

Rung 2:597

T/C ENABLE

I:18	HA178B1
75	N7:227
OPEN T/C	12
I:18	
76	
LO LIMIT	
I:18	
77	
HI LIMIT	
I:18	
78	
CNFG ERROR	
I:18	
79	

Rung 2:598

```
|
|
|      T/C ENABLE
|
|      I:18
|      ]/[-----+-----+-----+-----+-----+-----+-----+-----+
|      91
|      OPEN T/C
|      I:18
|      ] [-----+-----+-----+-----+-----+-----+-----+-----+
|      92
|      LO LIMIT
|      I:18
|      ] [-----+-----+-----+-----+-----+-----+-----+-----+
|      93
|      HI LIMIT
|      I:18
|      ] [-----+-----+-----+-----+-----+-----+-----+-----+
|      94
|      CNFG ERROR
|
|      I:18
|      ] [-----+-----+-----+-----+-----+-----+-----+-----+
|      95
|
```

HA178B2

N7:227

13

Rung 2:599

```
|
|
|      T/C ENABLE
|
|      I:18
|      ]/[-----+-----+-----+-----+-----+-----+-----+-----+
|      107
|      OPEN T/C
|      I:18
|      ] [-----+-----+-----+-----+-----+-----+-----+-----+
|      108
|      LO LIMIT
|      I:18
|      ] [-----+-----+-----+-----+-----+-----+-----+-----+
|      109
|      HI LIMIT
|      I:18
|      ] [-----+-----+-----+-----+-----+-----+-----+-----+
|      110
|      CNFG ERROR
|
|      I:18
|      ] [-----+-----+-----+-----+-----+-----+-----+-----+
|      111
|
```

HA178V1

N7:227

14

Rung 2:600

T/C ENABLE

```
|
|
|      I:18
|      ]/[-----
|      123
|      OPEN T/C
|      I:18
|      +-----]
|      124
|      LO LIMIT
|      I:18
|      +-----]
|      125
|      HI LIMIT
|      I:18
|      +-----]
|      126
|      CNFG ERROR
|
|      I:18
|      +-----]
|      127
|
```

HA178V2
N7:227

15

Rung 2:601

T/C ENABLE

```
|
|
|      I:19
|      ]/[-----
|      75
|      OPEN T/C
|      I:19
|      +-----]
|      76
|      LO LIMIT
|      I:19
|      +-----]
|      77
|      HI LIMIT
|      I:19
|      +-----]
|      78
|      CNFG ERROR
|
|      I:19
|      +-----]
|      79
|
```

HA179B1
N7:228

0

Rung 2:602

T/C ENABLE

```

I:19
-----] [-----
91
| OPEN T/C |
| I:19 |
| +---] [---+
| 92 |
| LO LIMIT |
| I:19 |
| +---] [---+
| 93 |
| HI LIMIT |
| I:19 |
| +---] [---+
| 94 |
| CNFG ERROR |
| I:19 |
| +---] [---+
| 95 |
  
```

HA179B2
 N7:228

Rung 2:603

```

DEV_3
N22:6
-----] [-----
| (L) |
| 3 |
| 14 |
| +---(JMP)---+
  
```

Rung 2:604

```

DEV3
10
-----[LBL]-----
DUMMY11
N22:7
( )
10
  
```

Rung 2:605

```

*****
ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION
|
| +ADD-----+
| +ADD-----+
| |Source A AV175B| |
| | 1728| |
| |Source B DEVIATION| |
| | 1250| |
| |Dest H175B| |
| | 2978| |
| +-----+
|
| +---+
|
  
```

```

+++
|
| *SUB-----+
|
| *SUBTRACT
| Source A AV175B|
| 1728|
| Source B DEVIATION|
| 1250|
| Dest L175B|
| 478|
|-----+
  
```

Rung 2:606

```

| HA175B1
| N7:227
|-----+GRT-----+
| 1/[-----+GREATER THAN-----+
| 0 | Source A C175B1|
| (2:585) | 1727|
| | Source B H175B|
| | 2978|
| |-----+
| N7:49 - (2:549)
| N10:113 - (2:605)
| +LES-----+
| +LESS THAN-----+
| | Source A C175B1|
| | 1727|
| | Source B L175B|
| | 478|
| |-----+
| N7:49 - (2:549)
| N10:64 - (2:605)
  
```

Rung 2:607

```

| HA175B2
| N7:227
|-----+GRT-----+
| 1/[-----+GREATER THAN-----+
| 1 | Source A C175B2|
| (2:586) | 1728|
| | Source B H175B|
| | 2978|
| |-----+
| N7:50 - (2:551)
| N10:113 - (2:605)
| +LES-----+
| +LESS THAN-----+
| | Source A C175B2|
| | 1728|
| | Source B L175B|
| | 478|
| |-----+
| N7:50 - (2:551)
| N10:64 - (2:605)
  
```

Rung 2:608

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

		+ADD-----+
		Source A AV175V
		1723
		Source B DEVIATION
		1250
		Dest H175V
		2973
		+-----+
		+SUB-----+
		+SUBTRACT-----+
		Source A AV175V
		1723
		Source B DEVIATION
		1250
		Dest L175V
		473
		+-----+

Rung 2:609

	HA175V1		D175V1
	N7:227	+GRT-----+	N7:174
		GREATER THAN	()
	2	Source A C175V1	2
	(2:587)	1724	
		Source B H175V	
		2973	
		+-----+	
		N7:51 - (2:553)	
		N10:114 - (2:608)	
		+LES-----+	
		LESS THAN	
		Source A C175V1	
		1724	
		Source B L175V	
		473	
		+-----+	
		N7:51 - (2:553)	
		N10:65 - (2:608)	

Rung 2:610

	HA175V2		D175V2
	N7:227	+GRT-----+	N7:174
		GREATER THAN	()
	3	Source A C175V2	3
	(2:588)	1722	
		Source B H175V	
		2973	
		+-----+	
		N7:52 - (2:555)	
		N10:114 - (2:608)	

+++

+++

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Rung 2:614

+ADD-----+	
+ADD-----+	
	Source A AV176V
	1711
	Source B DEVIATION
	1250
	Dest H176V
	2961
+SUB-----+	
+SUBTRACT-----+	
	Source A AV176V
	1711
	Source B DEVIATION
	1250
	Dest L176V
	461
+SUB-----+	

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```

+++
|
| +LES-----+
| +-LESS THAN +-+
| |Source A    C176V1|
| |           1711|
| |Source B    L176V|
| |           461|
| +-----+
| N7:55 - (2:561)
| N10:67 - (2:614)

```

Rung 2:616
 HA176V2
 N7:227

D176V2
 N7:174

```

|-----+-----+
| 1/|-----+ GREATER THAN -----+
| 7 | |Source A    C176V2| |
| (2:592) | |           1711| |
| | |Source B    H176V| |
| | |           2961| |
| | +-----+
| | N7:56 - (2:563)
| | N10:116 - (2:614)
| | +LES-----+
| | +-LESS THAN +-+
| | |Source A    C176V2|
| | |           1711|
| | |Source B    L176V|
| | |           461|
| | +-----+
| | N7:56 - (2:563)
| | N10:67 - (2:614)

```

Rung 2:617

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|-----+-----+
| +ADD-----+
| +ADD -----+
| |Source A    AV177B| |
| |           1732| |
| |Source B DEVIATION| |
| |           1250| |
| |Dest        H177B| |
| |           2982| |
| | +-----+
| | +SUB-----+
| | +SUBTRACT -----+
| |Source A    AV177B|
| |           1732|
| |Source B DEVIATION|
| |           1250|
| |Dest        L177B|
| |           482|
| +-----+

```

```

HA177B1
N7:227          *GRT-----+
---] / (-----+GREATER THAN-----+
      8          |Source A      C177B1|
(2:593)          |      1731|
      |          |Source B      H177B|
      |          |      2982|
      |          +-----+
      |N7:57 - (2:565)
      |N10:117 - (2:617)
      |LES-----+
      +LESS THAN-----+
      |Source A      C177B1|
      |      1731|
      |Source B      L177B|
      |      482|
      +-----+
      |N7:57 - (2:565)
      |N10:68 - (2:617)

```

N7:174

```

      HA177B2
      N7:227      +GRT-----+
      -/[------+GREATER THAN +-----+
      9           |Source A      C177B2|
      (2:594)     |           1733|
      |           |Source B      H177B|
      |           |           2982|
      |           +-----+
      |N7:58 - (2:567)
      |N10:117 - (2:617)
      |LES-----+
      +LESS THAN +-----+
      |Source A      C177B2|
      |           1733|
      |Source B      L177B|
      |           482|
      +-----+
      N7:58 - (2:567)
      N10:68 - (2:617)

```

N7:174

ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```
+ADD-----+
-+-+ADD-+-+
| |Source A      AV177V| |
| |              1732| |
| |Source B DEVIATION| |
| |              1250| |
| |Dest          H177V| |
| |              2982| |
| +-----+ |
+++                +++
```

```

+++
|
| +SUB-----+
|+SUBTRACT
|Source A    AV177V|
|              1732|
|Source B DEVIATION|
|              1250|
|Dest        L177V|
|              482|
|-----+
  
```

Rung 2:621

```

| HA177V1
| N7:227
|-----+GRT-----+
| 1/[-----+GREATER THAN-----+
| 10 |Source A    C177V1|
| (2:595) |          1731|
|         |Source B    H177V|
|         |          2982|
|         +-----+
|         N7:59 - (2:569)
|         N10:118 - (2:620)
|         +LES-----+
|         +LESS THAN-----+
|         |Source A    C177V1|
|         |          1731|
|         |Source B    L177V|
|         |          482|
|         +-----+
|         N7:59 - (2:569)
|         N10:69 - (2:620)
  
```

Rung 2:622

```

| HA177V2
| N7:227
|-----+GRT-----+
| 1/[-----+GREATER THAN-----+
| 11 |Source A    C177V2|
| (2:596) |          1732|
|         |Source B    H177V|
|         |          2982|
|         +-----+
|         N7:60 - (2:571)
|         N10:118 - (2:620)
|         +LES-----+
|         +LESS THAN-----+
|         |Source A    C177V2|
|         |          1732|
|         |Source B    L177V|
|         |          482|
|         +-----+
|         N7:60 - (2:571)
|         N10:69 - (2:620)
  
```

```
*****
ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION
```

```

+ADD-----+
+ADD
|Source A      AV178B|
|              1728|
|Source B DEVIATION|
|              1250|
|Dest          H178B|
|              2978|
+-----+
+SUB-----+
+SUBTRACT
|Source A      AV178B|
|              1728|
|Source B DEVIATION|
|              1250|
|Dest          L178B|
|              478|
+-----+

```

```

HA178B1                                DI78B1
N7:227                                N7:174
+-----+-----+
-1/[-----+GREATER THAN-----+-----+
|12| |Source A| C178B1| |12|
|(2:597)| |1727| |
| |Source B| H178B1| |
| |2978| |
+-----+-----+
|N7:61 - (2:573)|
|N10:119 - (2:623)|
|+LES-----+-----+
+-----+LESS THAN-----+-----+
|Source A| C178B1|
| |1727|
|Source B| L178B1|
| |478|
+-----+-----+
|N7:61 - (2:573)|
|N10:70 - (2:623)|

```

HA178B2		D178B2
N7:227	+GRT-----+	N7:174
-1/(-	+GREATER THAN +	-()-
13	Source A C178B2	13
(2:598)	1729	
	Source B H178B	
	2978	
	+-----+	
	N7:62 - (2:575)	
	N10:119 - (2:623)	
***	***	

```

+++
|
| +LES-----+
| +-LESS THAN +-+
| |Source A   C178B2|
| |           1729|
| |Source B   L178B|
| |           478|
| +-----+
|
| N7:62 - (2:575)
| N10:70 - (2:623)
|

```

Rung 2:626

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|
| +-----+ +ADD-----+
| | | | |
| | |Source A   AV178V|
| | |           1726|
| | |Source B DEVIATION|
| | |           1250|
| | |Dest       H178V|
| | |           2976|
| | +-----+
| | +SUB-----+
| | +SUBTRACT.
| | |Source A   AV178V|
| | |           1726|
| | |Source B DEVIATION|
| | |           1250|
| | |Dest       L178V|
| | |           476|
| | +-----+
|

```

Rung 2:627

```

| HA178V1
| N7:227
| 14
| (2:599)
|
| +-----+ +GRT-----+
| | | | |
| | |Source A   C178V1|
| | |           1726|
| | |Source B   H178V|
| | |           2976|
| | +-----+
| | N7:63 - (2:577)
| | N10:120 - (2:626)
| | +LES-----+
| | +-LESS THAN +-+
| | |Source A   C178V1|
| | |           1726|
| | |Source B   L178V|
| | |           476|
| | +-----+
|
| N7:63 - (2:577)
| N10:71 - (2:626)
|

```

D178V1
 N7:174

14

```

Rung 2:628
| HA178V2
| N7:227 +GRT-----+
| -1/[- +GREATER THAN +-----+
| 15 | |Source A C178V2|
| (2:600) | | 1726|
| | |Source B H178V|
| | | 2976|
| | +-----+
| | /N7:64 - (2:579)
| | N10:120 - (2:626)
| | +LES-----+
| | +LESS THAN +-----+
| | |Source A C178V2|
| | | 1726|
| | |Source B L178V|
| | | 476|
| | +-----+
| | N7:64 - (2:579)
| | N10:71 - (2:626)

```

Rung 2:629

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

| +ADD-----+
| +ADD +-----+
| | |Source A AV179B1|
| | | 1717|
| | |Source B DEVIATION|
| | | 1250|
| | |Dest H179B1|
| | | 2967|
| | +-----+
| | +SUB-----+
| | +SUBTRACT +-----+
| | |Source A AV179B1|
| | | 1717|
| | |Source B DEVIATION|
| | | 1250|
| | |Dest L179B1|
| | | 467|
| | +-----+

```

Rung 2:630

```

| HA179B1
| N7:228 +GRT-----+
| -1/[- +GREATER THAN +-----+
| 0 | |Source A C179B1|
| (2:601) | | 1716|
| | |Source B H179B|
| | | 2967|
| | +-----+
| | N7:65 - (2:581)
| | N10:121 - (2:629)

```

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Rung 2:635

HA175B1 N7:227	D175B1 N7:174	OUT175B1 N7:239	
0 (2:585)	0 (2:606)	12	+ADD-----+
			+ADD
			Source A 1
			Source B COUNT
			Dest COUNT
			2
			2
			+-----+
	DEV_3 N22:6		+ADD-----+
			+ADD
			Source A C175B1
			1727
			Source B TOTAL
			3453.000
			Dest TOTAL
			3453.000
			+-----+

Rung 2:636

HA175B2 N7:227	D175B2 N7:174	OUT175B2 N7:239	
1 (2:586)	1 (2:607)	13	+ADD-----+
			+ADD
			Source A 1
			Source B COUNT
			Dest COUNT
			2
			2
			+-----+
	DEV_3 N22:6		+ADD-----+
			+ADD
			Source A C175B2
			1728
			Source B TOTAL
			3453.000
			Dest TOTAL
			3453.000
			+-----+

Rung 2:637

			+DIV-----+
			+DIVIDE
			Source A TOTAL
			3453.000
			Source B COUNT
			2
			Dest AV175B1
			1728
			+-----+

Rung 2:638

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUT:xx) THEN AVERAGE THE T/C

+CLR-----+	
	CLEAR
	Dest COUNT
	2
+-----+	
+CLR-----+	
	CLEAR
	Dest TOTAL
	3453.000
+-----+	

Rung 2:639

HA175V1	D175V1	OUT175V1	
N7:227	N7:174	N7:239	
-]/[-	-]/[-	-]/[-	+ADD-----+
2	2	14	ADD
(2:587)	(2:609)		Source A 1
			Source B COUNT
			Dest COUNT
			2
			2
			+-----+
	DEV_3		+ADD-----+
	N22:6		ADD
			Source A C175V1
			1724
			Source B TOTAL
			3453.000
			Dest TOTAL
			3453.000
			+-----+

Rung 2:640

HA175V2	D175V2	OUT175V2	
N7:227	N7:174	N7:239	
-]/[-	-]/[-	-]/[-	+ADD-----+
3	3	15	ADD
(2:588)	(2:610)		Source A 1
			Source B COUNT
			Dest COUNT
			2
			2
			+-----+

+++

+++

+++

+++

```

++                                     ++
|                                     |
|                                     |
| +-----+ +-----+ +-----+
| +ADD-----+ +-----+ +-----+
| |Source A      C175V2|
| |              1722 |
| |Source B      TOTAL|
| |              3453.000|
| |Dest          TOTAL|
| |              3453.000|
| +-----+ +-----+ +-----+

```

```

+DIV-----+
-DIVIDE      -
|Source A      TOTAL|
|              3453.000|
|Source B      COUNT|
|              2|
|Dest          AV175V|
|              1723|
+-----+

```

```

+CLR-----+
+CLEAR      +-+
|Dest      COUNT|
|          21  |
+-----+
+CLR-----+
+CLEAR      +-+
|Dest      TOTAL|
|          3453.000|
+-----+

```

+ADD-----+		
+ADD		+--+
Source A	1	
Source B	COUNT	
	2	
Dest	COUNT	
	2	
+-----+		

```

***                                     ***
|                                     |
| +ADD-----+                       |
+--ADD                               +--+
|Source A      C176B1|
|              1711|
|Source B      TOTAL|
|              3453.000|
|Dest          TOTAL|
|              3453.000|
+-----+

```

```

+ADD-----+
+ADD
|Source A          1|
|Source B          COUNT|
|Dest              COUNT|
|                  2|
+-----+

+ADD-----+
+ADD
|Source A          C176B2|
|                  1713|
|Source B          TOTAL|
|                  3453.000|
|Dest              TOTAL|
|                  3453.000|

```

```

+DIV-----+
+DIVIDE                                     +-
|Source A          TOTAL|
|                   3453.000|
|Source B          COUNT|
|                   2|
|Dest              AV176B|
|                   1712|
+-----+

```

CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

```

+CLR-----+
|-----+CLEAR+
|               |Dest      COUNT|
|               |           2|
|               +-----+
|               |
+-----+
+++

```


Rung 2:649

+DIV-----+	
+DIVIDE	
Source A	TOTAL
	3453.000
Source B	COUNT
	2
Dest	AV176V
	1711
+-----+	

Rung 2:650

CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
HAVE BEEN TAKEN OUT (TE_OUIxx) THEN AVERAGE THE T/C

+CLR-----+	
+CLEAR	
Dest	COUNT
	2
+-----+	
+CLR-----+	
+CLEAR	
Dest	TOTAL
	3453.000
+-----+	

Rung 2:651

HA177B1 N7:227	D177B1 N7:174	OUT177B1 N7:240	
1/[	1/[	1/[	+ADD-----+
8	8	4	+ADD
(2:593)	(2:618)		Source A
			1
			Source B
			COUNT
			2
			Dest
			COUNT
			2
			+-----+
	DEV_3		+ADD-----+
	N22:6		+ADD
	+---1 {---+		Source A
	3		C177B1
	(2:603)		1731
			Source B
			TOTAL
			3453.000
			Dest
			TOTAL
			3453.000
			+-----+

Rung 2:653

+DIV-----+	
+DIVIDE	
Source A	TOTAL
	3453.000
Source B	COUNT
	2
Dest	AV177B
	1732
+-----+	

Rung 2:654

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE OUT=xx) THEN AVERAGE THE T/C

+	CLR	+
+	CLEAR	+
	Dest	COUNT
		2
+	CLR	+
+	CLEAR	+
	Dest	TOTAL
		3453.000
+		+

Rung 2:655

HA177V1 N7:227	D177V1 N7:174	OUT177V1 N7:240	+ADD-----+
10 (2:595)	10 (2:621)	6	+ADD
			Source A 11
			Source B COUNT
			Dest COUNT
			21
			+-----+
	DEV_3 N22:6		+ADD-----+
	3 (2:603)		+ADD
			Source A (177V1
			1731
			Source B TOTAL
			3453.000
			Dest TOTAL
			3453.000
			+-----+

Rung 2:656

HA177V2 N7:227	D177V2 N7:174	OUT177V2 N7:240	+ADD-----+
11 (2:596)	11 (2:622)	7	+ADD
			Source A 11
			Source B COUNT
			Dest COUNT
			21
			+-----+
	DEV_3 N22:6		+ADD-----+
	3 (2:603)		+ADD
			Source A (177V2
			1732
			Source B TOTAL
			3453.000
			Dest TOTAL
			3453.000
			+-----+

Rung 2:657

	+DIV-----+
	+DIVIDE
	Source A TOTAL
	3453.000
	Source B COUNT
	21
	Dest AV177V
	1732
	+-----+

Rung 2:658

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

+CLR-----+	
	+CLEAR
	Dest COUNT
	2
	+-----+
	+CLR-----+
	+CLEAR
	Dest TOTAL
	3453.000
	+-----+

Rung 2:659

HA178B1	D178B1	OUT178B1	
N7:227	N7:174	N7:240	
-1/[-	-1/[-	-1/[-	+ADD-----+
12	12	8	+ADD
(2:597)	(2:624)		Source A 1
			Source B COUNT
			Dest COUNT
			2
			+-----+
	DEV_3		+ADD-----+
	N22:6		+ADD
	3		Source A C178B1
	(2:603)		1727
			Source B TOTAL
			3453.000
			Dest TOTAL
			3453.000
			+-----+

Rung 2:660

HA178B2	D178B2	OUT178B2	
N7:227	N7:174	N7:240	
-1/[-	-1/[-	-1/[-	+ADD-----+
13	13	9	+ADD
(2:598)	(2:625)		Source A 1
			Source B COUNT
			Dest COUNT
			2
			+-----+

+++

+++

+++

+++

```

***                                     ***
|                                     |
|                                     |
|+-----+-----+-----+-----+
|+ADD-----+
|Source A      C178B2|
|              1729|
|Source B      TOTAL|
|              3453.000|
|Dest          TOTAL|
|              3453.000|
|-----+-----+-----+-----+

```

```
+DIV-----+
+DIVIDE      +-
|Source A      TOTAL|
|              3453.000|
|Source B      COUNT|
|              21     |
|Dest          AV178B|
|              1728|
+-----+
```

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

+CLR-----+	
+CLEAR-----+	
Dest	COUNT
	21
+CLR-----+	
+CLEAR-----+	
Dest	TOTAL
	3453.000
+-----+	

```

+ADD-----+
+ADD                                     +-+
| Source A                               1| | |
| |                                     | |
| Source B                               COUNT| |
| |                                     2| |
| Dest                                  COUNT| |
| |                                     2| |
+-----+

```

```

      ***          ***
      |              |
      |      DEV_3    |
      |      N22:6    |
      |-----|-----|
      |      3        |
      |      (2:603)   |
      |              |
  
```

```

      ***          ***
      |              |
      |      +ADD-----+
      |      +ADD      +
      |      |Source A   C178V1|
      |      |          1726|
      |      |Source B   TOTAL|
      |      |          3453.000|
      |      |Dest      TOTAL|
      |      |          3453.000|
      |      +-----+
  
```

Rung 2:664

```

      HA178V2      D178V2      OUT178V2
      N7:227      N7:174      N7:240
      |-----|-----|-----|
      |      15      |      15      |      11      |
      |      (2:600)  |      (2:628)  |             |
      |              |              |             |
      |              |              |             |
      |              |      DEV_3    |
      |              |      N22:6    |
      |-----|-----|-----|
      |      3        |
      |      (2:603)   |
  
```

```

      +ADD-----+
      +ADD      +
      |Source A   1|
      |Source B   COUNT|
      |Dest      COUNT|
      |          2|
      |          2|
      +-----+
      +ADD-----+
      +ADD      +
      |Source A   C178V2|
      |          1726|
      |Source B   TOTAL|
      |          3453.000|
      |Dest      TOTAL|
      |          3453.000|
      +-----+
  
```

Rung 2:665

```

      +DIV-----+
      +DIVIDE-----+
      |Source A   TOTAL|
      |          3453.000|
      |Source B   COUNT|
      |          2|
      |Dest      AV178V|
      |          1726|
      +-----+
  
```

Rung 2:666

CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

```

      +CLR-----+
      +CLEAR-----+
      |Dest      COUNT|
      |          2|
      |          |
      |          |
      +-----+
      +-----+
  
```

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+DIV-----+	
+DIVIDE-----+	
Source A	TOTAL
	3453.000
Source B	COUNT
	2
Dest	AV179B
	1717
+-----+	

```

*****
IF DEVIATION SET FOR SECTION 3 THEN GO THERE AND CALCULATE DEVIATION
|
|      DEV_3      DEV3
|      N22:6
|      ] [----- 10
|      3          (JMP)
|      (2:603)

```

```

*****
JUMPS TO SECTION 3 IF DN_3 IS NOT LATCHED DN_3 GETS LATCHED WHEN THE SECTION IS
ENTERED
MD4
|
|   DN_3
|   N22:5
|   -3/[
|       3
|   (2:40)
|
|-----4
|                      (JMP)
|

```

```
*****
IF RATE CALCULATIONS ARE FINISHED THEN GO TO THE PID BLOCK
RT_TMR/DN PID175B
T4:87 38
1/[-----] (JMP)
DN
(2:42)
```

	RATE CHECKING	+MOV-----+
-----		+MOVE-----+
		Source AV175B
		1728
		Dest R1_175B
		1727
		+-----+
	+++	++

```

+++
+-----+
+SUB-----+
+SUBTRACT+
+Source A  R1_175B|
+          1727|
+Source B  R2_175B|
+          1727|
+Dest      DIF1_175B|
+          -9|
+-----+
+MOV-----+
+MOVE-----+
+Source      R1_175B|
+          1727|
+Dest        R2_175B|
+          1727|
+-----+
+SUB-----+
+SUBTRACT+
+Source A DIF1_175B|
+          -9|
+Source B DIF2_175B|
+          0|
+Dest      DDIF1|
+          -1|
+-----+
+MOV-----+
+MOVE-----+
+Source      DIF1_175B|
+          -9|
+Dest        DIF2_175B|
+          0|
+-----+
+SUB-----+
+SUBTRACT+
+Source A DIF1_175B|
+          -9|
+Source B      9|
+Dest      DIF1_175B|
+          -9|
+-----+
+MUL-----+
+MULTIPLY+
+Source A DIF1_175B|
+          -9|
+Source B DIF1_175B|
+          -9|
+Dest      ACC|
+          -731|
+-----+
+++

```

```

| | *-----+-----+
| | +MUL-----+-----+
| | +MULTIPLY                                     +-----+
| | |Source A                                ACC|
| | |                                         -731|
| | |Source B DIF1_175B|
| | |                                         -9|
| | |Dest                                  ACC|
| | |                                         -731|
| | +-----+-----+
| | +CLR-----+-----+
| | +CLEAR                                           +-----+
| | |Dest                                 S:5|
| | |                                   0|
| | +-----+-----+
| | +MUL-----+-----+
| | +MULTIPLY                                     +-----+
| | |Source A                                DDIF1|
| | |                                         -1|
| | |Source B                                DDIF1|
| | |                                         -1|
| | |Dest                                  ACC1|
| | |                                         -730|
| | +-----+-----+
| | +MUL-----+-----+
| | +MULTIPLY                                     +-----+
| | |Source A                                DDIF1|
| | |                                         -1|
| | |Source B                                ACC1|
| | |                                         -730|
| | |Dest                                  ACC1|
| | |                                         -730|
| | +-----+-----+
| | +CLR-----+-----+
| | +CLEAR                                           +-----+
| | |Dest                                 S:5|
| | |                                   0|
| | +-----+-----+
| | SCRATCH
| | N7:235
| | +-----+-----+
| | +EQU-----+-----+
| | +EQUAL                                       +-----+
| | |Source A                ACC|          6
| | |                         -731|
| | |Source B                  0|
| | +-----+-----+
| | N22:0 - (2:215)
| | +EQU-----+-----+
| | +SUB-----+-----+
| | +SUBTRACT                                    +-----+
| | |Source A                ACC|   Source A    ACC|
| | |                         -731|             -731|
| | |Source B                  1|   Source B     1|
| | |                         |               |
| | |                         |               |
| | |                         |Dest            ACC|
| | |                         |             -731|
| | +-----+-----+
| | N22:0 - (2:215)
| | +-----+-----+

```

```

***
|  SCRATCH
|  N7:235
|  +-----+
|  +ADD-----+
|  +-----+
|  | 6
|  | (2:215)
|  |
|  |Source A      ACC1
|  |              -731
|  |Source B      1
|  |
|  |Dest          ACC1
|  |              -731
|  +-----+
|
|  +ADD-----+
|  +ADD-----+
|  |Source A      ACC1
|  |              -731
|  |Source B      ACC1
|  |              -730
|  |Dest          ACC1
|  |              -730
|  +-----+
|
|  +SUB-----+
|  +SUBTRACT-----+
|  |Source A      ACC1
|  |              -730
|  |Source B      N15:41
|  |              1
|  |Dest          ACC1
|  |              -731
|  +-----+
|
|  +GRT-----+
|  +GREATER THAN-----+
|  |Source A      ACC1
|  |              -731
|  |Source B      100
|  |Dest          N15:41
|  |              1
|  +-----+
|
|  N22:0 - (2:215)
|  +LES-----+
|  +LESS THAN-----+
|  |Source A      ACC1
|  |              -731
|  |Source B      1
|  |Dest          N15:41
|  |              1
|  +-----+
|
|  N22:0 - (2:215)
|  +LIM-----+
|  +LIMIT TEST-----+
|  |Low Lim      1
|  |Test          ACC1
|  |              -731
|  |High Lim     100
|  +-----+
|
|  N22:0 - (2:215)
  
```


Rung 2:674
 | PID175B
 |
 | 38
 |-----[LBL]-----

DUMMY38
 N22:9
 ()
 5

Rung 2:675

DETECT FROM SCADA PID ON/OFF
 IF PID OFF
 THEN ZERO PW FOR ZERO OUTPUT AT SCR
 AND JUMP AROUND THE PID BLOCK

| ON175B
 | N7:232
 |-----1/[-----
 | 13
 | (3:24)
 |
 |
 |
 |

+CLR-----+
 +CLEAR-----+
 |Dest PW175B|
 | 01 |
 +-----+
 | 77
 +--(JMP)-----+

Rung 2:676

DETECT AUTO/MANUAL FROM SCADA
 SET APPROPRIATE MODE IN PID BLOCK

| AM175B
 | N7:232
 |-----1/[-----
 | 12
 | (3:24)
 |

PID175B/1
 N15:30
 ()
 1

Rung 2:677

DETECT SETPOINT VALUE FROM SCADA
 PUT VALUE IN PID BLOCK

|
 |
 |
 |
 |

+MOV-----+
 +MOVE-----+
 |Source SET175B|
 | 01 |
 |Dest PIDSP175B|
 | 01 |
 +-----+

Rung 2:678

|
 |
 |
 |
 |

+PID-----+
 +PID-----+
 |Control Block PID175B|
 |Process Variable AV175B|
 |Control Variable CV175B|
 |Control Block Length 23|
 +-----+

+++

+++

```

+++
|
| +SCL-----+
| +SCALE      +-----+
| |Source      CV1753|
| |             01|
| |Rate [ /100001 15|
| |             01|
| |Offset      01|
| |             01|
| |Dest        PW1758|
| |             01|
| +-----+
| +CLR-----+
| +CLEAR      +-----+
| |Dest        S:5|
| |             01|
| +-----+
  
```

Rung 2:679

```

| 77
| --[LBL]-----N7:235
|                                     ( )
|                                     11
  
```

Rung 2:680

```

| RT_TMR/DN
| T4:87
| --] / [-----PID175V
|                                     39
|                                     (JMP)
| DN
| (2:42)
  
```

Rung 2:681

RATE CHECKING

```

|
| +MOV-----+
| +MOVE      +-----+
| |Source      AV175V|
| |             1723|
| |Dest        R1_175V|
| |             1722|
| +-----+
| +SUB-----+
| +SUBTRACT   +-----+
| |Source A     R1_175V|
| |             1722|
| |Source B     R2_175V|
| |             1722|
| |Dest        DIF1_175V|
| |             -10|
| +-----+
| +MOV-----+
| +MOVE      +-----+
| |Source      R1_175V|
| |             1722|
| |Dest        R2_175V|
| |             1722|
| +-----+
  
```

```

***
+-----+
+SUB-----+
+SUBTRACT   +
+Source A DIF1_175V|
+           -10|
+Source B DIF2_175V|
+           -1|
+Dest       DDIF1|
+           -1|
+-----+
+MOV-----+
+MOVE       +
+Source    DIF1_175V|
+           -10|
+Dest      DIF2_175V|
+           -1|
+-----+
+SUB-----+
+SUBTRACT   +
+Source A DIF1_175V|
+           -10|
+Source B           |
+           9|
+Dest      DIF1_175V|
+           -10|
+-----+
+MUL-----+
+MULTIPLY   +
+Source A DIF1_175V|
+           -10|
+Source B DIF1_175V|
+           -10|
+Dest       ACC|
+           -731|
+-----+
+MUL-----+
+MULTIPLY   +
+Source A      ACC|
+           -731|
+Source B DIF1_175V|
+           -10|
+Dest       ACC|
+           -731|
+-----+
+CLR-----+
+CLEAR      +
+Dest       S:5|
+           0|
+-----+
+MUL-----+
+MULTIPLY   +
+Source A      DDIF1|
+           -1|
+Source B      DDIF1|
+           -1|
+Dest       ACC|
+           -730|
+-----+
***

```

```

+++
+-----+
+MUL-----+
+MULTIPLY
+Source A      DDIF1
+Source B      ACC1
+Dest          ACC1
+              -730
+              -730
+-----+
+CLR-----+
+CLEAR
+Dest          S:5
+              0
+-----+
+SCRATCH
+N7:235
+-----+
+EQU-----+
+EQUAL
+Source A      ACC1
+              -731
+Source B      0
+-----+
+N22:0 - (2:215)
+-----+
+SUB-----+
+SUBTRACT
+Source A      ACC1
+              -731
+Source B      1
+Dest          ACC1
+              -731
+N22:0 - (2:215)
+-----+
+SCRATCH
+N7:235
+-----+
+ADD-----+
+ADD
+Source A      ACC1
+              -731
+Source B      1
+Dest          ACC1
+              -731
+-----+
+ADD-----+
+ADD
+Source A      ACC1
+              -731
+Source B      ACC1
+              -730
+Dest          ACC1
+              -730
+-----+
+++

```

```

+++
|
|                                     +SUB-----+
|-----+-----+-----+-----+-----+-----+
|                                     SUBTRACT
|Source A      ACC1      1001
|                                     -7301
|Source B      N15:71
|                                     11
|Dest          ACC1
|                                     -7311
|-----+-----+-----+-----+-----+
|+GRT-----+ +MOV-----+
|+GREATER THAN +MOVE
|Source A      ACC1      1001
|                                     -7311
|Source B      1001      Dest      N15:71
|                                     11
|-----+-----+-----+-----+
|N22:0 - (2:215)
|+LES-----+ +MOV-----+
|+LESS THAN +MOVE
|Source A      ACC1      11
|                                     -7311
|Source B      11      Dest      N15:71
|                                     11
|-----+-----+-----+-----+
|N22:0 - (2:215)
|+LIM-----+ +MOV-----+
|+LIMIT TEST +MOVE
|Low Lim      11      Source      ACC1
|                                     -7311
|Test          ACC1      Dest      N15:71
|                                     -7311
|High Lim      1001
|-----+-----+-----+-----+
|N22:0 - (2:215)

```

Rung 2:682
PID175V

```

|                                     DUMMY39
|                                     N22:9
|-----+-----+-----+-----+
|{LBL}                                     ( )
|
|                                     '6

```

Rung 2:683

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

```

| ON175V
| N7:232
|-----+-----+-----+-----+
|J/L-----+-----+-----+-----+
|15
| (3:24)
|
|                                     +CLR-----+
|-----+-----+-----+-----+
|                                     CLEAR
|Dest          PW175V
|                                     01
|-----+-----+-----+-----+
|78
|-----+-----+-----+-----+
| (JMP)

```

Rung 2:684

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

	AM175V		FID175V/1
	N7:232		N15:60
	1/[		()
	14		1
	(3:24)		

Rung 2:685

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

		+MOV-----+
		+MOVE
	Source	SET175V
		01
	Dest	PIDSP175V
		01
		+-----+

Rung 2:686

		+PID-----+
		+PID
	Control Block	PID175V
	Process Variable	AV175V
	Control Variable	CV175V
	Control Block Length	23
		+-----+
		+SCALE
	Source	CV175V
		01
	Rate [1/10000]	15
	Offset	01
	Dest	PW175V
		01
		+-----+
		+CLR-----+
		+CLEAR
	Dest	S:5
		01
		+-----+

Rung 2:687

	78		N7:235
	---[LBL]		()
			12

Rung 2:688

	RT_TMR/DN		PID176B
	T4:87		40
	1/[		(JMP)
	DN		
	(2:42)		

Rung 2:689

RATE CHECKING

		+MOV-----+
		MOVE
	Source	AV176B
		1712
	Dest	R1_176B
		1713
		+-----+
		+SUB-----+
		SUBTRACT
	Source A	R1_176B
		1713
	Source B	R2_176B
		1713
	Dest	DIF1_176B
		-8
		+-----+
		+MOV-----+
		MOVE
	Source	R1_176B
		1713
	Dest	R2_176B
		1713
		+-----+
		+SUB-----+
		SUBTRACT
	Source A	DIF1_176B
		-8
	Source B	DIF2_176B
		1
	Dest	DDIF1
		-1
		+-----+
		+MOV-----+
		MOVE
	Source	DIF1_176B
		-8
	Dest	DIF2_176B
		1
		+-----+
		+SUB-----+
		SUBTRACT
	Source A	DIF1_176B
		-8
	Source B	9
	Dest	DIF1_176B
		-8
		+-----+
		+MUL-----+
		MULTIPLY
	Source A	DIF1_176B
		-8
	Source B	DIF1_176B
		-8
	Dest	ACC
		-731
		+-----+

```

+++
+-----+
+MUL-----+
+MULTIPLY  +
|Source A      ACC|
|              -731|
|Source B DIF1_176B|
|              -81|
|Dest         ACC|
|              -731|
+-----+
+CLR-----+
+CLEAR      +
|Dest        S:5|
|              0|
+-----+
+MUL-----+
+MULTIPLY  +
|Source A      DDIF1|
|              -1|
|Source B      DDIF1|
|              -1|
|Dest         ACC1|
|              -730|
+-----+
+MUL-----+
+MULTIPLY  +
|Source A      DDIF1|
|              -1|
|Source B      ACC1|
|              -730|
|Dest         ACC1|
|              -730|
+-----+
+CLR-----+
+CLEAR      +
|Dest        S:5|
|              0|
+-----+
SCRATCH
N7:235
+-----+
+EQU-----+
+EQUAL      +
|Source A      ACC|
|              -731|
|Source B      0|
+-----+
N22:0 ~ (2:215)
+-----+
+EQU-----+
+SUB-----+
+SUBTRACT  +
|Source A      ACC|
|              -731|
|Source B      1|
|Dest         ACC|
|              -731|
+-----+
N22:0 ~ (2:215)
+-----+
+++

```



```

+++
SCRATCH
N7:235
] [-----+ADD-----+
6          |Source A      ACC|
(2:215)    |Source B      1|
           |Dest        ACC|
           |              -731|
           +-----+
           +ADD-----+
           +ADD-----+
           |Source A      ACC|
           |Source B      -731|
           |Source B      -730|
           |Dest        ACC|
           |              -730|
           +-----+
           +SUB-----+
           +SUBTRACT-----+
           |Source A      ACC|
           |Source B      -730|
           |Source B      N15:101|
           |Dest        1|
           |Dest        ACC|
           |              -731|
           +-----+
+GRT-----+ +MOV-----+
+GREATER THAN +MOVE-----+
|Source A      ACC| |Source      100|
|              -731| |
|Source B      100| |Dest      N15:101|
|              1|  |
|              +-----+
N22:0 - (2:215)
+LES-----+ +MOV-----+
+LESS THAN +MOVE-----+
|Source A      ACC| |Source      1|
|              -731| |
|Source B      1| |Dest      N15:101|
|              1|  |
|              +-----+
N22:0 - (2:215)
+LIM-----+ +MOV-----+
+LIMIT TEST +MOVE-----+
|Low Lim      1| |Source      ACC|
|              1| |              -731|
|Test        ACC| |Dest      N15:101|
|              -731| |              1|
|High Lim     100| +-----+
|              +-----+
N22:0 - (2:215)

```



```

+++
|
| +SCL-----+
| +SCALE-----+
| |Source      CV176B|
| |Rate [ /10000] 15|
| |Offset      0|
| |Dest        PW176B|
| |            0|
| +CLR-----+
| +CLEAR-----+
| |Dest        S:5|
| |            0|
|
+++

```

Rung 2:695

```

| 79
| --[LBL]----- N7:235
|                                     ( )
|                                     13

```

Rung 2:696

```

| RT_TMR/DN
| T4:87
| ---1/[----- PID176V
|                                     41
|                                     (JMP)
| DN
| (2:42)

```

Rung 2:697

RATE CHECKING

```

+MOV-----+
+MOVE-----+
|Source      AV176V|
|1711|
|Dest        R1_176V|
|1711|
+SUB-----+
+SUBTRACT-----+
|Source A      R1_176V|
|1711|
|Source B      R2_176V|
|1711|
|Dest        DIF1_176V|
|           -9|
+MOV-----+
+MOVE-----+
|Source      R1_176V|
|1711|
|Dest        R2_176V|
|1711|
+-----+

```

```

+++
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A DIF1_176V|
|          -9|
|Source B DIF2_176V|
|          0|
|Dest      DDIF1|
|          -1|
+-----+
+MOV-----+
+MOVE-----+
|Source   DIF1_176V|
|          -9|
|Dest     DIF2_176V|
|          0|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A DIF1_176V|
|          -9|
|Source B      9|
|          |
|Dest     DIF1_176V|
|          -9|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A DIF1_176V|
|          -9|
|Source B DIF1_176V|
|          -9|
|Dest      ACC|
|          -731|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A      ACC|
|          -731|
|Source B DIF1_176V|
|          -9|
|Dest      ACC|
|          -731|
+-----+
+CLR-----+
+CLEAR-----+
|Dest      S:5|
|          0|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A      DDIF1|
|          -1|
|Source B      DDIF1|
|          -1|
|Dest      ACC1|
|          -730|
+-----+
+++

```

+++

```

***
+SUB-----+
+SUBTRACT
|Source A      ACC1|
|              -730|
|Source B      N15:101|
|              1|
|Dest          ACC|
|              -731|
+-----+
+GRT-----+ +MOV-----+
+GREATER THAN +MOVE
|Source A      ACC| |Source      100|
|              -731| |Dest          N15:101|
|Source B      100| |              1|
+-----+ +-----+
N22:0 - (2:215)
+LES-----+ +MOV-----+
+LESS THAN +MOVE
|Source A      ACC| |Source      1|
|              -731| |Dest          N15:101|
|Source B      1| |              1|
+-----+ +-----+
N22:0 - (2:215)
+LIM-----+ +MOV-----+
+LIMIT TEST +MOVE
|Low Lim      1| |Source      ACC|
|              -731| |Dest          N15:101|
|Test          ACC| |              1|
|              -731| +-----+
|High Lim     100|
+-----+
N22:0 - (2:215)

```

Rung 2:698

PID176V

41

[LBL]

DUMMY41

N22:9

()

8

Rung 2:699

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

ON176V

N7:233

1/[

3

(3:25)

```

+CLR-----+
+CLEAR
|Dest          PW176V|
|              0|
+-----+
80
+-(JMP)-----+

```

Rung 2:700

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

```
| AM176V PID176V/1
| N7:233 N15:120
|-----|-----|
| 2 ( )
| (3:25) 1
```

Rung 2:701

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

```
|
|-----+MOV-----+
|-----+MOVE-----+
| |Source SET176V| |
| | | 0|
| |Dest PIDSP176V|
| | | 0|
|-----+-----+
```

Rung 2:702

```
|
|-----+PID-----+
|-----+PID-----+
| |Control Block PID176V|
| |Process Variable AV176V|
| |Control Variable CV176V|
| |Control Block Length 23|
| |-----+-----+
| |-----+SCL-----+
| |-----+SCALE-----+
| | |Source CV176V| |
| | | | 0|
| | |Rate [ /10000] 15|
| | | | 0|
| | |Offset 0|
| | | | 0|
| | |Dest PW176V|
| | | | 0|
| |-----+-----+
| |-----+CLR-----+
| |-----+CLEAR-----+
| | |Dest S:5|
| | | | 0|
|-----+-----+
```

Rung 2:703

```
| 80 N7:235
|-----|-----|
| [LBL] ( )
| 14
```

Rung 2:704

```
| PID177B
| RT_TMR/DN
| T4:87 42
|-----|-----|
| DN (JMP)
| (2:42)
```

RATE CHECKING

```

+MOV-----+
+MOVE-----+
|Source          AV177B|
|                1732|
|Dest            R1_177B|
|                1732|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A        R1_177B|
|                1732|
|Source B        R2_177B|
|                1732|
|Dest            DIF1_177B|
|                -9|
+-----+
+MOV-----+
+MOVE-----+
|Source          R1_177B|
|                1732|
|Dest            R2_177B|
|                1732|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A        DIF1_177B|
|                -9|
|Source B        DIF2_177B|
|                0|
|Dest            DDIF1|
|                -1|
+-----+
+MOV-----+
+MOVE-----+
|Source          DIF1_177B|
|                -9|
|Dest            DIF2_177B|
|                0|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A        DIF1_177B|
|                -9|
|Source B        9|
|Dest            DIF1_177B|
|                -9|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A        DIF1_177B|
|                -9|
|Source B        DIF1_177B|
|                -9|
|Dest            ACC|
|                -731|

```

+++

+++


```

+++
+-----+
+MUL-----+
+MULTIPLY  +--+
|Source A      ACC|
|              -731|
|Source B DIF1_177B|
|              -9|
|Dest          ACC|
|              -731|
+-----+
+CLR-----+
+CLEAR      +--+
|Dest              S:5|
|                  0|
+-----+
+MUL-----+
+MULTIPLY  +--+
|Source A      DDIF1|
|              -1|
|Source B      DDIF1|
|              -1|
|Dest          ACC1|
|              -730|
+-----+
+MUL-----+
+MULTIPLY  +--+
|Source A      DDIF1|
|              -1|
|Source B      ACC1|
|              -730|
|Dest          ACC1|
|              -730|
+-----+
+CLR-----+
+CLEAR      +--+
|Dest              S:5|
|                  0|
+-----+
SCRATCH
N7:235
+-----+
+EQU-----+
+EQUAL      +--+
|Source A      ACC| 6
|              -731|
|Source B      0|
|              |
+-----+
N22:0 - (2:215)
+-----+
+EQU-----+
+SUB-----+
+SUBTRACT  +--+
|Source A      ACC| |Source A      ACC|
|              -731| |              -731|
|Source B      1| |Source B      1|
|              | |Dest          ACC|
+-----+ |              -731|
N22:0 - (2:215)
+-----+
+++

```

SCRATCH			
N7:235		+ADD-----+	
1		+ADD-----+	
6		Source A	ACC1
(2:215)			-731
		Source B	1
		Dest	ACC1
			-731
		+-----+	
		+ADD-----+	
		+ADD-----+	
		Source A	ACC1
			-731
		Source B	ACC1
			-730
		Dest	ACC1
			-730
		+-----+	
		+SUB-----+	
		+SUBTRACT-----+	
		Source A	ACC1
			-730
		Source B	N15:161
			1
		Dest	ACC1
			-731
		+-----+	
+GRT-----+		+MOV-----+	
+GREATER THAN		+MOVE-----+	
Source A	ACC1	Source	100
	-731		
Source B	100	Dest	N15:161
			1
		+-----+	
N22:0 - (2:215)			
+LES-----+		+MOV-----+	
+LESS THAN		+MOVE-----+	
Source A	ACC1	Source	1
	-731		
Source B	1	Dest	N15:161
			1
		+-----+	
N22:0 - (2:215)			
+LIM-----+		+MOV-----+	
+LIMIT TEST		+MOVE-----+	
Low Lim	1	Source	ACC1
			-731
Test	ACC1	Dest	N15:161
	-731		1
High Lim	100	+-----+	
		+-----+	
N22:0 - (2:215)			


```

+++
+-----+
+SUB-----+
+SUBTRACT   +
|Source A DIF1_177V|
|      -9|
|Source B DIF2_177V|
|      0|
|Dest      DDIF1|
|      -1|
+-----+
+MOV-----+
+MOVE       +
|Source   DIF1_177V|
|      -9|
|Dest     DIF2_177V|
|      0|
+-----+
+SUB-----+
+SUBTRACT   +
|Source A DIF1_177V|
|      -9|
|Source B      9|
|Dest     DIF1_177V|
|      -9|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A DIF1_177V|
|      -9|
|Source B DIF1_177V|
|      -9|
|Dest      ACC|
|      -731|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A      ACC|
|      -731|
|Source B DIF1_177V|
|      -9|
|Dest      ACC|
|      -731|
+-----+
+CLR-----+
+CLEAR      +
|Dest      S:5|
|      0|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A      DDIF1|
|      -1|
|Source B      DDIF1|
|      -1|
|Dest      ACC1|
|      -730|
+-----+
+++

```

```

+++
+-----+
+MUL-----+
+MULTIPLY
|Source A      DDIF1|
|              -1|
|Source B      ACC1|
|              -730|
|Dest          ACC1|
|              -730|
+-----+
+CLR-----+
+CLEAR
|Dest          S:5|
|              0|
+-----+
SCRATCH
N7:235
+-----+
+EQU-----+
+EQUAL
|Source A      ACC| 6
|              -731|
|Source B      0|
|              |
+-----+
N22:0 - (2:215)
+-----+
+SUB-----+
+SUBTRACT
|Source A      ACC| |Source A      ACC|
|              -731| |              -731|
|Source B      1| |Source B      1|
|              |
+-----+
|Dest          ACC|
N22:0 - (2:215) |              -731|
+-----+
SCRATCH
N7:235
+-----+
+ADD-----+
+ADD
|Source A      ACC|
|              -731|
|Source B      1|
|              |
+-----+
|Dest          ACC|
|              -731|
+-----+
+ADD-----+
+ADD
|Source A      ACC|
|              -731|
|Source B      ACC1|
|              -730|
|Dest          ACC1|
|              -730|
+-----+
+++

```

```

+---+
| | | | | +SUB-----+ | | | | |
| | | | | +SUBTRACT | |
| | | | | |Source A ACC1| |
| | | | | | -730| |
| | | | | |Source B N15:191| |
| | | | | | 1| |
| | | | | |Dest ACC| |
| | | | | | -731| |
| | | | | +-----+ | |
| | | | | +GRT-----+ | |
| | | | | +GREATER THAN | |
| | | | | |Source A ACC| |Source 100| |
| | | | | | -731| |
| | | | | |Source B 100| |Dest N15:191| |
| | | | | | 1| |
| | | | | +-----+ | |
| | | | | N22:0 - (2:215) | |
| | | | | +LESS-----+ | |
| | | | | +LESS THAN | |
| | | | | |Source A ACC| |Source 1| |
| | | | | | -731| |
| | | | | |Source B 1| |Dest N15:191| |
| | | | | | 1| |
| | | | | +-----+ | |
| | | | | N22:0 - (2:215) | |
| | | | | +LIM-----+ | |
| | | | | +LIMIT TEST | |
| | | | | |Low Lim 1| |Source ACC| |
| | | | | | | | -731| |
| | | | | |Test ACC| |Dest N15:191| |
| | | | | | -731| |
| | | | | |High Lim 100| |
| | | | | +-----+ | |
| | | | | N22:0 - (2:215) | |

```

Rung 2:716

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

	AM177V	PID177V/1
	N7:233	N15:180
	1/1	()
	6	1
	(3:25)	

Rung 2:717

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

		+MOV-----+	
		+MOVE	
		Source SET177V	
			0
		Dest PIDSP177V	
			0
		+-----+	

Rung 2:718

		+PID-----+	
		+PID	
		Control Block PID177V	
		Process Variable AV177V	
		Control Variable CV177V	
		Control Block Length 23	
		+-----+	
	ON177V		
	N7:233	+CLR-----+	
	1/1	+CLEAR	
	7	Dest CV177V	
	(3:25)		0
		+-----+	
		+SCL-----+	
		+SCALE	
		Source CV177V	
			0
		Rate [1/10000] 15	
		Offset 0	
		Dest PW177V	
			0
		+-----+	
		+CLR-----+	
		+CLEAR	
		Dest S:5	
			0
		+-----+	

Rung 2:719

	82	N7:236
	[LBL]	()
		0

Rung 2:720

PID178B

| RT_TMR/DN
| T4:87
|-----1/|
| DN
| (2:42)

44
(JMP)

Rung 2:721

RATE CHECKING

```

+MOV-----+
+MOVE-----+
|Source      AV178B|
|              1728|
|Dest        R1_178B|
|              1729|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A     R1_178B|
|              1729|
|Source B     R2_178B|
|              1729|
|Dest        DIF1_178B|
|              -8|
+-----+
+MOV-----+
+MOVE-----+
|Source      R1_178B|
|              1729|
|Dest        R2_178B|
|              1729|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A     DIF1_178B|
|              -8|
|Source B     DIF2_178B|
|              1|
|Dest        DDIF1|
|              -1|
+-----+
+MOV-----+
+MOVE-----+
|Source      DIF1_178B|
|              -8|
|Dest        DIF2_178B|
|              1|
+-----+
+SUB-----+
+SUBTRACT-----+
|Source A     DIF1_178B|
|              -8|
|Source B      9|
|Dest        DIF1_178B|
|              -8|
+-----+

```

+++

+++

```

+++
+-----+
+MUL-----+
+MULTIPLY+
+Source A DIF1_178B|
+      -8|
+Source B DIF1_178B|
+      -8|
+Dest      ACC|
+      -731|
+-----+
+MUL-----+
+MULTIPLY+
+Source A      ACC|
+      -731|
+Source B DIF1_172V|
+      -8|
+Dest      ACC|
+      -731|
+-----+
+CLR-----+
+CLEAR+
+Dest      S:5|
+      0|
+-----+
+MUL-----+
+MULTIPLY+
+Source A      DDIF1|
+      -1|
+Source B      DDIF1|
+      -1|
+Dest      ACC1|
+      -730|
+-----+
+MUL-----+
+MULTIPLY+
+Source A      DDIF1|
+      -1|
+Source B      ACC1|
+      -730|
+Dest      ACC1|
+      -730|
+-----+
+CLR-----+
+CLEAR+
+Dest      S:5|
+      0|
+-----+
+SCRATCH
+N7:235
+-----+
+EQU-----+
+-----+
+EQUAL+
+Source A      ACC|
+      -731|
+Source B      0|
+-----+
+N22:0 - (2:215)
+++

```

```

+++
|
| +EQU-----+ +SUB-----+
| +EQU-----+ +SUBTRACT-----+
| |Source A      ACC| |Source A      ACC|
| |              -731| |              -731|
| |Source B      1| |Source B      1|
| |              | | |
| +-----+ |Dest      ACC|
| N22:0 - (2:215) | -731|
| +-----+
|
| SCRATCH
| N7:235
| +-----+ +ADD-----+
| +1 [-----+ +ADD-----+
| | 6 | |Source A      ACC|
| | (2:215) | |              -731|
| | | |Source B      1|
| | | |Dest      ACC|
| | | |              -731|
| | | +-----+
| | | +ADD-----+
| | | +ADD-----+
| | | |Source A      ACC|
| | | |              -731|
| | | |Source B      ACC|
| | | |              -730|
| | | |Dest      ACC|
| | | |              -730|
| | | +-----+
| | | +SUB-----+
| | | +SUBTRACT-----+
| | | |Source A      ACC|
| | | |              -730|
| | | |Source B      N16:11|
| | | |              1|
| | | |Dest      ACC|
| | | |              -731|
| | | +-----+
| | | +GRT-----+ +MOV-----+
| | | +GREATER THAN +MOVE-----+
| | | |Source A      ACC| |Source      100|
| | | |              -731| | |
| | | |Source B      100| |Dest      N16:11|
| | | |              | | |
| | | |              | | |
| | | N22:0 - (2:215) |
| | | +-----+ +MOV-----+
| | | +LES-----+ +MOVE-----+
| | | +LESS THAN +MOVE-----+
| | | |Source A      ACC| |Source      1|
| | | |              -731| | |
| | | |Source B      1| |Dest      N16:11|
| | | |              | | |
| | | |              | | |
| | | N22:0 - (2:215) |
|
|
+++

```

```

++
|
| +LIM-----+ +MOV-----+
| +LIMIT TEST +MOVE
| |Low Lim      1| |Source      ACC|
| |              | |             -731|
| |Test         ACC| |Dest      N16:11|
| |             -731| |             1|
| |High Lim     100| +-----+
|
|-----+
N22:0 - (2:215)

```

Rung 2:722

1 PID178B

44

| --- [LBL]

DUMMY44

N22:9

— () —

11

Rung 2:723

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

```

1      ON178B
2      N7:233

```

} ---- } / [-

19

+CLR+

- + CLEAR + - +

| Dest | PW178B |

1 01 1

100

83

Rung 2:724

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

1 AM178B
1 N7:233

1-----1/[-

8

PID178B/1

N16:Q

— () —

1

Rung 2:725

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

+MOV-----+

- + MOVE +

|Source| SET178B|

1 01

| Dest. | PIDSP178B |

101

```

+PID-----+
+PID+
|Control Block PID178B|
|Process Variable AV178B|
|Control Variable CV178B|
|Control Block Length 23|
+-----+
+SCALE-----+
+SCALE+-----+
|Source CV178B|
| | 0|
|Rate [ /10000] 15|
| | |
|Offset 0|
| | |
|Dest PW178B|
| | 0|
+-----+
+CLR-----+
+CLEAR+-----+
|Dest S:5|
| | 0|
+-----+

```

```
|---[LBL]----- ( )
```

```

| RT_TMR/DN
| T4:87
|-----] / (----- (JMP)
| DN
| (2:42)

```

```

+-----+-----+
+MOV-----+
+MOVE-----+
|Source      AV178V|
|            1726|
|Dest       R1_178V|
|            1726|
+-----+-----+
+SUB-----+
+SUBTRACT-----+
|Source A    R1_178V|
|            1726|
|Source B    R2_178V|
|            1726|
|Dest       DIF1_178V|
|            -9|

```

```

+++
+MOV-----+
+MOVE
|Source      R1_178V|
|Dest        R2_178V|
|            1726|
+-----+
+SUB-----+
+SUBTRACT
|Source A DIF1_178V|
|            -9|
|Source B DIF2_178V|
|            0|
|Dest         DDIF1|
|            -1|
+-----+
+MOV-----+
+MOVE
|Source      DIF_178V|
|            -9|
|Dest        DIF2_178V|
|            0|
+-----+
+SUB-----+
+SUBTRACT
|Source A DIF_178V|
|            -9|
|Source B      9|
|Dest         DIF1_178V|
|            -9|
+-----+
+MUL-----+
+MULTIPLY
|Source A DIF1_178V|
|            -9|
|Source B DIF1_178V|
|            -9|
|Dest         ACC|
|            -731|
+-----+
+MUL-----+
+MULTIPLY
|Source A      ACC|
|            -731|
|Source B DIF1_178V|
|            -9|
|Dest         ACC|
|            -731|
+-----+
+CLR-----+
+CLEAR
|Dest         S:5|
|            0|
+-----+
+++

```

```

+-----+
+ |      | +MUL-----+
+ |      | |MULTIPLY| +-----+
+ |      | |Source A  DDIF1| +-----+
+ |      | |      -1| +-----+
+ |      | |Source B  DDIF1| +-----+
+ |      | |      -1| +-----+
+ |      | |Dest    ACC1| +-----+
+ |      | |     -730| +-----+
+ |      | +MUL-----+
+ |      | |MULTIPLY| +-----+
+ |      | |Source A  DDIF1| +-----+
+ |      | |      -1| +-----+
+ |      | |Source B  ACC1| +-----+
+ |      | |     -730| +-----+
+ |      | |Dest    ACC1| +-----+
+ |      | |     -730| +-----+
+ |      | +CLR-----+
+ |      | |CLEAR   | +-----+
+ |      | |Dest    S:5| +-----+
+ |      | |      01| +-----+
+ |      | +SCRATCH| +-----+
+ |      | |N7:235| +-----+
+ |      | +EQU-----+
+ |      | |EQUAL   | +-----+
+ |      | |Source A  ACC1| +-----+
+ |      | |     -731| +-----+
+ |      | |Source B   01| +-----+
+ |      | +-----+
+ |      | |N22:0 - (2:215)| +-----+
+ |      | +EQU-----+
+ |      | |SUB-----+
+ |      | |SUBTRACT| +-----+
+ |      | |Source A  ACC1| +-----+
+ |      | |     -731| +-----+
+ |      | |Source B   11| +-----+
+ |      | |Source B   11| +-----+
+ |      | |Dest    ACC1| +-----+
+ |      | |     -731| +-----+
+ |      | |N22:0 - (2:215)| +-----+
+ |      | +SCRATCH| +-----+
+ |      | |N7:235| +-----+
+ |      | +ADD-----+
+ |      | |ADD     | +-----+
+ |      | |Source A  ACC1| +-----+
+ |      | |     -731| +-----+
+ |      | |Source B   11| +-----+
+ |      | |Dest    ACC1| +-----+
+ |      | |     -731| +-----+
+ |      | +-----+
+-----+

```

```

+++
+ADD-----+
+ADD
|Source A      ACC|
|              -731|
|Source B      ACC1|
|              -730|
|Dest          ACC1|
|              -730|
+-----+
+SUB-----+
+SUBTRACT
|Source A      ACC1|
|              -730|
|Source B      N16:41|
|              1|
|Dest          ACC|
|              -731|
+-----+
+GRT-----+ +MOV-----+
+GREATER THAN +MOVE
|Source A      ACC| |Source      100|
|              -731| |
|Source B      100| |Dest        N16:41|
|              1| |
+-----+
N22:0 - (2:215)
+LES-----+ +MOV-----+
+LESS THAN +MOVE
|Source A      ACC| |Source      1|
|              -731| |
|Source B      1| |Dest        N16:41|
|              1| |
+-----+
N22:0 - (2:215)
+LIM-----+ +MOV-----+
+LIMIT TEST +MOVE
|Low Lim      1| |Source      ACC|
|              1| |              -731|
|Test         ACC| |Dest        N16:41|
|              -731| |              1|
|High Lim     100| +-----+
+-----+
N22:0 - (2:215)

```

Rung 2:730
PID178V

45
[LBL]

DUMMY45

N22:9

12

!

() — — —

2

3

1

-- 1/[-

1

12)

(2:42)

2

- + MOVE +

17171

1 17181

+SUB-----+

[Source A R1 179B]

|Source B R2 179B|

1 Dest	DIE1	179B1
--------	------	-------

=====

-+MOVE +

17181

17181

+SUB-----+

!Source A DIF1_179B!

|Source B DIF2 179B|

| Dest | DDIF1 |

-+MOVE +
1CONFEE DIF1 170B1

| Dest | DIF2_179B |

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+++

+++

```

+++
+-----+
+SUB-----+
+SUBTRACT   +
+Source A DIF1_179B|
+          -9|
+Source B   9|
+          -9|
+Dest      DIF1_179B|
+          -9|
+-----+
+MUL-----+
+MULTIPLY   +
+Source A DIF1_179B|
+          -9|
+Source B DIF1_179B|
+          -9|
+Dest      ACC|
+          -731|
+-----+
+MUL-----+
+MULTIPLY   +
+Source A      ACC|
+          -731|
+Source B DIF1_179B|
+          -9|
+Dest      ACC|
+          -731|
+-----+
+CLR-----+
+CLEAR      +
+Dest      S:5|
+          0|
+-----+
+MUL-----+
+MULTIPLY   +
+Source A      DDIF1|
+          -1|
+Source B      DDIF1|
+          -1|
+Dest      ACC1|
+          -730|
+-----+
+MUL-----+
+MULTIPLY   +
+Source A      DDIF1|
+          -1|
+Source B      ACC1|
+          -730|
+Dest      ACC1|
+          -730|
+-----+
+CLR-----+
+CLEAR      +
+Dest      S:5|
+          0|
+-----+
+++

```

```

+++
|                                     |
|                                     | SCRATCH
| +EQU-----+ N7:235
| +EQU-----+ ( )
| |Source A    ACC| 6
| |             -731|
| |Source B    0|
| |             |
| +-----+
| N22:0 - (2:215)
| +EQU-----+ +SUB-----+
| +EQU-----+ +SUBTRACT
| |Source A    ACC| |Source A    ACC|
| |             -731| |             -731|
| |Source B    1| |Source B    1|
| |             | |             |
| +-----+ |Dest    ACC|
| N22:0 - (2:215) |             -731|
| +-----+
|
| SCRATCH
| N7:235
| ] [-----+
| 6
| (2:215)
|
| +ADD-----+
| +ADD
| |Source A    ACC|
| |             -731|
| |Source B    1|
| |             |
| |Dest    ACC|
| |             -731|
| +-----+
|
| +ADD-----+
| +ADD
| |Source A    ACC|
| |             -731|
| |Source B    ACC|
| |             -730|
| |Dest    ACC|
| |             -730|
| +-----+
|
| +SUB-----+
| +SUBTRACT
| |Source A    ACC|
| |             -730|
| |Source B    N16:71|
| |             1|
| |Dest    ACC|
| |             -731|
| +-----+
|
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE
| |Source A    ACC| |Source    100|
| |             -731| |             |
| |Source B    100| |Dest    N16:71|
| |             | |             1|
| +-----+
| N22:0 - (2:215)
|
+++

```


DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

```

+MOV-----+
+MOVE-----+
|Source      SET179B|
|            0|
|Dest        PIDSP179B|
|            0|
+-----+

```

```

+PID-----+
+PID-----+
|Control Block   PID179B|
|Process Variable AV179B|
|Control Variable CV179B|
|Control Block Length 23|
+-----+
+CLR-----+
+CLEAR-----+
|Dest           CV179B|
|                0|
+-----+
+SCL-----+
+SCALE-----+
|Source         CV179B|
|                0|
|Rate [1/10000] 15|
|                |
|Offset         0|
+-----+
|Dest           PW179B|
|                0|
+-----+
+CLR-----+
+CLEAR-----+
|Dest           S:5|
|                0|
+-----+

```

```

NOT END
      5
----(JMP)

```

```
*****  
                                BEGIN SECTION 4  
| MD4                               DUMMY15  
|                                     N22:7  
|-----[LBL]----- ( )-----  
|                                     14
```

Rung 2:746

DN_4
 N22:5
 (L)

4

Rung 2:747

 READ EACH THERMOCOUPLE AND STORE EACH TE'S VALUE IN ITS OWN MEMORY REGISTER

	+ADD-----+
	+ADD-----+
	Source A TC179V1
	716
	Source B 1000
	Dest C179V1
	1716
	+-----+

Rung 2:748

	+GRT-----+	+MOV-----+
	+GREATER THAN +-----+	+MOVE-----+
	Source A C179V1	Source 16383
	1716	
	Source B 16383	Dest C179V1
		1716
	+-----+	+-----+

N7:67 - (2:747)

Rung 2:749

	+ADD-----+
	+ADD-----+
	Source A TC179V2
	716
	Source B 1000
	Dest C179V2
	1716
	+-----+

Rung 2:750

	+GRT-----+	+MOV-----+
	+GREATER THAN +-----+	+MOVE-----+
	Source A C179V2	Source 16383
	1716	
	Source B 16383	Dest C179V2
		1716
	+-----+	+-----+

N7:68 - (2:749)

Rung 2:751

```
| +ADD-----+
|-----+
| +ADD
| |Source A   TC180B1|
| |          731|
| |Source B   1000|
| |          |
| |Dest      C180B1|
| |          1731|
|-----+
```

Rung 2:752

```
| +GRT-----+
| +GREATER THAN
| |Source A   C180B1|
| |          1731|
| |Source B   16383|
| |          |
|-----+
| +MOV-----+
|-----+
| +MOVE
| |Source     16383|
| |          |
| |Dest      C180B1|
| |          1731|
|-----+
```

N7:69 - (2:751)

Rung 2:753

```
| +ADD-----+
|-----+
| +ADD
| |Source A   TC180B2|
| |          735|
| |Source B   1000|
| |          |
| |Dest      C180B2|
| |          1735|
|-----+
```

Rung 2:754

```
| +GRT-----+
| +GREATER THAN
| |Source A   C180B2|
| |          1735|
| |Source B   16383|
| |          |
|-----+
| +MOV-----+
|-----+
| +MOVE
| |Source     16383|
| |          |
| |Dest      C180B2|
| |          1735|
|-----+
```

N7:70 - (2:753)

Rung 2:755

```
| +ADD-----+
|-----+
| +ADD
| |Source A   TC180V1|
| |          731|
| |Source B   1000|
| |          |
| |Dest      C180V1|
| |          1731|
|-----+
```


Rung 2:756

+GRT-----+	+MOV-----+
-+GREATER THAN +-----+	+MOVE-----+
Source A C180V1	Source 16383
1731	
Source B 16383	Dest C180V1
	1731
+-----+	+-----+
N7:71 - (2:755)	

Rung 2:757

	+ADD-----+
	+ADD-----+
	Source A TC180V2
	731
	Source B 1000
	Dest C180V2
	1731
	+-----+

Rung 2:758

+GRT-----+	+MOV-----+
-+GREATER THAN +-----+	+MOVE-----+
Source A C180V2	Source 16383
1731	
Source B 16383	Dest C180V2
	1731
+-----+	+-----+
N7:72 - (2:757)	

Rung 2:759

	+ADD-----+
	+ADD-----+
	Source A TC181B1
	733
	Source B 1000
	Dest C181B1
	1732
	+-----+

Rung 2:760

+GRT-----+	+MOV-----+
-+GREATER THAN +-----+	+MOVE-----+
Source A C181B1	Source 16383
1732	
Source B 16383	Dest C181B1
	1732
+-----+	+-----+
N7:73 - (2:759)	

Rung 2:761

	+ADD-----+
	+ADD-----+
	Source A TC181B2
	732
	Source B 1000
	1
	Dest C181B2
	1732
	+-----+

Rung 2:762

	+GRT-----+		+MOV-----+
	+GREATER THAN-----+		+MOVE-----+
	Source A C181B2		Source 16383
	1732		1
	Source B 16383		Dest C181B2
	1		1732
	+-----+		+-----+

N7:74 - (2:761)

Rung 2:763

	+ADD-----+
	+ADD-----+
	Source A TC181V1
	728
	Source B 1000
	1
	Dest C181V1
	1728
	+-----+

Rung 2:764

	+GRT-----+		+MOV-----+
	+GREATER THAN-----+		+MOVE-----+
	Source A C181V1		Source 16383
	1728		1
	Source B 16383		Dest C181V1
	1		1728
	+-----+		+-----+

N7:75 - (2:763)

Rung 2:765

	+ADD-----+
	+ADD-----+
	Source A TC181V2
	726
	Source B 1000
	1
	Dest C181V2
	1726
	+-----+

Rung 2:766

```

| +GRT-----+
| -+GREATER THAN
| |Source A      C181V2|
| |              1726|
| |Source B      16383|
| |              |
| +-----+
| N7:76 - (2:765)

```

```

+MOV-----+
+MOVE
|Source      16383|
|              |
|Dest        C181V2|
|              1726|
+-----+

```

Rung 2:767

```

|
|
|
|
|
|
|
|

```

```

+ADD-----+
+ADD
|Source A      TC182B1|
|              721|
|Source B      1000|
|              |
|Dest          C182B1|
|              1721|
+-----+

```

Rung 2:768

```

| +GRT-----+
| -+GREATER THAN
| |Source A      C182B1|
| |              1721|
| |Source B      16383|
| |              |
| +-----+
| N7:77 - (2:767)

```

```

+MOV-----+
+MOVE
|Source      16383|
|              |
|Dest        C182B1|
|              1721|
+-----+

```

Rung 2:769

```

|
|
|
|
|
|
|
|

```

```

+ADD-----+
+ADD
|Source A      TC182B2|
|              723|
|Source B      1000|
|              |
|Dest          C182B2|
|              1723|
+-----+

```

Rung 2:770

```

| +GRT-----+
| -+GREATER THAN
| |Source A      C182B2|
| |              1723|
| |Source B      16383|
| |              |
| +-----+
| N7:78 - (2:769)

```

```

+MOV-----+
+MOVE
|Source      16383|
|              |
|Dest        C182B2|
|              1723|
+-----+

```

Rung 2:771

	+ADD-----+
	+ADD-----+
	Source A TC182V1
	723
	Source B 1000
	Dest C182V1
	1723
	+-----+

Rung 2:772

	+GRT-----+		+MOV-----+
	+GREATER THAN-----+		+MOVE-----+
	Source A C182V1		Source 16383
	1723		
	Source B 16383		Dest C182V1
			1723
	+-----+		+-----+
	N7:79 - (2:771)		

Rung 2:773

	+ADD-----+
	+ADD-----+
	Source A TC182V2
	723
	Source B 1000
	Dest C182V2
	1723
	+-----+

Rung 2:774

	+GRT-----+		+MOV-----+
	+GREATER THAN-----+		+MOVE-----+
	Source A C182V2		Source 16383
	1723		
	Source B 16383		Dest C182V2
			1723
	+-----+		+-----+
	N7:81 - (2:773)		

Rung 2:775

	+ADD-----+
	+ADD-----+
	Source A TC183B1
	732
	Source B 1000
	Dest C183B1
	1732
	+-----+

Rung 2:776

+GRT-----+	+MOV-----+
-GREATER THAN	+MOVE-----+
Source A C183B1	Source 16383
1732	
Source B 16383	Dest C183B1
1732	
+-----+	+-----+
N7:80 - (2:775)	

Rung 2:777

	+ADD-----+
	+ADD-----+
	Source A TC183B2
	733
	Source B 1000
	Dest C183B2
	1733
	+-----+

Rung 2:778

+GRT-----+	+MOV-----+
-GREATER THAN	+MOVE-----+
Source A C183B2	Source 16383
1733	
Source B 16383	Dest C183B2
1733	
+-----+	+-----+
N7:82 - (2:777)	

Rung 2:779

	+ADD-----+
	+ADD-----+
	Source A TC183V1
	730
	Source B 1000
	Dest C183V1
	1730
	+-----+

Rung 2:780

+GRT-----+	+MOV-----+
-GREATER THAN	+MOVE-----+
Source A C183V1	Source 16383
1730	
Source B 16383	Dest C183V1
1730	
+-----+	+-----+
N7:83 - (2:779)	

Rung 2:781

```

+ADD-----+
|Source A   TC183V2|
|          730|
|Source B   1000|
|          |
|Dest      C183V2|
|          1730|
+-----+

```

Rung 2:782

```

+GRT-----+
+GREATER THAN
|Source A   C183V2|
|          1730|
|Source B   16383|
|          |
+-----+
+MOV-----+
+MOVE
|Source     16383|
|          |
|Dest      C183V2|
|          1730|
+-----+
N7:84 - (2:781)

```

Rung 2:783

** Alarms **

For each T/C read its STATUS BITS to detect T/C problems

```

T/C ENABLE
|          |
|I:19      |
|-----|/|-----+-----+
|107      |
|OPEN T/C  |
|I:19      |
|-----|/|-----+-----+
|108      |
|LO LIMIT  |
|I:19      |
|-----|/|-----+-----+
|109      |
|HIGH LIMIT|
|          |
|I:19      |
|-----|/|-----+-----+
|110      |
|CNFG ERROR|
|          |
|I:19      |
|-----|/|-----+-----+
|111      |

```

Rung 2:784

```

T/C ENABLE
|          |
|I:19      |
|-----|/|-----+-----+
|123      |
|          |
+++

```

```

+++          +++
| |          | |
| | OPEN T/C | |
| | I:19     | |
| +-----+ | |
| | 124      | |
| | LO LIMIT | |
| | I:19     | |
| +-----+ | |
| | 125      | |
| | HIGH LIMIT | |
| | I:19     | |
| +-----+ | |
| | 126      | |
| | CNFG ERROR | |
| | I:19     | |
| +-----+ | |
| | 127      | |
| |          | |
| |          | |

```

Rung 2:785

```

| |          | |
| | T/C ENABLE | |
| | I:20      | |
| +-----+ | |
| | 75        | |
| | OPEN T/C  | |
| | I:20      | |
| +-----+ | |
| | 76        | |
| | LO LIMIT  | |
| | I:20      | |
| +-----+ | |
| | 77        | |
| | HIGH LIMIT | |
| | I:20      | |
| +-----+ | |
| | 78        | |
| | CNFG ERROR | |
| | I:20      | |
| +-----+ | |
| | 79        | |
| |          | |
| |          | |

```

HA180B1
 N7:228

4

Rung 2:786

```

| |          | |
| | T/C ENABLE | |
| | I:20      | |
| +-----+ | |
| | 91        | |
| |          | |
| |          | |
+++          +++

```

HA180B2
 N7:228

5

```
+++
| | OPEN T/C |
| | I:20 |
| +-----+ |
| | 92 |
| | LO LIMIT |
| | I:20 |
| +-----+ |
| | 93 |
| | HIGH LIMIT |
| | I:20 |
| +-----+ |
| | 94 |
| | CNFG ERROR |
| | I:20 |
| +-----+ |
| | 95 |
|
```

Rung 2:787

```

|
| T/C ENABLE
|
| I:20
| +-----+ |----- HA180V1
| | 107 | | N7:228
| | OPEN T/C | | ( )
| | I:20 | | 6
| +-----+ |
| | 108 |
| | LO LIMIT |
| | I:20 |
| +-----+ |
| | 109 |
| | HIGH LIMIT |
| | I:20 |
| +-----+ |
| | 110 |
| | CNFG ERROR |
| | I:20 |
| +-----+ |
| | 111 |
|
```

Rung 2:788

```

|
| T/C ENABLE
|
| I:20
| +-----+ |----- HA180V2
| | 123 | | N7:228
| | | | | ( )
| | | | | 7
|
|
|
```



```

+++      +++
|      |      |
| OPEN T/C |
|      I:20 |
|-----|-----+
|      124 |
| LO LIMIT |
|      I:20 |
|-----|-----+
|      125 |
| HIGH LIMIT |
|      I:20 |
|-----|-----+
|      126 |
| CNFG ERROR |
|      I:20 |
|-----|-----+
|      127 |
|      |

```

Rung 2:789

T/C ENABLE

```

|      I:8 |
|-----|-----+
|      91 |
| OPEN T/C |
|      I:8 |
|-----|-----+
|      92 |
| LO LIMIT |
|      I:8 |
|-----|-----+
|      93 |
| HI LIMIT |
|      I:8 |
|-----|-----+
|      94 |
| CNFG ERROR |
|      I:8 |
|-----|-----+
|      95 |
|      |

```

HA181B1
 N7:228

8

Rung 2:790

T/C ENABLE

```

|      I:8 |
|-----|-----+
|      107 |
| OPEN T/C |
|      I:8 |
|-----|-----+
|      108 |
| LO LIMIT |
|      I:8 |
|-----|-----+
|      109 |
|      |

```

HA181B2
 N7:228

9

+++ +++

```

+++
| | HI LIMIT |
| | I:8      |
| +-----+ |
| | 110      |
| | CNFG ERROR |
| | I:8      |
| +-----+ |
| | 111      |

```

Rung 2:791
 T/C ENABLE

```

| | I:8      |
| | 107      |
| | OPEN T/C |
| | I:8      |
| +-----+ |
| | 108      |
| | LO LIMIT |
| | I:8      |
| +-----+ |
| | 109      |
| | HI LIMIT |
| | I:8      |
| +-----+ |
| | 110      |
| | CNFG ERROR |
| | I:8      |
| +-----+ |
| | 111      |

```

HA181V1
 N7:228

10

Rung 2:792

```

| | T/C ENABLE |
| | I:8      |
| | 123      |
| | OPEN T/C |
| | I:8      |
| +-----+ |
| | 124      |
| | LO LIMIT |
| | I:8      |
| +-----+ |
| | 125      |
| | HI LIMIT |
| | I:8      |
| +-----+ |
| | 126      |
| | CNFG ERROR |
| | I:8      |
| +-----+ |
| | 127      |

```

HA181V2
 N7:228

11

Rung 2:793

T/C ENABLE

```
|
|      I:3
|      75
| OPEN T/C
|      I:3
|      76
| LO LIMIT
|      I:3
|      77
| HI LIMIT
|      I:3
|      78
| CNFG ERROR
|
|      I:3
|      79
|
```

HA182B1
N7:228

12

Rung 2:794

T/C ENABLE

```
|
|      I:3
|      91
| OPEN T/C
|      I:3
|      92
| LO LIMIT
|      I:3
|      93
| HI LIMIT
|      I:3
|      94
| CNFG ERROR
|
|      I:3
|      95
|
```

HA182B2
N7:228

13

Rung 2:795

T/C ENABLE

I:3

HA182V1

N7:228

()

14

107

OPEN T/C

I:3

108

LO LIMIT

I:3

109

HI LIMIT

I:3

110

CNFG ERROR

I:3

111

Rung 2:796

T/C ENABLE

I:3

HA182V2

N7:228

()

15

123

OPEN T/C

I:3

124

LO LIMIT

I:3

125

HI LIMIT

I:3

126

CNFG ERROR

I:3

127

Rung 2:797

```
|
|
|      T/C ENABLE
|
|      I:4
|      ]/[-----+-----+-----+-----+
|      75
|      | OPEN T/C
|      | I:4
|      | ] [-----+-----+-----+
|      | 76
|      | LO LIMIT
|      | I:4
|      | ] [-----+-----+-----+
|      | 77
|      | HI LIMIT
|      | I:4
|      | ] [-----+-----+-----+
|      | 78
|      | CNFG ERROR
|      | I:4
|      | ] [-----+-----+-----+
|      | 79
|
```

HA183B1
N7:229

0

Rung 2:798

```
|
|
|      T/C ENABLE
|
|      I:4
|      ]/[-----+-----+-----+-----+
|      91
|      | OPEN T/C
|      | I:4
|      | ] [-----+-----+-----+
|      | 92
|      | LO LIMIT
|      | I:4
|      | ] [-----+-----+-----+
|      | 93
|      | HI LIMIT
|      | I:4
|      | ] [-----+-----+-----+
|      | 94
|      | CNFG ERROR
|      | I:4
|      | ] [-----+-----+-----+
|      | 95
|
```

HA183B2
N7:229

1

```

T/C ENABLE
I:4
1/0
107
OPEN T/C
I:4
108
LO LIMIT
I:4
109
HI LIMIT
I:4
110
CNFG ERROR
I:4
111

```

```

T/C ENABLE
I:4
I/C
123
OPEN T/C
I:4
+-----] [-----+
124
LO LIMIT
I:4
+-----] [-----+
125
HI LIMIT
I:4
+-----] [-----+
126
CNFG ERROR
I:4
+-----] [-----+
127

```

```

|                                     | DEV 4 |
|                                     | N22:6 |
|-----+-----+-----+-----+-----+-----+-----+-----+
|                                     | (L)   |
|                                     | 4     |
|                                     | AV4   |
|                                     | 15    |
|-----+-----+-----+-----+-----+-----+
|                                     | (JMP) |

```

Rung 2:802

1 DEV4

i

11

-----[LBL]----- ()-----
| 12

Rung 2:803

ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

+ADD-----+
+ADD
|Source A      AV179V|
|              1716|
|Source B DEVIATION|
|              1250|
|Dest          H179V|
|              2966|
+-----+
+SUB-----+
+SUBTRACT
|Source A      AV179V|
|              1716|
|Source B DEVIATION|
|              1250|
|Dest          L179V|
|              466|
+-----+

```

Rung 2:804

HA179V1

1 N7:228

```
|-----|/[-----+---GREATER THAN      +---|------( )-----|
|          2         |Source A    C179V1|          2
```

1	2	1	Source A	C179V1	1
1	(2:783)	1		1716	1
1		1	Source B	H179V	1
1		1		2966	1

```

|      |      | +-----+-----+
|      |      | N7:67 - (2:747)

```

```

| N7:107 - (2:717)
| N10:122 - (2:803)
| +LES-----+

```

+ - + LESS THAN + - +

Source A C179V1

17161

1 Source B L179V1

1 . 1 4661

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

1 N7:67 - (2:747)

1 N10:73 - (2:803)


```

+++
|
| +LES-----+
| +-LESS THAN +-
| |Source A    C180B1|
| |           1731|
| |Source B    L180B|
| |           483|
| +-----+
| N7:69 - (2:751)
| N10:74 - (2:806)

```

Rung 2:808
 HA180B2
 N7:228

D180B2
 N7:1175

```

| 1/1 | +GRT-----+
| 5 | |Source A    C180B2|
| (2:786) | |           1735|
| | |Source B    H180B|
| | |           2983|
| | +-----+
| | N7:70 - (2:753)
| | N10:123 - (2:806)
| | +LES-----+
| | +-LESS THAN +-
| | |Source A    C180B2|
| | |           1735|
| | |Source B    L180B|
| | |           483|
| | +-----+
| | N7:70 - (2:753)
| | N10:74 - (2:806)

```

Rung 2:809

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

| +ADD-----+
| +ADD +-+
| |Source A    AV180V|
| |           1731|
| |Source B DEVIATION|
| |           1250|
| |Dest        H180V|
| |           2981|
| +-----+
| +SUB-----+
| +-SUBTRACT +-+
| |Source A    AV180V|
| |           1731|
| |Source B DEVIATION|
| |           1250|
| |Dest        L180V|
| |           481|
| +-----+

```



```

+++
|
| +SUB-----+
| +SUBTRACT +
| Source A AV181B|
| 1732|
| Source B DEVIATION|
| 1250|
| Dest L181B|
| 482|
+-----+

```

Rung 2:813

```

| HA181B1 D181B1
| N7:228 N7:175
| ---J/[---+GRT-----+-----+
| 8 | Source A C181B1 |
| (2:789) | 1732|
| | Source B H181B|
| | 2982|
| +-----+
| N7:73 - (2:759) |
| N10:125 - (2:812) |
| +LES-----+
| +LESS THAN +
| Source A C181B1|
| 1732|
| Source B L181B|
| 482|
| +-----+
| N7:73 - (2:759)
| N10:76 - (2:812)

```

Rung 2:814

```

| HA181B2 D181B2
| N7:228 N7:175
| ---J/[---+GRT-----+-----+
| 9 | Source A C181B2|
| (2:790) | 1732|
| | Source B H181B|
| | 2982|
| +-----+
| N7:74 - (2:761) |
| N10:125 - (2:812) |
| +LES-----+
| +LESS THAN +
| Source A C181B2|
| 1732|
| Source B L181B|
| 482|
| +-----+
| N7:74 - (2:761)
| N10:76 - (2:812)

```

Rung 2:815

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

+ADD-----+		
	Source A	AV181V
		1727
	Source B DEVIATION	
		1250
	Dest	H181V
		2977
+SUB-----+		
+SUBTRACT		
	Source A	AV181V
		1727
	Source B DEVIATION	
		1250
	Dest	L181V
		477
+-----+		

Rung 2:816

	HA181V1		D181V1
	N7:228		N7:175
	/	+GREATER THAN	()
	10	Source A	C181V1
	(2:791)		1728
		Source B	H181V
			2977
+-----+			
		N7:75 - (2:763)	
		N10:126 - (2:815)	
		+LES-----+	
		+LESS THAN	+ +
		Source A	C181V1
			1728
		Source B	L181V
			477
+-----+			
		N7:75 - (2:763)	
		N10:77 - (2:815)	

Rung 2:817

	HA181V2		D181V2
	N7:228		N7:175
	/	+GREATER THAN	()
	11	Source A	C181V2
	(2:792)		1726
		Source B	H181V
			2977
+-----+			
		N7:76 - (2:765)	
		N10:126 - (2:815)	
+-----+			

```
+++
|
| +LES-----+
| +LESS THAN +
| |Source A   C181V2|
| |          1726|
| |Source B   L181V|
| |          477|
| +-----+
| N7:76 - (2:765)
| N10:77 - (2:815)
```

Rung 2:818

ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|
| +ADD-----+
| +ADD +
| |Source A   AV182B|
| |          1722|
| |Source B DEVIATION|
| |          1250|
| |Dest       H182B|
| |          2972|
| +-----+
| +SUB-----+
| +SUBTRACT +
| |Source A   AV182B|
| |          1722|
| |Source B DEVIATION|
| |          1250|
| |Dest       L182B|
| |          472|
| +-----+
```

Rung 2:819

```

| HA182B1
| N7:228
| 12
| (2:793)
|
| +CRT-----+
| +GREATER THAN +
| |Source A   C182B1|
| |          1721|
| |Source B   H182B|
| |          2972|
| +-----+
| N7:77 - (2:767)
| N10:127 - (2:818)
| +LES-----+
| +LESS THAN +
| |Source A   C182B1|
| |          1721|
| |Source B   L182B|
| |          472|
| +-----+
| N7:77 - (2:767)
| N10:78 - (2:818)
```

D182B1
N7:175
()
12

```

Rung 2:820
| HA182B2                                D182B2
| N7:228                                N7:175
|-----|+GRT-----+-----| | |
| 13 | |Source A C182B2| |
| (2:794) | | 1723| |
| | |Source B H182B| |
| | | 2972| |
| |-----+
| N7:78 - (2:769) |
| N10:127 - (2:818) |
| +LES-----+
| +LESS THAN +-----+
| |Source A C182B2|
| | 1723|
| |Source B L182B|
| | 472|
| |-----+
| N7:78 - (2:769) |
| N10:78 - (2:818) |

```

Rung 2:821

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|-----|+ADD-----+-----| |
| |Source A AV182V| |
| | 1723| |
| |Source B DEVIATION| |
| | 1250| |
| |Dest H182V| |
| | 2973| |
| |-----+
| |SUB-----+
| +SUBTRACT +-----+
| |Source A AV182V|
| | 1723|
| |Source B DEVIATION|
| | 1250|
| |Dest L182V|
| | 473|
| |-----+

```

```

Rung 2:822
| HA182V1                                D182V1
| N7:228                                N7:175
|-----|+GRT-----+-----| | |
| 14 | |Source A C182V1| |
| (2:795) | | 1723| |
| | |Source B H182V| |
| | | 2973| |
| |-----+
| N7:79 - (2:771) |
| N10:128 - (2:821) |
|
|+++

```

```

      +--+
      |
      | +LES-----+
      | +-LESS THAN +--+
      | |Source A   C182V1|
      | |           1723|
      | |Source B   L182V|
      | |           473|
      | +-----+
      | N7:79 - (2:771)
      | N10:79 - (2:821)
  
```

Rung 2:823

```

      HA182V2
      N7:228
      15
      (2:796)
      |
      | +GRT-----+
      | |Source A   C182V2|
      | |           1723|
      | |Source B   H182V|
      | |           2973|
      | +-----+
      | N7:81 - (2:773)
      | N10:128 - (2:821)
      | +LES-----+
      | +-LESS THAN +--+
      | |Source A   C182V2|
      | |           1723|
      | |Source B   L182V|
      | |           473|
      | +-----+
      | N7:81 - (2:773)
      | N10:79 - (2:821)
  
```

Rung 2:824

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

      +-----+
      | +ADD +-----+
      | |Source A   AV183B|
      | |           1733|
      | |Source B DEVIATION|
      | |           1250|
      | |Dest       H183B|
      | |           2983|
      | +-----+
      | +SUB +-----+
      | +-SUBTRACT +--+
      | |Source A   AV183B|
      | |           1733|
      | |Source B DEVIATION|
      | |           1250|
      | |Dest       L183B|
      | |           483|
      | +-----+
  
```

```

Rung 2:825
| HA183B1 | D183B1
| N7:229 | N7:176
|-----+GRT-----+-----+
| 1/[ | +GREATER THAN |-----+
| 0 | |Source A C183B1| |
| (2:797) | | 1732 | |
| | |Source B H183B1| |
| | | 2983 | |
| | +-----+
| | N7:80 - (2:775) |
| | N10:129 - (2:824) |
| | +LES-----+
| | +-LESS THAN +-+
| | |Source A C183B1|
| | | 1732 |
| | |Source B L183B1|
| | | 483 |
| | +-----+
| | N7:80 - (2:775)
| | N10:80 - (2:824)
  
```

```

Rung 2:826
| HA183B2 | D183B2
| N7:229 | N7:176
|-----+GRT-----+-----+
| 1/[ | +GREATER THAN |-----+
| 1 | |Source A C183B2| |
| (2:798) | | 1733 | |
| | |Source B H183B1| |
| | | 2983 | |
| | +-----+
| | N7:82 - (2:777) |
| | N10:129 - (2:824) |
| | +LES-----+
| | +-LESS THAN +-+
| | |Source A C183B2|
| | | 1733 |
| | |Source B L183B1|
| | | 483 |
| | +-----+
| | N7:82 - (2:777)
| | N10:80 - (2:824)
  
```

Rung 2:827

 ESTABLISH HIGH AND LOW LIMITS FOR RANGE CHECKING IF NO HARDWARE ALARMS EXIST
 CHECK T/C VALUES FOR OUT-OF-RANGE CONDITION

```

|-----+ADD-----+
|-----+ADD
| |Source A AV183V| |
| | 1730 | |
| |Source B DEVIATION| |
| | 1250 | |
| |Dest H183V| |
| | 2980 | |
| |-----+
| |
| |
| |
  
```



```

+++
|
| +SUB-----+
| +SUBTRACT +
| |Source A AV183V|
| | 1730|
| |Source B DEVIATION|
| | 1250|
| |Dest L183V|
| | 480|
|
+-----+

```

Rung 2:828

```

| HA183V1 D183V1
| N7:229 +GRT-----+
| ---] / [---+GREATER THAN-----+
| 2 | |Source A C183V1|
| (2:799) | | 1730|
| | |Source B H183V|
| | | 2980|
| | +-----+
| | N7:83 - (2:779)
| | N10:130 - (2:827)
| | +LES-----+
| | +LESS THAN +
| | |Source A C183V1|
| | | 1730|
| | |Source B L183V|
| | | 480|
| | +-----+
| | N7:83 - (2:779)
| | N10:81 - (2:827)
|

```

Rung 2:829

```

| HA183V2 D183V2
| N7:229 +GRT-----+
| ---] / [---+GREATER THAN-----+
| 3 | |Source A C183V2|
| (2:800) | | 1730|
| | |Source B H183V|
| | | 2980|
| | +-----+
| | N7:84 - (2:781)
| | N10:130 - (2:827)
| | +LES-----+
| | +LESS THAN +
| | |Source A C183V2|
| | | 1730|
| | |Source B L183V|
| | | 480|
| | +-----+
| | N7:84 - (2:781)
| | N10:81 - (2:827)
|

```

Rung 2:830

```

|
| DEV_4
| N22:6
| -----+
| (U)
|
4

```

Rung 2:831

AV4

15

[LBL]

DUMMY56

N22:10

()

7

Rung 2:832

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND, NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

+CLR-----+	
+CLEAR	
Dest	COUNT
	2
+CLR-----+	
+CLEAR	
Dest	TOTAL
	3453.000
+-----+	

Rung 2:833

HA179V1

D179V1

OUT179V1

N7:228

N7:175

N7:240

1/1

1/1

1/1

2

2

14

(2:783)

(2:804)

+ADD-----+	
+ADD	
Source A	
	1
Source B	COUNT
	2
Dest	COUNT
	2
+-----+	
+ADD-----+	
+ADD	
Source A	C179V1
	1716
Source B	TOTAL
	3453.000
Dest	TOTAL
	3453.000
+-----+	

Rung 2:834

HA179V2

D179V2

OUT179V2

N7:228

N7:175

N7:240

1/1

1/1

1/1

3

3

15

(2:784)

(2:805)

+ADD-----+	
+ADD	
Source A	
	1
Source B	COUNT
	2
Dest	COUNT
	2
+-----+	

```

***
|                                     |
| +ADD-----+                     + |
| +---+ADD-----+                 + |
| |Source A      C179V2|           | |
| |              1716|           | |
| |Source B      TOTAL|           | |
| |              3453.000|         | |
| |Dest          TOTAL|           | |
| |              3453.000|         | |
| +-----+                     + |

```

+DIV-----+	
DIVIDE	
Source A	TOTAL
	3453.000
Source B	COUNT
	2
Dest	AV179V
	1716
+-----+	

	+CLR-----+
	+CLEAR-----+
	Dest COUNT
	21
	+-----+
	+CLR-----+
	+CLEAR-----+
	Dest TOTAL
	3453.000
	+-----+

HA180B1 N7:228	D180B1 N7:175	OUT180B1 N7:241	+ADD-----+
-J/[	-J/[	-J/[	+ADD
4	4	0	Source A 1
(2:785)	(2:807)		Source B COUNT
			2
			Dest COUNT
			2
			+-----+
+++	+++	+++	+++

```

++          ++
|           |
|-----|
|+ADD-----+
++ADD      ++
|Source A   C18081|
|           1731|
|Source B   TOTAL|
|           3453.000|
|Dest       TOTAL|
|           3453.000|
|-----|

```

+ADD-----+	
+ADD	
Source A	1
Source B	COUNT
	2
Dest	COUNT
	2
+-----+	
+ADD-----+	
+ADD	
Source A	C180B2
	1735
Source B	TOTAL
	3453.000
Dest	TOTAL
	3453.000

```

+DIV-----+
+DIVIDE      +-
|Source A      TOTAL|
|              3453.000|
|Source B      COUNT|
|              2|
|Dest          AV180B|
|              1733|
+-----+

```

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE OUTxxx) THEN AVERAGE THE T/C

Rung 2:841

HA180V1	D180V1	OUT180V1
N7:228	N7:175	N7:241

] / [-----] / [-----] / [-----			+ADD-----+
6	6	2	+ADD-----+
(2:787)	(2:810)		Source A 1
			Source B COUNT
			Dest COUNT
			2
			2
			+-----+
	DEV_4		+ADD-----+
	N22:6		+ADD-----+
	4		Source A C180V1
	(2:801)		1731
			Source B TOTAL
			3453.000
			Dest TOTAL
			3453.000
			+-----+

Rung 2:842

HA180V2	D180V2	OUT180V2
N7:228	N7:175	N7:241

] / [-----] / [-----] / [-----			+ADD-----+
7	7	3	+ADD-----+
(2:788)	(2:811)		Source A 1
			Source B COUNT
			Dest COUNT
			2
			2
			+-----+
	DEV_4		+ADD-----+
	N22:6		+ADD-----+
	4		Source A C180V2
	(2:801)		1731
			Source B TOTAL
			3453.000
			Dest TOTAL
			3453.000
			+-----+

Rung 2:843

+DIV-----+	
+DIVIDE	
Source A	TOTAL
	3453.000
Source B	COUNT
	2
Dest	AV180V
	1731
+-----+	

Rung 2:844

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

+CLR-----+	
+CLEAR	
Dest	COUNT
	2
+-----+	
+CLR-----+	
+CLEAR	
Dest	TOTAL
	3453.000
+-----+	

Rung 2:845

HA181B1 N7:228	D181B1 N7:175	OUT181B1 N7:241	+ADD-----+	
/	/	/	+ADD	
8	8	4	Source A	1
(2:789)	(2:813)		Source B	COUNT
				2
			Dest	COUNT
				2
			+-----+	
	DEV_4		+ADD-----+	
	N22:6		+ADD	
			Source A	C181B1
				1732
			Source B	TOTAL
				3453.000
			Dest	TOTAL
				3453.000
			+-----+	

Rung 2:846

HA181B2 N7:228	D181B2 N7:175	OUT181B2 N7:241	
1/[9 (2:790)	1/[9 (2:814)	1/[5	
			+ADD-----+
			Source A 1
			Source B COUNT
			Dest COUNT
			2
			2
			+-----+
	DEV_4		+ADD-----+
	N22:6		+ADD-----+
	4		Source A C181B2
	(2:801)		1732
			Source B TOTAL
			3453.000
			Dest TOTAL
			3453.000
			+-----+

Rung 2:847

	+DIV-----+
	+DIVIDE-----+
	Source A TOTAL
	3453.000
	Source B COUNT
	2
	Dest AV181B
	1732
	+-----+

Rung 2:848

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

	+CLR-----+
	+CLEAR-----+
	Dest COUNT
	2
	+-----+
	+CLR-----+
	+CLEAR-----+
	Dest TOTAL
	3453.000
	+-----+

Rung 2:849

HA181V1 N7:228	D181V1 N7:175	OUT181V1 N7:241	
-1/[	-1/[	-1/[	+ADD-----+
10	10	6	+ADD
(2:791)	(2:816)		Source A 1
			Source B COUNT
			Dest COUNT
			2
			2
			+-----+
	DEV_4		+ADD-----+
	N22:6		+ADD
			Source A C181V1
			1728
			Source B TOTAL
			3453.000
			Dest TOTAL
			3453.000
			+-----+

Rung 2:850

HA181V2 N7:228	D181V2 N7:175	OUT181V2 N7:241	
-1/[	-1/[	-1/[	+ADD-----+
11	11	7	+ADD
(2:792)	(2:817)		Source A 1
			Source B COUNT
			Dest COUNT
			2
			2
			+-----+
	DEV_4		+ADD-----+
	N22:6		+ADD
			Source A C181V2
			1726
			Source B TOTAL
			3453.000
			Dest TOTAL
			3453.000
			+-----+

Rung 2:851

			+DIV-----+
			+DIVIDE
			Source A TOTAL
			3453.000
			Source B COUNT
			2
			Dest AV181V
			1727
			+-----+

Rung 2:852

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TF_OUTxxx) THEN AVERAGE THE T/C

+CLR-----+	
	+CLEAR
	Dest COUNT
	2
	+-----+
	+CLR-----+
	+CLEAR
	Dest TOTAL
	3453.000
	+-----+

Rung 2:853

+ADD-----+	
	+ADD
	Source A 1
	Source B COUNT
	Dest COUNT
	2
	+-----+
	+ADD-----+
	+ADD
	Source A C182B1
	1721
	Source B TOTAL
	3453.000
	Dest TOTAL
	3453.000
	+-----+

Rung 2:854

+ADD-----+	
	+ADD
	Source A 1
	Source B COUNT
	Dest COUNT
	2
	+-----+


```

+++
|
|      DEV_4
|      N22:6
|-----] [-----
|              4
|      (2:801)
|

```

```

+++
|
|      +ADD-----+
|      +ADD
|      |Source A    C182V1|
|      |              1723|
|      |Source B    TOTAL|
|      |              3453.000|
|      |Dest        TOTAL|
|      |              3453.000|
|      +-----+

```

```

Rung 2:858
HA182V2      D182V2      OUT182V2
N7:228      N7:175      N7:241
|/|/|/|
| 15      | 15      | 11
| (2:796) | (2:823) |
|

```

```

+ADD-----+
+ADD
|Source A    1|
|Source B    COUNT|
|Dest        COUNT|
|              2|
|              2|
+-----+

```

```

|
|      DEV_4
|      N22:6
|-----] [-----
|              4
|      (2:801)
|

```

```

+ADD-----+
+ADD
|Source A    C182V2|
|              1723|
|Source B    TOTAL|
|              3453.000|
|Dest        TOTAL|
|              3453.000|
+-----+

```

Rung 2:859

```

+DIV-----+
+DIVIDE
|Source A    TOTAL|
|              3453.000|
|Source B    COUNT|
|              2|
|Dest        AV182V|
|              1723|
+-----+

```

Rung 2:860

CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
HAVE BEEN TAKEN OUT (TE_OUTxxx) THEN AVERAGE THE T/C

```

+CLR-----+
+CLEAR
|Dest        COUNT|
|              2|
+-----+

```

			+++	+++
			+CLR-----+	
			+CLEAR	++
			Dest	TOTAL
				3453.000
			+-----+	
Rung 2:861				
HA183B1	D183B1	OUT183B1		
N7:229	N7:176	N7:241		
] / [-----]			+ADD-----+	
			+ADD	++
0	0	12	Source A	1
(2:797)	(2:825)		Source B	COUNT
				2
			Dest	COUNT
				2
			+-----+	
	DEV_4			
	N22:6			
+-----]			+ADD-----+	
			+ADD	++
	4		Source A	C183B1
(2:801)				1732
			Source B	TOTAL
				3453.000
			Dest	TOTAL
				3453.000
			+-----+	
Rung 2:862				
HA183B2	D183B2	OUT183B2		
N7:229	N7:176	N7:241		
] / [-----]			+ADD-----+	
			+ADD	++
1	1	13	Source A	1
(2:798)	(2:826)		Source B	COUNT
				2
			Dest	COUNT
				2
			+-----+	
	DEV_4			
	N22:6			
+-----]			+ADD-----+	
			+ADD	++
	4		Source A	C183B2
(2:801)				1733
			Source B	TOTAL
				3453.000
			Dest	TOTAL
				3453.000
			+-----+	

+DIV-----+	
+DIVIDE-----+	
Source A	TOTAL
	3453.000
Source B	COUNT
	2
Dest	AV183E
	1733
+-----+	

 CLEAR COUNT AND TOTAL. IF NO HARDWARE, NO RANGE ALARMS AND NO THERMOCOUPLES
 HAVE BEEN TAKEN OUT (TE_OUT=xxx) THEN AVERAGE THE T/C

	CLR
	*CLEAR
Dest	COUNT
	2
	CLR
	*CLEAR
Dest	TOTAL
	3453.000
	CLR

HA183V1 N7:229	D183V1 N7:176	OUT183V1 N7:241	
1/[2 (2:799)	1/[2 (2:828)	1/[14	
	DEV_4 N22:6		
	-J [4 (2:801)		
			+ADD-----+ +ADD Source A 1 Source B COUNT 2 Dest COUNT 2 +-----+
			+ADD-----+ +ADD Source A C183V1 1730 Source B TOTAL 3453.000 Dest TOTAL 3453.000 +-----+

HA183V2	D183V2	OUT183V2
N7:229	N7:176	N7:241

Rung 2:867

Rung 2:868

IF DEVIATION SET FOR SECTION 4 THEN GO THERE AND CALCULATE DEVIATION
DEV4

```

|      DEV_4
|      N22:6
|-----] [----- 11
|      4
|      (2:801)

```

```

|                                     END
|      DN_4
|      N22:5
|-----] / [----- 6
|      4              (JMP)
|      (2:43)

```

Rung 2:871

```

+MOV-----+
|MOVE|
|Source AV179V|
|1716|
|Dest R1_179V|
|1716|
+-----+
+SUB-----+
|SUBTRACT|
|Source A R1_179V|
|1716|
|Source B R2_179V|
|1716|
|Dest DIF1_179V|
|-9|
+-----+
+MOV-----+
|MOVE|
|Source R1_179V|
|1716|
|Dest R2_179V|
|1716|
+-----+
+SUB-----+
|SUBTRACT|
|Source A DIF1_179V|
|-9|
|Source B DIF2_179V|
|0|
|Dest DDIF1|
|-1|
+-----+
+MOV-----+
|MOVE|
|Source DIF1_179V|
|-9|
|Dest DIF2_179V|
|0|
+-----+

```

```

+*+
+SUB-----+
+SUBTRACT-----+
|Source A DIF1_179V|
|                               -9|
|Source B              9|
|                               |
|Dest      DIF1_179V|
|                               -9|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A DIF1_179V|
|                               -9|
|Source B DIF1_179V|
|                               -9|
|Dest      ACC|
|                               -731|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A              ACC|
|                               -731|
|Source B DIF1_179V|
|                               -9|
|Dest      ACC|
|                               -731|
+-----+
+CLR-----+
+CLEAR-----+
|Dest              S:5|
|                   0|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A              DDIF1|
|                               -1|
|Source B              DDIF1|
|                               -1|
|Dest      ACC1|
|                               -730|
+-----+
+MUL-----+
+MULTIPLY-----+
|Source A              DDIF1|
|                               -1|
|Source B              ACC1|
|                               -730|
|Dest      ACC1|
|                               -730|
+-----+
+CLR-----+
+CLEAR-----+
|Dest              S:5|
|                   0|
+-----+
+*+

```



```

+++
|
|                                     SCRATCH
| +EQU-----+ N7:235
| +EQU-----+
| |Source A      ACC|      6
| |              -731|
| |Source B      0|
| |
| +-----+
| N22:0 - (2:215)
| +EQU-----+ +SUB-----+
| +EQU-----+ +SUBTRACT-----+
| |Source A      ACC| |Source A      ACC|
| |              -731| |              -731|
| |Source B      1| |Source B      1|
| |
| +-----+ |Dest      ACC|
| N22:0 - (2:215) |              -731|
| +-----+
|
| SCRATCH
| N7:235
| ] [-----+ +ADD-----+
| |          | +ADD
| |          | |Source A      ACC|
| |          | |              -731|
| |          | |Source B      1|
| |          | |
| |          | |Dest      ACC|
| |          | |              -731|
| |          | +-----+
| |          | +ADD-----+
| |          | +ADD
| |          | |Source A      ACC|
| |          | |              -731|
| |          | |Source B      ACC|
| |          | |              -730|
| |          | |Dest      ACC|
| |          | |              -730|
| |          | +-----+
| |          | +SUB-----+
| |          | +SUBTRACT-----+
| |          | |Source A      ACC|
| |          | |              -730|
| |          | |Source B      N16:101|
| |          | |              1|
| |          | |Dest      ACC|
| |          | |              -731|
| |          | +-----+
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE
| |Source A      ACC| |Source      100|
| |              -731|
| |Source B      100| |Dest      N16:101|
| |              1|
| +-----+
| N22:0 - (2:215)
|
+++

```


Rung 2:875

DETECT SETPOINT VALUE FROM SCADA
 PUT VALUE IN PID BLOCK

	+MOV-----+
	+MOVE-----+
	Source SET179V
	0
	Dest PIDSP179V
	0
	+-----+

Rung 2:876

	+PID-----+
	+PID-----+
	Control Block PID179V
	Process Variable AV179V
	Control Variable CV179V
	Control Block Length 23
	+-----+
	+SCL-----+
	+SCALE-----+
	Source CV179V
	0
	Rate [/10000] 15
	Offset 0
	Dest PW179V
	0
	+-----+
	+CLR-----+
	+CLEAR-----+
	Dest S:5
	0
	+-----+

Rung 2:877

	86	N7:236
	[LBL]	()
		4

Rung 2:878

	RT_TMR/DN	PID180B
	T4:87	48
	DN	(JMP)
	(2:42)	

Rung 2:879

RATE CHECKING

	+MOV-----+
	+MOVE-----+
	Source AV180B
	1733
	Dest R1_180B
	1733
	+-----+

+++

1

15

AND JUMP AROUND THE PID BLOCK

1

--(JMP)-----

1

PUT VALUE IN PID BLOCK

1

✚ 1716 1717 1718 1719 1720 1721 1722 1723 1724 1725 1726 1727 1728 1729 1730 1731 1732 1733 1734 1735 1736 1737 1738 1739 1740 1741 1742 1743 1744 1745 1746 1747 1748 1749 1750 1751 1752 1753 1754 1755 1756 1757 1758 1759 1760 1761 1762 1763 1764 1765 1766 1767 1768 1769 1770 1771 1772 1773 1774 1775 1776 1777 1778 1779 1780 1781 1782 1783 1784 1785 1786 1787 1788 1789 1790 1791 1792 1793 1794 1795 1796 1797 1798 1799 1800 1801 1802 1803 1804 1805 1806 1807 1808 1809 1810 1811 1812 1813 1814 1815 1816 1817 1818 1819 1820 1821 1822 1823 1824 1825 1826 1827 1828 1829 1830 1831 1832 1833 1834 1835 1836 1837 1838 1839 1840 1841 1842 1843 1844 1845 1846 1847 1848 1849 1850 1851 1852 1853 1854 1855 1856 1857 1858 1859 1860 1861 1862 1863 1864 1865 1866 1867 1868 1869 1870 1871 1872 1873 1874 1875 1876 1877 1878 1879 1880 1881 1882 1883 1884 1885 1886 1887 1888 1889 1890 1891 1892 1893 1894 1895 1896 1897 1898 1899 1900 1901 1902 1903 1904 1905 1906 1907 1908 1909 1910 1911 1912 1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923 1924 1925 1926 1927 1928 1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952 1953 1954 1955 1956 1957 1958 1959 1960 1961 1962 1963 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072 2073 2074 2075 2076 2077 2078 2079 2080 2081 2082 2083 2084 2085 2086 2087 2088 2089 2090 2091 2092 2093 2094 2095 2096 2097 2098 2099 2100 2101 2102 2103 2104 2105 2106 2107 2108 2109 2110 2111 2112 2113 2114 2115 2116 2117 2118 2119 2120 2121 2122 2123 2124 2125 2126 2127 2128 2129 2130 2131 2132 2133 2134 2135 2136 2137 2138 2139 2140 2141 2142 2143 2144 2145 2146 2147 2148 2149 2150 2151 2152 2153 2154 2155 2156 2157 2158 2159 2160 2161 2162 2163 2164 2165 2166 2167 2168 2169 2170 2171 2172 2173 2174 2175 2176 2177 2178 2179 2180 2181 2182 2183 2184 2185 2186 2187 2188 2189 2190 2191 2192 2193 2194 2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2208 2209 2210 2211 2212 2213 2214 2215 2216 2217 2218 2219 2220 2221 2222 2223 2224 2225 2226 2227 2228 2229 2230 2231 2232 2233 2234 2235 2236 2237 2238 2239 2240 2241 2242 2243 2244 2245 2246 2247 2248 2249 2250 2251 2252 2253 2254 2255 2256 2257 2258 2259 2260 2261 2262 2263 2264 2265 2266 2267 2268 2269 2270 2271 2272 2273 2274 2275 2276 2277 2278 2279 2280 2281 2282 2283 2284 2285 2286 2287 2288 2289 2290 2291 2292 2293 2294 2295 2296 2297 2298 2299 2300 2301 2302 2303 2304 2305 2306 2307 2308 2309 2310 2311 2312 2313 2314 2315 2316 2317 2318 2319 2320 2321 2322 2323 2324 2325 2326 2327 2328 2329 2330 2331 2332 2333 2334 2335 2336 2337 2338 2339 2340 2341 2342 2343 2344 2345 2346 2347 2348 2349 2350 2351 2352 2353 2354 2355 2356 2357 2358 2359 2360 2361 2362 2363 2364 2365 2366 2367 2368 2369 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384 2385 2386 2387 2388 2389 2390 2391 2392 2393 2394 2395 2396 2397 2398 2399 2400 2401 2402 2403 2404 2405 2406 2407 2408 2409 2410 2411 2412 2413 2414 2415 2416 2417 2418 2419 2420 2421 2422 2423 2424 2425 2426 2427 2428 2429 2430 2431 2432 2433 2434 2435 2436 2437 2438 2439 2440 2441 2442 2443 2444 2445 2446 2447 2448 2449 2450 2451 2452 2453 2454 2455 2456 2457 2458 2459 2460 2461 2462 2463 2464 2465 2466 2467 2468 2469 2470 2471 2472 2473 2474 2475 2476 2477 2478 2479 2480 2481 2482 2483 2484 2485 2486 2487 2488 2489 2490 2491 2492 2493 2494 2495 2496 2497 2498 2499 2500 2501 2502 2503 2504 2505 2506 2507 2508 2509 2510 2511 2512 2513 2514 2515 2516 2517 2518 2519 2520 2521 2522 2523 2524 2525 2526 2527 2528 2529 2530 2531 2532 2533 2

✦ The following table shows the number of people who have been convicted of a crime in the United States since 1970.

+++

+++

+++


```

+++
|-----+
|*SUB-----+
|SUBTRACT    +
|Source A DIF1_180V|
|          -9|
|Source B DIF2_180V|
|          0|
|Dest      DDIF1|
|          -1|
|-----+
|*MOV-----+
|MOVE        +
|Source  DIF1_180V|
|          -9|
|Dest    DIF2_180V|
|          0|
|-----+
|*SUB-----+
|SUBTRACT    +
|Source A DIF1_180V|
|          -9|
|Source B      9|
|          |
|Dest    DIF1_180V|
|          -9|
|-----+
|*MUL-----+
|MULTIPLY     +
|Source A DIF1_180V|
|          -9|
|Source B DIF1_180V|
|          -9|
|Dest      ACC|
|          -731|
|-----+
|*MUL-----+
|MULTIPLY     +
|Source A      ACC|
|          -731|
|Source B DIF1_180V|
|          -9|
|Dest      ACC|
|          -731|
|-----+
|*CLR-----+
|CLEAR        +
|Dest          S:5|
|          0|
|-----+
|*MUL-----+
|MULTIPLY     +
|Source A      DDIF1|
|          -1|
|Source B      DDIF1|
|          -1|
|Dest      ACC|
|          -730|
|-----+
+++

```



```

+---+
|                                     +SUB-----+
|                                     |SUBTRACT    |
|                                     |Source A      ACC1|
|                                     |              -731|
|                                     |Source B    N16:161|
|                                     |              1|
|                                     |Dest        ACC1|
|                                     |              -731|
|                                     +-----+
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE
| |Source A      ACC1 |Source      100| |
| |              -731| |              |
| |Source B      100| |Dest        N16:161|
| |              | |              1|
| +-----+ +-----+
| N22:0 - (2:215) +MOV-----+
| +LES-----+ +MOVE
| +LESS THAN    +MOVE
| |Source A      ACC1 |Source      1| |
| |              -731| |              |
| |Source B      1| |Dest        N16:161|
| |              | |              1|
| +-----+ +-----+
| N22:0 - (2:215) +MOV-----+
| +LIM-----+ +MOVE
| +LIMIT TEST   +MOVE
| |Low Lim      1| |Source      ACC1|
| |              | |              -731|
| |Test         ACC1 |Dest        N16:161|
| |              -731| |              1|
| |High Lim     100| +-----+
| |              |
| +-----+
| N22:0 - (2:215)

```

Rung 2:888
PID180V

49

[LBL]

DUMMY49

N22:10

0

Rung 2:889

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

ON180V
N7:234

1/[
3
(3:26)

```

+CLR-----+
+CLEAR
|Dest      PW180V|
|              0|
| +-----+
| 88
| +-----+
| (JMP)

```

Rung 2:890

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

	AM180V	PID180V/1
	N7:234	N16:150
	1/[(	()
	2	1
	(3:26)	

Rung 2:891

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

		+MOV-	+
		MOVE	
		Source	SET180V
			0
		Dest	PIDSP180V
			0
		+-----+	+

Rung 2:892

		+PID-	+
		PID	
		Control Block	PID180V
		Process Variable	AV180V
		Control Variable	CV180V
		Control Block Length	23
		+-----+	+
		+SCL-	+
		+SCALE	+
		Source	CV180V
			0
		Rate [1/10000]	15
		Offset	0
		Dest	PW180V
			0
		+-----+	+
		+CLR-	+
		+CLEAR	+
		Dest	S:5
			0
		+-----+	+

Rung 2:893

	88	N7:236
	--[LBL]	()
		6

Rung 2:894

		PID181B
	RT_TMR/DN	
	T4:87	50
	1/[(	(JMP)
	DN	
	(2:42)	

Rung 2:895

RATE CHECKING

```

+MOV-----+
|MOVE|
|Source      AV181B|
|           1732|
|Dest       R1_181B|
|           1732|
+-----+
+SUB-----+
|SUBTRACT|
|Source A   R1_181B|
|           1732|
|Source B   R2_181B|
|           1732|
|Dest      DIF1_181B|
|           -10|
+-----+
+MOV-----+
|MOVE|
|Source      R1_181B|
|           1732|
|Dest       R2_181B|
|           1732|
+-----+
+SUB-----+
|SUBTRACT|
|Source A   DIF1_181B|
|           -10|
|Source B   DIF2_181B|
|           -1|
|Dest      DDIF1|
|           -1|
+-----+
+MOV-----+
|MOVE|
|Source      DIF1_181B|
|           -10|
|Dest       DIF2_181B|
|           -1|
+-----+
+SUB-----+
|SUBTRACT|
|Source A   DIF1_181B|
|           -10|
|Source B           9|
|           |
|Dest      DIF1_181B|
|           -10|
+-----+
+MUL-----+
|MULTIPLY|
|Source A   DIF1_181B|
|           -10|
|Source B   DIF1_181B|
|           -10|
|Dest      ACC|
|           -731|
+-----+

```

```

+++
+-----+
+MUL-----+
+MULTIPLY   +
|Source A      ACC|
|              -731|
|Source B DIF1_181B|
|              -10|
|Dest          ACC|
|              -731|
+-----+
+CLR-----+
+CLEAR      +
|Dest          S:5|
|              0|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A      DDIF1|
|              -1|
|Source B      DDIF1|
|              -1|
|Dest          ACC1|
|              -730|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A      DDIF1|
|              -1|
|Source B      ACC1|
|              -730|
|Dest          ACC1|
|              -730|
+-----+
+CLR-----+
+CLEAR      +
|Dest          S:5|
|              0|
+-----+
+SCRATCH
+EQU-----+ N7:235
+-----+
+EQUAL      +
|Source A      ACC| 6
|              -731|
|Source B      0|
|              |
+-----+
N22:0 - (2:215)
+-----+
+SUB-----+
+SUBTRACT   +
|Source A      ACC| |Source A      ACC|
|              -731| |              -731|
|Source B      1| |Source B      1|
|              | |              |
+-----+ |Dest          ACC|
N22:0 - (2:215) |              -731|
+-----+
+++

```

```

+++
| SCRATCH                                     |
| N7:235                                     | +ADD-----+
| ] [-----+ADD-----+
| 6                                           |Source A      ACC|
| (2:215)                                     | -731|
|                                           |Source B      1|
|                                           |Dest         ACC|
|                                           | -731|
|-----+
| +ADD-----+
| +ADD-----+
|Source A      ACC|
| -731|
|Source B      ACC|
| -730|
|Dest         ACC|
| -730|
|-----+
| +SUB-----+
| +SUBTRACT-----+
|Source A      ACC|
| -730|
|Source B      N16:191|
| 1|
|Dest         ACC|
| -731|
|-----+
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE-----+
|Source A      ACC|Source      100|
| -731|
|Source B      100|Dest        N16:191|
| 1|
|-----+
| N22:0 - (2:215) +MOV-----+
| +LES-----+ +MOVE-----+
| +LESS THAN +MOVE-----+
|Source A      ACC|Source      1|
| -731|
|Source B      1|Dest        N16:191|
| 1|
|-----+
| N22:0 - (2:215) +MOV-----+
| +LIM-----+ +MOVE-----+
| +LIMIT TEST +MOVE-----+
|Low Lim      1|Source      ACC|
| -731|
|Test         ACC|Dest        N16:191|
| -731|
|High Lim     100|
|-----+
| N22:0 - (2:215)

```

Page 737


```

+++
|
|+SCL-----+
|+SCALE-----+
| |Source      CV181B|
| |              01|
| |Rate [/10000] 15|
| |              01|
| |Offset       01|
| |Dest        PW181B|
| |              01|
|+-----+
|+CLR-----+
|+CLEAR-----+
| |Dest        S:5|
| |              01|
|+-----+
  
```

Rung 2:901

```

| 89
|---[LBL]-----N7:236
|                                     ( )
|                                     7
  
```

Rung 2:902

```

| RT_TMR/DN
| T4:87
|---] / [-----PID181V
| DN
| (2:42)
|                                     51
|                                     (JMP)
  
```

Rung 2:903

RATE CHECKING

```

+MOV-----+
+MOVE-----+
|Source      AV181V|
|              1727|
|Dest       R1_181V|
|              1727|
|+-----+
|+SUB-----+
|+SUBTRACT-----+
|Source A    R1_181V|
|              1727|
|Source B    R2_181V|
|              1727|
|Dest       DIF1_181V|
|              -101|
|+-----+
|+MOV-----+
|+MOVE-----+
|Source      R1_181V|
|              1727|
|Dest       R2_181V|
|              1727|
|+-----+
  
```


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|-----]/[-----
| 6
| (3:26)

```

+MOV-----+
+MOVE
|Source      SET181V
|              01
|Dest        PIDSP181V
|              01
+-----+

```

```

+PID-----+
|Control Block PID181V|
|Process Variable AV181V|
|Control Variable CV181V|
|Control Block Length 23|
+-----+
+SCL-----+
+SCALE-----+
|Source CV181V|
| | 0|
|Rate [1/10000] 15|
| | 1|
|Offset 0|
| | 1|
|Dest PW181V|
| | 0|
+-----+
+CLR-----+
+CLEAR-----+
|Dest S:5|
| | 0|

```

90 N7:236
--[LBL]----- ()--
7

52
= (JMP)

Rung 2:911

RATE CHECKING

		+MOV-----+
		+MOVE
	Source	AV182B
		1722
	Dest	R1_182B
		1723
		+-----+
		+SUB-----+
		+SUBTRACT
	Source A	R1_182B
		1723
	Source B	R2_182B
		1723
	Dest	DIF1_182B
		-9
		+-----+
		+MOV-----+
		+MOVE
	Source	R1_182B
		1723
	Dest	R2_182B
		1723
		+-----+
		+SUB-----+
		+SUBTRACT
	Source A	DIF1_182B
		-9
	Source B	DIF2_182B
		0
	Dest	DDIF1
		-1
		+-----+
		+MOV-----+
		+MOVE
	Source	DIF1_182B
		-9
	Dest	DIF2_182B
		0
		+-----+
		+SUB-----+
		+SUBTRACT
	Source A	DIF1_182B
		-9
	Source B	9
		-9
	Dest	DIF1_182B
		-9
		+-----+
		+MUL-----+
		+MULTIPLY
	Source A	DIF1_182B
		-9
	Source B	DIF1_182B
		-9
	Dest	ACC
		-731
		+-----+


```

+++
| SCRATCH
| N7:235
|-----+ADD-----+
| 1 |-----+ADD-----+
| 6 |Source A ACC|
| (2:215) |Source B 1|
| |Dest ACC|
| |-----+ADD-----+
| |-----+ADD-----+
| |Source A ACC|
| |Source B ACC|
| |Dest ACC|
| |-----+SUB-----+
| |-----+SUBTRACT-----+
| |Source A ACC|
| |Source B N17:41|
| |Dest ACC|
| |-----+GRT-----+
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE-----+
| |Source A ACC| |Source 100|
| |Source B 100| |Dest N17:41|
| |-----+LES-----+
| N22:0 - (2:215) +MOV-----+
| +LES-----+ +MOVE-----+
| |Source A ACC| |Source 1|
| |Source B 1| |Dest N17:41|
| |-----+LIM-----+
| N22:0 - (2:215) +MOV-----+
| +LIM-----+ +MOVE-----+
| +LIMIT TEST +MOVE-----+
| |Low Lim 1| |Source ACC|
| |Test ACC| |Dest N17:41|
| |High Lim 100|
|-----+
| N22:0 - (2:215)

```


Rung 2:912
| PID182B
|
| 52
|---[LBL]---()---
|

DUMMY52
N22:10
3

Rung 2:913

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

| ON182B
| N7:234
|---1/[
| 9
| (3:26)
|
|
|

+CLR-----+
+CLEAR-----+
|Dest PW182B|
| | 0|
+-----+
| 91
+---(JMP)-----+

Rung 2:914

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

| AM182B
| N7:234
|---1/[
| 8
| (3:26)
|

PID182B/1
N17:30
1

Rung 2:915

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

|
|
|
|
|

+MOV-----+
+MOVE-----+
|Source SET182B|
| | 0|
|Dest PIDSP182B|
| | 0|
+-----+

Rung 2:916

|
|
|
|
|

+PID-----+
+PID-----+
|Control Block PID182B|
|Process Variable AV182B|
|Control Variable CV182B|
|Control Block Length 23|
+-----+

+++

+++

```

+++
| +SCL-----+
| +SCALE      +-----+
| |Source      CV182B|
| |Rate [ /10000] 15|
| |Offset      0|
| |Dest        PW182B|
| |            0|
| +-----+
| +CLR-----+
| +CLEAR      +-----+
| |Dest       S:5|
| |           0|
| +-----+
+++

```

Rung 2:917

```

| 91
| ---[LBL]----- N7:236
|                                     ( )
|                                     9

```

Rung 2:918

```

| RT_TMR/DN      PID182V
| T4:87
| ---1/[----- 53
| DN              (JMP)---
| (2:42)

```

Rung 2:919

RATE CHECKING

```

| +MOV-----+
| +MOVE      +-----+
| |Source     AV182V|
| |          1723|
| |Dest       R1_182V|
| |          1724|
| +-----+
| +SUB-----+
| +SUBTRACT   +-----+
| |Source A    R1_182V|
| |          1724|
| |Source B    R2_182V|
| |          1724|
| |Dest       DIF1_182V|
| |          -8|
| +-----+
| +MOV-----+
| +MOVE      +-----+
| |Source     R1_182V|
| |          1724|
| |Dest       R2_182V|
| |          1724|
| +-----+
+++

```

```

+++
+-----+
+SUB-----+
+SUBTRACT+
+Source A DIF1_182V|
+      -8|
+Source B DIF2_182V|
+      1|
+Dest      DDIF1|
+      -1|
+-----+
+MOV-----+
+MOVE-----+
+Source      DIF1_182V|
+      -8|
+Dest      DIF2_182V|
+      1|
+-----+
+SUB-----+
+SUBTRACT+
+Source A DIF1_182V|
+      -8|
+Source B      9|
+Dest      DIF1_182V|
+      -8|
+-----+
+MUL-----+
+MULTIPLY+
+Source A DIF1_182V|
+      -8|
+Source B DIF1_182V|
+      -8|
+Dest      ACC|
+      -731|
+-----+
+MUL-----+
+MULTIPLY+
+Source A      ACC|
+      -731|
+Source B DIF1_182V|
+      -8|
+Dest      ACC|
+      -731|
+-----+
+CLR-----+
+CLEAR-----+
+Dest      S:5|
+      0|
+-----+
+MUL-----+
+MULTIPLY+
+Source A      DDIF1|
+      -1|
+Source B      DDIF1|
+      -1|
+Dest      ACC1|
+      -730|
+-----+
+++

```

```

+++
+-----+
+MUL-----+
+MULTIPLY
|Source A      DDIF1|
|              -1|
|Source B      ACC1|
|              -730|
|Dest          ACC1|
|              -730|
+-----+
+CLR-----+
+CLEAR
|Dest          S:5|
|              0|
+-----+
SCRATCH
N7:235
+-----+
+EQ-----+
+EQUAL
|Source A      ACC|
|              -731|
|Source B      0|
|              |
+-----+
N22:0 - (2:215)
+EQ-----+
+SUB-----+
+SUBTRACT
|Source A      ACC|
|              -731|
|Source B      1|
|              |
+-----+
|Dest          ACC|
N22:0 - (2:215)
|              -731|
+-----+
SCRATCH
N7:235
+-----+
+ADD-----+
+ADD
|Source A      ACC|
|              -731|
|Source B      1|
|              |
+-----+
|Dest          ACC|
|              -731|
+-----+
+ADD-----+
+ADD
|Source A      ACC|
|              -731|
|Source B      ACC1|
|              -730|
|Dest          ACC1|
|              -730|
+-----+
+++

```

```

+++
|
|                                     +SUB-----+
|                                     +SUBTRACT    +
|                                     |Source A      ACC1|
|                                     |              -730|
|                                     |Source B      N17:71|
|                                     |              1|
|                                     |Dest          ACC|
|                                     |              -731|
|                                     +-----+
|
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE
| |Source A      ACC| |Source      100| |
| |              -731| |
| |Source B      100| |Dest        N17:71|
| |              | | |              1|
| +-----+ +-----+
| N22:0 - (2:215)
|
| +LES-----+ +MOV-----+
| +LESS THAN    +MOVE
| |Source A      ACC| |Source      1| |
| |              -731| |
| |Source B      1| |Dest        N17:71|
| |              | | |              1|
| +-----+ +-----+
| N22:0 - (2:215)
|
| +LIM-----+ +MOV-----+
| +LIMIT TEST   +MOVE
| |Low Lim      1| |Source      ACC| |
| |              | | |              -731|
| |Test         ACC| |Dest        N17:71|
| |              -731| |              1|
| |High Lim     100| +-----+
|
| N22:0 - (2:215)

```

Rung 2:920
PID182V

```

| 53
| [LBL]-----+-----+-----+-----+-----+-----+-----+
|                                     DUMMY53
|                                     N22:10
|                                     ( )
|                                     4

```

Rung 2:921

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

```

| ON182V
| N7:234
| /[-----+-----+-----+-----+-----+-----+-----+
| 11
| (3:26)
|
|                                     +CLR-----+
|                                     +CLEAR
|                                     |Dest        PW182V|
|                                     |              0|
|                                     +-----+
|
| 92
| +--(JMP)-----+

```

Rung 2:922

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

```
| AM182V PID182V/1
| N7:234 N17:60
|-----|-----|
| 10 ( )
| (3:26) 1
```

Rung 2:923

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

```
| +MOV-----+
| +MOVE-----+
| |Source      SET182V|
| |           01|
| |Dest       PIDSP182V|
| |           01|
| +-----+
```

Rung 2:924

```
| +PID-----+
| +PID-----+
| |Control Block FID182V|
| |Process Variable AV182V|
| |Control Variable CV182V|
| |Control Block Length 23|
| +-----+
| +SCL-----+
| +SCALE-----+
| |Source      CV182V|
| |           01|
| |Rate [1/10000] 15|
| |           01|
| |Offset       01|
| |Dest        PW182V|
| |           01|
| +-----+
| +CLR-----+
| +CLEAR-----+
| |Dest        S:51|
| |           01|
| +-----+
```

Rung 2:925

```
| 92 N7:236
| [LBL]-----|
| 10
```

Rung 2:926

```
| PID183B
| RT_TMR/DN
| T4:87 54
|-----|-----|
| 10 (JMP)
| DN
| (2:42)
```

Rung 2:927

RATE CHECKING

		+MOV-----+
		MOVE
		Source AV183B
		1733
		Dest R1_183B
		1732
		+-----+
		+SUB-----+
		SUBTRACT
		Source A R1_183B
		1732
		Source B R2_183B
		1732
		Dest DIF1_183B
		8
		+-----+
		+MOV-----+
		MOVE
		Source R1_183B
		1732
		Dest R2_183B
		1732
		+-----+
		+SUB-----+
		SUBTRACT
		Source A DIF1_183B
		8
		Source B DIF2_183B
		1
		Dest DDIF1
		1
		+-----+
		+MOV-----+
		MOVE
		Source DIF1_183B
		8
		Dest DIF2_183B
		1
		+-----+
		+SUB-----+
		SUBTRACT
		Source A DIF1_183B
		8
		Source B 9
		1
		Dest DIF1_183B
		8
		+-----+
		+MUL-----+
		MULTIPLY
		Source A DIF1_183B
		8
		Source B DIF1_183B
		8
		Dest ACC
		731
		+-----+
		+++

```

+++
+MUL-----+
+MULTIPLY   +
|Source A    ACC|
|            -731|
|Source B DIF1_183B|
|            -8|
|Dest        ACC|
|            -731|
+-----+
+CLR-----+
+CLEAR      +
|Dest        S:5|
|            0|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A    DDIF1|
|            -1|
|Source B    DDIF1|
|            -1|
|Dest        ACC1|
|            -730|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A    DDIF1|
|            -1|
|Source B    ACC1|
|            -730|
|Dest        ACC1|
|            -730|
+-----+
+CLR-----+
+CLEAR      +
|Dest        S:5|
|            0|
+-----+
SCRATCH
N7:235
+-----+
+EQU-----+
+EQUAL      +
|Source A    ACC1| 6
|            -731|
|Source B    0|
|            |
+-----+
N22:0 - (2:215)
+-----+
+SUB-----+
+SUBTRACT   +
|Source A    ACC| |Source A    ACC|
|            -731| |            -731|
|Source B    1| |Source B    1|
|            |
+-----+
|Dest        ACC|
|N22:0 - (2:215)| |            -731|
+-----+
+++

```



```

+++
| SCRATCH
| N7:235
| +ADD-----+
| +-----+ +ADD
| 6
| (2:215)
| |Source A ACC1
| | -731
| |Source B 1
| |
| |Dest ACC1
| | -731
| +-----+
| +ADD-----+
| +ADD
| |Source A ACC1
| | -731
| |Source B ACC1
| | -730
| |Dest ACC1
| | -730
| +-----+
| +SUB-----+
| +SUBTRACT
| |Source A ACC1
| | -730
| |Source B N17:101
| | 1
| |Dest ACC1
| | -731
| +-----+
| +GRT-----+ +MOV-----+
| +GREATER THAN +MOVE
| |Source A ACC1 |Source 100
| | -731
| |Source B 100 |Dest N17:101
| | 1
| +-----+
| N22:0 - (2:215)
| +LES-----+ +MOV-----+
| +LESS THAN +MOVE
| |Source A ACC1 |Source 1
| | -731
| |Source B 1 |Dest N17:101
| | 1
| +-----+
| N22:0 - (2:215)
| +LIM-----+ +MOV-----+
| +LIMIT TEST +MOVE
| |Low Lim 1 |Source ACC1
| | -731
| |Test ACC1 |Dest N17:101
| | -731
| |High Lim 100
| +-----+
| N22:0 - (2:215)

```

Rung 2:928

| PID183B

|

| 54

| [LBL]

DUMMY54

N22:10

5

Rung 2:929

DETECT FROM SCADA PID ON/OFF

IF PID OFF

THEN ZERO PW FOR ZERO OUTPUT AT SCR

AND JUMP AROUND THE PID BLOCK

| ON183B

| N7:234

|

| 13

| (3:26)

+CLR-----+

+CLEAR +--+

|Dest PW183B|

| 0|

+-----+

| 93

+(JMP)-----+

Rung 2:930

DETECT AUTO/MANUAL FROM SCADA

SET APPROPRIATE MODE IN PID BLOCK

| AM183B

| N7:234

|

| 12

| (3:26)

PID183B/1

N17:90

1

Rung 2:931

DETECT SETPOINT VALUE FROM SCADA

PUT VALUE IN PID BLOCK

|

|

|

|

|

|

+MOV-----+

+MOVE +--+

|Source SET183B|

| 0|

|Dest PIDSP183B|

| 0|

+-----+

Rung 2:932

|

|

|

|

|

|

|

|

+PID-----+

+PID +--+

|Control Block PID183B|

|Process Variable AV183B|

|Control Variable CV183B|

|Control Block Length 23|

+-----+

+++

+++


```

+++
+-----+
+SUB-----+
+SUBTRACT   +
|Source A DIF1_183V|
|           -9|
|Source B DIF2_183V|
|           0|
|Dest       DDIF1|
|           -1|
+-----+
+MOV-----+
+MOVE       +
|Source     DIF1_183V|
|           -9|
|Dest       DIF2_183V|
|           0|
+-----+
+SUB-----+
+SUBTRACT   +
|Source A DIF1_183V|
|           -9|
|Source B     9|
|           |
|Dest        DIF1_183V|
|           -9|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A DIF1_183V|
|           -9|
|Source B DIF1_183V|
|           -9|
|Dest        ACC|
|           -731|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A     ACC|
|           -731|
|Source B DIF1_183V|
|           -9|
|Dest        ACC|
|           -731|
+-----+
+CLR-----+
+CLEAR      +
|Dest        S:5|
|           0|
+-----+
+MUL-----+
+MULTIPLY   +
|Source A     DDIF1|
|           -1|
|Source B     DDIF1|
|           -1|
|Dest        ACC1|
|           -730|
+-----+
+++

```

```

+++
+-----+
+MUL-----+
+MULTIPLY
|Source A      DDIF1|
|              -1|
|Source B      ACC1|
|              -730|
|Dest          ACC1|
|              -730|
+-----+
+CLR-----+
+CLEAR
|Dest          S:5|
|              0|
+-----+
SCRATCH
N7:235
+-----+
+EQU-----+
+EQUAL
|Source A      ACC1|
|              -731|
|Source B      0|
|              |
+-----+
N22:0 - (2:215)
+-----+
+SUB-----+
+SUBTRACT
|Source A      ACC1|
|              -731|
|Source B      1|
|              |
+-----+
|Dest          ACC1|
N22:0 - (2:215)
|              -731|
+-----+
SCRATCH
N7:235
+-----+
+ADD-----+
+ADD
|Source A      ACC1|
|              -731|
|Source B      1|
|              |
+-----+
|Dest          ACC1|
|              -731|
+-----+
+ADD-----+
+ADD
|Source A      ACC1|
|              -731|
|Source B      ACC1|
|              -730|
|Dest          ACC1|
|              -730|
+-----+
+++

```

```

+++
+-----+
+SUB-----+
+SUBTRACT
+Source A      ACC1
+              -731
+Source B      N17:131
+              1
+Dest          ACC1
+              -731
+-----+
+GRT-----+ +MOV-----+
+GREATER THAN +MOVE
+Source A      ACC1 Source      100
+              -731
+Source B      100 Dest        N17:131
+              1
+-----+
N22:0 - (2:215)
+LES-----+ +MOV-----+
+LESS THAN    +MOVE
+Source A      ACC1 Source      1
+              -731
+Source B      1 Dest        N17:131
+              1
+-----+
N22:0 - (2:215)
+LIM-----+ +MOV-----+
+LIMIT TEST   +MOVE
+Low Lim      1 Source      ACC1
+              -731
+Test         ACC1 Dest        N17:131
+              -731
+High Lim     100
+-----+
N22:0 - (2:215)

```

Rung 2:936

DNR_4

N22:5

(L)

8

Rung 2:937

PID183V

DUMMY55

N22:10

55

[LBLE]

()

6

Rung 2:938

DETECT FROM SCADA PID ON/OFF
IF PID OFF
THEN ZERO PW FOR ZERO OUTPUT AT SCR
AND JUMP AROUND THE PID BLOCK

	ON183V		+CLR-----+
	N7:234		+CLEAR-----+
	15		Dest PW183V
	(3:26)		O
			+-----+
			NOT END
			5
			+---(JMP)-----+

Rung 2:939

DETECT AUTO/MANUAL FROM SCADA
SET APPROPRIATE MODE IN PID BLOCK

	AM183V		PID183V1
	N7:234		N17:120
	14		()
	(3:26)		1

Rung 2:940

DETECT SETPOINT VALUE FROM SCADA
PUT VALUE IN PID BLOCK

			+MOV-----+
			+MOVE-----+
			Source SET183V
			O
			Dest PIDSP183V
			O
			+-----+

Rung 2:941

			+PID-----+
			+PID-----+
			Control Block PID183V
			Process Variable AV183V
			Control Variable CV183V
			Control Block Length 23
			+-----+
			+SCL-----+
			+SCALE-----+
			Source CV183V
			Rate [1/10000] 15
			Offset O
			Dest PW183V
			O
			+-----+
			+CLR-----+
			+CLEAR-----+
			Dest S:5
			O
			+-----+

Rung 2:943

There is one timer for each zone. Each timer is reset when it reaches 200ms. The zone's SCR is turned on when the timer is less than the zone's pulse width (PW). Note: no more than two tanks can be enabled at the same time.

Rung 2:944

Rung 2:945

Rung 2:946

Rung 2:947

HNF-SD-FF-CSWD-61 Rev. 0

Rung 2:948

```
|
| +LES-----+
| -LESS THAN |-----+
| |Source A   TMR144.ACC|
| |           4|
| |Source B   PW144|
| |           0|
| +-----+
| T4:2.ACC - (2:946)
| N10:2 - (2:225)
```

SCR_144

0:24

1

Rung 2:949

```
|
|-----+TON-----+
|-----+TIMER ON DELAY +- (EN)--
| |Timer      TMR150+- (DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       4|
| +-----+
```

Rung 2:950

```
| TMR150/DN
| T4:3
|-----] [-----+
| DN
| (2:949)
```

TMR150

T4:3

(RES)

Rung 2:951

```
|
| +LES-----+
| -LESS THAN |-----+
| |Source A   TMR150.ACC|
| |           4|
| |Source B   PW150|
| |           0|
| +-----+
| T4:3.ACC - (2:949)
| N10:3 - (2:233)
```

SCR_150

0:24

2

Rung 2:952

```
|
|-----+TON-----+
|-----+TIMER ON DELAY +- (EN)--
| |Timer      TMR151+- (DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       4|
| +-----+
```

Rung 2:953

```
| TMR151/DN
| T4:4
|-----] [-----+
| DN
| (2:952)
```

TMR151

T4:4

(RES)

```
Rung 2:954
|
| +LES-----+
| --LESS THAN +-----+
| |Source A      TMR151.ACC|
| |              4|
| |Source B      PW151|
| |              0|
| +-----+
| T4:4.ACC - (2:952)
| N10:4 - (2:241)
```

SCR_151
0:24
()
3

Rung 2:955

```
|
|-----+TON-----+
|-----+TIMER ON DELAY +-(EN)--
|Timer      TMR152+-(DN)
|Time Base   0.01|
|Preset      25|
|Accum       4|
|-----+
```

```
Rung 2:956
| TMR152/DN
| T4:5
|-----] [-----
| DN
| (2:955)
```

TMR152
T4:5
(RES)

Rung 2:957

```
|
| +LES-----+
| --LESS THAN +-----+
| |Source A      TMR152.ACC|
| |              4|
| |Source B      PW152|
| |              0|
| +-----+
| T4:5.ACC - (2:955)
| N10:5 - (2:249)
```

SCR_152
0:24
()
4

Rung 2:958

```
|
|-----+TON-----+
|-----+TIMER ON DELAY +-(EN)--
|Timer      TMR153+-(DN)
|Time Base   0.01|
|Preset      25|
|Accum       4|
|-----+
```

```
Rung 2:959
| TMR153/DN
| T4:6
|-----] [-----
| DN
| (2:958)
```

TMR153
T4:6
(RES)

Rung 2:960

```
|
| +LES-----+
| -LESS THAN
| |Source A      TMR153.ACC|
| |              4|
| |Source B      PW153|
| |              0|
| +-----+
| T4:6.ACC - (2:958)
| N10:6 - (2:257)
```

SCR_153

0:24

5

Rung 2:961

```
|
| +TON-----+
| -TIMER ON DELAY +-(EN)--
| |Timer      TMR154+-(DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       4|
| +-----+
```

Rung 2:962

```
| TMR154/DN
| T4:7
| ] [-----
| DN
| (2:961)
```

TMR154

T4:7

(RES)

Rung 2:963

```
|
| +LES-----+
| -LESS THAN
| |Source A      TMR154.ACC|
| |              4|
| |Source B      PW154|
| |              0|
| +-----+
| T4:7.ACC - (2:961)
| N10:7 - (2:265)
```

SCR_154

0:24

6

Rung 2:964

```
|
| +TON-----+
| -TIMER ON DELAY +-(EN)--
| |Timer      TMR160+-(DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       4|
| +-----+
```

Rung 2:965

```
| TMR160/DN
| T4:8
| ] [-----
| DN
| (2:964)
```

TMR160

T4:8

(RES)

```

+LES-----+
-+LESS THAN+
|Source A      TMR160.ACC|
|              4|
|Source B      PW160|
|              0|
+-----+
T4:8.ACC - (2:964).
N10:8 - (2:273)

```

$$--(\quad) =$$

✦ — — — — — ✦

```
Rung 2:972
|
| +LES-----+
| --LESS THAN +-----+
| |Source A      TMR162.ACC|
| |              4|
| |Source B      PW162|
| |              0|
| +-----+
| T4:10.ACC - (2:970)
| N10:10 - (2:290)
```

SCR_162

0:24

9

Rung 2:973

```

|
| +TON-----+
| -----+-----+
| |TIMER ON DELAY +-(EN)--
| |Timer          TMR163+-(DN)
| |Time Base      0.01|
| |Preset         25|
| |Accum          4|
| +-----+
|
```

Rung 2:974

```

| TMR163/DN
| T4:11
| ----] [-----+-----+
| |DN
| |              (RES)
| (2:973)
```

TMR163

T4:11

Rung 2:975

```

|
| +LES-----+
| --LESS THAN +-----+
| |Source A      TMR163.ACC|
| |              4|
| |Source B      PW163|
| |              0|
| +-----+
| T4:11.ACC - (2:973)
| N10:11 - (2:453)
```

SCR_163

0:24

10

Rung 2:976

```

|
| +TON-----+
| -----+-----+
| |TIMER ON DELAY +-(EN)--
| |Timer          TMR164+-(DN)
| |Time Base      0.01|
| |Preset         25|
| |Accum          4|
| +-----+
|
```

Rung 2:977

```

| TMR164/DN
| T4:12
| ----] [-----+-----+
| |DN
| |              (RES)
| (2:976)
```

TMR164

T4:12

```

Rung 2:978
|
| +LES-----+
| --LESS THAN +-----+
| |Source A      TMR164.ACC|
| |              4|
| |Source B      PW164|
| |              0|
| +-----+
| T4:12.ACC - (2:976)
| N10:12 - (2:461)
  
```

Rung 2:979

Fire SCRs
 Valve Zones

```

|
| +TON-----+
| --TIMER ON DELAY +- (EN)--
| |Timer      TMR170B+- (DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       9|
| +-----+
  
```

```

Rung 2:980
| TMR170B/DN
| T4:13
| ] [-----+
| DN
| (2:979)
  
```

TMR170B
 T4:13
 (RES)

Rung 2:981

```

|
| +LES-----+
| --LESS THAN +-----+
| |Source A      TMR170B.ACC|
| |              9|
| |Source B      PW170B|
| |              0|
| +-----+
| T4:13.ACC - (2:979)
| N10:13 - (2:469)
  
```

SCR 170B
 0:24
 ()
 12

Rung 2:982

```

|
| +TON-----+
| --TIMER ON DELAY +- (EN)--
| |Timer      TMR170V+- (DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       9|
| +-----+
  
```

```

Rung 2:983
| TMR170V/DN
| T4:14
| ] [-----+
| DN
| (2:982)
  
```

TMR170V
 T4:14
 (RES)

```
Rung 2:984
|
| +LES-----+
| |LESS THAN |
| |Source A   TMR170V.ACC|
| |          9|
| |Source B   PW170V|
| |          0|
| +-----+
| T4:14.ACC - (2:982)
| N10:14 - (2:477)
```

SCR_170V
0:24
()
13

```
Rung 2:985
|
|-----+TON-----+
| |TIMER ON DELAY |-(EN)--
| |Timer          TMR171B+-(DN)
| |Time Base      0.01|
| |Preset         25|
| |Accum          9|
| +-----+
```

```
Rung 2:986
| TMR171B/DN
| T4:15
| ] [------(RES)-----
| DN
| (2:985)
```

TMR171B
T4:15

```
Rung 2:987
|
| +LES-----+
| |LESS THAN |
| |Source A   TMR171B.ACC|
| |          9|
| |Source B   PW171B|
| |          0|
| +-----+
| T4:15.ACC - (2:985)
| N10:15 - (2:485)
```

SCR_171B
0:24
()
14

```
Rung 2:988
|
|-----+TON-----+
| |TIMER ON DELAY |-(EN)--
| |Timer          TMR171V+-(DN)
| |Time Base      0.01|
| |Preset         25|
| |Accum          9|
| +-----+
```

```
Rung 2:989
| TMR171V/DN
| T4:16
| ] [------(RES)-----
| DN
| (2:988)
```

TMR171V
T4:16

Rung 2:990

```
|
| +LES-----+ SCR_171V
| |--LESS THAN +-----+ 0:24
| |Source A      TMR171V.ACC| 15
| |              9|
| |Source B      PW171V|
| |              0|
| +-----+
| T4:16.ACC - (2:988)
| N10:16 - (2:493)
```

Rung 2:991

```
|
| +TON-----+
| +TIMER ON DELAY +--(EN)--
| |Timer      TMR172B+--(DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       9|
| +-----+
```

Rung 2:992
| TMR172B/DN

```
| T4:17 TMR172B
| ----] [-----+-----+ T4:17
|      DN (RES)
| (2:991)
```

Rung 2:993

```
|
| +LES-----+ SCR_172B
| |--LESS THAN +-----+ 0:25
| |Source A      TMR172B.ACC| 16
| |              9|
| |Source B      PW172B|
| |              0|
| +-----+
| T4:17.ACC - (2:991)
| N10:17 - (2:501)
```

Rung 2:994

```
|
| +TON-----+
| +TIMER ON DELAY +--(EN)--
| |Timer      TMR172V+--(DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       9|
| +-----+
```

Rung 2:995
| TMR172V/DN

```
| T4:18 TMR172V
| ----] [-----+-----+ T4:18
|      DN (RES)
| (2:994)
```



```

Rung 2:996
|
| +LES-----+
| -+LESS THAN +-----+
| |Source A    TMR172V.ACC|
| |              9|
| |Source B      PW172V|
| |              0|
| +-----+
| T4:18.ACC - (2:994)
| N10:18 - (2:509)
  
```

```

Rung 2:997
|
| +TON-----+
| +TIMER ON DELAY +--(EN)--
| |Timer      TMR173B+--(DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       9|
| +-----+
  
```

```

Rung 2:998
| TMR173B/DN
| T4:19
| -----] [-----
| DN
| (2:997)
|
| TMR173B
| T4:19
| (RES)
  
```

```

Rung 2:999
|
| +LES-----+
| -+LESS THAN +-----+
| |Source A    TMR173B.ACC|
| |              9|
| |Source B      PW173B|
| |              0|
| +-----+
| T4:19.ACC - (2:997)
| N10:19 - (2:517)
  
```

```

Rung 2:1000
|
| +TON-----+
| +TIMER ON DELAY +--(EN)--
| |Timer      TMR173V+--(DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       9|
| +-----+
  
```

```

Rung 2:1001
| TMR173V/DN
| T4:20
| -----] [-----
| DN
| (2:1000)
|
| TMR173V
| T4:20
| (RES)
  
```

Rung 2:1002

```

|                                     SCR_173V
| +LES-----+
| --LESS THAN +-----+
| |Source A   TMR173V.ACC|
| |           9|
| |Source B   PW173V|
| |           0|
| +-----+
| T4:20.ACC - (2:1000)
| N10:20 - (2:525)
  
```

Rung 2:1003

```

|                                     +TON-----+
| -----+TIMER ON DELAY +--(EN)--
| |Timer   TMR174B+--(DN)
| |Time Base 0.01|
| |Preset    25|
| |Accum      9|
| +-----+
  
```

Rung 2:1004

```

| TMR174B/DN                                     TMR174B
| T4:21                                           T4:21
| ----] [-----+-----+
| DN
| (2:1003)                                     (RES)
  
```

Rung 2:1005

```

|                                     SCR_174B
| +LES-----+
| --LESS THAN +-----+
| |Source A   TMR174B.ACC|
| |           9|
| |Source B   PW174B|
| |           0|
| +-----+
| T4:21.ACC - (2:1003)
| N10:21 - (2:533)
  
```

Rung 2:1006

```

|                                     +TON-----+
| -----+TIMER ON DELAY +--(EN)--
| |Timer   TMR174V+--(DN)
| |Time Base 0.01|
| |Preset    25|
| |Accum      9|
| +-----+
  
```

Rung 2:1007

```

| TMR174V/DN                                     TMR174V
| T4:22                                           T4:22
| ----] [-----+-----+
| DN
| (2:1006)                                     (RES)
  
```

Rung 2:1008

```

|                                     SCR_174V
| +LES-----+
| --LESS THAN +-----+
| |Source A    TMR174V.ACC| 21
| |             9|
| |Source B    PW174V|
| |             0|
| +-----+
| T4:22.ACC - (2:1006)
| N10:22 - (2:542)

```

Rung 2:1009

```

|                                     +TON-----+
| -----+TIMER ON DELAY +--(EN)--
| |Timer      TMR175B+--(DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       9|
| +-----+

```

Rung 2:1010

```

| TMR175B/DN                                     TMR175B
| T4:23                                           T4:23
| ----] [-----+-----+
| |DN
| | (2:1009)

```

Rung 2:1011

```

|                                     SCR_175B
| +LES-----+
| --LESS THAN +-----+
| |Source A    TMR175B.ACC| 22
| |             9|
| |Source B    PW175B|
| |             0|
| +-----+
| T4:23.ACC - (2:1009)
| N10:23 - (2:675)

```

Rung 2:1012

```

|                                     +TON-----+
| -----+TIMER ON DELAY +--(EN)--
| |Timer      TMR175V+--(DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       5|
| +-----+

```

Rung 2:1013

```

| TMR175V/DN                                     TMR175V
| T4:24                                           T4:24
| ----] [-----+-----+
| |DN
| | (2:1012)

```

Rung 2:1014

```
|
| +LES-----+
| |          SCR_175V
| |          O:24
| |          ( )
| |-----|
| |Source A   TMR175V.ACC|
| |          5|
| |          23
| |Source B   PW175V|
| |          0|
| |-----|
| |T4:24.ACC - (2:1012)
| |N10:24 - (2:683)
```

Rung 2:1015

```
|
| +TON-----+
| |          +---(EN)---+
| |          TIMER ON DELAY
| |          TMR176B+---(DN)
| |          Timer
| |          Time Base 0.01|
| |          Preset 25|
| |          Accum 5|
| |-----|
```

Rung 2:1016

```
| TMR176B/DN
| T4:25
|-----|
| DN
| (2:1015)
|
|          TMR176B
|          T4:25
|          (RES)
```

Rung 2:1017

```
|
| +LES-----+
| |          SCR_176B
| |          O:24
| |          ( )
| |-----|
| |Source A   TMR176B.ACC|
| |          5|
| |          24
| |Source B   PW176B|
| |          0|
| |-----|
| |T4:25.ACC - (2:1015)
| |N10:25 - (2:691)
```

Rung 2:1018

```
|
| +TON-----+
| |          +---(EN)---+
| |          TIMER ON DELAY
| |          TMR176V+---(DN)
| |          Timer
| |          Time Base 0.01|
| |          Preset 25|
| |          Accum 9|
| |-----|
```

Rung 2:1019

```
| TMR176V/DN
| T4:26
|-----|
| DN
| (2:1018)
|
|          TMR176V
|          T4:26
|          (RES)
```

Rung 2:1020

```
|
| +LES-----+
| -LESS THAN +-----+
| |Source A      TMR176V.ACC|
| |              9|
| |Source B      PW176V|
| |              0|
| +-----+
| T4:26.ACC - (2:1018)
| N10:26 - (2:699)
```

SCR_176V
0:24
()
25

Rung 2:1021

```
|
| +TON-----+
| -TIMER ON DELAY +-(EN)--
| |Timer      TMR177B+-(DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       9|
| +-----+
```

Rung 2:1022

```
| TMR177B/DN
| T4:27
| ] [-----+
| DN
| (2:1021)
```

TMR177B
T4:27
(RES)

Rung 2:1023

```
|
| +LES-----+
| -LESS THAN +-----+
| |Source A      TMR177B.ACC|
| |              9|
| |Source B      PW177B|
| |              0|
| +-----+
| T4:27.ACC - (2:1021)
| N10:27 - (2:707)
```

SCR_177B
0:24
()
26

Rung 2:1024

```
|
| +TON-----+
| -TIMER ON DELAY +-(EN)--
| |Timer      TMR177V+-(DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       9|
| +-----+
```

Rung 2:1025

```
| TMR177V/DN
| T4:28
| ] [-----+
| DN
| (2:1024)
```

TMR177V
T4:28
(RES)

```

Rung 2:1026
|
| +LES-----+
| --LESS THAN |-----+
| |Source A    TMR177V.ACC|
| |              9|
| |Source B      PW177V|
| |              0|
| +-----+
| T4:28.ACC - (2:1024)
| N10:28 - (2:715)
  
```

SCR_177V
 0:24
 ()
 27

Rung 2:1027

```

|
| +TON-----+
| -----+TIMER ON DELAY +- (EN)--
| |Timer      TMR178B+- (DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       9|
| +-----+
  
```

Rung 2:1028

```

| TMR178B/DN
| T4:29
| ----] [-----+
|      DN
| (2:1027)
  
```

TMR178B
 T4:29
 (RES)

Rung 2:1029

```

|
| +LES-----+
| --LESS THAN |-----+
| |Source A    TMR178B.ACC|
| |              9|
| |Source B      PW178B|
| |              0|
| +-----+
| T4:29.ACC - (2:1027)
| N10:29 - (2:723)
  
```

SCR_178B
 0:24
 ()
 28

Rung 2:1030

```

|
| +TON-----+
| -----+TIMER ON DELAY +- (EN)--
| |Timer      TMR178V+- (DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       9|
| +-----+
  
```

Rung 2:1031

```

| TMR178V/DN
| T4:30
| ----] [-----+
|      DN
| (2:1030)
  
```

TMR178V
 T4:30
 (RES)

Rung 2:1038

```

|
| +LES-----+
| --LESS THAN +-----+
| |Source A      TMR179V.ACC|
| |              9|
| |Source B      PW179V|
| |              0|
| +-----+
| T4:32.ACC - (2:1036)
| N10:32 - (2:873)

```

SCR_179V

0:24

31

Rung 2:1039

```

|
| +TON-----+
| -----+-----+
| |TIMER ON DELAY  +-(EN)--
| |Timer          TMR180B+-(DN)
| |Time Base      0.01|
| |Preset         25|
| |Accum          13|
| +-----+

```

Rung 2:1040

```

| TMR180B/DN
| T4:33
| ----] [-----+-----+
| |DN
| | (2:1039)

```

TMR180B

T4:33

(RES)

Rung 2:1041

```

|
| +LES-----+
| --LESS THAN +-----+
| |Source A      TMR180B.ACC|
| |              13|
| |Source B      PW180B|
| |              0|
| +-----+
| T4:33.ACC - (2:1039)
| N10:33 - (2:881)

```

SCR_180B

0:25

0

Rung 2:1042

```

|
| +TON-----+
| -----+-----+
| |TIMER ON DELAY  +-(EN)--
| |Timer          TMR180V+-(DN)
| |Time Base      0.01|
| |Preset         25|
| |Accum          13|
| +-----+

```

Rung 2:1043

```

| TMR180V/DN
| T4:34
| ----] [-----+-----+
| |DN
| | (2:1042)

```

TMR180V

T4:34

(RES)

Rung 2:1044

```
|
| +LES-----+
| -LESS THAN +-----+
| |Source A   TMR180V.ACC|
| |           13|
| |Source B   PW180V|
| |           0|
| +-----+
| T4:34.ACC - (2:1042)
| N10:34 - (2:889)
```

SCR_180V

0:25

()

1

Rung 2:1045

```
|
| +TON-----+
| +TIMER ON DELAY +-(EN)--
| |Timer       TMR181B+-(DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       13|
| +-----+
```

Rung 2:1046

```
| TMR181B/DN
| T4:35
| ---] [-----+
| |DN
| | (2:1045)
```

TMR181B

T4:35

(RES)

Rung 2:1047

```
|
| +LES-----+
| -LESS THAN +-----+
| |Source A   TMR181B.ACC|
| |           13|
| |Source B   PW181B|
| |           0|
| +-----+
| T4:35.ACC - (2:1045)
| N10:35 - (2:897)
```

SCR_181B

0:25

()

2

Rung 2:1048

```
|
| +TON-----+
| +TIMER ON DELAY +-(EN)--
| |Timer       TMR181V+-(DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       13|
| +-----+
```

Rung 2:1049

```
| TMR181V/DN
| T4:36
| ---] [-----+
| |DN
| | (2:1048)
```

TMR181V

T4:36

(RES)

Rung 2:1050

```

|                                     SCR_181V
| +LES-----+
| +LESS THAN
| |Source A    TMR181V.ACC|
| |             13|
| |Source B    PW181V|
| |             0|
| +-----+
| T4:36.ACC - (2:1048)
| N10:36 - (2:905)
  
```

Rung 2:1051

```

|                                     +TON-----+
| -----+-----+TIMER ON DELAY +- (EN)--
| |Timer      TMR182B+- (DN)
| |Time Base   0.01|
| |Preset      25|
| |Accum       13|
| +-----+
  
```

Rung 2:1052

```

| TMR182B/DN
| T4:37
| -----] [----- TMR182B
| |DN
| | (2:1051)
| | (RES)
  
```

Rung 2:1053

```

|                                     SCR_182B
| +LES-----+
| +LESS THAN
| |Source A    TMR182B.ACC|
| |             13|
| |Source B    PW182B|
| |             0|
| +-----+
| T4:37.ACC - (2:1051)
| N10:37 - (2:913)
  
```

Rung 2:1054

```

|                                     +TON-----+
| -----+-----+TIMER ON DELAY +- (EN)--
| |Timer      TMR182V+- (DN)
| |Time Base   C.01|
| |Preset      25|
| |Accum       13|
| +-----+
  
```

Rung 2:1055

```

| TMR182V/DN
| T4:38
| -----] [----- TMR182V
| |DN
| | (2:1054)
| | (RES)
  
```

Rung 2:1056

```
|
| +LES-----+
| --LESS THAN +-----+
| |Source A      TMR182V.ACC|
| |              13|
| |Source B      PW182V|
| |              0|
| +-----+
| T4:38.ACC - (2:1054)
| N10:38 - (2:921)
```

SCR_182V

O:25

5

Rung 2:1057

```
|
| +TON-----+
| --TIMER ON DELAY +--(EN)--+
| |Timer          TMR183B+--(DN)
| |Time Base      0.01|
| |Preset         25|
| |Accum          13|
| +-----+
```

Rung 2:1058

```
| TMR183B/DN
| T4:39
| ----] [-----+
|      DN
| (2:1057)
```

TMR183B

T4:39

(RES)---

Rung 2:1059

```
|
| +LES-----+
| --LESS THAN +-----+
| |Source A      TMR183B.ACC|
| |              13|
| |Source B      PW183B|
| |              0|
| +-----+
| T4:39.ACC - (2:1057)
| N10:39 - (2:929)
```

SCR_183B

O:25

6

Rung 2:1060

```
|
| +TON-----+
| --TIMER ON DELAY +--(EN)--+
| |Timer          TMR183V+--(DN)
| |Time Base      0.01|
| |Preset         25|
| |Accum          17|
| +-----+
```

Rung 2:1061

```
| TMR183V/DN
| T4:40
| ----] [-----+
|      DN
| (2:1060)
```

TMR183V

T4:40

(RES)---

```

+-----+
| +LES- |
| -+LESS THAN |
| |Source A      TMR183V.ACC |
| |              17 |
| |Source B      PW183V |
| |              0 |
+-----+

```

7

1

1 01

```

|
|-----+END+

```

Rung 3:0

Initialization Subroutine, runs once when the PLC is started.

write configuration number (3393d), (b) to
N7:0 (CONFIGURE) for use below, CONFIGURE T/C MODULES

```
|
|-----+MOV-----+
|          MOVE      +
|          |Source    2369|
|          |          |
|          |Dest      CONFIGURE|
|          |          2369|
|          +-----+
```

Rung 3:1

** CONFIGURE T/C MODULES **

Use Fill File to copy the configuration to each channel of each T/C module

MODULE 3

```
|
|-----+FLL-----+
|          FILL FILE  +
|          |Source    CONFIGURE|
|          |Dest      #0:3.0|
|          |Length     4|
|          +-----+
```

Rung 3:2

MODULE 4

```
|
|-----+FLL-----+
|          FILL FILE  +
|          |Source    CONFIGURE|
|          |Dest      #0:4.0|
|          |Length     4|
|          +-----+
```

Rung 3:3

MODULE 5

```
|
|-----+FLL-----+
|          FILL FILE  +
|          |Source    CONFIGURE|
|          |Dest      #0:5.0|
|          |Length     4|
|          +-----+
```

Rung 3:4

MODULE 6

```
|
|-----+FLL-----+
|          FILL FILE  +
|          |Source    CONFIGURE|
|          |Dest      #0:6.0|
|          |Length     4|
|          +-----+
```

Rung 3:5

MODULE 7

```
+FLL-----+
+--FILL FILE+
+--|Source  CONFIGURE|+
+--|Dest      #0:7.0|+
+--|Length    4|+
+-----+
```

Rung 3:6

MODULE 8

```
+FLL-----+
+--FILL FILE+
+--|Source  CONFIGURE|+
+--|Dest      #0:8.0|+
+--|Length    4|+
+-----+
```

Rung 3:7

MODULE 9

```
+FLL-----+
+--FILL FILE+
+--|Source  CONFIGURE|+
+--|Dest      #0:9.0|+
+--|Length    4|+
+-----+
```

Rung 3:8

MODULE 10

```
+FLL-----+
+--FILL FILE+
+--|Source  CONFIGURE|+
+--|Dest      #0:10.0|+
+--|Length    4|+
+-----+
```

Rung 3:9

MODULE 11

```
+FLL-----+
+--FILL FILE+
+--|Source  CONFIGURE|+
+--|Dest      #0:11.0|+
+--|Length    4|+
+-----+
```

Rung 3:10

MODULE 12

```
+FLL-----+
+--FILL FILE+
+--|Source  CONFIGURE|+
+--|Dest      #0:12.0|+
+--|Length    4|+
+-----+
```

Rung 3:11

MODULE 13

```
|
|-----+-----+
|FILL FILE|
|Source  CONFIGURE|
|Dest      #0:13.0|
|Length    4|
|-----+-----+
```

Rung 3:12

MODULE 14

```
|
|-----+-----+
|FILL FILE|
|Source  CONFIGURE|
|Dest      #0:14.0|
|Length    4|
|-----+-----+
```

Rung 3:13

MODULE 15

```
|
|-----+-----+
|FILL FILE|
|Source  CONFIGURE|
|Dest      #0:15.0|
|Length    4|
|-----+-----+
```

Rung 3:14

MODULE 16

```
|
|-----+-----+
|FILL FILE|
|Source  CONFIGURE|
|Dest      #0:16.0|
|Length    4|
|-----+-----+
```

Rung 3:15

MODULE 17

```
|
|-----+-----+
|FILL FILE|
|Source  CONFIGURE|
|Dest      #0:17.0|
|Length    4|
|-----+-----+
```

Rung 3:16

MODULE 18

```
|
|-----+-----+
|FILL FILE|
|Source  CONFIGURE|
|Dest      #0:18.0|
|Length    4|
|-----+-----+
```

Rung 3:17

MODULE 19

```
|
|-----+
|FILL FILE
|Source CONFIGURE|
|Dest #0:19.0|
|Length 4|
|-----+
```

Rung 3:18

MODULE 20

```
|
|-----+
|FILL FILE
|Source CONFIGURE|
|Dest #0:20.0|
|Length 4|
|-----+
```

Rung 3:19

MODULE 21

```
|
|-----+
|FILL FILE
|Source CONFIGURE|
|Dest #0:21.0|
|Length 4|
|-----+
```

Rung 3:20

MODULE 22

```
|
|-----+
|FILL FILE
|Source CONFIGURE|
|Dest #0:22.0|
|Length 4|
|-----+
```

Rung 3:21

MODULE 23

```
|
|-----+
|FILL FILE
|Source CONFIGURE|
|Dest #0:23.0|
|Length 4|
|-----+
```

Rung 3:22

```
|
|-----+
|CLEAR
|Dest N7:230|
| 0|
|-----+
```

Rung 3:23

```
|
|-----+
|CLEAR
|Dest N7:231|
| 0|
|-----+
```


Rung 3:24

```
+CLR-----+
+CLEAR
|Dest      N7:232|
|              0|
+-----+
```

Rung 3:25

```
+CLR-----+
+CLEAR
|Dest      N7:233|
|              0|
+-----+
```

Rung 3:26

```
+CLR-----+
+CLEAR
|Dest      N7:234|
|              0|
+-----+
```

Rung 3:27

```
+MOV-----+
+MOVE
|Source      43|
|              |
|Dest      PID143|
|              43|
+-----+
```

Rung 3:28

```
+CLR-----+
+CLEAR
|Dest      N12:1|
|              0|
+-----+
```

Rung 3:29

```
+MOV-----+
+MOVE
|Source      43|
|              |
|Dest      PID144|
|              43|
+-----+
```

Rung 3:30

```
+CLR-----+
+CLEAR
|Dest      N12:31|
|              0|
+-----+
```

Rung 3:31

```

+-----+
+MOV-----+
+-----+
+MOVE-----+
+-----+
|Source      43|
|-----|
|Dest       PID150|
|-----|
|      43|
+-----+

```

Rung 3:32

```

+-----+
+CLR-----+
+-----+
+CLEAR-----+
+-----+
|Dest       N12:61|
|-----|
|      0|
+-----+

```

Rung 3:33

```

+-----+
+MOV-----+
+-----+
+MOVE-----+
+-----+
|Source      43|
|-----|
|Dest       PID151|
|-----|
|      43|
+-----+

```

Rung 3:34

```

+-----+
+CLR-----+
+-----+
+CLEAR-----+
+-----+
|Dest       N12:91|
|-----|
|      0|
+-----+

```

Rung 3:35

```

+-----+
+MOV-----+
+-----+
+MOVE-----+
+-----+
|Source      43|
|-----|
|Dest       PID152|
|-----|
|      43|
+-----+

```

Rung 3:36

```

+-----+
+CLR-----+
+-----+
+CLEAR-----+
+-----+
|Dest       N12:121|
|-----|
|      0|
+-----+

```

Rung 3:37

```

+-----+
+MOV-----+
+-----+
+MOVE-----+
+-----+
|Source      43|
|-----|
|Dest       PID153|
|-----|
|      43|
+-----+

```

Rung 3:38

```
|
|-----+CLR-----+
|-----+CLEAR-----+
|Dest      N12:151|
|              0|
|-----+-----+
|
```

Rung 3:39

```
|
|-----+MOV-----+
|-----+MOVE-----+
|Source      43|
|              |
|Dest      PID151|
|              43|
|-----+-----+
|
```

Rung 3:40

```
|
|-----+CLR-----+
|-----+CLEAR-----+
|Dest      N12:181|
|              0|
|-----+-----+
|
```

Rung 3:41

```
|
|-----+MOV-----+
|-----+MOVE-----+
|Source      43|
|              |
|Dest      PID160|
|              43|
|-----+-----+
|
```

Rung 3:42

```
|
|-----+CLR-----+
|-----+CLEAR-----+
|Dest      N13:11|
|              0|
|-----+-----+
|
```

Rung 3:43

```
|
|-----+MOV-----+
|-----+MOVE-----+
|Source      43|
|              |
|Dest      PID161|
|              43|
|-----+-----+
|
```

Rung 3:44

```
|
|-----+CLR-----+
|-----+CLEAR-----+
|Dest      N13:31|
|              0|
|-----+-----+
|
```

Rung 3:45

```
|
|-----+MOV-----+
|-----+MOVE-----+
|Source      43|
|
|Dest      PID162|
|      43|
|-----+-----+
```

Rung 3:46

```
|
|-----+CLR-----+
|-----+CLEAR-----+
|Dest      N13:61|
|      0|
|-----+-----+
```

Rung 3:47

```
|
|-----+MOV-----+
|-----+MOVE-----+
|Source      43|
|
|Dest      PID163|
|      43|
|-----+-----+
```

Rung 3:48

```
|
|-----+CLR-----+
|-----+CLEAR-----+
|Dest      N13:91|
|      0|
|-----+-----+
```

Rung 3:49

```
|
|-----+MOV-----+
|-----+MOVE-----+
|Source      43|
|
|Dest      PID164|
|      43|
|-----+-----+
```

Rung 3:50

```
|
|-----+CLR-----+
|-----+CLEAR-----+
|Dest      N13:121|
|      0|
|-----+-----+
```

Rung 3:51

```
|
|-----+MOV-----+
|-----+MOVE-----+
|Source      43|
|
|Dest      PID170B|
|      43|
|-----+-----+
```

Rung 3:52

```
|
|-----+CLR-----+
|-----+CLEAR-----+
|Dest      N13:151|
|              0|
|-----+-----+
|
```

Rung 3:53

```
|
|-----+MOV-----+
|-----+MOVE-----+
|Source      43|
|              |
|Dest      PID170V|
|              43|
|-----+-----+
|
```

Rung 3:54

```
|
|-----+CLR-----+
|-----+CLEAR-----+
|Dest      N13:181|
|              0|
|-----+-----+
|
```

Rung 3:55

```
|
|-----+MOV-----+
|-----+MOVE-----+
|Source      43|
|              |
|Dest      PID171B|
|              43|
|-----+-----+
|
```

Rung 3:56

```
|
|-----+CLR-----+
|-----+CLEAR-----+
|Dest      N14:11|
|              0|
|-----+-----+
|
```

Rung 3:57

```
|
|-----+MOV-----+
|-----+MOVE-----+
|Source      43|
|              |
|Dest      PID171V|
|              43|
|-----+-----+
|
```

Rung 3:58

```
|
|-----+CLR-----+
|-----+CLEAR-----+
|Dest      N14:31|
|              0|
|-----+-----+
|
```

Rung 3:59

	+MOV-----+
	+-----+MOVE-----+
	Source 43
	Dest PID172B
	43
	+-----+

Rung 3:60

	+CLR-----+
	+-----+CLEAR-----+
	Dest N14:61
	0
	+-----+

Rung 3:61

	+MOV-----+
	+-----+MOVE-----+
	Source 43
	Dest PID172V
	43
	+-----+

Rung 3:62

	+CLR-----+
	+-----+CLEAR-----+
	Dest N14:91
	0
	+-----+

Rung 3:63

	+MOV-----+
	+-----+MOVE-----+
	Source 43
	Dest PID173B
	43
	+-----+

Rung 3:64

	+CLR-----+
	+-----+CLEAR-----+
	Dest N14:121
	0
	+-----+

Rung 3:65

	+MOV-----+
	+-----+MOVE-----+
	Source 43
	Dest PID173V
	43
	+-----+

Rung 3:66

```
|
|-----+CLR-----+
|          +CLEAR
|          |Dest      N14:151|
|          |          0|
|          +-----+
```

Rung 3:67

```
|
|-----+MOV-----+
|          +MOVE
|          |Source      43|
|          |          |
|          |Dest      PID174B|
|          |          43|
|          +-----+
```

Rung 3:68

```
|
|-----+CLR-----+
|          +CLEAR
|          |Dest      N14:181|
|          |          0|
|          +-----+
```

Rung 3:69

```
|
|-----+MOV-----+
|          +MOVE
|          |Source      43|
|          |          |
|          |Dest      PID174V|
|          |          43|
|          +-----+
```

Rung 3:70

```
|
|-----+CLR-----+
|          +CLEAR
|          |Dest      N15:1|
|          |          0|
|          +-----+
```

Rung 3:71

```
|
|-----+MOV-----+
|          +MOVE
|          |Source      43|
|          |          |
|          |Dest      PID175B|
|          |          43|
|          +-----+
```

Rung 3:72

```
|
|-----+CLR-----+
|          +CLEAR
|          |Dest      N15:31|
|          |          0|
|          +-----+
```

Rung 3:73

```
|
|-----+MOV-----+
|             +MOVE
|             |Source      43|
|             |
|             |Dest        PID175V|
|             |            43|
|             +-----+
```

Rung 3:74

```
|
|-----+CLR-----+
|             +CLEAR
|             |Dest        N15:61|
|             |            0|
|             +-----+
```

Rung 3:75

```
|
|-----+MOV-----+
|             +MOVE
|             |Source      43|
|             |
|             |Dest        PID176B|
|             |            43|
|             +-----+
```

Rung 3:76

```
|
|-----+CLR-----+
|             +CLEAR
|             |Dest        N15:91|
|             |            0|
|             +-----+
```

Rung 3:77

```
|
|-----+MOV-----+
|             +MOVE
|             |Source      43|
|             |
|             |Dest        PID176V|
|             |            43|
|             +-----+
```

Rung 3:78

```
|
|-----+CLR-----+
|             +CLEAR
|             |Dest        N15:121|
|             |            0|
|             +-----+
```

Rung 3:79

```
|
|-----+MOV-----+
|             +MOVE
|             |Source      43|
|             |
|             |Dest        PID177B|
|             |            43|
|             +-----+
```


Rung 3:80

```
|
|-----+CLR-----+
|-----+CLEAR-----+
|Dest      N15:151|
|              0|
|-----+-----+
```

Rung 3:81

```
|
|-----+MOV-----+
|-----+MOVE-----+
|Source      43|
|              |
|Dest      PID177V|
|              43|
|-----+-----+
```

Rung 3:82

```
|
|-----+CLR-----+
|-----+CLEAR-----+
|Dest      N15:181|
|              0|
|-----+-----+
```

Rung 3:83

```
|
|-----+MOV-----+
|-----+MOVE-----+
|Source      43|
|              |
|Dest      PID176B|
|              43|
|-----+-----+
```

Rung 3:84

```
|
|-----+CLR-----+
|-----+CLEAR-----+
|Dest      N16:1|
|              0|
|-----+-----+
```

Rung 3:85

```
|
|-----+MOV-----+
|-----+MOVE-----+
|Source      43|
|              |
|Dest      PID178V|
|              43|
|-----+-----+
```

Rung 3:86

```
|
|-----+CLR-----+
|-----+CLEAR-----+
|Dest      N16:31|
|              0|
|-----+-----+
```

Rung 3:87

	+MOV-----+
-----	+MOVE-----+
	Source 43
	Dest PID179B
	43

Rung 3:88

	+CLR-----+
-----	+CLEAR-----+
	Dest N16:61
	0

Rung 3:89

	+MOV-----+
-----	+MOVE-----+
	Source 43
	Dest PID179V
	43

Rung 3:90

	+CLR-----+
-----	+CLEAR-----+
	Dest N16:91
	0

Rung 3:91

	+MOV-----+
-----	+MOVE-----+
	Source 43
	Dest PID180B
	43

Rung 3:92

	+CLR-----+
-----	+CLEAR-----+
	Dest N16:121
	0

Rung 3:93

	+MOV-----+
-----	+MOVE-----+
	Source 43
	Dest PID180V
	43

Rung 3:94

```
|
|-----+CLR-----+
|          +CLEAR      +
|          |Dest      N16:151|
|          |          01|
|          +-----+
|
```

Rung 3:95

```
|
|-----+MOV-----+
|          +MOVE        +
|          |Source      43|
|          |          |
|          |Dest      PID181B|
|          |          43|
|          +-----+
|
```

Rung 3:96

```
|
|-----+CLR-----+
|          +CLEAR      +
|          |Dest      N16:181|
|          |          01|
|          +-----+
|
```

Rung 3:97

```
|
|-----+MOV-----+
|          +MOVE        +
|          |Source      43|
|          |          |
|          |Dest      PID181V|
|          |          43|
|          +-----+
|
```

Rung 3:98

```
|
|-----+CLR-----+
|          +CLEAR      +
|          |Dest      N17:11|
|          |          01|
|          +-----+
|
```

Rung 3:99

```
|
|-----+MOV-----+
|          +MOVE        +
|          |Source      43|
|          |          |
|          |Dest      PID182B|
|          |          43|
|          +-----+
|
```

Rung 3:100

```
|
|-----+CLR-----+
|          +CLEAR      +
|          |Dest      N17:31|
|          |          01|
|          +-----+
|
```

Rung 3:101

```
|-----+-----+
|          +MOV-----+
|          |MOVE
|          |Source      43|
|          |
|          |Dest        PID182V|
|          |          43|
|          +-----+-----+
```

Rung 3:102

```
|-----+-----+
|          +CLR-----+
|          |CLEAR
|          |Dest        N17:61|
|          |          0|
|          +-----+-----+
```

Rung 3:103

```
|-----+-----+
|          +MOV-----+
|          |MOVE
|          |Source      43|
|          |
|          |Dest        PID183B|
|          |          43|
|          +-----+-----+
```

Rung 3:104

```
|-----+-----+
|          +CLR-----+
|          |CLEAR
|          |Dest        N17:91|
|          |          0|
|          +-----+-----+
```

Rung 3:105

```
|-----+-----+
|          +MOV-----+
|          |MOVE
|          |Source      43|
|          |
|          |Dest        PID183V|
|          |          43|
|          +-----+-----+
```

Rung 3:106

```
|-----+-----+
|          +CLR-----+
|          |CLEAR
|          |Dest        N17:121|
|          |          0|
|          +-----+-----+
```

Rung 3:107

```
|-----+-----+
|          +END-----+
|          |
|          +-----+-----+
```