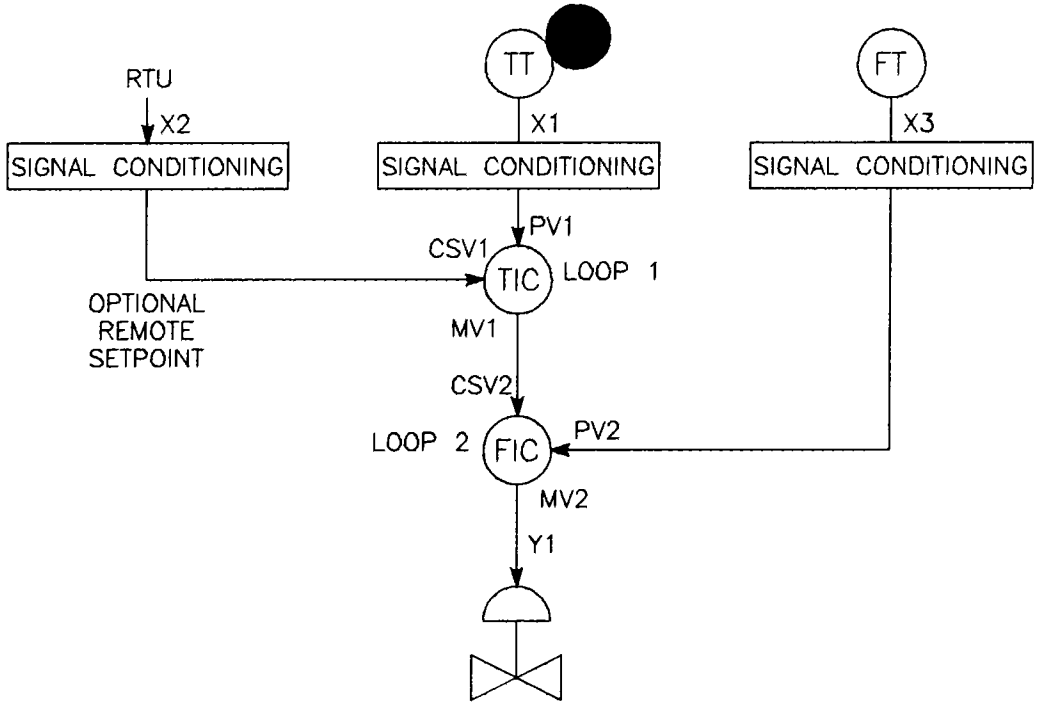


FIGURE 1: BASIC CASCADE CONFIGURATION, TIC–FIC

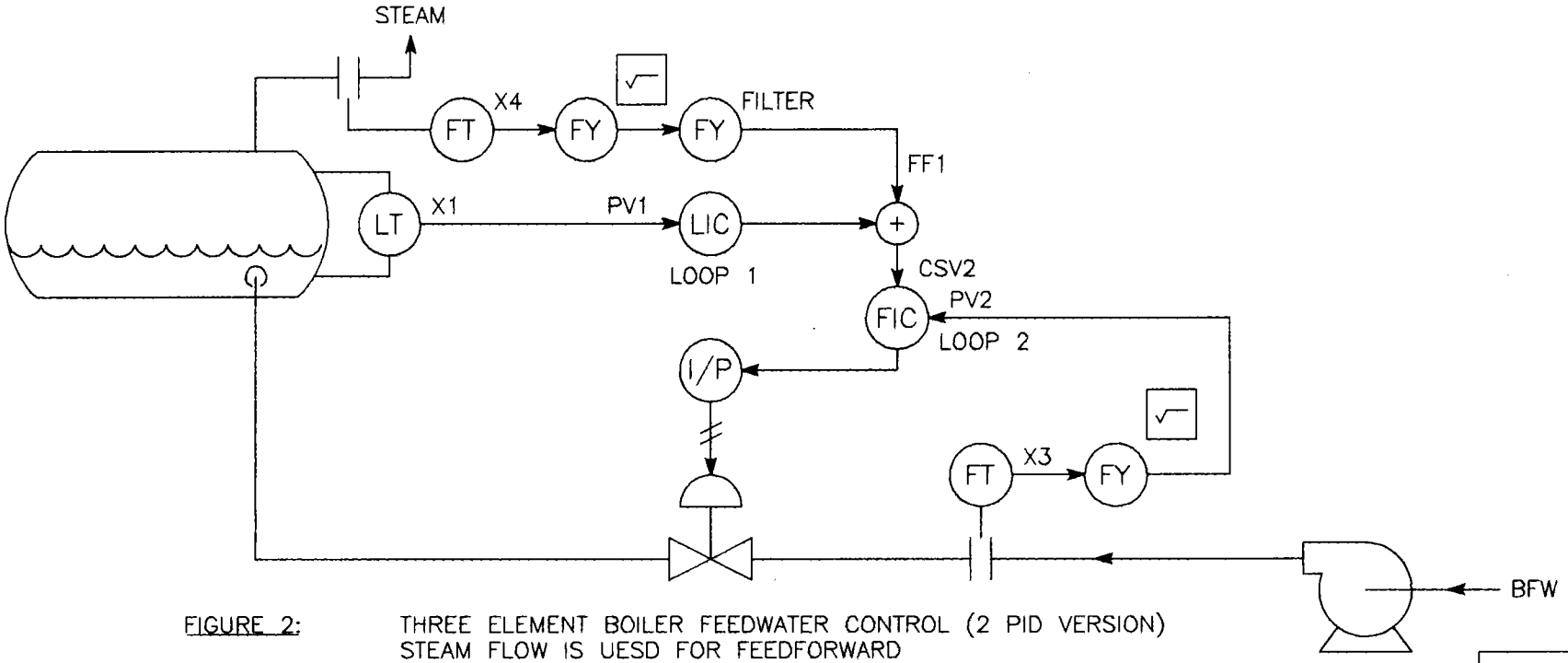


FIGURE 2: THREE ELEMENT BOILER FEEDWATER CONTROL (2 PID VERSION)
STEAM FLOW IS UESD FOR FEEDFORWARD

PROGRAM DESCRIPTION

GENERAL CASCADE:, File:CASCADEG

The general cascade controller is a programmable version of the pre-configured cascade controller described in TI 1B7C1-01E. Parameters can be set to implement the desired options. Control features include:

1. Cascade PID control: the primary variable is input X1 with possible conditioning; the secondary variable, input X3, again with possible signal conditioning.

2. Optional square root extraction based on parameter values, set to 100% to extract the square root: for input X1, P16, for input X2, P10, for input X3, P6, for input X4, P22.

3. Input filter time set by P11, P12, P13, and P14 for inputs X1, X2, X3, and X4.

4. Optional characterization available for inputs X1 and X3. Parameters FX101 through FX111 of look-up Table FX1 used for input X1 if P16 is 200%. Table FX2 used for input X3 if P15 is 100%.

5. If the Loop 1 cascade parameter (CMOD1) is set to cascade and P9 is 100%, then input X2 may be selected as the remote (cascade) set point for the primary loop (Loop 1). If P18 is 100%, then ratio (P5) and Bias (P8) are used to condition the X2 input.

6. Loop 1 output feed-forward is active based on input X4 if P21 is 100%. Ratio (P24) and bias (P25) are used to condition the input if P23 is 100%.

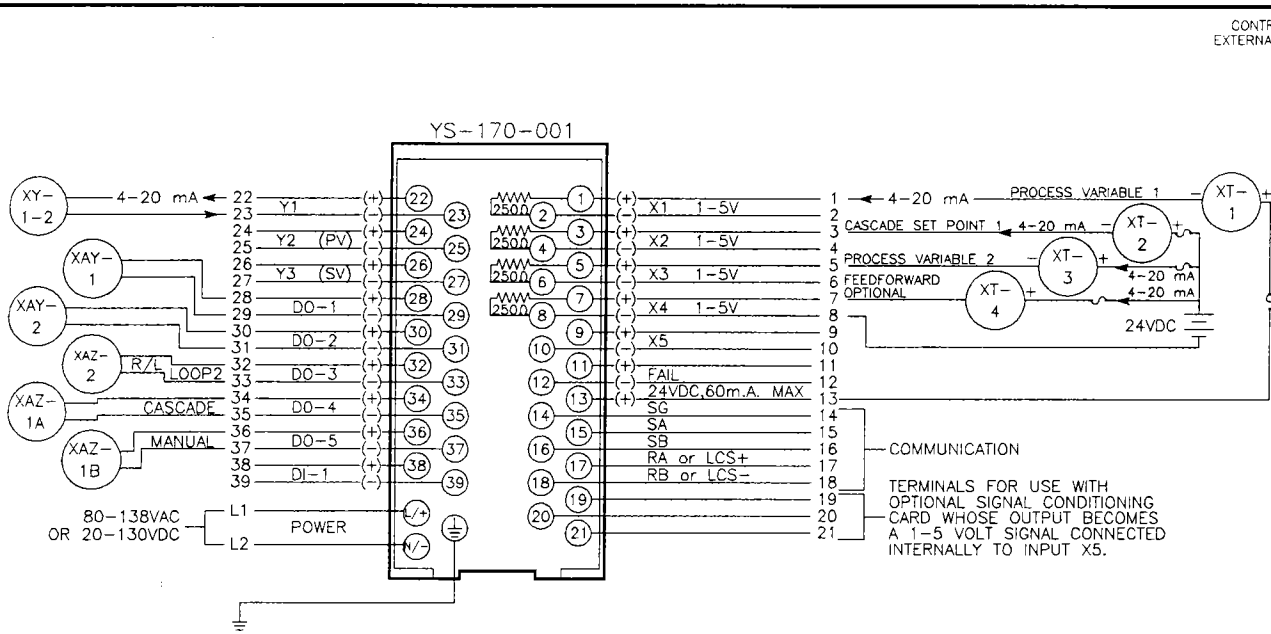
7. The secondary loop (Loop 2) can be operated in manual, automatic and cascade modes. When cascade is selected by the operator, the output of the primary controller (Loop 1) bumplessly becomes the set point of Loop 2.

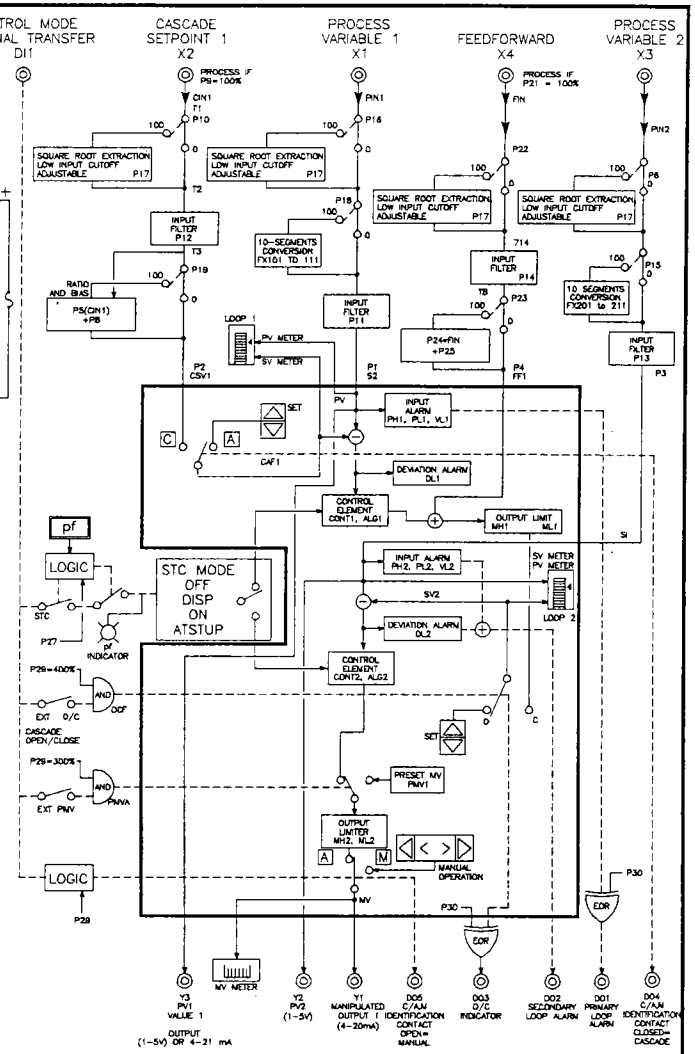
8. Alarm and status indication is available as shown on drawing 89403. The alarm status can be inverted using P30.

9. Discrete input DI1 may be selected to activate several functions based on the status of P29 and P27. See drawing 89403 for details.

10. The program can be used for three element feedwater with:

    steam flow as feedforward input X4
    Boiler Feedwater flow as loop 2 PV2, X3
    Drum level as Loop 1 PV1, X1





NOTES

(1) DI-1 IS DRY CONTACT INPUT, USED TO ACTIVATE SELECTED INTERNAL OPTIONS.

(2) DO-1 TO DO-5 ARE OPEN COLLECTOR TRANSISTORS RATED FOR A MAXIMUM OF 30VDC AND 200mA. A SUPPRESSION DIODE IS RECOMENDED FOR INDUCTIVE LOADS.

(3) PINS 2,4,6,8,10,23,25 AND 27 ARE CALLED DC COMMON AND ARE CONNECTED IN THE CONTROLLER.

(4) REMOTE MANUAL/AUTO MODE CHANGES BASED ON P29 & DI-1
1. P29=0, NO REMOTE CHANGES AS DI-01 CHANGES.
2. P29=100%, GO TO MANUAL IF DI-01 CLOSED, LOOP 2
3. P29=200%, GO TO MANUAL IF DI-01 CLOSED, LOOP 2 AND GO TO AUTO WHEN DI-01 GOES TO OPEN.
4. P29=300% USE PMV1 VALUE AND GO TO AUTOMATIC WHEN DI1 IS CLOSED.
5. P29=400% AND DI1 CLOSED, OPEN THE CASCADE LOOP.

(5) CONTROL OF SELF-TUNING BASED ON P27, pf KEY, SELF-TUNING SETTINGS AND DI-01
A. P27=0, SELF-TUNING SET FROM STC PANEL
B. P27=1, SELF-TUNING IS INHIBITED BY ACTION OF pf KEY. SELF-TUNE IS OFF IF pf INDICATOR IS "OFF"
C. P27=2, SELF-TUNE INHIBITED IF DI-01 IS OPEN; pf INDICATOR OFF WHEN DI-01 IS OPEN.
D. P27=3, SELF-TUNING INHIBITED IF DI-01 IS CLOSED; pf INDICATOR IS OFF WHEN DI-01 IS CLOSED.

(6) TRANSMITTER WIRING IS TYPICAL. INPUTS 2, 3, AND 4 MAY NOT BE USED IN ANY SPECIFIC APPLICATION. SIGNALS MAY BE 1-5 VOLTS ELIMINATING THE NEED FOR THE 250 ohm RESISTER SHOWN CONVERTING 4-20 mA TO 1-5 VOLT.

	LOOP 1	LOOP 2
TAG	XIC-1	XIC-2
RANGE	0-100	0-100
HIGH ALARM PH	80	80
LOW ALARM PL	20	20
INPUT FILTER SECONDS	P11	P12
INPUT FROM	X1	X3

JOHNSON YOKOGAWA

DATE	JOB #	DESIGNER	DRAWN BY	CHECKED BY
8/10/94		H.E.	E.E.M.	

GENERAL CONTROLLER

FILE: CASCADEG

FILE NUMBER 89403

```
Program list   1/4      File name: CASCADEG    1994.11. 8
================================================================
0001 ;   This program is based on the cascade loop configuration
0002 ;   available in the YS-150 and YS-170.  This configuration
0003 ;   is documented in the YS-150 and YS-170 GS sheets and
0004 ;   manuals.  Having a programmed version of the configuration
0005 ;   is useful when operationing conditions require a modification
0006 ;   of this commonly applied configuration.
0007 ;
0008 ;   The program is a general cascade loop configuration capable
0009 ;   of doing :
0010 ;       1. PID control of input X1 with optional characterization
0011 ;       2. Remote set point (X2) with optional ratio and bias
0012 ;          when in cascade
0013 ;       3. Output tracking of a remote signal (X3)
0014 ;       4. Feed-forward, output compensation based on X4
0015 ;       5. Optional square root extraction of all 4 inputs
0016 ;       6. Adjustable filtering of all 4 inputs
0017 ;       7. Self-tuning de-activation from front panel or external
0018 ;          input
0019 ;       8. Remotely place controller into specified mode, manual,
0020 ;          auto, casc.
0021 ;       9. Remote command to pre-position output to PMV1 value
0022 ;      10. Optional functions selected by setting values of
0023 ;          parameters, P1 through P30 and DI-01.
0024 ;      11. Use as a three element boiler feedwater controller
0025 ;           Steam flow is the feed-forward input, X4
0026 ;           Boiler feedwater flow is the loop 2 PV, X3
0027 ;           Drum level is the loop 1 PV, X1
0028
0029 ;   Copyright 1994, Dixon Control Systems, Inc.
0030 ;                    Houston, Texas
0031 ;                    Phone: 713-644-8025, Fax # 713-644-8285
0032
0033 ; Read, filter and characterize the input signals
0034
0035    ; The X1 input, Process Variable 1
0036 LD X1          ; Load Input X1, PV for loop 1
0037 LD P16         ; "1" to take square root
0038 GIFSUB @SQRT   ; If P16 > 50 per cent, then take go to SQRT
0039 LD P18         ; "1" to use FX1 to linearize input
0040 GIFSUB @FX1    ; Use FX1 to linearize if P18 > 50 per cent
0041 LD P11         ; Filter time constant, per cent = seconds, PLG1
0042 LAG1           ; First order, low pass filter
0043 ST P1          ; Store filtered & characterized value of X1 into P1
0044 ST Y3          ; Store Output Y3
0045
0046 ; The X2 input, if used, the cascade input for remote set point
0047 LD P9          ; If P9 is "0", less than 50 per cent, no cascade
0048 NOT            ; If P9 is "1", greater than 50process input X2
0049 GIF @NOCAS     ; Jump if cascade input not used
0050 LD X2          ; Load Input X2
0051 ST T1          ; For de-bug store intermediate values
0052 LD P10         ; "1" to take square root
0053 GIFSUB @SQRT   ; If P10 > 50 per cent, take square root
0054 ST T2          ; For de-bug store intermediate values
0055 LD P12         ; Filter time constant, per cent = seconds, CLG1
```

```
0056 LAG2          ; First order, low pass filter
0057 ST T3         ; For De-bug store intermediate values
0058 LD P19        ; If P19 > 50 per cent, then do ratio & bias
0059 NOT           ; Invert
0060 GIF @NORB     ; Jump if no scaling, ratio or bias for cascade set
0061               ; point
0062 LD P5         ; P5, ratio span
0063 *             ; P5*T3
0064 LD P8         ; The cascade set point off-set, bias
0065 +             ; P5*T3 + P8
0066 ST T5         ; For De-bug, store in T5
0067 @NORB         ; Jump to here if no ratio-bias to cascade set point
0068 ST P2         ; Store filtered value of X1 into P2
0069 ST CSV1       ; Store as Cascade set point
0070 @NOCAS        ; Jump here if no cascade set point
0071
0072 ;       Process X3, Process Variable 2
0073 LD X3         ; Load input X3
0074 LD P6         ; "1" to take square root
0075 GIFSUB @SQRT  ; If P28 > 50 per cent, then go to SQRT
0076 LD P15        ; "1" to use FX1 to linearize input
0077 GIFSUB @FX2   ; Use FX1 to linearize if P18 > 50 per cent
0078 LD P13        ; Filter time constant, per cent = seconds, TLG
0079 LAG3          ; First order, low pass filter
0080 ST P3         ; Store filtered value of X3 into P3
0081
0082 ;       Process X4, feed-forward input, if P21 is a "1"
0083 LD P21        ; If P21 > 50 per cent, then feed-forward
0084 NOT           ; Invert
0085 GIF @NOFFD    ; Jump if P21 is a "0", less than 50 per cent
0086 LD X4         ; Load Input X4
0087 ST T7         ; For de-bug, store in T7
0088 LD P22        ; "1" to take square root
0089 GIFSUB @SQRT  ; If P22 > 50 per cent, then take go to SQRT
0090 ST T14        ; Store in T14 for de-bug
0091 LD P14        ; Filter time constant, per cent = seconds, FLG
0092 LAG4          ; First order, low pass filter
0093 ST T8         ; For de-bug, store in T8
0094 LD P23        ; If P23 is "1", then Gain and bias for feed-forward
0095 NOT           ; Invert
0096 GIF @NOGNB    ; Jump if P23 is "0", less than 50 per cent
0097 LD P24        ; Feed-forward gain
0098 *             ; P24*(T8 or T9)
0099 ST T10        ; Store for de-bug
0100 LD P25        ; Feed-forward off-set, bias
0101 +             ; P24*(T8 or T9) + P25
0102 ST T11        ; Store for de-bug
0103 @NOGNB        ; Jump to here if no gain bais
0104 ST P4         ; Store filtered value of X4 into P4
0105 @NOFFD        ; Jump to here if no feed-forward
0106
0107 ; Set feed-forward value in FF1 if track flag T26 is on.
0108 ; P26 will set T26 if the loop is in manual.  Turning the
0109 ; feed-forward on or off in automatic will cause a jump so the
0110 ; option is inhibited.
0111 LD CAF2       ; "1" if loop 2 is in cascade
0112 LD P26        ; "1" to activate, set from P register panel
0113 OR            ; "1" in automatic or P26 is "1"
0114 ST T23        ; Store for de-bug
0115 LD CAF2       ; "1" if loop 2 is in cascade
```

```
0116 NOT          ; "1" if loop 2 is in manual or automatic
0117 LD P26       ; "1" to activate feed-forward
0118 AND          ; "1" in manual if P26 is "1", begin Feed-forward
0119 ST T24       ; Store for de-bug
0120 LD T26       ; Feed-forward flag, "1" feed-forward is active
0121 OR           ; Part of the latch to latch in feed-forward
0122 ST T25       ; Store for de-bug
0123 LD P21       ; Feed-forward not implemented flag,"1" to implement
0124 LD T23       ; "0" to stop feed-forward, manual and P26 "0"
0125 AND          ; "1" if P21 is "1" and latch are "1"
0126 AND          ; "1" to get feed-forward going
0127 ST T26       ; The feed-forward flag
0128 NOT          ; If T26 is "0" don't change FF1
0129 GIF @FFDEAD  ; Jump if feed-forward is dead
0130 LD P4        ; Feed-forward value after scaling, filtering etc.
0131 ST FF1       ; Store value in feed-forward register
0132 @FFDEAD      ; Jump to here if feed-forward processing off
0133
0134 ;  When DI-01 is closed, actions will be taken based on
0135 ;   P27=1,2,or3,self-tune controlled by pf (1) or DI-01(2or3)
0136 ;   P29=100, then go to manual if DI-1 is "1", closed
0137 ;   P29=200, then go to manual if DI-1 is closed, auto if open
0138 ;   P29=300, when DI-1 is closed, then auto output is PMV1
0139 ;   P29=400, when DI-1 is closed, open the cascade loop
0140 LD P29          ; P29 used to change remote auto/manual
0141 NOT             ; NOT
0142 GIF @NODI1      ; Jump if P29 = "0" (less than 50 per cent)
0143 LD K11          ; Constant = to 150
0144 LD P29          ; P29
0145 CMP             ; "1" if P29 between 50and 150
0146 GIF @DI1AM      ; Jump if 50< P29 < 150
0147 LD K12          ; Constant = to 250
0148 LD P29          ; P29
0149 CMP             ; "1" if P29 between 150and 250
0150 GIF @PMV1       ; Jump if 150< P29 < 250
0151 LD K13          ; Constant = to 350
0152 LD P29          ; P29
0153 CMP             ; "1" if P29 between 250and 350
0154 GIF @EXTSP      ; Jump if 250< P29 < 350
0155 LD K1           ; Constant = to 100
0156 ST OCF          ; set cascade Open/Closed Flag to "1"
0157 GO @NODI1       ; Jump to end of this section
0158 @EXTSP          ; Jump here if 250< P29 < 350
0159 LD K1           ; Constant = to 100
0160 LD DI1          ; Digital Input 1
0161 AND             ; AND
0162 ST PMVF1        ; set Preset MV Flag, "1" uses PMV1 as output
0163 ST CAMF1        ; set Auto/Manual Flag, "1" is Auto
0164 GO @NODI1       ; Jump to end of this section
0165 @PMV1           ; Jump here if 150< P29 < 250
0166 LD DI1          ; Digital Input 1
0167 NOT             ; NOT
0168 ST CAMF1        ; Auto/Manual Flag, "1" is Auto
0169 GO @NODI1       ; Jump to end of this section
0170 @DI1AM          ; Jump here if 50< P29 < 150
0171 LD DI1          ; Digital Input 1
0172 NOT             ; NOT
0173 GIF @NODI1      ; Jump to end of section if DI1 = 0
0174 LD K2           ; K2=0
0175 ST CAMF2        ; Set Auto/Manual Flag to Manual
```

```
0176 @NODI1           ; Jump here
0177
0178 ;  PID control
0179 LD P3            ; Filtered and manipulated Input X3
0180 LD P1            ; Filtered and manipulated Input X1
0181 CSC              ; CaSCade controller block
0182 ST Y1            ; Output Y1
0183
0184
0185 LD P27           ; Self-tune, "0", Std.;"1",pf;"2" or "3",DI-01
0186 NOT              ; Invert
0187 GIF @ENDSELT     ; Jump if self-tune not inhibited remotely
0188 LD P27           ; "1" uses pf key; "2" or "3" uses DI-01 to
0189                  ; inhibit STC
0190 LD K11           ; K11 = 1.5
0191 CMP              ; "0", use pf key, "1", use DI-01
0192 GIF @DISETS      ; Jump if DI-01 sets self-tune
0193 LD T27           ; Load self-tune status
0194 LD KY1           ; Load status of pf key
0195 CCD1             ; One shot
0196 EOR              ; Exclusive OR
0197 ST T27           ; Set self-tuning status
0198 NOT              ; Invert
0199 ST STCSW         ; "1" to inhibit self-tuning
0200 GO @ENDSEFT      ; Jump to end of self-tuning
0201 @DISETS          ; Use DI-01 to set self-tuning
0202 LD DI1           ; DI-01 "ON" or "OFF" based on P27 to self-tune
0203 LD P27           ; "2" for DI01 closed for self-tune;"3" open
0204 LD K10           ; K10 = 2
0205 -                ; P27 - K2, 0 or 1
0206 EOR              ; Exclusive OR
0207 ST STCSW         ; Set self-tune flag setting
0208 @ENDSEFT         ; End of self-tuning
0209 LD STCSW         ; "1"=stop self-tuning
0210 NOT              ; "0" indicates no self-tuning allowed
0211 ST LP1           ; Store self-tune activity in LP1
0212 @ENDSELT         ; End of self-tuning flag setting
0213
0214 ; Set Discrete Outputs
0215 LD PHF1          ; "1" if process high alarm
0216 LD VLF1          ; VeLocity alarm Flag
0217 LD PLF1          ; Process Low Flag
0218 OR               ; OR
0219 OR               ; OR
0220 LD P30           ; Sets output sense, 100per cent for normally closed
0221 EOR              ; Exclusive OR
0222 ST DO1           ; set DI-01, high alarm output
0223 LD DLF1          ; Deviation aLarm Flag
0224 ST DO2           ; Digital Output 2
0225 LD OCF           ; Open/Closed cascade Flag
0226 LD P30           ; sets output sense,100 percent for normally closed
0227 EOR              ; Exclusive OR
0228 ST DO3           ; Digital Output 3
0229 LD CAMF1         ; "0" if in manual, "1" in automatic or cascade
0230 ST DO5           ; DO-05 open
0231 LD CAF1          ; "1" in cascade, "0" in auto or manual
0232 ST DO4           ; DO4 closed in cascade, open in manual or aut
0233
0234 END              ; **** End of Main Program ****
0235
```

```
0236 SUB @SQRT      ; Sub-program to take Square root of S1
0237 LD P17         ; Typically P17 is 1 cut-off on square root
0238 SQTE           ; Take square root
0239 RTN            ; **** Return to Main Program ****
0240
0241 SUB @FX1       ; Use look-up table FX1 to process S1
0242 FX1            ; Function Generator, FX1
0243 RTN            ; **** Return to Main Program ****
0244
0245 SUB @FX2       ; Use look-up table FX2 to process S1
0246 FX2            ; Function Generator FX2, set values from panel
0247 RTN            ; **** Return to Main Program ****
```

==========

Parameter list 1/4 File name: CASCADEG 1994.11. 8

<<Configuration 1>>

CYCL	Control Period	200ms
DIO1	DI1/DO6 Set	IN
DIO2	DI2/DO5 Set	OUT
DIO3	DI3/DO4 Set	OUT
DIO4	DI4/DO3 Set	OUT
DIO5	DI5/DO2 Set	OUT
DIO6	DI6/DO1 Set	OUT
ATSEL	Auto Selector	LOW
START	Start Mode	AUT

<<Configuration 2-1>>			<<Configuration 2-2>>	
CMOD1	Cascade Mode	-	CMOD2	CAS
BMOD1	Back Up Mode	BUM	BMOD2	BUM
CNT1	Control Type	PID	CNT2	PD
ALG1	Control Computation	I-PD	ALG2	I-PD
ACT1	Direct/Reverse Action	RVS	ACT2	RVS
VDIR1	Valve Action	C-O	VDIR2	C-O
SCH1	Scale(100%)	1000	SCH2	1000
SCL1	Scale(0%)	0	SCL2	0
SCDP1	Decimal Point	3	SCDP2	3
SCDV1	Scale Division	10	SCDV2	10
UNIT1	Unit	%	UNIT2	%
TRDT1	Trend Scale	30M	TRDT2	30M
TAG1	Tag No.	XIC-1	TAG2	XIC-2

<<PID Parameters 1>>				<<PID Parameters 2>>		
SV1	SV initial start val	50.0		SV2	50.0	
PB1	Proportional Band	200.0	%	PB2	120.0	%
TI1	Integral Time	10	S	TI2	20	S
TD1	Derivative Time	0	S	TD2	0	S
SFA1	SV Filter A	0.500		SFA2	0.000	
SFB1	SV Filter B	0.200		SFB2	0.000	
GW1	Non-Linear Gap	0.0	%	GW2	0.0	%
GG1	Non-Linear Gain	0.300		GG2	0.300	
PH1	PV High Limit Alarm	80.0		PH2	80.0	
PL1	PV Low Limit Alarm	20.0		PL2	20.0	
DL1	Deviation Limit Alarm	106.3	%	DL2	106.3	
VL1	Velocity Limit Alarm	106.3	%	VL2	106.3	
VT1	V.L.A.Time Span	1	S	VT2	1	S
MH1	MV High Limit	100.0	%	MH2	100.0	%
ML1	MV Low Limit	0.0	%	ML2	0.0	%
MR1	Manual Reset	50.0	%	MR2	50.0	%
RB1	Reset Bias	0.0	%	RB2	0.0	%
PMV1	Preset MV	10.0	%	PMV2	10.0	%

<<Sample and Batch Control Parameters>>

STM1	Sampling Period	180	S	STM2	180	S
SWD1	Control Time	10	S	SWD2	10	S
BD1	Deviation Set Point	10.0	%	BD2	10.0	%
BB1	Bias Value	5.0	%	BB2	5.0	%
BL1	Lock Up Span	5.0	%	BL2	5.0	%

Parameter list 2/4 File name: CASCADEG 1994.11. 8

<<STC Parameters 1>>				<<STC Parameters 2>>		
STC	STC Operation Mode	OFF				
IP1	Process Type	STATIC		IP2	STATIC	
TR1	Process Response Time	30	S	TR2	30	S
NB1	Noise Band	5.0		NB2	5.0	
OS1	Control Target Type	ZERO		OS2	ZERO	
MI1	MV Interference	5.0	%	MI2	5.0	%
PMX1	PB Upper Limit	999.9	%	PMX2	999.9	%
PMN1	PB Lower Limit	50.0	%	PMN2	50.0	%
IMX1	TI Upper Limit	100	S	IMX2	100	S
IMN1	TI Lower Limit	3	S	IMN2	3	S
DMX1	TD Upper Limit	2000	S	DMX2	2000	S

<<Preset PID Parameters>>

	PB(%)	TI(S)	TD(S)
01	151.0	31	0
02	152.0	32	0
03	153.0	33	0
04	154.0	34	0
05	155.0	35	0
06	156.0	36	0
07	157.0	37	0
08	158.0	38	0

<<Program Set Parameters>>

	TIME(S)	OUTPUT(%)
101	10	10.0
102	10	20.0
103	10	30.0
104	10	40.0
105	10	50.0
106	10	60.0
107	10	70.0
108	10	80.0
109	10	90.0
110	10	50.0

<<FX1 Table>>		<<FX2 Table>>	
	VALUE(%)		VALUE(%)
101	0.0	201	0.0
102	10.0	202	10.0
103	20.0	203	20.0
104	30.0	204	30.0
105	40.0	205	40.0
106	50.0	206	50.0
107	60.0	207	60.0
108	70.0	208	70.0
109	80.0	209	80.0
110	90.0	210	90.0
111	100.0	211	100.0

Parameter list 3/4 File name: CASCADEG 1994.11. 8

<<GX1 Table >>

	INPUT(%)	OUTPUT(%)
101	0.0	0.0
102	10.0	10.0
103	20.0	20.0
104	30.0	30.0
105	40.0	40.0
106	50.0	50.0
107	60.0	60.0
108	70.0	70.0
109	80.0	80.0
110	90.0	90.0
111	100.0	100.0

<<GX2 Table >>

	INPUT(%)	OUTPUT(%)
201	0.0	0.0
202	10.0	10.0
203	20.0	20.0
204	30.0	30.0
205	40.0	40.0
206	50.0	50.0
207	60.0	60.0
208	70.0	70.0
209	80.0	80.0
210	90.0	90.0
211	100.0	100.0

<<P Parameters 1/2>>

01	36.5	Used to store the filtered value of X1
02	0.0	Used to store the filtered value of X2
03	36.5	Used to store the filtered value of X3
04	0.0	Used to store the filtered value of X4
05	1.500	Ratio span for remote set point
06	0.0	100 to extract square root of X3
07	0.000	
08	0.0	Cascade input bias (offset)
09	0.0	100 to process cascade input X2
10	0.0	100 to extract square root of X2
11	1.0	Time constant, seconds, for X1
12	1.0	Time constant, seconds, for X2
13	1.0	Time constant, seconds, for X3
14	1.0	Time comstant, seconds, for X4
15	0.0	100 to use FX2 to linearize input X3

<<P Parameters 2/2>>

16	0.0	Set to 100 per cent for SquareRoot ofX1
17	1.0	Low cut-off for square root, @SUB SQRT
18	0.0	100 to characterize X1 using FX1
19	0.0	100 to apply ratio&bias toCascade input
20	0.0	100 if tracking input is to be used
21	0.0	100 if feedforward input is to be used
22	0.0	100 to square root X4
23	0.0	100 to apply gain and bias to feed-forw
24	100.0	Feed-forward gain
25	0.0	Feed-forward bias (offset)
26	0.0	100 to activate feed-forward if P21
27	0.0	Self-tune switch,100fromPanel,2-300DI-1
28	2.0	100 for DI-01 to set PMV1, pre-set outp
29	0.0	100 for DI-01 closed
30	100.0	"1" makes outputs open to alarm,"0"clsd

Parameter list 4/4 File name: CASCADEG 1994.11. 8

<<P Scales>>

	100% VALUE	0% VALUE	DP
01	1000	0	3
02	1000	0	3
03	1000	0	3
04	1000	0	3
05	1000	0	1
06	1000	0	3
07	1000	0	1
08	1000	0	3

<<K Constants 1/2>>

01	100.0	Fixed constants, common 1.00
02	0.0	A good place to find zero
03	50.0	One half, 0.500
04	10.0	10 per cent, 0.1
05	1.0	1 per cent, 0.01
06	0.1	0.1 per cent, 0.001
07	-100.0	Minus 100 per cent, -1.00
08	799.0	Nearly the biggest number possible,7.99
09	-799.0	Bottom of number scale, -7.99
10	200.0	Two; two hundred per cent
11	150.0	1.5, used for P29 compare for manTOauto
12	250.0	2.5, used for P29 compare for manTOauto
13	350.0	3.5, used for P29 compare for manTOauto
14	0.0	
15	0.0	

<<K Constants 2/2>>

16	0.0
17	0.0
18	0.0
19	0.0
20	0.0
21	0.0
22	0.0
23	0.0
24	0.0
25	0.0
26	0.0
27	0.0
28	0.0
29	0.0
30	0.0

<<X Scales>>

	100% VALUE	0% VALUE	DP
01	1000	0	3
02	1000	0	3
03	1000	0	3
04	1000	0	3
05	1000	0	3