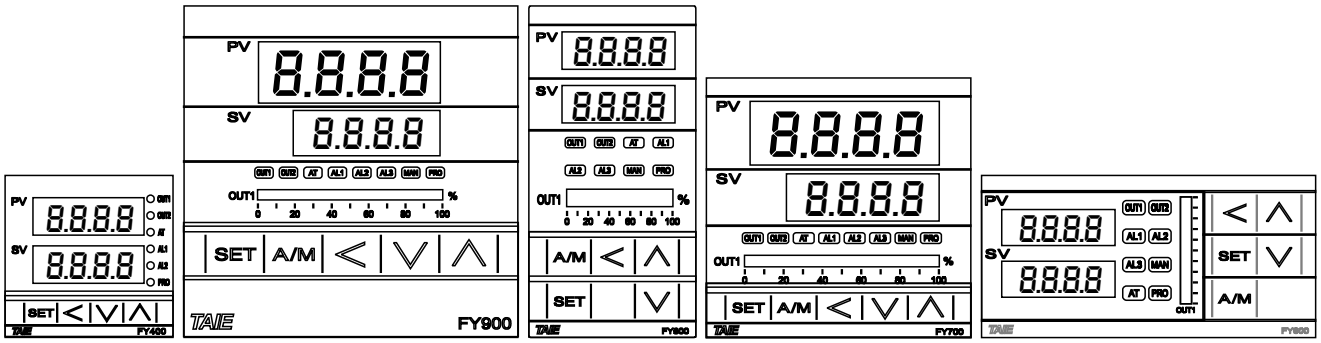
Digital PID Temperature Controllers

Model: NFY400/600/700/800/900

Ver 1.0

Operation Manual



台灣儀控股份有限公司

TAIWAN INSTRUMENT & CONTROL CO., LTD

Content

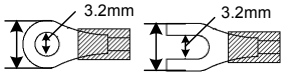
1. Notes

Warning

1. Beware of Electric Shock !
2. Once controller is activated, do not touch AC power wiring terminals to avoid electric shock !
3. First to confirm power is OFF, before working on the wiring of controller power supply !
4. Before using this product, please read through this operating manual thoroughly to understand the correct usage based on the fundamentals of its conten.
5. This product can be used in industrial equipment, working terminal, measurement equipment, but not in life-saving-related medical equipment.
6. In order to ensure safety even if the temperature controller fails, please set up another alarm system or safety redundancy.

Caution

1. Before the controller transmits power, make sure that the position of the AC power assembly leg is correct. Otherwise, the controller may be seriously damaged after power transmission is initiated.
2. Before powering on, please confirm whether the power supply voltage is in accordance with the controller's specification (AC 85~265V or DC 24V.) Otherwise, the controller may be seriously damaged after power transmission is initiated.
3. Check if the wiring is connected to the terminal for the correct terminals (Input, Output.)
4. Please use crimp terminals suitable for M3 screws, as shown below:



Torque : 0.4 N.m (4kgf.cm)

5. Do not install the controller in places subject to high-frequency interference, corrosive gases, and high temperature and humidity (normal working environment: 0 ~ 50°C, 20 ~ 90% RH.)
6. To avoid noise interference, please keep the sensor wiring away from the power cord and the loading power cord.
7. When the thermocouple lead is extended, please use the compensation lead of the corresponding type to this thermocouple.
8. When the RTD lead wire is extended, please use those with lower resistance value. Please use the same wire between the three wires.

2. Order Information

Model	Output 1	Output 2	Alarm	TRS	Remote	COMM	Input type	Power	Accessories
NFY900(Red/Green light) NFY901(Blue/White light) NFY902(Large LED) PNFY900(Program)	1	0	1	0	0	0	0 1	A	N
NFY400 48x48mm NFY600 96x48mm NFY700 72x72mm NFY800 48x96mm NFY900 96x96mm	0 None 1 Relay 2 Voltage Pulse (SSR Drive) 3 4~20mA 4 0~20mA A 0~5V B 0~10V C 1~5V D 2~10V 5 1ϕSCR zero cross control 6 3ϕSCR zero cross control 7 Motor valve control 8 1ϕSCR phase angle control	0 None 1 Relay 2 Voltage Pulse (SSR Drive) 3 4~20mA 4 0~20mA A 0~5V B 0~10V C 1~5V D 2~10V	0 None 1 1 Set 2 2 Sets 3 3 Sets A HBA B HBA+AL2 C HBA+AL2+AL3	0 None 1 4~20mA 2 0~20mA A 0~5V B 0~10V C 1~5V D 2~10V	0 None 1 4~20mA 2 0~20mA A 0~5V B 0~10V C 1~5V D 2~10V E DI F Remote + DI M Motor valve control feedback J PT(Second Input) K TC(Second Input) L Linear(Second Input)	0 None 3 TTL B RS-485(FY) C RS-485(NFY)	See input Range type code	A AC 85~265V D DC 24V	N None T Terminal Cover W IP65 R Terminal Cover +IP65
PNFY400 / 401 48x48mm PNFY600 / 602 96x48mm PNFY700 / 701 72x72mm PNFY800 / 801 48x96mm PNFY900 / 901 / 902 96x96mm									

※ Block means optional functions with additional charge
※ HBA : Heater Break Alarm(HBA must use AL1 as alarm relay)
※ The Second Input FY600/800/900 only

※ Boxed-in items are optional functions, which shall incur extra charges

3. Specifications

Model		NFY400	NFY600	NFY700	NFY800	NFY900
Supply Voltage		AC 85 ~ 265V, DC 24V (Optional Functions)				
Power Frequency		50/60 Hz				
Power Consumption		Approximately 6VA				
Memory		Non-Volatile Memory EEPROM				
Sensor Input ※ Please refer to Input Range Table		Accuracy : 0.1%				
		Sample time : 100ms				
		Thermalcouple (TC): (K、J、R、S、B、E、N、T) → 0.05% (W、PLⅡ、L) → 0.1%				
		RTD: PT100				
		DC Linear Analog Input: 0~20mA、4~20mA 0~1V、0~5V、0~10V、0~2V、1~5V、2~10V 0~25mV、0~50mV、0~70mV → 0.02%				
Output	OUT1 Relay	1a	1c	1c	1c	1c
		1a SPST-NO, 250 VAC, 8A (resistive load), electrical life: 100,000 operations 1c SPDT-NO, 250 VAC, 5A (resistive load), electrical life: 50,000 operations SPDT-NC, 250 VAC, 2A (resistive load), electrical life: 20,000 operations				
	OUT2 Relay	SPST-NO, 250 VAC, 8A (resistive load), electrical life: 100,000 operations				
	SSR Driver	ON: 24 V OFF: 0V max. load current: 20mA, with short circuit protection circuit				
	linear	4~20mA,0~20mA, 0~5V,0~10V, 1~5V,2~10V				
Control Method		ON-OFF or P、PI、PID control				
Alarm	Alarm 1	1a	1c	1a	1c	1c
		1a SPST-NO, 250 VAC, 8A (resistive load), electrical life: 100,000 operations 1c SPDT-NO, 250 VAC, 5A (resistive load), electrical life: 50,000 operations SPDT-NC, 250 VAC, 2A (resistive load), electrical life: 20,000 operations				
	Alarm 2	SPST-NO, 250 VAC, 8A (resistive load), electrical life: 100,000 operations				
	Alarm 3	---	1a	1a	1a	1a
		SPST-NO, 250 VAC, 8A (resistive load), electrical life: 100,000 operations				
Re-transmission	Re-transmitted Signal	4~20mA、0~20mA、0~5V、0~10V、1~5V、2~10V				
	Source of Re-transmission	SV1、PV1、MV1、SV1R、PV1R、MV1R、SV2、PV2、MV2、SV2R、PV2R、MV2R				
	Resolution	14bit				
Remote SV		Remote Analog Input Signal:: 4~20mA、0~20mA、0~5V、0~10V、1~5V、2~10V				
Digital Input		2 points				
Communication	Interface	RS-485 Half duplex Communication MAX. 31 units, MAX. distance 1200 meters				
	Protocol	Modbus RTU , TAIE				
	Parity bit	NONE, ODD, Even				
	Data bIt	8 bit				
	Stop bIt	1 or 2 bit				
	Baud rate	2400,4800,9600,19200,38400,57600,115200 bps				
	interval time	0~250ms				
Operating Environment Temperature/Humidity		0 ~ 50°C (in the case of no freezing or condensatioin) / 20% ~ 90% RH				
Storage Environment Temperature		-25 ~ 65°C (in the case of no freezing or condensatioin)				
Dimension (mm)		W48 x H48 x D95	W96 x H48 x D95	W72 x H72 x D95	W48 x H96 x D95	W96 x H96 x D95
weight		Appox.120g	Appox.170g	Appox.150g	Appox.170g	Appox.230g

4. Input Range Table

Types of input			Code	Range	
				°C	°F
Thermalcouple	K	K1	01	-50.0~600.0	-58.0~999.9
		K2	02	-50~1200	-58~2192
	J	J1	03	-50.0~400.0	-58.0~752.0
		J2	04	-50~1200	-58~2192
	R	R	05	-50~1760	-58~3200
	S	S	06	-50~1760	-58~3200
	B	B	07	-50~1820	-58~3308
	E	E	08	-50~900	-58~1652
	N	N	09	-50~1300	-58~2372
	T	T1	10	-199.9~400.0	-199.9~752.0
		T2	11	-199~400	-326~752
	W	W	12	-50~2320	-58~4208
	PL	PL	13	-50~1200	-58~2192
	L	L	14	-50~800	-58~1472
RTD	PT100	PT1	15	-199.9~850.0	-199.9~999.9
		PT2	16	-199~850	-326~1562
		PT3	17	0~850	32~1562
Linear	AN1	0~25mV	18	-1.999~9.999 -19.99~99.99 -199.9~999.9 -1999~9999	
	AN2	0~50mV	19		
		0~20mA	20		
		0~1V	21		
		0~2V	22		
		0~5V	23		
		0~10V	24		
	AN3	0~70mV	25		
	AN4	4~20mA	26		
		10~50mV	27		
		1~5V	28		
		2~10V	29		

5. Packing List & Label Information

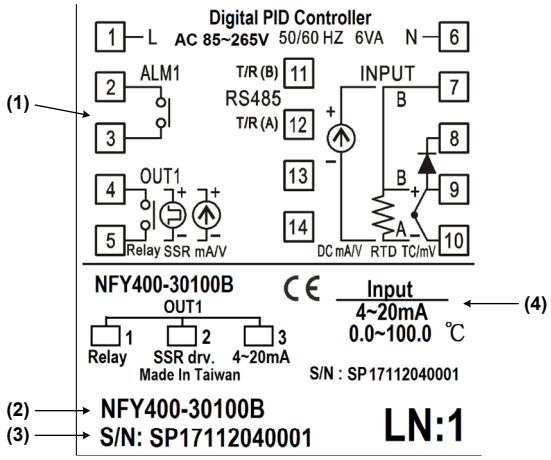
5.1 Packing List Guide

NFY400/600/700/800/900

1. Temperature Controller…1 unit
2. Mounting frame……2 units
3. Brief manual……..1 pcs

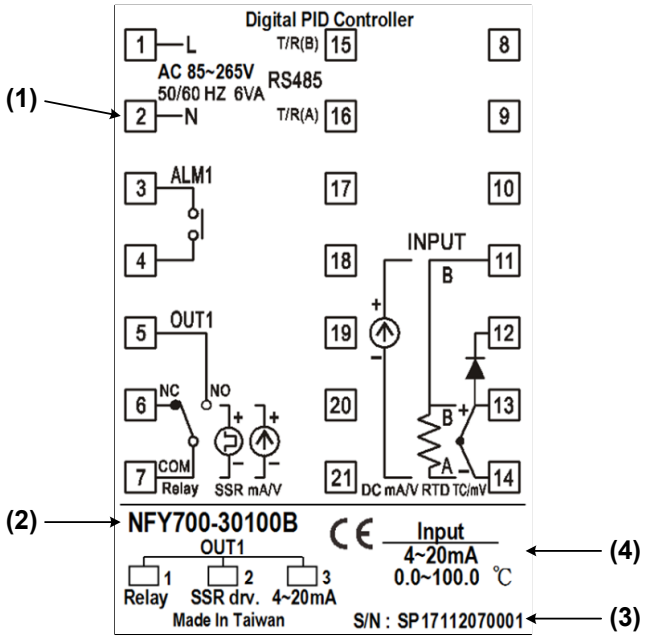
5.2 Label Guide

5.2.1 NFY400



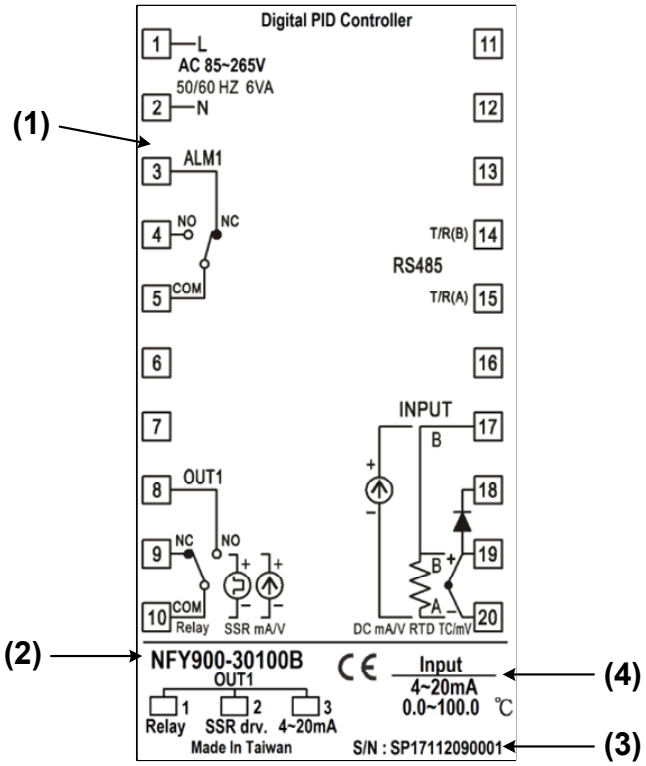
No.	Description	Example Description
(1)	Terminal arrangement	NFY400 Terminal Wiring Diagram
(2)	Model number	NFY400 model name
(3)	Serial number	17112040001
(4)	Input type	Controller Input Signal and Scope

5.2.2 NFY700



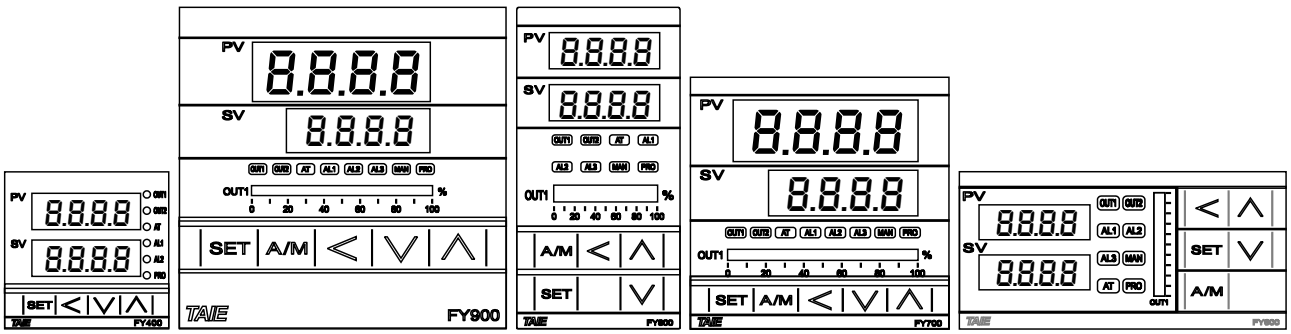
No.	Description	Example Description
(1)	Terminal arrangement	NFY700 Terminal Wiring Diagram
(2)	Model number	NFY700 model name
(3)	Serial number	17112070001
(4)	Input type	Controller Input Signal and Scope

5.2.3 NFY600/800/900

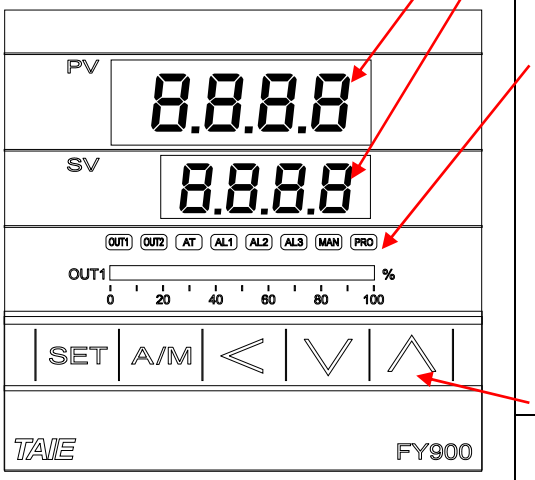


No.	Description	Example Description
(1)	Terminal arrangement	NFY900 Terminal Wiring Diagram
(2)	Model number	NFY900 model name
(3)	Serial number	17112090001
(4)	Input type	Controller Input Signal and Scope

6. Parts Description



NFY400 NFY900 NFY800 NFY700 NFY600



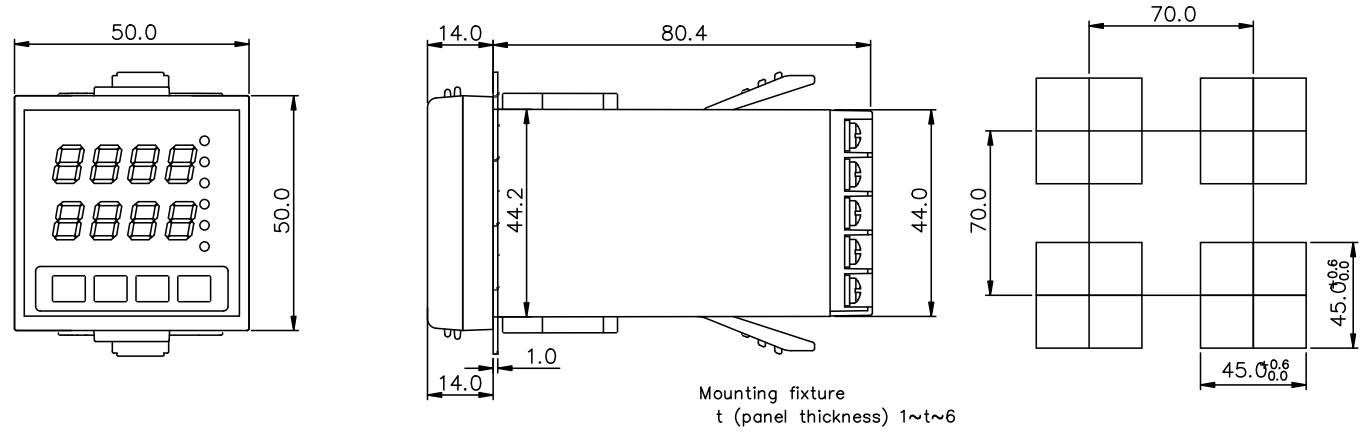
1	PV		Indicating PV (measured value) and character information such as parameter codes or error codes(Red)
2	SV		Indicating SV (target set value) or parameter values(Green)
3	LED	OUT1	Lamp lit when OUT1 is activated (Orange)
		OUT2	Lamp lit when OUT2 is activated (Orange)
		AT	Lamp lit when Auto tuning is activated (Orange)
		AL1	Lamp lit when Alarm 1 is activated (Red)
		AL2	Lamp lit when Alarm 2 is activated (Red)
		AL3	Lamp lit when Alarm 3 is activated (Red)
		MAN	Lamp lit when controller in manual mode or get error condition (Orange)
		PRO	When the program is executed, this light is on (orange)
		OUT1%	OUT1% bar-graph indicator(Green)
4	Keypad	SET	For parameter call-up and set value registration
		A/M	Function activation
		SHIFT	Shift digits when changing settings
		DOWN	Decrease numerals
		UP	Increase numerals

7. Installation

7.1 NFY400 Dimensions

(Unit : mm)

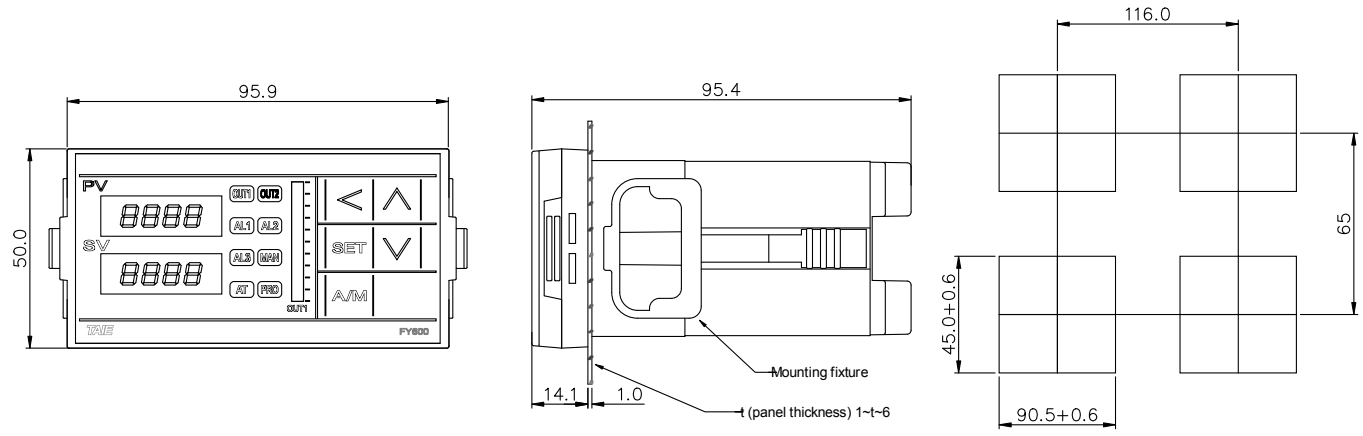
Dimensions	Individual mounting



7.2 NFY600 Dimensions

(Unit : mm)

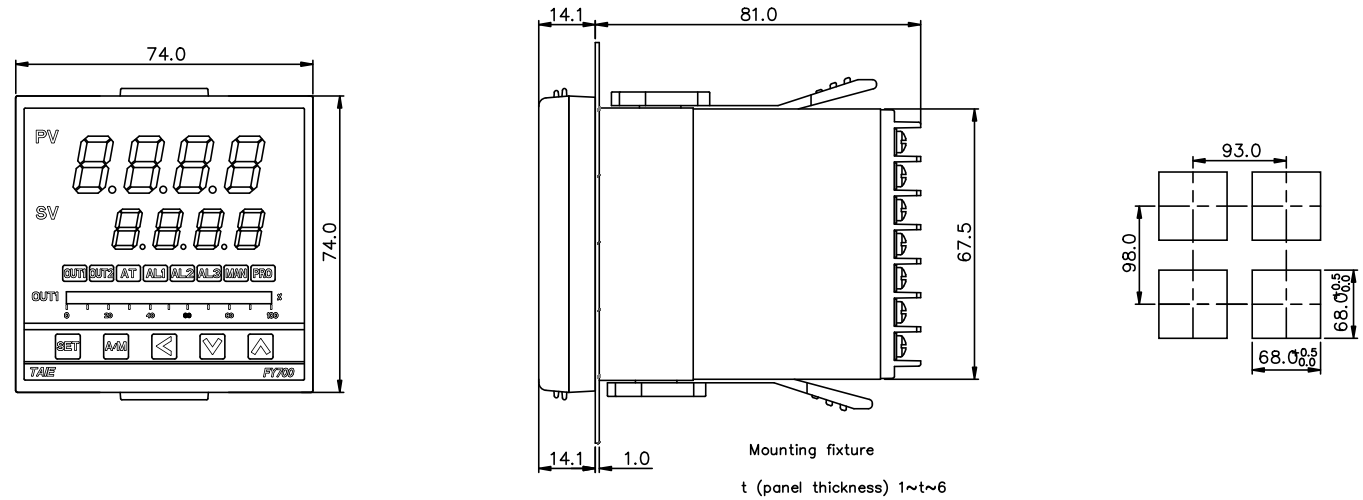
Dimensions	Individual mounting



7.3 NFY700 Dimensions

(Unit : mm)

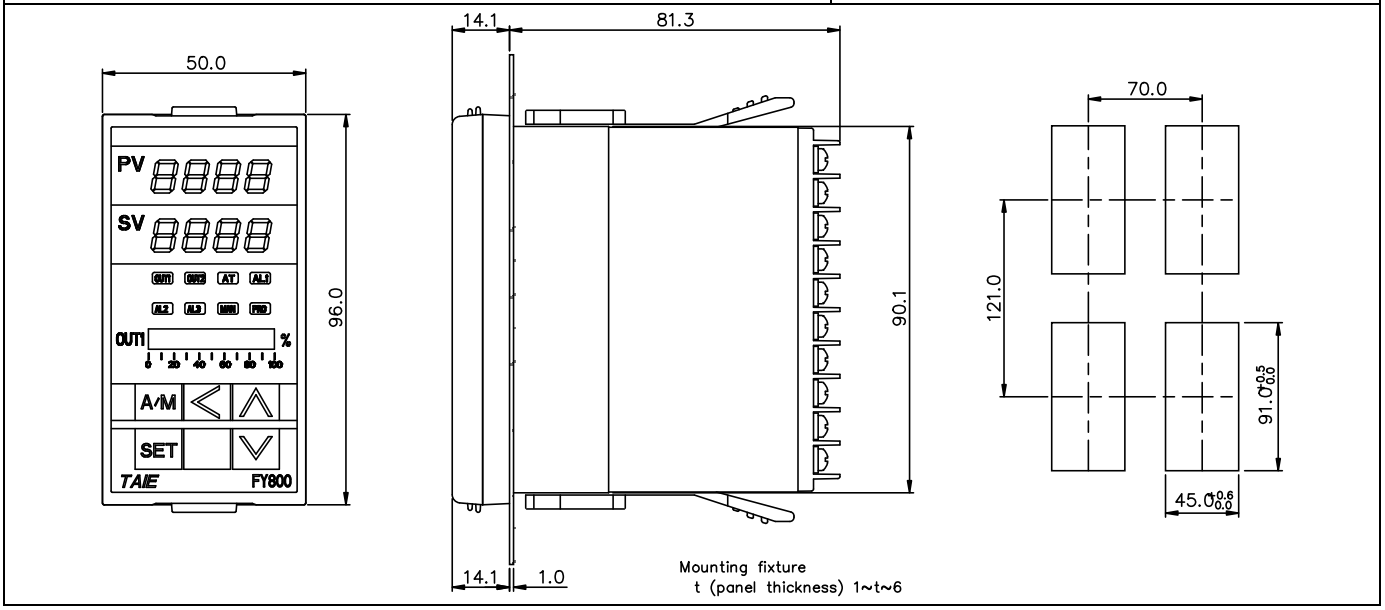
Dimensions	Individual mounting



7.4 NFY800 Dimensions

(Unit : mm)

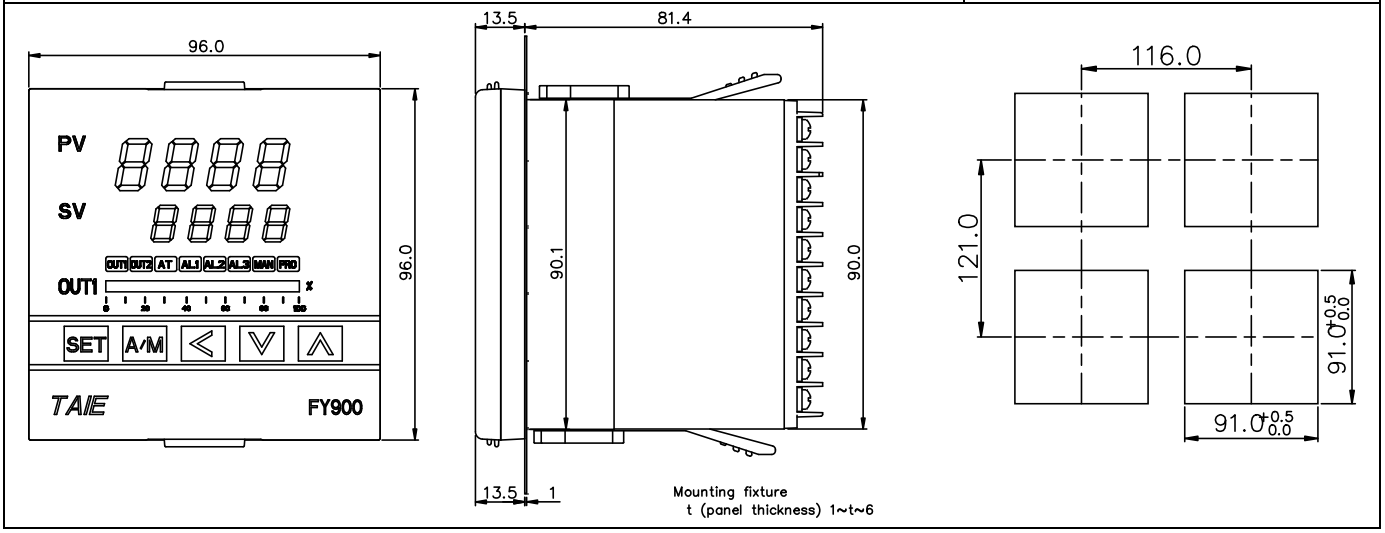
Dimensions	Individual mounting



7.5 NFY900 Dimensions

(Unit : mm)

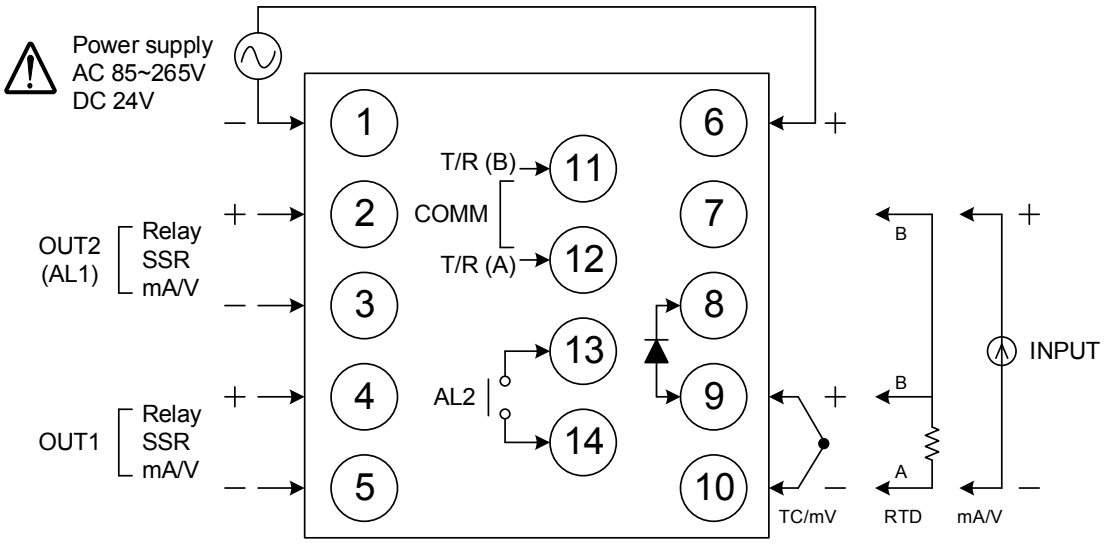
Dimensions	Individual mounting



8. Terminal Arrangement

> **⚠ Caution**
>
> When implementing wiring for the controller power supply, please make sure that the power supply is turned off to avoid electric shock!
> Do not touch the live parts, such as the terminals, while the power is on. Otherwise death or serious injury may be resulted from short circuit of the contact electrode.

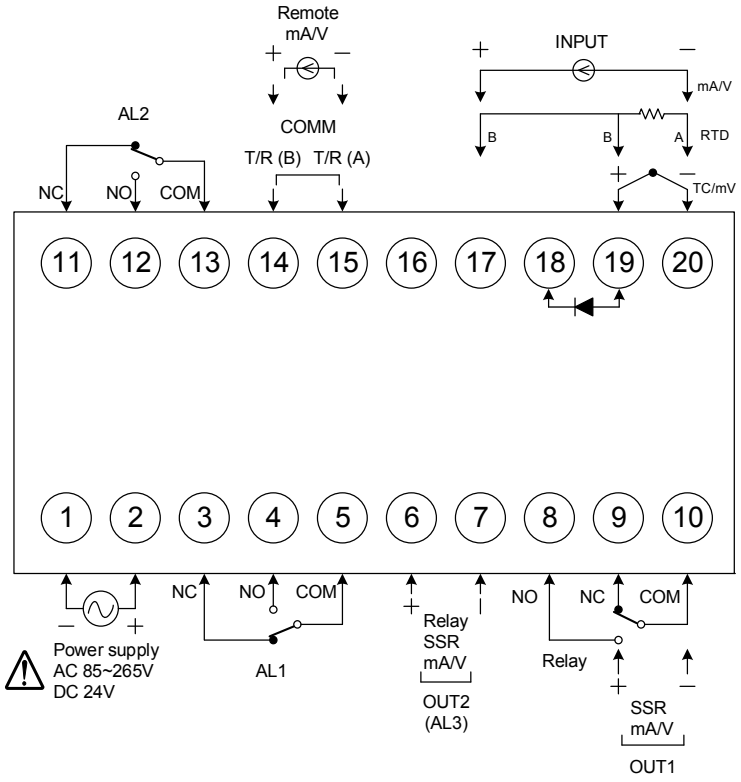
8.1 NFY400 Terminal Arrangement



Power	1 L, 6 N — AC 85~265V; 1 −, 6 + — DC 24V
Output-1	4, 5 — Relay; 4 +, 5 − — SSR; 4 +, 5 − — mA / V
Output-2	2, 3 — Relay; 2 +, 3 − — SSR; 2 +, 3 − — mA / V
1ϕ Zero cross	11 G1 12 K1 13 G2 14 K2
Motor valve	2 3 CLOSE 4 OPEN 5 COM

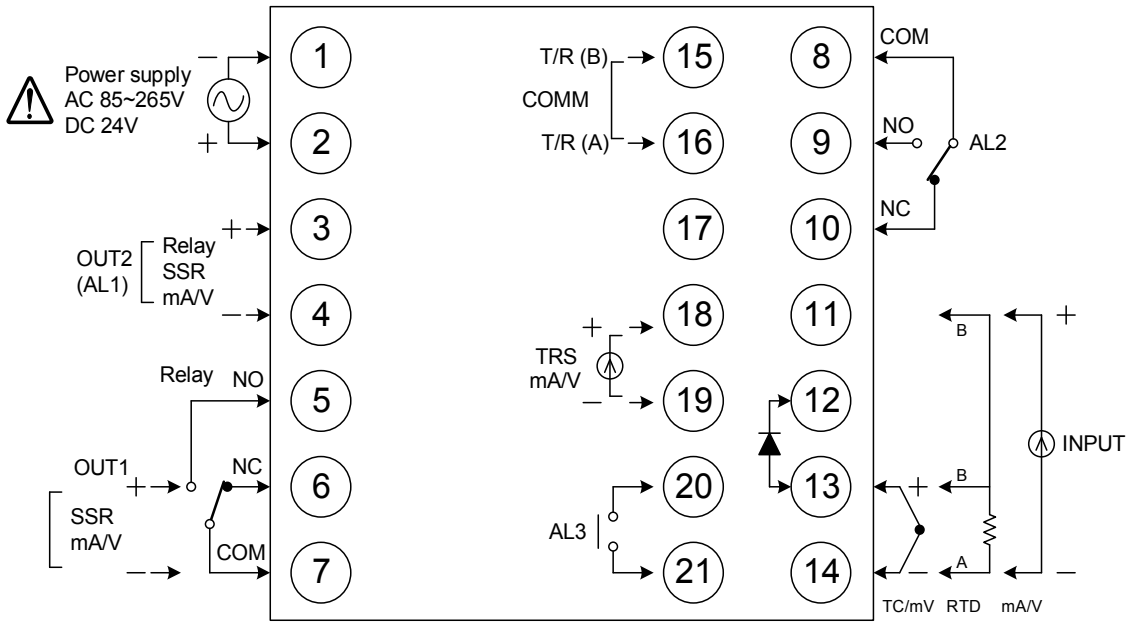
Alarm-1 Alarm-2	AL1 or AL2: 2, 3, 11, 12, 13, 14
Commu-nication	11 T/R (B) RS-485 12 T/R (A)
Transmi-ssion	11 +, 12 − — mA / V
Remote SV / CT Input	11 +, 12 − — mA / V; 11, 12 — CT
Digit Input	11 COM 12 NO — DI1 13 NO — DI2
Input	9 +, 10 − — TC / mV; 7 B, 9 B, 10 A — RTD; 7 +, 9, 10 − — mA / V

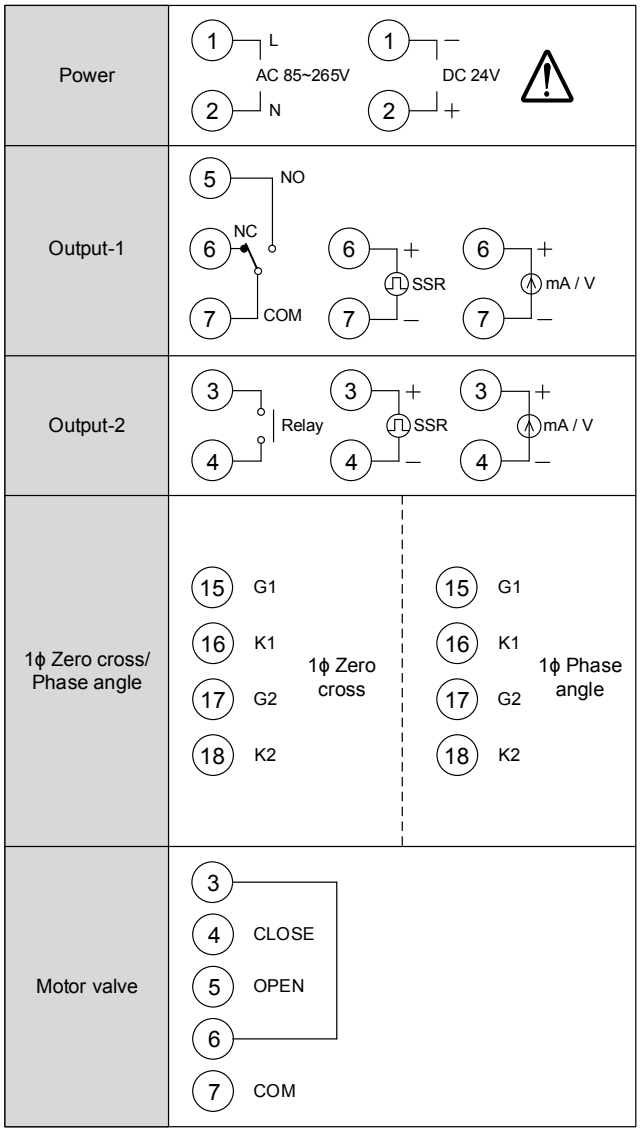
8.2 NFY600 Terminal Arrangement

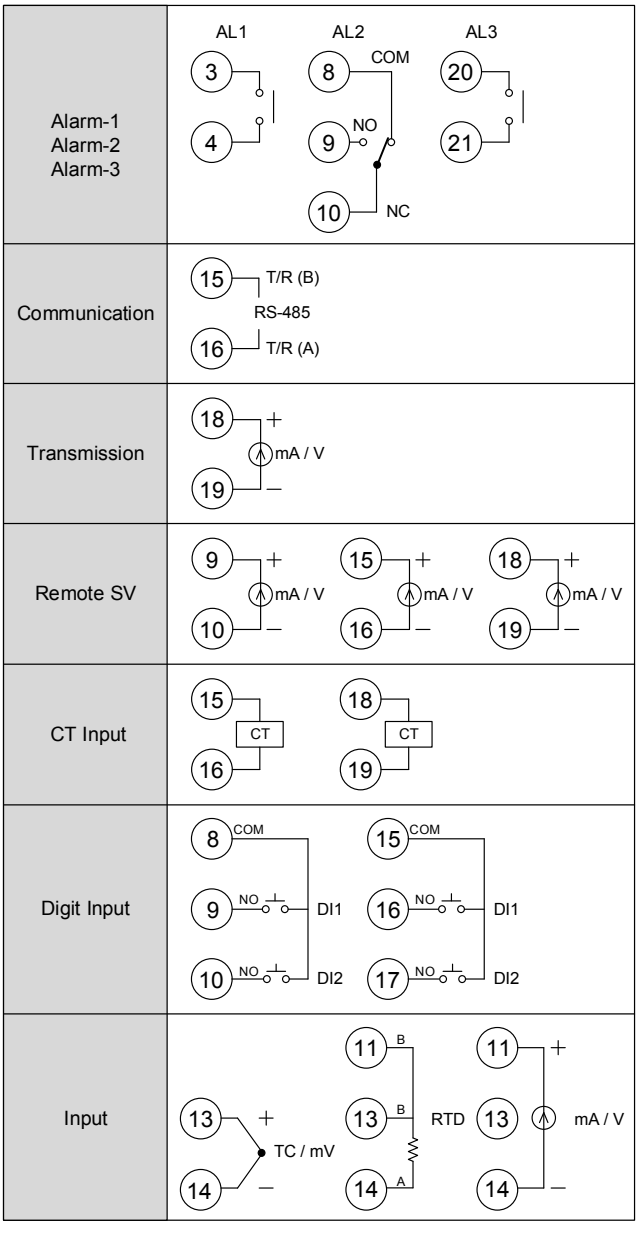


Power	1 L, 2 N — AC 85~265V; 1 −, 2 + — DC 24V
Output-1	8 NO, 9 NC, 10 COM; 9 + SSR 10 −; 9 + mA / V 10 −
Output-2	6, 7 Relay; 6 + SSR 7 −; 6 + mA / V 7 −
Motor valve	6, 7 CLOSE, 8 OPEN, 9, 10 COM
Alarm-1 Alarm-2 Alarm-3	AL1: 3 NC, 4 NO, 5 COM; AL2: 11 NC, 12 NO, 13 COM; AL3: 6, 7
Communication	14 T/R (B), 15 T/R (A) — RS-485
Transmission	12 + mA / V 13 −; 14 + mA / V 15 −
Remote SV/ CT Input	14 + mA / V 15 −; 14 CT 15
Digit Input	11 COM, 12 NO DI1, 13 NO DI2; 14 COM, 15 NO DI1, 16 NO DI2
Input 1	19 + TC / mV 20 −; 17 B, 19 B, 20 A RTD; 17 + 19 mA / V 20 −
Input 2	14 + TC / mV 15 −; 14 B, 15 A, 16 B RTD; 14 + mA / V 15 −

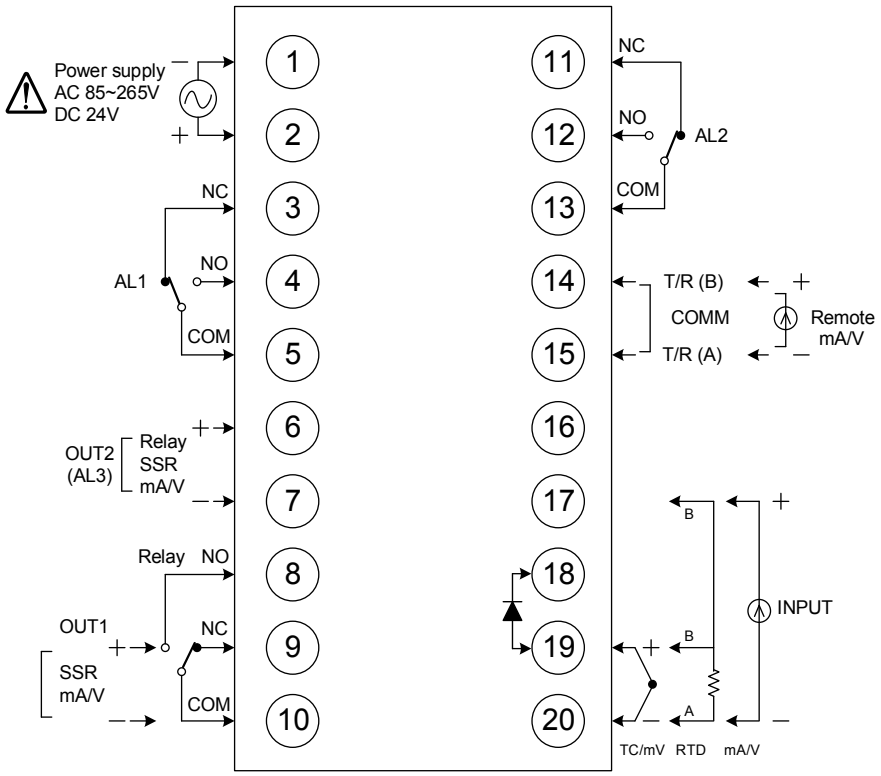
8.3 NFY700 Terminal Arrangement

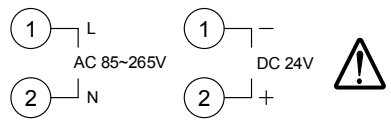
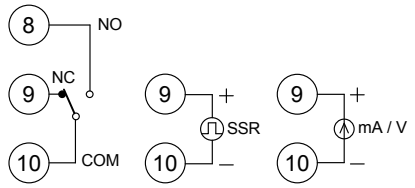
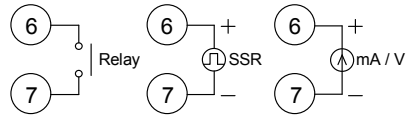
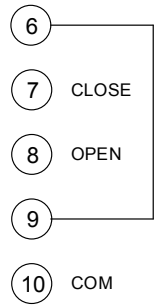
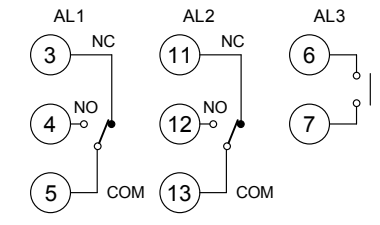


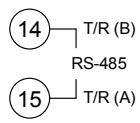
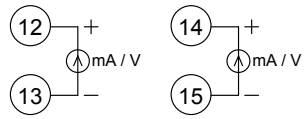
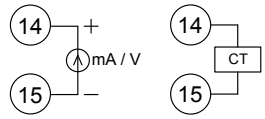
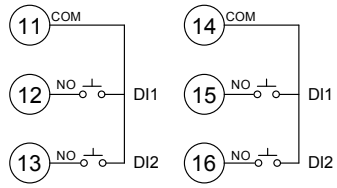
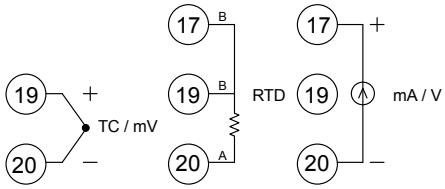
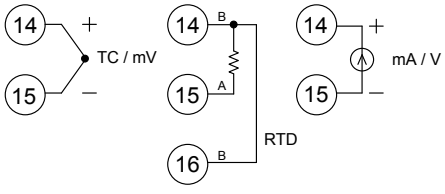




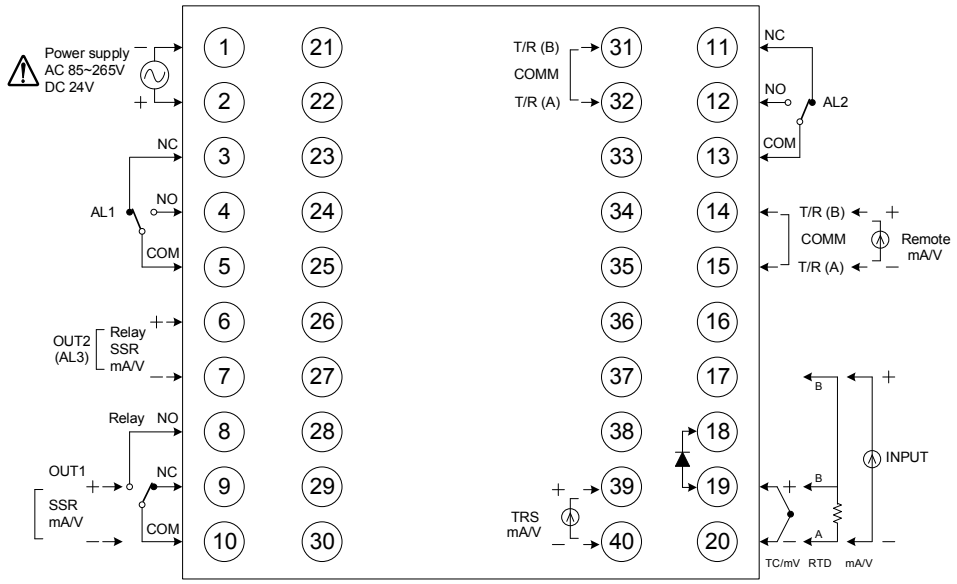
8.4 NFY800 Terminal Arrangement



Power	
Output-1	
Output-2	
Motor valve	
Alarm-1 Alarm-2 Alarm-3	

Communication	
Transmission	
Remote SV/ CT Input	
Digit Input	
Input 1	
Input 2	

8.5 NFY900 Terminal Arrangement



Power	1 L, 2 N — AC 85~265V; 1 −, 2 + — DC 24V
Output-1	8 NO, 9 NC, 10 COM; 9 (+) 10 (−) SSR; 9 (+) 10 (−) mA / V
Output-2	6, 7 Relay; 6 (+) 7 (−) SSR; 6 (+) 7 (−) mA / V
Motor valve	6 CLOSE, 7 OPEN, 8 COM, 9
1ϕ / 3ϕ Zero cross	31 G1, 32 K1, 33 G2, 34 K2 — 1ϕ Zero cross; 31 RG1, 32 RK1, 33 RG2, 34 RK2, 35 TG1, 36 TK1, 37 TG2, 38 TK2 — 3ϕ Zero cross
1ϕ Phase angle	31 G1, 32 K1, 33 G2, 34 K2

Alarm-1 Alarm-2 Alarm-3	AL1: 3 NC, 4 NO, 5 COM; AL2: 11 NC, 12 NO, 13 COM; AL3: 6, 7
Communication	14 T/R (B), 15 T/R (A) RS-485 — or — 31 T/R (B), 32 T/R (A) RS-485
Transmission	39 (+) 40 (−) mA / V
Remote SV/ CT Input	14 (+) 15 (−) mA / V; 14, 15 CT
Digit Input	14 COM, 15 NO DI1, 16 NO DI2; 31 COM, 32 NO DI1, 33 NO DI2
Input 1	19 (+) 20 (−) TC / mV; 17 B, 19 B, 20 A RTD; 17 (+) 19 (−) 20 mA / V
Input 2	14 (+) 15 (−) TC / mV; 14 B, 15 A, 16 B RTD; 14 (+) 15 (−) mA / V

9. Basic Function Setting

9.1 Input Type Setting

1.	PV 25 SV 0	Display after power-on.	2.	PV inPt SV K2	Hold SET key + ≪ key 3 seconds, to enter LEVEL_3 upper display showing “INPT” with lower display showing current input type.
3.	PV inPt SV K2	Press ≪ , the lower display flashes.	4.	PV inPt SV Pt1	Press ≪ key and ≫ key to enter the intended input type.
5.	PV inPt SV Pt1	Press SET key to store new value of INPT.	Modify input type needs to interchange of jumper location, and it needs to recalibration for linear input type change. Please refer to chapter 17 “Input type modification”.		

9.2 SV Value Setting

1.	PV 25 SV 0	Display after power-on.	2.	PV 25 SV 0000	When ≪ key is pressed, the lower display flashes.
3.	PV 25 SV 0150	Press ≪ key and ≫ key to adjust set value.	4.	PV 25 SV 150	Press SET key to store new value of SV.

9.3 RUN/STOP Mode Selection

1.	PV 25 SV 150	Display after power-on.	2.	PV r_S SV StoP	Press SET key to enter parameter setup display, with “R_S” shown on the upper display.
3.	PV r_S SV StoP	When ≪ key is pressed, the lower display flashes.	4.	PV r_S SV run	Press ≪ key or ≫ key to select RUN/STOP mode.
5.	PV r_S SV run	Press SET key to store new value of R_S.	When controller is in STOP mode, it shuts off OUTPUT and ALARM functions.		

9.4 Auto Tuning Execution

1.	PV 25 SV 150	Display after power-on.	2.	PV At SV oFF	Press SET key to get parameter setup display, as “OFF” will be shown on the upper display.
3.	PV At SV oFF	When ≪ key is pressed, the lower display flashes.	4.	PV At SV on	Press ≪ key or ≫ key to select auto tuning execution or not.
5.	PV At SV on	Press SET key to store new value of AT.	When auto tuning AT LED lamp lit and start to output, through a few circles to get new PID value with the precise control, if finished the AT LED will be lamp off.		

9.5 PID Value Setting

1.	PV 25 SV 0	Display after power-on.	2.	PV P1 SV 3.0	Hold SET key 3 seconds, then entering into LEVEL_2 upper display showing “P1”, with lower display show current P1 value.
3.	PV P1 SV 003.0	When ≪ key is pressed, the lower display flashes.	4.	PV P1 SV 050.0	Press ⩓ key and ⩔ key to set the intended P1 value.
5.	PV P1 SV 50.0	Press SET key to store new value of P1.	By the same procedure, use the same ways to set integral value(I1) and derivative value(D1).		

9.6 ON/OFF Control Setting

1.	PV 25 SV 150	Display after power-on.	2.	PV P1 SV 3.0	Hold SET key 3 seconds, then entering into LEVEL_2, as upper display shows “P1”, with lower display showing current P1 value.
3.	PV P1 SV 003.0	When ≪ key is pressed, the lower display flashes, upper display.	4.	PV P1 SV 000.0	Press ⩔ key until P1 = 0.0
5.	PV P1 SV 0.0	Press SET key to store new value.	6.	PV HYS1 SV 1	Press SET key to get parameter setup display, “HYS1” shown on the upper display.
7.	PV HYS1 SV -1	When ≪ key is pressed, the lower display flashes.	8.	PV HYS1 SV -10	Press ⩓ key and ⩔ key to set the intended HYS1 value.
9.	PV HYS1 SV 10	Press SET key to store new value.	Heat mode formula: PV > (SV + HYS1) → OUT1 OFF PV ≦ (SV – HYS1) → OUT1 ON Cool mode formula: PV ≧ (SV + HYS1) → OUT1 ON PV < (SV – HYS1) → OUT1 OFF		

9.7 Alarm Mode Setting

1.	PV 25 SV 0	Display after power-on.	2.	PV inPt SV tc	Hold SET key + ≪ key 3 seconds, then entering into LEVEL_3 upper display showing “INPT” with lower display showing current input type.
3.	PV ALd1 SV dEH	Press SET key to get parameter setup display, with “ALD1” shown on the upper display.	4.	PV ALd1 SV dEH	When ≪ SHIFT key is pressed, the lower display flashes.
5.	PV ALd1 SV dEL.o	Press ⩓ key and ⩔ key to set the intended ALD1 value.	6.	PV ALd1 SV dEL.o	Press SET key to store new value of ALD1. ※ Please refer to ch14.1 Alarm mode.

9.8 Alarm Value Setting

1.	PV 25 SV 0	Display after power-on.	2.	PV AL 1H SV 0	Press SET key to get parameter setup display, with “AL1H” shown on the upper display.
3.	PV AL 1H SV 0000	When ≪ key is pressed, the lower display flashes.	4.	PV AL 1H SV 0020	Press ≪ key and ≫ key to set the intended AL1H value.
5.	PV AL 1H SV 20	Press SET key to store new value of AL1H.			

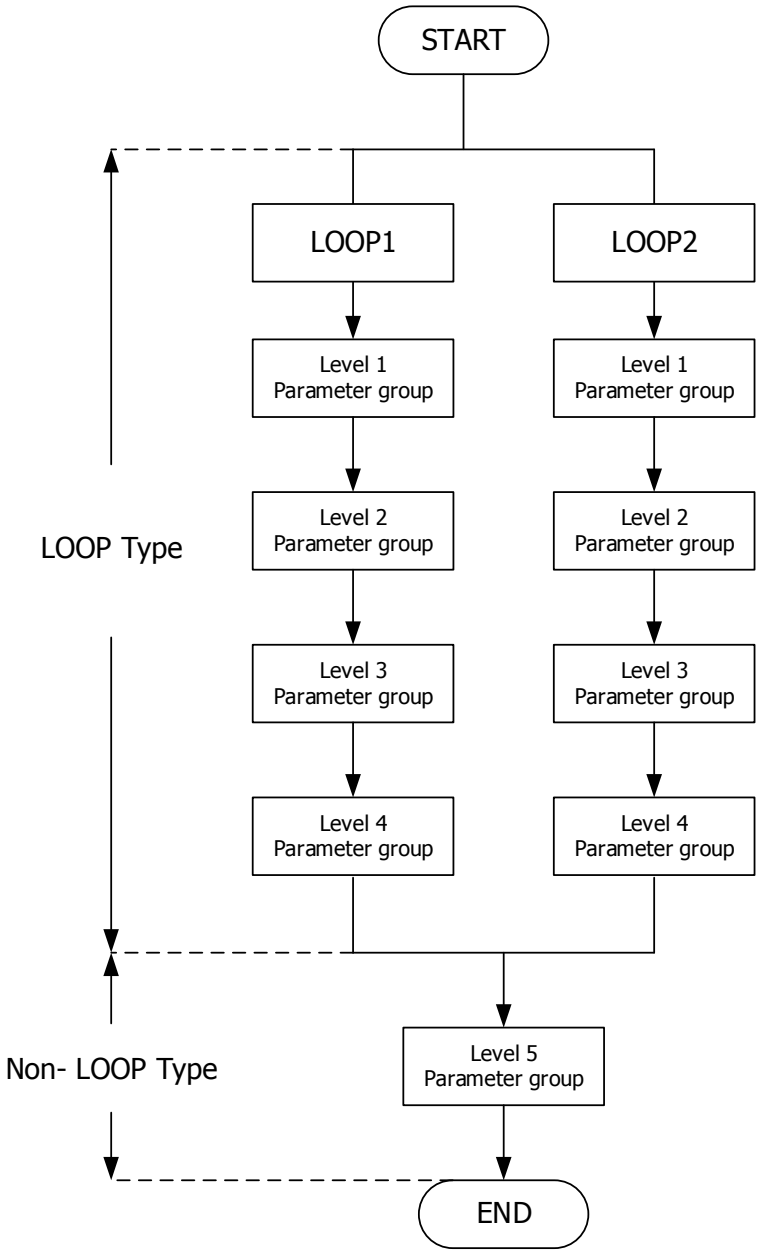
9.9 Manual Mode Selection

1.	PV 25 SV 150	Display after power-on.	2.	PV A_M SV Auto	Press SET key to get parameter setup display, with “A_M” shown on the upper display.
3.	PV A_M SV Auto	When ≪ key is pressed, the lower display flashes.	4.	PV A_M SV MMAN	Press ≪ key or ≫ key to select AUTO/MMAN mode.
5.	PV A_M SV MMAN	Press SET key to store new value of A_M.	6.	PV MOUt SV 45.0	Press SET key to get parameter setup display, with “MOUT” shown on the upper display.
7.	PV 25 SV 045.0	When ≪ key is pressed, the lower display flashes.	8.	PV 25 SV 100.0	Press ≪ key and ≫ key to set the intended MOUT value.
9.	PV MOUt SV 100.0	Press SET key to store new value of MOUT.	In manual mode and MOUT=100.0, output=100.0% continuously. In manual mode and MOUT=20.0, output=20.0% continuously.		

10. Flow Chart of Parameter Setting

10.1 Parameter Structure

The NFY controller is an original dual-loop controller. The parameter group of Level 1~Level 4 is of LOOP type.
There are two copies kept in LOOP1 and LOOP2.
Level 5 parameter group non-LOOP type is of an independent, linked with Level 4 of LOOP1 or LOOP2,
as the parameter structure is shown in the diagram below.



10.2 Level Operation Mode

1. LEVEL 1 enter to the LEVEL 2
   Hold SET key for 3 seconds then entering into LEVEL 2

2. LEVEL 1 enter to the LEVEL 3
   Hold SET key + SHIFT key for 3 seconds then entering into LEVEL 3

3. LEVEL 2 return to the LEVEL 1
   Hold SET key for 3 seconds then return to LEVEL 1

4. LEVEL 2 enter to the LEVEL 3
   Hold SET key for 3 seconds then return to LEVEL 3

5. LEVEL 1 enter to the LEVEL 4
   Hold SET key for 3 seconds then entering into LEVEL 2, in LEVEL 2
   press SET key to find parameter “LOCK”, modify LOCK value from current value to 1111
   then hold SET key + SHIFT key for 3 seconds then entering into LEVEL 4

6. LEVEL 2 enter to the LEVEL 5
   Hold SET key for 3 seconds then entering into LEVEL 2, in LEVEL 2
   press SET key to find parameter “LOCK”, modify LOCK value from current value to 1000
   then hold SET key + SHIFT key for 3 seconds then entering into LEVEL 5

7. LEVEL 3 return to the LEVEL 1
   hold SET key + SHIFT key for 3 seconds then return to LEVEL 1

8. LEVEL 3 enter to the LEVEL 2
   Hold SET key for 3 seconds then return to LEVEL 2

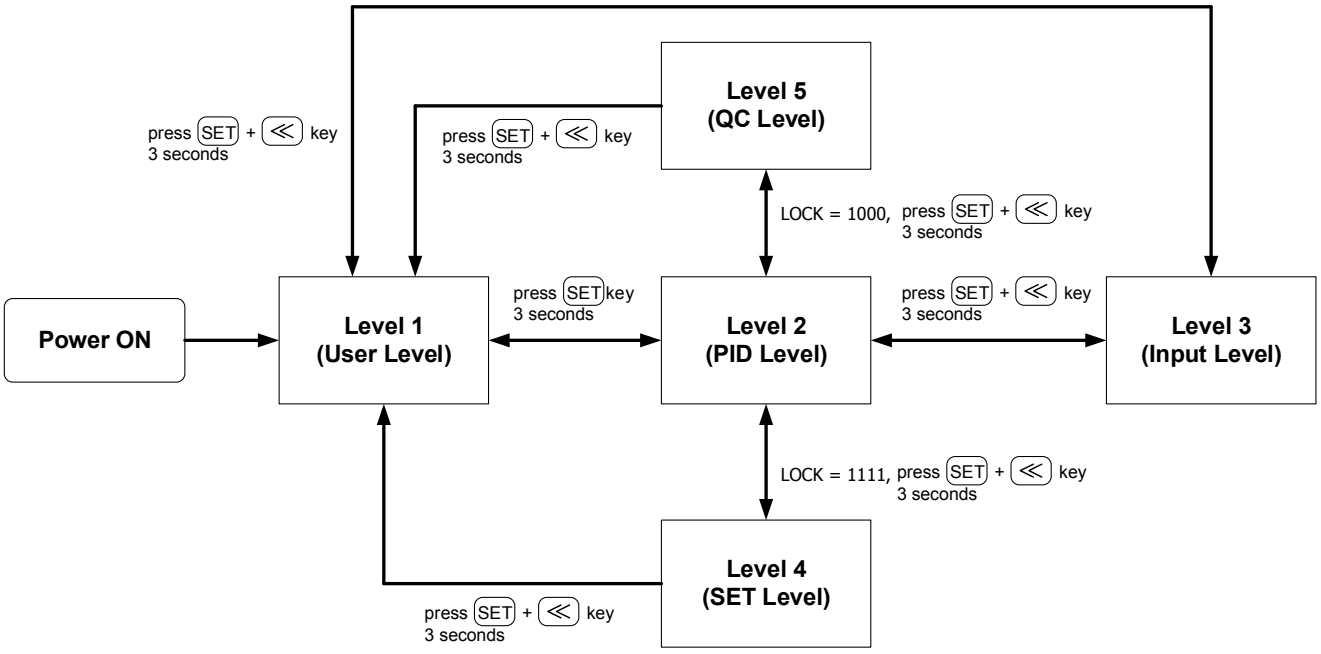
9. LEVEL 4 return to the LEVEL 1
   Hold SET key + SHIFT key for 3 seconds then return to LEVEL 1

10. LEVEL 4 return to the LEVEL 2
    Hold SET key for 3 seconds then return to LEVEL 2

11. LEVEL 5 return to the LEVEL 1
    Hold SET key + SHIFT key for 3 seconds then entering into LEVEL 1

12. LEVEL 5 return to the LEVEL 2
    Hold SET key for 3 seconds then return to LEVEL 2

10.3 Level Operation Diagram



※ : If no key is pressed within 60 seconds, it will automatically return to LEVEL 1 (user level) and display PV/SV.

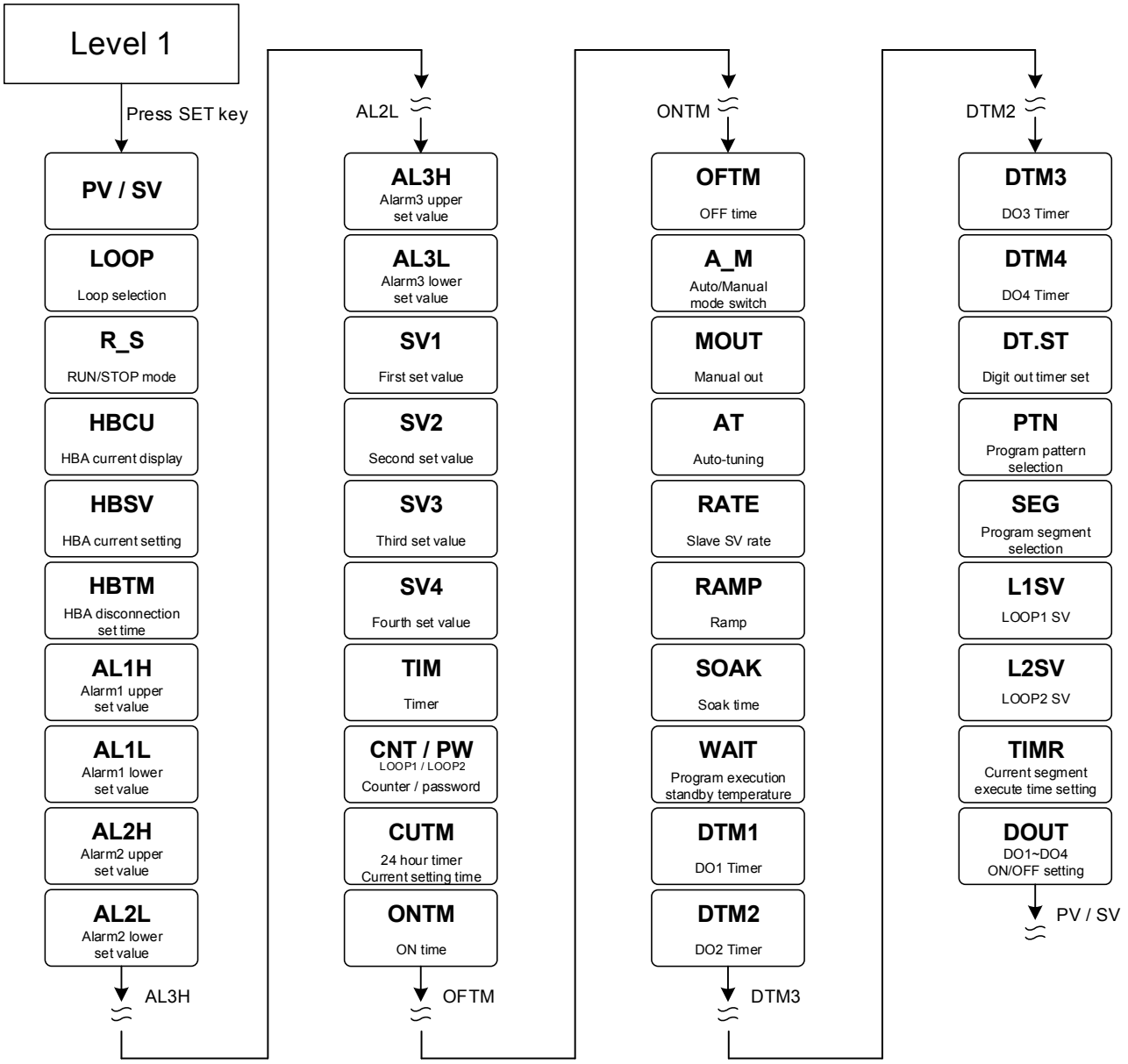
10.4 Data Lock Function

LOCK provides a parameter protection function to prevent the first line operator from touching or modifying important parameters. Conversely, when the parameter cannot be modified, please make sure that the set value of LOCK.

LOCK	LEVEL					Descriptions
	Level_1 USER Level	Level_2 PID Level	Level_3 INPUT Level	Level_4 SET Level	Level_5 QC Level	
0000	◎	◎	◎	X	X	All parameters of Level 1, 2 & 3 are able to be modified (Factory default setting)
1111	◎	◎	X	◎	X	All parameters of Level 1, 2 & 4 are able to be modified
1000	◎	◎	X	X	◎	All parameters of Level 1, 2 & 5 are able to be modified
0001	◎	◎	X	X	X	Only SV, LOOP, R_S, A_M,LOCK can be modified
0101	◎	◎	X	X	X	Only LOCK can be modified
0110	◎	◎	X	X	X	Only parameters of Level 1 and LOCK can be modified
Other	◎	◎	◎	X	X	Once jumping to other levels, LOCK will be automatically restored to 0000

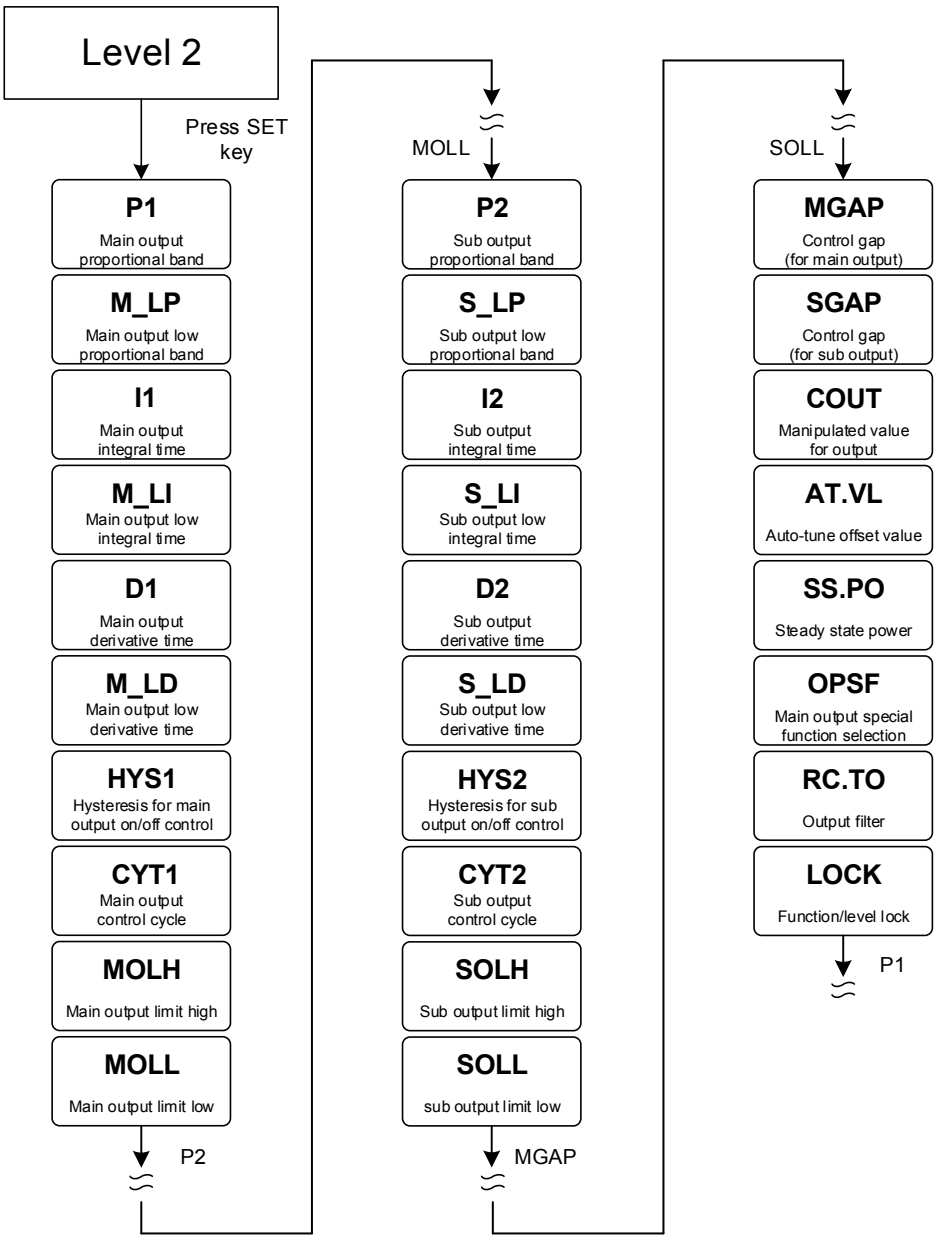
◎ : able to enter X : unable to enter

10.5 Level 1 (User Level) All Parameters Display



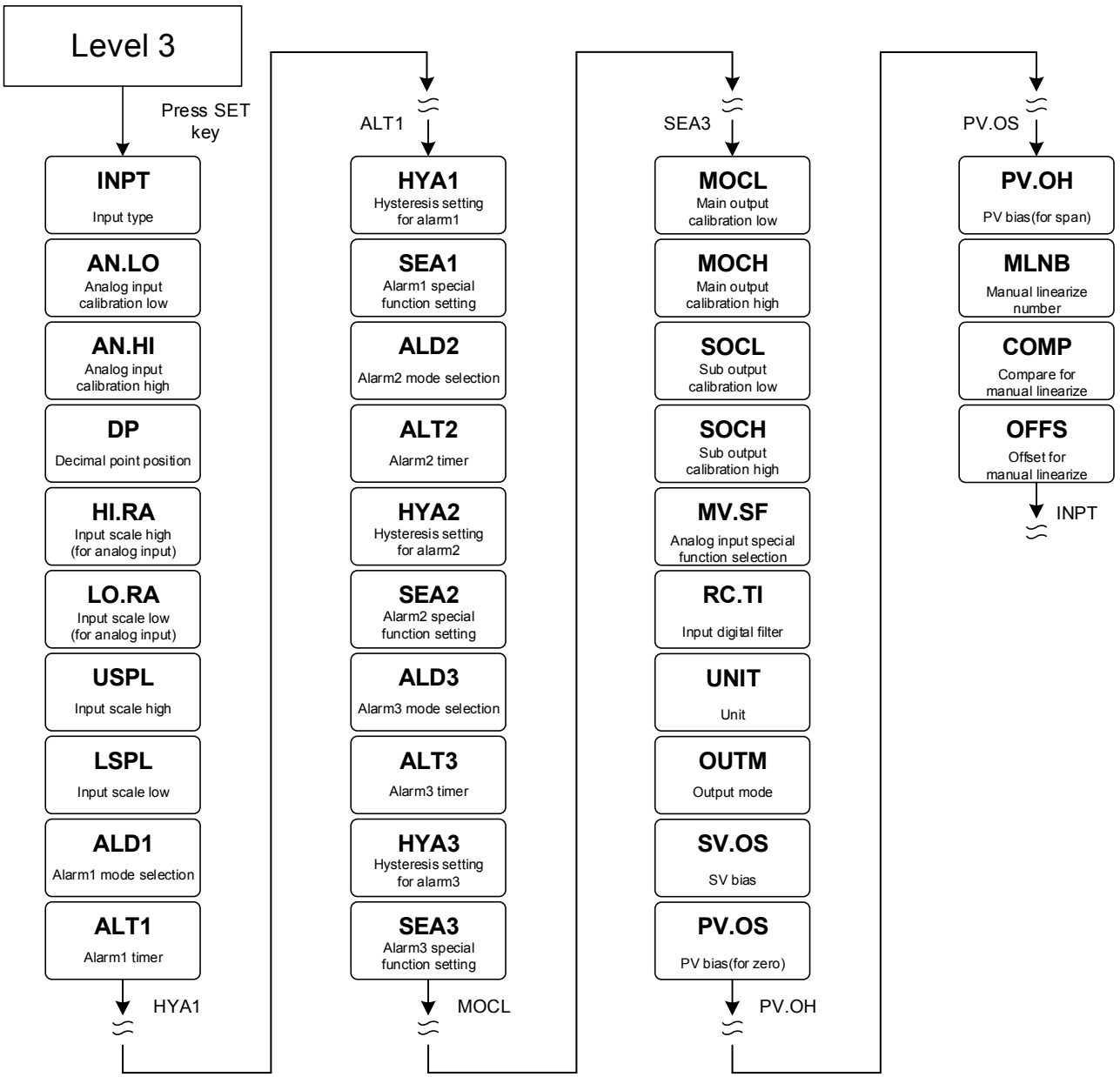
※ If no key is pressed within 60 seconds, it will automatically return to LEVEL 1 (user level) and display PV/SV.

10.6 Level 2 (PID Level) All Parameters Display



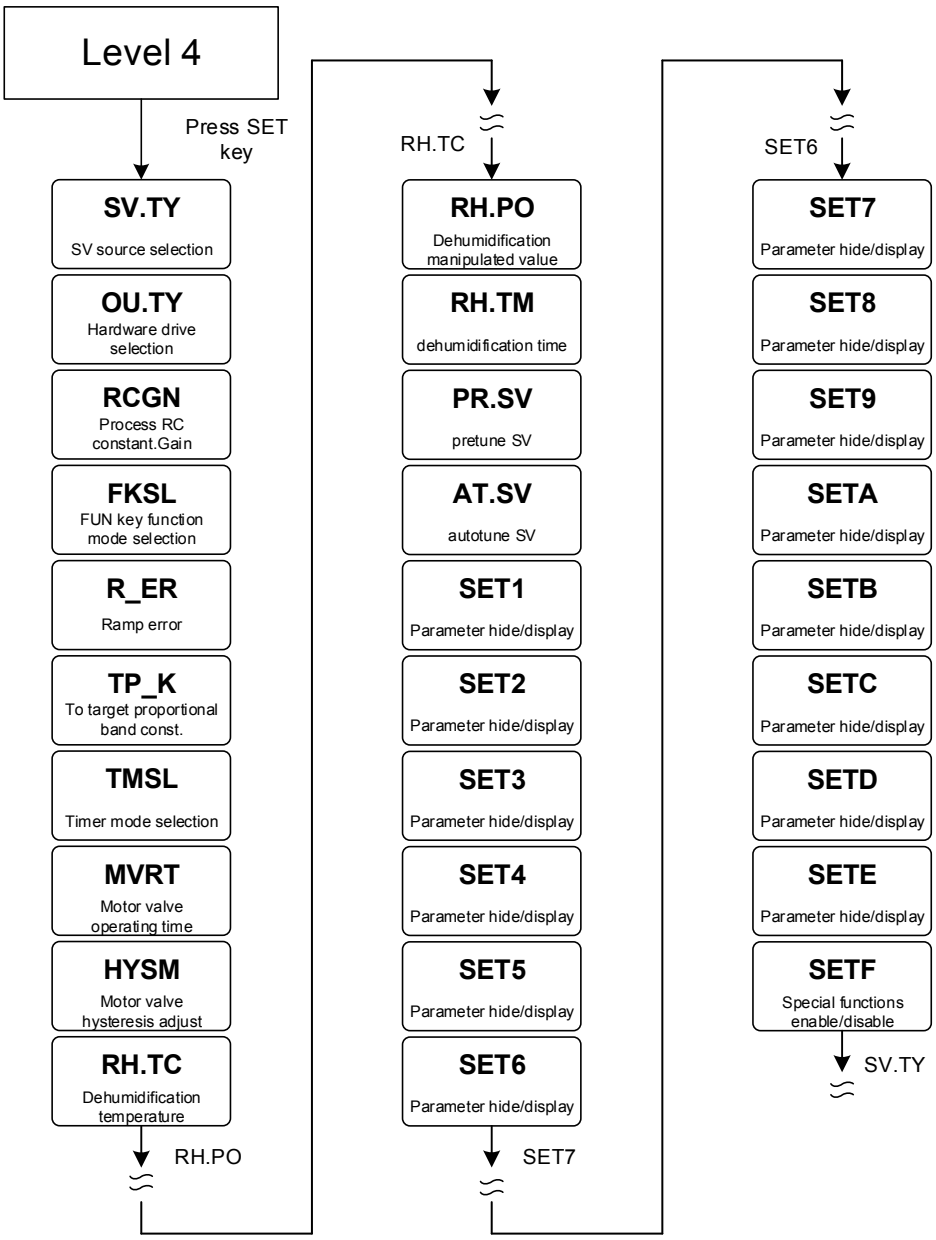
※ If no key is pressed within 60 seconds, it will automatically return to LEVEL 1 (user level) and display PV/SV.

10.7 Level 3 (Input Level) All Parameters Display



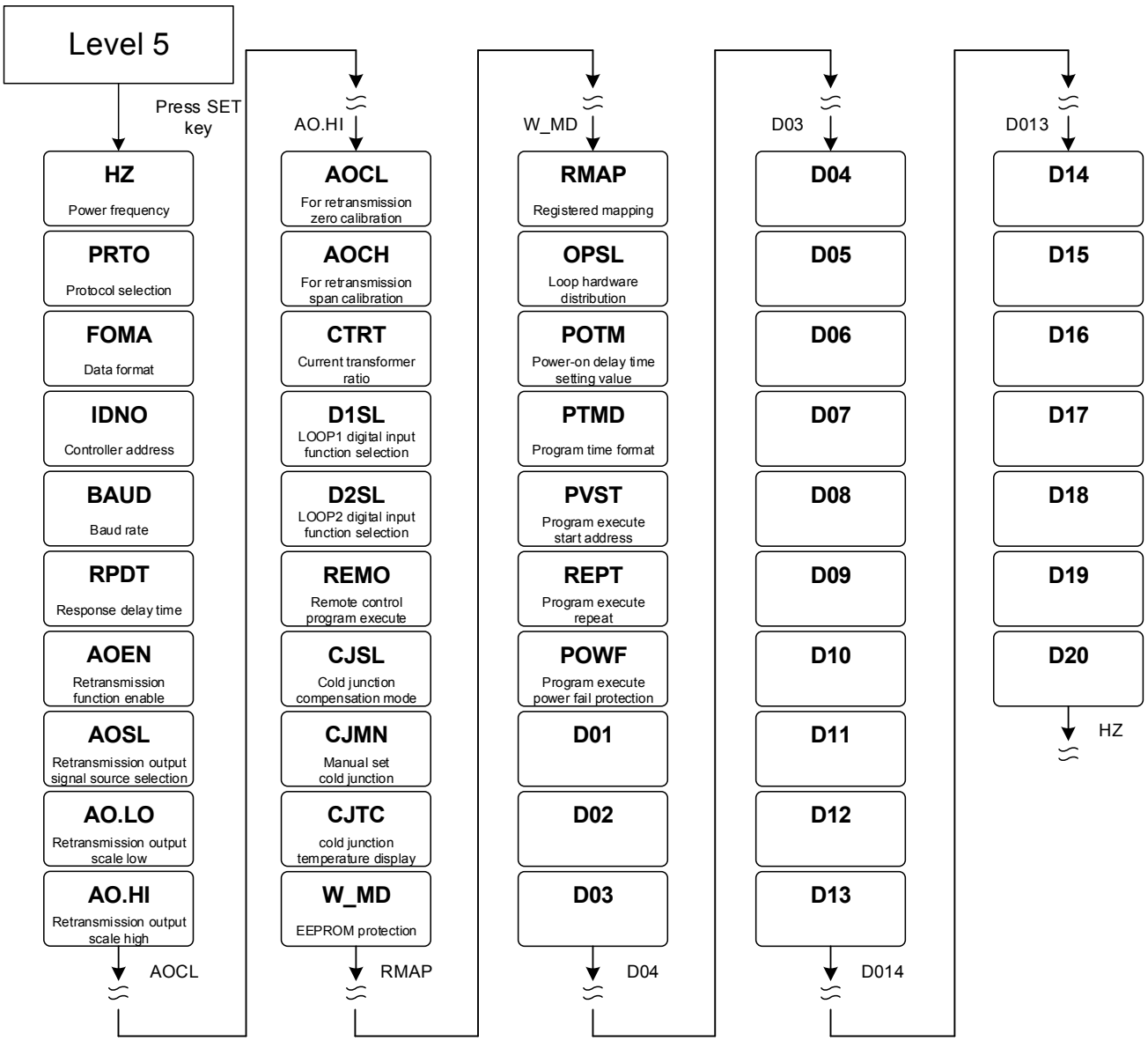
※ If no key is pressed within 60 seconds, it will automatically return to LEVEL 1 (user level) and display PV/SV.

10.8 Level 4 (Setting Level) All Parameters Display



※ If no key is pressed within 60 seconds, it will automatically return to LEVEL 1 (user level) and display PV/SV.

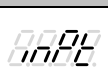
10.9 Level 5 (Quality Control) All Parameters Display



※ If no key is pressed within 60 seconds, it will automatically return to LEVEL 1 (user level) and display PV/SV.

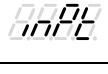
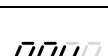
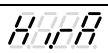
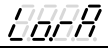
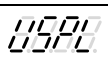
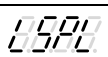
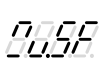
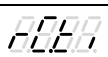
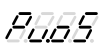
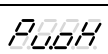
11. All Parameters and Default Settings

How to read the table

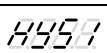
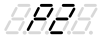
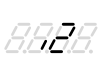
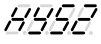
(1)	(2)	(3)	(4)	(5)		(6)	(7)
LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	INPT		Input type selection (please refer to Chapter 4 Input Type Glossary)	AN6	K1	K1	Level 3

(1) √ : This parameter exists in both LOOP1 and LOOP2
× : This parameter is not a LOOP type parameter and only exists in Level 5
(2) Parameter name
(3) Parametric symbols displayed on the 7-segment display in PV position
(4) Parameter content
(5) Range can be set by parameters
(6) The factory default value of the parameter
(7) The level of the parameter

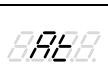
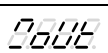
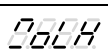
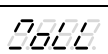
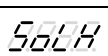
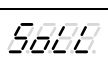
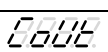
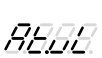
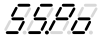
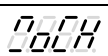
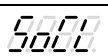
11.1 Input Group

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MAX		
√	PV	---	Process value	USPL	LSPL	---	Level 1
√	SV	---	Set value	USPL	LSPL	---	Level 1
√	INPT		Input type selection (please refer to Chapter 4 Input Type Glossary)	AN6	K1	K1	Level 3
√	AN.LO		Analog input zero calibration (only valid for linear analog signal, and for details, please refer to chapter 17.4)	9999	-1999	0	Level 3
√	AN.HI		Analog input span calibration (only valid for linear analog signal, and for details, please refer to chapter 17.4) (hexadecimal)	0x7FFF	0x0000	0x5FFF	Level 3
√	DP		Decimal point position (only available in linear signal input) 0 : 0000 1 : 000.0 2 : 00.00 3 : 0.000	0.000	0000	0000	Level 3
√	HI.RA		Input scale high(for analog input)	9999	-1999	---	Level 3
√	LO.RA		Input scale low(for analog input)	9999	-1999	---	Level 3
√	USPL		Input scale high (for Thermocouple or RTD)	9999	-1999	---	Level 3
√	LSPL		Input scale low (for Thermocouple or RTD)	9999	-1999	---	Level 3
√	MV.SF		Analog input special function selection 0 : NONE (special function OFF) 1 : SQUA (analog input square) 2 : ROOT (analog input square root) 3 : REVE (analog input reverse) 4 : SQ.RE (analog input square reverse) 5 : RO.RE (analog input square root reverse)	RO.RE	NONE	NONE	Level 3
√	RC.TI		Input digital filter Unit : second	1.00	0.01	0.10	Level 3
√	UNIT		Unit 0 : ℃ 1 : ℉ 2 : U (Linear signal)	2	0	---	Level 3
√	SV.OS		SV bias	100.0	-100.0	0	Level 3
√	PV.OS		PV bias(for zero) PV = PV x (PV.OH / 5000) + PV.OS	100.0	-100.0	0	Level 3
√	PV.OH		PV bias(for span) PV = PV x (PV.OH / 5000) + PV.OS	9999	0	5000	Level 3

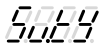
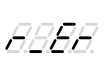
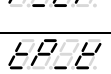
11.2 PID Group

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	P1		Main output proportional band 0 : ON/OFF control Other values : proportional band setting value	200.0	0.0	3.0	Level 2
√	I1		Main output integral time 0 : disable integral function Other values : integral time setting value	3600	0	240	Level 2
√	D1		Main output derivative time 0 : disable derivative function Other values : derivative time setting value	900	0	60	Level 2
√	HYS1		Hysteresis for main output on/off control(when P1 = 0.0 appear)	100.0	-100.0	1.0	Level 2
√	CYT1		Main output control cycle 0 : Linear signal 1 : SSR drive 2~150 : Relay	150	0	10	Level 2
√	P2		sub output proportional band 0 : ON/OFF control Other values : proportional band setting value	200.0	0.0	3.0	Level 2
√	I2		sub output integral time 0 : disable integral function Other values : integral time setting value	3600	0	240	Level 2
√	D2		sub output derivative time 0 : disable derivative function Other values : derivative time setting value	900	0	60	Level 2
√	HYS2		Hysteresis for sub output on/off control(when P2 = 0.0 appear)	100.0	-100.0	1.0	Level 2
√	CYT2		sub output control cycle 0 : Linear signal 1 : SSR drive 2~150 : Relay	150	0	10	Level 2
√	MGAP		Control gap (for main output)	1000	-1000	0	Level 2
√	SGAP		Control gap (for sub output)	1000	-1000	0	Level 2

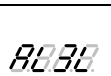
11.3 Control Group

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	R_S		RUN/STOP mode selection 0 : STOP (output & alarm disable) 1 : RUN (output & alarm enable)	RUN	STOP	RUN	Level 1
√	A_M		Auto/Manual mode switch 0 : AUTO (auto mode) 1 : MMAN (main output manual mode) 2 : SMAN (sub output manual mode)	SMAN	AUTO	AUTO	Level 1
√	AT		Auto-tuning execute selection 0 : OFF PID control 1 : ON execute auto tuning	ON	OFF	OFF	Level 1
√	MOUT		manual manipulated output setting value	100.0	0.0	0.0	Level 1
√	MOLH		High limit setting of manipulated value for main output	100.0	0.0	100.0	Level 2
√	MOLL		low limit setting of manipulated value for main output	100.0	0.0	0.0	Level 2
√	SOLH		High limit setting of manipulated value for sub output	100.0	0.0	100.0	Level 2
√	SOLL		low limit setting of manipulated value for sub output	100.0	0.0	0.0	Level 2
√	COUT		Manipulated value for output	100.0	0.0	---	Level 2
√	AT.VL		Auto tuning offset value execute auto tuning in (SV-ATVL) point	100.0	-100.0	0.0	Level 2
√	SS.PO		In manual mode or error condition controller will load this setting value as manipulate value	100.0	0.0	50.0	Level 2
√	OPSF		Main output special function selection 0 : NONE (special function OFF) 1 : SQUA (manipulated output value square) 2 : ROOT (manipulated output value square root) 3 : REVE (manipulated output value reverse) 4 : SQ.RE (manipulated output value square reverse) 5 : RO.RE (manipulated output value square root reverse)	RO.RE	NONE	NONE	Level 2
√	RC.TO		Output filter Unit : second	10.00	0.01	0.20	Level 2
√	MOCL		Main output zero calibration only for linear signal	9999	0	0	Level 3
√	MOCH		Main output span calibration only for linear signal	9999	0	3600	Level 3
√	SOCL		sub output zero calibration only for linear signal	9999	0	0	Level 3
√	SOCH		sub output span calibration only for linear signal	9999	0	3600	Level 3
√	OUTM		Control action selection 0 : HEAT reverse action 1 : COOL direct action	COOL	HEAT	HEAT	Level 3

11.3 Control Group

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	SV.TY		SV source selection LOOP1 0 : FIX (local SV) 1 : RATE (uart + rate SV) 2 : ANAG (remote 4~20mA SV) 3 : ANRA (remote 4~20mA + rate SV) 4 : RAMP (ramp SV) 5 : PROG (program SV) LOOP2 0 : FIX (local SV) 1 : RATE (uart + rate SV) 2 : ANAG (remote 4~20mA SV) 3 : ANRA (remote 4~20mA + rate SV) 4 : RAMP (ramp SV)	PROG	FIX	FIX	Level 4
√	OU.TY		Hardware drive selection LOOP1 0 : SING (single output) 1 : DOUB (dual output) 2 : 1SCR (single phase control) 3 : HLSL (high low signal selection) 4 : FBMV (valve control with feedback) 5 : NFMV (valve control without feedback) LOOP2 0 : SING (single output) 1 : DOUB (dual output) 2 : 1SCR (single phase control) 3 : HLSL (high low signal selection) 4 : NFMV (valve control without feedback)	NFMV	SING	SING	Level 4
√	RCGN		Process RC constant.Gain	10.0	0.1	1.0	Level 4
√	R_ER		Ramp error 0 : OFF 1 : ON	ON	OFF	ON	Level 4
√	TP_K		To target proportional band const.	100.0	1.0	35.0	Level 4

11.4 Alarm Group

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	AL1H		Alarm1 upper set value (ALD1 = DE.HI / DE.HL / BA.ND / PR.HI / DEHI / DEHL / BAND / PRHI appear)	USPL	LSPL	1.0	Level 1
√	AL1L		Alarm1 lower set value (ALD1 = DE.LO / DE.HL / BA.ND / PR.LO / DELO / DEHL / BAND / PRLO appear)	USPL	LSPL	1.0	Level 1
√	AL2H		Alarm2 upper set value (ALD2 = DE.HI / DE.HL / BA.ND / PR.HI / DEHI / DEHL / BAND / PRHI appear)	USPL	LSPL	1.0	Level 1
√	AL2L		Alarm2 lower set value (ALD2 = DE.LO / DE.HL / BA.ND / PR.LO / DELO / DEHL / BAND / PRLO appear)	USPL	LSPL	1.0	Level 1
√	AL3H		Alarm3 upper set value (ALD3 = DE.HI / DE.HL / BA.ND / PR.HI / DEHI / DEHL / BAND / PRHI appear)	USPL	LSPL	1.0	Level 1
√	AL3L		Alarm3 lower set value (ALD3 = DE.LO / DE.HL / BA.ND / PR.LO / DELO / DEHL / BAND / PRLO appear)	USPL	LSPL	1.0	Level 1

11.4 Alarm Group

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	ALD1	AL01	Alarm1 mode selection (Please refer to Chapter 14.1 Alarm Mode)	SOAK	NONE	DEHI	Level 3
√	ALT1	AL1t	FLIK (00.00) : Flicker COTI (99.59) : Continued ON 00.01~99.58 : delay time	COTI	FLIK	COTI	Level 3
√	HYA1	HYA1	Hysteresis setting for alarm1	100.0	-100.0	1.0	Level 3
√	SEA1	SEA1	Alarm1 special function setting (Please refer to Chapter 14.2 Alarm Special Setting)	1111	0000	0000	Level 3
√	ALD2	AL02	Alarm2 mode selection (Please refer to Chapter 14.1 Alarm Mode)	SOAK	NONE	NONE	Level 3
√	ALT2	AL2t	FLIK (00.00) : Flicker COTI (99.59) : Continued ON 00.01~99.58 : delay time	COTI	FLIK	COTI	Level 3
√	HYA2	HYA2	Hysteresis setting for alarm 2	100.0	-100.0	1.0	Level 3
√	SEA2	SEA2	Alarm2 special function setting (Please refer to Chapter 14.2 Alarm Special Setting)	1111	0000	0000	Level 3
√	ALD3	AL03	Alarm3 mode selection (Please refer to Chapter 14.1 Alarm Mode)	SOAK	NONE	NONE	Level 3
√	ALT3	AL3t	FLIK (00.00) : Flicker COTI (99.59) : Continued ON 00.01~99.58 : delay time	COTI	FLIK	COTI	Level 3
√	HYA3	HYA3	Hysteresis setting for alarm 3	100.0	-100.0	1.0	Level 3
√	SEA3	SEA3	Alarm3 special function setting (Please refer to Chapter 14.2 Alarm Special Setting)	1111	0000	0000	Level 3

11.5 HBA Group

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	HBCU	HBCU	HBA current display unit : ampere(A)	---	---	---	Level 1
√	HBSV	HBSU	HBA current setting unit : ampere(A)	100.0	0.0	1.0	Level 1
√	HBTM	HBET	HBA disconnection set time unit : second(S)	5999	0	10	Level 1

11.6 Transmission Group

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
×	AOEN	AoEn	Retransmission function enable 0 : OFF (Disable) 1 : ON (Enable)	ON	OFF	OFF	Level 5
×	AOSL	AoSL	Retransmission output signal source selection 0 : SV1 (Loop1 SV) 1 : PV1 (Loop1 PV) 2 : MV1 (Loop1 main out manipulated value) 3 : SV1R (Loop1 SV reverse) 4 : PV1R (Loop1 PV reverse) 5 : MV1R (Loop1 main out manipulated reverse value) 6 : SV2 (Loop2 SV) 7 : PV2 (Loop2 PV) 8 : MV2 (Loop2 main out manipulated value) 9 : SV2R (Loop2 SV reverse) 10 : PV2R (Loop2 PV reverse) 11 : MV2R (Loop2 main out manipulated reverse value)	MV2R	SV1	PV1	Level 5
×	AO.LO	AoLo	Retransmission output scale low	USPL	LSPL	LSPL	Level 5
×	AO.HI	AoH	Retransmission output scale high	USPL	LSPL	USPL	Level 5
×	※ AOCL	AoCL	For retransmission zero calibration	9999	0	0	Level 5
×	※ AOCH	AoCH	For retransmission span calibration	9999	0	3600	Level 5

※ For details, please refer to re-transmission examples

11.7 DI Group

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
×	D1SL	d1SL	LOOP1 digital input function selection 0 : OFF (disable digital input function) 1 : SWSV (switch 4 sets of SV) 2 : R_S (switch RUN/STOP) 3 : A_M (switch Auto/Manual) 4 : AT (ON/OFF auto-tunning) 5 : RESV (ON/OFF remote SV) 6 : AOEN (ON/OFF retransmission) 7 : TIM (ON/OFF timer) 8 : CNT(counter) 9 : PROG (run/reset program)	PROG	OFF	OFF	Level 5
×	D2SL	d2SL	LOOP2 digital input function selection 0 : OFF (disable digital input function) 1 : SWSV (switch 4 sets of SV) 2 : R_S (switch RUN/STOP) 3 : A_M (switch Auto/Manual) 4 : AT (ON/OFF auto-tunning) 5 : RESV (ON/OFF remote SV) 6 : AOEN (ON/OFF retransmission) 7 : TIM (ON/OFF timer) 8 : CNT(counter) 9 : PROG (run/reset program)	PROG	OFF	OFF	Level 5
√	SV1	SV1	First set value (DI function usage)	USPL	LSPL	0	Level 1
√	SV2	SV2	Second set value (DI function usage)	USPL	LSPL	0	Level 1
√	SV3	SV3	Third set value (DI function usage)	USPL	LSPL	0	Level 1
√	SV4	SV4	Fourth set value (DI function usage)	USPL	LSPL	0	Level 1

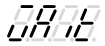
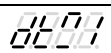
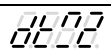
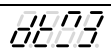
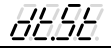
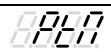
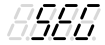
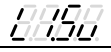
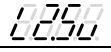
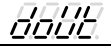
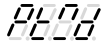
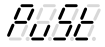
11.8 Communication Group

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
×	PRTO	PrtO	Protocol selection 0 : TAIE 1 : MRTU	MRTU	TAIE	MRTU	Level 5
×	FOMA	FoMA	Data format 0 : O_81 (parity bit=odd, stop bit=1) 1 : O_82 (parity bit=odd, stop bit=2) 2 : E_81 (parity bit=even, stop bit=1) 3 : E_82 (parity bit=even, stop bit=2) 4 : N_81 (parity bit=none, stop bit=1) 5 : N_82 (parity bit=none, stop bit=2)	N_82	O_81	O_81	Level 5
×	IDNO	Idno	Controller address	255	0	1	Level 5
×	BAUD	bAUd	Baud rate 0 : 24(2400) 1 : 48(4800) 2 : 96(9600) 3 : 192(19200) 4 : 384(38400) 5 : 576(57600) 6 : 1152(115200) bps	1152	24	384	Level 5
×	RPDT	rPdt	Response delay time(ms) When controller receive master command will delay this setting value then response master	250	0	0	Level 5
×	REMO	rEMo	Remote control program execute OFF : program execute by key ON : program execute by digital input or communication	ON	OFF	OFF	Level 5
×	W_MD	WMd	EEPROM protection 0 : OFF communication write command only write to CPU RAM 1 : ON communication write command write to CPU RAM and EEPROM	ON	OFF	ON	Level 5
×	RMAP	rMAP	Registered mapping 0 : OFF (disable registered mapping) 1 : FY (mapping to FY series memory address) 2 : FE (mapping to FE series memory address)	10	0	0	Level 5
×	RATE	rAtE	Slave SV rate	9999	0	9999	Level 1

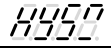
11.9 RAMP / SOAK Group

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	RAMP	rAMP	The rate of change during SV ramp operation format : ℃ / minute	99.99	-19.99	0.00	Level 1
√	SOAK	SoAK	Soak time	COTI	0.00	0.00	Level 1

11.10 Program Group

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	WAIT		Program execution standby temperature 0 : when program execute do not wait for PV temperature Other values : when PV= (target SV-WAIT), program entering next segment	1000	0	0	Level 1
√	DTM1		DO1 Timer	59.99	0.00	保留	Level 1
√	DTM2		DO2 Timer	59.99	0.00	保留	Level 1
√	DTM3		DO3 Timer	59.99	0.00	保留	Level 1
√	DTM4		DO4 Timer	59.99	0.00	保留	Level 1
√	DT.ST		Digit out timer set	59.99	0.00	保留	Level 1
√	PTN		Program pattern selection 1~15	15	TRIP	1	Level 1
√	SEG		Program segment selection 1~10	10	1	1	Level 1
√	L1.SV		LOOP1 current segment target SV	USPL	LSPL	0	Level 1
√	L2.SV		LOOP2 current segment target SV	USPL	LSPL	0	Level 1
√	TIMR		Current segment execute time setting END(-1) : program end in this segment 00.00 : program step change in this segment 00.01~99.58 : program in this segment execute time COTI(99.59) : program continue execute this segment no end	COTI	END	00.00	Level 1
√	DOUT		DO1~DO4 ON/OFF setting	1111	0000	保留	Level 1
×	PTMD		Program time format 0 : SEC (minute.second) 1 : MIN (hour.minute) 2 : 50MS (50ms)	50MS	SEC	SEC	Level 5
×	PVST		Program execute start address 0 : ZERO (execute from zero) 1 : FULT (execute from current PV, but use segment 1 fully time) 2 : CUTT (execute from current PV, cut time)	CUTT	ZERO	CUTT	Level 5
×	REPT		Program execute repeat 0 : OFF (disable repeat function) 1 : ON (Program execute repeat)	ON	OFF	OFF	Level 5
×	POWF		Program execute power fail protection 0 : OFF (disable power fail protection) 1 : ON (enable power fail protection)	ON	OFF	OFF	Level 5

11.11 Motor Valve Control Group

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	MVRT		Motor valve operating time	150	5	45	Level 4
√	HYSM		Motor valve hysteresis adjust	10.0	0.1	1.5	Level 4

11.12 System Group

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
×	OPSL	oPSL	Loop hardware distribution 0 : LOP1 loop1 main out drive out1 hardware, sub out drive out2 hardware (use for dual output) 1 : LOP2 loop2 main out drive out1 hardware, sub out drive out2 hardware (use for dual output) 2 : LP12 loop1 main out drive out1 hardware, loop2 main out drive out2 hardware (use for single output)	LP12	LOP1	LP12	Level 5
√	LOOP	Loop	Loop selection 0 : LOP1 (loop1) 1 : LOP2 (loop2)	LOP2	LOP1	LOP1	Level 1
√	PW	PW	Password	9999	0	0	Level 1
√	LOCK	LoCK	Function/level lock (Please refer to Chapter 10.4 Data Lock Function)	1111	0000	0000	Level 2
√	FKSL	FUSL	FUN key function mode selection 0 : OFF (disable FUN key) 1 : R_S (switch RUN/STOP) 2 : A_M (switch auto/manual) 3 : AT (ON/OFF auto-tuning) 4 : LOOP (switch LOOP1/2)	LOOP	OFF	OFF	Level 4
×	HZ	Hz	Power frequency 0 : 50HZ 1 : 60HZ	60HZ	50HZ	60HZ	Level 5
×	CJSL	CJSL	Cold junction compensation mode selection 0 : AUTO (auto cold junction compensation) 1 : MAN (manual cold junction compensation)	MAN	AUTO	AUTO	Level 5
×	CJMN	CJMN	manual cold junction compensation temperature setting	50.0	-10.0	0	Level 5
×	CJTC	CJtC	cold junction temperature display	---	---	---	Level 5
×	POTM	PoTM	Power-on delay time setting value	COTI	00.00	00.05	Level 5

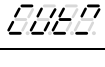
11.13 Other Group

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	PR.SV	Pr.SV	pretune SV	USPL	LSPL	100.0	Level 4
√	AT.SV	At.SV	autotune SV	USPL	LSPL	200.0	Level 4
√	MLNB	MLnb	Manual linear segment number	10	TRIP	TRIP	Level 3
√	COMP	CoMP	Manual linear compare value	USPL	LSPL	LSPL	Level 3
√	OFFS	oFFS	Manual linear offset value	150.0	-150.0	0.0	Level 3

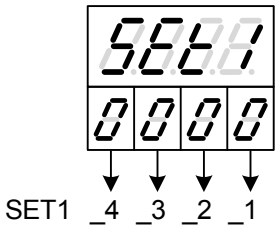
11.14 Dehumidification Group

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	RH.TC	rHtC	Dehumidification temperature If PV less than RH.TC manipulated value = RH.PO	100.0	0.0	35.0	Level 4
√	RH.PO	rHPo	Dehumidification manipulated value 0 : OFF disable dehumidification function Other values : 0.1~100.0 manipulated value	100.0	OFF	OFF	Level 4
√	RH.TM	rHtM	dehumidification time (time format : minute.second) 00.00~99.58 : execute dehumidification time	COTI	00.00	05.00	Level 4

11.15 Timer Counter Group

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	TIM		Timer PV address use for current time SV address use for target time ※ Need to use with DI function	5999	0	0	Level 1
√	CNT		Counter PV address use for current count SV address use for target count ※ Need to use with DI function	9999	0	0	Level 1
√	CUTM		24 hour timer Current setting time	23.59	00.00	0	Level 1
√	ONTM		24 hour timer , action ON time PV address use for display current time SV address use for setting action ON time	23.59	00.00	0	Level 1
√	OFTM		24 hour timer , action OFF time PV address use for display current time SV address use for setting action OFF time	23.59	00.00	0	Level 1
√	TMSL		24 hour timer , mode selection 0 : OFF (24 hour timer function disable) 1 : SWSV (switch SV) 2 : R_S (switch RUN/STOP) 3 : R_SO (switch to run)	R_SO	OFF	OFF	Level 4

12. Parameters Hide/Display Table on Level 4



SET1	SET1_1	0	hide	HBCU HBSV HBTM
		1	display	HBCU HBSV HBTM
	SET1_2	0	hide	AL1H AL1L
		1	display	AL1H AL1L
	SET1_3	0	hide	AL2H AL2L
		1	display	AL2H AL2L
	SET1_4	0	hide	AL3H AL3L
		1	display	AL3H AL3L

SET2	SET2_1	0	hide	SV1 SV2
		1	display	SV1 SV2
	SET2_2	0	hide	SV3 SV4
		1	display	SV3 SV4
	SET2_3	0	hide	TIM
		1	display	TIM
	SET2_4	0	hide	(CNT→ LOOP1) (PW→ LOOP2)
		1	display	(CNT→ LOOP1) (PW→ LOOP2)

SET3	SET3_1	0	hide	CUTM ONTM OFTM
		1	display	CUTM ONTM OFTM
	SET3_2	0	hide	A_M MOUT
		1	display	A_M MOUT
	SET3_3	0	hide	AT
		1	display	AT
	SET3_4	0	hide	RATE RAMP SOAK
		1	display	RATE RAMP SOAK

SET4	SET4_1	0	hide	WAIT
		1	display	WAIT
	SET4_2	0	hide	DTM1 DTM2 DTM3 DTM4
		1	display	DTM1 DTM2 DTM3 DTM4
	SET4_3	0	hide	DT.ST
		1	display	DT.ST
	SET4_4	0	hide	PV1 PV2
		1	display	PV1 PV2

SET5	SET5_1	0	hide	M_LP M_LI M_LD
		1	display	M_LP M_LI M_LD
	SET5_2	0	hide	MOLH MOLL
		1	display	MOLH MOLL
	SET5_3	0	hide	S_LP S_LI S_LD
		1	display	S_LP S_LI S_LD
	SET5_4	0	hide	SOLH SOLL
		1	display	SOLH SOLL

SET6	SET6_1	0	hide	COUT
		1	display	COUT
	SET6_2	0	hide	AT.VL SS.PO
		1	display	AT.VL SS.PO
	SET6_3	0	hide	OPSF RC.TO
		1	display	OPSF RC.TO
	SET6_4	0	hide	LOOP R_S
		1	display	LOOP R_S

SET7	SET7_1	0	hide	AN.LO AN.HI DP
		1	display	AN.LO AN.HI DP
	SET7_2	0	hide	HI.RA LO.RA
		1	display	HI.RA LO.RA
	SET7_3	0	hide	LSPL USPL
		1	display	LSPL USPL
	SET7_4	0	hide	ALD1 ALT1 HYA1 SEA1
		1	display	ALD1 ALT1 HYA1 SEA1

SET8	SET8_1	0	hide	ALD2 ALT2 HYA2 SEA2
		1	display	ALD2 ALT2 HYA2 SEA2
	SET8_2	0	hide	ALD3 ALT3 HYA3 SEA3
		1	display	ALD3 ALT3 HYA3 SEA3
	SET8_3	0	hide	MOCL MOCH
		1	display	MOCL MOCH
	SET8_4	0	hide	SOCL SOCH
		1	display	SOCL SOCH

SET9	SET9_1	0	hide	MV.SF
		1	display	MV.SF
	SET9_2	0	hide	RC.TI
		1	display	RC.TI
	SET9_3	0	hide	UNIT
		1	display	UNIT
	SET9_4	0	hide	OUTM
		1	display	OUTM

SETA	SETA_1	0	hide	SV.OS
		1	display	SV.OS
	SETA_2	0	hide	PV.OS PV.OH
		1	display	PV.OS PV.OH
	SETA_3	0	hide	MLNB COMP OFFS
		1	display	MLNB COMP OFFS
	SETA_4	0	hide	SV.TY
		1	display	SV.TY

SETB	SETB_1	0	hide	OU.TY
		1	display	OU.TY
	SETB_2	0	hide	RCGN
		1	display	RCGN
	SETB_3	0	hide	FKSL
		1	display	FKSL
	SETB_4	0	hide	R_ER TP_K
		1	display	R_ER TP_K

SETC	SETC_1	0	hide	TMSL
		1	display	TMSL
	SETC_2	0	hide	MVRT HYSM
		1	display	MVRT HYSM
	SETC_3	0	hide	RH.TC RH.PO RH.TM
		1	display	RH.TC RH.PO RH.TM
	SETC_4	0	hide	PR.SV AT.SV
		1	display	PR.SV AT.SV

SETD	SETD_1	0	hide	PRTO FOMA IDNO BAUD RPDT
		1	display	PRTO FOMA IDNO BAUD RPDT
	SETD_2	0	hide	AOEN AOSL AO.LO AO.HI AOCL AOCH
		1	display	AOEN AOSL AO.LO AO.HI AOCL AOCH
	SETD_3	0	hide	CTRT D1SL D2SL
		1	display	CTRT D1SL D2SL
	SETD_4	0	hide	REMO
		1	display	REMO

SETE	SETE_1	0	hide	CJSL CJMN CJTC W_MD RMAP OPSL POTM PTMD PVST REPT POWF
		1	display	CJSL CJMN CJTC W_MD RMAP OPSL POTM PTMD PVST REPT POWF
	SETE_2	0	hide	D01 D02 D03 D04 D05 D06 D07 D08 D09 D10 D11 D12 D13 D14 D15 D16 D17 D18 D19 D20
		1	display	D01 D02 D03 D04 D05 D06 D07 D08 D09 D10 D11 D12 D13 D14 D15 D16 D17 D18 D19 D20
	SETE_3	0	hide	reserve
		1	display	reserve
	SETE_4	0	hide	reserve
		1	display	reserve

SETF	SETF_1	0	valve control close Relay b contact out
		1	valve control close Relay a contact out
	SETF_2	0	in abnormal condition MOUT = SS.PO display MOUT
		1	in abnormal condition MOUT = 0 display PV(error message)
	SETF_3	0	PV Hysteresis_mode disable
		1	PV Hysteresis_mode enable
	SETF_4	0	manul_linearize_mode disable
		1	manul_linearize_mode enable

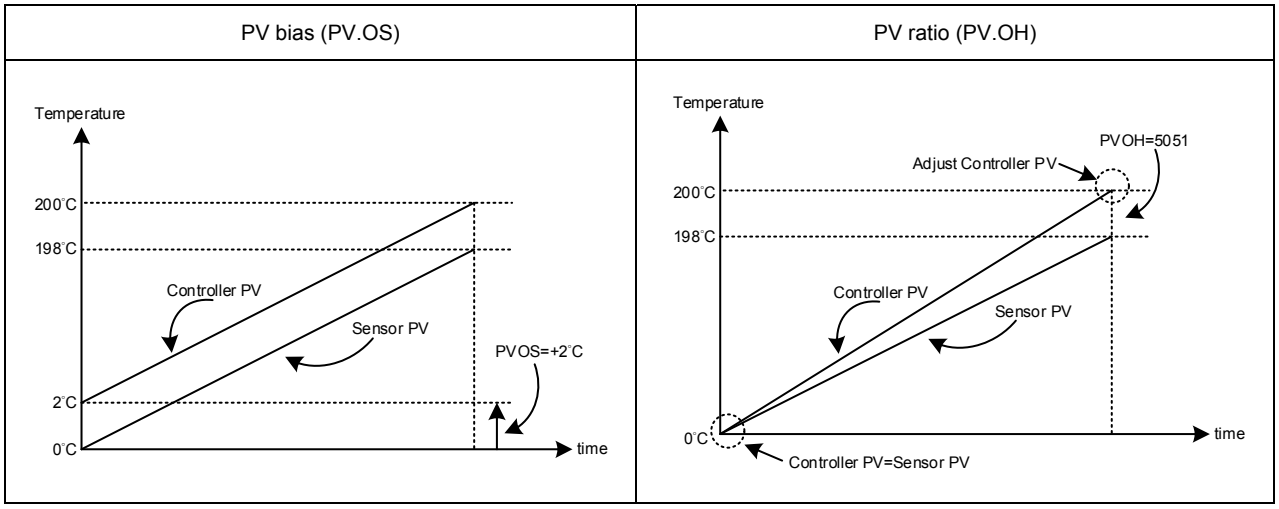
13. Functional Descriptions

13.1 Input Calibration

Outline

The NFY series controller offers two methods for input calibration, PV bias (PV.OS) and PV ratio (PV.OH) functions to correct the deviation of each sensor, as well as PV difference between controllers.

Functional Diagram



The related parameter of input calibration are as below:

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	PV.OS	PV.oS	PV bias(for zero) PV = PV x (PV.OH / 5000) + PV.OS	100.0	-100.0	0	Level 3
√	PV.OH	PV.oH	PV bias(for span) PV = PV x (PV.OH / 5000) + PV.OS	9999	0	5000	Level 3

Example 1

PV bias (PV.OS) adds bias to the Measured value(PV):

When two controllers measure the temperature of the same type of load, the measured values of the respective characteristics of the sensors are displayed as

Controller A : 200°C Controller B : 195°C

As shown above, Controller B is compensated by PV offset (PV.OS). The PV.OS parameter value must be corrected by +5°C.

The display value will be changed to 200°C, Same as Controller A, but Controller B will show 5°C at 0°C.

Parameter Setting

LOOP	Level	Parameter	Set value	Description
1	4	SETA.2	1	Display PV.OS / PV.OH
1	3	PV.OS	5	PV adds +5°C
1	3	PV.OH	5000	PV ratio unchanging

Example 2

PV ratio (PV.OH) is a multiplier to be applied to the Measured value(PV):

When two controllers measure the temperature of the same type of load, the measured values of the respective characteristics of the sensors are displayed as

Controller A : 200°C Controller B : 195°C

As shown above, if Controller B is compensated by the PV ratio (PV.OH), then the PV.OH parameter value is adjusted to display at 200°C. Consistent with Controller A, Controller B will show 0°C at 0°C.

Parameter Setting

LOOP	Level	Parameter	Set value	Description
1	4	SETA.2	1	Display PV.OS / PV.OH
1	3	PV.OS	0	PV bias unchanging
1	3	PV.OH	5129	PV ratio=(5129/5000)=1.0258

13.2 Retransmission

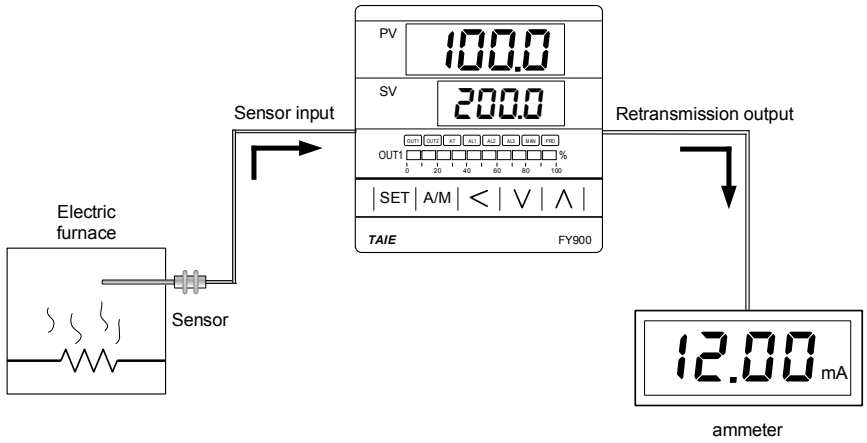
Outline

The retransmission function of the NFY series controller can provide digital values for parameters such as SV1, PV1, MV1, SV1R, PV1R, MV1R, SV2, PV2, MV2, SV2R, PV2R, MV2R, etc.

Analog signals are transmitted to external devices according to the set range (EX: PLC AI module, inverter, etc.).

transmission output signal selectable: 4~20mA, 0~20mA, 0~5V, 0~10V, 1~5V, 2~10V

Functional Diagram



The related parameter of Transmission are as below:

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
×	AOEN	AoEN	Retransmission function enable 0 : OFF (Disable) 1 : ON (Enable)	ON	OFF	OFF	Level 5
×	AOSL	AoSL	Retransmission output signal source selection 0 : SV1 (Loop1 SV) 1 : PV1 (Loop1 PV) 2 : MV1 (Loop1 main out manipulated value) 3 : SV1R (Loop1 SV reverse) 4 : PV1R (Loop1 PV reverse) 5 : MV1R (Loop1 main out manipulated reverse value) 6 : SV2 (Loop2 SV) 7 : PV2 (Loop2 PV) 8 : MV2 (Loop2 main out manipulated value) 9 : SV2R (Loop2 SV reverse) 10 : PV2R (Loop2 PV reverse) 11 : MV2R (Loop2 main out manipulated reverse value)	MV2R	SV1	PV1	Level 5
×	AO.LO	Ao.Lo	Retransmission output scale high	USPL	LSPL	LSPL	Level 5
×	AO.HI	Ao.Hi	Retransmission output scale low	USPL	LSPL	USPL	Level 5
×	AOCL	AoCL	For retransmission zero calibration	9999	0	0	Level 5
×	AOCH	AoCH	For retransmission span calibration	9999	0	3600	Level 5

Examples

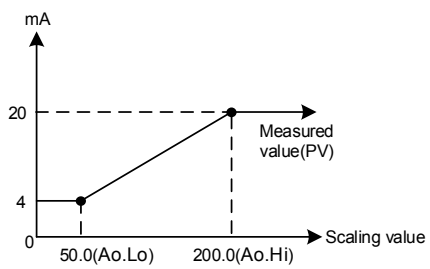
Assume the input range (LSPL & USPL) = -50.0~600.0, and the retransmission range (AO.LO & AO.HI) = 50.0~200.0,

Retransmit PV (AOSL)

When the PV value is between 50.0 and 200.0, the retransmission signal is based on the PV value, and the linear output analog signal is presented.

When the PV is less than 50.0, the retransmission signal remains at 4mA

When the PV value is greater than 200.0, the retransmission signal remains at 20mA



Parameter Setting

LOOP	Level	Parameter	Set value	Description
---	5	AOEN	ON	Retransmission function enable
---	5	AOSL	PV1	Retransmit the PV
---	5	AO.LO	-50.0	Retransmission range lower limit
---	5	AO.HI	600.0	Retransmission range upper limit
---	5	AOCL	3133	Retransmission signal low point calibration value (each controller calibrate value is different)
---	5	AOCH	3508	Retransmission signal high point calibration value (each controller calibrate value is different)

Note

1. To order TRS function, please confirm the type of retransmission output signal and retransmit signal range
2. The user can select the source to be transmitted according to the parameter AOSL. The factory default is to retransmit the PV.
3. Modify the parameter INPT/LSPL/USPL to reset the retransmission range AO.LO / AO.HI
4. AOCL & AOCH are the calibration parameters of the re-transmission signal. It has been calibrated before leaving the factory. Do not change this parameter value.
5. Users only need to set AOSL / AO.LO / AO.HI three parameters, the rest of the parameters will be set and corrected

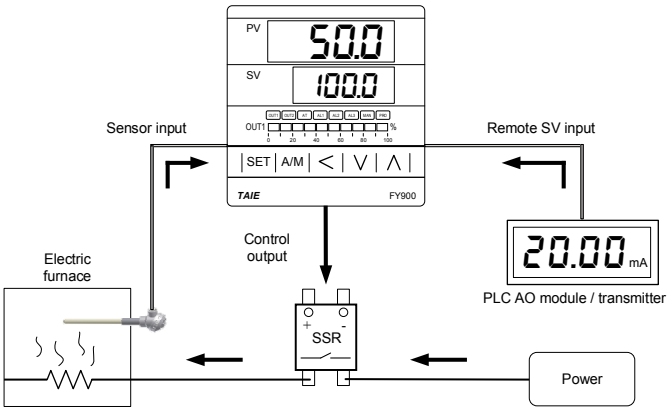
13.3 Remote SV

Outline

Remote SV functions as an analog signal (4~20mA or 0~10V) generated by external devices (EX: PLC AO module, transmitter) to the Remote SV terminal of the controller, to change the SV(LOOP1) with a preset range.

Remote SV signal selection: 4~20mA, 0~20mA, 0~5V, 0~10V, 1~5V, 2~10V

Function Diagram

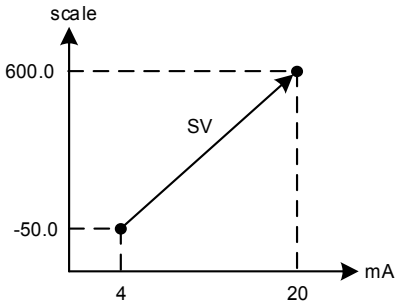


The related parameter of Remote SV are as below:

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	SV.TY	SuS9	SV source selection FIX, RATE, ANAG, ANRA, RAMP, PROG	PROG	FIX	FIX	Level 4
√	INPT	InPt	Input type selection (please refer to Chapter 4 Input Type Glossary)	AN6	K1	K1	Level 3
√	AN.LO	AnLo	Analog input zero calibration (only valid for linear analog signal, and for details, please refer to chapter 17.4)	9999	-1999	0	Level 3
√	AN.HI	AnHi	Analog input span calibration (only valid for linear analog signal, and for details, please refer to chapter 17.4) (hexadecimal)	0x7FFF	0x0000	0x5FFF	Level 3
√	DP	dP	Decimal point position (only available in linear signal input) 0 : 0000 1 : 000.0 2 : 00.00 3 : 0.000	0.000	0000	0000	Level 3
√	HI.RA	HiRA	Input scale high(for analog input)	9999	-1999	---	Level 3
√	LO.RA	LoRA	Input scale low(for analog input)	9999	-1999	---	Level 3

Examples
Assume LOOP1 input signal is K1 and its range is -50.0~600.0. When an external analog signal is input to the Remote SV terminal, the signal will be based on the range presents linear display of SV parameters in LOOP1

When the signal input value is less than 4mA, the PV position shows nnnn, indicating that the signal of Remote SV is lower than the lower limit value
When the signal input value is greater than 20mA, the PV position shows uuuu, indicating that the signal of Remote SV is higher than the upper limit value



Parameter Setting

LOOP	Level	Parameter	Set value	Description
1	4	SV.TY	ANAG	SV(LOOP1) provided by external analog signal
2	3	INPT	AN4	Remote SV input signal is 4~20mA
2	3	AN.LO	744	Remote SV signal low point calibration value (each controller calibrate value is different)
2	3	AN.HI	0x657C	Remote SV signal high point calibration value (each controller calibrate value is different)
2	3	HI.RA	600.0	LOOP2 highest linear input range (same as USPL of LOOP1)
2	3	LO.RA	-50.0	LOOP2 lowest linear input range (same as LSPL of LOOP1)

Notes

1. To order Remote SV function, please confirm signal type and Remote SV input range first.
2. Modify the parameter INPT & UNIT will reset the input range
3. The AN.LO and AN.HI of LOOP2 are the calibration parameters of Remote SV. It has been calibrated before leaving the factory. Please do not change this parameter.

13.4 Heater Break Alarm

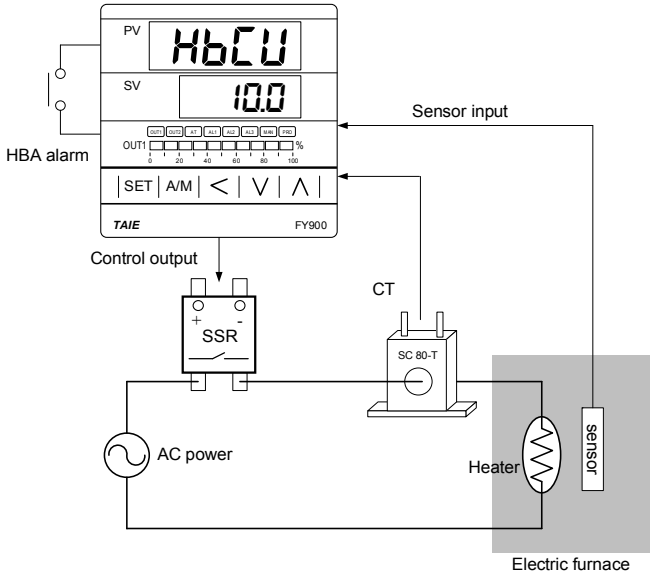
Outline

The HBA (Heater-Break-Alarm) function measures the heater current and displays the measured current value on the parameter HBCU so that the heater status can be monitored at any time.

When it is detected that the heater is disconnected or the heater current is abnormally reduced, an alarm message may be immediately output to notify the user.

The HBA function of the NFY series controller can be used as a general current display (ALDX=HBA), and the function of measuring current can be used to be controlled by RELAY or SSR heating systems.

Function Diagram



The related parameter of Heater Break Alarm are as below:

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	HBCU	HBCU	HBA current display unit : ampere(A)	---	---	---	Level 1
√	HBSV	HBSV	HBA current setting unit : ampere(A)	100.0	0.0	1.0	Level 1
√	HBTM	HBTM	HBA disconnection set time unit : second(S)	300	0	10	Level 1

HBA operating conditions

1. Heater current is less than the setting of HBSV
2. OUT1 output exceeds 90%
3. The conditions of 1 & 2 above are established and continue to exceed the set number of seconds for HBTM

Parameter Setting

LOOP	Level	Parameter	Set value	Description
1	1	HBCU	---	Heater Current Value Display
1	1	HBSV	1.0	HBA Action Current Set Value (Unit: A)
1	1	HBTM	10	HBA Action Time Set Value (unit: Second)
1	4	SET1.1	1	Display HBCU/HBSV/HBTM
1	3	ALD1	HBA	HBA Alarm
2	3	AN.LO	-12	Current low-point calibration value (each controller calibrate value is different)
2	3	AN.HI	0x4527	Current High-point calibration value (each controller calibrate value is different)

Examples
Heating system with SSR as control element, set HBSV=1.0, HBTM=10

1. The heater current display value HBCU = 0.0 when a heater disconnection occurs
   →The heater current is less than the set value of HBSV=1.0. At this point, the operating condition 1 is satisfied.
2. The heater no longer heats when the heater disconnection occurs, and the gap between the PV and SV will become larger and larger.
   → The manipulated value of OUT1 is also getting larger and larger, and eventually exceeds 90%. At this point, action condition 2 is satisfied.
3. The AL1 alarm will be activated when both 1 & 2 conditions are met and continue for more than 10 seconds of the HBTM setting.

Notes

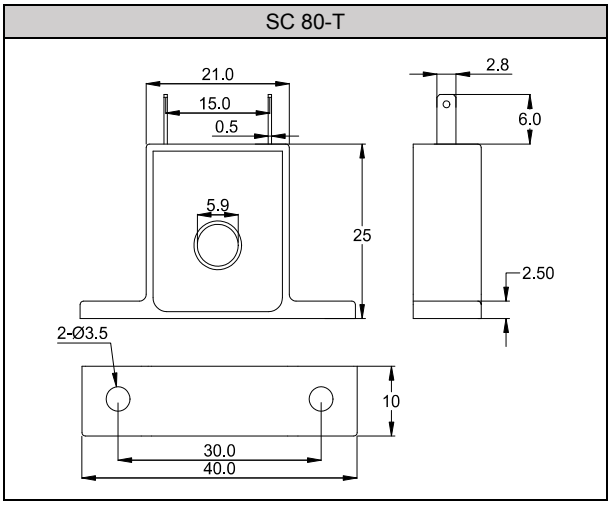
1. To order the HBA function, please confirm the control mode, only available in SSR/RELAY control linear signal (mA or V) Not applicable
2. AN.LO & AN.HI is the current signal calibration parameters. It has been calibrated before leaving the factory. Do not change this parameter value.
3. The user only needs to set two parameters of HBSV & HBTM, the rest of the parameters will be set & calibrated at the factory
4. CT has two specifications: SC 80-T & SC 100-T. Please check heater wire diameter and specify required CT.

CT Specifications

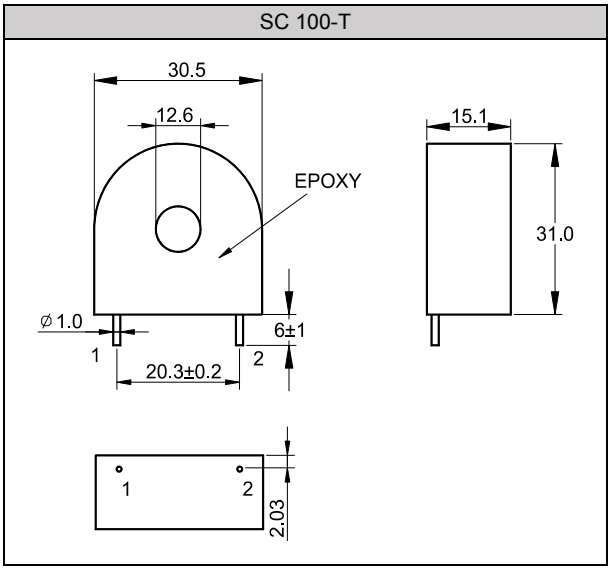
Item	Specifications	
Model number	SC 80-T	SC 100-T
Max. continuous current	80A	100A
Accuracy	3%	5%
Aperture	5.9mm	12.6mm
Dieiectric Withstanding Voltage(Hi-pot)	2500Vrms / 1 minute	4000Vrms / 1 minute
Vibration resistance	50 HZ, 98 m/s^2	
Weight	Approx. 12 g	Approx. 30 g

Dimensions (UNIT：mm)

SC 80-T



SC 100-T



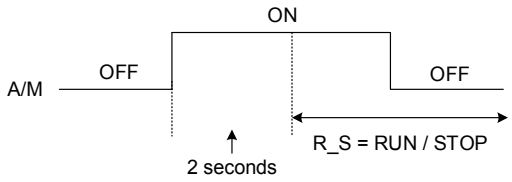
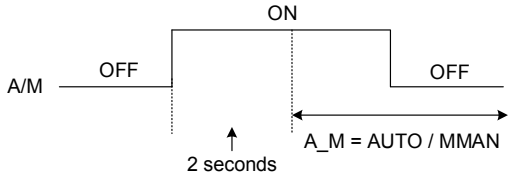
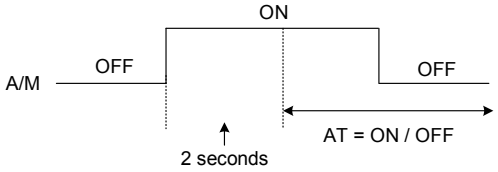
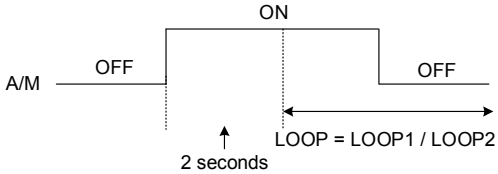
13.5 A/M Key

Outline

The A/M key of NFY600/700/800/900 is “programmable function key”. According to the setting value of parameter FKSL, it directly operates various events on the key.

With a two-second delay to prevent users from touching it inadvertently, it takes two seconds for the event to start.

A/M Key Mode table

LOOP	Parameter	Set value	Description
√	FKSL	OFF (0)	No action
		R_S (1)	Switch RUN/STOP mode 
		A_M (2)	Switch AUTO/MMAN mode 
		AT (3)	Autotuning ON/OFF mode 
		LOOP (4)	Switch LOP1/ LOP2  ※ FKSL of LOOP1/LOOP2 should be set as LOOP

Example Description

1. Use A/M key to switch loop1 manual/auto mode
   Parameter Setting

LOOP	Level	Parameter	Set value	Description
1	4	SETB.3	1	Display loop1 FKSL
1	4	FKSL	A_M	Switch to manual/auto mode

2. Use A/M key to switch loop2 manual/auto mode
   Parameter Setting

LOOP	Level	Parameter	Set value	Description
2	4	SETB.3	1	Display loop2 FKSL
2	4	FKSL	A_M	Switch to manual/auto mode

3. Use A/M key to switch loop1 run/stop mode
   Parameter Setting

LOOP	Level	Parameter	Set value	Description
1	4	SETB.3	1	Display loop1 FKSL
1	4	FKSL	R_S	Switch to RUN/STOP mode

4. Use A/M key to switch loop2 activate/stop mode
   Parameter Setting

LOOP	Level	Parameter	Set value	Description
2	4	SETB.3	1	Display loop2 FKSL
2	4	FKSL	R_S	Switch to RUN/STOP mode

5. Use A/M key to switch loop1/loop2
   Parameter Setting

LOOP	Level	Parameter	Set value	Description
1	4	SETB.3	1	Display loop1 FKSL
1	4	FKSL	LOOP	Switch loop1 / loop2
2	4	SETB.3	1	Display loop2 FKSL
2	4	FKSL	LOOP	Switch loop1 / loop2

Notes

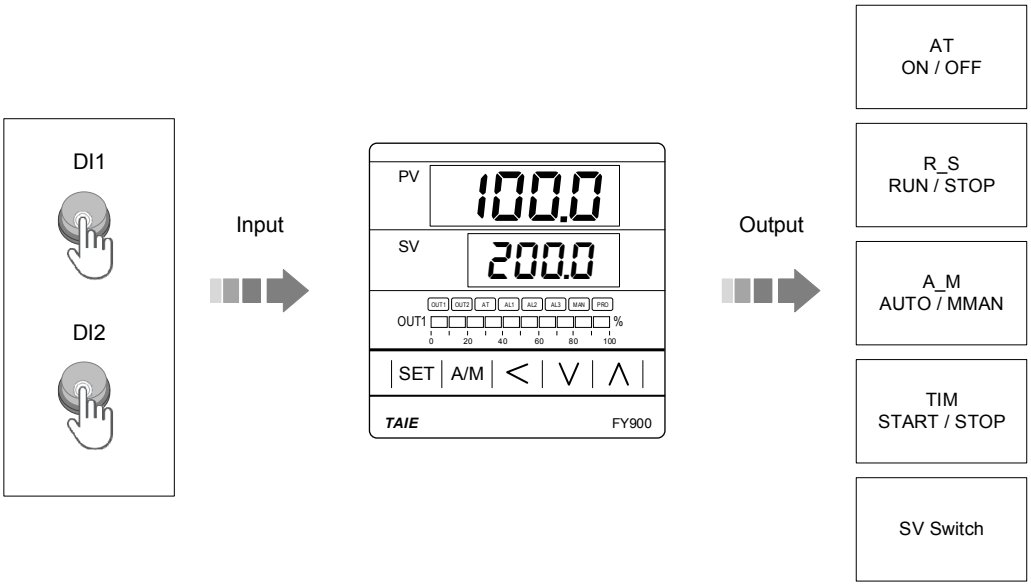
1. If you have added DI function, please avoid setting the parameters D1SL/D2SL and FKSL to the same function mode to avoid confusion
2. A/M key factory default is A_M, switch manual/auto mode

13.6 Digital Input

Outline

The NFY controller provides two-point digital inputs that can be used to switch SV values through external switches or perform various events.

Function Diagram

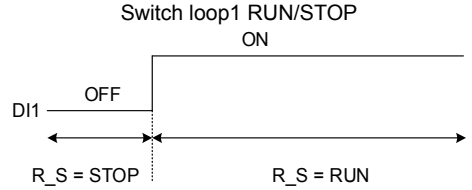
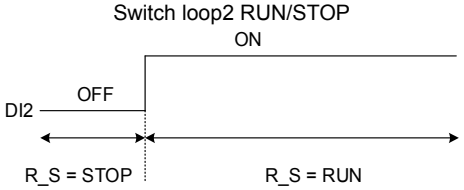
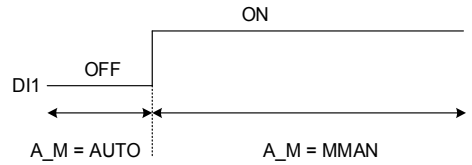
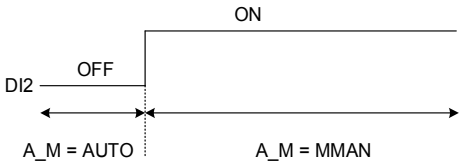
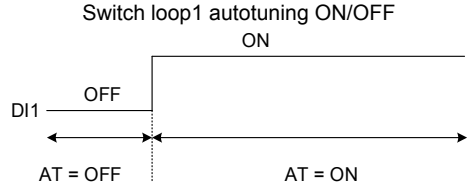
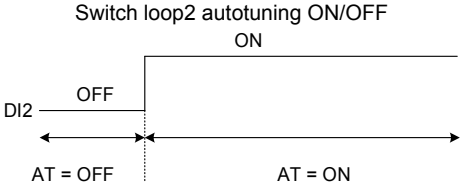
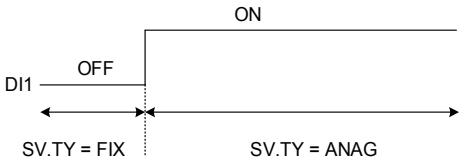


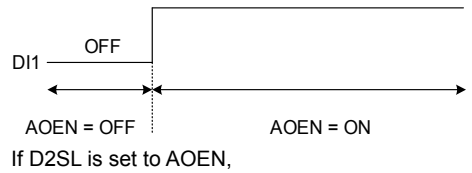
The related parameter of Digital Input are as below:

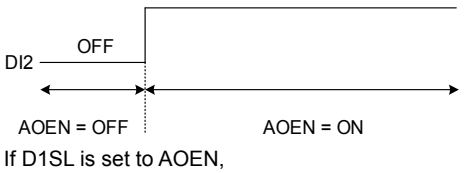
LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
×	D1SL	d1SL	LOOP1 digital input function selection 0 : OFF (disable digital input function) 1 : SWSV (switch 4 sets of SV) 2 : R_S (switch RUN/STOP) 3 : A_M (switch Auto/Manual) 4 : AT (ON/OFF auto-tunning) 5 : RESV (ON/OFF remote SV) 6 : AOEN (ON/OFF retransmission) 7 : TIM (ON/OFF timer) 8 : CNT(counter) 9 : PROG (run/reset program)	PROG	OFF	OFF	Level 5
×	D2SL	d2SL	LOOP2 digital input function selection 0 : OFF (disable digital input function) 1 : SWSV (switch 4 sets of SV) 2 : R_S (switch RUN/STOP) 3 : A_M (switch Auto/Manual) 4 : AT (ON/OFF auto-tunning) 5 : RESV (ON/OFF remote SV) 6 : AOEN (ON/OFF retransmission) 7 : TIM (ON/OFF timer) 8 : CNT(counter) 9 : PROG (run/reset program)	PROG	OFF	OFF	Level 5

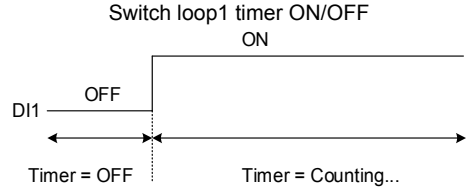
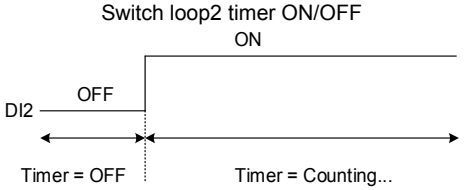
DI Mode table

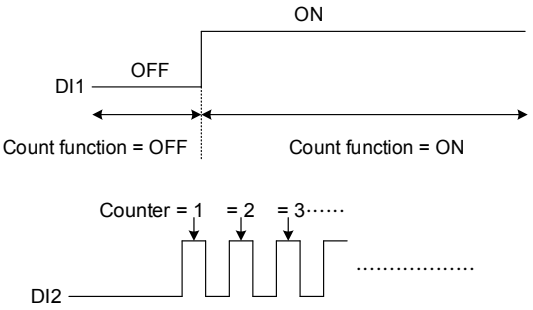
<table>
<tr><th>Mode</th><th colspan="2">Function Description</th></tr>
<tr><td rowspan="2">OFF</td><td>D1SL=OFF</td><td>D2SL=OFF</td></tr>
<tr><td>Disable Loop1 digital input function</td><td>Disable Loop2 digital input function</td></tr>
<tr><td rowspan="2">SWSV</td><td>D1SL= SWSV</td><td>D2SL= SWSV</td></tr>
<tr><td colspan="2">SV=SV1~SV4
Please refer to SV Switch table

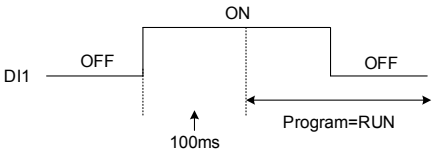
※ If D1SL is set to SWSV, Please set D2SL to OFF
※ If D2SL is set to SWSV, Please set D1SL to OFF</td></tr>
<tr><td rowspan="2">R_S</td><td>D1SL= R_S</td><td>D2SL= R_S</td></tr>
<tr><td>Switch loop1 RUN/STOP
 
</td><td>Switch loop2 RUN/STOP
 
</td></tr>
<tr><td rowspan="2">A_M</td><td>D1SL= A_M</td><td>D2SL= A_M</td></tr>
<tr><td>Switch loop1 AUTO/MMAN
 
</td><td>Switch loop2 AUTO/MMAN
 
</td></tr>
<tr><td rowspan="2">AT</td><td>D1SL= AT</td><td>D2SL= AT</td></tr>
<tr><td>Switch loop1 autotuning ON/OFF
 
</td><td>Switch loop2 autotuning ON/OFF
 
</td></tr>
<tr><td rowspan="2">RESV</td><td colspan="2">D1SL= RESV</td></tr>
<tr><td colspan="2">Switch loop1 SV to Local SV or Remote SV
 

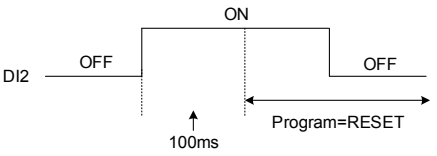
※ D2SL should be set as OFF or other modes</td></tr>
<tr><td rowspan="2">AOEN</td><td>D1SL= AOEN</td><td>D2SL= AOEN</td></tr>
<tr><td>Switch Retransmission ON/OFF
 

※ If D2SL is set to AOEN,
Please set D1SL to OFF or other modes</td><td>Switch Retransmission ON/OFF
 

※ If D1SL is set to AOEN,
Please set D2SL to OFF or other modes</td></tr>
<tr><td rowspan="2">TIM</td><td>D1SL= TIM</td><td>D2SL= TIM</td></tr>
<tr><td>Switch loop1 timer ON/OFF
 
</td><td>Switch loop2 timer ON/OFF
 
</td></tr>
</table>

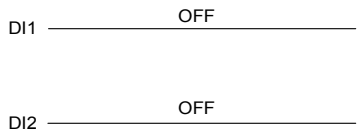
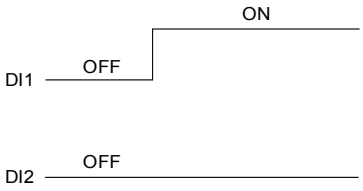
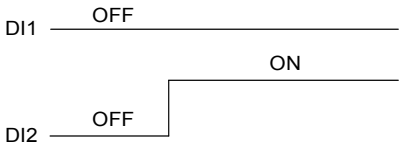
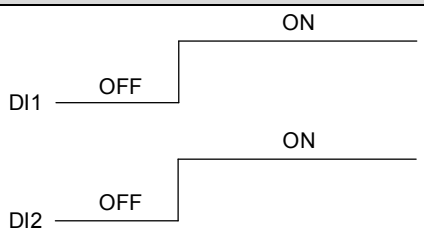
<table>
<tr><th>Mode</th><th colspan="2">Function Description</th></tr>
<tr><td rowspan="2">CNT</td><td>D1SL= CNT</td><td>D2SL= OFF</td></tr>
<tr><td colspan="2"> 

※ DISL= CNT(counter mode), D2SL is automatically set to OFF</td></tr>
<tr><td rowspan="3">PROG</td><td colspan="2">D1SL= PROG</td></tr>
<tr><td>Program execute</td><td>Program stop</td></tr>
<tr><td> 

※ In the PROG mode DI1 switch, please use a push button switch in DI1</td><td> 

※ In the PROG , please use a push button switch in DI1</td></tr>
</table>

SV Switch table

<table>
<tr><th>Mode</th><th>DI2</th><th>DI1</th><th>Action</th></tr>
<tr><td rowspan="8">SWSV</td><td rowspan="2">0</td><td rowspan="2">0</td><td>SV=SV1</td></tr>
<tr><td> 
</td></tr>
<tr><td rowspan="2">0</td><td rowspan="2">1</td><td>SV=SV2</td></tr>
<tr><td> 
</td></tr>
<tr><td rowspan="2">1</td><td rowspan="2">0</td><td>SV=SV3</td></tr>
<tr><td> 
</td></tr>
<tr><td rowspan="2">1</td><td rowspan="2">1</td><td>SV=SV4</td></tr>
<tr><td> 
</td></tr>
</table>

Example description

1. Use two sets of DI to switch 4 sets of SV

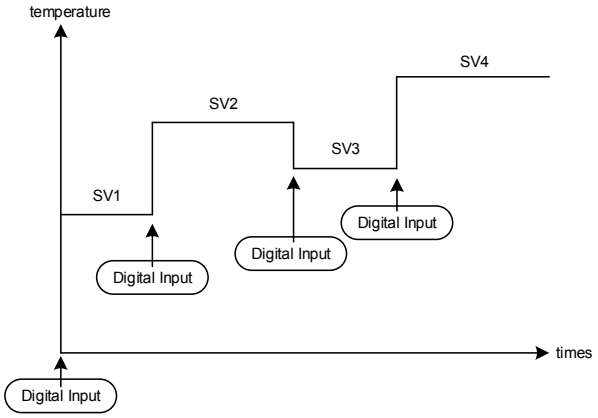
Assuming Local SV=0, set SV1=100, SV2=200, SV3=150, SV4=250

After the power is turned on, DI1=OFF, DI2=OFF, Local SV=100(SV1),

When DI1=ON, DI2=OFF, local SV=200(SV2),

When DI1=OFF, DI2=ON, local SV=150(SV3),

When DI1=ON, DI2=ON, local SV=250(SV4),



Parameter Setting

LOOP	Level	Parameter	Set value	Description
1	4	SET2.1	1	Display parameter SV1、SV2
1	4	SET2.2	1	Display parameter SV3、SV4
1	4	SETD.3	1	Display parameter D1SL、D2SL
---	5	D1SL	SWSV	Switch LOOP1 SV1~SV4
---	5	D2SL	OFF	---

2. Switch DI1 of loop1 with DI1 = RUN/STOP

Set D1SL = R_S, the controller will be in RUN mode after turning on DI1(ON), the controller will be in STOP mode after turning off DI1(OFF)

Parameter Setting

LOOP	Level	Parameter	Set value	Description
---	5	D1SL	R_S	DI1=ON R_S= RUN
				DI1=OFF R_S= STOP

3. Switch DI2 of loop2 with DI2 = RUN/STOP

Set D2SL = R_S, the controller will be in RUN mode after turning on DI2(ON), the controller will be in STOP mode after turning off DI2(OFF)

Parameter Setting

LOOP	Level	Parameter	Set value	Description
---	5	D2SL	R_S	DI2=ON R_S= RUN
				DI2=OFF R_S= STOP

4. Start/stop loop 1 timer with DI1

Set D1SL = TIM, TIM = 05.00 (5 minutes), the controller will start timing when DI1 is connected, and alarm 1 moves when the timer value reaches 5 minutes.

After disconnection of DI1, alarm 1 is released and the timer value is cleared

Parameter Setting

LOOP	Level	Parameter	Set value	Description
1	4	SET2.3	1	Display parameter TIM
1	1	TIM	05.00	Timer for 5 minutes
1	3	ALD1	TIM	When timer is up, alarm activates
---	5	D1SL	TIM	DI1 activates/ stop timer

5. Use DI as a counter to count the external contact or pulse signal. When the count reaches 100, the alarm 1 activates.

Set D1SL=TIM, CNT=100, the controller will start the counting function when DI1 is connected, the external contact or pulse signal is connected to DI2, when the count value reaches 100 times

Alarm 1 activates, alarm 1 is released after DI1 is disconnected, count value is cleared

Parameter Setting

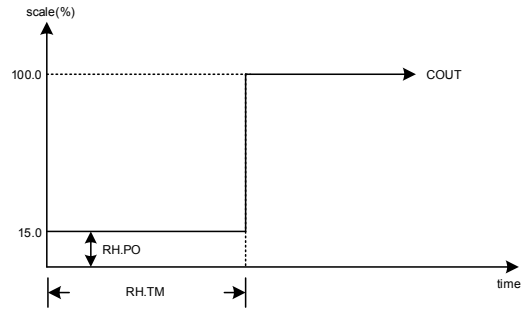
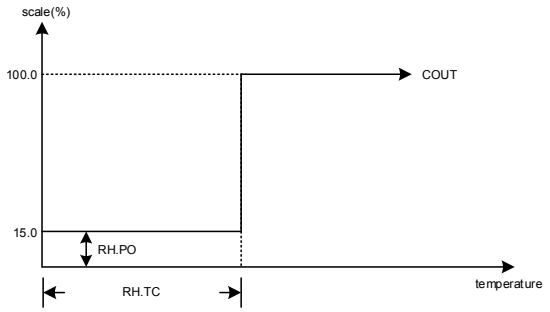
LOOP	Level	Parameter	Set value	Description
1	4	SET2.4	1	Display parameter CNT
1	1	CNT	100	Target counter value of 100
1	3	ALD1	CNT	Alarm activated, once counter value is reached
---	5	D1SL	CNT	DI1 Activate counter/ DI2 used for counter value
---	5	D2SL	OFF	As D1SL=CNT, D2SL is forced to be OFF

13.7 Dehumidification Function

Outlline

The NFY controller provides dehumidification work to protect the heater. When the power is turned on, the heater is dehumidified with low power. When the dehumidification is completed, the normal power is output to the heater.

Function Diagram

Time < RH.TM, output of RH.PO	PV < RH.TC, output of RH.PO
	

The related parameter of Dehumidification Function are as below:

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	RH.TC	rHtC	Dehumidification temperature If PV less than RH.TC manipulated value = RH.PO	100.0	0.0	35.0	Level 4
√	RH.PO	rHPo	Dehumidification manipulated value 0 : OFF disable dehumidification function Other values : 0.1~100.0 manipulated value	100.0	OFF	OFF	Level 4
√	RH.TM	rHtM	dehumidification time (time format : minute.second) 00.00~99.58 : execute dehumidification time	COTI	00.00	05.00	Level 4

Example description

After the controller is turned on, when the PV does not reach 50°C, output will be 10% of the operation time. When the time exceeds 15 minutes or the PV is greater than 50°C, the controller will produce output of normal PID gain.

Parameter Setting

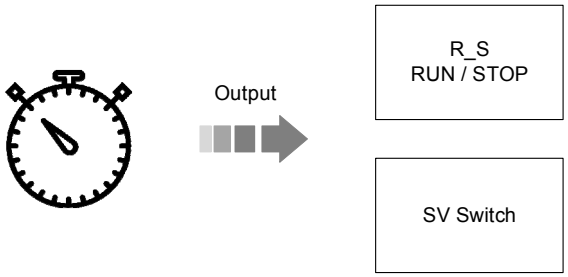
LOOP	Level	Parameter	Set value	Description
1	4	SETC.3	1	Display parameter RH.TC、RH.PO、RH.TM
1	1	SV	100.0	Target temperature
1	4	RH.TC	50.0	Execute de-humidifying function when PV is lower than this temperature
1	4	RH.PO	20.0	20% operation output when executing de-humidifying function
1	4	RH.TM	15.00	Dehumidifying function executed for 15 minutes

13.8 24-Hour Timer

Outline

The NFY controller provides a 24-hour timer to start/stop when a timer value arrives, or to switch SV

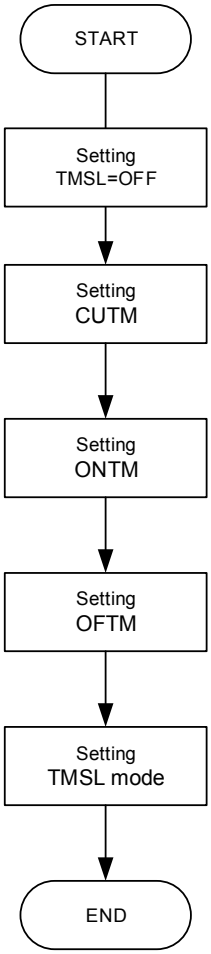
Function Diagram



The related parameter of 24-Hour Timer are as below:

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	CUTM	CUtM	24 hour timer Current setting time	23.59	00.00	0	Level 1
√	ONTM	ontM	24 hour timer , action ON time PV address use for display current time SV address use for setting action ON time	23.59	00.00	0	Level 1
√	OFTM	oFtM	24 hour timer , action OFF time PV address use for display current time SV address use for setting action OFF time	23.59	00.00	0	Level 1
√	TMSL	tMSL	24 hour timer , mode selection 0 : OFF (24 hour timer function disable) 1 : SWSV (switch SV) 2 : R_S (switch RUN/STOP) 3 : R_SO (switch to run)	R_SO	OFF	OFF	Level 4

Flow Setting



Example description

1. The controller switches to the RUN state at 8:30 am and starts the alarm at the same time. The controller switches to STOP at 17:30 PM

Parameter Setting

LOOP	Level	Parameter	Set value	Description
1	4	SET3.1	1	Display parameter CUTM ONTM OFTM
1	4	SETC.1	1	Display parameter TMSL
1	1	CUTM	---	Setting this parameter according to standard time, after controller is switched on
1	1	ONTM	08.30	Switch to RUN status at 8:30am
1	1	OFTM	17.30	Switch to STOP status at 17:30pm
1	3	ALD1	CUTM	Switch to RUN status and activate alarm at the same time
1	4	TMSL	R_S	Switch to RUN/STOP

2. Switch the controller to RUN at 8:30 AM and activate the alarm

Parameter Setting

LOOP	Level	Parameter	Set value	Description
1	4	SET3.1	1	Display parameter CUTM ONTM OFTM
1	4	SETC.1	1	Display parameter TMSL
1	1	CUTM	---	Setting this parameter according to standard time, after controller is switched on
1	1	ONTM	08.30	Switch to RUN status at 8:30am
1	3	ALD1	CUTM	Switch to RUN status and activate alarm 1 at the same time
1	4	TMSL	R_S	Switch to RUN/STOP

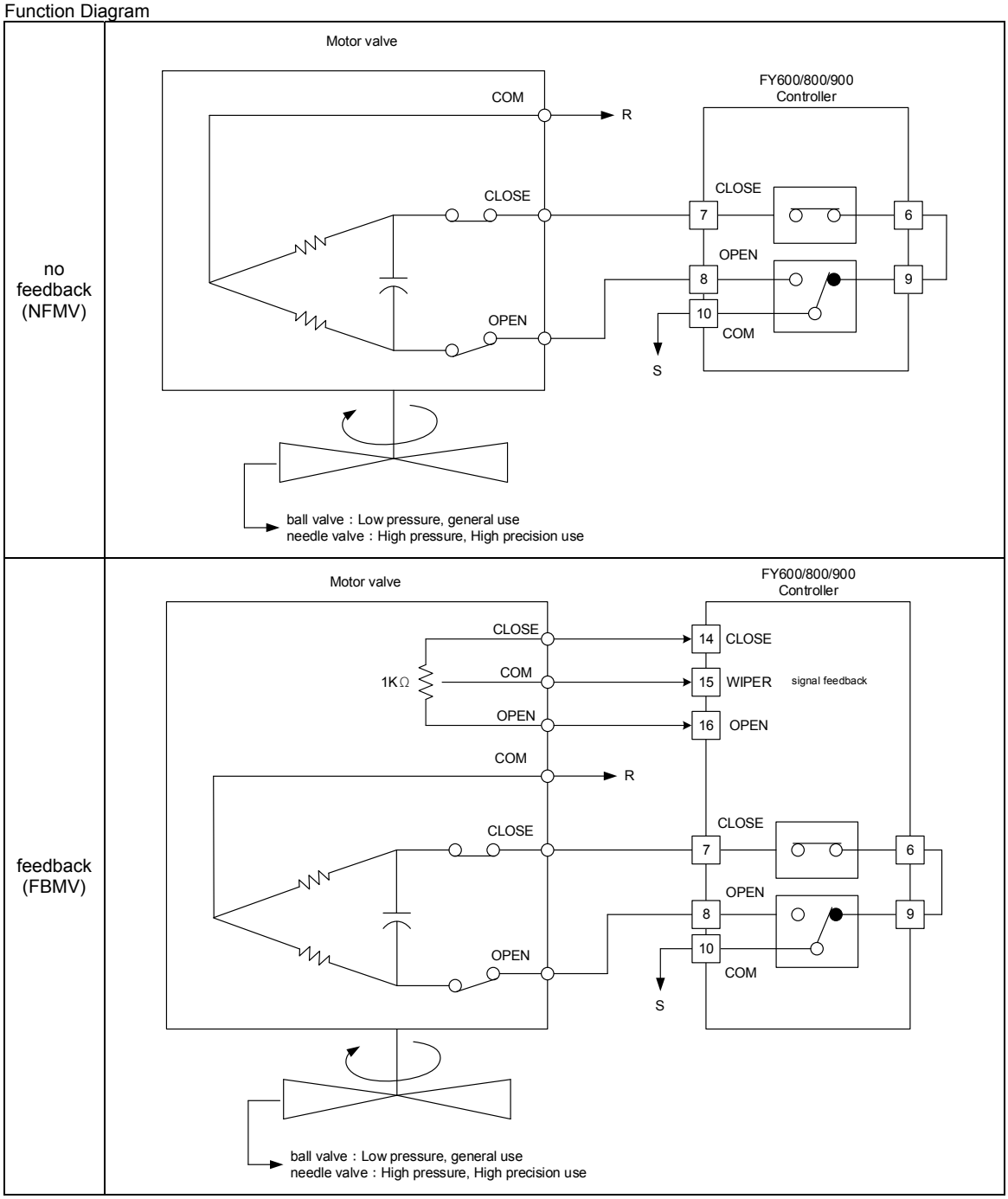
3. After the controller is turned on, SV=SV2 switches to SV=SV1 at 10:30am, and SV=SV2 switches at 1:30pm.

Parameter Setting

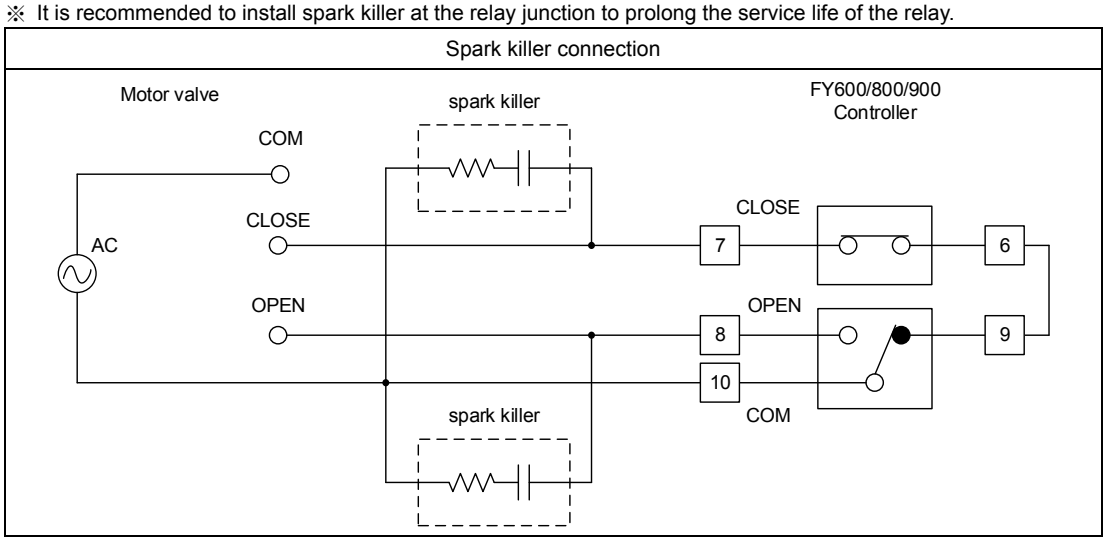
LOOP	Level	Parameter	Set value	Description
1	4	SET3.1	1	Display parameter CUTM ONTM OFTM
1	4	SETC.1	1	Display parameter TMSL
1	4	SET2.1	1	Display parameter SV1 SV2
1	1	CUTM	---	Setting this parameter according to standard time, after controller is switched on
1	1	ONTM	10.30	Switch SV=SV1 at 10:30am
1	1	OFTM	13.30	Switch SV=SV2 at 01:30pm
1	4	TMSL	SWSV	Switch SV

13.9 Motor Valve Control

Function Diagram



※ It is recommended to install spark killer at the relay junction to prolong the service life of the relay.



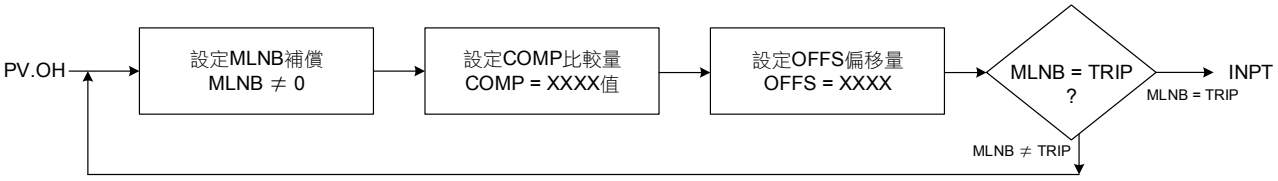
Parameter Setting

LOOP	Level	Parameter	Set value	Description
---	5	OPSL	LOP1	Valve control loop (can only be set to a single LOOP)
			LOP2	Valve control loop (can only be set to a single LOOP)
1	4	OU.TY	NFMV	Valve control, no feedback (for LOOP1, LOOP2)
			FBMV	Valve control, feedback (for LOOP1)
1	4	MVRT	45	Motor valve operating time (set the operating time according to the connected valve)
1	4	HYSM	1.5	Motor valve switching hysteresis adjustment (with feedback type 1.5 or more)

13.10 Artificial Linearization Compensating

Outline
When the analog input signal source is non-linearized, it is self-corrected using an artificial linear method to make the signal appear linear.
Manual linearization compensation There are four parameters to be set, and the parameters such as MLNB, COMP, OFFS, and SETF must be set.
MLNB is the number of set segments for artificial linearization compensation; when MLNB = TRIP(0), the artificial linear compensation parameters are skipped and there are a total of 1 to 10 set segments.
Deducting the first set segment and the last set segment must meet the upper and lower limits of the range, so the MLNB has 8 segments to provide linear compensation.
If MLNB≠TRIP, it will loop through the MLNB → COMP → OFFS parameter.

As shown below:

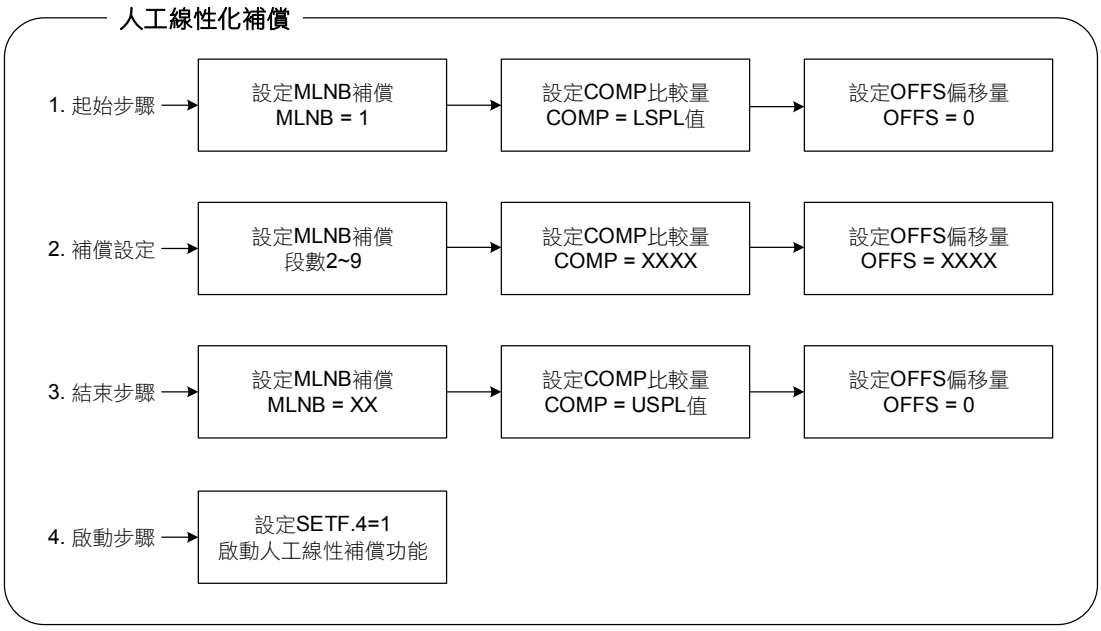


COMP is a numerical parameter that needs to be compensated. That is to say, when the value is displayed, it needs to do compensation action. The first setting must meet the LSPL value. with the last setting must meet the USPL value.
OFFS is the value to be compensated.

For example: The controller controls three temperature values that need to be corrected.
(1) When the temperature is 95°C, it needs to be corrected by +5°C.
(2) When the temperature is 185°C, it needs to be corrected when the temperature is +15°C
(3) 320°C. Correction +30°C
Step 1: Set MLNB = 1, COMP = LSPL, OFFS = 0
Step 2: First set MLNB = 2, COMP = 95, OFFS = 5
Step 3: Set MLNB = 3 first, COMP = 185, OFFS = 15
Step 4: Set MLNB = 4, COMP = 320, OFFS = 30
Step 5: Set MLNB = 5 first, COMP = USPL, OFFS = 0

SETF.4 = 1 Starts the artificial linear compensation function; this parameter setting must start when the upper MLNB, COMP, and OFFS are all set.
Doing so may cause the controller to jump to display an error message.

Setting before function execution

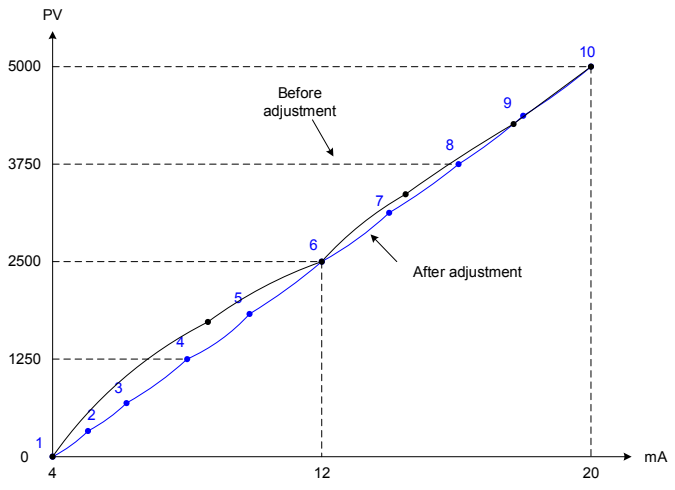


The related parameter of Artificial Linearization Compensating are as below:

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	MLNB	MLNB	Manual linear segment number	10	TRIP	TRIP	Level 3
√	COMP	CoMP	Manual linear compare value	USPL	LSPL	LSPL	Level 3
√	OFFS	oFFS	Manual linear offset value	150.0	-150.0	0.0	Level 3
√	SETF	SEtF	Artificial Linearization Compensating enable SETF.4 = 1XXX	1111	0000	XXXX	Level 5

Example description

1. Input signal 4~20mA, range 0~5000, the input signal source is unrestricted (as shown in the figure below), use 10 steps of artificial linearization compensation



step1：MLNB = 1, COMP = 0(LSPL), OFFS = 0 (Start-point compensation value being 0)
step 2：MLNB = 2, COMP = 100, OFFS = 400
step 3：MLNB = 3, COMP = 150, OFFS = 550
step 4：MLNB = 4, COMP = 500, OFFS = 750
step 5：MLNB = 5, COMP = 800, OFFS = 1075
step 6：MLNB = 6, COMP = 1300, OFFS = 1200
step 7：MLNB = 7, COMP = 1900, OFFS = 1225
step 8：MLNB = 8, COMP = 2650, OFFS = 1100
step 9：MLNB = 9, COMP = 3720, OFFS = 680
step 10：MLNB = 10, COMP = 5000(USPL), OFFS = 0 (End-point compensation value being 0)

13.11 RAMP & SOAK

Outline

The NFY general-purpose controller provides a single ramp and soak function. Five seconds after the power is turned on, the SV starts to increase according to the set value of RAMP. When both PV and SV reach SV target set value , the SOAK function will be executed according to the set value of SOAK, and the output will be turned off and return to STOP after the SOAK time is executed finish.

The related parameter of RAMP & SOAK are as below:

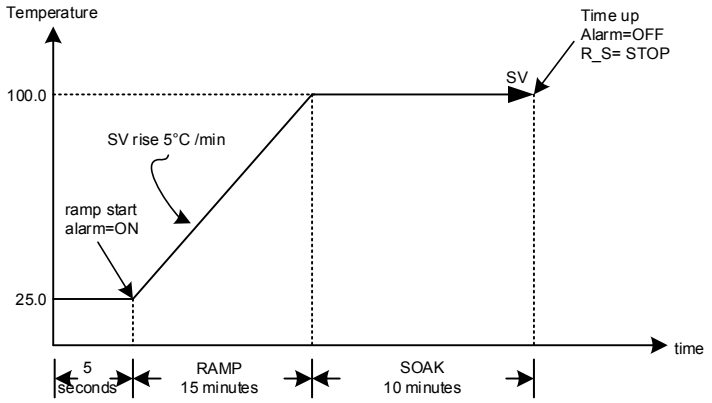
LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	RAMP	RAMP	The rate of change during SV ramp operation format : ℃ / minute	99.99	-19.99	0.00	Level 1
√	SOAK	SOAK	Soak time (format: minutes. second) 00.00~99.58 : Action time COTI (99.59) : Continuous Action	COTI	0.00	0.00	Level 1

Example (1) RAMP + SOAK mode

The system starts at room temperature and SV rises by 5°C per minute. When both PV and SV reach 100°C, the temperature is held for 10 minutes. After the temperature is maintained, the output and alarm are turned off.

Parameter setting

LOOP	Level	Parameter	Set value	Description
1	1	SV	100.0	Target temperature value
1	1	RAMP	5.00	5.00°C rise every minute
1	1	SOAK	10.00	10-minute temperature maintain
1	3	ALD1	SOAK	AL1 as soak alarm
1	4	SV.TY	RAMP	Activate RAMP, SOAK function
1	4	SET3.4	1	Display RAMP SOAK paremeter

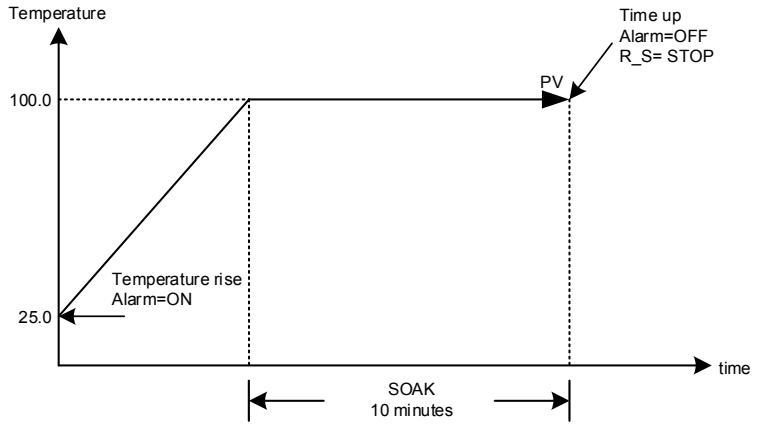


Example (2) SOAK mode

The system is started at room temperature and the PV is directly controlled at 100°C. When the PV reaches 100°C, the temperature is held for 10 minutes. After the temperature is maintained, the output and alarm are turned off.

Parameter setting

LOOP	Level	Parameter	Set value	Description
1	1	SV	100.0	target temperature value
1	1	SOAK	10.00	10-minute temperature maintain
1	3	ALD1	MSOK	AL1 as soak alarm
1	4	SV.TY	FIX	Activate SOAK function
1	4	SET3.4	1	Display RAMP SOAK paremeter

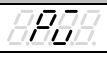


13.12 Password

Outline

The NFY general-purpose controller provides a password function limit enter Level 3~5 to prevent the first line operator from touching or modifying important parameters.

The related parameter of Password setting are as below:

LOOP	Parameter	Symbol	Content	Range		Default	Level
				MAX	MIN		
√	PW		Password input value	9999	0	0	Level 1
×	MPW	---	Verification code setting value This parameter can only be modified by communication address : 1022 0 : No password protection ,user can enter Level 3~5 according to the value of LOCK others : When password input value and verification code are the same, user can enter Level 3~5 according to the value of LOCK. otherwise, user cannot enter Level 3~5.	9999	0	0	---

example

Set verification code=1234 via communication, users cannot enter Level 3~5 when password input value is not 1234, when the user wants to enter Level 3~5, he must enter the password as 1234 before entering Level 3~5, there is a limit on the number of input passwords, after more than 3 times, it will be locked and cannot be entered. If you want to unlock, please contact the original factory or distributor.

Parameter setting

LOOP	Level	Parameter	Set value	Description
2	1	PW	1234	password input value
---	---	MPW	1234	verification code

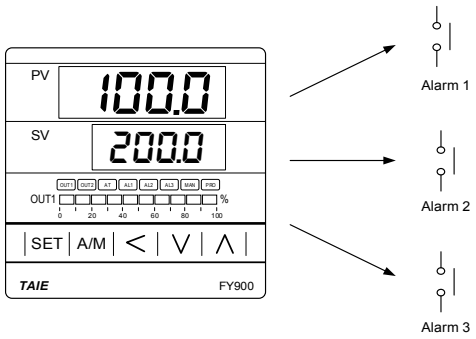
Notes

1. The value of the verification code can only be modified through communication
2. Password input value(PW) in LOOP2，To enter the password, please set parameter LOOP to LOP2 first
3. There is a limit on the number of password input ,please remember the value of verification code

14. Alarm Action

Outline
The NFY controller can support up to three sets of alarm functions. Each set of alarms has 20 mode, except NONE, MSOK, and SOAK.
There are 6 active options for each mode. There are a total of more than 100 operating modes to choose
Users can choose the most suitable alarm mode according to their needs for system protection or application.

Function Diagram



Parameter setting

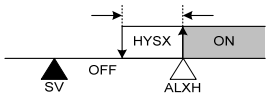
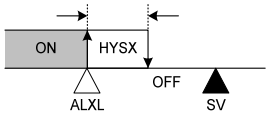
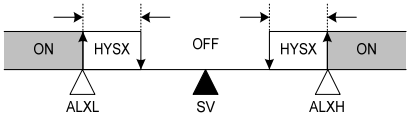
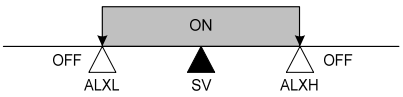
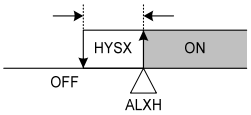
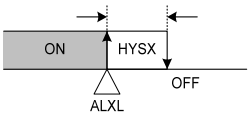
LOOP	LOOP	Parameter	Symbol	Range		Default	Level
				MAX	MIN		
√	R_S	rUN	RUN/STOP mode selection 0 : STOP (output & alarm disable) 1 : RUN (output & alarm enable)	RUN	STOP	RUN	Level 1
√	AL1H	AL1H	Alarm1 upper set value (ALD1 = DE.HI / DE.HL / BA.ND / PR.HI / DEHI / DEHL / BAND / PRHI appear)	USPL	LSPL	1.0	Level 1
√	AL1L	AL1L	Alarm1 lower set value (ALD1 = DE.LO / DE.HL / BA.ND / PR.LO / DELO / DEHL / BAND / PRLO appear)	USPL	LSPL	1.0	Level 1
√	AL2H	AL2H	Alarm2 upper set value (ALD2 = DE.HI / DE.HL / BA.ND / PR.HI / DEHI / DEHL / BAND / PRHI appear)	USPL	LSPL	1.0	Level 1
√	AL2L	AL2L	Alarm2 lower set value (ALD2 = DE.LO / DE.HL / BA.ND / PR.LO / DELO / DEHL / BAND / PRLO appear)	USPL	LSPL	1.0	Level 1
√	AL3H	AL3H	Alarm3 upper set value (ALD3 = DE.HI / DE.HL / BA.ND / PR.HI / DEHI / DEHL / BAND / PRHI appear)	USPL	LSPL	1.0	Level 1
√	AL3L	AL3L	Alarm3 lower set value (ALD3 = DE.LO / DE.HL / BA.ND / PR.LO / DELO / DEHL / BAND / PRLO appear)	USPL	LSPL	1.0	Level 1
√	ALD1	ALD1	Alarm 1 mode selection (Please refer to Chapter 14.1 Alarm Mode)	SOAK	NONE	DEHI	Level 3
√	ALT1	ALT1	FLIK (00.00) : Flicker COTI (99.59) : Continued ON 00.01~99.58 : delay time	COTI	FLIK	COTI	Level 3
√	HYA1	HYA1	Hysteresis setting for alarm 1	100.0	-100.0	1.0	Level 3
√	SEA1	SEA1	Alarm 1 special function setting (Please refer to Chapter 14.2 Alarm Special Setting)	1111	0000	0000	Level 3
√	ALD2	ALD2	Alarm 2 mode selection (Please refer to Chapter 14.1 Alarm Mode)	SOAK	NONE	NONE	Level 3
√	ALT2	ALT2	FLIK (00.00) : Flicker COTI (99.59) : Continued ON 00.01~99.58 : delay time	COTI	FLIK	COTI	Level 3
√	HYA2	HYA2	Hysteresis setting for alarm 2	100.0	-100.0	1.0	Level 3

Parameter setting

LOOP	LOOP	Parameter	Symbol	Range		Default	Level
				MAX	MIN		
√	SEA2	SEA2	Alarm 2 special function setting (Please refer to Chapter 14.2 Alarm Special Setting)	1111	0000	0000	Level 3
√	ALD3	ALD3	Alarm 3 mode selection (Please refer to Chapter 14.1 Alarm Mode)	SOAK	NONE	NONE	Level 3
√	ALT3	ALT3	FLIK (00.00) : Flicker COTI (99.59) : Continued ON 00.01~99.58 : delay time	COTI	FLIK	COTI	Level 3
√	HYA3	HYA3	Hysteresis setting for alarm 3	100.0	-100.0	1.0	Level 3
√	SEA3	SEA3	Alarm 3 special function setting (Please refer to Chapter 14.2 Alarm Special Setting)	1111	0000	0000	Level 3

14.1 Alarm Mode

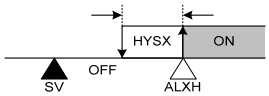
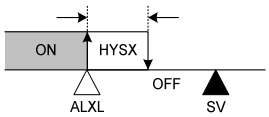
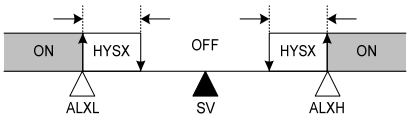
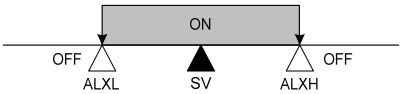
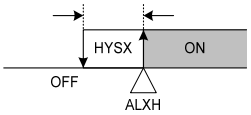
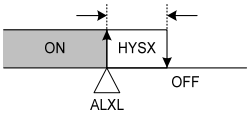
▲ : SV　　△ : Alarm set value　　**X** : 1 / 2 / 3 (There are up to 3 sets of alarms)

ALD**X**	Set value	Alarm mode	Description
None	0	No alarm function	Not drive any alarm relays and the corresponding LED lamp.
dEvH	1	Deviation high (With hold action)	 公式：PV ≧ (SV +ALXH) → Alarm ON PV ≦ (SV + ALXH– HYAX) → Alarm OFF
dEvL	2	Deviation low (With hold action)	 公式：PV ≦ (SV +ALXL) → Alarm ON PV ≧ (SV+ALXL+ HYAX) → Alarm OFF
dEvH	3	Deviation high/low (With hold action)	 公式：PV ≦ (SV + ALXL) → Alarm ON PV ≧ (SV + ALXL + HYAX) → Alarm OFF PV ≧ (SV + ALXH) → Alarm ON PV ≦ (SV + ALXH - HYAX) → Alarm OFF
bAnd	4	Band (With hold action)	 公式：PV ≦ (SV + ALXH) → Alarm ON PV ＞ (SV + ALXH) → Alarm OFF PV ≧ (SV + ALXL) → Alarm ON PV ＜ (SV + ALXL) → Alarm OFF
PrcH	5	Process high (With hold action)	 公式：PV ≧ ALXH → Alarm ON PV ≦ (ALXH – HYAX) → Alarm OFF
PrcL	6	Process low (With hold action)	 公式：PV ≦ ALXL → Alarm ON PV ≧ (ALXL + HYAX) → Alarm OFF
PEnd	7	Program end	When the program is end, the alarm action (applicable to programmable controllers only)
SyAb	8	System error	The Alert action, when PV displays error message
HbA	9	HBA (Heater Break Alarm)	Activated conditions : 1. Heater current(HBCU) is less the HBSV set value 2. OUT1 manipulated value exceed 90% 3. Fit with Condition1 and 2 and exceed set the seconds of HBTM

※ : The LED display shows if there is a dot for the first time without alarm, such as → dEvH. (Deviation high With hold action)
(When the controller power is ON, the PV value is within the alarm range, and no alarm action will be generated at this time. Until the alarm range is exceeded, the PV value again enters the alarm range and the alarm will be activated.)

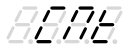
14.1 Alarm Mode

▲ : SV　　△ : Alarm set value　　**X** : 1 / 2 / 3 (There are up to 3 sets of alarms)

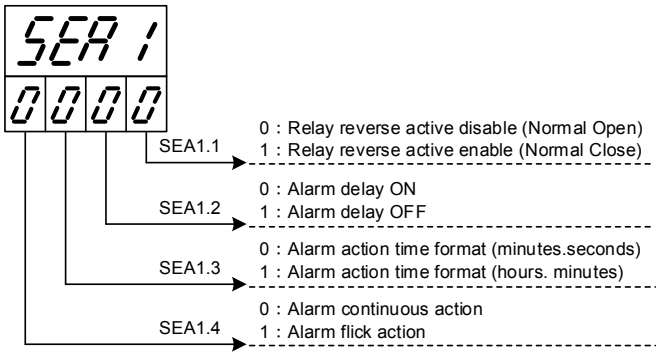
ALD**X**	Set value	Alarm mode	Description	
dSoX	10	soak timer	After the controller in RUN state, the alarm operates (ON). When PV=target SV SOAK start, alarm off in SOAK finish state. For details, please refer to chapter 13.11 RAMP + SOAK (This function has no alarm flash action mode)	
dEHi	11	Deviation high		
			公式	PV ≧ (SV +ALXH) → Alarm ON PV ≦ (SV + ALXH– HYAX) → Alarm OFF
dELo	12	Deviation low		
			公式	PV ≦ (SV +ALXL) → Alarm ON PV ≧ (SV+ALXL+ HYAX) → Alarm OFF
dEHL	13	Deviation high/low		
			公式	PV ≦ (SV + ALXL) → Alarm ON PV ≧ (SV + ALXL + HYAX) → Alarm OFF PV ≧ (SV + ALXH) → Alarm ON PV ≦ (SV + ALXH - HYAX) → Alarm OFF
bAnd	14	Band		
			公式	PV ≦ (SV + ALXH) → Alarm ON PV ＞ (SV + ALXH) → Alarm OFF PV ≧ (SV + ALXL) → Alarm ON PV ＜ (SV + ALXL) → Alarm OFF
PrHi	15	Process high		
			公式	PV ≧ ALXH → Alarm ON PV ≦ (ALXH – HYAX) → Alarm OFF
PrLo	16	Process low		
			公式	PV ≦ ALXL → Alarm ON PV ≧ (ALXL + HYAX) → Alarm OFF
PrUn	17	Program run	When the program is being executed, the alarm action (applicable to programmable controllers only)	
SyNo	18	System normal	The Alert action, when PV displays no-error message	
SoAt	19	Ramp Soak Timer	After the controller in RUN state, the alarm operates (ON). RAMP start, when PV=target SV SOAK start, alarm off in SOAK finish state. For details, please refer to chapter 13.11 RAMP + SOAK (This function has no alarm flash action mode)	

14.1 Alarm Mode

▲ : SV △ : Alarm set value **X** : 1 / 2 / 3 (There are up to 3 sets of alarms)

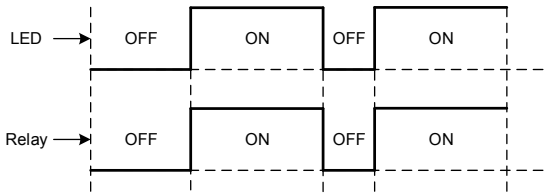
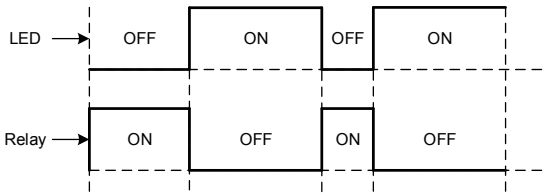
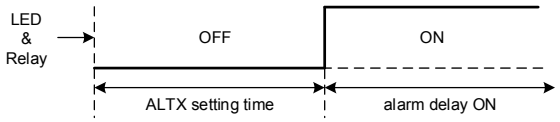
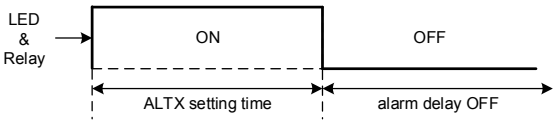
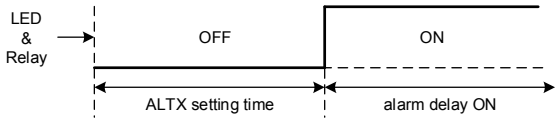
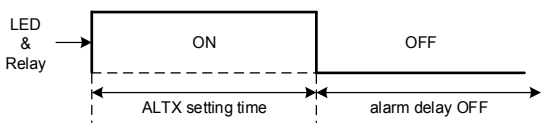
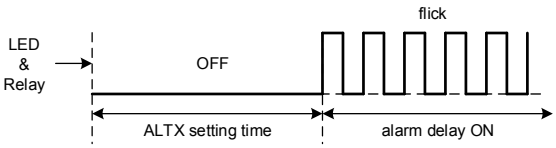
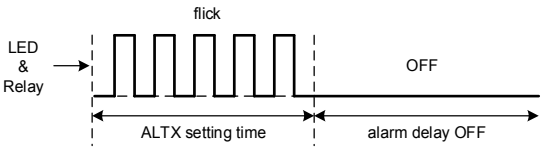
ALD**X**	Set value	Alarm mode	Description
	20	Timer	Alarm action after timer time-count is completed
	21	Counter	Alarm action after counter value is reached
	22	24H Timer	When CUTM=ONTM, alarm activates When CUTM=OFTM, alarm stops

14.2 Alarm Special Setting



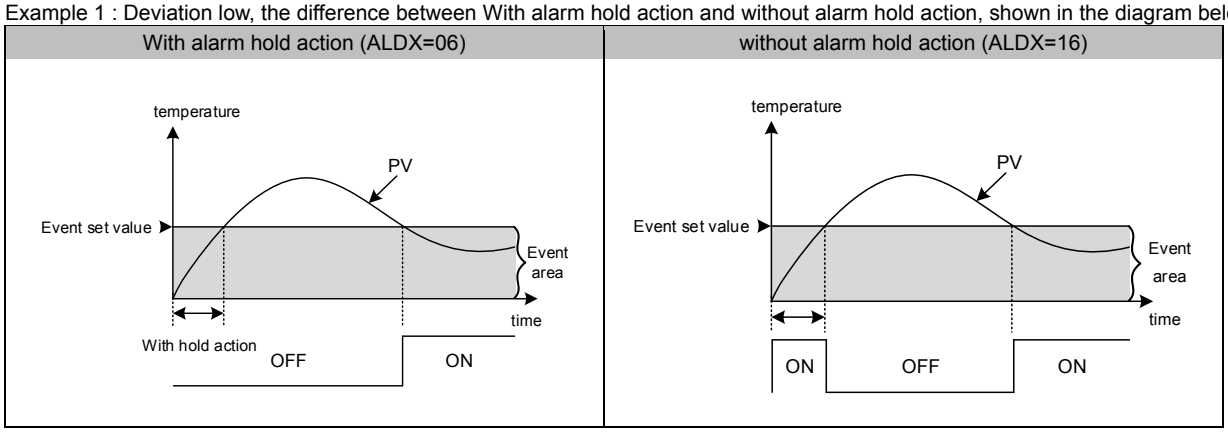
※ : Alarm Special Setting SEA1~SEA3

X : 1 / 2 / 3 (There are up to 3 sets of alarms)

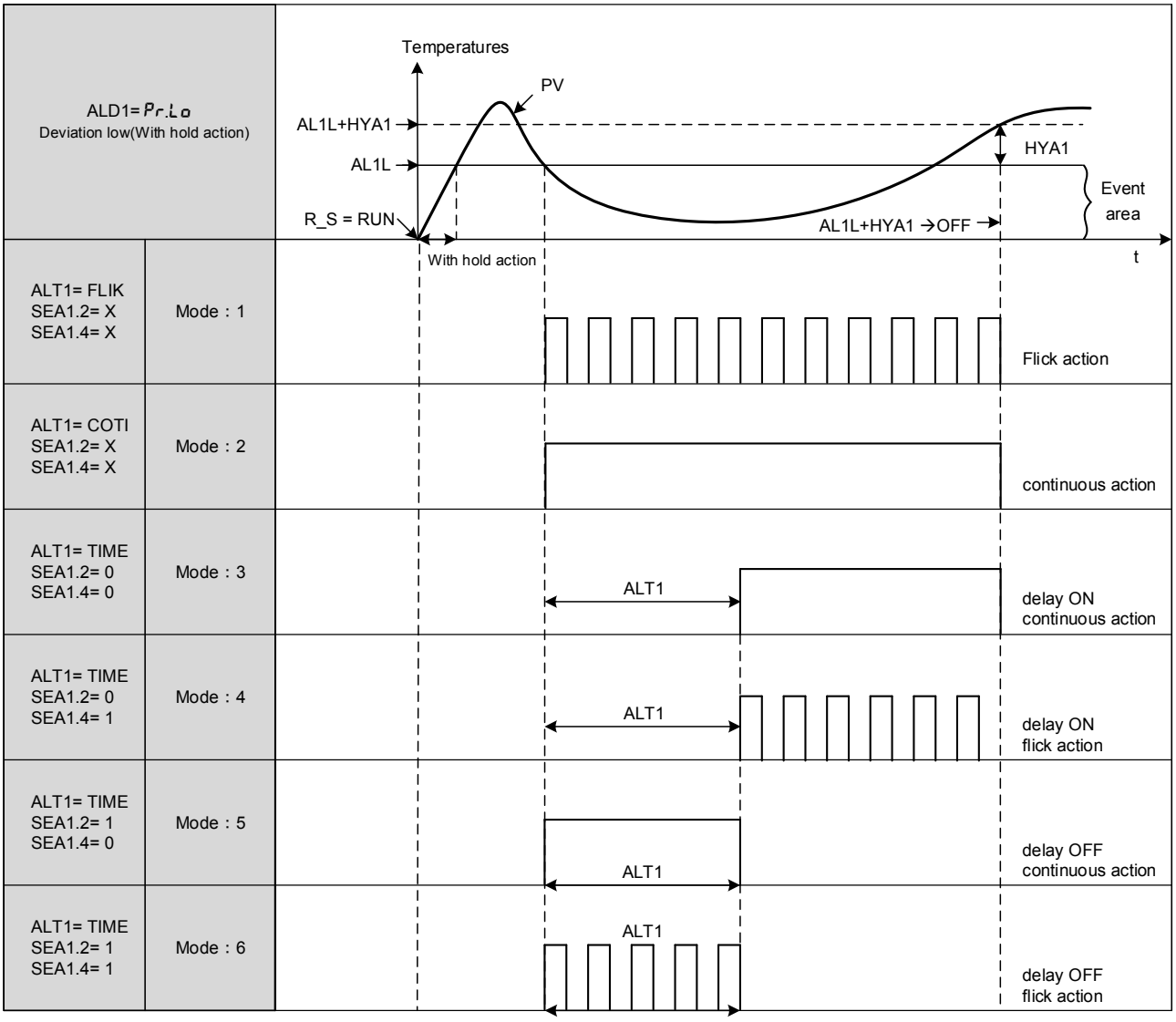
SEA**X**	Status = 0	Status = 1
SEA**X**.1	Relay action in A contact (Normal Open) The alarm LED is ON within the alarm range, and the alarm relay contact is ON The alarm LED is OFF when the alarm range is exceeded, and the alarm relay contact is OFF. 	Relay action in B contact (Normal Close) The alarm LED is ON within the alarm range, and the alarm relay contact is OFF The alarm LED is OFF when the alarm range is exceeded, and the alarm relay contact is ON. 
SEA**X**.2	Alarm delay ON Conditions: When ALTX = 00.01~99.58 After entering the alarm range, the timer starts. At this time, the alarm signal and the relay do not operate, and wait until the timer value reaches the set value of ALTX. 	Alarm delay OFF Conditions: When ALTX = 00.01~99.58 After entering the alarm range, the timer starts. At this time, the alarm signal and the relay both operate. Wait until the timer value reaches the set value of ALTX and then close the action. 
SEA**X**.3	ALTX time format (minutes.seconds) Ex : ALT1=33.23 , its time format is 33 minutes and 23 seconds	ALTX time format (hours. minutes) Ex : ALT1=33.23 , its time format is 33 hours and 23 minutes
SEA**X**.4	Alarm delay ON delay OFF action When ALTX = 00.01~99.58, according to the SETA.2 setting value, the relay and alarm lamp will continue to operate when the alarm occurs. SEA**X**.2=0  SEA**X**.2=1 	Alarm delay ON delay OFF with flick fuction action When ALTX = 00.01~99.58, according to the set value of SETA.2, the relay and alarm lamp will flash when an alarm occurs. SEA**X**.2=0  SEA**X**.2=1 

14.3 Alarm Example

Example 1 : Deviation low, the difference between With alarm hold action and without alarm hold action, shown in the diagram below



Example 2: Relative relevance between Alarm1 and ALT1 and SEA1

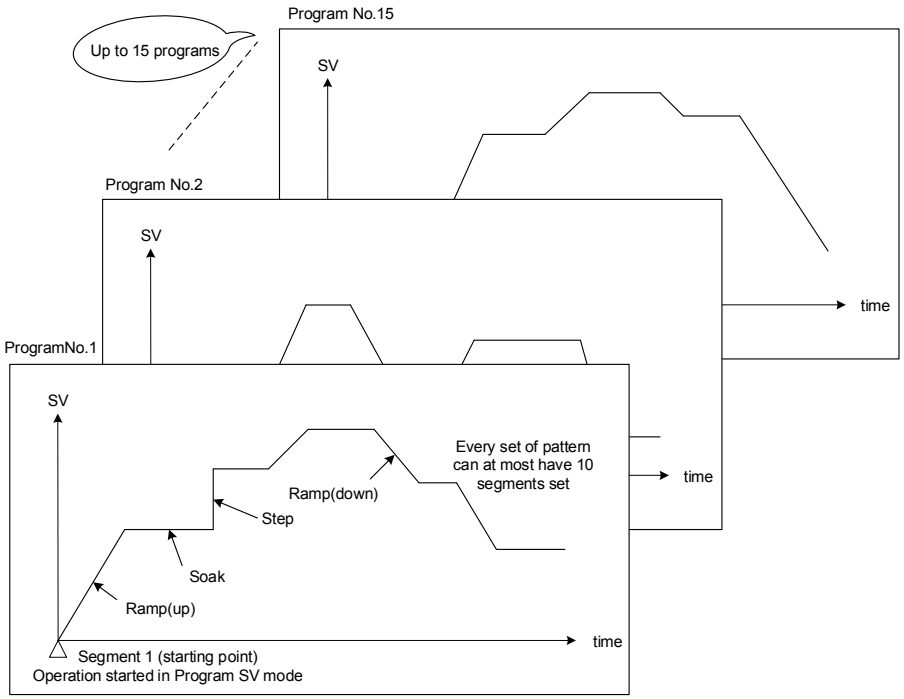


※ X : Don't care

15. Programmable

Outline
Programmable function is SV function that is variable to time, as user can set SV value to their needs according to time-based variation curve, which is called program setting

1. There are at most 15 sets of pattern setting
2. Every set of pattern can at most have 10 segments
3. Every segment include 4 settings such as ramp, soak, step and continue
4. Pattern can be randomly linked up, as each pattern of program contains 150 segment, at most.



15.1 Parameter Setting

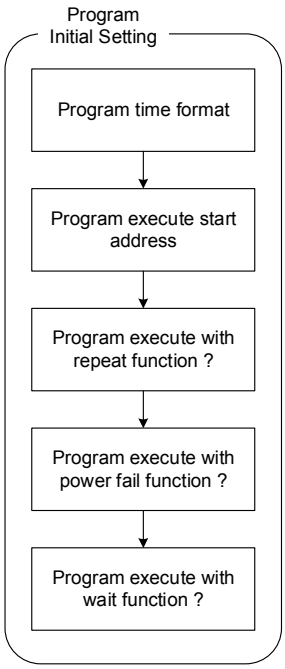
Parameter	LED display	Description	Default	Level
PTMD	PtMd	Program time format 0 : SEC (minute.second) 1 : MIN (hour.minute) 2 : 50MS (50ms)	SEC	Level 5
PVST	PuSt	Program execute start address 0 : ZERO (execute from zero) 1 : FULT (execute from current PV, but use segment 1 fully time) 2 : CUTT (execute from current PV, cut time)	CUTT	Level 5
REPT	rEPt	Program execute repeat 0 : OFF (disable repeat function) 1 : ON (Program execute repeat)	OFF	Level 5
POWF	PoUF	Program execute power fail protection 0 : OFF (disable power fail protection) 1 : ON (enable power fail protection)	OFF	Level 5
WAIT	WAIt	Program execution standby temperature 0 : when program execute do not wait for PV Other values : when PV= (target SV-WAIT), program entering next segment	0	Level 1
PTN	PtN	Program pattern selection 1~15	1	Level 1
SEG	SEG	Program segment selection 1~10	1	Level 1
L1.SV	L1SV	LOOP1 current segment target SV	100	Level 1
L2.SV	L2SV	LOOP2 current segment target SV	0	Level 1
TIMR	tiMr	Current segment execute time setting END(-1) : program end in this segment 00.00 : program step change in this segment 00.01~99.58 : program in this segment execute time COTI(99.59) : program continue execute this segment no end	00.10	Level 1
DOUT	doUt	DO1~DO4 ON/OFF setting	---	Level 1

15.2 Key Operation Description

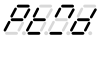
Program Functions	Usage Keys	Function Description
Program Execution		When activating program RUN, PRO_LED lamp ON
Program Pause		Pause executing program (HALT), as PRO_LED lights remains ON, and stop blinking At this moment, PV value position will display current temperature value and HOLD message alternately
Program Segment Jump		Jump to the next segment, and it can skip segment continuously
		Holding UP key and press SET key 1 time to skip 1 segment , press SET key 2 times to skip 2 segments, so on and so forth
Program Stop		Stop executing program, as PRO_LED lamp OFF

15.3 Program Initial Setting

Preliminary setting prior to program execution



1. Setting program time format setting

Parameter	LED display	Description	Default	Level
PTMD		Program time format 0 : SEC (minute.second) 1 : MIN (hour.minute) 2 : 50MS (50ms)	SEC	Level 5

This parameter determines the time-base of TIMER during program execution
When PTMD = SEC, TIMR = 33.23, it indicates that the execution time of this segment is 33 minutes and 23 seconds
When PTMD = MIN, TIMR = 33.23, it indicates that the execution time of this segment is 33 hours and 23 minutes

2. Setting program program execute start address

Parameter	LED display	Description	Default	Level
PVST		Program execute start address 0 : ZERO (execute from zero) 1 : FULT (execute from current PV, fully time) 2 : CUTT (execute from current PV, cut time)	CUTT	Level 5

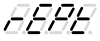
When program starts, SV default value will execute according to PVST set value

(1) PVST =ZERO，Pattern=1， Segment=1，PV=50.0，L1SV=100，TIMR=1.00(1 hour)
When program starts, SV will start to execute from 0.0, and SV shall reach LISV in one hour

(2) PVST =FULT，Pattern=1， Segment=1，PV=50.0，L1SV=100，TIMR=1.00(1 hour)
When program starts, SV will start to execute from 0.0, and SV shall reach LISV in one hour

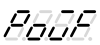
(3) PVST =CUTT，Pattern=1， Segment=1，PV=50.0，L1SV=100，TIMR=1.00(1 hour)
When program starts, SV will start to execute from PV temperature of 50.0, while controller will deduct the time taken to go from 0.0 to 50.0, as SV shall reach LISV in half hour

3. Setting program execute with repeat function

Parameter	LED display	Description	Default	Level
REPT		Program execute repeat 0 : OFF (disable repeat function) 1 : ON (Program execute repeat)	OFF	Level 5

When program completes the execution of the final segment, and “END” message is not shown, the program will be executed again.

4. Setting program execute with power failure protection function

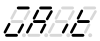
Parameter	LED display	Description	Default	Level
POWF		Program execute power fail protection 0 : OFF (disable power fail protection) 1 : ON (enable power fail protection)	OFF	Level 5

When encountering power failure during program execution, if there is power failure protection function set, controller will execute current segment program after re-start

Assume power failure occurring in the segment_4, ramp temperature from 100℃ to 200℃, and power failure occurring at SV=125, the program will execute from 100℃, after controller restarts.

(Re-start execution of segment_4)

5. Setting program execute with wait function

Parameter	LED display	Description	Default	Level
WAIT		Program execution standby temperature 0 : when program execute do not wait for PV Other values : when PV= (SV-WAIT), program entering next segment	0	Level 1

When program executes, if WAIT=0.0, and SV reaches set temperature, whether PV reaches target temperature or not, the controller will jump to the next segment

When program executes, if WAIT value is not 0.0, and SV reaches set temperature, as PV has not reached target temperature, controller will wait for PV temperature to reach SV-WAIT

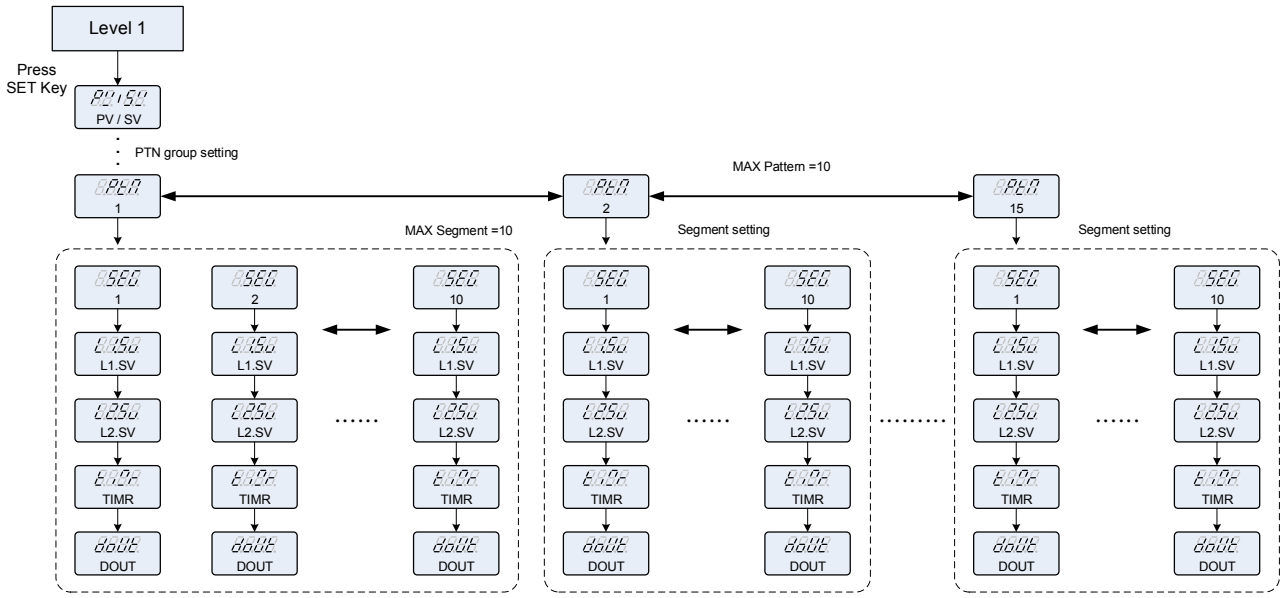
(1) WAIT = 0.0 without wait function set
Assume the set temperature of current segment is 100.0℃, and as SV reaches the set temperature of this segment, the controller will jump to the next phase

(2) WAIT = 5.0 with wait function set
Assume the set temperature of current segment is 100.0℃, and as SV reaches the set temperature of this segment, PV temperature needs to reach 100.0-5.0 (SV-WAIT)=95.0 then juming to the next segment

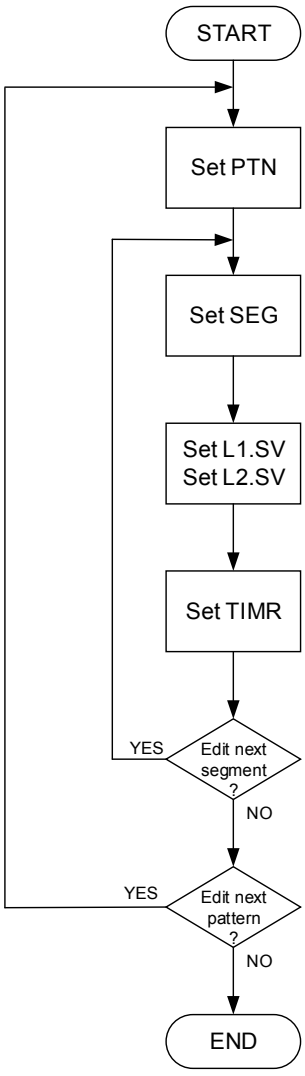
15.4 Create Program

There are 15 sets PTN to choose and each PTN have 10 segments for setting

Program structure diagram



Program edit flow-chat



1. Choose program pattern number

Parameter	LED display	Description	Default	Level
PTN		Program pattern selection 1~15	1	Level 1

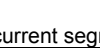
2. Choose program segment number

Parameter	LED display	Description	Default	Level
SEG		Program segment selection 1~10	1	Level 1

3. Setting LOOP1 current segment target SV

Parameter	LED display	Description	Default	Level
L1.SV		LOOP1 current segment target SV	100	Level 1

4. Setting LOOP2 current segment target SV

Parameter	LED display	Description	Default	Level
L2.SV		LOOP2 current segment target SV	0	Level 1

5. Setting current segment execute time

Parameter	LED display	Description	Default	Level
TIMR		Current segment execute time setting , this parameter can link segment and segment or pattern and pattern END：end program in this segment 00.00：step change program 00.01~99.58：execute time COTI：program execute continue	00.10	Level 1

TIMR setting explain：

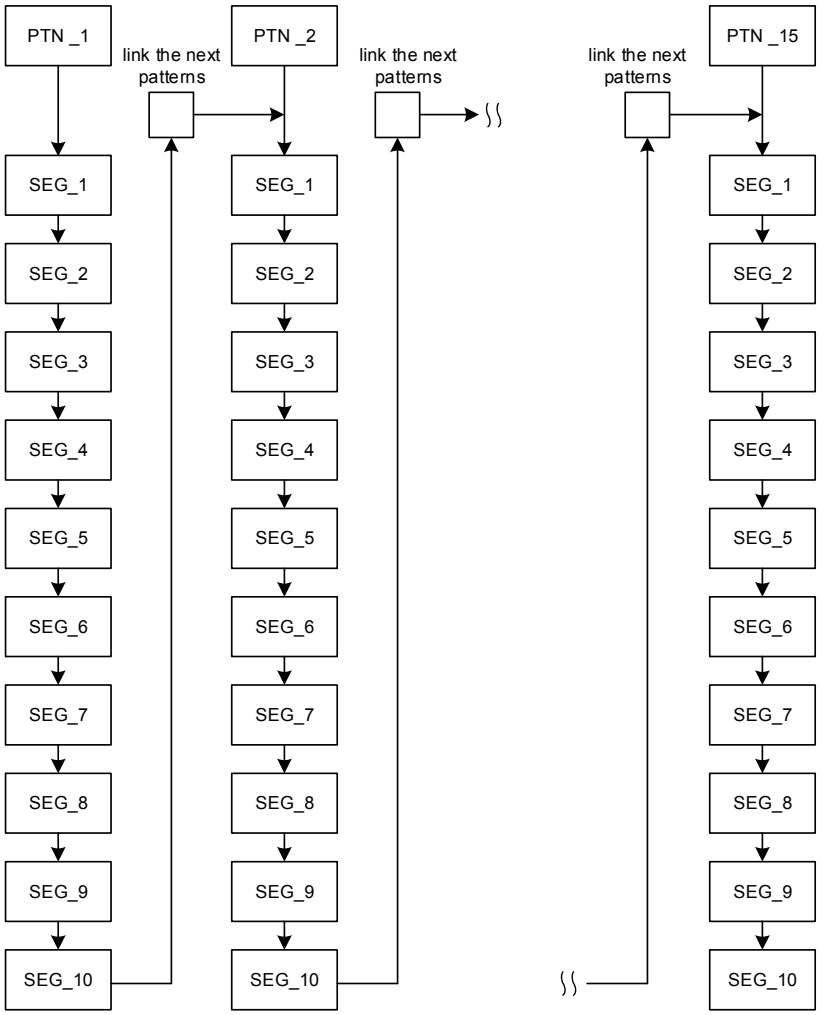
In segment_5(SEG_5) setting TIMR=END➔When the program finishes segment_4(SEG_4) , program end and display “END” message , can’t jump to next segment.

In segment_5(SEG_5) setting TIMR=00.00➔When the program finishes segment_4(SEG_4) , jump to next segment SV change suddenly

In segment_5(SEG_5) setting TIMR=10.00➔When the program finishes segment_4(SEG_4) , jump to next segment and executing TIMR setting value

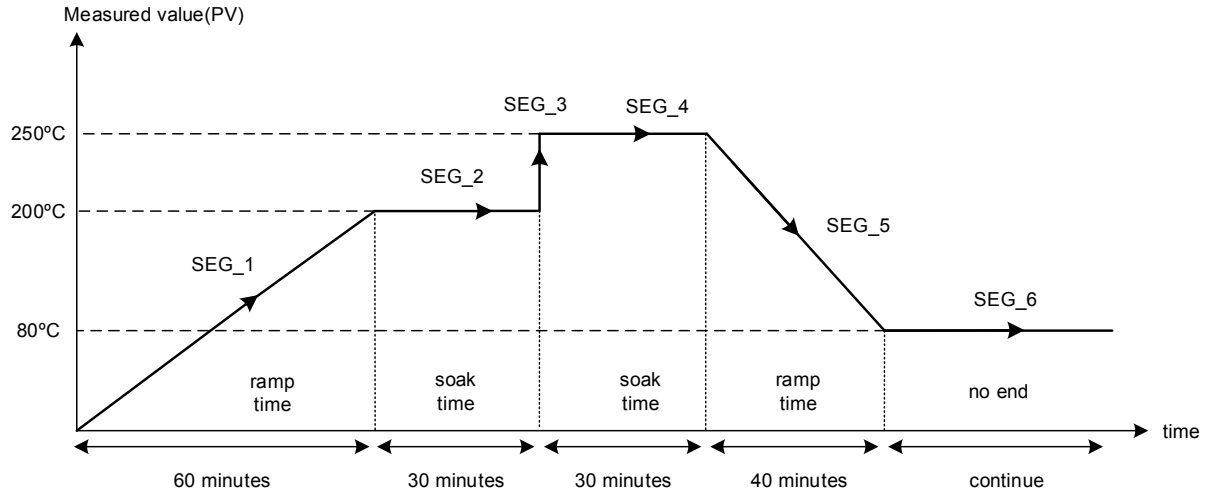
In segment_5(SEG_5) setting TIMR=COTI➔When the program finishes segment_4(SEG_4) , jump to next segment and executing contine can’t jump to next segmen or end state

15.5 Program Execution Flow



15.6 Program Setting Example

In pattern_1 edit program ramp, soak, step and continue



Initial setting

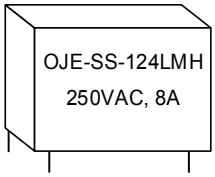
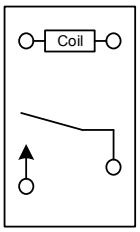
PTMD = SEC	PVST = ZERO	REPT = OFF	POWF = ON	WAIT = 0.5

Program edit

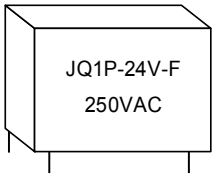
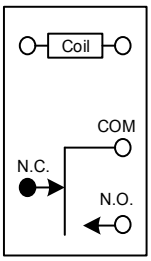
Segment_1	Segment_2	Segment_3	Segment_4	Segment_5	Segment_6
PTN = 1	PTN = 1	PTN = 1	PTN = 1	PTN = 1	PTN = 1
SEG = 1	SEG = 2	SEG = 3	SEG = 4	SEG = 5	SEG = 6
L1.SV = 200	L1.SV = 200	L1.SV = 250	L1.SV = 250	L1.SV = 80	L1.SV = 80
L2.SV = 0	L2.SV = 0	L2.SV = 0	L2.SV = 0	L2.SV = 0	L2.SV = 0
TIMR = 60.00	TIMR = 30.00	TIMR = 00.00	TIMR = 30.00	TIMR = 40.00	TIMR = COTI

16. Modification of Output Module

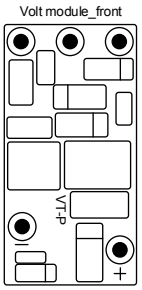
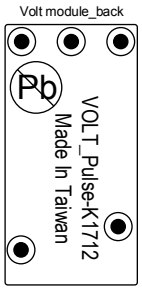
16.1 Relay Control (1a)

OJE	SPST	Software Setting
		Parameter set as “CYT1 =10”

16.2 Relay Control (1c)

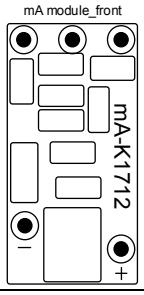
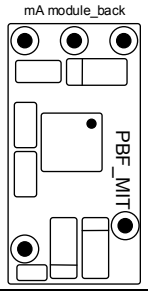
JQ1P	SPDT	Software Setting
		Parameter set as “CYT1 =10”

16.3 SSR Control

Top view	Bottom view	Software Setting
		Parameter set as “CYT1 =1”

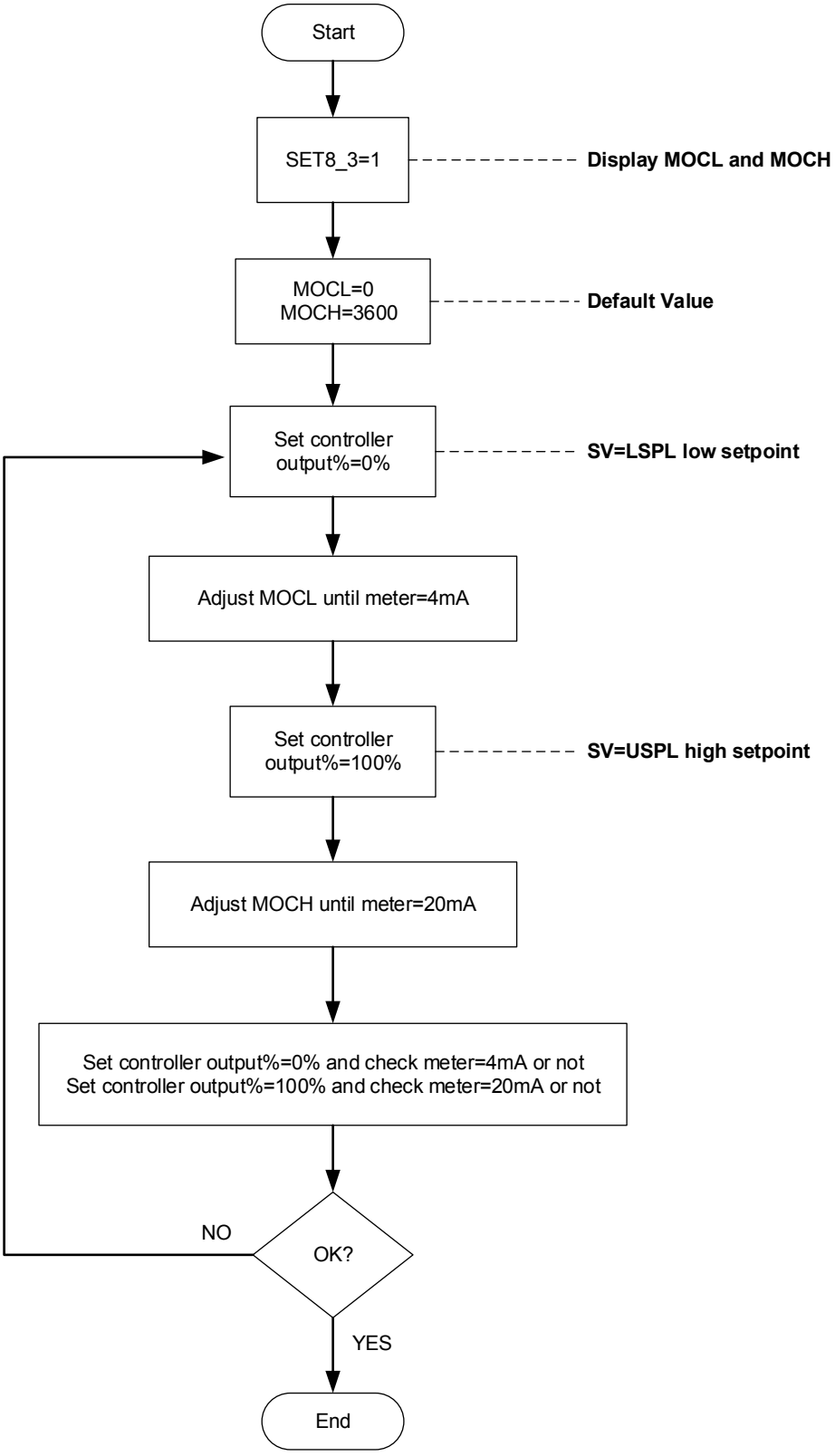
16.4 Linear Control

※ : When modifying mA current module, output signal needs to be calibrated, and for detailed calibration procedure, please refer to Chap. 16.5 Output Calibration Procedure Diagram

Top view	Bottom view	Software Setting
		Parameter set as “CYT1 =0”

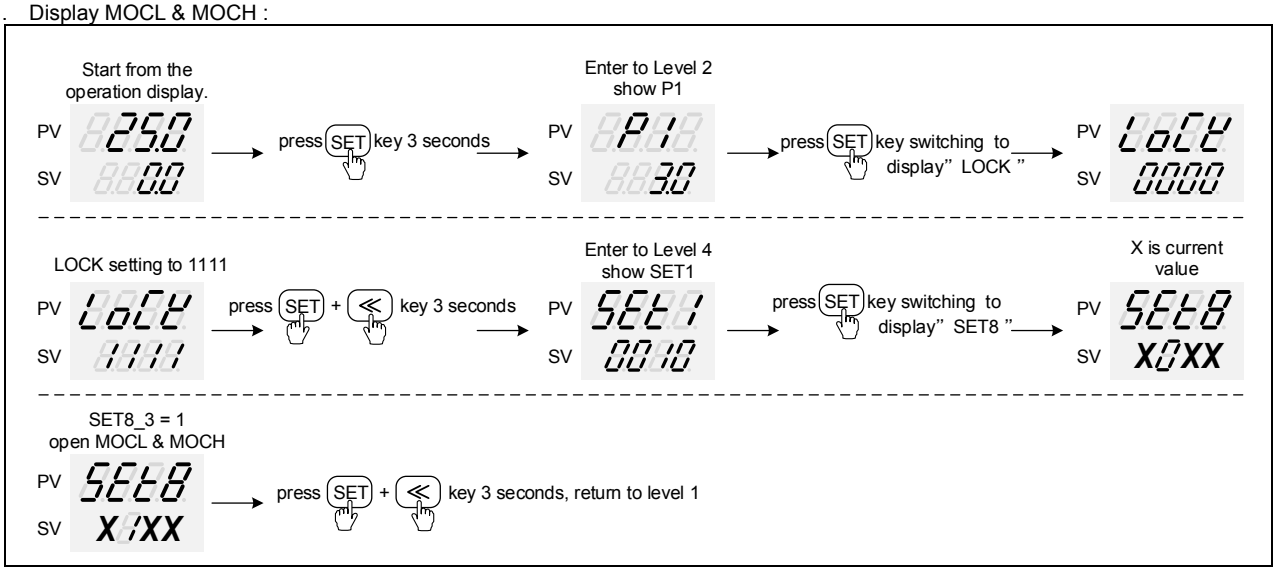
16.5 Output Calibration Proccedure Diagram

Output1 Signal (4mA~20mA) calibration flowchart



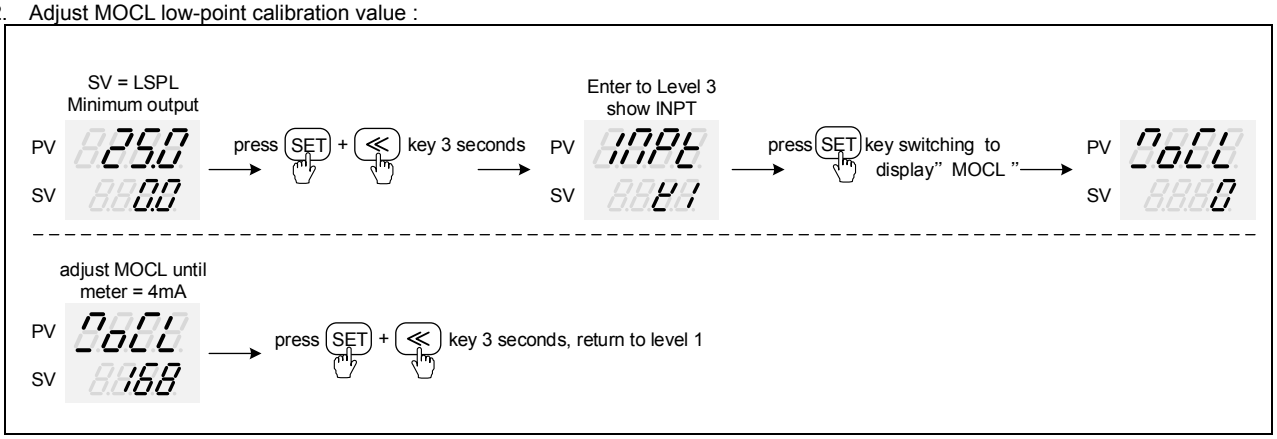
16.6 Output Calibration Steps

1. Display MOCL & MOCH :



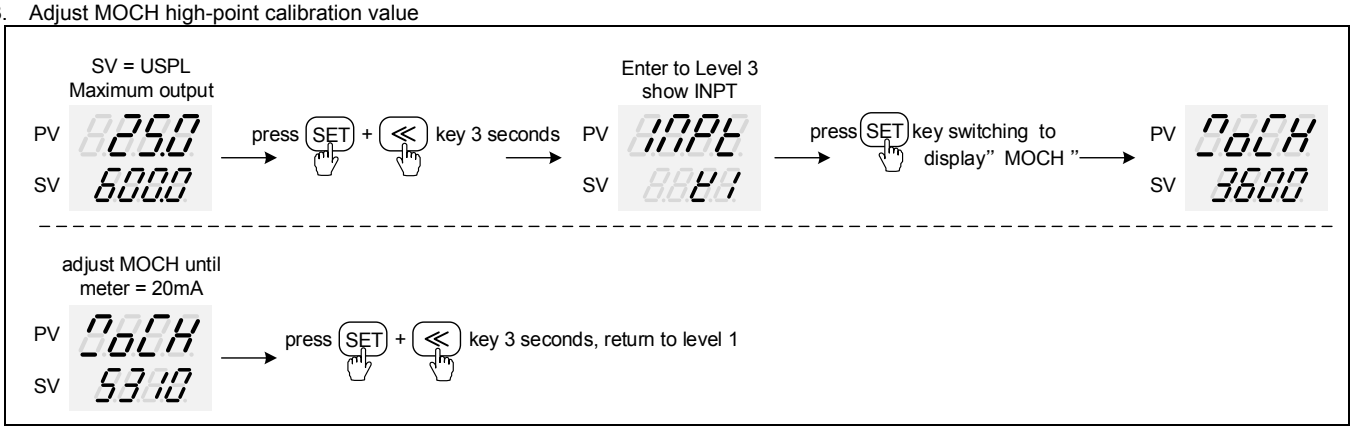
※ : X is default value which does not need to be modified

2. Adjust MOCL low-point calibration value :



※ : MOCL calibration value of each controller is different from the other

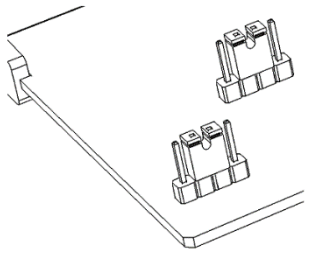
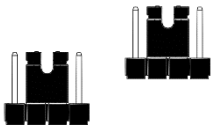
3. Adjust MOCH high-point calibration value



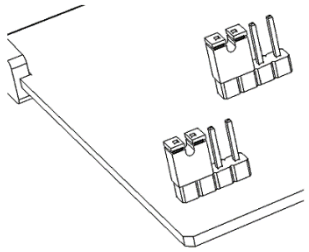
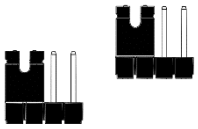
※ : MOCH calibration value of each controller is different from the other

17. Modification of Input Signal

17.1 Input Modification to Thermocouple Mode

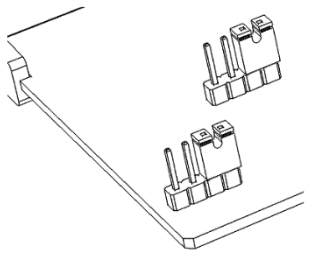
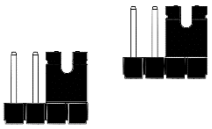
Jumper Position Plug 2 pcs of Jumper into the middle slot as shown		Software Setting
		Parameter set as “INPT=K1~L”

17.2 Input Modification to RTD Mode

Jumper Position Plug 2 pcs of Jumper into the left slot as shown		Software Setting
		Parameter set “INPT=PT1~PT3”

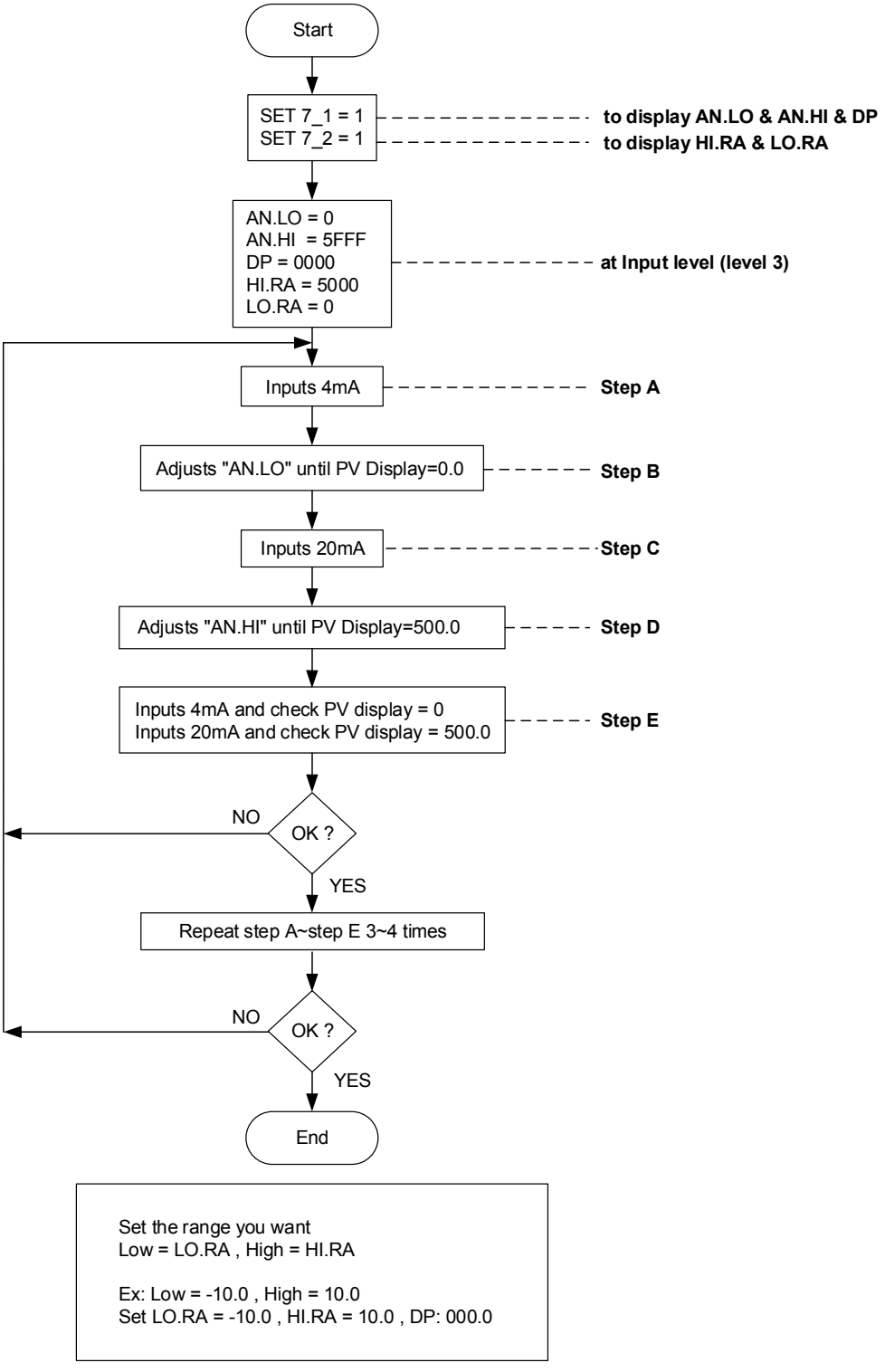
17.3 Linear (4~20mA) Input Modification to Linear Analog Signal

※ 1. When TC/RTD input is modified to linear analog signal (4~20mA), input signal needs to be calibrated, and please refer to Chapter 17.4 Input Calibration Procedure Diagram for calibration procedures.
2. If it is required to change to other linear analog signals, please send back to original manufacturer for modification and calibration

Jumper Position Plug 2 pcs of Jumper into the right slot as shown		Software Setting
		Parameter set as “INPT=AN4”

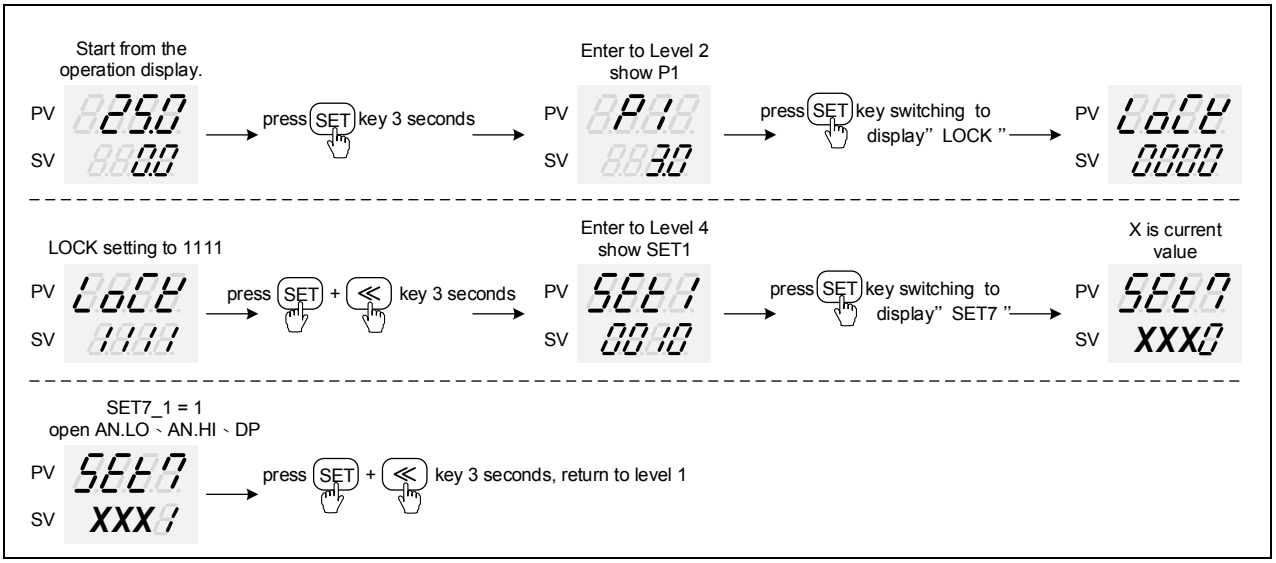
17.4 Input Calibration Procedure Diagram

Input Signal (4mA~20mA) calibration flowchart



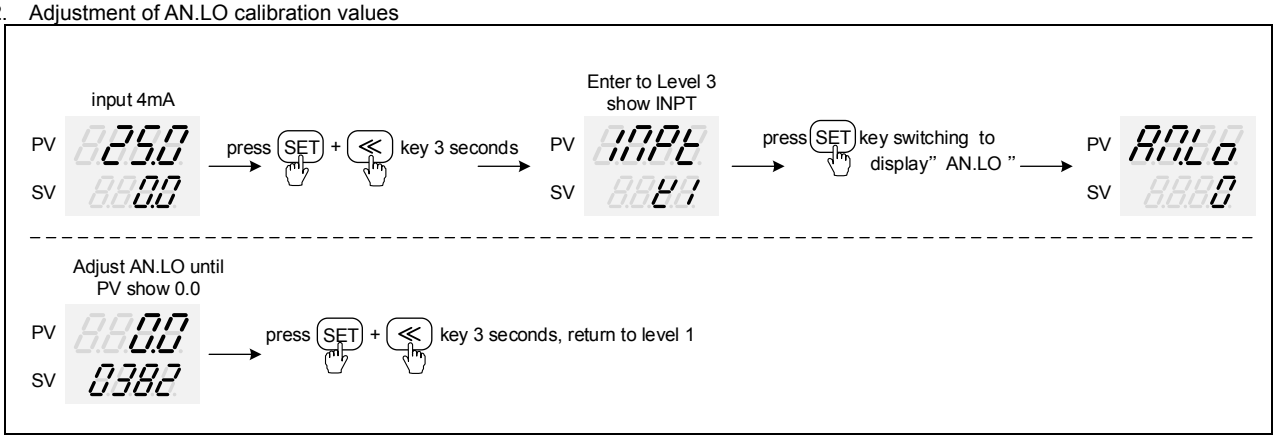
17.5 Steps For Input Calibration

1. Display AN.LO、AN.HI、DP：



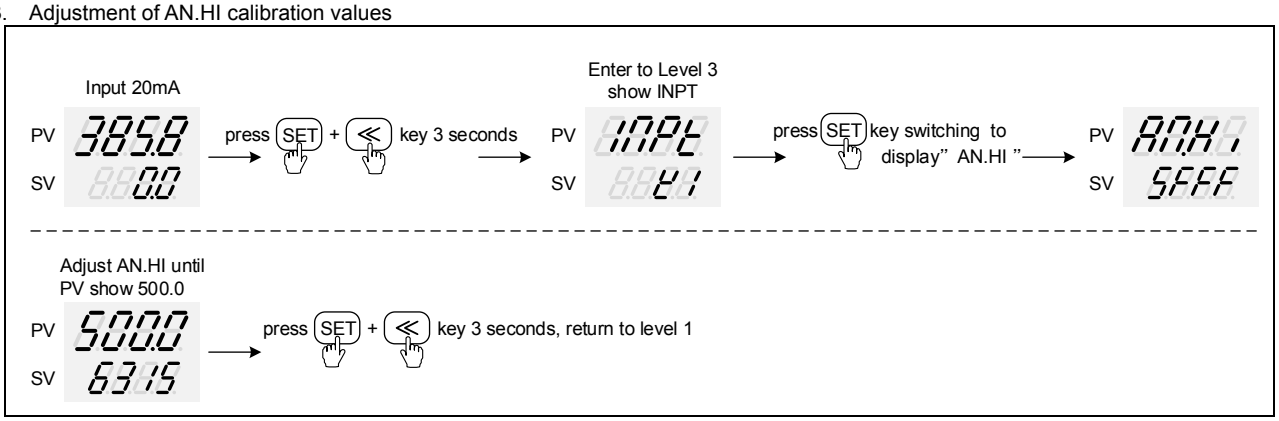
※ X is the default value which doest not require modification

2. Adjustment of AN.LO calibration values



※ AN.LO calibration value of each controller is different from the other

3. Adjustment of AN.HI calibration values

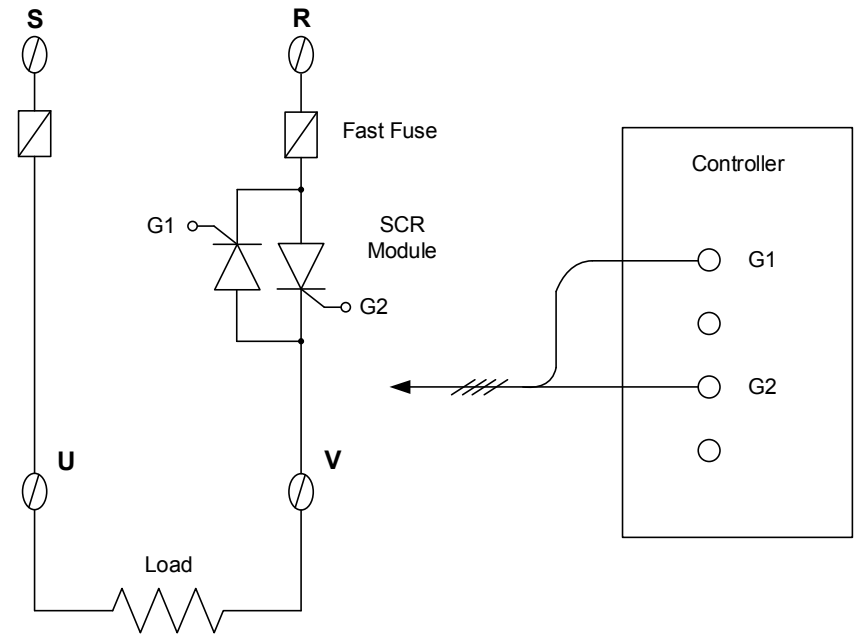


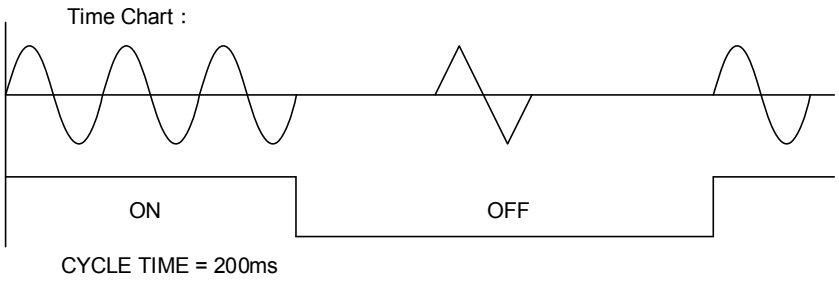
※ AN.HI calibration value of each controller is different from the other

18. Zero / Phase Control

18.1 1ϕ Zero Cross Control (SCR module)

OUT1 : 1Φ SCR zero cross control
Parameter setting : OU.TY= 1SCR, CYT1= 1
Wiring Setup:

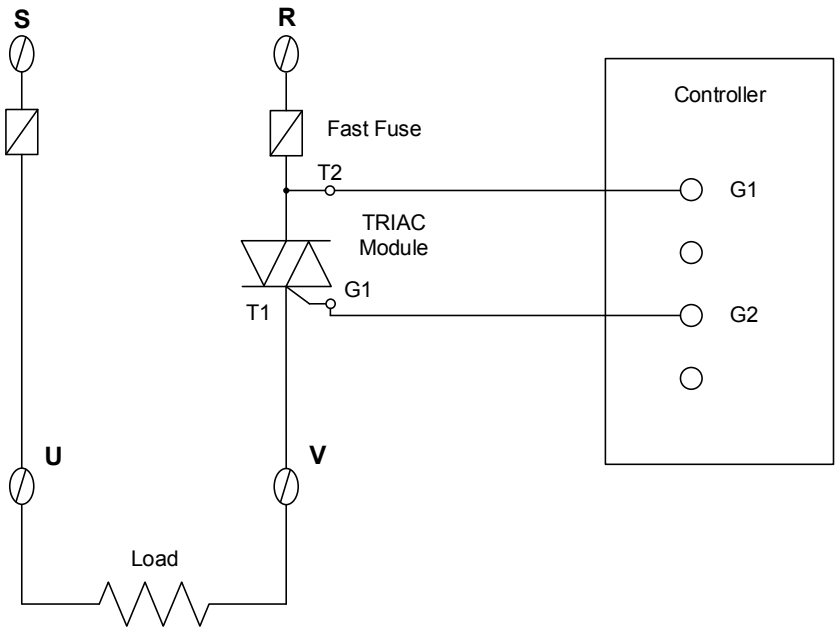




CYCLE TIME = 200ms

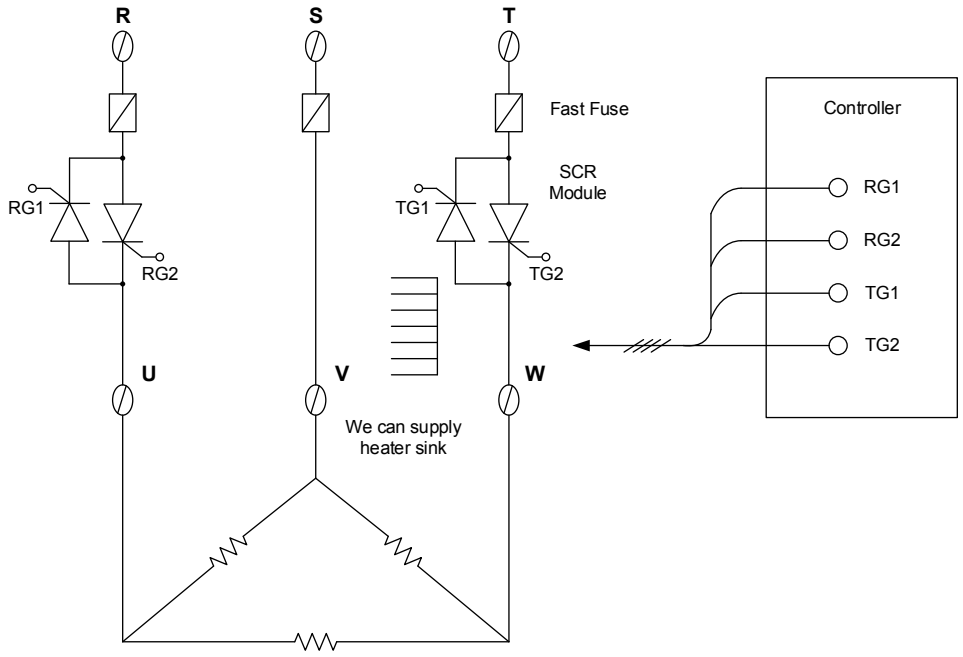
18.2 1ϕ Zero Cross Control (TRIAC module)

OUT1 : 1Φ SCR zero cross control
Parameter setting : OU.TY= 1SCR, CYT1= 1
Wiring Setup:

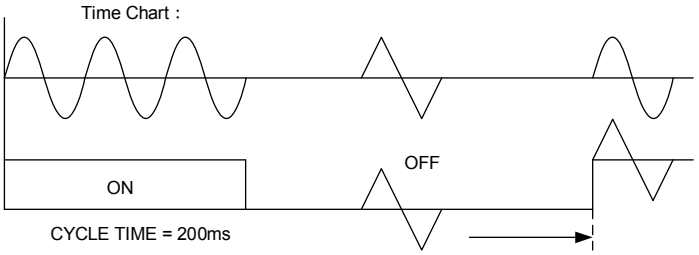


18.3 3ϕ Zero Cross Control (SCR module)

OUT1 : 3Φ SCR zero cross control
Parameter setting : OU.TY= 1SCR, CYT1= 1
Wiring Setup :

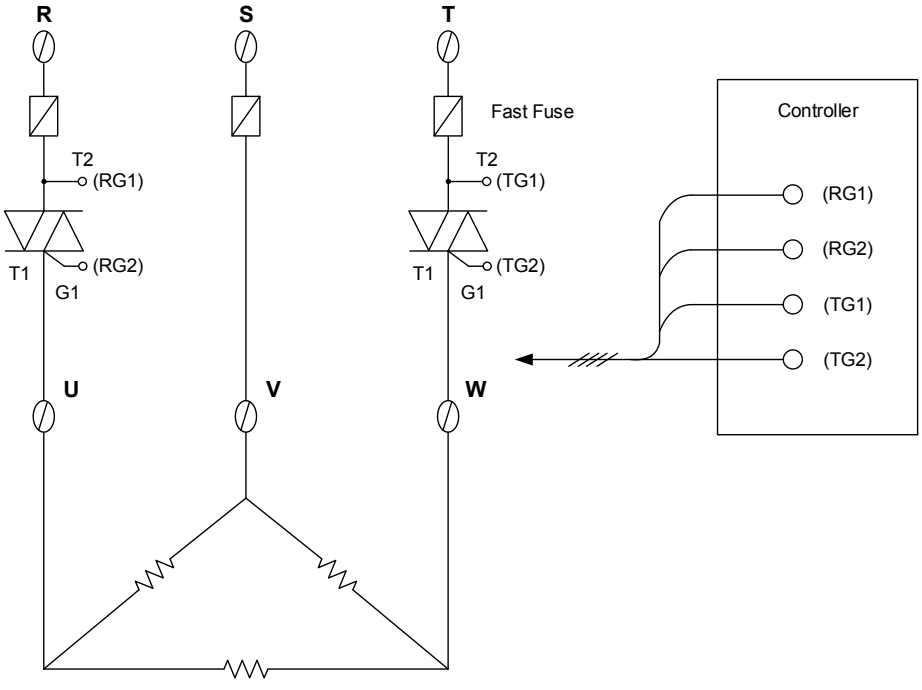


three phase three wire system



18.4 3ϕ Zero Cross Control (TRIAC module)

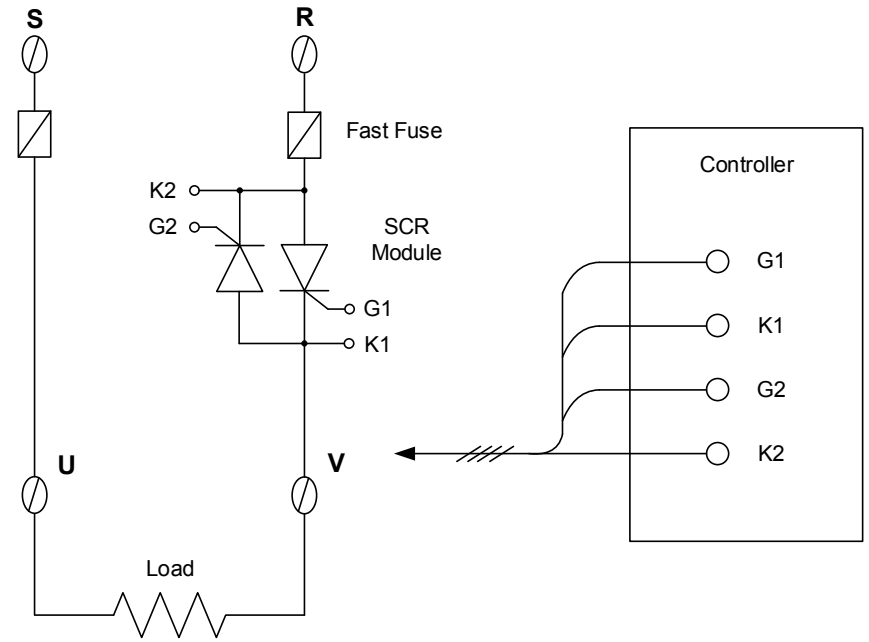
OUT1 : 3Φ SCR zero cross control
Parameter setting : OU.TY= 1SCR, CYT1= 1
Wiring Setup :



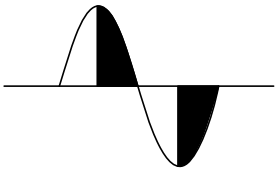
three phase three wire system

18.5 1ϕ Phase Angle Control (SCR module)

OUT1 : 1Φ SCR phase angle control
Parameter setting : OU.TY= 1SCR, CYT1= 0
Wiring Setup :

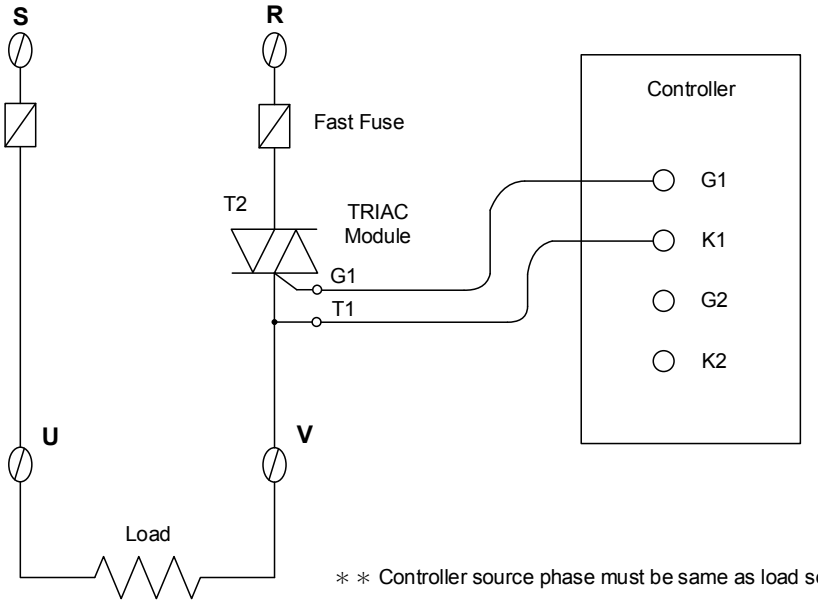


＊＊ Controller source phase must be same as load source phase

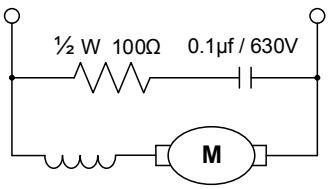


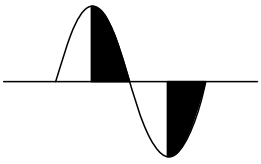
18.6 1ϕ Phase Angle Control (TRIAC module)

OUT1 : 1Φ SCR phase angle control
Parameter setting : OU.TY= 1SCR, CYT1= 0
Wiring Setup :



＊＊ Controller source phase must be same as load source phase





19. Error Message

If controller exhibits any of the following issues, please proceed with the following procedures

Symbol	Error	Solution
inEr	INIE: Input1 Error	Check whether input loop is opened or wiring is incorrect.
UUUU	UUUU: PV is above USPL	Check whether the input value is correct or not.
nnnn	NNNN: PV is below LSPL	Check whether the input value is correct or not.

If any of the indication in the table below appear, the controller need to be repaired do not try to repair the controller by yourself, order a new one or contact us to repair.

Symbol	Error	Solution
AdCF	ADCF: A/D convert failed	Please send for repair..
CJEr	CJER: Cold junction compensation failed	Please send for repair..
rAMF	RAMF: EEPROM failed	Please send for repair..

20. NFY Communication Register Address Table

LOOP1 Parameter address

Parameter	Register Address		R / W
	Hex	Dec	
PV	0x00	0	R
SV	0x01	1	R / W
LOOP	0x02	2	R / W
R_S	0x03	3	R / W
HBCU	0x04	4	R
HBSV	0x05	5	R / W
HBTM	0x06	6	R / W
AL1H	0x07	7	R / W
AL1L	0x08	8	R / W
AL2H	0x09	9	R / W
AL2L	0x0A	10	R / W
AL3H	0x0B	11	R / W
AL3L	0x0C	12	R / W
SV1	0x0D	13	R / W
SV2	0x0E	14	R / W
SV3	0x0F	15	R / W
SV4	0x10	16	R / W
TIM	0x11	17	R / W
CNT	0x12	18	R / W
CUTM	0x13	19	R / W
ONTM	0x14	20	R / W
OFTM	0x15	21	R / W
A_M	0x16	22	R / W
MOUT	0x17	23	R / W
AT	0x18	24	R / W
RATE	0x19	25	R / W
RAMP	0x1A	26	R / W
SOAK	0x1B	27	R / W
WAIT	0x1C	28	R / W
DTM1	0x1D	29	R / W
DTM2	0x1E	30	R / W
DTM3	0x1F	31	R / W
DTM4	0x20	32	R / W
DT.ST	0x21	33	R / W
PTN	0x22	34	R / W
SEG	0x23	35	R / W
L1SV	0x24	36	R / W
L2SV	0x25	37	R / W
TIMR	0x26	38	R / W
DOUT	0x27	39	R / W
P1	0x28	40	R / W
M_LP	0x29	41	R / W
I1	0x2A	42	R / W
M_LI	0x2B	43	R / W
D1	0x2C	44	R / W
M_LD	0x2D	45	R / W
HYS1	0x2E	46	R / W
CYT1	0x2F	47	R / W

Parameter	Register Address		R / W
	Hex	Dec	
MOLH	0x30	48	R / W
MOLL	0x31	49	R / W
P2	0x32	50	R / W
S_LP	0x33	51	R / W
I2	0x34	52	R / W
S_LI	0x35	53	R / W
D2	0x36	54	R / W
S_LD	0x37	55	R / W
HYS2	0x38	56	R / W
CYT2	0x39	57	R / W
SOLH	0x3A	58	R / W
SOLL	0x3B	59	R / W
MGAP	0x3C	60	R / W
SGAP	0x3D	61	R / W
COUT	0x3E	62	R
AT.VL	0x3F	63	R / W
SS.PO	0x40	64	R / W
OPSF	0x41	65	R / W
RC.TO	0x42	66	R / W
LOCK	0x43	67	R / W
INPT	0x44	68	R / W
AN.LO	0x45	69	R / W
AN.HI	0x46	70	R / W
DP	0x47	71	R / W
HI.RA	0x48	72	R / W
LO.RA	0x49	73	R / W
USPL	0x4A	74	R / W
LSPL	0x4B	75	R / W
ALD1	0x4C	76	R / W
ALT1	0x4D	77	R / W
HYA1	0x4E	78	R / W
SEA1	0x4F	79	R / W
ALD2	0x50	80	R / W
ALT2	0x51	81	R / W
HYA2	0x52	82	R / W
SEA2	0x53	83	R / W
ALD3	0x54	84	R / W
ALT3	0x55	85	R / W
HYA3	0x56	86	R / W
SEA3	0x57	87	R / W
MOCL	0x58	88	R / W
MOCH	0x59	89	R / W
SOCL	0x5A	90	R / W
SOCH	0x5B	91	R / W
MV.SF	0x5C	92	R / W
RC.TI	0x5D	93	R / W
UNIT	0x5E	94	R / W
OUTM	0x5F	95	R / W

20. NFY Communication Register Address Table

LOOP1 Parameter address

Parameter	Register Address		R / W
	Hex	Dec	
SV.OS	0x60	96	R / W
PV.OS	0x61	97	R / W
PV.OH	0x62	98	R / W
MLNB	0x63	99	R / W
COMP	0x64	100	R / W
OFFS	0x65	101	R / W
SV.TY	0x66	102	R / W
OU.TY	0x67	103	R / W
RCGN	0x68	104	R / W
FKSL	0x69	105	R / W
R_ER	0x6A	106	R / W
TP_K	0x6B	107	R / W
TMSL	0x6C	108	R / W
MVRT	0x6D	109	R / W
HYSM	0x6E	110	R / W
RH.TC	0x6F	111	R / W
RH.PO	0x70	112	R / W
RH.TM	0x71	113	R / W
PR.SV	0x72	114	R / W
AT.SV	0x73	115	R / W
SET1	0x74	116	R / W
SET2	0x75	117	R / W
SET3	0x76	118	R / W
SET4	0x77	119	R / W
SET5	0x78	120	R / W
SET6	0x79	121	R / W
SET7	0x7A	122	R / W
SET8	0x7B	123	R / W
SET9	0x7C	124	R / W
SETA	0x7D	125	R / W
SETB	0x7E	126	R / W
SETC	0x7F	127	R / W
SETD	0x80	128	R / W
SETE	0x81	129	R / W
SETF	0x82	130	R / W
HZ	0x106	262	R / W
PRTO	0x107	263	R
FOMA	0x108	264	R
IDNO	0x109	265	R
BAUD	0x10A	266	R
RPDT	0x10B	267	R / W
AOEN	0x10C	268	R / W

Parameter	Register Address		R / W
	Hex	Dec	
AOSL	0x10D	269	R / W
AO.LO	0x10E	270	R / W
AO.HI	0x10F	271	R / W
AOCL	0x110	272	R / W
AOCH	0x111	273	R / W
CTRT	0x112	274	R / W
D1SL	0x113	275	R / W
D2SL	0x114	276	R / W
REMO	0x115	277	R / W
CJSL	0x116	278	R / W
CJMN	0x117	279	R / W
CJTC	0x118	280	R / W
W_MD	0x119	281	R
RMAP	0x11A	282	R / W
OPSL	0x11B	283	R / W
POTM	0x11C	284	R / W
PTMD	0x11D	285	R / W
PVST	0x11E	286	R / W
REPT	0x11F	287	R / W
POWF	0x120	288	R / W
D01	0x121	289	R / W
D02	0x122	290	R / W
D03	0x123	291	R / W
D04	0x124	292	R / W
D05	0x125	293	R / W
D06	0x126	294	R / W
D07	0x127	295	R / W
D08	0x128	296	R / W
D09	0x129	297	R / W
D10	0x12A	298	R / W
D11	0x12B	299	R / W
D12	0x12C	300	R / W
D13	0x12D	301	R / W
D14	0x12E	302	R / W
D15	0x12F	303	R / W
D16	0x130	304	R / W
D17	0x131	305	R / W
D18	0x132	306	R / W
D19	0x133	307	R / W
D20	0x134	308	R / W

21. FY Communication Register Address Table

Parameter	Register Address		R / W
	Hex	Dec	
SV	0x00	0	R
OUTL	0x01	1	R / W
AT	0x02	2	R / W
AL1	0x03	3	R / W
AL2	0x04	4	R / W
AL3	0x05	5	R / W
PTN	0x06	6	R / W
SEG	0x07	7	R
TIMR	0x08	8	R
SV_1	0x09	9	R / W
TM_1	0x0A	10	R / W
OUT1	0x0B	11	R / W
SV_2	0x0C	12	R / W
TM_2	0x0D	13	R / W
OUT2	0x0E	14	R / W
SV_3	0x0F	15	R / W
TM_3	0x10	16	R / W
OUT3	0x11	17	R / W
SV_4	0x12	18	R / W
TM_4	0x13	19	R / W
OUT4	0x14	20	R / W
SV_5	0x15	21	R / W
TM_5	0x16	22	R / W
OUT5	0x17	23	R / W
SV_6	0x18	24	R / W
TM_6	0x19	25	R / W
OUT6	0x1A	26	R / W
SV_7	0x1B	27	R / W
TM_7	0x1C	28	R / W
OUT7	0x1D	29	R / W
SV_8	0x1E	30	R / W
TM_8	0x1F	31	R / W
OUT8	0x20	32	R / W
SV_12	0x21	33	R / W
TM_12	0x22	34	R / W
OUT12	0x23	35	R / W
SV_22	0x24	36	R / W
TM_22	0x25	37	R / W
OUT22	0x26	38	R / W
SV_32	0x27	39	R / W
TM_32	0x28	40	R / W
OUT32	0x29	41	R / W
SV_42	0x2A	42	R / W
TM_42	0x2B	43	R / W
OUT42	0x2C	44	R / W
SV_52	0x2D	45	R / W
TM_52	0x2E	46	R / W
OUT52	0x2F	47	R / W
SV_62	0x30	48	R / W
TM_62	0x31	49	R / W
OUT62	0x32	50	R / W
SV_72	0x33	51	R / W
TM_72	0x34	52	R / W
OUT72	0x35	53	R / W
SV_82	0x36	54	R / W
TM_82	0x37	55	R / W
OUT82	0x38	56	R / W
P1	0x39	57	R / W
I1	0x3A	58	R / W
D1	0x3B	59	R / W
DB1	0x3C	60	R / W
ATVL	0x3D	61	R / W
CYT1	0x3E	62	R / W
HYS1	0x3F	63	R / W

Parameter	Register Address		R / W
	Hex	Dec	
P2	0x40	64	R / W
I2	0x41	65	R / W
D2	0x42	66	R / W
CYT2	0x43	67	R / W
HYS2	0x44	68	R / W
GAP1	0x45	69	R / W
GAP2	0x46	70	R / W
LCK	0x47	71	R / W
INP1	0x48	72	R / W
ANL1	0x49	73	R / W
ANH1	0x4A	74	R / W
DP	0x4B	75	R / W
LSPL	0x4C	76	R / W
USPL	0x4D	77	R / W
ANL2	0x4E	78	R / W
ANH2	0x4F	79	R / W
ALD1	0x50	80	R / W
ALT1	0x51	81	R / W
ALD2	0x52	82	R / W
ALT2	0x53	83	R / W
ALD3	0x54	84	R / W
ALT3	0x55	85	R / W
HYSA	0x56	86	R / W
CLO1	0x57	87	R / W
CHO1	0x58	88	R / W
CLO2	0x59	89	R / W
CHO2	0x5A	90	R / W
CLO3	0x5B	91	R / W
CHO3	0x5C	92	R / W
RUCY	0x5D	93	R / W
WAIT	0x5E	94	R / W
SETA	0x5F	95	R / W
PSL	0x60	96	R
BITS	0x61	97	R
IDNO	0x62	98	R
BAUD	0x63	99	R
SVOS	0x64	100	R / W
PVOS	0x65	101	R / W
UNIT	0x66	102	R / W
PVFT	0x67	103	R / W
CASC	0x68	104	R / W
OUD	0x69	105	R / W
OPAD	0x6A	106	R / W
HZ	0x6B	107	R / W
SET1	0x6C	108	R / W
SET2	0x6D	109	R / W
SET3	0x6E	110	R / W
SET4	0x6F	111	R / W
SET5	0x70	112	R / W
SET6	0x71	113	R / W
SET7	0x72	114	R / W
SET8	0x73	115	R / W
SET9	0x74	116	R / W
SET0	0x75	117	R / W
INP2	0x76	118	R / W
OUTY	0x77	119	R / W
VER	0x86	134	R
OUT%	0x87	135	R
OBIT	0x88	136	R
CV	0x89	137	R
PV	0x8A	138	R

22. Glossary of Characters Used In This Manual

LED Display										
Characters	0	1	2	3	4	5	6	7	8	9
LED Display										
Characters	A	B	C	D	E	F	G	H	I	J
LED Display										
Characters	K	L	M	**N**	O	P	Q	R	S	T
LED Display										
Characters	U	V	W	X	Y	**Z**	℃	℉		

23. NFY Parameter Abbreviation Descriptions

PV	Process value
SV	Set value
LOOP	Loop
R_S	Run_Stop
HBCU	Heater Break Current
HBSV	Heater Break SV
HBTM	Heater Break timer
AL1H	Alarm 1 high value
AL1L	Alarm 1 low value
AL2H	Alarm 2 high value
AL2L	Alarm 2 low value
AL3H	Alarm 3 high value
AL3L	Alarm 3 low value
SV1~SV4	Set value 1~4
TIM	Timer
CNT	Counter
CUTM	Current time
ONTM	ON time
OFTM	OFF time
A_M	Auto_manual
MOUT	Manual out
AT	Control mode
RATE	Rate
RAMP	Ramp
SOAK	Soak
WAIT	Program action waiting for temperature
DTM1~DTM4	Do timer 1~4
DT.ST	Do timer set
PTN	Pattern
SEG	Segment
L1SV	Loop 1 SV
L2SV	Loop 2 SV
TIMR	Use for program
DOUT	Digit out
P1	Main proportional band
M_LP	Main low proportional band
I1	Main integral
M_LI	Main low integral
D1	Main differential
M_LD	Main low differential
HYS1	Main hysteresis
CYT1	Main cycle time
MOLH	Main output limit high
MOLL	Main output limit low
P2	Sub proportional band
S_LP	Sub low proportional band
I2	Sub integral
S_LI	Sub low integral
D2	Sub differential
S_LD	Sub low differential
HYS2	Sub hysteresis
CYT2	Sub cycle time
SOLH	Sub output limit high
SOLL	Sub output limit low
MGAP	Main gap
SGAP	Sub gap
COUT	Current output
AT.VL	Autotune offset value
SS.PO	Steady state power
OPSF	Output special function
RC.TO	Low pass filter RC const.time for output
LOCK	Lock
INPT	Input type
AN.LO	Analog input calibrate low
AN.HI	Analog input calibrate high
DP	Point
HI.RA	High range
LO.RA	Low range
USPL	Upper set point limit
LSPL	Lower set point limit
ALD1	Alarm 1 mode
ALT1	Alarm 1 timer
HYA1	Hysteresis for alarm 1
SEA1	Special function for alarm 1
ALD2	Alarm 2 mode

23. NFY Parameter Abbreviation Descriptions

ALT2	Alarm 2 timer
HYA2	Hysteresis for alarm 2
SEA2	Special function for alarm 2
ALD3	Alarm 3 mode
ALT3	Alarm 3 timer
HYA3	Hysteresis for alarm 3
SEA3	Special function for alarm 3
MOCL	Main output calibrate low
MOCH	Main output calibrate high
SOCL	Sub output calibrate low
SOCH	Sub output calibrate high
MV.SF	mV special function for input
RC.TI	Low pass filter RC const.time for input
UNIT	Unit
OUTM	Output mode
SV.OS	SV offset
PV.OS	PV offset
PV.OH	PV offset high
MLNB	Manual linearize number
COMP	Compare for manual linearize
OFFS	Offset for manual linearize
SV.TY	SV type
OU.TY	Output type
RCGN	Process RC const.Gain
FKSL	function key select
R_ER	Ramp error
TP_K	To target proportional band const.
TMSL	Timer mode select
MVRT	Motor value run time
HYSM	Hysteresis for motor value
RH.TC	(Relative humidity) temperature of except wet
RH.PO	(Relative humidity) power of except wet
RH.TM	(Relative humidity) time of except wet
PR.SV	Pretune SV
AT.SV	Autotune SV
SET1	---
SET2	---
SET3	---
SET4	---
SET5	---
SET6	---
SET7	---
SET8	---
SET9	---
SETA	---
SETB	---
SETC	---
SETD	---
SETE	---
SETF	---
HZ	HZ
PRTO	Protocol
FOMA	Data format
IDNO	ID number
BAUD	Baud rate
RPDT	Response Delay time
AOEN	Analog output enable
AOSL	Analog output signal select
AO.LO	Analog output scale low
AO.HI	Analog output scale high
AOCL	Analog output calibrate low
AOCH	Analog output calibrate high
CTRT	Current transformer ratio
D1SL	Digital input 1 select
D2SL	Digital input 2 select
REMO	Program remote control
CJSL	Cold junction select
CJMN	Manual set cold junction
CJTC	Cold junction temperature
W_MD	Write mode for uart
RMAP	Ram mapping
OPSL	Output select
POTM	Power ON delay time

23. NFY Parameter Abbreviation Descriptions

PTMD	Program time mode
PVST	PV start
REPT	Repeat
POWF	Power failure

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