User's Manual

Digital Controller
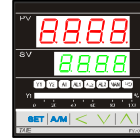### FZ400/600/700/800/900

NPH
call toll free: 1.877.674.9744
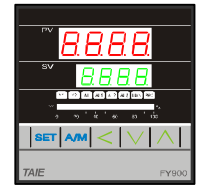
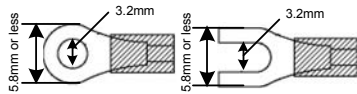FZ400   FZ600   FZ700   FZ800   FZ900

1 Notice

Please confirm the specification of controllers is to totally with your requirement before using it, also read this user's manual in detail.

⚠ **Danger**

1. Danger! Electric Shock!
   DON'T touch AC power wiring terminal when controller has been powered!
   Keep the power off until all of the wiring are completed!

⚠ **Warning**

1. Please confirm the AC power wiring to controller is correct, otherwise it would be caused aggravated damage on controller. (FY400 connecting with Pin 1 and 6, FY600/700/800/900 with Pin 1 and 2).
2. Be sure to use the rated power supply(AC85~265V or DC24V), otherwise it would be caused aggravated damage on controller.
3. Please confirm wires are connected with correct terminal (Input, Output).
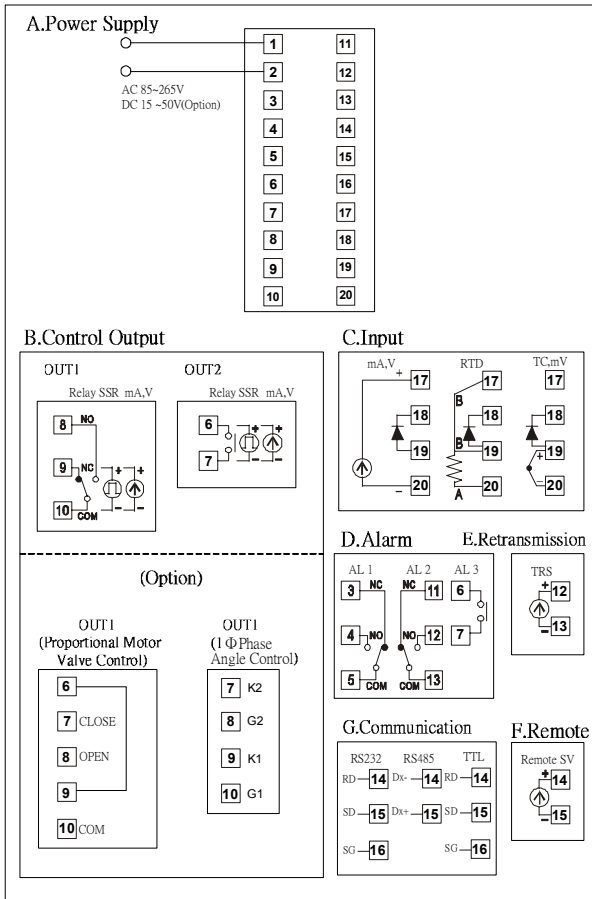4. Use M3 screw-compatible crimp-on terminals with an insulation sleeve, as shown below

3.2mm   3.2mm   5.8mm or less   Torque : 0.4 N.m (4kgf.cm)

5. Avoid to install controller in following spaces :
   I.   A place where the ambient temperature may reach beyond the range from 0 to 50℃
   II. A place where the ambient humidity may reach beyond the range from 50 to 85% RH.
   III. A place where the the controller likely to come into contact with water ,oil , chemicals ,steam and vapor.
   IV. A place where the controller is subject to interface with static electricity ,magnetism and noise.
6. For thermocouple(TC) input ,use shield compensating lead wire.
7. For RTD input ,use shield wires which have low resistance and no resistance difference between the 3 wires.

2 External Dimension and Panel Cutout 〈Unit：mm〉

FZ400
48   48   14   80
44.5 +0.5/0   44.5 +0.5/0   70   65

FZ600
96   48   14   80
90.5 +0.5/0   44.5 +0.5/0   70   111

FZ700
72   72   14   80
68.5 +0.5/0   68.5 +0.5/0   94   89

FZ800
48   96   14   80
44.5 +0.5/0   90.5 +0.5/0   116   65

FZ900
96   96   14   80
90.5 +0.5/0   90.5 +0.5/0   116   111

FZ600 / FZ800

A.Power Supply

AC 85~265V
DC 15 ~50V(Option)

1	11
2	12
3	13
4	14
5	15
6	16
7	17
8	18
9	19
10	20

B.Control Output

OUT1 — Relay SSR mA,V
8 NO 9 NC 10 COM

OUT2 — Relay SSR mA,V
6 7

C.Input

mA,V +17 RTD 17 B TC,mV 17
18 18 B 18
19 19 19
−20 20 A 20

D.Alarm

AL 1 AL 2 AL 3
3 NC 11 NC 6
4 NO 12 NO 7
5 COM 13 COM

E.Retransmission
TRS
+ 12
− 13

(Option)

OUT1 (Proportional Motor Valve Control)
6
7 CLOSE
8 OPEN
9
10 COM

OUT1 (1ΦPhase Angle Control)
7 K2
8 G2
9 K1
10 G1

G.Communication

RS232 RS485 TTL
RD 14 Dx− 14 RD 14
SD 15 Dx+ 15 SD 15
SG 16 SG 16

F.Remote
Remote SV
+ 14
− 15

FZ900

A.Power Supply

AC 85~265V
DC 15 ~50V(Option)

1	21	31	11
2	22	32	12
3	23	33	13
4	24	34	14
5	25	35	15
6	26	36	16
7	27	37	17
8	28	38	18
9	29	39	19
10	30	40	20

E.Retransmission
TRS
+ 39
− 40

F.Remote
Remote SV
+ 14
− 15

B.Control Output

OUT1 Relay SSR mA,V
8 NO 9 NC 10 COM

OUT1 (1ΦZero Cross Control)
31 G1 33 G2 39 40 PROT

OUT1 (3ΦZero Cross Control)
31 RG1 33 RG2 35 TG1 37 TG2 39 40 PROT

OUT2 Relay SSR mA,V
6 7

OUT1 (Proportional Motor Valve Control)
6 7 CLOSE 8 OPEN 9 10 COM

OUT1 (1ΦPhase Angle Control)
31 G1 32 K1 33 G2 34 K2 35 36 PROT

OUT1 (3ΦPhase Angle Control)
31 G1 32 K1 33 G2 34 K2 35 G3 36 K3 39 40 PROT

C.Input

mA,V +17 RTD 17 B TC,mV 17
18 18 B 18
19 19 19
−20 20 A 20

D.Alarm

AL 1 AL 2 AL 3
3 NC 11 NC 6
4 NO 12 NO 7
5 COM 13 COM

G.Communication

RS232 RS485 TTL
RD 14 Dx− 14 RD 14
SD 15 Dx+ 15 SD 15
SG 16 SG 16

(Remote SV)
RS232 RS485
RD 31 Dx− 31
SD 32 Dx+ 32
SG 33

1.Power ON:

Controller wiil display as following

Light all LEDs and all 7 segment displays → Display input type → Display range (0.0 ~ 400.0) → Ready for use
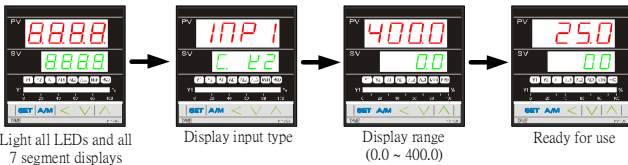
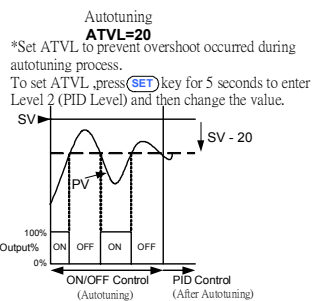### 2.Change the Set Value(SV):

Change SV from 0.0 to 100.0

Press ∨ Key
The SV number started to flash.The flashing digit indicates which digit can be set.

Press < Key
To select the hundreds digit.

Press ∧ Key
To change the number to 1.

Press SET Key
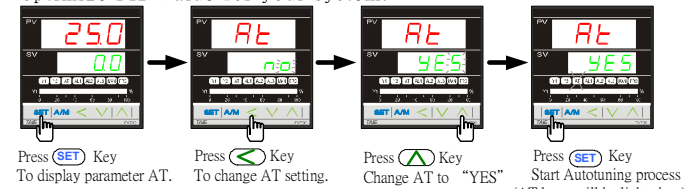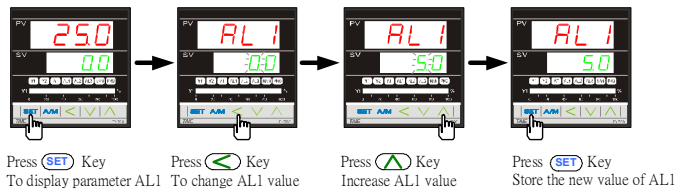To store the new set value.
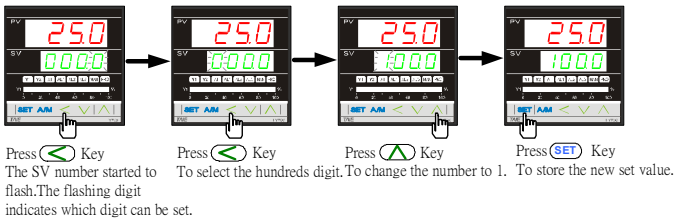
3.Autotuning (AT):

Use AT function to autimatically calculate and set the optimize PID value for your system.

Press SET Key
To display parameter AT.

Press < Key
To change AT setting.

Press ∧ Key
Change AT to "YES"

Press SET Key
Start Autotuning process
(AT lamp will be lighted on)

Autotuning **ATVL=0**

Autotuning **ATVL=20**

*Set ATVL to prevent overshoot occurred during autotuning process.
To set ATVL ,press SET key for 5 seconds to enter Level 2 (PID Level) and then change the value.
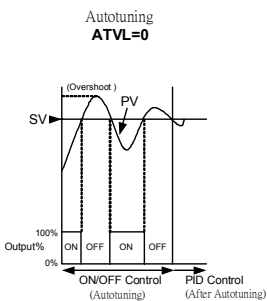
4.Change the Alarm value:

Change AL1 value to "5.0" (AL1 active ,if PV exceeds SV over 5.0)

Press SET Key
To display parameter AL1

Press < Key
To change AL1 value
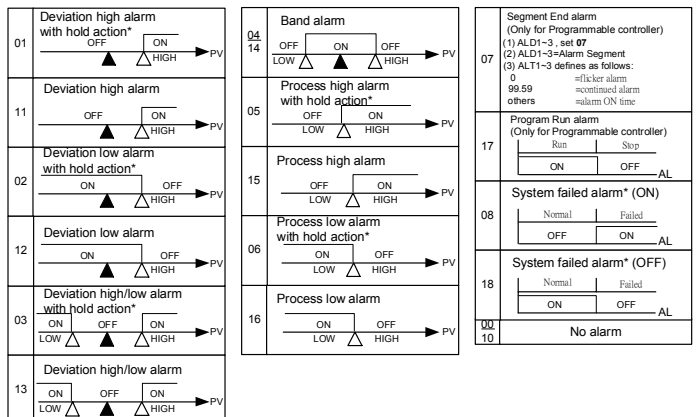
Press ∧ Key
Increase AL1 value

Press SET Key
Store the new value of AL1

* There are total 16 alarm mode types ,referenced as below:

* To change Alarm mode ,press SET + < key 5 seconds to enter Level 3(Input Level) and then change the value of ALD1/ALD2/ALD3.

5.Alarm mode type (Referenced for ALD1/ALD2/ALD3)

(▲ :SV   △ :Alarm set value)

01 Deviation high alarm with hold action*
11 Deviation high alarm
02 Deviation low alarm with hold action*
12 Deviation low alarm
03 Deviation high/low alarm with hold action*
13 Deviation high/low alarm
04/14 Band alarm
05 Process high alarm with hold action*
15 Process high alarm
06 Process low alarm with hold action*
16 Process low alarm
07 Segment End alarm (Only for Programmable controller)
(1) ALD1~3, set 07
(2) ALD1~3=Alarm Segment
(3) ALT1~3 defines as follows:
0 =flicker alarm
99.59 =continued alarm
others =alarm ON time
17 Program Run alarm (Only for Programmable controller)
08 System failed alarm* (ON)
18 System failed alarm* (OFF)
00/10 No alarm

*Hold action:
When Hold action is ON ,the alarm action is suppressed at start-up until the measured value(PV) enters the non-alarm range.

*System failed:
It means that the controller display error message with one of following :
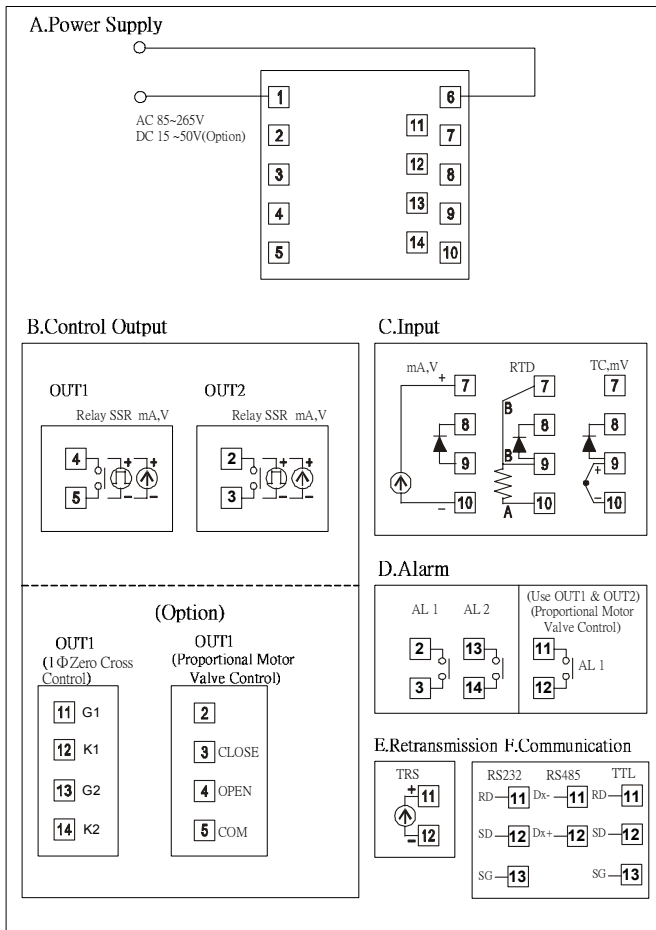"UUU1" or "NNN1" or "CJCE"

3 Parts Description

FZ400
FZ600
FZ800
FZ700 / FZ900
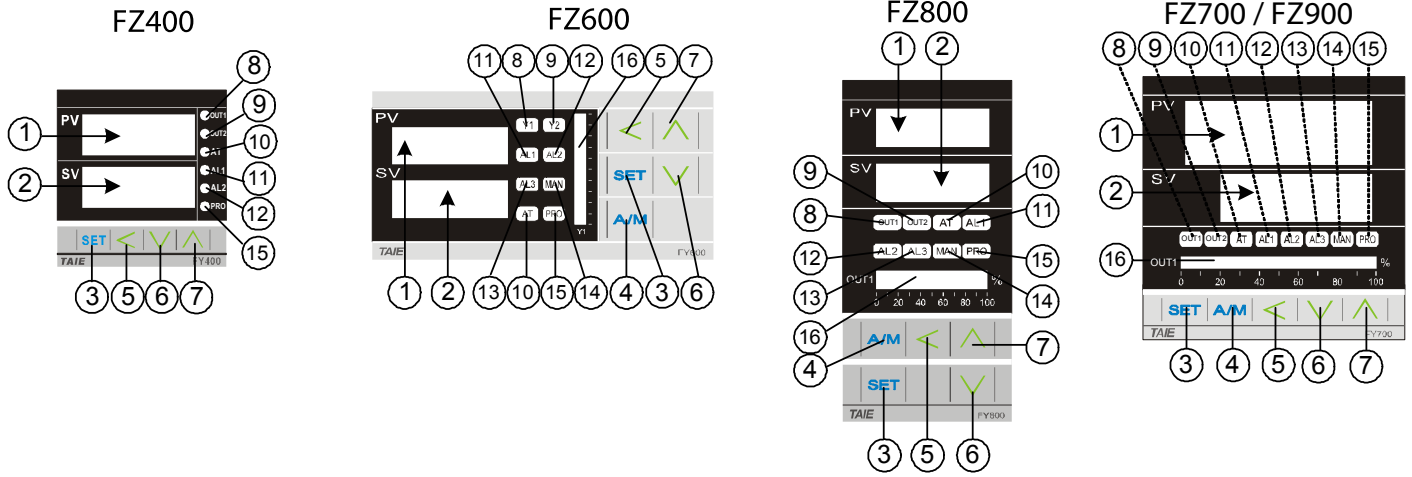
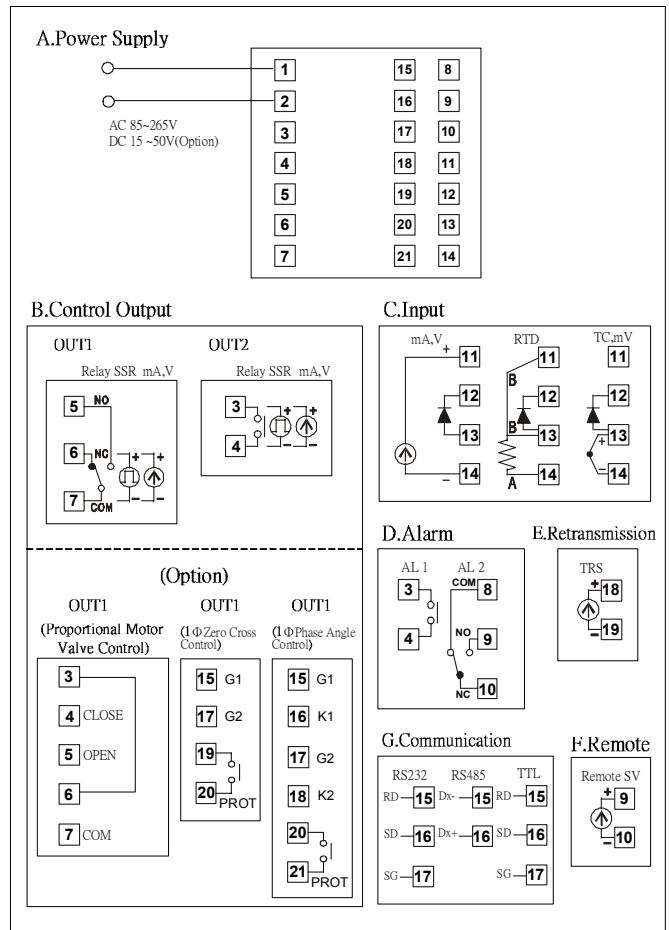| SYMBOL		NAME	FUNCTION
PV	①	Measured value (PV)display	Displays PV or various parameter symbols (Red)
SV	②	Setting value (SV)display	Displays SV or various parameter set values (Green)
SET	③	Set key	Used for parameter calling up and set value registration
A/M	④	Auto/Manual key	Switches between Auto(PID) output mode and Manual output
<	⑤	Shift key	Shift digits when settings are changed
V	⑥	Down key *(*Program Hold)*	Decrease numbers *(*Only for programmable controller)*
∧	⑦	Up key *(*Program Run)*	Increase numbers *(*Only for programmable controller)*

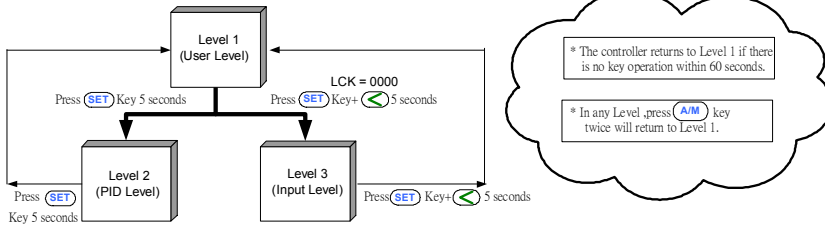| SYMBOL		NAME	FUNCTION
OUT1	⑧	OUT1 lamp	Lights when OUT1 is on (Green)
OUT2	⑨	OUT2 lamp	Lights when OUT2 is on (Green)
AT	⑩	Autotuning lamp	Lights when Autotuning is activated (Orange)
AL1	⑪	Alarm 1 lamp	Lights when Alarm 1 is activated (Red)
AL2	⑫	Alarm 2 lamp	Lights when Alarm 2 is activated (Red)
AL3	⑬	Alarm 3 lamp	Lights when Alarm 3 is activated (Red)
MAN	⑭	Manual output lamp	Lights when manual output is activated (Red)
PRO	⑮	*Program Running lamp*	*Flashes when program running (Only for programmable controller)*
OUT1%	⑯	Output% Bar-Graph display	Output% is displayed on 10-dot LEDs

4 Terminal Arrangement

FZ400

A.Power Supply

AC 85~265V
DC 15~50V(Option)

B.Control Output

OUT1   OUT2
Relay SSR mA,V   Relay SSR mA,V

C.Input

mA,V   RTD   TC,mV

(Option)

OUT1
(1Φ Zero Cross Control)

OUT1
(Proportional Motor Valve Control)

D.Alarm

AL 1   AL 2   (Use OUT1 & OUT2) (Proportional Motor Valve Control)

E.Retransmission F.Communication

TRS   RS232   RS485   TTL

FZ700

A.Power Supply

AC 85~265V
DC 15~50V(Option)

B.Control Output

OUT1   OUT2
Relay SSR mA,V   Relay SSR mA,V

(Option)

OUT1
(Proportional Motor Valve Control)

OUT1
(1Φ Zero Cross Control)

OUT1
(1Φ Phase Angle Control)

C.Input

mA,V   RTD   TC,mV

D.Alarm   **E.Retransmission**

AL 1   AL 2   TRS

G.Communication   **F.Remote**

RS232   RS485   TTL   Remote SV

Levels Diagram

Level 1 (User Level)

LCK = 0000

Press SET Key 5 seconds   Press SET Key+ ◀ 5 seconds

Level 2 (PID Level)   Level 3 (Input Level)

Press SET Key 5 seconds   Press SET Key+ ◀ 5 seconds

* The controller returns to Level 1 if there is no key operation within 60 seconds.

* In any Level ,press A/M key twice will return to Level 1.

| Parameter |
| Default Value |

Description

Level 1 (User Level)

PV	Process Value
SV	Set Value
↓ Set	
OUTL 100	Output Limt
↓ Set	
AT YES/NO	Autotuning
↓ Set	
AL1 0	Alarm 1 set value
↓ Set	
AL2 0	Alarm 2 set value
↓ Set	
AL3 0	Alarm 3 set value

Level 2 (PID Level)

P1 3.0	Proportional band 1 (For output 1)	Range：0.0~200.0% ON/OFF control if set to 0 (0.0)
I1 240	Integral time 1 (For output 1)	Range：0~3600 seconds PD control if set to 0
D1 60	Derivative time 1 (For output 1)	Range：0~900 seconds PI control if set to 0
db 1 0	Dead-band time	Don't care
ATVL 0	Auto tuning offset value	Range：0~USPL
CYT1 10	Output 1 cycle time	Range：0~150 seconds Relay output：10 Voltage pulse output：1 , mA output：0
HYS1 1	Hysteresis for output 1 ON/OFF control	Range：0~1000
P2 3.0	Proportional band 2 (For output 2)	The same with P1
I2 240	Integral time 2 (For output 2)	The same with I1
D2 60	Derivative time 2 (For output 2)	The same with D1
CYT2 10	Output 2 Cycle time	The same with CYT1
HYS2 1	Hysteresis for output 2 ON/OFF control	The same with HYS1
GAP1 0	Control gap 1 (For output 1)	Set point of output 1 (Heating side) =SV - GAP1
GAP2 0	Control gap 2 (For output 2)	Set point of output 2 (Cooling side) =SV + GAP2
LCK 0000	Function lock	

Display If P1=0 (for HYS1)
Display If P2=0 (for HYS2)
Display if output2 is provided

Return to "P1"

| LCK | Levels entering available | | | Parameters which can be changed |
	Level 1 (User Level)	Level 2 (PID Level)	Level 3 (Input Level)	
0000	◎	◎	◎	All parameters (Factory set value)
1111	◎	◎	-----	All parameters
0100	◎	◎	-----	All parameters except Level 3
0110	◎	◎	-----	Parameters in Level 1
0001	◎	◎	-----	"SV" and "LCK"
0101	◎	◎	-----	Only "LCK"

in1E	IN1E : Input 1 Error
	Check whether input loop is opened or wiring incorrect.
CJCE	CJCE :Cold Junction Compensation Failed
	Check the compensation diode outside controller.
uuu1	UUU1 : PV is above USPL
	Check whether the input value is correct or not.
nnn1	NNN1 : PV is below LSPL
	Check whether the input value is correct or not.
AdCF	ADCF :A/D Convert Failed
	Controller needs to be repaired.
rAMF	RAMF :RAM Failed
	Controller needs to be repaired.

Level 3 (Input Level)

INP1 K2	Input type selection	
ANL1 0	Analog input low limit calibration (Used for mA and V input)	Range：-1999 ~ 9999
ANH1 5000	Analog input high limit calibration (Used for mA and V input)	Range：0 ~ 9999
DP 0000	Decimal point position (Available for mA and V input)	0000，000.0，00.00，0.000
LSPL 0.0	Lower Set-Point Limit	Scaling Low Limit
USPL 400.0	Upper Set-Point Limit	Scaling High Limit
ANL2 0	Remote input low limit calibration	Range：-1999 ~ 9999
ANH2 5000	Remote input high limit calibration	Range：0 ~ 9999
ALD1 01	Alarm mode of AL1	Range:00~19 Refer to "Alarm mode type"
ALT1 10	Alarm time of AL1	Range：0~99 Min 59 Secs 0=Flicker Alarm , 99:59=Continued Others=On delay time (If ALD=07 , ALT means alarm on time)
ALD2 01	Alarm mode of AL2	The same with ALD1
ALT2 0	Alarm time of AL2	The same with ALT1
ALD3 01	Alarm mode of AL3	The same with ALD1
ALT3 0	Alarm time of AL3	The same with ALT1
HYSA 0	Hysteresis of all Alarm	Range：0~1000
CLO1 230	Output 1 low limit calibration (Used for mA and V output)	Range：0 ~ 9999
CHO1 3600	Output 1 high limit calibration (Used for mA and V output)	Range：0 ~ 9999
CLO2 230	Output 2 low limit calibration (Used for mA and V output)	The same with CLO1
CHO2 3600	Output 2 high limit calibration (Used for mA and V output)	The same with CHO1
CLO3 0	Retransmission low limit calibration	The same with CLO1
CHO3 5000	Retransmission high limit calibration	The same with CHO1
RUCY 5	Full run time of proportional motor (Used for proportional motor valve control output)	Range：5~200 seconds
WAIT 0	Used for programmable controller to wait continued operation	0=Not wait Others=Wait value
IDNO 1	ID number	Range：0 ~ 99
BAUD 2400	Baudrate	110 / 300 / 1200 / 2400 / 4800 / 9600 bps
SVOS 0	SV compensation	Range：-1000~1000
PVOS 0	PV compensation	Range：-1000~1000
UNIT C	Unit of PV & SV	C(℃) / F(℉) / A(Analog)
SOFT 0.200	Soft Filter	
OUD HEAT	Action mode	Heat / Cool
OPAD PID	Control algorithm	PID / Fuzzy
HZ 60	Frequency	50 / 60HZ

Return to "INP1"

National Plastic Heater Sensor & Control Co.
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