

LCD Display PID Temperature controller(820 version)

FS08-820 Series(Relay and SSR drive output selectable)

User Manual

FS08-820

Please read this manual carefully before operating this device and keep this manual for future reference

General feature

- Display: LCD three color VGA display, with bar graphic display and output digital display (MV1)
- Input: 0.2% accuracy, maximum resolution 0.1 degree for TC/RTD input, analog input maximum resolution 0.001
- Output: Relay and SSR Drive output selectable(separate terminals for different output), output selectable from software
- Alarm output, AL1/AL2 two outputs, alarm NO/NC programmable, output delay, output lock Alarm mode: PV value alarm, deviation alarm, absolute value alarm, band alarm, reverse band alarm, alarm standby, PV over range alarm, look break LBA alarm, Heater short circuit alarm
- Control mode: PID control mode, ON/OFF control mode, Heating, cooling, output limits
- Control method: Auto control mode, manual control mode, Stop mode
- Special feature: quick start menu can be programmed with the parameters you want
- RS-485 communication: RS-485, Modbus RTU mode, data format, 8 digit, (N, O, E), 1 or 2 stop bit
- Operating condition: 0-50 degree celcius, humidity 0-80% RH

1. Ordering Information

MODEL	FS108-820 (48mmX48mm)
Item Number(Panel Size:WidthXheight)	FS408-820 (48mmX96mm) FS708-820 (72mmX72mm) FS908-820 (96mmX96mm)

Function CODE

□ U - □ □ □ □ - U N * □ □ N - □
(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11)

- (1) Power supply
B: AC85~265V D: DC24V
- (2) Fixed function code: U
- (3) Control method:
F: Reverse control PID heating D: Direct control PID Cooling
B: Reverse control ON/OFF heating M: Direct control ON/OFF cooling
- (4) Input Code (5) Range and code refer to sensor input code
- (6) Output Type
U: Relay and SSR Drive built-in, output software selectable
- (7) Fixed code:N
- (8) Alarm 1 mode[AL1 terminal], (9) Alarm 2 mode[AL2 terminal] [Relay output for alarm]
Refer to "6.2.1" for detailed alarm mode.

- N: No alarm output
- A: Deviation high alarm
B: Deviation low alarm
C: Deviation band reverse alarm
D: Deviation band alarm
E: Deviation high alarm(with standby function)
F: Deviation low alarm(with standby function)
G: band reverse alarm(with standby function)
H: Absolute value high alarm
J: Absolute value low alarm
K: Absolute value high alarm(with standby function)
L: Absolute value low alarm(with standby function)
M: Deviation band alarm(with standby function)
V: Setting value high alarm
W: Setting value low alarm
P: Process value over range alarm
R: Loop break alarm LBA
Q: Heater break alarm HBA

*Remark: standby function only kicks-in one time right after power on

(10) Reserved code: N

(11) Communication N: Without communication 5: With RS-485 function

Ordering example:FS108-820-BU-FKA4-UN*ANN-N
FS108-820, size 48mm*48mm, AC source, type K default, 0-400 range, Relay+SSR drive, 1 alarm

FS08-820-C1

Input types and range

Input Type	Ordering code	Input Type	Ordering code
K	0.0 to 200.0 °C	K	D2
	0.0 to 400.0 °C	K	D4
	0 to 400 °C	K	A4
	0 to 600 °C	K	A6
	0 to 1200 °C	K	B2
	0.0 to 200.0 °C	E	D2
E	0.0 to 300.0 °C	E	D3
	0 to 200 °C	E	A2
	0 to 400 °C	E	A4
	0 to 600 °C	E	A6
	0.0 to 300.0 °C	J	D3
	0.0 to 400.0 °C	J	D4
J	0 to 300 °C	J	A3
	0 to 400 °C	J	A4
	0 to 1000 °C	J	A0
	0 to 300 °C	T	D4
T	0 to 400 °C	T	A4
S **	0 to 1600 °C	S	B6
R	0 to 1769 °C	R	B8
B	200 to 1800 °C	B	B8
N	0 to 1300 °C	N	B3
Wu3_Re25	600 to 2200 °C	W	B0

Input Type	Ordering code
0.0 to 100.0 °C	D B1
0.0 to 200.0 °C	D D2
-50.0 to 200.0 °C	D G2
-100.0 to +200.0 °C	D F2
-199.9 to +200.0 °C	D F3
0 to 100 °C	D A1
0 to 200 °C	D A2
0 to 400 °C	D A4
0 to 800 °C	D A8
-100 to 200 °C	D C2
-200 to 400 °C	D C4
-200 to 500 °C	D C5

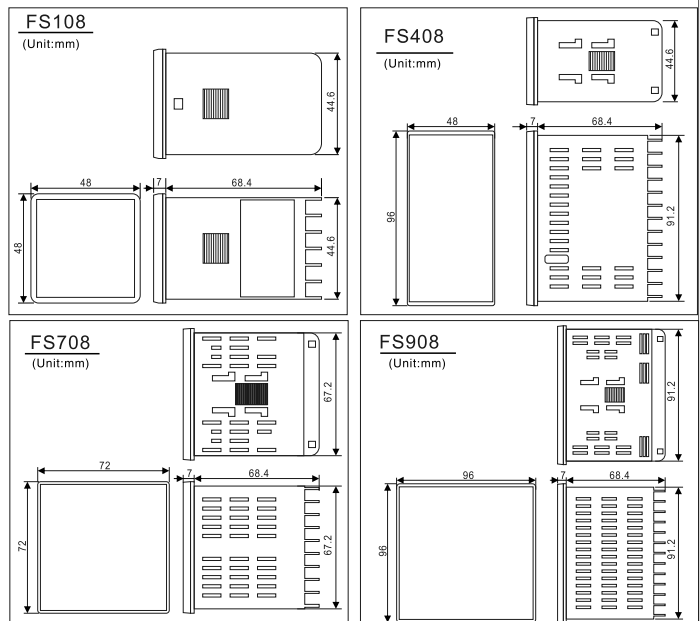
Input Type	Ordering code
AN1 0 to 50mV	V 02
AN2 10 to 50mV	V 10
AN3 0 to 5VDC	V 03
AN3 0 to 10VDC	V 04
AN4 1 to 5VDC	V 08
AN4 2 to 10VDC	V 09
AN4 4 to 20mA	A 03
AN3 0 to 20mA	A 02
AN3 0 to 10mA	A 01

*The accuracy of type S input for 0-100 degree is not accurate

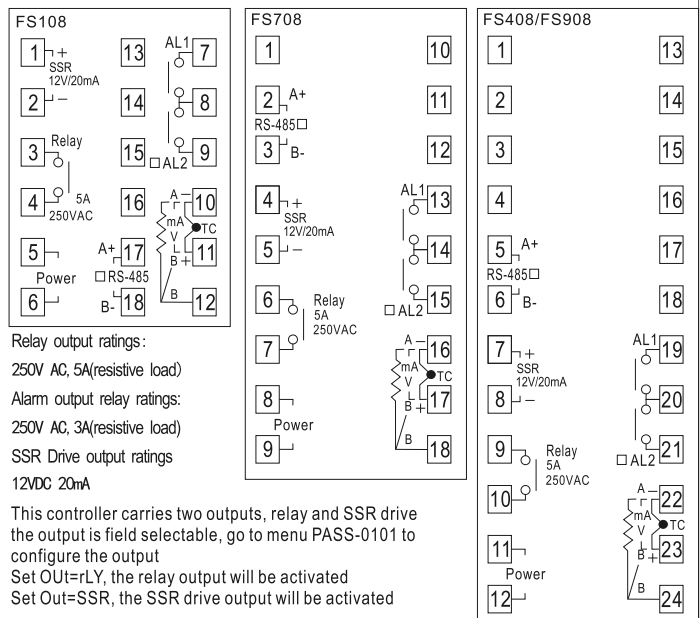
Thermocouple/Pt100/0-50mV/10-50mV

Other analog inputs needs to be specified when order.

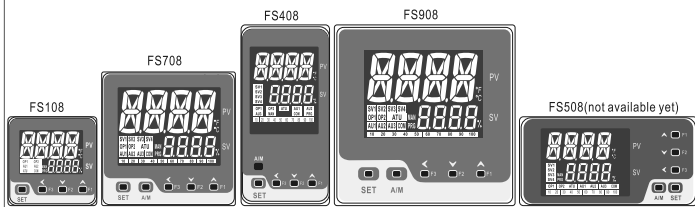
2. Overall size and panel cutout size



3. Wiring diagram



4. Panel description



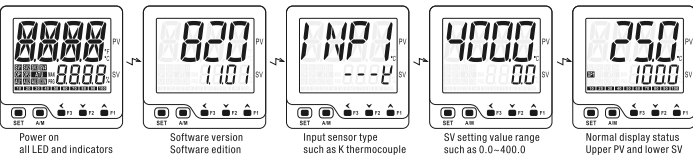
PV display window, display PV and parameter notation
 SV display window, display setting and parameter notation
 Bar graphic, display output value
 OP1: Indicate the output 1 status
 OP2: Reserved
 ATU: Auto-tuning indicator
 AU1: Alarm 1 indicator
 AU2: Alarm 2 indicator
 AU3: Reserved indicator
 MAN: Manual control mode indicator
 COM: Communication indicator
 RG: Reserved indicator

SET Function key
 A/M auto/manual control switch and ENTER key
 ◀ Shift key, (F3 function key, such as shortcut key for auto-tuning)
 ▼ decrease key (F2 function key)
 ▲ increase key (F1 function key, RUN/STOP)

5. Setting

5.1 Power on initialization

You can see various information like software edition, input types, preset SV range.



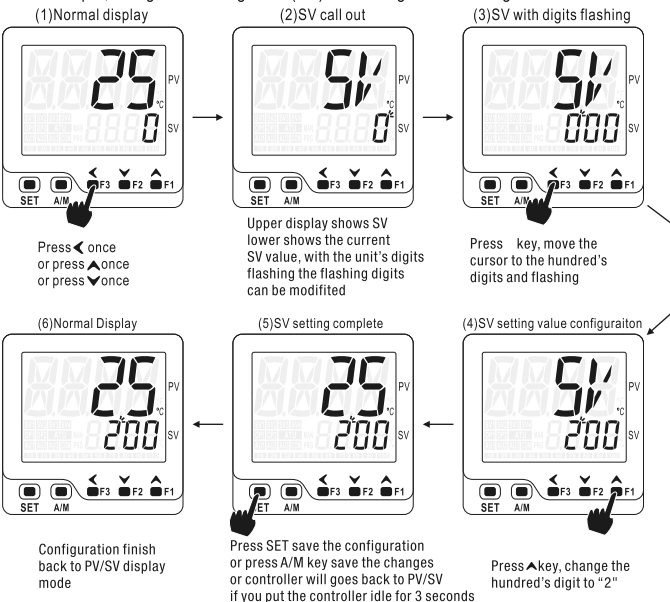
Notation	K	E	J	N	Wu3_Re25	S	t
Sensor type	K	E	J	N	Wu3_Re25	S	t
Range	-15 to 1200°C 0 to 2192°F	-15 to 800°C 0 to 1560°F	-15 to 1000°C 0 to 1950°F	-15 to 1300°C 0 to 2600°F	0 to 2200°C 0 to 3276°F	0 to 1600°C 0 to 3000°F	-15 to 400°C 0 to 782°F

Notation	r	b	AN1	AN2	AN3	AN4	PL
Sensor type	r	b	DC0-50mV	DC10-50mV	0-20mA/0-5V/0-10V	4-20mA/1-5V/2-10V	Pt100
Range	0 to 1769°C 0 to 3216°F	0 to 1800°C 0 to 3276°F	-1999 to 9999	-1999 to 9999	-1999 to 9999	-1999 to 9999	-199 to 500°C -326 to 932°F

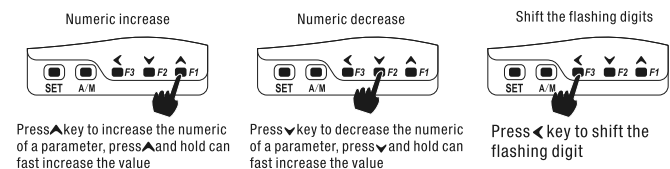
5.2 SV setting and configuration of other parameters

5.2.1 SV setting procedure

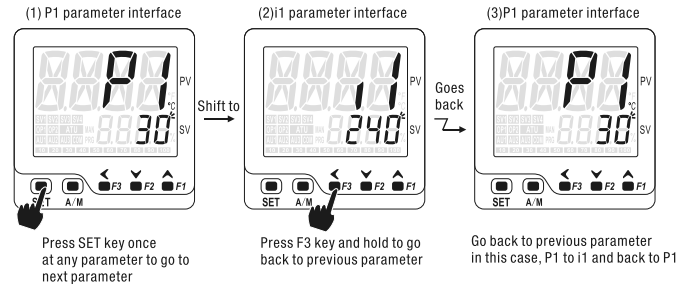
For example, change the setting value (SV) from 0 degree to 200 degree



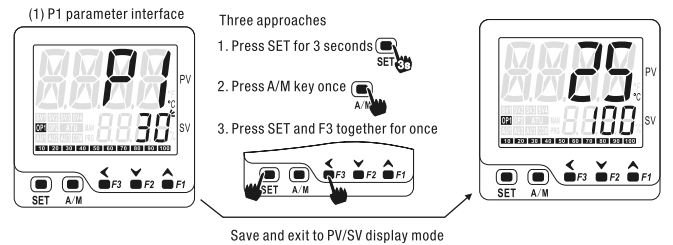
5.2.2 How to configure all configurable parameters



5.2.3 Shift between parameters and go back to previous parameter



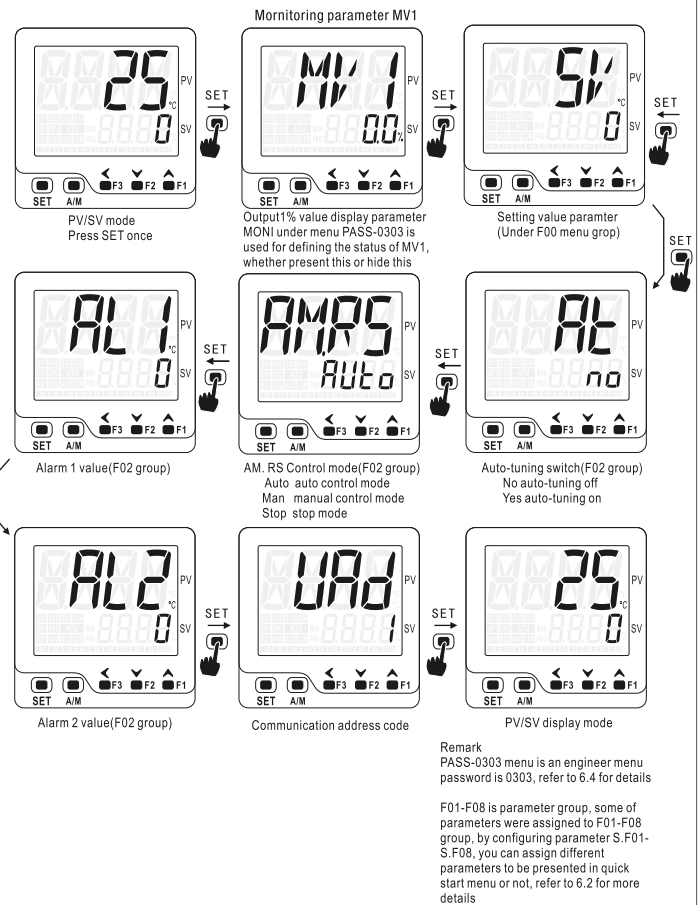
5.2.4 Save configuration and go back to normal PV/SV display mode



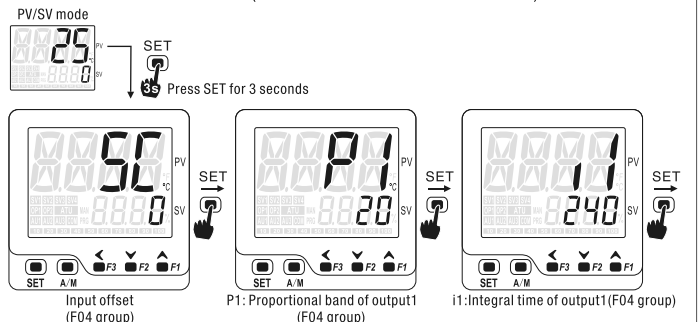
6. Parameter menu

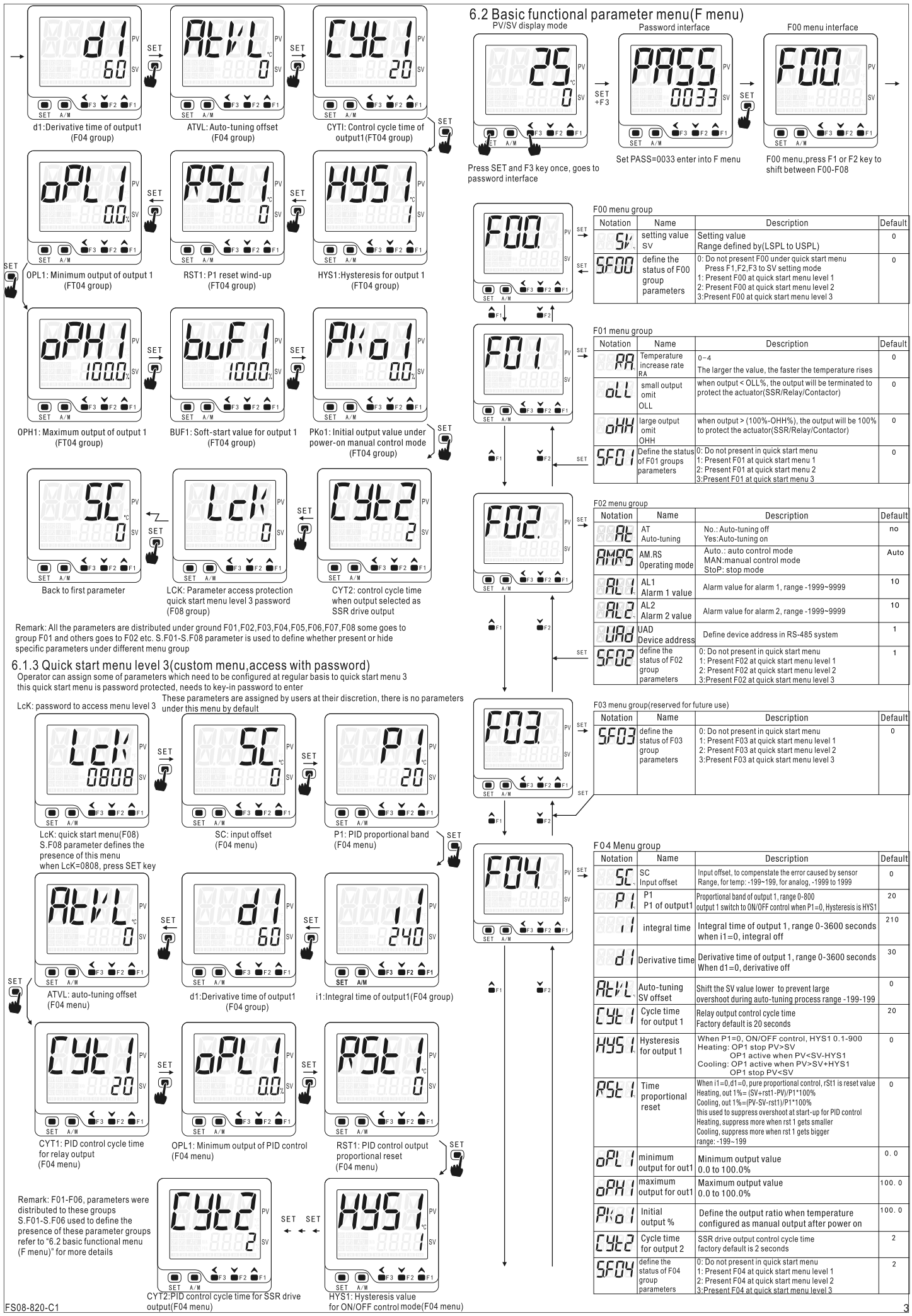
6.1 Factory default parameter menu

6.1.1 Quick start menu level 1 (Press SET once to enter this menu)

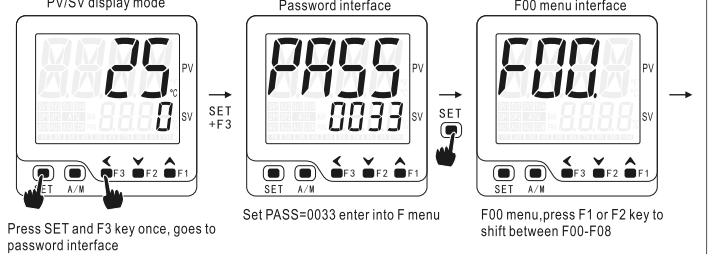


6.1.2 Quick start menu level 2 (Press SET for 3 seconds to enter)





6.2 Basic functional parameter menu(F menu)



F00 menu group

Notation	Name	Description	Default
SV	setting value	Range defined by (LSPL to USPL)	0
SF00	define the status of F00 group parameters	0: Do not present F00 under quick start menu Press F1, F2, F3 to SV setting mode 1: Present F00 at quick start menu level 1 2: Present F00 at quick start menu level 2 3: Present F00 at quick start menu level 3	0

F01 menu group

Notation	Name	Description	Default
RA	Temperature increase rate	0-4 The larger the value, the faster the temperature rises	0
OLL	small output omit	when output < OLL%, the output will be terminated to protect the actuator(SSR/Relay/Contactor)	0
OHH	large output omit	when output > (100%-OHH)%, the output will be 100% to protect the actuator(SSR/Relay/Contactor)	0
SF01	Define the status of F01 groups parameters	0: Do not present in quick start menu 1: Present F01 at quick start menu 1 2: Present F01 at quick start menu 2 3: Present F01 at quick start menu 3	0

F02 menu group

Notation	Name	Description	Default
AT	Auto-tuning	No.: Auto-tuning off Yes: Auto-tuning on	no
AM,RS	Operating mode	Auto.: auto control mode MAN: manual control mode Stop: stop mode	Auto
AL1	Alarm 1 value	Alarm value for alarm 1, range -1999-9999	10
AL2	Alarm 2 value	Alarm value for alarm 2, range -1999-9999	10
UAD	Device address	Define device address in RS-485 system	1
SF02	define the status of F02 group parameters	0: Do not present in quick start menu 1: Present F02 at quick start menu level 1 2: Present F02 at quick start menu level 2 3: Present F02 at quick start menu level 3	1

F03 menu group(reserved for future use)

Notation	Name	Description	Default
SF03	define the status of F03 group parameters	0: Do not present in quick start menu 1: Present F03 at quick start menu level 1 2: Present F03 at quick start menu level 2 3: Present F03 at quick start menu level 3	0

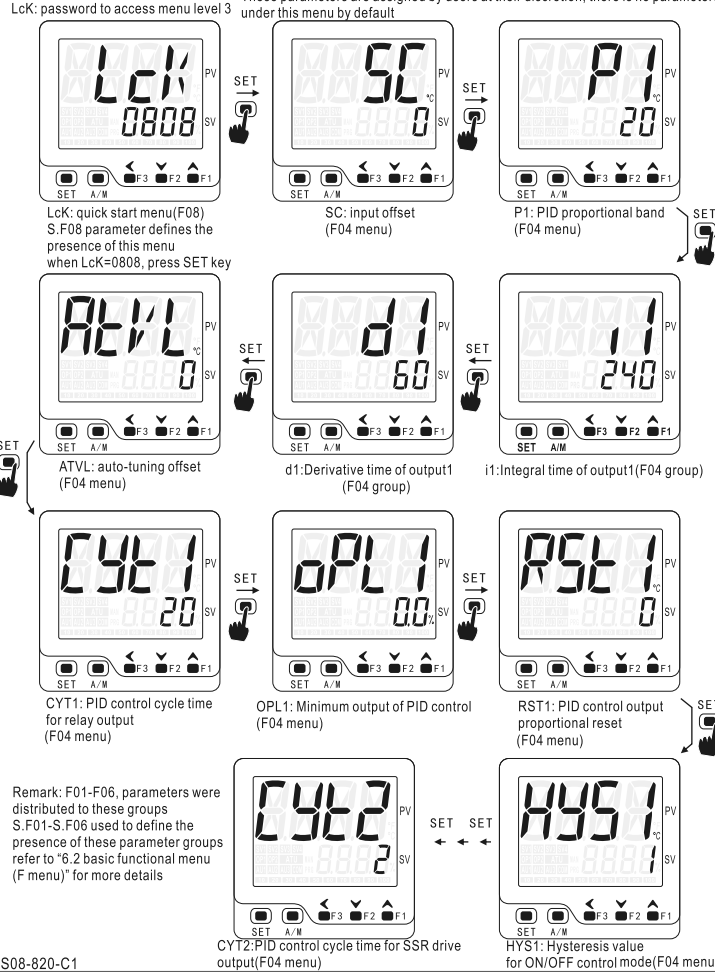
F04 Menu group

Notation	Name	Description	Default
SC	Input offset	Input offset, to compensate the error caused by sensor Range, for temp: -199-199, for analog: -1999 to 1999	0
P1	P1 of output1	Proportional band of output 1, range 0-800 output 1 switch to ON/OFF control when P1=0, Hysteresis is HYS1	20
i1	integral time	Integral time of output 1, range 0-3600 seconds when i1=0, integral off	210
d1	Derivative time	Derivative time of output 1, range 0-3600 seconds When d1=0, derivative off	30
ATVL	Auto-tuning SV offset	Shift the SV value lower to prevent large overshoot during auto-tuning process range -199-199	0
CYT1	Cycle time for output 1	Relay output control cycle time Factory default is 20 seconds	20
HYS1	Hysteresis for output 1	When P1=0, ON/OFF control, HYS1 0.1-900 Heating: OP1 stop PV>SV Cooling: OP1 active when PV<SV-HYS1 OP1 stop PV<SV	0
RST1	Time proportional reset	When i1=0, d1=0, pure proportional control, rSt1 is reset value Heating, out 1%=(SV+rSt1-PV)/P1*100% Cooling, out 1%=(PV-SV-rSt1)/P1*100% this used to suppress overshoot at start-up for PID control Heating, suppress more when rSt1 gets smaller Cooling, suppress more when rSt1 gets bigger range: -199-199	0
oPL1	minimum output for out1	Minimum output value 0.0 to 100.0%	0.0
oPH1	maximum output for out1	Maximum output value 0.0 to 100.0%	100.0
Pk01	Initial output %	Define the output ratio when temperature configured as manual output after power on	100.0
CYT2	Cycle time for output 2	SSR drive output control cycle time factory default is 2 seconds	2
SF04	define the status of F04 group parameters	0: Do not present in quick start menu 1: Present F04 at quick start menu level 1 2: Present F04 at quick start menu level 2 3: Present F04 at quick start menu level 3	2

Remark: All the parameters are distributed under ground F01, F02, F03, F04, F05, F06, F07, F08 some goes to group F01 and others goes to F02 etc. S.F01-S.F08 parameter is used to define whether present or hide specific parameters under different menu group

6.1.3 Quick start menu level 3(custom menu, access with password)

Operator can assign some of parameters which need to be configured at regular basis to quick start menu 3 this quick start menu is password protected, needs to key-in password to enter
These parameters are assigned by users at their discretion, there is no parameters under this menu by default



F05 menu group(reserved for future use)

Notation	Name	Description	Default
SF05	Define status of F05 group parameters	0: Do not present in quick start menu 1: Present F04 at quick start menu level 1 2: Present F04 at quick start menu level 2 3: Present F04 at quick start menu level 3	0

F06 group parameters for LBA(loop break alarm)and HBA(heater break alarm) only

Notation	Name	Description	Default
LbALt	LBA check time	Under heating mode(100% output),if the temperature did not increase LbAb within LbAt period, LBA will be triggered	80
LbAb	LBA temperature differential	Under cooling mode(100% output), if the temperature did not drop LbAb within LbAt period, LBA will be triggered	2
HbALt	Heater short circuit time	Under heating mode, if temperature increase HbAb within HbAt period at output 0% HBA goes off	180
HbAb	Temperature differential	Under cooling mode, if temperature drops HbAb within HbAt period at output 0% HBA goes off	10
SF06	Define status of F06 group parameters	0: Absent 1: Present in quick start menu 1 2: Present in quick start menu 2 3: Present in quick start menu 3	0

F07 group parameters

Notation	Name	Description	Default
1LR	ALM1 interlock	if alarm 1 interlocked, 1LR=1 put 1LR=0 can disengage the interlock	0
2LR	ALM2 interlock	if alarm 2 interlocked, 1LR=2 put 2LR=0 can disengage the interlock	0
SF07	Define status of F07 group parameters	0: no shortcut for interlock disengage 1: shortcut for interlock disengage available Press F1 and F2 at the same to quick access to 1LR and 2LR	0

F08 group parameters

Notation	Name	Description	Default
Lck	Access protection and password for quick start menu 3	=0/1: all parameters can be modified =2: F06 group of parameters locked =3: F05, F06 parameters locked =4: F04, F05, F06 parameters locked =5: F03, F04, F05, F06 parameters locked =6: F02, F03, F04, F05, F06 parameters locked =7: F01, F02, F03, F04, F05, F06 parameters locked =8: F00, F01, F02, F03, F04, F05, F06 parameters locked =0808: Press SET to quick start menu 3	0
SF08	Define status of F08 group parameters	0: Absent 1: Present in quick start menu 1 2: Present in quick start menu 2 3: Present in quick start menu 3	2

Engineer parameters(Passwor:PASS-0101)
Depends on the function,some of parameters might not be displayed

Notation	Name	Description	Default	Description			
INP1	Input sensor code selection INP1						
	Symbol	P	E	J	N	Wd.Ro25	S
input	K	E	J	N	Wd.Ro25	S	t
range	-15 to 1300°C 0 to 2626 °F	-15 to 800°C 0 to 1560 °F	-15 to 1000°C 0 to 1950 °F	-15 to 1300°C 0 to 2800 °F	0 to 2200°C 0 to 3000 °F	0 to 1600°C 0 to 3000 °F	-15 to 400°C 0 to 782 °F
Symbol	r	b	AN1	AN2	F3	F4	Pt
	input	r	b	DC0-50mV	DC10-50mV	Reserved	Reserved
range	0 to 1769°C 0 to 3216 °F	0 to 1800°C 0 to 3276 °F	-1999 to 9999	-1999 to 9999	Reserved	Reserved	-199 to 800°C -326 to 1472 °F
dP	Decimal point dP	0, 1, 2, 3	0	TC/RTD input, 0: without decimal point, 1: 1 decimal point Analog input: 0: without decimal point, 1: 1 decimal point, 2: 2 decimal points 3: 3 decimal points			
UNIT	Display unit UNIT	°C, °F, no	°C	°C: Celcius °F: Fahrenheit No:No unit			
LSPL	SV lower limit LSPL	Temp: -199~3276 Analog: -1999~9999	0	SV lower limit Remote-SV lower limit input display value			
USPL	SV higher limit USPL	Temp: -199~3276 Analog: -1999~9999	400	SV higher limit Remote-SV higher limit input display value			
PVOS	input offset PVOS	Temp: -199~199 Analog: -1999~9999	0	To compensate the input error caused by the sensor			
PVFL	Input filter strength PVFL	0 to 60	5	1-30 normal input filter strength 31-60 enhanced input filter strength			
ANL1	lower limit display for analog input	-1999~9999	0	Display for analog input at its lower limit value "ANL1"			
ANH1	higher limit display for analog input	-1999~9999	2000	Display for analog input as its higher limit value "ANH1"			
ALd1	Alarm mode for alarm 1	00 to 16	11	To configure the alarm mode of alarm 1			
AH1	Alarm hysteresis for alarm 1	0 to 9999	0	Hysteresis value for alarm 1			
ALt1	Alarm 1 delay time	0 to 9999S	0	Alarm delay time for alarm 1 only applicable for ALd1=01~06 and 11~16,Alarm 1 will be triggered after delay time ALt1			
ALd2	Alarm mode for alarm 2	00 to 16	10	To configure the alarm mode of alarm 2			
AH2	Alarm hysteresis for alarm 2	0 to 9999	0	Hysteresis value for alarm 2			
ALt2	Alarm 2 delay time	0 to 9999S	0	Alarm delay time for alarm 2 only applicable for ALd2=01~06 and 11~16,Alarm 2 will be triggered after delay time ALt2			
OPd1	OP1 output mode	0 or 1	0	0: reverse control(heating) 1:direct control(cooling)			
RAM	Temperature Setting value storage mode	0 or 1	0	Range: 0 to 1 When RAM=0, when SV set from master device via RS-485, the data is stored in EEPROM and is saved when power is turned off. (100,000 EEPROM refreshes, not suitable for cyclically writing different data) When RAM=1, when SV set from master device via RS-485, the data is stored in RAM and will not be saved when power is off. (Allows cyclic writing of different data)			
OUT	Output type Selection	RLY SSR		=RLY: OP1 output terminal,Relay output =SSR: OP2 output, SSR Drive output			
IdNO	IdNO	0-255	1	Device address configuration			
bAUD	bAud	2, 4 4, 8 9, 6 19, 2	9, 6	2.4 Baud rate 2400 bps 4.8 Baud rate 4800 bps 9.6 Baud rate 9600 bps 19.2 Baud rate 19200 bps			
UCR	UCR	n, o, E	n	N: 8 data bit, + No parity+1 stop bit(BN1) O: 8 data bit, + odd parity+1 stop bit(BO1) E: 8 data bit, + Even parity+1 stop bit(EE1)			

Three approaches to exist and save the configuration under F menu

- 1: Press SET key for 3 seconds
- 2: Quick press A/M key once
- 3: Press SET and F3 at the same time

6.2 Engineer parameter (PASS-0101 menu)

PV/SV display mode

Password interface

Engineer parameter

Press SET and F3 at the same time enter into PASS interface

SET PASS=0101 Press SET to F menu

Input sensor code selection

Setting value lower limit LSPL

Display Unit

Decimal point setting

Setting value higher limit USPL

Communication checking code UCR

- Alarm mode(ALd=00~23)
- 10: No alarm
 - 11: Deviation high alarm
 - 12: Deviation low alarm
 - 13: Deviation high/low alarm
 - 14: Deviation band alarm
 - 15: Process high alarm
 - 16: Process low alarm
 - 00: No alarm
 - 01: Deviation high alarm with standby function
 - 02: Deviation low alarm with standby function
 - 03: Deviation high/low alarm with standby function
 - 04: Deviation band alarm with standby function
 - 05: Process high alarm with standby function
 - 06: Process low alarm with standby function
 - 09: LBA alarm
 - 19: HBA heater short circuit alarm
 - 17: Timer kick-in alarm
 - 18: Timer finish alarm
 - 21: Setting value high alarm
 - 22: Setting value low alarm
 - 23: Process value limit value

6.2.1 Alarm mode details

Code	ALD	Specification(Example for alarm 1)
A	11	No alarm
	11	Deviation high alarm
B	12	Deviation low alarm
	12	Deviation high/low alarm
C	13	Deviation high/low alarm

Diagram details for Alarm mode 11 (Deviation high alarm):

- AL1 ≥ 0: Alarm ON at SV+AL1, Alarm OFF at SV.
- AL1 < 0: Alarm ON at SV, Alarm OFF at SV+AL1.

Diagram details for Alarm mode 12 (Deviation low alarm):

- AL1 ≥ 0: Alarm ON at SV, Alarm OFF at SV+AL1.
- AL1 < 0: Alarm ON at SV+AL1, Alarm OFF at SV.

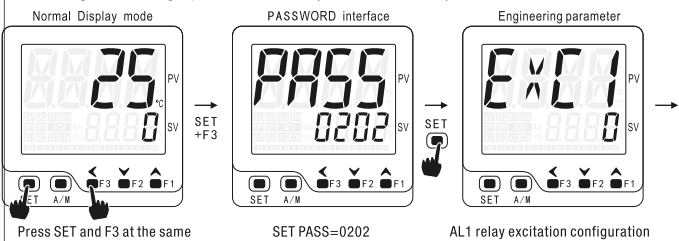
Diagram details for Alarm mode 13 (Deviation high/low alarm):

- Alarm ON at SV+AL1, Alarm OFF at SV.

D	14	Deviation band alarm	
H	15	Process high alarm	
J	16	Process low alarm	
E	01	Deviation high alarm with hold action	
		Deviation high alarm with hold action	
F	02	Deviation low alarm with hold action	
		Deviation low alarm with hold action	
G	03	Deviation high/low alarm with hold action	
M	04	Deviation band alarm with hold action	
K	05	Process high alarm with hold action	
L	06	Process low alarm with hold action	
V	21	SV high alarm	When SV ≥ AL1, AL1 on, When SV < AL1 - AH1, AL1 off
W	22	SV low alarm	When SV ≤ AL1, AL1 on, When SV > AL1 + AH1, AL1 off
P	23	Process value limit alarm	
R	09	LBA loop break alarm	
Q	19	Heater short circuit alarm	
3	17	timer kick-in alarm	
4	18	timer finish alarm	

Note: The alarm action will be suppressed right after power on even the condition is satisfied, and the alarm standby on works 1 time right after power on, the alarm will go off if the condition satisfied again after suppression at the first time

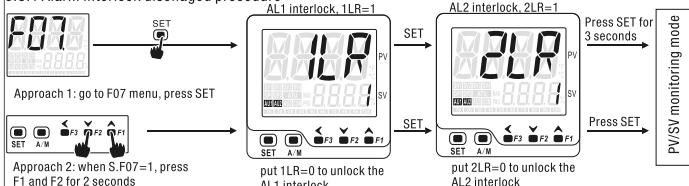
6.3 Engineering parameters(PASS-0202)



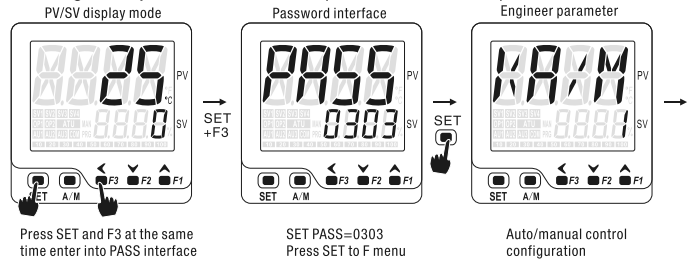
Engineer parameters menu "0202"(PASS-0202)

Notation	Name	Range	Default	Remark
EX01	AL1 relay excitation	0, 1	0	0: AL1 relay pull-in when alarm 1 triggered 1: AL1 relay release when alarm 1 triggered
AL11	AL1 interlock	0, 1	0	0: AL1 output standard mode 1: AL1 output interlock mode
EX02	AL2 relay excitation	0, 1	0	0: AL2 relay pull-in when alarm 2 triggered 1: AL2 relay release when alarm 2 triggered
AL12	AL2 interlock	0, 1	0	0: AL2 output standard mode 1: AL2 output interlock mode

6.3.1 Alarm interlock disengaged procedure



6.4 Engineer parameter menu 3 (PASS-0303 menu)



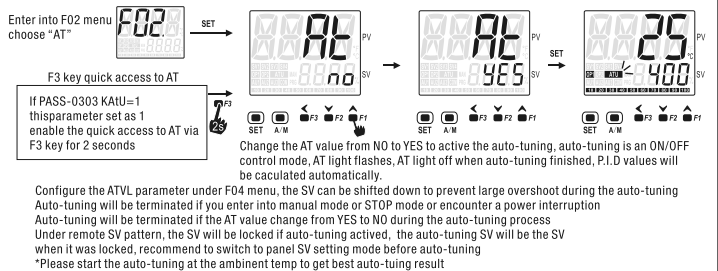
Depends on the specific functions some of parameter may or may not be available

Notation	Name	Range	Factory default	Remark
KAM	Auto/manual control switch configuration	0, 1	1	0: A/M key disabled 1: A/M Key enable (press A/M key 3 seconds to switch)
KRS	Run/Stop function configuration	0, 1	0	0: Disable RUN function active by F1 key Disable STOP function active by F2 key 1: Enable RUN function active by F1 key Enable STOP function active by F2 key
KATU	Auto-tuning short cut key	0, 1	0	0: Disable auto-tuning active by F3 key 1: Enable auto-tuning active by F3 key
PWON	Power on control mode	0, 1, 2, 3	0	0: Auto control mode after power on 1: Stop mode after power on 2: Manual control mode after power on initial output value defined by PK01 parameter 3: Controller continue the status from where it left off
MON1	Quick start menu 1 configuration	0, 1, 2, 3	1	0: MV1, MV2, MVFb absent in quick menu 1 1: MV1, MV2, present in quick menu 1, MVFb absent 2: MVFb present in quick menu 1, MV1, MV2 absent 3: MV1, MV2, MVFb present in quick menu 1
ELUN	Reserved for future use		0	

Three approaches to exist and save the configuration under F menu

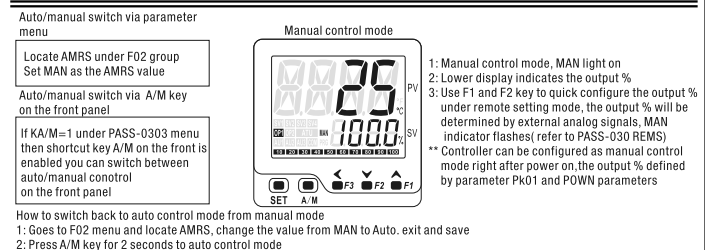
- 1: Press SET key for 3 seconds
- 2: Quick press A/M key once
- 3: Press SET and F3 at the same time

7. Auto-Tuning

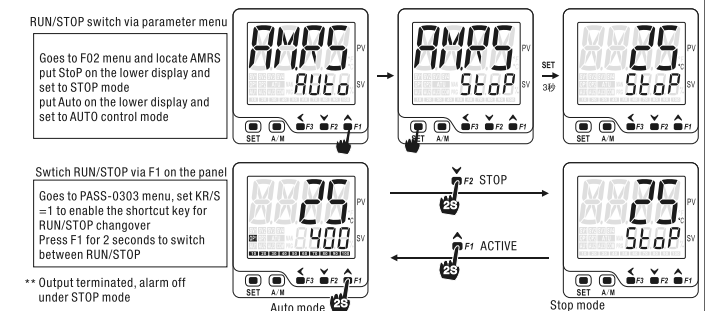


Configure the ATVL parameter under F04 menu, the SV can be shifted down to prevent large overshoot during the auto-tuning. Auto-tuning will be terminated if you enter into manual mode or STOP mode or encounter a power interruption. Auto-tuning will be terminated if the AT value change from YES to NO during the auto-tuning process. Under remote SV pattern, the SV will be locked if auto-tuning activated, the auto-tuning SV will be the SV when it was locked, recommend to switch to panel SV setting mode before auto-tuning. *Please start the auto-tuning at the ambient temp to get best auto-tuning result

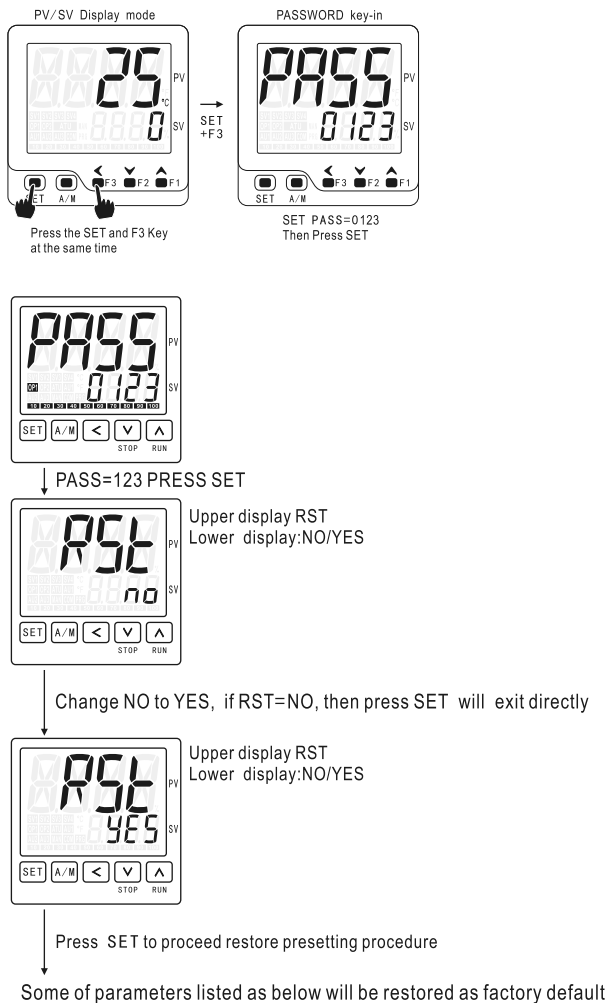
8. Auto manual control switch



9. RUN/STOP function



10. Restore Presettings For Some of Parameters



Parameters as below

- 1:OLL=0.0 (F01)
- 2:OHH=0.0 (F01)
- 3:SC=0.0 (F04)
- 4:P1=20.0 (F04)
- 5:I1=210 (F04)
- 6:D1=30 (F04)
- 7:ATVL=0.0(F04)
- 8:CYT1=20 (F04)
- 9:HYS1=2.0 (F04)
- 10:RST1=-5.0 (F04)
- 11:OPL1=0.0 (F04)
- 12:OPH1=100.0 (F04)
- 13:BUF1=100.0 (F04)
- 14:PKO1=0.0 (F04)
- 15:CYT2=2 (F04)

11. RS-485 communication brief

- (1) Communication based on modbus RTU, support 03 read command, 06 and 10 write command
- (2) Communication format, 2 wires system, half-duplex, single drop connection
- (3) Communication speed: 2400, 4800, 9600, 19200 baud rate, data format, 1 start bit+ 8 data bit+parity(N.o.E)+1 /2 stop bit
- (4) Support maximum 36 write command and 37 read command
- (5) Detailed setting goes to PASS-0101 and locate parameter ldn0, bAUd, UCR parameters
- (6) Refer to "COM-820-C1" for detailed communication protocol information