User Manual

MAU90-28 MAU90-38 Din Rail Mount PID Controller

3 Years Warranty !!

1:General Features:

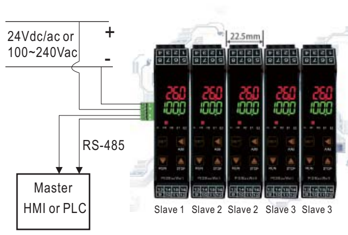
- DIN rail mount, 22.5mm width
- TC/RTD/Analog, Universal input
- NPID,APID,Autotune,ON-OFF control mode artificial intelligence fuzzy logic PID control algorithem
- 0.25%F.S measuring accuracy
- Dual display,4 digits,7 segments LED display
- °C/°F display selectable
- Excellent performance, very limited overshoot and undershoot
- 0.1 maximum resolution for TC/RTD, 0.001 maximum resolution for analog input
- Fast sampling rate at 250ms, suitable for both temperature or pressure control application
- Touch button, feedback beep sound when you tap on the buttons this is a very useful features for user to track the operation not only visually, but aslo auditory.
- Bus power supply or independent power supply optional
- Ultra high brightness LED, excellent readability under direct sunlight
- 100~240Vac or 24VDC/AC source optional
- Very small temperature drift,<0.03%FS/°C
- Modbus RS-485 communication optional
- Ultra low power consumption less than < 5W
- Output specs: Relay 2A 250Vac or 24VDC
  SSR Drive(12VDC 50mA)
  4-20mA, 0-10VDC
- Operates at extremely wide ambient range, -30℃~75℃ degree

2:Ordering Information

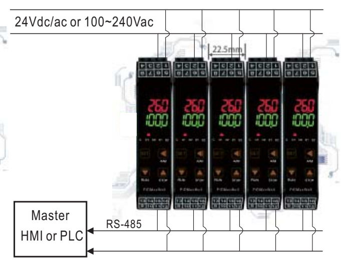
MAU90-1-2-3-4-5-6-7

1:Power supply format

28	Separate powered version
38	Bus powered version Please check below detailed information on the difference between version 28 and 38



38 version, bus powered
the power supply and RS-485 communication can be conducted as above image



28 version, separate powered
the power supply and RS-485 communication can be conducted as above image

2:Input

1	Code "1" for factory default input, compatible with TC/RTD and voltage signal, signal listed below is available Thermocouple: K, S, R, T, E, J, B,N, WRe3-WRe25, WRe5-WRe26. RTD: PT100, Cu50 Voltage: 0~75mV, 0~20mV, 0~100mV, 0~60mV, 0~500mV, 100~500mV 1~5V, 0~5V, 0~10V, 2~10V, 0~20V.
2	Code "2" means input compatible with TC/RTD and 4-20mA, 0-20mA, when input selected as "2", extra 24VDC auxiliary power supply will be embedded as well, as 4-20mA signal often comes from various transmitters, 24VDC source can be used to power transmitters. signal listed below is available. Thermocouple: K, S, R, T, E, J, B,N, WRe3-WRe25, WRe5-WRe26. RTD: PT100, Cu50 Analog singal: 4-20mA, 0-20mA Additional 24VDC auxiliary power supply embedded

3:Output

1	Relay
2	SSR Drive
3	4-20mA
4	0-10Vdc
5	1-5Vdc

4:Alarm(fixed option)

1	1 alarm(relay output NO+NC)

5:Auxiliary ouptut

0	DIN rail version do not have this option

6:Communication

0	Without communication
1	MT BUS RS-485 communication, free computer software for programming
3	Standard ModBus RS-485 communication

7:Power supply

A	100~240Vac 50/60HZ
D	24VDC source
24VAC	24Vac source

Ordering example: MAU90-38-1-2-1-0-3-D

- MAU90 series
- Bus powered version
- TC/RTD/Voltage input
- SSR Drive output
- 1 alarm
- No auxiliary output
- Standard RS-485 communication
- 24VDC source

3:Parameter Setting

Press SET key for more than 2 seconds, and then tap on the SET key, you will see below parameters one bye one.

- PV / SV
- ↓ SET 2S
- uPAL / 3200 — UPAL: Process high alarm
- ↓ SET
- LoAL / -999 — LOAL: Process low alarm
- ↓ SET
- ESAL / 3200 — ESAL: Deviation high alarm
- ↓ SET
- EIAL / -999 — EIAL: Deviation low alarm
- ↓ SET
- Loc / 0 — Loc: Parameter access protection factory default is "0"
- ↓ Change LOC from "0" to "808"
- Loc / 808 — Loc=808 you can access to all parameters after change LOC to 808
- ↓ SET
- uPAL / 3200 — UPAL: Process high alarm
- ↓ SET
- LoAL / -999 — LOAL: Process low alarm
- ↓ SET
- ESAL / 3200 — ESAL: Deviation high alarm
- ↓ SET
- EIAL / -999 — EIAL: Deviation low alarm
- ↓ SET
- AHYS / 2 — AHYS: Hysteresis band for alarm output
- ↓ SET
- AdIS / on — AdIS: Alarm indication configuration
- ↓ SET
- AoP / 1111 — AoP: Alarm output assigment
- ↓ SET
- CtrL / APId — CtrL: Control mode
- ↓ SET
- Srun / run — Srun: Controller status
- ↓ SET
- Act / rE — Act: Direct/reverse control selection
- ↓ SET
- At / oFF — AT: Auto-tuning switch
- ↓ SET
- P / 25 — P: Proportional constant
- ↓ SET
- I / 200 — I: Integral time
- ↓ SET
- d / 50.0 — d: Derivative time
- ↓ SET
- CtI / 2.0 — Ctl: Control cycle time
- ↓ SET
- P2 / 25 — P2: Proportional band for cooling control
- ↓ SET
- I2 / 200 — I2: Integral time for cooling control
- ↓ SET
- d2 / 50.0 — D2: Derivative time for cooling control
- ↓ SET
- CtI2 / 2.0 — CtL2: Cycle time for output2/cooling
- ↓ SET
- CHYS / 2 — CHYS: Hysteresis for ON/OFF control mode
- ↓ SET
- InP / 0 — InP: Input sensor code selection
- ↓ SET
- dPt / 0 — dPt: Decimal point position
- ↓
- ScL / 0 — SCL: Display low limit for analog signal
- ↓ SET
- ScH / 1000 — SCH: Display high limit for analog signal
- ↓ SET
- Scb / 0 — SCB: Input offset
- ↓ SET
- FILt / 1 — FILT: PV input filter
- ↓ SET
- Fru / 50C — Fru: Power frequency and display unit selection,select between 50/60HZ and C/F unit
- ↓
- oPt / SSr — oPt: Output type selection(SSR/Relay /0-20mA/4-20mA)
- ↓ SET
- Aut / SSr — Aut: Output type selection for cooling output
- ↓ SET
- oPL / 0 — OPL: Output low limit
- ↓ SET
- oPH / 100 — OPH: Output high limit
- ↓ SET
- OEF / 3200 — OEF: Assign the effective range for "OPH"
- ↓ SET
- Addr / 1 — Addr: Communication address
- ↓ SET
- bAud / 9600 — bAud: Communication baud
- ↓ SET
- Et / nonE — Et: Event input configuration
- ↓ SET
- AF / 32 — AF: System function selection
- ↓ SET
- PASd / 0 — PASd: Parameter access configuration
- ↓ SET
- SPL / -999 — SPL: Set value lower limit
- ↓ SET
- SPH / 3200 — SPH: Set value higher limit
- ↓ SET
- SP1 / 25 — SP1: Set value 1
- ↓ SET
- SP2 / 100 — SP2: Set value 2
- ↓ SET

EP1-EP8

3.1 List of system parameters

Table 1

Code	Description	Setting Range	Initial Setting	Remarks
uPAL	process high alarm	-999~3200	3200	See. 3.1.1 for details
LoAL	process low alarm	-999~3200	-999	
ESAL	deviation high alarm	-999~3200	3200	
EIAL	deviation low alarm	-999~3200	-999	
AHYS	alarm hysteresis band	0~200	2	
AdIS	alarm indication	ON/OFF	ON	
AoP	alarm output assigment	0~6666	3333	
CtrL	control mode	OnoF,APID,nPID,PoP,SoP	APID	See. 3.1.2 for details
Srun	controller status	run,Stop,Hold	run	See. 3.1.3 for details
Act	direct/reverse control selection	rE,dr,rEbA,drbA	rE	See. 3.1.4 for details
At	auto-tuning	OFF,on,FOFF	OFF	See. 3.1.5 for details
P	proportional band	0~3200 °C/°F	25	See. 3.1.6 for details
I	integral time	1~9999 Secs	200	
d	derivative time	0~3200 Secs	50.0	
CtI	control cycle time	0.2~300.0 Secs	2.0	See. 3.1.7
P2	proportional band for cooling	0~3200 °C/°F	25	See. 3.1.8
I2	Integral time for cooling control	1~9999 Secs	200	
d2	derivative time for cooling control	0~3200 Secs	50.0	
CtI2	control cycle time for cooling	0.2~300.0 Secs	2.0	See. 3.1.9
CHYS	hysteresis for ON/OFF control	0~2000	2	See. 3.1.10
InP	Input sensor code	0~37	0	See. 3.1.11
dPt	decimal point	0/0.0/0.00/0.000	0	See. 3.1.12
ScL	lower limit for analog input	-999~3200	0	See. 3.1.13
ScH	higher limit for analog input	-999~3200	1000	
Scb	input offset	-999~4000	0	See. 3.1.14
FILt	Filter strength	0~40	1	
Fru	power frequency and C/F display selection	50C/50F/60C/60F	50C	See. 3.1.15
oPt	output type	SSr/rELy/0-20/4-20/PHA1	anyone of them	See. 3.1.16
Aut	cooling output type	SSr/rELy/0-20/4-20	anyone of them	See. 3.1.17
oPL	output lower limit	-110~+110%	0	See. 3.1.18
oPH	output higher limit	0~+110%	100	
OEF	OPH effective range	-999~3200	3200	
Addr	address	0~80	1	See. 3.1.19
bAud	baud rate	0~19200	9600	See. 3.1.20
Et	event input	nonE,ruSt,SP.1.2, PId2,Eact	nonE	See. 3.1.21
AF	system function	0~255	32	See. 3.1.22
PASd	access protection	0~9999	0	See. 3.1.23
SPL	Setting value lower limit	-999~3200	-999	See. 3.1.24

SPH	Setting value higher limit	-999~3200	3200	See. 3.1.24
SP 1	Set value 1	-999~3200	0	See. 3.1.25
SP 2	Set value 2	-999~3200	0	
EP1~EP8	Field parameters	EP1=UPAL EP3=ESAL EP2=LOAL EP4=EIAL	N/A	See. 3.1.26

3.1.1 Alarm parameters

UPAL

-Absolute temperature value high alarm, if PV > UPAL , then alarm on.
If PV < UPAL-AHYS, alarm off. set UPAL=3200 will deactive the alarm. AHYS is alarm hysteresis

LoAL

-Absolute temperature value low alarm, if PV < UPAL , then alarm on.
If PV > UPAL+AHYS, alarm off. set LoAL=-999 will deactive the alarm.
AHYS is alarm hysteresis

ESAL

-Deviation high alarm, when PV-SV > ESAL, alarm on, when PV-SV < ESAL-AHYS, alarm off, set ESAL=3200 will deactive the alarm.

EIAL

-Deviation high alarm, when PV-SV > ESAL, alarm on, when PV-SV < ESAL-AHYS, alarm off, set ESAL=3200 will deactive the alarm

AHYS

-Deviation high alarm, when PV-SV > ESAL, alarm on, when PV-SV < ESAL-AHYS, alarm off, set ESAL=3200 will deactive the alarm

AdIS

When alarm is triggered, the alarm indicator will light up. at the same time,The lower display could display the alarm code "UPAL,LOAL, ESAL, EIAL" and setting value alternately, this is a visual warning for the operator to know that the alarm is triggered,if you put AdIS as "off" then the lower window won't display the alarm code when alarm is on, if you put AdIS as "on" then the lower window will display the alarm
code when alarm is triggered

AOP

Assign relays to different alarm, AL1 and AL2 refers to the two relays that are installed inside of the controller for alarm purpose, please do not confuse the relays with alarm parameter UPAL,LOALESAL,EIAL, The parameter AOP(alarm output defenition) allows user to select which relay to be triggered when the alarm set condition is met, You can set multiple alarms to active one relay(either AL1, AL2, AU1 or AU2) but you can't activate both relays with just one alarm. below is the format of the AOP value, the AOP value consist of a 4 digits number, like 4321. the numbers on the unit position defines which relay will be triggered when "UPAL" alarm is on, the numbers on the ten's position defines which relay will be triggered when "LoAL" alarm is on, the numbers on the hundred's position defines which relay will be triggered when "ESAL" alarm is on, the numbers on the thousand's position defines which alarm will be triggered when "ELAL" alarm is on.

$$AOP=\underset{EIAL}{\underline{4}}\ \underset{ESAL}{\underline{3}}\ \underset{LoAL}{\underline{2}}\ \underset{UPAL}{\underline{1}}$$

The range of the AOP is 0-4, 0 means no relay will be triggered even if alarm condition is met, 1 means AL1 relay will be triggered, 2 means AL2 relay will be triggered, 3 means AU1 relay will be triggered, 4 means AU2 relay will be triggered take "4321" as an example, it means that the AL1 relay will be triggered when UPAL alarm is ON, AL2 relay will be triggered when LOAL alarm is on, AU1 relay will be triggered when ESAL alarm is on, AU2 relay will be triggered when EIAL alarm is on. if you put AOP=3333, means all 4 different alarms when trigger the same relay which is AU1 relay.

3.1.2 Control mode(CtrL)

This controller incorporates 5 different control modes, the parameter code are OnoF, APID, nPID, PoP, SoP.

OnoF: ON/OFF control mode, for simple application which accuracy is not that critical
APID: Artifical intelligence PID control mode
nPID: Standard PID control mode
PoP: The controller will retransmit the PV value as analog output to feed to recorder or other device, this works if the main output is analog output
SoP:The controller will retransmit the SV value as analog output to feed to recorder or other device. this works if the main output is analog output

3.1.3 Controller status(Srun)

This parameters defines the controller status, available with 3 options, run, Stop ,Hold.
Run, controller at running mode
StoP, controller stop operating.

3.1.4 Direct/reverse or heating/cooling mode selection(Act)

This parameter available with 4 options, rE,dr, rEbA, drbA. these parameters are used to define the control action, whether you need heating or cooling control mode.
rE: reverse control mode, for heating application
dr: direct control mode, for cooling application
rEbA: reverse control mode with alarm suppression, unnecessary absolute low limit and deviation low limit alarm will be suppressed.
drbA: direct control mode with alarm suppression, unnecessary absolute high limit and deviation high alarm will be suppressed.

3.1.5 Auto-tuning switch(At)

This parameter is auto-tuning switch parameter, OFF, on, FOFF
OFF: auto-tuning off
on: auto-tuning on
FOFF: auto-tuning off, and you can not activate the auto-tuning from the front panel

3.1.6 P.I.D values and PID control mode

Please note that this controller has two PID control mode, APID and nPID, nPID is a normal conventional PID control mode, it's similar to PID control mode from other controllers on the markets, APID is a unique fuzzy logic enhanced PID control with advance algorithm

In most cases the fuzzy logic enhanced PID control is very adaptive and may work well without changing the initial PID parameters. If not, users may need to use auto-tune function to let the controller determine the parameters automatically. If the auto tuning results are not satisfactory, you can manually fine-tune the PID constants for improved performance. Or you can try to modify the initial PID values and perform auto tune again. Sometimes the controller will get the better parameters.

(1)Proportinal constant "P"
Please note that the P constant is not defined as proportional band as in the traditional model under **APID** control mode, its unit is not in degrees. A larger constant results in larger and quicker action, which is the opposite of the traditional proportional band valve. it also functions in the entire control range rather than a limited band.
If you are controlling a very fast response system (>1^{0}C/^{0}F/second) that fuzzy logic is not quick enough to adjust, set the control mode as nPID will change the controller to the traditional PID system with a moderate gain for the P.

(2) Integral time "I"
Integral action is used to eliminate offset. Larger values lead to slower action. Increase the integral time when temperature fluctuates regularly (system oscillating). Decrease it if the controller is taking too long to eliminate the temperature offset. When I = 0, the system becomes a PD controller.

(3) Derivative time "D"
Derivative action can be used to minimize the temperature overshoot by responding to its rate of change. The larger the number, the faster the action.

3.1.7 Control cycle time for reverse/heating action

CtL: Control cycle time for reverse/heating action, for SSR, analog and phase angled output, the range will 1.0~3.0 seconds. for relay output, the value will be greater than 3 seconds, the most optimal value will be calculated via auto-tuning process(This is a big difference between our PID and other PID on the markets, most of PID on the markets , the cycle time are predetermined, but for our PID, the control cycle time will be calculated via auto-tuning process, this will increase the control accuracy dramatically)
Under ON/OFF control mode, the Ctl will be used to define the ON delay time. this is very useful for some of application with the compressor involved. they need this feature to protect the compressor.

3.1.8 P.I.D values for cooling control action

P2,I2,d2 defines the P,I,D values for cooling control action, These parameters are not applicable for mode this model

3.1.9 Control cycle time for cooling control action

Ctl2, This parameter defines the control cycle time for cooling control action, these parameters are not applicable for this model

3.1.10 Hysteresis for ON/OFF control mode

CHYS, This parameters is used to remove the frequent ON/OFF action of the relay around the set point in an ON/OFF control situation. for reverse/heating control, the relay will release if PV>SV, and relay will pull-in when PV<SV-CHYS, for direct/cooling control application, the relay will release when PV<SV, and relay will pull-in when PV<SV+CHYS.

3.1.11 Input sensor code InP

InP, Please see table 2 for acceptable sensor type and its range

Table 2. code for InP input and its range.

InP code	Input sensor type	Display range (° C)	Display range (° F)
0	K (thermocouple)	-50~+1300	-58~2372
1	S (thermocouple)	-50~+1700	-58~3092
2	R(thermocouple)	0~1700	32~3092
3	T (thermocouple)	-200~350	-328~662
4	E (thermocouple)	0~800	32~1472
5	J (thermocouple)	0~1000	32~1832
6	B (thermocouple)	0~1800	32~3272
7	N (thermocouple)	0~1300	32~2372
8	WRe(3/25)(thermocouple)	0~2300	32~4172
9	WRe(5/26)(thermocouple)	0~2300	32~4172
10	Special input	N/A	N/A
12	Radiant high temperature sensor	N/A	N/A
17	K, with 2 decimal point	0~300.00	32~572.00
18	J, with 2 decimal point	0~300.00	32~572.00
20	Cu50	-50~+150	58~302
21	Pt100	-200~800	-328~1472
22	Pt100(-100~+300.00)	-100~+300.00	-148~+572.00
15	4-20mA(specify when order)	-9990~32000 **defined** by user with SCL and SCH	
16	0-20mA(specify when order)		
25	0~75mV		
26	0~80Ω		
27	0~400Ω		
28	0~20mV		
29	0~100 mV		
30	0~60 mV		
31	0~500mV		
32	100~500mV		
33	1~5V 4~20mA (w/ 250Ω Resistor)		
34	0~5V		
35	0~10V		
36	2~10V		
37	0~20V		

3.1.12. Decimal point setting (dPt)

The parameter dPT defines how many decimal point you will see for PV and SV value, the display format can be 0, 000.0 ,00.00 , 0.000. see table 4 for details

1) Thermocouple and RTD

For thermocouples and RTD sensors, dPt can be set to 0 or 0.0 or 0.00
when dPt=0, temperature display resolution is 1°C/F
when dPt=000.0, temperature display resolution is 0.1°C/F, the temperature will be displayed at the resolution for 0.1°C for input below 1000°C,display will be 1°C for input over 1000°C
For some of application where customer need 2 decimal points even when the input is K,J,PT100, in this case, the InP can be set as "17" "18" "22", and set "dPt" as 00.00, the display resolution will be 00.01°C/F

2) Linear input(Voltage, current, or resistance input, InP=25~37)

For other linear input signal, dPt can be set to all display format

Table 3. dPt parameter setting

dPt value	0000	000.0	00.00	0.000
Display format	0000	000.0	00.00	0.000

3.1.13 Limiting the control range, "SCL" and "SCH"

When you set InP=15,16, 25~37, the input will be analog inputs, parameter "SCL" and "SCH" are used for scaling display, "SCL" is the value to be displayed when the signal is at its low limit of the linear input, "SCH" is the value to be displayed when the signal is at its high limit of the linear input. for example, for 4-20mA signal,"SCL" corresponds to the value when signal is 4mA, and "SCH" corresponds to the value when signal is 20mA.

3.1.14 Input offset "Scb" and input filter strength "FILt"

Input offset Scb is used to add an offset value to compensate the sensor error or simply to shift the reading. for example, if the controller displays 2°C when probe is in ice/water mixture, setting Scb=-2, will shift the temperature reading to 0°C

If measurement input fluctuates due to noise, then a digital filter can be used to smooth the input. "FILt" may be configured in the range of 0 to 40. Stronger filtering increases the stability of the readout display, but causes more delay in the response to change in temperature. FILt = 0 disables the filter.

3.1.15 Frequency of power supply and display unit

These parameters have 4 options, "**50C**" "**50F**" "**60C**" "**60F**". 50 means the power supply is 50HZ AC source, C means the display will be in Celcius, 60 means the source is 60HZ AC source, F means the display will be in Fahrenheit ,to have a most optimal anti-inteference effect, make sure to choose the frequency according to your source, for instance, a typical north America source,the supply will be 110V 60HZ and display in Fahrenheit, in this case, user should chose 60F. for a domestic user in china, the setting will be 50C, 50HZ in Celcius unit.

3.1.16. Output definition "oPt"

These parameter defines the output type, options are "**SSr**", "**rELy**" "**0-20**", "**4-20**" "**PHA1**" These parameters are not applicable for this model

3.1.17. Output definition for cooling action "Aut"

This parameter is not applicable for this model

3.1.18 Output range limits "oPL" and "OEF" "oPH"

oPL and oPH allows you set the output range low and high limit. oPL is a useful feature for a system that needs to have a minimum amount of power as long as the controller is powered. For example, if oPL=20, the controller will maintain a minimum of 20% power output even when input sensor failed.
OEF assign the effective range of the output high limit function. makes the OPH function relevant to the process value, if the PV< OEF, the output high limit function kicks in, when PV>OEF, the output high limit function will be disengaged. this is very useful for some of application where the maximum power has to be under certain degree when the temperature less than certain value. for example, if you put OEF=300°C, and OPH=20%, when PV<300°C, the maximum output will be 20% ,when PV increase and eventually greater than 300°C, the maximum output will be no longer 20%, the limits will be 100%. the actual output will be determined by the controller itself.

3.1.19 Device address "Addr"

This controller available with RS-485 option, one may integrate this controller to a communication system, this parameters defines the address of the controller. the

3.1.20 Communication speed baud rate "bAud"

This parameter defines the communication speed between controller and other device such as PLC. the options are 1200bps,2400bps,4800bps,9600bps,19200 bps.

3.1.21 Even input configuration "Et"

This parameter is not application for this model

3.1.22 "AF" system function configuration

Parameter "AF" is used to some of advanced system functions of this controller, below is the details on how to calculate the AF value based on below formula.

AF= A x 1+ B x 2+ C x 4 +D x 8 + E x 16+ F x 32 + G x 64 + H x 128

A=0, ESAL and EIAL will be deviation alarm, **A**=1, ESAL and EIAL will be absolute alarm, if you put A=1, then the controller will have 2 group of absolute high limit alarm and 2 group of absolute low limit alarm.
B=0, Hysteresis for alarm and ON/OFF control will be unilateral hysteresis, if B=1. the hysteresis for will be bilateral hysteresis.
C=0, Bar graphics shows the output value, C=1, bar graphics shows the PV value
D=0, Password for engineering parameters is "808", D=1, password for engineering parameters is "PASd" you can assign any password to have a greater protection against unauthorized access.
E=0, UPAL and LOAL will be absolute high and absolute low alarm, if E=1, UPAL and LOAL will be switched to deviation high and deviation low alarm, together with ESAL and EIAL, the controller could have 2 groups deviation high alarm and 2 groups of deviation low alarm.
F=0, Ultra precision control mode, the actual control resolution is 10 times higher than the display, for analog input, the maximum display is 3200, F=1, conventional control accuracy, set F=1 if the display will exceed 3200.
G=0, The absolute high alarm will be triggered if temperature sensor break apart
G=1, The absolute high alarm won't be triggered if temperature sensor break apart.
If you put AF=160, the communication protocol will be RS-485 mode.

3.1.23 "PASd" engineer parameter access configuration

When PASd=0~255, or AF.D=0, you put LOC=808 will enable the user to access entire engineer parameters.
If PASd set to value between 256~9999 and AF.D=1, the engineering parameters can't access without input the password assigned under PASd, for example, if you set PASd=2687, to access to engineer parameters, user have to key-in password 2687 to access the engineer parameters.

3.1.24 "SPL" and "SPH" setting value low limit and high limit

SPL is setting value low limit, SPH is the setting value high limit, for example, if you put SPL=0 and SPH=400, the setting value will be from 0~400.

3.1.25 "SP1" and "SP2" dual setting value.

Controller can also be used as a standard PID controller, in this case, two setting values can be assigned to the same controller, when Et=SP1.2, a remote switch can be used to switch the setting value between SP1 and SP2, for example, if SP1= 100, SP2=400, at some point, user might want to use the controller with the setting value at SP1(100), in this case, you can switch the SV back and forth between SP1 and SP2. this parameter only works for panel mount version of MAU90

3.1.26 "EP1~EP8" field parameters and access protection parameter "Loc"

By assigning system parameters as Field Parameters (EP1 ~ EP8), you can select which parameter can be displayed or changed when controller is locked. Up to 8 parameters can be assigned as Field Parameter. The Field Parameter can be any parameter listed in Table 2 except Field parameters themselves and the Loc parameter.
By setting Loc to different values, different access privilege can be granted to user, if Loc=0, user can access and configure parameters under field parameter EP1~EP8 ,all shortcut and setting value, step time duration are configurable.
Loc=1, user can access and configure parameters under field parameter EP1~EP8 ,all shortcut and setting value, step time duration are configurable, but user can not Run, Stop, Pause, execute auto-tuning on the controller.
Loc=2, user can not access to the field parameter list, but user can Run,Stop,Pause, and execute the auto-tuning on the controller.
Loc=3, user can access and configure parameter under field parameter list, all short cut operation is disabled.
Loc=4~255, All parameters are locked expect the Loc parameter itself.

To prevent the parameters and the program being changed accidently, you can completely or partially lock the parameters and the program after the initial setup. the configuration privilege is determined by "Loc", please refer to the table 5 for the privilege levels.

Table 4. "Loc" value and the configuration privilege level

Loc value	Privilege	EP1 - 8 Adjustment	Program Adjustment	Step Selection
0	limited	Yes	Yes	Yes
1		Yes	No	Yes
2		Yes	No	No
3 and up		No	No	No
808 (Default)	unlimited	Yes	Yes	Yes
PAsd	unlimited	Yes	Yes	Yes