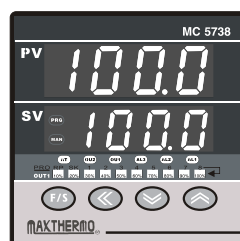
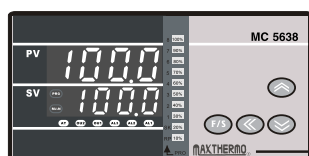


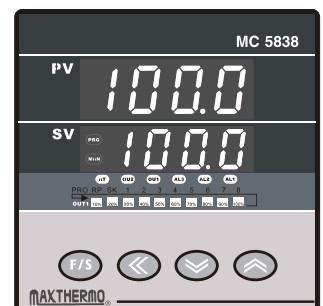
MAXTHERMO-GITTA GROUP CORP MAXIMUM ELECTRONIC CO., LTD

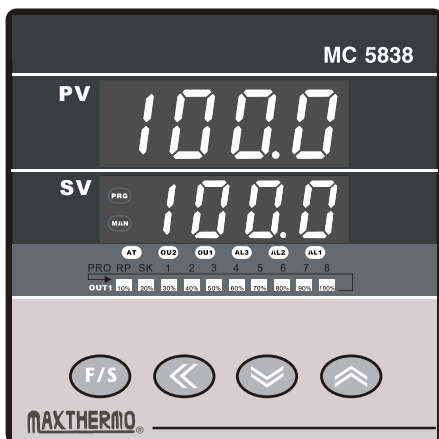
Temperature PID Controllers

OPERATIONAL MANUAL



MC 5438 / MC 5538 / MC 5638
MC 5738 / MC 5838





Display unit & Indication lamps

PV	=Measured value display
SV	=Set value display
AL1	=Alarm 1 output lamp
AL2	=Alarm 2 output lamp
AL3	=Alarm 3 output lamp
OU1	=Control output 1 lamp
OU2	=Control output 2 lamp
AT	=Autotuning lamp
MAN	=Manual mode lamp
10% ~ 100%	=Manipulated output value display
PRG	= Programmable mode lamp
1~8	=Segment-in-process display lamp
RP	=Ramping mode lamp(programmable mode only)
SK	=Soaking mode lamp (programmable mode only)

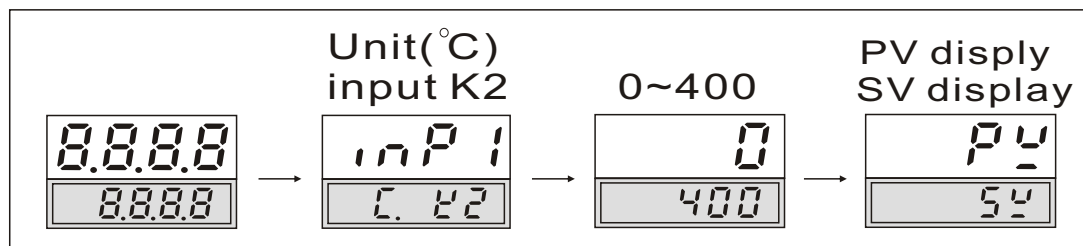
Operation keys

F/S	=Function & Set key
←	=Shift key
↓	=Down key
↑	=Up key
↑ 3sec	Press 3 sec while the SV is not flashing = Used for returning to initial window.
↓ 3sec	Press 3 sec while in level selection window= Used for calling up lock function.
↓ 3sec	Press 3 sec while in pv/sv initial window= Used for stopping output and SV window will display "HOLD", ↓ 3sec press 3 sec again to regain output. (This function is available only while OUTM is selected 1 or 2)
F/S 3sec	Press 3 sec while in pv/sv initial window= Used for calling up level selection.
F/S 3sec	Press 3 sec while in level selection window= Used for entering each level.

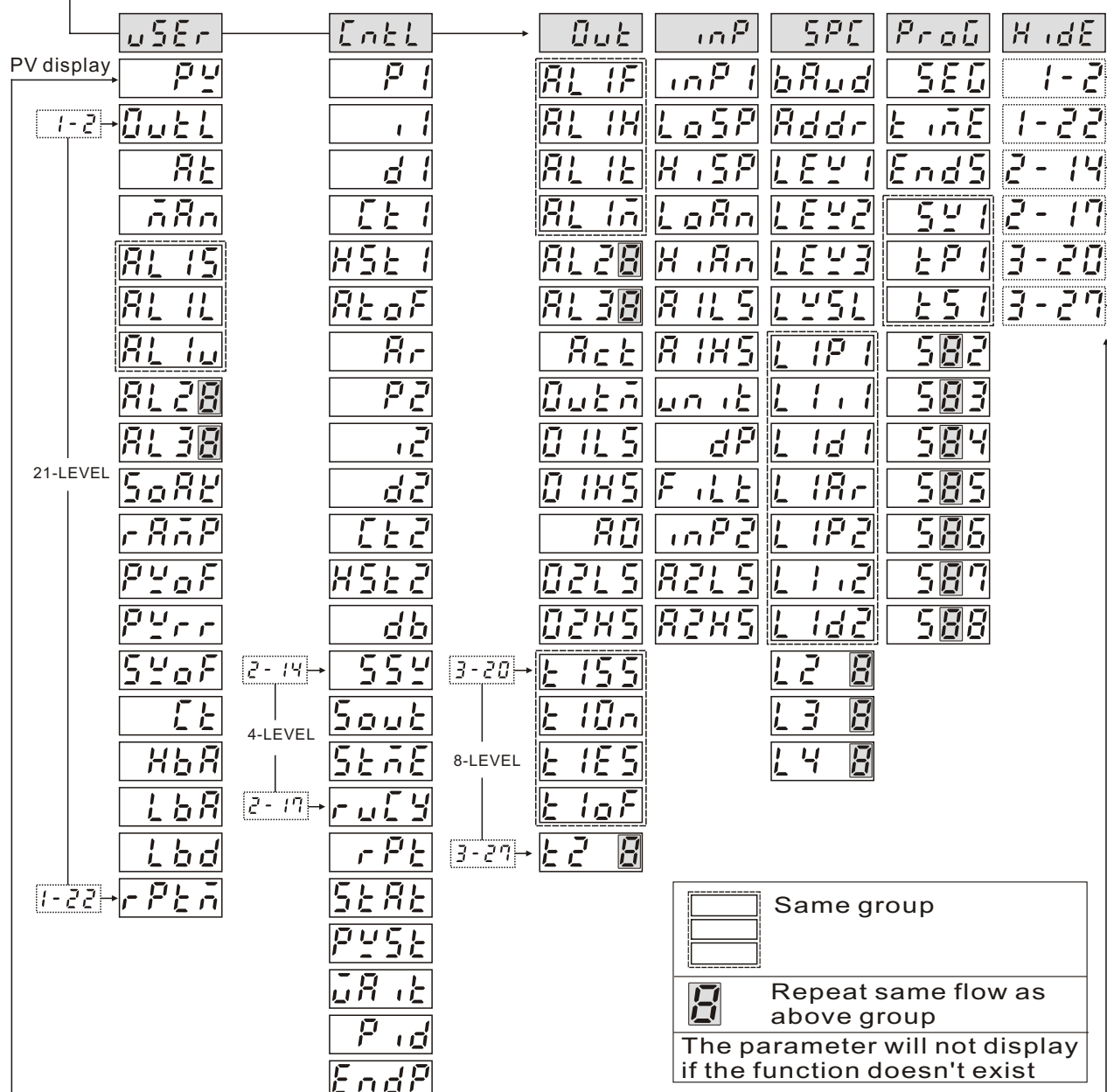
Operation keys (programmable mode only)

These keys are only operated in PV/SV initial window.	
↑ 3SEC Run	PRG lights, RP or SK flashes The executing segment lamp lights.
↓ 3SEC Pause	PRG, RP and SK light The executing segment lamp lights.
↑ + F/S Jump	Jump to the next segment, press ↑ first.
↓ + F/S Stop	Turn off all lamps which used for programmable mode, press ↓ first.
Refer to arrow ↩ When PRG Lights(No PRG light in MC-5438).	

Window checks display after turning on power



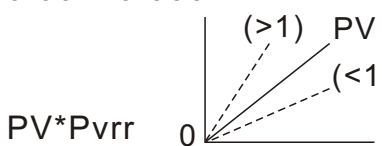
LEVEL Parameter flow chart

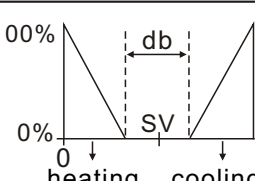


Parameter	DESCRIPTION	RANGE	Initial value
<i>Pv</i> Pv	Process value	LoSP~HiSP	
<i>Sv</i> Sv	Set value	LoSP~HiSP	0.0

USER



<i>OutL</i> OutL	Output percentage	0.0~100.0%	0.0
<i>At</i> At	Auto tuning	No / yes	no
<i>Man</i> Man	Manual mode	Man1 =power failure memory Man2 =no memory No=non	no
<i>AL1S</i> AL1S	Alarm 1 set value	If ALIF set at 1 or 2, range=-200~200 If ALIF set at 3 or 4, range=LoSP~HiSP If ALIF set at 10, range=1-8 segment ending	10.0
<i>AL1L</i> AL1L	Alarm 1 lower set value	0~200	10.0
<i>AL1u</i> AL1u	Alarm 1 upper set value	0~200	10.0
<i>AL2S AL3S</i> AL2S / AL3S	For operating functions same as the above descriptions		
<i>SoAK</i> SoAK	Perform only when AL1M set at 10 or 11 (Refer to explanation on page 7)	0.00~99.59 (h.m)	0.00
<i>rAmP</i> rAmP	Ramp (Refer to explanation on page 7)	0.0~200.0/m	0.0
<i>PvOF</i> PvOF	Pv offset (Refer to explanation on page 7)	-200~200	0.0
<i>Pvrr</i> Pvrr	Pv ratio (Refer to explanation on page 7)	0.001~9.999 	1.000
<i>SvOF</i> SvOF	Sv offset (Refer to explanation on page 7)	-200~200	0.0
<i>Ct</i> Ct	Current transformer monitor (Refer to explanation on page 7)	0.0~100.0A	
<i>HbA</i> HbA	Heater break alarm value (Refer to explanation on page 8)	0.1~100.0A	0.1
<i>LbA</i> LbA	Control loop break alarm time (Refer to explanation on page 8)	0.1~200.0 min	8.0
<i>Lbd</i> Lbd	LBA dead band (Refer to explanation on page 8)	0.0~200.0	0.0
<i>rPtM</i> rPtM	Repeat times monitor Only use in program function (Refer to explanation on page 8)	1~1000	

Parameter	DESCRIPTION	RANGE	Initial value
Ctrl ▼			
P1 P1	Output 1 proportional band	0.0~3000	30.0
i1 i1	Output 1 integral time	0~3600 sec	240
d1 d1	Output 1 derivative time	0~900 sec	60
Ct1 Ct1	Output 1 cyclic time (Refer to explanation on page 8)	0~150 sec	15
HSt1 HSt1	Output 1 hysteresis	0.0~200.0	0.0
AtoF AtoF	At offset (Refer to explanation on page 8)	-200~200	0.0
Ar Ar	Anti-reset windup (Refer to explanation on page 8)	0~100.0% SV-P1 x Ar	100.0
P2 P2	Output 2 proportional band	0.0~3000	30.0
i2 i2	Output 2 integral time	0~3600 sec	240
d2 d2	Output 2 derivative time	0~900 sec	60
Ct2 Ct2	Output 2 cyclic time	0~150 sec	15
HSt2 HSt2	Output 2 hysteresis	0.0~200.0	0.0
db db	Dead band/overlap	-200.0~200.0 	0.0
SSv SSv	Soft start set value (Refer to explanation on page 8)	0.0~200.0 (see fig 2)	120.0
Sout Sout	Soft start output percentage (Refer to explanation on page 8)	0.0~100.0% (see fig 2)	30.0
StmE StmE	Soft start failed time (Refer to explanation on page 8)	0~10 min (see fig 2)	10
ruCy ruCy	Motor valve cyclic time (Refer to explanation on page 8)	1~150 sec (see fig 3)	5
rPt rPt	Program executing times (Refer to explanation on page 8)	1~1000 (see fig 4)	1
StAt StAt	Start mode selection use in program function only (Refer to explanation on page 8)	CoLd = manual rSET=start after power ON Hot= start from memory of power failure	CoLd
PvSt PvSt	Start point selection use in program function only	RSEt = start from 0 Pv = start from PV	rSEt
wAit wAit	Wait value in program (Refer to explanation on page 8)	0.0~200.0	0.0
Pid Pid	PID/Level PID selection (Refer to explanation on page 9)	Pid =Pid Lpid =Level Pid	Pid
EndP EndP	Selects control when program ended (Refer to explanation on page 9)	Cont = Continue StoP = One program only (see fig 4)	StoP

Parameter	DESCRIPTION	RANGE	Initial value
Out ▼			
AL 1F AL1F	Alarm 1 action function	0~12 (see table 1)	1
AL 1H AL1H	Alarm 1 hysteresis	0.0~200.0	0.0
AL 1t AL1t	Alarm 1 in program mode on time	0.00~99.59 (h . m)	0.00
AL 1n AL1m	Alarm 1 special mode selection	(see table 2)	0
For operating functions refer to the above descriptions Different function see(1),(2),(3) AL 2F AL2F (1)AL2M Alarm 2 special mode selection (See Table 2) 0~7 AL 3F AL3F (2)AL3F Alarm 3 action function (See Table 1) 0~11 AL 3F AL3F (3)AL3M Alarm 3 special mode selection (see Table 2) 0~7			
Act Act	Control action selection	Cool / HEAt	HEAt
Outn Outm	Output mode selection This parameter is skipped, opening it needs to contact distributor (see table 3)		1
O 1LS O1LS	Output 1 scale low	0.0~100.0%	17.6
O 1HS O1HS	Output 1 scale high	0.0~100.0%	96.0
AO AO	Analog output selection	Pv=transmit PV Sv=transmit SV dEv=transmit (PV-SV) Mv=transmit output percentage	Pv
O 2LS O2LS	Output 2 and transmission scale low	0.0~100.0%	17.6
O 2HS O2HS	Output 2 and transmission scale high	0.0~100.0%	96.0
t 1SS t1SS	Time signal 1 start segment setting Use in program function only (Refer to explanation on page 9)	1~8	1
t 1On t1On	Time signal 1 on time setting Use in program function only (Refer to explanation on page 9)	0.00~99.59 (h . m)	0.01
t 1ES t1ES	Time signal 1 end segment setting Use in program function only (Refer to explanation on page 9)	1~8	1
t 1oF T1oF	Time signal 1 off time setting Use in program function only (Refer to explanation on page 9)	0.00~99.59 (h . m)	0.01
t 2SS t2SS	For operating functions refer to the above descriptions		

Parameter	DESCRIPTION	RANGE	Initial value
inP ▼			
inP1 inP1	Input 1 selection	(see table 4)	K2
LoSP LoSP	Low setting limit	LOSP~HiSP	0.0
HiSP HiSP	High setting limit	LOSP~HiSP	400.0
LoAn LoAn	Analog input range low	-1999~9999	0.0
HiAn HiAn	Analog input range high	-1999~9999	100.0
A1LS A1LS	Analog input 1 scale low	0~FFFF	
A1HS A1HS	Analog input 1 scale high	0~FFFF	
unit unit	Unit selection	°C / °F / non	°C
dP dP	Decimal point	0/0.0/0.00/0.000	0.0
FiLt FiLt	Digital filter (see fig 5)	0.001~1.000 Non = no function Ct = use for heater break alarm rmSV= use for remote SV	0.600
inP2 inP2	Input 2 selection		non
A2LS A2LS	Analog input 2 scale low	0~FFFF	
A2HS A2HS	Analog input 2 scale high	0~FFFF	
SPC ▼			
bAud bAud	Baud rate	2.4K / 4.8K / 9.6K 19.2K / 38.4K	9.6K
Addr Addr	Address	0~31	0
LEV1 Lev1	Set the range for level1 PID (see fig 6) (act only when level PID is selected)	LoSP~HiSP	400
LEV2 Lev2	Set the range for level2 PID (see fig 6) (act only when level PID is selected)	LoSP~HiSP	400
LEV3 Lev3	Set the range for level3 PID (see fig 6) (act only when level PID is selected)	LoSP~HiSP	400
LvSL LvSL	Watched PID level selection, the level is selected which will display below	1~4 refer to explanation on page 9	1
L1P1 L1P1	Output 1 proportional band for level 1	0.0~3000	30.0
L1i1 L1i1	Output 1 integral time for level1	0~3600 sec	240
L1d1 L1d1	Output 1 derivative time for level1	0~900 sec	60
L1Ar L1Ar	Anti-reset windup for level1	0.0~100.0%	100.0
L1P2 L1P2	Output 2 proportional band for level 1	0.0~3000 sec	30.0
L1i2 L1i2	Output 2 integral time for level1	0~3600 sec	240
L1d2 L1d2	Output 2 derivative time for level 1	0~900	60
L2P ~ 4 The same as level 1			

Parameter	DESCRIPTION	RANGE	Initial value
Prog ▼			
SEG SEG	Program segment monitor	1~8	
t nE Time	Program countdown monitor		
EndS EndS	Program segment end setting	1~8	1
Sv1 Sv1	Sv in segment 1 (see fig 7)	LoSP~HiSP	100
tP1 tP1	Program time in segment 1 (see fig 7)	0.00~99.59 (H.M)	0.00
tS1 tS1	Soak time in segment 1 (see fig 7)	0.00~99.59 (H.M)	0.00
Sv2~8 The same as segment 1			
Hide ▼			
1-2~1-22	Parameter shows with respect to this position	non~t2of	
2-14~2-17	Parameter shows with respect to this position	non~t2of	
3-20~3-27	Parameter shows with respect to this position	non~t2of	

PARAMETER EXPLANATIONS

SoAK	It performs only when AL1M set at 10 or 11, and when the controller is without program function. If you set AL1M at 10, AL1 shift to soak function and contactor will be normal open; if you set AL1M at 11, then AL1 shift to soak function but the contactor is normal close.
rAmP	It is for setting PV to increased or decreased according to the set value when the controller is without program function. For example: If rAmP is set at 10 ,PV will increase 10°C per minute, but if PV is higher than SV,PV will decrease 10°C per minute.
PvoF	When PV is not correct with SV, you can adjust this parameter with (+) or (-).
Pvrr	It's for adjusting PV be more accurate. The formulation is $PV (now) = PV (pre) \times Pvrr + PVOF$.
SvoF	When SV is not correct with PV, you can adjust this parameter with (+) or (-).
Ct	It's for detecting current to see whether the heater is broken. Display value:0.0~100.0A. When you order CT function, a small C.T. is included.

HbA	Heater break alarm set value. Set value range: 0.1 ~100.0 A. For Example: - When the current is low or off, but the control output is on, and $CT \leq HbA$, it means the heater is broken, and the alarm will be on. - When the current is over or short-circuit, but control output is off, and $CT \geq HbA$, the alarm is on. (The CT and HbA parameter work only when you order the heater break alarm function).
LbA & Lbd	Parameters for loop break alarm. For Example: - When OutL is 0.0% and LbA time is elapsed, PV should be below LBD ; if it is still within the LBD determination range, the alarm will be on. - When OutL is 100.0% and LbA time is elapsed, PV should be higher than LBD, if it is still within the LBD determination range, alarm will be on. (LbA and LBD works via software setting, no need to ordering extra components).
rPtm	It shows how many times the program runs at the moment. This parameter works when your PID controller is with program function.
Ct1	It's for setting ON-OFF cyclic time of output 1, normally it is set at 0 for 4~20mA output, 1 for SSR drive output, 15 for relay output.
Ar	It's a solution for preventing over-shooting. This parameter makes the Integral delay. The setting range is from 0 to 100%; initial value 100% means integral will perform when PV reaches proportional band, but if you set Ar at 50%, it means the integral will perform when PV reaches 50% of proportional band.
SSV	It's for setting soft start range, when you do not want the heating system to go up too quick at the beginning, you may set SSV. For Example: If you want the temperature to go up slowly under 120°C, you may set SSV at 120.
Sout	It is for setting the output percentage under SSV ; if you want to the output to be 50%, you may set it at 50.
StmE	It is for setting soft start failure time. When the PID controller reaches the StmE time, but PV does not reach SSV, it means soft start fails, and then the Controller will revert to SV.
RuCy	It is for the setting motor valve cyclic time from close to open a time or from open to close.
rPt	It's for setting how many times the program process is executed.
StAt	It is for setting when the program procedure starts. Cold is to start by manual, rSET is to start after power on. Hot is to start from memory of power failure.
wAit	It is for setting the value, for which SV will wait PV if PV goes up slowly than SV.

Pid	In this parameter, you can choose the controller with one PID performing only or multiple level-PID (LPID) performing, if you choose LPID you can set 4 levels of different PID.
Endp	It is for setting when the program ends, to run for one time only or to be continued.
tiSS	It is for setting in which segment you want the time signal alarm to start (in program function). For Example: If you want it to alarm in segment 2, you may set it as 2 .
tiOn	It is for setting in what time you want the alarm to perform. For Example: If your segment 2 is set as 10 minutes and you want the controller to alarm at the 6 th minute, you may set tiOn 6 th in this case the alarm will perform in segment 2, and start from the 6 th minute.
t1Es	It is for setting in which segment you want the time signal to end (in program function). For Example: If you want it to end in segment 5, you may set it as 5 .
T1oF	It is for selecting what time you want the alarm to end. For Example: If your segment 5 is set as 5 minutes and you want the alarm to end at 3 rd minute, you may set T1oF as 3 in this case the alarm will end at the 3 rd minute in segment 5.
LvsL	It is for selecting which level of PID you have set; then you can watch its PID value. For Example: If you set it as 3, you can watch L3P1, L3I1, L3d1 But first you need to set the Pid parameter in CntL Level as Lpid, and Lev1 to Lev3 in SPC level.

Fig 1. PID Auto Tuning

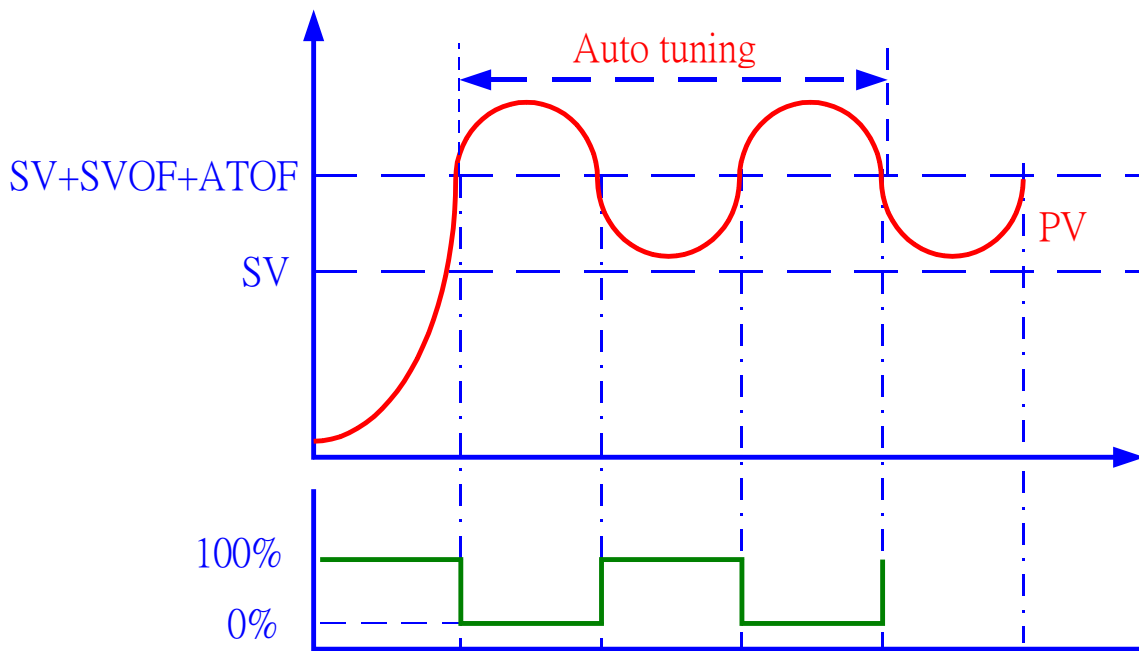


Fig 2. Soft Start

SSV

Soft start set value

SOUT

Soft start output percentage

STME

Soft start failed time

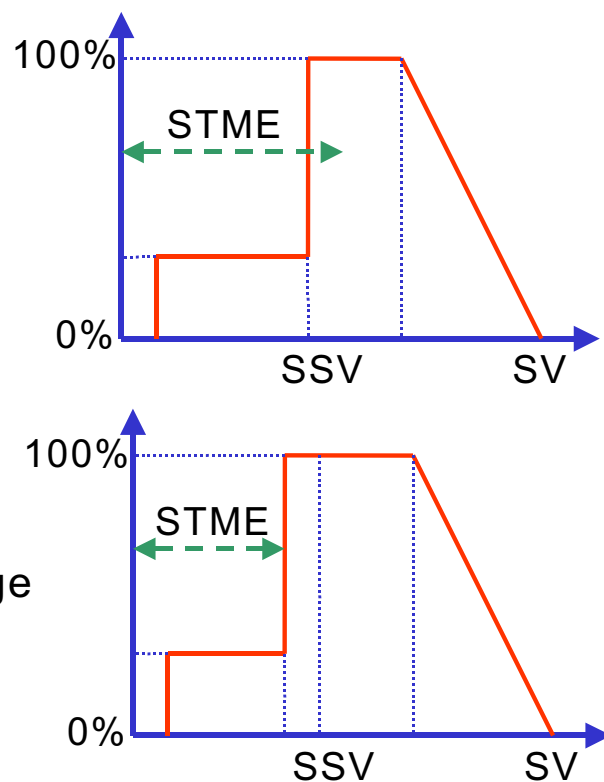


Fig 3. Motor Valve Control

RUCY

Motor valve cyclic time

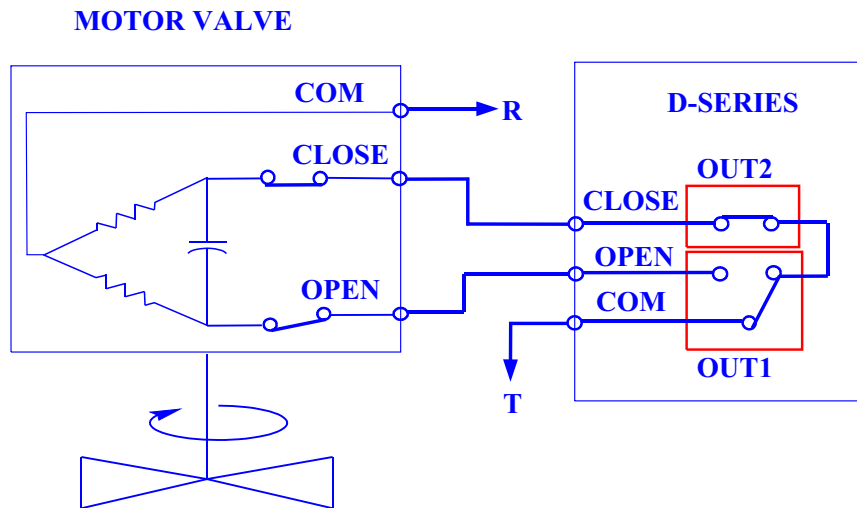


Fig 4. Program Control (Con't)

RPTM	Repeat times monitor
RPT	Program execution times setting
STAT	Start mode selection
PVST	Start point selection
WAIT	Wait zone
ENDP	Selects control when program ended
SEG	Program segment monitor
TIME	Program countdown monitor
ENDS	Program end segment setting

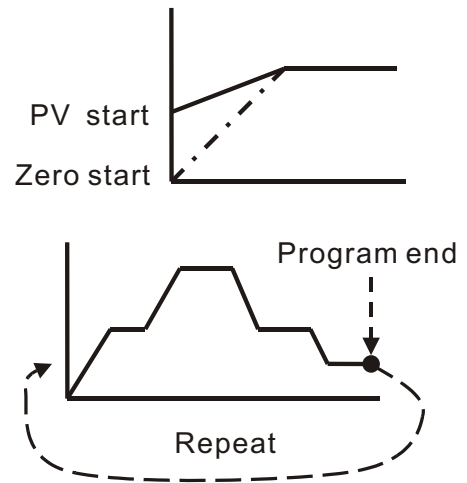


Fig 5. Digital Filter(con't)

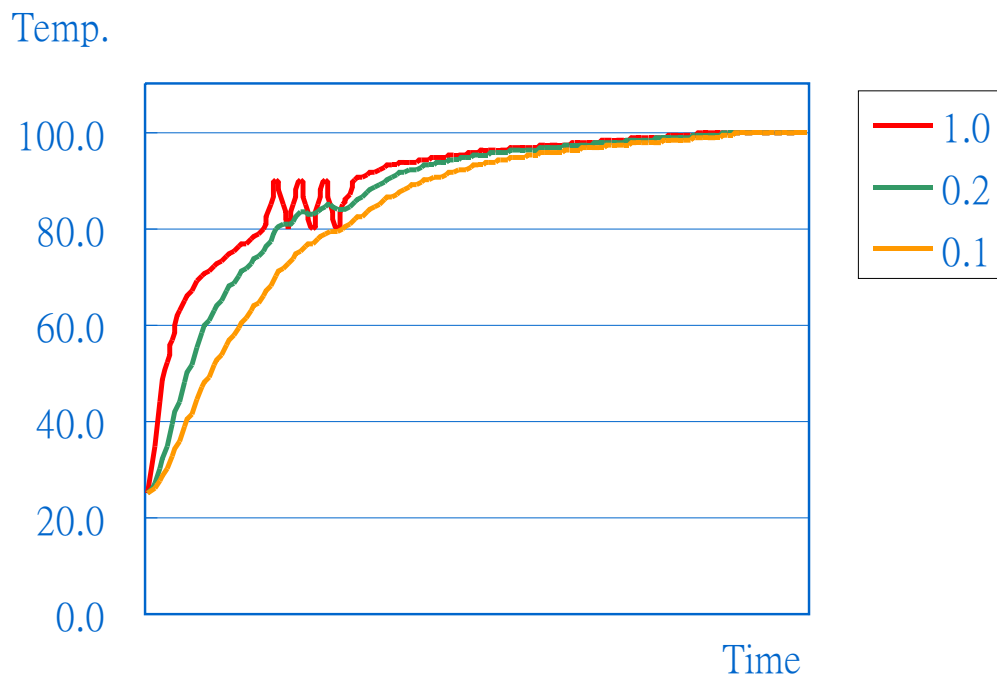


Fig 6. Level PID

PID	PID/level PID selection
LEV1	Level 1
LEV2	Level 2
LEV3	Level 3
LVSL	Levels selection
L1P1	P1 for group 1
L1I1	I1 for group 1
L1D1	D1 for group 1
L1AR	AR for group 1
L1P2	P2 for group 1
L1I2	I2 for group 1
L1D2	D2 for group 1

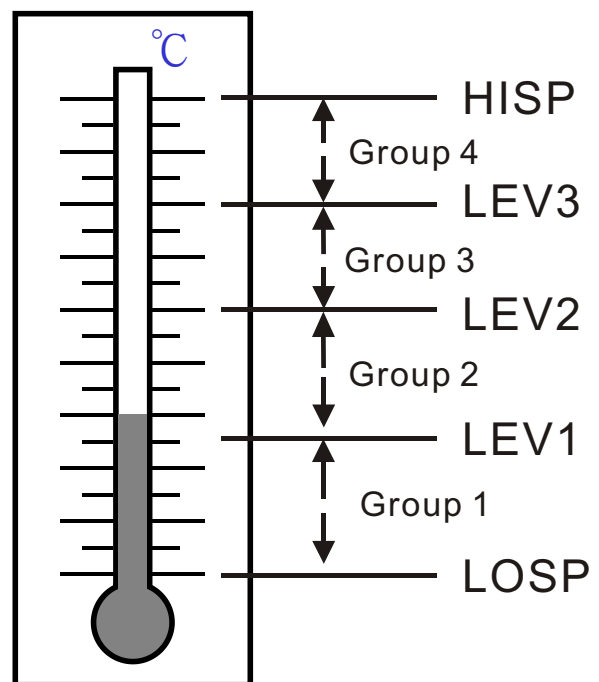


Fig7. Program Control

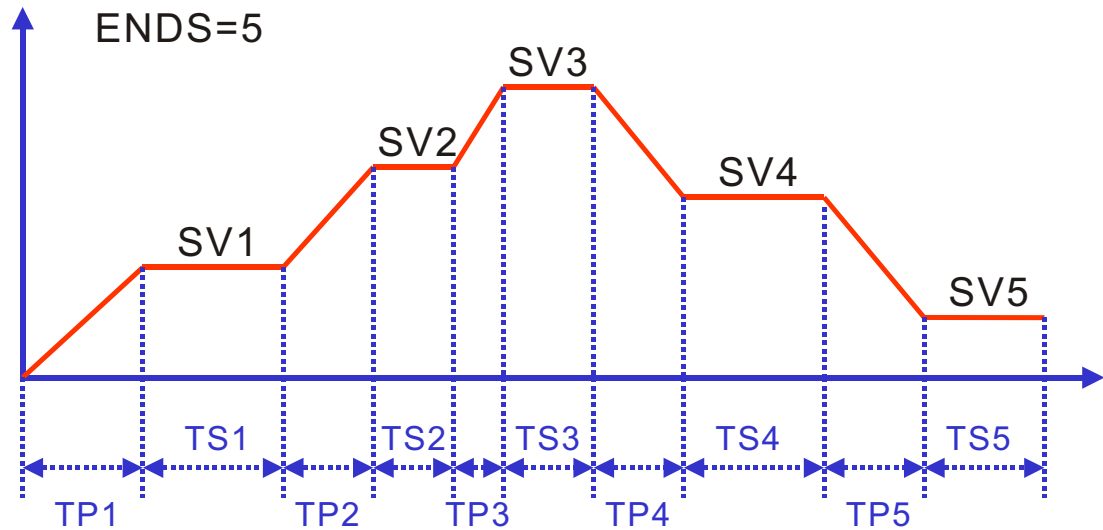


Fig8. Loop Break Alarm

OUTL=0.0%
LBA time elapsed
PV is still within
determination range

OUTL=100.0%
LBA time elapsed
PV is still within
determination range

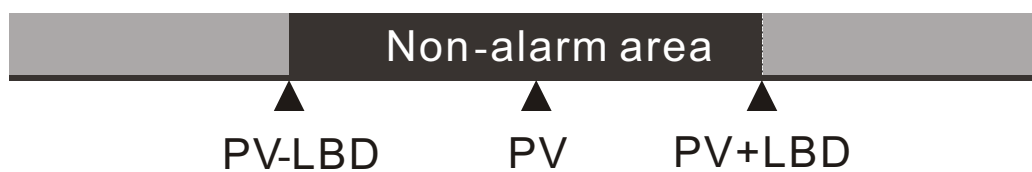
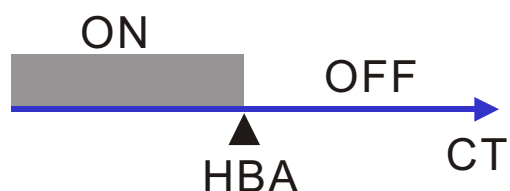


Fig 9. Heater Break Alarm

Low or No current flow
Control output is ON
 $CT \leq HBA$



Over current or short-circuit
Control output is OFF
 $CT \geq HBA$

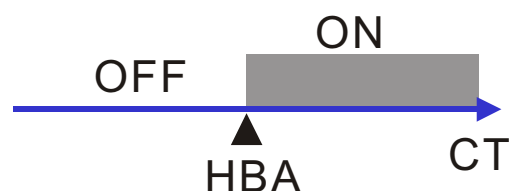


Fig 10. Segment Ending Alarm

AL1F

10

AL1S

1~8 segment

AL1T

0.00

Flicker alarm

99.59

Continued alarm

Others

ON delay time

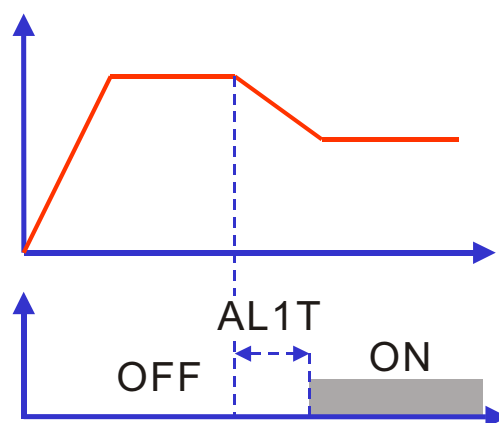


Fig 11. Program Ending Alarm

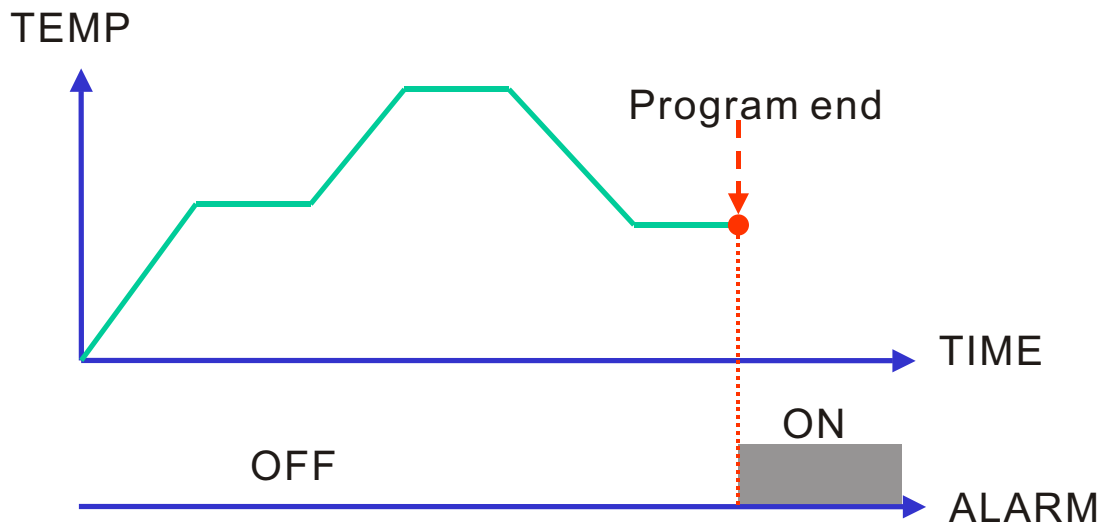


Fig 12. Time Signal Alarm

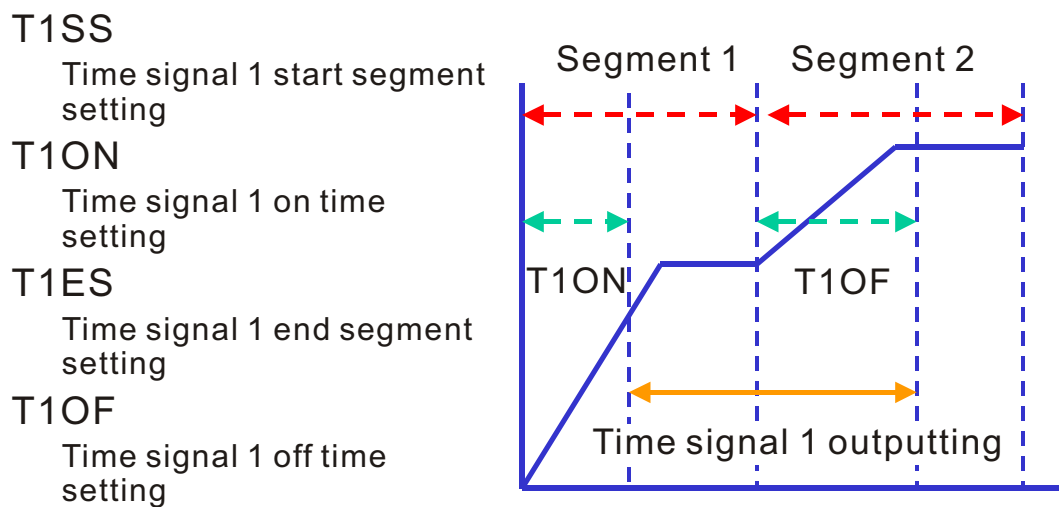


Fig 13. Program Running Alarm

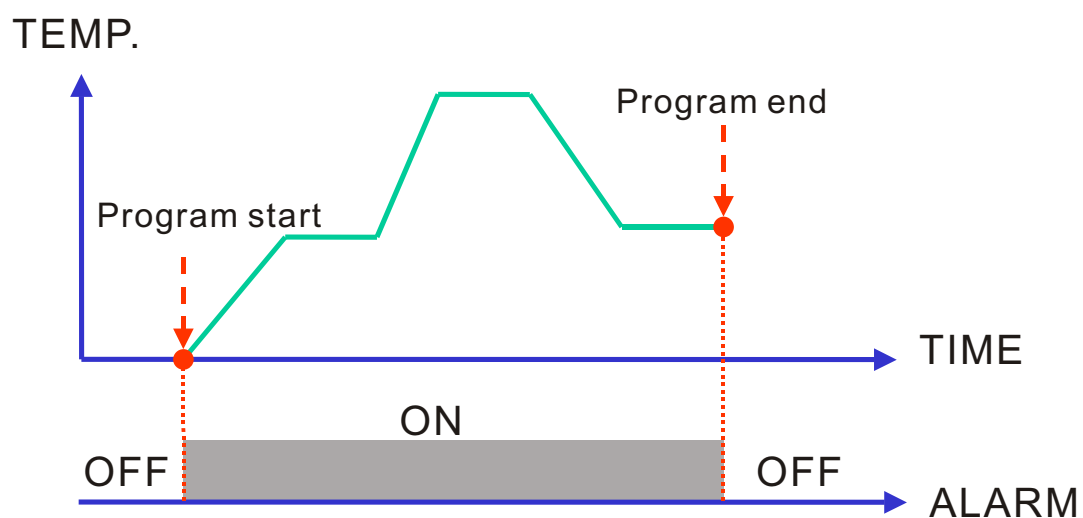


Fig 14. Communication Protocol

Interface

RS-485
RS-232

Baud rate

2400
4800
9600
19200
38400

Data frame

Data Bits=8
Parity = None
Start bit = 1
Stop bit = 1

Data format

ModBus Protocol RTU
Mode

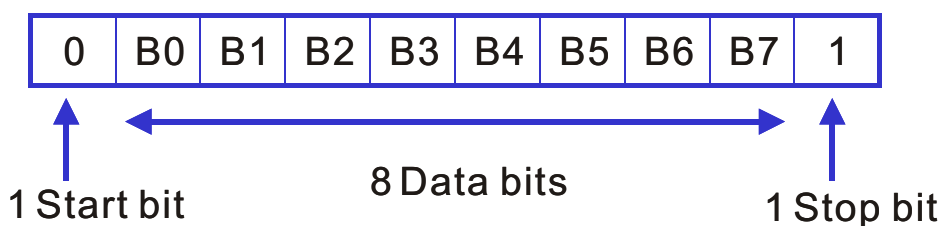


Table 1. Alarm Mode Selection
(Used in Parameter AL1F, AL2F, AL3F)

AL1F	AL2F	AL3F	Alarm function selection	
0	0	0	No alarm	
1	1	1	Deviation high alarm	
2	2	2	Deviation low alarm	
3	3	3	Absolute high alarm	
4	4	4	Absolute low alarm	
5	5	5	Deviation high/low alarm	
6	6	6	Band alarm	
7	7	7	System failure alarm (when error information happen)	
8	8	8	Loop break alarm	see fig 8
9	9	9	Heater break alarm	see fig 9
10	10	10	Segment ending alarm in program control	see fig 10
11	11	11	Program ending alarm in program control	see fig 11
12	12		Time signal alarm	see fig 12
13	13		Program running alarm in program control	see fig 13

Table 2. special alarm function selection
(used in parameter AL1M, AL2M, AL3M)

AL1M	AL2M	AL3M	Special alarm mode selection
0	0	0	Normal
1	1	1	Alarm with normal-close contact
2	2	2	Latch
3	3	3	Alarm with normal-close contact and latch
4	4	4	Alarm with inhibit
5	5	5	Alarm with inhibit and normal-close contact
6	6	6	Alarm with inhibit and latch
7	7	7	Alarm with inhibit , normal-close contact and latch
8			Alarm with on-delay timer
9			Alarm with on-delay timer but normal-close contact
10			Alarm with soaking timer
11			Alarm with soaking timer but normal-close contact

Table 4. Input & temperature ranges selection
(Used in parameter InP1)

TYPE	°C	°F
K1	0~200	32~392
K2	0~400	32~752
K3	0~800	32~1472
K4	0~1000	32~1832
K5	0~1200	32~2192
j1	0~200	32~392
j2	0~400	32~752
j3	0~800	32~1472
j4	0~1000	32~1832
j5	0~1200	32~2192
t1	-50~50	-58~122
t2	-100~100	-148~212
t3	-200~400	-328~752
r	0~1700	32~3092
E	0~1000	32~1832
S	0~1700	32~3092
b	0~1800	32~3272
n	-200~1300	-328~2372
Pt1	-50~50	-58~122
Pt2	0~100	32~212
Pt3	0~200	32~392
Pt4	0~400	32~752
Pt5	-200~600	-328~1112
jPt	-200~500	-328~932
Lin	-1999~9999	

Table 3. output mode selection
(use in Parameter OUTM)

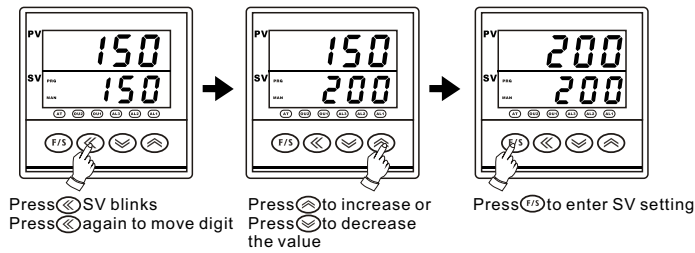
0	Non
1	Single output
2	Dual output
3	Motor value control output “a” contact
4	Motor value control output “b” contact
5	Single output with transmitter
6	Single output with soft start
7	Single output with transmitter and soft start
8	Program control
9	Program control with transmitter

Table 5. Error information

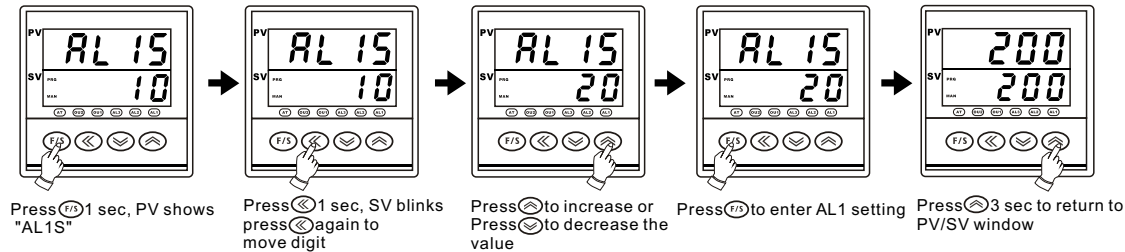
Display	description
in 1E	Input 1 error
AdCF	A/D converter failed
CJCE	Cold junction compensation failed
in 2E	Input 2 error
PV Blinks	PV exceeds set Ranges
rAnF	Ram failed
intF	Interface failed
AutF	Auto tuning failed

✱ The standard mode is set at NO.1
For using No.2.3.4.5.7.9, you need to install extra hardware.
For using No.6 and 8, you need to contact distributors.

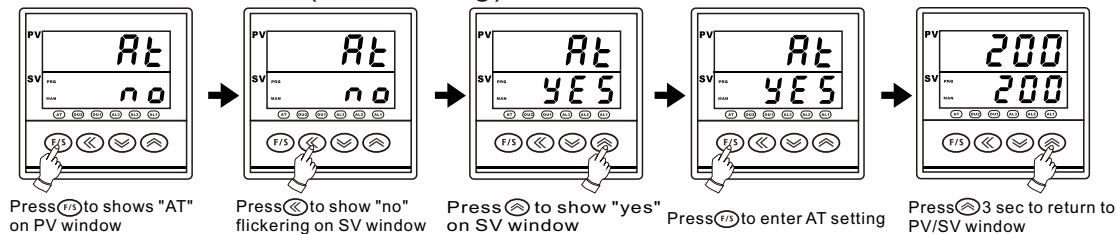
A How to set "SV" example: SV set at 200 °C



B How to set "AL1S,AL2S,AL3S" example: alarm 1 set at 20 °C

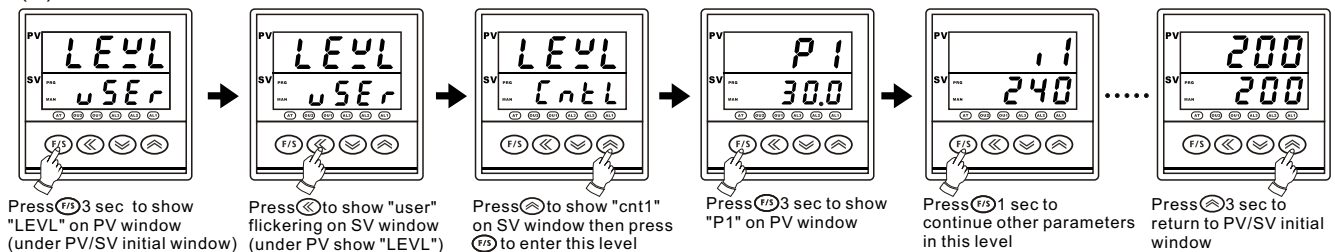


C How to set "AT" (auto tuning)

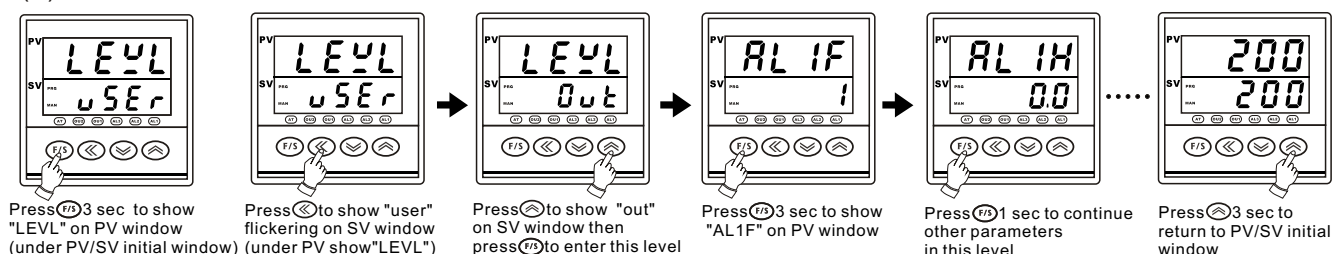


D How to enter different "level" for setting parameter

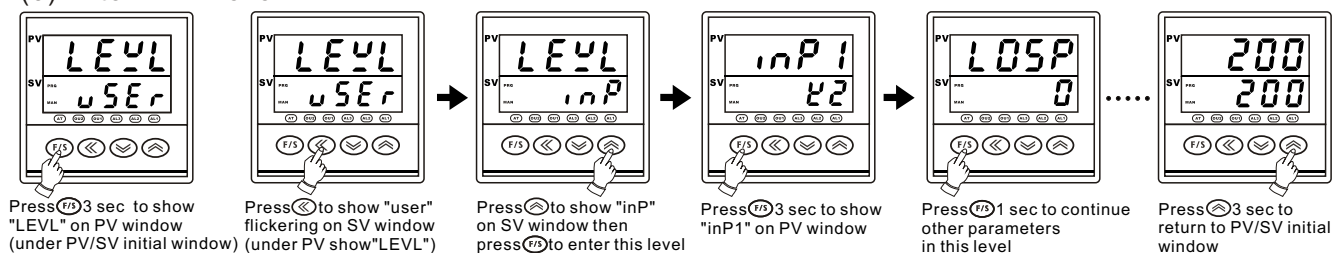
(1) Enter "CntL" level



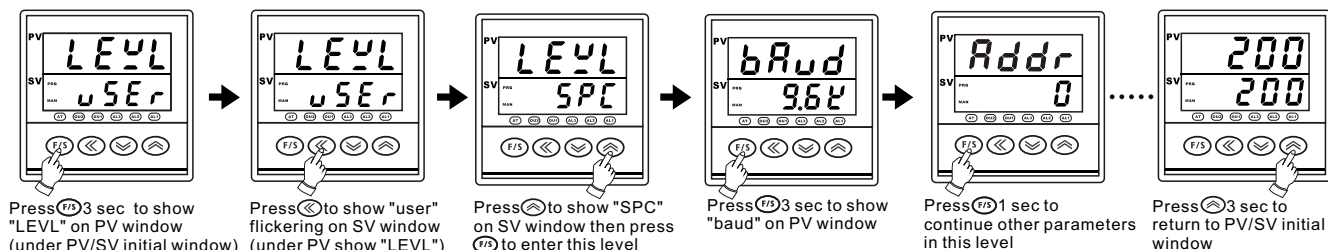
(2) Enter "Out" level



(3) Enter "inP" level

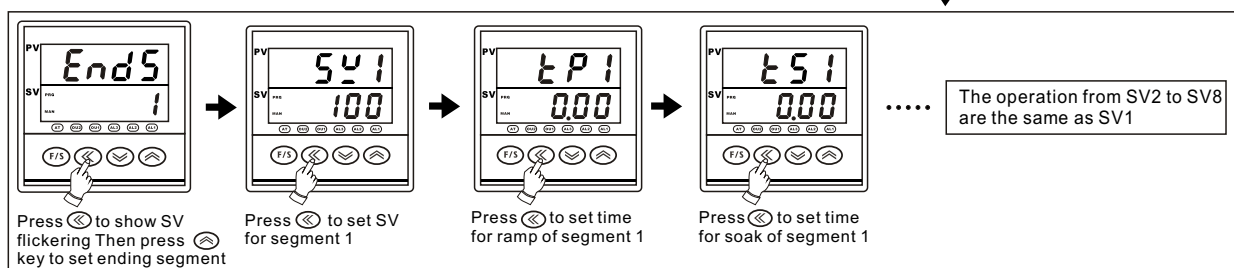
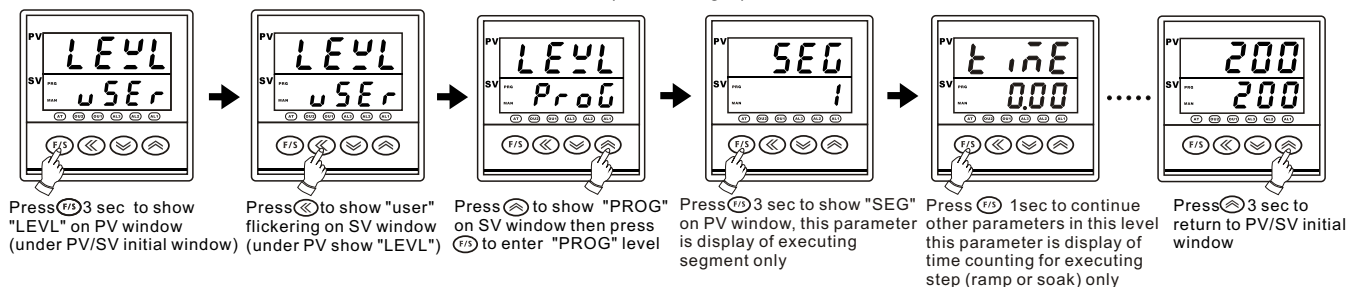


(4) Enter "SpC" level



(5) Enter program level

* "OUTM" in "out" level must be selected at "8" or "9" (refer to fig 3)

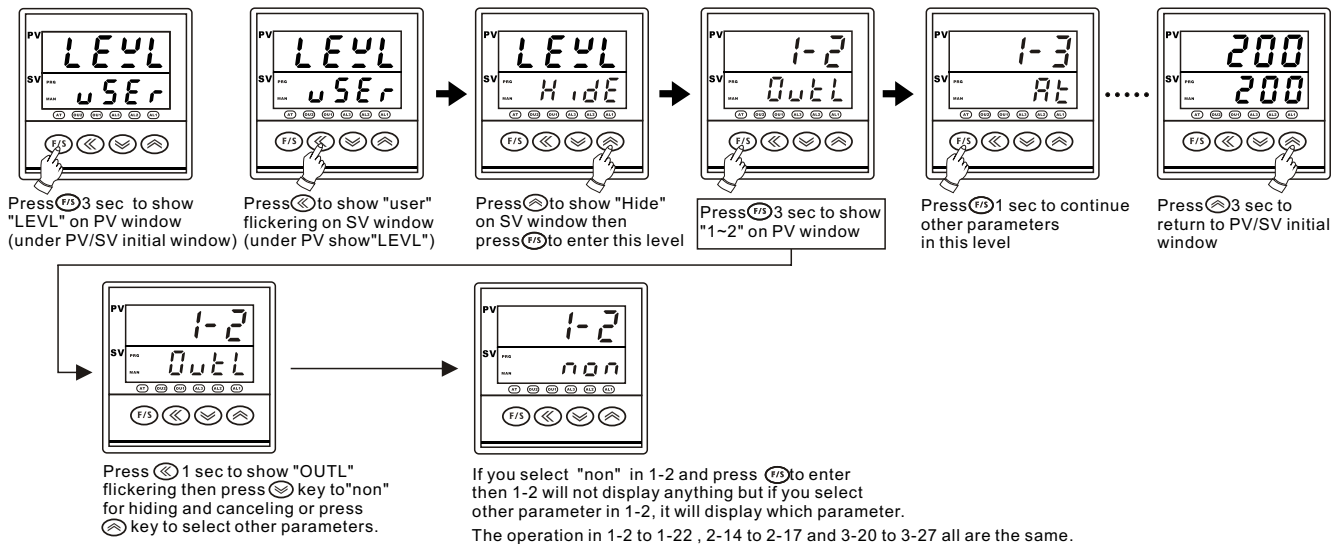


(6) Enter "Hide" level

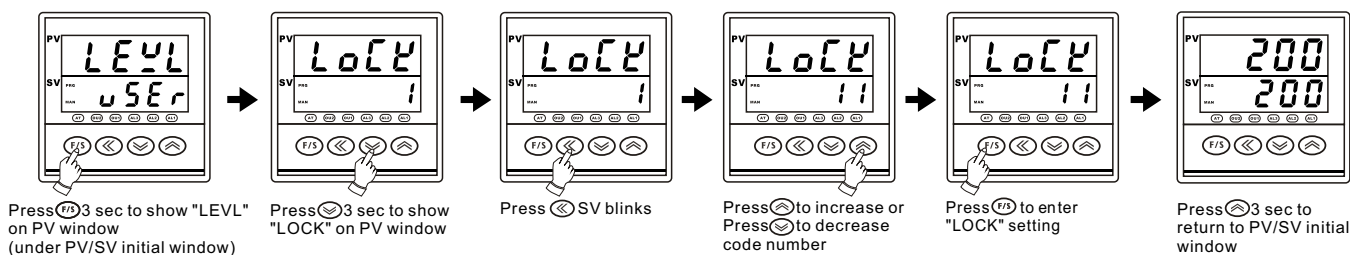
In this level, the user can arrange parameter order or hiding from NO. 1-2 to 1-22, 2-14 to 2-17 and 3-20 to 3-27

(please refer to level parameter flow chart in page 1),but same parameter can not be arranged in 2 positions in the same time,

for example you want to arrange "OUTL" to 1-3 you need to cancel it in 1-2 first. When you want to cancel or hide it you need to select "non" on the "SV"



E How to set "LoCK" function



Code number for Lock function

0	all parameters are locked except PV
101	all parameters are locked except SV
111	open"USER" level and above
122	open"CNTL" level and above
1111	open"OUT" level (Except OUTM)and above
222	open"INP" level and above
1100	open"SPC" level and above
2200	open"PROG" level and above
1122	open"HIDE" level and above
1234	open"USER" and "PROG" level only

P.S. Opening "PROG" level needs to contact distributor.

F. How to modify input

This series controller provides free input for T/C and RTD, it doesn't need to modify hardware except analog input.

1. Analog input hardware modification

(Refer to S1~S8 on PC board back)

S1 & S2 are shorted with COM. originally,

so it needs to open S1 or S1 & S2 and to short some pads as drawing.

INPUT	S1	S2	S3	S4	S5	S6	S7	S8
TC/RTD	○	○	×	×	×	×	×	×
0~20MA	×	○	×	×	○	×	×	×
4~20MA	×	○	×	×	○	×	×	×
0~100MV	×	×	○	×	×	○	×	×
0~1V	×	×	×	○	×	○	×	×
0~5V	×	×	×	×	×	○	×	○
1~5V	×	×	×	×	×	○	○	×
0~10V	×	×	×	×	×	○	×	○

[○] short [×] open

2. Analog input software modification

※Select "Lin" in "inpl" parameter

※Set "LoAn" in "inp" level to lowest range

※Set "HiAn" in "inp" level to highest range

3. Analog input calibration

※Enter "A1LS" parameter in "inp" level

※Provide signal for lowest range and wait for 3 sec then keep pressing  key

※Enter "A1HS" parameter in "inp" level

※Provide signal for highest range and wait for 3 sec then keep pressing  key

※Return to PV/SV initial window and provide signal for lowest range again then check if PV equals to LoAn

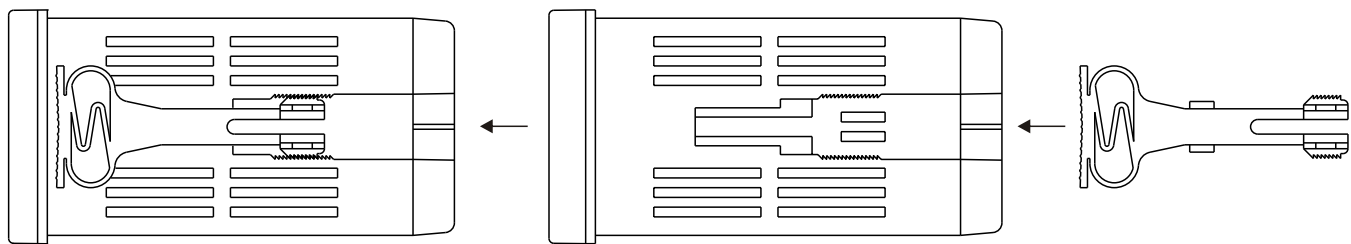
※Provide signal for highest range again then check if PV equals to HiAn

If it is not accuracy after calibrating, please repeat above procedure again

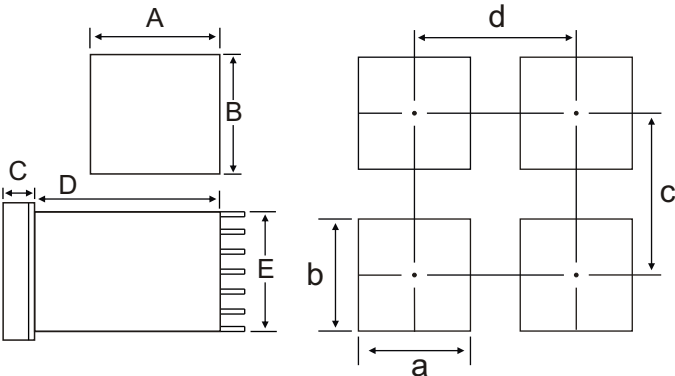
G. Communication Protocol (see fig 14)

PARA	INDEX	PARA	INDEX	PARA	INDEX	PARA	INDEX
LEvL	00	AL1F	30	L1i1	60	Sv7	90
LoCK	01	AL1H	31	L1d1	61	tP7	91
Sv	02	Al1t	32	L1Ar	62	tS7	92
OutL	03	AL1m	33	L1P2	63	Sv8	93
At	04	AL2F	34	L1i2	64	tP8	94
mAn	05	AL2H	35	L1d2	65	tS8	95
AL1S	06	AL2t	36	L2P1	66	1-2	96
AL1L	07	AL2m	37	L2i1	67	1-3	97
AL1U	08	AL3F	38	L2d1	68	1-4	98
AL2S	09	AL3H	39	L2Ar	69	1-5	99
AL2L	0A	AL3t	3A	L2P2	6A	1-6	9A
AL2U	0B	AL3m	3B	L2i2	6B	1-7	9B
AL3S	0C	Act	3C	L2d2	6C	1-8	9C
AL3L	0D	Outm	3D	L3P1	6D	1-9	9D
AL3U	0E	O1LS	3E	L3i1	6E	1-10	9E
SOAK	0F	O1HS	3F	L3d1	6F	1-11	9F
rAmP	10	AO	40	L3Ar	70	1-12	A0
PvoF	11	O2LS	41	L3p2	71	1-13	A1
Pvrr	12	O2HS	42	L3i2	72	1-14	A2
SvoF	13	t1SS	43	L3d2	73	1-15	A3
Ct	14	t1On	44	L4P1	74	1-16	A4
HbA	15	t1ES	45	L4i1	75	1-17	A5
LbA	16	t1oF	46	L4d1	76	1-18	A6
Lbd	17	t2SS	47	L4Ar	77	1-19	A7
rPtm	18	t2On	48	L4p2	78	1-20	A8
P1	19	t2ES	49	L4i2	79	1-21	A9
i1	1A	t2oF	4A	L4d2	7A	1-22	AA
d1	1B	inP1	4B	SEG	7B	2-14	AB
Ct1	1C	LoSP	4C	TimE	7C	2-15	AC
HSt1	1D	HiSP	4D	EndS	7D	2-16	AD
AotF	1E	LoAn	4E	Sv1	7E	2-17	AE
Ar	1F	HiAn	4F	tP1	7F	3-20	AF
P2	20	A1LS	50	tS1	80	3-21	B0
i2	21	A1HS	51	Sv2	81	3-22	B1
d2	22	unit	52	tP2	82	3-23	B2
Ct2	23	dp	53	tS2	83	3-24	B3
HSt2	24	FiLt	54	Sv3	84	3-25	B4
db	25	inP2	55	tP3	85	3-26	B5
SSv	26	A2LS	56	tS3	86	3-27	B6
Sout	27	A2HS	57	Sv4	87		
StmE	28			tP4	88		
rUCy	29	bAud	59	tS4	89		
rPt	2A	Addr	5A	Sv5	8A		
StAt	2B	LEv1	5B	tP5	8B		
PvSt	2C	LEv2	5C	tS5	8C		
wAit	2D	Lev3	5D	Sv6	8D		
Pid	2E	LvSL	5E	tP6	8E		
EndP	2F	L1P1	5F	tS6	8F	Pv	100

Mounting procedures

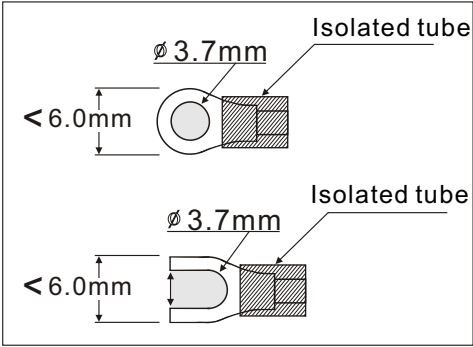


Dimension

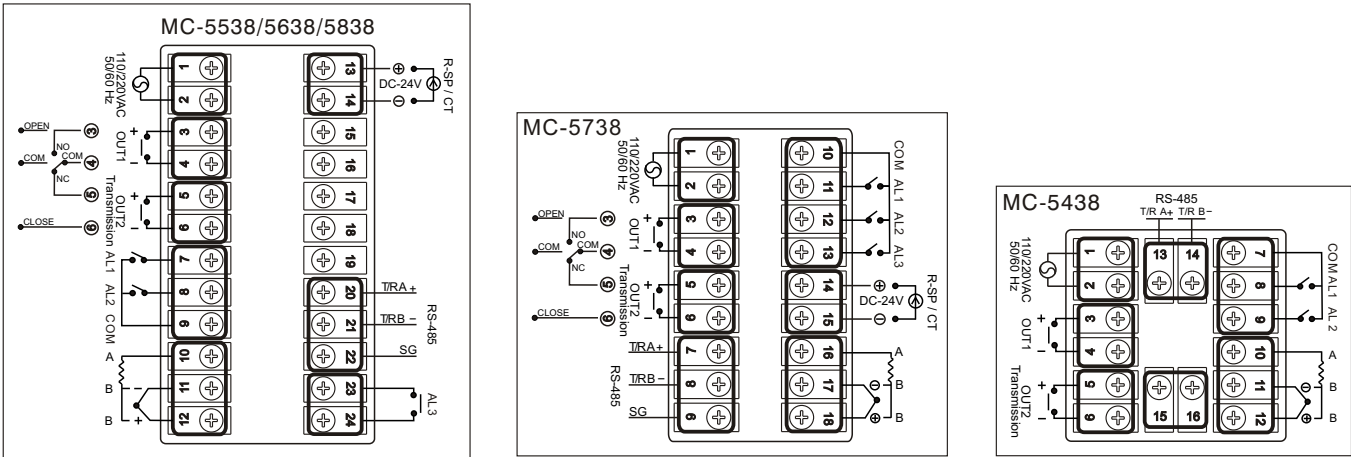


Type	A	B	C	D	E	a	b	c	d
MC-5838	96	96	10.5	83	90	91 ^{+0.5} ₋₀	91 ^{+0.5} ₋₀	120	120
MC-5738	72	72	10.5	83	67	68 ^{+0.5} ₋₀	68 ^{+0.5} ₋₀	100	100
MC-5638	96	48	10.5	83	43	91 ^{+0.5} ₋₀	46 ^{+0.5} ₋₀	70	120
MC-5538	48	96	10.5	83	90	46 ^{+0.5} ₋₀	91 ^{+0.5} ₋₀	120	70
MC-5438	48	48	10.5	83	45	46 ^{+0.5} ₋₀	46 ^{+0.5} ₋₀	70	70

Available terminal



External terminal



SPECIFICATIONS

PV Input	Type of Input	TC (K,J,T,R,E,S,B,N)
		RTD (Pt100, JPt100)
		Linear(1-5V, 4-20mA)
Indication	Input Sampling Time	300 ms
	PV/SV Indication	4-digit
	Constant Value Storage System	Non-volatile memory (E ² PROM)
Control Mode	Proportional Band (P)	0.0~3000
	Integral Time (I)	0~3600
	Derivative Time (D)	0~900
	Cycle Time	0~150
	Dead Band	0.0~200.0
Output	Relay Output Relay	Contact, SPDT 3A/240VAC
	Voltage Output	Voltage Pulse
	Linear Output	4~20mA, 1-5V ,
	Motor Control Output	Open loop motor valve
Alarm	Channel	3 Channels (Optional)
Communication	Type of Communication	RS-232, RS-485
General Specifications	Power Supply Voltage & Frequency	AC 90~260V, 50/60Hz
	Power Consumption	<3.5VA
	Ambient Temperature	-10°C ~ 55°C
	Ambient Humidity	0~80% RH

ORDERING INFORMATION

A
B C D
E F G
MC - 5438 - 101 - 000

A:Type (Dimension)

MC-5438 = 48x48mm (DIN 1/16), MC-5538 = 48x96mm (DIN 1/8),
MC-5638 = 96x48mm (DIN 1/8), MC-5838 = 96x96mm (DIN 1/4)),
MC-5738 = 72x72mm

B:Output 1

0=NONE
1=Relay,contact,SPDT 3A/240VAC
2=Volt,voltage pulse,20VDC/20MA
3=mA Current,4~20mA
4=Open loop motor valve control
A=0~5V
B=0~10V
C=1~5V
D=2~10V

E:Transmission

0=None
1=4~20mA (Adjustable)
2=0~20mA (Adjustable)
A=0~5V
B=0~10V
C=1~5V
D=2~10V

C:Output 2

0=NONE
1=Relay,contact,SPDT 3A/240VAC
2=Volt,voltage pulse,20VDC/20MA
3=mA Current,4~20mA
A=0~5V
B=0~10V
C=1~5V
D=2~10V

F:Input 2

0=None
1=4~20mA remote set point
2=0~20mA remote set point
3=CT for heater break alarm
A=0~5V remote set point
B=0~10V remote set point
C=1~5V remote set point
D=2~10V remote set point

D:Alarm

0 = NONE
1 = Alarm x 1
2 = Alarm x 2
3 = Alarm x 3

G:Communication

0 = None
1 = RS-232
2 = RS-485

※ C & E are used the same terminal so one function is available only but
C & E & F one function is available only in MC-5438