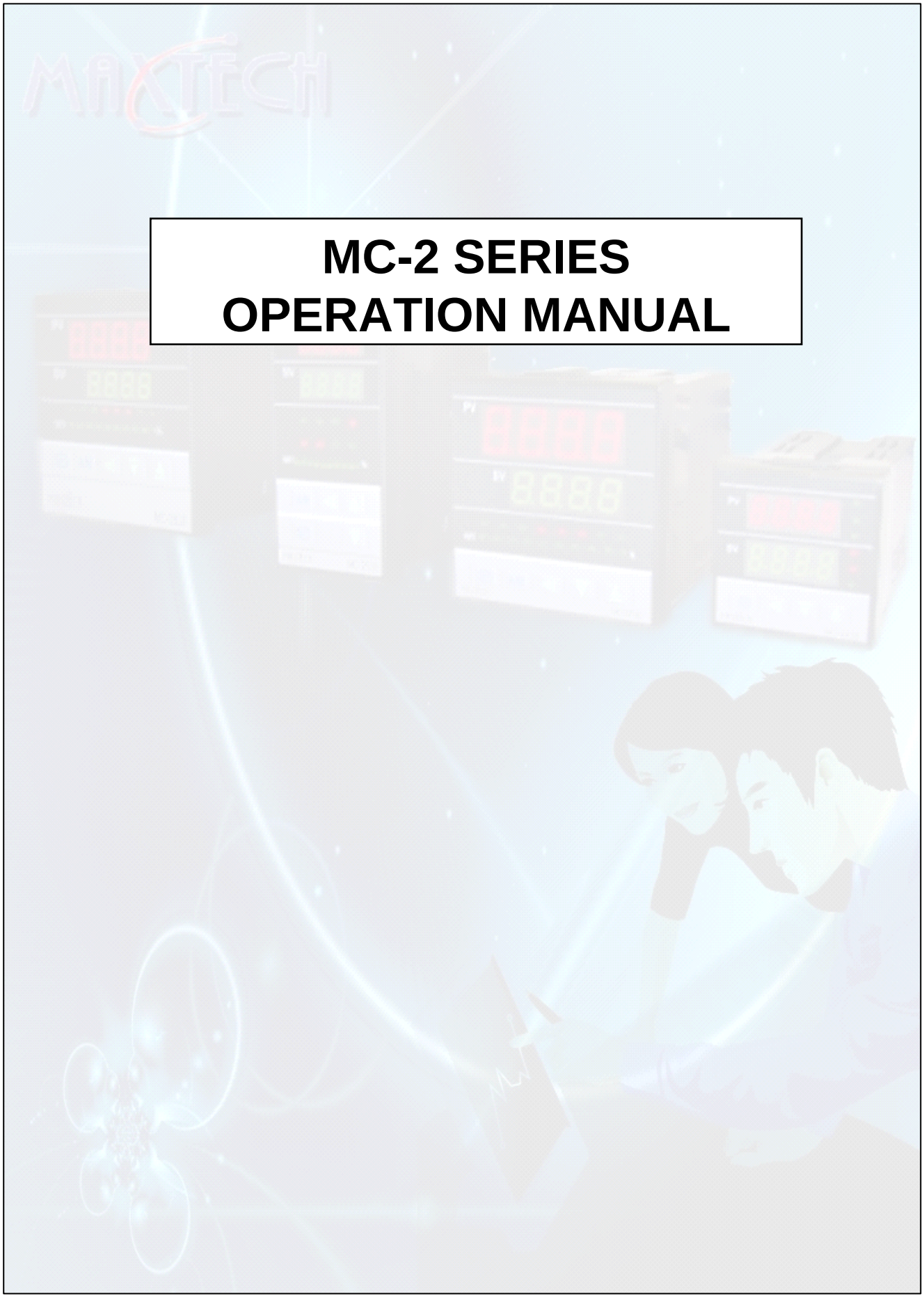
MAXTHERMO-GITTA GROUP CORP.

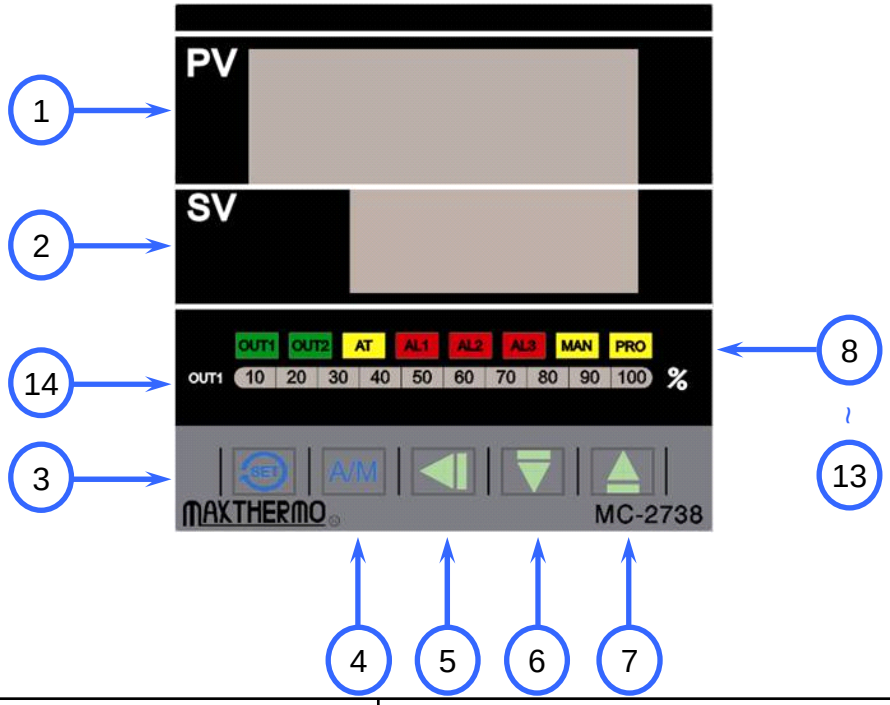
MC-2 SERIES
OPERATION MANUAL



Version：**1609200001**

Panel function：

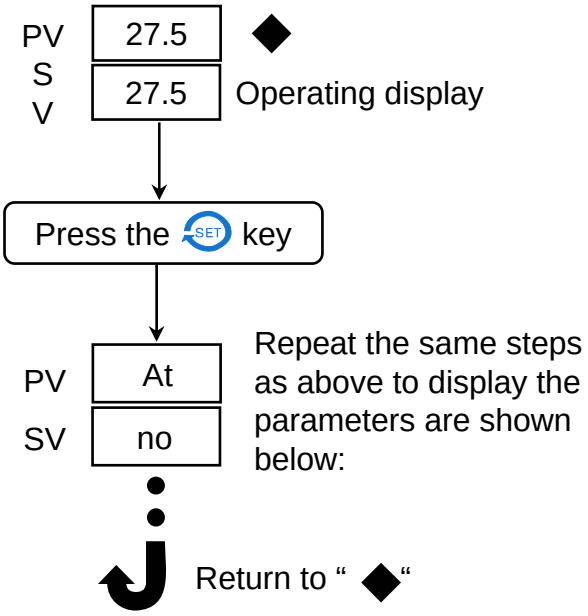
MC-2438/MC-2538/MC-2638/MC-2738/MC-2838



No.	Marks	Description	Function
1	PV	Process value	Display the process value and parameter 7 segment display LED(Red)
2	SV	Set value	Display the set value 7 segment display LED(Green)
3	SET	Set key & enter key	Enter set value
4	A / M	Manual / auto exchange key	Exchange manual and auto operation
5	◀	Shift key	Shift digits when settings are changed
6	▼	Down key	Decrease the set value
7	▲	Up key	Increase the set value
8	OUT 1	Output 1 lamp	Green LED lights when out1 is activated
9	OUT 2	Output 2 lamp	Green LED lights when out2 is activated
10	AT	Auto tuning lamp	Yellow LED lights when Auto tuning is activated
11	AL 1	Alarm 1 lamp	Red LED lights when Alarm1 is activated
12	AL 2	Alarm 2 lamp	Red LED lights when Alarm2 is activated
13	AL 3	Alarm 3 lamp	Red LED lights when Alarm3 is activated
14	OUT1 %	Output 1 percentage lamp	10 green LED display according to the output percentage

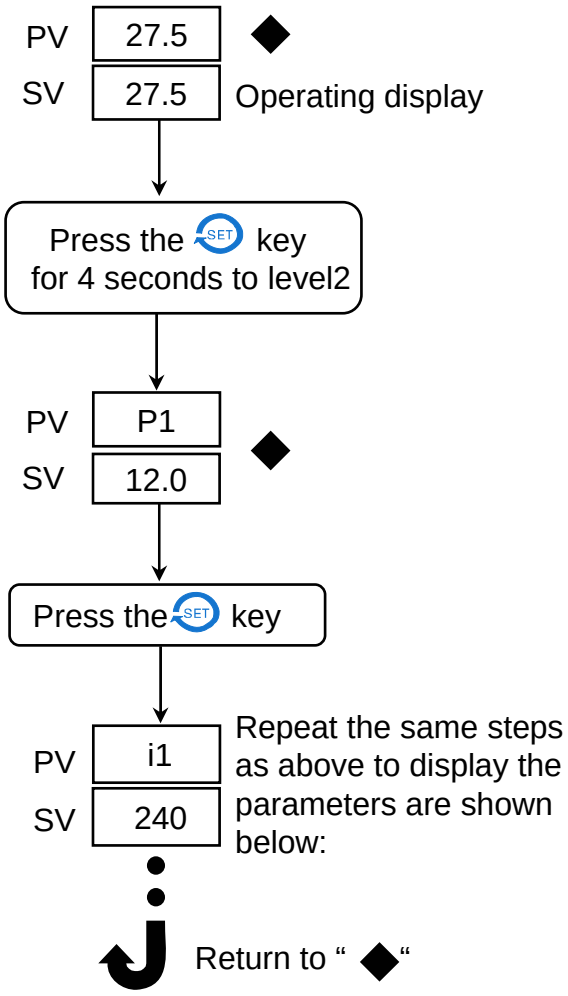
Operation Step：

Level1 (User level)



Parameter	Description	Range	Ex-factory
STBY	Output standby	on / Off	oFF
OTL1	Output 1 limit	0.0 ~ 100.0%	100.0
OTL2	Output 2 limit	0.0 ~ 100.0%	100.0
PCT1	Output 1 percentage	0.0 ~ 100.0%	—
PCT2	Output 2 percentage	0.0 ~ 100.0%	—
AT	Auto tuning	“YES / no” to be used when setting PID	no
AL1	Alarm 1 set value	-200.0 ~ 200.0℃	0.0
AL2	Alarm 2 set value	-200.0 ~ 200.0℃	0.0
AL3	Alarm 3 set value	-200.0 ~ 200.0℃	0.0
RAMP	Ramp rate	0.0 ~ 200.0℃/ min	0.0
CT	Current transformer monitor	0.0 ~ 100.0A	0.0
HBA	Heater break alarm set value	0.0 ~ 100.0A	0.1
LBA	Control loop break alarm time	0.1 ~ 200.0 min	8.0
LBD	LBA deadband	0.0 ~ 200.0	0.0

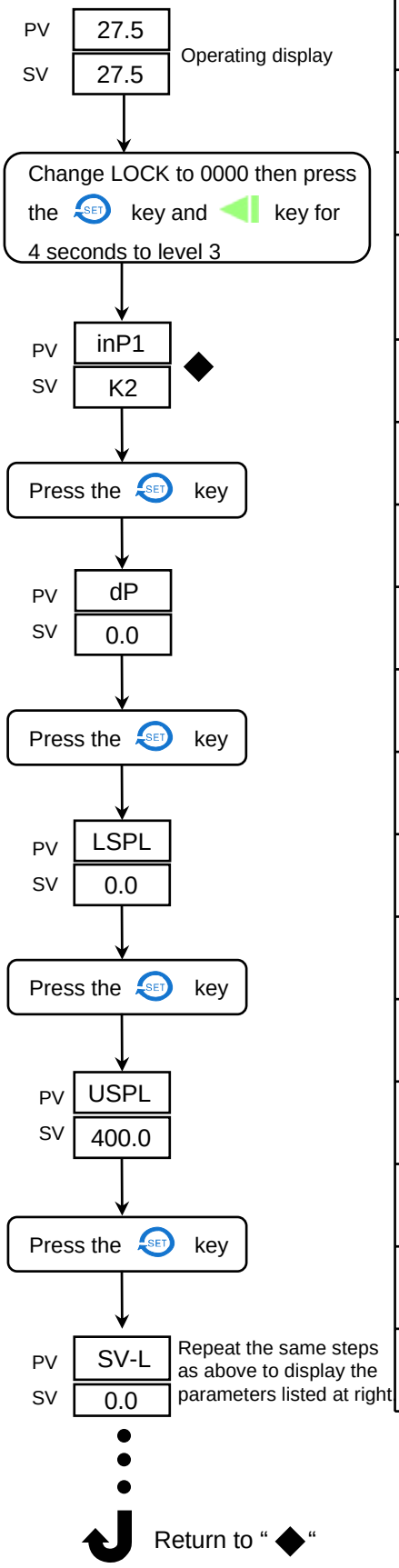
Level2 (PID level)



Parameter	Description	Range	Ex-factory
P1	Output 1 proportional band	0.0 ~ 3000.0 ON / OFF control if P1 = 0.0	12.0
I1	Output 1 Integral time	0 ~ 7200 Sec PD control if I1 = 0	240
D1	Output 1 derivative time	0 ~ 1800 Sec PI control if D1 = 0	60
DB1	Deadband / overlap	-200.0 ~ 200.0	0.0
ATVL	Output auto tuning offset	-200.0 ~ 200.0	0.0
CYT1	Output 1 cycle time	0 ~ 150 Sec When output is SSR , it is set at 2 , SCR is set at 0 When output is RELAY usually is set at 15.	15

Parameter	Description	Range	Ex-factory
HYS1	Output 1 hystersis	0.0 ~ 200.0 For ON / OFF control only	0.1
P2	Output 2 proportional band	0.0 ~ 3000.0 ON / OFF control if P2 = 0.0	12.0
I2	Output 2 integral time	0 ~ 7200 Sec PD control if I2 = 0	240
D2	Output 2 derivative time	0 ~ 1800 Sec PI control if D2 = 0	60
CYT2	Output 1 cycle time	0 ~ 150 Sec When output is SSR , it is set at 2 , SCR is set at 0 When output is RELAY usually is set at 15.	15
HYS2	Output 2 hystersis	0.0 ~ 200.0 For ON / OFF control only	0.1
PVOF	PV offset	-200.0 ~ 200.0	0.0
ADJS	PV ratio	-200.0 ~ 200.0	0.0
SVOF	SV offset	-200.0 ~ 200.0	0.0
SSV	Soft start set value	0.0 ~ 200.0	120.0
SOUT	Soft start output percentage	0.0 ~ 100%	30.0
STME	Soft start failed time	0 ~ 200min	10
LOCK	Lock function	0000： All parameters are open 0001： Only SV is adjustable 0100： User & PID level are adjustable 0101： Only LOCK is adjustable 0110： User level adjustable	0000

Level3 (Input level)

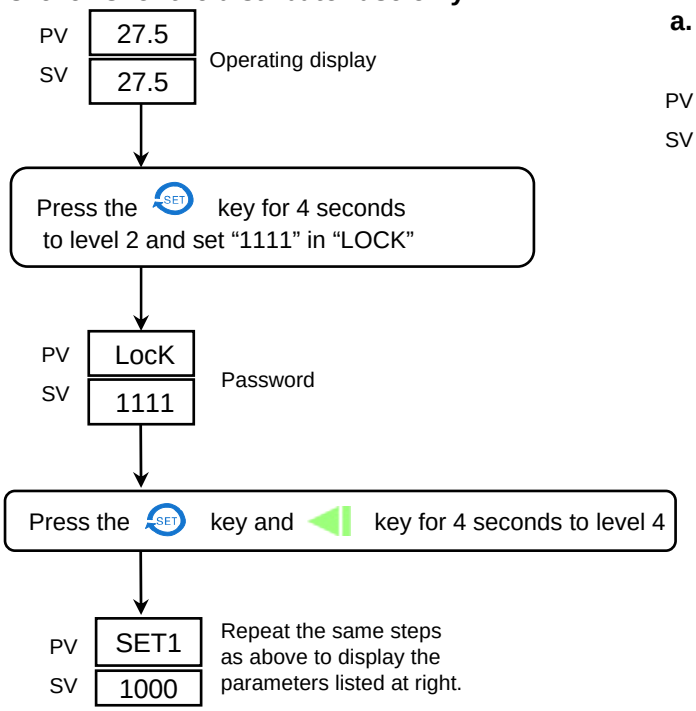


Parameter	Description	Range	Ex-factory
INP1	Input 1 selection	See Input Selection Table	K2
ANL1	Analog input 1 scale low	0~FFFF	—
ANH1	Analog input 1 scale high	0~FFFF	—
DP	Decimal point	0 / 0.0 Set the position of decimal point	0.0
LSPL	Lower set point limit	Set lower point within INP1	0.0
USPL	Upper set point limit	Set highest point within INP1	400.0
SV-L	Set value lower limit	Set lower limit of SV	0.0
SV-H	Set value upper limit	Set highest limit of SV	400.0
INP2	Input 2 selection	non / Ct / rmSv	non
ANL2	Analog input 2 scale low	0~FFFF	—
ANH2	Analog input 2 scale high	0~FFFF	—
AL1F	Alarm 1 action function	00 ~ 18	11
AL1H	Alarm 1 hystersis	0.0 ~ 200.0	0.1
AL1M	Alarm 1 special mode	0 ~ 11	0
AL2F	Alarm 2 action function	00 ~ 18	11
AL2H	Alarm 2 hystersis	0.0 ~ 200.0	0.1
AL2M	Alarm 2 special mode	0 ~ 11	0

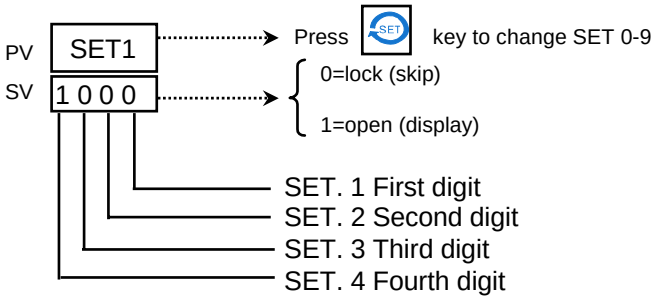
Parameter	Description	Range	Ex-factory
AL3F	Alarm 3 action function	00 ~ 18	11
AL3H	Alarm 3 hystersis	0.0 ~ 200.0	0.1
AL3M	Alarm 3 special mode	0 ~ 11	0
CLO1	Output1 scale low (Used for mA or V output)	0 ~ 1000 Calibrate the low value of output1	240
CHO1	Output1 scale high (Used for mA or V output)	0 ~ 1000 Calibrate the high value of output1	960
CLO2	Output2 scale low (Used for mA or V output)	0 ~ 1000 Calibrate the low value of output2	240
CHO2	Output2 scale high (Used for mA or V output)	0 ~ 1000 Calibrate the high value of output2	960
AO	Analog output selection	non / PV / SV / dEV	non
CLO3	Transmission output scale low	0 ~ 4095 Calibrate the low value of transmission output	780
CHO3	Transmission output scale high	0 ~ 4095 Calibrate the high value of transmission output	3900
RUCY	Motor value cyclic time	5 ~ 200	15
PMFB	Potentiometer feedback	“YES / no” , When OUTM is 5	no
BITS	Parity selection	n_81 / n_82 / O_81 / E_81	n_81
IDNO	ID number	0 ~ 255	1
BAUD	Baud rate	9.6K / 19.2K / 38.4K / 57.6K / 115.2K BTS baud rate selection	9.6K
UNIT	Unit selection	℃ / ℉ / non	℃
PVFT	Software filter	0.001 ~ 1.000	0.600
ACT	Heat / Cool mode selection	Heat / Cool	Heat
OUTM	Output mode selection	0：No output 1：Single output (OUT1) 2：Dual output (OUT1 & OUT2) 3：Open loop motor valve (3-wire) 4：Soft start mode 5：Close loop motor valve (6-wire) (with feed back)	1

Level4 (Set level)

This level is for the distributor use only



a. Example：



b. Function of set：

Main Stratum	Level	Parameter
SET1	1-1	STBY
	1-2	OTL1，OTL2
	1-3	PCT1，PCT2
	1-4	AT
SET2	2-1	AL1，AL1L，AL1U
	2-2	AL2，AL2L，AL2U
	2-3	AL3，AL3L，AL3U
	2-4	AL1T
SET3	3-1	AL2T
	3-2	AL3T
	3-3	
	3-4	RAMP
SET4	4-1	CT，HBA
	4-2	LBA，LBD
	4-3	PVOF
	4-4	ADJS
SET5	5-1	SVOF
	5-2	SSV，SOUT，STME
	5-3	RUCY
	5-4	PMFB
SET6	6-1	ANL1，ANH1，DP
	6-2	LSPL，USPL

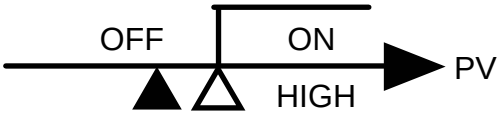
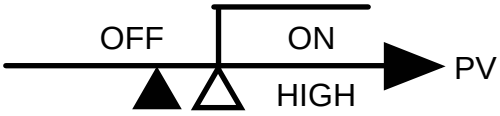
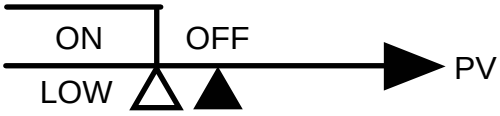
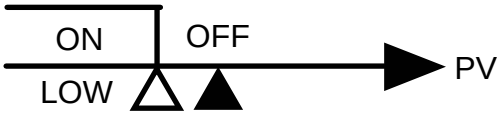
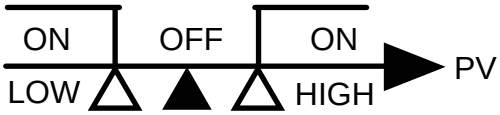
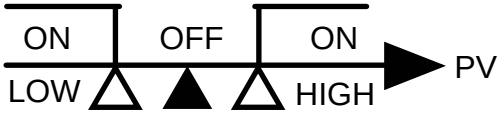
Main Stratum	Level	Parameter
SET6	6-3	SV-L，SV-H
	6-4	INP2
SET7	7-1	ANL2，ANH2
	7-2	AL1F
	7-3	AL1H
	7-4	AL1M
SET8	8-1	AL2F
	8-2	AL2H
	8-3	AL2M
	8-4	AL3F
SET9	9-1	AL3H
	9-2	AL3M
	9-3	CLO1，CHO1
	9-4	CLO2，CHO2
SETA	A-1	AO
	A-2	CLO3，CHO3
	A-3	BITS，IDNO，BAUD
	A-4	
SETB	B-1	UNIT
	B-2	PVFT
	B-3	ACT
	B-4	OUTM

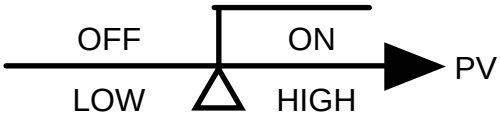
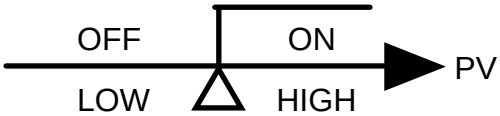
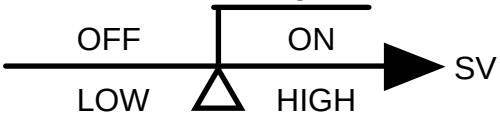
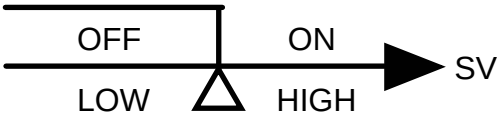
Alarm Function Description(ALxF)：

▲ : SV

△ : Alarm set value

(Inhibit means alarm doesn't work at first time)

00 10	No alarm
01	Deviation high alarm inhibit 
11	Deviation high alarm 
02	Deviation low alarm inhibit 
12	Deviation low alarm 
03	High low alarm inhibit 
13	High low alarm 
04	Band alarm inhibit 
14	Band alarm 

05	Absolute high alarm inhibit 
15	Absolute high alarm 
06	Absolute low alarm inhibit 
16	Absolute low alarm 
17	SP Absolute high alarm 
18	SP Absolute low alarm 
07	Loop break alarm
08	System Exceptions
09	Heater break alarm

Special alarm mode selection(ALxM)：

0	Normal
1	Alarm with normal-close contact
2	Latch
3	Alarm with normal-close contact and latch
4	Alarm with soaking timer (min : sec)
5	Alarm with soaking timer but normal-close contact (min : sec)
6	Alarm with soaking timer (hr : min)
7	Alarm with soaking timer but normal-close contact (hr : min)
8	Alarm with on-delay timer (min : sec)
9	Alarm with on-delay timer but normal-close contact (min : sec)
10	Alarm with on-delay timer (hr : min)
11	Alarm with on-delay timer but normal-close contact (hr : min)

Error information：

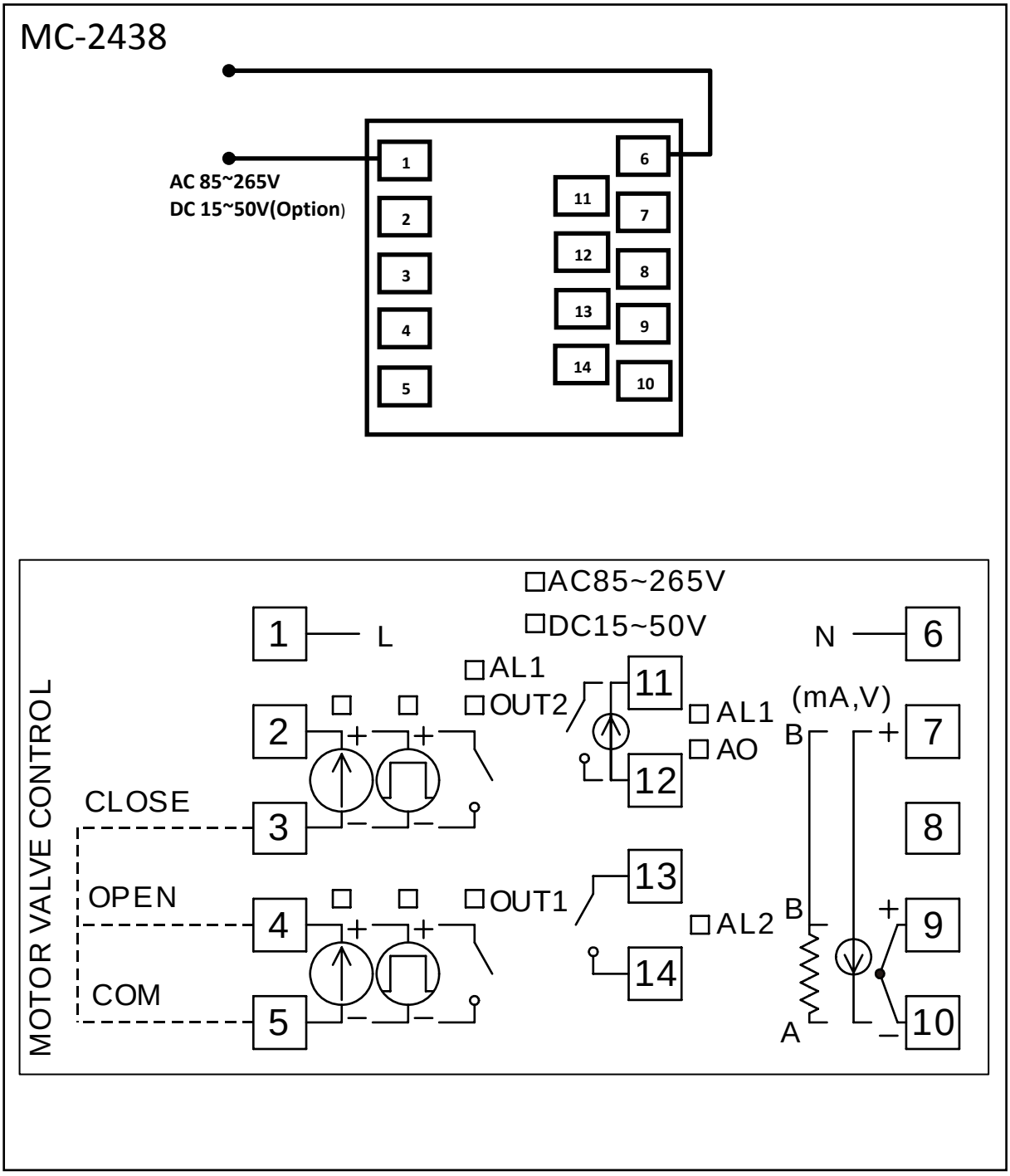
Parameter Display Code	Description
in1E	Input 1 error.
AdCF	A / D convertor failed.
CJCE	Cold junction compensation failed.
in2E	Input 2 error.
rAmF	RAM failed.
IntF	Interface failed.
AutF	Auto tuning failed.
AoEr	Analog output error.

Input Selection Table(INP1) ：

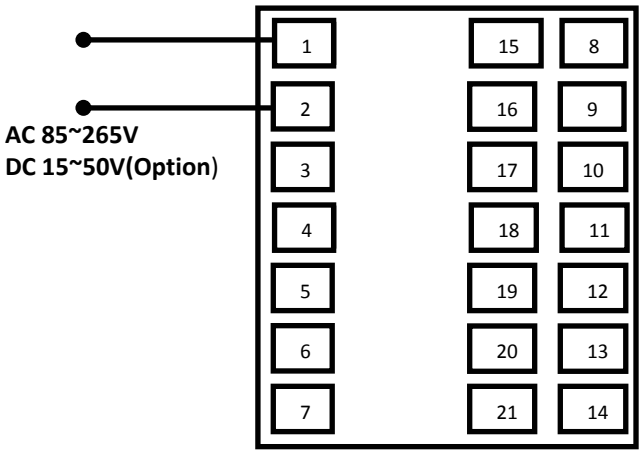
Type	Code	Range (℃ / ℉)
k	K1	0 ~ 200 / 32 ~ 392
	K2	0 ~ 400 / 32 ~ 752
	K3	0 ~ 800 / 32 ~ 1472
	K4	0 ~ 1000 / 32 ~ 1832
	K5	0 ~ 1200 / 32 ~ 2192
J	J1	0 ~ 200 / 32 ~ 392
	J2	0 ~ 400 / 32 ~ 752
	J3	0 ~ 800 / 32 ~ 1472
	J4	0 ~ 1000 / 32 ~ 1832
	J5	0 ~ 1200 / 32 ~ 2192
T	t1	-50 ~ 50 / -58 ~ 122
	t2	-100 ~ 100 / -148 ~ 212
	t3	-200 ~ 400 / -328 ~ 752

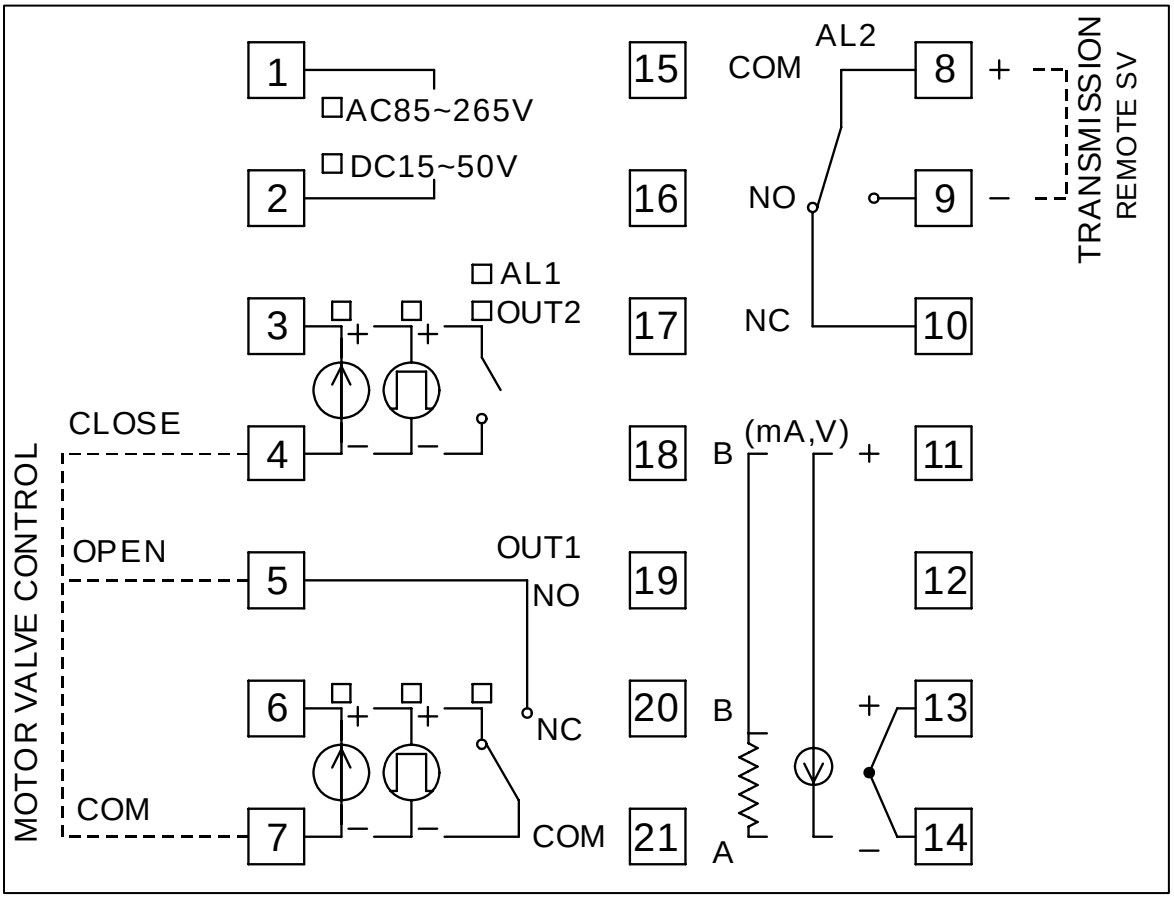
Type	Code	Range (℃ / ℉)
R	r	0 ~ 1700 / 32 ~ 3092
E	E	0 ~ 1000 / 32 ~ 1832
S	S	0 ~ 1700 / 32 ~ 3092
B	b	0 ~ 1800 / 32 ~ 3272
N	n	-200 ~ 1300 / -328 ~ 2372
PT	Pt1	-50 ~ 50 / -58 ~ 122
	Pt2	0 ~ 100 / 32 ~ 212
	Pt3	0 ~ 200 / 32 ~ 392
	Pt4	0 ~ 400 / 32 ~ 752
	Pt5	-200 ~ 800 / -328 ~ 1472
JPT	JPt	-200 ~ 500 / -328 ~ 932
ANA	An1	-1999 ~ 9999
	An2	

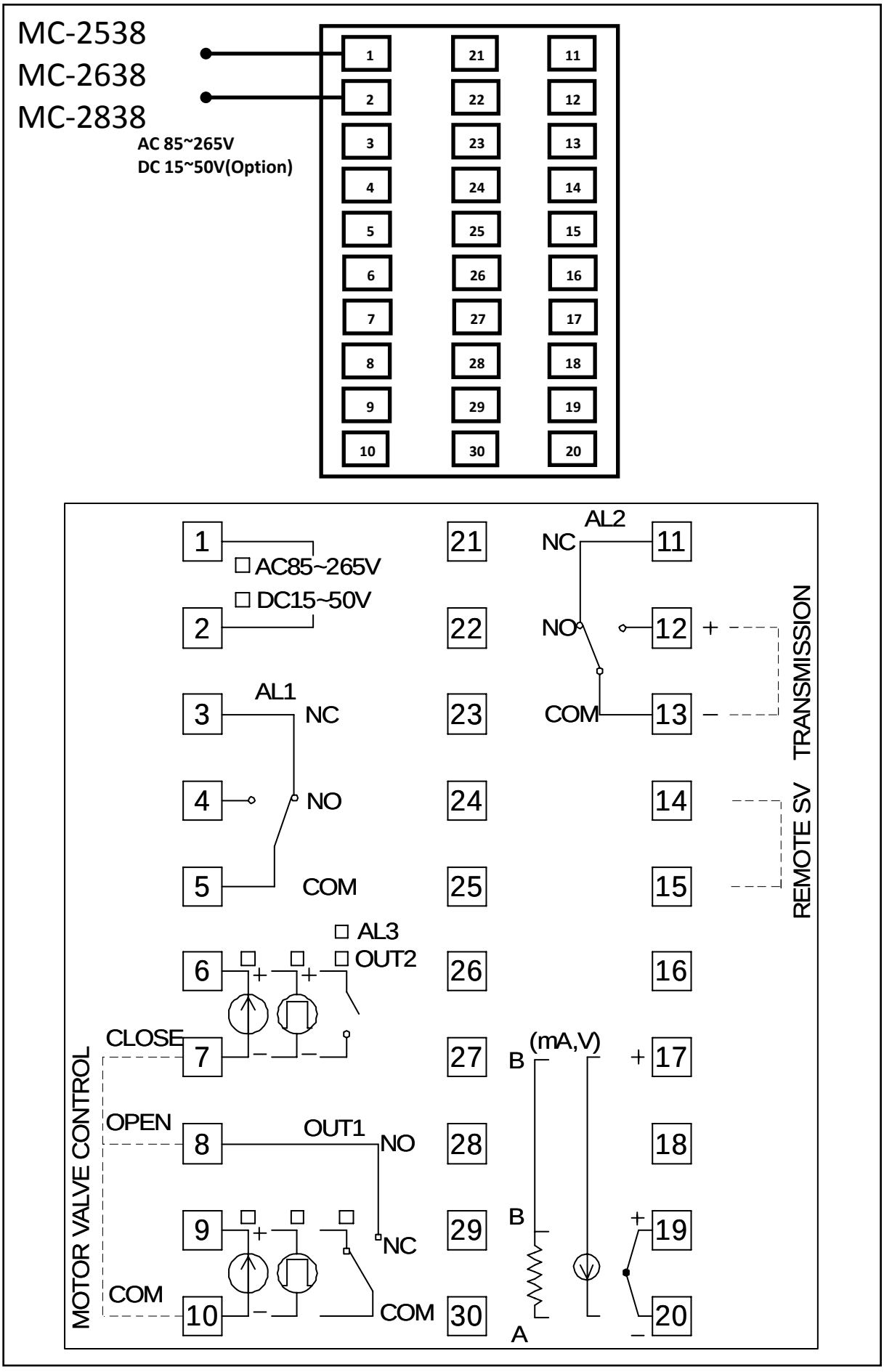
Wiring Diagram：



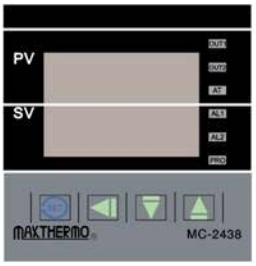
MC-2738


AC 85~265V
DC 15~50V(Option)
1
2
3
4
5
6
7
15
16
17
18
19
20
21
8
9
10
11
12
13
14

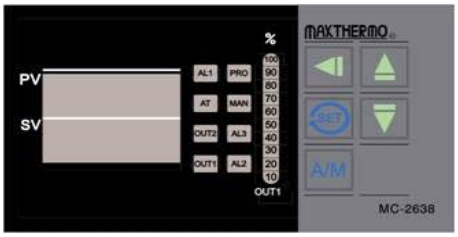

AC85~265V
DC15~50V
AL1
OUT2
CLOSE
OPEN
COM
MOTOR VALVE CONTROL
OUT1
NO
NC
COM
AL2
COM
NO
NC
TRANSMISSION
REMOTE SV
(mA,V)
B
A
1
2
3
4
5
6
7
15
16
17
18
19
20
21
8
9
10
11
12
13
14


MC-2538
MC-2638
MC-2838
AC 85~265V
DC 15~50V(Option)
1 2 3 4 5 6 7 8 9 10
21 22 23 24 25 26 27 28 29 30
11 12 13 14 15 16 17 18 19 20
AC85~265V
DC15~50V
AL1
NC
NO
COM
AL2
NC
NO
COM
TRANSMISSION
REMOTE SV
AL3
OUT2
CLOSE
OPEN
OUT1
NO
NC
COM
MOTOR VALVE CONTROL
(mA,V)
B
B
A

Dimension & Cut-out：

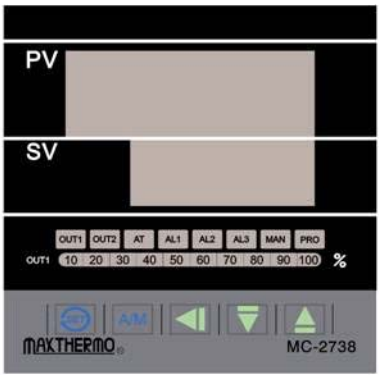


MC-2438

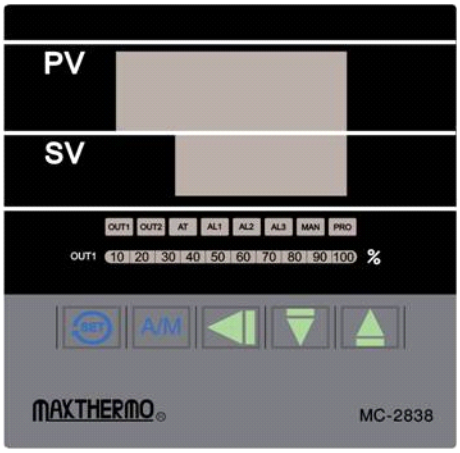


MC-2638

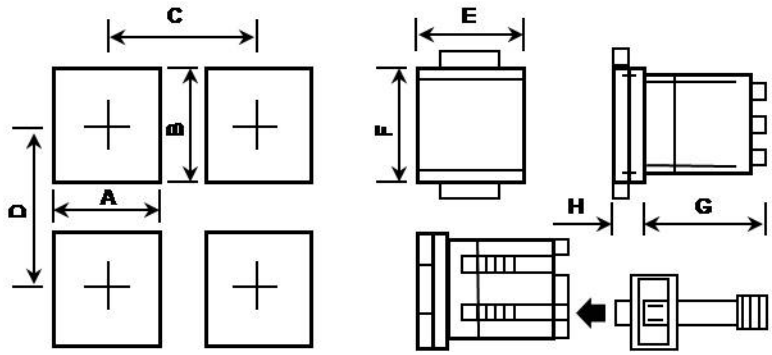
MC-2538



MC-2738



MC-2838



unit：mm

Model	A	B	C	D	E	F	G	H
MC -2438	44.5 $^{+0.5}_{-0}$	44.5 $^{+0.5}_{-0}$	65	70	50	50	80	17
MC -2538	44.5 $^{+0.5}_{-0}$	90.5 $^{+0.5}_{-0}$	65	116	50	96	80	17
MC -2638	90.5 $^{+0.5}_{-0}$	44.5 $^{+0.5}_{-0}$	111	70	96	50	80	17
MC -2738	68.5 $^{+0.5}_{-0}$	68.5 $^{+0.5}_{-0}$	89	94	74	74	80	17
MC -2838	90.5 $^{+0.5}_{-0}$	90.5 $^{+0.5}_{-0}$	111	116	96	96	80	17

Order information：

MC - 2438 - 101 - 001 - UA
A BCD EFG HI

A - Model NO.
MC-2438 with size 48x48mm(DIN 1/16)
MC-2538 with size 48x96mm(DIN1/8)
MC-2638 with size 96x48mm(DIN1/8)
MC-2738 with size 72x72mm
MC-2838 with size 96x96mm(DIN1/4)

B - Out 1 control output mode for heating or Cooling:
0 - None
1 - Relay contact, SPDT 5A/240VAC
2 - SSR Voltage pulse,24VDC/20mA
3 - Current, 4-20mA
4 - Open loop motor valve (3-wire)1a contact 5A/240VAC
7 - Close loop motor valve (6-wire)1a contact 5A/240VAC(with feed back)
A - 0~5V
B - 0~10V
C - 1~5V
D - 2~10V

C - Out 2 control output mode for cooling
0 - None
1 - Relay contact, SPDT 5A/240VAC
2 - SSR Voltage pulse,24VDC/20mA
3 - Current, 4-20mA

D - Alarm
0 - None
1 - One set alarm
2 - Two sets alarm
3 - Three sets alarm
*(except MC-2438)

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

F - Second Input
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

G - Communication
0 - None
1 - RS232
2 - RS485

H - Input type
U - TC/RTD
A - 4~20mA
B - 0~20mA
C - 0~5V
D - 0~10V
E - 1~5V
F - 2~10V
G - 4~20mA + DC24V
H - 0~20mA + DC24V
I - 0~5V + DC24V
J - 0~10V + DC24V
K - 1~5V + DC24V
L - 2~10V + DC24V

I - Main power
A - AC 85V ~ 265V
D - DC 15V ~ 50V

COMMUNICATION ADDRESS INDEX：

Function code：

Parameter	Register No.	Relative address	Parameter	Register No.	Relative address
PV	40117	0074	HBA	40023	0016
SV	40001	0000	LBA	40024	0017
STBY	40002	0001	LBD	40025	0018
OTL1	40003	0002	P1	40026	0019
OTL2	40004	0003	I1	40027	001A
PCT1	40005	0004	D1	40028	001B
PCT2	40006	0005	DB1	40029	001C
AT	40007	0006	ATVL	40030	001D
AL1	40008	0007	CYT1	40031	001E
AL1L	40009	0008	HYS1	40032	001F
AL1U	40010	0009	P2	40033	0020
AL1T	40011	000A	I2	40034	0021
AL2	40012	000B	D2	40035	0022
AL2L	40013	000C	CYT2	40036	0023
AL2U	40014	000D	HYS2	40037	0024
AL2T	40015	000E	PVOF	40040	0027
AL3	40016	000F	ADJS	40041	0028
AL3L	40017	0010	SVOF	40042	0029
AL3U	40018	0011	SSV	40043	002A
AL3T	40019	0012	SOUT	40044	002B
RAMP	40021	0014	STME	40045	002C
CT	40022	0015	INP1	40047	002E

Function code：

Parameter	Register No.	Relative address	Parameter	Register No.	Relative address
ANL1	40048	002F	CHO2	40070	0045
ANH1	40049	0030	AO	40071	0046
DP	40050	0031	CLO3	40072	0047
LSPL	40051	0032	CHO3	40073	0048
USPL	40052	0033	RUCY	40074	0049
SV_L	40053	0034	PMFB	40075	004A
SV_H	40054	0035	BITS	40077	004C
INP2	40055	0036	IDNO	40078	004D
ANL2	40056	0037	BAUD	40079	0050
ANH2	40057	0038	UNIT	40081	004F
AL1F	40058	0039	PVFT	40082	0051
AL1H	40059	003A	ACT	40083	0052
AL1M	40060	003B			
AL2F	40061	003C			
AL2H	40062	003D			
AL2M	40063	003E			
AL3F	40064	003F			
AL3H	40065	0040			
AL3M	40066	0041			
CLO1	40067	0042			
CHO1	40068	0043			
CLO2	40069	0044			

Alarm status (Word)：

CONTROL BITS Register No. 40118		
Parameter	Bit	Read-out
OUT1	0	0: Out1 OFF, 1:0ut1 ON
OUT2	1	0: Out2 OFF, 1:Out2 ON
AT	2	0: Auto-tuning OFF, 1: Auto-tuning ON
MAN	3	0: Manual OFF, 1: Manual ON
STBY	4	0: Stand-by OFF, 1: Stand-by ON
SOFT	5	0: Soft start OFF, 1: Soft start ON
AL1	7	0: AL1 OFF, 1: AL1 ON
AL2	8	0: AL2 OFF, 1: AL2 ON
AL3	9	0: AL3 OFF, 1: AL3 ON
AL1_H	10	0: AL1U OFF, 1: AL1U ON
AL2_H	11	0: AL2U OFF, 1: AL2U ON
AL3_H	12	0: AL3U OFF, 1: AL3U ON
AL1_L	13	0: AL1L OFF, 1: AL1L ON
AL2_L	14	0: AL2L OFF, 1: AL2L ON
AL3_L	15	0: AL3L OFF, 1: AL3L ON

Alarm status (Bit)：

Parameter	Register No.	Read-out
OUT1	10001	0: Out1 OFF, 1:0ut1 ON
OUT2	10002	0: Out2 OFF, 1:Out2 ON
AT	10003	0: Auto-tuning OFF, 1: Auto-tuning ON
MAN	10004	0: Manual OFF, 1: Manual ON
STBY	10005	0: Stand-by OFF, 1: Stand-by ON
SOFT	10006	0: Soft start OFF, 1: Soft start ON
AL1	10008	0: AL1 OFF, 1: AL1 ON
AL2	10009	0: AL2 OFF, 1: AL2 ON
AL3	10010	0: AL3 OFF, 1: AL3 ON
AL1_H	10011	0: AL1U OFF, 1: AL1U ON
AL2_H	10012	0: AL2U OFF, 1: AL2U ON
AL3_H	10013	0: AL3U OFF, 1: AL3U ON
AL1_L	10014	0: AL1L OFF, 1: AL1L ON
AL2_L	10015	0: AL2L OFF, 1: AL2L ON
AL3_L	10016	0: AL3L OFF, 1: AL3L ON

How to modify the input of analog signal：

This series provide the free input of T/C and RTD ；
it doesn't need to modify the hardware except the analog input.

- **Analog input hardware modification ：**

(Refer to S1~J2 on PC board)

INPUT	S1	S2	S3	S4	S5	S6	J2
T/C RTD	●	X	X	X	X	X	●
0~50mV	●	X	X	X	X	X	X
0~20mA	X	X	●	X	X	●	X
0~5V	X	●	X	X	●	X	X
0~10V	X	●	X	●	X	X	X

【●】：Short 【X】：Open

PCB:

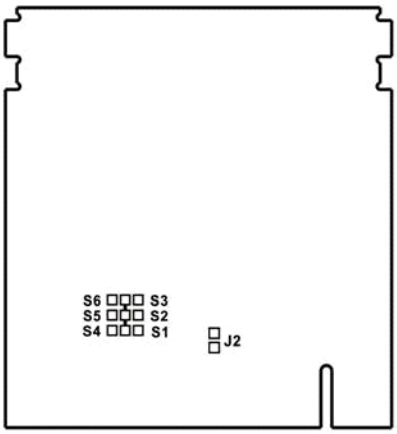
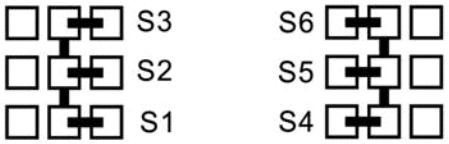
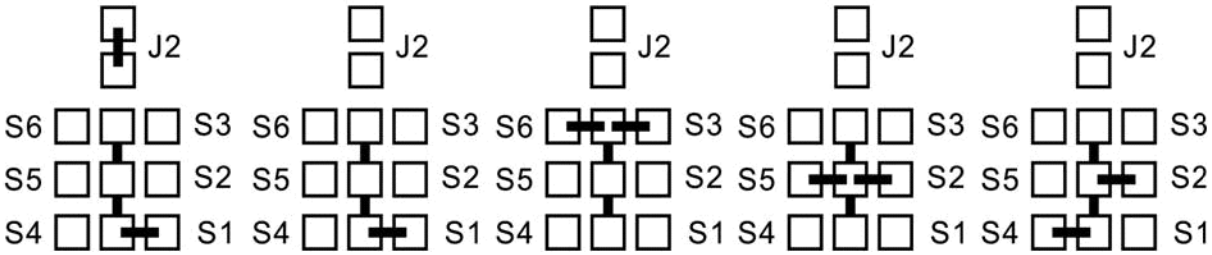


Diagram:



T/C RTD: **0~50mV:** **0~20mA:** **0~5V:** **0~10V:**



- **Analog input software modification ：**
  - Select ”AnX” in ”inP1” parameter .
  - Set ”LSPL” in ”input level” to lowest range .
  - Set ”USPL” in ”input level” to highest range .
- **Analog input calibration ：**
  - Enter “AnL1 ”parameter in ”Input level” .
  - Provide signal for lowest range and wait for 3 sec then keep pressing ▼ key .
  - Enter “AnH1 ”parameter in ”Input 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 LSPL .
  - provide signal for highest range again then check if PV equals to USPL .
  - If it is not accurate after calibrating, please repeat the above procedures again .

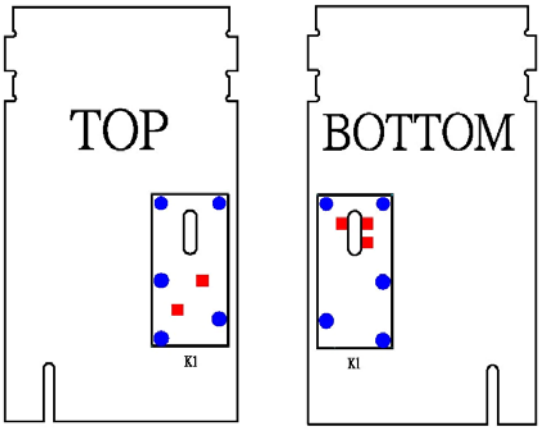
Order information：

- **Hardware Modification Position (Refer to Appendix 1)：**
  - **MC-2438**：K1 on 24C2 board.
  - **MC-2738**：K1 on 27C2 board.
  - **MC-2838**：K1 on 28C2 board.
  - **MC-2538**：K1 on 28C2 board.
  - **MC-2638**：K1 on 28C2 board.
- **Software Setting：**
  - **RELAY Output**：Place the RELAY following the above hardware modification position. Set parameter CYT1 → 15.
  - **PULSED Output**：Place the SSR Module (MC-V2) following the above hardware modification position. Set parameter CYT1 → 2.
  - **0-20mA Output**：Place the SCR Module (MC-mA3) following the above hardware modification position. Set Parameter CYT1 → 0, CL01 → 0 and CH01 → 960.
  - **4-20mA Output**：Place the SCR Module (MC-mA3) following the above hardware modification position. Set parameter CYT1 → 0, CL01 → 240 and CH01 → 960.
  - **0-5V Output**：Short J1 & J2 on SCR Module (MC-mA3) then place on the controller board following the above modification position. Set parameter CYT1 → 0, CL01 → 0 and CH01 → 965.
  - **1-5V Output**：Short J1 & J2 on SCR Module (MC-mA3) then place on the controller board following the above modification position. Set parameter CYT1 → 0, CL01 → 235 and CH01 → 965.
  - **0-10V Output**：Short J1 on SCR Module (MC-mA3) then place on the controller board following the above modification position. Set parameter CYT1 → 0, CL01 → 0 and CH01 → 965.
  - **2-10V Output**：Short J1 on SCR Module (MC-mA3) then place on the controller board following the above modification position. Set parameter CYT1 → 0, CL01 → 235 and CH01 → 965.

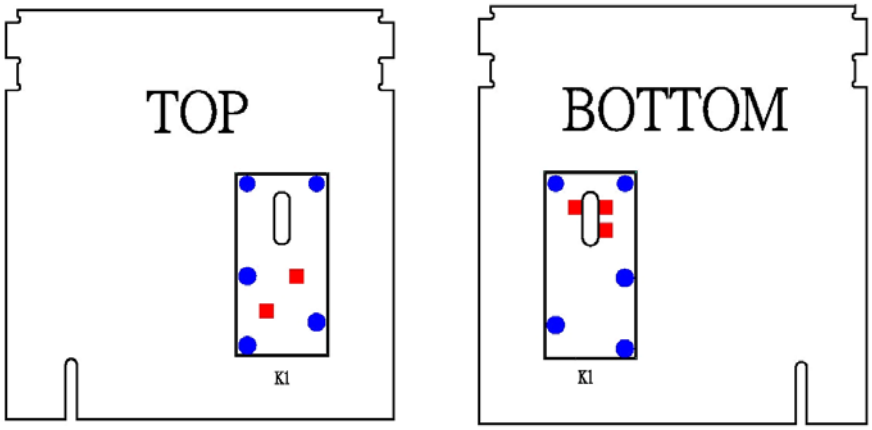
Appendix 1：

RELAY：Welding pads in blue

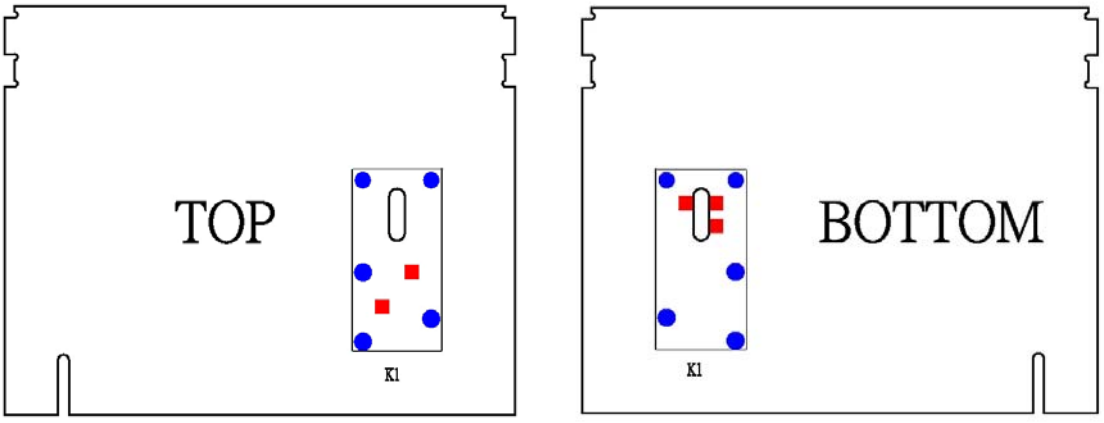
SSR & SCR：Welding pads in red



MC-2438

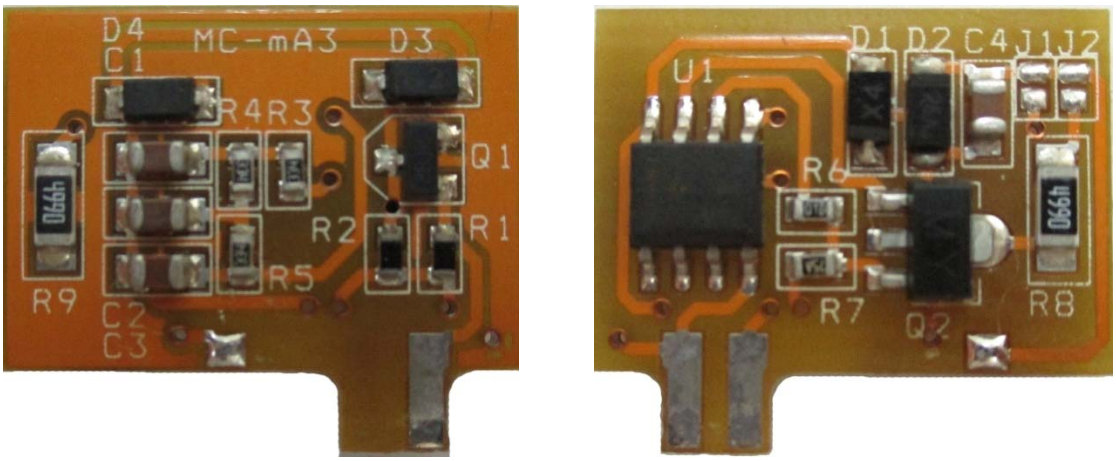


MC-2738

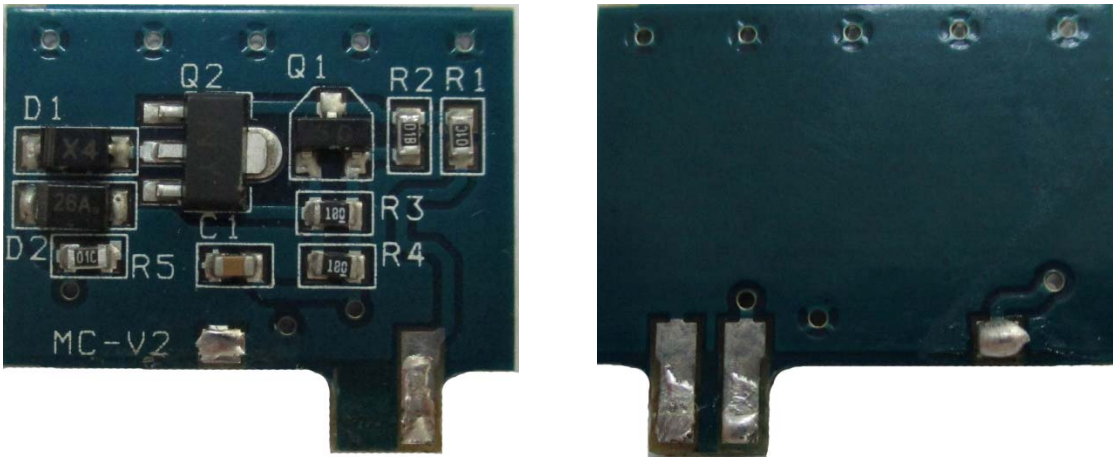


MC-2538/2638/2838

Appendix 2：



SCR Module (MC-mA3)



SSR Module (MC-V2)