TEMPERATURE CONTROLLER

OPERATION MANUAL

TB100 TB400 TB700 TB600 TB900

Before using please check whether range , input and output match your requirement.

1. Front panel instruction

1.1 DISPLAY

PV：Process value，4 digit display (red color)

SV：Setting value，4 digit display (green color)

1.2 LED

OUT1	：Output 1，green color
OUT2	：Output 2，green color
AT	：Auto Tuning，yellow color
PRO	：Program，yellow color
AL1	：Alarm 1，red color
AL2	：Alarm 2，red color
MAN	：Manual，yellow color

1.3 KEY

SET	：MODE ＆ SET key
◁	：SHIFT key
▽	：DOWN key
△	：UP key
A/M	：Auto/Manual key

2 Auto tuning

2.2 Once AT set YES，auto tuning is to be performed.

2.3 After auto tuning finished，PID parameter is to be set automatically.

2.4 ATVL=auto tuning offset，and it will be deduced from SV (it can prevent over shoot during auto tuning)

SV-ATVL=Auto-tuning value，ATVL=auto tuning offset

Ex.SV=200℃ ，ATVL=5，Auto tuning point is at 195℃

＊ ATVL means Auto-tuning point in program type

2.5 Auto tuning failure

Possible 1： ATVL is too big. (If not sure，set ATVL=0)

Possible 2： System time is too long.(Set PID parameter individually)

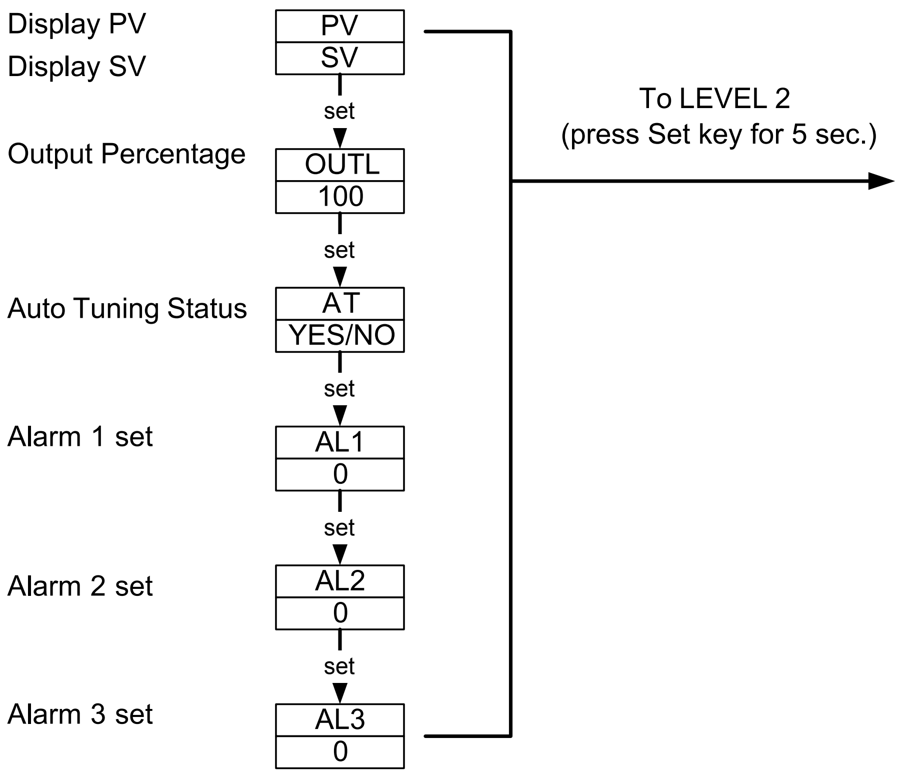
3. Error information

DISPLAY	DESCRIPTION
IN1E	Open circuit of main control sensor.
＊ ADCF	A/D converter failed.
＊ CJCE	Cold junction compensation failed.
IN2E	Open circuit of sub control sensor.
UUU1	PV exceeds USPL.
NNN1	PV under LSPL.
UUU2	Input signal of sub control exceeds the upper limit.
NNN2	Input signal of sub control under the lower limit.
＊ RAMF	RAM failed.
INTF	Interface failed.
AUTF	Auto tuning failed.

NOTE：If the "＊" marked error comes up，the Controller needs repair.
Please send it to the nearest sales office or retail dealer.

4. Operating flow

4.1 LEVEL 1 (User Level)



4.1.1 Press the **SHIFT KEY** (◁) to change the parameters. If the **SHIFT KEY** is pressed，the first digit begins blinking. Press the **UP KEY**(△) or **DOWN KEY**(▽) to increase or decrease the value of the digit，then press the **SHIFT KEY**(◁) again to go to the next digit. As all the digit are written，press **SET KEY** to enter the value.

4.1.2 **SET KEY** also has the function of changing MODEs，if the **SET KEY** is pressed，the display shows the next MODE.

4.1.3 Press **SET KEY** for 5 sec. the display goes to LEVEL 2，and do the same thing to return LEVEL 1.

4.1.4 If any key were not pressed for 1 minute，the display would go to LEVEL 1.

4.1.5 Press **A/M KEY** the display to go to LEVEL 1，no matter where it is.

4.1.6 If **OUTL** set "0"，it means the controller has no output,

4.2 LEVEL 2 (PID Level)

press SET key for 5 seconds to enter Level 2

P1	3	Main Control Proportional Band	Range：0-200% ON/OFF at P=0
I1	240	Main Control Integral Time	Range：0~3600 Sec Integral OFF at I=0
D1	60	Main Control Derivative Time	Range：0~900 Sec Derivative OFF at D=0
db 1	0	Main Control Dead-band Time	Dead time compensation Range：0~1000 Sec
ATVL	0	Main Control Auto tuning off-set	Range：0~USPL
CYT1	10	Main Control Proportional Cycle	Output (SSR=1，4 ~ 20mA=0，Relay=over 10) Range：0~150 Sec
HYS1	1	Main Control Hysteresis	For ON/OFF control only Range：0~1000
P2	3	Sub Control Proportional Band	Sames as P1
I2	240	Sub Control Integral Time	Sames as I1
D2	240	Sub Control Derivative Time	Sames as D1
CYT2	10	Sub Control Proportional Cycle	Sames as CYT1
HYS2	1	Sub Control Hysteresis	Sames as HYS1
GAP1	0	Main Control Gap (Output 1)	For 2 output use only，set the volume turning. "OFF" early to SV
GAP2	0	Sub Control Gap (Output 2)	For 2 output use only，set the volume turning. "ON" early to SV
LCK	0000	Function Lock	

Set → Return P1

LCK=0000，To enter any Level (not include SET Level) and change their parameters
LCK=1111，To enter any Level (include SET Level) and change their parameters
LCK=0100，To enter Level 1 & 2 and to change their parameters.
LCK=0110，To enter Level 1 & 2 and to change Level 1parameters only.
LCK=0001，To enter Level 1 only and to change SV only.
LCK=0101，it can't change any parameter except LCK.

4.3 LEVEL 3 (INPUT Level)

When LCK=0000，press SET key and SHIFT KEY ◁ for 5 seconds to enter LEVEL 3

Display	Description	Function
INP1 / K2	Main Control input selection	select the input range，refer to input selection (P.12 ~ 13)
ANL1 / 0	Main Control Analog Zero set	It is used as input code are AN1 to AN5 Range：LSPL~USPL
ANH1 / 5000	Main Control Analog Span set	Same as ANL1
DP / 0000	Decimal point	To set the position of decimal point
LSPL / 0.0	Lower set-point limit	To set the lowest point within INP1
USPL / 400.0	Upper set-point limit	To set the highest point within INP1
ANL2 / 0	Sub Control Analog Zero set	It is used as input code are AN1 to AN5 Range：LSPL~USPL
ANH2 / 5000	Sub Control Analog Span set	Sames as ANL2
ALD1 / 01	Alarm mode of AL1	Range:00~19 (see P.14~15)
ALT1 / 10	Time set of Alarm 1	It is used in program function Range：0~99.59 min. 0=flicker alarm，99.59=continued，and other=on delay time
ALD2 / 01	Alarm mode of AL2	Range:00~19 (see P.14~15)
ALT2 / 0	Time set of Alarm 2	Sames as ALT1
ALD3 / 01	Alarm mode of AL3	Range:00~19 (see P.14~15)
ALT3 / 0	Alarm 3 time set	Sames as ALT1
HYSA / 0	Hysteresis of alarm	Range：0~1000
CLO1 / 150	Main Control calibration	Calibrate the low value of output Range：LSPL~USPL(current output only)

Set

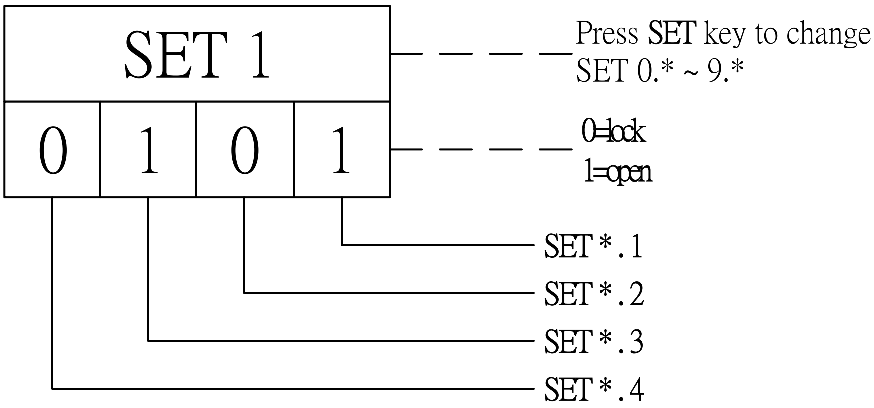
CHO1 3500	Main Control Calibration high	To calibrate the high value of output Range:0~9999(current output only)
CLO2 150	Sub control Calibration low	Same as CLO1
CHO2 3200	Sub control Calibration high	Same as CHO1
CLO3	Transmitter control Calibration low	Same as CLO1
CHO3	Transmitter control Calibration high	Same as CHO1
RUCY 00	Timer of motor	Full run time of proportional motor (without potentiometer) Range：0~150 sec.
WAIT 0	Use in program for waiting continued operation	0=No Wait Other=Wait volume
HYSM 1	Hysteresis for motor control	Range：0~1000
IDNO 1	ID number (don't care)	Communication ID number
BAUD 2400	Baud rate (don't care)	UART baud rate selection Range：110~9600 BIT/sec
SVOS 0	Compensate SV	Range：-1000~1000
PVOS 0	Compensate PV	Range：LSPL~USPL
UNIT C	Unit of PV & SV	Range：C，F，A(analog)
SOFT 1000	Soft filter (don't care)	Adjust the response time of PV (the bigger， the faster) Range：0.05~1.00
CASC	don't care	
OUD HEAT	Action mode	Range：heat，cool
OPAD PID	Control action	Range：PID，Fuzzy
HZ 60	Frequency	Range：50，60HZ

Return INP1

4.4 LEVEL 4 (SET Level)

When LCK=1111，press SET key and SHIFT KEY ◁ for 5 seconds to enter Level 4. There are SET 0.1 to SET 9.4 for use.

4.4.1 Display：



4.4.2 Function of SETs

SET	Function	SET	Function
1.1	OUTL	5.1	CLO2，CHO2
1.2	AT	5.2	CLO3，CHO3
1.3	AL1	5.3	RUCY，WAIT，HYSM
1.4	AL2	5.4	IDNO，BAUD
2.1	AL3	6.1	SVOS
2.2	ANL1，ANH1，DP	6.2	PVOS
2.3	LSPL，USPL	6.3	UNIT
2.4	ANL2，ANH2	6.4	SOFT
3.1	ALD1	7.1	CASC
3.2	ALT1	7.2	OUD
3.3	ALD2	7.3	OPAD
3.4	ALT2	7.4	HZ
4.1	ALD3		
4.2	ALT3		
4.3	HYSA		
4.4	CLO1，CHO1		

SET	Function	Remarks
8.1	0=No repeat	Program Use
	1=Program repeat	
8.2	0=No power failure	
	1=With power failure	
8.3	0=Start from 0	
	1=Start from PV	
		Auxiliary Output Use
9.3	TRS SV	
9.4	TRS PV	
0.3	0=No Remote SV	
	1=Remote SV	

- **NOTE**：Please don't operate **SET 8.4**，otherwise the controller's process will be in confusion.

4.4.3 FUNCTION OF LCK

LCK=**0000**，It can enter Level 3 (press SET + ◁ for 5 sec.)

LCK=**1111**，It can enter Level 4 (press SET + ◁ for 5 sec.)

LCK=**0100**，It can enter Level 1 & 2 and change their parameters.

LCK=**0110**，It can enter Level 1 & 2 but change Level 1 parameters only.

LCK=**0001**，It can enter Level 1 only and change SV only.

LCK=**0101**，It can't change any parameters except LCK.

4.5 PROGRAM LEVEL (to be ordered)

LEVEL 1

↓ Set

Display	Description
PTN 1	Set program pattern Range：0~2
↓ Set	
SEG 1	Program segment display Resprent ：("pattern"_"segment")
↓ Set	
TIMER	Program timer display Range：0~99 hour 59 min
↓ Set	
SV-1	Set volume for Seg.1 Range： LSPL~USPL
↓ Set	
TM-1	Set time for Seg.1 Range：0~99 hour 59 min
↓ Set	
OUT-1 100	Set output for Seg.1 Range：0~100% If OUT=0，No program function
↓ Set	
SV-2	Set volume for Seg.2
↓ Set	
TM-2	Set time for Seg.2
↓ Set	
OUT-2	Set output for Seg.2
↓ Set	
SV-3	Set volume for Seg.3
↓ Set	
TM-3	Set time for Seg.3
↓ Set	
OUT-3	Set output for Seg.3
↓ Set	
SV-4	Set volume for Seg.4
↓ Set	
TM-4	Set time for Seg.4
↓ Set	
OUT-4	Set output for Seg.4
↓ Set	
SV-5	Set volume for Seg.5
↓ Set	
TM-5	Set time for Seg.5
↓ Set	
OUT-5	Set output for Seg.5
↓ Set	
SV-6	Set volume for Seg.6
↓ Set	
TM-6	Set time for Seg.6
↓ Set	
OUT-6	Set output for Seg.6
↓ Set	
SV-7	Set volume for Seg.7
↓ Set	
TM-7	Set time for Seg.7
↓ Set	
OUT-7	Set output for Seg.7
↓ Set	
SV-8	Set volume for Seg.8
↓ Set	
TM-8	Set time for Seg.8
↓ Set	
OUT-8	Set output for Seg.8
↓ Set	

Return LEVEL 1

4.5.1 This program has 2 patterns，each pattern contains 8 segments. The segment can be arranged a period of Ramp status or Soak status.

4.5.2 Terminologies

pattern ：A program consists of some steps.

Step ：A Ramp status + a Soak status.

Ramp status：The status with changing SV.

Ramp status：The status with fixed SV.

4.5.3 Operating

1. **"KEY" function(no changing parameter)**

   △ (START) ：To start program procedure，**PRO** in panel flicker.

   ▽ (WAIT) ：To suspend program procedure，**PRO** in panel will stop flicker but light.

   △ **+ SET**(JUMP)：To to jump segment.

   ▽ **+ SET** (RESET)：To reset program procedure，PRO in panel will be "off".

2. **Alarm Function**：

   If **ALD1** to be set “07”(＊refer to the selection，p.14~15)，

   AL1 to be set “2”(AL1=2，it means alarm in segment 2 end)，

   ALT1 to be set “00.10”(alarm time 10 sec.).

   ＊In this case，when program proceeds to segment 2 end，ALM1 relay will be on 10 sec.

3. **END function**：

   If **ALD** to be set “17”(refer to the selection，p.14~15)，This program will be end in segment 8 or 16.

   ＊ In this case，**PV** and **END** will flicker in display window and the alarm relay acts.

   This controller doesn’t have END order if program procedure are less than 8 segments. In this case，please set segment’s out = 0. then this program will be end in last set segment. Otherwise，it will proceed 8 or 16 segments.

4. **Linking Function**：

   PTN=1 proceed pattern 1，contains 8 segments.

   PTN=2 proceed pattern 2，contains 8 segments.

   PTN=0 linking proceed pattern 1 and 2 totally 16 segments.(set PTN1 and PTN2 at first，then set PTN=0)

5. **Other function(＊refer to LEVEL 4)**

   SET 8.1=1 program repeat.

   SET 8.2=0 No power fail function.

SET 8.2=1 with power fail function (if power suspend，the controller will keep memory)

SET 8.3=0 program start from 0.

SET 8.3=1 program start from PV.

5. INPUT

5.1 Input selection (INP1)

TYPE	*CODE*	*RANGE*
K	**K1**	0.0 ~ 200.0℃ / 0.0 ~392.0°F
	K2	0.0 ~ 400.0℃ / 0.0 ~752.0°F
	K3	0 ~ 600℃ / 0 ~1112°F
	K4	0 ~ 800℃ / 0 ~1472°F
	K5	0 ~ 1000℃ / 0 ~1832°F
	K6	0 ~ 1200℃ / 0 ~2192°F
J	**J1**	0.0 ~ 200.0℃ / 0.0 ~392.0°F
	J2	0.0 ~ 400.0℃ / 0.0 ~752.0°F
	J3	0 ~ 600℃ / 0 ~1112°F
	J4	0 ~ 800℃ / 0 ~1472°F
	J5	0 ~ 1000℃ / 0 ~1832°F
	J6	0 ~ 1200℃ / 0 ~2192°F
R	**R1**	0 ~ 1600℃ / 0 ~2912°F
	R2	0 ~ 1796℃ / 0 ~3216°F
S	**S1**	0 ~ 1600℃ / 0 ~2912°F
	S2	0 ~ 1796℃ / 0 ~3216°F
B	**B1**	0 ~ 1820℃ / 0 ~3308°F
E	**E1**	0 ~ 800℃ / 0 ~1472°F
	E2	0 ~ 1000℃ / 0 ~1832°F
N	**N1**	0 ~ 1200℃ / 0 ~2192°F
	N2	0 ~ 1300℃ / 0 ~2372°F
T	**T1**	-199.9 ~ 400.0℃ / -199.9 ~752.0°F
	T2	-199.9 ~ 200.0℃ / -199.9 ~392.0°F
	T3	0.0 ~ 350.0℃ / 0.0 ~662.0°F
W	**W1**	0 ~ 2000℃ / 0 ~3632°F
	W2	0 ~ 2320℃ / 0 ~2372°F
PL II	**PL 1**	0 ~ 1300℃ / 0 ~2372°F
	PL 2	0 ~ 1390℃ / 0 ~2534°F
U	**U1**	-199.9 ~ 600.0℃ / -199.9 ~999.9°F
	U2	-199.9 ~ 200.0℃ / -199.9 ~392.0°F
	U3	0.0 ~ 400.0℃ / 0.0 ~752.0°F

TYPE	*CODE*	*RANGE*
L	**L1**	0 ~ 400℃ / 0 ~752˚F
	L2	0 ~ 800℃ / 0 ~1472˚F
JIS PT100	**JP 1**	-199.9 ~ 600.0℃ / -199.9 ~999.9˚F
	JP 2	-199.9 ~ 400.0℃ / -199.9 ~752.0˚F
	JP 3	-199.9 ~ 200.0℃ / -199.9 ~392.0˚F
	JP 4	0 ~ 200℃ / 0 ~392˚F
	JP 5	0 ~ 400℃ / 0 ~752˚F
	JP 6	0 ~ 600℃ / 0 ~1112˚F
DIN PT100	**DP 1**	-199.9 ~ 600.0℃ / -199.9 ~999.9˚F
	DP 2	-199.9 ~ 400.0℃ / -199.9 ~752.0˚F
	DP 3	-199.9 ~ 200.0℃ / -199.9 ~392.0˚F
	DP 4	0 ~ 200℃ / 0 ~392˚F
	DP 5	0 ~ 400℃ / 0 ~752˚F
	DP 6	0 ~ 600℃ / 0 ~1112˚F
JIS PT50	**JP.1**	-199.9 ~ 600.0℃ / -199.9 ~999.9˚F
	JP.2	-199.9 ~ 400.0℃ / -199.9 ~752.0˚F
	JP.3	-199.9 ~ 200.0℃ / -199.9 ~392.0˚F
	JP.4	0 ~ 200℃ / 0 ~392˚F
	JP.5	0 ~ 400℃ / 0 ~752˚F
	JP.6	0 ~ 600℃ / 0 ~1112˚F
AN1	**AN1**	-10 ~ 10mV / -1999~9999
AN2	**AN2**	0 ~ 10mV / -1999~9999
AN3	**AN3**	0 ~ 20mV / -1999~9999
AN4	**AN4**	0 ~ 50mV / -1999~9999
AN5	**AN5**	10 ~ 50mV / 1999~9999

＊The initial set in factory is “K2” without any certain requirement

6. ALARM

6.1 Alarm function selection

CODE	***DESCRIPTION***	***INHIBIT***
00 / 10	**None**	
01	**Deviation high limit alarm**	**YES**
11	**Deviation high limit alarm**	**NO**
02	**Deviation low limit alarm**	**YES**
12	**Deviation low limit alarm**	**NO**
03	**Deviation high / low limit alarm**	**YES**
13	**Deviation high / low limit alarm**	**NO**
04 / 14	**Deviation high / low limit range alarm**	**NO**
05	**Absolute value high limit alarm**	**YES**
15	**Absolute value high limit alarm**	**NO**
06	**Absolute value low limit alarm**	**YES**
16	**Absolute value low limit alarm**	**NO**
07	**Segment end alarm (use for program only)**	**-**
17	**Program end alarm (use for program only)**	**-**
08	**System error alarm-on**	**-**
18	**System error alarm-off**	**-**
09	**Heater break alarm-on (single phase)**	**-**
19	**On delay timer alarm**	**-**

Note：the word “**INHIBIT**” means that alarm does not work at the first time.

6.2 Alarm action description

▲ : **SV**

△ : **Alarm set value**
(**inhibit** means alarm doesn't work at the first time)

00 10	**Non**
01	**Deviation high alarm inhibit** OFF ON LOW △ ▲ △ HIGH
11	**Deviation high alarm no inhibit** OFF ON LOW △ ▲ △ HIGH
02	**Deviation low alarm inhibit** ON OFF LOW △ ▲ △ HIGH
12	**Deviation low alarm no inhibit** ON OFF LOW △ ▲ △ HIGH
03	**High low alarm inhibit** ON OFF ON LOW △ ▲ △ HIGH
13	**High low alarm no inhibit** ON OFF ON LOW △ ▲ △ HIGH
04 14	**Band alarm** OFF ON OFF LOW △ ▲ △ HIGH
05	**Absolute high alarm inhibit** OFF ON LOW △ HIGH

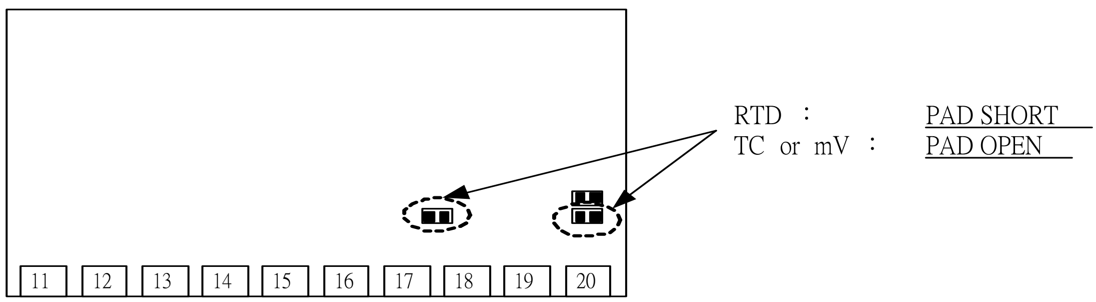
15	**Absolute high alarm no inhibit** OFF ON LOW △ HIGH
06	**Absolute low alarm inhibit** ON OFF LOW △ HIGH
16	**Absolute low alarm no inhibit** ON OFF LOW △ HIGH
07	**Segment end alarm** **(use for program only)** (1) ALD1~3，set **07** (2) AL1~3=alarm segment No.set (3) ALT1~3 if set **0**=flicker alarm ALT1~3 if set **99.59**=continued alarm ALT1~3 if set **others**=ON delay time
17	**Program end alarm** **(use for program only)** *RUN* *END* OFF ON AL
08	**System error alarm - ON** *Normal* *Error* OFF ON AL
18	**System error alarm - OFF** *Normal* *Error* ON OFF AL
09	
19	**On delay timer** When PV=alarm SV，it keeps a certain period(set time)before alarm action. Range:00H.00M~99H.59M

7. Modification of input “TC” ⇄ “RTD”(on PC board)

If the controller needs modification from **TC** or **mV** to <u>**RTD** </u>type，please <u>make PAD short</u> on PC board back as following diagram and changing input selection. On the contrary，modify from **RTD** to <u>**TC** or **mV**</u>，<u>make PAD open</u>.

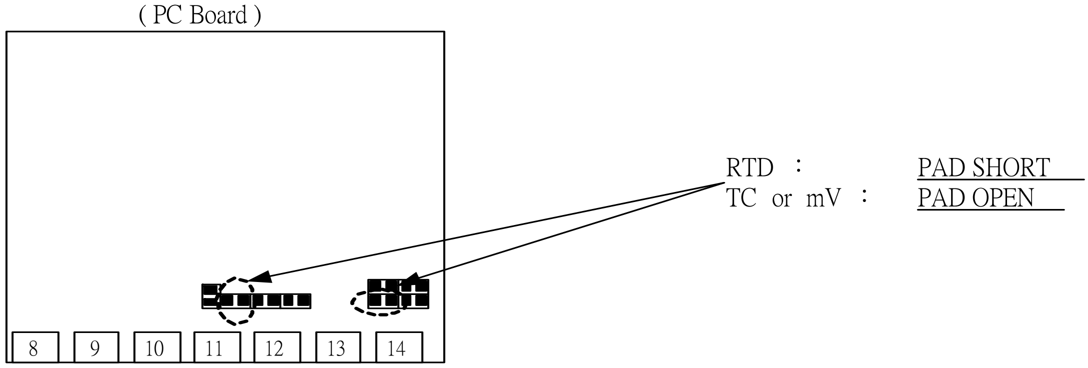
96×96，48×96，96×48

(PC Board)



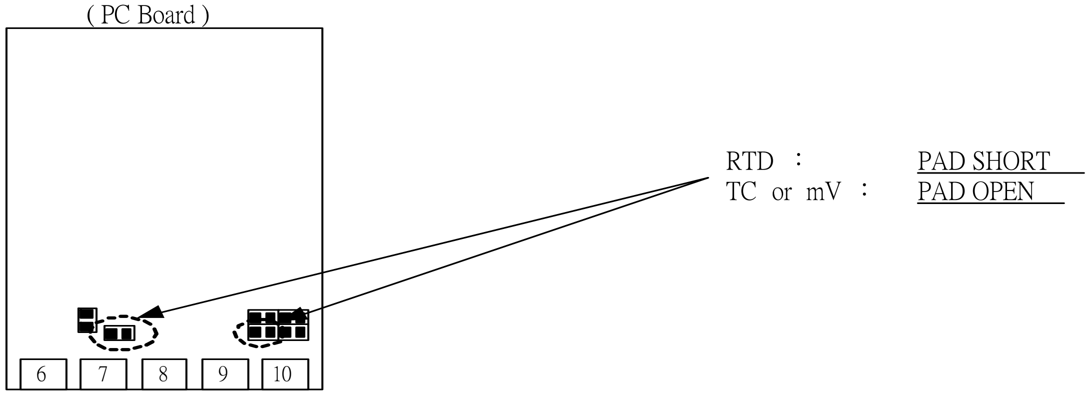
72×72

(PC Board)



48×48

(PC Board)



8.Modification of output “Relay” ⇄ “SSR” ⇄ “4~20mA”

It just needs to <u>change a module</u> at the same position，and modify parameter **CYT1** in LEVEL 2 .

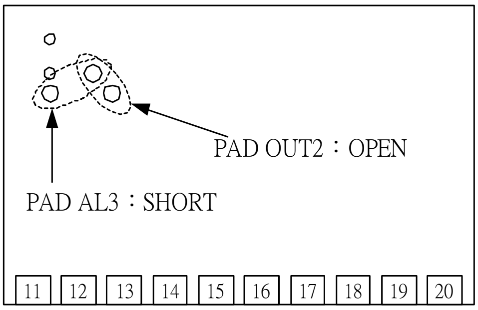
9. Modification of output

“HEAT/ALARM”⟶“HEAT/COOL” (on PC board)

HEAT / ALARM

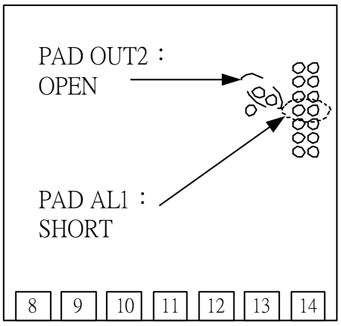
96×96，48×96，96×48

(PC Board)



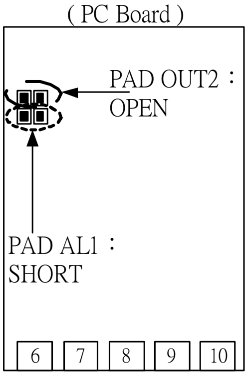
72×72

(PC Board)



48×48

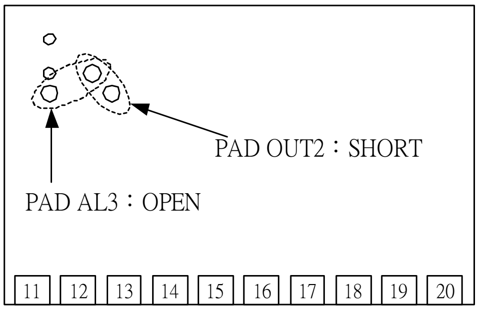
(PC Board)



HEAT / COOL

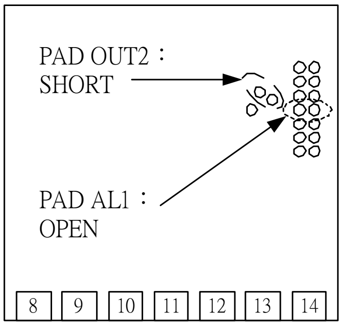
96×96，48×96，96×48

(PC Board)



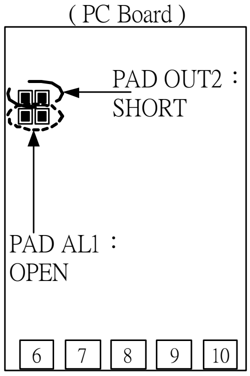
72×72

(PC Board)



48×48

(PC Board)



10. Modification of INPUT：0~1V，0~5V，0~10V，mA

10.1　Hardware part：

	96×96，48×96，96×48	72×72	48×48
INPUT(+)	PIN 17	PIN 11	PIN 7
INPUT (-)	PIN 20	PIN 14	PIN 10

1V，5V，10V：　(R4 use 100Ω)

mA：　(R3 use 100Ω，R5 use 2.4Ω，　S3＆S5 SHORT)

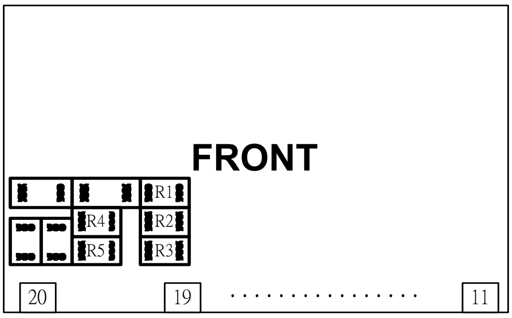
0 ~ 1V：　(R1 use 2KΩ，S1＆S4 SHORT)

0 ~ 5V：　(R2 use 10KΩ，S2＆S4 SHORT)

0 ~ 10V：　(R3 use 22KΩ，S3＆S4 SHORT)

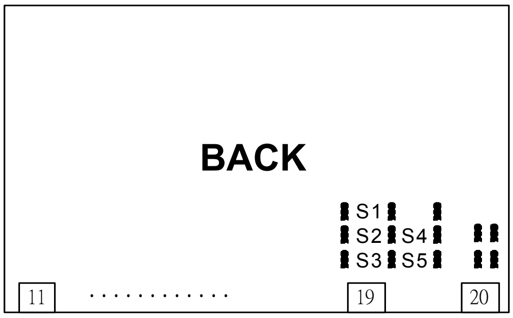
96×96，48×96，96×48

(PC Board)



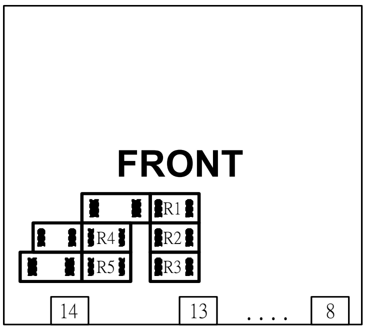
96×96，48×96，96×48

(PC Board)



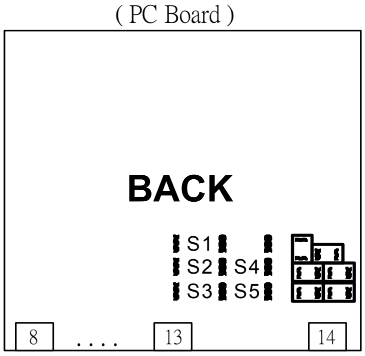
72×72

(PC Board)



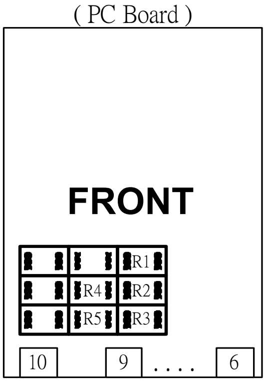
72×72

(PC Board)



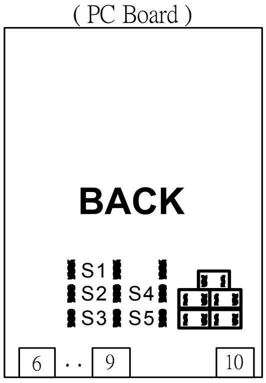
48×48

(PC Board)

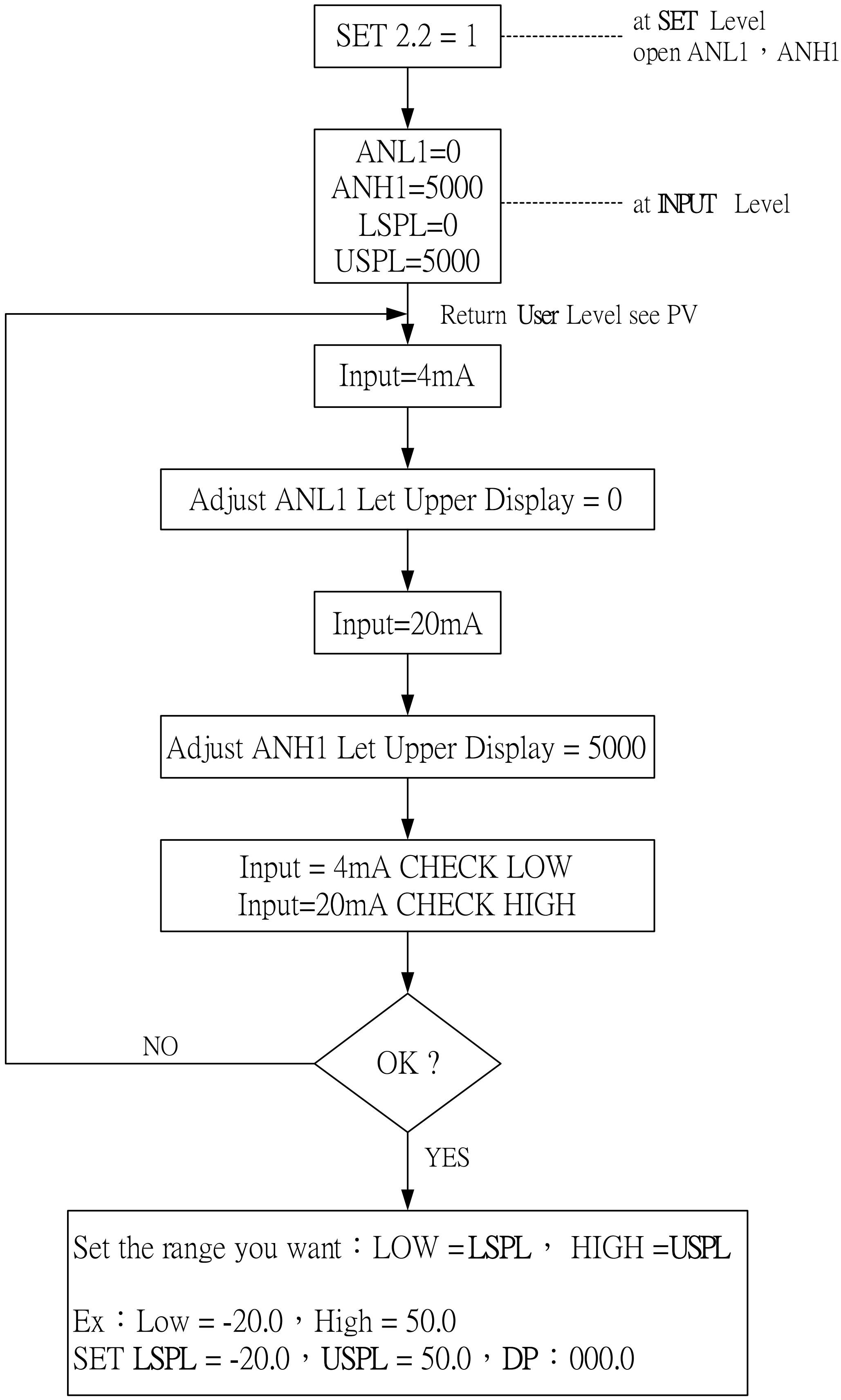


48×48

(PC Board)

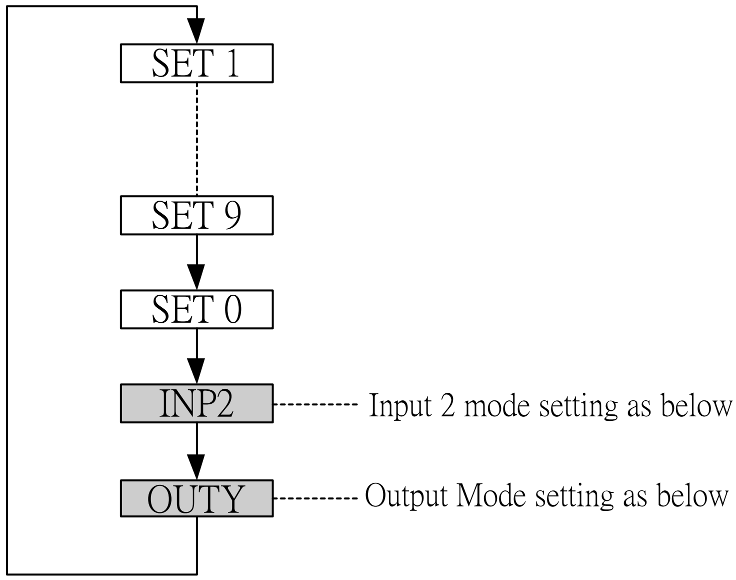


10.2 Software part(Calibrate input)



11. Special Function Description：

11.1 LEVEL 4 (Set Level)



11.1.1 Second input mode

INP2=0	Non (TB MODEL ONLY)
INP2=1	10~50mV / 4~20mA / 2~10V
INP2=2	0~50mV / 0~20mA / 0~10V

11.1.2 Output mode

OUTY=0	Single Output
OUTY=1	Double Output
OUTY=2	None
OUTY=3	Motor Valve
OUTY=4	1 φ SCR (Single Phase Control)
OUTY=5	3 φ SCR (Three Phase Control)

11.2 RAMP & SOAK (TB MODEL ONLY)

11.2.1 RAMP：

I. Please set “SET2.1=1”(Display AL3)，”SET4.1=1” (Display ALD3)

II. ALD3=9 at INPUT Level

III. RAMP menu will be displayed (replace AL3)

RAMP
0000

Range：00.00 ~ 99.99
Unit：℃ / min
(If RAMP not used，set ALD3=0)

11.2.2 SOAK：

I. ALD1 / ALD2=19

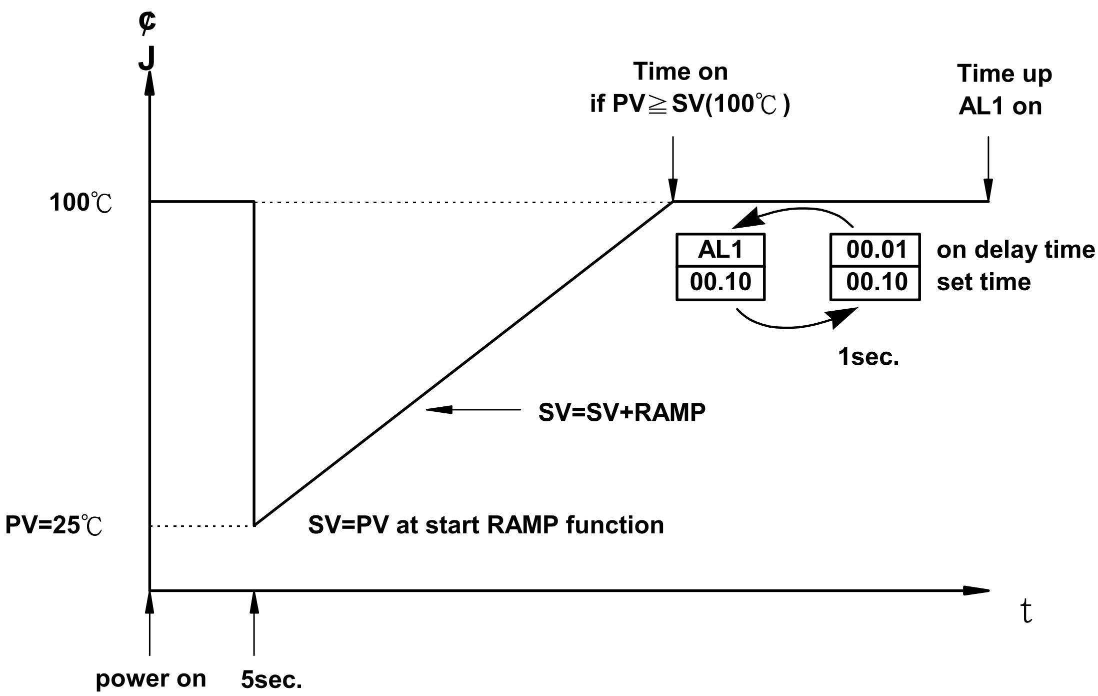
II. AL1 / AL2 will be display

AL1
00.00

Range：00.00 ~ 99.59(Hour.Minute)

11.2.3 Example：

SV=100℃ ，RAMP=10.00 (℃/min)，AL1=00.10 min，PV=25℃



11.3 REMOTE SV (TB MODEL ONLY)

11.3.1 Hardware must be mounted

11.3.2 Set INP2 to1 or 2 (calibration use ANL2，ANH2)

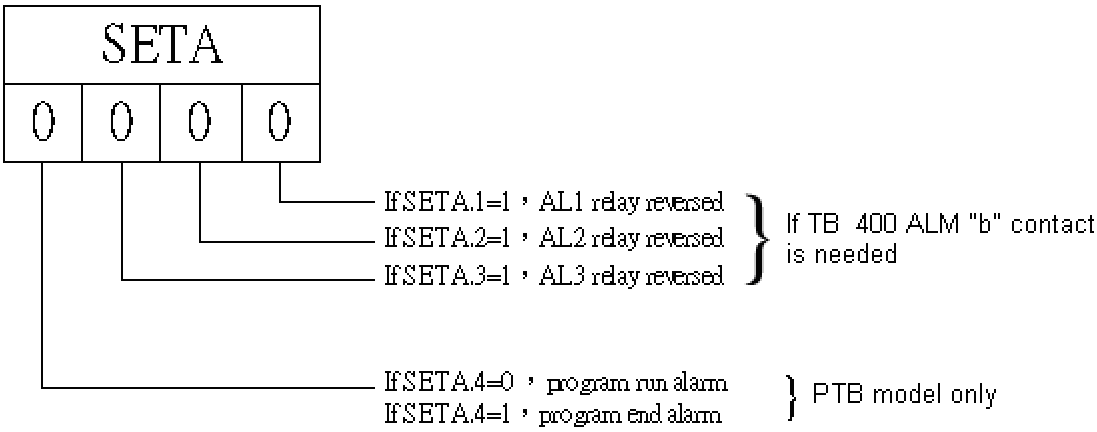
11.3.3 SET 0.3=0 means local SV

11.3.4 SET 0.3=1 means remote SV from Input 2 channel

11.4 Alarm Time ALT1/ALT2/ALT3 description (TB MODEL ONLY)

1. ALT1=0 means flicker if AL1 is on
2. ALT1=99.59 means alarm if AL1 is on
3. ALT1=00.01 ~ 99.58 means AL1 is on delay timer(＊ use for large EMI affect controller)

11.5 Renew function “HYSM” → “<u>SETA</u>”



11.6 Function SET8

11.6.1	SET8.1=0	Non
	SET8.1=1	program repeat (PTB model)
11.6.2	SET8.2=0	Non (PTB only)
	SET8.2=1	Power failure access
11.6.3	SET8.3=0	Zero start (PTB only)
	SET8.3=1	PV start
11.6.4	SET8.4=0	Non
	SET8.4=1	display will be transferred to single display (Don’t set this Bit) ＊SET8=0000 can return double display

11.7 Function SET9

11.7.1	SET9.1=0	Non
	SET9.1=1	PV / SV switching (use for single display so please don't set this Bit.)
11.7.2	SET9.2=0	Non
	SET9.2=1	PTB models ：Timer change from H.M to M.S
11.7.3	SET9.3=0	Non
	SET9.3=1	Transmission SV
11.7.4	SET9.4=0	Non
	SET9.4=1	Transmission PV

11.8 SET0

11.8.1	SET0.1=0	Non
	SET0.1=1	TTL communication SV output
11.8.2	SET0.2=0	Non
	SET0.2=1	Rate for AL3 (ALD3=0) (see Application 1，P.23)
11.8.3	SET0.3=0	Non
	SET0.3=1	Remote SV
11.8.4	SET0.4=0	Motor Valve close ＝ "b" out
	SET0.4=1	Motor Valve close ＝ "a" out

11.9 WAIT at INPUT Level

WAIT=0 means "no wait"

WAIT≠0 means "wait"

Application

App1. TTL communication：SV output & RATE function

- **Open RATE function (use for slave)**

11.10 Open Rate：SET0.2=1

11.11 Open AL3：SET2.1=1

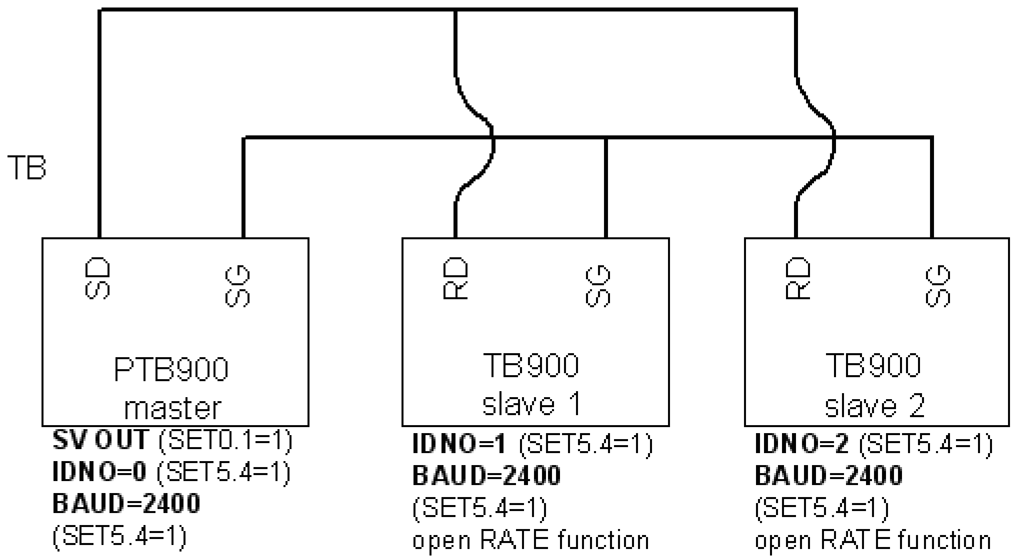
11.12 Open ALD3：SET4.1=1

11.13 ALD3=0 at INPUT Level

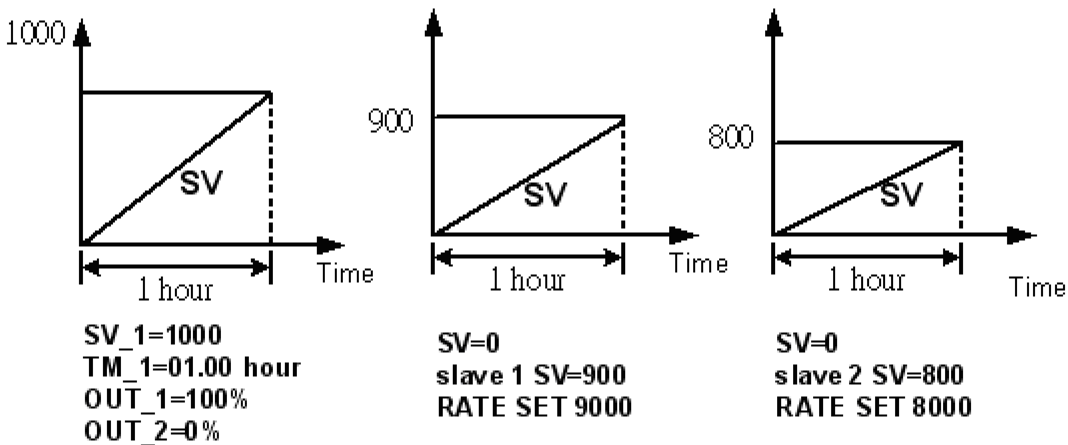
11.14 <u>Slave SV = (**RATE**÷9999)×master SV</u>

- **Example**：

Connect Diagram



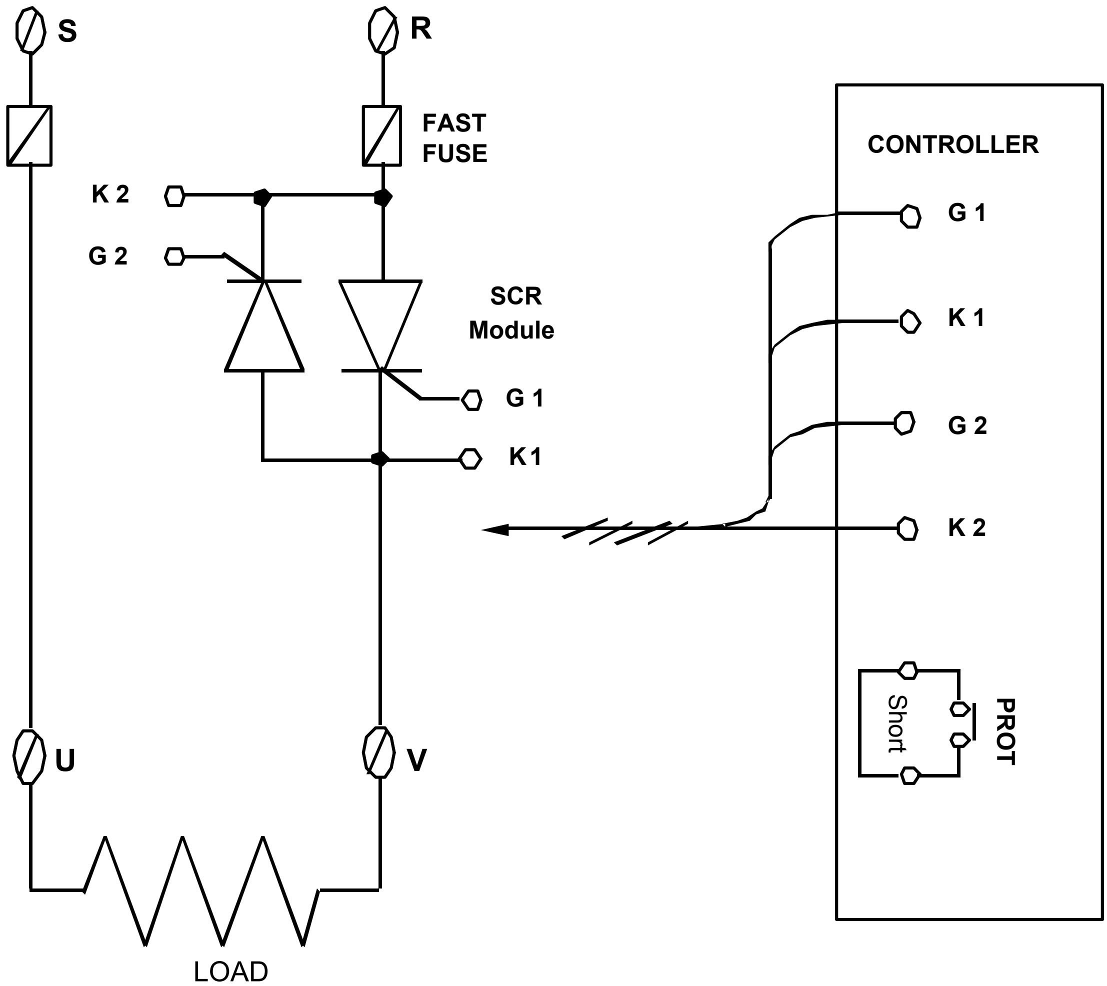
Time Chart



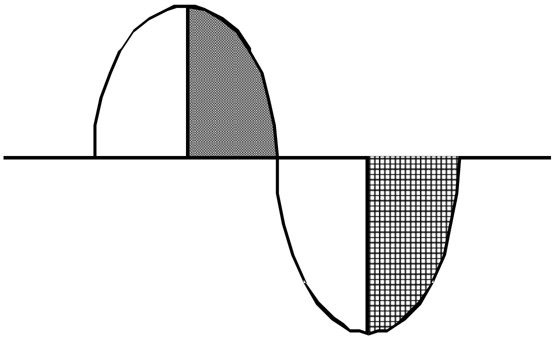
(All reach to the max value at the same time)

App2. Single Phase Control (for SCR module)

- **Available Models：　TB900 / PTB900，TB700 / PTB700**
- **Data Change：　OUTY=4**
  CLO1=0，CHO1=5000 if use for resistance load
  CLO1=0，CHO1=4000 if use for inductor load

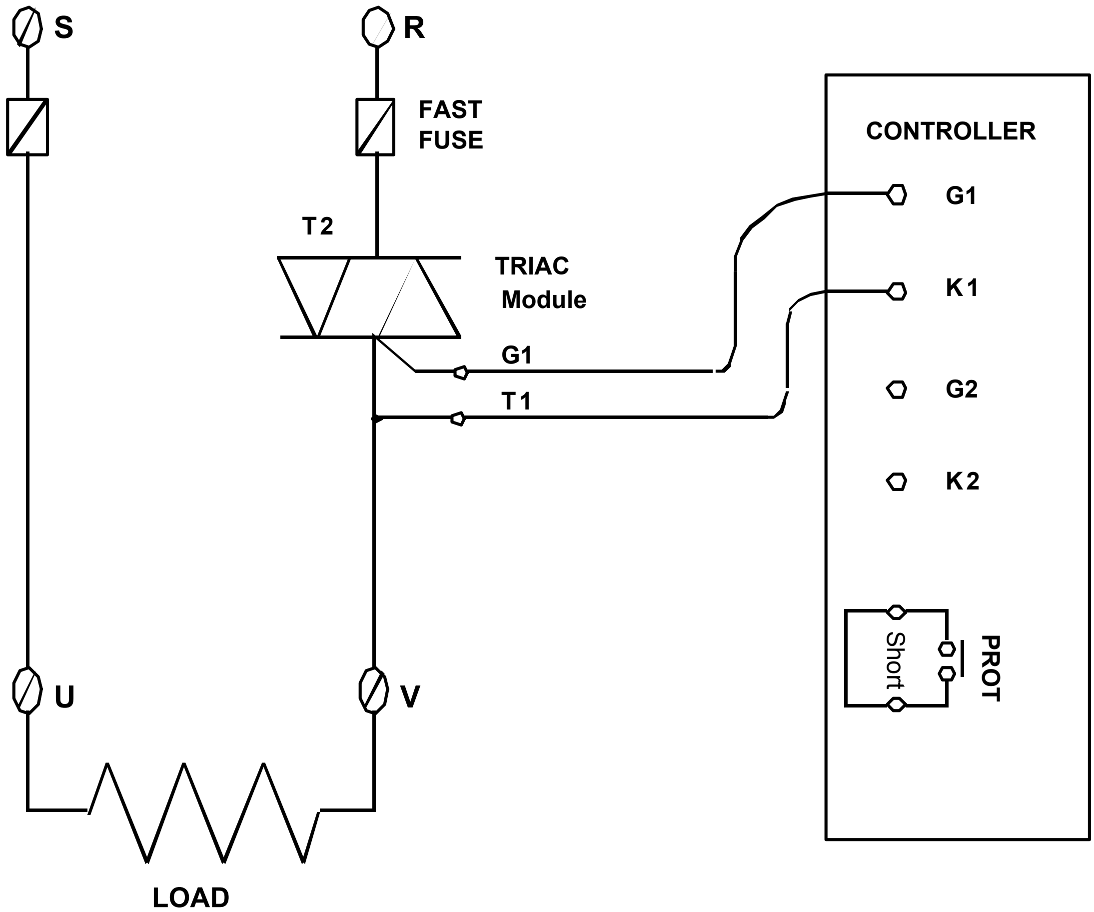


** Controller source phase must be same as load source phase

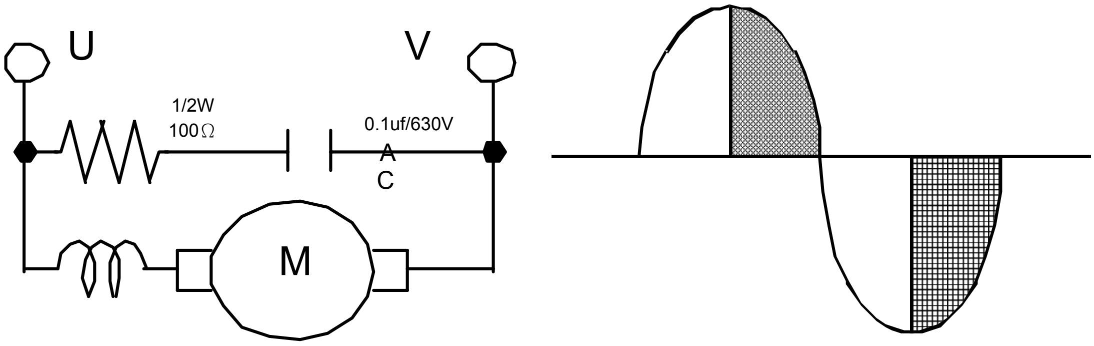


App3. Single Phase Control (for TRIAC module)

- **Available Models：　TB900 / PTB900，TB700 / PTB700**
- **Data Change：　OUTY=4**
  CLO1=0，CHO1=5000 if use for resistance load
  CLO1=0，CHO1=4000 if use for inductor load

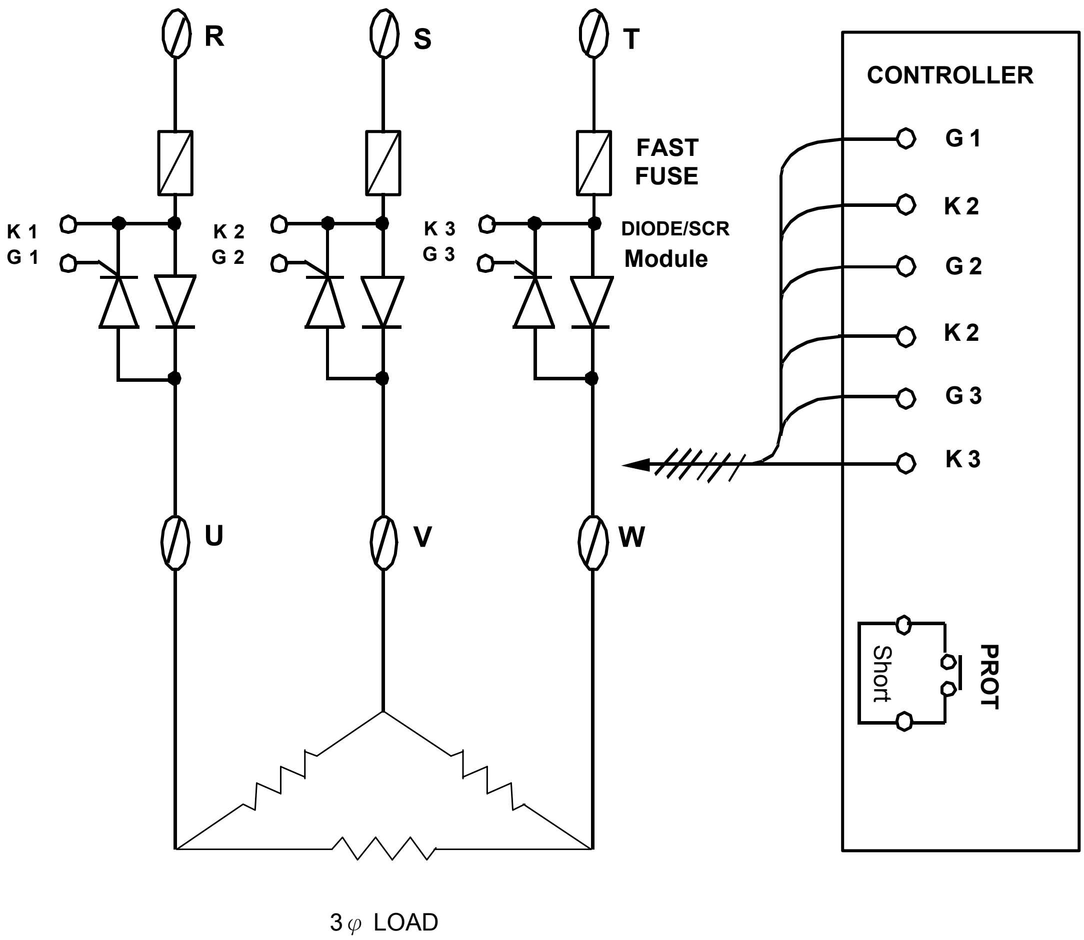


** Controller source phase must be same as load source phase



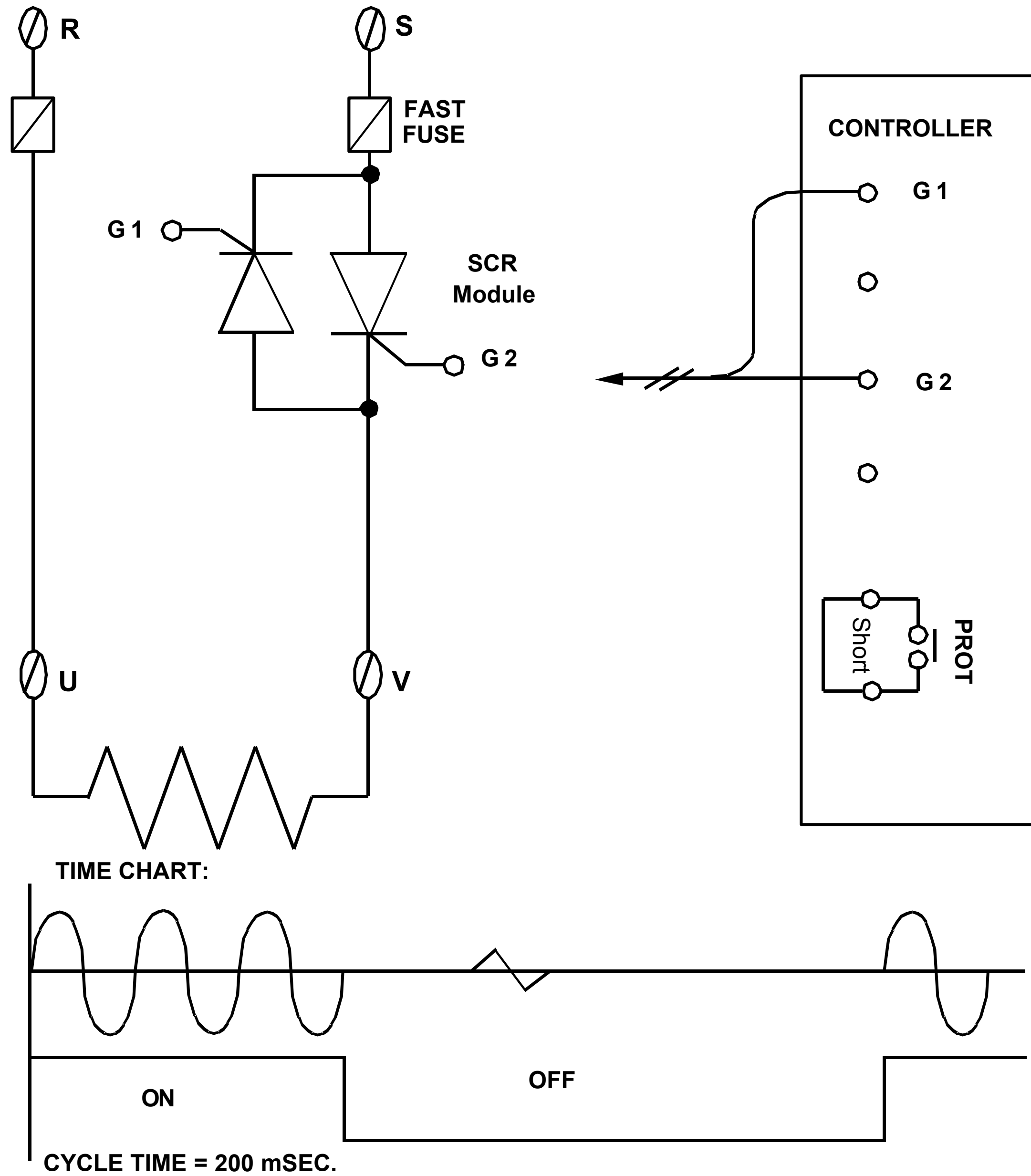
App4. Three Phase Control

- **Available Models：　TB900 / PTB900**
- **Data Change：　OUTY=5**
  CLO1=0，CHO1=5000 only if use for resistance load



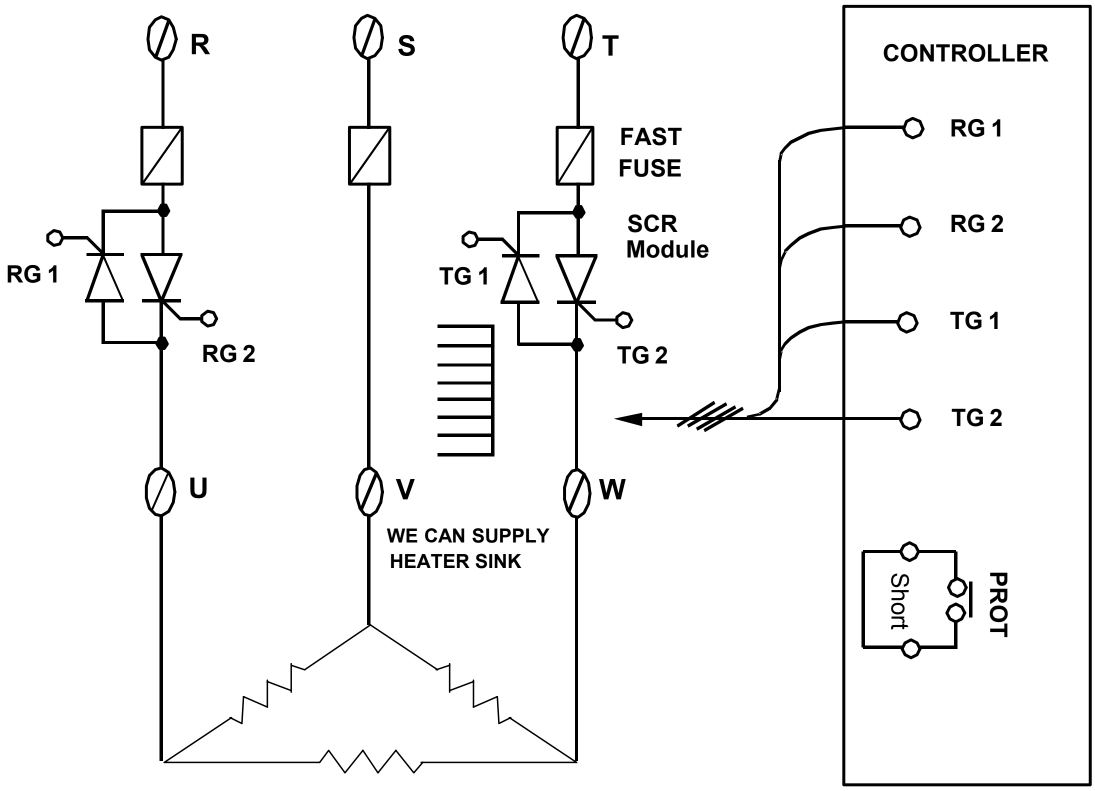
App5. Single Phase Zero Control

- **Available Models：** **TB900 / PTB900，TB700 / PTB700**
  TB400 / PTB400
- **Data Change：** **OUTY=0**
  CYT1=1

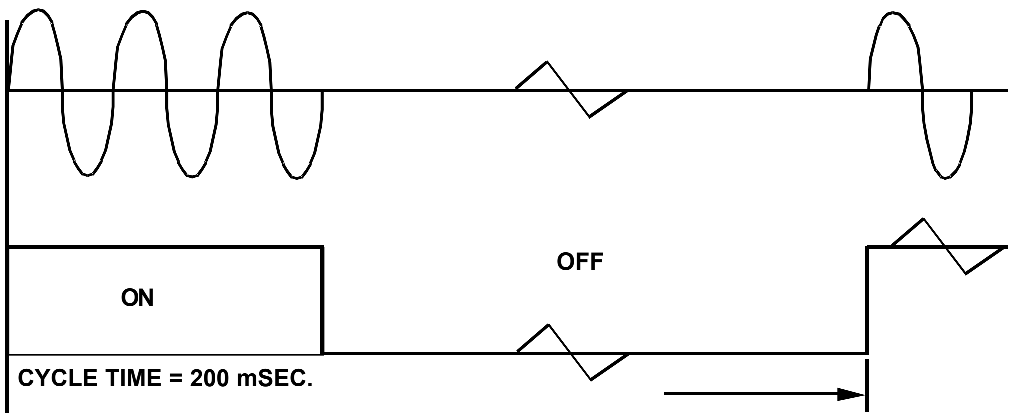


App6. Three Phase Zero Control

- **Available Models：　TB900 / PTB900**
- **Data Change：　OUTY=0**
  CYT1=1



TIME CHART:



App7. Motor Valve Control

- **Available Models：** **TB900 / PTB 900，TB800 / PTB800**
  TB700 / PTB700，TB600 / PTB600
- **Data Change：** **OUTY=3**
  CYT1=1 ~ 100sec.(Normally set 5 sec.)
  RUCY=5 ~ 200 sec.

1. **CYT1 is the cycle time of Open / Close**
2. **RUCY is the running time of motor valve 0 ~ 100%**