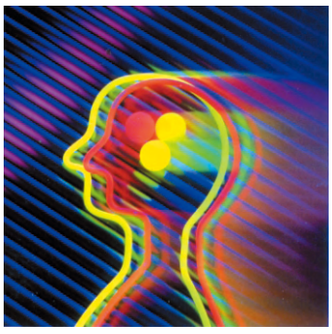

Think Controls

FOTEK

Self-adaptive Fuzzy + PID

Temperature Controller

NT series

§ Intelligence
§ Performance
§ Reliability
§ Easiness
§ Stability
§ Sensitivity

Complete Human- interface & Function

- ＊ 輸出量顯示
- ＊ 負載電流量顯示
- ＊ 關閉控溫功能
- ＊ 快速自動演算鍵
- ＊ 緩衝起動功能
- ＊ 加熱斜率控制
- ＊ 手動輸出控制
- ＊ 全機種可附通訊功能

- ＊ Output volume display
- ＊ Load current display
- ＊ Turn off control function
- ＊ Fast auto-tuning setting
- ＊ Soft start function
- ＊ Ramp control function
- ＊ Manual output control function
- ＊ Communication function available

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Fuzzy + PID Intelligent Temperature Controller

Model guiding / 型號索引

Ex. NT – 48 R – CT – RS (1 2 3 4 5)		
1	Series (系列名稱)	NT: New generation Temperature controller
2	Outline (外形) (Unit: mm)	10: 24*48*100　20: 48*96*60　21: 96*48*60　22: 22.6*75*100 32: 32*75*65　48: 48*48*72(1/16 DIN)　72: 72*72*60　96: 96*96*60(1/16 DIN)
3	Output method (輸出方式)	R: Relay (3A/250VAC)；NT-10R(0.25A/250VAC)　V: SSR (30mA/12V)　L: Linear output (4~20mA)
4	Optioned (附加功能)	CT: With Heater break detecting；NT-10R(0.25A/250VAC)　mA: DC current input　mV: DC Voltage input
5	Optioned (附加功能)	RS: With RS-485 communication (MODBUS protocol)　S: PV transmitter

How to set the function or parameter / 如何設定功能及參數

1. 「Temperature setting status」: Press「**SET**」key instantaneously to enter into the temperature setting status.
2. 「Auto-tuning status」: Press「▲」key 3 sec to set「Auto-tuning」,then press「▲」key 3 sec to reset it.
3. 「Manu-output status」: Press「▼」key 3 sec to turn off the output control, then press the「**SET**」key to set the「Manu-output volume」If press「▼」key 3 sec may to release「**Manu-output status**」
4. 「Display mode selecting」: Press「**SET**」key 3 sec to select display mode
   4-1.Without CT type: Display「Output volume」(u.xx)→then press「**SET**」key 3 sec → to display「Temperature set value」
   4-2. With CT type: Display「output volume」(u.xx)→then press「**SET**」key 3 sec → to display「Load current」(xx.xx)
   →then press「**SET**」key 3 sec → to display「Temperature set value」
5. 「Parameter setting status」:Press「**F**」key 3 sec to enter into the parameter setting status.
6. 「Alarm setting status」:Press「**SET**」&「**F**」key 3 sec to enter into the Alarm setting status.
7. 「Communication stetting status」:Press「**SET**」&「▼」key 3 sec to enter into the Communication stetting status.
8. 「Soft start function」: At the final parameter of「setting of alarm」, Press「**SET**」key 3 sec to set the **Soft start setting value**「**SV2**」.
   the fixed output volume is set by the manual output volume.
9. 「Ramping control」: At the「rAP」parameter in the「setting of alarm」level, if「rAP = 0」, it has not the ramping control function.
   if「rAP≠0」, it will perform the ramping control function.
10. 「Display mode setting」: At the「Sdc」parameter in the「**Setting of parameter**」level, if「Sdc = n」, it will be kept on the selected display mode, if「Sdc = A」, it will be returned to the Temperature set value mode after 10 seconds.

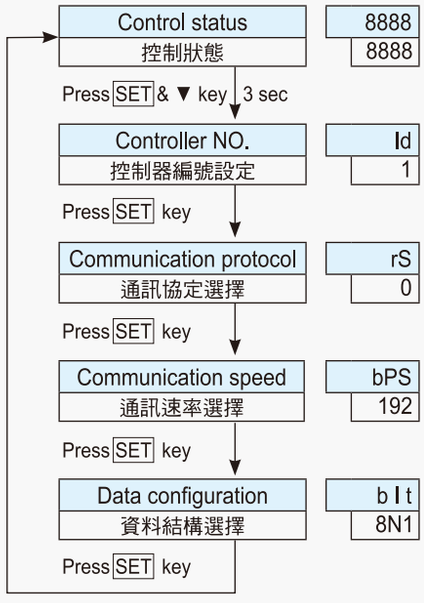
1. 「溫度值設定狀態」：按「**SET**」鍵一下就可進入「溫度值設定狀態」
2. 「自動演算狀態」：按「▲」鍵3秒可進入「自動演算狀態」；再按「▲」鍵3秒解除「自動演算狀態」
3. 「手動輸出控溫狀態」：按「▼」鍵3秒關閉輸出（顯示「OFF」），再按「**SET**」鍵3秒後可設定「手動輸出量」（顯示n.xx），完成手動輸出量設定後如果再按「▼」鍵3秒可解除「手動輸出控溫狀態」回複自動控溫狀態。。
4. 「顯示模式選擇」：按「**SET**」鍵3秒
   4-1. 無CT型：「輸出量顯示」（**u.xx**）→再按「**SET**」鍵3秒→「溫度設定值顯示」
   4-2. CT型：「輸出量顯示」（**u.xx**）　→再按「**SET**」鍵3秒→「負載電流量顯示」（**xx.xx**）
   →再按「**SET**」鍵3秒→「溫度設定值顯示」
5. 「參數設定」：按「**F**」鍵3秒：進入「參數設定」狀態
6. 「警報設定」：按「**SET**」&「**F**」鍵3秒：進入「警報設定」狀態
7. 「通訊參數設定」：按「**SET**」&「▼」鍵3秒：進入「通訊參數設定」狀態
8. 「緩衝起動設定」：在警報設定的最後一個參數時按「**SET**」鍵3秒可設定「緩衝起動設定值（SV2）」，固定輸出量由手動輸出量設定。
9. 「加熱速率控制」：可設定警報設定層的參數「**rAP**」；「**rAP = 0**」時沒有溫升速率控制功能，「**rAP≠0**」時執行溫升速率控制。
10. 「顯示自動切換設定」：可設定參數設定層的參數「**Sdc**」；「**Sdc = n**」時持續顯示「選擇顯示模式」；「Sdc= A」時10秒後會自動切回「溫度設定值顯示模式」。

Fuzzy + PID Intelligent Temperature Controller

General Specification / 共同規格

Fixed method		Panel type						Rail type	
Model	型號	NT-10	NT-48	NT-20	NT-21	NT-72E	NT-96E	NT-22	NT-32
Outline (U t: mm)	外形尺寸	24*48*100	48*48*72	48*96*60	96*48*60	72*72*60	96*96*60	22.6*75*100	32*75*65
Alarm output	警報輸出	Single alarm	Two alarm					Single alarm	Two alarm
Power supply	工作電壓	90~265 VAC/ 50/60 Hz or 24VDC/AC （Optioned）							
Power consumption	消耗電流	5 VA max. or 100mA max.（24VDC/AC）							
Input method	輸入方式	PT / K / J / R / S / T/ B / E / N / L(Selectable) or 4~mA or 0~10VDC （Optioned）							
Control method	控制方式	Fuzzy + PID or ON / OFF selectable							
Control output	控制輸出	Relay or SSR or 4~20mA (Optioned)							
Alarm output	警報輸出	Relay 1a（3A/250VAC SPDT）							
Display range	顯示範圍	-999 ~ 9999							
Accuracy of display	顯示精度	± (0.1 % OF F.S. + 1 DIGIT)							
Setting range	設定範圍	-999 ~ 9999							
Memory method	記憶方式	EEPROM							
Insulation resistance	絕緣強度	OVER 50MΩ / 500VDC							
Dielectric strength	耐壓強度	OVER 2.5 KV / 1 MINUTE							
Operating circum.	使用環境	–25℃ ~ 80℃ ;35%~85% RH							
EMC standard		ESD：8 KV Air Discharge（Level3）/ EN-61000-4-2 RF Interference：10V / M / ENV-50140 Burst test：2KV / EN61000-4-4							

Setting of Communication / 通訊參數設定

Function	Range	Description
	-200 ~ 9999 1 ~ 255 0 ~ 1 96 / 192 / 384 8N1 / 8O1 / 8E1 8N1 / 7O1 / 7E1	 1> Range：1~255 1>「rs=0」：Modbus-RTU 2>「rs=1」：Modbus-ASCII 1>「bPS =96」：9600 bps 2>「bPS =192」：19200 bps 3>「bPS =384」：38400 bps 1>「b I t =8N1」：8 bit non parity 2>「b I t =8O1」：8 bit odd parity 3>「b I t =8E1」：8 bit even parity 4>「b I t =8N2」：8 bit non parity 5>「b I t =7O1」：7 bit odd parity 6>「b I t =7E1」：7 bit even parity

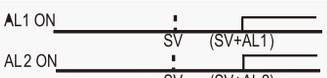
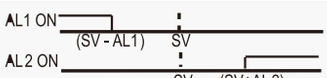
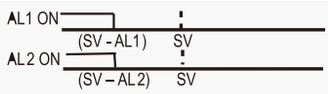
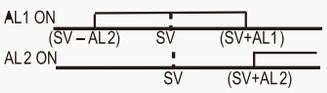
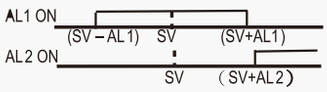
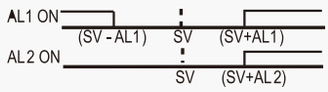
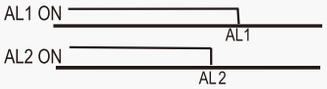
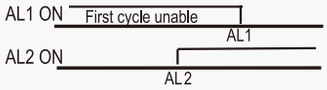
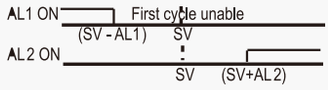
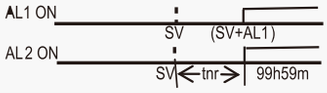
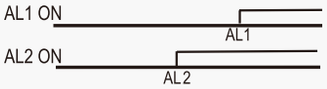
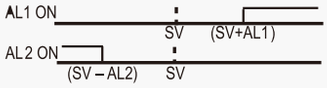
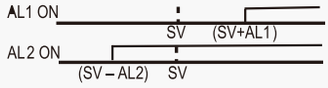
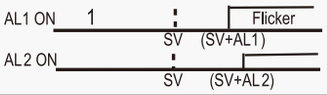
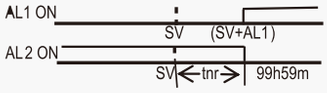
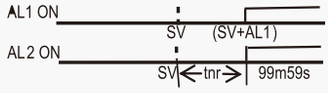
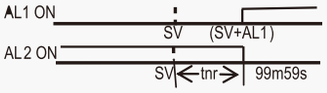
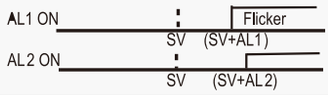
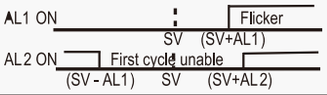
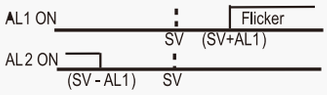
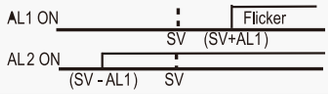
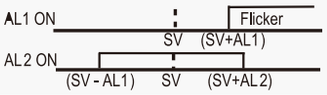
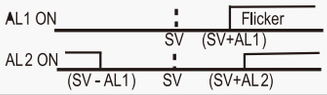
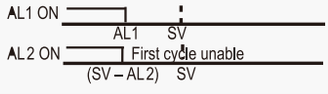
Setting of parameter / 參數設定

Function	Range	Description
Control status 控制狀態 — 8888 / 8888	-200 ~ 9999	
Press F key 3 sec		
Cycle time 動作週期 — C t / 15	0 ~ 99	1>「**CT = 0**」: ON/OFF control 2> Disappeared in Linear output type
Press SET key		
Auto tuning 自動演算 — A t / 0	0 ~ 1	1>「**At = 0**」: Control status 2>「**At = 1**」: Auto tuning status
Press SET key		
Auto tuning bias 自動演算偏差值 — t u / 0	0 ~ 99	1> Auto tuning value =「SV - tu」
Press SET key		
Proportion band 比例帶 — P / 10	0 ~ 3999	1>「**CT = 0**」→「P」is disappeared
Press SET key		
Integral time 積分時間 — I / 120	0 ~ 3999	1>「**CT = 0**」→「I」is disappeared
Press SET key		
Derivative time 微分時間 — d / 30	0 ~ 3999	1>「**CT = 0**」→「d」is disappeared
Press SET key		
Hysteresis 動作應差 — H y s / 1	0 ~ 99	1>「**CT = 0**」→「Hys」is appeared only 2>「PV＞SV）→ Out ON； 〔PV＜（SV-Hys）〕→ Out OFF
Press SET key		
Gain 輸出控制增益 — GAn / 1.0	0.1~9.9	1> Gain of output control
Press SET key		
Input selecting 輸入選擇 — I n t / k	PT / K / J / R / S T / B / E / N / L	1> 10 input type are selectable
Press SET key		
Unit selecting 單位選擇 — U n t / C	°C / °F	
Press SET key		
Decimal point selecting 小數點選擇 — d p / 0	0 / 1	1>「**d p = 0**」：Without decimal point 2>「**d p = 1**」：One decimal point
Press SET key		
Input shift setting 輸入修正 — S h t / 0	-999 ~ 9999	1>「PV」=（PV + Sht）
Press SET key		
Control method setting 控制方式 — H_C / Htr	Htr / cLr	1>「**Htr**」：Heating control 2>「**cLr**」：Cooling control
Press SET key		
Alarm mode setting 警報模式 — A L t / 0	0 ~ 26	1> Refer to the mode of Alarm
Press SET key		
Display mode setting 顯示自動切換設定 — S d c / n	n / A	1>「**n**」：Manual setting 2>「**A**」：Auto setting
Press SET key		

Setting of alarm / 警報設定

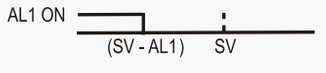
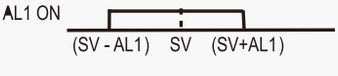
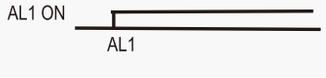
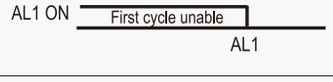
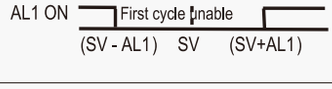
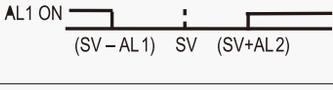
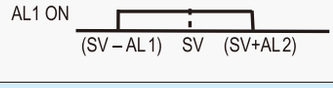
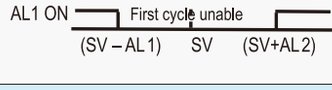
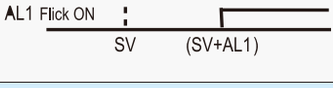
Function	Range	Description
Control status / 控制狀態 — 8888 / 8888 Press SET & F key 3 sec	0 ~ 9999	
Lock setting / 鎖定設定 — L c k / 0 Press SET	0 ~ 3	1>「Lck=0」: Unlock ; Lck=1」: SV settable only 「Lck=2」: SV&AL settable ;「Lck=3」: All lock
AL1 Limit setting / AL1 警報設定 — A L 1 / 50 Press SET	-999 ~ 9999	1> Refer to the mode of Alarm
AL2 Limit setting / AL2 警報設定 — A L 2 / 50 Press SET	-999 ~ 9999	1> Refer to the mode of Alarm
Hysteresis of alarm / 警報應差值設定 — A L H / 1 Press SET	0 ~ 9999	Ex. PV≧(SV+AL1)→AL1 ON, PV＜(SV+AL1-ALH)→AL1 OFF
Flick timer / 警報閃爍輸出時間設定 — t / 10 Press SET	0 ~ 99	1> Range: 0~99 sec 2> Cycle time of flick timer
Setting limit / 最大設定值限制 — S L h / 400 Press SET	0 ~ 9999	1> SV≦SLH 2> Range of transmitter : 0~SLH→
Output limit / 輸出量限制設定 — O u t / 100 Press SET	0 ~ 100%	1> Output volume = Control output volume * 「Out」
Process output volume / 實際輸出量 — U n / 0.0 Press SET	0 ~ 99.99	1> Display the output volume
Max. display value setting / 最大顯示值設定 — dSPH / 1000 Press SET	0 ~ 9999	1> Current or Voltage input type will be appeared only 2> Max. input value will be transmitted into the dSPH
Min. display value setting / 最小顯示值設定 — dSPL / 0 Press SET	-999 ~ 9999	1> Current or Voltage input type will be appeared only 2> Min. input value will be transmitted into the dSPL
Process current of heater / 實際加熱器輸出電流值 — C t u / 0.00 Press SET	0 ~ 99.99	1> Range: 0.00 ~ 99.99 A
Heater break setting / 加熱器斷線電流設定值 — H b / 1.00 Press SET	0 ~ 99.99	1> Range: 0.00 ~ 99.99 A 2> 「**C t u**」＜「**H b**」→ **AL2 ON**
CT Low limit setting / CT最小值設定 — C t L / 0.00 Press SET	0 ~ 99.99	1> Range: -9.99 ~ 99.99 2> Offset of CT current
CT High limit setting / CT最大值設定 — C t h / 30.00 Press SET	0 ~ 99.99	1> Range: 0.00 ~ 99.99 2> To set the max.CT current
Ramp control setting / 溫升速率控制 — r A P / 0 Press SET	0 ~ 9999	1> Range: 0 ~ 9999 ℃ or ℉ / minute 2> Rap=0: Without Ramp control function
Min. output volume setting / 最小輸出量設定 — L o t / 0 Press SET 3 sec	0 ~ 100%	1> Range: 0 ~ 100% 2> Setting of min. output volume
Soft start setting / 緩起動設定 — SV2 / 0 Press SET	-999 ~ 9999	1>「**SV2**」= 0: Without soft start function 2>「**PV**」<「**SV2**」: output volume is fixed at manual output volume 3>「**PV**」≧「**SV2**」: Output volume is controlled by PID

Mode of alarm / 警報模式【NT-□□】

Alt	Description / 警報說明	Alt	Description / 警報說明	Alt	Description / 警報說明
0		1		2	
3		4		5	
6		7		8	
9		10		11	
12		13		14	
15		16		17	
18		19	Non-used	20	
21		22		23	
24		25		26	

1.「ALt=15」: t = ON time of AL2 for cooling, OFF time is controlled by PID.
2.「ALH」: Hysteresis of alarm. Ex. PV≧(SV+AL1)→AL1 ON, PV＜(SV+AL1-ALH)→AL1 OFF
3.「tnu」= Process time of tnr, if「tnu≧tnr」→ AL2 is turned ON or OFF

Mode of alarm / 警報模式【NT-□□-CT & eTC-48 & NT-22】

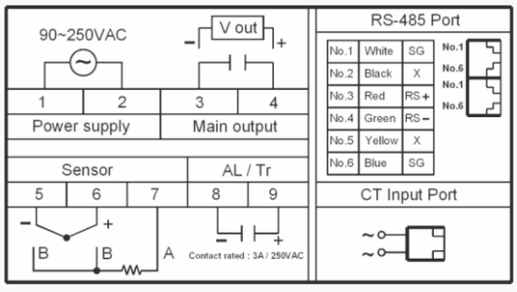
Alt	Description / 警報說明	Alt	Description / 警報說明	Alt	Description / 警報說明
0		1		2	
3		4		5	
6		7		8	
9		10		11	

1>「Alt = 11」: t = ON time of AL for cooling, OFF time is controlled by PID.
2>「ALH」: Hysteresis of alarm. Ex：PV≧（SV+AL1）→ AL1 ON；PV＜（SV+AL1-ALH）→ AL1 OFF
3> NT-22□-CT: HB alarm output is AL1
4> NT-48□-CT: HB alarm output is AL2

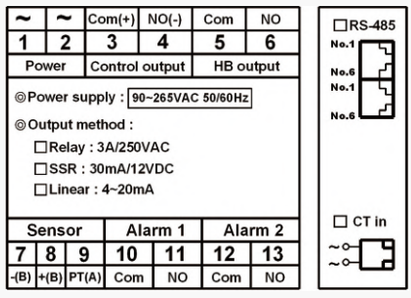
Fuzzy + PID Intelligent Temperature Controller

Connection diagram / 接線圖

NT - 22-□□



NT – 32-□□



NT - 10-□□

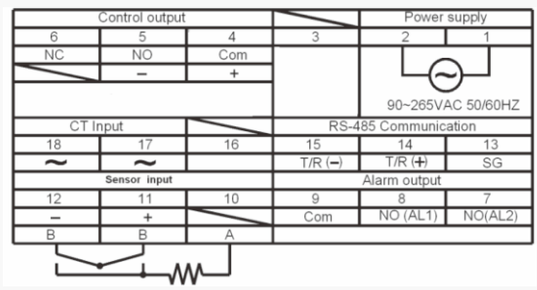
SG	RS+	RS-	PT	+	−
12	11	10	9	8	7
RS-485			Sensor input		

Alarm out		Main out		Power	
6	5	4	3	2	1
NO	Com	NO(-)	Com(+)	~	~

☐ Contact rated : 0.25A/250VAC max.
☐ SSR output : 30mA/12VDC max.
☐ Linear output : 4~20mA

90~265VAC
50/60Hz

NT – 48-□□



NT - 20-□□

SG	+	−	0V	In		Nc	No	Com		~	~
13	14	15	16	17	18	19	20	21	22	23	24
RS-485			Digital-in		Output 2					CT input	

Power		Control output			AL1		AL2		Sensor input		
1	2	3	4	5	6	7	8	9	10	11	12
		Com	No	Nc	Com	No	Com	No		+	−
		+	−		+	−	+	−	A	B	B

90~265VAC
50/60Hz

☐ Contact rated : 3A/250VAC
☐ Solid state output : 30mA/12V
☐ Linear : ☐ (4~20mA) ☐ (0~10V)

NT – 21-□□

SG	+	−	0V	In		Nc	No	Com		~	~
13	14	15	16	17	18	19	20	21	22	23	24
RS-485			Digital-in		Output 2					CT input	

Power		Control output			AL1		AL2		Sensor input		
1	2	3	4	5	6	7	8	9	10	11	12
		Com	No	Nc	Com	No	Com	No		+	−
		+	−		+	−	+	−	A	B	B

90~265VAC
50/60Hz

☐ Contact rated : 3A/250VAC
☐ Solid state output : 30mA/12V
☐ Linear : ☐ (4~20mA) ☐ (0~10V)

NT – 72-□□E

SG	+	−	~	~	NO	Com	NO	Com
10	11	12	13	14	15	16	17	18
RS-485			CT input		AL1		AL2	

Power		Heating output		Cooling output		Sensor input		
1	2	3	4	5	6	7	8	9
		Com	No	Com	No	PT	+	−
		+	−	+	−			

90~250VAC
50/60Hz

☐ Contact rated : 3A / 250VAC
☐ Solid state output : 30mA / 12V
☐ Linear : ☐ (4~20mA) ☐ (0~10V)

NT – 96-□□E

SG	+	−	0V	In		Nc	No	Com		~	~
13	14	15	16	17	18	19	20	21	22	23	24
RS-485			Digital-in		Output 2					CT input	

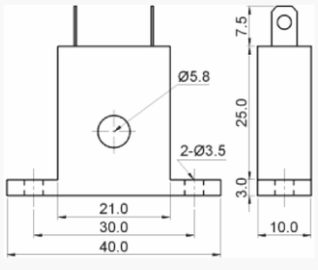
Power		Control output			AL1		AL2		Sensor input		
1	2	3	4	5	6	7	8	9	10	11	12
		Com	No	Nc	Com	No	Com	No		+	−
		+	−		+	−	+	−	A	B	B

90~265VAC
50/60Hz

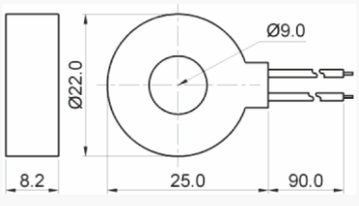
☐ Contact rated : 3A/250VAC
☐ Solid state output : 30mA/12V
☐ Linear : ☐ (4~20mA) ☐ (0~10V)

Attachment / 附件

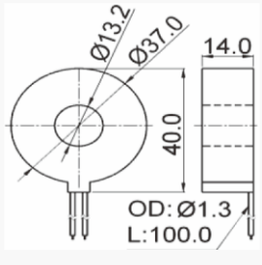
CT-06: Load current 10 A max



CT-09: Load current 30 A max.



CT-100: Load current 100 A max.



FOTEK

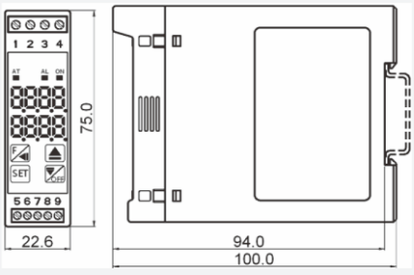
PID + Fuzzy Communication module

NT series

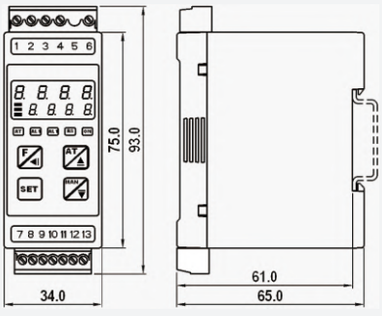
cULus / CE / RoHS

Outline dimension / 外形圖

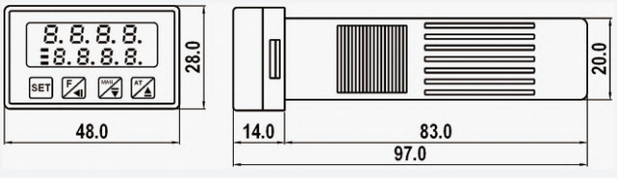
NT - 22-□□



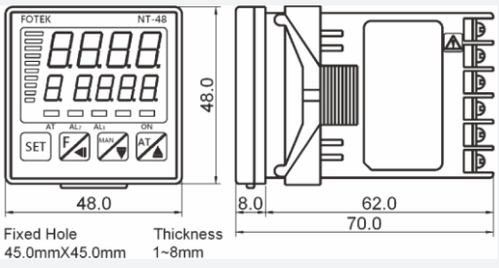
NT – 32-□□



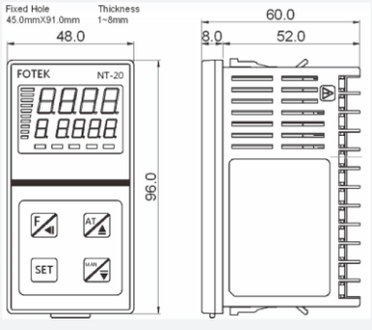
NT - 10-□□



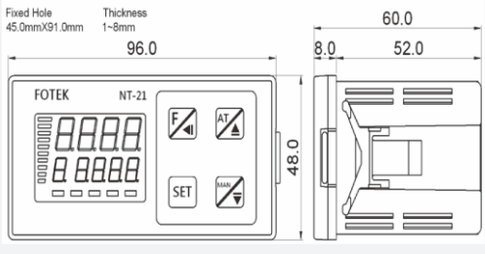
NT – 48-□□



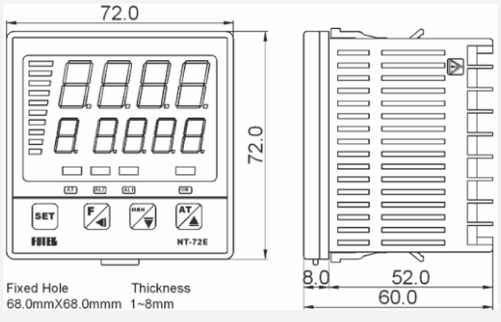
NT - 20-□□



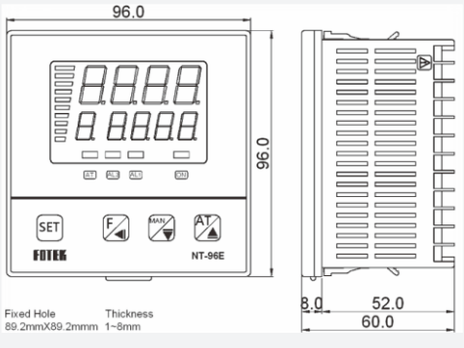
NT – 21-□□



NT – 72-□□E



NT – 96-□□E



Specification may be modified without notice in advance. (2015/5/5)

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E-mail: ventas.1@alltronicsperu.com
ventas.2@alltronicsperu.com
www.AlltronicsPerú.com

FOTEK

UL CE RoHs

Instruction Manual / Manual de Uso

F-71

NT-XX-RV-AF series All function temperature controller

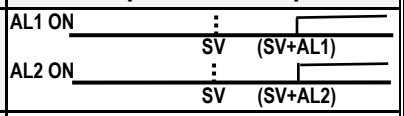
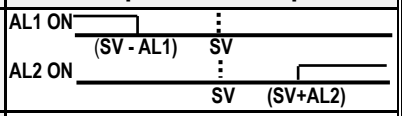
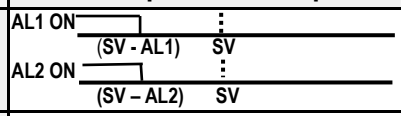
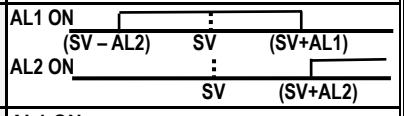
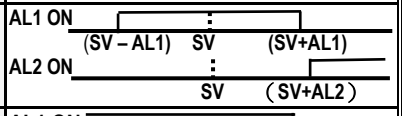
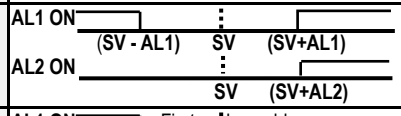
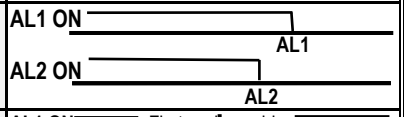
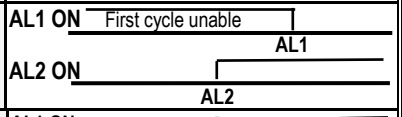
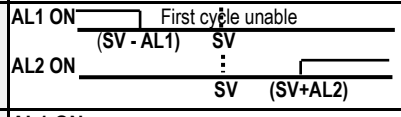
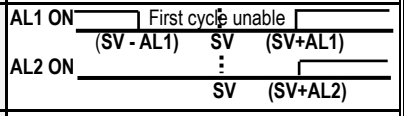
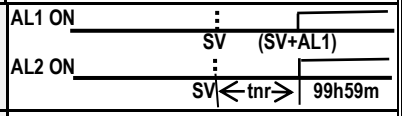
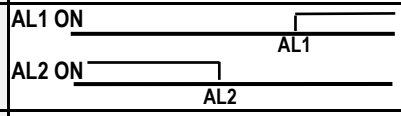
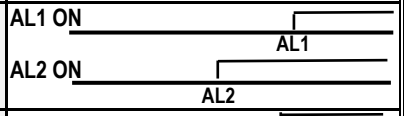
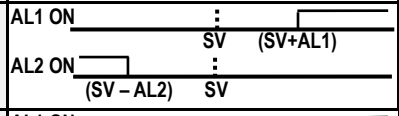
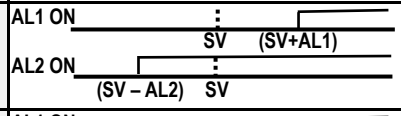
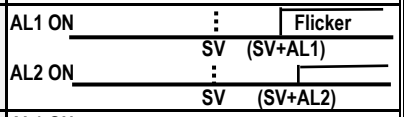
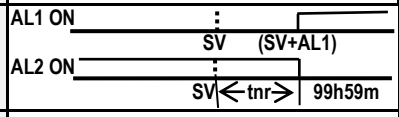
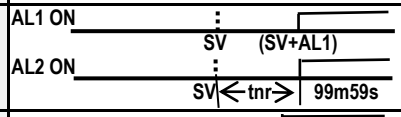
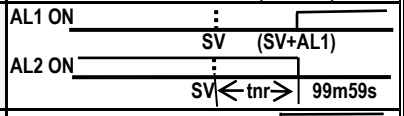
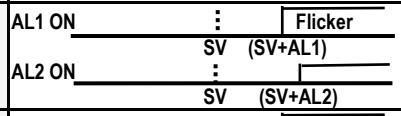
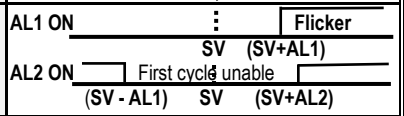
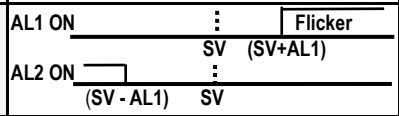
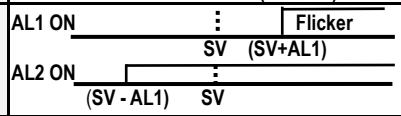
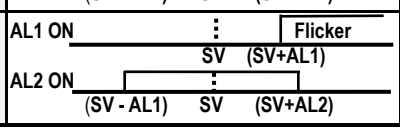
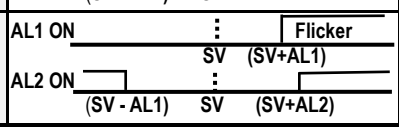
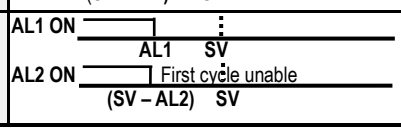
Thank you very much for using **FOTEK NT-XX-RV series All function Temperature controller**
Please read this instruction manual before operating it to avoid from the malfunction.

FOTEK NT10-R-AF / NT-22-R-AF / NT-48RV / NT-72-RV / NT-20-RV / NT-21-RV / NT96-RV-AF

Specification / Especificaciones:

Type	DIN 48*48	DIN 72*72 /48*96 /96*96	DIN 24*48
Model	NT-48RV-AF	NT-XX-RV-AF	NT-10-AF
Output method	Relay & SSR		Relay or SSR
Rated current	Relay （5A/250VAC）; SSR（30mA/12V）		
Operating voltage	90~265VAC 50/60Hz		
Alarm output	Relay （5A/250VAC）		
Control method	PID + Fuzzy		
Input method	PT / K / J / R / S / T/ B / E / N / L Selectable		
Display range	-999 ~ 9999 或 -99.9 ~ 999.9 Selectable		
Accuracy of display	± (0.1 % of F.S. + 1 DIGIT)		
Setting range	-999 ~ 9999 或 -99.9 ~ 999.9 Selectable		
Dielectric strength	Over 2.5KV		
Isolation strength	Over 100MΩ / 500VDC		
Operating temp	－ 20℃ ~ ＋ 80℃ ; 35 ~ 85%RH		
Housing material	Intensive PC+ABS（UL-94V0）		

Mode of alarm / Modos de Alarma

ALt	Description / Descripción	ALt	Description / Descripción	ALt	Description / Descripción
0		1		2	
3		4		5	
6		7		8	
9		10		11	
12		13		14	
15		16		17	
18		19	Non-used	20	
21		22		23	
24		25		26	

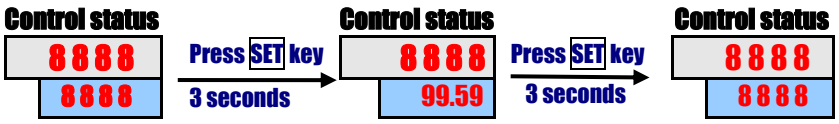
1. 「**ALt=15**」: **t = ON time of AL2 for cooling, OFF time is controlled by PID.**
2. 「**ALH**」: Hysteresis of alarm. Ex. PV≧(SV+AL1)→AL1 ON, PV＜(SV+AL1-ALH)→AL1 OFF
3. 「**tnu**」= Process time of **tnr**, if 「**tnu≧tnr**」→ AL2 is turned ON or OFF

Procedure of operating / Procedimiento de operación

1. Setting of heating timer / Ajuste de temporizador : Press SET key

1-1. After the time of heating being finished , The display of SV will display the 「Temp setting value」 & 「OFF」,
Meanwhile the temp control output will be Turned off and the AL1 output will be turned on.
1-2. It will be reset by setting the OFF/▼ key or turning off the power of controller If the time of heating being finished.
1-3. If 「Fun=SoF」 or 「Fun=noF」, setting of heating time will be unable.

2. Selecting of display / Seleccion de pantalla : Press SET key 3 seconds 【「Fun=SoF」or「Fun=noF」 without selecting】

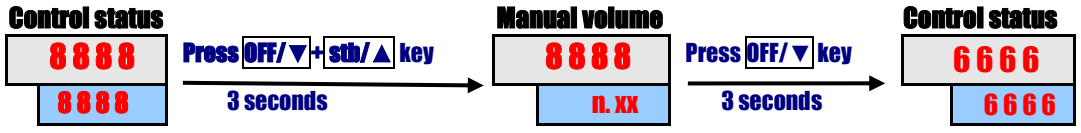


2-1. Press SET key to change the 「temp setting value」 or 「heating time」 on SV display.

3. Soft start : rAp Unit : Arranque Suave: Unidad de Rampa : ℃/ Minute / ℃ / Minuto

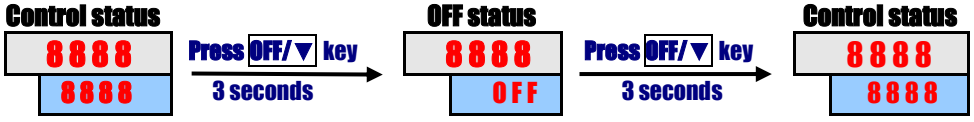
1-1. Press SET key 3 seconds into 「Soft start」 setting status ; if 「rAp」 = 0, it don't to do Soft start
1-2. 「rAp」 setting range : 0 ~ 9999 or 0.0~999.9
1-3. 「rAp」 > 0 ; Power on or ON/FF or to change setting value or stand-by change to normal control, it will work by Soft start
※ Release Soft start : In soft start status, Press SET key 3 seconds may to release Soft start status.

4. Manual control / Control modo Manual : Press OFF/▼+stb/▲ key 3 seconds



※ Press OFF/▼+stb/▲ key 3 seconds into manual control volume setting status
→ SV will display 「n.000」 that may to set the manual control volume.
※ Release manual control : In the manual control, Press OFF/▼ key 3 seconds to return the control status.

5. OFF (Stop) Función Stop: Press OFF/▼ key 3 seconds



※ Press OFF/▼ key 3 seconds → SV displays 「OFF」 into the stop control status.
※ Release OFF status : In the stop control status, Press OFF/▼ key 3 seconds may to turn the status to control status.

6. AT (Auto-tuning) : Press AT/<< key 3 seconds into the auto-tuning status, pilot 「AT」 on.

In the auto-tuning status, Press AT/<< key 3 seconds may return to control status.

7. Parameter Setting : Press SET & ▼ key 3 seconds

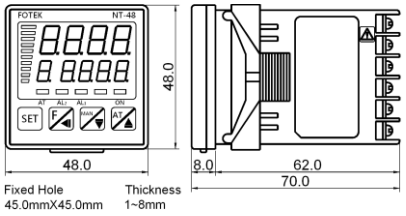
8. Alarm setting : Press SET & AT/<< key 3 seconds

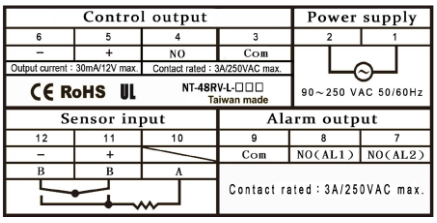
Setting of alarm

Function	Display	Range	Description
Control status 控溫狀態 Press SET & RAP key 3 sec	8888 8888	-999 ~ 9999	
Lock setting 鎖定設定 Press SET	Lck 0	0 ~ 3	1>「Lck=0」: Unlock ;「Lck=1」: SV settable only 2>「Lck=2」: SV&AL settable ;「Lck=3」: All lock
AL1 Limit setting AL1 警報設定 Press SET	AL1 20	-999 ~ 9999	Refer to alarm mode
Hysteresis of alarm 警報應差值設定 Press SET	ALH 1	-999 ~ 9999	Hysteresis of alarm
Delay time of alarm on 警報動作延遲時間設定 Press SET	ond 1200	0 ~ 9999	1> Unit : Second 2> For alarm mode #2 (Alt.2)
Setting limit 最大設定值限制 Press SET	SLh 400	0 ~ 9999	1> SV≦SLH
Output limit 輸出量限制設定 Press SET	Out 100	0 ~ 100%	1> Limit of output volume 2> Output volume = Control output volume *「Out」
Process output volume 實際輸出量 Press SET	Un 0.0	0 ~ 100%	1> Display of output volume
Min. output volume setting 最小輸出量設定 Press SET	Lot 0	0 ~ 100%	1> Output volume=「Lot」+ control volume

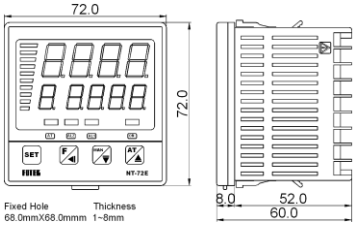
Outline & Connecting diagram

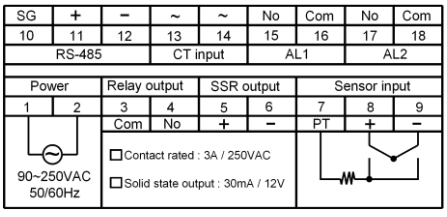
NT-48RV



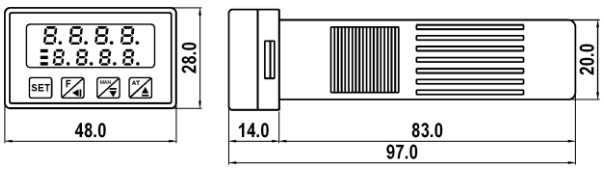


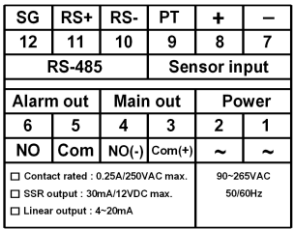
NT-72RV





NT-10





Setting of parameter / 參數設定

Function	Range	Description
Control status 控制狀態 — 8888 / 8888	-200 ~ 9999	
Press SET & ▲ key 3 sec		
Output method 輸出方式 — con / r	r or S	1>「con = r」: Relay output 2>「con = S」: SSR output
Cycle time 動作週期 — Ct / 15	0 ~ 1	1>「Ct = 0」: ON/OFF control 2> Range: 0~99s (con = r) or 0.0~9.9s (con = S)
Auto tuning 自動演算 — At / 0	0 ~ 99	1>「At = 0」: Control status 2>「At = 1」: Auto tuning status
Proportion band 比例帶 — P / 36	0 ~ 3999	1>「Ct = 0」→「P」is disappeared
Integral time 積分時間 — I / 120	0 ~ 3999	1>「Ct = 0」→「I」is disappeared
Derivative time 微分時間 — d / 30	0 ~ 3999	1>「Ct = 0」→「d」is disappeared
Hysteresis 動作應差 — HYS / 1	0 ~ 99	1>「Ct = 0」→「Hys」is appeared only 2> (PV > SV) → Out ON; 〔PV < (SV-Hys)〕→ Out OFF
Input selecting 輸入選擇 — Int / k	PT / K / J / R / S T / B / E / N / L	1> 10 input type are selectable
Unit selecting 單位選擇 — Unt / C	℃ / ℉	
Decimal point selecting 小數點選擇 — dp / 0	0 ~ 1	1>「dp = 0」: Without decimal point 2>「dp = 1」: One decimal point
Input shift setting 輸入修正 — SHt / 0	- 99 ~ + 99	1>「PV」= (PV + Sht)
Input span setting 輸入斜率修正 — Spn / 1.000	0.001~9.999	1>「PV」= (PV * Spn)
Alarm mode setting 警報模式設定 — ALt / 0	0 ~ 26	1> Refer to the mode of Alarm
Function selection 功能選擇選擇 — Fun / noF	ALL / tnr / SoF / noF	1.「Fun=ALL」: with heating timer and soft start function 2.「Fun=tnr」: with heating timer only 3.「Fun=SoF」: with soft start function only 4.「Fun=noF」: without heating timer and soft start function
Timing mode selection 計時模式選擇 — tnd / 0	0 or 1	1>「0」: PV≧SV to start timing 2>「1」: Power on to start timing
Timing unit selection 時間單位選擇 — tut / nS	nS or hr	1>「nS」: 0~99m59s 2>「hr」: 0~99h59m
Press SET key		

FOTEK

UL CE RoHS

Instruction Manual / 使用手冊

F- □□□

NT-48RV series All function temperature controller /全功能溫度控制器

Thank you very much for using **FOTEK NT-48RV series All function Temperature controller**
Please read this instruction manual before operating it to avoid from the malfunction.

非常感謝您採用 **FOTEK NT-48RV** 系列全功能溫度控制器，使用前務必詳讀本使用手冊以防止無法正常使用！

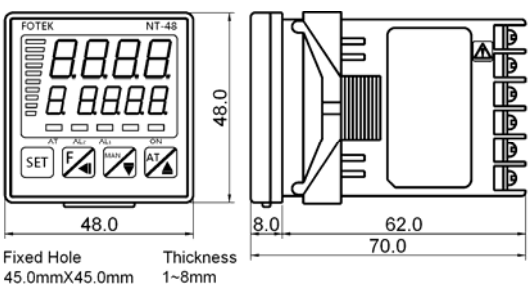
■ Specification / 規格

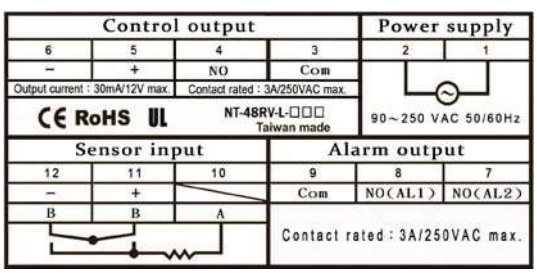
Type 型式	DIN 48*48
Model 型號	**NT-48RV-AF**
Output method 輸出方式	**Relay & SSR**
Rated current 額定電流	**Relay** （5A/250VAC）; **SSR**（30mA/12V）
Operating voltage 工作電壓	90~265VAC 50/60Hz
Alarm output 警報輸出	Relay （5A/250VAC）
Control method 控制方式	PID + Fuzzy
Input method 感溫線	PT / K / J / R / S / T/ B / E / N / L Selectable
Display range 顯示範圍	-999 ~ 9999 或 -99.9 ~ 999.9 Selectable
Accuracy of display 顯示精度	± (0.1 % of F.S. + 1 DIGIT)
Setting range 設定範圍	-999 ~ 9999 或 -99.9 ~ 999.9 Selectable
Dielectric strength 電介強度	Over 2.5KV
Isolation strength 絕緣強度	Over 100MΩ / 500VDC
Operating temp 使用環境	－ 20℃ ~ ＋ 80℃ ; 35 ~ 85%RH
Housing material 外殼材質	Intensive PC+ABS（UL-94V0）

■ How to operating

1. **Setting of heating timer** : Press SET key
2. **Selecting of display** : Press SET key 3 seconds
3. **Soft start** : rAp Unit : ℃ / Minute
4. **Manual control** : Press OFF/▼ + stb/▲ key 3 seconds
5. **OFF（Stop）**: Press OFF/▼ key 3 seconds
6. **AT（Auto-tuning）**: Press AT/<< key 3 seconds
7. **Parameter Setting** : Press SET & ▼ key 3 seconds
8. **Alarm setting** : Press SET & AT/<< key 3 seconds

■ Connection diagram& Outline dimension / 接線圖&外形尺寸圖

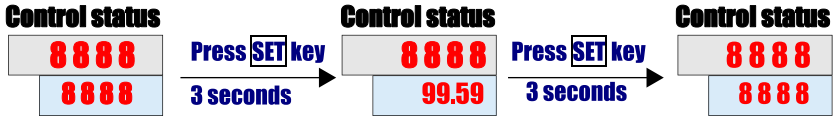




1. Setting of heating timer : Press SET key

1-1. After the time of heating being finished , The display of SV will display the 「Temp setting value」 & 「OFF」, Meanwhile the temp control output will be Turned off and the AL1 output will be turned on.
1-2. It will be reset by setting the OFF/▼ key or turning off the power of controller If the time of heating being finished.
1-3. If 「Fun=SoF」 or 「Fun=noF」, setting of heating time will be unable.

2. Selecting of display : Press SET key 3 seconds 【「Fun=SoF」 or 「Fun=noF」 without selecting】

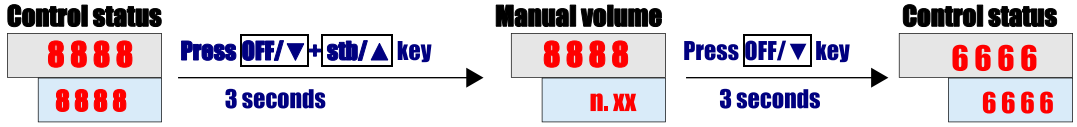


2-1. Press SET key to change the 「temp setting value」 or 「heating time」 on SV display.

3. Soft start : rAp Unit : ℃ / Minute

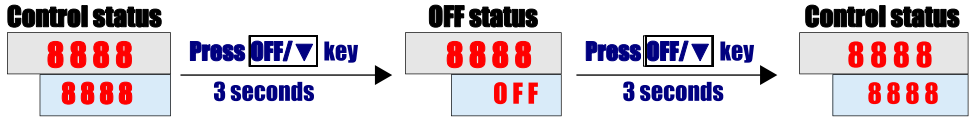
1-1. Press SET key 3 seconds into 「Soft start」 setting status ; if 「rAp」 = 0, it don't to do Soft start
1-2. 「rAp」 setting range : 0 ~ 9999 or 0.0~999.9
1-3. 「rAp」 > 0 ; Power on or ON/FF or to change setting value or stand-by change to normal control, it will work by Soft start
※ Release Soft start : In soft start status, Press SET key 3 seconds may to release Soft start status.

4. Manual control : Press OFF/▼+stb/▲ key 3 seconds



※ Press OFF/▼+stb/▲ key 3 seconds into manual control volume setting status
→ SV will display 「n.000」 that may to set the manual control volume.
※ Release manual control : In the manual control, Press OFF/▼ key 3 seconds to return the control status.

5. OFF (Stop) : Press OFF/▼ key 3 seconds



※ Press OFF/▼ key 3 seconds → SV displays 「OFF」 into the stop control status.
※ Release OFF status : In the stop control status, Press OFF/▼ key 3 seconds may to turn the status to control status.

6. AT (Auto-tuning) : Press AT/<< key 3 seconds into the auto-tuning status, pilot 「AT」 on.

In the auto-tuning status, Press AT/<< key 3 seconds may return to control status.

7. Parameter Setting : Press SET & ▼ key 3 seconds

8. Alarm setting : Press SET & AT/<< key 3 seconds

Procedure of operating

Setting of alarm

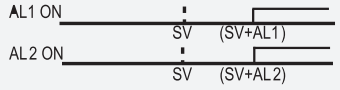
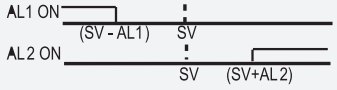
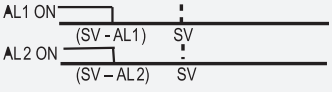
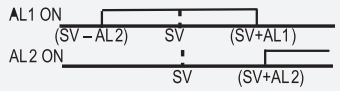
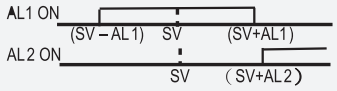
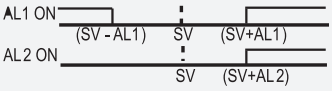
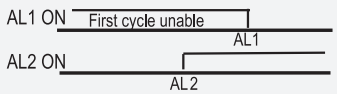
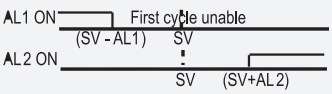
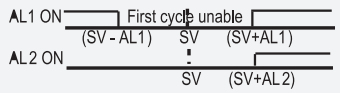
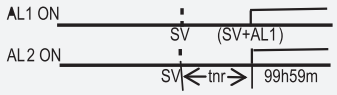
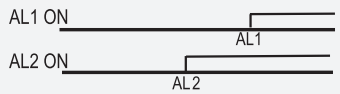
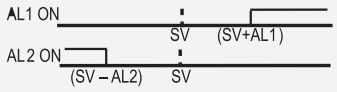
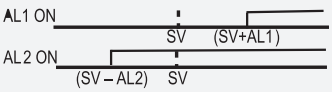
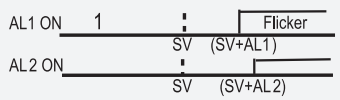
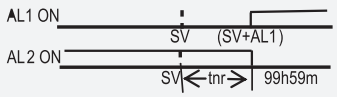
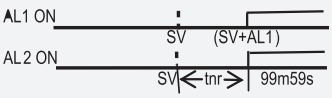
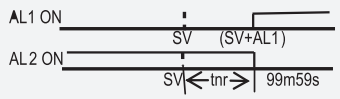
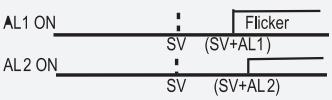
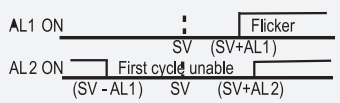
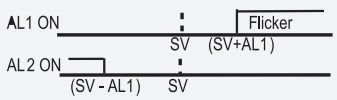
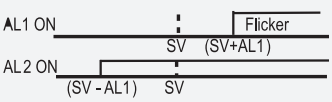
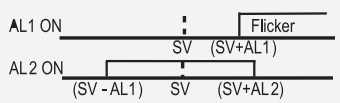
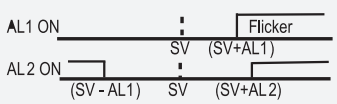
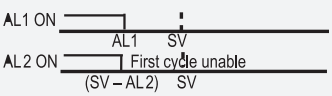
Function	Display	Range	Description
Control status 控溫狀態 Press SET&RAP key 3 sec	8888 8888	-999 ~ 9999	
Lock setting 鎖定設定 Press SET	Lck 0	0 ~ 3	1>「Lck=0」: Unlock ;「Lck=1」: SV settable only 2>「Lck=2」: SV&AL settable ;「Lck=3」: All lock
AL1 Limit setting AL1 警報設定 Press SET	AL1 20	-999 ~ 9999	Refer to alarm mode
Hysteresis of alarm 警報應差值設定 Press SET	ALH 1	-999 ~ 9999	Hysteresis of alarm
Delay time of alarm on 警報動作延遲時間設定 Press SET	ond 1200	0 ~ 9999	1> Unit : Second 2> For alarm mode #2 (Alt.2)
Setting limit 最大設定值限制 Press SET	SLh 400	0 ~ 9999	1> SV≦SLH
Output limit 輸出量限制設定 Press SET	Out 100	0 ~ 100%	1> Limit of output volume 2> Output volume = Control output volume * 「Out」
Process output volume 實際輸出量 Press SET	Un 0.0	0 ~ 100%	1> Display of output volume
Min. output volume setting 最小輸出量設定 Press SET	Lot 0	0 ~ 100%	1> Output volume= 「Lot」 + control volume

Setting of Communication

Function		Range	Description
Control status 控制狀態 Press SET&RAP key 3 sec	8888 8888	-200 ~ 9999	
Controller NO. 控制器編號設定 Press SET key	Id 1	1 ~ 255	1> Range : 1~255
Communication protocol 通訊協定選擇 Press SET key	rS 0	0 ~ 1	1>「rs=0」: Modbus-RTU 2>「rs=1」: Modbus-ASCII
Communication speed 通訊速率選擇 Press SET key	bPS 192	96 / 192 / 384	1>「bPS=96」: 9600 bps 2>「bPS=192」: 19200 bps 3>「bPS=384」: 38400 bps
Data configuration 資料結構選擇 Press SET key	bIt 8N1	8N1 / 8E1 8O1 / 7O1	1>「bIt=8N1」: 8 bit non parity 2>「bIt=8O1」: 8 bit odd parity 3>「bIt=8E1」: 8 bit even parity 4>「bIt=8N2」: 8 bit non parity 5>「bIt=7O1」: 7 bit odd parity 6>「bIt=7E1」: 7 bit even parity

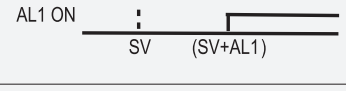
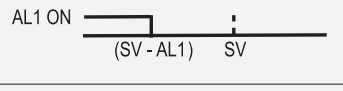
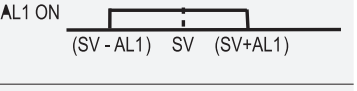
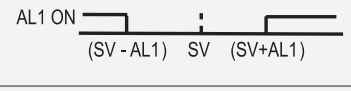
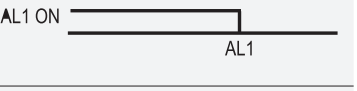
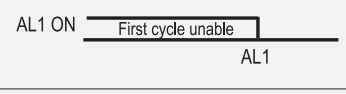
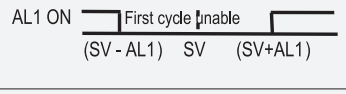
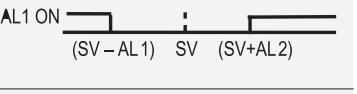
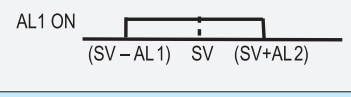
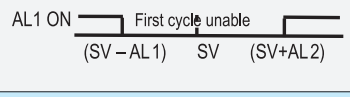
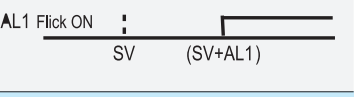
Function		Range	Description
Control status 控制狀態	8888 / 8888	-200 ~ 9999	
Press SET & AT key 3 sec			
Output method 輸出方式	con / r	r or S	1>「con = r」: Relay output 2>「con = S」: SSR output
Press SET key			
Cycle time 動作週期	Ct / 15	0 ~ 1	1>「Ct = 0」: ON/OFF control 2> Range : 0~99s (con = r) or 0.0~9.9s (con = S)
Press SET key			
Auto tuning 自動演算	At / 0	0 ~ 99	1>「At = 0」: Control status 2>「At = 1」: Auto tuning status
Press SET key			
Proportion band 比例帶	P / 36	0 ~ 3999	1>「Ct = 0」→ 「P」is disappeared
Press SET key			
Integral time 積分時間	I / 120	0 ~ 3999	1>「Ct = 0」→ 「I」is disappeared
Press SET key			
Derivative time 微分時間	d / 30	0 ~ 3999	1>「Ct = 0」→ 「d」is disappeared
Press SET key			
Hysteresis 動作應差	HYS / 1	0 ~ 99	1>「Ct = 0」→ 「Hys」is appeared only 2> (PV > SV) → Out ON ; 〔PV < (SV-Hys)〕→ Out OFF
Press SET key			
Input selecting 輸入選擇	Int / k	PT / K / J / R / S T / B / E / N / L	1> 10 input type are selectable
Press SET key			
Unit selecting 單位選擇	Unt / C	℃ / ℉	
Press SET key			
Decimal point selecting 小數點選擇	dp / 0	0 ~ 1	1>「dp = 0」: Without decimal point 2>「dp = 1」: One decimal point
Press SET key			
Input shift setting 輸入修正	SHt / 0	- 99 ~ + 99	1>「PV」= (PV + Sht)
Press SET key			
Input span setting 輸入斜率修正	Spn / 1.000	0.001~9.999	1>「PV」= (PV * Spn)
Press SET key			
Alarm mode setting 警報模式設定	ALt / 0	0 ~ 26	1> Refer to the mode of Alarm
Press SET key			
Function selection 功能選擇選擇	Fun / noF	ALL / tnr/SoF/ noF	1.「Fun=ALL」: with heating timer and soft start function 2.「Fun=tnr」: with heating timer only 3.「Fun=SoF」: with soft start function only 4.「Fun=noF」: without heating timer and soft start function
Press SET key			
Timing mode selection 計時模式選擇	tnd / 0	0 or 1	1>「0」: PV≧SV to start timing 2>「1」: Power on to start timing
Press SET key			
Timing unit selection 時間單位選擇	tut / nS	nS or hr	1>「nS」: 0~99m59s 2>「hr」: 0~99h59m
Press SET key			

Mode of alarm / 警報模式【NT-□□】

Alt	Description / 警報說明	Alt	Description / 警報說明	Alt	Description / 警報說明
0		1		2	
3		4		5	
6		7		8	
9		10		11	
12		13		14	
15		16		17	
18		19	Non-used	20	
21		22		23	
24		25		26	

1.「ALt=15」: t = ON time of AL2 for cooling, OFF time is controlled by PID.
2.「ALH」: Hysteresis of alarm. Ex. PV≧(SV+AL1)→AL1 ON, PV＜(SV+AL1-ALH)→AL1 OFF
3.「tnu」= Process time of tnr, if「tnu≧tnr」→ AL2 is turned ON or OFF

Mode of alarm / 警報模式【NT-□□-CT & eTC-48 & NT-22】

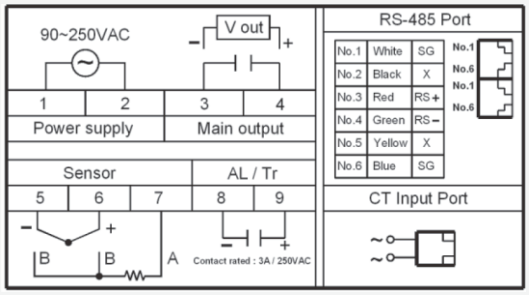
Alt	Description / 警報說明	Alt	Description / 警報說明	Alt	Description / 警報說明
0		1		2	
3		4		5	
6		7		8	
9		10		11	

1>「Alt = 11」: t = ON time of AL for cooling, OFF time is controlled by PID.
2>「ALH」: Hysteresis of alarm. Ex：PV≧（SV+AL1）→ AL1 ON；PV＜（SV+AL1-ALH）→ AL1 OFF
3> NT-22□-CT: HB alarm output is AL1
4> NT-48□-CT: HB alarm output is AL2

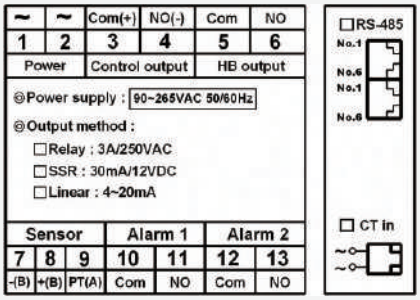
Fuzzy + PID Intelligent Temperature Controller

Connection diagram / 接線圖

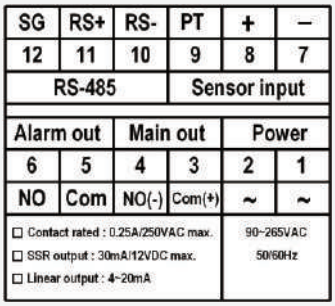
NT - 22-□□



NT – 32-□□



NT - 10-□□



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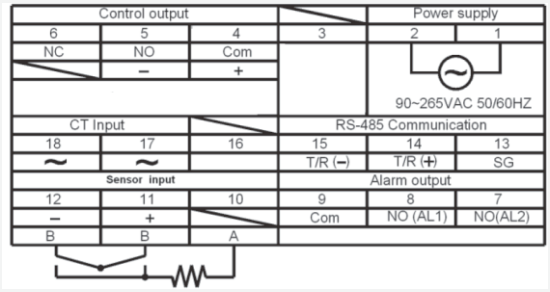
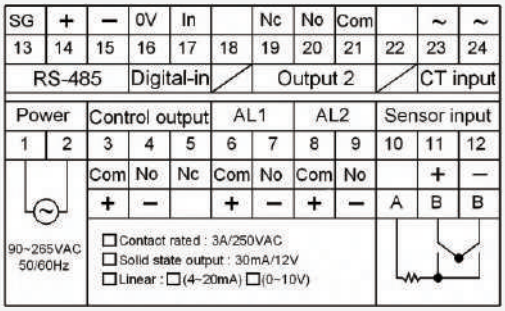
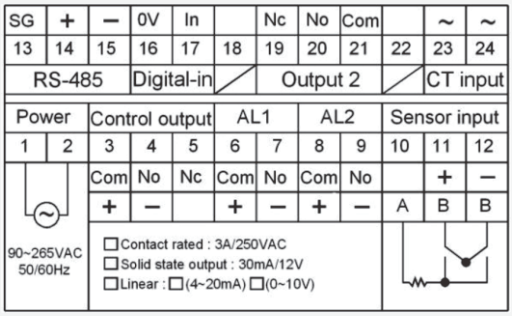


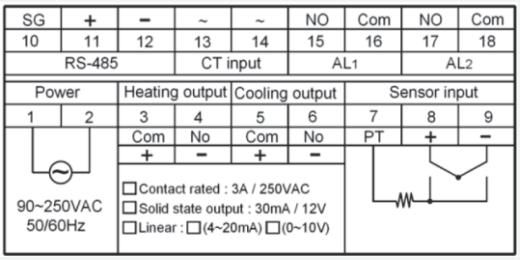
NT - 20-□□



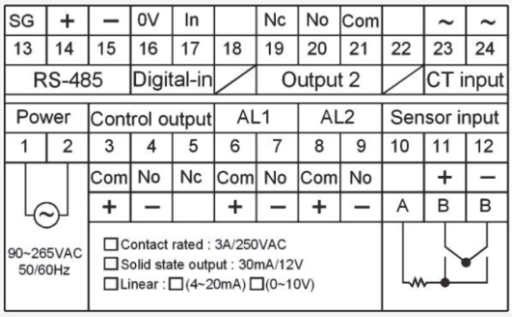
NT – 21-□□



NT – 72-□□E

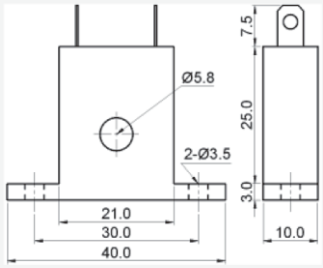


NT – 96-□□E

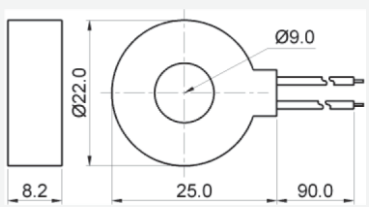


Attachment / 附件

CT-06: Load current 10 A max



CT-09: Load current 30 A max.



CT-100: Load current 100 A max.