

TD4LP Series

Dual setting type, Digital Switch PID Temperature Controller

NEW

Features

- Digital switch application to PID control temperature controller
- Realizes ideal temp. controlling with newly developed PID control algorithm and 100ms high speed sampling
- SSR drive output / relay output and SSR drive output / current output selectable
- Dramatically increased visibility using wide display part
- Mounting space saving with compact design
: Approx. 38% reduced size compared with existing model(depth-based)



! Please read "Caution for your safety" in operation manual before using.



Ordering information

T	D	4	LP	-	1	4	R	
Item	Setting type	Digit	Size		Alarm output	Power supply	Control output	
							R	Relay output + SSR drive output
							C	Current output + SSR drive output
						4		100-240VAC 50/60Hz
					1			Alarm output
					LP			DIN W96×H96mm Alarm setting type
					4			4 Digit
					D			Set by digital switch
					T			Temperature Controller

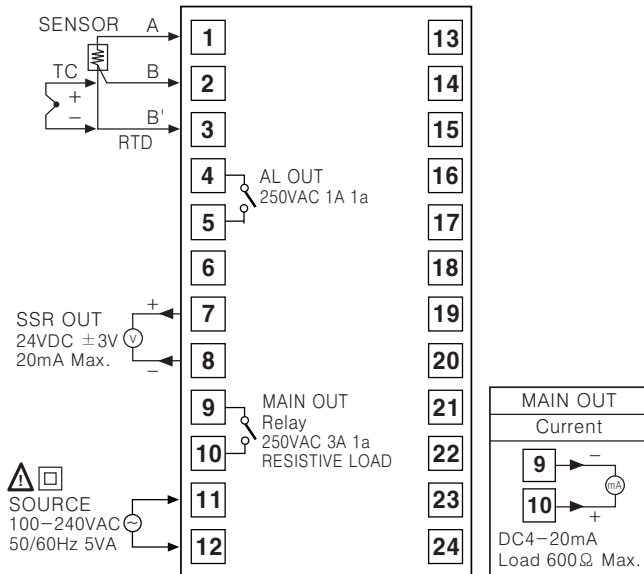
Specifications

Series	TD4LP	
Power supply	100-240VAC 50/60Hz	
Allowable voltage range	90 ~ 110% of rated voltage	
Power consumption	3VA	
Display method	7 Segment(Red), Other display(Green, Yellow, Red LED)	
Character size	H22×W11mm	
Input type	RTD	DIN Pt100Ω (Allowable line resistance max.5Ω per a wire)
	TC	K(CA), J(IC)
Display accuracy	RTD	(PV ±0.5% or ±2℃ higher one) rdg ±1Digit
	TC	
Control output	Relay	250VAC 3A 1a
	SSR	24VDC ±3V 20mA
	Current	DC4 - 20mA (Load resistance Max. 600Ω)
Sub output	ALM relay output : 250VAC 1A 1a 1 contact	
Control method	ON/OFF and P, PI, PD, PID control	
Hysteresis	1 ~ 100℃/°F	
Proportional band(P)	0.1 ~ 999.9℃/°F	
Integral time(I)	9999sec.	
Derivative time(D)	9999sec.	
Control period(T)	0.5 ~ 120.0sec.	
Manual reset	0.0 ~ 100.0%	
Sampling period	100ms	
Dielectric strength	2000VAC 50/60Hz for 1min.(Between input terminal and power terminal)	
Vibration	0.75mm amplitude at frequency of 5~55Hz in each X, Y, Z directions for 2 hours	
Relay life cycle	Control output	Mechanical : Min. 10,000,000 operations, Electrical : Min. 100,000 operations
	Alarm output	Mechanical : Min. 5,000,000 operations, Electrical : Min. 100,000 operations
Insulation resistance	Min. 100MΩ (at 500VDC mega)	
Noise strength	Square shaped noise by noise simulator (pulse width 1μs) ±2kV R-phase and S-phase	
Memory retention	Approx. 10 years (When using non-volatile semiconductor memory type)	
Ambient temperature	-10 ~ 50℃ (at non-freezing status)	
Storage temperature	-20 ~ 60℃ (at non-freezing status)	
Ambient humidity	35 ~ 85%RH	
Insulation type(*1)	□	
Unit weight	Approx. 185g	
Approval	CE c UL US	

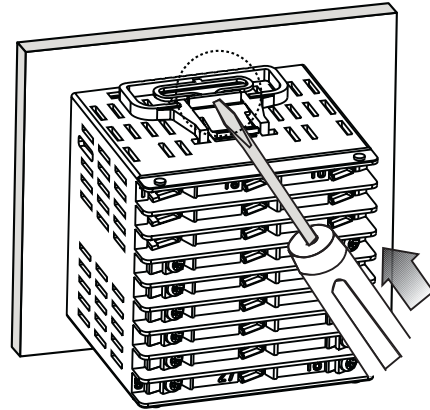
※(*1) □ Mark indicated that equipment protected throughout by double insulation or reinforced insulation.

Dual Setting Type

Connections



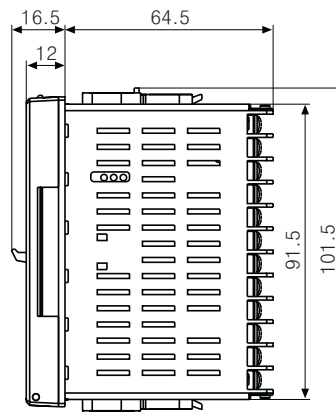
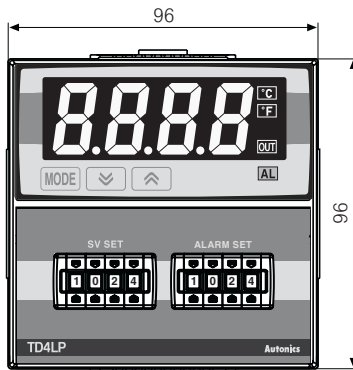
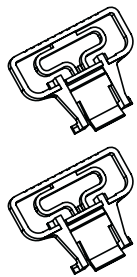
Product mounting



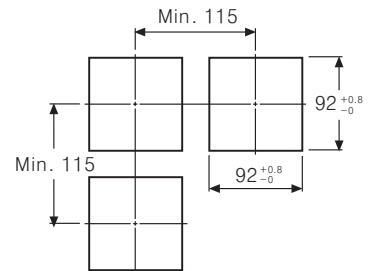
※ Insert product into a panel, fasten bracket by pushing with tools as shown above.

Dimensions

Bracket

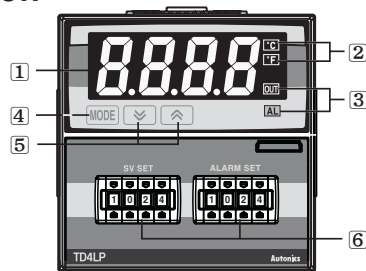


Panel cut-out



(Unit:mm)

Parts description



- 1 Temperature display
It shows current temperature (PV) in RUN mode and parameter and set value for each setting group in parameter change mode.
- 2 Temperature unit (°C/°F) indicator
- It shows current temperature unit.
- Temperature unit (°C or °F) display lamp will be flickering during AT function.
- 3 Control/sub output indicator
- OUT : It will be ON when control output is ON.
* In case of current output type, it will be OFF when output level is under 2%, and ON when output level is over 3%.
- ALM : It will light up when ALARM output is on.
- 4 MODE Key : Used when entering into parameter setting group, returning to RUN mode, moving parameter and saving setting values.
- 5 Adjustment : Used when entering into set value change mode, Digit moving and Digit Up/down.
Press + key at the same time to move Digit or to operate [**StoP**] function.
- 6 Digital switch : Used for SV setting or for ALARM SV setting.

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/Speed/Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Field network device

(Q) Production stoppage models & replacement

TD4LP Series

■ Factory default

● First setting group

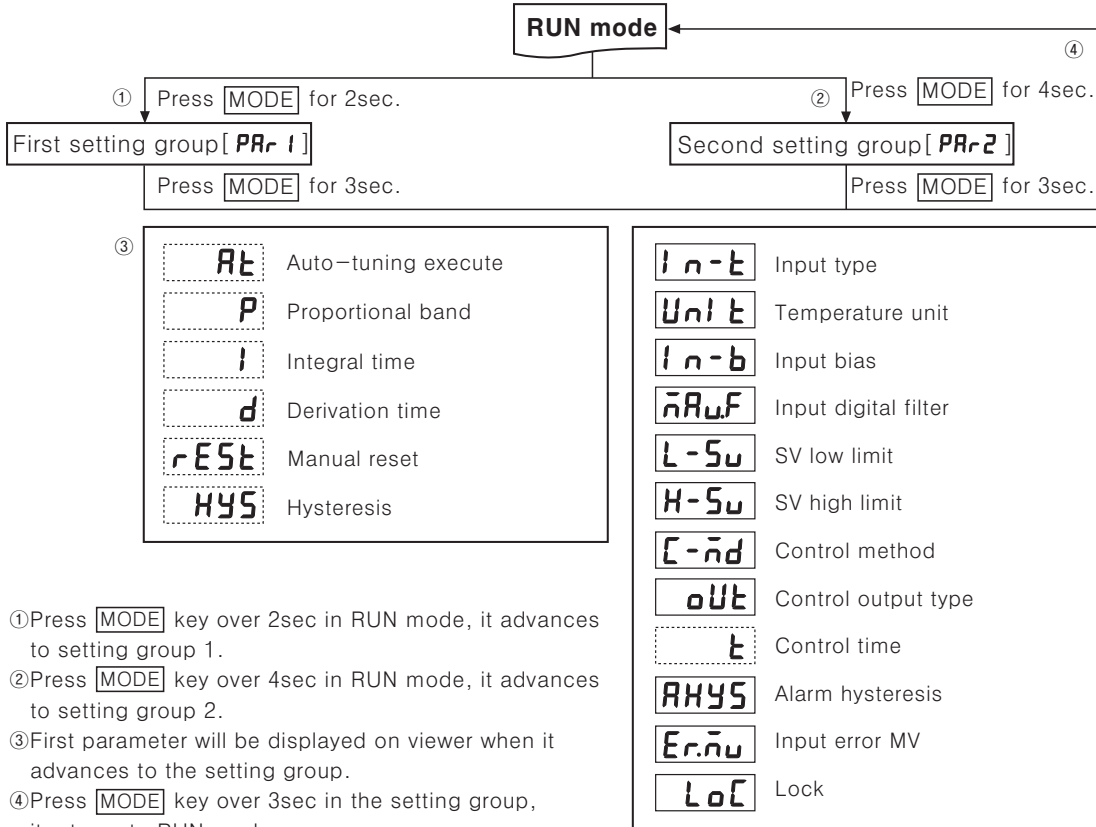
Parameter	Factory default
RE Auto-tuning execute	oFF
P Proportional band	100
I Integral time	0
d Derivation time	
rESE Manual reset	500
HYS Hysteresis	2

● Second setting group

Parameter	Factory default	Parameter	Factory default
In-t Input type	PCR	C-nd Control method	PI d
Un-t Temperature unit	°C	oUt Control output type	rLY
In-b Input bias	0	t Control time	200
nRwF Input digital filter	0.1		20
L-Sv SV low limit	-50	AHYS Alarm hysteresis	1
H-Sv SV high limit	1200	Er.nv Input error MV	00
		LoC Lock	oFF

*Default for [**t**] ⇨ Relay contact output : 20.0sec./ SSR output : 2.0sec.

■ Flow chart for setting group



- ① Press **MODE** key over 2sec in RUN mode, it advances to setting group 1.
- ② Press **MODE** key over 4sec in RUN mode, it advances to setting group 2.
- ③ First parameter will be displayed on viewer when it advances to the setting group.
- ④ Press **MODE** key over 3sec in the setting group, it returns to RUN mode.

● If no key touched for 30sec, it will return to RUN mode automatically and the set value of parameter will not be changed.

● Press **MODE** key again within a sec after return to RUN mode by press **MODE** key over 3sec, it advances to the first parameter of previous setting group.

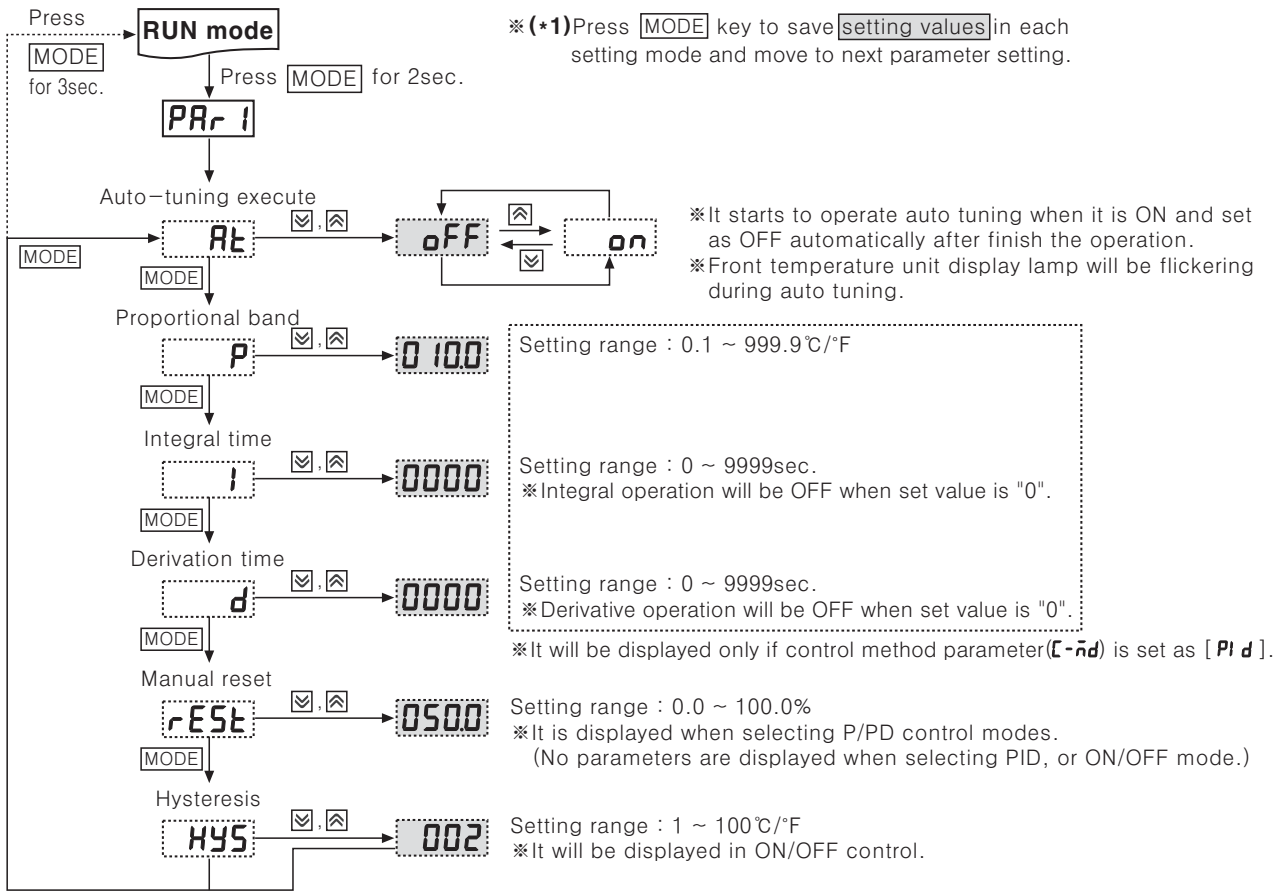
● Parameter setup

[Setting group 2] → [Setting group 1]

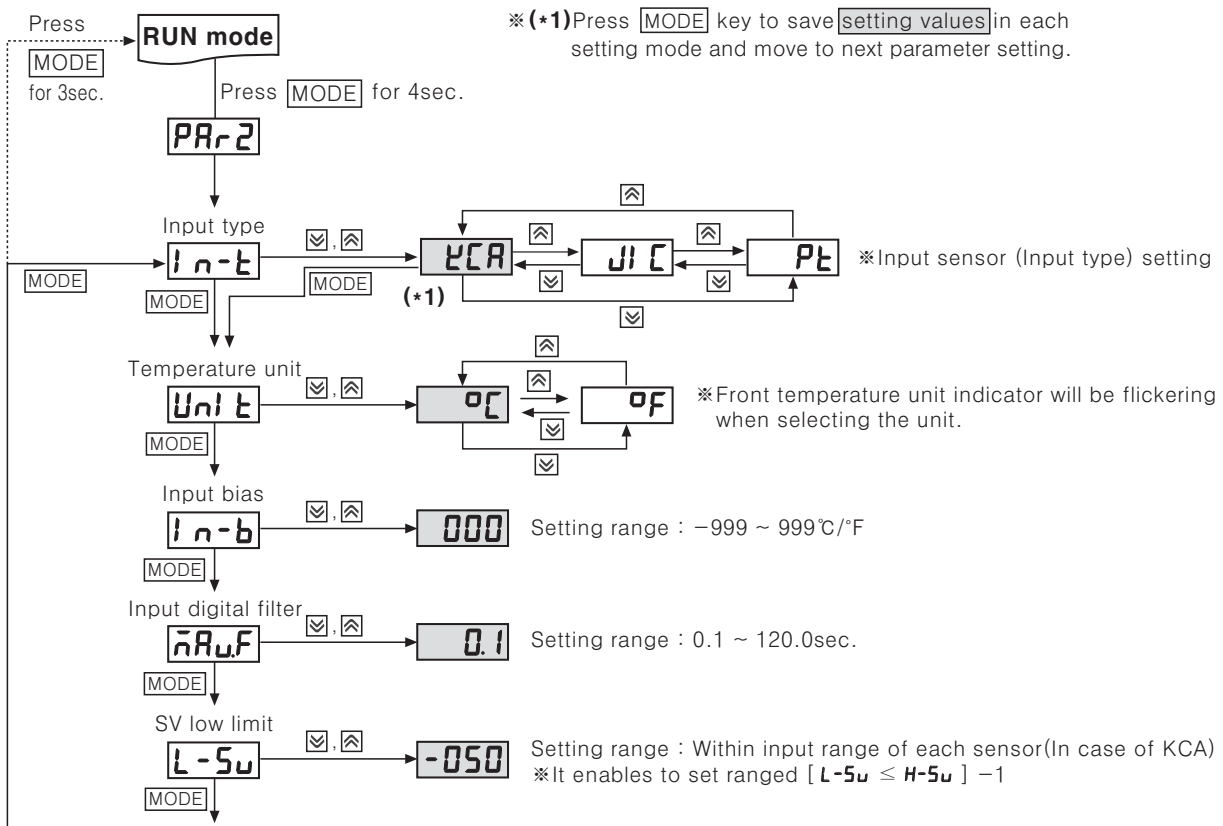
- Set parameter as the above considering parameter relation of each setting group.
- Check parameter set value after change parameter of setting group 2.
- [] The part shown in dotted line is displayed depending on setting in setting group 2.

Dual Setting Type

Flow chart for first setting group

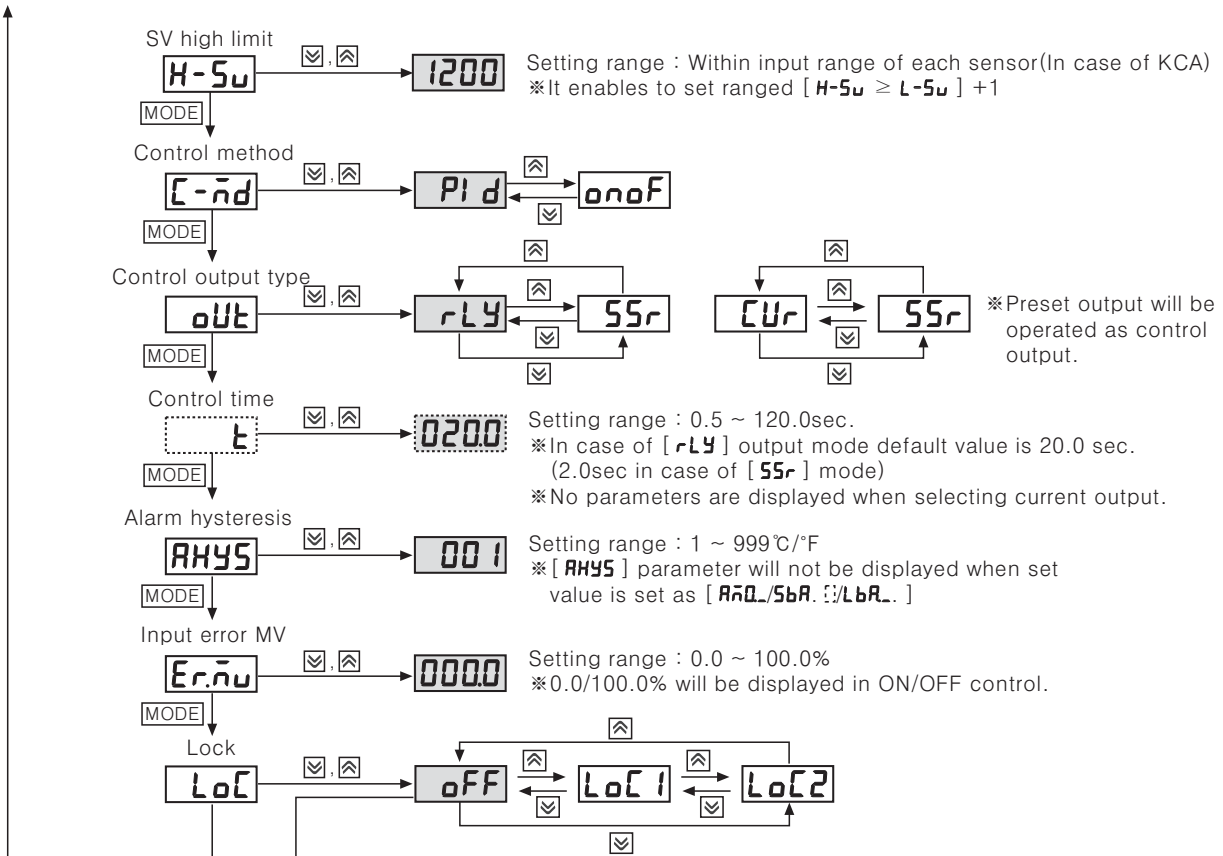


Flow chart for second setting group



- (A) Counter
- (B) Timer
- (C) Temp. controller
- (D) Power controller
- (E) Panel meter
- (F) Tacho/Speed/Pulse meter
- (G) Display unit
- (H) Sensor controller
- (I) Switching power supply
- (J) Proximity sensor
- (K) Photo electric sensor
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TD4LP Series



Input sensor and range [**I n-t**]

●Select proper input sensor type by user' application.

Input sensor		Display	Input range °C	Input range °F
ThermoCouple	K (CA)	KCA	-50 ~ 1200°C	-58 ~ 2192°F
	J (IC)	JIC	-30 ~ 500°C	-22 ~ 932°F
RTD	DIN rated Pt	Pt	-100 ~ 400°C	-148 ~ 752°F

●Setting range : [**KCA / JIC / Pt**] (Default : [**KCA**])

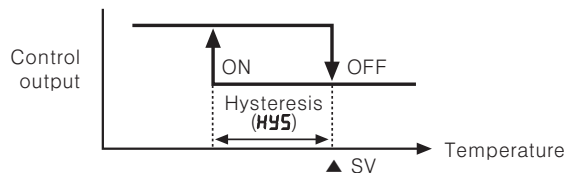
Function

Auto tuning [**At**]

- When setting [**At**] parameter to [**on**], front temperature unit display (°C or °F) lamp will be flickering during Auto tuning. After completing auto tuning, temperature unit display lamp returns to normal operation and [**At**] parameter automatically becomes [**on** → **oFF**].
- Set as [**oFF**] to stop auto tuning.
 ※It keeps previous P, I, D set values.
- If SV is changed during auto tuning mode, auto tuning is stopped.
- PID time constants figured out thru auto tuning function can be changed.
- If control method is set to [**oNoF**], no parameters are displayed.
- Finish auto tuning when [**oPEn**] error or [**Er.5u**] error (for TD series) occurs during the operation.
 ※In case of [**oPEn**] error or [**Er.5u**] error (for TD series), auto tuning operation is not applicable.

Hysteresis [**HYS**]

Set control output ON / OFF interval in ON / OFF control mode.



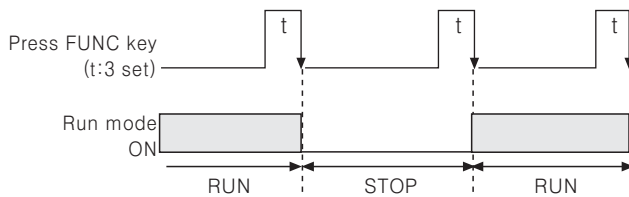
- If Hysteresis is too narrow, hunting (Oscillation, Chattering) could occur due to external noise.
- In case of ON / OFF control mode, even if PV reaches stable status, there still occurs hunting. It could be due to Hysteresis (HYS) SV, load's response characteristics or sensor's location. In order to reduce hunting to a minimum, it is required to take into following factors consideration when designing temp. controlling; proper Hysteresis (HYS), heater's capacity, thermal characteristics, sensor's response and location.

Dual Setting Type

◎Control output RUN / STOP

Press(▼ + ▲) keys for 3 sec at the same time to RUN or STOP the control output in RUN mode by force.

- When it is required to stop control output temporarily (e.g., during maintenance work), use "STOP" command to stop control output. (Auxiliary output is normally provided as setting values.)
- In case of STOP mode, [5tOP] parameter and PV value is flickering in turn on display part.
- When power is off in "STOP" mode, "STOP" mode will be kept after Power is supplied again. (In order to return to normal control operation, make "STOP" mode OFF using front keys.)

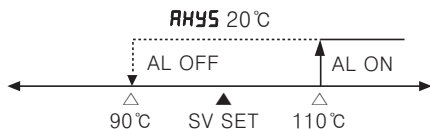


◎Alarm output function

When PV is higher than or equal to ALARM SV, alarm output will be ON and it becomes OFF according to [RHYS] setting when PV is lower than ALARM SV.

●ALARM output hysteresis [RHYS]

The figure represents the example of ALARM output operation (ALARM SV=110°C, ALARM output hysteresis = 20°C). ALARM output hysteresis (RHYS) is to represent alarm output ON / OFF cycle. It is allowed for users to set ALARM output hysteresis.



◎Input digital Filter [nRF]

A function to filter input signals for more stable PV display in order to provide stable control output. If noise occurs on input signals or PV value keeps changing, it gets difficult to perform high accuracy control since PV has a direct effect on output level.

◎SV High/Low limit [L-Su / H-Su]

- It sets SV high/low limit range of using temperature within temperature range for each sensor, user can set/change set temperature (SV) within SV high limit [H-Su] ~ SV low limit [L-Su]. (* L-Su > H-Su cannot be set.)
- When changing input specification (In-t), SV high limit (H-Su) and SV low limit (L-Su) of using temperature will be initialized as max./min. value of sensor temperature range automatically.

◎Input error MV(OPEn) [Er.nu]

- It sets control output when sensor input disconnection error is occurred enabling to set as ON/OFF and operation set by user.
- It executes control output by set operations regardless of ON/OFF and PID control operations.

◎Control output type selection [oUt]

- In case of relay output type model, relay output and SSR output supported. In case of current output type model, current output (DC4~20mA) and SSR output supported.
- A function to select control output type.

◎Lock setting [LoC]

- A function to prevent changing SV and parameters of each setting group.
- Parameter setting values are still possible to check while Lock mode is ON.

Display	Description
oFF	Lock off
LoC1	Lock setting group 2
LoC2	Lock setting group 1, 2

◎Error

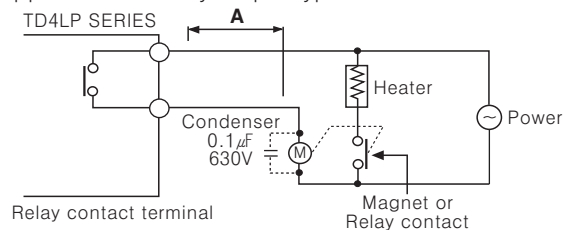
- Error mark will flash (every 1sec) in PV viewer when error is occurred during the control operation.

Display	Description
Er.Su	Setting error (When SV is out of SV range)
oPEn	If input sensor is disconnected or sensor is not connected.
HHHH	If measured sensor input is higher than temperature range.
LLLL	If measured sensor input is lower than temperature range.

- It will operate normally, if input sensor is connected or returned to normal range under error oPEn / HHHH / LLLL status.

◎Output connections

- Application of relay output type



Keep power relay as far away as possible from temperature controller. If wires length of **A** is short, electromotive force occurred from a coil of magnet switch & power relay may flow in power line of the unit, it may cause malfunction. If wires length of **A** is short, please connect a mylar condenser 104 (630V) across coil of the power relay "M" to protect electromotive force.

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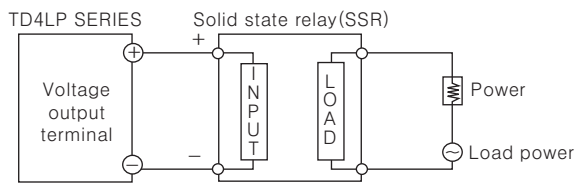
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TD4LP Series

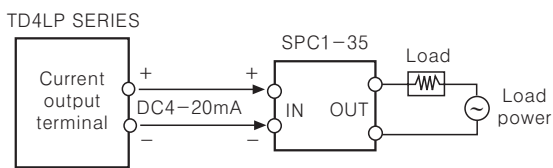
●Application of SSR output type



※ SSR should be selected by the capacity of load, otherwise, it may short-circuit and result in a fire. Indirect heated should be used with SSR for efficient working.

※ Heat sink integrated SSR must be used. Unless it may cause 70~80% of performance degrades or it may cause SSR failure in case of long term use.

●Application of current output(DC4~20mA)



※ It is important to select SCR unit after checking the capacity of the load.

※ If the capacity is exceeded, it may cause a fire.