ISO 9001:2008

CONOTEC ®
CONOTEC CO., LTD.   www.conotec.co.kr

Digital Temperature Controller

OPERATION MANUAL

FOX-2PD   FOX-2PT   FOX-2PF

FOX-2CD   FOX-2CT   FOX-2CF

1 SAFETY AND CAUTION

Please carefully digest all cautions prior to the use of product, and correctly operate.
※ The specification and external dimension may be changed for improvement of product performance without advance notice.

⚠ WARNING

1. Being the product not manufactured for safety related device, make sure to provide a duplicated safety apparatus for use of controlling the devices subject to potential personal injury and/or death, damages on critical peripheral devices and substantial property losses.
2. Do not execute the wiring, checking and/or repair works under the condition power supply is engaged.
3. Make sure to verify the correct terminal numbers and terminate, when connecting the power supply.

⚠ CAUTION

- Please carefully read and digest the operation procedure and safety related regulations or WARNING descriptions prior to the use of product, and make sure to operate the product only per the relevant specification or within the corresponding capacity rating.
- Do not make wiring or install the product on motor or solenoid with large inductive loads. When extending the sensor, use the shielded wire not extending the extension wire length unnecessarily long.
- Do not use the components generating arc when opening and closing under same power supply line or near to power supply.
- Keep the power supply line away from high voltage wire, and avoid installation at the locations subject to severe moisture, oily content and dust.
- Do not install the product at places exposed to direct sung light or rain.
- Do not install the product at places subject to strong magnetism or severe noise, vibration and impact.
- Keep the product far away from the places directly producing strong alkali or acidic substances using separate conduit for wiring.
- Do not spray water on the product for cleaning purpose when installed at kitchen area.
- Do not install at those places under the temperature and/or moisture exceeding the rated capacity.
- Use the product paying attention not to have disconnected sensor wiring or defect.
- Allow the sensor wiring stay away from signal, power supply, drive and load wires using separate conduit for wiring.
- Please note that no warranty services shall be provided when the product is disassembled or modified at user's own discretion.
- The ⚠ mark shown on Terminal Wiring Diagram is a safety notice notifying warning or caution.
- Do not use the product at places near to the devices generating strong high frequency noise (High frequency welding machine, high frequency sawing machine, high frequency radio, large capacity SCR controller).
- Using the product with procedures not specified by the manufacture may incur the personal injury or property damage.
- Not being a toy, do not allow children touch the product.
- Make sure to execute the installation only by the skilled person with related industry or authorized personnel.
- CONOTEC Co., Ltd. shall assume absolutely no responsibility of whatsoever nature for those damages and/or losses incurred due to the operation not complying with above WARNING or NOTE descriptions or negligence and/or fault of user.

⚠ DANGER

■ CAUTION on Danger of Electric Shock
- Electric Shock – Do not touch the AC power terminals when the power supply is ON, as it may incur the electric shock.
- Make sure to turn the input power supply OFF when checking the input power supply.

2 PRODUCT CONFIGURATION

Model No.	Sensor	Control Output	Temperature Range	Application
FOX-2PD/T/F	PT	Relay contacts (2 ~ 4EA)	-200℃ ~ +400℃	Temperature control
FOX-2CD/T/F	CA	Relay contacts (2 ~ 4EA)	-50℃ ~ +999℃	Temperature control

3 Name of part

■ Appearance of product and name of part

1 → K1
2 → K2
3 → K3
4 → K4

99.9 ℃

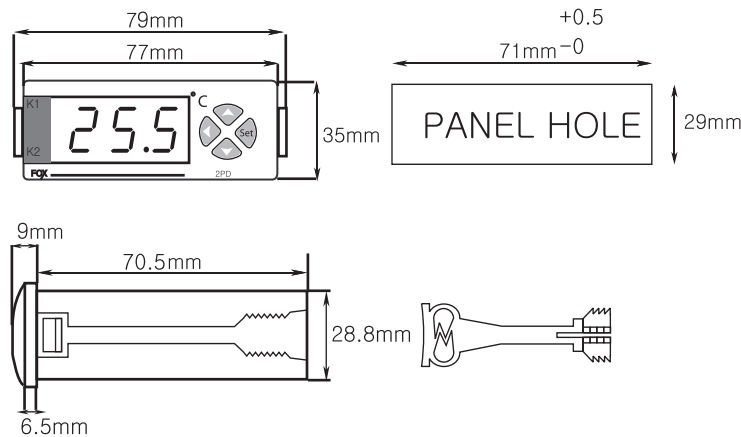5 Switch Increasing
6 Shift Function Switch
7 Switch Decreasing

FOX-2PF

1 OUT1 output indication
2 OUT2 output indication
3 OUT3 output indication
4 OUT4 output indication
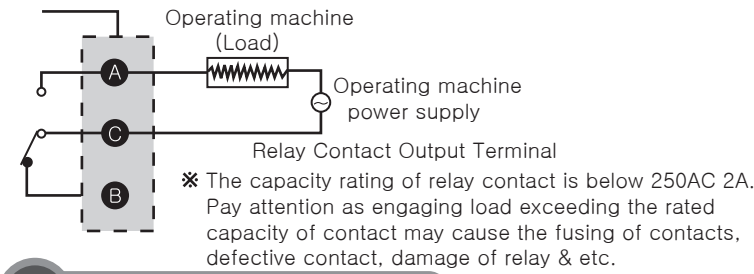5 Switch Increasing
6 Shift Function Switch
7 Switch Decreasing

■ Function of Operating key

1. Set : Key assigned for temperature setting and program change
2. ▲ ▼ : Key assigned for changing the temperature and program setup values.
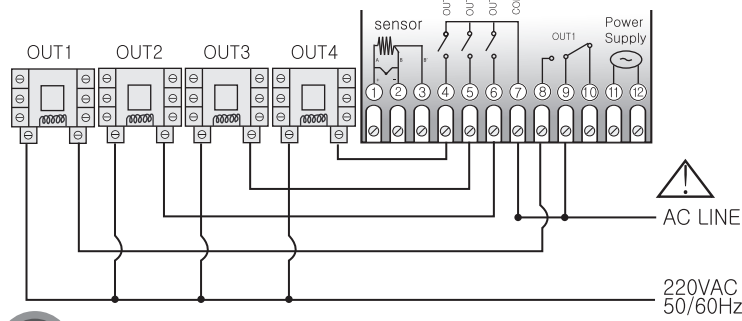
4 External Dimensions and panel size

79mm
77mm

35mm

+0.5
71mm -0

PANEL HOLE   29mm

25.5 ℃

9mm
70.5mm
28.8mm
6.5mm

■ Relay Wiring Example

Operating machine (Load)
A
C
B
Operating machine power supply
Relay Contact Output Terminal
※ The capacity rating of relay contact is below 250AC 2A. Pay attention as engaging load exceeding the rated capacity of contact may cause the fusing of contacts, defective contact, damage of relay & etc.

5 Terminal Wiring Diagram

■ Termianl Wiring Diagram

OUT1 OUT2 OUT3 OUT4   sensor OUT4 OUT3 OUT2 COM OUT1 Power Supply

⚠ AC LINE

220VAC 50/60Hz

6 Setting Range and Default Setup Value

	Function	Display	Range		Default Value	Remark
Temp. setting	TEMP 1 setting	St 1	PT: LSP ~ HSP	10.0		
			CA: LSP ~ HSP	10		
	TEMP 2 setting	St2	PT: LSP ~ HSP	10.0		
			CA: LSP ~ HSP	10		
	TEMP 3 setting	St3	PT: LSP ~ HSP	10.0		
			CA: LSP ~ HSP	10		
	TEMP 4 setting	St4	PT: LSP ~ HSP	10.0		
			CA: LSP ~ HSP	10		
Program setting	User set-up temp upper limit setting	HSP	PT: LSP ~ 400	400	Provided, not related w/relay output
			CA: LSP ~ 999	999	
	User set-up temp. lower limit setting	LSP	PT: -199 ~ HSP	-199	Provided, not related w/relay output
			CA: -50 ~ HSP	-50	
	Temperature correction	Cor	PT: -30.0 ~ 30.0	0.0	Correction temp. differs between Indicated & Actual
			CA: -50 ~ 50	0	
	Locking Function	LoC	on / oFF	oFF	on: Locking function setting oFF: Locking function release Provided except temp. set value
	TEMP 1 Function Select	tP1	CoL / HEt	CoL	CoL: cooling purpose HEt: heating purpose
	TEMP 1 deviation temp. setting	dF1	PT: 0.1 ~ 19.9	1.0	Output hysteresis interval setting
			CA: 1 ~ 50	1	
	TEMP 1 output delay time setting	dt1	0.00 ~ 9.59	0min00sec	
	TEMP 2 Function Select	tP2	CoL / HEt	CoL	CoL: cooling purpose HEt: heating purpose
	TEMP 2 deviation temperature setting	dF2	PT: 0.1 ~ 19.9	1.0	Output hysteresis interval setting
			CA: 1 ~ 50	1	
	TEMP 2 output delay time setting	dt2	0.00 ~ 9.59	0min00sec	
	TEMP 3 function selection	tP3	CoL / HEt	CoL	CoL: cooling purpose HEt: heating purpose
	TEMP 3 deviation temperature setting	dF3	PT: 0.1 ~ 19.9	1.0	Output hysteresis interval setting
			CA: 1 ~ 50	1	
	TEMP 3 output delay time setting	dt3	0.00 ~ 9.59	0min00sec	
	TEMP 4 function selection	tP4	CoL / HEt	CoL	CoL: cooling purpose HEt: heating purpose
	TEMP 4 deviation temperature setting	dF4	PT: 0.1 ~ 19.9	1.0	Output hysteresis interval setting
			CA: 1 ~ 50	1	
	TEMP 4 output delay time setting	dt4	0.00 ~ 9.59	0min00sec	

7 Setting Value Changing Procedure

Temperature Setting

25.0   Indicate current temperature

Set   Set TEMP 1 change

St1   Press the Set key to display St1.

0   Change the setting value using ▲ ▼ keys.

Set   Set TEMP 2 change

St2   Press the Set key to display St2.

0   Change the setting values using ▲ ▼ keys.

Set   Set TEMP 3 change

St3   Press the Set key to display St3.

0   Change the setting values using ▲ ▼ keys.

Set   Set TEMP 4 change

St4   Press the Set key to display St4.

0   Change the setting values using ▲ ▼ keys.

Set   Set completed

o-t   Setting value storing mark (o-t) is displayed, then showing the current temperature.

25.0

Temperature Program Setting

Set ☞ Press for more than 5 seconds

Common

- E60 ⇄ E61 ⇄ E62 ⇄ E63 ⇄ E64
- HSP / tP1 / tP2 / tP3 / tP4
- 99.9 [PT: LSP ~ 400 / CA: LSP ~ 999] / CoL [HEt / CoL] ...
- LSP / dt1 / dt2 / dt3 / dt4
- -55.0 [PT: -199 ~ HSP / CA: -50 ~ HSP] / 1.0 [PT: 0.1~19.9 / CA: 1~50]
- Cor / dF1 / dF2 / dF3 / dF4
- 0.0 [PT: 0.1~19.9 / CA: 1~50] / 0.00 [9min59sec ~ 0min00sec]
- LoC
- oFF [on / oFF]
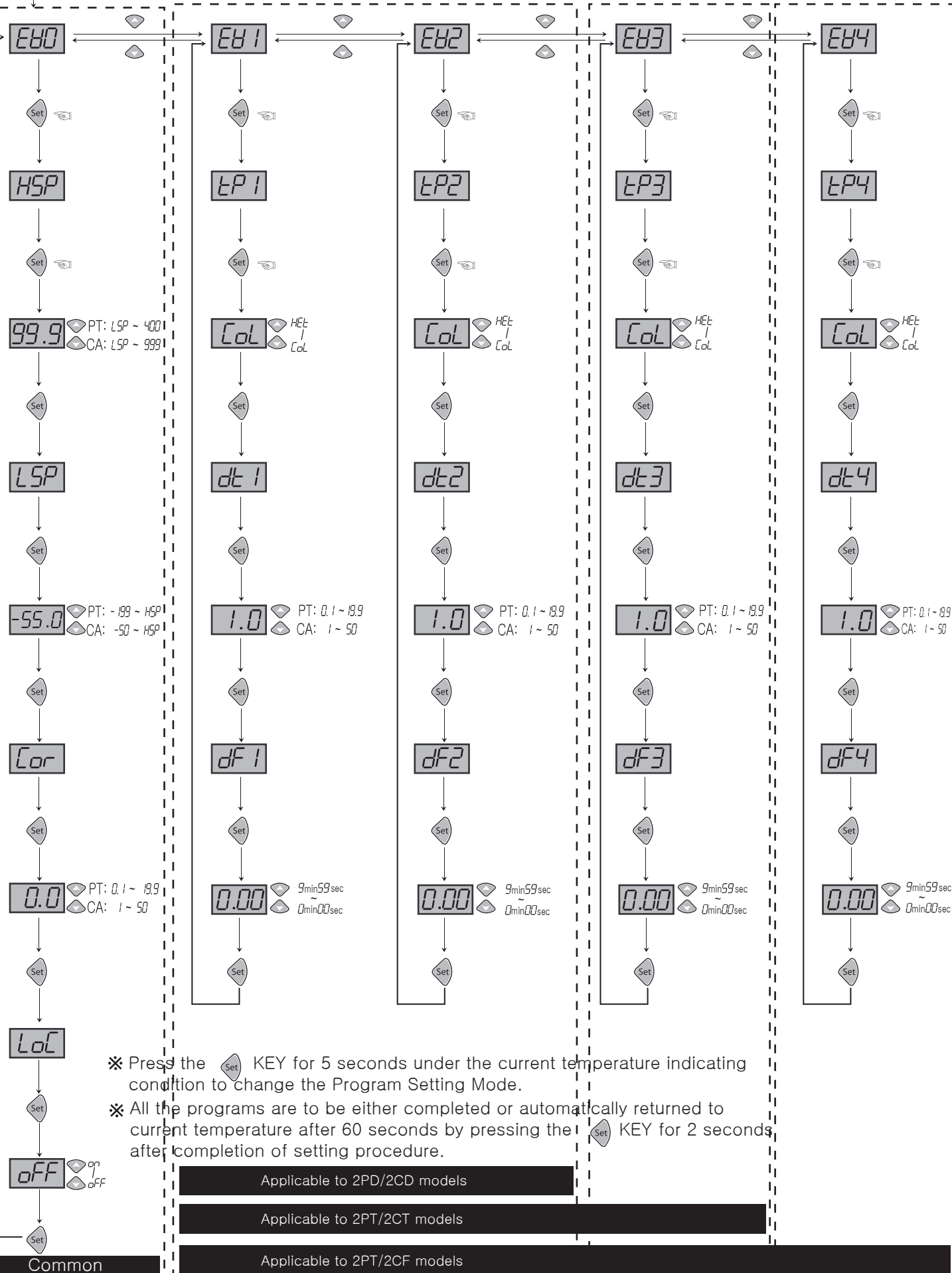
※ Press the (Set) KEY for 5 seconds under the current temperature indicating condition to change the Program Setting Mode.

※ All the programs are to be either completed or automatically returned to current temperature after 60 seconds by pressing the (Set) KEY for 2 seconds after completion of setting procedure.

Applicable to 2PD/2CD models

Applicable to 2PT/2CT models

Applicable to 2PT/2CF models

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8 Detail Description on Function

1. **St1** : Set the 1st stage temperature(Applicable model : 2PD, 2PT, 2PF, 2CD, 2CT, 2CF)

2. **St2** : Set the 2nd stage temperature(Applicable model : 2PD, 2PT, 2PF, 2CD, 2CT, 2CF)

3. **St3** : Set the 3rd stage temperature(Applicable model : 2PT, 2PF, 2CT, 2CF)

4. **St4** : Set the 4th stage temperature(Applicable model : 2PF, 2CF)

5. **HSP** : Set the upper limit of user Set-up temperature.(Max. set point allowed to the last user.) Prohibited setting value above HSP
   ex) When setting HSP = 25.0
   → Setting temperature cannot be increased over 25.0℃

6. **LSP** : Set the upper limit of user Set-up temperature.(Min. set point allowed to the last user.) Prohibited setting value below LSP
   ex) When setting LSP = 10.0
   → Setting temperature cannot be increased below10.0℃

7. **Cor** : Current temperature correcting function
   Function of correcting the current temperature against any errors generated by External Signal Input Sensor and the difference with reference temperature.(Example: Mercury thermometer or existing thermometer or temperature controller used)

   ex) Actual temp. : 25.0℃
   Displayed temp. : 28.0℃
   ※3℃ difference with actual temperature.
   ➡ Correct the Cor from 0.0 to −3.0 to display as 25.0℃ at the Indicating LCD window

8. **LoC** : Setting DATA locking function
   A sort of safety device prohibiting the change of various set-up values except with Primary User.
   When setting on : Lock all setting values except with temperature setting value
   When setting oFF : Release all setting values except with temperature setting value

9. **tP1** : Function selecting TEMP 1 Cooling (CoL) and Heating(HEt)
   (Applicable model : 2PD,2PT,2PF,2CD,2CT,2CF)

10. **dt1** : TEMP 1 output delay time
    (Applicable model : 2PD,2PT,2PF,2CD,2CT,2CF)
    Used when the control object repeats the ON/OFF frequently creating troubles. (Freezer, Compressor & etc.)
    Function protecting product from instantaneous power outage, or when re-engaging the power supply.

    ex) Set temp.: 25.0℃, dt : Set value: 1.30,
    dF set value : 1.0℃ which point to be output ON?
    =) In increasing current temp, if passes ⓑ 26.0℃ at dt, after 1 min 30sec as setting time, Relay is to be ON at ⓒ. The reason why applied output delay time not from ⓐ but ⓑ is set to be dF interval as 1.0℃.
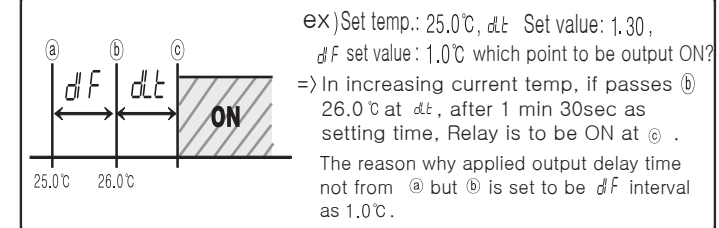
11. **dF1** : Setting TEMP 1 temperature deviation
    (Applicable model : 2PD,2PT,2PF,2CD,2CT,2CF)
    Constant interval required between ON and OFF with ON/OFF control
    Excessive actions of ON and OFF accelerates the damage and/or wear of output contact of relay or other devices, or creates haunting phenomenon due to the external noise & other interferences.
    This function protects the contacts and other components of device by setting the temperature deviation in order to prevent above said phenomenon.
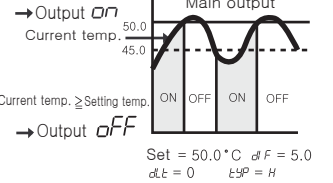

When used for freezing
Current temp. > Setting temp. + Deviation temp.
→Output on
Current temp. ≦ Setting temp.
→ Output oFF

Set =−25.0℃, dF = 5.0
dLt = 0.00, tYP =C
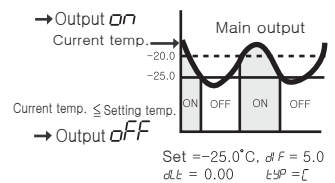
When used for heating
Current temp. < Setting temp. − Deviation temp.
→Output on
Current temp. ≧ Setting temp.
→ Output oFF


Set = 50.0℃, dF = 5.0
dLt = 0, tYP = H

12. **tP2** : TEMP 2 Cooling (CoL) and Heating selecting function
    Refer to Item 9. (Applicable model: 2PD, 2PT, 2PF, 2CD, 2CT, 2CF)

13. **dt2** : TEMP 2 Output Delay Time
    Refer to Item 10. (Applicable model: 2PD, 2PT, 2PF, 2CD, 2CT, 2CF)

14. **dF2** : Setting TEMP 2 Deviation Temperature
    Refer to Item 11. (Applicable model: 2PD, 2PT, 2PF, 2CD, 2CT, 2CF)

15. **tP3** : TEMP 3 Cooling (CoL) and Heating selecting function(HEt)
    Refer to Item 9. (Applicable model: 2PT, 2PF, 2CT, 2CF)

16. **dt3** : TEMP 3 Output Delay Time
    Refer to Item 10. (Applicable model: 2PT, 2PF, 2CT, 2CF)

17. **dF3** : Setting TEMP 3 Deviation Temperature
    Refer to Item 11. (Applicable model: 2PT, 2PF, 2CT, 2CF)

18. **tP4** : TEMP 4 Cooling (CoL) and Heating selecting function(HEt)
    Refer to Item 9. (Applicable model: 2PF, 2CF)

19. **dt4** : TEMP 4 Output Delay Time
    Refer to Item 10. (Applicable model: 2PF, 2CF)

20. **dF4** : Setting TEMP 4 Deviation Temperature
    Refer to Item 11. (Applicable model: 2PF, 2CF)

■ Example of Temperature Controller Application

ex1)
What are the temperature and program setting values to turn the Heater OFF at 30.0℃ and ON at 25.0℃ again?
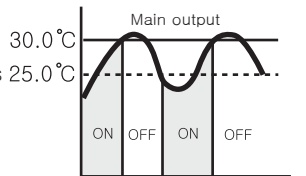
< Temperature Setting >
(Refer to the Temperature Setting Mode.)
Setting: 30.0℃
< Program Setting >
(Refer to the Program Setting Mode.)
tYP : HEt
dS : P (One side deviation, Setting point OFF)
dF : 5.0 (Because the on/off width is 5.0℃.)

ex2)
What are the temperature and program setting values to turn the Cooler OFF at 0.0℃ and ON at 2.0℃ again?
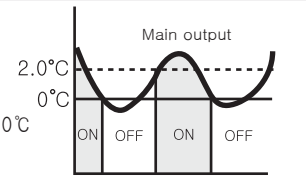
< Temperature Setting >
(Refer to the Temperature Setting Mode.)
Setting : 0.0℃
< Program Setting >
(Refer to the Program Setting Mode.)
tYP : C
dS : P (One side deviation, Setting point OFF)
dF : 2.0(Because the on/off width is 2.0℃.)