



USER MANUAL



\* Thank you for purchasing CONOTEC product. This user manual is provided to prevent product damage by carelessness and to inform the users of exact way of operations. Please keep it well and refer to it when you have any question in using the product. Regarding the English - language manual, please download it at our web-site.

**1 Cautions for safety**

Please read the cautions carefully before using the product and use it correctly.

\* The specifications, sizes and etc., described in this user manual are subject to change without advanced notice to improve the performance.

**WARNING**

- As the product is not manufactured as a safety equipment, make sure to use this product after mounting double safety device when using it for the purpose of controlling a device having risk of personal injury, equipment damage or huge property loss.
- Do not cut the wire or make check-up or maintenance when the power supply is connected.
- Make sure to check the socket number before connecting the power.
- Never disassemble process, improve or repair this equipment.

**CAUTIONS**

- Be well acquainted with way of operation, safety regulations and warnings and make sure to use the product in accordance with the defined specification and within the related capacity.
- Do not connect wiring or make installation with the motors or solenoids having big inductive load.
- In extending the sensor, use the same wire, and do not make it long unnecessarily.
- Do not use the parts to generate arc in opening and closing at the same or nearby power supply.
- Power cable should be kept away from high-voltage cable, and should not be installed in the place of much water, oil or dust.
- Do not install in the place exposed to direct sunlight or rain.
- Do not install in the place exposed to strong magnetism, noise, vibration and impact.
- Keep away from the place where strong alkali or strong acid material is directly discharged.
- Do not spray water directly for cleaning when installing in the kitchen.
- Do not install in the place where the temperature and humidity exceed rated range.
- Use the product not to cut the sensor line or to get flaw on it.
- Sensor line should be kept away from the signal line, power supply, driving power and load line, and independent piping should be used for it.
- This product may not be serviced when disassembled and modified as you like.
- The mark on the wiring diagram is the safety wording for warning or caution.
- Do not use near the devices which emit strong high frequency noise(High frequency welder, high frequency sewing machine, high frequency two-way radio, high capacity SCR controller).
- If the product is used by the way other than defined by the manufacturer, it may cause personal injury or property loss.
- As it is not a toy, keep out of the reach of the children.
- The installation should be done by an expert or a qualified person.
- Our company does not assume any responsibility for the damage and loss caused by non-complying with the above warnings and cautions or through the mistakes of the consumers.

**DANGER**

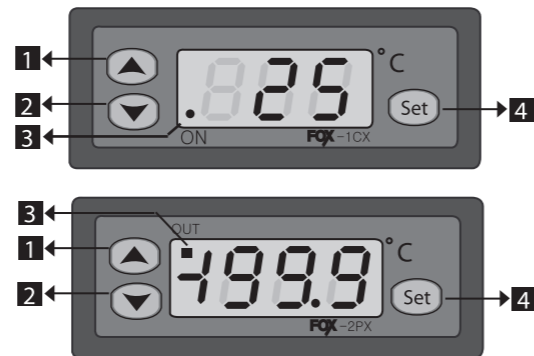
**Cautions, Danger of electric shock**

- Electric shock - Do not touch AC socket while the power is connected. You may get electric shock.
- Make sure to block the input power when you check the power input.

**2 MODELS**

| Model | Sensor | Temp.range         | Size        | Power supply          | Function                  |
|-------|--------|--------------------|-------------|-----------------------|---------------------------|
| 1PX   | PT100Ω | -50°C~400°C        | 77(W)x35(H) | 100~240VAC<br>50/60Hz | Temp.control<br>Relay 10A |
| 1CX   | K(CA)  | -50°C~400°C        | 77(W)x35(H) | 100~240VAC<br>50/60Hz | Temp.control<br>Relay 10A |
| 2PX   | PT100Ω | -199.9°C~<br>400°C | 77(W)x35(H) | 100~240VAC<br>50/60Hz | Temp.control<br>Relay 10A |
| 2CX   | K(CA)  | -50°C~1200°C       | 77(W)x35(H) | 100~240VAC<br>50/60Hz | Temp.control<br>Relay 10A |

**3 Name of each parts**



- Increasing switch
- Decreasing switch
- Output display
- Function change switch

Changing user mode and setting up of installer mode function

• Change of user mode(temperature setting)

Press the set key once, and then, the "SET" blinks.

Change the setting with these keys.

Press set key once again to save the setting.

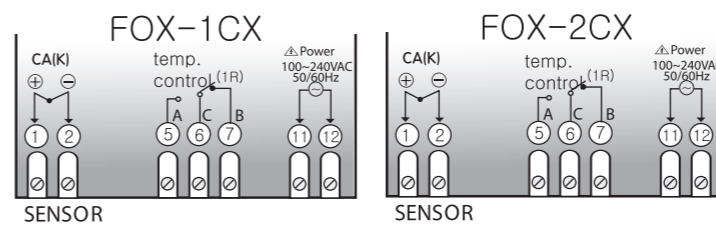
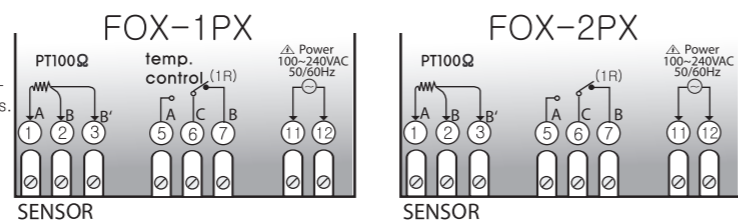
• Setting up of installer mode function.

Press key for more than 5 seconds to set in the order of maximum temperature of user setting, minimum temperature of user setting, C/H selection, delay time, deviation temperature, temperature correction and etc., on the display. The change of mode can be made by keys.

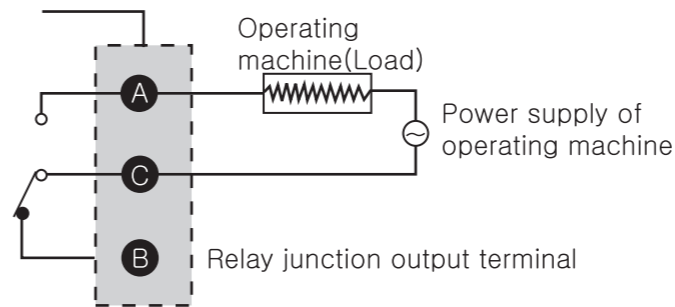
To change to the next mode, press key.

\* After putting all the setting value, message appears, and then, it returns to the current temperature.

**4 Wiring diagram**



**Example of relay connection**



\* The capacity of relay connection is below 250VAC 10A. Be careful as using the load exceeding the capacity of the junction may cause bonding of the junction, contact failure, breakage of the relay and etc.

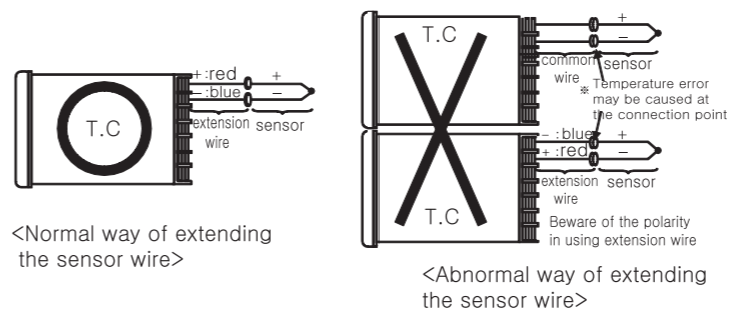
■ Cold junction compensating circuit (for the product with CA sensor)

When thermocouple sensor is connected to the input terminal of the temperature controller, thermal electromotive force proportional to the ambient temperature is generated at the contact point between the input terminal and thermocouple sensor like, which caused error. To prevent this error a cold junction compensating circuit is built-in.

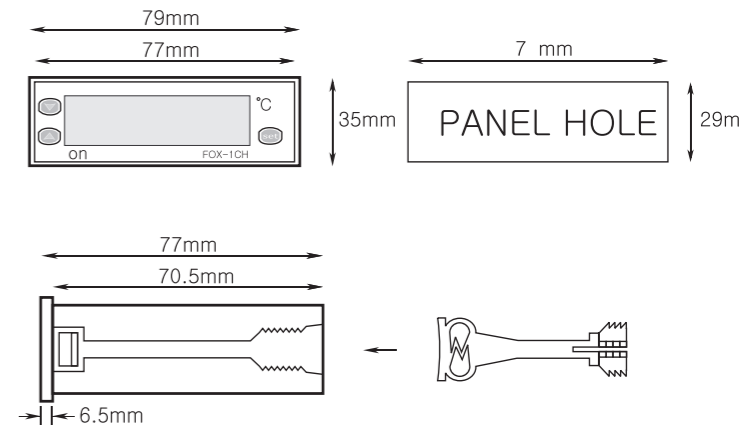
■ Extension wire (for the product with CA sensor)

Extension wire means the wire to extend the sensor line when the distance between the temperature controller and thermocouple sensor becomes long. When the distance between the thermocouple and temperature controller becomes long, it may cause error to extend with common wire as the connection area of thermocouple line and common wiring becomes another thermocouple sensor. To eliminate this error, it is necessary to extend the line with the metal wire of same characteristic as the metal wire of the thermocouple.

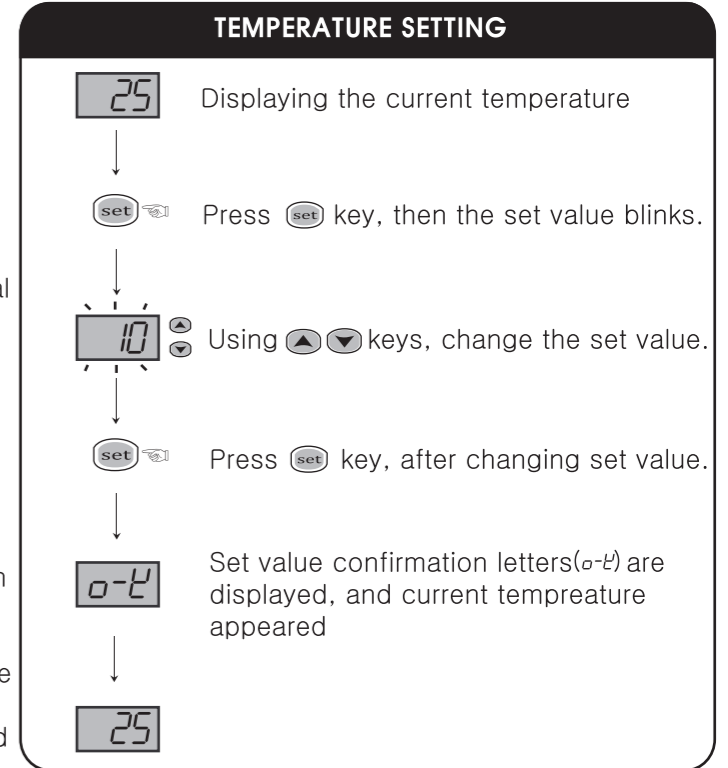
There are red wire indicating + polarity and blue (or white) wire indicating - polarity in the extension wire. Be careful not to connect + and - polarity the other way round in using the extension wire, which causes error.



**5 Product Size and Panel Processing Dimension**



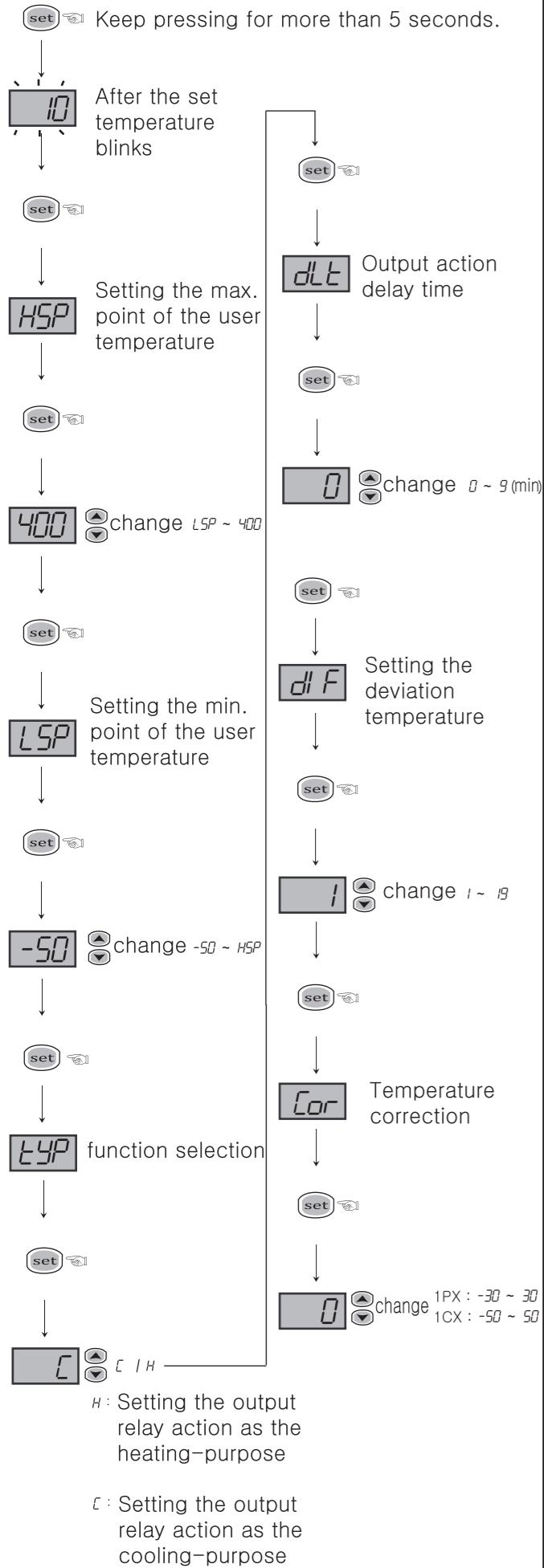
**6 Sequence for temperature setting value setting**



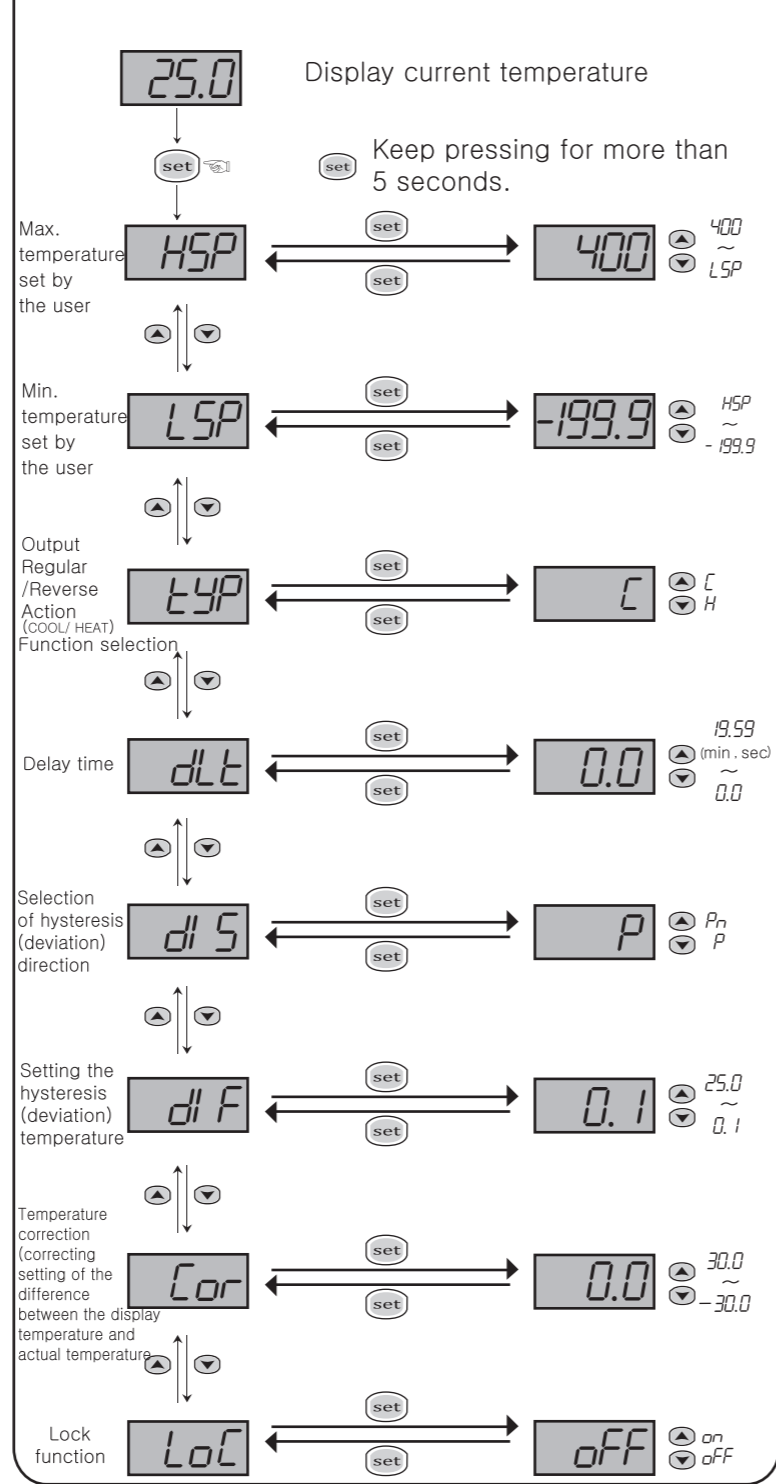
<Display (FND) Letter Table>

|   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| A | B | C | D | E | F | G | H | I | J |
| A | B | C | D | E | F | G | H | I | J |
| U | L | n | n | o | P | q | r | S | t |
| K | L | M | N | O | P | Q | R | S | T |
| U | U | Y | Y | Y | Y | Y | Y | Y | Y |
| U | V | W | X | Y | Z |   |   |   |   |

## Temperature Program Setting 1PX / 1CX



## Temperature Program Setting 2PX / 2CX



### 7 Temperature Range and Set value at the factory

| Function                   | Display | Model     | FOX-1PX | Set value at the factory | FOX-1CX     |
|----------------------------|---------|-----------|---------|--------------------------|-------------|
| Max. temp. set by the user | HSP     | LSP ~     | 400°C   | 400°C                    | LSP ~ 400°C |
| Min. temp. set by the user | LSP     | -50°C ~   | -50°C   | -50°C                    | -50°C ~ HSP |
| C/H selection              | TYP     | C / H     | C       | C                        | C / H       |
| Delay time                 | dLT     | 0 ~ 9 min | 0 min   | 0 min                    | 0 ~ 9 min   |
| Deviation temperature      | dIF     | 1 ~ 19°C  | 1°C     | 1°C                      | 1 ~ 19°C    |
| Temperature correction     | Cor     | ± 30°C    | 0°C     | 0°C                      | ± 50°C      |

※ As the deviation temperature is one side deviation of either + or -, it is turned off at set temperature.

On acts according to the deviation setting.

| Function                   | Display | Model               | FOX-2PX      | Set value at the factory | FOX-2CX             |
|----------------------------|---------|---------------------|--------------|--------------------------|---------------------|
| Max. temp. set by the user | HSP     | LSP ~               | 400°C        | 400°C                    | LSP ~ 400°C         |
| Min. temp. set by the user | LSP     | -199.9°C ~          | -199.9°C     | -50°C                    | -50°C ~ HSP         |
| C/H selection              | TYP     | C / H               | C            | C                        | C / H               |
| Delay time                 | dLT     | 0.00~19.59 min. sec | 0 min 00 sec | 0 min 00 sec             | 0.00~19.59 min. sec |
| Selection way of deviation | dIS     | P / PN              | P            | P                        | P / PN              |
| Deviation temperature      | dIF     | 0.1~25.0°C          | 1.0°C        | 1°C                      | 1 ~ 25°C            |
| Temperature correction     | Cor     | ± 30.0°C            | 0.0°C        | 0°C                      | ± 50°C              |
| Temperature Lock function  | LoC     | ON / OFF            | OFF          | OFF                      | ON / OFF            |

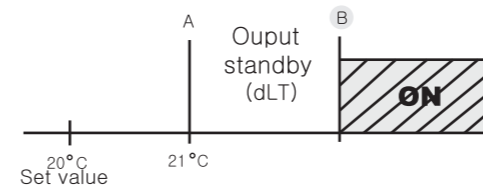
### 8 Detailed description of the function

**HSP** : Setting the maximum point of user setting temperature (Maximum point allowed to the last user). The setting temperature cannot be set above the HSP set value.  
Ex : When setting HSP = 25°C → Setting temperature cannot be above 25°C.

**LSP** : Setting the minimum point of user setting temperature (Minimum point allowed to the last user). The setting temperature cannot be set below the LSP set value.  
Ex : When setting LSP = 10°C → Setting temperature cannot be above 10°C.

**TYP** : Cooling [ C ] and heating [ H ] selection

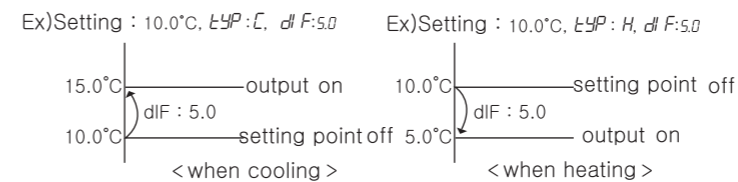
**dLT** : Output delay time  
It is used when there is trouble in the object to be controlled by frequent ON/OFF action (freezer, compressor and etc.) Protecting the machines in operation in case of momentary blackout or power restoration.



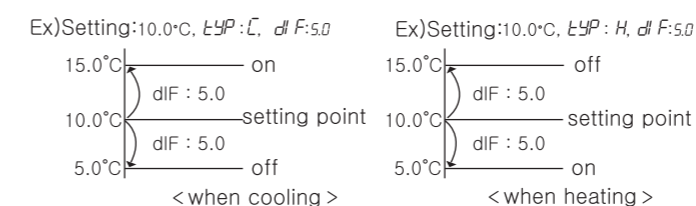
ex) When the set value is 1, the time from A point to B point is dLT set time (1 minute), after which a relay becomes ON at B point. (OUT display lamp blinks during dLT time.)

**dIS** : Selecting way of deviation

**P** Output action : Setting the deviation as + action (OFF at the set point)



**Pn** Output action : Setting the deviation as ± action (based on setting point)



**dIF** : Setting deviation temperature

In ON/OFF control, constant gap between ON and OFF is needed (Setting ON/OFF width)  
In case ON and OFF act too often, the relay and other output contact points can be damaged fast or hunting (oscillation, chattering) caused by external noise.

**Cor** : Current temperature correction function

It is the function to correct errors in the sensor put in from the outside even if there is no problem in the product, and when the base temperature is different with the temperature. (Ex : mercury thermometer, or existing temperature controller) is different with the temperature. ex) Actual temperature : 10°C  
Display window : 12°C

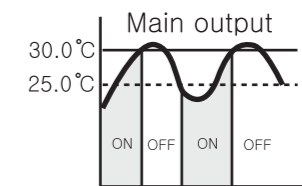
Cor : Correct 0 → -2 → Displayed as 10°C  
(Corrected current temperature)

**LoC** : on: Setting locking function

off: Releasing locking function

### Example of using the temperature controller

ex1) What is the temperature or program setting value to turn off the heater at 30.0°C and turn on at 25.0°C ?



<Temperature setting> (refer to the temperature setting mode)  
Setting : 30.0°C

<Program setting> (refer to the program setting mode)

TYP : HE  
dIS : P (One side deviation, Setting point OFF)  
dIF : 5.0 (on/off width 5.0°C)

### 9 Simple Fault Diagnosis method

- In case of ERROR is displayed during product operation.
- Er 1 is displayed when inside memory cell of various data is damaged by strong noise from outside during the product operation.
- This controller is prepared for the external noise, but cannot endure the noise without limit.
- In case the noise of 2KV or more flows in, the inside of product may be damaged.
- In case of σ-E (open error) or 5-E (short error) is displayed, the sensor has a problem. Check the sensor.

※ The above product specifications are subject to change without advanced notice to improve the performance. Please be well-acquainted with and keep the above mentioned cautions.

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■ Main product and development  
- Digital temp./humid. controller  
- Digital timer, Current/Voltage meter  
- Development of other products.