CONOTEC

CONOTEC CO., LTD.
DIGITAL TEMPERATURE CONTROLLER

ISO 9001:2008

FOX-2005　　　　INSTRUCTION MANUAL

- A user manual for this product is posted on the company website.
- Please download the technical document and communications manual on the company website.

01 Safety precautions

Please read the safety precautions carefully for correct operation of the product.

※ The specifications and dimensions specified in this instruction manual may be changed without any notice for performance enhancement.

⚠ Warning

1. This product was not made as a safe device. Therefore, this product should be attached with dual safety devices if it is used for the control purposes (e.g. a device vulnerable to accident and property damage, etc.).
2. Do not wire, inspect or service this product while the power is being supplied.
3. You must attach this product to a panel. Otherwise, it may cause an electric shock.
4. When connecting the power, you must check the terminal number.
5. Do not ever disassemble, process, modify or repair this product.

⚠ Caution

1. Please make yourself familiar with all the operation instructions, safety precautions and warnings before using this product. Comply with related specifications and capacity requirements
2. Do not wire or install this product to any unit with high inductive load (e.g. motor, solenoid, etc.).
3. Use a shielded cable with a proper length when extending a sensor.
4. Do not use any part that generates an arc when used in the same power or directly switched in close proximity.
5. Keep the power cable away from a high-voltage cable and do not install this product in any place that is full of water, oil and dust.
6. Do not install this product in any place that is exposed to direct sunlight or rain.
7. Do not install this product in any place that is subject to strong magnetic power, noise, vibration or shock.
8. Keep this product away from any place that generates strong alkaline or acid substances. Use a separate pipe.
9. Do not sprinkle water onto this product for cleaning when installing it in the kitchen.

10. Do not install this product in any place where the temperature/humidity ratings are exceeded
11. The sensor cable should not be cut or cracked..
12. Keep the sensor cable away from a signal cable, a power cable or a load cable. Use a separate pipe.
13. Keep in mind that the follow-up service will not be available if this product has been arbitrarily disassembled and modified
14. ! symbol on the terminal wiring diagram indicates a safety statement that alerts a warning or caution.
15. Do not use this product near any device generating strong high-frequency noise (e.g. high-frequency welding machine high-frequency sewing machine, high-frequency radio, large-capacity SCR controller, etc.).
16. Using this product in any method other than those specified by by the manufacturer may lead an injury or a property damage
17. The product is not a toy. Keep it away from children.
18. The product should be installed only by an expert or a qualified person.
19. The company will not be liable for any damage caused by the violation of the above warnings and cautions or by a consumer's fault
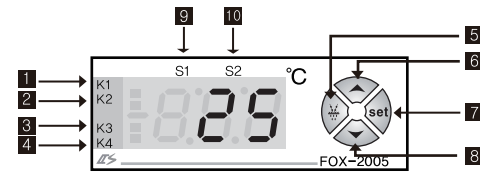
▲ Danger

Caution: Risk of electric shock
- Electric shock － Do not touch the AC terminal while the current is flowing. It may cause an electric shock.
- Disconnect the input power before checking the input power.

02 Model Types

Model	Sensor	Temperature Range	Size
FOX-2005	NTC (10K)	−55.0℃～99.9℃	77mm X 35mm

03 Components

1 Comp Output　2 Fan Output　3 Def Output　4 Alam Output　5 Def Swtich
6 Up Switch　7 Function changes switch　8 Down Switch　9 Indoor Sensor
10 Evaporator Sensor

■ Function of Control Key

1. set : Key for changing each setting value
   To save data, press the set key for more than 2 seconds, or it will save automatically after 10 seconds if no key is pressed

2. ※ : Manual Defrost Key
   Press and hold for more than 4 seconds to activate or deactivate the manual defrost function. (For details, refer to the next page

3. ︿ : Change each setting value data or switch to S2 temperature display mode
   After displaying the S2 temperature, it will automatically switch to the S1 temperature display mode after 5 seconds.

4. ﹀ : Change the data for each setting or the current operation stage of the controller.
   (drE dEL FRn PrE dEF) It displays the data for each setting or the current operation stage of the controller. After 5 seconds, it automatically switches back to the current temperature display mode.
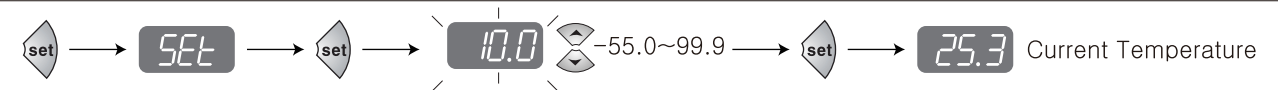
04 Terminal wiring diagram

[FOX-2005]　　　■ Relay Example
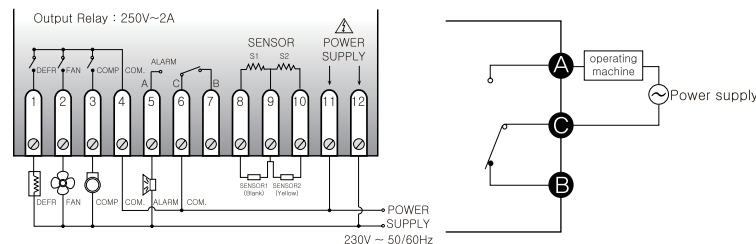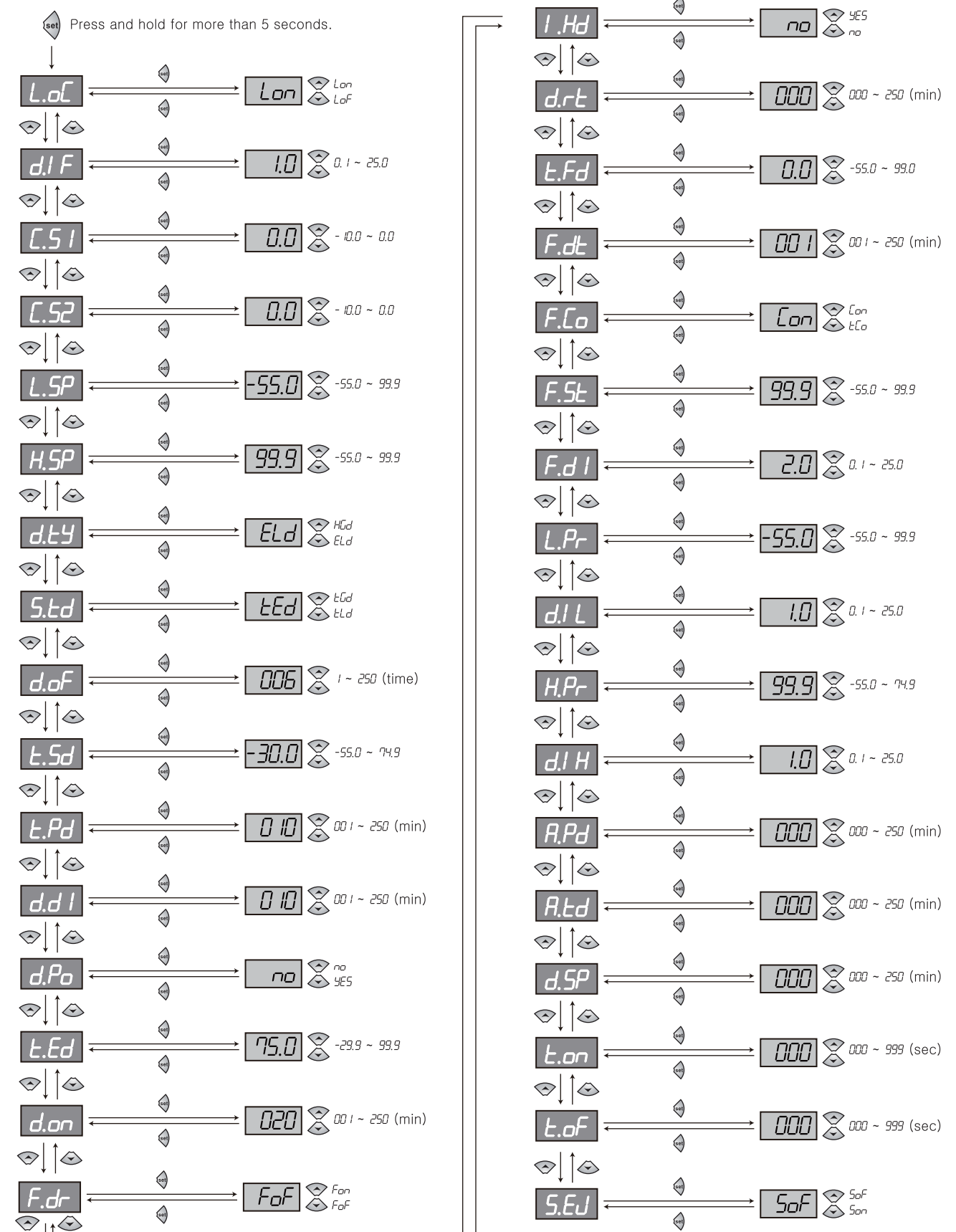

05 Setting process

Temperature Range

set → SEt → ︿﹀ → 10.0 △▽ −55.0~99.9 → set → 25.3 Current Temperature

Program Setting (The Value of each item is the factory setting.)

set Press and hold for more than 5 seconds.

Item	Value	Range
L.oC	Lon	Lon / LoF
d.I F	1.0	0.1 ~ 25.0
C.S1	0.0	-10.0 ~ 0.0
C.S2	0.0	-10.0 ~ 0.0
L.SP	-55.0	-55.0 ~ 99.9
H.SP	99.9	-55.0 ~ 99.9
d.tY	ELd	HGd / ELd
S.td	tEd	tGd / tLd
d.oF	006	1 ~ 250 (time)
t.Sd	-30.0	-55.0 ~ 74.9
t.Pd	010	001 ~ 250 (min)
d.d I	010	001 ~ 250 (min)
d.Po	no	no / yES
t.Ed	75.0	-29.9 ~ 99.9
d.on	020	001 ~ 250 (min)
F.dr	FoF	Fon / FoF

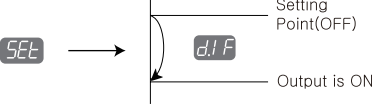| Item	Value	Range
I .Hd	no	yES / no
d.rt	000	000 ~ 250 (min)
t.Fd	0.0	-55.0 ~ 99.0
F.dt	001	001 ~ 250 (min)
F.Co	Con	Con / tCo
F.St	99.9	-55.0 ~ 99.9
F.d I	2.0	0.1 ~ 25.0
L.Pr	-55.0	-55.0 ~ 99.9
d.I L	1.0	0.1 ~ 25.0
H.Pr	99.9	-55.0 ~ 74.9
d.I H	1.0	0.1 ~ 25.0
A.Pd	000	000 ~ 250 (min)
A.td	000	000 ~ 250 (min)
d.SP	000	000 ~ 250 (min)
t.on	000	000 ~ 999 (sec)
t.oF	000	000 ~ 999 (sec)
S.EJ	SoF	SoF / Son

06 Function details

`L.oC` : Setting Data Lock Function

A type of safety feature that prevents anyone other than the primary user from changing various settings

`Lon` When set to this mode – Lock (disable) all settings except the set value.

`LoF` When Set as – Unlock (release) all settings.

`d.I F` : Deviation temperature setting

In ON/OFF control, a certain interval between ON and OFF is required. If this interval is too narrow, hunting (oscillation, chattering) may occur due to external noise or other factors. This device allows for the adjustment of this interval as needed.

```
SEt  ⟶        Setting
              Point(OFF)
        d.I F
              Output is ON
```

`CS1` : Sensor1(S1) – Indoor Sensor Temperature Correction

`CS2` : Sensor2(S2) – Evaporator Sensor Temperature Correction

– Current Temp. Correction : A function that compensates for discrepancies between the actual temperature and the temperature displayed on the device's screen.

Ex) Current Temp. : 23.0 ⟶ `CS1` or `CS2` By using this function, the displayed
Display : 23.5℃   temperature can be adjusted by subtracting 0.5℃.

`L.SP` : User Set Temperature Lower Limit
(Minimum Setpoint Allowed for End User)

`SEt` Value cannot be set below the `L.SP` Setting value

`H.SP` : User Set Temperature Upper Limit (Maximum Setpoint Allowed for End Users)

`SEt` values cannot be set higher than the `H.SP` setting value

`d.tY` : Defrost Method Selection

`ELd` : Electric Defrost → Only the defrost output operates

`HGd` : Hot Gas Defrost → Both defrost output and COMP output operate

`S.td` : Defrost Start Condition – Deciding if the defrost starts based on temperature or time

`t.d` : Defrost Start by Power-On

`tEd` : Defrost Start by Evvaporator Temperature
(`t.Sd` Defrost starts when the set value is below the threshold)

`d.oF` : Defrost cycle interval – Determining the time interval for executing the defrost

– Defrost based on evaporator temperature
→ If the S2 (evaporator sensor) temperature is lower than the `t.Sd` set value, defrost will start

`t.Sd` : Defrost Start Temperature

– Defrost Based on Evaporator Temperature
→ Defrost starts when the evaporator temperature reaches the `t.Sd` set value

`t.Pd` : Pre-temperature Defrost Maximum Waiting Time

As the first defrost after power-on, defrost starts after the set `t.Pd` time, and when the temperature reaches the `t.Sd` set value, defrost begins. If not, it returns to cooling mode.

`d.dI` : Pre-time Defrost Waiting Time

It operates when set to `t.d` with `S.td` The controller remains in cooling mode for the remaining time, which is the `d.dI` set time, before the first defrost starts. After this time elapses, defrost operation begins.

`d.Po` : System Defrost

Upon power supply to the controller, defrost selection

`YES` System defrost operation

`no` System defrost operation disabled

`t.Ed` : Defrost Termination Temperature

If S2 (Evaporator temperature) exceeds the `t.Ed` set value, defrost will terminate.

`d.oC` : Maximum Defrost Duration

Determines the maximum remaining time for defrost. If the defrost does not terminate due to an issue with the S2 evaporator sensor or temperature conditions, it will be terminated based on time

`F.dr` : Deforsting FAN Select

`F.on` → Deforsting FAN Operation / `F.oF` FAN does not operate during defrost

`1.Hd` : Temperature Display Option During Defrost

`YES` : Temp. Display / `no` : Temp. Display Lock

The purpose of this feature is to provide a visual effect by displaying the appropriate temperature instead of the rising indoor temperature caused by defrosting.

※ Appropriate Temperature: The last indoor temperature measured before defrost starts. During defrost, this temperature stays on the display. It updates when the compressor (COMP) runs again.

`d.rt` : Drain Time: Time allowed for water to drain after defrost.

Drain Time: Time for the last water droplets to drain from the evaporator. During this time, all outputs are turned OFF. If the compressor (COMP) needs to turn ON immediately after defrost, set the time to "0".

`t.Fd` : Fan Start Temperature After Drain

This function is necessary to remove the remaining heat from the evaporator after defrost.

`F.dt` : Maximum Fan Delay Time After Drain:

`t.Fd` The maximum time allowed to return to fan operation if the set temperature is not reached or if there is an error with sensor S2.

`F.Co` : FAN Operation Select

`tCo` : When Comp On : FAN → ON, When Comp Off : FAN → OFF

`Con` : During the entire cooling period Fan On

`F.St` : FAN Stopping Temperature

Fan stop due to high temperature at the evaporator (to prevent hot air from entering the room)

`F.dI` : Fan Restart Differential After Stop

Sets the temperature difference for the fan to restart when it was stopped due to the evaporator temperature being higher than the set value.

```
F.St  ⟶        FAN OFF
        F.dI
              FAN ON
```

`L.Pr` : Low Limit Alarm

Alarm ON when the input temperature (S1) is lower than the low limit setting.

`d.IL` : Low Limit Alarm Return Differential

```
L.Pr  ⟶        Alarm OFF
        d.IL
              Alarm ON
```

`H.Pr` : High Limit Alarm

Alarm ON when the input temperature (S1) is higher than the high limit setting.

`d.IH` : High Limit Alarm Return Differential

```
H.Pr  ⟶        Alarm ON
        d.IH
              Alarm OFF
```

`A.Pd` : System Alarm Delay Time

Alarm Suppression Time at Power-On

`A.Pd` After the set time elapses, the alarm operates normally.

`A.td` : Alarm Suppression Time After Drain

This function temporarily suppresses the alarm for a certain period because the temperature rises during defrost.

`d.SP` : System Start Delay Time

At Power-On: During the `d.SP` setting time, the controller operates only for temperature display.

`t.on` : COMP ON Minimum Time – The minimum amount of time the compressor must remain ON.

`t.on` If the compressor remains ON for the set time, it stays ON regardless of temperature changes.

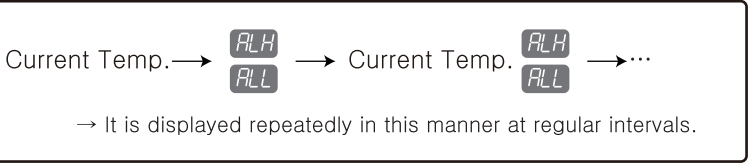`t.oF` : Minimum COMP OFF Time – The minimum amount of time the compressor must remain OFF.

`t.oF` If the compressor remains OFF for the set time, it stays OFF regardless of temperature changes.

`S.EU` : COMP Operation Selection in Case of Room Sensor Error

`S.oF` : COMP OFF In Case of S1 Error

`S.on` : COMP On In Case of S1 Error

■ Display Change During Alarm Operation

```
Current Temp.⟶  ALH  ⟶ Current Temp.  ALH  ⟶ ⋯
               ALL                    ALL

→ It is displayed repeatedly in this manner at regular intervals.
```

`Warning` After an alarm is activated, pressing the `set` key can temporarily disable the alarm output. The temporarily disabled alarm will be reactivated (output ON) if the alarm condition occurs again after being normally cleared by temperature.

`ALH` : High Temperature Alarm
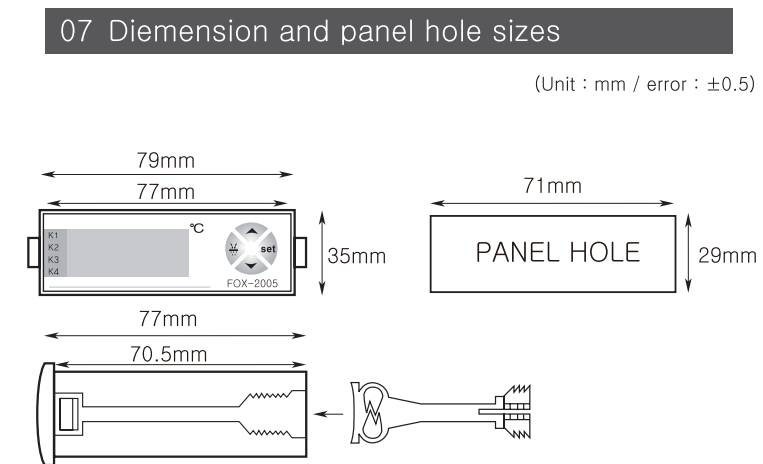
`ALL` : Low Temperature Alarm

■ ❄ Manual Defrost

To start manual defrost, press and hold the ❄ key for more than 4 seconds until `Pr-E` appears on the display. To stop manual defrost during its operation, press and hold the ❄ key for more than 4 seconds until `Pr-E` appears again. This will end the manual defrost process.

■ Controller Operation Status Display

`dr-E` → Initial Delay (Delay time after the controller is powered on before starting operation)

`dEL` → FAN Display(FAN Display after defrosting)

`FAn` → Freezing / `rEF` → Forced Defrost / `Pr-E` → Defrosting / `dEF` → Drain

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07 Diemension and panel hole sizes

(Unit : mm / error : ±0.5)

79mm / 77mm / 35mm
FOX-2005
PANEL HOLE 71mm / 29mm
77mm / 70.5mm

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08 Easy error diagnosis instructions

※ If an error is displayed while the product is running

`Er 1` : It is case where the product was subject to a strong external noise and internal data memories have been damaged In this case, contact us for product service.

Although this controller was designed to withstand a certain level of external noise, it is not supposed to withstand all levels of noise. If the product is subject to a noise greater than 2KV, it could be internally damaged.

`oE1` (Temper. Sensor Open Error), `SE1` (Temper. Shot Error)

`oE2` (Defrosting Sensor Open Error), `SE2` (Defrosting Sensor Shot Error)

If the same character appears repeatedly, it indicates a sensor error. Please check the sensor.