

CONOTEC

CONOTEC CO., LTD.
DIGITAL TEMPERATURE CONTROLLER



FOX-23AF, 2003S

Instruction Manual



FOX-23AF

FOX-2003S

- 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 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.
- You must disconnect the input power when servicing it.

02 Model Types

| Model | Sensor | Controlled output | Temperature range | Functions |
|----------------------------|--------|------------------------|-------------------|--|
| FOX-23AF (Cooler only) | NTC | Relay contact (3EA) | -55.0℃ ~ +99.9℃ | COMP control Defrost control FAN control (5A) |
| FOX-2003S (Cooler only) | | | | COMP control Defrost control FAN control |

03 Components



- 1 COMP OUTPUT DISPLAY
- 2 DEFROST OUTPUT DISPLAY
- 3 FAN OUTPUT DISPLAY
- 4 DEFROST SWITCH
- 5 UP SWITCH
- 6 FUNCTION CHANGE
- 7 DOWN SWITCH

■ User Mode Change (Temperature Setting)

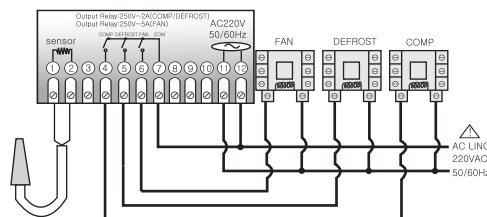
· Changing the main output set temperature

1. Press the button once → The set value will blink and be displayed.
 2. Use the or buttons to increase or decrease the setting value.
- Installer mode function setting

1. : Press and hold the Set button for more than 5 seconds
→ Enters installer mode, and you can change settings using , and buttons.

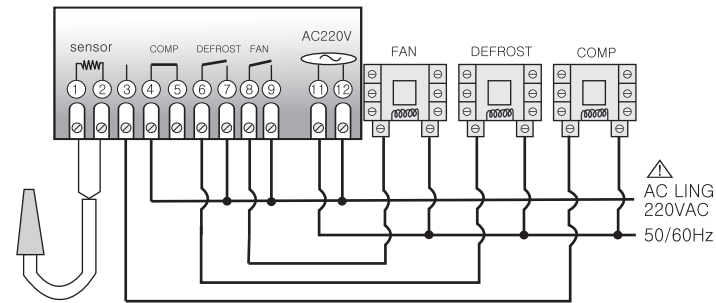
04 Terminal wiring diagram

[FOX-23AF]



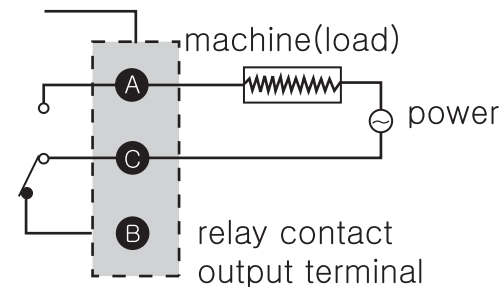
- ✱ Output: COMP/DEFROST relay connection capacity is less than 250VAC 2A.
- ✱ FAN relay connection capacity is less than 250VAC 5A.

[FOX-2003S]



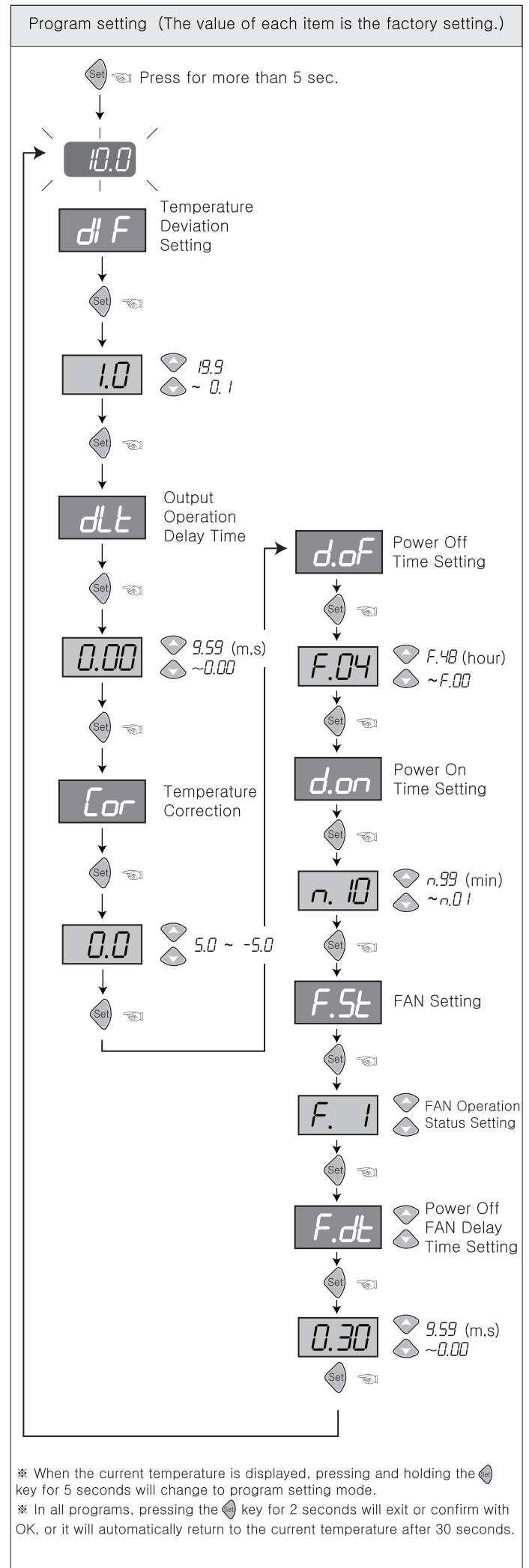
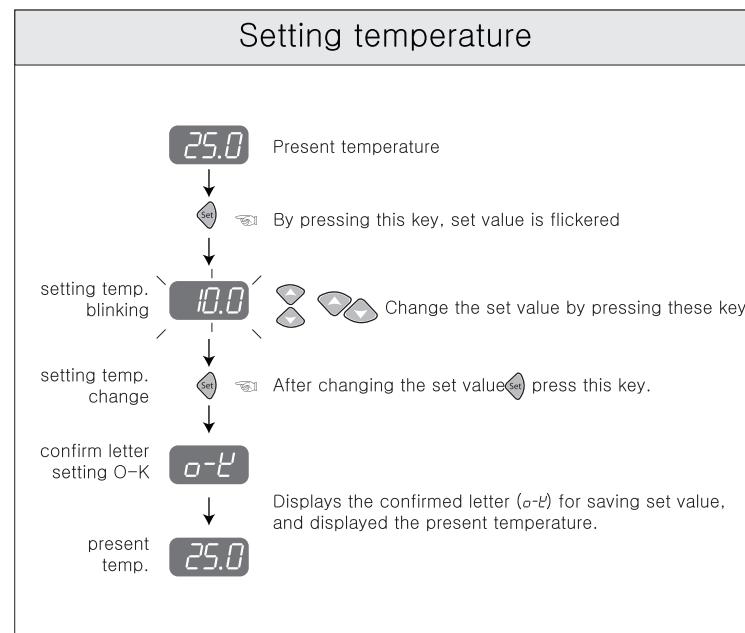
- ✱ Output Notice: If using more than 250VAC 2A, be sure to use a power relay or magnetic contactor.

■ Example of a Relay Access



- ✱ Note that use of load exceeding capacity of contact may cause fusion of contact, poor contact, damage of relay, etc.

05 Setting process



06 Function details

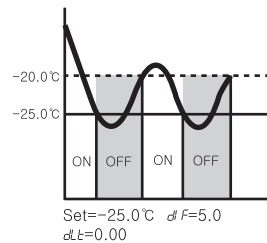
dF : Setting fot temperature deviation

–ON/OFF control requires a certain interval between ON and OFF (ON/OFF width setting)

If ON and OFF are operated too often, relay or other
–The output contact point is quickly damaged or hunting (power generation phenomenon, chattering) occurs due to external noise.

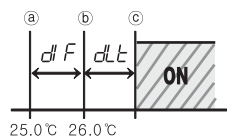
–To prevent this phenomenon, setting and using the deviation Temp is a function to protect the contact point of the device.

- Current Temp > Set Temp + Diff
→ Output **on**
- Current Temp ≤ Set Temp
→ Output **off**



dLt : Output Delay Time

- It is widely used as the followings in case of operating the ON/OFF control very often, (Cooler, Compressor and so on)
- To protect the operation machinery when re-input of the power supply or momentary stoppage of power supply.



EX) Set temperature: 25.0°C, dLt setting value: 1 minute 30 seconds, dF setting value: 1.0°C. When does the output turn ON?
=> When the current temperature rises and exceeds point B at 26.0°C, the relay turns ON at point C after the dLt delay time of 1 minute 30 seconds. The output delay time starts from point B, not point A, because the dF (hysteresis) interval is set to 1.0°C.

Cor : Current Temperature Calibration Function

– A function that calibrates the temperature when there is no issue with the product itself, but the sensor input shows errors or temperature differences compared to the reference temperature (e.g., mercury thermometer or previously used thermometer/temperature controller).

EX) Actual temperature: 10.0°C → **Cor** 0.0 to -2.0 Correction
Display window: 12.0°C → Displayed as 10.0°C (Corrected present temp)

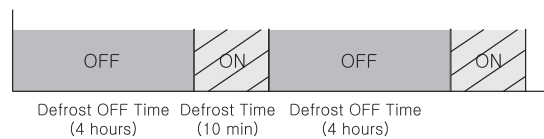
d.oF : Defrost OFF Time Setting

- Setting range: **F.00 ~ F.40** hours
- Defrost occurs when the defrost cycle time is reached.

d.on : Defrost ON Time Setting

- Defrost range: **n01 ~ n99** minutes
- Defrost occurs when the defrost cycle time is reached.

EX) **d.oF** : **F.04** (4hr), **d.on** : **n.10** (10min) setting



※ Defrost operates for 10 minutes every 4 hours repeatedly.

F.5t : Fan Operation Setting (**F.1 ~ F.4**)

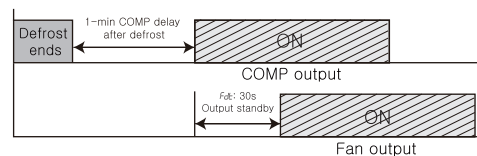
| | | COMP ON | COMP OFF | Defrost ON |
|------------------|----|---------|----------|------------|
| Fan Operation | F1 | Fan ON | Fan OFF | |
| | F2 | Fan ON | | |
| | F3 | Fan ON | Fan OFF | Fan ON |
| | F4 | Fan ON | | Fan OFF |

※ Manual Defrost Setting Method

1. Manual Defrost ON : Press and hold the key for more than 3 seconds. The K2 LED will light up, manual defrost will start, and the display will alternate between and the remaining defrost time.
2. Manual Defrost OFF : While manual defrost is ON, press and hold the 0 key again for 3 seconds to turn it OFF, or it will automatically end after the **d.on** time elapses.

FdLt : Defrost Fan ON Delay Time

- Setting range: **0.00 ~ 9.99** (minutes, seconds)
- EX) **FdLt** : **0.30** (30s)



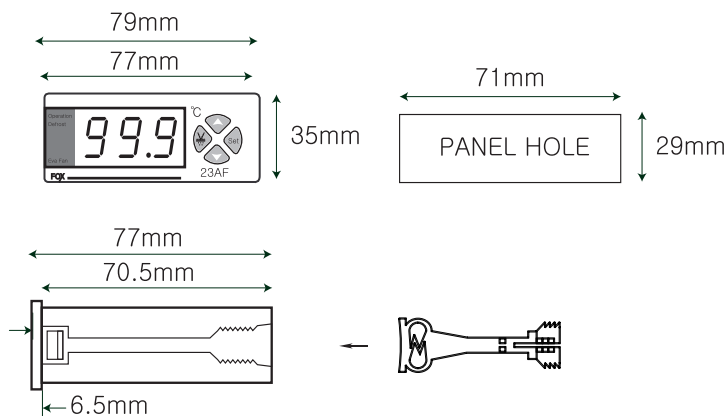
07 Model & output spec

| | 2001 (Sensor : 1EA) | 2001D (Sensor : 1EA) | 2001T (Sensor : 1EA) | 2001F (Sensor : 1EA) | 2000TT (Sensor : 1EA) |
|--------------|------------------------|-------------------------|-------------------------|-------------------------|--|
| Temp. output | one-stage output | two-stage output | three-stage output | four-stage output | Control by the temperature & time (for greenhouse) |

| | 2001 (sensor : 1EA) | 2002 (sensor : 1EA) | 2003 2003S (sensor : 1EA) | 2004 (sensor : 2EA) | 2005 (sensor : 2EA) | 2006 (sensor : 2EA) | |
|----------------|------------------------|------------------------|---------------------------------|------------------------|------------------------|------------------------|-------------|
| Temp.output | ○ | ○ | ○ | ○ | ○ | Temp.1 ○ | Temp.2 ○ |
| Alarm.output | – | ○ | – | – | ○ | Alarm1 ○ | Alarm2 ○ |
| Defrost.output | – | – | ○ | ○ | ○ | – | |
| FAN.output | – | – | ○ | ○ | ○ | – | |

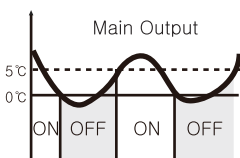
08 Diemension and panel hole sizes

(Unit : mm / error : ±0.5)



■ Example of Temperature Controller Use

Turn OFF the cooler at 0°C and restart it at 5°C, with defrost output activating for 10 minutes every 4 hours. The fan turns ON when COMP is ON, and turns OFF when COMP is OFF or during defrost. What are the appropriate setting values?



Temp. Setting (Refer to Temperature Setting Mode)

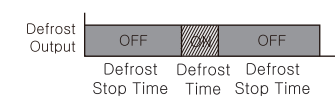
Setting : 0°C

Program Setting (Refer to Program Setting Mode)

tYP : **CoL**

d15 : **P** (One-sided deviation, OFF at set point)

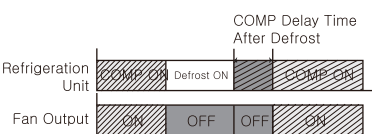
d1F : **5** (ON/OFF range is 2°C)



Defrost Setting

doF : **F04** (Defrost Stop Time : 4hr)

d1F : **n10** (Defrost Time : 10min)



FAN Setting

F5t : **F1**

COMP ON : Fan Output ON

COMP OFF/During Defrost

: Fan Output OFF

09 Easy error diagnosis instructions

※ If an error is displayed while the product is running

- **E-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.

- If **0-E** (open error) or **5-E** (short error) is displayed, there is something wrong with a sensor. Please check the sensor.

※ The above specifications may be changed without any notice for performance enhancement. Please make yourself fully familiar with and follow the above precautions.

■ Warranty period: One year from the date of purchase

■ Address : (Street address) 56, Ballyongsandan 1-rp, Jangnan-eup, Gijang-gun, Busan, ROK
(Land-lot address) 901-1, Ballyong-ri, Jangnan-eup, Gijang-gun, Busan, ROK (46034)

- Product service : 070-7815-8289
- Customer service : 051-819-0425 ~ 0427
- FAX : 051-819-4562
- Email : overseas-sales@conotec.co.kr
- SNS : Facebook, Instagram, Twitter, YouTube ▶ 'Search for 'Conotec'
- Website : www.conotec.co.kr

◆ Installation precautions

■ This device should be connected to a protective earth terminal and a power supply in order to prevent an electric shock.

■ Do not block the air outlet.

◆ Operation precautions

※ An operating environment of this device is as follows.

■ Ambient temperature : 0 ~ 60°C ■ Ambient humidity : 80%RH or less

■ Indoor uses only ■ Pollution class 2

■ Altitude under 2000m ■ Installation category : II

■ This device should be laid out in a way that its power cord is easy to handle.

■ Using this product in any method other than those specified by the manufacturer may damage its protection function

■ Major products and development

- Temperature/humidity controller
- Counter and timer controller
- Current and voltage panel meter
- Temperature/humidity indicator
- Oven controller
- CO2 controller
- PID controller
- Unit cooler controller
- Heat pump controller
- Chiller controller
- Thermo-hygrostat controller
- Short message alarm
- Temperature/humidity transmitter
- Smartphone app and monitoring system

※ This manual was prepared in the Naver Nanum fonts.