ISO 9001:2008

CONOTEC® Digital Temperature Controller

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

FOX-2003SS

1 Cautions for Safety

Read carefully this instruction manual before use and use the product properly.
※ The specifications, appearance and dimension may be changed for improvement of performance without a prior notice

WARNING

1. This product is not made as a safety device, so when it is used for a control of devices feared to cause casualties, damages to the peripheral devices or huge property loss, the double safety devices should be arranged before use.
2. Avoid connecting lines, checking and repairing the products while power is supplied.
3. Connect power after making sure the terminal number.
4. Never disassemble modify, improve or repair the product.

CAUTIONS

- Be well-informed of how to use, safety regulations, warnings, etc before installation of this device and apply it to the extent of the defined specifications and relevant capacity without fail.
- Avoid wiring or installation to a motor or solenoid with a large inductive load.
- Use a shiled cable for extention of the sensor and ensure not to make it longer than the necessity.
- Ensure not to use the parts generating arc when switching at the same power source or near to it.
- Keep the power cable away from a high-tention power line and ensure not to install it at a place with serious oil and dirt.
- Avoid strong magnetic field or serious noise, vibration or impact.
- Keep away from the place where strong alkaline or acid material is directly released and use an independent pipe line.
- When it is installed at kitchen, ensure not to pour water directly over the product for cleaning.
- Keep the sensor cable away from signal line, power source, power line or loaded line and use an independent pipe line.
- Note that the mark of ⚠ in terminal connection diagram is the safety expression for warnings or cautions.
- Avoid using the product close to the device generating noises(high frequency welder, high frequency sewing machine, high frequency radio, large capacity SCR Controller, etc).
- The use in any way other than what is instructed by the manufacturer may cause injury or property loss.
- It is not a toy and keep it out of reach of children's hand.
- The installation of the device should be performed by an expert or a qualified personnel without fail.
- We shall not take any responsibility for the damage caused by non-compliance with the above-mentioned warnings or cautions or by any consumer's mistake.

⚠ DANGER

Attention, Danger related to electric shock

Electric shock –Do not touch AC terminal during application of electric current. It may cause electric shock.
Cut the power supply without fail during checking the input power.

2 Model

Model	Sensor	Controlled output	Temp. Range	Functions
FOX-2003SS (Cooling only)	NTC	Relay contact	℃ : −55.0℃ ~ +99.9℃ °F : −67 °F ~ 212°F	COMP control Defrost control FAN control

3 Name of parts

■ External shpae & each name of part

1 COMP Output display
2 Defrost Output display
3 FAN Output display
4 Defrost switch
5 UP switch
6 Function changing switch
7 Down switch

User's mode changing(Temperature setting)
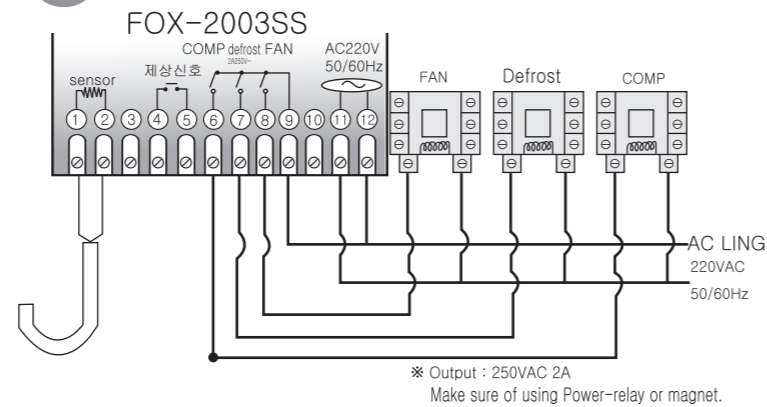How to change the setting temp. for Main output
[Set] If press it once, the setting value is flickered.
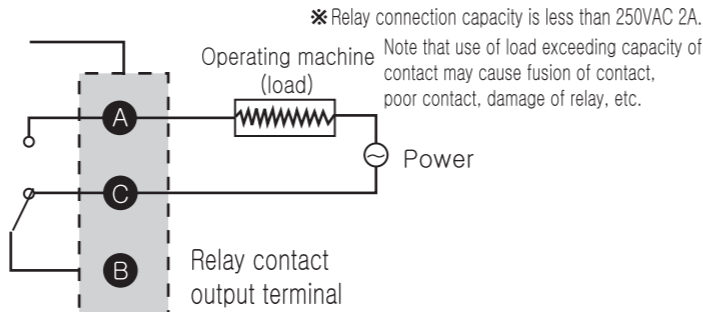[▲] or [▼] the value can be UP & DOWN with this key.
Mode setting for user
[Set] A key to enter to installer mode if press for [Set][▲][▼] more than 5 sec. change with these keys.
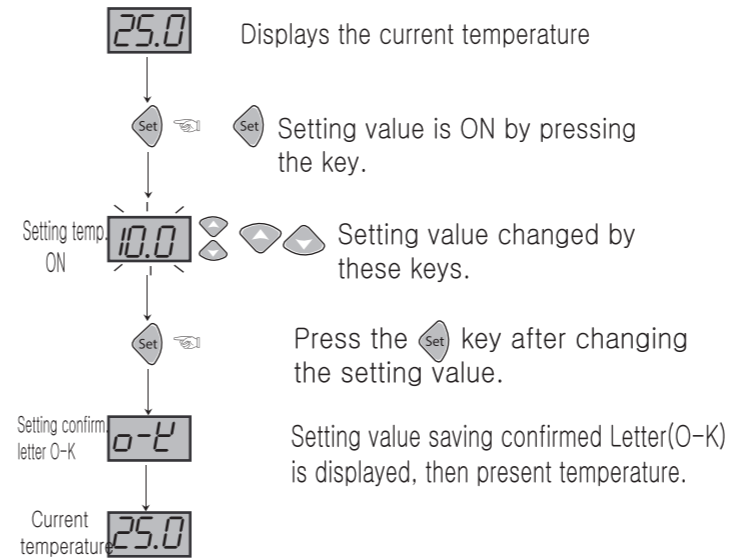
4 Terminal connection diagram

FOX-2003SS

※ Output : 250VAC 2A
Make sure of using Power–relay or magnet.

Example for connection of relay

※ Relay connection capacity is less than 250VAC 2A.
Note that use of load exceeding capacity of contact may cause fusion of contact, poor contact, damage of relay, etc.

Operating machine (load)

Power

Relay contact output terminal

5 SEQ to change the setting value

Temperature setting

`25.0` Displays the current temperature

Setting value is ON by pressing the key.

Setting temp. ON `10.0` Setting value changed by these keys.

Press the [Set] key after changing the setting value.

Setting confirm letter O-K `o-L` Setting value saving confirmed Letter(O-K) is displayed, then present temperature.

Current temperature `25.0`

6 Detailed manual

`Unt` : Display unit change
℃ : Display in Celcius   F : Display in Fahrenheit

Cautious : Please re-set all setting values to all setting values except for Unit are returned to the value for ex-factory if you change the unit in operation.
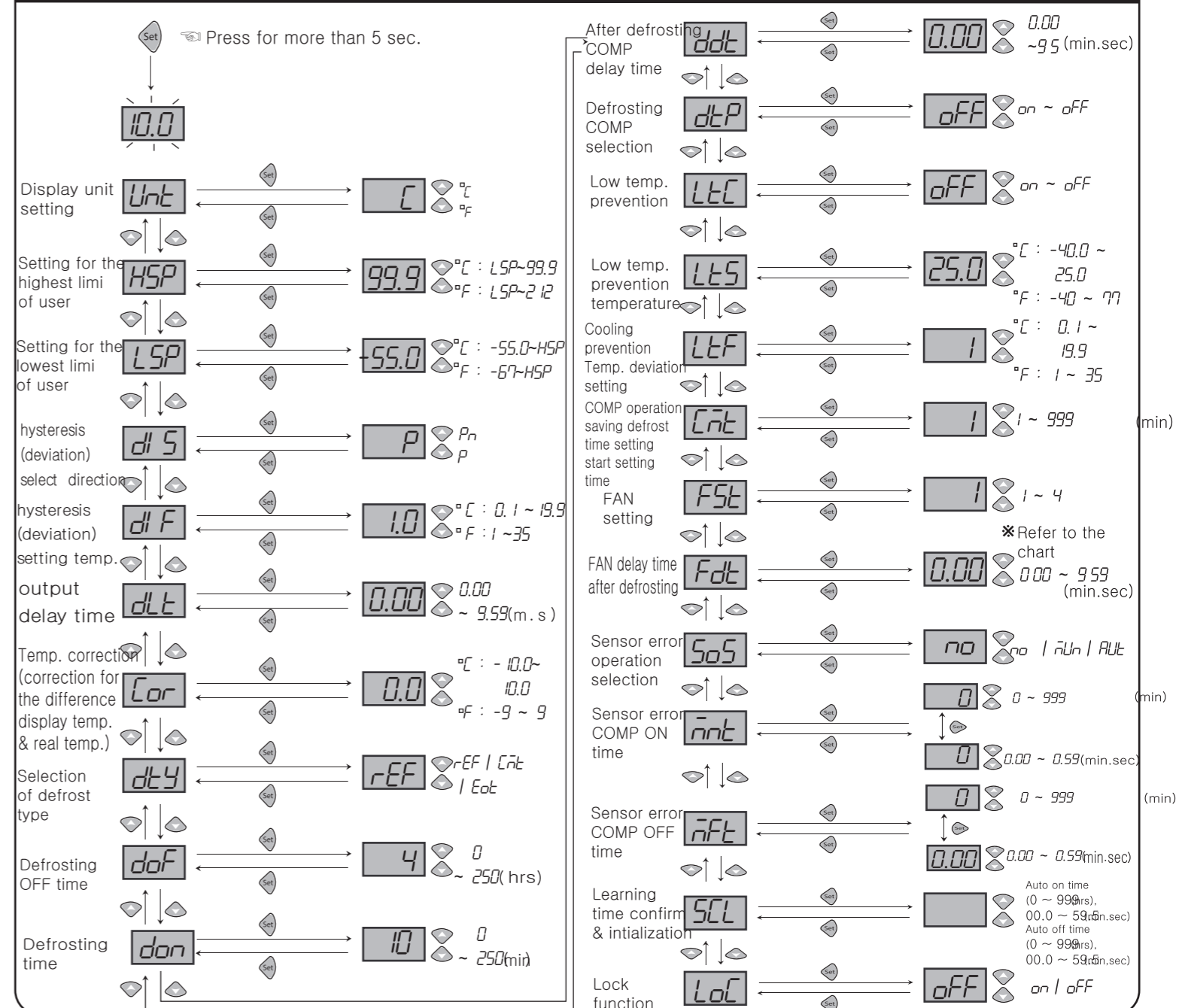
In case of changing to Celcius : temp. setting=10.0 hsp99.9 lSP–55.0 DIF1.0
Its =25.0 cor0

In case of changing to Fahrenheit : temp. setting=50 hsp212 lSP–67 DIF1
Its =77 cor=0

`HSP` : Setting for the highest limit of user's setting temperature. (Maximum set point allowed to the end user)
Impossible to set up the set value more than
ex) HSP =when setting to 25.0℃ →
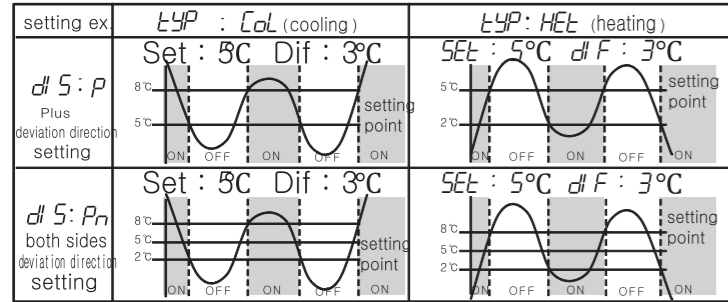Impossible to set higher than 25.0℃

`LSP` : Setting for the lowest limit of user's setting temperature. (Minimum set point allowed to the end user)
Impossible to set up the set value less than
ex)LSP = when setting to 10.0°C
Impossible to set up the set value less than   10.0°C
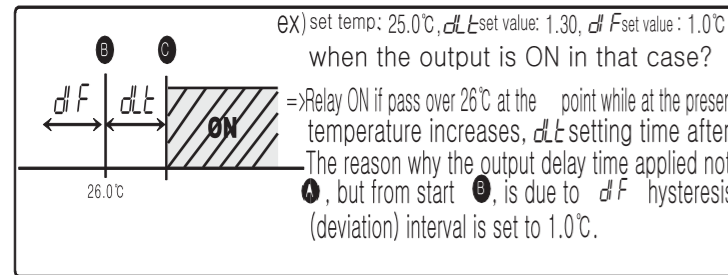
Temperature program setting

[Set] Press for more than 5 sec.

`10.0`

Display unit setting	`Unt`	`C` ℃ °F
Setting for the highest limi of user	`HSP`	`99.9` ℃ : LSP–99.9 °F : LSP–212
Setting for the lowest limi of user	`LSP`	`-55.0` ℃ : −55.0–HSP °F : −67–HSP
hysteresis (deviation) select direction	`di S`	`P` Pn P
hysteresis (deviation) setting temp.	`di F`	`1.0` ℃ : 0.1 ~ 19.9 °F : 1 ~35
output delay time	`dLt`	`0.00` 0.00 ~ 9.59(m.s)
Temp. correction (correction for the difference display temp. & real temp.)	`Cor`	`0.0` ℃ : −10.0~ 10.0 °F : −9 ~ 9
Selection of defrost type	`dtY`	`rEF` rEF丨Cnt 丨Eot
Defrosting OFF time	`doF`	`4` 0 ~ 250(hrs)
Defrosting time	`don`	`10` 0 ~ 250(min)

After defrosting COMP delay time	`ddt`	`0.00` 0.00 ~9.59 (min.sec)
Defrosting COMP selection	`dtP`	`oFF` on ~ oFF
Low temp. prevention	`LtC`	`oFF` on ~ oFF
Low temp. prevention temperature	`LtS`	`25.0` ℃ : −40.0 ~ 25.0 °F : −40 ~ 77
Cooling prevention Temp. deviation setting	`LtF`	`1` ℃ : 0.1 ~ 19.9 °F : 1 ~ 35
COMP operation saving defrost time setting start setting time	`Cnt`	`1` 1 ~ 999 (min)
FAN setting	`FSt`	`1` 1 ~ 4
FAN delay time after defrosting	`Fdt`	`0.00` 0.00 ~ 9.59 (min.sec)
Sensor error operation selection	`SoS`	`no` no丨run丨AUt
Sensor error COMP ON time	`nnt`	`0` 0 ~ 999 (min) 0.00 ~ 0.59(min.sec)
Sensor error COMP OFF time	`nFt`	`0` 0 ~ 999 (min) 0.00 ~ 0.59(min.sec)
Learning time confirm & intialization	`SCL`	`0.00` Auto on time (0 ~ 999hrs). 00.0 ~ 59.9(min.sec) Auto off time (0 ~ 999hrs). 00.0 ~ 59.9(min.sec)
Lock function	`LoC`	`oFF` on丨oFF

※Refer to the chart

dl S : Selection for the hysteresis application direction(deviation)

　　P : deviation value(DIF) applied (+) direction only(OFF in the setting point)

　　Pn : deviation value(DIF) applied (±) direction(setting point basis)

dl F : Setting for temperature deviation

In the ON/OFF control, it needs at regular intervals between ON and OFF. If ON/OFF operation is activated frequently, the relay or output contact can be damaging quickly and it occurs the hunting(oscillating, chattering) by virtue of external noise, and so on. To prevent these happenings, you can set up the temperature deviation in order to protect its relay or contact and so on.

setting ex	**tYP : CoL** (cooling)	**tYP : HEt** (heating)
dl S : P Plus deviation direction setting	Set : 5C Dif : 3C	SEt : 5°C dl F : 3°C
dl S : Pn both sides deviation direction setting	Set : 5C Dif : 3°C	SEt : 5°C dl F : 3°C

dLt : Delay time of the output

In case of operating the ON/OFF control very often.(cooler, compressor ,etc) To protec the operation machinery when re-input of the power supply or momentary stoppage of power supply

ex) set temp: 25.0℃, **dLt** set value: 1.30, **dl F** set value : 1.0℃

when the output is ON in that case?

=>Relay ON if pass over 26℃ at the ⒸＳpoint while at the present temperature increases, **dLt** setting time after The reason why the output delay time applied not Ⓐ, but from start Ⓑ, is due to **dl F** hysteresis (deviation) interval is set to 1.0℃.

Cor Correction of the present temp.

The product itself has no problem, but the correction functioned for that if temp. differs between an error occurs in the input sensor from outside and basic temp.

ex)real temp. : 25.0 C
display : 28.0℃
if 3℃ differs from the real temp.

Cor : 0.0 → -3.0 if changing like this screen shown in 25.0℃

dtY : Defrost type selection

　rEF : Cycling defrost
　　doF in setting time, defrost OFF→**don** Defrost ON in setting time

　CmP : COMP operation time defrost
　　If COMP operating time is saved more than **Cnt** setting time, defrst during **don** setting time, (After defrosting, COMP saving time is initialized automatically)

　Eot : External signal defrost
　　By an external signal to defrost, if an external signal is approved, defrost during **don** setting time.

doF : Defrost OFF time

Setting range is 0 ~ 250t

At the cycle of defrost, starts to defrost.

don : Defrost ON time

Setting range is 0 ~ 250　min.

At the cycle of defrost, starts to defrost.

OFF	∅N	OFF	∅N

Defrost OFF time | defrost time | Defrost OFF time

(4hours)　　(10min)　　(4hours)
Every 4 hours, 10 minutes defrost operation is repeated.

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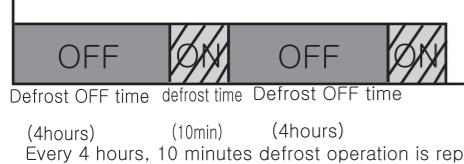
ddt : After defrost, COMP delay time

Setting Range　0.0 ~ 9.59　　(min,sec)

After defrosted, COMP outputs ON since delay as time as setting

ex) **ddt** : In case of　(1min)

defrost OFF　　COMP output

dtP : when defrost COMP selection

　on : When defrost, COMP ON　**oFF** : When deforst, COMP OFF

LtC : Low temperature ckeck

　oFF : Low temperature check system OFF
　on : Low temperature check system ON
　(**LtC** if less than set value, defrost output ON)

LtS : Low temperature setting

　LtC is **on**, if current temp. is less than **LtS** setting defrost, output **on**

LtF : Low temperature check deviation setting

0.7	OFF

present temp.　　LTC　　LTC+LTF

Cnt : **dtY** defrost type setting is limited as CMT only, if COMP operation saving time is more than setting time, operates ON during **don** setting time.

FSt :Fan setting(1 ~ 4) Refer to the program setting

※Chart

	COMP ON	COMP OFF	DEFROST
F 1	ON	OFF	OFF
F2	ON	ON	ON
F3	ON	OFF	ON
F4	ON	ON	OFF

How to set manual defrost
1. Manual defrost ON : ◁ if press the key for more than 3 sec., K2LED lights on, and starts to defrost manually, then displays on the screen this. **non** and defrost resting time alternately.
2. Manual defrost OFF if press for 3 sec. in ON state, ◁ press this key again, it turns OFF. Or, after **don** turns off automatically.

Fdt :After Defrost, FAN ON delay time

Setting range : 0.00 ~ 9.50(min.sec)

ex) **Fdt** : 0.30(30sec)

Defrost OFF　　COMP OUTPUT

FAN OUTPUT

SoS : Sensor error operation selection

　no : All operations OFF
　Aut : Cycling by MFT(COM OFF), MNT(COM ON)
　Aut : AUTO Learning time operation

mnt : When sensor errors, COMP ON time

　SoS operates when setting as

nFt : When sensor errors, COMP OFF time
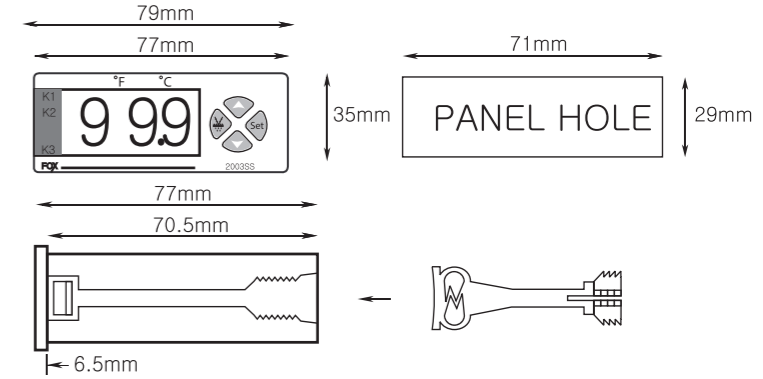
　SOS operates when seeting as **MUN**

SCL : Learning time confirmation & initialization

ON learning time confirms: SCL menu select —**SET** Key

UP Key input(000min)→UP Key input(00sec)

OFF earning time confirms : SCL menu select —**SET** Key input

DOWN Key input(000min)→DOWN Key input(00sec)

Learning time initialization : SCL menu select → Key input → defrost

If Key inputs DEL display then initialized

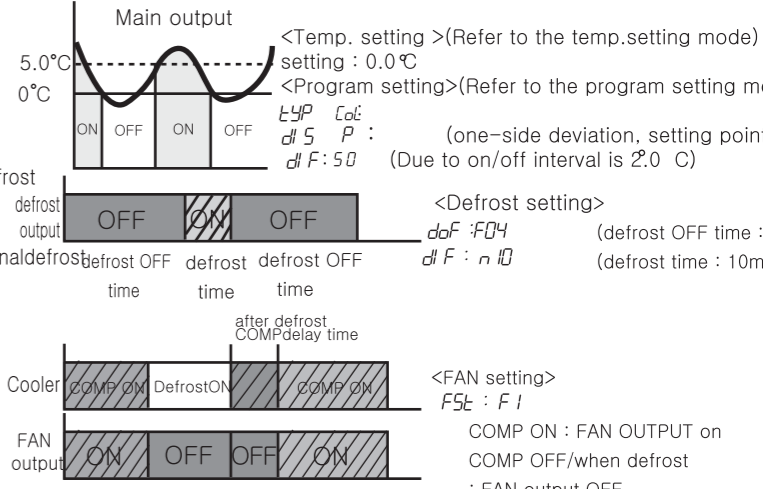**LoC** : Program Lock func. setting

　on : Program Lock
　oFF : Program Unlock

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8 External size & panel size

79mm / 77mm / 71mm / 35mm / 29mm / PANEL HOLE / 77mm / 70.5mm / 6.5mm

■ Example of using the temperature controller

* Cooler -> turn off at 0.0 C, turn on at 5.0 C, defrost output for 10 minutes every 4 hour

* FAN -> turn on while COMP output, turn off while COMP OFF and defrosting

How to operate (setting for the temperature & programs) ?

<Temp. setting >(Refer to the temp.setting mode)
<Program setting>(Refer to the program setting mode)

tYP CoL
dl S P (one-side deviation, setting point OFF)
dl F :50 (Due to on/off interval is 2.0 C)

<Defrost setting>
doF :F04 (defrost OFF time : 4hrs)
dl F : n10 (defrost time : 10min)

Cooler / FAN output

<FAN setting>
FSt : F1
COMP ON : FAN OUTPUT on
COMP OFF/when defrost
: FAN output OFF

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9 How to diagnose a breakdown

• Indicating ERROR on using items

• This **Er l** is the damage of memory data for various of inner-DATA due to be got nosied strongly from outside while using this items. Please request us A/S by return. Although our controller is designed as the complementary measures regarding these noise from outside, it is not endurable against these noise with endlessly.

• If noise(2KV) disordering become an inflow, the inner-part will be damaged.

• When shows these letter **o-E** (open error), **S-E** (short error) error in sensor. Please check sensor.

MEMO