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# CONOTEC® Digital Temperature Controller

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

FOX-300SERIES

# Operating Manual

Thank you very much for selecting our products.

## 1 Caution for your safety

Please read this instruction carefully before using this controller

※ The manual's information & specification can changeable to improve its quality without any notification.

### ⚠ Safety

1. Pls use this item after installing the duplex safety device in which is applied at dangerous factors such as serious human injury or serious damages of property & important machine because this item is not designed as a safety device.
2. Do not checking or repairing when it is power on.
3. Please check the terminal number before connecting power supply.
4. Do not disassemble or open, remodel, repair without any permission.

### ⚠ Safety Instruction and Hazard Warnings

- Please read the operating manual through completely before putting the device into operation.
- We will not assume any responsibility for damage to assets or persons caused by improper handling or failure to observe the safety instructions or hazard warnings.
- For safety and licensing reasons, unauthorized conversion and/or modification of the device is not permitted.
- Do not exceed the maximum permissible current – in case of higher loads, use a contactor of adequate power. Make sure that the supplied voltage matches the values specified for the instrument.
- The device must be adequately protected from water and dust as per the application and must be accessible via the use of appropriate tools
- The device must not be exposed to extreme temperature, sunlight, strong vibrations or high levels of humidity.
- Operation or installation is not permitted under unfavorable ambient conditions such as wetness or excessive induction loads or solenoid and dust, combustible gases, vapors or solvents, especially high-frequency noise
- Avoid operation or installation close to high-frequency fields such as welding devices, sewing machines, wireless transmitter, radio systems, SCR controller, etc
- Do not install the sensor cable nearby signal cable, power cable, load cable
- Please use the shield cable when the sensor cable's lengthen, however do not make it too much longer.
- Please use the sensor cable without any cutting or flaw, blemish.
- The device is not a toy and should be kept away from children.
- Installation work must only be carried out by suitably qualified personnel who are familiar with the hazards involved and with the relevant regulations.
- You shouldn't tinker with anything or the product may not be opened or disassembled unless you know what you're doing. Please ask us about this questioning.

### ⚠ Danger

■ Caution, Danger of Electric Shock

1. Electric shock – Do not contact AC terminal during the current carrying. Electric shock can occur.
2. In case of checking the input power, it should be disconnected without fail.

## 2 Composition

| Model | Sensor | Range | Size | Function |
|---|---|---|---|---|
| FOX-300-2S | SH-104 | -29.0 ~ 99.9℃<br>0.0 ~ 99.9% | W72 X H72mm | temp.,humi.control |
| FOX-300A-1 | HCPV-220NH | -40.0 ~ 65.0℃<br>10 ~ 95% | W72 X H72mm | temp.control<br>humi.control |
| FOX-300AR1 | | | | temp.,humi.control<br>RS485communication |
| FOX-300JB-1 | | | W194X H241mm | temp.control<br>humi.control |
| FOX-300JR1 | | | | temp.,humi.control<br>RS485 communication |
| FOX-8300R1 | | | W94 X H150mm | temp.,humi.control<br>RS485 communication |

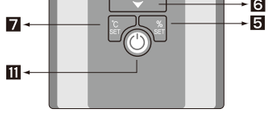
※300 series

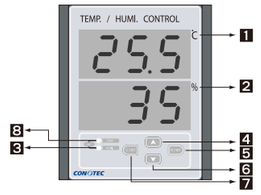
Temp./humi. range can be changed to -55.0°C ~ 99.9 C / 10~95% if using

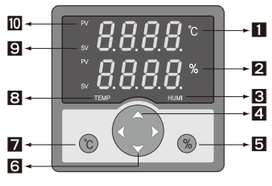
Temp. sensor : FS-200N(NTC 10K)
Humi. sensor : HCPV-220

instead of HCPV-220NH(Temp.&humi.)

## 3 Part name







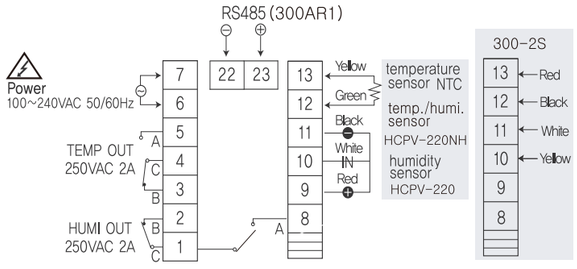
**1** : Display of the present temperature (red color)
**2** : Display of the present humidity(green color)
**3** : output display of the humidity's working
**4** : Up
**5** : Humidity mode
**6** : Down
**7** : Temperature mode
**8** : output display of the temperature' working
**9** : Display of the set value
**10** : Display of the measuring value
**11** : Power supply

## 4 Connection

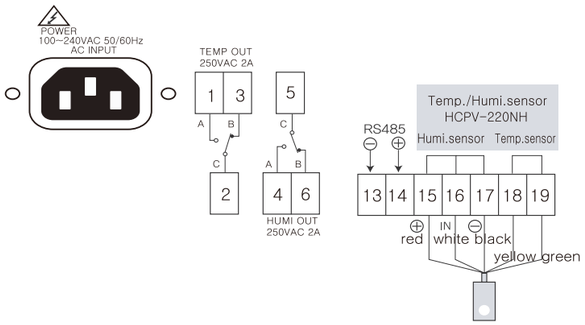
output : 250VAC 2A

Please make use of the power relay or a suitable magnet surely.

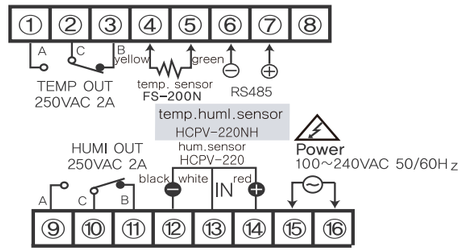
▶FOX-300A-1 /AR1 , 300-2S




▶FOX-300JB-1/JR1

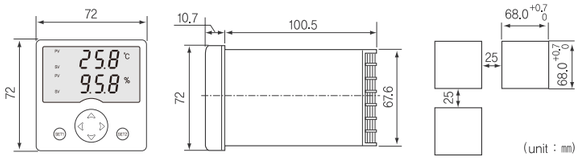



▶FOX-8300-1/R1

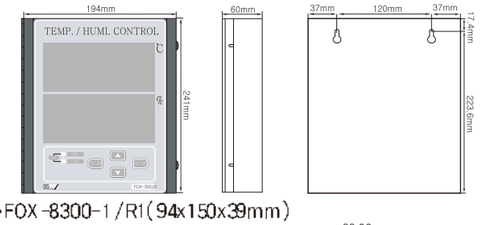



## 5 Size & Dimension

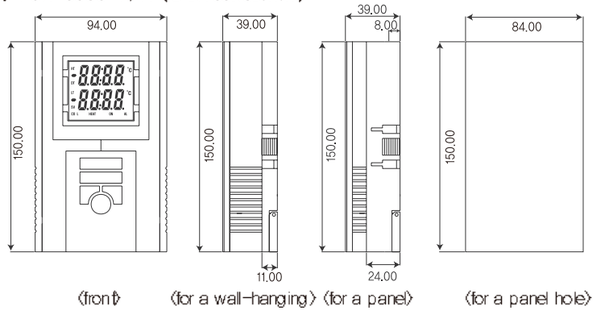
▶FOX-300A-1/AR1,300-2S (72x72x110mm)




▶FOX-300JB-1/JR1(194x241x60mm)

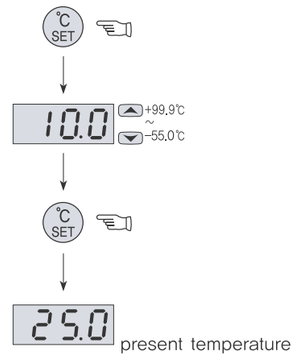


▶FOX-8300-1/R1(94x150x39mm)

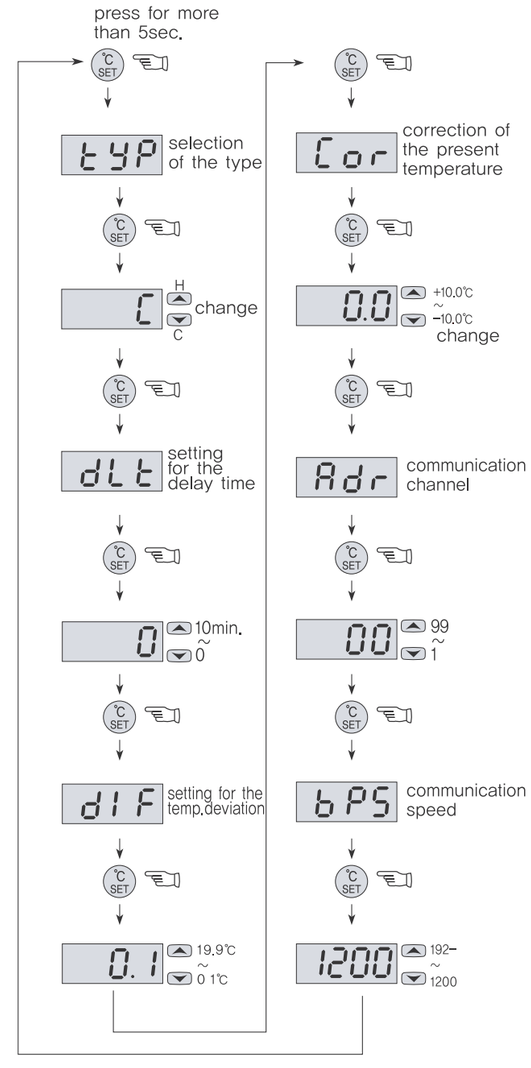



## 6 Temperature

### Setting for temperature

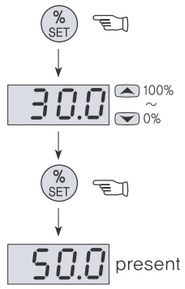



### Setting for temperature programs

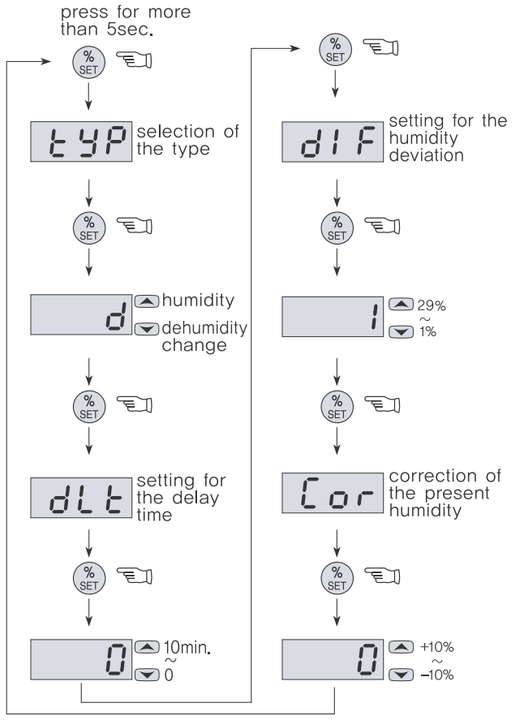


## 7 Humidity

### Setting for the humidity




### Setting for humidity programs



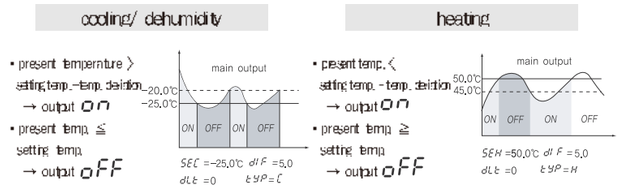

※To change it with program mode, press the --key for more than 5 second in the present temperature display mode.

※The set or programming mode is terminated, if you press the o-E key, parameters(set values) are saved after the display shows OK letter or return to present temperature automatically after 30 second.

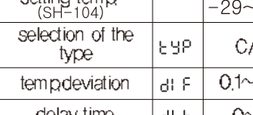
## 8 Detailed manual

1. tYP : temperature : possible to select the cooling or heating,
   humidity : possible to select the humidity or dehumidity.
2. dIF : Setting for temperature deviation
   - In the ON/OFF control, it needs at regular interval between ON and OFF.
   - By operating the ON/OFF control frequently, the relay or its output contact can be damaged quickly and it also occurs the hunting(oscillating, chattering) by virtue of external noise. You can make use of the temperature deviation in order to protect its relay or contact and so on.

「ex=〉 The method of the temp. deviation when ON/OFF control」




3. dLt : Delay time of the output
   It is widely used as followings ;
   - in case of operating the ON/OFF control very often,
   - to protect the operation machinery when re-input of the power supply or momentary stoppage of power supply




ex) if the set value is 1 ,
from a until b time -> the relay is ON in the b point after as delay as dLt the dLT setting time(1min.)
(The output display is flickering while delaying time of the output).

4. Cor : Correction of the present temperature.
   - It is used for the correction of a discrepancy between the display temperature and an actual temperature

ex) real temp. : 10.0℃ display : 12.0℃ → Cor : 0.0 ⇒ -2.0 correction
→ 10.0℃display

5. Adr : Communication channel
   - To designate the channel while RS485 communication working

6. bPS : Communication speed(velocity)
   - 120 , 1200 : 1200bps
   - 240 , 2400 : 2400bps
   - 480 , 4800 : 4800bps
   - 960 , 9600 : 9600bps
   - 19- , 192- : 19200bps
   (Start bit 1, Stop bit 1, Non parity)

## 9 Temp.range & set value when deliver

| | function | dsoay | range | Setting when delivery | remarks |
|---|---|---|---|---|---|
| setting temp. | setting temp. (HCPV-220NH) | | -40.0~65.0 | 10.0 | FOX-300-2S |
| | setting temp. (SH-104) | | -29~99.9 | | Other 300 series |
| setting programs | selection of the type | tYP | C/H | C | H : heating C : cooling |
| | temp.deviation | dIF | 0.1~19.9 | 1.0 | |
| | delay time | dLt | 0~10 | 0 | minute |
| | correction of the temp. (HCPV-220NH) | Cor | -10.0~10.0 | 0.0 | correction for a discrepancy between the display temp. and an actual temperature. |
| | correction of the temp. (SH-104) | | -9.9~9.9 | | |
| | communication channel | Adr | 1~99 | 0 | RS485 communication |
| | communication speed | bPS | 1200/2400/4800 /9600/192- | 9600 | RS485 communication |

## 10 Humi. range & set value when deliver

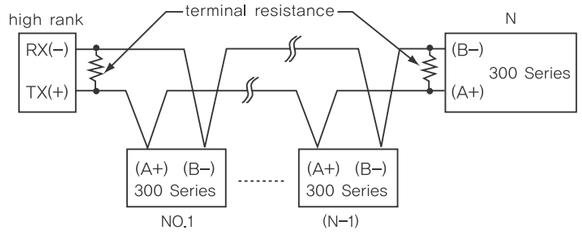
| | function | dsoay | range | Setting when delivery | remarks |
|---|---|---|---|---|---|
| setting humi. | setting humidity (HCPV-220NH) | | 0~100% | 30 | HCPV-220NH |
| | setting humidity (SH-104) | | 0.0~99.9% | 30.0 | SH-104 |
| setting programs | selection of the type | tYP | d/H | d | H : humidity d : dehumidity |
| | humidity deviation (HCPV-220NH) | dIF | 1~29 | 1 | |
| | humidity deviation (SH-104) | | 0.1~29.9 | 0.1 | |
| | delay time (HCPV-220NH) | dLt | 0~10 | 0 | minute |
| | correction of the humidity. (HCPV-220NH) | Cor | -10~10 | 0 | correct for a discrepancy between the display humi. and an actual humidity. |
| | correction of the humidity. (SH-104) | | -9.9~9.9 | | |

## 11 Communication output

### ■ Interface

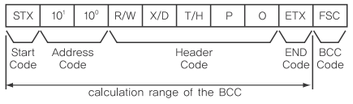
| | |
|---|---|
| specification | in conformity EIA RS485 |
| maximum connection | 32(However, available to set the Address from 01 until 99) |
| the method of communication | two-wire half-duplex operation |
| synchronous system | asynchronous system |
| communication distance | within 1.2km |
| communication speed | 1200/2400/4800/9600/19200bps(possible to select) |
| Start bit | fixed 1bit |
| Stop bit | fixed 1bit |
| Parity bit | none |
| Data bit | fixed 8bit |
| Protocol | BCC |

### ■ System

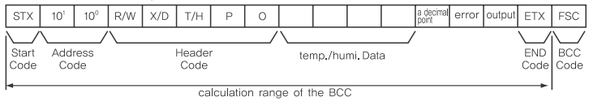



### ■ Definition between communication command and Block

Show the Format of the Command




Show the Format of the Response




① Start Code
show the lead(head) of the Block
ACK will be added in case of STX->[02H], Response

② Address Code
A high rank system can discriminate the channel code number among FOX-300series
It is available to set between 01 and 99(BCD ASC II)

③ Header Code
show the command name as a alphabetic letter
RX(reading demand) → R[52H], X[58H]
RD(reading response) → R[52H], D[44H]
WX(writing demand) → W[57H], X[58H]
WD(writing response) → W[57H], D[44H]
TPO(temperature measuring value) → W[54H], P[50], O[30H]
HPO(temperature measuring value) → H[48H], P[50], O[30H]

④ Composition of Data
Data is displayed as "Hexadecimal"

⑤ Decimal point → 0[30H] there is no "decimal point"
1[31H] there is "decimal point"

⑥ Error → 0[30H] there is no "error"
1[31] interrupted of the sensor's cable
2[32] short-circuited error of the sensor

⑦ Output → 0[30H] T/H OUT ON
3[33H] T/H OUT OFF

⑧ END Code
show the end(close) of the Block ETX → [03H]

⑨ BCC(Block Check Character)
show the XOR arithmetic and logic values from the start(STX) to the ETX

- the others : As of no response of the ACK
  ① in case of not equivalent to the channel after receiving STX
  ② in case of generating the Receive Buffer Overflow
  ③ in case of not equivalent to the communication's set values or baud rate
- treatment- in case of no response of the ACK
  ① check the cable
  ② check the communication's condition (set values)
  ③ if the main cause of the status is the noise, try to do communication practicing 3times until recovering normally.
  ④ change the communication speed in case of bring about the communication's error frequently.

## 12 Error message

■ Indicating ERROR on using items

- This Er! 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 the noise from outside, it is not endurable against the noise with endlessly.
- If noise(2KV) disordering become an inflow, the inner-part will be damaged.
- When shows these letters o-E (open error) S-E (short error) it is the case of the error of the sensor. Please check the sensor.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■ Main products & Development
- Digital temperature controller
- Digital humidity controller
- Digital timer