# CONOTEC®

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

Digital Temperature Controller

## Operating manual

CNT-2SH(R)
(temperature/humidity)

CNT-2H
(humidity)

※ Thank you for selecting our products.
please read carefully this instruction to reduce any damages or operation mistakes.

## 1 Model composition

| Model | Output | Sensor | Humidity range | RS485 |
|---|---|---|---|---|
| CNT-2H | Main:1c 250Vac2A  Aux:1a 250Vac2A | HCPV-220H | 0.0%~100.0%Rh | - |
| CNT-2SH | Main:1a 250Vac2A | DS-SH series | 0.0%~100.0%Rh | - |
| CNT-2SHR | Aux:1a 250Vac2A | DS-SH series | 0.0%~100.0%Rh | support |

## 2 Safety and Hazard instructions

### ⚠ Safety

Please 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 safety device.

### ⚠ safety instruction and hazard warnings

1. Please read the operating manual through completely before putting the device into operation.
2. 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.
3. For safety and licensing reason,unauthorized conversion and/or modification of the device is not permitted.
4. 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.
5. The device must be adequately protected from water and dust as per the application and must be accessible via the use of appropriate tools.
6. The device must not be exposed to extreme temperature, sunlight, strong vibrations or high levels of humidity.
7. Operation or installation in not permitted under unfavorable ambient conditions such as wetness or excessive induction loads or solenoid and dust, combustible gases, vapors or solvents, especially hugh-frequency noise.
8. Avoid operation or installation close to high-frequency fields such as welding devices, sewing machines, wireless transmitter, radio systems, SCR controller, etc
9. Do not install the sensor cable nearby signal cable, power cable, load cable.
10. Please use the shield cable when the sensor cable's lengthen, however do not make it too much longer.
11. Please use the sensor cable without any cutting or flaw, blemish.
12. The device is not a toy and should be kept away from children.
13. installation work must only be carried out by suitably qualified personnel who are familiar with the hazards involved and with the relevant regulations.
14. 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

Attention! Never work on electrical connections when the machine is switched on.
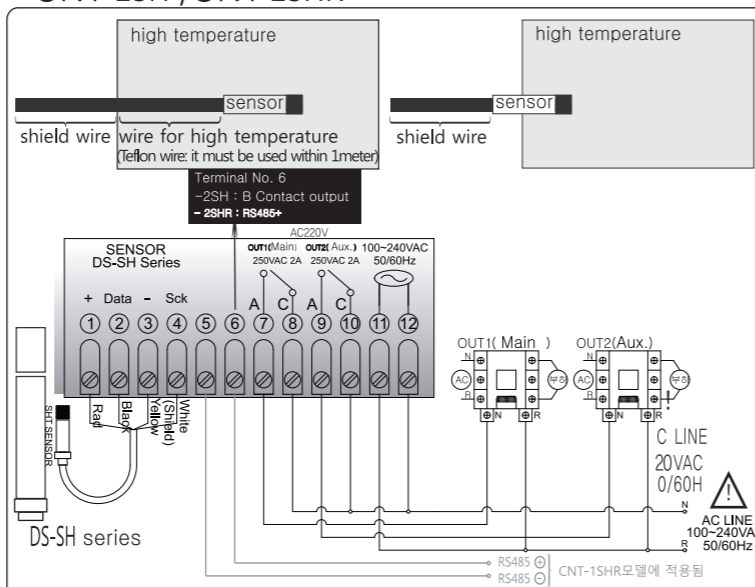
## 3 Part name

HUMI.

OUT1  %  ℃
OUT2  FOX-2SH

OUT1  %
OUT2  FOX-2H
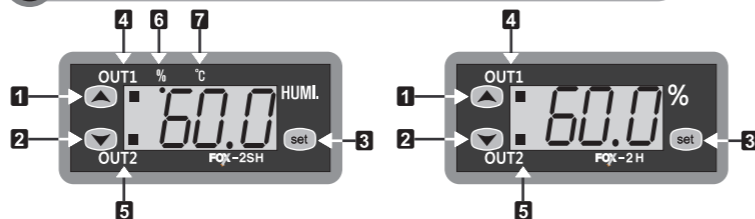
1 Setting up(UP)
2 Setting down(DN)
3 setting switch(SET)
4 Main ouput
5 Auxiliary ouput
6 Humidity display(CNT-2SH(R))
7 Temperature display(CNT-2SH(R))

CNT-2SH(R) : humidity display and cotrol + temperature display for the currency status display, there're 2 kinds of mode, as a switch of <UP(increase), DN(decrease)>, you can change the display like "Humidity/Temperature".
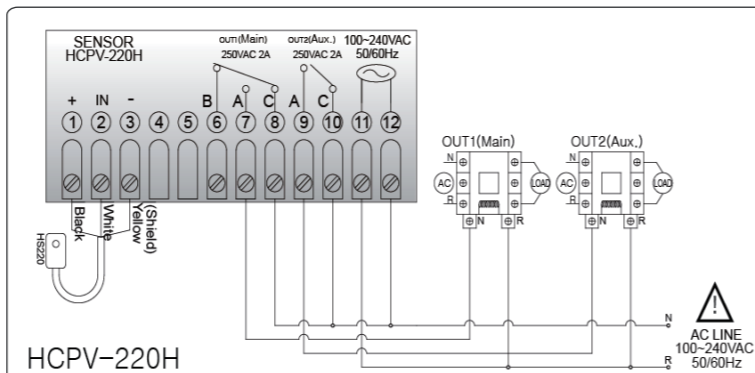CNT-2H : humidity display and control

## 4 Connection

### < CNT-2SH /CNT-2SHR >

high temperature
sensor
shield wire   wire for high temperature
(Teflon wire: it must be used within 1meter)

high temperature
sensor
shield wire

Terminal No. 6
-2SH : B Contact output
-2SHR : RS485+

SENSOR DS-SH Series
+ Data - Sck   A C A C
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫

AC220V
OUT1(Main)  OUT2(Aux.)
250VAC 2A  250VAC 2A  100-240VAC 50/60Hz

White(Shield) Yellow  Black  Red

OUT1(Main)   OUT2(Aux.)

SET SENSOR

DS-SH series

C LINE 20VAC 0/60H ⚠

AC LINE 100-240VAC 50/60Hz

RS485 ⊕
RS485 ⊖   CNT-1SHR모델에 적용됨

**Ref1.** Detailed specifications for the applicable sensor specifications, see the back of the '10. sensor's specifications'.
**Caution1.** Please make use of the shield wire when lengthening of the sensor wire, and in case of using in the high temperature range of 65℃~80℃, surely use the high temperature using wire(Teflon wiring).
**Caution2.** Please make the operating machine(load) be driven with using the power relay or magnet outside surely because its output specification of inside relay is less than 250VAC 2A

### <CNT-2H>

SENSOR HCPV-220H
+ IN -   B A C A C
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫

oum(Main) 250VAC 2A  outm(Aux.) 250VAC 2A  100-240VAC 50/60Hz

Black  White  Yellow (Shield)

HE20

OUT1(Main)   OUT2(Aux.)

AC LINE 100-240VAC 50/60Hz ⚠

HCPV-220H

**Ref1.** Detailed specifications for the applicable sensor specifications, see the back of the '10. sensor's specifications'.
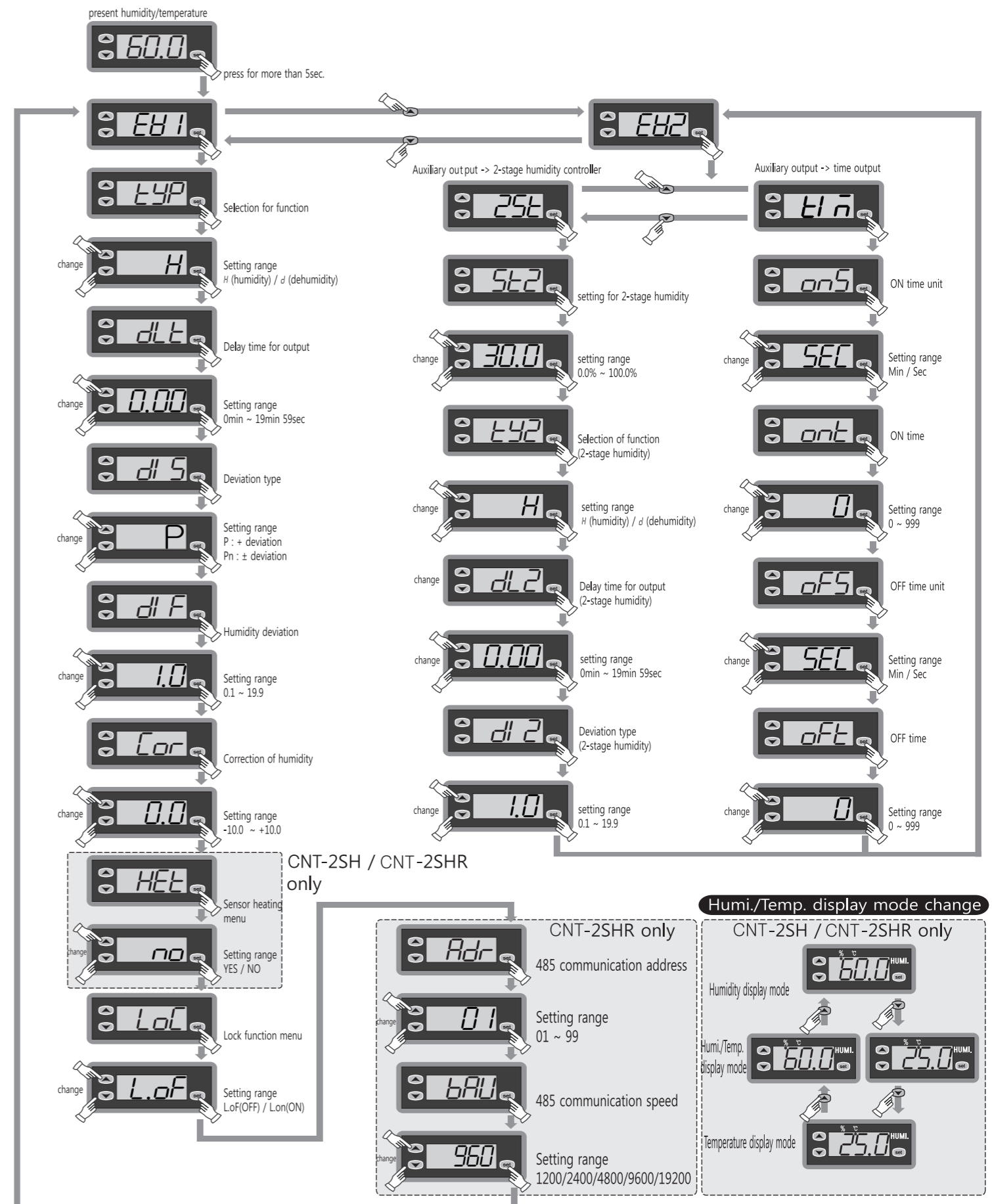**Caution2.** Please make the operating machine(load) be driven with using the power relay or magnet outside surely because its output specification of inside relay is less than 250VAC 2A

## 5 Setting for programs

### User setting humidity

60.0
Press SET key

30.0
Setting range : 0.0% ~ 100.0%Rh

30.0
press SET key

o-L
Save in memory

60.0

### Program setting

present humidity/temperature

60.0
press for more than 5sec.

EH1 ⟷ EH2

tYP — Selection for function

H — Setting range H (humidity) / d (dehumidity)   change

dLt — Delay time for output   change

0.00 — Setting range 0min ~ 19min 59sec   change

dIS — Deviation type   change

P — Setting range P : + deviation  Pn : ± deviation   change

dIF — Humidity deviation   change

1.0 — Setting range 0.1 ~ 19.9   change

Cor — Correction of humidity   change

0.0 — Setting range -10.0 ~ +10.0   change

HEt — Sensor heating menu   change
no — Setting range YES / NO   change

LoC — Lock function menu   change

L.oF — Setting range LoF(OFF) / Lon(ON)   change

**Auxiliary output -> 2-stage humidity controller**

2St — setting for 2-stage humidity

St2 — setting range 0.0% ~ 100.0%   change

30.0

tY2 — Selection of function (2-stage humidity)

H — setting range H (humidity) / d (dehumidity)   change

dL2 — Delay time for output (2-stage humidity)   change

0.00 — setting range 0min ~ 19min 59sec   change

dI2 — Deviation type (2-stage humidity)   change

1.0 — setting range 0.1 ~ 19.9   change

**Auxiliary output -> time output**

tIn

onS — ON time unit

SEC — Setting range Min / Sec   change

ont — ON time

0 — Setting range 0 ~ 999   change

oFS — OFF time unit

SEC — Setting range Min / Sec   change

oFt — OFF time

0 — Setting range 0 ~ 999   change

*CNT-2SH / CNT-2SHR only*

### CNT-2SHR only

Adr — 485 communication address
01 — Setting range 01 ~ 99   change
bAU — 485 communication speed
960 — Setting range 1200/2400/4800/9600/19200   change

### Humi./Temp. display mode change

*CNT-2SH / CNT-2SHR only*

60.0 HUMI.
Humidity display mode

Humi./Temp. display mode

60.0 HUMI.   25.0 HUMI.

25.0 HUMI.
Temperature display mode

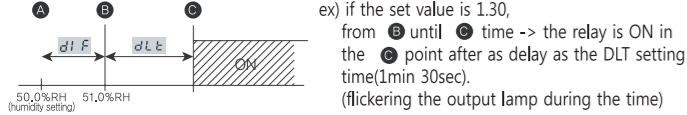## 7 Detailed explanation

**1** `EH 1` Set value of the main output

**2** `typ` Selection for function
- `H` : humidity    `d` : dehumidity

**3** `dLt` Delay time of the output
- It is widely used as the 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
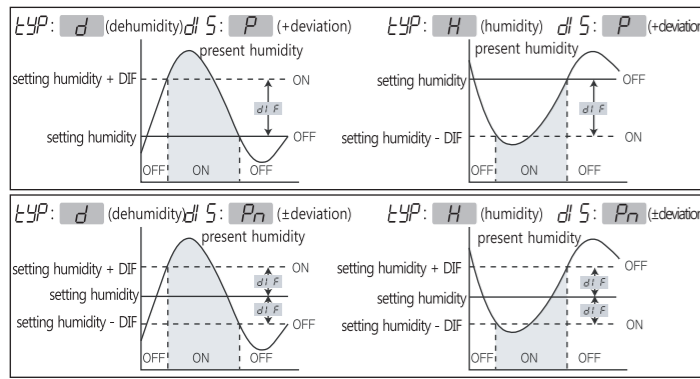
ex) if the set value is 1.30,
from **B** until **C** time → the relay is ON in the **C** point after as delay as the DLT setting time(1min 30sec).
(flickering the output lamp during the time)

**4** `di S` Selection of the deviation for a main output
- `P` : + deviation    `Pn` : ± deviation

**5** `di F` 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.

| `typ` : `d` (dehumidity) `di S` : `P` (+deviation) | `typ` : `H` (humidity) `di S` : `P` (+deviation) |
|---|---|
| setting humidity + DIF ... ON / setting humidity ... OFF | setting humidity ... OFF / setting humidity - DIF ... ON |

| `typ` : `d` (dehumidity) `di S` : `Pn` (±deviation) | `typ` : `H` (humidity) `di S` : `Pn` (±deviation) |
|---|---|
| setting humidity + DIF / setting humidity / setting humidity - DIF | setting humidity + DIF / setting humidity / setting humidity - DIF |

**6** `Cor` Correction of the present humidity
Correction function for an discrepancy between the present's display value and the actual value(accurate value)
ex) An actual humidity value is 55.5%RH only, but the present humidity's display value was 57.5%RH
=> You may use this function and can correct the display's humidity value by -2.0%RH

Caution. Actual humidity is validated the performance and accurately calibrated by using the equipment to produce. If an inaccurate equipment calculated on the basis of the actual humidity calibration, it can be caused problems with product operation.

**7** `HEt` Heating element for humidity sensor (only CNT-2SH)
It is possible to be covered with dew when the humidity is high, If the present humidity is 95%RH, it is generated heat inner its sensor in order to prevention of dewy.

`YES` It is operated the heating function automatically if the humidity is more than 95%RH. It is removed if the humidity is less than 95%RH

`no` The heating function will be prohibited.

※ Caution-It must be set up "NO" because the heating function can not be used for more than 95%RH

※ R.F) The present temperature's display can be increased a little while operating the humidity sensor's heating function

**8** `LoC` Lock function of setting data
As a safety device, it is used in orser not to change the set value except for an main user

`L.on` Setting for lock function    `L.oF` removal for lock function

**9** `Adr` RS485-communication address setting
The product FOX-2SHR supports RS485 communications. when communicating with the master device for mutual recognition is the ability to set the communication address.

**10** `bAU` RS485-communication speed setting
when communicating with the master device to the exchange of accurate data must match the communication speed.

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**11** `EH2` Set values for an auxiliary

**12** `2St` auxiliary output -> 2-stage output

**13** `St2` change of the setting humidity for an auxiliary output

**14** `ty2` Output type for an auxiliary output
- `H` : humidity    `d` : dehumidity

**15** `dL2` Delay time of the auxiliary output
see the 3. `dLt` menu

**16** `di 2` Humidity deviation of the auxiliary output
see the 5. `di F` menu

**17** `tl n` auxiliary output -> time output

**18** `on5` auxiliary output on time
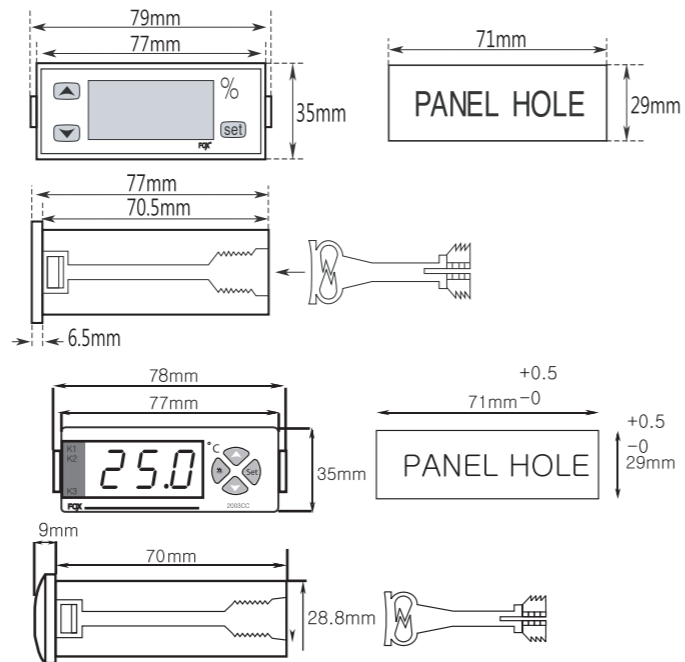`ñi n` : setting for a minute unit    `SEC` : setting for a second unit

**19** `ont` auxiliary output -> on time

**20** `oFS` auxiliary output off time
`ñi n` : setting for a minute unit    `SEC` : setting for a second unit

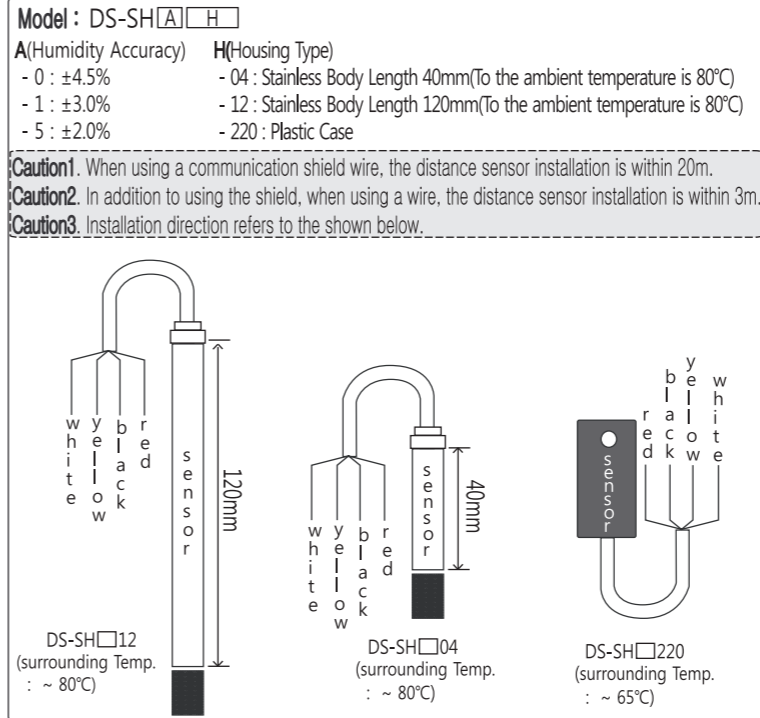**21** `oFt` auxiliary output -> off time

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## 8 Size & dimension

79mm / 77mm / 35mm

71mm PANEL HOLE 29mm

77mm / 70.5mm / 6.5mm

78mm / 77mm / `25.0` / 35mm / +0.5 71mm−0 PANEL HOLE +0.5 −0 29mm

9mm / 70mm / 28.8mm

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## 9 Setting range & Set value when deliver

| Model | Division | | Function | Range | set value when deliver |
|---|---|---|---|---|---|
| CNT-2SHR / CNT-2SH / CNT-2H | Main output | `SEt` | setting for humidity | 0.0~100.0%Rh | 30.0%Rh |
| | | `typ` | selection for function | `H / d` | `H`(humidity) |
| | | `dLt` | delay time for output | 0.0~19min 59sec | 0min 0sec |
| | | `di F` | humidity deviation | 0.1 ~ 19.9 | 0.1 |
| | main /2-stage | `di S` | deviation type | `P / Pn` | `P`(+deviation) |
| | Sensor | `Cor` | correction of humidity | -10.0 ~ +10.0℃ | 0.0℃ |
| | main /2-stage | `LoC` | lock function | `L.on/L.oF` | `L.oF` |
| | auxiliary output (2-stage) | `St2` | setting humidity | 0.0~100.0%Rh | 30.0%Rh |
| | | `ty2` | selection for function | `H / d` | `H`(humidity) |
| | | `dL2` | delay time for output | 0~19min 59sec | 0min 0sec |
| | | `di 2` | humidity deviation | 0.1 ~ 19.9 | 0.1 |
| | auxiliary output (time) | `on5` | ON time unit | `ñi n/SEC` | `SEC` (sec) |
| | | `ont` | setting for ON time | 0 ~ 999 | 0 |
| | | `oFS` | setting for OFF time unit | `ñi n/SEC` | `SEC` (sec) |
| | | `oFt` | setting for OFF time | 0 ~ 999 | 0 |
| | Sensor | `HEt` | heating function for the humidity sensor | `YES/no` | `no` |
| | communication | `Adr` | 485 communication address | 01 ~ 99 | 01 |
| | | `bAU` | 485 communication speed | `120`(1200Bps) `240`(2400Bps) `480`(4800Bps) `960`(9600Bps) `1920`(19200Bps) | `960` (9600Bps) |

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## 10 Sensor's specifications

### < DS-SH series >   CNT-2SH  CNT-2SHR

Model : DS-SH `A` `H`

**A(Humidity Accuracy)**
- 0 : ±4.5%
- 1 : ±3.0%
- 5 : ±2.0%

**H(Housing Type)**
- 04 : Stainless Body Length 40mm(To the ambient temperature is 80℃)
- 12 : Stainless Body Length 120mm(To the ambient temperature is 80℃)
- 220 : Plastic Case

Caution1. When using a communication shield wire, the distance sensor installation is within 20m.
Caution2. In addition to using the shield, when using a wire, the distance sensor installation is within 3m.
Caution3. Installation direction refers to the shown below.

DS-SH□12 (surrounding Temp. : ~ 80℃) — white yellow black red sensor 120mm

DS-SH□04 (surrounding Temp. : ~ 80℃) — white yellow black red sensor 40mm

DS-SH□220 (surrounding Temp. : ~ 65℃) — red black yellow white sensor

### < HCPV-220H >   CNT-2H

sensor — black white yellow (shield) red
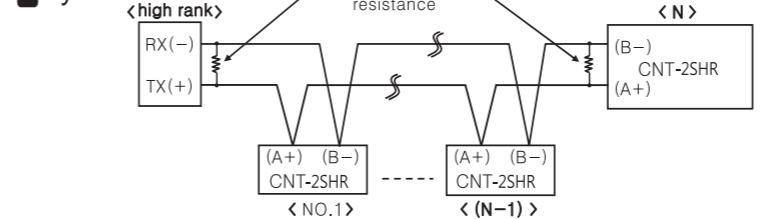
(surrounding temp. : 0 ~ 65℃)

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## 11 Communication interface ( CNT- 2SHR )

| specification | in conformity EIA RS485 |
|---|---|
| The method of communication | two wire half-duplex operation |
| syncronous system | asyncronous system |
| communication distance | within 1.2Km |
| communication speed | 1200/2400/4800/9600/19200bps |
| StartBit | fixed 1bit |
| StopBit | fixed 1bit |
| ParityBit | none |
| DataBit | fixed 8bit |
| Protocol | BCC |

**1** System

〈high rank〉 RX(−) TX(+) terminal resistance 〈N〉 (B−) CNT-2SHR (A+)

(A+) (B−) CNT-2SHR 〈NO.1〉 - - - (A+) (B−) CNT-2SHR 〈(N−1)〉

**2** Definition between communication command and block

〈 Show the format of the command 〉

| STX | 10¹ | 10⁰ | R/W X/D | T | P | 0 | ETX | BCC |
|---|---|---|---|---|---|---|---|---|

START CODE / ADDRESS CODE / HEADER CODE / END CODE / BCC CODE
calculation range of the BCC
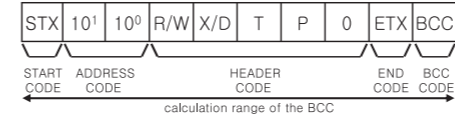
〈 Show the format of the response 〉

| STX | 10¹ | 10⁰ | R/W X/D | T | P | 0 | | a decimal point | error | output | ETX | BCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

START CODE / ADDRESS CODE / HEADER CODE / Humidity data / END CODE / BCC CODE
calculation range of the BCC

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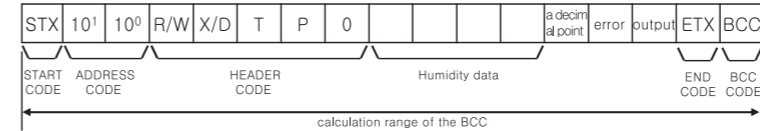
① **START CODE**
Show the lead(head) of the block
STX → [02H]

② **ADDRESS CODE**
A high rank system can discriminates the channel code number among FOX-2SHR. It is available to set between 01 and 99(BCD ASCII)

③ **HEADER CODE** : Show the command name as an 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]
TP0( temperature measuring value )→ T[54H], P[50H], 0[30H]

④ **Composition of data** : Data is displayed as "Hexa decimal" (negative number : 2's complement)

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[31H]: interrupted of the sensor' s cable
2[32H]: low error
3[33H]: high error

⑦ **Output**

| output | auxiliary | | main output | output | auxiliary | | main output |
|---|---|---|---|---|---|---|---|
| | time output | 2-stage output | | | time output | 2-stage output | |
| 0x30 | OFF | OFF | OFF | 0x34 | ON | OFF | OFF |
| 0x31 | OFF | OFF | ON | 0x35 | ON | OFF | ON |
| 0x32 | OFF | ON | OFF | 0x36 | ON | ON | OFF |
| 0x33 | OFF | ON | ON | 0x37 | ON | ON | ON |

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 nomally
④ change the communication speed in case of bring about the communication's error frequently

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## 12 Error message

■ If error message is displayed while using the product

▪ `Er 1` means damage to the data memory element due to powerful noise impact from outside while using the product. In such a case, contact our company for customer service.

▪ While the controller is equipped with supplementary measures for outside noise, the product inside may be damaged if noise in 2KV level is applied to the product.

▪ `o-E` display means communication defect with the sensor. Please check connection, wire short, and connection order to the sensor. If the problem persists, please contact our customer service department.

▪ `L-E` or `H-E` is shown when humidity display has exceeded the range. If the error is displayed despite maintaining normal surrounding humidity, please contact our customer service department.

▪ Warranty Period: One year from the date of purchase

◈ Installation Precautions
▪ WARNING: TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT REMOVE CONNECT to the protective earth ground and the mains supply.
▪ Do not block the vents.
※ Handling Precautions
※ This Product is suitable in the following environment:
▪ Ambient temperature: 0 C~ 60℃    ▪ Ambient humidity: 80%Rh max.
▪ Using for indoor only    ▪ Pollution Degree 2
▪ Altitude 2000 or less    ▪ Installation Category Ⅱ
▪ Avoid equipment placement that is difficult to operate power cord. If using the equipment in a manner not specified by the equipment manufacturer may impair the protection provided by the equipment.
▪ Rated power: AC 100~240VAC 50/60Hz 3VA

■ Major Products Manufactured and Developed
-Digital Temperature/Humidity Controller
-Digital Timer, Current/Voltage Meters
-Variety of products developed available