CONOTEC

CONOTEC CO., LTD.
DIGITAL TEMPERATURE CONTROLLER

CE ISO 9001:2008

CNT-2SHT-1,2SHTR-1	Instruction Manual

◆ Digital Temp
  & Humidity Controller
- Temp Output: 1Relay (1a)
- Humi Output: 1Relay (1a)
◆ Digital sensor applied
◆ Usable up to 80℃

- 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
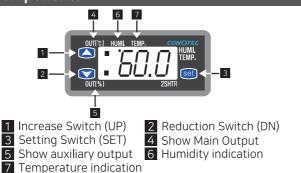
⚠ Danger

Caution: Risk of electric shock
- Electric shock – Do not touch the AC terminal while the current is flowing. It may cause an electric shock.
- You must disconnect the input power when servicing it.

02 Model Types

Model	Output	Sensor	Humidity range	RS485 Comm
CNT-2SHT-1	TEMP:1a 250Vac2A	CNT-H Series	0.0%~100.0%Rh	-
CNT-2SHTR-1	HUMI:1a 250Vac2A		-39.9℃~80.0℃	Supported

03 Components

1 Increase Switch (UP) 2 Reduction Switch (DN)
3 Setting Switch (SET) 4 Show Main Output
5 Show auxiliary output 6 Humidity indication
7 Temperature indication
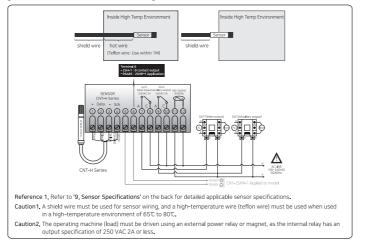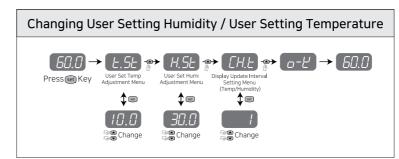
* Humidity display and control + temperature display There are two modes of current status display, which can be switched to "humi display/temp display" with UP (increase)/DN (decrease) switches.
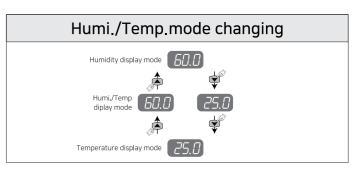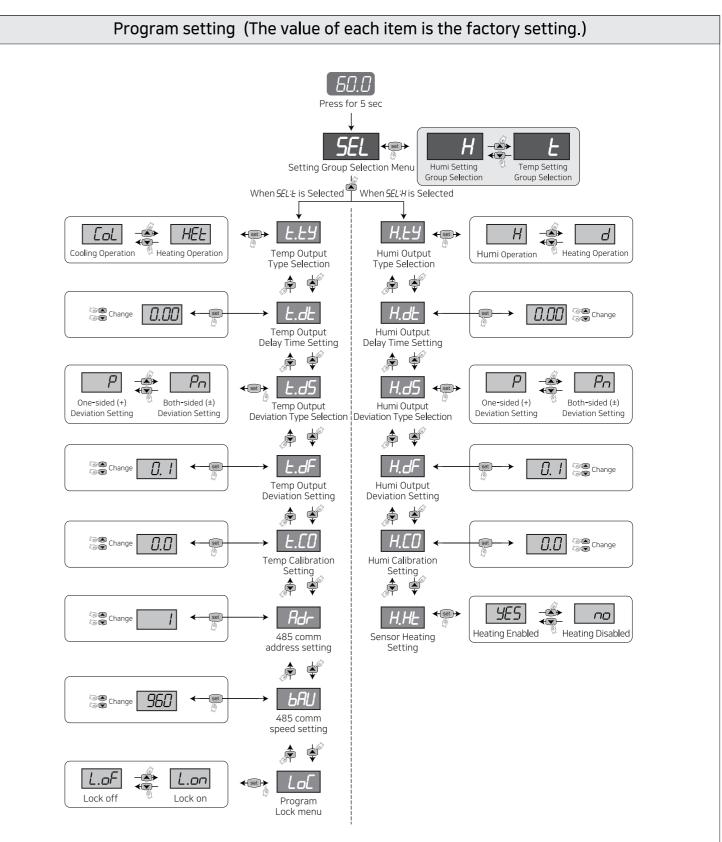
04 Terminal wiring diagram

[CNT-2SH-1 / CNT-2SHR-1]

Reference 1, Refer to '9, Sensor Specifications' on the back for detailed applicable sensor specifications.
Caution1, A shield cable must be used for sensor wiring, and a high-temperature wire (teflon wire) must be used when used in a high-temperature environment of 65℃ to 80℃.
Caution2, The operating machine (load) must be driven using an external power relay or magnet, as the internal relay has an output specification of 250 VAC 2A or less.

05 Setting process

Changing User Setting Humidity / User Setting Temperature

60.0 → t.St → H.St → CH.t → o-U → 60.0
Press set Key | User Set Temp Adjustment Menu | User Set Humi Adjustment Menu | Display Update Interval Setting Menu (Temp/Humidity)

10.0 / 30.0 / 1
set ▲▼ Change

Humi./Temp.mode changing

Humidity display mode 60.0
Humi./Temp diplay mode 60.0 25.0
Temperature display mode 25.0

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

60.0
Press for 5 sec

SEL
Setting Group Selection Menu

H t
Humi Setting Group Selection | Temp Setting Group Selection

When SEL:t is Selected | When SEL:H is Selected

CoL ↔ HEt
Cooling Operation Heating Operation

t.tY
Temp Output Type Selection

H.tY
Humi Output Type Selection

H ↔ d
Humi Operation Heating Operation

0.00
set Change

t.dt
Temp Output Delay Time Setting

H.dt
Humi Output Delay Time Setting

0.00
set Change

P ↔ Pn
One-sided (+) Deviation Setting Both-sided (±) Deviation Setting

t.dS
Temp Output Deviation Type Selection

H.dS
Humi Output Deviation Type Selection

P ↔ Pn
One-sided (+) Deviation Setting Both-sided (±) Deviation Setting

0.1
set Change

t.dF
Temp Output Deviation Setting

H.dF
Humi Output Deviation Setting

0.1
set Change

0.0
set Change

t.CO
Temp Calibration Setting

H.CO
Humi Calibration Setting

0.0
set Change

1
set Change

Adr
485 comm address setting

H.HE
Sensor Heating Setting

YES ↔ no
Heating Enabled Heating Disabled

960
set Change

bAU
485 comm speed setting

L.oF ↔ L.on
Lock off Lock on

LoC
Program Lock menu

06 Function details

L.St : User Temperature Setting Menu
- Sets the target temperature for relay output.

H.St : User Humidity Setting Menu
- Sets the target humidity for relay output.

CH.t : Temp/Humi Display Cycle Setting
- You can switch the display mode using the UP (increase) / DN (decrease) switch.

"Humidity Display Mode" ⟷ "Temp & Humi Display Mode" ⟷ "Temperature Display Mode"

- The LED at the top of the display panel will light up depending on the selected mode.

SEL : Setting Group Menu

H : Select Humidity Setting Group t : Select Temperature Setting Group

t.tY : Output Type Setting for Temperature Output

CoL : Cooling Operation HEt : Heating Operation

t.dt : Output Delay Time Setting for Temperature Output
- Used to protect equipment when frequent ON/OFF operations cause issues (e.g., refrigerator, compressor), such as momentary power failures or automatic restart after power recovery.

- Set Temp: 25.0℃, t.dt : 1.30, t.tY : CoL, t.dF : 1.0
When does the output turn ON?
If the current temperature rises and exceeds point 'B' (26.0℃), after the delay time set in t.dt. (1 minute 30 seconds), the relay will turn ON at point 'C'.
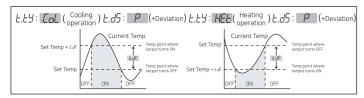
t.dS : Set the application method of deviation (hysteresis) for temperature output
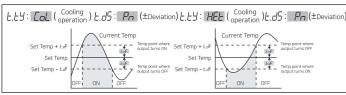P : + Application of deviation
Pn : ± Application of deviation

t.dF : Output deviation setting for temperature control
- If the relay output repeats ON/OFF too frequently with a small deviation, the output contact may be quickly damaged or hunting (oscillation, chattering) may occur due to external noise.
- This function protects the contact by setting a certain gap between ON and OFF operations to prevent such phenomena.

t.Co : Current Temp Compensation
- Although the product itself has no problem, if there is a difference between the actual Temp and the Temp displayed on the device, this function compensates the current Temp to match the actual Temp.
Ex) Actual Temp: 55.0℃, Current Temp: 57.0℃,
If t.Co is set to -2.0, the current Temp will be displayed as 55℃.

Adr : RS485 Communication Address Setting
The FOX-2SHR-1 product supports RS485 communication. This is a function to set a communication address for mutual recognition with the master equipment to use RS485 comm.

bAU : RS485 Communication Speed Setting
The FOX-2SHR-1 product supports RS485 communication. When RS485 communication is used, the communication speed must be matched for accurate data exchange with the master equipment.
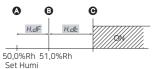
LoC : Setting Data Lock Function
- This is a type of safety mechanism that prevents changes to various setting values, such as user Temp setting, user Humi setting, and the Temp-Humi display switching indicator. **Lon** Lock **LoF** Unlock

H.tY : Humidity Output Delay Time Setting
H : Humidifying Operation d : Dehumidifying Operation

H.dt : Humidity Output Relay Delay Time Setting
- Use when frequent ON/OFF operations of the controlled object may cause issues (e.g., refrigerator, compressor).
- Protects against momentary power outages or power-on surges.

- Set value : 50.0%Rh, H.dt : 1.30, H.tY : d, H.dF : 1.0
What happens when the input humidity rises?
When the current humidity increases and exceeds the target value of 51.0%Rh, after 1 minute 30 seconds (H.dt setting time), the relay will turn ON at point C.

H.dS : Humidity Output Hysteresis Mode Setting
P : + Hysteresis Applied Pn : ± Hysteresis Not Applied

H.dF : Humidity Output Contact Gap Setting
- If the output relay turns ON/OFF too frequently, the relay contacts may wear out quickly or cause noise externally, resulting in chattering or sparks.
- To prevent this, you can set a gap between the ON and OFF points to protect the relay contacts.

H.Co : Current Humidity Correction
- If there is no issue with the product itself but the device display humidity and actual humidity differ due to external environment or sensor location, you can correct the current humidity to match the actual value.
Ex) Actual: 55.0%Rh, Current Display: 57.0%Rh
→ Set H.Co to -2.0, and the displayed humidity will now show 55.0%Rh.

HEt : Humidity sensor heating function
When the humidity is very high, dew may form around the sensor element, so when the current humidity is more than 95.0%, heat is generated inside the sensor to prevent dew.

⚠ Caution : Please use a verified and accurately calibrated instrument to determine the actual humidity. If you base the compensation on actual humidity measured with an inaccurate instrument, it may cause malfunction of the product.

YES : The heating function automatically operates at humidity above 95.0%, and is released when it reaches below 95.0%.
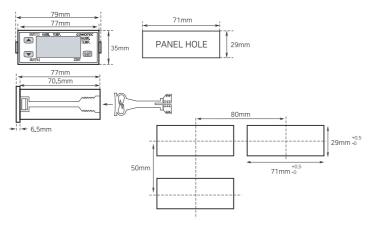
no : Disable automatic heating.

⚠ Caution : If the set humidity is more than 95%, the heating function cannot be used, so it must be set to NO.

⚠ Caution : When the humidity sensor heating function is in operation, the modern temperature of the display window may increase slightly.
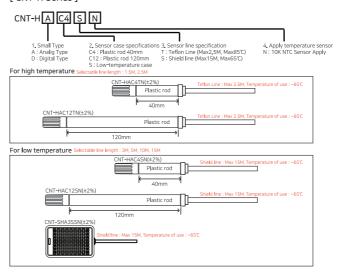
07 Diemension and panel hole sizes

(Unit : mm / error : ±0.5)
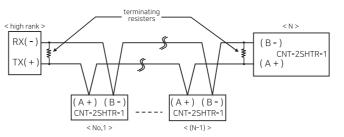

08 Applied Sensor Specifications

[CNT-H Series]

CNT-H [A] [C4] [S] [N]

1. Small Type
A : Analig Type
D : Digital Type

2. Sensor case specifications
C4 : Plastic rod 40mm
C12 : Plastic rod 120mm
S : Low-temperature case

3. Sensor line specification
T : Teflon Line (Max2.5M, Max85℃)
S : Shield line (Max15M, Max65℃)

4. Apply temperature sensor
N : 10K NTC Sensor Apply

For high temperature Selectable line length : 1.5M, 2.5M

For low temperature Selectable line length : 3M, 5M, 10M, 15M

* If not requested, it will be shipped in basic line length: 3M (CNT-HAC4N).

09 Comm. interface (CNT-2SHR-1 applicable)

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

※ For communication manuals, please refer to the detailed manual on the website.

■ System Configuration

■ Definition between communication command and block

[Top(host) Query format]

STX	10¹	10⁰	R/W	X/D	T	P	O	RTX	BCC

START CODE | ADDRESS CODE | HEADER CODE | END CODE | BCC CODE

calculation range of the BCC

[FOX-1SHR response Format]

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

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-2SHTR It is available to set between 01 and 99(BCD ASCII)

③ HEADER CODE: Displays the name of Command as a character
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 measured value) → T[54H], P[50H], O[30H]
HPO(Humidity measured value)->H[48H],P[50H],O[30H]

④ Configuration of data: The DATA is expressed in hexadecimal (Hex). (Negative values: 2's complement)
⑤ Decimal point - 0[30H] There's No decimal point // 1[31H] There's a decimal point

⑥ Error : 0[30H] : no error // 1[31H] : sensor open error
2[32H] : low error//3[33H] : high error
⑦ Output : 0[30H]:Output OFF//1[31H]:Output ON

⑧ END CODE : show the end (close) of the block | ETX -> [03H]

⑨ BCC : (Black Check Character)
Show the XOR arithmetic and logic values from the start(STX) to the ETX

※ Others
■ 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

11 Easy error diagnosis instructions

※ If an error is displayed while the product is running

- **Er1** : 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.

- **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 our customer service department