

User Manual CNT-500R



- Temperature, humidity, CO2 monitor and control
- RS485 Communication (MODBUS-RTU)
- Simple settings

1 Safety precautions

Be sure to read the precautions before using the product for proper and safe use.

※ The specification and external dimensions described in the handling instruction may be changed without prior notice to improve the product performance.

Warning

1. Since this product is not manufactured as a safety device, be sure to use with dual safety devices in the event of using the product with devices that may cause accidents or property damage or when used for controlling.
2. Do not perform wiring, inspection or maintenance while the power is connected to the product.
3. The terminal number must be checked when connecting power.
4. Do not disassemble, process, modify, or repair this device.

Cautions

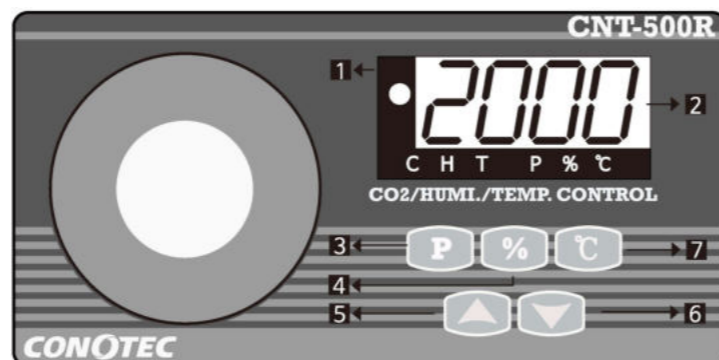
- Before using this product, be sure to familiarize yourself with usage, safety regulations, and warnings and use only within the specifications or capacity.
- Do not wire or install motors or solenoids with large inductive load.
- Use a shield cable in sensor extension and do not make the cable unnecessarily longer.
- Do not use parts that generate arc nearby when opening/closing or the same power source.
- The power line must be installed away from the power cable and avoid places where water, oil, or dust are severe.
- Do not install the product in a place exposed to direct sunlight or rain.
- Do not install the product in a place with a strong magnetic field, severe noise, vibration or impact.
- Avoid strong alkaline or strong acidic materials, and use independent piping.
- Do not spray water directly for cleaning when installing the product in the kitchen.
- Do not install the product in locations where temperature and humidity exceed the rating.
- Care should be taken not to cut the sensor wires or avoid scratch.
- Sensor wires should be away from signal lines, power, electric power and load lines, and use independent piping.
- Do not disassemble or modify this product. If so, the product cannot receive maintenance.
- The mark on the terminal wiring diagram is a safety statement regarding warning and caution.
- Do not use the product near equipment (high-frequency welding machine, high-frequency sewing machine, high-frequency radio, - high-capacity SCR controller) where strong high-frequency noise occurs.
- Use of the product other than the method specified by the manufacturer may result in personal injury or property damage..
- The product is not a toy, keep out of the reach of children.
- The product must be installed by specialists or qualified personnel only.
- Conotec is not responsible for any damages resulting from user's non-compliance with the aforementioned warnings or cautions, or user's faults.

Danger

- Caution, risk of electric shock
- Electrical shock - Do not contact with the AC terminal while applying electric current. There is a risk of electric shock.
- The input power should be shut off when checking input power.

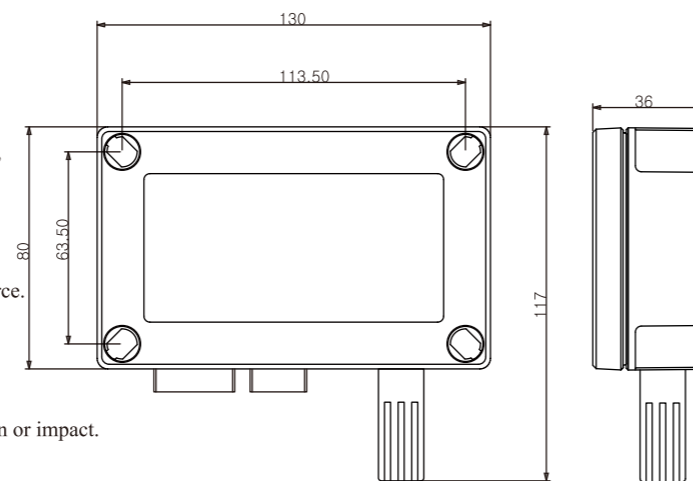
2 Components

Appearance and components



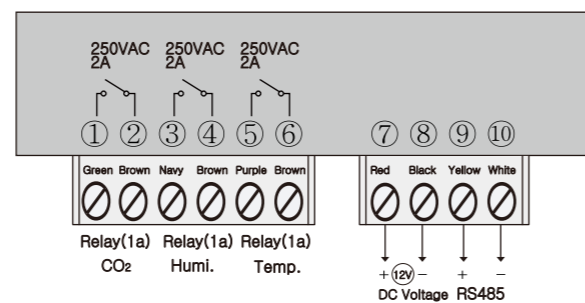
- 1 Display the state of current output and communication and measurement value unit (○:Communication status, C:CO2 Output, H:Humidity Output, T:Temp. Output, P:CO2 Unit, %:Humi. Unit, °C:Temp. Unit)
- 2 Display the current measurement value
- 3 CO2 Mode change key
- 4 Humidity mode change key
- 5 Setpoint (rounding up) control key
- 6 Setpoint (rounding down) control key
- 7 Temperature mode change key

3 External and panel dimension

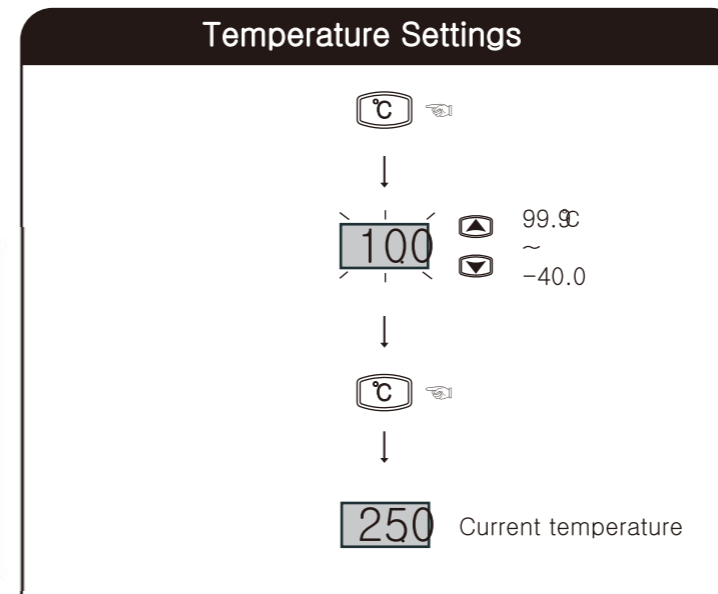


4 Terminal connection diagram

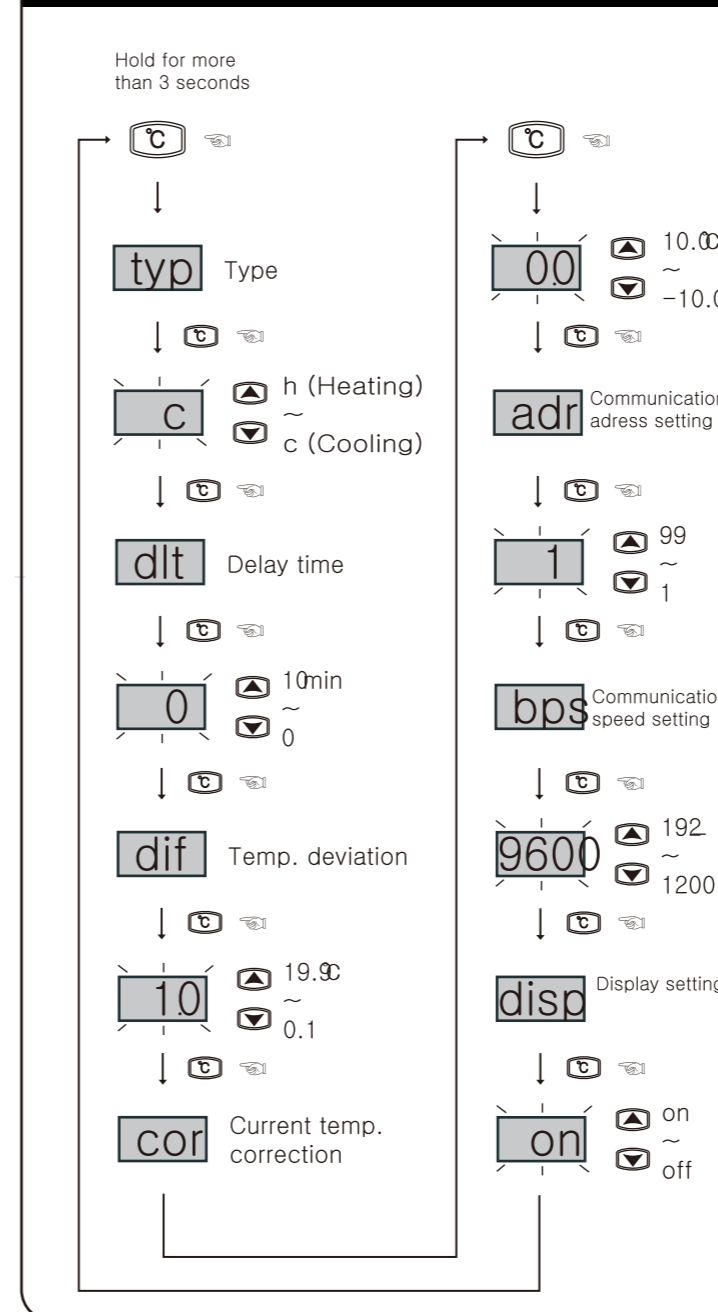
Input terminal connection diagram



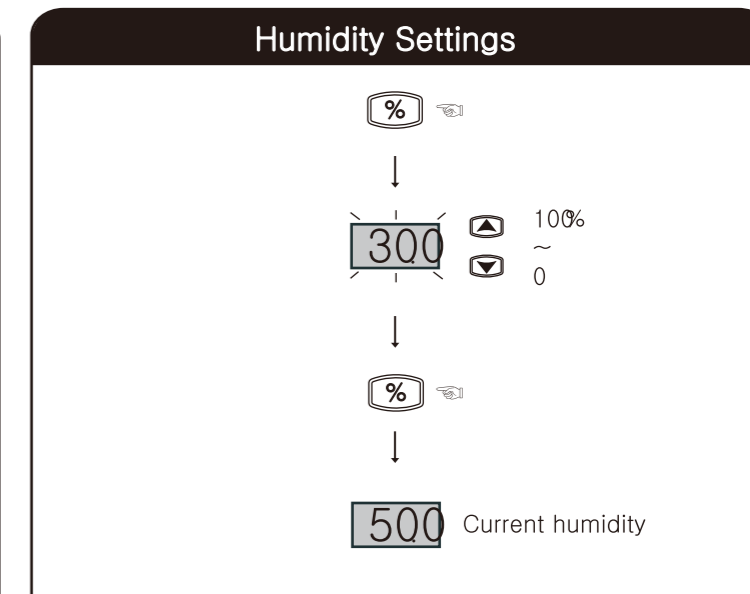
5 Sequence of Temp. setpoint change



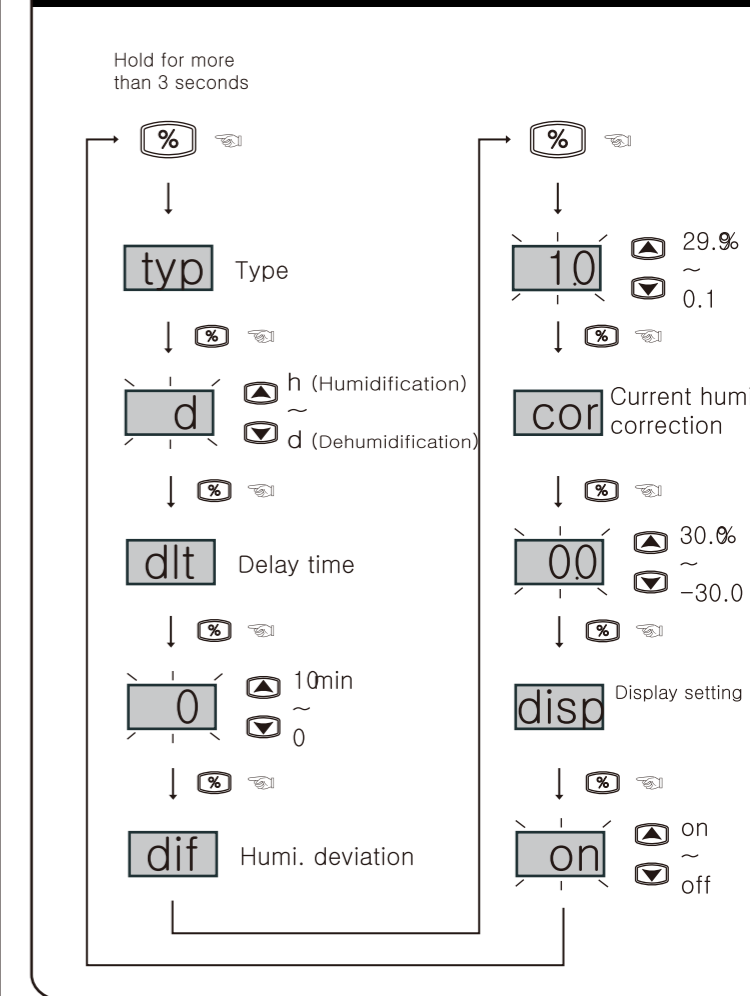
Temperature Program Settings



6 Sequence of Humi. setpoint change



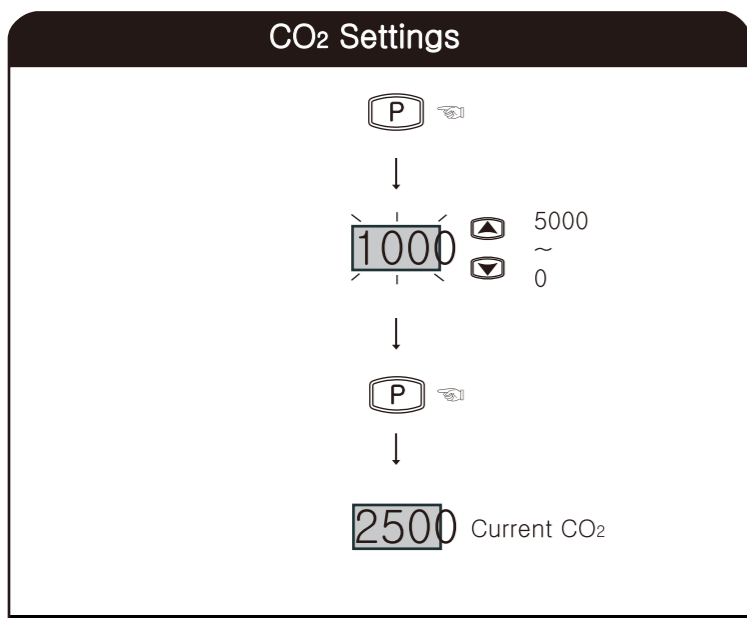
Humidity Program Settings



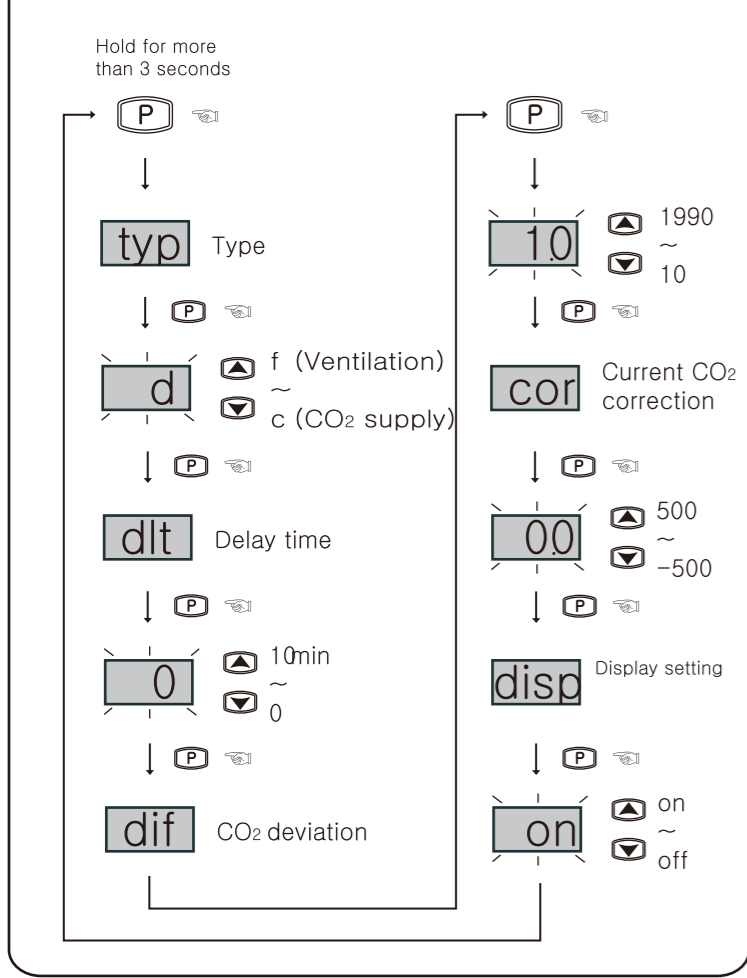
\* In the current temperature display mode press and hold the key for 3 seconds to change to the program setting mode.

\* All programs will return to the current temperature after display by pressing the key after changing the setpoint or it automatically returns to the current temperature after 1 minute.

## 7 CO2 Setpoint change sequence



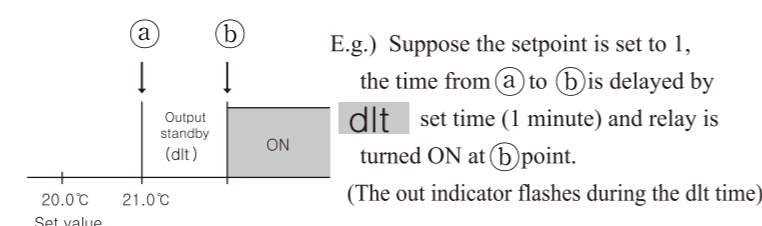
## CO2 Program Settings



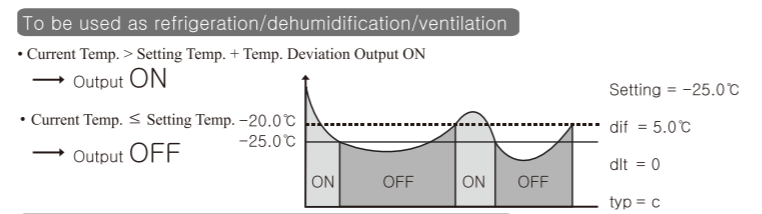
## 8 Detail description of the function

**typ** : Temp. : Cooling (C) and heating (H) selection function  
 Humi. : Dehumidification (d) and humidification (h) selection function  
 CO2 : Ventilation (f) and CO2 supply (c) selection function

**dlt** : Output operation delay time  
 - This function is used when a problem occurs due to frequent repetition of ON/OFF operation of the control object (refrigerator, compressor, etc.)  
 - A function to protect the machine in operation when power is re-applied or momentary power failure



**dif** : Temperature deviation settings  
 - A regular interval is required between ON and OFF in the ON/OFF control (set up ON/OFF width)  
 - Frequent ON and OFF will shorten the lifespan of the relay or the output contact or cause hunting (generation, chattering) by noise from outside. The temperature deviation function is used to setup temperature deviation to protect the equipment contact, etc.



**cor** : Current Temperature Correction  
 - The function calibrates temperature when error and reference temperature (e.g. mercury thermometer or the existing thermometer, or temperature controller) are different due to the sensor input from outside despite the product has no problem.

e.g.) Actual Temp. : 10.0°C  
 Display : 12.0°C  
 → **cor** : Modify 0.0°C → 2.0°C

**adr** : Communication number setting  
 - Set a number between 1-99 when using RS485 communication.

**bps** : Communication speed setting  
 - 1200 1200bps  
 - 2400 2400bps  
 - 4800 4800bps  
 - 9600 9600bps  
 - 192→ 19200bps

**disp** : Display settings  
 - When set to ON, the current sensor value (temperature, humidity, and CO2) is displayed.

※ CO2 Manual correction (MCDL)  
 1. Open the product case.  
 2. Expose the sensor to the outside air (about 400ppm).  
 3. Press ▲+▼ of the product for 3 seconds at the same time.  
 4. When MCDL displayed on the screen, manual calibration is applied and after 10 minutes of display the device returns to the current measurement value.  
 5. Repeat this process if there is a problem with the CO2 concentration value.  
 6. To stop during the process ▲+▼ for 3 seconds at the same time. However, CO2 concentration value may change.

## 9 Communication output

※ RS485 MODBUS RTU type protocol is embedded  
 ※ Asynchronous 2-wire half-duplex communication method  
 ※ Communication distance: within 1.2Km  
 ※ Communication speed : 1200 / 2400 / 4800 / 9600 / 18200BPS  
 ※ Start byte : 1byte, Stop byte : 1byte, parity byte : None, Data byte : 8byte

※ Modbus Mapping Table  
**<Func 0x02 : Read Discrete Inputs>** You can receive brief information of sensor status and decimal point in a byte form.

Request: 01 02 00 00 00 08 79 CC  
 Response: 01 02 01 C5 61 DB

Response bit mapping: bit7 bit6 bit5 bit4 bit3 bit2 bit1 bit0

MAP

NO	Address	Detail	Range	Unit	Factory setting
100001	0000	CO2 output	bit0 0:OFF, 1:ON		
100002	0001	Humi. output	bit1 0:OFF, 1:ON		
100003	0002	Temp. output	bit2 0:OFF, 1:ON		
100004	0003	CO2 sensor error	bit3 0:No error, 1:Sensor error		
100005	0004	Temp.&Humi. sensor error	bit4 0:No error, 1:Sensor error		
100006	0005	CO2 decimal point	bit5 0:None, 1:1Decimal point		
100007	0006	Humi. decimal point	bit6 0:None, 1:1Decimal point		
100008	0007	Temp. decimal point	bit7 0:None, 1:1Decimal point		

**<Func 0x04 : Read Input Registers>** You can receive simple information, such as sensor measurement value, status and decimal point, and output status.

Request: 01 04 00 00 00 08 79 CC  
 Response: 01 04 00 00 00 08 79 CC

MAP

NO	Address	Detail	Range	Unit	Factory setting
300001	0000	Current CO2	0 ~ 5000	ppm	
300002	0001	Current humi.	0.0 ~ 100.0	%	
300003	0002	Current temp.	-40.0 ~ 99.9	°C	
300004	0003	CO2 output	bit0 0:OFF, 1:ON		
300005	0004	Humi. output	bit1 0:OFF, 1:ON		
300006	0005	Temp. output	bit2 0:OFF, 1:ON		
300007	0006	CO2 sensor error	bit3 0:No error, 1:Sensor error		
300008	0007	Temp.&Humi. sensor error	bit4 0:No error, 1:Sensor error		
300009	0008	CO2 decimal point	bit5 0:None, 1:1Decimal point		
300010	0009	Humi. decimal point	bit6 0:None, 1:1Decimal point		
300011	000A	Temp. decimal point	bit7 0:None, 1:1Decimal point		
300012	000B	Model(500R)	'5' '0'		0x3530
300013	000C	Model(500R)	'0' 'R'		0x3052
300014	000D	Model(500R)	'0' 'R'		0x0000

**<Func 0x03 : Read Holding Registers>** The setpoint can be read.

Request: 01 03 00 00 00 08 79 CC  
 Response: 01 03 00 00 00 08 79 CC

**<Func 0x06 : Write Single Registers>** Setpoint can be changed for each item

Request: 01 06 00 00 00 08 79 CC  
 Response: 01 06 00 00 00 08 79 CC

**<Func 0x16 : Write Single Registers>** Several Setpoints can be changed at once. A multiple number of registers may not be written if there is an error in one of the data.

Request: 01 16 00 00 00 08 79 CC  
 Response: 01 16 00 00 00 08 79 CC

Response

Sub-product Address	Command	Write Address Upper Byte	Write Address Lower Byte	Data Upper Byte	Data Lower Byte	Data Lower Byte	CRC16 Upper Byte	CRC16 Lower Byte
1BYTE	0x06	1BYTE	1BYTE	1BYTE	1BYTE	1BYTE	1BYTE	1BYTE

Number of byte = Number of data \* 2

MAP Func 0x03, 0x06, 0x16

NO	Address	Name	Range	Unit	Factory setting
400001	0000	SET(Temp.)	-55.0 ~ 99.9	°C	10.0
400002	0001	TYP(Temp.)	0:C(Cooling), 1:H(Heating)		0:C(Cooling)
400003	0002	DLT(Temp.)	0 ~ 10	Minute	0
400004	0003	dIF(Temp.)	0.1 ~ 19.9	°C	1.0
400005	0004	COR(Temp.)	-10.0 ~ 10.0	°C	0
400006	0005	ADR	1 ~ 99	Address	1
400007	0006	ABR	0:1200, 1:2400, 2:4800, 3:9600, 4:18200	BPS	3:9600
400008	0007	DISP(Temp.)	0:No Indication, 1:Indication		1:Indication
400009	0008	SET(Humi.)	0.0 ~ 100.0	%	30.0
400010	0009	TYP(Humi.)	0:H(Humidification), 1:D(Dehumidification)		0:H(Humidification)
400011	000A	DLT(Humi.)	0 ~ 10	Minute	0
400012	000B	dIF(Humi.)	0.1 ~ 29.9	%	1.0
400013	000C	COR(Humi.)	-30.0 ~ 30.0	%	0
400014	000D	DISP(Humi.)	0:No Indication, 1:Indication		1:Indication
400015	000E	SET(CO2)	0 ~ 5000	PPM	1000
400016	000F	TYP(CO2)	0:C(CO2 supply), 1:F(Ventilation)		0:C(CO2 supply)
400017	0010	DLT(CO2)	0 ~ 10	Minute	0
400018	0011	dIF(CO2)	10 ~ 1990	PPM	10
400019	0012	COR(CO2)	-500 ~ 500	PPM	0
400020	0013	DISP(CO2)	0:No Indication, 1:Indication		1:Indication

**<Exception Response>** It returns error information when a command that is not supported by this product is sent or also when other errors occur.

Response: 01 04 00 00 00 08 79 CC

Error code: 0x01: Commands not supported, 0x02: Start address error, 0x03: Number of data error, 0x04: Unusual processing of requested commands

## 10 Rating/Performance

Item	Detail	Remarks
Input power	12VDC	
Output method	4Digit FND Display RS-485(Modbus-RTU) Relay 250VAC 5A(3ea)	
Temp. measurement range	-40.0 ~ 99.9°C	
Temp. measurement precision	±0.1°C	
Humi. measurement range	0.0 ~ 100.0%	
Humi. measurement precision	±0.1%	
CO2 measurement range	0 ~ 5000ppm	NDIR method
CO2 measurement precision	±3%	
Operating temp. range	-10.0 ~ 60.0°C	
Operating humi. range	0 ~ 95%	

## 11 Simple troubleshooting tips

If error is displayed while using the product :

- ER-1 Displayed when unusual data is recorded to the non-volatile memory in the product or if damaged due to severe external noises. Pressing the set key changes the setpoint to the factory set when ER-1 appears.
- 0-e Displayed when the sensor is faulty and cannot be connected.
- 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.

<Warranty Period> One year from the date of purchase>

※ The specification above is subject to change without prior notice in order to improve the product performance. Be sure to read and comply with the instructions shown in the handling precautions.

■ Address : 56, Ballyongsandan 1-ro, Jangan-eup, Gijang-gun, Busan, 46034, Rep. of KOREA

■ Customer support dep : 051-819-0425~7(For the repair of the product please send the product to the address above) Direct no. : 070-7815-8266

■ E-mail : conotec@conotec.co.kr URL : www.conotec.co.kr

※ Suitable for the following environment:  
 - Ambient temperature: 0 - 60  
 - Ambient humidity: 80%Rh or less  
 - Power rating: 100-240VAC 50/60Hz

■ Main products and development  
 -Digital temp./humi. controller  
 -Digital timer, current/voltage meter  
 -Development of other products