



- Temperature, Humidity, CO₂ monitor and control
- RS485(MODBUS-RTU)
- Simplified setting type

1 Cautions for Safety

Please read the cautions carefully before using the product and use it correctly.

※ The specifications, sizes and etc. described in this user manual are subject to change without advanced notice to improve the performance.

Warning

1. As this product is not manufactured as safety equipment, make sure to use this product after mounting double safety device when using it for the purpose of controlling a device having risk of personal injury, equipment damage or huge property loss.
2. Do not cut the wire or make check-up or maintenance when the power supply is connected.
3. Make sure to check the socket number before connecting the power.
4. Never disassemble process, improve or repair this equipment.

Cautions

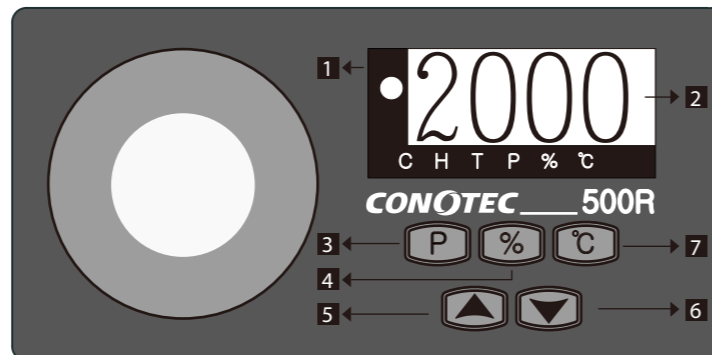
- Be well acquainted with way of operation, safety regulations and warnings and make sure to use the product in accordance with the defined specification and within the related capacity.
- Do not connect wiring or make installation with the motors or solenoids having big inductive load.
- In extending the sensor, use the same wire, and do not make it long unnecessarily.
- Do not use the parts to generate arc in opening and closing at the same or nearby power supply.
- Power cable should be kept away from high-voltage cable, and should not be installed in the place of much water, oil or dust.
- Do not install in the place exposed to direct sunlight or rain.
- Do not install in the place exposed to strong magnetism, noise, vibration and impact.
- Keep away from the place where strong alkali or strong acid material is directly discharged.
- Do not spray water directly for cleaning when installing in the kitchen.
- Do not install in the place where the temperature and humidity exceed rated range.
- Use the product not to cut the sensor line or to get flaw on it.
- Sensor line should be kept away from the signal line, power supply, driving power and load line, and independent piping should be used for it.
- This product may not be serviced when disassembled and modified as you like.
- The mark on the wiring diagram is the safety wording for warning or caution.
- Do not use near the devices which emit strong high frequency noise (High frequency welder, High frequency sewing machine, High frequency two-way radio, High capacity SCR controller).
- If the product is used by the way other than defined by the manufacturer, it may cause personal injury or property loss.
- As it is not a toy, keep out of the reach of the children.
- The installation should be done by an expert or a qualified person.
- Our company does not assume any responsibility for the damage and loss caused by non-complying with the above warnings and cautions or through the mistakes of the consumers.

Danger

- Cautions, Danger of electric shock
- Electric shock – Do not touch AC socket while the power is connected. You may get electric shock.
- Make sure to block the input power when you check the power input.

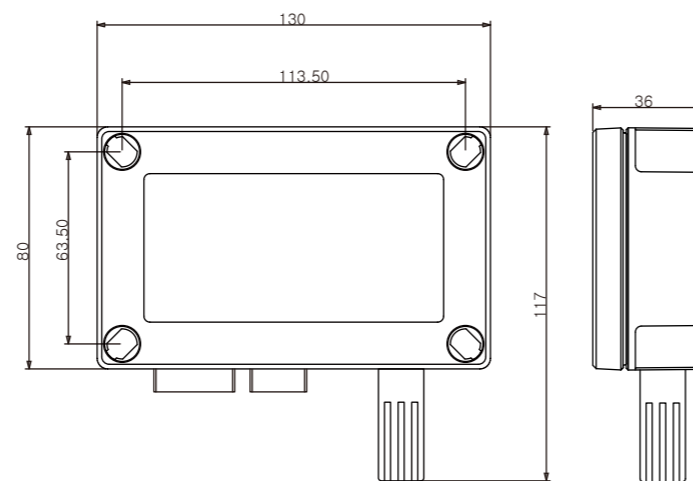
2 Name of each parts

Description of Product Exterior and Each Component



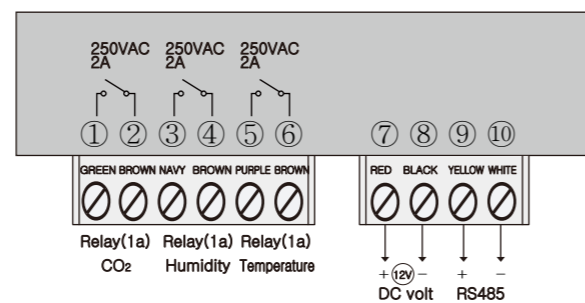
- 1 Current output and communication status, measured unit (○:Communication, C:CO₂, H:humidity, T:temperature, P:CO₂ unit, %:humidity unit, °C:temperature unit)
- 2 Present measured value display
- 3 CO₂ mode key
- 4 Humidity mode
- 5 Set value(UP) key
- 6 Set value(DOWN) key
- 7 Temperature mode key

3 Dimension

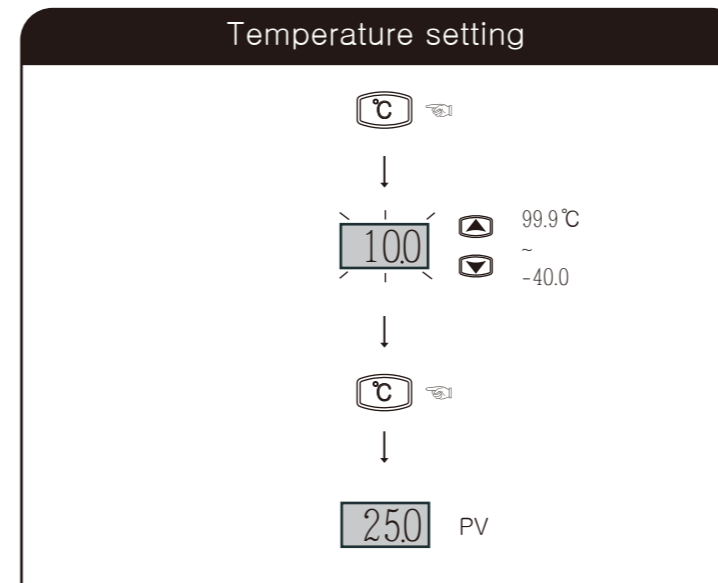


4 Terminal Wiring Diagram

Input terminal wiring

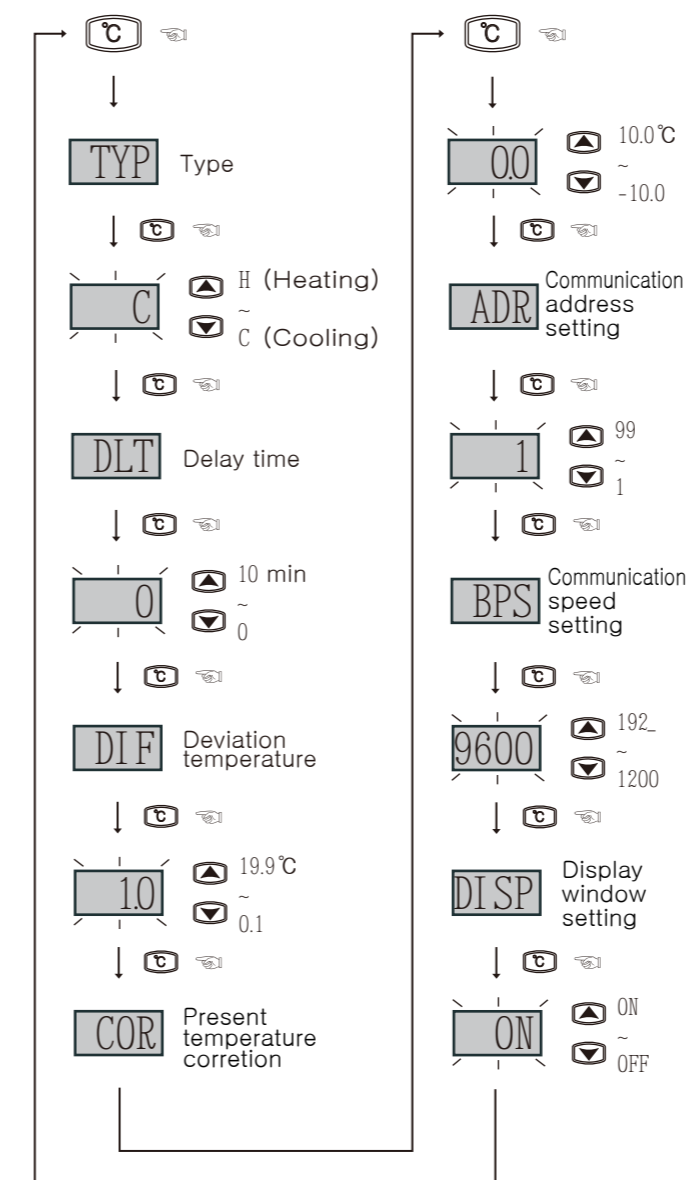


5 Temperature set value changing sequence

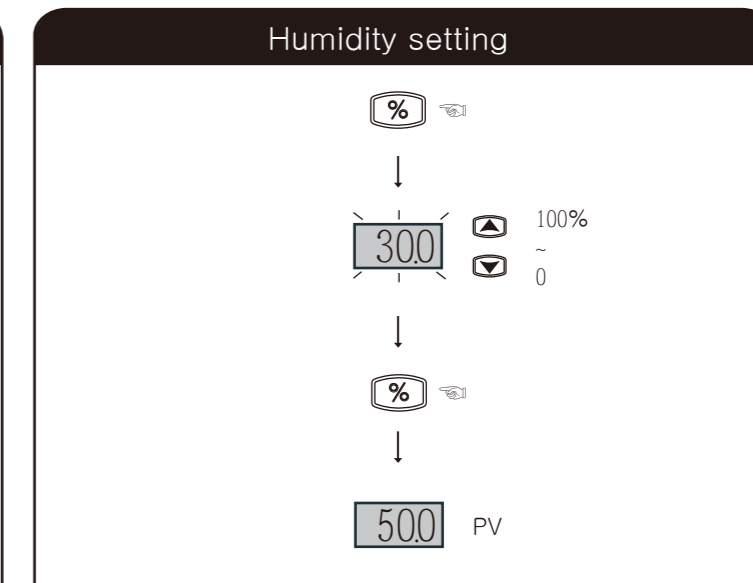


Temperature program setting

Press for more than 3 second

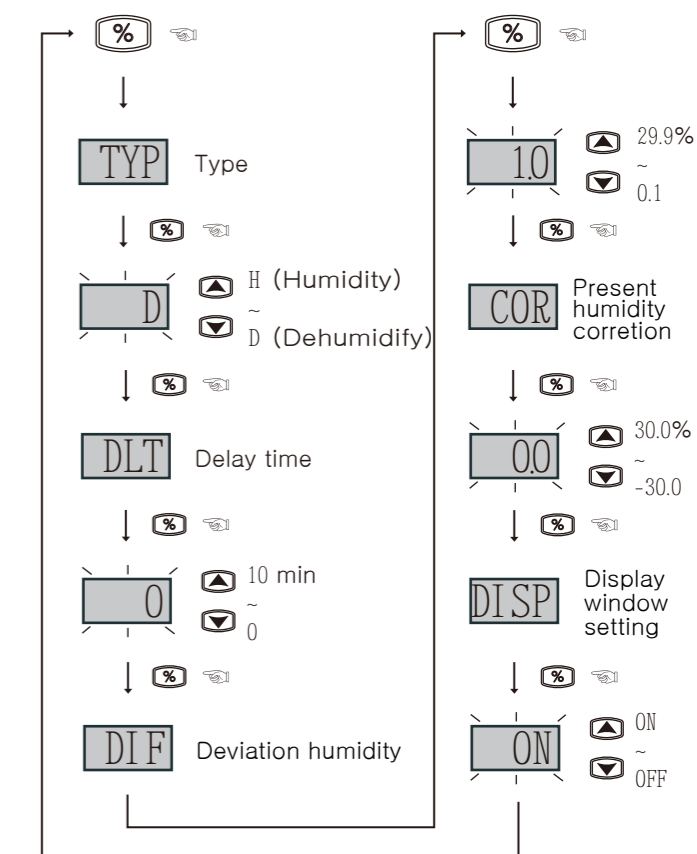


6 Humidity set value changing sequence



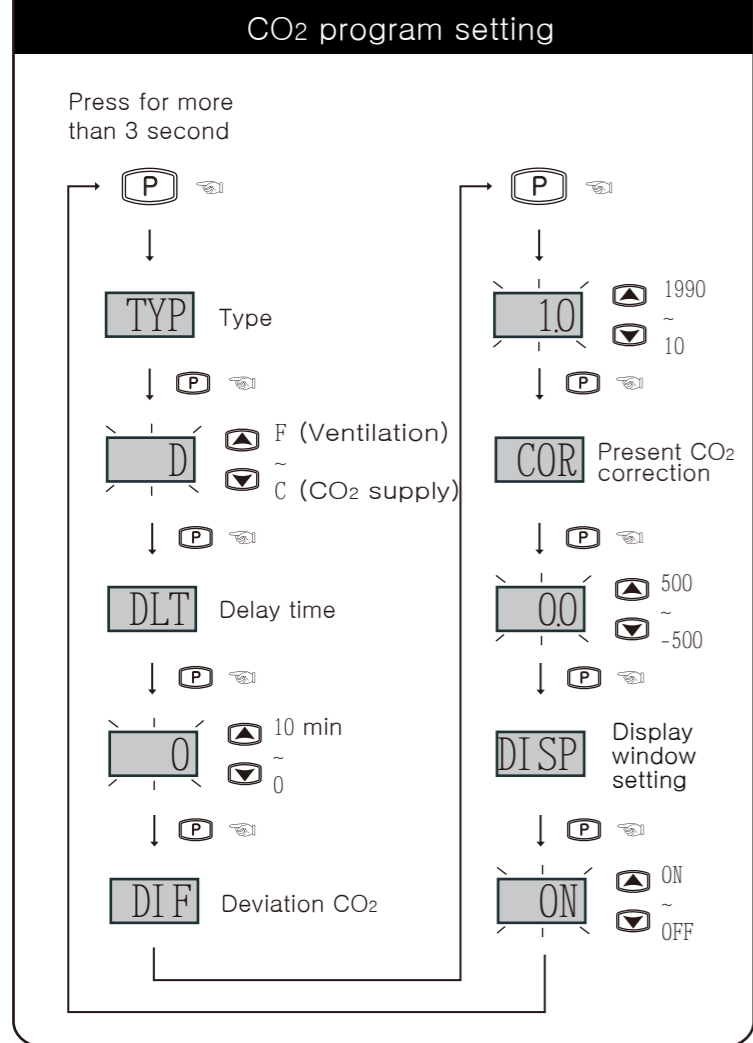
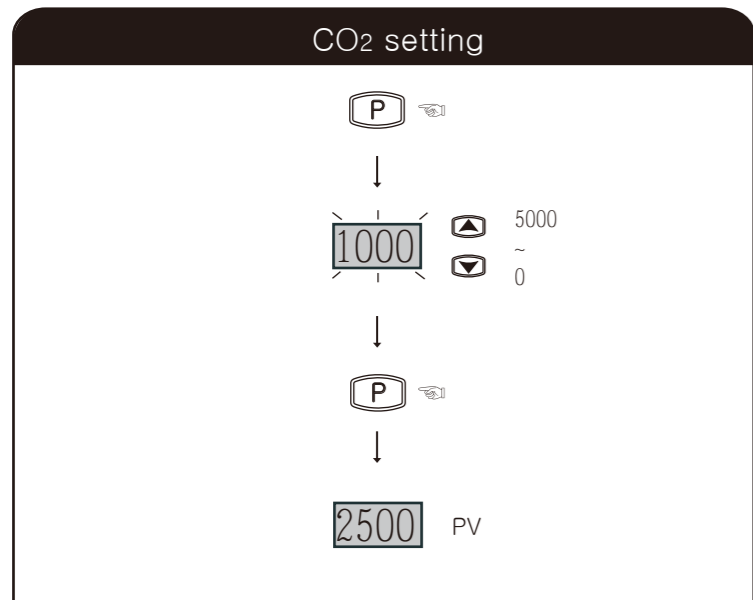
Humidity program setting

Press for more than 3 second



- ※ Pressing the key in the current temperature display state for 3 seconds continuously will change the program setting mode.
- ※ All programs will return to the current temperature after changing the set point, pressing the key once again, and displaying or automatically after 1 minute.

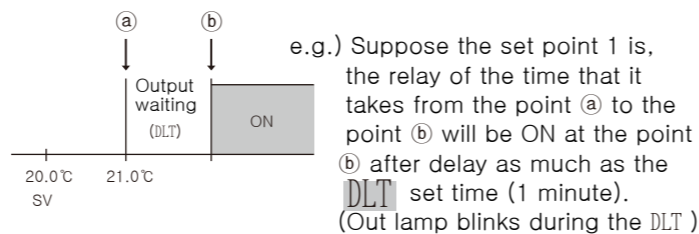
7 CO₂ set value changing sequence



8 Function Description

TYP : Temperature: Cooling (C) and Heating (H) selection function
Humidity: Dehumidification (D) and Humidity (H) selection function
CO₂: Ventilation (F) and CO₂ supply (C) selection function

DLT : Output Delay Time
- This function should be used when an object subject to control repeats On/Off actions and cause problems (chillers, compressors)
- A function to protect the working machine upon momentary power failure or power is reapplied.



DIF : Deviation temperature setting

- A regular interval is required between ON and OFF in the ON/OFF control (set up ON/OFF width)
 - Frequent ON and OFF will damage the relay or the output contact too fast or cause hunting (generation, chattering) due to external noise.
- Therefore, deviation temperature should be set up to protect contact of devices.

To use refrigeration / dehumidification / and ventilation

- PV > SV + DV
→ output ON
 - PV ≤ SV
→ output OFF
-
- Setting = -25.0°C
DIF = 5.0°C
DLT = 0
TYP = C

To use heating/humidity/ CO₂ supply

- PV < SV - deviation value
→ output ON
 - PV ≥ SV
→ output OFF
-
- Setting = 50.0°C
DIF = 5.0°C
DLT = 0
TYP = H

COR : Present teapeure correction

- While there is no product in the product, a function to calibrate when temperature is different error and reference standard that occur in the input sensor (e.g. Mercury thermometer or a thermometer currently use, a temperature controller)

ex) Actual value : 10.0°C
Display : 12.0°C
→ **COR** : Corrected to 0.0°C → 2.0°C
→ Displayed 10.0°C (Corrected PV)

ADR : Communication address setting

- When using the RS485 communication, specify a station number between 1~99.

BPS : Communication speed setting

- 1200 : 1200bps
- 2400 : 2400bps
- 4800 : 4800bps
- 9600 : 9600bps
- 192- : 19200bps

DISP : Display window setting

- Displays (temperature, humidity, and CO₂) the current sensor value when set to ON.

※ CO₂ manual correction (MCDL)

1. Open the product case.
2. The sensor should be fully exposed to external air (about 400ppm).
3. Press ▲ + ▼ for 3 seconds at the same time.
4. If MCDL is displayed on the screen, the display will be shown for about 10 minutes and return to the current measurement point as manual calibration is applied.
5. The process should be repeated if there is a problem in the CO₂ concentration value.
6. To stop in the middle of the process, press ▲ + ▼ for 3 seconds at the same time. However, CO₂ concentration value can be dislocated.

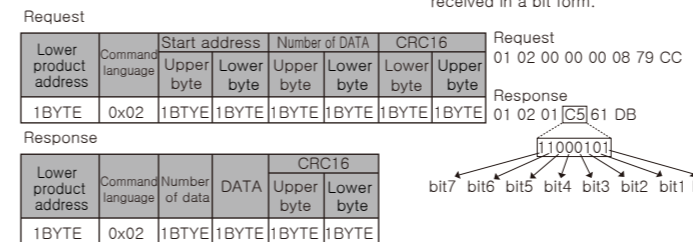
9 Communication Output

- ※ A protocol of the RS485 MODBUS RTU method is embedded.
- ※ Asynchronous two-wire half duplex communication method
- ※ Communication distance: Within 1.2Km
- ※ Communication speed: 1200 / 2400 / 4800 / 9600 / 18200BPS
- ※ Start bit: 1 bit, Stop bit: 1 bit, parity bit: None, Data bit: 8 Bits

※ Modbus Mapping Table

<Func 0x02 : Read Discrete Inputs>

Simple information, such as sensor status and decimal point can be received in a bit form.

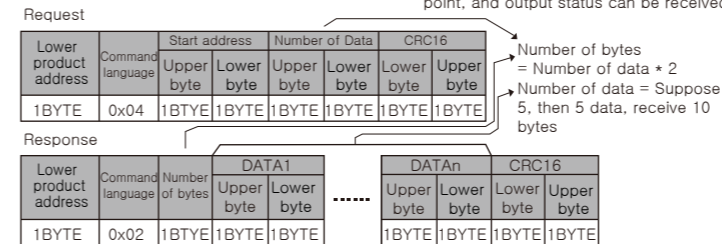


MAP

NO	Address	Description	Range	Unit	Factory value
100001	0000	CO ₂ output	bit0 0:OFF, 1:ON		
100002	0001	Humid. output	bit1 0:OFF, 1:ON		
100003	0002	Temp. output	bit2 0:OFF, 1:ON		
100004	0003	CO ₂ sensor error	bit3 0:No error, 1:Sensor error		
100005	0004	Temperature/humidity sensor error	bit4 0:No error, 1:Sensor error		
100006	0005	CO ₂ decimal point	bit5 0:None, 1:1 decimal point		
100007	0006	Humid. decimal point	bit6 0:None, 1:1 decimal point		
100008	0007	Temp. decimal point	bit7 0:None, 1:1 decimal point		

<Func 0x04 : Read Input Registers>

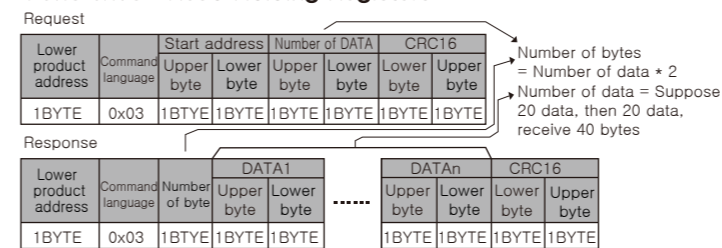
Simple information, such as sensor measurement value, status, decimal point, and output status can be received.



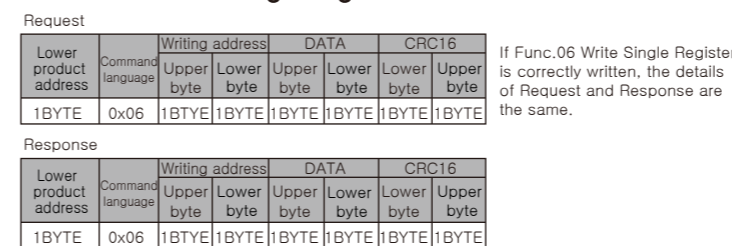
MAP

NO	Address	Description	Range	Unit	Factory value
300001	0000	Present CO ₂	0 ~ 5000	ppm	
300002	0001	Present humi.	0.0 ~ 100.0	%	
300003	0002	Present temp.	-40.0 ~ 99.9	°C	
300004	0003	CO ₂ output	bit0 0:OFF, 1:ON		
		Humid. output	bit1 0:OFF, 1:ON		
		Temp. output	bit2 0:OFF, 1:ON		
300005	0004	CO ₂ sensor error	bit0 0:No error, 1:Sensor error		
		T/H sensor error	bit1 0:No error, 1:Sensor error		
		CO ₂ decimal	bit2 0:None, 1:1 decimal p.		
		Humid. decimal	bit3 0:None, 1:1 decimal p.		
		Temp. decimal	bit4 0:None, 1:1 decimal p.		
300006	0005	Model (500R)	'5' '0'	0x3530	
300007	0006	Model (500R)	'0' 'R'	0x3052	
300008	0007	Model (500R)		0x0000	

<Func 0x03 : Read Holding Registers> Set value can be read.

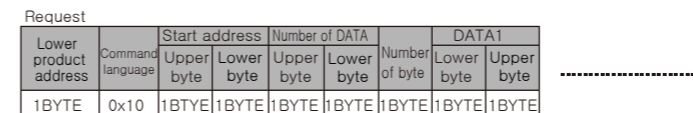


<Func 0x06 : Write Single Registers> Set point can be changed for each item.



<Func 0x16 : Write Single Registers>

Several items of set points can be changed all together. When writing several registers, there should not be data error in any of the register. Otherwise, all registers cannot be written.



DATA n		CRC16	
Upper byte	Lower byte	Upper byte	Lower byte
1 BYTE	1 BYTE	1 BYTE	1 BYTE

Response

Lower product address	Command language	Writing address	DATA	CRC16
Upper byte	Lower byte	Upper byte	Lower byte	Upper byte
1 BYTE	0x06	1 BYTE	1 BYTE	1 BYTE

Number of DATA = Number of bytes × 2

MAP Func 0x03, 0x06, 0x16

NO	Address	Display	Range	Unit	Factory value
400001	0000	SET (temperature)	-55.0 ~ 99.9	°C	10.0
400002	0001	TYP (temperature)	0:C(cooling), 1:H(heating)		0:C(cooling)
400003	0002	DLT (temperature)	0 ~ 10	minute	0
400004	0003	DIF (temperature)	0.1 ~ 19.9	°C	1.0
400005	0004	COR (temperature)	-10.0 ~ 10.0	°C	0
400006	0005	ADR	1 ~ 99	address	1
400007	0006	BPS	0:1200, 1:2400, 2:4800, 3:9600, 4:19200	BPS	3:9600
400008	0007	DISP (temperature)	0:no display, 1:display		1:display
400009	0008	SET (humidity)	0.0 ~ 100.0	%	30.0
400010	0009	TYP (humidity)	0:H (humidity), 1:D (Dehumidity)		0:H (Humidity)
400011	000A	DLT (humidity)	0 ~ 10	minute	0
400012	000B	DIF (humidity)	0.1 ~ 29.9	%	1.0
400013	000C	COR (humidity)	-30.0 ~ 30.0	%	0
400014	000D	DISP (humidity)	0:no display, 1:display		1:display
400015	000E	SET (CO ₂)	0 ~ 5000	PPM	1000
400016	000F	TYP (CO ₂)	0:C (CO ₂ supply), 1:F (FAN)		0:C (CO ₂ supply)
400017	0010	DLT (CO ₂)	0 ~ 10	minute	0
400018	0011	DIF (CO ₂)	10 ~ 1990	PPM	10
400019	0012	COR (CO ₂)	-500 ~ 500	PPM	0
400020	0013	DISP (CO ₂)	0:no display 1:display		1:display

<Exception Response> Returns error information if a command not supported by the product is sent or if there is an error.

Response

Lower product address	Command language	Error code	Data1	Error code
Upper byte	Lower byte	Upper byte	Lower byte	Upper byte
1 BYTE	Receiving command + 0x80	1 BYTE	1 BYTE	1 BYTE

Error code
0x01 : A command not supported
0x02 : Start address error
0x03 : Data number error
0x04 : Abnormal process of requested commands

10 Rating/Performance

Item	Details	Remarks
Input power source	12VDC	
Output method	4Digit FND Display RS-485(Modbus-RTU) Relay 250VAC 5A(3ea)	
Measurement	Temperature range	-40.0 ~ 99.9°C
	Temperature precision	±0.1°C
	Humidity range	0.0 ~ 100.0%
	Humidity precision	±0.1%
	CO ₂ measure range	0 ~ 5000ppm
	CO ₂ measure precision	±3%
Operating temperature range	-10.0 ~ 60.0°C	
Operating humidity range	0 ~ 95%	

11 Simple Fault Diagnosis method

In case ERROR is displayed during product operation

- ER-1 : Abnormal data is recorded in the non-volatile memory inside the product or the product is damaged due to severe noise from the outside. When the error displays, press the Set key to change the set point to the factory reset.
- 0-E : The sensor is not connected due to an error.
- The controller is provided with complementary measures against external noise; however, the internal device will be damaged if noise at 2KV enters the unit.
- Quality assurance period: One year from the date of purchase

※ The above product specifications are subject to change without advanced notice to improve the performance.

※ Please be well-acquainted with and keep the above-mentioned cautions. Regarding the English-language manual, please download it at our website.

- Address: Conotec Building, 26 Yunsan-ro (Bugok-dong), Bugok-dong, Geumjeong-gu, Busan
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 - Customer Service Phone: +82-51-819-0425-7
(For customer service please send the product our main office.)
Direct Phone: +82-70-7815-8266
E-mail : conotec@conotec.co.kr URL : www.conotec.co.kr
 - ※ The instrument is suitable for the following environment

<ul style="list-style-type: none"> ■ Main product and development - Digital temperature/humidity controller - Digital timer, Current/Voltage Meter - Development of other products
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- Ambient temperature : 0°C ~ 60°C
Ambient humidity : 80%Rh or below
Rated Power : 100~240VAC 50/60Hz