ISO 9001:2008

CONOTEC®

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

NF-9H24 Manual
Digital Control Panel Meter

1. Caution for safety

⚠ WARNING
This product should be used after installing the double safe device in case of using control purpose such as a device with great concern to personal injury and damage, significant peripheral damage, and property damage as it is not manufactured as safety device.
- Do not connect, check, repair when at the power supplying state.
- Make sure to check the socket number before connecting the power.
- Never disassemble process, improve or repair this equipment.

⚠ CAUTIONS
- Do not install outdoors.
- Must be used in rating / performance range.
- Do not use the parts that generate the arc at same power or near directly opening and closing.
- Power line should be kept away from high-voltage line and do not install in the watery, oily, and large dusty place.
- Do not install this device in a place exposed to direct sunlight, flammable or explosive gas, direct sunlight, radiant heat, vibration, shock place.
- Sensor line should be kept away signal, power, and load lines, and use an independent piping.
- Do not use near where devices generate strong high-frequency noise (high-frequency welders, high-frequency sewing machine, high frequency radios, large SCR controller).
- If you use this device beyond the method specified by the manufacturer, it may cause injury or property damage.
  Please use shielding wire at the sensor extension and do not make it unnecessarily long.

■ Caution, risk of electric shock.
- Electrical shock – Do not touch at the AC terminal during the application of an electric current.
- Must shut off the input power during the input power check.
- Although our controller is designed as the complementary measures regarding these noise from outside, if noise(2KV) disordering become an inflow, the inner-part will be damaged.
- In case *o-E* (open error) *S-E* (short error) *Err* (error) is displayed, the sensor has problem. Check the sensor.
- In case shown the character like r232 *Err* (communication error) it means the problem with the communication cable or cut off communication between the sensor unit and control unit.

2. Part names

- CH: channel display
- MAIN OUT
- HIGH OPEN
- LOW CLOSE
- ON
- OFF
- T/Set: time set key
- PV: measured humi. dispaly
- SV: set humi. display
- CL: time display
- ◀ ▲ ▶ ▼ : set value operate key
- %/Set : temp. set key

Key functions
1. %/Set : The key for setting humidity and program change
2. T/Set : The key for setting time and program change
3. ◀ ▶ ▲ ▼ : The key for changing temperature and time program set value

3. Code composition

| NF | — | 9 | H | 24 | |

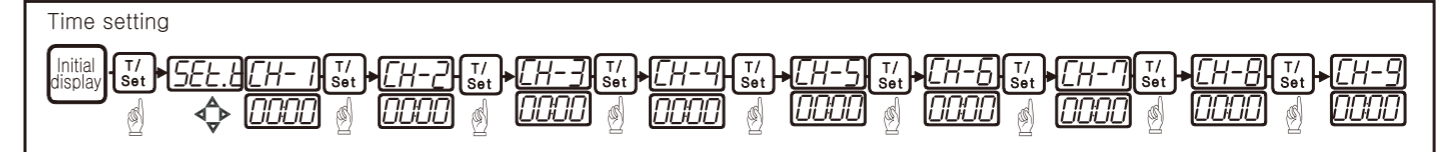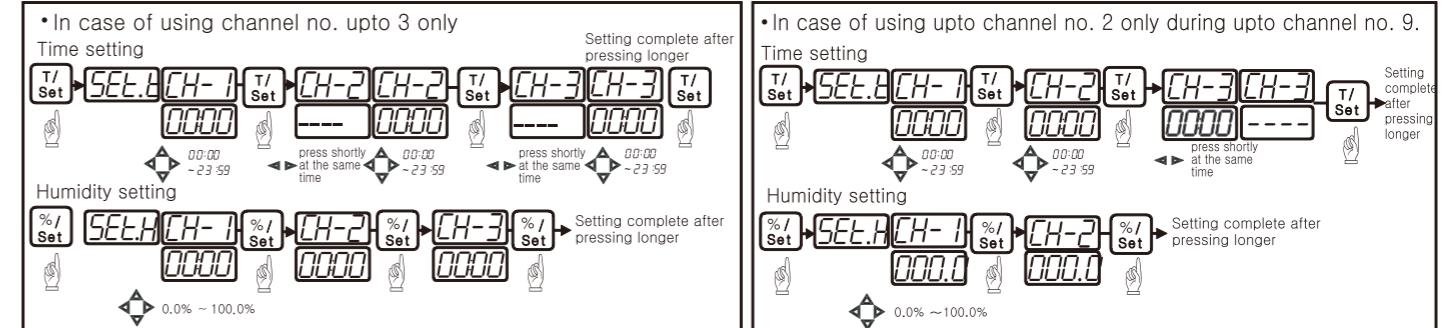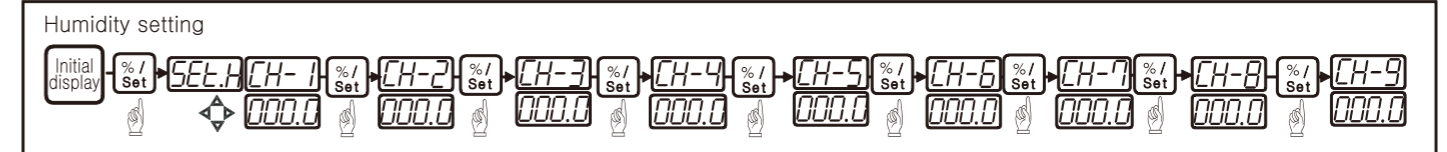| type	case		input		main output		aux.output kinds	
	1	Other	P	PT	R	Relay	1	alarm
	2	72*36	C	CA	S	SSR	2	defrost
NF (ON-OFF series)	4	48*48	N	NTC			3	communication
	5	96*48	A	4~20mA			4	alarm, defrost
	6	48*96	H	Humi. 10~95%	A	4~20mA	5	alarm,communi.
	7	72*72					6	defrost, communi.
	8	815					7	alarm,com,defrost
	9	96*96				24	24 hour 9 channel green house controller	

4. Rating/performances

Power supply	AC 100~240V , 50~60Hz
Change range of allowance voltage	90%~110% of power supply
Power consumption	Less than approx. 4VA
Method of display	7 Segment LED Display [Measured value (PV),set value (SV):red, channel(CH): green]
Display degree	F.S + 0.3% or 3℃ which side on the higher
Input specifications	Thermocouple : K(CA) < allow track resistance 100Ω> below
	Resistance temperature detector (RTD):DIN Pt100Ω
	NTC, 4~20mA Humidity: HCPV-220
Control type	ON/OFF control
Control output	Main output : relay SPDT max.250VAC, 2A(resistive load)
	Aux. output : SPST max.250VAC,2A(resistive load)
	Current output: 4~20mA DC , load resistance : less than 300Ω
Ambient temperature	0 ℃ to + 50 ℃(but, not in the state of freezing)
Ambient humdity	35% to 85% RH(non-condensing)
Reserved temperature	−20 ℃ to +65 ℃

5. Input range and set value when shipment

Sensor	Humidity
HCPV-220	10~95%

Mode	set point	oPt mode	set point	oPt mode	set point
tYPE	*dEH*	*ALn 1*		*oPCL*	
dLY.t	00:00	*1 H*	100.0	*oH.*	100.0
dI S	*P*	*1C*	0.0	*CH.*	- 100.0
dI F.F	1.0	*ALn2*		*oP-o*	09:59
Cor	0.0	*CH*	100.0	*oP-F*	09:59
oPt.	*ALn*	*CL*	- 100.0	*CL-o*	09:59
				CL-F	09:59

6. Program setting

%/SET Press for 5 seconds

ProG

tYPE type select

dLY.t delay time setting

dI S hysteresis (deviation)setting

dI FF hysteresis (deviation) humidity setting

Cor correct between dispaly value and an actual one

oPt. auxiliary output

SV set FND

dEH △ *HUn* ▽	dehumidity(dEH) humidity(HUM)
00.00 ◇	set range is 0 ~ 19.59 sec
P △ *Pn* ▽	one way hysteresis +(P) two ways ±(Pn) hysteresis
000.0 ◇	Set range 0.1 ~ 19.9%
000.0 ◇	Set range −30.0 ~ +30.0%

single alarm *ALn1* — humi. setting *1 H* 000.0 — humi. setting *1 L* 000.0

interlocked alarm *ALn2* — humi. setting *CH* 000.0 — humi. setting *CL* 000.0

open/shut time setting *oPCL* — *oH.* 000.0 — *CH.* 000.0

T/SET press for 5 seconds

tI nE time setting press for 5 sec

o-t. setting completed

SV set FND
0000 ◇ set range 0 ~23hr 59min

- To be set completely if press T/Set key for 5 sec. in the time setting.

- In the program for all operations, if not pressed the key for a while or press the key T/Set long, moves to the initialized display after display *PSEt*

oP-o ON time setting 00:00 ~ 09:59
oP-F OFF time setting 00:00 ~ 09:59
opened humi. setting
CL-o ON time setting 00:00 ~ 09:59
closed humi. setting
CL-F OFF time setting 00:00 ~ 09:59

7. Time setting per channel and temp. setting

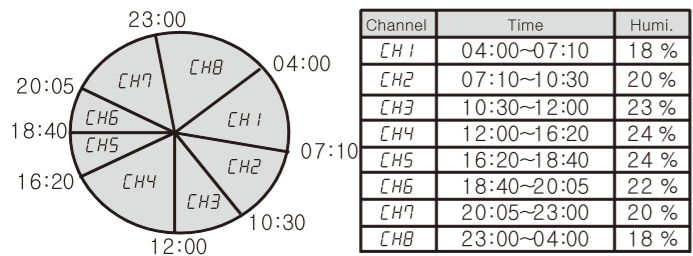※ Only temperature setting available at the relevant channel at first time setting per channel.

Time setting
Initial display → T/Set → *SEt.t* → CH-1 *0000* → T/Set → CH-2 → T/Set → CH-3 → T/Set → CH-4 → T/Set → CH-5 → T/Set → CH-6 → T/Set → CH-7 → T/Set → CH-8 → T/Set → CH-9

- Basic setup for time display is CH2~CH9 *----*
  When the relevant channel to set the time, at the time displayed *----* press the button ◀▶ at the same time shortly, will be turned to be set available status. *0000*
- If no pressing for a certain period after time setting or long pressing, move to the intial screen after saving set value. T/Set
- Time setting available range through whole channel is *0000 ~ 2359*.

- Time set value for channel no. 1 should be always closer to 00:00 than other channel.
- ex) In case of saving the channel no. 2 time set value is same with the channel no. 1 or less will be dispalyed. *bAd*
  Moving to the initial display at the right time set value and the set value can be saved.
- Time set value per channel is for time to start at the relevant channel.
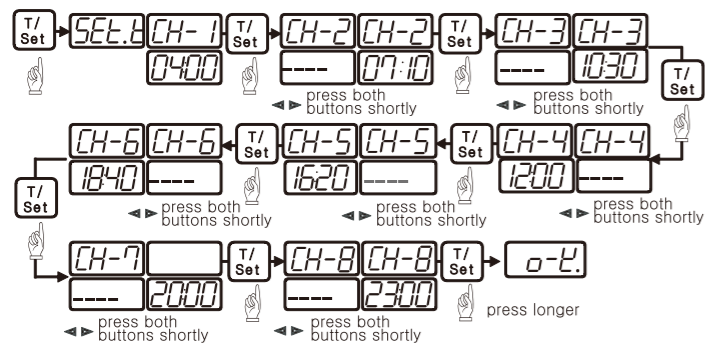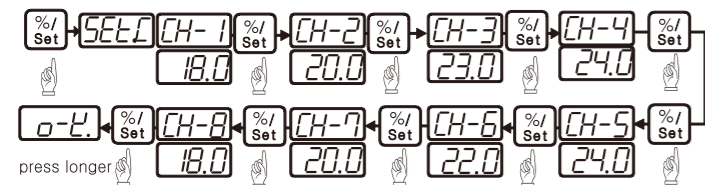- ex) channel no. 1 : 3:00 → apply time from 3:00 as a set value for channel no. 1 to next channel start time.

Humidity setting
Initial display → %/Set → *SEt.H* → CH-1 *000.0* → %/Set → CH-2 → %/Set → CH-3 → %/Set → CH-4 → %/Set → CH-5 → %/Set → CH-6 → %/Set → CH-7 → %/Set → CH-8 → %/Set → CH-9

- In case of using channel no. upto 3 only
Time setting
T/Set → *SEt.t* → CH-1 *0000* → T/Set → CH-2 CH-2 *----* *0000* → T/Set → CH-3 CH-3 *----* *0000* → Setting complete after pressing longer
00:00 ~23:59   press shortly at the same time

Humidity setting
%/Set → *SEt.H* → CH-1 *0000* → %/Set → CH-2 → %/Set → CH-3 → Setting complete after pressing longer
0.0% ~ 100.0%

- In case of using upto channel no. 2 only during upto channel no. 9.
Time setting
T/Set → *SEt.t* → CH-1 *0000* → T/Set → CH-2 → T/Set → CH-3 CH-3 *----* → T/Set → Setting complete after pressing longer
00:00 ~23:59   press shortly at the same time

Humidity setting
%/Set → *SEt.H* → CH-1 *000.0* → %/Set → CH-2 *000.0* → %/Set → Setting complete after pressing longer
0.0% ~100.0%

8. Program example

• Channel setting example per time

Channel	Time	Humi.
CH 1	04:00~07:10	18 %
CH2	07:10~10:30	20 %
CH3	10:30~12:00	23 %
CH4	12:00~16:20	24 %
CH5	16:20~18:40	24 %
CH6	18:40~20:05	22 %
CH7	20:05~23:00	20 %
CH8	23:00~04:00	18 %

time setting

humidity setting

9. Alarm & OPEN/CLOSE

◎ Alarm output
 – Alarm functions are single alarm `ALn1`, interlocked alarm `ALn2`
Single alarm – high limit alarm : If the current humi. is higher value than `1H` ON
 – Single low limit alarm : If current humi. is lower than `1L` ON
Interlocked alarm – Interlocked high limit alarm
 : If the current humi. is higher than set value + `CH` ON
 – Interlocked low limit alarm
 : If the current humi. is lower than set value + `CL` ON
 – OPEN / CLOSE `oP.CL`
 OPEN – :If the current humi. is higher than set value + `oH.` ON
 `oH.` set to humidity open
 `oP-o` set to open output ON time
 `oP-F` set to open output OFF time
 CLOSE – :If the current humi. is lower than set value + `CH.` ON
 `CH.` set to humidity close
 `CL-o` set to close output ON time
 `CL-F` set to close output OFF time
OPEN / CLOSE operation use example
 – Green house is set to be controlled humidity by openning and closing the door.
• If you wan to make it slow openning and fast closing, open it at 30%, close at 15% but set value should be 20%?
 Set `oH.` at 10% and `CH.` at−5%
Due to make opening slowly, should set short ON time, long OFF time.
 ex) `oP-o` = 1min `oP-F` = 3 min
 action : for 1 min. to move and 3 min. to stop repeatedly.
Due to make closing fast, should set long ON time, short OFF time.
 ex) `CL-o` = 3 min `CL-F` = 1 min
 action : for 3 min. to move and 1 min. to stop repeatedly.

10. Detailed explanation

1. `tYPE` : Humidity operation setting
 Dehumidity(dEH) or humidity(HUM) selection

2. `dIS` : Hysteresis Applying method selection
 `P` Apply deviation value to + direction only (OFF at set point)
ex)set :10.0%, type:COL, dIF:5.0   ex)set :15.0℃, type:HIT, dIF:5.0

 `Pn` Apply deviation value to +− both directions(Set point is based)

3. `dIFF` : Setting for humidity deviation
 – In the ON/OFF control, it need 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 humidity deviation in order to protect its relay or contact and so on.

Cooling | Heating
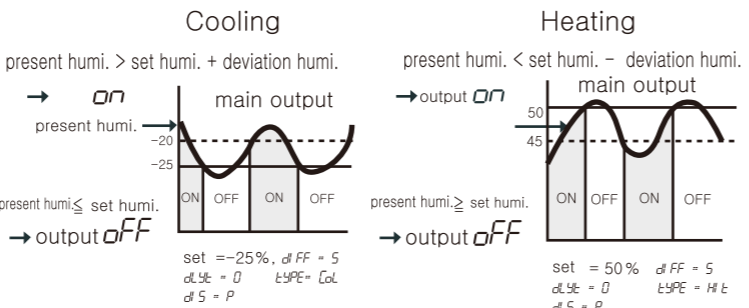
4. `dLY.t` : Output delay time
 –When control object has a problem due to frequent ON/OFF action(refrigerator compressor etc.,)
 –It protects operating machine at momentary power failure or re−supply of power.

 ex) If the set value is 1 : from Ⓐ until Ⓑ time→the relay is ON in the Ⓑ point after as delay as the `dLY.t` setting time(1min.)
 (For delay time OUT lamp flashing)

5. `Cor` : Correction of the present humi.
 – If it's generated by External Signal Input Sensor error and reference humidity while there is no problem in the product.
 Ex) Function to correct the different value from the existing hygrometer's in using.
 Ex) Actual humidity : 10.0%
 Display window : 12.0%
 `Cor` : 0.0 → −2.0 correction
 → Display : Displayed as 10.0% (corrected present humidity)

6. `Adr` : Communication address setting
 – Code number 1~99 should be designated when RS485 is used.

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

11. Communication output

■ Interface

Specification	in conformity EIA RS485
Max. speed	32 units (but, address setting can be upto 01~99)
Method of communication	two wire half-duplex operation
Syncronous system	asyncronous system
Communication distance	1.2 Km
Communication speed	1200/2400/4800/9600/19200bps(selectable)
StartBit	fixed 1bit
StopBit	fixed 1bit
ParityBit	none
DataBit	fixed 8bit
Protocol	BCC

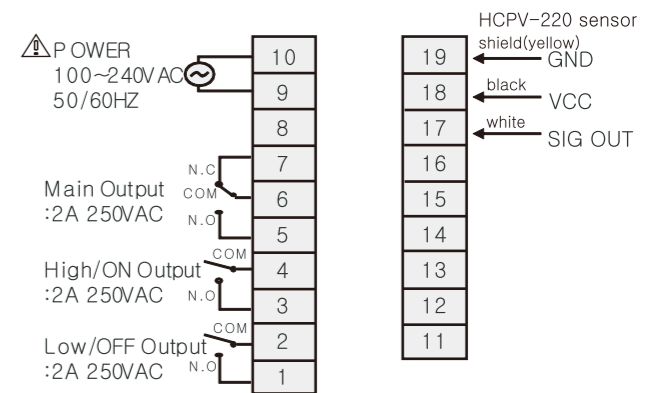■ System
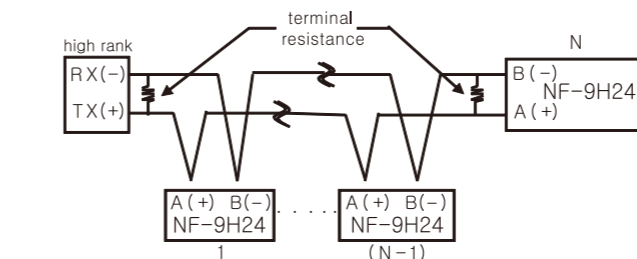
■ Definition between communication command and block
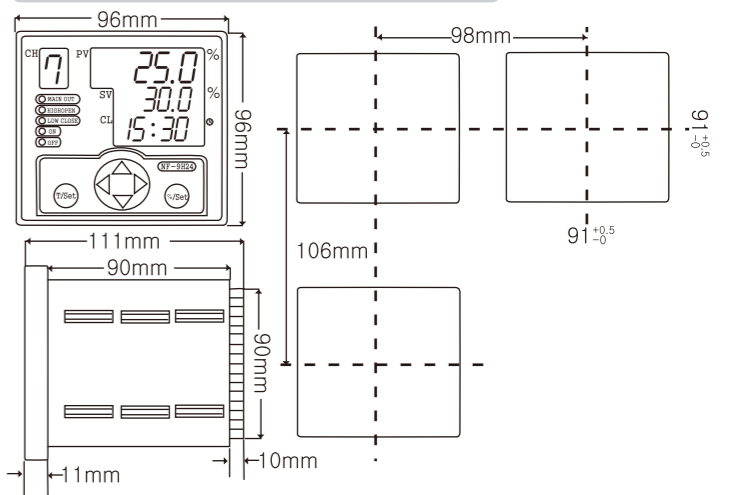< Command format >

< Response format >
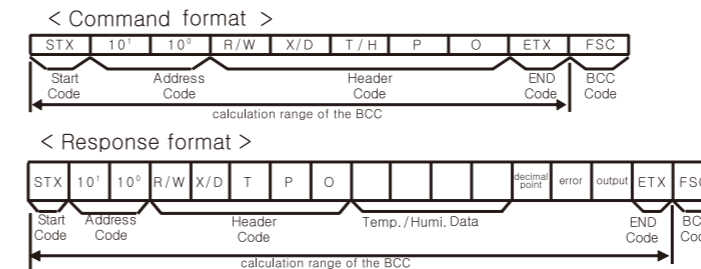
① Start Code
 – show the lead(head) of the block
 STX → [02H]
② ADDRESS CODE
 – A high rank system can discriminate the channel code number among NF-9H24
 It is available to set between 01 and 99(BCD ASCII) (ex–in case of the channel is 01, will be 30H,31H)
③ Header Code
 – Show the command name as an 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]
 TPO(humidity measuring value) → W[54H], 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[31H] interrupted of the sensor's cable
 2[32H] short−circuited error of the sensor
⑦ Output → [31H] 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 : in case of not 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 3−times until recovering nomally.
 ④ Change the communication speed in case of bring about the communication's error frequently.

12. Terminal Wiring Diagram

⚠P OWER
100~240VAC
50/60HZ

HCPV−220 sensor
shield(yellow) GND
black VCC
white SIG OUT

Main Output : 2A 250VAC
High/ON Output : 2A 250VAC
Low/OFF Output : 2A 250VAC

13. Dimension & Panel size(Unit:mm)

14. Product Handling Precautions

■ Indicating ERROR on using items.

• `Er1` : humidity setting value error
 `Er2` : channel time setting value error
 `Er3` : program setting value error
 `Er.t` : internal timer error
 `Er.S` : internal sensor data error

• When `o-E` (Open Error) or `S-E` (Short Error) is displayed, it indicates that sensor has problem. Please check the sensor.

■ Regarding the English-language manual, please download it at our website.