CONOTEC®
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ISO 9001:2008

NF-9N24 & NF-9P24 Manual
Digital Control Panel Meter

2. Names of Parts

CH : channel display
MAIN OUT
HIGH OPEN
LOW CLOSE
ON
OFF
T/Set : time set key

PV: measured temp. dispaly
SV: set temp. display
CL: time display
◀ ▲ ▶ ▼ : set value operate key
℃/Set : temp. set key
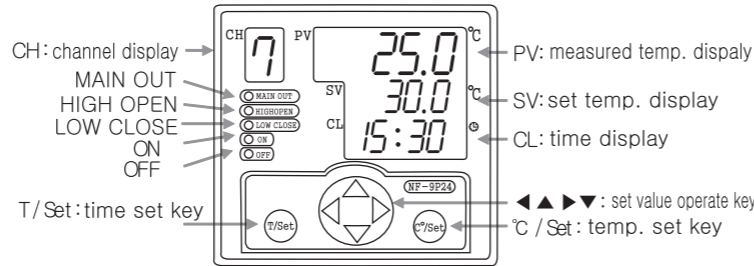
Key functions

1. [℃/Set] : The key for setting tempeature 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 | N | 24 | |

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

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 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.

4. Rating/performances

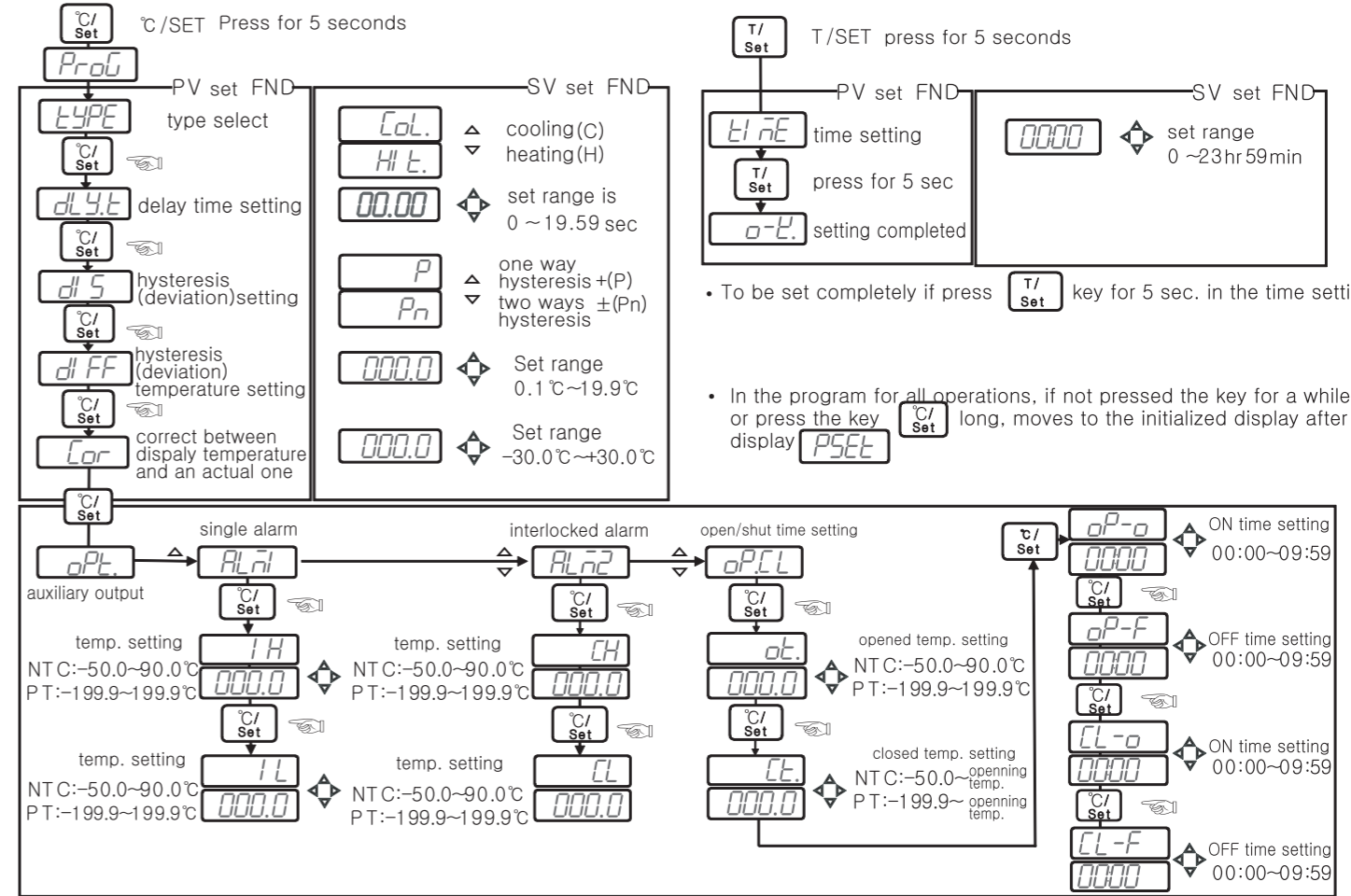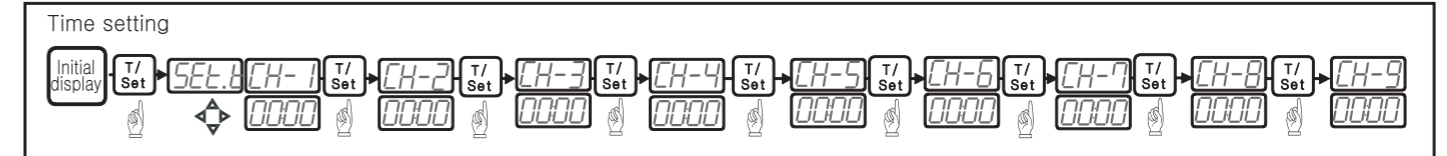| Power supply	AC 100~240V , 50~60Hz
Change range of allowance voltage	90%~110% of power supply
Power consumption	Less than approx. 4VA
Method of display	7 Segment LED Display [Measured value (PV),set value (SV):red, channel(CH): green]
Display degree	F.S + 0.3% or 3℃ which side on the higher
Input specifications	Thermocouple : K(CA) < allow track resistance 100Ω> below
	Resistance temperature detector (RTD):DIN Pt100Ω
	NTC, 4~20mA
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

PT100Ω	−199.9 ℃ ~+199.9 ℃
NTC	−50 ℃ ~+90.0 ℃
CA(K)	−50 ℃ ~+1200 ℃

Mode	set point	OPT mode	set point	OPT mode	set point
tYPE	COL	ALn1		oPCL	
dLY.t	00:00	1H	+90.0	ot.	+90.0
di S	P	1L	−50.0	Ct.	−50.0
di F.F	1.0	ALn2		oP-o	09:59
Cor	0.0	LH	+90.0	oP-F	09:59
oPt.	ALn1	CL	−50.0	CL-o	09:59
				CL-F	09:59

※ 9N24 (NTC sensor)

6. Program setting

[℃/Set] ℃/SET Press for 5 seconds

ProG
tYPE type select
dLY.t delay time setting
di S hysteresis (deviation) setting
di FF hysteresis (deviation) temperature setting
Cor correct between dispaly temperature and an actual one

PV set FND
CoL. cooling(C) / HI t. heating(H)
00.00 set range is 0 ~19.59 sec
P one way hysteresis +(P) / Pn two ways ±(Pn) hysteresis
000.0 Set range 0.1℃~19.9℃
000.0 Set range −30.0℃~+30.0℃

oPt. auxiliary output
single alarm ALn1
  temp. setting 1H NTC:−50.0~90.0℃ PT:−199.9~199.9℃
  temp. setting 1L NTC:−50.0~90.0℃ PT:−199.9~199.9℃
interlocked alarm ALn2
  temp. setting CH NTC:−50.0~90.0℃ PT:−199.9~199.9℃
  temp. setting CL NTC:−50.0~90.0℃ PT:−199.9~199.9℃
open/shut time setting oPCL
  opened temp. setting ot. NTC:−50.0~90.0℃ PT:−199.9~199.9℃
  closed temp. setting Ct. NTC:−50.0~90.0℃ PT:−199.9~199.9℃

oP-o ON time setting 00:00~09:59
oP-F OFF time setting 00:00~09:59
CL-o ON time setting 00:00~09:59
CL-F OFF time setting 00:00~09:59

[T/Set] T/SET press for 5 seconds

PV set FND
tl nE time setting press for 5 sec
o-U. setting completed

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

• 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 [℃/Set] long, moves to the initialized display after display PSEt

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 → [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.

Temperature setting

Initial display → [℃/Set] → SEt → CH-1 → CH-2 → CH-3 → CH-4 → CH-5 → CH-6 → CH-7 → CH-8 → CH-9
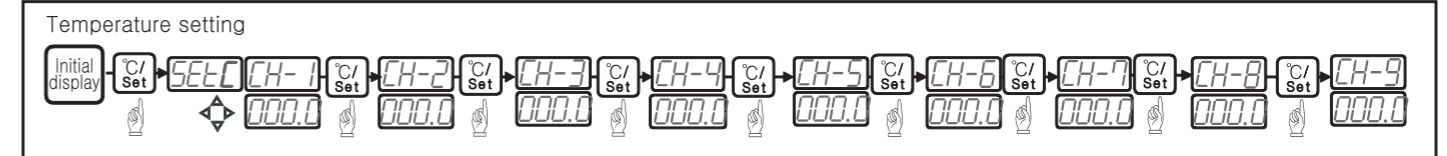
• In case of using channel no. upto 3 only
Time setting
Temperature setting

• In case of using upto channel no. 2 only during upto channel no. 9.
Time setting
Temperature setting

9N24:−50.0~90.0℃
9P24:−199.9~199.9℃

8. Program example

• Channel setting example per time

Channel	Time	Temp.
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

temperature setting

9. Alarm & OPEN/CLOSE

◎ Alarm output

– Alarm functions are single alarm `ALn1` , interlocked alarm `ALn2`

Single alarm – high limit alarm : If the current temp. is higher value than `1H` ON

– Single low limit alarm : If current temp. is lower than `1L` ON

Interlocked alarm – Interlocked high limit alarm

: If the current temp. is higher than set value + `CH` ON

– Interlocked low limit alarm

: If the current temp. is lower than set value + `CL` ON

– OPEN / CLOSE `oP.CL`

OPEN – :If the current temp. is higher than set value + `ot.` ON

`ot.` set to temperature open

`oP-o` set to open output ON time

`oP-F` set to open output OFF time

CLOSE – : if present temperature is lower than set value + `Ct.` ON

`Ct.` set to temperature 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 temperature 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 `ot.` at 10℃ and `Ct.` at –5℃.

Due to make openning 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` = 1min

action : for 3 min. to move and 1 min. to stop repeatedly.

10. Detailed explanation

1. `tYPE` : Temperature operation setting
Cooling or Heating 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

15.0 ℃ ── output (on)   15.0 ℃ ── set point (off)
10.0 ℃ ── set point (off)   10.0 ℃ ── output (on)

<Cooling>   < Heating>

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

3. `dIFF` : Setting for temperature 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 temperature deviation in order to protect its relay or contact and so on

Cooling
present temp. > set temp. + deviation temp.
→ `on`
present temp. ── main output
present temp ≤ set temp.
→ output `oFF`

set = –25℃, dIFF = 5
dLYt = 0   tYPE= CoL
dIS = P

Heating
present temp. < set temp. – deviation temp.
→ output `on`
── main output
present temp ≥ set temp.
→ output `oFF`

set = 50°C   dIFF = 5
dLYt = 0   tYPE = HIt
dIS = P

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)

output waiting (dLYT)
20.0°C 21.0°C
set value

5. `tor` : Correction of the present temp.
– It is the function to correct errors in the sensor put in from the outside even if there is no problem in the product, and when the base temperature (Ex: mercury thermometer, or existing temperature, temperature controller) is different with the temperature.

Ex) Actual temperature : 10.0℃
Display window : 12.0℃

`tor` : 0.0 → –2.0 correction

→ Display : Displayed as 10.0℃ (corrected present temperature)

11. Terminal Wiring Diagram

⚠ POWER
100~240VAC
50/60HZ

Main Output
:2A 250VAC

High/ON Output
:2A 250VAC

Low/OFF Output
:2A 250VAC

10	19
9	18
8	17
7	16
6	15
5	14
4	13
3	12
2	11
1	

NTC sensor
Pt100Ω sensor

12. Dimension & Panel size(Unit:mm)

96mm
96mm
111mm
90mm
90mm
11mm
10mm
98mm
91⁺⁰·⁵
106mm
91⁺⁰·⁵

13. Product Handling Precautions

■ Indicating ERROR on using items.

• `Er1` : temperature 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-t` (Open Error) or `S-t` (Short Error) is displayed, it indicates that sensor has problem. Please check the sensor.

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

Memo